



**OSGi<sup>TM</sup>**  
**Alliance**

## **RFC 209 - NetworkInterfaceInformationService**

Draft

34 Pages

### **Abstract**

This document defines the Java API that provides the information of network interfaces in an OSGi environment. The bundles can get not only information of network interfaces but notification when the configuration of network interfaces to be changed to use this API.

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# 0 Document Information

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## 0.3 Feedback

This document can be downloaded from the OSGi Alliance design repository at <https://github.com/osgi/design>. The public can provide feedback about this document by opening a bug at <https://www.osgi.org/bugzilla/>.

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## 0.5 Terminology and Document Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in 10.1.

Source code is shown in this typeface.

## 0.6 Revision History

The last named individual in this history is currently responsible for this document.

Revision	Date	Comments
Initial	Nov 18, 2013	Initial version Shigekuni Kondo, NTT Corporation, kondo.shigekuni@lab.ntt.co.jp
0.2	Feb 10, 2014	Based on the last meeting, the section 5 has changed. Changed the design to service repository model. Shigekuni Kondo, NTT Corporation, kondo.shigekuni@lab.ntt.co.jp
<u>0.3</u>	<u>Feb 28, 2014</u>	<u>Based on the last meeting, the following points have been modified.</u> <u>nwif.disprayname is changed to OPTIONAL.</u> <u>Interface name is changed.</u> <u>NwlflInfo --&gt; NetworkAdapter, NwlflnetAddress --&gt; NetworkAddress</u> <u>IPAdress Type is divided to IPAdresVersion and IPAdressScope.</u> <u>The functionality of configuration is removed.</u> <u>Shigekuni Kondo, NTT Corporation, kondo.shigekuni@lab.ntt.co.jp</u>
<u>0.4</u>	<u>Mar 6, 2014</u>	<u>Based on the last meeting, the following points have been modified.</u> <u>Update IPAdress Version and Scope.</u> <u>The order of registering (unregistering) NetworkAdapter and NetworkAddress is changed.</u> <u>Shigekuni Kondo, NTT Corporation, kondo.shigekuni@lab.ntt.co.jp</u>

# 1 Introduction

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Java standard APIs (i.e. `java.net.NetworkInterface`, `java.net.InetAddress`) provide functions that allow IP network interface information, such as the IP address and MAC address to be obtained.

However, the bundle that wants to get network interface information has to monitor whether the information has changed or not for a certain period of time. Changes in network interface can be pushed to the bundles concerned, the need for polling by bundles can be eliminated.

In addition, some information cannot be obtained via Java standard APIs.

This RFC

defines the Java API that provides the information of network interfaces in an OSGi environment. The bundles can get not only information of network interfaces but notification when the configuration of network interfaces to use this API.

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## 2 Application Domain

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There are many bundles that use the IP network to communicate with other networked devices. In particular, since a Residential Gateway (RGW) may have a number of network interfaces, each bundle running on the RGW needs to obtain an IP address and confirm whether the network interface associated with the allocated IP address suits the bundle's requirements or not.

For example, a protocol adapter needs the IP address of a network interface on the wide area network side to communicate with an external server. UPnP device service bundle needs the IP address that can be used to communicate with devices in a local area network.

These bundles can acquire information about the network interface via the following Java standard APIs.

- `java.net.NetworkInterface`
- `java.net.InetAddress`

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## 3 Problem Description

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Many application bundles on the RGW provide services on IP networks. For example, a protocol adapter for DMT Admin Service, a http server established by HTTP Service bundle and UPnP device service bundle use IP networks. In those cases, the bundles need to get information about the network interface on the RGW such as IP address, MAC address, network interface name, and so on.

The information about the network interface can be obtained by using Java standard APIs which are `java.net.NetworkInterface` and `java.net.InetAddress`. However, these APIs fail to provide the features needed by the bundles when they use the IP network in the following situations:

[Problem 1] There is no feature that sends a notification when information of the network interface (i.e. IP address) changes during runtime, e.g. the connection status or the assigned IP address.

[Problem 2] There is no feature that can acquire the subnet mask of the network interface.

[Problem 3] Operating System specific bundles must be prepared because some information about network interface depends on the Operating System.

If these functions were available, it would be very useful for bundles that need to use the IP network. However, a standard API does not exist at this time, so it must be prepared for each environment.

### 3.1 Use Cases

#### Use case 1

The TR-069 protocol adapter bundle on a RGW needs to communicate with an Auto Configuration Server (ACS). The ACS needs to know the public IP address of the Residential Gateway to send a UDP packet to the protocol adapter bundle for a connection request. In this case, the bundle has to provide the IP address to the ACS when the bundle is started or the IP address has changed.

#### Use case 2

When an HTTP Service bundle is available, at least one HTTP server is expected to run. When the HTTP server needs to be assigned to a specific network interface, the HTTP Service bundle has to know the information of the network interface. In addition, the HTTP Service bundle needs to know when the IP address of the network interface being managed changes.

#### Use case 3

The UPnP Device Service bundle needs to create the `DatagramSocket` for receiving and sending M-search messages. In the case of devices such as Residential Gateway, which has multi network interfaces, the UPnP bundle has to create a `DatagramSocket` that is bound to an appropriate local IP address. Therefore, the UPnP bundle needs to know the current IP address of the network interface and the replacement IP address.

**Use case 4**

An application bundle wants to obtain the subnet mask of the IP address to cover the situation in which the bundle needs to execute the Wake-up-On-LAN process.

