Cloud Migration Strategies Using Sap S/4 Hana

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Abstract :
With increasing cloud requirement it is essential for business organisations to migrate to the cloud in order to modernize their IT infrastructures, enhance operational efficiency, and achieve cost effectiveness. This paper examines the mehodology and intricacies of transitioning to the cloud with SAP S/4HANA. A detailed system considering ERP strategies that combines data, processes, and analytics. It focuses on of key migration requirements, which lead to the like real-time analytics, efficiency, and inculcation of the latest technologies.
Keywords: SAP, S/4HANA Migration, Digital Transformation, HANA CLOUD, BTP, Archiving, ERP

INTRODUCTION:
Transitioning to SAP S/4HANA cloud is a intricate process, hence requires effective planning, executed in stages to reduce any downtime. A layered top-to-bottom approach, beginning with migrating core systems, followed by system applications, prioritize the safe decommissioning of legacy infrastructure needed. Ensuring data integrity during the transition period is a major barrier that arises during the migration process, where data is temporarily locked. Effective migration requires consideration of technical areas such as data security, regulatory compliance, and integration with current IT infrastructure. This paper expands on the key considerations of cloud migration, providing valuable insights and practical guidelines for a successful move to SAP S/4HANA in the cloud.

Tools Comparison.
1. Cloud Platform Integration (CPI) by SAP: A platform that connects on-premises systems to SAP S/4HANA in the cloud with an integration tool.
- Makes it easier for third party app to link with old platforms
- Provides connections that work with SAP and systems that are not SAP compliant.
- Works with both cloud-to-cloud interactions and hybrid integration.

Pros:
- Compatible with SAP systems.
- Adaptability and scalability are key features of cloud-based architectures.
- Major support during SAP software and data migration.

Cons:
- Best for integration but not suitable for full migrations.
- Not suitable for NON -SAP platforms.

Optimal Situation: Organizations who need to integrate their on-premise or hybrid systems with SAP S/4HANA during or after migration might benefit from this approach.

2. SAP S/4HANA Migration Cockpit: To ease the process of moving data from older SAP systems to the newer S/4HANA platform.

Pros:
- Facilitate system conversions in both brownfield and greenfield environments.
- Data transfer objects (DTOs) and pre-made templates are provided.
- Keep tabs on the migration in progress and generate reports as it happens.
- Use of pre-configured migration items simplifies the migration operation
- A whole suite of tools for ETL, or data extraction, transformation, and loading.

Cons:
- Doesn't support complex migrations or systems from other companies.
- Companies planning to move away from SAP applications should not use this.

Optimal Situation: Specifically designed for businesses that are transitioning from SAP to S/4HANA and

focusing on system conversion approach.

3. RISE SAP: This comprehensive bundle from SAP comprises all the cloud infrastructure, tools, and services required for the S/4HANA conversion process.

Pros:

- Includes guidance, resourcing , and assistance.
- Includes the SAP Business Technology Platform (BTP), expert in analytics, data integration.
- Updates business processes to align with SAP recommended practices.
- Packages are managed for services and monitoring.
- Helps digital transformation and moving to the cloud go more smoothly.
- Grants access to SAP's constantly evolving cloud-native technologies, including automatic enhancements and newly added functionality.

Cons:

- The infrastructure and services provided by SAP are crucial to avoiding vendor lock-in.
- Investment may not be justified for smaller businesses or those with limited SAP infrastructure.
- In a nutshell:
- This solution streamlines and improves the efficiency of operations for businesses who want to move them to the SAP cloud.

4. SUM with DMO (Database Migration Option) for Software: A strategy for upgrading the database and transferring SAP systems to SAP S/4HANA parallely.

- The ability to facilitate database transfer and version upgrades.
- Facilitates the import of data into SAP HANA from sources outside of SAP HANA.
- Helps update the system in tandem with the Software Update Manager while the migration is underway.

Pros:

- Switching from traditional databases to HANA is easier.
- Concurrently updates the system and migrates databases.
- Companies are able to keep using their current infrastructure.

Cons:

- Not applicable for companies implying greenfield implementation.
- Solid preparation is required, especially working with complex datasets.

Best Use case: For organizations that wish to simultaneously upgrade to SAP S/4HANA and the SAP HANA database.

5. Accenture's Cloud Migration Factory (CMF): The goal of Accenture's Cloud Migration Factory (CMF) is to provide a complete migration framework for implementing SAP S/4HANA in the cloud.

