

Network Virtualization

Your business depends on your applications. So your mobile and Web apps have to work right—and perform well. But testing application performance in your lab doesn't tell you what users will experience when you deploy the app over the production network.

Product Highlights

Micro Focus® Network Virtualization software lets you test application performance under real world network conditions, identify bottlenecks, and optimize the code—before you deploy it.

Network Virtualization software allows you to discover and capture real-world network performance conditions from your production network, recreate network conditions in your lab during application testing, and optimize the applications to improve performance before you deploy into production.

Discover Network Conditions

Your network is complex and continually evolving. So the first step in network virtualization for software performance testing is to discover how network constraints affect communication between end users, the application, and its dependencies.

Network Virtualization Global Library

Start with the Network Virtualization Global Library. It's a library of ready-to-use mobile and broadband network conditions providing real-world Internet and last-mile condi-

Key Capabilities

With Network Virtualization software you can:

- Enable each load generator to emulate a different network location's transaction response time, and reduce or eliminate reliance on remote load generators
- Aggregate test results into a single database for ease and completeness of analysis
- Extend performance testing scripts with a single click
- Automate reporting and analysis for performance engineers, line of business owners, and other business constituents
- Integrate in VuGen and controller

Micro Focus Network Virtualization Supports

- Windows 7/8/10/2008/2012 operating systems and 64-bit for all platforms
- Linux Ubuntu and Red Hat operating systems (Network Virtualization 9.x product only)
- Bandwidth emulation up to 100 Mbps or unlimited
- Granular IP filtering (by protocol, port)
- Expanded packet capture (up to 1 GB)
- Micro Focus Network Virtualization Global Library
- Micro Focus Network Capture

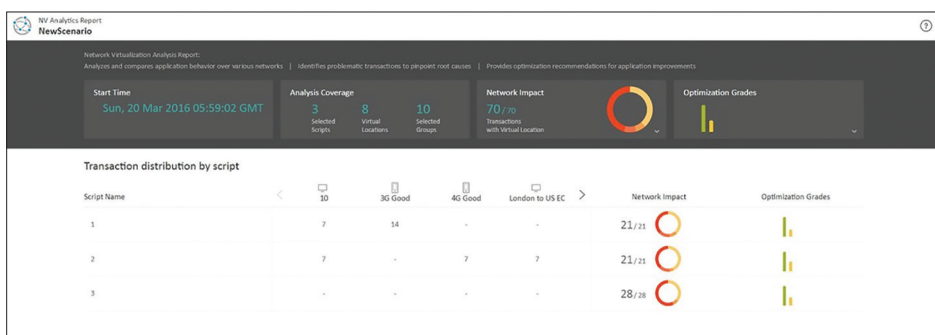


Figure 1. Analyst Report

Accurate Measurements

Network Virtualization simulates real-world network conditions to enable accurate analysis of user response time and throughput.

tions for thousands of cities worldwide. You specify a server and client location to obtain sample network conditions connecting those locations.

The data in the library represents the results of end-user network tests executed globally in both desktop browsers and on tablets and smartphones. The raw data comprises results from more than 5 billion end-user tests covering up to 6000 client locations and up to 100 server locations. They are categorized based on the type of network connection and other characteristics.

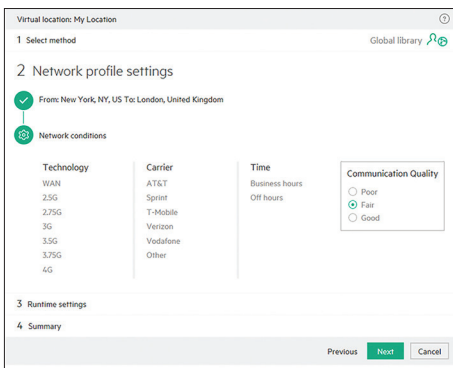


Figure 2. Virtual Location in the Global library

Network Capture Server

Micro Focus Network Capture—a component of Network Virtualization software—lets you easily and accurately record, import, and replay real-world network performance behavior, including conditions such as latency, packet loss, and available bandwidth. It is accessed remotely using a browser.

