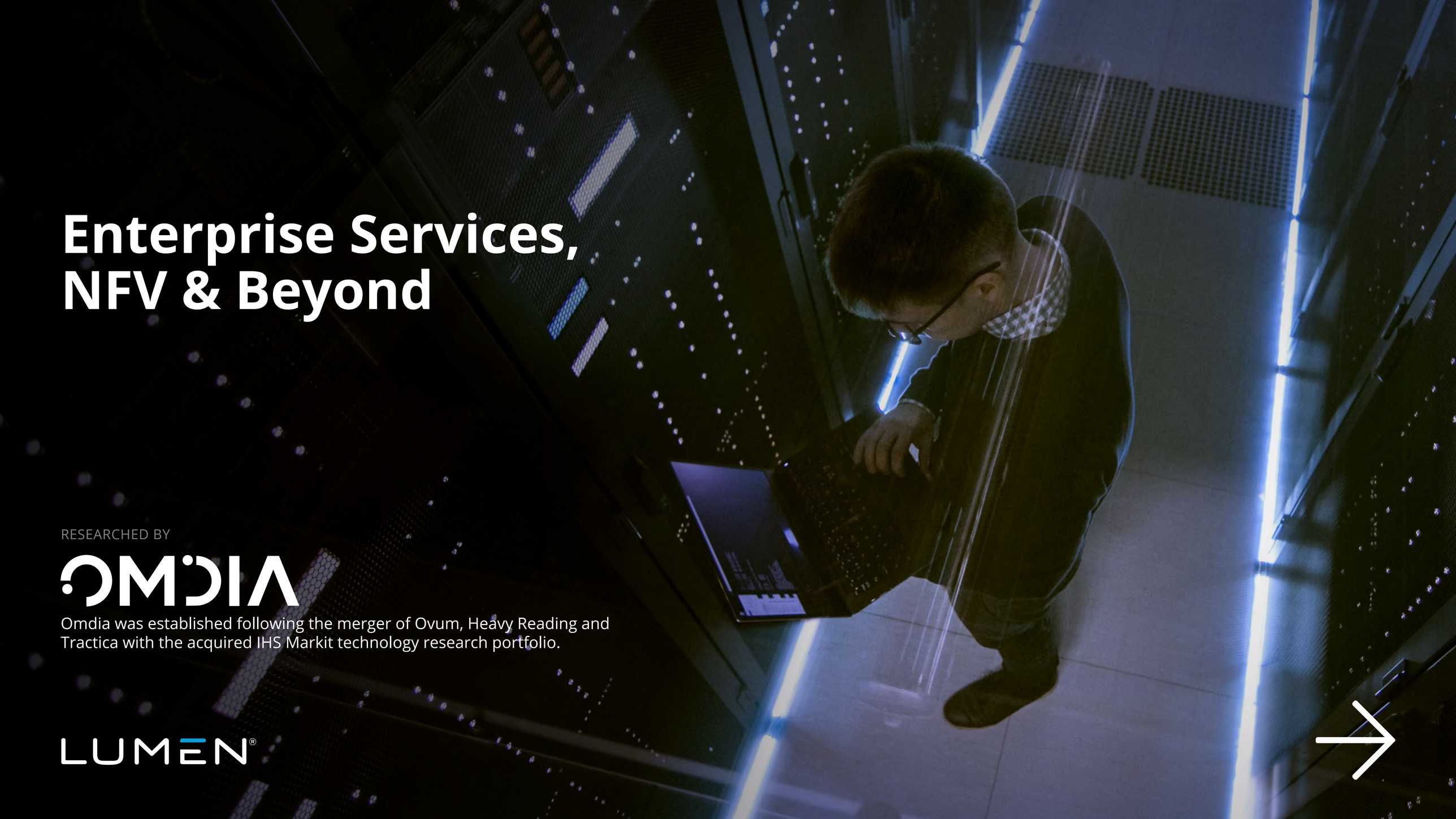
Enterprise Services, NFV & Beyond



RESEARCHED BY

OMDIA

Omdia was established following the merger of Ovum, Heavy Reading and Tractica with the acquired IHS Markit technology research portfolio.

