

Accessory tools

This section describes accessory tools that can be used to manage the WCS server.

Port routing checking

The WCS server may be behind NAT and as such it will require a port range opened for the external network, for instance, UDP 31000-32000. This means a UDP packet sent from the external network to the port in that range should reach the server where WCS is placed.

Hence, we have a simple test. Send a UDP packet from outside using `netcat (nc)` and receive it on the server using `tcpdump`. If the packet reached, the port is open.

nc

For Centos

```
echo -n "hello" | nc -4u -w1 wcs1.com 31000
```

or for Debian/Ubuntu:

```
echo -n "hello" | nc -u -w1 wcs1.com 31000
```

This command sends a simple UDP packet in the given direction.

tcpdump

```
tcpdump udp port 31000
```

This command makes the server listen for a particular port and immediately outputs information about packet arrival to the console:

```
17:50:21.932509 IP myhost.39194 > host.31000: UDP, length 5
```

jstack tool

This is Java utility that provides important information about a Java process and execution threads.

When you run `jstack` from the console, a brief information about `jstack` is shown:

```
[root@localhost bin]# jstack
Usage:
  jstack [-l] <pid>
    (to connect to running process)
  jstack -F [-m] [-l] <pid>
    (to connect to a hung process)
  jstack [-m] [-l] <executable> <core>
    (to connect to a core file)
  jstack [-m] [-l] [server_id@]<remote server IP or hostname>
    (to connect to a remote debug server)

Options:
  -F to force a thread dump. Use when jstack <pid> does not respond (process is hung)
  -m to print both java and native frames (mixed mode)
  -l long listing. Prints additional information about locks
  -h or -help to print this help message
```

If the information is not shown or the jstack utility is not found, use [the installation instruction to latest version of JDK](#). After installing jdk you should create a symbolical link to jstack to quickly run it, if the link is not created during installation:

```
ln -sf /usr/java/default/bin/jstack /usr/bin/jstack
```

Example:

```
jstack 8888 > jstack.report
```

Where `8888` is the ID of the Java process.

Since build [5.2.801](#), WCS is running from `flashphoner` user for security reasons. Therefore, jstack should be launched from the same user if using JDK 8:

```
sudo -u `ps -o uname= -p $(pgrep java)` `which jstack` `pgrep java`
```

Testing channel bandwidth using iperf

A stream published picture quality depends on channel bandwidth between publisher and server, the same for subscriber. Channel bandwidth can be checked using [iperf](#) utility. This program is implemented for all major OS: Windows, MacOS, Ubuntu/Debian, CentOS. iperf in server mode can be installed and running with WCS, that allows to check whole channel bandwidth from publisher to viewer.

iperf can be installed on CentOS 7 as follows:

```
yum install iperf3
```

Run iperf in server mode

```
iperf3 -s -p 5201
```

where `5201` is iperf port for testing client connections

On client side iperf can be launched as follows:

1. To test upload channel bandwidth via UDP:

```
iperf3 -c test2.flashphoner.com -p 5201 -u
```

Where

2. `test2.flashphoner.com` - WCS server
3. `5201` - iperf port to connect

The result of the command above should look like this:

```
Connecting to host test2.flashphoner.com, port 5201
[ 4] local 192.168.0.195 port 51502 connected to 95.191.131.65 port 5201
[ ID] Interval           Transfer             Bandwidth
[ 4]  0.00-1.00    sec   4.50 MBytes      37.7 Mbits/sec
[ 4]  1.00-2.00    sec   5.50 MBytes      46.1 Mbits/sec
[ 4]  2.00-3.00    sec   5.62 MBytes      47.2 Mbits/sec
[ 4]  3.00-4.00    sec   4.00 MBytes      33.6 Mbits/sec
[ 4]  4.00-5.00    sec   3.62 MBytes      30.4 Mbits/sec
[ 4]  5.00-6.00    sec   4.62 MBytes      38.8 Mbits/sec
[ 4]  6.00-7.00    sec   4.75 MBytes      39.8 Mbits/sec
[ 4]  7.00-8.00    sec   2.75 MBytes      23.1 Mbits/sec
[ 4]  8.00-9.00    sec   2.25 MBytes      18.9 Mbits/sec
[ 4]  9.00-10.00   sec   3.62 MBytes      30.4 Mbits/sec
-----
[ ID] Interval           Transfer             Bandwidth
[ 4]  0.00-10.00   sec  41.2 MBytes      34.6 Mbits/sec
[ 4]  0.00-10.00   sec  41.2 MBytes      34.6 Mbits/sec
iperf Done.
```

4. To test download channel bandwidth via UDP

```
iperf3 -c test2.flashphoner.com -p 5201 -u -R
```

Where

5. `test2.flashphoner.com` - WCS server
6. `5201` - iperf port to connect

The result of the command above should look like this:

```
Connecting to host test2.flashphoner.com, port 5201
Reverse mode, remote host test2.flashphoner.com is sending
[ 4] local 192.168.0.195 port 52044 connected to 95.191.131.65 port 5201
[ ID] Interval           Transfer             Bandwidth
[ 4]  0.00-1.00    sec   3.24 MBytes      27.2 Mbits/sec
[ 4]  1.00-2.00    sec   2.69 MBytes      22.5 Mbits/sec
[ 4]  2.00-3.00    sec   2.42 MBytes      20.3 Mbits/sec
[ 4]  3.00-4.00    sec   2.67 MBytes      22.5 Mbits/sec
[ 4]  4.00-5.00    sec   2.69 MBytes      22.5 Mbits/sec
[ 4]  5.00-6.00    sec   2.44 MBytes      20.5 Mbits/sec
[ 4]  6.00-7.00    sec   2.68 MBytes      22.5 Mbits/sec
[ 4]  7.00-8.00    sec   2.85 MBytes      23.9 Mbits/sec
[ 4]  8.00-9.00    sec   2.70 MBytes      22.6 Mbits/sec
[ 4]  9.00-10.00   sec   2.73 MBytes      22.9 Mbits/sec
-----
[ ID] Interval           Transfer             Bandwidth          Retr
[ 4]  0.00-10.00   sec  27.4 MBytes      23.0 Mbits/sec    162
[ 4]  0.00-10.00   sec  27.2 MBytes      22.9 Mbits/sec
```

By default, iperf tests the channel for 10 seconds. This interval should be increased, for example, to 120 second

```
iperf3 -c test2.flashphoner.com -p 5201 -u -t 120
```

The upload channel bandwidth test via UDP result shows the maximum video publishing bitrate without packet losses. In the sample above bitrate should be limited with 1000 kbps, on server side for example

```
webrtc_cc_max_bitrate=1000000
```

Note that iperf major versions on server and on testing client should be the same. Today version 3 is actual, but there is also version 2 in repositories.