Ascend

OVERVIEW SUMMARY

NavisXtend

CNM Gateway/Delivering SLAs

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ASCEND

Product Overview

The NavisXtend applications currently consist of:

- **Accounting Server** – collects SVC/PVC call details that can be used to generate invoices based on bandwidth consumed or call duration
- **CNM Gateway** – turn-key, Web-based Customer Network Management (CNM) solution that allows service provider to securely provide access to network information to their end-users.
- **CNM Server** – a first generation CNM solution that supports FRF.6 compliance
- **Fault Server** – intelligently correlates and consolidates network event and alarm information to concisely identify network problems
- **Provisioning Server** – automates network configuration processes for switch cards, ports, and circuits to speed configuration tasks
- **Statistics Server** – efficiently collects network statistics from the switches
- **Report Generator** – generates graphical reports on current network status that are easily digested by end users. Reports indicate network utilization and Service Level Agreement (SLA) metrics

Service providers can add NavisXtend server components into their existing network management infrastructures to streamline their network management processes. The distributed architecture and functional task division allow service providers to place the NavisXtend applications within the operational group they serve and eliminates the performance bottlenecks that a monolithic, centralized system creates.

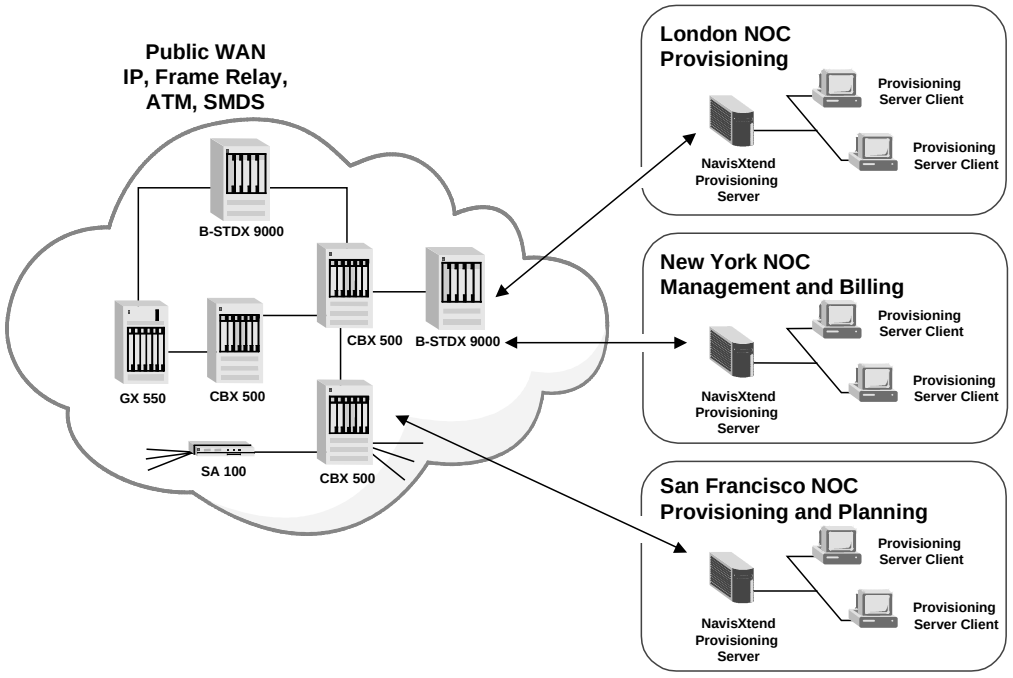

Figure 1 – Service Providers can place NavisXtend applications within each Network Operating Center, eliminating performance bottleneck.

The distributed architecture of the NavisXtend products enables the service provider to co-locate management tasks with the business functions they support to reduce overhead, increase reliability, increase network performance, and foster a tighter understanding of business and network operation integration and possibilities. For example, in Figure 1, the service provider has three separate groups, each performing a discrete management function. The London business center handles order entry (a business function) and circuit provisioning (a network management function). The IS department located in New York handles call accounting (a network management function) and billing (a business function). The San Francisco NOC handles traffic planning (a business function) and network utilization output (a network management function). The network management functions and the business functions are co-located, leading to cross-function synergies that deliver cost reduction and new service concepts. The network management applications are released from the glass rooms and can, for the first time, contribute to business goals.

The NavisXtend applications also allow multiple operators to access a single server. For example, provisioning operators located in San Francisco can access the provisioning server in London to handle accounts and deliver 24-hour service to the end-user customer base. This further extends the flexibility and scalability of the NavisXtend management solution.

In addition to the distribution of service provider NOC tasks, the NavisXtend products also enable service providers to offer new services to their customer base. These services can be positioned by the service provider as a value-added benefit to their customers or as a new source of revenue. Example service offerings that the NavisXtend products can support include:

- **Network-View service** – Customers can view their own network operation, gathering statistics and viewing network response time.
- **Network-Control service** – End-users can affect changes on their portion of the network, (for example, changing CIR levels to meet traffic needs).
- **QoS-View service** – Service providers can show customers the throughput of their piece of the network, on a daily, weekly, or monthly basis.
- **Capacity-Sell service** – Opportunities exist for proactive monitoring and servicing of customer accounts based on monthly or seasonal traffic volumes.
- **Uptime guarantee** – Intelligent gathering of network usage statistics points out problems before they cause outages, while intelligent highlighting of network events leads technicians to immediate corrective action.
- **Real-time inquiry** – Customers can view account status or initiate service changes via technology that limits access to database information.
- **Customize reports** – Individual end users can target their specific network concerns.
- **SLA verification** – End-users can examine reports to measure the quality of their provided service.

The NavisXtend products raise service provider expectations for network management functionality to a higher level, allowing a service provider to realize the advantages of linking network management operations with business goals, to significantly reduce operating overhead and to facilitate the introduction of revenue-generating, differentiating service.

