

Intelligent Transformation of Data Center to Edge



Gregory Pruett, Data Center Group

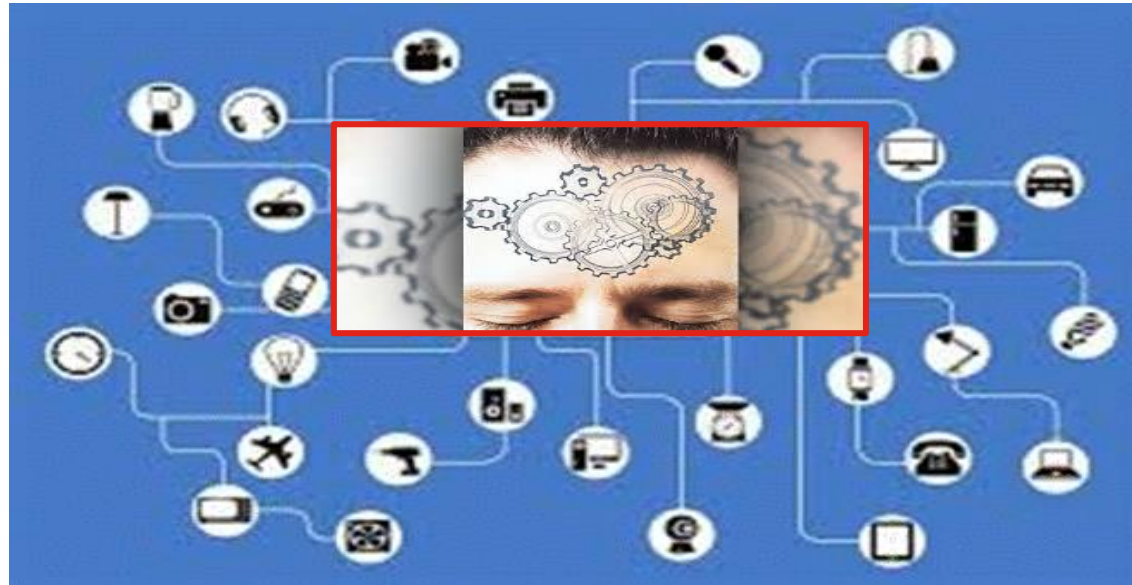
Data Center Landscape is Shifting

Putting compute resources close to the Data

Higher level of
availability

Lower level of
latency

Higher level of
security & privacy



Environmentally
Tolerant

Low Touch
Operations

Smaller
Footprint

By 2025, 75% of enterprise-generated data will be created and processed out of the data center or cloud, up from less than 20% today

Industry shifts impacting CoSP

Goal: Create new revenue sources to compete

Video & IoT Growth

- Improve network efficiency by reducing latency and bandwidth requirements.
- Increase reliability, scalability & performance.

