White Paper

Who Can Benefit from SAP HANA Database and S/4HANA on IBM Power Systems?

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IDC OPINION

The road to SAP HANA and SAP S/4HANA is paved with uncertainties, no matter how well-intentioned SAP SE has been with its renewed focus on customer needs and benefits. From an infrastructure perspective, the demands that the in-memory database and the integration of transactions and analytics impose on the underlying hardware are significant. As little as a few years ago, businesses had limited choice in terms of hardware – appliances available for SAP HANA only ran on commodity architecture, and many of those were not sufficiently equipped for the flexibility, performance, and reliability that SAP HANA and SAP S/4HANA demand.

Since late 2015, SAP HANA has also been available on IBM Power Systems with IBM's innovative IBM Power Systems architecture and processors, and IBM says that to date it has more than 3,000 customers running SAP HANA on IBM Power Systems. IDC believes that IBM Power Systems is a strong differentiator for SAP HANA and S/4HANA. IBM Power Systems is designed for very data-intensive workloads such as SAP HANA, with powerful built-in virtualization that is SAP certified as well as numerous reliability features.

IBM Power Systems use cases are not the same for all SAP customers. IDC believes that there are five types of businesses that can significantly benefit from running SAP HANA and/or S/4HANA on IBM Power Systems. They are:

- **Businesses with SAP HANA appliances due for a refresh.** These businesses can reduce scale-out sprawl, increase flexibility, obtain greater reliability, improve performance, and consolidate hardware to decrease overall total cost of ownership (TCO).
- **Businesses on commodity architecture moving to SAP HANA.** These businesses typically run a virtualized datacenter and can take advantage of the virtualization capabilities of IBM PowerVM and the infrastructure-as-a-service capabilities of IBM PowerVC, which integrate seamlessly with OpenStack.
- **Businesses with a traditional database and SAP applications on IBM Power Systems.** These businesses will get a database performance boost, easier administration, faster processing of vast data volumes, and a much faster user response time for transactional processing.
- **Businesses on IBM Power Systems that currently do not have SAP.** These businesses can start taking advantage of IBM Power Systems and run more SAP HANA production instances than on commodity systems.

- **Businesses with on-premises SAP applications that want to expand off premises.** These businesses can extend their environment to IBM Cloud using IBM Power Virtual Servers.

What all these businesses have in common, is that, with IBM Power Systems, they have an easy path to a strong SAP HANA, SAP S/4HANA, or SAP BW/4HANA platform that provides significant advantages. There is also support from many corners to embark on such a journey. Furthermore, even if IBM Power Systems is unfamiliar to an organization, the platform runs Linux, thus posing no skill set issues, and integrates easily with any virtualized datacenter, thanks to its OpenStack-based virtualization.

SITUATION OVERVIEW

The switch to an SAP HANA in-memory platform has become less unsettling than it was a few years ago, but also more urgent as the 2027 deadline for support for non-SAP HANA databases on SAP NetWeaver looms on the horizon, especially for enterprises with large SAP landscapes that can expect a multiyear migration (often after close to two years' planning for it).

Many businesses have completed the first step with a migration to SAP Business Warehouse (BW) on SAP HANA. BW is a good starting point for an SAP HANA in-memory database because the immediate performance improvements yield a high ROI and because BW is not considered an "enterprise critical" application — hence it is less complicated.

A significant portion of SAP customers worldwide have now purchased BW on SAP HANA, with a majority live and in production. Initially, most of these SAP HANA customers were running SAP HANA as an appliance built on commodity architecture — because this was the only option at the time. Many of these early adopters are now due for a technology refresh.

Deployment Options for SAP HANA and SAP S/4HANA

There are about a dozen vendors that offer SAP HANA appliances on commodity architecture with various SAP-certified configurations in terms of memory size and socket counts. Some of them also offer Tailored Datacenter Integration (TDI), which is a more versatile alternative to an appliance. It allows customers themselves to combine certified infrastructure components for their SAP HANA environment.

While appliance vendors all offer slightly different value propositions, only IBM with Power Systems offers a distinctly stronger per-core performance, thanks to its processor technology. IBM Power Systems processors are designed for intense data processing. Also, IBM Power Systems has a built-in SAP-certified virtualization solution that provides flexibility, scalability, and availability advantages. IBM Power Systems is only offered as a TDI solution to give businesses the greatest amount of flexibility.

