SAP Applications in the New Age of Mobility

Contents

Mobility — The always-connected device ......................................................... 2
In-memory computing – SAP’s real-time data platform ...................................... 3
Cloud — The pervasive delivery model ............................................................. 5
What does SAP in the cloud look like? ............................................................... 8
The value of cloud computing for SAP applications .......................................... 10
TCO savings by moving to the cloud ................................................................. 12
Ensuring a secure cloud ..................................................................................... 12
Conclusion .......................................................................................................... 13

Innovations in mobile technology have enabled the always-connected device, which has amplified expectations of applications in the workplace. With the next generation of IT users at their doorstep, CIOs will have to satisfy the demands of customers and business-process stakeholders with innovative solutions that provide secure and instant access to business data on any device, at any location.

In the center of this mobile workforce are business users who bring their own devices and expect secure, real-time access to business data with embedded analytics, along with full application integration. Enterprise applications such as SAP will see layers of mobile applications integrated within existing business processes to improve the customer experience and enhance business functionality.

Early use cases have begun to emerge and take shape, as business-process owners use mobile and cloud-based applications to grow customer intimacy through personalized interaction. This customer intimacy is predicated on real-time insight from feedback loops of social media and real-time analysis of transaction systems to better understand customer buying habits and match them with additional products and services in the sales portfolio. In addition, cloud, mobile and
real-time analytics enable tighter integration of back-end business processes to ensure that the customer experience after a sale builds loyalty to the brand through world-class delivery of services across the organization’s ecosystem, while reducing costs and complexity with fewer assets and pay-per-use computing platforms. Research firm Gartner similarly described these technology and use cases in defining the CIO agenda for the near-term future.¹

In the following sections, we will discuss how a nexus of three technologies — mobile, in-memory and cloud computing — will transform SAP applications to provide unparalleled value, improved business agility and lower operational costs.

**Mobility — The always-connected device**

The past decade has seen the emergence of two game-changing technologies. The first is the proliferation of wireless networks for wide- and local-area connections to enable devices to be constantly connected to the Internet. The ability to continuously connect people and devices to the Internet enables organizations to continuously monitor customers and devices so they can improve services, execute business transactions and predict behavior with preemptive engagement models.

The second game-changing technology is the advent of mobile computing devices that offer voice, optical, touch and kinetic sensory functionality that can be personalized for individual tastes. As functionality between smartphones, tablets and laptops merges, it is clear that the future of the corporate computing landscape must support users who bring their own devices and expect full integration from device to application to data center.

Mobility will significantly impact SAP applications and their underlying architecture with a new wave of expanded functionality that requires business processes to seamlessly operate at any venue, on any device. This is evident by SAP’s announcement of its new SAP 360 Customer Relationship Management software, a solution that utilizes mobile applications for improved interactions and real-time data with SAP HANA (High Performance Analytic Appliance),

¹ Amplifying the enterprise: the 2012 CIO agenda, Gartner, Jan. 18, 2012
incorporating feedback loops from social media that enable predictive analytics and improve execution of end-to-end business processes.\(^2\)

Mobile users will significantly impact the SAP infrastructure. Capacity based on fixed user counts will be replaced by varying loads, created by the expanded functionality of mobile devices. That means SAP systems will require elastic capacity that scales to the demands of the business. They will also need to be agile so that new functionality can be added as more mobile applications are deployed. Furthermore, new system landscapes will be needed to support mobile device management and both on- and off-premises integration of applications and business networks. These shifts are beginning to take shape with a wide array of SAP mobile applications that can be securely connected via Sybase Unwired Platform and managed by SAP Afaria. Integration to software-as-a-service applications such as SAP’s SuccessFactors or business networks such as SAP Ariba will need cloud-based integration frameworks such as Dell Boomi to seamlessly manage both on- and off-premises application integration points, with a complete audit trail for regulatory compliance.

