TODAY’S BIG DATA BOOM

We’re currently in the throes of an unprecedented big data boom. A recent IDC study revealed that revenue from big data and advanced analytics is forecasted to climb to $203 billion by 2020. Data, when harnessed correctly, can certainly provide businesses an invaluable leg up on competition, but it also creates new pressures for IT:

- IT is now expected to turn large amounts of data from diverse sources into new insights
- They’re expected to create and deploy new services quickly
- They also need to continue protecting the business from data threats

And they must do all of this with scarce resources and flatlining budgets. In short—they’re expected to do much more with less. How can they meet the needs of the business on years-old infrastructure?

CHALLENGES WITH AGING INFRASTRUCTURE

From both an IT and business performance standpoint, old infrastructure is a barrier to growth in a digital economy. The Enterprise Strategy Group recently conducted a survey where they found that companies with older infrastructure are being outpaced by companies who are using IT resources to increase their agility and competitiveness. The survey showed that companies with older infrastructure experienced a 6x slower rate for product innovation and time to market. As maintenance costs rise and performance struggles to keep up, it makes little sense to retain older server equipment beyond a certain point. At four years, performance drops significantly, while OpEx costs sharply increase. Organizations running outdated infrastructures are at risk of losing their competitive edge.

TRANSFORM YOUR DATA CENTER WITH WINDOWS SERVER 2016 AND INTEL® XEON® SCALABLE PLATFORM

Your data center doesn’t need to be an obstacle to growth—it should be an asset. It’s time to transform your data center and infrastructure to deliver new value to you and your organization. The combination of Microsoft Windows Server 2016 and Intel® Xeon® Scalable processors delivers the breakthrough improvements in performance, efficiency, and security you need to transform your data center and compete in this new digital world.

PERFORMANCE FOUNDATION FOR THE SOFTWARE-DEFINED DATA CENTER

- Built-in hyperconverged capabilities
- More cores, memory bandwidth, and doubled Advanced Vector Extensions

EFFICIENCY DATA CENTER CONSOLIDATION

- Hyperconvergence, networking, and container advancements
- Compute, storage, and networking

SECURITY END-TO-END DATA CENTER SECURITY

- OS-level security
- Hardware-level security
The hyperconverged infrastructure capability in Windows Server 2016—running compute and storage together in each server node—can allow you to go from today’s rigid, siloed, complex datacenter environment to one that’s efficient, automated, and cost-effective. Multiple nodes can be clustered together to create pools of shared compute and storage resources, designed for scale-as-you-grow convenience. And the use of standard hardware yields an infrastructure that’s designed to be more flexible and simpler to manage than traditional enterprise storage infrastructure. Gain the agility of the public cloud without relinquishing control of your on-premises hardware.

Refreshing Windows Server 2016 with the Intel® Xeon® Scalable platform will also give you new features for advanced virtual machine management. From the hypervisor, Hyper-V running on Windows Server 2016 provides significant improvements in physical memory support, virtual machine memory support, and virtual machine virtual processor support. And the Intel® Xeon® Scalable platform makes it possible to support more memory, cores, and ultimately, to run 4.2x more VMs, giving you improved performance and efficiencies.

**Intel performance optimizations**

- Integrated iWARP Remote Direct Memory Access (RDMA) allows server nodes to directly communicate with one another and speeds connectivity and traffic between nodes.
- Intel® Optane® SSDs provide breakthrough performance with ultra-low latency, ideal for the cache tier in Windows Server.
- Intel® AVX-512 improves compute performance by doubling the number of floating-point operations (FLOP) per second per clock cycle.
- Intel® Speed Shift Technology expands performance for your most demanding computational tasks.
Running Windows Server 2016 on the Intel® Xeon® Scalable Platform, not only gives you more horsepower in your data center, it affords more efficiency. You’re able to consolidate multiple servers and support more VMs in the process. By reducing the number of servers, you’re saving on power, cooling, and space costs in your data center.

The hyperconverged capability in Windows Server 2016 using Storage Spaces Direct is a win/win for any enterprise looking to transform. By moving to a hyperconverged architecture, you’re combining compute and storage resources on each server in the cluster. When you want to scale, you can add a new server into the cluster, which increases performance as well as capacity. This allows for modular growth. Every time you scale for capacity, the performance scales with you. With compute and storage running together, you make more efficient use of resources.

