



HP Network Virtualization for Mobile

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Windows and Linux

User Guide

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Network Virtualization for Mobile Overview

Network virtualization (NV) virtualizes real-world conditions by imposing impairments and constraints on a lab-network during the software testing process, thereby improving software testing accuracy. The imposed impairments and constraints include, amongst other things, network latency, packet loss, and bandwidth limitations.

How does network virtualization enhance software testing?

Network virtualization enables the testing environment to more accurately emulate a real-world network environment. This functionality is particularly useful when testing is performed in a geographically-complex scenario such as the following:

A server is located in New York. The server is accessed by users, who are located many miles away – in London. When users access the server, there is a delay due to network impairments and constraints that inevitably exist on an extended network, such as the one between New York and London.

Software updates are developed for the system, and are tested by the QA team based in New York. Because QA is located so close to the server, network impairments in the testing environment are much less than those that exist in the "live" system, and QA results may therefore not be accurate.

Network Virtualization for Mobile enables accurate network impairments to be implemented for the testing scenario, thereby more effectively emulating the live environment, thereby improving the accuracy of the testing.

What does HP Network Virtualization for Mobile do?

You can use HP Network Virtualization for Mobile to impose network impairments and constraints into a testing environment. You use HP Network Virtualization for Mobile to test the performance of your system while the network impairments are imposed. Based on the tests conducted, HP Network Virtualization for Mobile can analyze the test results, and make recommendations for improving the performance of your software.

What are the components that make up HP Network Virtualization for Mobile?

The HP Network Virtualization for Mobile bundle can include the following components:

- **NV Server.** Used as a repository for test results, test configurations, and network profiles. Manages user accounts and their privileges in the system. Enables the specification of various system and user settings. Enables management of floating licenses. Not every HP Network Virtualization for Mobile installation includes the NV Server. NV Server cannot be installed on the same computer as NV Test Manager.

For details on the NV Server, see ["NV Server" on page 76](#).

- **NV Test Manager.** Used to create and implement network impairments, to run tests, and to analyze test results.

There are two forms of the NV Test Manager UI (user interface) – the standard UI, which runs on desktop and laptop computers, and the mobile UI, which runs on mobile devices.

- The standard UI includes the full NV Test Manager functionality. It must be installed on the same computer as NV Agent, and cannot be installed on the same computer as NV Server.

For details on the standard form, see ["Creating and Running Tests" on page 16](#).

- The mobile UI contains a subset of the full NV Test Manager functionality. It enables you to quickly and easily run tests in which your application is operated directly from a mobile device – while the required network conditions are applied. No installation is required for the mobile UI; you can run it from the correctly specified URL.

For details on the mobile form, see ["Run a Test from a Mobile Device" on page 36](#).

- **NV Agent.** Used together with the NV Test Manager to impose network impairments and constraints, and run tests. It must be installed on every computer on which NV Test Manager is installed. NV Agent is accessed directly by NV Test Manager when required; there is (almost) no need for a user to access NV Agent directly.
- **NV License Manager.** Used to manage the licenses that are required for the HP Network Virtualization for Mobile components. It is installed when you install NV Server, NV Test Manager, NV Analytics, or NV Location Editor.

For details on the NV License Manager, see ["Licensing HP NV for Mobile Products" on page 124](#).

- **NV Analytics.** Provides in-depth analysis of your application's performance, based on test results from NV Test Manager. Helps to identify factors that negatively impact your application's performance.

For details, see the NV Analytics User Guide.

- **NV Location Editor.** Creates network profile data objects for use with the NV Test Manager API or when integrating with other testing solutions.

For details, see the NV Location Editor User Guide.

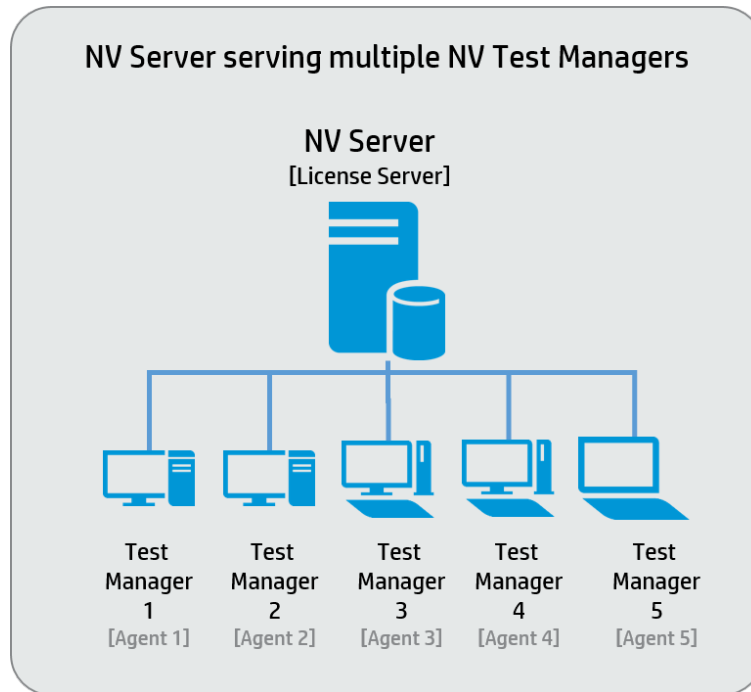
What are the HP Network Virtualization for Mobile installation configuration options?

An HP Network Virtualization for Mobile installation can be either a standalone Test Manager installation, or a Server-based installation.

- **Standalone Test Manager installation.** The Test Manager is installed, and NV Server is not installed. There is no connection between one Test Manager installation and any other Test

Manager installation. Only one user account can use each Test Manager installation.

- **Server-based installation.** There is a single installation of NV Server. Multiple Test Managers can be connected to the NV Server. This enables the Test Managers to access – and thereby share – files that are stored in a repository on the NV Server. In addition, the NV Server enables multiple users to access each of the Test Managers, and manages floating licenses for the Test Managers.



Note: The NV Server and the NV Test Manager cannot be installed on the same computer.

How do I start the HP Network Virtualization for Mobile components?

You can run NV Server, NV Test Manager, and the NV License Manager locally on the computers on which they are installed, or from a remote computer. For details, see:

- ["NV Test Manager" on page 11](#)
- ["NV Server" on page 76](#)
- ["Network Virtualization for Mobile Licensing" on page 125](#)

Does HP Network Virtualization for Mobile test only mobile applications?

No – you can use HP Network Virtualization for Mobile to test both desktop applications and mobile applications that interact with a server.

See also:

- ["NV Test Manager" on page 11](#)
- ["NV Server" on page 76](#)
- ["Installing HP NV for Mobile Components" on page 90](#)
- ["Licensing HP NV for Mobile Products" on page 124](#)

Part 1: NV Test Manager

You can use the NV Test Manager to create and run tests, analyze the test results, and produce recommendations for improving the performance of your application.

This section includes:

- ["Test Manager Overview" on page 12](#)
- ["Starting NV Test Manager" on page 13](#)
- ["Testing Overview" on page 14](#)
- ["Creating and Running Tests" on page 16](#)
- ["Viewing Test-Run Statistics" on page 46](#)
- ["Performing Transactions" on page 51](#)
- ["Analyzing Test Results" on page 56](#)
- ["Managing Network Profiles" on page 65](#)
- ["NV Test Manager Settings" on page 71](#)

Chapter 1: Test Manager Overview

You can use NV Test Manager to impose impairments and constraints on a network, and then to test the performance of your application while the impairments are imposed. Thereafter, you can use NV Test Manager to analyze the test results, and produce recommendations for improving application performance.

For details on the above tasks, see ["Testing Overview" on page 14](#).

How do I start NV Test Manager?

For details on how to start NV Test Manager, see ["Starting NV Test Manager" on page 13](#).

Can NV Test Manager work together with any other HP Network Virtualization for Mobile products?

Yes, NV Test Manager can work together with NV Server. This is called a Server-based configuration. NV Server enables the associated NV Test Managers to access various files that are stored in a repository on the NV Server. In addition, NV Server enables multiple users to operate each of the associated NV Test Managers.

- For details about the possible HP Network Virtualization for Mobile configurations, see ["Network Virtualization for Mobile Overview" on page 7](#).
- For details about NV Server, see ["NV Server" on page 76](#).

If NV Test Manager is installed without NV Server, how many users can use the NV Test Manager?

In a standalone NV Test Manager configuration, there is only a single user login available for accessing NV Test Manager.

Chapter 2: Starting NV Test Manager

You can run NV Test Manager either locally on the computer on which the Test Manager is installed, or from a remote computer.

- **To access NV Test Manager locally:**

Click **Start > All Programs > HP Software > NV for Mobile > NV Test Manager > NV Test Manager**.

- **To access NV Test Manager remotely:**

Enter the following URL into your browser:

```
http://<NV Test Manager Address>:<NV Test Manager Port>/shunra/controller/
```

For example:

```
http://198.51.100.24:8182/shunra/controller/
```

If secured communication was selected when NV Test Manager was installed, the URL begins with https://.

Note: The NV Test Manager port is set initially when NV Test Manager is installed. Port 8182 is the default port. For details on how to change the port after installation, see ["Changing the NV Test Manager Port" on page 71](#).

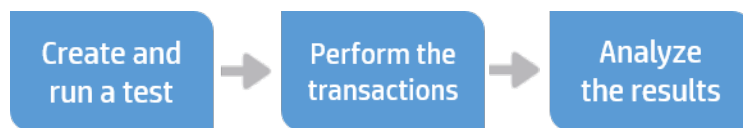
Chapter 3: Testing Overview

You use the NV Test Manager to conduct tests. Conducting a test lets you record and analyze the performance of your application while network impairments are imposed. You conduct a test by creating and running a new test or by copying and then running an existing test.

See ["Network Virtualization for Mobile Overview" on page 7](#).

How do I conduct a test?

Conducting a new test typically includes the following steps:



- For details on creating and running tests, see ["Creating and Running Tests" on page 16](#).
- For details on working with transactions, see ["Performing Transactions" on page 51](#).
- For details on analyzing test results, see ["Analyzing Test Results" on page 56](#).

What types of tests are there?

Tests can be either Quick Tests, or Advanced Tests:

- **Quick Tests.** Are defined by a limited set of parameters that define the network impairments. For details, see ["Create and Run Quick Tests" on page 16](#).
- **Advanced Tests.** Are defined by a comprehensive set of parameters that define the network impairments. For details, see ["Create and Run Advanced Tests" on page 19](#).

In a Server-based configuration, who can access an existing test?

Tests are typically created by users who are assigned to the **Testers** user group. Each tester creates tests that are then accessible to that user only – a tester cannot see or access tests that were created by other users of the NV Test Manager.

Note: Users that are assigned to the **Server Administrators** or **NV Test Manager Administrators** user groups are able to access the tests of all users that are registered in NV Server.

If a user (tester) wants to share a test with other users, the user can:

- Upload the test to the NV Server. Other users can then download the test. For details, see ["Upload Tests to NV Server" on page 42](#) and ["Download Tests from NV Server" on page 43](#).
- Save the test configuration to a test configuration file, which can then be made available to other users. For details, see ["Save a Test Configuration to a File" on page 44](#).

Test-Run Modes

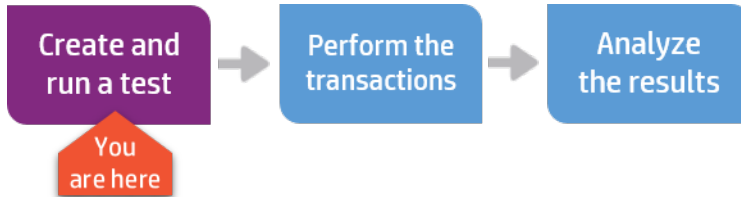
Each HP Network Virtualization for Mobile test must be assigned a run mode. The run modes determine whether or not multiple tests can run concurrently on the Test Manager. The available run modes are:

- **Concurrent.** Multiple concurrent-mode tests can run concurrently on the NV Test Manager. You cannot begin to run a single-mode test on the NV Test Manager when a concurrent-mode test is running.
- **Single.** Only one single-mode test can run on the NV Test Manager at any given time. If a single-mode test is running on the NV Test Manager, no other single or concurrent-mode tests can run on the NV Test Manager.

Note: Importing recorded network conditions is supported only by single-mode tests – not by concurrent-mode tests. For details on importing recorded network conditions, see ["Configuring Gateway Parameters" on page 23](#) and ["Latency and Packet Loss" on page 27](#).

For details on how to run tests, see ["Creating and Running Tests" on page 16](#).

Chapter 4: Creating and Running Tests



You use the NV Test Manager to create and run tests. You run a test in order to determine the performance of your application when it is operated under specified network conditions. When you create a test, you specify the run-mode of the test, and define one or more **flows**¹ in the test. Thereafter, you run the test to impose the required network impairments, and measure and record the performance of your application.

What types of tests are there?

Tests can be either Quick Tests, or Advanced Tests:

- **Quick Tests.** Are defined by a limited set of parameters that define the network impairments. For details, see ["Create and Run Quick Tests" below](#).
- **Advanced Tests.** Are defined by a comprehensive set of parameters that define the network impairments. For details, see ["Create and Run Advanced Tests" on page 19](#).

Note:

While a test is running, you can:

- View run-time statistics. For details, see ["Viewing Test-Run Statistics" on page 46](#).
- Add transactions to the test to make the test more effective. For details, see ["Performing Transactions" on page 51](#).

Create and Run Quick Tests

You run a Quick Test in order to determine the performance of your application when it is operated under specified network conditions. A Quick Test includes a limited set of parameters that define the network impairments to apply to the network. When you create a Quick Test, you specify the run-mode


¹A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the client and server IP addresses that are specified in the flow.

of the test, and define one or more **flows**¹ in the test. Thereafter, you run the test to impose the required network impairments.

The limited set of parameters that are included in a Quick Test is typically sufficient to enable you to quickly define the impairments and conditions to apply to a network. If a more extensive set of parameters is required, you can create an Advanced Test, as described in ["Create and Run Advanced Tests" on page 19](#).

Note: If the AUT (Application Under Test) uses HTTPS, and you want to use NV Test Manager analysis or NV Analytics to analyze the test results, you must perform the tasks that are described in ["Run a Test when the AUT uses HTTPS" on page 39](#) before you run the test.

To create and run a Quick Test:

1. In the NV Test Manager, click **Tests**, and then click **Create new test > Quick Test**.
2. Modify the name of the test, and enter a scenario name for the test. The scenario name is used to identify the scenario conditions that are applied when you run transactions in the test.
3. Select the **Test mode: Concurrent** or **Single**. For details, see ["Test-Run Modes" on page 15](#).
4. Define one or more flows that are included in the test. For details on adding and defining flows, see ["Add Flows to a Quick Test" below](#).
5. Click **Run**  to start the test.

Note: If you do not run the test, NV Test Manager does not save the test.

While a test is running, you can:

- View run-time statistics. For details, see ["Viewing Test-Run Statistics" on page 46](#).
- Add transactions to the test to make the test more effective. For details, see ["Performing Transactions" on page 51](#).

Add Flows to a Quick Test

Note: This topic applies to Quick Tests only – not to Advanced Tests.

¹A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the client and server IP addresses that are specified in the flow.

Each Quick Test contains one or more flows. A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the **client**¹ and **server**² IP addresses that are specified in the flow. For each flow, you specify the following:

- Client and server IP address lists:

Included IP addresses: The associated network impairments and constraints will be applied to network traffic between the specified client and server IP addresses.

Excluded IP addresses: The associated network impairments and constraints will not be applied to network traffic between the specified client and server IP addresses.

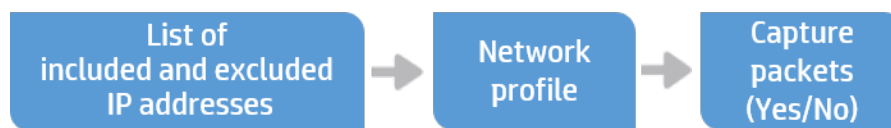
Note: Network traffic that is not included in any flow will not be impaired, and will not be included in analysis reports.


- The network profile. Network profiles contain the network virtualization specifications. For details on network profiles, see ["Managing Network Profiles" on page 65](#).
- Whether or not to capture packets when the test runs. Packets must be captured if you want to perform detailed analysis of the test results. For details, see ["Analyzing Test Results" on page 56](#).

Note: You can add a flow to a test only before you run the test. After a test has been run, you cannot add flows, but you can modify the existing flows in the test.

To add a flow to a Quick Test:


You will need to specify the following:



1. Specify the IP addresses to include and exclude
 - a. Create a new Quick Test, or open an existing one. For details, see ["Create and Run Quick Tests" on page 16](#).
 - b. Click **Add flow** .
 - c. Under **Client IPs**, specify all the client IP addresses to include or exclude from the flow.

¹The client is the computer that sends requests to your application that is being tested.

²The sever is the computer that receives and processes requests from the client application that is being tested.

You can click the drop-down icon [] to select one of the following predefined IP address options:

- **My IP.** Inserts the IP address of the computer from which the NV Test Manager is accessed.
 - **Active Adapter.** Inserts the active adapter's IP address (default). See ["NV Test Manager Settings" on page 71](#) for details on the active adapter.
 - **All IPs.** Inserts all IP addresses: 0.0.0.1 - 255.255.255.255.
- d. For each set of the Client IPs, specify the associated **Protocol** and **Port**.
 - e. Click **Add IP range** and repeat steps 1c and 1d for each set of the client IP addresses to include or exclude in the flow.
 - f. Repeat steps 1c to 1e for each set of the server IP addresses to include or exclude in the flow.

Note: If you do not specify an **Include** range for the Server, NV Test Manager includes the full IP range, even though it is not displayed in the UI.

2. Specify the network profile

Under **Network Profile**, select **Profile > Custom** to specify the characteristics of the network, or select an existing profile that contains the required network parameters. For details on saved network profiles, see ["Managing Network Profiles" on page 65](#).

3. Specify whether or not to capture packets when the test runs

Set **Packet Capture** to **On** if you want to capture network packets when the test runs. Capturing packets enables the test results to be analyzed in depth after the test has been run. For details, see ["Analyzing Test Results" on page 56](#).

Note: If you will not be analyzing the test results in depth, it is recommended not to enable **Packet Capture** because it requires substantial memory allocation and disk space. For details on how to set the maximum size of the packet list buffer, see ["Setting the Maximum Packet List Buffer Size" on page 73](#).

Create and Run Advanced Tests

Note: This topic applies to Advanced Tests only – not to Quick Tests.

You run an Advanced Test in order to determine the performance of your application when it is operated under specified network conditions. An Advanced Test includes a comprehensive set of parameters

that define the network impairments to apply to the network when the test runs. When you create an Advanced Test, you specify the run-mode of the test, and define one or more **flows**¹ in the test. Thereafter, you run the test to impose the required network impairments.

Use an Advanced Test if the smaller set of parameters that are included in a Quick Test is not sufficient to accurately define the impairments and conditions to apply to a network. For details on how to create a Quick Test, see ["Create and Run Quick Tests" on page 16](#).

For a list of impairments and constraints that can be configured in the flow of an Advanced Test, see ["Network Emulation Specifications" on page 34](#).

Note: If the AUT uses HTTPS, and you want to use NV Test Manager analysis or NV Analytics to analyze the performance of the AUT after the test is completed, you must perform the tasks that are described in ["Run a Test when the AUT uses HTTPS" on page 39](#) before you run the test.

To create and run an Advanced Test:

1. In the NV Test Manager, click **Tests**.
2. Click **Create new test > Advanced Test**.
3. Select the **Test mode: Concurrent** or **Single**. For details, see ["Test-Run Modes" on page 15](#).
4. Define the flows for the test. For details, see ["Add Flows to an Advanced Test" on the next page](#).

or

Click **Import test configuration**, and select:

- **From file system** to select a test configuration that was saved to a file.
- **From Test Manager database** to select a test configuration that was saved to the NV Test Manager database from the NV Server repository.

5. Click **Run**  to start the test.

Note: If you do not run the test, NV Test Manager does not save the test.

While a test is running, you can:

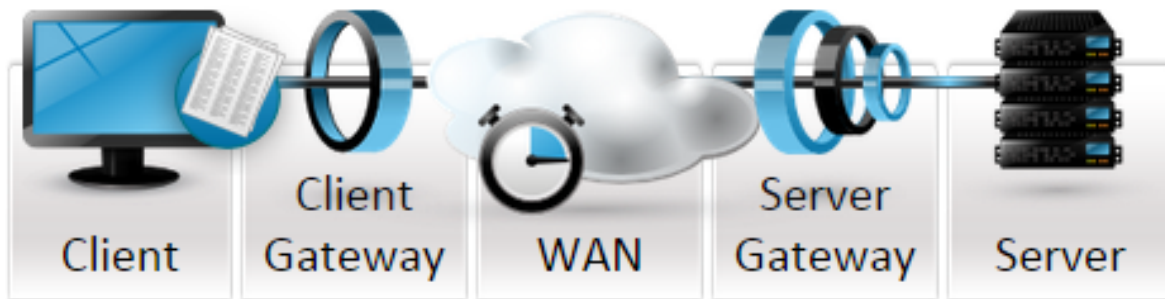
- View run-time statistics. For details, see ["Viewing Test-Run Statistics" on page 46](#).
- Add transactions to the test to make the test more effective. For details, see ["Performing Transactions" on page 51](#).

¹A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the client and server IP addresses that are specified in the flow.

Add Flows to an Advanced Test

Note: This topic applies to Advanced Tests only – not to Quick Tests.

Entities to configure when you create a flow for an Advanced Test.



When you create an Advanced Test, you add flows to the test. A flow is a set of network impairments and conditions that are applied to network traffic that flows between the **client**¹ and **server**² IP addresses that are defined in the flow.

- For a list of impairments and constraints that can be configured in a flow of an Advanced Test, see ["Network Emulation Specifications" on page 34](#).
- For details on how to add flows to a Quick Test, see ["Add Flows to a Quick Test" on page 17](#).

To define a flow in an Advanced Test:

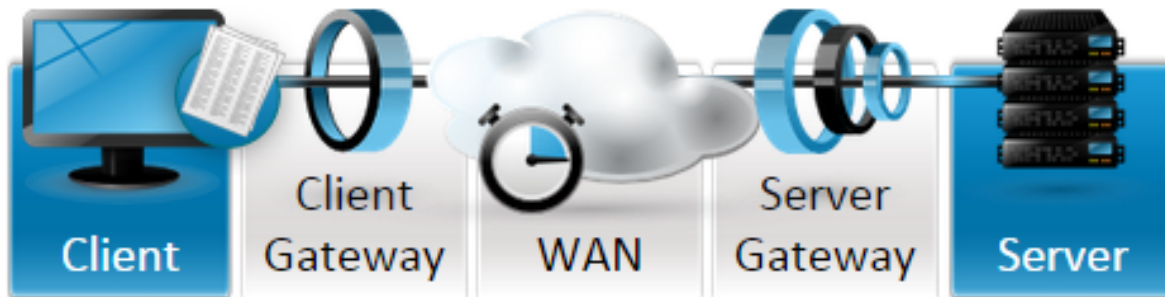
1. Create an Advanced Test, as described in ["Create and Run Advanced Tests" on page 19](#).
2. In the Tests page, specify the following parameters for each flow in the test:
 - a. Client and server IP ranges. For details, see ["Setting Client and Server IP Ranges" on the next page](#).
 - b. Client and server gateway parameters. For details, see ["Configuring Gateway Parameters" on page 23](#).
 - c. WAN parameters. For details, see ["Configuring the WAN Parameters" on page 26](#).
 - d. Whether or not to capture packets when the test runs. Packets must be captured to enable detailed analysis of the test results. For details, see ["Analyzing Test Results" on page 56](#).

