White Paper

Business Benefits Possible by Choosing the Right Cloud Provider to Run SAP Workloads

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IDC OPINION

Migrating workloads from on-premises traditional datacenter implementations to public cloud service providers (SPs) delivers several benefits, including lower costs, better security, greater scalability, and increased agility. Relocating workloads to the cloud improves agility and prepares organizations to quickly respond to uncertain future business requirements by aligning related processes with corporate strategy. Businesses have discovered that benefits associated with relocation workloads to the cloud are also true for their mission-critical ERP workloads, and cloud providers have developed the infrastructure to support those landscapes.

IDC's customer surveys demonstrate increasing investments by customers into building a future enterprise business model that requires a platform that supports sustained innovation in ever-changing business conditions. For example, IDC's research shows that SAP customers expect to migrate 25% of their on-premises SAP business applications and SAP analytics software to the cloud in the next 24 months.

Enterprises are best served through detaching the running of SAP from the rest of IT by leveraging the cloud service providers' ability to host critical business applications and the innovative extensions, delivering increased value to the business and customers.

SITUATION OVERVIEW

Why Cloud Migrations of SAP Workloads Are Accelerating

The possible migration of SAP workloads is an important decision for any company because of the mission criticality of the associated business operations. Therefore, CIOs must carefully balance any migration efforts against unique business or regulatory requirements, financial pressures, and other internal constraints. Despite the complexity of the related effort and possible operational disruptions, an increasing number of CIOs are advocating cloud migrations to realize greater overall business benefits.

As with any major technology migration, change does not occur overnight and requires a strong business justification to move forward. Many CIOs are noting key business operations challenges associated with only maintaining an on-premises infrastructure, including the following:

- **Adapting to growing demands for business innovation and digital transformation:** IDC's research found that businesses which migrated their existing ERP software from SAP to an infrastructure-as-a-service (IaaS) provider cited "greater flexibility" as their third biggest benefit from the cloud deployment. As businesses embark on their journey, the core objective becomes moving away from the responsibility of running IT to instead focusing on harvesting value from technology, which will build new business models.
- **Sizing, scaling, and related legacy infrastructure technical debt:** Greater scalability that businesses experienced after SAP S/4HANA migration was ranked as the fourth biggest advantage in the cloud, according to IDC's research; the ability to respond immediately to business developments that require more compute, memory, or storage capacity without delay is a cornerstone of achieving the "intelligent enterprise" with SAP solutions.
- **Maintaining required in-house expertise:** For many businesses, siloed on-premises SAP infrastructure can become a major liability as the expert skill sets required to manage that infrastructure disappear; in some cases, a retiring expert on a legacy system that runs critical SAP applications can cause a frantic and ultimately unsuccessful search for a replacement, followed by a necessary but hasty migration to the cloud.
- **Achieving required resiliency and availability:** SAP workloads are mission critical because they are at the center of many businesses' digital transformation with a laser focus on the customer experience, which is easily damaged by interruptions. IDC's research shows that businesses have to restart their SAP applications an average of 3.4 times per year after unplanned outages and each restart takes 25 minutes on average, which translates into an average availability of about 99.9% for the entire landscape. Businesses say that 33% of their SAP landscapes (notably, the database and S/4HANA, but also custom applications) require *high* availability (HA), which translates into 33% requiring at least 99.99% availability. High availability on premises requires high-end infrastructure that achieves availability with clustering, redundancy, and other capital-intensive solutions. Businesses cited greater availability as the fifth largest advantage in the cloud, mostly because HA clusters can be set up more easily and with lower cost in the cloud.
- **Adequately addressing security issues:** Businesses spend more of their SAP budget on security (12.4%) than on any other software category, and greater security is the single greatest benefit of moving portions of an SAP landscape to the cloud, according to multiple IDC surveys. This is especially true among midsize companies that do not necessarily have all the sophisticated security hardware and software that large companies invest in. Security is often an up-front consideration when selecting vendors, with some businesses requiring an onboarding security review through which every vendor for their SAP landscape is evaluated from a security perspective — whether hardware, software, or cloud.

