Brocade Vyatta 5600 vRouter

NFV Routing and Security Performance Benchmark on Mid-Range Cloud Servers

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1 EXECUTIVE SUMMARY

NFV (Network Functions Virtualization) promises to enable rapid innovation by liberating networking functions from proprietary hardware platforms. Core to the success of NFV is understanding the level of performance that can be achieved with software equivalents of hardware appliances. SDNCentral, with the help of its test lab partners, set out to validate the promise of NFV by conducting performance benchmark tests on real-world COTS (commercial off-the-shelf) mid-range server platforms. In this first of a series of reports commissioned by Brocade and conducted by SDNCentral, we will investigate the performance of Brocade Vyatta 5600 vRouter on x86 server platforms commonly found in public and private cloud environments.

The goals of this testing are to establish a baseline of the Brocade Vyatta 5600 vRouter running on a typical x86 COTS server platform, and to validate its L3 forwarding performance, route control-plane scalability, and firewall application performance in a setting relevant to data centers within enterprise, cloud service providers, and telecommunications providers.

Table 1 summarizes the Vyatta 5600 vRouter functions, scalability goals, and key highlights of the validation results on a 2-RU server fitted with dual 10-core Xeon processors (E5-2670v2@2.50GHz).

Validation Categories	Vyatta 5600 NFV Functions	Performance Goals	Finding and Highlights
L3 Forwarding Performance	• Core L3 dual-stack forwarding data plane	• Aggregate 80Gbps, 60 million packets per second L3 forwarding performance on modest COTS computing node • Maintain forwarding performance with IP diversity and up to 2 million flows in forwarding information base (FIB)	**Aggregate Port L1 Rx Rate** • 70 million packets per second with 64-byte frames • 80Gbps bi-directional traffic with 256- to 1518-byte frame sizes • More than 75Gps of throughput under many scenarios including IMIX frame sizes and IPv4/IPv6 dual-stack • Performance maintained with up to 2 million flows

Route Scalability	• Service aggregation routing	• Routing information base (RIB) scalability up to millions of routes • Across one or many BGP peers	• Scalability up to 8 million routes from a single peer or up to 8 peers
Firewall Application Performance	• Stateful firewall • Stateless firewall (ACLs)	• Stateful connection handling in high-subscriber/user scenarios • High-fidelity application quality of experience (QoE)	**Stateless Firewall** • 200K sessions/sec • 2.5 million concurrent sessions **Stateful Firewall** • 50K sessions/sec • 1 million concurrent connections Application QoE maintained with stateless/stateful firewall scenarios

Table 1. Summary of Test Results

In the tests conducted by SDNCentral testing lab partners, the Brocade Vyatta 5600 vRouter platform successfully demonstrated dual-stack IPv4 and IPv6 L3 forwarding performance that is comparable to many traditional hardware appliances under the scenarios tested. L3 forwarding for a dual-socket CPU compute node was measured with an impressive aggregate system performance of 70 million packets per second and 80Gbps rates over a wide set of IP conditions.

Furthermore, the validation successfully demonstrated that the Brocade Vyatta 5600 can support key routing and security NFV functions with route learning up to 8 million routes per server (4 million per Vyatta 5600 instance on single dual-socket compute node), as well as stateful connection handling of 1 million concurrent connections while maintaining a rate of 50K new sessions/second.

The validation results demonstrate that the Vyatta 5600 can deliver NFV cloud service aggregation routing and state-less/stateful firewall security functions at a high-level of performance on real-world servers commonly found within enterprise data centers, cloud service providers, and telecommunication carrier data centers.

Request a Copy of the Complete Report

If you are an end-user who can benefit from Brocade's Vyatta vRouters on your cloud and NFV infrastructure, sign up to request a your copy of the full report by visiting **nfv.io/1v4gQ23**