Hands-On
5ESS Switch Analysis

Course Description

Network Operations Center (NOC) 5ESS Switch Analysis Benefits

-Improved Maintenance
-Improved Customer Service
-Enhanced Technical Skills
-Reduced Vendor Escalations
-Reduced Maintenance Costs
-Outage Occurrences Reduced

This course begins with a brief overview of the 5ESS Switch. The 5ESS Analysis tools are presented next and include the 5ESS Plant 24 report, deciphering Output Messages, Output Message Routing, 5ESS Log Files and Operational Support System (OSS) filter procedures.

The Analysis presented in this course consists of Post Initialization Analysis, Remote Switching Module Stand Alone Analysis, Single Process Purge (SPP) Analysis, Return To Point Of Interrupt (RPI) Analysis, Communication Module TMS Post Mortem and Asynchronous Failure Analysis, Audit Analysis, Assert Analysis, Transport Facility Performance Monitoring Analysis, Machine Detected Interoffice Irregularities (MDII) Analysis, Cutoff Call Analysis and Peripheral Error Analysis. Each lesson provides procedures, tables, charts and a What To Do Next discussion. These lessons also identify 5ESS Switch documentation that can be used for further analysis.

Students Will Learn

- **The objective of 5ESS Switch Analysis is to train maintenance personnel to identify and analyze 5ESS Switch performance problems. After completing this course, the student will be able to**
- **Evaluate the level of service a 5ESS is providing based on a Plant 24 Report**
- **Identify where 5ESS Output Messages are being routed**
- **Retrieve 5ESS Output Messages from 5ESS Log Files and from your Operational Support System (OSS)**
- **Analyze an Administrative Module, Communication Module and Switching Module Initialization**
- **Analyze Single Process Purge (SPP) and Return To Point Of Interrupt (RPI) Failures**
- **Analyze TMS Post Mortem and Asynchronous Failures**
- **Analyze UNIX RTR and 5ESS Audit Messages**
- **Analyze Manual Action, Routing and Terminal Allocation (RTA), and Defensive Check Failure (DCF) Asserts**
- **Analyze Transport Facility Performance Monitoring Messages**
- **Analyze Machine Detected Interoffice Irregularities (MDII)**
- **Analyze Cutoff Call failures**
- **Analyze Switching Module Peripheral Errors**

Prerequisites

Basic knowledge of the physical and functional structure of the 5ESS Switch Modules and units
Administrative Module (AM)
Communications Module (CM)
Switching Module Processor (SMP) Module Controller and Time Slot Interchanger (MCTSI)
Switching Module Peripheral Units, such as
-Line Unit (LU)
-Access Interface Unit (AIU, XAIU & EAIU)
-Digital Carrier Line Unit (DCLU)
-Integrated Services Line Unit (ISLU & ISLU2)
-Integrated Digital Carrier Unit (IDCU)
-Packet Switch Unit (PSU & PSU2)
-Digital Line Trunk Unit (DLTU & DLTU2)
-Digital Network Unit SONET (DNU-S)
-Optical Interface Unit (OIU)
-Local Digital Service Unit/Function (LDSU & LDSF)
-Global Digital Service Unit/Function (GDSU & GDSF)
-Integrated Services Test Function (ISTF)
-Recorded Announcement Function (RAF)
-Service Announcement System (SAS)
-Directly Connected Test Unit (DCTU)
-Modular Metallic Service Unit (MMSU)
5ESS Recent Change and Verify procedures
Ability to use 5ESS Switch DynaText support documentation, such as
-Translations Guide (235-080-100)
-Maintenance/Retrofit/Update/Growth Doc. (235-105-xxx)
-DynaText Recent Change Procedures (235-118-xxx)
-DynaText Software Documents (235-600-xxx)
-Input Messages Manual
-Output Messages Manual

Course Outline

Customized Lessons That Will Be Developed for You

Lesson 1 - Overview and Introduction to 5ESS Switch Analysis
This lesson, 5ESS Switch Overview, presents a brief overview of the 5ESS Switch. This overview presents the hardware structure of the 5ESS Switch which includes defining the Administrative Module, Communication Module and Switching Module. It also states the function of the 5ESS Switching Module Peripheral Units and presents their connectivity to the Switching Module Processor and Time Slot Interchanger. This establishes some of the basic knowledge needed for the remainder of this course.

