

IBM Security QRadar
Version 7.2.1

AQL Flow and Event Query Guide



Note: Before using this information and the product that it supports, read the information in [Notices and Trademarks](#) on [page 21](#).

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ABOUT THIS GUIDE

The AQL Event and Flow Query CLI Guide provides you with information for using the AQL command-line shell. This guide assumes you have advanced knowledge of Linux command line functionality.

Intended audience This guide is intended to inform users of the commands required to view event or flow data stored in the Ariel database.

Documentation conventions The following conventions are used throughout this guide:

Note: Indicates that the information provided is supplemental to the associated feature or instruction.

CAUTION: *Indicates that the information is critical. A caution alerts you to potential loss of data or potential damage to an application, system, device, or network.*

WARNING: *Indicates that the information is critical. A warning alerts you to potential dangers, threats, or potential personal injury. Read any and all warnings carefully before proceeding.*

Technical documentation For information on how to access more technical documentation, technical notes, and release notes, see the [Accessing IBM Security QRadar Documentation Technical Note](http://www.ibm.com/support/docview.wss?rs=0&uid=swg21614644) (<http://www.ibm.com/support/docview.wss?rs=0&uid=swg21614644>)

Contacting customer support For information on contacting customer support, see the [Support and Download Technical Note](http://www.ibm.com/support/docview.wss?rs=0&uid=swg21612861) (<http://www.ibm.com/support/docview.wss?rs=0&uid=swg21612861>)

Statement of good security practices

IT system security involves protecting systems and information through prevention, detection and response to improper access from within and outside your enterprise. Improper access can result in information being altered, destroyed, misappropriated or misused or can result in damage to or misuse of your systems, including for use in attacks on others. No IT system or product should be considered completely secure and no single product, service or security measure can be completely effective in preventing improper use or access. IBM systems, products and services are designed to be part of a comprehensive security approach, which will necessarily involve additional operational procedures, and may require other systems, products or services to be most effective. IBM DOES NOT WARRANT THAT ANY SYSTEMS, PRODUCTS OR SERVICES ARE IMMUNE FROM, OR WILL MAKE YOUR ENTERPRISE IMMUNE FROM, THE MALICIOUS OR ILLEGAL CONDUCT OF ANY PARTY.

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THE AQL QUERY COMMAND-LINE INTERFACE

You can use the AQL Event and Flow Query Command Line Interface (CLI) to access flows and events stored in the Ariel database on your QRadar Console.

The AQL shell is a read-only interface for viewing events or flows based on the time they were written to disk. This interface does not support data imports for event or flow data.

About the AQL command-line interface (CLI)

The AQL Event and Flow Query CLI allows you to access raw flows and events stored in the Ariel database. The AQL query CLI includes syntax that is a subset of the SQL92 standard and provides support for two tables: events and flows.

Note: The AQL CLI does not provide support for joining tables.

The AQL Event and Flow Query CLI functions in the following modes:

- **Interactive mode** - This is the default mode. Using a command-line shell, you can enter queries interactively and view the results in a standard output. At the query prompt, any valid AQL statement is accepted. If time is not specified (using `-start` and `-end` options), the last minute is assumed as the time range. The start and end time for all searches is based on when Ariel writer wrote the event or flow to the disk. You can access previous queries by using the Up arrow key.
- **Non-interactive mode** - You can enter the non-interactive mode by adding the `-execute <AQL query>` parameter to the command. The `-execute` command must be followed by a valid AQL query surrounded by double quotes. Non-interactive mode does not include a prompt enabling you to redirect the output to a file using regular UNIX pipe syntax. By default, the results are sent to a standard output.

Accessing AQL from the command-line

You can access the AQL shell from the command-line of your QRadar Console.

Procedure

- Step 1** Using SSH, log in to your QRadar Console as the root user.
- Username: **root**
- Password: **<password>**
- Step 2** Type the following command to start the arielClient shell:
- ```
/opt/qradar/bin/arielClient
```
- Step 3** Optional. Type any additional command-line options to restrict the results returned by your AQL query.
- Optional query command are list in [Table 1-1](#).
- Step 4** Press Enter to start the AQL shell.
- The shell is active when the command-line prompt displays Query >>. You must exit the AQL shell to return to the standard command-line interface.
- Step 5** Type a select statement to query for event or flow data.
- Step 6** Type **exit** to leave the AQL shell.

## Optional command-line search parameters

You can enhance the results returned by your AQL query by defining parameters for your search results.