Product Positioning

Ascend offers three network management products under the Navis umbrella:

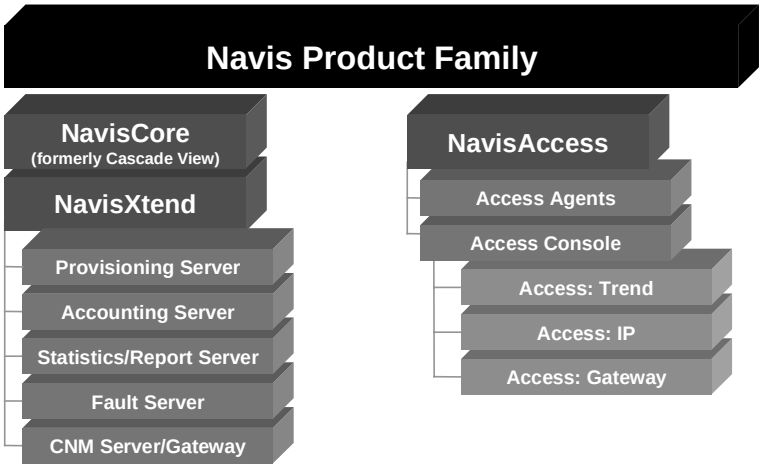

Figure 2 – The Navis family of network management software includes NavisCore, NavisXtend and NavisAccess.

- NavisAccess™ manages the Ascend MAX™ and MAX TNT™, GRF and Pipeline® products, providing superior support for discovery and mapping, configuration, fault and performance management, and security and accounting for these products. This software application works in conjunction with NavisAccess Agents located on each of the above products. More information on this product family is located on the Ascend intranet and Internet sites.
- NavisCore is an HP OpenView application tailored for configuration and centralized control of the Ascend core switches. NavisCore manages the STDX, B-STDX, CBX 500, GX 550, SA 100/600 and GRF product families. NavisCore was the first network management software to support multiservice (Frame Relay, ATM, IP and SMDS) management from a single platform. NavisCore is installed at all Ascend service provider accounts and is a necessary component for management of the backbone network. Development for NavisCore is ongoing and paced with switch releases. More information on NavisCore is located on the Ascend intranet and Internet sites.
- NavisXtend is Ascend's next-generation management product for service provider backbones. It currently manages the B-STDX 9000 and CBX 500. During 1998, it will also add management support for the GX 550, SA 100/600 and GRF 400/1600. Over time, the NavisXtend applications will reduce the reliance on OpenView and NavisCore for network management of Ascend equipment.

Each of the Navis products delivers best-of-breed management: NavisAccess for access products and NavisCore/NavisXtend for core products. Together in one network management family, these products offer the promise of end-to-end management and control, provisioning and delivery of new services, and the scalability and performance to meet the needs of large networks.

For more information on the integrated management positioning, please refer to the Navis folder and Network Management presentation and script.

The NavisXtend architecture was developed to help service providers respond to the new challenges of competitive wide area networking. It helps service providers reduce overhead costs and deliver new services to their customers. To be economically successful in the long term, service providers must constantly focus on delivering better quality services faster and at a lower cost than existing offerings. While backbone technology contributes to a successful network formula, increasingly the network management solution has the single biggest impact on the operational efficiency of the network and its ability to deliver value-added services.

NavisXtend is the first network management product suite that allows service providers to use network management as a competitive business tool by supporting:

Operational Objectives: Functionality, Scalability, and Reliability

- Complete ***end-to-end configuration*** and control of all WAN platforms and services
- A ***scalable and distributed architecture*** capable of supporting hundreds of operators located in varying regions
- New levels of ***reliability and security*** to strengthen the integrity of the data network information

Business Objectives: Service Delivery and Cost Reduction

- ***Open, standards-based*** design for seamless integration into existing management infrastructure and third party value-added applications
- New, ***revenue-generating*** services that bring dollars to the bottom line, such as the ability to generate custom reports for end-user accounts, or provide end users with the ability to view the operation of their portion of the public network

Target Applications

NavisXtend Fault Server

The NavisXtend Fault Server application is an intelligent manager of network fault information. The Fault Server correlates, parses, and filters the volume of traps and events generated by the network to provide the network operator with the most pertinent and concise information. When a trap is received, the Fault Server applies trap a number of rules-based processes to the trap in order to distill the cause of the network problem. This way, the critical service-affecting traps are highlighted when they are reported to the operator.

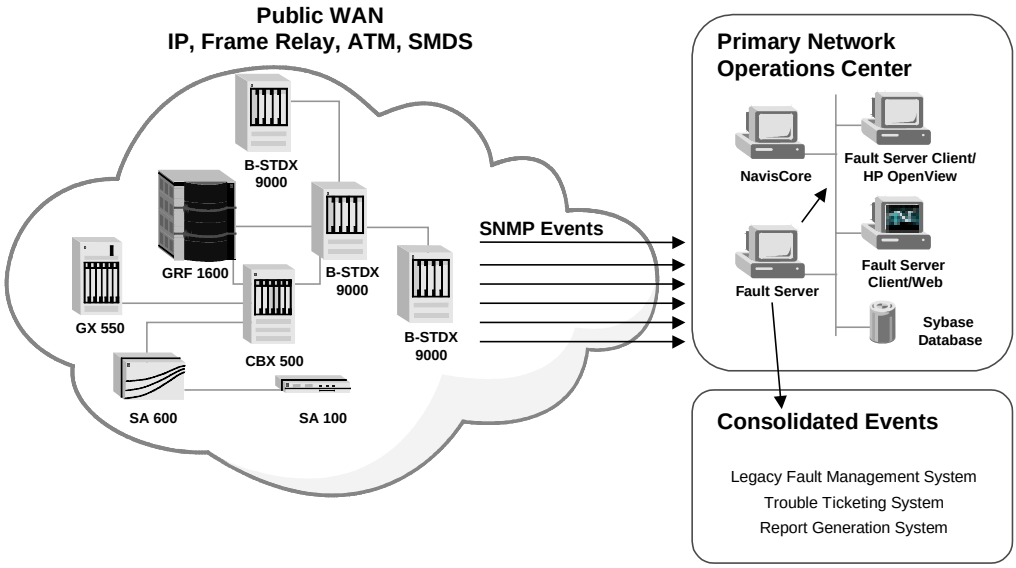

Figure 4 – The Fault Server intelligently processes fault information from Ascend IP, Frame Relay, ATM and SMDS networks to help Operator quickly identify and respond to network problems.