The impact of mobile device growth cannot be underestimated: If your company has not yet engaged mobile users, you must expect that requirements will increase as the mobile workforce invades your organization. With the proliferation of tablets, smartphones and machine-to-machine connections, the volume of network connections is expected to increase from 10.3 billion in 2011 to 18.9 billion in 2016.\(^3\) With SAP having a significant market share in business processing applications, it would be naïve to think your systems won’t be affected. The growth of the mobile device will render current capacity modeling obsolete and require transformative new architectures to handle the varying loads.

**In-memory computing — SAP’s real-time data platform**

One of the fundamental problems with ERP applications such as SAP is the built-in latency between transactional and reporting data. The shadow systems created with this architecture,
plus the costly process to extract, transform, load (ETL) and present SAP reporting data in the business warehouse (BW), have created layers of complexity and cost while delivering an ineffective (historical) view of the business.

SAP’s new in-memory computing database, known as SAP HANA, is an integral part of its emerging real-time data platform (RTDP), which will service all future SAP applications and provide game-changing technology in several ways:

1. **Embedded analytics** – SAP HANA provides the ability to eliminate data latency by providing a real-time view of the business. The synchronous feeding of SAP business transactions to the HANA database eliminates data latency, empowering business users to have a real-time view of their business, and enables them to embed analytics into the business process. This means:
   - **Business intelligence is easier to use** because it is brought “in-line” with daily business processes. Users are often unaware they’re executing BI queries.
   - **Business intelligence is more ubiquitous** and adopted by everyday users. This vastly improves business acumen by bringing BI into daily business processes.
   - **Business intelligence has more impact** because it furnishes users with timely, relevant information needed to control business process.
   - **Continuous improvement is enabled** with real-time feedback that identifies problems and changing business conditions.

2. **Business intelligence costs** – SAP HANA significantly reduces the cost of developing and sustaining business intelligence. In traditional business intelligence solutions, 80% of every dollar is spent on data acquisition processes (extract, transform, load) and 20% on data presentation. SAP HANA reverses the model by eliminating the costly ETL process with a direct feed to an in-memory database where data can be compressed and effectively

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**What is Embedded Analytics?**

**Traditional Business Intelligence** — provides a historical (rear) view of what has happened within the business process with latent data stores.

**Embedded Analytics** — directly embeds BI into the apps used for operational business processes, utilizing real-time data that provides instant analysis of business events.
queried. The outcome: More time is spent on data presentation and analysis and less time is spent on data acquisition. Investments in SAP HANA can improve return on investment for data warehousing by reducing the processes and delivering more value, faster.

3. Architecture – The current SAP landscape requires redundant data stores for both online transaction processing (OLTP) and BW data. When propagated to a full-support landscape, multiple copies of each database are needed for development, quality assurance, training, disaster recovery and production. SAP’s intent is to merge the OLTP and BW databases into a single RTDP to support both transaction processing and reporting featuring embedded analytics. The future SAP landscape will have reduced complexity, which lowers the cost of ownership by eliminating shadow systems and costly data acquisition and cleansing processes. Fewer systems will also lower administrative costs such as system refreshes, backups, synchronization and change management. Furthermore, SAP HANA changes the fundamental design requirements for the database architecture, where traditional relational databases that reside on disk need fast disk and I/O fabric to support continuous fetch and update requests. With the database residing in memory, the role of the disk changes to a persistent device needed for recovery. Hence, with the changing role of the disk subsystem for SAP HANA, opportunities exist to lower costs with less expensive, more densely configured disks.

4. Unix landscapes – Prior to HANA, SAP owners operating their systems on proprietary operating systems such as Unix had little incentive to migrate to lower-cost x86 platforms because the moderate cost savings did not warrant the risk. Now, with the SAP RTDP and the HANA database as the centerpiece to enhance functionality and business value, users have new incentives to retire SAP Unix landscapes with lower-cost x86 platforms that can take advantage of cloud computing.

