DMS
Switching Evolution
Transition Guide

DMS Switching Evolution Transition Guide

A guide to the new processes, tools, and terminology of DMS Switching Evolution-including planning, engineering, ordering, delivery, installation, support, documentation, and training

DMS Switching Evolution is a program to better equip our customers to succeed in the increasingly competitive telecommunications market. It represents a new business model for Northern Telecom-one that will support rapid feature development, enhanced performance, simpler ordering, and faster deployment of services to end users.

This endeavor includes a number of major initiatives-building on a new, layered software architecture and a greatly simplified commercial software structure for DMS SuperNode switches.
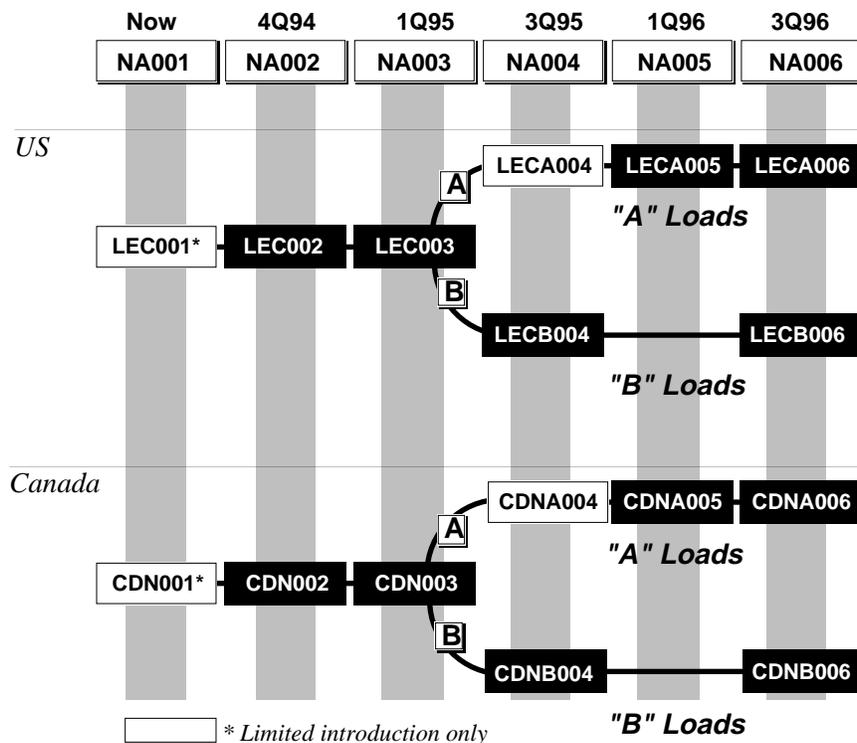
DMS Switching Evolution addresses the needs not only of our traditional customers-the telephone operating companies-but the new roster of alternate access, cellular, and cable providers. Evolution will enable telephony networks to extend their current services into new networks and create new revenue opportunities. Other customers such as cable providers can add powerful switch services to their portfolio and attract new subscribers.

DMS SuperNode Software Architecture	**Software Manufacturing & Delivery**
More manageable architecture based on distinct layers and a controlled number of interactions among layers	Programs and tools that reduce out-of-sync time, planned and unplanned outages

Software Commercial Structure	**Customer Support**
Simplified commercial structure based on generic software loads and functional groups of software	Customer-focused action teams and cross-functional "ownership" of support issues, for sure resolution

Service Activation	**Patch Management & Delivery**
Faster service turn-up through Software Optionality Control and Feature Bit Activation	Programs to minimize the number of patches and ensure patch quality, and a new, robust tool to apply patches

Functional Assurance	**Documentation & Training**
Processes to ensure consistency between traditional and new software loads	More efficient documentation structure, and delivery on CD-ROM
Engineering & Provisioning	Updates to training courses to reflect DMS Switching Evolution, plus training opportunities in new systems
New tools and provisioning models to greatly simplify engineering and provisioning	

Figure 1.   DMS Switching Evolution Redefines the Way Northern Telecom Does Business

The most visible result of DMS Switching Evolution is the replacement of traditional BCS releases and custom loads with "NA100 releases" and standard "Product Computing-Module Loads" (PCLs). Each PCL contains all the generally available software for a particular switch application in a market. Optional features-now known as "functional groups" and "optional functions"-can be activated simply by obtaining right-to-use authorization from Northern Telecom. Over time, optional features will be managed with Software Optionality Control, and right-to-use will be delivered in the form of a software password that permits the service provider to activate or deactivate the licensed feature at will.

The changes are happening now. The first PCL using the new, layered architecture began verification office testing in 1994. The first generally available PCL is scheduled for 4Q94 delivery. New processes are being implemented to streamline ordering, engineering, and customer support. These processes will be supported by sophisticated new systems, replacing mainframe "legacy" systems. The first PCL releases for the U.S. and Canadian markets are scheduled for delivery as shown below:

Now	4Q94	1Q95	3Q95	1Q96	3Q96
NA001	NA002	NA003	NA004	NA005	NA006

US

"A" Loads: LECA004, LECA005, LECA006
A
LEC001*, LEC002, LEC003
B
"B" Loads: LECB004, LECB006

Canada

"A" Loads: CDNA004, CDNA005, CDNA006
A
CDN001*, CDN002, CDN003
B
"B" Loads: CDNB004, CDNB006

☐ *Limited introduction only*

Each release includes a number of key new capabilities and feature enhancements:

- PCLs built from the **NA002** development stream will include BCS36 functionality plus Tailored Centrex Release 1 and Analog Display Services Interface (ADSI).

- **NA003** PCLs will add Tailored Centrex Release 2, AIN Release 0.1 enhancements, and a TR-303 interface through the Subscriber Carrier Module-100 Access.

- **NA004** PCLs will bring 15-digit international dialing and ISDN residential and small business services.

Details about deliverables for each release are provided in current issues of the *Feature Planning Guide*.

Contents

ABOUT THIS DOCUMENT

Northern Telecom technical groups have prepared a number of "process delta" documents, slide presentations, and related materials to present DMS Switching Evolution to customer technical representatives. In addition, marketing comunications and sales support materials have been prepared to explain the high-level concepts of the re-engineered software architecture and business model.

This document serves as a complement to these efforts. It explains the concepts, terminology, process, and systems of DMS Switching Evolution across organizational areas. The question-and-answer format provides at-a-glance answers to the questions we hear from customers.

The reader new to DMS Switching Evolution will find a comprehensive discussion of this far-reaching program in easy-to-understand language. The reader familiar with basic DMS Switching Evolution concepts will find the information necessary for implementation.

For additional copies of this document, contact Northern Telecom's Sales and Marketing Information Center at 1-800-NORTHERN, and request Product / Service Information (PSI) document number 50111.16/11-94.

DMS Switching Evolution Overview

*The "re-engineering" of DMS-100
product and service offerings*

DMS Switching Evolution includes a broad range of programs and services that redefine the way Northern Telecom does business. With a new hardware and software platform and a host of new service enablers and access technologies, DMS Switching Evolution will extend DMS services across multiple networks-including wireless and cable-and tap the power of Advanced Intelligent Networking (AIN) for a new breed of revenue-generating services.

Northern Telecom is in a unique position to deliver these differentiating services. Today, we offer the largest menu of telephony and data services in the industry. DMS Switching Evolution is taking these services beyond their traditional networks, into cable plants, fiber-optic networks, and wireless environments. And DMS Switching Evolution will support true, multivendor AIN, which will allow fast custom development of new services and their network-wide deployment and management.

For the Entire DMS Family	For the DMS SuperNode Family	For the DMS-10 Family
Installed base protection	Layered software architecture	New service capabilities
Improved processes for reduced customer cost	Simplified software commercial structure	Simpler processes
	Generic Services Framework (GSF)	Synergy with DMS-100 offerings
	Dual delivery stream	

DMS Switching Evolution Will Create a New Platform for Advanced Services
And Simplify the Way Northern Telecom Does Business with its Customers

This Guide describes 10 key areas where Northern Telecom has implemented significant process improvements pertaining to DMS Switching Evolution:

WHAT DOES SWITCHING EVOLUTION CHANGE?

DMS Switching Evolution is a far-ranging initiative that will create a new platform for advanced services and simplify the way Northern Telecom does business with its customers.

For the Entire DMS Family

For both the DMS SuperNode and DMS-10 environments, DMS Switching Evolution introduces enhancements that increase the value of the switch in the network-now and in the future-while making Northern Telecom an easier company with which to do business:

- *Installed Base Protection.* DMS Switching Evolution provides the platform to allow the installed base to provide the revenue services of the future, such as National ISDN-2, AIN 0.2, and Personal Communications Services (PCS).

- *Customer Cost Reduction through Improved Processes.* Our commercial and support services-from software packaging and ordering to documentation-are being re-engineered to decrease the time and expense required to provision, order, and support DMS switches.

For the DMS SuperNode Family

Software for the DMS SuperNode family is being restructured and optimized to improve the time-to-market for new services and enable a new generation of advanced services:

► *Layered Software Architecture.* DMS SuperNode software is being partitioned into four independent software layers with well-defined and closely managed links to other layers. The application modules-such as TOPS, within the Product Layer-can be enhanced independently to quickly meet the specific requirements of our customers.

► *Simplified Software Commercial Structure.* In line with software restructuring, switch software will be delivered in universal loads known as "Product Computing-Module Loads" (PCLs), which contain all generally available features for the switch. New capabilities will be delivered in functional groups of software-with some functions standard, some optional. The first North American PCL for local exchange carriers includes about 200 functional groups and orderable functions within those groups-compared to more than 1,000 NTX packages in the old ordering scheme.

► *Generic Services Framework (GSF) for Advanced Services.* GSF is an optional new call processing architecture for the DMS SuperNode switch that will support tomorrow's advanced revenue-generating services, such as AIN 0.2 and National ISDN-2 and -3.

► *Dual Delivery Stream.* Customers will be able to choose between two software-delivery streams based on their feature requirements.

- The *Advanced (A) Stream* is characterized by the GSF call-processing platform, and will be the focus for most future development, including AIN 0.2 and National ISDN-2 and beyond. Layered Software and GSF call processing will accelerate the development cycle for new A-Stream services to as little as three months.

- New software on the *Basic (B) Stream* will use the traditional call-processing platform to deliver regulatory features and limited new features. B-Stream releases will be less frequent than A-Stream releases, about one release per year.

For the DMS-10 Family

While this document focuses primarily on DMS SuperNode evolution, the DMS-10 switch platform is evolving as well. Several new Northern Telecom publications, available from the Sales and Marketing Information Center at 1-800-NORTHERN, describe these changes.

Many of the improvements mentioned in this document are already available on the DMS-10 platform, while others are unique to the DMS SuperNode environment. For example:

- *Product Computing-Module Loads (PCLs).* Since the DMS-10 switch uses generic loads, DMS-10 customers have already had the equivalent of a universal software load.

- *Software Optionality Control.* The equivalent of Software Optionality Control has been available on the DMS-10 switch as "Feature Bit Activation" for several years.

- *Faster time to market.* In order to improve availability of features to our customers, DMS-10 generic releases will be produced more frequently than in the past. In addition, we will continue to use OEM (Original Equipment Manufacturer) sources and business alliances to speed the time-to-market of new DMS-10 services.

- *New service capabilities.* We're taking the DMS-10 system's capabilities in new directions such as: an Enhanced High Capacity CPU, Switched 56 kbps data services, support for Meridian Business Sets, utility telemetry service, AIN, ISDN, PCS (personal communications services), new interfaces to remotes, and multimedia applications.

- *Process simplification.* As part of DMS Evolution, Northern Telecom is creating new software tools for customers to create planning quotations and place orders. By early 1995, the DMS-10 will be incorporated into these new tools, enabling faster turnaround for quotes and network planning.

- *Synergy of DMS-10 and DMS-100 offerings.* DMS-10 and DMS-100 processes will continue to converge to provide a more timely and improved Northern Telecom solution for your switching customers.

BENEFITS OF DMS SWITCHING EVOLUTION

The new software structure and business processes offer important benefits to network providers:

Faster Delivery of New Capabilities from Northern Telecom

The "decoupling" of DMS switch software from other product groups and base software allows software development to proceed on an independent cycle based on customer needs, rather than internal BCS schedules. In addition, layered software-which has a limited number of well-defined interactions among components-is far simpler to develop and test than the traditional structure that relies on thousands of interactions among features.

Faster Deployment, Fewer Software Reloads

Software is delivered in "Product Computing-Module Loads" (PCLs), which contain the full set of generally available features. As a result, new capabilities are always readily available in the switch, ready to be deployed without a new software load.

With the traditional software structure, when customers requested a package that had not been originally ordered for their BCS load, they had to reload the entire BCS load. In the new structure, Product Computing-Module Loads and Software Optionality Controls allow new services to be activated quickly for specific markets without loading base or service software.

Market-Leading Software Quality

The new architecture reduces software complexity, making feature interactions more predictable, and therefore producing more reliable software performance. In short, Northern Telecom tests the full complement of software it delivers to customer sites.

Simpler Engineering and Ordering

DMS Switching Evolution redefined software orders-mapping more than 1,500 NTX packages into a simple structure with fewer than 200 functional groups and optional capabilities within those groups. As a result, engineering and ordering are both greatly simplified.

Better Customer Service

Changes in the customer service organization are expected to trim 75 percent from the problem resolution cycle. A new software support policy offers two full years of support for a PCL release, no matter how many releases are issued in that two-year period. And documentation and training-both content and delivery mechanisms-are enhanced.

The rest of this document describes how DMS Switching Evolution will be implemented to achieve these benefits.

The New Software Structure

Simpler Ordering and Provisioning

The DMS Switching Evolution program represents a major change in the way Northern Telecom has developed software and offered it to customers. The new environment brings a new commercial structure, and new terminology that describes a simple hierarchy:

1 *DMS switch software is simplified through layering.*

2 *The four layers make up a Product Computing-Module Load (PCL).*

3 *PCLs contain all generally available software for a particular switch application in a particular market, such as a DMS-100 stand-alone switch for a US local exchange carrier (LEC).*

		NA100 PCL	
Applications	**Market Layer**	NA100	
	Product Layer	DMS-100 Common	TOPS	STP
Platform	**Telecom Layer**		
	Base Layer		
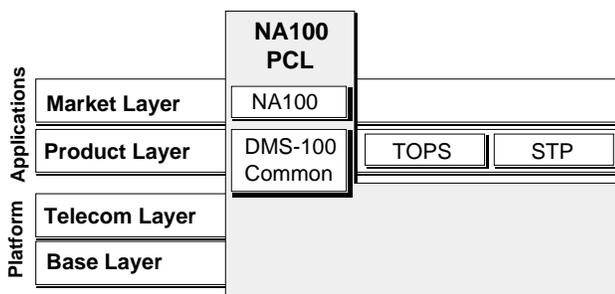
4 *PCLs include base and optional functional groups.*

5 *Some optional functional groups are activated through Software Optionality Control (SOC).*

6 *Functional groups can contain base and optional functions.*

7 *Optional functions can be activated through SOC.*

PCL

PCL

Functional Groups Some Base, Some Optional

Optional Capabilities
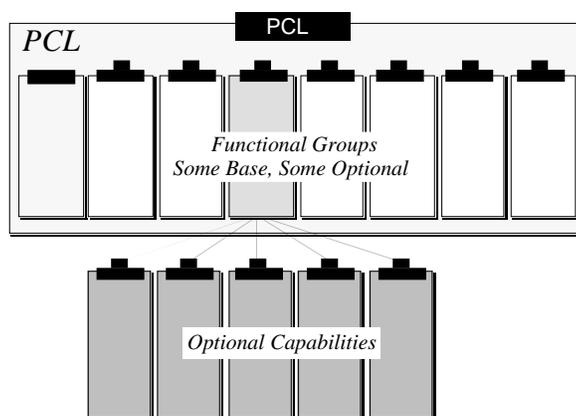
These concepts are described in the following sections.

1 *DMS Switch Software is Simplified Through Layering.*

A major component of DMS Evolution involves the simplification of switch software through layering. The restructured software features a Base Layer, Telecommunications Layer, Product Layer, and Market Layer. The layered architecture offers significant advantages over the traditional architecture.

The Current Software Structure

In the current non-layered software, any unit of software in the current code can interact with virtually any other piece of software. While this approach has allowed Northern Telecom to develop a feature-rich and flexible switch, these interactions have become more complex as the size of the software has grown (see figure below). In the current non-layered architecture, any change to the software must undergo a long process of testing to detect unexpected interactions-and the amount of testing required has grown as the software gets more complex.

The New Layered Architecture

The layered architecture will simplify software interactions in all DMS SuperNode switch software by partitioning code into relatively self-contained modules that have a small number of well-defined interfaces to the other modules. Such a software layer can be updated and tested more quickly and more reliably because there are fewer interactions to consider outside the layer. The application layers-those designed for specific DMS SuperNode applications-can be enhanced independently to quickly meet our customers' specific requirements.

Current Architecture
*Software modules may interface
many other modules.*

New Architecture
*Software is layered into more
independent modules with a
limited number of closely
managed interfaces.*
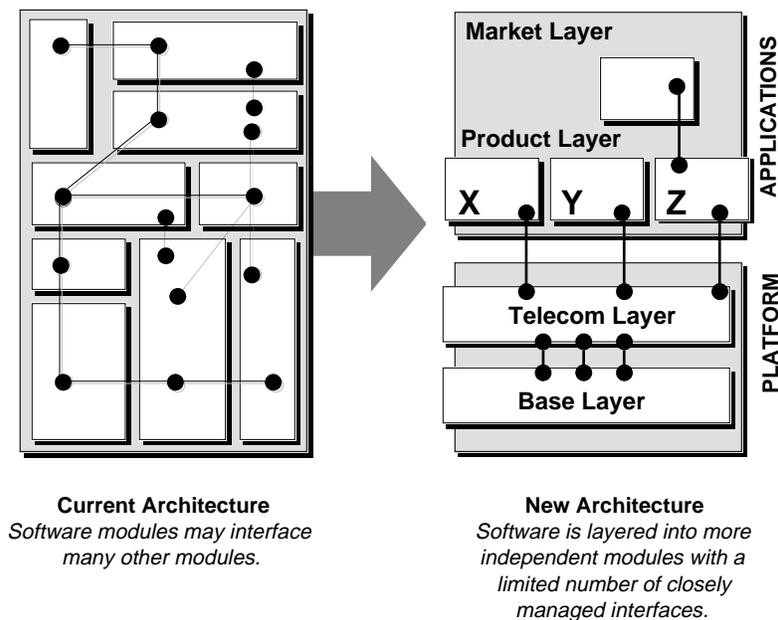
Figure 2-1. Non-Layered vs. Layered Architecture

2 *The Four Layers Make Up a PCL Software Load.*

After BCS36, traditional custom loads will be replaced with a number of Product Computing-Module Loads (PCLs), which offer the benefits of standardized software delivery while retaining the customer's ability to create a custom portfolio of licensed features on each switch. A PCL consists of the following:

- *Base and Telecom Layers combined,* which forms the foundation of the PCL
- *Product Layer,* which defines the product characteristics of the switch
- *Market Layer* for market-specific features

When a customer receives a PCL, that customer receives *all* the Computing-Module (CM) software contained in that release. For instance, a TOPS003 customer receives all the software in the Base Layer, the Telecom Layer, and the TOPS component. XPM software is provided in a distinct XPM load that is defined as an integrated part of the PCL product definition.

Market Layer

Market Layer
Software developed for a particular market

DMS-250
TOPS
North American DMS-100

Product Layer Modules
Application-specific software on independent development schedules (as often as every 6 months)

Telecom Layer

Base Layer

Generic Software Platform
A common platform for all DMS SuperNode applications, new releases every 12-18 months

APPLICATIONS

PLATFORM

Figure 2-2. Layered Software Architecture

3 *PCLs Contain all Generally Available Software for a Switch Application in a Market.*

Each PCL contains all the generally available software for a particular switch application in a particular market. There's no need to re-load software to deploy a generally available feature, because all features are already present in the switch.

Traditionally, customers ordered custom loads-a unique configuration of NTX packages to meet their individual needs. While this allowed flexibility in service selection, it had many drawbacks. If the customer chose to deploy a service resident in an NTX package not present in the switch, the customer had to completely re-load the BCS to obtain the new package. Also, custom software loads result in thousands of different software configurations in the field, greatly complicating verification and support.

4 *PCLs Include Base and Optional Software Groups.*

Within a PCL are several available functional groups-orderable entities-such as Operator Services Directory Assistance and Alternate Billing Services in the TOPS003 PCL.

PCL TOPS003

OSB	GOS	OSEA	OSDA	ABS	ADVQ	EWSS	ENSV
Operator Services Basic	Global Operator Services	Operator Services Equal Access	Operator Services Directory Assistance	Alternate Billing Services	Advanced Queuing	Enhanced Workstation Services	Enhanced Services
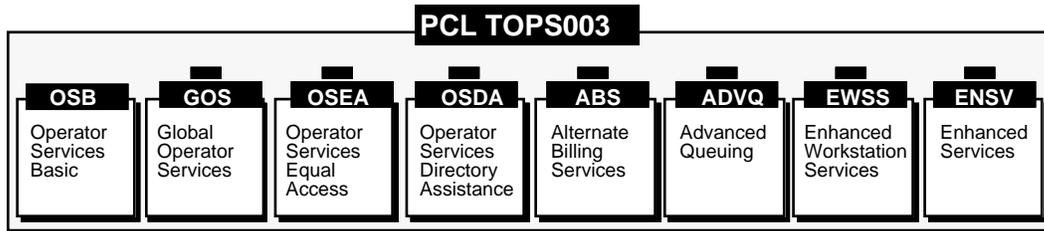
Figure 2-3. Sample Load with Functional Groups-The TOPS003 PCL

In this example, the first functional group, "Operator Services Basic (OSB)," is considered standard and is included in the price of the TOPS PCL. Every customer that receives the TOPS003 PCL can use all the software in functional group OSB. The other seven functional groups-which are included in the load but not licensed or activated-are priced separately.

Groups have been organized so that dependencies between groups are kept to a minimum. For instance, Automated Alternate Billing Service (AABS) Enhanced Services Access requires AABS. Therefore, both capabilities are contained within functional group ABS. Pictorial representations of TOPS PCL software groups are provided in the document, "TOPS Evolution Brings Simpler Engineering and Ordering," *Product/Service Information* document 50103.16/04-94.

5 *Optional Software is Activated with Software Optionality Control.*

PCLs include optional functional groups that provide specialized capabilities. In the example above, all but Operator Services Basic are optional functional groups. Initially, optional software will be deployed simply by having previously purchased the software in earlier loads or by obtaining "right-to-use" authorization from Northern Telecom. Beginning with TOPS003 and NA003 PCLs (for certain TOPS functions) and NA004 PCLs (for some non-TOPS functions), optional functions will be managed through Software Optionality Control (SOC). SOC is a DMS utility for tracking, monitoring, reporting, and controlling options.

6 *Software Groups Contain Optional Capabilities*

The optional software groups within a PCL may themselves contain several optional capabilities. For example, within Operator Services Directory Assistance (OSDA) are base directory assistance functions plus five optional capabilities. Network providers that obtain rights to use the OSDA group can order any or all of the options within that set.

It should be noted that "optional" functional groups and capabilities are truly optional. Base functions are not dependent on optional functions. For example, the software contained in the OSDA base does not require the software in any OSDA optional sets. This practice minimizes dependencies and greatly simplifies the process of engineering software for a switch.

SOC OSDA0001 **Operator Services Directory Assistance**

| SOC OSDA0002 Automated DA Call Completion (ADACC) *Includes alternate billing* | SOC OSDA0003 Automated Intercept Call Completion (AINTCC) | SOC OSDA0004 Automated Directory Assistance Service (ADAS) | SOC OSDA0005 Cellular/ IXC/ LEC ADACC Enhance-ments | SOC OSDA0006 DA Automation Interface |
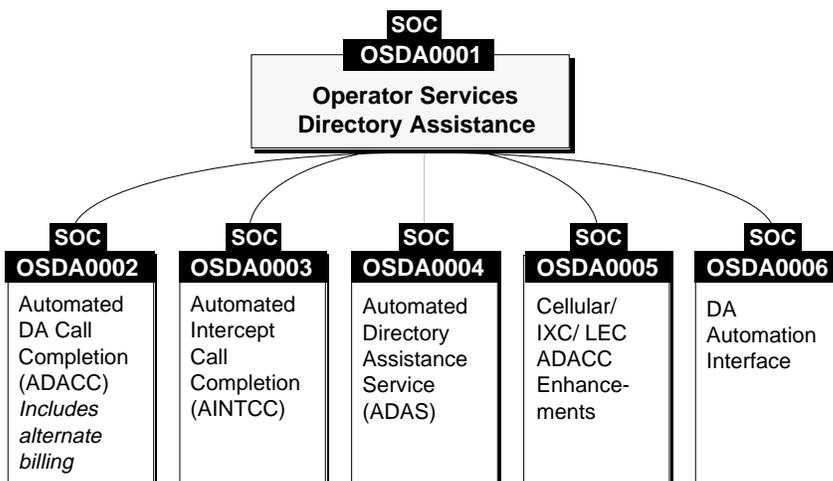
Figure 2-4. Functional Groups Contain Optional Functions

7 *Optional Capabilities Are Activated with SOC*

Just as optional functional groups may be activated with Software Optionality Control (SOC), optional capabilities within those groups are activated with SOC as well. The PCL load includes all the capabilities available at the time of release. Rather than ordering a software delivery to get a new function, the network provider simply orders the authorization, or the Right-to-Use to enable the function.

For more information about SOC, refer to section 3, "Software Optionality Control."

ANSWERS TO COMMONLY ASKED QUESTIONS
About the New Commercial Software Structure

Q *Will releases still be known as BCS releases?*

No. The concept of a BCS (Batch Change Supplement) release will be replaced by
"Product Computing-Module Loads" -PCLs. Instead of "BCS37," "BCS38," and so
on, releases after BCS36 will be known by the PCL code and a number that identifies the
development stream from which it came- LEC002 or CDNA005, for example.

Q *Are there different PCLs for different markets or switch types?*

Yes. Four PCLs are currently planned for general availability in North American markets
in the NA002 and NA003 timeframes (from 3Q94 to 2Q95); more are planned for NA004
and beyond. A list of the PCLs that have been identified for release in 1994 and 1995 is
included later in this section.

Q *How are PCLs identified?*

PCLs for different markets and switch types are identified by unique alphanumeric codes.
Unlike BCS releases, PCL naming conventions help to identify the content of the load.

Character Code. The first part of the code is an acronym that identifies several
characteristics of the load. For example:

LEC	Load for local exchange carriers
CDN	Load for Canadian local exchange market
LST	Load for DMS-100/200/STPs
LET	Load for local exchange carrier TOPS switch

Starting with PCLs built from NA004, PCLs will have either a "B,"-meaning a B-stream
(basic, traditional call processing platform) load-or an "A"-meaning A-stream
(advanced services, Generic Services Framework) load. For example:

LECA	Load for local exchange carrier using the A Stream
LECB	Load for local exchange carrier using the B Stream
CDNA	Load for Canadian carrier using the A Stream
CDNB	Load for Canadian carrier using the B Stream

"A" (Advanced) and "B" (Basic) streams are described later in this section.

Numbering. PCLs for the North American DMS-100 market are numbered according to
the North American DMS-100 (NA100) development stream from which they are built.
New NA100 releases (numbered consecutively NA002, NA003, and so forth) will be
made available for PCL builds about two or three times a year. For example, LEC002 is
built from the NA002 release, and CDNA0005 is built from NA005.

The following tables identify the PCL releases that have been identified for release in 1994 and 1995. The "Ordering Code" column lists the eight-digit code used to order the PCL.

