Freeing Businesses to Grow: SAP Business ByDesign*

Flexible and efficient data centres run on the Intel® Xeon® processor E5 family

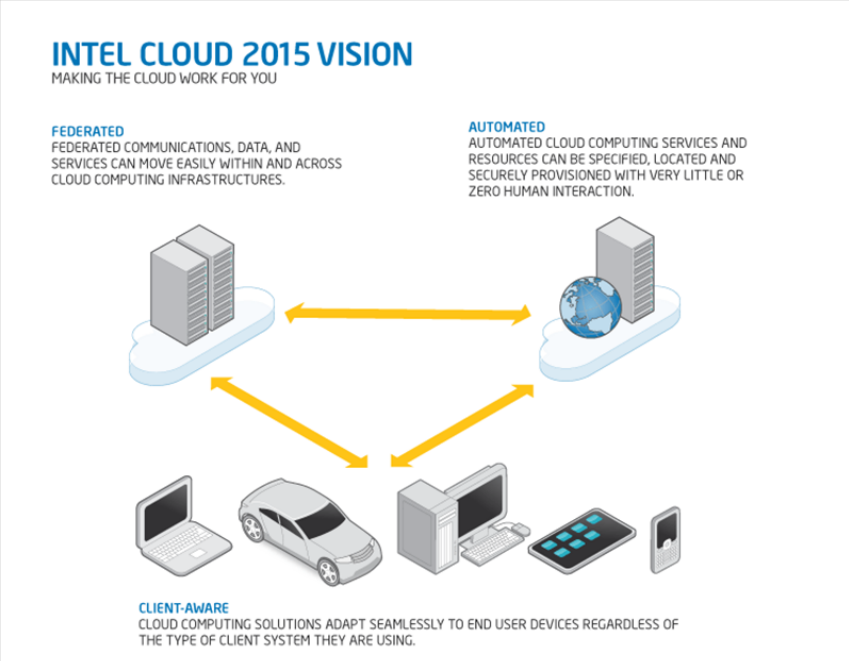
"Some key innovations from Intel are helping SAP deliver SAP Business ByDesign* based solutions to a level we barely dreamed possible. In terms of performance, we are at 1,000 concurrent users on a single blade implementation coming from 700 at previous-generation CPU. SAP's Business ByDesign based Cloud solutions benefit significantly from the Intel® Xeon® processor E5-2600 product family."

– Rainer Zinow, Senior Vice President, SAP Business ByDesign

Cloudy Skies are Good for Business

The economic backdrop in recent years has been exceptionally challenging for businesses. As ever in a competitive marketplace, the ability to differentiate and outperform one's peers can make the difference between success and failure – between profit and loss. Today, the challenge is finding how to create that differentiation in the most cost-effective fashion, as well as meeting the multifaceted needs of the business and its various internal functions. Introducing new tools and efficiencies to help drive new revenue streams and increase profit mar¬gins is often prohibitively expensive. Substantial financial outlays — upfront costs for large software license deals or capital expenditure for IT infrastructure — are frequently a barrier to buying and deploying business software that could help companies operate and compete more effectively.

Cloud computing has emerged within this context as a highly disruptive technology which is breaking down some of these existing constraints. Offering new delivery models and commercial opportunities, cloud computing in its various forms has captured the attention of the business world for good reasons. It brings unprecedented flexibility and responsiveness to business. Intel and SAP have been collaborating and co-innovating to ensure that businesses benefit from the very best of cloud computing experiences.



SAP and Intel – Shaping the Cloud

Cloud computing has opened doors for the remote provision of IT services and technologies, and SAP is fully leveraging the cloud as a delivery model across its solution portfolio. SAP Business ByDesign* has been launched as a robust, reliable, high-performing cloud service. Enabling unprecedented flexibility and scalability, it also allows new customers to get started quickly with their SAP solution, and existing customers to maximise their existing investments - a true reflection of cloud technology potential.

"SAP decided early on that it makes more sense from cost and quality of service perspective if we built on our own cloud services for SAP Business ByDesign," says Rainer Zinow, Senior Vice President, SAP Business by Design. "This also allows us to take responsibility for security, and design an integrated roadmap for SAP's growing portfolio of cloud solutions. In sync with that, Intel optimised the hardware stack for maximum performance and for lowest power consumption. SAP understood right from the beginning, that running mission-critical business processes in the cloud requires very unique capabilities. Scalability to very large number of users, highest security certificates and as well as highest levels of non—interruptible operations are just some of these qualities."

