



# Intel® Select Solutions for VMware Cloud Foundation\*

**Build a simple, security-enabled, agile software-defined hybrid cloud with a ready-to-deploy, optimized, performance-verified solution.<sup>1</sup>**



The world moves faster every day. You walk a tightrope of balancing business as usual against honing your competitive edge and maintaining or advancing your market position.

Like a lot of businesses, you are likely considering the agility of a hybrid cloud as a way to drive innovation and growth while still maintaining business as usual. A hybrid cloud can help your business grow more agile and innovative, reduce turnaround times, and lower expenses. It can give your business the flexibility of the public cloud combined with the control of an on-premises infrastructure.

Your next step is choosing a solution and infrastructure to run your hybrid cloud. Your business demands a common foundation for the on-premises and public cloud components of your hybrid solution. With a common foundation, you can simply and transparently migrate live workloads between the on-premises and public cloud sides of your hybrid cloud, in addition to utilizing the same skills and tools to manage your entire environment.

Intel and VMware have you covered with Intel® Select Solutions for VMware Cloud Foundation\*—a simple, verified path to quickly deploying VMware's integrated hybrid cloud platform, VMware Cloud Foundation, and to ensuring you achieve optimum performance once deployed.

## VMware Cloud Foundation

VMware Cloud Foundation is a hybrid cloud platform delivered as an integrated software-defined stack powered by Intel® architecture. It integrates a complete set of software-defined services for compute, storage, networking, security, and cloud management to allow enterprises to run traditional or containerized enterprise apps on a single platform. The platform deploys a software-defined data center (SDDC) with built-in automated lifecycle management that can be run on-premises or as a service in the public cloud. It is based on VMware\* technologies, including:

- VMware vSphere\* and the VMware vSphere Integrated Containers\* plug-in, which provide data center virtualization with comprehensive monitoring and deployments for both virtual machines (VMs) and containers
- VMware vSAN\*, which enables hyper-converged storage
- VMware NSX\* Data Center, which enables network virtualization and micro-segmentation for policy-driven security
- VMware vRealize Suite\*, which enables self-driving operations and infrastructure as a service (IaaS) for application provisioning
- VMware SDDC Manager\*, which provisions a management and monitoring interface

## Intel Select Solutions for VMware Cloud Foundation

VMware Cloud Foundation can help your business implement a hybrid cloud. Intel Select Solutions for VMware Cloud Foundation, for their part, can help your business more quickly deploy VMware Cloud Foundation. That's because choosing Intel Select Solutions eliminates the time needed to evaluate and set up hardware to accommodate your workloads. Intel Select Solutions for VMware Cloud Foundation combine VMware Cloud Foundation with an optimized high-performance infrastructure verified through benchmark testing to deliver workload-optimized performance across compute, storage, and networking on trusted Intel architecture.

### Hardware Selections

Intel Select Solutions for VMware Cloud Foundation combine the Intel® Xeon® Scalable processor platform, Intel® Optane™ DC Solid State Drives (SSDs), Intel® 3D NAND SSDs, and the Intel® Ethernet 700 Series, so your business can quickly harness a reliable, comprehensive VMware Cloud Foundation hybrid cloud built on a performance-optimized infrastructure.

Intel and VMware chose Intel Xeon Scalable processors for Intel Select Solutions for VMware Cloud Foundation because these processors were engineered to support hybrid cloud infrastructures and the most demanding workloads. Intel Xeon Scalable processors also optimize interconnectivity while delivering high performance without compromising data security. And the integrated high-speed Intel Ethernet 700 Series, at up to 4 x 10 gigabit Ethernet (GbE), helps reduce the total system cost, lowers power consumption, and improves the transfer latency of large storage blocks and VM migrations.

The benefits of combining VMware Cloud Foundation and Intel Xeon Scalable processors include:

- **Cutting-edge performance and scalability** through co-engineering, dynamic scalable capacity, and a small data center footprint from lower server counts
- **Accelerated transformation to a modern data center**, enabled by a hyper-converged infrastructure, greater agility and flexibility, and solid dependability
- **Automated security** across the stack due to complementary hardware and software features and an adaptable security approach

Intel Optane DC SSDs and Intel 3D NAND SSDs were chosen for Intel Select Solutions for VMware Cloud Foundation to deliver the capability to tune the balance between cost, performance, and capacity. Intel Optane DC SSDs deliver elastic scalability with high performance and low latency for the VMware Cloud Foundation caching tier. And Intel 3D NAND SSDs deliver data integrity, consistent performance, and reliability, with attractive price-performance characteristics for read-intensive workloads in the VMware Cloud Foundation data tier.