**Use case 5**

An application wants to obtain information about available network services, such as available DNS Server, Log Server, NTP Server, or network characteristics, such as domain names, ARP cache timeouts, broadcast address, etc. For this, the local DHCP server can be queried to get those information.

**Use case 6**

A device running an OSGi framework in an mixed IPv4/IPv6 environment needs to get specific information about the network interface(s) in order to provide, for example, different services for the IPv4 and IPv6 environments.

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## 4 Requirements

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[REQ\_1] The solution MUST provide means to send notifications to interested bundles whenever the information of network interface has changed.(i.e. The bundle is notified the information of IP address change from Network Interface Information Service implemented bundle)

[REQ\_2] The solution MUST provide an API that can obtain information from a multiple network interfaces. Each network interface can provide information about multiple addresses. (An application bundle needs to know whether the network interface is a LAN interface or a WAN interface.).

[REQ\_3] The solution MUST provide a mechanism that can provide the network interface information needed regardless of the Operating System type.

[REQ\_4] The solution MUST provide the means of configuring network interface type. It will be defined for each environment (i.e. "LAN", "WAN" that is bound to each logical interface) .

[REQ\_5] The solution MUST provide an API that can obtain the subnet mask of each IP address.

[REQ\_6] The solution MUST support both IPv4 and IPv6 environments (mixed or separately) and the corresponding characteristics, for example IPv4 and IPv6 addresses, multi-prefixes, multicast etc. .

[REQ\_7] The solution SHOULD support the retrieval of MAC addresses for network interfaces.

[REQ\_8] The solution MAY provide an API that allows alteration of network interface configurations.

[REQ\_9] The solution MAY provide an API that can obtain the capability of network interface. (e.g. the physical type of network interface, list of BOOTP/DHCP command options, DNS server address, Default Gateway address, etc.)



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## 5 Technical Solution

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### 5.1 Introduction

When the IP address is changed, the bundles utilize IP address information (i.e. Http Service bundle running HTTP Servers) is necessary to detect the fact of the change. In case of using the standard Java API, such as `java.net.InetAddress` and `java.net.NetworkInterface`, processing to confirm the IP address at regular intervals from the bundle itself is required. Since this is a process common to all bundles which are necessary to detect the change of IP address information, provision of services to notify a change of IP address is very effective.

Therefore the API provides the change notification feature for each network interface information (including the IP address information) is investigated in this RFC document. In addition to that, this RFC defines APIs which provide the functionalities to obtain the network interface information and the information of IP address which is bound ~~to the network interface it, to create and remove a logical network interface and to add, change and remove an IP address.~~

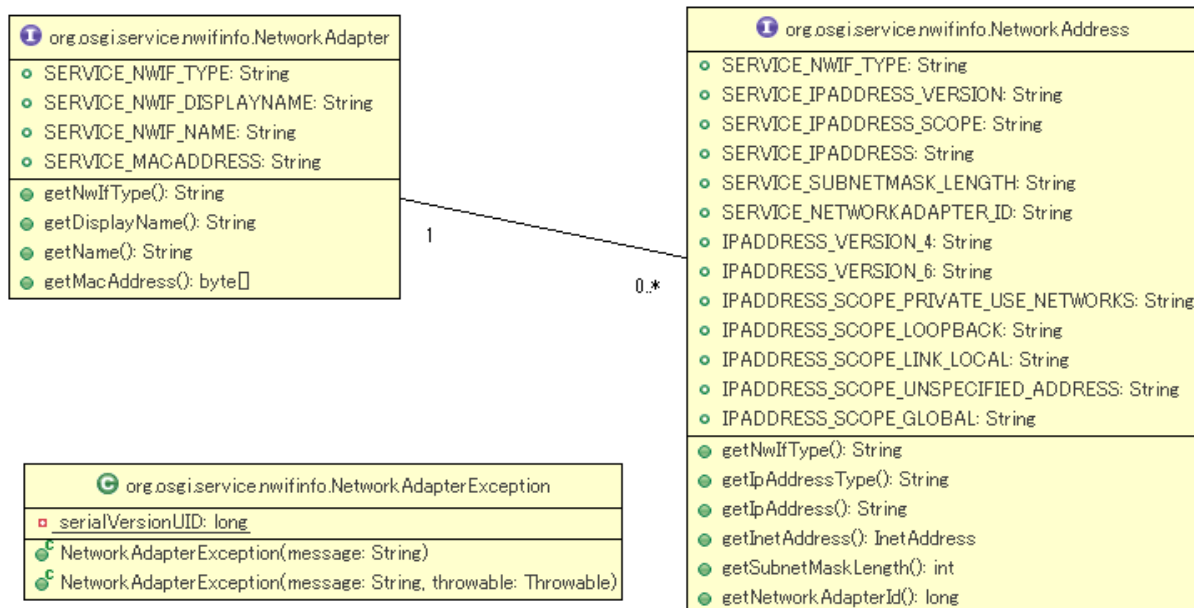
The name of the network interface is information dependent on the operating system. In order to be able to bundle implementation that uses the Network Interface Information Service is not aware of the differences in the operating system, the mechanism of identifying network interface is necessary in a format that does not depend on the operating system. This RFC also defines it.

