# NBAR Categorization and Attributes

NBAR Categorization and Attributes feature provides the mechanism to match protocols or applications based on statically assigned attributes such as application-group, category, sub-category, encrypted and tunnel. Categorizing the protocols and applications into different groups helps with reporting and applying Quality of Service (QoS) policies.


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# Information About NBAR2 Custom Protocol

## NBAR Categorization and Attributes

The NBAR Categorization and Attributes feature provides the mechanism to match protocols or applications based on certain attributes. Categorizing the protocols and applications into different groups will help with reporting and performing group actions, such as applying QoS policies, on them. Attributes are statically assigned to each protocol or application, and they are not dependent on the traffic. The following attributes are available to configure the match criteria using the **match protocol attribute** command:

- **application-group**: The **application-group** keyword allows the configuration of applications grouped together based on the same networking application as the match criteria. For example, Yahoo-Messenger, Yahoo-VoIP-messenger, and Yahoo-VoIP-over-SIP are grouped together under the yahoo-messenger-group.
- **category**: The **category** keyword allows you to configure applications that are grouped together based on the first level of categorization for each protocol as the match criteria. Similar applications are grouped together under one category. For example, the email category contains all email applications such as, Internet Mail Access Protocol (IMAP), Simple Mail Transfer Protocol (SMTP), Lotus Notes, and so forth.
- **sub-category**: The **sub-category** keyword provides the option to configure applications grouped together based on the second level of categorization for each protocol as the match criteria. For example, clearcase, dbase, rda, mysql and other database applications are grouped under the database group.

- **encrypted**: The **encrypted** keyword provides the option to configure applications grouped together based on whether the protocol is an encrypted protocol or not as the match criteria. Applications are grouped together based on the encrypted and nonencrypted status of the applications. Protocols for which the NBAR does not provide any value are categorized under the unassigned encrypted group.
- **tunnel**: The **tunnel** keyword provides the option to configure protocols based on whether or not a protocol tunnels the traffic of other protocols. Protocols for which the NBAR does not provide any value are categorized under the unassigned tunnel group. For example, Layer 2 Tunneling Protocols (L2TP).
- **p2p-technology**: The **p2p(Peer-to-Peer)-technology** attribute provides the option to indicate whether or not a protocol uses p2p technology.

**Note** Attribute-based protocol match configurations do not impact the granularity of classification either in reporting or in the Protocol Discovery information.

You can create custom values for the attributes application-group, category, and sub-category. The custom values enable you to name the attributes based on grouping of protocols. Use the **ip nbar attribute application-group custom application-group-name**, **ip nbar attribute category custom category-name**, and **ip nbar attribute sub-category custom sub-category-name** commands to add custom values for the attributes application-group, category, and sub-category, respectively.

The dynamically created custom attribute values can be used for attribute-map creation when using the **ip nbar attribute-map** command, and for configuring the match criterion for a class-map when using the **match protocol attribute** command.

The output from the **show ip nbar attribute-custom** command displays the number of custom values that can be defined for attributes, and the custom values that are currently defined. The **show ip nbar attribute** command displays all the attributes including the custom attributes used by NBAR.

To remove the custom values, use the **no ip nbar attribute** command.

# Overview of NBAR2 Custom Protocol

Network-Based Application Recognition (NBAR) supports the use of custom protocols to identify custom applications. Custom protocols support static port-based protocols and applications that NBAR does not support.

For more information about custom protocols, refer to "Creating a Custom Protocol" module.

# How to Configure NBAR2 Custom Protocol

## Customizing NBAR Attributes

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip nbar attribute-map** *profile-name*

4. [ **attribute category** *category-name* ]
5. [ **attribute sub-category** *sub-category-name* ]
6. [ **attribute application-group** *application-group-name* ]
7. [ **attribute tunnel** *tunnel-info* ]
8. [ **attribute encrypted** *encrypted-info* ]
9. [ **attribute traffic-class** *traffic-class* ]
10. [ **attribute business-relevance** *business-relevance* ]
11. [ **attribute p2p-technology** *p2p-technology-info* ]
12. **ip nbar attribute-set** *protocol-name profile-name*
13. **end**