NA001-NA003

Switch Type	Market	PCL Name	Ordering Code	A/B Load
DMS-100/200	US	**LECxxx**	LEC00xxx	N/A
DMS-100/200	Canada	**CDNxxx**	CDN00xxx	N/A
DMS-100/TOPS combo (All features in LEC plus all features in TOPS product)	US	**LETxxx**	LET00xxx	N/A
DMS-100/TOPS combo (All features in CDN plus all features in TOPS product)	Canada	**LTTxxx**	LTT00xxx	N/A

NA004 and Later

Switch Type	Market	PCL Name	Ordering Code	A/B Load
"B" Load-Traditional Call Processing Platform				
DMS-100/200	US	**LECBxxx**	LEC0Bxxx	B
DMS-100/200	Canada	**CDNBxxx**	CDN0Bxxx	B
DMS-100/TOPS combo (All features in LECB plus all features in TOPS product)	US	**LETBxxx**	LET0Bxxx	B
DMS-100/TOPS combo (All features in CDNB plus all features in TOPS product)	Canada	**LTTBxxx**	CLT0Bxxx	B
DMS-100/STP combo (All features in LECB plus all features in STP product)	US	**LSTBxxx**	LST0Bxxx	B
"A" Load-Generic Services Framework Platform for Advanced Services				
DMS-100/200	US	**LECAxxx**	LEC0Bxxx	A
DMS-100/200	Canada	**CDNAxxx**	CDN0Axxx	A
DMS-100/TOPS combo (All features in LECA plus all features in TOPS product)	US	**LETAxxx**	LET0Axxx	A
DMS-100/STP combo (All features in LECA plus all features in STP product)	US	**LSTAxxx**	LST0Axxx	A

Other PCL Loads (Not Built from NA Development Stream)

Switch Type	Market	PCL Name	Ordering Code	A/B Load
DMS TOPS	Global	**TOPSxxx**	TOPS0xxx	N/A
DMS-STP (Signal Transfer Point)	Global	**STPxxx**	STP0xxx	N/A

The NA100 development releases will not necessarily include new software for every PCL. Therefore, PCL numbering might not be sequential. For example, no "B" stream releases are planned for NA005; this means that PCL LECB006 comes after LECB004 in the U.S., and PCL CDNB006 comes after CDNB004 in Canada. This numbering strategy makes it easy to map PCLs to the larger development stream from which they are derived.

It should be noted that every PCL with the same name is the same in terms of software content-fully tested and verified in the configuration released to the customer.

Q *If there are no BCS releases, how will availability of a new feature be shown in Feature Planning Guide and other documents?*

When Northern Telecom advertises availability for DMS-100 features, it will give the NA product release in which the feature is available. For example, a feature may become available in "NA005." That means that PCLs built from NA005 will contain the feature. Note that the PCL is the orderable software load. The NA product release is not orderable, but represents the vintage of software from which the PCL is built.

Q *What does this structure do to the concept of "backward compatibility" for a certain number of BCS releases?*

Traditionally, the software support period has been designated in terms of a number of release versions back from the present release. "Backward compatibility for N-3 releases" meant that the software in question would work with the present BCS release and the previous two releases. With DMS Switching Evolution, however, PCLs for specific switch types and markets can be released on independent development schedules. As a result, support time frames and compatibility windows are designated in any of three ways:

- **In years**-"Software support for two years from date of release"

- **By the release of the North American DMS-100 development stream** from which PCLs are built-"Backward compatibility to NA002"

- **By the product release**-"Works with TOPS003, TOPS004, and TOPS005"

For more information about product support, refer to Chapter 8, "Customer Support."

Q *Does all DMS software come from the NA100 development stream?*

No. Some switch software comes from product-specific development streams that proceed on independent development cycles. The layered software architecture allows development for the Product Layer to follow separate schedules, while preserving full compatibility with the Base and Telecom layers.

Traffic Operator Position System (TOPS) PCLs, for one, are built from the TOPS development stream. Similarly, DMS-STP (Signal Transfer Point) PCLs are built from the STP development stream. Non-switch based software programs, such as those for the TOPS MPX-IWS operator workstation or Network Applications Vehicle, are developed independently from the NA100 stream.

Q *Can I order the individual layers of a PCL?*

No. The customer does not need to consider software layers when ordering a PCL. The PCL order automatically includes the latest available features in each software layer-Base, Telecom, Product, and Market, as well as XPM software.

Technically though, a PCL is a combination of three major software components, each of which is developed on an independent schedule:

- **Communications Software Platform (CSP).** The CSP includes the Base and Telecom layers, forming a software base common to all DMS SuperNode aplications.

- **DMS-100 Common.** DMS-100 Common is the Product Layer, containing all the features shared by all DMS-100 applications.

- **North American DMS-100 (NA100).** This is the Market Layer, containing the features that adapt the DMS-100 switch to serve North American markets.

These terms may occur occasionally in technical descriptions, but they are not relevant to provisioning and ordering a switch. They simply represent partitioned modules in the switch that are developed separately by distinct BNR development groups.

Q *If a PCL includes all generally available features, what will this do to processor and memory requirements?*

The various technology enhancements associated with DMS Switching Evolution-such as layering, robustness enhancements, Generic Services Framework (GSF) call processing, and standardized software loads-have only a modest impact on processor requirements. Processor upgrades will be driven by the network provider's need to deploy processing-intensive services, such as CLASS, AIN, and National ISDN.

This issue is described further in chapter 6, "Engineering and Provisioning Systems." A *Product/Service Information* (PSI) document provides planning guidelines for processor choices. To receive a copy, call the Sales and Marketing Information Center at 1-800-NORTHERN and request document 50112.16/08-94, *"DMS-100 Capacity Planner."*

Q *What will change about loading releases to the switch?*

PCLs are loaded to the switch through the familiar One Night Process (ONP), which has not changed as a result of DMS Switching Evolution. What has changed is that the number of reloads will be greatly reduced, because there is no longer the need to reload a BCS just to obtain features that were not originally provisioned. This activity now represents an estimated 30 to 40 percent of all BCS loads in North America. For more information, see chapter 7, "Software Manufacture and Delivery."

Q   *How do I order individual packages within a PCL?*

A large number of standard features are delivered with every PCL. But there are also optional software capabilities that can be purchased by the customer.

Each of these options is designated by an ordering code. Typically, a PCL ordering code will include the capabilities that now reside in several NTX packages. The capabilities of more than 500 NTX codes has been repackaged into fewer than 200 PCL order codes.

Some ordering codes deliver large groups of functions-these are referred to as *Function Groups*. In the example below (and on the following page), the customer can purchase ACD Base, CompuCALL Base, and/or ACD Networking Function Groups and receive a large group of features. These groups can be further enhanced by ordering one or more of optional *Functions* associated with the group. For example, after ordering the ACD Base Function group, the customer may choose to order ACD MIS and/or ACD Enhanced Functions for a higher level of service.

Service	AUTOMATIC CALL DISTRIBUTION		
Functional Groups	**ACD Base (ACD00001)**	**CompuCALL Base (ACD00002)**	**ACD Networking (ACD00004)**
Functions	ACD Enhanced (ACD00005) / ACD MIS (ACD00005)	CompuCALL for ACD (ACD00007)	Network ACD for PRI (ACD00010) / Network ACD for CCS7 (ACD00009)
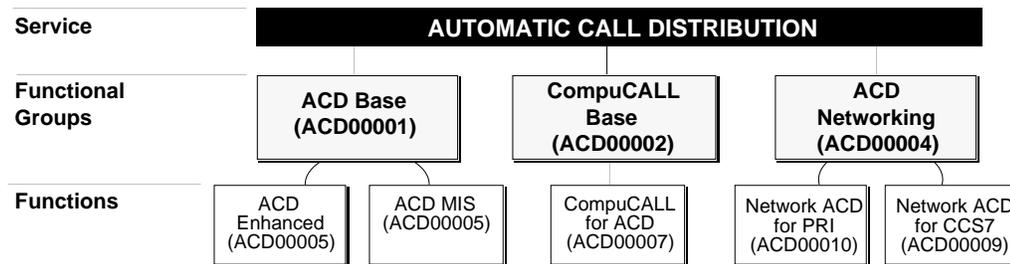
Figure 2-5. Sample Functional Group

All options within a PCL are assigned an eight-digit ordering code. The first four characters of the code are the product designation, and identify the software with a specific type of service. For example, all ordering codes beginning with MDC0 refer to Meridian Digital Centrex (MDC) options. The last three numerals are the Number Assignment, and are simply assigned in sequence to uniquely identify the option.

Q   *What is the relationship of NTX codes to PCL functional groups?*

The chart on the following page shows an example of how functional groups (leftmost columns) and functions (middle columns) map to existing NTX codes (rightmost columns) for the Automatic Call Distribution (ACD) service.

In this example, you can see that ordering ACD Base (ACD00001) gives the customer the right to use the features currently residing in NTX packages NTX407AB, NTX415AA, NTX416AK, NTX727AD, and NTXE09AB. After purchasing the right to use ACD00001, the customer can further choose two options that enhance the operation of ACD00001:

- **ACD Management Information System (MIS)** [ordering code ACD00005], which contains the functions now in NTX991AF and NTXA52AA.

- **ACD Enhanced** (ordering code ACD00006), which contains the functions now in NTXP53AA, NTX419AA, and NTX420AA.

Function Group	Function Group Name	Optional Function	Opt. Function Name	Existing NTX Code	Existing Package Name
ACD00001	ACD Base			NTX407AB	ACD CP Control
				NTX415AA	ACD Basic
				NTX416AJ	ACD Enhanced
				NTX727AD	ACD Load Management
				NTXE09AB	ACD on 2500 sets
		ACD00005	ACD Management Information Systems	NTX991AF	ACD Management Reports Two-Way Data Stream
				NTXA52AB	ACD Remote Load Mngmnt.
		ACD00006	ACD Enhanced	NTXP53AA	ACD Access Feature Grouping
				NTX419AA	N/A
				NTX420AA	N/A

Function Group	Function Group Name	Optional Function	Opt. Function Name	Existing NTX Code	Existing Package Name
ACD00002	ACD CompuCALL Base			NTXJ59AA	CompuCALL Base
		ACD00007	CompuCALL for ACD	NTXJ60AA	CompuCALL Coordinated Voice and Data
				NTXJ62AA	Third-Party Call Control
				NTXJ63AA	Voice Processing Integration
				NTXS22AA	Third-party Agent Control
				NTXR89AA	Centrex Coordinated Voice and Data

Function Group	Function Group Name	Optional Function	Opt. Function Name	Existing NTX Code	Existing Package Name
ACD00004	ACD Networking			NTXE22AA	ACD Supergroup
		ACD00009	Network ACD on CCS7	NTXN46AA	Network ACD on CCS7
		ACD00010	Network ACD on PRI	NTXN47AA	Network ACD on PRI

Q *How can I tell which NTX packages are included in other PCL functional groups?*

A *Product/Service Information (PSI)* document is available that maps the current NTX codes into the new structure for all DMS-100 software. This document also lists the NTX content of each ordering code in the new structure. To receive a copy of this document, call the Sales and Marketing Information Center at 1-800-NORTHERN and request PSI 50105.16/06-94, *BCS to PCL Mapping*.

Q *How can I be sure that my first PCL will give me the features that I have today?*

Because PCLs are designed to provide total functionality-all BCS36 and BCS36+ features, plus all new content developed since these releases-for a particular switch application in a particular market, customers can be confident that their initial PCL will deliver full feature availability from which they can select specific features for their marketing purposes.

To ensure a smooth transition of features between a switch's current BCS and a PCL upgrade, Northern Telecom includes-as part of its overall design verification activities prior to PCL introduction-a comprehensive functionality assurance process that provides a comparison of the customer's resident BCS and the soon-to-be-delivered PCL software modules. This process ensures that all present feature capabilities will be retained when the switch is upgraded.

Northern Telecom has verified more than 1,600 sites across the North American market. In addition, verification office sites moving from BCS loads to the new PCL software will have functional assurance run on the office. For customers that do not have verification offices in their network, Northern Telecom plans to conduct functional assurance analysis on Customer First applications. Other specific customer needs will be handled as required. After a service provider's initial PCL upgrade, the need for the functional assurance process decreases.

Q *What if I haven't bought all of the features in a functional group? Do I have to buy them from Northern Telecom before I can get the new software?*

When receiving a PCL generic software load, customers purchase functional groups from within that PCL that apply to their specific markets. These functional groups consist of individual feature (NTX) packages. In the new environment, sometimes customers will have previously purchased a feature package that is now part of a functional group.

While the transition to the new software is in progress, Northern Telecom will always honor previous right-to-use agreements-our customers will be allowed to retain ownership of features that are now included in functional groups, with Northern Telecom maintaining identification and tracking down to the feature (NTX) level until such time as the functional group is purchased.

Q *A functional group contains some functions I don't want and will never use. How is this handled?*

The licensing of the functional group does not require the use of all optional functions within that group. Through datafill and hardware provisioning, customers can choose which capabilities they wish to deploy within the group.

To further accommodate our customers as we transition to the new software process, in some cases Northern Telecom will allow the purchase of specific feature packages within a functional group. Because any exception arrangements will be account-specific, details should be obtained from your regional Northern Telecom representative.

Q *For some switches, we have and use optional features but not the latest versions of them. How does Northern Telecom reconcile bringing different vintages of software up to date?*

Extending the concept of Universal Software Loads (USLs), PCLs contain all BCS36 and BCS36+ feature content at the latest version, plus any new capabilities developed since these releases. Therefore, when a customer acquires a PCL, all features within that PCL will be the latest available feature.

Customers using Universal Software Loads will already be using the latest vintage of each feature. Therefore, the transition to PCLs will not involve reconciliation of different vintages. For customers using custom BCS loads, the first-time upgrade to a PCL will bring all capabilities up to the latest vintage, regardless of the vintage present on the switch before the upgrade. Because the extent of the upgrade-and therefore the nature of the reconciliation-will vary from customer to customer, arrangements will be individually negotiated by account.

Q *If a PCL includes all generally available software, do we have to purchase right-to-use for all functions?*

No. Most functional groups and functions are optional, and right-to-use is acquired for only those functions the customer requires. Software Optionality Control (SOC)-a utility in the DMS SuperNode switch-will enable the management and tracking of functions. For functions that are managed through SOC, Northern Telecom sends software passwords that allow the customer to activate or deactivate the function at will. The first SOC-controlled options appear in the TOPS003 PCL for a limited number of features. Additional functions will be managed through the SOC utility in later releases.

For more information about the SOC system, refer to section 3, "Software Optionality Control."

Q *Today we know what software we've purchased because it is resident on our switches. If every feature will be loaded on our switches, how do we track what we've purchased?*

The traditional INFORM report listed all the software loaded onto the switch. This report will still be provided, and will still indicate which software is loaded. However, because PCLs include all generally available functions-whether or not right-to-use has been obtained for all those functions-the INFORM report cannot indicate which software is licensed for use.

For this purpose, a new tracking mechanism has been provided through the Software Optionality Control (SOC) utility.

For all functions . . .
> the SOC utility reports whether or not the function has been licensed (beginning with releases built from the NA004 development stream).

For functions that are managed by Software Optionality Control . . .
> the SOC utility reports whether or not the function has been licensed, whether it is active on the switch, and-for functions where pricing is based on usage, reports the level of usage of the function.

In addition, Northern Telecom is offering the optional Software Tracking Tool (STT), which tracks the presence and ownership of software for one switch or across an entire network. The STT is scheduled for general availability in 1Q95; this first version can be used to track BCS software. PCL tracking will be incorporated into the next release of STT.

The centrally located STT database, which resides on a Northern Telecom file server, is updated continuously with information from Northern Telecom's order capture database. Authorized users can dial into STT from a Macintosh or DOS-based personal computer via modem or Ethernet connections.

A key advantage of this dial-up tracking mechanism, as opposed to a tracking mechanism within the switch, is the ability to report on software inventory across an entire network, not just a single switch. This data, organized in a relational database, provides a far more useful tool for network planners than the single-switch view formerly available from traditional INFORM report.

Q *If I just want new regulatory features, do I have to load all the software of a PCL?*

In order to acquire new function-whether a new service or regulatory requirement-the new PCL containing the function must be loaded on the switch. As an advantage, once the new PCL is loaded, all the features it contains can be activated as needed without a software reload.

Northern Telecom is considering incremental loading of software services as part of the Generic Services Framework (GSF) architecture. This program could potentially be used for regulatory features on the advanced services "A" platform. The customer choosing the "B" basic services platform will receive regulatory updates in PCL loads.

Q *Can I still get the custom loads I've been getting?*

The PCL software process was created to provide the benefits of a standardized load-benefits such as rapid feature activation, standardized switch maintenance and administration, and flexible marketing capabilities, including the ability to turn on features for six-month trial periods. Custom loads would seriously diminish these advantages and, therefore, will be discontinued with PCL introduction.

However, from a commercial standpoint, "custom" configurations are easier than ever to create. Because the PCLs contain the full portfolio of features applicable to a switch, the network provider can create a unique, custom mix of active and inactive features for each switch simply by obtaining right-to-use for those features.

Q *I understand that DMS Switching Evolution is the means to offer new advanced services. What if I don't need these new services?*

Network providers will have a choice. Beginning in the third quarter 1995 (NA004), DMS-100 customers in North American markets will be able to chooose between two types of PCL software loads; they can move to the "A" load and receive all future advanced services, or stay with traditional "B" loads with a limited number of future advanced features.

"A" (Advanced) loads are characterized by the new Generic Services Framework (GSF) call-processing platform for most future advanced services, including AIN 0.2 and National ISDN-2 and beyond. It will be possible for "A" load features to be developed on a development cycle as short as three to six months. "A" loads will be released with every new NA development stream version-approximately two times a year. The first generally available "A" loads are the LECA004 load (scheduled for 3Q95) and CDNA005 load (scheduled for 1Q96).

"B" (Basic) loads benefit from the new layered architecture but use the current call-processing platform. All commercial loads built through NA003 will be "B" loads. Starting with PCLs built from NA004, "A" loads and "B" loads will be offered, but "B" loads will be released less often than "A" loads (a "B" load about every year). "B" loads will not support advanced services such as National ISDN-2 and -3, and AIN 0.2 and later, but they will continue to meet the needs of customers without advanced-services requirements. "B" loads will contain essential services and functions, plus any required regulatory features.

Q

What is the release schedule for PCLs?

The following chart gives the general availability for the LEC PCLs (stand-alone DMS-100 switches, US customers) and CDN PCLs (stand-alone DMS-100 switches, Canadian customers).
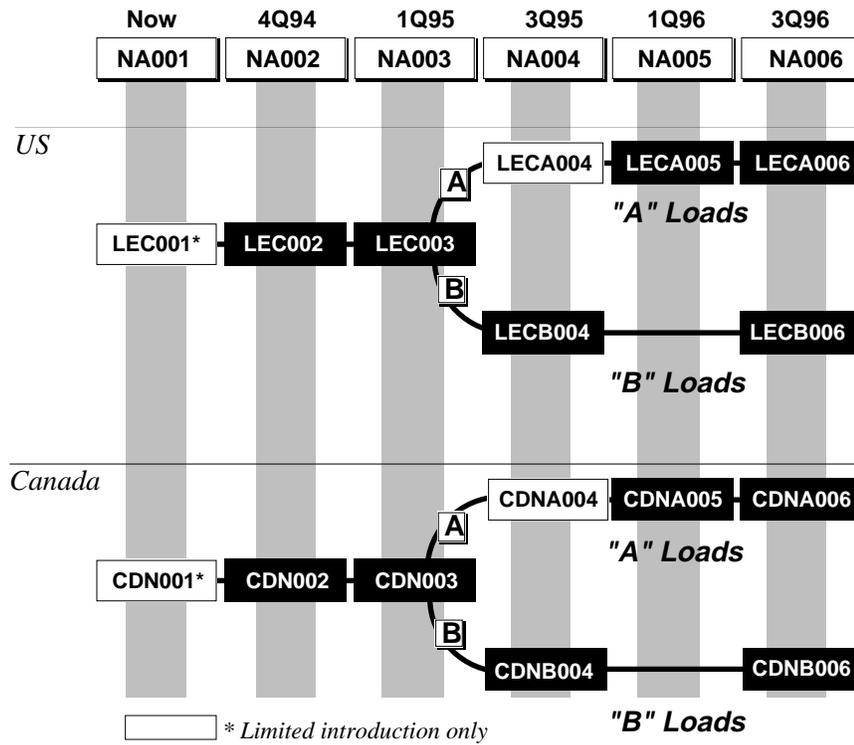

Figure 2-6. PCL Release Schedule

Software Optionality Control

3

New Methods for Activating, Deactivating, and
Tracking the Use of Optional Functions

With DMS Switching Evolution, software is delivered in "Product Computing-Module Loads" (PCLs), which contain the full set of generally available features appropriate to a particular switch type. For example, DMS TOPS switches receive PCLs that contain all generally available base software, plus the full set of operator services software-base and optional functions alike. DMS-STPs receive all generally available software-base and optional-appropriate to STPs.

Because the switch software will contain some optional capabilities that the network provider does not use-and does not wish to be charged for-a method is needed to manage the use of optional functions. The *Software Optionality Control (SOC)* system is a DMS utility that serves this purpose, performing the following tasks:

- **Supporting password protection for optional functions.** Northern Telecom will distribute software passwords for options licensed by the customer. These small password files, known as "Software Control Files," will be transferred to customers through the same network by which they receive patches today-drop boxes, X.25 communication, or dial-up modem communication. For some options, this password will simply trigger the display of a Right-to-Use flag on a tracking report. For other options, this password will be required in order to activate the option. The first passwords will be used for TOPS003 PCLs. Non-TOPS switches will see the first password-managed options in NA004 PCLs. For NA002 and NA003 PCLs, most options are managed through administrative agreements rather than the SOC utility.

- **Tracking and reporting the customer's right to use optional functions.** The SOC utility provides a SOC SELECT report, which shows which options have been licensed for use in the switch. These reports are used by customers to manage the features being used in their switches and by Northern Telecom to prepare accurate invoices.

- **Tracking and reporting on options where pricing is based on usage.** This capability, planned for 1995 introduction, provides a single interface to manage pay-as-you-play use of certain features. This strategy offers a low-risk situation whereby the customer pays based on the feature's success-and gains feature penetration through lower-cost introduction.

- **For certain options, controlling the ability to activate the option.** With TOPS003 PCLs and NA004 PCLs for non-TOPS switches, Northern Telecom will begin the limited introduction of SOC-controlled options-where a software password is required in order to activate the option. This capability provides central control of feature deployment and protects the network provider from accidental or unauthorized use of a feature.

ANSWERS TO COMMONLY ASKED QUESTIONS
About Software Optionality Control

Q *What benefits does the SOC system offer me?*

Northern Telecom's new methods for managing optional capabilities offer three important benefits to customers:

- **Significantly easier deployment of new capabilities.** With the traditional software structure, customers had to undergo a complete BCS application in order to add a package that had not been in the original load. In the new structure, Product Computing-Module Loads and Software Optionality Control allow services to be activated quickly without reloading software.

- **Protection against unauthorized use of chargeable features.** Some options will require a password before the option can be activated; for these options, the network provider can be assured that personnel cannot accidentally turn on features without authorization. Other options will have password protection that sets usage limits; for these options, the network provider can be assured that agreed limits are not exceeded.

- **Easy tracking and reconciliation of switch options.** Northern Telecom offers two mechanisms for tracking the use and licensing of switch options: the SOC SELECT report, which displays information from the switch, and the Software Tracking Tool, which displays information from an ordering database maintained by Northern Telecom. These two tools make it easy to identify the licensing and use of switch options-and to reconcile the information in the switch with customer and Northern Telecom records.

Q *How do these new methods affect options we already have?*

NTX packages have been mapped into functional groups and optional functions in the new PCL structure. An automated NTX-to-PCL cross-reference file allows Northern Telecom's Marketing Operations group to identify PCL functions the customer has already paid for in their NTX version. Any commercial issues-such as two NTX packages merged into one option-will be handled individually with the customer.

The resulting information is used to derive the customer's first delivery of PCL and password files. For previously purchased NTX packages, appropriate password files will be automatically delivered with the first PCL load to the customer. Requested options beyond that will be handled as software extensions-with passwords and invoicing delivered accordingly. This reconciliation process-and password activation for previously purchased features-will only have to take place the first time the function is delivered as a SOC-managed option. In PCL-to-PCL upgrades, this option information is preserved, and no re-activation is necessary for existing features.

Q *What methods will be used to manage options?*

Three basic methods will be used to manage optional capabilities on the DMS-100 switch:

- Most options will be "**tracking options**," which are tracked in SOC utility reports but not actually controlled by the SOC utility. Passwords are distributed for the options ordered by the customer; these passwords update the Right-to-Use flag on a SOC tracking report. The capability can be deployed at any time by providing the associated hardware, prerequisite software, parameters, and datafill.

- Other options are known as "**activatable**" options or **"SOC-controlled"** options, which require a SOC password not only for tracking purposes, but in order to activate the capability.

- Some options will be "**usage options**," where pricing is based on the present level of use or a prepurchased usage limit. For usage options, the SOC password file delivers the usage limit in addition to simple Right-to-Use, allowing network providers to monitor or control the level of use of a function.

Q *When will these methods be implemented?*

The new methods of managing optional capabilities will be implemented in phases beginning in 3Q94. The first product area to implement SOC controls will be TOPS (Traffic Operator Position System) services. TOPS003 PCLs (and NA003 PCLs that include the TOPS application) will include six SOC-controlled optional functional groups that provide specialized capabilities, such as directory assistance or alternate billing services. In the NA003 timeframe, password distribution and report collection will apply only to PCLs for DMS TOPS functions that are controlled by SOC.

- **Tracking options** will be generally implemented in NA004 PCLs.

- The first **SOC-controlled options** appear in TOPS003 PCLs for TOPS switches. Because the TOPS software also resides on DMS-100/200/TOPS combination switches, NA003 loads for these "combo" switches will also include the SOC-controlled options of the TOPS003 PCLs. SOC control for DMS-100 switch options will be introduced beginning in NA004 PCLs.

- The first **usage options** are scheduled to appear in NA004 PCLs. The largest number of usage-based options will be in the areas of mobile switching, subcriber services, and the general software for North American DMS-100 switches.

Q *Will all options be managed by Software Optionality Control?*

No. For NA002 and NA003 PCLs, options will be marketed, ordered, and engineered as options but not managed through the SOC utility. For these options, the customer purchases the right to use the option, and the option may be deployed by provisioning the associated hardware, parameters, and table datafill. No password is required. Right-To-Use fees will be assessed on the "honor system"-the customer reports which features are used on the switch, and Northern Telecom bills

> *Software for TOPS switches will include options managed through the SOC utility. This includes NA003 PCLs for DMS-100/TOPS combo switches.*

accordingly.

Beginning in NA004, all options will be managed through the SOC Utility. Some will be simply tracked through the utility; others will be monitored or controlled by the utility.

Q *What is the quotation and order process for Software Optionality Controls?*

For options in NA002 and NA003 PCLs . . .

Except for a few TOPS functions in the NA003 timeframe, options are managed by administrative agreements rather than the SOC utility. Each orderable entity (PCL, optional functional group, or optional function) will have an associated order code. Customers will place orders for options just as they do today-using the order code associated with the product.   The customer orders the function through the established ordering/engineering process and is invoiced accordingly. The formal ordering process ensures that engineering rules are addressed for successful implementation of the service. "Try and buy" periods will be available by special arrangement and are managed individually.

The PCL image in Northern Telecom's software vault is then cloned and delivered to the customer. Optional functions can be deployed simply by obtaining Right-To-Use for that option and any prerequisite options-and provisioning any necessary parameters, datafill, and hardware.

For options in NA004 and later PCLs that are <u>tracked</u> by the SOC utility . . .

The order system will initiate the generation and delivery of a software file containing the Right-To-Use password. Once this password has been applied on the switch, it will update the Right-To-Use flag in the SOC SELECT report, showing that the option has been licensed for use. The option can be deployed simply by obtaining the Right-To-Use for that option and any prerequisite options-and provisioning any necessary parameters, datafill, and hardware.

> *Note that SOC control will be used for six TOPS options in the TOPS003 (NA003) timeframe. Therefore, DMS-100/200/TOPS combo switches will have controlled options as early as NA003.*

For options in NA004 and later PCLs that are   <u>controlled</u> by the SOC utility . . .

The order system will initiate the generation and delivery of a software file containing the Right-To-Use password, required for customer activation of the option. Once this password file is executed on the switch, a single command activates each option. The SOC utility will ensure that prerequisite software has been activated before the option can be activated. The SOC SELECT report will be automatically updated to display the Right-To-Use flag and the option status. Option deployment requires any necessary parameters, datafill, and hardware to be provisioned.

Q *How long will it take to activate a feature, once we've placed an order?*

Our objective is to enable customers to turn on features within 48 hours of processing an order. In many cases, this will be easily achieved. However, additional time will be required for options that require detailed engineering, additional hardware, or delivery of the password via modem.

If the customer orders options at the same time the PCL is ordered . . .

SOC password production and distribution will be initiated two days before the PCL application date. SOC Control Files will be delivered before or on the application date.

