



# NFV Infrastructure Metrics for Monitoring Virtualized Network Deployments

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## Abstract

Service Providers are adopting advanced network virtualization technologies like SDN and NFV to benefit from time-to-market flexibility and service agility. Virtual Network Functions (VNFs) may be deployed across diverse, multi-vendor execution environments with variable configuration options and capabilities impacting performance and capacity. This report presents an overview of existing performance metrics/KPIs to assist in dimensioning the NFV infrastructure to meet the needs of the NFV applications it supports.

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## 1. Introduction

Driven by the requirements for agile service delivery Service Providers (SPs) are adopting Network Function Virtualization (NFV) and Software Defined Networks (SDN) technology to deploy a wide range of network functions and applications across cloud, mobility, enterprise, and core and edge network services. The supporting Infrastructure for these technologies includes industry standard computing systems, storage systems, networking systems, virtualization support systems (such as hypervisors), and management systems for the virtual and physical resources. This approach delivers significant improvements in service velocity and network flexibility while also reducing costs.

There are many potential suppliers of NFV Infrastructure components and significant flexibility in configuring these components for best performance. There are also many potential suppliers of Virtual Network Functions (VNFs), adding to the combinations possible in this environment. With this added flexibility, SPs must work to ensure that their infrastructure is correctly dimensioned and that resources are matched to services so that the performance requirements of all services are met.

This report provides a reference framework for NFV deployment planning that aims to assist in all aspects of ensuring, across a range of key performance indicators (KPIs), that the NFV Infrastructure is dimensioned to meet the needs of the NFV applications it supports. The framework will address:

- The characterization of different service types in terms of their critical KPIs and the parameters that describe their infrastructure requirements.
- An analysis of how to measure KPIs to assess the resource utilization and headroom on operational NFV infrastructure.

## 2. Infrastructure Resource Requirements across Service Types

The computational and networking requirements across VNFs can vary significantly depending on the type of network function. For example, latency and packets-per-second rate are key factors for VNFs that require packet-forwarding performance (i.e., firewalls and routers). Other network functions such as Session Border Controllers (SBCs) are bounded by network and compute resources for session state management. Sometimes, different sub-functions can be combined to form a higher-level, multi-

component VNF, such as a virtual router. Each of these components can exhibit different performance impacts and scalability requirements.

In the table below, several different VNF service types are examined to identify key infrastructure requirements. For any specific type of VNF deployed there are fixed and limited resources that must be tracked and trended to understand the capacity and performance of those functions.