

## White Paper

# The Power of IBM Power for SAP HANA and SAP S/4HANA Environments

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## IDC OPINION

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We live in a digital-first economy. For businesses, it means wide-ranging digital transformation (DX) initiatives – essential for maintaining the firm's competitive differentiation via new and innovative products and services – are a priority. An essential pillar of DX is information technology (IT) modernization, which includes core revenue-centric business systems. *IDC FutureScape: Worldwide Intelligent ERP 2022 Predictions* (IDC #US47981721, October 2021) estimates that by 2025, 80% of organizations (responding to the digital-first economy) will require advanced enterprise applications with exceptional innovation, multifunctional capabilities, and self-learning aspects. Many organizations rely on SAP's suite of applications as their core business systems. In a 2021 study on infrastructure adoption trends for SAP HANA and S/4HANA environments (see *Infrastructure Adoption Trends for SAP HANA and S/4HANA 2021 – Part 2: Market Trends/Landscape*, IDC #US48416021, December 2021), IDC found that more than 50% of North America-based firms with investments in SAP applications consider those environments essential for their business, with another third saying they play a significant role. While some are doing so in response to vendor mandates, many are investing in modernization of their SAP environments as a strategic imperative. For these firms, modernization of their "SAP landscape" requires SAP HANA, SAP's own in-memory database that powers modern SAP applications, including the enterprise resource processing solution SAP S/4HANA.

Upgrading SAP environments – modernizing them – is far from being a straightforward project. It is lengthy, disruptive, and costly and carries a certain amount of risk. Almost 65% of respondents say they struggle with it. Many of their challenges are centered around ensuring performance and scalability of the infrastructure for SAP HANA and SAP S/4HANA as well as the flexibility of the environment. As a result, many are shifting to public cloud deployments (which SAP encourages), but migration to the cloud has been proven to be not much easier, plus most businesses prefer a hybrid cloud for their SAP landscape. Challenges also include prioritizing tasks associated with S/4HANA-based digital transformation (for example, which elements to migrate first and choice of greenfield versus brownfield). Medium-sized and large enterprises – given the complexity and size of their SAP landscapes – are therefore seeking partnerships with third-party services firms to help them with these SAP modernization efforts.

Modernization of SAP environments onto SAP S/4HANA presents a significant opportunity to systems integrators (SIs). SIs can become a strategic partner to businesses as they go through their SAP migration journey. They can provide guidance and expertise to make the shift from on premises to hybrid cloud, ensuring the right selection of a "fit for purpose" infrastructure stack that scales, delivers

ample performance, and enables consolidation of the SAP environment, thus saving costs. IDC encourages SIs to explore the potential of presenting IBM Power for SAP workload modernization and consolidation to their customers. With over 4,800 businesses running SAP HANA on IBM Power, the system has proven to deliver scalable, performing, reliable, secure, flexible, and resilient infrastructure for complex and large SAP landscapes. SIs stand to gain traction with medium-sized to large enterprises with SAP modernization and implementation services with IBM Power and IBM Power Virtual Server in the cloud.

## SITUATION OVERVIEW

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Businesses that understand their role in the digital-first economy strive to be a step ahead of their competition. This is a two-part journey: The first part is to "run and maintain"; the second part is to "create new."

To "run and maintain" is to ensure consistent business outcomes. Among other things, it is to recognize the strategic role played by IT systems in delivering consistent business performance. These organizations make the necessary investments in modern business applications that are used to run the business smoothly (i.e., ensure seamless internal operations, market insights, customer engagement, and revenue capture and recognition). Many of them have invested heavily in SAP's suite of applications – and even though many endured an arduous implementation and go-live journey, the benefits to the business are clear. In a 2021 study on infrastructure adoption trends for SAP HANA and S/4HANA environments (see *Infrastructure Adoption Trends for SAP HANA and S/4HANA 2021 – Part 2: Market Trends/Landscape*, IDC #US48416021, December 2021), IDC found that more than 50% of North America-based firms with investments in SAP applications consider those environments essential for their business, with another third saying they play a significant role. Another 8% say that without SAP, their business would be in peril.

To "create new" is to foresee the winds of change in the industry and act accordingly. It could be that consumer preferences are changing, and the business needs to cater to a new demographic while also dealing with a changing workforce, global mandates on sustainability, and a post-pandemic era of conducting business. Organizations may have to deal with new competition and even sudden geopolitical changes. Here again businesses realize the importance of IT systems to innovate in response to new forces and sustain a level of resiliency. This means that their modern IT environments must be further transformed. What works with "run and maintain" may fall short for the "create new" side.

