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# Junos® Space

# Network Director API

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5.1
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# About the Documentation

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Use this guide to refer to APIs provided by Junos Space Network Director for automating provisioning and management of services on EX Series and QFX Series devices.

## Documentation and Release Notes

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at https://www.juniper.net/documentation/.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

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## Documentation Conventions

Table 1 on page vi defines notice icons used in this guide.

**Table 1: Notice Icons**

| Icon | Meaning | Description |
|---|---|---|
| | Informational note | Indicates important features or instructions. |
| | Caution | Indicates a situation that might result in loss of data or hardware damage. |
| | Warning | Alerts you to the risk of personal injury or death. |
| | Laser warning | Alerts you to the risk of personal injury from a laser. |
| | Tip | Indicates helpful information. |
| | Best practice | Alerts you to a recommended use or implementation. |

Table 2 on page vi defines the text and syntax conventions used in this guide.

**Table 2: Text and Syntax Conventions**

| Convention | Description | Examples |
|---|---|---|
| **Bold text like this** | Represents text that you type. | To enter configuration mode, type the **configure** command:<br>user@host> **configure** |
| `Fixed-width text like this` | Represents output that appears on the terminal screen. | `user@host>` **show chassis alarms**<br>`No alarms currently active` |
| *Italic text like this* | • Introduces or emphasizes important new terms.<br>• Identifies guide names.<br>• Identifies RFC and Internet draft titles. | • A policy *term* is a named structure that defines match conditions and actions.<br>• *Junos OS CLI User Guide*<br>• RFC 1997, *BGP Communities Attribute* |

**Table 2: Text and Syntax Conventions *(continued)***

| Convention | Description | Examples |
|---|---|---|
| *Italic text like this* | Represents variables (options for which you substitute a value) in commands or configuration statements. | Configure the machine's domain name:<br>[edit]<br>root@# **set system domain-name** *domain-name* |
| **Text like this** | Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components. | • To configure a stub area, include the **stub** statement at the **[edit protocols ospf area area-id]** hierarchy level.<br>• The console port is labeled **CONSOLE**. |
| < > (angle brackets) | Encloses optional keywords or variables. | **stub <default-metric *metric*>;** |
| \| (pipe symbol) | Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity. | **broadcast \| multicast**<br>**(*string1* \| *string2* \| *string3*)** |
| # (pound sign) | Indicates a comment specified on the same line as the configuration statement to which it applies. | **rsvp { # Required for dynamic MPLS only** |
| [ ] (square brackets) | Encloses a variable for which you can substitute one or more values. | **community name members [ *community-ids* ]** |
| Indention and braces ( { } ) | Identifies a level in the configuration hierarchy. | [edit]<br>routing-options {<br>static {<br>route default {<br>nexthop *address*;<br>retain;<br>}<br>}<br>} |
| ; (semicolon) | Identifies a leaf statement at a configuration hierarchy level. | |
| **GUI Conventions** | | |

Table 2: Text and Syntax Conventions *(continued)*

| Convention | Description | Examples |
| --- | --- | --- |
| **Bold text like this** | Represents graphical user interface (GUI) items you click or select. | • In the Logical Interfaces box, select **All Interfaces**.<br>• To cancel the configuration, click **Cancel**. |
| > (bold right angle bracket) | Separates levels in a hierarchy of menu selections. | In the configuration editor hierarchy, select **Protocols>Ospf**. |

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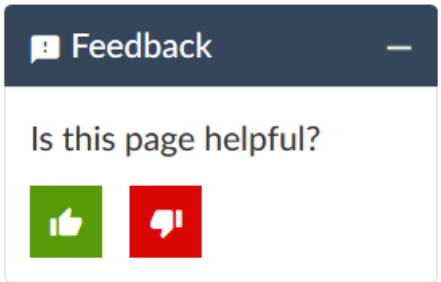
We encourage you to provide feedback so that we can improve our documentation. You can use either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the Juniper Networks TechLibrary site, and do one of the following:




  - Click the thumbs-up icon if the information on the page was helpful to you.
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- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit https://www.juniper.net/support/warranty/.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

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- Find product documentation: https://www.juniper.net/documentation/
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- Download the latest versions of software and review release notes: https://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://kb.juniper.net/InfoCenter/
- Join and participate in the Juniper Networks Community Forum: https://www.juniper.net/company/communities/
- Create a service request online: https://myjuniper.juniper.net

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://entitlementsearch.juniper.net/entitlementsearch/

### Creating a Service Request with JTAC

You can create a service request with JTAC on the Web or by telephone.

- Visit https://myjuniper.juniper.net.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see https://support.juniper.net/support/requesting-support/.

