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Query Quick Reference Guide

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Contact Information

Phone	A list of phone numbers is available on the HPE Security ArcSight Technical Support Page: https://softwaresupport.hpe.com/documents/10180/14684/esp-support-contact-list
Support Web Site	https://softwaresupport.hpe.com
Protect 724 Community	https://community.saas.hpe.com/t5/ArcSight/ct-p/argsight

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Informal search input query language specifications

Search input is a control, where the main query condition is built in ArcSight Investigate. This guide describes constructs provided in that control.

Search input query language is a simplified SQL WHERE clause with some "syntactic enhancements" designed to help you express complicated search constructs.

The goal of the search input query is to restrict a search to events having particular values and located in specific columns.

Tuples

A *tuple* is a building block of the query. A tuple restricts one or several columns as follows:

`<tuple> ::= <column-list>? <operator>? <value-list>`

`<column-list>? <range-operator> <value> and <value>`

Example query:

Request URL = www.test.com

This query consists of one tuple, which has a column list with one column and a value list with one value.

Lists

Column lists and value lists use commas as separators:

- `<value-list> ::= <value> (, <value>)*`
- `<column-list> ::= <column-expr> (, <column-expr>)*`

Note:

- For multiple fields left of the operator, OR is implied between the fields. For example, `<field-1>, <field-2> = <value>` is equivalent to `<field-1> OR <field-2> = <value>`
- To have an AND condition for multiple fields, set each field equal to a specific value, with the AND operator separating the fields. For example, `<field-1>=<value-1> AND <field-2>=<value-2>`

Examples

- Request URL = www.test.com, www.test2.com, www.test3.com

This query searches for events having a Request URL equal to one of the three URLs.

- `File Name, Destination Process Name = malware.exe`

This query finds events having File name or Destination Process Name equal to malware.exe.

- `Source Address, Destination Address = 127.0.0.1, 192.168.1.1`

This query searches for events with Source Address or Destination Address equal to 127.0.0.1 or 192.168.1.1. Any of the four cases satisfies this query: a) Source Address = 127.0.0.1, b) Destination Address = 127.0.0.1, c) Source Address = 192.168.1.1, and d) Destination Address = 192.168.1.1).

The use of a comma in the list depends on the operator and is natural. For operators that do not have not in their name it is OR, for operators with not it is AND.

- `Source Address, Destination Address != 127.0.0.1, 192.168.1.1`

This query searches for events that have both Source Address not equal to 127.0.0.1 or 192.169.1.1 and Destination Address not equal to 127.0.0.1 or 192.169.1.1. In any of the four following cases the event will not satisfy the query: a) Source Address = 127.0.0.1, b) Destination Address = 127.0.0.1, c) Source Address = 192.168.1.1, and d) Destination Address = 192.168.1.1).

Values

Investigate automatically detects the type of values used in the search input. You do not need to use quotes to specify string values unless a value contains query language syntax.

`<value> ::= <non-escaped-value> | <escaped-value>`

`<escaped-value> ::= '<text-without-single-quote>' | "<text-without-double-quote>"`

`<non-escaped-value> ::= <text-without-language-constructs>`

For example, the following query does not need any quotes for values:

`Device Vendor = blue coat`

Querying some fields may require the use of quotes to disambiguate the value from the query language:

`Raw Event contains 'Name = "test" and sourcePort = 8080'`

Some other examples include the use of special values such as null (see ["Value formats" on page 10](#)). This query searches for events that have no Source Username specified:

`Source Username = null`

This query will search for events that have Source Username equal to string Null:

`Source Username = "null"`

There are two types of quotes, double and single. They are interchangeable except when you have quotes inside your value. The following two queries are interchangeable:

- Raw Event contains 'sourcePort = 8080'
- Raw Event contains "sourcePort = 8080"

Use single quotes if your value contains double quotes or double quotes if your value contains single quotes:

- Raw Event contains 'Name = "test" and sourcePort = 8080'
- Raw Event contains "Name = 'test' and sourcePort = 8080"

Quotes are taken into account only if found at the beginning of the value. Otherwise, they are treated as a regular value characters. The following query will find events with Source Username equal to O'Brien:

Source Username = O'Brien

Column expressions

Column expressions enable you to specify a particular column name or use a special alias to denote a group of columns.