¹The client is the computer that sends requests to your application that is being tested.

²The sever is the computer that receives and processes requests from the client application that is being tested.

Setting Client and Server IP Ranges

Note: This topic applies to Advanced Tests only – not to Quick Tests.



When you create an Advanced Test, you must specify the required Client and Server parameters of the network, as described in this topic.

For each flow, you specify the following:

- Client and server IP address lists:

Included IP addresses: The associated network impairments and constraints will be applied to network traffic between the specified client and server IP addresses.

Excluded IP addresses: The associated network impairments and constraints will not be applied to network traffic between the specified client and server IP addresses.

Note: Network traffic that is not included in any flow will not be impaired, and will not be included in analysis reports.

- For details on how to set the client and server gateway parameters, see ["Configuring Gateway Parameters" on the next page](#).
- For details on how to set the WAN parameters, see ["Configuring the WAN Parameters" on page 26](#).

To include and/or exclude IP addresses:


1. In the **Client** tab, click the "+" icon.
2. Using **From IP** and **To IP**, specify the range of IP addresses to which to apply network impairments.
3. Select a **Protocol** and **Port**.

4. Click **Add exclude range**, use **From IP** and **To IP**, specify the range of IP addresses to which not to apply network impairments.

Note: The IPs of the excluded ranges must be within the included range.

5. Click **OK**.
6. Repeat steps 1-5 for all the IP addresses to include or exclude in the **flow**¹.
7. Click the **Server** tab, and repeat steps 1-6 above to specify the server IP addresses.

Note:

- The client IP addresses are displayed for reference, to avoid IP conflicts.
- You can click the **Sync Server IPs** button  to insert **Include** and **Exclude** IP addresses for the server, based on the IP addresses specified for the client.

Configuring Gateway Parameters

Note: This topic applies to Advanced Tests only – not to Quick Tests.



When you create an Advanced Test, you can specify the required Client and Server gateway parameters of the network, as described in this topic.

When network virtualization is applied, gateway parameters are used to emulate the behavior of access gateways on the real networks. For example, you can specify the bandwidth or queue limitation that a specific gateway imposes on the network.

Note:

¹A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the client and server IP addresses that are specified in the flow.

- Entering gateway parameters is optional.
- The gateway parameters are the same for both the client and the server gateways.

The gateway element represents an actual gateway that can be separately configured for incoming and outgoing traffic.

Click the **Client Gateway** and **Server Gateway** tabs to configure the gateway parameter settings.

- For details on how to set the client and server IP addresses, see ["Setting Client and Server IP Ranges" on page 22](#).
- For details on how to set the WAN parameters, see ["Configuring the WAN Parameters" on page 26](#).

The gateway settings include the following:

- [Bandwidth Settings](#)
- [Queue Settings](#)

Bandwidth Settings

Bandwidth values can be either defined or imported from a pre-recorded file.

You can specify different bandwidth values for upstream network traffic and downstream network traffic.

Note: The following procedures are valid for both the upstream and downstream settings.

Defining Bandwidth Settings

When defining bandwidth settings, you can either select pre-defined bandwidth settings, or specify custom bandwidth settings.

To define the bandwidth values:

1. In the **Client Gateway** or the **Server Gateway** tab, select one of the following options:
 - a. **Predefined:** Select one of the available values. (The available values correspond to common bandwidth settings, such as T1, etc.)
 - b. **Custom:** Specify a specific bandwidth. (Valid values are between 2.4 and 10,000,000 Kbps.)
2. Click **OK**.

Importing Recorded Bandwidth Settings

You can use HP Network Capture or HP Network Capture Express to record the bandwidth of a network over a period of time. Network Capture and Network Capture Express measure and records

the bandwidth, and save the values to an .ntx file. You can import the bandwidth values from the recorded file. NV Test Manager uses these recorded bandwidth values when you run the test.

Note: Importing recorded bandwidth settings is supported only by single-mode tests – not by concurrent-mode tests. For details on the test-run modes, see ["Test-Run Modes" on page 15](#).

To import recorded bandwidth parameters:

1. In the **Client Gateway** or the **Server Gateway** tab, click **Recorded** then click **Choose File**.
2. Locate and select the required file, and then click **Open**.

Queue Settings

The Queue settings define the queue limitations and packet overhead.

Queue Limitation

This group contains parameters that emulate limitations imposed on the maximum size of IP packet queues at the gateway NIC. If you specify a queue size, NV Test Manager emulates network behavior by dropping data packets when the queue is full.

To enable queue limitation:

1. Select **Queue Limitation**.
2. Select from the following parameters:

Parameter	Description
Queue Size	Select the amount of memory (KB) that NV Test Manager will allocate to the queue [16 to 4,096 MB].
Drop Mode	
■ Drop Tail	Select this option for NV Test Manager to drop newer data packets when the queue is full.

Parameter	Description
■ Random Early Detection (RED)	<p>This option provides a more sophisticated queue management method. The RED algorithm keeps track of the average increase in queue occupancy. If it detects an increase, it signals to the packet source that the queue may soon be full, by randomly dropping very small amounts of data packets.</p> <p>Keep Queue size between:</p> <p>Indicate the minimum and maximum average occupancy. The system issues signals (by dropping data packets) when the average occupancy fluctuates between the two values. It drops all packets if the average occupancy exceeds the maximum threshold.</p>
Fill mode	<ul style="list-style-type: none">■ Use the fixed size: 1,500 bytes for each packet.■ Use the actual packet size.

Packet Overhead

If your gateway adds overhead bytes to the IP data that flows through the gateway NIC, use this parameter to specify the number of additional bytes, in order to emulate the bandwidth consumption they impose on the network.

To enable packet overhead:

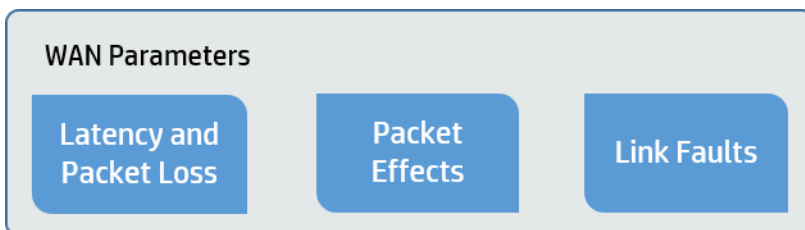
1. Select **Packet Overhead**.
2. Select either **Ethernet** (adds 18 bytes to each packet) or **PPP** (adds 9 bytes to each packet).

Configuring the WAN Parameters

Note: This topic applies to Advanced Tests only – not to Quick Tests.



When you create an Advanced Test, you specify the WAN parameters of the network, as described in this topic. The WAN parameters are divided into the categories shown below:



- **Latency and Packet Loss:** The latency defines the time it takes an IP packet to cross the WAN (one-way only); the packet loss determines how many packets are dropped according to different calculations.

For details, see ["Latency and Packet Loss" below](#).

- **Packet Effects:** Dynamic IP packet routing effects, including out-of-order packets (reordering), duplicated packets, and packet fragmentation.

For details, see ["Packet Effects" on page 30](#).

- **Link Faults:** Possible damage to bit streams, network disconnections, and network congestion.

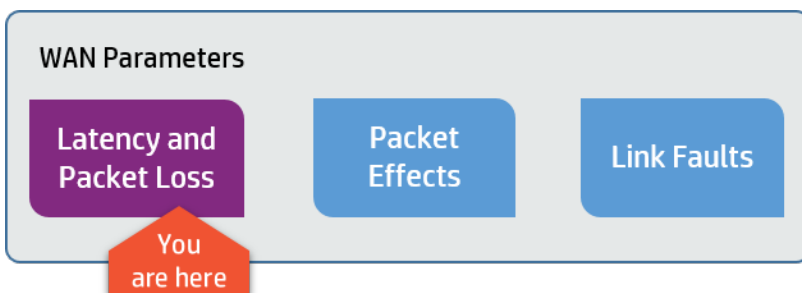
For details, see ["Link Faults" on page 32](#).

Note: You can manually specify the latency and packet loss parameters, or you can import the parameters from an .ntx file. Packet Effects and Link Faults are always set manually, i.e. they cannot be imported from a file.

- For details on how to set the client and server IP addresses, see ["Setting Client and Server IP Ranges" on page 22](#).
- For details on how to set the client and server gateway parameters, see ["Configuring Gateway Parameters" on page 23](#).

Latency and Packet Loss

Note: This topic applies to Advanced Tests only – not to Quick Tests.



- For details on how to set the packet effects, see ["Packet Effects" on page 30](#).
- For details on how to set the link Faults, see ["Link Faults" on page 32](#).

Latency is the time it takes an IP packet to cross the WAN. You can define a fixed latency or a statistically distributed latency. Via a fixed latency, you can emulate a simple WAN. Set the latency and packet loss parameters using the following modes:

- **Custom:** To set the latency and packet loss manually. For details, see [Custom Latency and Packet Loss](#).
- **Recorded:** To import a recording of network settings. For further information regarding importing settings, including predefined sample files, see [Importing a Recorded File](#) below.

Setting latency and packet loss parameters

1. Click the **WAN** tab, and then select **Latency and Packet Loss**.
2. Select:
 - **Custom:** To set the parameters manually. For details, see [Custom Latency and Packet Loss](#).
 - **Recorded:** To import a recorded file (.ntx) produced by HP Network Capture or HP Network Capture Express. For details, see [Importing network conditions from a recorded file](#) below.

Importing network conditions from a recorded file

Note: Importing recorded network conditions is supported only by single-mode tests – not by concurrent-mode tests. For details on the test-run modes, see ["Test-Run Modes" on page 15](#).

1. Select **Recorded** and then click **Choose file**.
2. Locate and select the required .ntx file, and then click **Open**. A summary of the network conditions is displayed.
3. If required, modify the latency and packet loss by selecting a percentage in the **Multiply latency values by** and **Multiply loss value by** lists.

This factor allows you to predict future load cases or to prepare some margins of service level over the current status. In this field, you can specify a number between 0 and 200 percent to have the latency and packet loss values multiplied by it. The value of 100% means that NV Test Manager will use the recorded values as they are. The value 200 means that each value will be doubled (multiplied by 200%).

4. If required, select a **Packet Loss** value.

5. If required, select a **Playback Mode**, as described in [Playback Mode](#) below.

Playback Mode

Play imported values sequentially	While emulating the network, NV Test Manager will cyclically use the latency values one after the other in the order in which they were recorded.
Play imported values randomly	While emulating the network, NV Test Manager will pick one of the recorded values randomly, for each packet. This allows you to experience random values from the real network to predict more network scenarios.

Specifying Custom Latency and Packet Loss

1. To define the settings manually, click **Custom**.
2. To set the Latency values, select one of the following options:
 - **Fixed:** Enter the number of milliseconds, from 0 to 8,000.
 - **Uniform distribution:** Specifies a changing latency over time (also referred to as jitter). Type the minimum and maximum latency values in the **Minimum** and **Maximum** boxes. This causes NV Test Manager to randomly change the latency between the minimum and maximum values (from 0 to 8,000 ms).

You can limit the change in latency between each two consecutive packets to a specified number. To use this option, select **Limit latency change** and enter the maximum allowed change, in milliseconds. For example, if you enter 45, NV Test Manager will change the latency by a maximum of 45 milliseconds between two consecutive packets.

- **Normal distribution:** Causes latency to fluctuate randomly and non-uniformly around an average value (milliseconds) that you specify in the **Average** box. This option can be used to emulate jitter conditions.

The **Standard Deviation** parameter allows you to exert some control over the random change in latency. Entering a value in this parameter sets a range for two thirds of the random values. For example, if the average is 600 milliseconds and the standard deviation is 100 milliseconds, two thirds of random latency values will be between 500 and 700.

- **Linear Latency:** Allows you to set a range of latency values and to indicate the time it takes latency to increase from the minimum to the maximum value in the range.

Enter the range in Minimum and Maximum (from 0 to 8,000 ms), and the cycle duration in Graph duration (from 1 to 65,535 seconds). For example, if you define a range of 100 to 200

milliseconds and a cycle duration of 100 seconds, NV Test Manager will increase latency by one millisecond each second.

When the NV Test Manager reaches maximum latency, it cycles back to the minimum value.

3. To integrate packet loss into a scenario, select a **Packet Loss** option:

Note: Packet loss can also be imported in a recorded file.

- **No packet loss:** Select this option if the WAN behavior you want to emulate is not affected by packet loss. In this case, NV Test Manager does not lose any packets and the impairment is not applied to network traffic.
- **Periodic loss:** Select this option and enter a number (from 2 to 65,535) in the **Lose one packet every x packets** box, to instruct NV Test Manager to discard every xth packet that passes through the emulated WAN. For example, if you enter 8, HP Network Virtualization for Mobile discards every 8th packet that enters the WAN.

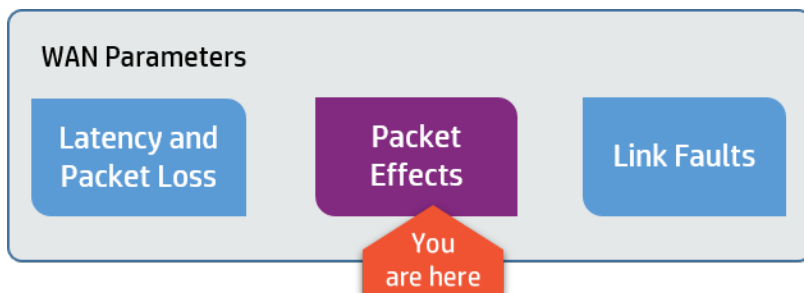
NV Test Manager counts packets separately in both directions. It loses the incoming xth packet and the outgoing xth packet.

- **Random Loss:** Allows you to set the probability for losing each packet (enter a percentage from 0.01 to 90). For example, entering 2 means that each packet has a 2 percent chance of being dropped while passing through the emulated WAN Cloud.
- **Burst Loss:** Allows you to introduce a "bursty" packet loss model in the emulated WAN Cloud, by setting a number of packets to lose (burst size) every time a loss event occurs. You can specify the probability of the loss event (Burst Probability), and the Minimum and Maximum parameters (from 1 to 65,535 packets) that specify a range for the random size of each packet loss burst.
- **Gilbert-Eliot Loss:** This model states that in terms of packet loss, some networks experience two states: good and bad. You can emulate a good and bad state by specifying an average packet loss percentage in the Lose parameter of the two states (from 0.01% to 100%).

In **Change state**, you specify the chances that the network will leave the specific state and move to the other (from 0.01% to 99.99%). For example, if the tested network has, at any given time, a 10% chance of moving from good to bad and a 50% chance of moving from bad to good, you specify 10 and 50 in the respective **Change State** fields.

Packet Effects

Note: This topic applies to Advanced Tests only – not to Quick Tests.



- For details on how to set latency and packet loss parameters, see ["Latency and Packet Loss" on page 27](#).
- For details on how to set link faults, see ["Link Faults" on the next page](#).

You can emulate IP routing effects such as disruption of packet order (reordering), packet duplication, and fragmentation, via parameters defined in the Packet Effects tab.

To instruct NV Test Manager to emulate packet effects, select the check box of the effect you want to emulate, and then configure the associated parameters:

- Out of Order

To emulate packet reordering, NV Test Manager can generate an out-of-order event, based on the probability set in the Chance parameter (from 1% to 50%), by randomly removing a packet from the data stream. Then it starts counting the incoming packets. It returns the removed packet after the *n*th packet has entered NV Test Manager. The *n*th packet is picked randomly from the range that you indicate in the Minimum and Maximum (Packet offset from original location) parameters (from 1 to 64 packets). For example, if you indicate a range of 5 to 10, NV Test Manager will return the removed packet randomly to the data stream (after the 5th, or 6th...or 10th packet that follows the removed one). In order to have NV Test Manager return all removed packets after a predefined number of incoming packets, the same value can be used for both Minimum and Maximum offset.

- Duplicate Packets

NV Test Manager emulates duplication by copying a packet that it selects randomly. The number of copies that will be created when the event occurs is specified in the Minimum and Maximum parameters (from 1 to 20 packets). For example, if you specify a range of 2-4 packets, NV Test Manager duplicates a packet 2, 3, or 4 times (randomly), when it decides to do so (according to the probability specified in Chance – from 1% to 99%). To instruct NV Test Manager to create a predefined number of copies, enter the same value in both the Minimum and Maximum parameters. For example, entering 3 in both parameters causes NV Test Manager to create 3 copies of the packet when the event occurs.

- Fragmentation

To emulate the packet fragmentation effect you need to set a packet size, in bytes, in the Maximum Transmission Unit parameter (from 64 to 1,460 bytes). This would be the maximum size a gateway along the path route would allow (MTU). Bigger packets are likely to be fragmented or discarded when the fragmentation event occurs (according to the probability set in Chance – from 1% to 99%).

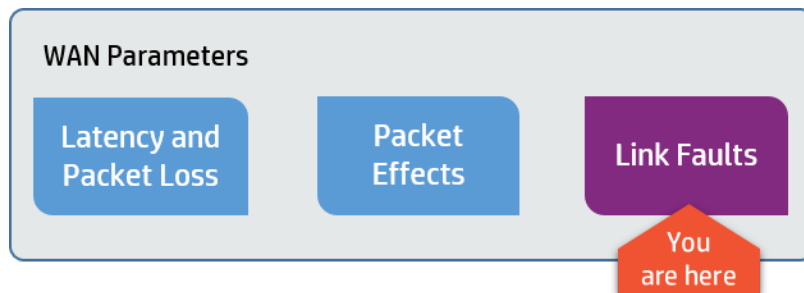
Whether or not the packets will be eventually fragmented depends on the state of the Do Not Fragment (DF) bit in the packet's IP header and on the policy you define via the options included in the Fragmentation group. If the flag is OFF, the packet is fragmented anyway. If the flag is set to ON, the policy you select applies.

A description of the DF=ON policies is as follows:

Option	Effect
Ignore Do Not Fragment (DF) bit	Fragment the packet.
Generate ICMP Error Messages to Source	Discard the packet and inform the packet's source, using an ICMP packet.
Do Not Generate ICMP Error Messages	Discard the packet without informing the packet's source.

Link Faults

Note: This topic applies to Advanced Tests only – not to Quick Tests.



Link faults consist of effects caused by physical link malfunctions, specifically bit errors and disconnections. Bit errors are emulated by instructing the NV Test Manager to toggle bits at a given frequency. To achieve "disconnection" in the WAN Cloud, you can instruct NV Test Manager to stop responding for a given period. Click the **Link Faults** tab to set the parameters that help emulate the link faults.

- For details on how to set latency and packet loss parameters, see "[Latency and Packet Loss](#)" on [page 27](#).
- For details on how to set the packet effects, see "[Packet Effects](#)" on [page 30](#).

You can emulate any of the link errors or all of them. Select the check box of the fault type that you want to emulate, and then enter the parameters described below:

Bit Error

In the Average Frequency box, type a number of bits (from 102 to 1,012). Bit toggling will occur every time that the indicated number of bits (on average) has crossed the WAN Cloud.

In the Minimum and Maximum parameters (Number of toggled bits), enter a range of numbers from 1 to 500. NV Test Manager randomly picks a number in the range and toggles as many bits.

Disconnect

The parameters in this group allow you to emulate a physical disconnection of the network. In the Average Frequency box type the desired number of seconds (from 3 to 300). NV Test Manager will emulate a disconnection once every so many seconds on average. In the Minimum and Maximum boxes (Disconnection time span), indicate a time range in milliseconds (from 10 to 30,000 ms). NV Test Manager will randomly pick a time value from this range and the lines will remain "disconnected" during this time, by dropping all packets that go through the WAN Cloud during this period.

Congestion

The Congestion feature helps you emulate a periodic and momentary rise in WAN Cloud traffic, which results in increased latency and packet loss.

Note: The Latency and Packet Loss values during the congestion event override the original values (either manually defined or imported).

Congestion Parameter	Description
Average congestion frequency	Type the frequency in seconds (from 1 to 300). For example, entering 20 means that the NV Test Manager will increase latency and packet loss every 20 seconds on average.
Congestion time span	The duration of the event in milliseconds (from 10 to 65,535). Type a range in the Maximum and Minimum parameters. NV Test Manager randomly picks a value from this range and sets the latency and packet loss to the values you indicate in the Fixed Latency and Loss fields (below), for the selected duration. After this time, latency and packet loss return to their original settings (as described under the Latency and Packet Loss branches).
Congestion event properties	
Fixed Latency	Enter the latency, in milliseconds, that will prevail during the congestion time (from 0 to 8,000 ms). This value replaces the original latency setting.
Lose x% of all packets	Enter a percentage of packets to be lost during the congestion time (from 0% to 90%). This value replaces the original setting for packet loss.

Network Emulation Specifications

The following impairments and constraints can be configured in the **flow**¹ of an Advanced Test.

WAN Specifications

Latency	
Fixed Latency	0-8,000 ms (Granularity = 1 ms)
Uniform Distributed Latency (minimum/maximum):	0-8,000 ms (Granularity = 1 ms)
Latency change limit	0-4,000 ms (Granularity = 1 ms)
Normal Distributed Latency:	
Average	0-8,000 ms (Granularity = 1 ms)
Standard Deviation	0-8,000 ms (Granularity = 1 ms)
Linear Latency (minimum/maximum):	0-8,000 ms (Granularity = 1 ms)
Cycle Duration	1-65,535 sec
Packet Loss	
Periodic Loss - Lose every n th packet	n=2-65,535
Random Loss	0-10% (Granularity = 0.01%)
Burst Loss:	
Probability	0.01-90% (Granularity = 0.01%)
Burst Size	1-65,534 packets
Gilbert-Elliot Loss Two State Loss Model:	
Loss Probability	0.0-100% (Granularity = 0.01%)
Transition to Other State	0.0-99.99% (Granularity = 0.01%)
Packet Effects	
Out Of Order:	
Probability	1-50%
Offset	1-64 packets

¹A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the client and server IP addresses that are specified in the flow.

Packet Duplication:	
Probability	1-99%
Number of duplicates	1-20 packets
Fragmentation:	
Probability	1-99%
MTU	64-1,460 bytes
DF Policy	<ul style="list-style-type: none"> Ignore DF and fragment packet. Discard packet and generate ICMP message. Discard packet and do not send a message.
Link Faults	
Bit Error:	
Frequency	$1/10^2 - 1/10^{12}$ bits
Number of Toggled Bits	1-500 bits
Disconnection:	
Average Frequency	3-300 sec
Disconnection Time	10-30,000 ms
Congestion:	
Frequency	1-300 sec
Time span	10-65,535 ms
Event Properties:	
Fixed Latency	0-8000 ms
Packet Loss Probability	0%-90% (Granularity = 0.01%)

Gateway Specifications

Bandwidth Settings	
Symmetric Bandwidth	1-10 GB
Asymmetric Bandwidth:	

Uplink/Downlink	1-10 GB
Packet Overhead Length	0-1000 bytes
Queue Limitations	
Queue Size	2-65,535 KB
Drop Mode:	Drop Tail or RED
RED Queue (Minimum/Maximum Threshold)	2-65,535 KB
Fill Mode (Queue Size Policy)	Byte Mode or Packet Mode
Packet Overhead	<ul style="list-style-type: none">Ethernet (Add 18 bytes to each packet)PPP (Add 9 bytes to each packet)
Traffic Type Support	IPv4

Run a Test from a Mobile Device

There are two user interfaces of the NV Test Manager, the standard UI – which runs on desktop and laptop computers, and the mobile UI – which runs on mobile devices.