**Table 1-1** AQL query result options

| Option                                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>-range &lt;first record&gt; &lt;last record&gt;</b> | Restricts the number of records sent to the output within the specified range. This is used for viewing a selection of records generated by an ordered query. For example, if you want to view the first ten records, you must specify <b>-range 1 10</b> .                                                                                                                                                                                                                                                                                                                          |
| <b>-debug</b>                                          | Generates debugging output during execution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>-start &lt;time&gt;, -end &lt;time&gt;</b>          | Specifies the start and end time of the query.<br>Where <b>&lt;time&gt;</b> specifies the time. You must specify the time as either a UNIX timestamp or a date using the following format: yyyy/mm/dd-hh:mm:ss.<br>For example:<br><pre>/opt/qradar/bin/arielClient - start 2012/08/11-01:15:00 -end 2012/08/11-01:17:00</pre><br>The start and end times for queries are based on the time the events were written to the disk. If you are using the Store and Forward feature your AQL query start and end time should reflect the start and end time of your forwarding schedule. |
| <b>-exectime &lt;time limit&gt;</b>                    | Specifies the maximum period of time, in seconds, a single query will continue processing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



**Table 1-1** AQL query result options (continued)

| Option                                  | Description                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>-execute &lt;AQL query&gt;</code> | Enables non-interactive mode that is used to process a query that is sent to standard output. The query must include double quotes. If you do not include this option, the command is entered in interactive mode.                                                                                          |
| <code>-f &lt;output format&gt;</code>   | Specifies the output format for the query results. The table format is an ASCII drawing of a multi-column table while the csv format provides a comma separated list.<br><br>Where <code>&lt;output format&gt;</code> indicates the output format. The options are <code>table</code> or <code>csv</code> . |
| <code>-remote &lt;host:port&gt;</code>  | Specifies the connection to a specific Ariel query host and port.                                                                                                                                                                                                                                           |

**Examples**

To enter a command in interactive mode:

```
/opt/qradar/bin/arielClient -start 2012/08/11-01:15:00 -end
2012/08/11-01:17:00 -exectime 60
/opt/qradar/bin/arielClient
/opt/qradar/bin/arielClient -start 2012/08/11-01:15:00 -end
2012/08/11-01:17:00 -f csv
```

To enter a command in non-interactive mode:

```
/opt/qradar/bin/arielClient -start 2012/08/11-01:15:00 -end
2012/08/11-01:17:00 -exectime 60 -execute "select * from flows
where sourceIP = '231.12.37.17' and protocol != 'TCP.tcp_ip'"
```

**Search for event or flow data in AQL**

The AQL shell allows you to use select statements to query specific data from the events or flows table in the Ariel database.

**Select statement examples**

You can use a select statement that includes one or more fields from the flow or event tables. You can also use an asterisk (\*) to denote all columns. All field names are case sensitive, however, the terms select and from are not case sensitive.

The full list of event and flow fields that can be queried by the AQL shell is listed in [Table 1-2](#).

The `idlist.sh` shell script can provide users with a list of the most commonly used event and flow fields, along with their data types. The use of the describe command is used. For more information on using the describe command, see [Querying for event or flow field names](#).

**Examples**

```
select sourceIP, destinationIP, application from flows where
protocol = 'TCP.tcp_ip'
```

```
select category, credibility from events where severity > 8
select * from events where credibility >=9
```

**Table 1-2** Supported flow and event fields

| Table | Field Name                | Description                                                                                                                                                                  | Data Type   | Visible using describe |
|-------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------|
| Flows | anyDestinationFlag        | Destination Flags                                                                                                                                                            | Numeric     | No                     |
|       | anySourceFlag             | Source Flags                                                                                                                                                                 | Numeric     | No                     |
|       | application               | Application                                                                                                                                                                  | String      | Yes                    |
|       | applicationId             | Application                                                                                                                                                                  | Numeric     | Yes                    |
|       | bytesIn                   | Bytes In                                                                                                                                                                     | Numeric     | No                     |
|       | bytesOut                  | Bytes Out                                                                                                                                                                    | Numeric     | No                     |
|       | destinationAssetName      | Destination Asset Name                                                                                                                                                       | String      | No                     |
|       | destinationASN            | Destination ASN                                                                                                                                                              | Numeric     | Yes                    |
|       | destinationBytes          | Destination Bytes                                                                                                                                                            | Numeric     | Yes                    |
|       | destinationByteRatio      | Destination Byte Ratio                                                                                                                                                       | Numeric     | No                     |
|       | destinationDSCP           | Destination DSCP                                                                                                                                                             | Numeric     | Yes                    |
|       | destinationDscpOnly       | Destination DSCP                                                                                                                                                             | Numeric     | No                     |
|       | destinationFlags          | Destination Flags                                                                                                                                                            | Numeric     | Yes                    |
|       | destinationIP             | Destination IP                                                                                                                                                               | String      | Yes                    |
|       | destinationIPSearch       | Destination IP Search                                                                                                                                                        | String      | No                     |
|       | destinationIfIndex        | Destination If Index                                                                                                                                                         | Numeric     | Yes                    |
|       | destinationNetwork        | Destination Network                                                                                                                                                          | String      | Yes                    |
|       | destinationPackets        | Destination Packets                                                                                                                                                          | Numeric     | Yes                    |
|       | destinationPacketRatio    | Destination Packet Ratio                                                                                                                                                     | Numeric     | No                     |
|       | destinationPayload        | Destination Payload                                                                                                                                                          | String      | Yes                    |
|       | destinationPayloadHex     | Destination Payload As Hex                                                                                                                                                   | Hexadecimal | No                     |
|       | destinationPort           | Destination Port                                                                                                                                                             | Numeric     | Yes                    |
|       | destinationPrecedence     | Destination Precedence                                                                                                                                                       | Numeric     | Yes                    |
|       | destinationPrecedanceOnly | Destination Precedence                                                                                                                                                       | Numeric     | No                     |
|       | destinationTOS            | Destination QoS                                                                                                                                                              | Composite   | Yes                    |
|       | destinationv6             | IPv6 Destination                                                                                                                                                             | Hexadecimal | No                     |
|       | firstPacketTime           | First Packet Time                                                                                                                                                            | Numeric     | Yes                    |
|       | flowBias                  | Flow Bias                                                                                                                                                                    | String      | Yes                    |
|       | flowDirection             | Flow Direction:                                                                                                                                                              | String      | Yes                    |
|       |                           | <ul style="list-style-type: none"> <li>• Local-to-Local (L2L)</li> <li>• Local-to-Remote (L2R)</li> <li>• Remote-to-Local (R2L)</li> <li>• Remote-to-Remote (R2R)</li> </ul> |             |                        |