Tangible Results from SAP Cloud Migration Efforts

IDC estimates that 50% of businesses either have migrated or are currently migrating some portion of their SAP workloads to the cloud. IDC research has found that businesses which have migrated to the cloud have, on average, 27% of their SAP HANA installations and 25% of their S/4HANA installations in the cloud. Benefits realized from these efforts are significant and include:

- **Productivity gains:** Businesses reported strong productivity improvements from running SAP on IaaS, more than 50% claimed significant productivity improvements, and more than 30% said they experienced modest productivity improvements.
- **Cost improvements:** Significant cost improvements were also mentioned, with more than 45% saying they saw significant cost improvements, and nearly 40% stating they had modest cost improvements.
- **Revenue gains:** Close to 40% of businesses stated that they saw significant revenue gains, but more than 50% experienced modest revenue gains.

Overall, it is fair to say that more than 80% of businesses experienced productivity, cost, and revenue gains from moving portions of their SAP workloads to an IaaS cloud provider.

Advantages of Running SAP S/4HANA in the Cloud

The benefits that organizations cite and the satisfaction rating they give to various SAP IaaS services in the cloud point to the possibility of missed opportunities when businesses do not run SAP S/4HANA in the cloud. Higher cost on-premises translates into less available budget for innovation; lower availability means more frequent disruptions leading to increased staffing to keep systems operational and potentially lower customer satisfaction due to decreased availability. Inadequate security will lead to cybersecurity incidents that directly impact customers, and it will result in reputation loss and noncompliance penalties for businesses.

But the advantages extend beyond IT; a centralized cloud deployment of SAP S/4HANA for a globally dispersed organization can optimize various business processes (e.g., global parts inventory, multiregional sales, or multidivisional business projections). This also extends to accessing the analytics performed on that data from anywhere in the world, potentially in near real time, for immediate business insights. If SAP S/4HANA is running in a local datacenter, collecting data from around the world, analyzing the data, and then providing business insights to end users (who can be anywhere in the world) in near real time, latency and availability issues can bog down the business. This results in potential missed opportunities to respond to fast-moving customer trends or react to market situations, the things that a modern, agile businesses should be able to respond to instantly for revenue protection or new revenue generation.

Undertaking an SAP Workload Migration

With the 2027 SAP support deadline for NetWeaver looming, businesses are essentially just one hardware cycle away from making a decision to migrate to SAP HANA as the database and SAP S/4HANA as the primary business application on SAP-certified hardware. IDC estimates that the average hardware cycle for SAP workloads is 4.5 years, so any organization launching a new hardware cycle for SAP workloads in 2021 will be facing the next refresh in 2025/2026. If organizations do not migrate to SAP HANA or S/4HANA this time around, a decision to migrate to SAP HANA and S/4HANA or to migrate portions of the SAP workloads to the cloud *before* 2026 could potentially disrupt their capex depreciation cycle. In other words, from 2021 on, there is strong incentive for organizations to combine a hardware refresh with a migration to SAP HANA and S/4HANA. In addition, businesses should consider combining a more limited hardware refresh with a cloud migration for some of their SAP workloads.

Cloud Options for SAP

SAP is urging its customers to migrate to the cloud. There are various options for SAP customers: IaaS at one of the SAP HANA-certified public cloud service providers, hosted infrastructure from managed services providers, and software-as-a-service (SaaS) platforms, including SAP's own cloud offerings. In addition, many of SAP's solutions are cloud only, available for cloud and on premises, or a combination of SAP hosting offerings and SaaS solutions.

The four largest IaaS providers that have SAP-certified environments are (in alphabetical order) AWS, Google (GCP), IBM (IBM Cloud), and Microsoft (Azure). IDC has found that they are all extremely active in attempting to attract SAP customers to their offerings by strongly building them out and by providing numerous infrastructure sizes, certified benchmarks, tools and mechanisms to make the migration and deployment process as seamless and, ultimately, rewarding as possible. They also collaborate closely with many of the third-party consultants that have become indispensable for complex and/or large SAP ERP, database, or cloud migrations.