This white paper takes a closer look at SAP HANA on IBM Power Systems and addresses five customer types that can take immediate advantage of the benefits of SAP HANA and SAP S/4HANA on IBM Power Systems.

SAP HANA ON IBM POWER SYSTEMS

IBM is positioning itself as the SAP S/4HANA expert that can provide a complete SAP S/4HANA package — from strategy setting and functional specification with its Global Business Services (GBS) unit to implementation to IBM Power Systems and IBM storage hardware for on premises and as a

hybrid cloud. IBM and SAP SE have a "digital transformation" partnership to innovate solutions around cognitive extensions, user experiences, and industry-specific functionality with SAP S/4HANA. There are multiple reasons why IBM Power Systems is an excellent platform for SAP HANA, centered on the exceptional flexibility, resiliency, and performance of the platform.

Flexibility of SAP HANA on IBM Power Systems

The IBM Power Systems platform gives businesses a greater amount of agility and variability than would be possible with an appliance, including during the initial transition from an existing database to SAP HANA. Businesses can consolidate multiple SAP HANA databases on a single IBM Power Systems server. This provides greater speed and flexibility and avoids the complexities of a bare metal installation. Using PowerVM, organizations can currently virtualize up to 16 production SAP HANA virtual machines (VMs; logical partitions [LPARs]) on a single Power System, and they can mix non-production HANA instances and traditional workloads on the same system. The result is very efficient workload consolidation, requiring fewer servers while maximizing the utilization rates of the processors. The utilization rates of Power processors are demonstrably higher than with commodity architecture, which translates into substantial cost savings for businesses.

For example, a business could carve out a VM to run traditional SAP ERP Central Component (SAP ECC), another to run BW HANA, another to start a sandbox S/4HANA project, and a few virtualized VMs for application service. Such a combination would be impossible on an appliance on commodity architecture because of SAP rules. What's more, instead of the so-called T-shirt sizes for HANA appliances, which are jumps in the numbers of CPUs that can be added to increase capacity, PowerVM allows for more granular scaling and dynamically changing allocation of system resources. This means businesses avoid adding new scale-out hardware that would have caused higher energy, cooling, and management needs.

1-, 2-, 4-, and 16-Socket IBM Power Systems for SAP HANA

IBM's large systems for SAP HANA have been very successful, and over time, they have progressed to 64TB with the number of instances and the size of the VMs. Not only on-premises customers are using these systems as building blocks for their SAP infrastructure, but so do many infrastructure-as-a-service (IaaS) providers, managed service providers (SPs), and SAP HANA Enterprise Cloud (HEC) providers. These services and businesses are taking full advantage of the efficiency, flexibility, shared processors, and many other capabilities of the large IBM Power Systems.

But perhaps less talked about are the smaller IBM Power Systems for SAP HANA, which are ideal for customers with production landscapes between, say, 2TB and 8TB as well as for businesses that are migrating from a non-SAP HANA database on NetWeaver to SAP HANA, slowly refactoring their landscape, and that want to start on a smaller IBM Power platform. These customers can get the same architecture, the same software, and support from the same IBM team in smaller building blocks. In essence, everything that IBM does on its SAP HANA platform at the high end is also available in the smaller systems.

IBM Power Systems for SAP HANA scale from a single socket with dark cores to 2 sockets to scale up 4 sockets to a single scale up server with 16 sockets in the form of a network of several servers with hundreds of cores. IDC expects businesses to be very cost conscious with their infrastructure investments in 2021–2022, and one way in which this is achieved is with a more gradual enterprise resource planning (ERP) transformation, which smaller IBM Power Systems can contribute to.

According to IBM, such customers can benefit from both financial and technology mechanisms, such as a pay-per-use model, to support their growth.

Resiliency of SAP HANA on IBM Power Systems

IBM Power Systems' enterprise-class servers are included in IDC's highest category for fault tolerance with more than 99.999% uptime.

Resiliency is critical for an in-memory database such as SAP HANA and for business-critical applications such as SAP ECC or SAP S/4HANA. IBM Power Systems has an undisputed reputation for its built-in RAS features, and these now extend to SAP HANA on IBM Power Systems. Indeed, since 2016, IDC has included IBM Power Systems' enterprise-class servers in its highest category for fault tolerance – availability Level 4, which represents more than 99.999% uptime. Note that the performance metrics of Power are measured with these built-in RAS features. On commodity systems, memory-related RAS features are often optional – they increase reliability at the expense of performance and are usually not weighed in performance claims.

