Ascend

TECHNICAL OVERVIEW

NavisXtend Application: Provisioning Server Automates Network Configuration to Drive Down Operational Costs

Service providers save money and increase productivity with NavisXtend Provisioning Server



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1. Introduction

Network management and control represent approximately 70% of a service provider's yearly operations budget. In addition, service providers are facing a shortage of experienced people to run and maintain the networks. Network management solutions, such as Ascend's Navis™ family of network management products, can help reduce the operational costs and increase operator productivity to bring higher profits to the service provider bottom line.

The NavisXtend™ Provisioning Server application helps lower operational costs by allowing the service provider to automate the network configuration process. This application can streamline operational procedures for initial and on-going configuration of ports and circuits. This streamlining results in significant operational savings, reduced order backlog, and increased operator productivity.

In addition, the NavisXtend Provisioning Server also allows the service provider to deploy new services such as a time of day-based configuration service and a dynamic configuration service.

This document details some of the significant savings Ascend service provider customers have realized from the deployment of the NavisXtend Provisioning Server application into their network operations. One service provider estimated a 500% increase in productivity through the elimination of redundant provisioning tasks. Another service provider estimated an initial $400,000 (US) savings through the integration of Provisioning Server into their existing order entry system.

2. The Problems of Today's Configuration Environment

Today's Telecom environment is incredibly competitive. Service providers, including IXCs, PTTs, ILECs, CLECs, CAPs, ISPs and OLOs, are all striving to deliver differentiated services to their end user customers faster and more cost-effectively.

To drive down the significant operational costs and pass some of the cost-efficiencies on to the end-user customers, service providers are automating and streamlining the interfaces between internal systems in an effort to re-engineer internal operational processes. For example, a major European service provider found that provisioning a 2 Mb private circuit took an average of 60 days, yet the amount of measurable "real work" took only 12 hours on average. The balance of the calendar time was consumed by handoffs from one department to the next, one system to the next. The use of task automation and interfaces to existing OSS allowed them to streamline the provisioning process.

End-to-end automation is one of the key critical success factors in driving down operational costs. In many service provider networks, service configuration is performed by many people, each using separate systems to advance an order from the order entry center to the circuit and number assignment center, to the plant assignment center, to the frame, and then to the switch. On the average as many as 10% of all simple orders encountered at least one error along the way, and at least five people "touch" the order before the configuration is complete. This complexity when configuring equates to time lost and errors made. The provisioning process can be automated, generating immense savings in network operations.

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3. Configuration Automation Streamlines the Process

Rather than rely on older processes that involve paper and manual processing, service providers can save thousands of operational dollars by automating provisioning tasks.

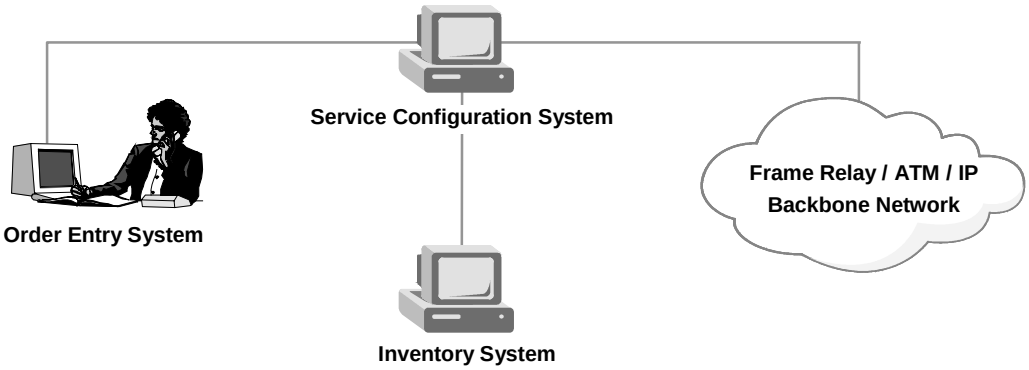


Figure 1 – An Example of an Automated Network Provisioning System

Upon receiving an order to establish a service, the order entry system can electronically pass configuration information to a service configuration system. The service configuration system interprets what has been ordered, makes assignments of line equipment and DLCI or phone number from available inventory, directs a software controlled cross connect to be made to the line equipment, and sends software information to the switch to record the customer and the class of service features.

By deploying an automated function for the service configuration, several steps are eliminated: there is no manual hand-off from departments and systems, and no operator necessary to implement the activation or change order. This results in a greatly streamlined configuration process that saves operational time and dollars. The streamlined process also increases Network Operations Center (NOC) productivity and allows service providers to quickly and efficiently deploy new circuits.

