

Research Article

Sap on Cloud Solutions

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Abstract

The advent of SAP S/4HANA has heralded a new era in enterprise resource planning (ERP), promising enhanced agility, efficiency, and innovation for businesses across industries. As organizations embark on their digital transformation journeys, migrating to SAP S/4HANA has emerged as a pivotal step towards achieving greater operational excellence and competitive advantage. This paper elaborates the fundamental concepts of SAP ON CLOUD, multiple cloud providers, Hybrid solutions, SAP On-premises choices in enabling real-time data processing, intelligent decision-making, and streamlined business processes. Furthermore, this article delves into the importance of SAP ON CLOUD, RISE with SAP solutions, across various verticals of industries, ranging from retail to healthcare, finance, manufacturing, elucidating how SAP S/4HANA empowers organizations to address industry specific challenges, optimize operational efficiency, and capitalize on emerging opportunities in today's dynamic world with Artificial Intelligence embeds, machine learning fastening solutions.

Keywords: SAP On CLOUD, SAP on aws, google cloud platform, Azure, SAP hybrid on-premises

1. Introduction

This is to familiarize & highlight about options available for decision making for an organization's SAP environments, decision making which Cloud Provider to choose based on individual businesses, their inhouse or cloud existing infrastructures, explore considerations to help, evaluating Cloud providers offerings, Current leaders/dominance in cloud vendors. Saving Money, Cost Optimizations, Quality infrastructure, easy to migrate & maintain, Support process, their Strengths, Computing resources Infrastructure bandwidth, Business global presence, Carbon Footprints, Methodology, Reuse (data/international licenses, Data Centers, global footprints), Hybrid vs multi-Cloud strategies, elasticity, architectural enhancements,

2. Materials and Methods

2.1 What is SAP?

SAP stands for "Systems, Applications & Products in data processing" – this is German Software Company that provides enterprise application software (ERP) help businesses manager their operations. Supply Chain Manufacturing several horizontal alliances of a company including Finance. Human Resources and Customer Relationships using SAP ERP software. 85% of fortune 500 companies rely on SAP for their core business processes. Customers using SAP have reported 20% increase in operational efficiency.

2.2 What is Hyperscaler?

Hyperscalers is a type of large-scale data center that offers massive computing resources, typically in the form of an elastic cloud platform. Organizations use them to deploy and manage large scale applications and services. In SAP

it is basically offered as Infrastructure-as-a-Service (IaaS). Platform-as-a-Service (PaaS) over these hyperscale cloud platforms for SAP applications considering their scalability. Network connectivity for their mass/critical distributed environments across multiple datacenters across global/regions.

2.3 What are Computing Resources in SAP

SAP can be implemented in customers own hardware or Cloud environments – considering proven best practices hardware recommendations. Fast time to value. Continuous Innovation. Open & extensible Security Compliance and scalability. Automatic and continual updates – these are possible based on cost/money on the table to choose between below snip to show SAP trend on top. Cloud Vendors market share between Q1 2021 to Q2 2024.

2.4 SAP Cloud Service Provider

A CSP (cloud service provider) is a third-party company that provides scalable computing resources that businesses can access on demand over a network, including cloud-based compute, storage, platform and application services, Cloud Computing is becoming go-to model for accelerating digital transformation and offers flexibility, scalability, resiliency with Security protocols in place that business demands without being concerned with physical limitations, easy to manage & maintain plannings instead of building a own infrastructure for your business applications, you can rent any CSP which can be shared with other individuals or other organizations.

2.5 Variety of Services

Fundamentally there are three types of Cloud Service Provider Services – IAAS / PAAS / SAAS. IaaS – Infrastructure-as-a-Service this includes resources like Compute/Network & Storage Data Management. Virtualizations & Operating Systems PaaS – Platform-as-a-Service this offers tools and services to create and deploy SAP applications, PaaS encompasses Operating Systems, runtime environments ready for SAP Stack this manages corresponding IaaS & Underlying hardware for SAP Applications. SaaS – Software-as-a-Service – Cloud Providers perhaps Series for Virtual Machines to embed and read-to-use applications, pre-imaged with SAP Software’s corresponding HANA or relied on Databases with emerging technologies like containerization edge computing machine learning and Kubernetes.

