# Comprehensive Guide to Cloud Migration Strategy for Financial Systems

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**Abstract:**

The paper aims to describe some of the common pitfalls that can be easily avoided during migration from on premises to cloud. The paper is not specific to any cloud technology or cloud survive provider, rather it addresses the common mistakes made and how they can be easily avoided. A financial system is taken into consideration to explain this topic, however the problems described, and the strategy described is generic in nature for any domain that uses IT systems.

**Keywords:** DB: Database , RDBMS: Relational Database Management System , ETL: Extract, transform and Load

## Introduction

To adapt with the scale of growth, many organizations that are dependent on IT systems have upgraded their infrastructure by procuring servers with high processing power and memory along with the software to manage them.

This expansion has led to costly expenditure for maintenance and licensing of software and hardware. Often, the expansion of IT infrastructure has resulted in wasted expenditure as software and hardware tend to get outdated even by the time entire upgrade is complete.

Thus came the evolution of cloud technologies, where scale it limitless in theory. Practically someone else is doing the job of maintaining huge data center's that are flexible, efficient and can be leased by the month, week, day and at times lease by the hour.

The cloud infrastructure has made expanding IT organizations infrastructure capability more cost effective and their IT operations more efficient.

**The Problem:** Many organizations viewed cloud migration as a lift and shift strategy. Which is not the case in most of the scenarios and never for financial institutions.

Organizations failed to understand how managing their data and operations on could be costlier than keeping their data on-prem if the migration strategy is not well thought out.

Organizations often fail to understand the complexities involved at high level dependency at application level andlow-level dependency at DB object level. One needs to remember that Data is everything for any enterprise and DB migration planning and execution is probably the most critical one. Loss of data or data integrity for any organization is not negotiable.

**Solution:** Let us talk about why cloud migration is not a simple lift and shift strategy for financial systems and why dependency management is crucial for successful cloud migration.

**System Down Time:** No financial system can afford couple of days or even couple of hours of down time in the process of migration. We simply can't snap the DB, ETL, File processing systems and reconnect them over cloud infrastructure. Migration is a carefully planned sequence of events where traffic is routed to a new instance on cloud before decommissioning the legacy/on-prem system.

Organizations should consider developing parallel loaders and data replication mechanism onto the cloud infrastructure much before the actual cutover date. Having parallel loaders or similar mechanisms helps in switching the Application data source from on-premises to cloud with virtually no down time.

This approach also helps to fall back to on-premises system in the unlikely event of migration failures. Fall back to on-premises is not an ideal scenario. But having plan B is always required when an enterprise migrates completely to cloud.

**Application and Systems Dependency**
Many view financial system as a web portal or an App on the smart device. Financial systems have a slew of applications that perform specific operations and feed the customer facings application such as the banking portal.

Every system needs to be in sync with the upstream and downstream applications.

Financial systems perform a lot of market research to offer various products to its customers. A typical financial system can have (not limited to) following sub systems:

1. Data acquisition
2. Data Processing
3. File processing
4. Data distribution
5. Data security
6. Data Privacy
7. Data retention
8. ETL System
9. RDBMS
10. Data replication
11. Common data management
12. Shared data management
13. Market data research
14. End of Day operations / Batch processing
15. Start of Day operations / Batch processing
16. Payment network systems
17. Trading systems
18. Settlement system
19. Reporting and reconciliation
20. Financial Literature generation

All the financial sub-systems have a defined set of data flow with various dependencies on each other and with hundreds of scheduled events and jobs. So, it is of great importance to identify the data flow, event flow to define a migration plan that can connect the systems with the right workflow to avoid any applications integration and dependency problems.

**DB Object Dependency**

While application dependency is crucial for defining cloud migration plan, the database systems have unique dependencies of their own .It is important to identify every DB object and its dependencies. During database migration planning, we should be asking questions like:

- How many DB views are present and their dependency on Store Procedures?
- How many reports modules are using the DB views?
- How many triggers are on the DB and what is the impact of disabling them for migration activities?
- What happens to the data replication process during migration?
- What Is the order in which tables needs to be recreated on cloud platform?
- What is the time taken to populate all the data?
- How much of data needs to be on cloud?
- What are the data constraints and referential integrity keys on the database tables?

In essence, DB migration to cloud in itself require identifying all the DB objects, list them, identify dependencies and the order of recreating objects, enabling and disabling triggers such that the data flow is not impacted, and data relations and integrity is not lost.

Creating a checklist of all the objects, analyzing their dependencies on other objects, analyzing dependent processes and brainstorming the whole migration

activity with the development, DBA and Support teams is required for a successful migration plan.

A successful DB migration plan can take multiple iterations before being finalized for execution on non-prod environment before implementing on production environment.

**Data Volume for Migration:** Migration of data to cloud not only involves recreating data bases and copy of data. One for the key aspects for data migration is identifying the amount of data that needs to be migrated. Data needs to be segregated as operational data, transactional data and historical data.

Different strategies need to be adopted based on types of data. Historical data need not be in the same schema as the transactional data. In fact, historical data can be migrated to less costly data management systems that are in-frequently accesses.

Transactional data needs to be on the most efficient RDMS system that is replicated across geographies and zones.

Almost all the database management tools such as TOAD for Oracle offer a pictorial view of object dependencies, also called object browser. These tools offer a great view of object dependencies which can be further analyzed to create a migration plan.

Here is an example of how a Table, View and Trigger is displayed in any standard object browser.
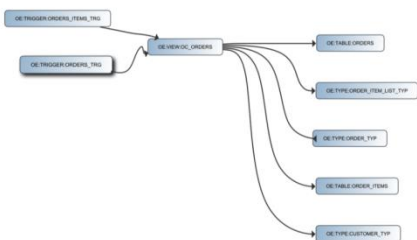
cloud is not having a strategy that clearly identifies the dependencies. With careful analysis of all the dependent systems and by understanding the data flow, it is possible to implement a successful migration strategy.

Cloud Migration is an art of collective collaboration and analysis across cross-functional teams. No single person in the organization knows all the touch points in the system. Hence, dependency analysis and a strategy with fall back option that is fully tested is the only way to achieve 100% success in actual implementation.

## References

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*Fig 1.0 [2]*

## Conclusion

There are numerous tools and technologies for migration to cloud, the most significant reason for failure or over budgeting [1] of migration activities to