4. NavisXtend Provisioning Server Overview

The NavisXtend Provisioning Server is a client/server software application that supports automated network configuration of the Ascend switch networks. This single application lets service providers use their existing order entry systems to configure their Ascend Frame Relay, SMDS, IP or ATM network.

The Provisioning Server provides the ability to inventory and configure Frame Relay and ATM switch nodes, cards, physical ports, logical ports, and circuits, as well as SMDS address, screen, and group objects. This application interfaces to the service provider order entry system or Operational Support System (OSS) via an Applications Programming Interface (API). API options include C, C++, SNMP, and Command Line Interface (CLI).

The following two examples detail service provider savings with the NavisXtend Provisioning Server.

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5. Example #1: Dramatic reduction of per circuit configuration times result in 500% productivity increase

Network Overview

This service provider has over 300 Ascend Frame Relay switches located in dispersed geographies. The NMS stations are also distributed throughout the network. The diagram below gives an overview of the NMS station locations and operations.

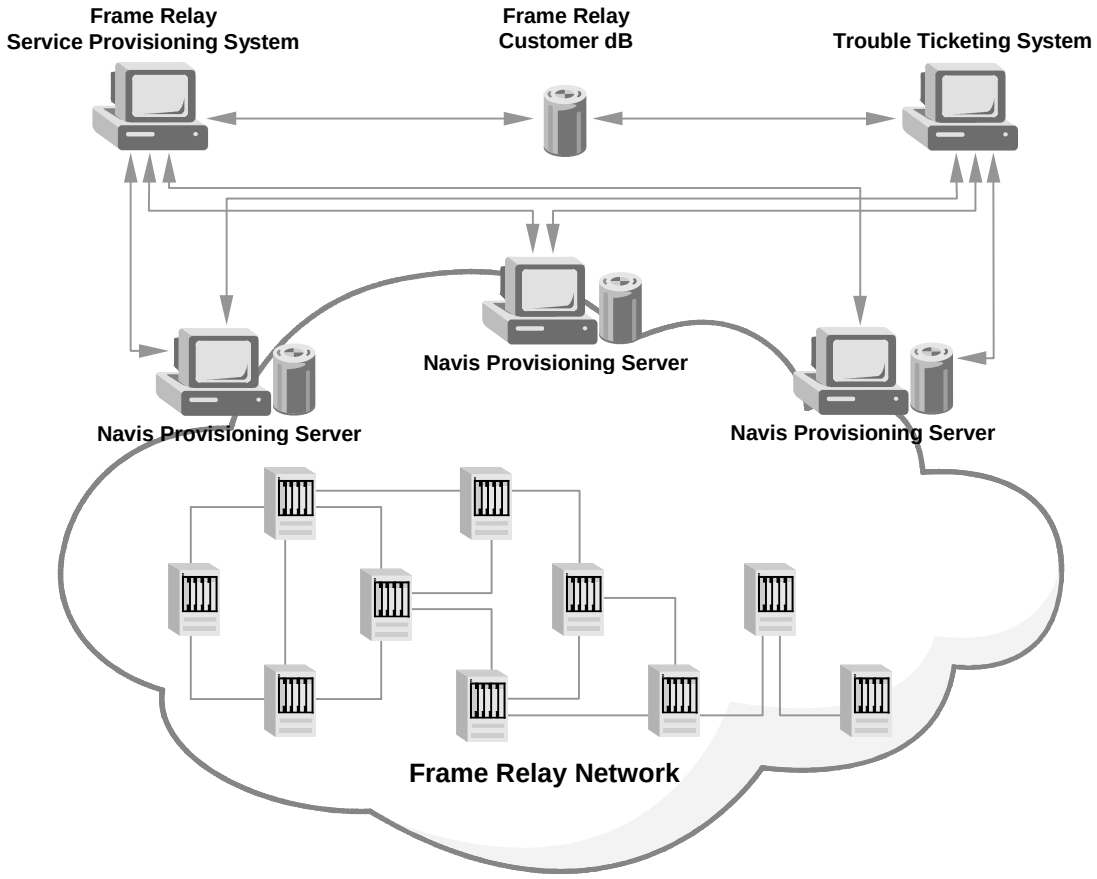


Figure 2 – Example of a Service Provider's Network Management System

Before Provisioning Server

Before implementation of the NavisXtend Provisioning Server, network configuration was a manual, multi-step process. Service orders were received from customers and hard copy order reports were generated. These orders were then passed on to service provisioners who used the point and click GUI of the NavisCore™ network management application to set the various parameters for pport, lport, and circuit to provision the complete circuit. Operators could provision about 20 to 30 PVCs a day.