2.6 Market Capture

CSP leaders mainly captured by Amazon Web Services (AWS), Microsoft Azure, Google Cloud – are established leaders, there are other cofferers like IBM, Alibaba, Rackspace, Dell EMC, Lemongrass, other private vendors with business agility, reduced costs, scalability options for SAP workloads.

2.7 SAP Data Centers

SAP primarily offers SAP ECS or RISE with SAP solutions for SAP ERP setups, these solutions also available on CSP (Cloud Service Providers), conversely SAP data centers provide a comprehensive range of capabilities to support a wide range of business applications and workloads, including.

Cloud Hosting & Management: to host SAP S/4 HANA, SAP Business Technology Platform, and provide robust infrastructure management services to help ensure optimal

performance and uptime.

Data Residency and Compliance: Global/regionally available SAP data centers ensure business to process data, and continuous growths adhere to geographical meeting local regulatory requirements.

Scalability & Flexibility: SAP data centers offer more computing power or tailored configurations to adapt required extra storage and meet increasing demands for customers organizations organic growth.

High Availability & Disaster Recovery solutions: High Availability is always on TOP PRIORITY based on the connectivity at every level Infrastructure then Operating System then Database level and finally Application Level High Availability solutions, SAP gateway connects with customer Gateway connectivity establishes with DNS and DNS forwarders based on the customers/organizational global presence, depends if customer wants to control or SAP can help controlling customer accessibility with these solutions ensuring data protection and recoverability in the event of an unforeseen incidents. SAP data centers are certified to comply with global security standards, such as ISO/IEC 27001 and SOC 2. We implement stringent security measures including encryption, 24/7 monitoring, and regular audits. Sustainability and operates energy efficient data centers powered by renewable electricity wherever possible. SAP adhere to environmental certifications like ISO 14001. SAP data centers are designed with redundancy and disaster recovery plans to help ensure business continuity. In the event of an outage, data and services are automatically rerouted to other operational centers.

By Category	By Industry	Business Technology Platform
Enterprise Resource Planning	Automotive	Overview
Supply Chain Management	Banking	Application Development and Automation
Financial Management	Consumer Products	Data and Analytics
Spend Management	Oil, Gas, and Energy	Extended Planning and Analysis
Human Capital Management	Retail	Integration
CRM and Customer Experience	View all Industries	
View Products A-Z		
Business Transformation Management	Featured	Try and Buy
Overview	Artificial Intelligence	Try SAP
SAP Signavio 🔗	Business Network	SAP Store
SAP LeanIX 🔗	Small and Midsize Enterprises	
WalkMe 🔗	Sustainability Management	

Figure 1: SAP Deployment Categories, by Industry and BTP

2.8 Virtualization Infrastructure

SAP Components in Virtual and Cloud Environments – SAP supports multiple Virtual Environments, SAP Supported & operated applications in Virtual Environments.

- SAP on VMware vSphere environments (vSphere 8.0)
- SAP on Microsoft Hyper-V
- SAP on RedHat
- SAP on SuSE Linux
- SAP on IBM INxHY

- SAP on Hitachi LPAR
- SAP on IBM Power Systems running Linux
- SAP Running Windows SAP Support Cloud Service Offerings
- SAP on Amazon Web Services
- SAP on Microsoft Azure
- SAP on Google Cloud Platform
- SAP on IBM Cloud Infrastructure
- SAP on Oracle – Oracle Cloud
- SAP on Alibaba Cloud

- SAP on Huawei Cloud
- SAP on Open Telekom Cloud

2.9 Deployment Models by SAP and Hyperscale’s

Certified Infrastructure as a Service Platforms: Cloud Providers must be certified by SAP to get their hardware models with IAAS/PAAS/SAAS supporting structure, all Cloud Providers have hardware manufactured from globally multiple vendors to run SAP OLAP, OLTP, SAP Applications on those platforms like AWS/Azure/Google Cloud/Huawei

Technologies Co. Ltd, IBM Cloud, Alibaba.