Resilient application landscapes require an extra passive node for failover. But with a Power scale-up system (scale up is ideal for S/4HANA), the built-in virtualization allows for a VM to be the designated failover target. This VM can even be used for test and development while in standby mode on another node. This, again, contributes to a reduction in footprint and a lower TCO. Because of limited virtualization possibilities, this is not an option on SAP HANA appliances.

To prevent failure, IBM Power Systems uses heuristics that run in the background during SAP HANA processing and that deliver predictive failure alerts to the administrator. These alerts serve as warnings that a failure is likely to occur rather than communicating – after the fact – that a failure has occurred. An administrator can then take immediate action and move the live workload to another VM before it is affected by the anticipated failure, greatly improving business continuity.

IBM Power Systems also – by default – features an error checking and correcting technology that protects against memory chip failure by taking a failing chip out of the ongoing processing. This prevents data loss and allows businesses to keep throughput levels high while the memory remains protected. On commodity architecture, comparable technology is an option; when turned on, it affects performance. In addition, IBM Power Systems provides memory rank sparing, which consists of an extra chip that can receive the data from a failing chip and take over the failing chip's tasks. This avoids having to do memory mirroring, which reduces a system's total available memory.

Finally, when discussing resiliency, it is important to address the speed with which an SAP HANA database can be restarted after a planned downtime session or even after unplanned downtime due to a problem. The larger the in-memory database, the longer it takes to load back into the DRAM and recommence production. In the commodity processor world, there is some interest in Intel Optane persistent memory speeding up such a restart, but Optane is considered to be expensive. IBM offers virtual persistent memory to achieve a much faster SAP HANA start-up, but the company says that it is also developing its own hardware solution, a second tier of memory for non-production instances, for IBM Power Systems.

Performance of SAP HANA on IBM Power Systems

SAP HANA is very data intensive, and the IBM Power processor was designed for such workloads. Power features eight-way simultaneous multithreading versus two-way multithreading on commodity processors. This means that Power can process up to four times as many instructions at the same

time, a major contributing factor to the processor's higher per-core performance. It also means that the same workload can run on a fewer number of cores, which translates into lower licensing costs and — again — lower datacenter footprint and energy use and improved staffing benefits. What's more, it means that a workload can run on a single system rather than a cluster, avoiding the complexity and sprawl of clusters.

As an in-memory database, SAP HANA is hungry for memory capacity. The Power scale-up portfolio provides abundant memory — up to 64TB, more than any appliance available today. This massive memory footprint has the added benefit that it allows multiple SAP HANA and SAP applications to be consolidated on the same physical server. SAP HANA also likes high memory bandwidth, which Power provides at a rate of 230GBps. IBM expects this rate to go up further with the next-generation processor POWER10, which is expected to be released in the second half of 2021. IDC does not compare performance metrics such as memory bandwidth, but we recommend that readers do — because higher memory bandwidth translates directly into faster results for the business. IBM Power Systems also features very large L2 and L3 cache plus — uniquely — an L4 cache. The large cache further boosts SAP HANA's performance as data stored in the cache can be accessed much faster than data held in memory. Again, the benefit to the business is faster results.

Finally, it is worth noting that IBM Power Systems is equipped with a technology called single instruction, multiple data (SIMD) vector processing, which provides yet another performance boost to columnar in-memory databases such as SAP HANA. SIMD refers to an in-memory database's ability to process multiple elements of data as a single instruction.

Scalability of SAP HANA on IBM Power Systems

Businesses that are looking to scale up SAP HANA infrastructure need to consider IBM Power Systems in their evaluations. This includes businesses with BW on SAP HANA on scale-out infrastructure that are planning to add Business Suite on SAP HANA, because SAP requires scale up for Business Suite, or that plan to move to S/4HANA. IBM Power Systems' ability to scale in the box, while leveraging virtualization capabilities and running multilayered partitions, is exceptional. Note that both the IBM Power Systems enterprise and the smaller S-class model types can be used for either scale up or scale out (i.e., multinode SAP HANA installation). For SAP HANA scale up, all the resources must fit on a single IBM Power Systems server or on a VM inside it. Also, multiple single-node SAP HANA databases and other workloads can be consolidated on a single server.