- The migration accelerators, pre-made tools, and methodologies that come with it.
- It uses a staged migration approach that incorporates planning, readiness reviews, and execution.
- Allows for the use of cloud computing approaches that combine elements of several clouds.
- This includes reengineering business processes and managing change.

Pros:

- Easily adjustable according to huge business needs.
- Offers extensive support for complex topologies and hybrid cloud setups.
- Customize optimization and transformation for business processes.

Cons:

- Not as well-suited to smaller businesses without specialized migration needs.
- Small businesses could end up spending a tonne of money.

Best Use Case: Optimal for large enterprises that require a customized SAP S/4HANA migration solution in the context of hybrid cloud infrastructures.

6. AWS Cloud Durability: To simplify cloud transfer of large programs like SAP workloads.

- Automate and speed up the migration to cloud platforms using the lift-and-shift method.
- Gives systems continuous replication so migration is smooth.
- Includes tools for disaster recovery and real-time replication.

Pros:

Data is copied in real time, which lowers latency.

- Optimal for moving to Amazon Web Services' cloud.

Cons:

- Focus is on infrastructure migration rather than the full SAP program
- Not only SAP S/4HANA specific, it can be used for infrastructure relocation.

Best Use Case: Ideal for organizations that wish to relocate their SAP systems and infrastructure to AWS with minimal disruption

7. Smart Shift, by Deloitte:

- Automated tools and accelerators like Intelligent Automation,
- Handle testing, data migration, and modification management.
- Makes pre-made templates to speed things process.
- Links SAP S/4HANA to external business processes

Pros:

Cons:

- Deloitte's expertise in SAP and cloud migrations offers in-depth guidance.
- Provides a holistic approach that includes process optimization and change management.
- Strong support for data governance and risk management.
- High dependency on Deloitte consultants, which may increase costs.
- Less flexible for organizations with very specific or unique needs.

Best Use Case: Suitable for medium to large organizations seeking a comprehensive migration strategy with expert consultancy and accelerated timelines.

A Detailed Cost Comparison

SAP S/4HANA Cloud Migration Cost Comparison
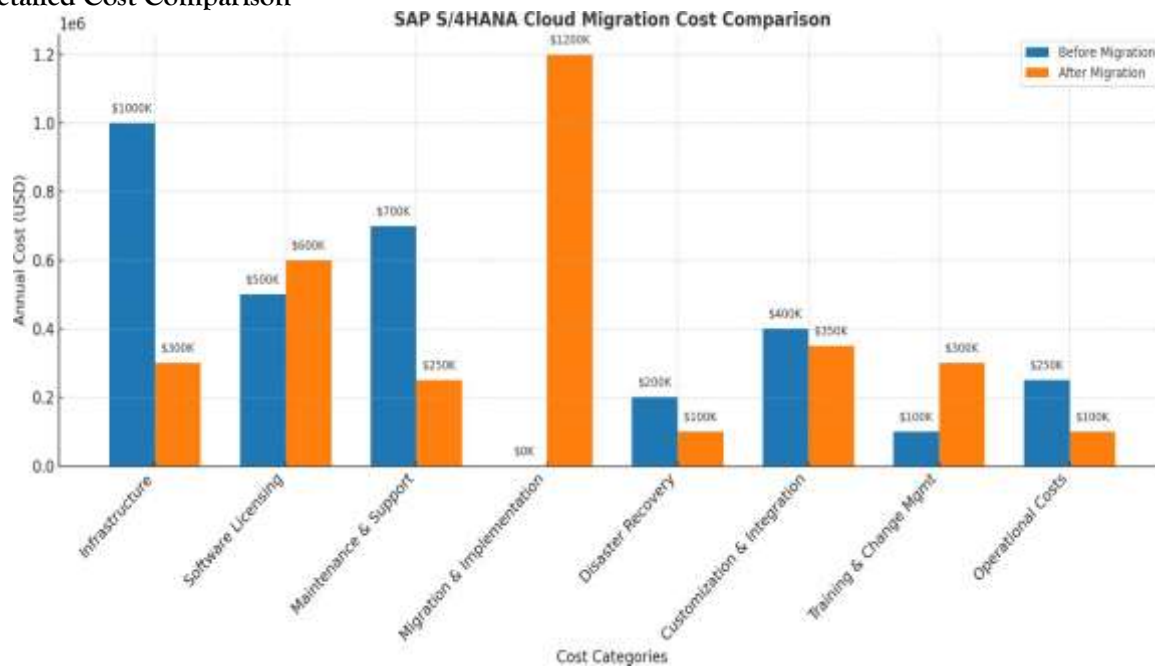
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Additional Considerations:

- Cost Variability: Actual costs depend heavily on company size, migration complexity, cloud provider, and customization level.
- Hidden Costs: Data migration complexity, downtime risks, and post-migration optimization can impact budgets.
- Cost Savings: Long-term savings also come from business process improvements, faster innovation cycles, and reduced time-to-market.

