15-MINUTE GUIDE

Dell EMC Converged Infrastructure for SAP

DELL EMC PERSPECTIVE

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Preface

Transforming IT to run SAP in the digital business

The digital economy offers incredible opportunities for businesses, but it also brings formidable challenges. IT departments struggle to derive fresh insights from complex, isolated systems. SAP HANA addresses those concerns by replacing and transforming complex systems to help reimagine business processes and deliver real-time insights from data that's always fresh.

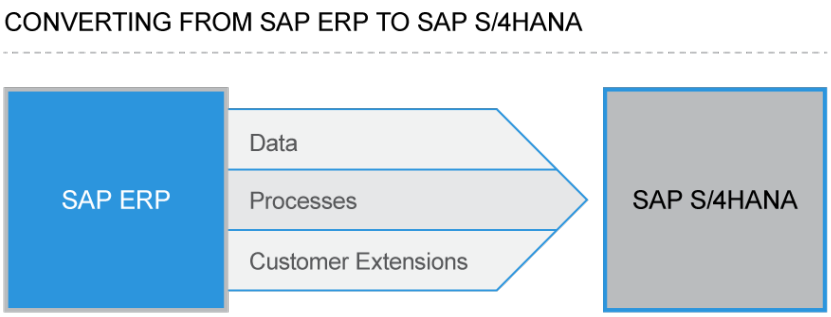


Figure 1. Businesses require new IT infrastructure and models to run SAP S/4HANA.

For most businesses, converting from existing infrastructure and SAP applications to SAP HANA is easier said than done. Chief information officers (CIOs) would love to simply redirect a chunk of their budgets for quickly enabling SAP applications that transform their businesses for the digital economy. Unfortunately, according to SAP, an IT survey conducted by Forester revealed a full 72 percent of IT dollars go toward maintaining legacy mission-critical applications, such as SAP enterprise resource planning (ERP). That leaves only 28 percent of the IT budget available to invest in new growth and enable the digital enterprise. Given that fiscal landscape, how can businesses make any headway on modernization?

Planning the Modern Datacenter that includes SAP

While every company's path to transforming IT and modernizing the data center is unique, most share some common objectives in sustaining SAP ERP deployments while migrating to SAP S/4HANA. These objectives include the need to;

- Consolidate, automate and simplify IT to lower infrastructure costs and increase productivity of SAP admins, database administrators (DBAs) and IT operations staff and,
- Migrate to SAP S/4HANA and integrate the platform as part of your standard data-infrastructure design and architecture, in order to making use of existing operations, processes and tools.

This 15-minute guide—written for IT managers and architects— introduces Dell EMC converged platforms as an enterprise-wide foundation for the modern data center to lower cost for SAP ERP deployments, while enabling your migration to SAP S/4HANA and ITaaS.

Transformationing the Data Center

Digital transformation is a journey, with different routes for different users. But regardless of the road taken, there are common preparations that all travelers need to make to reach their destination successfully and efficiently.

Building blocks of the modern data center

When building a modern data center running SAP, three areas requiring careful discussion and planning include:

1. **Deploying cloud-enabled infrastructure**: The first logical starting point is to set an infrastructure foundation that can be fully virtualized or "cloud-ready".
2. **Enabling self-services for SAP software**: Next is to extend cloud-ready infrastructure with infrastructure-as-a-service (IaaS) for SAP, based on a software-defined data center (SDDC) model allowing self-service provisioning of systems that include pre-defined options to address SLAs for performance and availability.
3. **Running SAP software in a cloud**: Third is to run SAP with the "personality" of web 2.0 applications bringing greater agility with higher-value features, including self-service, orchestration and application-lifecycle management for traditional mission-critical applications and cloud-native SAP apps.

To reach the goal of SAP in the cloud, it's important to carefully research, select and deploy an infrastructure foundation that can support your current and future needs

Setting a foundation with converged platforms

Realizing that speed and agility are critical to the business, the ideal way to modernize quickly and reliably is to use pre-built turn-key systems that are optimally designed for ease of purchase, deployment and maintenance.

The Dell EMC converged platforms portfolio delivers IT managers and architects the flexibility required for an enterprise-wide infrastructure strategy running SAP and non-SAP systems.