One of the key contributing factors to the near-linear scalability (meaning, the performance increases at the same rate as the number of processors) of the scale-up IBM Power Systems to 16 sockets is the fabric bus. The bus interconnects all the processors and is designed for maximum throughput.

For scale out, the network between the nodes and the failover architecture need to be planned, but on IBM Power Systems, SAP HANA scale-out setups can also consist of multiple VMs residing on a single server. For example, a 16TB BW on eight 2TB scale-out commodity architecture appliances can be migrated to a 16TB VM on a single scale-up IBM Power Systems server.

For achieving high availability (HA), SAP allows a "cost-optimized replication scenario," which gives an organization the ability to host non-production workloads on a standby IBM Power Systems server as long as 10% of the production resources are allocated to supporting system replication. This scenario helps businesses avoid the need for a costly passive failover node.

PowerHA for Linux provides the capability to manage HA operations for SAP HANA system replicator deployed configurations. With many of the same features and functions as PowerHA for AIX, PowerHA for Linux provides a robust solution operationally similar to PowerHA for AIX. PowerHA for AIX and Linux provide an advanced UI, enabling customers to monitor and manage HA operations for both AIX and Linux cluster deployments from a single pane of glass.

Cloud with SAP HANA on IBM Power Systems

IBM Power Systems for SAP HANA provides both public and private cloud deployment options. The public cloud options include IBM Cloud and multiple third-party hosting solutions. Recently, IBM Power Systems Virtual Servers in the IBM Cloud were certified by SAP for 14TB scale-up SAP S/4HANA, 14.4TB scale-up SAP BW/4HANA, and 115.2TB scale-out BW/4HANA on eight nodes. IBM is also an SAP partner for the SAP HANA Enterprise Cloud offering.

SAP expects many of its customers to move to a hybrid cloud and is focusing its offerings on this trend. The latest release of SAP HANA Cloud Platform allows businesses to incorporate new cloud functionality with existing on-premises business applications. This includes an API Business Hub that gives developers, customers, and partners easy access to APIs for SAP HANA Cloud Platform and other SAP applications. A version of SAP Solution Manager for SAP S/4HANA customers that helps manage software environments that are partially on premises and partially on a cloud was also recently released. Hybrid cloud is core to the direction that SAP and IBM are taking in their partnership, and IBM Power Systems servers have outstanding capabilities to serve as a private cloud or hybrid cloud for SAP HANA.

For businesses that are concerned about moving their mission-critical production SAP workloads to a public cloud, a resilient, on-premises private cloud on IBM Power Systems is a comprehensive, future-oriented solution. From the perspective of the business, the advantage of a private cloud on IBM Power Systems is that it does not need to concern itself with what's "behind the curtain." What matters is that the system works, that the system is secure and reliable, that SLAs are met, and that the business is paying for the system like a utility. From the perspective of a cloud service provider, the benefit of a cloud on IBM Power Systems is the ability to reliably serve more customers on a smaller footprint — in other words, more revenue with less infrastructure. Providers, and businesses alike, can take advantage of the option to leverage Power Virtual Servers in the cloud as a disaster recovery (DR) destination.

IBM Power Systems provides various options for cloud economics. The platform features Capacity on Demand that enables a business to turn on and pay for cores only when it needs them and then turn them off for cost savings. Organizations can also bring up SAP via PowerVC based on OpenStack, which can be used in combination with other cloud solutions, including SAP's Landscape Virtualization Manager (LVM) and VMware's vRealize/vCloud. This enables organizations to run their IBM Power Systems server as a cloud with all the cloud functionality that OpenStack delivers. In addition, IBM PowerVC based on OpenStack is a robust tool for virtual machine setup and management. It lets a business fully virtualize, automate, and orchestrate its SAP environment from a single pane of glass.

SAP S/4HANA Containerization

If there is one thing high on the wish list of SAP customers, it is containerization of the SAP landscape to enable a flexible hybrid cloud. SAP is said to be working on true containerization — meaning, making SAP solutions available as containerized microservices — of several of its platforms. Both SAP-certified OS vendors, Red Hat and SUSE, say that they are collaborating with SAP on containerization

initiatives. This should be considered a long-term development, probably in the order of several years. SAP has developed its own container development platform, Gardener, to bring this to fruition.