**Table 1-2** Supported flow and event fields (continued)

| Table | Field Name            | Description                 | Data Type   | Visible using describe |
|-------|-----------------------|-----------------------------|-------------|------------------------|
|       | flowSource            | Flow Source                 | Numeric     | Yes                    |
|       | flowType              | Flow Type                   | Numeric     | Yes                    |
|       | geographic            | Matches Geographic Location | String      | Yes                    |
|       | hasDestinationPayload | Has Destination Payload     | Boolean     | No                     |
|       | hasSourcePayload      | Has Source Payload          | Boolean     | No                     |
|       | icmpType              | ICMP Type/Code              | Numeric     | Yes                    |
|       | interface             | Flow Interface              | String      | Yes                    |
|       | intervalId            | Interval ID                 | Numeric     | Yes                    |
|       | lastPacketTime        | Last Packet Time            | Numeric     | Yes                    |
|       | packetsIn             | Packets In                  | Numeric     | No                     |
|       | packetsOut            | Packets Out                 | Numeric     | No                     |
|       | protocol              | Protocol                    | String      | Yes                    |
|       | protocolId            | Protocol                    | Numeric     | Yes                    |
|       | remoteHost            | Remote Host                 | String      | No                     |
|       | remoteNet             | Matches Remote Network      | String      | No                     |
|       | remoteServices        | Matches Remote Service      | String      | No                     |
|       | sourceASN             | Source ASN                  | Numeric     | Yes                    |
|       | sourceAssetName       | Source Asset Name           | String      | No                     |
|       | sourceByteRatio       | Source Byte Ratio           | Numeric     | No                     |
|       | sourceBytes           | Source Bytes                | Numeric     | Yes                    |
|       | sourceDSCP            | Source DSCP                 | Numeric     | Yes                    |
|       | sourceDscpOnly        | Source DSCP                 | Numeric     | No                     |
|       | sourceFlags           | Source Flags                | Numeric     | Yes                    |
|       | sourceIP              | Source IP                   | String      | Yes                    |
|       | sourceIPSearch        | Source IP Search            | String      | No                     |
|       | sourceIfIndex         | Source If Index             | Numeric     | Yes                    |
|       | sourceNetwork         | Source Network              | String      | Yes                    |
|       | sourceOrDestinationIP | Source or Destination IP    | String      | No                     |
|       | sourcePackets         | Source Packets              | Numeric     | Yes                    |
|       | sourcePacketRatio     | Source Packet Ratio         | Numeric     | No                     |
|       | sourcePayload         | Source Payload              | String      | Yes                    |
|       | sourcePayloadHex      | Source Payload As Hex       | Hexadecimal | No                     |
|       | sourcePort            | Source Port                 | Numeric     | Yes                    |
|       | sourcePrecedence      | Source Precedence           | Numeric     | Yes                    |
|       | sourcePrecedanceOnly  | Source Precedence           | Numeric     | No                     |