# 1

PART

# Overview

CHAPTER 1

# Network Director API

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## Overview of Network Director API

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- Supported Devices and Services | 3


The Junos Space Network Director API application runs on the Junos Space Network Management Platform, and is exposed by the Network Director orchestration services.

The Network Director API is a set of Representational State Transfer (REST) APIs that enable network management functions, including:

- Plugin and integration with CloudStack
- Virtualization of cloud and data center operations
- Provisioning of secure multitenant networks in a shared network infrastructure
- Automation of tenant services in the data center
- Support for Layer 2, Layer 3, security, and Internet services
- Provision of a single point of integration with external cloud and data center orchestration tools
- Support for obtaining alarm, monitoring and fault, and wireless client information.

Only the Super Administrator and Monitor Admin can access the Network Director APIs.

This topic describes:

## Prerequisites

Before you can use the Network Director API, you must first install the following software:

- Junos Space Network Management Platform Release 20.3R1.
- Network Director API and Network Director GUI Release 4.1R1. These two applications are packaged together and need to be installed.
- REST HTTP client, which can be browser-based or script-based.
- (Optional) Python 2.7, 3.1, or 3.4 programming language software for running the sample API scripts included in the Network Director API software.

## Supported Devices and Services

Table 3 on page 3 lists the Juniper Networks devices that Network Director orchestration services and API support:

**Table 3: Supported Platforms and the Software Versions for Network Director API**

| Supported Platforms | Qualified Junos OS, MSS, or the ESXi Releases |
|---|---|
| **EX Series Switches** | |
| EX2200 and EX2200-C (standalone and Virtual Chassis) and<br>EX3200<br>EX3300 (standalone and Virtual Chassis)<br>EX4200 (standalone and Virtual Chassis)<br>EX4500 (standalone and Virtual Chassis)<br>EX4550 (standalone and Virtual Chassis)<br>Mixed EX4200, EX4500, and EX4550 Virtual Chassis<br>EX6200<br>EX8200 (standalone and Virtual Chassis) | Junos OS Releases 11.4, 12.1, 12.2, 12.3, and 13.2X50-D10.2, |
| **EX Series Switches with ELS** | |
| EX9200 (standalone and Virtual Chassis) | Junos OS Releases 13.2R1, 13.2R2.4, 13.3R2, 16.1R1, 17.1R1.8, 17.2R1.13, 17.4R1.16, 18.1R1.9, and 18.2R1 |
| **QFX Series Switches and Datacenter Fabrics** | |
| QFX3500 (non-ELS)<br>QFX3600 (non-ELS) | Junos OS Release 12.3X50-D40 |

**Table 3: Supported Platforms and the Software Versions for Network Director API *(continued)***

| Supported Platforms | Qualified Junos OS, MSS, or the ESXi Releases |
|---|---|
| QFX3500 with ELS (standalone and Virtual Chassis)<br>QFX3600 with ELS (standalone and Virtual Chassis)<br>QFX5100-48S with ELS (standalone and Virtual Chassis)<br>QFX5100-24Q with ELS (standalone and Virtual Chassis)<br>QFX5100-96S with ELS (standalone and Virtual Chassis)<br>QFX5110 | Junos OS Release 13.2X51-D20<br><br>Junos OS Release17.4R1.16 and 18.1R3.3 for QFX5110 |
| QFabric systems (QFX3000-G and QFX3000-M) | Junos OS Releases 13.1X52-D10 and 13.1X50-D15 |
| Virtual Chassis Fabric | Junos OS Releases 13.1X52-D10 and 13.1X50-D15 |
| VMware vCenter Server<br>VMware Host | VMware ESX versions 4.0 and 4.1<br><br>VMware ESXi versions 5.0, 5.1, 5.5, 6.0, and 6.5 |

The type of network services supported depends on the device and the topology of the network.

Table 4 on page 4 describes the supported devices and topologies, and configurations.

**Table 4: Supported Devices, Topologies, and Services**

| Supported Devices and Topologies | Services | Configuration |
|---|---|---|
| • EX Series switches—EX4200 and EX4550 switches<br>• QFabric systems—QFX 3000-G and QFX3000-M QFabric systems<br>• QFX Series—QFX3500 and QFX3600 switches | Layer 2 | VLANs on the EX Series switch, QFX Series, or QFabric system |
| • EX Series switch or QFX Series connected to an MX Series router<br>• QFabric system connected to an MX Series router | • Layer 2<br>• Layer 2 and Layer 3<br>• Layer 2 and Layer 3 with Internet access | • VLANs on the EX Series switch, QFX Series, or QFabric system<br>• Layer 3 interfaces on the MX Series router<br>• BGP static configuration on the MX Series router |