As illustrated in figure 2, cloud-ready infrastructure is the foundation for enabling self-service for SAP and for running SAP in the cloud. According to IDC, customers that migrated to CI from traditional environments saw a dramatic improvement in the time to deploy and scale new services.[1] CI also freed up customers' IT resources to focus on more value-added, strategic activities, all while reducing operational costs.[2]

DELL EMC CONVERGED INFRASTRUCTURE

A portfolio of factory-built, pre-validated systems supports SAP HANA while continuing to provide exceptional performance for existing SAP ERP and non-SAP systems.

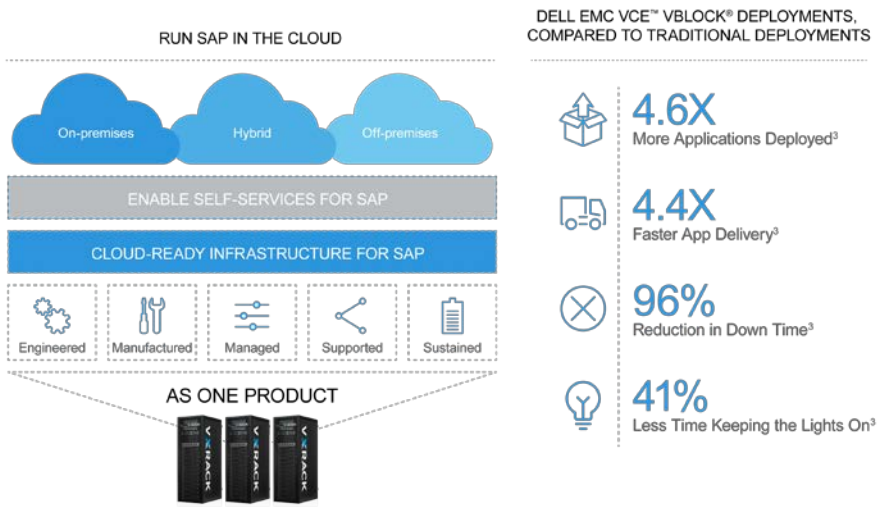


Figure 2. Dell EMC CI is engineered to provide a foundation for SAP mixed workloads, self-services for SAP software, and SAP cloud deployments.

The modern data center running SAP needs to:

- Consolidate and lower the cost to maintain your existing SAP systems
- Pave the way for full adoption of the SAP HANA platform for the digital economy
- Support SAP software accessible from anywhere on any device at any time

CI deployment scenarios for SAP

Dell EMC provides a range of CI platforms that support SAP. To determine which CI offerings are best suited to your organization, you need to consider your specific use cases and business SLA requirements for performance, protection and availability.

Below we identified traditional and emerging SAP use cases common to most businesses looking to transform IT to run SAP in digital business;

- **Business-critical SAP landscapes** that include SAP ERP, SAP Suite on SAP HANA (SoH), SAP Business Warehouse (BW) on SAP HANA (BWoH), SAP Business Suite 4 SAP HANA (SAP S/4HANA), and SAP ERP Accelerators with SAP HANA.
- **Data analytics with SAP**, with a focus on the SAP HANA Data Warehouse platform and data-management options for "hot" in-memory data, "warm/ cold" storage data and Apache® Hadoop data.
- **Developing cloud-native** SAP apps and extensions.

Each of these uses cases is discussed in further in the following sections.

Business-critical SAP landscapes

As mentioned earlier, enabling SAP applications to run in a digital economy takes more than a quick investment and the flip of a switch. If you're like most organizations, you need to maintain traditional SAP ERP and BW systems running on storage-based databases, while transitioning to an SAP HANA in-memory database and ultimately to SAP S/4HANA.

That means your cloud-ready infrastructure most likely will need to support mixed SAP workloads based on one or more of the following SAP deployment scenarios

Figure 3. As you modernize IT to run SAP, your infrastructure must support mixed SAP architectures and workloads.

IT considerations in planning your SAP Infrastructure

Depending on the SAP application portfolio you are running and varying architectures, you most likely need an infrastructure strategy supporting both traditional SAP on classic storage databases and SAP HANA in-memory database.

Thus, choosing the best converged infrastructure platform for your organization is dependent on SAP characteristics and requirements for SAP landscapes that include production and non-production landscapes comprised of transactional, reporting and analytical workloads.

