Reference Guide for Sample Python Client Scripts

Python Script Release (3.2.0)

Document Revision 1.0, July 2022

Preface

ABOUT THE REFERENCE GUIDE

This reference guide describes the functions used in the Sample Python Client Script files.

AUDIENCE

This document is targeted at the following types of users:

- Network Planners and Architects
- Traffic Engineers and Capacity Planners
- Network Operation and Maintenance Personnel
- IT Staff and Telco Product Managers

RELATED DOCUMENTATION

For more information on using Corvil, see the following documents:

- Corvil Analytics XML API Reference Guide
- Corvil Analytics Installation Guide
- Corvil Analytics User Guide
- Corvil Analytics Configuration Guide
- Corvil Analytics Administration Guide
- Corvil Analytics CLI Command Reference Guide
- Corvil Analytics Network Packet Capture Export Guide

CONVENTIONS USED IN THIS GUIDE

`Monospace` indicates variable names, directory paths, file names, and configuration command names.

`Monospace` indicates configuration command examples.

Boldface indicates names of user interface elements, such as menu options, toolbar button, dialog box and window field names, and commands and keywords that are entered literally as shown.

Command arguments are enclosed in angle brackets (< >).

Square brackets ([ ]) indicate optional elements.

Braces ({ }) group required choices, and vertical bars (|) separate alternative elements.

Braces and vertical bars within square brackets ([{ | }]) indicate a required choice within an optional element.

NOTE: Means reader take note. Notes contain helpful suggestions or references to material not covered in the manual.

CONTACTING CORVIL TECHNICAL SUPPORT

If you require further information or support, please contact Corvil Technical Support:

e-mail: support@corvil.com

USA/Canada Toll Free: 1800 673 3185

UK Freephone: 0800 066 4799

International: +353 1 859 1010

Website: www.pico.net/support

Sample Python Client Scripts

Overview of Sample Python Client Scripts

Pico provides Python script files which allow you to access many of the Corvil Analytics XML API functions. These Sample Python Client scripts are available for the version 2 Corvil Web Services API.

The Corvil Analytics XML API provides access to a large range of metrics, packet captures and message decodes, including historical data, live data, and interrogations of the packet and message stores. The Sample Python Client Scripts are designed to make it easy to script integrations with your Corvil data, and support most API functionality. Examples include:

- Packet capture retrieval, including support for retrieving compressed zip files
- Subscribing to live metrics with one second updates
- Retrieving specific orders, by filtering on client order IDs
- End of day retrieval of full order-flow decodes, or tick data
- Latency timeseries data with an arbitrary selection of percentiles
- Tabular summaries of metrics aggregated by Gateway, Market, Client Firm
- Lens data retrieval

Use the `CorvilApiStatsClient.py` script to retrieve API measurements including historical, live and Inspect Data results:

- "Sample Python Client Script for Retrieving Web Services API Measurements" on page 11

Use the `CorvilApiStreamingClient.py` script to retrieve packet capture (.pcap) and message results (.csv) via streamed processing of MTOM attachments:

- "Sample Python Client Script for Retrieving Packet Capture and Message CSV Results" on page 50

The scripts support Corvil Analytics Software Release 9.7.x and earlier releases (to 9.5.x).

NOTE: The sample Python scripts were tested using python version 3.6 but are supported against Python versions 3.0 and later. The suds directory contains a patched copy of the suds library - this must be kept in the same location as the scripts.

Quick Start Examples - Sample Python Client Scripts

`CorvilApiStreamingClient.py` and `CorvilApiStatsClient.py` can be used to retrieve API measurements including pcap, csv, historical, live and event inspection results. A few examples are shown below.

The examples below support Sample Python Client version 3.2.0 which can be downloaded from the Corvil Customer Center.

1. Finding the API name of a session

```
$./CorvilApiStreamingClient.py -z mp-list nyc-cne | grep PortABCD
Channel local-cne[any] -> [any] PortABCD:
channel//local-cne///PortABCD
rt-class//local-cne///PortABCD/class-default
```

Here the 'rt-class' line gives us the API name for retrieving data from the PortABCD session. The "-z" option uses HTTPS to communicate with the CNE, which is required, if using role-based access control, or HTTP has been disabled. Use "-n <user> -p <password>" unless you are using the default admin/admin username/password combination.

2. Retrieving a packet capture file

```
$./CorvilApiStreamingClient.py -z pcap nyc-cne rt-class//local-
cne///PortABCD/class-default "2021-09-09 08:30:00" "2021-09-09 08:35:00" >
market-open.pcap
```

This example retrieves a five minute packet capture file from the PortABCD session. Use the '-F zip' option to retrieve a zip-compressed pcap file instead.

3. Retrieving message decodes

```
./CorvilApiStreamingClient.py -z message-csv cne-mah-01 rt-class/CUST_
Bergman//London_CNE/CustomerGateway/Bergman/class-default "2021-09-15
08:30:00" "2021-09-15 08:35:00" > Bergman-market-open.csv
```

You can also use filters, such as "-t Message -f FIX:NewOrderSingle::" to retrieve only the NewOrderSingle messages, or "-t Message -f FIX::ClOrdID:7S0D44-1" to retrieve messages matching a specific field (such as FIX client order id in this example).

4. Retrieving historical metrics

```
./CorvilApiStatsClient.py -z -s "2021-09-16 09:00:00" -e "2021-09-16
10:00:00" stats cne-mah-01 rt-class//local-cne///PortABCD/class-default top-
conversations
```

The "stats" method accesses the historical database, with 5 minute granularity, providing fast results.

This example retrieves ‘top-conversations’ for the PortABCD session over a specified one hour period. There are many metrics available, including timeseries, summary and top-n data. You can retrieve multiple metrics in a single request.

5. Retrieving Inspect Data (message / packet drilldown) metrics

```
./CorvilApiStatsClient.py -z analytics probe645 rt-class/CUST_
Bergman//London_CNE/CustomerGateway/Bergman/class-default "2021-09-16
09:00:00" "2021-09-16 09:01:00" e2e-latency -q 50,90,99 -o 60
```

The ‘analytics’ method access the packet and message store, allowing access to very specific time periods. The example above retrieves multiple latency percentiles (median, 90th, 99th) over a one minute period, with 60 1-second buckets. For drilldown to shorter timescales, you can use nanosecond ‘epoch’ timestamps. On Linux, you can use the ‘date’ utility to calculate epoch timestamps with nanosecond resolution. For example: date -d “2021-09-16 12:00” +%s%N” produces the output “1631790000000000000”.

6. Retrieving Lens Data metrics

```
./CorvilApiStatsClient.py lens-data nyc-cne
"latency,response,max:descending" "latency,request,percentile,99" "packet-
count,request" -n admin -p admin -r "Last 48 hours" -g Client,Sessions -f
"session:isOneOf:s_client_gw9,s_client_gw8 Client:is:client9"
```

This example queries the last 48 hours for statistics: request latency for 99 percentile and packet-count in request. The returned results are grouped by client and sessions and filtered by sessions "s_client_gw9" and s_client_gw8 and Client "client9".

Sample Python Client Script for Retrieving Web Services API Measurements

`CorvilApiStatsClient.py` can be used to retrieve API measurements including historical, live and event inspection results.

The descriptions below support Sample Python Client version 3.2.0.

The sample script uses version 2 of the Corvil Web Services XML API.

The `CorvilApiStatsClient.py` script has the following general format:

```
CorvilApiStatsClient.py <command> <hostname | ip-address> <options>
```

where `command` is one of the following:

- `version` – print the version of the client
- `stats` – retrieve historical results
- `live-stats` – retrieve live results
- `summary` – retrieve summary results
- `cnes` – retrieve a list of CNEs defined on Corvil Management Center
- `message-protocols` – retrieve a list of installed message decoders
- `applications` – retrieve a list of system-defined and custom applications
- `message-protocols-details` – retrieve message types and fields for a specified message decoder
- `analytics` – retrieve event inspection results
- `clock-tracking` - retrieve clock tracking statistics from a CNE
- `lens-data` - retrieve Lens data results

`hostname | ip-address` is the name or IP address of the host to which the requests will be sent.

NOTE: Many of the API calls described below allow you to enter a time range option using the parameters `start-time` and `end-time`. If you enter these times in non-epoch format, for example, "YYYY-MM-DD HH:MM:SS", the time is taken as the local system time from where the request is run, and this is converted to and executed as UTC time on the CNE.

Along with command arguments such as the hostname, start/end times and measurement point name, you can also add some of the following command options to your command (refer to the command description for valid options for the command):

Option	Description
-n <username>	Specify username, default: admin
-p <password>	Specify password, default: admin
-x <cne>	Specify CNE for requests sent to CMC
-r <reporting-period>	Reporting period - One of: "1-hour", "12-hours", "24-hours", "48-hours", "7-days", "30-days" and "60-days". Default is "1-hour" (summary, stats) One of: "Last1 hour", "Last 12 hours", "Last 24 hours", "Last 48 hours", "Last 7 days", "Last 30 days" and "Last 60 days". Default is "Last 1 hour" (lens-data)
-s <start-time>	Start time of a time range (stats, lens-data). NOTE: The start time needs to be aligned to 5 minute boundary.
-e <end-time>	End time of a time range (stats, lens-data)
-f <fqn>	Fully qualified channel name to filter summary method results, e.g.: "channel//local-cne///PortA" (summary)
-m <mps>	Comma-separated list of additional measurements points (stats, live-stats)
-q <quantiles>	Comma-separated list of quantile to request, e.g.: 25,50 (stats, live-stats, analytics)
-u <update-period>	The time between updates, in seconds, default: 1 (live-stats)
-i <iterations>	Number of iterations, default: -1 which means infinite number of iterations (live-stats)
-o <points>	Number of points to request, default: 100 (analytics)
-z	Use HTTPS to access the CNE
-l <local-cne-name>	Local CNE name as configured by the "local-cne" command. Default value: local-cne (clock-tracking)
-t <thresholds>	Comma-separated list of clock deviation thresholds (in ns). Default value: 1000,5000,25000 (clock-tracking)
-T <timeout-seconds>	Request timeout in seconds, default value: 3600
-R <resolutionMinutes>	Resolution (in minutes) of the time series data points in the response
<statistic>	Specify one or more statistics to request (stats, live-stats, analytics, lens-data)
-g <grouping>	Specify grouping by sessions or tag types in a comma separated list (lens-data)
-f <filter-expression>	Single line filter expression, one of CQL, Wireshark, BPF or Message filter (lens-data)
-b <businessHours>	Specify the name of the business hours reporting period for which you want results (lens-data)

CHECKING THE SAMPLE CLIENT VERSION

Use `CorvilApiStatsClient.py version` to check the version of the client.