## Pathways for Modernizing SAP Environments

There is a clear path established by SAP on maintaining currency (for run and maintain) and to modernize and transform (to create new). The modernization road map calls for organizations to shift their SAP ERP workloads to SAP S/4HANA. The stated business benefits of SAP S/4HANA are:

- Simplification and consolidation of the entire environment with a single in-memory database; ease of use with a modern design, regardless of device or deployment
- Cost-effectiveness and better decision making by tying together all the analytical and transactional capabilities of a variety of systems at one location
- Accelerating innovation with an application stack that can leverage speed, context, and data accessibility

- Improved performance that enables the organization to provide better response times for customer-facing and internal applications

A peculiar challenge with SAP environments is determining the infrastructure requirements of the SAP HANA in-memory database that powers SAP S/4HANA and other modern SAP environments. SAP HANA is a multi-model database that keeps the data in memory instead of accessing it on persistent media (like flash or disk). The column-oriented, in-memory database design enables advanced analytics alongside high-speed transactions in a single system. It lets businesses process massive amounts of data with near-zero latency and gain instant responses to queries. By storing data in column-based tables in main memory and bringing online analytical processing (OLAP) and online transactional processing (OLTP) together, SAP HANA is significantly faster than other traditional database management systems (DBMSs).

SAP HANA databases are performance-intensive, memory-optimized, computing platforms. IDC research has found that the memory size of the SAP HANA database varies with company size – for small companies, it is 3.6TB on average, for midsize companies 11.5TB, and for large companies 26.9TB; and the average size is 15.5TB. Limitations with maximum memory supported by the platform limit the ability of some businesses to scale their SAP environment.

The appropriate choice of a computing platform (server) is also important in terms of deployment costs. IDC finds that most businesses plan to significantly virtualize their SAP workloads, going from an average of 45% today to 52% in the next 24 months. An appropriate computing platform enables organizations to consolidate other parts of the SAP application stack onto a single environment. For these businesses, key benefits of virtualization include increased efficiency, flexibility, reduction in compute footprint, and reduction in costs and environment footprint.

## SAP Modernization Journey Can Be Arduous

On paper, the migration process is a simple, straightforward initiative. However, many organizations say they struggle with deploying and maintaining the currency of their SAP environment. Surveyed respondents agree on the challenges:

- Two-thirds of respondents admit it is hard to keep up with new products, requirements, and deployment recommendations. Two-thirds also say that integrating a multi-deployment SAP landscape is challenging to almost impossible.
- Less than half of the survey respondents said they had deployed SAP HANA in production, and only around less than a fifth of all respondents said they ran SAP S/4HANA in production (which is approximately 30% of all respondents who run SAP HANA).

IDC also finds a direct correlation between the size of the company and the issues the company faces with maintaining the currency of its SAP environment – whether minor upgrades, major upgrades for bringing the environment in line with vendor recommendations, or to shift the entire environment to public cloud. Respondents cite anywhere from 15 months to 18 months to migrate from an SAP Business Suite on a non-SAP HANA database to SAP S/4HANA – the larger the business, the longer it takes to migrate. Capex spending on infrastructure creates an additional burden on ITDMs.

These struggles can sometimes lead businesses to embrace a public cloud-first strategy for their SAP modernization initiatives. This may not be sound strategy for all businesses, especially businesses with large SAP environments. Let alone the cost overruns that occur due to a "lift and shift" approach, a public cloud-first strategy could introduce new variables into the mix – variables that make the task of operating the environment even more complex.

## Systems Integrators as Trusted Partners

Not all businesses are sold on a public cloud-first strategy. IDC finds that businesses are seeking to implement a hybrid cloud operating strategy that governs their on-premises footprint with selective deployments in the public cloud. They cite greater security, more cost efficiency, and easier data management as the key benefits to this approach. Their biggest challenge – as they cite it – is that they lack the expertise to implement this approach for their SAP environments.

Systems integrators play a key role as trusted advisors and partners to businesses with large and/or complex SAP deployments or to businesses seeking to deploy a new SAP S/4HANA environment. They can help them in guiding them through the various steps of SAP implementation or modernization journey, which often starts with gathering business requirements and size and growth estimates and determining the right application and infrastructure architecture and deployment type. Selecting the right vendors and service providers that can deliver the computing platform is important – it ties into whether the platform enables deployment of SAP workloads in a hybrid cloud environment.

