

# Connector Framework Server

Software Version 12.1

## Administration Guide



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# Chapter 1: Introduction

This section provides an overview of Connector Framework Server.

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## Connector Framework Server

Connector Framework Server (CFS) processes the information that is retrieved by connectors, and then indexes the information into one or more indexes, such as IDOL Server or Haven OnDemand.

Connectors send information to CFS in the form of documents. A *document* is a collection of metadata and, usually, an associated source file. The metadata describes the location of the file or record that was retrieved, and other information that was extracted by the connector. For example, a document sent for ingestion by a Web Connector includes the URL of the page and the links that were extracted from the page when it was crawled. The Web Connector provides the downloaded HTML in an associated file so that it can be processed by CFS.

Sometimes a document does not have an associated source file. For example, if you retrieve information from a database using the ODBC Connector, the documents sent for ingestion contain the information extracted by your chosen query, and might not have an associated file. These documents are referred to as having *metadata only*.

CFS uses KeyView to extract information from the source file. Some source files are container files, such as zip archives, and these are extracted. CFS then uses KeyView to obtain text and file-specific metadata from the file, and adds it to the document. The original source file is discarded before the document is indexed. This allows IDOL to search and categorize documents, and perform other operations, without needing to process the information from a repository in its native format.

CFS provides features to manipulate and enrich documents. For example, you can send media files to an IDOL Media Server and perform tasks such as optical character recognition and face recognition. This adds additional information to the IDOL document, so that when a user queries IDOL the results include relevant images, audio, and video files. CFS also supports the Lua scripting language so that you can write your own tasks and develop custom processing rules.

A single CFS can process information from any number of connectors. For example, a CFS might process files retrieved by a File System Connector, web pages retrieved by a Web Connector, and e-mail messages retrieved by an Exchange Connector. Alternatively, you or an application can send information to CFS directly.

## Filter Documents and Extract Subfiles

CFS uses KeyView to extract meaningful information from the files retrieved by a connector. KeyView can extract the file content, metadata, and subfiles from over 1,000 different file types.

- *File content* is the main content of a file, for example the body of an e-mail message.
- *Metadata* is information about a file itself, for example the sender of an e-mail message or the date and time when it was received.
- *Subfiles* are files that are contained within the main file. For example, an e-mail message might contain embedded images or attachments that you want to index.

## Manipulate and Enrich Documents

CFS provides features to manipulate and enrich documents. *Enriching* a document means adding additional information, or improving the quality and usefulness of the information, before the document is indexed into IDOL. For example, you can:

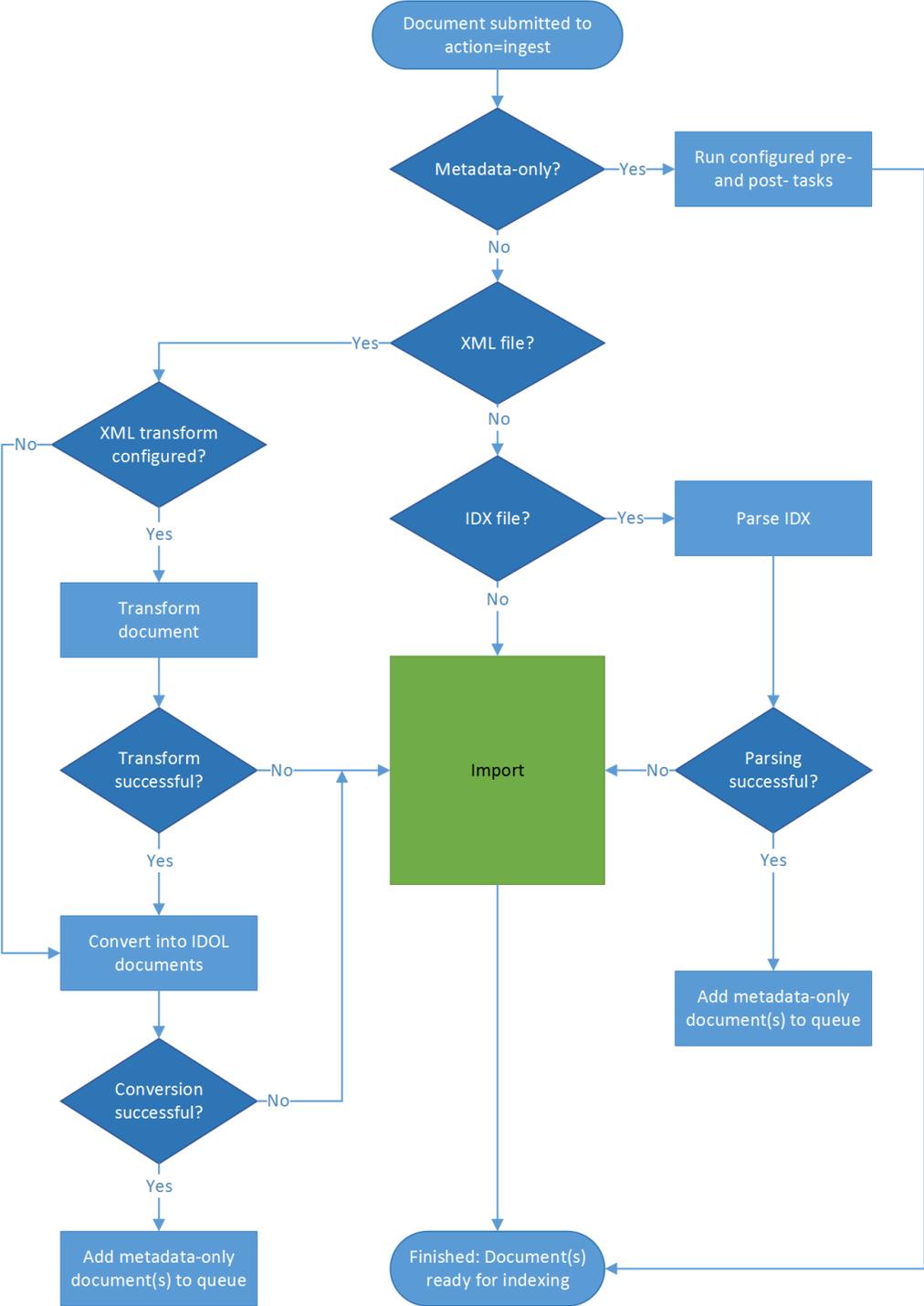
- Add additional fields to a document.
- Extract content from HTML pages, discarding irrelevant content such as headers, sidebars, advertisements, and scripts.
- Split long documents into multiple sections. This can improve performance when you query IDOL, because IDOL can return a specific part of a document in response to a query.
- Standardize field names, so that documents that originated from different repositories use the same fields to store the same type of information.
- Perform *Eduction* on document fields. Eduction extracts *entities* from a document, and writes them to specific document fields. An entity can be a word, phrase, or block of information - for example an address or telephone number.
- Perform analysis on image and video files and add the results to the document. Examples of media analysis include optical character recognition (OCR), face detection and recognition, and object recognition. To analyze media you must have an IDOL Media Server.
- Extract speech from audio and video files, and add the transcription to the document content. To analyze speech you must have an IDOL Speech Server.
- Reject documents that do not contain content in a specific language.

The simplest way to manipulate documents is to use the *import tasks* that are included with CFS. For information about the tasks that are available, see [Manipulate and Enrich Documents, on page 50](#). You can configure these tasks by modifying configuration parameters in the CFS configuration file.

CFS also supports Lua, an embedded scripting language. You can write Lua scripts to manipulate documents and define custom processing rules. For information about the Lua functions that are provided with CFS, refer to the *Connector Framework Server Reference*.

# The Ingestion Process

The following chart provides a summary of the ingestion process.



Documents are submitted to Connector Framework Server through the `ingest` action. If the document has metadata only, CFS runs any processing tasks that have been configured and the document is then ready for indexing. If the document has an associated file then the ingestion process depends on the file format.

- **All files apart from IDOL IDX and XML.** Most documents that have an associated file are added to the import queue so that the information in the file can be extracted by KeyView or other processing tasks. For information about the import process, see [The Import Process, on the next page](#).
- **IDOL IDX files.** An IDX file contains one or more documents in IDOL IDX format, so CFS attempts to parse the file. If parsing is successful then the IDOL documents are returned to the ingest queue as metadata-only documents. If parsing is not successful then CFS adds the document to the import queue so that the IDX file is processed by KeyView. Parsing an IDX file is preferable to processing it with KeyView, because although KeyView can extract the text, it cannot extract the structure information that divides the text into separate documents, content sections, and metadata fields.
- **XML files.** Many systems export information in XML format and CFS has features to help you convert XML into IDOL documents.

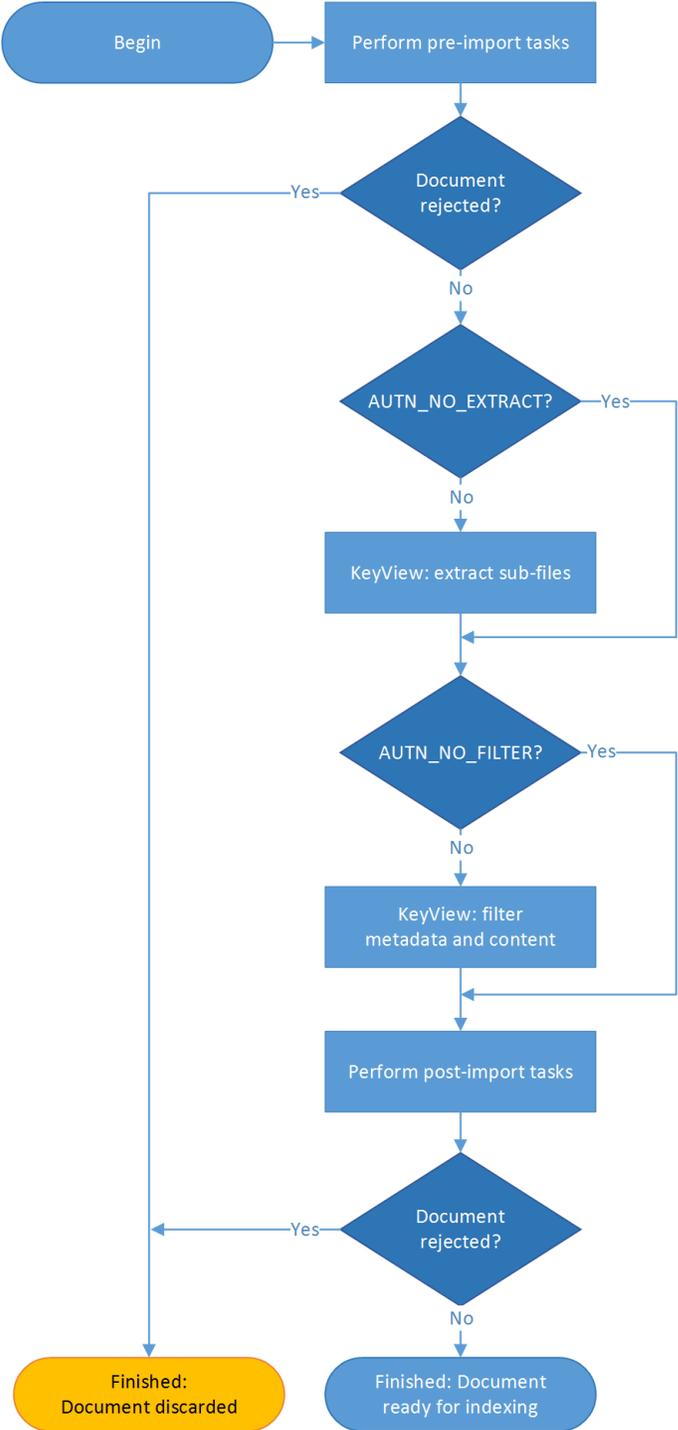
CFS can run a transformation on an ingested XML file. This is an optional step but can be useful in cases where your XML files do not resemble IDOL documents or you are processing XML from many sources and the files have different schemas. You can configure any number of transformations and CFS runs the first transformation where the ingested XML matches the specified schema. You can also configure a default transformation that CFS runs when an XML file does not match any of your schemas. When a transformation is configured but is not successful, CFS adds the document to the import queue so that the XML is processed by KeyView.

After an XML transformation is successful or when transformation is not configured, CFS attempts to convert the XML into IDOL documents. The conversion is performed by mapping elements in the XML to IDOL documents and document fields. If the conversion is successful the resulting documents are returned to the ingest queue as metadata-only documents. If the conversion does not result in any IDOL documents but the XML was transformed after matching a schema, CFS does not consider this as a failure and does not index any documents. Otherwise, CFS adds the document to the import queue so that the XML is processed by KeyView.

Parsing an XML file is usually preferable to processing it with KeyView, because although KeyView can extract the text it does not preserve the structure information (the XML tags are discarded).

# The Import Process

The following chart provides a summary of the import process.



1. CFS takes a document from the import queue.
2. CFS performs the pre-import tasks that are configured in its configuration file. Pre-import tasks occur before files are processed by KeyView. You can use pre-import tasks to manipulate and enrich documents (see [Manipulate and Enrich Documents, on page 10](#)). Sometimes it is important to run tasks before KeyView processing. For example, if you send an audio file to Media Server for analysis, you might not want to process it with KeyView.

**TIP:**

Both pre- and post-import tasks can reject a document, so that it is discarded and not indexed. You might configure CFS to reject a document if the associated file does not contain useful content. Documents are not rejected when an import task fails - in that case CFS continues processing the document.

3. Unless the document contains the metadata field `AUTN_NO_EXTRACT`, CFS uses KeyView to extract sub-files. Examples of files that have sub-files include e-mail messages (which have attachments) and zip files (which contain other files). CFS creates a new document for each sub-file and adds the new documents to the import queue to be processed separately.
4. Unless the document contains the metadata field `AUTN_NO_FILTER`, CFS uses KeyView to filter the associated source file. Filtering extracts the text from a file. An office document is likely to contain useful text, while an archive file (for example a zip file) or a media file is unlikely to have textual content.

**TIP:**

Although media files (images, audio, and video) do not contain text, you can extract useful information by sending the files to an IDOL Media Server.

5. CFS performs the post-import tasks that are configured in its configuration file.
6. Processing is complete and the document is ready to be indexed.

## Index Documents

After CFS finishes processing documents, it automatically indexes them into one or more indexes. You can index documents into:

- **IDOL Server** (or send them to a *Distributed Index Handler*, so that they can be distributed across multiple IDOL servers).
- **Haven OnDemand**.
- **Vertica**.

## The IDOL Platform

At the core of Connector Framework Server is the *Intelligent Data Operating Layer* (IDOL).

IDOL gathers and processes unstructured, semi-structured, and structured information in any format from multiple repositories using IDOL connectors and a global relational index. It can automatically form a contextual understanding of the information in real time, linking disparate data sources together

based on the concepts contained within them. For example, IDOL can automatically link concepts contained in an email message to a recorded phone conversation, that can be associated with a stock trade. This information is then imported into a format that is easily searchable, adding advanced retrieval, collaboration, and personalization to an application that integrates the technology.

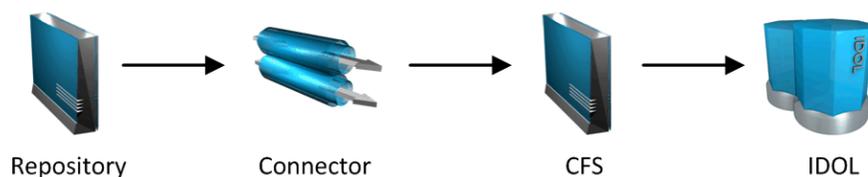
For more information on IDOL, see the *IDOL Getting Started Guide*.

## System Architecture

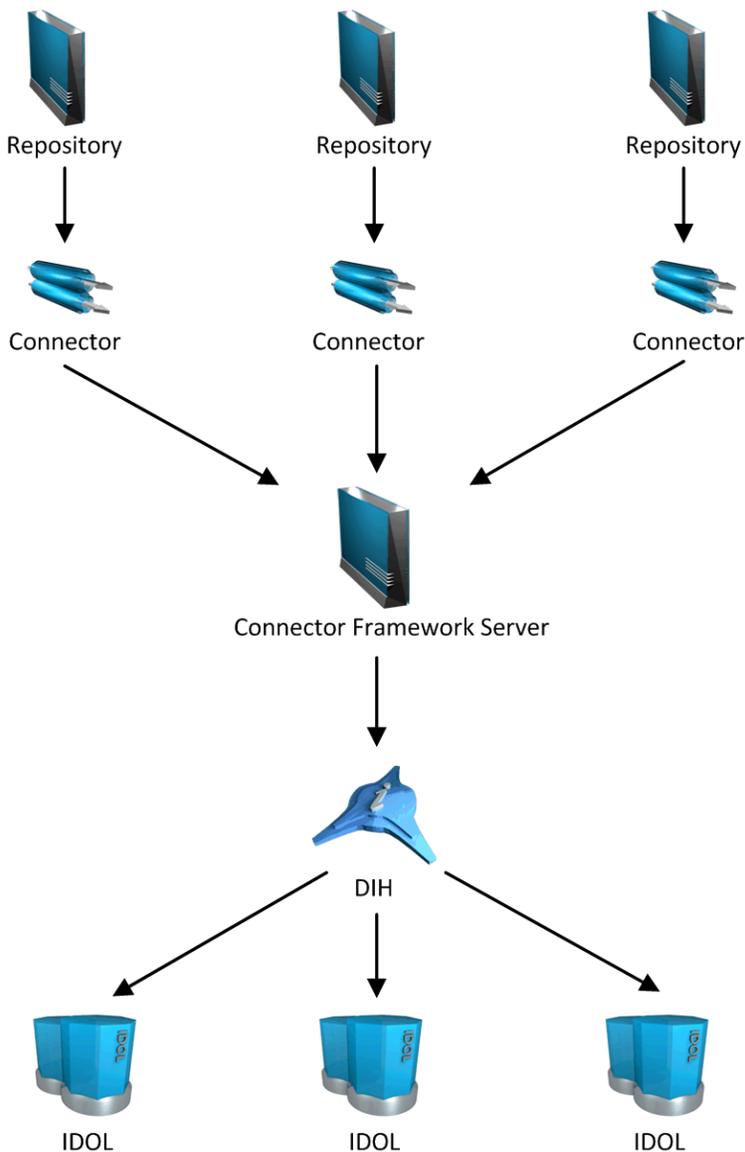
An IDOL infrastructure can include the following components:

- **Connectors.** Connectors extract data from repositories and send the data to CFS.
- **Connector Framework Server.**
- **IDOL Server.** IDOL Server provides features to analyze unstructured information and extract meaning from that information.
- **Distributed Index Handler (DIH).** The Distributed Index Handler distributes data across multiple IDOL servers. Using multiple IDOL servers can increase the availability and scalability of the system.

These components can be installed in many different configurations. The simplest installation consists of a single connector, a single CFS, and a single IDOL server.



A more complex configuration might include more than one connector, or use a Distributed Index Handler (DIH) to index content across multiple IDOL servers.



## OEM Certification

Connector Framework Server works in OEM licensed environments.

## Related Documentation

The following documents provide more details on Connector Framework Server.

- *Connector Framework Server Reference*  
The *Connector Framework Server Reference* describes the configuration parameters and actions that are supported by CFS.
- *IDOL Server Administration Guide*  
The *IDOL Server Administration Guide* describes the operations that IDOL Server can perform, and describes how to set them up.
- *Distributed Index Handler (DIH) Administration Guide*  
This guide describes how you can use a DIH to distribute aggregated documents across multiple IDOL Servers.
- *License Server Administration Guide*  
This guide describes how to use a License Server to license multiple IDOL services.

## Display Online Help

You can display the Connector Framework Server Reference by sending an action from your web browser. The Connector Framework Server Reference describes the actions and configuration parameters that you can use with Connector Framework Server.

For Connector Framework Server to display help, the help data file (`help.dat`) must be available in the installation folder.

### To display help for Connector Framework Server

1. Start Connector Framework Server.
2. Send the following action from your web browser:

```
http://host:port/action=Help
```

where:

*host* is the IP address or name of the machine on which Connector Framework Server is installed.

*port* is the ACI port by which you send actions to Connector Framework Server (set by the `Port` parameter in the `[Server]` section of the configuration file).

For example:

```
http://12.3.4.56:9000/action=help
```

# Chapter 2: Configure Connector Framework Server

This section describes how to configure CFS.

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## Connector Framework Server Configuration File

To configure CFS, modify the configuration file. The file is located in the CFS installation folder and can be modified with a text editor.

The parameters in the configuration file are divided into sections that represent CFS functionality. CFS supports standard Server, Service, Logging, and License parameters.

### Service Section

The [Service] section specifies the service port used by CFS.

### Server Section

The [Server] section specifies the ACI port of the Connector Framework Server. When you configure connectors, the `IngestPort` parameter in the connector configuration file should point to this port.

### Actions Section

The [Actions] section specifies how CFS processes actions that are sent to the ACI port.

## Logging Section

The [Logging] section contains configuration parameters that determine how messages are logged. You can create separate log streams for different message types. The configuration file also contains a section to configure each of the log streams.

## Indexing Section

The [Indexing] section specifies the host name or IP address, and port, of machines where data is sent after it has been processed by CFS. This is usually the IP address and ACI port of an IDOL Server. You can use other indexing parameters to specify how data is indexed.

## ImportService Section

The [ImportService] section specifies details for KeyView.

## ImportTasks Section

The [ImportTasks] section is used to set up custom import tasks. CFS performs these tasks on data before it is indexed into IDOL Server. For more information about Import Tasks, see [Manipulate and Enrich Documents, on page 50](#).

## IndexTasks Section

The [IndexTasks] section is used to set up custom index tasks. IDOL connectors detect when documents are updated or removed from a repository. The connectors pass this information to CFS so that the documents can be updated or removed from IDOL Server. When CFS receives this information, it can perform custom Index tasks before the information is sent to IDOL. For more information about Index tasks, see [Manipulate and Enrich Documents, on page 50](#).

### Related Topics

- [Example Configuration File, on page 28](#)
- [Customize Logging, on page 117](#)

## Modify Configuration Parameter Values

You modify Connector Framework Server configuration parameters by directly editing the parameters in the configuration file. When you set configuration parameter values, you must use UTF-8.

### **CAUTION:**

You must stop and restart Connector Framework Server for new configuration settings to take

effect.

This section describes how to enter parameter values in the configuration file.

## Enter Boolean Values

The following settings for Boolean parameters are interchangeable:

TRUE = true = ON = on = Y = y = 1

FALSE = false = OFF = off = N = n = 0

## Enter String Values

To enter a comma-separated list of strings when one of the strings contains a comma, you can indicate the start and the end of the string with quotation marks, for example:

```
ParameterName=cat,dog,bird,"wing,beak",turtle
```

Alternatively, you can escape the comma with a backslash:

```
ParameterName=cat,dog,bird,wing\,beak,turtle
```

If any string in a comma-separated list contains quotation marks, you must put this string into quotation marks and escape each quotation mark in the string by inserting a backslash before it. For example:

```
ParameterName="<font face=\"arial\" size=\"+1\"><b>","<p>"
```

Here, quotation marks indicate the beginning and end of the string. All quotation marks that are contained in the string are escaped.

# Configure Connector Framework Server

This section describes how to configure CFS.

### To configure CFS

1. Stop CFS, if it is running.
2. Open the CFS configuration file.
3. In the [Service] section, specify the service port:

ServicePort                      The port for CFS to use as the service port.

4. In the [Server] section, set the ACI port:

Port                                The port for CFS to use as the ACI port.

5. (Optional) In the [ImportService] section, you can set parameters to configure KeyView. You can choose the number of threads to use, specify the folders to use for extracting files, and customize how documents are imported.

ThreadCount	The number of threads to use for importing documents.
-------------	---

For information about the configuration parameters that you can set, refer to the *Connector Framework Server Reference*.

6. Save the configuration file.

### Related Topics

- [Start and Stop Connector Framework Server, on page 30](#)
- [Connector Framework Server Configuration File, on page 18](#)
- [Customize Logging, on page 117](#)

## Include an External Configuration File

You can share configuration sections or parameters between ACI server configuration files. The following sections describe different ways to include content from an external configuration file.

You can include a configuration file in its entirety, specified configuration sections, or a single parameter.

When you include content from an external configuration file, the `GetConfig` and `ValidateConfig` actions operate on the combined configuration, after any external content is merged in.

In the procedures in the following sections, you can specify external configuration file locations by using absolute paths, relative paths, and network locations. For example:

```
../sharedconfig.cfg  
K:\sharedconfig\sharedsettings.cfg  
\\example.com\shared\idol.cfg  
file://example.com/shared/idol.cfg
```

Relative paths are relative to the primary configuration file.

#### NOTE:

You can use nested inclusions, for example, you can refer to a shared configuration file that references a third file. However, the external configuration files must not refer back to your original configuration file. These circular references result in an error, and Connector Framework Server does not start.

Similarly, you cannot use any of these methods to refer to a different section in your primary configuration file.

## Include the Whole External Configuration File

This method allows you to import the whole external configuration file at a specified point in your configuration file.

### To include the whole external configuration file

1. Open your configuration file in a text editor.
2. Find the place in the configuration file where you want to add the external configuration file.
3. On a new line, type a left angle bracket (<), followed by the path to and name of the external configuration file, in quotation marks (""). You can use relative paths and network locations. For example:

```
< "K:\sharedconfig\sharedsettings.cfg"
```

4. Save and close the configuration file.

## Include Sections of an External Configuration File

This method allows you to import one or more configuration sections (including the section headings) from an external configuration file at a specified point in your configuration file. You can include a whole configuration section in this way, but the configuration section name in the external file must exactly match what you want to use in your file. If you want to use a configuration section from the external file with a different name, see [Merge a Section from an External Configuration File, on the next page](#).

### To include sections of an external configuration file

1. Open your configuration file in a text editor.
2. Find the place in the configuration file where you want to add the external configuration file section.
3. On a new line, type a left angle bracket (<), followed by the path of the external configuration file, in quotation marks (""). You can use relative paths and network locations. After the configuration file path, add the configuration section name that you want to include. For example:

```
< "K:\sharedconfig\extrasettings.cfg" [License]
```

**NOTE:**

You cannot include a section that already exists in your configuration file.

4. Save and close the configuration file.

## Include Parameters from an External Configuration File

This method allows you to import one or more parameters from an external configuration file at a specified point in your configuration file. You can import a single parameter or use wildcards to specify

multiple parameters. The parameter values in the external file must match what you want to use in your file. This method does not import the section heading, such as `[License]` in the following examples.

### To include parameters from an external configuration file

1. Open your configuration file in a text editor.
2. Find the place in the configuration file where you want to add the parameters from the external configuration file.
3. On a new line, type a left angle bracket (`<`), followed by the path of the external configuration file, in quotation marks (`"`). You can use relative paths and network locations. After the configuration file path, add the name of the section that contains the parameter, followed by the parameter name. For example:

```
< "license.cfg" [License] LicenseServerHost
```

To specify a default value for the parameter, in case it does not exist in the external configuration file, specify the configuration section, parameter name, and then an equals sign (`=`) followed by the default value. For example:

```
< "license.cfg" [License] LicenseServerHost=localhost
```

You can use wildcards to import multiple parameters, but this method does not support default values. The `*` wildcard matches zero or more characters. The `?` wildcard matches any single character. Use the pipe character `|` as a separator between wildcard strings. For example:

```
< "license.cfg" [License] LicenseServer*
```

4. Save and close the configuration file.

## Merge a Section from an External Configuration File

This method allows you to include a configuration section from an external configuration file as part of your Connector Framework Server configuration file. For example, you might want to specify a standard SSL configuration section in an external file and share it between several servers. You can use this method if the configuration section that you want to import has a different name to the one you want to use.

### To merge a configuration section from an external configuration file

1. Open your configuration file in a text editor.
2. Find or create the configuration section that you want to include from an external file. For example:

```
[SSLOptions1]
```

3. After the configuration section name, type a left angle bracket (`<`), followed by the path to and name of the external configuration file, in quotation marks (`"`). You can use relative paths and network locations. For example:

```
[SSLOptions1] < "../sharedconfig/ssloptions.cfg"
```

If the configuration section name in the external configuration file does not match the name that you want to use in your configuration file, specify the section to import after the configuration file name. For example:

```
[SSLOptions1] < "../sharedconfig/ssloptions.cfg" [SharedSSLOptions]
```

In this example, Connector Framework Server uses the values in the [SharedSSLOptions] section of the external configuration file as the values in the [SSLOptions1] section of the Connector Framework Server configuration file.

**NOTE:**

You can include additional configuration parameters in the section in your file. If these parameters also exist in the imported external configuration file, Connector Framework Server uses the values in the local configuration file. For example:

```
[SSLOptions1] < "ssloptions.cfg" [SharedSSLOptions]  
SSLCACertificatesPath=C:\IDOL\HTTPConnector\CACERTS\
```

4. Save and close the configuration file.

## Encrypt Passwords

Micro Focus recommends that you encrypt all passwords that you enter into a configuration file.

### Create a Key File

A key file is required to use AES encryption.

**To create a new key file**

1. Open a command-line window and change directory to the Connector Framework Server installation folder.
2. At the command line, type:

```
outpassword -x -tAES -oKeyFile=./MyKeyFile.ky
```

A new key file is created with the name MyKeyFile.ky

**CAUTION:**

To keep your passwords secure, you must protect the key file. Set the permissions on the key file so that only authorized users and processes can read it. Connector Framework Server must be able to read the key file to decrypt passwords, so do not move or rename it.

### Encrypt a Password

The following procedure describes how to encrypt a password.

**To encrypt a password**

1. Open a command-line window and change directory to the Connector Framework Server installation folder.
2. At the command line, type:

```
outpassword -e -tEncryptionType [-oKeyFile] [-cFILE -sSECTION -pPARAMETER] PasswordString
```

where:

Option	Description
-t <i>EncryptionType</i>	The type of encryption to use: <ul style="list-style-type: none"> <li>• Basic</li> <li>• AES</li> </ul> For example: -tAES <div style="border-left: 2px solid #0070C0; padding-left: 10px; margin-top: 10px;"> <p><b>NOTE:</b> AES is more secure than basic encryption.</p> </div>
-oKeyFile	AES encryption requires a key file. This option specifies the path and file name of a key file. The key file must contain 64 hexadecimal characters.  For example: -oKeyFile=./key.ky
-cFILE -sSECTION -pPARAMETER	(Optional) You can use these options to write the password directly into a configuration file. You must specify all three options. <ul style="list-style-type: none"> <li>• -c. The configuration file in which to write the encrypted password.</li> <li>• -s. The name of the section in the configuration file in which to write the password.</li> <li>• -p. The name of the parameter in which to write the encrypted password.</li> </ul> For example: -c./Config.cfg -sMyTask -pPassword
<i>PasswordString</i>	The password to encrypt.

For example:

```
outpassword -e -tBASIC MyPassword
```

```
outpassword -e -tAES -oKeyFile=./key.ky MyPassword
```

```
outpassword -e -tAES -oKeyFile=./key.ky -c./Config.cfg -sDefault -pPassword MyPassword
```

The password is returned, or written to the configuration file.

## Decrypt a Password

The following procedure describes how to decrypt a password.

### To decrypt a password

1. Open a command-line window and change directory to the Connector Framework Server installation folder.
2. At the command line, type:

```
autopassword -d -tEncryptionType [-oKeyFile] PasswordString
```

where:

Option	Description
-t <i>EncryptionType</i>	The type of encryption: <ul style="list-style-type: none"><li>• Basic</li><li>• AES</li></ul> For example: -tAES
-o <code>KeyFile</code>	AES encryption and decryption requires a key file. This option specifies the path and file name of the key file used to decrypt the password.  For example: -o <code>KeyFile</code> =./key.ky
<i>PasswordString</i>	The password to decrypt.

For example:

```
autopassword -d -tBASIC 9t3M3t7awt/J8A
```

```
autopassword -d -tAES -oKeyFile=./key.ky 9t3M3t7awt/J8A
```

The password is returned in plain text.

## Configure Client Authorization

You can configure Connector Framework Server to authorize different operations for different connections.

Authorization roles define a set of operations for a set of users. You define the operations by using the `StandardRoles` configuration parameter, or by explicitly defining a list of allowed actions in the `Actions` and `ServiceActions` parameters. You define the authorized users by using a client IP address, SSL identities, and GSS principals, depending on your security and system configuration.

For more information about the available parameters, see the *Connector Framework Server Reference*.

**IMPORTANT:**

To ensure that Connector Framework Server allows only the options that you configure in [AuthorizationRoles], make sure that you delete any deprecated *RoLeClients* parameters from your configuration (where *RoLe* corresponds to a standard role name, for example *AdminClients*).

**To configure authorization roles**

1. Open your configuration file in a text editor.
2. Find the [AuthorizationRoles] section, or create one if it does not exist.
3. In the [AuthorizationRoles] section, list the user authorization roles that you want to create. For example:

```
[AuthorizationRoles]
0=AdminRole
1=UserRole
```

4. Create a section for each authorization role that you listed. The section name must match the name that you set in the [AuthorizationRoles] list. For example:

```
[AdminRole]
```

5. In the section for each role, define the operations that you want the role to be able to perform. You can set *StandardRoles* to a list of appropriate values, or specify an explicit list of allowed actions by using *Actions*, and *ServiceActions*. For example:

```
[AdminRole]
StandardRoles=Admin,ServiceControl,ServiceStatus
```

```
[UserRole]
Actions=GetVersion
ServiceActions=GetStatus
```

**NOTE:**

The standard roles do not overlap. If you want a particular role to be able to perform all actions, you must include all the standard roles, or ensure that the clients, SSL identities, and so on, are assigned to all relevant roles.

6. In the section for each role, define the access permissions for the role, by setting *Clients*, *SSLIdentities*, and *GSSPrincipals*, as appropriate. If an incoming connection matches one of the allowed clients, principals, or SSL identities, the user has permission to perform the operations allowed by the role. For example:

```
[AdminRole]
StandardRoles=Admin,ServiceControl,ServiceStatus
Clients=localhost
SSLIdentities=admin.example.com
```

7. Save and close the configuration file.
8. Restart Connector Framework Server for your changes to take effect.

**IMPORTANT:**

If you do not provide any authorization roles for a standard role, Connector Framework Server uses the default client authorization for the role (localhost for `Admin` and `ServiceControl`, all clients for `Query` and `ServiceStatus`). If you define authorization only by actions, Micro Focus recommends that you configure an authorization role that disallows all users for all roles by default. For example:

```
[ForbidAllRoles]
StandardRoles=*
Clients=""
```

This configuration ensures that Connector Framework Server uses only your action-based authorizations.

## Example Configuration File

This section contains an example configuration file, which meets the minimum configuration requirements.

```
[Service]
Port=17000

[Server]
Port=7000
MaxInputString=-1
MaxFileUploadSize=-1
XSLTemplates=TRUE

[AuthorizationRoles]
0=AdminRole
1=QueryRole

[AdminRole]
StandardRoles=admin,servicecontrol,query,servicestatus
Clients=:1,127.0.0.1

[QueryRole]
StandardRoles=query,servicestatus
Clients=*

[Actions]
MaxQueueSize=100

[Logging]
LogLevel=NORMAL
0=ApplicationLogStream
1=ActionLogStream
2=ImportLogStream
3=IndexLogStream
```

```
[ApplicationLogStream]  
LogTypeCSVs=application  
LogFile=application.log
```

```
[ActionLogStream]  
LogTypeCSVs=action  
LogFile=action.log
```

```
[ImportLogStream]  
LogTypeCSVs=import  
LogFile=import.log
```

```
[IndexLogStream]  
LogTypeCSVs=indexer  
LogFile=indexer.log
```

```
[Indexing]  
IndexerSections=IdolServer  
IndexBatchSize=1000  
IndexTimeInterval=300
```

```
[IdolServer]  
Host=idol  
Port=9000  
DefaultDatabaseName=News  
SSLConfig=SSLOptions
```

```
[SSLOptions]  
SSLMethod=SSLV23
```

```
[ImportService]  
KeyviewDirectory=filters  
ExtractDirectory=temp  
ThreadCount=3  
ImportInheritFieldsCSV=AUTN_GROUP,AUTN_IDENTIFIER,DREDBNAME
```

```
[ImportTasks]  
//Post0=lua:<path_to_lua_file>  
Post0=IdxWriter:C:\Autonomy\ConnectorFramework\IDX\output.idx
```

# Chapter 3: Start and Stop Connector Framework Server

This section describes how to start and stop CFS.

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- [Stop Connector Framework Server](#) ..... 30

## Start Connector Framework Server

This section describes how to start Connector Framework Server.

### To start CFS on Windows

1. Open the Windows Services dialog box.
2. Select the **ConnectorFramework** service (you might have chosen a different name for the service during the installation process).
3. Click **Start**.
4. (*Optional*). To verify that CFS is ready, send the following action to the ACI port.

```
http://host:port/action=getstatus
```

A response is displayed.

### To start CFS on UNIX

1. Change to the CFS installation directory.
2. Run the start script by using the following command.

```
./startconnectorFramework.sh
```

## Stop Connector Framework Server

This section describes how to stop Connector Framework Server.

### To stop CFS on Windows

1. Open the Windows Services dialog box.
2. Select the **ConnectorFramework** service (you might have chosen a different name for the service during the installation process).
3. Click **Stop**, and close the Windows Services dialog box.

### To stop CFS on UNIX

1. Change to the CFS installation directory.
2. Run the stop script by using the following command.

```
./stopconnectorFramework.sh
```

# Chapter 4: Send Actions to Connector Framework Server

This section describes how to send actions to Connector Framework Server.

- [Send Actions to Connector Framework Server](#) .....32
- [Asynchronous Actions](#) ..... 32
- [Store Action Queues in an External Database](#) ..... 34
- [Store Action Queues in Memory](#) ..... 36
- [Use XSL Templates to Transform Action Responses](#) ..... 38

## Send Actions to Connector Framework Server

Connector Framework Server actions are HTTP requests, which you can send, for example, from your web browser. The general syntax of these actions is:

```
http://host:port/action=action&parameters
```

where:

- host* is the IP address or name of the machine where Connector Framework Server is installed.
- port* is the Connector Framework Server ACI port. The ACI port is specified by the `Port` parameter in the `[Server]` section of the Connector Framework Server configuration file. For more information about the `Port` parameter, see the *Connector Framework Server Reference*.
- action* is the name of the action you want to run.
- parameters* are the required and optional parameters for the action.

**NOTE:**

Separate individual parameters with an ampersand (&). Separate parameter names from values with an equals sign (=). You must percent-encode all parameter values.

For more information about actions, see the *Connector Framework Server Reference*.

## Asynchronous Actions

When you send an asynchronous action to Connector Framework Server, the CFS adds the task to a queue and returns a token. Connector Framework Server performs the task when a thread becomes

available. You can use the token with the `QueueInfo` action to check the status of the action and retrieve the results of the action.

Most of the actions sent to CFS are `ingest` actions, so when you use the `QueueInfo` action, query the `ingest` action queue, for example:

```
/action=QueueInfo&QueueName=ingest&QueueAction=GetStatus
```

## Check the Status of an Asynchronous Action

To check the status of an asynchronous action, use the token that was returned by Connector Framework Server with the `QueueInfo` action. For more information about the `QueueInfo` action, refer to the *Connector Framework Server Reference*.

### To check the status of an asynchronous action

- Send the `QueueInfo` action to Connector Framework Server with the following parameters.

<code>QueueName</code>	The name of the action queue that you want to check.
<code>QueueAction</code>	The action to perform. Set this parameter to <code>GetStatus</code> .
<code>Token</code>	(Optional) The token that the asynchronous action returned. If you do not specify a token, Connector Framework Server returns the status of every action in the queue.

For example:

```
/action=QueueInfo&QueueName=ingest&QueueAction=getstatus&Token=...
```

## Cancel an Asynchronous Action that is Queued

To cancel an asynchronous action that is waiting in a queue, use the following procedure.

### To cancel an asynchronous action that is queued

- Send the `QueueInfo` action to Connector Framework Server with the following parameters.

<code>QueueName</code>	The name of the action queue that contains the action to cancel.
<code>QueueAction</code>	The action to perform . Set this parameter to <code>Cancel</code> .
<code>Token</code>	The token that the asynchronous action returned.

For example:

```
/action=QueueInfo&QueueName=ingest&QueueAction=Cancel&Token=...
```

## Stop an Asynchronous Action that is Running

You can stop an asynchronous action at any point.

### To stop an asynchronous action that is running

- Send the `QueueInfo` action to Connector Framework Server with the following parameters.

<code>QueueName</code>	The name of the action queue that contains the action to stop.
<code>QueueAction</code>	The action to perform. Set this parameter to <code>Stop</code> .
<code>Token</code>	The token that the asynchronous action returned.

For example:

```
/action=QueueInfo&QueueName=ingest&QueueAction=Stop&Token=...
```

## Store Action Queues in an External Database

Connector Framework Server provides asynchronous actions. Each asynchronous action has a queue to store requests until threads become available to process them. You can configure Connector Framework Server to store these queues either in an internal database file, or in an external database hosted on a database server.

The default configuration stores queues in an internal database. Using this type of database does not require any additional configuration.

You might want to store the action queues in an external database so that several servers can share the same queues. In this configuration, sending a request to any of the servers adds the request to the shared queue. Whenever a server is ready to start processing a new request, it takes the next request from the shared queue, runs the action, and adds the results of the action back to the shared database so that they can be retrieved by any of the servers. You can therefore distribute requests between components without configuring a Distributed Action Handler (DAH).

### NOTE:

You cannot use multiple servers to process a single request. Each request is processed by one server.

## Prerequisites

- Supported databases:
  - PostgreSQL 9.0 or later.
  - MySQL 5.0 or later.
- If you use PostgreSQL, you must set the PostgreSQL ODBC driver setting `MaxVarChar` to 0 (zero).

If you use a DSN, you can configure this parameter when you create the DSN. Otherwise, you can set the `MaxVarcharSize` parameter in the connection string.

## Configure Connector Framework Server

To configure Connector Framework Server to use a shared action queue, follow these steps.

### To store action queues in an external database

1. Stop Connector Framework Server, if it is running.
2. Open the Connector Framework Server configuration file.
3. Find the relevant section in the configuration file:
  - To store queues for all asynchronous actions in the external database, find the `[Actions]` section.
  - To store the queue for a single asynchronous action in the external database, find the section that configures that action.
4. Set the following configuration parameters.

<code>AsyncStoreLibraryDirectory</code>	The path of the directory that contains the library to use to connect to the database. Specify either an absolute path, or a path relative to the server executable file.
<code>AsyncStoreLibraryName</code>	The name of the library to use to connect to the database. You can omit the file extension. The following libraries are available: <ul style="list-style-type: none"><li>• <code>postgresAsyncStoreLibrary</code> - for connecting to a PostgreSQL database.</li><li>• <code>mysqlAsyncStoreLibrary</code> - for connecting to a MySQL database.</li></ul>
<code>ConnectionString</code>	The connection string to use to connect to the database. The user that you specify must have permission to create tables in the database. For example:  <code>ConnectionString=DSN=ActionStore</code>  or  <code>ConnectionString=Driver={PostgreSQL}; Server=10.0.0.1; Port=9876; Database=SharedActions; Uid=user; Pwd=password; MaxVarcharSize=0;</code>  If your connection string includes a password, Micro Focus recommends encrypting the value of the parameter before

entering it into the configuration file. Encrypt the entire connection string. For information about how to encrypt parameter values, see [Encrypt Passwords, on page 24](#).

For example:

```
[Actions]
AsyncStoreLibraryDirectory=acidlls
AsyncStoreLibraryName=postgresAsyncStoreLibrary
ConnectionString=DSN=ActionStore
```

5. If you are using the same database to store action queues for more than one type of component, set the following parameter in the [Actions] section of the configuration file.

**DatastoreSharingGroupName** The group of components to share actions with. You can set this parameter to any string, but the value must be the same for each server in the group. For example, to configure several Connector Framework Servers to share their action queues, set this parameter to the same value in every Connector Framework Server configuration. Micro Focus recommends setting this parameter to the name of the component.

**CAUTION:**

Do not configure different components (for example, two different types of connector) to share the same action queues. This will result in unexpected behavior.

For example:

```
[Actions]
...
DatastoreSharingGroupName=ComponentType
```

6. Save and close the configuration file.

When you start Connector Framework Server it connects to the shared database.

## Store Action Queues in Memory

Connector Framework Server provides asynchronous actions. Each asynchronous action has a queue to store requests until threads become available to process them. These queues are usually stored in a datastore file or in a database hosted on a database server, but in some cases you can increase performance by storing these queues in memory.

**NOTE:**

Storing action queues in memory improves performance only when the server receives large numbers of actions that complete quickly. Before storing queues in memory, you should also consider the following:

- The queues (including queued actions and the results of finished actions) are lost if Connector Framework Server stops unexpectedly, for example due to a power failure or the component being forcibly stopped. This could result in some requests being lost, and if the queues are restored to a previous state some actions could run more than once.
- Storing action queues in memory prevents multiple instances of a component being able to share the same queues.
- Storing action queues in memory increases memory use, so please ensure that the server has sufficient memory to complete actions and store the action queues.

If you stop Connector Framework Server cleanly, Connector Framework Server writes the action queues from memory to disk so that it can resume processing when it is next started.

To configure Connector Framework Server to store asynchronous action queues in memory, follow these steps.

### To store action queues in memory

1. Stop Connector Framework Server, if it is running.
2. Open the Connector Framework Server configuration file and find the [Actions] section.
3. If you have set any of the following parameters, remove them:
  - AsyncStoreLibraryDirectory
  - AsyncStoreLibraryName
  - ConnectionString
  - UseStringentDatastore
4. Set the following configuration parameters.

UseInMemoryDatastore

A Boolean value that specifies whether to keep the queues for asynchronous actions in memory. Set this parameter to TRUE.

InMemoryDatastoreBackupIntervalMins

(Optional) The time interval (in minutes) at which the action queues are written to disk. Writing the queues to disk can reduce the number of queued actions that would be lost if Connector Framework Server stops unexpectedly, but configuring a frequent backup will increase the load on the datastore and might reduce performance.