5. Big data – IT organizations are being besieged by the concept of big data from both vendors and business-process owners. While big data is a reality, the real business value is “big insight,” where effective use of big data provides actionable competitive knowledge. While big data processes such as capture, storage, analysis and curation present IT challenges, the fundamental issue is that big data is largely unstructured: To be effectively used, it must be merged with structured data from systems such as SAP. Here is where the SAP RTDP solution — with its multisource capabilities, compression algorithms and parallelization technology — can query structured data from SAP along with unstructured data from sources such as social media, to gain valuable insight for predictive analytics. When SAP HANA is coupled with the text search functionality within SAP BusinessObjects, business-process owners gain powerful tools to slice through big data pools and find predictive patterns to differentiate.

Cloud — The pervasive delivery model

At Dell, we believe that the enhanced business opportunities made possible by mobility and real-time analytics for SAP applications will motivate adoption. For organizations that run SAP on proprietary landscapes such as Unix, TCO will no longer be the compelling factor to migrate to x86. Instead, business requirements for new functionality will be the key.
In anticipation of this paradigm shift, Dell conducted a “lighthouse program” to understand the potential savings for SAP customers that migrate from Unix to x86 and then utilize cloud computing for elasticity and agility.

To understand the potential cost savings for an SAP application operating in a cloud landscape, a baseline cost model was needed to determine the TCO for a typical SAP landscape. To establish this baseline, Dell took the following steps:

- Dell solicited VMS AG to conduct an independent TCO analysis to validate potential cost savings for SAP applications operating in a hybrid cloud architecture, utilizing Dell Cloud with VMware Cloud Director in a service provider data center and VMware vSphere at the customer’s premises.

- Dell executed a lighthouse program, whereby customers that fit the Dell profile were invited to test their SAP systems in a hybrid cloud architecture to validate TCO claims and experiment in a wide range of use cases. Customers provided confidential cost data to VMS, which compared their costs with profile data in the VMS database. Given the objectives of the test (experimentation, not adoption), it was agreed that claims about specific customer cost savings would not be publicized, but rather findings about customers that fit the Dell profile, which is the target for a midmarket design point.

1. **Who is VMS?** VMS is an operational business intelligence provider based in Heidelberg, Germany. Its primary service is the benchmarking of SAP systems and processes, supported by the VMS Benchmarkbase™, which contains the measured data of more than 2,400 SAP systems, making it the largest and most detailed SAP benchmark database worldwide.

2. For baseline cost analysis, Dell targeted midmarket customers that run SAP on both proprietary and commodity server platforms in an in-house data center, serviced by their own internal staff.

<table>
<thead>
<tr>
<th>Employees</th>
<th>&lt; 50,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>1 company</td>
</tr>
<tr>
<td>Concurrent users</td>
<td>1,200</td>
</tr>
<tr>
<td>Systems</td>
<td>4 SAP production systems; for each production system (PROD) there is a development system (DEV) and a test/acceptance system (QA)</td>
</tr>
<tr>
<td>Named users</td>
<td>20,000</td>
</tr>
<tr>
<td>Database size</td>
<td>5 TB (Assumption: QA systems are full copies of PROD, using the same database size)</td>
</tr>
<tr>
<td>(Production systems only)</td>
<td></td>
</tr>
</tbody>
</table>
3. The landscape covered these SAP applications:

<table>
<thead>
<tr>
<th>System</th>
<th>Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP</td>
<td>ECC 6.0</td>
</tr>
<tr>
<td>BW</td>
<td>7.0</td>
</tr>
<tr>
<td>SRM</td>
<td>7.0</td>
</tr>
<tr>
<td>Enterprise Portal</td>
<td>7.0</td>
</tr>
<tr>
<td>SAP Solution Manager</td>
<td></td>
</tr>
<tr>
<td>Potential Extensions</td>
<td>MDM, PI</td>
</tr>
</tbody>
</table>

Other Assumptions:

Each application runs in the typical three-stage mode with development systems (DEV), acceptance test and quality assurance (QA) systems and production systems (PROD):