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### 5.2 Entities

- **Network Interface**  
Available and activated network interfaces provided in the execution environment. In this specification, the unit of the network interface is the logical interface, not the physical interface.
- **NetworkAdapterwifInfo**  
The OSGi service that provides information related to the Network Interface. This service provides functionalities corresponding to “`java.net.NetworkInterface`”.
- **NwifInetAddress**  
The OSGi service that provides information of IP addresses available on execution environment on a Network Interface Information Service bundle is running.
- **NwifInfoAdmin**  
~~The OSGi Service. This interface provides the functionality to create new logical network interface. IP address can be configured via created NwifInfo Service.~~
- **NwifInfoPermission**  
~~This class represents execute authority of the bundle which registers NwifInfo Admin Service, NwifInfo service and NwifInetAddress service.~~

- **NetworkAdapterNwifInfoException**  
Exception class that represents a processing failure of **NwifInfoNetworkAdapter**.
- **NetworkAdapternwifType**  
The identifier of the network interface to be defined in a manner. It is independent of the operating system. This identifier string is not specified in this specification. The Network Interface Information Service bundle provider should define this identifier string. This identifier is used by user bundle to specify the network interface to be monitored.
- **IPAdressTypeVersion**  
An identifier indicating the **versiontype** of IP address (i.e. **Ipv4\_PRIVATE**, **IPv6\_GROVAL**). This identifier is defined in this specification. This identifier is used by user bundle to specify the network interface to be monitored.
- **IPAdressScope**  
An identifier indicating the scope of IP address (i.e. GROVAL, PRIVATE). This identifier is defined in this specification. This identifier is used by user bundle to specify the network interface to be monitored.



**Fig.1 Class structure of Network Interface Information Service**

## <Network Interface Information Bundle>

To register three kind of services.

[NwlflInfoNetworkAdapter](#) service provides network interface information, this bundle registers this service each logical interface.

[NwlflNetAddressNetworkAddress](#) service provides each IP address information, this bundle registers this service each IP address.

[NwlflNetAddressNetworkAddress](#) service is associated with specific [NwlflInfoNetworkAdapter](#) service.

When information of network interface is changed, service properties of [NwlflInfoNetworkAdapter](#) service and [NwlflNetAddressNetworkAddress](#) service will be modified. NwlflInfoAdmin service provides the functionality to create new logical network interface.

## <User bundle>

Tracking necessary [NwlflInfoNetworkAdapter](#) service and [NwlflNetAddressNetworkAddress](#) service (using filter). This bundle can be notified the change of network interface information via Service Event.

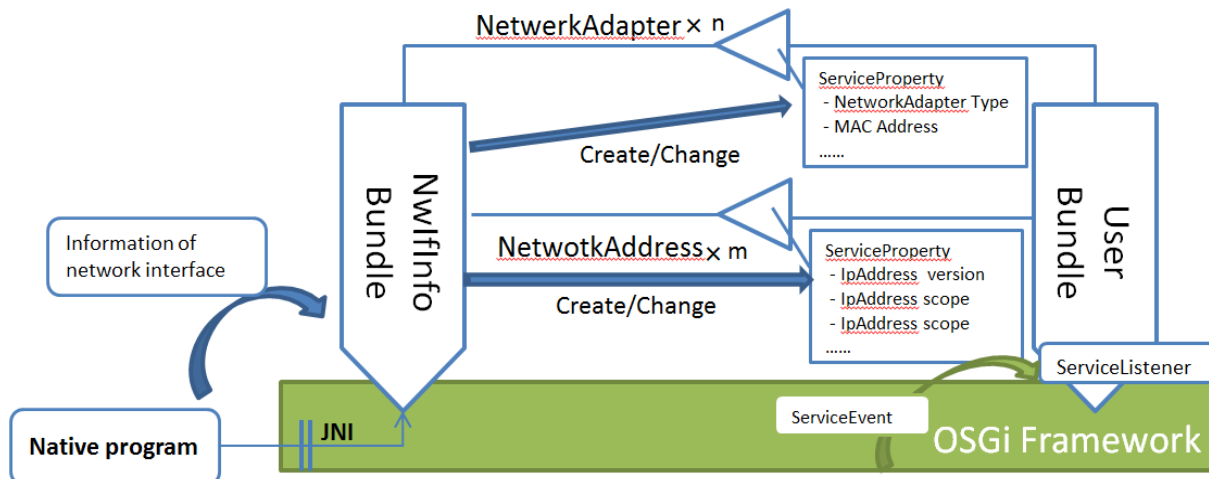


Fig.2 Overview of Network Interface Information Service

### 5.3 **NwIfInfoNetworkAdapter** Service

**NwIfInfoNetworkAdapter** is an interface that provides information about available network interfaces that are provided by the execution environment on the Network Interface Information Service bundle is running.

**NwIfInfoNetworkAdapter** service is registered to the service repository with service properties which are shown in the following table.

**Table 1. Service properties of **NwIfInfoNetworkAdapter** Service**

The key of service property	Description
service.nwif.type	Required property. Network interface type is set to a value.
service.macaddress	Required property. MAC address is set to a value.
service.nwif.name	Required property. Network interface name is set to a value.
service.nwif.displayname	<b>OptionalRequired</b> property. Network interface display name is set to a value.

When a network interface becomes available, **NwIfInfoNetworkAdapter** service associated with the network interface is registered to service repository. If the network interface becomes unavailable, the corresponding **NwIfInfoNetworkAdapter** service is unregistered.