Intel has proven the perfect partner for SAP's ambitions to deliver its business applications through a cloud model. Drawing on its Cloud 2015 Vision, Intel is taking an industry-leading role in facilitating a move to the cloud. The Cloud 2015 Vision is backed by Intel's own experience in developing private internal and external clouds and jointly developing cloud services. It presents a view of an IT world in which separate clouds are unified in a federa¬tion and interoperate with each other. Reflecting the co-innovation with SAP, the Cloud 2015 Vision also sees automated movement of software through the cloud. It is also a world where clouds can tell which device you are using, whether it's a PC, smartphone, or laptop.

Introducing SAP Business ByDesign - Running on Intel® Xeon® Processors

To eliminate capital expenditure as a barrier to success, and to help companies scale their software costs in line with business needs, SAP has developed an integrated software suite which is delivered 'on demand.' SAP Business ByDesign is an affordable, reliable, and flexible solution. Using a Software-as-a-Service (SaaS) delivery model, SAP Business ByDesign represents the next generation of business applications. Running on the Intel® Xeon® processor E5 family, it delivers true flexibility while exhibiting groundbreaking performance, energy efficiency and scalability.

Intel and SAP have worked together over the last 15 years to deliver the industry-leading performance of SAP solutions on Intel® architecture. As a consequence of this successful relationship, a large proportion of new SAP implementations are now deployed on Intel platforms. Intel and SAP are collaborating to ensure that the SAP Business ByDesign benefits from a new generation of high-performance servers, and that its data centres will run more efficiently than any before. The latest Intel Xeon processors are built for demanding applications precisely such as SAP Business ByDesign

SAP: Freeing Businesses to Grow - On Demand

SAP formulated several key ambitions which the SAP Business ByDesign suite of applications needed to fulfil. These embody the needs of SAP's business, as well as those of its customers, all of whom are operating in an increasingly cloud-driven world. The four key objectives SAP identified were:

- To deliver computing services as utilities for all business units
- To provide a flexible and adaptable tool which will help businesses thrive
- To ensure high performance which is robust
- To achieve a low total cost of ownership (TCO) and minimise energy consumption

"Thanks to a long-standing co-innovation partnership between SAP and Intel, which has spanned the last 15 years, we could meet these objectives with confidence," says Rainer Zinow. "Intel worked closely with SAP to develop key features within its platform and to enable our developers to optimise SAP Business ByDesign to fully exploit those capabilities."

> "Jointly with Intel SW engineering, a 2x factor in energy savings was measured with Intel® Xeon® processor E5-2600 compared to previous-generation architecture. A 15 percent improvement in response time was achieved, even with the energy-saving features turned on. This is a significant contribution to overall TCO and CO2 reduction at SAP's worldwide data centre deployments."
>
> *Rainer Zinow, Senior Vice President, SAP Business ByDesign*

Computing Services as Utilities

In developing SAP Business ByDesign, SAP has created a family of engaging business applications, delivered through a software-as-a-service model, to enable computing services to be provided as utilities. The primary objective in development was to create a robust, reliable, high-performing cloud service that provides software, platform, and partner applications at a very competitive cost.

Working closely with Intel to optimise the performance delivered by SAP Business ByDesign, this new suite of applications provides customers with more value in terms of solutions, support and service.

The complete solution: SAP Business ByDesign integrates all of a company's key business functions such as Finance, Human Resources, Customer Relationship Management, Marketing and Sales and Procurement within a single software suite. Reflecting the integrated nature of modern businesses, it also enables end-to-end business processes that span organisational boundaries. Designed to solve problems rather than create admin, SAP Business ByDesign ensures that data flows unhindered across the entire company, instead of losing time and resource when it becomes siloed in a particular function or department. This approach avoids the failings of point solutions, which require expensive integrations with other applications to achieve similar levels of flawless business transaction.

