Quantum Policy Suite 5.5.1 Troubleshooting Guide

Version 5.5.1

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Cisco Systems, Inc.
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Quantum Policy Suite 5.5.1 Troubleshooting Guide

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Getting Started

Revised: March 14, 2014, OL-29750-01

Welcome to Cisco's Quantum Policy Suite 5.5.1 Troubleshooting Guide.

This document describes common methods and scenarios of correcting processing and production functions for the Quantum Policy Suite.

Read about these topics in these sections:

Readers

This guide is best used by the following readers.

- Deployment engineers
- System administrators
- Network administrators
- Network engineers
- Network operators
- Implementation engineers

This document assumes an intermediate level of understanding of network architecture, configuration, and operations. This document is most helpful if readers have completed Cisco training classes and have a firm introduction to the concepts and behavior of Quantum Policy Suite.

Additional Support

For further documentation and support:

- Contact your Cisco Systems, Inc. technical representative.
- Call the Cisco Systems, Inc. technical support number.
- Write to Cisco Systems, Inc. at support@cisco.com
- Refer to your other documents.

Terms and Definitions

This document uses certain terms and definitions specific to the QPS software application. Please refer to our common Glossary of Terms.

Troubleshooting QPS

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This chapter covers the following topics:

Troubleshooting

- Find out if your problem is related to QPS or another part of your network.
- Gather materials that facilitate the support call.

General Troubleshooting

- Are their specific SNMP traps being reported that can help you isolate the issue?
- Run **/opt/broadhop/installer/diagnostic.sh**

```
[root@lab ~]# exec diagnostics.sh
?[H?[2JQNS Diagnostics
Validating hostnames...[?[32mPASS?[0m]
Checking basic ports (80, 11211, 7070, 8080, 27017,
9091, 9092)...[?[32mPASS?[0m]
Checking qns passwordless logins on all
boxes...[?[32mPASS?[0m]
Checking swap space...
Checking swap memory usage on
pcrfclient01...[?[33mWARN?[0m]
Swap usage is 977 MB. This may indicate that the system
needs more memory allocated. Please monitor closely for
swap usage increase.
If systems memory usage is no longer high, you can reset
swap with: /opt/broadhop/installer/diag/support/
swap2ram.sh
```

```
Checking disk usage...[?[32mPASS?[0m]
Checking QNS RADIUS (UDP) ports (1812, 1813)...
Could not connect to port 1812 on qns01 (Radius access
requests)...[?[1;31mFAIL?[0m]
Could not connect to port 1813 on qns01 (Radius
accounting requests)...[?[1;31mFAIL?[0m]
Retrieving QNS diagnostics from
qns01:9045...[?[33mWARN?[0m]
```

- Run **/opt/broadhop/control/statusall.sh**

```
[root@lab ~]# exec statusall.sh
Executing sudo /etc/init.d/qns status on all QNS Servers
lab
qns-1 (pid 21995) is running...
qns-2 (pid 22035) is running...
Connection to lab closed.
```

- From pcrfclient01, run **tail –f /var/log/broadhop/consolidated-qns.log**

Go to the bottom of the log file and search backwards for 'ERROR'. For more details, see Quantum Policy Suite 5.5.1 Alarming and SNMP Guide, OL-29747-01.

- Look for stack traces.

```
2013-05-28 05:40:36 Error: [InternalErrorException]
Failed finding location.
#0 /var/www/portal/app/Controller/
SubscribersController.php(1420):
Subscriber->getLocation()
#1 /var/www/portal/app/Controller/
SubscribersController.php(45):
SubscribersController->_setLocationAndProfile()
#2 [internal function]:
SubscribersController->beforeFilter(Object(CakeEvent))
#3 /var/www/portal/lib/Cake/Event/
CakeEventManager.php(246): call_user_func(Array,
Object(CakeEvent))
#4 /var/www/portal/lib/Cake/Controller/
Controller.php(670):
CakeEventManager->dispatch(Object(CakeEvent))
#5 /var/www/portal/lib/Cake/Routing/
Dispatcher.php(100): Controller->startupProcess()
#6 /var/www/portal/lib/Cake/Routing/Dispatcher.php(85):
Dispatcher->_invoke(Object(SubscribersController),
Object(CakeRequest), Object(CakeResponse))
#7 /var/www/portal/app/webroot/index.php(153):
Dispatcher->dispatch(Object(CakeRequest),
Object(CakeResponse))
#8 {main}
```

Portal Troubleshooting

- Is the right portal page displaying?
- If not, review the consolidated log output to see what network mapping is being applied and what the location query response is back to the portal.
- Fix any network mapping problems through your portal administration GUI. In a web browser go to <IP_address>users/login and log in as administrator.

- Enable API debugging in the portal by modifying the script **/var/www/portal/app/Config/broadhop.php**
- Run **tail -f /var/www/portal/app/tmp/logs/api_request.log**

```
2013-05-28 05:40:36 Api_request: REQUEST:
Array
(
[method] => POST
[body] => <soapenv:Envelope xmlns:soapenv="http://
schemas.xmlsoap.org/soap/envelope/" xmlns:typ="http://
broadhop.com/unifiedapi/soap/types">
<soapenv:Header/>
<soapenv:Body>
<typ:ExecuteActionRequest>
<typ:code>location-query</typ:code>
<typ:arg>
<typ:code>ip-address</typ:code>
<typ:value><![CDATA[127.0.0.1]]></typ:value>
</typ:arg>
<typ:arg>
<typ:code>port</typ:code>
<typ:value><![CDATA[60147]]></typ:value>
</typ:arg>
</typ:ExecuteActionRequest></soapenv:Body></
soapenv:Envelope>
[uri] => Array
(
[scheme] => http
[host] => 127.0.0.1
[port] => 8080
[path] => /ua/soap
)
[header] => Array
(
[Content-Type] => text/xml;charset="utf-8"
[Cache-Control] => no-cache
[Pragma] => no-cache
[SOAPAction] => ""
[Content-length] => 511
)
)
```

for the older portal version, or else run **tail -f /var/www/portal/app/tmp/logs/qns_calls.log**

for the newer portal version

- Run **tail -f /var/www/portal/tmp/logs/api_response.log**

```
2013-05-28 05:40:36 Api_response: RESPONSE:
object(HttpResponse)#67 (7) {
["body"]=>
string(1274) "<html>
<head>
<meta http-equiv="Content-Type" content="text/
html;charset=ISO-8859-1"/>
<title>Error 404 Not Found</title>
</head>
<body>
<h2>HTTP ERROR: 404</h2>
<p>Problem accessing /ua/soap. Reason:
<pre> Not Found</pre></p>
<hr /><i><small>Powered by Jetty://</small></i>
</body>
</html>
"
```

```
["headers"]=>
array(5) {
["Cache-Control"]=>
string(33) "must-revalidate,no-cache,no-store"
["Content-Type"]=>
string(28) "text/html;charset=ISO-8859-1"
["Content-Length"]=>
string(4) "1274"
["Connection"]=>
string(5) "close"
["Server"]=>
string(21) "Jetty(7.x.y-SNAPSHOT)"
}
["cookies"]=>
bool(false)
["httpVersion"]=>
string(8) "HTTP/1.1"
["code"]=>
string(3) "404"
["reasonPhrase"]=>
string(9) "Not Found"
["raw"]=>
string(1466) "HTTP/1.1 404 Not Found
Cache-Control: must-revalidate,no-cache,no-store
Content-Type: text/html;charset=ISO-8859-1
Content-Length: 1274
Connection: close
Server: Jetty(7.x.y-SNAPSHOT)
<html>
<head>
<meta http-equiv="Content-Type" content="text/
html;charset=ISO-8859-1"/>
<title>Error 404 Not Found</title>
</head>
<body>
<h2>HTTP ERROR: 404</h2>
<p>Problem accessing /ua/soap. Reason:
<pre> Not Found</pre></p>
<hr /><i><small>Powered by Jetty://</small></i>
</body>
</html>
"
}
```

Domain Troubleshooting

- Run **tail –f consolidated-qns.log** from the bottom to determine what domain is being calculated for your call flow.
- The domain calculation comes after the location query response to the portal.
- If the domain calculation is wrong, either the wrong portal has been determined or the wrong domain is associated with your desired portalpage.
- You can fix your domain association through the portal administration page.
- If your domain is correct but the call flow is incorrect after that, access Quantum Policy Builder to review your domain configuration.

RADIUS Troubleshooting

- Test service definition requests from a PEP such as ISG to the QPS by running the following command:

  testaaa group radius L4REDIRECT_SERVICE password legacy

  - Repeat this command for PBHK and OPENGARDEN.
- Listen for RADIUS traffic from the PEP by logging into lb01 and lb02 and run the following command:

  tcpdump –i any port 1812 –s 0 -vvv

Test general subscriber access with the procedures in Check Subscriber Access.

E2E Call Flow Troubleshooting

- On an All-in-One deployment, run the following commands:

  tcpdump –i <any port 80 or 8080 or 1812 or 1700 or 1813 or 3868> –s 0 –vv

  - Append a **–w /tmp/callflow.pcap** to capture output to Wireshark file
- Open the file in WireShark and filter on HTTP or RADIUS to assist debugging the call flow.
- In a distributed model, you need to tcpdump on individual VMs:
  - Load balancers on port 1812, 1813, 1700, 8080 and 3868
  - Portallbs and Portals on ports 80

Correct call flows are shown in Call Flows.

Troubleshooting Basics

Troubleshooting QPS consists of these types of basic tasks:

- Gathering Information
- Collecting logs
- Running traces

This section also presents QPS-specific tasks:

- Common Troubleshooting Scenarios
- System Maintenance and Recovery
- System Maintenance
- Replacing Hardware

Gathering Information

Determine the Impact of the Issue

- Is the issue affecting subscriber experience?
- Is the issue affecting billing?
- Is the issue affecting all subscribers?
- Is the issue affecting all subscribers on a specific service?
- Is there anything else common to the issue?
- Have there been any changes performed on the QPS system or any other systems?
- Has there been an increase in subscribers?
- Is the issue affecting all subscribers?
- Is the issue affecting all subscribers on a specific service?
- Is there anything else common to the issue?

Initially, categorize the issue to determine the level of support needed.

QPS Control Center Interface Guide

The QPS Control Center interface has screens that help you and your Cisco technical representative diagnose troubles.

1. Access the Control Center interface at **http://<ipserver>:8090** on your server. Here, ipserver is lbvip01.
2. Enter your username and password to log in.
3. Click the Monitoring tab and open the tree on the left to examine:
   - System health
   - Current statistics for your system
   - Trends

For Control Center documentation, locate the Cisco Quantum Policy Suite Control Center Interface Guide, document ID 178-266-001-x.x.

QPS Subscriber Services Admin User Interface Guide

The QPS Quantum Subscriber Service Portal interface has screens that help you and your Cisco technical representative diagnose troubles with the portal and its interaction with Quantum Policy Builder.

1. Access the Quantum Subscriber Service Portal interface at http://<ipserver>/users/login on your server. Here ipserver is sslvip01.
2. Log in as an admin user.
3. Click Settings and use any of these screens underneath:
   - Configuration Check
   - Location Settings
   - Query Map
   - QPS Logs

For Quantum Subscriber Service Portal documentation, locate the Cisco Quantum Policy Suite Quantum Subscriber Service Portal Admin User Interface Guide, document ID 178-727-002-x.x.

Check Zabbix Information

- Is there any alarming in Zabbix that would indicate a component or connectivity failure?
- Do any of the KPIs indicate a change in the call flow or subscriber volume?

Check NMS Information

This is not as detailed as Zabbix KPIs or component views but provides a wider view of the entire system.

- Is there any alarming that would indicate a component or network failure?
- Are there any KPIs that indicate changes in the call flow or traffic volume?

Common Troubleshooting Scenarios

Scenario - No Response to Diameter Request

Using TCPDUMP

- Collect tcpdump packet capture from the primary IOmanager:

  tcpdump –i any –port 3868 –s0 –w filename test.pcap

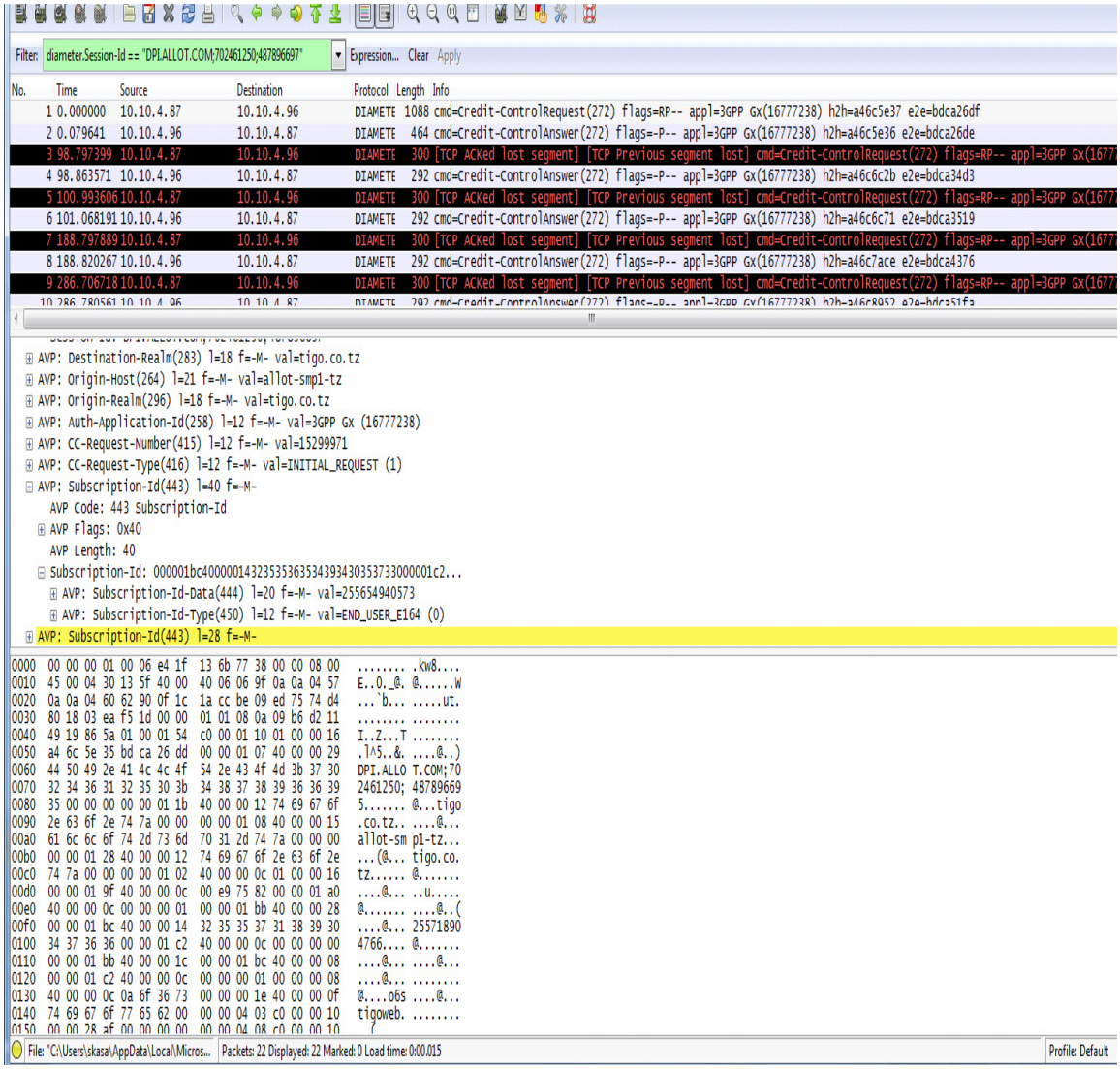
In the collected trace file,

- Verify that the response message is sent back to PCEF.
- Use Session-Id as filter if the Session-Id of the user's session is available.
- If Session-Id for the user is not available, use MSISDN as filter to retrieve the Session-Id. Then apply Session-Id filter to view all the messages for the session.
- Match the request to response for Credit Control Request, CC-Request-Type attribute (Initial/Update/Terminate).