Combining VMware Cloud Foundation with Intel Optane DC SSDs and Intel 3D NAND SSDs creates software-defined storage that:

## What Are Intel® Select Solutions?

Intel Select Solutions are verified hardware and software stacks that are optimized for specific software workloads across compute, storage, and network. The solutions are developed from deep Intel experience with industry solution providers, in addition to extensive collaboration with the world's leading data center and service providers.

To qualify as an Intel Select Solution, solution providers must:

- Follow the software and hardware stack requirements jointly developed by VMware and Intel (see **Appendix A**)
- Replicate or exceed Intel's reference benchmark-performance threshold
- Publish a detailed implementation guide to facilitate customer deployment

Solution providers can develop their own optimizations to add further value to their solutions.

- **Enhances scalability, performance, and reliability** with high optimization of VMware Cloud Foundation using Intel Select Solutions for VMware Cloud Foundation from leading OEMs
- **Eliminates storage silos** to enhance the value of enterprise data for conventional and cloud-native applications using your existing servers and tools
- **Simplifies infrastructure and reduces operational expenditures (OpEx)** using standards-based hardware, two-click provisioning, and management within the vSphere component of VMware Cloud Foundation

Intel and VMware also chose the Intel Ethernet 700 Series with 10/25/40 GbE for Intel Select Solutions for VMware Cloud Foundation.<sup>2</sup> The series offers intelligence and performance for virtualization with network packet processing. And flexible, scalable input/output (I/O) virtualization and intelligent offloads improve performance and efficiency. The Intel Ethernet 700 Series delivers validated performance, is ready to meet high quality thresholds for data resiliency and service reliability for most media types and port speeds, and is backed by extensive testing, validation, and worldwide product support.<sup>3,4,5,6</sup>

## Verified Performance through Benchmark Testing

All Intel Select Solutions are verified to meet a specified minimum level of workload-optimized performance capabilities. For Intel Select Solutions for VMware Cloud Foundation, Intel and VMware chose the VMmark 3.0\* benchmark to evaluate the solutions' performance.

VMmark 3.0 is a web-scale multi-server virtualization platform benchmark. It combines commonly virtualized applications into predefined bundles called "tiles." The VMmark 3.0 score is determined by the number of tiles that a virtualization platform can run, the cumulative performance

of those tiles, and the results of a variety of platform-level workloads.<sup>7</sup> Results are verified both by Intel and by a review panel made up of representatives from multiple companies before being published.

### Base and Plus Configurations

Intel Select Solutions for VMware Cloud Foundation are available in two configurations: “Base” and “Plus,” as shown in [Appendix A](#). The Base configuration specifies the minimum required performance capability for an Intel Select Solution for VMware Cloud Foundation, and the Plus configuration provides one example of how system builders, system integrators, and solution and service providers can further optimize to achieve higher performance and capabilities. For example, businesses can achieve up to 43 percent more throughput while supporting 57 percent more workloads when using the Plus configuration compared to using the Base configuration.<sup>8</sup>

### Technology Selections for Intel Select Solutions for VMware Cloud Foundation

In addition to the Intel hardware used for Intel Select Solutions for VMware Cloud Foundation, the following Intel technologies can bring performance, data protection, reliability, and security gains to VMware Cloud Foundation:

- **Intel® Platform Trust Technology (Intel® PTT) or a discrete Trusted Platform Module (TPM) 1.2** provides secured storage for sensitive data and protects the system startup process by ensuring the boot hardware is tamper-free.
- **Intel® Advanced Vector Extensions 512 (Intel® AVX-512)** streamlines processing to deliver higher performance for mixed workloads.
- **Intel® Transactional Synchronization Extensions New Instructions (Intel® TSX-NI)** provides high performance for multi-threaded workloads.
- **Intel® Volume Management Device (Intel® VMD)** ensures smooth, hot-swappable additions and removals of NVMe Express\* (NVMe\*) drives to help improve uptime and serviceability.

### Inside Intel Select Solutions for VMware Cloud Foundation

Intel Select Solutions for VMware Cloud Foundation are made up of key hardware and software components that combine to provide optimized software-defined compute, storage, and networking abilities.

#### Software-Defined Compute

VMware vSphere and Intel Xeon Scalable processors provide the technologies that enable software-defined compute for hybrid cloud environments in Intel Select Solutions for VMware Cloud Foundation.

