Department of Computer Science and Engineering (Data Science)

Subject: Big Data Engineering (DJ19DSL604)

AY: 2022-23

Experiment 3

(Messaging Services)

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Aim: Implement messaging system using AMPS

Theory:

Communication, in general, is the process of transferring data from a source to a destination by using any of the available modes such as audio, video, text or even signals, etc. This communication may be straightforward between one sender and one receiver or it may include multiple senders and receivers. On the basis of the number of senders and receivers involved, a communication can either be "Point-to-Point" or "Multi-point".

Point-to-Point Communication:

In telecommunications, a point-to-point connection is a communications link between two communication endpoints or nodes. A telephone call is an example of this, in which two phones are linked, and what one caller says can only be heard by the other.

A "point-to-multipoint" or broadcast link, on the other hand, allows multiple nodes to receive information sent by a single node. Leased lines and microwave radio relays are also examples of point-to-point connections.

In a point-to-point communication, there will be a transmitter and a receiver connected together with a suitable connection. The capacity of the connecting channel remains unchanged throughout the communication.

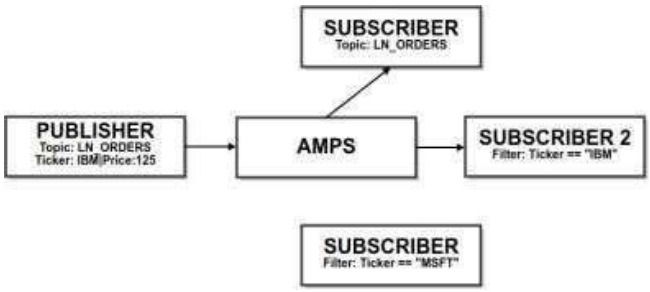
Multi-point Communication

In telecommunications, point-to-multipoint communication (P2MP, PTMP, or PMP) is a form of one-to-many communication that allows numerous routes to be established from a single site to several locations.

The usage of gigahertz radio frequencies for point-to-multipoint telecommunications is common in wireless Internet and IP telephony. P2MP systems have been created with and without a return channel from the numerous receivers. The system employs a kind of time-division multiplexing to enable the return channel traffic, which is transmitted from a central antenna to numerous receiving antennas.

AMPS from 60East Technologies is a fast messaging engine that supports both publish-subscribe messaging and queuing. It is not just a simple messaging engine it is also packed with some powerful feature like high availability, historical replay, aggregation and analytics, content filtering and continuous query, last value caching, focus tracking, and more.

AMPS PUB-SUB Model

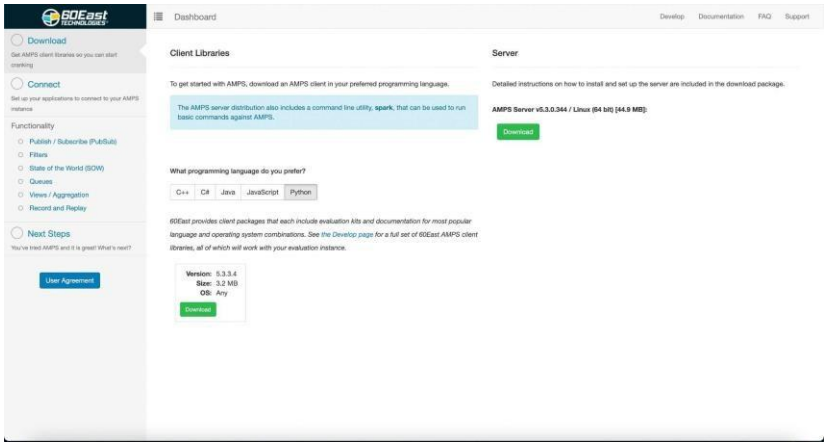


This is same as any other pub-sub model wherein a publisher publishes the message to a topic and subscriber subscribes to a topic and reads the message from it. But amps also provide some