Letting Businesses Work – Fast: SAP Business ByDesign has been created to provide a feature-rich and intuitive user experience. However, the functionality is only as good as the ability a company has to use it. To address this issue, SAP has introduced starter packages to speed customer adoption of initial capabilities on the path toward realising the full value of an integrated suite. The solution uses Microsoft Silverlight* technology to deliver a rich user experience with simplified navigation, interactive graphics and tight Microsoft Office* integration. Implementing SAP Business ByDesign is made easy by guided configuration tools. For current customers already relying on SAP to support their critical business functions, use of a cloud model facilitates the full utilisation of existing SAP investments. SAP's cloud delivery includes optimising classical products to work within private clouds, SaaS and platform-as-a-service (PaaS) offerings so that customers can rapidly deploy and innovate with a low cost of ownership.

A Scalable and Adaptable Tool to Help Businesses Thrive

Offering an affordable, reliable, and flexible solution, SAP Business ByDesign allows implementation and scaling of the

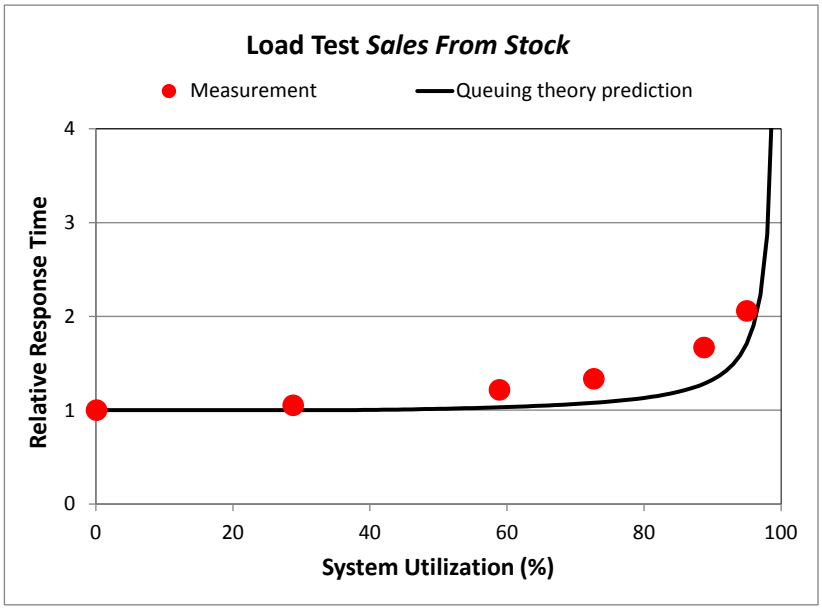


Figure 1 Load Test Sales From Stock

Profitability – Scaled Up

The scalability of the Intel® Xeon® processor E5 family directly impacts SAP's efficiency in managing SAP Business ByDesign, allowing a higher number of users per server. For SAP, that means a reduction in the number of servers and less power consumed, lowering costs and the environmental impact of the data centre. Testing for optimal number of users-per-server is fine in laboratory conditions. But real world usage is highly variable requiring SaaS service providers to maintain additional capacity.

To further reduce costs for maintaining this capacity, the Intel Xeon processor E5 family can scale processor performance up and down, reducing power consumption in the low state, to cope with fluctuations is application usage. Ultimately this helps ensure that SAP's customers get the performance they want when they need it, whilst allowing SAP to keep control of its infrastructure costs.

Additionally, Intel has worked closely with SAP to maximise scalability when running in a virtualised environment. Testing by SAP has shown SAP Business ByDesign Feature Pack 3.0 can handle as many as 1,000 users when running on the latest Intel Xeon processor E5 family, both per typical 2-socket server. For illustration, see figure 1.

software needed to grow revenues and sharpen profits. This SaaS model means that companies deploy only the resources they need – and no more. Truly flexible performance is driven by the highly scalable and efficient Intel Xeon processor E5 family. With two sockets and up to 16 cores, the Intel Xeon processor E5 family delivers up to 80 percent greater performance than its predecessor.