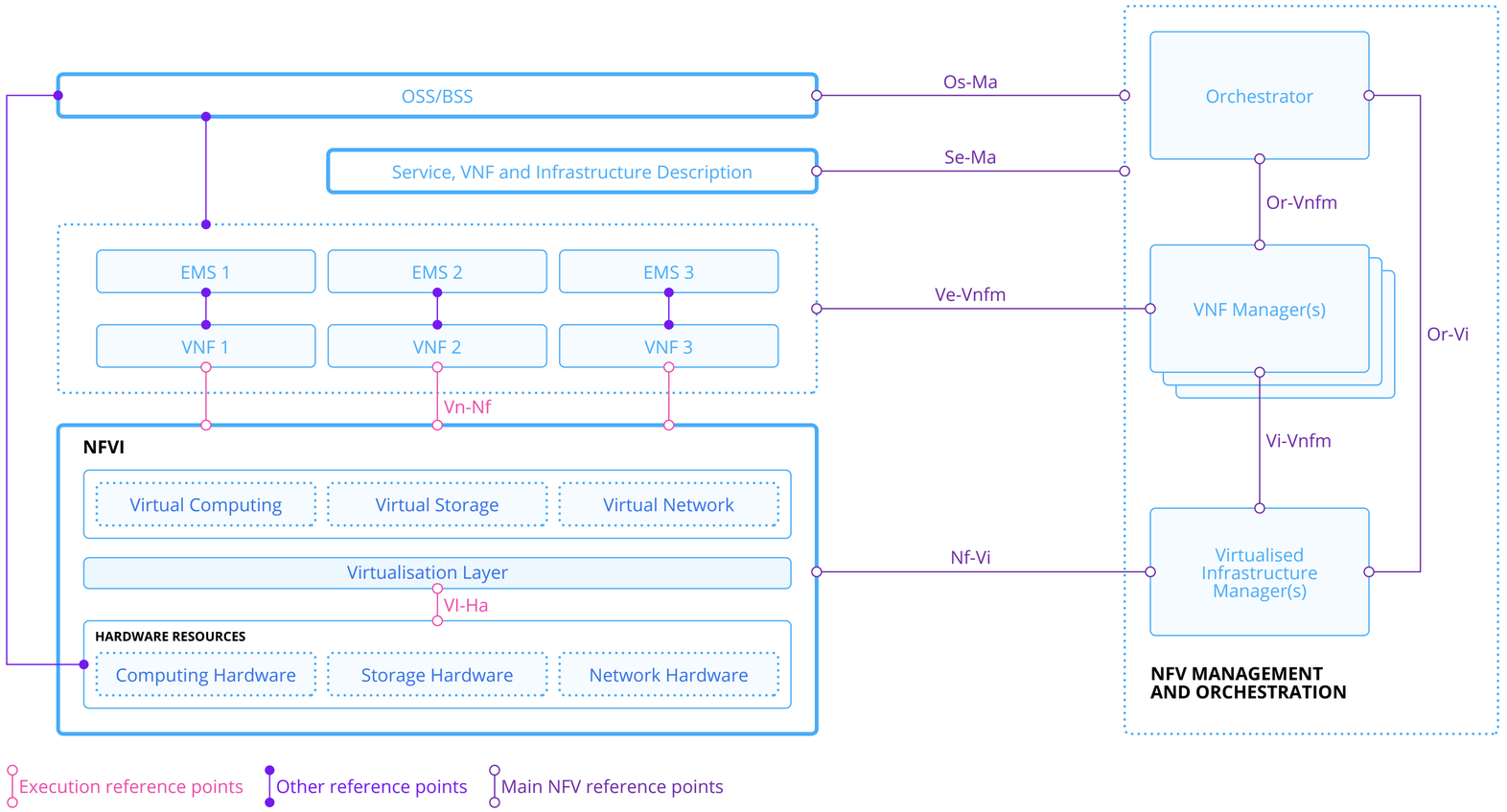
LUMEN®

Why network functions virtualization?

For the past decade, enterprises have widely turned to virtualization in the cloud as a superior way to host their business applications. Cloud services vastly opened up flexibility and scale for computing securely, while lowering power consumption and costs.

Networks are also virtualizing. The move to network functions virtualization (NFV) started years ago with internal operations, moved to commercial services, and now extends onto enterprise sites. NFV services host the network functions that companies need today: Software-defined WAN, IP routing, firewall and security and in some cases even third-party and custom business applications.

Like the cloud, network virtualization delivers flexibility and secure scaling by hosting software, but in this case the software can be right on the company's site. When NFV is delivered as a managed service, it includes orchestration that coordinates network functions to work together in an optimized, secure way.