QPS Logs

- Verify the consolidated-qns.log on PCRFCLIENT01 for any exceptions with policy executions, for example, Null Pointer Exception.
- Filter using Session-Id

TCPDUMP – User Id Filter



- Filter using Subscription-Id-Data (MSISDN) to retrieve the CCR initial request
- Start the policy trace for a subscriber using MSISDN as the search string. For example, in a deployment with qns01-04,

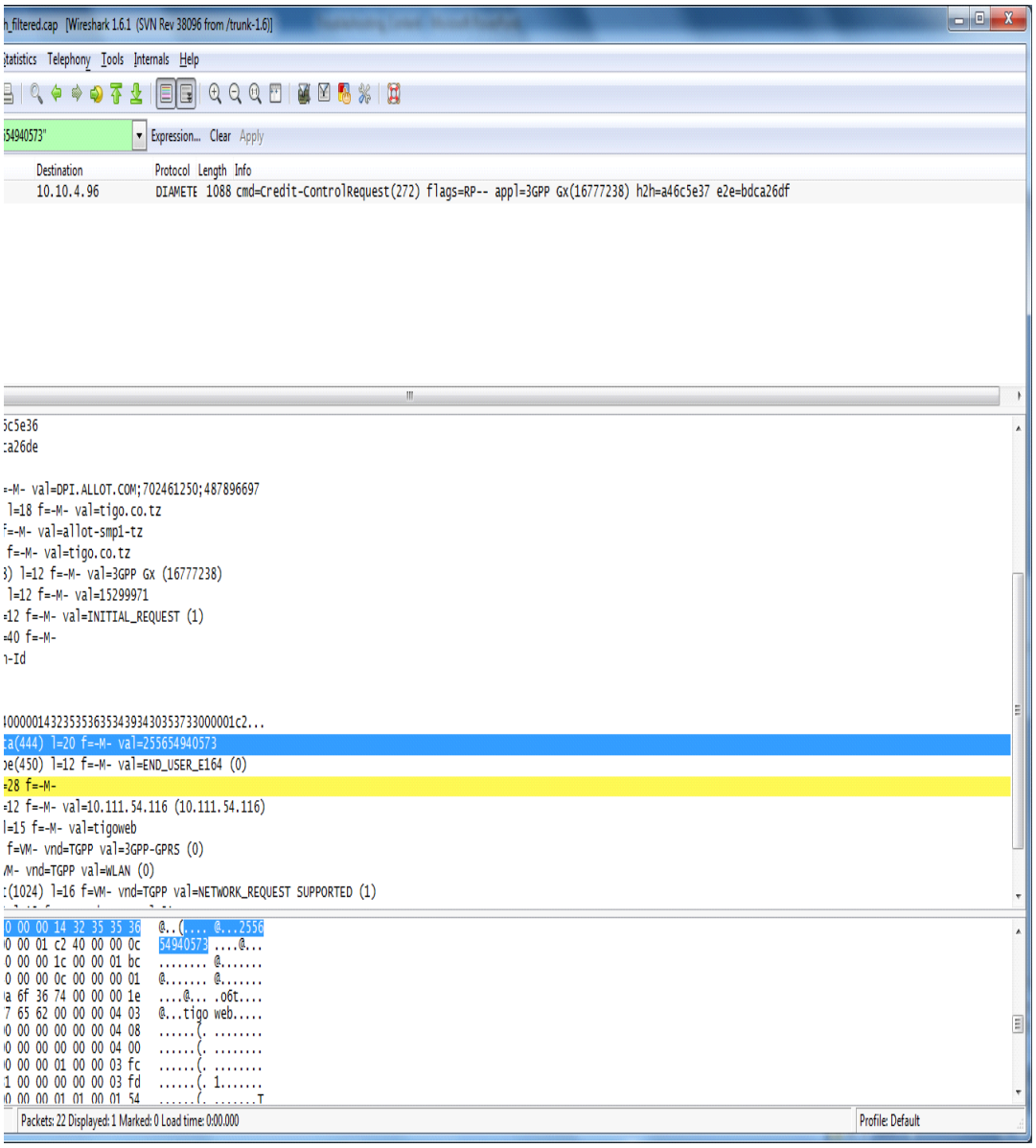
```
java -DsearchString=255654940574
-Dservers=qns01,qns02,qns03,qns04 -DtraceLogging=true
-jar traceMonitor.jar &> /var/tmp/policy-trace.log &
```

- When a deployment with qns01-06

```
java -DsearchString=255654940574
-Dservers=qns01,qns02,qns03,qns04,qns05,qns06
-DtraceLogging=true -jar traceMonitor.jar &> /var/tmp/policy-trace.log &
```

- The Policy trace logs all policies executed for each message handled for the user.
- Verify the log to match requests and responses using CC-Request-Type attribute in the request/response.
- Verify the log for any policy execution errors.

No Response – Using Policy Trace



Policy Trace – Match Response

Use the search string “Set Diameter Session Key” to identify incoming request

```
[255654940573] Policy executed "Set Diameter Session
Key"[255654940573]Triggering Conditions[255654940573]
Object ID : 21, Class:
com.broadhop.diameter.gx.allot.messages.DiameterCCRMess
age[255654940573]{subIdType=1, calledStationID=tigoweb,
requestId=bb487926-41c2-459f-aafd-d768cf5abe38#1026576,
msisdn=255654940573, originHost=allot-smp1-tz,
originRealm=tigo.co.tz, stackName=10.10.4.96:3868,
requestType=1, framedIpAddress=10.111.17.98,
bearerOperation=1, requestNumber=10660733,
usageVolume=-1,
sessionId=DPI.ALLOT.COM;702461250;485609944,
bearerIdentifier=1, eventTrigger=[],
chargingRuleReport=[], imsi=,
usageMonitoringControl=[]}
```

- Use the search string “Send Allot Gx Answer Message” to identify matching response

```
[255654940573]Object ID : 21, Class:
com.broadhop.diameter.gx.allot.messages.DiameterCCRMess
age[255654940573]{subIdType=1, calledStationID=tigoweb,
requestId=bb487926-41c2-459f-aafd-d768cf5abe38#1026576,
msisdn=255654940573, originHost=allot-smp1-tz,
originRealm=tigo.co.tz, stackName=10.10.4.96:3868,
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requestType=1, framedIpAddress=10.111.17.98,
bearerOperation=1, requestNumber=10660733,
usageVolume=-1,
sessionId=DPI.ALLOT.COM;702461250;485609944,
bearerIdentifier=1, eventTrigger=[],
chargingRuleReport=[], imsi=,
usageMonitoringControl=[]}[255654940573]Policy object
changes: No changes[255654940573]Actions
executed[255654940573]
com.broadhop.diameter.actions.ISendDiameterAnswerSynch
```

Maintenance Window Procedures

The usual tasks for a maintenance window might include these:

- Change Request Procedure
- Software Upgrades
- Application Restarts
- VM Restarts
- Hardware Restarts
- Planned Outages

Prior to any Maintenance

Backup all relevant information to an offline resource. For more information on backup, see Quantum Policy Suite 5.5 Backup and Restore Guide.

- Data—Backup all database information. This includes Quantum MsBM, Quantum Unified SuM.

Note Sessions can be backed up as well.

- Configurations—Backup all configuration information. This includes SVN (from PCRFClient), the **/etc/broadhop** directory from all PCRFs
- Logs—Backup all logs for comparison to the upgrade. This is not required, but will be helpful if there are any issues

Change Request Procedure

- Have proper sign off for any change request. Cisco and all customer teams must sign off.
- Make sure the proposed procedures are well defined.
- Make sure the rollback procedures are correct and available.

Software Upgrades

- Determine if the software upgrade will cause an outage and requires a maintenance window to perform the upgrade.
- Typically software upgrades can be done on one node a time and so minimize or eliminate any outage.
- Most of the time, an upgrade requires a restart of the application. Most applications can be started in less than 1 minute.

Application Restarts

Application restarts are component independent. These are the components:

- PCRF/PCRFClient
- Load Balancer/IO Manager
- sessionMgr

IO Manager, PCRF, PCRFClient

- IO Managers and PCRF give up their resources and allow the fail overs to take over. They can be stopped directly with **service qns restart**
- PCRFClient is a GUI application and can be restarted at any point. If SVN is restarted, the PCRF applications continue to run, but throw errors saying that they cannot check for new configurations. This will not impact the environment.
- sessionMgr is deployed as active - standby and is used by the policy server to maintain the subscriber session state information.

- Load Balancers distribute the load for RADIUS, Web Services, MySQL, LDAP, and SVN. Two load balancers are deployed for each Quantum Policy Suite in active/passive mode.

VM Restarts

- LINUX must be shutdown normally for VM restarts.
- All VMs are Linux.
- The preferred methods are **Init 0 or shutdown –h**
- Failure to use the Linux OS shutdown can result in VM corruption and problems restarting the VM and applications.
- VM restart is typically done to increase resources to the VM (disk, memory, CPU).

Hardware Restarts

- Hardware restarts should be rare.
- When a hardware restart is needed, VMs must be shutdown first.
- When all VMs are stopped, shutdown the hardware with either the ESXi console or as a power off.

Planned Outages

- Planned outages are similar to hardware restarts.
- VMs need to be shutdown, hardware can then be stopped.
- When hardware is started, the typical hardware starting order is:
  - Start the servers with PCRFClient01, LB01, and SessionMgr01 first.
  - Start all other servers in any order after that.

Non-maintenance Window Procedures

Tasks you can perform as non-maintenance, that is at any time, are these:

- Data archiving or warehousing
- Log removal

Common Troubleshooting Tasks

This section describes frequently used troubleshooting tasks you might use before calling support or as directed by support.

Kill All Cisco Processes From the Command Line as Root

Depending on the Linux version, one or both of these ps commands are applicable. Remove the portion '| xargs kill -9' if you want to test out the command.

These commands do the following:

- print out all processes (ps), then
- search (grep) for all processes that do not contain the word grep or

mysql, then

- use sed to remove all the remaining text except for the PID value, and

then

- send that PID to kill -9.

PIDs must be 3 characters to 5 characters long.

```
[root@lab ~]# ps -A
PID TTY TIME CMD
1 ?              00:00:00 init
2 ?              00:00:01 migration/0
3 ?              00:00:00 ksoftirqd/0
4 ?              00:00:01 migration/1
5 ?              00:00:00 ksoftirqd/1
6 ?              00:18:49 events/0
7 ?              00:00:00 events/1
8 ?              00:00:00 khelper
49 ?             00:00:00 kthread
54 ?             00:00:00 kblockd/0
55 ?             00:00:00 kblockd/1
56 ?             00:00:00 kacpid
217 ?            00:00:00 cqueue/0
218 ?            00:00:00 cqueue/1
221 ?            00:00:00 khubd
223 ?            00:00:00 kseriod
299 ?            00:00:00 khungtaskd
300 ?            00:00:00 pdflush
301 ?            00:01:09 pdflush
302 ?            00:00:01 kswapd0
303 ?            00:00:00 aio/0
304 ?            00:00:00 aio/1
510 ?            00:00:00 kpsmoused
554 ?            00:00:00 mpt_poll_0
555 ?            00:00:00 mpt/0
556 ?            00:00:00 scsi_eh_0
560 ?            00:00:00 ata/0
561 ?            00:00:00 ata/1
562 ?            00:00:00 ata_aux
569 ?            00:00:00 kstriped
582 ?            00:00:00 ksnapd
597 ?            00:04:19 kjournald
623 ?            00:00:00 kauditd
656 ?            00:00:00 udevd
2168 ?           00:00:00 kmpathd/0
2169 ?           00:00:00 kmpathd/1
2171 ?           00:00:00 kmpath_handlerd
2194 ?           00:00:00 kjournald
2664 ?           00:00:00 vmmemctl
2795 ?           00:02:38 vmtoolsd
2877 ?           00:00:00 iscsi_eh
2920 ?           00:00:00 cnic_wq
```

```
2924 ?           00:00:00 bnx2i_thread/0
2925 ?           00:00:00 bnx2i_thread/1
2939 ?           00:00:00 ib_addr
2949 ?           00:00:00 ib_mcast
2950 ?           00:00:00 ib_inform
2951 ?           00:00:00 local_sa
2954 ?           00:00:00 iw_cm_wq
2958 ?           00:00:00 ib_cm/0
2959 ?           00:00:00 ib_cm/1
2963 ?           00:00:00 rdma_cm
2984 ?           00:00:00 iscsiuio
3784 ?           00:06:49 snmpd
3799 ?           00:00:00 snmptrapd
3814 ?           00:00:21 memcached
3836 ?           00:00:00 sshd
3857 ?           00:00:00 ntpd
3870 ?           00:00:00 mysqld_safe
3925 ?           00:00:19 mysqld
3977 ?           00:00:01 gpm
3992 ?           00:00:01 httpd
4006 ?           00:03:18 collectd
4058 ?           00:00:00 crond
4077 ?           00:00:42 pcrfclient_avai
4079 ?           00:00:34 qns_availabilit
4081 ?           00:00:17 database_availa
4082 ?           00:00:13 server_availabi
4098 ?           00:00:00 atd
4169 ?           00:00:03 avahi-daemon
4170 ?           00:00:00 avahi-daemon
4302 ?           2-15:01:05 java
4324 ?           00:21:27 java
4375 ?           00:20:32 mongod
4380 tty1        00:00:00 mingetty
4381 tty2        00:00:00 mingetty
4382 tty3        00:00:00 mingetty
4383 tty4        00:00:00 mingetty
4384 tty5        00:00:00 mingetty
4393 tty6        00:00:00 mingetty
4395 ?           00:00:00 gdm-binary
4433 ?           00:00:00 gdm-binary
4435 ?           00:00:02 gdm-rh-security
4436 tty7        00:05:28 Xorg
5022 ?           00:00:00 ntpd
14425 ?          00:00:00 sshd
14487 pts/0      00:00:00 bash
14823 ?          00:00:00 sleep
14837 ?          00:00:00 sleep
14854 ?          00:00:00 sleep
15014 ?          00:00:00 sleep
15019 pts/0      00:00:00 ps
25203 ?          00:00:00 gnome-vfs-daemo
25316 ?          00:00:00 pam_timestamp_c
28836 ?          00:00:06 httpd
28837 ?          00:00:06 httpd
28838 ?          00:00:06 httpd
28839 ?          00:00:06 httpd
28840 ?          00:00:06 httpd
28841 ?          00:00:06 httpd
28842 ?          00:00:06 httpd
28843 ?          00:00:06 httpd
[root@lab ~]#
```

Low or Out of Disk Space

To determine the disk space used, use these Linux disk usage and disk free commands:

- **du**
- **df**

df Command

Example is provided at

home# df -h

df

Response to this command is as follows:

```
Filesystem Size Used Avail Use% Mounted on
/dev/cciss/c0d0p5 56G 27G 26G 51% /
/dev/cciss/c0d0p1 99M 12M 83M 12% /boot
tmpfs 2.0G 0 2.0G 0% /dev/shm
none 2.0G 0 2.0G 0% /dev/shm
/dev/cciss/c0d0p2 5.8G 4.0G 1.6G 73% /home
```

As shown above, the **/home** directory is using the most of it's allocated space (73%).

du Command

The /home directory is typically for /home/admin but in some cases, there is also

/home/qns or /home/remote. You can check both:

du

An example of this command is found at:

home# du -hs * Linux Disk Usage command

This command produces this output:

```
[root@lab home]# du -hs
160M .
[root@lab home]# du -hs *
1.3M   qns
158M   remote
36K    testuser
```

The **du** command shows where the space is being used. By default, the **du** command by itself gives a summary of quota usage for the directory specified and all subdirectories below it.

Note By deleting any directories, you remove the ability to roll back if for some reason an update is not working correctly. Only delete those updates to which you would probably never roll back, perhaps those 6 months old and older.

Frequently Encountered Troubles

This section lists trouble issues already diagnosed and solved.

Subscriber not Mapped on SCE

This issue was causing the subscriber to get no mapping on the SCE.

1. Write an awk script to perform the following grep to create a text file of over 1000 instances of this message:

```
grep "No member in system" policy.log* >
no_member_found.txt
```

   This grep resulted in a file with these lines:

```
policy.log:2009-07-17 11:00:21,201 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for d162818
policy.log:2009-07-17 11:02:06,108 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for D02625
policy.log.1:2009-07-17 09:25:29,036 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for D162346
policy.log.1:2009-07-17 09:27:28,718 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for d162365
policy.log.1:2009-07-17 09:27:37,193 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for d162365
policy.log.1:2009-07-17 09:27:42,257 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for d162365
policy.log.1:2009-07-17 09:38:09,010 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for d02116
policy.log.1:2009-07-17 09:38:12,618 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for D163647
policy.log.1:2009-07-17 09:40:42,751 INFO
wikiimport:com.broadhop.sme.business.network.accounting.Ne
tworkAccountingUtil No member in system for d102096
```

2. Then use the following awk script to generate a new file that only has the user name. The script says print the 10th field:

```
awk '{print $10}' no_member_found.txt >
no_member_found_usernames_with_dupes.txt
```

3. Run the following command to remove duplicates:

```
sort no_member_found_usernames_with_dupes.txt | uniq >
uniq_sorted_no_member_found_usernames.txt
```

This resulted in a file with usernames only:

```
D00059
D00077
D001088
D00112
d001313
D00145
D001452
```

```
d00156
D00186
d00198
D00200
d00224
```

QPS Server Will Not Start and Nothing is in the Log

If the QPS server does not start (or starts and immediately crashes) and no errors appear in **/var/log/broadhop/qns.log** to give reasons it did not start, check the following list:

1. **Check /var/log/broadhop/service-qns-1.log**
2. Check **/etc/broadhop/servers**
   - There should be an entry in this file for the current host name (Type 'hostname' in the console window to find the local hostname)
   - There must be directory that corresponds to the hostname entry with config files. That is, if the servers file has svn01=controlcenter, there must be a /etc/broadhop/control center directory
3. Attempt to start the server directly from the command line and look for errors.
   - Type: **/opt/broadhop/qns/bin/qns.sh**
   - The server should start up successfully and the command line should not return. If the command prompt returns then the server did not start successfully.
   - Look for any errors displayed in the console output
4. 4. Look for OSGi Errors
   - Look in /opt/broadhop/qns/configuration for a log file. If any exist examine the log file for error messages.

Server returned HTTP Response Code: 401 for URL

A 401 type error means you're not logging in to SVN with proper credentials.

The server won't start and the following appears in the log:

```
2010-12-10 01:05:26,668 \[SpringOsgiExtenderThread-8\]
ERROR c.b.runtime.impl.RuntimeLoader - There was an error
initializing reference data\!
java.io.IOException: Server returned HTTP response code:
401 for URL: http://lbvip01/repos/run/config.properties
sun.net.www.protocol.http.HttpURLConnection.getInputStream
(HttpURLConnection.java:1313) \~\[na:1.6.0_20\]
org.springframework.core.io.UrlResource.getInputStream(Url
Resource.java:124) \~\[org.springframework.core_3.0.0.REL
```

To fix this error:

- Edit **/etc/broadhop/qns.conf**
- Ensure that the configuration URL and repository credentials hostnames match.

```
\-Dcom.broadhop.config.url=http://lbvip01/repos/run/
\-Dcom.broadhop.repository.credentials=broadhop/
broadhop@lbvip01
```

com.broadhop.exception.BroadhopException: Unable to Find System Configuration for System

Symptoms: server won't stay started and the log displays this:

```
com.broadhop.exception.BroadhopException: Unable to find system configuration for
system:
The system that is set up in your Quantum Policy Builder (and cluster name) must match
the one specified in /etc/broadhop/qns.conf. Either add or change this via the Quantum
Policy Builder interface, and then publish or update the system/clustername in
/etc/broadhop/qns.conf
\-Dcom.broadhop.run.systemId=poc-system
\-Dcom.broadhop.run.clusterId=cluster-1
```

Log Files Display the Wrong Time but the Linux Time is Correct

If log files or other dates are showing in the incorrect time zone despite the Linux time being set to the proper time zone, most likely the time zone that the JVM reads is incorrect.

1. In **/etc/sysconfig**, run the command **cat clock** to see this output:

   ```
   ZONE="America/Denver"
   UTC=false
   ARC=false
   ```
2. Change the ZONE line to the time zone you desire, for instance you could change it to:

   ```
   ZONE="Asia/Singapore"
   UTC=false
   ARC=false
   ```
   to change the JVM time zone to Singapore time.

The value for ZONE is driven by the directories in **/usr/share/zoneinfo**

JMX Management Beans are not Deployed

1. Restart the QPS Server. The JMX Beans sometimes are not deployed when features are installed or updated.
2. Run **ps -ef | grep java** and look for: '**-javaagent:/opt/broadhop/qns/bin/jmxagent.jar**'. If this is absent, you have an old build and need to update.
3. If you have an old build, see the Operations guide for instructions on updating.

