

HPE Integrity NonStop Operating System Architecture U8609S

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Delivery mode	ILT, VILT
Course length	5 days
HPE course number	U8609S

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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, runtime 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

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

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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 elnspect 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 structureTime servicesProcess contention controls	PROCESS_WAIT_ and PROCESS_AWAKE Classic privileged semaphores
Module 8: Memory Access and Management	Hardware Physical layer sogical segments sogical 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 	ExpandServerNet and InfiniBand clustersQIO
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	OSS process creation	fork() and exec () process termination
Module 12: Guardian File System	 Functions of the file system control structures Open request processing 	Receive depth Nowait depth Sync depth
Module 13: OSS File System	File systemsOSS file system and supportOSS file organization	OSS pathname mapping OSS open
Module 14: I/O	 Storage I/O: architecture, operation, completion Configuring storage device Comparing storage and comm I/O 	 QIO Outgoing comm I/O Incoming comm I/O WAN I/O Other devices

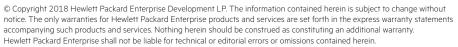
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