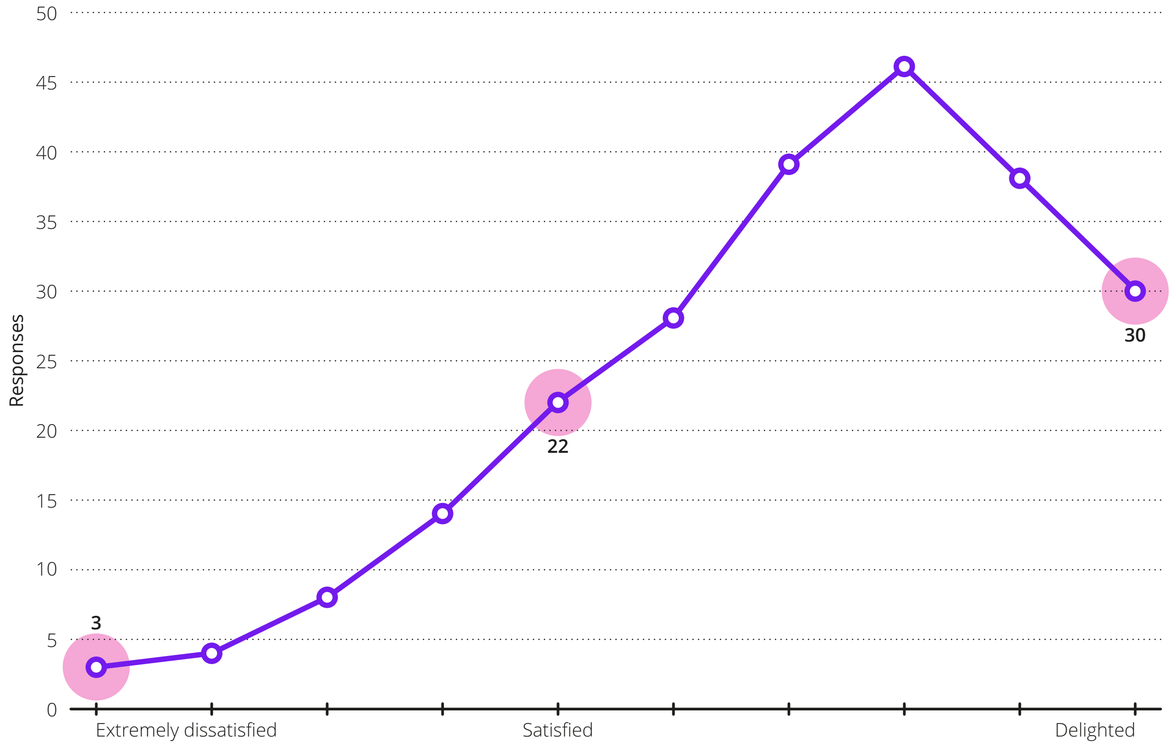
SOURCE: ETSI

NFV for enterprise

Between 2018 and 2020 the number of enterprises deploying NFV has more than doubled, with 17% now reporting significant deployments. Common deployments have seen enterprises host a firewall, router or SD-WAN function in a cloud or datacenter where they would not put an appliance. Despite this increase in deployments there remains a long way to go until enterprises become major adopters of NFV. Only 1.5% of enterprises report that they currently use on-premises NFV at most of their sites.

In total 41% of Enterprises already have NFV deployments. A further 37% are considering deploying NFV in the next 24 months. If they follow through this will see nearly 80% of enterprises with at least some limited deployments by 2022. This includes 5.6% of enterprises who expect to use NFV at most of their sites for much of their networking needs, including router, security, SD-WAN, WAN acceleration, and hosting specialist applications crucial to their core business.

Enterprise NFV Adopter Satisfaction



NOTE: N=175 (EXCLUDING THE 3 "DON'T KNOWS")

SOURCE: OMDIA ENTERPRISE NETWORK SERVICES STUDY 2020

The total number of Enterprises using NFV has nearly doubled between 2018-2020.

Today, enterprises predominantly use NFV for point solutions to solve particular challenges. NFV has done this well so far, as shown by the robust satisfaction reported by enterprises who have deployed NFV. Early deployments have focused on premium security and routing solutions.

Among NFV adopters, 84% are satisfied with their experience to date. Of the one in six adopters who are not satisfied, nearly half plan internal IT integration work; one-third plan to swap out service partners; one-third plan to stay the course; and a few plan to add a services partner, or to swap out hardware and/or VNFs.

