



# NNMi120 – Network Node Manager i Software 9.x Essentials

Instructor-Led Training  
For versions 9.0 – 9.2

## OVERVIEW

This course is designed for those Network and/or System administrators tasked with the installation, configuration, and maintenance of the Network Node Manager i Software (NNMi) product. This course teaches the skills needed to successfully implement the product to manage small, medium, or large networked enterprises. The course includes training on the NNM i Smart Plug-In (NNM iSPI) Performance for Metrics Software.

This course is designed for administrators of the NNMi software 9.x application.

The hands-on lab exercises in this course use NNMi software version 9.2.

## INTENDED AUDIENCE

This course is intended for network or system administrators and network engineers seeking a more in-depth knowledge of Network Node Manager i Software 9.x

## DURATION: 5 DAYS

## SOFTWARE VERSIONS: 9.0 – 9.2

## PREREQUISITES

To maximize success in this course, students should have a working knowledge the following topics:

- Windows system administration
- Network protocols
- Network device administration

## COURSE OBJECTIVES

At the end of the course, you should be able to:

- Configure network discovery
- Manipulate NNMi tables and device object records
- Design topology maps
- Configure incidents
- Generate performance graphs
- Generate performance reports
- Perform core administration tasks

## RELATED COURSES

- NNMi140 – Network Node Manager i Software 9.x for Operators
- NNMi200 – Network Node Manager i Software 9.x Advanced
- NNMi01IT – Network Node Manager i Software 9.1 Interactive Training Created by ART

## **Module 1: Introduction to HP Network Node Manager i Software**

- Course Objectives
- Course Outline
- Module Objectives
- HP BTO Software Portfolio
- HP Network Management Center
- Business Requirements Drive the Operational Objectives for Network Operations
- How NNMi Addresses Business Challenges
- Operational Success Depends on Information
- Reduce Mean Time to Repair
- Current Network Configuration and Health
- Continuous, Accurate Spiral Discovery
- Comprehensive Device Monitoring
- Active Root Cause Analysis on Changing Topology
- Map-based Management
- Resolve a Current Problem
- Graphical Topology Visualization
- Application-aware Network Management
- Router Fault Example
- Application- level Failover
- NNMi Product Structure
- NNMi Smart Plug-ins
- Products Integrated with NNMi
- Network Management Center Integrations
- NNMi + UCMDB: Supporting ITILv3
- NNMi + Network Automation: Network Lifecycle Management
- Real User Monitoring and NNMi: Application Perspective Use Case
- Alarmpoint Express: Automated Notification
- NNMi Features and Benefits Summary
- Module Summary
- Lab Exercises

## **Module 2: Managing SNMP and ICMP Communication**

- Module Objectives
- The Network Management Model
- A Network Management Protocol – SNMP
- The Management Information Base
- NNMi Uses SNMP
- SNMP Authentication
- NNMi Communication Layer Architecture
- Communication Parameters and Assignment
- Coordinate NNMi Configuration Areas
- Communication Parameter Lifecycle – Discovery
- Use Alternative Authentication Strings
- Communication Parameter Lifecycle – Monitoring
- Re-Discovery (with or without Configuration Change)
- Configure the Communication Layer
- Start Communication Configuration
- Default Protocol Settings for Communication (SNMPv1 or SNMPv2c)
- Set Default Minimum Authentication Level
- Set Default Community Strings (SNMPv1 or SNMPv2c)
- Configure Default SNMPv3 Settings
- Configure Regional Community String or Access
- Extend Timeouts for Remote Area
- Provide Regional Community Strings
- Provide Regional SNMPv3 Authentication

- Regional SNMP Proxy Configuration
- Add a Specific Node Configuration
- Direct NNMi to Use a Specific IP Address to Communicate with a Node
- Review Results
- Load Community Strings from a File
- Verify Communication Settings
- SNMP Command Line Interface
- Module Summary
- Lab Exercises

### **Module 3: Discovery Architecture and Operation**

- Module Objectives
- How Spiral Discovery Works
- Compare Discovery Methods
- Initial Discovery of a New Node
- Connectivity Details and Connectivity Analysis
- Derive Attributes Using Device Profiles
- Simple Object Containment Model
- Single Node Discovery Algorithm
- Discovery: Parallel and Sequential Collection
- Single Node Discovery
- Component Health Discovery
- Auto-Discovery
- Continue Discovery
- Connectivity Details Collection Architecture and Operation
- Discovery: Parallel and Sequential Collection
- Find VLAN Names and Ports
- Find Explicit L2 Connections from xDP
- Identify Router Redundancy Groups
- Subnet Connections
- Identify Aggregated Links
- Gather Forwarding Data Base Information
- Connectivity Analysis Architecture and Operation
- Analyze FDB Information for Working Sets
- Analyze the Working Set
- Island Discovery
- Rediscovery
- Module Summary
- Lab Exercises