IDC research shows that, on average, existing SAP customers expect to migrate almost half of their on-premises SAP deployments to an IaaS cloud provider in the next 12 months. New SAP customers expect to deploy 47% of their SAP databases, 48% of their SAP business applications, and 47% of their SAP AI and analytics applications in the cloud. Businesses that are currently running SAP HANA expect, on average, to adopt SAP S/4HANA in slightly under two years. Meanwhile, those that have adopted SAP S/4HANA and migrated the platform from on premises to the cloud say that this migration initiative took, on average, close to two years.

SAP Migration Considerations

The numerous factors for organizations to consider when contemplating migrating SAP workloads to the cloud can be roughly divided into four categories. The sections that follow briefly discuss each of them.

The Organization's Overall Public Cloud Stance

In many organizations, the driving force toward general cloud migration is the C-level, while the more tactical drive comes from lines of business and developers. At the same time, IT is typically the most nuanced entity in the equation, weighing all the pros and cons in terms of ROI, SLAs, and security. The biggest considerations for IT with regard to an SAP cloud migration are performance, availability, security, and cost.

IDC has found that an SAP migration to the cloud is rarely swept up in an organization's overall migration to the cloud. Often, businesses have already migrated significant parts of their workloads to the cloud, while their SAP landscape is still on premises. Initiatives to start migrating all or part of the SAP landscape tend to be standalone efforts that involve more stakeholders than general cloud migration.

There's some amount of loyalty to an organization's current cloud providers when it comes to choosing a cloud destination for SAP workloads, especially if the SAP landscape is expected to collect data from other applications that are already in the provider's cloud. However, businesses also shop around to compare the capabilities of various SAP-certified cloud providers, with security, compliance, and scalability being primary concerns. Furthermore, organizations are becoming comfortable with running their workloads on multiple clouds. With future containerized application workloads, this approach will only increase.

Business Forces

Various events in an organization can either trigger or complicate an SAP migration to the cloud. A merger or an acquisition, for example, can cause complexities with incompatible ERP systems, which results in a fast-tracked cloud migration with many more moving parts. In the drive toward digital transformation, in which the customer experience is central, the ability to combine data in near real time and translate it into insights demands seamless data processing, which typically means that businesses want to consolidate their different databases and ERP systems from a merger or an acquisition onto SAP S/4HANA, most likely in the cloud. Another driver can be a business consolidation in which divergent business units with different data processing approaches are consolidated under SAP S/4HANA in the cloud.

The Existing SAP Landscape

An organization's current SAP landscape and expected future SAP landscape give rise to many factors that businesses need to consider as part of the cloud migration. The number of servers and storage devices, their memory requirements, the SAP applications and custom applications that they host, the current database (DB2, SQL servers, HANA), the current ERP system (R/3, ECC, Business Suite including ECC, SAP S/4HANA), and the current primary operating system all influence the time required for a migration to the cloud.

The complexity of the landscape also plays a role, for example, because of deep integration with non-SAP applications, the mission criticality of the SAP workloads (requiring HA setups with failover nodes), the age and nature of the SAP infrastructure, and the integration of the SAP infrastructure with the overall datacenter. Regarding the latter, SAP running on so-called "legacy" systems can pose more cloud migration difficulties than SAP running on standardized plain and currently distributed hardware.

It is important for organizations to take into account the latency requirements of the SAP landscape as discussed previously; the security requirements, which can differ widely from industry to industry but are typically a primary concern across industries; the data protection and compliance requirements of the landscape; and the available communication infrastructure in the datacenter as well as in the region to ensure low latency with a cloud deployment.

Budget and Risk Tolerance

SAP landscape migrations to the cloud are costly and time consuming, require expert staff that are not always available inside the organization, typically involve third-party consulting firms, and expose an organization to risk, such as outages. Much depends on the size and complexity of the landscape, but for larger organizations, such an initiative can cost tens of millions of dollars and take several years, with the migration being executed in carefully orchestrated stages.

SAP landscapes often are the heart of an organization's digital production systems, and disruptions or outages caused by migration initiatives can have severe financial, legal, and reputational impact. Often, businesses decide to run the old production system in parallel with the new cloud environment until they can safely switch over. The degree to which a business can tolerate some risk will dictate how fine-tuned this process needs to be.