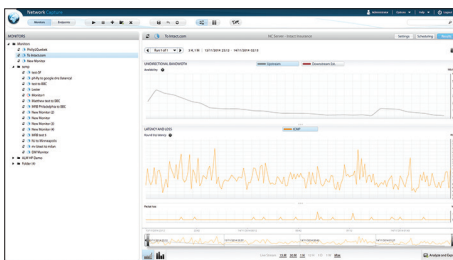


Figure 3. Network Capture

With Network Capture you record network performance conditions from clients or servers to

other targets. You can record and profile conditions between data centers, remote offices, and remote workers and then replay them with Network Virtualization software for testing. The network conditions typically cover client-to-server connections for applications such as Web, SAP, and virtual desktop infrastructure as well as server-to-server environments.

Network Capture Express Mobile App

The Network Capture express mobile app is available free for both iOS and Android platforms from the appropriate app store. It enables you to test latency, packet loss, and bandwidth on a mobile device and then share the profile for use in Network Virtualization software tests. You can configure the app to test for between 1 and 15 minutes, and it will repeatedly test latency, resulting packet loss, and download bandwidth in cycles.

The app sends ICMP ping requests to the remote server to measure latency and loss. Bandwidth measurements use servers hosted in the Internet to download data to the mobile device. Since the mobile network bottleneck is usually located in the last mile between the mobile device and the cellular provider, this provides a good approximation of the bandwidth limits of the connected network.

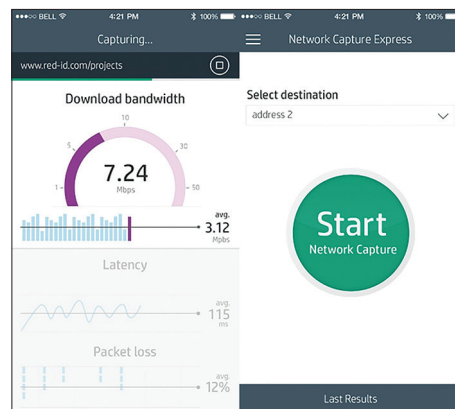


Figure 4. Approximation of the bandwidth limits view

Key Benefits

Web, mobile, and cloud network conditions are dynamic and vary by provider, location, and time of day. So your test environment must accurately recreate multiple network scenarios to analyze application performance and the effect of network conditions on different user populations. Network Virtualization software can virtualize real-world network conditions including bandwidth, latency, jitter, and packet loss on multiple platforms alongside all test activities.

Network Virtualization

Network Virtualization software integrates seamlessly with Micro Focus LoadRunner, Micro Focus Performance Center, Micro Focus Mobile Center, Micro Focus StormRunner Load, and Micro Focus Unified Functional Testing software to improve the accuracy of load, performance, and functional tests. It accelerates application performance testing across WANs, the Web, mobile networks, and the cloud.

The solution's unique interface, integrated within the familiar LoadRunner, Performance Center, and StormRunner Load GUIs, makes it easy to configure and use. Network Virtualization software requires no script editing and places no limits on test scheduling. In addition, test results and data are automatically stored and organized by emulated location for precise and actionable analysis.

Load generators can emulate multiple locations, each with a unique set of network conditions. That lets you simultaneously emulate multiple user populations and more accurately recreate the real-world conditions affecting the end-user experience.

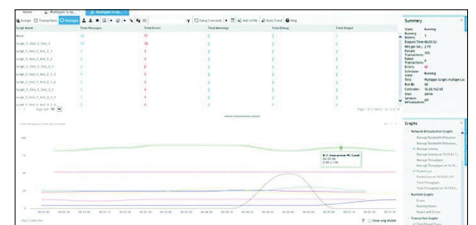


Figure 5. Performance Center dashboard

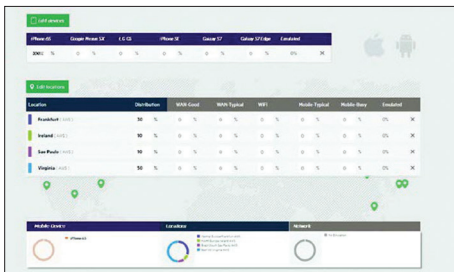


Figure 6. StormRunner dashboard

Mobile Application Testing

Network Virtualization software works seamlessly with Mobile Center to accurately verify the performance mobile users will experience when using an app on the real mobile network. Mobile devices under test are connected via Wi-Fi and send mobile traffic via Network Virtualization software using a proxy. Mobile Center includes simple definitions of the network performance conditions to be simulated for each test device independently, and it manages the API calls to Network Virtualization software to apply the conditions during testing across multiple mobile devices simultaneously.