A Flexible Experience for Changing Environments: Critically, SAP Business ByDesign makes it easy to adjust systems capabilities according to the unique needs of the business. This includes modifying the business configuration and adapting user interfaces, reports and forms. In light of the spirit of innovation that cloud computing is helping nurture, this provides a new kind of relationship for SAP, its customers, and partners. On SAP's part it places significant demands on the infrastructure which drives SAP Business ByDesign. Without scalable server performance, SAP would struggle to efficiently cope with spikes in demand or the opportunity to make cost savings by reducing server power requirements. Intelligent, automated power management and the inherent scalability of performance within the Intel Xeon processor E5 family-based servers makes this daunting challenge an effortless reality for SAP.

"With Intel® AES-NI encryption enabled, we saw a 25 percent faster finish using a database-consistency checkload, as well as 20 percent less CPU utilization. Additionally, we experienced a fantastic 2.1x increase in the rate of encryption/ decryption

Jochen Haller, onDemand Security Officer, SAP

Partners that Support Solution Extensibility: SAP Business ByDesign was designed to enable partners and customers to build their own solution extensions on top of the application. It it easy for customers to acquire, deploy and manage new capabilities from SAP's partners. A key advantage provided by SAP Business ByDesign against other SaaS solution providers is that partners are able to build cloud applications using a Microsoft Visual Studio*-based development environment that is fully integrated into SAP's life cycle management system. Partners can add greater value to customers by integrating mash-ups, adding incremental functionality or building industry-specific and/or niche microvertical applications. In real terms this means maximising value through the extension of their current solutions to deliver an enhanced user experience.

Ensuring High Performance which is Robust

SAP Business ByDesign incorporates over 35 years of experience in managing the critical business functions of the world's largest and most successful businesses. It also incorporates industry best practices in a solution built from the outset for small and midsize businesses. No other on-demand business software solution can provide the experience and stability of the world's market leader in enterprise application software. Running on an infrastructure built on high-performance and resilient Intel Xeon processor E5 family-based servers, SAP Business ByDesign is – by design – an incredibly powerful and secure solution.

Business-Defining Integrated Analytics: The Intel Xeon processor E5 family gives SAP the high-performance platform needed to build and deliver a new generation of business applications. Providing up to 80 percent greater performance compared to its predecessor, the Intel Xeon processor E5 family ensures that SAP Business ByDemand delivers real-time business analytics, giving customers unprecedented business agility. SAP Business ByDesign therefore includes integrated analytics and flexible reporting options that ensure SMEs can take advantage of timely and accurate information delivered in context to every user based on their role. Integrated analytics include graphical information embedded in transaction screens, role based dashboards and ad hoc reporting options through SAP Crystal Reports* and Microsoft Excel*. This ensures all users have the information they need to make better and timelier decisions while increasing their productivity and effectiveness. Additionally, through in-memory analytics, an innovation that allows vast amounts of data to be stored in main memory instead of

Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI)

Intel AES-NI is a set of instructions in the Intel Xeon processor E5 family. It comprises a set of seven new instructions: four instructions accelerate encryption and decryption; two instructions improve key generation and matrix manipulation; and the seventh aids in carry-less multiplication.

Intel AES-NI implements some sub-steps of the AES algorithm in the hardware, speeding up execution of the AES encryption / decryption algorithms and removing one of the main objections to using encryption to protect data: the performance penalty.

By implementing some complex and costly sub-steps of the AES algorithm in hardware, Intel AES-NI accelerates execution of the AES-based encryption. The result is faster, more secure encryption than ever available before.

a separate database, SAP Business ByDesign delivers sophisticated analytics at unrivaled speed and performance.

Meeting Mission-Critical Demands: When you implement a strict security policy, the conventional understanding is that you expect to see a dip in performance. It's the classic trade off-between protecting the data and infrastructure, and getting the most from your applications. Intel Architecture brings with it Intel® AES-NI, which speeds up execution of the AES encryption / decryption algorithms and removes one of the main objections to using encryption to protect data: the performance penalty. The real-world result of this is faster, more secure encryption than ever available before. The Intel Xeon processor E5 family also provides Intel® Trusted Execution Technology (Intel® TXT) to secure data being moved through virtual environments.