After Provisioning Server Implementation

Now that the NavisXtend Provisioning Server is deployed, the service provider benefits from a streamlined configuration process. When a service order is received from a customer, operators initiate a streamlined series of steps to provision the appropriate switch object (port, card, circuit, etc.), as shown in the diagram above:

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1. Operators launch the Frame Relay Service Provisioning System application to initiate configuration of the new circuit. This application has the intelligence to know the network location of the switch object that is to be provisioned and sends a request to the appropriate Provisioning Server.

2. The Frame Relay Service Provisioning System stores all lport, circuit, and pport information in an Oracle database.

3. The Frame Relay Service Provisioning System acts as a client to the NavisXtend Provisioning Server communicating with the CLI. The operator selects from a series of different NavisXtend Provisioning Server scripts to configure the appropriate switch object (scripts exist for actions on Pports, Lports and PVC provisioning). The scripts have been defined using the CLI option available in the Provisioning Server. Examples of scripts for Pports include the following:

   - delete pport
   - enter pport
   - modify pport
   - modify channel
   - modify pport and channel

Once the script is chosen, the available lports and DLCIs are automatically assigned by the Frame Relay Service Provisioning System. The operator enters the appropriate object-specific information such as CIR, speed and LMIs.

4. The Provisioning Server sends the SNMP information down to the Ascend BSTDX switches. If objects cannot be provisioned, error messages are returned to the operator. If the operation is successful, the Provisioning Server enters the information into the Sybase configuration database.

5. The Trouble Ticketing application can request information from the NavisXtend Provisioning Server database, including lists of active pports, lports, and circuits. This information is transferred to the Oracle database that contains all the customer, enterprise and business information.

Using this process, switch provisioning can be done in 5 to 10 seconds per circuit. This allows operators to configure thousands of circuits per day.

Operational Savings

Network Status	Number of Steps to Provision one Switch Object	Time to Provision one Switch Object
Before Provisioning Server	10+	15-20 minutes
After Provisioning Server	1	5-10 seconds

This per-circuit time savings results in the following direct operational costs reductions:

- Provisioning task automation and increased operator productivity frees valuable operator resources to pursue more complex tasks.
- Frame Relay service order backlog was eliminated, increasing service revenues.
- Frame Relay service order turn-around was decreased and processing errors were decreased, dramatically improving customer satisfaction and service provider competitiveness.
- In addition, lower-end computing platforms can be used to handle provisioning tasks. For example, Pentium Pro 200 PCs with Linux are replacing high-end UNIX platforms.

Based on the savings from the increased operator productivity alone, the NavisXtend Provisioning Server application paid for itself within the *first week* of operation. This service provider continues to benefit from on going savings generated through streamlining and automating the provisioning process.

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6. Example #2: Integration into existing OSS preserves a common operator GUI resulting in a an initial $400K savings

Network Overview

In this example, the service provider uses a network management architecture that relies on a comprehensive Manager of Managers (MOM). The MOM is an umbrella management system that communicates to lower element managers via a variety of protocols. All management functions are integrated into the MOM, including provisioning. This allows the service provider to use a centralized system, with a consistent operator interface even though the network elements are a multivendor mix.