**Table 1-2** Supported flow and event fields (continued)

| Table         | Field Name            | Description                                                                                                                                                           | Data Type   | Visible using describe |
|---------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------|
|               | sourceTOS             | Source QoS                                                                                                                                                            | Composite   | Yes                    |
|               | sourcev6              | IPv6 Source                                                                                                                                                           | Hexadecimal | No                     |
|               | token                 | Associated With Offense                                                                                                                                               | Numeric     | Yes                    |
|               | totalBytes            | Total Bytes                                                                                                                                                           | Numeric     | No                     |
|               | totalPackets          | Total Packets                                                                                                                                                         | Numeric     | No                     |
|               | viewObjectPair        | View/Object                                                                                                                                                           | String      | No                     |
| <b>Events</b> | category              | Low Level Category                                                                                                                                                    | Numeric     | Yes                    |
|               | creEventList          | Matched Custom Rule                                                                                                                                                   | String      | No                     |
|               | credibility           | Credibility                                                                                                                                                           | Numeric     | Yes                    |
|               | destinationAssetName  | Destination Asset Name                                                                                                                                                | String      | No                     |
|               | destinationIP         | Destination IP                                                                                                                                                        | String      | Yes                    |
|               | destinationMAC        | Destination MAC                                                                                                                                                       | Hexadecimal | Yes                    |
|               | destinationNetwork    | Destination Network                                                                                                                                                   | String      | Yes                    |
|               | destinationPort       | Destination Port                                                                                                                                                      | Numeric     | Yes                    |
|               | destinationv6         | IPv6 Destination                                                                                                                                                      | Hexadecimal | No                     |
|               | device                | Log Source                                                                                                                                                            | Numeric     | Yes                    |
|               | deviceGroup           | Log Source Group                                                                                                                                                      | Numeric     | Yes                    |
|               | deviceTime            | Log Source Time                                                                                                                                                       | Numeric     | No                     |
|               | deviceType            | Log Source Type                                                                                                                                                       | Numeric     | Yes                    |
|               | duration              | Duration                                                                                                                                                              | Numeric     | Yes                    |
|               | endTime               | End Time                                                                                                                                                              | Numeric     | Yes                    |
|               | eventCount            | Event Count                                                                                                                                                           | Numeric     | Yes                    |
|               | eventDirection        | Event Direction: <ul style="list-style-type: none"> <li>• Local-to-Local</li> <li>• Local-to-Remote</li> <li>• Remote-to-Local</li> <li>• Remote-to-Remote</li> </ul> | String      | Yes                    |
|               | eventProcessor        | Event Processor                                                                                                                                                       | Numeric     | Yes                    |
|               | hasIdentity           | Has Identity                                                                                                                                                          | Boolean     | Yes                    |
|               | hasOffense            | Associated With Offense                                                                                                                                               | Boolean     | Yes                    |
|               | highLevelCategory     | High Level Category                                                                                                                                                   | Numeric     | Yes                    |
|               | isCREEvent            | Is CRE Event                                                                                                                                                          | Boolean     | No                     |
|               | identityExtendedField | Identity Extended Field                                                                                                                                               | String      | Yes                    |
|               | identityGroupName     | Identity Group Name                                                                                                                                                   | String      | Yes                    |
|               | identityHostName      | Identity Host Name                                                                                                                                                    | String      | Yes                    |

**Table 1-2** Supported flow and event fields (continued)

| Table | Field Name             | Description                   | Data Type   | Visible using describe |
|-------|------------------------|-------------------------------|-------------|------------------------|
|       | identityIP             | Identity IP                   | String      | Yes                    |
|       | identityMAC            | Identity MAC                  | Hexadecimal | Yes                    |
|       | identityNetBiosName    | Identity NetBIOS Name         | String      | Yes                    |
|       | identityUserName       | Identity User Name            | String      | Yes                    |
|       | magnitude              | Magnitude                     | Numeric     | Yes                    |
|       | payload                | Payload                       | String      | Yes                    |
|       | payloadHex             | Payload As Hex                | Hexadecimal | No                     |
|       | postNatDestinationIP   | Post NAT Destination IP       | String      | Yes                    |
|       | postNatDestinationPort | Post NAT Destination Port     | Numeric     | Yes                    |
|       | postNatSourceIP        | Post NAT Source IP            | String      | Yes                    |
|       | postNatSourcePort      | Post NAT Source Port          | Numeric     | No                     |
|       | preNatDestinationIP    | Pre NAT Destination IP        | String      | Yes                    |
|       | preNatDestinationPort  | Pre NAT Destination Port      | Numeric     | Yes                    |
|       | preNatSourceIP         | Pre NAT Source IP             | String      | Yes                    |
|       | preNatSourcePort       | Pre NAT Source Port           | Numeric     | Yes                    |
|       | protocol               | Protocol                      | String      | Yes                    |
|       | qid                    | Event Name ID                 | Numeric     | Yes                    |
|       | relevance              | Relevance                     | Numeric     | Yes                    |
|       | severity               | Severity                      | Numeric     | Yes                    |
|       | sourceAssetName        | Source Asset Name             | String      | No                     |
|       | sourceIP               | Source IP                     | String      | Yes                    |
|       | sourceMAC              | Source MAC                    | Hexadecimal | Yes                    |
|       | sourceNetwork          | Source Network                | String      | Yes                    |
|       | sourcePort             | Source Port                   | Numeric     | Yes                    |
|       | sourcev6               | IPv6 Source                   | Hexadecimal | No                     |
|       | startTime              | Start Time                    | Numeric     | Yes                    |
|       | token                  | Token Associated With Offense | Numeric     | Yes                    |
|       | unparsed               | Event Is Unparsed             | Boolean     | Yes                    |
|       | userName               | Username                      | String      | Yes                    |

**Additional examples**

You can also use CIDR-based queries using the select statement. To query by source IP address (sourceIP) or by destination IP address (destinationIP) using a CIDR, use the following format:

```
select <query item> from <flows|events> where
<sourceCIDR|destinationCIDR> = '<CIDR Range>'
```

For example:

```
select * from flows where sourceCIDR = '10.100.100/24'
```

To return all flows coming from the 10.100.100 subnet or capture flows coming from and into the subnet, use the regular OR expression as follows:

```
select * from flows where sourceCIDR = '10.100.100/24' OR
destinationCIDR = '10.100.100/24'
```

You can use the following statements to filter AQL queries.