For example:

```
[Actions]
UseInMemoryDatastore=TRUE
InMemoryDatastoreBackupIntervalMins=30
```

5. Save and close the configuration file.

When you start Connector Framework Server, it stores action queues in memory.

## Use XSL Templates to Transform Action Responses

You can transform the action responses returned by Connector Framework Server using XSL templates. You must write your own XSL templates and save them with either an `.xsl` or `.tmpl` file extension.

After creating the templates, you must configure Connector Framework Server to use them, and then apply them to the relevant actions.

### To enable XSL transformations

1. Ensure that the `autnxs1t` library is located in the same directory as Connector Framework Server. If the library is not included in your installation, you can obtain it from Micro Focus Support.
2. Open the Connector Framework Server configuration file in a text editor.
3. In the `[Server]` section, ensure that the `XSLTemplates` parameter is set to `true`.

#### CAUTION:

If `XSLTemplates` is set to `true` and the `autnxs1t` library is not present in the same directory as the configuration file, the server will not start.

4. (Optional) In the `[Paths]` section, set the `TemplateDirectory` parameter to the path to the directory that contains your XSL templates. The default directory is `acitemplates`.
5. Save and close the configuration file.
6. Restart Connector Framework Server for your changes to take effect.

### To apply a template to action output

- Add the following parameters to the action:

<code>Template</code>	The name of the template to use to transform the action output. Exclude the folder path and file extension.
<code>ForceTemplateRefresh</code>	(Optional) If you modified the template after the server started, set this parameter to <code>true</code> to force the ACI server to reload the template from disk rather than from the cache.

For example:

```
action=QueueInfo&QueueName=Ingest
      &QueueAction=GetStatus
      &Token=...
      &Template=myTemplate
```

In this example, Connector Framework Server applies the XSL template `myTemplate` to the response from an `Ingest` action.

**NOTE:**  
If the action returns an error response, Connector Framework Server does not apply the XSL template.

## Example XSL Templates

Connector Framework Server includes the following sample XSL templates, in the `acitemplates` folder:

<b>XSL Template</b>	<b>Description</b>
LuaDebug	Transforms the output from the <code>LuaDebug</code> action, to assist with debugging Lua scripts.

# Chapter 5: Ingest Data

This section describes how to send data to CFS.

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- [Ingest an IDX File](#) ..... 41
- [Ingest XML](#) ..... 41
- [Ingest PST Files](#) ..... 44
- [Ingest Password-Protected Files](#) ..... 45
- [Ingest Data for Testing](#) ..... 46

## Ingest Data using Connectors

To configure a connector to send data to CFS, follow these steps.

### To configure a connector to send data to CFS

1. Stop the connector, if it is running. For information about how to stop a connector, refer to the connector's documentation.
2. Open the connector's configuration file in a text editor.
3. In the [Ingestion] section, set the following parameters:

<code>EnableIngestion</code>	To enable ingestion, set this parameter to <code>true</code> .
<code>IngesterType</code>	To send data to CFS, set this parameter to <code>CFS</code> .
<code>IngestHost</code>	The host name or IP address of the CFS.
<code>IngestPort</code>	The ACI port of the CFS.

For example:

```
[Ingestion]
EnableIngestion=True
IngesterType=CFS
IngestHost=localhost
IngestPort=7000
```

4. Save and close the configuration file.

You can now start the connector.

## Ingest an IDX File

You can ingest an IDX file using the `Ingest` action.

Use the `adds` parameter to specify the document that you want to ingest. This parameter takes XML like the following example which ingests `c:\data.idx`:

```
<adds>
  <add>
    <source filename="c:\data.idx" />
  </add>
</adds>
```

The XML must be URL encoded:

```
http://server:port/action=ingest&adds=[URL encoded XML]
```

For more information about the `Ingest` action, refer to the *Connector Framework Server Reference*.

## Ingest XML

Many systems export information in XML format and CFS has features to help you convert XML into IDOL documents.

**NOTE:**

The XML must be encoded in UTF-8.

You can configure CFS to transform XML files, with an XSL transformation, before they are processed. This is an optional step but can be useful in cases where your XML files do not resemble IDOL documents or you are processing XML from many sources and the files have different schemas. You can configure any number of transformations and CFS runs the first transformation where the ingested XML matches the specified schema. You can also configure a default transformation that CFS runs when an XML file does not match any of your schemas.

After an XML file has been transformed, or when transformation is not configured, CFS attempts to convert the XML into IDOL documents. The XML is parsed according to the rules that you configure in the `[XmlParsing]` section of the CFS configuration file. If the conversion is successful, the resulting metadata-only documents are added to the ingest queue (for more information about the ingestion process, see [The Ingestion Process, on page 11](#)). If the conversion does not result in any IDOL documents but the XML was transformed after matching a schema, CFS does not consider this as a failure and does not index any documents. Otherwise, for example if the XML is invalid, the XML file is added to the import queue so that it is processed by KeyView along with other file types.

## Transform XML Files

CFS can transform XML files before attempting to parse them. XSL transformations are configured in the `[XmlTransformation]` section of the CFS configuration file.

To run a single transformation, you can specify the settings in the [XmlTransformation] section:

```
[XmlTransformation]
ValidationSchema=schema.xsd
TransformationStylesheet=transform.xslt
```

In this example, CFS uses the stylesheet `transform.xslt` to transform any XML file that matches `schema.xsd`.

If you are processing XML files that have more than one schema, you might want to configure several transformations. To do this, use the `Sections` parameter to specify the names of sections that configure the transformations:

```
[XmlTransformation]
Sections=XmlTransform1,XmlTransform2

[XmlTransform1]
ValidationSchema=schema1.xsd
TransformationStylesheet=transform1.xslt

[XmlTransform2]
TransformationStylesheet=transform2.xslt
```

In this example, any XML file that matches `schema1.xsd` is transformed by `transform1.xslt`. These files are then parsed. The parameter `ValidationSchema` is not set in the section `XmlTransform2`, so any files that do not match `schema1.xsd` are transformed by `transform2.xslt`.

You can configure as many different transformations as you require. If you set the parameter `ValidationSchema` in every section and an XML file does not match any of the schemas, it is not transformed.

## Parse XML into Documents

CFS attempts to parse any XML file that it receives according to rules that are specified in the [XMLParsing] section of its configuration file. The parameters in the [XMLParsing] section specify:

- How to divide the XML into documents.
- How to populate each document's DREREFERENCE field.
- How to populate each document's DRECONTENT field.

### To configure settings for parsing XML

1. Open the CFS configuration file.
2. In the [XMLParsing] section, set the following parameters:

`DocumentRootPaths` A comma-separated list of paths to nodes that contain a single document. Specify the paths relative to the root of the XML. Use a forward slash (/) to represent levels in the XML hierarchy. Any elements

contained within the specified node are added to the document as metadata.

IncludeRootPath	A Boolean value (default <code>false</code> ) that specifies whether to include the node specified by <code>DocumentRootPaths</code> in the document. You might set this parameter to <code>TRUE</code> if the root node has attributes that you need to include in the document.
ReferencePaths	A comma-separated list of possible paths to a node that contains the document reference. Specify the paths relative to the node identified by <code>DocumentRootPaths</code> . Use a forward slash (/) to represent levels in the XML hierarchy. The XML for each document must contain exactly one node that matches the specified path(s).
ContentPaths	A comma-separated list of possible paths to a node that contains the document content. Specify the paths relative to the node identified by <code>DocumentRootPaths</code> . Use a forward slash (/) to represent levels in the XML hierarchy. If multiple content nodes are identified for a single document, a document is produced with multiple sections.

3. Save and close the configuration file.

## Example

Consider the following XML:

```
<xml>
  <documents>
    <document>
      <metadata>
        <name>This is the name of the document</name>
        <created>28/02/15 11:01:17</created>
        <modified>28/02/15 15:23:00</modified>
      </metadata>
      <content>Here is some content</content>
    </document>
    <document>
      <metadata>
        <name>This is another document</name>
        <created>01/03/15 12:21:13</created>
        <modified>02/03/15 13:23:03</modified>
      </metadata>
      <different_content>Here is some content</different_content>
    </document>
  </documents>
</xml>
```

To ingest this XML file, you might use the following configuration:

```
[XMLParsing]
DocumentRootPaths=documents/document
ReferencePaths=metadata/name
ContentPaths=content,different_content
```

To ingest the XML, send the ingest action to CFS:

```
http://localhost:7000/action=ingest&adds=%3Cadds%3E%3Cadd%3E%3Csource%20
filename%3D%22xmlfile.xml%22%20
lifetime%3D%22permanent%22%20%2F%3E
%3C%2Fadd%3E%3C%2Fadds%3E
```

This would produce the following documents:

```
#DREFERENCE This is the name of the document
#DREFIELD UUID="bfa1a8aac0b772d1ee467d830fa179bc"
#DREFIELD DocTrackingId="3cd0e5cf3160163adf7445d013ef10b1"
#DREFIELD ImportVersion="1207655"
#DREFIELD KeyviewVersion="10220"
#DREFIELD metadata/created="28/02/15 11:01:17"
#DREFIELD metadata/modified="28/02/15 15:23:00"
#DRECONTENT
Here is some content
#DRENDDOC
```

```
#DREFERENCE This is another document
#DREFIELD UUID="aadf6628fccd0c6b885a79e2e39f4357"
#DREFIELD DocTrackingId="66a63287d85b500159c5b5fb099b99a5"
#DREFIELD ImportVersion="1207655"
#DREFIELD KeyviewVersion="10220"
#DREFIELD metadata/created="01/03/15 12:21:13"
#DREFIELD metadata/modified="02/03/15 13:23:03"
#DRECONTENT
Here is some content
#DRENDDOC
```

## Ingest PST Files

Consider the following points before ingesting Microsoft Outlook Personal Folders (PST) files:

- The best results are usually obtained when KeyView uses MAPI to extract and filter PST files. To use MAPI, you must:
  - Run CFS on Windows.
  - Install Microsoft Outlook on the same machine as CFS. If you are using 64-bit CFS, install 64-bit Outlook. If you are using 32-bit CFS, install 32-bit Outlook.

- Ensure that MAPI has write access to the PST files. Set the `WorkingDirectory` parameter in the `[ImportService]` section of the CFS configuration file so that CFS copies files to a working directory and processes the copies, rather than processing the files in their original location.
- PST files can contain a large amount of data and KeyView might not finish processing them within the default time limit allowed by CFS. Consider increasing the value of the `KeyviewTimeout` parameter, in the `[ImportService]` section of the CFS configuration file.

## Ingest Password-Protected Files

To process password-protected files you must provide CFS with the passwords.

### To specify the passwords for password-protected files

1. Create a credentials file to contain the passwords for your password-protected files:
  - a. Open a text editor and create a new text file.
  - b. Create an `[ImportService]` section in the file.
  - c. In the `ImportService` section, set the following parameter:

<code>ImportCredentialCount</code>	The total number of file name and password combinations specified in the credentials file.
------------------------------------	--

For example:

```
[ImportService]
ImportCredentialCount=1
```

- d. Create a new section in the file, named `[CredentialN]`, where `N` is the number of the file name/password combination, starting from 0.

In the new section, set the following parameters:

<code>FileSpec</code>	The name of the password protected file(s). You can use the <code>*</code> wildcard to match the file name(s).
<code>Password</code>	The password for the file(s). You can encrypt the password using the password encryption utility. For information about how to do this, see <a href="#">Encrypt Passwords, on page 24</a> .
<code>UserName</code>	The user name to use to open the file(s). Set this parameter if a user name is required to access the file.
<code>NotesIDFile</code>	The path of the ID file. Set this parameter for <code>.nsf</code> files only.

For example, the following settings could be used to specify a single password for all ZIP files:

```
[ImportService]  
ImportCredentialCount=1
```

```
[Credential0]  
FileSpec=*.zip  
Password=9t3M3t7awt/J8A
```

- e. To specify further file name and password combinations, repeat steps c and d.
  - f. Save the file to a suitable location.
2. Specify the location of the credentials file. There are several ways to do this:
    - To use the credentials file you created for all ingested documents, set the CFS configuration parameter `ImportCredentialFile` to the path of the file. For more information about this parameter, refer to the *Connector Framework Server Reference*.
    - To use the credentials file that you created to process a single document, set the document field `AUTN_CREDENTIALS`. This field accepts either the path to the credentials file, or the credentials file content. You can encrypt the text using the password encryption utility. The `AUTN_CREDENTIALS` field is removed from all documents before they are indexed. When you send an `ingest` action to CFS, you can set this field using the `xmlmetadata` element in the `adds` or `updates` action parameter. For more information about the `ingest` action, refer to the *Connector Framework Server Reference*.

## Ingest Data for Testing

To ingest data for testing purposes, use the `IngestTest` action. You can use this action to view the output of the ingestion process for a small amount of data, without the data being indexed into IDOL.

**TIP:**

CFS includes an XSL template to help you send `IngestTest` actions. Open a web browser and navigate to `http://host:7000/action=IngestTest&Template=IngestTest` (where `host` is the machine where CFS is running and `7000` is the CFS ACI port).

Micro Focus does not support the XSL template, it is provided only as an example of a template that you could build.

The `IngestTest` action has the following parameters:

```
/action=IngestTest  
    &config=[base64_encoded_config]  
    &adds=[URL_encoded_adds_xml]
```

`IngestTest` is similar to the `Ingest` action, but has the following differences which make it suitable for testing:

- `IngestTest` is a synchronous action, and the document data is returned in the ACI response.
- Indexing, whether as a result of ingestion or as a result of an import task, is disabled.

- Update and Delete commands are disabled (you cannot use the `updates` and `removes` action parameters like you can with the `Ingest` action).
- Any writer tasks that have been configured (`IdxWriter`, `XmlWriter`, `JsonWriter`, `CsvWriter`, `SqlWriter`) are disabled.
- Logging to the import log stream is disabled. The log messages are redirected to the action response.
- The global Lua variable `is_test` is set to `true`. You can use this variable in your Lua scripts to prevent certain parts of your scripts from running when you use the `IngestTest` action.

For more information about the `IngestTest` action and its parameters, refer to the *Connector Framework Server Reference*.

# Chapter 6: Filter Documents and Extract Subfiles

CFS automatically extracts metadata, content, and sub-files from all files that are ingested. KeyView does not need to be configured, but this section describes how to customize the filtering and extraction process.

- [Customize KeyView Filtering](#) .....48
- [Disable Filtering or Extraction for Specific Documents](#) .....48

## Customize KeyView Filtering

If necessary, you can customize the filtering and extraction process. For example, you can choose whether to extract comments added by reviewers to a Microsoft Word document.

To customize filtering, use the Import Service parameters, in the [ImportService] section of the CFS configuration file. For information about the parameters that you can set, refer to the *Connector Framework Server Reference*.

You can also customize KeyView filtering by modifying the configuration parameters in the KeyView filters\formats.ini configuration file. For more information about customizing KeyView filtering by modifying formats.ini, refer to the KeyView documentation.

## Disable Filtering or Extraction for Specific Documents

To prevent KeyView from processing specific documents, you can add the following fields to documents. You can add the fields with any value.

<b>AUTN_FILTER_META_ONLY</b>	Prevents CFS extracting content from a file. CFS only extracts metadata and adds this information to the document.
<b>AUTN_NO_FILTER</b>	Prevents CFS extracting any text (metadata or content) from a file. This can be useful if you do not want to extract text from certain file types.
<b>AUTN_NO_EXTRACT</b>	Prevents CFS from extracting sub-files. This can be useful if you want to avoid extracting items from ZIP files and other container files.

**NOTE:**

To add a field to a document, use a Lua script. You must run the Lua script using a *Pre* import task. This is because *Post* import tasks run after KeyView filtering.

**Related Topics**

- [Write and Run Lua Scripts, on page 55](#)
- [Add a Field to a Document, on page 62](#)

# Chapter 7: Manipulate and Enrich Documents

This section describes how to manipulate and enrich documents using CFS.

- [Introduction](#) .....50
- [Write and Run Lua Scripts](#) ..... 55
- [Add Titles to Documents](#) .....64
- [Analyze Media](#) ..... 65
- [Analyze Speech](#) .....72
- [Categorize Documents](#) .....76
- [Run Education](#) .....80
- [Process HTML](#) .....82
- [Extract Metadata from Files](#) .....87
- [Import Content Into a Document](#) .....88
- [Reject Invalid Documents](#) .....89
- [Split Document Content into Sections](#) .....91
- [Split Files into Multiple Documents](#) .....92
- [Write Documents to Disk](#) .....94
- [Standardize Document Fields](#) .....97
- [Normalize E-mail Addresses](#) .....101
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- [Translate Documents](#) .....103

## Introduction

The documents produced by connectors and CFS contain information extracted from the source repository. In many cases you might want to add additional information to documents, or modify the structure of the documents, before they are indexed.

To modify documents before they are indexed, use *Import Tasks* and *Index Tasks*. These are customizable processing tasks that you can run on documents. You can use these tasks to write documents to disk, manipulate documents, reject documents, and run custom Lua scripts.

## Write documents to disk

You can write documents to disk in IDX or XML format. This allows you to view the information that is being indexed, so that you can check the information is being indexed as you expected. If necessary, you can then use other import tasks to manipulate and enrich the information.

## Manipulate and enrich documents

You can use import tasks to enrich documents. For example, you can:

- extract the meaningful content from HTML, and discard advertisements, headers, and sidebars.
- divide document content into sections. Dividing a document can result in more relevant query results, because IDOL can return a specific part of a document in response to a query.
- extract speech from audio and video files, and write a transcription of the speech to the document content. IDOL Server can then use the speech for retrieval, clustering, and other operations.

## Validate and reject documents

You can reject documents that you do not want to index, for example those that do not appear to contain valid content. When a document is rejected, it is not processed further and is not indexed. However, you can index the document into an IDOL Server that has been configured to handle failed documents.

## Run a Lua Script

Lua is an embedded scripting language that you can use to manipulate documents and define custom processing rules. CFS includes Lua functions for manipulating documents and running other tasks.

## Choose When to Run a Task

*Import Tasks* run when new documents are processed by CFS, before the documents are indexed. You can run Import Tasks before and/or after KeyView filtering.

- *Pre-import* tasks run before KeyView filtering. At this point the document only contains metadata extracted from the repository by the connector.
- *Post-import* tasks run after KeyView filtering. At this point the document also contains any content and metadata that was extracted from the file associated with the document.

*Index Tasks* run when a document's metadata (but not its content) is updated, or when a document is deleted. When a connector detects that document metadata has been updated or that a document has been deleted from a repository, it sends this information to CFS so that the document can be updated or removed from indexes such as IDOL Server.

- *Update* index tasks run when a document’s metadata (but not its content) is updated.
- *Delete* index tasks run when a document is deleted from a repository.

You can run some tasks, such as the Lua task, at any point during the import or indexing process.

You can run other tasks only at specific points within the import or indexing process. For example, to validate the content of documents you must use a post-import task. You cannot use a pre-import task because pre-import tasks occur before KeyView filtering, when documents do not contain any content.

The following table shows when you can run each type of task.

Task	Import Tasks		Index Tasks	
	Pre	Post	Update	Delete
<b>Run a Lua script</b>				
Lua	✓	✓	✓	✓
<b>Write documents to disk</b>				
CsvWriter	✓	✓	✓	✓
IdxWriter	✓	✓	✓	✓
JsonWriter	✓	✓	✓	✓
SqlWriter	✓	✓	✓	✓
XmlWriter	✓	✓	✓	✓
<b>Manipulate and enrich documents</b>				
Eduction		✓		
EmailAddressNormalisation	✓	✓		
ExtractMetadata	✓			
HtmlExtraction	✓			
ImportFile	✓	✓		
Sectioner		✓		

Task	Import Tasks		Index Tasks	
	Pre	Post	Update	Delete
Standardizer	✓	✓		
TextToDocs	✓			
<b>Validate and reject documents</b>				
BadFilesFilter		✓		
BinaryFileFilter		✓		
ImportErrorFilter		✓		
SymbolicContentFilter		✓		
WordLengthFilter		✓		
<b>Media analysis</b>				
MediaServerAnalysis	✓	✓		
IdolSpeech	✓	✓		

You can also call many of the tasks from a Lua script, which allows more advanced processing. For example, you might want to run a task only on selected documents. For information about the Lua functions that are provided by CFS, refer to the *Connector Framework Server Reference*.

**Related Topics**

- [The Import Process, on page 13.](#)

## Create Import and Index Tasks

Import tasks are configured in the [ImportTasks] section of the CFS configuration file. Import tasks run when files are imported, for example when a new item is retrieved from a repository or when the content of a file in a repository is updated. Use the Pre parameter to specify a list of tasks to run before KeyView filtering, and the Post parameter to specify a list of tasks to run after KeyView filtering.

Index tasks are configured in the [IndexTasks] section of the CFS configuration file. Use the Update parameter to specify a list of tasks to run when a connector instructs CFS to update the metadata of a document. Use the Delete parameter to specify a list of tasks to run when a connector instructs CFS to delete a document from indexes such as IDOL Server.

The tasks that you define run in sequence. In the following example, CFS creates an IDX file, then runs a Lua script, and then creates another IDX file:

```
[ImportTasks]
Post0=IdxWriter:C:\IDXArchive\before_script.idx
Post1=Lua:C:\Scripts\my_script.lua
Post2=IdxWriter:C:\IDXArchive\after_script.idx
```

### To create an import task

1. Stop CFS.
2. Open the CFS configuration file.
3. Find the `[ImportTasks]` section of the configuration file, or create it if it does not exist.
4. Add the task by setting the `Pre` or `Post` parameter.

The value of the `Pre` or `Post` parameter must be the name of the task that you want to run. Some tasks also require further information, such as the name of a file or the name of a section in the configuration file.

For example, to run a Lua script before `KeyView` filtering:

```
[ImportTasks]
Pre0=Lua:myscript.lua
```

5. Some import tasks require you to identify the documents to process by adding a field to the documents. For example, the `IdolSpeech` task only runs on documents that have the `AUTN_NEEDS_TRANSCRIPTION` field. For more information about the document fields that are used with import tasks, see [Document Fields for Import Tasks, on the next page](#).

To add a field to the documents that you want to process, use a Lua script. In the following example, a Lua script named `Filter.lua` runs before an `IdolSpeech` import task, to identify suitable documents and add the field `AUTN_NEEDS_TRANSCRIPTION`.

```
[ImportTasks]
Pre0=Lua:Filter.lua
Pre1=IdolSpeech:IdolSpeechSettings
```

6. Save the configuration file and restart CFS.

### To create an index task

1. Stop CFS.
2. Open the CFS configuration file.
3. Find the `[IndexTasks]` section of the configuration file, or create it if it does not exist.
4. Add the task by setting the `Update` or `Delete` parameter.

The value of the `Update` or `Delete` parameter must be the name of the task that you want to run. Some tasks also require further information, such as the name of a file or the name of a section in the configuration file.

For example:

```
[IndexTasks]  
Update0=Lua:myscript.lua
```

5. Save the configuration file and restart CFS.

## Document Fields for Import Tasks

You can customize how documents are processed by import tasks, by adding the following fields to your documents.

**NOTE:**

The Lua script that adds the document fields must run before the import tasks.

### AUTN\_NEEDS\_TRANSCRIPTION

To use an IDOL Speech Server to extract the speech from a document that represents an audio or video file, you must add the field `AUTN_NEEDS_TRANSCRIPTION` to the document. The `IdolSpeech` task only runs on documents that have this field. The field can have any value. For more information about the `IdolSpeech` task, see [Analyze Speech, on page 72](#).

### AUTN\_FORMAT\_CORRECT\_FOR\_TRANSCRIPTION

To bypass the transcoding step of an `IdolSpeech` task, add the field `AUTN_FORMAT_CORRECT_FOR_TRANSCRIPTION`. The field can have any value. Documents that have this field are not sent to a Transcode Server. For more information about the `IdolSpeech` task, see [Analyze Speech, on page 72](#).

### AUTN\_AUDIO\_LANGUAGE

To bypass the language identification step of an `IdolSpeech` task add the field `AUTN_AUDIO_LANGUAGE`. The value of the field must be the name of the IDOL Speech Server language pack to use for extracting speech. Documents that have this field are not sent to the IDOL Speech Server for language identification. For more information about the `IdolSpeech` task, see [Analyze Speech, on page 72](#).

### AUTN\_NEEDS\_MEDIA\_SERVER\_ANALYSIS

To perform analysis on media files using the `MediaServerAnalysis` task, you must add this field to every document that you want to analyze. The field can have any value.

## Write and Run Lua Scripts

Connector Framework Server supports Lua, an embedded scripting language. CFS supports all standard Lua functions. For more information about Lua, refer to <http://www.lua.org/>.

You can use a Lua script to:

- Add or modify document fields.
- Run built-in processing tasks, such as Education or image analysis.
- Call out to an external service, for example to alert a user.
- Interface with other libraries.

## Write a Lua Script

Your Lua script must have the following structure:

```
function handler(document)
    ...
end
```

The `handler` function is called for each document and is passed a document object. The document object is an internal representation of the document being processed. Modifying this object changes the document.

For CFS to continue processing the document, the function must return `true`. If the function returns `false`, the document is discarded.

The script can also terminate due to an error, for example if you use the Lua `error` function or call a Lua function that causes an error. In this case CFS continues to process the document, but places an error message in the `ImportErrorDescription` field.

### TIP:

You can write a library of useful functions to share between multiple scripts, which you can then include in the scripts by adding `dofile("library.lua")` to the top of the lua script outside of the `handler` function.

## Run a Lua Script

To run a Lua script, create a Lua import or index task, and specify the path to your script. You can run Lua scripts using *pre* and *post* Import Tasks, and using *update* and *delete* index tasks. For example:

```
[ImportTasks]
Post0=Lua:c:\scripts\script1.lua
```

## Debug a Lua Script

When you run a Lua script and the script fails due to an error, CFS writes the error to the import log stream, and to the `ImportErrorDescription` field of any documents that are affected.

To debug your Lua scripts, you can use the `LuaDebug` action. You can use this action to pause and resume scripts, and set and remove breakpoints. When a script is paused you can view the values of variables, view a stack trace, and step over single lines.

## Sessions

CFS can have more than one import thread, and might run multiple Lua scripts concurrently. This means that you can have multiple Lua Debugging sessions. You might want to pause or continue running scripts on one thread but not others. Some of the commands available through the `LuaDebug` action allow or require you to specify a `session` action parameter. If the `session` parameter is optional and you do not specify a session, the command applies to all sessions. To view open sessions and obtain the values you can set for the `session` action parameter, use the command `/action=LuaDebug&command=get-status`.

## Example

The following procedure demonstrates how to set a breakpoint in a script, view the values of Lua variables when the script is paused, and step over single lines. The actions in this procedure assume that your CFS is running on the local machine and is listening for actions on port 7000. For more information about the `LuaDebug` action, refer to the *Connector Framework Server Reference*.

### To debug a Lua script

1. In the CFS configuration file, configure the script to run. This example uses the `AddLanguageDetectionFields` script that is included with CFS. For example:

```
[ImportTasks]
Post0=Lua:scripts/AddLanguageDetectionFields.lua
```

2. Start CFS.
3. To pause the script before a specific line is executed, set a breakpoint on that line. Line 33 of the `AddLanguageDetectionFields` script sends an action to IDOL Server and stores the response in a variable named `response`. To stop the script before this happens, use the following action:

```
http://localhost:7000/action=luadebug
      &command=set-breakpoint
      &file=scripts/AddLanguageDetectionFields.lua
      &line=33
```

4. (Optional) Confirm the breakpoint has been set using the `get-breakpoints` command:

```
http://localhost:7000/action=luadebug&command=get-breakpoints
```

CFS returns the response.

```
<autnresponse xmlns:autn="http://schemas.autonomy.com/aci/">
  <action>LUADEBUG</action>
  <response>SUCCESS</response>
  <responsedata>
    <data>
      <command>get-breakpoints</command>
      <breakpoints>
        <breakpoint
```

```
source="C:\Autonomy\ConnectorFramework\scripts\AddLanguageDetectionFields.lua"  
line="33"/>  
    </breakpoints>  
  </data>  
</responsedata>  
</autnresponse>
```

5. Send CFS an `IngestTest` action so that CFS ingests a document and runs the script:

```
http://localhost:7000/action=IngestTest&adds=...
```

**TIP:**

Use an `IngestTest` action, rather than an `Ingest` action, because the `IngestTest` action does not index any information into IDOL Server. For more information about the `IngestTest` action, see [Ingest Data for Testing, on page 46](#).

CFS runs the script. The `IngestTest` action does not finish (because the script is paused at the breakpoint) and therefore does not return a response.

6. Retrieve a token for the debugging session by sending CFS the `LuaDebug` command `get-status`:

```
http://localhost:7000/action=LuaDebug&command=get-status
```

CFS returns the response. You can see that there is a single debugging session and the Lua script has stopped at the breakpoint.

```
<autnresponse xmlns:autn="http://schemas.autonomy.com/aci/">  
  <action>LUADEBUG</action>  
  <response>SUCCESS</response>  
  <responsedata>  
    <data>  
      <command>get-status</command>  
      <session id="e4f7c45f561930cd17a5aed0fe1481d8">  
        <status>AtBreak</status>  
      </session>  
    </data>  
  </responsedata>  
</autnresponse>
```

7. To retrieve the values of the Lua variables at the breakpoint, run the `LuaDebug` command `get-locals`. Use the session token that you retrieved with the `get-status` command:

```
http://localhost:7000/action=LuaDebug  
    &command=get-locals  
    &session=e4f7c45f561930cd17a5aed0fe1481d8
```

CFS returns the response.

```
<autnresponse xmlns:autn="http://schemas.autonomy.com/aci/">  
  <action>LUADEBUG</action>  
  <response>SUCCESS</response>  
  <responsedata>  
    <data>
```

```
<command>get-locals</command>
<session id="e4f7c45f561930cd17a5aed0fe1481d8">
  <locals>
    ...
    <local name="idolHost" type="string">localhost</local>
    <local name="idolACIPort" type="number">9000</local>
    <local name="timeout" type="number">30000</local>
    ...
    ...
    <local type="string" name="detectionString">This is a document that
      contains text in English. Automatic Language Detection will
      detect the language and add the information to the document
    ...</local>
  </locals>
</session>
</data>
</responsedata>
</autnresponse>
```

8. Use the `step` command to run line 33. CFS does not run subsequent lines (the script will remain paused). Use the session token you retrieved with the `get-status` command:

```
http://localhost:7000/action=LuaDebug
      &command=step
      &session=e4f7c45f561930cd17a5aed0fe1481d8
```

CFS returns the response.

```
<autnresponse xmlns:autn="http://schemas.autonomy.com/aci/">
  <action>LUADEBUG</action>
  <response>SUCCESS</response>
  <responsedata>
    <data>
      <command>step</command>
      <session id="e4f7c45f561930cd17a5aed0fe1481d8"/>
    </data>
  </responsedata>
</autnresponse>
```

9. To see what effect the `step` had on the variables, run the `get-locals` command again. You should see a new variable named `response` that contains the response from the `DetectLanguage` action.

```
http://localhost:7000/action=LuaDebug
      &command=get-locals
      &session=e4f7c45f561930cd17a5aed0fe1481d8
```

10. After examining the variables, you might want to remove the breakpoint. To remove the breakpoint, send CFS the following action:

```
http://localhost:7000/action=LuaDebug
      &command=remove-breakpoint
```

```
&file=scripts/AddLanguageDetectionFields.lua  
&line=33
```

CFS returns the response. You can also use `/action=LuaDebug&command=get-breakpoints` to confirm that the breakpoint has been removed.

11. To continue running the Lua script, use the `continue` command:

```
http://localhost:7000/action=LuaDebug  
      &command=continue  
      &session=e4f7c45f561930cd17a5aed0fe1481d8
```

CFS continues to run the script. The `IngestTest` action finishes and returns a response.

## Lua Scripts Included With CFS

The CFS installation directory includes a `scripts` folder that includes the following Lua scripts:

Script	Description
<code>AddLanguageDetectionFields.lua</code>	<p>Detects the language of a document's content, using the IDOL Server action <code>DetectLanguage</code>. The script then adds fields describing the language and encoding to the document's metadata.</p> <p>The script demonstrates how to:</p> <ul style="list-style-type: none"><li>• send an action to an ACI server.</li><li>• parse the action response to a <code>LuaXmlDocument</code>.</li><li>• use the methods of <code>LuaXmlDocument</code> to extract data from the document.</li></ul> <p>The script assumes that an IDOL Server is installed on the local machine with an ACI port of 9000. You might need to modify these values.</p> <p>If you use this script, run it as a <i>post</i> import task so that it runs after <code>KeyView</code> has extracted document content.</p>
<code>CategorySuggestFromText.lua</code>	<p>Sends a document to IDOL for categorization, and adds information about the matching categories to the document's metadata. For information about how to use this script, see <a href="#">Categorize Documents, on page 76</a>.</p>
<code>filterdodgyfiles.lua</code>	<p>An example script that demonstrates various ways to reject unwanted files, for example by file extension, by detecting the file format, or by analyzing the file content.</p>
<code>identifiers.lua</code>	<p>Adds sub-file indexes to the <code>AUTN_IDENTIFIER</code> document field of sub-files. This allows a connector to retrieve the sub-file, rather than the whole container, when the <code>collect</code> or</p>

Script	Description
	<p>view actions are used to retrieve the original file.</p> <p>If you use this script, you must run it as a <i>post</i> import task (so that it runs after KeyView processes the documents).</p> <p>For more information about the AUTN_IDENTIFIER field, see <a href="#">AUTN_IDENTIFIER, on page 205</a>.</p>
IdolSpeech.lua	<p>Runs speech-to text on all files identified by KeyView as containing audio or video. To use this script, you must configure the settings for your IDOL Speech Server in the [IdolSpeechSettings] section of the CFS configuration file. For more information about using this script, see <a href="#">Run Analysis on All Audio and Video Files, on page 72</a>.</p>
mediaserver/*.lua	<p>These scripts run analysis on images, audio files, and video files by sending them to Media Server. For information about configuring media analysis, see <a href="#">Analyze Media, on page 65</a>.</p>

**NOTE:**

CFS also includes scripts for use with Education. Some of these scripts are Education post processing scripts, which modify the output from an Education import task. The post processing scripts have the entry point function `processmatch (edkmatch)`, rather than function handler `(document)`. You must run a post processing script using the [Education](#) import task. Do not run an Education post processing script using a Lua task. For more information about Education Lua Post Processing, see [Lua Post Processing, on page 81](#). For information about the Education scripts that are included with CFS, refer to the *Education User Guide*.

## Use Named Parameters

Some Lua functions have an argument that takes named parameters. This argument is a table in which you can specify values for various parameters that affect the operation of the function.

You can specify a value for every parameter, or just those that you need. If you do not specify a value for a parameter, the function uses a default value. You can also specify the name of a configuration section and the function will read settings from that section in the CFS configuration file.

For example, when you call the function `looks_like_language`, you can set only the `term_file` named parameter, and use default values for the other settings:

```
looks_like_language(document, { term_file = "english.ocr" })
```

You might choose to set the `stop_list` parameter as well:

```
looks_like_language(document, { term_file = "english.ocr",  
                               stop_list = "englishstoplist.dat" })
```

Alternatively, you can specify the name of a section in the CFS configuration file:

```
looks_like_language(document, { term_file = "english.ocr",  
                               section = "LanguageSettings" })
```

In this example, the function uses the `english.ocr` term file. The settings for the remaining parameters are read from the `LanguageSettings` section of the CFS configuration file.

If you specify the name of a configuration section and use named parameters, the named parameters override any values set in the configuration file. In the following example, the `threshold` is set to 100, while other parameters (like `term_file`) are read from the `LanguageSettings` section:

```
looks_like_language(document, { section = "LanguageSettings",  
                               threshold=100 })
```

For information about individual named parameters and corresponding configuration parameters, refer to the *Connector Framework Server Reference*.

## Enable or Disable Lua Scripts During Testing

Lua scripts run by CFS can read a global Lua variable, `is_test`.

- When a script runs as part of an `Ingest` action, this variable is `false`.
- When a script runs as part of an `IngestTest` action, this variable is `true`.

You can use the `is_test` variable to enable or disable parts of a script. For example:

```
if is_test then  
    -- The part of the script to enable for IngestTest  
    -- (or disable for Ingest)  
end  
  
if not is_test then  
    -- The part of the script to disable for IngestTest  
    -- (or enable for Ingest)  
end
```

## Example Lua Scripts

This section contains example Lua scripts.

### Add a Field to a Document

The following script demonstrates how to add a field named "MyField" to a document, with a value of "MyValue".

```
function handler(document)  
    document:addField("MyField", "MyValue");  
    return true;  
end
```

The following script demonstrates how to add the field `AUTN_NEEDS_IMAGE_SERVER_ANALYSIS` to all JPEG, TIFF and BMP documents. This field specifies that the documents can be processed using an `ImageServerAnalysis` import task (you must also define the task in the CFS configuration file).

The script finds the file type using the `DREREFERENCE` document field, so this field must contain the file extension for the script to work correctly.

```
function handler(document)
  local extensions_for_ocr = { jpg = 1 , tif = 1, bmp = 1 };
  local filename = document:getFieldValue("DREREFERENCE");
  local extension, extension_found =
    filename:gsub("^.*%.(%w+)$", "%1", 1);

  if extension_found > 0 then
    if extensions_for_ocr[extension:lower()] ~= nil then
      document:addField("AUTN_NEEDS_IMAGE_SERVER_ANALYSIS", "");
    end
  end

  return true;
end
```

## Count Sections

For each document, this Lua script adds a total sections count to the title, and replaces the content of each section with the section number.

```
function handler(document)
  local section_count = 0;
  local section = document;

  while section do
    section_count = section_count + 1;
    section:setContent("Section " .. section_count);
    section = section:getNextSection();
  end

  local title = document:getFieldValue("TITLE");

  if title == nil then title = "" end
  document:setFieldValue("TITLE", title .. " Total Sections "
    .. section_count);

  return true;
end
```

## Merge Document Fields

This script demonstrates how to merge the values of document fields.

When you extract data from a repository, CFS can produce documents that have multiple values for a single field, for example:

```
#DREFIELD ATTACHMENT="attachment.txt"  
#DREFIELD ATTACHMENT="image.jpg"  
#DREFIELD ATTACHMENT="document.pdf"
```

This script shows how to merge the values of these fields, so that the values are contained in a single field, for example:

```
#DREFIELD ATTACHMENTS="attachment.txt, image.jpg, document.pdf"
```

## Example Script

```
function handler(document)  
  onefield(document, "ATTACHMENT", "ATTACHMENTS")  
  return true;  
end  
  
function onefield(document, existingfield, newfield)  
  if document:hasField(existingfield) then  
    local values = { document:getFieldValues(existingfield) }  
    local newfieldvalue=""  
  
    for i,v in ipairs(values) do  
      if i>1 then  
        newfieldvalue = newfieldvalue ..", "  
      end  
  
      newfieldvalue = newfieldvalue..v  
    end  
  
    document:addField(newfield, newfieldvalue)  
  end  
  
  return true;  
end
```

## Add Titles to Documents

IDOL documents have a field named `DRETITLE` that can contain a title for the document. Front end applications might use the value of this field to present a title to users when displaying query results.

You should not rely on a connector to add a document title, because the connector might not be able to obtain this information. A suitable title for an e-mail message could be the subject of the e-mail, but this is not extracted until the e-mail is processed by CFS.

You can therefore use a Lua script to add a title to documents that do not have one, and, if necessary, ensure that all documents have suitable titles.

CFS includes a Lua script that adds titles to documents. The script is named `ExtractDreTitles.lua`, and is located in the `scripts` folder, in the CFS installation directory. You can use this script or modify it to suit your requirements.

The unmodified script ensures that all documents have a title. If a title has already been added to the document, that title is respected. If the document does not have a title, the script attempts to extract one from metadata fields that are added by KeyView and often contain titles. If none of these fields are present, the script adds a title by extracting the original file name from the field `DREORIGINALNAME`.

### To add titles to documents using the `ExtractDreTitles` Lua script

1. Open the CFS configuration file.
2. Find the `[ImportTasks]` section of the configuration file, or create this section if it does not exist.
3. In the `[ImportTasks]` section, configure a `Post` import task to run the Lua script `scripts/ExtractDreTitles.lua`.

For example:

```
[ImportTasks]
Post0=Lua:scripts/ExtractDreTitles.lua
```

**TIP:**

You must use a `Post` task so that the script runs after KeyView filtering.

4. Save and close the configuration file.

## Analyze Media

Images, audio, and video are examples of unstructured information that represent a vast quantity of data. CFS extracts metadata from these files but cannot process their content, so by default documents that represent these files are indexed without any content.

To enrich documents that represent rich media files, you can send the files to an IDOL Media Server for analysis. Media Server can:

- extract text from scanned documents, and subtitles and scrolling text from video.
- identify people that appear by matching faces to a database of known faces.
- identify known logos and objects.
- detect and read barcodes, including QR codes.
- determine the language of speech in a video file, convert the speech into text, and identify any known speakers (speech processing also requires an IDOL Speech Server).

For more information about the types of analysis that you can run, refer to the *Media Server Administration Guide*.

**NOTE:**

Some types of analysis require you to train Media Server before you start processing.

## Create a Media Server Configuration

To run analysis on media, you must create a Media Server configuration file that instructs Media Server how to process the media. Micro Focus recommends that you save the configuration in a location accessible to CFS, and configure CFS to send the configuration to Media Server with each request.

Example Media Server configurations are provided with CFS in the `script_resources/mediaserver` directory.

The Media Server configuration must meet the following requirements.

### Ingestion

There is no single configuration that can process both images and video, so you must configure Media Server to ingest the correct type of media.

The following example demonstrates how to configure ingestion. To process audio or video files, set the parameter `IngestEngine=AudioVideo` so that Media Server uses the settings in the `[AudioVideo]` section of the configuration. To process image files (including PDF files and office documents that contain embedded images), set the parameter `IngestEngine=Image`. The Lua functions `analyze_media_in_document` and `analyze_media_in_file` allow you to override individual parameters, so if you request analysis from a Lua script you can first determine the file type and then set the value of the parameter when you call the function.

```
[Ingest]
IngestRate=0
IngestEngine=AudioVideo
```

```
[AudioVideo]
Type=LibAv
```

```
[Image]
Type=Image
```

For more information about configuring ingestion, and the file types that are supported, refer to the *Media Server Administration Guide*.

### Analysis

Create a section in the configuration file named `[Analysis]`, and configure the analysis operations that you want to run.

The following example configures face detection and optical character recognition:

```
[Analysis]
AnalysisEngine0=FaceDetect
AnalysisEngine1=OCR
```

```
[FaceDetect]
Type=FaceDetect
```

```
MinSize=70
```

```
[OCR]  
Type=OCR
```

For more information about configuring analysis in Media Server, refer to the *Media Server Administration Guide*.

## Output

CFS expects Media Server to return the results of analysis in the `process` action response. You must create a section in the configuration file named `[Output]`, and configure an output task to write data to the action response.

```
[Output]  
OutputEngine0=response
```

```
[response]  
Type=response
```

## Configure the Media Analysis Task

You can run media analysis on documents by using the `MediaServerAnalysis` import task. This task only processes documents that have the document field `AUTN_NEEDS_MEDIA_SERVER_ANALYSIS`, so you must add this field to any document that you want to process.

### To configure the Media Server Analysis task

1. Write a Lua script to add the document field `AUTN_NEEDS_MEDIA_SERVER_ANALYSIS` to the documents that you want to analyze. For an example script that adds a field to a document, see [Add a Field to a Document, on page 62](#).
2. Open the CFS configuration file.
3. In the `[ImportTasks]` section, configure a `Pre` or `Post` import task to run your Lua script. For example:

```
[ImportTasks]  
Pre0=Lua:scripts/TagVideoFiles.lua
```

4. Add another `Pre` or `Post` task to run the `MediaServerAnalysis` task. Set the `Pre` or `Post` parameter to `MediaServerAnalysis`, followed by a colon (`:`), followed by the name of the section in the CFS configuration file that contains the task settings. For example:

```
Pre1=MediaServerAnalysis:MediaServerSettings
```

5. Create a new section in the configuration file, using the name you specified in Step 4.
6. In the new section, set the following parameters:

MediaServerHost	The host name and ACI port of your Media Server. To distribute requests between several servers, specify a comma-separated list of servers.
MediaAnalysisTransform	(Optional) To transform the metadata produced by Media Server, before CFS adds the data to your documents, set this parameter to the path of the XSL transformation to use. By default, CFS adds the information to your documents in a document field named <code>MediaServerAnalysis</code> , in the same structure that is returned from Media Server.

7. Specify the Media Server configuration file that you want to use for running analysis:
  - If you saved your configuration file in the directory specified by the `ConfigDirectory` parameter, in the `[Paths]` section of the Media Server configuration file, set `MediaServerConfigurationName` to the name of the configuration.
  - If you saved your configuration file in a location accessible by CFS, set the parameter `MediaServerConfigurationFileName` to the path of the configuration file. If you set a relative path, specify the path relative to CFS, not relative to Media Server.
8. Specify how to send media to Media Server:
  - If your Media Server can read files directly from the CFS working directory, set `ReadFromOriginalLocation=TRUE`.
  - To copy files to a shared folder, set the configuration parameter `MediaServerSharedPath`. This folder must be accessible to both CFS and Media Server. CFS copies files to the shared folder so that Media Server can read them. Micro Focus recommends that you use a shared folder for sending large files.
  - To send files to Media Server using HTTP POST requests, set neither `ReadFromOriginalLocation` nor `MediaServerSharedPath`.
9. Save and close the configuration file.