Fault Server Quick Overview

Description	The Fault Server application enhances management capabilities by intelligently correlating and prioritizing incoming network events to enable service provider operators to quickly identify and respond to network issues.
Innovative Features	• Can generate an alarm in response to a configured threshold level • Event forwarding to any SNMP management system • Scripts can be executed in response to network events (for example, paging based on specific incoming alarms).
Key Features	• Correlates, parses, filters, and ages incoming records to consolidate network events • Configurable severity level alarms • Stores all event information into Sybase database • Deploys sequencing protocol to ensure event delivery
Key Benefits	• Increases network uptime by focusing operators on service-affecting fault information • Increases information relevancy by consolidating and correlating events with intelligence • Cost-effectively distributes fault management tasks and scales network performance with powerful client/server, Web, and IP technologies • Improves response consistency and efficiency by centralizing event collection and integrating with existing trouble-ticketing and response systems • Operators can use SQL or Web interface to query complete database of historical alarm information.
Number of Fault Servers per network	Unlimited, each Fault Server application can handle any number of switches (recommendations exist on events/second at sustained rates). The Fault Server to switch ratio is 1:N: one Fault Server handles multiple switches.
Configured by	Web browser (such as Netscape or Explorer)
Client Access	Web browser (such as Netscape or Explorer)
Part number	70028
Current version (as of 3/98)	Version 1.0
First ship date	6/97
Current version manages	B-STDX, CBX, STDX
Planned management for	SA, GX

NavisXtend Provisioning Server

The NavisXtend Provisioning Server application lets service providers use their existing order entry systems to configure their Ascend IP, Frame Relay, SMDS, or ATM network. Provisioning Server automates management tasks, dramatically reducing provisioning overhead costs and greatly speeding circuit setup times. This increases NOC productivity and allows service providers to more quickly and efficiently deploy new circuits.

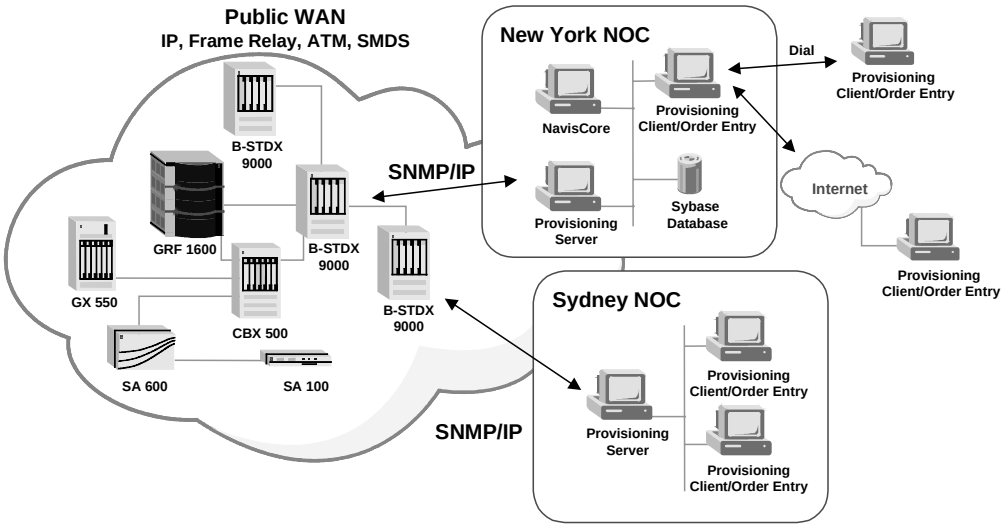

Figure 5 – The Provisioning Server allows service providers to use their existing order entry systems to provision their network.

Provisioning Server Quick Overview

Description	The Provisioning Server application ties Ascend network configuration commands to the existing service provider order entry systems to completely automate configuration of network services by a single order entry operator. This product includes the toolkit to develop the interface between the order entry system and the Provisioning Server. Customization work can be done by the service provider or Ascend's Advanced Applications group.
Innovative Features	• Powerful API can completely automate network provisioning based on information obtained in the order entry process • Batch processing allows for configurations to be downloaded on time of day or calendar day to support pre-configuration and new time of day configuration services • Supports hundreds of distributed operators
Key Features	• Standards-based SNMP interface to the network switches
Key Benefits	• Multiple, open, standards-based interfaces support seamless integration to any existing service provider order entry software for one-entry provisioning with no personnel retraining. • Service providers reduce daily operating costs by automating network provisioning tasks. • Service providers increase customer satisfaction by reducing circuit configuration lead times and increasing order consistency. • Support for hundreds of geographically dispersed operators to increase provisioning flexibility
Number of Provisioning Server supported per network	Multiple; the client device will have to know which Provisioning Server to direct the network information toward if multiple Provisioning Servers are deployed.
Configured by	C/C++ API, SNMP or Command Line Interface (CLI).
Client Access	Service provider order entry system (or any third party application that is interfaced via the API)
Part number	70025
First Ship Date	8/96
Current version (as of 3/98)	Version 2.0
Current version manages	B-STDX, CBX, STDX
Planned management for	SA, GX

NavisXtend Statistics Server and Report Generator

The NavisXtend Statistics Server application collects near real-time statistical information from the Ascend Frame Relay, SMDS, IP and ATM network and stores the information in a database for extraction by any standards-based third party application.

The Report Generator application front ends the Statistics Server database and builds tables and graphs that can be viewed by an end-user with a standard web browser. Standard reports are available for 1) network utilization on ATM, Frame Relay, and SMDS networks and 2) SLA measurements of throughput and network delay for Frame Relay networks.

