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DMS-100 Family

Software Delivery

Software Delivery Process Description

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Preface

This publication provides information on the NTI software delivery process beginning with a telephone company request for new software and ending with installation of the new software into the in-service DMS switch. Software delivery processes, intervals, policies, and interfaces are described in this document.

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About this document

Purpose

This document provides information on the Northern Telecom software delivery processes for the DMS-100 Family of digital switches. These processes include the One Night Process (ONP), Two Night Process, Hybrid process, and SuperNode to BRISC Retrofit. The major steps of the software delivery process are described, beginning with the telephone company's request for new features, and proceeding through the major tasks prior-to, during, and after the installation of the new software load into the telephone switch.

This document references processes, intervals, and methods used in the United States and Canada. Information applicable only to the United States will be identified as "US Sites." Information applicable only to Canada will be identified as "Canadian Sites."

Software evolution

After BCS36 the DMS software architecture has changed. Northern Telecom will begin delivering Product Computing-Module Loads (PCLs) rather than custom-built BCS loads or USLs. In this manual the term "DMS Evolution" (or "DMSE") is used to identify the processes and terminology that have changed to support PCL software delivery.

Who will use this document

Northern Telecom and telephone companies or carriers (telco) with software upgrades on DMS 100, 100/200 and 200 switches should use this document. This information is intended to help telco managers, planners, and engineers in understanding DMS software upgrades. In addition, this document provides Northern Telecom with a standardized software delivery process which allows for definition, description, and requirements of the software delivery tasks.

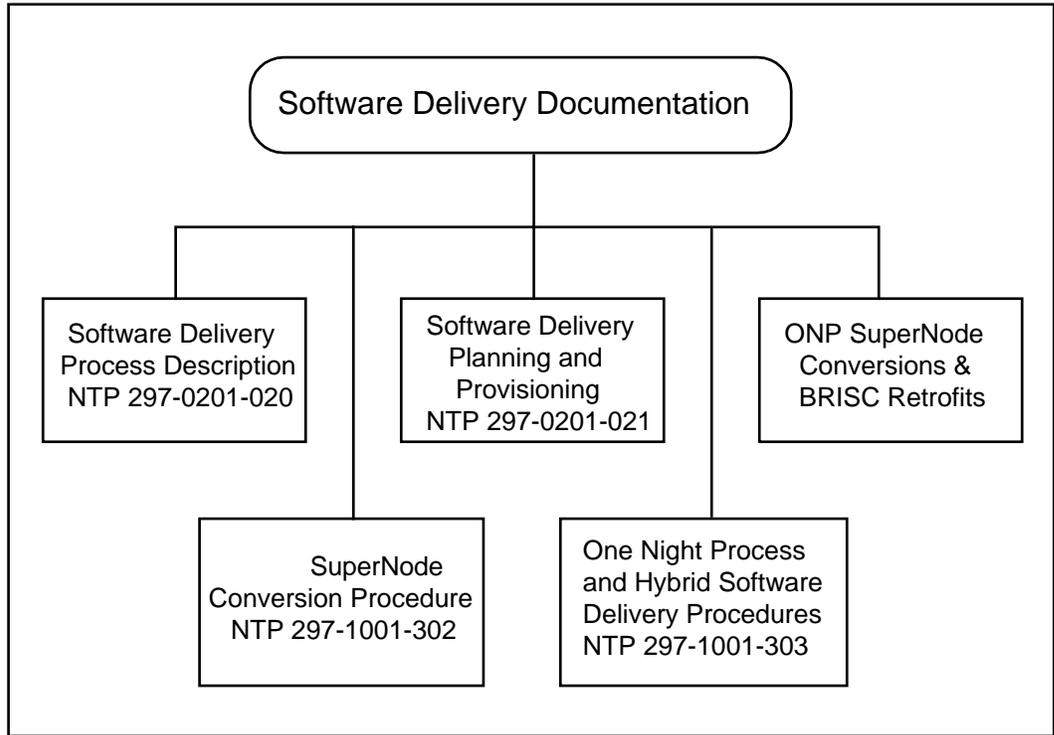
Where to find information

Refer to the following section to locate information on the NTI Software Delivery Process.

In the software delivery package

Figure 1-1 indicates the documentation that specifically addresses software delivery.

Figure 1-1 Software Delivery Documentation



NTP 297-8991-020, *Software Delivery Process Description*, describes the NTI software delivery process beginning with the telephone company request for new software and ending with the installation of the new software into the DMS switch. Software delivery processes, intervals, policies, and interfaces are described in this document.

NTP 297-8991-021, *Software Delivery Planning and Provisioning*, provides advanced planning information for telephone companies preparing for software upgrades. Telephone company responsibilities and tasks required for the software delivery process are discussed along with impact to the operation, administration, and maintenance activities.

NTP 297-1001-303, *ONP/Hybrid Software Delivery Procedures*, consists of procedures needed to upgrade an in-service DMS switch to BCS 29 and following using the ONP for smaller offices, and either the 2-Night or Hybrid process for larger offices. It includes information on preparing for the upgrade (including journal file when required), installing the new software load, and preparing follow-up testing procedures.

In this document

To Find . . . See . . .

General rules and guidelines for installing new software	Software Delivery Policies, Chapter 2
NTI organizations involved in software delivery	Software Delivery Organizations, Chapter 3
Software delivery process for Canadian supported sites	Software delivery process (Canadian sites), Chapter 4
Software delivery process for US supported sites	Software delivery process (US sites), Chapter 5
How NTI receives orders and quotes software jobs	Quoting and Ordering Software, Chapter 6
How NTI engineers and provisions the office for the new software load	Provisioning, Chapter 7
How NTI builds a new customized software load	Producing a New Software Load, Chapter 8
How NTI delivers software with the One Night Process method	One Night Process (ONP) Software Delivery, Chapter 9
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Timelines for software delivery activities	Software delivery timelines, Chapter 11
Information on problem resolution	Technical support and system recovery, Chapter 12
Information on the databases and systems in software delivery	Databases and systems (US), Chapter 13
Supplementary procedures, information	Appendices
Listing of abbreviations used in this manual	Abbreviations, Appendix F
Glossary of terms used in this manual	Glossary, Appendix G

Other software delivery documentation

This part of the document describes documentation and reference materials that may be referred to in the Software Delivery Process:

- Marketing Bulletins: Documents which include advance feature information, notification of new software release, and feature descriptions of new BCS releases.
- NT8620 Questionnaire: Structured manual order capture document for the customer to use when ordering from the DMS-100 Family of Switches.
- NT8620 Questionnaire Reference Document: Guide to completing the manual NT8620 Questionnaire.
- NT8630 Order Capture Document: Paper issue of the on-line NT-ACCESS order capture system for the DMS-100 Family of Host Switches.
- DMS-100F Host Provisioning Reference Guide: Guide to completing the on-line NT-ACCESS order capture system for the DMS-100 Family of Host Switches (NT8630).
- NT8602 Questionnaire: Structured manual order capture document for the customer to use when ordering from the DMS-100 Family of Remotes.
- NT8602 Questionnaire Reference Document: Guide to completing the manual NT8602 Questionnaire.
- NT8603 Order Capture Document: Paper issue of the on-line NT-ACCESS order capture system for the DMS-100 Family of Remote Switches.
- DMS-100F Remote Provisioning Reference Guide: Guide to completing the on-line NT-ACCESS order capture system for the DMS-100 Family of Remote Switches (NT8603).
- NT-ACCESS User Reference: Guide to using the NT-ACCESS on-line order capture system.
- NT-ACCESS Customer Procedures Manual: Guide to the functions of NTI and telco personnel as they use the NT-ACCESS order capture system.
- Office Parameters Reference Document, Practice 297-1001-455: Document providing information on the software office parameters.
- Peripheral Software Release Documents: Documents providing information on the PM and XPM software loads as well as BCS gating hardware.

Software delivery policies

Purpose of software delivery

Software delivery refers to the updating of software in an existing in-service telephone office. New software features and technologies must be added to the existing telephone systems to meet the changing communications needs of business and residential telecommunication users. The purpose of the Software Delivery Process is to install new software into an in-service telephone office with no impact to service.

In addition software delivery refers to the delivery of software loads in new installing DMS offices.

Software development and release

New software features and capabilities for the DMS Family of switching products are developed as a result of customer needs. Northern Telecom works with customers and Bell Northern Research (BNR) to define new software requirements for implementation in future software loads.

Note: Bell Northern Research (BNR) is the research and development subsidiary of Northern Telecom Limited.

Simplified product structure

In the past, the software structure of the DMS-100 Family of products was based on a non-generic packaged concept: every software load built was a combination of feature packages or modules unique to the customer's office. This package concept of delivering software allowed telephone companies/carriers to customize their software loads to meet the service needs of their customers.

After BCS36, Northern Telecom began delivering Product Computing-Module (PCLs) rather than custom-built BCS loads or USLs. PCLs will contain all available software for a particular switch type and market. The customer customizes the capability of a PCL by licensing Right-to-Use or activating Software Optionality Control (SOC) for options within the PCL.

New software verification

The software development process consists of defining, designing, testing and implementing. It consists of several development stages with many quality checks and tests performed at each stage.

Verification trials are conducted on new BCS software loads in two stages:

- First Application System Test (FAST) trials
- Verification Office (VO) trials

FAST trials are conducted on several NTI-owned DMS switches to provide valuable early service exposure with minimum risk. FAST is a sophisticated NTI testing complex that makes it possible to test new products under both normal and maximum stress conditions. The new software is loaded into the FAST switches and verification testing begins. The new software load is soaked, test cases are executed, and new software load operation is verified.

The Verification Office (VO) trials are conducted after FAST testing and comprehensive feature testing. The VO sites are customer in-service offices that are selected to provide extensive product coverage and a wide variety of switch configurations and traffic loads.

After successful verification trials, BNR and NTI evaluate a number of items relating to the new software load performance. Once both BNR and NTI agree that the new software load is ready for general distribution, the load reaches the "ready to ship" (RTS) status.

Typical release intervals

Northern Telecom typically provides two new software releases per year. The new software releases are available at approximate intervals of every 6 to 9 months. Northern Telecom reserves the right to change these intervals to accommodate customer needs and to implement new technologies.

Northern Telecom recommends that each office perform a minimum of one software upgrade per year.

Software status

Feature status

Each software release contains feature packages with the following release status designations:

- ***Controlled Introduction:*** Features which must be approved by NTI Marketing for insertion in an office. These features are also called limited features.
- ***General Availability:*** Features which are generally available and can be ordered by the customer without special approval.

Software release status and technical support

Each software load (BCS 28, BCS 29, BCS 30, etc.) is assigned one of the following status designations:

- **Production:** Most recent software release
- **Active:** Five software releases prior to the production release
- **Retired:** All software releases prior to the five active releases and one production release

The status of a software load changes as newer software loads become available. For example, production status applies until the next BCS is released. When a new BCS is released, its status is designated as production and the previous BCS release status is redesignated as active.

Northern Telecom supports the production BCS as well as the previous five BCS software releases which are designated as active. All other BCS releases are redesignated as retired. For example:

- BCS 36 - Production
- BCS 35 - Active
- BCS 34 - Active
- BCS 33 - Active
- BCS 32 - Active
- BCS 31 - Active
- BCS 30 - Retired

Emergency and technical support is provided, if needed, for software releases with the production and active status. Technical support only for outage recovery is provided for offices with software releases with a retired status. If a telephone company requires full technical support for an office, the software release status for that office must be active.

Policy on skipping BCS levels

Northern Telecom allows telcos to "skip" software loads in the DMS-100 Family of digital switching systems. For example, a BCS 27 office may be content to stay with that software release until a desired feature package or capability is included in BCS 30. NTI does not require the telco to purchase BCS 28 and 29 loads in order to get BCS 30. A telco may upgrade to a BCS that is 3 levels higher than its current level. This benefit provides flexibility to the telco, and eliminates additional cost and potential for problems since only one upgrade is needed instead of three.

In order to upgrade to the desired BCS level, however, some telcos may require multiple upgrades. For example, a BCS 27 office wanting features

available in BCS 31 cannot skip to a BCS that is more than 3 levels higher than its current level. It would require an upgrade to an interim level before upgrading to BCS 31. A typical multiple upgrade has the first upgrade to a BCS that is 3 levels higher (depending upon memory requirements, etc.), and the next upgrade to the desired level. In this example, the interim upgrade is to BCS 30, followed by an upgrade from BCS 30 to BCS 31.

Minimum intervals between software upgrades

In order to upgrade to the desired BCS level, some telcos may require multiple upgrades. With multiple software release applications occurring in the same office, Northern Telecom requires a minimum time interval of three weeks between the application of one software load and the next. This rule must be followed to allow adequate time for various pre-engineering activities, such as patching and polling .

PM and XPM compatibility

The software loads in the PMs (peripheral modules) and XPMs (extended multi-processor system PM) are backward compatible for 3 BCSs with the software load in the DMS front-end central control complex (CCC). Because of this backward compatibility, the PMs and CCC can be upgraded at different times. The PMs and XPM (if applicable) are loaded with new software prior to the installation of new software in the DMS front end CCC (NT40 or SuperNode).

Approximately thirty-five days before the application of the new software load to the CCC, the site receives the new PM software and, if applicable, the XPM software load tapes. If the CCC will be installed with BCS 26, the baseline PM and XPM software load tape will shipped to the office site using the 3 BCS compatibility rule. If the baseline PM and XPM software loads are at BCS 26, the loads for this BCS will be shipped. If a baseline BCS 29 PM and XPM software load exists, the office may receive the higher load level provided that needed hardware is equipped.

The switch will operate, for example, with the PMs at BCS 29 and the CCC at BCS 26. After the PMs and XPMs are upgraded, the CCC can be updated with new software.

The BCS skipping and backward compatible PM load rules provide flexibility for upgrading the software in the DMS 100 Family of switches.

Software delivery organizations (US and Canada)

The software delivery process involves many groups within Northern Telecom, both in the United States and Canada. Because of the international differences, this section describes US and Canadian groups separately.

US regions

The regional offices are strategically located in the major regional areas of the United States. The regions perform job specific coordination, engineering, installation, and customer interface functions for software delivery that may differ between software orders and telephone company customers.

The NTI regions are involved heavily in the initial stages of the software delivery process. As a software order nears the software delivery date, the NTI regional involvement and tasks decrease as the NTI core organizations involvement and tasks increase. The NTI core organizations perform production tasks common to all software orders. Although the NTI regional involvement decreases, the NTI regions continue to follow the progress of the software order and perform job specific software delivery functions.

NTI regional locations include the following:

Northern Telecom, Inc. Northeast Region 200 Summit Lake Dr. 4th Fl. Valhalla, N.Y. 10552 (914) 773-2400	Northern Telecom, Inc. Pacific Region 2305 Camino Ramon P. O. Box 5070 San Ramon, CA 94583 (415) 867-2000
Northern Telecom, Inc. Central Region 475 N. Martingale Road Schaumburg, IL 60173 (708) 706-8000	Northern Telecom, Inc. Southern Region One Ravina Drive Suite 700 Atlanta, GA 30346 (404)-395-5100

3-2 Software delivery organizations (US and Canada)

Northern Telecom, Inc. Eastern Region 2000 Corporate Ridge Suite 950 McLean, VA 22102 (703) 847-8000	Northern Telecom, Inc. Southwest Region Williams Square East Tower 11th 5221 N. O'Connor Irving, TX 75039 (214) 506-2000
Northern Telecom, Inc. Western Region 5575 DTC Parkway Suite 150 Englewood, CO 80111 (303) 850-5600	

This section provides a listing and description of the various regional organizations involved in the software delivery process.

- Marketing
- Installation
- Customer service
- Systems engineering

Installation (US regions)

The installation departments in the regions are responsible for the installation of all BCS gating materials by the K(Z) date identified on the RFS.

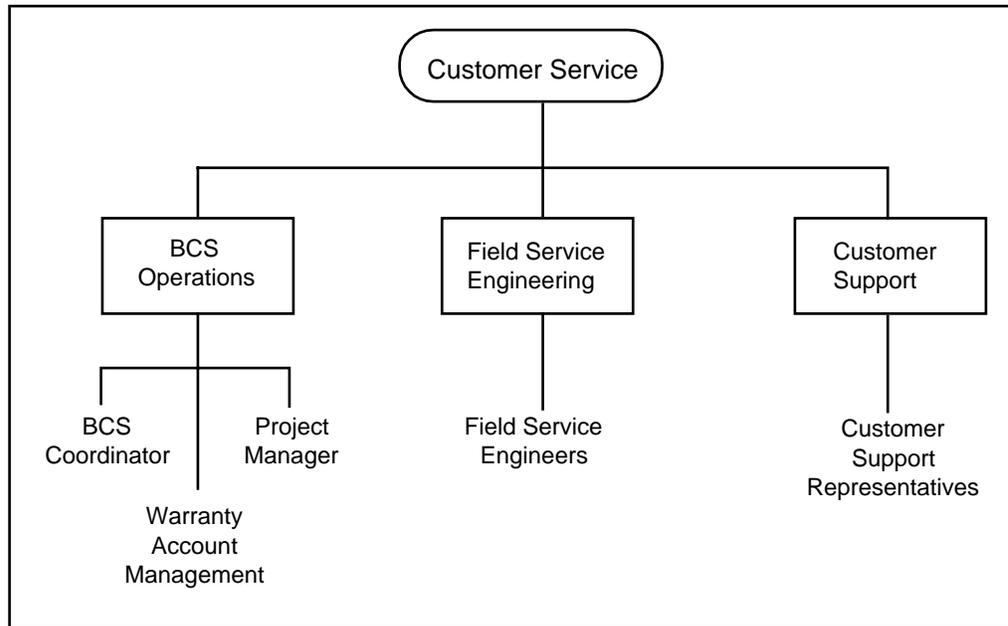
Customer service (US regions)

Regional customer service groups cover customer support, BCS operations and coordination, BCS project management, and field service engineering. The primary sub-organizations under customer service include:

- **BCS Operations:** Covers the BCS coordination, project management of software delivery processes, and warranty account management functions.
- **Field Service Engineering:** Covers the technical customer support and assistance functions related to the software delivery process.
- **Customer Support:** Covers the customer interface and support functions.

Figure 3-1 illustrates the typical regional organization for customer service.

Figure 3-1 Typical NTI Regional Organization for Customer Service



BCS operations (US regions)

BCS Operations includes the BCS Coordinator, Project Manager, and Warranty Account Manager functions. The major functions performed by the BCS Coordinator include the following tasks:

- Verify compatibility issues for possible impact on other nodes if office is in one or multiple networks.
- Review the BCS Checklist items in each gate review.
- Coordinate all activities and tasks related to a software delivery order.
- Coordinate all schedule changes to the software order.
- Complete BCS checklist items with BCS Planning and Field Support to set the production flag to indicate order is ready for production.
- Request new dump and restore and application dates for re-scheduled jobs.
- Resolve all software delivery process issues in the region.

Field service engineering (US regions)

The field service engineer (FSE) in the NTI regions performs technical checks, resolves problems, and verifies that critical technical activities have been performed prior to the software upgrade. In addition, the FSE works with the Pre-application engineer and telephone company site personnel to resolve issues and solve problems detected by the pre-application procedure.

Customer support (US regions)

The regional customer support representatives perform customer interface functions, verification of tape and documentation shipments, and other customer interface and verification functions related to delivering software to the customer. The customer support representatives are responsible for the following major tasks:

- Notify and confirm the delivery date with the customer.
- Verify preliminary tape and documentation shipment to customer site.
- Verify PMs and XPMs are loaded and XPMs are patched by the telco.
- Verify completion of any memory installation.
- Arrange image tape shipment for RTP (local) dump and restore.
- Verify shipment of final tapes to site.
- Verify final checks performed before insertion.

Systems engineering (US regions)

Systems Engineering in the software delivery process refers to the application of established NTI engineering rules and guidelines to existing in-service DMS switches upgrading to newer software loads. The systems engineering group ensures that the in-service DMS switch has been adequately provisioned for the requirements of the ordered feature packages and the new software load. Existing hardware and software in the office are checked and the requirements posed by the new software load are examined during the systems engineering phase of the the software delivery process.

The systems engineering group includes the Systems Application Engineer (SAE) and the Software Systems Engineer (SSE).

The SAE performs the following functions:

- Capture customer information related to a software order on the CI document or through NTACCESS.
- Release the CI at the DCI date on the RFS.
- Run Memcalc and provisions the memory.
- Consult with the regional software system engineer to resolve orders with memory restraints.

- Perform CI updates when authorized by marketing as change orders are received.
- Verify the job features database (JFDB) for feature packages to be built in the new BCS load and ensure all feature interdependencies are met.

The SSE performs the following functions:

- Receive PARMMail from BCS Operations Organization at -20 working days from dump and restore or insert date.
- Define the software parameters for the software job based on customer requests and data captured at CI.
- Return the PARMMail with defined software parameters to BCS Operations prior at -13 working days from dump and restore or insert date.
- Work with the assigned Systems Application Engineer to resolve memory issues by examining and altering software parameters.

US core

Core organizations are located in the Research Triangle Park (RTP) area of North Carolina. The core groups performs major software delivery functions that are common to all software delivery jobs.

As a software order nears the delivery date, the NTI core organizations involvement and tasks increase. The regions continue to follow the progress of the software order and perform job specific software delivery functions.

This section provides a listing and description of the various core organizations involved in the software delivery process.

- Marketing
- BCS Planning
- Tape and Documentation
- BCS Polling
- BCS Software Production
- Dump and Restore
- BCS Patch Administration
- Pre-application Engineering
- Applications Engineering

Marketing (US core)

The Marketing group, Order Planning, is located at RTP, NC. All orders and changes orders are processed here. Order Planning provides the following deliverables to the software delivery process:

- request for schedule (RFS) generation
- change order request handling
- input and distribution of RFS to review committee

BCS Project Office tracks the controlled introduction phase of each BCS release and maintains a feature status matrix which lists the status of each feature package. BCS Project Office provides the following deliverables to the software delivery process:

- limited feature package approval
- maintenance of feature status matrix

BCS planning (US core)

The core BCS Planning group is responsible for assigning insertion dates via the Request for Schedule (RFS) which trigger all batch change supplement (BCS) related activities and providing support to NTI regions in the day to day scheduling functions, BCS checklist process, and field support activities. A joint review of the BCS process is accomplished for each office during the 6-to-4 week gate reviews. Positions in the core planning organization include the BCS master scheduler and BCS planning analyst.

The BCS Master Scheduling subgroup in the BCS Planning Department performs the following tasks:

- Assign BCS production/application slots.
- Set production flags at the local dump and restore (LDR) / One-Night Process.
- Provides capacity consumption monitoring support for all S/W Delivery groups.
- Conducts verification/validation checks of schedule requests to ensure successful software delivery
- Coordinate all scheduling related activities.

The BCS Planning Analyst subgroup in the BCS Planning Department performs the following tasks:

- Ensures delivery of all BCS gating material to site.
- Provide hardware field support for BCS gating hardware.
- Update the C-Report with pertinent BCS gating hardware information.

- Ensures delivery of installation documentation to the job site.
- Provides overall logistical support to the field installation groups.
- Performs software and hardware quality checks for all BCS related activities.
- Conducts/administers BCS Checklist reviews for memory requirements, feature issues, etc., to ensure successful software delivery.
- Releases paperwork and ensures shipment of BCS Gating Hardware by established D-Date milestones.
- Validates BCS Checklist deliverables (ie Automail Verification, Parmmail receipt, memcalc, firm P.O., limited (LTD) feature approval etc.).
- V.O. (Verification Office) scheduling/checklist validation.
- Delivery media verification (9-Track, SLMI,SLMII)

All requirements for the BCS hardware (memory, firmware, etc.) are funnelled through the BCS Field Planning Analyst subgroup, loaded into the Customer Order Tracking database and shipped from Northern Telecom's RTP facility with the associated documentation.

Tape and documentation (US core)

The Tape and Documentation group is the interface with the Customer to provide necessary software tapes and supporting documentation for software upgrades.

They perform the following tasks:

- Generate and assemble into labelled binders the required documentation to support software upgrades.
- Maintain a stock of cloned tapes to support software upgrades.
- Provide preliminary and final shipment of documents and tapes to Customer site including preparation of shipping paperwork (airbills, Software Transmittals, Request for Shipment).
- Maintain a job file on sites which includes the software transmittal, request for shipment, software production documentation (console file, patcher listing) and other supporting information.

BCS polling (core)

The core BCS polling group polls DMS offices for specific switch information needed by NTI to deliver a new software load. Offices scheduled for a software extension will be polled by the BCS polling group at approximately 7 weeks prior to the scheduled software delivery date.

Prior to any polling session, the telephone company is contacted by BCS Polling to request permission to dial into the switch. After permission has been granted, NTI personnel dial into the switch for the polling session which lasts approximately one hour. During a polling session, the following DMS switch information is obtained:

- inform list
- office tables
- DS and PS areas
- DS and PS tables (NT40)
- memory information (SN)

After the software upgrade, the BCS Polling group contacts the office to perform a post-insertion polling. This polling session is performed from 1 to 5 days after the software application. The same process used in the first polling is followed to conduct the post-insertion polling session.

Software production (core)

The Software Production organization is a core NTI group that merges base level software with the optionally ordered software feature packages to produce an undatafilled software load. Deliverables to the software delivery process from the Software Production organization include:

- undatafilled image tape containing all approved limited and general availability software packages listed in the JFDB for the order
- all released patches (available at this milestone) applied to the undatafilled image
- generation of D190 Reports
- patch tape containing patches for all software packages on new undatafilled image tape.

Dump and Restore (core)

Telco provides NT with a site image (either a "frozen" or "ONP test" image). The Dump and Restore group within core Software Operations combines the undatafilled software load and the image tape to create a new datafilled BCS load. This process allows NT to test the data transfer portion of the software delivery to ensure there will be no table data issues. If a Hybrid method, the datafilled load will be returned to the Telco. Other sub tasks include ensuring that the customer has made an image tape and that the journal file has been prepared (Hybrid method) to capture all service order changes after the image tape is made.

Patch administration engineering (core)

The patch administration organization is a core group responsible for downloading patches to an office site, applying CC patches, generating a patch propagation report, and performing patch follow-up activities before and after a software upgrade.

Pre-application engineering (core)

The pre-application engineering group within BCS Operations is responsible for conducting the pre-application procedure and final office review. For telephone companies doing their own BCS applications, all pre-application activities, which are normally performed by Pre-application Engineering, become the responsibility of the participating telephone company.

Applications engineering (core)

The applications engineering group within BCS Operations installs the new software load into the DMS switch on the scheduled software insertion date. The application engineer dials into the DMS switch from an NTI location and executes commands on the switch. Telephone company site personnel assist in the software application by loading tapes, running call tests, and performing other tasks necessary for the software application.

Some telephone companies may elect to apply their own software loads. For telephone company software applications, all software application functions are performed by the telephone company.

The telephone company is responsible for the post-application period which begins when the site accepts the new software and the software application completes. If technical assistance is needed, site may call Northern Telecom TSC (Technical Service Center).

Telephone company or carrier

The telephone companies or carrier companies are the customers receiving the new software loads. The software delivery process contains deliverables that must be supplied to Northern Telecom by the telephone company. These deliverables include tapes and documents, as well as specific tasks that need to be performed to the telephone switch in order to deliver new software. The customer is a very integral part of the software delivery process.