- You can use the standard UI, which includes the full NV Test Manager functionality, to create and run all NV tests.
- The mobile UI, which contains a subset of the full NV Test Manager functionality, enables you to run tests in which your application is operated directly from a mobile device. This topic describes how to use the mobile form of NV Test Manager UI.

What can I do with NV Test Manager on my mobile device?

Access NV Test Manager on your mobile device

To access NV Test Manager on your mobile device, open the following URL:

```
http://<NV Test Manager IP>:8182/shunra/controller-mobile/
```

For example:


```
http://198.51.100.24:8182/shunra/controller-mobile/
```



Tip: You can display the required URL by clicking **Mobile UI** in NV Test Manager.

Note:

- If secured communication was selected when the NV Mobile components were installed, the URL begins with `https://`.
- If you used the default port during installation, the port number is 8182.


Tip: When using NV Test Manager on your mobile, it may be necessary to tap the **Refresh** icon  to synchronize the display with changes that have been made in other instances of NV Test Manager.

Create and run a test from a mobile device


When you create a new test from a mobile device, you create a simplified Quick Test. The new test includes only a single **flow**¹. The flow includes all network communication between the mobile device and all other IP addresses. You cannot add additional flows to the test. You can specify only whether or not to capture packets, and the network profile to apply when the test runs. You can select an existing profile or specify a custom profile.

Note: If a test requires transactions, use the desktop version of NV Test Manager to create the transactions, and to mark the beginning and the end of the transactions, while you use your mobile device to perform the transactions.

To create and run a test from a mobile device:

1. Open NV Test Manager on your mobile device, as described above.
2. Tap the **Create new test** button .
3. In the **Test Configuration** tab, select whether or not to capture packets when the test runs.

Set **Packet Capture** to **On** if you want to capture network packets when the test runs. Capturing packets enables the test results to be analyzed in depth after the test has been run. For details, see ["Analyzing Test Results" on page 56](#).

4. From the **Profile** list, select an existing network profile, or select **Custom** to define custom network parameters for the test.
5. Tap the **Run** button .

¹A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the client and server IP addresses that are specified in the flow.

While the test is running, NV Test Manager displays the amount of data that has been sent from the specified client IP address and received by the client IP address. These values are the "Total Client out Throughput" and "Total Client in Throughput" respectively.

Sent data: 535 Bytes	Received data: 706 Bytes
----------------------	--------------------------

View transaction details from a mobile device

You can use NV Test Manager on your mobile device to view the details of the transactions that are included in a test. However, you cannot use a mobile device to create or run transactions – the transactions must be created and run using the standard version of NV Test Manager. For details, see ["Performing Transactions" on page 51](#).



To view transaction details from your mobile device:

1. Open the test in NV Test Manager on your mobile device and display the **Transactions** tab.
2. Tap any of the transactions in the test to display the transaction details.

Edit test details from a mobile device

You can use your mobile device to edit the details of a test that you started from your mobile device, or of a Quick Test that has only a single flow; you must use the standard version of NV Test Manager to edit any Advanced Test or a Quick Test that has more than one flow.


To edit test configuration details of a running test from your mobile device:

1. Open the running test in NV Test Manager on your mobile device and display the **Test Configuration** tab.
2. Tap the **Unlock** icon , make the required changes, update the network scenario name, and then tap the **Update** icon .

Stop a test from a mobile device

You can use your mobile device to stop a running test.

To stop a test from your mobile device:

1. Open the test in NV Test Manager on your mobile device.
2. Display the list of running tests, select the required test, and tap the **Stop** button .

Run a Test when the AUT uses HTTPS

If the AUT uses HTTPS, and you want to analyze the performance of the AUT after the test is completed, you must perform the tasks that are described in this topic before you run the test.

For details on running tests, and specifically when to perform the tasks that are contained in this topic, see ["Create and Run Quick Tests" on page 16](#) and ["Create and Run Advanced Tests" on page 19](#).

Note:

- If the AUT does not use HTTPS, or if you do not want to analyze the test results, then it is not necessary to perform the tasks that are described in this topic.
- If a proxy server was not yet installed or configured on the NV Test Manager, see ["Setting up the Testing Environment" on page 91](#).
- The required tasks vary depending on the proxy used, and the tool that you will use to analyze the test results.

Analyzing the test results in NV Test Manager when using mitmproxy

An HAR (HTTP Archive) file of the test traffic is required for analyzing the application's HTTPS traffic in NV Test Manager. The HAR file is generated from a log file that is written by mitmproxy while the test runs.

Perform the following procedure before running a test, to generate the HAR file:

1. Use RDP to connect to the NV Test Manager host machine.
2. Start an mitmproxy instance dedicated for the test in order to capture only the relevant traffic:
 - a. Open a command line window.
 - b. Go to "C:\envs\env0\scripts"
 - c. Run "activate," select a port for running the mitmproxy, and verify that no existing running mitmproxy instance is using the port.
 - d. Run "python mitmdump -p <available port> -w <mitmproxy log files folder\log file name>"

For example, "python mitmdump -p 8889 -w "C:\mitmproxy_nv_test_logs\test1""

Note: mitmproxy has started successfully if no error message appears.

- e. Leave the command line window open and mitmproxy running.

- f. Configure the proxy on the mobile device with the selected port. Follow the instructions in ["Setting up the Testing Environment" on page 91](#).

Perform the following tasks after the test has finished running:

1. Stop the mitmproxy by pressing Ctrl+C.
2. If it is not already there, copy the script "harwriter.py" (which is located by default under "C:\Program Files (x86)\HP\NV\bin\") to the mitmproxy log files folders.
3. Generate a HAR file from the log file using the harwriter.py script by running "harwriter.py <log file name> <name for HAR file>".

For example, "harwriter.py "C:\mitmproxy_nv_test_logs\test1" "C:\mitmproxy_nv_test_logs\test1.har""

4. Run the "HAR Analysis" using the file.

For details, see ["Analyzing Test Results" on page 56](#).

Analyzing the test with NV Analytics when using mitmproxy

The mitmproxy private key is required for decrypting and analyzing the application's HTTPS traffic with NV Analytics.

To generate a private key:

1. Make sure that mitmproxy is configured on the test device. For details, see configuration 2 in ["Setting up the Testing Environment" on page 91](#).
2. The private key is created when running mitmproxy for the first time and does not change. If you do not have the private key file already:
 - a. Copy it from the NV Test Manager machine where mitmproxy installed - "C:\Users\<username>\.mitmproxy\mitmproxy-ca.pem".
 - b. Open the file for editing, delete all the second block (from "-----BEGIN CERTIFICATE-----" to "-----END CERTIFICATE-----"), and save the file.
3. Keep the private key file. See the NV Analytics User Guide for instructions on how to use a private key for analyzing tests in NV Analytics.

See ["Analyzing Test Results" on page 56](#) for further details about analyzing tests.

Analyzing the test with NV Analytics when using Fiddler

The Fiddler private key is required for decrypting and analyzing the application's HTTPS traffic in NV Test Manager.

To generate the private key:

1. Make sure that Fiddler is running and configured on the test device. For details, see configuration 2 in ["Setting up the Testing Environment" on page 91](#).
2. The private key changes every time Fiddler is restarted. For obtaining the private key file, after the test has completed:
 - a. Use RDP to connect to the NV Test Manager host machine.
 - b. In Fiddler's QuickExec box, run the command "!dumpcerts". A folder containing the private key file will be created on the Desktop.
 - c. Copy the private key .pem file.

See the NV Analytics User Guide for instructions on how to use a private key for analyzing tests in NV Analytics.

See ["Analyzing Test Results" on page 56](#) for further details about analyzing tests.



Copy and Re-run a Test

You can create a copy of a test, and then run the new test. When you copy a test, the NV Test Manager copies the network configuration details of the original test to the new test. You can modify the test name, as well as any of the details in the test. When you run the new test, you can specify whether or not to copy the transactions from the original test to the new test. Test results from the original test are not copied to the new test.

Note: The copied test can be either still running, or finished running,

For details on how to create and run a new test, see ["Testing Overview" on page 14](#).

To copy and then re-run a test:

1. In the NV Test Manager, click **Tests**.
2. From the lists of **Running tests** and **Completed tests**, select the test that you want to copy and re-run, and click **Copy** .
3. Modify the name and details of the new test [as required], and then click **Run** .

Note: If you do not run the test, then the new test is not saved.


Stop a Running Test


The Test page shows a list of **Running tests**, those tests that are currently being run by the NV Test Manager. You can stop any of the running tests. When you stop a test, all network impairments that are

specified in the test are no longer applied.

- For details on how to create and run a new test, see ["Testing Overview" on page 14](#).
- For details on how to copy and run an existing test, see ["Copy and Re-run a Test" on the previous page](#).

To stop a running test:

1. In the NV Test Manager, click **Tests**. The list of running tests appears under the **Running tests** header.
2. Click the **Stop** button  to the right of the test that you want to stop.

Note: To abort all the tests of all users that are running on the NV Test Manager, on the NV Test Manager host computer, click the NV Agent icon  in the Windows notification icon-bar, and select **Forcibly stop all tests**. To display the NV Agent icon, select **Start > All Programs > HP Software > NV for Mobile > NV Agent > NV Agent**.

Upload Tests to NV Server

Note: The functionality in this topic is available only to Server-based installations i.e. those Network Virtualization for Mobile installations that include NV Server.

You can upload tests from NV Test Manager to the NV Server. This makes the tests available to other NV Test Manager users who can access the NV Server. These users can download test files from the NV Server to their NV Test Manager installations. For details, see ["Download Tests from NV Server" on the next page](#).

Each NV test is composed of two parts:

- **Test Configuration.** The parameters that specify the network conditions in the test.

You can import a downloaded test configuration into an Advanced Test. For details, see ["Create and Run Advanced Tests" on page 19](#).

- **Test Results.** The results of the test-run.


After downloading test results from the NV Server to NV Test Manager, the downloaded results appear in the **Completed tests** list in the NV Test Manager. You can analyze these results as described in ["Analyzing Test Results" on page 56](#), or copy and rerun the test as described in ["Copy and Re-run a Test" on the previous page](#).

When you upload a test, you specify if you want to upload the test configuration or the test results. In addition, you specify the location on the NV Server to where you want to upload the files. You can upload only one test at a time – you cannot select multiple tests, and then upload them simultaneously.

Note: Instead of uploading a test configuration to the server, you can create an ntx file – that contains the test configuration – and save the file on the NV Test Manager. For details, see ["Save a Test Configuration to a File" on the next page](#).

For details on how to upload network profiles to the server, see ["Upload Network Profiles to the NV Server" on page 69](#).

To upload test files to the NV Server:


1. In the NV Test Manager, click **Tests**.
2. From the lists of **Running tests** and **Completed tests**, select the test that you want to upload.
3. Click **Upload to NV Server** , and then select **Test results** or **Test configuration**.
4. Specify the location on the NV Server to where you want to upload the files. For details on how to add a folder, see ["Managing the Folders in the Repository" on page 79](#).
5. Specify a name and description for the uploaded files.
6. Click **Upload**.

Download Tests from NV Server


Note: The functionality in this topic is available only to Server-based installations i.e. those Network Virtualization for Mobile installations that include the NV Server.

Users can upload tests from NV Test Manager to the NV Server. This makes the tests available to other NV Test Manager users – who can access the NV Server. These users can download test files from the Server. For details on uploading tests, see ["Upload Tests to NV Server" on the previous page](#).

You can download **test configuration** files and **test results** files from the NV Server.

- **Test Configuration** files. Contain network configuration parameters, and appear in the NV Server repository as test configuration files .




After downloading test configuration files to the NV Test Manager, the downloaded files appear in the NV Test Manager database's **Test Configuration** list, that is available when developing Advanced Tests. For details, see ["Create and Run Advanced Tests" on page 19](#).

- **Test results** files. Contain the results of tests that have run. These files appear in the NV Server file system as test result files .

After downloading test result files to the NV Test Manager, the downloaded files appear in the **Completed tests** list in the NV Test Manager. You can analyze these results as described in ["Analyzing Test Results" on page 56](#).

You can download network profiles from the NV Server. For details, see ["Download Network Profiles from the NV Server" on page 68](#).

To download test files from the NV Server to NV Test Manager:

1. In the NV Test Manager, click **Tests**.
2. Click **Download from NV Server** . The Download File dialog box opens.
3. Locate and select the test configuration files [] or test result files [] that you want to download.
4. Click **Download**.


Save a Test Configuration to a File

Note: This topic applies to both Quick Tests and Advanced Tests.

You can save the test configuration of any test that appears in the lists of **Completed tests** or **Running tests**. When you save a test configuration, NV Test Manager creates a test configuration file that has an .ntxx extension. The file contains all the network parameters that are defined in the test. When you develop an Advanced Test, you can import the required network parameters from the test configuration file. For details, see ["Create and Run Advanced Tests" on page 19](#).

- Instead of saving the test configuration file on the NV Test Manager, you can upload the test configuration file to the NV Server, thereby making the file available to other users who can access the Server. For details, see ["Upload Tests to NV Server" on page 42](#).
- You can save a profile as a test configuration file. For details, see ["Save a Network Profile to a Test Configuration File" on page 69](#).

To save a test configuration to a file:

1. In the NV Test Manager, click **Tests**.
2. In the list of **Completed tests** or **Running tests**, locate and open the test that you want to save to a file.
3. Click **Save**  > **Test configuration**. NV Test Manager creates an .ntxx file that contains the test configuration, and saves the file in the NV Test Manager file system.

Save Test Results to a File for NV Analytics

Note: This topic applies to both Quick Tests and Advanced Tests.


You can save the details and results of a test to a *.shunra* file. You can then use NV Analytics to open the *.shunra* file and analyze the results of the test-run. For details on NV Analytics, see the NV Analytics User Guide.

Why would I want to save test results to a file for NV Analytics?

The **NV Test Manager** analysis functionality produces comprehensive reports for each transaction in a test, or for the entire test if there are no transactions in the test. For details, see ["Analyzing Test Results" on page 56](#).

NV Analytics produces reports that are similar to the reports produced by the NV Test Manager analysis routines, but offer additional information and functionality. For details on the differences, see ["Analysis vs NV Analytics" on page 63](#).


To save test results to a *.shunra* file for NV Analytics:

1. In the NV Test Manager, click **Tests**.
2. In the list of **Completed tests** or **Running tests**, locate and open the test that you want to save to a file.
3. Click **Save**  **> .shunra file (for NV Analytics)**. NV Test Manager creates an *.ntxx* file that contains the test results, and saves the file in the NV Test Manager file system.

Delete Tests

If a test is no longer required, you can delete the test. When you delete a test, the NV Test Manager deletes both the test configuration and the associated test results.

To delete a test:

1. In the NV Test Manager, click **Tests**.
2. In the lists of **Completed tests** and **Running test**, select the test or tests that you want to delete, and then click **Delete Tests** .

Chapter 5: Viewing Test-Run Statistics

While a test is running, or after a test has been run, you can view various statistics relating to the test-run. NV Test Manager derives the statistics by analyzing the **flows**¹ that are defined in the test, while the test runs. The statistics are displayed in charts – you can select which charts to display, and how to display the charts.

- For details on the various test-run statistics charts, see ["Test-Run Statistics Charts" on the next page](#).
- You can increase the effectiveness of your tests by including transactions in the tests. For details, see ["Performing Transactions" on page 51](#).
- For details on how to analyze test results after running a test, see ["Analyzing Test Results" on page 56](#).





How do I view test-run statistics?

1. View test-run statistics.
 - a. In the NV Test Manager, click **Tests**.
 - b. From the lists of **Running tests** and **Completed tests**, locate and open the test for which you want to view run statistics.
 - c. Click the **Statistics** tab to display the default set of statistics charts.

For details on the various test-run statistics charts, see ["Test-Run Statistics Charts" on the next page](#).

2. Customize the chart display.

Perform any of the following optional steps:

- Click **Charts**  to change the list of charts that are displayed. You can show up to six charts concurrently. The charts appear in the order in which you select them.
- Click **Flows**  to specify the flows to include in the charts.
- Click the maximize button  to enlarge the associated chart; click the minimize button  to display a chart in its regular size.

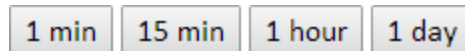
¹A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the client and server IP addresses that are specified in the flow.

3. Set the chart display duration and display period.

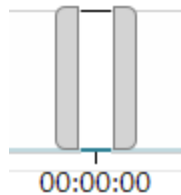
Note: This functionality is available only for tests that are no longer running.

Scroll to the bottom of the screen to display the **Chart Duration Display** control.

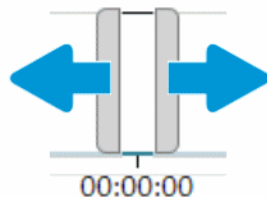
- a. Click any of the "chart display duration" buttons [1 min, 15 mins, 1 hour, 1 day] to set the duration to display in the charts.



- b. Click inside the duration indicator and drag it to display a specific period in the charts.



- c. Drag either side of the duration-indicator to modify the duration and time period displayed in the charts.



Test-Run Statistics Charts

The following charts, available in the Statistics tab, display statistics relating to the test-run. For details on how to view test-run statistics, see "[Viewing Test-Run Statistics](#)" on the previous page. The lists of available charts vary slightly based on whether the test is currently running, or the test has finished running.

- [Test-run statistics – while a test is running](#)
- [Test-run statistics – after a test has run](#)

Test-run statistics – while a test is running

Note: While a test is running, each chart shows data from the time that the chart was first accessed until the present time – you cannot change the period that is displayed in the charts.

Chart	Description
Latency	The emulated one-way latency, averaged over one-second intervals. The actual network latency is the emulated latency plus any latency that exists in the actual network. (Latency values are in milliseconds.)
Packet Loss percent	The emulated packet-loss percentage, averaged over one-second intervals. The actual packet-loss percentage for the network is the emulated packet-loss percentage plus any packet-loss percentage that exists in the actual network.
Total Client-in Throughput	The total number of bytes that were received by the client since the beginning of the test-run.
Total Client-out Throughput	The total number of bytes that were sent out by the client since the beginning of the test-run.
Total Server-in Throughput	The total number of bytes that were received by the server since the beginning of the test-run.
Total Server-out Throughput	The total number of bytes that were sent out by the server since the beginning of the test-run.
Client-in Throughput	The number of bits received by the client during each one-second interval.
Client out Throughput	The number of bits sent out by the client during each one-second interval.
Server in Throughput	The number of bits received by the server during each one-second interval.
Server-out Throughput	The number of bits sent out by the server during each one-second interval.
Client-in Bandwidth Utilization	The percentage of the available in-coming bandwidth that was used by the client during each one-second interval. The available bandwidth is defined in the associated network profile. If the available bandwidth is unlimited, then the chart shows a utilization of 0%.

Chart	Description
Client-out Bandwidth Utilization	<p>The percentage of the available out-going bandwidth that was used by the client during each one-second interval.</p> <p>The available bandwidth is defined in the associated network profile. If the available bandwidth is unlimited, then the chart shows a utilization of 0%.</p>
Server-in Bandwidth Utilization	<p>The percentage of the available in-coming bandwidth that was used by the server during each one-second interval.</p> <p>The available bandwidth is defined in the associated network profile. If the available bandwidth is unlimited, then the chart shows a utilization of 0%.</p>
Server-out Bandwidth Utilization	<p>The percentage of the available out-going bandwidth that was used by the server during each one-second interval.</p> <p>The available bandwidth is defined in the associated network profile. If the available bandwidth is unlimited, then the chart shows a utilization of 0%.</p>
Packet loss count	<p>The number of packets that were lost during a specific second – due to network impairments imposed by NV Test Manager.</p> <p>The actual number of packets lost is the emulated packet loss plus any packet losses that occurred in the actual network.</p>
Total number of Packet loss	<p>The total number of packets that were lost during the entire test-run – due to network impairments imposed by NV Test Manager.</p> <p>The actual number of packets lost across the network is the emulated packet loss plus any packet losses that occurred in the actual network.</p>

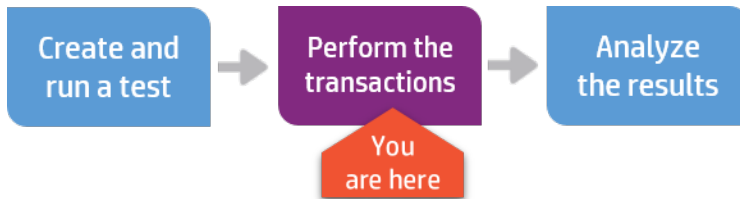
Test-run statistics – after a test has run

Note: You can set the duration and time period that are shown in the charts. For details, see ["Viewing Test-Run Statistics" on page 46](#).

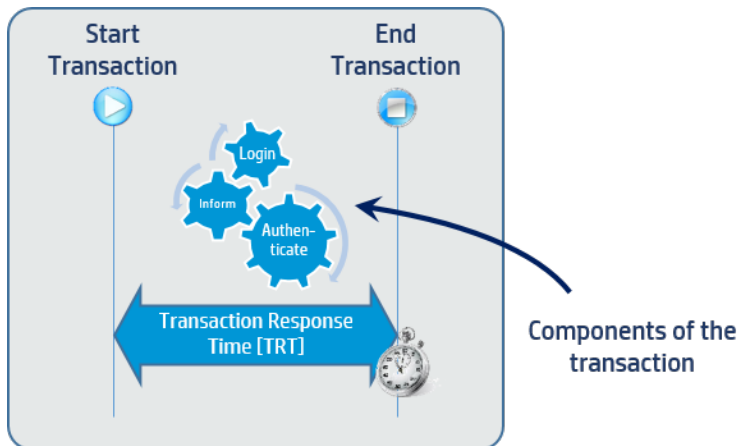
Chart	Description
Average Latency	<p>The emulated one-way latency, averaged over a period.</p> <p>The actual network latency is the emulated latency plus any latency that exists in the actual network. (Latency values are in milliseconds.)</p>
Average Packet Loss percent	<p>The emulated packet-loss percentage, averaged over a period.</p> <p>The actual packet-loss percentage for the network is the emulated packet-loss percentage plus any packet-loss percentage that exists in the actual network.</p>

Chart	Description
Average Client-in Throughput	The number of bits received [per second] by the client, averaged over a period.
Average Client-out Throughput	The number of bits sent out [per second] by the client, averaged over a period.
Average Server-in Throughput	The number of bits received [per second] by the server, averaged over a period.
Average Server-out Throughput	The number of bits sent out [per second] by the server, averaged over a period.
Average Client-in Bandwidth Utilization	<p>The percentage of the available in-coming bandwidth that was used by the client, averaged over a period.</p> <p>The available bandwidth is defined in the associated network profile. If the available bandwidth is unlimited, then the chart shows a utilization of 0%.</p>
Average Client-out Bandwidth Utilization	<p>The percentage of the available out-going bandwidth that was used by the client, averaged over a period.</p> <p>The available bandwidth is defined in the associated network profile. If the available bandwidth is unlimited, then the chart shows a utilization of 0%.</p>
Average Server-in Bandwidth Utilization	<p>The percentage of the available in-coming bandwidth that was used by the server, averaged over a period.</p> <p>The available bandwidth is defined in the associated network profile. If the available bandwidth is unlimited, then the chart shows a utilization of 0%.</p>
Average Server-out Bandwidth Utilization	<p>The percentage of the available out-going bandwidth that was used by the server, averaged over a period.</p> <p>The available bandwidth is defined in the associated network profile. If the available bandwidth is unlimited, then the chart shows a utilization of 0%.</p>

Chapter 6: Performing Transactions



A **transaction** is a particular business process or part of a business process that is performed in your application. Typically, you want to measure and analyze the duration of the transaction under various network conditions.



