NSP
Network Services Platform
Release 17.9

Deployment Overview

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About this document

Purpose

The *NSP Deployment Overview* provides a high-level description of the Network Services Platform, or NSP. The guide describes product components, capabilities, and deployment options, and provides references to further information.

Document support

**Customer documentation and product support URLs:**

- Customer Documentation Welcome Page
- Technical support

How to comment

Documentation feedback
1 NSP product overview

1.1 NSP terms and concepts

1.1.1 Introduction
This section introduces the terms and concepts essential to NSP product description.

1.1.2 Modules
Modules are the orderable commercial units that comprise the NSP product.
NSP product software is licensed, versioned, and delivered in modules. The end user interacts with
the applications licensed under the module or modules purchased.

1.1.3 Applications
The NSP provides a suite of user applications that include traditional network management client
interfaces as well as web-based applications. Some of these applications are specific to certain
modules, that is, licensed with the purchase of a particular module. Other applications are common,
that is, licensed under more than one module.

Users access the licensed NSP applications by clicking on icons in the NSP Launchpad. Some
applications are only available with the purchase of a premium license.

1.1.4 Packages
Packages refer to the collection of files made available for download and installation. When a
customer purchases a module, the right to download and install the software package or packages
is acquired, along with the license to use the module’s applications.

Some NSP modules are delivered in more than one package. Some NSP modules are delivered
together in a single package.

1.2 NSP product description

1.2.1 Product position
The NSP allows operators to automate, optimize, and assure network services across multiple
network layers and both physical and virtual infrastructure, including equipment from multiple
vendors. By integrating the Nokia IP and optical network management platforms with our carrier
SDN platform, the NSP:
• enhances customers’ current investment in 5620 SAM, 1350 OMS, and NSP
• accelerates the creation of on-demand IP/optical network services
• allows for the optimization of networks in real-time
• extends assurance capabilities to SDN services, and SDN automation to assurance functions
1.2.2 Modular platform

The NSP comprises one to seven interoperable modules with a common resource base to offer a set of network and service management and optimization capabilities. As shown in the following table, the NSP modules include new iterations of three existing products.

Table 1 NSP orderable modules

<table>
<thead>
<tr>
<th>NSP module</th>
<th>Expanded module name</th>
<th>Key licensed functionality</th>
<th>Evolution</th>
</tr>
</thead>
</table>
| NFM-P      | Network Functions Manager - Packet                | • Infrastructure management for IP/MPLS networks  
• Assurance for IP/MPLS networks  
• Traditional service management for L2 and L3 services | 5620 SAM  |
| NFM-T      | Network Functions Manager - Transport             | • Optical network management from access to metro to core  
• Service provisioning over multi-technology optical transport networks | 1350 OMS  |
Table 1  NSP orderable modules  (continued)

<table>
<thead>
<tr>
<th>NSP module</th>
<th>Expanded module name</th>
<th>Key licensed functionality</th>
<th>Evolution</th>
</tr>
</thead>
</table>
| NSD        | Network Services Director | • SDN service fulfillment for L2 and L3 services  
• Assurance (service supervision) | NSP 2.0 |
| NRC-F      | Network Resource Controller - Flow | • Optimization in IP/MPLS networks  
• Flow steering based on statistics, analytics, and operator decisions | |
| NRC-P      | Network Resource Controller - Packet | • Optimization in IP/MPLS networks  
• Path computation engine | |
| NRC-T      | Network Resource Controller - Transport | • SDN service fulfillment for L1 and L0 services  
• Network abstraction | |
| NRC-X      | Network Resource Controller - Cross domain | • IP-optical correlation  
• Cross domain link creation and discovery | n/a |

NFM-P

The applications licensed under the NFM-P module perform traditional IP network and service management across all IP/MPLS and carrier Ethernet network domains—access, aggregation, metro, and core. They deliver unified operations, whether network services are running in a virtualized environment or on dedicated hardware. The operations include mobile management from backhaul to packet core, and IP/microwave transmission. NFM-P also provides an advanced scripting framework to enable customized, programmatic control and automation of functions such as configuration deployment, performance auditing, route analysis, and maintenance.

