Hewlett Packard Enterprise

HPE Virtual HSS

Scale your mobile core

Insights

- It's essential to be more innovative, launch services faster, and reduce costs.

- Networks functions virtualization is the key.

- With HPE vHSS, you can do it.

Join the network vision

As a communications service provider (CSP), it's essential in today's competitive environment to become more innovative, launch services faster, and reduce your cost structure while facing over-the-top providers. This new network vision strategy supports emerging business segments—those with a high return on investment potential, and also a higher risk level.

Erect and fold services—they're key

Networks functions virtualization (NFV) enables CSPs, like you, to radically decrease infrastructure capital and operational costs—while providing a more agile environment to introduce new services more quickly and at far less cost than previous network infrastructures.

In an environment that requires fast scaling, while leveraging standard hardware platforms and common virtualization technology, Hewlett Packard Enterprise (HPE) Home Subscriber Service (HSS) is the answer. As the core of your network, this NFV-enabled master user database holds subscription-related information and subscriber profiles, performs user authentication and authorization, and provides information about subscribers' location and IP information. And given its critical function to the network, it satisfies high-availability requirements and has a set of interfaces and features that support a diverse and evolving services ecosystem.

In a recent survey commissioned by HPE through Coleman Parkes Research, it was revealed that the speed of erecting and folding services, including their subscriber profile, is a key motivation of CSPs around the world to evaluate and deploy NFV-based solutions.[1]

[1] "Survey of NFV priorities for services provider CIOs and," Coleman Parkes Research, January 2014

When selecting the most important business driver for
adoption of NFV, driving new revenue is at the forefront.
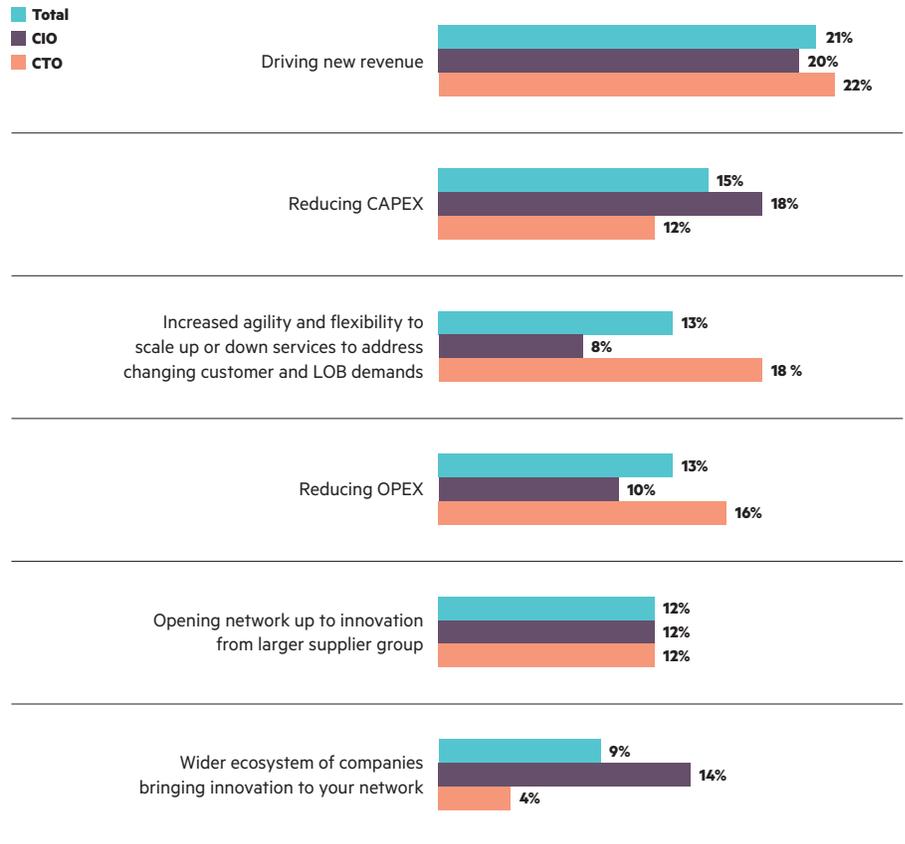
Total
CIO
CTO