## SYSTEMS INTEGRATORS GAIN WITH IBM POWER FOR SAP ENVIRONMENTS

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SIs can deliver distinct value to businesses with investments in SAP, especially if they leverage their expertise to help a customer think beyond the narrow frameworks in which they typically tend to consider their solution options. IDC research has shown that many businesses with SAP landscapes choose a hardware vendor for SAP since they do business with the vendor for their general-purpose infrastructure, without ever considering alternatives. SIs are in a unique position to educate their customers about solutions that they might otherwise never consider, including the extensive IBM Power systems for SAP portfolio.

With IBM Power systems for SAP, SIs can provide services that deliver:

- Flexibility, resiliency, security, and performance without any compromises on memory and I/O scaling for bare metal, virtualized, and containerized workloads
- Workload consolidation as part of modernization initiatives, with the ability to run legacy or current generation workloads (for example, on AIX) and newer ones (for example, on Linux)
- Accelerated modernization pathways using IBM's comprehensive suite of migration tools, designed to automate and reduce migration times
- Sustainability goals for businesses with a balanced hybrid cloud strategy (factors in optimal sizing of the environment, consolidation to eliminate underutilized resources, and placement of resources across on premises and public cloud)

IBM's portfolio of Power10 servers delivers flexibility, reliability, security, performance, and scalability in a class of computing platforms designed for highly specialized, mission-critical workloads. A totally integrated approach to the design, development, and testing of each IBM Power server ensures the resiliency required for today's enterprise IT infrastructure.

## WHY IBM POWER?

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### Customer Testimonials

As a part of this engagement, IDC asked information technology decision makers at three large enterprises to provide their rationale for selecting IBM as a vendor for their SAP modernization

initiatives. All three executives cited the following benefits of deploying SAP HANA and SAP S/4HANA on Power:

- "IBM Power's scale-up architecture offers much better memory scaling compared with clustered configurations that are necessary for other platforms." – Pramod Gokhale, group CIO at Mankind Pharma
- "IBM's PowerVM virtualization enables workload consolidation. It presents the option to mix the existing environments (running on Linux, AIX, or IBM i) with the new environment (SAP S/4HANA running on Linux). This enables businesses to switch between environments as needed." – Christoph Kalt, IT architect at Coop Group
- "The capabilities of IBM Power enable IT organizations to consolidate workloads onto a smaller, denser footprint. Other SAP workloads can also be hosted on the same environment. This is a good way to meet energy consumption and sustainability objectives." – Scott Groth, director, ERP Technical Architect, Pfizer
- "The resiliency and availability of IBM Power are remarkable. Businesses are able to gain high levels of availability with no hardware-related unplanned downtime. One customer quoted 100% availability for 11 years straight." – Michael Rodel, head of System Technology, Unix Solutions
- "Minimal administration effort – the machines can be placed in a remote location and do not require physical access, which is much different than general-purpose infrastructure." – Pramod Gokhale, group CIO at Mankind Pharma
- "The tamperproof security capabilities of the system provide peace of mind. Power10 supports hardware-based encryption, key management, and secure hybrid cloud deployments." – Pramod Gokhale, group CIO at Mankind Pharma
- "The stability, performance, energy efficiency, flexibility, and reduced support overhead of Power10 lead to reduced IT operational costs." – Christoph Kalt, IT architect at Coop Group

## IBM Power Servers Enable a Hybrid Cloud Operating Strategy

The capabilities of IBM Power can be leveraged by global systems integrators for delivering a customized hybrid cloud environment for their clients. This is especially important for SIs that support advisory, digital transformation, implementation, managed services, hosting, and private cloud services. Hybrid cloud is an important aspect that differentiates IBM Power from pure public cloud deployments.

### *Flexibility*

IBM Power supports a variety of cloud deployment options: on premises, Power Private Cloud with Dynamic Capacity on demand, and off-premises public cloud via IBM Power Virtual Server, thus providing a client full flexibility on where to host its environment. It also supports three operating environments – AIX, IBM i, and Linux – on the same platform and is designed to enable a hybrid cloud operating strategy for all three operating environments. Finally, IBM Power servers offer advanced virtualization options, which enable businesses to optimize their compute investments. IBM Power is the only platform certified by SAP to run up to 16 SAP HANA production instances on the same system. The flexibility offered by IBM to run AIX, IBM i, and Linux operating systems (OSs) concurrently on the same Power servers is unparalleled in the industry.