Until then, on-premises SAP solutions will remain monolithic — they cannot be executed as microservices inside containers. Nevertheless, it can be useful to put SAP HANA inside a container and create a more distributed development landscape. IBM says that, together with Red Hat, it has started to cover more use cases for hybrid cloud for SAP HANA in which a business runs SAP HANA on premises, often for regulatory reasons, but containerized. Typically, these businesses want to enable their teams to develop microservices around containers on on-premises IBM Power Systems.

To this end, IBM has placed the SAP S/4HANA image into a container (not as a microservices architecture). Businesses can leverage Red Hat Ansible automation and provisioning to make this containerized image cloudlike, place it on Red Hat OpenShift, and run it on their on-premises IBM Power Systems side by side with traditional VMs that are running in the LPARs.

This should be considered a first stepping-stone. The long-term vision at IBM is to offer support for a truly *cloud-native* S/4HANA stack on IBM Power Systems, which would enable businesses to seamlessly move to a public cloud for production or disaster recovery or for any other reason.

BUSINESS CASES

Coop Group

Coop Group is one of Switzerland's largest supermarket chains headquartered in Basel. The company manufactures, distributes, and wholesales foods, delivering goods to restaurants, hotels, and staff cafeterias across Europe. Coop Group employs almost 90,000 people and generated annual sales of CHF30.7 billion in 2019.

Coop decided to provide an integrated shopping experience by letting customers collect online purchases from their local store at a time that fits best for them. However, ensuring that inventory information is always accurate and that the products customers order online are actually available for collection in their preferred store at their preferred time is a major challenge. To offer this service, Coop needed to transform internal processes and gain almost real-time insight into stock levels at all locations. With data growth of 30% each year, Coop needed a flexible IT solution that would support its retail strategy without reducing performance, increasing costs, or adding to the management and administration workload. Coop Group runs a full suite of SAP applications to manage the business, including the mission-critical SAP Customer Activity Repository application on the SAP HANA platform. In the past, Coop had to cut down the volume of data used for SAP Customer Activity Repository analytics because of the limitations of the commodity infrastructure it was using. This made it difficult to gain a near-real-time overview of inventory movement.

Coop Group says it closely worked with teams from IBM and SAP to migrate the company's SAP Customer Activity Repository database from a complex eight-node x86 cluster to a single SAP HANA database on IBM Power Systems, with 70% fewer processor cores and more memory. According to Coop, this move enabled it to achieve five times better performance, and it was able to complete the implementation and migration phases in less than two months. The scalability and virtualization capabilities of the IBM Power Systems platform were key factors behind Coop's decision to move to the SAP HANA environment. Using IBM PowerVM functionality, Coop replaced a number of physical

appliances with virtual servers and achieved high levels of consolidation, saving floor space as well as reducing energy costs.

Today, Coop says it has near-real-time insight into inventory data. Running SAP HANA on IBM Power Systems also allowed Coop Group to simplify and streamline its IT environment, thereby improving its ability to scale to meet growing demand. With IBM Power Systems and PowerVM virtualization, Coop claims that it can provide resources much more efficiently. In the past, if it needed to provision large new SAP HANA systems, Coop had to buy, install, and configure new physical appliances. Today, it can spin up new logical partitions as and when needed, making the process of provisioning new SAP HANA systems significantly faster.

Syntax

Syntax, a Montreal-based provider of cloud and managed IT services to businesses, acquired the Germany-based IT services provider Freudenberg IT (FIT) GmbH & Co. KG in 2019. At that time, FIT had 400+ customers and 125+ SAP HANA worldwide installations. It was founded in the German town of Weinheim and had grown to acquire a global presence spanning Europe, the Americas, and Asia.

FIT needed to find a more cost-effective way to satisfy customers' growing appetites for SAP HANA instances to outshine competition in the crowded IT services market. FIT was one of the early adopters of SAP HANA when it was only available as an appliance. After a few years, it was running SAP HANA systems for 180 clients. Each customer required separate boxes for its development, QA, and production environments, so in total FIT was running 540 appliances. This started to put a serious strain on the space available in FIT's datacenter, to the point where the company needed to enlarge it or possibly even build a new one. FIT realized that to provide better hosting services more cost effectively, it needed a better way to manage its SAP HANA systems.

FIT says it chose to migrate its client SAP HANA instances to IBM Power Systems and virtualized them using IBM PowerVM. Given that FIT was running so many SAP HANA instances for such a large number of clients, it was critical that the company choose the right infrastructure. FIT found that IBM Power Systems represented by far the most cost-effective option for running SAP HANA to support multiple client systems.