Unable to Access Binding Information

Make sure the binding has been compiled.

This error is typically caused by a bad build.

Attempt to upgrade to a newer build.

If you're on a released build, try restarting, there's been a strange bug which causes web service problems after update.

```
2010-10-19 12:05:00,194 [pool-4-thread-1] ERROR
c.b.d.impl.DiagnosticController - Diagnostic failed. A
problem exists with the system --> Common Services: Feature
com.broadhop.ws.service is unabled to start. Error: Error
```

```
creating bean with name
'org.springframework.web.servlet.mvc.annotation.DefaultAnn
otationHandlerMapping#0' defined in URL [bundleentry://
27.fwk15830670/META-INF/spring/bundle-ws-context.xml]:
Initialization of bean failed; nested exception is
org.springframework.beans.factory.BeanCreationException:
Error creating bean with name 'subscriberEndpoint' defined
in URL [bundleentry://27.fwk15830670/META-INF/spring/
bundle-ws-context.xml]: Cannot resolve reference to bean
'jibxMarshaller' while setting bean property 'marshaller';
nested exception is
org.springframework.beans.factory.BeanCreationException:
Error creating bean with name 'jibxMarshaller' defined in
URL [bundleentry://27.fwk15830670/META-INF/spring/
bundle-ws-context.xml]: Invocation of init method failed;
nested exception is org.jibx.runtime.JiBXException: Unable
to access binding information for class
com.broadhop.ws.impl.messages.RemoveSubscriberProfileReque
st
```

Error Processing Package, Reference Data Does Not Exist for NAS IP...

```
2010-10-19 13:25:53,481 [pool-11-thread-1] ERROR
c.b.u.t.udp.UdpMessageListener - Error processing packet {}
com.broadhop.exception.BroadhopException: Radius reference
data does not exist for NAS IP 192.168.180.74 or 10.0.0.52
at
com.broadhop.radius.impl.RadiusReferenceData.getRadiusDevi
ce(RadiusReferenceData.java:111)
~[com.broadhop.radius.service_1.0.0.release.jar:na]
at
com.broadhop.radius.impl.RadiusReferenceData.getSharedSecr
et(RadiusReferenceData.java:130)
~[com.broadhop.radius.service_1.0.0.release.jar:na]
at
com.broadhop.radius.impl.RadiusMessageListener.getSharedSe
cret(RadiusMessageListener.java:247)
~[com.broadhop.radius.service_1.0.0.release.jar:na]
at
com.broadhop.radius.impl.RadiusMessageListener.processPack
et(RadiusMessageListener.java:86)
~[com.broadhop.radius.service_1.0.0.release.jar:na]
at
com.broadhop.utilities.transports.udp.UdpMessageListener$1
.run(UdpMessageListener.java:192)
~[com.broadhop.utility_5.1.1.r019218.jar:na]
at
java.util.concurrent.Executors$RunnableAdapter.call(Unknow
n Source) [na:1.6.0_21]
at
java.util.concurrent.FutureTask$Sync.innerRun(Unknown
Source) [na:1.6.0_21]
at java.util.concurrent.FutureTask.run(Unknown
Source) [na:1.6.0_21]
Quantum Policy Builder Copyright 2013 Cisco Systems. All rights reserved.
Troubleshooting Guide Issue 1.0 August 2013
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at
java.util.concurrent.ThreadPoolExecutor$Worker.runTask(Unk
nown Source) [na:1.6.0_21]
at
java.util.concurrent.ThreadPoolExecutor$Worker.run(Unknown
```

```
Source) [na:1.6.0_21]
at java.lang.Thread.run(Unknown Source)
[na:1.6.0_21]
```

Ensure that this NAS IP has been set up in Quantum Policy Builder under Reference Data->Policy Enforcement Points. If you use an ISG, add to the ISG Pools folder. Otherwise, add to the RADIUS Device Pools folder. The IP's that matter are in the 'Devices' table on the ISG Pool object itself.

REST Web Service Queries Returns an Empty XML Response for an Existing User

For example:

<subscriberProfile><content/></subscriberProfile>

Because there are multiple ways needed to return web service data, the BroadHop Web Service Blueprint doesn't return any XML by default. To fix this issue, configure the 'Default Web Service Query Response' blueprint under the 'BroadHop Web Services' Blueprint.

Error in Datastore: "err" : "E11000 Duplicate Key Error Index

Note This removes ALL sessions

Typically, duplicate keys like this happen when initially configuring policies and switching primary keys. In a production scenario, you may not want to remove all sessions.

1. **ssh** into sessionmgr01
2. Open SessionMgr CLI

   /usr/bin/mongo --port 27717

   Using **/usr/bin/mongo** indicates whether the mongo replica set is primary or secondary.
3. Enter following commands on the MongoDB CLI

   use session_cache;

   db.session.remove();
4. If it gives you a 'not master' error, log into sessionmgr02 and do the same

Error Processing Request: Unknown Action

```
com.broadhop.policy.impl.RulesPolicyService - Error
processing policy request: Unknown action:
com.broadhop.pop3auth.actions.IPOP3AuthRequest and Remote
Actions are disabled.
```

If you see an error of the type above, it means that the implementation class it's looking for is not available on the server.

This can be caused by:

- The component needed is not installed on the server.

- Ensure that the pop3auth service is installed in your server.
- Look for exceptions in the logs when starting up.
- Try restarting the service bundle (pop3auth service in this case) using the OSGi console and looking at the logs.

Memcached Server is in Error

```
ERROR c.b.d.impl.DiagnosticController - Diagnostic failed.
A problem exists with the system --> Common Services:
2:Memcached server is in error
```

1. 1. Log on to the server where qns is running
2. 2. telnet to the memcache server's IP and port 11211 (ex: telnet lbvip01 11211).

   You can figure out which memcache server QPS is pointing to in Quantum Policy Builder. Look at: Reference Data->Systems> <System Name> -> Cluster Name

   a. If you can't telnet to the port, do this

   Ensure memcache is running:

   – Log on to server where memcache is running

```
run service memcached status
[root@sessionmgr01 ~]# service memcached status
memcached is stopped
```

   – If the service is stopped, start it:

```
[root@sessionmgr01 ~]# service memcached start
Starting a new distributed memory caching
(memcached) process for 11211:
```

   b. Ensure firewall configuration is OK:

   To check if this is the problem, just stop the firewall.

   /etc/init.d/iptables stop

   If it is the problem, add an exception in **/etc/sysconfig/iptables**. Look at other entries in the file for an example.

   After adding an exception, restart iptables **/etc/init.d/iptables restart**

Unknown Error in Logging: License Manager

```
2010-12-12 18:51:32,258 [pool-4-thread-1] ERROR
c.b.licensing.impl.LicenseManager - Unknown error in
logging
java.lang.NullPointerException: null
at
com.broadhop.licensing.impl.LicenseManager.checkFeatures(L
icenseManager.java:311) ~[na:na]
```

This issue may occur if no license has been assigned yet.

Option 1: If this is for development or Proof Of Concept deployments, you can turn on developer mode. This effectively gives you 100 users but is not for use in production.

1. Login to qps.
2. Add the following to the **/etc/broadhop/qns.conf** file:

-Dcom.broadhop.developer.mode=true

3. Restart qps

Option 2: Generate a real license. Have your Cisco technical representative send you the Technical Article *Tool com.broadhop.licensing.service - Creating a QPS License.*

Ecore File is Not Generated:

```
(Example shown is RADIUS feature)
2010-12-12 18:39:34,075 [SpringOsgiExtenderThread-8] ERROR
c.b.runtime.impl.RuntimeLoader - Unable to load class:
com.broadhop.refdata.radius.RadiusPackage. Ecore file is
not generated http://lbvip01/repos/run/
com.broadhop.radius.ecore
```

A feature (RADIUS) has been installed in Quantum Policy Builder, but is not installed on the server. Or, a features file being accessed is not where features have been placed.

1. Check if the feature is installed in your server by running **/opt/broadhop/qns/bin/features.sh**.
2. If the feature IS installed, you probably are pointing to (or publishing to) the wrong repository. Check where you're publishing to in Policy Builder and check and what URL you are pulling from in **/etc/broadhop/qns.conf**
3. If the feature IS NOT installed, you may be pointing to a different features file than you expect. Do this:
   a. Login to QPS server and find the name of the qns server you are on
   b. Type: **hostname**
   c. Check **/etc/broadhop/servers** file

   Whatever is listed next to the hostname you are using should also have a directory in the **/etc/broadhop** directory. It is in THAT directory you should change the features file. This defaults to qns01 to 'iomanager'.

   Change it to 'pcrf'.

Logging Does Not Appear to be Working

1. Run the JMX Command:

```
/opt/broadhop/qns/bin/jmxcmd.sh
ch.qos.logback.classic:Name=default,Type=ch.qos.logback
.classic.jmx.JMXConfigurator Statuses
```

or

2. Access that bean using JMX Term or JConsole to view the status of the Logback Appenders. To access JMX Term, follow these steps:
   - Execute below script: **/opt/broadhop/qns-1/bin/jmxterm.sh**
   - If user does not have permission to execute the command then change the permission using below command:

   chmod 777 opt/broadhop/qns-1/bin/jmxterm.sh

   - Again execute the script: **/opt/broadhop/qns-1/bin/jmxterm.sh**

- Once command is executed, JMX terminal opens up.
- Execute the below command to open connection:

$>open qns01:9045

- All beans can be seen using below command

$>beans

```
#domain = JMImplementation:
JMImplementation:type=MBeanServerDelegate
#domain = ch.qos.logback.classic:
ch.qos.logback.classic:Name=default,Type=ch.qos.logba
ck.classic.jmx.JMXConfigurator
#domain = com.broadhop.action:
com.broadhop.action:name=AddSubscriberService,type=hi
stogram
com.broadhop.action:name=AddSubscriberService,type=se
rvice
com.broadhop.action:name=GetSessionAction,type=histog
ram
com.broadhop.action:name=GetSessionAction,type=servic
e
com.broadhop.action:name=GetSubscriberActionImpl,type
=histogram
com.broadhop.action:name=GetSubscriberActionImpl,type
=service
com.broadhop.action:name=LockSessionAction,type=histo
gram
com.broadhop.action:name=LockSessionAction,type=servi
ce
com.broadhop.action:name=LogMessage,type=histogram
com.broadhop.action:name=LogMessage,type=service
com.broadhop.action:name=OCSLoadBalanceState,type=his
togram
com.broadhop.action:name=OCSLoadBalanceState,type=ser
vice
java.nio:name=mapped,type=BufferPool
#domain = java.util.logging:
java.util.logging:type=Logging
```

Cannot Connect to Server Using JMX: No Such Object in Table

This is likely caused because the server's name is not set up in the hosts file with its proper IP address.

In /etc/hosts the hostname (e.g., qns01) SHOULD NOT be aliased to 127.0.0.1 or localhost.

If improperly aliased, JMX tells the server it's connecting to connect back with the IP of it's hostname. If it's aliased to localhost (127.0.0.1), the server attempts to open connections with itself, which is unfortunate.

Example Error:

```
ERROR com.broadhop.management.JmxClient -
Unable to connect to JmxClient: iomgr01:9045. Cause: no
such object in table Will attempt to reconnect.
```

File System Check (FSCK) Errors

During machine boot, **fsck** is run on file systems to check its consistency. This consistency check is done without user intervention and automatically fixes errors which it can. But sometimes, if there is a hard reset to QPS VM/machine, for example, because of abrupt power failure, then during **fsck**, all the problems are not automatically fixed and user intervention is must to fix theerrors reported by fsck. The table below describes the common fsck errors along with their description and solution.

Table 2-1 FSCK Errors

SNo.	FSCK Error	Description/Solution
1	BAD SUPER BLOCK: MAGIC NUMBER WRONG USE ALTERNATE SUPER-BLOCK TO SUPPLY NEEDED INFORMATION	This error comes when file system is cleanly unmounted. Some superblock corruptions can be automatically repaired. But for some like BAD MAGIC number, fsck aborts and alternate superblock must be specified to fsck command to continue file system check. Reference link to fix the issue - http://www.cyberciti.biz/faq/recover-bad-superblock-from-corrupted-partition/
2	Block bitmap not in a group/inode bitmap not in a group	When this error occurs, data on the device need to be restored using dd or any other device specific command. Reference link to fix the issue - https://bbs.archlinux.org/viewtopic.php?id=128478 http://serverfault.com/questions/131536/ext3-fs-block-bitmap-for-group-1-not-in-group-block-0-is-fs-dead
3	Inode table not in a group	When this error occurs, data on the device need to be restored using dd or any other device specific command. Reference link to fix the issue - http://www.linuxquestions.org/questions/linux-hardware-18/missing-inode-table-646788/
4	Primary superblock is corrupt	Please refer to Error 1, apart from bad magic number if fsck detects corruption in any static parameters of primary superblock (file system size, inode list size etc) it requests operator to specify location of alternate superblock.
5	Journal superblock has an unknown read-only feature flag set	Please refer to Error 1 to 4 to fix this issue.
6	Resize inode is invalid	This error occurs after file system is resized. Reference link to fix this issue - https://bugzilla.redhat.com/show_bug.cgi?id=156954

Table 2-1 FSCK Errors

SNo.	FSCK Error	Description/Solution
7	Last mount time is in the future	This error occurs after reboot system clock is not synchronized with UTC. Reference link to fix this issue - http://forums.debian.net/viewtopic.php?t=45797
8	Root directory is not an inode	If primary superblock is corrupt this error occurs, alternate superblock needs to be specified to fsck in this case. Reference link to fix this issue - http://serverfault.com/questions/204617/causes-of-sudden-massive-filesystem-damage-root-inode-is-not-a-directory http://www.programmersheaven.com/user/mariapeter12/blog/4320-Resolving-Root-inode-is-not-a-directory-Clear-Linux-Error/
9	Duplicate '..' entry	An indirect block is a pointer to a list of every block claimed by an inode. fsck checks every block number against a list of allocated blocks: if two inodes claim the same block number, that block number is added to a list of duplicate block numbers. The administrator may be asked to choose which inode is correct, and usually time to verify files against backups. fsck additionally checks the integrity of the actual block numbers, which can also become corrupt - it should always lie in the interval between the first data block and the last data block. If a bad block number is detected, the inode is cleared. Similar to above example, this issue is with file system synchronization with actual disk. If machine is powered OFF before fs synchronization to hardware disk, on next reboot, fsck will ask corrective questions to the user to take the action accordingly. For which manual intervention is needed as corrective actions will defer case to case. For example, if one record is created by database operation and at the same time another record is deleted, and same block number (of deleted record) is used for the newly created record, duplicate block error might come.

Table 2-1 FSCK Errors

SNo.	FSCK Error	Description/Solution
10	Error reading block <block_no> (Attempt to read from filesystem resulted in short read) while doing inode scan.	This error stops the user from continuing with the fsck scan, and correcting the problem. Disks that have physical hardware errors often report - being unable to read inodes error. To resolve this issue replace the disk, rather than attempting any corrective action.
11	Journal superblock has an unknown incompatible feature flag set	Feature flag specifies what features a file system has. If this flag is corrupted, fsck asks whether you want to abort the operation. You need to specify "no" and after this fix the superblock corruption. Reference link to fix the issue - http://forums.debian.net/viewtopic.php?f=5&t=83716

- Following link gives list of all the errors which are automatically fixed by fsck as well as list of errors where user intervention is must - http://unix.stackexchange.com/questions/18526/what-does-fsck-p-preen-do-on-ext4
- Following link gives general idea about various phases in fsck - http://etutorials.org/Misc/solaris+exam+guide/Part+I+Solaris+9+Operating+Environment+Exam+I/Chapter+9+Introduction+to+File+Systems/Fixing+Problems+with+fsck/
- Following link describes all the errors in case of UFS file system - http://docs.oracle.com/cd/E19253-01/817-0403/tsfsck-26279/index.html

  This link can be used as a reference to fix the errors reported by fsck on QPS filesystem which is ext3.

Check Subscriber Access

Revised: March 14, 2014, OL-29750-01

This chapter covers the following topics:

Checking Access

When you are confident that the installation and configuration tasks are complete and processing properly, try running a small amount of test traffic, following it through the system. Here are three ways to ascertain correct process of access from a subscriber perspective.

Testing Subscriber Access with 00.testAccessRequest.sh

00.testAccessRequest.sh is a test script used to test subscriber access to the ISG and

QPS system.

You can find the **00.testAccessRequest.sh in /opt/broadhop/installer/isg/troubleshooting** directory on the QPS server.

To configure the subscriber used, edit **/opt/broadhop/installer/isg/troubleshooting/config.ini**

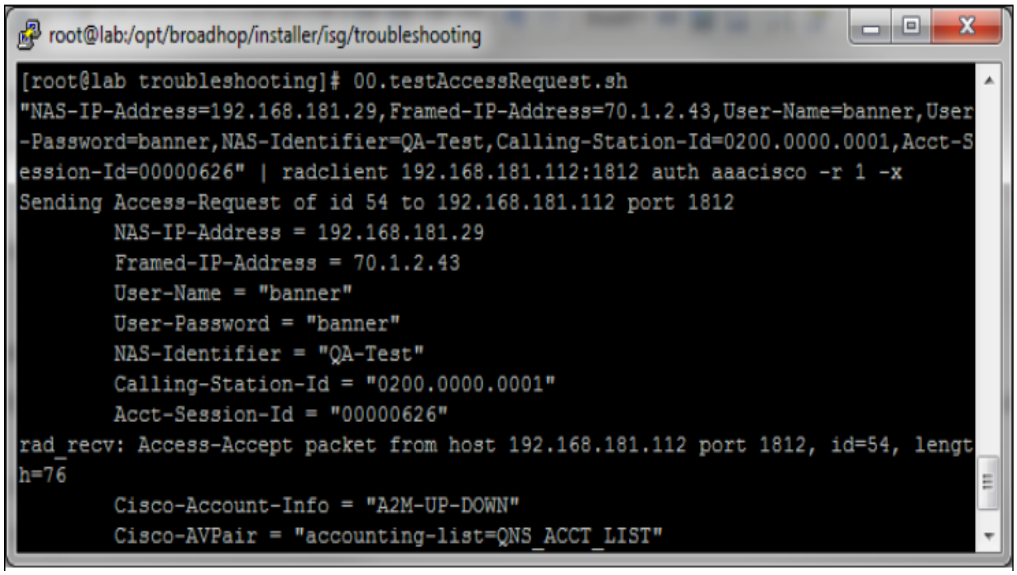
Step 1 In the config.ini file, change the User-Name and Password fields.