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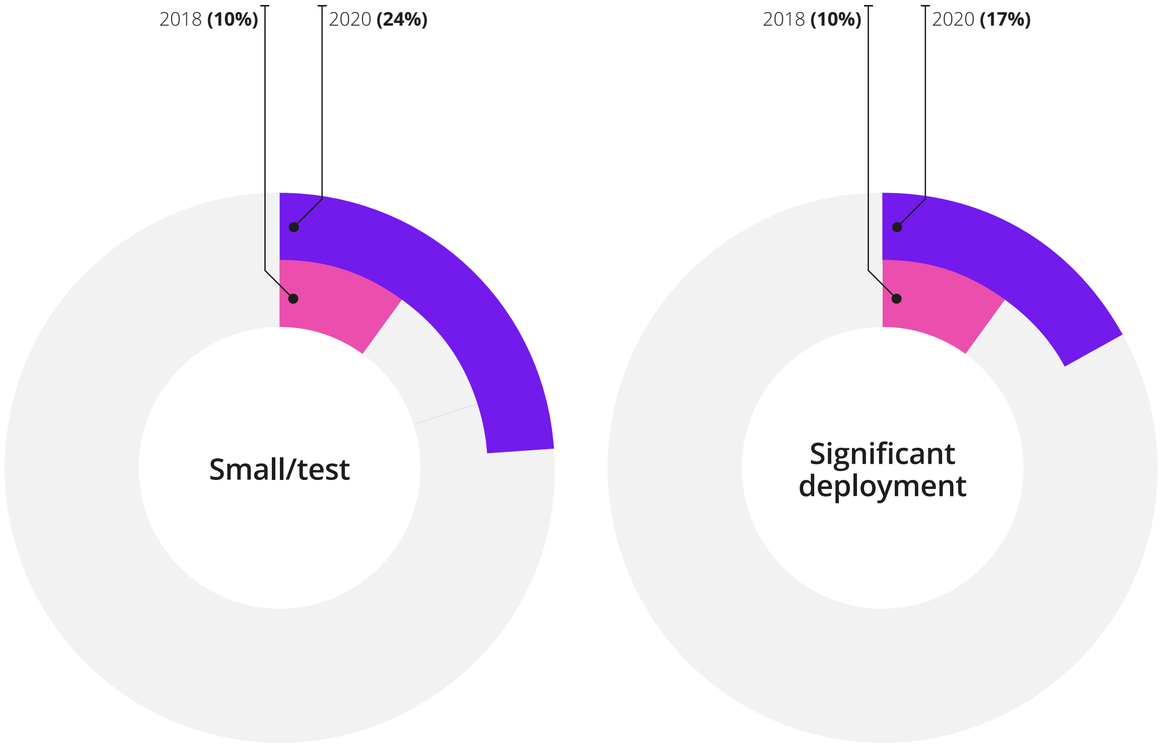
NFV Deployment