Microsoft Azure: SAP collaboration between SAP and Microsoft Azure have various options of deploying SAP solutions and applications on Microsoft Azure environments, there are several other whitepapers, e-books, webinars Azure Docs, blogs on Microsoft Azure documentation for this readiness setup. Azure provides different Virtual Machine Series based on solutions, pricing, security, resources/benefits, guided experiences, RISE with SAP solutions for SAP on Azure VM workloads.

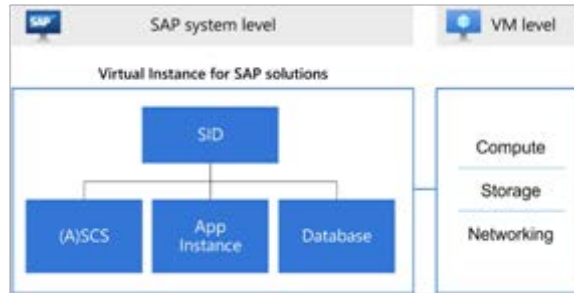


Figure 2

SAP on Amazon Web Services: provides on-demand access to SAP customers/partners servers, storage & networking in the cloud, to run their SAP systems, its offers complete self-service to pay only for the resources used, AWS provides approved ready to procure & provisioned infrastructure, AWS provides infrastructure these with-in few hours with readily available images Hyperscalars, how-to guides information, overviews and implementing/configuration/operating SAP environments are available on AWS cloud documentation. Solutions for SAP migrations like lift & shift your existing landscapes to AWS digitally transform with SAP S/4 HANA or modernize your business processes with AWS services, available readily certified Instance types, preconfigured deployed solutions, Ready to Migrate SAP workloads either self-services or with AWS support partners or professions services. Ready to start <https://aws.amazon.com/sap/get-started/>.

small/medium/large scale instances predefined CPU/Memory support projected instances readily available. <https://docs.aws.amazon.com/pdfs/sap/latest/general/general.pdf> SAP on Google Cloud – another SAP certified cloud provider which accelerates with Google AI, offers leading solutions along with Google innovative AI to bring, Google How-to-Guides and several customer success stories are available running successfully on Google Cloud, SAP ERP & SAP BTP solutions supported on Google Cloud, SAP Migrations strategies, AI powered resilient supply chain solutions, real-time insights, other Google featured products with Virtual Machines running in Google’s data center adaptability of AI & ML on Google Kubernetes Engine managed environment for running containerized apps, Cloud Storage, Vertex AI, Gemini, several other 100+ products for SAP centric solutions.

SAP EC2 instance type based on sizing decisions taken for

What is the difference between product and appliance template?

Appliance Templates	Products
an appliance for test, demo, and exploration purposes with business content and demo scenarios in most cases	a guided path to an up-to-date SAP installation process including feature pack stack upgrade without demo content; an option for tool-guided migration of an on-premises instance from SAP ERP to SAP S/4HANA
optimized infrastructure costs and provisioning time for a non-production environment with less architectural flexibility	distributed topologies including high-availability setups, suitable for production use
appliances can be created in Amazon Web Services, Microsoft Azure, and Google Cloud Platform	systems can be deployed or converted to Microsoft Azure
available for a variety of SAP on-premises products	available for SAP S/4HANA
SAP Cloud Appliance Library subscription required after expiration of the trial period for the Trial appliance templates	no SAP Cloud Appliance Library subscription required
appliances can be created in any existing network setup or together with a new network	requires prerequisite procedures depending on the scenario - deploying a system or converting a system.

Table

Appliance Templates – there are readily SAP S/4 HANA 2022 / SAP S/4 HANA 2023 FPS0* are readily available on almost all these Cloud Providers with fully activated features, SAP application templates and products can be reachable at <https://cal.sap.com/catalog#/applianceTemplates>. All SAP appliance templates use pre-configured public images provided by OS vendors. These VM sizes are fully supported on the certified platforms.