Lesson 2 Plant 24:
The PLANT 24 lesson presents and analyzes the 5ESS Plant 24 Report. The Plant 24 Report contains Parts that can be used to evaluate the level of service currently being provided by a 5ESS Switch. This lesson presents these Plant 24 Parts and

provides procedures on how to interpret them. The emphasis is placed on identifying operational and service performance problems that have occurred. During this lesson, three 5ESS Switches will be evaluated. This lesson includes references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Lesson 3 Output Messages and Log Files:
This Output Messages and Log Files lesson defines the characteristics of 5ESS Output Messages, how they are routed and the 5ESS Log Files they are logged to. This is accomplished by presenting Output Message Classes and explaining how Output Messages are routed based on the Equipment Configuration Database (ECD) - Class Definition Record, form "classdef." The lesson also presents the Input Messages OP:LPS,MSGCLS and OP:OUTCLS which identify Message Class printing and logging status. Next, the lesson addresses log files. The log files addressed are the Administrative Module UNIX RTR Log Files, Common Network Interface Log Files and 5ESS Log Files.

Lesson 4 Initialization Analysis:
The Initialization Analysis lesson presents procedures for post recovery analysis of Administrative Module Initializations, Communication Module Initializations, Switching Module Initializations and Common Network Interface Initializations. Recovery from an initialization is covered in Alcatel-Lucents System Recovery (235-105-220) document and CNI Common Channel Signaling (235-200-115) document. After recovering from an initialization it is very important to identify why the initialization occurred so corrective actions can be performed so the initialization does not reoccur. This lesson presents this post initialization analysis. The lesson analyzes Initialization Messages, other Printouts associated with the initializations, Administrative Module Postmortem printouts, Communication Module Event History (Postmortem) printouts (and dumps), Switching Module Event History (Postmortem) printouts (and dumps) and Common Network Interface Log Files. The lesson includes references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Lesson 5 TMS Post Mortem and Asynchronous Failure Analysis:
This TMS Post Mortem and Asynchronous Failure lesson presents procedures to analyze TMS failure printouts and identify the circuitry involved with the failure. The lesson provides a detailed description and handouts of the CM2 Office Network and Timing Complex (ONTC) and TMS terminations. It then relates the different TMS printouts, reports and dumps to their physical components. The lesson also identifies how to determine the direction (CM or SM) the TMS error was received from. The lesson includes register breakdown examples, charts and references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation.

Lesson 6 MMRSM, RSM, ORM and EXM Stand Alone Analysis:
This MMRSM, RSM, ORM and EXM2000 Stand Alone Analysis lesson presents procedures for the post analysis of a Multi Module Remote Switching Module (MMRSM), Remote Switching Module (RSM), Optically Integrated Remote Module (ORM) and Extended Switch Module 2000 (EXM2000) Stand Alone occurrence. Recovery from a Stand Alone is covered in Alcatel-Lucents System Recovery (235-105-250) document. After recovering from a Stand Alone it is very important to identify why the Stand Alone occurred so corrective actions can be performed to ensure the Stand Alone does not reoccur. The Recovery from a Stand Alone usually identifies and cares for the cause of the outage. The next important item is to identify the time frames of the Stand Alone and its service impact. This lesson presents procedures to identify when the Stand Alone occurred, the impact to service caused by the Stand Alone and when the Stand Alone cleared. These items are usually required for regulatory notifications of the service outage. The lesson includes references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Lesson 7 Single Process Purge (SPP) and Return to Point of Interrupt (RPI) Analysis:
This lesson, Single Process Purge (SPP) and Return to Point of Interrupt (RPI) Analysis, presents procedures to analyze SPP and RPI events and messages. The lesson begins by defining what an SPP and RPI is and the type of failures they identify. The lesson then addresses analyzation procedures for Dual Link Interface (DLI) and Network Link Interface (NLI) failures, Data Interface (DI PIDB PARITY) failures, Control Interface (CI) failures and Memory (CORR BIT, MEM-SYSTEM and PARITY ERROR) failures. This includes the analysis of other related and supplemental messages created by the failure. The effect to customer service is also discussed with each problem. This lesson includes references to Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Lesson 8 Audit Analysis:
The Audit Analysis lesson presents procedures to analyze UNIX RTR and 5ESS Application Audit messages. The lesson begins by defining what an Audit is, the different types of Audits and how Audits are run. From this point, the lesson goes on to present procedures to analyze UNIX RTR Audits. The lesson presents the UNIX RTR Audit and then uses Alcatel-Lucents Output Manual (235-600-750) and Audits Manual (235-600-400) to analyze a UNIX RTR Audit. Next, the lesson presents a brief overview of Dynamic and Static Relations. This knowledge is required in order to analyze 5ESS Application Audits. The 5ESS Application Audit analysis identifies how the Audit was run (Segmented, Elevated or Non Segmented (Directed/Demand)) and how the Audit was requested. Several 5ESS Application Audit Events are analyzed along with relating the Audits to other failures, such as Asserts. This lesson includes references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Lesson 9 Assert Analysis:
This Assert Analysis lesson presents procedures to analyze Manual Action Asserts, Routing and Terminal Allocation (RTA) Asserts and Defensive Check Failure (DCF) Asserts messages. The lesson begins by defining what an Assert is, the variety of failures they identify and the different types of Asserts. Next, the lesson addresses each of the Assert messages: Manual Action Asserts, Routing and Terminal Allocation Asserts and Defensive Check Failure Asserts. The lesson presents procedures on how to obtain an Assert definition through the 5ESS Unix Shell (RCV:MENU:SH) and Alcatel-Lucents DynaText Assert Manual (235-600-500). The lesson goes on to analyze each type of Assert message and its related messages including any related audit messages. This lesson also presents several 5ESS Switch Data Structures used to store call processing information in Assert Stack Frames and Register Dumps. The analysis procedures presented include references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation.

