Abstract
Achieving the Intelligent Enterprise is about adapting and changing so you’re ready for what’s ahead: data-driven innovation, process automation and new business models.

And for IT, moving to SAP® HANA® and SAP S/4HANA® means viewing old problems with new perspectives.

In this guide we share the Dell Technologies approach to IT modernization, so you’re prepared to turn data insights into action — across the business.

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#1 priority
when making operational improvements to business is to modernize IT

The Intelligent Enterprise

Winning in the experience economy

The experience economy offers incredible opportunities for organizations, but it also brings new challenges. Winning requires a new mindset: a focus on interconnecting business operations through data to become a truly intelligent enterprise. Yet, this becomes difficult when the IT environment is overly complex and siloed.

For businesses running SAP, the key lies in adopting SAP HANA and S/4HANA applications. SAP S/4HANA, together with SAP Intelligent Technologies, address this integrative approach by bringing transactional data together with big data and Internet of Things (IoT). By moving from classic SAP ERP and Business Suite applications to powerful in-memory and edge processing, IT can gain real-time business insights with machine learning (ML) and artificial intelligence (AI).

SAP HANA is the future of the Intelligent Enterprise. Since the 2010 release of SAP HANA for real-time computing, adoption has grown to 33,000 customers to date. Nearly 14,000 customers have purchased licenses for SAP S/4HANA.

To build an Intelligent Enterprise strategy, customers are laying the groundwork now. And according to SAP Insights, “more than half (52%) of respondents report that their number one priority when making operational improvements to their businesses is to modernize their IT systems to improve information flow. In doing so, they’re building the foundation they need to capitalize on the intelligent technologies they expect to deploy.”

An Intelligent Enterprise is driven by the power of data.

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1 SAP Corporate Fact Sheet, February 2020.
Adopt SAP HANA: The time is now

To give customers more flexibility to plan and execute S/4HANA migrations, SAP announced that it will extend mainstream maintenance on core applications of SAP Business Suite 7 from 2025 to 2027. The SAP HANA database is a strategic foundation for data-driven applications — S/4HANA will run only with SAP HANA. SAP acknowledges that these are complex, resource-intensive projects. So, the time to begin adopting SAP HANA is now.

To run this digital core from SAP, modern IT infrastructure is required. But moving to S/4HANA and SAP Intelligent Technologies is easier said than done. Many times, IT must reduce the resources required to maintain traditional SAP ERP and SAP Business Warehouse (SAP BW), while safeguarding investments for eventual adoption of S/4HANA. More than ever, CxOs need to rethink how to run, grow and transform businesses. New efficiencies are required.

Plan a path to SAP HANA and SAP S/4HANA

While every journey is different, the path to IT modernization and the Intelligent Enterprise includes three essential elements.

- **A dynamic infrastructure** with flexible consumption that’s ready for SAP HANA when you are. Many begin by consolidating SAP landscapes. This helps simplify IT and reduce the cost of innovation.
- **Cloud momentum.** While organizations recognize the value of cloud, their plans lag behind their ambitions.
- **Better management of data** to achieve faster insights with SAP Intelligent Technologies.
Dynamic infrastructure: Run mixed workloads

With Dell Technologies, you can deploy the right mix of infrastructure using flexible consumption models. This helps eliminate the complexity that often hinders SAP success. We help simplify highly virtualized SAP landscapes as you adopt SAP HANA and SAP S/4HANA. With our dynamic infrastructure, you can deliver performance at scale for mixed workloads — from online transaction processing (OLTP) and analytical processing (OLAP) to analytics and big data.

Consolidate SAP landscapes: Reduce cost and complexity

Historically, IT has run SAP production and non-production systems on siloed infrastructure, whether by design — to protect production performance — or ad hoc as new projects are added.

As a result, IT must manage sprawling, complex system landscapes with limited budget and resources.

SAP landscapes are complicated

Delivering performance for mission-critical SAP is crucial. Common SAP performance concerns include:

- Reducing time to execute SAP ERP month-end batch jobs
- Accelerating data loads to BW and/or SAP HANA
- Meeting SAP key performance indicators (KPIs)
- Accelerating data loads for cold restarts of SAP HANA

Increasingly, to support new processes, SAP must be “always on.” Dell EMC has deep experience providing high-performance data protection solutions for SAP — ensuring availability — no matter where your data resides, both in the data center and the cloud.

Production SAP ERP systems can quickly grow to many terabytes, and customers often run multiple SAP applications along with those for development, test and QA. This leads to data footprints that are costly to protect and difficult for SAP and database admins to manage.