The customer deliverables include:

- initiating a request (Telephone Company Request) for new software
- accepting the NTI marketing quote for the job
- providing customer input (questionnaire) in consultation with NTI Systems Application Engineer

3-10 Software delivery organizations (US and Canada)

- allowing the switch to be polled by NTI
- accepting the NTI scheduled date assignments for the job
- making changes to the order before loadbuild
- reviewing software parameters (optional, depending upon customer requests or NTI regional practice)
- checking CC logs for problems
- performing memory retention tests
- loading PMs and XPM (if applicable) with new software loads
- patching XPMs with patches from XPM patch tape
- checking the DMS tables by running TABCHK
- assisting NTI Pre-application engineering in performing the Pre-check
- generating an image tape and preparing journal file
- performing BCS verification tests prior to the BCS application and recording the results
- scheduling personnel to be on-site on the night of application
- providing input to the 15-day post insertion report

Canada

The major Canadian organizations involved in the software delivery process for Northern Telecom (Canadian supported DMS offices) are:

- System Application Engineering
- Field Support Engineering
- Installation
- Change Application (88K and EWP H/W Orders)
- Customer Service
- Customer Service Software Delivery (Applicators)
- Verification Office (VO) Dump / Restore and Test
- Software Production (Loadbuild)
- Software Engineering Process
- Documentation (Northern Telecom Practices, Specifications, and Drawings)
- Software Quality Assurance
- Telephone Company (Customer)
- Marketing

The following NTI locations are provided for Canadian telco customers:

Northern Telecom S/W Update Verification Dept: S645/7M24 1285 Baseline Road Ottawa, Ontario Canada K2C 0A7	Northern Telecom S/W Production Dept: S644 8200 Dixie Road Bramalea, Ontario Canada L6V 2M6
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Marketing

Marketing informs Systems Application Engineering when a software order is received. The COEO and feature list are given to the SAE.

Systems application engineering

The systems application engineer (SAE) confirms the dates and COEO in the JFDB and notifies other departments of the software extension. The SAE issues a load notification form listing the following:

- hardware upgrades
- software packages changes
- software parameters
- dates
- application type

Field support engineering

The Field Service Engineer (FSE) is the prime overall software delivery monitor who is involved directly or indirectly in many software delivery activities. The FSE is involved in scheduling the application with the SAE, the telco, and the Customer Software Delivery department. Various activities planned and in-progress in the office are considered when scheduling an application date.

Installation

Any hardware identified by the SAE on the load notification form is installed by the Northern Telecom installation group.

Change application

The change application department is responsible for processing and shipping 88K and EWP hardware orders.

Customer service

The customer service department is responsible for processing and shipping COEO hardware orders.

Customer software delivery (Applicators)

The customer software delivery department performs the following functions:

- schedules the application with the SAE, FSE, and the telephone company
- verifies the office memory requirements and, if necessary, polls the office
- performs patch downloading
- performs the 10 day check
- performs the 0-day check
- performs the software application

VO Dump/Restore and Test

The VO Dump/Restore and Test department tests and performs the dump and restore for verification offices.

Software production (Loadbuild)

The software production department performs the following functions:

- builds the new software load based on the feature packages listed in the Job Features Database (JFDB)
- ships the S/W documentation including the D190 document and tapes to the DMS site upgrading to the new BCS.

Software engineering process

The software engineering process department performs an outgoing quality check on the software load.

Documentation

Northern Telecom Practice (NTP) updates are shipped to the telco by the documentation department. This department also handles specifications and drawings.

Software quality assurance

The software quality assurance group monitors the software delivery process, identifies any software delivery issues, and takes appropriate action to ensure that the best software and services are delivered to the telco. This is accomplished by issue and problem tracking, and categorization. The software quality assurance group inputs customer ratings into the application database (ADB), a computerized NT database used to track software applications.

Telephone company (customer)

For a software extension, the telco responsibilities include the following:

- confirm load notification form (verify load contents)
- confirm parameter changes
- forward data frozen image
- load peripheral module loads
- review D190 and Northern Telecom Practices (NTPs)
- rate the software application as satisfactory, unsatisfactory, or fail.

Software delivery process (Canadian sites)

Overview

This chapter provides an overview of the Northern Telecom software delivery process for all Canadian-supported DMS offices. The various software delivery activities and their timelines have been established to ensure that a quality software load is delivered to the telephone company.

Software delivery involves many functional departments both at NT and the telephone company. Each functional NT group is responsible for tracking and reporting specified software delivery milestones.

Note: The abbreviation AD is used in this chapter for the Canadian software application date. For example, AD - 36 refers to 36 days prior to the schedule software application date.

Software delivery milestones

At AD - 40:

- Activity: BCS Application request/schedule (envoy or meeting with telephone company is completed)
- Responsibility: Telephone company and field support engineer (FSE)

At AD - 38:

- Activity: Identify COEO number and feature list to System Applications Engineer (SAE)
- Responsibility: Marketing

At AD - 36:

- Activity: Firm date/COEO in JFDB/notify other departments. (Load Notification Form issued including hardware upgrades, software package changes, software parameters, dates, and application type.)
- Responsibility: SAE

4-2 Software delivery process (Canadian sites)

At AD - 34:

- Activity: Verify polling (updated job features database)
- Responsibility: Customer Software Delivery Department

At AD - 31:

- Activity: Verify and confirm load content
- Responsibility: Telephone company

At AD - 26:

- Activity: Finalize software line/1091 specification; verify Memcalc; and order hardware (final software parameter list is sent to Software Production)
- Responsibility: SAE

At AD - 25:

- Activity: Order hardware and memory
- Responsibility: SAE

At AD - 22:

- Activity: Ship NTP documents
- Responsibility: Documentation Department

At AD - 22:

- Activity: Ship software documentation and tapes to office site.
- Responsibility: Software Production Department

At AD - 20:

- Activity: Ship hardware order and confirm installation schedule.
- Responsibility: Change Application and Installation

At AD - 20:

- Activity: Patch download to office site scheduled for upgrade
- Responsibility: Customer Software Delivery

At AD - 10:

- Activity: Install hardware
- Responsibility: Installation

At AD - 10:

- Activity: Perform 10-day check
- Responsibility: Customer Software Delivery (Field Support Engineer is advised of any problems)

At AD - 6:

- Activity: Image received by Software Production
- Responsibility: Telephone company / Field Support Engineer

At AD - 3:

- Activity: Build the software load.
- Responsibility: Software Production

At AD - 2:

- Activity: Perform outgoing quality check.
- Responsibility: Software Engineering Process Department

At AD - 0:

- Activity: 0 day check
- Responsibility: Customer Software Delivery (The applicator reviews the latest status of application with site including the data exception report contents. The new BCS tapes should be on site by 5:00 pm.)

At AD - 0:

- Activity: Apply the new software load.
- Responsibility: Customer Software Delivery (Applicator)

At AD + 5:

- Activity: Rate software application.
- Responsibility: Telephone company and NT Software Quality Assurance Department

Application scheduling (AD - 40)

A BCS application is scheduled at AD - 40 by the Customer Software Delivery Department as a result of one of the following:

- meeting with the telephone company for a specific BCS roll-out
- request from the telephone company to change software feature package and/or data

- requirement of EWP that the office be upgraded if it is three BCSs below the current ready to order (RTO) software load

The marketing department is involved in the software delivery process for the billing requirements. If a software application is to be scheduled (or re-scheduled) in a shorter time interval than that outlined in the Software Delivery Process, the Exception Handling Procedures must be followed.

In scheduling a software application, various activities including extensions and re-homing remotes are considered in order to minimize the office impact.

Load Notification Form (AD - 36)

After the application requirements (including telco request, software package changes, software parameter changes), the SAE issues the load notification form at AD - 36 which is 36 days prior to the software application date.

The load notification form performs the following function:

- Inform all involved departments about the upcoming application, including all required dates, required software and hardware changes, and customer-originated parameter changes.
- Establish a mechanism to check and verify the software load content.

This form is used by the telephone company to confirm the content and dates of all changes that will be occurring as a result of software application. If the load notification form is not released at AD - 36, the Customer Software Delivery Department flags the situation.

Office Polling Verification (AD - 34)

The office memory requirements are verified (and polled, if necessary) by the Customer Software Delivery Department. If the polling results conflict with the load notification form and/or the Job Features Database (JFDB), the Customer Software Delivery Department flags the situation to the following departments:

- Field Support Engineering
- System Application Engineering
- Software Production
- Software Quality Assurance

Load Content Verification (AD - 31)

The load notification form content is verified by the telephone company at AD - 31. The verification assures the SAE that all changes are covered before the load content is finalized.

Software Line Up Freeze (AD - 26)

After Memcalc is verified and the software lineup/1091 specification is finalized, the SAE places the hardware order for Pre-BCS27 and Non-EWP applications. After this milestone, no changes are allowed to the job. All exceptions must follow the Process/Exception Handling Procedures.

Hardware Order (AD - 25)

If the SAE also delivers all software parameter changes, then all SAE deliverables are completed by AD - 25. Software parameter changes are provided to the Software Production Department.

Normally, all software parameter changes are completed by Software Production during the loadbuild process, and no manual parameter changes are performed by the applicator on the night of the application. This process is necessary for the following reasons:

- to minimize the software duration time
- to include changes in the data exception report
- to resolve problems in a timely manner

Software Production flags the situation if software parameter changes are not on time by the SAE. The Change Application Department or Customer Service Department flags the situation if the hardware order is not on time by the SAE.

Tapes and Documentation Shipped (AD - 22)

At AD - 22 the following documents and tapes are shipped to the telco:

- NTP Updates
- D190 Document
- Customized Release Document
- PM Release Document
- PM Tapes (2 Copies)
- Commissioning Tapes
- TAS Non-RES Tapes
- BCS Tools Tapes

The NTP updates are shipped by the Documentation Department. All other tapes and documents are shipped by Software Production.

Hardware Shipped (AD - 20)

At AD - 20, the hardware order is shipped to the site. The Installation Department confirms that the job has been scheduled to allow for 2 weeks of

memory soak time. The field support engineer (FSE) flags the situation if the installation schedule is not confirmed.

Patch Downloading (AD - 20)

At AD - 20, the Customer Software Delivery Department downloads all XPM patches and any other patches that are required for the new BCS. Other activities at this milestone include downloading exec files for hardware checks, site preparation document, and journal file sorting.

10 Day Check (AD - 10)

At AD - 10, the Customer Software Delivery Department contacts the site to review various activities. (Refer to "Pre-application site checks" for more information).

Hardware Installed (AD - 10)

At AD - 10, the hardware installation must be completed.

Image Tape Received (AD - 6)

At AD - 6, the image tape from the telephone company must be received by the Software Production Department. The telephone company should make the necessary shipping arrangements to have the image tape delivered to the following address:

**Northern Telecom
S/W Production
Department S644
8200 Dixie Road
Bramalea Ontario, Canada L6V 2M6**

The Software Production Department flags the situation if the image tape shipment is not received on time.

Note: The site must specify that the image tape shipment be delivered to the "South Lobby" and not to the Receiving Department at Bramalea. Some mail and shipping courier companies will only deliver to a receiving department which will not allow for a timely software delivery process.

Loadbuild (AD - 3)

At AD - 3, the loadbuild process is completed. The data exception report (DER) available on-line the following day through GENESIS.

Outgoing quality check (AD - 2)

At AD - 2, the Software Engineering Process Department completes the Outgoing Quality Check on the software load. This is an automated process which highlights any problems that need to be resolved during the software

application. This check makes the necessary process/design changes to ensure minimal or no impact to the software application.

If issues are identified by the Outgoing Evaluation Check, the Field Support Engineer must be informed so that a decision can be made to proceed with the software application.

Application (AD)

The software application is performed using the SWAP process or One Night Process (ONP) by the Customer Software Delivery Department.

After an application, the Customer Software Delivery Department enters information on the software application into the Application Database (ADB). This internal NT database is used to track and store information on software applications.

Customer Application Rating (AD + 5)

At AD + 5, the telephone company provides a rating on the software application. Northern Telecom is committed to delivery of the best possible software and services; therefore, every software delivery activity is performed with the intention of avoiding any end user problem during and/or after the BCS application process. Telephone company feedback is encouraged to help improve the software delivery process.

The Software Quality Assurance Department inputs customer ratings into the ADB.

Pre-application site checks

At AD - 20, the Customer Software Delivery Department (patch download) contacts the DMS site and performs the following activities:

- Download XPM patches for the new XPM software loads.
- Download any CC patches required for the application.
- Download JFSORT, HWCHECK, and the HWEXEC.
- Inform site personnel of HWCHECK.
- Inform site not to erase any of the patches and files downloaded.
- Record/list storage device of downloaded patches and files.

At AD - 10, the Customer Software Delivery Department (BCS Applicator) contacts the DMS site and performs the following activities:

- Read HWEXEC.
- Confirm that memory is adequate. If not, the BCS Applicator flags the condition.

4-8 Software delivery process (Canadian sites)

- Review/preview HWCHECK list with site.
- Complete the 10-day checklist.
- Set a start time for the application with site personnel.
- Run the BCSCHECK program (unless the telephone company will perform this function).

At AD - 0, the BCS Applicator contacts the DMS and performs the following activities:

- Complete the day of application checklist.
- Complete a conference call checklist (if necessary).

Software delivery process overview (US sites)

Introduction

The Northern Telecom software delivery process consists of the following major phases:

- **Quoting and Ordering:** A quote is a cost estimate of the new software. After a quote is given, the telephone company may choose to order the new software. Ordering refers to the request from the customer for new software and the interfaces for software orders. Ordering also covers changes to the original software order or request.
- **Provisioning the office:** Provisioning refers to planning for and preparing the in-service telephone switch for the new software load and for any gating hardware necessary for successful switch operation on the new load. Provisioning also includes scheduling and allocating NTI production facilities for delivery of the software.
- **Producing a new software load:** Producing a new software load consists of compiling the ordered software into the new load by NT software production.
- **Delivering a new software load:** Delivery refers to the merging of the office-specific data from the telco switch into the undatafilled software load. The finished software product is then installed into the telco switch. The new software is sent to the telco on magnetic tapes for the NT40 or on SLM (System Load Module) cartridges for the SuperNode. Installation of the new software may be performed by either NTI or the telco.

The sections that follow give an overview of each of these major processes listed. Table 5-1 summarizes the Hybrid NTI software delivery processes according to time, NTI databases and major participants. The hybrid process is used for large offices upgrading to BCS 29 and higher. Table 5-2 summarizes the One Night Process software delivery method for small and mid-sized offices upgrading to BCS 29 and higher.

5-2 Software delivery process overview (US sites)

Table 5-1 Summary of hybrid software delivery processes

MAJOR PROCESS	QUOTE AND ORDER	PROVISIONING	PRODUCTION	DELIVERY
SUB-ACTIVITIES	<ul style="list-style-type: none"> • Request For quote • Telco order 	<ul style="list-style-type: none"> • Scheduling • Initial preparation 	<ul style="list-style-type: none"> • Load build 	<ul style="list-style-type: none"> • Final preparation • Dump and restore • Application • Monitor
NORMAL TIME INTERVAL	16 weeks or more	I* - 17 wks	1 - 3 wks	1 - 2 wks to 1 - 15 days
MAJOR NTI DATA BASES USED	FORTUNE OR (order receivables) NTACCESS	BCS IS CADES CHKMSTR (BCS checklists) COT DFDB RTPOLL FORTUNE FDB ISS (Installation) PEDMS JFDB SES SMS	FDB GENESIS JFDB SMS CHKMSTR RTPOLL SOLID	Genesis SMS
MAJOR PARTICIPANTS	NTI Sales Representative Telco Marketing Quote Specialist	BCS Coordinator Contract Administration Customer Support Rep Engineering Analyst Equipment Application Engineer Field Support Coord Installation Master Scheduler Patch Engineer Scheduling Analyst Software Systems Eng Systems Application Eng Tape and Documentation Telco Warranty Account Mgr	Customer Support Rep Field Support Eng Software Production Eng Telco BCS Coordinator	Pre-application Engineer D/R Engineer Patch Engineer Application Engineer Monitor Engineer Telco BCS Coordinator
Legend: * I references the Insertion date for the new software load. For example, 1 - 3 wks refers to 3 wks prior to the scheduled upgrade.				

Table 5-2 Summary of the One Night Process software delivery method

MAJOR PROCESS	QUOTE AND ORDER	PROVISIONING	PRODUCTION	DELIVERY
SUB-ACTIVITIES	<ul style="list-style-type: none"> Request For quote Telco order 	<ul style="list-style-type: none"> Scheduling Initial preparation 	<ul style="list-style-type: none"> Load build 	<ul style="list-style-type: none"> Final preparation Dump and restore Application Monitor
NORMAL TIME INTERVAL	16 weeks or more	I* - 17 wks	I - 7days	I - 2 wks to I - 15 days
MAJOR NTI DATA BASES USED	FORTUNE OR (order receivables) NTACCESS	BCS IS CADES CHKMSTR (BCS checklists) COT DFDB RTPOLL FORTUNE FDB ISS (Installation) PEDMS JFDB SES SMS	FDB GENESIS JFDB SMS CHKMSTR RTPOLL SOLID	Genesis SMS
MAJOR PARTICIPANTS	NTI Sales Representative Telco Marketing Quote Specialist	BCS Coordinator Contract Administration Customer Support Rep Engineering Analyst Equipment Application Engineer Field Support Coord Installation Master Scheduler Patch Engineer Scheduling Analyst Software Systems Eng Systems Application Eng Tape and Documentation Telco Warranty Account Mgr	Customer Support Rep Field Support Eng Software Production Eng Telco BCS Coordinator	Pre-application Engineer D/R Engineer Patch Engineer Application Engineer Monitor Engineer Telco BCS Coordinator
Legend: * I references the Insertion date for the new software load. For example, I - 3 wks refers to 3 wks prior to the scheduled upgrade.				

Quoting and ordering software (US sites)

Quoting new software

Before the telco places an order for a new software load, it requests a preliminary cost estimate for the software. This process is the Request for Quote (RFQ). The NTI regional sales group generates the quote using existing office data and information such as feature packages in the new load, and materials required.

The quote is then provided to the customer. After the quote is received, the telephone company may choose to place an order for the new software.

Telephone company order

The telco orders a new software load through a letter of intent, which includes information such as the office site name, BCS levels "to" and "from", feature packages in the new software load, and a schedule identifying when the software is needed. A purchase order should accompany the letter of intent. NTI should receive the order from the customer no more than 20 working days before the CI date on the request for schedule (RFS).

The telco point of contact for new software is the NTI regional sales representative, no matter which NTI organization (engineering, marketing or other internal groups) actually receives the customer order. Once an order has been received, the sales organization notifies marketing through COCOS (NTI's Corporate Communications System) of the need for a schedule.

Software order activities

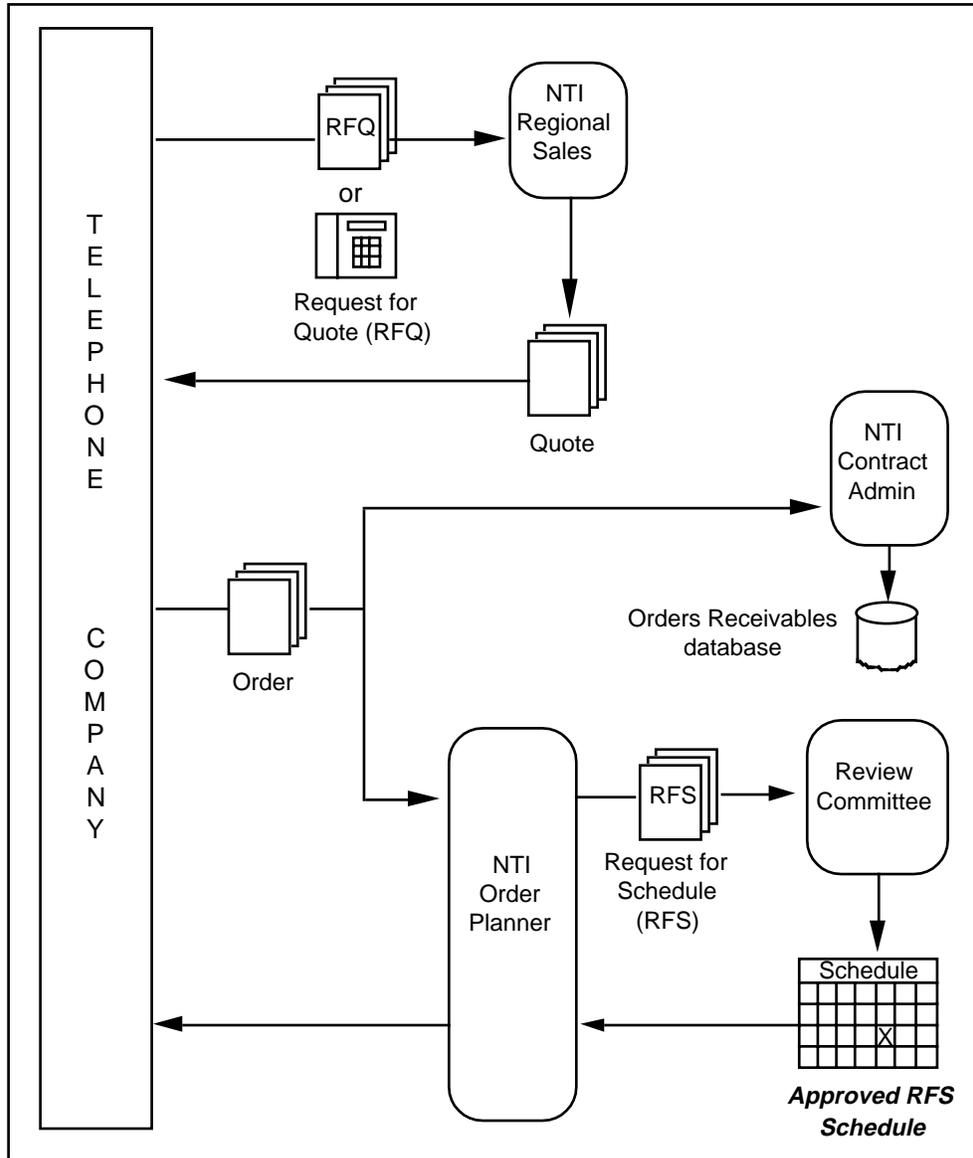
Following the receipt of a software order from a telephone company, an NTI regional scheduling analyst generates a schedule for the order. NTI develops and manages customer schedules based on both hardware and software parameters through the 4.0 release of the FORTUNE ordering system. FORTUNE 4.0 incorporates hardware and software requirements into a single stream process to provide a total job view when developing a schedule for a system order.

6-2 Quoting and ordering software (US sites)

NTI contract administration then sets up the job in Orders Receivable Database and authorizes engineering time to be billed to job in the Product Engineering Management Database (PEDMS).

Figure 6-1 shows a simplified flow diagram of the quote process and the actions taken after the software order.

Figure 6-1 Software Quote and Order



Provisioning (US sites)

This section describes the provisioning phase of the NTI software delivery process (US supported sites). Provisioning refers to the planning and preparation activities necessary to accommodate the installation of a new software load.

Provisioning covers the process from the scheduling of the order to the start of loadbuild. The software delivery activities are described in sequence as they occur prior to the scheduled software application date. Also included are automated software processes and databases. The following major provisioning activities are described in this section:

- Scheduling
 - developing schedule for software delivery activities
 - approval process for developed schedule
 - delivery of approved schedule to telephone company
- Systems application engineering
 - capture of telco information regarding software order
 - provisioning the DMS switch memory
 - identifying gating hardware
 - delivery of customer information (DCI) to NTI software delivery
 - verification of software order
- Installing BCS gating hardware
- Pre-production activities
 - purchase order
 - JFDB verification
 - automated BCS checklist
 - preliminary tapes and documents shipped to site
 - patching activities (I - 7 to 2 weeks)

Order Planning Scheduling

Scheduling is the generation of a time plan for engineering, provisioning, production and installation of a product, including hardware, software, and support services. NTI develops and manages customer schedules based on both hardware and software parameters through the FORTUNE ordering system.

The FORTUNE scheduling system incorporates hardware and software requirements into a single stream process to provide a total job view when developing a schedule for a system order.

The Central Office Equipment Order (COEO) number is assigned at this time to track and identify the order and office through the various software delivery phases. The COEO number (also called H-number) has a format of Hxxxxx. The COEO format currently used has xxxxx being any numeral from 00000 to 99999 or can be formatted to include an alpha character for the second character.

Generating an RFS

A Request for Schedule (RFS) is generated when a telephone company order is received for hardware and software, or for software only. The NTI Order Planner records pertinent customer, product, and feature information on the RFS. An RFS also identifies several critical dates for events that must be performed at specific times to achieve successful software delivery. The RFS packages the product for both hardware and software to provide the customer with the total scheduling picture.

An RFS includes the following information on the customer:

- customer name
- holding company
- sales region
- NTI region

An RFS includes the following information about the customer's order:

- order status
- type
- sales representative
- CLLI (common language location identifier)
- location
- installation district
- contact

- equipment list

An RFS includes the following information about the order schedule:

- scheduled shipping date (D)
- scheduled M1 - M6 specification dates
- hardware feature requirements
- scheduled date for shipment to arrive on site (H)
- requested software insertion date (APP)
- date of product turnover to customer (K)

The NTI specifications (131, 132, and 133) are used to order BCS gating hardware. These specifications are written and released by the Equipment Application Engineering group.

The following items must be considered when generating an RFS:

- type of order
- gating material
- specific customer requests or site requirements
- network arrangement and compatibility (impact of the software upgrade and compatibility to other nodes in a network)
- production capacities of NTI

Order Types

The following types of orders are considered in the development of an RFS:

- *Initial Order*: Order for software and hardware to equip a new DMS office.
- *Extension*: Order for an upgrade to an existing DMS office. An extension may be hardware only, or may include hardware and software.
- *SWE (Software-only Extension)*: Order for a software upgrade to an existing DMS office. May include BCS gating hardware, but does not support feature gating hardware.

Each of the order types identified above begins with a **Base** order. The Central Office Equipment Order number (COEO) is assigned to the base order, and basic due dates are included. If software is included in any type of order (initial, extension, or SWE), an **S Suborder** is attached to the Base. The S Suborder has the same COEO as the Base, followed by a "dash S" (for example, H12345-S).

An office ordering a BCS upgrade that includes multiple levels (for example, from BCS 25 to BCS 31) has a Base order with two S Suborders attached. If

7-4 Provisioning (US sites)

the Base order is H12345, the suborders are H12345-S1 (for BCS 25 to 28) and H12345-S2 (for BCS 28 to 31). Figures 7-1 and 7-2 identify the dates and intervals for the various types of orders.

Figure 7-1 Scheduling Intervals for Initial Orders

Note : On initial software loads the standard interval is H +2 weeks.

BASE SUBORDER											
		M1			M5						
CI	DCI	M2	M3	M4	M6	DTD	JDOC	D	H	K	
2	1	2	1	1	1	2	1	2	*		

SOFTWARE SUBORDER				
		PDOC		APP
	D	H	K	LOS
	2	0	2	

* H to K is based on the high value of wired lines or wired trunks.