The IP Manager and other user applications that comprise the NFM-P module each have their own user documentation available from the product interface.

For more information about the NFM-P, see the NSP NFM-P User Guide.
NFM-T

The applications licensed under the NFM-T module centralize and consolidate multiple functions for optical network management from access to metro to core. The NFM-T allows network operators to efficiently plan, deploy and manage an optical network over a full life cycle. It also provides element, network and service management that supports multiple optical technologies, service types, and network scopes.

The NFM-T provides end-to-end optical management functions that include service provisioning over multi-technology optical transport networks such as SDH/SONET, carrier Ethernet, WDM, ROADM, OTN, and packet. Browser-based fault management applications reduce the time and cost of network and service assurance operations. A common northbound API enables OSS integration.

For more information about the NFM-T, see the *NSP NFM-T Getting Started Guide*.

NSD

The NSD is the network service fulfillment module of the NSP. The applications licensed under the NSD module automate IP/MPLS, carrier Ethernet and optical service provisioning by mapping abstract service definitions to detailed service templates using operator-defined policies. They also provide provisioning for complex multi-technology services across multi-domain networks.

NSD applications maintain abstracted service models that are based on YANG standards, and map the models to device-specific models that are normalized for multi-vendor provisioning transparency.

The NSD provides network-aware management using a central service connection resource database to track tunnel bandwidth. As the NSD provisions a service, it performs an intelligent database search to choose the optimal path based on the required bandwidth, span, latency, cost, path diversity, and other constraints. Using the resource database and policies, the NSD directs service connection requests to tunnels or paths that have low utilization and thus averts link congestion.

An NSD operator can customize the binding of service connections to tunnels or paths using service-specific policies. If there is no service connection path that meets the specified requirements, the NSD can use a policy to request a new path from the NRC modules.

The NSD works with the NSP Assurance and Analytics functions for use cases such as IP/optical network-aware provisioning automation with service validation, and bandwidth-on-demand for IP/optical services with LAG resizing.

For more information about the NSD, see the *NSP NSD and NRC User Guide*.

NRC-F

The NRC-F is the flow controller module of the NSP. The NRC-F uses flow-based protocols such as OpenFlow and BGP FlowSpec to perform intelligent traffic steering, and to automate policy-based redirection at the flow or route level. The applications licensed with the purchase of the NRC-F modules intelligently divert traffic as required to reduce congestion, increase forwarding efficiency, and balance the traffic load.

The NRC-F use cases include the following:
- congestion resolution with flow redirection to alternate paths
• VIP-source subnet-based steering and link management
• AS-based traffic optimization
• egress peer engineering
• DDoS attack mitigation

For more information about the NRC-F, see the *NSP NSD and NRC User Guide*.

**NRC-P**

The applications licensed under the NRC-P module manage the creation of LSPs across IP NEs, and support RSVP and segment routing LSP technologies. They maintain an enhanced IGP-TE topology and a current path database that is synchronized among the NEs.

The NRC-P communicates with NEs using PCEP, and employs multiple techniques for topology discovery, including traffic engineering, OSPFTE, IS-IS TE, and BGP-LS.

For more information about the NRC-P, see the *NSP NSD and NRC User Guide*.

**NRC-T**

The applications licensed under the NRC-T module manage transport path connection creation for L1 optical transport networks and L0 WDM networks. The NRC-T maintains an optical topology and current path database that is synchronized among the NEs and uses physical layer knowledge such as impairments to ensure that the optimal paths are computed.

For more information about the NRC-T, see the *NSP NSD and NRC User Guide*.

**NRC-X**

The NRC-X, provides cross domain coordination between multiple layers, domains, and IP-optical integration functions. The NRC-X automatically discovers the cross-layer links between the IP routers and the optical switches using LLDP and LLDP snooping. In a brownfield deployment where a customer has pre-configured IP-optical links, the NRC-X will automatically discover the network, run its IP-optical correlation algorithms, and detect all misconfigured IP-optical links.