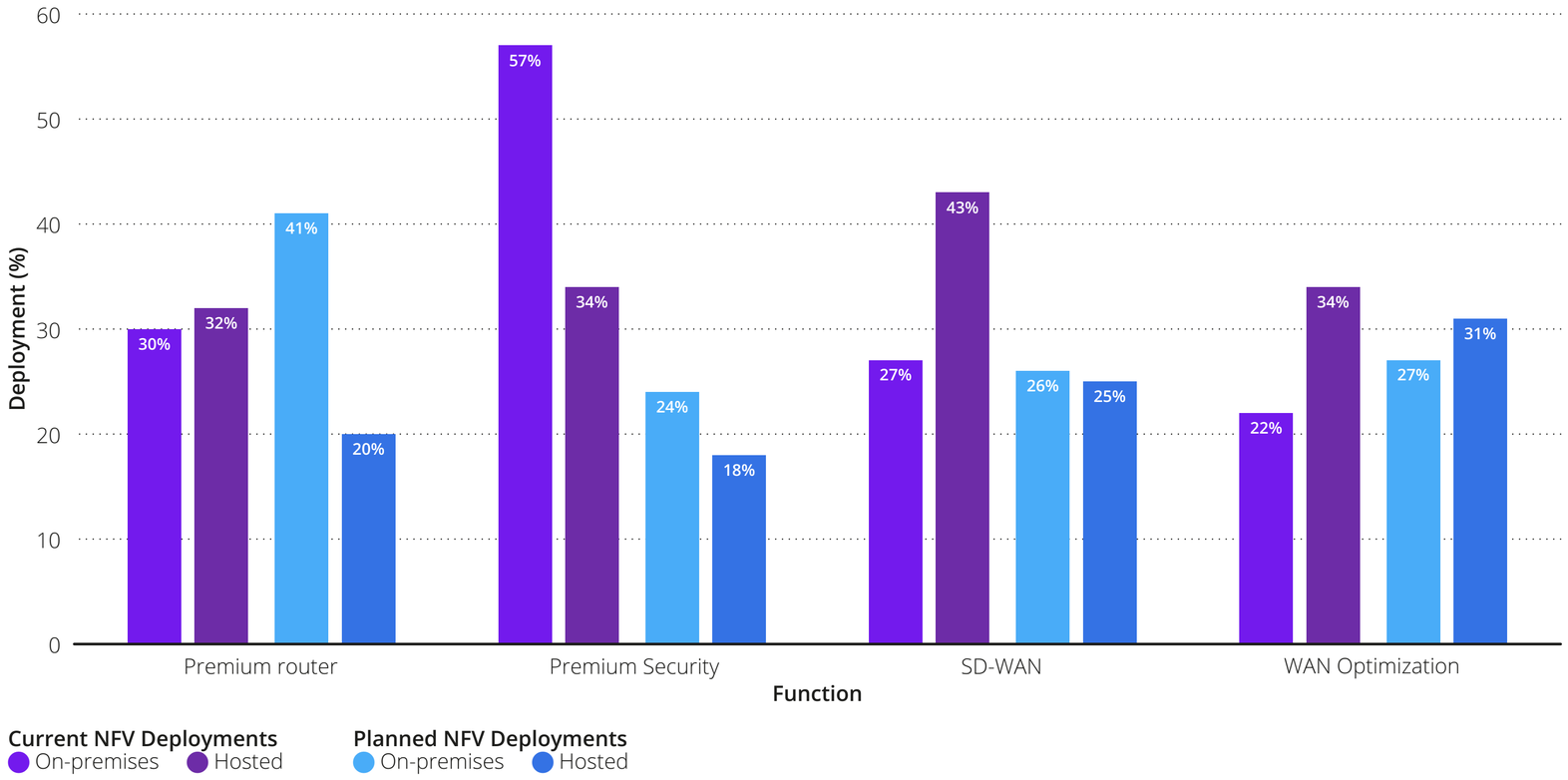
SOURCE: OMDIA ENTERPRISE NETWORK SERVICES STUDY 2020

Key use cases for enterprise NFV

In NFV's role as a point solution for particular challenges, to date NFV has been most widely used to deploy premium security solutions, followed by premium routing, and SD-WAN solutions. These represent enterprises' increasing need to defend themselves from cyber-threats, and organizational focus on digital transformation.

Where enterprises plan to expand their NFV deployments the focus is shifting to continue enhancing routing capabilities. Those enterprises who have already invested in SD-WAN will be looking to go further by investing in additional WAN optimization, while others starting their network transformation will begin deploying SD-WAN, either standalone or by using the flexibility of NFV to deploy it in tandem with WAN optimization and/or premium security features.

Key deployment and planned deployments rates of top NFV use cases



SOURCE: OMDIA

The environments where enterprise is deploying NFV

About 60% of enterprise NFV solutions today are pilots, or limited to one or two locations to address a specific enterprise challenge. Pilots represent enterprises' continued education as they seek to understand how to best implement NFV solutions for their business needs, while limited deployments represent NFV's ability to fill networking gaps. So far, public cloud and data centers have seen the most deployments; these sites are naturally virtualized. In the future, enterprises should consider on-premises NFV to move applications and workloads closer to their end users. There is the opportunity to reduce and replace multiple CPE boxes and even site servers with a single device that supports multiple VNFs and hosts business applications, which could equate to significant cost savings for organisations.

Where do enterprises deploy NFV?