**Table 1-3** Fields that use the any statement type

| Table         | Field Name                 | Description                       | Data Type |
|---------------|----------------------------|-----------------------------------|-----------|
| <b>Flow</b>   | anyASN                     | Source or Destination ASN         | Numeric   |
|               | anyHost                    | Source or Destination IP          | String    |
|               | anyNetwork                 | Source or Destination Network     | String    |
|               | destinationTOS             | Destination QoS                   | Composite |
|               | icmpType                   | ICMP Type/Code                    | Numeric   |
|               | sourceOrDestinationIP      | Source or Destination IP          | String    |
|               | sourceTOS                  | Source QoS                        | Composite |
| <b>Events</b> | anyIP                      | Any IP                            | String    |
|               | anyMac                     | Source or Destination MAC Address | Hex       |
|               | anyPort                    | Any Port                          | Numeric   |
|               | sourceOrDestinationIP      | Source or Destination IP          | String    |
|               | sourceOrDestinationNetwork | Source or Destination Network     | String    |
|               | sourceOrDestinationPort    | Source or Destination Port        | Numeric   |

### Where clause examples

You can restrict your AQL queries using **where** clauses. The supported logical operators in the clause include **and**, **or**, and parentheses. AQL queries also support the following relational operators: **=**, **<**, **>**, **>=**, **<=**, and **!=**.

### Examples

```
select sourceIP, category, credibility from events where
severity > 9 and category = 5013
```

```
select sourceIP, category, credibility from events where
(severity > 9 and category = 5013) or (severity < 5 and
credibility > 8)
```

The where clause also supports the **arietime** variable, which overrides the time settings passed to the AQL CLI. The **arietime** variable must be used with the **between** keyword to specify the start and end time bounds of the query. All time constraints must be entered as either UNIX timestamps or formatted date or time

strings. The results returns are based on the time that the event or flow was written to the Ariel database.

You can only use the arietime variable once in a single query. Therefore, you can only query a continuous span of time in a single AQL command.

The logical operator for the arietime variable and the remainder of the where clause should be the and operator. We recommend that you use the arietime variable as the last constraint of the query and the and operator between the arietime variable and the rest of the where clause.

### Group by clause examples

You can use the group by clause to aggregate your data. Normally, data aggregation is combined with arithmetic functions on remaining columns to provide meaningful results of the aggregation.

#### Examples

To enter a query to investigate the IP addresses that sent more than 1 million bytes within all flows in a specific time frame, you must enter:

```
select sourceIP, SUM(sourceBytes) from flows where sourceBytes >
1000000 group by sourceIP
```

The output resembles:

| sourceIP       | SUM_sourceBytes |
|----------------|-----------------|
| 64.124.201.151 | 4282590.0       |
| 10.105.2.10    | 4902509.0       |
| 10.103.70.243  | 2802715.0       |
| 10.103.77.143  | 3313370.0       |
| 10.105.32.29   | 2467183.0       |
| 10.105.96.148  | 8325356.0       |
| 10.103.73.206  | 1629768.0       |

However, if you compare this information to a non-aggregated query, the output displays all the IP addresses that are unique:

```
select sourceIP, sourceBytes from flows where sourceBytes >
1000000
```

```

| sourceIP | sourceBytes |

| 64.124.201.151 | 1448629 |
| 10.105.2.10 | 2412426 |
| 10.103.70.243 | 1793095 |
| 10.103.77.143 | 1449148 |
| 10.105.32.29 | 1097523 |
| 10.105.96.148 | 4096834 |
| 64.124.201.151 | 2833961 |
| 10.105.2.10 | 2490083 |
| 10.103.73.206 | 1629768 |
| 10.103.70.243 | 1009620 |
| 10.105.32.29 | 1369660 |
| 10.103.77.143 | 1864222 |
| 10.105.96.148 | 4228522 |

```

In addition to the `sum` operator, the `min`, `max`, `avgnonzero` and `avg` arithmetic aggregation functions are also supported.

For example, to view the maximum number of events:

```
select max(eventCount) from events
```

To view the number of average events from a source IP:

```
select avg(eventCount) from events group by sourceIP
```

### Order by clause examples

You can add a single `order by` clause to the end of your AQL CLI query. Only one field can be used in the `order by` clause. Also, sorting can be switched between ascending or descending by appending the `asc` or `desc` keyword to the `order by` clause, respectively.

