Data Migration and Its Impact on Provisioning Operations

Are system upgrades placing your operations at risk?

A well-planned data migration effort can enable increased efficiency in provisioning operations. Proper planning for a data migration ensures that the benefits of integrated operations can be fully realized.

This white paper addresses:

- The different types of data migration
- Factors that influence the scope of a data migration
- Impact on operations
- Functions that need to be covered in a data migration project

Lucent Technologies
Bell Labs Innovations



Abstract

Data migration in relationship to Operations Support Systems (OSS) can mean many different things. One thing that is certain, any system that is needed to support provisioning operations needs to have good data. When data is moved into systems, there is a risk that operations will fail, but a well-planned and executed transfer of data can ensure that the systems involved can use the data to properly perform provisioning functions. This paper explores what data migration is, why it is important to service provisioning operations, how to plan and implement, and most importantly, opportunities to streamline your operations. Data is a key element to successful flow-through provisioning operations… so don't blame the systems if the data you feed them is not fully digested.

Introduction

Operations Support Systems (OSS) don't exist without data. Getting the data into a new system or moving it from one system release to another can involve data migration. Supporting an integrated solution that requires data to be synchronized across multiple systems takes data migration to another level of complexity. How data are introduced into new systems or moved from existing systems needs to be a well planned and executed project in order to maintain data integrity. Ultimately, the efficiency of your operations will depend on how well data migration is accomplished. This paper discusses some different types of data migration and how it impacts provisioning operations.

OSS Data Migration can include:

- *Initial Data Load*
- *Data Synchronization*
- *Data Conversion*

Defining Data Migration

In the context of an OSS, data migration can be one of the following:

- The initial load of data into an OSS. The source and format of data needed to populate the OSS database can vary considerably depending on the type of network and the maturity of the service provider. The integrity of the data in the initial load is critical. These data may be propagated to other OSS in the future as an integrated solution evolves. The more this process is automated, the better the chances are of maintaining data integrity.
- The synchronization of data across several OSSs. This type of data migration is required when an integrated solution is implemented to support flow-through provisioning. All OSS and Element Management Systems need to have the same view of the network as represented in their databases.
- The conversion of data within an OSS. Data conversion within an OSS may be required as a product introduces new features and database schemas change. Often this process is handled within the context of a product upgrade, but if new source data are introduced to support new features, data migration may be required. This process needs to be as transparent as possible to current operations.

All these migration situations have their own challenges. The factors that affect the scope of a data migration depend on the state of the network and the size of a service provider. A network can be an established entity, a merged set of assets, or a new enterprise deploying infrastructure equipment.

The size of a carrier can be defined using the type or number of services offered, the number of subscribers, and the geographic coverage of the network. The more services, subscribers, and locations, the more complex the data tends to be; therefore, a migration of data tends to be more complex. For initial network builds or small carriers, there is often pressure to get services provisioned as soon as possible to bring in revenue. In this case, operations start before the systems are in place and data are often transferred manually using paper records or spreadsheets. Keeping inventory data in synch with the network, as it is being built or expanded, is a challenge. In these types of operations, you may have to deal with inexperienced staff, lack of standards, and phased deployments.

For existing networks or large carriers there are others factors to deal with. Data that may need to be migrated reside in production systems and the integrity must be maintained. Test runs of a migration are required to validate the process and ensure that the migration can take place within a fixed window of downtime. The volume of data and diverse legacy systems involved with a large carrier can add to the complexity of a data migration.

Why Careful Data Migration Is Critical

Data play a key role in providing operational efficiency with regard to automated provisioning. There are two main aspects that need to be considered:

- Data integrity
- Data flow

Data integrity ensures that data entered into an operations system are in the proper format to support operations with upstream or downstream systems. When naming conventions and standards are not adopted early on in a deployment, there is usually more rework required when flow-through operations are later implemented. Another aspect of data integrity involves keeping OSS databases in sync with the network elements. This is usually an issue when an OSS and an Element Management System are operating independently. Data integrity issues can often be addressed within the data migration process by using scripts to make adjustments in data formats.

"Data integrity involves ensuring that data entered into an operations system is in the proper format to support operations with upstream or downstream systems."

Data flow is important in supporting provisioning operations and business objectives, i.e., it is critical that the data flow properly through operations systems and ultimately to network elements connecting the service facilities. Data must also flow from the network to the OSS databases to keep changes to network elements in synch with the provisioning systems. In addition, current data need to be available to personnel supporting business processes, such as knowing the available network capacity allows services to be sold and provisioned more quickly. When data migration is needed to implement a flow-through solution, it often involves moving large chunks of data that would have flowed automatically if the systems were inter-connected. This also means that any future provisioning operations on existing circuits, e.g., change orders, assumes that the data will now flow through. Data migration can emulate the flow of data that will be required for flow-through operations. It can verify system interfaces are configured and operating properly.

"Data migration can emulate the flow of data that will be required for flow-through operations. It can verify system interfaces are configured and operating properly."

Organizing for Smooth Data Migration

When a complex integrated product solution is deployed, data integrity is critical from start. There are usually several sources of data that need to be migrated into newly deployed operations systems. Data can be in the form of paper records, spreadsheets, or relational databases. The source of the data can be office records, network element dumps, or legacy operations systems.