Figure 7-2a Scheduling Intervals for Extension Orders

Note: On extension order types, the standard interval is H +5 weeks.

Hardware extension package

BASE SUBORDER											
		M1			M5						
CI	DCI	M2	M3	M4	M6	DTD	JDOC	D	H	K	
2	1	2	1	1	1	2	1	2	*		

SOFTWARE SUBORDER				
	PDOC			APP
	D	H	K	LOS
	2	2	3	

* H to K is based on the high value of wired lines or wired trunks.

Figure 7-2b Scheduling Intervals for Extension Orders
Software extension package with BCS gating hardware

BASE SUBORDER									
CI	DCI	M1	DTD	JDOC	D	H	*	K	
2	1	1	2	0	2	7			

SOFTWARE SUBORDER				
D	PDOC	H	K	APP LOS
2	2	2	3	

* If multiple Software suborders are required the applications must be scheduled with 3 weeks minimum between application dates in the Base order H - K interval.

The following date abbreviations are used throughout the scheduling process:

- CI Customer information
- DCI Delivery of customer information to Core
- M1 - M6 Engineering specification release
- DTD Drawings to documentation
- JDOC Job-specific documentation
- D Product ready to deliver to site
- Ship Product shipped to site
- H Product on-site; Installation begins
- PDOC Product-specific documentation
- APP Software application
- Z Early turnover of material
- LOS Load on site (no application required)
- K Turnover of total product to customer (base)

BCS gating hardware

BCS required hardware includes any hardware required in the DMS office prior to the software delivery date. Two types of BCS required hardware include:

- *BCS gating*: Required by the BCS software load. Without BCS gating hardware, the BCS load will experience problems. For example, if BCS 30 requires more memory than a switch currently needs for BCS 27, an upgrade to BCS 30 would require additional memory packs as BCS gating hardware. BCS gating hardware is scheduled by an S Suborder.
- *Feature gating*: Hardware required to support feature functionality. The absence of feature gating hardware does not affect the success of the BCS load, but the specific software feature will not work.

Gating hardware is identified by the Systems Application Engineers (SAEs) in the NTI regions, using the following sources:

- NTI Engineering Change Memorandums (ECMs)
- NTI Marketing Bulletins
- Internal correspondence (COCOS) from individuals and groups within NTI
- NTI Product Change Notifications (PCNs)
- NTI internal memoranda from various Northern Telecom groups

In addition, BCS gating information beginning with BCS 26 is identified on the BCS checklist that verifies critical activities in the software delivery process.

The identification of gating material for a BCS is used by marketing to schedule the job and by installation to identify required intervals for gating hardware installation. A material required list (MRL) identifies the BCS gating hardware for a software order, and is released by engineering to marketing. Marketing uses the MRL to schedule gating material ordering and installation.

All BCS gating hardware must be ordered (either on an S Suborder or customer provided), shipped, and installed 12.5 days prior to the application date for the new software. This allows for sufficient hardware testing prior to the application and a sufficient interval to verify new hardware reliability.

For more information on the installation of gating materials, refer to *Gating Materials Installation and Ordering* in this section.

Site requirements

Site-specific requirements must be considered in the development of an RFS. Site requirements include the following:

- BCS level (from and to)
- size of office (determines type of software delivery process)
- requested date of application
- requested day of application (weekday or weekend slot)

Network arrangement and compatibility

Network arrangement and compatibility are examined when an RFS is generated for a software order. This refers to the current configuration of the switch or remote in relation to other nodes of the switching network. Network arrangement issues include whether the DMS is connected to an operator position, network controller, remotes; whether the office is part of a traffic operator position system (TOPS); and whether the new BCS software load will impact these systems.

Figure 7-3 Network compatibilities

If . . .	Verify . . .
Member of TOPS network	That host and remote OC meet compatibility requirements
Signal Transfer Point (STP)	That STP pair are scheduled in a comparable timeframe
Connected to Dynamic Network Controller (DNC)	That the new BCS level is compatible with NSR release
Connected to Voice Service Node (VSN)	That the new BCS level is compatible with VSN release
TOPS host switch	That Operator Service Center (OSC), TOPS Position Controller (TPC), and remote switches have same BCS level

If an incompatibility issue is found between two or more network nodes as result of the software upgrade, plans are made to upgrade each node in the network in proper order as not to impact the total network. For example, in a host OC (Operator Centralization)/remote OC switching arrangement, the host OC must be upgraded before the remote OC. If the remote OC was

being scheduled for an upgrade, the scheduling analyst would determine if the host OC was scheduled to receive a BCS upgrade prior to the remote OC. If the host OC was scheduled for an upgrade, the scheduling analyst would verify that the remote OC upgrade occurs after the host OC upgrade.

In the case of the TOPS host switch identified above, the following example illustrates the impact. Suppose a TOPS switch at BCS 28 is being upgraded to BCS 30 for ISDN services which have no interaction with the TOPS features. Having the TOPS switch and OSC TPC at different BCS levels can create the potential for service-affecting problems. The CI document has been upgraded to require new configuration information for an OS software extension. Upgrades in the OS service network must be completed in the following order:

- 1) Upgrade OSC TPCs with software compatible with the new BCS load.
- 2) Upgrade the TOPS host switch software.
- 3) Upgrade the remote switch software.

Network arrangement and compatibility are examined for each software delivery order. Refer to Appendix A for information on network compatibility.

RFS approval process

Using the above criteria, the NTI Order Planning Analyst generates an RFS through the Fortune Scheduling System which stores information on customer orders and schedules. The generated RFS is distributed electronically to a review committee consisting of Engineering, Installation, Hardware Operations, BCS Planning, Project Management, and Documentation Distribution. Each group represented on the committee is responsible for specific schedule intervals, and approves or rejects the RFS based on their ability to support and meet these commitments.

A rejected RFS is returned to the regional scheduler for change. Scheduling conflicts and open issues require the submission of another schedule to the review committee. The process of submission and re-submission continues until any issues and scheduling conflicts are resolved.

Schedule mail (SCHEDML)

A process called "schedule mail," or SCHEDML, sends information from the NTI BCS Planning Group to the regions. SCHEDML electronically sends a letter within a 15-week window to the region responsible for each upgrade scheduled on the BCS IS database. SCHEDML includes the assigned dates for dump and restore, if applicable, and the application. The region then contacts the customer for confirmation of the assigned slots.

An example of a SCHEDML relaying date assignments is shown in Figure 7-4:

Figure 7-4 Software Delivery Schedule Acceptance

```
DATE: XX/YY/ZZ

TO: BCS Coordinator

FROM: BCS Marketing Scheduler

SUBJECT: Customer Acceptance - Schedule Date

Please advise on the Customer Acceptance on the
following schedule:

OFFICE NAME:      Anytown_ST
COEO:            H12345_00

BCS LEVEL:       26-29

D/R  LDR:        RTP   XX/YY/ZZ

APPLICATION LAP: RTP   XX/XY/ZZ

Please contact your respective BCS Marketing
Scheduler with Customer acceptance.
```

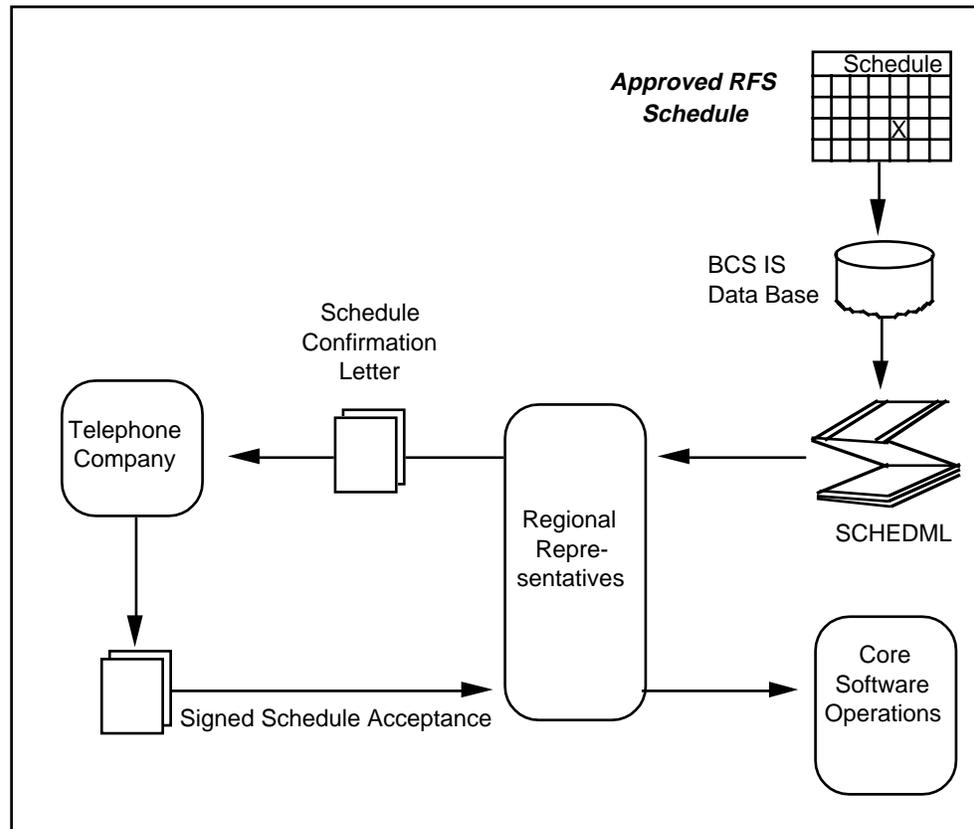
Telco schedule acceptance

Once the software delivery dates have been confirmed through SCHEDML, the Regional Customer Service representative notifies the customer (telephone company) of the schedule, usually by telephone. After a verbal acceptance of the scheduled dates, the regional representative sends to the telco a confirmation letter identifying the dates and the scheduled sequence of events. This letter is sent at 7 to 4 weeks before the scheduled insertion date, depending upon the nature of the order.

As a final acceptance, the authorized telco representative signs the schedule and returns it to NTI. This ensures that both NTI and the telco have an agreed-upon schedule in writing. A sample confirmation letter is in Appendix C.

The following figure shows the process of sending scheduled software delivery dates to the telephone company for acceptance.

Figure 7-5 Software Delivery Schedule Acceptance



Scheduling billing and engineering

Billing for the software order is initiated, authorized, and coordinated by NTI Contract Administration. In addition, Contract Administration provides authorization so that engineering time can be allocated for the job.

Regional marketing notifies the engineering group when an order is received. The Systems Application Engineer (SAE) assigned to the job contacts the telephone company to review office information, dates, and other information needed for preparation of CI (customer input).

Systems Application Engineering

Systems application engineering (SAE) ensures that the in-service DMS switch has been adequately provisioned for the requirements of the ordered feature packages. Using the office information collected from the customer, along with established NTI engineering rules and guidelines, the engineer prepares the office for the new BCS load.

The NTI regional SAE performs the following tasks:

- customer input of information regarding the software order

- processing and changing the order from change order requests
- checking feature package interdependencies
- ordering limited feature packages
- releasing the CI Document (electronic submission) at the DCI-date identified on the request for schedule (RFS)
- running the Memcalc program and provisioning the DMS memory
- identifying gating hardware
- verifying the job features database prior to software load production

Customer input (CI)

The telco information required to build the software load is called customer input (CI). The CI is provided through an on-line computerized questionnaire, NT-ACCESS.

The information recorded at CI for a software order includes the following:

- Office CLLI (common language location identifier): Combination of alphanumeric characters used to identify an office site.
- BCS application service time: Day of the week for the software delivery.
- Type of translations input, if required: Indication of whether the translation collection system (TCS) or keypunch forms will be used to supply the translation data in the new load. If translation data is supplied at the time of the initial or extension, the input method is required.
- Line input data, if required, and method of input
- TOPS: Identification of TOPS operator centralization (OC) network (remote OC or host OC), if applicable.
- BCS "to" level: Production BCS to which the office is upgrading.
- List of feature packages: Selection of major package for office, and any optional feature packages.

CI 8630: Electronic CI Capture Process

The electronic CI capture process is called the 8630 questionnaire. It includes a list of questions requesting customer information for the order, and serves as the official interface between Northern Telecom and the customer. Names and telephone numbers of interfaces in the telco are recorded in case consultation or further information is needed.

The regional Systems Application Engineer (SAE) works with the telco to complete the CI. Sometimes this occurs through a telephone call. In most cases, however, the SAE visits the customer site and records the needed information. The decision to handle the customer input phase with a

telephone call or customer visit is determined by the complexity and nature of the order.

NT-Access: Computerized questionnaire

A computerized on-line questionnaire may be used by the telephone company to input order information. The computerized system, NT-Access, is an umbrella of computer systems used by the telcos to plan for and order NTI products.

NT-Access provides the following capabilities:

- **Questionnaire Capture:** Allows telco to capture office data.
- **Equipment Calculation:** Uses input information from on-line questionnaire to generate equipment list by applying established NTI engineering rules to captured data.
- **Modification of Job Data:** Allows calculations and equipment quantities to be modified by user.
- **On-Line Display of Job Information:** Enables user to display wide range of information related to job.

The output of the system is a list of product codes (PECs), quantities required, and a price summary.

Releasing the CI document at the DCI-date

The RFS identifies the DCI date (delivery of the CI) when the CI process must be complete and delivered to various NTI groups. The typical interval between CI and DCI is two weeks, depending upon the complexity of the job. CI release is accomplished through electronic submission of 8630 information to the various downstream departments (FORTUNE, JFDB, Documentation, etc.)

JFDB creation is accomplished when the SAE runs automated processes to transfer the CI information to a VMID reader identified by software production.

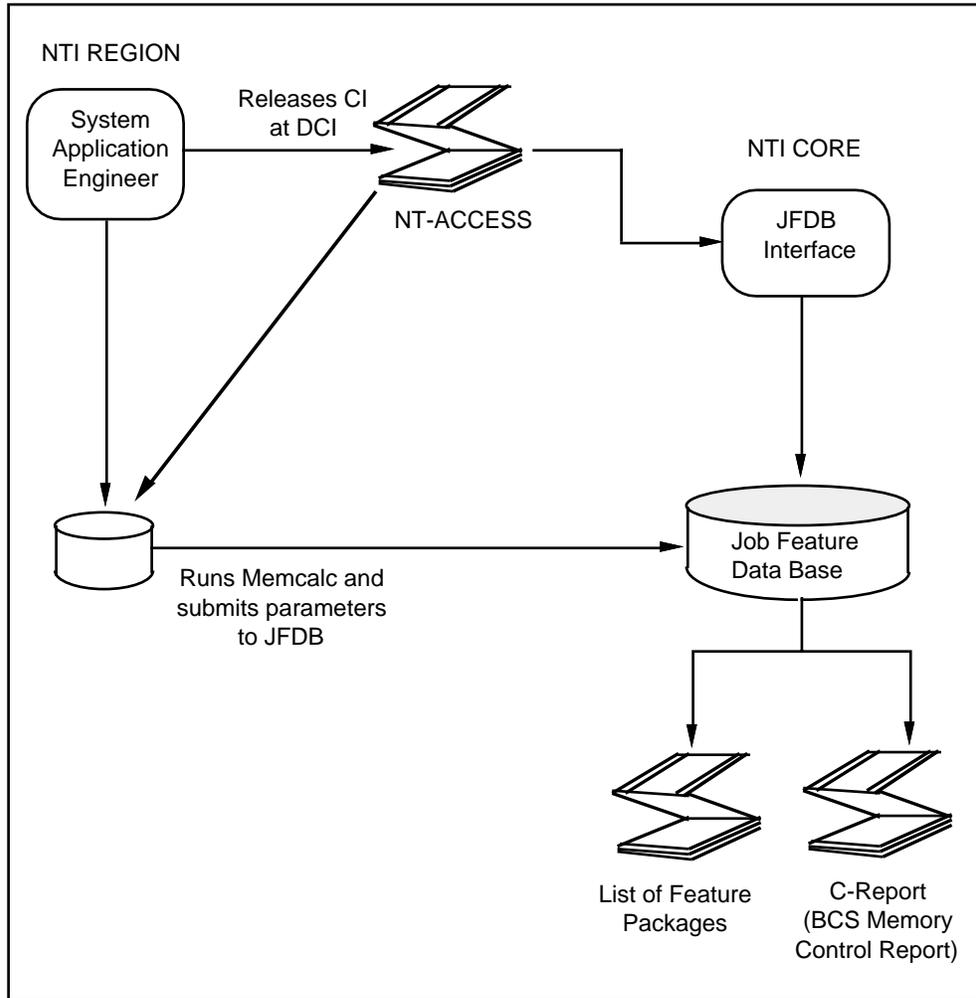
The software production group builds the software load based on the feature packages ordered by the customer. The list of feature packages for a software order is extracted from the JFDB at the start of the loadbuild process.

If an office currently exists in the JFDB, the JFDB is updated with information from the completed CI. Software Production sends an electronic notification to the region indicating that activity in the JFDB has occurred during the previous week on a particular COEO. (Activity refers to software package additions, deletions, and changes.) This is important because the

job must be entered into the JFDB before Memcalc is run and the schedule confirmation is routed.

Figure 7-6 illustrates the information flow from the CI to the JFDB.

Figure 7-6 CI document and JFBD Creation



Feature verification

Feature package interdependencies

The regional Systems Application Engineer (SAE) determines if all feature interdependency requirements have been met. Feature interdependency refers to features that rely on, or operate with other features. Some features may have several feature dependency requirements while other features may have none.

For example, software package TOPS - Remote ONI (Operator Number Identification) - CAMA (centralized automatic message accounting)

NTX035AA requires software package NTX030CC, TOPS Call Processing feature package. If a customer orders NTX035AA, the switch must have NTX030CC already, or must have included it in the order.

The SAE verifies that all software interdependent features have been ordered by checking ordered features for any associated required feature packages. Section 2 of the Customer Questionnaire lists the feature packages and their associated feature dependencies.

Limited feature packages

Feature packages have one of the following release status designations:

- T = TBD (to be determined). No committed date for the feature package but currently planned.
- D = Development. In development and cannot currently be ordered.
- F = Field Trial. Can be ordered but only for field trial upgrades.
- V = VO (Verification Office). Can be ordered for the VO office.
- L = LTD (Limited). Order must be approved by New Product Introduction.
- G = GA (General Availability). Can be ordered by any office.
- A = A+M (Additions and Maintenance). Can be ordered only if the feature package already exists in the office.
- M = MD (Manufacture Discontinued). Can no longer be ordered because the package has been discontinued.

Approval of limited feature packages refers to the decision to permit ordered feature packages with the limited status into the new software load. Each BCS typically has feature packages with the limited feature status that are not available to every office but are introduced on a controlled basis. A feature status matrix maintained by the core marketing group identifies the limited feature packages for a BCS load.

Request for limited package approval is initiated by the Regional SAE to core BCS project office. All approvals or rejections will feed into JFDB. Once limited feature packages are identified using the feature status matrix, the regional analyst initiates a request through the FORTUNE Order Scheduling System to core NTI Marketing (BCS Project Office) for approval. The approvals or rejections of each of these requests are transmitted to software operations on a nightly basis. All approved limited feature packages are flagged with an "L" in the JFDB to be included in the load.

Memcalc and memory provisioning

Using the Memcalc engineering software tool, the SAE calculates the DMS memory needed to accommodate a new software load. Memcalc calculates the program store (PS) and data store (DS) requirements for an office. The SAE inputs to Memcalc a list of the feature packages in the new software load (from the JFDB or CI document) and a list of engineering parameters (polled from the customer's switch). The engineering parameters are based on the End of Design (EOD) quantities or actual switch parameters.

Memcalc is submitted at the BCS level of the office upgrade. If the office is scheduled for multiple BCS upgrades, memcalc must be run for each BCS transition. During the 3-week time interval between one BCS upgrade and the next, separate memory provisioning must be performed for each BCS level the office will use. Since Memcalc uses input from the JFDB and the list of ordered feature packages could change, it must be submitted after the job features database (JFDB) has been created or updated.

An administrative 10 percent memory spare is included in the NT40 memory provisioning process. This memory spare accounts for Memcalc accuracy (+ or - 5%), BCS dump and restore tools, and normal service order activity. A reliability spare is provisioned for the DMS SuperNode.

Memcalc executes a formula on the input, including required memory allocator rounding rules in its output, and submits the results to the JFDB. These parameters may be retrieved, altered, or recalculated at any time. When the telco or NTI makes an order change, such as adding more feature packages, Memcalc must be rerun. The regional SAE may run Memcalc several times.

C-report (BCS memory control report)

The BCS C-Report is the main tool for controlling the memory provisioning that must be performed prior to each software insertion. Several departments are responsible for entering data into the JFDB that will appear on the C-Report. The report contains general job information, software scheduling dates, memory calculations, polling information, and ordered gating hardware.

The criteria for a job appearing in the report include the following:

- The job must be entered into the JFDB.
- Software insertion must be scheduled.

BCS Polling

Each office scheduled for a new BCS load is polled at approximately 7 weeks prior to the scheduled software delivery date by the NTI BCS Polling group. The DMS switch information obtained during a polling session consists of:

- inform list
- office tables
- DS and PS areas
- DS and PS tables (NT40)
- memory information (SN)

The BCS Polling group first contacts the customer to request permission to poll the office, and then dial into the switch to begin the polling session. Memory usage and correct BCS levels are verified on the switch. The results of the seven week polling session are submitted to the NTI RTPOLL database. This information is used by various software production and delivery groups who build and deliver the new software loads.

NT40 PS Memory

Program Store and Data Store memory are physically separate in an NT40. Program store is used to store instructions required by the Central Processing Unit (CPU) for call processing, maintenance and administrative tasks.

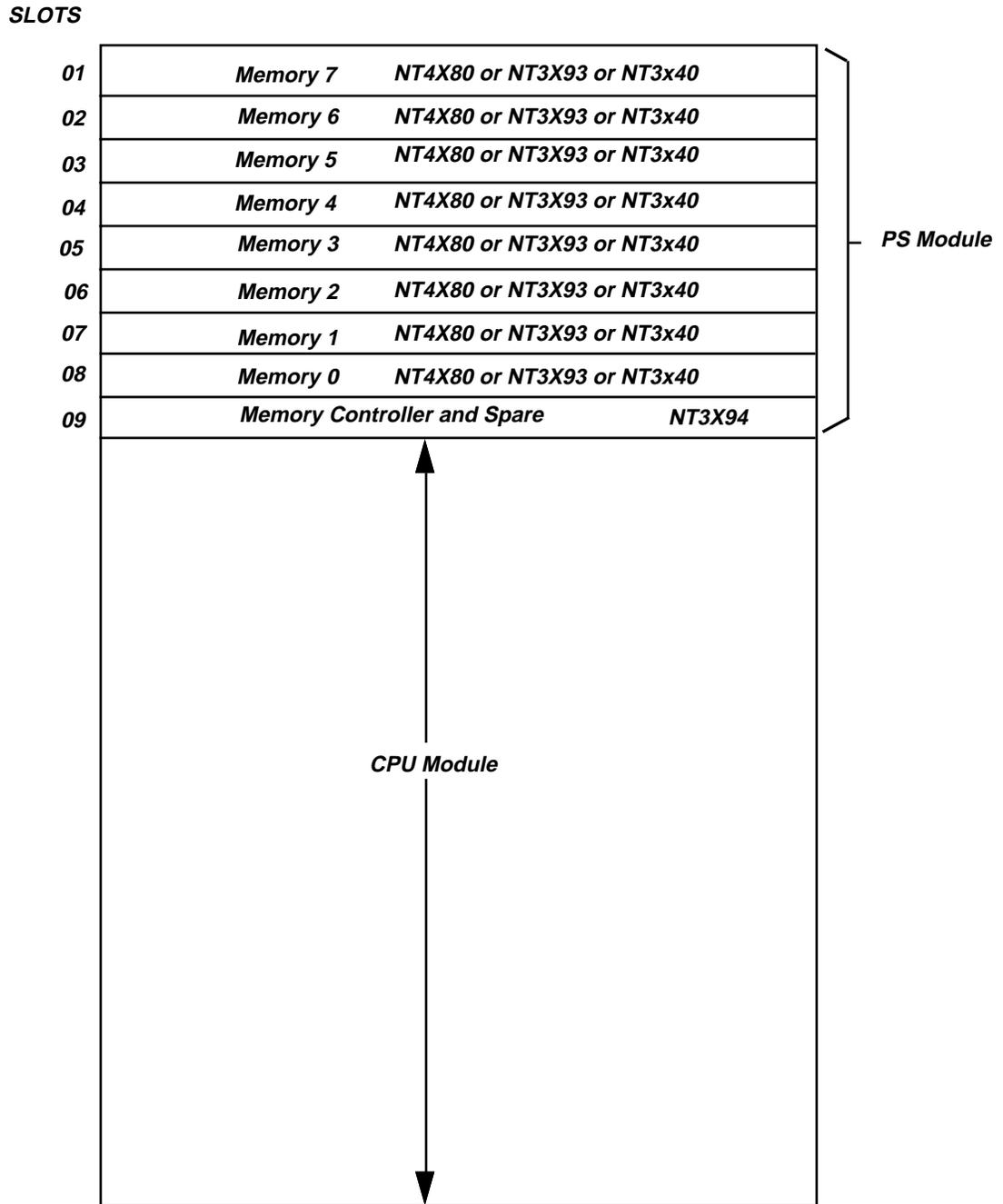
Program store memory has not expanded to become a limiting factor on NT40 software extensions. The maximum amount of provisionable PS memory is eight NT4X80 cards which provide 8 Mbytes (7.75 Mbytes addressable). Each memory card is divided into 64K blocks of memory. An NT4X80 card has sixteen 64K memory blocks. The SAE provisions NT40 program store with one spare 64K memory block once the memory requirements have been determined.

The following three types of memory circuit packs exist for the NT40:

- NT3X40 provides 64Kwords of random access memory (RAM)
- NT3X93 provides 256Kwords of RAM
- NT4X80 provides 1024Kwords or 1 Mwords or RAM

The NT40 Central Processor and Memory shelf houses the program store module and CPU module. The PS module is comprised of memory circuit packs located in eight slot positions, 01-08. A memory controller and spare card (NT3X94) are in slot position 10.

Figure 7-7 Program Store Module
(side view for illustration only)



NT40 DS Memory

Data store (DS) is used to store transient information for telephone calls in-progress, customer data, and office parameters. Growth of lines, features, usage and equal access requirements have expanded memory requirements. This has increased the DS memory requirements in an NT40-equipped DMS so that maximum expandable memory range has been reached in some offices (15.75 Mwords = 16 NT4X80 memory circuit packs in the data store shelf).

On software orders for offices that reached the maximum memory requirement using the 10 percent sparing rule, the Systems Application Engineer (SAE) consults with the assigned Software Systems Engineer (SSE) to change the software parameters. The SSE, in consultation with the telco, maximizes memory resources and allocation to meet the sparing rule and keep the memory requirement within the addressable memory spectrum, if possible. If memory requirements cannot be satisfied through software parameter changes, the office may need to convert to a SuperNode front-end. The DMS SuperNode allows for increased memory requirements and has different memory rules.

