

Network Connect Performance Logs on MAC OS How-to



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Introduction

The procedure outlined in this document describes the process of enabling and collecting the required log files which are required by Juniper Support in order to troubleshoot slowness issues over the Network Connect (NC) VPN tunnel. These log collection requirements outlined in this document do NOT apply to installation, launch, or access related issues.

Part 1: Client Prerequisites

Please ensure that we use the same client machine is used for the entire process outlined in this document.

Step 1.1: Packet Sniffer

Packet Sniffers are programs which can be used for capturing live traffic on a client network. There are several packet sniffers available today for a price and which are also free for download and use. Juniper Networks does not assume any responsibility for the selection of or use of these third party sites and products, so we do ask that you take the time to evaluate and gain the necessary approval needed to install such a program on the designated client machine and Application Server (if possible) prior to starting the log gathering process. Please ensure that the packet sniffer which you chose will allow you to save the TCP capture in either pcap or tcpdump(.dmp) format. Such a packet sniffer will be required by Juniper Support in order to validate the traffic pattern(s) and behavior on the client machine's local network.

While Juniper Networks does not advocate or condemn the use of any such packet sniffer in particular, we commonly suggest the use of "tcpdump" which is a command line tool that is included with all versions of MAC OS X. See [Apple Article HT3994](#) or [Apple QA Article 1176](#) for more information. If prefer, you can also use [Wireshark](#) as the full version is freely available for commercial use and it is supported on a wide range of platforms (Windows, MAC OS, Linux, and so forth). See [Wireshark's FAQ](#) for additional details.

Step 1.2: Output of IPs, Routes, Ping, and Trace Route

IP Addresses

A print out of the IP Addressing assigned to the interface(s) and on the client will allow us to determine the network details for each interface currently in use on the client prior to setting up the VPN tunnel.

Routes

The Routing Table will confirm where data packets traveling over the client's network is normally directed when the Juniper VPN is not in use.

Ping

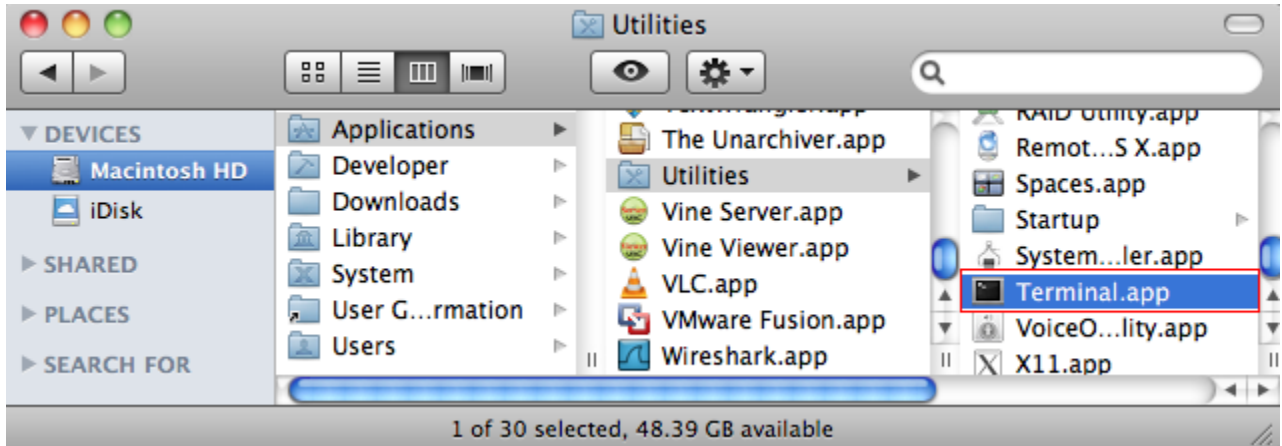
In order to determine if there is any latency of the SA over the Wide Area Network (WAN), we will need to run the ping command to measure the response times.

Trace Route

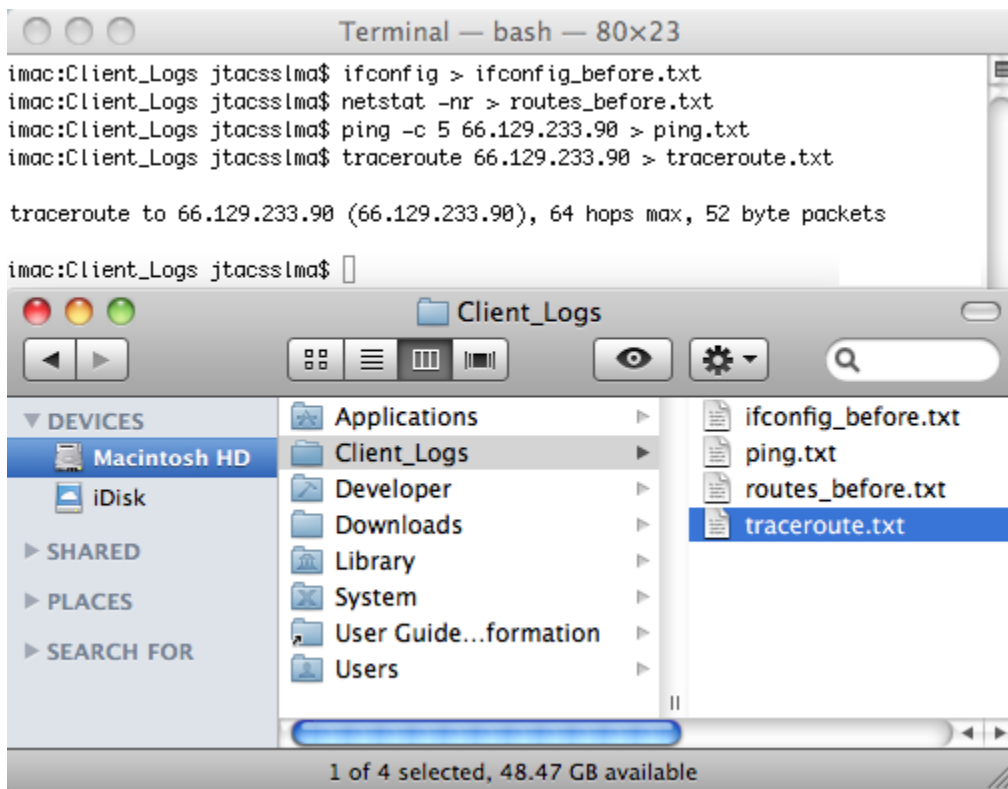
Because the number of hops in between the client and the server can have an impact on latency, we suggest collecting a trace route so this can be confirmed.