The NRC-X discovers the entire L0-L3 (IP, optical ODU, and optical OCH) topology. It processes information acquired from the other NSP modules, traverses the IP-optical layers and links, and computes the SRLG and the latency values end-to-end on the optical paths over which the IP interfaces ride. Once those values are computed, they are passed on to the IP layer for further processing. Doing this helps the IP layer to prevent SRLG risks during cross-layer end-to-end IP/MPLS computation. Passing the latency values helps the IP layer to establish latency-aware IP/MPLS LSPs.

**Note:** The NRC-X module and the corresponding Cross Domain Coordination application are beta quality in NSP Release 17.9.

For more information about the NRC-X, see the *NSP NSD and NRC User Guide*.

### 1.2.3 nspOS common resource base

The nspOS is a set of platform services used by all NSP applications. The nspOS enables system-wide functions such as SSO, application cross-launch, and operator access via the NSP Launchpad.
The nspOS is delivered with each module. In a multi-module NSP deployment, the nspOS instance runs on the NSD and NRC host station. See the *NSP NSD and NRC Installation and User Guide* for more information.

The nspOS includes the following functions:

- **Login**—provides SSO access to all NSP applications, GUI clients, and other resources via the NSP Launchpad
- **NSP Launchpad**—serves as the entry point for all NSP applications
- **Central Authentication Server, or CAS**—receives and authenticates user login attempts
- **Session Manager**—tracks and manages SSO sessions
- **REST API Gateway**—acquires the REST token for the NSP’s REST APIs and locates specific APIs across the NSP

The nspOS also contains a service registry, distributed streaming platform, and graph database.

### 1.3 NSP functional architecture

#### 1.3.1 NSP functional architecture

The NSP is designed for flexibility, simplifying the transition to SDN for existing 5620 SAM and 1350 OMS customers, and allowing customers to add functions over time.

The following figure shows a high-level abstraction of the NSP functions.
Figure 1  NSP product abstraction

<table>
<thead>
<tr>
<th>APIs</th>
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</thead>
<tbody>
<tr>
<td>SAM-O</td>
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</tr>
<tr>
<td>ReST</td>
<td>!</td>
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<td>!</td>
</tr>
<tr>
<td>ReSTconf</td>
<td>!</td>
<td>!</td>
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<td>!</td>
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<tr>
<td>OMS-NBI</td>
<td>!</td>
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</tr>
</tbody>
</table>

APPLICATION LAYER

<table>
<thead>
<tr>
<th>Fault Management</th>
<th>Network &amp; Service Supervision</th>
<th>Analytics &amp; Reporting</th>
<th>SDN Service Provisioning</th>
<th>SDN Resource Control</th>
<th>Optical Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>!</td>
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</tr>
</tbody>
</table>

nsP OS

<table>
<thead>
<tr>
<th>Common Models</th>
<th>Data Persistence</th>
<th>Messaging &amp; Logging</th>
<th>Registry</th>
<th>SSO &amp; User Management</th>
<th>License Management</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

NETWORK MEDIATION LAYER

<table>
<thead>
<tr>
<th>Telemetry</th>
<th>IP/MPLS</th>
<th>BGP/IP Control</th>
<th>BGP LS/CEP Control</th>
<th>Optical</th>
</tr>
</thead>
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</tbody>
</table>
2 NSP deployment

2.1 Overview

2.1.1 NSP deployment options

The modular design of the NSP supports a variety of deployment options. Each NSP module can be deployed and operated independently, or in combination with one or more additional modules.

Although any module combination can be installed, certain module combinations are required in order to provide meaningful management functions.

The various expected NSP deployment scenarios are outlined in the following sections:

- 2.2 “Single-module deployments” (p. 14)
- 2.3 “Multi-module deployments” (p. 15)

2.1.2 Redundancy

The NSP modules support a 1+1, or warm standby, redundancy model. Each NSP module can have a group of active components, and a group of warm standby components; each component is a separate OS instance that hosts a module function.

For example, the NFM-P has main server, main database, and optional auxiliary components that perform additional functions. Each main or auxiliary component supports redundancy. All active components of a module require low network latency, so ideally are geographically collocated.

The redundancy functions of an NSP module are described in the administrative user documentation for the module.

For NSP disaster recovery, you can use NSP 1+1 redundancy model in two geographically separate locations. Only one system is active at a time; the active system hosts all NSP applications and processes all client requests. The other system at the remote site is running in a warm standby mode.