Complexity of Migration Requires a Unique Approach

The aforementioned complexities of migrating an SAP landscape to the cloud and the demands for a carefully orchestrated approach from organizations. IDC sees businesses start the process by forming an SAP cloud migration committee that consists of all the stakeholders, including lines-of-business representatives, developers, the IT infrastructure team, the SAP teams (Functional, Development, Technical), the security team, the database team, the cloud team, third-party consultants such as systems integrators and, in some cases, representatives of the cloud provider.

This white paper cannot go into the intricacies of analyzing an existing SAP landscape and the decision-making process involved with determining which applications are to be migrated to the cloud and how. However, the seven basic stages are:

- Building a business case
- Initial project assessment
- Developing a landing zone
- Proof of concept (POC)
- Migration of assets
- Preparing for production
- In production

IDC data indicates that at the time of research (late 2019), more than 60% of businesses had not yet reached the POC stage with their SAP S/4HANA migration to the cloud. Today, the number is closer to 50%. About 20% were building the business case, 10% were in the initial project assessment stage, and close to 30% were in the process of developing a landing zone. Only 5–10% were in production with their SAP S/4HANA in the cloud.

Some of the key decisions that businesses have to make are around the logical order of moving from another database to SAP HANA and/or moving the existing ERP system to SAP S/4HANA with a migration/conversion approach, a reimplementation, or a selective data transition strategy rather than a scenario in which the end of hardware support forces the relocation of the existing SAP landscape.

Businesses are also building stages into the migration process to completely reexamine their business operations and enhance them. The SAP landscape migration process provides a unique window of opportunity to innovate many of these business processes. Similarly, the migration initiative is a logical trigger for innovating or adding various SAP solutions that will improve business operations.

Another innovation opportunity can be found in the cloud provider's offerings. For example, a cloud provider that provides a sophisticated open source–supported environment will more easily enable a host of custom applications that feed various types of data into the SAP landscape. There are many tools to support an SAP migration to the cloud, several from SAP and many more that have been developed by the cloud providers themselves and by the two SAP-certified OS providers — Red Hat and SUSE. These tools can simplify and speed up the process through automation but only as a small component in the larger process. Some of SAP's migration tools are:

- SAP SWPM System Copy (Homogeneous or Heterogenous copy)
- SAP SWPM for SAP HANA Classical Migration
- SAP Software Update Manager DMO
- SAP HANA System Replication

- SAP HANA HSR with Initialization via Backup and Restore

Further, there is the choice of the cloud infrastructure provider. As mentioned previously, businesses are typically not wed to their main cloud provider when it comes to deciding on a cloud provider for the SAP landscape.
They do look for specific capabilities in continuing to run existing SAP systems as-is on cloud as they begin their SAP S/4HANA implementation, and the key capabilities, such as:

- Security capabilities
- Cost
- Transactional throughput capability
- Analytics capability
- Overall performance
- Scalability
- Flexibility
- Availability
- Integration with IoT
- Datalake integration
- Integration of various parts of the SAP landscape

The section that follows takes a deeper dive into IBM Cloud for running SAP.

WHY SAP ON IBM CLOUD?

IBM has decades of experience partnering with SAP, first in its services business, then in the IBM Db2, IBM Z and IBM Power Systems Group, and most recently with IBM Cloud. There are two useful ways to look at IBM Cloud for SAP: the all-important performance specs and the cloud-native vision.

Specifications

IBM Cloud provides a wide variety of SAP certified options for running SAP workloads, including Intel Bare Metal, Intel Bare Metal with Intel Optane Persistent Memory, VMware Software-Defined Data Centers, and Virtual Machines from both Intel and IBM Power Systems. Intel Bare Metal, Intel Bare Metal with Intel Optane Persistent Memory, and VMware SDDC can be rented as secure single tenant Infrastructure-as-a-Service. The service is enterprise focused with much emphasis on security while enabling an opex pricing model with monthly billing and zero commitment terms or long-term pricing models with discounted billing.

