



White Paper

The SAP® Business ByDesign® Solution Powered by Intel® Xeon® Scalable Processors

SAP powers the SAP Business ByDesign solution with Intel® processors to provide companies with reliable, real-time, scalable business management and the agility of the cloud

An enterprise resource planning (ERP) platform is the engine that drives a business. ERP integrates mission-critical processes into one system with a shared database that enables efficiencies that are not otherwise available.

Historically, implementing high-performance ERP has been out of reach for all but the largest enterprises. Deploying ERP has traditionally meant having the necessary on-premises infrastructure, staff, and budget to implement, manage, and maintain it. This is because if the ERP platform went down, the entire business could go down. Managing availability and infrastructure posed a barrier to ERP implementation for mid-market companies and companies with geographically distributed offices.

Cloud computing has changed all that. With cloud computing, any size company can access a high-performance ERP platform, such as the SAP® Business ByDesign® solution, without the need to purchase, staff, or manage on-premises infrastructure. What's more, the cloud-based SAP Business ByDesign solution is easy to manage, cost-effective, high-performing, scalable, and reliable enough to keep up with today's business needs and future growth, which is why, in 2017, more than 4,100 companies across 131 countries used the SAP Business ByDesign solution.¹

Companies using the SAP Business ByDesign solution benefit from its ERP capabilities and the SAP HANA® in-memory database platform. SAP uses the SAP HANA platform as the database that fuels the SAP Business ByDesign solution. The SAP HANA platform has a strong history of enabling large enterprises to manage massive quantities of data, process transactions, and develop applications in real time.

SAP also powers the SAP Business ByDesign solution and the SAP HANA platform with Intel® Xeon® Scalable processors, which lets SAP maximize performance, reliability, and scalability for SAP Business ByDesign users.

This paper looks at the benefits of the cloud-based SAP Business ByDesign solution. It also looks at how and why Intel Xeon Scalable processors help SAP deliver this innovative, high-performance, security-enabled, and scalable cloud-based ERP solution, including why SAP chose Intel® processors. The paper covers recent performance tests done by SAP that demonstrate the benefits SAP and SAP Business ByDesign customers can realize with the solution being powered by Intel Xeon Scalable processors.



The SAP Business ByDesign Solution: Scalable ERP On-Demand

Studies have shown that the majority of the companies that choose cloud-based ERP solutions realize cost savings.² Choosing the SAP Business ByDesign solution for ERP is no exception. The cloud-based software-as-a-service (SaaS) SAP Business ByDesign solution helps businesses manage their entire organizations or remotely located subsidiaries using a security-enabled, hosted ERP suite that supports growth and is available anytime, anywhere, on virtually any device. It gives businesses a flexible, affordable way to automate processes and functions across all levels of their companies—whether those functions are co-located or geographically distributed. Functions that can be integrated and automated span from finance and human resources (HR) to customer-relationship management (CRM), marketing and sales, procurement, accounting, supply-chain management (SCM), and more.

With a single subscription to the SAP Business ByDesign integrated cloud suite, companies can access security features and scalability at a manageable total cost of ownership (TCO), and with a rapid return on investment (ROI), without purchasing and managing on-premises infrastructure. They can have the peace of mind of knowing their data sits in security-enabled data centers that are managed, monitored, and maintained by the experts at SAP.

