

HPE Integrity NonStop Operating System Architecture U8609S

HPE course number	U8609S
Course length	5 days
Delivery mode	ILT, VILT
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This course provides an in-depth understanding of the J-series and L-series HPE NonStop Operating Systems architecture. It includes Itanium and x86-64 based processors, modular I/O, and Cluster I/O subsystems, as well as their ServerNet and InfiniBand fabrics. It also includes debugging, run-time architecture, memory management, process control, and synchronization. TNS/X, TNS/E, and TNS process executions are explained, along with the internals that support user services. User services such as Guardian and Open System Services (OSS) file systems and process control are also examined.

Audience

System programmers, field analysts, application designers

- Know when to use a particular debugger
- Understand ordinary DLLs and programs using DLLs

Prerequisites

At a minimum, students attending this course should have the following VMware infrastructure skills:

- Concepts and Facilities for HPE NonStop Systems (U4147S)
- Working knowledge of C/C++ or pTAL

Course objectives

By the end of the course, you should be able to meet the following objectives:

- Understand Itanium and x86-64 based HPE NonStop systems
- Know when to use a particular debugger
- Understand ordinary DLLs and programs using DLLs
- Describe how virtual addressing is supported by the addressing schemes of TNS/X, TNS/E, and TNS processes
- Understand the fundamental tools and mechanisms used by the HPE NonStop Operating System
- Describe memory management and process control functions
- Understand the Guardian and OSS file systems and their supporting structures
- Know the elements of the HPE NonStop Operating System that constitute the message system
- Support HPE software products

Detailed course outline

Module 1: Course Overview

Module 2: Hardware and Software Overview

- NonStop Multi-core Architecture (NSMA) hardware
- NonStop x86-64 Architecture (NXMA) hardware
- Modular I/O
- CLIM hardware
- Code generation, address space, code space, and process execution
- Interprocessor and I/O architecture
- Message-based operating system software layers

Module 3: Debuggers

- J and L-series debuggers
- Debugger selection
- eInspect and xInspect
- NonStop Debugging Environment for Eclipse (NSDEE)
- TNS Visual Debugger (TNSVDBG) and Inspect

Module 4: Process Runtime Architecture

- TNS/E and TNS/X processes
- Building TNS/E and TNS/X programs and libraries
- TNS processes
- Legacy TNS processes
- Interpreted TNS on Itanium and x86-64
- TNS accelerated on Itanium and x86-64
- TNS transitions
- TNS calling native procedures
- TNS application migration and debugging

Module 5: Addressing

- Itanium and x86-64 processor addressing
- Extended data areas TNS/E, TNS/X, and TNS process lay out

Module 6: Interrupts and Exceptions

- Interrupts
- Synchronization and coordination mechanisms
- Interrupt and auxiliary processes

Module 7: Operating System Tools and Mechanisms

- Data structure
- Time services
- Process contention controls
- PROCESS_WAIT_ and PROCESS_AWAKE
- Classic privileged semaphores

Module 8: Memory Access and Management

- Hardware
- Physical layer logical segments logical map sharing
- Priv considerations
- Page faults

Module 9: The Message System

- Interprocess communication within the same node
- ServerNet and InfiniBand topology and the message system
- MQCs
- Communication across nodes
- Expand
- ServerNet and InfiniBand clusters
- QIO

Module 10: Process Life Cycle and Management

- Guardian process creation
 - Process states
 - Process synchronization, monitor process operation, processor load and reload
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Module 11: OSS Process Life Cycle	<ul style="list-style-type: none"> • OSS process creation 	<ul style="list-style-type: none"> • fork() and exec () process termination
Module 12: Guardian File System	<ul style="list-style-type: none"> • Functions of the file system control structures • Open request processing 	<ul style="list-style-type: none"> • Receive depth Nowait depth Sync depth
Module 13: OSS File System	<ul style="list-style-type: none"> • File systems • OSS file system and support • OSS file organization 	<ul style="list-style-type: none"> • OSS pathname mapping • OSS open
Module 14: I/O	<ul style="list-style-type: none"> • Storage I/O: architecture, operation, completion • Configuring storage device • Comparing storage and comm I/O 	<ul style="list-style-type: none"> • QIO • Outgoing comm I/O Incoming comm I/O • WAN I/O • Other devices

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