SUMMARY MEASUREMENTS

Use the following form of the script to retrieve summary results for sessions, based on the API `getSummary` function:

```
CorvilApiStatsClient.py summary <hostname | ip-address>
[-f <measurement-point-filter>]
[-r <reporting-period> ]
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

Summary Measurement Example

For example, using a Linux machine to retrieve summary results for the specified session on a CNE with IP address 192.168.6.250:

```
$./CorvilApiStatsClient.py -z summary 192.168.6.250 -f channel/FIX-
CLIENTS/local-cne//FIX-SERVERS/FIX-RTT
#summary request generated at 2021-01-08 15:28:22
#CNE: 192.168.6.250:5101
#Reporting period: 1-hour
#name,display name,configured capacity (kbps),effective capacity (kbps),total
bytes (B),average utilisation,network service indicator,measure
messages,monitoring mechanism,one second peak (messages per second),max
microburst (messages per second),packet microburst available,link size packet
delay,link size packet
length,recommendation,Cancels,Cancels/Orders,Orders,Quotes,Replaces
local-cne[FIX-CLIENTS] -> [FIX-SERVERS] FIX-RTT,channel/FIX-CLIENTS/local-
cne//FIX-SERVERS/FIX-
RTT,1000000,1000000,9499076,0,14.3,true,pnqm,59,220,false,,,none,,,,,
local-cne[FIX-CLIENTS] -> [FIX-SERVERS] FIX-RTT - class-default,rt-class/FIX-
CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,,1000000,9499076,0,14.3,true,pnqm,59,220,false,,,none,count/counts,ratio
/%,count/counts,count/counts,count/counts
```

NOTE: By default the script sends output to stdout. The script output can be redirected and saved, for example to a .csv file.

Summary Measurement Options

The following describes the options available with `CorvilApiStatsClient.py` when retrieving summary results:

`hostname | ip-address`

Specify the Corvil Management Center or CNE hostname or IPv4 address.

`-f measurement-point-filter`

[Optional]

Specify a fully-qualified session name to match a specific session, or a wildcard rule to match multiple session names.

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

defined from CNE A to CNE B and equivalent to the channel:

`channel src X from A to B dst Y label Z`

The measurement-point definition for the session is:

`channel/X/A/B/Y/Z`

> NOTE: Use channel rather then rt-class when specifying the fully-qualified session name in the measurement-point-filter.

Any of X, Y, B and Z may be blank if it's a single-CNE session or using "any" as a src/dst subnet match.

To match multiple sessions, use a wildcard (*) before and after the search text.

For example, use

–f '*X*' to return results for all sessions with a site, subnet-group, CNE name or label containing X.

NOTE: Using `CorvilApiStreamingClient.py -z mp-list` is a useful way to find the measurement point name for your session, which can then be cut and pasted into other API calls.

`-r reporting-period`

[Optional]

Specify one of the following predefined reporting periods:

- 1-hour
- 12-hours
- 24-hours
- 48-hours
- 7-days
- 30-days
- 60-days

Default: 1-hour

`-n username`

[Optional]

Specify the Corvil Management Center or CNE login name.

Default: admin

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p password`

[Optional]

Specify the Corvil Management Center or CNE login password.

Default: admin

`-x cne`

Corvil Management Center ONLY

[Optional]

If using Corvil Management Center, specify the name of a specific CNE from which to request results.

When this option is included, the response contains summary information for measurement points from the specified CNE only.

If this option is not included, the response contains summary information for all measurement points across multiple CNEs but using only data available locally on Corvil Management Center. The CNEs are not contacted directly.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-R`

[Optional]

Specify the resolution (in minutes) of the time series data points in the response (e.g. resolutionMinutes=5 results in each data point covering a 5 minute period). The value must be a multiple of 5 and a factor of 60. If omitted, the resolution is calculated automatically based on the time period size.

HISTORICAL MEASUREMENTS

Use the following form of the script to retrieve historical measurements, based on the API `getStats` function:

```
CorvilApiStatsClient.py stats <hostname | ip-address>
<measurement-point>
[-m <additional-measurement-points>]
<statistic>
[-q <quantile>]
[-r <reporting-period> | -s <start-time> -e <end-time> ]
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

NOTE: The CorvilApiStatsClient Python script comes bundled with a custom version of the suds client library to enable successful historical measurement retrieval.

Historical Measurement Example

The following example shows the sample script being used on a Linux machine to retrieve measurements for the specified session class on a CNE with IP address 192.168.6.250.

```
$ ./CorvilApiStatsClient.py -z stats 192.168.6.250 rt-class/FIX-CLIENTS/local-
cne//FIX-SERVERS/FIX-RTT/class-default e2e-channel-availability e2e-latency e2e-
delay-dist top-applications message-rate-microburst-1sec top-conversations-rate
#stats request generated at 2021-01-08 15:53:24
#CNE: 192.168.6.250:5101
#Reporting period: 1-hour

#distribution data
#measurement point,e2e-delay-dist min (ms),e2e-delay-dist mean (ms),e2e-delay-
dist max (ms),e2e-delay-dist 99.9 percentile (ms),e2e-delay-dist availability (%)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,0.003,731.24507,8249.99,6064.488579,100

#scalar value data
#measurement point,start time,start timestamp,end time,end timestamp,e2e-channel-
availability (%)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
14:50:00,1389192600000,2021-01-08 15:50:00,1389196200000,100.0

#summary results for time series data
#measurement point,e2e-latency min (ms),e2e-latency min count,e2e-latency mean
(ms),e2e-latency mean count,e2e-latency max (ms),e2e-latency max count,message-
rate-microburst-1sec min (messages per second),message-rate-microburst-1sec mean
(messages per second),message-rate-microburst-1sec max (messages per
second),message-rate-microburst-1sec total (messages per second),message-rate-
microburst-1sec availability (%),message-rate-microburst-1sec config changes (ms)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
```

```
default,0.003,31967,731.24507,31967,8249.99,31967,34.0,43.0,59.0,509.0,100,

#time series data
#measurement point,start time,start timestamp (ms),end time,end timestamp
(ms),e2e-latency min (ms),e2e-latency mean (ms),e2e-latency max (ms),message-
rate-microburst-1sec value (messages per second)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
14:50:00,1389192600000,2021-01-08
14:55:00,1389192900000,0.01,849.240745,6599.98,40.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
14:55:00,1389192900000,2021-01-08
15:00:00,1389193200000,47.539,531.248907,4299.956,35.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:00:00,1389193200000,2021-01-08
15:05:00,1389193500000,0.007,435.818642,2849.702,39.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:05:00,1389193500000,2021-01-08
15:10:00,1389193800000,18.15,945.422209,8249.99,59.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:10:00,1389193800000,2021-01-08
15:15:00,1389194100000,0.003,1026.874706,6699.883,56.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:15:00,1389194100000,2021-01-08
15:20:00,1389194400000,0.011,732.869556,4050.018,44.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:20:00,1389194400000,2021-01-08
15:25:00,1389194700000,0.945,600.191587,4400.062,37.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:25:00,1389194700000,2021-01-08
15:30:00,1389195000000,0.005,782.368919,6600.973,40.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:30:00,1389195000000,2021-01-08
15:35:00,1389195300000,8.46,646.576433,4300.009,34.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:35:00,1389195300000,2021-01-08
15:40:00,1389195600000,0.004,411.15284,2462.678,35.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:40:00,1389195600000,2021-01-08
15:45:00,1389195900000,40.503,596.524566,3899.993,43.0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-08
15:45:00,1389195900000,2021-01-08
15:50:00,1389196200000,0.006,728.894878,5300.018,47.0

#summary results for topn data
#measurement point,type,totalBytes (bytes),totalPackets (packets),totalFlows
(flows),maxError,availability (%),periodEndsAt (ms)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
applications,11318217,56376,0,0,100,1389195900000

#topn data
#measurement point,type,key,byteCount (bytes),byteCountPercentage (%),packetCount
(packets),flowCount (flows),bitRate (kbps),application
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
applications,FIX,11318217,100.0,56376,0,25,
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
```

```
applications,Others,0,0.0,-2,-2,-2,

#summary results for time series topn data
#measurement point,top-conversations-rate availability (%),top-conversations-rate
config changes (ms)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,100,

#time series topn data
#measurement point,type,key,start time,start timestamp,end time,end timestamp,bit
rate (bps),packet rate (pps)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
conversations-rate,TCP 192.168.122.158:5274 -> 192.168.186.20:23122,2021-01-08
14:45:00,1389192300000,2021-01-08 15:00:00,1389193200000,14642,9676
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
conversations-rate,TCP 192.168.122.158:5274 -> 192.168.186.20:23122,2021-01-08
15:00:00,1389193200000,2021-01-08 15:15:00,1389194100000,24908,14428
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
conversations-rate,TCP 192.168.122.158:5274 -> 192.168.186.20:23122,2021-01-08
15:15:00,1389194100000,2021-01-08 15:30:00,1389195000000,32608,19066
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
conversations-rate,TCP 192.168.122.158:5274 -> 192.168.186.20:23122,2021-01-08
15:30:00,1389195000000,2021-01-08 15:45:00,1389195900000,28448,19471
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
conversations-rate,Others,2021-01-08 14:45:00,1389192300000,2021-01-08
15:00:00,1389193200000,0,0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
conversations-rate,Others,2021-01-08 15:00:00,1389193200000,2021-01-08
15:15:00,1389194100000,0,0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
conversations-rate,Others,2021-01-08 15:15:00,1389194100000,2021-01-08
15:30:00,1389195000000,0,0
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,top-
conversations-rate,Others,2021-01-08 15:30:00,1389195000000,2021-01-08
15:45:00,1389195900000,0,0
```

NOTE: By default the script sends output to stdout. The script output can be redirected and saved, for example to a .csv file.