Driving new revenue
- Total: 21%
- CIO: 20%
- CTO: 22%

Reducing CAPEX
- Total: 15%
- CIO: 18%
- CTO: 12%

Increased agility and flexibility to scale up or down services to address changing customer and LOB demands
- Total: 13%
- CIO: 8%
- CTO: 18 %

Reducing OPEX
- Total: 13%
- CIO: 10%
- CTO: 16%

Opening network up to innovation from larger supplier group
- Total: 12%
- CIO: 12%
- CTO: 12%

Wider ecosystem of companies bringing innovation to your network
- Total: 9%
- CIO: 14%
- CTO: 4%

Figure 1: Most important business driver for NFV adoption

HPE Virtual HSS (vHSS)—the virtual version of HPE HSS—provides a software-only HSS function using a cloud environment. With this latest innovation—an industry first—Hewlett Packard Enterprise maintains its technology leadership and leverages a comprehensive HPE program, called HPE OpenNFV, to adopt NFV and support its introduction into the market place.
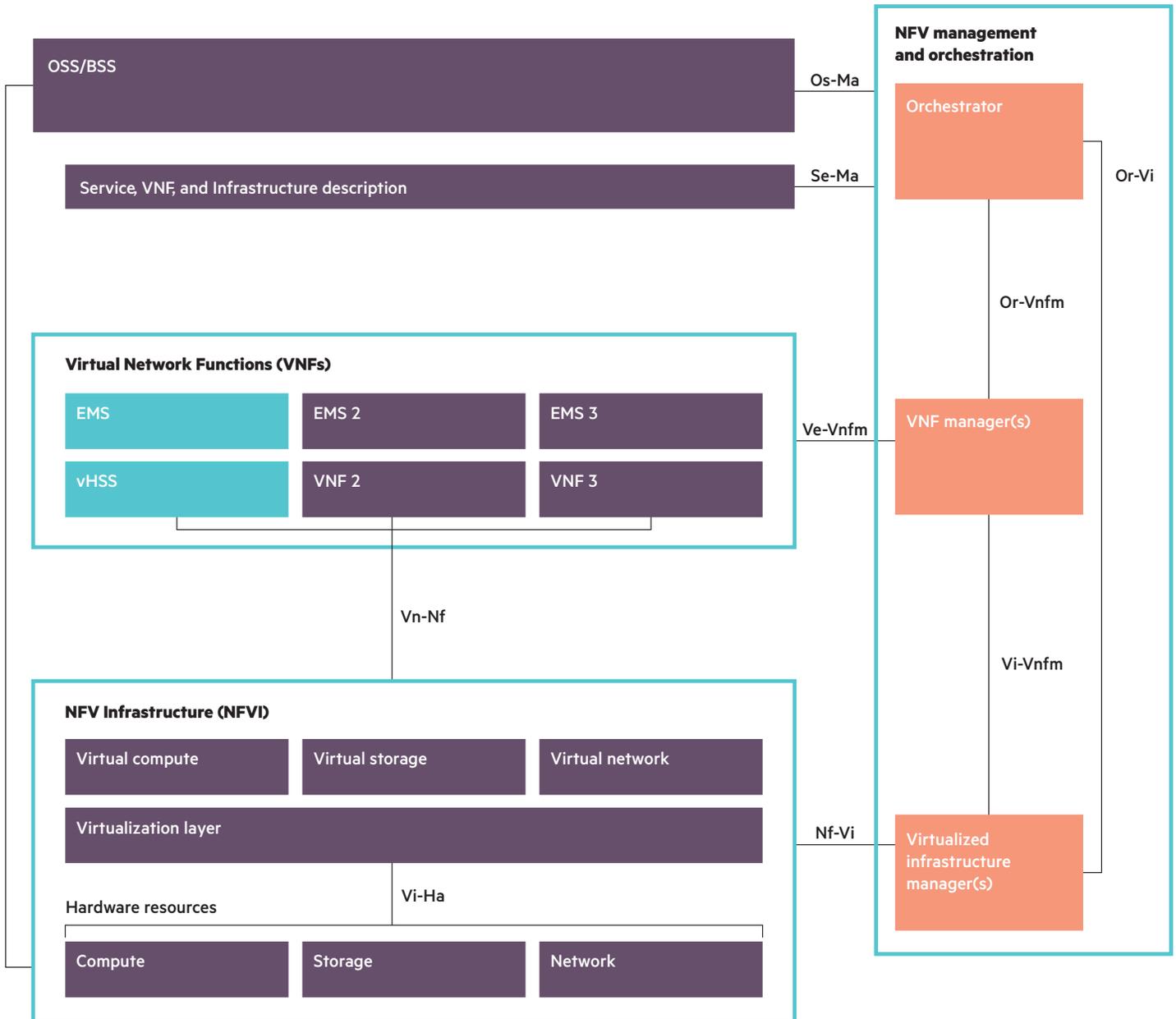
	NFV management and orchestration
OSS/BSS	**Os-Ma** — Orchestrator
Service, VNF, and Infrastructure description	**Se-Ma**