Note You may need to change some of the other parameters in order to match your configuration. The other main attributes to change will be the NAS-IP-Address and Framed-IP-Address.

Step 2 Run the script from a command line. No arguments are necessary:

00.testAccessRequest.sh

Upon success, this output displays:



Testing Subscriber Access with soapUI

This procedure tests end subscriber access to your system.

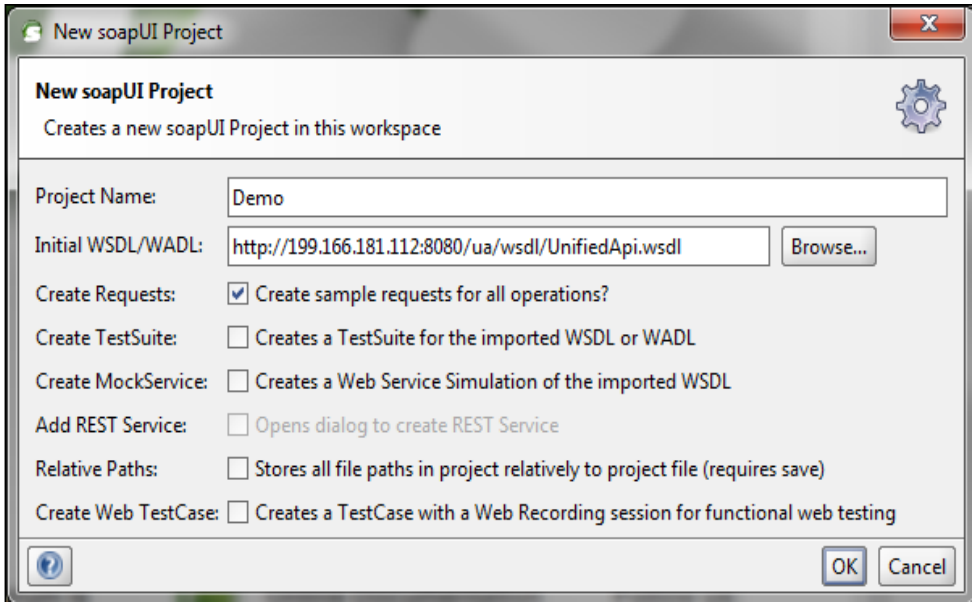
Step 1 Download soapUI from here: http://www.soapui.org/

You only need the freeware version (not soapUI Pro).

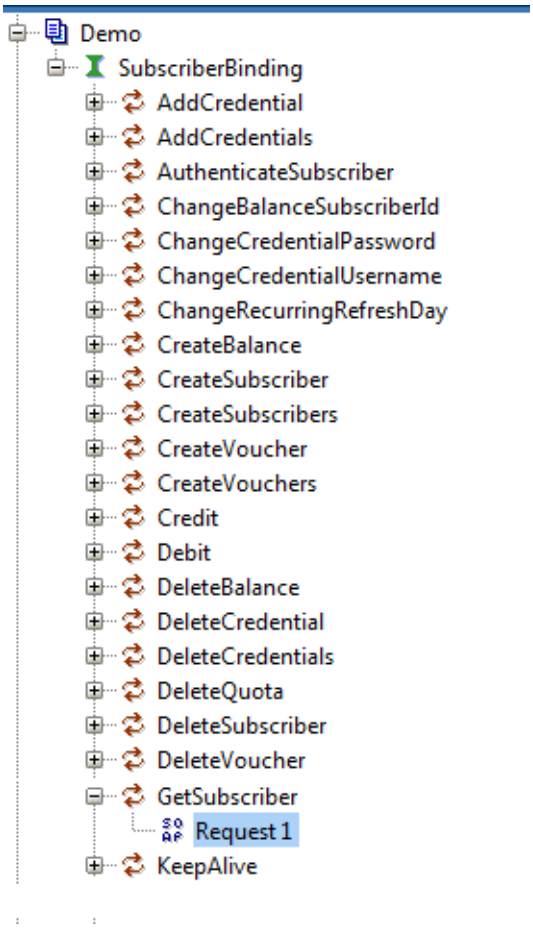
Step 2 Launch soapUI.

Step 3 Right click on projects, select New soapUIProject from the drop-down menu.

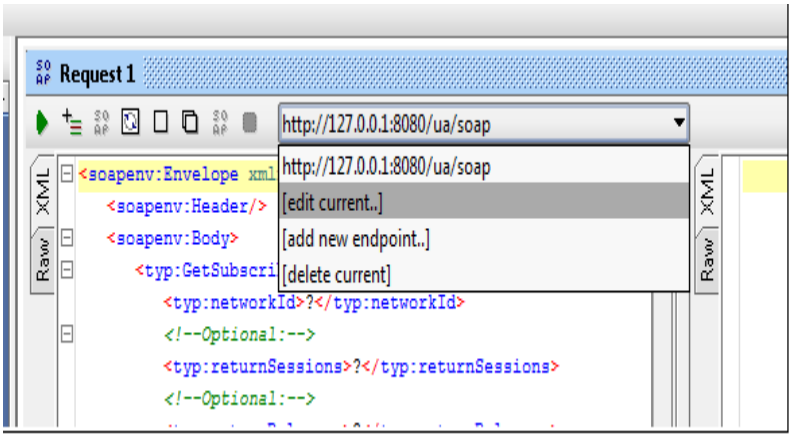
Step 4 Name your project and enter into Initial WSDL/WADL the appropriate WSDL URL (you may have to replace the IP in display with your own IP) and select OK:



Step 5 In the tree click Demo > SubscriberBinding > GetSubscriber > Request 1, as shown in the figure on the right.



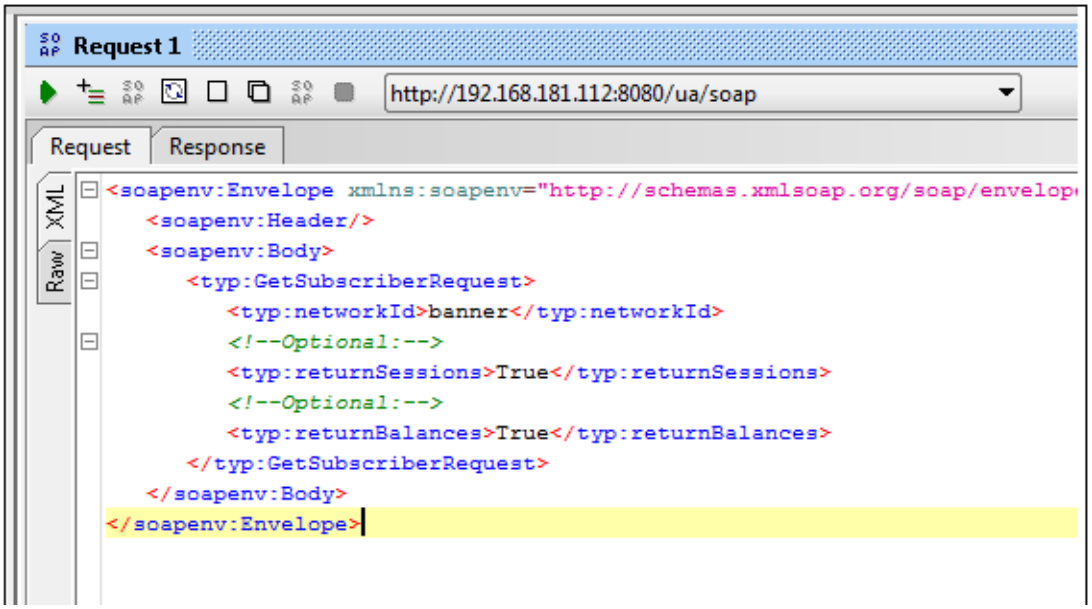
Step 6 Edit the End Point by selecting from the drop down: [edit current...]. Enter the appropriate IP.



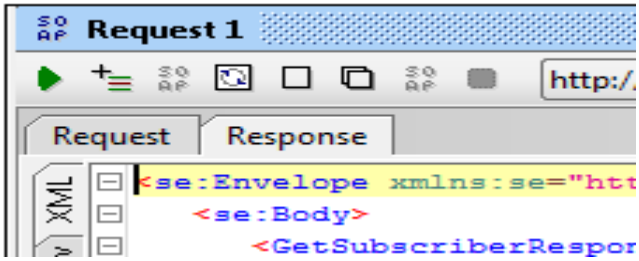
Step 7 In the XML file:

- Replace the ? in <typ:networkId>?</typ:networkId> with the appropriate credential or network Id.

- Replace the ? in <typ:returnSessions>?</typ:returnSessions> with "True".
- Replace the ? in <typ:returnBalance>?</typ:returnBalance> with "True".



Step 8 Click on the green arrow (underneath "Request 1").



Step 9 Check the resulting XML output. Pay special attention to the relevant subscriber information

:

```
<se:Envelope xmlns:se="http://schemas.xmlsoap.org/soap/envelope/">
   <se:Body>
      <GetSubscriberResponse xmlns="http://broadhop.com/unifiedapi/soap/types">
         <errorCode>0</errorCode>
         <errorMessage>Request completed successfully</errorMessage>
         <subscriber>
            <id>4fb54d03e4b01e8478d309c2</id>
            <name>
               <fullName>Bruce Banner</fullName>
            </name>
            <credential>
               <networkId>banner</networkId>
               <password>banner</password>
            </credential>
            <credential>
               <networkId>0200.0000.0001</networkId>
               <expirationDate>2012-05-17T13:17:07.020-06:00</expirationDate>
            </credential>
            <service>
               <code>SERVICE_A</code>
               <enabled>true</enabled>
            </service>
            <session>
               <sessionKey>
                  <code>UserIdKey</code>
                  <primary>false</primary>
                  <keyField>
                     <code>userId</code>
                     <value>banner</value>
                  </keyField>
               </sessionKey>
               <sessionObject>
                  <entry>
                     <string>tags</string>
                     <list>
```

Testing for ISG Functionality and Connectivity with *test aaa* Scripts

The four scripts described here test ISG functionality and connectivity.

Step 1 Connect to the ISG with username and password.

Step 2 Type the 'en' command.

Step 3 Enter 'cisco' as the password to the en command.

From here use the four "test aaa" scripts to verify correct ISG functionality and connectivity. No IP addresses or any other arguments are needed.

```
test aaa group QNS_AAA PBHK_SERVICE servicecisco legacy
test aaa group QNS_AAA L4REDIRECT_SERVICE servicecisco legacy
test aaa group QNS_AAA OPENGARDEN_SERVICE servicecisco legacy
```

```
test aaa group QNS_AAA BroadHop BroadHop legacy
```

If functioning correctly, each script returns this message:

```
Attempting authentication test to server-group QNS_AAA using
radius
User was successfully authenticated.
```

TCP Dumps

Revised: March 14, 2014, OL-29750-01

QPS administrators can use the tcpdump Linux command in the command line to intercept and display TCP/IP packets, as well as others, as they are being transmitted or received.

With the tcpdump command, you can analyze network behavior, performance, and applications that generate or receive network traffic.

While not specific to QPS, the following examples of tcpdump are frequently helpful for troubleshooting QPS network packets.

This chapter covers the following topics:

TCPDUMP Command

tcpdump -i any -s 0 port XXXX

where XXXX is the port number you are interested in, RADIUS ports are used for Default examples unless otherwise specified.

Options

To Specify Multiple Ports

To capture more than one port,

tcpdump -i any -s 0 port 1812 or 1813

To capture a port range,

tcpdump -i any -s 0 portrange 1812-1817

Combining both techniques:

tcpdump -i any -s 0 portrange 1812-1817 or port 1700

Verbose Mode

tcpdump -i any -s 0 -v port XXXX

Even more Verbose Mode

tcpdump -i any -s 0 -vv port XXXX

Restrict to a Specific Interface, such as eth0

tcpdump -i eth0 -s 0 port XXXX

Redirect Output of the Command to a File

tcpdump -i any -s 0 port 1812 -w output.pcap

The resulting output.pcap file can be opened and utilized using such tools as WireShark

More options

From a UNIX/Linux prompt, type **man tcpdump**

Specific Traffic Types

Note These examples assume that the default ports have not been changed or have been specified in Quantum Policy Builder. One must modify these examples to use the appropriate ports that have been specified in Quantum Policy Builder if the default/typical values have been changed.

Capture RADIUS Traffic

tcpdump -i any -s 0 port 1812 or 1813

Port 1812 is the default for Authorization traffic.

Port 1813 is the default for Accounting traffic.

Capture SNMP Traffic

tcpdump -i any -s 0 port 1161 or 1162 or 161 or 162

Note This command works for both the sending and receiving machine; the port just needs to match the source or destinationport.

Other Ports

The following information follows the following format:

Host/VM name Port "Service/traffic type"

where XX is the numeric value of the given host, i.e. pcrfclient01.

pcrfclientXX 80 "Subversion"

pcrfclientXX 7070 "Policy Builder"

sessionmgrXX 27717 "Session Database"

sessionmgrXX 27718 "Quota/Balance Database"

sessionmgrXX 27719 "Reporting Database"

sessionmgrXX 27720 "USuM Database"

lbvipXX 80 "Portal vip management"

lbvipXX 80 "Subversion vip external"

lbvipXX 8080 "QNS/Unified API VIP"

lbvipXX 11211 "Memcache vip internal"

lbvipXX 7070 "Policy Builder VIP"

lbvipXX 8082 "Portal Admin VIP"

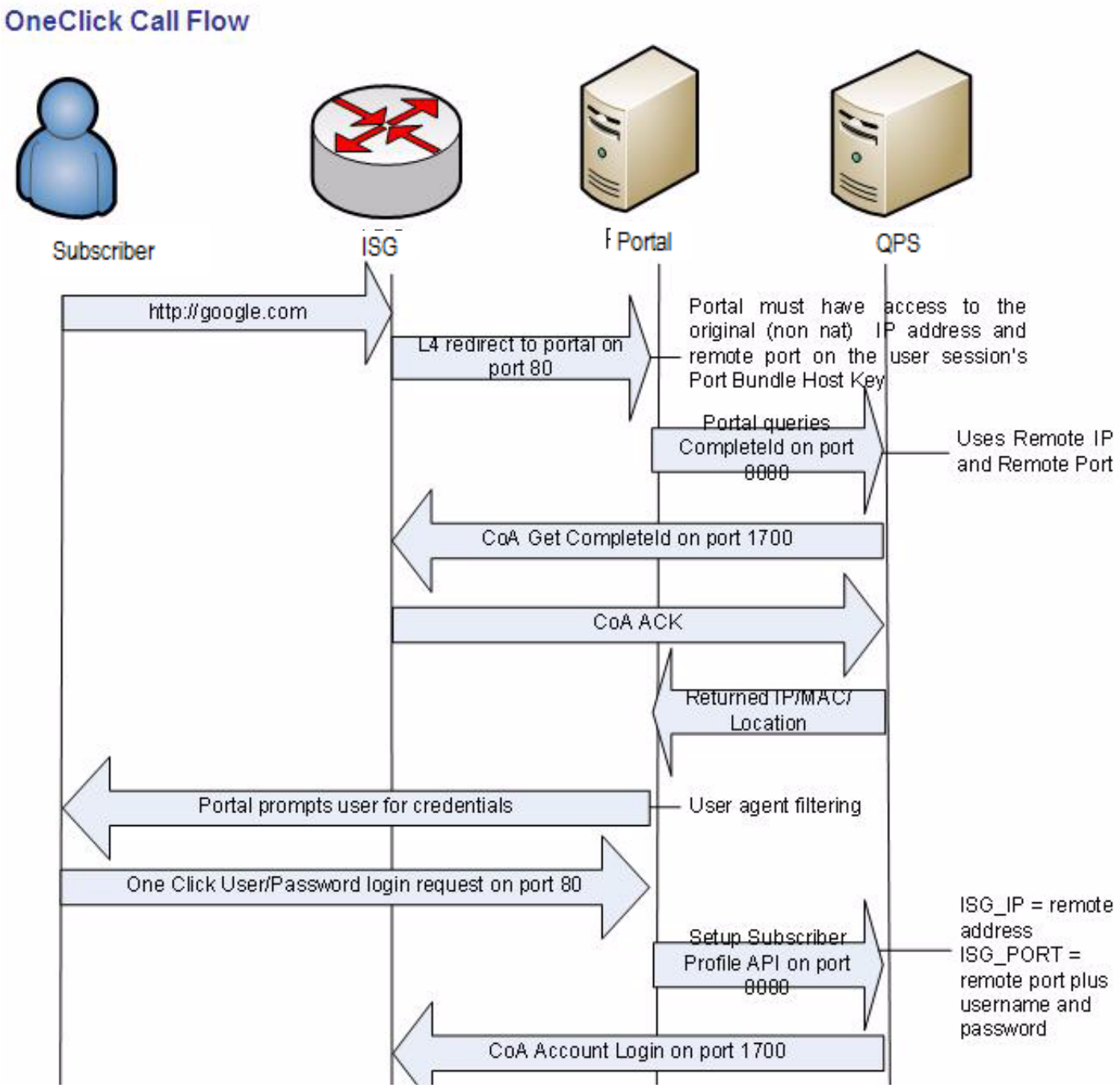
qnsXX 9091 "QNS admin port"