Enhance SAP with All-Flash Converged Infrastructure

BUSINESS-CRITICAL SAP SYSTEMS

RUN SAP MIXED WORKLOADS

SAP ON TRADITIONAL STORAGE BASED DBMS

- 66% reduction in long running batch jobs
- 75% reduction in SAP ECC to BW interaction
- 60% reduction in MARA raw data base reads

SAP ON HANA IN-MEMORY DMBS

- Certified to meet SAP KPI's
- 15-60% faster read times lead to faster databases restarts, host-auto failovers, log backups, data base recoveries and table loads

AVAILABILITY AND PROTECTION

- Backup and restore
- Continuous data protection
- Data mobility & continuous availability

SYSTEM COPY/ REFRESH

- Dramatically simplify provisioning & management of SAP systems and data
- Instantly provision more system copies while consuming almost zero net-new storage

Below we have identified key characteristics for mixed SAP workloads including performance, availability & data protection, and copy management for SAP systems and data. Understanding these characteristics is important as they influence the infrastructure options you choose.

Performance

When running **SAP software on traditional storage-based databases such as Oracle® Database, Microsoft® SQL Server® and IBM® DB2**, workload attributes typically include multiple input/output (I/O) profiles supporting hundreds or thousands of concurrent users at scale including long running large batch jobs and processing data loads into SAP BW.

Also, with traditional storage-based databases, customers observe a ratio of 80 to 90 percent reads to 10 to 20 percent writes.

When running **SAP on the HANA in-memory database**, workload attributes include input/output profiles with 100% of all "hot-data" process in-memory platform, all data and logs are maintained on the storage layer for persistency with guaranteed low-latency is required at the storage layer and high throughput required at storage layer for cold-data reads on startup.

Availability and data protection

When running mission critical SAP systems, ensuring business continuity requires bullet-proof services to minimize planned and/ or unplanned downtime by eliminating single points of failure. For example, disaster-avoidance strategies including recovery from data corruption, enabling self-services for SAP/ DBA admins for backup and restore and reducing the size and time to backup SAP landscapes.

Copy management for SAP systems and data

It is common to have four, six, or even ten or more SAP applications running with each system requiring multiple, fast system copies resulting in environments multiple terabytes in size. Historical roadblocks to hindering SAP Administrators, DBA's and developers productivity include the complexity and cost in creating and managing copies of SAP production and non-production systems including data refresh. Lack of automation and silos of infrastructure are two key factors.

CI Options for business critical landscapes

Now that we have reviewed key IT considerations for running SAP systems, we will take a closer look at Dell EMC converged infrastructure for business critical landscapes.

Because of their versatility, Dell EMC Vblock Systems and VxBlock Systems are ideal solutions for running mixed SAP and non-SAP workloads including:

- infrastructure consolidation and IT automation for to reduce cost of legacy SAP systems,
- integrating SAP HANA as part of your standard datacenter architecture leveraging SAP HANA Tailored Data Center (TDI) Integration Model.
- delivering the performance and scalability for mixed transactional, reporting and analytic workloads, and
- enabling greater business agility with automation and self-services.

VBLOCK® AND VXBLOCK™ SYSTEMS

CONVERGED INFRASTRUCTRE

BUSINESS-CRITICALSAPSYSTEMS

- Support for core mission-critical business processes and reporting
- Designed to run legacy SAP and SAP HANA workloads
- Support SAP HANA Tailored Data Center Integration (TDI) Model
- Engineered to meet SLAs for performance, availability and protection on large production and non-production landscapes
- Support both on-premises deployments and off-premises cloud deployments

VXRACK SYSTEM 1000

HYPER-CONVERGED INFRASTRUCTRE (HCI)

IS NOW THE TIME FOR SAP? *

- HCI rack-scale engineered systems provide integrated networking, scalability and management requirements of traditional and cloud native workloads.
- HCI is increasingly becoming attractive alternative to CI for service providers and IT departments looking for highly scalable lower cost software defined infrastructure.

* Check with your Dell EMC account representatives for SAP availability.

Vblock Systems seamlessly integrate best-in-class compute, network, and storage technologies from industry leaders Cisco, Dell EMC, and VMware. VxBlock Systems, engineered to the same specifications as Vblock Systems, address a need for increased choice of network virtualization solutions with VMware NSX.