Learn more about transactions

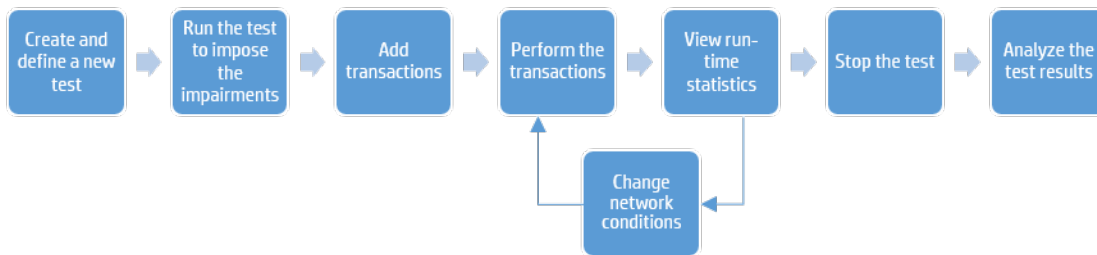
For example, you can create a transaction called *User Login*, which includes the process of a user logging in to a specific system. You can perform the transaction, and thereby determine how long it takes to perform this part of the business process under various network conditions. This time is known as the *Transaction Response Time* – TRT. You can thereafter run the transaction multiple times, each time varying the network conditions. By recording and analyzing the Transaction Response Time under the various network conditions, you can gain insight into the effect of the network parameters on the transaction response time.

Besides monitoring transaction response times, what else can I do with transactions?

If you select to capture packets when a test runs, NV Test Manager captures the packets that are sent and received while each transaction in the test is performed. After running the test, you can analyze the captured packets – to gain further insight into the breakdown of the transactions – and then improve the efficiency with which the transactions are performed. For details, see ["Analyzing Test Results" on page 56](#).

What is the procedure for running a transaction?

The diagram below shows the procedure for working with transactions.



Can I see the packet list that is associated with a transaction?

Yes. If you selected to capture the packet list while a test runs, then you will be able to download the packet list after the test has finished running. If the test contains transactions, then you can download a packet list for each of the transaction runs. If the test has no transactions, then the downloaded file will contain the packet list for the entire test. The downloaded file has a .pcap extension. You can use NV Analytics or an external tool to analyze the test results.

How do I work with transactions?

You use the **Transactions** tab inside the **Tests** page to perform all transaction-related tasks. To access the **Transactions** tab, from the list of **Running tests** or the list of **Completed tests**, locate and open the required test, and then click the **Transactions** tab. The **Transactions** tab displays the list of transactions that are defined for the test.

- [Add transactions](#)
- [Run transactions](#)
- [Stop transactions](#)
- [Change network conditions](#)
- [Delete transactions](#)
- [Cancel transactions](#)
- [Downloading transaction packet lists](#)

Add transactions


You add transactions to your tests. You then apply the test's network impairments and conditions while the transactions are performed, thereby enabling you to record and analyze the performance and behavior of the application under test while the transactions are executed.

You can add a transaction only while a test is running – not before running a test. When you add a transaction, you specify a name and an optional description for the new transaction.

When you run a test, NV Test Manager captures the packets that are sent and received while each transaction is performed. After running a test, you can analyze the captured packets in detail. For details, see ["Analyzing Test Results" on page 56](#).

Note: You can add packets only if packet capture is ON.

To add a transaction to a test:

1. In the **Transactions** tab, click **Add Transaction**.
2. Specify a **Name** and **Description** for the transaction, and click **Save** . The transaction is added to the test's **Transactions** list.

Run transactions

After you have added a transaction to a test, you can run the transaction. When you run a transaction, you:


- Indicate in the NV Test Manager that the transaction has started.
- Perform the transaction in the application under test.
- Indicate in the NV Test Manager that the transaction has finished.

NV Test Manager records the time that it takes to perform the transaction. This duration is known as the Transaction Response Time (TRT). When you run the test, NV Test Manager captures the packets that are transmitted. You can analyze the captured packets in detail after running a test. For details, see ["Analyzing Test Results" on page 56](#).

Note:

- You can run a transaction only while a test is running, not before running a test.
- You can run only one transaction at a time.
- You can use the standard NV Test Manager UI to run transactions as described below. You can use the mobile Test Manager UI to view transaction details, as described in ["Run a Test from a Mobile Device" on page 36](#).


To run a transaction:

1. In the **Transaction** list for the test, select the transaction that you want to run, and then click **Run** . The transaction is added to the transaction run list, and NV Test Manager begins to time the transaction.
2. Perform the transaction in the application under test.

Stop transactions

When you have finished performing a transaction in the application under test, you indicate that the transaction is complete.

To stop a transaction:

1. Display the **Transaction** list for a test.
2. Locate and select the transaction that you want to stop, and then click **Stop** .

Change network conditions

After you have performed the transactions that are included in a test, while the test is still running, you can change the network configuration and then re-run the transactions. This enables you to analyze the transactions under various network conditions.

To change network conditions while a test is running:

1. Click **Unlock test to change configuration**.
2. Modify the network conditions.
3. Modify the **Current scenario** name.
4. Click **Update test configuration**.


You can now re-run the transactions.

Delete transactions

If a transaction is not required, you can delete the transaction.

Note: You cannot delete a transaction that has already been run, or that is currently running.


To delete a transaction:

1. Display the **Transaction** list for a test.
2. Select the transaction that you want to delete, and click **Delete** .

Canceling transactions

While a transaction is running, you can cancel the transaction. When you cancel a transaction, the transaction stops running, and all run-data associated with the transaction – for the canceled run – is deleted. However, the transaction remains in the test's transaction list.

To cancel a transaction:


1. Display the **Transaction** list for a test.
2. Open the transaction that you want to cancel, and click **Cancel** .

Downloading a packet list for a transaction run

After a test has finished running, you can download the packet list for a specific run of the transaction. The packet list contains the packets that were captured while the transaction was running. You can use NV Analytics or an external application to analyze the packet list.

Note: If the test contains no transactions, you can download the packet list for the entire test.

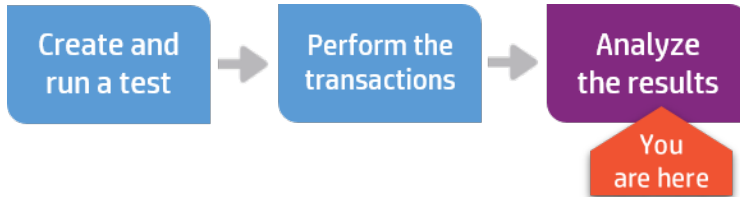
To download a transaction packet list:

1. In the **Transactions** tab, open the transaction that contains the packet list that you want to download.
2. Click **Download Packet list** .

To download a packet list for an entire test that contains no transactions:

1. Open the test, and click **Download**  > **Packet list**.

Chapter 7: Analyzing Test Results



After you run a test, you can run the NV Test Manager analysis routine to analyze the test results. The analysis routine produces comprehensive reports that help you improve the performance of your application.

Note: You can analyze test results only if you captured packets while the test ran.


About analyzing test results

The NV Test Manager analysis routine helps you to analyze the results of a test. NV Test Manager performs the analysis by analyzing the packets that were captured while the test ran.

Analysis is typically performed per transaction. If the test contains transactions, analyzing the results may help you understand which aspects of a transaction took the most time to perform, what changes can be implemented to improve the transaction response times, and why a transaction failed. If a test does not include any transactions, analysis is performed on the packet list for the entire test.

Note: Using transactions in a test is recommended because it allows you to focus on relevant network traffic, to get insights into the performance of each transaction separately, and to locate issues more accurately.

Before you run the analysis routine for a test, make sure that the Analysis settings are correct. For details, see ["NV Test Manager Settings" on page 71](#).

After a test has finished running, you can open the test and run the analysis routine from the NV Test Manager. After a test had been analyzed, the "Analyzed" icon  appears as an attribute for the test in the list of completed tests.

Note: After running the analysis routine on a test, you can re-run the analysis routine. Typically, the only reason to re-run the routine is if you have modified the list of ports to be included in the analysis. For details, see ["NV Test Manager Settings" on page 71](#). After you re-run the analysis, only the most recent analysis results are accessible.

What types of analysis can I perform with NV Test Manager?



NV Test Manager provides two types of analysis:

- **Standard analysis.** Used when AUT communication is HTTP only. If HTTPS communication is used, use HAR analysis or NV Analytics to analyze the test results.
- **HAR analysis.** Used when AUT communication is HTTPS.

Where do I access the analysis reports?

After running the analysis routine, you use either the **Transactions** tab or the **Analysis** tab to access the analysis functionality.

The Transactions tab gives you the following options for each transaction:

- **Show Analysis Reports.**  Shows a detailed analysis report for the selected transaction.
- **Download Packet List.**  Saves the packet list for the selected transaction to a pcap file. You can use NV Analytics or another pcap analysis tool to analyze the pcap file. NV Analytics offers additional analysis capability beyond what is available from the NV Test Manager.

The Analysis tab shows a detailed Analysis report for each transaction. See ["Learn More About Test Analysis" on the next page](#) for further details.

Note: You can use NV Analytics to produce a more comprehensive analysis of the test results. For details, see the *HP NV Analytics User Guide*.

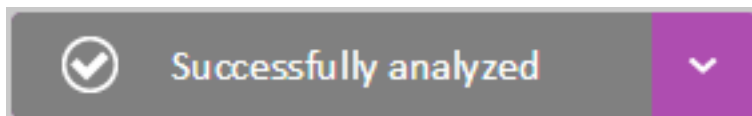
Show detailed analysis reports


1. Run a test. If necessary, define transactions as described in ["Performing Transactions" on page 51](#).
2. Stop the test-run.
3. Select **Run Analysis > Standard Analysis** (for HTTP communication).

or

Select **Run Analysis > HAR Analysis** (for HTTPS communication), and specify the .har file.

NV Test Manager runs the analysis routine in the background. When the routine is complete, the following indication appears in the NV Test Manager:



The Transactions tab shows a summary of the detailed results. To display a detailed report for any transaction, click the **View Analysis Report** icon  that appears next to the transaction.


For details on how to interpret the analysis reports, see "[Learn More About Test Analysis](#)" below.

Save a packet list to a file


1. Run a test. If necessary, you can create transactions as described in "[Performing Transactions](#)" on page 51.
2. Perform the test, including any transactions inside the test.
3. Stop the test-run.
4. Select **Run Analysis > Standard Analysis**.
5. For tests with transactions:

In the **Transactions** tab, click **Download Packet List**  for the transaction you want to save.

For tests without transactions:

Click **Download**  to the right of the test timer and select **Packet List**. This saves the packet list for the entire test.

Save the analysis results to a file

1. Run a test.
2. Stop the test-run.
3. Select **Run Analysis > Standard Analysis**.
4. Click **Download**  to the right of the test timer and select **Analysis**. NV Test Manager creates a zip file that contains the analysis results for all transactions in the test. The zip file includes:
 - An html file for each transaction and includes all analysis reports for that transaction. For more information about analysis reports, see "[Learn More About Test Analysis](#)" below.
 - A csv file that includes a summary of all transactions in the test.

Learn More About Test Analysis

After running the standard test analysis, you can view an analysis report for each transaction. If a test contains no transactions, you can view an analysis report for the entire test.

Analysis reports include the following sections:

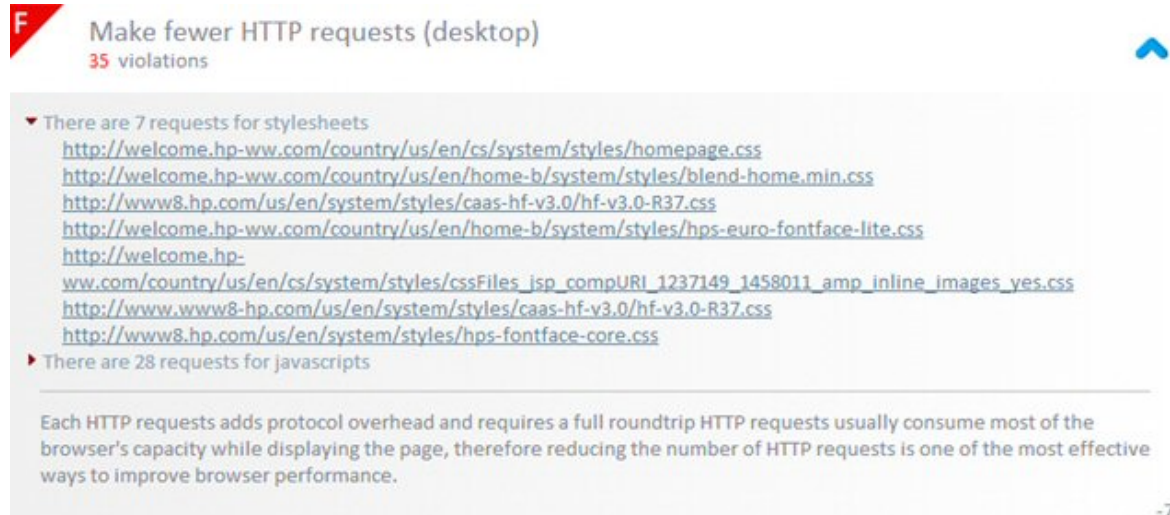
- ["Optimization" below](#)
- ["Waterfall" on the next page](#)
- ["Data" on page 62](#)
- ["Errors" on page 63](#)

Optimization

There are many factors beyond bandwidth and latency that affect the speed at which network requests are fulfilled. For example, two web pages that look exactly the same can load at very different speeds if one of the pages is optimized and the other isn't. As part of the analysis process, Network Virtualization for Mobile provides recommendations for optimizing network traffic to your website or application so that it is as efficient as possible.

Each transaction is measured against accepted industry standards as well as HP's enhanced best practices in order to find optimization problems. The Optimization Report shows:

- A specific category for each best-practice
- Individual best-practice violations in each category
- Optimization recommendations for each category



F Make fewer HTTP requests (desktop)
35 violations

▼ There are 7 requests for stylesheets

- <http://welcome.hp-ww.com/country/us/en/cs/system/styles/homepage.css>
- <http://welcome.hp-ww.com/country/us/en/home-b/system/styles/blend-home.min.css>
- <http://www8.hp.com/us/en/system/styles/caas-hf-v3.0/hf-v3.0-R37.css>
- <http://welcome.hp-ww.com/country/us/en/home-b/system/styles/hps-euro-fontface-lite.css>
- http://welcome.hp-ww.com/country/us/en/cs/system/styles/cssFiles_jsp_compURI_1237149_1458011_amp_inline_images_yes.css
- <http://www8.hp.com/us/en/system/styles/caas-hf-v3.0/hf-v3.0-R37.css>
- <http://www8.hp.com/us/en/system/styles/hps-fontface-core.css>

▶ There are 28 requests for javascripts

Each HTTP requests adds protocol overhead and requires a full roundtrip HTTP requests usually consume most of the browser's capacity while displaying the page, therefore reducing the number of HTTP requests is one of the most effective ways to improve browser performance.

-7

Additionally, the Optimization Report gives you a grade for each category, and then gives you a total optimization grade for the entire transaction. The higher your grade, the better you've optimized the transaction. A fully optimized transaction should complete much faster than an unoptimized one.

Note that the optimization rules differ slightly between desktop and mobile clients. Click on either the Desktop or Mobile button to select the appropriate optimization rules.

Note: The Optimization Report analyzes only HTTP traffic.

Waterfall

The Waterfall Report shows you the following for each individual resource that is requested during the transaction:

- Server response code (e.g. 200 - OK)
- Requested resource
- Host or IP where the resource is stored, or the associated test **flow**¹

Note: A resource is associated with a test flow when the IP address where the resource is stored falls into the IP range of the test flow.

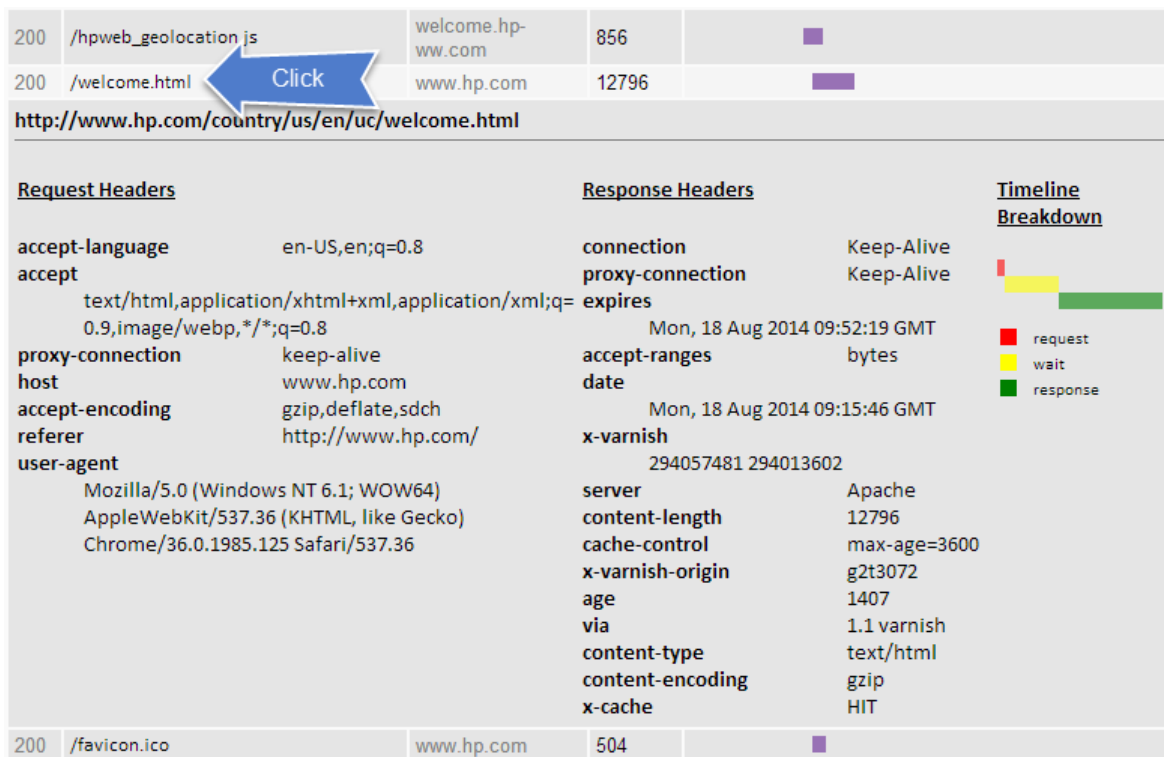
- Size of the requested resource
- The time frame during the transaction when the request occurred

Note: The Waterfall Report shows only HTTP traffic.

Viewing resource details

You can click on any resource to view additional information about the request for that resource.

¹A flow is a set of network impairments and conditions that are applied to the network traffic that flows between the client and server IP addresses that are specified in the flow.

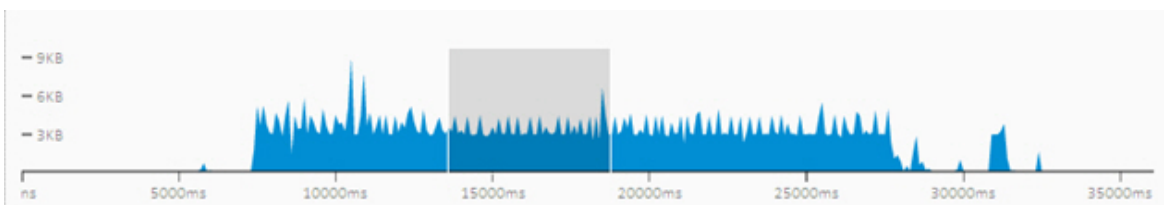


Statuses in the Timeline Breakdown include:

- **TCPSetup:** TCP setup time.
- **ClientWaitAfterTCPSetup:** Any wait time between the end of TCP setup and the sending of the first request data packet.
- **Request:** Time required for the client to send the request to the server.
- **Wait:** Time (in ms) between the last packet of the request and the first packet of the response.
- **Response:** Time (in ms) between the first packet and the last packet of the response.

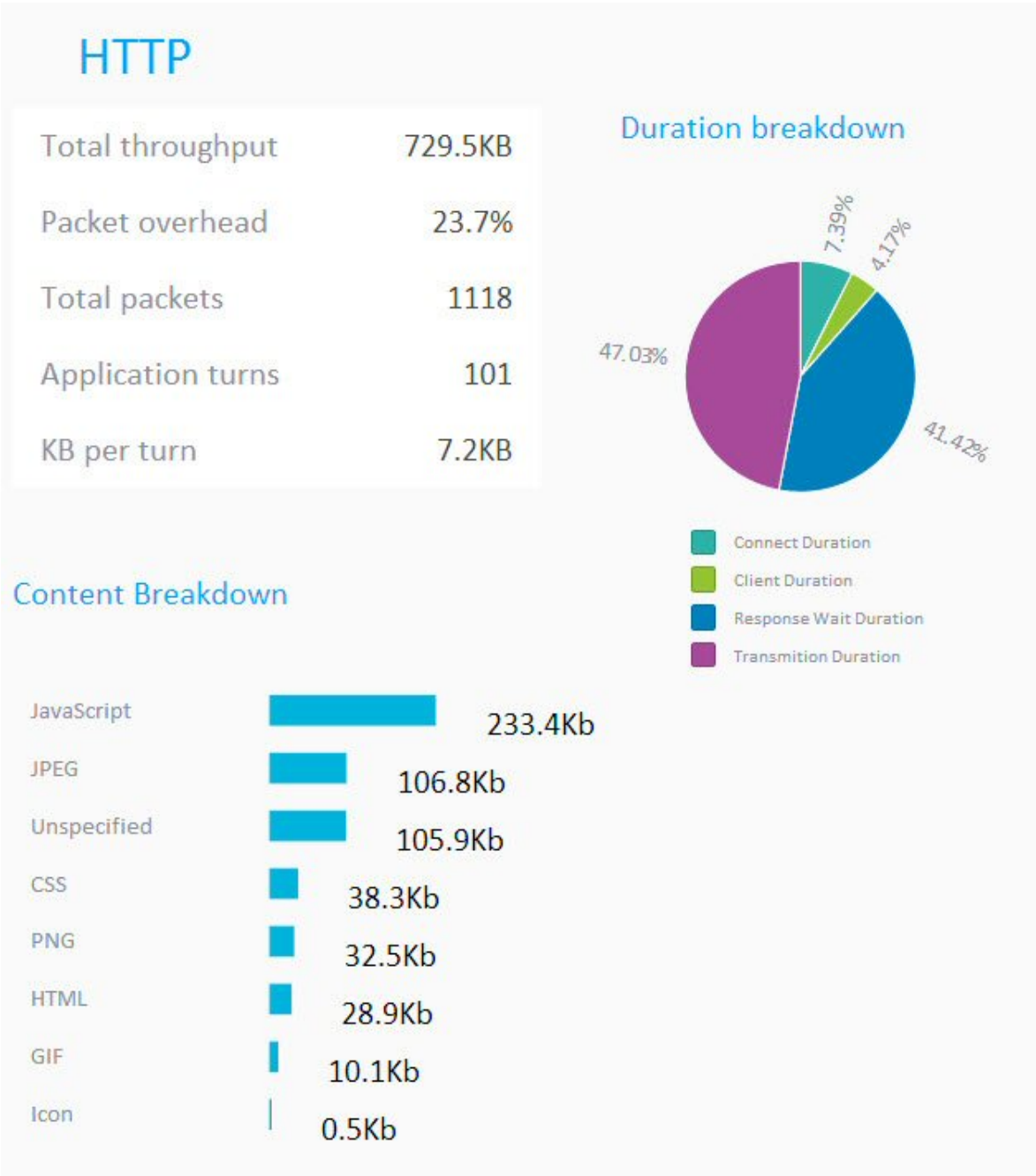
Viewing requests for only a portion of the transaction timeline

If you would like to see requests occurring during only a portion of the transaction, click and drag to select the desired time frame on the transaction timeline, as seen in the screenshot:



Data

The Data Report shows a breakdown of network traffic by protocol. For the HTTP protocol, there is an additional breakdown by content type.