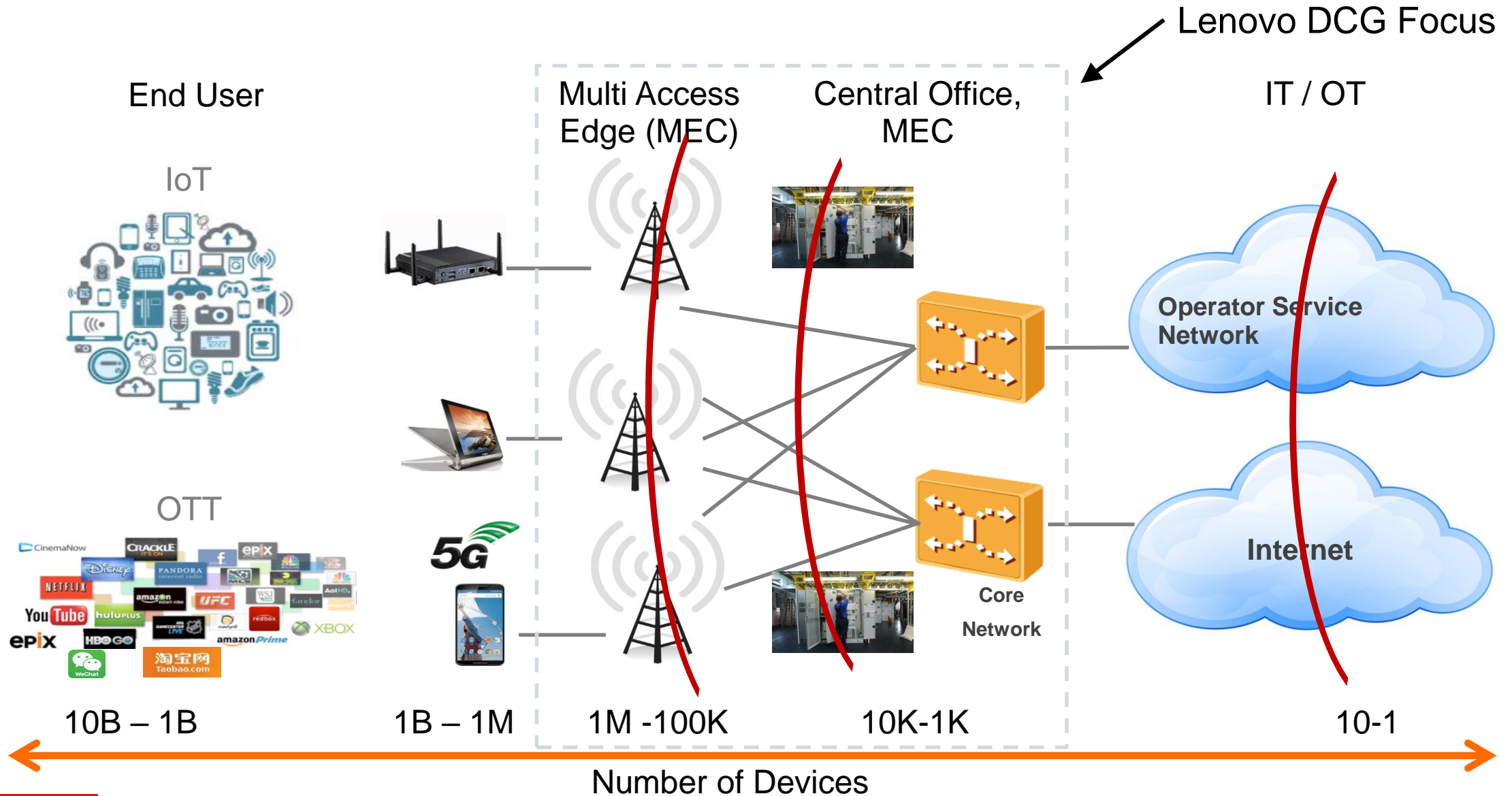
NFV Transformation

- Rapid advancements in technology make CAPEX a long term investment risk. Mitigate risk by shifting to OPEX based service model.
- NFV enables services model, but requires investment in COTS hardware for agile service delivery.