When the attribute values of the network interface are set to the service property changes, **NwIfInfoNetworkAdapter** service is updated. **NwIfInfoNetworkAdapter** interface provides a method corresponding to java.net.NetworkInterface in order to provide information on the network interface associated with. However, it does not provide in this interface method corresponding to the Static method. In addition to that, because **NetworkInterfaceInetAddress** object or **NetworkInterfaceInetAddress** object is registered in the service repository **as NetworkAdapter and NetworkAddress**, the method to get those objects does not provide in **NwIfInfoNetworkAdapter** interface. **NwIfInfoNetworkAdapter** provides a method to retrieve the value of an attribute of a network interface.

**Table 2. The method adopted in NetworkAdapter**

Method in java.net.NetworkInterface	Adoption
<b>getByInetAddress(InetAddress)</b>	<b>Not adopted in this interface because this method is static method.</b>
<b>getByName(String)</b>	<b>Not adopted in this interface because this method is static method.</b>
<b>getDisplayName()</b>	<b>Adopted in this interface.</b>
<b>getHardwareAddress().getName()</b>	<b>Adopted in this interface.</b>

<code>getInetAddresses().getHardwareAddresses()</code>	<u>Not adopted in this interface because InetAddress object is provided by NetworkAddress service.</u>
<code>getInterfaceAddresses().getInetAddresses()</code>	<u>Not adopted in this interface because InetAddress object is provided by NetworkAddress service.</u>
<code>getMTU().getInterfaceAddresses()</code>	<u>Adopted in this interface.</u>
<code>getName().getMTU()</code>	<u>Adopted in this interface.</u>
<code>getNetworkInterfaces().getName()</code>	<u>Not adopted in this interface because this method is static method.</u>
<code>getParent().getNetworkInterfaces()</code>	<u>Not adopted in this interface because NetworkAdapter service is registered.</u>
<code>getSubInterfaces().getParent()</code>	<u>Not adopted in this interface because NetworkAdapter service is registered.</u>
<code>isLoopback().getSubInterfaces()</code>	<u>Adopted in this interface.</u>
<code>isPointToPoint().isLoopback()</code>	<u>Adopted in this interface.</u>
<code>isUp().isPointToPoint()</code>	<u>Adopted in this interface.</u>
<code>isVirtual().isUp()</code>	<u>Adopted in this interface.</u>
<code>supportsMulticast()</code>	<u>Adopted in this interface.</u>

~~provides the remove method to delete the network interface associated with it. However, network interface that can be removed by the remove method is limited to the network interface generated via Network Interface Information Service. The network interface provided in the execution environment from the beginning cannot be deleted in the remove method. It is in order not to disturb the behavior of the non-OSGi application.NwIfInfo~~

~~service.NwIfInetAddressNwIfInfoAdmin Service~~

~~This interface provides the functionality to create new logical network interface. After the creating new logical network interface, NwIfInfo service will be registered. IP address can be added and configured via NwIfInfo service and-~~

## 5.4 NwIfInetAddressNetworkAddress Service

NwIfInetAddressNetworkAddress interface provides information of IP addresses available on execution environment on a Network Interface Information Service bundle is running.

NwIfInetAddressNetworkAddress service is registered to the service repository with service properties which are shown in the following table.

**Table 23. Service properties of NwiflnetAddressNetworkAddress Service**

The key of service property	Description
service.nwif.type	Required property. Network interface type is set to a value.
<u>service.ipaddress.versiontype</u>	Required property. IP address <u>versiontype</u> is set to a value.
<u>service.ipaddress.scope</u>	<u>Required property. IP address scope is set to a value.</u>
service.ipaddress	Required property. IP address String is set to a value.
service.subnetmask.length	Required property. subnet mask length of the required properties IPv4, or IPv6 prefix length is set to a value.
<u>service.nwiflnetnetworkadapter.pid</u>	Required property. Service ID of the <u>NwiflnetNetworkAdapter</u> service corresponding to the network interface binding this IP address is set to a value.

NwiflnetAddressNetworkAddress service is registered to service repository for each available IP address.

When the associated IP addresses is deleted, or the network interface that the IP address is bound becomes unavailable, the NwiflnetAddressNetworkAddress service is unregistered. When the associated IP address has been changed, NwiflnetAddressNetworkAddress service is updated. The user bundle can detect the change of IP address by monitoring the registration or unregistering, updating of NwiflnetAddressNetworkAddress service.

Because IP addresses are bound to the network interface of any, Service PID of the associated NwiflnetNetworkAdapter service and its network interface type are set to service property.

NwiflnetAddressNetworkAdapter service MUST be registered after the all associated NwiflnetNetworkAddress services are registered. On the other hand, in case of unregistering services, after associated NetworkAdapter service is unregistered, NwiflnetAddressNetworkAddress all related services are unregistered, associated Nwiflnet service is unregistered.

~~Service:~~

~~The action string is defined only "ADMIN". It means the permission to execute the Add, Set and Delete method for each information.~~

~~There is no need for this permission to execute of the Get method for each information. NwiflnetAddress service and Nwiflnet Service that match the "Network interface type" represented Str1.~~

#### <Name3>

The name is consisted of only "\*". This name represents all `NwiflnetAddress` service and `Nwiflnfo` Service that match the "Network interface type" represented `Str1` and "IP address type" represented `Str2`.

#### <Name2>

The name is consisted of `Str1` and "\*" which is a dot-separated string (i.e. `Str1.*`).: "Network interface type" is described as `Str1`. This name represents all `NwiflnetAddress` service and `Nwiflnfo` service.

The name is a string using the network interface type and the IP address type. There are three types of name as below. "`Str1`" and "`Str2`" is used to represent string example.