#### Examples

To query AQL to return results in descending order.

```
select sourceBytes, sourceIP from flows where sourceBytes >
1000000 order by sourceBytes
```

To display results in ascending order:

```
select sourceBytes, sourceIP from flows where sourceBytes >
1000000 order by sourceBytes asc
```

Combining the `group by` and the `order by` clauses in a single query can be used to create data, such as TopN lists, to determine the most abnormal events or the most bandwidth intensive IP addresses. For example, the following query displays the most traffic intensive IP address in descending order:

```
select sourceIP, sum(sourceBytes) from flows group by sourceIP
order by sum(sourceBytes) desc
```



**Count(\*) clause examples** You can use the count(\*) clause to count the number of records matching your query.

**Example**

To count all events with credibility equal to or greater than 9, type the following query:

```
select count(*) from events where credibility >= 9
```

**Distinct clause examples** You can use the distinct clause to select unique rows based on a column or a group of columns. This clause is similar to the group by clause, however, the distinct clause ensures ANSI SQL compatibility.

**Example**

To create a query to return results with distinct values, type the following query.

```
select distinct sourceIP, sourcePort from flows where
sourceBytes > 1000000
```

**Count (distinct ...) clause examples** You can use the standard SQL Count(Distinct ...) clause to obtain unique counts. Using the AQL CLI, you can only use one field.

**Examples**

To view all the IP addresses that are connected to a specific IP address over time:

```
select count(distinct sourceIP) from flows where destinationIP =
'192.168.61.71'
```

Or, if you want to view the number of unique source IP addresses communicating with a particular destination IP address:

```
select destinationIP, count(distinct sourceIP) from flows group
by destinationIP
```

Using UniqueCount also returns unique counts for items in the table:

```
select destinationIP, UniqueCount(sourceIP) from flows
```

**Note:** Using this clause could require additional system resources. Therefore, depending on the query, the amount of time to return results could vary.

**Materialize view clauses** The materialize view clause allows you to produce query results as a virtual table and run subsequent queries against the view. You can also specify the period of time that the materialized view is accessible.

**Note:** You cannot create a materialized view statement based on a previously created materialized view.

The syntax for creating materialized view includes:

```
materialize view NameOfView <time> as select <statement>
```

Where:

- **<time>** specifies the time you want the **materialized view** to be accessible.
- **<statement>** specifies a valid select statement.

### Examples

To create a materialized view containing flows with more than 1,000,000 source bytes, type the following command:

```
materialize view LargeSourceBytesFlows as select * from flows
where sourceBytes >1000000
```

To select from this view, enter the select statement as you would a valid table:

```
select * from LargeSourceBytesFlows
```

You can also use an aggregation statement on a materialized view:

```
select sourceIP, sum(sourceBytes) from LargeSourceBytesFlows
group by sourceIP
```

To create a **materialized view** to select from a record set with ambiguous column names, you can define aliases for all computed columns. For example:

```
materialize view MyView as select sourceIP, sum(sourceBytes) as
srcBytesSum from flows group by sourceIP
```

Then you can refer to the alias in a subsequent query against **MyView**:

```
select * from MyView orderBy srcBytesSum
```

**Like clause queries** You can search text fields using the standard like clause. You can also use the two wild card options supported by the AQL Query CLI: percentage (%) and underscore (\_). The percentage (%) wild card option matches zero or more characters while the underscore (\_) wild card option only matches one character.

### Examples

To match names such as Joe, Joanne, Joseph, or any other name beginning with Jo, type the following query:

```
select * from events where userName like 'jo%'
```

To match names beginning with Jo that are three characters long, such as, Joe or Jon, type the following query:

```
select * from events where userName like 'jo_'
```

You can enter the wild card option at any point in the command. For example:

```
select * from flows where sourcePayload like '%xyz'
```

```
select * from events where payload like '%xyz%'
```

```
select * from events where payload like '_yz'
```

**Boolean clause queries** Boolean clauses allow you to restrict your AQL queries to return data matching values you specify using true or false with relational operators. AQL queries support the following relational operators, equals (=) and does not equal (!=).

### Examples

To sort events that are unparsed, type the following query:

```
select * from events where payload = "false"
```

To sort flows to find a specific source IP address that has an offense, type the following query:

```
select * from events where sourceIP = '231.12.37.17' and
hasOffense = "true"
```

To display a list of source IP addresses and protocols that have an offense you can use BooleanTrueCount, and type the following query:

```
select sourceIP, protocol, BooleanTrueCount(hasOffense) from
events group by sourceIP
```

| sourceIP       | protocol     |
|----------------|--------------|
| 64.124.201.151 | TCP.tcp.ip   |
| 10.105.2.10    | UDP.udp.ip   |
| 10.103.70.243  | UDP.udp.ip   |
| 10.103.77.143  | UDP.udp.ip   |
| 10.105.32.29   | TCP.tcp.ip   |
| 10.105.96.148  | TCP.tcp.ip   |
| 64.124.201.151 | TCP.tcp.ip   |
| 10.105.2.10    | ICMP.icmp.ip |

## Identifying AQL fields

AQL queries to event or flow fields could return numeric codes making query responses or searches difficult. The shell script `idlist.sh` provides additional information from numeric AQL fields in the event and flow tables.