Elements of the Data Report include:

- **Total throughput:** Total amount of data transferred using this protocol, including headers such as TCP, IP, etc.
- **Packet overhead:** Percentage of the total throughput for this protocol used by non-data elements such as headers.
- **Total packets:** Total number of packets sent using this protocol.
- **Application turns:** Number of times a communication flow change occurred from the request to the response for data transferred using this protocol.
- **KB per turn:** Average KB of data transferred per application turn for this protocol.

The Duration Breakdown chart includes the following elements:

- **Connect duration:** Portion of time in which the client connected to the server, such as the request in TCP or the triple handshake in SSL (the establishment of a secure channel).
- **Client duration:** Portion of time that the client processes (does not include time waiting for a server response).
- **Response wait duration:** Portion of time spent waiting for the server's response.
- **Transmission duration:** Portion of time data was downloaded or uploaded.

Errors

The Errors Report shows a list of errors that were detected during the transaction. Errors are detected for the following protocols:

- HTTP
- TCP
- UDP
- HLS

Analysis vs NV Analytics

If you capture the packet list when a test runs, after you run the test, you can analyze the packet list. To perform the analysis, you can use any of the following:

- **NV Test Manager analysis functionality.** Produces comprehensive reports for each transaction in the test, or for the entire test if there are no transactions in the test. For details, see ["Analyzing Test Results" on page 56](#).
- **NV Analytics.** The NV Analytics reports are similar to the reports produced by the NV Test

Manager analysis routines, but offer additional information and functionality. For details on the differences, see the table below.

To make the test results available to NV Analytics, use NV Test Manager to download a .shunra file that contains the packet list for the test. For details, see ["Save Test Results to a File for NV Analytics" on page 44](#).

- **External tools.** You can use external tools to analyze the captured packet lists. For details on how to download the packet lists, see ["Performing Transactions" on page 51](#).

Differences between NV Test Manager analysis and NV Analytics:

Feature	NV Analytics	NV Test Manager Analysis
HTTP request/response body is included in the HTTP waterfall, and is displayed if the resource format is supported.	Yes	No
General (low level protocols) analysis waterfall.	Yes	No
TCP and UDP sessions analysis/summary.	Yes	No
Advanced UI features, including filtering, sorting, highlighting, navigation shortcuts, and search.	Yes	No

Chapter 8: Managing Network Profiles

You use NV Test Manager to create and maintain network profiles. A network profile is a set of parameters that define network impairments and conditions. When you create a Quick Test, you can specify a network profile that contains the parameters to impose when the test runs.

This section includes:

Network Profile Overview	65
Create a Custom Network Profile	67
Import Network Profiles from the NV Global Library	67
Download Network Profiles from the NV Server	68
Upload Network Profiles to the NV Server	69
Save a Network Profile to a Test Configuration File	69
Modify a Network Profile	69
Delete a Network Profile	70
Network Profile Parameters	70

Network Profile Overview

You can use NV Test Manager to create and maintain network profiles. A network profile is a set of parameters that define network impairments and conditions. When you create a Quick Test, you can specify a network profile that contains the parameters to impose when the test runs.

What is included in a network profile?

Each network profile contains a list of network parameters. When a test is run, the parameters in the associated network profile are imposed on the network. The parameters in a network profile are:

- **Latency.** The amount of time that it takes for an IP packet to travel across the network, from the client to the server, or from the server to a client. The actual network latency is the emulated latency plus any latency that exists in the actual network. The valid range is 0 to 8,000 msec.
- **Packet Loss.** The percentage of IP packets that are sent through the network, but do not reach their destination. The valid range is 0 to 100%.
- **Bandwidth in.** The maximum throughput through the network [in Kb per second], for data traveling from the server to the client.

- **Bandwidth out.** The maximum throughput through the network [in Kb per second], for data traveling from the client to the server.

How do I create a network profile?

There are various methods that you can use to create a network profile, including:

- Downloading the parameters from the NV Global Library, as described in ["Import Network Profiles from the NV Global Library" on the next page](#).
- Specifying the parameters of a custom profile, as described in ["Create a Custom Network Profile" on the next page](#).
- Downloading a network profile from the NV Server, as described in ["Download Network Profiles from the NV Server" on page 68](#).

What is a predefined network profile?

The NV Test Manager is installed with a number of predefined network profiles. Each predefined network profile includes parameters that define a common network testing environment. You can select any one of these predefined profiles when you create a Quick Test. For details, see ["Create and Run Quick Tests" on page 16](#). You can view the predefined profiles and their parameters in the Profiles page in the NV Test Manager.

Note: You cannot edit, delete, or rename a predefined profile.

For details on how to create a custom profile, see ["Create a Custom Network Profile" on the next page](#).

Predefined network profiles:

Profile Name	Latency [ms]	Packet Loss [%]	Bandwidth-in [kb/s]	Bandwidth-out [kb/s]
4G Good	40	0	10,000	7,500
3G Good	80	0	2,000	512
3G Typical	120	0	512	256
3G Busy	200	0.5	384	128
2.5G Busy	300	0.5	128	56

Can I use a network profile in an Advanced Test?

No, you can use a network profile in a Quick Test only. However, you can import a test configuration into an Advanced Test. A test configuration contains the parameters that specify the network conditions and constraints to apply when the test runs. For details, see ["Create and Run Advanced Tests" on page 19](#).

Create a Custom Network Profile

The procedure below describes how to create a custom network profile.

- For details on how to download network parameters from the NV Global Library, see ["Import Network Profiles from the NV Global Library" below](#).
- For details on how to download a network profile from the NV Server, see ["Download Network Profiles from the NV Server" on the next page](#).

To create a custom network profile:


1. In the NV Test Manager, click **Profiles**, and then click **Create new profile**.
2. Modify the profile name, and enter values for the latency, packet loss, bandwidth-in and bandwidth-out of the profile. For details on the profile parameters, see ["Network Profile Parameters" on page 70](#).
3. Click **Save**.

Import Network Profiles from the NV Global Library

The NV Global Library is comprised of a regularly updated set of more than 20 million real-world data points of point-to-point network conditions, recorded around the world. You can import network characteristics from the global library by specifying the locations of the client and server computers, as well as a various other characteristics that define the network.



- For details on how to create a custom network profile, see ["Create a Custom Network Profile" above](#).

To import a network profile from the NV Global Library:

1. In the **Profiles** page, click **Global Library**.
2. In Step 1 of the Global Library wizard, specify the **Client Location** and the **Server Location**. These locations are typically the cities or states in which the client and server are located.
3. Click the **Next** button .
4. In Step 2 [**Connection Properties**], specify the technology of the network between the client and server:
 - **Technology.** The technology on which the network is based.
 - **Carrier.** The carrier that operates the network.

- **Time.** Specify if the network communication occurs during business hours or outside of business hours.


Note: The wizard displays only those options that are available for the network client and server locations that you specified.

5. Click the **Next** button .
6. In Step 3 [**Finish**], specify:
 - The **Communication Quality** of the connection (determines packet loss)
 - The connection **Bandwidth** (for WiFi connections only)
 - A **Profile Name**
7. Click the **Finish** button .

Download Network Profiles from the NV Server


Note: The functionality in this topic is available only to those Network Virtualization for Mobile installations that include the NV Server.

You can download network profiles from the NV Server repository, and then use the downloaded profiles in your Quick Tests.

Network profiles in the NV Server repository are indicated by a **Profile** icon []. After downloading a profile from the NV Server, the downloaded profile appears in the **Profiles** list in the **Profiles** page of the NV Test Manager.

- For details on uploading network profiles to the NV Server, see "[Upload Network Profiles to the NV Server](#)" on the next page.

To download a network profile from the NV Server to an NV Test Manager:


1. In the NV Test Manager, click **Profiles**, and then click **Download from NV Server**. The Download File dialog box opens.
2. Locate and select the profile [] that you want to download, and then click **Download**. The downloaded profile appears in the **Profiles** list.

Upload Network Profiles to the NV Server

Note: The functionality in this topic is available only to those NV installations that include the NV Server.

You can upload network profiles from the NV Test Manager to the NV Server. This makes the profiles available to other NV users – users who can access the NV Server. These users can download profiles from the NV Server, and then include them in their Quick Tests. For details, see ["Download Network Profiles from the NV Server" on the previous page](#).


To upload a network profile from the NV Test Manager to the NV Server:

1. In the NV Test Manager, click **Profiles**.
2. In the list of **Profiles**, select the profile that you want to upload, and click the **Upload to NV Server** icon .
3. Enter the required details, and then click **Upload**.

Save a Network Profile to a Test Configuration File

You can save any network profile to a **test configuration** file, and then import the test configuration file when you create an Advanced Test. For details, see ["Create and Run Advanced Tests" on page 19](#).

To save a profile to a test configuration file:

1. In the NV Test Manager, click **Profiles**.
2. In the list of **Profiles**, select the profile that you want to save to a test configuration file.
3. Click **Save as Test Configuration** . The NV Test Manager creates an .ntxx file that contains the network configuration.


Modify a Network Profile

You can modify the details of a network profile. The details that can be modified are the profile name, and the latency, packet loss, bandwidth-in and bandwidth-out values in the profile.

Note: You cannot modify a predefined profile. For details on predefined profiles, see ["Network Profile Overview" on page 65](#).

For details on how to create a new network profile, see ["Create a Custom Network Profile" on page 67](#).

To modify a network profile:

1. In the NV Test Manager, click **Profiles**.
2. In the list of profiles, locate the profile that you want to edit, and then click the **Expand** icon  to the left of the profile name.
3. Modify the profile details as required. For details on the profile parameters, see "[Network Profile Parameters](#)" below.


Delete a Network Profile

If a network profile is no longer needed, you can delete the profile. You can delete the profile even if it has been included in a Quick Test.

Note: You cannot delete a predefined profile. For details on predefined profiles, see "[Network Profile Overview](#)" on page 65.

For details on how to create a new network profile, see "[Create a Custom Network Profile](#)" on page 67.

To delete a network profile:

1. In the NV Test Manager, click **Profiles**.
2. Select the profile or profiles that you want to delete, and then click **Delete profiles** .

Network Profile Parameters

Each network profile contains a list of network parameters. When a test is run, the parameters in the associated network profile are imposed on the network. The parameters in a network profile are:

- **Latency.** The amount of time that it takes for an IP packet to travel across the network, from the client to the server, or from the server to a client. The actual network latency is the emulated latency plus any latency that exists in the actual network. The valid range is 0 to 8,000 msec.
- **Packet Loss.** The percentage of IP packets that are sent through the network, but do not reach their destination. The valid range is 0 to 100%.
- **Bandwidth in.** The maximum throughput through the network [in Kb per second], for data traveling from the server to the client.
- **Bandwidth out.** The maximum throughput through the network [in Kb per second], for data traveling from the client to the server.

Chapter 9: NV Test Manager Settings

You can use the **Settings** page in NV Test Manager to specify the settings below.

- **Active Adapter Settings**

Active Adapter

The Active Adapter is the NIC [network interface card] on the NV Test Manager to which network impairments are applied when you run a test.

Note:

- It is necessary to select the Active Adapter only if the NV Test Manager has more than one NIC installed.
- The active adapter can be changed only when no tests are running on the NV Test Manager.
- When using setup configuration #2, the network adapter which is on the client side should be selected as the Active Adapter. For details on the setup configurations, see ["Setting up the Testing Environment" on page 91](#).

- **Analysis Settings**

You can specify that NV Test Manager captures packets when a test runs, and saves the captured packets as part of the test. When you use the NV Test Manager to analyze the packets, you specify which ports to include in the analysis. By default, only those packets that are associated with port 80 are included in the analysis. You can modify the port or list of ports to include in an analysis. To include multiple ports, enter the port numbers, separated by commas.

This section also includes:

- ["Changing the NV Test Manager Port" below](#)
- ["Log Files" on page 73](#)
- ["Setting the Maximum Packet List Buffer Size" on page 73](#)
- ["Resetting a Lost User Name or Password" on page 74](#)

Changing the NV Test Manager Port

By default, port 8182 is the port number that is used to access to the NV Test Manager using a browser. Although there is typically no need to change the port number, if required, you can change the port number as described below.

For details on how to change the NV Server port number, see ["Changing the NV Server Port" on page 87](#).

Note: Perform the following steps are on each NV Test Manager computer.

1. Make sure that no tests are running on the NV Test Manager.
2. Make sure that the new port has been allowed in the firewall.
3. Navigate to the following folder: <installation_folder>\conf.

By default, <installation_folder> is C:\Program Files (x86)\HP\NV\ or C:\Program Files\HP\NV\.


4. Open the *config.properties* file in a text editor.
5. Change:

```
com.shunra.bootstrapper.port=X
```

to

```
com.shunra.bootstrapper.port=Y
```

where "X" is the current port number [by default – 8182] and "Y" is the new port number.

6. Save the file.
 7. Navigate to the following folder: <installation_folder>\lib\shunra\vcap\.
- By default, <installation_folder> is C:\Program Files (x86)\HP\NV\ or C:\Program Files\HP\NV\.
8. Open the *NVAgent.exe.config* file in a text editor.
 9. Replace both instances of "8182" (or the current port) with the new port number.
 10. Restart **NV Watchdog Service**.
 11. Right-click the NV Agent icon  in the icon-bar and click **Exit**. Start the NV Agent by clicking **Start > All Programs > HP Software > NV for Mobile > NV Agent > NV Agent**.
 12. Navigate to the following folder: <installation_folder>\conf.
- By default, <installation_folder> is C:\Program Files (x86)\HP\NV\ or C:\Program Files\HP\NV\.
13. Right-click the file *Controller.url* and select **Properties**. In the **URL**, replace the old port number with the new port number.

14. Right-click the file *License.url* and select **Properties**. In the **URL**, replace the old port number with the new port number.
15. In all browser shortcuts to the NV Test Manager and the NV License Manager, replace the old port number with the new port number.

Log Files

HP Network Virtualization for Mobile log files are located in the following folder: <installation_folder>\logs.

By default, <installation_folder> is C:\Program Files (x86)\HP\NV\ or C:\Program Files\HP\NV\.

Setting the Maximum Packet List Buffer Size

You can specify that when a test runs, NV Test Manager captures the network packets that are transmitted across the network, and stores the packets in a buffer – for future analysis. The **PacketListMaxSizeMB** property defines the maximum size of the packet list buffer. By default, **PacketListMaxSizeMB** is set to 300 MB. You can modify the maximum buffer size as described below.

NV Test Manager attempts to allocate the packet list buffer when you start a test:

- in the single test mode, and have selected to capture packets.
- in concurrent test mode. This allocation occurs even if packet list capture is set to “OFF.” This functionality enables packets to be captured in subsequent concurrent tests – if required.

Note: A test will not run if a packet list buffer is required, and the maximum packet list buffer size is more than 25% of the RAM on the NV Test Manager host computer.

To modify the packet capture buffer settings:

1. Stop all network virtualization tests that are currently running on the NV Test Manager.
2. Navigate to the following folder: <installation_folder>\conf.

By default, <installation_folder> is C:\Program Files (x86)\HP\NV\ or C:\Program Files\HP\NV\.

3. Open the file *userConfiguration.xml* file in a text editor.
4. Locate the 'PacketListMaxSizeMB' property, and set it to the required value.
5. Save the file.
6. Restart **NV Watchdog Service**.

Resetting a Lost User Name or Password

Note: This topic applies to standalone NV Test Manager installations only. If your NV Test Manager installation is connected to NV Server, use NV Server to perform the required procedures for resetting lost user names and passwords. For details, see ["Managing User Accounts" on page 83](#).

If you forget the user name that you use to access a standalone NV Test Manager, you can specify a new user name, and then configure NV Test Manager to use the new user name.

If you forget the password that you use to access the NV modules, you can generate a new encrypted password, and then configure NV Test Manager to use the new password.

If you forget your NV Mobile Administrator user name or password that you use to access NV Server, see ["Resetting a Lost NV Server Admin Password" on page 89](#) for details on how to reset the user name and/or password.

To generate a new encrypted password:

1. Click **Start > All Programs > Accessories**, right-click **Command Prompt**, and then click **Run as administrator** (to run the CMD command with elevated privileges).
2. In the Command Prompt window, change folder to "<installation_folder>\lib."
 - <installation_folder> is the full path to NV installation folder.

By default, <installation_folder> is C:\Program Files (x86)\HP\NV\ or C:\Program Files\HP\NV\.

3. Run the following command: `javaw -classpath bootstrapper.jar; com.shunra.common.license.utils.CryptoUtils /e <password> /f <output_file>`

For example:

```
javaw -classpath bootstrapper.jar; com.shunra.common.license.utils.CryptoUtils /e  
mypassword /f "c:\aabb\out.txt"
```

- <password> – The new password to encrypt.
- <output_file> – The full path and file name of the text file that will contain the encrypted password. The folder that will contain the output file must exist before running the command.

After generating the new encrypted password, configure NV Test Manager to use the new password, as described below.

To configure NV Test Manager to use a new user name and/or password:

1. Open a text editor with elevated permission ("Run as administrator") and then open the following file in the text editor:

```
<install_folder>\conf\user.properties
```

2. [For a new password] In the "user.properties" file, locate the following property:

```
com.shunra.bootstrapper.user.password
```

Copy the new encrypted password from the output file to the "com.shunra.bootstrapper.user.password" property.

3. [For a new user name] In the "user.properties" file, locate the following property:

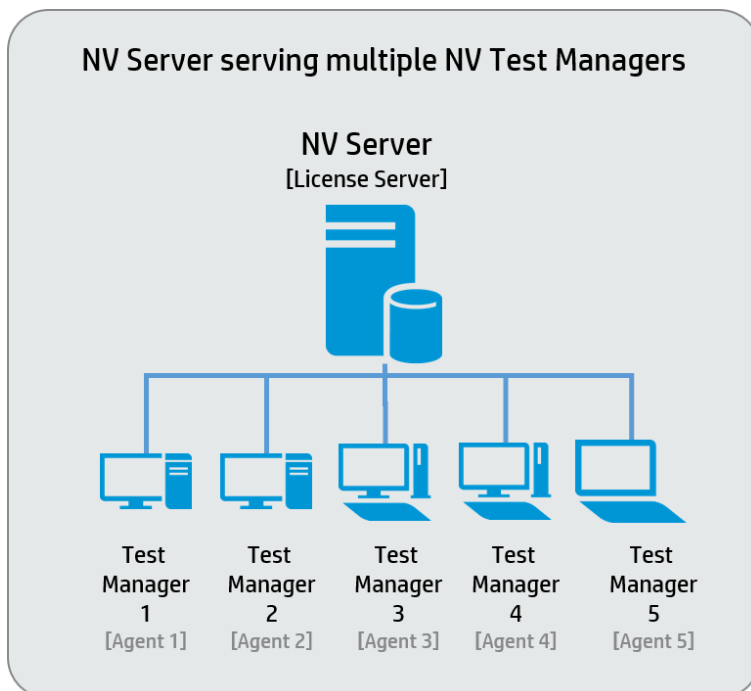
```
com.shunra.bootstrapper.user.user
```

Replace the property with the new user name.

4. Restart **NV Watchdog Service**.
5. Start NV Test Manager using the new password and/or user name.

Part 2: NV Server

In an HP Network Virtualization for Mobile Server-based installation, multiple NV Test Managers can be connected to a single NV Server. The NV Server enables the NV Test Managers to access and share various files that are stored in a repository on the NV Server. In addition, the NV Server manages the NV Server and the NV Test Manager users, and enables multiple users to operate each of the associated NV Test Managers. The NV Server also manages the floating licenses that are used by the NV Test Managers.



This section includes the following topics:

- ["NV Administration Overview" on page 77](#)
- ["Starting the NV Server" on page 78](#)
- ["Managing the NV Server Repository" on page 79](#)
- ["Managing User Accounts" on page 83](#)
- ["Managing User Groups" on page 85](#)
- ["Changing the NV Server Port" on page 87](#)
- ["Resetting a Lost NV Server Admin Password" on page 89](#)

Chapter 10: NV Administration Overview

You can use the NV Server to perform the following functions:

- **Manage user accounts.** A user must have a user account in order to be able to access the NV Server and the NV Test Manager. Use the NV Server to create new accounts, and to modify existing accounts. For details, see ["Managing User Accounts" on page 83](#).
- **Manage user groups.** Each HP Network Virtualization for Mobile user is assigned to one or more user groups. The user groups define the permissions that an associated user has within the system. For details, see ["Managing User Groups" on page 85](#).
- **Maintain the folder structure of the repository on the NV Server.** These folders serve as a repository for storing test results, test configurations, and network profiles. The files in the repository can be shared to users of the NV Test Manager. For details, see ["Managing the NV Server Repository" on page 79](#).

Does every HP Network Virtualization for Mobile installation include an NV Server?

No. An NV Test Manager can be installed in a standalone configuration, in which case there is no NV Server. For details, see ["Network Virtualization for Mobile Overview" on page 7](#).

For details on how to start the NV Server, see ["Starting the NV Server" on page 78](#).

Chapter 11: Starting the NV Server

You can access the NV Server either locally on the computer on which it is installed, or remotely using a supported browser.

Note: For a list of supported browsers, see ["Installing NV Server" on page 119](#).

- To access the NV Server locally:

Click **Start > All Programs > HP Software > NV for Mobile > HP NV Server > HP NV Server**.

- To access the NV Server remotely:

Enter the following URL into your browser:

`https://<NV Server Address>:<NV Server Port>/snv/`

For example: `https://198.51.100.24:8443/snv/`

Note: Port 8443 is the default port. To change the port, see ["Changing the NV Server Port" on page 87](#).

Note: Some of the NV Server functionality requires a valid license. For details on how to license the NV Server, see ["Licensing HP NV for Mobile Products" on page 124](#).

Chapter 12: Managing the NV Server Repository

The NV Server serves as a repository for HP Network Virtualization for Mobile resources, enabling the resources to be shared by NV Test Manager users. Users of the NV Test Manager can upload resources from the NV Test Manager to the repository, and download resources from the repository to the NV Test Manager.

All Network Virtualization for Mobile users can create folders in the repository. When a new folder is created, the folder is accessible only to the user who created the folder, and to all Server Administrators and NV Test Manager Administrators. The folder creator can share the folder with other users.