When redundant NSP systems are in geographically separate facilities, it is recommended for best performance to keep all active NSP modules on one site to minimize network latency between the modules. Aligning the active NSP modules in a multi-module deployment is performed by an administrator.

The following figure shows an NSP deployment in a 1+1 redundancy configuration.
Note: In order to deploy the NSP in a redundant multi-module configuration, each module in the deployment must be in a redundant configuration.

Note: In Release 17.9, the NFM-T module cannot be deployed in a redundant configuration. Therefore, each module in a multi-module deployment that includes NFM-T must be in a standalone configuration.

2.2 Single-module deployments

2.2.1 NFM-P-only deployment

The NFM-P can perform IP/MPLS network management functions when deployed independently. See the NSP NFM-P Planning Guide and the NSP NFM-P Installation and Upgrade Guide for NFM-P system requirements and deployment procedures.

2.2.2 NFM-T-only deployment

The NFM-T can perform transport network management functions when deployed independently. See the NSP NFM-T HW and OS Installation Guide for the NFM-T system requirements and deployment procedures.
2.2.3 Control plane-only deployment

The NRC-P can perform IGP link-state topology optimization functions when deployed independently. See the NSP NSD and NRC Installation and Upgrade Guide for the NSD and NRC deployment procedures.

The following figure shows a typical Control plane-only deployment on virtual machines.

Figure 2  Control plane deployment

2.3 Multi-module deployments

2.3.1 Overview

Deploying multiple NSP modules provides enhanced network management functions. In multi-module deployments, the NSD and one or more NRC modules are combined with additional modules to achieve extended management capabilities and SDN assurance.

NSP modules can be installed together, or added over time. Module release compatibility is described in the NSP Release Notice.
2.3.2 WAN SDN IP deployment scenario

WAN SDN IP deployments allow for IP/MPLS network management functions while also providing SDN service provisioning and resource control. The following figure shows a typical WAN SDN IP deployment on virtual machines.

Figure 3  WAN SDN IP deployment

2.3.3 WAN SDN Optical deployment scenario

WAN SDN Optical deployments allow for transport network management functions while also providing SDN service provisioning and resource control. The following figure shows a typical WAN SDN Optical deployment on virtual machines.
2.3.4 WAN SDN IP and Optical deployment scenario

WAN SDN IP and Optical deployments allow for multi-domain network management and optimization, cross-domain resource control, and SDN assurance. The following figure shows a typical WAN SDN IP and Optical deployment on virtual machines.
Figure 5  WAN SDN IP and Optical deployment
3 NSP scaling guidelines

3.1 Scaling guidelines by module

3.1.1 NFM-P
The NSP NFM-P Planning Guide provides scaling guidelines for areas such as OSS client capacity, scheduled tests, and statistics collection, and must be used as a reference when you plan any NFM-P deployment.

3.1.2 NFM-T
The NSP NFM-T Dimensioning and System Configuration Guideline provides scaling guidelines for the NFM-T, and must be used as a reference when you plan any NFM-T deployment.

3.1.3 NSD and NRC
The NSP NSD and NRC Planning Guide must be used as a reference when you plan any NSD and NRC deployment.

3.1.4 Multi-module
The scaling limits of each module in a multi-module deployment must be considered before the deployment of any module; scaling support is limited to the lowest scale limit of the combined modules.
4  NSP security

4.1  Module security mechanisms

4.1.1  NFM-P
The NFM-P server component interfaces are secured using SSL/TLS, and support the use of a firewall between specific components. For detailed information about securing the NFM-P, including firewall port restrictions, see the *NSP NFM-P Planning Guide*.

4.1.2  NFM-T
For detailed information about securing the NFM-T, including firewall port restrictions, see the *NSP NFM-T Firewall Configuration Guide*.

4.1.3  NSD and NRC
The NSD and NRC modules support the use of a firewall between the module components. For detailed information about securing the NSD and NRC, including firewall port restrictions, see the *NSP NSD and NRC Planning Guide*.

4.1.4  Multi-module
You can enable TLS for inter-module communication. See the *NSP NSD and NRC Installation and Upgrade Guide* for more information.