43%
Public cloud

38%
Data center/colo

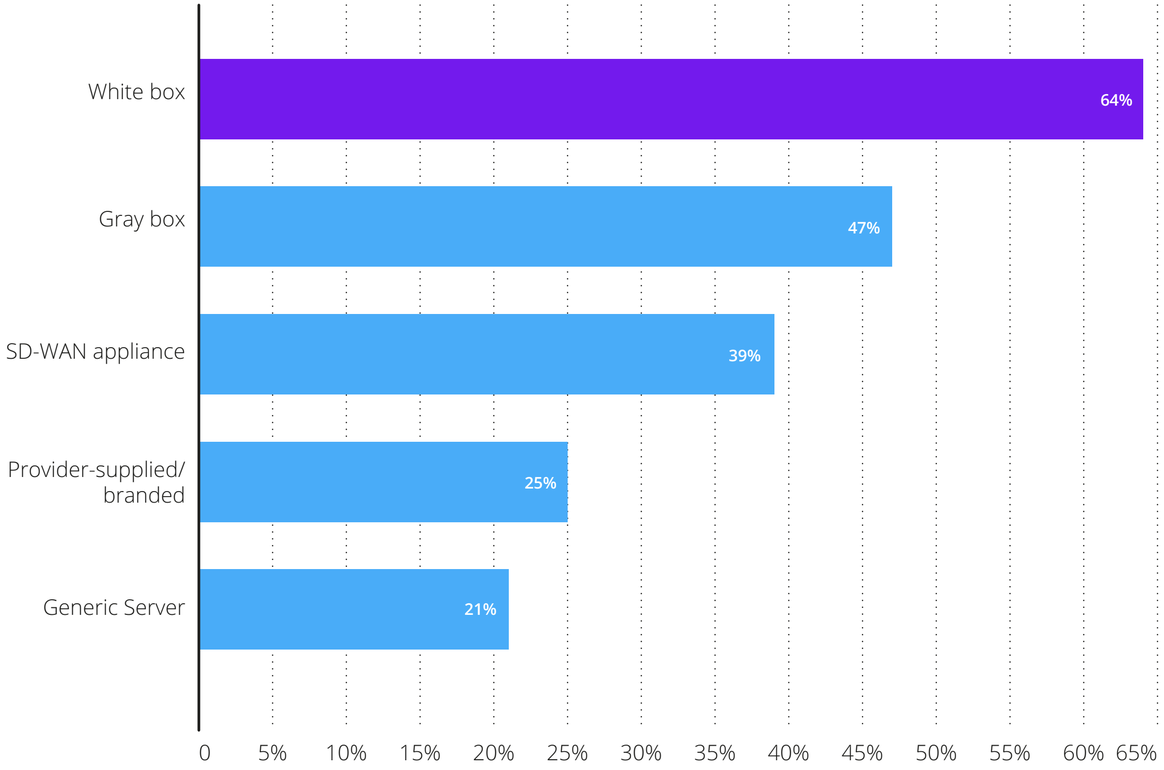
33%
CPE

25%
Private/hybrid cloud

25%
Network-hosted

SOURCE: OMDIA ENTERPRISE NETWORK SERVICES STUDY 2020

White boxes most widely deployed CPE



SOURCE: OMDIA ENTERPRISE NETWORK SERVICES STUDY 2020

64% of enterprises prefer a vendor agnostic 'white box' to support multiple VNF solution providers.

Enterprises are clear on their NFV hardware preference. More have deployed 'white box' virtual CPE from a manufacturer such as Dell or Lanner, which is not tied to a particular networking vendor, than the universal CPE 'gray box' provided by vendors like Cisco and Juniper.

While Omdia expects white boxes will remain the CPE of choice for enterprise NFV deployments, such as in branch SD-WAN plus firewall, these white boxes need a hosting environment that can support and chain together multiple VNF solution providers on a single box. In search of that platform, enterprises are beginning to explore edge computing, with 29% of enterprises expecting to increase funding for edge related services as 2020 draws to a close.

By year end, 29% of enterprises expect to increase funding for edge related services.