If the customer orders options separately from the PCL order . . .

SOC passwords are produced two days before the option's application date. If the customer wants immediate delivery of passwords, the application date in the order can be set to "Today," and password production and distribution are initiated immediately. The password production and distribution interval may range from 10 minutes to two days, depending on the type of access to the customer:

- Five minutes for distribution to a secure drop box
- Less than 30 minutes on average for X.25 distribution directly to site
- One to two days maximum for distribution to site via dial-up modem

In the future, the SOC utility will support pre-delivery of SOC Control Files before delivery of the related PCL. With this capability, the customer can turn on features immediately after installation of the PCL-on the same night if desired. However, SOC provides a unique opportunity to separate the two tasks-(1) receiving the load and (2) activating new capabilities-thereby improving the reliability of both.

Q *How do I track the use of optional functions?*

For options in NA002 and NA003 PCLs . . .

The optional Software Tracking Tool (STT) tracks the presence and ownership of software for one switch or across an entire network. The STT is scheduled for general availability in 4Q94, and can be used for PCLs built from the NA002 and subsequent software releases.

The centrally located STT database, which resides on a Northern Telecom file server, is updated continuously with information from Northern Telecom's order capture database. Authorized users can dial into STT from a Macintosh or DOS-based personal computer via modem or Ethernet connections.

A key advantage of this dial-up tracking mechanism is the ability to report on software inventory across an entire network, not just a single switch. This data, organized in a relational database, provides a far more useful tool for network planners than the single-switch view formerly available from traditional switch INFORM reports.

For options in NA004 and later PCLs that are managed by the SOC utility . . .

The SOC utility SOC SELECT report lists all options in a PCL and whether or not the option has been licensed. For usage options and SOC-controlled options, the SOC SELECT report also shows option status, usage limits, current level of use, and other applicable information.

> SELECT NAME CTX BRIEF

GROUP: CTX

OPTION	NAME	RTU	STATE	USAGE	LIMIT	UNIT	LAST CHG	
CTX00075	CALL RETURN	N	IDLE	-	-	-	94/01/02	
CTX00128	CALL FORWARDING	Y	ON	-	-	-	94/01/08	
CTX00130	CALL WAITING	Y	-	578	1000	lines	94/02/25	
CTX00131	RING AGAIN	Y	-	350	400	lines	94/02/15	
CTX00153	CALL FORWARD BUSY	Y	IDLE	-	-	-	94/02/05	
CTX00173	CALLING LINE ID	Y	-	302	20,000	lines	94/02/15	
CTX00180	CONFERENCE	Y	-	-	-	-	94/01/02	TRAK
CTX00185	HOT LINE	Y	-	-	1500	lines	94/01/08	TRAK

Figure 3-1. Sample SOC SELECT Report (Preliminary)

One version of this report is designed for transmission to Northern Telecom. This version is created by invoking the SOC CI command SELECT ALL PACK.   This version of the report is intentionally terse to save space and reduce transmission bandwidth requirements. The customer can obtain the same report content formatted with data field titles and option descriptions by invoking the SOC CI command SELECT ALL without the PACK operand.

In addition, the Software Tracking Tool, described earlier, will provide reports of option licensing as recorded in a central database maintained by Northern Telecom based on ordering records.

The DMS switch log system will produce an audit trail of events related to the SOC utility. State changes, limit changes, and usage exceeding thresholds, for example, will all generate logs indicating the option, event, user, terminal, date and time of the event.

Q *What happens if an optional function requires other additional hardware or software?*

Engineering to identify other requirements will continue to take place as part of the order process for all options. As a result, these issues will be identified during the engineering process, just as they are today, before delivery of the password file.

When a new PCL is ordered, the customer can elect to engineer the office for some specific options, even though they are not yet activated. This may eliminate engineering requirements later.

For options that are actually controlled by the SOC utility, the utility will check for software dependencies during option activation-and advise the user which software is required. Software prerequisites for an option can also be displayed in the detailed version of the SOC SELECT report.

Q *How does Software Optionality Control work in "nested" options?*

The optional software groups within a PCL may contain several optional capabilities. For example, within the Operator Services Directory Assistance (OSDA) functional group for DMS TOPS switches are base directory assistance functions plus five optional capabilities. Network providers that obtain rights to use the OSDA group can choose to order any or all of the options within that set.

Just as optional functional groups may be managed with Software Optionality Control (SOC), optional capabilities within those groups may be managed with this utility as well. In fact, for options controlled by the SOC utility, the SOC system ensures that the functional group is activated before any of its "nested" capabilities can be activated.

Q *How are SOC Control Files identified?*

SOC Control Files (passwords) are given unique names-16 digits or less-that contain the 11-digit Common Language Location Identifier (CLLI) of the office receiving the option(s), a '$' (dollar sign) delimiter, and the initials 'SCF' (representing SOC Control File). This naming convention will facilitate automation for customers that choose to manage their own distribution.

Each record within this file will provide the Right-To-Use (password) for an option. For "pay-as-you-play" options, the usage limit will be encoded in the password. The password consists of 20 alphanumeric characters, and is unique for each option at each site. The passwords to assign and remove the Right-to-Use are also different.

Sample SOC Control File

```
Filename:  OTWAON17DS1$SCF
Contents:

OTWAON17DS1
+  OPTCODE1  Q92KJ23A9XCCLQW98137
+  OPTCODE2  A4DB5TYFVNBXCI1247AE
+  OPTCODE3  U9Q34TW98FSLVN2YPM43
```

In the rare event that a password must be re-delivered, the system can generate passwords previously delivered to an office.

Q *How are SOC Control Files delivered?*

SOC Control Files are passed to the distribution tool immediately after they are produced. Two distribution methods are available to the customer:

- Northern Telecom distributes the SOC Control Files **directly to the customer's switch** through dial-up modem connections or X.25 communication. The user then executes a CI command to apply the SOC Control File.

- Northern Telecom sends the SOC Control Files **to a secure drop box** and the customer takes responsibility for transfering these files to the switch. Security is established through an approved list of customer machines, accounts, and passwords. Customers cannot view each others' files. The customer accesses the drop box via modem, retrieves the password file, and distributes it to the designated site.

These methods are consistent with Northern Telecom's existing patch distribution process. The same tools will be used. Note that the SOC Control File is not a patch file; it simply flows through the same distribution channels.

Only the password is delivered as a result of ordering an option. The actual option software-and documentation for the optional function-will have been delivered with the Product Computing-Module Load (PCL).

Q *How do I apply SOC Control Files to the switch?*

The SOC CI command   ASSIGN KEY FROM <filename>[<device>]   instructs the SOC utility to process the SOC Control File. This applies all passwords associated with the customer order. For TOPS003 PCLs, the SOC CI command is ASSIGN PASSWORD FROM <filename>[<device>] .

Application of each password does not automatically turn the option on; it simply causes the switch to recognize that the option has been licensed for use.

Q *How do I activate optional functions?*

For options in NA002 and NA003 PCLs . . .

> Optional functions are deployed simply by obtaining Right-to-Use for that option and any prerequisite options-and provisioning any necessary parameters, datafill, and hardware. License agreements are tracked through the Software Tracking Tool.

For options in NA004 and later PCLs that are <u>*tracked*</u> *by the SOC utility . . .*

> The customer receives a password file that updates the Right-to-Use flag on the SOC SELECT report, showing that the option has been licensed for use. The option can be deployed simply by obtaining Right-to-Use for this option and any prerequisite options-and provisioning any necessary parameters, datafill, and hardware.

> *Note that SOC control will be used for six TOPS options in the TOPS003 (NA003) timeframe. Therefore, DMS-100/200/TOPS combo switches will have controlled options as early as NA003.*

For options in NA004 and later PCLs that are   <u>controlled</u> by the SOC utility . . .

The customer receives and executes a SOC Control File that permits activation of the feature. The SOC utility provides a user interface that then allows the customer to activate (turn *on*), deactivate (*idle*), and report on the options.   The *on* state allows full operation of the option; *idle* prevents the feature from being used but retains any datafill previously assigned. The utility checks for software dependencies during option activation and advises the user if prerequisite software must be deployed. Option deployment requires any necessary parameters, datafill, and hardware to be provisioned.

Q *Can I later deactivate a SOC-controlled function?*

Yes. Once licensed to use a SOC-controlled option, the customer may activate and deactivate it at any time through command entry at the DMS Maintenance and Administration Position (MAP), without Northern Telecom involvement.

When activating a feature, the SOC utility checks to see that the option is licensed for use, before allowing any state change. When deactivating a feature, the switch checks to see if datafill exists for the option. If it does, the switch provides a warning describing the effect of deactivating the feature. If the system administrator chooses to proceed, the option will be deactivated and will no longer be in use, but all datafill will be preserved. Once deactivated, the option can be activated again without Northern Telecom involvement.

Whether the customer chooses to activate or deactivate the feature, it remains licensed for use. The capability to remove licenses will be introduced with NA004 PCLs.

Q *Will password processing be automated as part of the One Night Process?*

For the first generally available PCLs, the process of applying SOC Control Files will not be automated during the One Night Process (ONP). However, the SOC-controlled options in these early PCLs implement new capabilities, so there is no danger of temporarily losing functionality during the ONP. SOC Control Files can be applied after the ONP, even on the same night, or at a later date.

With NA004, Northern Telecom is introducing the ability to process passwords *before* loading the PCL to which the password applies. For example, the customer could order, receive, and apply a password for an NA005 option while the site is at the NA004 release. The SOC utility will record the password as "pending" and will automatically process the password during the ONP upgrade to the NA005 PCL containing the option. This also provides a framework to implement SOC control on existing features and maintain functionality over an ONP.

The ONP will not activate options that are new or that were previously idle. This approach avoids adding complexity to the ONP, thereby improving the opportunity of a successful reload. The customer may activate options later on the same night as the ONP.

Q *Will I have to repeat SOC processing after I apply each new PCL load?*

No. The One Night Process (ONP) for reloading office software will preserve option Right-to-Use and status settings. Options that were active before the One Night Process (ONP) will be active after the upgrade. Options that were idle before the upgrade will remain idle.

Q *What controls are in place to ensure that this process is successful?*

For one, engineering approval takes place before passwords are generated. This means that certain assurances are in place even as the SOC Control Files are delivered.

The DMS switch log system maintains a complete audit trail of activities related to the SOC system. The log will record any warnings issued by the switch, such as those for problems experienced applying a SOC Control File, or for attempts to activate a function that has not been licensed, or to de-activate a function that has datafill associated with it.

To make it easily understood where the licensed option may be used, a separate password will be issued for each option in each office. The SOC Control File will include the CLLI code of the office, making it simple to properly distribute SOC files to multiple locations.

Q *Will the SOC system support usage-based pricing-"pay as you play" agreements for options?*

Yes. "Pay as you play" agreements help minimize start-up cost and risk of introducing new services. Customers pay for the service based on the success of the feature.

The SOC utility will support usage-based pricing for options starting with NA004 PCLs. Options may be paid for on a per-use or a per-resource basis. The SOC utility tracks the number of "uses" or resources and reports them to Northern Telecom as part of the regular SOC status report collection.

If the license includes usage limitations, these may be defined to the SOC utility as "soft" or "controlled" limits. For example, the license may specify that the customer may provision 20,000 lines of the service. If the option is provisioned with "soft" limits, the SOC utility generates a log message and a flag in the SOC SELECT report if that usage level is reached. For "controlled limits," the SOC utility actually prevents datafill that exceeds the limit. For either type of usage limit, the SOC utility threshold capability will provide warnings in the status report and through the DMS switch log system that the limit is being approached.

Q *For usage-based option pricing, how is usage reported?*

Through the SOC Status Report. The SOC utility will generate a report file when the SOC CI command   SELECT ALL PACK   is invoked. The packed file is intentionally terse to minimize transfer and storage requirements.

For NA003 containing the TOPS component, the SOC Status Report will contain the following information:

> Office Common Language Location Identifier (CLLI)
> Report generation date
> Ordering code of the PCL
> Ordering code of each option
> Which options are licensed for use
> State of each option
> Date of last state change for each option
> File integrity code (to validate data contained in the report)

For NA004 PCLs, the SOC report will also include current usage and usage limits.

Two options are available for sending the SOC Status Report to Northern Telecom:

- Northern Telecom collects the report directly from the customer's DMS switch through dial-up modem connections or X.25 links.

- The customer sends the SOC Status Report to a secure drop box for Northern Telecom to pick up.

Specific contractual arrangements-such as reporting schedules, method, and usage-based charges-will be individually negotiated with customers and administered by the Marketing Operations group.

Q *How is the use of SOCs for other optional functions reported to Northern Telecom?*

Because SOC Control Files are obtained through the established ordering/engineering process, notification to Northern Telecom is automatic through the order management process. However, usage-based pricing is made possible through regular collection of SOC Status Reports. SOC Status Reports also provide automated reconciliation of ordered options versus delivered options.

Q *What protections are in place to prevent unauthorized or accidental use of SOC controls?*

The protections set in place by the network provider to control users' access to the Maintenance and Administration Position (MAP) provide the first level of protection against unauthorized use of SOC controls. Only authorized users will be able to issue the CI commands that load SOC Control Files to the switch and activate or de-activate options. Additional protections are built into the SOC utility itself, for example:

- SOC passwords are unique for each option and site, which prevents options from being activated at the wrong site.

- The SOC utility enforces option dependencies and Right-to-Use license during option activation. The utility informs the user which prerequisite software is required.

- A warning would be issued if the user tried to change an option state to IDLE for an option that had datafill assigned to it. The user would be required to enter the full 20-character name of the option before the state could be changed. This practice protects against accidental deactivation of an option.

- The DMS switch log system and SOC SELECT report will produce an audit trail of SOC-related events. This will enable authorized administrators to track the use of SOC Control Files and optional functions. In addition, Northern Telecom will compare customer-provided SOC Status Reports with Northern Telecom's most recent view of the switch's option status. Any discrepancies will be brought to the customer's attention for their investigation.

Q *What if I need help with a SOC Control File or SOC option?*

Help with the Function	Northern Telecom's TAS (Technical Assistance Service) and ETAS (Emergency Technical Assistance Service) organizations will continue to provide technical assistance for installed and deployed software.
Help with the SOC System	Since each option with a SOC Control File is formally tested by BNR before release, option problems in the field should be rare. If a problem is encountered, a "Triad" team of representatives from Product Management, Emergency Technical Assistance Service (ETAS), and BNR design will correct the problem.

For either type of problem, help is obtained through the central 1-800-NT-4HELP number.

Q *What changes do I have to make to my internal procedures or systems to address SOCs?*

SOC Control Files are received (and SOC Status Reports sent) through the same methods used to distribute patches today, so there is no new requirement for electronic communication. However, for PCLs that include SOC-managed options, staff must be prepared to perform the following new tasks:

- Receive and apply SOC Control Files to the switch
- For SOC-controlled options, issue a SOC CI command to activate each option
- Review SOC logs, which provide an audit trail of all meaningful SOC events
- Generate SOC Status Reports on a schedule agreed to with Northern Telecom

These tasks are performed using the existing DMS-100 Maintenance and Administration Position, existing patching drop boxes, X.25 or modem communication, and reporting mechanisms. No new hardware or software systems or applications are required for Software Optionality Control.

Customers ordering PCLs with the SOC utility will automatically receive a user guide to the SOC utility with their PCL documentation.

Functional Assurance **4**

*Delivering predictable and reliable performance before and
after implementation of the new software structure*

Northern Telecom has taken great care to ensure that no required functionality will be lost or changed when customers move from the BCS environment to the new DMS Switching Evolution software. As the new Product Computing-Module Loads (PCLs) were structurally defined, designers at Bell Northern Research (BNR) compared the new PCLs to the existing software in more than 1,500 offices across North America, performing the following functional assurance tasks:

- Individually examining each deleted module to ensure that no required capabilities had been removed from the switch

- Analyzing the PCL product to ensure that pieces of the software worked appropriately together

- Identifying mutually exclusive packages and adjusting the product accordingly

Therefore, functionality and feature interworking is verified thoroughly in the PCL testing and verification process. Rigorous performance criteria must be met before the product is delivered to verification office (VO) sites.

Northern Telecom then conducts a second stage of verification, performing the following detailed analysis for each VO site:

- Comparing the module listing of the office to the PCL received, and analyzing each deleted module to ensure that there is no loss of expected functionality

- Preparing a delta list showing changes in parameters, logs, tables, and operational measurements-with explanations of the functional impact of these changes-and providing this information to the VO sites before insertion

ANSWERS TO COMMONLY ASKED QUESTIONS
About Functional Assurance in the Transition from
Traditional to New Software Structures

Q *Will the new software structure change anything about today's functionality in operations, administration, and maintenance?*

Restructuring has both added and deleted certain functionalities from the software. However, rigorous quality control procedures have been established to ensure that none of the functionality being deleted was needed in that market, and none of the added functionality would cause any negative side effects by being delivered in the software load.

Functional changes fall into the following categories:

- New tables, logs, and office parameters that will be added to the switch because they are associated with PCL functions not previously resident on the switch. For example:

  - The new R2PROT table stores information used for implementing the R2 signaling protocol. If the resources to perform R2 signaling are not in place, datafill in this table has no effect.

  - The MAX MFT FILES office parameter-used outside of North America for manual file transfer using the RASL protocol-is not needed on North American switches but it is present in the Telecom Layer of the software. Setting this office parameter has no effect on the switch.

- Tables, logs, and office parameters removed from the switch, because they are associated with obsolete functions or functions not used in North America.

  - The CCARD Log will not be present in the new software because it is only used for international credit card calling.

  - The OFFICE_DS_FUN_NOM parameter will not be present in the new software because it is used with CCS6 signaling, a discontinued function.

Q *How can I get detailed information about operational changes?*

Northern Telecom will perform a functionality assurance analysis on VO switches to make sure that all required functionality has been retained in the transition from traditional to new software architectures. This analysis will also identify any changes in logs, operational measurements, tables, and office parameters.

For network providers that do not have VO switches, this functional assurance analysis will be performed on the first switch that receives a new PCL load. To request this service, contact your regional customer service organization.

Q   *Will there be any changes in the way end users see the features they use?*

No. The new software structure has changed the behind-the-scenes organization of software code, but not the actual operation of software features. For example, Meridian Digital Centrex and CLASS features will perform exactly as they did before software restructure. So will data communications services, operator / caller interactions, and other end-user services in the existing portfolio.

Q   *Will the format, presentation, or delivery of billing records change?*

No. As with end-user features, the new software structure has changed the behind-the-scenes organization of software code for billing, but not the actual operation of the billing function. Screen displays, log formats, feature interactions, and interfaces are the same as with the traditional software. No modification to downstream processes or systems will be required in the transition from BCS to new software structures.

Q   *What testing procedures is Northern Telecom using to identify operational and administrative changes?*

BNR carries out two levels of testing to verify the performance of new capabilities being added to the PCL. Unit testing tests the individual feature; integration testing tests the feature after it has been added to the PCL.

Once the new function has successfully passed this testing, the Product Test group performs four more levels of testing: product testing, regression testing, traffic testing, and One Night Process testing. These test suites have been run on previous releases, including BCS36 and BCS36+-then on the current PCL release-to validate correct operation of features.

Q   *Besides testing, what quality control mechanisms are in place to ensure that DMS Switching Evolution programs are successful?*

Northern Telecom and BNR have always used a rigorous Gate process-a series of milestones in development and verification-to keep development on course and ensure that quality targets are met as the feature moves toward final release to customers. This quality assurance process will be still required for all new function development.

In addition, architectural reviews and code design reviews are held for any changes going into a PCL to ensure that those changes are implemented correctly and that the architectural integrity of the software is maintained. The functional assurance process, described earlier, provides a double-check to see that quality standards are met.

BNR designers also analyze in-service statistics reported in quarterly RQMS (Reliability and Quality Metrics System) reports to gauge the real-world success of their development and verification processes-and to devise improvements to the software and processes.

Q *Where can we get detailed advance planning information about the functional changes coming with 1994 and 1995 releases?*

High-level information about new and enhanced capabilities will be communicated in the *Feature Planning Guide (FPG)*, a catalog published each year, with a two-year view of software offerings. The latest edition of the FPG was published in June 1994 and presents a two-year view of software offerings from BCS36 to NA006.

Detailed technical information will be found in the *Northern Telecom Publications* (NTPs) provided with each release. For more information about documentation changes brought by DMS Switching Evolution, see chapter 10, "Customer Documentation."

Quotations, Ordering, and Invoicing

Simplifying the way Northern Telecom does business

Central to DMS Switching Evolution is the simplification of business processes. From planning quotations through ordering and final billing, our goal is to offer our customers a friendlier and more efficient environment. Improvements now well underway will make Northern Telecom an easier company with which to do business, while bringing new services to market more quickly.

The simplified software structure-described in chapter 2, "The New Software Structure"-is the foundation of this effort. In the new software structure, many hundreds of NTX feature packages are replaced by a manageable number of functional groups and optional functions for easier ordering.

After BCS36, Northern Telecom will begin delivering Product Computing-Module Loads (PCLs) instead of BCS releases or Universal Software Loads (USLs). Each PCL consists of all the generally available software for a particular switch application in a particular market. The network provider can choose to license any or all of the capabilities in that PCL. Quotation and ordering processes will evolve to incorporate this structure, offering three important advantages:

- It reduces the number of orderable entities that must be selected in order to provide a service.
- It organizes the orderable selections into logical groups, thereby reducing the time and effort required to select the desired software options.
- It completely eliminates the need to reload the software release just to add new generally available capabilities. New services can be offered simply by obtaining license to use them.

A PCL includes several optional functional groups-orderable entities-such as Operator Services Directory Assistance in the TOPS003 PCL example below. These functional groups-while they are included in the load, but are not activated or licensed-are priced separately.

The familiar ordering tools-NT-ACCESS, PAQS, and PRISM-are being updated to address this new structure, while new, simplified ordering and quotation tools are being developed. For the near term, the capabilities will exist to order either by traditional feature packages or new functional groups and functions-with planning through a two-year horizon. By mid 1995, these systems will support the mix of functional groups and individual software packages in the same order-enabling a smooth transition to the new, simplified methods.

PCL TOPS003

OSB	GOS	OSEA	OSDA	ABS	ADVQ	EWSS	ENSV
Operator Services Basic	Global Operator Services	Operator Services Equal Access	Operator Services Directory Assistance	Alternate Billing Services	Advanced Queuing	Enhanced Workstation Services	Enhanced Services
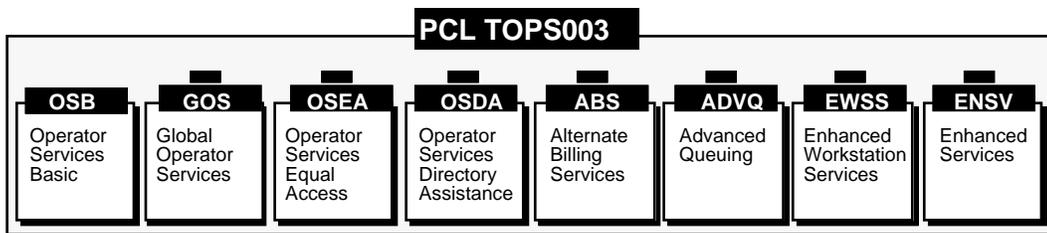
Figure 5-1. Sample Load with Functional Groups-The TOPS003 PCL

ANSWERS TO COMMONLY ASKED QUESTIONS
About Quotations, Ordering, and Invoicing

Q *Does the new software structure affect basic ordering concepts?*

Yes. Changes will be introduced gradually to allow customers to maintain continuity with previous processes. Ultimately, the new ordering process will be much simpler than in the past. Instead of ordering a unique collection of feature packages, customers order a standard Product Computing-Module Load (PCL) for the switch type and market. For example, U.S. local exchange carriers would order the current LEC load. Canadian customers order the current CDN load. For signal transfer points (STPs), the LST load would be ordered. TOPS switches would receive the TOPS PCL. A list of currently defined PCLs is provided in chapter 2, "The New Software Structure."

For a base price, the customer receives a PCL that includes all generally available features appropriate for the switch type and market. Many capabilities are included in the base price; others are delivered in the load but not automatically licensed for use.

For example, in the TOPS PCL for operator services switches, the Operator Services Basic functional group is included in the base price of the PCL. Other functional groups, such as Operator Services Directory Assistance and Enhanced Workstation Services, are optional and priced separately. However, all capabilities-base and optional-are delivered in the software load, along with associated tables, logs, office parameters, and documentation.

The concept of a BCS (Batch Change Supplement) release is replaced by PCLs. Instead of "BCS37," "BCS38," and so on, releases after BCS36 will be known by a PCL code and a number that identifies the development stream from which it came-LEC002 or LEC003, for example. For more information about PCL naming conventions, see chapter 2, "The New Software Structure."

Q *What if we want software for the Generic Services Framework?*

Software for the Advanced Services Platform, to support such services as AIN 0.2 and National ISDN-2, will also be delivered in PCLs. An "A" or "B" in the ordering code indicates whether the PCL is an "A" load with advanced services on an enhanced call-processing platform (Generic Services Framework)-or a "B" load that benefits from the new layered software structure, but continues to use the current call-processing platform.

The first generally available "A" loads are the LECA005 (for U.S. local exchange carriers) and CDNA005 (Canadian carriers) loads, scheduled for the first half of 1996.

Q *Given that the new software is layered, do we have to order the individual layers of a PCL?*

No. A service provider does not need to consider software layers when ordering DMS-100 software. Each new PCL order automatically includes the latest generally available features in each software layer-Base, Telecom, Product, and Market, as well as XPM software.

Technically, a PCL is a combination of three major software components, each of which is developed on an independent schedule:

- **Communications Software Platform (CSP).** The CSP includes the Base and Telecom layers, forming a software base common to all DMS SuperNode applications.

- **DMS-100 Common.** DMS-100 Common is the Product Layer, containing all the features shared by all DMS-100 applications.

- **North American DMS-100 (NA100).** This is the Market Layer, containing the features that adapt the DMS-100 switch to serve North American markets.

While these terms may occur occasionally in technical descriptions, they are not relevant to provisioning and ordering a switch. They simply represent partitioned modules in the switch that are developed separately by distinct BNR (Bell Northern Research) development groups.

Q *Can I still get the custom loads I've been getting?*

The PCL software process was created to provide the benefits of a standardized load-benefits such as rapid feature activation, standardized switch maintenance and administration, and flexible marketing capabilities, including the ability to turn on features for trial periods. Custom loads would seriously diminish these advantages and, therefore, will be discontinued with PCL introduction.

However, the new product structure gives the service provider unusual flexibility in creating custom configurations-by activating and deactivating optional services at any time, without reloading the software.

Q *How do we order optional functions within a PCL?*

A large number of standard features are delivered with every PCL. In addition, there are also many optional software capabilities within the PCL to tailor the service set and meet the operational requirements of the switch.

Commercial Options and SOC Options. Initially, optional software will be activated simply by having previously purchased the software in earlier loads or by obtaining "right-to-use" authorization from Northern Telecom. These options are known as "commercial options." In later releases, optional software will be activated with Software Optionality Control (SOC)-whereby Northern Telecom delivers software "keys" that allow capabilities to be turned on. These options are known as "SOC options." The first generally available TOPS PCL (TOPS003) includes the first SOC options. For more information about Software Optionality Control, refer to chapter 3, "Software Optionality Control."

Ordering Codes. Whether optional functions are managed by SOC or the commercial option ordering method, the ordering method is the same. Optional functions are ordered by their unique, eight-digit ordering codes. Typically, a new ordering code will contain the functionalities of several previous NTX packages. The number of software option ordering codes in a typical DMS-100/200 switch will be reduced from more than 1500 NTX codes to fewer than 200 PCL function codes, greatly simplifying provisioning and ordering.

The first four characters of the code are the product designation, and identify the software with a specific type of service. For example, all ordering codes beginning with MDC0 refer to Meridian Digital Centrex (MDC) options. The fifth character is a "0" if the option is available in both "A" and "B" loads, "A" if available only in an "A" load. The last three numerals are the ID number-they have no special significance except to uniquely identify the switch option.