The two applications work in tandem to allow service providers and their customers real-time access to statistical information. Service providers can extend their understanding and analysis of network operations to proactively plan for network growth and uncover emerging network problems before service is affected. Service providers can also deliver tangible proof of service level quality to their customer base, supporting increased network outsourcing by the customer and the generation of increased revenues for the service provider.

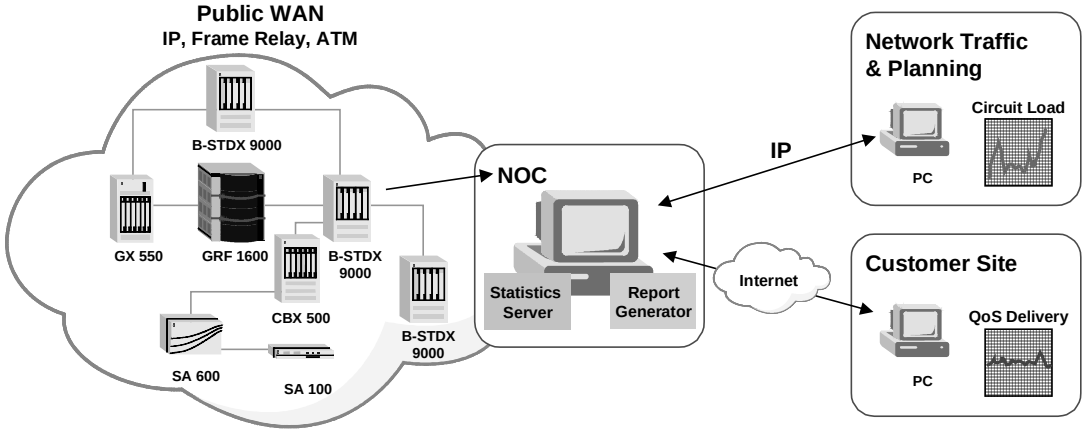

Figure 6 – The Statistics Server and Report Generator let Service Providers assess network operations and deliver near real-time network status to their customers.

Statistics Server Overview

Description	The Statistics Server application collects statistical information from the Ascend Frame Relay, SMDS, IP and ATM networks and stores the information in a Sybase database. The statistics can be extracted via SQL, ASCII, NavisXtend Report Generator, third-party applications and used for use in internal planning or for a customer-based reporting service.
Innovative Features	• Intelligently processes the statistical information, presenting cumulative totals, delta changes, or maximum values calculations • Statistics stored on the switches and collected by the application • Statistics granularity down to five minute intervals
Key Features	Statistics are collected on: • Frame Relay trunks, UNI, NNI, and PVCs down to a per port (pport) or per customer port (lport) level • SMDS DX1/SSI interfaces • ATM PVCs and SVCs, including complete call statistics on a UNI level • Efficiently gathers the statistics (via Bulk TFTP file transfers) from the switch network to minimize the impact of statistics collection. • Configurable poll times (from five minutes to one hour) • Standard output (ASCII or Sybase) to interface with a variety of software applications
Key Benefits	• Provides enhanced data on network operations to support proactive planning and discovery of emerging network issues • Real-time access allows end users to view their portion of the network, allowing service providers to generate increased revenues and tangible support for service level and QoS agreements. • Data consolidation and configurable-gathering metrics optimizes the amount of network bandwidth used for statistics collection.
Number of Statistics Servers supported per network	Multiple can be supported with a 1:N relationship between server and switch (each switch may only report to one server; each server may support multiple switches).
Configured by	The individual switches are configured via NavisCore to deliver the statistics to Statistics Server. The Statistics Server application is configured via CLI.
Client Access	Not Applicable – data is stored in the database. Other applications (such as Report Generator) are responsible for displaying the information.
Part number	70020
Current version (as of 3/98)	Version 2.5 for FR, Version 1.0 for ATM (Version 3.0 for Jade handles both FR and ATM)
First Ship Date	11/95
Current version manages	B-STDX, CBX, STDX
Planned management for	SA, GX, IP

Report Generator Quick Overview

Description	The Report Generator application takes the information collected and stored by Statistics Server and outputs it in easy-to-understand tables and graphs for service provider use in internal planning or as a customer service offering. Note that the Report Generator product is based on an OEM of the Report Server from Actuate Software Corporation. The Report Generator consists of two major components: 1) the application that handles all the report generation, user authentication, and report posting, and 2) the sets of template reports. Two sets of template reports are currently available: 1) network utilization reports for FR, ATM, and SMDS, and 2) SLA metric reports for FR that show network throughput and delay.
Innovative Features	• Can use Web to distribute reports to service provider customers • Optional SLA report templates to offer SLA-based reports to service provider customers
Key Features	• Thousands of simultaneous clients supported • Custom reports can be developed by the Ascend Advanced Applications Group, or through purchase of a report toolkit from Actuate.
Key Benefits	• Custom reports and real-time access allows end users to view their portion of the network, allowing service providers to generate increased revenues and tangible support for service level and QoS agreements. • No specialized client software required (any Web-based browser can be used)
Number of Report Generators supported per Statistics Server	Multiple Report Generator applications can be supported per Statistics Server.
Configured by	Graphical interface on a Windows NT application
Client Access	Web browser application (such as Netscape or Explorer)
Part number	70040 Report Generator 70041 Report Generator with Web agent support 70048 SLA Report Templates
Current version (as of 3/98)	Version 1.1
First Ship Date	11/97
Current version manages	B-STDX, CBX, STDX
Planned management for	SA, GX

NavisXtend Customer Network Management Gateway and Server

NavisXtend offers two CNM solutions: CNM Gateway and CNM Server. CNM Gateway is a turnkey CNM solution. CNM Server must be front-ended with a proprietary service provider gateway. Both CNM products allow service providers to deliver new services to their customers such as real-time status viewing, configuration checking, and fault forwarding. They also allow service providers to offer tangible proof of network operation to support QoS and SLA agreements.