Table 2 shows the Vblock® Systems, VxBlock™ Systems suited for mixed applications workloads including traditional SAP and SAP HANA workloads.

Table 2. CI options for running business-critical SAP systems

CI Platforms	SAP Use Case
Vblock System 300 Series VxBlock System 350	Ideal for midsized deployments and cost-sensitive mixed SAP HANA and non-HANA workloads.
Vblock System 500 Series VxBlock System 540	Ideal for consolidating SAP production and non-production systems such as SAP ERP, SAP BW and HANA that demand high throughput with low latency .
Vblock System 700 Series VxBlock System 740	Built for enterprise-scale, mission-critical applications and mixed workloads; designed to reliably run thousands of virtual machines and desktops supporting SAP, Oracle, Microsoft Exchange, Microsoft SharePoint, virtual desktop infrastructures (VDIs) and other platforms.

DEL EMC Technology Extensions let you quickly and flexibly increase processing power or add storage capacity without typical technology risks. Tightly integrated, fully tested, and validated, Technology Extensions bring the convenience and assurance of proven engineering and support to expanded infrastructure.

Table 3. Technical extensions for growing and protecting SAP Vblock systems

Technical Extensions	SAP Use Case
Compute	DELL EMC provides compute to seamlessly scale and grow SAP systems for scenarios including: • virtual desktops and mobile users, • ingesting mergers & acquisitions and, • accelerating development, migrations and deployments.
Storage	Dell EMC provide choice with: • Scale-up and scale out flash or hybrid storage for growing SAP mission critical transactional, reporting and analytical workloads
Data Protection	As businesses increasingly require “always-on” systems, Dell EMC enables business continuity for mission critical SAP with solutions including; • Application aware backup, archive and recovery with Avamar, DD Boost for DBA’s and Data Domain • Application consistent protection due to operational incidents and disasters, including migrations with RecoverPoint and RecoverPoint for Virtual Machines. • Continuous availability and mobility with VPLEX that enables SAP to remain up and running during a variety of scenarios that would otherwise cause planned or unplanned downtime scenarios.

EXTENDING DELL EMC CI WITH ISILON

SAP ANALYTICS AND IOT

- Ingest and process SAP business-generated data and IoT data
- Enable a single Vblock System with integrated protection for all data temperatures
- Reduce the need to store data on expensive memory
- Allow for a scale-out enterprise data lake for structured and unstructured data
- Enable the ability to augment an existing data-warehousing and BI investment

VBLOCK AND VXBLOCK

DELL EMC ISILON

Data analytics: business data meets IoT

To compete in the digital age, many companies are exploring ways to merge traditional business data with the internet of things (IoT) data collected at the edge. By combining back-office transactional and reporting data with IoT information, businesses can gain actionable insights on freight deliveries, customer preferences, the health and status of equipment and a nearly infinite range of other possibilities.

Application and Infrastructure IT Considerations

The topic of data analytics can be broad extending from the core to the edge. In this guide we will focus on SAP's HANA Data Warehouse located in the "core" data center.

SAP architecture: As depicted in Figure 7 below, the SAP HANA Data Warehouse provides unified access for in-memory SAP HANA data (in orange), dynamic tiering for data located on storage (in blue) and Apache Hadoop data (in green).

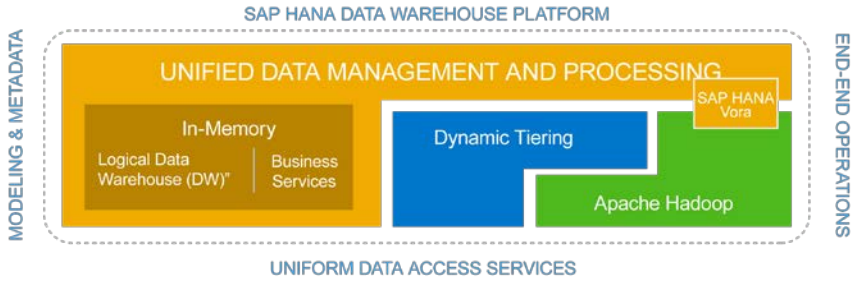


Figure 7. Data can be stored more efficiently depending on its classification and how often it is accessed.