With IBM Power Systems, Syntax, the new parent company of FIT, can now run multiple SAP HANA instances for different clients on a single physical server. Thanks to advanced virtualization from IBM PowerVM, each client's system resides in its own logical partition on the server, making the sharing of physical infrastructure between clients highly secure. The LPARs can be sized precisely to fit each customer's needs, so Syntax achieves superb server utilization. And as client systems grow, Syntax can easily resize the LPARs in a completely transparent manner, without the client incurring downtime.

Just before its acquisition by Syntax, FIT said that it is was running SAP HANA instances for nearly 50 clients on just 9 IBM Power Systems servers, which equates to running 5.55 clients on each IBM Power Systems server rather than needing three appliances to support each client. Running fewer physical servers helps the company reduce energy consumption and costs, allowing it to pursue a greener IT strategy.

FIVE CUSTOMER TYPES THAT CAN BENEFIT FROM SAP HANA ON IBM POWER SYSTEMS

Businesses with SAP HANA Appliances Due for a Refresh

Many businesses started their SAP HANA journey as many as six years ago with SAP HANA appliances on commodity architecture. This was the only solution available at the time. Those businesses are now facing a costly scale-out expansion or possibly a complete technology refresh. Given their lower reliability, appliances on commodity architecture are often sold in multiples for failover purposes. This practice has been causing datacenter sprawl, with related cooling and energy, maintenance, and staffing costs. The reliability concerns with appliances also point to a larger issue, which is that, today, BW may not be mission critical but tomorrow SAP S/4HANA will be.

Businesses with BW on an appliance can evaluate whether they would benefit from moving to SAP HANA on IBM Power Systems to reduce sprawl, increase flexibility, obtain greater reliability, improve performance, and consolidate fewer workloads on a smaller footprint. A switch to IBM Power Systems will not lead to skill set complications — businesses will be running SAP HANA on the same Linux operating system.

TDI may be unfamiliar to the businesses, but it need not be a hurdle. TDI offers much more flexibility when it comes to selecting the right server, storage, and networking hardware for integrating SAP HANA in the datacenter. For customers that do not have any IBM Power Systems in the datacenter, TDI involves choosing the right IBM Power Systems, selecting an SAP TDI-certified storage solution, following SAP best practices for networking, and performing the software installation according to SAP requirements. IBM's GBS, SAP Active Global Support, and any number of third-party systems integrators that are certified SAP HANA installers can provide support.

IDC recommends that businesses with SAP HANA appliances on commodity architecture that are due for a technology refresh or are reaching end of lease, or businesses that are considering an infrastructure change for other reasons (e.g., a mandate to move to hybrid cloud), consider SAP HANA on IBM Power Systems.

Businesses on Commodity Architecture Moving to SAP HANA

Businesses that are running their datacenter on commodity architecture that have not yet moved to SAP HANA have a choice between appliances on commodity architecture and IBM Power Systems. Even if they have never had IBM Power Systems in the datacenter, bringing the platform in today provides a powerful Linux system with significant processor benefits. IBM has been adding many new SAP HANA on IBM Power Systems customers that did not have IBM Power Systems before.

Some clients have some hesitance regarding TDI if the business is not familiar with its definition. SAP provides good resources regarding TDI for IBM Power Systems, and IBM's approach to TDI is identical to what SAP prescribes. Also, IBM's business partners and resellers are helping businesses implement TDI. Some resellers offer a slightly different approach by creating bundles of the required hardware components, services, and the SUSE operating system. These are not appliances, but they are sold as a package.

These potential SAP HANA customers typically run heavily virtualized datacenters. What they will appreciate about the SAP HANA on IBM Power Systems platform is its powerful virtualization capabilities and the fact that PowerVM and PowerVC integrate seamlessly with OpenStack

management tools. This makes it easy to integrate SAP HANA on IBM Power Systems with their existing virtualized infrastructure.

Businesses with a Traditional Database and SAP Applications on IBM Power Systems

There are many businesses that run their SAP business applications on IBM Power Systems with a traditional database, such as Oracle or DB2. For them, a move to SAP HANA (BW on SAP HANA, Suite on SAP HANA, SAP BW/4HANA, or SAP S/4HANA) involves their mission-critical processes and data. On the other hand, migrating to SAP HANA on IBM Power Systems will provide businesses with a significant database performance boost, easier administration and processing of vast volumes of business data, and faster user response time for transactional in-memory processing.