Or-Vi

Or-Vnfm

Virtual Network Functions (VNFs)

EMS	EMS 2	EMS 3
vHSS	VNF 2	VNF 3

Ve-Vnfm — VNF manager(s)

Vn-Nf

Vi-Vnfm

NFV Infrastructure (NFVI)

Virtual compute	Virtual storage	Virtual network

Virtualization layer

Nf-Vi — Virtualized infrastructure manager(s)

Hardware resources   **Vi-Ha**

Compute	Storage	Network

Figure 2: HPE reference architecture for vHSS in NFV

Evaluate the benefits

The key benefits of vHSS, when compared to traditional deployment models, include:

• Get instantiation within minutes, based on templates and controlled by NFV orchestrations.

• Scale up and down as needed, supported by our unique Traffic Surge Control and ability to scale up per traffic peaks.

• Be licensed by actual use—reduce up-front investment and enable the profile to be licensed per actual success of the services associated with it.

• Leverage commodity infrastructure with our leading blade technology.

• Comply to standard interfaces as a Virtual Network Function (VNF).

Understand the solution architecture

HPE vHSS leverages the same code base as HPE Integrated-HSS (I-HSS), which is built on the NonStop platform and supports millions of LTE subscribers worldwide in one of the largest LTE deployments in the world.

Importantly, it integrates with the HPE NFV-Director, enabling a streamlined scale-up and -down operation as part of the overall elasticity of HPE OpenNFV. And as part of the HPE OpenNFV architecture, vHSS can integrate with NFV orchestration solutions such as the HPE NFV Director—an NFV orchestrator with embedded virtualized network functions manager capabilities, as defined in the ETSI model. NFV Director ensures consistency between physical and virtual resources and application instances, and copes with multivendor hypervisors and controllers.

To maintain high availability, vHSS leverages our 20 years of experience with the active/ active deployment model, providing milliseconds synchronization of the database between two separate nodes. This synchronization increases solution reliability and enables simplified operations with no downtime in maintenance events.

Review supported features

HPE vHSS releases are based on the code base of HPE I-HSS and evolve its capabilities in parallel to the industry-leading product. The first versions of vHSS are focused on LTE network support for virtual Evolved Packet Core (EPC) and IMS.

