

# Running SAP on AWS and Azure: Practical Considerations for Hybrid SAP Architectures

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## Abstract

In today's enterprise landscape, organizations running SAP systems are increasingly leveraging public cloud platforms such as Amazon Web Services (AWS) and Microsoft Azure to drive agility, scalability, and cost efficiency. While both hyperscalers offer comprehensive SAP-certified infrastructure, many large enterprises are adopting hybrid architectures that integrate on-premise systems with both AWS and Azure. This paper explores the key practical considerations for deploying SAP workloads in such hybrid environments. It discusses platform capabilities, architectural design patterns, integration challenges, security frameworks, high availability options, cost optimization strategies, and vendor support models. The paper also outlines lessons learned from real-world scenarios, offering recommendations to SAP architects and IT leaders navigating hybrid SAP cloud journeys.

**Keywords:** SAP, AWS, Azure, Hybrid Cloud, Cloud Architecture, SAP on Cloud, Enterprise IT, Public Cloud, Digital Transformation

## 1. Introduction

The migration of SAP landscapes to the cloud has accelerated over the past decade, driven by organizations' need for agility, scalability, and reduced infrastructure overhead. Traditionally hosted on-premise, SAP systems are now increasingly being deployed on hyperscaler platforms such as Amazon Web Services (AWS) and Microsoft Azure. These platforms offer SAP-certified infrastructure, pre-configured solutions, and global reach, making them attractive choices for enterprises undergoing digital transformation.

However, rather than choosing a single cloud provider, many large enterprises are opting for hybrid SAP architectures. These architectures involve running different components of the SAP landscape across on-premise data centers and multiple public cloud platforms — often with the aim of balancing cost, resilience, regulatory compliance, and vendor flexibility. This hybrid model presents both opportunities and challenges, especially for SAP architects responsible for ensuring performance, availability, integration, and security across disparate environments.

This paper investigates the practical considerations for designing and operating SAP systems in hybrid environments involving AWS, Azure, and on-premise data centers. Through a review of platform-specific capabilities, architectural patterns, and operational insights, we aim to equip SAP architects with a decision-making framework for hybrid cloud strategy execution.

## 2. Methodology

This research follows a qualitative, comparative, and analytical approach. We conducted a structured review of SAP deployment guidelines on AWS and Azure, examined reference architectures published by SAP and hyperscalers, and synthesized insights from public cloud practitioners and SAP architects. Case observations were drawn from enterprise cloud transformations across manufacturing, retail, and public sector domains.

The analysis is structured around five core dimensions:

- Architecture Design
- Integration and Interoperability
- Security and Compliance
- Performance and High Availability

## - Cost Optimization and Governance

Where applicable, vendor documentation (e.g., AWS SAP Notes, Azure Well-Architected Framework for SAP) was triangulated with community best practices and real-world hybrid implementations.

## 3. Results

### 3.1 Architecture Design Patterns

Hybrid SAP landscapes are often organized in a three-tiered structure:

- On-premise for legacy ECC or tightly coupled systems
- AWS for scalable dev/test or DR environments
- Azure for production S/4HANA and SaaS integrations (e.g., Microsoft 365, Power Platform)

Enterprises typically adopt one of the following models:

- Split-tier (e.g., app servers on Azure, DB on-prem)
- Workload-based separation (e.g., CRM on AWS, ERP on-prem)
- Disaster Recovery across clouds (active-active or active-passive)

### 3.2 Integration and Interoperability

Hybrid environments require robust network integration:

- VPN or Direct Connect / ExpressRoute for low-latency, secure connectivity
- SAP Cloud Connector and Azure Private Link for S/4HANA Cloud and BTP
- Third-party tools for orchestrating cross-cloud monitoring and logging

### 3.3 Security and Compliance

Key security elements include:

- Identity federation via Azure AD or AWS IAM Identity Center
- Encryption at rest and in transit using KMS/Key Vault
- Compliance with frameworks such as ISO 27001, HIPAA, or GDPR

### 3.4 Performance and Availability

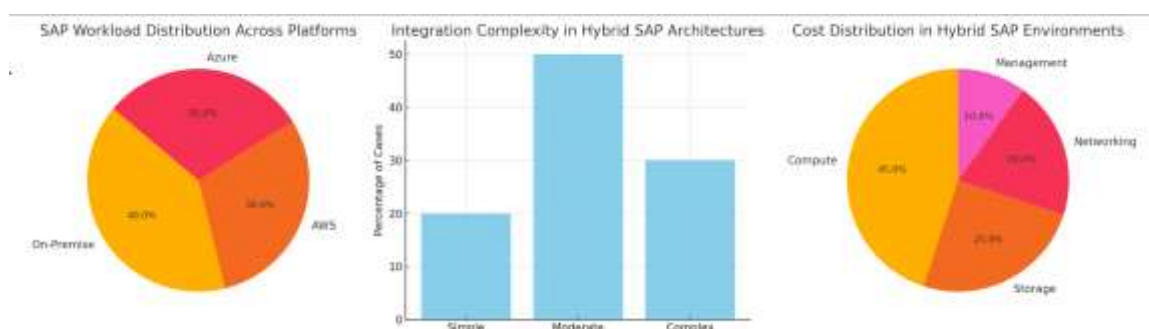
SAP workloads require:

- Certified VM types (e.g., EC2 X1/X2, Azure M-series)
- Scale-up vs. scale-out planning for HANA workloads
- Availability designs like AWS Auto Recovery, Azure Availability Zones, and cross-region failover

### 3.5 Cost Optimization and Governance

Cost-effective hybrid SAP architectures leverage:

- Reserved Instances and Savings Plans
- Tag-based cost allocation
- Governance frameworks using AWS Control Tower or Azure Landing Zones



#### 4. Discussion

A hybrid approach offers strategic flexibility but introduces complexity. AWS is often preferred for innovation, agility, and third-party ecosystem support, while Azure benefits from tight integration with Microsoft services and existing enterprise licensing models. Deciding between them — or leveraging both — must align with business priorities.

Key challenges include:

- Skill gaps across platforms
- Operational silos without unified monitoring
- Vendor lock-in risks

Architects must ensure standardized deployment patterns, automation via Infrastructure as Code (IaC), and use of SAP-certified HA/DR solutions to mitigate these risks.

Another critical insight is that not all workloads benefit from the cloud equally. Legacy custom developments may remain cost-effective on-prem, while analytics and AI components gain more from cloud-native services. A portfolio-based migration strategy, rather than a "lift-and-shift" approach, is recommended.

#### 5. Conclusion

Hybrid SAP architectures involving AWS, Azure, and on-premise environments represent the future state for many enterprises. These models offer operational resilience, architectural flexibility, and financial optimization — but also demand careful planning and skilled execution.

SAP architects play a central role in designing these landscapes. By understanding the strengths and limitations of each cloud platform, aligning deployment strategies with business needs, and adhering to best practices in security, integration, and cost management, organizations can successfully navigate their hybrid cloud journey.

Future research can explore automation frameworks (e.g., Terraform, Ansible), AI-driven operations (AIOps) for hybrid SAP landscapes, and cost modeling tools that simulate hybrid TCO scenarios.

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