The CNM Gateway allows service provider to control all end-user access to network information for Ascend FR and ATM networks. With CNM Gateway, service providers can define varied levels of CNM services (such as gold, sliver, bronze) and define user access to these services. Service settable parameters include both read and write capabilities for: lport and PVC configurations, status, and reports. View capabilities for real-time statistics and traps. And write capabilities for loopback initiation. Once the services are defined and the user permission levels are set, users can use standard browsers to log into the CNM Gateway and view their allowed network information. To fulfill the request, the CNM Gateway either queries the network directly, queries a local cache, or forwards the request to Provisioning Server, Fault Server, or Report Generator for fulfillment.

The CNM Server application works in conjunction with a proprietary service provider CNM Gateway to offer partitioned views of Ascend Frame Relay network to the service provider customers. This product is useful for service providers who have already established a CNM gateway and want to interface to the Ascend FR switches.

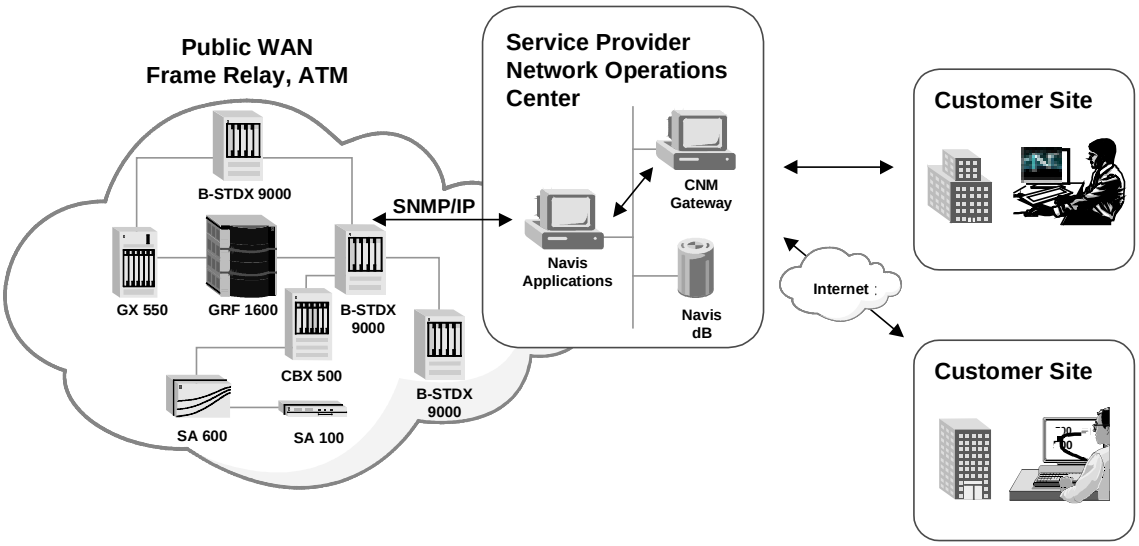

Figure 7 – The CNM Server enables service providers to offer partitioned views of Ascend Frame Relay network to their customers.

Customer Network Management Gateway Quick Overview

Description	The CNM Gateway application works in conjunction with other NavisXtend applications (such as Provisioning Server, Fault Server, and Statistics Server/Report Generator) to allow end-users to view and/or control their private portion of the public network. CNM Gateway allows service providers to deliver new, management services to their customers such as real-time status viewing, configuration checking, configuration control and fault forwarding.
Innovative Features	• Service provider can configure a host of CNM services, including read and read/write control over configurations, faults, performance monitoring, and reports • Web-based interface allows easy configuration of CNM services and addition of new users for the service provider • JAVA-based applets for the end-user client software eliminates need for service providers to manage software distribution • Independent Sybase database caches a local copy of network information; this greatly enhances response times for customer requests while also isolating the operational database from customer queries. • Intelligent decisions are made regarding data fulfillment: static data is processed from the local cache, while real-time requests are retrieved from the switch network, which further improve response times.
Key Features	• Allows customers to access information on their Frame Relay and/or ATM portion of the network, including network utilization, traffic statistics, and QoS parameters on a per port or per PVC basis. • Multithreaded architecture to take full advantage of multi-CPU network management hosts for service providers who need to support hundreds of CNM customers.
Key Benefits	• Allows service providers to provide Frame Relay and/or ATM network views to their customers to offer tangible proof of QoS and SLA services • Tightly links service providers to their customers to increase customer loyalty • High-performance architecture minimizes the traffic impact of customer access and keeps customer inquires isolated from the day-to-day network management operations • Web-based interfaces ease use, reduce training, and reduce implementation and upkeep costs
Number of CNM Gateways supported per network	Multiple -- Gateways can be deployed geographically and multiple gateways can be used to distribute network loading
Configured by	Web-based interface
Client Access	JAVA-based applets can be accessed with any standard browser, such as Netscape
Part number	TBD
Current version (as of 3/98)	Version 1.0
First Ship Date	6/98
Current version manages	B-STDX, STDX, CBX
Planned management for	GX, IP Navigator

Customer Network Management Server Quick Overview

Description	The CNM Server application works in conjunction with a proprietary service provider CNM Gateway to allow service providers to deliver CNM services to their customers such as real-time status viewing, configuration checking, and fault forwarding.
Innovative Features	• Independent Sybase database caches a local copy of network information; this greatly enhances response times for customer requests while also isolating the operational database from customer queries. • Intelligent decisions are made regarding data fulfillment: static data is processed from the local cache, while real-time requests are retrieved from the switch network, which further improve response times.
Key Features	• Allows customers to access information on their Frame Relay portion of the network, including network utilization, traffic statistics, and QoS parameters on a per port or per PVC basis. • Customers have read-only access to their portion of the network. • The CNM Server has an SNMP interface with full support for the RFC 1604 MIB definition. • Multithreaded architecture to take full advantage of multi-CPU network management hosts for service providers who need to support hundreds of CNM customer requests per second.
Key Benefits	• Allows service providers to provide Frame Relay network views to their customers to offer tangible proof of QoS and SLA services • Tightly links service providers to their customers to increase customer loyalty • High-performance architecture minimizes the traffic impact of customer access and keeps customer inquires isolated from the day-to-day network management operations. • Completely standards-based with support for FRF.6 CNM recommendations
Number of CNM Server supported per network	One CNM Server can support up to 20 CNM gateways. Multiple servers can be installed in the network.
Configured by	Command Line Interface
Client Access	Not Applicable – all access from the client is handled by the service provider's CNM gateway software.
Part number	70022
Current version (as of 8/97)	Version 1.1
First Ship Date	1/96
Current version manages	B-STDX, STDX
Planned management for	No other products – see CNM Gateway

NavisXtend Accounting Server

The NavisXtend Accounting Server application lets service providers collect information on ATM and Frame Relay SVCs and PVCs on a per call basis to bill customers based on network usage or duration. This detailed call information enables service providers to offer new, competitive data call plans and precise performance information on a per call, real-time basis to their customer accounts.