4.2  SSO

4.2.1  Authentication mechanisms
Access to all NSP applications is provided via the NSP Launchpad using Single Sign-On, or SSO, authentication. The following table displays the supported authentication mechanisms for different NSP deployment types.

**Table 2  Supported authentication mechanisms**

<table>
<thead>
<tr>
<th>Authentication provider</th>
<th>NFM-P only deployment</th>
<th>NFM-T only deployment</th>
<th>NSD and NRC only deployment</th>
<th>IP deployment</th>
<th>Transport deployment</th>
<th>Multi-domain deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local</td>
<td>✓ (NFM-P Oracle)</td>
<td>✓ (NFM-T LDAP)</td>
<td>✓ (Neo4j)</td>
<td>✓ (Neo4j)</td>
<td>✓ (NFM-T LDAP via CAS, Neo4j)</td>
<td>✓ (NFM-T LDAP via CAS, Neo4j)</td>
</tr>
<tr>
<td>LDAP via CAS</td>
<td>✓</td>
<td>✓</td>
<td>✓ (Neo4j)</td>
<td>✓ (Neo4j)</td>
<td>✓ (NFM-T LDAP via CAS, Neo4j)</td>
<td>✓ (NFM-T LDAP via CAS, Neo4j)</td>
</tr>
</tbody>
</table>
Table 2  Supported authentication mechanisms  (continued)

<table>
<thead>
<tr>
<th>Authentication provider</th>
<th>NFM-P only deployment</th>
<th>NFM-T only deployment</th>
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<th>Multi-domain deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NFM-P</td>
<td>NSD and NRC</td>
<td>NFM-T</td>
</tr>
<tr>
<td>RADIUS via CAS</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Active Directory via CAS</td>
<td>✓</td>
<td></td>
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<td>✓</td>
</tr>
<tr>
<td>NFM-P Oracle</td>
<td>✓</td>
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<td></td>
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<td></td>
<td>✓</td>
</tr>
<tr>
<td>LDAP via NFM-P</td>
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<td></td>
<td>✓</td>
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<tr>
<td>RADIUS via NFM-P</td>
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<td>✓</td>
<td></td>
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<td>✓</td>
</tr>
<tr>
<td>TACACS+ via NFM-P</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

4.3  Inter-module communication

4.3.1  Inter-module communication

Based on the deployment type, one, or both, of the NFM-P and NFM-T may need to communicate with the NSD and NRC modules. Communication between the NSD and NRC modules and the NFM-P is secured with TLS. Communication between the NSD and NRC modules and the NFM-T is accomplished using REST over TLS-secured HTTPS.

ℹ️ Note: Inter-module communication is performed using IPv4 only; IPv6 communication is not supported.

Bandwidth requirement, NFM-P and other modules

The bandwidth requirement for communication between the NFM-P and the other NSP modules with which it communicates, such as the NRC-F, NRC-P, and NSD, depends on the number of NEs, LSPs, and services in the NFM-P network, as well as the frequency of NE updates that are pushed to other modules. Optimum performance during module re-synchronization with the NFM-P is attained when 50 Mbps of bandwidth is available. Service provisioning operations typically require less bandwidth; 25 Mbps is recommended. Network latency affects how long it takes to re-synchronize a large amount of data; it is recommended that the latency between components not exceed 100 ms.
Bandwidth requirement, NFM-T and other modules

The bandwidth requirement between the NFM-T and the other NSP modules with which it communicates, such as the NRC-T and NSD, depends on the number of optical nodes and services in the NFM-T network. It is recommended to provide 10 Mbps of bandwidth between the NFM-T and other modules. High round-trip network latency may affect GUI performance, and must not exceed 100 ms.
5 NSP installation and upgrade

5.1 Installation

5.1.1 Individual module installation

You can install an individual module by downloading its package or packages from the Nokia software download site and following the procedures in the module documentation.

You can install a new NSP module at any time, but if you are adding a module to an installed NSP, the new module release must be compatible with the release of each existing NSP module. See the NSP module compatibility matrix in the NSP Release Notice for information.

Nota: Before you attempt to install a module, you must review and comply with the deployment requirements in the planning guide for that module.