Call Flows

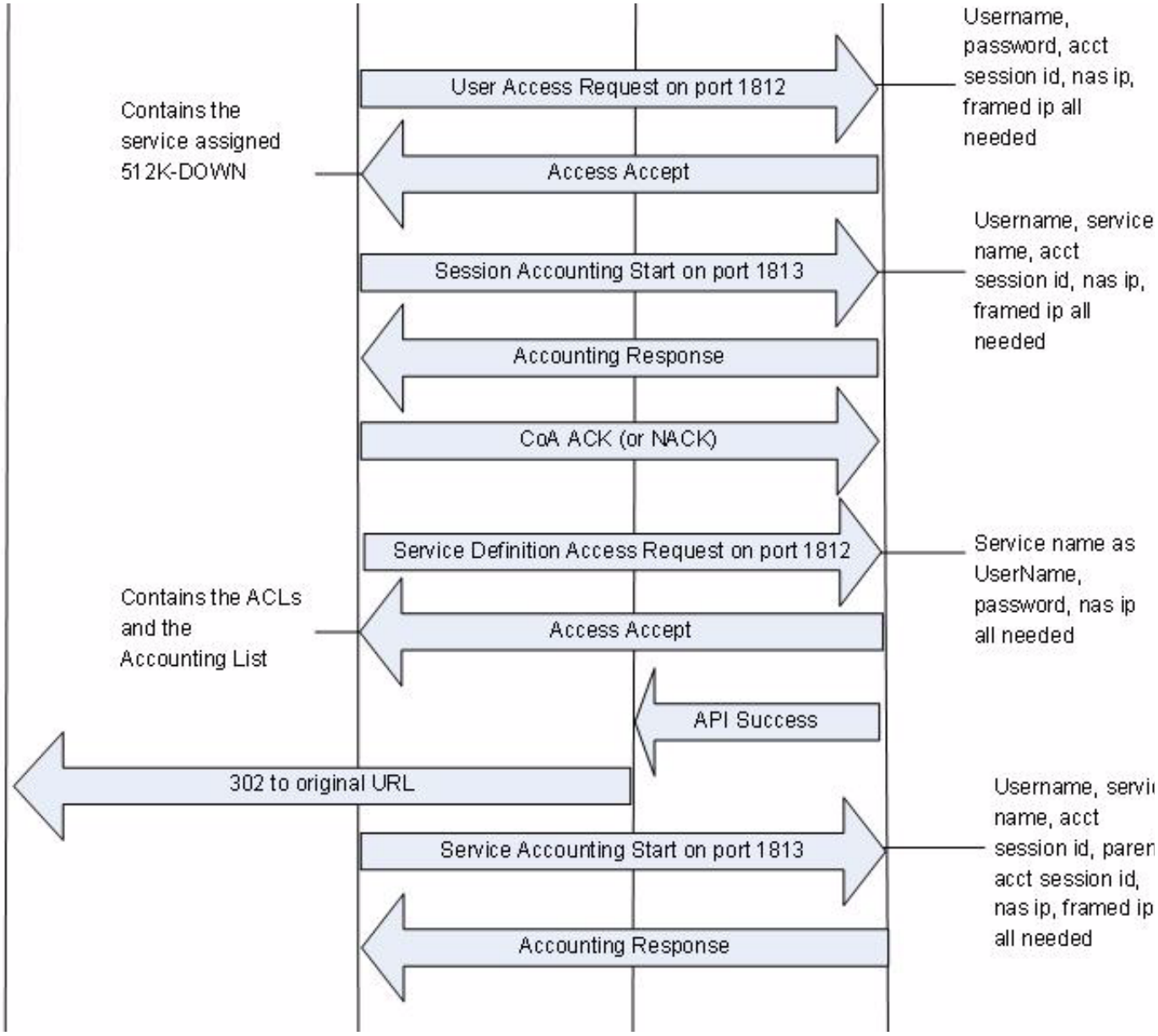
Revised: March 14, 2014, OL-29750-01

The following diagrams of call flows hill help you troubleshoot and understand you QPS deployment.

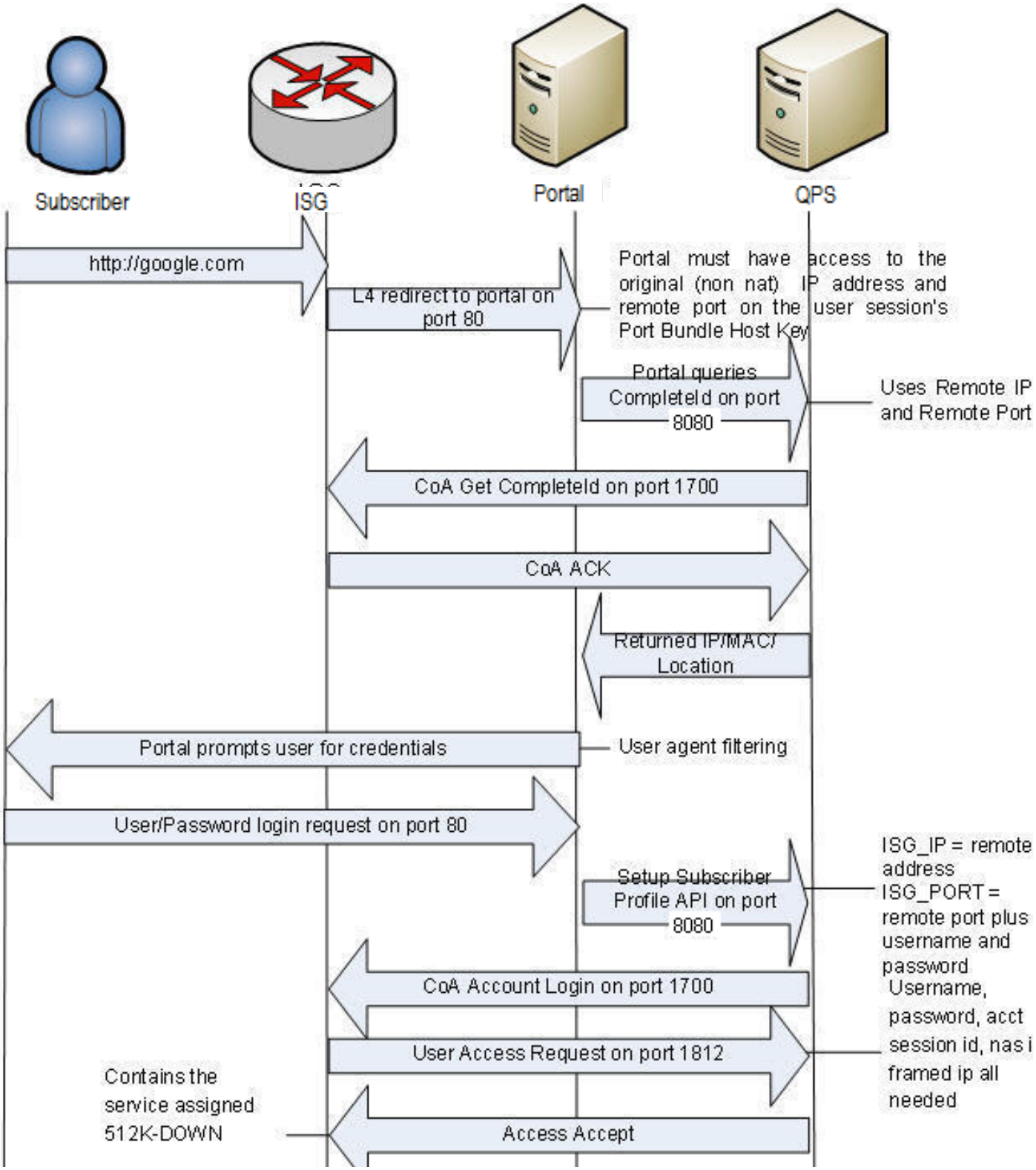
One-click Call Flow



(continued)


Username, password, acct session id, nas ip, framed ip all needed
User Access Request on port 1812
Contains the service assigned 512K-DOWN
Access Accept
Username, service name, acct session id, nas ip, framed ip all needed
Session Accounting Start on port 1813
Accounting Response
CoA ACK (or NACK)
Service Definition Access Request on port 1812
Service name as UserName, password, nas ip all needed
Contains the ACLs and the Accounting List
Access Accept
API Success
302 to original URL
Username, servi name, acct session id, paren acct session id, nas ip, framed ip all needed
Service Accounting Start on port 1813
Accounting Response

User/Password Login Call Flow



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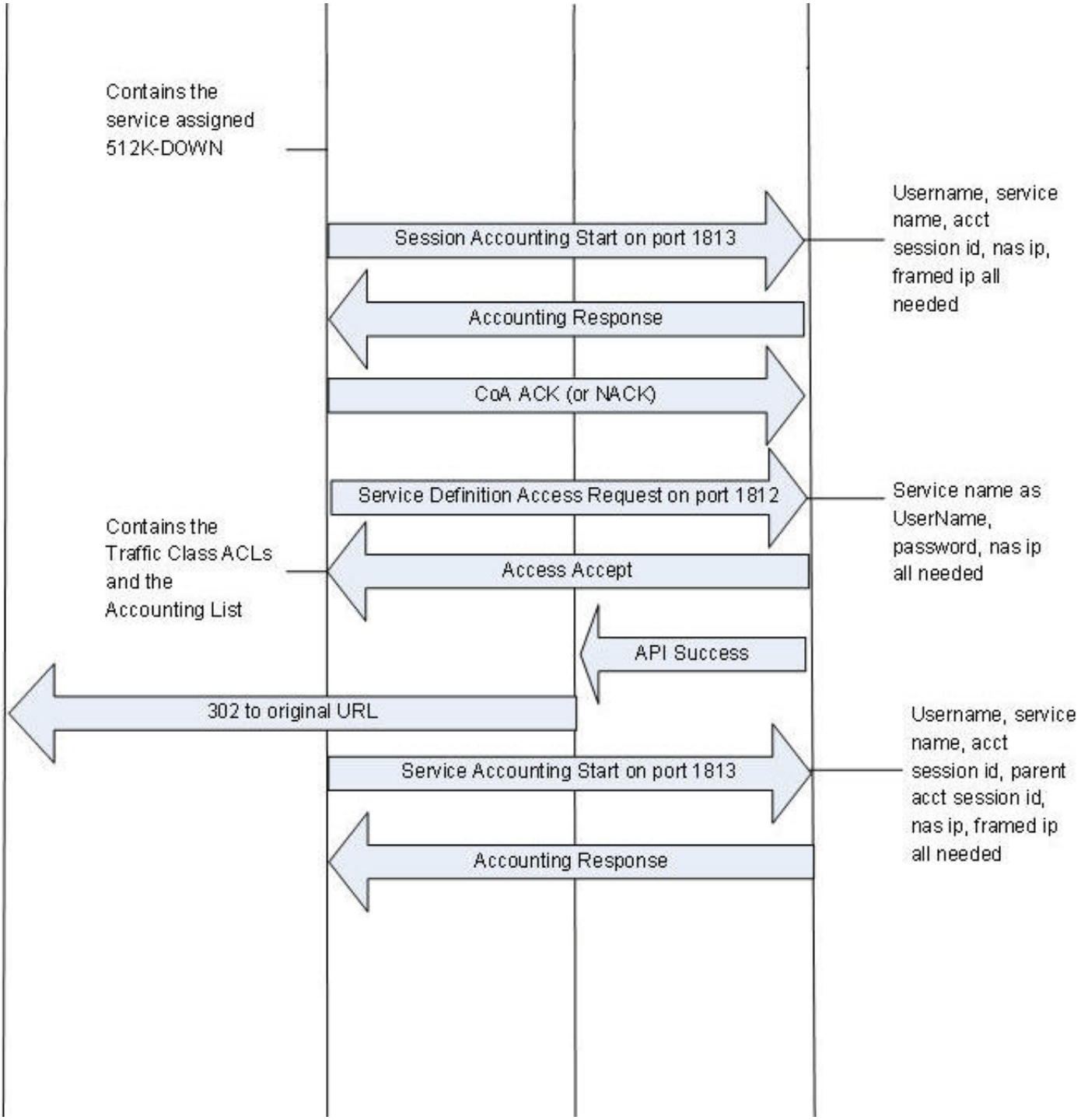
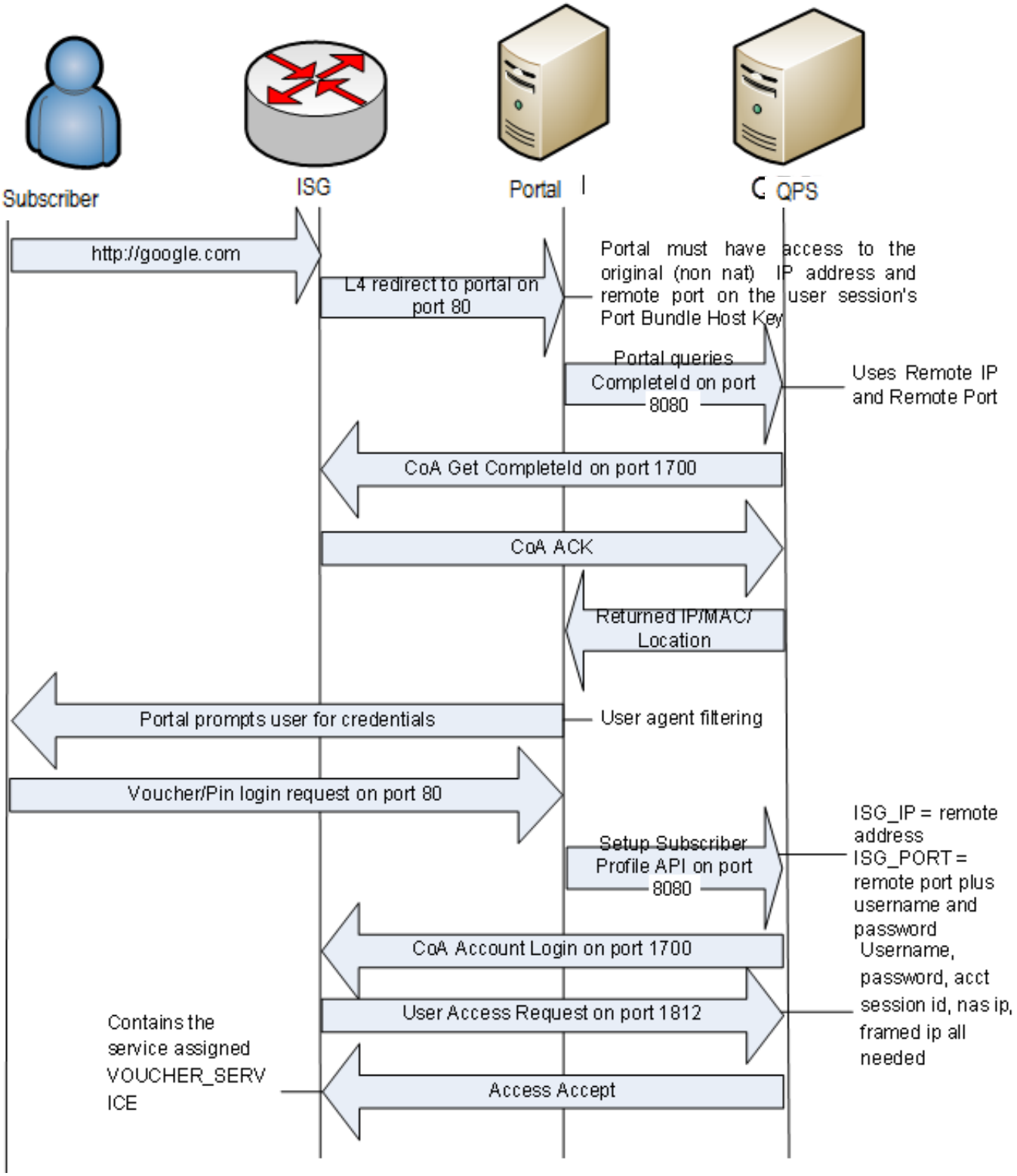
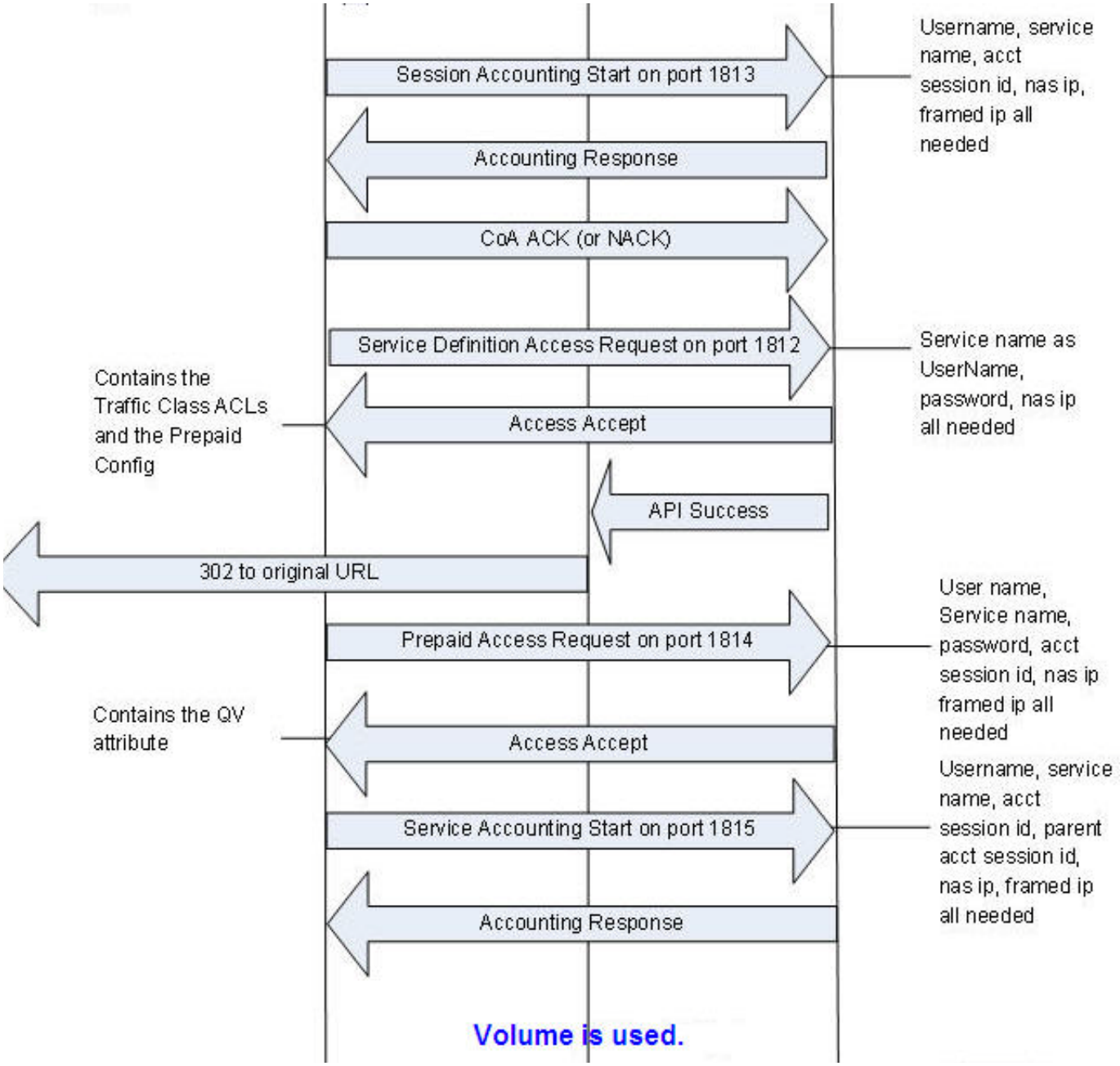