Businesses can also take full advantage of the server, storage, and networking choice with TDI, including cost savings from using existing IT assets such as their installed IBM Power Systems. As the transition to SAP HANA-based applications proceeds, these businesses can easily shift resources from the traditional environment to the growing SAP HANA portfolio.

Businesses on IBM Power Systems That Currently Do Not Have SAP

Quite a few businesses, including many IBM i (formerly known as AS/400) customers, are running IBM Power Systems with a non-SAP HANA database and business applications from vendors other than SAP. For these organizations, a move to SAP HANA or SAP S/4HANA means a migration of both the database and the applications, which essentially means changing their business environment. This is not an easy decision.

Many of these businesses prefer to remain on IBM Power Systems because they are invested and know IBM Power Systems, which makes migration easier. What's more, once they have started a discussion to migrate off their traditional relational database management system (RDBMS), they are typically not looking to replace it with another traditional RDBMS. This essentially leaves them with two options: an open source database solution (e.g., EnterpriseDB) or SAP HANA on IBM Power Systems.

As discussed previously, SAP HANA excels on high-performance hardware such as IBM Power Systems — as an in-memory database, it performs best with the high-quality memory and large memory spaces that IBM Power Systems provides. What's more, SAP HANA runs very efficiently on a single node. Businesses with scale-up IBM Power Systems that do not run SAP can immediately start taking advantage of SAP HANA or SAP S/4HANA, and they can do so carefully by starting on one or two VMs and then expanding. This allows them to remain on their preferred platform while gaining the magnified performance of the in-memory SAP HANA or SAP S/4HANA platform on IBM Power Systems.

Businesses with On-Premises SAP Apps That Want to Expand Off Premises

As previously mentioned, SAP expects its customers to move to a cloud or hybrid cloud model. Businesses can extend their environment to IBM Cloud using Power Virtual Servers. IBM Cloud provides a wide variety of SAP-certified options for running SAP workloads, including IBM Power Systems. SAP infrastructure services are available in 58 IBM Cloud datacenters around the globe.

IBM Cloud is SAP HANA certified from 192GB RAM to 14.4TB scale up and 92TB scale out and is consistently increasing hardware specifications. For SAP HANA, IBM Cloud provides both Red Hat Enterprise Linux (RHEL) for SAP and SUSE Linux Enterprise Server for SAP, which provide additional

capabilities such as Red Hat OpenShift and Ansible or SUSE Active/Active failover nodes for high availability.

Recently, IBM Power Systems Virtual Servers in the IBM Cloud were certified by SAP for 14TB scale-up SAP S/4HANA, 14.4TB scale-up SAP BW/4HANA, and 115.2TB scale-out BW/4HANA on eight nodes.

AVAILABLE POWER SYSTEMS MODELS AND SUPPORT FROM IBM AND SAP

IBM currently offers four IBM Power Systems models that run SAP HANA or SAP S/4HANA: the enterprise-class E950 andE980 and the smaller systems S922 and S924.

The large systems – E950 and E980 – have been SAP certified for the following configurations:

- 28TB scale-up SAP S/4HANA (or 32TB at customer request)
- 28TB scale-up SAP BW/4HANA (or 32TB at customer request)
- 448TB scale-out SAP BW/4HANA (16 nodes)

The smaller systems – S922 and S924 – have been SAP certified for the following configurations:

- 4TB scale-up SAP S/4HANA
- 4TB scale-up SAP BW/4HANA
- 64TB scale-out SAP BW/4HANA (16 nodes)

In the cloud, whether on IBM Cloud, cloud SPs, managed SPs, or HEC, the available configurations for IBM Power Systems Virtual Server are:

- 14TB scale up SAP S/4HANA
- 14.4TB scale-up SAP BW/4HANA
- 115.2TB scale-out SAP BW/4HANA (8 nodes)

IBM provides cloudlike economics on premises with pay-per-use models and allows for extremely granular provisioning with 0.01GB and 1GB increments to help businesses avoid overprovisioning their SAP installation. Another cost saving is the ability to minimize resources with shared processor pools for various VMs running SAP HANA databases or SAP applications, significantly reducing the number of cores being utilized.

