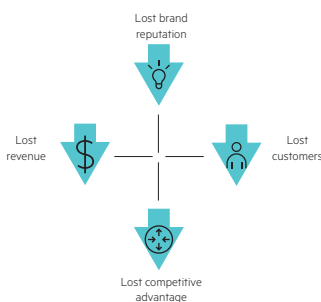


Deliver faster performing applications

HPE Network Virtualization 9.x

The costs of poor application performance



Next evolution of NV capabilities, delivered in software

In today's digital era, applications have become the driving engine behind enterprises, with organizations finding that their digital footprint represents a bigger part of their core business. In light of that, delivering well performing applications is no longer an afterthought but a business critical requirement. Yet the process of ensuring that applications perform well has evolved into an increasingly difficult challenge during the last several years, largely due to the increased complexity of modern applications.

Application complexity is one of the biggest factors affecting application performance. Today's multi-channel applications and services are a mosaic of components sourced from multiple places: data centers, clouds, and third-party services all accessed through a wide variety of clients including desktops, tablets, smartphones and a growing number of wearable devices. In addition, consumers are connecting across a wide range of network technologies, including WAN, residential Internet connections, and low-speed variable mobile connections. So while the user might see a single application, multiple moving parts must execute in the expected manner to deliver high performance and a great end-user experience.

Given this complexity, the impact of the network on application performance is substantial, and the need to test and optimize for that impact is a critical capability needed to ensure the successful delivery of fast performing applications.

The network impacts application performance in largely two main areas:

1. The networks connecting clients with an application front end impact the speed at which data can be downloaded and rendered to the user. Applications, which are not optimized against the wide range of network technologies, will fail to deliver a fast and positive end-user experience.
2. The networks connecting application components across data centers, cloud hosting, and third-party services impacts application processing time, and the application's ability to scale under high volumes of end-user load.

Testing and optimizing application performance for the above network impacts require the ability to introduce those network conditions as part of the development and test environments. This enables application teams to understand what performance would be like, under a variety of deployment scenarios across a multitude of networks, ahead of time. Once performance is predicted, developers need insight into the root cause of performance bottlenecks, so they can address those ahead of time and ensure that the rolled out application is optimized for its target network environment.

All those capabilities and more are provided with the latest release of HPE Network Virtualization (NV) 9.x. HPE NV 9.x is a comprehensive solution for delivering network virtualization capabilities to support even the most complex testing scenarios driven by today's modern application architecture.



HPE Network Virtualization
 Learn how you can virtualize real-world network conditions in your software testing environment.
[Read the data sheet.](#)

HPE NV 9.x delivers powerful capabilities

Traditionally, testing and optimizing application performance for the network impact on both client front end and application back end required either a hardware-based solution or a combination of hardware- and software-based network virtualization solutions.

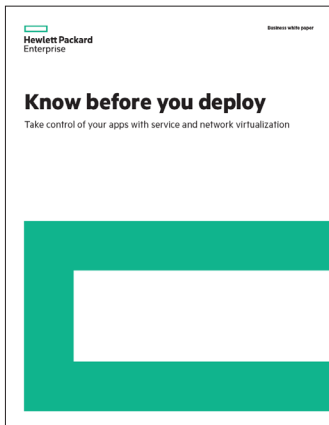
While hardware-based solutions provide a great deal of capability for application delivery teams, they are typically not very flexible and are difficult to deploy, especially in rigidly controlled environments such as managed data centers and third-party clouds. This makes them hard to use in an agile way and are less suitable for today’s modern application architectures. With NV 9.x, customers can benefit from the flexibility of deploying a software NV solution that supports most of the capabilities previously delivered only through an appliance, while allowing for more test coverage and an easier deployment process. Table 1 provides comparison details capabilities covered in software compared to what was before only possible with an NV physical appliance.

Table 1: Capabilities in HPE NV as compared to physical NV appliance

	Physical NV appliance	HPE NV 9.x
Virtualize multiple network locations	✓	✓
Control the NV environment and launch tests remotely via a Web browser	✓	✓
Control the NV environment and launch tests remotely via a smartphone or tablet mobile Web app		✓
Control user access		✓
Automate the tests via robust Web services APIs	Partially	✓
Easily deploy in difficult-to-access environments such as managed data centers and cloud hosts		✓
Introduce network conditions between virtual machines (VMs) on the same physical server		✓
Deploy as a proxy to test mobile applications		✓
Deploy as a software client to impact multiple workstations in different environments		✓
Test the quality of VoIP and video streaming	✓	✓
Support 1Gbps and 10Gbps network interfaces	✓	✓
Test application performance prior to a data center relocation and consolidation	✓	✓

One software product with numerous supported use cases

HPE NV 9.x was built with the required flexibility to support modern and complex application topologies in mind. Whether you need to introduce network conditions to test mobile applications, desktop applications, server-to-server communication, third-party cloud services or even between VMs, NV 9.x can be configured to support that complexity. The following examples demonstrate some of the common supported use cases.