2.10 SAP Business Technology Platform

SAP Product SAP BTP services that help business to integration, extend and build your solutions, SAP BTP helps to build SAP Apps, Core Clean using SAP Build Apps with SAP S/4 HANA, Can started with SAP Build Code and Joule using Generative AI (Trial and Enterprise), SAP Joule is SAP's AI product tool can activate SAP joule for SAP SuccessFactors instance, Automated missions available with SAP BTP accounts

2.11 SAP BTP Partner Missions & SAP Service Missions

These are very new technologies to align with Artificial

intelligence & Machine leaning cutting edge deployment strategies with various SAP products into customer Supply Chain functional deployments.

Partner Missions: Automate the migration from SAP Process integration to SAP Integration suite with Figaf – Customers using SAP Process Integration to migration to SAP Cloud Integration with next few (ten) years as SAP PI support is ending, Migration to SAP Cloud Integration is well work it but requires reasonable development time. Figaf is migration tool for SAP Integration suite to speed up migration from SAP PI to SAP Integration suite.

Service Missions: this is to build SAP SuccessFactors integrations or extensions following best practices and Application Program Interfaces (APIs). Clear path and Deployment journey path map with associated deliverables and implementation steps that deployment partners can walkthrough and follow through, SAP will provide if required better collaboration opportunities and insights into each milestone along the way.

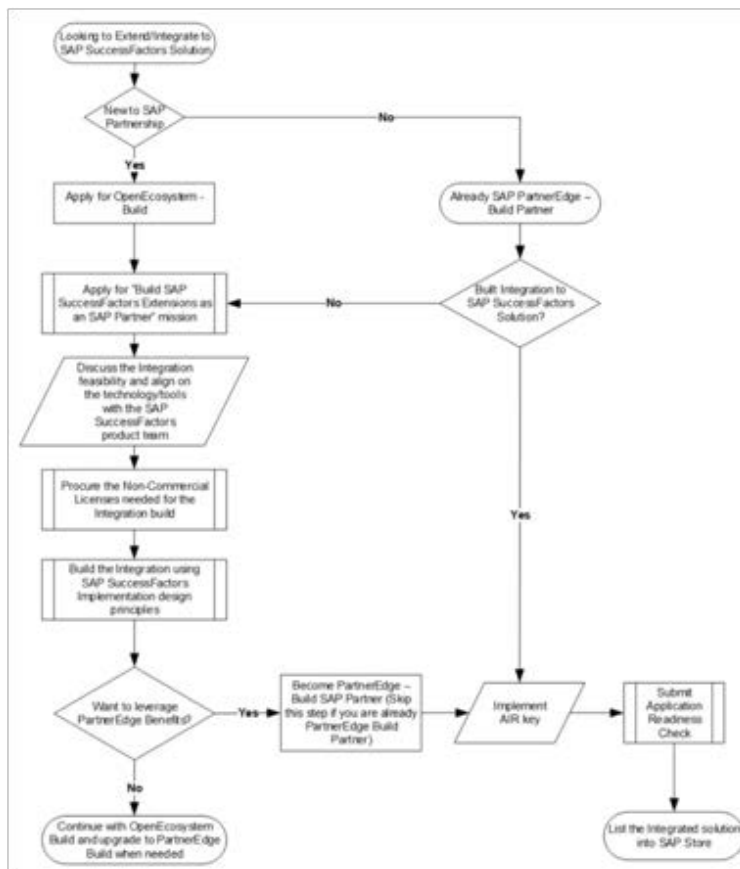


Figure 3: Flow Diagram - SAP BTP Mission Partner Mission Strategies

2.12 SAP Reference Architectures for Business Technology Platforms Services

There are different architecture patterns which are recommended using SAP BTP services.

- API managed Integration
- Application to Application integration
- Architecting multi-region resiliency for SAP BTP use-cases
- Business-to-business integration
- Business-to-government integration

- Cloud Leading authentication
- Cloud leading identify Lifecycle
- Cloud Leading identify lifecycle authorizations
- Events to business framework
- Explore Hyperscaler data with SAP Datasphere Integration
- Federated Machine Learning
- Integration and Extend SAP and non-SAP Solutions with SAP Build Process Automation
- Master Data Integration

- Retrieval Augmented Generation and Generative AI on SAP BTP
- Security Connectivity with SAP Private Link Service

2.13 SAP Business AI Features

Discover SAP Business AI features and their benefits, pricing and resources. Experience how embedded SAP Business AI capabilities help you achieve real-world results.