You can search the `idlist.sh` output using standard operators such as `fowardslash`. Search terms are case sensitive in the `idlist.sh` output.

### Procedure

**Step 1** Using SSH, log in to QRadar as the root user.

Username: **root**

Password **<password>**

**Step 2** Type the following command:

```
/opt/qradar/bin/idlist.sh <-e or -f> <field name>
```

**Step 3** Enter the appropriate parameters:

**Table 1-4** AQL field parameters

| Parameters | Description                                                                                                                                                                                                                                                                                      |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -f         | Specifies that the script is to return information from the flow table.<br>For example,<br><pre>/opt/qradar/bin/idlist.sh -f application</pre><br>The example query returns a list of application names and the numeric identifier associated with the application from the flows table.         |
| -e         | Specifies that the script is to identify a field from the events table.<br>For example:<br><pre>/opt/qradar/bin/idlist.sh -e category</pre><br>The example query returns a list of low level categories and the numeric identifier associated with the low level category from the events table. |

**Table 1-4** AQL field parameters (continued)

| Parameters   | Description                                                                                                                                                                           |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <field name> | Specifies the field name of the event or flow you want to identify. See <a href="#">Table 1-2</a> for a complete list of fields that can be identified using <code>idlist.sh</code> . |

## Querying for event or flow field names

To view a list of the most commonly used field names for a select statement, you can use the `describe` command.

The results returned by the `describe` command provides you with a list of field names, a description, and the type of data for the most commonly queried events and flows types. This is helpful for customers to view fields that can be queried without reviewing the documentation.

### Procedure

**Step 1** Using SSH, log in to QRadar as the root user.

Username: **<root>**

Password: **<password>**

**Step 2** Type the following command to start the AQL shell:

```
/opt/qradar/bin/arielClient
```

**Step 3** Type one of the following commands to view common event or flow fields:

- `describe flows`
- `describe events`

For a list of fields returned, you can review the following tables:

- Common flow table fields are listed in [Table 1-5](#).
- Common event table fields are listed in [Table 1-6](#)

**Table 1-5** Flow table fields listed in describe events

| Table | Field Name         | Description          | Data Type |
|-------|--------------------|----------------------|-----------|
| Flow  | application        | Application          | String    |
|       | destinationASN     | Destination ASN      | Numeric   |
|       | destinationBytes   | Destination Bytes    | Numeric   |
|       | destinationDSCP    | Destination DSCP     | Numeric   |
|       | destinationFlags   | Destination Flags    | Numeric   |
|       | destinationIP      | Destination IP       | String    |
|       | destinationIfIndex | Destination If Index | Numeric   |
|       | destinationNetwork | Destination Network  | String    |
|       | destinationPackets | Destination Packets  | Numeric   |
|       | destinationPayload | Destination Payload  | String    |

**Table 1-5** Flow table fields listed in describe events (continued)

| Table | Field Name            | Description                                                                                                                                                                                  | Data Type |
|-------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|       | destinationPort       | Destination Port                                                                                                                                                                             | Numeric   |
|       | destinationPrecedence | Destination Precedence                                                                                                                                                                       | Numeric   |
|       | destinationTOS        | Destination QOS                                                                                                                                                                              | Composite |
|       | firstPacketTime       | First Packet Time                                                                                                                                                                            | Numeric   |
|       | flowBias              | Flow Bias                                                                                                                                                                                    | String    |
|       | flowDirection         | Flow Direction: <ul style="list-style-type: none"> <li>• Local-to-Local (L2L)</li> <li>• Local-to-Remote (L2R)</li> <li>• Remote-to-Local (R2L)</li> <li>• Remote-to-Remote (R2R)</li> </ul> | String    |
|       | flowSource            | Flow Source                                                                                                                                                                                  | Numeric   |
|       | flowType              | Flow Type                                                                                                                                                                                    | Numeric   |
|       | geographic            | Matches Geographic Location                                                                                                                                                                  | String    |
|       | icmpType              | ICMP Type/Code                                                                                                                                                                               | Numeric   |
|       | interface             | Flow Interface                                                                                                                                                                               | String    |
|       | intervalId            | Interval ID                                                                                                                                                                                  | Numeric   |
|       | lastPacketTime        | Last Packet Time                                                                                                                                                                             | Numeric   |
|       | protocolId            | Protocol ID                                                                                                                                                                                  | Numeric   |
|       | sourceASN             | Source ASN                                                                                                                                                                                   | Numeric   |
|       | sourceBytes           | Source Bytes                                                                                                                                                                                 | Numeric   |
|       | sourceDSCP            | Source DSCP                                                                                                                                                                                  | Numeric   |
|       | sourceFlags           | Source Flags                                                                                                                                                                                 | Numeric   |
|       | sourceIP              | Source IP                                                                                                                                                                                    | String    |
|       | sourceIfIndex         | Source If Index                                                                                                                                                                              | Numeric   |
|       | sourceNetwork         | Source Network                                                                                                                                                                               | String    |
|       | sourcePackets         | Source Packets                                                                                                                                                                               | Numeric   |
|       | sourcePayload         | Source Payload                                                                                                                                                                               | String    |
|       | sourcePort            | Source Port                                                                                                                                                                                  | Numeric   |
|       | sourcePrecedence      | Source Precedence                                                                                                                                                                            | Numeric   |
|       | sourceTOS             | Source QOS                                                                                                                                                                                   | Composite |
|       | token                 | Associated With Offense                                                                                                                                                                      | Numeric   |