Considering the cost associated with processing of information, SAP introduced the concept of data temperatures to store data on the most economically suitable repository based on the data's business value. In the system, only the most frequently accessed data ("hot" data) resides in higher-cost SAP HANA memory. Less frequently accessed "warm" or "cold" data is stored on more affordable flash storage, traditional hard-disk drives or other options.

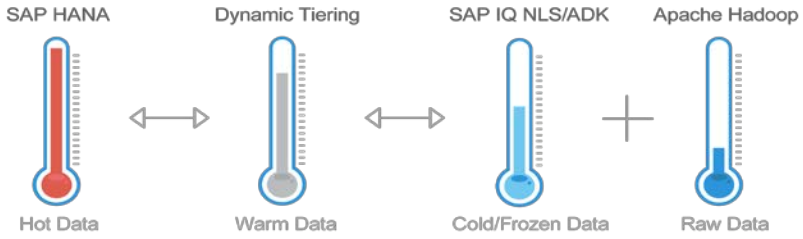


Figure 8. The data temperature model. "Hot" data is accessed frequently, while "warm" or "cold" data is accessed less frequently.

VXRACK™ SYSTEMS

VXRAIL SYSTEMS

HYPER-CONVERGED INFRASTRUCTURE

SAP CLOUD NATIVE APPS AND EXTENTIONS

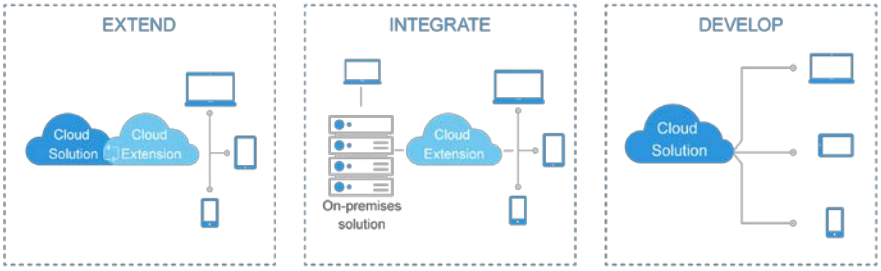
- In on-premises deployments, SAP HANA Extended Applications Services (XS) can be run/manage “in-a-box” but scale out on lower cost systems
- In cloud deployments, XS applications run on SAP the HANA Cloud Platform PaaS.
- AX supports Cloud Foundry enabling businesses to build, deploy and move cloud apps seamlessly across private and public clouds
- Ideal for SAP HANA service providers

Cloud-native SAP apps and extensions

Companies are increasingly looking for fast, efficient ways to provide cloud-enabled apps for their customer. Many customers and service providers are answering that call by providing a platform-as-a-service (PaaS) running the SAP HANA Platform.

Emerging SAP Use Cases

SAP HANA Platform is designed to help developers develop, deploy and operate applications that run in the cloud. For example, SAP’s HANA Cloud Platform provides the following functionality and services:



Extend cloud and on-premises solutions

Integrate cloud and on-premises solutions

Develop new applications

S

SAP HANA Extended Application Services (XS): Architecture and Portability

SAP HANA SPS 11 represented an evolution of the XS applications server architecture to make SAP HANA Platform more open and lighter-weight for building portable apps and extensions.

SAP HANA XS Advanced offers customer the freedom choice of technologies, tools and deployment options for high-scale development and operation of native SAP HANA applications. With SAP HANA XS Advanced Services no longer tied to the HANA DBMS, on-premises and service provider deployments of SAP HANA (XS) can be run/managed “in-a-box” similar to classic XS deployments but deployed and scaled out on lower cost hyper-converged systems.

HCI options for cloud-native SAP apps and extensions

DELL EMC Hyper-converged Infrastructure integrates IT components in a scalable rack or appliance allowing you to modernize your data center with simplified management, improved performance, and elastic scalability.

- DELL EMC VxRack™ System 1000 consists of hyper-converged rack-scale engineered systems, with integrated networking, the scalability and management requirements of traditional and cloud native workloads.
- DELL EMC VxRail is a fully integrated, preconfigured, and pre-tested VMware hyper-converged infrastructure appliance.