A 10 percent administrative sparing rule is applied to NT40 data store memory when it is provisioned. This means that 10 percent of the available DS memory must be extra. Beginning with BCS 28, the 10 percent memory spare is automatically provisioned by Memcalc. Prior to BCS 28, the SAE manually added the 10 percent spare once the DS requirements were determined.

The NT40 Data Store shelf has memory circuit cards located in sixteen slot positions, 06-21. A memory controller and spare card (NT3X94) is located in slot position 04. Other circuit packs equipped in the DS shelf include a power converter, filler faceplates, and a bus interface/terminator (NT3X36) pack.

DMS SuperNode Memory

SuperNode (or SuperNode SE) offices must also be provisioned with 10 percent spare memory. Unlike the NT40, the DMS SuperNode does not have separate DS and PS memory areas. The memory is provisioned into a common memory pool. The following two types of memory circuit packs are available for the SuperNode:

- NT9X14BB provides 6 Mbytes of RAM
- NT9X14DB provides 24 Mbytes of RAM

Memory sparing is provided through an extra NT9X14BB or NT9X14DB card. The extra memory circuit pack (i.e., a spare 6 and 24 Mbyte circuit pack for mixed memory applications) is provided per computing module and is assigned as a reliability spare. A maximum of nine operational memory

circuit packs may be provisioned, plus one reliability spare. Ten slots are available for memory packs in each plane of the DMS Core shelf (Figure 7-8). Slots in the DMS Core shelf reserved for unequipped memory packs will have NT9X19AA filler plates.

Offices equipped only with NT9X14BBs (6 Mbyte cards) require at least BCS 24. Offices equipped with NT9X14BB (6 Mbyte cards) and NT9X14DBs (24 Mbyte cards) require at least BCS 25. Offices equipped only with NT9X14DBs (24 Mbyte cards) require at least BCS 26. Slots in the DMS Core shelf reserved for unequipped memory packs will have NT9X19AA filler plates installed.

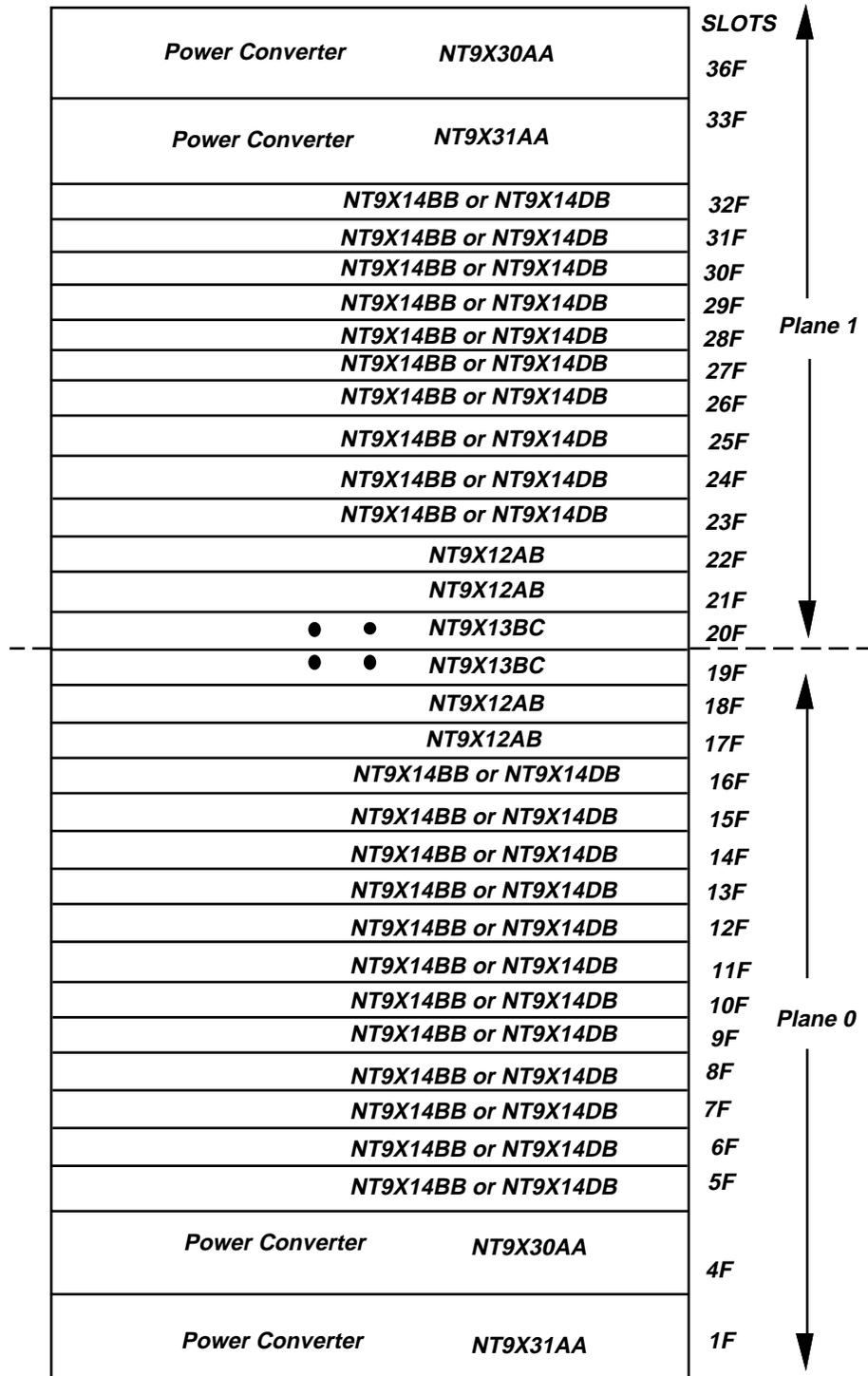
Figure 7-8 Data Store Shelf Layout

(side view for illustration only)

SLOTS

01	<i>Filler Faceplate</i>
02	<i>Bus Interface & Terminator</i>
03	<i>Filler Faceplate</i>
04	<i>Memory Controller and Spare NT3X94 or NT4X79</i>
05	<i>Filler Faceplate</i>
06	<i>Memory 0 NT4X80 or NT3X93 or NT3x40</i>
07	<i>Memory 1 NT4X80 or NT3X93 or NT3x40</i>
08	<i>Memory 2 NT4X80 or NT3X93 or NT3x40</i>
09	<i>Memory 3 NT4X80 or NT3X93 or NT3x40</i>
10	<i>Memory 4 NT4X80 or NT3X93 or NT3x40</i>
11	<i>Memory 5 NT4X80 or NT3X93 or NT3x40</i>
12	<i>Memory 6 NT4X80 or NT3X93 or NT3x40</i>
13	<i>Memory 7 NT4X80 or NT3X93 or NT3x40</i>
14	<i>Memory 8 NT4X80 or NT3X93 or NT3x40</i>
15	<i>Memory 9 NT4X80 or NT3X93 or NT3x40</i>
16	<i>Memory 10 NT4X80 or NT3X93 or NT3x40</i>
17	<i>Memory 11 NT4X80 or NT3X93 or NT3x40</i>
18	<i>Memory 12 NT4X80 or NT3X93 or NT3x40</i>
19	<i>Memory 13 NT4X80 or NT3X93 or NT3x40</i>
20	<i>Memory 14 NT4X80 or NT3X93 or NT3x40</i>
21	<i>Memory 15 NT4X80 or NT3X93 or NT3x40</i>
22	<i>Filler Faceplate</i>
25	<i>Power Converter +,- 5 v, + - 12 v</i>

Figure 7-9 DMS Core Shelf
(side view for illustration only)



Making changes to the order

Change order requests refer to changes the telco or NTI may make to the software order. Change orders include the following major types:

- Class A: Customer initiated
- Class M: Marketing initiated
- Class V: New Product Introduction initiated or Verification Office change

Telco changes to the software order are in an authorization letter to NTI detailing the change. In general, the customer is allowed to make changes to the software order until the automail is returned 25 working days prior to dump and restore or application date. (Refer to *Automail* in this section for more information.) However, as changes are made closer to the actual loadbuild, chances increase that the delivery schedule may be impacted to accommodate processing the change order.

Minor changes to the Customer Input (CI) document regarding the order may be made after CI but before the delivery of the CI (DCI). (See *Customer Input* in this section for more information). Changes made to the order by the customer after DCI require an authorization letter from the telco. These changes after the DCI date may cost the customer more than the original quote, depending upon the nature of the requested changes and the time at which the request was made. Adding software packages requires re-quoting the software order.

Verification of the Job Features Database (JFDB) is provided by Automail, an automated system of checking software to be delivered to a site which is generated by regional system applications engineer. Automail consists of information about the software upgrade, and the differences between the software packages found in the current site load and in the JFDB.

The Automail Verification is due -25 working days prior to dump and restore or application engineer. The production flag is set on the BCSIS database after all BCS checklist items are complete. Once the production flag is set, no feature package additions or deletions are possible. The production flag causes automated computer processes to run for the Loadbuild group to produce the new undatafilled software load.

Change order requests (authorization letter) from the telephone company are received by the regional NTI sales group, regional engineers and order planning. Once a change to the original software order is received, NTI regional sales authorizes the change. Order Planning, marketing provides authorization to engineering to do a CI update. The engineer updates the CI to accommodate the change. Any additional materials required to accommodate the change are identified by regional systems engineering.

NTI provides a price quote to the customer identifying the cost of the change. Charges for changes in the initial software order are based on the nature of the change and the time the request was received.

Automail

Automail is an automated electronic mailing system used to exchange software order information between the NTI core groups and NTI regions. This information exchange is necessary to coordinate software delivery activities performed in the NTI regions and those performed by NTI core groups.

Automail is used for the following tasks:

- to verify the JFDB contents (maintained by an NTI core group, but is verified by the NTI regional SAE and marketing)
- to provide software load insertion details (e.g., on 03/26/89, COEO H12345_00, CLLI xxxxyyyzzzz is scheduled to receive a BCS insertion to upgrade the office from BCS xx to BCS xy).
- to list package differences (packages in the old software load versus feature packages in the new load, and ACT patches in the old software load replaced by optional software features in the new load)
- to list CLLI (common language location identifiers) discrepancies
- to list deletions/additions to the software order (e.g., feature packages)

Normal or non-emergency automail verifications are available for generation by the SAE - 35 working days prior to insert and are due for return at - 25 working days prior to insert. Emergency automail verifications are available for generation immediately upon update of the BCSIS scheduling DB and JFDB with insert date information. Emergency automails should be returned within a 24 hour timeframe.

Automail is generated by the regional SAE. The SAE reviews the automail and forwards it to the marketing organization in the region. The SAE identifies all the features that will be added on the automail and those required on the automail verification, and ensures that those packages are at an orderable status.

The regional marketing organization verifies that all the feature packages were quoted. Regional marketing is also responsible for identifying to engineering any quoted features that are not on the automail. Once the information in the automail is verified by both NTI regional engineering and marketing, the automail is returned with any comments or changes to the automail administrator in the core.

An automail verification is an electronic mail message concerning the software order prior to its being built by software production. Automail verifications consist of software load insertion details, package differences, optional additions and deletions. Automail is used to find a delta or differences between feature packages that currently exist in the switch (obtained from polling) and the feature packages listed for the software order. The following dates on the BCS checklist relate to automail verifications:

- date when the automail is generated by the regional SAE
- date when automail is verified with marketing in the region
- date when automail is verified/returned with engineering in the region

Automail uses the BCSIS, RTPOLL and JFDB databases to get the office information needed for the verification. After a switching office is scheduled for insertion and polling is done, mail can be generated by the appropriate NTI regional SAE. A re-schedule note is sent when a job is re-scheduled. All mail generated by a region is logged in a file. The reply date will be checked by a monitoring process to ensure that a reply is returned on that date. If a reply is not received by the required date, a BCS Planning Analyst Engineer calls the SAE.

Appendix F contains examples of automail verification and the SMS77 job order list.

Installing gating hardware

Ordering and installation

The SAE is responsible for identifying all required hardware in the CI document. The EAE (Equipment Application Engineer) is responsible for ordering all hardware on specifications and releasing the Specs at M1 through M6 on the approved RFS. BCS gating materials are ordered on the 131, 132, 133 specifications which are released at the M1 date on the RFS.

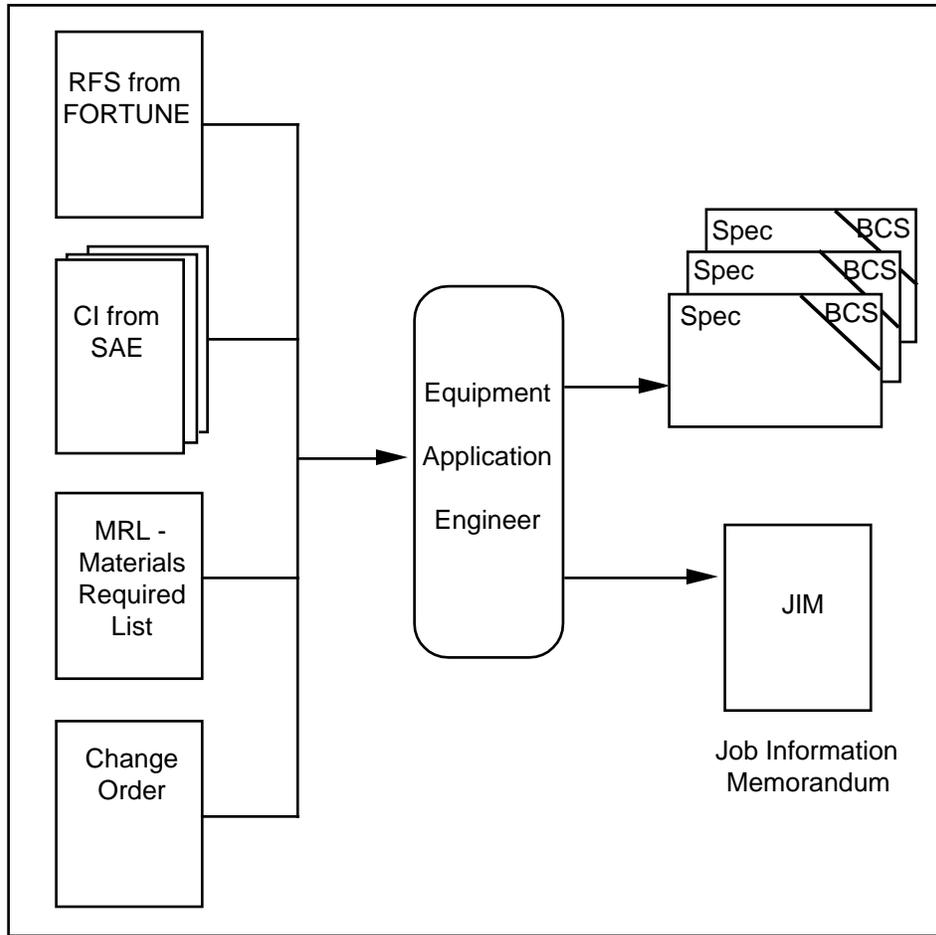
The BCS Planning Analyst coordinates activities involved in ordering and shipping gating material to avoid delays in the software delivery process, and is responsible for the Customer Order Tracking Database (COT). The EAE orders materials on a JIM (Job Information Memorandum) if a CI update has been received requesting additional hardware and the "M" date has passed for that specification.

An approved RFS is required to release material orders, and to ship and install BCS gating hardware according to the D, H, and K dates of the S Suborder. The hardware cartons shipped to the site containing BCS gating hardware are marked with a bright orange BCS label.

When material orders are received and the RFS is approved, jobs are entered into the Customer Order Tracking (COT) database which generates reports to monitor and track the material shipment. Job entry into the COT is used to establish a job and order, to relate an order number to a job number, and to assign specific line items of material from the specifications to a customer.

The regional installation group sends personnel to the customer site and installs the gating materials. The installation group uses the Installation Support System (ISS) database for accurate schedule information. The ISS receives schedule information directly from the Fortune System. The CI, MRLs, specs, ECMs, and Advance Product Introductions (APIs) are used by the installation group to identify BCS gating materials.

Figure 7-10 Gating Material Ordering and Installation



Soak rule

All BCS gating hardware must be installed 12.5 days before the scheduled software upgrade (APP date). These 12.5 days are called the "soak period" during which the hardware is monitored for stability. Any hardware that

becomes defective within the 12.5 day soak period is replaced and must operate a minimum of 72 hours without a fault prior to the software application. If there is insufficient time to allow for a 72 hour period (e.g., the fault occurred 24 hours before the application), the software job is re-scheduled by NTI.

The 12.5 day soak rule decreases the likelihood that the software upgrade will be impacted or unsuccessful due to faulty or unstable hardware in the office.

Pre-production activities

Pre-production activities are tasks performed immediately prior to building or producing the new software load. The following activities are required:

- Confirm the purchase order.
- Verify the job features database (JFDB).
- Complete the BCS checklist
- Set the production flag for loadbuild.

In addition to the activities listed above which relate to producing the load, the following software delivery activities occur during the same time frame:

- Ship preliminary tapes and documents to site.
- Perform patching activities (I - 7 to 2 weeks).

Purchase order

The purchase order must be firm or waived by the sales organization before production of a software order can begin. The purchase order status appears as item 1 on the automated BCS checklist and is extracted from the FORTUNE database. BCS Planning Analyst identifies to NTI Sales all offices that are not firm at "D" minus 3 weeks. The sales organization then notifies BCS Planning Analyst to ship material and proceed with the loadbuild process, or re-schedule the job.

JFDB verification

The JFDB is the database that NTI uses to create the feature package content of the new BCS load on a per office basis. The JFDB verification by the regional SAE occurs at -25 working days before the application date. It confirms the software packages ordered for a job, and that all software interdependencies are met. Final software package changes are allowed at this time. JFDB verification involves the following four sources:

- The CI document (8620) contains all feature packages to be added or deleted to the new BCS load and all feature packages present in the office.

- Office polling identifies all feature packages that are present in the office at the current time.
- Automail contains all changes required, both additions and deletions, in the new BCS load.
- The SMS77 (JFDB) identifies all feature packages to be added/deleted to the new load.

All the above sources are compared to ensure that the feature package content is correct for the upcoming BCS load. Any discrepancies between any of the above sources must be reconciled prior to the beginning of the loadbuild process. The feature content must be correct at the beginning of the loadbuild process for a feature package to be included in the software load.

BCS checklist

The BCS checklist is an automated list of tasks to be performed to ensure that an office is ready to receive a software load. The NT40, SuperNode, and BRISC checklists serve the same purpose but check different items for each DMS front-end type. Specific information must exist in both the BCSIS database and JFDB before a checklist can be created for a job. (See Appendix D for an example of a BCS checklist.)

The regional BCS Co-ordinators are responsible for checking the items on the BCS checklist. The Co-ordinators may consult with BCS Planning Analysts in the core BCS Planning group, as needed.

Production flag

The regional BCS Co-ordinator submits the completed BCS checklist to the core BCS Planning group for final verification. After verification, the Master Scheduler sets a production flag in the BCSIS database which triggers the loadbuild process to begin. If a job does not pass each item on the checklist, it will be re-scheduled.

Shipment of preliminary tapes and documents

The Tape and Documentation department is notified that shipment of peripheral module (PM) loads and software upgrade documentation is required via the XPM Report. The XPM Report is generated by the BCSIS (BCS Information System) scheduling system. The BCS process is driven by the scheduling functions of BCSIS. When the Software Application date is scheduled, a predetermined set of milestones are back-propagated with due dates for the associated activities. The XPM Report is issued daily, listing the scheduled software orders that require preliminary shipments and final shipments for that day. Preliminary shipments are triggered at I (Insertion) minus 35 working days (5 weeks).

Preliminary tapes and documents are shipped from NTI at approximately 35 days before the scheduled insertion date. The following items are included:

- Feature Description Manual
- Software Delivery MOP
- Peripheral Software Release Documents (regular PM [peripheral module] and XPM [extended multi-processor system based peripheral module])
- NPM (new peripheral module) software load tape
- XPM patch tape
- BCS tools tapes
- Blank tapes
- Software Transmittal Listings (hardcopy inventory listing of shipment, quantity of tapes and documents)

Preliminary shipments include tapes for all PM loads (Series I, Series III, ISDN, ISN, and XPM Plus), an XPM patch tape, and 2 new blank scratch media (either 9-track for NT40, or SLM I or SLM II for SuperNode).

Documents in this shipment include a Feature Description Manual, PM Release Document, Traffic and Maintenance Synopsis, and the Application MOP (Method of Procedure) specific to the scheduled application type (for example, ONP, 2NP, or BRISC Retrofit).

The Feature Description Manual provides software feature information pertinent to the new BCS software load. The Software Delivery MOP provides information and procedures to prepare for and perform a software application. (NTP 297-1001-303 is for ONP and Hybrid processes.) The PM Release Document provides information on loading the PMs and XPMs with the new software. The release document also provides information on the new BCS gating hardware.

The "NPM Load Tape" is the new peripheral module software load tape. Both the new PM and XPM software loads are provided with this shipment. The BCS tools tape contains the software programs needed to perform the pre-checks and the software application. This tape should be available for the pre-application procedures conducted at 10 days and final office review at 2 days prior to the scheduled software delivery date.

The BCS Tape and Documentation group makes the preliminary and final shipment of tapes and documents to the site. Preliminary shipments typically are sent via second day air. In short interval jobs or emergencies, special shipping arrangements can be made (that is, special arrangements such as counter-to-counter airline shipments can be made).

DMSE process

All DMS, PM, and Customer Non-Res software will be shipped on SLMII tape.

The process for compiling the Preliminary and Final shipments will remain the same, but the *tools* that cue the activities will change. BCSIS will be replaced by the ASD scheduler. SOLID will provide the details for airbill and label creation. Tapes and documents will be created by the SDC (Satellite Distribution Center).

Preliminary tape and documentation shipments include:

- 1 SLMII tape containing all Series I & II peripheral loads supported by the ordered PCL
- 1 SLMII tape containing all Series III and various peripheral loads supported by the ordered PCL
- 1 XPM Patch tape
- 2 New blank scratch SLMII tapes
- 1 Feature Description Manual
- 1 Traffic and Maintenance Synopsis
- 1 Application MOP (Method of Procedure) specific to the scheduled application type

Patching activities (I - 7 to 2 weeks)

Patches are software rewrites to existing software loads. Patches change only a small portion of a software package or piece of data in the switch as opposed to a software upgrade which changes all the system software. Two types of patches exist: CC patches are written for software in the central control; XPM patches are written for the software in the XPMs.

Patch administration can be performed by NTI or by the telephone company using Customer Supported Patch Process System through Customer Services Computerized Access Network (C-SCAN). C-SCAN is a computerized network for use by the telephone company for administration of patching. If the software application will be performed by the telephone company, the office must be a C-SCAN site. Patching activities surrounding a software upgrade are the same, whether patching for an office site is NTI-administered or telephone company administered via C-SCAN.

An XPM Patch tape is included in the preliminary tape and documentation shipment. Loading the new PM and XPM software loads and patching the new XPM software loads should be completed by the telco before the pre-application procedure (approximately 10 days before the software application). Any additional XPM patches that are issued prior to the

software upgrade but are not included on the patch tape will be downloaded into the DMS switch at various intervals before the upgrade.

Patches are not written against PM loads (i.e., older peripheral modules such as MTM [maintenance trunk module] and TM8 [trunk module - 8 wire]). For this reason, no PM patch tape is included in the preliminary tape and documentation shipment.

Normally, a DMS office site is scheduled for patch downloading every 28 or 14 days, depending on the BCS level in the office. If the office is scheduled to receive a new software load, it is taken off the patch downloader queue 21 days before the software upgrade.

At 15 days prior to the scheduled software application, a patch propagation report is generated of all patches currently in the office that must be carried over to the new software load. Normally patches are temporary measures that are used until a more permanent fix is made in a higher BCS load; however, some issues require that the patches be carried over to a higher BCS. The patch propagation report identifies the patches carried over to the new software load based on the ordered software packages.

In parallel with patching activities and loading the PMs with new software by the telephone company, NTI builds the new software load and datafills it with office site data. The NTI loadbuild function produces a new undatafilled image consisting of all the ordered software packages. This new load is patched by the Loadbuild group at approximately 28 to 21 days before the software application.

For conventional and hybrid software deliveries, the NTI Dump and Restore group datafills the new software load from Loadbuild with data that was dumped from the telephone company image tape. In most instances, the RTP dump and restore method is used. The NTI D/R group also patches the new software load for any patches that could have been issued since the Loadbuild group patched the load. The RTP D/R occurs at approximately 1 week prior to the scheduled application.

Producing the software load (US sites)

This section describes the software production phase (loadbuild) of the NTI software delivery process (US-supported DMS sites only). It includes the generation of the new load based on ordered software packages.

DMSE process

With DMS Evolution software loads will not be custom-built. PCLs will be offered based on product and market. For example, initially available in the US LEC market are PCLs for US 100/200 offices, TOPS , 100/200/TOPS combos, and STP. PCLs offer the advantages of eliminating packaging issues. The software is tested as a product. Some release upgrades are eliminated due to full software content. See additional information at the end of this section.

Loadbuild functions

Loadbuild is a series of procedures that merge base level software with optionally ordered features into a customized undatafilled software load. Base level software includes general software packages common to all offices.

Note: Merging the specific customer data with the customized undatafilled image produced at loadbuild occurs during dump and restore (conventional and hybrid) or one night process (ONP).

The BCS loadbuild process has many steps that require activities on several different platforms. Because of the complexity of the process, it will be described here in general terms.

When a BCS Software Release is released for production (RTM), BNR transfers the library of modules that makeup that release to NT. From this library, NT assembles custom software loads for each scheduled software application. The custom content for each load to be built is stored in the JFDB (Job Feature Database).

When JFDB is locked (usually at I-20 days), this triggers creation of the office parameter template for the subject office. This is made available to the Regional SSE (Software Systems Engineer). Local practices for completing

the parameter template apply. (As an example, the Regional Engineer may fax a copy of the Parameter template to the appropriate department within a telco.) The specifics of the Parmmail process are described below.

When the parameters are returned from the Region, the production flag is set. The loadbuild process is initiated when the production flag is set in BCSIS. At I-12 the actual building of the customer software UDF (undafilled image) begins. Most of the assembly process resides on the HP workstation. The HP workstations are equipped with HPSOS that allows the workstation to run DMS SuperNode software.

The software configuration is generated and patches are calculated for that configuration. Other inputs such as EXT files (default datafill based on feature content) are generated. These inputs are compiled into an un-IPL-ed image on the workstation. The image is IPL-ed, and patches are applied. When the Parmmail is returned, it is formatted into a dmopro-able file and dmopro-ed into the office parameter tables in the patched CM image. The CM image is placed into the workstation tape queue where a tape is created by spooling the image to a SLM tape along with the appropriate MS load. The MS load is determined by the package content of the load during the engineering cycle. Three copies of the resulting image are produced on a SLM cloner. The type of SLM (I or II) tape used is specified in BCSIS. The image tapes are booted on a lab switch. The Patcher Inform List and Office Parameter Table contents are dumped from the image. The Inform List is sent to the PATADM (Patch Administration system) and the parameter listing is sent to the mainframe to produce the Parm Variance Report. Two of the verified images are given to Tape and Documentation to be included in the Final tape shipment. The other image is given to Dump and Restore to complete the test ONP.