- The QA systems are copies of the production systems. The customer refreshes the test systems about six times a year. Each refresh involves a minimum of two systems, ERP and BW.
- In addition, there are a variable number of test systems and sandboxes, plus corresponding evaluation systems for the verification of new SAP solutions.
- The platform for the current SAP landscape is a proprietary Unix environment, running in a high-availability mode. This is used to show the savings for Unix to Windows or Linux platform migrations. Existing customers that run SAP on x86 platforms (both physical and virtual) can also realize cost savings to the cloud.
- Disaster recovery is currently implemented by access to a remote replacement data center. Using this facility would require restoring tape backups, which may easily require days. Commercial terms of this solution are unique and customer-specific. For future case design, customers will use remote facilities in the Dell cloud to implement a near-time replacement with an RTO (return-to-operation) time of four hours.

After establishing the target customer profile, VMS established the baseline cost from its proprietary database for customers with similar profiles. The baseline costs are as follows:

<table>
<thead>
<tr>
<th>SAP TCO model, Level 1</th>
<th>Typical Customer TCO cost share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware/Software Investment</td>
<td>4%</td>
</tr>
<tr>
<td>Implementation</td>
<td>12%</td>
</tr>
<tr>
<td>Hardware/Software Ongoing Cost</td>
<td>7%</td>
</tr>
<tr>
<td>Operations</td>
<td>31%</td>
</tr>
<tr>
<td>Continuous Improvement Projects</td>
<td>26%</td>
</tr>
<tr>
<td>Upgrade Projects</td>
<td>20%</td>
</tr>
</tbody>
</table>

On the left, we see what the Dell customer’s TCO cost share for the SAP environment looks like before the migration project.
Cost data from lighthouse customers used for this study indicated a rather typical distribution. There are two slight deviations to the standard split, as shown in the following graphic:

The differences are not significant for the TCO calculations of the study and have been taken into account:

- For the hardware/software ongoing cost, a somewhat higher share of 10% can be expected.
- For operations, a typical value would be 27%.

Since the cost distribution is typical, the savings potentials shown in the next sections can safely be generalized to other SAP landscapes.

The more important lesson to take from these charts is that the overwhelming part of cost is triggered by operations, continuous improvement and upgrades. So while buying bare metal at low cost will also save money, it is far more important to look at the architecture of the solution to see what it does to the TCO of these three quarters of an SAP application owner’s budget.

**What does SAP in the cloud look like?**

Each enterprise will approach its SAP cloud deployment differently, based on its own computing environment and business objectives. Virtualization has become a key inflection point at many organizations. Now that many enterprises are more comfortable with virtualization for their mission-critical applications, they are finally ready to apply virtualization to their SAP environments.

By moving SAP to a virtualized environment, the enterprise can benefit greatly from consolidation, optimization, cost reductions and reduced complexity. From virtualization, it’s a short path to the cloud, and for many organizations, once the commitment to virtualization for SAP is made, a concurrent commitment to the cloud can be made as well.

One of the advantages of working with Dell in this transition is the flexibility it offers with a reference architecture for SAP in the cloud that supports different approaches — whether
fully hosted by Dell, fully hosted by the enterprise, a hybrid cloud that takes advantage of both private and public cloud services, or some combination of approaches.

Any way the enterprise chooses to go, there is a consistent architectural approach. This approach has been validated by the independent TCO study for Dell Cloud for SAP Solutions sponsored by Dell and SAP. A graphic depiction of the approach is as follows:

Utilizing this approach, the migration of SAP to the cloud typically moves in four phases:

- **Phase 1: SAP Platform Migration**: This step covers the extension of the underlying bare metal, the operating system and the database environment. For many organizations, particularly those married to proprietary Unix environments, one of the keys will be the shift to a hardware platform dominated by x86-based equipment.

- **Phase 2: SAP Self-Service Provisioning**: Once the systems are in their new virtual home, the next objective is to improve agility for provisioning SAP instances — especially in development, test, sandbox and training environments — through a self-service portal provided by Dell's Virtual Integrated System (VIS).