## Examples

The following example shows how to configure the `MediaServerAnalysis` task. This example runs analysis using a configuration named `RecognizeFacesInVideo` that exists on the Media Server machine:

```
[ImportTasks]
Pre0=Lua:TagVideoFiles.lua
Pre1=MediaServerAnalysis:MediaServerSettings

[MediaServerSettings]
MediaServerHost=localhost:14000
MediaServerConfigurationName=RecognizeFacesInVideo
ReadFromOriginalLocation=TRUE
```

The following example is similar but configures CFS to send a configuration file to Media Server:

```
[ImportTasks]
Pre0=Lua:TagVideoFiles.lua
Pre1=MediaServerAnalysis:MediaServerSettings

[MediaServerSettings]
MediaServerHost=localhost:14000
MediaServerConfigurationFileName=./script_resources/mediaserver/facerecognition.cfg
ReadFromOriginalLocation=TRUE
```

If your CFS and Media Server are running on separate machines, you can configure CFS to copy media files to a shared folder:

```
[ImportTasks]
Pre0=Lua:TagVideoFiles.lua
Pre1=MediaServerAnalysis:MediaServerSettings

[MediaServerSettings]
MediaServerHost=media1:14000,media2:14000
MediaServerConfigurationName=RecognizeFacesInVideo
MediaServerSharedPath=\\server\videofiles
```

CFS adds the results of analysis to your documents. By default, the information is added in the same structure that is returned from Media Server, in a document field named `MediaServerAnalysis`. Using the configuration parameter `MediaAnalysisTransform`, you can configure CFS to run an XSL transformation to transform the information before adding it to a document:

```
[ImportTasks]
Pre0=Lua:TagVideoFiles.lua
Pre1=MediaServerAnalysis:MediaServerSettings

[MediaServerSettings]
MediaServerHost=media1:14000,media2:14000
MediaServerConfigurationName=RecognizeFacesInVideo
MediaServerSharedPath=\\server\videofiles
MediaAnalysisTransform=./xslt/transform.xsl
```

For more information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Run Analysis From Lua

CFS provides Lua functions to run media analysis from a Lua script. These functions are named `analyze_media_in_document` and `analyze_media_in_file`. There are several advantages to running media analysis from a Lua script, instead of using the `MediaServerAnalysis` import task.

Firstly, you can use a single configuration to process audio, video, and image files. Your Lua script can identify the type of content that is associated with a document, and choose the correct Media Server engine to use for ingesting that content. The only way to process audio, video, and image files using the `MediaServerAnalysis` import task is to configure several tasks.

Secondly, you can configure more complex operations. For example, you can write a Lua script that sends audio to Media Server for language identification, and then uses the results of language identification to run speech-to-text with the correct language pack.

Finally, you can run analysis from Lua by configuring a single import task. To use the `MediaServerAnalysis` import task, you run a Lua script that identifies the documents to process, followed by the `MediaServerAnalysis` task itself.

CFS is supplied with example scripts that run media analysis. The scripts are in the `scripts/mediaserver` folder, in the CFS installation directory.

The following procedure demonstrates how to configure media analysis from a Lua script, in this case language detection followed by speech-to-text.

### To run media analysis from Lua

1. Write a Lua script that identifies the documents that you want to process and calls the function `analyze_media_in_document` (or `analyze_media_in_file`).

An example Lua script for running language detection and speech-to-text is located at `./scripts/mediaserver/LangDetectAndSpeechToText.lua`.

2. Create one or more configurations for Media Server that specify the tasks to perform. The Lua script `LangDetectAndSpeechToText.lua` uses two configurations, one for language detection and another for speech-to-text:

- `./script_resources/mediaserver/langdetect.cfg`
- `./script_resources/mediaserver/spechtotext.cfg`

If you are using the example configuration files, check that the details are correct for your environment. For example, you might need to set the host name and ACI port of your Speech Server.

3. In the CFS configuration file, create an import task to run the Lua script. For example:

```
[ImportTasks]
Pre0=Lua:./scripts/mediaserver/LangDetectAndSpeechToText.lua
```

```
[MediaServerSettings]
MediaServerHost=mediaserver:14000
ReadFromOriginalLocation=true
// MediaServerSharedPath=<Share Directory UNC path>
```

The example script passes the `[MediaServerSettings]` section to the Lua function `analyze_media_in_document`. In the example configuration, above, this section provides the host name and ACI port of the Media Server and specifies how Media Server can access the media.

You can provide files to Media Server in several ways:

- If your Media Server can read files directly from the CFS working directory, set `ReadFromOriginalLocation=TRUE`.
- To copy files to a shared folder, set the configuration parameter `MediaServerSharedPath`. This folder must be accessible to both CFS and Media Server. CFS copies files to the shared folder

so that Media Server can read them. Micro Focus recommends that you use a shared folder for sending large files.

- To send files to Media Server using HTTP POST requests, set neither `ReadFromOriginalLocation` nor `MediaServerSharedPath`.

4. Save and close the configuration file.

## Examples

The following example configuration runs OCR on all supported image and video files ingested by CFS:

```
[ImportTasks]
Pre0=Lua:scripts/mediaserver/OCR.lua
```

```
[MediaServerSettings]
MediaServerHost=localhost:14000
ReadFromOriginalLocation=TRUE
```

If your CFS and Media Server are running on separate machines, you can configure CFS to copy the files to a shared folder:

```
[ImportTasks]
Pre0=Lua:scripts/mediaserver/OCR.lua

[MediaServerSettings]
MediaServerHost=mediaserver:14000
MediaServerSharedPath=\\server\videofiles
```

## Troubleshoot Media Analysis

This section describes how to troubleshoot problems that might occur when you configure media analysis.

### ***Error: Failed to find output node in response***

Task (type: POST) failed with error: MediaServerAnalysis task failed: Failed to find output node in response

Analysis will fail if CFS cannot retrieve the results of analysis from Media Server. If your analysis task fails with this error, check that your Media Server configuration includes an output task to add the results of analysis to the `process` action response. For example:

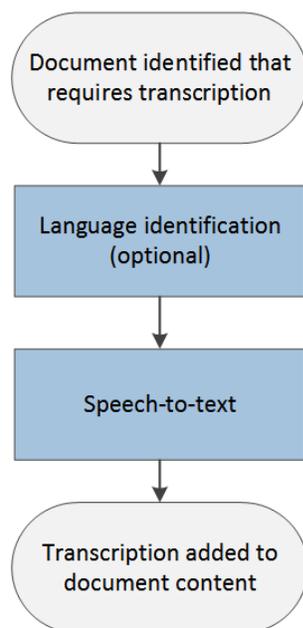
```
[Output]
OutputEngine0=response

[response]
Type=response
```

## Analyze Speech

CFS extracts metadata from audio and video files but cannot process their content, so by default documents that represent audio and video are indexed without any content. You can enrich these documents by sending the files to an IDOL Speech Server. The Speech Server processes the audio, extracts any speech, and writes it to the document content.

The processing task that sends files to IDOL Speech Server for analysis is called `IdolSpeech`. It can include the following steps.



1. Documents are identified that require speech-to-text processing.
2. (Optional) CFS sends the audio to an IDOL Speech Server to determine the language of the speech.
3. CFS sends the audio to an IDOL Speech Server for transcription.
4. CFS adds the transcription to the document content.

## Run Analysis on All Audio and Video Files

To run speech-to-text on all files identified by KeyView as containing audio or video, run the Lua script `scripts/IdolSpeech.Lua`. The script reads settings from the `[IdolSpeechSettings]` section of the CFS configuration file.

The following example demonstrates how to run the script and specify information about your Speech Server:

```
[ImportTasks]
Pre0=Lua:scripts/IdolSpeech.lua
```

```
[IdolSpeechSettings]
IdolSpeechServers=server:15000
IdolSpeechLanguage=ENUK
```

The `IdolSpeechServers` parameter specifies the host name or IP address, and ACI port, of your Speech Server. Speech-to-text processing can be time consuming, so you can distribute the load over more than one Speech Server. For information about how to do this, see [Use Multiple Speech Servers, on the next page](#).

The `IdolSpeechLanguage` parameter is optional and specifies the language pack to use for transcription. If you do not set this parameter, Speech Server runs language detection on each file and chooses a language pack automatically. If you know that all of your files are in the same language, Micro Focus recommends setting this parameter to reduce the load on the Speech Server.

If you prefer to send files to your IDOL Speech Server by writing them to a shared folder, add the `IdolSpeechUseSharedPath` and `SharedPath` parameters to the configuration:

```
[ImportTasks]
Pre0=Lua:scripts/IdolSpeech.lua
```

```
[IdolSpeechSettings]
IdolSpeechServers=server:15000
IdolSpeechLanguage=ENUK
IdolSpeechUseSharedPath=true
SharedPath=\\server\SharedPath
```

Setting the parameter `IdolSpeechUseSharedPath` to `true` specifies that CFS sends files to Speech Server by copying them to a shared folder. The `SharedPath` parameter specifies the location of the shared folder. The folder must be accessible to both CFS and Speech Server.

## Run Analysis on Specific Documents

To run speech-to-text on specific documents, you can modify the criteria in `scripts/IdolSpeech.lua`, or you can use the `IdolSpeech` import task and write your own Lua script to identify the documents to process. The `IdolSpeech` task only processes documents that have the field `AUTN_NEEDS_TRANSCRIPTION`, so your script must add this field to any document that you want to process.

The following example shows how to configure the `IdolSpeech` task in the CFS configuration file:

```
[ImportTasks]
Pre0=Lua:Identify_Audio_Files.lua
Pre1=IdolSpeech:IdolSpeechSettings
```

```
[IdolSpeechSettings]
IdolSpeechServers=server:15000
IdolSpeechLanguage=ENUK
```

The `Pre0` import task runs a Lua script that determines whether a file is suitable for transcription. You must write this script. The script must add the field `AUTN_NEEDS_TRANSCRIPTION` to any documents that you want to process. You can include conditions in the script to filter documents based on the document source, file type, or metadata extracted by KeyView.

The `Pre1` import task is the `IdolSpeech` task. It specifies the name of a section in the configuration file that contains the settings for the task. In this example the section is named `IdolSpeechSettings`.

The `IdolSpeechServers` parameter specifies the host name or IP address, and ACI port, of your IDOL Speech Server. To use multiple Speech Servers, see [Use Multiple Speech Servers, below](#).

The `IdolSpeechLanguage` parameter is optional and specifies the language pack to use for transcription. You can set this parameter when all of your audio files are in the same language. If your audio files are in different languages, remove `IdolSpeechLanguage` so that Speech Server uses language detection to detect the language for each document. For more information about language identification, see [Language Identification, below](#).

If you prefer to send files to your IDOL Speech Server by writing them to a shared folder, add the `IdolSpeechUseSharedPath` and `SharedPath` parameters to the configuration:

```
[ImportTasks]
Pre0=Lua:Identify_Audio_Files.lua
Pre1=IdolSpeech:IdolSpeechSettings
```

```
[IdolSpeechSettings]
IdolSpeechServers=server:15000
IdolSpeechLanguage=ENUK
IdolSpeechUseSharedPath=true
SharedPath=\\server\SharedPath
```

Setting `IdolSpeechUseSharedPath=TRUE` instructs CFS to send files to Speech Server by writing them to the shared folder, specified by the `SharedPath` parameter.

For more information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Use Multiple Speech Servers

Language identification and speech-to-text processing can be time consuming. To increase performance, you can use several IDOL Speech Servers. The `IdolSpeechServers` configuration parameter accepts a comma-separated list of servers. For example:

```
IdolSpeechServers=server1:15000,server2:15000
```

Alternatively, you can use a numbered list:

```
IdolSpeechServers0=server1:15000
IdolSpeechServers1=server2:15000
```

## Language Identification

To convert speech to text successfully, the IDOL Speech Server must know the language of the speech.

The IDOL Speech Server can automatically identify the language of speech. If language identification is not bypassed using one of the following methods it is performed automatically.

### To bypass language identification

- To bypass language identification for all documents, set the `IdolSpeechLanguage` configuration parameter. This parameter specifies the language pack to use for all documents and takes precedence over other language settings. You can set this parameter when all of your audio is in the same language.
- To bypass language identification for a single document, add the field `AUTN_AUDIO_LANGUAGE` to the document. The value of the field must identify the language pack to use for transcription, for example:

```
#DREFIELD AUTN_AUDIO_LANGUAGE="ENUK"
```

For a list of IDOL Speech Server language packs, refer to the *IDOL Speech Server Administration Guide*.

## Transcode Audio

In most cases you do not need to transcode audio before sending it to IDOL Speech Server.

#### TIP:

Transcoding is necessary only when you set `IdolSpeechUseStreaming=TRUE`, which is **not** recommended.

In the following configuration, audio is streamed to the IDOL Speech Server, because the parameter `IdolSpeechUseStreaming` is `TRUE`. The configuration therefore includes the parameters `TranscodeServerHost` and `TranscodeServerPort` so that CFS sends the audio to a Transcode Server before it is sent to Speech Server. Although the audio is streamed to Speech Server, the shared folder specified by the `SharedPath` parameter is required so that CFS and the Transcode Server can exchange data.

```
[ImportTasks]
Pre0=Lua:scripts/IdolSpeech.lua

[IdolSpeechSettings]
IdolSpeechServers=server1:15000,server2:15000
IdolSpeechUseStreaming=TRUE
TranscodeServerHost=server3
TranscodeServerPort=30000
SharedPath=\\server\SharedPath
IdolSpeechLanguage=ENUK
```

If you are streaming audio to Speech Server but know that files are already in an acceptable format, you can configure CFS to bypass the transcoding step of the `IdolSpeech` task.

### To bypass transcoding

- To bypass transcoding for all documents, do *not* set the `TranscodeServerHost` or `TranscodeServerPort` configuration parameters when you configure the `IdolSpeech` task.

- To bypass transcoding for a single document, add the field `AUTN_FORMAT_CORRECT_FOR_TRANSCRIPTION` to the document. The field can have any value. CFS does not send these files to the Transcode Server.

## Speech-To-Text Results

When you run speech-to-text, CFS adds a transcription of the speech to the document content (the `DRECONTENT` field).

CFS can also add the start time, duration, and confidence score for each detected word, sentence boundary, and period of silence to the document metadata:

- To add start times and durations to the document metadata, set the parameter `AddTimingsToMetadata=TRUE`.
- To add confidence scores to the document metadata, set the parameter `AddConfidenceToMetadata=TRUE`.

If you choose to add information to the document metadata, CFS adds a metadata field named `SpeechToTextWord` for each detected word, sentence boundary, or period of silence.

When you set `AddTimingsToMetadata=TRUE`, the field includes attributes named `start` and `duration`, which describe the start time and duration in the audio:

```
<SpeechToTextWord start="3.1562" duration="0.3568">hello</SpeechToTextWord>
```

When you set `AddConfidenceToMetadata=TRUE`, the field includes an attribute named `confidence`, which describes the confidence score. The confidence score is a value between 0 (zero) and 1. Higher confidence scores indicate greater confidence of a correct result.

```
<SpeechToTextWord confidence="0.9568">hello</SpeechToTextWord>
```

When you set `AddTimingsToMetadata=TRUE` and `AddConfidenceToMetadata=TRUE`, CFS adds fields that include all of these attributes:

```
<SpeechToTextWord start="3.1562" duration="0.3568" confidence="0.9568">hello</SpeechToTextWord>
```

Fields that represent periods of silence have no value, for example:

```
<SpeechToTextWord start="3.1562" duration="0.3568" confidence="0.9568" />
```

Fields that represent sentence boundaries have a value of `.`, for example:

```
<SpeechToTextWord start="3.1562" duration="0.3568" confidence="0.9568">.</SpeechToTextWord>
```

## Categorize Documents

Categorization analyzes the concepts that exist in a document and, if those concepts match categories in IDOL Server, adds category information to the document. Categorizing documents is useful because you can alert IDOL users to new content that matches their interests, help them find information through taxonomies, and help them to identify similar documents.

To use categorization, you must have created and trained categories in IDOL Server. CFS queries IDOL by sending the `CategorySuggestFromText` action for each document, and IDOL returns information about any categories that match. If a document does not match any of the categories in IDOL Server, the document is not categorized. For information about how to create and train categories, refer to the *IDOL Server Administration Guide*.

### To categorize documents

1. Stop CFS.
2. Open the CFS configuration file.
3. Create an import task to run the `CategorySuggestFromText` Lua script that is supplied with CFS. For example:

```
[ImportTasks]
Post0=Lua:./scripts/CategorySuggestFromText.lua
```

4. Open the script in a text editor.
5. Modify the variables in the script so that the script sends actions to your IDOL Server:

Line	Variable name	Value
178	<code>idolCategorizeHost</code>	The host name or IP address of your IDOL Server.
179	<code>idolCategorizePort</code>	The ACI port of your IDOL Server. The <code>port</code> argument in the function <code>send_aci_action</code> expects a number, so do not surround the port number with quotation marks.
184	<code>timeoutMilliseconds</code>	The amount of time, in milliseconds, that CFS waits for a response from your IDOL Server. If CFS does not receive a response within this time limit and the number of retries is reached, the document is not categorized. You should not need to modify the default value, which is 60 seconds.
185	<code>retries</code>	The number of times that CFS retries a request to your IDOL Server, if the first attempt is not successful.
186-192	<code>sslParameters</code>	A table of SSL parameters for connecting to your IDOL Server. For more information about the SSL parameters that you can set, refer to the <i>Connector Framework Server Reference</i> .

For example:

```
local idolCategorizeHost = "10.0.0.1"
local idolCategorizePort = 9000

...

local timeoutMilliseconds = 30000
local retries = 3
local sslParameters =
```

```
{
  SSLMethod = "SSLV23",
  --SSLCertificate = "host1.crt",
  --SSLPrivateKey = "host1.key",
  --SSLCACertificate = "trusted.crt"
}
```

6. Save and close the script.

## Customize the Query

The `CategorySuggestFromText` Lua script sends an entire document (metadata and content) to IDOL for categorization. The document is converted to a string using the `to_idx` method and then passed to the `QueryText` parameter of the `CategorySuggestFromText` action:

```
local categorySuggestFromTextParameters = { QueryText = document:to_idx() }
```

...

```
local output = send_aci_action(
  idolCategorizeHost,
  idolCategorizePort,
  "categorysuggestfromtext",
  categorySuggestFromTextParameters,
  timeoutMilliseconds,
  retries,
  sslParameters
)
```

You can modify the script to categorize the document based on a specific field. For example, to use only the document content:

```
local categorySuggestFromTextParameters = {
  QueryText = document:getContent()
}
```

Alternatively, to use the value of a single document field:

```
local categorySuggestFromTextParameters = {
  QueryText = document:getFieldValue("MyFieldName")
}
```

You can also add additional parameters to the action. For example, the `CategorySuggestFromText` Lua script does not limit the number of categories that are added to the document. To add only the most relevant category to a document, add the `CategorySuggestFromText` action parameter `NumResults=1` by modifying the script as follows:

```
local categorySuggestFromTextParameters = {
  QueryText = document:getContent(),
  NumResults = 1
}
```

For more information about the `CategorySuggestFromText` action and the parameters that it supports, refer to the *IDOL Server Reference*.

## Customize the Output

The `CategorySuggestFromText` Lua script creates the following document fields by default:

Field name	Value
<code>category_title</code>	The name of the category.
<code>category_id</code>	The ID of the category in IDOL Server.
<code>category_reference</code>	The DRREFERENCE of the category, stored as a document in the Agentstore.

The script adds one value to each field for each category that matches the document. For example:

```
#DREFIELD category_id="200"  
#DREFIELD category_id="100"  
#DREFIELD category_reference="200"  
#DREFIELD category_reference="100"  
#DREFIELD category_title="Science"  
#DREFIELD category_title="BusinessNews"
```

To modify how the information is added to the document, customize the Lua script. For example, to change the names of the fields, modify the first argument of the `addField` method on lines 211 to 213:

```
document:addField("category_name", category["title"])  
document:addField("category_ref", category["reference"])  
document:addField("category_id", category["id"])
```

To add only the category names, remove lines 212 and 213:

```
document:addField("category_title", category["title"])  
-- document:addField("category_reference", category["reference"])  
-- document:addField("category_id", category["id"])
```

To add all of the category information to a single field, using subfields, you could modify the script as follows (replacing lines 207-219):

```
if(suggestWasSuccessful) then  
  local suggestedCategories = parseCategories(output)  
  
  document:addField("category", "category information")  
  local field = document:getField("category")  
  for i, category in ipairs(suggestedCategories) do  
    field:addField("title", category["title"])  
    field:addField("reference", category["reference"])  
    field:addField("id", category["id"])  
  end  
  
  document:setFieldValue("result", output)
```

```
    return true  
end
```

To add all of the category names to a single field as a comma-separated list, you could modify the script as follows (replacing lines 207-219):

```
if(suggestWasSuccessful) then  
    local suggestedCategories = parseCategories(output)  
  
    local names=""  
    for i, category in ipairs(suggestedCategories) do  
        if i==1 then  
            names = category["title"]  
        else  
            names = names .. "," .. category["title"]  
        end  
    end  
  
    if names~="" then  
        document:addField("category_names_CSV", names)  
    end  
  
    document:setFieldValue("result", output)  
  
    return true  
end
```

## Run Education

Education identifies and extracts entities from text, based on a pattern that you define. An *entity* is a word, phrase, or block of information. A *pattern* might be a dictionary, for example a list of people or places. Alternatively, the pattern can describe what the entity looks like without having to list it explicitly, for example a regular expression that describes an address or telephone number. After entities are extracted the text is written to the document fields that you specify. For more information about Education, refer to the *IDOL Education User Guide*.

You can run Education on document fields using the `Education` task.

**NOTE:**

To use the `Education` task you must have a license for Education and the relevant grammar files, and specify the host name and ACI port of your License Server in the CFS configuration file.

You can run the `Education` task using the `Post` parameter. The parameters that are passed to the task are specified in a named section of the configuration file. For example:

```
[ImportTasks]  
Post0=Education:EducationSettings  
  
[EducationSettings]
```

```
ResourceFiles=C:\MyGrammar\gram1.ecr  
SearchFields=DRECONTENT  
Entity0=edk_common_entities/postal_address  
EntityField0=SHIPPING_ADDRESS
```

## Redact Documents

You can use the `Eduction` task to redact information in documents.

To enable redaction, set the configuration parameter `RedactedOutput=True`. If you want to specify the value or characters that replace the redacted text, use the configuration parameter `RedactionOutputString` or `RedactionReplacementCharacter`.

For example, the following configuration redacts addresses contained in a document's `DRECONTENT` or `ADDRESS` fields:

```
[ImportTasks]  
Post0=Eduction:EductionSettings  
  
[EductionSettings]  
ResourceFiles=C:\Autonomy\IDOLServer\Eduction\address_gb.ecr  
SearchFields=DRECONTENT,ADDRESS  
RedactedOutput=True
```

The fields specified by `SearchFields` are not modified. CFS places the redacted text in fields with a `_REDACTED` suffix. For example:

```
#DREFIELD ADDRESS="Cambridge Business Park, Cowley Road, Cambridge, CB4 0WZ"  
#DREFIELD ADDRESS_REDACTED="[redacted]"
```

The `Eduction` task also adds the value, offset, and score for any matched entities to the document. For example:

```
#DREFIELD /offset="298"  
#DREFIELD /score="1"  
#DREFIELD /value="Cambridge Business Park, Cowley Road, Cambridge, CB4 0WZ"
```

## Lua Post Processing

An *Eduction Lua Post Processing* task runs a Lua script that modifies the output from the `Eduction` module. For example, you might want to increase the score for a match if it is found near similar matches.

### NOTE:

The Lua script is run by the `Eduction` module, not by CFS. The `Eduction` module expects the script to start with `function processmatch (edkmatch)`. You cannot modify the document being processed by CFS, or use the Lua methods that are available to CFS Lua scripts. For information about the Lua methods that are available in the `Eduction` module, refer to the *Eduction User Guide*.

To create an Education Lua Post Processing task, set the `PostProcessingTaskN` parameter. This specifies the name of a section in the CFS configuration file that contains parameters to configure the task. For example:

```
[ImportTasks]
Post0=Education:EducationSettings

[EducationSettings]
ResourceFiles=C:\MyGrammar\gram1.ecr
SearchFields=DRECONTENT
Entity0=edk_common_entities/postal_address
EntityField0=SHIPPING_ADDRESS
PostProcessingTask0=EducationLuaPostProcessing

[EducationLuaPostProcessing]
Script=scripts/education_post_process.lua
ProcessEnMasse=False
```

The Education Lua module will call function `processmatch` (`edkmatch`). For example:

```
function processmatch(edkmatch)
    if edkmatch then
        local text = edkmatch:getOutputText()
        -- modify the match
        edkmatch:setOutputText(text)
        return true
    end

    return false -- return false to drop the match
end
```

The `edkmatch` argument represents a single education match, or the complete set of matches if you set the configuration parameter `ProcessEnMasse` to `true`.

If the `processmatch` function returns `true`, the match is returned to CFS. If the function returns `false`, the match is discarded.

For more information about writing Education post-processing scripts, and information about the Lua methods that you can use, refer to the *Education User Guide*.

## Process HTML

Connectors, including the IDOL Web Connector, can send documents to CFS that have associated HTML files.

CFS can send the HTML files to KeyView, which discards the HTML markup and extracts the text contained in the file. However, HTML pages often contain irrelevant content such as invalid HTML, headers, sidebars, advertisements, and scripts. This text does not contain any useful information and could pollute the IDOL index, degrading performance. KeyView does not remove this irrelevant content, so Connector Framework Server provides features to process HTML files.

- **HTML processing with WKOOP.** CFS can use an embedded browser (WKOOP) to process HTML in a similar way to the IDOL Web Connector. There are many reasons to use WKOOP over other methods of processing HTML:
  - The browser allows scripts to run before the page is processed, so CFS can extract content and links that are added by JavaScript.
  - Links are resolved before a document is ingested, so that indexed documents contain absolute URLs.
  - You can remove unwanted content using the automatic clipping algorithm, or by selecting parts of the page with CSS selectors.
  - You can extract metadata or divide pages into multiple documents using CSS selectors rather than regular expressions.

**NOTE:**

To use WKOOP you must also install the IDOL Web Connector, because WKOOP is not provided with CFS. You must install a version of WKOOP that is the same as, or later than, the version of CFS that you are using.

- **HTMLExtraction.** HTML extraction extracts the useful information from the page and discards the irrelevant content. It automatically determines which content is relevant, so there are no configuration parameters for customizing this operation. If HTML extraction does not produce good results for your use case, you might want to use the clipping features provided by WKOOP, instead.

## HTML Processing with WKOOP

The `WKOOPHTMLExtraction` task processes an HTML file that is associated with a document. It extracts links and metadata and adds these to the document in a metadata field named `HTML_PROCESSING`. The task appends a page to the document content that contains the plain text extracted from the HTML source. It also sets the field `AUTN_NO_FILTER`, to prevent the document being processed by KeyView.

This section describes how to configure HTML processing with WKOOP.

You can configure WKOOP HTML extraction as a pre-import task (`Pre0` in the following example). The `Pre0` parameter also specifies the name of a section that contains the settings for the task. In the following example the section is named `HtmlProcessingSettings`.

```
[ImportTasks]
Pre0=WKOOPHTMLExtraction:HtmlProcessingSettings
```

```
[HtmlProcessingSettings]
WKOOPPath=F:\IDOL\WebConnector\WKOOP.exe
ProxyHost=proxy.domain.com
ProxyPort=8080
SSLMethod=NEGOTIATE
ExtractLinks=TRUE
ResolveLinks=TRUE
Url=https://www.example.com/
```

The `WKOOPPath` parameter specifies the path to WKOOP. WKOOP is not included with CFS, so you must install the IDOL Web Connector and specify the path to the WKOOP executable file. You must install a version of WKOOP that is the same as, or later than, the version of CFS that you are using.

If you are running CFS on a machine that is behind a proxy server, set the `ProxyHost` and `ProxyPort` parameters to specify the proxy server to use to access the web. The `SSLMethod` parameter specifies the version of SSL or TLS to use when connecting to the web site, and is necessary to retrieve resources over HTTPS. Setting this parameter to `NEGOTIATE` uses the latest version that is supported by both CFS and the web server.

The `ExtractLinks` parameter accepts a Boolean value that specifies whether to extract links from HTML pages and add the links to the document metadata. When `ResolveLinks=TRUE` the links are resolved so that indexed documents contain absolute URLs. The `Url` parameter specifies the source URL so that links can be resolved. You do not need to specify the exact URL of the page being processed, as long as all URLs in the document being processed are relative to the web server.

For a full list of configuration parameters that you can use to configure WKOOP HTML extraction, refer to the *Connector Framework Server Reference*.

## Remove Irrelevant Content

To remove irrelevant content from HTML pages using the automatic clipping algorithm, add the parameter `Clipped=TRUE` to your task configuration. CFS decides which parts of the page to keep and which to discard.

The automatic clipping algorithm has been designed to work with many different pages, but this means that automatic clipping might not give the best results for every page. Alternatively, you can use CSS selectors to choose which parts of the page to keep and which to discard. To clip pages with CSS selectors, add `Clipped=TRUE` to your task configuration, and then set `ClipPageUsingCssSelect` to specify the parts of the page to keep and `ClipPageUsingCssUnselect` to specify the parts of the page to remove. These parameters accept standard CSS2 selectors.

You can also remove scripts and hidden content from the HTML page:

- Remove all scripts from the HTML page by setting `RemoveScripts=TRUE`.
- Remove "noframes" content by setting `RemoveNoFrames=TRUE`. When web developers use frames they might include content in a `<noframes></noframes>` element, for web browsers that do not support frames. This content might duplicate content elsewhere in the HTML page or simply contain a message that the browser does not support frames.

## Extract Metadata

This section demonstrates how to extract metadata from an HTML page and add it to a document field.

Consider the following HTML:

```
<h1>This is a title</h1>
<h2>This is a sub-title</h2>
<p class="important">This is <strong>important</strong> text</p>
```

From this HTML you could extract all of the headings and add them to a metadata field named `heading`. You could also extract the important text and add that to a separate document field.

The configuration parameters `MetadataSelector` and `MetadataFieldName` select the information to extract and provide the name of the destination document field. These parameters must be set in numbered pairs (so that each `MetadataSelector` parameter has a matching `MetadataFieldName`). The `MetadataSelector` parameter accepts standard CSS2 selectors.

The following configuration would extract the information described above:

```
MetadataSelector0=h1,h2,h3
MetadataFieldName0=heading
MetadataSelector1=p.important
MetadataFieldName1=important_paragraph
MetadataSelectorExtractPlainText=TRUE
```

The parameter `MetadataSelectorExtractPlainText` specifies whether to extract as plain text (removing HTML markup, for example).

The configuration above would produce the following metadata fields:

```
#DREFIELD heading="This is a title"
#DREFIELD heading="This is a sub-title"
#DREFIELD important_paragraph="This is important text"
```

## Split Web Pages into Multiple Documents

You might want to split pages into multiple documents. For example, if you ingest pages from a discussion board you might want to ingest one document for each message on the page.

Connector Framework Server can create documents for sections of a Web page identified using CSS selectors. CFS creates a child document for each section of the page that is identified. Metadata fields (named `CHILD_DOCUMENT`) are added to the parent document, to refer to the child documents.

To split pages into multiple documents, add the following parameters to your `WK00PhtmlExtraction` task:

- |                                     |   |
|-------------------------------------|---|
| <code>ChildDocumentSelector</code>  | A CSS2 selector that identifies the root element of each child document in the page source.   |
| <code>ChildReferenceSelector</code> | (Optional) An element in the child document that contains a value to use as the document reference. The value you extract should be unique for each child document, because it is used as part of the <code>DREREFERENCE</code> field in the child document. If you do not set this parameter, the connector uses a GUID. Specify the element using a CSS2 selector, relative to the element identified by <code>ChildDocumentSelector</code> .   |
| <code>ChildMetadataSelector</code>  | (Optional) A list of elements in the child document that contain metadata. The metadata in these elements are extracted and added to the metadata fields of child documents. Specify the elements as a list of CSS2 selectors, relative to the element identified by <code>ChildDocumentSelector</code> .<br><br>To specify the name(s) of the document field(s) to contain the extracted information, set the configuration parameter <code>ChildMetadataFieldName</code> . Both parameters must have the same |

number of values.

`ChildMetadataFieldName` (Optional) The names to use for document fields (in child documents) that contain information extracted using the parameter `ChildMetadataSelector`. This parameter must have the same number of values as `ChildMetadataSelector`.

For example, consider the following example page which represents messages on a page of a discussion board:

```
<html>
  <head>
    <title>Example Page</title>
    <meta charset="utf-8">
  </head>
  <body>
    <div>
      <h1>Example Page</h1>
      <div class="content">
        <p>content</p>
      </div>
      <div class="message">
        <h1>Message 1</h1>
        <p class="meta">some metadata</p>
        <p>some content</p>
      </div>
      <div class="message">
        <h1>Message 2</h1>
        <p class="meta">some metadata</p>
        <p>some content</p>
      </div>
      ...
    </div>
  </body>
</html>
```

To create separate documents for the messages contained on this page, you could use the following configuration:

```
[MyTask]
...
ChildDocumentSelector=div.message
ChildReferenceSelector=h1
ChildMetadataFieldName0=my_metadata
ChildMetadataSelector0=p.meta
```

This example would produce the following child document (and a similar document for the second message):

```
#DREREFERENCE <current_document_reference>:<child_reference>
#DREFIELD my_metadata="some metadata"
```

```
...  
#DRECONTENT  
Message 1  
some metadata  
some content  
...
```

The value of the `DREREFERENCE` field is constructed from the reference of the original document and the value of the element identified by the `ChildReferenceSelector` configuration parameter. If you don't set this configuration parameter or the element is not found, CFS uses a GUID instead.

CFS adds the reference of the original document to the fields `DREPARENTREFERENCE` and `DREROOTPARENTREFERENCE`. It also adds an `HTML_PROCESSING` metadata field that contains any metadata and links that are extracted from the child document.

The `DRECONTENT` field is populated with text extracted from the HTML elements that you identified as belonging to the child document.

Connector Framework Server automatically adds fields to the parent document, named `CHILD_DOCUMENT`, that contain the references of associated child documents.

## HTML Extraction

HTML pages often contain irrelevant content such as invalid HTML, headers, sidebars, advertisements, and scripts. CFS can extract the useful information from the page and discard the irrelevant content.

To extract the useful information from an HTML page, use the `HtmlExtraction` import task. This task works only on HTML files and ignores other file types.

CFS reads the HTML document, and discards data such as invalid HTML, headers, sidebars, advertisements, and scripts. In the remaining content, CFS then extracts blocks of text that contain a large number of stopwords and a low proportion of links. This text is likely to be the most important content. Because CFS automatically determines which content is relevant, there are no configuration parameters for customizing this task.

Micro Focus recommends that you configure the `HtmlExtraction` task as a *Pre* import task. For example:

```
[ImportTasks]  
Pre0=HtmlExtraction
```

After extracting the useful information, the HTML Extraction task sets the document field `AUTN_NO_FILTER`, so that the HTML file is not processed by `KeyView`.

## Extract Metadata from Files

The `ExtractMetadata` task extracts metadata from the file associated with a document. This task extracts a subset of the metadata obtained by standard `KeyView` filtering. It is faster than standard `KeyView` filtering and does not extract the file content.

**TIP:**

When documents are ingested, CFS automatically extracts metadata. Do not use this task unless you have set the fields `AUTN_NO_FILTER` and `AUTN_NO_EXTRACT` on a document and want to extract basic metadata only.

The `ExtractMetadata` task is configured as a *Pre* task. Specify the name of the section that contains settings for the task. For example:

```
[ExtractMetadata]
Pre0=Lua:scripts/nofilter.lua
Pre1=ExtractMetadata:ExtractMetadataSettings
```

```
[ExtractMetadataSettings]
FieldnamePrefix=FIELD_
ReservedFieldnames=Reserved1,Reserved2
```

The `Pre0` task runs a Lua script that adds the fields `AUTN_NO_FILTER` and `AUTN_NO_EXTRACT` to documents. Adding these fields prevents `KeyView` from filtering the documents and extracting subfiles.

The `Pre1` task runs the `ExtractMetadata` task using the settings contained in the `[ExtractMetadataSettings]` section of the CFS configuration file.

The `FieldnamePrefix` parameter specifies a prefix for the names of the metadata fields that are added to the document. The `ReservedFieldnames` parameter specifies a comma-separated list of field names that the task must not use. If the task needs to add a metadata field with one of the specified names, it prefixes the name with an underscore. For example, with the settings specified above, the task would not add a field named `FIELD_Reserved1`. Instead, the task would add `_FIELD_Reserved1`.

## Import Content Into a Document

The `ImportFile` task imports a file and adds its content to the document being processed. CFS does not extract sub files from the file.

The `ImportFile` task can be configured as a *Pre* or *Post* task. When you create the task, specify the name of a document field that contains the path or URL of the file to import, for example:

```
Pre0=ImportFile:fieldname
Post0=ImportFile:fieldname
```

where `fieldname` is the name of the document field.

Alternatively, specify the name of a section in the configuration file that contains the settings for the task:

```
[ImportTasks]
Post0=ImportFile:MySettings

[MySettings]
Fieldname=field_containing_file_path_or_url
ProxyHost=10.0.0.1
ProxyPort=8080
SSLMethod=TLV1
```

If the field contains a URL, CFS downloads the file and adds its content to the document.

## Reject Invalid Documents

You can configure CFS to reject documents based on several criteria.

When documents are rejected, they are not processed by further tasks. You can index rejected documents or discard them:

- To index the documents into one or more indexes, such as an IDOL Error Server, set the parameters `OnErrorIndexerSections` and `IndexDatabase`. `OnErrorIndexerSections` specifies a list of configuration file sections to use to index a document. These sections must contain indexing parameters, such as the host name and ACI port of your IDOL Server. `IndexDatabase` specifies the name of the IDOL database into which the rejected documents are indexed. Before indexing a document, CFS writes the name of the filter that caused the document to be rejected to a field named `MATCHEDFILEFILTERS`.
- If you do not specify any indexing details, the documents are discarded. CFS writes a message to the import log showing that the document was rejected, and showing which filter caused the rejection.

## Reject Documents with Binary Content

The `BinaryFileFilter` task rejects any documents that have been filtered as binary. This can occur when `KeyView` filtering fails, for example due to corrupt files.

When CFS detects a non-UTF8 character, it replaces the character with a hexadecimal character code. The `BinaryFileFilter` task detects these character codes and rejects documents where the proportion exceeds the limit set by the `ThresholdPercent` parameter.

The `BinaryFileFilter` task can be configured as a *Post* task. The parameters that are passed to the task are specified in a named section of the configuration file. For example:

```
[ImportTasks]
Post0=BinaryFileFilter:BinaryFileFilterSettings
```

```
[BinaryFileFilterSettings]
ThresholdPercent=10
OnErrorIndexerSections=IdolErrorServer
IndexDatabase=IdolErrorReview
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Reject Documents with Import Errors

The `ImportErrorFilter` task rejects any documents for which errors have occurred. Errors can occur during `KeyView` filtering or during *pre* and *post* import tasks.

The `ImportErrorFilter` task can be configured as a *Post* task. The parameters that are passed to the task are specified in a named section of the configuration file. For example:

```
[ImportTasks]
Post0=ImportErrorFilter:ImportErrorFilterSettings
```

```
[ImportErrorFilterSettings]
OnErrorIndexerSections=IdolErrorServer
IndexDatabase=IdolErrorReview
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Reject Documents with Symbolic Content

The `SymbolicContentFilter` task calculates the proportion of symbolic characters in a document. If the proportion of symbolic characters in the document content exceeds the limit specified by the `MaxSymbolicCharactersPercent` parameter, the document is rejected.

Symbolic characters are defined as any character between U+2000 and U+2FFF.

The `SymbolicContentFilter` task can be configured as a *Post* task. The parameters that are passed to the task are specified in a named section of the configuration file. For example:

```
[ImportTasks]
Post0=SymbolicContentFilter:SymbolicContentFilterSettings
```

```
[SymbolicContentFilterSettings]
MaxSymbolicCharactersPercent=8
OnErrorIndexerSections=IdolErrorServer
IndexDatabase=IdolErrorReview
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Reject Documents by Word Length

The `WordLengthFilter` task calculates the average length of words in a document. If the average length of words in the document content (`DRECONTENT`) falls outside the limits specified by the `MinimumAverage` or `MaximumAverage` parameters, the document is rejected.

The `WordLengthFilter` task can be configured as a *Post* task. The parameters that are passed to the task are specified in a named section of the configuration file. For example:

```
[ImportTasks]
Post0=WordLengthFilter:WordLengthFilterSettings
```

```
[WordLengthFilterSettings]
MinimumAverage=3.0
MaximumAverage=10.0
```

```
OnErrorIndexerSections=IdolErrorServer  
IndexDatabase=IdolErrorReview
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Reject All Invalid Documents

The `BadFilesFilter` task rejects all documents that are considered to be invalid:

- Documents that have binary content.
- Documents for which import errors have occurred.
- Documents that have too high a proportion of symbolic content.
- Documents where the average word length is too long or too short.

`BadFilesFilter` must be configured as a *Post* task.

`BadFilesFilter` reads configuration parameters from the section of the configuration file that you specify in the `Post` parameter. In this section you can set parameters for each filter. In the example below, two parameters have been set to configure the word length filter:

```
[ImportTasks]  
Post0=BadFilesFilter:BadFilesFilterSettings
```

```
[BadFilesFilterSettings]  
MinimumAverage=3.0  
MaximumAverage=10.0  
OnErrorIndexerSections=IdolErrorServer  
IndexDatabase=IdolErrorReview
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Split Document Content into Sections

Dividing the content of long documents into sections can result in more relevant search results, because IDOL Server can return a specific part of a document in response to a query.

To divide document content into sections, use the `Sectioner` task.

The `Sectioner` import task must be configured as a *Post* task. The parameters that are passed to the task are specified in a named section of the configuration file. For example:

```
[ImportTasks]  
Post0=Sectioner:Sectioning
```

```
[Sectioning]  
SectionerMaxBytes=3000  
SectionerMinBytes=1500
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Split Files into Multiple Documents

Sometimes you might retrieve files from a repository that you would prefer to ingest as multiple documents.

You can use the `TextToDocs` task to split a file containing text (for example an HTML file or XML file) into multiple documents. To divide a file, you specify regular expressions that match the relevant parts of the document. The task creates a main document and one or more child documents, which can all have metadata and content. When you run `TextToDocs` on a document, the original document is discarded. The documents created by `TextToDocs` are metadata-only documents, which means that they do not have an associated file and are not filtered by `KeyView`.

The `TextToDocs` task should be configured as a *Pre* task. The parameters that are passed to the task are specified in a named section of the configuration file. For example:

```
[ImportTasks]
Pre0=TextToDocs:MyTextToDocs
```

```
[MyTextToDocs]
...
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

The `TextToDocs` task expects documents to use UTF-8 character encoding. If your documents are not encoded in UTF-8 you can use the configuration parameter `SourceEncoding` to specify the character set encoding of the source documents, so that they can be converted to UTF-8. If conversion fails, the original encoding is used and CFS adds an error message to the `ImportErrorCode` and `ImportErrorDescription` document fields.

## Example

The following HTML is an example file that you might want to ingest as separate documents. There are clear sections which could represent different topics:

```
<html>
  <body>
    <p class="main">Main content</p>

    <div class="section">
      <h1>First document</h1>
      <p class="metadata">Extract as metadata</p>
      <p>Some text</p>
    </div>

    <div class="section">
      <h1>Second document</h1>
```

```
<p class="metadata">Extract as metadata</p>
<p>Some text</p>
</div>

<div class="section">
  <h1>Third document</h1>
  <p class="metadata">Extract as metadata</p>
  <p>Some text</p>
</div>

</body>
</html>
```

You might want to split this file into a main document and three child documents, one of which might look like this:

```
#DREREFERENCE C:\MyFiles\TextToDocs\textToDocs.html:0
#DREDBNAME FileSystem
#DREFIELD MyMetadataField="Extract as metadata"
#DRECONTENT
First document
Some text

#DREENDDOC
```

To do this, you could use the following configuration:

```
[ImportTasks]
Pre0=TextToDocs:MyTextToDocs

[MyTextToDocs]
FilenameMatchesRegex0=.*\.html

MainRangeRegex0=<html>(.*?)</html>
MainContentRegex0=<p class="main">(.*?)</p>

ChildrenRangeRegex0=<html>(.*?)</html>
ChildRangeRegex=<div class="section">(.*?)</div>
ChildContentRegex0=<h1>(.*?)</h1>
ChildContentRegex1=<p>(.*?)</p>
ChildFieldName0=MyMetadataField
ChildFieldRegex0=<p class="metadata">(.*?)</p>
ChildInheritFields=DREDBNAME
```

In this example, the `FilenameMatchesRegex` parameter has been set to process only those files that have the extension `.html`.

The `MainContentRegex` parameter identifies parts of the original document to add to the `DRECONTENT` field of the main document.

The `ChildRangeRegex` parameter identifies the parts of the original document that should become child documents. The sub-match `(.*?)` matches all of the content between a `<div class="section">` tag

and a `</div>` tag. When this regular expression is applied to the example document above, there are three matches and therefore three child documents are created. It is important to make the regular expression lazy, because otherwise it would match everything between the first `<div class="section">` and the final `</div>`, resulting in a single child document.

The `ChildContentRegex` parameter identifies the content to add to the `DRECONTENT` field of a child document. In this example two regular expressions are used to extract content. The `ChildFieldName` and `ChildFieldRegex` parameters populate metadata fields. In this example a single field named `MyMetadataField` is created.

Setting the parameter `ChildInheritFields=DREDBNAME` specifies that the child documents inherit the field `DREDBNAME` from the original document. If you are indexing documents into IDOL Server it is important to set this parameter, because (depending on how your system is configured) documents without a `DREDBNAME` field might not be indexed.

## Write Documents to Disk

CFS can write documents to disk in several formats. You might want to write documents to disk for the following reasons:

- so that you can see the data that is being indexed into IDOL Server, Haven OnDemand, or Vertica. You can then set up further processing tasks to manipulate and enrich the data.
- so that you can debug your Lua scripts or other processing tasks.
- so that you can export the data from documents to other systems.

## Write Documents to Disk in IDX Format

To write documents to disk in IDX format, configure an `IdxWriter` processing task by setting the `Pre`, `Post`, `Update`, or `Delete` configuration parameter.

To run the `IdxWriter` task with default settings, use the `Pre`, `Post`, `Update`, or `Delete` parameter to specify the file name for the IDX file:

```
[ImportTasks]
Pre0=IdxWriter:pre.idx
Post0=IdxWriter:post.idx
```

Alternatively, set the parameter to `IdxWriter`, followed by a colon (:), followed by the name of the section in the configuration file that contains custom settings for the task. For example:

```
[ImportTasks]
Pre0=IdxWriter:PreIDX
Post0=IdxWriter:PostIDX
```

```
[PreIDX]
IdxWriterFilename=pre.idx
IdxWriterMaxSizeKBs=100
IdxWriterArchiveDirectory=./IDXArchive
```

```
[PostIDX]
IdxWriterFilename=post.idx
IdxWriterMaxSizeKBs=100
IdxWriterArchiveDirectory=./IDXArchive
```

For information about the configuration parameters you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Write Documents to Disk in XML Format

To write documents to disk in XML format, configure an `XmlWriter` processing task by setting the `Pre`, `Post`, `Update`, or `Delete` configuration parameter.

When you create the `XmlWriter` task, specify the file name of the XML file. For example:

```
[ImportTasks]
Pre0=XmlWriter:C:\ConnectorFrameworkServer\pre.xml
Post0=XmlWriter:C:\ConnectorFrameworkServer\post.xml
```

## Write Documents to Disk in JSON Format

To write documents to disk in JSON format, configure a `JsonWriter` processing task by setting the `Pre`, `Post`, `Update`, or `Delete` configuration parameter.

To configure the task with default settings, specify the file name for the output file:

```
[ImportTasks]
Pre0=JsonWriter:pre.json
Post0=JsonWriter:post.json
```

Alternatively, set the parameter to `JsonWriter`, followed by a colon (:), followed by the name of the section in the configuration file that contains custom settings for the task. For example:

```
[ImportTasks]
Post0=JsonWriter:PostJsonWriting
```

```
[PostJsonWriting]
JsonWriterFilename=post.json
JsonWriterMaxSizeKBs=1000
JsonWriterArchiveDirectory=./JSONArchive
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Write Documents to Disk in CSV Format

The `CsvWriter` task writes document metadata and content to a comma-separated values (CSV) file. This allows you to export the data to other systems.