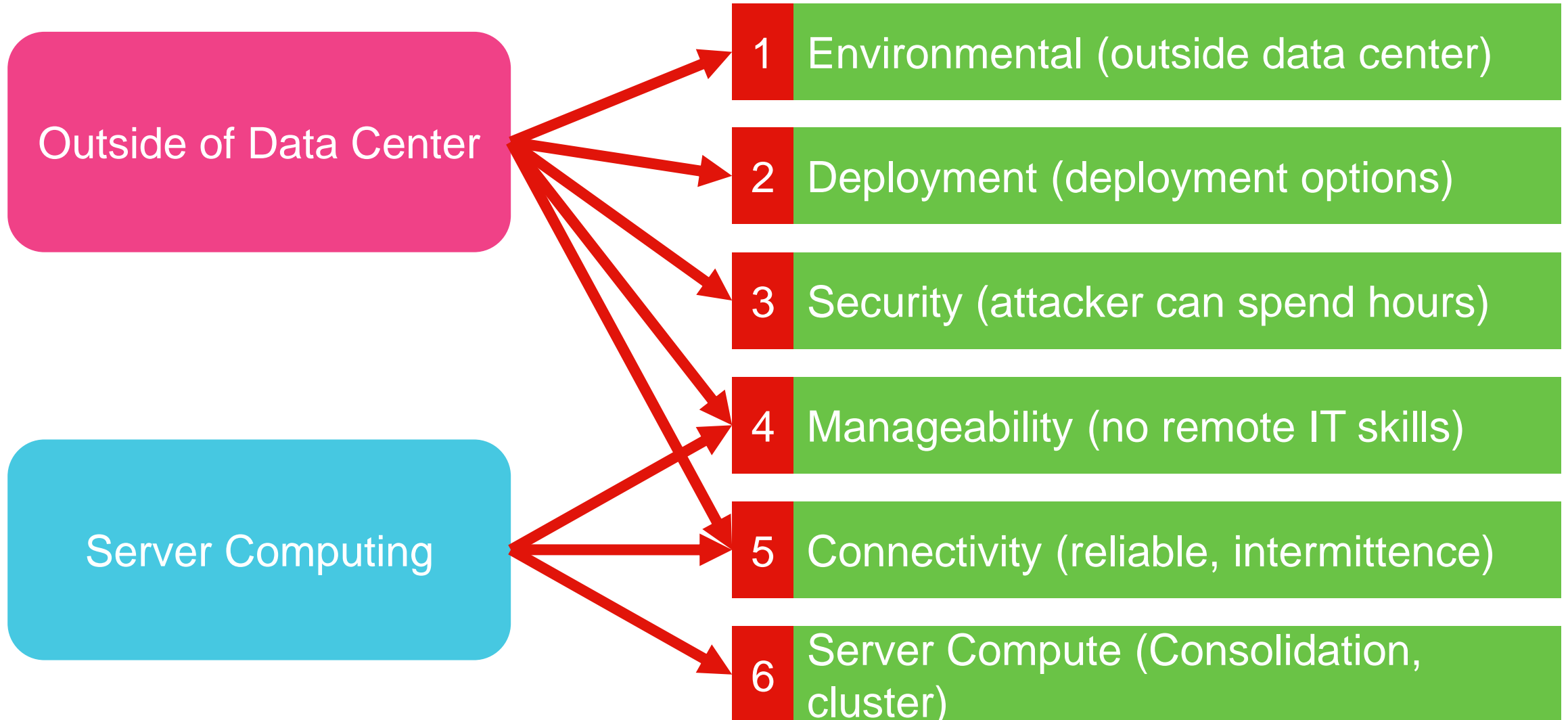
Multi-Access Edge (MEC)

- Realize benefits quickly with the flexible MEC node.
- Rapidly deploy new services, reduce latency.