Contains the service assigned 512K-DOWN
Username, service name, acct session id, nas ip, framed ip all needed
Session Accounting Start on port 1813
Accounting Response
CoA ACK (or NACK)
Service Definition Access Request on port 1812
Service name as UserName, password, nas ip all needed
Contains the Traffic Class ACLs and the Accounting List
Access Accept
API Success
302 to original URL
Username, service name, acct session id, parent acct session id, nas ip, framed ip all needed
Service Accounting Start on port 1813
Accounting Response

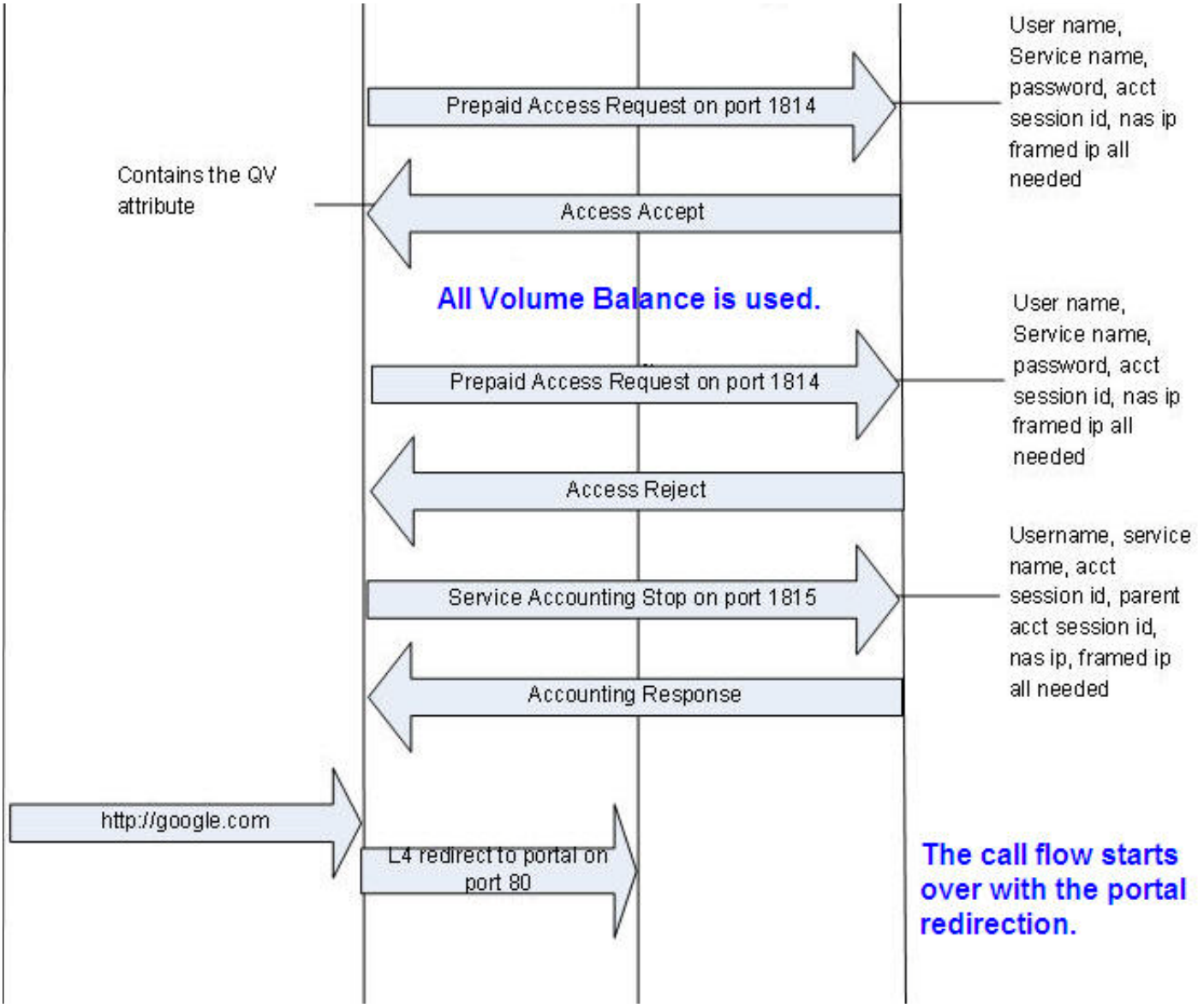
Data-limited Voucher Call Flow



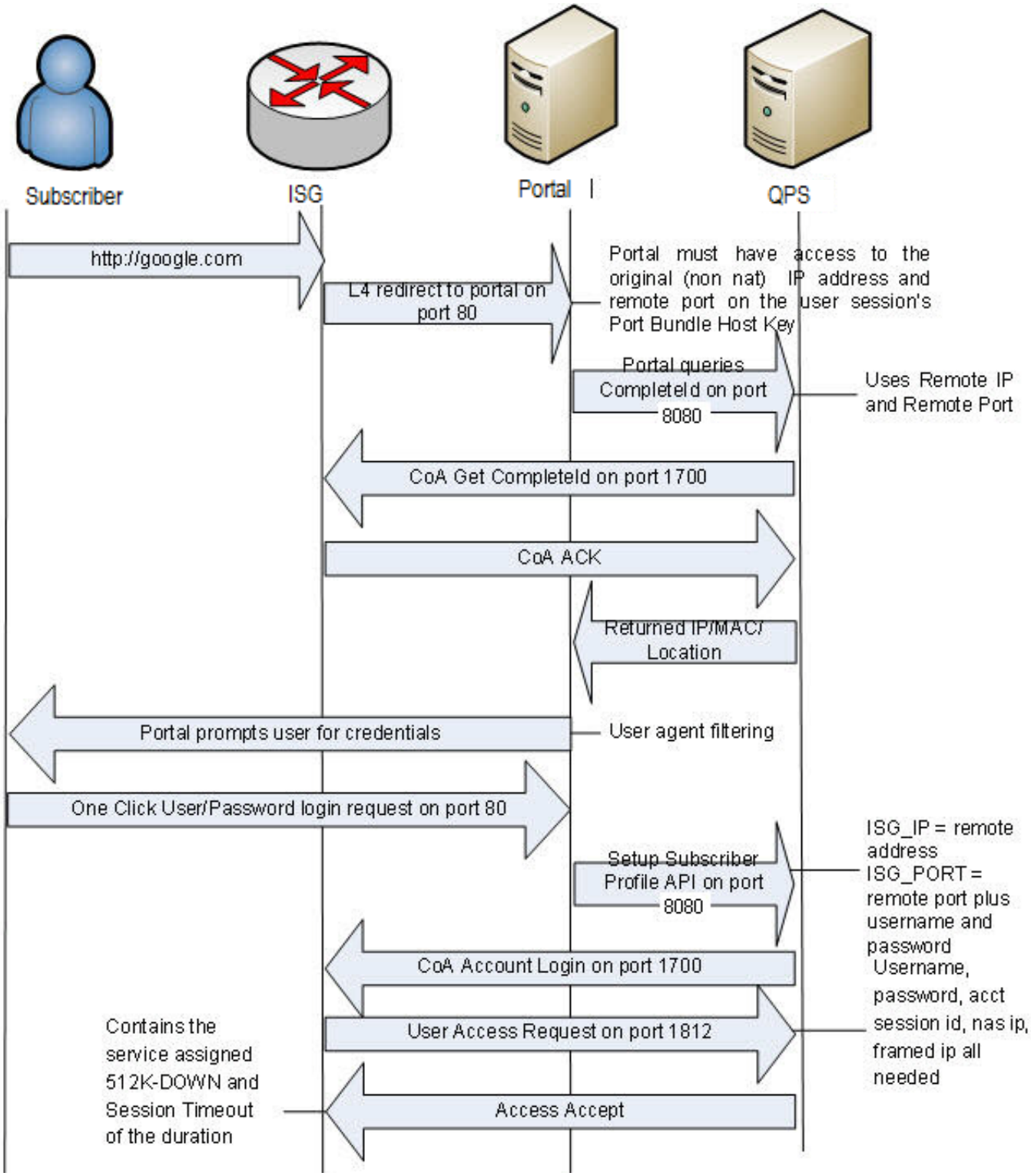
(continued)


Session Accounting Start on port 1813
Username, service name, acct session id, nas ip, framed ip all needed
Accounting Response
CoA ACK (or NACK)
Service Definition Access Request on port 1812
Service name as UserName, password, nas ip all needed
Contains the Traffic Class ACLs and the Prepaid Config
Access Accept
API Success
302 to original URL
Prepaid Access Request on port 1814
User name, Service name, password, acct session id, nas ip framed ip all needed
Contains the QV attribute
Access Accept
Service Accounting Start on port 1815
Username, service name, acct session id, parent acct session id, nas ip, framed ip all needed
Accounting Response
Volume is used.

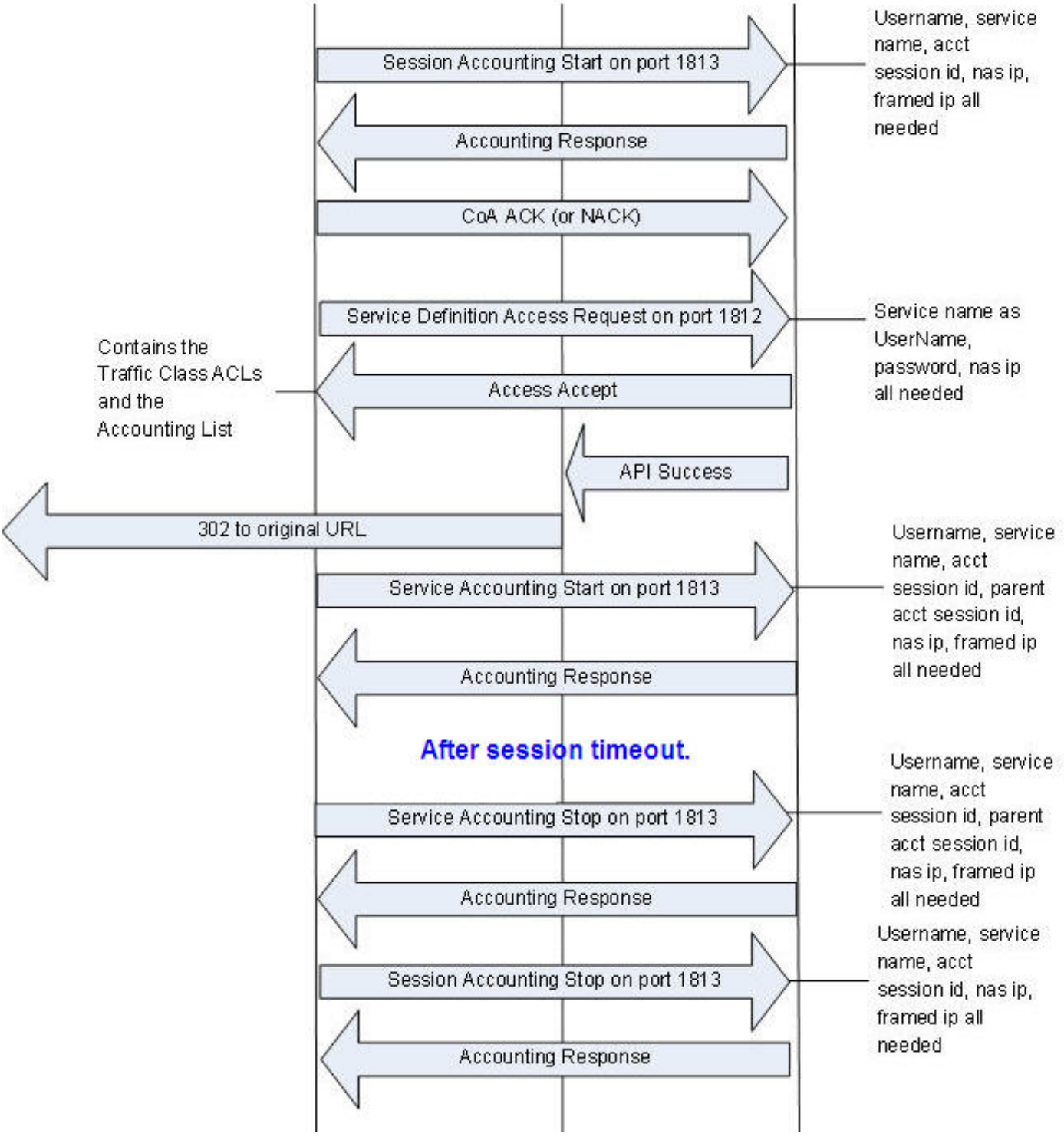
(continued)


User name, Service name, password, acct session id, nas ip framed ip all needed
Prepaid Access Request on port 1814
Contains the QV attribute
Access Accept
All Volume Balance is used.
User name, Service name, password, acct session id, nas ip framed ip all needed
Prepaid Access Request on port 1814
Access Reject
Username, service name, acct session id, parent acct session id, nas ip, framed ip all needed
Service Accounting Stop on port 1815
Accounting Response
http://google.com
L4 redirect to portal on port 80
The call flow starts over with the portal redirection.

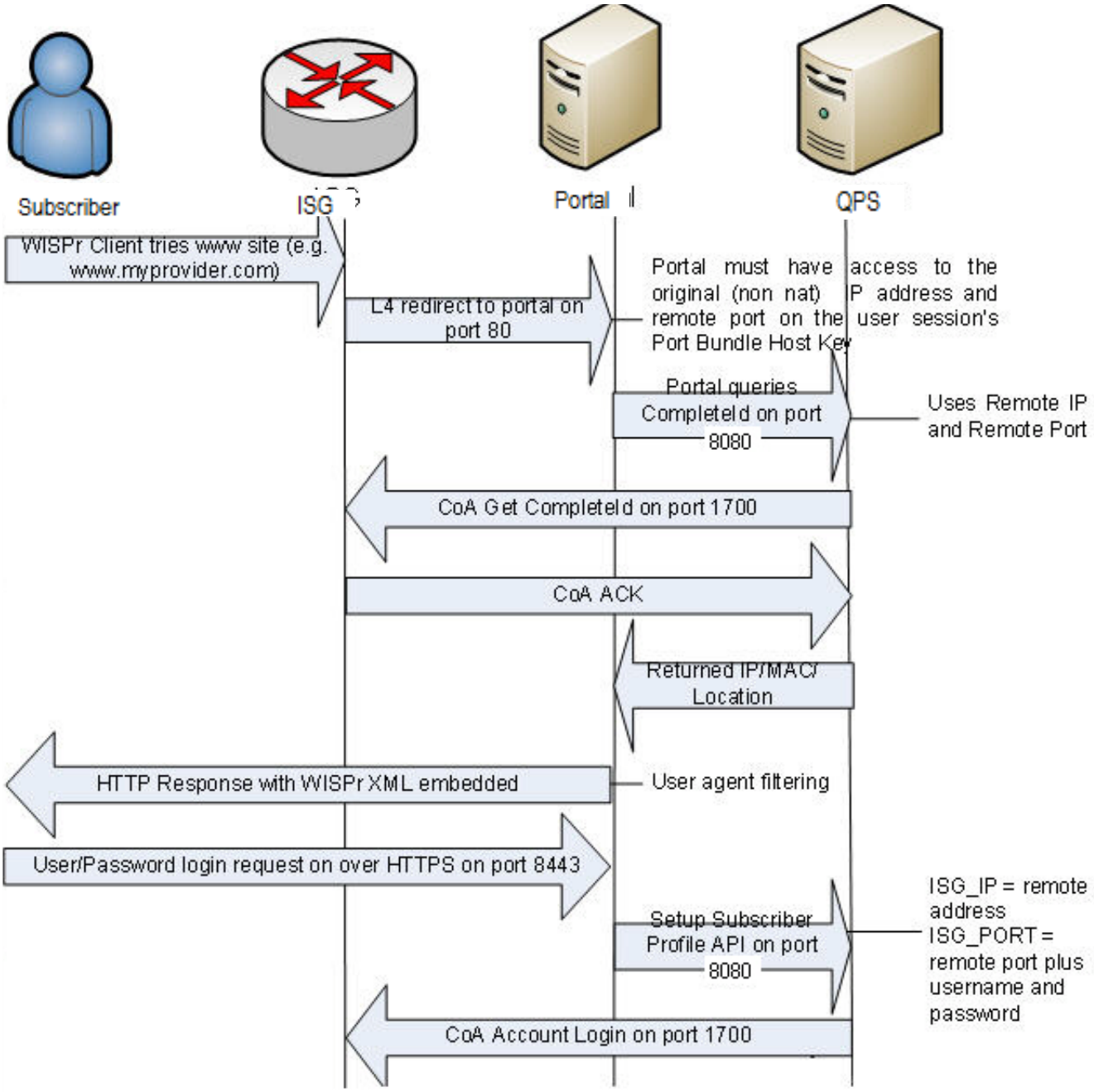
Time-limited Voucher Call Flow



(continued)


Session Accounting Start on port 1813
Username, service name, acct session id, nas ip, framed ip all needed
Accounting Response
CoA ACK (or NACK)
Service Definition Access Request on port 1812
Service name as UserName, password, nas ip all needed
Contains the Traffic Class ACLs and the Accounting List
Access Accept
API Success
302 to original URL
Service Accounting Start on port 1813
Username, service name, acct session id, parent acct session id, nas ip, framed ip all needed
Accounting Response
After session timeout.
Service Accounting Stop on port 1813
Username, service name, acct session id, parent acct session id, nas ip, framed ip all needed
Accounting Response
Session Accounting Stop on port 1813
Username, service name, acct session id, nas ip, framed ip all needed
Accounting Response