Job Folder

The NTI job folder is created and maintained during loadbuild, and follows the software order as the load is produced and delivered. Verifications and other job data added by other groups are compared. The software production engineer verifies the package by comparing the SMS database with the inform list. Any added or deleted packages should coincide with packages listed on the automail verification. Any inconsistencies should be resolved before the job progresses by contacting the BCS Planing group//Regional SAE.

Loadbuild on the IBM™ 370 computer

The software loadbuild function on the IBM 370 consists of the following:

- generation of an office feature package list (AUTOBUILD)
- the execution of GENSC, GENPARM and WSIMAGE
- determination of software base type for office
- generation of software configuration files
- generation of D190 Reports
- generation of the software configuration files
- sending files to the patch administration group for processing
- generation of office parameter files to be applied (GENPARM)

Based on job information in the JFDB, the computer generates a list of all NTX codes for the software order. It then creates a file containing a list of the software modules corresponding to the feature packages ordered by the telco.

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Figure 8-1 Software Feature Package Verification

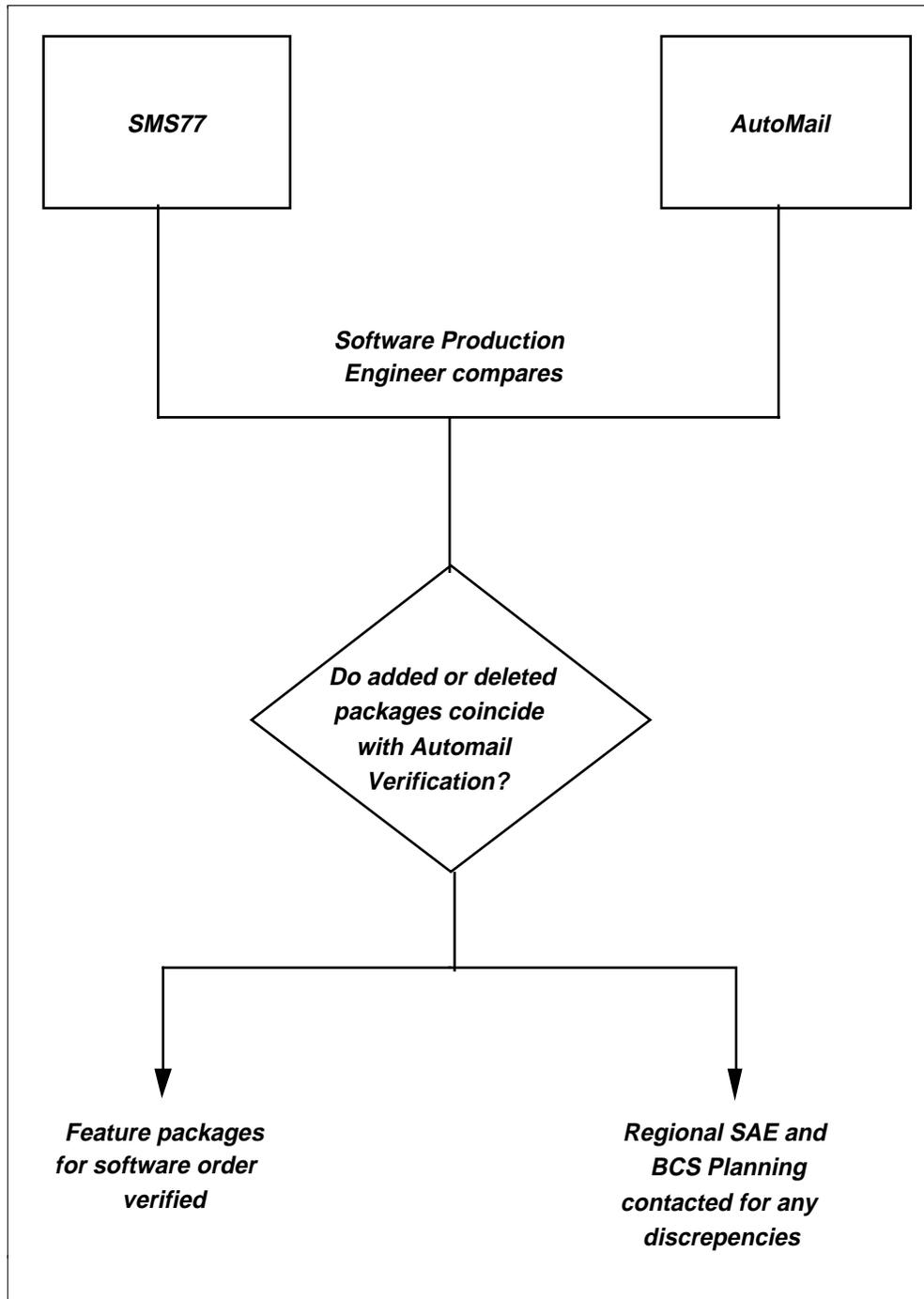
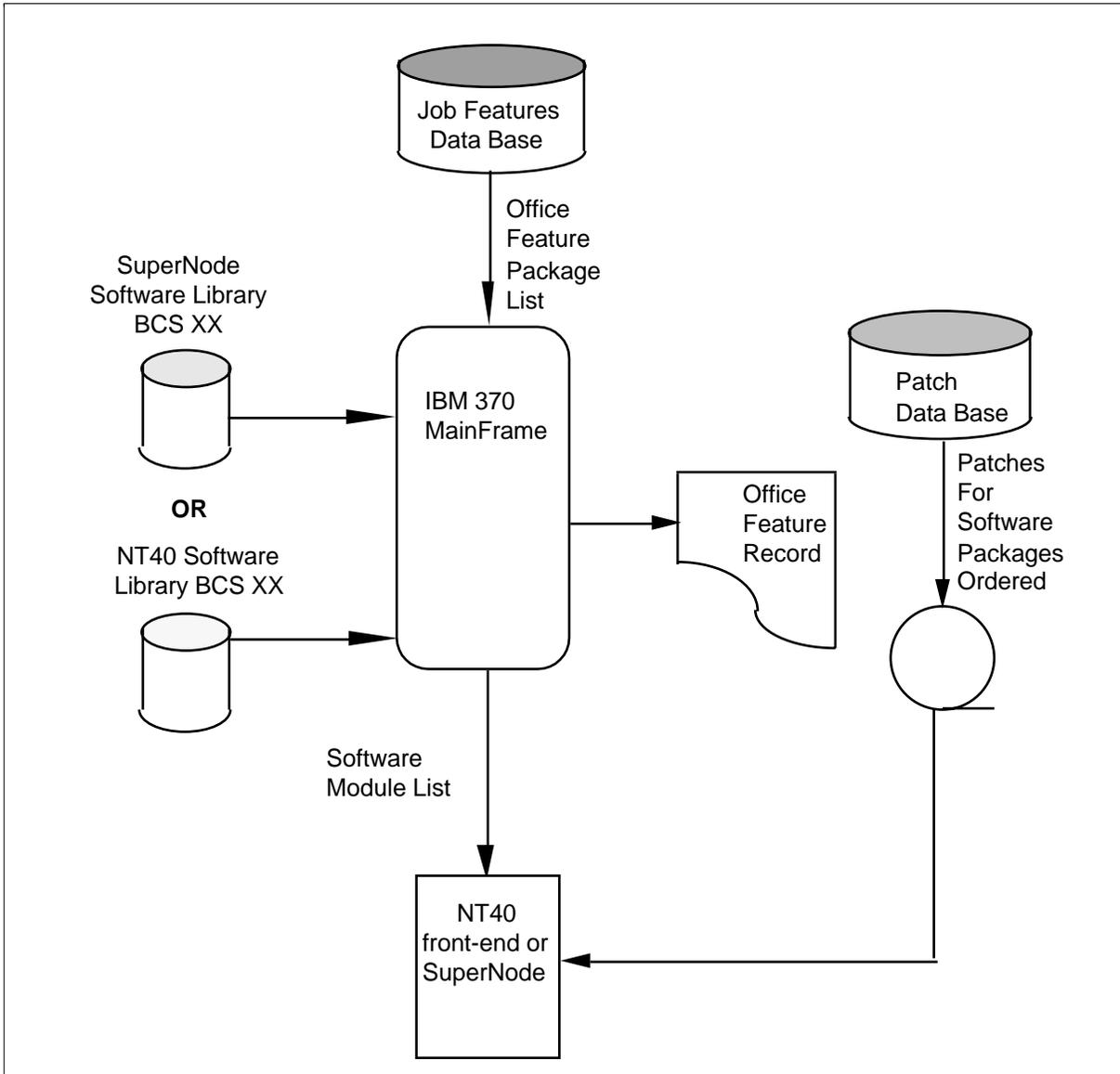


Figure 8-2 Loadbuild Function on IBM Main Frame



Software configuration files generated on the IBM 370 (by GENSC) are used for the loadbuild process on the NT40 or SuperNode. These files include a software module list, feature package list, and feature packages. D190 reports are generated to illustrate the ordered feature packages as specified in the JFDB, the delivered features according to the features tracking database (FTDB), and other information relating to software delivery. The D190 document (office record drawing) is released to the telephone company with the software load. Some sections included in the D190 document are used internally by NTI and are not distributed to the customer.

The next step in the loadbuild process consists of loading the Un-IPL-ed base into the Software Operations Lab DMS switch (SN/NT40 front end). The ordered software modules are then IPL-ed and site specific Office Parameters are datafilled. The patch tape that was produced earlier during loadbuild process is loaded, and the undatafilled software load is patched. The result is an patched current undatafilled image tape that has the correct base software and the ordered software packages.

Initial loadbuild

The Initial Office loadbuild process follows basically the same process as the BCS Upgrade build process. The key exception is the application of Office Parameters at loadbuild. Subsequent to the completion of the loadbuild process, all of the site specific data (hardware, trunk and routing translations) in addition to the site specific Office Parameters are datafilled. The load is then subjected to a BellCore quality audit prior to shipment to the job site.

Patching

Patches are software rewrites to existing software packages currently in-service. The appropriate CC (central control) patches are extracted from the patch database (Figure 8-2) based on the software packages ordered. A tape of those patches is produced and loaded on the captive switch for patching the undatafilled software load. During the automated loadbuild procedure, a copy of the inform list (list of software packages and patches) is sent to the Patch Administration group. Any patches that could not be applied are recorded on a Patch Exception Report and sent to Patch Administration for resolution prior to the software application.

Software parameters

Software parameters (parms) are identified in four software tables that the system software uses in normal switch operation. Parameter values may differ from one customer to the next. (For more information on Office Parameters, refer to the *Office Parameters Reference Manual*, NTP 297-1001-455.) The telco submits the required parameters to NTI for input into the software. The major parameter tables are identified below:

- Table OFCENG (office engineering): This table lists the office-engineered parameters whose values are defined by the operating company and will not require change before the end of the engineering interval. Examples of OFCENG parameters include the number of recording units in the office, call routing options, and the time diagnostics start running. These parameters are engineered per office, and may require formulas or a procedure to determine a value. The values in this table may be changed by the telephone company by use of the "Non-Resident Procedures."
- Table OFCSTD (office standards): This table lists switch parameters having a standard range of values with a specified default value. An

example is the length of delay between trunk seizure and the outpulsing of digits for outgoing and two-way immediate start trunks. The range of values could be a minimum of 80 ms to a maximum of 2.55 seconds with a default value of 15 milliseconds. These parameters can be changed by the telco at the time of an initial order or extension. The values are write-protected and require NTI intervention for change. For parameter changes at other times, the customer must submit request forms to NTI.

- Table OFCOPT (office options): This table defines optional parameters in the office, e.g., whether a trunk test position has the circuit locate feature. Options usually refer to whether an equipment unit, feature, or operation has access to the optional enhancement or capability. The values of these options are determined by NTI at the time of the initial order or extension. These values are write-protected and require NTI intervention for change.
- Table OFCVAR (office variables): This table defines global office variables in an office, for example, the time interval between bursts of call waiting tone. The values of the parameters are submitted to NTI by the operating company on the appropriate forms at the time of the initial order or extension. At all other times, the telco can change values in the OFCVAR table by using the DMS table editor.

Thirty-five days prior to the software delivery, BCS Polling polls the telco switch to determine the current software parameters. These parameters are sent to the region via PARMmail, an electronic communication with the regional software system engineer (SSE). The SSE indicates any required changes to the parameters based on customer requests and data captured in the CI document.

For BCSs 26 and higher, BCS Polling will poll the telco switch as before, but changes after the 35-day check are not recommended. At I - 12 days BCS Polling will poll the switch again. When office parameter tables are delta'ed the night of application, the parameters will be set in the following priority: parameters will be set to the value entered in requested value on parmmail; otherwise, if there is no requested value, then the parameter will be set to the current switch value.

The PARMMail consists of the following information:

- Section A - Parameters existing in loadbuild and polling as of <date>
- Section B - New parameters
- Section C - Deleted parameters
- Section D - Comments
- Note to contact Software Quality Engineering if question exists regarding Bell Core Standard values used as system defaults.

8-8 Producing the software load (US sites)

- Telco translation contact (name and telephone number)
- Signature, date, and telephone number for NTI regional SSE

For BCSs 26 and lower, requests for parm changes received by NTI after the due date are processed on an emergency basis only. The request for change must come through the regional SSE manager by phone with a follow-up COCOS to a Dump and Restore manager (conventional and hybrid) or to a BCS Applications manager (ONP). The appropriate manager determines if the change can be made without risk of service degradation. If the request is denied, the software delivery job is rescheduled to accommodate the parameter change later.

The following timeline details the current PARMMail processes.

TABLE - PARMMail process timeline	
	Work Days
Package list created (JFDB)	DCI
Pre-application polling	- 35
AUTOMAIL recieved	- 23
AUTOMAILS processed JFDB locked	- 21
PARMMail available to region	- 20
PARMMail due	- 13
Production flag set Parm tables polled Loadbuild starts	- 12
Loadbuild complete	- 6
Variance report created	- 5
Variance report in C-SCAN	- 4
DR/ONP	0

DMSE process**Software production**

The Software Production Process has changed completely for DMS Evolution. There is no longer the concept of NT "loadbuild" after BCS36. BNR will retain the software library rather than transferring it to NT after the final compile. BNR will assemble and maintain in the Software Vault the PCLs (Product CM Loads), PM loads, PM Release Documents, MS loads, and Inform Lists for each defined PCL. (As a group, these are referred to as Product Files.) BNR will patch the PCL and MS loads regularly, and replace the associated Inform List.

NT Software Production will be characterized by a Software Distribution Center (SDC). The SDC is workstation based. When prompted by the schedule received from SOLID, the SDC verifies that the locally stored Product Files required to fulfill the order (for Preliminary or Final shipments) are current. If not, the SDC retrieves the current Product Files from the BNR Software Vault. It then clones the required tapes, and spools the required documentation to be printed. A Patcher/PRSM Inform Listing is provided with the PCL and MS images to identify the patches applied to the loads. The Inform is transferred to PATADM (later WISURD) to be processed for that unique order.

SOLID populates the ASD scheduler with the milestones required to drive the Software Delivery department to perform scheduled functions and expect output from the SDC.

Because software loads are no longer custom-built, the processes that "customize" the load, such as setting the log message, the site-identifying patches in the inform, and application of parameter values, must be done later in the delivery process. These procedures have been transferred from the loadbuild process to the ONP application. These are explained in the next section.

One night process (ONP) software delivery

Introduction

This section describes the One Night Process (ONP) software delivery method for upgrades of offices to BCS 29 and higher. The ONP method allows for the dump, restore and application processes to be performed during a single night for most offices, instead of the previous 7 to 10 days. This is possible in part because new software tools for the ONP method have been written using the faster PROcedure Oriented Type Enforcing Language (PROTEL).

Note: The Hybrid software delivery method for larger office upgrades to BCS 29 and higher is detailed in other sections of this manual. Criteria for determining candidate offices for ONP or Hybrid software delivery methods are established and maintained by NTI.

Several advantages are realized by performing the dump and restore and application processes as a single operation:

- ONP requires no frozen image capture for the dump and restore process.
- ONP requires no Data Modification (DMO) restrictions since a frozen image period is not needed.
- ONP requires no journal file maintenance by telco personnel.

The quoting, provisioning, and production of the software order are the same, regardless of the software delivery method used.

Terminology

The terms "application," "insertion," "upgrade," and "delivery" are often used synonymously to refer to the activation of the new software load in the switch. FORTUNE 4.0, the order scheduling program, uses the abbreviation "APP" to identify the date of the application (activation of the new load).

Although this document uses all the above terms, slight variations in meaning have arisen. Because the ONP method includes the dump and

restore and application processes in one night, references to the activation of the new load using ONP are usually the more generic "upgrade" or "delivery." The term "application" is usually associated with the programs providing the Hybrid (BCSUPDATE) and Conventional (manual) methods of activation, excluding the dump and restore process. The term "insertion" usually refers to the actual time of activation, not the programs or processes that control it.

Final preparation

Final preparation covers the activities and processes that occur from the completion of loadbuild to the night of the ONP software delivery. These processes are described in the order they occur. The following major events occur during the final preparation:

- At 15 days prior to the software delivery,
 - XPM audit is conducted and any XPM patches needed for the office are downloaded into the switch.
- At 14 days prior to the software delivery,
 - required patch propagations are identified.
- At 12 days prior to the software delivery,
 - loadbuild completed.
- At 10 days prior to the software delivery,
 - BCS pre-application engineer contacts site to perform the preliminary pre-application checks; scan listing due to region from Loadbuild.
- At 8 days prior to the software delivery,
 - test image due from site.
- At 7 days prior to the software delivery,
 - ONP Test MOVEBCS run in lab; undatafilled image shipped to site.
- At 5 days prior to the software delivery,
 - Act. patches identified by region.
- At 3 to 1 day(s) prior to the software delivery,
 - the final tape and documentation shipment arrives at the office site.
- At 2 days prior to the software delivery,
 - PARMmail is due from the region.
- At 2 days prior to the software delivery,
 - BCS pre-application engineer calls site to perform final pre-application checks.
- At 1 day prior to the software delivery,

- any additional patches needed are downloaded into the switch
- On the day of the software delivery,
 - final patch audit (APF) is performed.
- At 7 days after the software application,
 - issues are reviewed in the Software Devlivery Excellence! follow-up meeting.

XPM audits and patches

At I - 15 days, an XPM audit is conducted to determine the readiness of the office to receive the new BCS software load relative to the XPMs loads and XPM patches. NTI Patch Administration dials into the customer switch and accesses information needed to conduct the audit. Any required XPM patches are downloaded into the switch at this time.

Dump and Restore test ONP

At I-10 days the customer is requested to ship an office image to the BCS Dump and Restore department. The dump and restore engineer uses the customer office image and the newly built UDF image received from Loadbuild to perform an test ONP. The test ONP is run on an HP workstation. The test ONP simulates the upcoming application, from drop-sync to the end of the table transfer (MOVEBCS or TABXFR). The Custom Calling Table transfer procedures in PRESWACT are also run. Any required Software Delivery Bulletins are performed. The testing objective is to find any issues with table data transfer. Datafill issues can be time consuming to resolve during the actual application. Any issues found are resolved, and any workarounds or information uncovered that will make the application go smoother are formatted into a report and sent to the Applicator Package for that application.

Pre-application checks

Pre-application integrity checks are scheduled at I-10 and I-2 days. This function is completed by NT with assistance from the customer central office engineer. Typical checks include switch stability, PM loading complete, translation table integrity checking (TABAUDIT) is up to date, and required patches are present. Because RTP performs test ONPs to verify data transfer, TABAUDIT is optional, but recommended, for RTP supported offices.

During the pre-application process, the engineer attempts to correct any problems that are found, and establishes a date and time for the final office review. Unresolved problems are handed to the NTI region for resolution.

DMSE process

The pre-application process is not BCS (PCL) dependent, therefore DMSE will not require any changes to the current Pre-Application process. An

automated tool to perform the pre-application checks is planned for the near future and is a tool that will be run by the customer on the customer's switch.

Final office review

At typically 2 days prior to the software delivery, the final office review is conducted by the pre-application engineer to determine if the office is ready to proceed with a BCS software upgrade. All issues and problems identified at the pre-application process (10 days prior to the schedule software application date) must be resolved at the final office review. Examples of the activities in the final office review include:

- Dump BCS monitoring data (BCSMON)
- Verify front-end stability.
- Confirm the start time for the ONP.
- Ensure all problems are corrected and issues resolved.

After the final office review, the pre-application engineer completes a pre-application report, supplying information necessary for the ONP delivery. The pre-application report is forwarded to the assigned engineer.

Final tape and documentation shipment

The telco receives the final tape and documentation shipment two to three days before the scheduled software delivery. The shipment includes the following:

- TAS Non-Res tapes
- super Non-Res tapes
- commissioning tapes
- new undatafilled BCS load tapes (2)
- patch tape
- Inform list
- D190 Document (office feature record, or similar document)
- customer survey

Final Shipments are sent as soon as all of the components are available, usually between I-5 and I-3 days. The Final shipment includes one of all tapes (except two CM/MS image tapes). These tapes are a Commissioning Non-Res, Super Non-Res, Tas Non-Res, and two CM/MS images. Documents in this shipment include two final D190 documents and one Patcher Inform Listing. All final shipments are sent via overnight carrier.

Patching activities

DMSE process

All DMS, PM, and Customer Non-Res software will be shipped on SLMII tape. TAS Non-Res software will continue, for the time being, to be shipped on 9-track because SLMII does not currently offer password protection against unauthorized use.

The process for compiling the Preliminary and Final shipments will remain the same, but the *tools* that cue the activities will change. BCSIS will be replaced by the ASD scheduler. SOLID will provide the details for airbill and label creation. Tapes and documents will be created by the SDC (Satellite Distribution Center).

Final tape and documentation shipments include:

- 1 Customer Non-Res Tools on SLMII tape (includes all Commissioning and Super Non-Res tools)
- 1 TAS Non-Res Tools on 9-track tape
- 2 PCL/MS image tapes
- 1 Feature Description Manual
- 1 PCL Content Document
- 1 Patcher/PRSM Inform Listing

One day prior to the software application, a final XPM audit is conducted to verify that the XPMs are loaded with the correct loads and have been patched. Any additional XPM patches needed are downloaded at this time. The NTI Patch Administration downloader logs into the NTI Patch Downloader System and generates a list of patches to be downloaded to the office site. The downloader then notifies telco personnel that CC (central control) patches need to be downloaded into store file.

The downloader identifies the XPM patches on the tape. If an XPM patch is both on the XPM patch tape and in the list of patches to be downloaded, the downloader removes the XPM patch from the list to eliminate duplication.

On the scheduled application day, the APF report (list of the downloaded patches) is generated by the patch administration group, and a copy is provided for the NTI applicator who will be performing the software upgrade. The APF is checked for patches that have status of EMG (emergency), OBS (obsolete), OBE (obsolete emergency), or OBR (obsolete replacement). The OBE and OBS patches are removed from the inactive side of the DMS switch before the SWACT (SWitch of ACTivity form old to new software load). OBR patches are checked to ensure that their replacements are applied to the new load. EMG patches are checked to verify that they are applied.

After the software application, the downloader notifies the telco personnel that an inform list is needed from the switch to identify all patches, patch type, patch status, and feature packages in the software load. The inform list verifies feature package content and patches applied, and it updates office site information in the NTI patch database.

Software parameters

Software parameters (parms) are identified in four software tables that the system software uses in normal switch operation. Thirty-five days prior to the software delivery, BCS Polling polls the telco switch to determine the current software parameters. These parameters are then sent to the region via PARMmail, an electronic means of communication with the regional software system engineer (SSE). The regional SSE indicates any required changes to the parameters based on customer requests and data captured in the CI document.

Requests for parameter changes that are received by NTI after the due date are processed on an emergency basis only. The request for change must come through the regional Software Systems Engineering manager by telephone with a follow-up COCOS to a BCS Applications manager. The manager reviews the request to determine if the change can be made safely, without risk of service degradation. If the request is denied, the software delivery job will be rescheduled to accommodate the parameter change at a later time.

Delivering the software load

On the night of the scheduled ONP, procedures identified in NTP 297-1001-303, *ONP/Hybrid Software Delivery Procedures*, are followed. This document lists the role and responsibilities of the telephone company and Northern Telecom for the one night process software delivery.

The NTI Software Delivery Bulletin System on C-SCAN provides information to NTI and telcos concerning changes, alerts, and additional information related to software delivery that may not yet be released in an NTP or other documentation. The bulletin system must be accessed to review any bulletins that impact the pre-application procedure or the software application.

The ONP software delivery can be divided into two major phases:

- data transfer (MOVEBCS or TABXFR)
- BCSUPDATE

During the data transfer phase, office data from the old BCS load is used to datafill the new undatafilled BCS load. Using the ONP method, the procedure is performed the night of the delivery; with the Hybrid method,

this is performed using dump and restore processes at approximately 7 to 10 days prior to the software application. MOVEBCS is used for upgrades to BCS35 and TABXFR is used for upgrades from BCS35 and higher.

The BCSUPDATE phase controls the activation of the datafilled software load in the DMS switch.

Note: The Hybrid software delivery process includes BCSUPDATE, run with the dump and restore process instead of the ONP MOVEBCS program. When the Hybrid method is used, a frozen image period and journal file procedures must be followed if service order activity occurs between running both programs. See the Hybrid Software Delivery section of this manual for detailed information.

On the night of the software upgrade the following major activities are performed on the DMS office:

- drop sync procedure
- loadmate procedure
- preparation
- data transfer
- BCSUPDATE PRESWACT procedure
- RESTARTSWACT or NORESTARTSWACT
- BCSUPDATE POSTSWACT procedure
- Telco monitor the switch and test calls completed
- sync the DMS on the new BCS / take new images

Drop sync procedure

The drop sync procedure consists of jamming the inactive central control (CC) and un-syncing the DMS front-end. This is necessary because the inactive DMS front-end will be loaded with the new undatafilled BCS load while the active side continues to process calls using the old load.

The new undatafilled tape is shipped to the DMS office site in final tape and documentation shipment. During the software delivery procedure, all data modifications must cease.

Loadmate procedure

The loadmate procedure consists of loading the new undatafilled BCS image from magnetic tape into the DMS front-end mate (inactive) side. If the office is a SuperNode with a system load module (SLM) drive, the new undatafilled BCS image arrives at the office on an SLM tape cartridge.

Preparation for the data transfer

The following preparatory activities are performed before the data transfer increment (TABXFR or MOVEBCS):

- Log into the inactive DMS side.
- Return to service (RTS) the mate control register (MCR).
- Set logutil NT40 CC logs and SuperNode CM logs.
- Activate any needed patches.
- Order table DART (dump and restore table) sequentially. (DART contains a sequential list of tables that will be datafilled during MOVEBCS.)

MOVEBCS

The MOVEBCS program datafills the new undatafilled image on the mate side with the office data on the old load. (The Conventional software delivery method refers to this as dump and restore.) A report produced by MOVEBCS is equivalent to the data exception report (DER) in the Conventional software delivery method. The main sections in the report are shown below:

- Northern Telecom Software Feature Package (NTX) Delta: Differences between feature packages in the old and new BCS loads.
- Table Exception Report: List of table(s) having tuples that were not restored on the new BCS.

All unrestored tuples on the MOVEBCS report are corrected or rationalized during the ONP software delivery.