Reliable Workload Management: SAP Business ByDesign relies on management of workloads and frequent migration between virtual machines to optimise performance. Business functionality is reliant upon consistent uptime and unfaltering service delivery. Intel Xeon processor E5 family-based servers enable exceptionally stable and secure virtual machines. Intel® Virtualization Technology FlexMigration gives SAP the flexibility to efficiently migrate workloads to fewer servers at night to save energy. Next-generation virtualisation with Intel TXT provides

Unprecedented Encryption with SAP Cryptolib*

Intel and SAP have been working collaboratively to ensure that performance is maximised even when all security features are enabled within SAP Business ByDesign*. SAP with Intel's help, has developed a new version of the SAP Cryptolib that leverages the onboard encryption capabilities in the Intel chips, thereby dramatically speeding up performance of SAP Business Bydesign's security features.

This Intel-optimised version of the SAP Cryptolib will be available Q1 2012 for use by SAP Business ByDesign as well as all ABAP and C-Based SAP components that require access to cryptographic software routines. The outcome is accelerated performance of encryption-based SAP applications running on Intel servers without requiring additional changes to customer implementation other than updating with a service pack containing the new version of the library. All new products delivered to customers after Q1 2012 will contain this new library. New service packs released after Q1 2012 will also have the new version of the library, and can be obtained as usual from the SAP Service Marketplace.

SAP – Growing the Cloud with Intel

Co-innovation between Intel and SAP ensured that SAP Business ByDesign is optimised to make full use of the capabilities offered by the Intel Xeon processor E5 family:

- Intelligent performance: delivering superior analytical capabilities on a smaller server footprint, with processor operation running dynamically to the needs of the workload
- Automated energy efficiency: automatically regulating power consumption and intelligently adjusting performance according to application needs
- Advanced reliability: making the data centre secure and reliable thanks to advanced encryption and virtualisation support.

SAP Business ByDesign runs more energy efficiently on latest Intel CPU technology

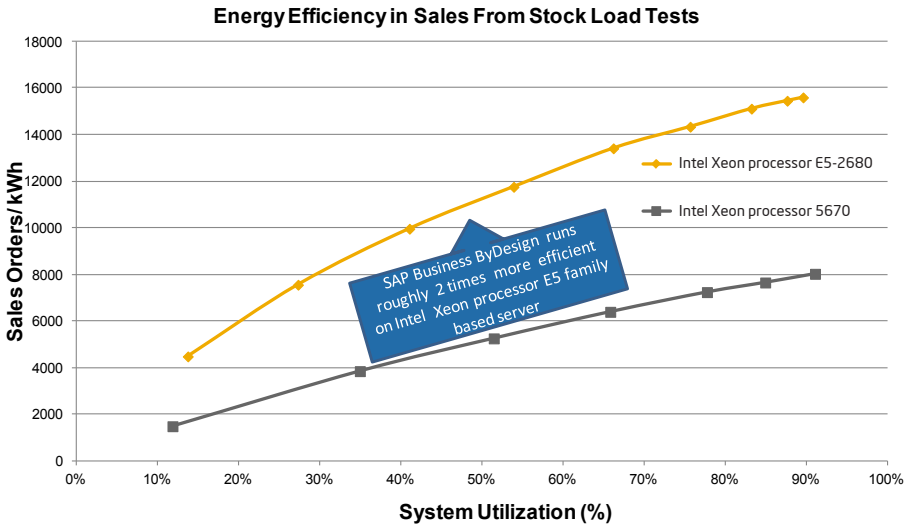


Figure 2 Energy Efficiency in Sales From Stock Load Tests

hardware-based resistance to malicious software attacks before a virtual machine boots. By engineering SAP Business ByDesign around these technologies, SAP and Intel together have achieved a highly secure virtual environment.

A Low TCO and Reduced Energy Consumption

One of the predominant driving factors for a SaaS-based delivery model is the ability to better manage costs. This is true for the customer purchasing the service from SAP, but it is also true for SAP itself. The greater the efficiencies SAP can achieve in its infrastructure, the more benefits SAP can pass on to its customers and the better the margins SAP Business ByDesign can achieve. Amongst the essential elements in achieving a competitive TCO is the cost of powering the data centres which form the hub of the SAP Business ByDesign offering. However the rising cost of electricity means that these data centres become a veritable sink for expenditure; simply 'keeping the lights on' proves to be a make-or-break factor when in comes to reducing costs. The Intel Xeon processor E5 family has formed an essential part of this strategy to manage the energy required to power SAP Business ByDesign.