WISPr Call Flow



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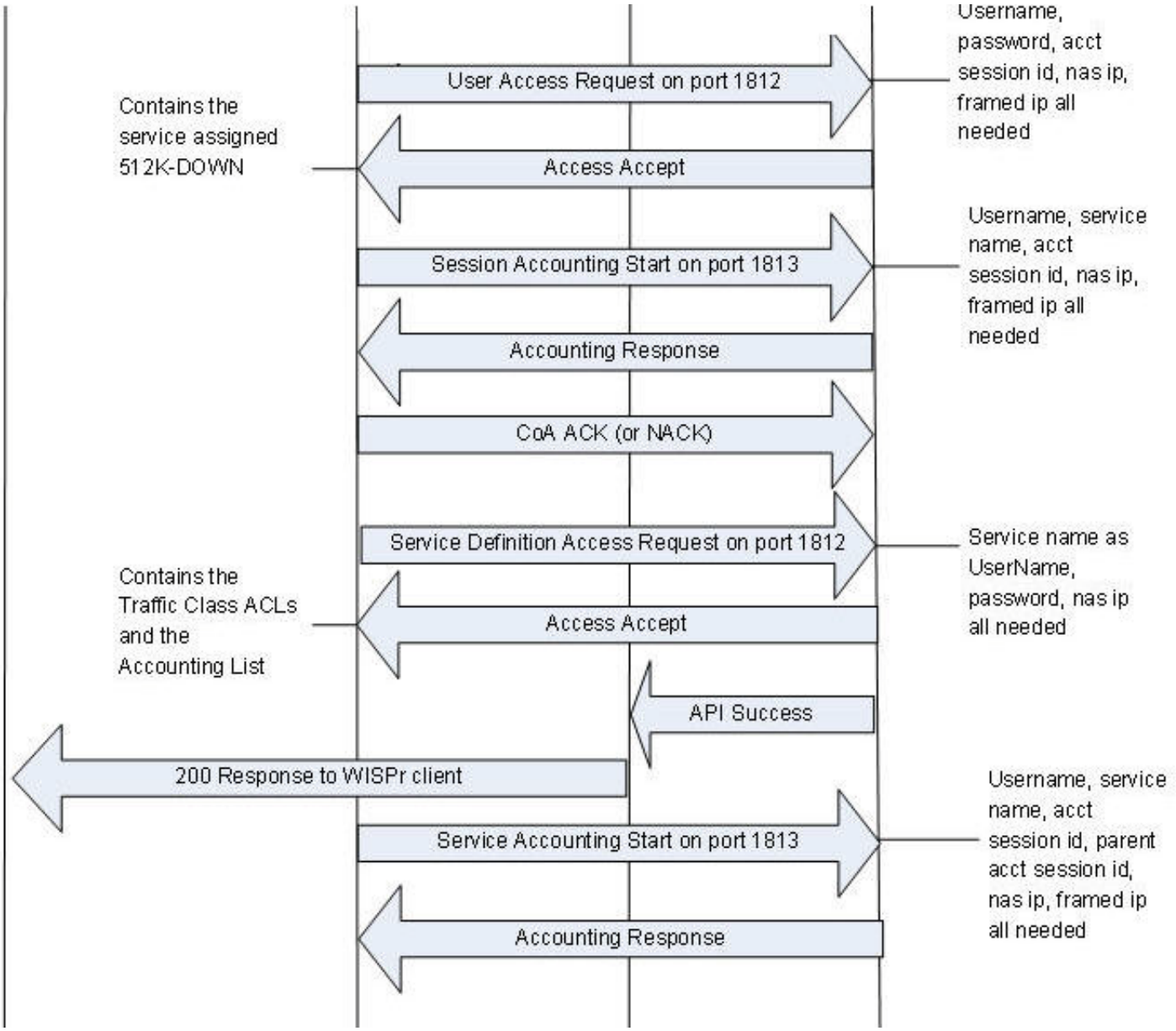
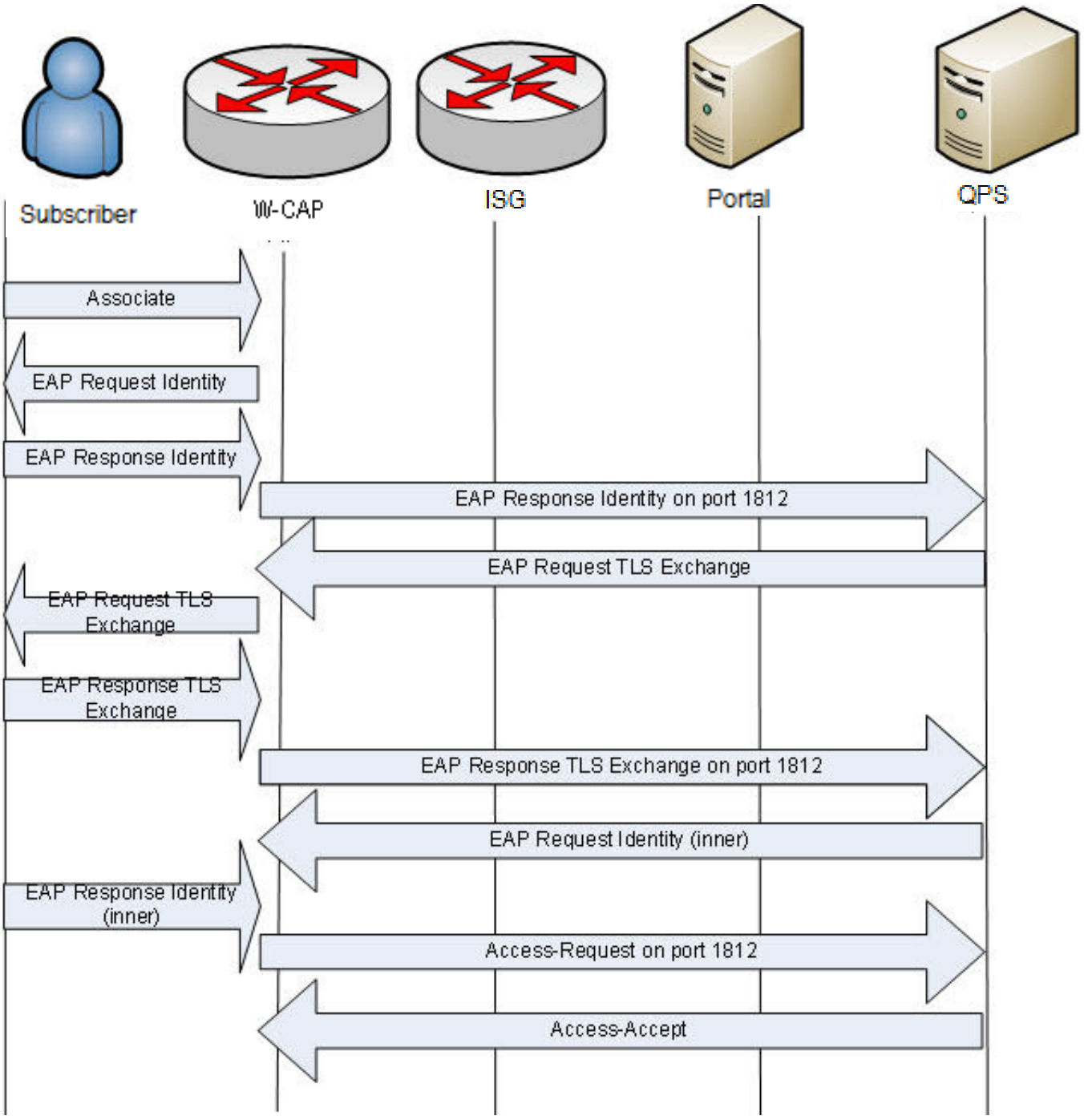
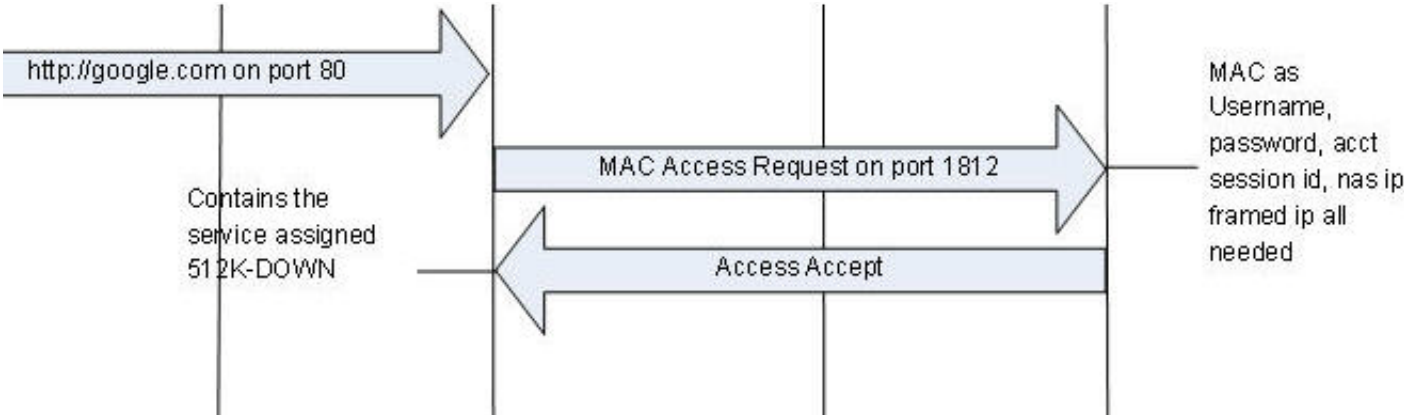

Username, password, acct session id, nas ip, framed ip all needed
User Access Request on port 1812
Contains the service assigned 512K-DOWN
Access Accept
Username, service name, acct session id, nas ip, framed ip all needed
Session Accounting Start on port 1813
Accounting Response
CoA ACK (or NACK)
Service Definition Access Request on port 1812
Service name as UserName, password, nas ip all needed
Contains the Traffic Class ACLs and the Accounting List
Access Accept
API Success
200 Response to WISPr client
Username, service name, acct session id, parent acct session id, nas ip, framed ip all needed
Service Accounting Start on port 1813
Accounting Response

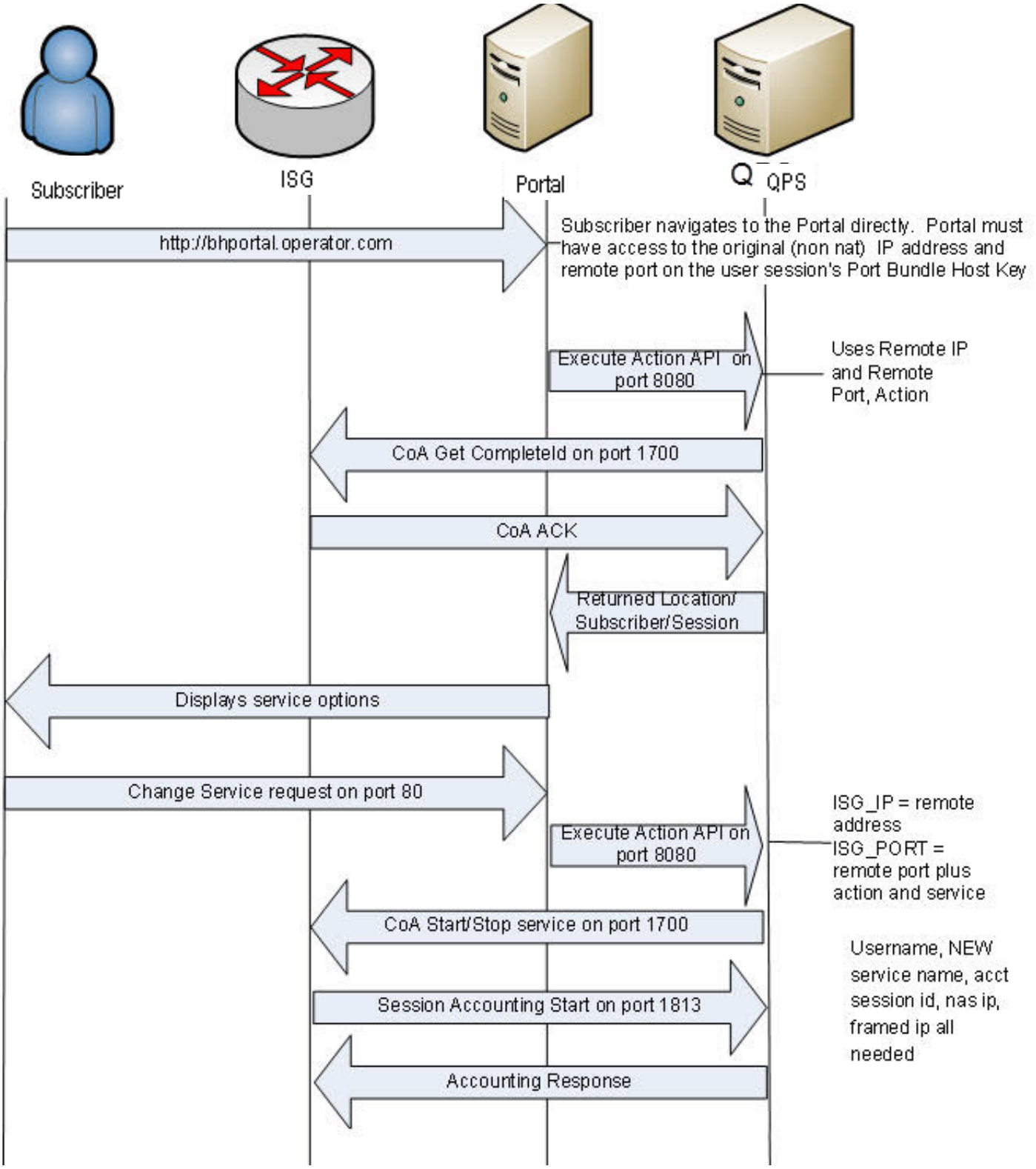
EAP-TTLS Call Flow



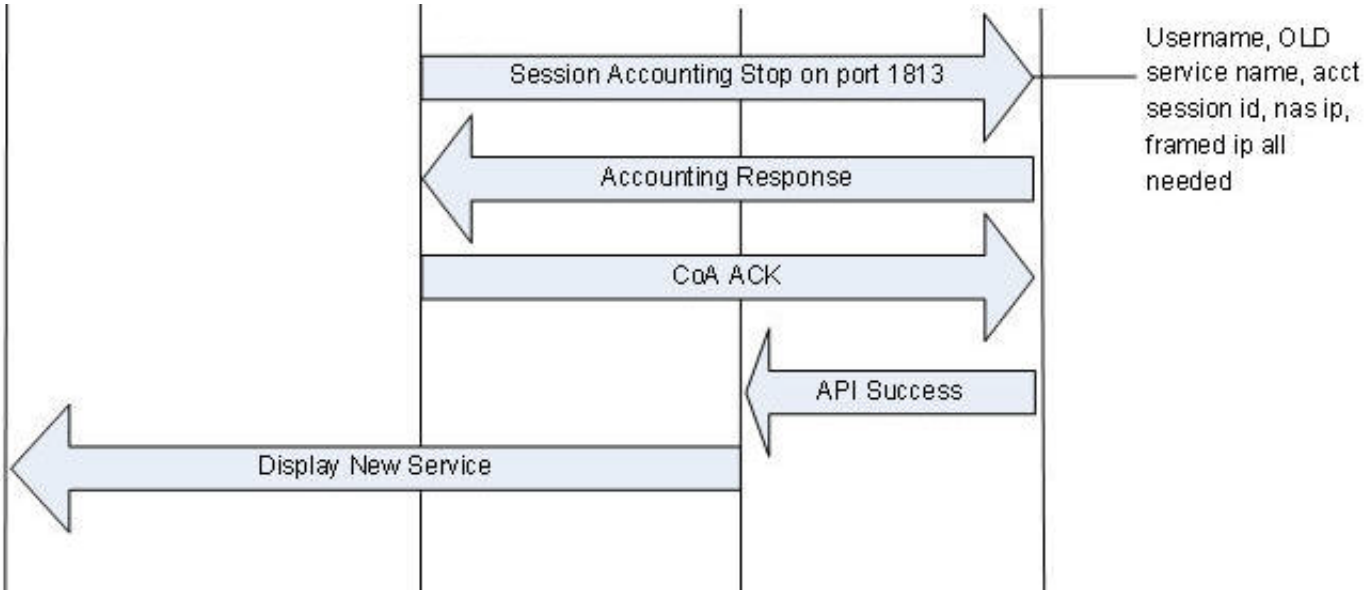
(continued)


http://google.com on port 80
MAC Access Request on port 1812
MAC as Username, password, acct session id, nas ip framed ip all needed
Contains the service assigned 512K-DOWN
Access Accept

