

## CASE STUDY

Cloud services  
Cloud services, SaaS



# Massive Cloud Deployment Speeds Zoho's SaaS Solutions for Business

Latest data center building blocks from Intel accelerate Zoho's cloud-based application suite for business productivity, serving 35 million customers worldwide

### At a Glance:

- Zoho's SaaS infrastructure relies on multiple data centers in several countries – hosting many applications
- The company worked with Intel to optimize, benchmark and test the applications using the latest Intel® technologies and software
- The combined team enhanced Zoho's infrastructure to reduce latency, increase performance and meet regulatory requirements
- Zoho benefitted from new technology including Intel® Xeon® Scalable processors, Intel® 3D NAND SSDs and 25GB Intel® Ethernet Adapters

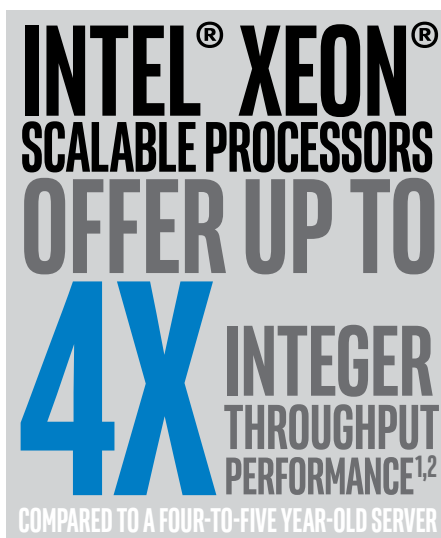
The speed of business today mandates comprehensive and integrated software solutions for greater productivity and faster business insights. As a software-as-a-service (SaaS) provider, Zoho offers holistic and integrated software solutions to companies of all sizes. Zoho applications help customers manage multiple business processes like customer relationship management (CRM), human resources and accounting. To best serve the millions of users who depend on Zoho applications, the Intel team worked closely with the company to enhance their comprehensive cloud solution. Hardware upgrades to the India data center included the latest Intel® Xeon® Scalable processors, Intel® 3D NAND SSDs, and 25GbE Intel® Ethernet Adapters. Zoho applications, too, underwent scrutiny for potential areas of optimization. Because of these efforts, Zoho's holistic solution provides its ever-growing client base a faster, more robust user experience.

### Challenge

- Zoho's massive deployment relies on multiple data centers located in several countries. These data centers must deliver low latency, scalability, reliability, and compliance levels that customers' businesses require.
- With many applications – including over 40 comprising its comprehensive Zoho One\* suite alone – the SaaS provider's cloud infrastructure must allow fast application deployments, updates, and easy addition of new modules.
- Zoho's data centers require underlying technologies which offer excellent price-performance, low power consumption, thermal efficiency, and more.

### Solution

- Working closely with Zoho to ensure a detailed understanding of its cloud infrastructure needs, the Intel team kicked off the eight-month collaboration process with a specially tailored "Deep Dive" workshop. During that time, the teams architected an ideal hardware solution to support Zoho's needs and performed application optimizations to get the most from the new hardware.
- Before deployment, Intel's team engaged with Zoho to optimize, test, and benchmark Zoho applications using the latest Intel® technologies and software.
- The team enhanced Zoho's infrastructure and applications to reduce latency, increase performance, and meet the regional regulatory requirements needed by Zoho customers.



## Results

Zoho experienced several benefits resulting from Intel® hardware implementation:

- Intel Xeon Scalable processors offer up to 4x integer throughput performance<sup>1,2</sup> compared to a four-to-five-year-old server.
- Intel 3D NAND SSD Data Center P4600 Series<sup>3</sup> offers a new design optimized for cloud storage architectures needing improved capacity, manageability, and reliability. Intel 3D NAND SSD Data Center P4600 Series enables greater read/write performance with 64k sequential read/write up to 3280/2100 MB/s, and 4k random read/write up to 702,500/257,000 IOPS<sup>4,5</sup>.
- 25GbE Intel Ethernet Adapter XXV710-DA2 delivers 25GbE connectivity that is backward compatible to 1/10GbE making the migration to higher speeds easier. 25GbE Intel Ethernet Adapter XXV710-DA2 also includes features like Intel® Ethernet Flow Director (Intel® Ethernet FD), an advanced traffic steering capability, which increases the number of transactions per second and reduces latency for cloud applications<sup>6</sup>.