These SAP infrastructure services are available in 58 IBM Cloud datacenters around the globe, which is the kind of scale that global businesses with vast SAP landscapes would require. Intel Optane Persistent Memory is increasingly being recognized as a way to dramatically decrease the reboot time of the in-memory SAP HANA database, thus greatly reducing the time involved with planned and unplanned outages of the SAP environment as highlighted above. The complementary IBM Power Systems offerings run on IBM POWER9 processors, providing exceptional per-core performance and memory bandwidth coupled with the robust virtualization advantages that IBM Power provides – with low latency access to all IBM Cloud services.

IBM Cloud is SAP HANA certified from 192GB of RAM to 14.4TB scale up and 92TB scale out and is consistently increasing hardware specifications. For SAP HANA, the cloud service provides both SAP-certified operating systems run using Red Hat Enterprise Linux (RHEL) for SAP and SUSE Linux Enterprise Server for SAP applications, which can be paired many broader capabilities that SAP customers can benefit from, such as Red Hat OpenShift and Ansible or SUSE Active/Active failover nodes for high availability. IBM Cloud also supports the VMware software-defined datacenter (SDDC).

For SAP NetWeaver, the cloud service additionally provides AIX and Windows, enabling businesses to continue to run SAP on their non-HANA databases, such IBM DB2, and Microsoft SQL Server or Oracle DB with complementary offerings from IBM Power Systems. IBM Cloud is certified for all SAP business and technical applications, including the latest SAP S/4HANA and SAP BW/4HANA releases.

For OLTP workloads such as SAP S/4HANA, the cloud provider offers systems up to 12TB DRAM scale-up, and 550,000 SAPS with Intel; complementary IaaS offerings from IBM Power Systems provide up to 14.4TB DRAM scale-up and 840,000 SAPS. For OLAP workloads such as SAP BW/4HANA, the cloud provider offers systems with up 6TB DRAM scale-up or 92TB DRAM scale-out systems with Intel; complementary IaaS offerings from IBM Power Systems provide up to 14TB DRAM scale-up.

SAP certified IBM Cloud originally in late 2014 as the first cloud provider, and in May 2020 certified the extremely fast single-node performance of 550,670 SAPS (SAP Application Performance Standard) for SAP S/4HANA using Intel Bare Metal, and impressive single-node scale-up and scale-out deployments for BW/4HANA. In July 2020, IBM Power Virtual Servers environment with access from IBM Cloud achieved a total rating of 908,000 SAPS.

As for the larger ecosystem, the IBM Cloud marketplace provides organizations access to various solutions that can support them with implementing and maintaining their secure cloud-based SAP landscapes. Solutions with specific SAP capabilities include F5 BIG-IP for L4-L7 traffic management, Veeam and Actifio for SAP HANA backups, and HyTrust Cloud Control. In addition, other capabilities for SAP, such as monitoring and integration, are available from IBM Cloud Paks – an enterprise-ready containerized software platform, using Red Hat OpenShift, that provide solutions and enable clients with an open, faster and secure way to move core business applications to any cloud.

Security and compliance are leading concerns with IaaS services for SAP, especially among large enterprises with global footprints. Because IBM Cloud clearly caters to this segment of the market, the service's compliance certifications and attestations are numerous and include compliance with all the leading industry models. IBM Cloud also supports workloads governed by global and industry regulations, standards, and frameworks – such as the prepared industry-ready platforms, IBM Cloud for Financial Services and IBM Cloud for Telecommunications.

The Cloud-Native Vision

IBM Cloud sees its longer-term mandate as becoming a cloud-native SAP provider focused on customers' continuing innovation, leveraging SAP and data from other sources, including IBM services such as IBM Watson or The Weather Company, with SAP Data Intelligence running on top of the Red Hat OpenShift layer. Here, the tighter relationship between IBM and Red Hat is clearly bearing out.

SAP Data Intelligence is a cloud-native service from SAP that runs natively on Red Hat OpenShift and facilitates data integration from all types of sources. Some popular use cases for SAP Data Intelligence are data warehousing, allowing for a variety of data streams to be added to a data warehouse for business insights; big data and AI data; or data from IoT devices that can be leveraged by the ERP system, for example, in AI inferencing models for intelligent insights.

