

Designing a Seamless **Migration Strategy**

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The Importance of Migration

As customer experience and quality of services take center stage, digital transformation is on the cards for most industries, especially telecom. Operators today are firmly focused on innovating to bring advanced and differentiated services to the market. And as they modernize their legacy core and IT systems to an advanced next-gen enterprise platform, migration plays a key role in enabling a seamless transition.

Migrations are typically complex projects with many pitfalls that can be disastrous if not properly planned and executed. A robust migration strategy to transfer data and all business information from the legacy platform is highly critical for CSPs to ensure their transformation project meets all desired business needs such as security, scalability, flexibility, availability, and affordability. Several challenges must be considered while designing the strategy:

Data transfer

High volumes of data need to be migrated from a legacy application or database to the new one within a short cutover window, which increases the chances of data loss.

Vendor expertise

Large-scale data migration often involves a high risk of failure. It is essential to work with vendors with vast experience in performing such complex activities.

Entity mapping

Applications have varied business processes, terminologies, and data models. Mapping new ones with the legacy ones is complicated, and often resulting in complex, inconsistent, and user-hostile results.

Data protection

Migration of sensitive information such as passwords, subscriber data, voucher serial numbers, and more needs stringent data protection measures, the absence of which may result in frauds and impacting the credibility of the operator.

Data cleansing

Transferring only relevant and logical data from legacy to the new system needs a flawless data-cleansing action plan, preventing data loss and irrelevant and inconsistent data from being migrated to a new platform.



Short cutover windows

Data migration activities performed in multiple phases include extensive testing before the final cutover. The short cutover window is usually a few hours, which only experienced vendors can execute to have the system up and running on time.

Service impact possibility

Real-time application migration, if handled incorrectly, can directly impact service uptime as well as revenues. Robust and well-thought-out migration activities help avoid system downtime.

Rollback/fallback plan

Complex and extensive orchestration increases the possibility of mishaps during migration. An impeccable ready-to-execute rollback/fallback strategy ensures that network services run on the legacy platform in the event of migration failure. A robust rollback testing process plays an important role while testing data migration to prepare CSPs for the worst-case scenario.

Types of Migration

Storage Migration	Application Migration
Process of transferring data from one storage medium to another, such as from physical servers to the cloud.	Process of migrating an application or platform to an application procured from a new vendor.
Database Migration	Business Process Migration
Process of transporting data from a legacy database to a new one. This is the most sensitive type of migration as it holds subscriber- and service-related data.	Process of transferring the complete and complex business process (application, database, customers, services, and more) to a new advanced system.

Migration Approaches

Big Bang

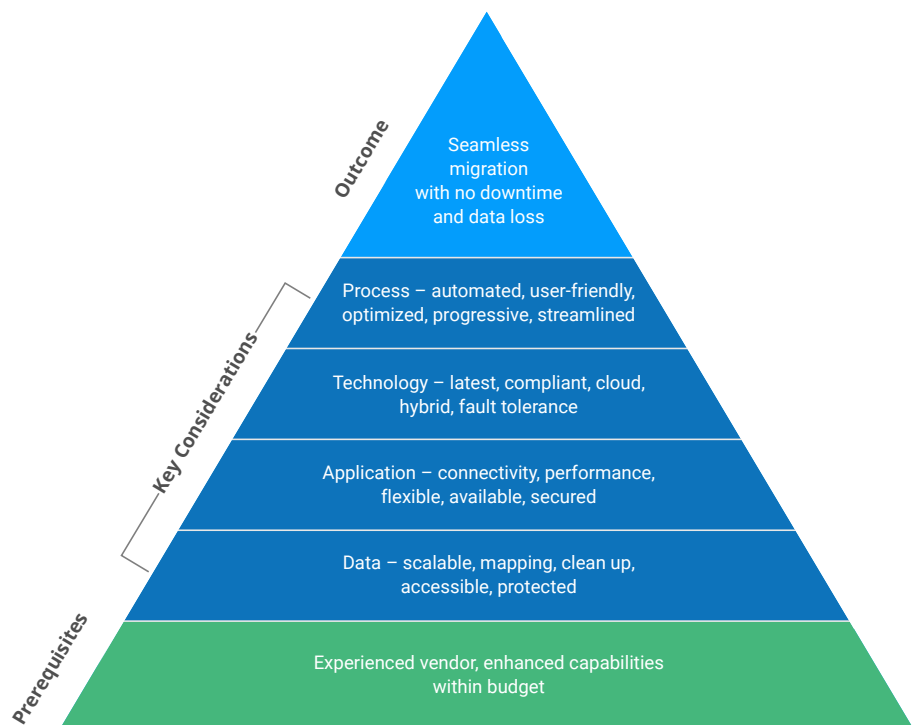
All the systems and services are migrated in a single cutover window. The entire process requires relatively less time to complete.