NFM-P

See the NSP NFM-P Installation and Upgrade Guide for NFM-P installation information and procedures.

NFM-T

See the NSP NFM-T HW and OS Installation Guide and the NSP NFM-T Installation Guide for NFM-T installation information and procedures.

NSD and NRC

See the NSP NSD and NRC Installation and Upgrade Guide for NSD and NRC installation information and procedures.

5.1.2 Multi-module installation

For multi-module deployments, installation is accomplished by installing the software packages for each module individually according to the installation instructions in the module documentation.

Alternatively, in greenfield, non-redundant trial deployments only, you can install multiple modules simultaneously from qcow images using the NSP Installer.

NSP Installer

The NSP Installer is an alternative to the classic installation mechanisms for the following specific scenarios:

- initial installation of the complete NSP product in a standalone configuration
- multi-module installation that includes the NSD and NRC modules and one of the following:
  - NFM-P
  - NFM-T
  - VSR-NRC
Note: The NSP Installer supports only the initial installation of modules in a non-redundant configuration, and does not support the use of IPv6 addressing between modules.

The NSP Installer and the product images it uses are delivered on the Nokia software download site in a dedicated NSP Installer directory beneath the NSP release.

The installer uses the specifications in a configuration file to deploy a set of modules in separate VMs on one host station. The NSP Installer also establishes security among the modules, applies the required license keys, and initializes each installed module.

After the NSP Installer completes an NSP installation, the NSP is responsive to client API and application requests, and is ready to perform actions such as network discovery and management.

See the NSP Installer Reference for the NSP host system platform requirements and module deployment information.

5.2 Upgrade

5.2.1 Individual module upgrade

To upgrade an NSP module, you must use the upgrade procedure in the module documentation.

You can upgrade an NSP module at any time, but the new module release must be compatible with the release of other NSP modules deployed. See the NSP module compatibility matrix in the NSP Release Notice for information.

Note: Before you attempt to upgrade a module, you must review and comply with the deployment requirements in the planning guide for the module.

To upgrade from legacy systems

To upgrade a legacy system to an NSP release, for example, to upgrade a 5620 SAM to the NFM-P, you must use the appropriate upgrade procedure in the NSP module documentation, as described in the following table.

<table>
<thead>
<tr>
<th>To</th>
<th>From</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFM-P</td>
<td>5620 SAM</td>
<td>NSP NFM-P Installation and Upgrade Guide</td>
</tr>
<tr>
<td>NFM-T</td>
<td>1350 OMS</td>
<td>• NSP NFM-T HW and OS Installation Guide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• NSP NFM-T Installation Guide</td>
</tr>
<tr>
<td>NSD and NRC</td>
<td>NSP 2.x</td>
<td>NSP NSD and NRC Installation and User Guide</td>
</tr>
</tbody>
</table>

5.2.2 Multi-module NSP upgrade

You must upgrade the modules in a multi-module NSP system in a specific order using the upgrade procedures in the module documentation. The following workflow describes the order of actions required to upgrade NSP in a multi-module deployment.
Workflow for multi-module NSP upgrade

1 Upgrade the NSD and NRC modules to a release with which the existing NFM-P and/or NFM-T modules are compatible; the modules must be able to communicate with the NSD and NRC modules after the NSD and NRC upgrade.

See the NSP module compatibility matrix in the NSP Release Notice for information.

Note: While the upgrade is in progress, the NSP Launchpad is down, and the NFM-P and/or NFM-T are unavailable.

2 Upgrade the NFM-P and/or NFM-T modules. You can upgrade these modules in either order.

5.3 Backup and restore

5.3.1 Synchronized backup and restore

For multi-module deployments, Nokia recommends that users synchronize all backup and restore operations performed within the modules in the deployment.
6 Obtaining NSP software and documentation

6.1 Software

6.1.1 Overview

NSP software is delivered to registered customers through the electronic delivery portal of the Nokia Online Customer Support (OLCS) site. If you are a new user and require access to this service, please contact your Nokia support representative.

Once registered, you can use this direct link to the NSP software.