### **Module 4: Configuring Discovery**

- Module Objectives
- Open Discovery Configuration
- Tune Discovery Polling Intervals
- Discovery Node Name Choices
- Node Name Configuration and Normalization
- Avoid Lookups
- Configure Ping Sweep Globally
- Configure IP Exclusion Range
- Configure Interface Filters
- Add an Auto-Discovery Rule
- Name the Rule
- Enable Regional Ping Sweep
- Specify the IP Address Range
- Add System Object ID Range
- Subnet Connection Rules
- Tenants
- Discovery Seeds

- Add or Deleting Discovery Seeds
- Load a File of Seeds
- Sample Configuration: Managing HP-UX Servers
- Specifying Devices by System Object ID
- Verify Discovery
- Troubleshoot Auto-Discovery Rules
- View Discovered Objects
- Update Object Information
- Delete an Object
- Add or Deleting a Connection
- Device Profiles
- Detect Interface Changes (renumbering issues)
- View Device Profile Definition
- Device Group Forms
- Module Summary
- Things to Do With Your Topology Results
- Lab Exercises

### **Module 5: Touring the Management Console**

- Module Objectives
- Start the Management Console
- Access Online Help
- Workspaces
- Map Views
- Interpret Map Symbols
- Interact with Maps
- Table Views
- Access More Details About an Object
- Work with Objects in NNMI
- Modify Attribute Values for an Object
- Invoke Actions
- Refresh a View
- Use Table Views
- Filter Views
- Export Table Information
- Find a Node
- Tour the Workspaces
- Incident Management
- Incident Browsing
- Topology Maps: Visualize Key Groups
- Troubleshooting: Visualize Relationships
- Inventory: The Whole List
- Management Mode: Manage Monitoring
- Configuration: Tools for Configuring NNMI
- Display NNMI System Information
- Module Summary
- Lab Exercises
- Inventory-based Management
- Filter Table Views with Node Groups
- View Status of a Group
- List Objects by Category
- List Cards and Ports
- List VLANs
- Show Card Redundancy Groups
- Show Router Redundancy Groups
- Show Layer 2 Connections
- View Interface Details: Link Aggregation

## **Module 6: Configuring Node and Interface Groups**

- Module Objectives
- Node Groups Are Used in Many Places
- Group Overlap
- Hierarchies and Containment
- How Node Groups Get Populated
- Default Node Groups
- Create a Node Group
- Set Availability for View Filtering
- Assign Specific Nodes to a Node Group
- Child Node Groups
- Add a Device Filter
- Select Device Descriptors
- Select the Device Model
- Specify Node Group Additional Filters
- Operators in the Additional Filters Editor
- Use a Text File to Create Node Groups
- Syntax of a Comma Separated File
- Example Spreadsheet
- Find an SNMP OID to Use in Text File
- Find a Unique Key Value to Use in Text File
- Find Which Nodes Belong to a Group
- Configure Node Group Status Propagation
- Special Handling for Important Nodes
- Island Node Groups
- Interface Groups
- Interface Groups Are Used in Many Places
- Default Interface Groups
- Modify Interface Group Filters
- Use If Type Filters – Interface Groups
- View and Create Interface Type
- Use Additional Filters - Interface Groups
- Module Summary
- Lab Exercises

## **Module 7: Customizing Views**

- Module Objectives
- Customize NNMi Node Group Maps
- Add Node Group to List of Maps
- Set Map Ordering
- Preserve User Layouts
- Customize Node Group Maps
- Node Group Connectivity
- User-Provided Backgrounds
- Apply Background Image
- Display a Map Automatically
- Add a Connection to a Path View
- Add a Path
- Amend a Path View Map
- Module Summary
- Lab Exercises

## **Module 8: Status Monitoring Architecture and Operation**

- Module Objectives
- Automated Root Cause Analysis
- About the State Poller
- About the Causal Engine
- Status Monitoring Terms

- State Poller Retrieves Settings
- State Poller Gathers Data
- Receive Measurements
- Poll SNMP Devices
- Poll Non-SNMP Devices
- Re-queue a Poll
- Update State Poller Operation
- Trigger State Poller
- Causal Engine Receives Notification
- Causal Engine Receives a Trap
- State Polling Interval Completes
- Status Episodes
- NNMi Neighbor Analysis: The Situation
- First Symptom: Poller Says IFOperDown
- Link Down Trap
- Polling Cycle Completes with No Trap
- Causal Engine Completes Analysis
- Causal Engine Updates the Database
- Monitor Network Islands
- Island Group Monitoring
- Link Aggregation Analysis
- Monitor Redundant Routing Groups
- RRP Normalized States
- Monitor Component Health
- Component Health Status Propagation
- Component Health Incidents
- Module Summary