- <column-expr> ::= <column name> | <group-expression>
- <group-expression> ::= (any | event) <group-name>? | <group-name>

Column (field) names can be any of the column names available in ArcSight Investigate. They are not restricted to the fieldset of the query. In the search field of the Search page, Investigate underlines an unknown column and then suggests a fix if one is available.

Column names are case-insensitive. Many columns have shortcut synonyms. Some columns have more than one synonym. For example, Source Address can be referred to as sourceAddress, src, source ip, src ip, and source ip.

Group names are shortcuts to common lists of columns. The following group names are supported:

category – list of all category fields

domain – list of all domain fields

custom float – list of all custom float fields

hostname – list of two columns, Source Hostname and Destination Hostname

id – list of all id columns

ip – list of all IP address columns (agentAddress, destinationAddress, etc.)

ip6 – list of all IP6 address columns

label – list of all label columns

mac – list of all mac address columns

path – list of all path columns

port – list of all port columns

timestamp or **time** – list of all time columns (End Time, Start Time)

uri – list of all uri columns

url – list of all url columns

username or **user** – list of two columns, Source Username and Destination Username

Example

The following interchangeable queries search for events with Source Port or Destination Port equal to 8080:

- any port = 8080
- port = 8080

If you do not specify a group name, the query will infer the CEF type of the value and run a query over all columns that satisfies the value type. For example, the following query searches for events with any of the integer fields equal to 10:

any = 10

The use of any with string values triggers a free text search.

Operators

The query language supports the following operators:

- equals
alternatives: =, ==, is equal to, equal
- not equal
alternatives: <>, !=, not equal
- less than
alternatives: <, is less, is lower, less
- greater than
alternatives: >, is greater
- less equal than
alternatives: <=, lte, less equal
- greater equal than
alternatives: >=, gte, greater equal
- contains
alternatives: contain, like, has substring
- does not contain
alternative: does not have
- starts with

alternative: startswith

- ends with

alternative: endswith

- does not start with
- does not end with

The equals and not equal operators work with columns of any type. The less, greater, less equal, greater equal work only with numbers. The contains, starts with, and ends with operators work only with strings. A warning message appears if you try to use an operator with a column of a type that does not accept that operator.

If you omit an operator, the query will infer one. If both column list and value list are present, equals will be used. If only value list is present, the operator will be deduced based on the value type. It will be contains for strings and equals for other types.

For example, the following queries assumes the equals operator:

- username Mike
- 8080

The following query will assumes the contains operator:

Microsoft

In addition to binary operators, Investigate supports range operators:

- ibt, between – in between
- nibt, not between – not in between

Range operators take a column list and two values.

Example

Source Port between 0 and 32565

Omitting operators and column expressions

You can omit column names and operators. Omitting column names leads to value type being used to determine the list of columns. Omitting operator leads to value types or column types used to determine the omitted operator.

There is one invalid omitting combination: omitting groupname and operator between any and a value. The following query is invalid and will have red underline in the Search page.

any John Doe

If you want to construct an equivalent valid query use:

equals John Doe

Note that the query John Doe is equivalent to contains John Doe

Note that you can omit the operator after any if you have a group name like in the following query:

any user John Doe

Or you can simply use:

user John Doe

Combining tuples

Combining with logic

If you want to combine several tuples to further narrow your query, you can use and and or logic in between. As usual, and has a stronger binding than or. To form complicated conditions, you can use parenthesis.

Examples

```
<sub-query> ::= <or-element> (or <or-element>)*  
<or-element> ::= <and-element> (and <and-element>)*  
<and-element> ::= <tuple> | <lpar> <sub-query> <rpar>  
<lpar> ::= (  
<rpar> ::= )
```

The following query demonstrates basic use of parenthesis:

```
Category Device Group = /Firewall and Category Object starts with  
/Host/Application/Service and (Category Behavior starts with /Access or  
Category Behavior = /Communicate/Query) and Category Outcome = /Failure
```

Parenthesis can be arbitrary nested.

The and/or logic has some alternatives that can be used in the query formulation. You can replace and with &, &&, connecting to, with, and for. You can replace or with | and ||. Special forms of and (for, connecting to, with) allow you to better express intent of the query and enable Investigate to display more precise warnings and errors, as in the following example:

```
#Failed logins for user Mike
```

Cross-referencing

Investigate enables you to reference a query in another query. Whenever you use a query name in place of a tuple, the query is referenced. To indicate the use of a cross-referenced query, attach a pound sign (#) to the beginning of the referenced query name, as in the following example:

```
#Failed logins for user Mike
```

Queries are referenced by name. If multiple queries have the same name, the first one will be used. There are also several preset queries, which you can reference as any other query. You can also hide them by creating a query with the same name as a preset one.