To collect this data from a MAC OS client:

1. Open the terminal:
 - a. Browse to **Applications > Utilities**
 - b. Select **Terminal.app**



2. Create text file outputs of IPs, Routes, Ping, and Trace Route:
 - a. Type **ifconfig > ifconfig_before.txt** and select enter on your keyboard.
 - b. Type **route print > routes_before.txt** and select enter on your keyboard
 - c. Type **ping -c 5 <Secure-Access-IP> > ping.txt** and select enter on your keyboard
 - d. Type **tracert <Secure-Access-IP> > tracert.txt** and select enter on your keyboard.
3. Please save **ifconfig_before.txt**, **routes_before.txt**, **ping.txt**, and **tracert.txt** in a separate folder titled **Client_Logs**.



Step 1.3: Delete Client-Side Logging

To delete client-side logs for Network Connect, browse to the following location and delete the **ncproxyd.log**, **Network Connect.log**, **ncproxyd-admintool.log**, and **dsNcLauncher_mac1.log**:

~/Library/Logs/Juniper Networks/Network Connect/

Step 1.4: Timezone of the client

Please make a note of the client's timezone so that we can coordinate the time stamps of the client logs to the time stamps of the Server-Side and Application server logs. Please save this information in a file called **client_timezone.txt**, and place this inside the **Client_logs** folder.

Part 2: Server Prerequisites

Step 2.1: Enable Relay Protection

If you are using the Encapsulating Security Payload (ESP) protocol, then we ask that you enable Relay Protection for our tests. This option helps protect against hostile “repeat attacks” from the network. The client’s sequence number counter and the Secure Access Appliance counter are initialized to 0 when the ESP tunnel is established. The first packet sent will have a sequence number of 1, and will continue to increment with each subsequent packet. Replay protection ensures that the IP Header information is never allowed to cycle until a new ESP encryption key is established or unless the tunnel has to be re-established and thus establishes a new encryption key. Included in the IP header information is the sequence number. Avoiding duplicate sequence numbers makes it easy for us to determine if there was any packet loss.

To enable Replay Protection for NC:

1. In the Admin Console choose **Resource Policies > Network Connect > NC Connection Profiles**
2. Select your existing NC Connection Profile
3. Ensure that **Replay Protection** is **checked**. If not, please put a check by Relay protection to enable it.
4. Select **Save Changes**

ESP (maximize performance)
ESP mode of transportation and encryption is not applicable in FIPS Boxes or Junos Pulse. Only SSL is supported.

UDP port:

ESP to SSL fallback timeout: seconds

Key lifetime (time based): minutes

Key lifetime (bytes transferred): bytes (0 implies no limits)

Replay Protection:

Compression:

Encryption: AES128/MD5 (maximize performance)
 AES128/SHA1
 AES256/MD5
 AES256/SHA1 (maximize security)

Step 2.2: Disable the Upload Logs feature

Enable Upload Logs feature allows the end-user to upload client-side logs directly to the Secure Access(SA) Appliance. Prior to 6.5R10, 7.0R6, and 7.1R2, this option automatically sets the NC client to detailed logging in the NC UI. In turn, this also sets the logging level to 5. The default log level is 3.

The reason we ask that you disable this option for all performance based testing is because extended use of this option enables verbose (Level 5) logging and can create large log files which may impact performance.

If you are running 6.5R10, 7.0R6, and 7.1R2 and above, then this behavior has been changed so that logging level is automatically set to 3, and it is not required for you to disable the upload logs feature.

To disable the Upload Logs feature:

1. In the Admin Console choose **Users > User Roles**
2. Select applicable your **role(s)**

Note: You will need to disable this option on each role assigned to the user account currently used for the subsequent test.

3. In your **role(s)** select **General > Session Option**
4. **Uncheck Enable Upload Logs**
5. Select **Save Changes**

Upload logs

Allows the end-user to upload client-side logs for troubleshooting purposes. You may need to enable client-side logs. Extended use of this option can create large log files and may impact performance.

Enable Upload Logs

Save changes?

Step 2.3: Bandwidth Management

If you have Bandwidth Management policy enabled, please disable this policy per the instructions below.

To disable bandwidth management:

1. In the admin console, choose **Users > Resource Policies > Network Connect > NC Bandwidth Management**
2. On the Network Connect Network Connect Bandwidth Management page, click on your **existing Bandwidth Management policy**
3. In the Roles section, specify **Policy applies to SELECTED roles**. Then remove any and all possible roles which your NC user could have assigned. If the user is assigned multiple (and you are implementing the **Merge settings for all assigned roles** setting in your Realm. See **Users > User Realms > Your Realm > Role Mapping**) roles, then this policy will continue to be enforced if it applies to even one your user's assigned roles.