Stages of SAP S/4HANA Cloud Migration

1. Preparation Phase:

● Planning and Assessment: Review the existing SAP ERP environment, pinpoint challenges, and clarify business objectives for migration.

● Business Case Development: Justify the move to SAP S/4HANA by outlining expected benefits such as enhanced performance, cost efficiency, and scalability.

● Change Management Strategy: Make plan for effective communication, and change management to ensure organizational alignment and readiness.

● Cloud Platform Selection: Choose the most suitable deployment model based on technical and business needs.

● Scope and Timeline Definition: Establish detailed project scope, allocate resources, and create a realistic migration schedule.

2. Analysis and Fit-Gap Assessment

● Current State Review: Assess technical architecture, data strength, and custom developments in SAP ECC and rest legacy systems.

● Fit-Gap Analysis: Identify areas which need redesigning or replacement by comparing current business processes with S/4HANA's capabilities.

● Data Quality Review: Evaluate data volume, standard, expected migration challenges.

● Integration Mapping: Identifying systems and third-party applications need amalgamation with S/4HANA in the cloud.

3. Blueprint and Design Phase

● Process Blueprint: Design business processes within SAP S/4HANA, for configurations and integrations.

● Data Migration Planning: Configure tools, procedures, and validation methods for secure and accurate data transfer

● Design Cloud Architecture: Plan cloud infrastructure, address security, networking, and disaster recovery.

● System Configuration: Adapt the solution to meet business needs and regulatory requirements.

● Testing Planning: Develop test strategies, involving unit, integration, and user acceptance testing

4. Migration Execution and Configuration

● System Conversion: Transition from ECC to S/4 might involve database upgrades, migrating to HANA, and ensuring custom code compatibility.

● System Deployment: Implement and set up S/4 on the chosen cloud platform, with tools eg SAP Software Update Manager (SUM).

● Data Migration: Execute migration plan with tools such as SAP Data Services or S/4HANA Migration Cockpit.

● Integration Setup: Configure connections to both ends effectively SAP and non-SAP systems to ensure fluid business operations.

● Upgrade customize codes : To comply with new system update or rewrite customs code.

5. Testing Phase

● Unit Testing: individual system components function testing needed.

● Integration Testing: Test end-to-end processes and cross-system interactions.

● Performance Testinystem's ability to manage anticipated workloads.

● User Acceptance Testing (UAT): Key business users validation requires to ensure system meets operational requirements before go-live.

6. Go-Live and Implementation

● Go-Live Planning: Decide a cutover date, prepare required downtime and anticipate buffer time to ensure that data is ready before proceedings.

● Cutover Execution: Migrate final datasets, apply final on-going changes, push to a live system.

● Immediate Support: Technical and operational support team should be prepared to resolve any kind of ongoing issue like access authorization , blockage pipeline.

7. Post-Go-Live Support and Optimization

● Troubleshooting: Address any operational issues, system defects, or user queries.

● Training: Provide training and understanding to users to maximize system utilization.

● System Tuning: Monitor system performance, apply required optimizations to increase speed and reliability.

● Performance Monitoring: Conduct regular reviews to identify opportunities for technical or process

improvements.

8. Continuous Maintenance and Enhancement

● Updates and Patch Management: SAP updates and security patches must be adhered at timely intervals to maintain compliance and discover latest features.

● Process Improvement: Continuously refine business processes and system configurations based on operational feedback and evolving business needs.

● Scalability Planning: Adjust system resources as business requirements grow or change, taking advantage of the cloud's flexibility.

● Regulatory Compliance: Ensure that data management, security, and privacy policies are continuously reviewed and updated to meet regulatory demands.