Phase-Wise

The systems, services and/or users are migrated in phases to mitigate complexities, downtime, and other risk factors, where the legacy and new systems coexist for a period of time. Such an approach will include:

- Mapping of migration entities, including business configuration, plan mapping, and feature list mapping
- Protection of customer data
- Review of custom as well as deprecated features in the new version
- Data clean-up, as requested
- Mandatory dry runs for both systems, live and receiving feeds, for multiple benefits such as identifying missing attributes, gaps, revenue leakages, and more.

Key Considerations



Factors to consider while migrating from legacy

Five Essential Steps for Success

Migration is a significant business decision that involves meticulous planning and strategic management. A foolproof plan prevents downtime, data loss, and compatibility issues, which may eat into the CSP's revenue and impact their reputation in the market. However large or small, it is wise for vendors and CSPs to claim joint ownership of each activity and decision. Here are the most important steps for a successful, seamless, and flawless migration:

I. Plan and Assess

The first step is to itemize the project requirements, freeze scope of work, plan resources needed, set a realistic budget, and assess the legacy and planned systems for a clear understanding of the expected outcome. A strategic approach – focused on security, accessibility, and performance of the new system – is essential to correctly gauge the impact of the migration.

II. Data Cleansing and Evaluation

At this stage, identification of ROT (redundant, obsolete, and trivial) helps zero in on the relevant and logical data that needs to be transferred to the new system. Called data cleansing, this process helps CSPs precisely identify information that is adequate, optimized, and usable from a business perspective. Any unwanted, stale, and useless data is discarded. For instance, during a BSS migration, the product catalog in the legacy system needs to be cleansed as CSPs may have accumulated numerous products or business plans that are no longer in use. Data cleansing or data cleaning activities filter out such data and ensure only consistent, relevant, and validated data is migrated to the new system. For this, both the CSP and vendor need to closely monitor the process to ensure there is no data loss and resolve any issues that may emerge.

III. Entity Mapping

Next, the legacy cleansed data is mapped to the new data model to ensure a successful outcome. Entity mapping helps map legacy data with the new system to ensure compatibility between applications, repositories, configurations, back-end scripts, and more. This exercise also helps determine how long the migration will take in the production environment.

IV. Test Migration

After PoC and an initial test migration, different ETL-compliant (extract/transform/load) best practices are performed to resolve all errors, exceptions, and problems to eradicate any possible hindrances during the final migration.



V. Production Migration

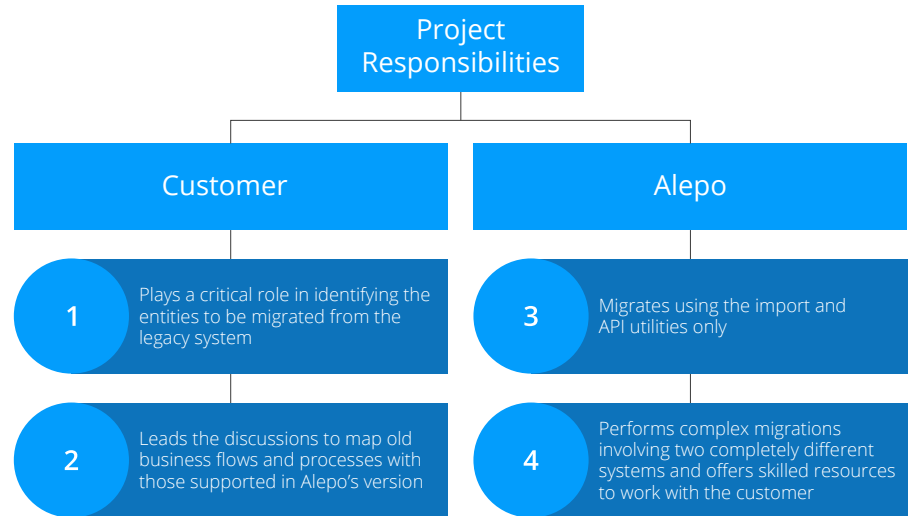
The final phase of the process, production migration, factors in all the information gathered from the first four phases to help devise the migration strategy, including how long the migration will take, what network resources it will require, any foreseeable challenges and contingencies to overcome them. Once this strategy is approved, the data is migrated.