IBM has also made SAP's high-level Advanced Business Application Programming (ABAP) language, which organizations use for the development of business applications in the SAP environment, available as an ABAP SDK for IBM Watson Developer Services, including access directly from SAP ABAP to the RESTful APIs. This allows developers to build business applications for SAP that incorporate IBM Watson intelligence combined with SAP technologies, supporting the ultimate goal of most SAP customers toward becoming an "intelligent enterprise", a goal that IDC too sees as a critical direction for businesses to remain competitive.

All of these provisions are to help enable SAP customers to achieve Side-by-Side Extensibility and de-couple their SAP Business Applications from the rapid change of the custom development extensions, which append unique value to their SAP landscape but have in the past caused slower innovation from technical/development debt. IBM Cloud is providing the cloud-native capabilities to empower businesses' SAP workloads and increase their pace of innovation.

How Businesses Rate IBM Cloud

IDC data shows that businesses which run SAP S/4HANA on the IBM Cloud experienced the following top 5 benefits (in order of ranking) from the IBM Cloud vis-à-vis their previous on-premises environment:

- Higher performance infrastructure
- Greater security
- Greater scalability
- Better integration of various parts of the SAP landscape
- Better analytics capability

Almost half of organizations said they experienced a strong revenue improvement from running SAP on IBM Cloud, while about 40% said they saw a modest improvement – in other words, 90% saw a revenue improvement. About 35% experienced a strong cost improvement, and nearly half of businesses achieved a modest cost improvement from moving SAP to the IBM Cloud – again, in total, this means that more than 80% saw a cost improvement. In terms of productivity, more than 50% of businesses significantly improved their productivity on IBM Cloud and about one-third improved productivity modestly.

In other words, almost 9 out of 10 business improved their productivity after they migrated SAP to the IBM Cloud.

Businesses rated various SAP services on IBM Cloud between 4.2 (very good) and 4.5 (excellent) on a scale of 1 – 5, where 3.0 – 3.5 is very low and problematic, 3.5 – 3.7 is low and demands attention, 3.7 – 3.9 is decent, 3.9 – 4.1 is good, 4.1 – 4.3 is very good, and >4.3 is excellent.

FUTURE OUTLOOK

Why a Comprehensive Cloud Provider?

The selection of an appropriate cloud provider is a critical business decision. In addition to offering total cost of ownership (TCO) savings, a cloud provider should possess the current technical and support expertise to assist in all phases of the required effort and customize efforts depending upon your current and future business requirements.

In your evaluation of various cloud providers, there are several factors to consider as you develop your selection criteria documents.

Cloud Provider Selection Criteria

- Comprehensive understanding of evolving business requirements and objectives
- Ability to align efforts and offer viable options that address business growth and agility requirements with in-house SAP-certified professionals who can assist at any stage of your efforts
- Ability to recognize your current infrastructure investments and provide logical and cost-effective alternatives and implementation options that match budget and migration timetables
    - Ability to coexist without risk in a hybrid environment as necessary
- Current technical expertise
    - Number of certified SAP engineers in geographic area
    - Data security certification
- Proven track record and market recognition
    - Experienced project management
- Ability to provide best practices and methodology assistance to minimize "recreating the wheel"
    - Considerations and guidance for sizing your SAP systems on cloud
    - Networking Integration checklists and connectivity options
- Implementation and post-implementation training and support expertise
- Global on-demand support expertise and responsiveness for business-critical incidents

CONCLUSION

An enterprise's journey to business transformation requires the following steps to leverage cloud resources:

- Choose the cloud provider which can provide a path to move workloads from datacenters to the cloud starting from planning and sizing and ending with a secure, scalable, and reliable environment.
- Leverage the cloud provider that can act as a partner in helping the enterprise innovate with end-to-end cloud-native capabilities.
- Pick a hybrid cloud platform that enables the enterprise to connect services from a wide array of information sources delivering long-term business agility.

The core capabilities of an organization lie in the ERP system, and the right cloud provider can provide the required infrastructure to eliminate cloud migration risks. To derive transformational value, the cloud service provider also needs to provide the resources and services to become the enterprise platform coupled with SAP S/4HANA - for continuous innovation in a rapidly changing business environment.

About IDC

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