The task always writes the document reference (*DRREFERENCE*) and content (*DRECONTENT*) fields, and you can choose the other fields that you want to include. The task writes the field names, followed by one line of values for each document that is ingested.

The *CsvWriter* task can be configured as a *Pre*, *Post*, *Update* or *Delete* task.

To run the task with default settings, specify the file name for the output file:

```
[ImportTasks]
Post0=CsvWriter:MyTask.csv
```

Alternatively, specify the name of a section in the configuration file that contains the settings for the task:

```
[ImportTasks]
Post0=CsvWriter:CsvWriting

[CsvWriting]
CsvWriterFilename=MyTask.csv
CsvWriterMaxSizeKbs=1000
CsvWriterArchiveDirectory=./CSVarchive
CsvWriterFieldNames0=A_FIELD
CsvWriterFieldNames1=A_FIELD/subfield
CsvWriterFieldNames2=A_FIELD/@attribute
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Write Documents to Disk as SQL INSERT Statements

The *SqlWriter* task writes document metadata and content to a file in the form of SQL “INSERT” statements. You can use the SQL to insert the data from the documents into a database.

The task always writes the document reference (*DRREFERENCE*) and content (*DRECONTENT*) fields, and you can choose the other fields that you want to include. The task writes one INSERT statement for each document that is processed.

The *SqlWriter* task can be configured as a *Pre*, *Post*, *Update* or *Delete* task.

To configure the task, specify the name of a section that contains the settings, for example:

```
[ImportTasks]
Post0=SqlWriter:SqlWriting

[SqlWriting]
SqlWriterFileName=MyTask.sql
SqlWriterTableName=table
SqlWriterDreReferenceColumnName=REFERENCE
SqlWriterDreContentColumnName=CONTENT

SqlWriterFieldNames0=MODIFIED_DATE
SqlWriterColumnNames0=DATE
SqlWriterDataTypes0=DATE_TIME
```

```
SqlWriterUseNullForMissingFields=true
```

```
SqlWriterDateFormats0=DD/MM/YYYY  
SqlWriterDateFormats1=YYYY/MM/DD
```

```
SqlWriterMaxSizeKbs=1024  
SqlWriterArchiveDirectory=./SQLarchive
```

For information about the parameters that you can use to configure this task, refer to the *Connector Framework Server Reference*.

## Standardize Document Fields

The documents created by your connectors might not have consistent field names. For example, documents created by the File System Connector can have a field named `FILEOWNER`. Documents created by the Documentum Connector can have a field named `owner_name`. Both of these fields store the name of the person who owns a file.

You might want to rename document fields so that documents use the same field names to store the same type of information. CFS includes the `standardizer` task to do this.

You can configure the `Standardizer` task as a *Pre* or *Post* task. For example:

```
[ImportTasks]  
Post0=Standardizer
```

To use the `Standardizer` task, you must set the `EnableFieldNameStandardization` and `FieldNameDictionaryPath` configuration parameters in the `[ImportService]` section of the CFS configuration file. For more information about these parameters, refer to the *Connector Framework Server Reference*.

## Customize Field Standardization

Field standardization modifies documents so that they have a consistent structure and consistent field names. You can use field standardization so that documents indexed into IDOL through different connectors use the same fields to store the same type of information. Field standardization only modifies fields that are specified in a dictionary, which is defined in XML format. A standard dictionary, named `dictionary.xml`, is supplied in the CFS installation folder.

In most cases you should not need to modify the standard dictionary, but you can modify it to suit your requirements or create dictionaries for different purposes. By modifying the dictionary, you can configure CFS to apply rules that modify documents before they are ingested. For example, you can move fields, delete fields, or change the format of field values.

The following examples demonstrate how to perform some operations with field standardization.

The following rule renames the field `Author` to `DOCUMENT_METADATA_AUTHOR_STRING`. This rule applies to all components that run field standardization and applies to all documents.

```
<FieldStandardization>
  <Field name="Author">
    <Move name="DOCUMENT_METADATA_AUTHOR_STRING"/>
  </Field>
</FieldStandardization>
```

The following rule demonstrates how to use the Delete operation. This rule instructs CFS to remove the field `KeyviewVersion` from all documents. The `Product` element ensures that this rule is run only by CFS.

```
<FieldStandardization>
  <Product key="ConnectorFramework">
    <Field name="KeyviewVersion">
      <Delete/>
    </Field>
  </Product>
</FieldStandardization>
```

There are several ways to select fields to process using the `Field` element.

Field element attribute	Description	Example
name	Select a field where the field name matches a fixed value.	Select the field <code>MyField</code> : <pre>&lt;Field name="MyField"&gt;   ... &lt;/Field&gt;</pre> Select the field <code>Subfield</code> , which is a subfield of <code>MyField</code> : <pre>&lt;Field name="MyField"&gt;   &lt;Field name="Subfield"&gt;     ...   &lt;/Field&gt; &lt;/Field&gt;</pre>
path	Select a field where its path matches a fixed value.	Select the field <code>Subfield</code> , which is a subfield of <code>MyField</code> . <pre>&lt;Field path="MyField/Subfield"&gt;   ... &lt;/Field&gt;</pre>
nameRegex	Select all fields at the current depth where the field name matches a regular expression.	In this case the field name must begin with the word <code>File</code> : <pre>&lt;Field nameRegex="File.*"&gt;   ... &lt;/Field&gt;</pre>
pathRegex	Select all fields where the path of the	This example selects all subfields of

	<p>field matches a regular expression.</p> <p>This operation can be inefficient because every metadata field must be checked. If possible, select the fields to process another way.</p>	<p>MyField.</p> <pre>&lt;Field pathRegex="MyField/[^/]*"&gt;   ... &lt;/Field&gt;</pre> <p>This approach would be more efficient:</p> <pre>&lt;Field name="MyField"&gt;   &lt;Field nameRegex=".*"&gt;     ...   &lt;/Field&gt; &lt;/Field&gt;</pre>
--	--	--

You can also limit the fields that are processed based on their value, by using one of the following:

Field element attribute	Description	Example
matches	Process a field if its value matches a fixed value.	Process a field named MyField, if its value matches abc. <pre>&lt;Field name="MyField" matches="abc"&gt;   ... &lt;/Field&gt;</pre>
matchesRegex	Process a field if its entire value matches a regular expression.	Process a field named MyField, if its value matches one or more digits. <pre>&lt;Field name="MyField" matchesRegex="\d+"&gt;   ... &lt;/Field&gt;</pre>
containsRegex	Process a field if its value contains a match to a regular expression.	Process a field named MyField if its value contains three consecutive digits. <pre>&lt;Field name="MyField" containsRegex="\d{3}"&gt;   ... &lt;/Field&gt;</pre>

The following rule deletes every field or subfield where the name of the field or subfield begins with temp.

```
<FieldStandardization>
  <Field pathRegex="(.*?)?temp[^/]*">
    <Delete/>
  </Field>
</FieldStandardization>
```

The following rule instructs CFS to rename the field `Author` to `DOCUMENT_METADATA_AUTHOR_STRING`, but only when the document contains a field named `DocumentType` with the value `230` (the `KeyView` format code for a PDF file).

```
<FieldStandardization>
  <Product key="ConnectorFramework">
    <IfField name="DocumentType" matches="230"> <!-- PDF -->
      <Field name="Author">
        <Move name="DOCUMENT_METADATA_AUTHOR_STRING"/>
      </Field>
    </IfField>
  </Product>
</FieldStandardization>
```

**TIP:**

In this example, the `IfField` element is used to check the value of the `DocumentType` field. The `IfField` element does not change the current position in the document. If you used the `Field` element, field standardization would attempt to find an `Author` field that is a subfield of `DocumentType`, instead of finding the `Author` field at the root of the document.

The following rules demonstrate how to use the `ValueFormat` operation to change the format of dates. The only format that you can convert date values into is the IDOL `AUTNDATE` format. The first rule transforms the value of a field named `CreatedDate`. The second rule transforms the value of an attribute named `Created`, on a field named `Date`.

```
<FieldStandardization>
  <Field name="CreatedDate">
    <ValueFormat type="autndate" format="YYYY-SHORTMONTH-DD HH:NN:SS"/>
  </Field>
  <Field name="Date">
    <Attribute name="Created">
      <ValueFormat type="autndate" format="YYYY-SHORTMONTH-DD HH:NN:SS"/>
    </Attribute>
  </Field>
</FieldStandardization>
```

As demonstrated by this example, you can select field attributes to process in a similar way to selecting fields.

You must select attributes using either a fixed name or a regular expression:

Select a field attribute by name	<code>&lt;Attribute name="MyAttribute"&gt;</code>
Select attributes that match a regular expression	<code>&lt;Attribute nameRegex=".*"&gt;</code>

You can then add a restriction to limit the attributes that are processed:

Process an attribute only if its value matches a fixed value	<code>&lt;Attribute name="MyAttribute" matches="abc"&gt;</code>
Process an attribute only if its value matches a regular expression	<code>&lt;Attribute name="MyAttribute" matchesRegex=".*"&gt;</code>

Process an attribute only if its value `<Attribute name="MyAttribute" containsRegex="\w+">` contains a match to a regular expression

The following rule moves all of the attributes of a field to sub fields, if the parent field has no value. The `id` attribute on the first `Field` element provides a name to a matching field so that it can be referred to by later operations. The `GetName` and `GetValue` operations save the name and value of a selected field or attribute (in this case an attribute) into variables (in this case `'name'` and `'value'`) which can be used by later operations. The `AddField` operation uses the variables to add a new field at the selected location (the field identified by `id="parent"`).

```
<FieldStandardization>
  <Field pathRegex=".*" matches="" id="parent">
    <Attribute nameRegex=".*">
      <GetName var="name"/>
      <GetValue var="value"/>
      <Field fieldId="parent">
        <AddField name="'name'" value="'value'"/>
      </Field>
    </Attribute>
  </Field>
</FieldStandardization>
```

The following rule demonstrates how to move all of the subfields of `UnwantedParentField` to the root of the document, and then delete the field `UnwantedParentField`.

```
<FieldStandardization id="root">
  <Product key="ConnectorFramework">
    <Field name="UnwantedParentField">
      <Field nameRegex=".*">
        <Move destId="root"/>
      </Field>
    </Field>
  </Product>
</FieldStandardization>
```

## Normalize E-mail Addresses

Documents can contain e-mail addresses in many formats, and often the name of the sender or recipient is contained in the same metadata field as their e-mail address.

The `EmailAddressNormalisation` task searches metadata fields for the names and e-mail addresses of e-mail senders and recipients. It then writes the information back to the document in a standard format. For named e-mail addresses ("`Name`" `<name@domain.com>`), the task separates the name from the address. The task also converts all e-mail addresses to lower-case.

For example, a document might include the following field:

```
<To>"One, Some" <Someone@Somewhere.com>, <user.name@domain.com>, "Else, Someone" <SomeoneElse@Somewhere.com ></To>
```

The `EmailAddressNormalisation` task reads this information and adds the following fields to the document:

```
<to_email>someone@somewhere.com</to_email>  
<to_email>user.name@domain.com</to_email>  
<to_email>someoneelse@somewhere.com</to_email>  
<to_name>One, Some</to_name>  
<to_name/>  
<to_name>Else, Someone</to_name>
```

As shown in the previous example, when an e-mail address does not have an associated name, an empty name field is added to the document. This is necessary because the order of the fields in the document is the only way to determine which name belongs with which e-mail address. The first e-mail address is associated with the first name, the second e-mail address with the second name, and so on.

This means that if your source field does not contain any names:

```
<To>Someone@Somewhere.com, SomeoneElse@Somewhere.com</To>
```

The task writes the following fields to the document:

```
<to_email>someone@somewhere.com</to_email>  
<to_email>someoneelse@somewhere.com</to_email>  
<to_name/>  
<to_name/>
```

You can configure `EmailAddressNormalisation` as a *Pre* or *Post* task. For example:

```
[ImportTasks]  
Post0=EmailAddressNormalisation:EmailAddressNormalisationSettings
```

```
[EmailAddressNormalisationSettings]  
FieldNameRegex="To", "From", "Cc", "Bcc"  
AddresseeFieldName="to_name", "from_name", "cc_name", "bcc_name"  
EmailFieldName="to_email", "from_email", "cc_email", "bcc_email"
```

The `Post0` task runs e-mail address normalisation using the settings in the `[EmailAddressNormalisationSettings]` section. The `FieldNameRegex` parameter specifies a list of regular expressions that identify the fields to process. The `AddresseeFieldName` and `EmailFieldName` parameters specify the names of the fields to add to the document. CFS adds the name of the sender or recipient to the addressee field and their e-mail address to the e-mail field.

## Language Detection

CFS can identify the language of a document, and write the name of the language to a document field. A front-end application could use this field to provide a way to filter documents by language. You can also use language detection to reject invalid documents (when a language cannot be detected).

Language detection can be configured as a post-import task. Set the `Post` parameter to `LangDetect` and specify the name of a configuration file section that contains the task settings. For example:

```
[ImportTasks]
Post0=LangDetect:LangDetectSettings

[LangDetectSettings]
LanguageDetectionDirectory=./filters/datafiles/
OutputField=DetectedLanguage
FailIfLanguageUnknown=TRUE
```

You must set the parameter `LanguageDetectionDirectory` to the path of the folder that contains the file `langdetect.dat`. The remaining parameters are optional. The parameter `OutputField` specifies the name of the document field to write the name of detected language to. By default, CFS rejects documents where it cannot detect a language but you can configure this by setting `FailIfLanguageUnknown`. To continue processing documents when a language cannot be detected, set `FailIfLanguageUnknown=FALSE`.

## Translate Documents

CFS can use third-party translation services to translate documents into other languages. This can be useful when you have documents that are not in your users' native language.

### **IMPORTANT:**

To perform translation, you must have a license for one of the supported translation services. CFS relies on third-party services to translate text between languages. The language translation library that CFS uses to communicate with third-party translation services is not included in the standard CFS installation but can be obtained through Micro Focus software support.

Micro Focus recommends that you configure the `LanguageTranslation` task as a post-import task. Use the `Post` parameter to specify the name of a section that contains the task settings.

The following is an example task that uses the translation services provided by an SDL Enterprise Translation Server:

```
[ImportTasks]
Post0=Library:LanguageTranslation

[LanguageTranslation]
Library=LanguageTranslation
TranslatorType=SdlEts
ApiBaseUrl=https://host:port
ApiKey=0a12b34c56d78e9
SourceField=DRECONTENT
TargetField=DRECONTENT
TargetLanguage=ENG
Quality=medium-high
```

The following is an example task that uses the translation services provided by `sdlbeglobal.com`:

```
[ImportTasks]
Post@=Library:LanguageTranslation
```

```
[LanguageTranslation]
Library=LanguageTranslation
TranslatorType=SdlBeGlobal
AccountId=12345
ApiKey=0a12b34c56d78e9
UserId=23456
TouchpointId=34567
SourceField=DRECONTENT
TargetField=DRECONTENT
TargetLanguage=ENG
```

In both cases, the `TranslatorType` configuration parameter specifies the type of translation service to use. To use an SDL Enterprise Translation Server, set this parameter to `SdlEts`. To use the services that are provided by `sdlbeglobal.com`, set this parameter to `SdlBeGlobal`. You must then set the relevant parameters that are required to use the API:

- To use an SDL Enterprise Translation Server, set the configuration parameter `ApiBaseUrl` to the base URL of the API to use for translation, and the `ApiKey` parameter to the API key.
- To use the services provided by `sdlbeglobal.com`, set the parameters `AccountId`, `ApiKey`, `UserId` and `TouchpointId` to the values provided by SDL.

The remaining parameters are optional but you can set these to customize the task to your use case.

The `SourceField` configuration parameter specifies the name of the document field to translate, and the `TargetField` parameter specifies the name of the field to contain the results. If you specify the same field name for both parameters, CFS reads the text from the field, sends it for translation, and then writes the result back to the same field (which overwrites the original value).

The source language is detected automatically, but if automatic detection is not successful you can specify the source language by setting the configuration parameter `SourceLanguage`, which accepts the name of a language or a three-letter language code. Alternatively, you can configure the task to read the source language from a document field, by setting the parameter `SourceLanguageField`. For information about the languages that are supported, refer to the SDL documentation or translation service user interface.

The target language is specified by the configuration parameter `TargetLanguage`, which has a default value of `ENG` (English).

If you are using an SDL Enterprise Translation Server, you can also choose how to balance translation quality and speed by setting the `Quality` parameter.

For more information about the configuration parameters that you can use to configure the language translation task, refer to the *Connector Framework Server Reference*.

# Chapter 8: Index Documents

This section describes how to configure indexing.

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## Introduction

The final step in the ingestion process is to index information into an index, such as IDOL Server or Haven OnDemand. After CFS finishes processing documents, it automatically indexes them into the indexes that you have configured.

CFS can index documents into:

- **IDOL Server.**  
Index documents into IDOL Server to search, analyze, and find patterns in unstructured information. You can index documents directly into an IDOL Server, or send them to a Distributed Index Handler (DIH) to be distributed between multiple IDOL Servers in a distributed architecture.
- **Haven OnDemand.**  
Haven OnDemand analyzes unstructured information in the cloud.
- **Vertica.**  
Index documents into a Vertica database to analyze the structured information contained in your data repositories. Much of the metadata extracted by connectors and by KeyView is structured information held in structured fields, so you can use Vertica to gain insight into this information.

By default, CFS indexes each document into all of the indexes specified by the `IndexerSections` parameter in the `[Indexing]` section of its configuration file. However, if the document field `AUTN_INDEXER_SECTIONS` is set, CFS routes the document to the indexes specified in the field. The field accepts a comma-separated list of index names that must match the names of the sections in the CFS configuration file.

## Configure the Batch Size and Time Interval

CFS indexes documents in batches. This is more efficient because fewer requests are made to the server.

Documents wait in the index queue until there are enough documents to create a batch, or until the maximum time interval for indexing is reached. If the time interval is reached, CFS indexes all of the documents in the queue regardless of the batch size.

### To configure indexing settings

1. Stop CFS.
2. Open the CFS configuration file.
3. In the `[Indexing]` section, set the following configuration parameters:

<code>IndexBatchSize</code>	The number of documents to index in a single batch. CFS waits until this number of documents are ready for indexing, unless the <code>IndexTimeInterval</code> is reached.
<code>IndexTimeInterval</code>	The maximum amount of time, in seconds, that a document can wait in the index queue.

For example:

```
[Indexing]
IndexBatchSize=1000
IndexTimeInterval=600
```

4. Save the configuration file.

## Index Documents into an IDOL Server

### To index documents into an IDOL Server

1. Check that CFS is authorized to index documents into the IDOL index. In the IDOL Content configuration file, CFS must belong to an authorization role that includes the `admin`, `query`, and `index` standard roles.
2. Stop CFS.
3. Open the CFS configuration file.
4. In the `[Indexing]` section, use the `IndexerSections` parameter to specify the names of the sections that contain indexing settings. If this parameter is already set, add the name of the new indexer to the list. For example:

```
[Indexing]
IndexerSections=IdolServer
```

5. Create a new section in the CFS configuration file, with the same name that you specified in the `IndexerSections` parameter. In the new section, set the following parameters:

<code>Host</code>	The host name or IP address of the IDOL Server.
<code>Port</code>	The ACI Port of the IDOL Server.
<code>DefaultDatabaseName</code>	The name of the IDOL database to index a document into when the <code>DREDBNAME</code> document field is not set.
<code>SSLConfig</code>	(Optional) The name of a section in the CFS configuration file that contains SSL settings for connecting to IDOL. Set this parameter if your IDOL Server is configured to accept connections over SSL. For more information about the configuration parameters you can use to configure SSL connections, refer to the <i>Connector Framework Server Reference</i> .
<code>CreateDatabase</code>	(Optional, default <code>false</code> ) Specifies whether IDOL should create databases that do not already exist. For example, if you set this parameter to <code>TRUE</code> and the database specified in a <code>DREDBNAME</code> document field does not exist, IDOL Server will create it.

For example:

```
[IdolServer]
Host=idol
Port=9000
DefaultDatabaseName=News
SSLConfig=SSLOptions

[SSLOptions]
SSLMethod=NEGOTIATE
```

For more information about these parameters and other parameters that you can set to customize the indexing process, refer to the *Connector Framework Server Reference*.

6. Save and close the configuration file.

## Index Documents into Haven OnDemand

CFS can index documents into a Haven OnDemand text index, or send the documents to a Haven OnDemand combination which can perform additional processing and then index the documents into a text index.

## Prepare Haven OnDemand

Before you can send documents to Haven OnDemand, you must create a text index. For information about how to create text indexes, refer to the [Haven OnDemand documentation](#).

Before you can send documents to a Haven OnDemand combination endpoint, the combination must exist. CFS requires your combination to accept the following input parameters, and produce the following output.

### Input Parameters

Name	Type	Description
json	any	A JSON object that contains a single attribute 'documents' that is an array of document objects.
index	string	The name of the text index that you want the combination to add documents to. CFS uses the value of the parameter <code>HavenOnDemandIndexName</code> to set this value.
duplicate_mode	string	Specifies how to handle duplicates when adding documents to the text index. CFS uses the value of the parameter <code>HavenOnDemandDuplicateMode</code> to set this value.

### Output

Name	Type	Description
result	any	The result of the call to <code>AddToTextIndex</code> made by the combination.

## Configure CFS to Index into Haven OnDemand

This section describes how to send documents to Haven OnDemand.

### To index documents into Haven OnDemand

1. Stop CFS.
2. Open the CFS configuration file.
3. In the `[Indexing]` section, use the `IndexerSections` parameter to specify the names of the sections that contain indexing settings. If this parameter is already set, add the name of the new indexer to the list. For example:

```
[Indexing]
IndexerSections=IdolServer,HavenOnDemand
```

4. Create a new section in the CFS configuration file, with the same name that you specified in the `IndexerSections` parameter. In the new section, set the following parameters:

<code>HavenOnDemandApiKey</code>	Your Haven OnDemand API key. You can obtain the key from your Haven OnDemand account.
<code>HavenOnDemandIndexName</code>	The name of the Haven OnDemand text index to index

	documents into.
HavenOnDemandDuplicateMode	The value to use for the <code>duplicate_mode</code> parameter in calls to the Haven OnDemand Add to Text Index API.
SSLConfig	The name of a section in the CFS configuration file that contains SSL settings for connecting to Haven OnDemand. The connection to Haven OnDemand must be made over SSL. For more information about the configuration parameters you can use to configure SSL connections, refer to the <i>Connector Framework Server Reference</i> .
HavenOnDemandCombinationName	(Optional) The name of the Haven OnDemand combination to send documents to. If you set this parameter, CFS sends all documents to the combination endpoint. If you don't set this parameter, CFS indexes all documents directly into the text index specified by <code>HavenOnDemandIndexName</code> .

For example:

```
[HavenOnDemand]
HavenOnDemandApiKey=[Your API Key]
HavenOnDemandIndexName=MyTextIndex
SSLConfig=SSLOptions
HavenOnDemandCombinationName=MyCombination
```

```
[SSLOptions]
SSLMethod=TLSV1
```

For more information about these parameters and other parameters that you can set to customize the indexing process, refer to the *Connector Framework Server Reference*.

5. Save and close the configuration file.

## Index Documents into Vertica

CFS can index documents into Vertica, so that you can run queries on structured fields (document metadata).

Depending on the metadata contained in your documents, you could:

- Investigate the average age of documents in a repository. You might want to answer questions such as: How much time has passed since the documents were last updated? How many files are regularly updated? Does this represent a small proportion of the total number of documents? Who are the most active users?
- Find the number of e-mail messages sent to your sales or support teams each week, and calculate the average response time to customer queries.

## Prerequisites

- CFS supports indexing into Vertica 7.1 and later.
- You must install the appropriate Vertica ODBC drivers (version 7.1 or later) on the machine that hosts Connector Framework Server. If you want to use an ODBC Data Source Name (DSN) in your connection string, you will also need to create the DSN. For more information about installing Vertica ODBC drivers and creating the DSN, refer to the [Vertica documentation](#).

## New, Updated and Deleted Documents

When documents are indexed into Vertica, CFS adds a timestamp that contains the time when the document was indexed. The field is named `VERTICA_INDEXER_TIMESTAMP` and the timestamp is in the format `YYYY-MM-DD HH:NN:SS`.

When a document in a data repository is modified, CFS adds a new record to the database with a new timestamp. All of the fields are populated with the latest data. The record describing the older version of the document is not deleted. You can create a projection to make sure your queries only return the latest record for a document.

When a connector detects that a document has been deleted from a repository, CFS inserts a new record into the database. The record contains only the `DRREFERENCE` and the field `VERTICA_INDEXER_DELETED` set to `TRUE`.

## Fields, Sub-Fields, and Field Attributes

Documents that are created by connectors and processed by CFS can have multiple levels of fields, and field attributes. A database table has a flat structure, so this information is indexed into Vertica as follows:

- Document fields become columns in the flex table. An IDOL document field and the corresponding database column have the same name.
- Sub-fields become columns in the flex table. A document field named `my_field` with a sub-field named `subfield` results in two columns, `my_field` and `my_field.subfield`.
- Field attributes become columns in the flex table. A document field named `my_field`, with an attribute named `my_attribute` results in two columns, `my_field` holding the field value and `my_field.my_attribute` holding the attribute value.

## Prepare the Vertica Database

Indexing documents into a standard database is problematic, because documents do not have a fixed schema. A document that represents an image has different metadata fields to a document that represents an e-mail message. Vertica databases solve this problem with *flex tables*. You can create a flex table without any column definitions, and you can insert a record regardless of whether a referenced column exists.

You must create a flex table before you index data into Vertica.

When creating the table, consider the following:

- Flex tables store entire records in a single column named `__raw__`. The default maximum size of the `__raw__` column is 128K. You might need to increase the maximum size if you are indexing documents with large amounts of content. Alternatively, you could configure CFS to remove content from documents before they are indexed.
- Documents are identified by their `DRREFERENCE`. Micro Focus recommends that you do not restrict the size of any column that holds this value, because this could result in values being truncated. As a result, rows that represent different documents might appear to represent the same document. If you do restrict the size of the `DRREFERENCE` column, ensure that the length is sufficient to hold the longest `DRREFERENCE` that might be indexed.

To create a flex table without any column definitions, run the following query:

```
create flex table my_table();
```

To improve query performance, create real columns for the fields that you query frequently. For documents indexed by CFS, this is likely to include the `DRREFERENCE`:

```
create flex table my_table(DRREFERENCE varchar NOT NULL);
```

You can add new column definitions to a flex table at any time. Vertica automatically populates new columns with values for existing records. The values for existing records are extracted from the `__raw__` column.

For more information about creating and using flex tables, refer to the [Vertica Documentation](#) or contact Micro Focus Vertica technical support.

## Configure CFS to Index into Vertica

The following procedure demonstrates a basic configuration that indexes all documents into a Vertica database.

However, you can customize the indexing process. For example, your CFS might be importing files from a File System Connector, e-mail messages from Exchange, and social media content. You might want to index these items into separate flex tables. To do this, you could run a Lua script to set the `AUTN_INDEXER_SECTIONS` field in each document, and create a separate indexing operation for each type of content.

### To configure CFS to index documents into Vertica

1. Stop CFS.
2. Open the CFS configuration file.
3. In the `[Indexing]` section, use the `IndexerSections` parameter to specify the names of the sections that contain indexing settings. If this parameter is already set, add the name of the new indexer to the list. For example:

```
[Indexing]  
IndexerSections=IdolServer,Vertica
```

4. Create a new section in the CFS configuration file, with the same name that you specified in the `IndexerSections` parameter. In the new section, set the following parameters:

<code>IndexerType</code>	The type of index to index documents into. Set this parameter to <code>Library</code> .
<code>LibraryDirectory</code>	The directory that contains the library to use to index data.
<code>LibraryName</code>	The name of the library to use to index data. You can omit the <code>.dll</code> or <code>.so</code> file extension. Set this parameter to <code>verticaIndexer</code> .
<code>ConnectionString</code>	The connection string to use to connect to the Vertica database.
<code>TableName</code>	The name of the table in the Vertica database to index the documents into. The table must be a flex table and must exist before you start indexing documents. For more information, see <a href="#">Prepare the Vertica Database, on page 110</a> .

For example:

```
[Vertica]
IndexerType=Library
LibraryDirectory=indexerdlls
LibraryName=verticaIndexer
ConnectionString=DSN=VERTICA
TableName=my_flex_table
```

For more information about these parameters and other parameters that you can set to customize the indexing process, refer to the *Connector Framework Server Reference*.

5. Save and close the configuration file.

## Troubleshooting

This section describes how to troubleshoot problems that might occur when you index data into Vertica.

### ***Documents are not indexed into Vertica***

Documents cannot be indexed when the Vertica database server is unavailable, or cannot be reached by CFS. To see whether an indexing error has occurred, check the CFS indexer log. The default location for this log file is `logs/indexer.log`. If documents were not indexed successfully, you will need to ingest these documents again.

## Index Documents into another CFS

You can index documents into another CFS. You might want to do this if you want to perform further processing on them.

### To index documents into another CFS

1. Stop CFS.
2. Open the CFS configuration file.
3. In the [Indexing] section, use the `IndexerSections` parameter to specify the names of the sections in the configuration file that contain indexing settings. If this parameter is already set, add the name of the new indexer to the list. For example:

```
[Indexing]
IndexerSections=IndexCFS
```

4. Create a new section in the CFS configuration file, with the same name that you specified in the `IndexerSections` parameter. In the new section, set the following parameters:

<code>IndexerType</code>	The type of index that you want to index documents into. Set this parameter to <b>CFS</b> .
<code>Host</code>	The host name or IP address of the CFS.
<code>Port</code>	The ACI Port of the CFS.
<code>SSLConfig</code>	(Optional) The name of a section in the CFS configuration file that contains SSL settings for connecting to the other CFS. Set this parameter if the CFS is configured to accept connections over SSL. For more information about the configuration parameters you can use to configure SSL connections, refer to the <i>Connector Framework Server Reference</i> .

For example:

```
[IndexCFS]
IndexerType=CFS
Host=cfs.domain.com
Port=7000
SSLConfig=SSLOptions
```

```
[SSLOptions]
SSLMethod=TLSV1.2
```

For more information about these parameters and other parameters that you can set to customize the indexing process, refer to the *Connector Framework Server Reference*.

5. Save and close the configuration file.

## Index Documents into MetaStore

### To index documents into MetaStore

1. Stop CFS.
2. Open the CFS configuration file.
3. In the [Indexing] section, use the `IndexerSections` parameter to specify the names of the sections that contain indexing settings. If this parameter is already set, add the name of the new indexer to the list. For example:

```
[Indexing]
IndexerSections=IdolServer,MetaStore
```

4. Create a new section in the CFS configuration file, with the same name that you specified in the `IndexerSections` parameter. In the new section, set the following parameters:

<code>IndexerType</code>	Set this parameter to <code>MetaStore</code> .
<code>Host</code>	The host name or IP address of the MetaStore.
<code>Port</code>	The port of the MetaStore.
<code>SSLConfig</code>	(Optional) The name of the section in the CFS configuration file that contains the SSL settings to use for communicating with the MetaStore.

For example:

```
[MetaStore]
IndexerType=MetaStore
Host=localhost
Port=4500
```

For more information about these parameters and other parameters that you can set to customize the indexing process, refer to the *Connector Framework Server Reference*.

5. Save and close the configuration file.

## Document Fields for Indexing

To customize the way that documents are indexed, set the following document fields.

### AUTN\_NO\_INDEX

Documents that have this field are not indexed. You can use this field when you want to troubleshoot the ingestion process without indexing documents.

## AUTN\_INDEXER\_SECTIONS

A comma-separated list of sections in the CFS configuration file to use to index the document. CFS indexes the document into all of the indexes that you specify. If this field is not set, CFS indexes the document into all of the indexes specified by the configuration parameter `IndexerSections`.

## AUTN\_INDEXPRIORITY

This field can be used to increase the priority of an index action sent to IDOL Server to index a batch of documents. You can specify a priority from 0 to 100, where 0 is the lowest priority and 100 is the highest. This means that you can configure some documents to be indexed before others, or before documents from sources other than CFS.

### CAUTION:

Use this field with care. Modifying the index priority for documents changes the order of the index commands processed by IDOL. For example, in the case of an ingest-replace, the add command could be processed before the delete, resulting in a loss of data. Micro Focus recommends that you configure the indexing priority for batches of documents indexed into IDOL using the `IndexPriority` configuration parameter. This ensures that all of the batches indexed by CFS have the same priority.

If documents in a batch contain the field `INDEXPRIORITY`, and the value of this field is greater than that specified by the `IndexPriority` configuration parameter, the priority of the batch is increased to the highest `INDEXPRIORITY` field value present in the batch.

## Manipulate Documents Before Indexing

CFS can index documents into multiple indexes. Normally, CFS indexes identical data into every index, but you might want to manipulate documents depending on the index that they are sent to. For example, if you are using Vertica to analyze structured information, you might want to remove the content from the documents indexed into Vertica, but keep the content in documents that are indexed into IDOL.

You cannot use import and index tasks to manipulate documents in this way, because those tasks affect documents sent to all of the indexes. To manipulate the documents sent to a single index, you can run a Lua script during the indexing process.

The script must define a `handler` function:

```
function handler(document, operation)
  -- do something, for example
  document:deleteField("UNINTERESTING_FIELD")
  return true
end
```

The `operation` argument specifies the documents that you want to run the script on. This argument is a string and can be set to `add`, `update`, or `remove`:

- `add` - manipulate documents that are being added to the index. Ingest-adds are sent when a connector finds new documents in a repository, or when a document's content is changed (the old document is removed, and the new document added).
- `update` - manipulate documents that represent metadata updates.
- `remove` - manipulate documents that represent information deleted from the source repository.

To index the document the `handler` function must return `true`. To discard the document, return `false`.

### To manipulate documents before indexing

1. Open the CFS configuration file.
2. In a section of the configuration file specified by the `IndexerSections` configuration parameter, set the `IndexLuaScript` parameter. This parameter specifies the path to the script that you want to run. For example:

```
[Indexing]
IndexerSections=IdolServer,Vertica

[Vertica]
IndexerType=Library
LibraryDirectory=indexerdlls
LibraryName=verticaIndexer
ConnectionString=DSN=VERTICA
TableName=my_flex_table
IndexLuaScript=./scripts/remove_content.lua
```

3. Save and close the configuration file.

# Chapter 9: Monitor Connector Framework Server

This section describes how to monitor CFS.

- [Use the Logs](#) .....117
- [Monitor Asynchronous Actions using Event Handlers](#) .....119
- [Monitor the size of the Import and Index Queues](#) ..... 121
- [Set Up Document Tracking](#) .....122

## Use the Logs

As Connector Framework Server runs, it outputs messages to log files. Most log messages occur due to normal operation, for example when CFS starts, receives actions, or processes documents. If CFS encounters an error, the logs are the first place to look for information to help troubleshoot the problem.

CFS separates log messages into the following message types, each of which relates to a specific feature:

Log Message Type	Description
Action	Logs actions that are received by CFS, and related messages.
Application	Logs application-related occurrences, such as when the CFS starts.
Import	Information about the import process.  When you set <code>LogLevel</code> to <code>FULL</code> , CFS can log a significant amount of information about the import process, which might reduce performance.
Indexer	Information about the indexing process.

## Customize Logging

You can customize logging by setting up your own *log streams*. Each log stream creates a separate log file in which specific types of message are logged.

## To set up log streams

1. Open the CFS configuration file in a text editor.
2. Find the [Logging] section. If the configuration file does not contain a [Logging] section, create it.
3. In the [Logging] section, create a list of the log streams you want to set up using the format *N=LogStreamName*. List the log streams in consecutive order, starting from 0 (zero). For example:

```
[Logging]
LogLevel=NORMAL
0=ApplicationLogStream
1=ActionLogStream
2=ImportLogStream
3=IndexLogStream
```

You can also use the [Logging] section to configure any default values for logging configuration parameters, such as `LogLevel`. For more information, refer to the *Connector Framework Server Reference*.

4. Create a new section for each of the log streams. Each section must have the same name as the log stream. For example:

```
[ApplicationLogStream]
[ActionLogStream]
...
```

5. Specify the settings for each log stream in the appropriate section. You can specify the type of logging to perform (for example, full logging), the maximum size of log files, and so on. For example:

```
[ApplicationLogStream]
LogTypeCSVs=application
LogFile=application.log
LogHistorySize=50
LogTime=True
LogEcho=False
LogMaxSizeKBs=1024
```

```
[ActionLogStream]
LogTypeCSVs=action
LogFile=action.log
LogHistorySize=50
LogTime=true
LogEcho=false
LogMaxSizeKBs=1024
```

6. Save and close the configuration file.
7. Restart CFS for your changes to take effect. For information about how to start and stop CFS, see [Start and Stop Connector Framework Server, on page 30](#).

## Monitor Asynchronous Actions using Event Handlers

Some of the actions that you can send to Connector Framework Server are asynchronous. Asynchronous actions do not run immediately, but are added to a queue. This means that the person or application that sends the action does not receive an immediate response. However, you can configure Connector Framework Server to call an event handler when an asynchronous action starts, finishes, or encounters an error.

You might use an event handler to:

- Return data about an event back to the application that sent the action.
- Write event data to a text file, to log any errors that occur.

You can also use event handlers to monitor the size of asynchronous action queues. If a queue becomes full this might indicate a problem, or that applications are making requests to Connector Framework Server faster than they can be processed.

Connector Framework Server can call an event handler for the following events.

<b>OnStart</b>	The <code>OnStart</code> event handler is called when Connector Framework Server starts processing an asynchronous action.
<b>OnFinish</b>	The <code>OnFinish</code> event handler is called when Connector Framework Server successfully finishes processing an asynchronous action.
<b>OnError</b>	The <code>OnError</code> event handler is called when an asynchronous action fails and cannot continue.
<b>OnQueueEvent</b>	The <code>OnQueueEvent</code> handler is called when an asynchronous action queue becomes full, becomes empty, or the queue size passes certain thresholds. <ul style="list-style-type: none"><li>• A <code>QueueFull</code> event occurs when the action queue becomes full.</li><li>• A <code>QueueFilling</code> event occurs when the queue size exceeds a configurable threshold (<code>QueueFillingThreshold</code>) and the last event was a <code>QueueEmpty</code> or <code>QueueEmptying</code> event.</li><li>• A <code>QueueEmptying</code> event occurs when the queue size falls below a configurable threshold (<code>QueueEmptyingThreshold</code>) and the last event was a <code>QueueFull</code> or <code>QueueFilling</code> event.</li><li>• A <code>QueueEmpty</code> event occurs when the action queue becomes empty.</li></ul>

Connector Framework Server supports the following types of event handler:

- The `TextFileHandler` writes event data to a text file.
- The `HttpHandler` sends event data to a URL.
- The `LuaHandler` runs a Lua script. The event data is passed into the script.

## Configure an Event Handler

To configure an event handler, follow these steps.

### To configure an event handler

1. Stop Connector Framework Server.
2. Open the Connector Framework Server configuration file in a text editor.
3. Set the `OnStart`, `OnFinish`, `OnError`, or `OnQueueEvent` parameter to specify the name of a section in the configuration file that contains the event handler settings.
  - To run an event handler for all asynchronous actions, set these parameters in the `[Actions]` section. For example:

```
[Actions]
OnStart=NormalEvents
OnFinish=NormalEvents
OnError=ErrorEvents
```

- To run an event handler for a specific action, set these parameters in the `[ActionName]` section, where `ActionName` is the name of the action. The following example calls an event handler when the `Example` action starts and finishes successfully, and uses a different event handler to monitor the queue size:

```
[Example]
OnStart=NormalEvents
OnFinish=NormalEvents
OnQueueEvent=QueueSizeEvents
```

4. Create a new section in the configuration file to contain the settings for your event handler. You must name the section using the name you specified with the `OnStart`, `OnFinish`, `OnError`, or `OnQueueEvent` parameter.
5. In the new section, set the `LibraryName` parameter.

`LibraryName` The type of event handler to use to handle the event.

- To write event data to a text file, set this parameter to `TextFileHandler`, and then set the `FilePath` parameter to specify the path of the file.
- To send event data to a URL, set this parameter to `HttpHandler`, and then use the HTTP event handler parameters to specify the URL, proxy server settings, credentials, and so on.
- To run a Lua script, set this parameter to `LuaHandler`, and then use the `LuaScript` parameter to specify the script to run. For information about writing the script, see [Write a Lua Script to Handle Events, on the next page](#).

For example:

```
[NormalEvents]
LibraryName=TextFileHandler
FilePath=./events.txt

[ErrorEvents]
LibraryName=HTTPHandler
URL=http://handlers:8080/lo-proxy/callback.htm?