Run SAP in multiple locations

Dell EMC solutions can help extend deployments beyond the core data center to multiple data centers and regions with DELL EMC ™ Vscale™ Architecture. Vscale Architecture helps deliver optimal resources to applications—regardless of the location, scale and performance requirements—with full visibility across components.

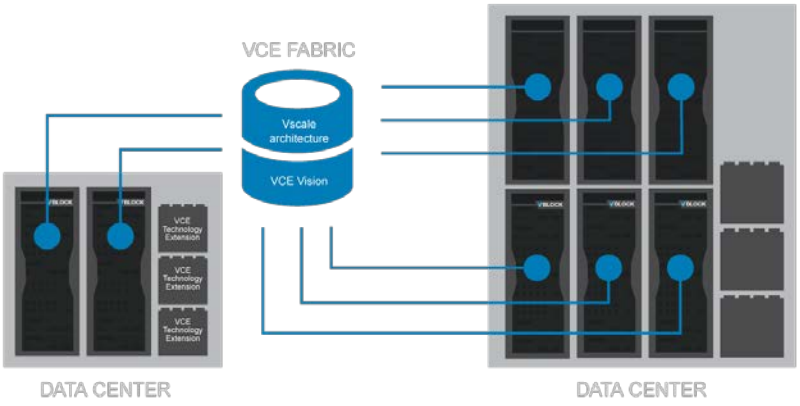


Figure 9. DELL EMC Fabric extends intelligent operations and life cycle management across geographically-dispersed data centers.

Vscale Architecture consists of several components:

DELL EMC Fabric is a scalable network fabric that connects multiple systems and modular components to create a shared pool of resources. A business can construct a unified data center that takes full advantage of the company's on-premises SAP infrastructure as a shared pool of resources.

DELL EMC Vision™ helps drive specific business outcomes for SAP by complementing traditional SAP application-lifecycle management with infrastructure-lifecycle management. Vision software is embedded in Dell EMC CI and hyper-converged infrastructure (HCI) systems. It provides intelligence, automation and visualization to simplify and standardize processes for continuous IT operations.

Summary

Modern businesses are under increasing pressure to transform themselves for the digital economy. Dell EMC CI platforms provide cloud-ready infrastructure designed to protect current investments in traditional SAP platforms, while establishing the foundation that you need to support the next generation SAP HANA platform.

Dell EMC CI and HCI systems help to:

- ✓ Consolidate, automate and simplify IT to lower infrastructure cost and increase productivity for SAP ERP and BW platforms
- ✓ Integrate SAP HANA as part of your standard data-infrastructure design and architecture
- ✓ Deploy and scaled out on lower cost hyper-converged systems for traditional SAP applications and SAP cloud native app and extensions.
- ✓ Set the stage for delivering ITaaS, with SAP applications running in the cloud

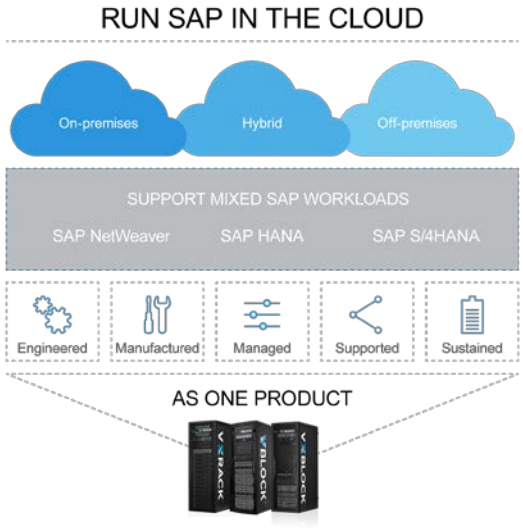


Figure 10. DELL EMC CI systems provide the infrastructure foundation for running and managing SAP and SAP HANA mixed workloads in the data center and the cloud.

[1] IDC. "The Business Value of VCE Vblock Systems: Leveraging Convergence to Drive Business Agility." May 2015. http://www.vce.com/asset/documents/idc-business-value-whitepaper.pdf.
[2] IDC. "Convergence with Vblock Systems: A Value Measurement." September 2013. https://www.emc.com/collateral/white-papers/idc-vblock-value-whitepaper.pdf.
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To learn more about Dell EMC CI solutions, visit:

http://www.dellemc.com