- For details on how to manage the folders in the repository, see ["Managing the Folders in the Repository" below](#).
- For details on the resources that can be stored in the repository, see ["Repository Contents" on page 81](#).
- The location of the NV Server repository is specified when the NV Server is installed. After installation, you can change the location of the repository. For details, see ["Changing the NV Server Repository Location" on page 81](#).

Managing the Folders in the Repository

You use the **Folders** page in the NV Server to manage the repository folders.

What do you want to do?

- [Add a folder](#)
- [View the properties of a file or a folder](#)
- [Share a folder with other users](#)
- [Un-share a folder with other users](#)
- [Rename a file or a folder](#)
- [Copy a folder](#)
- [Move a file or a folder](#)
- [Delete a file or a folder](#)

Add a folder



1. In the **Folders** page, click **New Folder**.
2. Specify a name for the new folder. The folder is created in the folder that is currently displayed. You can move the folder to a new location if required.

View the properties of a file or a folder



In the **Folders** page, select the required file or folder, and then click **Properties**.

Note: You cannot modify any of the property details.

Share a folder with other users

In the **Folders** page, locate and select the folder that you want to share, and then click the **Share folder** icon . In the file list, the **Type** changes from **Directory** to **Shared Directory**, and the **Shared Directory** icon  is displayed.

Un-share a folder with other users

In the **Folders** page, locate and select the folder that you want to un-share, and then click the **Un-Share folder** icon . In the file list, the **Type** changes from **Shared Directory** to **Directory**, and the **Directory** icon  is displayed.

Rename a file or a folder

1. In the **Folders** page, locate and select the file or folder that you want to rename, and then click **Rename**.
2. Modify the name as required.

Copy files and folders

You can copy an existing folder, and save the copy in another location in the file system on the NV Server. When you copy a folder, all the sub-folders and files in the sub-folders are copied.

To copy a file or a folder:

1. In the **Folders** page, select the file or folder that you want to copy, and then click **Copy**.
2. Select the location for the copied file or folder, and then click **Copy**.

Move a file or a folder

1. In the **Folders** page, select the file or folder that you want to move, and then click **Move**.
2. Select the location for the moved file or folder, and then click **Move**.




Delete a file or a folder

In the **Folders** page, select one or more files and/or folders that you want to delete, and then click **Delete**.

Repository Contents

The HP Network Virtualization for Mobile repository contents

The resources that can be uploaded and downloaded to-and-from the repository are shown below:

Resource type	For details, see...	Identifying Icon
Test configurations	<ul style="list-style-type: none">• "Upload Tests to NV Server" on page 42• "Download Tests from NV Server" on page 43	
Test results	<ul style="list-style-type: none">• "Upload Tests to NV Server" on page 42• "Download Tests from NV Server" on page 43	
Network Profiles	<ul style="list-style-type: none">• "Upload Network Profiles to the NV Server" on page 69• "Download Network Profiles from the NV Server" on page 68	

- For details on how to work with the folders in the repository, see ["Managing the Folders in the Repository" on page 79](#).
- The location of the NV Server repository is specified when the NV Server is installed. After installation, you can change the location of the repository. For details, see ["Changing the NV Server Repository Location" below](#).

Changing the NV Server Repository Location

When you install NV Server, you specify the location in which the NV Server saves the repository contents. By default, the repository location is C:\ProgramData\HP\NV Server. You can change this location during installation, or after installation as described below.

To change the location in which the NV Server repository is saved:

1. Make sure that no tests are currently running on any of the NV Test Managers that are connected to the NV Server.
2. On the NV Server, open the configuration file *<installation_folder>\NVServer\ApacheTomcat\webapps\snv\WEB-INF\classes\snv.properties* in a text editor.

By default, *<installation_folder>* is C:\Program Files (x86)\HP\NV\ or C:\Program Files\HP\NV\.

3. Locate the property *file.content.repository.root*, and change the value as required.
4. Save the configuration file.
5. Restart the service: *Apache Tomcat NV Server*.
6. Move any existing repository files to the new location.

Chapter 13: Managing User Accounts

Before a user can access the HP Network Virtualization for Mobile components, an account must be created for the user.

Note: A user must be assigned to the **Server Administrators** user group to be permitted to manage user accounts. For details, see ["Managing User Groups" on page 85](#).

You use the **User Accounts** tab in the NV Server to manage user accounts.

What do you want to do?

- [Create a new user account](#)
- [List all user accounts and logged-on users](#)
- [Change a user's password](#)
- [Edit the details of a user account](#)
- [Delete a user account](#)

Create a new user account

In the **User Accounts** tab, click **New User**, and enter the user's details. While filling in the various fields, make sure to:

- **Enter a user login name.** The user will use this name to log in to all HP Network Virtualization for Mobile components.
 - The login name must be 6 to 30 characters long, and contain only the following characters: a-z; A-Z; 0-9; _; -.
 - The login name is case sensitive.
- **Select the user groups of which the user will be a member.** For details, see ["Managing User Groups" on page 85](#).
- **Enter a password.** The user will use this password to log in to all HP Network Virtualization for Mobile components.
 - The password must be between 6 and 30 characters long, and contain only the following characters: a-z; A-Z; 0-9; _; -.
 - Passwords are case sensitive.

The user can change the password after logging in.

List all user accounts and logged-on users

In the NV Server, click the **User Accounts** tab. A list of all user accounts is displayed.

A green circle to the left of a user name indicates that the user is currently logged on to one or more of the HP Network Virtualization for Mobile components.

Change a user's password

1. In the **User Accounts** tab, select the user and then click **Edit**.
2. Select **Reset Password**, and then enter a new password for the user.

Edit the details of a user account

In the **User Accounts** tab, select the user account that you want to edit, click **Edit**, and then modify the user's details as required.

Note: You cannot change the user group of the administrator that was created when the NV Server was installed.

Delete a user account

In the **User Accounts** tab, select one or more user accounts that you want to delete, and then click **Delete**.

Note: You cannot delete the administrator that was created when the NV Server was installed.

Chapter 14: Managing User Groups

Users of HP Network Virtualization for Mobile are assigned to user groups. The user groups define the permissions that the users have within the NV Server and NV Test Manager.

- **Server Administrators.** These users are permitted to perform all functionality that is available in both NV Test Manager and the NV Server.
- **Test Manager Administrators.** These users have limited test management and user management permissions.
- **Testers.** These users are permitted to manage and run their own tests, and to view a restricted set of server resources.

The functionality that is available to each user group is set when the NV Server is installed, and cannot be modified. You cannot add or delete user groups. For details on the permissions that are associated with each user group, in NV Server, click **User Groups > Permissions**.

Note: A user can be assigned to multiple user groups.

This topic includes:

- [Viewing user-group permissions](#)
- [Moving users between user groups](#)

Viewing user-group permissions

Note: This procedure can be performed by users who are assigned the **Server Administrators** role only.

1. In the NV Server, click the **User Groups** tab.
2. Select the required user group, and then click the **Permissions** tab. A list of functionalities is displayed. A check mark to the left of a functionality indicates that the functionality is permitted to users in the selected user group.

Note: You cannot modify any of the permitted functionalities.

Moving users between user groups

You can add users to user groups, and remove users from user groups.

To move users between user groups:

1. In the NV Server, click the **User Groups** tab.
2. Select the user group to which you want to add members or from which you want to remove members.

Note: The number of users in each user group appears to the right of the user-group name.

3. Make sure that the **Members** tab is displayed.
4. To add a member: From the **Available Users** list, select the user and click **Add**.
5. To remove a member: From the **Group Members** list, select the user and click **Remove**.
6. Click **Save**.

You can add a user to a user group or remove a user from a user group by editing the user account details. For details, see ["Managing User Accounts" on page 83](#).

Chapter 15: Changing the NV Server Port

Port 8443 is the NV Server port that NV Test Managers uses, by default, to communicate with the associated NV Server. In addition, this is the port that is used by users to access to the NV Server and the NV License Manager using a browser. Although there is typically no need to change the port number, if required, you can change the port number as described below.

For details on how to change the NV Test Manager port number, see ["Changing the NV Test Manager Port" on page 71](#).

Changing the NV Server port number includes the following steps:

- Making changes on the NV Server.
- Making changes on each of the NV Test Managers attached to the NV Server.

To change the NV Server port number:

Perform the following steps on the NV Server computer:

1. Navigate to the folder:
`<installation_folder>\NVServer\ApacheTomcat\conf`.

By default, `<installation_folder>` is `C:\Program Files (x86)\HP\NV\` or `C:\Program Files\HP\NV\`.
2. Open the *Server.xml* file in a text editor.
3. Replace 3 instances of "8443" (or the current port) – inside the "Connector port" elements – with the new port number.
4. Navigate to the folder:
`<installation_folder>\NVServer\ApacheTomcat\webapps\snv\WEB-INF\classes`.
5. Open the *cas.properties* file in a text editor.
6. Replace 2 instances of "8443" (or the current port) with the new port number.
7. Navigate to the folder:
`<installation_folder>\NVServer\ApacheTomcat\webapps\shunra#license\WEB-INF\classes`.
8. Open the *cas.properties* file in a text editor.
9. Replace 2 instances of "8443" (or the current port number) with the new port number.
10. Restart the **Apache Tomcat NV Server** service.

Note: It may take a few minutes for the service to restart successfully.

11. In all browser shortcuts to the NV Server and the NV License Manager, replace the old port number with the new port number.

Perform the following steps on each NV Test Manager that is connected to the NV Server:

1. Navigate to the following folder: <installation_folder>\conf.
2. Open the *config.properties* file in a text editor.
3. Replace "8443" (or the current port number) – inside the "com.shunra.bootstrapper.server" property – with the new port number.
4. Open the *snvcontroller.properties* file in a text editor.
5. Replace "8443" (or the current port number) – inside the "com.shunra.snvcontroller.nvserver.port" property – with the new port number.
6. Restart **NV WatchDog Service**.

Chapter 16: Resetting a Lost NV Server Admin Password

If you forget the NV Mobile Administrator password or user name that you use to access NV Server, you can reset the password and/or user name as described below.

- If you forget the user name or password that you use to access the NV Mobile modules in an NV Server configuration, see ["Managing User Accounts" on page 83](#) for details on how to reset the user name and/or password.
- If you forget the user name or password that you use to access standalone NV modules, see ["Resetting a Lost User Name or Password" on page 74](#) for details on how to reset the user name and/or password.

To reset the Server Admin user name and/or password:

1. On the NV Server computer, open the Control Panel, and select **Programs > Uninstall a program**.
2. Select **NV Server**, and then click **Repair**.
3. In the NV Server Setup wizard, select **Repair**, and then click **Next**.
4. In the Server Logon page, enter a new user name and/or password, and then complete the wizard.
5. Start NV Server using the new user name and/or password.

Part 3: Installing HP NV for Mobile Components

Note:

- **Upgrading to HP Network Virtualization for Mobile version 9.00:** Before you install any HP Network Virtualization for Mobile version 9.00 components, uninstall any existing HP Network Virtualization or Shunra Network Virtualization products.
- Tests from previous versions of Shunra network virtualization products are not compatible with HP Network Virtualization for Mobile version 9.00. Even if you select to maintain the data files when you uninstall a previous version, the tests will not appear in the list of existing tests in NV Test Manager 9.00. To maintain access to tests from a previous version, do not uninstall the previous version, and install NV Test Manager 9.00 on a different computer.

Before you install any of the HP Network Virtualization for Mobile components, make sure that your testing configuration meets the requirements. For details, see ["Setting up the Testing Environment" on page 91](#).

For details on installing the HP Network Virtualization for Mobile components, see:

- ["Installing NV Test Manager on Windows" on page 103](#)
- ["Installing NV Test Manager on Linux" on page 113](#)
- ["Installing NV Server" on page 119](#)

For an overview of the HP Network Virtualization for Mobile components, see ["Network Virtualization for Mobile Overview" on page 7](#).

Chapter 17: Setting up the Testing Environment

When running tests with Network Virtualization for Mobile, the traffic of the Application Under Test (AUT) must flow through NV Test Manager.

To enable the required flow of network traffic, select one of the configuration options below, according to your needs:

- ["Configuration 1: Set up NV as a desktop client" below](#)
- ["Configuration 2: Set up NV as a proxy" on page 93](#)
- ["Configuration 3: Set up NV as a router, impairing traffic between systems on different networks" on page 101](#)

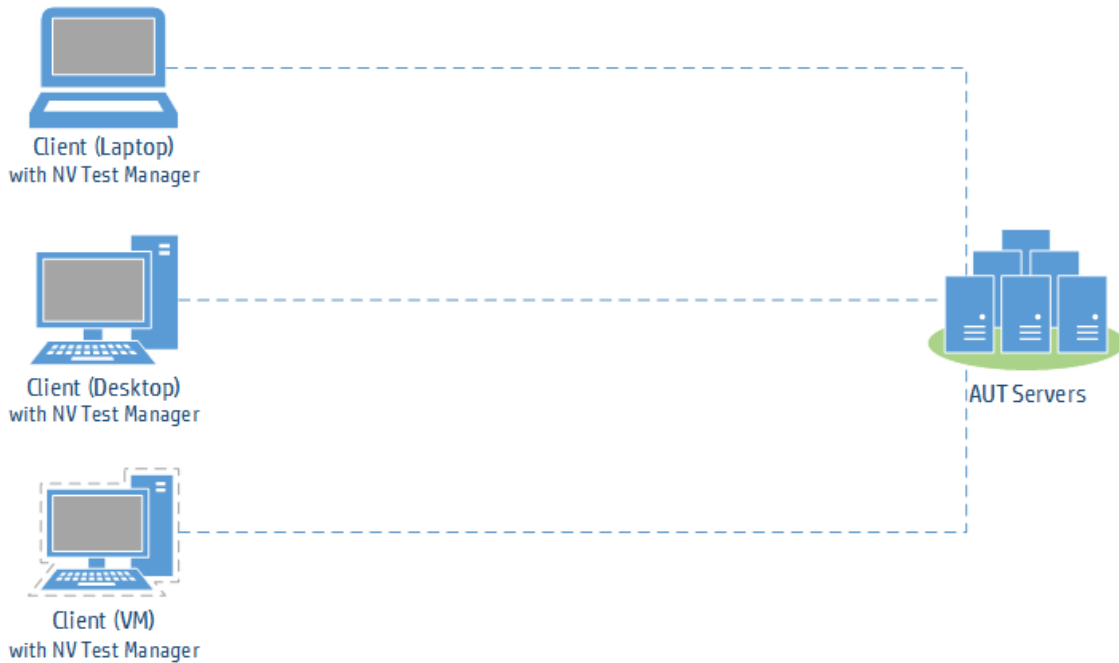
Note: Analyzing secured traffic (HTTPS) requires proxy configuration as described in configuration #2.

For assistance in setting up the environment, contact your HP Software representative.

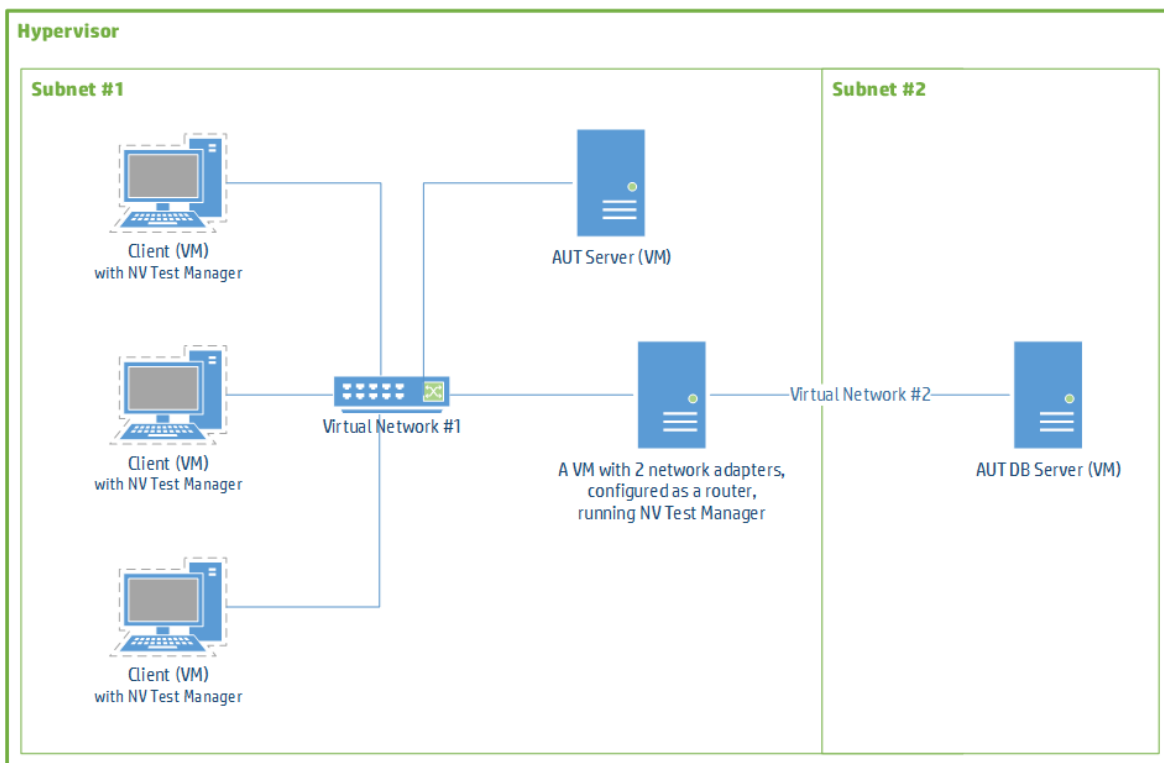
Configuration 1: Set up NV as a desktop client

In this configuration, NV Test Manager is installed on each client. This enables network traffic between the clients and the AUT servers to flow through NV Test Manager to emulate the specified real-world network conditions.

This configuration requires the AUT to operate on the client where NV Test Manager is installed. This may be significant when testing a web browser or thick client program running on Windows or Linux. If the AUT cannot operate locally on the same client as NV Test Manager, then an alternative configuration must be used.. This may occur when testing mobile apps or where the AUT does not operate on a supported Windows or Linux platform.



Configuration 1 can also be used in conjunction with Configuration 3. In the following diagram, the testing environment is running on a hypervisor. NV Test Manager is installed on each client VM in order to add the required network conditions between the client and the AUT servers. In addition, NV Test Manager is installed on a VM configured as a router between the AUT server and the DB server, for adding the network conditions between them.



Configuration 1 – Setup procedure

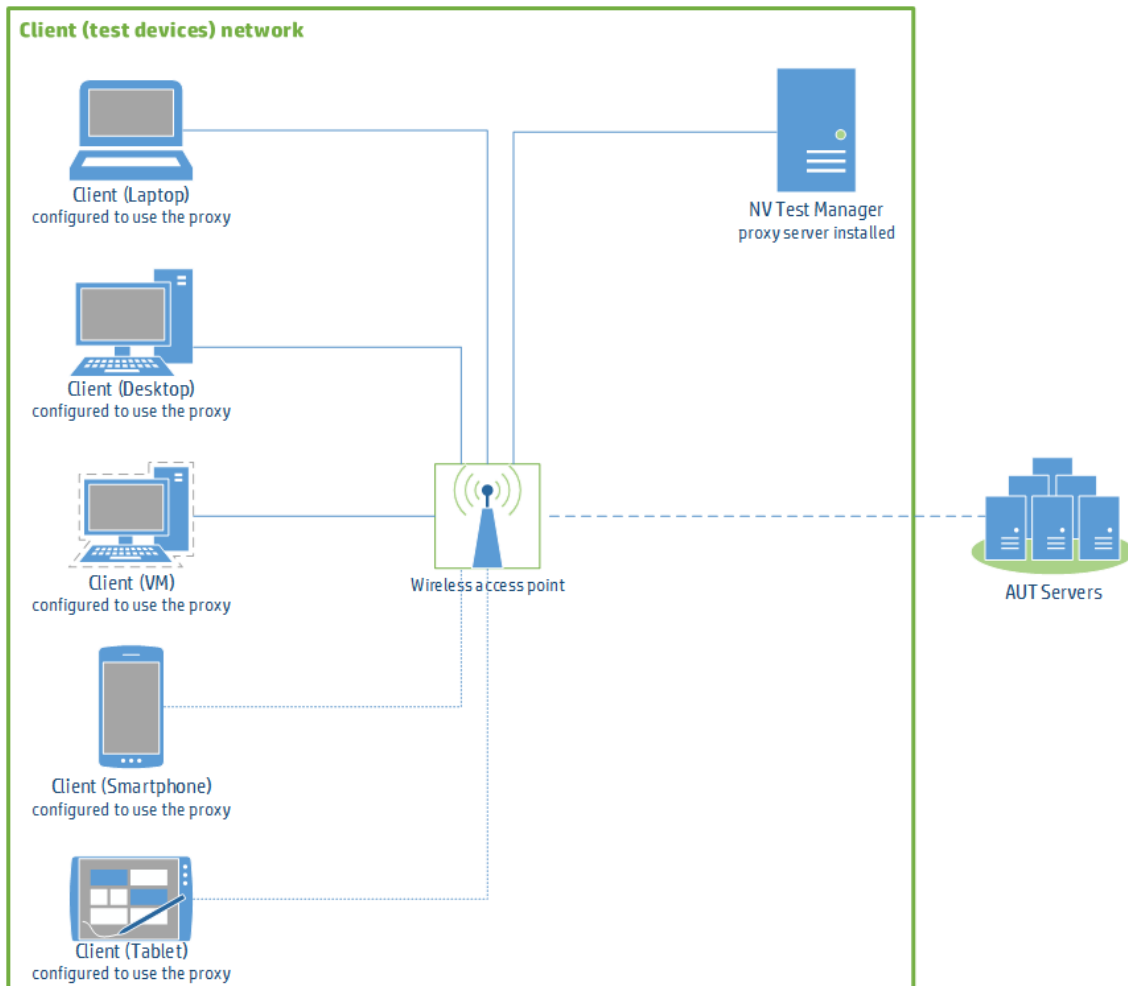
Install NV Test Manager on each client. For details, see ["Installing HP NV for Mobile Components" on page 90](#).

Configuration 2: Set up NV as a proxy

In this configuration, NV Test Manager is installed on a single machine in the testing lab. A proxy server is installed on the NV Test Manager host machine. The clients are configured to use the proxy server. When the AUT traffic flows through the NV Test Manager, the specified real world network conditions are emulated.

This configuration supports testing applications where the client cannot operate on the same platform as NV Test Manager. This may occur with on-device testing of mobile and mobile-web applications or desktop testing of web applications. It is the preferred method for on-device mobile testing, although configuration 3 can also be used.

Note: The proxy server also enables NV Test Manager to analyze the performance of applications that communicate using HTTPS. For details, see ["Analyzing Test Results" on page 56](#). In NV Test Manager, the HTTPS analysis is performed using an HAR (HTTP Archive) file generated by the proxy. In NV Analytics, the HTTPS decryption is performed using the proxy's private key.



Note:

- The wireless network may be the corporate wireless LAN or another dedicated wireless network.
- The wireless network must allow devices (i.e. the test devices) to use another device on the network (i.e. the NV Test Manager workstation) as a proxy.
- NAT devices cannot be placed between the clients and the NV Test Manager host machine.
- Mobile web applications always use a proxy if configured on the mobile devices since they are running in the browser. Native applications however might ignore the device's proxy settings.