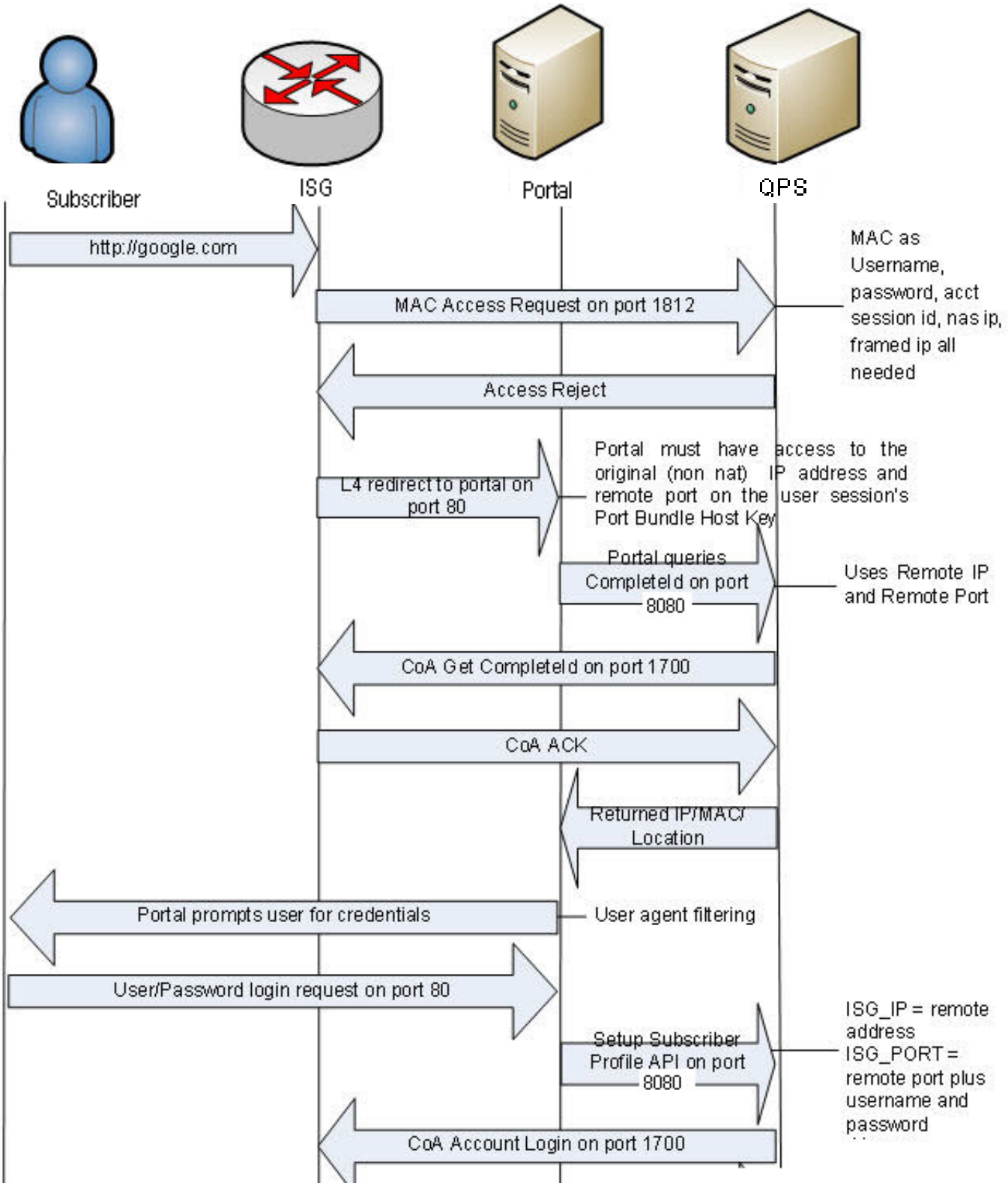
Service Selection Call Flow



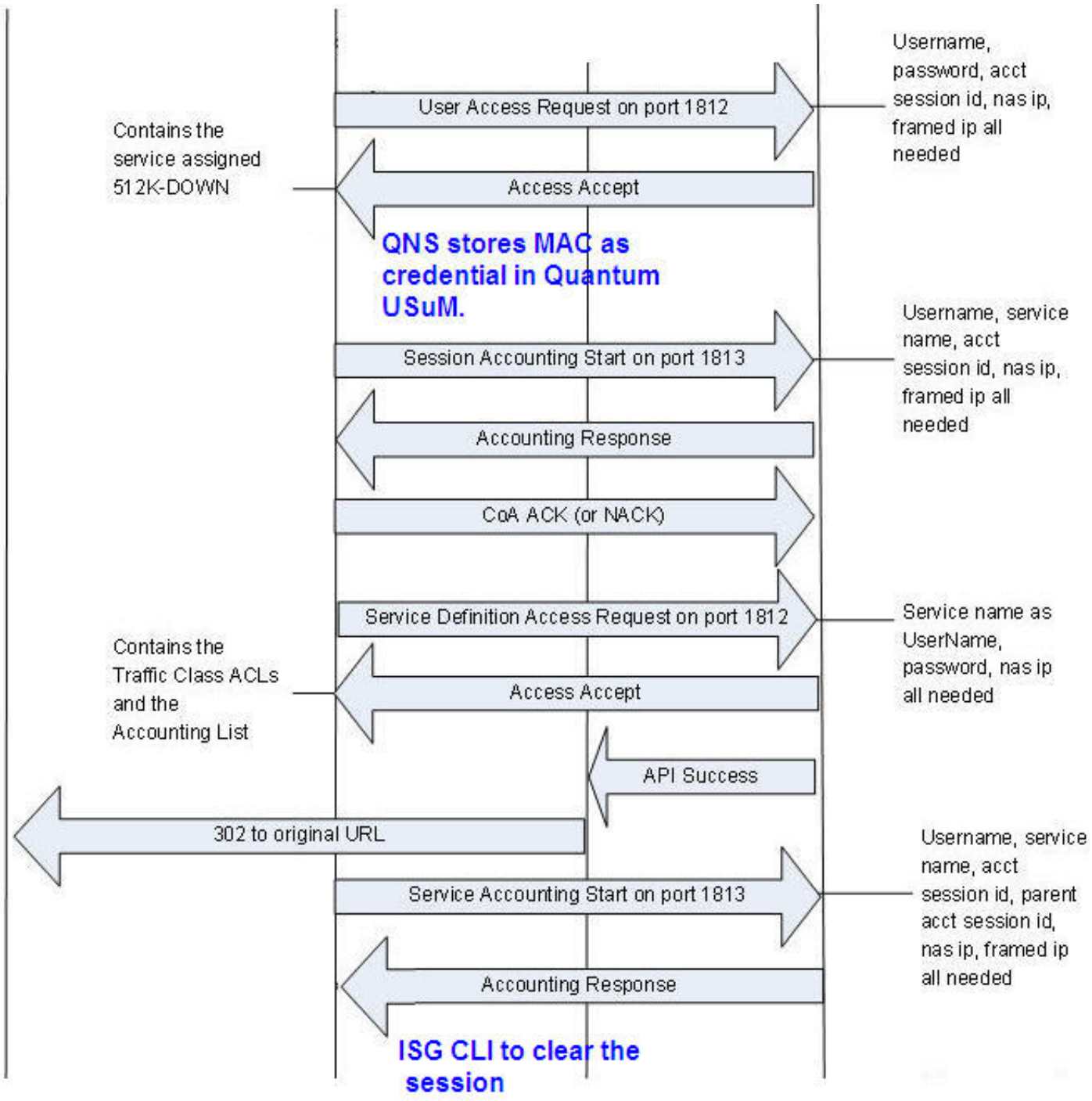
(continued)


Session Accounting Stop on port 1813
Username, OLD service name, acct session id, nas ip, framed ip all needed
Accounting Response
CoA ACK
API Success
Display New Service

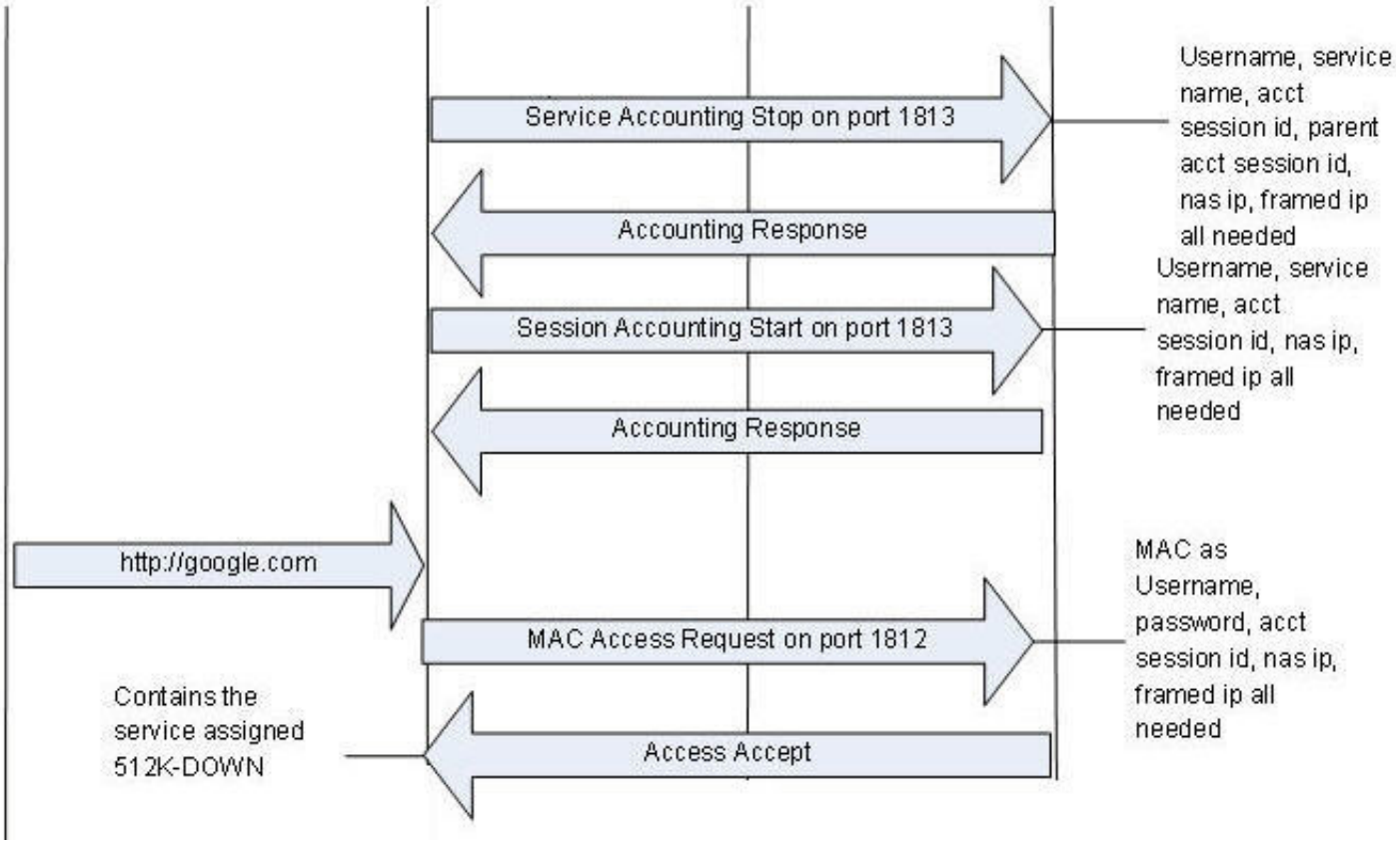
MAC TAL Call Flow



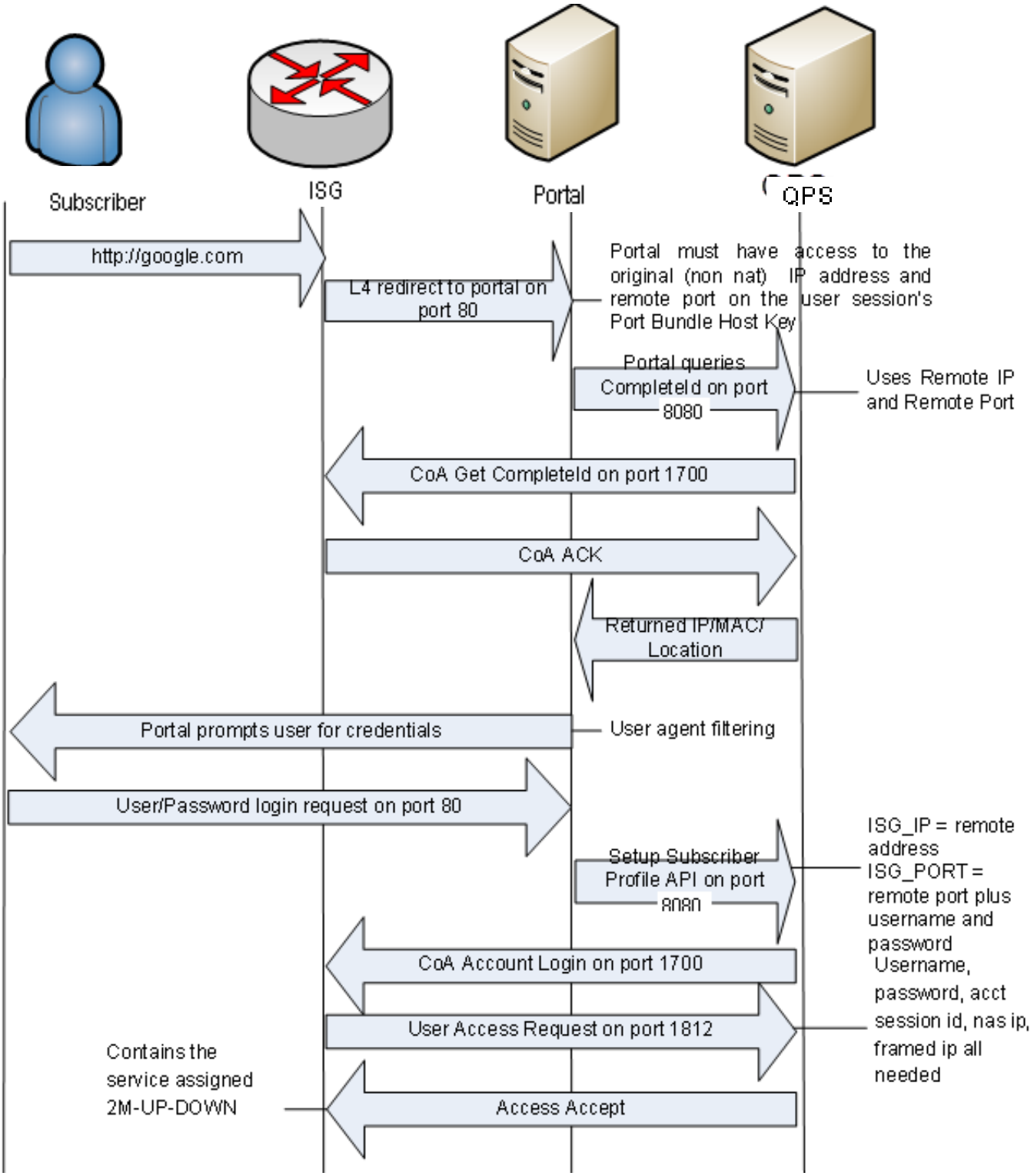
(continued)


Username, password, acct session id, nas ip, framed ip all needed
User Access Request on port 1812
Contains the service assigned 512K-DOWN
Access Accept
QNS stores MAC as credential in Quantum USuM.
Username, service name, acct session id, nas ip, framed ip all needed
Session Accounting Start on port 1813
Accounting Response
CoA ACK (or NACK)
Service Definition Access Request on port 1812
Service name as UserName, password, nas ip all needed
Contains the Traffic Class ACLs and the Accounting List
Access Accept
API Success
302 to original URL
Username, service name, acct session id, parent acct session id, nas ip, framed ip all needed
Service Accounting Start on port 1813
Accounting Response
ISG CLI to clear the session

(continued)


Service Accounting Stop on port 1813
Username, service name, acct session id, parent acct session id, nas ip, framed ip all needed
Accounting Response
Session Accounting Start on port 1813
Username, service name, acct session id, nas ip, framed ip all needed
Accounting Response
http://google.com
MAC Access Request on port 1812
MAC as Username, password, acct session id, nas ip, framed ip all needed
Contains the service assigned 512K-DOWN
Access Accept

Tiered Services Call Flow



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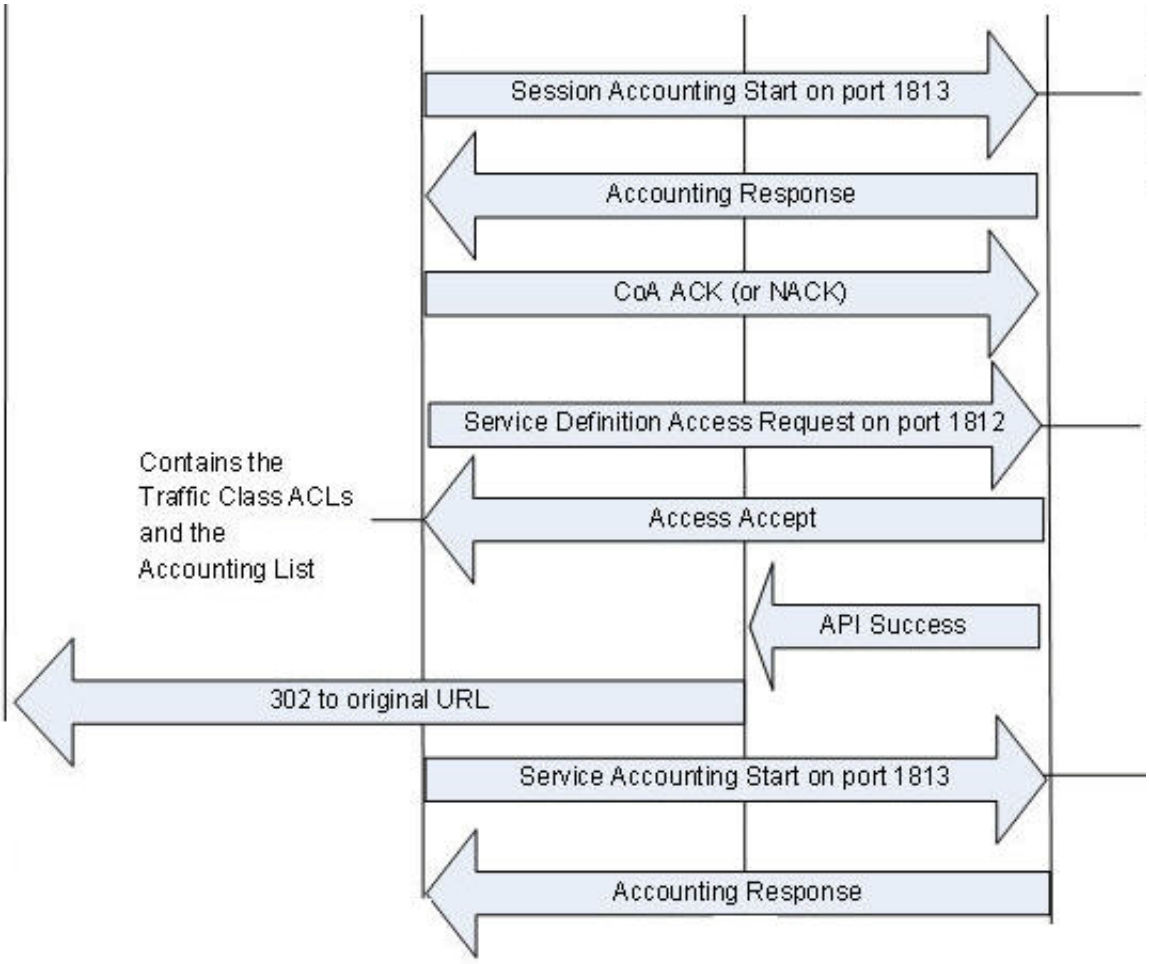
Session Accounting Start on port 1813
Accounting Response
CoA ACK (or NACK)
Service Definition Access Request on port 1812
Contains the Traffic Class ACLs and the Accounting List
Access Accept
API Success
302 to original URL
Service Accounting Start on port 1813
Accounting Response