**Table 4: Supported Devices, Topologies, and Services *(continued)***

| Supported Devices and Topologies | Services | Configuration |
| --- | --- | --- |
| • EX Series switch or QFX Series connected to an SRX Series Services Gateway<br>• QFabric system connected to an SRX Series Services Gateway | • Layer 2<br>• Layer 2 and Layer 3<br>• Layer 2 and Layer 3 with firewall | • VLANs on the EX Series switch, QFX Series, or QFabric system<br>• Layer 3 interfaces on the SRX Series Services Gateway<br>• Security policies on the SRX Series Services Gateway |

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# Fault and Monitoring APIs

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CHAPTER 2

# Overview

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## Fault and Monitoring APIs

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The fault and monitoring APIs provide monitoring information, alarm notifications, and client information.

Network Director management APIs are a set of Representational State Transfer (REST) APIs that enable network management functions, including:

- Exporting monitoring and fault data for location, logical, and virtualization hierarchy to a third party management system
- Providing client data regarding location, equipment, and domains, as well information for wireless connected and unconnected clients
- Using notification profiles for forwarding events for alarms relating to all categories and severities
- Querying alarm history and filters based on time, type, and severity
- Allowing clients to specify host and NIC (network interface card) information

This topic describes:

### Monitoring APIs

Monitoring APIs provide inventory information for managed devices in the network in both summarized and detailed levels. At the detailed level, the APIs provide data about the device's operational and environmental status, as well as the operational status of ports on the devices.

The monitoring APIs provide the following types of device information:

- Junos devices
- QFabric systems
- Virtual Chassis
- Wireless LAN controllers
- Access points
- Radios
- Power supplies
- Fans
- Ports
- Virtual machines (VMs)

See the Network Director API reference documentation for more details regarding specific APIs.

### Client APIs

Client APIs provide information about wired and wireless clients and sessions on the network. A client is any device that is connected to the network through a wireless access point or through an access port on a switch that is an 802.1X authenticator port. Examples of clients include VoIP phones, laptops, printers, security cameras, and so on. Examples of session information includes number of sessions, session activity, information about each client, such as MAC address, IP address, username, client VLAN, port or wireless access point to which client is connected to, and so on.

See the Network Director API reference documentation for more details regarding specific APIs.

### Alarm APIs

Network Director alarm APIs collect SNMP notifications and system alerts from devices and systems that are monitored. Depending on the notification or alert, an alarm is triggered. Client applications are required to receive alarms that are forwarded. The client application must use the same login credential as the one used for Network Director UI.

The alarm APIs provide the following types of alarm information:

- Name of alarm
- ID number of alarm
- Alarm type
- Category of alarm
- Severity of alarm
- State of alarm
- Acknowlegment of alarm
- Entity ID of alarm
- Source address of device that triggered alarm
- Date and time when alarm was created and updated
- Party that updated alarm

See the Network Director API reference documentation for more details regarding specific APIs.

CHAPTER 3

# API Elements and Sample Output Files

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## Fault and Monitoring API Elements and Sample Output Files

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This topic provides the following sample API requests and associated output:

- Resource utilization
- Alarms and alarm count trend data
- Port traffic trend data
- Client sessions

Options on how to display the output are also provided. Options include viewing the output based on a range of pages (pagination) and the amount of detail (detail).

This topic provides the following information:

### Managed Devices API Sample Output

All APIs require that you provide an accept header in the API request, otherwise the output data will be presented by default.

Here is an example of an API request, followed by sample output. The sample output is in JSON format:

```
https://10.94.45.84/api/juniper/nd/monitoring/devices
Authorization: Basic c3VwZXI6anVuaXBlcjEyMw==
Accept: application/vnd.juniper.nd.devices+json;version=2;q=0.01
```


```
{
    "managedDeviceList": {
        "@total": "3",
        "device": [
            {
                "@uri": "/api/juniper/nd/monitoring/devices/qfx/622592",
                "resourceType": "JUNOS_QFX",
                "instanceId": 622592,
                "hostname": "qfx5100-01",
                "platform": "QFX5100-96S-8Q",
                "ipaddr": "192.168.48.168",
                "serial": "VB3113470018",
                "osVersion": "13.2X51-D20.2",
                "family": "JUNOS_QFX",
                "type": "NORMAL",
                "connStatus": "UP",
                "configState": "OUT_OF_SYNC"
            },
            {
                "@uri": "/api/juniper/nd/monitoring/devices/qfx/622593",
```

```
                "resourceType": "JUNOS_QFX",
                "instanceId": 622593,
                "hostname": "qfx5100-02",
                "platform": "QFX5100-48S-6Q",
                "ipaddr": "192.168.55.88",
                "serial": "TA3714141203",
                "osVersion": "13.2X51-D20.2",
                "family": "JUNOS_QFX",
                "type": "NORMAL",
                "connStatus": "UP",
                "configState": "OUT_OF_SYNC"
            },
            {
                "@uri": "/api/juniper/nd/monitoring/devices/ex/622611",
                "resourceType": "JUNOS_MX",
                "instanceId": 622611,
                "hostname": "EX9200-01",
                "platform": "MX240",
                "ipaddr": "10.204.245.71",
                "serial": "IBM888",
                "osVersion": "13.3R2.7",
                "family": "JUNOS",
                "type": "NORMAL",
                "connStatus": "DOWN",
                "configState": "SYNCHRONIZING"
            }
        ]
    }
}
```