Policy applies to ALL roles
 Policy applies to SELECTED roles
 Policy applies to all roles OTHER THAN those selected below

Available roles:

Network Connect
Users

Selected roles:
(none)

If you are reporting a performance issue which is directly related to bandwidth management (For Example: Users are receiving less than the minimum bandwidth guaranteed by the policy. Or users are receiving more than the maximum bandwidth allotted by their policy), then please keep in mind that Part 3 of this document will need to be performed twice: Once with the Bandwidth Management policy enabled and again with the Bandwidth Management policy disabled.

Step 2.4: FTP

If possible, we recommend that you setup an FTP server environment and allow the NC user (who will be performing the steps in this document) the ability to access the designated FTP server. You can also use an existing FTP server if you already have one which is enabled and functioning. Before proceeding to Part 3 of this document, please ensure that you have verified the following:

- a) Both download and upload to this FTP server is allowed and functioning for the designated test user.
- b) If your application uses a GUI interface, you observe a “slight” improvement of the command line FTP application as it lacks the additional overhead associated with a GUI. If you do not observe at least equal or slight improvement in performance when using command line ftp, then ftp will not be of any assistance to us. Likely, there are other external factors which could be introducing additional latency to the network hosting the FTP server and or the Application server. Please rule out any such factors before proceeding with ftp.

Assuming the above criteria have been met, we can then use command line ftp as a baseline to compare the performance of your application. This can also help us to identify and isolate if the issue lies between the client and the SA or between the SA and the Application Server for the problem application. Please note that we do not “require” the use of FTP (as we understand this option cannot be enabled in some production environments), but it is strongly recommended for the reasons already stated above.

Step 2.5: Additional Information

Please provide the following information in addition to the Logs above:

1. Is the SA in a Cluster? If so, is it Active/Active (A/A) or Active/Passive (A/P)?
2. If this is in an A/A Cluster, can you replicate without the Load Balancer?
3. Time zone of the SA
4. Screenshot of the Dashboard\Central Manager Graph on the SA (System > Status > Overview)
5. Network Topology Diagram which labels each device by name and IP Address.
6. Please confirm if slowness is visible for download, upload or both?
7. What are we comparing NC slowness to (Third Party VPN, Internal Corporate Access, or similar Secure Access setup)?

Please save this information in a file called **sa_info.doc**.

Part 3: Log Gathering Procedure

Step 3.1: Enable Server-Side Logging

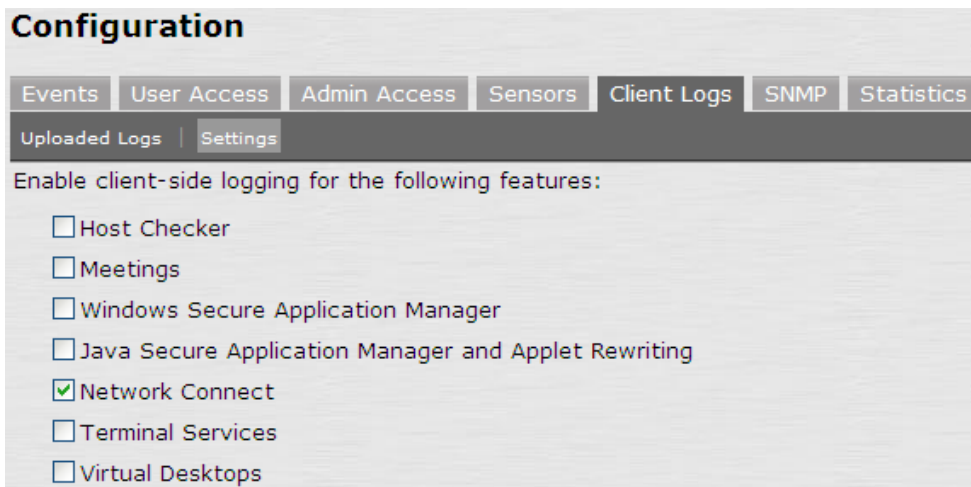
The following log files must be enabled from the Junos Pulse Secure Access Appliance.

Step 3.1.1: Enable Server-Side logging for NC client log files

Client-side logging is useful for debugging problems with an SA Series Appliance client-side feature such as Network Connect. When you enable logging Network Connect, the Appliance writes a log to any client computer that uses either Network Connect. These settings are global, which means that the SA Series Appliance writes a log file to all clients that use the enabled feature. The Appliance then appends to the log file each time the feature is invoked during subsequent user sessions. Please note that logging on the client will be automatically enabled at level 3.

To enable Client-Side logging:

1. In the Admin Console choose **System > Log/Monitoring > Client Side Logs > Settings**
2. Put a **check** in **Network Connect**
3. Select **Save Changes**



Step 3.1.2: Debuglog

The Server-Side debug logging requested in this document may increase overall system load, so we ask that you enable this option only if one or both criteria are met:

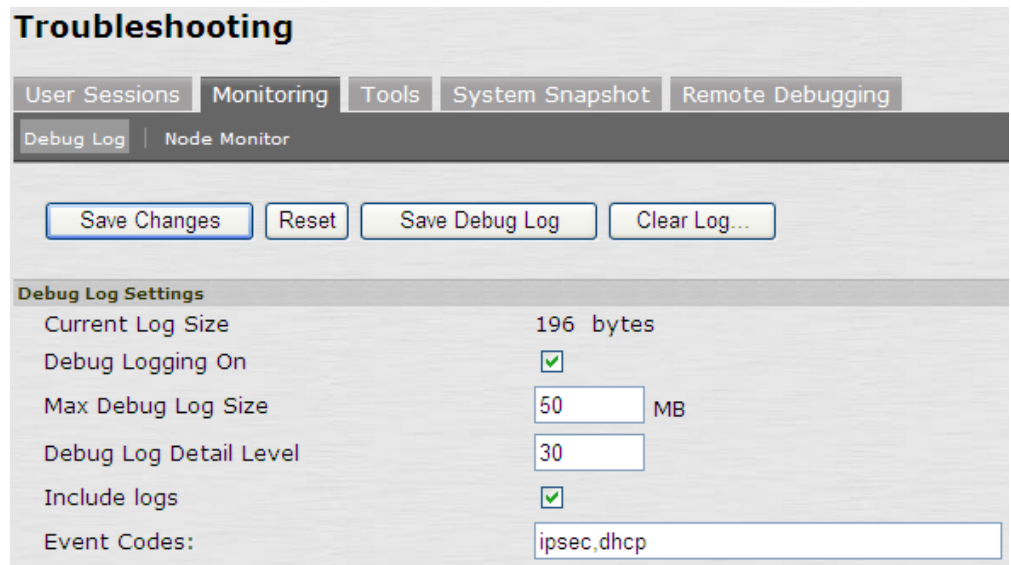
- a) The Secure Access currently in use for the following test does not have a heavy Network Connect load.
- b) JTAC has confirmed that debug logging can be enabled.

Debug logs are particularly important in the event of a problem. You will need to set the debug log at a certain level and add the events list as directed below. We can include both the Debuglog and the system configuration in the System Snapshot. The debuglog is encrypted; you cannot view it.

To enable Debuglog:

1. In the Admin Console choose **Maintenance > Troubleshooting > Monitoring > Debug**
2. Put a **check** in **Debug Logging On**
3. Set Max Debug Log Size to **50**, Debug Log Detail Level to **30**, and Event Codes to **ipsec,dhcp** (Comma separated, no spaces)

4. Select **Save Changes**



Troubleshooting

User Sessions | Monitoring | Tools | System Snapshot | Remote Debugging

Debug Log | Node Monitor

Save Changes | Reset | Save Debug Log | Clear Log...

Debug Log Settings

Current Log Size: 196 bytes

Debug Logging On:

Max Debug Log Size: 50 MB

Debug Log Detail Level: 30

Include logs:

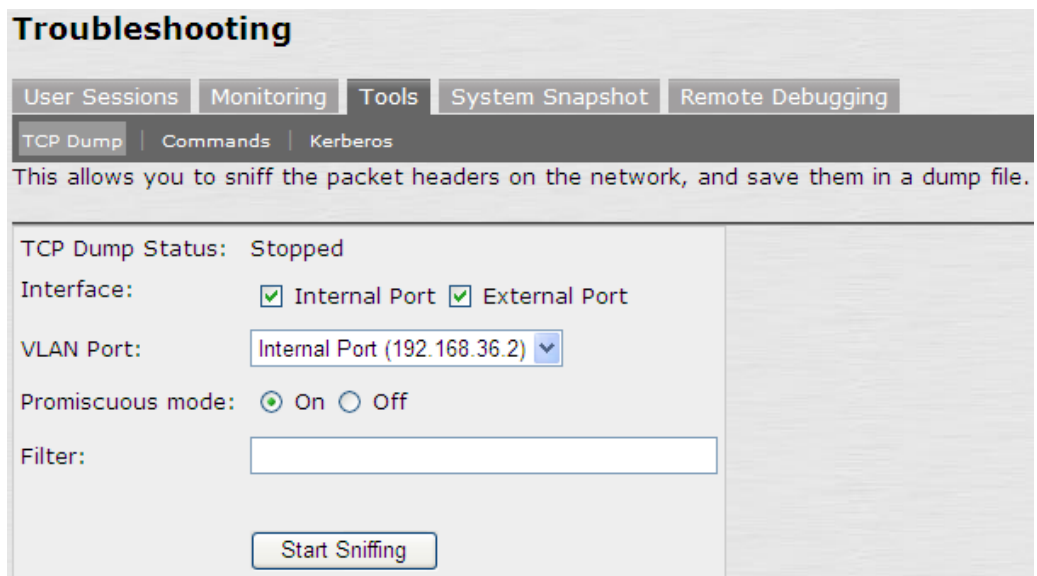
Event Codes: ipsec,dhcp

Step 3.1.3: SA TCP Dump

TCP Dump is a packet sniffer which is built-in to the Secure Access Appliance. This packet capture will be required by Juniper Support in order to validate the traffic pattern(s) and behavior on the local network of the Appliance.

To enable TCP Dump:

1. In the Admin Console choose **Maintenance > Troubleshooting > Tools > TCP Dump**
2. Make sure that **Promiscuous mode** is turned on, and that you are sniffing on the **Internal Port** and **External Port** (if enabled).
3. Select **Start Sniffing**



Troubleshooting

User Sessions | Monitoring | Tools | System Snapshot | Remote Debugging

TCP Dump | Commands | Kerberos

This allows you to sniff the packet headers on the network, and save them in a dump file.

TCP Dump Status: Stopped

Interface: Internal Port External Port

VLAN Port: Internal Port (192.168.36.2)

Promiscuous mode: On Off

Filter:

Start Sniffing

Note: If you have a large number of users logged in to your Appliance, please create a filter for the assigned Network Connect IP and the Source IP of the client. Example: host X.X.X.X or host X.X.X.X. If you are unsure what the NC IP and WAN IP of the client will be, then you can log into the Appliance from the client in order to obtain this information from the User Access Log.