**Table 1-6** Event table fields listed in describe events

| Table                 | Field Name               | Description                                                                                                                                          | Data Type   |
|-----------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Event                 | category                 | Low Level Category                                                                                                                                   | Numeric     |
|                       | credibility              | Credibility                                                                                                                                          | Numeric     |
|                       | destinationIP            | Destination IP                                                                                                                                       | String      |
|                       | destinationMAC           | Destination MAC                                                                                                                                      | Hexadecimal |
|                       | destinationNetwork       | Destination Network                                                                                                                                  | String      |
|                       | destinationPort          | Destination Port                                                                                                                                     | Numeric     |
|                       | device                   | Log Source                                                                                                                                           | Numeric     |
|                       | deviceGroup              | Log Source Group                                                                                                                                     | Numeric     |
|                       | deviceType               | Log Source Type                                                                                                                                      | Numeric     |
|                       | duration                 | Duration                                                                                                                                             | Numeric     |
|                       | endTime                  | End Time                                                                                                                                             | Numeric     |
|                       | eventCount               | Event Count                                                                                                                                          | Numeric     |
|                       | eventDirection           | Event Direction:                                                                                                                                     | String      |
|                       |                          | <ul style="list-style-type: none"> <li>• Local-to-Local</li> <li>• Local-to-Remote</li> <li>• Remote-to-Local</li> <li>• Remote-to-Remote</li> </ul> |             |
|                       | hasIdentity              | Has Identity                                                                                                                                         | Boolean     |
|                       | hasOffense               | Associated With Offense                                                                                                                              | Boolean     |
|                       | highLevelCategory        | High Level Category                                                                                                                                  | Numeric     |
|                       | identityExtendedField    | Identity Extended Field                                                                                                                              | String      |
|                       | identityGroupName        | Identity Group Name                                                                                                                                  | String      |
|                       | identityHostName         | Identity Host Name                                                                                                                                   | String      |
|                       | identityIP               | Identity IP                                                                                                                                          | String      |
|                       | identityMAC              | Identity MAC                                                                                                                                         | Hexadecimal |
|                       | identityNetBiosName      | Identity NetBIOS Name                                                                                                                                | String      |
|                       | identityUserName         | Identity User Name                                                                                                                                   | String      |
|                       | magnitude                | Magnitude                                                                                                                                            | Numeric     |
|                       | payload                  | Payload                                                                                                                                              | String      |
|                       | postNatDestinationIP     | Post NAT Destination IP                                                                                                                              | String      |
|                       | postNatDestinationPort   | Post NAT Destination Port                                                                                                                            | Numeric     |
|                       | postNatSourceIP          | Post NAT Source IP                                                                                                                                   | String      |
|                       | postNatSourcePort        | Post NAT Source Port                                                                                                                                 | Numeric     |
|                       | preNatDestinationIP      | Pre NAT Destination IP                                                                                                                               | String      |
| preNatDestinationPort | Pre NAT Destination Port | Numeric                                                                                                                                              |             |

**Table 1-6** Event table fields listed in describe events (continued)

| <b>Table</b> | <b>Field Name</b> | <b>Description</b>            | <b>Data Type</b> |
|--------------|-------------------|-------------------------------|------------------|
|              | preNatSourceIP    | Pre NAT Source IP             | String           |
|              | preNatSourcePort  | Pre NAT Source Port           | Numeric          |
|              | protocol          | Protocol                      | String           |
|              | qid               | Event Name ID                 | Numeric          |
|              | relevance         | Relevance                     | Numeric          |
|              | severity          | Severity                      | Numeric          |
|              | sourceIP          | Source IP                     | String           |
|              | sourceMAC         | Source MAC                    | Hexadecimal      |
|              | sourceNetwork     | Source Network                | String           |
|              | sourcePort        | Source Port                   | Numeric          |
|              | startTime         | Start Time                    | Numeric          |
|              | token             | Token Associated With Offense | Numeric          |
|              | unparsed          | Event Is Unparsed             | Boolean          |
|              | userName          | Username                      | String           |



# A

## NOTICES AND TRADEMARKS

What's in this appendix:

- [Notices](#)
- [Trademarks](#)

This section describes some important notices, trademarks, and compliance information.

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