### Managed Devices API Sample Output Using Paging Option

You can use the paging option to apply filters on the output. For example, you can specify how many entries to display and from which entry in the output set. In this example, the API request specifies output for three entries, starting from the second entry.

Here is an example API request, followed by sample output. The sample output is in JSON format:

```
https://10.94.45.84/api/juniper/nd/monitoring/devices?paging=(start eq 2, limit
eq 3)
```

```
{
    "managedDeviceList": {
        "@total": "3",
        "device": [
            {
                "@uri": "/api/juniper/nd/monitoring/devices/qfx/622592",
                "resourceType": "JUNOS_QFX",
                "instanceId": 622592,
                "hostname": "QFX5100-01",
                "platform": "QFX5100-96S-8Q",
                "ipaddr": "192.168.48.168",
                "serial": "VB3113470018",
                "osVersion": "13.2X51-D20.2",
                "family": "JUNOS_QFX",
                "type": "NORMAL",
                "connStatus": "UP",
                "configState": "OUT_OF_SYNC"
            },
            {
                "@uri": "/api/juniper/nd/monitoring/devices/qfx/622593",
                "resourceType": "JUNOS_QFX",
                "instanceId": 622593,
                "hostname": "QFX5100-04",
                "platform": "QFX5100-48S-6Q",
                "ipaddr": "192.168.55.88",
                "serial": "TA3714141203",
                "osVersion": "13.2X51-D20.2",
                "family": "JUNOS_QFX",
                "type": "NORMAL",
                "connStatus": "UP",
                "configState": "OUT_OF_SYNC"
            },
            {
                "@uri": "/api/juniper/nd/monitoring/devices/ex/622611",
                "resourceType": "JUNOS_MX",
                "instanceId": 622611,
                "hostname": "EX9200-06",
                "platform": "MX240",
                "ipaddr": "10.204.245.71",
                "serial": "IBM888",
                "osVersion": "13.3R2.7",
                "family": "JUNOS",
                "type": "NORMAL",
                "connStatus": "DOWN",
```

```
                "configState": "SYNCHRONIZING"
            }
        ]
    }
}
```

### Managed Devices API Sample Output Using Detail Option

You can request detailed information for a device by using the query parameter in each device summary block.

Here is an example API request, followed by sample output. This sample output is in XML format.

```
https://10.94.45.84/api/juniper/nd/monitoring/devices/ex/622611/
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<junosDeviceMO uri="/api/juniper/nd/monitoring/devices/ex/622611">
    <resourceType>JUNOS_MX</resourceType>
    <instanceId>622611</instanceId>
    <hostname>EX9200-01</hostname>
    <platform>MX240</platform>
    <ipaddr>10.204.245.71</ipaddr>
    <serial>IBM888</serial>
    <osVersion>13.3R2.7</osVersion>
    <family>JUNOS</family>
    <type>NORMAL</type>
    <connStatus>DOWN</connStatus>
    <configState>SYNCHRONIZING</configState>
    <usedMacCount>0</usedMacCount>
    <usedVlanCount>0</usedVlanCount>
    <lastChanged>Tue Jun 24 05:08:34 +0000 2014</lastChanged>
    <tempRange>avg=48, max=62 (FPC 1 XM 0 Chip)</tempRange>
    <totalPortUps>32</totalPortUps>
    <totalPortDowns>0</totalPortDowns>
    <totalPortFrees>32</totalPortFrees>
    <totalPortUsed>0</totalPortUsed>
    <psStatus>
        <name>PEM 0</name>
        <status>ABSENT</status>
    </psStatus>
    <psStatus>
```

```
        <name>PEM 1</name>
        <status>ABSENT</status>
    </psStatus>
    <psStatus>
        <name>PEM 2</name>
        <status>ABSENT</status>
    </psStatus>
    <psStatus>
        <name>PEM 3</name>
        <status>OK</status>
    </psStatus>
    <fanStatus>
        <name>Front Fan</name>
        <status>OK</status>
    </fanStatus>
    <fanStatus>
        <name>Middle Fan</name>
        <status>OK</status>
    </fanStatus>
    <fanStatus>
        <name>Rear Fan</name>
        <status>OK</status>
    </fanStatus>
    <uptime>3d:18h:14m:41s</uptime>
</junosDeviceMO>
```