Examples of Switch-Option Ordering Codes

Service	Service ID	Load Designation	ID Number	Load Type
Meridian Digital Centrex Standard	**MDC0**	**0**	**003**	"A" and "B"
Meridian Automatic Call Distribution	**ACD0**	**0**	**001**	"A" and "B"
Residential Subscriber Services	**RES0**	**0**	**001**	"A"
National ISDN PRI Base	**NI00**	**0**	**022**	"A" and "B"

Functional Groups and Optional Functions. Some ordering codes deliver large groups of functions-these are referred to as ***functional groups***. In the example pictured here, the customer can purchase ACD Base, CompuCALL Base, and/or ACD Networking functional groups and receive a large group of features. These groups can be further enhanced by ordering one or more optional ***functions*** associated with the group. For example, after ordering the ACD Base functional group, the customer may choose to order ACD MIS and/or ACD Enhanced functions for a higher level of service.

Service — AUTOMATIC CALL DISTRIBUTION

Functional Groups

ACD Base (ACD00001) | CompuCALL Base (ACD00002) | ACD Networking (ACD00004)

Functions

ACD Enhanced (ACD00005) | ACD MIS (ACD00005) | CompuCALL for ACD (ACD00007) | Network ACD for PRI (ACD00010) | Network ACD for CCS7 (ACD00009)
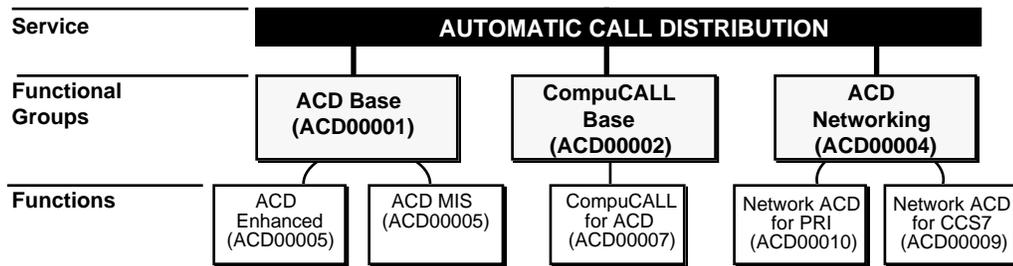
Figure 5-2. The ACD Functional Group

In another example, the service provider orders functional group OSDA0001, "Operator Services Directory Assistance," to receive basic software for directory assistance functions. The service provider then can choose to acquire optional functions within the OSDA functional group, such as:

- OSDA0002 for Automated Directory Assistance Call Completion (ADACC)
- OSDA0003 for Automated Intercept Call Completion (AINTCC)
- OSDA0004 for Automated Directory Assistance Service (ADAS) on the DMS TOPS switch
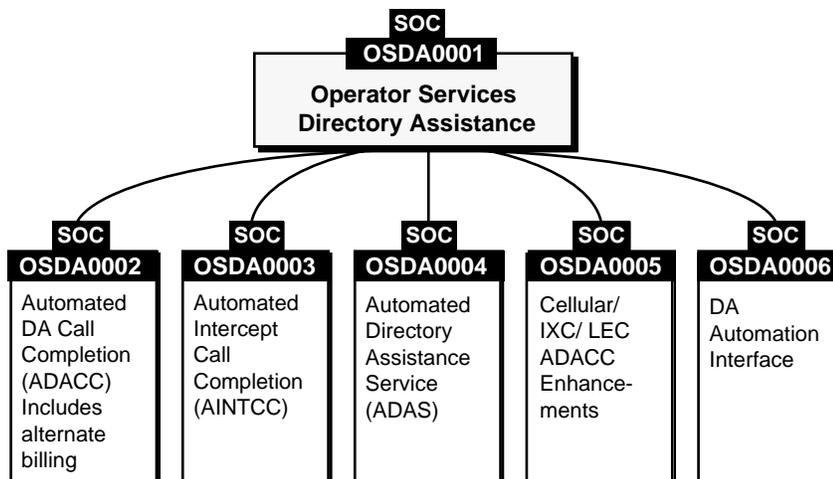
Figure 5-3. The Operator Services Directory Assistance Functional Group

Base functions are not dependent on licensing optional functions. For example, the OSDA base software does not require the software in any OSDA optional sets. Thus dependencies are minimized and the process of engineering software for a switch is greatly simplified.

Q *What is actually received when I order optional software?*

The ability to use the optional software that was delivered in the full-featured PCL. For commercial options, this means written right-to-use authorization from Northern Telecom. For SOC options, it is a SOC Control File, delivered through the same network used for patches. The SOC Control File is simply a password that enables the service provider to activate or de-activate the optional software at will. Some options will be set up as usage-based options-with pricing based on use-and the SOC utility will be used to create regular reports of service use.

Both for commercial options and SOC options, this strategy offers an enormous advantage-there is no need to reload the software just to deliver new services already in a PCL. The result is reduced downtime and faster response to the market.

Q *How long will it take to activate an option, once we've placed an order?*

Our objective is to enable customers to turn on capabilities within 72 hours of placing an order. In many cases, this will be easily achieved. However, additional time will be required for options that require detailed engineering, additional hardware, or delivery of the password via modem.

Q *What if I haven't bought all of the features in a functional group? Do I have to buy them from Northern Telecom before I can get the new software?*

When receiving a PCL generic software load, customers purchase functional groups from within that PCL that apply to their specific markets. These functional groups consist of individual feature (NTX) packages-for feature packages defined in BCS36+ or earlier releases. (New capabilities introduced after BCS36+ will be packaged at the function level, rather than the traditional NTX level.)

In the new environment, some customers will have previously purchased a feature package that is now part of a functional group. While the transition to the new software is in progress, Northern Telecom will honor previous right-to-use agreements-our customers will be allowed to retain ownership of features that are now included in functional groups, with Northern Telecom maintaining identification and tracking down to the feature (NTX) level until such time as the entire functional group has been purchased.

Q *A functional group contains some functions I don't want and will never use. How is this handled?*

In some cases, Northern Telecom will continue to allow the purchase of specific feature packages within a functional group. However, customers are encouraged to consider the administrative savings they will gain from provisioning and tracking at the functional group level, rather than the time-consuming NTX code level.

Q *For some switches, we have and use optional features but not the latest versions of them. How does Northern Telecom reconcile bringing different vintages of software up to date?*

The first generally available PCLs will contain all BCS36 and BCS36+ feature content, plus any new capabilities developed since these releases. Therefore, when a customer acquires a PCL, all features within that PCL will be the most current vintage. The quotation received from Northern Telecom will include a reconciliation that addresses different vintages of software. Pricing tools are continually updated to reflect this information for pricing purposes.

5-6

Q *Today we know what software we've purchased because it is resident on our switches. If every feature will be loaded on our switches, how do we track what we've purchased?*

For commercial options, Northern Telecom has developed a Software Tracking Tool (STT) that will allow customers to use a PC or workstation to access a database of their commercial and administrative agreements with Northern Telecom. STT will show, office by office, which capabilities have been licensed for use.

For SOC options, the SOC utility tracks and reports on which options are being used and-for options where pricing is based on usage-reports the level of use. In addition, the Software Tracking Tool will also provide detailed reporting of right-to-use for SOC options, just as it does for commercial options.

Q *Will we continue to use NT-ACCESS to create planning quotations and place orders?*

Customers will continue to prepare planning quotations and orders as they do today-through NT-ACCESS, Northern Telecom's umbrella of systems that provides automated provisioning and pricing capabilities for the DMS-100 family product line. NT-ACCESS-including the PAQS100 (Provisioning and Quotation) tool- has been modified to address the requirements of DMS Switching Evolution.

The updated version of NT-ACCESS will support the order and verification of PCLs, functional groups, and optional functions-while continuing to recognize NTX feature packages. Ongoing development and modification will ensure that NT-ACCESS keeps pace with the requirements and goals of DMS Switching Evolution.

In addition to engineering initial office installations, NT-ACCESS will continue to capture, provision, and price subsequent changes to original orders. NT-ACCESS will also retrieve job information at any time for engineering extensions to an office.

Q *What has changed about using NT-ACCESS?*

Although the behind-the-scenes workings of NT-ACCESS have been substantially changed to match the new product structure, the user interface remains basically the same.

These changes are documented in revisions to the *NT-ACCESS User Reference*, which customers receive automatically if they have an NT-ACCESS customer account. Northern Telecom course 0402, "NT-ACCESS / Provisioning and Quotation System," has been updated to reflect any changes.

The use of traditional NTX ordering codes will continue to be supported in NT-ACCESS until customers have transitioned to new ordering codes.

Q *Who can we call if we have questions about NT-ACCESS?*

Contact the person in your organization who is designated to serve as the point of contact with Northern Telecom's NT-ACCESS regional coordinator for your region. The following is a list of Northern Telecom NT-ACCESS regional coordinators:

5-7

LOCATION	NT-ACCESS COORDINATOR	PHONE
Valhalla	Glen Adair	(914) 773-2655
Westboro	Hassan Muhammad	(617) 366-5608
McLean	Kathy Gomm	(703) 712-8427
Atlanta	Meena Chary	(404) 661-5056
Dallas	Charla Crisler	(214) 506-4095
Chicago	Ray Micek	(708) 706-8043
Denver	Peter Kraus	(303) 850-5650
San Ramon	Rob Johnson	(415) 867-2128
GTE	Walter Kuehn	(919) 992-0292
Raleigh	Rita Pompey (Marketing) Matt Hopkins (Business Systems)	(919) 992-3135 (919) 481-7803

Q *Will NT-ACCESS address hardware and software dependencies with the new product structure?*

Yes. An automated order verification process will be developed to ensure that the customer's request can be fulfilled, addressing the following requirements:

- Options available in the customer's PCL
- Options that can be ordered for that site, customer, or market
- Availability of the options by the desired application date
- The licensing of prerequisite options for that office
- The presence of required software from other development streams
- The presence of prerequisite hardware
- The presence of an "on hold" condition for the option
  (Note that order engineering can proceed even if the option is on hold, as long as the customer and Northern Telecom agree that the reason for the hold will not negatively affect the customer's switch.)

Additional hardware, if required for the option, is ordered through the same method used today. Plans are in place to integrate hardware and software provisioning rules to further automate the verification process.

Q *Will ordering always be done through NT-ACCESS?*

At least until mid-1995. Northern Telecom is developing a new generation of ordering tools that take advantage of the powerful and user-friendly computer environments available today. The new ordering tool will eventually replace NT-ACCESS and related mainframe computer systems.

Customers will use the POET Entry Node (PEN) to prepare planning quotations, firm quotations, and place orders. This easy-to-use system will run on Macintosh or IBM-compatible personal computers, or UNIX workstations. It will combine point-and-click simplicity with many user interface enhancements to simplify the ordering process even more.

PEN offers greater capabilities than existing tools, with full automation of hardware and software dependencies and support for the most advanced attributes of DMS Switching Evolution. Customer-specific implementation and training plans will be developed to ensure a smooth transition to the new tools.

Q *Our internal systems-inventory, accounts payable, asset management systems-are populated with NTX codes. How do we address the changes brought by DMS Switching Evolution?*

Existing NTX codes will be maintained while new function order codes are introduced for new (post-BCS36+) capabilities. The new function codes are consistent in format to the NTX codes-they are eight-digit alphanumeric codes-which should minimize the impact of adjusting internal systems to accommodate the new codes.

Traditional NTX codes are matched to the new PCL ordering codes in a *Product/Service Information* (PSI) document, "BCS to PCL Mapping," published in May 1994.

An enhanced version of the PEN ordering tool will include an automated version of this information, to help customers make the transition from traditional to new ordering codes.

Q *What procedures are in place to prevent problems with an order?*

Northern Telecom's order verification process ensures that the customer's request can be fulfilled. Order verification addresses the following questions:

- Are the options available in the customer's PCL?
- Can the options be ordered for that site, customer, or market?
- If not present today, will the options be available by the desired application date?
- Have all dependent options been ordered or previously licensed for that office?
- Has required software from other development streams been installed?
- Is prerequisite hardware in place?
- Is the option's availability "on hold" for any reason? (Note that order engineering can proceed even if the option is on hold, as long as the customer and Northern Telecom agree that the reason for the hold will not negatively affect the customer's switch.)

Except for hardware dependencies, this verification process is fully automated. Additional hardware, if required for the option, is ordered through the same method used today.

Q *What about dependencies among features?*

Dependencies are thoroughly accounted for in the product definition and design processes. The development process requires that the designers address prerequisites and dependencies, and communicate this information to the ordering, engineering, and production groups. *Product definition* describes such issues as the following:

- Which options are available in each PCL
- Which options are "commercial" and which are SOC options
- Which markets, customers, or sites may order the option
- When the approved markets, customers, or sites can order the option
- Which options are being withheld from the market, and why
- A cross-reference from BCS package code to PCL functional group and function ordering code

For each option, *product rules* are set forth that define:
- Which options require another option
- Which options are mutually exclusive
- The prerequisite hardware
- Memory and realtime impact
- Office parameters and datafill that must be provided
- Software prerequisites for adjunct processors other than the switch computing module, such as loads for the Link Peripheral Processor or Voice Services Node

For options that are controlled by the SOC utility, the system issues a warning if an attempt is made to change the state of the option when dependencies and prerequisites are not in place. For example, warnings would be issued if the user attempted to turn on a feature that wasn't licensed or to idle a feature that had datafill assigned to it. Similarly, the utility issues a warning if the customer attempts to turn on a feature that is lacking dependent software.

Q *Where can I get more detail on the new product structure?*

Your Northern Telecom regional sales representative is available to answer questions pertaining to DMS Switching Evolution and the new product structure. In addition, several marketing publications explain the new programs and product structure. To order any of the following documents, call the Sales and Marketing Information Center at 1-800-NORTHERN, and request the document by its name and number.

A list of reference sources, such as marketing publications and technical documents, is provided in chapter 12, "Where to Get More Information."

Engineering & Provisioning Systems

6

Enhancements to the processes of gathering customer information and provisioning hardware and software

DMS Switching Evolution brings a series of improvements to the engineering and provisioning process and systems. Simplifying the product offering will greatly reduce the interdependency rules and eventually allow integrated hardware and software provisioning rules to be encoded in automated engineering tools. Integrated provisioning rules will enhance the quality of planning, ordering, and engineering processes-resulting in fewer changes between order placement and delivery.

Simplification makes possible a number of far-reaching enhancements to the engineering process, such as the following:

- **New methods of gathering customer information**, including a dramatically simplified customer questionnaire with an easy-to-use graphic interface, and a shared central database to manage information about office configurations

- **Simplified hardware engineering**, made possible by frame-level models, and integrated hardware and software provisioning rules

- **Simplified software engineering,** made possible by Product Computing-Module Loads (PCLs), functional software groups, and feature activation by Software Optionality Control.

- **New automated tools**, such as POET (Planning, Ordering, and Engineering Tool-a UNIX application), and PEN (POET Entry Node)-a planning and engineering application for IBM-compatible, UNIX, and Macintosh computers.

- **Single point of contact**, whereby the engineering group is organized into small, customer-focused teams. Each team will handle a whole engineering job, giving customers a single point of contact with the accountability, decision-making authority, and total job "ownership" to direct the engineering process from start to finish.

Northern Telecom will begin introducing these new programs and tools in mid-1995. For the near term though, we will continue to use established engineering and provisioning processes. Internal systems are being modified to accommodate the new functional group ordering structure, but from the customer's perspective the systems and processes will appear much the same.

ANSWERS TO COMMONLY ASKED QUESTIONS
About DMS Switching Evolution Initiatives in Engineering and Provisioning

Q *How does DMS Switching Evolution affect the engineering and provisioning process?*

Through mid-1995, Northern Telecom will continue to use its existing engineering and provisioning processes and systems. Interdependencies and hardware requirements will be addressed at the NTX level for capabilities introduced at BCS36+ or earlier. For capabilities delivered after 1995, these issues will be handled at the function level. From the customer's perspective, there will be no change seen in the process of validating dependencies and requirements.

Beginning in mid-1995, Northern Telecom will be introducing a new set of engineering tools and processes that will greatly simplify the process for customers. Some of these initiatives are described later in this chapter. Note that these new engineering tools and processes are still under development, and therefore the information presented here is preliminary and subject to change.

Q *What is Northern Telecom doing today to simplify software engineering?*

Several changes in software provisioning will offer significant efficiencies in the engineering and ordering process. Software simplification includes the following initiatives:

- **Product Computing-Module Loads**-Generally available features are included in a few standard loads rather than custom loads for each customer site. As the DMS switch software becomes more feature-rich, PCLs provide the assurance that all prerequisite features are available in the switch. And PCLs can be delivered to customers quickly, because the number of load-builds is reduced from more than 1,000 to less than 100.

- **Functional Groups and Optional Functions**-Software is logically organized into functional groups to allow engineering and ordering by capability rather than by component NTX packages. Customers choose from a manageable number of functional groups rather than 1800+ individual feature packages.

- **Easy Feature Activation** -With PCLs, new orders don't necessarily mean new software loads. Features delivered in Product Computing-Module Loads can be "added" at any time without a new load-making it easy to create a custom set of features out of a software load common to many offices.

For more information about these initiatives, refer to chapter 2, "The New Software Structure," and chapter 3, "Software Optionality Control."

Q *How do we make the transition from engineering by NTX codes to engineering by functional groups?*

The transition has been designed to be as seamless as possible, whereby existing functionality is engineered by existing NTX codes, and new functionality is engineered by new function codes.

Engineering for both hardware and software interdependencies will be performed by NTX code for features introduced in BCS36+ or earlier releases. For new capabilities, engineering will be performed by function code. In order to ease the transition, the NT-ACCESS ordering and engineering system will support traditional NTX ordering codes as well as the new PCL functional group and function ordering codes.

Q *Where can I get detailed information that reconciles NTX codes to functional groups for the software I have licensed?*

Regional Northern Telecom representatives will be able to give customers documentation of their most current installed software. This documentation will map previously purchased NTX packages to the new functional group ordering structure.

Customers will also have access to their own network inventory information through a new Software Tracking Tool, which tracks software commercial and administrative agreements. The Software Tracking Tool-used on PCs or workstations-began trial use in 2Q94 and is scheduled for general availability in 4Q94.

For general information about how NTX packages map into PCL functional groups and functions, refer to PSI number 50105.16/06-94, *BCS to PCL Mapping*. For a free copy of this document, call the Sales and Marketing Information Center at 1-800-NORTHERN and request the document by number.

Q *What hardware requirements change as a result of DMS Switching Evolution?*

There are DMS-100 hardware requirements for upcoming PCLs, detailed in the following tables. Some requirements are load-gating, others are feature-gating. Special programs will be offered to our customers to ensure the "service readiness" of their networks.

"B" Load Dependencies

NA Vintage	Offices	Hardware
NA003	ISDN Offices	XPM+ on LGCI/LTCI
	All Offices	Message Switch Processor/Memory
		Link Peripheral Processor
		XPM+ on LGC, LTC, and RSC
		XPM+ on DTC7
NA004	ISDN Offices	XPM+ on DTCI
	LPP Offices	LMS Processor/Memory
	SMU Offices	XPM+ on SMU
NA005	All Offices	XPM+ on DTC
	SMS Offices	XPM+ on SMS/SMSR
	ENET Offices	ENET Processor/Memory

"A" Load Dependencies
-All "B" Load Dependencies, plus:

NA Vintage	Offices	Hardware
NA005	All Offices	BRISC processor
		HDLC card (MX76AB)
		SuperNode Data Manager (for GSF features)
	ENET Offices	ENET Processor/Memory Upgrade
	SMS Offices	XPM+ on SMS/SMS-R

Feature Dependencies

NA Vintage	Feature	Required Hardware
NA001	9.6 kbps Data Transfer	1X89BB EMPC Card
NA003	SCWID/ADSI	6X96AD on RSC-S (non-Extended Distance Capability)
	Tailored Centrex Release 2	XPM+ on LGC, LTC, SMU, SMS, and SMS-R
NA004	BITS (TR-1244)	MX73AB on RSC-S
	SCWID/ADSI	6X69AD HDLC Card on RSC-S (Extended Distance Capability)
	National ISDN-2 (NI-2)	BX02BA (Enhanced D-Channel Handler)
	15-Digit International Dialing	XPM+ (for all peripherals except DTC, SMS, and SMS-R)
	GSF Features ("A" Stream)	SuperNode Data Manager (SDM)
NA005	TR-199 Provisioning (ISDN NI-2 and -3, PCS, and Advanced Services)	SuperNode Data Manager
NA006	New Attendant Console	Business Services in GSF
	NI-3 PRI	6X50BA on DTCI/LTCI

Q *How does the new software architecture affect processor real-time?*

The various technology elements associated with DMS Switching Evolution-such as layering, robustness enhancements, Generic Services Framework (GSF) call processing, and standardized software loads-have only a modest impact on real-time requirements. The A-Stream has no impact on real-time until the customer deploys advanced services. Layering has virtually no impact on real-time requirements. However, as customers choose to deploy more processing-intensive services such as CLASS, AIN, and National ISDN, these *services* will require additional capacity on the DMS SuperNode switch.

The following table summarizes the projected upgrade requirements for eight model offices using LEC PCLs for DMS-100/200 switches-10K lines, 20K lines, 30K lines, and 50K lines with high or low penetration of centrex services. Furthermore, projections are shown for model offices taking "A" loads or "B" loads.

The NA releases refer to the release by which the upgrade should be made. A shaded box indicates that the PCL will not be available from that particular NA release. For example, the first "A" load will be available with NA004. There will be no LEC "B" load (for US DMS-100/200) or CDN "B" load (for Canadian DMS-100/200) released in NA005.

Lines	Centrex	Loads	NA001	NA002	NA003	NA004	NA005	NA006
10,000	Low	B	SN20	SN20	SN20	SN20		50 MixMem
		A				**50 MixMem**	50 MixMem	50 MixMem
	High	B						50 MixMem
		A				**50 MixMem**	50 MixMem	50 MixMem
20,000	Low	B						50 MixMem
		A				**50 MixMem**	50 MixMem	50 MixMem
	High	B						**50 MixMem**
		A				**50 MixMem**	50 MixMem	50 MixMem
30,000	Low	B						**50 MixMem**
		A				**50 MixMem**	50 MixMem	50 MixMem
	High	B				**50 MixMem**		50 MixMem
		A				**50 MixMem**	50 MixMem	50 MixMem
50,000	Low	B						**50 MixMem**
		A				**50 MixMem**	50 MixMem	50 MixMem
	High	B	**Series 60**	Series 60	Series 60	Series 60		Series 60
		A				**Series 60**	Series 60	Series 60

50 MixMem refers to the Series 50 with Mixed Memory feature.

These projections were generated with the July 1994 MEMCALC and REAL::TIME 7.0 tools. Results for actual offices will vary. For more information about the assumptions and results of this analysis, refer to *Product/Service Information (PSI)* number 50112.16/08-94, "DMS-100 Capacity Planner."

Q *Doesn't the Generic Services Framework architecture introduce new processor demands?*

Typically, advanced services on GSF require 1.5 times the real-time resources of similar call types on the current architecture. Because GSF is optimized for complex services, the more complex the service (e.g., AIN), the smaller the difference in real-time impact. An unfeatured call may take 3 times the real-time of the current architecture, whereas a featured call is closer to a 1.2 factor. Because only featured lines will be moved to GSF, the actual real-time impact will be minimized.

In the initial stages of advanced-services deployment, only 10 to 20 percent of all lines on a switch are expected to use advanced services. The remainder of the lines may remain on the current architecture.

Therefore, even with deployment of GSF features, real-time requirements are not likely to be driving processor upgrades. The current processor platform (SuperNode 20 through BRISC SuperNode 50) will meet the real-time requirements of the vast majority of offices through NA006.

Q *How does the new software architecture affect memory requirements?*

PCLs-because they contain all generally available software-may increase memory requirements over traditional custom loads. The amount of this increase varies according to the volume of software currently deployed. The difference in memory requirements between traditional and new loads will be greatest for offices that have limited feature deployment. Offices using feature-rich USLs today will not see much change when moving to PCLs.

The GSF call-processing platform typically has a 12-15-MB "start-up" effect on memory requirements-plus memory requirements directly proportional to service deployment. There is no incremental real-time demand associated with loading GSF software. Real-time effect is directly related to the volume of GSF-based services deployed.

However, offices choosing to move to A-stream advanced services will find that these services require more memory, directly proportional to the penetration of Generic Services Framework (GSF) services. The MEMCALC tool accounts for the 24-Megabyte increase in memory caused by PCLs, but not the additional demands of GSF services. Therefore, MEMCALC calculations must be adjusted to reflect the penetration of GSF services. In the LEC005 PCL, for example, an office with 10 percent of its lines using GSF services would see a 4.8 percent increase in memory requirements (over the MEMCALC figure). An office with 20 percent penetration of GSF services would use 9.6 percent more memory than MEMCALC calculated. And if 30 percent of the office's lines use GSF services, add 14.4 percent more memory to the MEMCALC figure.

Generally speaking, offices moving to the A stream will require BRISC processors for PCLs built from the NA006 release stream (3Q96). Average B stream offices with 120 Megabytes of memory can remain with non-BRISC processors through that release. High-traffic offices will require a BRISC processor earlier, probably by NA003.

Q *If memory requirements call for 96-Meg memory cards, does this mean a required upgrade to a SuperNode 60 processor?*

Not necessarily. Mixed Memory for Series 50 BRISC processors will be introduced with NA004. Mixed Memory allows a Series 50 processor to accept specific mixes of 24-MB and 96-MB memory packs. This means that existing 24-MB memory packs can be reused in the same switch, extending the addressable memory of the switch while deferring an upgrade to a Series 60. Before the introduction of Mixed Memory, the Series 50 processor is limited to using 24-MB cards.

The ability to mix and match memory packs allows network providers to extend the life of existing 24-MB circuit packs and grow their capacity in stages.

As memory requirements grow, 96-MB memory packs can be added to support growth up to 320 MB. Beyond this point, the processor grows as a Series 60 processor, using 96-MB memory cards only and supplying "burst mode memory" for an additional performance enhancement."

It is recommended that Series 60 be deployed now in sites that are expected to move to "A" loads in the future. This activity will make 24-MB cards available for redeployment elsewhere in the network, for example, in smaller offices.

Q *How can we plan ahead for real-time and memory requirements with new services and a new call-processing architecture?*

Real-time Calculation. Real-time calculation of an office will still be required to properly size the Central Processing Unit and, in certain cases, determine the quantity of certain peripheral units. Real-time calculations for every DMS-100 office will be different, depending on line and feature mix.

The REAL::TIME tool (RT7.0) will calculate the impact based on the switch's penetration of services, through NA006. Real-time and capacity calculations have been re-engineered using call equivalents instead of call timings. Calculations are based on wired lines, referring to customer-provided information on residential, Meridian Digital Centrex (MDC), ISDN, and digital lines. All other lines are assumed to be POTS lines. All remotes will be assumed to have the same mix of cards as the host. If AIN (Advanced Intelligent Networking) is ordered, three percent of calls will be calculated as AIN, with two triggers per call.

Memory Calculation. The July 1994 version of the MEMCALC tool provides detailed calculations for NA001 memory requirements based on the content of the selected PCL and office-specific parameters. In addition to the NA001 detailed view, the tool also projects memory requirements through NA007 to support network providers' long-range planning activities. The tool accounts for planned new developments, such as new services and system enhancements.

For the A-stream loads, memory calculations address two requirements: a "getting started" requirement and an effect directly proportional to service penetration. The July 1994 version of the MEMCALC tool lets the user project this memory requirement for each office, beginning with NA005 releases. Memory projections for NA004 A-Stream offices will be handled individually, using NA005 projections as a guideline.

Q *Are there any incentives or special programs related to processor and memory upgrades?*

Yes. Northern Telecom recommends standardization on the BRISC processor for the installed base. In order to support migration, our sales teams will be working closely with their customers to implement the most cost-effective upgrade plan that will prepare them for the deployment of GSF-based advanced services. It is also recommended that all initials be provisioned with Series 60s to best accommodate future growth. Your regional Northern Telecom representative can provide more information about potential incentive programs.

For customers that may not need to deploy GSF-based services in the near future, there are other considerations that make a BRISC upgrade attractive. Customers that standardize on BRISC-enhancing consistency and capacity across the entire network- will see considerable administrative savings. In addition, the incremental capacity will provide the flexibility to meet revenue opportunities quickly.

Q   *What about other hardware upgrade requirements?*

Hardware readiness-other than CPU issues-will also become more important as network providers choose to deploy more advanced services. It is not uncommon to have new services create new hardware demands-requiring significant investment before the profitable new service can be offered. Establishing a certain hardware baseline capability significantly improves the network provider's business case for introducing new revenue-generating services.