## Resiliency

IDC considers the enterprise-class Power family of servers as having AL4, in other words: fully fault tolerant and therefore providing 99.999% or greater availability. With Power10, IBM goes a step further than its predecessor in delivering very high bandwidth and memory reliability, availability, and serviceability (RAS) with the new Open Memory Interface. The processor can automatically detect, isolate, and recover from soft errors without an outage or without relying on the operating system to manage faults and self-heal recoverable errors. The system also features enhanced concurrent repair capabilities such as internode subminiature push-on (SMP) cables to reduce application downtime.

## Security

To make security persistent and penalty free, IBM has built encryption into the Power10 processor. This allows data to be encrypted without compromising system performance. IBM Power systems have further been equipped with additional security features to protect against return-oriented programming attacks, a technique in which an attacker can execute malicious code in the presence of security defenses. IBM Power systems provide advanced data protection with transparent memory encryption, the type of hardware-level security for data in use that confidential computing is based on, and feature four times as many cryptographic encryption accelerators as their predecessor. Partitions on the platform have improved isolation, and the system is protected from future quantum-based threats with post quantum crypto (PQC) as well as fully homomorphic encryption (FHE), a technology in which inputs into the system don't need to be decrypted, which means that it can be run by an untrusted party without revealing those inputs.

## Scalability and Sustainability

In terms of scalability and sustainability, the IBM Power family of servers benefit tremendously from the fact that they are exceptionally well integrated from processor to firmware to OS to hardware as these are all IBM components. The software and OpenShift container efficiency of the platform are exceptional, according to IBM. As a result, the platform, the IBM Power E1080, for example, achieves 50% more performance in the same space and energy footprint as compared with Power E980. This also translates to 33% lower energy consumption for the same workload, states IBM. The greater efficiency helps businesses significantly reduce their carbon footprint and potentially consolidate workloads, saving on both hardware and software costs.

## Software

The following IBM Power software components play an important role in enabling businesses to leverage their enterprise-grade Power platform with AIX, IBM i, and Linux for secure, highly available, and cloud-based workload modernization.

- **IBM PowerVM:** PowerVM enables workloads to be virtualized, mobile, and fully cloud enabled. The product was recently enhanced with multiple new features, including compression and encryption of live partition mobility (LPM) data, meaning that when an active partition is migrated from one Power server to another, which occurs with zero downtime, the data will be automatically encrypted and compressed – an important security and performance feature.
- **IBM PowerVC:** PowerVC is the virtualization management tool that is built on OpenStack, simplifying the management of virtual resources in Power environments; the software has recently been improved with multiple new features, including an export/import capability to share VM images across datacenters.