Know before you deploy
HPE service and network virtualization creates real-world conditions for testing business applications and verifying that they will perform to the expectations of end users.

[Read the data sheet](#)

Multi-flow emulation of numerous networks via software appliance

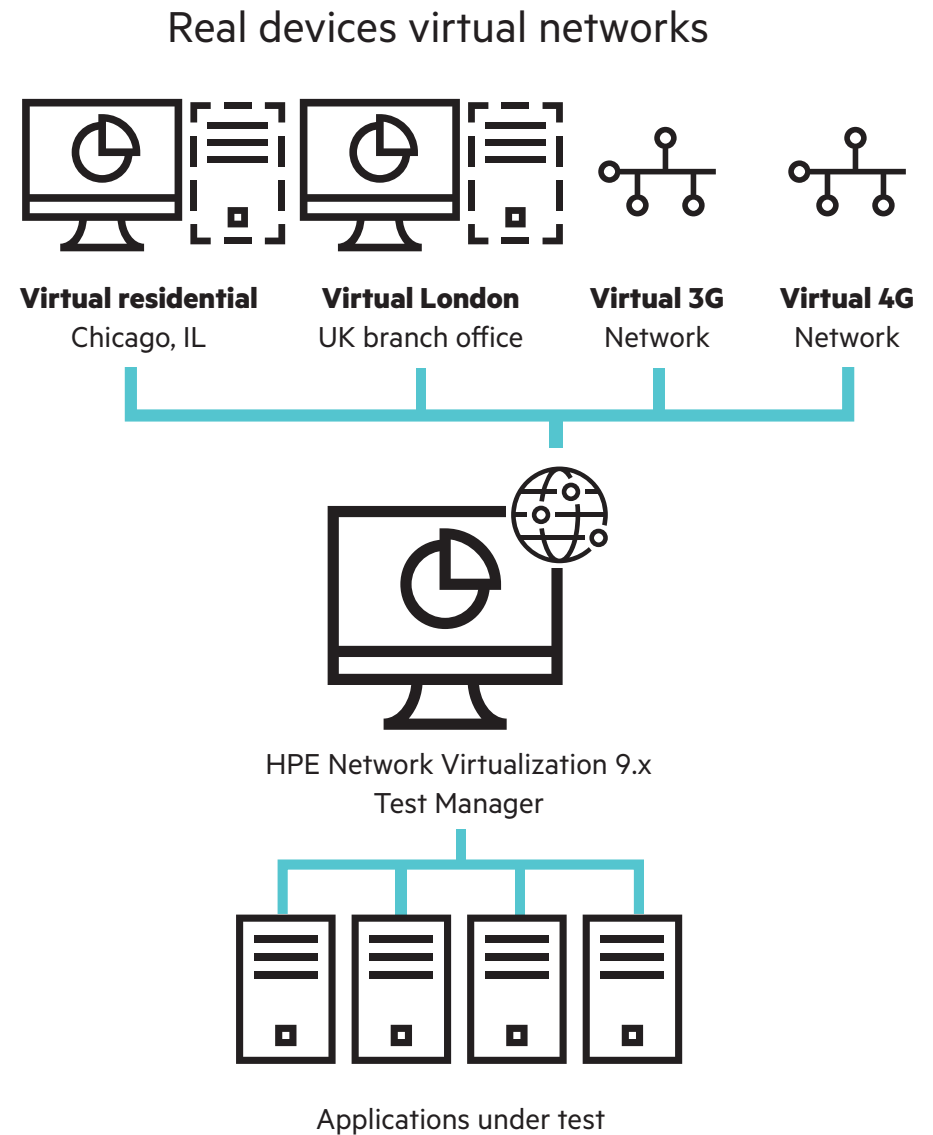


Figure 1: NV configured as a software NV appliance allowing real test devices to virtualize their network conditions and test applications for mobile and remote network conditions

An enterprise-ready user virtualization capability with HPE Service Virtualization, and adding HPE Network Virtualization, enables you to mitigate your risk and go to production with confidence, while lowering development, testing, and infrastructure costs and speeding up release cycles.