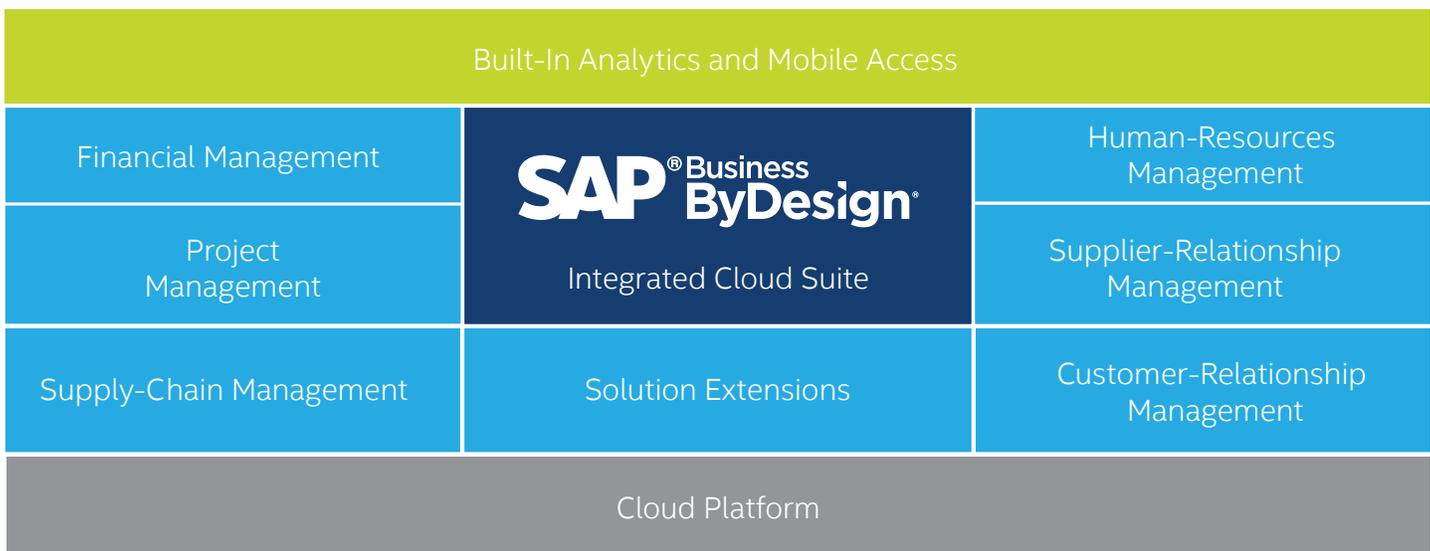


Figure 1. The SAP[®] Business ByDesign[®] solution at a glance

Businesses can also use the SAP Business ByDesign solution knowing that it incorporates SAP's experience in managing critical business functions for the world's largest and most successful enterprises in an on-demand SaaS model. That model enables mid-market companies to manage virtually all business processes and to streamline operations while accessing timely business insights with integrated analytics and reporting powered by the SAP HANA platform. The subscription-based model is extensible, capable of growing as a business grows, and is used in more than 131 countries around the globe.¹

SAP Business ByDesign Features and Benefits

Key benefits of the cloud-based SAP Business ByDesign solution center around its ability to integrate business functions, including analytics and reporting, into a single, secure, easy-to-use suite that can be used at the office or on the road.

Streamline Processes to Maximize Efficiency across the Organization

Reflecting the integrated nature of modern businesses, the SAP Business ByDesign solution also enables end-to-end business processes that span organizational boundaries and include:

- **CRM** capabilities that support personalization for campaigns, lead generation, and customer qualification, along with complete sales-force automation to improve customer contacts
- **Finance (FIN)** functionality to support real-time financial information and visibility, streamlined processes across organizational units, and improved management of cash flow
- **HR/human capital management (HCM)** features to improve organizational management, administer the workforce, manage time and attendance, and enable employee HR self-service
- **Supplier relationship management (SRM)** functionality that supports self-service to achieve centralized vendor management with real-time information that can improve efficiencies and reduce time and costs
- **Project-management** capabilities that enable real-time project management for any size of project to improve efficiency, productivity, and profitability
- **SCM** features that facilitate improved supply-and-demand matching and customer-supplier collaboration, which can accelerate time to market, aid supply-chain modeling, and improve inventory control and logistics

Gain Real-Time Insights with Integrated Analytics and Reporting Powered by the SAP HANA® Platform

With the SAP Business ByDesign solution, the database used to integrate data across a company is the SAP HANA platform, which is an in-memory database that is highly available, scalable, and security-enabled. It enables accessing data in real-time to make decisions virtually the minute data is in-hand. SAP publishes scheduled maintenance windows well in advance to ensure higher systems availability and that customers maintain access to the latest software and infrastructure.

The platform's powerful analytical processing provides integrated analytics with an extensive, flexible analytics feature set that can be used to customize reports using a guided process. It also enables controlling access to reports with user/role permissions.

A single database ensures data can be seamlessly shared across the entire company. The same data is available to all users without the need for the complex, time-consuming, and costly integrations that can be needed to achieve integration and transparency of data siloed in point solutions used by different functions or departments.

Manage Business from Anywhere and at Any Time

A cloud-based ERP is not tied to business hours or IT availability. It is also available 24 hours a day, 7 days a week. Users can access it from any device—desktop, laptop, smart phone, or tablet—anytime and anywhere there is an active Internet connection. So when a critical inventory or other business issue arises at 8:00 p.m., staff can carry out effective remediation and keep the business running.