[QueueSizeEvents]
LibraryName=LuaHandler
LuaScript=./handle_queue_events.lua
```

6. Save and close the configuration file. You must restart Connector Framework Server for your changes to take effect.

## Write a Lua Script to Handle Events

The Lua event handler runs a Lua script to handle events. The Lua script must contain a function named `handler` with the arguments `request` and `xml`, as shown below:

```
function handler(request, xml)
    ...
end
```

- `request` is a table holding the request parameters. For example, if the request was `action=Example&MyParam=Value`, the table will contain a key `MyParam` with the value `Value`. Some events, for example queue size events, are not related to a specific action and so the table might be empty.
- `xml` is a string of XML that contains information about the event.

## Monitor the size of the Import and Index Queues

CFS generates events when the import queue and the outgoing (indexing) queue become full, become empty, or the queue size passes certain thresholds. If a queue approaches its maximum size, this might indicate a problem, or that applications are making requests to Connector Framework Server faster than they can be processed.

CFS generates the following events for each queue that is monitored:

- A `QueueFull` event occurs when the queue becomes full.
- A `QueueFilling` event occurs when the queue size exceeds a configurable threshold (`QueueFillingThreshold`) and the last event was a `QueueEmpty` or `QueueEmptying` event.
- A `QueueEmptying` event occurs when the queue size falls below a configurable threshold (`QueueEmptyingThreshold`) and the last event was a `QueueFull` or `QueueFilling` event.
- A `QueueEmpty` event occurs when the queue becomes empty.

You can configure event handlers to process these events. For example, you might want to notify an administrator if the size of a queue reaches 80 percent of the maximum.

### To monitor queue sizes

1. Stop CFS.
2. Open the CFS configuration file in a text editor.
3. Set the `OnQueueEvent` parameter to the name of a section that configures the event handler.
  - To monitor the size of the import queue, set this parameter in the `[ImportService]` section. For example:

```
[ImportService]
OnQueueEvent=MyEventHandler
```

- To monitor the size of the outgoing (indexing) queue, set this parameter in the `[Indexing]` section. For example:
- ```
[Indexing]
OnQueueEvent=MyEventHandler
```
4. Create a new section in the configuration file to contain the settings for your event handler. You must name the section using the name you specified with the `OnQueueEvent` parameter.
  5. In the new section, set the `LibraryName` parameter.

`LibraryName` The type of event handler to use to handle the event.

- To write event data to a text file, set this parameter to `TextFileHandler`, and then set the `FilePath` parameter to specify the path of the file.
- To send event data to a URL, set this parameter to `HttpHandler`, and then use the HTTP event handler parameters to specify the URL, proxy server settings, credentials, and so on.
- To run a Lua script, set this parameter to `LuaHandler`, and then use the `LuaScript` parameter to specify the script to run. For information about writing the script, see [Write a Lua Script to Handle Events, on the previous page](#).

For example:

```
[MyEventHandler]
LibraryName=LuaHandler
LuaScript=./handle_queue_event.lua
```

6. Save and close the configuration file. You must restart CFS for your changes to take effect.

## Set Up Document Tracking

Document tracking reports metadata about documents when they pass through various stages in the ingestion and indexing process. Document tracking can help you detect problems with the indexing

process.

You can write document tracking events to a database, log file, or IDOL Server. For information about how to set up a database to store document tracking events, refer to the *IDOL Server Administration Guide*.

### To enable Document Tracking

1. Open the CFS configuration file.
2. Create a new section in the configuration file, named [DocumentTracking].
3. In the [DocumentTracking] section, specify where the document tracking events are sent.
  - To send document tracking events to a database through ODBC, set the following parameters:

|                  |                                                                                                |
|------------------|------------------------------------------------------------------------------------------------|
| Backend          | To send document tracking events to a database, set this parameter to <b>Library</b> .         |
| LibraryPath      | Specify the location of the ODBC document tracking library. This is included with IDOL Server. |
| ConnectionString | The ODBC connection string for the database.                                                   |

For example:

```
[DocumentTracking]
Backend=Library
LibraryPath=C:\Autonomy\IDOLServer\IDOL\modules\dt_odbc.dll
ConnectionString=DSN=MyDatabase
```

- To send document tracking events to the CFS import log, set the following parameters:

|              |                                                                                                           |
|--------------|-----------------------------------------------------------------------------------------------------------|
| Backend      | To send document tracking events to the logs, set this parameter to <b>Log</b> .                          |
| DatabaseName | The name of the log stream to send the document tracking events to. Set this parameter to <b>import</b> . |

For example:

```
[DocumentTracking]
Backend=Log
DatabaseName=import
```

- To send document tracking events to an IDOL Server, set the following parameters:

|            |                                                                                         |
|------------|-----------------------------------------------------------------------------------------|
| Backend    | To send document tracking events to an IDOL Server, set this parameter to <b>IDOL</b> . |
| TargetHost | The host name or IP address of the IDOL Server.                                         |
| TargetPort | The index port of the IDOL Server.                                                      |

For example:

```
[DocumentTracking]
```

```
Backend=IDOL
```

```
TargetHost=idol
```

```
TargetPort=9001
```

For more information about the parameters you can use to configure document tracking, refer to the *Connector Framework Server Reference*.

4. Save and close the configuration file.

# Appendix A: KeyView Supported Formats

This section lists the file formats that KeyView can process.

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## Supported Formats

The tables in this section provide the following information:

- The file formats that can be processed by KeyView, and the features that are supported for each format:
  - The **Filter** column specifies whether KeyView can extract the main content of the file (for example the text in a document or the body of an email message). CFS writes this text to the document content.
  - The **Extract** column specifies whether KeyView can extract subfiles from the file, if it is a container file.
- The file formats for which KeyView can detect and extract the character set and metadata information (properties such as title, author, and subject).

Even though a file format might be able to provide character set information, some documents might not contain character set information. Therefore, the document reader would not be able to determine the character set of the document. In this case, either the operating system code page or the character set specified in the API is used.

- The document reader used to filter each format.

**Key to Support Tables**

| <b>Symbol</b> | <b>Description</b>                                                                                                                      |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Y             | The format is supported.<br>You can extract metadata for this format.<br>You can determine the character set for this format.           |
| N             | The format is not supported.<br>You cannot extract metadata for this format.<br>You cannot determine the character set for this format. |
| P             | Partial metadata is extracted from this format. Some non-standard fields are not extracted.                                             |
| T             | Only text is extracted from this format. Formatting information is not extracted.                                                       |
| M             | Only metadata (title, subject, author, and so on) is extracted from this format. Text and formatting information are not extracted.     |

# Archive Formats

## Supported Archive Formats

| Format                                           | Version | Reader                            | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|--------------------------------------------------|---------|-----------------------------------|-----------|--------|--------|------|---------|----------|---------|---------------|
| 7-Zip                                            | 4.57    | z7zsr,<br>multiarcsr <sup>1</sup> | 7Z        | N      | N      | Y    | Y       | N        | n/a     | N             |
| AD1                                              | n/a     | ad1sr                             | AD1       | N      | N      | Y    | Y       | N        | n/a     | N             |
| ARJ                                              | n/a     | multiarcsr                        | ARJ       | N      | N      | N    | Y       | N        | n/a     | N             |
| B1                                               | n/a     | b1sr                              | B1        | N      | N      | Y    | Y       | N        | n/a     | N             |
| BinHex                                           | n/a     | kvhqxsr                           | HQX       | N      | N      | Y    | Y       | N        | n/a     | N             |
| Bzip2                                            | n/a     | bzip2sr                           | BZ2       | N      | N      | Y    | Y       | N        | n/a     | N             |
| Expert Witness<br>Compression Format<br>(EnCase) | 6       | encasesr                          | E01, L01  | N      | N      | Y    | Y       | N        | n/a     | N             |
|                                                  | 7       | encase2sr                         | Lx01      | N      | N      | Y    | Y       | N        | n/a     | N             |
| GZIP                                             | 2       | kvgzsr                            | GZ        | N      | N      | N    | Y       | N        | n/a     | N             |
|                                                  |         | kvgz                              | GZ        | N      | N      | Y    | N       | N        | n/a     | N             |
| ISO                                              | n/a     | isosr                             | ISO       | N      | N      | Y    | Y       | N        | n/a     | N             |
| Java Archive                                     | n/a     | unzip                             | JAR       | N      | N      | Y    | Y       | N        | n/a     | N             |
| Legato EMailXtender<br>Archive                   | n/a     | emxsr                             | EMX       | N      | N      | Y    | Y       | N        | n/a     | N             |

<sup>1</sup>7zip is supported with the multiarcsr reader on some platforms for Extract.

**Supported Archive Formats, continued**

| Format                              | Version               | Reader     | Extension  | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|-------------------------------------|-----------------------|------------|------------|--------|--------|------|---------|----------|---------|---------------|
| MacBinary                           | n/a                   | macbinsr   | BIN        | N      | N      | Y    | Y       | N        | n/a     | N             |
| Mac Disk Copy Disk Image            | n/a                   | dmgsr      | DMG        | N      | N      | Y    | Y       | N        | n/a     | N             |
| Microsoft Backup File               | n/a                   | bkfsr      | BKF        | N      | N      | Y    | Y       | N        | n/a     | N             |
| Microsoft Cabinet format            | 1.3                   | cabsr      | CAB        | N      | N      | Y    | Y       | N        | n/a     | N             |
| Microsoft Compiled HTML Help        | 3                     | chmsr      | CHM        | N      | N      | Y    | Y       | N        | n/a     | N             |
| Microsoft Compressed Folder         | n/a                   | lzhsr      | LZH<br>LHA | N      | N      | N    | Y       | N        | n/a     | N             |
| Microsoft Power BI Desktop format   | n/a                   | unzip      | PBIX       | N      | N      | N    | Y       | N        | n/a     | N             |
| PKZIP                               | through<br>9.0        | unzip      | ZIP        | N      | N      | Y    | Y       | N        | n/a     | N             |
| RAR archive                         | 2.0<br>through<br>3.5 | rarsr      | RAR        | N      | N      | N    | Y       | N        | n/a     | N             |
| RAR5 archive                        | 5                     | multiarcsr | RAR5       | N      | N      | N    | Y       | N        | n/a     | N             |
| Tableau Packaged Data Source format | n/a                   | unzip      | TDSX       | N      | N      | N    | Y       | N        | n/a     | N             |
| Tableau Packaged Workbook format    | n/a                   | unzip      | TWBX       | N      | N      | N    | Y       | N        | n/a     | N             |
| Tape Archive                        | n/a                   | tarsr      | TAR        | N      | N      | Y    | Y       | N        | n/a     | N             |

**Supported Archive Formats, continued**

| Format                         | Version      | Reader     | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|--------------------------------|--------------|------------|-----------|--------|--------|------|---------|----------|---------|---------------|
| UNIX Compress                  | n/a          | kvzeesr    | Z         | N      | N      | N    | Y       | N        | n/a     | N             |
|                                |              | kvzee      | Z         | N      | N      | Y    | N       | N        | n/a     | N             |
| UUEncoding                     | all versions | uudsr      | UUE       | N      | N      | Y    | Y       | N        | n/a     | N             |
| XZ                             | n/a          | multiarcsr | XZ        | N      | N      | N    | Y       | N        | n/a     | N             |
| Windows Scrap File             | n/a          | olesr      | SHS       | N      | N      | N    | Y       | N        | n/a     | N             |
| WinZip                         | through 10   | unzip      | ZIP       | N      | N      | Y    | Y       | N        | n/a     | N             |
| Zipped Keyhole Markup Language | n/a          | unzip      | ZIP       | N      | N      | N    | Y       | N        | n/a     | N             |

## Binary Format

**Supported Binary Formats**

| Format       | Version | Reader | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|--------------|---------|--------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Executable   | n/a     | exesr  | EXE       | N      | N      | Y    | N       | N        | n/a     | N             |
| Link Library | n/a     | exesr  | DLL       | N      | N      | Y    | N       | N        | n/a     | N             |

## Computer-Aided Design Formats

### Supported CAD Formats

| Format                   | Version                                          | Reader                            | Extension        | Filter | Export | View | Extract        | Metadata | Charset | Header/Footer |
|--------------------------|--------------------------------------------------|-----------------------------------|------------------|--------|--------|------|----------------|----------|---------|---------------|
| AutoCAD Drawing          | R13, R14, R15/2000, 2004, 2007, 2010, 2013, 2018 | kpODArdr<br>kpDWGrdr <sup>1</sup> | DWG              | Y      | Y      | Y    | N              | Y        | Y       | N             |
| AutoCAD Drawing Exchange | R13, R14, R15/2000, 2004, 2007, 2010, 2013       | kpODArdr<br>kpDXFrdr <sup>2</sup> | DXF              | Y      | Y      | Y    | N              | Y        | Y       | N             |
| CATIA formats            | 5                                                | kpCATrdr                          | CAT <sup>3</sup> | Y      | N      | N    | N              | Y        | N       | N             |
| Microsoft Visio          | 4, 5, 2000, 2002, 2003, 2007, 2010 <sup>4</sup>  | vsdsr                             | VSD              | Y      | Y      | Y    | Y <sup>5</sup> | Y        | Y       | N             |
|                          |                                                  | kpVSD2rdr                         | VSD, VSS<br>VST  | Y      | Y      | Y    | N              | Y        | Y       | N             |

<sup>1</sup>The kpODArdr reader can filter, export, and view all versions but is supported only on Windows, Linux, and OSX. The kpDWGrdr reader is used on AIX, FreeBSD, Solaris, and SPARC platforms, but does not support graphics for versions after 2004 or text for versions after 2013.

<sup>2</sup>The kpODArdr reader can filter, export, and view all versions but is supported only on Windows, Linux, and OSX. The kpDXFrdr reader is used on AIX, FreeBSD, Solaris, and SPARC platforms, but does not support graphics for versions after 2004.

<sup>3</sup>All CAT file extensions, for example CATDrawing, CATProduct, CATPart, and so on.

<sup>4</sup>Viewing and Export use the graphic reader, kpVSD2rdr for Microsoft Visio 2003, 2007, and 2010, and vsdsr for all earlier versions. Image fidelity in Viewing and Export is therefore only supported for versions 2003 and above. Filter uses the graphic reader kpVSD2rdr for Microsoft Visio 2003, 2007, and 2010, and vsdsr for all earlier versions.

<sup>5</sup>Extraction of embedded OLE objects is supported for Filter on Windows platforms only.

**Supported CAD Formats, continued**

| Format              | Version | Reader             | Extension                                    | Filter | Export | View           | Extract | Metadata | Charset | Header/Footer |
|---------------------|---------|--------------------|----------------------------------------------|--------|--------|----------------|---------|----------|---------|---------------|
|                     | 2013    | ActiveX components | VSDM<br>VSSM<br>VSTM<br>VSDX<br>VSSX<br>VSTX | N      | N      | Y <sup>1</sup> | N       | Y        | N       | N             |
|                     |         | kpVSDXrdr          | VSDM<br>VSSM<br>VSTM<br>VSDX<br>VSSX<br>VSTX | Y      | Y      | Y              | Y       | Y        | Y       | N             |
| Unigraphics (UG) NX |         | kpUGrdr            | PRT                                          | Y      | N      | N              | N       | N        | N       | N             |

## Database Formats

**Supported Database Formats**

| Format         | Version  | Reader | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|----------------|----------|--------|-----------|--------|--------|------|---------|----------|---------|---------------|
| dBase Database | III+, IV | dbfsr  | DBF       | Y      | Y      | Y    | N       | N        | N       | N             |

<sup>1</sup>Visio 2013 is supported in Viewing only, with the support of ActiveX components from the Microsoft Visio 2013 Viewer. Image fidelity is supported but other features, such as highlighting, are not.

### Supported Database Formats, continued

| Format            | Version                                          | Reader | Extension  | Filter | Export | View | Extract | Metadata | Charset        | Header/Footer |
|-------------------|--------------------------------------------------|--------|------------|--------|--------|------|---------|----------|----------------|---------------|
| Microsoft Access  | 95, 97, 2000, 2002, 2003, 2007, 2010, 2013, 2016 | mdbsr  | MDB, ACCDB | Y      | T      | T    | N       | N        | Y <sup>1</sup> | N             |
| Microsoft Project | 2000, 2002, 2003, 2007, 2010, 2013, 2016         | mppsr  | MPP        | Y      | Y      | Y    | Y       | Y        | Y              | N             |

## Desktop Publishing

### Supported Desktop Publishing Formats

| Format              | Version    | Reader  | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|---------------------|------------|---------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Microsoft Publisher | 98 to 2016 | mspubsr | PUB       | Y      | T      | T    | Y       | Y        | Y       | N             |

## Display Formats

### Supported Display Formats

| Format    | Version    | Reader | Extension | Filter | Export | View | Extract        | Metadata | Charset | Header/Footer |
|-----------|------------|--------|-----------|--------|--------|------|----------------|----------|---------|---------------|
| Adobe PDF | 1.1 to 1.7 | pdfsr  | PDF       | Y      | Y      | N    | Y <sup>2</sup> | Y        | Y       | N             |

<sup>1</sup>Charset is not supported for Microsoft Access 95 or 97.

<sup>2</sup>Includes support for extraction of subfiles from PDF Portfolio documents.

**Supported Display Formats, continued**

| Format | Version | Reader                 | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|--------|---------|------------------------|-----------|--------|--------|------|---------|----------|---------|---------------|
|        |         | pdf2sr                 | PDF       | N      | Y      | N    | N       | N        | N       | N             |
|        |         | kppdfdr                | PDF       | N      | Y      | Y    | N       | N        | N       | N             |
|        |         | kppdf2rdr <sup>1</sup> | PDF       | N      | N      | Y    | N       | N        | N       | N             |

## Graphic Formats

**Supported Graphic Formats**

| Format                     | Version                           | Reader                | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|----------------------------|-----------------------------------|-----------------------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Computer Graphics Metafile | n/a                               | kpcgmrdr <sup>2</sup> | CGM       | Y      | Y      | Y    | N       | N        | N       | N             |
| CorelDRAW <sup>3</sup>     | through 9.0<br><br>10, 11, 12, X3 | kpcdrdr               | CDR       | N      | Y      | Y    | N       | N        | N       | N             |
| DCX Fax System             | n/a                               | kpcxrdr               | DCX       | N      | Y      | Y    | N       | N        | N       | N             |

<sup>1</sup>kppdf2rdr is an alternate graphic-based reader that produces high-fidelity output but does not support other features such as highlighting or text searching.

<sup>2</sup>Files with non-partitioned data are supported.

<sup>3</sup>CDR/CDR with TIFF header.

**Supported Graphic Formats, continued**

| Format                                               | Version     | Reader      | Extension                     | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|------------------------------------------------------|-------------|-------------|-------------------------------|--------|--------|------|---------|----------|---------|---------------|
| Digital Imaging & Communications in Medicine (DICOM) | n/a         | dcmsr       | DCM                           | M      | N      | N    | N       | Y        | N       | N             |
| Encapsulated PostScript (raster)                     | TIFF header | kpepsrdr    | EPS                           | N      | Y      | Y    | N       | N        | N       | N             |
| Enhanced Metafile                                    | n/a         | kpemfrdr    | EMF                           | Y      | Y      | Y    | N       | Y        | N       | N             |
| GIF                                                  | 87, 89      | kpgifrdr    | GIF                           | N      | Y      | Y    | N       | N        | N       | N             |
|                                                      |             | gifsr       |                               | M      | M      | N    | N       | Y        | N       | N             |
| ISO-BMFF JPEG 2000 compound image                    | n/a         | kpjp2000rdr | JPM                           | N      | Y      | Y    | N       | N        | N       | N             |
|                                                      |             | jp2000sr    |                               | M      | M      | N    | N       | Y        | N       | N             |
| ISO-BMFF JPEG 2000 image                             | n/a         | kpjp2000rdr | JP2                           | N      | Y      | Y    | N       | N        | N       | N             |
|                                                      |             | jp2000sr    |                               | M      | M      | N    | N       | Y        | N       | N             |
| ISO-BMFF JPEG 2000 with extensions                   | n/a         | kpjp2000rdr | JPX                           | N      | Y      | Y    | N       | N        | N       | N             |
|                                                      |             | jp2000sr    |                               | M      | M      | N    | N       | Y        | N       | N             |
| JBIG2                                                | n/a         | kpJBIG2rdr  | JBIG2                         | N      | Y      | Y    | N       | N        | N       | N             |
| JPEG                                                 | n/a         | kpjpgdr     | JPEG                          | N      | Y      | Y    | N       | N        | N       | N             |
|                                                      |             | jpgsr       |                               | M      | M      | N    | N       | Y        | N       | N             |
| JPEG 2000                                            | n/a         | kpjp2000rdr | JP2, JPF, J2K, JPWL, JPX, PGX | N      | Y      | Y    | N       | N        | N       | N             |
|                                                      |             | jp2000sr    |                               | M      | M      | N    | N       | Y        | N       | N             |

**Supported Graphic Formats, continued**

| Format                                    | Version | Reader      | Extension  | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|-------------------------------------------|---------|-------------|------------|--------|--------|------|---------|----------|---------|---------------|
| JPEG 2000 PGX<br>Verification Model image | n/a     | kjpg2000rdr | PGX        | N      | Y      | Y    | N       | N        | N       | N             |
|                                           |         | jp2000sr    |            | M      | M      | N    | N       | Y        | N       | N             |
| Lotus AMIDraw<br>Graphics                 | n/a     | kpsdwrdr    | SDW        | N      | Y      | Y    | N       | N        | N       | N             |
| Lotus Pic                                 | n/a     | kppicrdr    | PIC        | Y      | Y      | Y    | N       | N        | N       | N             |
| Macintosh Raster                          | 2       | kppctrdr    | PIC<br>PCT | N      | Y      | Y    | N       | N        | N       | N             |
| MacPaint                                  | n/a     | kpmacrdr    | PNTG       | N      | Y      | Y    | N       | N        | N       | N             |
| Microsoft Office Drawing                  | n/a     | kpmsordr    | MSO        | N      | Y      | Y    | N       | N        | N       | N             |
| Omni Graffiti                             | n/a     | kpGFLrdr    | GRAFFLE    | Y      | N      | N    | N       | Y        | Y       | N             |
| PC PaintBrush                             | 3       | kppcxrdr    | PCX        | N      | Y      | Y    | N       | N        | N       | N             |
| Portable Network<br>Graphics              | n/a     | kppngrdr    | PNG        | N      | Y      | Y    | N       | N        | N       | N             |
|                                           |         | pngsr       | PNG        | M      | M      | N    | N       | Y        | N       | N             |
| Scalable Vector<br>Graphics               | n/a     | xmlsr       | SVG        | Y      | T      | T    | N       | Y        | Y       | N             |
| SGI RGB Image                             | n/a     | kpsgirdr    | RGB        | N      | Y      | Y    | N       | N        | N       | N             |
| Sun Raster Image                          | n/a     | kpsunrdr    | RS         | N      | Y      | Y    | N       | N        | N       | N             |

**Supported Graphic Formats, continued**

| Format                  | Version                  | Reader   | Extension | Filter         | Export | View | Extract | Metadata | Charset | Header/Footer |
|-------------------------|--------------------------|----------|-----------|----------------|--------|------|---------|----------|---------|---------------|
| Tagged Image File       | through 6.0 <sup>1</sup> | tifsr    | TIFF      | M              | M      | N    | N       | Y        | N       | N             |
|                         |                          | kptifrd  | TIFF      | N              | Y      | Y    | N       | N        | N       | N             |
| Truevision Targa        | 2                        | kpTGArdr | TGA       | N              | Y      | Y    | N       | N        | N       | N             |
| Windows Animated Cursor | n/a                      | kpanirdr | ANI       | N              | Y      | Y    | N       | N        | N       | N             |
| Windows Bitmap          | n/a                      | kpbmprdr | BMP       | N              | Y      | Y    | N       | N        | N       | N             |
|                         |                          | bmpsr    | BMP       | M              | M      | N    | N       | Y        | N       | N             |
| Windows Icon Cursor     | n/a                      | kpicordr | ICO       | N              | Y      | Y    | N       | N        | N       | N             |
| Windows Metafile        | 3                        | kpwmfrdr | WMF       | Y <sup>2</sup> | Y      | Y    | N       | N        | N       | N             |
| WordPerfect Graphics 1  | 1                        | kpwpgrdr | WPG       | N              | Y      | Y    | N       | N        | N       | N             |
| WordPerfect Graphics 2  | 2, 7                     | kpwg2rdr | WPG       | N              | Y      | Y    | N       | N        | N       | N             |

<sup>1</sup>The following compression types are supported: no compression, CCITT Group 3 1-Dimensional Modified Huffman, CCITT Group 3 T4 1-Dimensional, CCITT Group 4 T6, LZW, JPEG (only Gray, RGB and CMYK color space are supported), and PackBits.

<sup>2</sup>Windows Metafiles can contain both raster images (KeyView file class 4) and vector graphics (KeyView file class 5). Filtering is supported only for vector graphics (class 5).

## Mail Formats

### Supported Mail Formats

| Format                           | Version                     | Reader             | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|----------------------------------|-----------------------------|--------------------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Documentum EMC MF                | n/a                         | msgsr              | EMCMF     | N      | N      | Y    | Y       | Y        | Y       | N             |
| Domino XML Language <sup>1</sup> | n/a                         | dxlsr              | DXL       | N      | N      | Y    | Y       | Y        | N       | N             |
| GroupWise FileSurf               | n/a                         | gwfssr             | GWFS      | N      | N      | Y    | Y       | Y        | N       | N             |
| Legato Extender                  | n/a                         | onmsr              | ONM       | N      | N      | Y    | Y       | Y        | N       | N             |
| Lotus Notes database             | 4, 5, 6.0, 6.5, 7.0, 8.0    | nsfsr              | NSF       | N      | N      | Y    | Y       | Y        | N       | N             |
| Mailbox <sup>2</sup>             | Thunderbird 1.0, Eudora 6.2 | mbxsr <sup>3</sup> | MBX       | N      | N      | T    | Y       | Y        | Y       | N             |
| Microsoft Entourage              | 2004                        | entsr              | various   | N      | N      | Y    | Y       | Y        | Y       | N             |

<sup>1</sup>Supports non-encrypted embedded files only.

<sup>2</sup>KeyView supports MBX files created by Eudora Email and Mozilla Thunderbird. MBX files created by other common mail applications are typically filtered, converted, and displayed.

<sup>3</sup>This reader supports both clear signed and encrypted S/MIME. KeyView supports S/MIME for PST, EML, MBX, and MSG files.

**Supported Mail Formats, continued**

| Format                                 | Version                                      | Reader             | Extension | Filter | Export | View | Extract | Metadata | Charset        | Header/Footer |
|----------------------------------------|----------------------------------------------|--------------------|-----------|--------|--------|------|---------|----------|----------------|---------------|
| Database                               |                                              |                    |           |        |        |      |         |          |                |               |
| Microsoft Outlook                      | 97, 2000, 2002, 2003, 2007, 2010, 2013, 2016 | msgsr <sup>1</sup> | MSG, OFT  | Y      | T      | T    | Y       | Y        | Y <sup>2</sup> | N             |
| Microsoft Outlook DBX                  | 5.0, 6.0                                     | dbxsr              | DBX       | N      | N      | Y    | Y       | Y        | Y              | N             |
| Microsoft Outlook Express              | Windows 6<br>Macintosh 5                     | emlsr <sup>3</sup> | EML       | Y      | T      | T    | Y       | Y        | Y              | N             |
|                                        |                                              | mbxsr <sup>4</sup> | EML       | N      | N      | T    | Y       | Y        | Y              | N             |
| Microsoft Outlook iCalendar            | 1.0, 2.0                                     | icssr              | ICS, VCS  | N      | N      | Y    | Y       | Y        | Y              | N             |
| Microsoft Outlook for Macintosh        | 2011                                         | olmsr              | OLM       | N      | N      | Y    | Y       | N        | Y              | N             |
| Microsoft Outlook Offline Storage File | 97, 2000, 2002, 2003, 2007, 2010, 2013       | pffsr <sup>5</sup> | OST       | N      | N      | Y    | Y       | Y        | Y              | N             |

<sup>1</sup>This reader supports both clear signed and encrypted S/MIME. KeyView supports S/MIME for PST, EML, MBX, and MSG files.

<sup>2</sup>Returns "Unicode" character set for version 2003 and up, and "Unknown" character set for previous versions.

<sup>3</sup>This reader supports both clear signed and encrypted S/MIME. KeyView supports S/MIME for PST, EML, MBX, and MSG files.

<sup>4</sup>This reader supports both clear signed and encrypted S/MIME. KeyView supports S/MIME for PST, EML, MBX, and MSG files.

<sup>5</sup>The reader pffsr is available only on Windows and Linux.

**Supported Mail Formats, continued**

| Format                                 | Version                                      | Reader              | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|----------------------------------------|----------------------------------------------|---------------------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Microsoft Outlook Personal Folder      | 97, 2000, 2002, 2003, 2007, 2010, 2013, 2016 | pstsr <sup>12</sup> | PST       | N      | N      | Y    | Y       | Y        | N       | N             |
|                                        | 97, 2000, 2002, 2003, 2007, 2010, 2013       | pstnsr              | PST       | N      | N      | Y    | Y       | Y        | Y       | N             |
| Microsoft Outlook vCard Contact        | 2.1, 3.0, 4.0                                | vcfsr               | VCF       | Y      | Y      | T    | N       | Y        | N       | N             |
| Text Mail (MIME)                       | n/a                                          | emlsr <sup>3</sup>  | various   | Y      | T      | T    | Y       | Y        | Y       | N             |
|                                        |                                              | mbxsr <sup>4</sup>  | various   | Y      | T      | T    | Y       | Y        | Y       | N             |
| Transport Neutral Encapsulation Format | n/a                                          | tnfsr               | various   | N      | N      | Y    | Y       | Y        | Y       | N             |

## Multimedia Formats

Viewing SDK plays some multimedia files using the Windows Media Control Interface (MCI). MCI is a set of Windows APIs that communicate with multimedia devices.

<sup>1</sup>This reader supports both clear signed and encrypted S/MIME. KeyView supports S/MIME for PST, EML, MBX, and MSG files.

<sup>2</sup>Uses Microsoft Messaging Application Programming Interface (MAPI). The MAPI reader (*pstsr*) works only on Windows, and requires that you have Microsoft Outlook installed. As an alternative, the native PST reader (*pstnsr*) runs on all platforms, and does not require Microsoft Outlook.

<sup>3</sup>This reader supports both clear signed and encrypted S/MIME. KeyView supports S/MIME for PST, EML, MBX, and MSG files.

<sup>4</sup>This reader supports both clear signed and encrypted S/MIME. KeyView supports S/MIME for PST, EML, MBX, and MSG files.

**Supported Multimedia Formats**

| Format                               | Version | Reader  | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|--------------------------------------|---------|---------|-----------|--------|--------|------|---------|----------|---------|---------------|
| 3GPP video file                      | n/a     | mpeg4sr | 3GP       | M      | N      | N    | N       | Y        | N       | N             |
| 3GPP2 video file                     | n/a     | mpeg4sr | 3G2       | M      | N      | N    | N       | Y        | N       | N             |
| Adobe Flash Player audio             | n/a     | mpeg4sr | F4A       | M      | N      | N    | N       | Y        | N       | N             |
| Adobe Flash Player audio book        | n/a     | mpeg4sr | F4B       | M      | N      | N    | N       | Y        | N       | N             |
| Adobe Flash Player protected video   | n/a     | mpeg4sr | F4P       | M      | N      | N    | N       | Y        | N       | N             |
| Adobe Flash Player video             | n/a     | mpeg4sr | F4V       | M      | N      | N    | N       | Y        | N       | N             |
| Apple ISO-BMFF QuickTime video       | n/a     | MCI     | QT<br>MOV | N      | N      | Y    | N       | N        | N       | N             |
| Apple MPEG-4 Part 14 audio           | n/a     | mpeg4sr | M4A       | M      | N      | N    | N       | Y        | N       | N             |
| Apple MPEG-4 Part 14 audio book      | n/a     | mpeg4sr | M4B       | M      | N      | N    | N       | Y        | N       | N             |
| Apple MPEG-4 Part 14 protected audio | n/a     | mpeg4sr | M4P       | M      | N      | N    | N       | Y        | N       | N             |
| Apple MPEG-4 Part 14 video           | n/a     | mpeg4sr | M4V       | M      | N      | N    | N       | Y        | N       | N             |
| Audible Enhanced Audiobook           | n/a     | mpeg4sr | AAX       | M      | N      | N    | N       | Y        | N       | N             |
| KDDI video file                      | n/a     | MCI     |           | N      | N      | Y    | N       | N        | N       | N             |

**Supported Multimedia Formats, continued**

| Format                             | Version          | Reader      | Extension         | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|------------------------------------|------------------|-------------|-------------------|--------|--------|------|---------|----------|---------|---------------|
| Advanced Systems Format            | 1.2              | asfsr       | ASF<br>WMA<br>WMV | N      | N      | N    | N       | Y        | N       | N             |
| Audio Interchange File Format      | n/a              | MCI         | AIFF              | N      | N      | Y    | N       | N        | N       | N             |
|                                    |                  | aiffsr      | AIFF              | M      | N      | N    | N       | Y        | N       | N             |
| ISO-BMFF MPEG-4 with AVC extension | n/a              | mpeg4sr     |                   | M      | N      | N    | N       | Y        | N       | N             |
| Microsoft Wave Sound               | n/a              | MCI         | WAV               | N      | N      | Y    | N       | N        | N       | N             |
|                                    |                  | riffsr      | WAV               | M      | N      | N    | N       | Y        | N       | N             |
| MIDI                               | n/a              | MCI         | MID               | N      | N      | Y    | N       | N        | N       | N             |
| Mobile QuickTime video             | n/a              | mpeg4sr     | MQV               | M      | N      | N    | N       | Y        | N       | N             |
| Motion JPEG 2000                   | n/a              | kpjp2000rdr | MJ2<br>MJP2       | N      | Y      | Y    | N       | N        | N       | N             |
|                                    |                  | jp2000sr    |                   | M      | M      | N    | N       | Y        | N       | N             |
| MPEG-1 Audio layer 3               | ID3 v1<br>and v2 | MCI         | MP3               | N      | N      | Y    | N       | N        | N       | N             |
|                                    |                  | mp3sr       | MP3               | M      | M      | Y    | N       | Y        | N       | N             |
| MPEG-1 Video                       | 2, 3             | MCI         | MPG               | N      | N      | Y    | N       | N        | N       | N             |
| MPEG-2 Audio                       | n/a              | MCI         | MPEGA             | N      | N      | Y    | N       | N        | N       | N             |
| MPEG-21                            | n/a              | mpeg4sr     |                   | M      | N      | N    | N       | Y        | N       | N             |
| MPEG-4 Audio                       | n/a              | mpeg4sr     | MP4<br>3GP        | M      | N      | N    | N       | Y        | N       | N             |

**Supported Multimedia Formats, continued**

| Format                                 | Version | Reader  | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|----------------------------------------|---------|---------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Nero AAC audio                         | n/a     | mpeg4sr |           | M      | N      | N    | N       | Y        | N       | N             |
| Nero MPEG-4 profile                    | n/a     | mpeg4sr |           | M      | N      | N    | N       | Y        | N       | N             |
| Nero MPEG-4 profile with AVC extension | n/a     | mpeg4sr |           | M      | N      | N    | N       | Y        | N       | N             |
| NeXT/Sun Audio                         | n/a     | MCI     | AU        | N      | N      | Y    | N       | N        | N       | N             |
| NTT MPEG-4                             | n/a     | mpeg4sr |           | M      | N      | N    | N       | Y        | N       | N             |
| QuickTime Movie                        | 2, 3, 4 | MCI     | QT<br>MOV | N      | N      | Y    | N       | N        | N       | N             |
| Sony PSP MPEG-4                        | n/a     | mpeg4sr | MP4       | M      | N      | N    | N       | Y        | N       | N             |
| Sony XAVC video                        | n/a     | mpeg4sr |           | M      | N      | N    | N       | Y        | N       | N             |
| Windows Video                          | 2.1     | MCI     | AVI       | N      | N      | Y    | N       | N        | N       | N             |

**NOTE:**

Depending on the default multimedia player installed on your computer, the View API might not be able to play some supported multimedia formats. To play multimedia files, the View API uses the Windows Media Control Interface (MCI) to communicate with the multimedia player installed on your computer. If the player does not play a multimedia file that is supported by the Viewing SDK, the View API cannot play the file.

If you cannot play a supported multimedia file by using the View API, install a different multimedia player or compressor/decompressor (codec) component.

## Presentation Formats

### Supported Presentation Formats

| Format                                   | Version                       | Reader           | Extension   | Filter | Export | View | Extract | Metadata | Charset        | Header/Footer |
|------------------------------------------|-------------------------------|------------------|-------------|--------|--------|------|---------|----------|----------------|---------------|
| Apple iWork Keynote                      | 2, 3, '08, '09                | kpIWPGGrdr       | GZ          | Y      | Y      | Y    | N       | Y        | Y              | N             |
|                                          | '13, '16<br>iCloud 2018       | kpIWPG13rdr<br>1 | KEY         | Y      | T      | N    | N       | N        | N              | N             |
| Applix Presents                          | 4.0, 4.2, 4.3,<br>4.4         | kpagrdr          | AG          | Y      | Y      | Y    | N       | N        | N              | N             |
| Corel Presentations                      | 6, 7, 8, 9, 10,<br>11, 12, X3 | kpshwrdr         | SHW         | Y      | Y      | Y    | N       | N        | N              | N             |
| Extensible Forms<br>Description Language | n/a                           | kpXFDLrdr        | XFD<br>XFDL | Y      | Y      | Y    | N       | Y        | Y              | N             |
| Lotus Freelance<br>Graphics              | 96, 97, 98,<br>R9, 9.8        | kpprzrdr         | PRZ         | Y      | Y      | Y    | N       | N        | N              | N             |
| Lotus Freelance<br>Graphics 2            | 2                             | kprrdr           | PRE         | Y      | Y      | Y    | N       | N        | N              | N             |
| Macromedia Flash                         | through 8.0                   | swfsr            | SWF         | Y      | Y      | Y    | N       | N        | Y <sup>2</sup> | N             |
| Microsoft OneNote                        | 2007, 2010,                   | kpONErdr         | ONE         | Y      | Y      | Y    | Y       | N        | Y              | N             |

<sup>1</sup>This reader is available only on Windows (32-bit and 64-bit), Linux (32-bit and 64-bit), and Solaris x86-64.

<sup>2</sup>The character set cannot be determined for versions 5.x and lower.

**Supported Presentation Formats, continued**

| Format                           | Version                | Reader   | Extension                                            | Filter | Export | View | Extract | Metadata | Charset | Header/Footer  |
|----------------------------------|------------------------|----------|------------------------------------------------------|--------|--------|------|---------|----------|---------|----------------|
|                                  | 2013, 2016             |          | ONETOC2                                              |        |        |      |         |          |         |                |
| Microsoft PowerPoint Macintosh   | 98                     | kpp40rdr | PPT                                                  | Y      | Y      | Y    | N       | N        | N       | N              |
|                                  | 2001, v.X, 2004        | kpp97rdr | PPT<br>PPS<br>POT                                    | Y      | Y      | Y    | N       | P        | Y       | N              |
| Microsoft PowerPoint PC          | 4                      | kpp40rdr | PPT                                                  | Y      | Y      | Y    | N       | P        | N       | N              |
| Microsoft PowerPoint Windows     | 95                     | kpp95rdr | PPT                                                  | Y      | Y      | Y    | N       | P        | Y       | N              |
| Microsoft PowerPoint Windows     | 97, 2000, 2002, 2003   | kpp97rdr | PPT<br>PPS<br>POT                                    | Y      | Y      | Y    | Y       | P        | Y       | Y <sup>1</sup> |
| Microsoft PowerPoint Windows XML | 2007, 2010, 2013, 2016 | kpppxrdr | PPTX<br>PPTM<br>POTX<br>POTM<br>PPSX<br>PPSM<br>PPAM | Y      | Y      | Y    | Y       | Y        | Y       | Y              |

<sup>1</sup>Slide footers are supported for Microsoft PowerPoint 97 and 2003.

**Supported Presentation Formats, continued**

| Format                                     | Version           | Reader   | Extension                | Filter | Export | View | Extract        | Metadata | Charset | Header/Footer |
|--------------------------------------------|-------------------|----------|--------------------------|--------|--------|------|----------------|----------|---------|---------------|
| OASIS Open Document Format                 | 1, 2 <sup>1</sup> | kpodfrdr | SXD<br>SXI<br>ODG<br>ODP | Y      | Y      | Y    | Y <sup>2</sup> | Y        | Y       | N             |
| OpenOffice Impress,<br>LibreOffice Impress | 1 to 5            | sosr     | SXI<br>SXP<br>ODP        | Y      | T      | T    | N              | Y        | Y       | N             |
| StarOffice Impress                         | 3, 4, 5           | kpsddrdr | SDA<br>SDD               | Y      | T      | N    | N              | N        | N       | N             |
|                                            | 6, 7, 8, 9        | sosr     | SXI<br>SXP<br>ODP        | Y      | T      | T    | N              | Y        | Y       | N             |

<sup>1</sup>Generated by OpenOffice Impress 2.0, StarOffice 8 Impress, and IBM Lotus Symphony Presentation 3.0.

<sup>2</sup>Supported using the olesr embedded objects reader.

## Spreadsheet Formats

### Supported Spreadsheet Formats

| Format                  | Version                 | Reader        | Extension  | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|-------------------------|-------------------------|---------------|------------|--------|--------|------|---------|----------|---------|---------------|
| Apple iWork Numbers     | '08, '09                | iwsssr        | GZ         | Y      | Y      | Y    | N       | Y        | Y       | N             |
|                         | '13, '16<br>iCloud 2018 | iwss13sr<br>1 | NUMBERS    | Y      | T      | T    | N       | N        | Y       | N             |
| Applix Spreadsheets     | 4.2, 4.3, 4.4           | assr          | AS         | Y      | Y      | Y    | N       | N        | Y       | N             |
| Comma Separated Values  | n/a                     | csvsr         | CSV        | Y      | Y      | Y    | N       | N        | N       | N             |
| Corel Quattro Pro       | 5, 6, 7, 8              | qpssr         | WB2<br>WB3 | Y      | Y      | Y    | N       | P        | Y       | N             |
|                         | X4                      | qpwsr         | QPW        | Y      | N      | Y    | N       | P        | Y       | N             |
| Data Interchange Format | n/a                     | difsr         |            | Y      | Y      | Y    | N       | N        | N       | N             |
| Lotus 1-2-3             | 96, 97, R9, 9.8         | l123sr        | 123        | Y      | Y      | Y    | N       | P        | Y       | N             |
| Lotus 1-2-3             | 2, 3, 4, 5              | wkssr         | WK4        | Y      | Y      | Y    | N       | N        | Y       | N             |
| Lotus 1-2-3 Charts      | 2, 3, 4, 5              | kpchtrdr      | 123        | N      | Y      | Y    | N       | N        | N       | N             |
| Microsoft Excel Charts  | 2, 3, 4, 5, 6, 7        | kpchtrdr      | XLS        | N      | Y      | Y    | N       | N        | N       | N             |

<sup>1</sup>This reader is available only on Windows (32-bit and 64-bit), Linux (32-bit and 64-bit), and Solaris x86-64.

**Supported Spreadsheet Formats, continued**

| Format                            | Version                | Reader  | Extension                            | Filter | Export | View | Extract        | Metadata | Charset | Header/Footer |
|-----------------------------------|------------------------|---------|--------------------------------------|--------|--------|------|----------------|----------|---------|---------------|
| Microsoft Excel Macintosh         | 98, 2001, v.X, 2004    | xlssr   | XLS                                  | Y      | Y      | Y    | Y <sup>1</sup> | Y        | Y       | N             |
| Microsoft Excel Windows           | 2.2 through 2003       | xlssr   | XLS<br>XLW<br>XLT<br>XLA             | Y      | Y      | Y    | Y <sup>2</sup> | Y        | Y       | Y             |
| Microsoft Excel Windows XML       | 2007, 2010, 2013, 2016 | xlsxsr  | XLSX<br>XLTX<br>XLSM<br>XLTM<br>XLAM | Y      | Y      | Y    | Y              | Y        | Y       | Y             |
| Microsoft Excel Binary Format     | 2007, 2010, 2013, 2016 | xlsbsr  | XLSB                                 | Y      | Y      | Y    | N              | N        | N       | N             |
| Microsoft Works Spreadsheet       | 2, 3, 4                | mwssr   | S30<br>S40                           | Y      | Y      | Y    | N              | N        | Y       | N             |
| OASIS Open Document Format        | 1, 2 <sup>3</sup>      | odfsssr | ODS<br>SXC<br>STC                    | Y      | Y      | Y    | Y <sup>4</sup> | Y        | Y       | N             |
| OpenOffice Calc, LibreOffice Calc | 1 to 5                 | sosr    | SXC<br>ODS                           | Y      | T      | T    | N              | Y        | Y       | N             |

<sup>1</sup>Supported using the embedded objects reader olesr.

<sup>2</sup>Supported for versions 97 and higher using the embedded objects reader olesr.

<sup>3</sup>Generated by OpenOffice Calc 2.0, StarOffice 8 Calc, and IBM Lotus Symphony Spreadsheet 3.0.

<sup>4</sup>Supported using the embedded objects reader olesr.

**Supported Spreadsheet Formats, continued**

| Format          | Version    | Reader  | Extension  | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|-----------------|------------|---------|------------|--------|--------|------|---------|----------|---------|---------------|
|                 |            |         | OTS        |        |        |      |         |          |         |               |
| StarOffice Calc | 3, 4, 5    | starcsr | SDC        | Y      | T      | T    | N       | N        | N       | N             |
|                 | 6, 7, 8, 9 | sosr    | SXC<br>ODS | Y      | T      | T    | N       | Y        | Y       | N             |

## Text and Markup Formats

**Supported Text and Markup Formats**

| Format                      | Version          | Reader | Extension  | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|-----------------------------|------------------|--------|------------|--------|--------|------|---------|----------|---------|---------------|
| ANSI                        | n/a              | afsr   | TXT        | Y      | Y      | Y    | N       | N        | N       | N             |
| ASCII                       | n/a              | afsr   | TXT        | Y      | Y      | Y    | N       | N        | N       | N             |
| HTML                        | 3, 4             | htmsr  | HTM        | Y      | Y      | Y    | N       | P        | Y       | N             |
| Microsoft Excel Windows XML | 2003             | xmlsr  | XML        | Y      | T      | T    | N       | Y        | Y       | N             |
| Microsoft Word Windows XML  | 2003             | xmlsr  | XML        | Y      | T      | T    | N       | Y        | Y       | N             |
| Microsoft Visio XML         | 2003             | xmlsr  | VDX<br>VTX | Y      | T      | T    | N       | Y        | Y       | N             |
| MIME HTML                   | n/a              | mhtsr  | MHT        | Y      | Y      | Y    | N       | Y        | Y       | N             |
| Rich Text Format            | 1 through<br>1.7 | rtfsr  | RTF        | Y      | Y      | Y    | N       | P        | Y       | Y             |

**Supported Text and Markup Formats, continued**

| Format                                      | Version | Reader   | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|---------------------------------------------|---------|----------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Tableau Data Source format                  | n/a     | xmlsr    | TDS       | Y      | T      | T    | N       | Y        | Y       | N             |
| Tableau Map Source format                   | n/a     | xmlsr    | TMS       | Y      | T      | T    | N       | Y        | Y       | N             |
| Tableau Preferences format                  | n/a     | xmlsr    | TPS       | Y      | T      | T    | N       | Y        | Y       | N             |
| Tableau Workbook format                     | n/a     | xmlsr    | TWB       | Y      | T      | T    | N       | Y        | Y       | N             |
| Unicode HTML                                | n/a     | unihtmsr | HTM       | Y      | Y      | Y    | N       | Y        | Y       | N             |
| Unicode Text                                | 3, 4    | unisr    | TXT       | Y      | Y      | Y    | N       | N        | Y       | N             |
| Vector Open Diagnostic Data Exchange Format | n/a     | xmlsr    | ODX       | Y      | T      | T    | N       | Y        | Y       | N             |
| XHTML                                       | 1.0     | htmsr    | HTM       | Y      | Y      | Y    | N       | Y        | Y       | N             |
| XML (generic)                               | 1.0     | xmlsr    | XML       | Y      | T      | T    | N       | Y        | Y       | N             |

## Word Processing Formats

**Supported Word Processing Formats**

| Format                              | Version                 | Reader  | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|-------------------------------------|-------------------------|---------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Adobe FrameMaker Interchange Format | 5, 5.5, 6, 7            | mifsr   | MIF       | Y      | Y      | Y    | N       | N        | Y       | N             |
| Apple iChat Log                     | 1, AV 2<br>AV 2.1, AV 3 | ichatsr | ICHAT     | Y      | Y      | Y    | N       | N        | N       | N             |

**Supported Word Processing Formats, continued**

| Format                            | Version                        | Reader             | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|-----------------------------------|--------------------------------|--------------------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Apple iWork Pages                 | '08, '09                       | iwwpsr             | GZ        | Y      | Y      | Y    | N       | Y        | Y       | N             |
|                                   | '13, '16<br>iCloud 2018        | iwwp13sr<br>1      | PAGES     | Y      | T      | T    | N       | N        | N       | N             |
| Applix Words                      | 3.11, 4, 4.1,<br>4.2, 4.3, 4.4 | awsr               | AW        | Y      | Y      | Y    | N       | N        | Y       | Y             |
| Corel WordPerfect<br>Linux        | 6.0, 8.1                       | wp6sr              | WPS       | Y      | Y      | Y    | N       | P        | Y       | N             |
| Corel WordPerfect<br>Macintosh    | 1.02, 2, 2.1,<br>2.2, 3, 3.1   | wpmsr              | WPM       | Y      | Y      | Y    | N       | N        | Y       | N             |
| Corel WordPerfect<br>Windows      | 5, 5.1                         | wosr               | WO        | Y      | Y      | Y    | N       | P        | Y       | Y             |
| Corel WordPerfect<br>Windows      | 6, 7, 8, 9, 10,<br>11, 12, X3  | wp6sr              | WPD       | Y      | Y      | Y    | N       | P        | Y       | Y             |
| DisplayWrite                      | 4                              | dw4sr              | IP        | Y      | Y      | Y    | N       | N        | Y       | N             |
| Folio Flat File                   | 3.1                            | foliosr            | FFF       | Y      | Y      | Y    | N       | Y        | Y       | Y             |
| Founder Chinese E-<br>paper Basic | 3.2.1                          | cebsr <sup>2</sup> | CEB       | Y      | N      | N    | N       | N        | N       | N             |

<sup>1</sup>This reader is available only on Windows (32-bit and 64-bit), Linux (32-bit and 64-bit), and Solaris x86-64.

<sup>2</sup>This reader is only supported on Windows 32-bit platforms.

**Supported Word Processing Formats, continued**

| Format                               | Version                   | Reader | Extension  | Filter | Export | View | Extract        | Metadata | Charset | Header/Footer |
|--------------------------------------|---------------------------|--------|------------|--------|--------|------|----------------|----------|---------|---------------|
| Fujitsu Oasys                        | 7                         | oa2sr  | OA2        | Y      | Y      | Y    | N              | P        | N       | N             |
| Haansoft Hangul                      | 97                        | hwpsr  | HWP        | Y      | Y      | Y    | N              | Y        | Y       | N             |
|                                      | 2002, 2005,<br>2007, 2010 | hwposr | HWP        | Y      | Y      | Y    | Y              | Y        | Y       | N             |
| Health level7                        | 2.0                       | hl7sr  | HL7        | Y      | Y      | Y    | N              | Y        | Y       | N             |
| IBM DCA/RFT<br>(Revisable Form Text) | SC23-0758-1               | dcasr  | DC         | Y      | Y      | Y    | N              | N        | Y       | N             |
| JustSystems Ichitaro                 | 8 to 2013,<br>2018        | jtdsr  | JTD        | Y      | Y      | Y    | N              | P        | N       | Y             |
| Lotus AMI Pro                        | 2, 3                      | lasr   | SAM        | Y      | Y      | Y    | N              | P        | Y       | Y             |
| Lotus AMI Professional<br>Write Plus | 2.1                       | lasr   | AMI        | Y      | Y      | Y    | N              | N        | N       | Y             |
| Lotus Word Pro                       | 96, 97, R9                | lwpsr  | LWP        | Y      | Y      | Y    | N              | P        | N       | Y             |
| Lotus SmartMaster                    | 96, 97                    | lwpsr  | MWP        | Y      | Y      | Y    | N              | N        | N       | N             |
| Microsoft Word<br>Macintosh          | 4, 5, 6, 98               | mbsr   | DOC        | Y      | Y      | Y    | N              | Y        | N       | Y             |
|                                      | 2001, v.X,<br>2004        | mw8sr  | DOC<br>DOT | Y      | Y      | Y    | Y <sup>1</sup> | Y        | Y       | N             |

<sup>1</sup>Supported using the embedded objects reader olesr.

**Supported Word Processing Formats, continued**

| Format                          | Version                | Reader | Extension                    | Filter | Export | View | Extract        | Metadata | Charset | Header/Footer |
|---------------------------------|------------------------|--------|------------------------------|--------|--------|------|----------------|----------|---------|---------------|
| Microsoft Word PC               | 4, 5, 5.5, 6           | mwsr   | DOC                          | Y      | Y      | Y    | N              | N        | N       | Y             |
| Microsoft Word Windows          | 1.0, 2.0               | misr   | DOC                          | Y      | Y      | Y    | N              | N        | N       | Y             |
| Microsoft Word Windows          | 6, 7, 8, 95            | mw6sr  | DOC                          | Y      | Y      | Y    | N              | Y        | Y       | Y             |
| Microsoft Word Windows          | 97, 2000, 2002, 2003   | mw8sr  | DOC<br>DOT                   | Y      | Y      | Y    | Y <sup>1</sup> | Y        | Y       | Y             |
| Microsoft Word Windows XML      | 2007, 2010, 2013, 2016 | mwxsr  | DOCM<br>DOCX<br>DOTX<br>DOTM | Y      | Y      | Y    | Y              | Y        | Y       | Y             |
| Microsoft Word Windows Flat XML | 2007, 2010, 2013, 2016 | mwxsr  | XML                          | Y      | Y      | Y    | Y              | Y        | Y       | Y             |
| Microsoft Works                 | 1, 2, 3, 4             | mswsr  | WPS                          | Y      | Y      | Y    | N              | N        | N       | Y             |
| Microsoft Works                 | 6, 2000                | msw6sr | WPS                          | Y      | Y      | Y    | N              | N        | N       | Y             |
| Microsoft Windows Write         | 1, 2, 3                | mwsr   | WRI                          | Y      | Y      | Y    | N              | N        | Y       | N             |

<sup>1</sup>Supported using the embedded objects reader olesr.

**Supported Word Processing Formats, continued**

| Format                                   | Version               | Reader  | Extension               | Filter | Export | View | Extract        | Metadata | Charset | Header/Footer |
|------------------------------------------|-----------------------|---------|-------------------------|--------|--------|------|----------------|----------|---------|---------------|
| OASIS Open Document Format               | 1, 2 <sup>1</sup>     | odfwpsr | ODT<br>SXW<br>STW       | Y      | Y      | Y    | Y <sup>2</sup> | Y        | Y       | Y             |
| Omni Outliner                            | v3, OPML,<br>OOutline | oo3sr   | OO3<br>OPML<br>OOUTLINE | Y      | Y      | Y    | N              | N        | Y       | N             |
| OpenOffice Writer,<br>LibreOffice Writer | 1 to 5                | sosr    | SXW<br>ODT              | Y      | T      | T    | N              | Y        | Y       | N             |
| Open Publication<br>Structure eBook      | 2.0, 3.0              | epubsr  | EPUB                    | Y      | Y      | Y    | N              | Y        | Y       | N             |
| StarOffice Writer                        | 3, 4, 5               | starwsr | SDW                     | Y      | T      | T    | N              | N        | N       | N             |
|                                          | 6, 7, 8, 9            | sosr    | SXW<br>ODT              | Y      | T      | T    | N              | Y        | Y       | N             |
| Skype Log                                | 3                     | skypesr | DBB                     | Y      | Y      | Y    | N              | N        | N       | N             |
| WordPad                                  | through 2003          | rtfsr   | RTF                     | Y      | Y      | Y    | N              | P        | Y       | N             |
| XML Paper<br>Specification               | n/a                   | xpssr   | XPS                     | Y      | T      | T    | N              | N        | N       | N             |
| XyWrite                                  | 4.12                  | xywsr   | XY4                     | Y      | Y      | Y    | N              | N        | N       | N             |

<sup>1</sup>Generated by OpenOffice Writer 2.0, StarOffice 8 Writer, and IBM Lotus Symphony Documents 3.0.

<sup>2</sup>Supported using the embedded objects reader olesr.

**Supported Word Processing Formats, continued**

| Format                   | Version | Reader             | Extension | Filter | Export | View | Extract | Metadata | Charset | Header/Footer |
|--------------------------|---------|--------------------|-----------|--------|--------|------|---------|----------|---------|---------------|
| Yahoo! Instant Messenger | n/a     | yimsr <sup>1</sup> | DAT       | Y      | Y      | Y    | N       | N        | N       | N             |

<sup>1</sup>To successfully use this reader, you must set the KV\_YAHOO\_ID environment variable to the Yahoo user ID. You can optionally set the KV\_OTHER\_YAHOO\_ID environment variable to the other Yahoo user ID. If you do not set it, "Other" is used by default. If you enter incorrect values for the environment variables, erroneous data is generated.

# Appendix B: KeyView Format Codes

This section lists the KeyView format classes and codes used with Connector Framework Server.

- [KeyView Classes, below](#)
- [KeyView Formats, on the next page](#)

[KeyView Classes](#) lists KeyView file classes. The numbers are reported in the `DocumentClass` field in documents processed by CFS. Consult the table to determine the file class that was imported.

[KeyView Formats, on the next page](#) lists all KeyView formats. The numbers are reported in the `DocumentType` field in documents processed by Connector Framework Server. Consult the table to determine the file type that was imported.

You can use any of the format numbers from [KeyView Formats, on the next page](#) in conjunction with the `ImportFamilyRootExcludeFmtCSV` parameter. For more information about this parameter, refer to the *Connector Framework Server Reference*.

## KeyView Classes

### File Classes

| Attribute Number | Description        | File class      |
|------------------|--------------------|-----------------|
| 0                | No file class      | AutoDetNoFormat |
| 01               | Word processor     | adWORDPROCESSOR |
| 02               | Spreadsheet        | adSPREADSHEET   |
| 03               | Database           | adDATABASE      |
| 04               | Raster image       | adRASTERIMAGE   |
| 05               | Vector graphic     | adVECTORGRAPHIC |
| 06               | Presentation       | adPRESENTATION  |
| 07               | Executable         | adEXECUTABLE    |
| 08               | Encapsulation      | adENCAPSULATION |
| 09               | Sound              | adSOUND         |
| 10               | Desktop publishing | adDESKTOPPUBLSH |
| 11               | Outline/planning   | adOUTLINE       |

**File Classes, continued**

| Attribute Number | Description           | File class      |
|------------------|-----------------------|-----------------|
| 12               | Miscellaneous         | adMISC          |
| 13               | Mixed format          | adMIXED         |
| 14               | Font                  | adFONT          |
| 15               | Time scheduling       | adSCHEDULE      |
| 16               | Communications        | adCOMMUNICATION |
| 17               | Object module         | adOBJECTMODULE  |
| 18               | Library module        | adLIBRARY       |
| 19               | Fax                   | adFAXFORMAT     |
| 20               | Movie                 | adMOVIE         |
| 21               | Animation             | adANIMATION     |
| 22               | Source Code           | adSOURCECODE    |
| 23               | Computer-Aided Design | adCAD           |
| 24               | BI and analysis tools | adANALYTICS     |

## KeyView Formats

The following table lists KeyView file format codes and the file extensions they are most commonly associated with.

**NOTE:**

This table is not a complete list of file extensions. KeyView returns format codes based on file content, which cannot always be predicted from the file extension. Some file extensions may also be associated with multiple format numbers.

| Format Name            | Number | Format Description         | File Extension |
|------------------------|--------|----------------------------|----------------|
| AES_Multiplus_Comm_Fmt | 1      | Multiplus (AES)            | PTF            |
| ASCII_Text_Fmt         | 2      | Text                       |                |
| MSDOS_Batch_File_Fmt   | 3      | MS-DOS Batch File          | BAT            |
| Applix_Alis_Fmt        | 4      | APPLIX ASTERIX             | AX             |
| BMP_Fmt                | 5      | Windows Bitmap Image (BMP) | BMP            |

| <b>Format Name</b>       | <b>Number</b> | <b>Format Description</b>                | <b>File Extension</b> |
|--------------------------|---------------|------------------------------------------|-----------------------|
| CT_DEF_Fmt               | 6             | Convergent Technologies DEF Comm. Format |                       |
| Corel_Draw_Fmt           | 7             | Corel Draw                               | CDR                   |
| CGM_ClearText_Fmt        | 8             | Computer Graphics Metafile (CGM)         | CGM                   |
| CGM_Binary_Fmt           | 9             | Computer Graphics Metafile (CGM)         | CGM                   |
| CGM_Character_Fmt        | 10            | Computer Graphics Metafile (CGM)         | CGM                   |
| Word_Connection_Fmt      | 11            | Word Connection                          | CN                    |
| COMET_TOP_Word_Fmt       | 12            | COMET TOP                                |                       |
| CEOwrite_Fmt             | 13            | CEOwrite                                 | CW                    |
| DSA101_Fmt               | 14            | DSA101 (Honeywell Bull)                  |                       |
| DCA_RFT_Fmt              | 15            | DCA-RFT (IBM Revisable Form)             | RFT, DC               |
| CDA_DDIF_Fmt             | 16            | CDA / DDIF                               |                       |
| DG_CDS_Fmt               | 17            | DG Common Data Stream (CDS)              | CDS                   |
| Micrografx_Draw_Fmt      | 18            | Windows Draw (Micrografx)                | DRW                   |
| Data_Point_VistaWord_Fmt | 19            | Vistaword                                |                       |
| DECdx_Fmt                | 20            | DECdx                                    | DX                    |
| Enable_WP_Fmt            | 21            | Enable Word Processing                   | WPF                   |
| EPSF_Fmt                 | 22            | Encapsulated PostScript                  | EPS                   |
| Preview_EPSF_Fmt         | 23            | Encapsulated PostScript                  |                       |
| MS_Executable_Fmt        | 24            | MSDOS/Windows Program                    | EXE                   |
| G31D_Fmt                 | 25            | CCITT G3 1D                              |                       |
| GIF_87a_Fmt              | 26            | Graphics Interchange Format (GIF87a)     | GIF                   |
| GIF_89a_Fmt              | 27            | Graphics Interchange Format (GIF89a)     | GIF                   |
| HP_Word_PC_Fmt           | 28            | HP Word PC                               | HW                    |
| IBM_1403_LinePrinter_Fmt | 29            | IBM 1403 Line Printer                    | I4                    |
| IBM_DCF_Script_Fmt       | 30            | DCF Script                               | IC                    |

| <b>Format Name</b>         | <b>Number</b> | <b>Format Description</b>            | <b>File Extension</b> |
|----------------------------|---------------|--------------------------------------|-----------------------|
| IBM_DCA_FFT_Fmt            | 31            | DCA-FFT (IBM Final Form)             | IF, FFT               |
| Interleaf_Fmt              | 32            | Interleaf                            |                       |
| GEM_Image_Fmt              | 33            | GEM Bit Image                        | IMG                   |
| IBM_Display_Write_Fmt      | 34            | Display Write                        | IP                    |
| Sun_Raster_Fmt             | 35            | Sun Raster                           | RAS                   |
| Ami_Pro_Fmt                | 36            | Lotus Ami Pro                        | SAM                   |
| Ami_Pro_StyleSheet_Fmt     | 37            | Lotus Ami Pro Style Sheet            |                       |
| MORE_Fmt                   | 38            | MORE Database MAC                    |                       |
| Lyrix_Fmt                  | 39            | Lyrix Word Processing                |                       |
| MASS_11_Fmt                | 40            | MASS-11                              | M1                    |
| MacPaint_Fmt               | 41            | MacPaint                             | PNTG                  |
| MS_Word_Mac_Fmt            | 42            | Microsoft Word for Macintosh         | DOC                   |
| SmartWare_II_Comm_Fmt      | 43            | SmartWare II                         |                       |
| MS_Word_Win_Fmt            | 44            | Microsoft Word for Windows           | DOC, WPS              |
| Multimate_Fmt              | 45            | MultiMate                            |                       |
| Multimate_Fnote_Fmt        | 46            | MultiMate Footnote File              |                       |
| Multimate_Adv_Fmt          | 47            | MultiMate Advantage                  |                       |
| Multimate_Adv_Fnote_Fmt    | 48            | MultiMate Advantage Footnote File    |                       |
| Multimate_Adv_II_Fmt       | 49            | MultiMate Advantage II               |                       |
| Multimate_Adv_II_Fnote_Fmt | 50            | MultiMate Advantage II Footnote File |                       |
| Multipan_PC_Fmt            | 51            | Multipan (PC)                        |                       |
| Multipan_Mac_Fmt           | 52            | Multipan (Mac)                       |                       |
| MS_RTF_Fmt                 | 53            | Rich Text Format (RTF)               | RTF                   |
| MS_Word_PC_Fmt             | 54            | Microsoft Word for PC                | MW                    |
| MS_Word_PC_StyleSheet_Fmt  | 55            | Microsoft Word for PC Style Sheet    |                       |
| MS_Word_PC_Glossary_Fmt    | 56            | Microsoft Word for PC Glossary       |                       |

| <b>Format Name</b>      | <b>Number</b> | <b>Format Description</b>                | <b>File Extension</b> |
|-------------------------|---------------|------------------------------------------|-----------------------|
| MS_Word_PC_Driver_Fmt   | 57            | Microsoft Word for PC Driver             |                       |
| MS_Word_PC_Misc_Fmt     | 58            | Microsoft Word for PC Miscellaneous File |                       |
| NBI_Async_Archive_Fmt   | 59            | NBI Async Archive Format                 |                       |
| Navy_DIF_Fmt            | 60            | Navy DIF                                 | ND                    |
| NBI_Net_Archive_Fmt     | 61            | NBI Net Archive Format                   | NN                    |
| NIOS_TOP_Fmt            | 62            | NIOS TOP                                 |                       |
| FileMaker_Mac_Fmt       | 63            | Filemaker MAC                            | FP5, FP7              |
| ODA_Q1_11_Fmt           | 64            | ODA / ODIF                               |                       |
| ODA_Q1_12_Fmt           | 65            | ODA / ODIF                               |                       |
| OLIDIF_Fmt              | 66            | OLIDIF (Olivetti)                        |                       |
| Office_Writer_Fmt       | 67            | Office Writer                            | OW                    |
| PC_Paintbrush_Fmt       | 68            | PC Paintbrush Graphics (PCX)             | PCX                   |
| CPT_Comm_Fmt            | 69            | CPT                                      |                       |
| Lotus_PIC_Fmt           | 70            | Lotus PIC                                | PIC                   |
| Mac_PICT_Fmt            | 71            | QuickDraw Picture                        | PCT                   |
| Philips_Script_Word_Fmt | 72            | Philips Script                           |                       |
| PostScript_Fmt          | 73            | PostScript                               | PS                    |
| PRIMEWORD_Fmt           | 74            | PRIMEWORD                                |                       |
| Quadratron_Q_One_v1_Fmt | 75            | Q-One V1.93J                             |                       |
| Quadratron_Q_One_v2_Fmt | 76            | Q-One V2.0                               |                       |
| SAMNA_Word_IV_Fmt       | 77            | SAMNA Word                               | SAM                   |
| Ami_Pro_Draw_Fmt        | 78            | Lotus Ami Pro Draw                       | SDW                   |
| SYLK_Spreadsheet_Fmt    | 79            | SYLK                                     |                       |
| SmartWare_II_WP_Fmt     | 80            | SmartWare II                             |                       |
| Symphony_Fmt            | 81            | Symphony                                 | WR1                   |
| Targa_Fmt               | 82            | Targa                                    | TGA                   |

| <b>Format Name</b>          | <b>Number</b> | <b>Format Description</b>          | <b>File Extension</b> |
|-----------------------------|---------------|------------------------------------|-----------------------|
| TIFF_Fmt                    | 83            | Tag Image File Format (TIFF)       | TIF, TIFF             |
| Targon_Word_Fmt             | 84            | Targon Word                        | TW                    |
| Uniplex_Ucalc_Fmt           | 85            | Uniplex Ucalc                      | SS                    |
| Uniplex_WP_Fmt              | 86            | Uniplex                            | UP                    |
| MS_Word_UNIX_Fmt            | 87            | Microsoft Word UNIX                |                       |
| WANG_PC_Fmt                 | 88            | WANG PC                            |                       |
| WordERA_Fmt                 | 89            | WordERA                            |                       |
| WANG_WPS_Comm_Fmt           | 90            | WANG WPS                           | WF                    |
| WordPerfect_Mac_Fmt         | 91            | WordPerfect MAC                    |                       |
| WordPerfect_Fmt             | 92            | WordPerfect                        | WP, WP4, WPD, WOP     |
| WordPerfect_VAX_Fmt         | 93            | WordPerfect VAX                    |                       |
| WordPerfect_Macro_Fmt       | 94            | WordPerfect Macro                  |                       |
| WordPerfect_Dictionary_Fmt  | 95            | WordPerfect Spelling Dictionary    |                       |
| WordPerfect_Thesaurus_Fmt   | 96            | WordPerfect Thesaurus              |                       |
| WordPerfect_Resource_Fmt    | 97            | WordPerfect Resource File          |                       |
| WordPerfect_Driver_Fmt      | 98            | WordPerfect Driver                 |                       |
| WordPerfect_Cfg_Fmt         | 99            | WordPerfect Configuration File     |                       |
| WordPerfect_Hyphenation_Fmt | 100           | WordPerfect Hyphenation Dictionary |                       |
| WordPerfect_Misc_Fmt        | 101           | WordPerfect Miscellaneous File     |                       |
| WordMARC_Fmt                | 102           | WordMARC                           | WM, PW                |
| Windows_Metafile_Fmt        | 103           | Windows Metafile                   | WMF                   |
| Windows_Metafile_NoHdr_Fmt  | 104           | Windows Metafile (no header)       | WMF                   |
| SmartWare_II_DB_Fmt         | 105           | SmartWare II                       |                       |
| WordPerfect_Graphics_Fmt    | 106           | WordPerfect Graphics               | WPG, QPG              |
| WordStar_Fmt                | 107           | WordStar                           | WS, WSD               |

| <b>Format Name</b>     | <b>Number</b> | <b>Format Description</b>                  | <b>File Extension</b> |
|------------------------|---------------|--------------------------------------------|-----------------------|
| WANG_WITA_Fmt          | 108           | WANG WITA                                  | WT                    |
| Xerox_860_Comm_Fmt     | 109           | Xerox 860                                  |                       |
| Xerox_Writer_Fmt       | 110           | Xerox Writer                               |                       |
| DIF_SpreadSheet_Fmt    | 111           | Data Interchange Format (DIF)              | DIF                   |
| Enable_Spreadsheet_Fmt | 112           | Enable Spreadsheet                         | SSF                   |
| SuperCalc_Fmt          | 113           | Supercalc                                  | CAL                   |
| UltraCalc_Fmt          | 114           | UltraCalc                                  |                       |
| SmartWare_II_SS_Fmt    | 115           | SmartWare II                               |                       |
| SOF_Encapsulation_Fmt  | 116           | Serialized Object Format (SOF)             | SOF                   |
| PowerPoint_Win_Fmt     | 117           | Microsoft PowerPoint PC                    |                       |
| PowerPoint_Mac_Fmt     | 118           | Microsoft PowerPoint MAC                   |                       |
| PowerPoint_95_Fmt      | 119           | Microsoft PowerPoint 95                    |                       |
| PowerPoint_97_Fmt      | 120           | Microsoft PowerPoint 97                    |                       |
| PageMaker_Mac_Fmt      | 121           | PageMaker for Macintosh                    |                       |
| PageMaker_Win_Fmt      | 122           | PageMaker for Windows                      |                       |
| MS_Works_Mac_WP_Fmt    | 123           | Microsoft Works Word Processor for MAC     | MWK                   |
| MS_Works_Mac_DB_Fmt    | 124           | Microsoft Works Database for MAC           |                       |
| MS_Works_Mac_SS_Fmt    | 125           | Microsoft Works Spreadsheet for MAC        |                       |
| MS_Works_Mac_Comm_Fmt  | 126           | Microsoft Works Communication for MAC      |                       |
| MS_Works_DOS_WP_Fmt    | 127           | Microsoft Works Word Processor for DOS     | WPS                   |
| MS_Works_DOS_DB_Fmt    | 128           | Microsoft Works Database for DOS           | WDB                   |
| MS_Works_DOS_SS_Fmt    | 129           | Microsoft Works Spreadsheet for DOS        |                       |
| MS_Works_Win_WP_Fmt    | 130           | Microsoft Works Word Processor for Windows | WPS, W40              |
| MS_Works_Win_DB_Fmt    | 131           | Microsoft Works Database for               |                       |

| Format Name               | Number | Format Description                      | File Extension |
|---------------------------|--------|-----------------------------------------|----------------|
|                           |        | Windows                                 |                |
| MS_Works_Win_SS_Fmt       | 132    | Microsoft Works Spreadsheet for Windows | S30, S40       |
| PC_Library_Fmt            | 133    | DOS/Windows Object Library              | LIB, A         |
| MacWrite_Fmt              | 134    | MacWrite                                |                |
| MacWrite_II_Fmt           | 135    | MacWrite II                             |                |
| Freehand_Fmt              | 136    | Freehand MAC                            |                |
| Disk_Doubler_Fmt          | 137    | Disk Doubler                            |                |
| HP_GL_Fmt                 | 138    | HP Graphics Language                    | HPGL           |
| FrameMaker_Fmt            | 139    | FrameMaker                              | FM, FRM        |
| FrameMaker_Book_Fmt       | 140    | FrameMaker                              | BOOK           |
| Maker_Markup_Language_Fmt | 141    | Maker Markup Language                   |                |
| Maker_Interchange_Fmt     | 142    | Maker Interchange Format (MIF)          | MIF            |
| JPEG_File_Interchange_Fmt | 143    | JPEG Interchange Format                 | JPG, JPEG      |
| Reflex_Fmt                | 144    | Reflex                                  |                |
| Framework_Fmt             | 145    | Framework                               |                |
| Framework_II_Fmt          | 146    | Framework II                            | FW3            |
| Paradox_Fmt               | 147    | Paradox                                 | DB             |
| MS_Windows_Write_Fmt      | 148    | Microsoft Windows Write                 | WRI            |
| Quattro_Pro_DOS_Fmt       | 149    | Quattro Pro for DOS                     | WQ1            |
| Quattro_Pro_Win_Fmt       | 150    | Quattro Pro for Windows                 | WB1, WB2, WB3  |
| Persuasion_Fmt            | 151    | Persuasion                              |                |
| Windows_Icon_Fmt          | 152    | Windows Icon Format                     | ICO            |
| Windows_Cursor_Fmt        | 153    | Windows Cursor                          | CUR            |
| MS_Project_Activity_Fmt   | 154    | Microsoft Project                       |                |
| MS_Project_Resource_Fmt   | 155    | Microsoft Project                       |                |

| <b>Format Name</b>         | <b>Number</b> | <b>Format Description</b>    | <b>File Extension</b> |
|----------------------------|---------------|------------------------------|-----------------------|
| MS_Project_Calc_Fmt        | 156           | Microsoft Project            |                       |
| PKZIP_Fmt                  | 157           | ZIP Archive                  | ZIP                   |
| Quark_Xpress_Fmt           | 158           | Quark Xpress MAC             |                       |
| ARC_PAK_Archive_Fmt        | 159           | PAK/ARC Archive              | ARC, PAK              |
| MS_Publisher_Fmt           | 160           | Microsoft Publisher          | PUB                   |
| PlanPerfect_Fmt            | 161           | PlanPerfect                  |                       |
| WordPerfect_Auxiliary_Fmt  | 162           | WordPerfect auxiliary file   | WPW                   |
| MS_WAVE_Audio_Fmt          | 163           | Microsoft Wave               | WAV                   |
| MIDI_Audio_Fmt             | 164           | MIDI                         | MID, MIDI             |
| AutoCAD_DXF_Binary_Fmt     | 165           | AutoCAD DXF                  | DXF                   |
| AutoCAD_DXF_Text_Fmt       | 166           | AutoCAD DXF                  | DXF                   |
| dBase_Fmt                  | 167           | dBase                        | DBF, VCX              |
| OS_2_PM_Metfile_Fmt        | 168           | OS/2 PM Metfile              | MET                   |
| Lasergraphics_Language_Fmt | 169           | Lasergraphics Language       |                       |
| AutoShade_Rendering_Fmt    | 170           | AutoShade Rendering          |                       |
| GEM_VDI_Fmt                | 171           | GEM VDI                      | VDI                   |
| Windows_Help_Fmt           | 172           | Windows Help File            | HLP                   |
| Volkswriter_Fmt            | 173           | Volkswriter                  | VW4                   |
| Ability_WP_Fmt             | 174           | Ability                      |                       |
| Ability_DB_Fmt             | 175           | Ability                      |                       |
| Ability_SS_Fmt             | 176           | Ability                      |                       |
| Ability_Comm_Fmt           | 177           | Ability                      |                       |
| Ability_Image_Fmt          | 178           | Ability                      |                       |
| XyWrite_Fmt                | 179           | XYWrite / Nota Bene          | XY4                   |
| CSV_Fmt                    | 180           | CSV (Comma Separated Values) | CSV                   |
| IBM_Writing_Assistant_Fmt  | 181           | IBM Writing Assistant        | IWA                   |

| Format Name              | Number | Format Description                        | File Extension |
|--------------------------|--------|-------------------------------------------|----------------|
| WordStar_2000_Fmt        | 182    | WordStar 2000                             | WS2            |
| HP_PCL_Fmt               | 183    | HP Printer Control Language               | PCL            |
| UNIX_Exe_PreSysV_VAX_Fmt | 184    | Unix Executable (PDP-11/pre-System V VAX) |                |
| UNIX_Exe_Basic_16_Fmt    | 185    | Unix Executable (Basic-16)                |                |
| UNIX_Exe_x86_Fmt         | 186    | Unix Executable (x86)                     |                |
| UNIX_Exe_iAPX_286_Fmt    | 187    | Unix Executable (iAPX 286)                |                |
| UNIX_Exe_MC68k_Fmt       | 188    | Unix Executable (MC680x0)                 |                |
| UNIX_Exe_3B20_Fmt        | 189    | Unix Executable (3B20)                    |                |
| UNIX_Exe_WE32000_Fmt     | 190    | Unix Executable (WE32000)                 |                |
| UNIX_Exe_VAX_Fmt         | 191    | Unix Executable (VAX)                     |                |
| UNIX_Exe_Bell_5_Fmt      | 192    | Unix Executable (Bell 5.0)                |                |
| UNIX_Obj_VAX_Demand_Fmt  | 193    | Unix Object Module (VAX Demand)           |                |
| UNIX_Obj_MS8086_Fmt      | 194    | Unix Object Module (old MS 8086)          |                |
| UNIX_Obj_Z8000_Fmt       | 195    | Unix Object Module (Z8000)                |                |
| AU_Audio_Fmt             | 196    | NeXT/Sun Audio Data                       | AU             |
| NeWS_Font_Fmt            | 197    | NeWS bitmap font                          |                |
| cpio_Archive_CRCHdr_Fmt  | 198    | cpio archive (CRC Header)                 |                |
| cpio_Archive_CHRhdr_Fmt  | 199    | cpio archive (CHR Header)                 |                |
| PEX_Binary_Archive_Fmt   | 200    | SUN PEX Binary Archive                    |                |
| Sun_vfont_Fmt            | 201    | SUN vfont Definition                      |                |
| Curses_Screen_Fmt        | 202    | Curses Screen Image                       |                |
| UUEncoded_Fmt            | 203    | UU encoded                                | UUE            |
| WriteNow_Fmt             | 204    | WriteNow MAC                              |                |
| PC_Obj_Fmt               | 205    | DOS/Windows Object Module                 | OBJ            |
| Windows_Group_Fmt        | 206    | Windows Group                             |                |
| TrueType_Font_Fmt        | 207    | TrueType Font                             | TTF            |

| <b>Format Name</b>     | <b>Number</b> | <b>Format Description</b>      | <b>File Extension</b> |
|------------------------|---------------|--------------------------------|-----------------------|
| Windows_PIF_Fmt        | 208           | Program Information File (PIF) | PIF                   |
| MS_COM_Executable_Fmt  | 209           | PC (.COM)                      | COM                   |
| Stuffit_Fmt            | 210           | Stuffit (MAC)                  | HQX                   |
| PeachCalc_Fmt          | 211           | PeachCalc                      | CAL                   |
| Wang_GDL_Fmt           | 212           | WANG Office GDL Header         |                       |
| Q_A_DOS_Fmt            | 213           | Q & A for DOS                  |                       |
| Q_A_Win_Fmt            | 214           | Q & A for Windows              | JW                    |
| WPS_PLUS_Fmt           | 215           | WPS-PLUS                       | WPL                   |
| DCX_Fmt                | 216           | DCX FAX Format(PCX images)     | DCX                   |
| OLE_Fmt                | 217           | OLE Compound Document          | OLE                   |
| EBCDIC_Fmt             | 218           | EBCDIC Text                    |                       |
| DCS_Fmt                | 219           | DCS                            |                       |
| UNIX_SHAR_Fmt          | 220           | SHAR                           | SHAR                  |
| Lotus_Notes_BitMap_Fmt | 221           | Lotus Notes Bitmap             |                       |
| Lotus_Notes_CDF_Fmt    | 222           | Lotus Notes CDF                | CDF                   |
| Compress_Fmt           | 223           | Unix Compress                  | Z                     |
| GZ_Compress_Fmt        | 224           | GZ Compress                    | GZ                    |
| TAR_Fmt                | 225           | TAR                            | TAR                   |
| ODIF_FOD26_Fmt         | 226           | ODA / ODIF                     | F26                   |
| ODIF_FOD36_Fmt         | 227           | ODA / ODIF                     | F36                   |
| ALIS_Fmt               | 228           | ALIS                           |                       |
| Envoy_Fmt              | 229           | Envoy                          | EVY                   |
| PDF_Fmt                | 230           | Portable Document Format       | PDF                   |
| BinHex_Fmt             | 231           | BinHex                         | HQX                   |
| SMTP_Fmt               | 232           | SMTP                           | SMTP                  |
| MIME_Fmt               | 233           | MIME <sup>1</sup>              | EML, MBX              |
| USENET_Fmt             | 234           | USENET                         |                       |

| Format Name                  | Number | Format Description                   | File Extension |
|------------------------------|--------|--------------------------------------|----------------|
| SGML_Fmt                     | 235    | SGML                                 | SGML           |
| HTML_Fmt                     | 236    | HTML                                 | HTM, HTML      |
| ACT_Fmt                      | 237    | ACT                                  | ACT            |
| PNG_Fmt                      | 238    | Portable Network Graphics (PNG)      | PNG            |
| MS_Video_Fmt                 | 239    | Video for Windows (AVI)              | AVI            |
| Windows_Animated_Cursor_Fmt  | 240    | Windows Animated Cursor              | ANI            |
| Windows_CPP_Obj_Storage_Fmt  | 241    | Windows C++ Object Storage           |                |
| Windows_Palette_Fmt          | 242    | Windows Palette                      | PAL            |
| RIFF_DIB_Fmt                 | 243    | RIFF Device Independent Bitmap       |                |
| RIFF_MIDI_Fmt                | 244    | RIFF MIDI                            | RMI            |
| RIFF_Multimedia_Movie_Fmt    | 245    | RIFF Multimedia Movie                |                |
| MPEG_Fmt                     | 246    | MPEG Movie                           |                |
| QuickTime_Fmt                | 247    | QuickTime Movie                      | MOV, QT, MP4   |
| AIFF_Fmt                     | 248    | Audio Interchange File Format (AIFF) | AIF, AIFF      |
| Amiga_MOD_Fmt                | 249    | Amiga MOD                            | MOD            |
| Amiga_IFF_8SVX_Fmt           | 250    | Amiga IFF (8SVX) Sound               | IFF            |
| Creative_Voice_Audio_Fmt     | 251    | Creative Voice (VOC)                 | VOC            |
| AutoDesk_Animator_FLI_Fmt    | 252    | AutoDesk Animator FLIC               | FLI            |
| AutoDesk_AnimatorPro_FLC_Fmt | 253    | AutoDesk Animator Pro FLIC           | FLC            |
| Compactor_Archive_Fmt        | 254    | Compactor / Compact Pro              |                |
| VRML_Fmt                     | 255    | VRML                                 | WRL            |
| QuickDraw_3D_Metafile_Fmt    | 256    | QuickDraw 3D Metafile                |                |
| PGP_Secret_Keyring_Fmt       | 257    | PGP Secret Keyring                   |                |
| PGP_Public_Keyring_Fmt       | 258    | PGP Public Keyring                   |                |

| Format Name                  | Number | Format Description               | File Extension  |
|------------------------------|--------|----------------------------------|-----------------|
| PGP_Encrypted_Data_Fmt       | 259    | PGP Encrypted Data               |                 |
| PGP_Signed_Data_Fmt          | 260    | PGP Signed Data                  |                 |
| PGP_SignedEncrypted_Data_Fmt | 261    | PGP Signed and Encrypted Data    |                 |
| PGP_Sign_Certificate_Fmt     | 262    | PGP Signature Certificate        | SIG             |
| PGP_Compressed_Data_Fmt      | 263    | PGP Compressed Data              |                 |
| PGP_ASCII_Public_Keyring_Fmt | 264    | ASCII-armored PGP Public Keyring | PGP             |
| PGP_ASCII_Encoded_Fmt        | 265    | ASCII-armored PGP encoded        |                 |
| PGP_ASCII_Signed_Fmt         | 266    | ASCII-armored PGP signed         |                 |
| OLE_DIB_Fmt                  | 267    | OLE DIB object                   |                 |
| SGI_Image_Fmt                | 268    | SGI Image                        | RGB             |
| Lotus_ScreenCam_Fmt          | 269    | Lotus ScreenCam                  | SCM             |
| MPEG_Audio_Fmt               | 270    | MPEG Audio                       | MPEGA, MPG, MP3 |
| FTP_Software_Session_Fmt     | 271    | FTP Session Data                 | STE             |
| Netscape_Bookmark_File_Fmt   | 272    | Netscape Bookmark File           |                 |
| Corel_Draw_CMX_Fmt           | 273    | Corel CMX                        | CMX             |
| AutoDesk_DWG_Fmt             | 274    | AutoDesk Drawing (DWG)           | DWG             |
| AutoDesk_WHIP_Fmt            | 275    | AutoDesk WHIP                    | WHP             |
| Macromedia_Director_Fmt      | 276    | Macromedia Director              | DCR             |
| Real_Audio_Fmt               | 277    | Real Audio                       | RM, RA          |
| MSDOS_Device_Driver_Fmt      | 278    | MSDOS Device Driver              | SYS             |
| Micrografx_Designer_Fmt      | 279    | Micrografx Designer              | DSF             |
| SVF_Fmt                      | 280    | Simple Vector Format (SVF)       | SVF             |
| Applix_Words_Fmt             | 281    | Applix Words                     | AW              |
| Applix_Graphics_Fmt          | 282    | Applix Graphics                  | AG              |

| <b>Format Name</b>      | <b>Number</b> | <b>Format Description</b>     | <b>File Extension</b> |
|-------------------------|---------------|-------------------------------|-----------------------|
| MS_Access_Fmt           | 283           | Microsoft Access              | MDB                   |
| MS_Access_95_Fmt        | 284           | Microsoft Access 95           | MDB                   |
| MS_Access_97_Fmt        | 285           | Microsoft Access 97           | MDB                   |
| MacBinary_Fmt           | 286           | MacBinary                     | BIN                   |
| Apple_Single_Fmt        | 287           | Apple Single                  |                       |
| Apple_Double_Fmt        | 288           | Apple Double                  | AD                    |
| Enhanced_Metafire_Fmt   | 289           | Enhanced Metafile             | EMF                   |
| MS_Office_Drawing_Fmt   | 290           | Microsoft Office Drawing      |                       |
| XML_Fmt                 | 291           | XML                           | XML                   |
| DeVice_Independent_Fmt  | 292           | DeVice Independent file (DVI) | DVI                   |
| Unicode_Fmt             | 293           | Unicode                       | UNI                   |
| Lotus_123_Worksheet_Fmt | 294           | Lotus 1-2-3                   | WKS, WK1,<br>WK3, WK4 |
| Lotus_123_Format_Fmt    | 295           | Lotus 1-2-3 Formatting        | FM3                   |
| Lotus_123_97_Fmt        | 296           | Lotus 1-2-3 97                | 123                   |
| Lotus_Word_Pro_96_Fmt   | 297           | Lotus Word Pro 96             |                       |
| Lotus_Word_Pro_97_Fmt   | 298           | Lotus Word Pro 97             | LWP, MWP              |
| Freelance_DOS_Fmt       | 299           | Lotus Freelance for DOS       |                       |
| Freelance_Win_Fmt       | 300           | Lotus Freelance for Windows   | PRE                   |
| Freelance_OS2_Fmt       | 301           | Lotus Freelance for OS/2      | PRS                   |
| Freelance_96_Fmt        | 302           | Lotus Freelance 96            | PRZ                   |
| Freelance_97_Fmt        | 303           | Lotus Freelance 97            |                       |
| MS_Word_95_Fmt          | 304           | Microsoft Word 95             | DOC                   |
| MS_Word_97_Fmt          | 305           | Microsoft Word 97             | DOC, WPS              |
| Excel_Fmt               | 306           | Microsoft Excel               | XLS                   |
| Excel_Chart_Fmt         | 307           | Microsoft Excel               | XLC                   |
| Excel_Macro_Fmt         | 308           | Microsoft Excel               | XLM                   |

| <b>Format Name</b>           | <b>Number</b> | <b>Format Description</b>           | <b>File Extension</b> |
|------------------------------|---------------|-------------------------------------|-----------------------|
| Excel_95_Fmt                 | 309           | Microsoft Excel 95                  |                       |
| Excel_97_Fmt                 | 310           | Microsoft Excel 97                  |                       |
| Corel_Presentations_Fmt      | 311           | Corel Presentations                 | XFD, XFDL             |
| Harvard_Graphics_Fmt         | 312           | Harvard Graphics                    | PR4                   |
| Harvard_Graphics_Chart_Fmt   | 313           | Harvard Graphics Chart              | CH3, CHT              |
| Harvard_Graphics_Symbol_Fmt  | 314           | Harvard Graphics Symbol File        | SY3                   |
| Harvard_Graphics_Cfg_Fmt     | 315           | Harvard Graphics Configuration File |                       |
| Harvard_Graphics_Palette_Fmt | 316           | Harvard Graphics Palette            |                       |
| Lotus_123_R9_Fmt             | 317           | Lotus 1-2-3 Release 9               | 123                   |
| Applix_Spreadsheets_Fmt      | 318           | Applix Spreadsheets                 | AS                    |
| MS_Pocket_Word_Fmt           | 319           | Microsoft Pocket Word               | PWD                   |
| MS_DIB_Fmt                   | 320           | Microsoft Device Independent Bitmap | DIB                   |
| MS_Word_2000_Fmt             | 321           | Microsoft Word 2000                 | DOC                   |
| Excel_2000_Fmt               | 322           | Microsoft Excel 2000                | XLS                   |
| PowerPoint_2000_Fmt          | 323           | Microsoft PowerPoint 2000           | PPT                   |
| MS_Access_2000_Fmt           | 324           | Microsoft Access 2000               | MDB                   |
| MS_Project_4_Fmt             | 325           | Microsoft Project 4                 |                       |
| MS_Project_41_Fmt            | 326           | Microsoft Project 4.1               | MPP                   |
| MS_Project_98_Fmt            | 327           | Microsoft Project 98                | MPP                   |
| Folio_Flat_Fmt               | 328           | Folio Flat File                     | FFF                   |
| HWP_Fmt                      | 329           | HWP(Arae-Ah Hangul)                 | HWP                   |
| ICHITARO_Fmt                 | 330           | ICHITARO                            | JTD                   |
| IS_XML_Fmt                   | 331           | Extended or Custom XML              | XML                   |
| Oasys_Fmt                    | 332           | Oasys                               | OAS, OA2, OA3         |
| PBM_ASC_Fmt                  | 333           | Portable Bitmap Utilities ASCII     | PBM                   |

| Format Name             | Number | Format Description                             | File Extension |
|-------------------------|--------|------------------------------------------------|----------------|
|                         |        | format (PBM)                                   |                |
| PBM_BIN_Fmt             | 334    | Portable Bitmap Utilities BINARY format (PBM)  | PBM            |
| PGM_ASC_Fmt             | 335    | Portable Greymap Utilities ASCII format (PGM)  | PGM            |
| PGM_BIN_Fmt             | 336    | Portable Greymap Utilities BINARY format (PGM) | PGM            |
| PPM_ASC_Fmt             | 337    | Portable Pixmap Utilities ASCII format (PPM)   | PPM            |