TABXFR

The TABXFR increment is used to perform the data move portion of a BCS application. TABXFR replaces the MOVEBCS increment in BCS 35. It uses a newer data transfer mechanism and combines the commands that are currently in MOVEBCS and MOVEBCSR CIs.

BCSUPDATE PRESWACT process

The BCSUPDATE PRESWACT procedure consists of steps in preparation to the switch of activity to the new load. These steps include the following:

- Rotate device independent recording package (DIRP) subsystems such as automatic message accounting (AMA) and station message detail recording (SMDR).
- Verify distributed processing peripheral (DPP) firmware, if used.
- Notify remote billing collection center to poll for billing information.

RESTARTSWACT or NORESTARTSWACT

This process consists of activating the new BCS load so that all DMS activities are controlled by the new software load. Prior to this operation, essential services and high profile are checked. The RESTARTSWACT or NORESTARTSWACT operation consists of switching activity (SWACT) to the new load. The switch remains out-of-sync.

BCSUPDATE POSTSWACT procedure

The BCSUPDATE program runs the POSTSWACT steps and flags them as they pass. If a step fails, the BCSUPDATE program provides instructions on how to continue. Once the failure is corrected, POSTSWACT is re-entered and BCSUPDATE continues.

The BCSUPDATE program stops when site testing, critical call testing, and new software load acceptance are conducted by the telco personnel. If they determine that the software load cannot be accepted, they follow the appropriate procedures to return to the old load. The capability to go back to the old software load exists until the switch is synced on the new software load. After telco accepts the new software load, the BCSUPDATE program is started again and the POSTSWACT steps are completed.

Sync the switch

After the BCSUPDATE process, the DMS switch is synced on the new BCS load. The engineer then takes a new system image for backups.

Monitor

Monitor refers to the phase of the software delivery during which Telco observes logs and switch performance. This phase begins when the software insertion is complete. If technical assistance is needed, site may call Northern Telecom TSC (Technical Service Center).

Customer service reports

Customer service reports (CSRs) are reports regarding problems detected in the DMS switch. The telephone company should retest CSRs opened on the previous software load. If the problem documented by the CSR still exists in the new software load, the CSR should be re-opened on the new load within two weeks of the software application date. If the problem no longer exists on the new software load, the CSR may be closed.

Software applications with *DMSE*

The ONP application process is virtually the same with DMSE as it was for BCS. The same tools (TABXFR, PRESWACT, NORESTARTSWACT, and POSTSWACT) are used. Two procedures have been added to the ONP due to the changes in the Software Production process. These two procedures are required for: 1) installing site-identifying patches in the administration

section of the Patcher/PRSM Inform List, and 2) the process for installing office parameter values.

The site-identifying patches are installed in the administration section of the Patcher/PRSM Inform List to identify the Inform List to PATADM (and later to WISURD). These patches are commonly referred to as "dummy patches" since they contain no data, merely a blank line. Their purpose is to install the name in the listing. The three patches are: the site CLLI, the PATADM SITE_KEY (for identification of that unique load to PATADM), and the SOLID_LOAD_ID. The SOLID_LOAD_ID is unique to that office upgrade. WISURD will use the SOLID_LOAD_ID for identification. The SITEINFO file will be created by PATADM when it receives the BBIF created at the time the Office Parameter Template is generated. After receiving the BBIF, PATADM assigns a SITE_KEY for that load. A simple exec is created that creates, installs, and erases all three patches.

The sequence of the ONP for DMSE is as follows:

(1) Drop synchronization in the switch.

(2) Loadmate the PCL image into the inactive CM. It is assumed that the correct MS load was loaded ahead-of-time according to the MOP. After the undatafilled PCL is installed on the inactive CM, the Applicator logs in on the inactive side and sets the date and time. The Header message identifying the software load is customized to include the COEO, the Office Name, and application date. The file SITEINFO is downloaded and read on the inactive load. When SITEINFO is read the Site CLLI, PATADM SITE_KEY, and SOLID_LOAD_ID are patched into Patcher or PRSM (whichever is the applicable patch management utility).

(3) The switch translations are transferred to the undatafilled PCL on the inactive CM via the TABXFR tool. Tuple reformat is achieved on the new (inactive) side through table control. Prior to transfer of table data, SOC state information and status will be transferred to the new side. All previously ON options will be set ON. Options that are IDLE will remain IDLE. Office parameters will be set during the TABXFR process.

At RTP Office Parameters are currently applied to the undatafilled image during loadbuild. In DMSE PCLs will be cloned and shipped to site without being customized. This requires that RTP change its process for setting office parameters. The DMSE process will directly deposit a file in DMO format containing only changed, reformatted, or new office parameter values for the switch to be upgraded into a file known as the Applicator Package. The Applicator Package is part of the Applicator UNIX Workstation Tools. It contains files specific to a particular site upgrade. The parameter file will be downloaded to SFDEV on the target switch the night of the ONP and named FEATDATA. The Applicator will transfer the values present in the

current load to the new DMSE load. The TABXFR process will then read the FEATDATA file in SFDEV to apply the changes, thus setting the office parameters to the approved values.

The Applicator will perform a delta between the old and new loads to verify parameters.

(4) After the inactive side is datafilled (via TABXFR) PRESWACT is run. PRESWACT is an increment of the BCSUPDATE utility. PRESWACT automates the collection of hardware states on the active, the setting of hardware states on the inactive, and the transfer of dynamic table data; then prepares for a switch of activity (swact) to the inactive new software load.

(5) SWACT is the increment of BCSUPDATE that verifies PRESWACT has been successfully completed. It then switches activity (swact) using NORESTARTSWACT (introduced in BCS36). NORESTARTSWACT will be the standard for all DMS 100, 200 and TOPS offices swacting from BCS36. NORESTARTSWACT provides vast improvements on the scheduled outage experienced over SW upgrades in the past. Office recovery is reduced to seconds rather than minutes.

(6) POSTSWACT is a clean-up phase of BCSUPDATE where conditions that were changed during the ONP specifically for purpose of the ONP are set back to their original status. It is during this phase that the craftsperson is performing test calls to validate the new software load.

(7) If the test calls are successfully completed and no service degradation is ensuing, the customer agrees to accept the new software load and the switch will be put back into synchronous operation.

Hybrid software delivery

Introduction

This section describes the Hybrid software delivery method for upgrades of larger offices to BCS 29 and higher. The Hybrid method includes merging the office-specific data into the new undatafilled software load (conventional dump and restore), and installing the new datafilled software into the in-service DMS switch (BCSUPDATE).

Note: Criteria for determining candidate offices for One-Night Process or Hybrid software delivery methods are established and maintained by NTI.

The Hybrid software delivery method is most like the Conventional method in the timeline of activities. A frozen data interval with journal files is required to allow NTI to perform the dump and restore process and ship tapes to the telco. The primary difference between the Hybrid and Conventional methods is the software tools used for the application. The Conventional method uses SWAP (Canada), manual or AutoApply (US) programs. The Hybrid method uses BCSUPDATE, the application portion of the ONP software delivery method.

The quoting, provisioning, and production of the software order are the same, regardless of the software delivery method used.

Terminology

The terms "application," "insertion," "upgrade," and "delivery" are often used synonymously to refer to the activation of the new software load in the switch. FORTUNE 4.0, the order scheduling program, uses the abbreviation "APP" to identify the date of the application (activation of the new load).

Although this document uses all the above terms, slight variations in meaning have arisen. Because the ONP method includes the dump and restore and application processes in one night, references to the activation of the new load using ONP are usually the more generic "upgrade" or "delivery." The term "application" is usually associated with the programs providing the Hybrid (BCSUPDATE) and Conventional (manual) methods

of activation, excluding the dump and restore process. The term "insertion" usually refers to the actual time of activation, not the programs or processes that control it.

Final preparation

Final preparation covers the activities and processes that occur from the completion of loadbuild to the night of a Hybrid software application. These processes are described in the order they occur prior to the software application. The following major events occur during the final preparation:

- At 15 days prior to the software application,
 - XPM audit is conducted and any XPM patches needed for the office are downloaded into the switch.
- At 14 days prior to the software application,
 - required patch propagations are identified.
- At 10 days prior to the software application,
 - Pre-application engineer calls site to perform preliminary pre-application checks.
- At 10 to 8 days prior to the software application,
 - telco takes system image, prepares journal files, and sends image to NTI.
- At 9 days prior to the software application,
 - PARMmail is due from the region.
- At 7 days prior to the software application,
 - NTI performs dump and restore procedure.
- At 5 days prior to the software application,
 - Act. patches identified by region.
- At 3 to 1 day(s) prior to the software application,
 - the final tape and documentation shipment arrives at the office site.
- At 2 days prior to the software application,
 - BCS pre-application engineer calls site to perform final pre-application checks.
- At 1 day prior to the software application,
 - any additional patches needed are downloaded into the switch
- On the day of the software application,
 - final patch audit (APF) is performed.
- At 7 days after the software application,

- issues are reviewed in the Software Delivery Excellence! follow-up meeting.

TABAUDIT/CHECKTAB

TABAUDIT/CHECKTAB is a table verification process that can be run prior to making an image tape (approximately 15 days prior to the scheduled application) and periodically after the image tape is made to verify office data. Errors and inconsistent data identified by TABAUDIT/CHECKTAB should be corrected by the telephone company prior to making the system image tape. This process decreases the need for NTI to contact the customer during the dump and restore process for direction on how to correct table errors.

XPM audits and patches

At I - 15 days, an XPM audit is conducted to determine the readiness of the office to receive the new BCS software load relative to the XPMs loads and XPM patches. NTI Patch Administration dials into the customer switch and accesses information needed to conduct the audit. Any required XPM patches are downloaded into the switch at this time.

Pre-application checks

To ensure that an office is ready for a software upgrade, a pre-application engineer performs a series of pre-application office checks to verify certain conditions that must exist. Through the pre-application procedure, various problems and issues which may prevent or impact the upgrade are identified and resolved. The actual checks in the pre-application process evolve as new software loads are introduced.

One week before the scheduled pre-application process, the pre-application engineer contacts the telco for the following:

- to confirm the pre-application date and negotiate the beginning time
- to identify the telco contact, and voice and data numbers

Also at this time, the pre-application engineer contacts the responsible NTI region for the following:

- to provide the schedule of the pre-application process
- to determine which NTI regional Field Service Engineer (FSE) will help resolve the problems identified during the pre-application

Twelve to fourteen days prior to the BCS upgrade, the pre-application engineer contacts telco personnel at the switch site and establishes dial-ups to the DMS switch for the pre-application process, both verbal and automated

checks. The automated checks consist of programs run on the DMS switch that perform the following activities:

- Check DMS front-end memory.
- Verify front-end stability.
- Load program files and modules required for dump and restore, and application.
- Check office data and tables.
- Verify correct gating hardware and front-end cards for the new load.
- Negotiate a start time for the insertion.
- Review with telephone company site personnel:
 - office freeze and journal file requirements
 - office site tasks and responsibilities.

During the pre-application process, the attempts to correct any problems that are found. Any unresolved problems are handed over to the NTI Region for resolution. The engineer also establishes a completion date for the final office review and establishes a time for the review to begin

Making a system image tape and preparing journal files

At approximately 10 to 8 days before the software insertion and prior to the scheduled RTP or split-site dump and restore, the "office data freeze period" begins. At the beginning of this period, the telco personnel make an image tape of the system data (frozen image). An image tape contains the office site-specific data assignments, such as customer specific data, line and trunk assignments, and office specific data values.

Changes to the DMS switch, such as memory/network extensions, must be completed before the frozen image tape is made. No re-grades, additions, or deletions can occur once the image tape is made until after the software application. The telephone company should limit the number of data changes once the system image tape has been made. Restrictions exist on what type of data modifications to the DMS switch software are supported after the image tape is made.

Three image tapes are made. Two of the image tapes are shipped to the NTI Dump and Restore group in Morrisville, North Carolina, and the other tape is kept by the telephone company. The image tape is used by the NTI Dump and Restore group to datafill the new undatafilled software load built by the NTI Loadbuild group based on the customer order.

Any data changes (service orders) required during the data freeze period are recorded on journal files for insertion into the switch just prior to the activation of the new software load during the application. The data freeze

period ends with the application of the new software load. When the switch is activated on the new software load, all service orders made since the making of the image tape are active.

JFFREEZE Feature

The JFFREEZE feature assists the telco in taking system images for the dump and restore process. It creates and maintains a history of all journal files created during the data freeze period before the software application. Disk drives must be equipped in the office to use this feature.

Note: JFFREEZE is used only for the Conventional and Hybrid software delivery methods. It is not needed for the ONP method since a frozen image period does not exist.

Prior to taking the system image tape, the telephone company activates the JFFREEZE feature. To determine if the feature is available, enter "HELP JFFREEZE" on the DMS switch. If JFFREEZE is available for use, a help message will be displayed. If JFFREEZE is not available, the response will be "NO COMMAND IN LINE."

Most data changes made to the switch software are captured in the journal files and can be restored with the software tools, JFDUMP and the data modification processor (DMOPRO). The JFFREEZE feature locks out all non-restorable data changes, and provides the following capabilities:

- Automatic daily rotation of JF during the data freeze period. JFFREEZE automatically rotates the JF at 3:00 am daily. A new JF is used daily to record data modifications. This feature eliminates the need for daily manual rotation of the JF by the telephone company. Recording data modifications in several JFs decreases the impact if a JF is corrupted.
- JF history file which maintains a record of each JF created during the data freeze period.
- Lock-out of data changes to some of the DMS switch tables by setting the state of the tables to read-only. This capability ensures that only supported data modifications during the data freeze period are allowed in the switch.
- Suspension of lock-out of the restricted data tables by NTI technical support in emergency situations when a data change is needed. NTI support personnel are capable of suspending the data lock for a two-hour period in which the necessary data changes can be made. After that time the lock is re-asserted automatically.
- Disallowance of certain system CI (command interpreter) commands which allow data changes not written to journal files and are not restorable on the new BCS.

All restricted data changes made to the DMS tables during suspension of the lock-out capability are recorded in a journal file. On the night of the software application, JFDUMP screens the journal files created during the data freeze period and creates an exception file. This exception file is used by the NTI software application engineer to manually re-input the data changes to the restricted tables. JFDUMP automatically processes the journal files based on the JF history file during the software application.

Software parameters

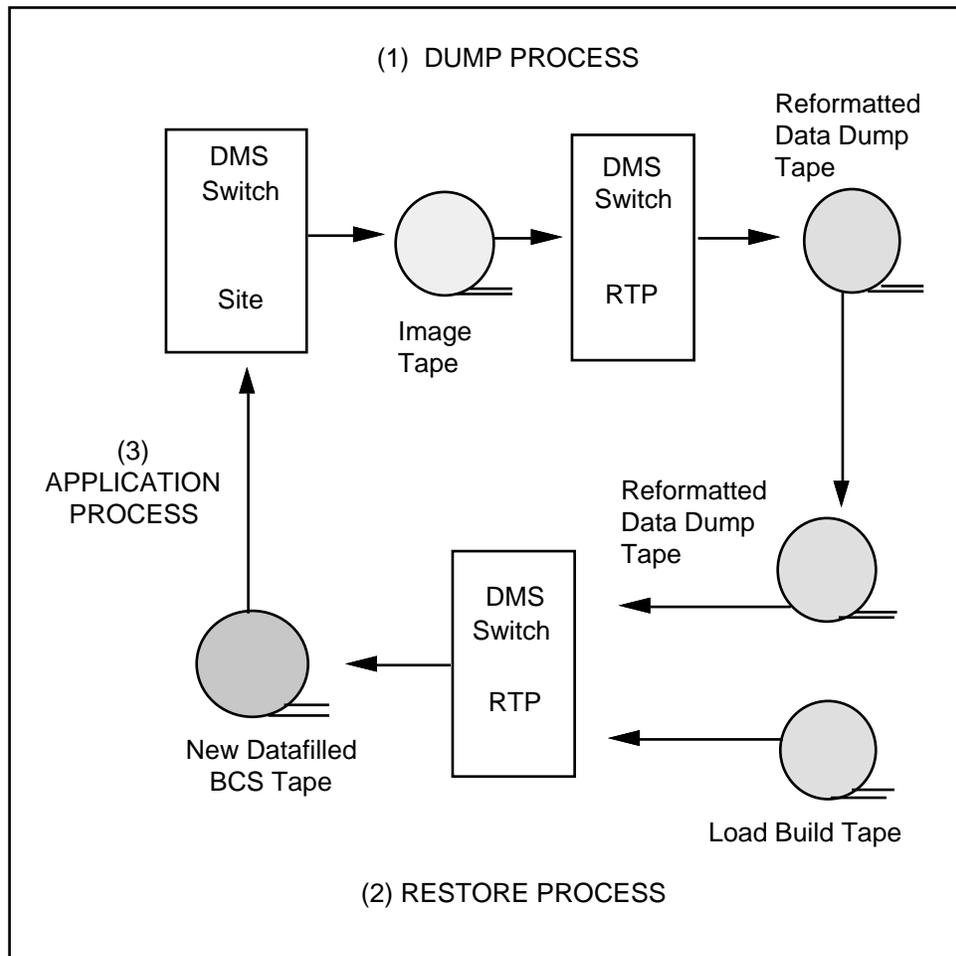
Software parameters (parms) are identified in four software tables that the system software uses in normal switch operation. Thirty-five days prior to the software delivery, BCS Polling polls the telco switch to determine the current software parameters. These parameters are then sent to the region via PARMmail, an electronic means of communication with the regional software system engineer (SSE). The regional SSE indicates any required changes to the parameters based on customer requests and data captured in the CI document.

Requests for parameter changes that are received by NTI after the due date are processed on an emergency basis only. The request for change must come through the regional Software Systems Engineering manager by telephone with a follow-up COCOS to a Dump and Restore manager. The manager reviews the request to determine if the change can be made safely, without risk of service degradation. If the request is denied, the software delivery job will be rescheduled to accommodate the parameter change at a later time.

Dump and restore

Dump and restore is the process of dumping all office data from the old BCS load and restoring it in the new BCS load. Telco personnel make a frozen image tape, a copy of the telco office data. The telco may continue to enter service orders into the DMS switch after the frozen image with all dump and restore methods except the site dump and restore method. All service orders made after the image tape are logged in journal files in the switch. The journal files are used later to apply all service orders on the new BCS load.

Figure 11-1 Dump and restore process



The *dump* part of the dump and restore process involves loading the site image tape into an NTI lab switch. Customer data is extracted, reformatted, and written onto another tape during the dump process. The new undatafilled software load is then loaded into a DMS switch, and reformatted customer data datafills the new image. Datafilling the new BCS software load is the *restore* portion of dump and restore.

Final office review

At typically 2 days prior to the software delivery, the pre-application engineer conducts the final office review to determine if the office is ready to proceed with the upgrade. All issues and problems identified at the pre-application process (10 days prior to the application date) must be resolved at the final office review. Examples of the activities in the final office review follow:

- Dump BCS monitoring data (BCSMON).

- Verify front-end stability.
- Verify software table issues identified by TABAUDIT/CHECKTAB are corrected.
- Verify journal files have been handled according to procedures.
- Confirm the start time for the application.
- Ensure all problems are corrected and issues resolved.

After the final office review, the pre-application engineer completes a pre-application report, supplying information required for the software application. The pre-application report is forwarded to the assigned engineer.

Final tape and documentation shipment

The site receives the final tape and documentation shipment two to three days before the software delivery. This final shipment includes the following:

- TAS Non-Res tapes (2)
- super Non-Res tapes (2)
- commissioning tapes (2)
- new undatafilled BCS load tapes (2)
- patch tape
- D190 Document (office feature record)

Patching activities

One day prior to the software application, a final XPM audit is conducted to verify that the XPMs are loaded with the correct loads and have been patched. Any additional XPM patches needed are downloaded at this time. The NTI Patch Administration downloader logs into the NTI Patch Downloader System and generates a list of patches to be downloaded to the office site. The downloader then notifies telco personnel that CC (central control) patches need to be downloaded into store file.

The downloader identifies the XPM patches on the tape. If an XPM patch is both on the XPM patch tape and in the list of patches to be downloaded, the downloader removes the XPM patch from the list to eliminate duplication.

On the scheduled application day, the APF report (list of the downloaded patches) is generated by the patch administration group, and a copy is provided for the NTI applicator who will be performing the software upgrade. The APF is checked for patches that have status of EMG (emergency), OBS (obsolete), OBE (obsolete emergency), or OBR (obsolete replacement). The OBE and OBS patches are removed from the inactive

side of the DMS switch before the SWACT (SWitch of ACTivity form old to new software load). OBR patches are checked to ensure that their replacements are applied to the new load. EMG patches are checked to verify that they are applied.

After the software application, the downloader notifies the telco personnel that an inform list is needed from the switch to identify all patches, patch type, patch status, and feature packages in the software load. The inform list verifies feature package content and patches applied, and it updates office site information in the NTI patch database.

Hybrid delivery process

On the night of the scheduled Hybrid software application, procedures identified in NTP 297-1001-303, *ONP/Hybrid Software Delivery Procedures*, should be followed. This document lists the role and responsibilities of the telephone company and Northern Telecom for the Hybrid software delivery.

The NTI Software Delivery Bulletin System, available through C-SCAN, provides information to NTI and telco user groups concerning changes, alerts, and additional information related to software delivery that may not yet be released in an NTP or other documentation. The bulletin system must be accessed to review any bulletins that impact the pre-application procedure or the software application.

The BCSUPDATE phase controls the activation of the datafilled software load in the DMS switch. In the Convention and Hybrid methods, this procedure is performed by the AutoApply, SWAP, or manual application procedure.

On the night of the software application the following major activities are performed on the DMS office:

- drop sync procedure
- loadmate procedure
- preparation
- Hybrid journal files
- RESTARTSWACT or NORESTARTSWACT
- BCSUPDATE POSTSWACT procedure
- Telco monitor the switch and test calls completed
- sync the DMS on the new BCS / take new images

Drop sync procedure

The drop sync procedure consists of jamming the inactive central control (CC) and un-syncing the DMS front-end. This is necessary because the inactive DMS front-end will be loaded with the new datafilled BCS load while the active side continues to process calls using the old load.

The new undatafilled tape is shipped to the DMS office site in final tape and documentation shipment. During the software delivery procedure, all data modifications must cease.

Loadmate procedure

The loadmate procedure consists of loading the new undatafilled BCS image from magnetic tape into the DMS front-end mate (inactive) side. If the office is a SuperNode with a system load module (SLM) drive, the new undatafilled BCS image arrives at the office on an SLM tape cartridge.

Preparation

Prior to the execution of MOVEBCS, the following preparatory activities are performed:

- Log into the inactive side.
- Verify processor stability by examining mismatch and checksum logs.
- Stop all data modifications (DMOs).
- Drop sync on switch.
- Loadmate software load.
- Return to service (RTS) the mate control register (MCR).
- Set logutil NT40 CC logs and SuperNode CM logs.
- Activating any needed patches.

Hybrid journal files

All data modifications (DMOs) stored in the journal files since the frozen office image tape was made (10 to 5 days prior to the software application) must be applied to the new datafilled software load which now resides on the inactive side of the DMS switch.

If the JFFREEZE feature was used, a listing of all journal files used during the frozen data interval is maintained. Each journal file is "DMOPRO'ed" (restored) to the new BCS load on the inactive side in the order it was created, with the most recent journal file restored last. The length of time required for this procedure depends upon the number of DMOs made during the frozen data interval. Data changes should be kept to a minimum during the frozen data interval to shorten the restoral process.

BCSUPDATE PRESWACT process

The BCSUPDATE PRESWACT procedure consists of steps in preparation to the switch of activity to the new load. These steps include the following:

- Rotate device independent recording package (DIRP) subsystems such as automatic message accounting (AMA) and station message detail recording (SMDR).
- Verify distributed processing peripheral (DPP) firmware, if used.
- Notify remote billing collection center to poll for billing information.

RESTARTSWACT or NORESTARTSWACT

This process consists of activating the new BCS load so that all DMS activities are controlled by the new software load. Prior to this operation, essential services and high profile are checked. The RESTARTSWACT or NORESTARTSWACT operation consists of switching activity (SWACT) to the new load. The switch remains out-of-sync.

BCSUPDATE POSTSWACT procedure

The BCSUPDATE program runs the POSTSWACT steps and flags them as they pass. If a step fails, the BCSUPDATE program provides instructions on how to continue. Once the failure is corrected, POSTSWACT is re-entered and BCSUPDATE continues.

The BCSUPDATE program stops when site testing, critical call testing, and new software load acceptance are conducted by the telco personnel. Should site personnel determine that the software load cannot be accepted, the decision to return to the old load is made, and procedures are followed to return the switch to the old software load. The capability to go back to the old software load exists until the DMS switch is synced on the new BCS software load. After telco personnel accept the new software load, the BCSUPDATE program is started again and the POSTSWACT steps are completed.

Sync the switch

After the BCSUPDATE process, the DMS switch is synced on the new BCS load. The engineer then takes a new system image for backups.

Monitor

Monitor refers to the phase of the software delivery during which Telco observes logs and switch performance. This phase begins when the software insertion is complete. If technical assistance is needed, site may call Northern Telecom TSC (Technical Service Center).

Customer service reports

Customer service reports (CSRs) are reports regarding problems detected in the DMS switch. The telephone company should retest CSRs opened on the previous software load. If the problem documented by the CSR still exists in the new software load, the CSR should be re-opened on the new load within two weeks of the software application date. If the problem no longer exists on the new software load, the CSR may be closed.

Software delivery timelines

This section describes the software delivery process from the perspective of time. It includes a sequence of events from the time a telephone company request is received through the post-application interval. Typical time intervals are given for each process. Emergency or high priority orders will not follow the typical timeline intervals.

Scheduling the software delivery

The chart that follows in this section lists a timeline based on weeks or days before the scheduled BCS Insertion date (I) .

Note: Preliminary tape and document shipments for sites designated as ramp sites (ie, pre-RTS) should be expected I - 7-14 days. This includes PM loads and associated documents.