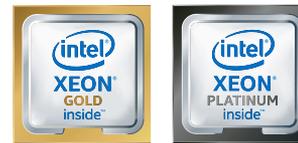
VMware vSphere is a suite of server-virtualization solutions. The foundation of vSphere is a bare-metal hypervisor that runs directly on server hardware without the overhead of an intervening host operating system. And when run on Intel Xeon Scalable processors, vSphere technologies provide performance gains enabled in both hardware and software, for up to a 19 percent higher VMmark 3.0 result compared to running on predecessor Intel Xeon processor platforms.<sup>9</sup>

## Intel® Xeon® Scalable Processors

Intel Xeon Scalable processors:

- Offer high scalability for enterprise data centers
- Deliver performance gains for virtualized infrastructure compared to previous-generation processors
- Achieve exceptional resource utilization and agility
- Enable improved data and workload integrity and regulatory compliance for data center solutions

The Intel Select Solutions for VMware Cloud Foundation feature Intel Xeon Gold processors and Intel Xeon Platinum processors.



## Intel and VMware

For more than a decade, Intel and VMware have co-developed innovative solutions that help businesses transform their data. Joint areas of focus include next-generation software-defined data centers (SDDCs), hybrid clouds, and virtualized enterprise workload solutions.

Optimized VMware\* hyper-converged solutions based on Intel® architecture bring together leading compute, storage, and network virtualization managed through VMware vRealize\*. Co-developed solutions help:

- Simplify, accelerate, and optimize software-defined infrastructure (SDI)/SDDC adoption in the enterprise
- Provide simplicity and flexibility with solutions from VMware Validated Design\* partners and Intel® Select Solutions
- Deliver outstanding cost-effectiveness with solutions that include capabilities powered and optimized by Intel architecture

#### Software-Defined Storage

The Intel Select Solutions for VMware Cloud Foundation hybrid cloud solution stack for software-defined storage is based on VMware vSAN and the Intel SSD Data Center Family. VMware vSAN is a hyper-converged, software-defined storage solution that pools direct-attached storage devices across a VMware vSphere cluster to create a distributed, shared data store.

## Software-Defined Networking

Intel Select Solutions for VMware Cloud Foundation combine VMware NSX Data Center and the Intel Ethernet 700 Series to create software-defined networking. VMware NSX Data Center is a software-defined network-virtualization and security platform that abstracts network resources and applies them on demand.

VMware NSX Data Center streamlines network operations with software-based central management across network services, including virtual network functions (VNFs) defined by VMware NSX Data Center, such as switching, routing, firewalls, load balancing, and VPNs. Virtual networks can be spun up on demand, allowing workloads to be moved around freely.

The Intel Ethernet 700 Series provides reliable, high-performance network packet processing for VNFs and VM workloads. Network-virtualization overlays provide a software-driven switching layer that allows seamless migration of virtual servers across the network without physical switch reconfiguration. And intelligent offloads increase network throughput while reducing CPU utilization, increasing both network performance and efficiency.

## Access a Simple, Verified Deployment with Intel Select Solutions for VMware Cloud Foundation

Intel Select Solutions for VMware Cloud Foundation are a fast, easy, and optimized way to build a hybrid cloud-ready environment—one with scalable support for both VMs and containers.

Choose Intel Select Solutions for VMware Cloud Foundation from your preferred data center infrastructure vendor and get the optimized and balanced performance that your business and your users demand in less time, with less tuning, and that is proven to perform.

Visit [intel.com/selectsolutions](https://intel.com/selectsolutions) for more information on Intel Select Solutions.

## Learn More

VMware Cloud Foundation: [vmware.com/products/cloud-foundation.html](https://vmware.com/products/cloud-foundation.html)

Hybrid cloud: <https://intel.ly/BeReady> and [intel.com/cloud](https://intel.com/cloud)

Intel Select Solutions for Hybrid Cloud: <https://intel.ly/HybridCloudSolutions>

Intel Select Solutions: [intel.com/selectsolutions](https://intel.com/selectsolutions)

Intel Xeon Scalable processors: [intel.com/xeonscalable](https://intel.com/xeonscalable)

Intel SSD Data Center Family:  
[intel.com/content/www/us/en/products/memory-storage/solid-state-drives/data-center-ssds.html](https://intel.com/content/www/us/en/products/memory-storage/solid-state-drives/data-center-ssds.html)

Intel Ethernet 700 Series: [intel.com/ethernet](https://intel.com/ethernet)

Intel and VMware alliance: [intel.com/vmware](https://intel.com/vmware)

Intel Select Solutions are supported by Intel® Builders: [http://builders.intel.com](https://builders.intel.com). Follow us on Twitter: [#IntelBuilders](https://twitter.com/IntelBuilders)

## Appendix A: The Base and Plus Configurations for Intel Select Solutions for VMware Cloud Foundation

To refer to a solution as an Intel Select Solution, a server vendor or data center solution provider must meet or exceed the defined minimum configuration ingredients and reference minimum benchmark-performance thresholds listed below.