6.1.2 Delivery site

The NSP software on the OLCS electronic delivery site is organized by release and module. You navigate through the hierarchy to select and download the packages you are licensed to use according to your purchase agreement.

The following figure shows the NSP software delivery portal, with the hierarchy of folders fully expanded to the point at which a module is selected.
As the directory structure shows, software is packaged individually for NFM-P and NFM-T modules, and combined for NSD plus NRC modules. In the latter case, licenses determine which of the modules are available upon installation.

The following table summarizes the hierarchy of the delivery site.

**Table 4  OLCS software delivery site structure**

<table>
<thead>
<tr>
<th>Directory level</th>
<th>Selections</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>NSP</td>
<td>This is the top level of the software download hierarchy.</td>
</tr>
</tbody>
</table>
### Table 4: OLCS software delivery site structure (continued)

<table>
<thead>
<tr>
<th>Directory level</th>
<th>Selections</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release</td>
<td>NSP releases and patches, for example:</td>
<td>The NSP release selected determines which files are available lower in the hierarchy. Service Pack folders may contain maintenance loads or patch software.</td>
</tr>
<tr>
<td></td>
<td>• NSP 17.3</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• NSP 17.3 Service Packs</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>• NSP 17.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• NSP 17.6</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>Images</td>
<td>For some modules, a qcow disk image is available to deploy in a VM without the use of the NSP Installer. This alternative installation method is subject to limitations as described in the <em>NSP Release Notice</em>.</td>
</tr>
<tr>
<td></td>
<td>NSP Packages</td>
<td>Each subfolder contains the standard installation package or packages for the module or module combination. There may be one or more packages per module. The packages contain the rpm files used for installation.</td>
</tr>
<tr>
<td></td>
<td>The following module selections are available under the NSP Packages category</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• NFM-P</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• NFM-T</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• NSD_NRC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NSP Documentation</td>
<td>The <em>NSP Release Notice</em> and <em>NSP Deployment Overview</em> are available here, as well as on the OLCS Documentation Center.</td>
</tr>
<tr>
<td></td>
<td>NSP Installer</td>
<td>This folder contains the NSP Installer utility, the available module qcow images, and the <em>NSP Installer Reference</em>.</td>
</tr>
</tbody>
</table>

Once you have selected items for download and clicked Next, you must choose your download method. Click Help for information about the various download methods available.

### 6.2 Documentation

#### 6.2.1 Overview

NSP documentation consists of:
- product-level documentation
- module-level documentation
- application help
Product-level documentation

Information about NSP in general, as well as about multi-module compatibility and deployments, is conveyed in product-level documentation.

The following documents apply to the entire NSP product and are available in PDF on the OLCS Documentation Center:

• NSP Deployment Overview (this document)
• NSP Installer Reference
• NSP Release Notice

In addition, general NSP help is available from the NSP Launchpad.

Module-level documentation

The NSP functions delivered by individual modules are described in the module documentation. There are user documentation suites and Release Notices for the following individually deployable modules or module combinations:

• NFM-P
• NFM-T
• NSD and NRCs

Module-level documentation is available on OLCS in a variety of formats.

Application help

The NSP applications have documentation available from the product user interfaces. Web-based applications have embedded help in the form of product tours and videos. Client-based applications such as the NFM-P and NFM-T clients have user guides, reference documents, and tools available from the client interface.

6.2.2 OLCS

NSP product- and module-level documentation is available on the Documentation Center of the Nokia Online Customer Support Site (OLCS). If you are a new user and require access to this service, please contact your Nokia support representative.

Once registered, you may use the following direct link to the NSP user documentation, although login will still be required: https://infoproducts.alcatel-lucent.com/aces/cgi-bin/dbaccessproddoc.cgi?edit?entryId=1-0000000004100.
From the NSP product documentation page in the OLCS Documentation Center you can:

- filter by release, model, category, content type, and format
- sort the results by title, document number, or issue date
- search for documents
- create a downloadable collection of your filtered documents

User documentation is filed under the “Manuals and Guides” content type, whereas Release Notices and Release Descriptions are filed under “Release Information.”

**Documentation alerts**

To receive an email when new or reissued NSP customer documents are posted to OLCS, subscribe to the notification service for documentation alerts.