Know Data Is Secure and Enforce Security In-House

SAP Business ByDesign users can rely on SAP to help secure business data in its security-enabled data centers that are managed, monitored, and maintained by the company's experts. However, companies that use the SAP Business ByDesign

Subscription and Deployment Options

The SAP® Business ByDesign® solution is licensed through monthly subscription fees calculated on a named-user basis. There are three categories of users: self-service users, team users, and enterprise users, and each category has its own pricing and functionality.

With the SAP Business ByDesign solution, all core services, such as backup, recovery, and regular upgrades, are handled by SAP and included in the monthly fee. Businesses can choose to deploy the complete solution or to address immediate business needs first and add functionality as required.

Deployment options include a single-tenant public edition for 20 or more users, with shared hardware, quarterly releases, upgrade dates determined by SAP, and a dedicated multi-tenant private edition with quarterly releases and upgrades agreed to by SAP and the customer. The private option must include 10 tenants or more and 200 users or more.

solution retain control of their in-house security. The SAP Business ByDesign solution helps businesses enforce security with capabilities such as secured e-mail, the ability to scan incoming and outgoing documents for viruses, authorization-based service consumption, and support for single sign-on (SSO).

Access Features for Easy Customization, Integration, and Ease of Use

The SAP Business ByDesign solution enables a business and its users to customize configurations and capabilities as needed for business needs. This includes modifying the business configuration and customizing user interfaces (UIs), reports, and forms to allow the service to be adapted to meet a company's unique business processes and workflows. Additional features that support customization and ease of use include, but are not limited to:

- **APIs and a software development kit (SDK)** that enable extending the SAP Business ByDesign solution through easy integration with other systems. The SAP Business ByDesign solution can be fully integrated with other cloud and on-premises SAP® solutions as well.
- **Integration with Microsoft Office* products** to enable managing business processes using Microsoft Outlook* and to share information out to Microsoft Excel* and then back to the SAP Business ByDesign application.
- **Workflow configuration** that enables business-process management.
- **The SAP Business ByDesign migration tool** for a fast, effective means of preparing and validating data to be loaded into the SAP Business ByDesign solution for reducing cost and manual labor while enabling fast deployment.
- **Scheduling for mass data processing** so that data can be processed in the background or at a predefined time interval.

Access Extended Solutions with Partner Offerings, Add-Ons, and Integrations

SAP and its partners offer purpose-built enterprise applications that extend the functionality of the SAP Business ByDesign solution. These applications enable businesses to rapidly and easily incorporate innovation into the business landscape. Businesses can also build and run their own add-on services. In 2017, 3,172 customer add-ons and integration scenarios were created.¹

Why SAP Powers the SAP Business ByDesign Solution with Intel Xeon Scalable Processors

Intel and SAP have collaborated on SAP solutions and Intel processors for more than 20 years. And the companies have collaborated on the SAP HANA platform from its inception; Intel provided the original reference architecture for the SAP HANA platform.

In other words, Intel processors are made to run the SAP HANA platform, and the SAP HANA platform is optimized to run on Intel processors. Intel Xeon processors power more than 75 percent of all new SAP solution deployments.³ Intel processors also power the majority of the world's data centers, which means most cloud solutions—regardless of vendor—are powered by Intel processors.⁴

When creating the cloud infrastructure for the SAP Business ByDesign solution, SAP chose servers powered by Intel Xeon processors for its data centers to enable the level of IT services required to satisfy SAP customers worldwide, while containing the costs to deliver those services. The SAP Business ByDesign solution delivers one of the best TCOs that SAP realizes.⁵

“The engineering work of our joint SAP and Intel team drives tangible results for our customers. Benchmarking SAP Business ByDesign and proving the close-to-linear scalability is a testimonial to what native SAP cloud applications can accomplish with the latest Intel technology.”

— Rainer Zinow, Senior Vice President,
SAP Business ByDesign

Today, the SAP Business ByDesign solution takes advantage of Intel's high-performing Intel Xeon Scalable processors. With Intel Xeon Scalable processors, SAP's suite of cloud-based applications provides businesses with more value in terms of number of concurrent users supported, time to solution, size of workloads accommodated, security, scalability, and more, including fast access to actionable data and the agility needed in an ERP solution.