To help network providers achieve readiness for new services, Northern Telecom has designed a Hardware Baselining Program-a process of gradual upgrades to customer hardware bases through forward-thinking incremental investments. Customer networks will move easily toward readiness for intensive new services-as opposed to facing big investments forced by the immediate need to offer a new service.

Under this program, certain hardware components will be bundled into generic releases, thereby ensuring that customers have the prerequisite hardware for satisfactory system performance.

Q   *What new engineering tools will be available to us as DMS Switching Evolution progresses?*

After mid-1995, order capture and engineering will take place on an easy-to-use PC- or Macintosh-based personal computer or UNIX workstation-rather than the existing mainframe system.

This software application, known as PEN, will allow customers to quickly and graphically lay out a network, and prepare a budgetary estimate at the device, node, and network levels. For example, a customer will be able to use PEN to quickly get a planning quote for a remote access solution-complete with engineering specifics, and comparing alternatives using different combinations of equipment. No in-depth technical expertise or Northern Telecom involvement is required.

By design, PEN will provide quotes at the frame level with options, rather than the detailed PEC code level. Detail will be provided only when needed-for asset management records. If a detailed quotation is desired up front, the customer will be able to request a detailed quote from the Northern Telecom regional representative, who will pass the PEN file to Northern Telecom's POET (Planning, Ordering, and Engineering Tool) for processing.

In either case, NT-POET uses the PEN output file to prepare hardware configurations and assignments. The resulting frame layouts will be automatically generated and can be displayed simply by clicking on the frame as displayed on the floor plan.

Faster Planning Quotes and Firm Price Quotes. Simplification of the hardware and software structure makes possible a new customer information survey with a dramatically reduced number of questions and a user-friendly graphical interface. Detailed CI information that once required hours to gather will be gathered quickly using PEN.

Central, Shared Database. A common, central database will be shared by multiple ordering-related applications, ensuring consistency and accuracy throughout the ordering, engineering, and invoicing process. As an order progresses through the stages from quotation to installation, the central database provides a "living" document to track the life of the order. This automation and reduction of "hand-offs" is expected to reduce the interval from Customer Information (CI) to installation (H).

Bar Coding of Office Records. Accurate, up-to-date records of customer office configurations are crucial for engineering future extensions to those offices. A new process will use bar-coding technology to replace the current pen-and-paper process of encoding this information. Because bar-coded offices can be inventoried in hours rather than days, this initiative will reduce the burden of gathering this information while improving accuracy and timeliness.

Q *Does DMS Switching Evolution affect the way I get engineering support?*

Not until mid 1995 or later. For the near-term releases-NA002, NA003, and NA004-you will receive engineering support from your regional engineering primes, just as in the past. When the new engineering tools-most notably, PEN-are introduced, the engineering task will be streamlined, and the engineering support process and structure will be modified accordingly. These changes will not take place until customers transition to the new tools, and will be described in communications associated with that transition.

Q *What hardware engineering changes will we see as DMS Switching Evolution progresses?*

Orders will be based on functionality, capacity, and features, rather than on individual hardware and software components. Three key initiatives are being implemented to simplify and streamline hardware engineering:

- **Frame Level Hardware Provisioning**-Customers will order equipment at a higher level than before, with engineering and pricing made at the summary frame level, rather than the PEC code level.

- **Integrated Hardware and Software Provisioning Rules**-Hardware and software provisioning rules will be integrated; the automated engineering tool will then be able to identify hardware and software dependencies early in the planning process.

- **Simplified Parameters**-Simplification will make it possible to forecast memory needs more efficiently and accurately, reducing the engineering requirement.

These programs will streamline the engineering process, reduce the engineering interval, and reduce the amount of engineering time the customer must contribute to the process.

Q *What is "frame-level" hardware provisioning?*

Under the new processes, customers are not expected to engineer switch hardware at the component level. The new hardware provisioning process is based on a concept of Frame Level Models (FLMs) with options.   FLMs can be best understood by comparing them to the current "Building Block" and full-frame models method of provisioning.

- *Building Blocks* are **logical** groupings of parts which simplified the ordering and pricing process-but do not simplify most downstream processes (spec-writing, manufacturing, installation, and order reconciliation).

- *Full-frame models* are the **physical** grouping of parts at the frame level. This concept would provide the ultimate in savings from ordering through engineering, manufacturing, and installation. To provide true savings, all customers would have to agree on the same frame models. This would force some customers to have functions and features they do not want or need.

- *Frame-level modeling* -the strategy chosen for DMS Switching Evolution-is the **logical and physical** grouping of parts. Like Models, FLMs group parts at the physical frame level. However, major sellable functions are not included. They are instead, logically and physically grouped as products suitable for manufacturing and kitting. Each option has a standard assignment or placement within its frame. FLMs achieve the best of both worlds-simplifying ordering, pricing, engineering, manufacturing, and installation processes, while allowing customers to choose the functions and features they want or need.

Ordering at the frame level with options makes it possible to order and bill at the summary level, rather than the PEC code level. (Material detail is provided on the asset management document.) This policy will result in more accurate and consistent provisioning and faster delivery-while reducing engineering requirements for both Northern Telecom and the customer.

The figures show sample frame level models with options. For each model, the customer orders the base model (shown at the left of the drawing) plus options at one or two levels. The base model automatically includes the components listed in the base box. Options are provisioned as necessary to meet technology, service, or capacity requirements.

DTE Frame Model

Digital Trunk Equipment Frame	**ENET Interface**
	JNET Interface
DTE Base Earthquake Frame	*Choice is determined by office type*
FSP	**DTC Module**
Cooling Unit	Two shelves / Two UTRs / XPM-based common CP

ENET Interface

JNET Interface

Choice is determined by office type

CCS7 Support

For CCS7 signaling

Additional UTRs

For high call volume DTCs

One or two DTC Modules per DTE Frame

Each DTC module supports up to 480 digital trunks

DS-1 Cards

One to 10 cards per DTC

One or two DS-1s per card

One to 24 trunks per DS-1

LCE Frame Model

POTS Type A

1 for each 2500 set line (POTS, MDC, CLASS)

World Type A

1 for each 2500 set line (replaces POTS A)

COIN w+48V

1 for each +48V coin line

Line Concentrating Equipment Frame

LCE Base Earthquake Frame

Frame Supervisory Panel

Cooling Unit

LCM Module

Two shelves

10 line drawers

10 cutoff straps

Common CP

COIN w/o 48V

1 for each coin line w/out 48V

Data Type D

1 for each DataPath line

EBS Type C

1 for each MBS Line

IBERT

1 for each LCM with DataPath (for testing)

MSG Waiting E

1 for each line with MSG waiting lamp

PBX

1 for each PBX line

MSG Wait Conv

1 for each drawer with MSG Waiting cards

+48V Conv

1 for each drawer with +48V coin cards

One or two LCM Modules per LCE Frame

Each LCM module supports up to 640 line cards

Q *What systems or methods will I have to change as a result of new hardware engineering programs?*

The concept of frame-level models is still in the future and subject to change. Additional documentation of this initiative will be provided to customers in advance of implementation, to make the transition as smooth as possible.

Q *Where can I get more information about engineering changes brought by DMS Switching Evolution?*

The following *Product / Service Information (PSI)* publications provide additional information about processor options and DMS Switching Evolution programs:

Feature Planning Guide: 3Q94-A Planning Perspective for Creating Tomorrow's Network -50004.11/06-94 Issue 12, June 1994

Introduction to the New North American Product Structure-50104.16/06-94 Issue 1

Series 60-A Powerful New Option in BRISC Processing-50084.16/05-94 Issue 1

DMS-100 Capacity Planner-50112.16/08-94 Issue 1

To receive any of the above-listed publications, call the Sales and Marketing Information Center at 1-800-NORTHERN and request the document by number.   The following user publications provide technical information related to real-time and memory provisioning:

DMS-100F Memory Administration Provisioning-SEB 88-01-002
REAL::TIME Version 7.0 Users Guide
BRISC Engineering Philosophy-SEB 91-11-003

For these technical user publications, contact your organization's documentation coordinator.

For more information about DMS Switching Evolution, Product Computing-Module Loads (PCLs), and processor options, contact your regional Northern Telecom senior manager of engineering.

7

Software Manufacture & Delivery

*Improvements to customer processes resulting
from DMS Switching Evolution*

With DMS Switching Evolution, software is delivered in "Product Computing-Module Loads" (PCLs), which are generic software loads for specific switch types and markets. Each PCL contains all the generally available software for a particular switch application in a particular market. There's no need to re-load software to deploy a generally available feature, because all features are already present in the switch.

This new software commercial structure has brought changes in software manufacture and delivery:

- Instead of custom loads created from a library of software modules, standard loads are cloned from a protected software vault.

- Instead of sending a new load in order to supply new functions ordered by the customer, Northern Telecom sends right-to-use or a password file; the function itself will already reside on the switch.

- Instead of sending a patch tape with the load, the image in the vault is kept "patched-current."

- Instead of entering parameter changes during loadbuild, this information may be entered any time before, during, or after the night of application.

DMS Switching Evolution brings consistent, fully verified software loads. The package the customer receives is the *same package that has been tested by BNR*, as opposed to some unique assembly of customer-requested features. And because all functions are available in the switch all the time, the network provider can deploy new services quickly across an entire marketing area.

ANSWERS TO COMMONLY ASKED QUESTIONS
About Software Manufacture and Delivery

Q *How does the new software architecture affect software loadbuild?*

Instead of assembling thousands of custom loads, Northern Telecom will create a handful of PCLs, store these software "images" in a controlled software vault, and clone software loads from this vault as needed.

Traditionally, customers ordered custom loads-a unique configuration of NTX packages to meet their specific needs. The customer's order for a unique set of features was processed through the NT-ACCESS system, which fed a Job Feature Database on a mainframe server.   Loadbuild personnel sitting at a workstation accessed this server to pull load content. A custom load was assembled from the requested features-plus customer-specific additions, such as log messages and parameter settings. This load was then initialized through an Initial Program Load (IPL), and an image of the composite load was created, without datafill. The image contained the customer-requested features, basic table structures for those features, default parameters that define basic functionality, and some basic, minimal datafill.

For US local exchange carriers (LECs), Northern Telecom also added customer-specific parameters at loadbuild time. Patches that applied to the software modules in the load were then applied to the undatafilled image. This was the package shipped to the customer site.

While the traditional method of software loadbuild allowed flexibility in service selection, it had many drawbacks. If the customer chose to deploy a service resident in an NTX package not present in the switch, the customer had to completely re-load the BCS to obtain the new package. Also, custom software loads resulted in thousands of different software configurations in the field, greatly complicating verification and support.

With DMS Switching Evolution, customers order PCLs instead of custom loads-a standard load that includes all generally available features for a specific switch type and market. A PCL is assembled from the various development layers, patches are applied, and the resulting product is stored in a controlled software vault. When a customer orders a software load, a clone is made from the image in the software vault. This is the package shipped to the customer site. This strategy will improve the quality of the upgrade process by reducing problems associated with assembling custom loads from many individual NTX packages.

Before NA004, customer-specific parameters, existing datafill, and key site identifiers are added during the One Night Process of loading the PCL. Starting with NA004, Northern Telecom plans to decouple parameter changes from the One Night Process to further improve the delivery process. Two programs make this possible:

- The NORESTARTSWACT feature (introduced in BCS36), cuts planned outages to 30 seconds or less and makes it possible to make parameter changes outside the ONP without the disruption traditionally associated with this activity.

- Restart requirements are being eliminated for most parameter changes, making it feasible to perform these changes at any time, with no disruption.

Q *What advantages does this new software loadbuild process offer?*

The new software loadbuild process offers several advantages to network providers.

- **Fewer reloads.** PCLs eliminate the time and expense of reloading the same BCS just to obtain features that were not originally provisioned. This activity now represents an estimated 30 to 40 percent of all BCS loads in North America.

- **Greater reliability.** BNR will test each PCL as a unit to verify software interactions and dependencies. The load that is delivered to the customer is the same load that has been thoroughly tested and approved by BNR. When thousands of custom loads were produced, it was impossible to fully test every unique configuration.

- **Consistency.** The BNR design team verifies and releases a complete PCL to Northern Telecom-not a library of software modules that are later mixed and matched in ways not predicted by the designers.

- **Reduced engineering cost.** Because PCLs contain all generally available features, there is no need to engineer unique software loads to meet the feature requirements of diverse offices. Standard load content makes it possible to standardize engineering and parameter modeling, for simpler and more cost-effective engineering. And if the network provider decides to offer a new service available in the PCL, service can be turned up faster than ever, without reloading the PCL.

Q *What is included in each new software release?*

Each PCL will include all generally available features for the switch type and market. For example, the LEC002 PCL will include all generally available (GA) features for local exchange carriers in the US, and the CDN002 release will include all GA features for Canadian local carriers. Upcoming releases include the following key capabilities:

- PCLs built from NA001, the first DMS Evolution release, include feature content through BCS36 and will be used for verification office testing only

- PCLs built from the NA002 development stream will include BCS36 functionality plus Tailored Centrex Release 1 and Analog Display Services Interface (ADSI).

- NA003 PCLs will add Tailored Centrex Release 2, AIN Release 0.1 enhancements, and a TR-303 interface through the Subscriber Carrier Module-100 Access.

- NA004 PCLs will bring 15-digit international dialing and ISDN residential and small business services.

For additional information about the development of new capabilities for upcoming PCLs, refer to Chapter 1, "DMS Evolution Overview."

Q *How often will new releases be offered?*

Features for all North American DMS-100 PCLs-standalone and combined applications-are developed in the North American DMS-100 (NA) development stream. The NA development stream is updated approximately twice a year, and each new product release is given a sequential number (e.g., NA001, NA002, NA003, etc.) The availability of a new NA version allows new PCLs to be assembled from the NA stream.

The availability of new releases for a customer will depend on which development stream the customer has chosen: the "B" stream for traditional services or the "A" stream for advanced services. Separate release schedules have been established for these development streams.

- **"B" loads** will be released about once a year. These loads will not support Generic Services Framework advanced services, such as NI-2 and -3, but they will continue to meet the needs of customers without advanced-services requirements, delivering a more limited feature set as well as required regulatory features.

- **"A" loads** will be released with every new NA product release-approximately twice a year. It will be possible for "A" load features to be developed on an accelerated development cycle-as short as three to six months.

The following chart gives the planned general availability for upcoming PCLs in the United States and Canada. Refer to Northern Telecom's *Feature Planning Guide* for a complete rollout schedule for each PCL.
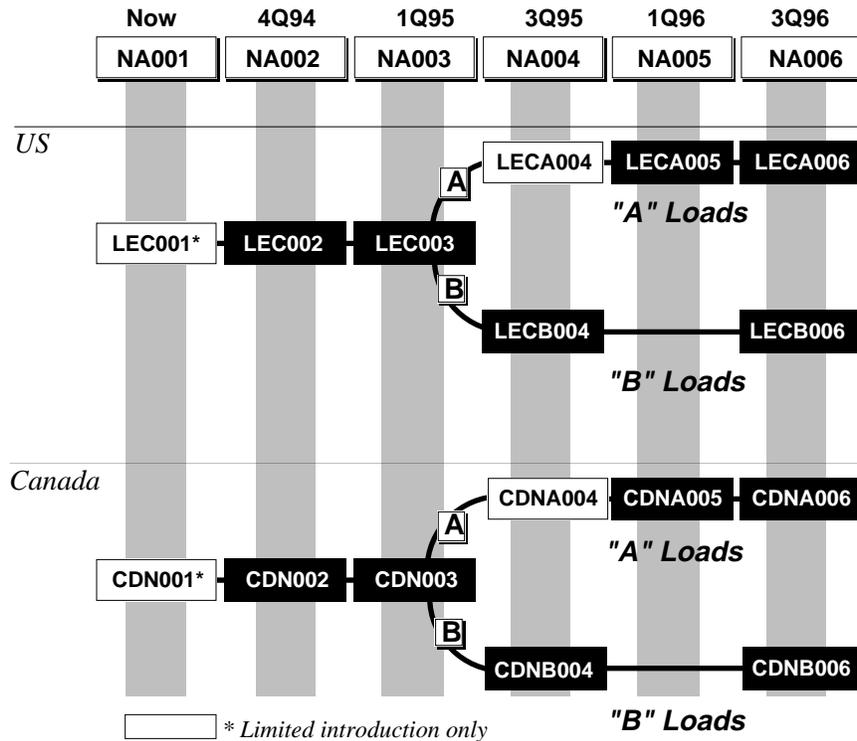
Figure 7-1. Planned Delivery Schedule for North American PCL Releases

Q *If developments for each layer can proceed on independent timeframes, does that mean I'll have to load many releases?*

No. Although layers are developed in independent timeframes, these layers are combined to form the orderable product. The customer orders a PCL-not the individual layers of a PCL. A PCL is released when all layers achieve a designated release status.

The software layers are developed on independent schedules because they are hierarchical in nature. The base layers can be designed and tested ahead of the product application layer, to produce a more reliable product.

7-4

Q *How will new releases be delivered?*

PCLs will be shipped to customers on SLMII (Software Loading Module II) tape cartridge. The 150-meg SLMII tape cartridge requires SLMII hardware. However, Non-Res software can also be shipped on nine-track tape, which does not require SLM hardware.

BNR and Northern Telecom are continuously improving the delivery process and investigating new delivery mechanisms. However, traditional mechanisms will be used for all PCLs delivered in 1994.

Q *What has changed about the process of loading new releases?*

PCLs are loaded to switches through the familiar One Night Process (ONP). This process has been continuously improved to reduce out-of-sync times, aborts, defects, and outage time. For example, BNR will now use the ONP to datafill loads for lab testing during the design phase. This policy will provide early and ongoing testing of the ONP, thereby reducing issues encountered in customer site upgrades. With the new NORESTARTSWACT capability, planned outages are cut to 30 seconds or less, about 50 percent less for offices using BRISC processors. A new automated site check feature is also available to simplify the process of ensuring site readiness and to reduce the incidence of aborts.

From the customer's perspective, a notable change is that parameters will not be set during the loadbuild process, as is done today.

For customers that have Northern Telecom enter parameter settings . . .

> Northern Telecom will still perform this task, but it will take place during the night of ONP rather than at loadbuild. Existing office table data will be moved to the new software load during the One Night Process. Beginning with NA004, parameter changes will be decoupled from the ONP, given the elimination of the restart requirement for most parameter changes and the availability of NORESTARTSWACT.

> The only major change that the customer will see is the elimination of the Parm Variance Report. This report, formerly distributed through the C-SCAN system, compared the parameters set at loadbuild time with the settings in the customer's switches as of 12 days before the ONP date. Now that parameters are not set at loadbuild, the Parm Variance Report becomes obsolete and will no longer be created.

> Working with their regional system software engineers, customers will use the PARMMAIL system to request changes to parameter settings and to view the parameter settings they have requested. This fill-in-the-blank form shows what parameter settings are available and provides default settings. The completed PARMMAIL containing the new requested values will be provided in place of the Parm Variance Report on CSCAN.

For customers that load their own PCLs . . .

> The customer may insert parameter settings on the night of application. The new Method of Procedure document for the first orderable PCL will include new instructions for this process. Beginning with NA004, parameter changes will be decoupled from the ONP, given the elimination of the restart requirement for most parameter changes and the availability of NORESTARTSWACT.

For either case, a major advantage is that parameter values are not "frozen" for the two-week period before the ONP.

Q *If the release load includes all generally available functions, how does this affect my memory requirements?*

The memory impact of the PCL code itself, compared to BCS loads, is very small. The first PCL requires only about 14 megabytes of memory more than an average BCS36 custom load. This will vary depending on the feature content of the custom load; offices with many features will see little impact, and offices with limited features will see more. In either case, the memory requirements of the PCL program code are minimal, and memory requirements are actually determined by table datafill for features that are being used. For more information about memory requirements, see Chapter 6, "Engineering Process and Systems."

Q *If the PCL now includes all features, will it take longer to load it to the switch?*

BNR testing has shown that the time required to load a PCL to the switch is not appreciably different from the time required to apply a traditional BCS load. Although more features are included in the PCL, the data transfer requirements associated with *program code* are insignificant compared to the time required to transfer *data tables*.

Design changes continue to reduce out-of-sync time required during office upgrades. Offices that have not significantly increased datafill will continue to see reduced out-of-sync times.

The existing ONP TimeCalc tool-used for estimating the number of hours required to apply a load-has proven highly accurate for PCL loads and will continue to be used, without modification.

Q *How do I turn on the optional functions I wish to use?*

Many orderable options can be turned on simply by obtaining the right to use them, datafilling the required tables, and if necessary, installing required hardware. The customer orders an optional function by its unique ordering code. The order triggers engineering and provisioning steps within Northern Telecom, consistent with today's process. The only difference is that the customer receives license authorization instead of software-because the software is already present on the switch as part of a fully featured PCL.

Beginning with the TOPS003 PCL for operator services, many optional features can be turned on with Software Optionality Control. The customer orders right-to-use and receives a software file that contains a password that permits customer activation of the optional function. For more information, refer to Chapter 3, "Software Optionality Control."

Q *How do I track which software is being used in which switches?*

With traditional custom loads, network providers knew which software they had licensed by running an INFORM report to identify the software resident in the switch. Generally, if the software was in the switch, it was licensed. With PCLs (much like Universal Software Loads) the switch INFORM report will list many optional features that have not been licensed for use.

Starting with NA004 PCLs, options will be managed by the Software Optionality Control (SOC) utility and will appear in SOC SELECT reports produced by that utility. The SOC SELECT report will be used by customers to track the features being used in their switches and by Northern Telecom to prepare accurate invoices. For options where pricing is based on usage-the SOC SELECT report will show the level of use.

Tracking information will also be provided by a new Software Tracking Tool. Using personal computers or workstations, customers can dial in to view and print reports from a centralized database maintained by Northern Telecom. This database will record which software has been licensed for use in which switches.

Q *What improvements is Northern Telecom making to decrease out-of-sync time, planned outages, and unplanned outages?*

No Restart SWACT. With BCS36, Northern Telecom introduced No Restart SWACT. This DMS SuperNode feature provides a major performance enhancement by reducing planned system interruption for scheduled maintenance activities from 3-5 minutes to less than 30 seconds. For example, the first US application to an in-service office was completed in less than 13 seconds. This can be used for manually initiated maintenance activities that require a restart-such as PCL applications, office parameter changes, and hardware changes including remote terminal interface (RTIF) and processor upgrades.

This feature also introduces human/machine interface changes that direct switch technicians to use the "NORESTARTSWACT" utility. For more information, refer to *Feature Planning Guide 4Q93*.

No Restart for Parameter Changes. Northern Telecom is eliminating the need to perform a restart when changing parameter values. This program reduces planned outages, but it also "decouples" parameter changes from the ONP. This strategy simplifies the ONP and reduces ONP aborts and issues.

Other Initiatives. A BNR/NT team is working to enhance table structure in order to reduce the time required to move table data during PCL loads. This team has already shown significant improvements in data transfer times, thereby decreasing out-of-sync time. In addition, an E3 (Emergency Priority 3) team-part of the Global Product Support group-has been dedicated to investigating and reducing the incidence of unplanned outages.

Q *What steps has Northern Telecom made to improve the quality of software deliveries?*

BNR and Northern Telecom teams are continuously reviewing opportunities to improve the quality of software delivery. Programs developed and implemented by these teams are ongoing and not specifically tied to DMS Switching Evolution.

For example, in 1992, the Global Product Support group restructured the Technical Assistance Service (TAS) group in order to provide joint "ownership" of support issues across organizational boundaries. The new organization created teams along product lines rather than geographic lines. Teams are now product experts, owning a product and its support issues from design to post-installation support, including software delivery.

DMS Switching Evolution-with its emphasis on global process re-engineering-will be the foundation for other improvements in software delivery vehicles and processes.

Q *What changes, if any, affect the process of preparing our sites for a new release?*

Northern Telecom has reduced the number site visits we require to prepare for a PCL load. Previously, Northern Telecom representatives made three, possibly four visits to the customer site in the weeks before the One Night Process, with one final check before the night of application. The new process consolidates ONP preparation tasks into two visits-10 days and 2 days before the night of application. These visits are supplemented with twice-a-week conference calls in the weeks before the load. For the network provider, this means less disruption and less time required to prepare for ONP.

Q *What changes, if any, will I have to make to my systems or procedures?*

DMS Switching Evolution brings no changes to customer systems or procedures pertaining to software loadbuild and delivery, assuming that SLMII hardware is available to accept PCL loads on SLMII tape cartridges.

However, if the network provider uses the Parm Variance report for downstream reports or processing, modifications may be required to substitude PARMMAIL reports for the Parm Variance Report.

For more information about Northern Telecom's software development cycles, software loadbuild and delivery, and software administration policy, please contact your regional Northern Telecom representative.

Customer Support Systems

*Re-engineering to improve the quality and
timeliness of service to customers*

DMS Switching Evolution brings software and process improvements that will significantly
reduce the likelihood of problems. Although the number of problems will be reduced, this in no
way diminishes the importance of fast, expert response for cases when a customer does
experience a problem. This section describes some of Northern Telecom's initiatives designed to
make maintenance and support activities more responsive than ever to customer needs, including:

- The creation of interdisciplinary teams to address support issues
- New systems capabilities for tracking and reporting Customer Service Reports (CSRs)

ANSWERS TO COMMONLY ASKED QUESTIONS
About Customer Support Systems and DMS Switching Evolution

Q *What change is Northern Telecom making to its customer support
structure?*

The customer support structure is being reshaped to cross organizational boundaries and
assemble related skills toward one objective-faster closure of Customer Service Reports
(CSRs). Traditionally, product line management, BNR, and TAS/ETAS (Technical
Assistance Service/Emergency Technical Assistance Service) people have worked
independently, as established by the organizational structure, even as their functions
coincided. With DMS Switching Evolution, the knowledge and resources associated with
software support are brought together in inter-disciplinary teams. Known as "Triad"
teams, these groups share joint "ownership" of support-related concerns.

*Figure 8-1. Triad teams share joint
ownership of support issues*
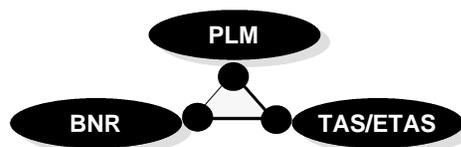
After a year of implementation, the Triad concept has proven beneficial and been expanded
in the customer support organization. In April 1994, the global Northern Telecom
Support organization established a Global Product Support team, a joint venture between
Northern Telecom-which houses the technical support and product line management
functions-and BNR (Bell Northern Research)-which houses the design and verification
functions.

The concept of TAS specialty groups-which concentrate on one product area, such as TOPS, Meridian Digital Centrex, XPM, ISDN, or CPU issues-has proven valuable and been retained in the new structure.

Approximately 25 highly skilled senior people from TAS specialty groups have been assigned to the Global Product Support team, plus another 40 from BNR. The TAS specialty groups were repopulated from within the TAS organization, and training is being provided to these new group members as necessary.

Q *What is expected to change by having a joint Northern Telecom-BNR support team?*

Turnaround, for one. And pursuit of mutual objectives. In the traditional structure, Northern Telecom TAS group and BNR design groups established their own methods of prioritizing problems-and their own performance standards for resolving those problems. Two organizations could potentially have different turn-around objectives for resolving the same type of problem.

Now the Global Product Support group-which includes Northern Telecom *and* BNR staff-has a shared objective to deliver fixes for major issues to the customer in 30 days from the date the Customer Service Report is opened. The entire process-from the time the call comes in to the time the solution goes out-is under the responsibility of a single group.

Q *Do these changes affect how I report problems?*

No. The central contact number-1-800-NT-4HELP- has not changed. The only change is that responses are expected sooner as a result of new problem escalation procedures.

In the past, when a call came into the Customer Service Center (CSC), a CSC engineer would open a Customer Service Report and attempt to resolve the problem. If unable to resolve it in a reasonable time, the engineer forwarded the problem to a TAS specialty group, which would work on the problem as long as it deemed necessary. If required, the TAS specialty group called in BNR design resources, and the two groups-with separate management and separate accountabilities-worked toward a solution.

Now, when a call comes into the center, the engineer performs only a preliminary analysis of the problem-just enough to determine if it is a technical issue and, if so, the appropriate specialty group-and routes the caller immediately to that group. The specialty group has a fixed time limit-seven days-to determine whether or not it can resolve the problem. If the specialty group can fix it, the problem stays with the group. If not, it is immediately routed to the Global Product Support organization. In either case, the system is designed to deliver a fix to the customer within 30 days of the original call.