Telecom Topology: Edge to Data Center

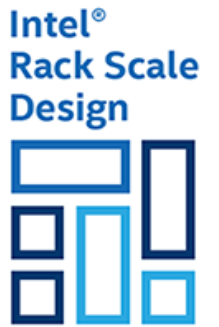


Key attributes of Edge Computing Hardware

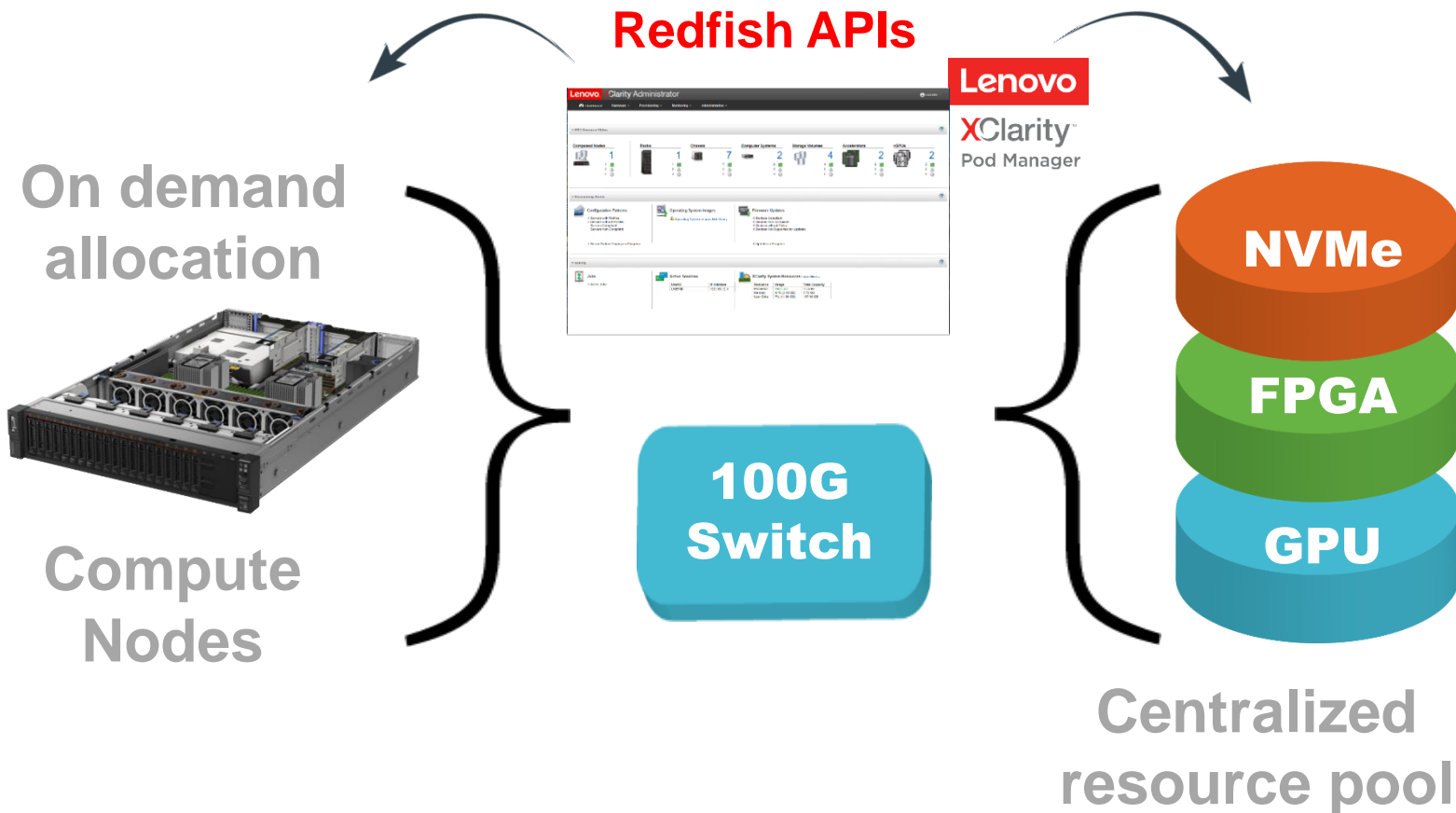


Lenovo Dynamic Infrastructure

Challenge: Optimal use of expensive resources



Single pane of glass



On demand @ Edge

- Optimize utilization
- Grow compute, storage, acceleration hardware independently
- Avoid downtime for maintenance

Software capabilities

- Inventory management & power administration
- Vary resources offline to save power or reduce thermal load at edge
- Map and compose required resources

ThinkSystem SE350

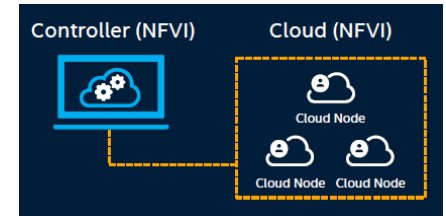


SE350 Edge Server – 1U ½-wide
Intel® Xeon® D processor, 1 HHHL GPU

Lenovo's Intel® Select Solutions for NFVi w/ Red Hat OpenStack

Reduce time to value with validated and optimized NFV solutions

- Pre-defined, work-load optimized solutions minimize COSP's infrastructure deployment challenges
- Verified performance through benchmark testing accelerating time-to-market
- Optimized for virtualized packet-based network workloads and crypto/compression acceleration



Intel® Select Solutions for NFVI v2 Configurations with Lenovo ThinkSystem SR630/SR650 Gen2 Servers

- 2nd Gen Intel® Xeon® Scalable Processors
- Intel® Optane™ DC Persistent Memory
- Intel® Ethernet Network Adapter XXV710 25GbE
- Intel® QuickAssist Adapter 8970
- Intel® Solid State Drive Data Center Family for NVMe