11-2 Software delivery timelines

TABLE A - Conventional and Hybrid Software Delivery	
Software Delivery Activity	Time
Telephone company request RFS generated, reviewed, and approved	-
CI Date (SAE and Customer Information capture start) Memcalc quote by SAE	I - 17 weeks
Delivery of CI	I - 15 weeks
Limited features requested Job entered into JFDB	I -13 weeks
Memcalc submitted by SAE	I -11 weeks
BCS Polling polls the office to be upgraded	I - 7 weeks
Final Memcalc by SAE Automail generated by region	I - 40 working days or 56 calendar days
Preliminary tapes and documents shipped to site Site profile completed in Genesis	I - 5 weeks
Parmmail sent to region	- 25 working days or - 35 calendar days
Parmmail due from customer/region	- 18 working days or 24 calendar days
Production flag set to start loadbuild	I - 17 working days or 23 calendar days
Loadbuild completed or 15 calendar days	I - 11 working days
Site patch propagation report completed	I - 14 days
BCS Polling	I - 12 days
Software parameters received from regional SSE 16 calendar days	I - 12 working days
Pre-application procedure	I - 10 days
Site takes frozen image Dump and restore (RTP method)	I - 10 to 7 days

Software Delivery Activity	Time
Final office review	I - 2 days
Final patches downloaded Dump and restore (split site method) Data Exception Report issues addressed	I - 1 day
Dump and restore (site method)	Insertion day (AM)
BCS application	Insertion Date
Monitor and testing (Telco)	I + 1 day
Post BCS polling	I + 5 days

11-4 Software delivery timelines

TABLE B - ONP Software Delivery	
Software Delivery Activity	Time
Telephone company request RFS generated, reviewed, and approved	-
CI Date (SAE and Customer Information capture start) Memcalc quote by SAE	I - 16 weeks
Delivery of CI	I - 14 weeks
Limited Features Requested Job entered into JFDB	I - 13 weeks
Memcalc submitted by SAE	I - 11 weeks
BCS Polling polls the office to be upgraded	I - 7 weeks
Final Memcalc by SAE Automail generated by region	I - 25 working days or 42 calendar days
Production Flag set to start loadbuild	I - 5 weeks
Preliminary Tapes and Documents Shipped to Site Site profile completed in Genesis	I - 5 weeks
Parmmail sent to region	I - 20 working days or 28 calendar days
Parmmail due and from customer/region	I - 13 working days or 17 calendar days
Site patch propagation report completed	I - 15 days
BCS Polling	I - 12 days
Pre-application procedure	I - 10 days
Loadbuild completed	I - 6 working days or 8 calendar days
Test image due from telco	I - 8 days
Test MOVEBCS run in lab Undatafilled image shipped to site	I - 7 days
Final office review	I - 2 days
Final patches downloaded	I - 1 day

Software Delivery Activity	Time
ONP software delivery	Insertion Date
Monitor and testing (Telco)	I + 1 day
Post BCS polling	I + 5 days

For additional information on the One Night Process (ONP), refer to the "One Night Process Software Delivery section" in this manual as well as NTP 297-1001-303, *ONP/Hybrid Software Delivery Procedures*.

BCS Application process (Canadian sites)

TABLE F - CANADIAN BCS APPLICATION PROCESS		
MILESTONE	RESPONSIBILITY	COMP.
BCS Application request/ schedule (envoy or meeting)	Telephone company /FSE	AD - 40
Inform SAE (COEO # and Feature List	Marketing	AD - 38
Firm data/COEO in JFDB Notify other depts using form	SAE	AD - 36
Polling verified (JFDB)	Customer Software Delivery	AD - 34
Load content verified (Provi- sioning sends envoy to SAE)	Telephone company	AD - 31

11-6 Software delivery timelines

MILESTONE	RESPONSIBILITY	COMP.
S/W lineup/1091 spec final/ Memcalc verified/HW ordered/ final parms to S/W production	SAE	AD - 26
Hardware/Memory ordered	SAE	AD - 25
NTP documents shipped	Documentation	AD - 22
S/W documentation	S/W Production	AD - 22
HW order shipped	Change Application/Installation	AD - 20
Installation schedule confirmed		
Patch download	Customer Software Delivery	AD - 20
HW installed	Installation	AD - 10
10 Day check	Customer Software Delivery	AD - 10
Image received by SW production	Telephone Company/FSE	AD - 6
Loadbuild	Software Production	AD - 3
Outgoing quality check	Software Engineering Process	AD - 2
0 Day check	Software Engineering Process	AD - 0
Application	Customer Software Delivery	AD - 0
Rate application	Telephone Co. / Quality	AD + 5

Software delivery technical support

Technical assistance and support (TAS)

Technical support for each BCS software load is provided by Northern Telecom's Technical Assistance and Support (TAS) group. Support is provided for critical service priority levels by means of emergency software applications or supplemental tapes that contain patches that can be downloaded quickly as required by TAS.

The service priority classifications are defined in Northern Telecom Practice (NTP) 297-0201-019.

BCS technical support

Northern Telecom has established a problem escalation procedure called BCS technical support in the event that a problem arises during software delivery. NTI senior engineers specially trained in software delivery and experienced with possible problems during the upgrade are present to support the NTI software delivery engineers during all software upgrades. This procedure ensures problem resolution in a timely manner while maintaining the highest level of service that is possible under a problem condition. The BCS technical support is provided in addition to the NTI TAS and Emergency Recovery groups.

If a problem occurs during a software upgrade, the following steps are taken:

1. Identify problem. Is it an E1 or E2 problem? (According to NTP 297-0201-019, E1 problems result in system degradation and/or outage, and E2 problems have the potential for system degradation and/or outage.)

No. BCS technical support is contacted for assistance and resolution.
Go to step 2.

Yes. Problem is escalated to BCS technical support immediately. In addition, Northern Telecom Emergency Recovery group is contacted for problem resolution. Emergency Recovery directs the problem resolution strategy with BCS technical support personnel assisting. The Emergency Recovery personnel and telephone company site personnel generate a customer service report (CSR) on the problem. The BCS operations manager is also notified of the E1 or E2 problem. Emergency Recovery

personnel, BCS technical support, and telephone company site personnel will work the problem to resolution.

2. Is a recovery strategy available to resolve the problem within 10 minutes? Has an action plan been determined to resolve problem ?

No. Go to Step 4.

Yes. Go to Step 3.

3. Is the problem resolved within 10 minutes?

No. Go to Step 4.

Yes. The problem is resolved. The steps taken to correct the problem are documented and all involved parties, telephone company and NTI personnel are notified that problem is resolved.

4. Contact next level of support for assistance. Go to Step 5.

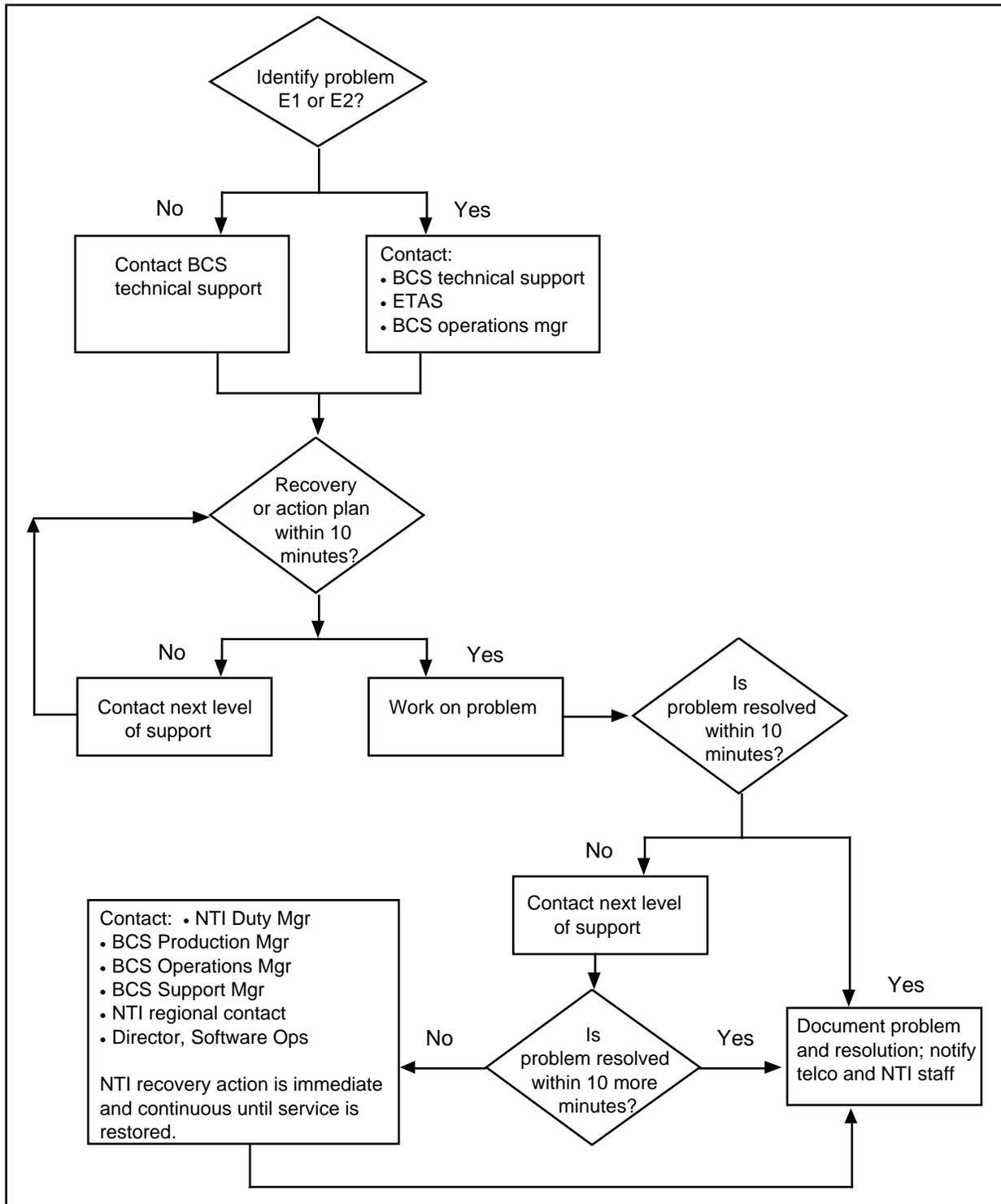
5. Is problem resolved within 10 more minutes?

No. Escalate problem to NT duty manager and BCS Manager for further escalation. For all E1 conditions lasting more than 10 minutes, the BCS manager notifies the BCS Production Manager, BCS Operations Manager, BCS Support Manager, NTI regional contact, and Director of Software Operations for resolution and assistance from additional resources.

Yes. The problem is resolved. The steps taken to correct the problem are documented and all involved parties, telephone company and NTI personnel are notified that problem is resolved.

For E1 and E2 problems, recovery action by Northern Telecom is immediate and continuous until the service level is restored to the pre-incident operation.

Figure 13-1 Escalation Procedure



Databases and systems (US sites)

Fortune Order Scheduling System

The Fortune Order Scheduling System is a computerized scheduling system that runs on an NTI mainframe computer. FORTUNE develops and manages customer schedules based on both hardware and software parameters. FORTUNE 4.0 incorporates hardware and software requirements into a single stream process to provide a total job view when developing a schedule for a system order.

FORTUNE is used to generate and distribute an RFS (request for schedule) for approval by a review committee. The system contains information such as customer name, holding company, sales region, NTI region, order status, type, sales representative, CLLI, location, scheduled in-service date, actual in-service date, job identifier, installation district, contact, and provisioning.

Job Features Database (JFDB)

The Job Features Database (JFDB) stores job-related information which is used to generate other reports and to track job status in the software delivery process. The regional Systems Application Engineer (SAE) electronically submits 8630 CI questionnaire data via NT Access to the JFDB interface program for automatic creation/update of the JFDB.

The JFDB is used by many groups in the software delivery process to obtain information about specific jobs such as software package listings. The JFDB maintains a record of packages ordered for each office and identifies the package manufacturing status. A user can retrieve the following information:

- BCS level
- data on an office location
- feature packages for a job
- memory hardware for a job
- program and data store requirements.

At the start of the loadbuild process, the software production group extracts from the JFDB a list of feature packages to be included in the new BCS load.

BCS Insertion Schedule (BCSIS) database

The BCSIS database is used by the BCS Planning organization and other NTI organizations to perform the following tasks:

- Assign BCS insertion schedules.
- Generate reports for software upgrades.
- Send scheduled dates to NTI regions.
- Provide information to the automated checklist to verify that critical activities are performed during the delivery process.
- Track/monitor software delivery performance indicators.

The BCSIS database uses information from the Job Features Database (JFDB) and the NTI Research Triangle Park Polling Database (RTPOLL). Software jobs that have scheduled dump and restore dates are entered into the BCS IS database by the master scheduler in BCS Planning. For each scheduled BCS insertion, information for all stages of the software upgrade are kept in the database, including dates, status, and re-scheduling information. If part of a job re-schedules, a new record in the database reflects the new dates.

A read-only version of the BCS IS database exists for report generation by NTI users outside the BCS Planning and Field Support organization. BCS IS database information is also used to initiate other processes in the various steps of the software delivery process such as automail. (Refer to *Automail Sent to Region* in this section for more information).

Desired Features Database (DFDB)

Some requested feature packages cannot be provided to the customer for various reasons, including the following:

- Feature package is not available in the requested software load.
- Development on the requested feature package is incomplete.

The regional marketing Scheduling Analyst enters these unavailable requested feature packages into the Desired Features Database (DFDB). NTI sales and marketing groups use this information to help define customer needs.

BCS calendar

BCS Calendar provides the BCS Application group with the ability to maintain their work schedule on-line. The BCSIS and GENESIS databases provide data to the BCS calendar.

Customer Order Tracking (COT) database

The COT database system consists of several databases used to track customer orders. COT is accessed to perform the following tasks:

- schedule customer order for manufacturing intervals
- establish a job and order
- assign specific line items with an order to a customer
- display an order and specifications for a given central office equipment order (COEO)
- display notes for a given COEO and specification
- provide job status information
- monitor the progression of an order.

Genesis

The GENESIS system is a central source for customer service related information.

RTPOLL

The RTPOLL database stores data recorded during polling sessions of DMS offices. It provides access to needed polling information on offices by multiple NTI groups. Information collected during a polling session consists of NTX feature packages in the load, data store and program store report, table counts, memory card information, and office information.

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Appendix A-Network compatibility (US)

Appendix A lists the guidelines and items required when network arrangements and compatibility issues are examined. The following items must be considered together when a site requests a software upgrade:

- Network Operator Centralization (OC) Type
- BCS and NSR Compatibility Issues
- Overlapping Network Issues

Remote/host OC network issues

Determine site OC (Operator Centralization) type:

- Host OC: DMS-200, DMS 100/200, DMS-250 that hosts a TOPS (traffic operator service position system). The host OC handles operator-assisted traffic from the remote OCs.
- Remote OC: DMS-100 which connects and routes operator assisted calls through the host OC.

Guidelines:

Host and remote OCs must be on compatible BCS releases. This means that the remote OC BCS level must never be lower than 3 BCS levels below its host OC. The remote OC and host OC can have the same BCS level. However, the remote OC cannot at any time have a higher BCS level than the host OC.

The host OC office must be upgraded to the higher BCS before the remote OC.

Normally an office is automatically brought up to the latest BCS level unless the customer specifically requests otherwise.

An office may stay at the current BCS level if the office is a remote OC, and if the host OC is at the same level. If the host OC is at a higher level, the remote OC must update to the host OC level.

An office can upgrade only to a maximum of 3 BCS levels during a single upgrade (e.g., BCS 27 to BCS 30).

Recommendation:

NTI/BNR recommends that the host and remote offices remain at different BCS release levels only long enough to complete a network upgrade. Both the host OC and remote OC should be on the same BCS loads. The following examples assume a simple network with one host OC and one remote OC.

Example 1:

- Current Host OC BCS Level is BCS27
- Current Remote OC BCS Level is BCS27

The remote OC in this example cannot be upgraded until the host OC is upgraded. The host OC could be upgraded to BCS 30 and still be compatible with the BCS 27 load in the remote OC. The software load in the remote OC should be brought up to the software level of the host OC after the update.

Example 2:

- Current Host OC BCS Level is BCS28
- Current Remote OC BCS Level is BCS27

The remote OC in this example can be upgraded to a maximum of BCS 28. The host OC could be upgrade to a maximum of BCS 30 and still be compatible with the remote OC load of BCS 27.

BCS and NSR load compatibilities

In general, each NSR release supports the current BCS load, along with one BCS load forward and two BCS loads backward. For example, NSR26 is compatible with BCS 27, BCS 26, BCS 25, and BCS 24.

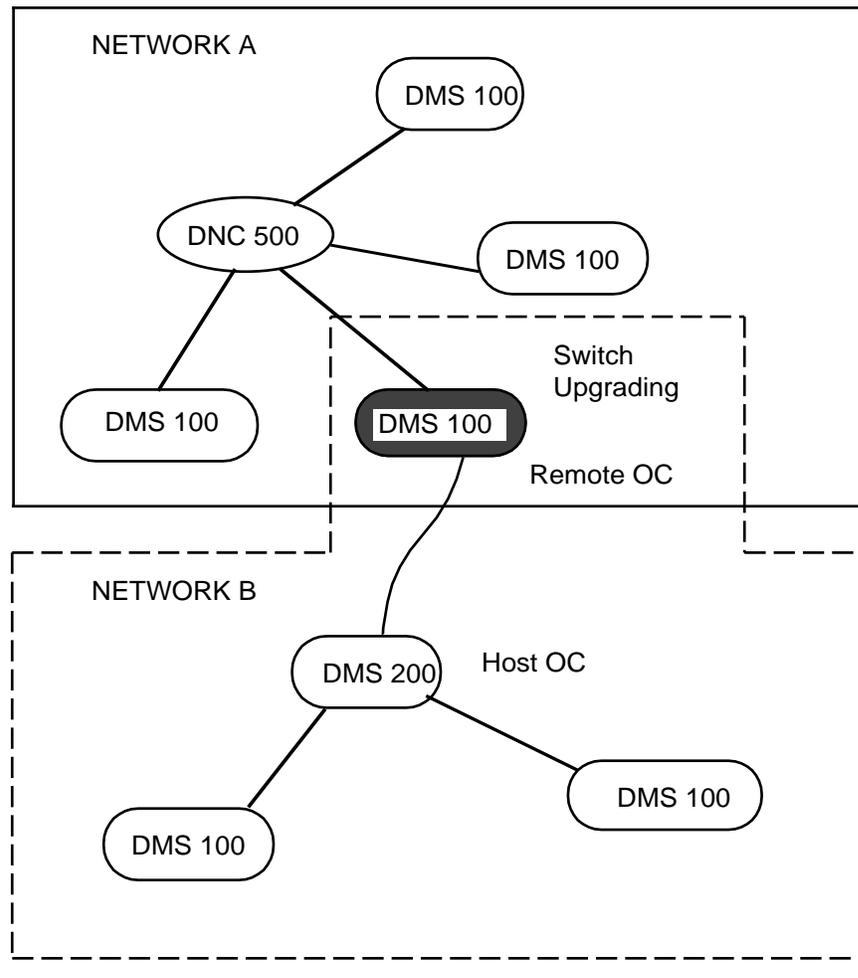
	BCS 31
NSR30	BCS 30
	BCS 29
	BCS 28

Overlapping network issues

Overlapping networks are networks that have switches or nodes in common. A switch with a planned upgrade to a new software load must be examined for its impact if it is in more than one network. For a switch residing in three networks that is planning a software upgrade, the three networks must be examined for compatibility and potential impact as a result of the upcoming upgrade.

The following figure illustrates overlapping networks.

Figure A-1 Overlapping Networks



The switch in the above example is part of Network A and Network B. Before a software upgrade can be performed on this switch, the BCS level in the host OC and the NSR level in the DNC-500 must be examined for compatibility.

Appendix B-Confirmation letter (US)

This appendix shows examples of a confirmation letters sent to the customer after acceptance of the dates for a software delivery. These types of letters may vary in content from region to region.

ONP version

<date>

Mr. Telco Contact
XYZ Telephone Company
123 Communications Avenue
Anytown, State 12345

Dear Mr. Contact:

This letter is to confirm your scheduled software upgrade from BCS <##> to BCS <##>, Northern Telecom reference number <H#####>. The dates outlined below are based on an delivery (insertion) date of <date>.

- I - 35 days Telco receives preliminary tapes with release documents
- I - 10 days Office check by Pre-application Engineer
- I - 2 days Final office review by Pre-application Engineer
- I - 1 day Telco receives final tapes and documentation
- * <date> **Delivery (insertion) date**
- I + 1 day Actual activation date (at approximately 4 am)

** NOTE: All dates without asterisks (*) are general target dates for completion. If you are not contacted by NTI or do not receive specified information by the target date, please contact me.*

Please review the application date above. If this date is acceptable, sign the enclosed form and return it within ten days of the letter date. A self-addressed stamped envelope is enclosed for your convenience. Failure to return this form is considered a rejection of the scheduled date. DO NOT SIGN this letter if you cannot accept the application date. Please contact an NTI Customer Service representative as soon as possible at <telephone number>. Because of our schedule capacity, changes to this date may cause a delay of several weeks in rescheduling your software upgrade.

Detailed information on the software delivery process is available in NTP 297-8991-020, Software Delivery Process Description. If you have other questions, please call me at <telephone number>.

<name>

Customer Support Representative (or other title)

Enclosure

CC: Northern Telecom, Inc.
Pre-Application Engineering Group
500 Perimeter Park East
Morrisville, NC 27560

Acceptance of Schedule

Please review the application schedule for your software upgrade. If this date is acceptable, complete and sign this form, and return it within ten days of the issue date of the letter. A self-addressed stamped envelope is enclosed for your convenience. Failure to return this form will be considered a rejection of the scheduled date.

XYZ Telephone Company
Anytown, State 12345
BCS <##>

I - 35 days Telco receives preliminary tapes with release documents

I - 10 days Office check by Pre-application Engineer

I - 2 days Final office review by Pre-application Engineer

I - 1 day Telco receives final tapes and documentation

* *<date>* **Delivery date**

I + 1 day Actual activation date (at approximately 4 am)

NOTE: All dates except those with asterisks () are general target dates.*

I have reviewed the attached document, and accept the scheduled dates.

Telephone Company Authorization Signature Date

Title

Site Contact for Office Check Telephone Number

Requested SWACT (switch activity) time

Conventional and hybrid version

<date>

Mr. Telco Contact
XYZ Telephone Company
123 Communications Avenue
Anytown, State 12345

Dear Mr. Contact:

This letter is to confirm your scheduled software upgrade from BCS <##> to BCS <##>, Northern Telecom reference number <H#####>. The dates outlined below are based on an application (insertion) date of <date>.

- I - 35 days Telco receives preliminary tapes with release documents
- I - 10 days Office check by Pre-application Engineer
- * I - 8 days (RTP dump and restore) Site image tapes MUST be received at NTI by 3 pm
- I - 7 days RTP dump and restore
- I - 2 days Final office review by Pre-application Engineer
- I - 1 day Telco receives final tapes and documentation
- * <date> **Application (insertion) date**
- I + 1 day Actual activation date (at approximately 4 am)

** NOTE: All dates without asterisks (*) are general target dates for completion. If you are not contacted by NTI or do not receive specified information by the target date, please contact me.*

Please review the application date above. If this date is acceptable, sign the enclosed form and return it within ten days of the letter date. A self-addressed stamped envelope is enclosed for your convenience. Failure to return this form is considered a rejection of the scheduled date. **DO NOT SIGN** this letter if you cannot accept the application date. Please contact an NTI Customer Service representative as soon as possible at <telephone number>. Because of our schedule capacity, changes to this date may cause a delay of several weeks in rescheduling your software upgrade.

Detailed information on the software delivery process is available in NTP 297-8991-020, Software Delivery Process Description. If you have other questions, please call me at <telephone number>.

<name>
Customer Support Representative (or other title)

Enclosure
CC: Northern Telecom, Inc.
Pre-Application Engineering Group
500 Perimeter Park East
Morrisville, NC 27560

Acceptance of Schedule

Please review the application schedule for your software upgrade. If this date is acceptable, complete and sign this form, and return it within ten days of the issue date of the letter. A self-addressed stamped envelope is enclosed for your convenience. Failure to return this form will be considered a rejection of the scheduled date.

XYZ Telephone Company
 Anytown, State 12345
 BCS <##> to <##>

- I - 35 days Telco receives preliminary tapes with release documents
- I - 10 days Office check by Pre-application Engineer
- * I - 8 days (RTP dump and restore) Site image tapes MUST be received at NTI by 3 pm
- I - 7 days RTP dump and restore
- I - 2 days Final office review by Pre-application Engineer
- I - 1 day Telco receives final tapes and documentation
- * <date> **Application date**
- I + 1 day Actual activation date (at approximately 4 am)

NOTE: All dates except those with asterisks () are general target dates.*

I have reviewed the attached document, and accept the scheduled dates.

 Telephone Company Authorization Signature Date

 Title

 Site Contact for Office Check

 Telephone Number

 Requested SWACT (switch activity) time

Appendix C-BCS checklists (US)

This appendix includes examples of the BCS checklists.