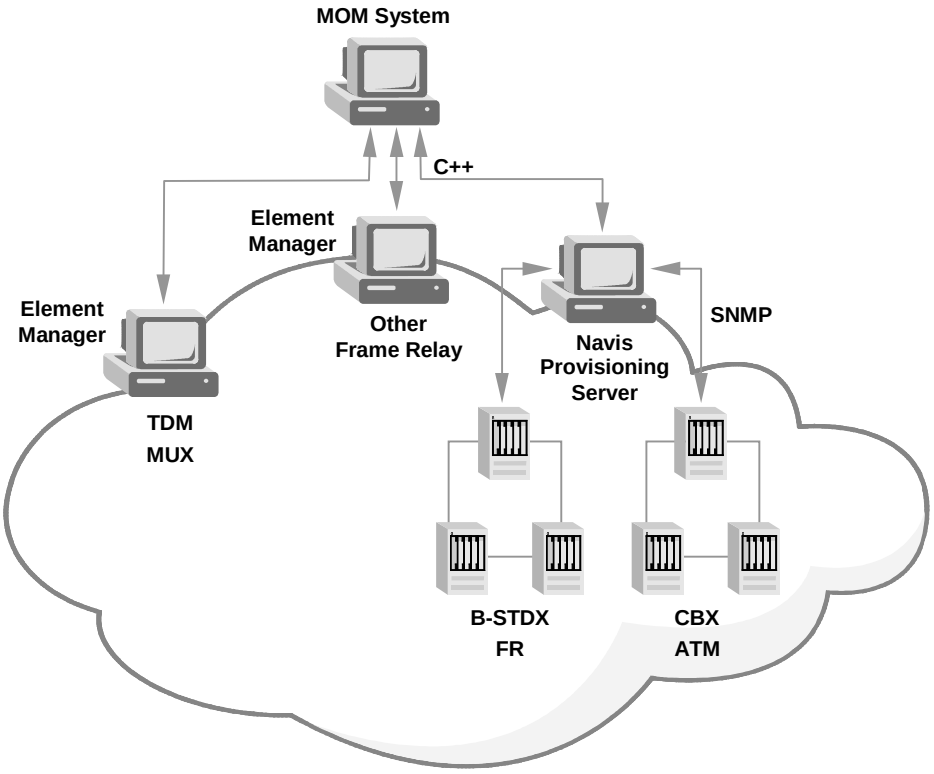


Figure 3 – An Example of a Service Provider's Network Management System

The operator submits tasks to the MOM through a common Graphical User Interface (GUI), no matter which underlying elements are being configured. The MOM determines which element manager applications are required to fulfill the request and exchanges messages with the appropriate application. The element manager application interacts with its network elements until the task is complete. This chain of events begins with a high level business objective (ie: provision a circuit for a customer) and ends with a sequence of detailed commands.

Before Provisioning Server

This service provider requires that all new network elements be integrated into the MOM through their element management applications. All current and future services, from digital cross connects to ATM services, are provisioned by craft people who use the MOM GUI. This is due to partly to union regulations, the experience level of the employees doing the provisioning and the need to retain employees.

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After Provisioning Server Integration

The NavisXtend Provisioning Server application was particularly easy to integrate into the MOM management model. The Provisioning Server has a published Application Programming Interface (API), with a number of access methods: C, C++, SNMP, and CLI. In this application, the service provider is using C++ to communicate between the MOM and the Provisioning Server. In contrast, other element management applications that were integrated into the MOM, and that were not designed with an open architecture, required proprietary extensions and separate application proxies to communicate with the MOM. This was a lengthy, costly and performance-impacting process.

Operational Savings

As a result of their MOM architecture strategy, this service provider estimates $448,000 in savings due to employee retention, training, and productivity by integrating the control of new services into the MOM. With this savings, the Provisioning Server payback was less than two weeks.

Training Savings

With the reliance on a common, stable GUI on the MOM, the service provider reduces the need for training craft operators when new services and elements are added to the network. The service provider estimates the training savings in the following way:

Expense	Assumptions	Savings
Two Data Centers, with 40 people each	80 total people	
Cost of Training Class, $1200, two classes needed	$2400/person	
Total Cost of Courses		$192,000
T&E		$96,000
Six days of lost time, $50,000 annual compensation, 240 work days/year	$1250/person	
Lost Productivity		$100,000
Training Savings Totals		$388,000

Employee Retention Savings:

In addition, the service provider has historic trend information that when their operators are trained in a new technology approximately 10% of their operators leave the organization.

Employment Conditions	Assumptions	Savings
80 total operators	8 vacancies	
Recruiting costs of 15% per person (salary of $50,000)	$7500/person	
Total Savings		$60,000

This savings does not include transition time between old and new operators, which would further add to the overall savings.

Additional Savings:

In addition to the quantifiable training and retention savings, the service provider also estimates additional savings resulting from the speed of introducing new services into the operations environment. Since no new procedures or training is required, new services can be deployed as soon as the element management systems are integrated into the MOM.

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7. Provisioning Server Description

The NavisXtend Provisioning Server automates the configuration of Ascend Frame Relay, SMDS, IP, and ATM networks to dramatically reduce provisioning overhead costs.