Intel verified network performance metrics

NIC	Performance requirement	Test cases	Lenovo conformance	
Intel® Ethernet Network Adapter XXV710 25GbE	90% Line Rate with Packet Size 256B	DPDK L3fwd RFC2544 zero packet loss test	Yes – measured 97%	
		PF Pass-through	Yes – measured 94%	
		SRIOV VF NIC	Yes – measured 91%	
Intel® QAT 8970 AIC	Compression ¹	Encryption ²	RSA2048 ³	Lenovo conformance
QAT cpa_sample_code	>34 Gb/s	50 Gb/s	40 K Ops/s	Yes
Intel® QAT 8970 AIC	AES128-CBC-HMAC SHA1 ¹	RSA2048 (1 Core)		
	Intel® QAT	Intel® QAT	Software	
OpenSSL Speed Benchmark	48.29 Gb/s	100K sign/s	100K sign/s	Yes
Intel® QAT 8970 AIC	Intel® QAT	Software (16 threads)		
SSL PKE with NGINX	92617 CPS	18554 CPS		Yes

Open/Standards based interoperability testing and 3rd party performance benchmarking

- ETSI NFV Plugtests Standards based Interoperability
- OPNFV Plugfest and OVP compliance
- EANTC Performance benchmarking with select VNFs



2019 Lenovo Internal. All rights reserved.

Intel, the Intel logo and Xeon are trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries.

Lenovo NFVi + Wind River Titanium Cloud

Promotes Open Source community led compliance with Intel® Select Solution for NFVi configurations



- Open source, community-led compliance and verification program to demonstrate readiness and availability of commercial NFV offerings
- OPNFV Verification Program (OVP) solutions have been validated with a standard set of use cases to meet certain performance threshold requirements
- Certification for NFVi requires that vendors demonstrate pre-deployment and VNF infra testing aligned to ETSI TST 001
- Lenovo is committed to working with partners and industry consortia to deliver optimized, high performing and open systems to maximize value
- Wind River Titanium Cloud enables an NFV infrastructure to achieve the ultra-reliability (99.9999%) and high performance mandated for telecom networks.