BCS Checklist for SuperNode

BCS CHECKLIST		UPDATED: 900801	
SITE: _____	TELCO: _____	REGION: _____	
COEO: H _____	TARGET: MC68020	INSERVICE: _____	
BCS: _____-_____	LOAD TYPE _____		
1. PURCHASE ORDER STATUS			
2. JFDB CREATION		DATE:	_____
2A. S/W INTERDEPENDENCIES (Y/N)?			_____
2B. LIMITED FEATURES IN SMS77?			_____
2C. LIMITED FEATURES FLAGGED 'L' IN SMS77? (___)			_____
2D. HAVE APPROVAL FOR LTD FEATURES NOT IN SMS77?			_____
2E. AUTOMAIL GENERATED		DATE:	_____
2F. AUTOMAIL DUE		DATE:	_____
2G. AUTOMAIL VERIFIED WITH MARKETING?		DATE:	_____
2H. AUTOMAIL VERIFIED WITH ENG & RETURNED?		DATE:	_____
2I. JFDB LOCK DATE		DATE:	_____
3. C REPORT			
3A. MEMCALC		DATE:	_____
3B. MEMCALC		BCS LEVEL:	_____
MEMCALC IU/RQ/TL			
3C. 1M EQUIVALENTS / /		10% SPARE?	_____
3D. WILL SITE HAVE 24M? (NT9X13'S SHOULD BE ORDERED)			_____
3E. WILL LOAD BE DELIVERED ON SLM I _____ OR SLM II TAPE			_____
3F. SLM II S/W ORDERED? _____ H/W ORDERED/INSTALLED?			_____
3G. ALL GATING H/W SHIPPED? (D_DATE: _____)			_____
3H. PLANNED INSTALLATION/12.5 DAY SOAK MET			_____
3I. POLLING		DATE:	_____
3J. POLLING		BCS LEVEL:	_____
3K. PRELIMINARY TAPES SHIPPED		DATE:	_____
4. SPECIFIC BCS GATING INFORMATION			
4A. BCS 27:	PATCHES _____	TOPS MP _____	_____
	6 MEG.(MS) _____		_____
	XPM H/W _____	(LGC, LTC, DTC/CCS7, SMU,	_____
		RSC, MS7E, ISDN-IAC/LGCI)	_____
4B. BCS 28:	XPM H/W _____	(SMS, ISDN-LCMI)	_____
4C. BCS 29:	PATCHES _____		_____
4D. BCS 30:	XPM H/W _____	(LTC, ISDN-RCCI)	_____
4E. BCS 31:	PATCHES _____	XPM H/W _____ (LGC, SMR,	_____
		SMS, SMU)	_____
4F. BCS 32:	PATCHES _____	XPM H/W _____ (ISDN-IAC/LGCI)	_____
4G. BCS 33:	PATCHES _____	XPM H/W _____ (DTC, SMR,	_____
		RLCM, OPM W/ESA, MS W/FLIS)	_____
4H. BCS 34:	PATCHES _____	XPM H/W _____ (MS W/PKT HAN,	_____
		ISDN-RCCI)	_____
5. DUMP/RESTORE _____	WEEK: _____	1ST DATE:	_____
_____	WEEK: _____	2ND DATE:	_____
LOAD SHIP _____	WEEK: _____	DATE:	_____
INSERTION _____	WEEK: _____	DATE:	_____

(Continued)

5A. CUSTOMER IMAGE TAPE DUE AT RTP	DATE: _____
5B. Member of Network?___If so, do schedules coordinate?	_____
5C. Is Data Extension Required?___	If yes, date:_____
5D. Customer Acceptance?	Date: _____
6. Parmmail Returned?	Date: _____
6A. Parmmail Due	Date: _____
7. Checklist Due Date:_____ Signature_____	Date: _____
8. Production Flag Due	Date: _____

BCS Checklist for NT40

BCS CHECKLIST		Updated :	_____
Site:	_____	Telco:	_____
		Region:	_____
Coeo:	H_____	Target:	NT40
		Inservice:	_____
BCS:	____-_____	Load Type	_____

1. Purchase Order Status _____
2. JFDB Creation _____ Date: _____
 - 2A. S/W INTERDEPENDENCIES (Y/N)? _____
 - 2B. LIMITED FEATURES IN SMS77? _____
 - 2C. LIMITED FEATURES FLAGGED 'L' IN SMS77? (____) _____
 - 2D. HAVE APPROVAL FOR LTD FEATURES NOT IN SMS77? _____
 - 2E. AUTOMAIL GENERATED _____ DATE: _____
 - 2F. AUTOMAIL DUE _____ DATE: _____
 - 2G. AUTOMAIL VERIFIED WITH MARKETING? _____ DATE: _____
 - 2H. AUTOMAIL VERIFIED WITH ENG & RETURNED? _____ DATE: _____
 - 2I. JFDB LOCK DATE _____ DATE: _____
3. C Report
 - 3a. Memcalc _____ Date: _____
 - 3b. Memcalc _____ BCS Level: _____

Memcalc IU/RQ/TL
 - 3c. PS 64K Equiv. / / _____ 10% Spare? _____
 - 3d. DS 64K Equiv. / / _____
 - 3e. All Gating H/W Shipped? (D_DATE: _____) _____
 - 3f. Planned Installation/12.5 Day Soak Met _____
 - 3g. Polling _____ Date: _____
 - 3h. Polling _____ BCS Level: _____
 - 3i. Preliminary Tapes Shipped _____ Date: _____
4. SPECIFIC BCS GATING INFORMATION
 - 4A. BCS 27: PATCHES _____ TOPS MP _____

6 MEG.(MS) _____

XPM H/W _____ (LGC, LTC, DTC/CCS7, SMU, _____

RSC, MS7E, ISDN-IAC/LGCI)
 - 4B. BCS 28: XPM H/W _____ (SMS, ISDN-LCMI) _____
 - 4C. BCS 29: PATCHES _____
 - 4D. BCS 30: XPM H/W _____ (LTC, ISDN-RCCI) _____
 - 4E. BCS 31: PATCHES _____ XPM H/W _____ (LGC, SMR, _____

SMS, SMU)

 - 4F. BCS 32: PATCHES _____ XPM H/W _____ (ISDN-IAC/LGCI) _____
 - 4G. BCS 33: PATCHES _____ XPM H/W _____ (DTC, SMR, RCLM _____

OPM W/ESA)

 - 4H. BCS 34: PATCHES _____ XPM H/W _____ (ISDN-RCCI) _____
5. Dump/Restore _____ Week: _____ 1st Date: _____

_____ Week: _____ 2nd Date: _____

Insertion _____ Week: _____ Date: _____

 - 5a. Customer Image Tape Due at RTP _____ Date: _____
 - 5b. Member of Network? If so, do schedules coordinate? _____
 - 5c. Is Date Extension Required? _____ If Yes, Date: _____
 - 5f. Customer Acceptance? _____ Date: _____

(Continued)

6. Parmmail Returned?	Date: ____
6A. Parmmail Due	Date: ____
7. Checklist Due Date:_____ Signature_____	Date: ____
8. Production Flag Due	Date: ____

Appendix D-Memory provisioning (US)

This appendix lists provisioning guidelines for memory restricted offices.

Prior to CI

Step 1. Immediately after the Systems Application Engineer (SAE) has been assigned the job, the SAE contacts the Software Systems Engineering (SSE) department to identify the SSE assigned to the software extension.

Step 2. The SSE polls the switch, and dumps all pertinent information that is required for the SAE to run Memcalc. The SSE also records the current memory usage for the switch and gives all data to the SAE.

Step 3. The SAE runs a Memcalc with the actual switch values and the current BCS level. The SAE performs an accuracy check between the present switch usage and the memory estimate of Memcalc.

Step 4. The SAE determines if there is a memory restraint or if the present office configuration is acceptable for the next BCS level, including tools necessary for loading the new BCS. (If no memory restraint issue exists, the normal job should continue as stated in the System Engineering Bulletin 88-01-002. If a memory restraint issue exists, the SAE contacts the SSE.)

Step 5. If a memory restraint issue exists, the SAE contacts the SSE. The SSE re-configures the office parameters to allow loading the next BCS without interfering with normal call processing. The telephone company is contacted prior to changing any existing software parameters and must agree with the suggested changes (See Step 6). The SSE determines which software parameter changes are needed to accommodate the new software load, and forwards them to the SAE. The SAE reruns Memcalc with the new office parameters.

CI meeting with telco

Step 6. The SAE presents the new software parameters to the telco at the CI meeting via the CI document, Section 7: "Inservice Parm's" and "End of Design Parm's." The SAE completes the Inservice section prior to the CI meeting, and the telco completes the End of Design section at the CI

meeting. The Inservice Section contains NT recommendations; the telco must agree to these changes by DCI, and complete them before the image dump, with written verification to NT.

Step 7. Once the telco lowers the software parameter, sufficient memory for the load application may exist. If the memory restraint condition no longer exists, the normal job flow for the extension is followed. If insufficient memory exists for the office, an NTI Memory Restricted Escalation procedure exists to continue with the software order.

Step 8. The SAE contacts the SSE if there are any new software packages added on this software extension. The SSE calculates any effect these software packages and/or software parameters will have on memory.

Memory restricted escalation procedure

An office with memory requirements that cannot accommodate the 10% administrative sparing rule measured by Memcalc should consider upgrading to the DMS SuperNode for memory relief. If this is not feasible, the following steps should be followed for software jobs that have less than a 5% memory spare. If the memory spare for the job is between 10% and 5%, continue with the job as stated in NTI System Engineering Bulletin (SEB) 88-01-002 to resolve the memory restricted issue.

At this point, the following actions should have already been performed:

- The SAE notified the SSE to lower software parameters that impact memory usage. The telco has determined that no more parm changes can be made.
- An upgrade to SuperNode has been studied and is not feasible at this time.

The next procedure deviates from normal operating procedures and requires notification of the following individuals for determination of the appropriate action. Since every memory-restricted job site differs, specific issues related to the upgrade must be examined in detail to determine the next course of action.

Notification to memory restraint committee

Notification to the NTI Memory Restraint Committee should include the following pertinent job information:

- Office site name and COEO
- Calculated memory spare measured by Memcalc
- Current BCS level and BCS level after upgrade
- Software package additions or deletions for the software load

- Software parameter changes
- Notification of telephone company

Notification to the Memory Restraint Committee of jobs with less than 5% spare should include the following pertinent information:

- NT Director of Technical Operations (or designate)
- NT Regional Director of Customer Service
- NT Manager of Dump and Restore
- NT Manager of BCS Operations (Applications)
- NT Regional BCS Coordinator (Chairman of Memory Restraint Committee)
- NT Regional Marketing Manager
- NT Regional Sales Manager
- NT Manager of Software Marketing Systems
- NT Manager of Software Engineering - New Product System Engineering
- NT Manager of BCS Planning
- Telephone company

The Chairman of the Memory Restraint Committee (BCS Coordinator) notifies the committee via COCOS or telephone. The regional SAE notifies the telco of the memory restraint issue. The regional SAE and SSE assigned to the memory restricted job are not listed on the review committee since they have been involved earlier in the process trying to resolve the issue.

Possible action

- Reschedule the existing job
- Continue with the job only after memory restraint committee and telco approve. The Memory Restraint Committee develops a method to continue with the software upgrade and ensure success. Any potential problem or subsequent effect on switch operation must be identified to the telco and approved by them prior to the plan's execution.

Appendix E-Automail and SMS77 (US)

This appendix provides examples of an automail verification and the SMS77 job order list. The automail verification consists of the following sections:

- Section 1: Identifies all software packages in the SMS77 that are not in the polling. If an office was not polled at the "From BCS Level," this section identifies all packages in the SMS77. The regional SAE identifies which features should/should not be included in the load by changing the "Delete?" flag for the package from its default of "N" to "Y".
- Section 2: Identifies features that exist in polling but not in the SMS77. The SAE indicates if these features are to be added to or deleted from the new load.
- Section 3: Identifies software feature interdependencies of the existing SMS77 packages when the required packages are not included in the SMS77. The SAE determines if these interdependency packages should be added to the new software load.
- Section 4: Lists the required features that are not identified in the SMS77 or the polling. All features added in this section are at an orderable status and are checked for interdependencies by the SAE.
- Section 5: Lists global updates required for the specific BCS load being delivered.
- Section 6: Identifies global package upgrades required to support the new BCS load.

The SMS77 report is the software job order list that is retrieved from the Software Management System (SMS) database. The report has two sections:

- Section A: Customer Feature Package Order: List of master and feature packages ordered by the customer in the CI document, section 2, part 1.
- Section B: Committed Feature List: List of customer-ordered feature packages that were not available when ordered. The feature package will be added to the job as soon as it is ready to manufacture (RTM).
- Section 7: Identifies software features that are manufacture discontinued and the required upgrade package that replaces it.

- Section 8: Lists limited software features that have been approved, rejected, or are pending approval. The SAE must ensure that approved packages are added in the appropriate section of the automail for them to be included in the load.

Example of AUTOMAIL VERIFICATION

```

*****
AUTOMAIL JOB INFORMATION
Site:      XXXXXXXX          CLLI:      XXXXXXXX
COEO:     XXXXXXXX          Target:    MC68020
From BCS: 32                To BCS:    33
D/R Date: 01/23/93         Type:      ON2 BCS
DSU CLLI: XXXXXXXX          OFCENG:    XXXXXXXX
Telco:    XXXXXXXX          Polled BCS: 32
Due Date: 08/27/92

Automail Generated: 09/08/92
Automail has been verified
Automail was returned on 09/09/92
No package changes were made

NT Engineering Contacts:
Name       : XXXXXXXX
Phone     : XXXXXXXX
Alternate Name : XXXXXXXX
Alternate Phone: XXXXXXXX
Alternate Name : XXXXXXXX
Alternate Phone: XXXXXXXX

*****
SECTION 1 - PACKAGES IN THE SMS77 BUT NOT IN POLLING

Packages marked 'Y' will be deleted from the JFDB.
Limited Packages marked 'K' will be kept in the JFDB but will
not be flagged (delivered) in this load. Use this feature for
intermediate loads.

Contact your regional limited feature coordinator to receive
approval for limited packages. The JFDB administrator at RTP will
change the flag from 'A' to 'L' upon receipt of authorization.
Global updates should not be deleted from the JFDB.
A+M packages should not be ordered unless already existing in
polling.

Package  Status  Flag  Delete?      Package  Status  Flag  Delete?
-----  -
NTXA18AA LTD    P     N           NTXN75AA RTM    A     N
NTXD44AB LTD    P     N           NTXP00AA LTD    P     N
NTXF71AB LTD    P     N           NTXR46AA RTM    A     N
NTXN65AA LTD    P     N

```

Example of AUTOMAIL VERIFICATION (cont.)

```
*****
SECTION 2 - PACKAGES IN POLLING BUT NOT IN THE SMS77
Packages marked 'Y' will be added to the JFDB.
Package      Add?      Feature      Add?      Package      Add?
-----      -
NTXD44AA     N           NTXF71AA     N
*****
SECTION 3 - SOFTWARE INTERDEPENDENCIES IN THE JOB
ALL INTERDEPENDENCIES ARE PRESENT IN THE JOB
*****
SECTION 4 - OTHER PACKAGES TO BE ADDED OR DELETED
No packages have been added via this section
No packages have been deleted via this section
*****
SECTION 5 - GLOBAL UPDATES FOR THE U.S.
NO GLOBAL UPDATE PACKAGES MISSING
*****
SECTION 6 - GLOBAL PACKAGE UPGRADES FOR THE U.S.
NO GLOBAL UPGRADE PACKAGES MISSING
*****
SECTION 7 - PACKAGES MANUFACTURE DISCONTINUED IN THE U.S.
NO MD PACKAGE UPGRADES MISSING
*****
SECTION 8 - LIMITED PACKAGE APPROVAL STATUS

Please Note:  Approved packages are not automatically added.
If you want a package, check that it has not been added in the
appropriate section.

Limited Feature      Status
-----
NTXA18AA             Pending
NTXD44AB             Pending
NTXF71AB             Pending
NTXN65AA             Pending
NTXP00AA             Pending
*****
```

Example of SMS77 Job Order List

```

                SMS77
                *****

    CUSTOMER FEATURE PACKAGE ORDER FOR RTP
    -----
COEO: HXXXXXX_XX
OFFICE  : ABCDEF_GG  STATE
SYSTEM  : 1/ZZ
ENG     : BCS22
VERSION DATE : WXYZ
LAST SHIPPED : BCS20ZS ON 880913
        F N
        L O

ORDERED      STA AT INPUT LAST SHIPPED
PACKAGE      TUS GE  DATE BCS      DATE  TITLE

NTX008AB02  RTM S XXXXXX BCS20ZS 880913 PBX INTERFACE II
NTX019AA01  RTM S XXXXXX BCS20ZS 880913 CIVIC SERVICES
NTX020AB03  A+M S XXXXXX BCS20ZS 880913 VERTICAL SERVICES I
                                         (UPGRADED BY NTX020AC)
NTX021AA03  RTM S XXXXXX BCS20ZS 880913 REMOTE CALL FORWARDING
NTX042AA04  RTM S XXXXXX BCS20ZS 880913 LOCAL AUTOMATIC MESSAGE
                                         ACCOUNTING (LAMA)

    Remaining feature packages are listed

NOTICES AND NOTE EXPLANATIONS
    SMS77
    *****

    PACKAGES INCLUDED IN MASTER PACKAGES FOR RTP
    -----
COEO  : HXXXXXX_XX
OFFICE  : ABCDEF_GG  STATE
SYSTEM  : 1/ZZ  ENG   : BCS22
VERSION DATE : WXYZ
LAST SHIPPED : BCS20ZS ON 880913

MASTER      INCLUDED  STA
PACKAGE     PACKAGE   TUS  TITLE

NTX286BA02  NTX134BA02 RTM  REM OPERATOR CENTRAL DATA LINK HANDLING
NTX171CA02  RTM  MCCS CALL PROC (ORDER VIA MASTER_PACKAGE)

    (Remaining list of packages which are included in master packages)

```

Appendix F-Abbreviations

AMA	Automatic Message Accounting
API	Advance Product Introduction
BCS	Batch Change Supplement
BCS IS	Batch Change Supplement Insertion Schedule
BNR	Bell Northern Research
BOC	Bell Operating Company
CADES	Computer Aided Design Engineering System
CAP	Change Application Procedure
CC	Central Control
CCC	Central Control Complex
CI	Command Interpreter
CI	Customer Input

COCOS	Corporate Communications System
COEO	Central Office Equipment Order
COT	Customer Order Tracking
CPU	Central Processing Unit
CSR	Customer Service Report
D	D Date on RFS
DCI	Delivery of Customer Input
DFDB	Desired Features Database
DMSE	DMS Evolution
DNC	Dynamic Network Controller
DPP	Distributed Processing Peripheral
DS	Data Store
DSU	Data Store Unit
ECM	Engineering Change Memorandum
EMG	Emergency
EST	Eastern Standard Time

FAST	First Application System Test
FTDB	Feature Tracking Database
GA	General Availability
IBN	Integrated Business Network
ISS	Installation Support System
IS	Insertion Schedule
IOC	Independent Operating Company
IU	In Use
JFDB	Job Features Database
JIM	Job Information Memorandum
LDMATE	Load Mate
LTD	Limited
MOP	Method Of Procedure
MRL	Material Requirements List
NSR	Network operating system Software Release
NT	Northern Telecom

NTI	Northern Telecom, Inc.
OBE	Obsolete Emergency
OBR	Obsolete Replace By
OBS	Obsolete
OC	Operator Centralization
OFCENG	Office Engineering
OFCOPT	Office Options
OFCSTD	Office Standards
OFCVAR	Office Variables
ONP	One Night Process
OPM	Outside Plant Module
PARM	Parameter
PCL	Product Computing-Module Load
PM	Peripheral Module
PS	Program Store
RFS	Request For Schedule

RQ	Required
RSC	Remote Switching Center
RTM	Ready To Manufacture
RTO	Ready To Order
RTP	Research Triangle Park
SAE	Systems Application Engineer
SDPM	Software Delivery Process Manual
SFDEV	Store File Device
SIF	Site Inform List
SMS	Software Management System
SOLID	Software Office based Loadbuild Information Database
SPE	Software Production Engineer
SSE	Software Systems Engineer
STP	Signal Transfer Point
SWACT	Switch Activity
SWAP	Software Application Process

SYNC	Synchronous
TAS	Technical Assistance and Support
TBD	To Be Determined
TEO	Telephone Equipment Order
TL	Total
XMS	Extended Multiprocessor System
XPM	Extended multiprocessor system PM

Appendix G-Glossary

Abort

Termination of a BCS application when an unrecoverable error or malfunction occurs, or when directed by the operating company.

Active BCS

Software release designation for a previous software release once a new production software release becomes available. At any given time, the BCS stream includes 1 production, and 5 active levels. The remaining levels are retired.

Application

Installation of the new software into the DMS switch. A software application may be performed by an NTI software application engineer or telephone company personnel. An "application" may also be called an "insertion" or an "upgrade."

AutoApply

Automated series of programs for upgrades to BCS 25 through 28 which determine the routines needed for an office upgrade, and runs them with limited engineer input and intervention. Used with NTI- or telco-administered upgrades.

AutoImage

Feature which takes the office image automatically without user intervention. It stops journal file and then restarts it after the image is taken.

Automail

Automated electronic mailing system for core/regional information exchange regarding software orders.

Batch Change Supplement (BCS)

Software load or release which consists of base level software and a collection of feature packages. A new BCS is released two or three times per year.

BCSUPDATE

DMS-resident program in BCS 29 and higher that applies the new datafilled software load into the switch during the One Night Process (ONP) software delivery and the Hybrid process software delivery. If the "From BCS" is BCS 28 or below, BCSUPDATE must be loaded into the switch.

Bulletin

See Software Delivery Bulletin System.

CHECKTAB

Program available with BCS34 and lower which identifies errors and inconsistent data in selected tables. These problems should be corrected before the software delivery. (Also see TABAUDIT.) TABAUDIT or CHECKTAB is more powerful than TABCHK.

Controlled introduction

Status designation for new software feature packages that are not yet generally available. These packages require approval from NTI Marketing, New Product Introduction, for inclusion in a software order.

Conventional software upgrade

Software upgrade to BCS 28 or lower which transfers data through dump and restore, and installs the new load using the manual or AutoApply method. It requires a data freeze period.

Core

Centralized Northern Telecom INS organizations located in the Research Triangle Park area of North Carolina. For software delivery, the term refers to the centralized RTP organizations which perform software delivery functions in all regions.

Custom calling features

Features that can be altered by residential and business subscribers, such as speed calling and call forwarding.

Customer

DMS switch owner such as a telephone company or operating long distance carrier. Should not be confused with residential or business telephone subscribers.

Customer input

Specific information that is needed from the customer (telephone company) before provisioning and production of new software can begin. Customer specific information for a new software load is recorded on the CI (customer input) document.

Data Exception Report (DER)

A delta is run after the dump and restore process in the conventional and hybrid software delivery methods. The DER resulting from the delta indicates any data changes from the old to the new loads.

DMS Evolution

Transition from BCS software releases to standardized PCL loads.

Dump and restore

Process of dumping all office data from the old BCS load and restoring it into the new BCS load. This applies only to the conventional and hybrid software delivery processes.

Fail

Condition of a software upgrade in which the customer or any of its subscribers experience any type of service degradation as a result of the software delivery.

FAST (First Application System Test)

Northern Telecom facility for testing new software loads. FAST I is in Canada; FAST II is in the Research Triangle Park area.

Frozen image

"Snapshot" image of the switch when the data is frozen, allowing no service orders. The frozen image tape is sent to NTI where the data is dumped from the old load, and restored to the new load. The frozen image is required only for the conventional and hybrid software delivery processes.

Gating hardware

Hardware required for a new software load because of a specific feature or the entire BCS release.

General availability

Feature packages that are available for order by any customer.

Hardware extensions

Requests for upgrades to existing hardware. Hardware extensions may also have software requirements.

Hybrid software upgrade

Software delivery option for larger offices beginning with BCS 29 which moves office data through the conventional dump and restore procedure, and applies the load using BCSUPDATE resident software tools.

Image tape

Magnetic tape containing the datafilled software load which is produced by the telco and sent to NTI for testing or dump and restore. A system image tape is not necessarily a frozen image.

Inform list

List of feature packages and patches currently present in the office. The inform list is obtained when NT dials into the customer's switch and requests it.

Initial order

Customer order for a new DMS or network product. The initial order schedule establishes the common base for all other order types for that job, including information that identifies the customer, the location, product and other data pertinent to the order.

Insertion

Installation of new software into a DMS switch. The terms "upgrade," "insertion," and "application" are synonymous.

In-sync

See "Sync"

JFDB (Job Features Database)

NTI database that stores office- and job-related information. It is used during software production to generate a list of feature packages to include in the new software load.

JFFREEZE

Feature activated prior to dump and restore that assists in making the image tape and preparing the journal file.

Job book

Internal NTI tracking notebook that follows a software job from Loadbuild through the software delivery. Each group inserts relevant documentation that can be used by later groups in the process.

Journal file (JF)

Collection of stored service orders made during the office data freeze period. The journal files are rotated daily and applied during the application.

Loadbuild

Series of processes that merge DMS base level software with ordered feature packages into a customized undatafilled software load. This term also refers to the group that performs these procedures.

Loadmate

Process of loading the new software load into the inactive side of the switch to begin the software delivery.

Manual apply process

Series of programs requiring much engineer input and intervention to apply a software load through BCS 24.

MemCalc

Software tool which calculates program and data store requirements for a new software load based on the existing switch configuration.

Monitor

Phase of the software delivery during which telco observes logs and switch performance. This phase begins when the software insertion is complete. If technical assistance is needed, site may call Northern Telecom TSC (Technical Service Center).

MOVEBCS

DMS-resident program in BCS 29 and higher that moves the data from the old software load to the new load during the One Night Process (ONP) software delivery. If the "From BCS" is BCS 28 or below, MOVEBCS must be loaded into the switch.

NSR (Network Software Release)

Software loads for the Dynamic Network Controller family of products (DNC-500, DNC-100, etc.)

NT-Access

Computerized on-line questionnaire used by the telco to input provisioning information for an order.

One Night Process (ONP)

Software delivery option for smaller offices beginning with BCS 29 which moves data (using MOVEBCS) and applies the new load (using BCSUPDATE) in one night, eliminating the need for freezing office data.

PARMMail

Electronic transmission of software parameters requested by the telco for the new software load. The PARMMail is sent to the regional software system engineer (SSE) who then verifies and forwards it to core for setting the parms.

Parms (Parameters)

Software variables which are identified in four software tables in the DMS switch: OFCENG (office engineering), OFCSTD (office standards), OFCOPT (office options), OFCVAR (office variables). Parameters are used

by the DMS software during switch operation to define the length of timing intervals, routing options, and other elements in the switch.

Pass, by process

Any BCS application that takes place with no unplanned activities, e.g., software parameters changes, patches needed, translation changes, defective hardware.

Pass, with process intervention

Any BCS application that requires some unplanned activities to avoid service-affecting issues.

Patch

Rewrite to an existing software load which changes only a small portion of data or program.

Polling

Process of dialing into the customer switch prior to the software upgrade to obtain memory and other information on the existing system.

Pre-application procedure

Series of pre-application office checks to ensure that the office is ready for the software upgrade. The NTI BCS Pre-application engineer performs these procedures with telephone company site personnel on the DMS switch.

Production BCS

Software release designation used to indicate the most recent software release.

Regions

NTI organizations located in the major regional areas of the United States that perform various customer interface functions in the software delivery process.

Reschedule

Condition in which a scheduled software upgrade is cancelled and re-scheduled due to an unexpected problem or issue that would impact the success of the software delivery. This condition occurs after the production flag is set in loadbuild, but before sync is dropped for the application.

Retired BCS

Designation for a software release which has been followed by six newer software releases (five active and one production) and is, therefore, no longer supported by NTI.

RTP dump and restore

Process in which the telco sends a frozen image to NTI, and captures service orders through journal file. In an NTI captive lab, the data is dumped from the image and restored to the new load in a captive lab one week before the application.

Service orders

Process of changing customer data in the switch. For conventional and hybrid software deliveries, service orders are not allowed during the data freeze period. Any required service orders are collected in journal files, which are then applied during the application.

Soak rule

Policy requiring all gating hardware to be installed 12 days before the scheduled insertion date to ensure good working order.

Site dump and restore

Process in which the site switch is used for the dump and restore through dial-up ports one day before the application. Service orders are suspended.

Split site dump and restore

Process similar to the site dump and restore except that service order activity is provided during the time between the dump and restore procedures.

Software delivery

Process of updating software in existing in-service telephone office. The term also refers to installing software loads in new DMS offices.

Software Delivery Bulletin System

Computerized menu-driven bulletin system on C-SCAN that provides temporary "workaround" procedures for conditions that have been identified to be changed. Bulletins contain information that has not yet been released in NTI documentation.

Software extensions

Requests for software-only upgrades to existing DMS switches, Network Products or remotes.

SWACT (SWitch of ACTivity)

Switching of all switch activities and operations from the old software load to the new load. The inactive side with the new software becomes the active side.

SWAP

Software delivery process for DMS 250, DMS-MTX, SL-100, and all Canadian and international DMS 100 Family switches.

Sync (synchronization)

Process of having active and inactive sides running on the same software load, with the inactive side serving as backup to the active side (duplex mode). When the switch is out-of-sync (simplex mode), the inactive side is being used for another purpose, such as upgrading to a new software load, and cannot back up the active side.

TABAUDIT

Program available with BCS35 and higher which identifies errors and inconsistent data in selected tables. These problems should be corrected before the software delivery. (Also see CHECKTAB.) TABAUDIT or CHECKTAB is more powerful than TABCHK.

TABCHK

Program which identifies basic inconsistencies in tables, including false tops and bottoms. TABCHK is not as powerful as TABAUDIT or CHECKTAB, but it can be used on all tables.

Telco

Telephone company, Northern Telecom's customer.

Undatafilled image

DMS base level software combined with all feature packages ordered by the telephone company, but without office data assignments (line, trunk assignments, routing options, etc.) An undatafilled system image tape is produced during the loadbuild process.

Upgrade

Installation of new software into a DMS switch. The terms "upgrade," "insertion," and "application" are synonymous.

Verification Office (VO)

Telco offices which test new software releases before they become generally available.

DMS-100 Family
Software Delivery
Software Delivery Process Description

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