| PPM_BIN_Fmt             | 338    | Portable Pixmap Utilities BINARY format (PPM)  | PPM            |
| XBM_Fmt                 | 339    | X Bitmap format (XBM)                          | XBM            |
| XPM_Fmt                 | 340    | X Pixmap format (XPM)                          | XPM            |
| FPX_Fmt                 | 341    | FlashPix FPX Image format                      | FPX            |
| PCD_Fmt                 | 342    | PCD Image format                               | PCD            |
| MS_Visio_Fmt            | 343    | Microsoft Visio                                | VSD            |
| MS_Project_2000_Fmt     | 344    | Microsoft Project 2000                         | MPP            |
| MS_Outlook_Fmt          | 345    | Microsoft Outlook                              | MSG, OFT       |
| ELF_Relocatable_Fmt     | 346    | ELF Relocatable                                | O              |
| ELF_Executable_Fmt      | 347    | ELF Executable                                 |                |
| ELF_Dynamic_Lib_Fmt     | 348    | ELF Dynamic Library                            | SO             |
| MS_Word_XML_Fmt         | 349    | Microsoft Word 2003 XML                        | XML            |
| MS_Excel_XML_Fmt        | 350    | Microsoft Excel 2003 XML                       | XML            |
| MS_Visio_XML_Fmt        | 351    | Microsoft Visio 2003 XML                       | VDX            |
| SO_Text_XML_Fmt         | 352    | StarOffice Text XML                            | SXW            |
| SO_Spreadsheet_XML_Fmt  | 353    | StarOffice Spreadsheet XML                     | SXC, STC       |
| SO_Presentation_XML_Fmt | 354    | StarOffice Presentation XML                    | SXD, SXI       |
| XHTML_Fmt               | 355    | XHTML                                          | XML, ASP       |
| MS_OutlookPST_Fmt       | 356    | Microsoft Outlook Personal Folders File (.pst) | PST            |

| Format Name             | Number | Format Description                                      | File Extension         |
|-------------------------|--------|---------------------------------------------------------|------------------------|
| RAR_Fmt                 | 357    | RAR                                                     | RAR                    |
| Lotus_Notes_NSF_Fmt     | 358    | IBM Lotus Notes Database NSF/NTF                        | NSF                    |
| Macromedia_Flash_Fmt    | 359    | Macromedia Flash (.swf)                                 | SWF                    |
| MS_Word_2007_Fmt        | 360    | Microsoft Word 2007 XML - Docx                          | DOCX, DOTX             |
| MS_Excel_2007_Fmt       | 361    | Microsoft Excel 2007 XML                                | XLSX, XLTX             |
| MS_PPT_2007_Fmt         | 362    | Microsoft PowerPoint 2007 XML                           | PPTX, POTX, PPSX       |
| OpenPGP_Fmt             | 363    | OpenPGP Message Format (with new packet format)         | PGP                    |
| Intergraph_V7_DGN_Fmt   | 364    | Intergraph Standard File Format (ISFF) V7 DGN (non-OLE) |                        |
| MicroStation_V8_DGN_Fmt | 365    | MicroStation V8 DGN (OLE)                               | DGN                    |
| MS_Word_Macro_2007_Fmt  | 366    | Microsoft Word Macro 2007 XML                           | DOCM, DOTM             |
| MS_Excel_Macro_2007_Fmt | 367    | Microsoft Excel Macro 2007 XML                          | XLSM, XLTM, XLAM       |
| MS_PPT_Macro_2007_Fmt   | 368    | Microsoft PPT Macro 2007 XML                            | PPTM, POTM, PPSM, PPAM |
| LZH_Fmt                 | 369    | LZH Archive                                             | LZH, LHA               |
| Office_2007_Fmt         | 370    | Office 2007 document                                    | XLSB                   |
| MS_XPS_Fmt              | 371    | Microsoft XML Paper Specification (XPS)                 | XPS                    |
| Lotus_Domino_DXL_Fmt    | 372    | IBM Domino Data in XML format (.dxl)                    | DXL                    |
| ODF_Text_Fmt            | 373    | ODF Text                                                | ODT                    |
| ODF_Spreadsheet_Fmt     | 374    | ODF Spreadsheet                                         | ODS                    |
| ODF_Presentation_Fmt    | 375    | ODF Presentation                                        | ODP                    |
| Legato_Extender_ONM_Fmt | 376    | Legato Extender Native Message ONM                      | ONM                    |
| bin_Unknown_Fmt         | 377    | Bin unknown format (.xxx)                               |                        |
| TNEF_Fmt                | 378    | Transport Neutral Encapsulation Format (TNEF)           | various                |

| Format Name               | Number | Format Description                        | File Extension              |
|---------------------------|--------|-------------------------------------------|-----------------------------|
| CADAM_Drawing_Fmt         | 379    | CADAM Drawing                             | CDD                         |
| CADAM_Drawing_Overlay_Fmt | 380    | CADAM Drawing Overlay                     | CDO                         |
| NURSTOR_Drawing_Fmt       | 381    | NURSTOR Drawing                           | NUR                         |
| HP_GLP_Fmt                | 382    | HP Graphics Language (Plotter)            | HPG                         |
| ASF_Fmt                   | 383    | Advanced Systems Format (ASF)             | ASF                         |
| WMA_Fmt                   | 384    | Windows Media Audio Format (WMA)          | WMA                         |
| WMV_Fmt                   | 385    | Windows Media Video Format (WMV)          | WMV                         |
| EMX_Fmt                   | 386    | Legato EMailXtender Archives Format (EMX) | EMX                         |
| Z7Z_Fmt                   | 387    | 7 Zip Format (7z)                         | 7Z                          |
| MS_Excel_Binary_2007_Fmt  | 388    | Microsoft Excel Binary 2007               | XLSB                        |
| CAB_Fmt                   | 389    | Microsoft Cabinet File (CAB)              | CAB                         |
| CATIA_Fmt                 | 390    | CATIA Formats (CAT*)                      | CATPART,<br>CATPRODUCT<br>2 |
| YIM_Fmt                   | 391    | Yahoo Instant Messenger History           | DAT                         |
| ODF_Drawing_Fmt           | 392    | ODF Drawing                               | ODG                         |
| Founder_CEB_Fmt           | 393    | Founder Chinese E-paper Basic (ceb)       | CEB                         |
| QPW_Fmt                   | 394    | Corel Quattro Pro 9+ for Windows          | QPW                         |
| MHT_Fmt                   | 395    | MHTML format (MHT) <sup>1</sup>           | MHT, MHTML                  |
| MDI_Fmt                   | 396    | Microsoft Document Imaging Format         | MDI                         |
| GRV_Fmt                   | 397    | Microsoft Office Groove Format            | GRV                         |
| IWWP_Fmt                  | 398    | Apple iWork Pages format                  | PAGES                       |
| IWSS_Fmt                  | 399    | Apple iWork Numbers format                | NUMBERS                     |
| IWPG_Fmt                  | 400    | Apple iWork Keynote format                | KEY                         |
| BKF_Fmt                   | 401    | Windows Backup File                       | BKF                         |
| MS_Access_2007_Fmt        | 402    | Microsoft Access 2007                     | ACCDB                       |

| <b>Format Name</b>      | <b>Number</b> | <b>Format Description</b>                              | <b>File Extension</b>                   |
|-------------------------|---------------|--------------------------------------------------------|-----------------------------------------|
| ENT_Fmt                 | 403           | Microsoft Entourage Database Format                    |                                         |
| DMG_Fmt                 | 404           | Mac Disk Copy Disk Image File                          | DMG                                     |
| CWK_Fmt                 | 405           | AppleWorks File                                        | CWK                                     |
| OO3_Fmt                 | 406           | Omni Outliner V3 File                                  | OO3                                     |
| OPML_Fmt                | 407           | Omni Outliner OPML File                                | OPML                                    |
| Omni_Graffle_XML_Fmt    | 408           | Omni Graffle XML File                                  | GRAFFLE                                 |
| PSD_Fmt                 | 409           | Photoshop Document                                     | PSD, PSB                                |
| Apple_Binary_PLList_Fmt | 410           | Apple Binary Property List format                      | PLIST                                   |
| Apple_iChat_Fmt         | 411           | Apple iChat format                                     | ICHAT                                   |
| OOUTLINE_Fmt            | 412           | OOutliner File                                         | OOUTLINE                                |
| BZIP2_Fmt               | 413           | Bzip 2 Compressed File                                 | BZ2                                     |
| ISO_Fmt                 | 414           | ISO-9660 CD Disc Image Format                          | ISO                                     |
| DocuWorks_Fmt           | 415           | DocuWorks Format                                       | XDW                                     |
| RealMedia_Fmt           | 416           | RealMedia Streaming Media                              | RM, RA                                  |
| AC3Audio_Fmt            | 417           | AC3 Audio File Format                                  | AC3                                     |
| NEF_Fmt                 | 418           | Nero Encrypted File                                    | NEF                                     |
| SolidWorks_Fmt          | 419           | SolidWorks Format Files                                | SLDASM,<br>SLDPRT,<br>SLDDRW,<br>SLDDRT |
| XFDL_Fmt                | 420           | Extensible Forms Description Language                  | XFDL, XFD                               |
| Apple_XML_PLList_Fmt    | 421           | Apple XML Property List format                         | PLIST                                   |
| OneNote_Fmt             | 422           | OneNote Note Format                                    | ONE                                     |
| Dicom_Fmt               | 424           | Digital Imaging and Communications in Medicine (Dicom) | DCM                                     |
| EnCase_Fmt              | 425           | Expert Witness Compression Format (EnCase)             | E01, L01, Lx01                          |
| Scrap_Fmt               | 426           | Shell Scrap Object File                                | SHS                                     |

| <b>Format Name</b>      | <b>Number</b> | <b>Format Description</b>                          | <b>File Extension</b>                       |
|-------------------------|---------------|----------------------------------------------------|---------------------------------------------|
| MS_Project_2007_Fmt     | 427           | Microsoft Project 2007                             | MPP                                         |
| MS_Publisher_98_Fmt     | 428           | Microsoft Publisher from version 98                | PUB                                         |
| Skype_Fmt               | 429           | Skype Log File                                     | DBB                                         |
| HI7_Fmt                 | 430           | Health level7 message                              | HL7                                         |
| MS_OutlookOST_Fmt       | 431           | Microsoft Outlook Offline Folders File (OST)       | OST                                         |
| Epub_Fmt                | 432           | Electronic Publication                             | EPUB                                        |
| MS_OEDBX_Fmt            | 433           | Microsoft Outlook Express DBX                      | DBX                                         |
| BB_Activ_Fmt            | 434           | BlackBerry Activation File                         | DAT                                         |
| DiskImage_Fmt           | 435           | Disk Image                                         | DMG                                         |
| Milestone_Fmt           | 436           | Milestone Document                                 | MLS, ML3, ML4, ML5, ML6, ML7, ML8, ML9, MLA |
| E_Transcript_Fmt        | 437           | RealLegal E-Transcript File                        | PTX                                         |
| PostScript_Font_Fmt     | 438           | PostScript Type 1 Font                             | PFB                                         |
| Ghost_DiskImage_Fmt     | 439           | Ghost Disk Image File                              | GHO, GHS                                    |
| JPEG_2000_JP2_File_Fmt  | 440           | JPEG-2000 JP2 File Format Syntax (ISO/IEC 15444-1) | JP2, JPF, J2K, JPWL, JPX, PGX               |
| Unicode_HTML_Fmt        | 441           | Unicode HTML                                       | HTM, HTML                                   |
| CHM_Fmt                 | 442           | Microsoft Compiled HTML Help                       | CHM                                         |
| EMCMF_Fmt               | 443           | Documentum EMCMF format                            | EMCMF                                       |
| MS_Access_2007_Tmpl_Fmt | 444           | Microsoft Access 2007 Template                     | ACCDT                                       |
| Jungum_Fmt              | 445           | Samsung Electronics Jungum Global document         | GUL                                         |
| JBIG2_Fmt               | 446           | JBIG2 File Format                                  | JB2, JBIG2                                  |
| EFax_Fmt                | 447           | eFax file                                          | EFX                                         |
| AD1_Fmt                 | 448           | AD1 Evidence file                                  | AD1                                         |
| SketchUp_Fmt            | 449           | Google SketchUp                                    | SKP                                         |

| <b>Format Name</b>      | <b>Number</b> | <b>Format Description</b>                       | <b>File Extension</b> |
|-------------------------|---------------|-------------------------------------------------|-----------------------|
| GWFS_Email_Fmt          | 450           | Group Wise File Surf email                      | GWFS                  |
| JNT_Fmt                 | 451           | Windows Journal format                          | JNT                   |
| Yahoo_yChat_Fmt         | 452           | Yahoo! Messenger chat log                       | YCHAT                 |
| PaperPort_MAX_File_Fmt  | 453           | PaperPort MAX image file                        | MAX                   |
| ARJ_Fmt                 | 454           | ARJ (Archive by Robert Jung) file format        | ARJ                   |
| RPMSG_Fmt               | 455           | Microsoft Outlook Restricted Permission Message | RPMSG                 |
| MAT_Fmt                 | 456           | MATLAB file format                              | MAT, FIG              |
| SGY_Fmt                 | 457           | SEG-Y Seismic Data format                       | SGY, SEGY             |
| CDXA_MPEG_PS_Fmt        | 458           | MPEG-PS container with CDXA stream              | MPG                   |
| EVT_Fmt                 | 459           | Microsoft Windows NT Event Log                  | EVT                   |
| EVTX_Fmt                | 460           | Microsoft Windows Vista Event Log               | EVTX                  |
| MS_OutlookOLM_Fmt       | 461           | Microsoft Outlook for Macintosh format          | OLM                   |
| WARC_Fmt                | 462           | Web ARChive                                     | WARC                  |
| JAVACLASS_Fmt           | 463           | Java Class format                               | CLASS                 |
| VCF_Fmt                 | 464           | Microsoft Outlook vCard file format             | VCF                   |
| EDB_Fmt                 | 465           | Microsoft Exchange Server Database file format  | EDB                   |
| ICS_Fmt                 | 466           | Microsoft Outlook iCalendar file format         | ICS, VCS              |
| MS_Visio_2013_Fmt       | 467           | Microsoft Visio 2013                            | VSDX, VSTX, VSSX      |
| MS_Visio_2013_Macro_Fmt | 468           | Microsoft Visio 2013 macro                      | VSDM, VSTM, VSSM      |
| ICHITARO_Compr_Fmt      | 469           | ICHITARO Compressed format                      | JTDC                  |
| IWWP13_Fmt              | 470           | Apple iWork 2013 Pages format                   | IWA                   |
| IWSS13_Fmt              | 471           | Apple iWork 2013 Numbers format                 | IWA                   |

| <b>Format Name</b>               | <b>Number</b> | <b>Format Description</b>           | <b>File Extension</b> |
|----------------------------------|---------------|-------------------------------------|-----------------------|
| IWPG13_Fmt                       | 472           | Apple iWork 2013 Keynote format     | IWA                   |
| XZ_Fmt                           | 473           | XZ archive format                   | XZ                    |
| Sony_WAVE64_Fmt                  | 474           | Sony Wave64 format                  | W64                   |
| Conifer_WAVPACK_Fmt              | 475           | Conifer Wavpack format              | WV                    |
| Xiph_OGG_VORBIS_Fmt              | 476           | Xiph Ogg Vorbis format              | OGG                   |
| MS_Visio_2013_Stencil_Fmt        | 477           | MS Visio 2013 stencil format        | VSSX                  |
| MS_Visio_2013_Stencil_Macro_Fmt  | 478           | MS Visio 2013 stencil Macro format  | VSSM                  |
| MS_Visio_2013_Template_Fmt       | 479           | MS Visio 2013 template format       | VSTX                  |
| MS_Visio_2013_Template_Macro_Fmt | 480           | MS Visio 2013 template Macro format | VSTM                  |
| Borland_Reflex_2_Fmt             | 481           | Borland Reflex 2 format             | R2D                   |
| PKCS_12_Fmt                      | 482           | PKCS #12 (p12) format               | P12, PFX              |
| B1_Fmt                           | 483           | B1 format                           | B1                    |
| ISO_IEC_MPEG_4_Fmt               | 484           | ISO/IEC MPEG-4 (ISO 14496) format   | MP4                   |
| RAR5_Fmt                         | 485           | RAR5 Format                         | RAR                   |
| Unigraphics_NX_Fmt               | 486           | Unigraphics (UG) NX CAD Format      | PRT                   |
| PTC_Creo_Fmt                     | 487           | PTC Creo CAD Format                 | ASM, PRT              |
| KML_Fmt                          | 488           | Keyhole Markup Language             | KML                   |
| KMZ_Fmt                          | 489           | Zipped Keyhole Markup Language      | KMZ                   |
| WML_Fmt                          | 490           | Wireless Markup Language            | WML                   |
| ODF_Formula_Fmt                  | 491           | ODF Formula                         | ODF                   |
| SO_Text_Fmt                      | 492           | Star Office Writer Text             | SDW, SGL, VOR         |
| SO_Spreadsheet_Fmt               | 493           | Star Office Calc Spreadsheet        | SDC                   |
| SO_Presentation_Fmt              | 494           | Star Office Impress Presentation    | SDD, SDA              |
| SO_Math_Fmt                      | 495           | Star Office Math                    | SMF                   |
| STEP_Fmt                         | 496           | ISO 10303-21 STEP format            |                       |

| Format Name      | Number | Format Description                           | File Extension |
|------------------|--------|----------------------------------------------|----------------|
| STL_Fmt          | 497    | 3D Systems STL ASCII format                  |                |
| AppleScript_Fmt  | 498    | AppleScript Source Code <sup>3</sup>         | APPLESCRIPT    |
| Assembly_Fmt     | 499    | Assembly Code <sup>3</sup>                   |                |
| C_Fmt            | 500    | C Source Code <sup>3</sup>                   | C, H           |
| Csharp_Fmt       | 501    | C# Source Code <sup>3</sup>                  | CS             |
| CPlusPlus_Fmt    | 502    | C++ Source Code <sup>3</sup>                 | CPP, HPP       |
| Css_Fmt          | 503    | Cascading Style Sheet <sup>3</sup>           | CSS            |
| Clojure_Fmt      | 504    | Clojure Source Code <sup>3</sup>             | CLJ, CL2       |
| CoffeeScript_Fmt | 505    | CoffeeScript Source Code <sup>3</sup>        | COFFEE, CAKE   |
| Lisp_Fmt         | 506    | Common Lisp Source Code <sup>3</sup>         | EL             |
| Dockerfile_Fmt   | 507    | Dockerfile <sup>3</sup>                      |                |
| Eiffel_Fmt       | 508    | Eiffel Source Code <sup>3</sup>              | E              |
| Erlang_Fmt       | 509    | Erlang Source Code <sup>3</sup>              | ERL, ES        |
| Fsharp_Fmt       | 510    | F# Source Code <sup>3</sup>                  | FS             |
| Fortran_Fmt      | 511    | Fortran Source Code <sup>3</sup>             | F              |
| Go_Fmt           | 512    | Go Source Code <sup>3</sup>                  | GO             |
| Groovy_Fmt       | 513    | Groovy Source Code <sup>3</sup>              | GRT, GUY       |
| Haskell_Fmt      | 514    | Haskell Source Code <sup>3</sup>             | HS             |
| Ini_Fmt          | 515    | Initialization (INI) file <sup>3</sup>       |                |
| Java_Fmt         | 516    | Java Source Code <sup>3</sup>                | JAVA           |
| Javascript_Fmt   | 517    | Javascript Source Code <sup>3</sup>          | JS             |
| Lua_Fmt          | 518    | Lua Source Code <sup>3</sup>                 | LUA            |
| Makefile_Fmt     | 519    | Makefile <sup>3</sup>                        | MAKE           |
| Mathematica_Fmt  | 520    | Wolfram Mathematica Source Code <sup>3</sup> | M              |
| ObjC_Fmt         | 521    | Objective-C Source Code <sup>3</sup>         |                |
| ObjCpp_Fmt       | 522    | Objective-C++ Source Code <sup>3</sup>       |                |
| ObjJ_Fmt         | 523    | Objective-J Source Code <sup>3</sup>         | J              |

| Format Name               | Number | Format Description                                   | File Extension |
|---------------------------|--------|------------------------------------------------------|----------------|
| PHP_Fmt                   | 524    | PHP Source Code <sup>3</sup>                         | PHP            |
| PLSQL_Fmt                 | 525    | PLSQL Source Code <sup>3</sup>                       |                |
| Pascal_Fmt                | 526    | Pascal Source Code <sup>3</sup>                      | PASCAL         |
| Perl_Fmt                  | 527    | Perl Source Code <sup>3</sup>                        | PL             |
| Powershell_Fmt            | 528    | PowerShell Source Code <sup>3</sup>                  | PS1            |
| Prolog_Fmt                | 529    | Prolog Source Code <sup>3</sup>                      | PRO, PROLOG    |
| Puppet_Fmt                | 530    | Puppet Source Code <sup>3</sup>                      | PP             |
| Python_Fmt                | 531    | Python Source Code <sup>3</sup>                      | PY             |
| R_Fmt                     | 532    | R Source Code <sup>3</sup>                           | R              |
| Ruby_Fmt                  | 533    | Ruby Source Code <sup>3</sup>                        | RB             |
| Rust_Fmt                  | 534    | Rust Source Code <sup>3</sup>                        | RS             |
| Scala_Fmt                 | 535    | Scala Source Code <sup>3</sup>                       | SC             |
| Shell_Fmt                 | 536    | Shell Script <sup>3</sup>                            | SH             |
| Smalltalk_Fmt             | 537    | Smalltalk Source Code <sup>3</sup>                   | ST             |
| ML_Fmt                    | 538    | Standard ML Source Code <sup>3</sup>                 | ML             |
| Swift_Fmt                 | 539    | Swift Source Code <sup>3</sup>                       | SWIFT          |
| Tcl_Fmt                   | 540    | Tool Command Language (Tcl) Source Code <sup>3</sup> | TM             |
| Tex_Fmt                   | 541    | TeX Typesetting File <sup>3</sup>                    |                |
| TypeScript_Fmt            | 542    | TypeScript Source Code <sup>3</sup>                  | TS             |
| Verilog_Fmt               | 543    | Verilog Source Code <sup>3</sup>                     | V              |
| YAML_Fmt                  | 544    | YAML File <sup>3</sup>                               | YML            |
| Wiki_Fmt                  | 545    | MediaWiki File                                       |                |
| MS_Word_2007_Flat_XML_Fmt | 546    | Microsoft Word 2007 XML - Flat xml                   | XML            |
| Matroska_Fmt              | 547    | Matroska video File                                  | MKV            |
| SVG_Fmt                   | 548    | Scalable Vector Graphics image                       | SVG            |
| Shapefile_Fmt             | 549    | Shapefile                                            | SHP, SHX       |

| <b>Format Name</b>       | <b>Number</b> | <b>Format Description</b>          | <b>File Extension</b> |
|--------------------------|---------------|------------------------------------|-----------------------|
| Flash_Video_Fmt          | 550           | Flash video File                   | FLV                   |
| Embedded_OpenType_Fmt    | 551           | Embedded OpenType font             | EOT                   |
| Web_Open_Font_Fmt        | 552           | Web Open Font Format               | WOFF, WOFF2           |
| OpenType_Fmt             | 553           | OpenType Font                      | OTF                   |
| MNG_Fmt                  | 554           | Multiple-image Network Graphics    | MNG                   |
| JNG_Fmt                  | 555           | JPEG Network Graphics              | JNG                   |
| AppleScript_Binary_Fmt   | 556           | AppleScript Binary Source Code     | SCPT                  |
| Maya_Binary_Fmt          | 557           | Autodesk Maya binary file          | MB                    |
| Jupiter_Tesselation_Fmt  | 558           | UGS Jupiter Tesselation file       | JT                    |
| OGV_Fmt                  | 559           | Ogg Theora Video format            | OGV                   |
| OGG_Container_Fmt        | 560           | General Ogg Container format       | OGG                   |
| GNU_Message_Catalog_Fmt  | 561           | GNU Message Catalog format         | MO                    |
| Windows_Shortcut_Fmt     | 562           | Windows shortcut file              | LNK                   |
| Apple_Typedstream_Fmt    | 563           | Apple/NeXT typedstream data format |                       |
| XCF_Fmt                  | 564           | GIMP XCF image                     | XCF                   |
| PaintShop_Pro_Fmt        | 565           | PaintShop Pro image                | PSP,<br>PSPIMAGE      |
| SQLite_Database_Fmt      | 566           | SQLite database format             | QHC                   |
| MySQL_Table_Fmt          | 567           | MySQL table definition file        | FRM                   |
| Microsoft_Program_DB_Fmt | 568           | Microsoft Program Database format  | PDB                   |
| OpenEXR_Fmt              | 569           | OpenEXR image format               | EXR                   |
| XMV_Fmt                  | 570           | 4X Movie File                      |                       |
| AMV_Fmt                  | 571           | AMV video file                     | AMV                   |
| NIFF_Fmt                 | 572           | Notation Interchange File Format   | NIF                   |
| CuBase_Fmt               | 573           | Steinberg CuBase file              |                       |
| SoundFont_Fmt            | 574           | SoundFont file                     |                       |
| WebP_Fmt                 | 575           | WebP image                         | WEBP                  |

| Format Name                | Number | Format Description                           | File Extension |
|----------------------------|--------|----------------------------------------------|----------------|
| ICC_Fmt                    | 576    | International Color Consortium files         | ICC, ICM       |
| PCF_Fmt                    | 577    | X11 Portable Compiled Font file              | PCF            |
| WebM_Fmt                   | 578    | WebM video file                              | WEBM           |
| AMFF_Fmt                   | 579    | Amiga Metafile                               | AMF            |
| ANBM_Fmt                   | 580    | IFF Animated Bitmap                          |                |
| ANIM_Fmt                   | 581    | IFF Amiga animated raster graphics format    |                |
| DEEP_Fmt                   | 582    | IFF-DEEP TVPaint image                       | DEEP           |
| FAXX_Fmt                   | 583    | IFF-FAXX Facsimile image                     |                |
| ICON_Fmt                   | 584    | IFF Glow Icon image                          |                |
| ILBM_Fmt                   | 585    | Interleaved BitMap image                     | IFF            |
| LWOB_Fmt                   | 586    | LightWave Object format                      | LWOB           |
| MAUD_Fmt                   | 587    | IFF-MAUD MacroSystem audio format            |                |
| PBM_Fmt                    | 588    | IFF Planar BitMap                            |                |
| TDDD_Fmt                   | 589    | IFF TDDD and Imagine Object animation format | TDD            |
| DjVu_Fmt                   | 590    | AT&T DjVu format                             | DJVU           |
| InDesign_Fmt               | 591    | Adobe InDesign document                      |                |
| Calamus_Fmt                | 592    | Calamus Desktop Publishing                   |                |
| Adaptive_MultiRate_Fmt     | 593    | Adaptive Multi-Rate audio format             | AMR            |
| FLAC_Fmt                   | 594    | Free Lossless Audio Codec format             | FLAC           |
| Ogg_FLAC_Fmt               | 595    | Ogg Container FLAC audio format              | OGG            |
| SAS7BDAT_Fmt               | 596    | SAS7BDAT database storage format             | SAS7BDAT       |
| Design_Web_Format_Fmt      | 597    | Autodesk Design Web Format                   | DWF            |
| Adobe_Flash_Audio_Book_Fmt | 598    | Adobe Flash Player audio book                | F4B            |
| Adobe_Flash_Audio_Fmt      | 599    | Adobe Flash Player audio                     | F4A            |
| Adobe_Flash_Protected_     | 600    | Adobe Flash Player protected video           | F4P            |

| Format Name                   | Number | Format Description                               | File Extension |
|-------------------------------|--------|--------------------------------------------------|----------------|
| Video_Fmt                     |        |                                                  |                |
| Adobe_Flash_Video_Fmt         | 601    | Adobe Flash Player video                         | F4V            |
| Audible_Audiobook_Fmt         | 602    | Audible Enhanced Audiobook                       | AAX            |
| Canon_Camera_Fmt              | 603    | Canon Digital Camera image                       |                |
| Canon_Raw_Fmt                 | 604    | Canon Raw image                                  | CR3            |
| Casio_Camera_Fmt              | 605    | Casio Digital Camera image                       |                |
| Convergent_Design_Fmt         | 606    | Convergent Design file                           |                |
| DMB_MAF_Audio_Fmt             | 607    | DMB MAF audio                                    |                |
| DMB_MAF_Video_Fmt             | 608    | DMB MAF video                                    |                |
| DMP_Content_Fmt               | 609    | Digital Media Project Content Format             |                |
| DVB_Fmt                       | 610    | Digital Video Broadcast format                   | DVB            |
| Dirac_Wavelet_Compression_Fmt | 611    | ISO-BMFF Dirac Wavelet compression               |                |
| HEICS_Image_Sequence_Fmt      | 612    | High Efficiency Image Format HEVC image sequence | HEICS          |
| HEIC_Image_Fmt                | 613    | High Efficiency Image Format HEVC image          | HEIC           |
| HEIFS_Image_Sequence_Fmt      | 614    | High Efficiency Image Format image sequence      | HEIFS          |
| HEIF_Image_Fmt                | 615    | High Efficiency Image Format image               | HEIF           |
| ISMACryp_Fmt                  | 616    | ISMACryp 2.0 Encrypted format                    |                |
| ISO_3GPP2_Fmt                 | 617    | 3GPP2 video file                                 | 3G2            |
| ISO_3GPP_Fmt                  | 618    | 3GPP video file                                  | 3GP            |
| ISO_JPEG2000_JP2_Fmt          | 619    | ISO-BMFF JPEG 2000 image                         | JP2            |
| ISO_JPEG2000_JPM_Fmt          | 620    | ISO-BMFF JPEG 2000 compound image                | JPM            |
| ISO_JPEG2000_JPX_Fmt          | 621    | ISO-BMFF JPEG 2000 with extensions               | JPX            |
| ISO_QuickTime_Fmt             | 622    | Apple ISO-BMFF QuickTime video                   | QT, MOV        |
| KDDI_Video_Fmt                | 623    | KDDI Video file                                  |                |

| Format Name                      | Number | Format Description                     | File Extension |
|----------------------------------|--------|----------------------------------------|----------------|
| MAF_Photo_Player_Fmt             | 624    | MAF Photo Player                       |                |
| MPEG4_AVC_Fmt                    | 625    | ISO-BMFF MPEG-4 with AVC extension     |                |
| MPEG4_M4A_Fmt                    | 626    | Apple MPEG-4 Part 14 audio             | M4A            |
| MPEG4_M4B_Fmt                    | 627    | Apple MPEG-4 Part 14 audio book        | M4B            |
| MPEG4_M4P_Fmt                    | 628    | Apple MPEG-4 Part 14 protected audio   | M4P            |
| MPEG4_M4V_Fmt                    | 629    | Apple MPEG-4 Part 14 video             | M4V            |
| MPEG4_Sony_PSP_Fmt               | 630    | Sony PSP MPEG-4                        | MP4            |
| MPEG_21_Fmt                      | 631    | MPEG-21                                |                |
| Mobile_QuickTime_Fmt             | 632    | Mobile QuickTime video                 | MQV            |
| Motion_JPEG_2000_Fmt             | 633    | Motion JPEG 2000                       | MJ2, MJP2      |
| NTT_MPEG4_Fmt                    | 634    | NTT MPEG-4                             |                |
| Nero_MPEG4_AVC_Profile           | 635    | Nero MPEG-4 profile with AVC extension |                |
| Nero_MPEG4_Audio_Fmt             | 636    | Nero AAC audio                         |                |
| Nero_MPEG4_Profile               | 637    | Nero MPEG-4 profile                    |                |
| OMA_DRM_Fmt                      | 638    | OMA DRM Format                         |                |
| Panasonic_Camera_Fmt             | 639    | Panasonic Digital Camera image         |                |
| Ross_Video_Fmt                   | 640    | Ross video                             |                |
| SDA_Video_Fmt                    | 641    | SDA SD Memory Card video               |                |
| Samsung_Stereoscopic_Fmt         | 642    | Samsung stereoscopic stream            |                |
| Sony_XAVC_Fmt                    | 643    | Sony XAVC video                        |                |
| JPEG_2000_PGX_Fmt                | 644    | JPEG 2000 PGX Verification Model image | PGX            |
| Apple_Desktop_Services_Store_Fmt | 645    | Apple Desktop Services Store file      | DS_Store       |
| Core_Audio_Fmt                   | 646    | Apple Core Audio Format                | CAF            |
| VICAR_Fmt                        | 647    | VICAR image format                     | IMG            |

| Format Name               | Number | Format Description                                     | File Extension |
|---------------------------|--------|--------------------------------------------------------|----------------|
| FITS_Fmt                  | 648    | Flexible Image Transport System FITS image             | FIT            |
| DIF_Fmt                   | 649    | Digital Interface Format (DIF) DV video                | DV             |
| MPEG_Transport_Stream_Fmt | 650    | MPEG Transport Stream data                             | TS             |
| MPEG_Sequence_Fmt         | 651    | MPEG Sequence format                                   |                |
| Ogg_OGM_Fmt               | 652    | Ogg OGM video format                                   | OGM            |
| Ogg_Speex_Fmt             | 653    | Ogg Speex audio format                                 | SPX            |
| Ogg_Opus_Fmt              | 654    | Ogg Opus audio format                                  | OGG            |
| Musepack_Audio_Fmt        | 655    | Musepack audio format                                  | MPC            |
| ART_Image_Fmt             | 656    | ART image format                                       | ART            |
| Vivo_Fmt                  | 657    | Vivo audio-video format                                | VIV            |
| QCP_Fmt                   | 658    | Qualcomm QCP audio                                     | QCP            |
| CSP_Codec_Fmt             | 659    | Creative Signal Processor codec                        | CSP            |
| TwinVQ_Fmt                | 660    | NTT TwinVQ audio format                                | VQF            |
| Interplay_MVE_Fmt         | 661    | Interplay MVE video format                             | MVE            |
| IRIX_Moviemaker_Fmt       | 662    | IRIX Silicon Graphics moviemaker video file            | MV, MOVIE      |
| Sega_FILM_Fmt             | 663    | Sega FILM video format                                 | CPK, CAK       |
| SMAF_Fmt                  | 664    | Synthetic music Mobile Application Format              | MMF            |
| NIST_SPHERE_Fmt           | 665    | NIST SPeech HEader Resources format                    | NIST           |
| Chinese_AVS_Fmt           | 666    | Chinese AVS video format                               |                |
| VQA_Fmt                   | 667    | Westwood Studios Vector Quantized Animation video file | VQA            |
| YAFA_Fmt                  | 668    | Wildfire YAFA animation                                | YAFA           |
| Origin_MVE_Fmt            | 669    | Origin Wing Commander III MVE movie format             | MVE            |

| <b>Format Name</b>          | <b>Number</b> | <b>Format Description</b>                         | <b>File Extension</b> |
|-----------------------------|---------------|---------------------------------------------------|-----------------------|
| BBC_Dirac_Fmt               | 670           | BBC Dirac video format                            | DRC                   |
| Maya_ASCII_Fmt              | 671           | Autodesk Maya ASCII file format                   | MA                    |
| RenderMan_Fmt               | 672           | Pixar RenderMan Interface<br>Bytestream file      | RIB                   |
| NOFF_Binary_Fmt             | 673           | NOFF 3D Object File Format                        | NOFF                  |
| VTK_ASCII_Fmt               | 674           | Visualization Toolkit VTK ASCII<br>format         | VTK                   |
| VTK_Binary_Fmt              | 675           | Visualization Toolkit VTK Binary<br>format        | VTK                   |
| Wolfram_CDF_Fmt             | 676           | Wolfram Mathematica Computable<br>Document Format | CDF                   |
| Wolfram_Notebook_Fmt        | 677           | Wolfram Mathematica Notebook<br>Format            | NB                    |
| HDF4_Fmt                    | 678           | Hierarchical Data Format HDF4                     | HDF, H4               |
| HDF5_Fmt                    | 679           | Hierarchical Data Format HDF5                     | HDF, H5               |
| ARMovie_Fmt                 | 680           | Acorn RISC ARMovie video format                   | RPL                   |
| Windows_TV_DVR_Fmt          | 681           | Windows Television DVR format                     | WTV                   |
| InstallShield_Z_Fmt         | 682           | InstallShield Z archive format                    | Z                     |
| MS_DirectDraw_Surface_Fmt   | 683           | Microsoft DirectDraw Surface<br>container format  | DDS                   |
| Bink_Fmt                    | 684           | Bink audio-video container format                 | BIK, BK2              |
| LZMA_Fmt                    | 685           | LZMA compressed data format                       | LZMA                  |
| True_Audio_Fmt              | 686           | True Audio format                                 | TTA                   |
| Keepass_Fmt                 | 687           | Keepass Password file                             | KDB, KDBX             |
| RPM_Fmt                     | 688           | RPM Package Manager file                          | RPM                   |
| Printer_Font_Metrics_Fmt    | 689           | Adobe Printer Font Metrics format                 | PFM                   |
| Adobe_Font_Metrics_Fmt      | 690           | Adobe Font Metrics ASCII format                   | AFM                   |
| Printer_Font_ASCII_Fmt      | 691           | Adobe Printer Font ASCII format                   | PFA                   |
| Netware_Loadable_Module_Fmt | 692           | Netware Loadable Module format                    | NLM                   |

| Format Name                        | Number | Format Description                            | File Extension     |
|------------------------------------|--------|-----------------------------------------------|--------------------|
| TCPdump_pcap_Fmt                   | 693    | TCPdump packet stream capture savefile format | PCAP               |
| Multiple_Master_Font_Fmt           | 694    | Adobe Multiple master font format             | MMM                |
| TrueType_Font_Collection_Fmt       | 695    | TrueType font collection format               | TTC                |
| Shapefile_Spatial_Index_Fmt        | 696    | Shapefile binary spatial index format         | SBX, SBN           |
| Java_Key_Store_Fmt                 | 697    | Java Key Store format                         | KS                 |
| Java_JCE_Key_Store_Fmt             | 698    | Java JCE Key Store format                     |                    |
| Quark_Xpress_Intel_Fmt             | 699    | QuarkXPress Intel format                      | QXB                |
| Windows_Imaging_Fmt                | 700    | Microsoft Windows Imaging Format WIM          | WIM                |
| VMware_Virtual_Disk_Fmt            | 701    | VMware Virtual Disk Format 5.0                | VMDK               |
| XPCConnect_Typelib_Fmt             | 702    | XPCConnect Typelib Format                     | XPT                |
| MS_DOS_Compression_Fmt             | 703    | Microsoft MS-DOS installation compression     | EX_                |
| DLS_Fmt                            | 704    | DLS Downloadable Sounds format                | DLS                |
| MS_Windows_Registry_Fmt            | 705    | Microsoft Windows Registry format             |                    |
| Microsoft_Help_2_Fmt               | 706    | Microsoft Help 2.0 format                     | HXD, HXW, HXH      |
| Qt_Translation_Fmt                 | 707    | Qt binary translation file format             | QM                 |
| PEM_SSL_Certificate_Fmt            | 708    | PEM-encoded SSL certificate                   | CRT, PEM, CER, KEY |
| PostScript_Printer_Description_Fmt | 709    | Adobe PostScript Printer Description file     | PPD                |
| Speedo_Font_Fmt                    | 710    | Speedo Font format                            | SPD                |
| InstallShield_Cabinet_Fmt          | 711    | InstallShield Cabinet Archive format          | CAB, HDR           |
| InstallShield_Uninstall_Fmt        | 712    | InstallShield Uninstall format                | ISU                |
| MS_OEDBX_Folder_Fmt                | 713    | Outlook Express DBX folder database format    | DBX                |
| LabVIEW_Fmt                        | 714    | National Instruments LabVIEW file format      | VI                 |

| Format Name                       | Number | Format Description                          | File Extension |
|-----------------------------------|--------|---------------------------------------------|----------------|
| SAP_Archive_SAR_Fmt               | 715    | SAP compression archive SAR format          | SAR            |
| Netscape_Address_Book_Fmt         | 716    | Netscape Address Book format                | NAB            |
| Universal_3D_Fmt                  | 717    | Universal 3D file format                    | U3D            |
| Open_Inventor_ASCII_Fmt           | 718    | Open Inventor ASCII format                  | IV             |
| Open_Inventor_Binary_Fmt          | 719    | Open Inventor Binary format                 | IV             |
| X_Window_Dump_Fmt                 | 720    | X Window Dump image                         | XWD            |
| Git_Packfile_Fmt                  | 721    | Git Packfile format                         | PACK           |
| Xara_Xar_Fmt                      | 722    | Xara X Xar image format                     | XAR            |
| Internet_Archive_ARC_Fmt          | 723    | Internet Archive ARC format                 | ARC            |
| Applix_Builder_Fmt                | 724    | Applix Builder format                       | AB             |
| Applix_Bitmap_Fmt                 | 725    | Applix Bitmap image format                  | IM             |
| PEM_RSA_Private_Key_Fmt           | 726    | PEM-encoded RSA private key                 | PEM            |
| MIFF_Fmt                          | 727    | Magick Image File Format                    | MIFF           |
| Subversion_Dump_Fmt               | 728    | Subversion Dump format                      |                |
| Virtual_Hard_Disk_Fmt             | 729    | Microsoft Virtual Hard Disk format          | VHD            |
| Direct_Access_Archive_Fmt         | 730    | PowerISO Direct Access Archive format       | DAA            |
| Debian_Binary_Fmt                 | 731    | Debian binary package format                | DEB            |
| XUL_Fastload_Fmt                  | 732    | Mozilla XUL Fastload format                 | MFL            |
| Nastran_OP2_Fmt                   | 733    | Nastran OP2 format                          | OP2            |
| Binary_Logging_Fmt                | 734    | CAD Binary Logging Format                   | BLF            |
| Measurement_Data_Fmt              | 735    | CAD Measurement Data Format                 | MDF            |
| Abaqus_ODB_Fmt                    | 736    | Abaqus ODB Format                           | ODB            |
| Open_Diagnostic_Data_Exchange_Fmt | 737    | Vector Open Diagnostic Data Exchange format | ODX            |
| Vector_ASCII_Fmt                  | 738    | Vector CAD ASCII ASC format                 | ASC            |

| Format Name                      | Number | Format Description                    | File Extension |
|----------------------------------|--------|---------------------------------------|----------------|
| LSDYNA_State_Database_Fmt        | 739    | LS-DYNA State Database format         |                |
| LSDYNA_Binary_Output_Fmt         | 740    | LS-DYNA binary output (binout) format |                |
| MS_Power_BI_Fmt                  | 741    | Microsoft Power BI Desktop format     | PBIX           |
| Tableau_Workbook_Fmt             | 742    | Tableau Workbook format               | TWB            |
| Tableau_Packaged_Workbook_Fmt    | 743    | Tableau Packaged Workbook format      | TWBX           |
| Tableau_Extract_Fmt              | 744    | Tableau Extract format                | TDE            |
| Tableau_Data_Source_Fmt          | 745    | Tableau Data Source format            | TDS            |
| Tableau_Packaged_Data_Source_Fmt | 746    | Tableau Packaged Data Source format   | TDSX           |
| Tableau_Preferences_Fmt          | 747    | Tableau Preferences format            | TPS            |
| Tableau_Map_Source_Fmt           | 748    | Tableau Map Source format             | TMS            |
| ABAP_Fmt                         | 749    | ABAP Source Code <sup>4</sup>         | ABAP           |
| AMPL_Fmt                         | 750    | AMPL Source Code <sup>4</sup>         | AMPL           |
| APL_Fmt                          | 751    | APL Source Code <sup>4</sup>          | APL            |
| ASN1_Fmt                         | 752    | ASN.1 Source Code <sup>4</sup>        | ASN            |
| ATS_Fmt                          | 753    | ATS Source Code <sup>4</sup>          |                |
| Agda_Fmt                         | 754    | Agda Source Code <sup>4</sup>         | AGDA           |
| Alloy_Fmt                        | 755    | Alloy Source Code <sup>4</sup>        | ALS            |
| Apex_Fmt                         | 756    | Apex Source Code <sup>4</sup>         | CLS            |
| Arduino_Fmt                      | 757    | Arduino Source Code <sup>4</sup>      | INO            |
| AsciiDoc_Fmt                     | 758    | AsciiDoc Source Code <sup>4</sup>     | ASC            |
| AspectJ_Fmt                      | 759    | AspectJ Source Code <sup>4</sup>      | AJ             |
| Awk_Fmt                          | 760    | Awk Source Code <sup>4</sup>          | AWK            |
| BlitzMax_Fmt                     | 761    | BlitzMax Source Code <sup>4</sup>     | BMX            |
| Bluespec_Fmt                     | 762    | Bluespec Source Code <sup>4</sup>     | BSV            |
| Brainfuck_Fmt                    | 763    | Brainfuck Source Code <sup>4</sup>    | B, BF          |

| Format Name                  | Number | Format Description                                | File Extension        |
|------------------------------|--------|---------------------------------------------------|-----------------------|
| Brightscript_Fmt             | 764    | Brightscript Source Code <sup>4</sup>             | BRS                   |
| CLIPS_Fmt                    | 765    | CLIPS Source Code <sup>4</sup>                    | CLP                   |
| CMake_Fmt                    | 766    | CMake Source Code <sup>4</sup>                    | CMAKE                 |
| COBOL_Fmt                    | 767    | COBOL Source Code <sup>4</sup>                    | CBL, CCP,<br>COB, CPY |
| CWeb_Fmt                     | 768    | CWeb Source Code <sup>4</sup>                     | W                     |
| CartoCSS_Fmt                 | 769    | CartoCSS Source Code <sup>4</sup>                 | MSS                   |
| Ceylon_Fmt                   | 770    | Ceylon Source Code <sup>4</sup>                   | CEYLON                |
| Chapel_Fmt                   | 771    | Chapel Source Code <sup>4</sup>                   | CHPL                  |
| Clarion_Fmt                  | 772    | Clarion Source Code <sup>4</sup>                  | CLW                   |
| Clean_Fmt                    | 773    | Clean Source Code <sup>4</sup>                    | DCL, ICL              |
| Component_Pascal_Fmt         | 774    | Component Pascal Source Code <sup>4</sup>         | CP                    |
| Cool_Fmt                     | 775    | Cool Source Code <sup>4</sup>                     | CL                    |
| Coq_Fmt                      | 776    | Coq Source Code <sup>4</sup>                      | V                     |
| Creole_Fmt                   | 777    | Creole Source Code <sup>4</sup>                   | CREOLE                |
| Crystal_Fmt                  | 778    | Crystal Source Code <sup>4</sup>                  | CR                    |
| Csound_Fmt                   | 779    | Csound Source Code <sup>4</sup>                   | ORC                   |
| Csound_Document_Fmt          | 780    | Csound Document Source Code <sup>4</sup>          | CSD                   |
| Cuda_Fmt                     | 781    | Cuda Source Code <sup>4</sup>                     | CU                    |
| D_Fmt                        | 782    | D Source Code <sup>4</sup>                        | DCL, ICL              |
| DIGITAL_Command_Language_Fmt | 783    | DIGITAL Command Language Source Code <sup>4</sup> | COM                   |
| DTrace_Fmt                   | 784    | DTrace Source Code <sup>4</sup>                   | D                     |
| Dart_Fmt                     | 785    | Dart Source Code <sup>4</sup>                     | DART                  |
| E_Fmt                        | 786    | E Source Code <sup>4</sup>                        | E                     |
| ECL_Fmt                      | 787    | ECL Source Code <sup>4</sup>                      | ECL                   |
| Elm_Fmt                      | 788    | Elm Source Code <sup>4</sup>                      | ELM                   |
| Emacs_Lisp_Fmt               | 789    | Emacs Lisp Source Code <sup>4</sup>               | EL                    |

| Format Name             | Number | Format Description                           | File Extension |
|-------------------------|--------|----------------------------------------------|----------------|
| EmberScript_Fmt         | 790    | EmberScript Source Code <sup>4</sup>         | EM             |
| Fantom_Fmt              | 791    | Fantom Source Code <sup>4</sup>              | FAN            |
| Forth_Fmt               | 792    | Forth Source Code <sup>4</sup>               | FOR, FORTH     |
| FreeMarker_Fmt          | 793    | FreeMarker Source Code <sup>4</sup>          | FTL            |
| Frege_Fmt               | 794    | Frege Source Code <sup>4</sup>               | FR             |
| G_code_Fmt              | 795    | G-code Source Code <sup>4</sup>              | G              |
| GAMS_Fmt                | 796    | GAMS Source Code <sup>4</sup>                | GMS            |
| GAP_Fmt                 | 797    | GAP Source Code <sup>4</sup>                 |                |
| GDScript_Fmt            | 798    | GDScript Source Code <sup>4</sup>            | GD             |
| GLSL_Fmt                | 799    | GLSL Source Code <sup>4</sup>                | GLSL           |
| Game_Maker_Language_Fmt | 800    | Game Maker Language Source Code <sup>4</sup> | GML            |
| Gnuplot_Fmt             | 801    | Gnuplot Source Code <sup>4</sup>             | GNU, GP        |
| Golo_Fmt                | 802    | Golo Source Code <sup>4</sup>                | GOLO           |
| Gosu_Fmt                | 803    | Gosu Source Code <sup>4</sup>                | GS             |
| Gradle_Fmt              | 804    | Gradle Source Code <sup>4</sup>              | GRADLE         |
| GraphQL_Fmt             | 805    | GraphQL Source Code <sup>4</sup>             | GRAPHQL        |
| Graphviz_DOT_Fmt        | 806    | Graphviz (DOT) Source Code <sup>4</sup>      | DOT            |
| HLSL_Fmt                | 807    | HLSL Source Code <sup>4</sup>                | HLSL           |
| Hack_Fmt                | 808    | Hack Source Code <sup>4</sup>                |                |
| Haml_Fmt                | 809    | Haml Source Code <sup>4</sup>                | HAML           |
| Handlebars_Fmt          | 810    | Handlebars Source Code <sup>4</sup>          | HBS            |
| Hy_Fmt                  | 811    | Hy Source Code <sup>4</sup>                  | HY             |
| IDL_Fmt                 | 812    | IDL Source Code <sup>4</sup>                 | PRO            |
| IGOR_Pro_Fmt            | 813    | IGOR Pro Source Code <sup>4</sup>            | IPF            |
| Idris_Fmt               | 814    | Idris Source Code <sup>4</sup>               | IDR            |
| Inform_7_Fmt            | 815    | Inform 7 Source Code <sup>4</sup>            | I7X            |
| loke_Fmt                | 816    | loke Source Code <sup>4</sup>                | IK             |

| Format Name         | Number | Format Description                       | File Extension |
|---------------------|--------|------------------------------------------|----------------|
| Isabelle_Fmt        | 817    | Isabelle Source Code <sup>4</sup>        |                |
| J_Fmt               | 818    | J Source Code <sup>4</sup>               | IJS            |
| JSONiq_Fmt          | 819    | JSONiq Source Code <sup>4</sup>          | JQ             |
| JSX_Fmt             | 820    | JSX Source Code <sup>4</sup>             | JSX            |
| Jasmin_Fmt          | 821    | Jasmin Source Code <sup>4</sup>          | J              |
| Jolie_Fmt           | 822    | Jolie Source Code <sup>4</sup>           |                |
| Julia_Fmt           | 823    | Julia Source Code <sup>4</sup>           | JL             |
| KiCad_Layout_Fmt    | 824    | KiCad Layout Source Code <sup>4</sup>    |                |
| KiCad_Schematic_Fmt | 825    | KiCad Schematic Source Code <sup>4</sup> | SCH            |
| Kotlin_Fmt          | 826    | Kotlin Source Code <sup>4</sup>          | KT             |
| LFE_Fmt             | 827    | LFE Source Code <sup>4</sup>             | LFE            |
| LOLCODE_Fmt         | 828    | LOLCODE Source Code <sup>4</sup>         | LOL            |
| Lasso_Fmt           | 829    | Lasso Source Code <sup>4</sup>           | LAS, LASSO     |
| Limbo_Fmt           | 830    | Limbo Source Code <sup>4</sup>           |                |
| LiveScript_Fmt      | 831    | LiveScript Source Code <sup>4</sup>      | LS             |
| M_Fmt               | 832    | M Source Code <sup>4</sup>               | M              |
| MAXScript_Fmt       | 833    | MAXScript Source Code <sup>4</sup>       | MS             |
| Markdown_Fmt        | 834    | Markdown Source Code <sup>4</sup>        | MD             |
| Matlab_Fmt          | 835    | Matlab Source Code <sup>4</sup>          | M              |
| Max_Code_Fmt        | 836    | Max Source Code <sup>4</sup>             | MXT            |
| Mercury_Fmt         | 837    | Mercury Source Code <sup>4</sup>         |                |
| Modelica_Fmt        | 838    | Modelica Source Code <sup>4</sup>        | MO             |
| Modula_2_Fmt        | 839    | Modula-2 Source Code <sup>4</sup>        | MOD            |
| Monkey_Fmt          | 840    | Monkey Source Code <sup>4</sup>          | MONKEY         |
| Moocode_Fmt         | 841    | Moocode Source Code <sup>4</sup>         | MOO            |
| NL_Fmt              | 842    | NL Source Code <sup>4</sup>              | NL             |
| NSIS_Fmt            | 843    | NSIS Source Code <sup>4</sup>            | NSI            |

| Format Name         | Number | Format Description                       | File Extension |
|---------------------|--------|------------------------------------------|----------------|
| NetLogo_Fmt         | 844    | NetLogo Source Code <sup>4</sup>         | NLOGO          |
| NewLisp_Fmt         | 845    | NewLisp Source Code <sup>4</sup>         | NL             |
| Nginx_Fmt           | 846    | Nginx Source Code <sup>4</sup>           | VHOST          |
| Nix_Fmt             | 847    | Nix Source Code <sup>4</sup>             | NIX            |
| Nu_Fmt              | 848    | Nu Source Code <sup>4</sup>              | NU             |
| OCaml_Fmt           | 849    | OCaml Source Code <sup>4</sup>           |                |
| OpenCL_Fmt          | 850    | OpenCL Source Code <sup>4</sup>          | CL             |
| OpenEdge_ABL_Fmt    | 851    | OpenEdge ABL Source Code <sup>4</sup>    |                |
| OpenSCAD_Fmt        | 852    | OpenSCAD Source Code <sup>4</sup>        | SCAD           |
| Ox_Fmt              | 853    | Ox Source Code <sup>4</sup>              | OX             |
| Oxygene_Fmt         | 854    | Oxygene Source Code <sup>4</sup>         | OXYGENE        |
| Oz_Fmt              | 855    | Oz Source Code <sup>4</sup>              | OZ             |
| PAWN_Fmt            | 856    | PAWN Source Code <sup>4</sup>            | PWN            |
| PLpgSQL_Fmt         | 857    | PLpgSQL Source Code <sup>4</sup>         | PLSQL          |
| Pan_Fmt             | 858    | Pan Source Code <sup>4</sup>             | PAN            |
| Parrot_Assembly_Fmt | 859    | Parrot Assembly Source Code <sup>4</sup> | PASM           |
| PicoLisp_Fmt        | 860    | PicoLisp Source Code <sup>4</sup>        |                |
| Pike_Fmt            | 861    | Pike Source Code <sup>4</sup>            | PIKE           |
| Pony_Fmt            | 862    | Pony Source Code <sup>4</sup>            | PONY           |
| Processing_Fmt      | 863    | Processing Source Code <sup>4</sup>      | PDE            |
| PureBasic_Fmt       | 864    | PureBasic Source Code <sup>4</sup>       | PB             |
| QMake_Fmt           | 865    | QMake File <sup>4</sup>                  |                |
| RAML_Fmt            | 866    | RAML Source Code <sup>4</sup>            | RAML           |
| RDoc_Fmt            | 867    | RDoc Source Code <sup>4</sup>            | RDOC           |
| REXX_Fmt            | 868    | REXX Source Code <sup>4</sup>            | REXX           |
| Racket_Fmt          | 869    | Racket Source Code <sup>4</sup>          |                |
| Ragel_Fmt           | 870    | Ragel Source Code <sup>4</sup>           |                |

| Format Name        | Number | Format Description                      | File Extension |
|--------------------|--------|-----------------------------------------|----------------|
| Rascal_Fmt         | 871    | Rascal Source Code <sup>4</sup>         | RSC            |
| Rebol_Fmt          | 872    | Rebol Source Code <sup>4</sup>          | REB, REBOL     |
| Red_Fmt            | 873    | Red Source Code <sup>4</sup>            | RED            |
| RenPy_Fmt          | 874    | Ren'Py Source Code <sup>4</sup>         | RPY            |
| RenderScript_Fmt   | 875    | RenderScript Source Code <sup>4</sup>   | RS             |
| Ring_Fmt           | 876    | Ring Source Code <sup>4</sup>           | RING           |
| RobotFramework_Fmt | 877    | RobotFramework Source Code <sup>4</sup> | ROBOT          |
| SAS_Fmt            | 878    | SAS Source Code <sup>4</sup>            | SAS            |
| SPARQL_Fmt         | 879    | SPARQL Source Code <sup>4</sup>         |                |
| SQL_Fmt            | 880    | SQL Source Code <sup>4</sup>            |                |
| SQLPL_Fmt          | 881    | SQLPL Source Code <sup>4</sup>          |                |
| SaltStack_Fmt      | 882    | SaltStack Source Code <sup>4</sup>      | SLS            |
| Scheme_Fmt         | 883    | Scheme Source Code <sup>4</sup>         |                |
| Scilab_Fmt         | 884    | Scilab Source Code <sup>4</sup>         | SCI            |
| Squirrel_Fmt       | 885    | Squirrel Source Code <sup>4</sup>       | NUT            |
| Stan_Fmt           | 886    | Stan Source Code <sup>4</sup>           | STAN           |
| Stata_Fmt          | 887    | Stata Source Code <sup>4</sup>          |                |
| Stylus_Fmt         | 888    | Stylus Source Code <sup>4</sup>         | STYL           |
| SuperCollider_Fmt  | 889    | SuperCollider Source Code <sup>4</sup>  | SC             |
| SystemVerilog_Fmt  | 890    | SystemVerilog Source Code <sup>4</sup>  | SV             |
| TXL_Fmt            | 891    | TXL Source Code <sup>4</sup>            | TXL            |
| Turing_Fmt         | 892    | Turing Source Code <sup>4</sup>         | T              |
| Turtle_Fmt         | 893    | Turtle Source Code <sup>4</sup>         | TTL            |
| UrWeb_Fmt          | 894    | UrWeb Source Code <sup>4</sup>          | UR, URS        |
| Vim_script_Fmt     | 895    | Vim script File <sup>4</sup>            | VIM            |
| Visual_Basic_Fmt   | 896    | Visual Basic Source Code <sup>4</sup>   | VB             |
| WebAssembly_Fmt    | 897    | WebAssembly Source Code <sup>4</sup>    | WAT            |

| Format Name                  | Number | Format Description                               | File Extension |
|------------------------------|--------|--------------------------------------------------|----------------|
| WebIDL_Fmt                   | 898    | WebIDL Source Code <sup>4</sup>                  | WEBIDL         |
| X10_Fmt                      | 899    | X10 Source Code <sup>4</sup>                     | X10            |
| XQuery_Fmt                   | 900    | XQuery Source Code <sup>4</sup>                  | XQM            |
| Xojo_Fmt                     | 901    | Xojo Source Code <sup>4</sup>                    |                |
| Xtend_Fmt                    | 902    | Xtend Source Code <sup>4</sup>                   | XTEND          |
| YANG_Fmt                     | 903    | YANG Source Code <sup>4</sup>                    | YANG           |
| Zephir_Fmt                   | 904    | Zephir Source Code <sup>4</sup>                  | ZEP            |
| eC_Fmt                       | 905    | eC Source Code <sup>4</sup>                      | EC             |
| reStructuredText_Fmt         | 906    | reStructuredText Source Code <sup>4</sup>        |                |
| xBase_Fmt                    | 907    | xBase Source Code <sup>4</sup>                   |                |
| Windows_Installer_Fmt        | 908    | MSI Windows Installer format                     | MSI            |
| Autodesk_3ds_Max_Fmt         | 909    | Autodesk 3ds Max format                          | MAX            |
| PhotoDraw_Mix_Fmt            | 910    | PhotoDraw MIX image                              | MIX            |
| Softimage_SCN_Fmt            | 911    | Softimage Scene SCN format                       | SCN            |
| Parasolid_XT_Fmt             | 912    | Parasolid ascii XT format                        | X_T            |
| Parasolid_XB_Fmt             | 913    | Parasolid binary XB format                       | X_B            |
| IGES_Fmt                     | 914    | Initial Graphics Exchange Specification format   | IGS            |
| ACE_Archive_Fmt              | 915    | ACE archive format                               | ACE            |
| Grasshopper_GHX_Fmt          | 916    | Grasshopper GHX format                           | GHX            |
| MS_FrontPage_Macro_Fmt       | 917    | Microsoft FrontPage macro file format            | FPM            |
| MS_AtWork_Fax_Fmt            | 918    | Microsoft AtWork Fax format                      | AWD            |
| MS_Image_Composer_Fmt        | 919    | Microsoft Image Composer format                  | MIC            |
| MS_Visual_InterDev_Fmt       | 920    | Microsoft Visual InterDev web project items file | WDM            |
| Macromedia_Flash_FLA_OLE_Fmt | 921    | Macromedia Flash FLA Project File OLE format     | FLA            |
| Corel_Draw_X4_Fmt            | 922    | CorelDRAW version X4 onwards                     | CDRX           |

| Format Name                       | Number | Format Description                                                   | File Extension |
|-----------------------------------|--------|----------------------------------------------------------------------|----------------|
| Ogg_Daala_Fmt                     | 923    | Ogg Daala video format                                               | OGV            |
| Ogg_BBC_Dirac_Fmt                 | 924    | Ogg BBC Dirac video format                                           | OGV            |
| PKCS_7_Fmt                        | 925    | PKCS #7 cryptographic format                                         | P7S            |
| Time_Stamped_Data_Fmt             | 926    | Time-stamped data format                                             | TSD            |
| Sereal_Fmt                        | 927    | Sereal data serialization format                                     | SRL            |
| Associated_Signature_Simple_Fmt   | 928    | Associated Signature Container Simple format                         | ASICS          |
| Associated_Signature_Extended_Fmt | 929    | Associated Signature Container Extended format                       | ASICE          |
| iBooks_Fmt                        | 930    | Apple iBooks format                                                  | IBOOKS         |
| PDF_Forms_Data_Fmt                | 931    | PDF Forms Data Format                                                | FDF            |
| PDF_XML_Forms_Data_Fmt            | 932    | PDF XML Forms Data Format                                            | XPDF           |
| AxCrypt_Fmt                       | 933    | AxCrypt encrypted document                                           | AXX            |
| Unix_Archive_Fmt                  | 934    | Unix Archive ar format                                               | AR             |
| Berkeley_Btree_Database_Fmt       | 935    | Berkeley DB btree database format                                    | DB             |
| Berkeley_Hash_Database_Fmt        | 936    | Berkeley DB hash database format                                     | DB             |
| Berkeley_Log_Database_Fmt         | 937    | Berkeley DB log database format                                      |                |
| Berkeley_Queue_Database_Fmt       | 938    | Berkeley DB queue database format                                    |                |
| BitTorrent_Fmt                    | 939    | BitTorrent file format                                               | TORRENT        |
| Chrome_Extension_Fmt              | 940    | Google Chrome Extension format                                       | CRX            |
| Dalvik_Executable_Fmt             | 941    | Dalvik Executable dex format                                         | DEX            |
| Foxmail_Fmt                       | 942    | Foxmail email format                                                 | BOX            |
| GRIB_Fmt                          | 943    | General Regularly-distributed Information in Binary form GRIB format | GRB, GRIB2     |
| Zstandard_Fmt                     | 944    | Zstandard compression format                                         | ZSTD           |

| Format Name                   | Number | Format Description                                     | File Extension |
|-------------------------------|--------|--------------------------------------------------------|----------------|
| LZ4_Fmt                       | 945    | LZ4 compressed file                                    | LZ4            |
| MS_Money_Fmt                  | 946    | Microsoft Money format                                 | MNY            |
| NetCDF_Fmt                    | 947    | Network Common Data Form<br>NetCDF format              | NC             |
| SAS6_Data_Fmt                 | 948    | SAS 6 Data storage format                              | SD2            |
| SAS_Transport_Fmt             | 949    | SAS Transport File XPORT format                        | XPT, XPORT     |
| Snappy_Framed_Fmt             | 950    | Snappy Framed compression format                       | SZ             |
| Stata_Data_Fmt                | 951    | Stata Data Format                                      | DTA            |
| SPSS_SAV_Fmt                  | 952    | SPSS Statistics Data File Format                       | SAV            |
| Zoo_Archive_Fmt               | 953    | Zoo Compressed Archive Format                          | ZOO            |
| CDX_Fmt                       | 954    | ChemDraw CDX format                                    | CDX            |
| CDXML_Fmt                     | 955    | ChemDraw CDXML format                                  | CDXML          |
| BPG_Fmt                       | 956    | Better Portable Graphics BPG format                    | BPG            |
| Apple_Icon_Fmt                | 957    | Apple Icon image format                                | ICNS           |
| NITF_Fmt                      | 958    | National Imagery Transmission<br>Format NITF image     | NTF, NITF      |
| ERDAS_Imagine_Fmt             | 959    | ERDAS Imagine image format                             | HFA            |
| MS_Office_Temporary_Owner_Fmt | 960    | Microsoft Office temporary owner file                  |                |
| EAC3_Audio_Fmt                | 961    | Enhanced-AC3 (EAC3) Audio File<br>format               | AC3            |
| COFF_Relocatable_Fmt          | 962    | Common Object File Format (COFF)<br>relocatable object | O              |
| COFF_Executable_Fmt           | 963    | Common Object File Format (COFF)<br>executable         |                |
| COFF_Dynamic_Lib_Fmt          | 964    | Common Object File Format (COFF)<br>dynamic library    |                |
| ELF_Core_Fmt                  | 965    | ELF Core file                                          |                |
| Purify_Fmt                    | 966    | Rational Purify data file                              | PFY            |
| Kryptel_Fmt                   | 967    | Kryptel encrypted file                                 | EDC            |

| Format Name                 | Number | Format Description                                    | File Extension |
|-----------------------------|--------|-------------------------------------------------------|----------------|
| Windows_Core_Dump_Fmt       | 968    | Windows heap or mini core dump file                   | DMP            |
| Qt_Prerendered_Font_Fmt     | 969    | Qt Prerendered Font format                            | QPF2           |
| AIX_Relocatable_Fmt         | 970    | AIX/RISC COFF relocatable object                      |                |
| AIX_Executable_Fmt          | 971    | AIX/RISC COFF executable                              |                |
| AIX_Dynamic_Lib_Fmt         | 972    | AIX/RISC COFF dynamic library                         | A              |
| HPUX_Relocatable_Fmt        | 973    | HPUX/PA-RISC COFF relocatable object                  |                |
| HPUX_Executable_Fmt         | 974    | HPUX/PA-RISC COFF executable                          |                |
| HPUX_Dynamic_Lib_Fmt        | 975    | HPUX/PA-RISC COFF dynamic library                     | SL             |
| XML_EBCDIC_Fmt              | 976    | EBCDIC-encoded XML file                               | XML            |
| MPEG_JVT_H264_Fmt           | 977    | MPEG JVT-NAL sequence H264 video                      | 264            |
| Material_Exchange_Fmt       | 978    | Material Exchange Format audio-video container format | MXF            |
| MS_Agent_Character_Fmt      | 979    | Microsoft Agent Character file                        | ACS            |
| Quicken_Fmt                 | 980    | Quicken data file                                     | QDF            |
| MS_Outlook_Address_Fmt      | 981    | Microsoft Outlook address file                        | WAB            |
| MS_Answer_Wizard_Fmt        | 982    | Microsoft Answer Wizard file                          |                |
| ADX_Fmt                     | 983    | ADX audio file                                        | ADX            |
| System_Deployment_Image_Fmt | 984    | Microsoft System Deployment Image SDI format          | SDI            |
| Free_Lossless_Image_Fmt     | 985    | Free Lossless Image Format (FLIF)                     | FLIF           |
| DPX_Fmt                     | 986    | Digital Picture Exchange (DPX) image format           | DPX            |
| Avro_Fmt                    | 987    | Apache Avro binary format                             | AVRO           |
| InstallShield_Archive_Fmt   | 988    | InstallShield archive (early versions) format         | EX_            |
| Mac_Executable_Fmt          | 989    | Mac OS-X (Mach-O) executable format                   |                |

| Format Name                | Number | Format Description                                             | File Extension |
|----------------------------|--------|----------------------------------------------------------------|----------------|
| GDSII_Fmt                  | 990    | GDSII data format                                              | GDS            |
| ActiveMime_Fmt             | 991    | Microsoft ActiveMime (mso) documents                           | MSO            |
| SmartCharts_Fmt            | 992    | BizInt SmartCharts data format                                 | CHP, CHRR      |
| Webex_ARF_Fmt              | 993    | Webex advanced network ARF recordings                          | ARF            |
| Webex_WRF_Fmt              | 994    | Webex local WRF recordings                                     | WRF            |
| PGP_NetShare_Fmt           | 995    | Symantec PGP NetShare encrypted file                           |                |
| Ability_WP_OLE_Fmt         | 996    | Ability Write later versions format                            | AWW            |
| Ability_SS_OLE_Fmt         | 997    | Ability Spreadsheet later versions format                      | AWS            |
| InDesign_IDML_Fmt          | 998    | Adobe InDesign IDML format                                     | IDML           |
| Executable_JAR_Fmt         | 999    | Executable Java Archive (jar) file                             | JAR            |
| IDOL_IDX_Fmt               | 1000   | IDOL Server IDX file                                           | IDX            |
| Android_Package_Kit_Fmt    | 1001   | Android Package Kit (APK) format                               | APK            |
| Android_Binary_XML_Fmt     | 1002   | Android Binary XML (compressed by aapt) format                 | XML            |
| Java_WAR_Fmt               | 1003   | Java WAR file format                                           | WAR            |
| Java_EAR_Fmt               | 1004   | Java EAR file format                                           | EAR            |
| Atom_Syndication_Fmt       | 1005   | Atom Syndication Format                                        | ATOM           |
| RSS_Fmt                    | 1006   | RSS syndication XML format                                     | RSS            |
| SMIL_Fmt                   | 1007   | Synchronized Multimedia Integration Language (SMIL) XML format | SMIL           |
| XSLT_Fmt                   | 1008   | Extensible Stylesheet Language Transformations (XSLT) format   | XSL, XSLT      |
| XML_Shareable_Playlist_Fmt | 1009   | XML Shareable Playlist Format (XSPF)                           | XSPF           |
| FictionBook_Fmt            | 1010   | FictionBook e-book XML format                                  | FB2            |
| Adobe_Premiere_Project_Fmt | 1011   | Adobe Premiere project format                                  | PPJ            |

| <b>Format Name</b>          | <b>Number</b> | <b>Format Description</b>                                     | <b>File Extension</b> |
|-----------------------------|---------------|---------------------------------------------------------------|-----------------------|
| RDF_XML_Fmt                 | 1012          | RDF/XML format                                                | RDF                   |
| Really_Simple_Discovery_Fmt | 1013          | Really Simple Discovery (RSD) XML format                      | RSD                   |
| SBML_Fmt                    | 1014          | Systems Biology Markup Language (SBML) XML format             | SBML                  |
| SRU_Fmt                     | 1015          | Search/Retrieve via URL (SRU) XML format                      | SRU                   |
| SSML_Fmt                    | 1016          | Speech Synthesis Markup Language (SSML) XML format            | SSML                  |
| PLS_Fmt                     | 1017          | Pronunciation Lexicon Specification (PLS) XML format          | PLS                   |
| TEI_Fmt                     | 1018          | Text Encoding Initiative (TEI) XML format                     | TEI                   |
| METS_Fmt                    | 1019          | Metadata Encoding and Transmission Standard (METS) XML format | METS                  |
| MODS_Fmt                    | 1020          | Metadata Object Description Schema (MODS) XML format          | MODS                  |
| Metalink_Fmt                | 1021          | Metalink XML format                                           | METALINK              |
| Open_eBook_Fmt              | 1022          | Open eBook (OEBPS) XML format                                 | OPF                   |
| SRGS_Fmt                    | 1023          | Speech Recognition Grammar Specification (SRGS) XML format    | SRGS                  |
| SPARQL_Results_Fmt          | 1024          | SPARQL Query Results XML format                               | SRX                   |
| Adobe_XML_Data_Package_Fmt  | 1025          | Adobe XML Data Package format                                 | XDP                   |
| ESzigno_Fmt                 | 1026          | e-Szigno signed xml document                                  | ES3                   |
| Mozilla_XUL_Fmt             | 1027          | Mozilla XML User Interface Language (XUL) XML format          | XUL                   |
| SyncML_Fmt                  | 1028          | Synchronization Markup Language (SyncML) XML format           | XML                   |
| VoiceXML_Fmt                | 1029          | VoiceXML (VXML) XML format                                    | VXML                  |
| TI_Target_Configuration_Fmt | 1030          | Texas Instruments CCXML target configuration XML format       | CCXML                 |

| Format Name                  | Number | Format Description                                         | File Extension |
|------------------------------|--------|------------------------------------------------------------|----------------|
| LZFSE_Fmt                    | 1031   | Lempel-Ziv Finite State Entropy (LZFSE) compression format | LZFSE          |
| Kindle_eBook_Fmt             | 1032   | Amazon Kindle or Mobipocket eBook format                   | AZW, PRC       |
| Oasis_Stream_Fmt             | 1033   | Open Artwork System Interchange Standard (OASIS) format    | OAS            |
| Amazon_KFX_Fmt               | 1034   | Amazon KFX eBook format                                    | KFX            |
| KTX_Fmt                      | 1035   | KTX image format                                           | KTX            |
| GMSH_Mesh_Fmt                | 1036   | GMSH Mesh polygon format                                   | MSH            |
| Collada_DAE_Fmt              | 1037   | Collada Digital Asset Exchange (DAE) format                | DAE            |
| YIN_Fmt                      | 1038   | YIN XML format                                             | YIN            |
| MPEG_Playlist_Fmt            | 1039   | MPEG audio playlist format                                 | M3U            |
| Windows_Audio_Playlist_Fmt   | 1040   | Windows Audio playlist format                              | WAX            |
| DTS_Audio_Fmt                | 1041   | DTS Coherent Acoustics audio format                        | DTS            |
| Chemical_Markup_Language_Fmt | 1042   | Chemical Markup Language (CML) XML format                  | CML            |
| CrystalMaker_Fmt             | 1043   | CrystalMaker chemical format                               | CMDF           |
| VTK_XML_Fmt                  | 1044   | Visualization Toolkit VTK XML format                       | VTU            |
| IPFIX_Fmt                    | 1045   | IP Flow Information Export (IPFIX) format                  | IPFIX          |
| Portable_Font_Resource_Fmt   | 1046   | Portable Font Resource font format                         | PFR            |
| MARC_Fmt                     | 1047   | Machine-Readable Cataloging (MARC21) format                | MARC           |
| MARC_XML_Fmt                 | 1048   | Machine-Readable Cataloging (MARC) XML format              | XML            |
| XAR_Fmt                      | 1049   | Extensible Archive (XAR) format                            |                |
| Symbian_Installer_Fmt        | 1050   | Symbian installer format                                   | SIS            |
| SO_Drawing_XML_Fmt           | 1051   | OpenDocument format (OpenOffice)                           | SXD            |

| Format Name                   | Number | Format Description                                                           | File Extension |
|-------------------------------|--------|------------------------------------------------------------------------------|----------------|
|                               |        | 1/StarOffice 6.7) Drawing XML                                                |                |
| SO_Text_Global_XML_Fmt        | 1052   | OpenDocument format (OpenOffice 1/StarOffice 6.7) Writer Master document XML | SXG            |
| ODF_Chart_Fmt                 | 1053   | ODF Chart                                                                    | ODC            |
| ODF_Database_Fmt              | 1054   | ODF Database                                                                 | ODB            |
| ODF_Image_Fmt                 | 1055   | ODF Image                                                                    | ODI            |
| ODF_Text_Master_Fmt           | 1056   | ODF Text Master                                                              | ODM            |
| ODF_Text_Web_Fmt              | 1057   | ODF Text Web                                                                 | OTH            |
| ODF_Chart_Template_Fmt        | 1058   | ODF Chart Template                                                           | OTC            |
| ODF_Formula_Template_Fmt      | 1059   | ODF Formula Template                                                         | OTF            |
| ODF_Drawing_Template_Fmt      | 1060   | ODF Drawing/Graphics Template                                                | OTG            |
| ODF_Image_Template_Fmt        | 1061   | ODF Image Template                                                           | OTI            |
| ODF_Presentation_Template_Fmt | 1062   | ODF Presentation Template                                                    | OTP            |
| ODF_Spreadsheet_Template_Fmt  | 1063   | ODF Spreadsheet Template                                                     | OTS            |
| ODF_Text_Template_Fmt         | 1064   | ODF Text Template                                                            | OTT            |
| ODF_Chart_XML_Fmt             | 1065   | ODF Chart flat XML format                                                    | FODC           |
| ODF_Drawing_XML_Fmt           | 1066   | ODF Drawing/Graphics flat XML format                                         | FODG           |
| ODF_Formula_XML_Fmt           | 1067   | ODF Formula flat XML format                                                  | FODF           |
| ODF_Image_XML_Fmt             | 1068   | ODF Image flat XML format                                                    | FODI           |
| ODF_Presentation_XML_Fmt      | 1069   | ODF Presentation flat XML format                                             | FODP           |
| ODF_Spreadsheet_XML_Fmt       | 1070   | ODF Spreadsheet flat XML format                                              | FODS           |
| ODF_Text_XML_Fmt              | 1071   | ODF Text flat XML format                                                     | FODT           |
| ODF_Extension_Fmt             | 1072   | ODF Extension format                                                         | OXT            |

| Format Name                  | Number | Format Description                                                | File Extension |
|------------------------------|--------|-------------------------------------------------------------------|----------------|
| StarView_Metafile_Fmt        | 1073   | OpenOffice StarView MetaFile format                               | SVM            |
| BBeB_LRF_eBook_Fmt           | 1074   | Broad Band eBook (BBeB) in LRF format                             | LRF            |
| GPG_Trust_DB_Fmt             | 1075   | GPG trust database format                                         | GPG            |
| VICE_Emulator_Fmt            | 1076   | VICE (Versatile Commodore Emulator) format                        | VSF            |
| Portable_Game_Notation_Fmt   | 1077   | Portable Game Notation chess format                               | PGN            |
| Doom_WAD_Fmt                 | 1078   | Doom IWAD/PWAD format                                             | WAD            |
| Device_Tree_Blob_Fmt         | 1079   | Linux Device Tree Blob format                                     | DTB            |
| BDF_Font_Fmt                 | 1080   | Glyph Bitmap Distribution Format                                  | BDF            |
| PC_Screen_Font_Fmt           | 1081   | PC Screen Font format                                             | PSF            |
| JNLP_Fmt                     | 1082   | Java Network Launching Protocol                                   | JNLP           |
| XAML_Browser_Application_Fmt | 1083   | XAML Browser Application (XBAP) format                            | XBAP           |
| MS_Binder_Fmt                | 1084   | Microsoft Office Binder format                                    | OBP            |
| XAP_Fmt                      | 1085   | Microsoft Silverlight application (XAP) format                    | XAP            |
| Stuffit_X_Fmt                | 1086   | Stuffit X (SITX) archive format                                   | SITX           |
| FIG_Fmt                      | 1087   | Facility for Interactive Generation of figures (FIG) image format | FIG            |
| XPIInstall_Fmt               | 1088   | XPIInstall Cross-Platform Installer Module (XPI) format           | XPI            |
| XDF_Fmt                      | 1089   | Extensible Data Format (XDF) XML format                           | XDF            |
| MXML_Fmt                     | 1090   | MXML UI markup language XML format                                | MXML           |
| MusicXML_Fmt                 | 1091   | MusicXML format                                                   | MXL            |
| Finale_Fmt                   | 1092   | Finale audio format                                               | MUS            |
| Spotfire_DXP_Fmt             | 1093   | TIBCO Spotfire DXP data format                                    | DXP            |
| MS_Office_Theme_2007_Fmt     | 1094   | Microsoft Office theme format                                     | THMX           |

| Format Name             | Number | Format Description                             | File Extension |
|-------------------------|--------|------------------------------------------------|----------------|
| Adobe_AIR_Installer_Fmt | 1095   | Adobe AIR application installer package        | AIR            |
| Flex_Project_Fmt        | 1096   | Adobe Flash Flex project file format           | FXP            |
| FoxPro_Fmt              | 1097   | FoxPro compiled source format                  | FXP            |
| VST_Preset_Fmt          | 1098   | Virtual Studio Technology (VST) preset format  | FXP            |
| Mischief_Image_Fmt      | 1099   | Mischief vector graphics image format          | ART            |
| FreeArc_Fmt             | 1100   | FreeArc archive format                         | ARC            |
| Autodesk_3ds_Fmt        | 1101   | Autodesk 3ds format                            | 3DS            |
| Monkeys_Audio_Fmt       | 1102   | Monkey's Audio format                          | APE            |
| CALS_Fmt                | 1103   | CALS raster image format                       | CAL            |
| Dr_Halo_PAL_Fmt         | 1104   | Dr Halo raster image PAL file format           | PAL            |
| DPG_Fmt                 | 1105   | Nintendo DS DPG video format                   | DPG            |
| JPEG_XR_Fmt             | 1106   | JPEG XR (extended range) image format          | JXR, HDP       |
| TCR_eBook_Fmt           | 1107   | TCR (Text Compression for Reader) eBook format | TCR            |

<sup>1</sup>MHT, EML, and MBX files might return either format 2, 233, or 395, depending on the text in the file. In general, files that contain fields such as **To**, **From**, **Date**, or **Subject** are considered to be email messages; files that contain fields such as **content-type** and **mime-version** are considered to be MHT files; and files that do not contain any of those fields are considered to be text files.

<sup>2</sup>All CAT file extensions, for example CATDrawing, CATProduct, CATPart, and so on.

<sup>3</sup>This format is returned only if you enable source code identification.

<sup>4</sup>This format is returned only if you enable extended source code identification.

# Appendix C: Document Fields

This appendix describes the standard fields that Connectors and CFS add to documents before the documents are indexed into IDOL Server.

- [Document Fields](#)
- [AUTN\\_IDENTIFIER](#)

## Document Fields

The following fields are added to a document by connectors:

| Field                      | Description                                                                                                                                                                                                                                                                                                                  |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AUTN_IDENTIFIER            | An identifier that allows a connector to extract the document from the repository again, for example during the collect or view actions. For more information about the identifier, see <a href="#">AUTN_IDENTIFIER, on page 205</a> .                                                                                       |
| DocTrackingId              | An identifier used for document tracking functionality.                                                                                                                                                                                                                                                                      |
| DRREFERENCE                | A reference for the document. This is the standard IDOL reference field, which is used for deduplication.                                                                                                                                                                                                                    |
| source_connector_run_id    | (Added only when <code>IngestSourceConnectorFields=TRUE</code> ). The asynchronous action token of the <code>fetch</code> action that ingested the document.                                                                                                                                                                 |
| source_connector_server_id | (Added only when <code>IngestSourceConnectorFields=TRUE</code> ). A token that identifies the instance of the connector that retrieved the document (different installations of the same connector populate this field with different IDs). You can retrieve the UID of a connector through <code>action=GetVersion</code> . |

The following fields are added to a document during ingestion:

| Field              | Description                  |
|--------------------|------------------------------|
| DocumentAttributes | KeyView document attributes. |
| DocumentClass      | The KeyView document class.  |

| Field                     | Description                                                                                                                                                                                                                                                                                                 |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DocumentSize              | The size of the document.                                                                                                                                                                                                                                                                                   |
| DocumentType              | A number that represents the program that created the file format.                                                                                                                                                                                                                                          |
| DRECHILDCount             | The number of sub-files that the document contains.                                                                                                                                                                                                                                                         |
| DREDBNAME                 | The name of the IDOL database that the document must be indexed to.                                                                                                                                                                                                                                         |
| DREFILENAME               | The file name of the original document.                                                                                                                                                                                                                                                                     |
| DREORIGINALNAME           | The original file name passed to CFS. This is the full path for extracted sub-files.                                                                                                                                                                                                                        |
| DREROOTFAMILYREFERENCE    | The parent document for the family of documents.                                                                                                                                                                                                                                                            |
| DREROOTFAMILYREFERENCE_ID | A unique hash for the family of documents.                                                                                                                                                                                                                                                                  |
| FAMILYSORT                | A field used to track families (that is, containers) of documents. It contains a hash unique to the family, with indices appended that describe the depth and number of attachments.                                                                                                                        |
| ImportErrorDescription    | If an error occurs when a document is processed, a description of the error is written to this field.                                                                                                                                                                                                       |
| ImportMagicExtension      | The file extension of the detected document type.                                                                                                                                                                                                                                                           |
| ImportOriginalEncoding    | The detected encoding used by the document.                                                                                                                                                                                                                                                                 |
| ImportVersion             | Internal version number.                                                                                                                                                                                                                                                                                    |
| InfoFlag                  | A KeyView Flag that describes the file type (External, Embedded and so on).<br>0 = default<br>1 = This sub file needs further extraction<br>2 = This sub file is protected<br>4 = This sub file is an external file<br>8 = This sub file is a mail item attachment<br>16 = This sub file is SMIME protected |
| KeyviewVersion            | The version of KeyView that CFS was released with.                                                                                                                                                                                                                                                          |
| UUID                      | A unique identifier for the document.                                                                                                                                                                                                                                                                       |
| VersionNumber             | The version of CFS that was used to import the document.                                                                                                                                                                                                                                                    |

## AUTN\_IDENTIFIER

An *Identifier* is a base-64 encoded string that identifies the source of a document in IDOL Server. When you use a connector to index documents into IDOL Server, an identifier is added to every document, in the `AUTN_IDENTIFIER` document field.

A connector can use the identifier to extract the original file from the repository. An application might need to extract the original file when presenting the results of a query. The application can request the file by sending a `collect` or `view` action to the connector.

The exact content of the `AUTN_IDENTIFIER` field depends on the connector that retrieved the document, but contains information such as:

- The document reference. The document reference identifies an item in a repository. For the files retrieved from the same repository, a reference is unique. For files retrieved by a File System Connector, the document reference is the path to the file. For e-mail messages retrieved by an Exchange Connector, the document reference includes the name of the message store and folder that contains the message.
- Additional information used to find the document in the repository. Though the document reference identifies a file in the repository, it might not provide sufficient information to retrieve it efficiently. The identifier can include additional information to assist the connector locate the document.
- The name of the fetch task that was used to retrieve the document. When a connector needs to retrieve a file, it can use the same settings by finding the fetch task in its configuration file.

An example identifier appears below:

```
<id section="MyTask1" reference="http://myserver:4567/doc/_vxswdfguhjknbio_earycqzt_">  
  <param name="SERVICEURL" value="http://myserver:4567/service"/>  
  <param name="DOCID">_vxswdfguhjknbio_earycqzt_</param>  
</id>
```

## Sub File Indexes

Documents in IDOL Server can represent sub-files. In these documents, the `AUTN_IDENTIFIER` field contains the identifier of the container file.

To retrieve a sub-file from a repository, a connector must retrieve the container file and send it to KeyView so that the sub-file can be extracted. So that KeyView can extract the correct sub-file, the identifier must include a sub-file index.

When CFS indexes documents into IDOL Server, sub-file indexes are automatically written to the `SubFileIndexCSV` document field. For example:

```
SubFileIndexCSV="1"
```

### NOTE:

Your connector must be configured with `EnableExtraction=true`. The connector's `KeyviewDirectory` parameter must also be set.

The sub-file index in this example (1) indicates that the document represents the second file in the container (the sub-files are indexed from 0).

Container files can contain other container files (for example an e-mail message file could contain ZIP file attachments, containing further sub-files). In this case, the sub-file index might include more than one level:

```
SubFileIndexCSV="2,6"
```

A sub-file index of 2,6 indicates that the document represents the seventh file in the third container, in the original container file.

When an action is sent to a connector to retrieve sub-files, the sub-file index must be appended to the identifier of the container. For example:

```
PG1kIHM9Ik15VGFzazEiIHI9Imh0dHA6Ly9teXN1cnZlcjo0NTY3L2RvYy9fdnhzd  
2RmZ3VoamtuYm1vX2Vhcn1jcXp0XyI+PHAgbj0iU0VSVk1DRVWSTCIgdj0iaHR0cD  
ovL215c2VydmVyOjQ1Njcvc2Vydm1jZSIvPjxwIG49IkRPQ01EiIiB2PSJfdnhzd2R  
mZ3VoamtuYm1vX2Vhcn1jcXp0XyIvPjwvawQ+|2.6
```

**NOTE:**

Where sub-file indexes have multiple levels (for example `SubFileIndexCSV="2,6"`, the comma must be replaced by a period).

## Append Sub File Indexes to the Document Identifier

You can configure CFS to automatically append sub-file indexes to document identifiers, before the documents are indexed into IDOL Server.

To do this, use the lua script `identifiers.lua`, which is included with CFS in the `scripts` folder. The script is also included below:

```
function handler( document )  
    identifier = document:getFieldValue( "AUTN_IDENTIFIER" )  
  
    if identifier then  
        indices = document:getFieldValue( "SubFileIndexCSV" )  
  
        if indices then  
            indices = string.gsub(indices, ",", ".")  
            document:setFieldValue("AUTN_IDENTIFIER", identifier .. "|" .. indices)  
        end  
    end  
  
    return true  
end
```

You must run the script after `KeyView` has extracted sub-files, so run the script using a *Post Import* task. For example:

```
[ImportTasks]  
Post0=Lua:scripts/identifiers.lua
```

# Glossary

## A

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### **ACI (Autonomy Content Infrastructure)**

A technology layer that automates operations on unstructured information for cross-enterprise applications. ACI enables an automated and compatible business-to-business, peer-to-peer infrastructure. The ACI allows enterprise applications to understand and process content that exists in unstructured formats, such as email, Web pages, Microsoft Office documents, and IBM Notes.

### **ACI Server**

A server component that runs on the Autonomy Content Infrastructure (ACI).

### **ACL (access control list)**

An ACL is metadata associated with a document that defines which users and groups are permitted to access the document.

### **action**

A request sent to an ACI server.

### **active directory**

A domain controller for the Microsoft Windows operating system, which uses LDAP to authenticate users and computers on a network.

## C

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### **Category component**

The IDOL Server component that manages categorization and clustering.

### **Community component**

The IDOL Server component that manages users and communities.

### **connector**

An IDOL component (for example File System Connector) that retrieves information from a local or remote repository (for example, a file system, database, or Web site).

### **Connector Framework Server (CFS)**

Connector Framework Server processes the information that is retrieved by connectors. Connector Framework Server uses KeyView to extract document content and metadata from over 1,000 different file types. When the information has been processed, it is sent to an IDOL Server or Distributed Index Handler (DIH).

### **Content component**

The IDOL Server component that manages the data index and performs most of the search and retrieval operations from the index.

## D

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### **DAH (Distributed Action Handler)**

DAH distributes actions to multiple copies of IDOL Server or a component. It allows you to use failover, load balancing, or distributed content.

### **DIH (Distributed Index Handler)**

DIH allows you to efficiently split and index extremely large quantities of data into multiple copies of IDOL Server or the Content component. DIH allows you to create a scalable solution that delivers high performance and high availability. It provides a flexible way to batch, route, and categorize the indexing of internal and external content into IDOL Server.

## I

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### **IDOL**

The Intelligent Data Operating Layer (IDOL) Server, which integrates unstructured, semi-structured and structured information from multiple repositories through an understanding of the content. It delivers a real-time environment in which operations across applications and content are automated.

### **IDOL Proxy component**

An IDOL Server component that accepts incoming actions and distributes them to the appropriate subcomponent. IDOL Proxy also performs some maintenance operations to make sure that the subcomponents are running, and to start and stop them when necessary.

### **Intellectual Asset Protection System (IAS)**

An integrated security solution to protect your data. At the front end, authentication checks that users are allowed to access the system that contains the result data. At the back end, entitlement checking and authentication combine to ensure that query results contain only documents that the user is allowed to see, from repositories that the user has permission to access. For more information, refer to the IDOL Document Security Administration Guide.

## K

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### **KeyView**

The IDOL component that extracts data, including text, metadata, and subfiles from over 1,000 different file types. KeyView can also convert documents to HTML format for viewing in a Web browser.

## L

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### **LDAP**

Lightweight Directory Access Protocol. Applications can use LDAP to retrieve information from a server. LDAP is used for directory services (such as corporate email and telephone directories) and user authentication. See also: active directory, primary domain controller.

### **License Server**

License Server enables you to license and run multiple IDOL solutions. You must have a License Server on a machine with a known, static IP address.

## O

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### **OmniGroupServer (OGS)**

A server that manages access permissions for your users. It communicates with your repositories and IDOL Server to apply access permissions to documents.

## P

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### **primary domain controller**

A server computer in a Microsoft Windows domain that controls various computer resources. See also: active directory, LDAP.

## V

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### **View**

An IDOL component that converts files in a repository to HTML formats for viewing in a Web browser.

## W

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### **Wildcard**

A character that stands in for any character or group of characters in a query.

## X

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### **XML**

Extensible Markup Language. XML is a language that defines the different attributes of document content in a format that can be read by humans and machines. In IDOL Server, you can index documents in XML format. IDOL Server also returns action responses in XML format.

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