Dell EMC Data Protection portfolio offers SAP- and SAP HANA-certified backup and restore solutions that provide centralized visibility and control along with industry-leading deduplication to reduce storage requirements by 65:1*. As a result, IT can deliver faster performance for SAP and SAP HANA workloads, while meeting stringent protection SLOs.

For more information check out DELL EMC SOLUTION: DESIGNED FOR SAP LANDSCAPE CONSOLIDATION.

* Based on Dell EMC internal testing with DDOS 7.0 August 2019. Actual results may vary.
Simplify SAP system copy/refresh cycles

SAP admins spend a great deal of time creating and managing copies of SAP production systems to support development, test, QAS and training environments. The process can be time consuming with SAP system copy/refresh taking several business days to complete. The most common challenges include:

- Coordination among storage, server and virtualization teams
- Manual, time-consuming, complex post-processing steps
- Risk of manual errors and quality of copy/refresh
- Large data footprints leading to increased storage costs

These circumstances slow innovation and increase the risk of data inconsistencies and corruption – major reasons organizations are looking for new ways to improve the process.

During upgrades, migrations and/or deployment of new functionality developer cycles are at a premium. With Dell EMC storage snaps and integrated copy management, IT can accelerate SAP development, testing and deployment by instantly creating on-demand, space-saving, high-performance copies without impacting production performance.

Typical SAP landscapes include dozens of non-production systems, like development, training and sandbox. Automating the management of SAP system copies with trusted storage-based cloning, reduces the TCO of an SAP landscape, resulting in:

- More productive SAP admins, focused on higher value work versus time-consuming, error-prone manual tasks.
- Faster delivery of high-performance copies with minimal-to-no impact on production.
- Lower costs by reducing the size of storage footprints for SAP copies via highly efficient data-reduction intelligence.

For more information review DELL EMC SOLUTION: DESIGNED FOR SAP LANDSCAPE MANAGEMENT (SAP LAMA).
**Take advantage of a shared infrastructure**

SAP HANA and SAP S/4HANA are disrupting IT. Dell Technologies invests in the SAP HANA Certification Program for hardware, designed to fast-track implementation with reduced risk.

Dell EMC has partnered with SAP since the release of SAP HANA in 2011, when SAP announced the HANA appliance delivery model for targeted workloads. Since then, Dell EMC’s portfolio has expanded to include SAP Tailored Datacenter Integration (TDI) so that IT can run SAP HANA like any other database on a shared infrastructure.

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**SAP HANA TDI model**

Use your preferred Dell EMC SAP HANA TDI infrastructure

While Dell EMC supports all SAP paths to deploying SAP HANA infrastructure on-premises, running SAP HANA on shared infrastructure has become the preferred model — it provides more flexibility with lower TCO as you scale deployments.

Dell EMC offers comprehensive choice in SAP HANA — certified infrastructure options, data protection and availability, and professional services for SAP HANA deployment, migration and replatforming projects.

For more information review [DELL EMC SOLUTION: DESIGNED FOR SAP HANA](#).
Reduce TCO for SAP and SAP HANA applications

As organizations scale the adoption of SAP HANA for “data-driven” applications, IT needs a strategy for managing TCO and SAP HANA licensing costs. By reducing the amount of data that must be maintained in expensive DRAM, IT can safeguard maximum data value at the minimum cost.

SAP HANA data tiering gives IT a framework for managing data placement based on the data value and SLA over time.

- Hot store is used to store mission-critical data for real-time processing and real-time analytics. Persistent memory (PMEM) extends the in-memory storage capacity for hot data in SAP HANA.
- Warm store is for less critical data with reduced performance and SLAs that can be stored on lower cost storage but still managed as part of the SAP HANA database.
- Cold store provides persistence capabilities for HANA cold data in external data stores, like Hadoop® Distributed File System (HDFS), Azure® Data Lake and SAP Big Data Services.

With Dell EMC solutions for SAP Data Tiering, IT can deploy an SAP HANA TDI certified infrastructure foundation ready to support a “holistic” data management model for SAP HANA landscapes.

For more information review: DELL EMC SOLUTION: SAP HANA DATA TIERING
Cloud momentum: Run SAP in a cloud-operating model

Increasingly, organizations running SAP are modernizing their IT systems to improve information flows while applying much more of a hybrid cloud approach. The goal is to invest in technology but also address the entire business. Connecting operations through data is critical.