Preset queries list:

Malicious code activity

Firewall drop

Windows account creation

Failed logins

Failed logins for \$username

SSH authentication

A cross-referenced query is a textual substitution. Suppose you have a query named **Failed logins**:

`categoryBehavior = /Authentication/Verify` and `categoryOutcome = /Failure`

The following query,

`#Failed logins for user Mike`

would be equivalent to:

`(categoryBehavior = /Authentication/Verify and categoryOutcome = /Failure)`
`for user Mike`

Value formats

Special values

Some values have special meaning. All values with special meaning are written without single or double quotes. If you need to use a special value as a regular string, just put quotes around as was mentioned before. For example, the following query searches events with Source Username being NULL in the database:

`Source Username = Null`

If you want to search for users with the name 'Null', add single or double quotes:

`Source Username = 'Null'`

The following values are treated in a special way:

- Null, NULL, null, when used after equals or not equals or their synonyms, works as IS/IS NOT NULL
- A timestamp in ISO 8601 format is converted to the integer format when running a query.

Example

The following timestamp will be converted to integer time:

`End Time = 2017-01-01 00:00:00`

When translated to SQL, this expression would be transformed to Epoch time using your local time zone. For example, `endTime = 1483257600000`

- Values starting with a dollar sign (\$) indicate a template query.
Before running the template query, replace the \$-value with information for which you would like to search.

Example

The following query requires you to modify `$username`:

`#Failed logins for user $username`

- Values starting with # are treated as references if they point to an existing query. The search field shows an underline with yellow if a reference cannot be resolved. In this case, the query uses a reference as a value. In the example above, `#Failed logins` is a reference.

Value types

A value type is associated with each value. The value type depends on the value format. The value type determines suggestions and column lists in case no operators and/or columns are provided.

Investigate recognizes the following value types:

- Null literal value
- IPv4 address
- IPv6 address
- DNS domain
- Unsigned integer
- Floating point number
- Time stamp in ISO 8601 format
- MAC address

Adding and removing quotes does not change the value type except for null and time stamp types.

Example

The following queries are valid and interchangeable:

- `Source Address = 127.0.0.1`
- `Source Address = '127.0.0.1'`

Search input use cases

In the examples below | indicates the caret position. All suggestions are listed according to the present SuperSchema. Suggestions might change if another superschema is used.

- ✔ – query behavior is fine and unlikely to change.
- ⚠ – query behavior has minor issues and may change.
- ✖ – query behavior has major issues and will eventually change.

When testing suggestions, note that spaces before and/or after caret affect the behavior of suggestions in a meaningful way. Some of the examples below show how.

Empty query suggestions

⚠ Query: |

Popup aligned to the beginning of search input field.

Expected suggestions:

Source Address

Destination Address

Source Username

Destination Username

Source Hostname

Destination Hostname

Destination DNS Domain

Source DNS Domain

Device Address

Request URL

any category

any custom float

any domain

any hostname

any id

any ip
any ip6
any label
any mac
...

Column names suggestions

✅ Query: 1.1.1.1 = A

Popup aligned to the beginning of A.

Expected suggestions:

Source Address
Destination Address
Device Address
any ip
Agent Address
Agent Translated Address
Destination Translated Address
Device Translated Address
Source Translated Address

❌ Query: Dest = 1.1.1.1

Popup aligned to the beginning of Dest.

Expected suggestions:

Destination Address
Destination Username
Destination Hostname
Destination DNS Domain
Destination Geolocation Info
Destination Mac Address
Destination NT Domain
Destination Port

Destination Process ID
Destination Process Name
Destination Service Name
Destination Translated Address
Destination Translated Port
Destination Translated Zone URI
Destination User ID
Destination User Privileges
Destination Zone URI
Source Address
Destination Address
...

✔ Query: Source = 1.1.1.1

Popup aligned to the beginning of Source.