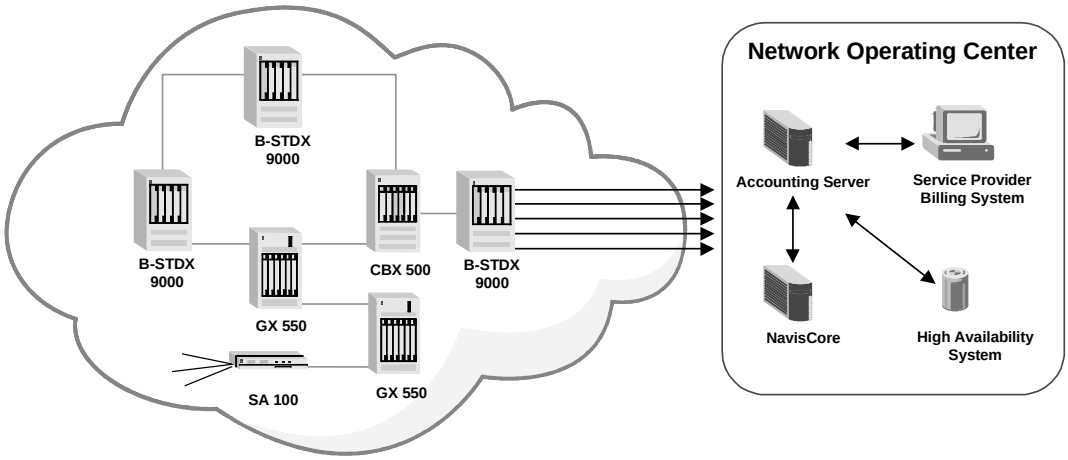

Figure 8 – The Accounting Server collects detailed call information on ATM and FR SVCs and PVCs on a per call basis

Accounting Server Quick Overview

Description	The Accounting Server application collects ATM and Frame Relay SVC and PVC information to enable service providers to offer new, competitive data call plans and precise performance information on a per call, real-time basis to their customer accounts.
Innovative Features	• Supports either network usage (cells/time) or time-based account billing
Key Features	• Measures billable data traffic being passed through the network, forwards the data to the service provider account billing system for generation of invoices or performance reports • Cell counts for each call are efficiently measured at only the ingress and egress point of the PVC/SVC, minimizing the impact of accounting on the network. • Billing records are in the case of SVCs are created within 15 mins of the termination of the call or within 15 mins of a call creation failure • In the case of PVCs either every hour or when a PVC is terminated. • The Accounting Server application correlates information from the switches to create a call record based on usage or time. • Data is available in either comma-delimited ASCII or Bellcore AMA Format (BAF) for ATM and comma delimited ASCII files for FR. • Provides summary logs of all SVCs call attempts and completions, PVCs enabled and disabled, and number of accounting records stored and filed • In the event of the AS being unreachable from the switch, for the CBX 500 data is stored on the on-board PCMCIA hard disk of the switch till the AS is back on-line. SNMP warning traps are generated to alert operators to the condition. The system also provides the ability to have a backup Accounting Server and provides for automatic switchover in the case of the primary accounting server being unavailable.
Key Benefits	• Allows service providers to collect PVC and SVC call information to offer new usage-based or time-based call plans • Allows service providers to deliver precise performance information on a per-call basis to offer complete service information to their customers • Automates information collection and integrates data with existing billing systems via standard comma-delimited ASCII (FR and ATM) or BAF record formatting(ATM only)
Number of Accounting Servers supported per network	Single accounting server provides call data records for SVCs and PVCs Allows for a backup Accounting Server and provides automatic switchover
Configured by	NavisCore provides a number of configuration screens to configure the Accounting Server application and enable collection of accounting data on the switches
Client Access	Not Applicable – all data is output in either comma-delimited ASCII (FR and ATM) or BAF format (ATM only)to feed a billing system.
Part number	70029
Current version (as of 4/98)	Version 2.0
First Ship Date	5/98
Current supports	ATM on CBX, FR on B-STDX
Planned support for	IP, FR on CBX and ATM on B-STDX, SA,

Software Features

NavisXtend consists of several applications; each of the applications is discussed in detail below.

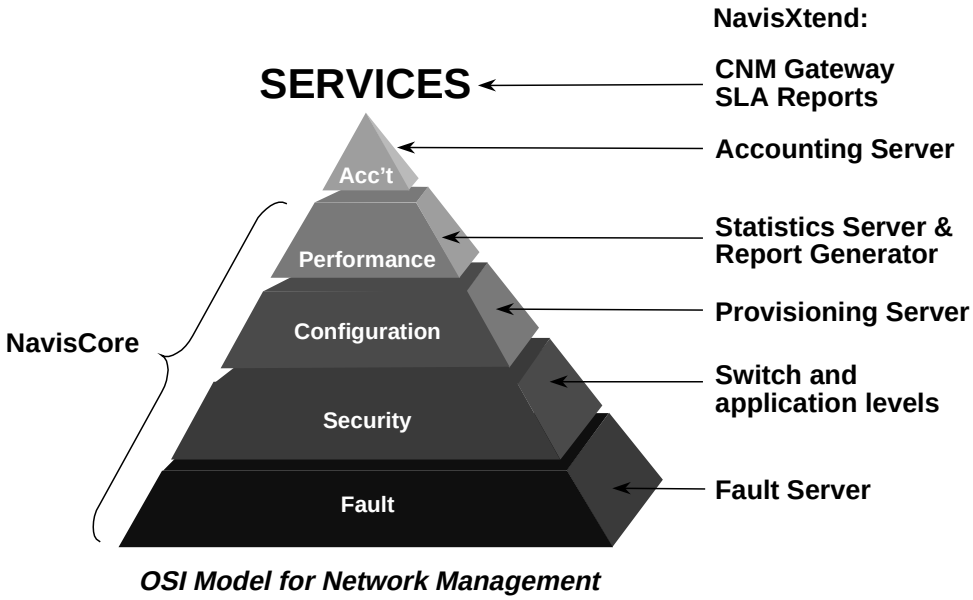

Figure 3 – NavisXtend offers a suite of applications that provide multiple services for network service providers.