Q *How will you cut 75 percent from the problem-resolution cycle with the same number of staff?*

For one, new layered software architecture-with its closely managed interactions among layers-will make it easier than ever to isolate problems and verify the performance of fixes. It is for exactly this kind of performance improvement that Northern Telecom has made the substantial investment in software restructure.

From an organizational perspective, Triad teams ensure that issues are addressed in the larger context, not just the software code perspective. The involvement of Triads in this process is expected to produce better quality solutions-which are more likely to be approved without the back and forth between customers and NT that sometimes occurs today.

In addition, the joint Northern Telecom-BNR customer support team completely changes the internal dynamics of problem resolution. The communication and cooperation made possible by the Global Product Support group exceeds anything that could be achieved when these people resided in separate organizations. The staffing of this group will be adjusted as necessary to meet performance objectives as measured by Bellcore's RQMS (Reliability and Quality Metrics System).

We don't expect to see an overnight drop to a 30-day turnaround. By the end of 1994, we expect to see 30-day turnaround for 90 percent of all fixes for BCS35 and forward; 80 percent for BCS34 and earlier releases; significantly better for service-affecting issues, of course. We will adjust staffing and processes as necessary to meet these goals.

NOTE: It should be noted that age of the CSR will be determined by fix delivery date, not CSR closure date, as is presently done. This allows the automation of CSR aging based on patch release date rather than additional manual entry after verbal confirmation from the customer.

Q *What new or improved services will be offered?*

There are no new service offerings associated with DMS Switching Evolution. However, organizational and procedural changes are expected to provide significant improvements in the overall quality and timeliness of the services we provide.

Q *If there are no more BCS intervals, how do you define the period of software support?*

By years rather than by release. Customers will now receive full support for two years on each release, regardless of the number of releases during the period or the type of software load the customer chooses. In the past, software support was extended for the current BCS release and five earlier releases. With DMS Switching Evolution, software support will be offered for all PCLs for a period of two years.

The level of support is determined by the status of the release:

- *In Production*-When a new software release is issued, it goes into Production and continues to be referred to as the Production release until the next release is issued.
- *Active*-When a new release is issued, the previous Production release changes its status and is designated as an Active release.
- *Retired* -A release achieves Retired status two years from when it was released into production.

Whatever type of load the customer chooses (for example, BCS36, LEC002, CDNB006), *all software will be supported for a full two years from its general availability date.*

Production
When a new software release becomes generally available, it is referred to as the Production release until the next release is generally available.

Active
When a new release becomes generally available, the previous Production release is designated as an Active release.

Retired
A release achieves Retired status two years from when it became generally available.

Figure 8-2. Three Levels of Software Status

Q *What levels of support are offered for each status category?*

Northern Telecom's Customer Service Center (CSC) provides support for Production and Active releases. Additionally, emergency software applications can be provided, as needed, through an expedited software delivery process.

A Retired release is not recommended for use in an in-service central office because CSC support is only available under a separate service contract and emergency support is limited to outage situations. If an office requires full technical support, it should be equipped with a Production or Active load. The following table describes each release status and the support levels applicable:

Status	Definition	Applicability	Support Levels
Production	*Until general availability of the next release*	*Available for initial deliveries and extensions*	*Critical, Major, and Minor are supported*
Active	*Prior release excluding Production*	*Not available for initial deliveries and extensions*	*Critical, Major, and Minor are supported*
Retired	*No longer in Production or Active*	*Not recommended for in-service offices*	*Critical only is supported*

The figure that follows shows a hypothetical release schedule, showing how releases change status from Production to Active when a new release comes out, and from Active to Retired after two years.

A B-load office with Release 1 would, for instance, continue to receive support through the third quarter of Year 3, when the office should progress to Release 3 (based on projected annual release of B loads). An A-load office with Release A would, as another example, continue to receive support through the third quarter of Year 3 when it should progress to Release E because Release A is now retired.

Service Priorities	
Critical	*Degradation and/or outage*
Major	*Potential degradation and/or outage*
	Service-affecting
	Intermittently service-affecting
Minor	*Not service-affecting*

Figure 8-3. Offices Receive a Full Two Years of Support
Regardless of the Number of Releases Made Available During the Two-Year Period

To ensure that each office is operating with the current software and that the desired level of support is maintained, each site should be upgraded to the current production release. Northern Telecom customer service representatives can supply you with information about any necessary progressions required when moving from B loads to either A or B loads, or from one A load to another.

Q *When does this new software support policy take effect?*

For B-stream software loads, software support policy will continue as specified in existing contracts between Northern Telecom and its customers. The new software support policy is effective immediately where the applicable contract references Northern Telecom's current software support policy. For A-stream software loads, the new software support policy is also effective immediately.

Q *What improvements is Northern Telecom making to its customer support systems?*

The Technical Assistance Service (TAS) organization is developing a new tracking system-Customer Service Data Systems (CSDS)-targeted for implementation in 4Q94. CSDS will provide far more tracking detail than the existing CSR database. Who is working on the fix? What software modules does the problem affect? Does the problem cross software boundaries? The present CSR database accepts this information in text form, but the new CSDS system provides data fields for this information. As a result, we will be able to provide automated tracking and more sophisticated trend reporting of this kind of detailed information.

Q *Will these changes affect my internal procedures or systems?*

No. Changes to Northern Telecom's internal tracking tools will enhance our customer support efforts but will not require changes to customer procedures or systems. Customers will still be able to use C-SCAN to display Customer Service Reports and determine the status of fixes. The user interface to this system is not expected to change, except as necessary to reflect the new software commercial structure. There will be some new fields, such as fields for preventive action required to close the Customer Service Report, to provide information pertaining to remote outages, and to reconcile fix due date and delivery date. There will be no changes to access privileges or procedures to dial into the database.

However, customers that perform their own patch administration will find that changes in patch administration records will affect their patch calculation systems. For more information, refer to section 9, "Patch Delivery and Administration."

Q *Where can I get more information?*

A *Product/Service Information (PSI)* document has been prepared that describes Northern Telecom's new software support policy. To receive a copy of this document, call the Sales and Marketing Information Center at 1-800-NORTHERN and request PSI number 50113.16/08-94, *DMS-100 Family North American Software Support Policy.*

For additional information about customer support programs for 1994 and 1995, contact your regional customer service representative.

Patch Administration & Delivery 9

*Changes to customer processes and systems
resulting from DMS Switching Evolution*

Northern Telecom's software development program includes an established process for making incremental enhancements to software releases that have already been distributed to customers. This process, traditionally known as "patching," gives customers corrections to software problems, performance improvements, and even new capabilities-with priority turnaround that is not tied to BCS development schedules.

DMS Switching Evolution, because it changes the software architecture, also introduces some changes to patch administration. In addition, processes are in place and under development to enhance the quality of patch development and minimize the number and impact of patches that must be applied to the switch.

ANSWERS TO COMMONLY ASKED QUESTIONS
About the Effects of DMS Switching Evolution on Patching

Q *How does the new layered software architecture affect patches?*

Today, software is developed in indivisible, monolithic BCS releases, and patches are written corresponding to each BCS release. For example, there is a stream of patches for BCS35, and another stream for BCS36. The new layered software architecture brings two principal changes in this area:

- **Patches will be contained within software layers.** With DMS Switching Evolution, patches will be written to correspond to a layer, rather than a monolithic BCS release. Separate patches will be created to address those few issues that span software layers. This practice has several benefits:

  - *Preserves the architectural integrity of the software.* The fundamental principle of the new layered software is to replace a complex web of interactions in the software with a few, closely managed links among layers. Accordingly, software patches cannot span more than one layer; to allow cross-layer patching would violate the integrity of the closely managed links among layers.

- *Support development of software layers on asynchronous schedules.* For example, release 002 of a PCL could be built on the same Base layer as release 001. The same Base layer patches would apply to both PCL releases. Therefore, to simplify patch administration by the customer, patches will correspond to layers rather than PCL releases.

- **Patches for one PCL will be identified by several stream numbers.**
  Because there will be a separate patch stream per layer, rather than one per release, patch naming conventions must identify multiple patch streams.

Q *How are patches identified?*

Traditionally, patches were identified by an eight-character patch name, with the last two characters identifying the release to which the patch applied. For example, every patch for BCS35 software was named xxxxxx35. Every patch for BCS36 was named xxxxxx36, and so on.

This patch naming convention has been slightly modified; it now corresponds to patch development streams that relate to software layer rather than BCS release. In the new patch naming convention, the first six characters will identify the patch writer and target node-as they always have-but the last two characters will identify the layer and version to which the patch applies. The last two characters are alphanumeric and not necessarily sequential.

Patch writer identifier

*Target Node
(CM, XPM, ISN, BRISC)*

BCS Release Number

PES07 C 35   ***OLD***

PES07 C B3   *NEW*

Unchanged

*Layer and Version
Examples:*
  B3 *Base 03 patch*
  T2 *Telecom02 patch*
  S2 *STP02 patch*
  P4 *SCP04 patch*
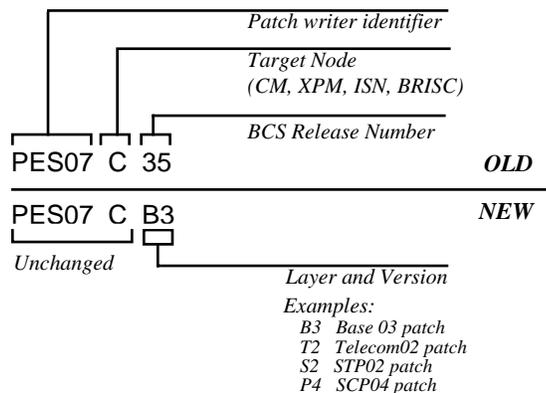
Q *How do these changes affect patch calculators?*

Patch calculators are automated tools used to identify software modules loaded in each switch, track patches that have been applied to modules, and determine where new patches must be applied.

For independent operating companies and others for which Northern Telecom performs patch administration, the customer will not have to make any changes to patch calculators or their present roles in patch administration. Regional Bell Operating Companies and others that perform their own patch calculation and administration will have to change their patch calculators to accommodate multiple patch streams and new release designations. The figure shows a comparison of patch administration information for the old and new software structures.

```
┌─────────────────────────────────────┐
│ Admin Section of Patch              │
├─────────────────────────────────────┤
│ Patch   BBB16C36                    │
│                                     │
│ P  BCS36RTM                         │
│                                     │
│                                     │
│ ┌─┐                                 │
│ │A│                                 │
│ └─┘                                 │
│ M  LNUTIL     FQ02    DAV13C36      │
│ M  INTRASW    BF02    IAD13C36      │
│ M  RLLPRCI    FC04                  │
│                                     │
│ LPATCH   BBB16GATAA01  COMMON       │
│                                     │
│ S·   LNUTIL  FQ03                   │
│ S.   INTRASW BF03                   │
│ S    RLLPRCI FI01                   │
│         ▪                           │
│         ▪                           │
│         ▪                           │
│         ▪                           │
│         ▪                           │
│         ▪                           │
│                                     │
│   *EOF*                             │
└─────────────────────────────────────┘
```

```
┌─────────────────────────────────────┐
│ Feature PKG_MOD_XREFILE             │
├─────────────────────────────────────┤
│ FEATURE PKG          MODULE         │
│ NTX000AA             MATHUI         │
│ NTX000AA             DSKTYP         │
│ NTX001AA             ORDRTL         │
│    .                    .           │
│    .                    .           │
│ NTX100AB             INTRASW        │
│ NTX100AB             LNUTIL         │
│ NTX100AB             IDLED          │
└─────────────────────────────────────┘
```

A *Patch contains records identifying the software modules affected by the patch.*

B *Cross reference containing thousands of feature packages is used to determine the feature packages the modules reside in.*

Sites requiring the patch are identified by affected NTX package.

Figure 9-1. Administrative Section of Patch File-BCS36

PCL_DRU_XREF FILE

PCL NAME	TARGET	DRU EDITION	PATCH SUFFIX
LEC001	M68K	CNA01BA	N1
LEC001	M68K	CCM01AK	C1
LEC001	M68K	SHR02AK	H2
LEC001	M68K	TL02AC	T2
LEC001	M68K	BAS03AD	B3
LEC001	M88K	CNA01BA	N1
LEC001	M88K	CCM01AK	C1

Admin Section of Patch

Patch   BBB16CC1

P CCM01AK
P SHR02AK
P TL02AC
P BAS03AD

M LNUTIL   FQ02   DAV13CC1
M INTRASW   BF02   IAD13CC1
M RLLPRCI   FC04

LPATCH   BBB16GATAA01 COMMON

SPATCH   LNUTIL FQ03
SPATCH   INTRASW BF03
SPATCH   RLLPRCI FI01
          ▪
          ▪
          ▪
          ▪
          ▪
          ▪
EOF

A *Patch contains P records identifying layers affected by the patch.*

Layer information is cross referenced to identify the PCLs potentially affected by the patch.

B *M records in patch identify affected modules, used to refine list of PCLs to those which do require the patch.*

Limited number of standard PCLs makes it easy to identify sites that require the patch.

A

B

PCL_MODULE_XREF FILE

PCL NAME	TARGET	DRU EDITION	MODULE	SUBSYSTEM
LEC001	M68K	BAS03AD	MATHUI	SOSBILGE
LEC001	M68K	BAS03AD	DSKTYP	DISKSUB
LEC001	M68K	TL02AC	ORDRTL	TABUSUB
LEC001	M68K	TL02AC	UXEC1	COMMTL1
LEC001	M68K	SHR02AK	TOPPF	AIFOBJ
LEC001	M68K	SHR02AK	XFRSVC	XFRSUB
LEC001	M68K	CCM01AK	LNUTIL	LNSUB
LEC001	M68K	CCM01AK	IDLED	COMMON
LEC001	M68K	CCM01AK	INTRASW	LOCAL
.	.	.	.	.
.	.	.	.	.
LEC001	M88K	BAS03AD	MATHUI	SOSBILGE

Figure 9-2. Administrative Section of Patch File-After BCS36

In May 1994, the Customer Service Information Systems group published a technical document that details these changes, such as layout record formats and lengths, to guide system development engineers. The document, "CSCAN Plus Source Code Patching CSP02 System Changes-System Specifications and Design Details," has been distributed to the National ESAC Mechanization and Cooperative User Programming (MCUP) subcommittee, a group responsible for coding and maintaining calculator systems for Regional Bell Operating Companies. For additional information about this document, contact either of these individuals:

- Jeff Kanz   Author   (919) 481-7543
- Mike Hill   CSCAN Interface System   (919) 481-5306 ESN 283-5306

Q *Looking at the sample patch files, it looks like patch calculation has become more complicated, rather than simpler. Is this so?*

Patch calculation is actually greatly streamlined. In the BCS world, one had to search thousands of NTX packages to find the module(s) being patched, and then see if one of the affected packages was in the office. With the new method, one only needs to match up a very short list of PCLs with the module(s) being patched, and find the affected offices based on PCL-which is much easier and faster than searching for NTX packages by office.

BCS-Search at the feature-package level, because each switch could have a completely unique set of features

PCL-Search at the PCL level, because each switch with the same PCL will have the same set of features
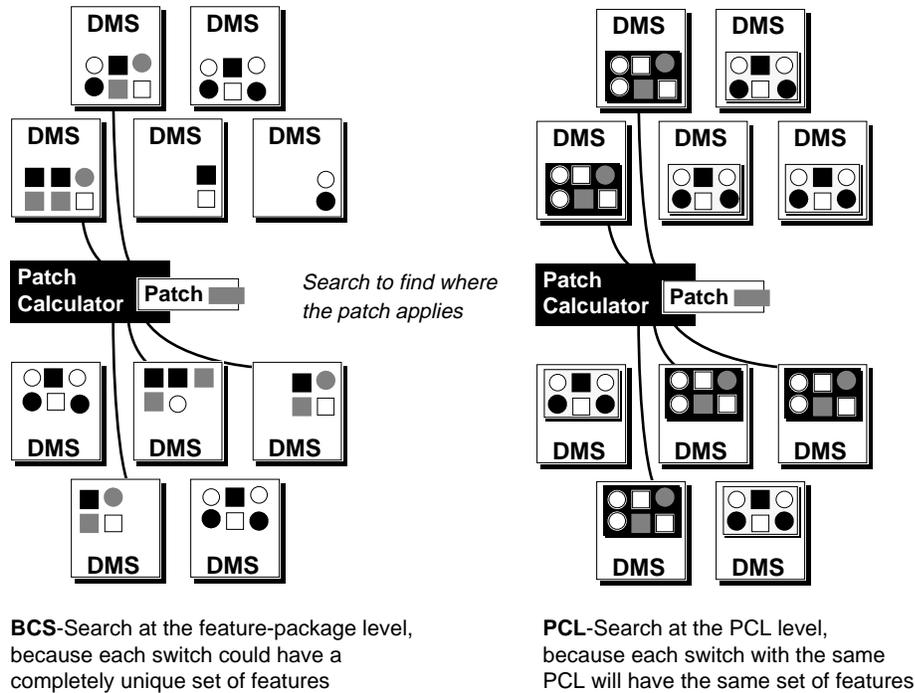
Figure 9-3. Patch Calculators Search by PCL, Rather than by Feature

Q *Will a new patch application tool be provided?*

Northern Telecom is releasing a new patch utility-Post-Release Software Manager (PRSM)-that will replace the DMS Patcher utility. PRSM is a robust, feature-enhanced replacement for the DMS Patcher utility. It provides full Patcher functionality with a simplified user interface, flexible reporting, and consistent command syntax across all patchable nodes. These advantages will reduce the craftsperson's time and effort to administer patches on the DMS-100 switch. PRSM also provides a stable, responsive platform on which to implement future improvements to software patching, with the goal of reducing the cost of DMS ownership.

PRSM is scheduled for verification office testing and rollout in the NA004 development period. As a base utility, it will be included in the price of the PCL.

Patcher will no longer be supported starting with NA005, having been removed and replaced by PRSM. In NA004, both Patcher and PRSM will be resident in the software load. The ability to switch back and forth between the two by means of password-protected commands will assist in a painless transition to PRSM.

Craftspersons already familiar with Patcher and those new to DMS-100 patching will benefit from the "Post Release Software Manager Transition Guide," delivered with the software. This guide describes how tasks which were performed using Patcher are now performed using PRSM. In addition, the "PRSM Reference Manual" documents all PRSM functions and command syntax.

The *Northern Telecom Publication*, NTP 297-5001-540 "SuperNode Patching," provides detailed, step-by-step procedures for using the DMS patching tools.

Q *What hardware and software will I need in order to use PRSM?*

Hardware. PRSM uses exactly the same hardware as the Patcher utility it replaces. However, additional memory resources may be required in the NA004-NA005 timeframe, because both Patcher and PRSM will be resident simultaneously, both consuming memory resources.

- PRSM requires about 500 kBytes of program store and 165 kBytes of data store-plus approximately 200 bytes of data store per patch.

- Patcher requires about 500 kBytes of program store and 265 kBytes of data store-plus approximately 200 bytes of data store per patch.

When Patcher is retired in NA006, memory requirements drop to the PRSM-only level.

Software. PCLs from release NA004 and up will automatically include the PRSM utility. No other special software is required.

Q *How do these changes affect our process of applying patches?*

The changes brought by DMS Switching Evolution will not change the methods of receiving or applying patches.

Receiving patches from Northern Telecom. Regional Bell Operating Companies will continue to use CSCAN (Customer Service Computerized Access Network) to track trouble reports and receive patch files. Other customers will continue to use asynchronous modems or X.25 packet-data transfer to receive patch files. Nothing will change about these delivery mechanisms from the customer's perspective.

Applying patches to the switch. Whether using DMS Patcher or PRSM, the basic concepts of applying patches will not change from traditional methods. However, the PRSM user interface and command syntax is greatly simplified. For example, the number of commands required to manually apply patches has been significantly reduced. The "Post Release Software Manager Transition Guide" describes the differences between Patcher and PRSM methods.

Q *What is Northern Telecom doing to minimize the impact of patching?*

Northern Telecom has instituted several programs to reduce the number and impact of patches-which in turn reduces patch administration:

- **"Triad" teams**-composed of representatives from product-line management, design, and support organizations-are bringing diverse expertise and resources to problem resolution. The team structure is designed to create joint ownership across organizational lines for faster, higher quality responses. The Triad concept also ensures that the "owners" of the software code are the ones making changes, an essential control for quality software development.

- **A patch writer training program and new control mechanisms** are being introduced to reduce the rate of defective patches. In addition, recognizing that software defects are the root cause of many patches, programs are underway to manage defects as an integral part of the product introduction "gate" process.

- **Automated patch application.** Traditionally, some patches required manual application effort by the customer. Beginning in July 1994, patches to software in Static Random Access Memory (SRAM) are being automated-eliminating about 80 percent of computing-module (CM) patches that required manual intervention. Our next focus is to eliminate the requirement to manually apply patches on the XPM products, such as patches that require a restart to be performed.

- **Post Release Software Manager (PRSM)** provides an enhanced user interface and powerful commands to reduce the craftsperson's time and effort to administer patches on the DMS-100 switch.

Q *How do I request a patch?*

DMS Switching Evolution brings no change to the process of initiating a Customer Service Report (CSR). The central contact number is still 1-800-NT-4HELP. If the problem requires a patch, patch development will be handled by the appropriate specialty group or Global Product Support organization. Improvements to internal procedures and organization are expected to result in fixes delivered to customers within 30 days of the original call-sooner for service-affecting issues, of course. For more information about customer support and problem resolution, see chapter 8, "Customer Support Systems."

Q *How do changes in patches affect the INFORM report?*

Today, INFORM reports produced by DMS Patcher detail the software update history of each office. These reports will change to reflect changes in the software commercial structure and patch process. The most visible change will be that the Site Admin section of the report will show the PCL release instead of a BCS release, and the software layers which form the PCL will be identified.

PRSM, which will replace Patcher, includes a more flexible and easy-to-use replacement for INFORM-the SELECT command. Pre-defined and user-definable SELECT reports allow the craftsperson to quickly extract the desired information. The "Post Release Software Manager Transition Guide" describes the changes for the user.

9-7

Figure 9.3 provides an example of the existing BCS36 INFORM LIST report. It contains sections describing the patch status on the various targets, a list of the peripheral loads present on the switch, and site administrative information. The Site Admin information includes a list of the feature "NTX" packages in the load.

```
* CM Patches
PATCH ID      INFO A TP    MODULES    TYPE  DATE      TIME      CAT     T ASR  R ST
------------ ---- - --    -------    ----  ----      ----      ---     - ---  - --
MDV13C36          Y CM ISUPTYPE BC01 SRC  94/09/22 09:49:30 GEN     C YNN UN A
JMA98C36          Y CM MDNFTR   BG02 SRC  94/09/22 11:55:19 GEN     C YNN NR R
   .
   .
WEZ28C36     0004 Y CM            CMD  94/01/21 09:48:36 GEN     C YNN NR A
CDR49C36     0001 Y CM ADUMPPRC AZ01 SRC  94/01/21 09:48:18 EMG     C YNN AV A
* END CM Patches

* XPM Patches
PATCH ID      INFO A TP    MODULES    TYPE  DATE      TIME      CAT     T ASR  R ST
------------ ---- - --    -------    ----  ----      ----      ---     - ---  - --
XTN33X36          Y PM  0    0    0 SRC  94/09/22 10:06:38         C YNN NR A
XDJ66X36          Y PM  1    1    2 SRC  94/09/20 23:55:17         C YNN NR A
   .
   .
XWR16X36     0032 Y PM  0    1    1 SRC  94/08/23 21:07:33         C YNN NR A
XAZ05X36     0023 Y PM  0    1    1 SRC  94/08/23 21:07:33         C YNN NR A
* END XPM Patches

* MS Patches
PATCH ID      INFO A TP    MODULES    TYPE  DATE      TIME      CAT     T ASR  R ST
------------ ---- - --    -------    ----  ----      ----      ---     - ---  - --
MNJ29I36     GEN  Y PM                     94/09/21 01:04:33 GEN     C NYN NR NN
   .
   .
JHT55I36     0002 Y PM  1    1    2      94/01/21 15:36:26 GEN     C YNN AV A
                    MSLTBAC  BE01 SRC
* END MS Patches

* Site Admin Information
PATCH ID      INFO A TP    MODULES    TYPE  DATE      TIME      CAT     T ASR  R ST
------------ ---- - --    -------    ----  ----      ----      ---     - ---  - --
S_KEY0015685      N CM                     94/01/21 09:46:56         NNN NR A
TASCAPTIVE_A      N CM                     94/01/21 09:16:44         NNN NR A
RLGHNCTCAPA       N CM                     94/01/21 09:16:43         NNN NR A
H13727_00         N CM                     94/01/21 09:16:43         NNN NR A
BCS36RTM          N CM                     94/01/21 09:16:42         NNN NR A
NTXC45AD01        N CM                     94/01/21 09:16:41         NNN NR A
NTXD18AB02        N CM                     94/01/21 09:16:40         NNN NR A
   .
   .
NTX991AF01        N CM                     94/01/21 08:38:40         NNN NR A
* END Site Admin Information

* Patchable PM Loads

** XPM loads
    LTI02C
    DC703BX
      .
      .
    ERI03BX
** END XPM loads

* END of INFORM
```

Figure 9-3.   Old INFORM Display (BCS36)

Figure 9.4 illustrates how the INFORM LIST report will appear in a typical PCL, in this case the LET00002 product. Notice the new patch filename suffixes, which correspond to the software layer. The Site Admin section now contains the product name "LET00002" as well as the layers which form that product. In the first DMS Evolution releases, the Site Admin section also lists the orderable, optional functional groups in the product. This replaces the NTX packaging information. Beginning with NA004 PCLs, this information will be shown in a SOC SELECT report produced by the SOC utility.

```
* CM Patches
PATCH ID      INFO A TP    MODULES    TYPE  DATE     TIME     CAT     T ASR  R ST
----------- ---- - --    -------    ----  ----     ----     ---     - ---  - --
DOA00CC2             Y CM BCLAMAUI AV05 SRC  94/09/22 10:32:48 GEN     C YNN UN A
KSH19CN2             Y CM BCLAMAUI AV04 SRC  94/09/22 10:22:38 GEN     C YNN UN A
                        IBNOTALC DD02 SRC
RWF02CT2             Y CM RCSPMFI  BD01 SRC  94/09/16 03:26:45 GEN     C YNN UN A
       .
       .
       .
LCF04CB3             Y CM LOGDEVP  BT01 SRC  94/07/04 21:25:52 GEN     C YNN UN A

* END CM Patches

* XPM Patches
PATCH ID      INFO A TP    MODULES    TYPE  DATE     TIME     CAT     T ASR  R ST
----------- ---- - --    -------    ----  ----     ----     ---     - --- - --
XBN33X03             Y PM  0    0    0 SRC  94/09/22 10:06:38         C YNN NR A
XEJ66X03             Y PM  1    1    2 SRC  94/09/20 23:55:17         C YNN NR A
       .
       .
XVR16X03      0032 Y PM  0    1    1 SRC  94/08/23 21:07:33         C YNN NR A
XBZ05X03      0023 Y PM  0    1    1 SRC  94/08/23 21:07:33         C YNN NR A

* Site Admin Information
PATCH ID      INFO A TP    MODULES    TYPE  DATE     TIME     CAT     T ASR  R ST
----------- ---- - --    -------    ----  ----     ----     ---     - --- - --
LET002             N CM                     94/07/04 21:22:58         NNN NR A
LET00002           N CM                     94/07/04 21:22:58         NNN NR A
M68K               N CM                     94/07/04 21:22:58         NNN NR A
TOP21AW            N CM                     94/07/04 21:22:58         NNN NR A
CNA02AW            N CM                     94/07/04 21:22:58         NNN NR A
CCM02AW            N CM                     94/07/04 21:22:58         NNN NR A
SHR02AO            N CM                     94/07/04 21:22:58         NNN NR A
TL02AO             N CM                     94/07/04 21:22:57         NNN NR A
BAS03AO            N CM                     94/07/04 21:22:57         NNN NR A
ABS00001           N CM                     94/07/04 21:25:48         NNN NR A
ABS00002           N CM                     94/07/04 21:25:48         NNN NR A
.
.
TEL00008           N CM                     94/07/04 21:24:32         NNN NR A
UDD00001           N CM                     94/07/04 21:24:32         NNN NR A
WLC00003           N CM                     94/07/04 21:24:30         NNN NR A

* END Site Admin Information

* Patchable PM Loads

** XPM loads
    NLG03BX
    NLT03BX
      .
      .
    ESA03BX
** END XPM loads

* END of INFORM
```

Figure 9-4. New INFORM Display (LET0002)

Figure 9.5 shows a preliminary example of a SELECT report available through the Software Optionality Control (SOC) utility. The example shows how the powerful SOC SELECT command syntax can be used to report on specific options; in this case, the Meridian Digital Centrex features. Starting with NA004 PCLs, the SOC report will identify the status of the orderable software options, and this information will no longer be shown in the Site Admin information of the INFORM LIST.

```
> SELECT NAME CTX BRIEF

GROUP: CTX

OPTION      NAME                RTU  STATE  USAGE   LIMIT    UNIT    LAST CHG
CTX00075    CALL RETURN         N    IDLE   -       -        -       94/01/02
CTX00128    CALL FORWARDING     Y    ON     -       -        -       94/01/08
CTX00130    CALL WAITING        Y    -      578     1000     lines   94/02/25
CTX00131    RING AGAIN          Y    -      350     400      lines   94/02/15
CTX00153    CALL FORWARD BUSY   Y    IDLE   -       -        -       94/02/05
CTX00173    CALLING LINE ID     Y    -      302     20,000   lines   94/02/15
```

Figure 9-5. Example SOC SELECT Report (Preliminary)

Q *When will these changes to patching take place?*

The changes described in this section-such as new patch naming conventions and separate patch streams for each software layer-were introduced in mid-1994 with the release of PCLs built from the NA100 development stream.