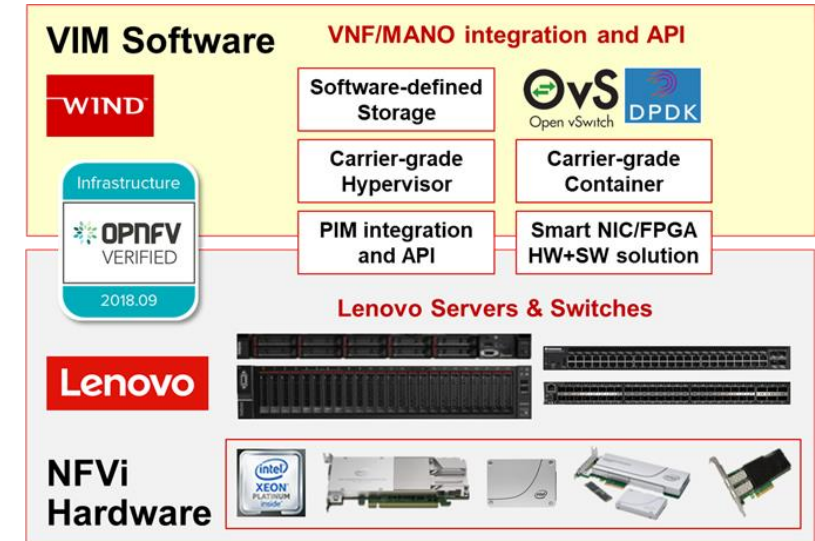
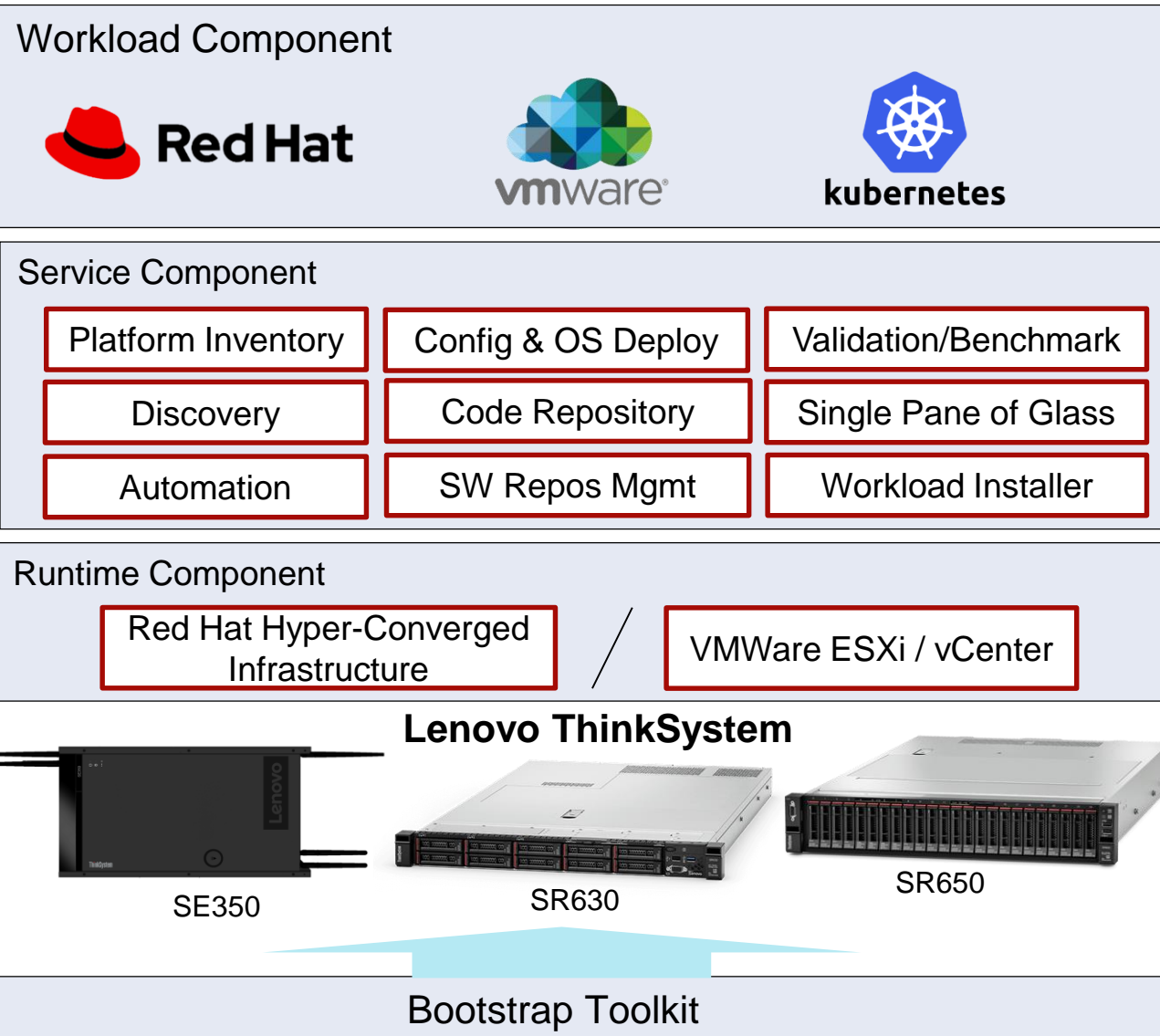


Table 1: Lenovo supported configuration for Intel® Select Solution for NFVi certification (Base)

Lenovo and Wind River collaborated to secure OVP compliance which simplifies selection and deployment of integrated NFV hardware and software solutions

Lenovo Open Cloud (LOC) – Automation



Accelerate deployment and cloud readiness

Up to 3x faster than manual cloud deployment – Open Cloud with Professional Services – enable swift initial deployment on private cloud

Rapid time to incremental revenue with tools and templates

Incremental service launch time reduced with integrated tool sets, and automated service deployment templates

Edge friendly to efficiently extend the network

Time to value maximized with zero touch deployment; minimizes requirement for high skilled truck rolls; automated cloud integration

Built in benchmarking to reduce cost

Reduction in test expenditure, Open source Phoronix test suite pre-integrated, Network Service Benchmarking (NSB) out of box with solution.

thanks.