Best Practices for Successful Migration

- 1 Create a well-documented plan that captures every single assessment, audited and validated by the business users.
- 2 Plan and freeze on a strategy down to the lowest level of detail.
- 3 Never modify the source database.
- 4 Back up the data before execution as a contingency in case of any migration failures.
- 5 Keep stakeholders (internal and external) informed of all planned activities.
- 6 Draft general migration-related guidelines and communicate them to the stakeholders.
- 7 Implement migration on staging first to avoid service outages in the production environment.
- 8 Test, test, test.



Migrating to the Alepo Platform



Alepo's Migration Process

Alepo has over 15 years of expertise in transforming telecommunication businesses. With multiple processes and tools in place to carry out seamless migrations and several success stories, it is globally trusted by industry-leading CSPs, including Saudi Telecom, Orange, Zain, Tata Tele Business Services, NTA Marshall Islands, ACT Fibernet, and more.

Designed for a smooth transition to the new system, Alepo's migration strategy ensures:

- No loss of business features or critical functionality.
- Reduced cutover time.
- Reduced risk by using efficient methods that have been perfected over time.
- Migration of only relevant data for improved optimization and usability.
- Offsite and onsite dry runs.
- A contingency plan that accounts for all possible risks.
- Extensive documentation detailing each step of the migration and training of stakeholders.

The stage-wise highlights of the migration and/or upgrade and key milestones to be accomplished in each stage include:



Migration Stage	Description
Migration requirements capture	Defining migration scope and details of the AS-IS model and objects to be captured
Migration design	Prepared by capturing every single detail
Migration approach	<p>Prepared considering the following aspects:</p> <ul style="list-style-type: none"> ● Seed data generation and business entities configuration ● Importing active entities ● Migration dry run ● Migration verification ● Pre-migration activities such as importing history data ● Actual migration
Migration development	<ul style="list-style-type: none"> ● Any specific scripts and development to be done ● Business plan configuration, templates for configuration of plans and packages, vouchers development, external system configurations, scripts for importing and exporting data
Migration verification	<ul style="list-style-type: none"> ● Verification through various methods ● Sanity checks, troubleshooting ● Ready contingency plan
Actual migration	<p>Once dry run verification is successful, then the operator and Alepo mutually decide the migration date and perform pre-production activity on the production server. The operator executes migration verification UAT after the migration and makes the system available in production.</p>

Success Stories

Alepo has a rich history of zero-impact migrations completed with zero downtime and without affecting existing services. A few examples of recent successes include:

Customer	Subscribers	Key Challenges	Highlights
STC, Saudi Arabia	4,000K	<ul style="list-style-type: none"> ● Large volumes of data migrated ● Tier 1 vendor with streamlined processes 	<ul style="list-style-type: none"> ● Phased approach ● Seamless migration with zero downtime ● Improved business processes and call flows alongside data migration, reducing noise by 10x and increased network performance and robustness significantly
Muni, Equatorial Guinea	400K	<ul style="list-style-type: none"> ● An expanse of integration in a multi-vendor ecosystem ● Included a host of services and systems 	<ul style="list-style-type: none"> ● Phased approach ● Contingency plan prepared for every phase ● Newer access technology 3G was launched after migrating to Alepo systems
ACT Fibernet, India	400K	<ul style="list-style-type: none"> ● API migration using API GW ● Resistance for change in the existing peripheral systems 	<ul style="list-style-type: none"> ● Migration provided stability and confidence to expand aggressively in new cities ● Within six months, the number of licenses increased by 25%
Tier 1 CSP, UAE	1,200K	<ul style="list-style-type: none"> ● Large volumes of data migrated ● New deployment (NFVi) process alongside data migration 	<ul style="list-style-type: none"> ● Phased approach ● Seamless migration to NFVi ● Migrated to a more advanced and scalable solution

<p>Tier 1 CSP, Cameroon</p>	<p>8,000K</p>	<ul style="list-style-type: none"> ● A large volume of data migrated ● Lack of support to understand the legacy platform 	<ul style="list-style-type: none"> ● Phased migration to minimize the downtime and service impact ● Scalable to support a high subscriber base ● Seamless migration without service interruption
<p>NTA, Marshall Islands</p>	<p>50K</p>	<ul style="list-style-type: none"> ● Difficult to change the existing peripheral systems ● Full convergence of multiple services including wireline and wireless 	<ul style="list-style-type: none"> ● Phased approach ● Migration helped NTA move towards 4G ● Ensured no revenue leakage post-migration