Message	Source IP	NC/Pulse IP
2011-06-17 10:59:33 - ive - [66.129.233.89] user01(Users)[Users] - Connected to TUN-VPN port 443	[66.129.233.89]	
2011-06-17 10:59:33 - ive - [66.129.233.89] user01(Users)[Users] - Network Connect: Session started for user with IP [192.168.36.30] hostname Win7Pro32	[66.129.233.89]	[192.168.36.30]
2011-06-17 10:59:33 - ive - [66.129.233.89] user01(Users)[Users] - Network Connect: ACL count = 1.	[66.129.233.89]	
2011-06-17 10:58:24 - ive - [66.129.233.89] user01(Users)[Users] - Login succeeded for user01/Users (session:00000000) from 66.129.233.89.	[66.129.233.89]	
2011-06-17 10:58:24 - ive - [66.129.233.89] user01(Users)[] - Primary authentication successful for user01/System Local from 66.129.233.89	[66.129.233.89]	

Unless there are fewer IP Addresses than the number of NC users, the user is not getting mapped to the same roles, or the user has not used NC in the last 24 hours then the user will receive the last NC IP he was assigned from the Appliance.

Step 3.2: Enable Client-Side Logging

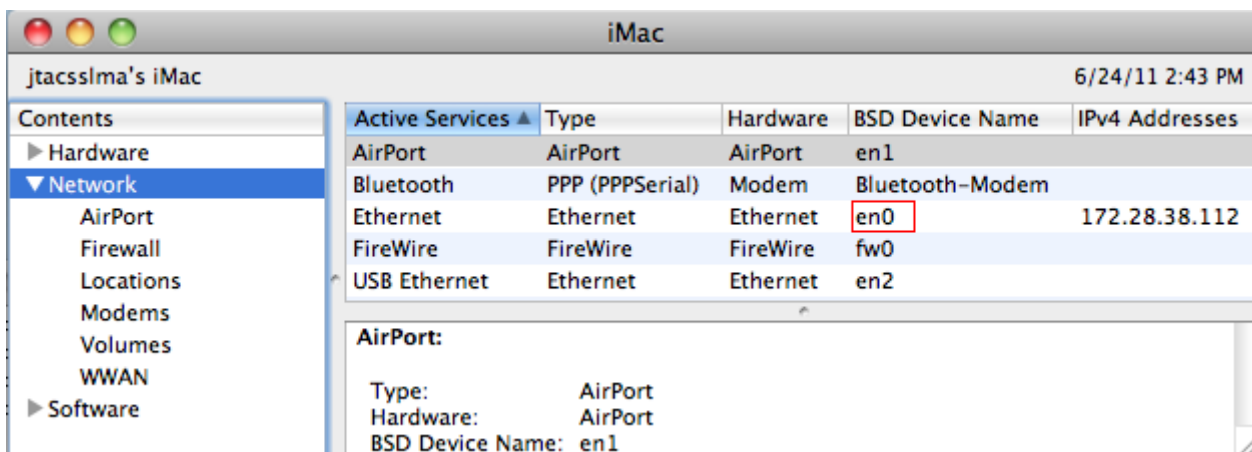
The following log files must be enabled from the client machine which will be used to recreate the issue. Before proceeding to the next steps, please close out all applications and programs including the problem application which we will be used to replicate the problem. This will ensure that the client generates the least amount of unnecessary traffic possible when the packet sniffers are running. This will also ensure that all traffic related to the problem application only applies to a single session.

Step 3.2.1: Start Packet Sniffer on the Local Client Adapter

If you have opted to use a packet sniffer other than the built in “tcpdump” application, please see Vendor instructions for enabling the packet capture on the appropriate interface. Otherwise, if you have chosen to proceed with tcpdump, you can enable it using the instructions provided below.

To determine the name of your Local Client Adapter enable tcpdump for this interface:

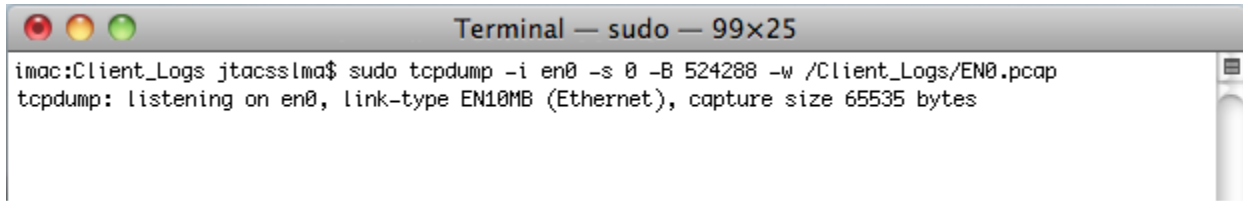
1. Browse to **Applications > Utilities**
2. Select **System Profiler** and make a note of the **BSD Device Name** for your Local Client Adapter. In our example, we will be capturing on the **en0** adapter.



3. Browse to **Applications > Utilities**
4. Select **Terminal.app**

5. Type **sudo tcpdump -i en0 -s 0 -B 524288 -w /Client_Logs/EN0.pcap** and select enter on your keyboard

Note: This command required the local administrator password for your machine.



