An Advanced Integration Solution to Migration of Legacy System to Standard Cloud Based Global Legal Instances

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Abstract. Data migration is the process of transferring data from one system or storage location to another. It is commonly performed when transitioning from legacy systems to new systems, upgrading software or hardware, consolidating databases, or merging organizations. Data migration to the cloud involves transferring data from on-premises systems or other cloud platforms to a cloud-based environment. Cloud migration offers numerous benefits, including scalability, cost-efficiency, flexibility, and improved accessibility. Data migration to the cloud brings several challenges that organizations should be aware of and address effectively. The proposed work gives an advanced integration solution for migrating data from legacy systems to standard cloud based global legal instances.

Keywords: Data migration, legacy systems, cloud migration, upgrading software, legal instances.

1. Introduction

Data migration [2] is the process of transferring data from one system or storage location to another. It is commonly performed when transitioning from legacy systems to new systems, upgrading software or hardware, consolidating databases, or merging organizations. Due to exponential growth of data, it could be considered to become denser or have a greater mass. The density of data refers to the amount of information that can be stored in a given space or storage medium. The accumulation of data density can have several consequences, both positive and negative. There are some potential effects of data density accumulation.

A. Increased Storage Capacity: Higher data density allows for increased storage capacity within a given physical space. This means that more data can be stored on a storage medium, such as a hard drive or solid-state drive, without the need for additional physical storage devices. This is beneficial as it enables organizations and individuals to store and manage larger volumes of data more efficiently.

B. Improved Efficiency and Cost-Effectiveness: Higher data density can lead to improved efficiency and cost-effectiveness in data storage. It enables organizations to optimize their storage infrastructure, reduce the physical footprint required for data storage, and potentially lower associated costs such as power consumption, cooling, and maintenance.

C. Enhanced Performance: With higher data density, more data can be accessed and processed in a given period, leading to potential improvements in data retrieval and processing times. This can result in faster access to information and improved overall system performance, particularly in applications that rely heavily on data retrieval or processing.

D. Complex Data Recovery: As data density accumulates and storage capacities increase, the complexity of data recovery in the event of failures or data loss also increases. With denser storage, there is a higher volume of data to recover, and the process may require more specialized techniques or technologies to retrieve the desired information. This underscores the importance of robust data backup and recovery strategies.

E. Higher Sensitivity to Errors: As data is packed more densely, any errors or corruption in a small portion of the storage medium can potentially affect a larger amount of data. The higher data density can make data more susceptible to errors caused by factors such as

physical damage, magnetic interference, or data degradation over time. Robust error detection and correction mechanisms are necessary to mitigate the risks associated with higher data density.

F. Data Security and Privacy Challenges: The accumulation of data density also brings challenges in data security and privacy. With more data stored in a smaller physical space, the potential impact of a data breach or unauthorized access can be more significant. Organizations must prioritize implementing robust security measures, including encryption, access controls, and monitoring, to protect sensitive data and mitigate the risks associated with higher data density.

It's important for organizations to carefully consider the implications of data density accumulation and ensure they have appropriate strategies and technologies in place to handle the increased complexities and challenges that come with it. Legacy systems refer to older computer systems, technologies, or software applications that are still in use within an organization. These systems have typically been in operation for a long time and may have become outdated or less compatible with modern technologies and standards. Legacy systems require modernization else they can expose to crashes any time and these no longer receive support and maintenance. Now a days most of the organizations prefer to reposition their information, applications and foundation to cloud computing. Cloud computing refers to the delivery of computing services, including servers, storage, databases, networking, software applications, and more, over the internet ("the cloud"). It enables users to access and utilize computing resources on-demand, without the need for extensive on-premises infrastructure or local hardware. The following are the key characteristics of cloud computing.

On-Demand Self-Service: Users can provision and configure computing resources, such as virtual machines or storage, as needed without requiring human intervention from the cloud service provider.

Broad Network Access: Cloud services are accessible over the internet via various devices, including laptops, smartphones, or tablets, enabling users to access applications and data from anywhere with an internet connection.

Resource Pooling: Cloud providers consolidate computing resources, such as processing power, storage, and memory, to serve multiple users simultaneously. The resources are dynamically allocated based on user demand to achieve optimal resource utilization and efficiency.