For more information about the effect of DMS Switching Evolution on patch delivery and administration, contact your regional Northern Telecom representative.

Customer Documentation

Re-engineering Northern Telecom's
Documentation Products and Processes

Documentation Evolution is a far-reaching program to redesign *Northern Telecom Publications*
(NTPs) for the larger DMS switching systems. It is an aggressive commitment to quality
customer documentation, driven by switching evolution and customer needs:

- *Documenting the changes brought by DMS Switching Evolution.* DMS Switching
  Evolution has brought far-reaching changes in the way Northern Telecom develops products
  and does business. These changes are communicated to customers in many avenues.

- *Being an active part of the corporate-wide DMS Switching Evolution program.*
  Far more than just a software restructure, DMS Switching Evolution calls for new initiatives
  in all areas of the company. The Documentation group is contributing to this effort with
  significant improvements in documentation content, organization, and delivery.

- *Responding to customer needs.* Long before DMS Switching Evolution was initiated in
  the corporation, we have been responding to customer input and improving our
  documentation to align with their needs. We have changed the format, added more flow
  charts and tables, and distributed documentation on cost-effective CD-ROM discs, which
  allow users to automate their searches for a particular subject.

This section describes the changes affecting *Northern Telecom Publications (NTPs)*-changes
which demonstrate a vigorous commitment to improving the usefulness of documents, streamlining
the ordering process, and enhancing delivery methods. Also included are descriptions of new
marketing publications that will help customers make the transition to the new architecture.

New Standards for Documentation

- Streamlined Ordering
- CD-ROM Delivery
- One Document Suite Per Product
- Subject Indexing
- Consolidated Like Information
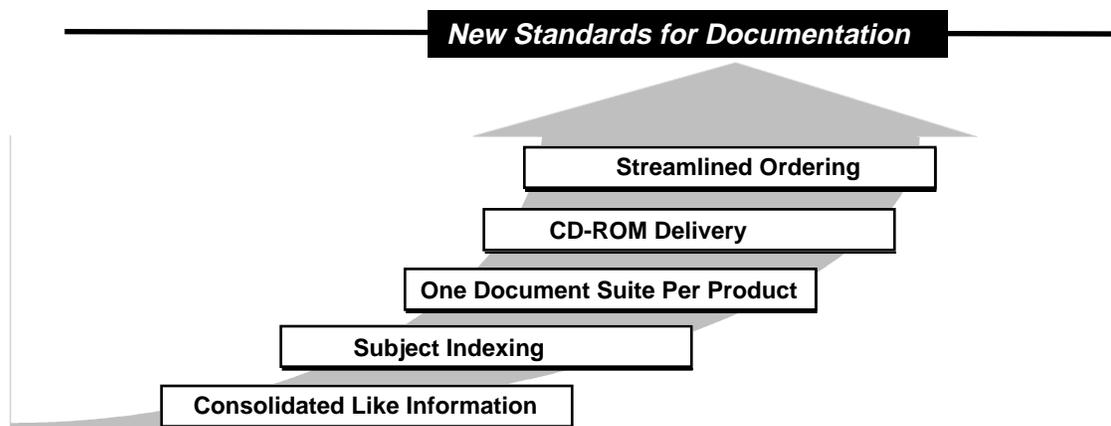
Figure 10-1. Improvements in Documentation Process and Product

ANSWERS TO COMMONLY ASKED QUESTIONS

About Enhancements to the Documentation Process

Q *How will DMS Switching Evolution affect customer documentation?*

DMS Switching Evolution includes a broad range of improvement programs, from software restructure to improved processes. Northern Telecom's Documentation group is contributing to this global re-engineering with many customer-requested improvements to product documentation, including the following.

Consolidation of Like Information	Similar types of information will be consolidated in a single *Northern Telecom Publication* (NTP). For example, card replacement information for all the features on a switch will be consolidated in a single document. This means easy, one-stop access to card-replacement information.
	All like information will be delivered in one document. For example, a customer ordering the LEC002 PCL will receive one document containing translations, one document containing alarms, and so on.
Reduction of Out-Referencing	Traditionally, documentation was likely to refer the reader to other documents-translation guides, for example-for detailed information on a subject. This practice made the documents more cumbersome to use. Now we are reducing cross-referencing in all NTPs and, through consolidation of like information, will eliminate most out-referencing within NTP chapters.
Improved Accuracy	The Documentation group is now assuming more pro-active responsibility in product development. By participating as part of the product development team in creating and maintaining the product design documentation, the Documentation group will be involved and informed of ongoing design changes.
Module Consistency	Standard templates have been created to ensure consistency in format, headings, and content. The templates will provide guidelines as to what types of information are required under each heading, optional information depending on functionality, and suggestions on how to find the most up-to-date and complete source. In addition, responsibility for a documentation module will be assigned to a single author-ensuring consistency of language and content.
Subject Indexes	In response to customer requests, we're adding subject indexes to all procedural NTPs. Maintenance books, such as the alarm clearing NTP, will be indexed by procedure. Translations NTPs will be indexed by functionality.

Q *When will the new documentation be available?*

The first standard suite of DMS Switching Evolution product documentation was delivered in 3Q94. The transition from the current environment to the DMS Switching Evolution environment-which affects documentation content-will continue throughout 1994.

Preliminary PCL-specific documentation is available early enough in the product development cycle for use in verification offices, and *standard* PCL-specific documentation is available at the ready to manufacture (RTM) stage of each product.

Q *What will the new documentation look like?*

With the advent of DMS Switching Evolution and advanced authoring technologies, the DMS-100 Product Documentation group will be able to capitalize on software changes to improve the usability and accessibility of our documents, as well as reduce the number of documents required to support the product.

You will find all like documentation in one document-for the STP PCL, for example, there will be one document for translations, one document for alarms, and so forth-with notable reductions in search times. Documentation suites been streamlined based on customer input-and indexes have been included for maintenance and translation guides. In addition, translations guides now include such useful features as translations table flow and datafill sequences, and basic maintenance documents provide step-by-step procedures.

Some documents in the traditional NTP suite will not be included in the documentation suite for PCLs. The content of these discontinued volumes has been distributed to other volumes as shown in the following figures.
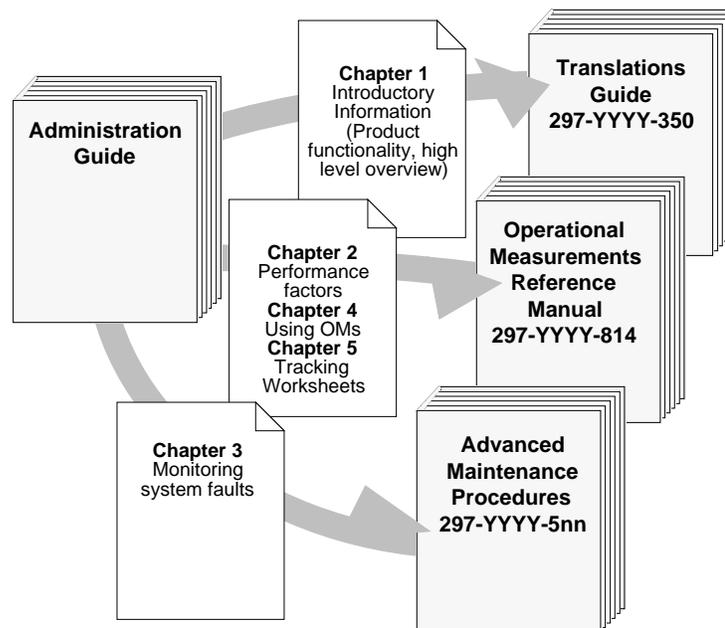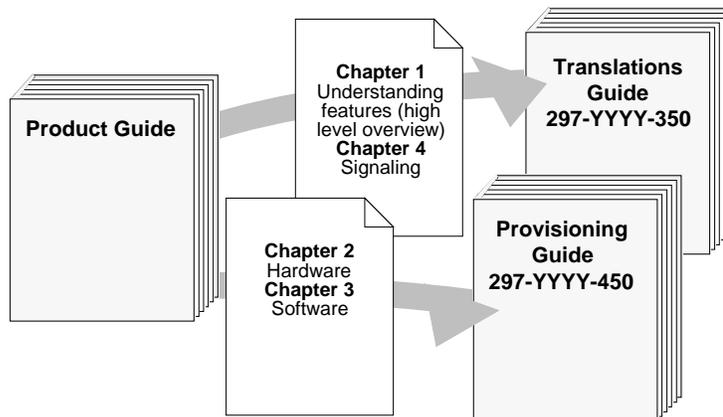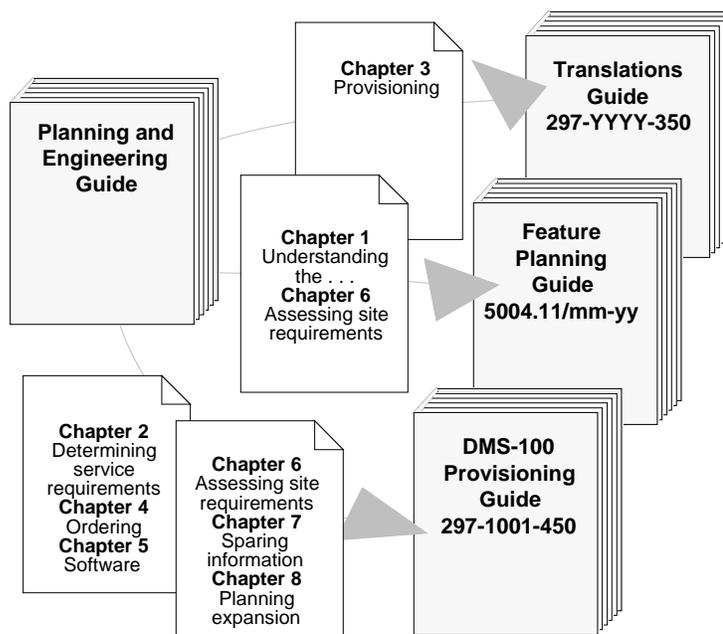

Figure 10-2. Distribution of Information from Discontinued NTP Volumes
Administration Guide

*Figure 10-3. Distribution of Information from Discontinued NTP Volumes
Product Guide*

*Figure 10-4. Distribution of Information from Discontinued NTP Volumes
Planning and Engineering Guide*

Q *How will I identify the documentation required for my load?*

The numbering scheme for restructured NTPs has changed. All NTPs are identified by a 10-digit number that is divided into three blocks-XXX-YYYY-ZZZ-where XXX identifies the system, YYYY denotes the PCL, and ZZZ identifies the type of NTP.

The CD-ROM disc that contains the PCL documentation will include a cross-reference document that provides information to guide users from BCS documentation to PCL documentation. The following NTPs are among the first deliverables:

LEC002 PCL (U.S. LECs)	Alarm Clearing and Performance Monitoring Proced.	297-8001-543
	Trouble Locating and Clearing Procedures	297-8001-544
	Recovery Procedures	297-8001-545
	Routine Maintenance Procedures	297-8001-546
	Card Replacement Procedures	297-8001-547
CDN002 PCL (Canada)	Alarm Clearing and Performance Monitoring Proced.	297-8011-543
	Trouble Locating and Clearing Procedures	297-8011-544
	Recovery Procedures	297-8011-545
	Routine Maintenance Procedures	297-8011-546
	Card Replacement Procedures	297-8011-547
LET002 PCL (TOPS Switches)	Alarm Clearing and Performance Monitoring Proced.	297-8021-543
	Trouble Locating and Clearing Procedures	297-8021-544
	Recovery Procedures	297-8021-545
	Routine Maintenance Procedures	297-8021-546
	Card Replacement Procedures	297-8021-547

The last three digits of the document number indicate the document type. Standard suffixes have been identified for the following document types:

Translations	350	Hardware Description	805
Alarm Clearing and Performance		Servord	808
Monitoring Procedures	543	Operational Measurements	814
Trouble Locating and Clearing Procedures	544	Logs	840
Recovery Procedures	545	XPM Translations	815
Routine Maintenance Procedures	546	Logs	840
Card Replacement Procedures	547	Office Parameters	855

Q *There is a vast amount of information available through the current NTPs. Will the same range and depth of information be available with the new documentation?*

Yes. Although the structure and format will be different, the range and depth of information will be equal to, and in some cases greater than, the current suite of NTPs.

The new NTPs eliminate much redundancy and are based on what customers tell us they need to support the software. Through surveys, report cards, user needs analyses, and customer forums, customers have indicated that some documents and chapters are considered repetitive. As a result, we have reorganized the DMS product documentation suites to include the following documents for each PCL:

- Translations guides
- Maintenance (Basic and Advanced) documents
- Reference documents (logs, operational measurements, etc.)
- Change documentation

Translations and maintenance documentation in particular have been reorganized so that like information is together for customer convenience.

Translations Guides. Translations guides have been continuously improving with the support of customer input. These documents address:

- Translations table flow
- Limitations and restrictions
- Feature interactions
- Activation/deactivation
- Datafill sequence

Maintenance Documents. Basic maintenance documents have been updated to meet our customers' requirements for step-by-step procedures. In addition, we will be providing advanced maintenance documentation that is directed to the most highly-trained craftspersons. Content for advanced maintenance includes theory and background for previous actions, possible side effects and implications, and information required for root cause analysis.

Q *With Product Computing-Module Loads (PCLs), we will receive all the features for the product-will we also receive documentation for all the features?*

Documentation for all software options included in a PCL will be delivered as part of the product suite-whether or not the customer chooses to use them immediately. When a customer chooses to activate optional features, the supporting documentation is already available.

Q *How will the DMS Switching Evolution affect the delivery of documentation for new software?*

Canadian customers will see no difference in documentation delivery. However, the successful Canadian model is being implemented in the U.S. as well.

We are building customer order profiles that include the customer's address, the media by which documentation is received, and the types of documentation ordered. As this process is implemented, customers will be notified and provided with information regarding their profile and how to request changes.

> ***Standard Order Profiles Deliver Convenience and Efficiency-***
>
> ▶ *Eliminate repeat orders for each software purchase*
>
> ▶ *Deliver documentation to targeted locations only*

This process will eliminate the need for customers and systems engineers to repeatedly order documentation with each software purchase. Instead, new documentation will be delivered automatically with the related software. For more information on how to initiate the standard orders process, call 1-800-NT-I-CARE.

Q *What medium will be used to deliver documentation in the new DMS Switching Evolution environment?*

CD-ROM (Compact Disc-Read Only Memory) is a powerful tool that adds speed, versatility, and efficiency to information searches of all kinds. Customers can choose to receive NTPs on CD-ROM today. Beginning in July 1995, Northern Telecom's standard delivery method for DMS-100 NTPs will be CD-ROM disc. Customers can search, read, and print the "electronic" documentation using Helmsman™, Northern Telecom's CD-ROM information retrieval system.

Each new set of CDs includes information applicable to the release level, information that updates pervious documents, and new information that has been released since the last CD-ROM was produced.

DMS-100 NTPs
(80 three-inch binders)

DOS Personal Computer
Macintosh Personal Computer
UNIX Workstation
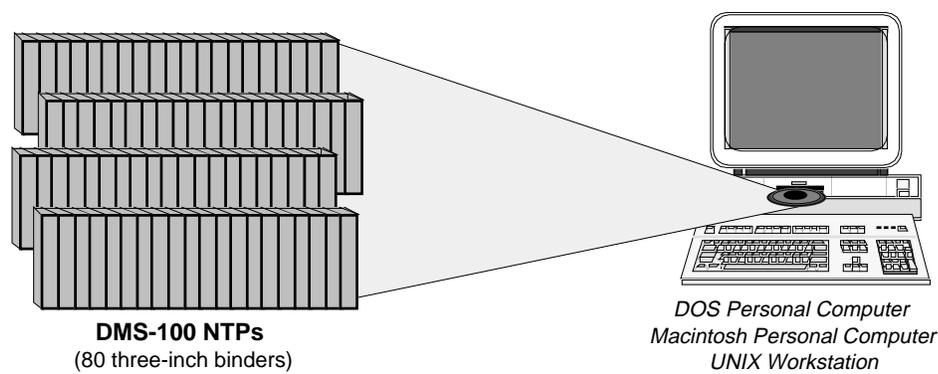
Figure 10-5-Up to 210,000 Pages of Documentation on a Single CD-ROM

Q *How will CD-ROM be delivered to support the new software?*

Our current plans are to deliver a CD for each PCL, with timing linked to PCL gate dates-instead of the traditional monthly distribution schedule. Some exceptions exist where documentation for multiple PCLs will be provided on one CD-ROM disc. If updates must be sent out, the replacement CD-ROM will include *all* information for the PCL, not just the changed information.

In 1994, we plan to deliver CD-ROM documentation for PCLs associated with the NA002 and NA003 development streams. The CD-ROM discs will also contain appropriate XPM-based information.

Q *What are the advantages of changing to CD-ROM?*

CD-ROM will deliver several major benefits, including the following:

Faster, Easier Searches. The search capabilities available in Helmsman™ CD-ROM allow you to search for words, partial words, phrases, or document numbers across an entire suite of documents in a matter of seconds. All words in a document or set of documents can be searched.

Cost Savings. For the customer receiving information through contracted agreements, no cost changes will apply. For customers purchasing documentation through merchandise orders, the initial cost of a full set of DMS-100/200 documentation on CD-ROM is significantly less than that of a set of paper NTPs-one price covers the delivery of software upgrades for the Helmsman™ retrieval engine as well as compact disc deliveries for a period of one year. In addition, the life cycle cost of CD-ROM documentation is significantly less than that of paper. The initial cost incurred to purchase the necessary hardware is rapidly decreasing, while the cost to store and the labor required to file and maintain paper volumes continues to increase.

Frequent delivery of CDs ensures that information is always current. Updates won't sit in a corner until personnel have the time to physically replace them-updating NTPs is as simple as replacing a disc.

> ***Distribution of NTPs on CD-ROM saves valuable natural resources.***
>
> ***In a single year . . .***
>
> *3.4 million pounds of paper*
>
> *115,000 boxes*
>
> *250,000 vinyl binders*
>
> *Massive quantities of packing materials*
>
> *Transportation fuel*

Greater Availability of Information. By copying a Helmsman CD-ROM disc to a file server attached to a network, NTPs can easily be made available to a large number of users for on-line access.

A Cleaner Environment. Northern Telecom is deeply committed to addressing environmental issues proactively. Reducing the use of paper through CD-ROM strongly reinforces this commitment. Consider the positive environmental impact of replacing 90,000 pages that fill 80 three-inch binders with one compact disc that can store more than twice that amount of information.

Also, in response to many requests, Northern Telecom has initiated a CD-ROM recycling program in the United States for the compact discs and their cases. For more information on this program, please call your regional Helmsman™ coordinator or the reclamation coordinator at Northern Telecom at (919) 687-3928 (ESN 262-3928).

Q *Our users are familiar with the paper documentation. What assurances do we have that they will accept electronic documentation?*

Changing from paper to electronic media does require some adaptation, and a new way of reading and using documentation is admittedly a big shift. But customers who already use our electronic documentation report that automated searches alone more than compensate for adjusting to a new method. Helmsman™ and CD-ROM offer the following benefits, which users are quick to appreciate:

- *Fast search time.* Using the equipment recommended earlier, the user can enter a technical term-"patch admin file," for example-and typically see the requested information on screen in less than 10 seconds.

10-8

- *Ability to create custom documentation.* The customer's documentation administrator or other authorized users can cut text and pictures from the documentation, then paste them to a clipboard-enabling them to create custom documentation unique to their needs.

- *Ability to print hard copy, if desired.* If paper documentation is preferred by some users, it can easily be printed at the customer's site-a single page, a range of pages, or an entire document.

Q *Is CD-ROM a long-range solution? Can I be assured that equipment investments will be justified?*

Investment protection is ensured because Northern Telecom offers Helmsman™ support for the most popular computing platforms-Macintosh or IBM-compatible PCs and UNIX-based workstations. PCs and workstations can stand alone or be connected in local area networks (LANs) and wide area networks (WANs)-referencing one copy of CD-ROM documentation on a file server.

Q *What equipment do I need in order to use CD-ROM?*

CD-ROM implementation requires the following hardware and software:

- CD-ROM reader for each craftsperson's computer or, for multi-user setups, a LAN-based CD reader or network server delivering electronic documentation to several computers

- Macintosh, WINDOWS, or UNIX operating systems to run Helmsman ™ program

- Optional LANs that support Helmsman™ for each platform

The following tables list the technical recommendations for running Helmsman™ on computers using Macintosh, WINDOWS, or UNIX operating systems. Using computers inferior to those recommended in the Helmsman™ Technical Requirements degrades Helmsman™'s performance. This hardware is provided by the customer and may be used for other tasks; it need not be dedicated to Northern Telecom documentation functions.

Macintosh	
Macintosh II, Centris, Quadra, Performa, or PowerBook	-4 Megabytes (MB) RAM available -20 MB hard disk drive (5 MB available) -68030 or 68040 CPU -System 7.0 or higher -Color or B&W monitor (12-inch minimum display)
CD-ROM reader	-ISO 9660-compliant (with applicable software driver)
Local Area Network (optional)	-AppleShare
Printer	-PostScript

WINDOWS	
IBM-compatible computer	-4 Megabytes (MB) RAM available -20 MB hard disk drive (5 MB available) -386 or 486 CPU (33 Mhz or faster) -MS-DOS 5.0 or higher -Windows 3.1 or higher (with TrueType installed or enabled)
CD-ROM reader	-ISO 9660-compliant (with applicable software driver) -MS CD-ROM extensions
Local Area Network (optional)	-Novell -Banyan -3Com Plus -LANTASTIC -NetBIOS
Printer	-PostScript (MS Windows driver) -Non-PostScript

UNIX	

SUN SPARC II	-16 MB RAM (32 MB if running other applications
	       at the same time)
	-Hard disk drive: 5 MB of application file storage, 64
	     MB of swap space
	-CD-ROM drive with ISO 9660/High Sierra format
	-SCSI card for CD-ROM attachment
	-MOTIF 1.1 or higher
	-X-Windows X11R4 or higher
	-SUN OS 4.1 or higher
	-Color or B&W monitor
	-Mouse

Hewlett-Packard Series 300/400 or Series 700/800	-8 MB RAM -MOTIF 1.0 or higher -X-Windows X11R4 or higher -HP-UX 8.0 or higher -Color or B&W monitor -Mouse
Local Area Network (optional)	-Ethernet TCP/IP
Printer	-PostScript

NOTE: Helmsman^{TM} is also compatible with the IBM RS/6000 and ATT StarServer E
hardware platforms.

Q *Can we buy this hardware from Northern Telecom?*

Customers can purchase this equipment from any source, and may find cost-effective
alternatives among large-volume sales outlets for this type of equipment. This
equipment-staged in ready-to-use kits for Helmsman-can also be purchased from
Northern Telecom through the merchandise order system.

Q *How does Helmsman ™/CD-ROM operate? How easy will it be to find information?*

Helmsman™ comes with a video and user's guide to make it easy to learn to use. The interface-such as the sample screen shown below-was designed to be simple and intuitive, requiring minimal training.
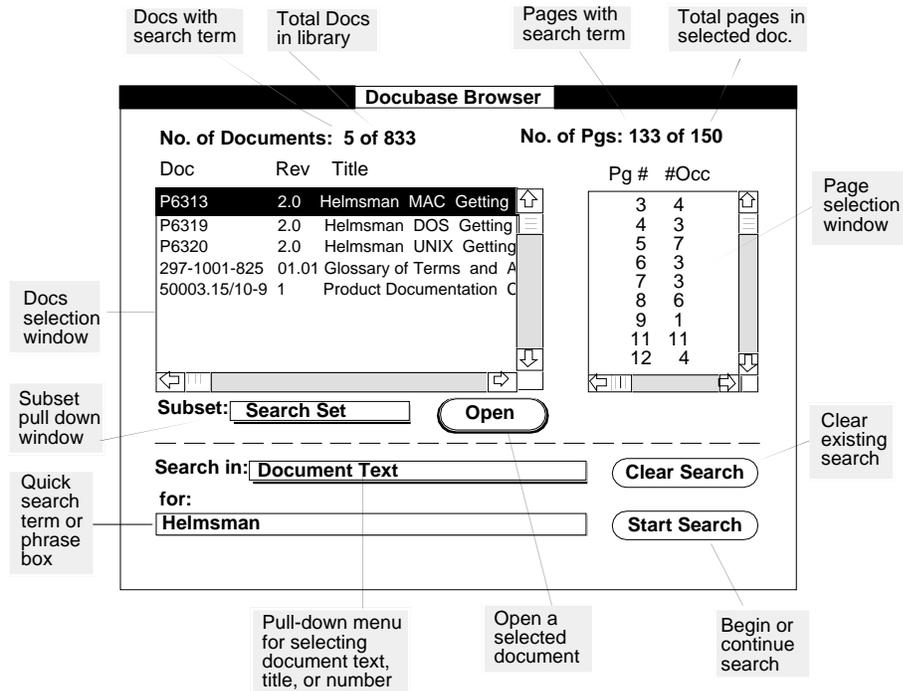

Figure 10-6. Helmsman ™ Docubase Browser Window

By double-clicking on a title in this window, the user can open a document and view pages within that document just as they would appear in printed form.
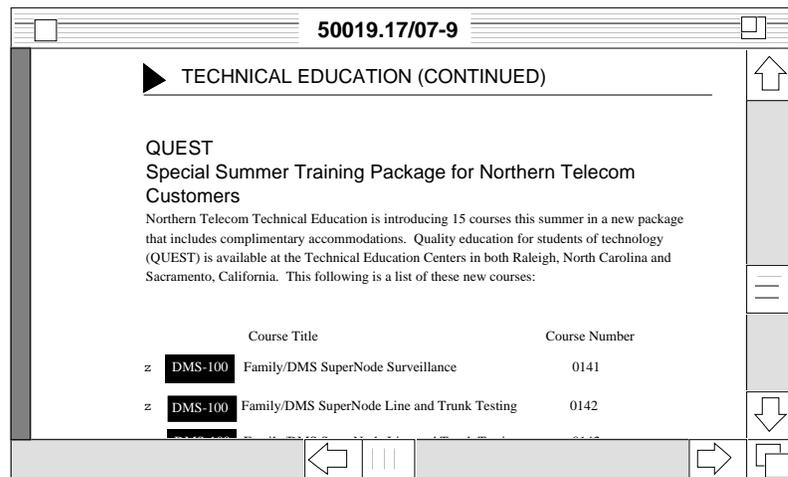

Figure 10-7. Document Page as Viewed in Helmsman ™

Q *Who can I call for questions about ordering and using Helmsman ™/CD-ROM?*

Technical and customer support are available from several sources, as follows:

For inquiries about the ordering, distribution, or content of Helmsman ™/CD-ROM . . .
In the U.S., call . . .   1-800-NT-I-CARE
In Canada, call . . .   (905) 452-4588

For technical support in either Canada or the U.S. . . .
For Macintosh and DOS-WINDOWS environments   (703) 802-8878
For the UNIX environment   (615) 734-4848

Q *How will I order additional documentation that has not been included as part of the central office equipment order?*

As a merchandise order. In the U.S., call 1-800-NT-I-CARE. In Canada, call (905) 452-4588. Be prepared to give the representative the following information:

- *Purchase order number*

- *Shipping address, including contact name, floor and room number, service provider function, and telephone number*

- *Billing address*

- *The software load for which the documentation is needed*

- *Type of order*

   - *One-time order (not for updates)*

   - *Annual order (initial documentation plus updates for 12 months)*

   - *Standing order (initial documentation and subsequent updates until the order is canceled). This option requires an open purchase order, and Northern Telecom reserves the right to discontinue the order at any time.*

> *NOTE-Regional Bell Operating Companies (RBOCs) should place orders through their documentation coordinator.*

Q *How will I identify the documents I need to order?*

The documentation distribution process is aligned with the software ordering process to capture customer shipping, media, and quantity information. The NTPs required for a given PCL are identified by the Northern Telecom product development team and tied to the PCL to ensure delivery of the correct documents to support the load. As new PCL documents become available, information will be included on Helmsman™/CD-ROM, in customer letters, and compiled in a cross-reference document.