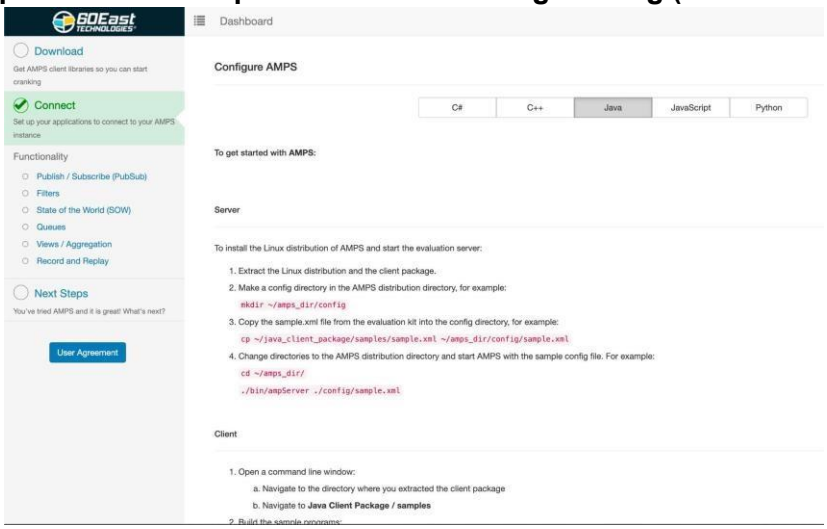
powerfully features like we can do **content filtering** where we can subscribe to a topic with a filter and with the help of that we can get only the filtered messages from AMPS server.

Setting up AMPS:

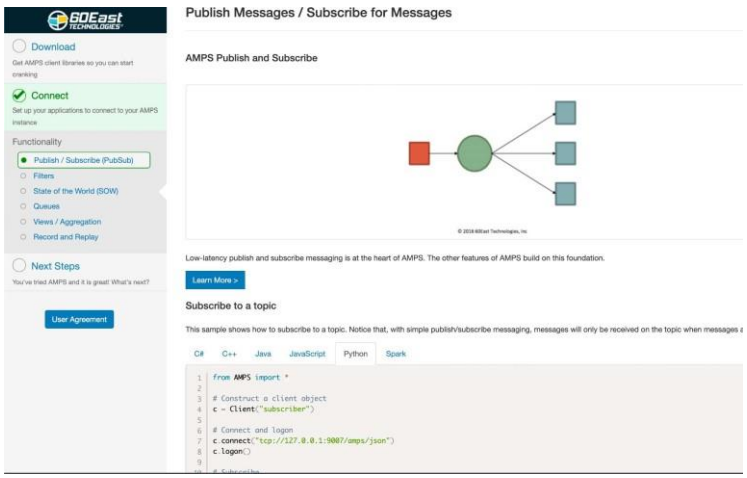
- Visit https://www.crankuptheamps.com/evaluate/
- Sign up with any email ID
- You'll receive an evaluation kit of AMPS in your email.
- Download the AMPS Server
- Download the Client Libraries (as per programming language preference)



- After downloading the server binaries and client, click on Connect



- On the right side pane, you'll see the steps to configure AMPS Server and Client.
- Once configured, head over to the Functionality tab (below Connect)
- Test your AMPS configuration by publishing / subscribing to a topic.



AMPS is now ready to be explored.

Lab Assignment:

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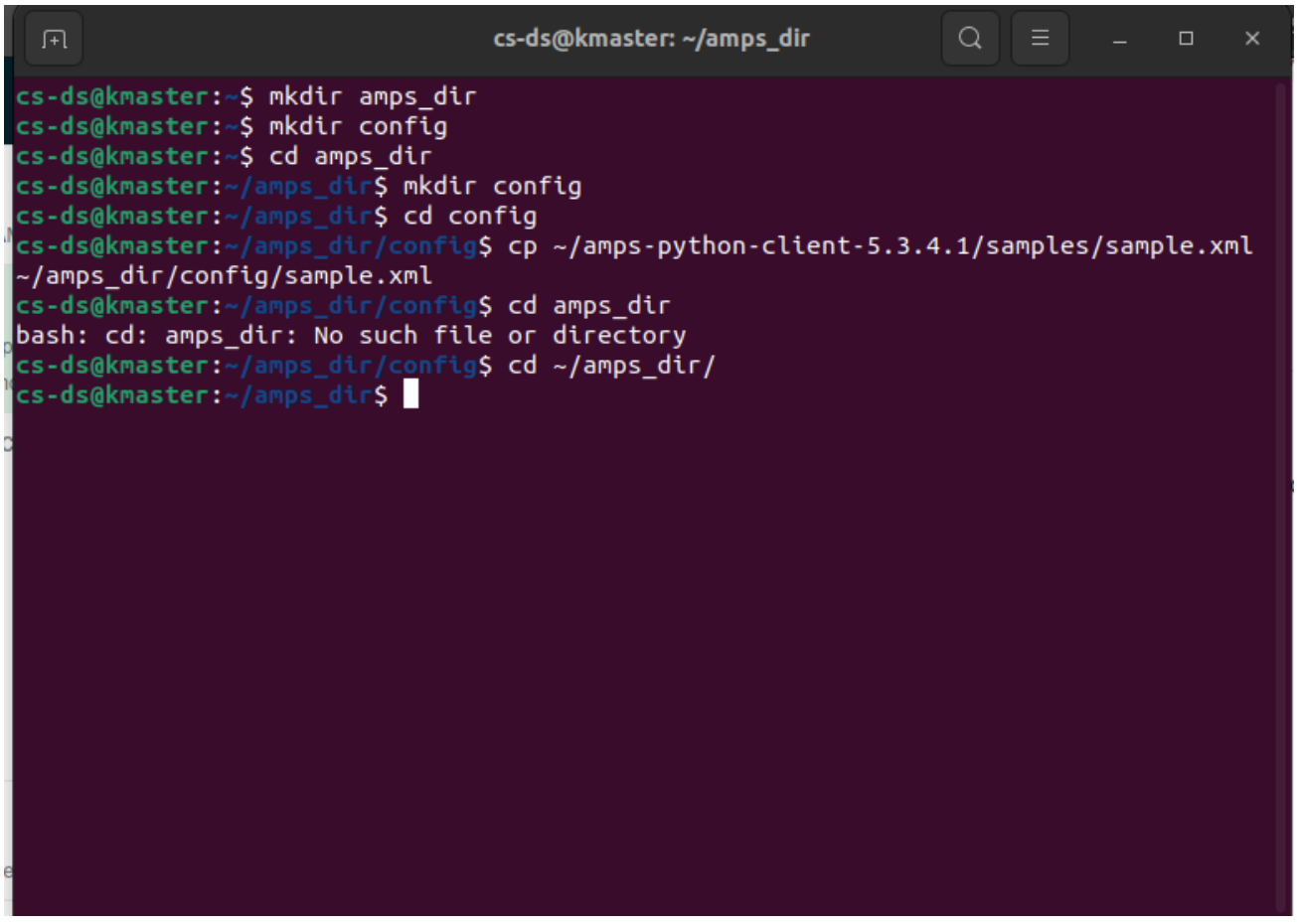
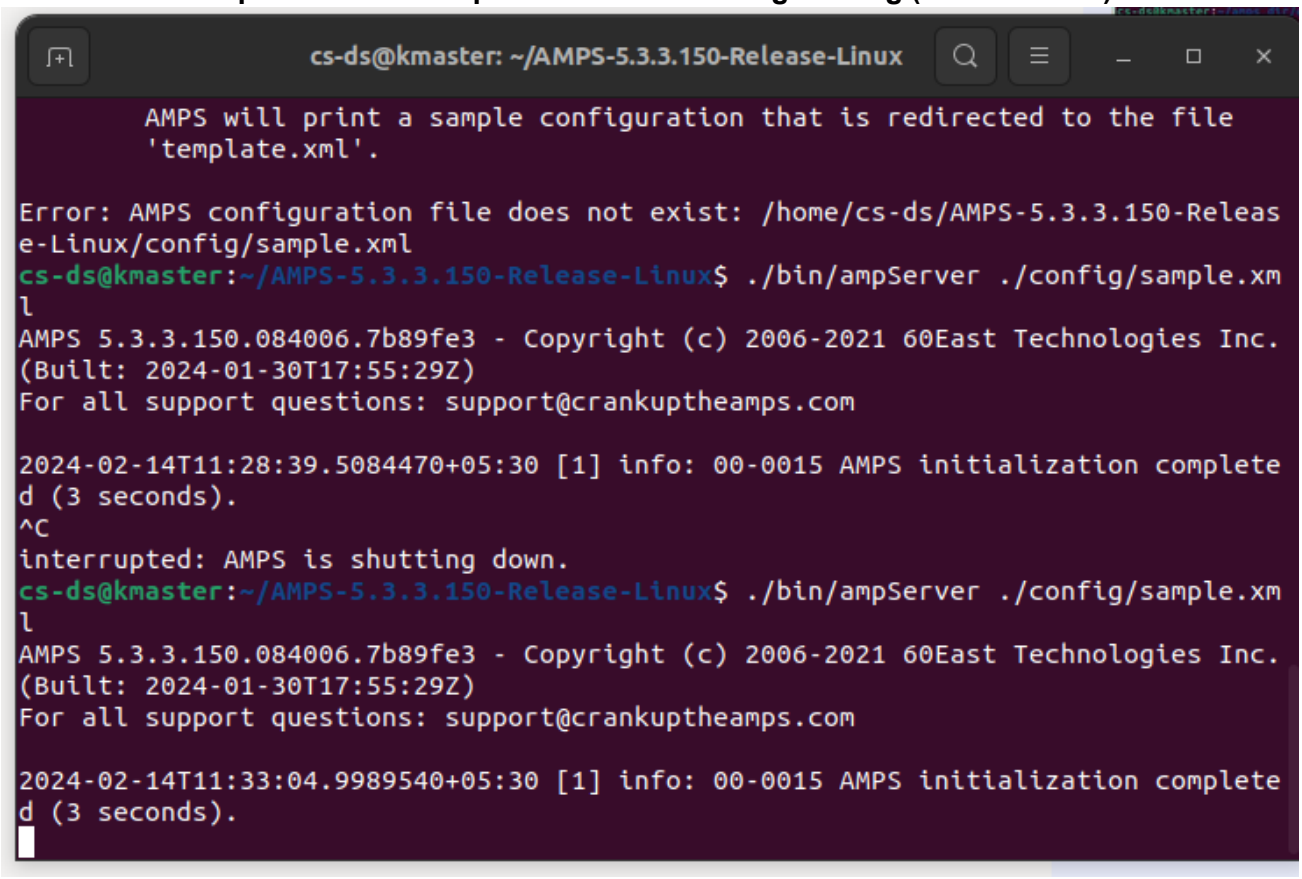
1. Setup AMPS server in the lab and all students will connect to it.
2. Write basic JSON messages (having flat structures), publish, and consume using AMPS.
3. Write nested JSON messages (having 5-6 levels of hierarchy), publish and subscribe using AMPS.
4. Apply Content Filtering, subscribing to relevant messages only.