### **Module 9: Customizing Status Monitoring**

- Module Objectives
- Open the Monitoring Configuration
- Disable Status Polling
- Set Status Monitoring Defaults
- Disable ICMP Ping
- Poll Unconnected Interfaces
- Apply a Configuration to a Group
- Group Polling Overview
- Add a Node Setting Group
- Select the Node Group
- Set the Monitoring Intervals
- Interface Group Polling
- Save the Configuration
- Monitor Router Redundancy Groups
- Verify Settings
- Check Monitoring Settings for a Device
- Status Poll a Device
- Configuration Poll a Device
- Check State Poller Health
- Use Management Modes
- Not Managed or Out of Service
- Management Mode Values
- Inherit Management Mode
- Set an Object Management Mode
- List Unmanaged or Out-of-Service Objects
- Monitor Setting Interactions
- Module Summary
- Lab Exercises

## **Module 10: Configuring Users**

- Module Objectives
- Overview of NNMi Security Model
- NNMi Groups
- Permissions by Group
- Configure User Accounts and Groups
- Create a New Account
- Assign an Account to a Group
- Delete an Account
- Security Groups
- Create a Security Group
- Assign a Node to a Security Group
- Assign a User Group to a Security Group
- Customer Tenants
- Create a Customer Tenant
- Assign a Node to a Customer Tenant
- Single Sign On (SSO)
- Control Command-Line Access
- Troubleshoot NNMi Access
- Audit Account Activity
- Module Summary
- Lab Exercises
- Lab Solutions

## **Module 11: Troubleshooting Network Issues**

- Module Objectives
- Monitoring Your Network Using an Incident View
- Primary Incident Use Model
- Incident Concepts
- Incident Views Provided by NNMi
- View Key Incidents
- Organize Your Incidents
- Incident Lifecycle
- Find Unassigned Incidents
- Own an Incident
- Assign an Incident Using the Details Page
- Start Working on an Incident
- Track an Incident's Progress
- Change Lifecycle State
- View Incidents by Lifecycle State
- Note Actions Taken and Results
- Complete an Incident
- Close an Incident
- View Closed Key Incidents
- View Incident Details: Basic Attributes
- Incident Details
- View Incident Attributes
- View Incident Diagnostic Results
- Additional Incident Views
- View All Incidents
- View Service Impact Incidents
- View Incidents by Severity
- Change Incident Classification
- Custom Incident Views
- SNMP Traps View
- Interpret Root Cause Incidents
- View Root Cause Incidents

- Interpret Root Cause Incident Messages
- Node and/or Connection Down
- Address Not Responding
- Connection Down
- Interface Down or Card Down
- Monitor the Network for Problems
- Map-based Management
- NNMi Intuitive Interface: Map-based Management
- View Logical Network Overview
- View Node Group Status Overview
- View Propagated Network Infrastructure Device Status
- View Router or Switch Connectivity
- Check Status Details for a Node Group
- Troubleshoot from Map View
- Show Key Incidents by Enlarging Nodes
- Adjust Map Layout
- View Details
- View Analysis Pane for a Node
- Explore Node Details
- Troubleshoot from Node Details
- View Interface Details
- Use the IP Address Form
- Use the Cards Form
- View Card Details
- Use the Port Form
- Troubleshoot Tools
- Troubleshoot from the Incident Browser
- Layer 2 Neighbor View
- View Connection Information
- View Connection Details
- View Layer 3 Connectivity
- View a Path
- Interpret Path View Results
- Test Node Access
- Telnet to a Device
- Status Poll a Device
- Configuration Poll a Device
- View Graphic Troubleshooting Information
- Attached Switch Port Troubleshooting Tool
- Show Attached End Nodes
- Monitor Status Distribution for Network Objects
- List Objects by Status
- Troubleshoot from a Table
- Module Summary
- Lab Exercises

## **Module 12: Troubleshooting Using MIBs**

- Module Objectives
- Identify MIB Variable
- Management and Vendor MIBs
- MIB Instances
- View Line Graphs
- Access Line Graphs
- Read Line Graphs
- Show and Hide the Line Graph Legend
- Change the Lines Displayed on a Line Graph
- Change the Polling Interval for a Graph



- Change the Zoom Value for a Graph
- Select a Time Segment Using the Timeline Viewer
- Lock the Y-Axis When Viewing a Time Segment
- Display Data Values on a Graph
- Display Messages on a Line Graph
- Print a Graph
- Export Graph Data to a Comma-Separated Values (CSV) File
- Configure Default Settings for Line Graph
- Configure Default Settings for Line Graph
- View MIB Data
- MIB Browser Keyboard Navigation
- List a Node's Supported MIBs
- Review MIB File Definition
- MIB Variable Form
- Determine a Node's MIB Variable Values
- Display a MIB Table
- Find an Entry in the MIB Browser Output
- Export MIB Browser Output
- Print MIB Browser Output
- Display MIB Variable Details
- Load MIBs
- Identify the MIB Variable You Want to Poll
- View Loaded MIBs
- Retrieve MIB from a Vendor
- Load MIB into NNMi
- Examine MIB Data
- Module Summary
- Lab Exercises