Proof That Newer Processors Offer More for SAP and SAP Business ByDesign Customers

To examine the performance and scalability that can be achieved using SAP Business ByDesign powered by the latest generation of Intel Xeon Scalable processors in the cloud, SAP performed internal testing. The testing ran the SAP Business ByDesign solution and the supporting SAP HANA database on the earlier-generation Intel Xeon processor E5-2699 v4 compared to Intel Xeon Platinum 8180 processors.⁶ Micro Focus LoadRunner* was used to compare the ability of the servers to process an increasing quantity of customer invoices with 20 line items each. Different numbers of parallel input channels were used to simulate scaling the system load. The SAP Business ByDesign solution ran on one server, and the SAP HANA database ran on another.

The results showed that the Intel Xeon Platinum 8180 processors consistently processed 29.73 percent more invoices at each level of CPU utilization.⁶ At 90-percent CPU utilization, the Intel Xeon Platinum 8180 processors processed 43,200 invoices per hour, whereas the Intel Xeon processor E5-2699 v4 processed 33,300 invoices per hour.⁶

The increase in capacity per server means that SAP can reduce the number of servers it uses to support a given load. This impacts overall power consumption, lowering costs and minimizing the environmental impact of the data center.

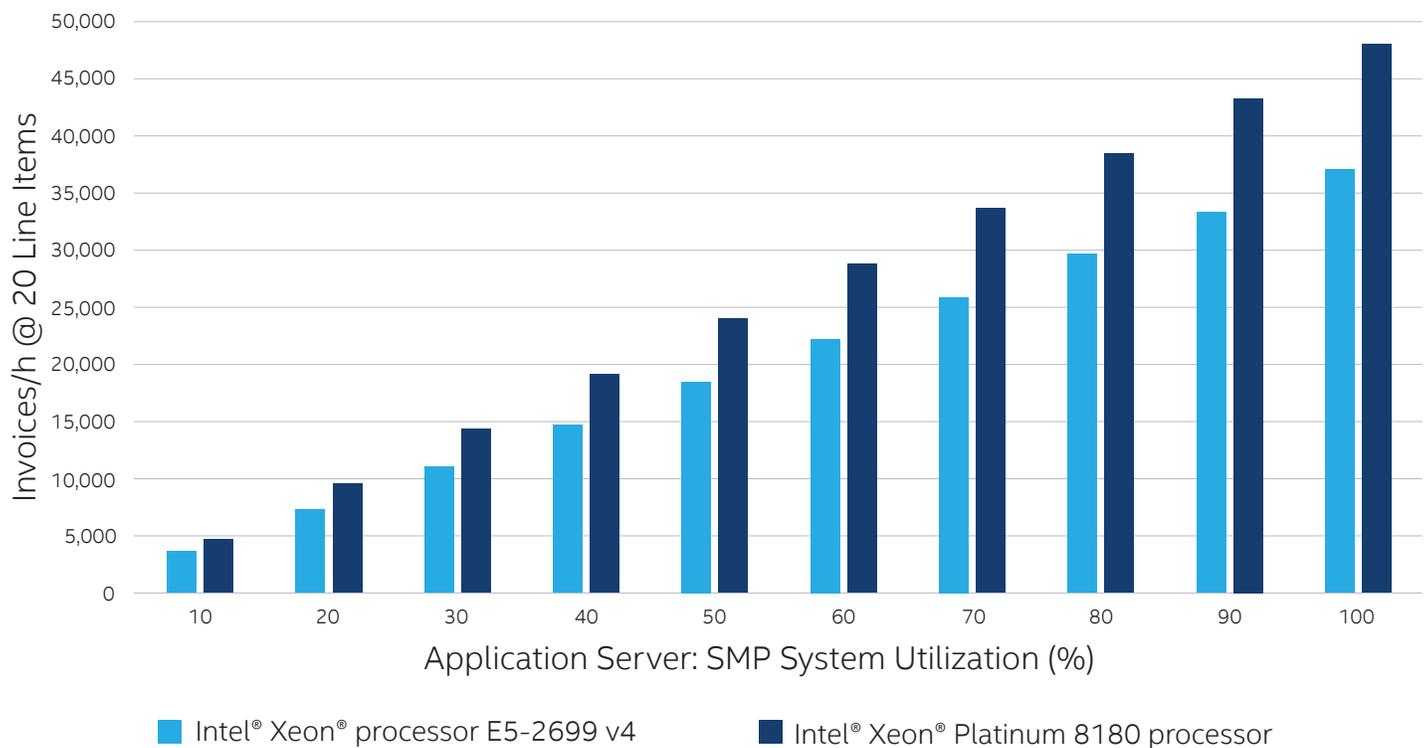


Figure 2. Internal testing at SAP shows that Intel® Xeon® Platinum 8180 processors consistently process an average of 29.73 percent more invoices at each level of CPU utilization compared to the previous-generation Intel Xeon processor E5-2699 v4⁶