- **Phase 3: SAP Elastic Computing**: With elastic computing, resource provisioning moves closer to real-time needs. Achieving success in this phase requires virtualization, along with management tools that reach out from the server and storage perspective up to an application perspective. With the Dell Advanced Infrastructure Manager (AIM), enterprises can scale hardware resources in minutes rather than hours or days, as required in more traditional Unix-based SAP environments.

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*Case Study, Moving into the Cloud, VMS, May 26, 2011*
• **Phase 4: SAP Hybrid Cloud Solution:** At this stage of the cloud deployment, agility and flexibility are at their peak. Decisions can be made right along with business demand. Enablers of this flexibility include pay-per-use public cloud services from Dell that can be used as an extension to the enterprise’s private cloud, along with an integrated management tool set to manage private and public cloud, with flexibility to move from one part to the other simply and homogeneously.

**The value of cloud computing for SAP applications**

Enterprises can realize significant advantages by moving their SAP implementations to the cloud. Savings in TCO can be dramatic, as estimated in the VMS study where lighthouse participants could save between 17% and 20% over a five-year period. But the advantages of moving SAP to the cloud go way beyond costs, enabling major improvements in aligning IT resources with business initiatives. Here are five key ways enterprises can benefit from moving their SAP applications into the cloud, and how each of these benefits can be achieved by working with Dell.

1. **Easily switch between on- and off-premises computing:** By using Dell Cloud solutions with integrated VMware tools such as vCloud Connector, enterprises can bring SAP applications to a public cloud while retaining the ability to move them back to their own data center. This fluid portability can be extremely cost effective while also delivering major advances in business agility. Organizations can save money and time in provisioning hardware and storage, and take advantage of cloud-based services to develop, iterate and test new business services in a sandbox environment. In a disaster recovery environment, organizations can mirror their key SAP databases into a Dell-hosted cloud data center, allowing for the speedy restart of the mirror database.

2. **Break free from the physicality of your data center:** In deploying hybrid cloud solutions from Dell, organizations can utilize resources from a large reservoir of shared servers and storage in a public cloud, saving money on hardware and maintenance costs while using this shared-resource pool as an extension of their own private cloud. The public cloud servers can be charged on a pay-per-use basis, which makes the cost structure very attractive and enables an organization to scale up and down quickly and easily, depending upon resource requirements. A large online commerce organization, for example, could scale up capacity for the Christmas season without having to invest in additional hardware capacity. This capability, enabled by tools such as Dell VIS Creator, dramatically reduces the pressure on the IT department to scale up for periods of peak demand, which is often a major contributor to server sprawl and poor infrastructure utilization.

3. **Remove waste by automating provisioning/de-provisioning to eliminate change latency:** One of the biggest opportunities of the cloud in SAP environments is to speed up processes for making all kinds of changes — from provisioning of users and applications to developing and rolling out enhancements to business services. With VIS Creator and other tools from Dell, enterprises can automate redundant tasks and enable business decision-makers to have more flexibility in creating new business services through the use of self-service resources with instant availability. What may have taken months in a traditional sandbox environment — developing a service, testing it, trying out different iterations — can be done much more efficiently and effectively in a cloud environment. VIS Creator automates many of the traditional tasks involved in workload deployment,
4. Any-premises integration with improved control points: The concept of deploying hybrid cloud infrastructures with resources both on and off premises is undoubtedly a point of concern for many enterprise IT managers still getting used to the idea of the cloud for mission-critical applications such as SAP. How will they know where their resources and information are located, and how will they ensure that they work together fluidly? The key to making it work successfully is to deploy solutions that successfully integrate applications and data in any IT environment. The Dell Boomi AtomSphere is a solution designed specifically for such integration, acting as the connection between applications no matter where they reside — in the cloud or on the premises of the enterprise.