Lesson 10 Transport Facility Performance Monitoring:
The Transport Facility Performance Monitoring lesson presents Transport Facilities as they relate to the 5ESS Switch. The lesson begins by defining the transport facilities within the telecommunications industry. This is followed by identifying how these transport facilities terminate in the 5ESS Switch. In order to understand Performance Monitoring, the students need a short analog/digital conversion presentation which is presented next. This leads into Line Coding, Framing and Signaling along with where these items are optioned in the 5ESS Switch. The lesson completes by presenting 5ESS Performance Monitoring and 5ESS Switch Transport Facility fault analyzation procedures. This lesson includes references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Lesson 11 Machine Detected Interoffice Irregularities (MDII) Analysis:
The Machine Detected Interoffice Irregularities (MDII) Analysis lesson Trunk operation and how Trunk operational and signaling failures are identified through Machine Detected Interoffice Irregularity (MDII) messages. This lesson presents procedures to analyze Machine Detected Interoffice Irregularities. The lesson begins by defining what an MDII is and the

reasons why they occur. This is followed by presenting and deciphering the MDII output message along with determining the effect on customer service. The lesson provides procedures on how to obtain MDII printouts based on failure type and/or Trunk Group. Throughout this lesson different MDII printouts are presented and analyzed. This lesson includes references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Lesson 12 Cutoff Call Analysis:

This Cutoff Call Analysis lesson presents procedures to detect and identify the source of customer Cutoff Calls. The lesson begins by defining what constitutes a cutoff call and how daily cutoff call counts are reported in the 5ESS Switch. The lesson then provides Cutoff Call maintenance input messages and several filters to obtain Cutoff Call output messages. Seven Cutoff Call messages are analyzed and the physical equipment involved with each Cutoff Call is identified. The lesson completes by presenting several helpful hints to determine the source of Customer Cutoff Calls. This lesson includes references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Lesson 13 Peripheral Unit Error Analysis:

This Peripheral Unit Error Analysis lesson presents two procedures to identify and correct Peripheral Unit Errors. The lesson starts by defining Peripheral Unit Errors and what they can escalate to. Next, the lesson presents the Peripheral Unit Error Analysis procedure stated in Alcatel-Lucents 5ESS Switch System Maintenance Requirements and Tools document (235-105-110). This is followed by presenting a second procedure involving the analysis of Switching Module Event History (Postmortem) printouts. Both procedures can identify failing circuits and components. This lesson includes references to Alcatel-Lucents Dyna Text 5ESS Switch support documentation and relates procedures in the lesson to the documentation.

Delivery Method

Instructor-Led with numerous Hands-On labs and exercises.

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

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