### Resource Utilization and Alarm Count Trending APIs Sample Output

Resource utilization and alarm count trend data are supported only on EX Series devices, Access Points, Wireless LAN Controllers, and QFabric systems.

Here is an example API request, followed by sample output. This sample output is in XML format.

```
https://10.94.45.84/api/juniper/nd/monitoring/devices/ex/622611/resource-utilization-trend?hours=2
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<resourceUtilizationTrend total="0”/>

https://10.94.45.84/api/juniper/nd/monitoring/devices/ex/622611/alarm-count-trend?hours=1
Output:
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
```

```xml
<alarmCountTrend total="12">
    <stat>
        <collectionTimestamp>1403815500</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403815800</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403816100</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403816400</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
```

```
    </stat>
    <stat>
        <collectionTimestamp>1403816700</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403817000</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403817300</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403817600</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
```

```
    </stat>
    <stat>
        <collectionTimestamp>1403817900</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403818200</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403818500</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
    </stat>
    <stat>
        <collectionTimestamp>1403818800</collectionTimestamp>
        <allInfoAlarm>0.0</allInfoAlarm>
        <allMinorAlarm>0.0</allMinorAlarm>
        <allMajorAlarm>1.0</allMajorAlarm>
        <allCriticalAlarm>0.0</allCriticalAlarm>
        <newInfoAlarm>0.0</newInfoAlarm>
        <newMinorAlarm>0.0</newMinorAlarm>
        <newMajorAlarm>0.0</newMajorAlarm>
        <newCriticalAlarm>0.0</newCriticalAlarm>
```

```
    </stat>
</alarmCountTrend>
```

### Port APIs Sample Output

You can use port API requests to query managed ports for summary information for each port based on query parameters. If the query parameter value is omitted, summary information for all ports will be displayed.

Here is an example without any query parameters:

```
https://10.94.45.84/api/juniper/nd/monitoring/ports
```

Output is not included.

You can use the paging option to apply filters on the output. For example, you can specify how many entries to display and from which entry in the output set. In this example, the API request specifies output for three entries, starting from the tenth entry.

Here is an example API request, followed by sample output. The sample output is in XML format:

```
https://10.94.45.84/api/juniper/nd/monitoring/ports?paging=(start eq 10, limit eq
 3)
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<ports uri="/api/juniper/nd/monitoring/ports">
    <port uri="/api/juniper/nd/monitoring/ports/ex/VB3113470018_xe-0.0.90">
        <instanceId>VB3113470018_xe-0.0.90</instanceId>
        <portId>VB3113470018_xe-0.0.90</portId>
        <portName>xe-0/0/90</portName>
        <portMac>88:e0:f3:1d:6b:5d</portMac>
        <hostSerial>VB3113470018</hostSerial>
        <hostname>analytics-qfx5100-01</hostname>
        <portSpeed>10000</portSpeed>
        <portType>10-Gigabit</portType>
        <adminStatus>UP</adminStatus>
        <operStatus>UP</operStatus>
        <lastFlap>2 Days 5 Hrs 15 Mins 24 Secs ago</lastFlap>
    </port>
```

```
    <port uri="/api/juniper/nd/monitoring/ports/ex/VB3113470018_xe-0.0.91">
        <instanceId>VB3113470018_xe-0.0.91</instanceId>
        <portId>VB3113470018_xe-0.0.91</portId>
        <portName>xe-0/0/91</portName>
        <portMac>88:e0:f3:1d:6b:5e</portMac>
        <hostSerial>VB3113470018</hostSerial>
        <hostname>analytics-qfx5100-01</hostname>
        <portSpeed>10000</portSpeed>
        <portType>10-Gigabit</portType>
        <adminStatus>UP</adminStatus>
        <operStatus>UP</operStatus>
        <lastFlap>2 Days 5 Hrs 15 Mins 24 Secs ago</lastFlap>
    </port>
    <port uri="/api/juniper/nd/monitoring/ports/ex/VB3113470018_xe-0.0.92">
        <instanceId>VB3113470018_xe-0.0.92</instanceId>
        <portId>VB3113470018_xe-0.0.92</portId>
        <portName>xe-0/0/92</portName>
        <portMac>88:e0:f3:1d:6b:5f</portMac>
        <hostSerial>VB3113470018</hostSerial>
        <hostname>analytics-qfx5100-01</hostname>
        <portSpeed>10000</portSpeed>
        <portType>10-Gigabit</portType>
        <adminStatus>UP</adminStatus>
        <operStatus>UP</operStatus>
        <lastFlap>2 Days 5 Hrs 15 Mins 23 Secs ago</lastFlap>
    </port>
</ports>
```

### Port APIs Sample Output Using Detail Option

You can request detailed information for a port by using the query parameter in each port summary block.