Profiles				
Profile name ^	Date created	Created by	Date modified	Modified by
+ 2.5G Busy (predefined profile)	Thursday, January 08, 2015 3:57:59 PM		Thursday, January 08, 2015 3:57:59 PM	
+ 3G Busy (predefined profile)	Thursday, January 08, 2015 3:57:59 PM		Thursday, January 08, 2015 3:57:59 PM	
+ 3G Good (predefined profile)	Thursday, January 08, 2015 3:57:59 PM		Thursday, January 08, 2015 3:57:59 PM	
+ 3G Typical (predefined profile)	Thursday, January 08, 2015 3:57:59 PM		Thursday, January 08, 2015 3:57:59 PM	
+ 4G Good (predefined profile)	Thursday, January 08, 2015 3:57:59 PM		Thursday, January 08, 2015 3:57:59 PM	
+ Chicago IL Residential Cable	Friday, January 09, 2015 11:27:05 AM	admin1	Friday, January 09, 2015 11:27:05 AM	admin1
+ London UK Branch Office	Friday, January 09, 2015 11:26:25 AM	admin1	Friday, January 09, 2015 11:26:25 AM	admin1

Figure 2: NV Test Manager is controlled through a Web-based interface, allowing tests to be configured and operated remotely

Flow 1

Client Gateway WAN Server Gateway Server

Latency and Packet Loss

Packet Effects

Link Faults

Latency Curve

- Fixed
- Uniform distribution
- Normal distribution
- Linear

Min: 0 ms (0-8000)

Max: 50 ms (0-8000, Min <=)

Graph duration: 1 sec (0-65535)

Packet Loss

- No packet loss
- Random loss
- Periodic loss
- Burst loss
- Gilbert-Elliott loss

Loss probability: 1.00 % (0.01-99)

Number of lost packets in every burst:

Min: 1 packets (1-65534)

Max: 1 packets (1-65534, Min <= Max)

OK Cancel

+ Add Flow

Figure 3: NV Test Manager includes an easy-to-use interface to configure complex network performance scenarios

70%

of mobile transaction response is spent on the network. Why are you ignoring it?

Virtualize network conditions between VMs on the same physical infrastructure

When building development and test environments, VMs have been heavily leveraged for years. Now, with HPE NV 9.x, developers and testing staff can quickly capture and recreate network conditions from production in the development and test environments, accurately recreating the conditions that applications will be exposed to, even if all the workstations and servers are VMs on the same physical server.

Applications under test—VMs 1–4

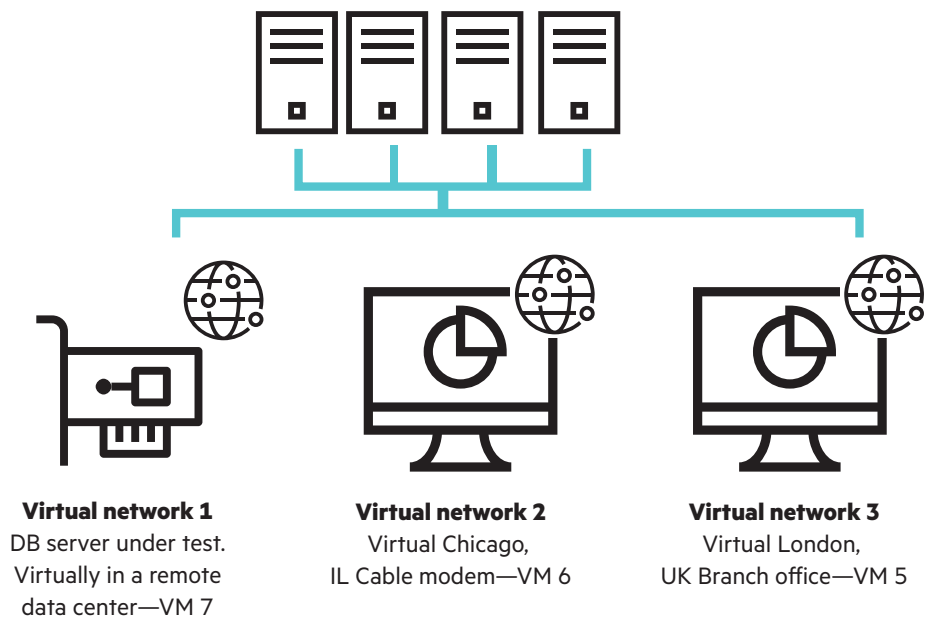


Figure 4: HPE NV deployed on VMs, creating virtual networks between clients to servers, as well as servers to servers within the same physical server

295

Average ROI with breakeven at three months

\$514,

800

First-year savings by avoiding performance-related production incidents

Built-in analytics with automated application performance improvement recommendations

NV 9.x ships with a powerful analytics engine, which delivers front-end performance analysis and automated optimization recommendations. Best practice rules for application optimization, delivered automatically, enables developers to improve application performance prior to production deployment.