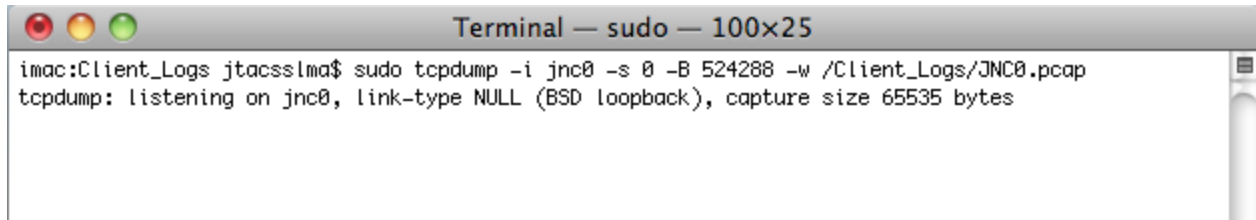
```
Terminal — sudo — 99x25
imac:Client_Logs jtacsslma$ sudo tcpdump -i en0 -s 0 -B 524288 -w /Client_Logs/EN0.pcap
tcpdump: listening on en0, link-type EN10MB (Ethernet), capture size 65535 bytes
```

Step 3.2.2: Start Packet Sniffer on the Juniper Virtual Adapter

If you have opted to use a packet sniffer other than the built in “tcpdump” application, please see Vendor instructions for enabling the packet capture on the appropriate interface. Otherwise, if you have chosen to proceed with tcpdump, you can enable it using the instructions provided below.

To enable tcpdump on the Juniper Virtual Adapter:

1. **Login to Network Connect** as you will not be able to capture on the Juniper Virtual Adapter (jnc0) until you connect.
2. Browse to **Applications > Utilities**
3. Select **Terminal.app**
4. Type **sudo tcpdump -i jnc0 -s 0 -B 524288 -w /Client_Logs/JNC0.pcap** and select enter on your keyboard



```
Terminal — sudo — 100x25
imac:Client_Logs jtacsslma$ sudo tcpdump -i jnc0 -s 0 -B 524288 -w /Client_Logs/JNC0.pcap
tcpdump: listening on jnc0, link-type NULL (BSD loopback), capture size 65535 bytes
```

Step 3.3: Application Packet Sniffer

Capture a packet sniffer on the Application Server. This will enable Juniper Support to validate the traffic pattern(s) and also analyze the packet flow between the client and servers.

Step 3.4: Reproduce the Issue

At this point in the Log Gathering process, we can attempt to replicate the performance issues using the designated client machine. We will want to use the same client machine which was used in Part 1 of this document. Please keep all application closed except the problem application. Once you have replicated the issue using the problem application, please close out of the program. If we are able to use FTP, we can now test it out within the same NC session.

To open and test out FTP:

1. Browse to **Applications > Utilities**
2. Select **Terminal.app**
3. To upload/download to the FTP server
 - a. Enter a username and if required, enter a password.
 - b. Browse to the directory designated for testing (Example: Type **cd /pub/incoming** and press enter on your keyboard)

- c. Execute FTP upload: **put <filename>**
- d. Execute FTP download: **mget <filename>**
- e. Highlight entire FTP output and save in a text file titled **ftp.txt** in the **Client_Logs** folder

```

Terminal — ftp — 62x23
230 Anonymous user logged in
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> cd /pub/incoming/test
250 OK. Current directory is /pub/inco
ftp> put Archive.zip
local: Archive.zip remote: Archive.zip
229 Extended Passive mode OK (|||43353
150 Accepted data connection
100% |*****| 1574      20.84 MiB/s    00:00 ETA
226-File successfully transferred
226 0.383 seconds (measured here), 4.8
1574 bytes sent in 00:00 (4.15 KiB/s)
ftp> mget Archive.zip
mget Archive.zip [anpqy?]? yes
229 Extended Passive mode OK (|||19869|)
150 Accepted data connection
100% |*****| 1574      50.00 KiB/s    00:00 ETA
226-File successfully transferred
226 0.000 seconds (measured here), 42.83 Mbytes per second
1574 bytes received in 00:00 (49.47 KiB/s)
ftp>

```

Step 3.5: Turn off Server-Side logging and Collect Log files

Once you have replicated the issue, please collect the following log files while NC is still connected. Do not disconnect from NC until after all of the Server-Side and Client-Side logs files have been collected.

Step 3.5.1: SA TCP Dump

To turn off TCP Dump and save the capture:

1. In the Admin Console choose **Maintenance > Troubleshooting > Tools > TCP Dump**
2. Select **Stop Sniffing**
3. Under the Dump File section choose **Raw** from the drop down, then select **Get** to save the file as **ive-<date>-<time>.dmp**

Troubleshooting

User Sessions | Monitoring | Tools | System Snapshot | Remote Debugging

TCP Dump | Commands | Kerberos

This allows you to sniff the packet headers on the network, and save them in a dump file.

TCP Dump Status: Stopped

Interface: Internal Port External Port

VLAN Port: Internal Port (192.168.36.2) ▼

Promiscuous mode: On Off

Filter:

Dump file (Created: Fri Jun 17 12:24:00 2011, Size: 320005 bytes)

