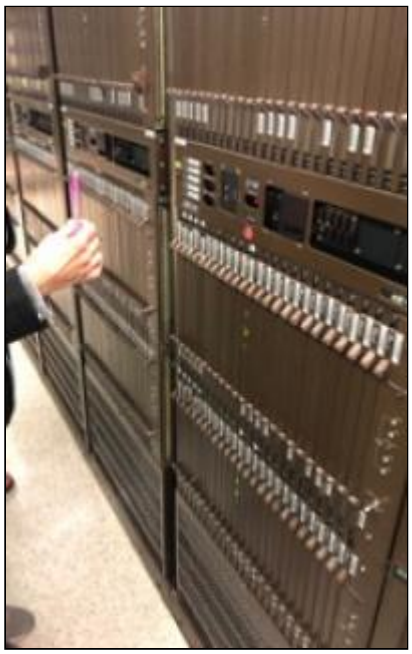
Hands-On

DMS-100 System Maintenance and Troubleshooting

Virtual Live Instructor-led or Available On-Site

Course Description



The Nortel DMS-100 is still one of the most common switches installed in the world today, and remains so due to its high reliability and low-latency for voice circuits.

This extensive Virtual Live Instructor-led DMS-100 course provides the skills required to perform maintenance and a high-degree of troubleshooting, and will walk the student through a practical understanding of the Genband (Nortel) DMS-100 switching system. It discusses the general system architecture used by all Digital Multiplex System switches, with functional block diagrams of the switch and its main modules, including the SN/XAC front-end, the Network (JNET & ENET), MS, CCS, IOD, and the various PM and LCM types for Line and Trunk peripherals, plus RCU, RLCM, OPM, and GR-303-compliant remotes. MAP and RTIF terminal use are explained, plus remote access through serial TTY and telnet. MAP alarm & fault interpretation are demonstrated, using data from the MAP and from logs, showing the student how to locate suspect cards within the system. The Helmsman documentation viewer and Nortel Technical Publications (NTPs) are covered in detail, with an emphasis on documents used for maintenance and troubleshooting procedures.

Previous troubles are reviewed and used as exercises, including LNS line and TRKS trunk maintenance, but also parts of the SuperNode/XA-Core front-end (SN) including the Computing Module (CM), Network (NET), Message Switch (MS), and CCS (SS7) modules. Peripheral Modules (PM), and modules of particular interest to the students are emphasized. Different equipment types are compared where necessary (network & CPU). IOD maintenance is also discussed, including procedures to back-up the Program and Data stores, and a discussion of how hard disks, tape, and billing devices are connected to the system. Special topics like the Star Hub, Remote Concentrating Cluster (RCC), Subscriber Module Access (SMA2), Emergency Stand Alone (ESA), Remote Measurement Module (RMM), etc. can also be discussed per the needs of the class.

Our non-intrusive exercises equip the student to conduct day-to-day maintenance activities and show how to perform troubleshooting procedures, including aspects of cabling and the backplane, which helps prepare them for higher-tier support interaction. The course is flexible, allowing the most important content for a particular group of students to be emphasized.

Students Will Learn

- **Switching Fundamentals**
- **DMS-100 Theory of Operation**
- **Terminal Access MAP, RTIF & IP**
- **Primary bays and modules used in the DMS-100, including different types of remotes, CCS7**
- **connections, and different network (JNET vs. ENET) or different CPU (SN vs. XAC)**
- **How to use the MAP Command Interpreter with CI, MAPCI**
- **How to use Logutil and SERVORD commands**
- **Use documentation including Helmsman viewer, NTPs, and installation methods**
- **How to find the physical location of a fault**
- **How to change cards in various bays**
- **How to query directory numbers, view certain tables, and run hardware/software reports**
- **Basic service order processing**
- **Where to find Emergency Action procedures**
- **And much more...**

Target Audience

Technical staff such as Central Office Technicians, combo-techs, and those who are responsible for the maintenance and troubleshooting of Central Office systems, plus NOC/SCC personnel who must respond to alarms. No previous switching background is required, although some familiarity with CO equipment will be beneficial. Certain management and provisioning personnel will also benefit, providing a greater understanding of the resources needed for the system, and how to program it.