Expected suggestions:

Source Address
Destination Address
Device Address
any ip
Agent Address
Agent Translated Address
Destination Translated Address
Device Translated Address
Source Translated Address
Source Address
Source Username
Source Hostname
Source DNS Domain
Category Significance
Severity
Source Geolocation Info

Source Mac Address

Source NT Domain

Source Port

...

✔ Query: ByteSource Address = 1.1.1.1

Popup aligned to the beginning of ByteSource.

Expected suggestions:

Bytes In =

Bytes Out =

Source Address

Destination Address

Device Address

Agent Address

Agent Translated Address

Destination Translated Address

Device Translated Address

Source Translated Address

✔ Query: Source Address| 1.1.1.1

Popup aligned to the beginning of Source Address.

Expected suggestions:

=

Destination Address

Device Address

Agent Address

Agent Translated Address

Destination Translated Address

Device Translated Address

Source Translated Address

Source Address =

✔ Query: 1.1.1.1 equals Source Address

Popup aligned to the beginning of Source Address.

Expected suggestions:

Destination Address

Device Address

any ip


Agent Address

Agent Translated Address

Destination Translated Address

Device Translated Address

Source Translated Address

 Query: 1.1.1.1 equals Source Address

Popup aligned to the beginning of Source Address.

Expected suggestions:

and

or

 Query: Device Action = Amazon

Popup aligned to the beginning of Device Action.

Expected suggestion:

Device Vendor

Text value suggestions

 Query: Source P

Popup aligned to the beginning of Source.

Expected suggestions:

Source Port =

Source Process ID =

Source Process Name =

Source Username = Source P

Destination Username = Source P

Source Hostname = Source P

Destination Hostname = Source P

Destination DNS Domain = Source P

Source DNS Domain = Source P

Agent DNS Domain = Source P

Agent Hostname = Source P

Destination NT Domain = Source P

Device DNS Domain = Source P

Device Domain = Source P

Device Hostname = Source P

Device NT Domain = Source P

Source NT Domain = Source P

 Query: Source Port = 2

Popup aligned to the beginning of Source.

Expected suggestions:

and

or

 Query: Device Vendor = Amazon

Popup aligned to the beginning of Amazon.

Expected suggestions:

AirMagnet

Apache

Application Security

Arbor Networks

Barracuda Networks

Blue Coat

Box

CA Technologies

Check Point Software Technologies

Cisco Systems Inc.

Citrix

Dell

eEye

EMC

Extreme Networks


F5 Networks

F-Secure Corporation

Gemalto

HP

...

 Query: Source Address = 1.1.1.1 a

Popup aligned to the beginning of 1.1.1.1.

Expected suggestion:

and

 Query: Source Username e

Popup aligned to the beginning of Source.

Expected suggestions:

equals

ends with

 Query: Device Vendor Ap

Popup aligned to the beginning of Ap.

Expected suggestions:

Apache


Application Security

NetApp Inc.

=

 Query: Source Username = an

Suggestions popup should not be visible.

 Query: any ip e

Popup aligned to the beginning of e.

Expected suggestions:

equals

ends with

⚠️ Query: source port in between 2 a

Popup aligned to the beginning of 2.

Expected suggestion:

and

✅ Query: www.google.com

Popup aligned to the beginning of www.google.com.

Expected suggestions:

Destination DNS Domain = www.google.com

Source DNS Domain = www.google.com

Request URL = www.google.com

any domain = www.google.com

any url = www.google.com

Agent DNS Domain = www.google.com

Destination NT Domain = www.google.com

Device DNS Domain = www.google.com

Device Domain = www.google.com

Device NT Domain = www.google.com

Source NT Domain = www.google.com

✅ Query: andrey

Popup aligned to the beginning of andrey.

Expected suggestions:

Source Username = andrey

Destination Username = andrey

any username = andrey

Source Hostname = andrey

Destination Hostname = andrey

any hostname = andrey

Agent Hostname = andrey

Device Hostname = andrey

Destination DNS Domain = andrey

Source DNS Domain = andrey

any domain = andrey

Agent DNS Domain = andrey

Destination NT Domain = andrey

Device DNS Domain = andrey

Device Domain = andrey

Device NT Domain = andrey

Source NT Domain = andrey

✔ Query: #

Popup aligned to the beginning of #.

Expected suggestions:

#Configuration changes

#Failed logins

#Failed logins for \$username

#Firewall drop

#Firewall drop for \$ip

#Malicious code activity

#SSH authentication

#VPN connections

#Windows account creation

Comma suggestions

✔ Query: Source Address , = 1.1.1.1

Popup aligned to the beginning of ,.