Intel Select Solutions for VMware Cloud Foundation include separate specifications for the control-plane node and the application nodes. The Base configuration consists of a single node for storage. The Plus configuration demonstrates scalability through a three-node storage cluster.

INGREDIENT	INTEL® SELECT SOLUTIONS FOR VMWARE CLOUD FOUNDATION* <b>BASE CONFIGURATION</b> (8 NODES MINIMUM)	INTEL SELECT SOLUTIONS FOR VMWARE CLOUD FOUNDATION <b>PLUS CONFIGURATION</b> (8 NODES MINIMUM)
<b>MANAGEMENT DOMAIN (4-NODE CONFIGURATION)</b>		
<b>PROCESSOR</b>	2 x Intel® Xeon® Gold 6130 processor, 2.1 GHz, 16 cores, or a higher number Intel Xeon Scalable processor	2 x Intel Xeon Gold 6130 processor, 2.1 GHz, 16 cores, or a higher number Intel Xeon Scalable processor
<b>MEMORY</b>	384 GB (12 x 32 GB 2,667 MHz DDR4)	384 GB (12 x 32 GB 2,667 MHz DDR4)
<b>STORAGE</b>	<b>Cache tier:</b> 2 x Intel® Optane™ SSD DC P4800X Series (375 GB or higher) <b>Capacity tier:</b> 4 x Intel® SSD DC P4500 Series (2 TB or higher)	<b>Cache tier:</b> 2 x Intel Optane SSD DC P4800X Series (375 GB or higher) <b>Capacity tier:</b> 4 x Intel SSD DC P4500 Series (2 TB or higher)
<b>DATA NETWORK</b>	10 Gb Intel® Ethernet Connection X722 with Intel® Ethernet Network Connection OCP X527-DA2/DA4 or 10 Gb Intel® Ethernet Converged Network Adapter X710-DA2/DA4	10 Gb Intel Ethernet Connection X722 with Intel Ethernet Network Connection OCP X527-DA2/DA4 or 10 Gb Intel Ethernet Converged Network Adapter X710-DA2/DA4 or 25 Gb Intel® Ethernet Network Adapter XXV710-DA2 or 40 Gb Intel Ethernet Converged Network Adapter XL710-QDA2
<b>MANAGEMENT NETWORK</b>	Integrated 1 GbE or better	Integrated 1 GbE or better
<b>BOOT DRIVE</b>	1 x Intel SSD DC S4500 Series (150 GB or higher)**	2 x Intel SSD DC S4500 Series (150 GB or higher)**
<b>WORKLOAD DOMAIN (4-NODE CONFIGURATION)</b>		
<b>PROCESSOR</b>	2 x Intel Xeon Gold 6130 processor, 2.1 GHz, 16 cores, or a higher number Intel Xeon Scalable processor	2 x Intel Xeon Platinum 8160 processor, 2.1 GHz, 24 cores, or a higher number Intel Xeon Platinum processor
<b>MEMORY</b>	384 GB (12 x 32 GB 2,667 MHz DDR4)	768 GB (24 x 32 GB 2,667 MHz DDR4)
<b>STORAGE</b>	<b>Cache tier:</b> 2 x Intel Optane SSD DC P4800X Series (375 GB or higher) <b>Capacity tier:</b> 6 x Intel SSD DC P4500 Series (2 TB or higher)	<b>Cache tier:</b> 4 x Intel Optane SSD DC P4800X Series (375 GB or higher) <b>Capacity tier:</b> 12 x Intel SSD DC P4500 Series (2 TB or higher)
<b>DATA NETWORK</b>	10 Gb Intel Ethernet Converged Network Adapter X710	10 Gb Intel Ethernet Converged Network Adapter X710 or 25 Gb Intel Ethernet Converged Network Adapter XXV710 or 40 Gb Intel Ethernet Converged Network Adapter XL710
<b>MANAGEMENT NETWORK</b>	Integrated 1 GbE or better	Integrated 1 GbE or better