Historical Measurement Options

The following describes the options available with `CorvilApiStatsClient.py` when retrieving historical results:

`hostname | ip-address`

Specify the Corvil Management Center or CNE hostname or IPv4 address.

```
measurement-point
-m additional-measurement-points
```

Specify a fully-qualified session or class name.

Additional measurement points may be specified using the `-m` option followed by a comma-separated list.

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

defined from CNE A to CNE B and equivalent to the channel:

```
channel src X from A to B dst Y label Z
```

The measurement-point definition for a session is:

```
channel/X/A/B/Y/Z
```

and the definition for a class contains:

```
rt-class/X/A/B/Y/Z/<class>
```

where <class> is "class-default" in single-class configurations and the configured name of a class in multiclass configurations.

Any of X,Y,B and Z may be blank if it's a single-CNE session, you haven't assigned a label, or are using "any" as a src/dst subnet match.

If requesting results from multiple CNEs using Corvil Management Center, the name of a CNE configured on Corvil Management Center can precede the measurement point name, separated by a colon (:).

For example:

```
nyc-cne:channel/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT
```

Alternatively, if using Corvil Management Center to request results from a single CNE, specify the CNE name using the –x <cne> option.

`statistic`

Specify one or more statistics to request. Multiple statistics may be requested with a space between each statistic name.

For example:

```
e2e-latency e2e-loss
```

For the list of supported statistics, refer to "getStats Request" in the Corvil Analytics XML API Reference Guide.

Configurable statistics are specified with the prefix conf:

For example:

```
conf:Cancels conf:Orders
```

Event data can be requested for the following system-defined statistics:

- e2e-latency
- e2e-loss
- message-sequence-gap
- oos-packet-count
- left-roundtrip-time
- right-roundtrip-time
- tcp-zero-window-packet-count

`-q quantile`

[Optional]

Specify one or more percentile values to request.

For example: 25,75,98

Reporting period

Choose the collection period that you want to retrieve the data for. You can enter either a time range using the start/end time (-s and -e) attributes OR one of the predefined reporting periods (-r).

`-r reporting-period`

[Optional]

Specify one of the following predefined reporting periods:

- 1-hour
- 12-hours
- 24-hours
- 48-hours
- 7-days

- 30-days
- 60-days

Default: 1-hour

`-s start-time`

[Optional]

If using this attribute, you must also include the -e attribute.

Specify the start of the time range in seconds or nanoseconds since the Unix epoch

OR

"YYYY-MM-DD HH:MM:SS"

For example:

1591795200000000000 (in nanoseconds)

OR

"2020-06-10 13:20:00"

`end-time`

Specify the end of the time range in seconds or nanoseconds since the Unix epoch

OR

"YYYY-MM-DD HH:MM:SS"

For example:

1623331200000000000 (in nanoseconds)

OR

"2021-06-10 13:20:00"

`-n username`

[Optional]

Specify the Corvil Management Center or CNE login name.

Default: admin

Access to Corvil Web Services is available to the admin and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p password`

[Optional]

Specify the Corvil Management Center or CNE login password.

Default: admin

`-x cne`

Corvil Management Center ONLY

[Optional]

If using Corvil Management Center, specify the name of a specific CNE from which to request results. Use this option when requesting results from a single CNE.

NOTE: If you want to request data from multiple CNEs, remove this option. Instead, include the appropriate CNE name with the measurement-point attribute.

When using Corvil Management Center, at least one CNE name identifier must be included, either here or with a measurement-point, otherwise an error is returned.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-R`

[Optional]

Specify the resolution (in minutes) of the time series data points in the response (e.g. resolutionMinutes=5 results in each data point covering a 5 minute period). The value must be a multiple of 5 and a factor of 60. If omitted, the resolution is calculated automatically based on the time period size.

LIVE MEASUREMENTS

Use the following form of the script to retrieve live measurements, based on the API `getLiveStats` function:

```
CorvilApiStatsClient.py live-stats <hostname | ip-address>
<measurement-point>
[-m <additional-measurement-points>]
<statistic>
[-u <update-period>]
[-i <iterations>]
[-q <quantile>]
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

Live Measurement Example

For example, using a Linux machine to retrieve latency measurements for the specified class on a CNE with IP address 192.168.6.250:

```
$./CorvilApiStatsClient.py -z live-stats 192.168.6.250 rt-class/FIX-
CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default e2e-latency -i 10
#live-stats request generated at 2021-01-08 14:08:56
#CNE: 192.168.6.250:5101
#mp name,start time,start timestamp (s),end time,end timestamp (s),e2e-latency
min (ms),e2e-latency mean (ms),e2e-latency max (ms),e2e-latency count (ms),e2e-
latency percentile (ms)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:16,1389276616,2021-01-09 14:10:16,1389276616,-,-,-,-,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:18,1389276618,2021-01-09 14:10:19,1389276619,-,-,-,0,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:20,1389276620,2021-01-09 14:10:21,1389276621,-,-,-,0,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:23,1389276623,2021-01-09 14:10:24,1389276624,-,-,-,0,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
```

```
14:10:25,1389276625,2021-01-09 14:10:26,1389276626,-,-,-,0,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:27,1389276627,2021-01-09 14:10:28,1389276628,-,-,-,0,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:30,1389276630,2021-01-09 14:10:31,1389276631,-,-,-,0,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:32,1389276632,2021-01-09 14:10:33,1389276633,-,-,-,0,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:34,1389276634,2021-01-09 14:10:35,1389276635,-,-,-,0,-
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default,2021-01-09
14:10:36,1389276636,2021-01-09 14:10:37,1389276637,-,-,-,0,-
```

NOTE: By default the script sends output to stdout. The script output can be redirected and saved, for example to a .csv file.

Live Measurement Options

The following describes the options available with `CorvilApiStatsClient.py` when retrieving live results:

`hostname | ip-address`

Specify the Corvil Management Center or CNE hostname or IPv4 address.

```
measurement-point

-m additional-measurement-points
```

Specify a fully-qualified channel or class name.

Additional measurement points may be specified using the –m option followed by a comma-separated list.

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

the definition for a class contains

`rt-class/X/A/B/Y/Z/<class>`

where <class> is "class-default" in single-class configurations and the configured name of a class in multiclass configurations.

Or, defined from CNE A to CNE B and equivalent to the channel:

```
channel src X from A to B dst Y label Z
```

The measurement-point definition for a session is:

```
channel/X/A/B/Y/Z
```

Any of X,Y,CNE-B and Z may be blank if it's a single-CNE channel, you haven't assigned a label, or are using "any" as a src/dst subnet match.

> Note: In most cases, you should use the "rt-class" name when using ‘‘live-stats".

`statistic`

Specify one or more statistics to request. Multiple statistics may be requested with a space between each statistic name.

For example:

```
e2e-latency e2e-loss
```

For the list of supported statistics, refer to "getLiveStats Request" in the Corvil Analytics XML API Reference Guide.

Configurable statistics are specified with the prefix conf:

For example:

```
conf:Cancels conf:Orders
```

`-q quantile`

[Optional]

Specify one or more percentile values to request.

For example: 25,75,98

`-u update-period`

[Optional]

Specify the rate (in seconds) at which live view results are updated. The default update period is one second. So retrieved results are for each second since the last request.

By default the API provides one-second snapshots of each statistic and these are equivalent to what is shown in the CNE LiveView. If you adjust the update period out to, for example, five seconds, you get a mean value for that five-second period.

`-i iterations`

[Optional]

Specify the number of iterations after which the script stops. If a specific number of iterations is not specified, then the script will continue to run until stopped by other means.

`-n username`

[Optional]

Specify the Corvil Management Center or CNE login name.

Default: admin

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p password`

[Optional]

Specify the Corvil Management Center or CNE login password.

Default: admin

`-x cne`

Corvil Management Center ONLY

[Optional]

If using Corvil Management Center, specify the name of a specific CNE from which to request results.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-R`

[Optional]

Specify the resolution (in minutes) of the time series data points in the response (e.g. resolutionMinutes=5 results in each data point covering a 5 minute period). The value must be a multiple of 5 and a factor of 60. If omitted, the resolution is calculated automatically based on the time period size.

EVENT INSPECTION MEASUREMENTS

Use the following form of the script to retrieve event inspection measurements, based on the API `getAnalytics` function:

```
CorvilApiStatsClient.py analytics <hostname | ip-address>
<measurement-point>
<start-time>
<end-time>
<statistic>
[-q <quantile>]
[-o <points>]
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

Event Inspection Measurement Example

For example, using a Linux machine to retrieve event inspection latency measurements for the specified channel class and time range on a CNE with IP address 192.168.6.250:

```
$ ./CorvilApiStatsClient.py -z analytics 192.168.6.250 rt-class/FIX-
CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default "2021-01-08 14:10:00 to
2021-01-08 14:12:00" e2e-latency -o 10
#analytics request generated at 2021-01-09 18:06:24
#CNE: 192.168.6.250:5101
#Time period: 2021-01-08 14:10:00 to 2021-01-08 14:12:00

#summary results for analytics data
#measurement point,e2e-latency min (ms),e2e-latency max (ms)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49295000,4150039000

#analytics data
#measurement point,e2e-latency min (ms),e2e-latency mean (ms),e2e-latency max
(ms),e2e-latency percentile (ms)
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.891,515.949023,1999.939,1999.939
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.865,464.698378,1449.945,1449.945
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.903,869.964082,4050.058,4050.058
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.975,867.776082,3298.927,3298.927
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.838,454.66413,1900.009,1900.009
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.953,449.430675,1700.076,1700.076
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.295,1114.47162,4149.731,4149.731
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.963,913.466555,4099.984,4099.984
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.967,950.727645,3649.943,3649.943
rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-
default,49.944,1192.018579,4150.039,4150.039
```

NOTE: By default the script sends output to stdout. The script output can be redirected and saved, for example to a .csv file.

Event Inspection Measurement Options

The following describes the options available with `CorvilApiStatsClient.py` when retrieving event inspection results:

`hostname | ip-address`

Specify the Corvil Management Center or CNE hostname or IPv4 address.