Here is an example API request, followed by sample output. The sample output is in XML format:

```
https://10.94.45.84/api/juniper/nd/monitoring/ports/ex/VB3113470018_xe-0.0.91
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<portTraffic uri="/api/juniper/nd/monitoring/ports/ex/VB3113470018_xe-0.0.91">
    <instanceId>VB3113470018_xe-0.0.91</instanceId>
    <portId>VB3113470018_xe-0.0.91</portId>
    <portName>xe-0/0/91</portName>
```

```
<portMac>88:e0:f3:1d:6b:5e</portMac>
<hostSerial>VB3113470018</hostSerial>
<hostname>analytics-qfx5100-01</hostname>
<portSpeed>10000</portSpeed>
<portType>10-Gigabit</portType>
<adminStatus>UP</adminStatus>
<operStatus>UP</operStatus>
<lastFlap>2 Days 5 Hrs 25 Mins 18 Secs ago</lastFlap>
<trafficInOut>
    <collectionTimestamp>1403819400</collectionTimestamp>
    <unicastInRate>0.0</unicastInRate>
    <unicastOutRate>0.0</unicastOutRate>
    <broadcastInRate>0.0</broadcastInRate>
    <broadcastOutRate>0.0</broadcastOutRate>
    <multicastInRate>0.0</multicastInRate>
    <multicastOutRate>0.0</multicastOutRate>
</trafficInOut>
<trafficError>
    <collectionTimestamp>0</collectionTimestamp>
    <dropsInErrs>0.0</dropsInErrs>
    <framingErrsIn>0.0</framingErrsIn>
    <runtInErr>0.0</runtInErr>
    <discardsInErr>0.0</discardsInErr>
    <l3IncompletesIn>0.0</l3IncompletesIn>
    <l2ChannelErrorsIn>0.0</l2ChannelErrorsIn>
    <l2MismatchTmeout>0.0</l2MismatchTmeout>
    <fifoErrsIn>0.0</fifoErrsIn>
    <resourceErrsIn>0.0</resourceErrsIn>
    <carrierTransOut>0.0</carrierTransOut>
    <collisionOut>0.0</collisionOut>
    <dropsOut>0.0</dropsOut>
    <agedPktsOut>0.0</agedPktsOut>
    <mtuErrsOut>0.0</mtuErrsOut>
    <hsLinkCrcErr>0.0</hsLinkCrcErr>
    <fifoErrsOut>0.0</fifoErrsOut>
    <resourceErrsOut>0.0</resourceErrsOut>
    <crcErrsIn>0.0</crcErrsIn>
    <crcErrsOut>0.0</crcErrsOut>
    <oversizedFrmIn>0.0</oversizedFrmIn>
    <oversizedFrmOut>0.0</oversizedFrmOut>
    <jabberFrmIn>0.0</jabberFrmIn>
    <fragFrmIn>0.0</fragFrmIn>
    <codeViolationIn>0.0</codeViolationIn>
```

```
    </trafficError>
</portTraffic>
```

### Port Traffic Trend Data APIs Sample Output

You can use Port traffic trend data API requests to query ports based on the port ID as well as the time range given by the parameters. You must provide either start time and end time of the query or the last number of hours.