To further reduce the costs of maintaining capacity, the Intel Xeon Scalable processors can dynamically scale processor performance up and down, reducing power consumption in low-activity states to match fluctuations in application usage. Ultimately, this helps ensure that SAP's customers get the performance they need when they need it, while allowing SAP to better control infrastructure costs.

Intel has worked closely with SAP to maximize scalability on servers powered by Intel Xeon Scalable processors to ensure consistent linear performance gains as workloads and CPU utilization increase, as shown by the testing.

Intel Xeon Scalable Processors: The Power behind SAP® Cloud Solutions

When creating the cloud infrastructure for the SAP Business ByDesign solution, SAP chose servers based on Intel Xeon processors to ensure the level of IT services required to satisfy its customers around the world, while containing the cost of delivering those services.

Intel Xeon Scalable processors boost performance for SAP itself, and for SAP Business ByDesign subscribers. They also support Intel's and SAP's vision of open cloud computing. Intel has been a key contributor to the community, shaping the future of cloud computing. Intel's own experiences with building internal and external private and hybrid clouds, and with helping develop public cloud services, has driven Intel's vision for cloud computing, in which:

- **Separate clouds are federated to interoperate with each other**, allowing easy migration across internal and external boundaries to scale and support services as needed
- **Services are automated to manage themselves**, based on policies to meet service-level agreements (SLAs) and customer requirements
- **Systems are client-aware**, enabling applications to deliver the best customer experience possible on users' devices

Enhanced features engineered into Intel Xeon Scalable processors help fulfill Intel's vision of open cloud computing. Those features maximize performance, reliability, availability, serviceability, security, and manageability in the cloud and for the SAP Business ByDesign solution and the SAP HANA platform. Features that benefit SAP Business ByDesign subscribers include:

- **Intel® Advanced Vector Extensions 512 (Intel® AVX-512)**, which has ultra-wide 512-bit vector operations capabilities to handle the most demanding computational tasks and aid data analytics and performance
- **Integrated Intel® QuickAssist Technology (Intel® QAT)**, which offers hardware-assisted acceleration for critical workloads, such as data compression and cryptography
- **Intel® Ultra Path Interconnect (Intel® UPI)**, the successor to Intel® QuickPath Interconnect (Intel® QPI), which improves bandwidth for input/output (I/O)-intensive workloads

Intel Xeon Scalable processors offer a highly scalable, future-forward infrastructure platform built for the cloud and the cloud-hosted SAP Business ByDesign solution. Their higher core and thread counts and more cache compared to previous-generation processors—up to 28 cores with 56 threads, 38.5 MB of L3 Cache, and a larger 1 MB L2 cache—allow more data to be stored close to the cores, which helps reduce memory requests and helps deliver a faster time-to-solution.

The SAP® Business ByDesign® Solution Offers a Simplified User Experience

The SAP Business ByDesign solution uses the SAP Fiori® user experience (UX) to offer a personalized and simplified UX. The SAP Fiori UX uses modern UX-design principles to deliver a role-based, consumer-grade UX across all lines of business, tasks, and devices. SAP Fiori benefits include:

- Increased productivity, with faster, direct access to relevant information and applications
- Transparency on items needing attention, including timely notifications
- Helps users decide what they need to do next
- Enables users to take quick and informed actions
- Increased user satisfaction

Intel Xeon Scalable processors also have up to 50 percent more memory support for online analytical processing (OLAP) and online transaction processing (OLTP) workloads compared to previous-generation processors.⁷ With support for six memory channels and DDR4-2666, Intel Xeon Scalable processors support fast, integrated I/O services, including Peripheral Component Interconnect Express* (PCIe*) 3.0, to help remove bottlenecks on the platform and better meet requirements for high-capacity, massive streaming workloads in the cloud.