The task of migrating the data can be more difficult given the diverse operating environments that result from mergers within the service provider industry. Merging data from several sources into a common format requires that naming conventions are standardized and formats of both the data source and destination database are well understood.

When operations systems are phased into production, there are additional complexities that need to be dealt with. Even though data may be loaded into individual systems correctly, once they are put into production independently, data will most likely be out of synch between systems. This can result from manual provisioning where human intervention is required on multiple operations systems. Therefore, before an automated flow-through provisioning solution can be fully deployed, there needs to be a data synchronization effort.

"Before an automated flow-through provisioning solution can be fully deployed, there needs to be a data synchronization effort."

The data synchronization aspect of data migration can be a difficult task when dealing with systems that are in production and trying to synchronize a moving target. The synchronization effort often requires the use of relational database scripts to make bulk changes to a production database.

When an automated flow-through provisioning solution is in full production the data integrity should be controlled by the interconnected systems. Given a relatively static environment, the data would stay in good shape. In reality, service providers will continuously change requirements introducing new services, network elements, and operations systems as well as extending the use of data from provisioning to asset management or other business support systems. This requires additional data migration or synchronization and possibly new interfaces between systems.

Data Migration Program Elements

The key to keeping high data integrity through data migration is to ensure that the following functions are covered:

- Project Management – Prior to an actual data migration, diligent tracking of work items that may be required to scrub the data is necessary. This is particularly important when migrating from stand-alone systems to an integrated environment. Making changes across several independent systems needs to be a coordinated process, as source data need to be in the best possible condition to ensure smooth data migration.
- Relational Database Development – Relational database scripts can be used to both identify data inconsistencies and to make bulk changes required prior to migration. A team of programmers needs to be able to analyze data and respond with scripts required to modify the data. Scripts are also used to unload and load data from various systems.

- Operations Engineering – Knowledge of how the customer's operations and the OSS work together in an integrated solution is needed to ensure that the resulting data will support the provisioning process. There also needs to be base-lined requirements for the services that will be supported with the solution.

Opportunities for Improvement

Given that the operational environment of most service providers is very dynamic, adjusting to new technologies and market conditions, there are ample opportunities for OSS data to become out of synch with the network or other OSSs. Many of the methodologies and tools used in data migration can be applied in a maintenance program. Scripts used to analyze data can be employed as systematic audits. Using production database snapshots would allow an analysis to be done off-line without impacting operations. This would allow data inconsistencies to be identified in a pro-active manner and avoid real-time fall-out in a provisioning operation. Tight project management post-migration would also ensure that any exceptions identified during a migration are resolved and not propagated to the next system upgrade.

"Un-leash the power of your Operations Support Systems by feeding them the correct diet of data."

Summary

In summary, a data migration effort can be a difficult task, but with the proper planning and resources, the results can enable increased efficiency in provisioning operations. The impact of a poor data migration can be far reaching. When you factor in the effect of provisioning times used with manual operations or the number of customers that can be affected by a high order facility, you want your data to be as clean as possible. The data integrity and the proper flow of data are critical to an automated flow-through solution; a smooth migration of data will enable a service provider to quickly realize the benefits of an integrated solution.

Let your Operations Support Systems perform to their full potential by giving them the right data to do the job.

About Lucent Worldwide Services

Lucent Worldwide Services (LWS) is the industry's leading network services organization with more than 20,000 consultants, network designers, engineers, installers, and technicians located in offices around the world. LWS offers a complete range of professional, deployment, operations, and maintenance services to help maximize your network value. These services support the entire network lifecycle - from initial consultation to network design and optimization, engineering and installation, program management, network monitoring, and ongoing technical support.

No other services organization in the world can offer you a higher level of support to successfully design, deploy, and integrate multivendor and multitechnology networks. From high-bandwidth core optical and multiservice data networks to metropolitan and broadband access networks, LWS combines an extensive portfolio of network solutions with advanced network diagnostic and response tools developed by the world-renowned research and development teams at Bell Labs. LWS can help you achieve rapid deployment of network infrastructures, reduce time to revenue, and gain a clear, competitive advantage.

About the Author

Bob Cardone, Technical Manager, Lucent Worldwide Services

Bob Cardone has over 17 years of experience with Operations Support Systems at AT&T and Lucent Technologies. He has worked with a variety of systems that include special services test automation and provisioning systems for both wire-line and wire-less applications. Currently, Mr. Cardone is a technical manager at Lucent Worldwide Services providing Software Integration Services for Service Providers with U.S. and international deployments.

To learn more about our comprehensive portfolio of Data Migration Services, please contact your Lucent Technologies Sales Representative or visit our web site at www.lucent.com.

This document is for planning purposes only, and is not intended to modify or supplement any Lucent Technologies specifications or warranties relating to these products or services. The publication of information in this document does not imply freedom from patent or other protective rights of Lucent Technologies or others.

Copyright © 2002
Lucent Technologies Inc.

All rights reserved

LWS WP v.1 0602

Lucent Technologies
Bell Labs Innovations