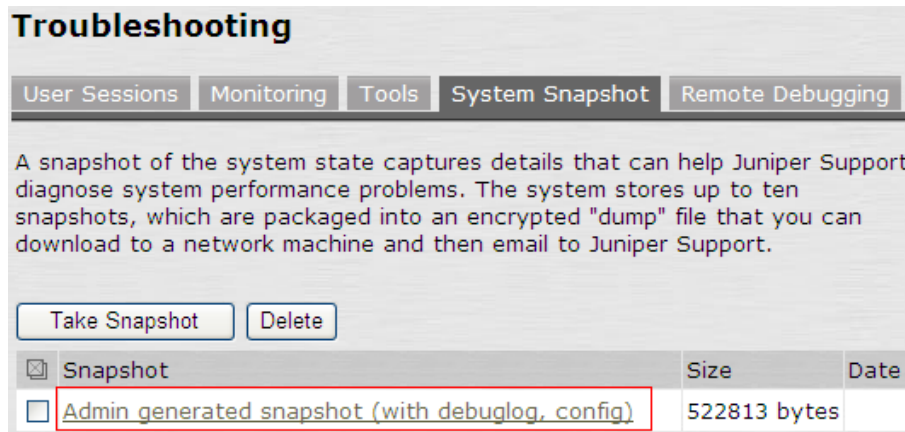
▼

Step 3.5.2: System Snapshot

When you use this option, the Appliance runs various utilities to gather details on the system state, such as the amount of memory in use, paging performance, the number of processes running, system uptime, the number of open file descriptors, ports in use, and FIPS log messages. We can include both the Debuglog and the system configuration in the System Snapshot. The system snapshot and debuglog is encrypted; you cannot view it.

To take System Snapshot, turn off debuglog, save the snapshot (which includes the debuglog):

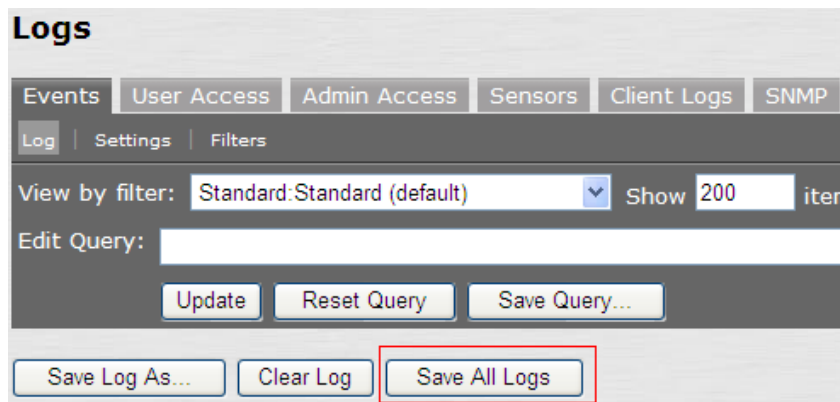
1. In the Admin Console choose **Maintenance > Troubleshooting > Monitoring > Debug**
2. **Uncheck Debug Logging On**
3. Select **Save Changes**
4. Go to **Maintenance > Troubleshooting > System Snapshot**
5. Put a **check** in **Include system config** and **Include debug log**
6. Select **Save Changes**
7. Select **Take Snapshot**
8. Select **<Snapshot-File-Name>** to save the file as **juniper-state-admin-<date>-<time>**



Step 3.5.3: User Access Log, Event Log, and Administrator Access Log

To collect the User Access Log, Event Log, and Administrator Access Log all at one time:

1. In the Admin Console choose **System > Log/Monitoring > Events**
2. Select **Save All Logs** to save all three log files as **juniperlogs.tar.gz**



Step 3.5.4: Disable Server-Side logging for NC client log files

To disable Client-Side logging:

1. In the Admin Console choose **System > Log/Monitoring > Client Side Logs > Settings**
2. **Uncheck Network Connect**
3. Select **Save Changes**

Step 3.6: Turn off Client-Side logging and Collect Log files

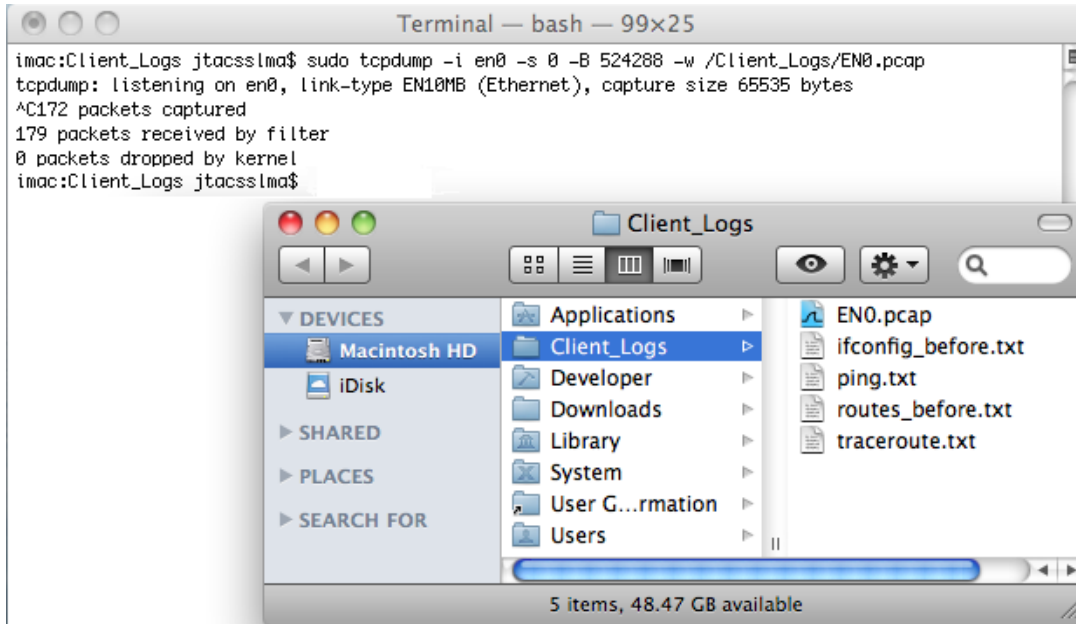
Once you have replicated the issue, please collect the following log files while NC is still connected. Do not disconnect from NC until after all of the Server-Side and Client-Side logs files have been collected.