Rapid Elasticity: Cloud resources can be rapidly scaled up or down based on fluctuating workload demands. This elasticity allows users to adjust their resource consumption dynamically, ensuring efficient resource utilization and cost optimization.

Measured Service: Cloud usage is typically metered, allowing users to monitor and track resource consumption accurately. Pricing models are based on factors such as storage usage, data transfer, or compute hours, enabling organizations to pay for what they use

2. MIGRATION OF LEGACY SYSTEMS TO STANDARD GLOBAL LEGAL INSTANCES

Migration of legacy systems to standard global legal instances can be a complex task, but there are integration solutions available to help facilitate the process. Data migration to the cloud brings several challenges [3] that organizations should be aware of and address effectively. Some common challenges include

Data Transfer Speed and Bandwidth: Moving large volumes of data over the network can be time-consuming and may face limitations due to network bandwidth constraints. It can impact migration timelines and result in longer downtime during the transition.

Data Compatibility and Integration: Compatibility issues may arise when migrating data from on-premises systems to the cloud. Differences in data formats, storage structures, or database management systems can require data transformation or reconfiguration to ensure seamless integration into the cloud environment.

Data Security and Privacy: Data security is a significant concern during migration. Organizations must ensure the confidentiality, integrity, and protection of data during transit and storage. Adequate measures, such as encryption, access controls, and secure data transfer protocols, should be implemented to mitigate the risk of unauthorized access or data breaches.

Data Governance and Compliance: Compliance with regulatory requirements (e.g., GDPR, HIPAA) and industry-specific standards becomes crucial when migrating sensitive data to the cloud. Organizations need to understand the cloud provider's compliance certifications, data handling practices, and contractual obligations to ensure compliance throughout the migration process and after the data is in the cloud.

Application Compatibility and Dependencies: Applications that rely on specific hardware, software, or network configurations in the on-premises environment may face challenges when migrating to the cloud. Compatibility issues, such as dependency on legacy systems or outdated software versions, may require application refactoring or adjustments to ensure seamless functionality in the cloud.

Downtime and Business Disruption: Data migration often requires a certain amount of downtime or temporary suspension of services. Organizations need to carefully plan and schedule the migration process to minimize business disruption and ensure a smooth transition. Effective communication with stakeholders and users is essential to manage expectations and mitigate potential impacts on business operations.

Data Loss and Data Integrity: The risk of data loss or corruption during migration exists, especially during the data transfer process. It is crucial to implement robust data validation mechanisms, perform thorough testing, and maintain proper backups to ensure data integrity and minimize the risk of data loss.

Cost Management: Cloud migration introduces new cost structures, including storage, data transfer, and compute resources. Organizations must carefully plan and budget for the ongoing costs associated with cloud storage and data management to avoid unexpected expenses.

Vendor Lock-In: Moving data to a specific cloud provider may create dependency and potential vendor lock-in. Consideration should be given to data portability, interoperability, and the ability to switch providers, if necessary, in the future.

Organizational Readiness and Skills: Migrating data to the cloud requires a certain level of expertise and understanding of cloud technologies and best practices. Organizations may need to invest in training or seek external expertise to ensure a successful migration process and ongoing management in the cloud environment.

Addressing these challenges requires careful planning, thorough risk assessment, and proactive measures to mitigate potential issues. Engaging with experienced cloud migration specialists, conducting pilot migrations, and leveraging appropriate tools and technologies can significantly enhance the success of data migration to the cloud. It is important to note that the complexity of the integration solution may vary depending on the specific legacy systems, legal instances, and compliance requirements involved. Engaging with experienced integration specialists or consultants can greatly assist in the successful migration of legacy systems to standard global legal instances.

3. PROPOSED MODEL FOR MIGRATION OF LEGACY SYSTEMS TO STANDARD GLOBAL LEGAL INSTANCES

This work proposed an integration solution for migration of legacy system's account's data to standard Global Legal Instance where in the accounts will be mastered in conjunction with Enterprise customer master. Data from legacy systems will be migrated in 2 steps i.e.