The fact is that workloads have various operating profiles and SLA requirements. This is especially true in massive, dynamic IT environments that consist of multiple mission-critical applications that use the same underlying infrastructure.

Running SAP in a cloud-operating model gives IT the flexibility to meet a variety of workloads and performance needs.

Begin with a cloud-enabling infrastructure

Many customers run (and will continue to run) “core” SAP applications on-premises. As these businesses modernize their IT infrastructures for mission-critical SAP, they are looking for a future-proof foundation designed to run traditional SAP ERP and BW as well as intelligent applications powered by SAP HANA and SAP S/4HANA.

According to an ESG Survey, organizations find that by modernizing IT using converged- and hyperconverged infrastructure (CI/HCI), they can fulfill the requirements.

As an on-premises infrastructure foundation for a cloud-operating model, Dell EMC’s converged (VxRail) and hyperconverged (VxFlex) infrastructures offer IT organizations flexibility in meeting the delivery model that best fits their requirements — including hybrid cloud deployments. PowerOne introduces additional levels of automation.

Running SAP in a hybrid cloud operating model begins with this cloud-enabling infrastructure.
Transform to a cloud operating model

It’s a multi-cloud world. Organizations want to take control of their cloud environments — private cloud, public cloud and edge locations. A better cloud experience means a consistent operating model, starting with on-premises deployment.

The Dell Technologies Cloud helps organizations gain cloud momentum by providing a consistent infrastructure and operational experience across the cloud ecosystem.

• The on-premise Dell Technologies Cloud is built on Dell Technologies hyper-converged infrastructure, VxRail, as well as VMware® Cloud Foundation™, so you can run applications in both private and public environments.
• With Dell Technologies validated designs, you can build Dell Technologies Cloud using traditional servers, networking and storage including Dell EMC PowerEdge MX, PowerStore, PowerMax and Unity XT.
• Data protection for Dell Technologies Cloud accelerates your hybrid cloud journey, helping you to reduce business risk and meet regulatory compliance.
Get flexible cloud services and consumption

Based on their experience with public clouds, organizations want more choice, flexibility and predictability in how they consume IT infrastructure for their own data centers.

Dell Technologies offers three flexible payment solutions:

- **Commitment-based** (pay-as-you-grow and PC-as-a-service, known as PCaaS) — Align predictable payments with business goals, deployment schedules and growth forecasts.
- **Usage-based** (flex on demand and data center utility) — Meter variable usage to pay only for what you consume. Scale up or down with elastic capacity.
- **Subscription-based** (cloud platform) — Choose purpose-built turnkey solutions with simplified payments to accelerate time to value.

Next-generation intelligence: Data management

Achieve data-driven innovation

Organizations understand that in order to thrive in the digital economy, they must derive better insights from the data they own — and do it in a more automated, reliable way. The faster this process, the faster the time to insights.

That means fueling business processes with insights from data across all information sources — at the edge, in core SAP environments, from IoT, data lakes and Hadoop repositories or in the cloud.

Establish an IT foundation for data management

No matter where you are in your journey, the challenges are all too common: aligning business owners and IT on next steps and engaging resources to fully operationalize the value of next-gen intelligence, with SAP Intelligent Technologies.
But creating data-driven applications is not a linear process — it’s a continuous, iterative loop that requires five main things:

- Architects to wrangle data
- Data scientists to create, train and take models to production
- Application developers to integrate the output of analytics for meaningful action
- IT architects to build a flexible foundation that’s agile and automated enough to handle the new workloads, and
- DevOps capabilities to tie it all together into one seamless machine

Without better data management, organizations find the road to achieving data-driven insights is longer and more difficult. The single biggest problem we hear about from customers is that business and IT are not aligned on a data-driven strategy. That problem is highlighted by research that says more than half of all business users aren’t clear what to expect from AI/ML projects.6

IT needs a simpler way to deploy, integrate and manage these new data-driven applications. Dell Technologies allows businesses to more easily support this continuous data analytics process at each step along the way by providing these core essentials:

- A flexible IT foundation so you can scale without constraints. Dell Technologies infrastructure provides consistently high performance for SAP workloads, with a rich mix of compute, storage and data protection solutions that enable density and power efficiency for both transactional processing, analytics, AI and IoT. As a result, IT can bridge the data gaps, bringing structured operational data from SAP HANA together with unstructured IoT and big data sources so you gain actionable insight without limits.

Our AI-enabling infrastructure makes AI adoption faster, simpler, and more collaborative. We deliver a choice of flexible and scalable AI solutions for organizations of every size, with purpose-built servers, storage and workstations to address every use case.