Expected suggestions:

Destination Address

Device Address

any ip

Agent Address

Agent Translated Address

Destination Translated Address

Device Translated Address

Source Translated Address

✔ Query: Device Vendor = Apache ,

Popup aligned to the beginning of ,.

Expected suggestions:

AirMagnet

Amazon

Apache

Application Security

Arbor Networks

Barracuda Networks

Blue Coat

Box

CA Technologies

Check Point Software Technologies

Cisco Systems Inc.

Citrix

Dell

eEye

EMC

Extreme Networks

F5 Networks

F-Secure Corporation

Gemalto

...

Logic suggestions

✔ Query: Device Vendor = Apache and

Popup aligned to the beginning of and.

Expected suggestion:

or

⚠ Query: Device Vendor = Apache and

Popup aligned to the beginning of and.

Expected suggestions:

Source Address

Destination Address

Source Username

Destination Username

Source Hostname

Destination Hostname

Destination DNS Domain

Source DNS Domain

Device Address

Request URL

any category

any custom float

any domain

any hostname

any id

any ip

any ip6

any label

any mac

...

Operators suggestions

✅ Query: Device Vendor =

Popup aligned to the beginning of =.

Expected suggestions:

not equal

less than

greater than

less equal than

greater equal than

contains

does not contain

starts with

ends with

does not start with

does not end with

⚠️ Query: Device Vendor =

Popup aligned to the beginning of =.

Expected suggestions:

AirMagnet

Amazon

Apache

Application Security

Arbor Networks

Barracuda Networks

Blue Coat

Box

CA Technologies

Check Point Software Technologies

Cisco Systems Inc.

Citrix

Dell

eEye

EMC

Extreme Networks

F5 Networks

F-Secure Corporation

Gemalto

...

 Query: `www.google.com =`

Popup aligned to the beginning of `=`.

Expected suggestions:

Source Address

Destination Address

Source Username

Destination Username

Source Hostname

Destination Hostname

Destination DNS Domain

Source DNS Domain

Device Address

Request URL

any category

any custom float

any domain

any hostname

any id

any ip


any ip6

any label

any mac

...

Group suggestions

 Query: any

Popup aligned to the beginning of any.

Expected suggestions:

category

domain

custom float

hostname

id

ip

ip6

label

mac

path


port

timestamp

uri

url

username

 Query: any ip 1.1.1.1

Popup aligned to the beginning of any.

Expected suggestions:

Source Address

Destination Address

Device Address

Agent Address

Agent Translated Address

Destination Translated Address

Device Translated Address

Source Translated Address

✔ Query: any = 1.1.1.1

Popup aligned to the beginning of any.

Expected suggestions:

Source Address

Destination Address

Device Address

any ip

Agent Address

Agent Translated Address

Destination Translated Address

Device Translated Address

Source Translated Address

Groupname suggestions

✔ Query: any ip

Popup aligned to the beginning of any.

Expected suggestions:

equals

not equal

less than

greater than

less equal than

greater equal than

contains

does not contain

starts with

ends with

does not start with

does not end with

in between

is not between

✔ Query: any i

Popup aligned to the beginning of i.

Expected suggestions:

id

ip

ip6

✔ Query: any i = 1.1.1.1

Popup aligned to the beginning of i.

Expected suggestions:

id

ip

ip6

✘ Query any i 1.1.1.1

Popup aligned to the beginning of i.

Expected suggestions:

category

domain

custom float

hostname

id

ip

ip6

label

mac

path

port

timestamp

uri

url

username

✔ Query: any ip google.com

Popup aligned to the beginning of ip.

Expected suggestions:

=

Destination DNS Domain

Source DNS Domain

Request URL

any domain

any url

Agent DNS Domain

Destination NT Domain

Device DNS Domain

Device Domain

Device NT Domain

Source NT Domain

✔ Query: any ip = 1.1.1.1

Popup aligned to the beginning of ip.

Expected suggestions:

Source Address

Destination Address

Device Address

Agent Address

Agent Translated Address

Destination Translated Address

Device Translated Address

Source Translated Address

✔ Query: any domaIn = 100

Popup aligned to the beginning of domaIn.

Expected suggestion:

`domain`

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