<b>BOOT DRIVE</b>	1 x Intel SSD DC S4500 Series (150 GB or higher)**	2 x Intel SSD DC S4500 Series (150 GB or higher) (RAID)**
<b>PERIPHERAL COMPONENT INTERCONNECT EXPRESS* (PCIe*) SWITCH</b>	2 x Intel® Accessory AXXP3SWX08080 eight-port PCIe Gen3 x8 switch AIC**	2 x Intel Accessory AXXP3SWX08080 eight-port PCIe Gen3 x8 switch AIC**
<b>SOFTWARE</b>		
<b>VMWARE CLOUD FOUNDATION</b>	2.3 or above	2.3 or above
<b>OTHER</b>		
<b>TRUSTED PLATFORM MODULE (TPM)</b>	TPM 1.2 or Intel® Platform Trust Technology (Intel® PTT)	TPM 1.2 or Intel PTT
<b>FIRMWARE AND SOFTWARE OPTIMIZATIONS</b>	VMware ESXi*, two sockets per node VMware ESXi power-management configuration set to high performance Disk groups—minimum two per node Intel® Trusted Execution Technology (Intel® TXT) enabled Intel® Hyper-Threading Technology (Intel® HT Technology) enabled Intel® Turbo Boost Technology enabled Intel® Speed Shift Technology, Hardware P-states (HWP) native Intel® Volume Management Device (Intel® VMD)** C-states disabled Power-management settings optimized for performance LLC prefetch enabled Uncore frequency scaling enabled	VMware ESXi, two sockets per node VMware ESXi power-management configuration set to high performance Disk groups—minimum four per node Intel TXT enabled Intel® HT Technology enabled Intel Turbo Boost Technology enabled Intel Speed Shift Technology, HWP native Intel VMD** C-states disabled Power-management settings optimized for performance LLC prefetch enabled Uncore frequency scaling enabled

**MINIMUM PERFORMANCE STANDARDS**

Verified to meet or exceed the following minimum performance capabilities:

<b>VMMARK 3.0* SCORE</b>	6.76 or higher	9.67 or higher
<b>VMMARK 3.0 TILE COUNT</b>	7 or higher	11 or higher

**BUSINESS VALUE OF CHOOSING A PLUS CONFIGURATION OVER A BASE CONFIGURATION**

With the Plus configuration of Intel Select Solutions for VMware Cloud Foundation shown above, businesses can achieve 43 percent more throughput while supporting 57 percent more workloads.<sup>8</sup>

\*\*Recommended, not required



<sup>1</sup> No computer system can be absolutely secure.

<sup>2</sup> VMware Cloud Foundation 2.3.1\* and earlier versions have additional requirements.

<sup>3</sup> The Intel® Ethernet 700 Series includes extensively tested network adapters, accessories (optics and cables), hardware, and software, in addition to broad operating system support. A full list of the product portfolio's solutions is available at [intel.com/ethernet](https://intel.com/ethernet). Hardware and software is thoroughly validated across Intel® Xeon® Scalable processors and the networking ecosystem. The products are optimized for Intel® architecture and a broad operating system ecosystem: Windows®, Linux® kernel, FreeBSD®, Red Hat® Enterprise Linux (RHEL®), SUSE®, Ubuntu®, Oracle Solaris®, and VMware ESXi®.

<sup>4</sup> The Intel® Ethernet 700 Series is backed with global support infrastructure for customers pre- and post-sales.

<sup>5</sup> Supported connections and media types for the Intel® Ethernet 700 Series are: direct-attach copper and fiber SR/LR (QSFP+, SFP+, SFP28, XLPP/CR4, 25G-CA/25G-SR/25G-LR), twisted-pair copper (1000BASE-T/10GBASE-T), backplane (XLAUI/XAUI/SFI/KR/KR4/KX/SGMI). Note that Intel is the only vendor offering the QSFP+ media type.

<sup>6</sup> The Intel® Ethernet 700 Series supported speeds include 1 GbE, 10 GbE, 25 GbE, and 40 GbE.

<sup>7</sup> VMmark 3.0\* generates a realistic measure of platform performance by incorporating a variety of platform-level workloads, such as shared-nothing migration, VM migration, clone and deploy, snapshotting, and storage migration operations, in addition to traditional application-level workloads. To learn more about the benchmark, visit [vmware.com/products/vmmark.html](https://vmware.com/products/vmmark.html).