Network protocols
- EPC—S6a (to MME), S6d (to S4-SGSN), Slh (to GMLC)

- IMS—Cx (to CSCF), Sh (to application server)

Authentication
- EAP-AKA

- SIP digest

Application features
- **MSISDN splitting** of a numbering plan in areas where new area codes need to be assigned

- **IPV4/IPV6** supports three modes of operations—IPV4, IPV6, and IPV4/IPV6.

- **Idle Signal Reduction (ISR)** is a mechanism that enables the UE to remain simultaneously registered in a UTRAN/GERAN Routing Area (RA) and an E-UTRAN Tracking Area (TA). When ISR is enabled, the UE does not have to make cell reselections between E-UTRAN and UTRAN/GERAN as long as it remains within the registered RA and TA list. As a consequence, HSS will maintain two PS registrations—one from the MME and another from the SGSN.

- **CALEA** supports lawful interception requirements (stage 1) described in 3GPP TS 33.106 (Ref. [1]), Lawful interception architecture and functions (stage 2) described in 3GPP TS 33.106 (Ref. [2]), and the handover interface for lawful interception (stage 3) described in 3GPP TS 33.108 (Ref. [3]).

- **Roaming Restriction** enables the MNO to identify and establish multiple regions based on E.164 addresses. When Roaming Restriction is used, HSS compares the candidate E.164 address with the entries in the subscriber's Roaming Restriction Class of Service.

- **Subscriber Routing** supports the forwarding of Diameter S6a messages from one HPE HSS to another HSS, based on the identity of the subscriber contained within the message being forwarded. This rudimentary Diameter routing, included in the vHSS application, enables a nonserving HSS to proxy received Diameter messages to the serving HSS based on service provider provisioned mappings of subscribers to serving HSSes.

- **Force cancellations** support manually detaching a subscriber from the network using the provisioning tool.

- **Subscriber trace** supports functionality as defined in 3GPP TS 32.421, 32.422, and 32.423.

- **Multi-Sub defaults** enable operators to define multiple default profiles that can be used while provisioning a new subscriber profile.

- **Access control**—role-based identity management—controls the profile data access based on rules defined for the user of the provisioning system.