`measurement-point`

Specify a fully-qualified channel or class name.

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

defined from CNE A to CNE B and equivalent to the channel:

`channel src X from A to B dst Y label Z`

The measurement-point definition for a session is:

`channel/X/A/B/Y/Z`

and the definition for a class contains

`rt-class/X/A/B/Y/Z/<class>`

where <class> is "class-default" in single-class configurations and the configured name of a class in multiclass configurations.

Any of X,Y,B and Z may be blank if it's a single-CNE channel, you haven't assigned a label, or are using "any" as a src/dst subnet match.

`start-time`

Specify the start of the time range in seconds or nanoseconds since the Unix epoch

OR

"YYYY-MM-DD HH:MM:SS"

For example:

1591795200 (in seconds)

OR

1591795200000000000 (in nanoseconds)

OR

"2020-06-10 13:20:00"

`end-time`

Specify the end of the time range in seconds or nanoseconds since the Unix epoch

OR

"YYYY-MM-DD HH:MM:SS"

For example:

1623331200 (in seconds)

OR

1623331200000000000 (in nanoseconds)

OR

"2021-06-10 13:20:00"

`statistic`

Specify one or more statistics to request. Multiple statistics may be requested with a space between each statistic name.

For example:

```
packet-count packet-rate
```

For the list of supported statistics, refer to the section "getStats Request Supported Statistics" in the Corvil Analytics XML API Reference Guide.

Configurable statistics are specified with the prefix `conf:`

For example:

```
conf:Cancels conf:Orders
```

`-q quantile`

[Optional]

Specify one or more percentile values to request.

For example:25,75,98

`-o points`

[Optional]

Specifies the number of values to return for the analytics command.

The analytics request divides the selected time period into bins of equal size and returns one value for each bin. The points attribute specifies the number of these bins.

Range: 1 – 600

Default: 100

`-n username`

[Optional]

Specify the Corvil Management Center or CNE login name.

Default: admin

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p password`

[Optional]

Specify the Corvil Management Center or CNE login password.

Default: admin

`-x cne`

Corvil Management Center ONLY

[Optional]

If using Corvil Management Center, specify the name of a specific CNE from which to request results.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-R`

[Optional]

Specify the resolution (in minutes) of the time series data points in the response (e.g. resolutionMinutes=5 results in each data point covering a 5 minute period). The value must be a multiple of 5 and a factor of 60. If omitted, the resolution is calculated automatically based on the time period size.

UTC CLOCK SYNC REPORTING DATA

To collect and store the status of clock synchronization sources in your CNE and capture the clock adjustments the CNE is making to keep itself synchronized to UTC, a predefined session called "ClockTracking" is used. To request the information collected by this session, a special command `clock-tracking` is used.

Use the following form of the script to retrieve clock event measurements, based on the API `getAnalytics` function:

```
CorvilApiStatsClient.py clock-tracking <hostname | ip-address>
<start-time>
<end-time>
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-l <local-cne-name>]
[-t <thresholds>]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

UTC Clock Sync Reporting Example

For example, using a Linux machine to retrieve clock event measurements for the CNE named nyc-cne for the specified times:

```
$ ./CorvilApiStatsClient.py -z clock-tracking nyc-cne "2021-03-12 00:00:00"
"2021-04-12 00:00:00" -l nyc-cne -T 36000
#client version: 191956
#clock-tracking request generated at 2021-04-13 10:14:24
#CNE: nyc-cne:5101
#Time period: 2021-03-12 00:00:00 to 2021-04-12 00:00:00

# clock name,clock type,availability,max deviation,sample count/time,samples
>1000ns,samples >5000ns,samples >25000ns
PPS,Primary,100.0,10,2673863,0,0,0
PTP,Secondary,100.0,217,2673722548800306,0,0,0
```

NOTE: By default the script sends output to stdout. The script output can be redirected and saved, for example to a .csv file.

UTC Clock Sync Reporting Options

The following describes the options available with `CorvilApiStatsClient.py` when retrieving clock event results:

`hostname | ip-address`

Specify the Corvil Management Center or CNE hostname or IPv4 address.

`start-time`

Specify the start of the time range in seconds or nanoseconds since the Unix epoch

OR

"YYYY-MM-DD HH:MM:SS"

For example:

1591795200 (in seconds)

OR

1591795200000000000 (in nanoseconds)

OR

"2020-06-10 13:20:00"

`end-time`

Specify the end of the time range in seconds or nanoseconds since the Unix epoch [1970-01-01T00:00:00Z]

OR

"YYYY-MM-DD HH:MM:SS"

For example:

1623331200 (in seconds)

OR

1623331200000000000 (in nanoseconds)

OR

"2021-06-10 13:20:00"

`-n username`

[Optional]

Specify the Corvil Management Center or CNE login name.

Default: admin

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p password`

[Optional]

Specify the Corvil Management Center or CNE login password.

Default: admin

`-x cne`

Corvil Management Center ONLY

[Optional]

If using Corvil Management Center, specify the name of a specific CNE from which to request results.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-l`

[Optional]

Local CNE name as configured by the `local-cne` command.

Default: local-cne

`-t`

[Optional]

Comma-separated list of clock deviation thresholds (in ns).

Default: 1000,5000,25000

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-R`

[Optional]

Specify the resolution (in minutes) of the time series data points in the response (e.g. resolutionMinutes=5 results in each data point covering a 5 minute period). The value must be a multiple of 5 and a factor of 60. If omitted, the resolution is calculated automatically based on the time period size.

MESSAGE DECODER INFORMATION

Use the following form of the script to retrieve a list of installed message decoders, based on the API `getMessageProtocols` function:

```
CorvilApiStatsClient.py message-protocols <hostname | ip-address>
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

Use the following form of the script to retrieve a list of message types and fields for a message decoder, based on the API `getMessageProtocolDetails` function:

```
CorvilApiStatsClient.py message-protocols-details <hostname | ip-address>
<message-decoder-name>
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

Message Decoder Example

For example, using a Linux machine to retrieve message decoder information from a CNE with IP address 192.168.6.250:

```
$./CorvilApiStatsClient.py -z message-protocols 192.168.6.250
#message-protocols request generated at 2021-01-08 18:09:48
#CNE: 192.168.6.250:5101

#protocol,description
Corvil-Correlation-Mapping,Corvil Correlation Mapping decoder
Corvil-LatencyFeed,Decodes Corvil-LatencyFeed
FIX,Handles the FIX traffic (OrderTracking)

$./CorvilApiStatsClient.py message-protocols-details 192.168.6.250 FIX
#message-protocols-details request generated at 2021-01-08 18:13:09
#CNE: 192.168.6.250:5101
#Reporting period: 1-hour

#protocol,description
FIX,Handles the FIX traffic (OrderTracking)
#message types
AdjustedPositionReport
Advertisement
AllocationInstruction
AllocationInstructionAck
```

```
AllocationInstructionAlert
AllocationReport
AllocationReportAck
ApplicationMessageReport
ApplicationMessageRequest
ApplicationMessageRequestAck
AssignmentReport
BidRequest
BidResponse
.
```

Message Decoder Options

The following table describes the options available with `CorvilApiStatsClient.py` when retrieving message decoder information:

`hostname | ip-address`

Specify the Corvil Management Center or CNE hostname or IPv4 address.

`<message-decoder-name>`

When using message-protocols-details, specify the name of a message decoder for which to return message types and fields.

`-n username`

[Optional]

Specify the Corvil Management Center or CNE login name.

Default: admin

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p password`

[Optional]

Specify the Corvil Management Center or CNE login password.

Default: admin

`-x cne`

Corvil Management Center ONLY

[Optional]

If using Corvil Management Center, specify the name of a specific CNE from which to request results.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-R`

[Optional]

Specify the resolution (in minutes) of the time series data points in the response (e.g. resolutionMinutes=5 results in each data point covering a 5 minute period). The value must be a multiple of 5 and a factor of 60. If omitted, the resolution is calculated automatically based on the time period size.

CNE INFORMATION FROM CORVIL MANAGEMENT CENTER

Use the following form of the script to retrieve a list of CNEs defined on Corvil Management Center, based on the API `getCnes` function:

```
CorvilApiStatsClient.py cnes <hostname | ip-address>
[-n <username>]
[-p <password>]
```

```
[-z]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

CNE Information from Corvil Management Center Example

For example, using a Linux machine to retrieve the list of CNEs defined on Corvil Management Center with IP address 192.168.8.20:

```
$./CorvilApiStatsClient.py -z cnes 192.168.8.20
#cnes request generated at 2021-01-08 18:16:45
#CMC: 192.168.8.20:5101

#cne,ip address
ldn-cne,192.168.1.221
dublin-cne,192.168.12.40
```

CNE Information Options

The following describes the options available with `CorvilApiStatsClient.py` when retrieving details of CNEs defined on Corvil Management Center:

`hostname | ip-address`

Specify the Corvil Management Center hostname or IP address.

`-n username`

[Optional]

Specify the Corvil Management Center login name.

Default: admin

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is ‘admin’. The default monitor user password on the CNE is ‘monitor’.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p password`

[Optional]

Specify the Corvil Management Center login password.

Default: admin

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-R`

[Optional]

Specify the resolution (in minutes) of the time series data points in the response (e.g. resolutionMinutes=5 results in each data point covering a 5 minute period). The value must be a multiple of 5 and a factor of 60. If omitted, the resolution is calculated automatically based on the time period size.