### **Module 13: Event Monitoring Architecture**

- Module Objectives
- Event Sources
- Event Receivers
- Initial Event Pipeline Processing
- Incident Correlation Processing
- Incident-based Actions
- Trap Filtering Architecture
- Event Filtering
- Configuration Changes
- Module Summary

### **Module 14: Customizing Event Monitoring**

- Module Objectives
- Open Incident Configuration
- Specify an Author for Your Incident Configuration
- Work with Management Events
- NNMi Management Event Configuration Tab
- Modify a Configuration
- Add a Category
- Add a Family
- Specify a Message Format
- Work with SNMP Traps
- Traps: From Device to Management Station
- Default Traps Enabled as Incidents
- Enable Specific Traps in NNMi Console
- Add a Trap Configuration
- SNMP Trap Configuration
- Node Group Configuration

- Node Group Enrichment
- Pairwise Configuration
- Syslog Message Configuration
- Trap Addresses
- Load a Trap Definition from MIB File
- Delete Trap Configuration
- Block Traps
- Database Limits for Number of Traps
- Block Event or Trap Reception
- Configure What to Block
- Block Trap Storms
- Additional Trap Service Configuration
- Troubleshooting
- iSPI NET Trap Analytics
- Trap Analytics
- Trap Analytics Report
- iSPI Net Trap Analytics Log File
- Block Trap Storms by Threshold
- Important Trap Configuration Properties in `nms-jsboss.properties`
- Module Summary
- Lab Exercises

### **Module 15: Thresholds and Customized MIB Monitoring**

- Module Objectives
- Compare Thresholds from Performance Monitoring and Custom Polling
- Configure Performance Thresholds and Events
- Examples of Threshold Monitoring
- Determine Reasonable Threshold Settings
- Configure Interface Threshold Monitoring
- Configure Node Component Health Threshold Monitoring
- Configure Threshold Incidents
- Check State Poller Health
- Interface Performance View
- View Performance Data on Map
- View Interface Details: Performance
- Custom Poller Threshold Monitoring
- Module Summary
- Lab Exercises

### **Module 16: NNM iSPI Performance for Metrics Software Architecture**

- Module Objectives
- NNM iSPI Performance for Metrics Software Architecture
- File Sharing
- About NNM iSPI Performance for Metrics Software Data
- Data Dimensions
- Hierarchy
- Troubleshooting
- Potential Problems – Demo Data in Reports
- Verify Data Is Being Collected by NNMI
- Verify Collected Data Is Being Used by NNM iSPI Performance for Metrics Software
- Verify NNM iSPI Performance for Metrics Software Is Configured Properly
- Change the Configuration Settings
- Verify the NNM iSPI Performance for Metrics Software Service Is Started
- Verify that Performance Polling Is Enabled
- Potential Problems
- Unusual Login Screen
- Expected iSPI Performance
- Report Menu – iSPI Diagnostics

- What to Do If Reports Are Slow
- Module Summary

### **Module 17: Viewing Performance Data and Reports**

- Module Objectives
- Launch NNM iSPI Reports from NNMi
- Single Sign On
- Report Menu
- Performance Reporting Domains
- iSPI Self Diagnostics
- Interface Health
- Component Health
- Set Report Options
- Results Scoped by Interface
- Interface Utilization and Exceptions
- Detect Performance Problems Along a Path
- Review Trends This Month: Isolate Performance Spikes
- Summarize Network Behavior
- Review Trends
- Rank Nodes by Amount of Change Over Time
- Rank Performance Utilization
- Manage Reporting Using BI Server Portal
- Access BI Server Portal
- Features in BI Portal
- Schedule (and Email) a Report
- Use Jobs to Schedule Multiple Entries
- Performance Troubleshooting Reports
- Module Summary
- Lab Exercises

### **Module 18: Administering NNMi**

- Module Objectives
- User Interface Configuration
- Secure the NNMi Console
- Launch NNMi Views from an External Portal
- Start and Stop NNMi Processes
- Start and Stop Services
- Troubleshooting and Log Files
- Monitor NNMi Health and Status
- Check Overall System Health and License Usage
- Maintain the Database
- Archive and Delete Incidents
- Back Up NNMi
- Restore a Backup
- Export and Import Configuration Settings
- Stop Everything and Start Over Again
- Shrink the Size of the iSPI Performance for Metrics Software Database
- Module Summary
- Lab Exercises
- Lab Solutions