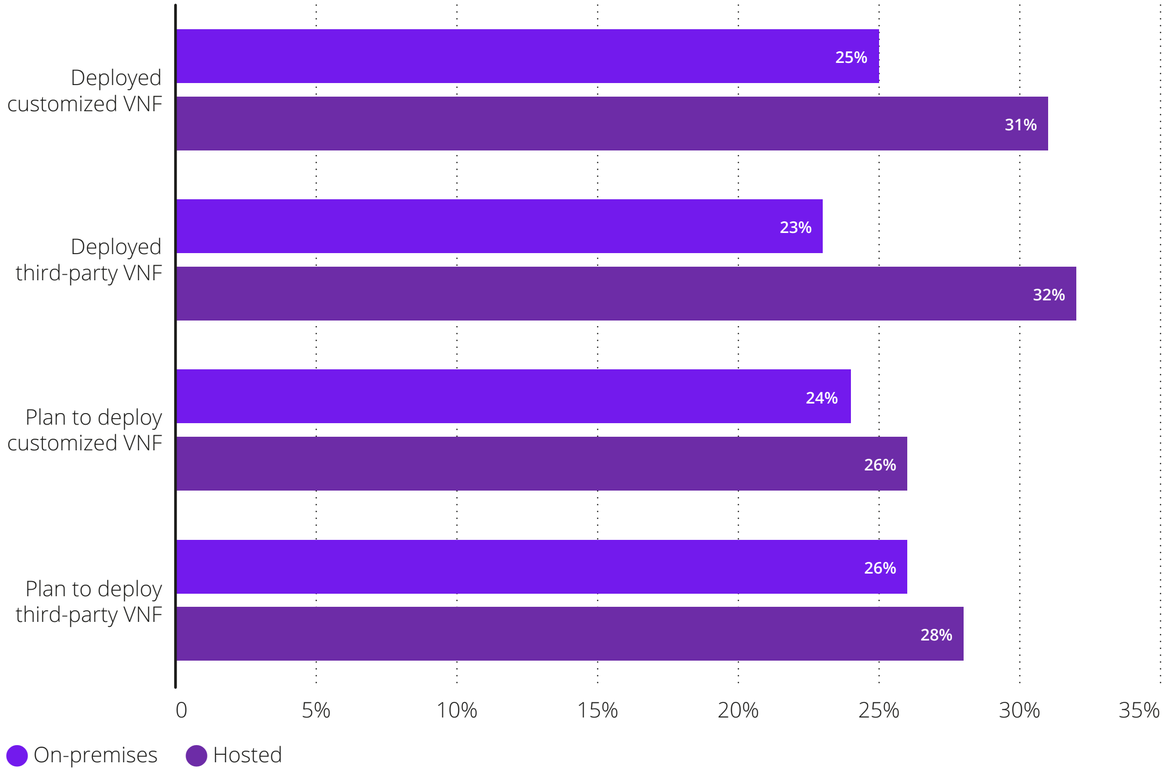
Planning for the future – long term ROI and BYO-x

A few leading providers have begun to support 'bring your own' (BYO) plans for NFV services as a hosting environment for third-party VNFs and business applications. These services let enterprises streamline their infrastructure and maximize ROI. They enable the assembly of custom hosted environments, and can also support the purchase of spin-up and self-managing VNFs, such as a Cisco cloud services router spun-up on AWS.

BYO-VNF is already part of some enterprise NFV deployments today. Many enterprises that have NFV environments want to bring their own VNFs – whether off-the-shelf from an outside third-party vendor or customized for their business. Between 13-25% of enterprises host at least one such VNF in parts of their network – on-premises, hosted in a data center or a cloud.

The need for BYO-VNF and BYO-applications hosting will only grow as enterprises want NFV to live up to its potential as an extensible hosting environment, not a closed platform. On-premises NFV lets enterprises host applications at the point of delivery, working with their preferred vendor partners and their own developer eco-system to support and deliver those functions and applications.

Customized & third party VNF adoption



SOURCE: OMDIA

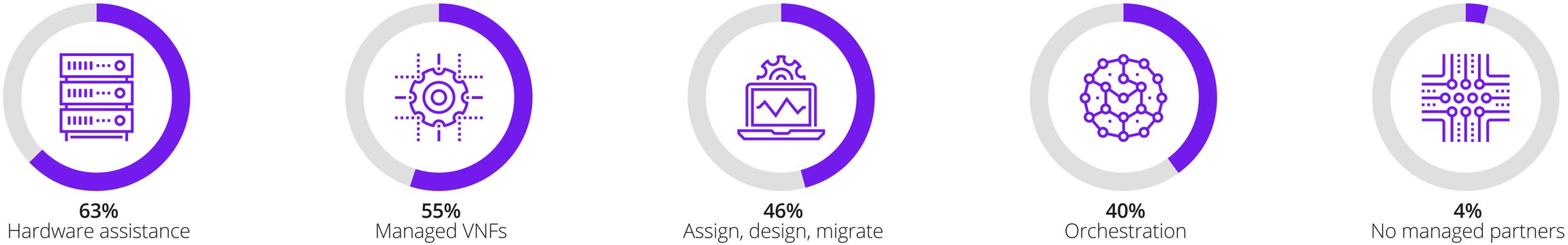
Where do enterprises need help implementing NFV?