## Building a Faster Solution for Global SaaS Delivery

Around the globe, millions of concurrent users demand an agile experience from Zoho applications 24 hours a day. In addition to scalability and performance, security represents another major consideration for Zoho's deployment. Behind the scenes, customers' data must remain protected. In some cases, regionally specific and legally based compliance requirements also mandate careful governance of customer data.

Intel and Zoho teams collaborated on the herculean challenge of accelerating both Zoho's system architecture and the software running on it. Several hardware considerations also proved paramount to the data center implementation. Zoho also needed to derive the greatest data center efficiency, accounting for factors like power consumption, cooling, telemetry and more. A proof-of-concept system helped evaluate and optimize the hardware configuration before implementation in Zoho's data center. As a result, the team had a clear picture of anticipated improvements, and the return on investments to expect.

## Technical Components of the Solution

Intel® Xeon® Gold 5118 processor  
 Intel® Xeon® Gold 5115 processor  
 Intel® Xeon® Silver 4114 processor  
 Intel® Xeon® Silver 4110 processor  
 25GbE Intel® Ethernet Adapter XXV710-DA2  
 Intel® 3D NAND P4600 NVMe SSD 1.6TB

## Optimizing Cloud Infrastructure for Enhanced Scale

Over an eight-month period of work together, Zoho and Intel scrutinized the existing solution for any bottlenecks that impeded customer experience. By optimizing Intel hardware alongside Zoho's applications, the team ensured each application made the most of the new hardware.

Zoho's nine data centers in India, Europe, China, Singapore, Australia, and the United States meet a high standard for customer experience today. However, the enhanced cloud infrastructure and optimized applications deployed in the India data center pave the way for even more comprehensive and integrated Zoho solutions in the future.

## A Better, Faster Cloud with Greater ROI

Zoho's SaaS solutions address major customer needs through a comprehensive software suite. Using Zoho's advanced tools, enterprises and small and medium-sized businesses (SMBs) around the world improve employee productivity and integrate cross-company functions like CRM, human resources, and finance. When combined, Zoho applications provide better insights across the organization for better collaboration and faster, more comprehensive business decisions.

### Investment strategy

To best meet the needs of its growing client base, Zoho adopted several Intel technologies so its data centers could accommodate larger-scale usage scenarios. Together, a combination of Intel Xeon processors, Intel 3D NAND SSDs, and 25GbE Intel Ethernet Adapter XXV710-DA2 make a substantial contribution to each data center's ability to handle increased traffic.

## Intel® Technology Accelerates Data Centers Beneath the Cloud

At the beginning of the Zoho engagement process, a “Deep Dive” workshop explored ways in which Intel could bolster Zoho’s existing data centers. The process led to a collaborative effort to explore Zoho’s infrastructure in detail for possible areas of optimization.

To determine if Intel’s newest generation of technologies would deliver the substantial data center improvements desired, a team comprised of Zoho and Intel experts created sandboxed test systems for use in benchmarking. These test systems helped determine the optimal hardware configuration behind Zoho’s massive cloud deployment. Using the latest processors, SSDs, and 25Gb Ethernet adapters – unseating the existing 10Gb network in critical system areas – the Zoho team witnessed significant performance and scalability increases while ensuring capability for security, failover, and other system requirements.

Once the sandbox system proved its capability to address Zoho’s compute power and network I/O requirements, Zoho’s engineering team worked closely with Intel and OEM teams to introduce these ingredients into Zoho’s data centers in India and then deploy them in the production system at full scale.

Moving forward, in anticipation of further cloud optimizations, Intel will maintain ongoing engagement with Zoho’s engineering team. The process will align with Zoho’s growth path and Intel’s longer-term cloud technologies roadmap. This process will ensure that Intel delivers the greatest levels of investment return for Zoho’s ongoing needs.