APPLICATION INFORMATION

Use the following form of the script to retrieve a list of available applications (both user-defined custom applications and system-defined applications that are part of the application, based on the API `getApplications` function:

```
CorvilApiStatsClient.py applications <hostname | ip-address>
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-R <resolutionMinutes>]
```

Application Information Example

For example, using a Linux machine to retrieve application information from a CNE with IP address 192.168.6.250:

```
$./CorvilApiStatsClient.py -z applications 192.168.6.250
#applications request generated at 2021-01-08 10:18:53
#CNE: 192.168.6.250:5101

#application,type
.NET Remoting (undecoded),drdl
9P (undecoded),drdl
AARP,custom
Abacast (undecoded),drdl
Abacast transfer (undecoded),drdl
Adobe Acrobat HTTP (undecoded),drdl
Adobe Update Manager (undecoded),drdl
Agresso (undecoded),drdl
Alexa toolbar (undecoded),drdl
Allot Netenforcer (undecoded),drdl
Amanda (undecoded),drdl
Amanda transfer (undecoded),drdl
AmericasTradingGRoup-FIX-test,custom
Apple Filing Protocol (undecoded),drdl
Apple Software Update (undecoded),drdl
appleJuice (undecoded),drdl
AppleTalk,custom
APT (undecoded),drdl
ArcaVir Antivirus update (undecoded),drdl
Ariel (undecoded),drdl
Ariel transfer (undecoded),drdl
ARP,custom
.
.
.
```

Application Information Options

The following describes the options available with `CorvilApiStatsClient.py` when retrieving application information:

`hostname | ip-address`

Specify the CNE or Corvil Management Center hostname or IPv4 address.

`-n username`

[Optional]

Specify the Corvil Management Center or CNE login name.

Default: admin

Access to Corvil Web Services is available to the admin and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p password`

[Optional]

Specify the Corvil Management Center or CNE login password.

Default: admin

`-x cne`

Corvil Management Center ONLY

[Optional]

If using Corvil Management Center, specify the name of a specific CNE from which to request results.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-R`

[Optional]

Specify the resolution (in minutes) of the time series data points in the response (e.g. resolutionMinutes=5 results in each data point covering a 5 minute period). The value must be a multiple of 5 and a factor of 60. If omitted, the resolution is calculated automatically based on the time period size.

RETRIEVING LENS DATA RESULTS

To retrieve Corvil Lens session and statistics results, and output in CSV format, the example script has the following format:

```
CorvilApiStatsClient.py lens-data <hostname | ip-address> "<statistic>"
"<statistic>" ..

[-r <reporting-period> [-b <businessHours>] | -s <start-time> -e <end-time> [-b
<businessHours>]]

[-n <username>]
[-p <password>]
[-g <grouping>]
[-z]
[-b <businessHours> or --businessHours <businessHours>]
[-f <filter> or --filter <filter>]
```

Retrieving Lens Data Results Example

In the following Linux-based example, Corvil Lens Data results for specific statistics are retrieved and saved from the CNE named nyc-cne for the specified Lens reporting period:

```
$./CorvilApiStatsClient.py lens-data nyc-cne -r "Last 1 hour"
"conf:Request,request" "packet-count,request" "packet-count,response"
"latency,response,percentile,99.9"
```

Lens Data Options

The following describes the parameters and options available with the `CorvilApiStatsClient.py` script when retrieving Lens Data results:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`-r <reporting-period>`

Specify the name of the Corvil Lens reporting period for which you want results.

The default list of Corvil Lens reporting periods are as follows:

- “Last 1 hour”
- “Last 12 hours”
- “Last 24 hours”
- “Last 48 hours”
- “Last 7 days”
- “Last 30 days”
- “Last 60 days”

Any of the default reporting periods on a given CNE or Corvil Management Center may be disabled and unavailable when defining requests.

You can also specify the name of a user-defined Corvil Lens reporting period, if configured.

For more information on disabling reporting periods and defining custom reporting periods, refer to "Configuring UI Reporting Periods" in the Corvil Analytics User Guide.

`-s <start-time>`

[Optional]

If using this attribute, you must also include the -e attribute.

Specify the start of the time range in seconds or nanoseconds since the Unix epoch

OR

"YYYY-MM-DD HH:MM:SS"

For example:

1384870200000000000 (in nanoseconds)

OR

"2013-11-19 14:10:00"

`-e <end-time>`

[Optional]

Use this attribute with the -s attribute.

Specify the end of the time range in seconds or nanoseconds since the Unix epoch

OR

"YYYY-MM-DD HH:MM:SS"

For example:

1384870320000000000 (in nanoseconds)

OR

"2013-11-19 14:12:00"

`-b <businessHours>`

Specify the name of the business hours reporting period for which you want results.

You can enter the “Business Day” reporting period provided in the first-day-of-service configuration or a custom-defined business hours period (define using the `reporting-period` CLI command).

You can add `businessHours` as an option if you are exporting results for a reporting-period or start-time/end-time.

Note that if you use `businessHours` on its own (without a reporting-period or start-time/end-time), it is used with the default reporting period of "Last1Hour".

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is ‘admin’. The default monitor user password on the CNE is ‘monitor’.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`<statistic>`

Specify one or more statistics to request. Multiple statistics may be requested with a space between each statistic name. Enclose each statistic in double quotes.

If no statistics are specified, then all statistics are returned.

Use the format `stat,direction,aspect,percentile` , where aspect and percentile are optional.

Note that if you only specify a statistic and direction, then all aspects for that statistic will be returned.

For example:

```
"packet-count,request"
"latency,request,percentile,99.9"
```

If requesting a configurable statistic, prefix the statistic name with `conf:`.

For example:

```
"conf:orders"
"conf:MOS LQK,request,min"
```

If sorting is required, you can append the sort direction to the statistic. Sorting can be done on only one statistic.

For example

```
"latency,request,percentile,99.9:ascending"
```

Note that if a statistic name contains a space or comma, use `\` to escape it.

`-g <grouping>`

Enter grouping tag types in a comma separated list.

If you include the session grouping (keyword "Sessions") and it must be the last grouping specified.

If you don't enter a grouping, it defaults to session grouping.

For example

```
-g Client,Gateway,Sessions
```

`-z`

[Optional]

Use HTTPS to access the CNE.

`-f <filter>`

[Optional]

Specify the filter expression for the CSV results. You can filter by a tag or session value. Multiple filters may be requested with a space between each filter, with the filters being 'AND'ed. The full filter expression must be enclosed in double quotes.

NOTE: The session filtering options below mirror the options available in the CNE/CMC dashboards. Refer to "Data Filter" in the Corvil Analytics User Guide for more information.

Use the following format when filtering by sessions:

`session:operator:value:cneName`

where

`session` is a keyword indicating that you are filtering by session.

`value` is the name of a session defined on the CNE. You must use the session name visible on the UI and not the fully qualified session name. You can enter a comma separated list of values here if `isOneOf` or `isNotOneOf` filter is used.

`cneName` - If requesting data via a CMC, you can specify a `cneName` after the session name if you only want results returned for the session on that CNE. If you don't specify a CNE here, the returned session data is aggregated across all CNEs for that CMC.

`operator` can be

`is, isNot, isOneOf, isNotOneOf, isPresent, isNotPresent, contains, doesNotContain`

NOTE: For the 'isPresent' and 'isNotPresent' operators, a trailing ':' is required.

Use the following format when filtering by tag names:

`tag name:operator:value`

where

`tag name` is a tag defined in the CMC, for example, Venue, Client.

`value` is the tag value to filter by

`operator` can be

`is, isNot, isOneOf, isNotOneOf, isPresent, isNotPresent, contains, doesNotContain`

Below are some examples of single and mulitple filters:

Filtering on a single session in a specified CNE:

```
-f "session:isOneOf:s_client_gw1:cne1"
```

Filtering on multiple sessions:

```
-f "session:isOneOf:s_client_gw1,s_client_gw7"
```

Filtering on a single tag:

```
-f "Client:is:client9"
```

Combined filters (note that these are additive):

```
-f "Client:is:client9 session:isOneOf:s_client_gw9,s_client_gw8 "
-f session:isPresent:s_client_gw9 Market:isPresent:
```

Below is an example of the CSV output from a lens-data request.

```
#client version: Corvil_CNE-v9.7.0.17917-GA.272704
#lens-data request generated at 2022-05-18 17:46:40
#CNE: cne123:5101
#Reporting period: Last 48 hours
#Grouping:Client,Gateway
Client,Gateway,Session,-> Latency min (ns),-> Latency mean (ns),-> Latency 99.9
pctl (ns),-> Latency max (ns)
client1,,,,16000,205245,895000,895000
client1,client_gw1,,,,,,
client1,client_gw1,s2_client_gw__1_1,,,,,
client1,client_gw1,s3_client_gw__1_1,,,,,
client1,client_gw1,s_client_gw_1_1,,,,,
client1,client_gw1,s_http_cl1_gw1,,,,,
client1,client_gw2,,,23000,375500,895000,895000
client1,client_gw2,s_client_gw_1_2,,23000,375500,895000,895000
client1,client_gw22,,,105000,228375,541000,541000
client1,client_gw22,s_client_gw_1_22,,105000,228375,541000,541000
client1,client_gw3,,,113000,225125,549000,549000
client1,client_gw3,s_client_gw_1_3,,113000,225125,549000,549000
```

Sample Python Client Script for Retrieving Packet Capture and Message CSV Results

`CorvilApiStreamingClient.py` can be used to retrieve packet capture (.pcap) and message results (.csv) via streamed processing of SOAP Message Transmission Optimization Mechanism (MTOM) attachments.

The descriptions below support Sample Python Client version 3.2.0.

The sample script uses version 2 of the Corvil Web Services XML API.

The `CorvilApiStreamingClient.py` script has the following general format:

```
CorvilApiStatsClient.py <command> <hostname | ip-address> <options>
```

where

`command` is one of the following:

- `version` – print the version of the client
- `pcap` – retrieve packet capture results
- `message-csv` – retrieve message CSV results
- `clock-tracking` – retrieve UTC Clock Sync Reporting event results
- `packet-csv` – retrieve packet CSV results
- `gap-csv` – retrieve message sequence gap CSV results
- `multihop-csv` – retrieve multihop CSV results
- `lens-csv` – retrieve Lens CSV results
- `mp-list` – retrieve measurement point results
- `flow-index` – retrieve flow index table CSV results

`hostname | ip-address` is the name or IP address of the host to which the requests will be sent.

NOTE: Many of the API calls described below allow you to enter a time range option using the parameters `start-time` and `end-time`. If you enter these times in non-epoch format, for example, "YYYY-MM-DD HH:MM:SS", the time is taken as the local system time from where the request is run, and this is converted to and executed as UTC time on the CNE."