cs-ds@kmaster: ~/AMPS-5.3.3.150-Release-Linux
cs-ds@kmaster:~/AMPS-5.3.3.150-Release-Linux$ ./bin/ampServer
AMPS 5.3.3.150.084006.7b89fe3 - Copyright (c) 2006-2021 60East Technologies Inc.
(Built: 2024-01-30T17:55:29Z)
For all support questions: support@crankuptheamps.com
Usage:
ampServer [--help | --version | --sample-config]
or
ampServer [--verify-config | --daemon] <config>
Options:
--help : prints this help message
--version : print version and exit
--sample-config : print a configuration template to standard out
--verify-config : verify configuration file and exit
--dump-config : output configuration file contents to standard out
--daemon : run as a background daemon
config : configuration file to load
Examples:
% ./ampServer orders.xml

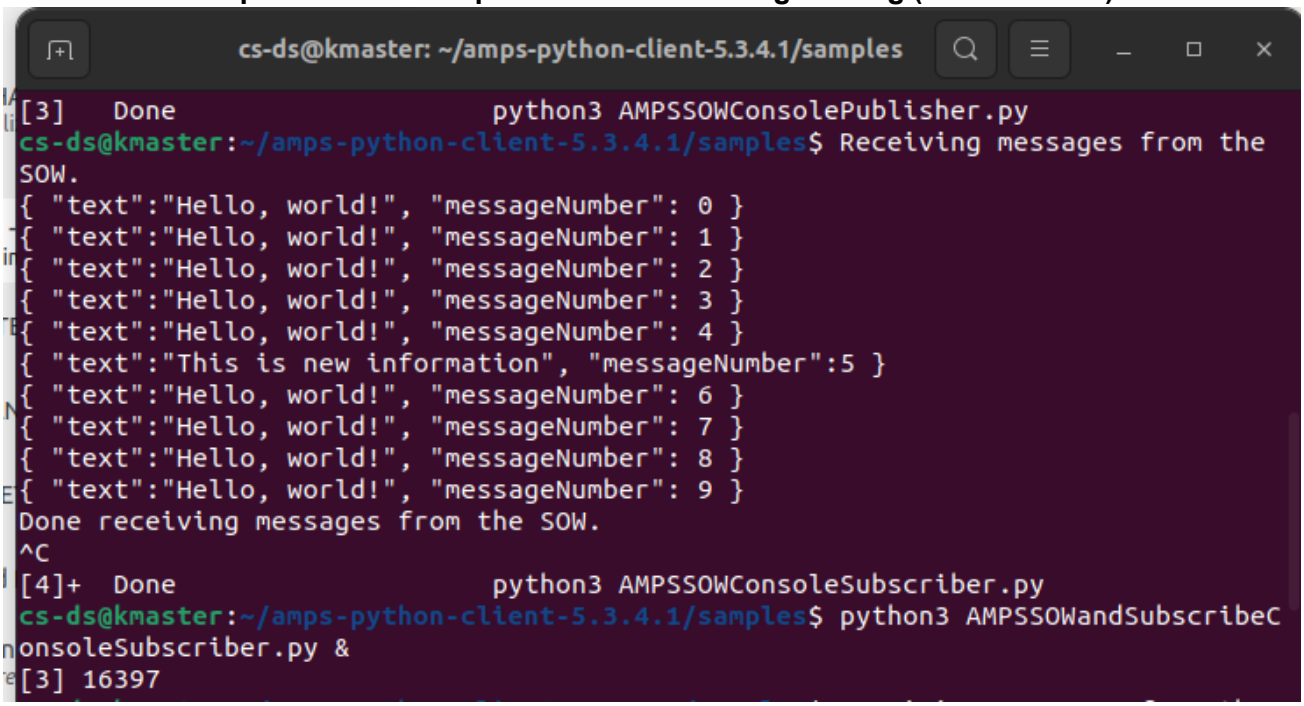

cs-ds@kmaster: ~/AMPS-5.3.3.150-Release-Linux
AMPS will print a sample configuration that is redirected to the file
'template.xml'.
Error: AMPS configuration file does not exist: /home/cs-ds/AMPS-5.3.3.150-Releas
e-Linux/config/sample.xml
cs-ds@kmaster:~/AMPS-5.3.3.150-Release-Linux$ ./bin/ampServer ./config/sample.xm
l
AMPS 5.3.3.150.084006.7b89fe3 - Copyright (c) 2006-2021 60East Technologies Inc.
(Built: 2024-01-30T17:55:29Z)
For all support questions: support@crankuptheamps.com
2024-02-14T11:28:39.5084470+05:30 [1] info: 00-0015 AMPS initialization complete
d (3 seconds).
^C
interrupted: AMPS is shutting down.
cs-ds@kmaster:~/AMPS-5.3.3.150-Release-Linux$ ./bin/ampServer ./config/sample.xm
l
AMPS 5.3.3.150.084006.7b89fe3 - Copyright (c) 2006-2021 60East Technologies Inc.
(Built: 2024-01-30T17:55:29Z)
For all support questions: support@crankuptheamps.com
2024-02-14T11:33:04.9989540+05:30 [1] info: 00-0015 AMPS initialization complete
d (3 seconds).