A Closer Look at the STC Migration Project

Client

Saudi Telecom Company

Project Background

Alepo first helped enhance STC's legacy DSL core infrastructure, successfully delivering a comprehensive solution including a performance-driven AAA and policy framework and expert professional services. Pleased with the outcome, STC once again recruited Alepo for a complete upgrade of its AAA, PCRF, and Digital BSS. The project included complex migration from a monolithic platform to a modern, modular, microservice-based architecture. The new platform was delivered with zero defect, no downtime, and an overnight migration.

Migration Challenges

In the first project, Alepo was required to migrate and clean all data without any downtime and disturbances, a complex task as it involved multiple departments and stakeholders. In the second project, the migration was more complicated because over five years, several small customizations had been made to the platform on STC's request. Retaining these changes meant more integration with other systems and more interdepartmental dependencies. Alepo had to ensure clean migration with exact feature parity and no data loss, downtime, or disturbances.

Alepo's Migration Plan

The previous AAA had a benchmarked TPS of 2000, which was to be maintained and handled post-upgrade. Plus, the two-level authentication for DSL users (L1: CLID and L2: UserID) had to be changed to three-level after the migration (L1: PortID, L2: CLID and L3: UserID), without downgrading performance. Here's how Alepo planned and executed the migration.

Pre-migration preparation tasks

- To do the upgrade in-place as requested by STC, Alepo provided two temporary AAA servers in addition to the six already in production, in the same IP pool of production (say AAA7 and AAA8).
- Alepo installed 10.x version of modules on these new servers and conducted multiple stress tests with two-level authentication (as in production scenario) using internal simulators.
- A production DB dump was taken from the existing AAA DB and uploaded to the two new AAA servers, then conducted a short traffic dry run by diverting live traffic from BRAS.
- AAA servers were cleared for production after successful Upon dry run. Simulation statistics indicated the new AAA would be able to handle far greater capacity than estimated.
- As in-place upgrade required all the production servers, all six AAA servers were installed with the new application version with utmost care not to affect any existing services. This was done by creating a new Unix user that could not hamper any existing files due to limited permissions, and the new version was installed in a separate directory to avoid any overwriting.
- All the existing AAA servers were ready for traffic on the new version from the network with the possibility of rolling back to the old version any time without any impact.

6

Total AAA instances

200+

Total BRAS/BNG in the network

4 million+

Subscribers in Alepo database

1.2-2 million

Average subscribers online during off-peak to peak time

2000

AAA TPS in Project 1

6000

(on same hardware)
AAA TPS in Project 2

32

Total provisioning APIs exposed by Alepo towards external CRM

760K

Average API invocations on a business day

1000+

Avg number of customer care agents logged in to Alepo portal

6

Total outages in 8+ years (includes external system failures)