The table below shows which Navis releases support the various Ascend switch software releases. See footnotes below the tables and the comment section for more information.

NavisCore Release/ B-STDX/CBX Release	2.3/4.1/1.2	2.4/4.2/2.0 (AM)	2.5/4.3/2.0. X (AM M1)	2.6/4.4/2.0. X (AM M2)	3.0/5.0/2.5 (Emerald)	4.0/6.0/3.0 (Jade)	4.1/6.1/3.1 (Jade M1)
HP OV 3.3.1	X	X					
HP OV 4.1.1	X	X	X	X	X	X	X
Sybase 4.92	X	X	X	X	X		
Sybase 11	X	X	X	X	X	X	X
Solaris 2.4/Motif 1.2.4	X	X	X	X	X	X	X
Solaris 2.5/Motif 1.2.5[1]	X	X	X	X	X	X	X
Accounting Server 1.0 (ATM only)		X	X	X	X[1]		
Accounting Server 2.0						X[2]	X[2]
CNM Gateway 1.0		X	X	X			
Fault Server 1.0		X	X	X	X[1]	X	X
Fault Server 2.0						X	X
Provisioning Server 2.0		X	X				
Provisioning Server 2.1				X			
Provisioning Server 4.0 (FR and ATM)						X	
Provisioning Server 4.1 (FR, ATM, IP)						X	
Report Generator 1.0	X	X	X	X	X[1]	X	X
Report Generator SLA Report Set					X[1]	X	X
Statistics Server 2.5 (FR only)	X	X	X	X	X[1]		
Statistics Server 2.6 (FR only)	X	X	X	X	X[1]	X	X
Statistics Server 1.1 (ATM only)	X	X	X	X	X[1]	X	X
Statistics Server 3.0		X	X	X	X	X	X
ToolBox 2.0				X	X	X	X

[1] All NavisXtend server support for Emerald includes support for the FR and ATM services. No specific IP service support is added.

[2] Accounting Server 2.0 supports FR accounting on the B-STDX and ATM accounting on the CBX. It does not support FR accounting on the CBX or ATM accounting on the B-STDX.

The SA product family and GRF product family are planned for support in 1998. Support in NavisCore will be added first, with support for the different NavisXtend servers being added in 1998 and 1999.

Hardware Features

Feature Description

NavisXtend consists of seven separate applications. Detailed features for each server application are found in the software overview sections. Features that are common to all NaxisXtend applications are found in the table below:

Feature	Description	Benefit
End-to-end configuration and control of all WAN switch platforms and services	• All NavisXtend applications will support multiple services (IP, ATM, Frame Relay, and SMDS) and multiple switch platforms (B-STDX, CBX, GX, SA). (The exception is CNM Server, which supports only Frame Relay.)	• Eliminates the inefficiency of running between multiple interfaces and NMS in order to manage multiple devices and services • One consolidated database allows network-wide analysis, eliminating the holes that a piecemeal approach delivers. • Internetworking between different platforms and services is easily accomplished. • Intelligent gathering and correlation of network statistics across devices
Scalable and distributed architecture	• Use of WEB, JAVA, client/server and IP technologies • Applications can be loaded on one machine or distributed across an entire network • Supports multiple simultaneous operators	• Multiple CPUs bring more performance power to the network management; eliminating bottlenecks • Eliminates client limits found in centralized architectures • Web GUI reduces cost of software and eases training • Java applet use eliminates software distribution issues • Scales as network scales; more applications can be added to share the load • IP-based technology allows Internet access to server information (for service provider internal or external customer access).
Reliable data and secure access	• Increases reliability of data information • Network events can be distilled to the critical alarms to focus the operator; reducing downtime	• Three levels of authorization • Robust fault delivery with sequenced packets
Open, standards-based design for seamless integration into existing management infrastructure and third-party applications	• Defined and documented open APIs for ease of integration with existing service provider management software and third party applications • Coexist and interface with Enterprise Managers such as HP OpenView or Net Expert	• Allows service providers to tie existing business systems with NavisXtend applications to automate management tasks • Integrates new functions with existing management infrastructure • Allows service provider to integrate value-added applications with NavisXtend servers • Allows service provider to integrate NavisXtend with a TMN-based management architecture
The opportunity to offer new, revenue-generating services that bring dollars to the service provider bottom line	• Customers can view their own network operation, gathering statistics and viewing network response time. • Service providers can show customers the throughput of their portion of the public network, on a daily, weekly, or monthly basis. • Service providers can proactively monitor the service levels of customer accounts based on monthly or seasonal traffic volumes. • Service providers can customize reports for end users to target their specific network concerns. • Web-based, client/server architecture allows customers to use standard browsers to access network information.	• New ways to generate revenues • New ways to differentiate in the increasingly competitive market • New ways to increase customer satisfaction and loyalty • Customers can use cost-effective, easy-to-use browsers to access information.