- **IBM PowerSC:** PowerSC is the platform's security portfolio, simplifying security and compliance management and featuring compliance automation, malware intrusion detection, patch management, and more; it has been enhanced with various features or even new offerings, including multifactor authentication (MFA) enablement (another important security feature). In general, security on IBM Power with AIX is achieved with a comprehensive solution that includes the processor, firmware, hypervisor, and the countless security features of the operating system itself to protect data at all levels.
- **IBM PowerHA and VM Recovery Manager (VMRM) HA and DR:** PowerHA is a high-availability technology that helps provide near-continuous application availability and improves service reliability – it is a key contributor to IBM Enterprise Power being characterized as fault tolerant (AL4) by IDC and has been improved with various features such as enhanced failover metrics and cross-cluster verification (for example, to compare a development with a test cluster). VM Recovery Manager is a simplified HA/DR solution based on VM replication and restart that is operating system agnostic and includes application monitoring agents such as for DB2, Oracle, and SAP HANA.
- **IBM Power Virtual Server:** IBM Power Virtual Server is a Power offering in IBM's cloud datacenters, but distinct from the IBM Cloud servers – they have separate networks and direct-attached storage. A Power Virtual Server is in its own pod, and the internal networks are fenced off, but they offer all the connectivity that businesses require. This design enables Power Systems Virtual Server to maintain key enterprise software certification and support as it is identical to certified on-premises infrastructure. The virtual servers, also known as logical partitions (LPARs), run on IBM Power systems hardware with the PowerVM hypervisor. Businesses can quickly create and deploy one or more virtual servers (that are running either the AIX, IBM i, or Linux operating systems) and get access to IBM Power infrastructure without the need to manage or operate it. They do have to manage the operating system and the software applications and data. IBM Power Virtual Server supports SAP NetWeaver as well as SAP HANA and Red Hat OpenShift. This is a key differentiator for IBM in that its own cloud service seamlessly integrates with its hardware platform, thus enabling a consistent, seamless hybrid cloud experience for businesses. SIs that partner with IBM can deliver on the promise of a hybrid cloud strategy, complete with very capable on-premises infrastructure (IBM Power) and a suitable ramp into the public cloud (IBM Power Virtual Server).
- **IBM Power Private Cloud Solution with Dynamic Capacity:** IBM Power Private Cloud Solution with Dynamic Capacity is designed to deliver enhanced multisystem resource sharing and by-the-minute consumption of on-premises Power server compute resources to clients deploying and managing a private cloud infrastructure. All installed processors and memory on the pool of servers are activated and made available for immediate use when a pool is started. There is no need to reallocate mobile resources from server to server. System capacity may be seamlessly made available when it is needed without requiring human awareness or intervention. Permanent Capacity Upgrade on Demand processor and memory activations (Base Capacity) and corresponding license entitlements are purchased on each Power server. These base processor and memory activation resources are then aggregated across a pool. Unpurchased (inactive upon shipment) processor and memory capacity in the pool are activated when a pool is started and can subsequently be used on a pay-as-you-go basis (Metered Capacity) from Capacity Credits purchased from IBM or an authorized IBM Business Partner. Processor resource within a pool is tracked by the minute, based on actual consumption by shared processor partitions. Memory resource within a pool is tracked by the minute, based on the assignment of resources to partitions, not based on operating system usage of the memory. Metered Capacity consumption on one system may be offset by idle Base Capacity elsewhere in the pool during the same period. A single pool may support up to

500 shared processor partitions across up to 16 Power systems within a single enterprise, within a single country. Each pool is monitored and managed from a Cloud Management Console (CMC) in the IBM Cloud. Capacity Credits may be purchased from IBM, an authorized IBM Business Partner, or online through the IBM Entitled Systems Support website, where available. Businesses can more easily identify capacity usage and trends across their Power systems in a pool by viewing web-accessible aggregated data without spreadsheets or custom analysis tools. In May 2022, IBM Power introduced a new monthly billing option for meter capacity consumption in the North Americas and support for OpenShift Container Platform as a new Shared Utility software element that may be shared as a Base Capacity and used by the minute as Metered Capacity, above Base, in a Power Enterprise Pool.

- **Cloud Management Console:** The Cloud Management Console provides a complete view on performance, inventory, and logging of on-premises and off-premises Power infrastructure. CMC is hosted on the IBM Cloud, thereby freeing businesses from having to maintain software to monitor their infrastructure and helping simplify management of hybrid cloud deployments and simplify monitoring and managing their infrastructure.
- **Enterprise Cloud Edition 2.0:** Enterprise Cloud Edition brings together all the key components of a simplified cloud management infrastructure on top of PowerVM, including PowerSC, MFA, PowerVC, CMC, VMRM, and Aspera. It enables rapid deployment and management of a private cloud, simplified security, compliance management, simplified high availability, and accelerated large file transfers across clouds. Enterprise Cloud 2.0 can be purchased with AIX 7.2 built in.
- **Red Hat Ansible Automation Platform:** Red Hat Ansible Automation Platform enables scalable and secure automation of various aspects of enterprise IT operations, including resource provisioning, application life-cycle management, and network operations. It consists of Ansible Engine, Ansible Tower, and Ansible Hosted Services. All other products within the Red Hat portfolio can be integrated using the Red Hat Ansible Automation Platform. Red Hat Ansible Automation Platform enables consistency in the datacenter by providing programmatic methods to deploy, manage, and secure infrastructure resources.
- **Red Hat OpenShift:** Red Hat OpenShift is an enterprise-grade, certified Kubernetes (a container orchestration) platform to build, deploy, and manage containerized applications. Red Hat OpenShift can be consumed as a fully managed service on different cloud providers or customer managed using Red Hat OpenShift Container Platform or Red Hat OpenShift Kubernetes Engine. It can be deployed on premises on bare metal servers, on virtualization platforms (Red Hat Virtualization, VMware, or Red Hat OpenStack), or on major cloud providers such as IBM Cloud, AWS, Google, or Azure. In addition, Red Hat Advanced Cluster Management for Kubernetes can be used to manage multiple Red Hat OpenShift Clusters and applications from a single console, with built-in security policies, enabling customers on open hybrid cloud. Red Hat OpenShift is supported across IBM Power, IBM Z, and x86-based platforms and can be used with AIX, IBM i, and Linux.
- **IBM Cloud Paks:** IBM Cloud Paks are increasingly popular software products prepackaged in containers and highly integrated into various OpenShift services for fast and easy deployment onto OpenShift. IBM Cloud Paks offer developer tools, data, artificial intelligence (AI) services, and open source middleware software. They run on the Red Hat OpenShift cloud platform. Some Cloud Paks that are particularly relevant for IBM Power are:
  - Cloud Pak for Data helps customers with expanding insights from data and AI capabilities.
  - Cloud Pak for Integration consists of integration tools for data, application services, and cloud services to help integrate apps, data, cloud services, and APIs.