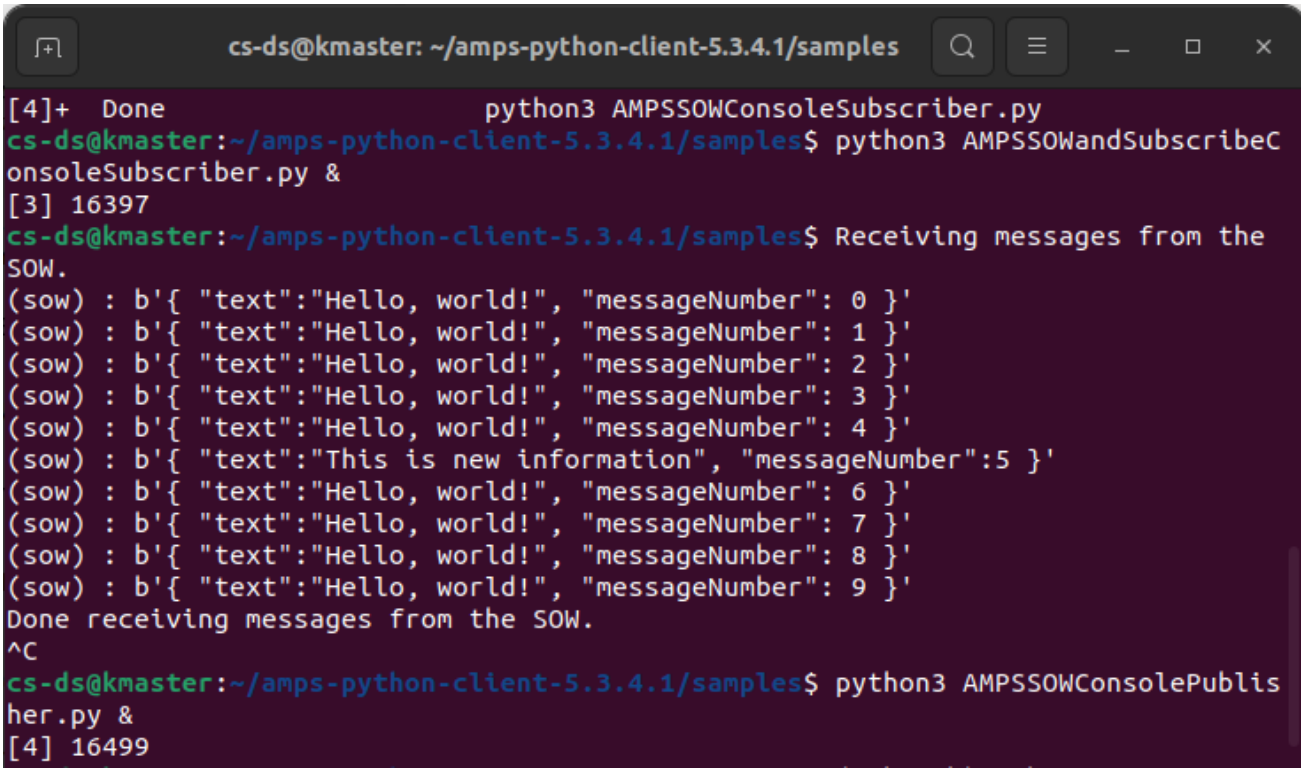
cs-ds@kmaster: ~/amps-python-client-5.3.4.1

```
cs-ds@kmaster:~/amps-python-client-5.3.4.1$ sudo python3 setup.py build install
[sudo] password for cs-ds:
/home/cs-ds/amps-python-client-5.3.4.1/setup_amps.py:30: DeprecationWarning: The
 distutils package is deprecated and slated for removal in Python 3.12. Use setu
ptools or check PEP 632 for potential alternatives
  from distutils.core import setup
/home/cs-ds/amps-python-client-5.3.4.1/setup_amps.py:32: DeprecationWarning: The
 distutils.sysconfig module is deprecated, use sysconfig instead
  from distutils.sysconfig import get_config_var
running build
running build_clib
building 'amps' library
creating src/cpp/lib
creating src/cpp/lib/src
creating src/cpp/lib/src/cpp
creating src/cpp/lib/src/cpp/src
x86_64-linux-gnu-gcc -Wno-unused-result -Wsign-compare -DNDEBUG -g -fwrapv -O2 -
Wall -g -fstack-protector-strong -Wformat -Werror=format-security -g -fwrapv -O2
 -std=gnu11 -Wall -Wdate-time -D_FORTIFY_SOURCE=2 -fPIC -Isrc/cpp/src -Isrc/cpp/
include -Iinclude -c src/cpp/src/client.c -o src/cpp/lib/src/cpp/src/client.o
x86_64-linux-gnu-gcc -Wno-unused-result -Wsign-compare -DNDEBUG -g -fwrapv -O2 -
Wall -g -fstack-protector-strong -Wformat -Werror=format-security -g -fwrapv -O2
 -std=gnu11 -Wall -Wdate-time -D_FORTIFY_SOURCE=2 -fPIC -Isrc/cpp/src -Isrc/cpp/
include -Iinclude -c src/cpp/src/transports.c -o src/cpp/lib/src/cpp/src/transpo
```