#### <Name1>

It is consisted of `Str1` and `Str2` which is a dot-separated string (i.e. `Str1.Str2`). "\*" is not included in the name. "Network interface type" is described as `Str1` and "IP address type" is described as `Str2`. This name represents all `NwiflnetAddress` service and `NwiflnfoPermission`

This class represents execute authority of the bundle which registers `Nwiflnfo`

~~provides the Setter method to change the subnet mask (or prefix length) and IP address. `NwiflnetAddress` provides the remove method to delete the IP address associated with it. In addition to that `NwiflnetAddress`~~

## 5.5 `NwiflnfoNetworkAdapterException`

Exception class that represents a processing failure of `NwiflnfoNetworkAdapter`.

## 5.6 ~~IP address type and~~ Network interface type and IP address type

### 5.6.1 Network interface type

In order to identify the network interface, it is possible to use the network interface name.

However, since the network interface name is an identifier that is dependent on the operating system, if network interface name is used as identifier, it is necessary to implement the user bundle being aware of the operating system. Therefore, in this specification, "network interface type" which is independent of the operating system is used to identify the network interface. The network interface type sting itself is not defined in this specification. It should be provided by the platform provider on which Network Interface Information Service bundle is running. For example, Network interface type "LAN" indicates the network interface to connect to a local area network, Network interface type "WAN" indicates the network interface to connect to the Internet. If a bundle wants to obtain the information of the network interface which connects to the Internet, the bundle is able to get it to obtain `NwiflnfoNetworkAdapter` service which is set "SERVICE\_NWIF\_TYPE = WAN" to service property from service repository.

## 5.6.2 IP address type

This spec defines "IP address versiontype" and "IP address scope" as IP address type to be narrowed down the IP address by user bundle of following.

**Table 34. IP Address TypeVersion**

IP Address <u>TypeVersion</u>	Discription
IPV4_ <u>GLOBAL</u>	IP address <u>versiontype</u> which means IPv4 <u>global</u> address.
IPV6_ <u>GLOBAL</u>	IP address <u>versiontype</u> which means IPv6 <u>global</u> address.

**Table 5. IP Address Scope (T.B.D)**

IP Address Scope	Description
<u>GLOBAL</u>	<u>IP address scope which means global address.</u>
<u>PRIVATE_USE</u>	<u>IP address scope which means private address.</u>
<u>LOOPBACK</u>	<u>IP address scope which means loopback address.</u>
<u>LINKLOCAL</u>	<u>IP address scope which means linklocal address.</u>
<u>UNIQUE_LOCAL</u>	<u>IP address scope which means unique-local address.</u>
<u>UNSPECIFIED</u>	<u>IP address scope which means the absence of an address.</u>

If a bundle which wants to check for the IP address of the IPv4 global, the bundle is able to confirm to obtain NwIfinetAddressNetworkAddress service which is set "SERVICE\_IPADDRESS\_VERSIONTYPE = IPV4\_GLOBAL" and "SERVICE\_IPADDRESS\_SCOPE = GLOBAL" to service property from service repository.

## 5.7 Usage

T.B.D.



## 6 Data Transfer Objects

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*T.B.D.*

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## 7 Javadoc

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## OSGi Javadoc

14/02/06 17:54

Package Summary		Page
<a href="#">org.osgi.service.nwifinfo</a>		19

## Package org.osgi.service.nwifinfo

Interface Summary		Page
<a href="#">NwlflnetAddresses</a>	This interface represents an IP address information.	20
<a href="#">NwlflInfo</a>	This interface represents network interface information.	25
<a href="#">NwlflInfoAdmin</a>	This interface represents a administrator of network interface information.	29

Class Summary		Page
<a href="#">NwlflInfoPermission</a>	This class represents execute authority of the bundle which registers NwlflInfo service and NwlflnetAddress service.	31

Exception Summary		Page
<a href="#">NwlflInfoException</a>	Exception class that represents a processing failure of NwlflInfo.	30

## Interface NwIfInetAddress

[org.osgi.service.nwifinfo](http://org.osgi.service.nwifinfo)

```
public interface NwIfInetAddress
```

This interface represents an IP address information. IP address information service is set the following information as service property.

1. [SERVICE\\_NWIF\\_TYPE](#) : Network Interface Type
2. [SERVICE\\_IPADDRESS\\_TYPE](#) : IP Address Type
3. [SERVICE\\_IPADDRESS](#) : IP Address
4. [SERVICE\\_SUBNETMASK\\_LENGTH](#) : Subnet Mask Length(IPv4) or Prefix Length(IPv6)
5. [SERVICE\\_NWIFINFO\\_ID](#) : Service ID of the interface information service to which it belongs

Field Summary		Page
String	<a href="#">SERVICE_IPADDRESS</a> The key string of "service.ipaddress" service property.	21
String	<a href="#">SERVICE_IPADDRESS_TYPE</a> The key string of "service.ipaddress.type" service property.	21
String	<a href="#">SERVICE_NWIF_TYPE</a> The key string of "service.nwif.type" service property.	21
String	<a href="#">SERVICE_NWIFINFO_ID</a> The key string of "service.nwifinfo.id" service property.	21
String	<a href="#">SERVICE_SUBNETMASK_LENGTH</a> The key string of "service.subnetmask.length" service property.	21