Here is an example API request, followed by sample output. The sample output is in XML format:

```
https://0.94.45.84/api/juniper/nd/monitoring/ports/ex/
VB3113470018_xe-0.0.91/port-traffic-trend?startTime=2014-03-03T01:02:00Z&endTime=2014-03-14T10:00:00Z
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<portTrafficTrend total="12"
uri="/api/juniper/nd/monitoring/ports/ex/VB3113470018_xe-0.0.91">
    <instanceId>VB3113470018_xe-0.0.91</instanceId>
    <portId>VB3113470018_xe-0.0.91</portId>
    <portName>xe-0/0/91</portName>
    <portMac>88:e0:f3:1d:6b:5e</portMac>
    <hostSerial>VB3113470018</hostSerial>
    <hostname>analytics-qfx5100-01</hostname>
    <portSpeed>10000</portSpeed>
    <portType>10-Gigabit</portType>
    <adminStatus>UP</adminStatus>
    <operStatus>UP</operStatus>
    <lastFlap>2 Days 5 Hrs 25 Mins 18 Secs ago</lastFlap>
    <trafficInOut>
        <collectionTimestamp>1403816100</collectionTimestamp>
        <unicastInRate>0.0</unicastInRate>
        <unicastOutRate>0.0</unicastOutRate>
        <broadcastInRate>0.0</broadcastInRate>
        <broadcastOutRate>0.0</broadcastOutRate>
        <multicastInRate>0.0</multicastInRate>
        <multicastOutRate>0.0</multicastOutRate>
    </trafficInOut>
    <trafficInOut>
        <collectionTimestamp>1403816400</collectionTimestamp>
        <unicastInRate>0.0</unicastInRate>
        <unicastOutRate>0.0</unicastOutRate>
```

```
        <broadcastInRate>0.0</broadcastInRate>
        <broadcastOutRate>0.0</broadcastOutRate>
        <multicastInRate>0.0</multicastInRate>
        <multicastOutRate>0.0</multicastOutRate>
    </trafficInOut>
    <trafficInOut>
        <collectionTimestamp>1403816700</collectionTimestamp>
        <unicastInRate>0.0</unicastInRate>
        <unicastOutRate>0.0</unicastOutRate>
        <broadcastInRate>0.0</broadcastInRate>
        <broadcastOutRate>0.0</broadcastOutRate>
        <multicastInRate>0.0</multicastInRate>
        <multicastOutRate>0.0</multicastOutRate>
    </trafficInOut>
    <trafficInOut>
        <collectionTimestamp>1403817000</collectionTimestamp>
        <unicastInRate>0.0</unicastInRate>
        <unicastOutRate>0.0</unicastOutRate>
        <broadcastInRate>0.0</broadcastInRate>
        <broadcastOutRate>0.0</broadcastOutRate>
        <multicastInRate>0.0</multicastInRate>
        <multicastOutRate>0.0</multicastOutRate>
    </trafficInOut>
...
</portTrafficTrend>
```

### Client Sessions APIs Sample Output

You can use the client sessions APIs to query client sessions based on search parameters, such as username, MAC address, IPv4 address, IPv6 address, and so on. If you do not specify a search parameter, an exception error is issued.

Here is an example API request, followed by sample output. The sample output is in XML format:

```
https://10.94.45.84/api/juniper/nd/monitoring/client-sessions?search=18:26:66:72:81:62
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<clientSessions total="1" uri="/api/juniper/nd/monitoring/client-sessions">
    <session
uri="/api/juniper/nd/monitoring/client-sessions/wireless/18:26:66:72:81:62">
```

```
        <instanceId>18:26:66:72:81:62</instanceId>
        <resourceType>WIRELESSCLIENT</resourceType>
        <macAddress>18:26:66:72:81:62</macAddress>
        <userName>last-resort-AWN-2105</userName>
        <ipv4>192.168.34.175</ipv4>
        <ipv6>[]</ipv6>
        <linkLocal>fe80::1a26:66ff:fe72:8162</linkLocal>
    </session>
</clientSessions>
```

You can also search using partial search data:

Here is an example API request, followed by sample output. The sample output is in XML format:

```
https://10.94.45.84/api/juniper/nd/monitoring/client-sessions?search=BB
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<clientSessions total="3" uri="/api/juniper/nd/monitoring/client-sessions">
    <session
uri="/api/juniper/nd/monitoring/client-sessions/wireless/1c:b0:94:4c:bb:09">
        <instanceId>1c:b0:94:4c:bb:09</instanceId>
        <resourceType>WIRELESSCLIENT</resourceType>
        <macAddress>1c:b0:94:4c:bb:09</macAddress>
        <userName>last-resort-AWN-2095</userName>
        <ipv4>192.168.33.197</ipv4>
        <ipv6>[]</ipv6>
        <linkLocal>fe80::1eb0:94ff:fe4c:bb09</linkLocal>
    </session>
    <session
uri="/api/juniper/nd/monitoring/client-sessions/wireless/34:bb:26:df:ec:05">
        <instanceId>34:bb:26:df:ec:05</instanceId>
        <resourceType>WIRELESSCLIENT</resourceType>
        <macAddress>34:bb:26:df:ec:05</macAddress>
        <userName>last-resort-AWN-2124</userName>
        <ipv4>192.168.32.95</ipv4>
        <ipv6>[]</ipv6>
        <linkLocal>fe80::36bb:26ff:fedf:ec05</linkLocal>
    </session>
    <session
uri="/api/juniper/nd/monitoring/client-sessions/wireless/58:a2:b5:d0:49:bb">
        <instanceId>58:a2:b5:d0:49:bb</instanceId>
        <resourceType>WIRELESSCLIENT</resourceType>
```

```
        <macAddress>58:a2:b5:d0:49:bb</macAddress>
        <userName>last-resort-AWN-2262</userName>
        <ipv4>192.168.33.3</ipv4>
        <ipv6>[]</ipv6>
        <linkLocal>fe80::5aa2:b5ff:fed0:49bb</linkLocal>
    </session>
</clientSessions>
```