<sup>8</sup> Intel internal testing as of June 6, 2018. **Base configuration:** Management domain: four nodes, 2 x Intel® Xeon® Gold 6130 processor, Intel® Server Board S2600WFT, total memory: 384 GB, 12 slots/32 GB/2,666 megatransfers per second (MT/s) DDR4 RDIMM, Intel® Hyper-Threading Technology (Intel® HT Technology) enabled, Intel® Turbo Boost Technology enabled; storage (boot): 1 x 150 GB Intel® SSD DC S3520 Series M.2 SATA, storage (cache): 2 x 375 GB Intel® Optane™ SSD DC P4800X Series Peripheral Component Interconnect Express\* (PCIe\*) with NVM Express\* (NVMe\*), storage (capacity): 4 x 2 TB Intel SSD DC P4500 Series PCIe with NVMe; network devices: 1 x dual-port 10 Gb Intel® Ethernet Converged Network Adapter X710, network speed: 10 GbE, ucode: 0x043, OS/software: VMware Cloud Foundation bundle 2.3.2\*. **Workload domain:** four nodes, 2 x Intel Xeon Gold 6130 processor, Intel Server Board S2600WFT, total memory: 384 GB, 12 slots/32 GB/2,666 MT/s DDR4 RDIMM, Intel HT Technology enabled, Intel Turbo Boost Technology enabled; storage (boot): 1 x 150 GB Intel SSD DC S3520 Series M.2 SATA, storage (cache): 2 x 375 GB Intel Optane SSD DC P4800X Series PCIe with NVMe; storage (capacity): 6 x 2 TB Intel SSD DC P4500 Series PCIe with NVMe; network devices: 1 x dual-port 10 Gb Intel Ethernet Converged Network Adapter X710, network speed: 10 GbE, ucode: 0x043, OS/software: VMware Cloud Foundation bundle 2.3.2. **Plus configuration:** Management domain: four nodes, 2 x Intel Xeon Gold 6130 processor, Intel Server Board S2600WFT, total memory: 384 GB, 12 slots/32 GB/2,666 MT/s DDR4 RDIMM, Intel HT Technology enabled, Intel Turbo Boost Technology enabled; storage (boot): 2 x 150 GB Intel SSD DC S3520 Series M.2 SATA, storage (cache): 4 x 375 GB Intel Optane SSD DC P4800X Series PCIe with NVMe; storage (capacity): 12 x 2 TB Intel SSD DC P4500 Series PCIe with NVMe; network devices: 1 x dual-port 10 Gb Intel Ethernet Converged Network Adapter X710, network speed: 10 GbE, ucode: 0x043, OS/software: VMware Cloud Foundation bundle 2.3.2. **Workload domain:** four nodes, 2 x Intel Xeon Platinum 8160 processor, Intel Server Board S2600WFT, total memory: 768 GB, 24 slots/32 GB/2,666 MT/s DDR4 RDIMM, Intel HT Technology enabled, Intel Turbo Boost Technology enabled; storage (boot): 2 x 150 GB Intel SSD DC S3520 Series M.2 SATA, storage (cache): 4 x 375 GB Intel Optane SSD DC P4800X Series PCIe with NVMe; storage (capacity): 12 x 2 TB Intel SSD DC P4500 Series PCIe with NVMe; network devices: 1 x dual-port 10 Gb Intel Ethernet Converged Network Adapter X710, network speed: 10 GbE, ucode: 0x043, OS/software: VMware Cloud Foundation bundle 2.3.2.

<sup>9</sup> VMmark 3.0\* improvement (see [vmware.com/products/vmmark/results3x.html](https://vmware.com/products/vmmark/results3x.html)):

**OLD:** Two HPE ProLiant DL380 Gen9\* servers, each with 2 x Intel® Xeon® processor E5-2699A v4 at 2.4 GHz (44 cores) and VMware ESXi 6.5\*. Result: 5.88 at 6 tiles.

**NEW:** Two HPE ProLiant DL380 Gen10 servers, each with 2 x Intel Xeon Platinum 8180 processors at 2.5 GHz (56 cores) and VMware ESXi 6.5.0d. Result: 6.99 at 8 tiles.

Performance results are based on Intel internal testing as of June 6, 2018, and may not reflect all publicly available security updates. See configuration disclosure for details. No product can be absolutely secure.

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark\* and MobileMark\*, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit [intel.com/benchmarks](https://intel.com/benchmarks).

Cost reduction scenarios described are intended as examples of how a given Intel- based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

Intel does not control or audit third-party benchmark data or the web sites referenced in this document. You should visit the referenced web site and confirm whether referenced data are accurate.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at [intel.com](https://intel.com).

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