cs-ds@kmaster: ~/amps-python-client-5.3.4.1/samples

```
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ python3 AMPSConsolePublisher
.py &
[2] 15810
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ { "hi" : "Hello, world!"}
^C
[2]+  Done                    python3 AMPSConsolePublisher.py
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ python3 AMPSConsoleSubscribe
r.py &
[2] 16034
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ python3 AMPSSOWConsolePublis
her.py &
[3] 16221
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ python3 AMPSSOWConsoleSubscr
iber.py &
[4] 16340
[3]   Done                    python3 AMPSSOWConsolePublisher.py
```


cs-ds@kmaster: ~/amps-python-client-5.3.4.1/samples
[3]   Done   python3 AMPSSOWConsolePublisher.py
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ Receiving messages from the SOW.
{ "text":"Hello, world!", "messageNumber": 0 }
{ "text":"Hello, world!", "messageNumber": 1 }
{ "text":"Hello, world!", "messageNumber": 2 }
{ "text":"Hello, world!", "messageNumber": 3 }
{ "text":"Hello, world!", "messageNumber": 4 }
{ "text":"This is new information", "messageNumber":5 }
{ "text":"Hello, world!", "messageNumber": 6 }
{ "text":"Hello, world!", "messageNumber": 7 }
{ "text":"Hello, world!", "messageNumber": 8 }
{ "text":"Hello, world!", "messageNumber": 9 }
Done receiving messages from the SOW.
^C
[4]+ Done   python3 AMPSSOWConsoleSubscriber.py
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ python3 AMPSSOWandSubscribeConsoleSubscriber.py &
[3] 16397


cs-ds@kmaster: ~/amps-python-client-5.3.4.1/samples
[4]+ Done   python3 AMPSSOWConsoleSubscriber.py
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ python3 AMPSSOWandSubscribeConsoleSubscriber.py &
[3] 16397
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ Receiving messages from the SOW.
(sow) : b'{ "text":"Hello, world!", "messageNumber": 0 }'
(sow) : b'{ "text":"Hello, world!", "messageNumber": 1 }'
(sow) : b'{ "text":"Hello, world!", "messageNumber": 2 }'
(sow) : b'{ "text":"Hello, world!", "messageNumber": 3 }'
(sow) : b'{ "text":"Hello, world!", "messageNumber": 4 }'
(sow) : b'{ "text":"This is new information", "messageNumber":5 }'
(sow) : b'{ "text":"Hello, world!", "messageNumber": 6 }'
(sow) : b'{ "text":"Hello, world!", "messageNumber": 7 }'
(sow) : b'{ "text":"Hello, world!", "messageNumber": 8 }'
(sow) : b'{ "text":"Hello, world!", "messageNumber": 9 }'
Done receiving messages from the SOW.
^C
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ python3 AMPSSOWConsolePublisher.py &
[4] 16499

```
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$ (publish) : b'{ "text":"Hell
o, world!", "messageNumber": 0 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 1 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 2 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 3 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 4 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 5 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 6 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 7 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 8 }'
(publish) : b'{ "text":"Hello, world!", "messageNumber": 9 }'
(publish) : b'{ "text":"This is new information", "messageNumber":5 }'
^C
[4]+  Done                    python3 AMPSSOWConsolePublisher.py
cs-ds@kmaster:~/amps-python-client-5.3.4.1/samples$
```

filter.py

```
c = Client("subscriber")

# Connect and logon
c.connect("tcp://127.0.0.1:9007/amps/json")
c.logon()

# Subscribe with a filter
for m in c.subscribe("test", "/details/items/description LIKE
'kitten' "):
    print ("Received message for topic: %s : %s" % (m.get_topic(),
m.get_data()))
```

publish.py

```
from AMPS import *

# Construct a client object
c = Client("publisher")

# Connect and logon
c.connect("tcp://127.0.0.1:9007/amps/json")
c.logon()

# Publish
c.publish("test", '{ "message" : "Hello, world!" }')
```

subscribe.py

```
from AMPS import *

# Construct a client object
c = Client("subscriber")

# Connect and logon
c.connect("tcp://127.0.0.1:9007/amps/json")
c.logon()

# Subscribe
for m in c.subscribe("test"):
    print ("Received message: %s" % (m.get_data()))
```

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