A. One-time Migration

One-step migration typically refers to the process of migrating an application or system directly from one environment or platform to another without any intermediate steps or stages. It involves moving the entire application or system as a single unit, often with the goal of minimizing downtime and simplifying the migration process
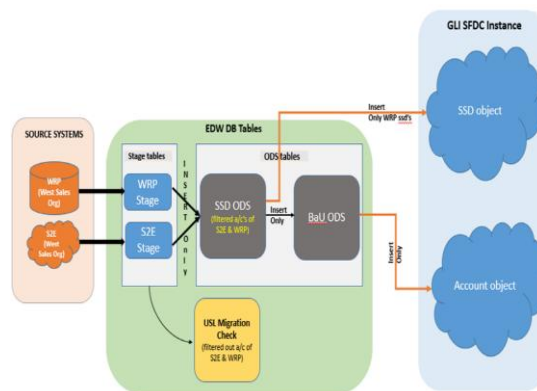

Figure 1 Data flow diagram of one-step migration.

The following steps need to follow while performing this one-step migration

Data identification in source system:

Data identification [4] is a crucial step in the migration process, as it involves identifying and understanding the data that needs to be migrated from the source system to the target environment. Here are the steps involved in data identification for migration:

1. Determine the scope: Define the scope of the migration project and identify the specific application or system that needs to be migrated. Clearly define the boundaries and components of the source system that will be included in the migration.

2. Analyze data dependencies: Identify the data dependencies within the source system. Understand how different data elements are related to each other and determine any dependencies that need to be maintained in the target environment.

3. Identify relevant data sources: Identify the data sources within the source system that need to be migrated. This includes databases, files, configurations, user profiles, or any other relevant data repositories.

4. Evaluate data quality: Assess the quality of the data in the source system. Determine if there are any data integrity issues, data duplication, or inconsistencies that need to be resolved before migrating the data.

5. Define data retention policies: Determine the data retention requirements for the migration. Identify any data that needs to be retained in the source system for compliance or archival purposes, and ensure that it is appropriately handled during the migration process.

6. Categorize data types: Categorize the data based on its type, sensitivity, and criticality. Identify different data categories such as customer data, transaction data, configuration data, or

any other relevant data types. This categorization helps in prioritizing and managing the data migration process effectively.

7.   Assess data volume and size: Determine the volume and size of the data that needs to be migrated. This information is important for capacity planning, resource allocation, and estimating the time required for the migration.

8.   Consider data transformation requirements: Evaluate whether any data transformations are required during the migration. Determine if the data needs to be converted into a different format, normalized, or cleansed before being migrated to the target environment.

9.   Data mapping and documentation: Map the data elements in the source system to their corresponding counterparts in the target environment. Document the mapping rules and transformations that need to be applied during the migration process.

10. Perform data profiling: Analyze the data in the source system to gain insights into its characteristics, distribution, and quality. Data profiling helps in identifying any data anomalies or issues that may require special attention during the migration.

By following these steps, you can effectively identify and understand the data that needs to be migrated from the source system, ensuring a smooth and successful migration process while maintaining data integrity and consistency in the target environment.

Data Migration Steps:

Follow the procedures below to migrate data from a source to an GLI cloud platform.

1.   Load all filtered data in stage by using load strategy.

2.   Extract the filtered data

3.   Create stage tables

4.   Transform and load data

5.   Load data into stage tables with the help of foreign key population

6.   Validate the loaded data with the help of exception handling [1]

It's important to note that the specific implementation steps may vary depending on the source and target systems, the data extraction and loading tools being used, and any specific requirements of the migration project

Conflict check:

While migrating data onto attributes few non-core attributes will also make into target object. For such columns conflict check should be done and if conflict found appropriate reason should be captured and reported in migration check table. Conflict checks play a crucial role in ensuring data integrity and consistency during a migration process. These checks help identify and resolve conflicts that may arise when migrating data from a source system to a target environment. Understand the different types of conflicts that may occur during the data migration process. Some common conflict scenarios include:

•   Primary key violations: When duplicate primary key values are encountered in the target environment.

•   Foreign key constraints: When referenced records are missing or do not exist in the target environment.

•   Data type mismatches: When data types in the source and target systems do not match, causing potential data truncation or conversion issues.

- Unique constraints: When uniqueness constraints are violated in the target environment.

- Business rule conflicts: When data values or combinations violate specific business rules or constraints defined in the target environment.