Method Summary		Page
InetAddress	<a href="#">getInetAddress()</a> Returns the InetAddress object of this IP address.	22
String	<a href="#">getIpAddress()</a> Returns the IP address of "service.ipaddress" service property value.	22
String	<a href="#">getIpAddressType()</a> Returns the IP address type of "service.ipaddress.type" service property value.	22
long	<a href="#">getNwIfInfoId()</a> Returns the "service.nwifinfo.id" service property value.	23
String	<a href="#">getNwIfType()</a> Returns the network interface type of "service.nwif.type" service property value.	21
int	<a href="#">getSubnetMaskLength()</a> Returns the "service.subnetmask.length" service property value.	23
void	<a href="#">remove()</a> Remove IP address of the relevant network interface from the environment.	23
void	<a href="#">setIpAddress(String address)</a> Set the IP address.	22
void	<a href="#">setSubnetMaskLength(int length)</a> Set the Subnet Mask Length(IPv4) or Prefix Length(IPv6) The Subnet Mask Length(IPv4) or Prefix Length(IPv6) of the relevant network is changed.	23

## Field Detail

### SERVICE\_NWIF\_TYPE

```
public static final String SERVICE_NWIF_TYPE = "service.nwif.type"
```

The key string of "service.nwif.type" service property.  
Network Interface Type is specified.

---

### SERVICE\_IPADDRESS\_TYPE

```
public static final String SERVICE_IPADDRESS_TYPE = "service.ipaddress.type"
```

The key string of "service.ipaddress.type" service property.  
IP Address Type is specified.

---

### SERVICE\_IPADDRESS

```
public static final String SERVICE_IPADDRESS = "service.ipaddress"
```

The key string of "service.ipaddress" service property.  
IP Address is specified.

---

### SERVICE\_SUBNETMASK\_LENGTH

```
public static final String SERVICE_SUBNETMASK_LENGTH = "service.subnetmask.length"
```

The key string of "service.subnetmask.length" service property.  
Subnet Mask Length(IPv4) or Prefix Length(IPv6) is specified.

---

### SERVICE\_NWIFINFO\_ID

```
public static final String SERVICE_NWIFINFO_ID = "service.nwifinfo.id"
```

The key string of "service.nwifinfo.id" service property.  
Service ID of the interface information service to which it belongs is specified.

---

## Method Detail

### getNwIfType

```
String getNwIfType()
```

Returns the network interface type of "service.nwif.type" service property value.

**Returns:**  
Network Interface Type

---

## getIpAddressType

String **getIpAddressType**()

Returns the IP address type of "service.ipaddress.type" service property value.

**Returns:**  
IP Address Type

---

## getIpAddress

String **getIpAddress**()

Returns the IP address of "service.ipaddress" service property value.

**Returns:**  
IP Address string

---

## getInetAddress

InetAddress **getInetAddress**()

Returns the InetAddress object of this IP address.  
Returned object is created from "service.ipaddress" service property value.

**Returns:**  
InetAddress

---

## setIpAddress

void **setIpAddress**(String address)  
throws [NwlflInfoException](#)

Set the IP address.

The IP address of the relevant network interface is changed.  
If the operation fails for some reason, [NwlflInfoException](#) is thrown.  
If a security manager exists, [NwlflInfoPermission](#) [.,ADMIN] must be required.  
If the caller does not have the appropriate [NwlflInfoPermission](#) [SecurityException](#) is thrown.

Service property value of "service.ipaddress" is changed to set value.  
[ServiceEvent.MODIFIED](#) is fired with the change of service properties.

**Throws:**  
[NwlflInfoException](#) - In case that the operation fails for some reason.  
[SecurityException](#) - If the caller does not have the appropriate [NwlflInfoPermission](#), and the Java Runtime Environment supports permissions.

## getSubnetMaskLength

```
int getSubnetMaskLength()
```

Returns the "service.subnetmask.length" service property value.

### Returns:

Subnet Mask Length(IPv4) or Prefix Length(IPv6)

---

## setSubnetMaskLength

```
void setSubnetMaskLength(int length)
    throws NwIfInfoException
```

Set the Subnet Mask Length(IPv4) or Prefix Length(IPv6)

The Subnet Mask Length(IPv4) or Prefix Length(IPv6) of the relevant network is changed. If the operation fails for some reason, [NwIfInfoException](#) is thrown. If a security manager exists, [NwIfInfoPermission](#) [.,ADMIN] must be required. If the caller does not have the appropriate [NwIfInfoPermission](#) [SecurityException](#) is thrown.

Service property value of "service.subnetmask.length" is changed to set value. [ServiceEvent.MODIFIED](#) is fired with the change of service properties.

### Throws:

[NwIfInfoException](#) - In case that the operation fails for some reason.

[SecurityException](#) - If the caller does not have the appropriate [NwIfInfoPermission](#), and the Java Runtime Environment supports permissions.

---

## getNwIfInfoId

```
long getNwIfInfoId()
```

Returns the "service.nwifinfo.id" service property value.

### Returns:

Service ID of the interface information service to which it belongs

---

## remove

```
void remove()
    throws NwIfInfoException
```

Remove IP address of the relevant network interface from the environment.

Remove IP address of the relevant network interface from the environment and unregister this service. If the operation fails for some reason, [NwIfInfoException](#) is thrown. If a security manager exists, [NwIfInfoPermission](#) [.,ADMIN] must be required. If the caller does not have the appropriate [NwIfInfoPermission](#) [SecurityException](#) is thrown.

IP address represented this service is removed. After that, this service is unregistered.

ServiceEvent.UNREGISTERING is fired with the unregistering this service.

**Throws:**

[NwlfinfInfoException](#) - In case that the operation fails for some reason.