- **Geo-redundant Synch** is the data synchronization mechanism for vHSS while maintaining active/active-mated instances for high availability.
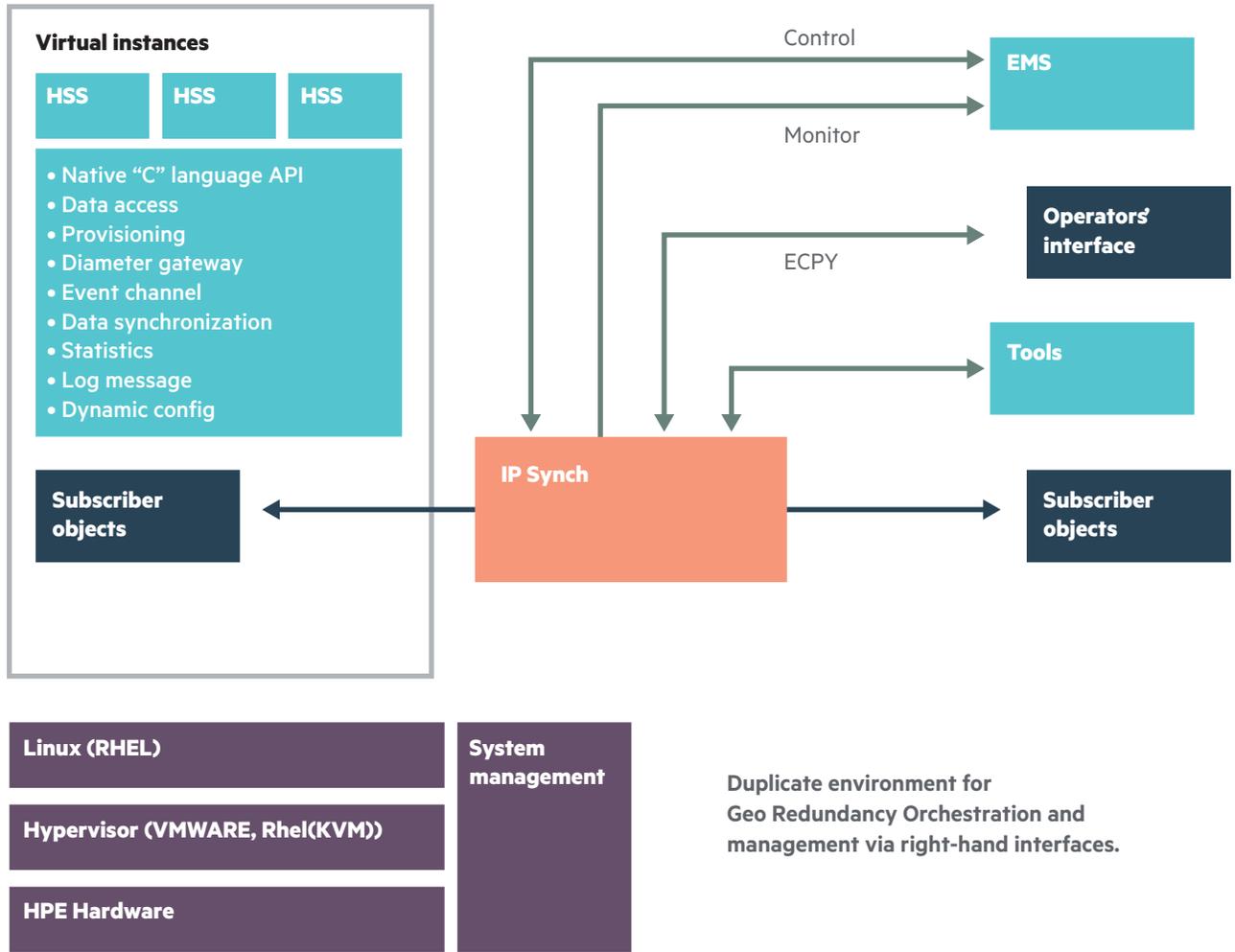
Virtual instances

| HSS | HSS | HSS |

- Native "C" language API
- Data access
- Provisioning
- Diameter gateway
- Event channel
- Data synchronization
- Statistics
- Log message
- Dynamic config

Subscriber objects

IP Synch

Control

Monitor

ECPY

EMS

Operators' interface

Tools

Subscriber objects

Linux (RHEL)

Hypervisor (VMWARE, Rhel(KVM))

HPE Hardware

System management

Duplicate environment for Geo Redundancy Orchestration and management via right-hand interfaces.

Figure 3: HPE vHSS logical deployment diagram

Gain from our experience

For more than 20 years, Hewlett Packard Enterprise has provided market-leading products in the Subscriber Data Management (SDM) domain. Starting in 1992, we've supported the telecommunication industry journey with an evolving product portfolio, from ANSI HLR (Home Location Register) to GSM HLR, IMS HSS, and EPC HSS, and UDR (User Data Repository).

Review other HPE Services

HPE Solution Lifecycle Services for the communications and media industry help you realize the full value of your solutions, from planning and assessment through to testing, deployment, operation, and nearly continuous improvement. Each service area leverages proven processes and best practices to balance capital expenditures and operating expenses (OPEX) and reduce risk, while keeping your projects on time and your operations running smoothly.

HPE Solution Consulting Services help define business transformation and translate strategies into actionable solutions.

HPE Solution Implementation Services offer a low-risk project lifecycle across design, development, customization, and network and system integration.

HPE Solutions Management Services increase the operational efficiency of your existing solutions, including reactive, proactive, operational, and enhancement services.

HPE outsourcing options are designed to improve business agility while reducing your OPEX; options include IT and infrastructure outsourcing, application management, and business process outsourcing.

Learn more at
hpe.com/CSP/I-HSS