**Comparison of Legacy Systems to Migrated systems.**

Aspect	Legacy System (SAP ECC)	Migrated System (SAP S/4HANA Cloud)	Citation / Source
Technology Architecture	Traditional systems with older databases (non-HANA), high customization	Cloud-native, modern stack using SAP HANA (in-memory)	[1][2]
Database Example	Oracle, SQL Server, IBM DB2 (disk-based)	SAP HANA (in-memory, faster processing)	[2]
Database Performance	5K–10K TPS (average)	100K+ TPS (approx. 10x faster)	[2][3]
Real-Time Processing	Batch jobs, mostly overnight	True real-time with in-memory tech	[1][3]
Scalability	Manual server scaling (limited to 2x)	Elastic auto-scaling in minutes (up to 10x)	[4]
Total Cost of Ownership (TCO)	$1M–$5M+ (includes infra, staff, support)	$300K–$1.5M (pay-as-you-go cloud model)	[5][6]
Annual Infra Costs	$300K–$1.5M (hardware, cooling, IT staff)	$100K–$300K (cloud fees)	[5]
System Upgrade Costs	$200K–$500K per major upgrade (5–10 years)	Minimal due to automatic updates	[3][6]
User Interface & Experience	SAP GUI (low usability), ~30% satisfaction	SAP Fiori UI (intuitive), ~70–80% satisfaction	[4]
Customization Load	Heavy reliance on ABAP-based custom coding	Streamlined through configuration and templates	[2][6]
Customization Flexibility	6–12 months for major custom builds	3–6 months using modular, best-practice models	[4]
Integration Time	3–6 months (custom connectors/middleware)	1–3 months (SAP BTP/CPI prebuilt flows)	[4][6]
Integration Cost	$200K–$500K	$50K–$150K	[5][9]
Annual Maintenance	$150K–$500K (manual patching, staff)	$50K–$100K (provider-managed)	[1][6]
Data Migration Effort	3–6 months (ETL tools, manual checks)	1–3 months (accelerators + SAP migration tools)	[2][4]
Security Compliance	Manual audits, 24/7 monitoring	Cloud-native compliance tools (e.g., GDPR, SOC2)	[3][10]
Disaster Recovery	Redundant systems, high cost	Geo-redundant automated DR (low cost)	[1][5]
Innovation Access	Updates 2–5 years apart (on-prem cycles)	Quarterly innovations and auto-deployments	[1][6]

Annual Training Cost	$50K–$200K (due to complexity)	$20K–$50K (simpler UI, faster adoption)	[4]

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Cost Comparison: Legacy ERP vs. SAP S/4HANA Cloud