5. Incrementally adopt cloud computing at your own pace: Dell offers the broadest possible range of solutions for migrating SAP from a proprietary platform to an open cloud platform. Enterprises can deploy the full cloud infrastructure as a service on their own premises or off premises; they can utilize a shared, multi-customer public cloud environment; they can use Dell hardware, software and expertise to build their own private clouds; or they can combine any of the above structures into their own hybrid cloud solution. This broad and flexible approach means that organizations don’t have to be in a rush to rip and replace their existing investments and can migrate at their own pace. In typical proprietary Unix environments, the size and scope of the SAP environment has probably grown way out of control — over-the-top server sprawl, high maintenance costs and an army of employees with specialized skill sets. By moving to a virtualized environment and using open platforms and industry-standard hardware, organizations finally have the opportunity to right-size SAP and build a flexible foundation for the future.
TCO savings by moving to the cloud

As noted, the VMS lighthouse program showed significant savings when applying the VMS SAP TCO model to a migration of the SAP application landscape from a more traditional in-house operations model toward a Dell hybrid cloud model. The results include a typical cost savings of at least 17.5% over a typical SAP/infrastructure lifecycle of five years, with additional savings of 3.5% to 6% depending upon how participants chose to exploit the pay-per-use Dell public cloud offering and other potential services.

These are some of the ways in which a migration to a Dell cloud solution can trigger these TCO savings:

- **Hardware/Software**: Hardware savings are driven by the shift to cost-efficient x86-based hardware. As noted by VMS, the introduction of Dell’s on-premises cloud approach supports a heterogeneous infrastructure that protects investments in existing hardware. Dell AIM is the central tool to manage Dell’s cloud, covering all hardware components, regardless of the vendor. AIM eliminates the need for expensive clustering software to achieve high availability.

- **Ongoing Hardware/Software**: Dell-triggered cost savings extend to the application server, database server, storage systems and backup hardware. Dell VIS leads to a significant reduced number of hardware system pieces, which lowers maintenance efforts. For both hardware investment and ongoing cost, there is an additional benefit that doesn’t immediately compute into TCO savings but leads to improved operations: the impact of flexibility.

- **Implementation**: The VIS Self-Service Portal generates cost savings through the provisioning and de-provisioning of SAP systems for training and testing. VMS notes that there are also quality factors: If it is simple to set up a test system, it will be done; if not, people will experience inappropriate training data.

- **Continuous Improvement Projects and Upgrades**: These have a 47% share of overall TCO in running SAP, so improvements are critical. Moving to a Dell cloud deployment can result in overall cost reductions of up to 11% for improvements and 24% for upgrades. Automation is central to these savings. As noted by VMS, Dell offers automated migrations from virtual to physical servers for patching, testing, root-cause analysis or increases in SAP demand curves, using Dell AIM, VIS and SAP Adaptive Computing Controller.

Ensuring a secure cloud

Finally, no discussion of the cloud would be complete without focusing on security. Dell offers a full range of security solutions for cloud environments, including the following three that may be of particular interest to IT managers in SAP environments:

- Dell customers can utilize Dell SecureWorks to proactively manage security risks and understand emerging threats with a 24/7 threat detection and remediation solution.

- Dell cloud solutions include the VMware vShield family of virtualization security products, which improve on physical security methodologies through introspection capabilities, change-aware policy enforcement and seamless integration with existing virtualization and IT security infrastructures.
• Dell cloud offers data encryption and management security services through Trend Micro SecureCloud solutions. This is particularly valuable for easy-to-use key management administration of data encryption keys for SAP server volumes.

Conclusion

As with many IT initiatives these days, there seems to be a certain expectation of inevitability associated with cloud computing. That inevitability has to do with the types of cost efficiencies and advances in agility that organizations are already achieving. It is only a matter of time before all applications are touched by the cloud in one way or another. However, when coupled with next-generation technologies such as mobility and real-time data analytics, SAP landscapes will migrate to x86 because of the necessity to support functional business requirements.

For IT professionals responsible for SAP, the opportunity is to get ahead of the curve. It is possible to significantly reduce costs of managing an SAP environment, while increasing flexibility, agility, manageability, scalability and many other “abilities” that will align IT more closely with business goals. Dell is delivering the technology, expertise and experience to help you move SAP into the cloud from any environment — efficiently, successfully and at your own pace. All you have to do is contact Dell to get started.