- Account synopsis for SAP Sales Cloud Version
- Account Receivable – Automate cleaning and recommended proposed matches by Accounts Receivable
- Activity Summary
- Advanced Skill Match
- AI-Assisted Authoring – Enrich enablement content automatically with support
- AI-Assisted Text – this is to simplify and standardize text creation by analyzing context and context
- AI-Assisted Writing – Enhance the quality of content writing in text fields
- Applicant Screening
- Automate Emission Factor Mapping
- Behavioral insights for Contract Accounting
- Image Generation – SAP CX AI Toolkit
- Intelligent Filtering – this is Estimate the expected real duration of activities based on time efforts logged
- Inventory Prompts – Support analyzes of IT application

landscape

- SAP Joule – SAP AI - Get quick answers based on product documentation, SAP BTP, SAP S/4 HANA Cloud Public Edition, SAP S/4 HANA Cloud Private Edition, SAP SuccessFactors Solutions, SAP Asset Performance Management, SAP Sales Cloud Version. There are several products supports SAP AI & ML technologies

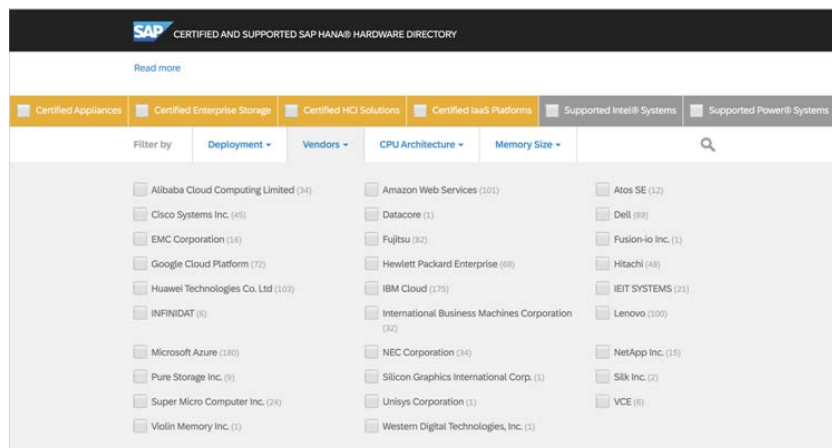
2.14 SAP Customer Stories

There are several SAP Customers are transforming business to more successful taking lead of these AI platforms. SAP Roadmap explorer, Customer references are available in SAP discovery center Cloud platform.

2.15 Certified and Support SAP HANA Hardware

SAP Cloud Providers provided hardware powered by SAP HANA that can fast track implementation, application enterprise IaaS, Hyper-Converged Infrastructure (HCI) solutions, Support systems.

- Certified Appliances
- Certified Enterprise Storages
- Certified HCI Solutions
- Certified IAAS Platforms
- Support Intel Systems
- Support Power Systems



2.16 SAP Certified Providers and Partners

SAP partners with their proven operational excellence in connection with SAP software's, this is only for operating service providers who are certified in "Cloud and Infrastructure Operations" ability to operate SAP applications in released IaaS environments while observing the support requirements. SAP provided Max Attention, Product Availability Matrix, before considering SAP migrations, deployment options for any platform-specific supports released SAP products in combination with support infrastructure and machine types [1-12].

3. Conclusion

SAP ERP products are proven software's (IaaS/PaaS/SaaS) already running large scale business activities in all certified cloud providers with their integration and compatible with popular industry standards provided by Cloud Providers with their robust connectors, API's, seamless facilities,

frameworks, databases used in applications. Choosing the right CSPs that balances customer critical criteria businesses. Evaluating CSPs by ensuring organization can leverage the benefits of Cloud Providers computing resources. These CSPs never comprise on security norms, based on Cost optimization solutions, SAP Architecture optimizations, consolidating landscapes, development/increasing business needs based on choosing right Cloud Provider evaluating exercises performed with help of SAP Support technical/Sales/Pre-Sales support entities. It does not harm evaluating right choice for your Organizational cloud computing needs-based SAP & Non-SAP needs to make the right choice for success of your business Cloud Transformation journey.

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