[SecurityException](#) - If the caller does not have the appropriate NwlfinfoPermission, and the Java Runtime Environment supports permissions.



## Interface NwIfInfo

[org.osgi.service.nwifinfo](http://org.osgi.service.nwifinfo)

```
public interface NwIfInfo
```

This interface represents network interface information. Network interface information service is set the following information as service property.

1. [SERVICE\\_NWIF\\_TYPE](#) : Network Interface Type
2. [SERVICE\\_NWIF\\_DISPLAYNAME](#) : Network Interface Display Name
3. [SERVICE\\_NWIF\\_NAME](#) : Network Interface Name
4. [SERVICE\\_MACADDRESS](#) : MAC Address

Field Summary		Page
String	<a href="#">SERVICE_MACADDRESS</a> The key string of "service.macaddress" service property.	26
String	<a href="#">SERVICE_NWIF_DISPLAYNAME</a> The key string of "service.nwif.displayname" service property.	26
String	<a href="#">SERVICE_NWIF_NAME</a> The key string of "service.nwif.name" service property.	26
String	<a href="#">SERVICE_NWIF_TYPE</a> The key string of "service.nwif.type" service property.	25

Method Summary		Page
void	<a href="#">addNwIfInetAddress</a> (String address, int length) Adding IP address.	28
String	<a href="#">getDisplayName</a> () Returns the network interface display name of "service.nwif.displayname" service property value.	26
byte[]	<a href="#">getMacAddress</a> () Returns the MAC address of "service.macaddress" service property value.	27
String	<a href="#">getName</a> () Returns the network interface name of "service.nwif.name" service property value.	27
String	<a href="#">getNwIfType</a> () Returns the network interface type of "service.nwif.type" service property value.	26
void	<a href="#">remove</a> () Remove Network Interface represented this service from the environment.	27
void	<a href="#">setDisplayName</a> (String name) Set the network interface display name The display name of the relevant network is changed.	26

## Field Detail

### SERVICE\_NWIF\_TYPE

```
public static final String SERVICE_NWIF_TYPE = "service.nwif.type"
```

The key string of "service.nwif.type" service property.  
Network Interface Type is specified.

---

## SERVICE\_NWIF\_DISPLAYNAME

```
public static final String SERVICE_NWIF_DISPLAYNAME = "service.nwif.displayname"
```

The key string of "service.nwif.displayname" service property.  
Network Interface Display Name is specified.

---

## SERVICE\_NWIF\_NAME

```
public static final String SERVICE_NWIF_NAME = "service.nwif.name"
```

The key string of "service.nwif.name" service property.  
Network Interface Name is specified.

---

## SERVICE\_MACADDRESS

```
public static final String SERVICE_MACADDRESS = "service.macaddress"
```

The key string of "service.macaddress" service property.  
MAC Address is specified.

---

## Method Detail

### getNwIfType

```
String getNwIfType()
```

Returns the network interface type of "service.nwif.type" service property value.

**Returns:**  
Network Interface Type

---

### getDisplayName

```
String getDisplayName()
```

Returns the network interface display name of "service.nwif.displayname" service property value.

**Returns:**  
Network Interface Display Name

---

### setDisplayName

```
void setDisplayName(String name)
```

Set the network interface display name  
The display name of the relevant network is changed.  
Service property value of "service.nwif.displayName" is changed to set value.  
ServiceEvent.MODIFIED is fired with the change of service properties.

---

## getName

String **getName**()

Returns the network interface name of "service.nwif.name" service property value.

**Returns:**  
Network Interface Name

---

## getMacAddress

byte[] **getMacAddress**()

Returns the MAC address of "service.macaddress" service property value.

**Returns:**  
MAC Address

---

## remove

void **remove**()  
throws [NwIfInfoException](#)

Remove Network Interface represented this service from the environment.

Remove Network Interface represented this service from the environment and unregister this service. If the operation fails for some reason, [NwIfInfoException](#) is thrown. If a security manager exists, [NwIfInfoPermission](#) [.,ADMIN] must be required. If the caller does not have the appropriate [NwIfInfoPermission](#) [SecurityException](#) is thrown.

Network Interface represented this service is removed. Then, the service represents IP address of the relevant network interface is unregistered. After that, this service is unregistered. [ServiceEvent.UNREGISTERING](#) is fired with the unregistering this service.

**Throws:**  
[NwIfInfoException](#) - In case that the operation fails for some reason.  
[SecurityException](#) - If the caller does not have the appropriate [NwIfInfoPermission](#), and the Java Runtime Environment supports permissions.

---

## **addNwIfInetAddress**

```
void addNwIfInetAddress(String address,  
                        int length)  
    throws NwIfInfoException
```

Adding IP address.

Adding IP address of the relevant network interface represented this service to the environment. IP address type is defined from the IP address. If the operation fails for some reason, [NwIfInfoException](#) is thrown. If a security manager exists, [NwIfInfoPermission](#) [.,ADMIN] must be required. If the caller does not have the appropriate [NwIfInfoPermission](#) [SecurityException](#) is thrown.

IP address is added. After that [NwIfInetAddress](#) service is registered. [ServiceEvent.REGISTERING](#) is fired with the registering the service.

### **Parameters:**

address - IP Address

length - Subnet Mask Length(IPv4) or Prefix Length(IPv6)

### **Throws:**

[NwIfInfoException](#) - In case that the operation fails for some reason.

[SecurityException](#) - If the caller does not have the appropriate [NwIfInfoPermission](#), and the Java Runtime Environment supports permissions.