“Millions of customers depend on Zoho to deliver a broad suite of applications for their mission-critical business processes and productivity each day. We cannot fail them. We chose Intel’s end-to-end hardware and software solutions for their proven performance, scalability, and reliability to empower our global data centers.” - Shailesh Kumar Davey, Vice President, Zoho

## Spotlight on Zoho

India’s premier software-as-a-service provider, Zoho, serves over 35 million customers worldwide through its comprehensive portfolio of cloud-based business applications. Its flagship product suite, Zoho One\*, offers more than 40 integrated applications which together comprise a holistic and cost-effective solution for corporate productivity and automated business processes. Today, enterprise and small and medium business (SMB) customers depend on Zoho’s applications to support sales, email and collaboration, human resources, finance, and customer relationship management (CRM). Zoho’s infrastructure investments make its cloud deployment the largest in India, with support from nine data centers around the world.

## Lessons Learned

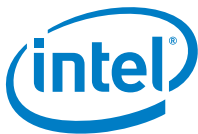
- During the process of evaluating, architecting, and implementing changes to Zoho’s cloud infrastructure, the team shared best practices for similarly large deployments. The team also noted the importance of optimizing cloud-based applications to make the most of the new data center hardware.
- Early collaboration with Intel teammates helped ensure the Zoho team learned about the benefits of the latest product offerings, and how those implementations could better support critical data centers.
- The team performed a walkthrough of Intel’s Bangalore data center, sharing perspectives on the benefits of product updates, networking best practices, and considerations for maximum uptime.

## Learn More

- **Intel® solutions for the cloud:**  
[www.intel.com/CSP](http://www.intel.com/CSP)
- **Intel® Xeon® processor family:**  
[www.intel.com/xeon](http://www.intel.com/xeon)

Find the solution that is right for your organization.  
Contact your Intel representative or visit  
[www.intel.com/csp](http://www.intel.com/csp)

### Solution Provided By:



<sup>1</sup> 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 [www.intel.com/benchmarks](http://www.intel.com/benchmarks).

Performance results are based on Intel testing as of 1st June 2018 and may not reflect all publicly available security updates. See configuration disclosure for details. No component or product can be absolutely secure.

Results have been estimated or simulated using internal Intel analysis or architecture simulation or modeling, and provided to you for informational purposes. Any differences in your system hardware, software or configuration may affect your actual performance

<sup>2</sup> Configuration details: Per node 4X higher integer throughput performance: estimate based on SPECrate\*2017\_int\_base on Intel internal platforms as of June 2018: 1x node, 2x Intel® Xeon® Processor E5-2690, 128GB total memory, 16 slots / 8 GB/ 1600MT/s DDR3 RDIMM, Benchmark: SPEC CPU2017 V1.2, Compiler: Intel® Compiler IC17 update 2, Optimized libraries / versions: IC18.0\_20170901, Other Software: MicroQuill SMART HEAP. uCode: 713, OS: Red Hat Enterprise Linux\* 7.4, Kernel: 3.10.0-693.11.6.el7.x86\_64 x86\_64, Score 65.5 vs. 1x Node, 2x Intel® Xeon® Platinum 8180 Processor, 384GB total memory, 12 slots / 32 GB / 2666 MT/s DDR4, Benchmark software: SPEC CPU® 2017, Compiler: Intel® Compiler IC18 OEM, Optimized libraries: AVX512, ucode:0x043, Red Hat Enterprise Linux\* 7.4, 3.10.0-693.11.6.el7.x86\_64, Score: 281.

<sup>3</sup> <https://www.intel.com/content/www/us/en/products/docs/memory-storage/solid-state-drives/ssd-dc-p4600-brief.html>

<sup>4</sup> <https://www.intel.com/content/www/us/en/products/docs/memory-storage/solid-state-drives/ssd-dc-p4600-brief.html>

<sup>5</sup> <https://www.intel.com/content/www/us/en/products/docs/memory-storage/solid-state-drives/ssd-dc-p4600-brief.html>

<sup>6</sup> <https://www.intel.com/content/www/us/en/ethernet-products/network-adapters/ethernet-xxv710-brief.html>

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