Unprecedented Performance; Lower Power: It is clear that SAP Business ByDesign delivers superior analytical capabilities in a highly scalable fashion. But running on the Intel Xeon processor E5 family, it achieves all of this on a smaller server footprint. With up to 80 percent greater performance compared to its predecessor and unique virtualisation capabilities, the Intel Xeon processor E5 family, with power-saving features activated, delivers more business results from every clock cycle. See figure 2.

The reality is that SAP Business ByDesign has been optimised to exploit this level of performance capability, and so the very DNA of the service has efficiency and performance as its building blocks.

By automatically regulating power consumption and intelligently adjusting performance according to application needs, Intel Xeon processor E5 family-based servers deliver SAP Business ByDesign with significantly lower data centre costs, massively reduced energy consumption, and a diminished carbon footprint. SAP is therefore also proud to boast more environmentally-friendly data centres. The partnership between SAP and Intel has resulted in greater performance and improved efficiency, leading to lower costs and an enhanced position within the SaaS market. It's a true win-win situation.

Relationships Matters: Intel as the Foundation for SAP Business ByDesign

The long-standing co-innovation partnership between Intel and SAP, which has lasted for over 15 years, is a key reason that SAP has designed SAP Business ByDesign specifically to run on Intel Xeon processors. Another is the unprecedented performance – in processing power and energy efficiency - delivered by the Intel Xeon processor E5 family. To ensure that SAP Business ByDesign is able to fully exploit this technological innovation, Intel worked closely with SAP to develop key features within the server platform. The tangible benefits have been direct and clear – increasing the number of concurrent users that SAP's stack can run, while improving energy efficiency. That equates to a high-performing, scalable cloud service offering which is delivered at the lowest possible cost.

"Some key innovations from Intel are helping SAP deliver SAP Business ByDesign to a level we barely dreamed possible," comments Rainer Zinow. "In terms of performance, we are nearing 1,000 concurrent users in a virtualised environment, and we're looking to continue growing that number. As for security, we've been worry-free. Intel has worked closely with us to provide onboard functions that keep performance up even when we implement security processes. The Intel AES-NI instruction set has been particularly impressive and valuable to us, as have Intel® Anti-Theft Technology (Intel® AT) and Intel® Identity Protection Technology (Intel® IPT). I think Intel® TXT has already established itself in the market and it's an important feature for us too."

The environmental and cost benefits of energy efficiency have also been a significant motivator for SAP to continue its partnership with Intel. "Energy efficiency was a major factor in our decision to run SAP Business ByDesing on Intel technology. The ability to overclock the chips when we have a demand spike and need the power, and conversely the ability to slow down the processor at a lower power level when demand is low - so that we can save energy – is truly revolutionary for businesses running the sort of infrastructure we do at SAP," says Rainer Zinow.

A Head in the Clouds is No Bad Thing

The challenges faced by many businesses in uncertain economic times – which look set to continue – make any sort of internal investment subject to scrutiny. As a result, many companies will simply leave critical applications to run as outdated versions, or not invest at all – leading to underperforming business units. SAP introduced SAP Business ByDesign to address precisely these needs and to mitigate against the potential CAPEX barriers which prevent businesses being the best they can be. In developing SAP Business ByDesign, SAP has created a family of engaging business applications, delivered through a software-as-a-

service model, to enable computing services to be provided as utilities.

The longstanding and ongoing co-innovation with Intel has been crucial to the development of SAP Business ByDesign. As a set of cloud-based business applications, SAP Business ByDesign is optimised to make full use of the capabilities offered by the Intel Xeon processor E5 family. That means intelligent performance with superior analytical capabilities delivered on a smaller server footprint; automated energy efficiency – where power consumption is automatically regulated and performance is intelligently adjusted according to application needs; and advanced reliability - thanks to advanced encryption and virtualisation support.

"SAP Business ByDesign is the foremost suite of business applications available in the SaaS market, and our ability to deliver performance at this level has been underpinned by a close working relationship with Intel. The technological advantages we've seen from the Intel Xeon processor E5 family have allowed SAP to be unrestrained in our ambitions for SAP Business ByDesign. We have seen the benefits of running our infrastructure on Intel Xeon processor E5 family-based servers, and know that our customers will also profit from this decision," Rainer Zinow concludes.