As the name says, Intel Xeon Scalable processors are designed to scale in ways never before possible. All Intel Xeon Scalable processors have a uniform shape that fits into the same socket type, Socket P, to enable scaling from two sockets up through four and on to eight without requiring any external third-party chipsets. Systems can scale up to eight sockets and up to 1.5 TB capacity in each of those sockets for a total of up to 12 TB in an eight-socket configuration. This ensures SAP has the agility to grow capacity as customer needs grow.

Intel Xeon Platinum processors also offer more threads, DDR4-2666 memory with up to six memory channels versus four channels in the Intel Xeon processor E5 v4 family, and eight more lanes of PCIe 3.0 bandwidth—48 compared to 40 in the Intel Xeon processor E5 v4 family.

On top of scalability, the new Intel Mesh internal microarchitecture improves performance relative to the earlier “ring” architecture. It also facilitates enhanced and all-new technologies that maximize performance, reliability, availability, serviceability, and manageability. The new microarchitecture also includes features that help improve power and performance efficiency to reduce data-center costs—savings that can be passed on to customers.



Summary

The SAP Business ByDesign solution is an ideal way for mid-market companies and subsidiaries of larger corporations to connect every function across the business, including financials and accounting, HR, sales, procurement, customer service, SCM, and more. By working together, SAP and Intel have optimized the SAP Business ByDesign solution for Intel Xeon Scalable processors and Intel technologies to deliver a scalable, high-performance, highly available, and security-enabled cloud-based ERP suite. The result is easy accessibility to the benefits of digital transformation and the ability to gain a competitive advantage.

Learn More

Find out more about the SAP Business ByDesign solution: sap.com/products/business-bydesign.why-sap.html

Learn more about Intel Xeon Scalable processors: intel.com/xeonscalable

¹ SAP Small Business. "Business ByDesign - Key Achievements 2017 and Outlook 2018." December 2017. [youtube.com/watch?time_continue=1472&v=FOsV6o5EIU](https://www.youtube.com/watch?time_continue=1472&v=FOsV6o5EIU).

² Technousa. "ERP – Facts, Statistics, and Trends in 2017." September 2017. technousa.com/blog/erp-trends-facts-statistics-2017-18.

³ HP, Intel, SAP, SUSE, and VMware. "Virtualizing Enterprise SAP® Software Deployments." June 2011. suse.com/docrep/documents/o4r7to9d2y/virtualizing_enterprise_SAP_software_deployments.pdf.

⁴ The Motley Fool. "3 Things Intel Corp.'s Data Center Chief Wants You to Know." November 2017. fool.com/investing/2017/11/17/3-things-intel-corps-data-center-chief-wants-you-t.aspx.

⁵ Based on internal anecdotal information from SAP.

⁶ Comparing results from testing the Intel® Xeon® Platinum 8180 processor with Micro Focus LoadRunner® in November 2017 against results from testing the Intel Xeon processor E5-2699 v4 with Micro Focus LoadRunner in early 2016. Testing was conducted internally at SAP.

Configurations: Two enterprise platform servers, each powered by two Intel® Xeon® processor E5-2699 v4, 22 cores per processor, 44 threads per processor, 2.50 GHz, 55 MB L3 cache per processor, 256 GB main memory; CIV throughput per hour at 90-percent server utilization: 33,300. Compared to two enterprise platform servers, each powered by two Intel Xeon Platinum 8180 processors, 28 cores per processor, 56 threads per processor, 2.50 GHz, 38.5 MB L3 cache per processor, 377.3 GB main memory; CIV throughput per hour at 90-percent server utilization: 43,200, 29.73 percent more than 33,300.

⁷ Up to 6x greater system memory supported vs. available solutions from four years ago (representing the currently installed data-center base):

SAP has certified its SAP HANA® 2 platform for online analytical processing (OLAP) workloads to support up to 3 TB of memory per system for the upcoming Intel® Xeon® processor Scalable family for a 4-socket configuration (or 6 TB for an 8-socket configuration). Systems available four years ago (representing the typical data center installed base infrastructure) could only support 0.5 TB (or 1 TB in an 8-socket configuration), respectively. For comparative purposes, SAP certifies support for up to 2 TB of memory for the current Intel Xeon processor E7 v4 family in a 4-socket configuration, so upcoming Intel Xeon processor Scalable family-based systems are certified to support up to 50 percent greater system memory than the generation they replace.

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