Time Savings: Legacy ERP vs. SAP S/4HANA Cloud
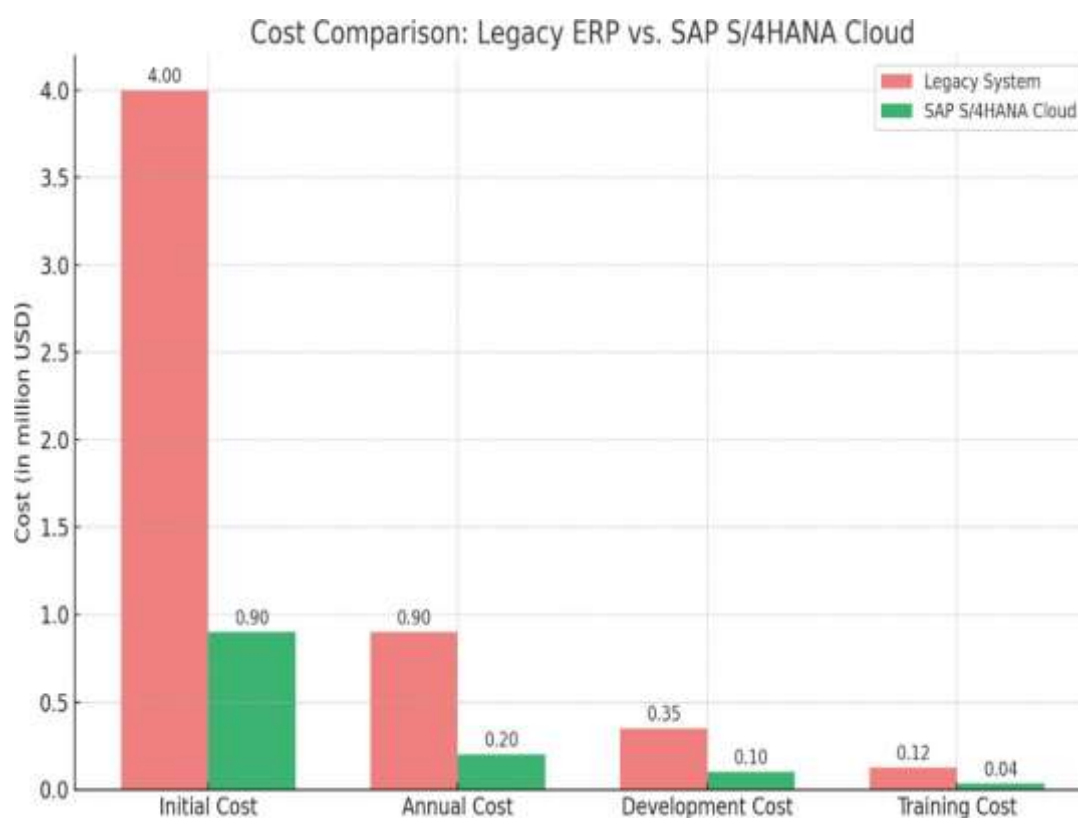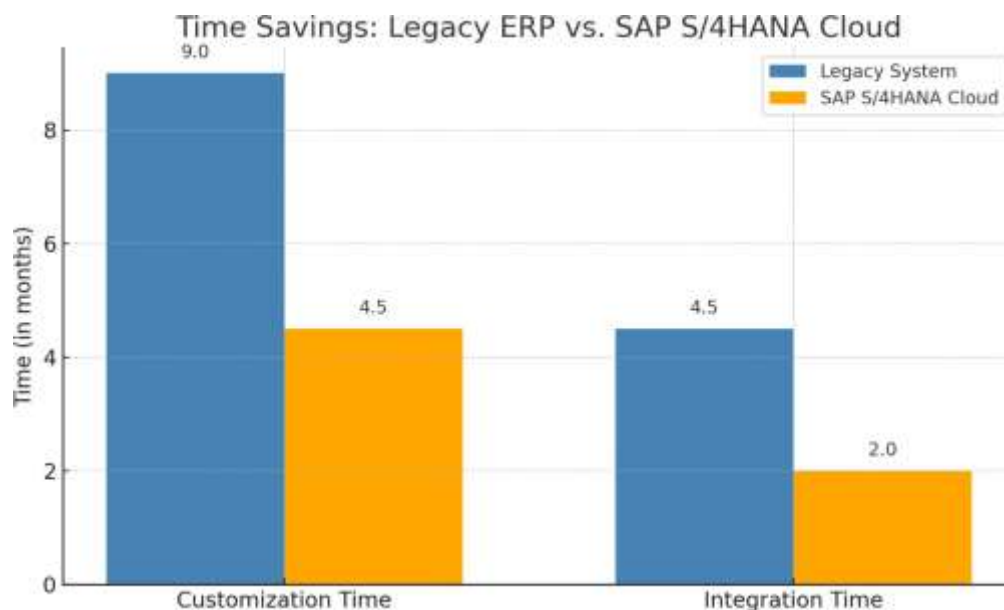
Tools Used in System Decommissioning

A range of technologies and platforms are employed to manage the process of retiring old systems. These tools help ensure secure shutdown, data transfer, and long-term information retention.

a. Data Management Solutions

● SAP Data Services: An ETL platform that supports moving data from outdated systems to new environments.

● S/4HANA Migration Cockpit: A built-in SAP tool that streamlines the transfer of data from legacy SAP solutions to S/4HANA, and assists in deactivating the old environment.

● SAP Near-Line Storage (NLS): Provides cost-effective storage for infrequently accessed historical data required for compliance or reference.

● Third-Party Archiving Tools (e.g., OpenText, DataKinetics): Used for securely archiving and disposing of data in non-SAP systems.

● Archival Platforms: Providers such as Iron Mountain and OpenText offer secure, long-term data storage services.

b. Decommissioning Process Management

● SAP Landscape Management (LaMa): Automates management of the entire system lifecycle, including the retirement of old systems, regardless of platform.

● Cloud Monitoring Platforms: Solutions like AWS CloudWatch, Azure Monitor, and Google Cloud Operations Suite verify that decommissioned cloud resources are fully terminated and secure.

● Configuration Management Databases (CMDB): Tools such as ServiceNow and BMC Helix help track assets and dependencies to prevent overlooked connections during system shutdown.

● Data Archiving Software: NetBackup, Veritas, and CommVault enable secure backup and
retrieval after a system's retirement.

c. Security and Compliance Tools

● Data Erasure Solutions: Programs such as Blancco and Certus permanently remove sensitive data, ensuring it cannot be recovered.

● Encryption & Tokenization: Tools like Vormetric and Thales protect data during transfer and while archived, especially for sensitive information.