Frequently Asked Questions

1. What is CNM?

CNM stands for Customer Network Management. CNM is the concept that a service provider can share information about network operations with enterprise network managers, carrier partners and internal employees. For this concept to become reality, the service provider must consider several things:

- Extraction of the information from the network without slowing overall network operations or opening operations to security problems
- Packaging of the information so that the customer can receive an appropriate level of detail and receive it in a way they can understand
- Delivery of the information to the customer in a cost-effective and secure manner, so that a customer only sees the information about their portion of the network

2. What is NavisXtend CNM Gateway?

NavisXtend™ CNM Gateway is a network management software application that allows service providers to deliver network information to their end-users in a secure and cost-effective manner. The NavisXtend CNM Gateway acts as a gate to the network information, letting users access only the information they are authorized to see. The NavisXtend CNM Gateway allows service providers to:

- Define different levels of CNM services (gold, silver, bronze) to offer to their customers by manipulating any of the following parameters: read access, write access, configuration information, fault information, accounting real time monitoring information, and historical reporting information
- Define users who are allowed to access the information and set their privilege levels

3. How does a CNM gateway benefit the service provider?

By deploying a CNM Gateway solution, the service providers receives three key benefits:

- The service provider can offer CNM services to their customers for delivery of a new, competitive-differentiating product to the market. These services may also provide new sources of revenue.
- In addition, CNM is a very interactive service. It allows service providers to get close to the enterprise network managers, carrier partners and internal employees, increasing customer loyalty and customer retention.
- CNM services can also be used to deliver information to internal employees, giving business manager, marketing managers, and account managers access network information to better serve the customer base.

4. How does NavisXtend CNM Gateway benefit the service provider?

NavisXtend CNM Gateway is a completely turn-key CNM solution. It does not require any proprietary coding or extensions from the service provider. It allows the service provider to quickly offer a wide range of CNM services to their end users.

5. What are the key features of the NavisXtend CNM Gateway?

The NavisXtend CNM Gateway offers the following key features:

- Flexible and concise control over service definition, allowing service providers to create different CNM services for different markets
- Web-based access to the network information, allowing end-users to access network information with standard web browsers for cost-effective delivery
- Java technology prevents service providers from developing and implementing software revision control procedures, helping to ease the deployment and reduce the costs of CNM services
- Secure control over user access and transport of users data with use of SSL and encryption technologies
- Web-based configuration control over service definition and user privileges eases initial service provider CNM setup and on-going maintenance
- Both read and read/write access to allow end-users both viewing and control privileges
- Complete network information is available to the end-user, including configuration, real-time performance, monitoring and fault statistics
- Intelligent fulfillment of end-user requests limits the stress on the network from additional information requests
- Complete turn-key CNM solution that quickly allows service providers to offer CNM services to their customers.
- Support for both Frame Relay and ATM network information with a single CNM product

6. What are SLAs?

SLA stands for Service Level Agreement. SLA is the concept that service providers give their customers a contract for a guaranteed level of wide area network traffic delivery. An SLA can be a simple contract or a complex measured performance contract. Typically the service provider measures the service levels and informs the customer in the event they are not met. Most service providers give refunds if the contracted service levels are not met.

7. What are NavisXtend SLA Reports?

The NavisXtend™ SLA Reports allow service providers to share Frame Relay SLA information with their customers on a 24-hour basis, via Web access. These reports allow service providers to show their customer the quality of the service they are receiving. The NavisXtend SLA reports give IS Managers information about the quality and consistency of the service. The NavisXtend SLA Reports are formatted as at-a-glance understanding of the network information.

8. What types of reports does the NavisXtend SLA Report set deliver?

The NavisXtend SLA Report set consists of three reports, a summary report and two drill-down reports.

- The SLA Summary Report shows the state of the network versus the SLA contract. This report graphically and quickly shows any problem areas.
- The SLA Exception Report details any problem Permanent Virtual Circuits (PVCs) in a tabular form, with more detail on the type of errors, to help drill down and discover the problems affecting the network.

The Detailed PVC Report provides precise PVC information with a high level of granularity for further drill down.

9. What do the NavisXtend SLA reports measure?

The NavisXtend SLA reports measures SLA information for Frame Relay networks. Both network throughput and network delay statistics are measured and calculated into meaningful service level information and displayed to the customer.

10. What are the key features of the NavisXtend SLA Report set?

The NavisXtend SLA Report set offers the following key features:

- Web-based access to the SLA information – End users can access the SLA reports with standard browsers, run from their desktop. Service providers do not have to deliver and control proprietary client software, greatly easing deployment.
- Reports formatted to be easy to digest, focusing the viewer on the critical deviations in the service levels.
- Drill down reports that provide additional information to uncover problem areas
- Works with the NavisXtend Report Generator, which delivers secure access to the reports, and allows the service providers to assign and control report viewing and scheduling privileges.

Ordering Information

Product	Part Number	Availability	Current Version
Accounting Server	70029	5/98	2.0
CNM Server	70022	Shipping	1.1
Fault Server	70028	Shipping	1.0
Provisioning Server	70025	Shipping	2.0
Report Generator	70040	Shipping	1.0
Report Generator with Web Agent	70041	Shipping	1.0
Statistics Server	70020	3/98	3.0
CNM Gateway	TBD	6/98	1.0
SLA Report Set	70048	6/98	1.0

In addition to the sales of the NavisXtend server applications, you can also sell contract services from Ascend's Advanced Applications Professional Services group. This group can program value-added extensions to the NavisXtend applications for individual customer accounts. In addition to the revenue it brings to the company, this group provides a strategic differentiator to help close the deal through the ability to offer an integrated NMS solution customized to the service provider's systems and operating practices. This, in turn, provides two significant benefits:

1. The service provider uses the NavisXtend server applications faster.

2. NavisXtend is intimately integrated with service provider systems and operations to increase the service provider's reliance on Ascend's hardware solutions.

The Advanced Applications Professional Services group handles custom network management applications design, NMS software consulting services, prototype development, and complete custom application rollout. The group has engineered applications such as specialized provisioning API programs, new and customized reporting applications, and CNM gateway development for customers such as Bell Atlantic (North), NTT Japan, AT&T, and MPT China. Service providers can use this group to augment their internal development efforts and speed time to market for service delivery, and to gain an competitive advantage through NavisXtend applications that are custom-tailored to the service provider's particular operating systems and practices.