- Services for AI, making it easier to accelerate innovation and achieve optimal business outcomes. We partner with you every step of the way on your AI journey, linking people, processes and technology. The Dell Technologies team of industry and technology experts can help you achieve faster time to results by shortening use-case identification, system design cycle and configuration time.

Manage diverse data sources: Edge to core to cloud
We know that the SAP HANA in-memory database is foundational for data-driven applications, but there are other non-HANA data sources.

First, IoT data at the edge. IoT edge computing is designed to support business decisions that need to be made locally. Organizations can prioritize data to process locally with subsets of aggregated data being transferred to the core.

Since intellectual property (IP) must be protected, data placement is key. IT organizations are finding an increasing need to manage IoT data on-premises. SAP Edge Services works together with SAP-certified Dell Edge gateways — tested and validated to run SAP IoT applications at the edge. This edge-to-core approach is advantageous because it uses existing investments in SAP ERP analytics and in-house teams while securing intellectual property on-premises.
At the core, IT can store S/4HANA data on SAP-certified Dell EMC infrastructure and unstructured big data with massive scalability on Dell EMC PowerScale, scaling from tens of terabytes to tens of petabytes.

Become data-driven, edge to core

AI and ML data
With SAP Data Intelligence it’s easy to manage the data for AI and ML with data orchestration and ML services. IT can discover and connect to any data source, then refine and transform data connections into usable data across landscapes. That means accessing structured, unstructured, streaming, cloud, on-premises, IoT, SAP and non-SAP data sources.

- When it comes to deploying SAP Data Intelligence on-premises, IT can run Red Hat® and SUSE® containers on Dell EMC infrastructure. SAP Data Intelligence is a containerized application and uses Kubernetes®. IT can orchestrate and execute data pipelines using containers to access and share data smoothly.
- Operations like blockchain also enable data-driven innovation and may take place in the cloud. This case study shows how to drastically speed up the information flow of regulated substances in a production supply chain while still fully protecting the intellectual properties of all involved parties. This is accomplished with the combination of SAP HANA, SAP Cloud Platform Blockchain Services and Camelot Trusted Computing Appliances running on Dell EMC PowerEdge servers.

With Dell Technologies you can gain better control of your data and achieve faster insights with SAP Intelligent Technologies.

Gerolsteiner: Edge computing and SAP S/4HANA
Gerolsteiner supplies one of the best-selling ranges of mineral water in Germany. In line with its aim to provide water sustainably, the company wanted to develop an edge computing application to improve demand forecasting. It also planned to upgrade plant-wide operational systems to SAP S/4HANA and needed to ensure its IT infrastructure could support the enhancement. This case study shows how Gerolsteiner made the move to edge computing and SAP S/4HANA with a Dell Technologies infrastructure.
Together we'll shape what comes next

Dell Technologies stands ready to work with IT organizations on the journey to achieving better outcomes — accelerating innovation for the experience economy, innovation powered by data-driven processes and SAP Intelligent applications.

Modern SAP platforms are becoming critical to improving customer experience and driving differentiation, but require infrastructure that delivers resources with superior performance, protection and agility, wherever and whenever needed.

With Dell Technologies solutions for SAP, IT can run mixed workloads for traditional SAP ERP and BW as well as intelligent applications powered by SAP S/4HANA and SAP BW/4HANA®. By beginning with a Dell EMC cloud-enabling infrastructure, organizations can more easily adopt a cloud operating model across private cloud, public cloud and edge locations. Dell EMC’s dynamic infrastructure provides the foundation for IT to accelerate data-driven disruption in the experience economy, to improve information flow and to design new intelligent applications — using big data, ML and AI.

Partner with us

For more than two decades, Dell EMC and SAP have collaborated to implement hundreds of customer solutions. The Dell Technologies SAP Innovation Lab, located at the PartnerPort in Walldorf, is where we develop innovative infrastructure for SAP and best practices for customers’ SAP solutions — from edge to core to cloud. Our joint customers learn from demos, proof-of-concepts in the data center, technical briefings and events onsite in the center or remotely.

We invite you to partner with us on your SAP deployment — whether it be a simple HANA deployment, migration to SAP S/4HANA or system refresh. With Dell Technologies, you can accelerate innovation and your move to cloud so you can achieve the Intelligent Enterprise.

www.delltechnologies.com/SAP

“Dell Technologies plays a big part in our SAP transformation strategy.”

— CIO at Gerolsteiner