Configuration 2 – Setup procedure

Step 1: Install NV Test Manager

For details, see "[Installing NV Test Manager on Windows](#)" on page 103.

Note: Some test devices may fail to reach the proxy when using the proxy's hostname. It is therefore recommended that you assign the NV Test Manager machine a static IP address, and use the assigned address when configuring the test devices with the proxy.

Step 2: Select, install, and configure the proxy server

The recommended proxy server is mitmproxy. However, if the clients are already using a proxy server before HP Network Virtualization for Mobile is implemented, then the recommended proxy server is Fiddler, because Fiddler supports chaining to another proxy.

Installing and configuring mitmproxy

1. Copy the "...\\mitmproxy\\" folder from the HP Network Virtualization for Mobile installation package to the NV Test Manager machine, if the folder is not already there.
2. Install the following prerequisites from the "mitmproxy\\prereq" folder:
 - a. Microsoft visual c++ 2008 redistributable
 - b. OpenSSL for Windows 32bit version
 - c. Python 2.7.5
 - d. pyOpenSSL for Python 2.7
3. Create the folder "C:\\envs"
4. Copy the folder "mitmproxy\\env0" into "C:\\envs"
5. Open **Control Panel > System and Security > System > Advanced system settings**, click the **Advanced** tab and then click **Environment Variables**.
6. Add a system variable "PYTHONPATH" with the following value:

```
C:\\envs\\env0\\Lib\\sitepackages\\libmproxy;C:\\envs\\env0\\Lib\\site-packages\\netlib;C:\\envs\\env0\\Lib\\site-packages
```

7. Add a system variable "PYTHONUSERBASE" with the following value:

```
C:\\envs\\env0\\Lib\\site-packages
```

8. Add **Python** and **OpenSSL** to the value of the existing PATH variable by adding the following at the end of the value of the existing PATH variable:

```
;C:\Python27;C:\OpenSSL-Win32\bin
```

9. Start mitmproxy:
 - a. Open a command line window.
 - b. Go to "C:\envs\env0\scripts"
 - c. Run "activate"
 - d. Run "python mitmdump -p 8888"

Note: mitmproxy has started successfully if no error message appears.

10. Prepare and copy the private key file.

The mitmproxy private key is created when running mitmproxy for the first time and does not change. The key is required when using NV Analytics to analyze the performance of an application which uses HTTPS.

- a. Copy the following file from the NV Test Manager machine where the mitmproxy was installed to the machine where NV Analytics is installed.

```
C:\Users\<username>\.mitmproxy\mitmproxy-ca.pem
```

- b. Open the file for editing, delete the second block (from "-----BEGIN CERTIFICATE-----" to "-----END CERTIFICATE-----"), and save the file.
11. Create a folder for mitmproxy logs, for example, "C:\mitmproxy_nv_test_logs".
12. Copy the script "harwriter.py" to the folder. By default, the script is located under "C:\Program Files (x86)\HP\NV\bin\".

Generating an HAR file from the mitmproxy log using the script is required when using NV Test Manager to analyze the performance of an application which uses HTTPS. For details, see ["Analyzing Test Results" on page 56](#).

13. Leave the command line window open and mitmproxy running.

Installing and configuring Fiddler

1. Download and install Fiddler.
2. Install Fiddler's CertMaker plugin from the following URL:

<http://www.telerik.com/fiddler/add-ons>

3. Copy the Microsoft Visual C++ Redistributables and OpenSSL installation files to the NV Test Manager machine, if they are not already there, and install them. The installation files can be found in the following locations in the HP Network Virtualization for Mobile installation package:

- ...\\mitmproxy\\prereq\\vc_redist_x86.exe
- ...\\mitmproxy\\prereq\\Win32OpenSSL-1_0_1h.exe

4. Launch Fiddler and click **Tools > Fiddler Options**.
5. In the **Connections** tab, enable **Allow remote clients to connect**.
6. In the **HTTPS** tab, enable **Decrypt HTTPS Traffic**.
7. Restart Fiddler.
8. In the Fiddler QuickExec box (bottom left), run the following commands:

- `prefs set fiddler.certmaker.bc.ReusePrivateKeys True`
- `prefs set fiddler.certmaker.bc.LogPrivateKeys True`

9. Leave Fiddler running.

Step 3: Configuring the test devices to use the proxy server

You can use the following methods to configure the clients (e.g. Internet Explorer, Chrome, Firefox, iOS, Android) to use a proxy server:

- Manual proxy configuration
- Proxy Auto-Config (PAC)

The communication between the NV Test Manager UI on the test device and the NV Test Manager should bypass the proxy to enable NV Test Manager to automatically discover the device IP when starting a test, and so that the communication will not be impaired by the emulation.

While configuring the bypass on non-mobile test devices can be done using manual proxy configuration, configuring it on mobile test devices requires PAC in most cases.

Note: Using the NV Test Manager UI on mobile test devices is optional. Using PAC is not required when not using it. For details about the NV Test Manager mobile UI, see ["Run a Test from a Mobile Device" on page 36](#).

- If during the NV Test Manager installation "Secured communication (HTTPS) for connecting to the NV Test Manager" was not selected, then the test devices should be able to use the PAC file that is located on the NV Test Manager web server.

The PAC file URL is: `http://<NV Test Manager IP>:<NV Test Manager port, 8182 by default>/shunra/shared/nv.8888.pac`.

In order to make sure that the PAC file is reachable from the test devices, open a browser on a test device and browse to the above URL.

- If secured communication (HTTPS) was selected during installation, test devices may fail to use the PAC file located on the NV Test Manager web server as long as a trusted SSL certificate was not installed for the NV Test Manager. For details about installing a trusted SSL certificate for the NV Test Manager, see the HP Network Virtualization for Mobile Security Guide. If a trusted SSL certificate is not installed, the PAC file can be placed on another web server which is accessible to the test devices. The PAC file is located at:

```
C:\Program Files (x86)\HP\NV\web\emulation\shared\nv.8888.pac
```

Note:

- In some cases, it will be necessary to simultaneously run more than one instance of mitmproxy, each instance running on different a port. There are therefore 4 additional PAC files available in the same folder: `nv.8889.pac`, `nv.8890.pac`, `nv.8891.pac`, and `nv.8892.pac`.
- The instructions below may differ slightly on different devices, operating systems, and browsers versions.

Configuring Internet Explorer and Chrome to use the proxy server

1. Make sure that the PAC file is reachable from the test device by try opening the URL of the PAC file in the browser.
2. Open Windows' Internet Options from the Control Panel, Internet Explorer, or Chrome.
3. Go to **Connections > LAN settings**.
4. When using PAC, select **Use automatic configuration script** and enter the PAC file URL.
5. When using manual configuration:
 - a. Select **Use a proxy server for your LAN** and enter the proxy (NV Test Manager) IP address and port 8888 (by default).
 - b. Click **Advanced** and add the proxy IP address and hostname to the Exceptions.

Configuring Firefox to use the proxy server

1. Make sure that the PAC file is reachable from the test device by try opening the URL of the PAC file in the browser.
2. Open Firefox Options.
3. Select **Advanced > Network > Connection > Settings**.
4. When using PAC, select **Automatic proxy configuration URL** and enter the PAC file URL.
5. When using manual configuration:
 - a. Select **Manual proxy configuration**.
 - b. Enter the proxy (NV Test Manager) IP address and port 8888 (by default).
 - c. Select **Use this proxy server for all protocols**.
 - d. Add the proxy IP address and hostname to the **No Proxy for** list.

Configuring iOS devices to use the proxy server

1. Make sure that the PAC file is reachable from the test device by try opening the URL of the PAC file in the browser.
2. Click **Settings > Wi-Fi**.
3. Select the “i” next to the wireless network name to display its properties.
4. When using PAC, select **Auto** and enter the PAC file URL.
5. When using manual configuration, select **Manual** and enter the proxy IP address and port 8888 (by default).

Configuring Android devices to use the proxy server

1. Make sure that the PAC file is reachable from the test device by trying to open the URL of the PAC file in the browser.
2. Click **Settings > Wi-Fi**.
3. Long press the wireless network name, select **Modify network**, and then click **Advanced options**.
4. When using PAC, select **Proxy Auto-Config** and enter the PAC file URL.

Note: PAC is supported only from Android v5. For using PAC on an older Android version, Drony or other similar apps can be downloaded from Google Play.

5. When using manual configuration, select **Manual** and enter the proxy IP address and port 8888 (by default). Add the proxy IP address and hostname to the **Bypass Proxy for** list.

Step 4: Installing the proxy's SSL certificate on the testing devices

When testing applications that use secured communication (HTTPS), the proxy's certificate should be installed on each testing client for the AUT to be able to communicate through the proxy without getting an SSL warning.

When using mitmproxy:

1. Start mitmproxy.

The certificate is located in the following location:

```
C:\Users\<username>\.mitmproxy
```

2. Connect the device to the wireless network.
3. Make sure that the proxy is configured on the device. See [Configuring the test devices to use the proxy server](#) for details.
4. Browse to <http://mitm.it>
5. Select the certificate according to the OS. For Windows select **Other**.
6. Install the certificate. On Windows, install the certificate to the "Trusted Root Certification Authorities" store.

When using Fiddler:

1. Connect the device to the wireless network.
2. Make sure that the proxy is configured on the device. See [Configuring the test devices to use the proxy server](#) for details.
3. Browse to <http://<proxy IP>:8888>
4. Select **FiddlerRoot certificate**.
5. Install the certificate. On Windows, install the certificate to the "Trusted Root Certification Authorities" store.

Step 5: Verify that the test devices communicate successfully through the proxy

From a test device configured to use the proxy, try browsing to a web site or using an app, and make sure that the traffic goes through the proxy by seeing it in the proxy window (the mitmproxy command line window or Fiddler).

Step 6: Add the proxy port to the list of ports for analysis

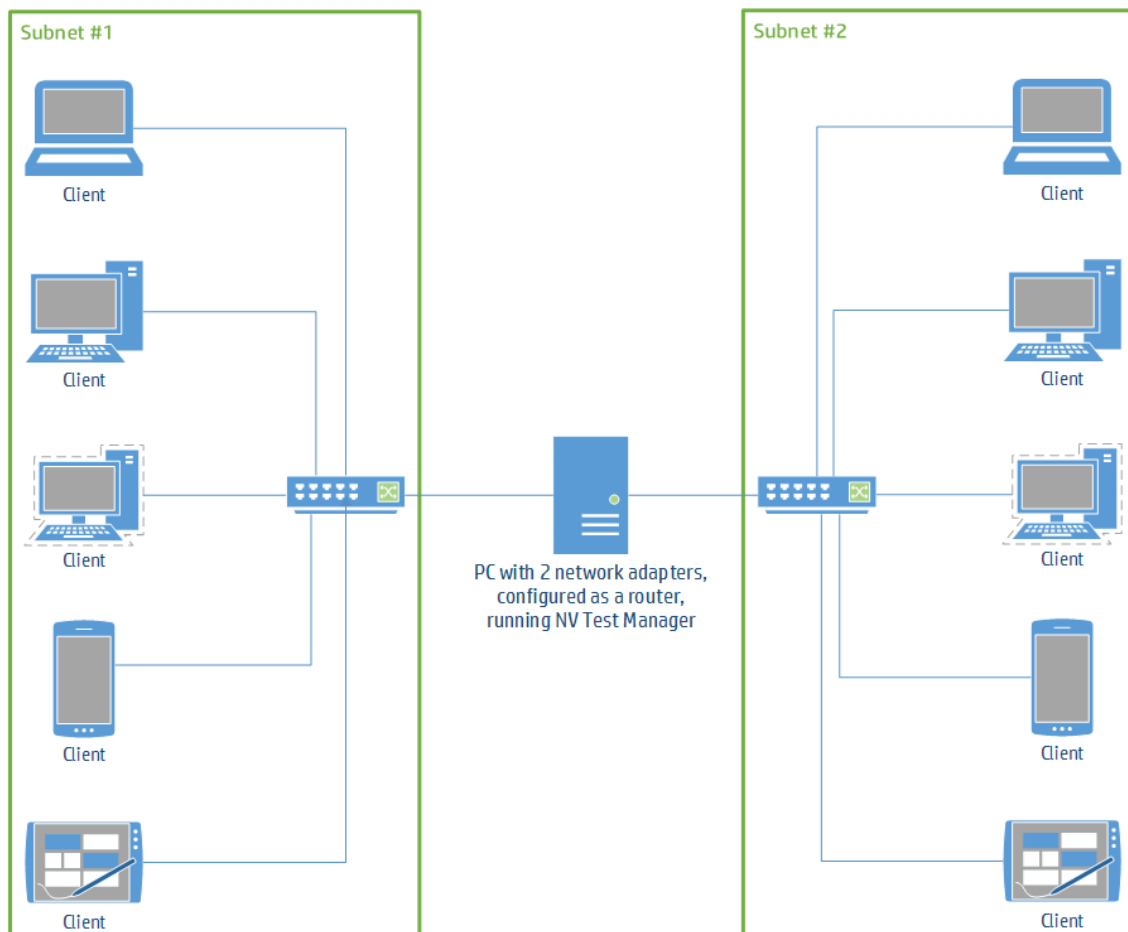
The proxy port (8888 by default) should be added to the list of ports for analysis. This is done in the

analysis settings in NV Test Manager and NV Analytics. For details, see ["NV Test Manager Settings" on page 71](#).

Configuration 3: Set up NV as a router, impairing traffic between systems on different networks

The objective of this configuration is to impair network traffic between systems on different networks communicating through a router. In this setup, you install NV Test Manager on a host which has multiple network adapters and is configured as a router. The NV driver (NV Agent) is assigned to one of the network adapters, thus affecting the traffic between that LAN segment and the other LAN segments.

The router model is a flexible configuration that allows you to create a standalone test unit based on Network Virtualization for Mobile. You can use the unit to run a variety of tests that involve different clients and servers without installing NV Test Manager on the clients or the servers themselves.



Note:

- When introducing NV into an existing testing environment, configuration #2 is preferable in many cases as it does not require changes to the existing testing environment network other than the proxy installation and configuration.
- Since the NV Test Manager host is a router in this configuration, it needs to have at least two network adapters.
- In scenario where the AUT servers and the DB servers will not be deployed in the same location in production, NV Test Manager as a router can also be installed between them in the testing environment in order to add the required network conditions.

Configuration 3 – Setup procedure

You can configure routing on the NV Test Manager host machine using one of the following:

- Enable routing in the Windows registry
- Windows Internet Connection Sharing (ICS)
- Windows Server Routing and Remote Access Service (RRAS) Role
- Enable routing in Linux

Chapter 18: Installing NV Test Manager on Windows

This section provides information about installing NV Test Manager on Windows systems.

- For details on how to install NV Test Manager on Linux systems, see ["Installing NV Test Manager on Linux" on page 113](#).
- For details on how to install the NV Server, see ["Installing NV Server" on page 119](#).

This section includes:

- [System Requirements](#)
- [Prerequisites](#)
- [Upgrading](#)
- [Installing the NV Test Manager](#)
- [Uninstalling the NV Test Manager](#)

System Requirements

The minimum requirements for NV Test Manager are as follows:

Processor	Quad core 2.5 GHz or stronger
Memory	4 GB RAM
Hard Disk	50 GB of free disk space
Network Adapter	1 Gigabit Ethernet adapter
Operating System (English versions only)	<ul style="list-style-type: none">• Windows 7 SP1 (32/64 bit)• Windows Server 2008 SP2 (32/64 bit)• Windows Server 2008 R2 SP1 (64 bit)
Supported Browsers	<ul style="list-style-type: none">• Internet Explorer 9.0 and higher• Firefox• Chrome• Safari 7 and higher

Prerequisites

The following products will be installed during the installation of NV Test Manager – if they are not already installed:

- Java Runtime Environment [JRE] 7 (32 bit) Update 25 will be installed if JRE 6 Update 24 or higher is not present.
- Microsoft .NET Framework 4.0 - Full.

Upgrading to NV Test Manager version 9.00

Before you install any HP Network Virtualization for Mobile version 9.00 components, uninstall any existing HP Network Virtualization or Shunra Network Virtualization products.

Note: Tests from previous versions of Shunra network virtualization products are not compatible with HP Network Virtualization for Mobile version 9.00. Even if you select to maintain the test data when you uninstall a previous version, the tests will not be included in the list of existing tests in NV Test Manager version 9.00. To maintain access to tests from a previous version, do not uninstall the previous version, and install NV Test Manager version 9.00 on a different computer.

Installing NV Test Manager

There are two steps involved in installing NV Test Manager so that the NV Test Manager will be able to impose network impairments and run network virtualization tests:

- Install NV Agent
- Install NV Test Manager

To install NV Agent:

On the NV Test Manager computer, run the NVSetupWizard.exe setup file (as an administrator), select **NV Agent**, click **Install**, and follow the on-line directions.

Note: NV Server and NV Agent cannot be installed on the same computer.

Make sure to restart the computer after installing NV Agent.

To install NV Test Manager:

Note: The installation differs slightly depending on whether you are performing a standalone installation, or are installing NV Test Manager in a server-based configuration.

On the NV Test Manager computer, run the NVSetupWizard.exe setup file (as an administrator), select **NV Test Manager**, click **Install**, and follow the on-line directions.

Note: NV Server and NV Test Manager cannot be installed on the same computer.

- **For a server-based installation:**

You will need to specify the IP address or the host name of the computer on which NV Server is installed. In addition, you will need to specify the port on the NV Server that the NV Test Managers will use to communicate with the NV Server. By default, this is port 8443 – there is typically no need to modify this value.

For details on how to modify this value after installation, see ["Changing the NV Server Port" on page 87](#).

- **For a standalone installation:**

You will be required to enter a user name and password that can be used to access the NV Test Manager.

Note: This will be the only user name that will have access to the NV Test Manager.

During installation, you will need to specify the destination folder (where the NV Test Manager program files are installed) and the data folder (where the data files will be saved). For better performance, make sure that the destination folder and the data folder are located on the same drive.

Uninstalling NV Test Manager

To uninstall NV Test Manager:

In the Microsoft Windows Control Panel, click **Uninstall a program**, select **NV Test Manager**, and then click **Uninstall**.

During the process of uninstalling NV Test Manager, be sure to select to retain the data folder if you want to be able to access the data after NV Test Manager is uninstalled.

To uninstall NV Agent:

In the Microsoft Windows Control Panel, click **Uninstall a program**, select **NV Agent**, and then click **Uninstall**.

Some notes about installing NV Test Manager:

- After installing NV Test Manager, you can specify the NV Test Manager settings. For details, see ["NV Test Manager Settings" on page 71](#).
- For details on how to install NV Server, see ["Installing NV Server" on page 119](#).
- For details on how to license NV Test Manager, see ["Network Virtualization for Mobile Licensing" on page 125](#).

Silent Installation of NV Test Manager

NV Test Manager and NV Agent can be installed (and uninstalled) silently. The installation process for NV Test Manager varies slightly depending on whether it is a standalone NV Test Manager installation or a Server-based installation.

NV Agent must always be installed on the same computer as NV Test Manager.

Note:

- When performing a silent installation of NV Test Manager or NV Agent, you must be logged in as an Administrator.
 - Make sure that all system requirements are met before beginning the installation.
 - You will not be notified if the silent installation fails. The installation log is located under %temp%.
-
- For details on how to silently uninstall NV Test Manager and NV Agent, see ["Silent Un-installation of NV Test Manager" on page 110](#).
 - For details on how to silently install NV Server, see ["Silent Installation of NV Server" on page 121](#).

To silently install NV Agent:

1. Copy the NVAgentSetup.exe file to a convenient location.
2. Click **Start > All Programs > Accessories**, right-click **Command Prompt**, and then click **Run as administrator** (to run the CMD command with elevated privileges).
3. In the Command Prompt window, navigate to the location of the file copied in step 1, and enter the following command together with the required command line options:

```
NVAgentSetup.exe /s /v"/qn command_line_options"
```

Command line options [* indicates a mandatory command line option]:

- * PORT=<port number>

The port used to connect to NV Agent.

- INSTALLDIR="\<path to installation folder>"

The location where the application files will be installed.

Default is C:\Program Files (x86)\HP\NV\

- DATA_FOLDER="<path to data folder>"

The location where temporary internal application data and user data is saved.

Default is <Common App Data folder>\HP\NV (C:\ProgramData\HP\NV in Win 7).

- ENABLE_REMOTE=TRUE | FALSE

Opens the port in the firewall.

Default is TRUE.

- REBOOT_IF_NEED=TRUE | FALSE

If a reboot is needed, automatically reboots the computer after installation completes.

Default is TRUE.

- SECURE_CONNECTION=TRUE | FALSE

Installs with an SSL (secure) connection between the server and the client.

Default is TRUE.

Example:

```
NVAgentSetup.exe /s /v"/qn PORT=8182 ENABLE_REMOTE=TRUE DATA_
FOLDER="C:\Data" INSTALLDIR="C:\HP-NV" REBOOT_IF_NEED=TRUE SECURE_
CONNECTION=TRUE"
```

Note: Even if the REBOOT_IF_NEED=FALSE option is used during installation, the machine will need to be rebooted before NV Agent is operational.

To silently install NV Test Manager [Standalone NV Test Manager configuration – no NV Server]:

1. Copy the NVTestManagerSetup.exe file to a convenient location.
2. Click **Start > All Programs > Accessories**, right-click **Command Prompt**, and then click **Run as administrator** (to run the CMD command with elevated privileges).
3. In the Command Prompt window, navigate to the location of the file copied in step 1, and enter the following command together with the required command line options:

```
NVTestManagerSetup.exe /s /v"/qn command_line_options"
```

Command line options [* indicates a mandatory command line option]:

- * ADMIN_NAME=administrator username
The username for the NV Test Manager user.
- * ADMIN_PASS=administrator password
The password for the NV Test Manager user.
- PORT=<port number>
The port used to connect to NV Test Manager.
- INSTALLDIR=\"<path to installation folder>\"
The location where the application files will be installed.
Default is C:\Program Files (x86)\HP\NV\
- DATA_FOLDER=\"<path to data folder>\"
The location where internal application data and user data is saved.
Default is <Common App Data folder>\HP\NV (C:\ProgramData\HP\NV in Win 7).
- ENABLE_REMOTE=TRUE | FALSE
Opens the port in the firewall.
Default is TRUE.
- REBOOT_IF_NEED=TRUE | FALSE
If a reboot is needed, automatically reboots the computer after installation completes.
Default is TRUE.
- SECURE_CONNECTION=TRUE | FALSE
Installs with an SSL (secure) connection between the server and the client.
Default is TRUE.

Example:

```
NVTestManagerSetup.exe /s /v"/qn PORT=8183 ENABLE_REMOTE=TRUE DATA_FOLDER=\"C:\Data\" INSTALLDIR=\"C:\HP-NV\" ADMIN_NAME=Jenkins1 ADMIN_PASS=Jenkins1 REBOOT_IF_NEED=TRUE SECURE_CONNECTION=TRUE"
```

To silently install the NV Test Manager [Server-based configuration]:

1. Copy the NVTestManagerSetup.exe file to a convenient location.
2. Click **Start > All Programs > Accessories**, right-click **Command Prompt**, and then click **Run as administrator** (to run the CMD command with elevated privileges).
3. In the Command Prompt window, navigate to the location of the file copied in step 1, and enter the following command together with the required command line options:

```
NVTestManagerSetup.exe /s /v"/qn command_line_options"
```

Command line options [* indicates a mandatory command line option]:

- * PORT=<port number>

The port used to connect to NV Test Manager.