# Interface NwIfInfoAdmin

[org.osgi.service.nwifinfo](#)

public interface **NwIfInfoAdmin**

This interface represents a administrator of network interface information.

Method Summary		Pag e
void	<a href="#">addNwIfInfo</a> (String nwIfType, String displayName, String name, byte[] macAddress, String address, int length) Method to add the interface information.	29

## Method Detail

### addNwIfInfo

```
void addNwIfInfo(String nwIfType,
                 String displayName,
                 String name,
                 byte[] macAddress,
                 String address,
                 int length)
    throws NwIfInfoException
```

Method to add the interface information.

A network interface information is added to operating environment. IP address type is defined from the IP address. If the MAC address bound network interface is not exist, NwIfInfoException is thrown. If the operation fails for some reason, NwIfInfoException is thrown. If a security manager exists, NwIfInfoPermission [.,ADMIN] must be required. If the caller does not have the appropriate NwIfInfoPermission SecurityException is thrown.

Network Interface Information Service bundle will detect adding network interface information, and register the network interface information service. After that, the event of ServiceEvent.REGISTERING will be fired.

**Parameters:**

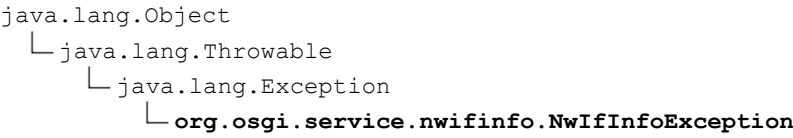
- nwIfType - Network Interface Type
- displayName - Network Interface Display Name
- name - Network Interface Name
- macAddress - MAC Address
- address - String of IP Address
- length - Subnet Mask Length(IPv4) or Prefix Length(IPv6)

**Throws:**

- [NwIfInfoException](#) - In case that the operation fails for some reason.
- SecurityException - If the caller does not have the appropriate NwIfInfoPermission, and the Java Runtime Environment supports permissions.

# Class NwIfInfoException

[org.osgi.service.nwifinfo](#)



All Implemented Interfaces:  
Serializable

```
public class NwIfInfoException
extends Exception
```

Exception class that represents a processing failure of NwIfInfo.

Constructor Summary	Page
<a href="#">NwIfInfoException</a> (String message) Constructor.	30
<a href="#">NwIfInfoException</a> (String message, Throwable throwable) Constructor.	30

## Constructor Detail

### NwIfInfoException

```
public NwIfInfoException(String message)
```

Constructor.

Parameters:  
message - Exception message

### NwIfInfoException

```
public NwIfInfoException(String message,
                          Throwable throwable)
```

Constructor.

Parameters:  
message - Exception message

Class NwlflInfoPermission

[org.osgi.service.nwifinfo](#)

```
java.lang.Object
├── java.security.Permission
│   └── java.security.BasicPermission
│       └── org.osgi.service.nwifinfo.NwlflInfoPermission
```

All Implemented Interfaces:  
Guard, Serializable



```
public class NwlflInfoPermission
extends BasicPermission
```

This class represents execute authority of the bundle which registers NwlflInfo service and NwlflNetAddress service. This class extends BasicPermission, BasicPermission.implies(java.security.Permission), BasicPermission.equals(Object), BasicPermission.hashCode() and BasicPermission.newPermissionCollection() don't need to be overridden in this class.

The name is a string using the network IF information type and the IP address type. There are three types of name as below. "Str1" and "Str2" is used to represent string example. The length of Str1 and Str2 are greater or equal 1, "." and "\*" are not included in the strings.

- 1. name 1: It is consisted of Str1 and Str2 which is a dot-separated string (i.e. Str1.Str2). "\*" is not included in the name. "Network Interface Type" is described as Str1 and "IP Address Type" is described as Str2. This name represents all NwlflInfo service and NwlflNetAddress Service that match the "Network Interface Type" represented Str1 and "IP Address Type" represented Str2.
- 2. name 2: The name is consisted of Str1 and "\*" which is a dot-separated string (i.e. Str1.\*): "Network Interface Type" is described as Str1. This name represents all NwlflInfo service and NwlflNetAddress Service that match the "Network Interface Type" represented Str1.
- 3. name 3: The name is consisted of only "\*". This name represents all NwlflInfo service and NwlflNetAddress Service.

action is a string of below.

- 1. [ADMIN](#)   Permission to execute the Add, Set and Delete method for each information

There is no need for this permission to execute of the Get method for each information.

Field Summary		Pag e
static String	<a href="#">ADMIN</a> A string that represents the execution of authority Add, Set and Delete method of the information.	32

Constructor Summary		Pag e
<a href="#">NwlflInfoPermission</a> (String name, String actions) Constructor.		32

## Field Detail

### ADMIN

```
public static final String ADMIN = "admin"
```

A string that represents the execution of authority Add, Set and Delete method of the information.

## Constructor Detail

### NwIfInfoPermission

```
public NwIfInfoPermission(String name,  
                          String actions)
```

Constructor.

#### Parameters:

name - The name of access authority  
actions - Action

---

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## 8 Considered Alternatives

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*T.B.D.*

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## 9 Security Considerations

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*T.B.D.*

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## 10 Document Support

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### 10.1 References

- [1]. Bradner, S., Key words for use in RFCs to Indicate Requirement Levels, RFC2119, March 1997.
- [2]. Software Requirements & Specifications. Michael Jackson. ISBN 0-201-87712-0

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### 10.3 Acronyms and Abbreviations

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## **10.4 End of Document**