Key features of the NavisXtend Provisioning Server are as follows:

- An open API ties Ascend switch provisioning tasks into the existing service provider order entry system. The API is customized through the Provisioning Server toolkit, which is included with the product and provides several coding options, including C, C++, SNMP, or CLI. The API interface can be built by the service provider or by the Ascend Advanced Applications Group.
- The operator can deploy batch processing options, allowing for mass release of configuration information to the network.
- If the CLI is used, the operator can also take advantage of script macros that can be tied into order entry systems as a speedy means to implement the integration.
- Provisioning Server and NavisCore share the same database to ensure that all updates are performed, even if both configuration methods are used.
- The Provisioning Server can also be used to inventory switch nodes, cards, physical ports, logical ports, and circuits, as well as SMDS address, screen, and group objects.
- Multiple Provisioning Servers can be deployed within a network to increase the number of simultaneous operators.
- When provisioning commands are sent to the network, they are transferred in bulk to reduce network management traffic.
- The application is client/server-based to support scalability. The server is a UNIX process that responds to requests from NMS clients and updates the NavisCore database. The clients are any management GUI linked to the server application.

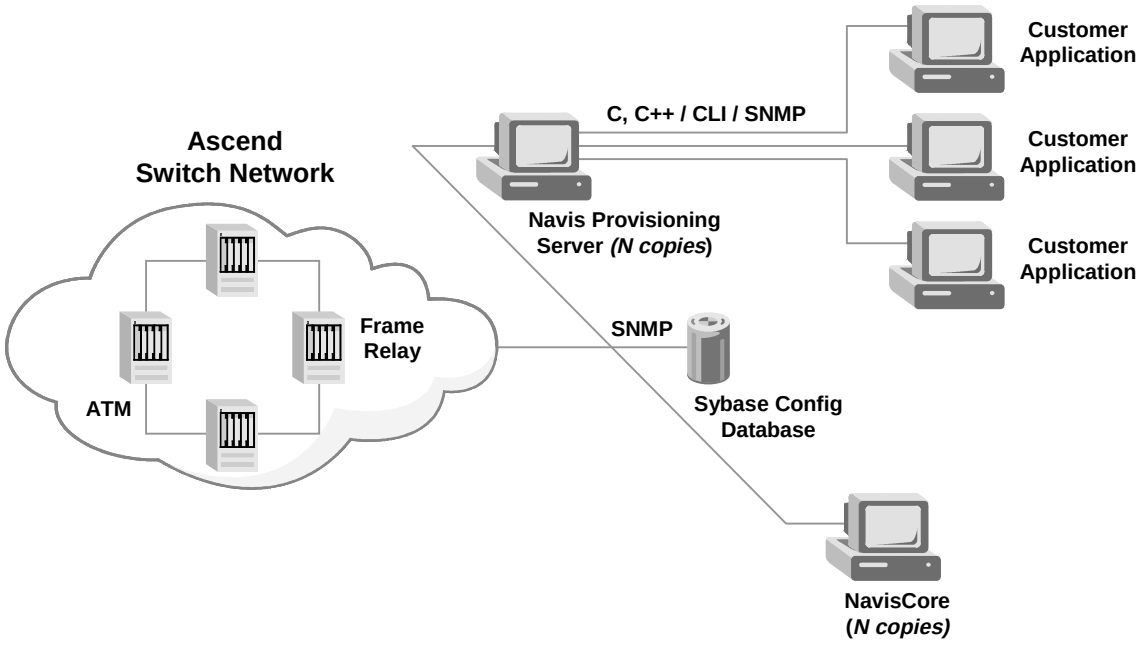


Figure 4 – NavisXtend Provisioning Server Operation

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In addition to the operational savings that Provisioning Server can generate, the product also offers service providers the ability to offer new services based on configuration tasks:

- Time of day, day of week, calendar-based services that allow service providers to offer varying configurations to customers based on time
- Scheduled services that allow end users to change their network configuration based on preset schedules
- Read services where end users can view network configuration
- Write services where end users can affect changes on their network configuration

The NavisXtend Provisioning Server can also be used in conjunction with the NavisXtend Customer Network Management (CNM) Gateway product to deliver turn-key CNM services to end-users. This pairing of NavisXtend applications allows service providers to deliver provisioning control directly to their end-user customers, carrier partners, and internal employees. Both read-only and read/write capabilities are supported. The network is securely partitioned so that the user only sees the network resources that he or she is allowed to see. Information is delivered via encrypted web sessions that are both secure and cost-effective. The combination of the two Navis products allows service provider to quickly and securely implement CNM services.

8. Summary

The NavisXtend Provisioning Server helps service providers deliver two key components of effective network management:

- Improved service delivery and quality
- Improved cost

The NavisXtend Provisioning Server can be used to immediately lower operational costs associated with network element provisioning and generate significant, reoccurring savings from order backlog reduction and the customer satisfaction increases. Payback from the installation of the application is measured in days, and the competitive advantage in streamlining operations and increase in new services offerings is measured in bottom line dollars.

The NavisXtend Provisioning Server is available today. Part number 70025.

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