

# Telefónica

## EXECUTIVE SUMMARY

Brocade transforms data center networking with open, virtual, and automated solutions that empower organizations to maximize their investments for the New IP

### Challenge

Deliver virtualized solutions efficiently and consistently and establish new benchmarks for the deployment and performance of Network Functions Virtualization (NFV) solutions for the world's largest telecommunication and service providers

### Solution

- Brocade vRouter with Intel Xeon processor-based servers and Data Plane Development Kit (DPDK)
- Runs on common off the shelf servers based on Intel's x86 architectures

### Results

- Achieved 80 Gbps on a Commercial Off-the-Shelf (COTS) x86 Intel architecture-based system
- Supported all of the server's available ports at line rate
- Easily deployed from a memory stick and completed performance tests in less than two hours

## Putting NFV to the Test

Telefónica, one of the largest telecommunications companies in the world, has a significant presence in 24 countries and a customer base that amounts to more than 313 million accesses around the world. As Telefónica transforms into a "Digital Telco" with an innovative portfolio of digital solutions in addition to its best-in-class mobile, fixed, and broadband networks, the company is constantly looking for new ways to meet the needs of customers while growing revenue.

As a large telecommunications company, Telefónica recognizes the advantages that virtualized solutions can bring to its customers. By driving down the costs of operation and reducing time to market for new services, Network Functions Virtualization (NFV) creates tremendous opportunity, both for customers and for telcos, who can package services in a new and highly customizable way. However, the challenges associated with virtualized services, including performance bottlenecks, high costs of operation, and lengthy deployment schedules, can impact the momentum of NFV deployment.

Telefónica partnered with Brocade, Intel, and Red Hat to demonstrate that a virtualized environment can not only deliver the performance a telecom provider demands, but can do so without requiring significant customization, commitment to an inflexible proprietary solution, or hefty deployment cycles.

The companies joined together to test a solution within the Telefónica NFV Reference Lab Framework, which is aimed at helping an ecosystem of partners and Network Equipment Providers (NEPs) test and develop virtual network functions

along with upper service orchestration layers.

The tests included the Brocade 5600 vRouter on a Commercial Off-the-Shelf (COTS) Intel architecture-based server that was deployed within a Red Hat KVM environment with Kernel-based Virtual Machine (KVM) hypervisor, well-regarded for industry-leading performance and configuration options, and Open Flow-enabled switching equipment.

"In less than two hours, we deployed the Brocade 5600 vRouter from a memory stick and completed our performance

tests in our NFV Reference Lab," said Francisco-Javier Ramón, Head of Telefónica NFV Reference Lab. "These results are allowing us, as network operators, to aggressively change our perspective regarding what is possible with software-driven networking in order to accelerate the adoption and deployment of these revolutionary technologies."

The Brocade 5600 vRouter achieved 80 Gbps on the Intel Xeon processor-based server, while being deployed as a single Virtual Machine (VM) and supporting all of the server's available ports at the line rate. The tests proved that the performance barrier from the NFV adoption conversion could be removed, enabling the expansion of capabilities across the service provider network.

In addition to Brocade vPlane® technology, the Brocade 5600 vRouter takes advantage of Intel Xeon processor-based servers and the Data Plane Development

Kit (DPDK) to achieve the performance required by the demanding networks of the world's leading telecommunication and service providers.

"DPDK takes a completely flexible software-centric approach to packet processing, enabling extremely high packet processing performance on industry-standard high volume servers," explains Pravin Kantak, Product Marketing Manager, Intel. "In this community driven DPDK program we wanted to prove that performance advantages delivered by DPDK transcend seamlessly from conventional physical appliance designs to the virtual appliance designs. The remarkable data plane performance achieved by Brocade 5600 vRouter in the independent settings made the point."

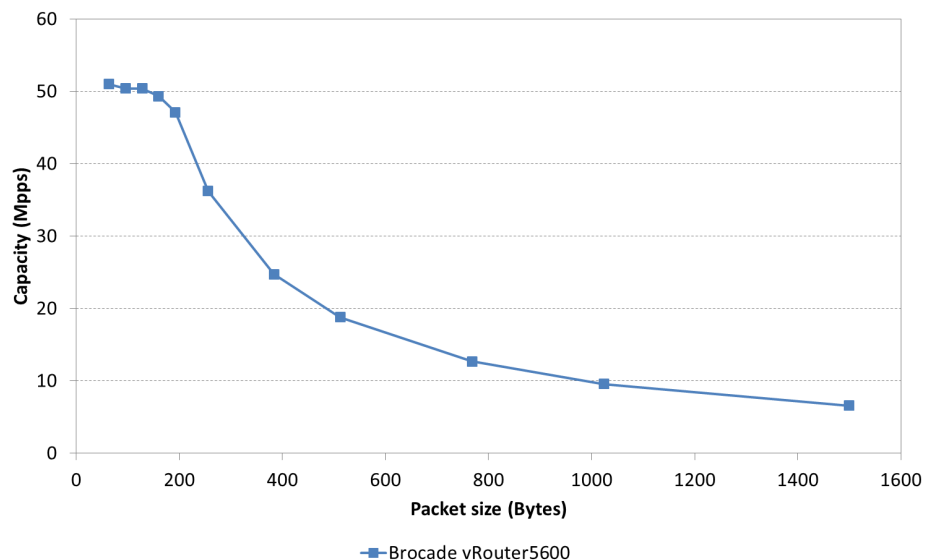


Figure 1. Global Switching Capacity.

## Quick Glance:

- The Brocade 5600 vRouter is a router VNF, intended to support line rate speed in a fully virtual environment
- DPDK based data plane
- Linux/Zebra based control plane
- Red Hat KVM environment with kernel-based Virtual Machine (KVM) hypervisor
- Delivered 80 Gbps line rate at 192Bpackets using 46% CPU on two sockets server
- Memory stick to deployment in less than two hours
- Global switching capacity per COTS Server (using 40M flows, 512K routes, E5-2697 v2 dual socket- 8x10 GbE ports on four Intel X520 NICs)

How this will impact the services a service provider can offer to customers? Significantly.

"The high level of performance and ease of operation is a powerful combination," notes Antonio José Elizondo Armengol, Head of Network Virtualization Technology & Strategy at Telefónica Global CTO unit. "With the Brocade 5600 vRouter we demonstrated we have the potential to significantly simplify operations and reduce costs by implementing NFV in an open environment without having to customize the solution. Add that to the ease of deployment, and the results prove that performance is no longer a barrier to NFV adoption."

For more information, visit [www.brocade.com](http://www.brocade.com).

## WHY BROCADE

*"With the Brocade 5600 vRouter we demonstrated we can build an implementation of NFV in an open environment and achieve results without having to customize the solution. Add that to the ease of deployment, and the results prove that performance is no longer a barrier to NFV adoption."*

— Antonio José Elizondo Armengol, Head of Network Virtualization Technology & Strategy at Telefónica Global CTO unit

**Corporate Headquarters**

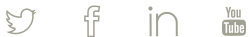
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