Along with command arguments such as the hostname, start/end times and measurement point name, you can also add some of the following command options to your command (refer to the command description for valid options for the command):

Option	Description
-n <username>	Specify username, default: admin
-p <password>	Specify password, default: admin
-x <cne>	Specify CNE for requests sent to CMC
-L <local-cne-name>	Specify the local CNE name, default: local-cne (clock-tracking)
-b	Request bidirectional export (pcap, gap-csv, message-csv, packet-csv)
-c	Request correlation analysis (message-csv)
-C	Request correlation IDs (message-csv)
-a	Request summaries (flow-index)
-w	Request watch list metadata (flow-index)
-m	Request additional measurement points (pcap)
-s	Request measurement points in the flow-index response (flow-index)
-q <query>	Optional filter which utilizes Corvil Query Language (flow-index)
-l <columns>	Comma-separated list of columns to return (message-csv, packet-csv)
-t <filter type>	CQL, Wireshark, BPF, Message
-f <filter text>	Single line filter expression, one of CQL, Wireshark, BPF or Message filter
-r	Field value in Message filter is regex
-d	Optional Message filter delimiter (default is ':')
-z	Use HTTPS to access the CNE
-g	Specify snaplength for PCAP Export (pcap)
-F <compression type>	Optional compression output format 'gzip' or 'zip'. By default uncompressed (pcap, message-csv, packet-csv, flow-index, lens-csv, multihop-csv, gap-csv)
-T <timeout-seconds>	Request timeout in seconds, default value: 3600

RETRIEVING PACKET CAPTURES

To retrieve packet capture results, the example script has the following format:

```
CorvilApiStreamingClient.py pcap <hostname | ip-address>
<measurement-point>
<start-time>
<end-time>
[-b]
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-t <filter type>]
[-f <filter text>]
[-T <timeout-seconds>]
[-m]
[-g]
[-F <compression-type>]
```

Retrieving Packet Capture Example

In the following Linux-based example, capture results are retrieved from the CNE named nyc-cne for the specified class between the specified times and saved in the file named mycapture.pcap:

```
$./CorvilApiStreamingClient.py -z pcap nyc-cne rt-class//London_CNE//VENUE_NJ-ATS/trade-to-tick-latency/class-default "2021-01-09 14:10:00" "2021-01-09 14:12:00" > mycapture.pcap
```

You can filter on the capture results. In the example below, only results from source IP address 192.168.6.250 and source port 15102 are retrieved and saved to the PCAP file:

```
$./CorvilApiStreamingClient.py -z pcap nyc-cne rt-class//London_CNE//VENUE_NJ-ATS/trade-to-tick-latency/class-default "2021-01-09 14:10:00" "2021-01-09 14:12:00" -t cql -f "ip.src=192.168.6.250 and tcp.srcport=15102" > mycapture.pcap
```

Capture Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving packet capture (.pcap) files:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`measurement-point`

Specify the fully qualified name of a single measurement point.

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

defined from CNE A to CNE B and equivalent to the channel:

```
channel src X from A to B dst Y label Z
```

The measurement-point definition for a session is:

`channel/X/A/B/Y/Z`

and the definition for a class contains

`rt-class/X/A/B/Y/Z/<class>`

where <class> is "class-default" in single-class configurations and the configured name of a class in multiclass configurations.

Any of X,Y, B and Z may be blank if it's a single-CNE channel, you haven't assigned a label, or are using "any" as a src/dst subnet match.

Use the `mp-list` command with the script to obtain a full list of available measurement points.

`start-time`

Specify the start time of the reporting period of interest.

Time Format: “YYYY-MM-DD HH:MM:SS”

OR

seconds or nanoseconds since the Unix epoch

For example:

“2021-09-19 14:10:00”

or

1632060600000000000 (in nanoseconds)

`end-time`

Specify the end time of the reporting period of interest.

Time Format: “YYYY-MM-DD HH:MM:SS”

OR

seconds or nanoseconds since the Unix epoch

For example:

“2021-09-19 14:12:00”

or

1632060720000000000 (in nanoseconds)

`-b`

[Optional]

If present, requests that PCAP results include both directions of the specified channel.

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

When using Corvil Management Center, at least one CNE name identifier must be included, otherwise an error is returned.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-t`

[Optional]

Specify the type of filter to use for the exported PCAP file. Can be CQL, Wireshark or BPF.

`-f`

[Optional]

Specify the filter expression for the exported results.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-m`

[Optional]

Request capture results for additional measurement points.

NOTE: You can use the format described above for `measurement-point`, however, you must use `channel` instead of `rt-class` when specifying additional measurement points for PCAP retrieval.

`-g`

[Optional]

Specify the snaplength for the PCAP Export.

Range: 0 - 65535

`-F <compression-type>`

[Optional]

[Supported in software release 9.6.2 and later]

Specify the output format for the exported PCAP file. It can be exported as a plain binary PCAP file or as a zip or gzip compressed file.

Set to "zip" for compressed output to be exported in zip format.

Set to "gzip" for compressed output to be exported in gzip format. **[Supported in 9.7 releases only]**

For uncompressed, do not set the attribute.

Default:uncompressed

RETRIEVING PACKET CSV RESULTS

To retrieve packet CSV results, the example script has the following format:

```
CorvilApiStreamingClient.py packet-csv <hostname | ip-address>
<measurement-point>
<start-time>
<end-time>
[-b]
[-l <columns>]
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-F <compression-type>]
```

Retrieving Packet CSV Example

In the following Linux-based example, packet CSV results are retrieved and saved from the CNE named nyc-cne for the specified class between the specified times:

```
$./CorvilApiStreamingClient.py -z packet-csv nyc-cne rt-class/FIX-CLIENTS/local-
cne//FIX-SERVERS/FIX-RTT/class-default "2021-01-09 14:10:00" "2021-01-09
14:12:00" -l "Source Address,Source Port,Destination Address,Destination Port,IP
Protocol"
```

Packet CSV Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving packet CSV results:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`measurement-point`

Specify the fully qualified name of a single measurement point.

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

defined from CNE A to CNE B and equivalent to the channel:

`channel src X from A to B dst Y label Z`

The measurement-point definition for a session is:

`channel/X/A/B/Y/Z`

and the definition for a class contains

`rt-class/X/A/B/Y/Z/<class>`

where <class> is "class-default" in single-class configurations and the configured name of a class in multiclass configurations.

Any of X,Y, B and Z may be blank if it's a single-CNE channel, you haven't assigned a label, or are using "any" as a src/dst subnet match.

Use the `mp-list` command with the script to obtain a full list of available measurement points.

`start-time`

Specify the start time of the reporting period of interest.

Time Format: "YYYY-MM-DD HH:MM:SS"

OR

seconds or nanoseconds since the Unix epoch

For example:

"2013-11-19 14:10:00"

or

1384870200000000000 (in nanoseconds)

`end-time`

Specify the end time of the reporting period of interest.

Time Format: “YYYY-MM-DD HH:MM:SS”

OR

seconds or nanoseconds since the Unix epoch

For example:

“2013-11-19 14:12:00”

or

1384870200000000000 (in nanoseconds)

`-b`

[Optional]

If present, requests that `packet-csv` results include both directions of the specified channel.

`-l`

[Optional]

Specify the fields to export in the CSV file as a comma-separated list. Enclose in double quotes if your field names contain spaces.

The order in which the fields are specified determines the order they appear in the CSV file.

For example: including `-l “Source Address,ClOrdID,Symbol”`

If the `-l` option is not specified then all fields are exported.

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is ‘admin’. The default monitor user password on the CNE is ‘monitor’.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

When using Corvil Management Center, at least one CNE name identifier must be included, otherwise an error is returned.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-F <compression-type>`

[Optional]

[Supported in software release 9.7.0 and later]

Specify the output format for the exported CSV file. It can be exported as a plain binary CSV file or as a zip or gzip compressed file.

Set to "zip" for compressed output to be exported in zip format.

Set to "gzip" for compressed output to be exported in gzip format.

For uncompressed, do not set the attribute.

Default:uncompressed

RETRIEVING MESSAGE CSV RESULTS

To retrieve message CSV results, the example script has the following format:

```
CorvilApiStreamingClient.py message-csv <hostname | ip-address>
<measurement-point>
<start-time>
<end-time>
[-b]
[-c]
[-C]
[-l <columns>]
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-t <filter type>]
[-f <filter text>]
[-r]
[-d]
[-F <compression-type>]
```

Retrieving Message CSV Example

In the following Linux-based example, message CSV results are retrieved and saved from the CNE named nyc-cne for the specified class between the specified times. Message correlation data (`-c`) and correlation ID analysis (`-C`) information is included in the exported .csv file and only the specified message fields (`-l`) are included:

```
$./CorvilApiStreamingClient.py -z message-csv nyc-cne rt-class/FIX-CLIENTS/local-
cne//FIX-SERVERS/FIX-RTT/class-default "2021-01-09 14:10:00" "2021-01-09
14:12:00" -l ClOrdID,Symbol -c -C > sample-l-c-C.csv
```

In the example below, results are filtered for messages that match a specific field (FIX client order id 7S0D44-1 in this case):

```
$./CorvilApiStreamingClient.py -z message-csv nyc-cne rt-class/FIX-CLIENTS/local-
cne//FIX-SERVERS/FIX-RTT/class-default "2021-01-09 14:10:00" "2021-01-09
14:12:00" -t Message -f FIX::ClOrdID:7S0D44-1 -c -C > sample-l-c-C.csv
```

Message CSV Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving message CSV results:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`measurement-point`

Specify the fully qualified name of a single measurement point:

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

defined from CNE A to CNE B and equivalent to the channel:

`channel src X from A to B dst Y label Z`

The measurement-point definition for a session is:

`channel/X/A/B/Y/Z`

and the definition for a class contains

`rt-class/X/A/B/Y/Z/<class>`

where <class> is "class-default" in single-class configurations and the configured name of a class in multiclass configurations.

Any of X,Y,B and Z may be blank if it's a single-CNE channel, you haven't assigned a label, or are using "any" as a src/dst subnet match.

Note that retrieving statistics related to the special ClockTracking session for UTC Clock Sync Reporting data, requires the special measurement point name "`channel//local-cne///ClockTracking`".

Use the `mp-list` command with the script to obtain a full list of available measurement points.

For more information, refer to "URL Encoding of Configuration Object Name Character Set" in the Corvil Analytics XML API Reference Guide.