Prerequisites

A basic understanding of telecommunications and switching principles is helpful due to the accelerated nature of the course. Our BTS Telephony for Telecom Techs or our TDM Switching Fundamentals courses are available for students with little or no previous telecom background.

Course Outline

Module 1 : Switching Fundamentals
- T&R, E&M, 2/4/8 Wire
- Supervision & Signaling
    - Negative Battery
- AC & DC Superposition
- Decibels

logarithmic scale
copper & optical measurements
    - Digital: A/D & D/A Conversion

Nyquist Theorem
Multiplexing Samples
PCM bit depth - 8 bit, 10 bit
    - Time Division Multiplexing (TDM)

Pulse Code Modulation (PCM)
DS0/1/3
DS-30, DS-30A, DS-60, DS-512
E1, PCM30
SR128, SR256
Line Coding
AC & DC Signals
- Transport: AMI, B8ZS, OC-x, STS-x
- Carrier Signal Comparison
- Binary & Hexadecimal overview
- PSTN & CCS7 Overview
- Why Legacy PSTN Support

Module 2 : DMS-100 Theory of Operation
- Multiplexing PCM Channels
- Time-Switch-Time Philosophy
- DMS-100 Topology
- Switch Capabilities
- Functional Block Diagrams
- Time Stage/PM
- Space Stage/Network incl. 16K, 64K, 128K XPT
- Hardware Modules:
SuperNode & XA-Core, incl. SLM, RTIF
ENET & JNET types
IOC
LPP incl. LIU7 & EIU
PM Series I, II, & III
DS-30/512 Links
Aux PM: LCM, Drawers, BIC
SPM & OC-x
TM Peripherals
SMA2 & GPP: GR-303 remotes, EOC & TMC channels
Remotes: RCU, RLCM, OPM, DMS-1, RMM, etc.
Service Equipment
- End-to-End Call

Module 3 : Terminal Access - MAP & RTIF
- Maintenance and Administrative Position (MAP)
RS-232C, Terminal Server
- Map Login ($$, Break, ?), Logout
- Command Interpreter (CI) Commands
CI (Non-Menu) Commands
Non-Menu Commands
Menu Commands
MAP command prompt, CM, MS, IOD, Net, PM, CCS, Trks, Ext, Appl
- Telnet
Terminal Server, EIU, table IPNETWRK, XAC ETHR
- Remote Terminal Interface (RTIF)
RTIF Indicators
9X26, NTLX03, NTLX08
RTIF-to-CM/XAC Cabling
- NTP 297-1001-129 - Input/Output System

Module 4 : Commands
- Sample CI Commands
SYS (Non-Menu) Commands: msg, restart, permit, etc.
Logutil
Tables
- Sample MAPCI Commands
Menus vs. CI
MTC, other choices, disambiguating menu choices
Lns & Trks sub-menus

Notes

This course can also be delivered in 5-8-10 day formats, depending upon the number of labs and specific topics covered.

The course is designed to run in a Live Instructor-Led Virtual Classroom setting, where additional length is added upon request to provide a greater understanding of foundational topics, such as telecom network/stored-program control background, PCM theory, hexadecimal-binary-decimal conversion, and the many tracing functions available in the DMS-100. Complex Tier-2 troubleshooting concepts can also be introduced with this course including various debug logs, inter-bay cabling, and backplane fault analysis. Virtual Field Trips can be added to allow students an opportunity to see and understand where all the parts of the system are found, what they do, and provide a better end-to-end understanding of the switch.

This course can be combined with other courses like CO Switching Fundamentals, the DMS-100 Support Course, and the DMS-100 Translations Course for a customized curriculum.

Delivery Method

LIVE Virtual Instructor-led with a flexible approach that adjusts content most relevant to students. Includes various non-intrusive labs, demonstrations, and exercises to help students focus on and retain the material presented.

Equipment Requirements

(This apply's to our hands-on courses only)

Students must have Virtual and or remote access to a DMS100 Switch for this training.

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

5 Days