Flexible Deployment Options

In addition to being integrated with the Micro Focus performance test products and running on the load generators, Network Virtualization software can also be deployed on the system hosting the application under test or in virtual appliance mode on a dedicated physical server. In virtual appliance mode, network traffic to and from the application is routed through the server hosting Network Virtualization software which applies the specified network impairments to the actual traffic.

Location-Aware Analytics

Network Virtualization software provides deep-dive analytic capabilities and location-specific network performance information. It helps you identify poorly performing business transactions and the root cause of

performance issues. It provides service level and performance compliance reporting, and it is closely integrated with Micro Focus performance test products.

Key Features

While Network Virtualization software supports accurate prediction of the networked performance of applications before you deploy them, Network Virtualization Analytics lets you drill down into the root cause of performance issues, and it provides recommendations for optimizing Web and mobile apps.

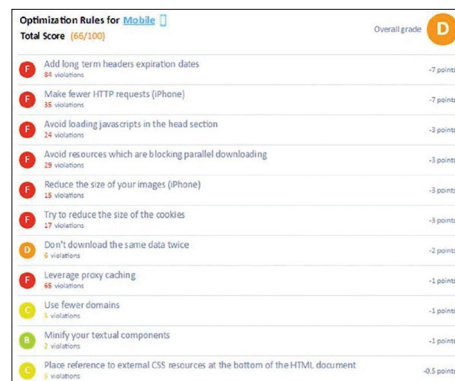


Figure 7. NV Analytics Report

Web and mobile analysis: Network Virtualization Analytics enables rapid analysis of transaction response times.

Web and Mobile Applications

In Network Virtualization Analytics, a waterfall diagram visualizes individual resource sizes and load times breaking down transaction response times, so you can quickly identify areas for optimization. These deep-dive capabilities show you how the end user experiences an application or page load and provide insight into client-network server timing by sub transaction.

Whether you are analyzing Web-based, mobile Web-based, or native mobile applications, this

information is critical to understanding the end user's perception of performance and where you should focus your optimization efforts.

Automated Optimization Recommendations

Micro Focus Application Performance Analytics provides a transaction scorecard.



Figure 8. NV Analytics Report Optimization Recommendation view

In addition to providing extensive Web and mobile analysis, Network Virtualization Analytics delivers a transaction performance scorecard that automatically grades application performance and offers custom performance optimization suggestions based on industry accepted and additional proprietary rule sets.

These performance optimization suggestions help improve the load time of mobile-optimized sites by at least 20 percent and of standard websites by a typical level of 44 percent when viewed on an iPhone. With comprehensive analysis capabilities, you can quickly and reliably identify bottlenecks and get specific recommendations for performance optimization to help you deliver applications that live up to the expectations of your users.

Transaction Analysis

Obtaining enhanced performance information on each transaction enables quick isolation of the root cause of performance problems. Network Virtualization Analytics includes the following reports to enable rapid analysis and problem diagnosis:

- The **transaction analysis report** shows how resource intensive a transaction is and enables comparison with other

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applications that are consuming the same network resources.

- The **bandwidth bottleneck report** identifies throughput and bandwidth utilization for each transaction.
- The **network and application error report** highlights all application-related errors and isolates problems such as caching issues, unutilized buffer size, and other functional problems for remediation.
- The **breakdown analysis** of infrastructure shows the elapsed time an application spends on the server, the client, and the network, helping to pinpoint bottlenecks in the application infrastructure.

Transaction Management

With Network Virtualization Analytics, it is easy to incorporate packet capture buffers into automated test sessions and correlate business transactions with the resulting traffic traversing the network. This transaction data

is captured in an industry-standard format for further analysis with Network Virtualization, or it can be easily accessed directly from the LoadRunner or Performance Center scripting interface VuGen.

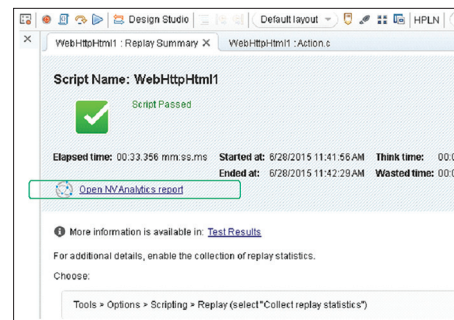


Figure 9. Test Results

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