`start-time`

Specify the start time of the reporting period of interest.

Time Format: "YYYY-MM-DD HH:MM:SS"

OR

seconds or nanoseconds since the Unix epoch

For example:

“2013-11-19 14:10:00”

or

1384870200000000000 (in nanoseconds)

`end-time`

Specify the end time of the reporting period of interest.

Time Format: “YYYY-MM-DD HH:MM:SS”

OR

seconds or nanoseconds since the Unix epoch

For example:

“2013-11-19 14:10:00”

or

1384870200000000000 (in nanoseconds)

`-b`

[Optional]

If present, requests that message-csv results include both directions of the specified channel.

`-c`

[Optional]

If present, requests that message-csv results include message correlation data.

Use this option only for CSV exports that contain a small number of messages. When used, the CNE must look up each message to find the correlating message. Therefore it should not be used for exports that contain a large number of messages.

`-C`

[Optional]

Request correlation ID analysis for message-csv results. For latency measurement channels, this extends the existing CSV format with per-message fields indicating IDs of correlated message as well as stage-1 and stage-2 translation messages. These IDs can then be used to look up corresponding messages in CSV export files from the other channels involved in the latency measurement, based on the Msg ID which is already present in all CSV message exports.

Use this option for high-performance exports with correlated data, matching up the correlated IDs after export. In other words, use for CSV exports that contain a large number of messages.

`-l <columns>`

[Optional]

Specify the fields to export in the CSV file as a comma-separated list. Enclose in double quotes if your field names contain spaces.

The order in which the fields are specified determines the order they appear in the CSV file.

For example: including -l ClOrdID,Symbol

If the `-l` option is not specified then all fields are exported.

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

> NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

When using Corvil Management Center, at least one CNE name identifier must be included, otherwise an error is returned.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-t`

[Optional]

Specify the type of filter to use for the CSV results. The only valid filter type is Message.

`-f`

[Optional]

Specify the filter expression for the CSV results.

As the filter type is Message, the filter expression should be in the format below, where ':' is the field delimiter (see `-d` below to change it)

```
protocol:msgType:msgField:msgFieldValue
```

For example:

```
FIX:NewOrderSingle:ClOrdID:7RIB3D-1
```

All fields are optional, except protocol. The delimiter should be present for all fields, and if you exclude a field, you must still include the delimiter.

For example, a filter with only the FIX protocol specified would be expressed as `FIX:::`

The above example filter with only the protocol and message field value would be expressed as `FIX:::7RIB3D-1`

Use `\` to escape the delimiter.

`-r`

[Optional]

Specify that the field value in the Message filter is regex.

`-d`

[Optional]

Specify a different Message filter delimiter.

Default: ':'

`-F <compression-type>`

[Optional]

[Supported in software release 9.7.0 and later]

Specify the output format for the exported CSV file. It can be exported as a plain binary CSV file or as a zip or gzip compressed file.

Set to "zip" for compressed output to be exported in zip format.

Set to "gzip" for compressed output to be exported in gzip format.

For uncompressed, do not set the attribute.

Default:uncompressed

RETRIEVING MESSAGE SEQUENCE GAP CSV RESULTS

To retrieve message sequence gap CSV results, the example script has the following format:

```
CorvilApiStreamingClient.py gap-csv <hostname | ip-address>
<measurement-point>
<start-time>
<end-time>
[-b]
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
```

```
[-F <compression-type>]
```

Retrieving Message Sequence Gap CSV Results Example

In the following Linux-based example, message sequence gap CSV results are retrieved and saved from the CNE named nyc-cne for the specified class between the specified times:

```
$./CorvilApiStreamingClient.py -z gap-csv nyc-cne rt-class/FIX-CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default "2021-01-09 14:10:00" "2021-01-09 14:12:00" > sample-gap.csv
```

Message Gap CSV Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving message sequence gap CSV results:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`measurement-point`

Specify the fully qualified name of a single measurement point:

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

defined from CNE A to CNE B and equivalent to the channel:

```
channel src X from A to B dst Y label Z
```

The measurement-point definition for a session is:

```
channel/X/A/B/Y/Z
```

and the definition for a class contains

```
rt-class/X/A/B/Y/Z/<class>
```

where <class> is "class-default" in single-class configurations and the configured name of a class in multiclass configurations.

Any of X,Y,B and Z may be blank if it's a single-CNE channel, you haven't assigned a label, or are using "any" as a src/dst subnet match.

Use the `mp-list` command with the script to obtain a full list of available measurement points.

For more information, refer to "URL Encoding of Configuration Object Name Character Set" in the Corvil Analytics XML API Reference Guide.

`start-time`

Specify the start time of the reporting period of interest.

Time Format: "YYYY-MM-DD HH:MM:SS"

OR

seconds or nanoseconds since the Unix epoch

For example:

"2013-11-19 14:10:00"

or

1384870200000000000 (in nanoseconds)

`end-time`

Specify the end time of the reporting period of interest.

Time Format: "YYYY-MM-DD HH:MM:SS"

OR

seconds or nanoseconds since the Unix epoch

For example:

"2013-11-19 14:12:00"

or

1384870200000000000 (in nanoseconds)

`-b`

[Optional]

If present, requests that message gap csv results include both directions of the specified channel.

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

When using Corvil Management Center, at least one CNE name identifier must be included, otherwise an error is returned.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-F <compression-type>`

[Optional]

[Supported in software release 9.7.0 and later]

Specify the output format for the exported CSV file. It can be exported as a plain binary CSV file or as a zip or gzip compressed file.

Set to "zip" for compressed output to be exported in zip format.

Set to "gzip" for compressed output to be exported in gzip format.

For uncompressed, do not set the attribute.

Default:uncompressed

RETRIEVING MULTIHOP CSV RESULTS

To retrieve multihop CSV results, the example script has the following format:

```
CorvilApiStreamingClient.py multihop-csv <hostname | ip-address>
<measurement-point>
<message-timestamp>
<packet-id>
<message-index>
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
[-F <compression-type>]
```

Retrieving Multihop CSV Results Example

In the following Linux-based example, multihop CSV results are retrieved and saved from the CNE named nyc-cne for the specified class. The request specifies

- the timestamp of the packet containing the messages
- the packet ID and message index of the message on which multi-hop analysis is performed

```
$./CorvilApiStreamingClient.py -z multihop-csv nyc-cne rt-class/FIX-
CLIENTS/local-cne//FIX-SERVERS/FIX-RTT/class-default 1387537921054678689
156976786412000 4 > sample-multihop.csv
```

To get the packet ID and message index of the message, you can run the message-csv request and extract the information from the Msg ID column, where they are stored as colon-separated values "packet-id:message-index". Below is an extract from a message-csv response, showing the Msg ID "1813143312766061:0":

```
time,ts_ns,src_ip,src_port,dst_ip,dst_
port,bytes,application,dir,CorvilOrderId,PNQM Latency (ms),PNQM Loss,Msg
Decoder,Msg Type,Msg ID,VirtSessionID,ClOrdID,OrderID,QuoteID,
BusinessRejectRefID,ExecType,OrdStatus,Symbol,Price,OrderQty,CumQty,
LastQty,LeavesQty,VirtFilledPct,VirtOrderComplete,VirtNs_
SendingTime2Rx,Currency,SecurityID,SenderCompID,TargetCompID,SenderSubID,TargetS
ubID,Account,BeginString,BodyLength,CheckSum,MsgSeqNum,MsgType,SendingTime,TestR
eqID,Version,VirtVariant,LastMsgSeqNumProcessed,TradingSessionID,TransactTime,Vi
rtFixSkippedTags,NoQuoteEntries,NoQuoteSets,QuoteEntryID,QuoteSetID,QuoteStatus,
SecurityExchange,SecurityIDSource,Text,VirtClientID,VirtServerID,AvgPx,ExecID,Ex
ecTransType,HandlInst,LastCapacity,LastMkt,LastPx,OrdType,Rule80A,SenderLocation
ID,SettlType,Side,TimeInForce,TradeDate,VirtCumulativeValueFilled,VirtCumulative
ValueFilledUnrounded,VirtCurrency,VirtLastQtyDec,VirtLastQtyFracAccumulated,Virt
ValueFilled,VirtValueFilledUnrounded
```

```
="2021-09-20 08:46:36.578409845",="1632127596578409845","20.48.66.2",25102,
"19.48.26.11",59496,127,"FIX",0,="0",,,"FIX","TestRequest",="1813143312766061:0"
,,,,,,,,,,,,,,,,,,,"FPGADRCT","BNKFIX01","NXTGEN","FIX_algo001",,"FIX.4.2",
="104",="028",="4548",="1",="20090625-16:46:26",="1245941186810000",
="4.2","FIX",,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
```

Multihop CSV Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving multihop CSV results:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`measurement-point`

Specify the fully qualified name of a single measurement point:

For a session defined at the CLI

```
session Z
 session-subnet-groups src dst Y
 session-cnes from A to B
```

defined from CNE A to CNE B and equivalent to the channel:

```
channel src X from A to B dst Y label Z
```


The measurement-point definition for a session is:

`channel/X/A/B/Y/Z`

and the definition for a class contains

`rt-class/X/A/B/Y/Z/<class>`

where <class> is "class-default" in single-class configurations and the configured name of a class in multiclass configurations.

Any of X,Y,B and Z may be blank if it's a single-CNE channel, you haven't assigned a label, or are using "any" as a src/dst subnet match.

Use the `mp-list` command with the script to obtain a full list of available measurement points.

For more information, refer to "URL Encoding of Configuration Object Name Character Set" in the Corvil Analytics XML API Reference Guide.

`message-timestamp`

Specifies the timestamp of the packet containing the messages.

Values can be obtained using the data generated as part of message-csv export, where the timestamp values are stored in the column named ts_ns.

`packet-id`

Specifies the packet ID of the message on which multi-hop analysis is performed.

Values can be obtained using the data generated as part of message-csv export, where the packet-id and message-index are stored colon-separated in the column named Msg ID.

`message-index`

Specifies the message index (within a specific packet) of the message on which multi-hop analysis is performed.

Values can be obtained using the data generated as part of `message-csv` export, where the packet-id and message-index are stored colon-separated in the column named Msg ID.