### Alarm APIs Sample Output

You can use alarm API requests to query alarms based on the query parameters. If you omit the query parameter, information for all alarms will be provided.

Here is an example API request, followed by sample output. The sample output is in XML format:

```
https://10.94.45.84/api/juniper/nd/monitoring/alarms?paging=(start eq 10, limit
eq 3)
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<alarms uri="/api/juniper/nd/monitoring/alarms" total="93">
    <alarm uri="/api/juniper/nd/monitoring/alarms/11">
        <instanceId>11</instanceId>
        <alarmId>11</alarmId>
        <name>Port High Non-Unicast Traffic</name>
        <catergory>Threshold</catergory>
        <severity>MAJOR</severity>
        <state>ACTIVE</state>
        <ack>false</ack>
        <entityId>Port:LX0212521598.ge-0/0/2</entityId>
        <source>10.94.45.171</source>
        <creationTime>Thu Jun 12 18:48:23 UTC 2014</creationTime>
        <lastUpdated>Mon Jun 23 19:48:23 UTC 2014</lastUpdated>
        <updatedBy>System</updatedBy>
    </alarm>
    <alarm uri="/api/juniper/nd/monitoring/alarms/12">
        <instanceId>12</instanceId>
        <alarmId>12</alarmId>
        <name>Device High CPU Utilization</name>
        <catergory>Threshold</catergory>
        <severity>MAJOR</severity>
        <state>ACTIVE</state>
```

```
        <ack>false</ack>
        <entityId>Device:LX0212521598</entityId>
        <source>10.94.45.171</source>
        <creationTime>Thu Jun 12 19:48:23 UTC 2014</creationTime>
        <lastUpdated>Thu Jun 26 17:54:16 UTC 2014</lastUpdated>
        <updatedBy>System</updatedBy>
    </alarm>
    <alarm uri="/api/juniper/nd/monitoring/alarms/13">
        <instanceId>13</instanceId>
        <alarmId>13</alarmId>
        <name>Port High Utilization</name>
        <catergory>Threshold</catergory>
        <severity>MAJOR</severity>
        <state>ACTIVE</state>
        <ack>false</ack>
        <entityId>Port:P5228.xe-0/0/30</entityId>
        <source>192.168.48.246</source>
        <creationTime>Thu Jun 12 22:18:23 UTC 2014</creationTime>
        <lastUpdated>Thu Jun 26 17:54:17 UTC 2014</lastUpdated>
        <updatedBy>System</updatedBy>
    </alarm>
</alarms>
```

### Alarm APIs Sample Output Using Detail Option

You can use alarm API requests to query alarms based on query parameters. If you omit the query parameter, information for all alarms will be provided.

Here is an example API request, followed by sample output. The sample output is in XML format:

```
https://10.94.45.84/api/juniper/nd/monitoring/alarms/10
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<alarm uri="/api/juniper/nd/monitoring/alarms/10">
    <instanceId>10</instanceId>
    <alarmId>10</alarmId>
    <name>Port High Non-Unicast Traffic</name>
    <catergory>Threshold</catergory>
    <severity>MAJOR</severity>
    <state>ACTIVE</state>
```

```
    <ack>false</ack>
    <entityId>Port:PG3713400425.ge-0/0/23</entityId>
    <source>10.204.247.50</source>
    <creationTime>Thu Jun 12 18:48:23 UTC 2014</creationTime>
    <lastUpdated>Thu Jun 26 17:54:16 UTC 2014</lastUpdated>
    <updatedBy>System</updaedBy>
</alarm>
```

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# API Reference

CHAPTER 4

# API Reference

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## Junos Space Network Director API Reference

Junos Space Network Director APIs are based on the Representational State Transfer (REST) standards. REST defines a set of principles for defining Web services, including how a system's resource states are transferred over HTTP. Clients can be written in any language that sends HTTP requests.

Network Director RESTFul API Reference describes the Junos Space Network Director REST APIs and how to use them for automating Network Director operations.