Procedures for System Decommissioning:

a. Planning and Preparation

● Define Objectives and Scope: Identify which systems and datasets will be retired, migrated, archived, or destroyed.

● Data Assessment: Analyzing data to seggregate what should be moved, archived, or deleted.

● Stakeholder Engagement: Consult IT leads, business heads, legal, and compliance teams to ensure requirements and risks .

● Timeline Creation: Develop a schedule for backup, migration, shutdown, and archiving.

b. Data Migration and Retention

- Data Mapping and Transfer: Use migration tools to move essential data, ensuring nothing critical is left behind.
- Data Cleaning: Deletion of data exceeded retention period before migration or archiving.
- Archiving: Securely store data not required in the new system, using compliant archiving solutions.

c. System Decommissioning Execution

- Backups and Snapshots: Create full backups before starting the shutdown, as a precaution.
- Scheduled Shutdown: Systematically disable features and services, and then power down databases and applications.
- Sever Connections: All interfaces with other internal or external systems must be disconnected.
- User Access Controls: Block access for all users during and after the shutdown.
- Final Data Wipe: Use certified tools to irreversibly erase sensitive data from retired hardware.

d. Post-Decommissioning Actions

- Audit and Compliance: Confirm that the process meets all regulatory, business, and legal obligations. Ensure archives remain accessible if needed.
- Documentation: Thoroughly document each step taken during decommissioning, including migration, archiving, and data destruction, for audit and reference.

Retrieval from cloud systems

a. Cloud-Based retrieval Solutions

Organizations may require access to the data for compliance, reporting, or analysis after it has been archived from legacy systems. Therefore, it is imperative that the retrieval process from cloud storage be optimized and efficient.

Services for cloud archiving: Archiving services that are specifically designed for data retention are provided by major cloud providers:

- **Amazon S3 Glacier (AWS):** A cloud archive storage solution that is both long-term and cost-effective. The data retrieval duraton vaies according the option chosen while retrieving.
- **Azure Blob Storage (Archive Tier)**: A cost-effective storage solution for data that is rarely accessed, with retrieval options that are both inexpensive and sluggish.
- **Google's archiving solutions** for infrequently accessed data are Google Cloud Storage Nearline and Coldline.

Third-Party Solutions: Enterprise-level cloud archiving solutions are available from providers such as OpenText, Iron Mountain, and Veritas. These solutions include automated data classification, indexing, and secure retrieval.

b. Methods of Retrieval

- **Search and Query**: Majorly during cloud archiving users can locate specific files or data. This requires metadata-based mehodology, full-text indexing, and query runs (examples through Azure Search or AWS Athena).

Integration of SAP S/4HANA with SAP ILM (Information Lifecycle Management) can be used for direct retrieval.

- **REST APIs and SDKs**: Cloud providers such as AWS, Azure, and Google Cloud provide RESTful APIs for programmatical retreival

AWS S3 Glacier: Automate retrieval using AWS SDKs.

Google Cloud Storage: Retrieve archived data using the gsutil command-line tool or the Google Cloud SDK.

- **Manual Retrieval**: Minimal volume request through cloud console The retrieval process duration depends, contingent upon the pace of archive retrieval (e.g., AWS Glacier standard retrieval can take 3-5 hours).

c. Retrieval Considerations

- **Latency**: Generally in cloud archiving systems cost reductions and latency are inversely propotional.
- **Retrieval Cost**: The cost of retrieving data from cloud archives is frequently determined by the quantity of data and the pace of the retrieval process.Like ,in AWS Glacier and Azure Archive Blob the rates for efficient standard, and group retrieval are different .
- **Policies for Data Access**: Establish access policies and role-based access control (RBAC) to guarantee that archived data can only be retrieved by authorized users or applications. These policies should be firmly integrated with organizational access management systems, such as Azure Active Directory or IAM in AWS.

d. Archiving in SAP S/4HANA Cloud

- **The SAP Information Lifecycle Management (ILM)** utility is utilized by the SAP Cloud Platform to provide integrated archiving capabilities. ILM guarantees that data is automatically archived from legacy systems and

stored in secure, compliant cloud environments.

• **SAP Data Services or SAP Data Intelligence** can be used to migrate and archive data from SAP ECC (legacy) systems in the cloud.. This enables organizations to establish precise regulations for data retention and retrieval.

• **SAP ArchiveLink:** Enables the archiving and retrieval of business data and documents from the cloud-based document management system.

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