Q *What if we don't want to subscribe to CD-ROM at this time?*

Until July 1995, NTP documentation via CD-ROM is an optional service. At that time, NTPs for the DMS-100 will be distributed primarily on CD-ROM. The option to secure paper copies of specific DMS-100 NTPs is available by ordering through the Merchandise Order Service.

Q *Is there any documentation, besides this Transition Guide, that will help us better understand the changes that are part of the new process and how these changes affect us directly?*

Northern Telecom has developed a comprehensive plan of marketing publications to communicate the policy, program, and product changes related to DMS Switching Evolution. For a list, see chapter 12, "Where to Get More Information."

Customer Training

Updated training courses, new courses, and new methods
for offering courses via interactive distance learning
and satellite broadcast

Northern Telecom Technical Education, North America, will offer new and updated training courses to address the changes brought by DMS Switching Evolution. The TEC training plan identifies more than 100 courses for updating and several new courses that will exclusively address the DMS Switching Evolution. In addition, new training methods-such as videos, computer-based training, and interactive distance learning-will make it easier than ever to provide training to personnel.

Our present training doctrine-which incorporates Instructional System Design (ISD) methods in compliance with Bellcore standards-will continue as the guideline for course development.

ANSWERS TO COMMONLY ASKED QUESTIONS
About Enhancements to the Training Process

Q *Will there be special update courses on DMS Switching Evolution for people who have already attended engineering and maintenance courses?*

Customers will not need to attend updates of maintenance or engineering classes they have already completed. Important information relating to the DMS Switching Evolution will be communicated to maintenance and engineering personnel via new training courses planned for PROTEL 2 software, Post Release Software Manager (PRSM) patch administration, POET Entry Node (PEN), Software Optionality Control (SOC), and SuperNode Data Manager (SDM). Plans for these new courses are described in more detail further on in this section. In addition, a general overview of the DMS Switching Evolution on videotape is available; call 1-800-NT-TRAIN for information.

Q *Will existing DMS-100 courses be changed as a result of DMS Switching Evolution?*

Yes. More than 100 courses will be updated to reflect DMS Switching Evolution. The magnitude of change will vary with each course. A list of updated courses is presented at the end of this chapter.

Course updates are scheduled to coincide with the introduction of each new Product Computing-Module Load (PCL), with the first updates taking place in 4Q94. To receive the most current training schedule, call **1-800-NT-TRAIN** and select **Option 1.**

Q *How does Northern Telecom's re-engineering affect our training plans?*

As with any new product, training is required to ensure that everyone has the necessary knowledge and skill sets to work efficiently and effectively with the product. The existing courses that will be updated to incorporate DMS Switching Evolution information will not have any additional impact to a customer's training budget. New courses designed specifically for DMS Switching Evolution need to be planned for in the training budget.

Q *What new courses are being developed as a result of the DMS Switching Evolution?*

The following new courses are linked to the rollout of new tools or software:

▶ *PROTEL 2 Software Course*

This course is intended for support personnel who require a knowledge of PROTEL software to maintain and troubleshoot the DMS SuperNode system. This course is anticipated to be delivered in a classroom by an instructor, but other delivery methods are being investigated.

Course material is planned to include:

- Overview of Object-Oriented Programming, including benefits to customers and Northern Telecom
- Object-Oriented PROTEL structure (PROTEL 2)
- Impact of the Post Release Software Manager (PRSM) Patcher replacement

▶ *Post Release Software Manager (PRSM) Patch Administration Course*

This course is intended for support-level personnel who need to know about or actually implement the hands-on application of software patches to the DMS-100 system. Planned to be instructor-led in a classroom environment, this course may be taught at the customer site if the necessary equipment is available.

Course material is planned to include:

- Introduction to PRSM, including customer advantages
- Comparison of PRSM to Patcher
- Hands-on PRSM patch application or video demonstration

▶ *POET Entry Node (PEN) Course*

Because PEN will be so easy to use, a formal course may not be necessary. Various options such as Interactive Distance Learning (IDL) sessions, videos, a user guide, or an on-line tutorial are being considered-further analysis is required before the final training medium is selected. Our goal is to provide a quality training solution for PEN that provides the greatest flexibility to our customers at the lowest possible cost.

The PEN course is planned to include:

- Overview of the Network Order Management (NOM) process

- PEN's function within the NOM process

- PEN hardware and software requirements

- Customer benefits

- Descriptions of all screens associated with PEN

- Demonstrations and interactive case study

Note: All of the above information is based upon current information and is subject to change as new data becomes available and curriculum design studies are completed.

Also, training requirements are being analyzed to determine if courses should be developed for the following:

- Software Optionality Control (SOC)

- SuperNode Data Manager (SDM)

Q *What new or improved types of training will be offered?*

In 1986 Northern Telecom introduced self-paced computer-based training, which allowed students to receive training at their own sites, on their own schedules. Customers have told us that this flexibility is important-that they appreciate having staff stay on site in case they are needed, and that expenses to travel to regional training centers are becoming increasingly difficult to budget.

However, there is no substitute for lively interchange with colleagues and an instructor, which cannot take place with videos and computer-based training. Accordingly, Northern Telecom has developed interactive distance learning courses-which allow students to participate in classes at our regional training centers without leaving their home sites.

Customers receive the interactive distance learning seminars via a live *interactive* network. Two-way audio/video capabilities allow participants and instructors to see and hear each other just as if they were in the same classroom. The technology allows multiple simultaneous presentations of a class.

Classes that do not require two-way interaction can also be offered via live satellite broadcast to a virtually unlimited number of sites.

Depending on your company's distance learning video network design, all or many of your employees may not have to incur travel or living expenses to participate in distance learning seminars.

Customers that are not equipped to receive interactive distance learning courses on site can have access through public videoconferencing rooms located all over North America. If you are not sure if your company has an internal distance learning network or has access to a public videoconferencing network, call us at (919) 859-8407, and we will help you find out that information.

Interactive distance learning can be a cost-effective alternative to traditional classroom instruction in many cases, with rates calculated per broadcast site rather than per student. Therefore, the per-student cost of providing interactive distance learning goes down as more students enroll for a single broadcast. You save money while ensuring that students across the company get the same training at the same time. In addition, the savings are substantial because there are generally no costs for student travel, lodging, and meals.

Benefits of Interactive Distance Learning

▶ *No need to travel to a regional training center*

▶ *Reduced travel and living expenses*

▶ *Two-way interaction for classroom participation*

▶ *Presentation of one class to multiple sites*

▶ *Ability to train larger numbers of students*

▶ *"Front-row" seats for all students to see visual aids and demonstrations*

Which courses will be offered through interactive distance learning?

In 1994, 10 distance learning courses have been broadcast from Northern Telecom's Technical Education Center in Raleigh, North Carolina. Among the selections are the popular DMS-100 Family Performance Measuring Tools Seminar, S/DMS AccessNode Technical Seminar, DMS-100 Common Channel Signaling No. 7 (CCS7) Seminar, and others. These seminars are scheduled upon request. Additional seminars will be made available in the future.

Q *Who are my contacts for any questions related to DMS Switching Evolution training?*

For information about any of Northern Telecom's training programs, contact your company's training coordinator or call: **1-800-NT-TRAIN** (1-800-688-7246)**.**

Table 12-1-Course Update Schedule for DMS Switching Evolution

COURSE NUMBER	COURSE TITLE	SCHEDULED UPDATE
0138	DMS SuperNode Central Processor Maintenance (CBT) (Hands-On)	3Q 94
0146	DMS-100F/DMS SuperNode Maintenance (CBT) (Hands-On)	3Q 94
0170	Introduction to Integrated Services Digital Network (ISDN) (CBT)	1Q 95
0173	Integrated Services Digital Network (ISDN) Hardware Maintenance (CBT)	1Q 95
0190	CCS7 Link Peripheral Processor (LPP) Maintenance (CBT)	1Q 95
0308	DMS-100F TOPS Engineering	4Q 94
0309	DMS-100F TOPS Method of Operation	4Q 94
0311	DMS-100F System Translations	3Q 94
0312	DMS-100F TOPS Translations	4Q 94
0314	DMS-100 Meridian Digital Centrex (MDC) Translations	4Q 94
0315	DMS-100F Products Overview	3Q 94
0316	Enhanced 911 (E911) Emergency Service Translations	4Q 94
0324	DMS-100F TOPS MP Maintenance	4Q94
0326	DMS-100F TOPS MPX Maintenance	4Q 94
0331	DMS-100F Operational Measurements and Traffic Separations	3Q 94
0353	DMS-100F Hardware Testing	3Q 94
0354	DMS-100F Operational Testing	3Q 94
0370	DMS-100F System Installation Translations	3Q 94
0371	DMS-100 Meridian Digital Centrex (MDC) Translations and Hardware Testing	3Q 94
0376	DMS-100F Traffic Simulation/Assessment	4Q 94
0386	Integrated Services Digital Network (ISDN) Peripheral Modules	4Q 94
0388	Integrated Services Digital Network (ISDN) DIagnostics and Troubleshooting	4Q 94
0391	DMS-100F Enhanced Network (ENET) Installation Test and Cutover	3Q 94
0396	DMS-100F TOPS MPX Installation	4Q 94
0399	DMS SuperNode System Installation	3Q 94
0400	DMS-100F Method of Operation	4Q 94
0402	NT-ACCESS/Provisioning and Quotation System	3Q 94
0415	DMS-100F Technical Managers Overview	3Q 94
0430	DMS-100 Line Data Modification by SERVORD	4Q 94
0431	DMS-100F Traffic Analysis	3Q 94
0438	DMS-100F Distributed Processing Peripheral (DPP) Installation and Maint.	4Q 94
0441	SuperNode Advanced Hardware Maintenance	4Q 94
0442	DMS-100F Network Advanced Hardware Maintenance	4Q 94
0443	DMS-100F XPM Advanced Hardware Maintenance	4Q 94
0446	DMS-100F Advanced RLCM/OPM/RSC Hardware Maintenance	4Q 94
0449	DMS SuperNode Enhanced Network (ENET) Advanced Maintenance	4Q 94
0451	DMS-100F Switch Performance Analysis	4Q 94
0453	DMS-100F Device Independent Recording Package (DIRP)/ (AMA) Mntc.	4Q 94
0458	DMS-100F Remote Switching Center - SONET (RSC-S) Maintenance	4Q 94
0462	DMS-100F Common Channel Signaling 7 (CCS7) Overview	4Q 94
0463	Custom Local Area Signaling Services (CLASS) Overview	3Q 94
0464	Custom Local Area Signaling Services (CLASS) Translations	3Q 94
0471	Integrated Services Digital Network (ISDN) Engineering/Provisioning	4Q 94
0472	ISDN Basic Rate Interface (BRI) Translations	3Q 94

Table 12-1 (continued)-Course Update Schedule for DMS Switching Evolution

COURSE NUMBER	COURSE TITLE	SCHEDULED UPDATE
0476	ISDN Customer Premises Equipment (CPE)	4Q 94
0477	DMS-100 Common Channel Signaling 7 (CCS7) Translations	4Q 94
0478	CCS7 Network Operations	3Q 94
0481	DMS-100F Low Bit Error Rate Maintenance	4Q 94
0491	ISDN Service Advanced Testing and Protocols Workshop	3Q 94
0495	DMS-100F Patch Administration Maintenance	4Q 94
0501	Queue Management Systems Seminar	3Q 94
0504	Queue Management Systems (QMS) Translations Introduction	4Q 94
0515	TOPS Operator Services Overview	4Q 94
0516	TOPS MP Basic Call Handling Procedures	4Q 94
0536	TOPS MP Toll and Assistance Force Administration	4Q 94
0625	DMS-100 Meridian Digital Centrex (MDC)	3Q 94
0635	DMS Data Services Overview	4Q 94
0636	DMS Data Services Translations and Service Order	4Q 94
0640	Meridian Automatic Call Distribution (ACD) Overview	3Q 94
0642	Meridian Automatic Call Distribution (ACD) Translations and Service Order	4Q 94
0643	Meridian Automatic Call Distribution (ACD) MIS Integration and TS	4Q 94
0654	DMS-100 Meridian Digital Centrex (MDC) CompuCALL Overview	4Q 94
0655	DMS-100 Meridian Digital Centrex (MDC) CompuCALL Integration and TS	4Q 94
0752	DataSPAN Operations, Administration, and Maintenance (OAM)	4Q 94
0755	DMS Packet Handler Operations, Administration, and Maintenance (OAM)	4Q 94
0836	Voice Service Node (VSN) OAM	4Q 94
0912	DMS-100F XPM Software Support	3Q 94
0931	DMS SuperNode Software Support	4Q 94
0932	DMS SuperNode Advanced Software Troubleshooting	4Q 94
0935	DMS SuperNode Enhanced Network (ENET) Support	4Q 94
0936	DMS SuperNode BRISC Translations Support	4Q 94
0938	DMS SuperNode Software Transition	4Q 94
0939	DMS SuperNode Hardware Support	4Q 94
0951	DMS Advanced Common Channel Signaling 7 (CCS7) Network Troubleshooting	4Q 94
4500	DMS-100F Switch Performance Management	4Q 94
5420	DMS-100 SuperNode SE Maintenance	4Q 94
5515	DMS-100 ADAS Software Installation and Translations	3Q 94
7002	DMS-100 Family Primary Rate Interface (PRI) Translations	3Q 94
8001	DMS-100 SuperNode SE Seminar	3Q 94
8503	SCPII Maintenance	3Q 94
9000	DMS-100 Family Switch Performance Measuring Systems (SPMS) Seminar	3Q 94
9030	DMS-100F Common Channel Signaling 7 (CCS7) Protocol	3Q 94

11-6

12

For More Information

About DMS Switching Evolution

Your Northern Telecom regional sales representative is available to questions pertaining to DMS Switching Evolution and the new product structure. In addition, several marketing publications explain the new programs and product structure.

These publications are available at no charge from Northern Telecom's Sales and Marketing Information Center. To request a publication, call the center at 1-800-NORTHERN (1-800-667-8437). (Northern Telecom employees can call ESN 255-2729.)

If you would like to be added to the mailing list to receive future publications pertaining to DMS-100 planning issues, be sure to ask for a subscription request form.

"Give me more detail about the new product structure."	A 14-page *Product/Service Information (PSI)* document, published in June 1994, explains the product structure in easy-to-understand language. *Introduction to the New North American DMS-100 Product Structure* 50104.16/06-94 Issue 1
"How do NTX packages map into PCL functional groups?"	A *PSI* published in June 1994 provides a comprehensive guide for mapping Northern Telecom's BCS-based NTX codes to the new ordering codes used under the simplified PCL releases. *BCS-to-PCL Mapping* 50105.16/06-94 Issue 1
"What new capabilities are being delivered in the first PCLs?"	The 3Q94 issue of Northern Telecom's *Feature Planning Guide* provides a two-year planning view of software offerings for the DMS-100 switch. The format used for feature desciptions and availability information in this edition of the FPG helps the user make the transition from the BCS release system to the new PCL releases. *Feature Planning Guide: 3Q94* 50004.11/06-94 Issue 12

"How does DMS Switching Evolution affect my DMS TOPS switches?"	A 36-page *PSI*, published in April 1994, provides an overview of the new product structure for directory and operator services on the DMS TOPS network. A brief introduction to DMS Switching Evolution is presented, followed by pictorial displays of TOPS functional groups and functions. An index is provided that maps TOPS functional group and function ordering codes to the traditional NTX ordering codes. *TOPS Evolution Brings Simpler Engineering and Ordering* 50103.16/04-94 Issue 1
"How does DMS Switching Evolution affect real-time and memory planning?"	A 15-page *PSI* describes the real-time and memory requirements associated with DMS Switching Evolution. The document shows the projected impact of PCLs, new features, and the Generic Services Framework (GSF) architecture-and presents recommendations on processor requirements. Real-time and memory requirements are calculated for eight model offices, from a 10,000-line office with low penetration of advanced services . . . to a 50,000-line office with high penetration of advanced GSF services. *DMS-100 Capacity Planner* 50112.16/08-94 Issue 1
"How does DMS Switching Evolution affect software support?"	A *PSI* document describes the transition from a release-based support policy to a time-based one, with full support for two years on each release, regardless of the number of releases during the period or the type of software load the customer chooses. *DMS-100 Family North American Software Support Policy* 50113.16/08-94 Issue 1

DMS Switching Evolution Terminology

*An explanation of terms and acronyms
related to DMS Switching Evolution*

Term	Definition
"A" Loads	PCLs that will contain advanced services on an enhanced call-processing platform (Generic Services Framework). The first "A" loads will be generally available in 3Q95.
ACT	ACTivatable [patch] - a patch which is activated manually in some offices, sometimes with a password; for example, a feature patch.
Advanced Stream (A-Stream)	The "A" Stream uses Generic Services Framework (GSF) call processing to deliver advanced services such as AIN 0.2, National ISDN-2 and -3, Enhanced CLASS features, and most future developments. A-Stream software loads will be available after 3Q95.
Agent Interworking Protocol (AIP)	Part of the GSF call-processing architecture, AIP uses a standardized set of instructions to allow the two call halves to communicate.
"B" Loads	PCLs that use layered architecture with the current call-processing platform and do not include advanced services on the Generic Services Framework (GSF).
Basic Stream (B-Stream)	The B Stream is an enhanced BCS-type delivery stream.
BCS	Batch Change Supplement - Northern Telecom's traditional method of releasing software, with custom loads created from the features available in a given BCS cycle (now replaced by PCLs).
Bellcore	Bell Communications Research - a technical standards andconsulting body for the U.S. Regional Bell Operating Companies.
BSE	Building Studies Engineer. A Northern Telecom engineer responsible for engineering facility-dependent products.
CAE	Customer Application Engineer. A Northern Telecom engineer responsible for engineering outputs, such as specifications, drawings, manufacturing, and installation requirements. Customer application engineers and customer engineers together form an engineering team.
Calculator	A system used to identify the field sites to which a patch is applicable, based on whether the site has the module(s) being patched or not.
Call Separation	A feature of GSF that separates software data and processes to handle the two "halves" of a call (originating and terminating).

CDN	A PCL definition for DMS-100/200s in Canada. These three letters begin the ordering code for these PCLs, for example, CDN002 is the first generally available PCL for Canadian carriers.
CE	Customer Engineer. A Northern Telecom engineer responsible for input functions, such as customer interface, quotations engineering, CI capture, and initial floor plan layout. Customer engineers and customer application engineers together form an engineering team.
Change Order, CO	Customer authorized modification of the original order.
CI	Customer Information. The stage of the order management process where customer requirements, installed base, and other information is gathered in order to prepare a quotation or engineering specifications.
CLEI, CLLI	Common Language Equipment Identifier. Common Language Location Identifier.
CM	Computing Module. The DMS SuperNode processing platform.
CODB	Central Order Database. A relational database, in development as of June 1994, to be shared by all order management applications. Includes four databases: Products, Business Entity, Installed Base, and Orders.
CODES	Central Office Data Engineering System. An automated translations collection system used by Northern Telecom.

Commercial Option	An optional software function that is licensed by obtaining right-to-use for an ordering code (versus SOC options, which are managed by a DMS utility).
COT	Customer Order Tracking system (US manufacturing system).
CSCAN	Customer Service Computerized Access Network. A network used in the US to distribute patches, bulletins, Customer Service Reports, and-with DMS Switching Evolution-SOC Control Files.
CSP *(Communication Services Platform)*	An internal Northern Telecom term used to describe the development unit that includes the Base and Telecom layers-the common platform for all DMS SuperNode applications. In customer communications, the associated PCL name is used instead. For example, CSP02 is the underlying development platform for PCLs in the NA002 release, such as LEC002.
D-Date	The delivery date associated with an order.
DBS PAT	DataBase System PATch. A pre-Evolution mainframe database used to store patch files and administrative information.
DMSE	An unofficial but frequently used acronym for DMS Switching Evolution.
Double-Ended Call Processing (DECP)	The current call-processing architecture of the DMS SuperNode switch. With DECP, software for each service type contains the information it needs to handle both the originating and terminating ends of a call, and the information it needs to communicate with every other service type or terminal.

13−2

DRU	Development Release Unit. A set of functional software components developed and released on the same schedule.	*Functional Group*	Logical groups of software capabilities, each containing the functionality of multiple NTX packages. For example, the ACD functional group contains software to provide Automatic Call Distribution. This is the first level of optionality in a PCL.
EAE	Equipment Application Engineer. A Northern Telecom engineer responsible for detailed engineering of network orders.		
EDI	Electronic Data Interchange. Usually referring to the electronic transmission of information between the customer or supplier and Northern Telecom, such as quotes, invoices, and payment funds.	*Generic Services Framework (GSF)*	An optional call-processing architecture that will greatly accelerate the introduction of new services. The Advanced Services Platform (ASP) uses GSF call processing.
		GOA	Global Order Assignment. An automated system used by manufacturing groups to distribute (assign) orders to manufacturing facilities.
Event-Driven Call Processing (EDCP)	Part of the GSF call-processing architecture, EDCP uses a standardized set of instructions to simplify messaging between call halves.	*GPSM*	Global Packing and Shipping Module. An automated system used to track and manage fulfillment processes.
Fast Feature	New software functionality delivered as a patch (usually consisting of new modules) instead of waiting for the next compile of that architectural component	*H-Date*	The installation date associated with an order.
FLM	Frame-Level Models. Ordering models that make it possible for customers to select equipment at the frame level rather than PEC level. For each model, the customer orders a base model plus options at one or more option levels.	*INFORM*	A command provided by the DMS Patcher tool that produces a report listing the status of all patches on the switch. Traditionally, the loadbuild group applied a set of dummy patches to the load before shipment that identified the software release (BCS) and all NTX packages present in the load. These dummy patches were reported along with all the other patches in the INFORM listing and hence provided a means to query the software version and content on the switch.
FORTUNE	Pre-Evolution order scheduling system used in the traditional order management process in the U.S.		
FPQ	Firm Price Quote. A legally binding quote generated by Northern Telecom.	*Installed Base*	One of four databases in the central database containing detailed information about all network products deployed at a customer site.
Function	The second level of optionality in a PCL. The customer orders a functional group and then can enhance the functional group by adding one or more *functions*.		

13-3

JIM	Job Information Memorandum. Documents issued in the traditional order process to alert staff to issues of concern, such as change orders.	**MOA**	Mechanized Order Acknowledgment. A detailed record of goods and services supplied to a customer, used for asset depreciation purposes.
K-Date	The in-service date associated with an order.	**Model**	Standardized product offering with predefined configurations. Usually referring to "frame-level models," whereby equipment is ordered at the frame level rather than the level of individual components.
Layer	A relatively independent partition of software in the DMS SuperNode switch. There are four layers to the new architecture: Base, Telecom, Product, and Market.		
		NA	Denotes the North American DMS-100 product release.
LCF	Load Content File. A file used by the software vault to determine which functional components (subsystems) make up a load.	**NA100**	North American DMS-100. The development stream for all DMS-100/200 features in North America.
LEC	A PCL definition for DMS-100/200 switches in the United States.	**No Restart SWACT**	A feature introduced with BCS36 to allow a switch of activity (SWACT) without a system restart. This will significantly the incidence of planned outages.
LET	A PCL definition for DMS-100/200/TOPS switches in the United States.		
LST	A PCL definition for DMS-100/200/STP switches in the United States.	**NOM**	Network Order Management. A comprehensive program developed in 1994 to redefine the organization, processes, and systems for ordering network hardware and software from Northern Telecom.
LTT	A PCL definition for DMS-100/200/TOPS switches in Canada.		
MEL	Main Equipment List. A shopping list of equipment, generated by a provisioning system in response to customer requirements. The MEL is then reviewed and refined in subsequent engineering.	**North American DMS-100**	The development stream for all DMS-100 features in North America.
		NT-ACCESS	Northern Telecom's mainframe computer system for capturing customer order information, generating quotations, and initiating a new order, extension, or change order.
MEMCALC	A software tool that helps calculate memory and real-time requirements of a software load.		
Mixed Memory	A feature of the SuperNode 60 processor that will allow it to support a mix of 24 and 96 Megabyte memory cards.		

NTX	The Product Engineering Code (PEC) prefix previously used to refer to orderable software packages in the DMS SuperNode. Now replaced by eight-digit ordering codes, such as OSDA0001 for the Operator Services Directory Assistance functional group.	**PADN**	PAtch DowNloader communication software
		PatAdm	Patch Administration system used by NT/BRN in RTP.
		Patch	An incremental change to software applied after the load has been compiled, to correct a problem or introduce one or more features
OEM	Original Equipment Manufacturer. A term that refers to components received from another manufacturer, such as modems, Maintenance and Administration Positions (MAPs), and TOPS MPX operator workstations.	**PCL**	Product Computing-Module Load-A compiled software load consisting of software from the Base Layer, Telecom Layer, some or all of a specific Product Layer, some or all of the Shared Library (optional), and some or all of the Market Layer (optional).
ONP	One Night Process. An eight-week process that culminates in the overnight application of a new release of software to the switch		
		PEC	Product Engineering Code. The alphanumeric code assigned to every hardware and software component in a DMS switch.
Options	For software, refers to capabilities that are not required for switch functions. Commercial options are licensed by obtaining right-to-use from Northern Telecom. SOC options are licensed by receiving a software "password" that allows the capability to be activated.		
		PEN	POET Entry Node. A new system-under development in 1994-to replace NT-ACCESS for quote generation and order capture, using IBM-compatible, Macintosh, or UNIX platforms.
	For hardware, refers to selectable components of FLMs. For example, the customer would order a Line Concentrating Equipment Frame (base) and choose one or two Line Concentrating Modules (options) plus up to 640 line cards (options).	**POET**	Planning, Ordering, and Engineering Tool. A new system-under development in 1994-to be used by Northern Telecom for engineering and provisioning.
OR	Order Receivables. A pre-Evolution automated system used in the traditional order management process.	**Product Computing-Module Load (PCL)**	A PCL consists of features selected from the NA development stream software product intended for a particular DMS SuperNode application in a particular market. Every PCL with the same name is the same in terms of software content.
Ordering Code	An eight-digit code used to order a PCL, functional group, or optional function.		
PaDel	Patch file Delivery system used at NT/BNR Research Triangle Park (RTP) facilities.		

PRS	Problem Reporting System. A database linked to the Customer Service Report (CSR) system, used to identify and track resolution of product functionality problems. The term PRS also refers to a specific problem report.	***Software Optionality Control (SOC)***	A DMS utility that manages access to optional software through delivery of software "passwords" from Northern Telecom. The SOC utility will also be used to monitor usage of a feature.
PRSM	Post Release Software Manager. A highly robust, user-friendly replacement for the DMS Patcher utility; used to manage the application of patches on the switch.	***Spec***	Hardware manufacturing specification, prepared as a result of detailed engineering.
RBOC	Regional Bell Operating Company	***Triad***	A team composed of a Design Manager, Product Manager and Product Support person who are responsible for a specific part of the system architecture (called an ARCHID). The Triad decides which problems get fixed, and whether the fix is incorporated in the next release or patched. In the case of a feature request, the Triad determines whether it is warranted to release it as a "Fast Feature."
Right to Use (RTU)	The ability to use a feature in the DMS SuperNode because license fees have been paid (based upon its use being reported to Northern Telecom or a SOC option having been activated).		
RTU	Right to Use	***USL***	Universal Software Load. A software load that contains all generally available features.
SOC	Software Optionality Control		