For transformational network services, almost all enterprises turn to partners. For NFV, 96% of enterprises bring in outside consulting, managed and/or professional services help at some point, whether overcoming a critical security or routing issue, or when planning a long-term network refresh and need to stay flexible for future technology migration.

Businesses most commonly (63%) look for hardware and network assistance: A partner to offload and support hardware and service delivery. More than half of enterprises also use a partner to manage individual VNFs.

Currently 4 in 10 enterprises rely on a partner for NFV orchestration. Orchestration is a must to maintain a complex NFV deployment. The service delivers an automated, managed environment to load and pre-configure VNFs. Orchestration also handles administrative functions such as licensing, upgrades and patches to the NFV environment quickly and easily. Omdia expects orchestration to be a growing concern for enterprises as they move to scale-up the number of VNF instances, and scale-out the range of VNFs and VNF suppliers utilised in each deployment.

Enterprise welcome assistance – selectively



SOURCE: OMDIA ENTERPRISE NETWORK SERVICES STUDY 2020

Enterprise NFV case study: network transformation in financial services

A financial services firm with a global presence with at least 10 private cloud datacenters and 200 branch offices. They also have several edge locations all around the globe where they leverage hosting providers to get closer connectivity to clients and business partners. This footprint extends further to a network of connected payment devices their customers use, giving them around 10,000 endpoints in North America alone.

Challenge:

The financial services firm wanted to overhaul its WAN. Key considerations were:

- Automation
- Time to market
- Network visibility
- Inter-vendor connectivity
- Hosting applications in multiple locations

They saw NFV as their path to breaking the continued end-of-life/end-of-support equipment cycle, and stay in sync with the latest networking innovations.

Results:

- SD-WAN deployment cycle went from 90 days to provision a new site to under 30.
- Zero-touch provisioning to configure the white box with their partners reduced thea costs and delivery time as there was no need to send out an installation specialist.
- Additional network visibility and hardware cost reduction.

Next steps:

- Invest in orchestration and automation.
- This is to help dynamically scale network infrastructure.
- And deliver more complex business offerings which will enable improved utilization of its partner eco-system.

Omdia view: the way forward for enterprise NFV

The deployments of enterprise NFV so far have proven its value. For NFV to progress it requires enterprises to build on their vision of what they want from virtualization. For many Enterprises this will incorporate greater end-2-end automation capabilities, zero-touch provisioning, and an escape from a hardware based network lifecycle.

The industry is quickly moving to white box hardware on-site, which provides a good foundation to support a growing, diverse range of NFV solutions and services.

NFV encourages a distributed cloud environment, where applications can be hosted at the network edge or even on-site. Service providers can open up this distributed environment as a managed service, letting enterprises bring and host their own applications. This is key for enterprises that want to go one step further and offload critical applications.

1 **NFV is a highly valuable tool, frequently used to address thorny IT challenges.** NFV has proved successful in this role: 85% of enterprises using NFV are satisfied with their deployments.

2 **Enterprises deploying NFV will need it to reach network-wide: in the cloud, in gateways, at the edge, and on-site.** Enterprises need all these NFV aspects to work together.

3 **Enterprises bring in help for NFV assessment, set-up, and management.** Managed NFV services bring with them a ready-made ecosystem of interoperable VNFs.

About

Lumen

Lumen provides an all-in-one platform that combines adaptive networking, edge cloud, connected security, and collaboration to accelerate next-generation business applications and data.

With approximately 450,000 route fiber miles and serving customers in more than 60 countries, Lumen delivers the fastest, most secure global platform for applications and data to help businesses, government and communities deliver amazing experiences.

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About

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Omdia

Omdia is a global technology research powerhouse, established following the merger of the research division of Informa Tech (Ovum, Heavy Reading, and Tractica) and the acquired IHS Markit technology research portfolio*.

We combine the expertise of more than 400 analysts across the entire technology spectrum, covering 150 markets. We publish over 3,000 research reports annually, reaching more than 14,000 subscribers, and cover thousands of technology, media, and telecommunications companies.

Our exhaustive intelligence and deep technology expertise enable us to uncover actionable insights that help our customers connect the dots in today's constantly evolving technology environment and empower them to improve their businesses – today and tomorrow.

*The majority of IHS Markit technology research products and solutions were acquired by Informa in August 2019 and are now part of Omdia.

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