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user

password on the CNE is ‘monitor’.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

> NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

When using Corvil Management Center, at least one CNE name identifier must be included, otherwise an error is returned.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-F <compression-type>`

[Optional]

[Supported in software release 9.7.0 and later]

Specify the output format for the exported CSV file. It can be exported as a plain binary CSV file or as a zip or gzip compressed file.

Set to "zip" for compressed output to be exported in zip format.

Set to "gzip" for compressed output to be exported in gzip format.

For uncompressed, do not set the attribute.

Default:uncompressed

RETRIEVING LENS CSV RESULTS

To retrieve Corvil Lens CSV results, the example script has the following format:

```
CorvilApiStreamingClient.py lens-csv <hostname | ip-address>
<reporting-period>
<lens-view>
[-n <username>]
[-p <password>]
[-x <cne>]
[-z]
[-T <timeout-seconds>]
[-F <compression-type>]
```

Retrieving Lens CSV Results Example

In the following Linux-based example, Corvil Lens CSV results are retrieved and saved from the CNE named nyc-cne for the specified Lens reporting period and the default Lens view (named Default):

```
$./CorvilApiStreamingClient.py -z lens-csv nyc-cne "Last 1 hour" Default >
sample-lens.csv
```

Lens CSV Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving Lens CSV results:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`reporting-period`

Specify the name of the Corvil Lens reporting period for which you want results.

The default list of Corvil Lens reporting periods are as follows:

- “Last 1 hour”
- “Last 12 hours”
- “Last 24 hours”
- “Last 48 hours”
- “Last 7 days”
- “Last 30 days”
- “Last 60 days”
- “Business Day”

Any of the default reporting periods on a given CNE or Corvil Management Center may be disabled and unavailable when defining requests.

You can also specify the name of a user-defined Corvil Lens reporting period, if configured.

For more information on disabling reporting periods and defining custom reporting periods, refer to "Configuring UI Reporting Periods" in the Corvil User Guide.

`lens-view`

Specify the name of a Corvil Lens view.

The default Corvil Lens view name is “Default”.

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is ‘admin’. The default monitor user password on the CNE is ‘monitor’.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

> NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

When using Corvil Management Center, at least one CNE name identifier must be included, otherwise an error is returned.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-F <compression-type>`

[Optional]

[Supported in software release 9.7.0 and later]

Specify the output format for the exported CSV file. It can be exported as a plain binary CSV file or as a zip or gzip compressed file.

Set to "zip" for compressed output to be exported in zip format.

Set to "gzip" for compressed output to be exported in gzip format.

For uncompressed, do not set the attribute.

Default:uncompressed

RETRIEVING A LIST OF AVAILABLE MEASUREMENT POINTS

To retrieve a list of available measurement points, the example script has the following format:

```
CorvilApiStreamingClient.py mp-list <hostname | ip-address>
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-T <timeout-seconds>]
```

Retrieving Available Measurement Points Example

In the following Linux-based example, a list of available measurement points are retrieved from the CNE named nyc-cne for the specified class between the specified times and saved to a text file:

```
$./CorvilApiStreamingClient.py -z mp-list nyc-cne > channel-list.txt
```

Available Measurement Points Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving the list of available measurement points:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is ‘admin’. The default monitor user password on the CNE is ‘monitor’.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

RETRIEVING FLOW INDEX TABLE CSV RESULTS

NOTE: Flow data is only available from release 9.5.0 onwards, and only in Full Analytics mode (not Network Capture mode). Your appliance must be in Full Analytics mode and must have Corvil Analytics release 9.5.0 or later installed to run the flow index queries below using Web Services API requests.

To retrieve flow index table CSV results, the example script has the following format:

```
CorvilApiStreamingClient.py flow-index <hostname | ip-address>
<start-time>
<end-time>
<aggregations>
[-x <cne>]
[-n <username>]
[-p <password>]
[-a]
[-w]
[-s]
[-q <query>]
[-z]
[-T <timeout-seconds>]
[-F <compression-type>]
```

Retrieving Flow Index Table CSV Example

In the following Linux-based example, flow index table results are retrieved and saved from the CNE named nyc-cne for the specified times:

```
$./CorvilApiStreamingClient.py -z flow-index nyc-cne "2021-01-09 14:10:00" "2021-01-09 14:12:00" "talkers, listeners”
```

Flow Index Table CSV Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving flow index table CSV results:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`start-time`

Specify the start time of the reporting period of interest.

Time Format: “YYYY-MM-DD HH:MM:SS”

OR

seconds or nanoseconds since the Unix epoch

For example:

“2021-09-19 14:10:00”

or

1632060600000000000 (in nanoseconds)

`end-time`

Specify the end time of the reporting period of interest.

Time Format: “YYYY-MM-DD HH:MM:SS”

OR

seconds or nanoseconds since the Unix epoch

For example:

“2021-09-19 14:12:00”

or

1632060720000000000 (in nanoseconds)

`-aggregations`

[Optional – last command line argument, if used]

Specify how the flow index data should be aggregated in the CSV file as a comma-separated list. The available aggregation options are: conversations, conversations-bidirectional, talkers, listeners, ports, vports, vlans, applications, time-seconds, time-minutes, time-hours, clients, servers, client-server-direction, eth-talkers, eth-listeners

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is ‘admin’. The default monitor user password on the CNE is ‘monitor’.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

When using Corvil Management Center, at least one CNE name identifier must be included, otherwise an error is returned.

`-a`

[Optional]

Request summary information.

`-w`

[Optional]

Request watchlist metadata.

`-s`

[Optional]

Request measurement points in the flow-index response.

`-q <query>`

[Optional]

Specify filter queries using Corvil Query Language (CQL).

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600

`-F <compression-type>`

[Optional]

[Supported in software release 9.7.0 and later]

Specify the output format for the exported CSV file. It can be exported as a plain binary CSV file or as a zip or gzip compressed file.

Set to "zip" for compressed output to be exported in zip format.

Set to "gzip" for compressed output to be exported in gzip format.

For uncompressed, do not set the attribute.

Default:uncompressed

RETRIEVING UTC CLOCK SYNC REPORTING EVENT DATA

To retrieve UTC Clock Sync Reporting Event Data CSV results, the example script has the following format:

```
CorvilApiStreamingClient.py clock-tracking <hostname | ip-address>
<start-time>
<end-time>
[-x <cne>]
[-n <username>]
[-p <password>]
[-z]
[-L <local-cne-name>]
[-T <timeout-seconds>]
```

Retrieving UTC Clock Sync Reporting Event CSV Example

In the following Linux-based example, UTC clock sync reporting event results are retrieved and saved from the CNE named nyc-cne for the specified times:

```
$./CorvilApiStreamingClient.py -z clock-tracking nyc-cne "2021-04-12 09:00:00"
"2021-04-12 09:00:05" -L nyc-cne
#client version: 191956
# Clock synchronization event data
# Period start time: 1523520000000000000
# Period end time: 1523520005000000000
UTC time,Clock,Event type,Clock source,Nanoseconds,Debug
1523520000253059237,Secondary,offset,"PTP",132,"HW=3617374952384738"
1523520000752924145,Secondary,offset,"PTP",117,"HW=3617375452249573"
1523520001000000000,Primary,adjustment,"PPS",-
1,"HW=3617375699325502;NTPOffset=665426"
1523520001252903349,Secondary,offset,"PTP",109,"HW=3617375952228697"
1523520001752869888,Secondary,offset,"PTP",97,"HW=3617376452195161"
1523520002000000000,Primary,adjustment,"PPS",1,"HW=3617376699325326;NTPOffset=66
6856"
1523520003252917461,Secondary,offset,"PTP",67,"HW=3617377952242503"
```

```
1523520003752771422,Secondary,offset,"PTP",59,"HW=3617378452096384"
1523520004000000000,Primary,adjustment,"PPS",-
1,"HW=3617378699324978;NTPOffset=666618"
1523520004252842307,Secondary,offset,"PTP",78,"HW=3617378952167162"
1523520004752721090,Secondary,offset,"PTP",55,"HW=3617379452045881"
UTC time,Clock,Event type,Clock source,Nanoseconds,Debug
```

UTC Clock Sync Reporting Event CSV Options

The following describes the parameters and options available with the `CorvilApiStreamingClient.py` script when retrieving UTC Clock Sync Reporting event CSV results:

`hostname | ip-address`

Specify the host name or IPv4 address of the CNE or Corvil Management Center.

`start-time`

Specify the start time of the reporting period of interest.

Time Format: “YYYY-MM-DD HH:MM:SS”

OR

seconds or nanoseconds since the Unix epoch

For example:

“2013-11-19 14:10:00”

or

1384870200000000000 (in nanoseconds)

`end-time`

Specify the end time of the reporting period of interest.

Time Format: “YYYY-MM-DD HH:MM:SS”

OR

seconds or nanoseconds since the Unix epoch

For example:

“2013-11-19 14:12:00”

or

1384870200000000000 (in nanoseconds)

`-n <username>`

[Optional]

Specify the CNE or Corvil Management Center login user name.

Default: admin.

Access to Corvil Web Services is available to the admin, config and monitor users. Authentication is provided by basic HTTP authentication. Use the current configured admin or monitor passwords for authentication. The default admin user password on the CNE is 'admin'. The default monitor user password on the CNE is 'monitor'.

Authenticated restricted users, such as LDAP and TACACS users, can access Corvil Web Services through a secure (HTTPS) login only. Ensure that the option `-z` is used when running the script.

`-p <password>`

[Optional]

Specify the CNE or Corvil Management Center login password.

Default: admin.

`-x cne`

Corvil Management Center ONLY

[Optional]

Specify the name of a specific CNE from which to request results.

NOTE: Data cannot be obtained from multiple CNEs in a single request. A separate request must be defined for each CNE, as required.

When using Corvil Management Center, at least one CNE name identifier must be included, otherwise an error is returned.

`-z`

[Required if using role-based access control, or HTTP has been disabled]

Use HTTPS to access the CNE.

`-L`

[Optional]

Specify the local CNE name.

Default: local-cne

`-T`

[Optional]

Specify the time (in seconds) to wait for the request to complete.

Default: 3600