IBM provides an end-to-end solution for SAP HANA on IBM Power Systems that includes planning, installation, operation, problem resolution, ongoing end-user support, and migration. In terms of infrastructure, the solution includes IBM Power Systems hardware, integrated virtualization, tested flash storage, and IBM's GBS and Lab Services. For example, GBS as well as third-party systems integrators can evaluate any business' requirements for an SAP HANA or SAP S/4HANA strategy via workshops or engagements. IBM's Lab Services helps make migration easy, with expert consultants helping businesses mitigate the risk of migrating by building a tailored infrastructure strategy for flexible virtualization and superior performance and capacity management.

Consultants at IBM's Lab Services make migration easy and low risk by building a tailored infrastructure strategy for flexible virtualization and superior performance and capacity management.

A move to SAP S/4HANA can provide an opportunity to streamline the infrastructure because SAP S/4HANA delivers simplification of the application and the platform. A

significant reduction in the required number of application servers could be one outcome, for example. IBM also supports businesses with POC efforts, even a small-scale POC to start a project. A small-scale POC is easy to initiate — if a business has some capacity on installed IBM Power Systems, it can carve out a small VM (e.g., 256GB) and start a sandbox SAP S/4HANA. Another way to start would be on S922.

SAP offers various tools for determining the rightsize hardware (CPU, memory, and disks) both for customers that are starting with a greenfield installation and for those migrating from a traditional database to SAP HANA. Customers that are considering SAP HANA for the first time can use SAP's Quick Sizer tool that demonstrates how to start a new project.

CHALLENGES/OPPORTUNITIES

For Businesses

Businesses that see their future for business analytics on SAP are getting comfortable with SAP HANA and SAP S/4HANA, yet some new concerns are emerging. Running analytics and transactions on the same system, as with SAP S/4HANA, demands strong performance to manage vast amounts of data, uncompromising resilience to protect in-memory processing, a large amount of flexibility from virtualization and hybrid cloud deployments, and easy manageability. Not all hardware available for SAP HANA and SAP S/4HANA today can optimally deliver on these requirements. Businesses that are evaluating hardware options for SAP HANA or SAP S/4HANA should investigate the benefits of SAP HANA on IBM Power Systems. These businesses have an opportunity to consolidate and simplify on IBM Power Systems while magnifying the performance gains that SAP HANA and SAP S/4HANA can provide.

For IBM

IBM is differentiating itself in the SAP HANA infrastructure market with an end-to-end solution for running SAP HANA — from the server, storage, services, and support to the software. IBM also provides flexibility to reuse existing server and storage investments with TDI and delivers built-in virtualization that supports the extreme workload density of SAP HANA production instances. These strengths help the type of customers discussed in this white paper decide whether they can benefit from a transition to SAP HANA on IBM Power Systems. However, migrations are never easy. IBM will have to deliver on its stated goal of being the SAP S/4HANA expert in the industry, functionally with GBS as well as infrastructure-wise with IBM Power Systems. The company also has to make sure that potential customers see IBM as a vendor that can support them with all aspects of their SAP strategy without the perception that only the largest among them can afford such a full-service partner. Those potential customers that do not have IBM Power Systems servers in the datacenter today may need to take small steps with POCs and with support around TDI. If no project is too small for IBM, this presents a good opportunity to attract new IBM Power Systems customers.

CONCLUSION

IDC is always of the opinion that IT diversity and choice is a good thing. The hardware environment for SAP HANA had been lacking in this respect. There was choice among vendors, but not with regard to the processor and its performance, the virtualization strength of the platform, or the way in which SAP HANA platforms were only sold as an appliance. The enterprise and scale-out IBM Power Systems

models that are now available for SAP HANA and SAP S/4HANA add a significant new dimension to the options that businesses have, especially if they have SAP S/4HANA in their sights.

Because of IBM Power Systems' stronger per-core performance, built-in virtualization, and well-known resiliency, it is no longer a risky proposition for businesses to put their mission-critical data in an in-memory database on a smaller footprint and without an extra passive node for failover — this white paper describes in detail why. Instead, these businesses gain enormously in flexibility — with the transition to SAP HANA as well as once they are in production; they benefit from the IBM Power Systems' performance in the form of faster business results and can cut costs, thanks to the smaller footprint and all of the associated costs.

Businesses that do not have IBM Power Systems in the datacenter today should take the leap and investigate how they could benefit, whether they are already running SAP on appliances or not. Businesses that do have IBM Power Systems, but no SAP HANA, can take smaller steps by leveraging their existing infrastructure. The bottom line for all businesses is that they now have a real choice.

About IDC

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