Average API response time

<1 second for 99.9% invocations

BNG vendors: Huawei, Cisco, Juniper

In-migration window

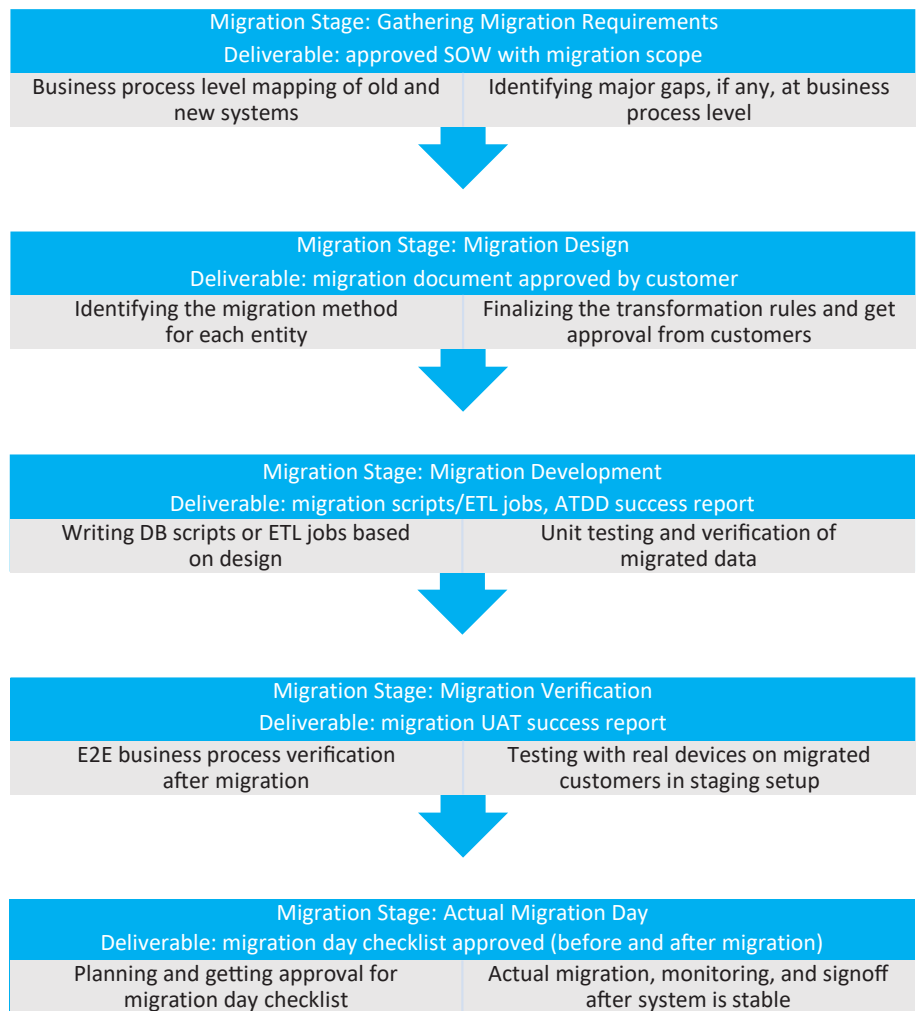
- The AAA servers were up and running with 1.2 million online (connected) users of the total four million subscribers in the database.
- Data was migrated using optimized ETL jobs and scripts from old schema to new schema format. Since the new version had distributed architecture, data from old schema had to be populated in multiple schemas on the new version.
- Data such as inactive customers profiles, old accounting logs, and more was migrated the day before to save time in the cut-over window.
- All new application folders were configured to point to use new version DB schema with migrated customer data.
- Once data was migrated successfully, all AAA services on old version were stopped one by one to prevent service impact and restarted on new version with the same IP and radius ports 1812/1813).
- On the network/BRAS/BNG side, no changes or restarts were performed. All users who tried to connect to AAA landed on the new application version.
- This approach leveraged on the fact that the session timeout was set as five days on the group/user's policy in AAA. Also, there was no interim authentication required at STC due unlimited plans. So all users who might have been authenticated by old version five days before the cutover into new version would automatically start reconnecting through BRAS and being authenticated by new AAA.
- As the IP and port remained the same, end users did not face any issues.
- After almost five days after cutover, all 1.2 million online users were on new Alepo platform.

Post-migration window

- No action was required for users as services were not impacted and users were automatically connecting to new version.
- All the CDRs generated from the time of the last history migration till the cutover time on the old AAA DB gradually had to be migrated into the accounting log table – a challenging task as there was over six months of history, with the existing AAA continuously writing and many API/GUI operations reading on this table. Alepo and STC cleanly and completely concluded this delta migration without any loss of records.

How We Did It

Alepo has a robust process in place to ensure seamless migrations. Here's a step-by-step breakdown of how we perform the migration:



“

Of all the vendors we evaluated, Alepo showed the greatest commitment and in-depth understanding of STC's requirements and needs. Thanks to Alepo's complete solution and professional services, STC has a faster, more powerful network today.

- Turki Mohammed Al-Badri
Billing Section Manager, STC

Migration Results

Alepo outperformed its committed performance benchmarks with a 3x increase. To date, services have remained uninterrupted and Alepo's continues to be the most stable system employed by STC.

Overall, Alepo's solution accelerated CRM performance, enhanced network capacity, and increased operational efficiency. It offers a continual low total cost of ownership (TCO) and investment protection, even as STC's network grows and business requirements evolve. It is backed by ongoing 24x7x365 remote support.

About Alepo

Alepo makes next-generation data opportunities a reality, creating advanced software solutions and services that enable global communications service providers to accelerate revenue growth, market share, and business success on fixed and mobile broadband networks. For over a decade, Alepo has been the go-to technology partner for all things data at leading service providers.

Established in 2004, Alepo is a mature technology solutions provider based in Austin, Texas, with a presence in all regions of the world.

For more information, please visit www.alepo.com

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