Post one-time migration:

After completing a one-time migration, there are several important post-migration activities to consider. These activities help ensure that the migrated application or system is functioning properly in the new environment and that any remaining tasks are addressed. Here are some key post-migration steps:

- Testing and validation

- Data integrity and validation

- Post migration support and monitoring

- Documentation and knowledge transfer

- Post migration clean-up

B. Business as Usual Process

The "Business as Usual" (BAU) process refers to the normal day-to-day operations and activities of a business or organization after a significant change or event, such as a migration. Once the migration is completed, the focus shifts to maintaining regular operations and ensuring smooth business continuity. Here are some key aspects of the BAU process.

1. Operations Management:

• Task Execution: Ensure that routine tasks and activities are executed as per standard operating procedures (SOPs) and established workflows.

- Resource Allocation: Manage and allocate resources effectively to support ongoing operations, including personnel, equipment, and budgetary resources.

- Incident Management: Implement a process for handling incidents, issues, or disruptions that may occur during normal operations. This includes timely identification, resolution, and communication of incidents to minimize their impact.

2. Performance Monitoring and Reporting:

- Performance Metrics: Establish key performance indicators (KPIs) and monitor them regularly to evaluate the performance of various business functions, systems, and processes.

- Monitoring Tools: Utilize monitoring tools and systems to track system performance, network health, application availability, and other critical parameters.

- Reporting: Generate regular reports and dashboards to provide insights into business performance, identify areas for improvement, and support decision-making processes.

3. Maintenance and Support:

- Application Maintenance: Conduct routine maintenance activities such as applying patches, updates, and bug fixes to ensure the continued functionality and security of applications.

- Technical Support: Provide technical support to address user inquiries, troubleshoot issues, and resolve problems that arise during regular operations.

•   Change Management: Implement a change management process to handle any necessary updates or modifications to systems, processes, or configurations while minimizing disruption to business operations.

4.   Continuous Improvement:

•   Process Optimization: Continuously review and refine operational processes to improve efficiency, effectiveness, and overall performance.

•   Feedback and Suggestions: Encourage feedback and suggestions from employees, customers, and stakeholders to identify opportunities for improvement and innovation.

•   Training and Development: Invest in ongoing training and development programs to enhance the skills and capabilities of employees and ensure they are equipped to perform their roles effectively.

5.   Business Continuity Planning:

•   Disaster Recovery: Maintain a robust disaster recovery plan to ensure that critical systems and data can be restored and business operations can resume in the event of an unexpected disruption or disaster.

•   Risk Management: Continuously assess and mitigate risks to business operations, including cybersecurity risks, regulatory compliance, and potential disruptions.

The BAU process aims to maintain stability, productivity, and profitability in the organization's day-to-day operations while adapting to changes and optimizing performance over time. It requires effective coordination, communication, and continuous monitoring to ensure smooth operations and deliver value to customers and stakeholders
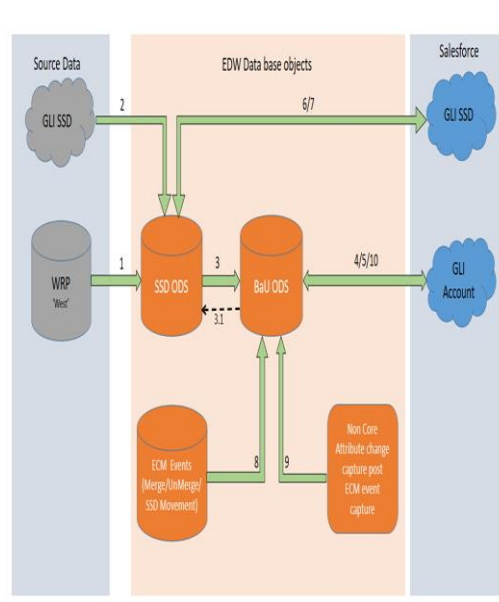

Figure 2 Business as Usual Process

4.   Conclusions

It is important to note that each migration project is unique, and the specific steps and considerations may vary depending on factors such as the complexity of the application or system, the source and target environments, and the migration strategy employed. Consulting with experts and utilizing relevant documentation and resources specific to the technologies involved can help ensure a smooth and successful one-step migration.

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