The screenshot displays the NV Analytics Report interface for a test named "Sample Get Started Test" on a "3G Busy" scenario. The report shows a total score of 63/100, resulting in a grade of D. The interface includes a navigation menu on the left with options like "Network time", "Duration", "Summaries", "General Analysis", "HTTP Analysis", "Optimization", "Resources", "Errors", and "Endpoint Latencies". The main content area is titled "Optimization Recommendations" and lists several issues with their violation counts and point deductions:

- Make fewer HTTP requests (iPhone): 68 violations, -7 points
- Avoid URL redirects: 22 violations, -5 points
- Use fewer domains: 15 violations, -5 points
- Don't download the same data twice: 9 violations, -4 points
- Try to reduce the size of the cookies: 17 violations, -3 points
- Add long term headers expiration dates: 57 violations, -3 points
- Reduce the size of your images (iPhone): 7 violations, -2 points
- Leverage proxy caching: 76 violations, -1 point

Additional details include a note about image optimization: "GIF images which are non-animated usually can be converted to PNG8", "Images which are bigger than 1/4 of the screen size. Its size should probably be reduced", and "PNG images which are small enough to be converted to PNG8". A specific URL is provided: <http://www8-hp.com/us/en/images/I/common/s-15px-hpe.png>. A summary note states: "Converting gif to png, and converting all pngs to png8 will reduce image size significantly and most likely will have no visible effect."

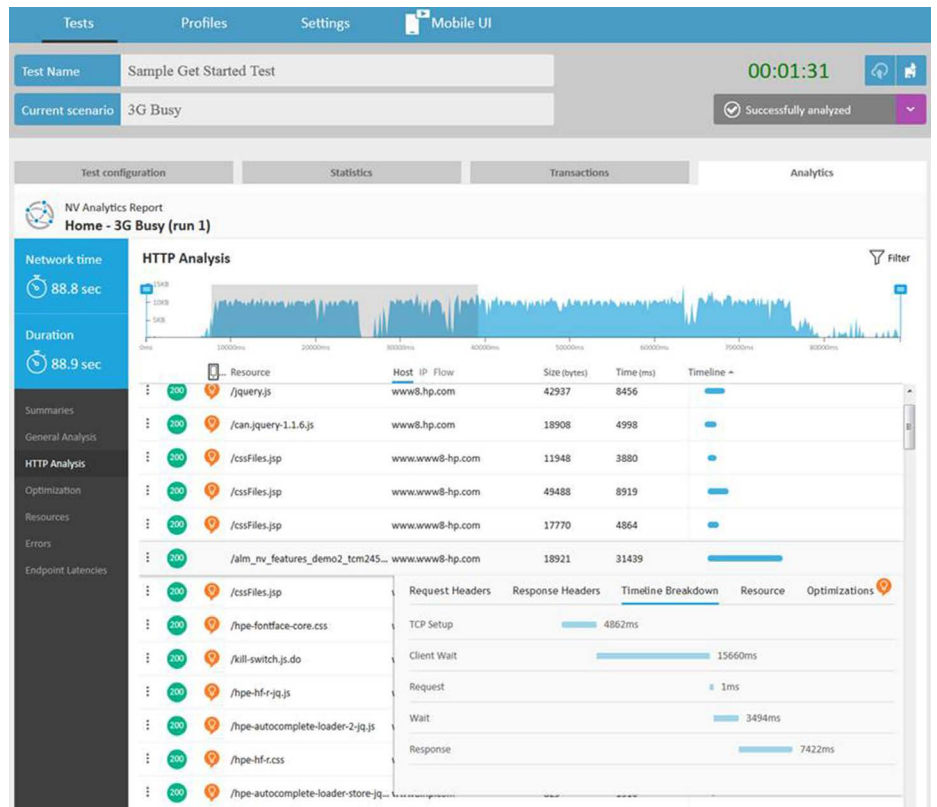
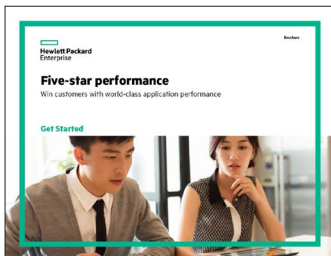


Figure 5: The powerful analytics engine within NV



Seven ways to fail



Five-star performance

Table 2: HPE NV specifications

Capability	Parameters	Granularity
Latency	0–8,000 ms	1 ms
Bandwidth	14.4 Kbps–1 Gbps	1 Kbps
Packet loss	0–100%	0.1%
Jitter	0–8000 ms	1 ms
Packet reorder, duplication, fragmentation	✓	
Supported OSs	Windows 7, 8, 8.1, 10, 2012, 2012R2, 64-bit RHEL/CentOS 6.7 and up, 64-bit Ubuntu 10.04 and up, 64-bit	
Number of virtual locations per test manager	Up to 100 based on license	1
Playback of network capture recordings	✓	Up to 15 minutes of playback
Import mobile profiles from the global library	✓	
Open API	RESTful Web Services	
Analysis and optimization recommendations	HTTP, HTTPS, native iOS, native Android H264 over HTTP	

Learn more at hpe.com/software/nv



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