Step 3.6.1: Stop Packet Sniffer on the Local Client Adapter and save it in pcap format

If you have opted to use a packet sniffer other than the built in "tcpdump" application, please see Vendor instructions for enabling the packet capture on the appropriate interface. Otherwise, if you have chosen to proceed with tcpdump, you can enable it using the instructions provided below.

To stop tcpdump on the Local Client Adapter and save it in pcap format:

In the terminal type the letter **c** from your keyboard while you are holding down the **control** key.

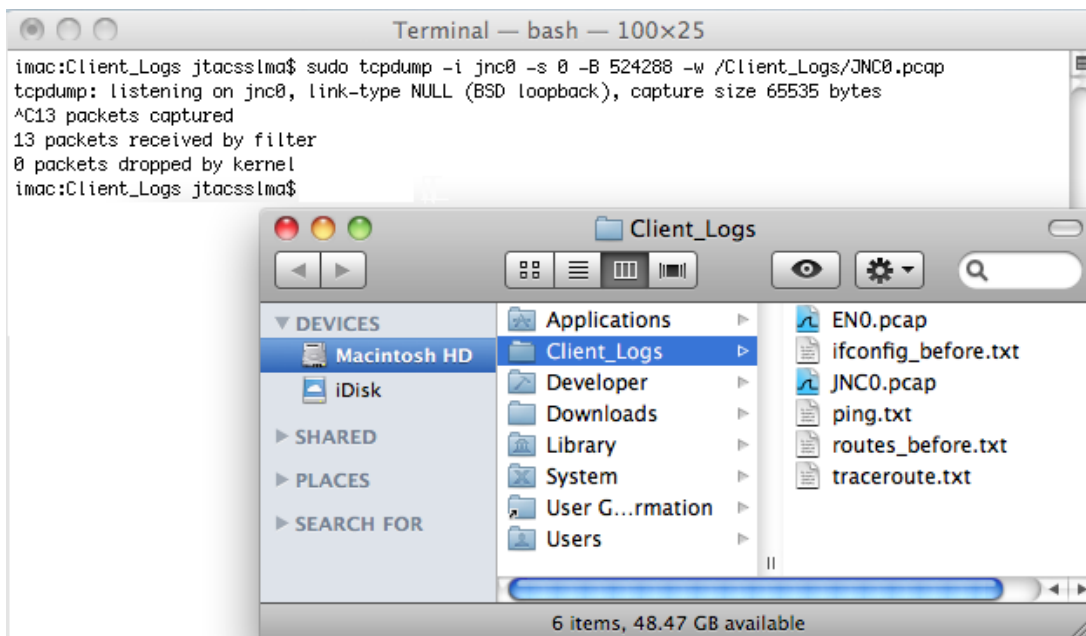


Step 3.6.2: Stop Packet Sniffer on the Juniper Virtual Adapter and save it in pcap format

If you have opted to use a packet sniffer other than the built in “tcpdump” application, please see Vendor instructions for enabling the packet capture on the appropriate interface. Otherwise, if you have chosen to proceed with tcpdump, you can enable it using the instructions provided below.

To stop tcpdump on the Juniper Virtual Adapter and save it in pcap format:

In the terminal type the letter **c** from your keyboard while you are holding down the **control** key.



Step 3.6.3: Collect Client-Side Log Files

To collect client-side logs for Network Connect, browse to the following location and save the **ncproxyd.log**, **Network Connect.log**, **ncproxyd-admintool.log**, and **dsNcLauncher_mac1.log**:

~/Library/Logs/Juniper Networks/Network Connect/

Step 3.6.4: Output of Route Table and IP Address while NC is connected

A print out of the IP Addressing assigned to the interface(s) and on the client will allow us to determine the network details for the NC interface while the VPN tunnel is connected. The Routing Table will confirm where data packets traveling over the client's network when the Juniper VPN is in use.

To collect this data from a MAC OS client:

1. Open the terminal:
 - a. Browse to **Applications > Utilities**
 - b. Select **Terminal.app**
2. Create text file outputs of IPs and Routes:
 - a. Type **ifconfig > ifconfig_before.txt** and select enter on your keyboard.
 - b. Type **route print > routes_before.txt** and select enter on your keyboard
3. Please save **ifconfig_after.txt** and **routes_after.txt** in a separate folder titled **Client_Logs**.

Step 3.7: Turn off Application Packet Sniffer and Save Capture

You can save this file as ApplicationServer.pcap.

You can now disconnect from NC on the client machine. Please confirm that you have the following log files both from the Server-Side and the Client-Side:

1. ipconfig_before.txt
2. routes_before.txt
3. ping.txt
4. tracert.txt
5. client_timezone.txt
6. sa_info.doc (This contains the additional information and screenshot of Dashboard)
7. ftp.txt (if applicable)
8. ive-<date>-<time>.dmp
9. juniper-state-admin-<date>-<time>
10. juniperlogs.tar.gz
11. ipconfig_after.txt
12. routes_after.txt
13. NC_Adapter.pcap
14. LAN_Adapter.pcap
15. debuglog.log and debuglog.old (if created)

16. In the case of Windows Vista/Windows 7 only you should also have a second set of client logs. (Example: debuglog.log, debuglog.old, debuglog_public.log, debuglog_puplic.old)
17. ApplicationServer.pcap

For any questions or issues relating to the procedures outlined in this document, please contact support. For details on how to engage support, please refer to the following link: <http://www.juniper.net/support/requesting-support.html>