- INSTALLDIR="\<path to installation folder>"

The location where the application files will be installed.

Default is C:\Program Files (x86)\HP\NV\

- DATA_FOLDER="\<path to data folder>"

The location where internal application data and user data is saved.

Default is <Common App Data folder>\HP\NV (C:\ProgramData\HP\NV in Win 7).

- ENABLE_REMOTE=TRUE | FALSE

Opens the port in the firewall.

Default is TRUE.

- REBOOT_IF_NEED=TRUE | FALSE

If a reboot is needed, automatically reboots the computer after installation completes.

Default is TRUE.

- SECURE_CONNECTION=TRUE | FALSE

Installs with an SSL (secure) connection between the server and the client.

Default is TRUE.

- SERVER_PORT=<port number>

The port used to access NV Server.

- * SERVER_ADDRESS=NV Server hostname or IP address

Example:

```
NVTestManagerSetup.exe /s /v"/qn PORT=8182 ENABLE_REMOTE=TRUE  
INSTALLDIR="C:\HP-NV\" SERVER_ADDRESS=ABC1213 SERVER_PORT=8443  
REBOOT_IF_NEED=TRUE SECURE_CONNECTION=TRUE"
```

Silent Un-installation of NV Test Manager

NV Test Manager and NV Agent can be uninstalled silently. It is recommended that you first uninstall NV Test Manager and then uninstall NV Agent.

For details on how to silently install NV Test Manager and NV Agent, see ["Silent Installation of NV Test Manager" on page 106](#).

Note: When silently uninstalling NV Test Manager and NV Agent, you must be logged in as an Administrator.

To silently uninstall NV Test Manager:

1. Copy the NVTestManagerSetup.exe file to a convenient location.
2. Click **Start > All Programs > Accessories**, right-click **Command Prompt**, and then click **Run as administrator** (to run the CMD command with elevated privileges).
3. In the Command Prompt window, navigate to the location of the file copied in step 1, and enter the following command together with the required command line options:

```
NVTestManagerSetup.exe /s /removeonly /v"/qn command_line_options"
```

Command line options

The following command line options are optional:

- REBOOT_IF_NEED=TRUE | FALSE

If a reboot is needed, automatically reboots the computer after uninstall completes.

Default is TRUE.

- FORCE_REBOOT=TRUE | FALSE

Automatically reboots the computer after uninstall completes, whether or not a reboot is needed.

Default is FALSE.

- **DELETE_DATA=TRUE | FALSE**

Deletes all stored NV Test Manager data.

Default is FALSE.

The following command line options are mandatory if NV Analytics is still installed on the computer.

- **ADMIN_NAME=administrator username**

The username for the NV Server admin user.

- **ADMIN_PASS=administrator password**

The password for the NV Server admin user.

Example:

The following example uses the default values for all the options, so the system will reboot if needed.

```
NVTestManagerSetup.exe /s /removeonly /v"/qn"
```

To silently uninstall NV Agent:

1. Copy the NVAgentSetup.exe file to a convenient location.
2. Click **Start > All Programs > Accessories**, right-click **Command Prompt**, and then click **Run as administrator** (to run the CMD command with elevated privileges).
3. In the Command Prompt window, navigate to the location of the file copied in step 1, and enter the following command together with the required command line options:

```
NVAgentSetup.exe /s /removeonly /v"/qn command_line_options"
```

Command line options [All the command line options are optional]:

- **REBOOT_IF_NEED=TRUE | FALSE**

If a reboot is needed, automatically reboots the computer after uninstall completes.

Default is TRUE.

- **FORCE_REBOOT=TRUE | FALSE**

Automatically reboots the computer after uninstall completes, whether or not a reboot is needed.

Default is FALSE.

- **DELETE_DATA=TRUE | FALSE**

Deletes all stored NV Agent temporary data.

Default is FALSE.

Example:

The following example uses the default values for all the options, so the system will reboot if needed.

```
NVAgentSetup.exe /s /removeonly /v"/qn"
```

Chapter 19: Installing NV Test Manager on Linux

This section provides information regarding the installation, configuration, setup, and licensing of NV Test Manager for Linux.

- For details on how to install NV Test Manager on Windows systems, see ["Installing NV Test Manager on Windows" on page 103](#).
- For details on how to install NV Server, see ["Installing NV Server" on page 119](#).
- For details on how to start the NV Test Manager after it is installed, see ["Starting NV Test Manager" on page 13](#).

This section includes:

- ["System Requirements" below](#)
- ["Prerequisites" on the next page](#)
- ["Installing the NV Test Manager for Linux" on page 115](#)
- ["Log Files" on page 118](#)
- ["Uninstalling the NV Test Manager for Linux" on page 118](#)

System Requirements

The minimum requirements for NV Test Manager for Linux are as follows:

Processor	Quad core 2.5 GHz or stronger
Memory	4 GB RAM
Hard Disk	50 GB of free disk space
Network Adapter	1 Gigabit Ethernet adapter
Supported Browsers	<ul style="list-style-type: none">• Internet Explorer 9.0 and higher• Firefox• Chrome• Safari 7 and higher

Prerequisites

- Java Runtime Environment (32/64 bit) 6 update 24 or higher

or

Java Runtime Environment (32/64 bit) 7 update 21 or higher
- Development Tools to build kernel modules:
 - GCC
 - kernel-devel/linux-headers for the running kernel
- For 64 bit OS: 32 bit compatibility libraries
- If a firewall is active, open ports 8182 (or other port selected during installation) for TCP and 1947 for TCP and UDP

To install the prerequisites:

1. Download from the Oracle website, and install the Java Runtime Environment:

For RedHat-based OS:

```
yum install -y jre-7u25-linux-x64.rpm
```

or

```
yum install -y jre-7u25-linux-i586.rpm
```

For Debian-based OS:

```
mkdir -p /usr/java
```

```
cd /usr/java
```

```
tar xzf jre-7u25-linux-x64.tar.gz
```

```
ln -s jre1.7.0_25 default
```

2. Install GCC:

For RedHat-based OS:

```
yum install gcc
```

For Debian-based OS:

```
apt-get install gcc
```

3. Install kernel-devel/linux-headers:

For RedHat-based OS:

Note: To update and install appropriate kernel-devel package that matches your specific kernel, run the following command before installing kernel-devel: `uname -r`

```
yum install -y kernel-devel
```

For Debian-based OS:

```
apt-get -y install linux-headers
```

4. For 64 bit OS, install the 32 bit compatibility for the running kernel:

For RedHat-based OS:

```
yum install -y glibc.i686 libgcc.i686 libstdc++.i686
```

For Debian-based OS:

```
apt-get -y install ia32-libs
```

5. Install Line Editor:

For RedHat-based OS:

```
yum install ed
```

For Debian-based OS:

Line Editor is pre-installed – no additional installation required.

Installing the NV Test Manager for Linux

Note:

- Installation must be done with root (super-user) permissions.
- When installing NV Test Manager for Linux on virtual machines, do not clone the machine after the trial license has started.

For details on how to start the NV Test Manager after it is installed, see ["Starting NV Test Manager" on page 13](#).

Supported Operating Systems

- CentOS 6.4 x64 and x32
- RedHat 6.3 x64
- CentOS 5.5 x32
- CentOS 5.10 x64
- Fedora 8 x64
- Ubuntu 10.04.4 x32
- Ubuntu SRV12 x32

NV Test Manager supports kernel releases up to 3.2.x.

Installing on RedHat-based Operating Systems (such as RedHat, CentOS, Fedora)

To install NV Test Manager for Linux:

1. Locate the NV rpm file (e.g. **nv-9.0_xx.rpm**)
2. At the Linux prompt run:

```
rpm -i nv-9.0_xx.rpm
```

Installing on Debian OS (such as Debian, Ubuntu)

To install NV Test Manager for Linux:

1. Locate the NV Test Manager for Linux package file (**nv-9.0_xx.deb**)
2. Run:

```
dpkg -i nv-9.0_xx.deb
```

Note: The system time, time zone and daylight savings settings must be synchronized.

Configuring NV Test Manager Operation mode

After the NV Test Manager installation is complete, you must choose the operation mode. There are two available operation modes for the NV Test Manager:

- **Standalone:** The NV Test Manager authenticates user logins locally. All data storage is local, and the NV Test Manager requires a fixed license key. See ["Configuring NV Test Manager in standalone mode" on the next page](#) for setup instructions.
- **Server-Based:** The NV Test Manager authenticates user logins against the NV Server. Data is stored locally, but can also be uploaded to, and downloaded from the NV Server. The NV Test Manager can use a fixed license key, or it can pull a floating license from the NV Server. See ["Configuring NV Test Manager to use NV Server" on the next page](#) for setup instructions.

Note: For licensing details, see ["Network Virtualization for Mobile Licensing" on page 125](#).

Configuring NV Test Manager in standalone mode

1. At the Linux prompt run:

```
service nvd setting
```

2. At the prompt, choose option 1 to use Standalone mode.
3. Create a username and password of the local NV Test Manager administrator.
4. Choose whether or not to use a secured connection when you access the NV Test Manager.

Note: If you choose to use a secured connection, you will **only** be able to connect over a secured connection.

5. Choose whether or not to enable remote connections to the NV Test Manager.

Configuring NV Test Manager to use NV Server

1. At the Linux prompt run:

```
service nvd setting
```

2. At the prompt, choose option 2 to use Server mode.
3. Enter the IP address or hostname of your NV Server. Do not enter a leading **http://** or a trailing **:<portnumber>** in this field.
4. Enter the NV Server's port number.
5. Choose whether or not to use a secured connection when you access the NV Test Manager.

Note: If you choose to use a secured connection, you will **only** be able to connect over a secured connection.

6. Choose whether or not to enable remote connections to the NV Test Manager.

Changing the NV Test Manager for Linux port

To change the port:

1. Ensure that no emulations are currently running.
2. Open the configuration folder, by default:

/opt/<NV Test Manager build>/conf

3. Open the file: **config.properties**
4. Change:

```
com.shunra.bootstrapper.port=="X1"
```

to

```
com.shunra.bootstrapper.port ="X2"
```

5. Save the file.
6. Restart the services by typing:

```
service nvd restart
```

Log Files

The log files of the Network Virtualization for Mobile products are located by default in: **/opt/nv-*/logs**

Uninstalling the NV Test Manager for Linux

To uninstall the NV Test Manager for Linux (Red Hat based OS):

```
rpm -e nv-9.0-xx
```

To uninstall the NV Test Manager for Linux (Debian based OS):

```
dpkg -r nv
```

Some notes about installing NV Test Manager:

- After installing NV Test Manager, you can specify the NV Test Manager settings. For details, see ["NV Test Manager Settings" on page 71](#).
- For details on how to install NV Server, see ["Installing NV Server" on page 119](#).
- For details on how to license NV Test Manager, see ["Network Virtualization for Mobile Licensing" on page 125](#).

Chapter 20: Installing NV Server

This section provides information about installing NV Server.

- For details on how to install the Windows-based NV Test Manager, see ["Installing NV Test Manager on Windows" on page 103](#).
- For details on how to install the Linux-based NV Test Manager, see ["Installing NV Test Manager on Linux" on page 113](#).
- For details on how to perform a silent installation of NV Server, see ["Silent Installation of NV Server" on page 121](#).

This section includes:

Installing NV Server

- [System Requirements](#)
- [Prerequisites](#)
- ["Upgrading to NV Server version 9.00" on the next page](#)
- [Installing the NV Server](#)
- [Uninstalling the NV Server](#)

Configuring NV Server

- ["Changing the NV Server Repository Location" on page 81](#)
- ["Changing the NV Server Port" on page 87](#)

System Requirements

The minimum requirements for NV Server are as follows:

Processor	Quad core 2.5 GHz or stronger
Memory	4 GB RAM
Hard Disk	50 GB of free disk space
Network Adapter	1 Gigabit Ethernet adapter

Operating System (English versions only)	<ul style="list-style-type: none">• Windows Server 2008 SP2 (32/64 bit)• Windows Server 2008 R2 SP1 (64 bit)• Windows Server 2012
Supported Browsers	<ul style="list-style-type: none">• Internet Explorer 9.0 and higher• Firefox• Chrome• Safari 7 and higher

Prerequisites

The following products will be installed during the installation of NV Server – if they are not already installed:

- Java Runtime Environment [JRE] 7 (32 bit) Update 25 will be installed if JRE 7 Update 24 or higher or JRE 6 Update 24 or higher is not present.
- Microsoft .NET Framework 4.0 – Full.

Upgrading to NV Server version 9.00

Before you install any HP Network Virtualization for Mobile version 9.00 components, uninstall any existing HP Network Virtualization or Shunra Network Virtualization products.

Note: Test data from previous versions of Shunra network virtualization products is not compatible with HP Network Virtualization for Mobile version 9.00. . To maintain access to test data from a previous version, do not uninstall the previous version, and install NV Server version 9.00 on a different computer.

Installing NV Server

On the NV Server computer, run the NVSetupWizard.exe setup file (as an administrator), select **NV Server**, click **Install**, and follow the on-line directions.

Note: NV Server and NV Test Manager cannot be installed on the same computer.

- During the installation, you will be required to enter a user name and password that can be used to access the NV Server. You can change both the user name and the password after installing NV Server.
- During the installation, you will be required to specify the Destination folder and the Data folder. The

NV Server application files are installed in the Destination folder. After installation, the NV Server will store all data in the Data folder. After installation, You can change the data folder, as described in ["Changing the NV Server Repository Location" on page 81](#).

Note: For better performance, make sure that the destination folder and the data folder are located on the same hard drive.

- After installing NV Server, you must reboot the NV Server computer.

Uninstalling NV Server

In the Microsoft Windows Control Panel, click **Uninstall a program**, select **NV Server**, and then click **Uninstall**.

Note: During the process of uninstalling NV Server, be sure to select to retain the data folder if you want to be able to access the data after NV Server is uninstalled.

Silent Installation of NV Server

NV Server can be installed (and uninstalled) silently.

Note:

- When performing a silent installation of NV Server, you must be logged in as an Administrator.
 - Make sure that all system requirements are met before beginning the installation.
 - You will not be notified if the silent installation fails. The installation log is located under %temp%.
- For details on how to silently uninstall NV Server, see ["Silent Un-installation of NV Server" on the next page](#).
 - For details on how to silently install NV Test Manager, see ["Silent Installation of NV Test Manager" on page 106](#).

To silently install NV Server:

1. Copy the NVServerSetup.exe file to a convenient location.
2. Click **Start > All Programs > Accessories**, right-click **Command Prompt**, and then click **Run as administrator** (to run the CMD command with elevated privileges).
3. In the Command Prompt window, navigate to the location of the file copied in step 1, and enter the

following command together with the required command line options:

```
NVServerSetup.exe /s /v"/qn command_line_options"
```

Command line options [* indicates a mandatory command line option]:

- * ADMIN_NAME=administrator username
- * ADMIN_PASS=administrator password
- DATA_FOLDER="\<path to data folder>"

The location where internal application data and user data is saved.

Default is <Common App Data folder>\HP\NV (C:\ProgramData\HP\NVServer in Win 7).

- INSTALLDIR="\<path to the installation folder>"

The location where the application files will be installed.

Default is C:\Program Files (x86)\HP\NV\

- ENABLE_REMOTE=TRUE | FALSE

Opens the port in the firewall.

Default is TRUE.

- REBOOT_IF_NEED=TRUE | FALSE

If a reboot is needed, automatically reboots the computer after installation completes.

Default is TRUE.

Example:

```
NVServerSetup.exe /s /v"/qn ENABLE_REMOTE=TRUE INSTALLDIR="\C:\HP-NV\"  
ADMIN_NAME=User12 ADMIN_PASS=pwuser1 REBOOT_IF_NEED=TRUE"
```

Note: Even if the if the REBOOT_IF_NEED=FALSE option is used during installation, the machine will need to be rebooted before NV Server is operational.

Silent Un-installation of NV Server

NV Server can be uninstalled silently.

Note: When silently uninstalling NV Server, you must be logged in as an Administrator.

For details on how to silently install NV Server, see ["Silent Installation of NV Server" on page 121](#).

To silently uninstall NV Server:

1. Copy the NVServerSetup.exe file to a convenient location.
2. Click **Start > All Programs > Accessories**, right-click **Command Prompt**, and then click **Run as administrator** (to run the CMD command with elevated privileges).
3. In the Command Prompt window, navigate to the location of the file copied in step 1, and enter the following command together with the required command line options:

```
NVServerSetup.exe /s /removeonly /v"/qn command_line_options"
```

Command line options [All the command line options are optional]:

■ REBOOT_IF_NEED=TRUE | FALSE

If a reboot is needed, automatically reboots the computer after uninstall completes.

Default is TRUE.

■ FORCE_REBOOT=TRUE | FALSE

Automatically reboots the computer after uninstall completes, whether or not a reboot is needed.

Default is FALSE.

■ DELETE_DATA=TRUE | FALSE

Deletes all stored NV Server data, including the NV Server repository.

Default is FALSE.

Example:

The following example uses the default values for all the options, so the server repository data will not be deleted, and the system will reboot if needed.

```
NVServerSetup.exe /s /removeonly /v"/qn"
```

Part 4: Licensing HP NV for Mobile Products

You need a valid license in order to use the following HP Network Virtualization for Mobile modules:

- NV Server
- NV Test Manager
- NV Analytics

In addition, you need a valid license in order to use the NV Global Library functionality in NV Test Manager.

For details on the licensing requirements and procedures, see ["Network Virtualization for Mobile Licensing" on page 125](#).

Chapter 21: Network Virtualization for Mobile Licensing

Network Virtualization for Mobile licenses are managed from the NV License Manager. The NV License Manager is installed automatically on each computer that has NV Server, NV Test Manager, NV Analytics, or NV Location Editor.

This topic includes:

Licensing Overview	125
Accessing the NV License Manager	126
Using Fixed Licenses	126
Using Floating Licenses	127
Viewing Current License Usage	129

Licensing Overview

The following licensing methods are available for the Network Virtualization for Mobile products:

- Fixed licenses
- Floating licenses
- Trial licenses

Fixed licenses

When using fixed licenses, HP sends you a license key for each computer that has a Network Virtualization for Mobile product installed (NV Test Manager, NV Agent, NV Analytics, or NV Global Library). The license is created for a specific Network Virtualization for Mobile product on a specific computer, and cannot be transferred to any other computer.

Fixed licenses are useful when you have not installed NV Server and you are therefore using a standalone installation of NV Test Manager or NV Analytics.

Floating licenses

You can use floating licenses only if NV Server is installed. When using floating licenses, the NV Server acts as a licensing server. Each NV Test Manager or NV Analytics that you install can check out licenses from the license server. When you are finished using the licenses, you return the licenses to the license server so that they can be used by other NV Test Manager or NV Analytics installations.

The advantage of floating licenses is that you can install Network Virtualization for Mobile on as many computers as you like, but you need licenses for only those computers that are actively using Network Virtualization for Mobile components.

Note: When using floating licenses, the license server still requires a fixed license.

Trial licenses

Each Network Virtualization for Mobile product is installed with a two-day trial license. The trial license gives access to all product functionality. The trial period begins the first time you log in to the product.

Caution: If you install any Network Virtualization for Mobile product on a virtual machine, do not clone the machine after the trial license has started.

Accessing the NV License Manager

You can access the NV License Manager in the following ways:

- From the Windows **Start** menu, select **All Programs > HP Software > NV for Mobile > NV License Manager**.
- From a web browser, navigate to the following URL:

```
http://<hostname>:<port>/shunra/license/
```

For example:

```
http://198.51.100.24:8182/shunra/license/
```

Note:

- If secured communication was selected when the NV Mobile components were installed, the URL begins with `https://`.
- If you used the default port during installation, the port number is 8182. To change the port, see "Changing the NV Test Manager Port" in the *NV for Mobile User Guide*.

- From within the NV Server or NV Test Manager, click the **License** link.

Using Fixed Licenses

When using fixed licenses, you must apply a license key to every computer that has one of the Network Virtualization for Mobile components installed on it.


Note: When using floating licenses, you must still apply a fixed license to the license server (see ["Using Floating Licenses" below](#) for more information).

To apply a fixed license key:

1. Open the NV License Manager on the desired computer.
2. Click the appropriate **Update license** button.
3. Click **Update via: > File**.
4. Click **Download the Product Key** and save the .c2v file in a convenient location.
5. Click [Contact HP to obtain a new license](#) to connect to the HP Licensing site, and do one of the following:
 - If you have a valid license Entitlement Order Number (EON), enter your EON to activate your license.
 - To obtain a new license, click **Contact HP Licensing** to locate a Regional Licensing Support Center.

Your license activation request will be routed to the HP licensing team for processing. The licensing team will contact you to request the .c2v file, and send you a .v2c license key file.

Note: The .v2c license key you receive from HP can be used only on the computer on which you generated the .c2v file.

6. When you receive the .v2c license file, click the folder icon  that appears to the right of the **License File** box, locate and upload the .v2c file.
7. Click **Update**. The updated license details are displayed in the NV License Manager main page.

Using Floating Licenses

When using floating licenses, licenses are held by the license server and are checked out as necessary by your NV Test Manager and NV Analytics machines. A license is checked out for a specified number of days, at the end of which it is automatically returned to the license server. A license can be returned early, if desired.

What do you want to do?

- ["Set up your license server" on the next page](#)
- ["Check out a license" on the next page](#)

- ["Return a license" below](#)
- ["Change the maximum number of days a license can be checked out" on the next page](#)

Set up your license server

The license server is installed automatically along with the NV Server. To begin using the license server, you must upload a bundle license key that includes your floating licenses. This bundle license key is a fixed license, and the instructions for uploading it are detailed under ["Using Fixed Licenses" on page 126](#). Note that this bundle license includes a fixed license for the NV Server.

Note: You apply the bundle license using the NV License Manager of the machine where the NV Server is installed.

Check out a license

To check out a license:

Note: The machine that checks out a license must have access to the license server over TCP port 1947.

1. Open the NV License Manager on the machine that needs to check out a license. For details, see ["Accessing the NV License Manager" on page 126](#).
2. Click the appropriate **Update License** button.
3. Choose **Update via: License server**.
4. In the **Local server address** field, select the machine where the license server is installed. If the license server does not appear in the list, enter its IP address.
5. In the **License duration (days)** field, choose for how long to check out the license. By default, the maximum number of days a license can be checked out is 14.
6. Click **Checkout license**. The license is checked out from the license server.

Return a license

To return a checked-out license:

1. Open the NV License Manager on the machine that needs to return a license.
2. Click the **Update License** button.
3. Choose **Update via: Local licensing server**.
4. Click **Return license**. The license is returned to the license server.

Change the maximum number of days a license can be checked out

You can change the maximum number of days that a license can be checked out. To do so:

1. Log into the computer that hosts the license server (NV Server).
2. Open the Sentinel Admin Control Center at the following URL:

```
http://localhost:1947
```

3. From the **Options** menu, click **Configuration**.
4. Click the **Detachable Licenses** tab.
5. In the **Max. Detach Duration** field, enter the maximum number of days that a license can be checked out.
6. Click the **Submit** button.

Viewing Current License Usage

If you are using floating licenses, the NV License Manager shows you the total number of available and in-use licenses, as well as a list of computers that have checked out licenses.

For a report of floating licenses for all product types, view this report on the NV Server.

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