It also brings you closer to realizing the benefits of the software-defined model. Software-defined storage from Windows Server 2016 simplifies provisioning and management of storage resources with a scalable, flexible, and easy-to-configure solution for a wide range of Hyper-V workloads. And software-defined networking increases network agility for workload mobility, while also reducing costs.

Intel efficiency optimizations

- Intel® Node Manager 4.0 to maximize performance per watt on mixed workloads by up to 42.8%.5
- Xeon® Scalable processors enable mirror-accelerated parity in Windows Server 2016, for more efficient data durability than simple replication.
Data should be encrypted in all of its phases: at rest, in use, and in transit. Companies can do this today, but usually through a patchwork of disparate solutions. Running Windows Server 2016 on the Intel® Xeon® Scalable platform delivers the end-to-end security data centers need today—in a single strategy.

Windows Server 2016 provides granular security at the OS level. For example, Device Guard ensures that only permitted binaries can be executed from the moment the OS is booted. If someone tries to infect your OS with malware, they can’t run it when the OS is protected by Code Integrity. And the new Microsoft Shielded Virtual Machines technology protects virtual machines from compromised or malicious administrators in the fabric by encrypting disks and the state of virtual machines so that only the VM or tenant administrators can access them.

Intel provides granular security at the hardware layer by building our technologies directly into the silicon. We do this because silicon runs faster than software, and provides a much smaller attack surface. Through this method, the Intel® Xeon® Scalable platform has security built into every layer.

**Intel security optimizations**

- Intel® Platform Trust Technology (PTT) for tamper-free boot-up and secure storage for sensitive data and keys.
- Intel® Boot Guard puts cryptographic measurement of Early Firmware into the platform protected storage device and cryptographically verifies the Early Firmware using the OEM provided policies.
- Intel® TXT verifies BIOS images, kernel images, and all modules loaded at boot time as known good, trusted versions when a system is powered on.
WORKLOAD PERFORMANCE AND BENCHMARKS

Refreshing Windows Server 2016 with the Intel® Xeon® Scalable platform offers versatility across diverse workloads, whether deployed in traditional datacenter architecture, in the cloud, or within a hosted environment.

When customers pair Windows Server 2016 with the Intel® Xeon® Scalable platform, they benefit from:

Network performance gains with RDMA:

- 50% more input/output per second
- 45% lower latency for applications

Improved storage infrastructure:

- High CPU headroom: 23.7% CPU utilization
- Low latency: average read latency of 80 microseconds

World-record benchmark results with Lenovo* ThinkSystem* SR650, SQL Server 2017, and Windows Server 2016:

- TPC-E throughput – 6,598.36 tpsE on a 2-socket server
- $93.48 USD per tpsE – overall TPC-E price/performance result

INTEL® SELECT SOLUTIONS FOR WINDOWS SERVER SOFTWARE-DEFINED STORAGE

Advance your hyperconverged infrastructure with Intel® Select Solutions for Windows Server Software-Defined Storage.

- Transform your infrastructure faster, with lower investment
- Reduce the time required to evaluate, select, and deploy Windows Server Software-Defined Solutions
- Performance is verified to a specific benchmark across compute, storage, and network on a trusted Intel architecture
- Intel and Microsoft have collaborated with leading OEMs to deliver Intel® Select Solutions to market

Deploying Intel® Xeon® Scalable processors with an Intel® Select Solution delivers verified solution performance to meet high-quality thresholds for data protection, resiliency, system agility, and service reliability.

NEXT STEPS

Accelerate business transformation by partnering with Intel and Microsoft. Benefit from solutions such as:

- Intel® Xeon® Scalable platform
- Windows Server 2016
- Intel® Cloud Builders
- Intel® Storage Builders
- Intel and Microsoft Data Center Transformation site
- Intel® Select Solutions

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Benchmark results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.

Intel® Advanced Vector Extensions (Intel® AVX)® provides higher throughput to certain processor operations. Due to varying processor power characteristics, utilizing AVX instructions may cause a) some parts to operate at less than the rated frequency and b) some parts with Intel® Turbo Boost Technology 2.0 to not achieve any or maximum turbo frequencies. Performance varies depending on hardware, software, and system configuration and you can learn more at http://www.intel.com/go/maximum.

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