- Cloud Pak for Watson AIOps offers multicloud visibility, governance, and automation, given the common use of multicloud deployments.

## CHALLENGES/OPPORTUNITIES FOR SYSTEMS INTEGRATORS

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Implementation, migration, and modernization services of SAP's suite of applications present a significant revenue opportunity for SIs. A partner like IBM with compelling on-premises infrastructure solutions, public cloud services, migration tools, and hybrid cloud-enabling operating environments helps SIs focus on their core value proposition: delivering stated business outcomes.

The current landscape of SAP deployments is quite fragmented. 83.9% of businesses say that they run their SAP landscape in multiple deployment scenarios – for example, on premises and on public cloud infrastructure, on public cloud infrastructure and via software as a service, and on premises and at a managed service provider. This is not a desirable scenario for undertaking any modernization initiative.

As a part of their suite of SAP services, with IBM as a partner, SIs can compress the time it takes to modernize, migrate, and consolidate their SAP workloads to a single hybrid cloud environment and ensure a seamless application experience. IDC found that businesses that migrated to SAP HANA, SAP S/4HANA, and/or BW/4HANA on IBM Cloud needed the least amount of time for the migration. IBM's on-premises solution is suitable for all kinds of environments but scales best for environments with a large memory footprint (>6TB) given the scale-up architecture of Power systems. IBM's Storage portfolio, especially all-flash storage systems, nicely complements IBM Power systems.

### Guidance for "IBM Power for SAP" Systems Integrators

Fortunately for SIs, more than half of the businesses said they are open to partnerships with service providers, server vendors, and software providers, though their experience can be soured by the provider's service falling short of the stated objectives. Businesses are likely to be more receptive if an SI service is backed by a trusted vendor that delivers the on-premises platform, hybrid cloud experience, and required suite of tools. IDC recommends that SIs must:

- Decisively respond to various customer requirements that on other platforms tend to be contradictory, such as delivering on both performance and sustainability
- Provide a longer-term per-core performance ROI that cannot be matched by alternative platforms
- Deliver a hybrid cloud experience for SAP that takes advantage of the same infrastructure on premises and in the cloud (IBM Power Virtual Server), with guaranteed seamless cross-deployment operations
- Support long-term SAP landscape development on the more versatile IBM Power platform, including integrating legacy SAP environments
- Enable customers to build on a more resilient and highly available platform for SAP
- Integrate AI solutions into customers' applications, taking advantage of the Power10 integrated AI inferencing engine (which would require a complicated coprocessor on other platforms)
- Help customers reduce the migration time to cloud – IDC research has found that IBM Cloud has the shortest cloud migration time

## CONCLUSION

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Digitally determined organizations need a modern infrastructure strategy to reliably accelerate their transformation journey. Successful outcomes require technology-enabled business strategies to expand their competitive differentiation and meet their sustainability goals in the market. With such an infrastructure in place, digitally determined firms effectively and efficiently combine (technology) platforms, (business) processes, (data) governance, and (people) talent to gather deep, timely, and actionable insights from data. These insights can be used to optimize business operations, accelerate innovation (develop new and innovative products and services), and transform customer engagement. Systems integrators can partner with a vendor like IBM to deliver highly differentiated services to businesses seeking to transform their SAP environments. IBM's industry-leading, hybrid cloud-enabling platforms enable businesses to have a common infrastructure foundation for hosting current-gen and next-gen SAP workloads.

## About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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