## DETAILED STEPS

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **ip nbar attribute-map** *profile-name*<br>**Example:**<br>`Device(config)# ip nbar attribute-map actdir-attrib` | Creates an attribute profile with the name that you specify, and enters the attribute-map configuration mode. |
| **Step 4** | [ **attribute category** *category-name* ]<br>**Example:**<br>`Device(config-attribute-map)# attribute category net-admin` | Adds attribute values from the application-group attribute, on to your profile. |
| **Step 5** | [ **attribute sub-category** *sub-category-name* ]<br>**Example:**<br>`Device(config-attribute-map)# attribute sub-category network-management` | Adds attribute values from the sub-category attribute, on to your profile. |
| **Step 6** | [ **attribute application-group** *application-group-name* ]<br>**Example:** | Adds attribute values from the application-group attribute, on to your profile. |

| | Command or Action | Purpose |
|---|---|---|
| | `Device(config-attribute-map)# attribute application-group other` | |
| **Step 7** | [ **attribute tunnel** *tunnel-info* ]<br>**Example:**<br>`Device(config-attribute-map)# attribute tunnel no` | Adds attribute values from the tunnel attribute, on to your profile. |
| **Step 8** | [ **attribute encrypted** *encrypted-info* ]<br>**Example:**<br>`Device(config-attribute-map)# attribute encrypted no` | Adds attribute values from the encrypted attribute, on to your profile. |
| **Step 9** | [ **attribute traffic-class** *traffic-class* ]<br>**Example:**<br>`Device(config-attribute-map)# attribute traffic-class multimedia-conferencing` | Adds traffic-class attribute value to the profile. |
| **Step 10** | [ **attribute business-relevance** *business-relevance* ]<br>**Example:**<br>`Device(config-attribute-map)# attribute business-relevance business-relevant` | Adds business-relevance attribute value to the profile. |
| **Step 11** | [ **attribute p2p-technology** *p2p-technology-info* ]<br>**Example:**<br>`Device(config-attribute-map)# attribute p2p-technology no` | Adds attribute values from the p2p-technology attribute, on to your profile. |
| **Step 12** | **ip nbar attribute-set** *protocol-name profile-name*<br>**Example:**<br>`Device(config-attribute-map)# ip nbar attribute-set active-directory actdir-attrib` | Adds attribute values from the specified profile to the specified protocol. |
| **Step 13** | **end**<br>**Example:**<br>`Device(config-attribute-map)# end` | Returns to privileged EXEC mode. |

# Configuration Examples for NBAR2 Custom Protocol

## Example: Adding Custom Values for Attributes

The following example shows how to add custom values for the attributes application-group, category, and sub-category:

```
Device> enable
Device# configure terminal
Device(config)# ip nbar attribute application-group custom Home_grown_finance_group "our
finance tools network traffic"
Device(config)# ip nbar attribute category custom dc_backup_category "Data center backup
traffic"
Device(config)# ip nbar attribute sub-category custom hr_sub_category "HR custom applications
 traffic"
Device(config)# exit
```

## Examples: Viewing the Information About Custom Values for Attributes

The following sample output from the **show ip nbar attribute-custom** command displays the number of custom values that can be defined, and the custom values that are currently defined for the attributes:

```
Device# show ip nbar attribute-custom

                 Name :  category
                 Help :  category attribute
   Custom Groups Limit :  1
 Custom Groups Created :  dc_backup_category

                 Name :  sub-category
                 Help :  sub-category attribute
   Custom Groups Limit :  1
 Custom Groups Created :  hr_sub_category

                 Name :  application-group
                 Help :  application-group attribute
   Custom Groups Limit :  1
 Custom Groups Created :  Home_grown_finance_group
```

The following sample output from the **show ip nbar attribute category** command displays the details about the Category attribute:

```
Device# show ip nbar attribute category

      Name :  category
      Help :  category attribute
      Type :  group
    Groups :  newsgroup
           :  instant-messaging
           :  net-admin
           :  trojan
           :  email
           :  file-sharing
           :  industrial-protocols
           :  business-and-productivity-tools
```

```
          :  internet-privacy
          :  social-networking
          :  layer3-over-ip
          :  obsolete
          :  streaming
          :  location-based-services
          :  voice-and-video
          :  other
          :  gaming
          :  browsing
          :  dc_backup_category
   Need :  Mandatory
   Default :  other
```

# Example: Creating a Profile and Configuring Attributes for the Profile

The following example shows how to create an attribute profile with attributes configured for the Network News Transfer Protocol (NNTP) protocol:

```
Device> enable
Device# configure terminal
Device(config)# ip nbar attribute-map nntp-attrib
Device(config-attribute-map)# attribute category newsgroup
Device(config-attribute-map)# attribute application-group nntp-group
Device(config-attribute-map)# attribute tunnel tunnel-no
Device(config-attribute-map)# attribute encrypted encrypted-yes
Device(config-attribute-map)# attribute p2p-technology p2p-tech-no
Device(config-attribute-map)# end
```

The following example shows how to verify the above configuration:

```
Device> enable
Device# show ip nbar attribute-map nntp-attrib
Device# Profile Name :  nntp-attrib
            category :  newsgroup
   application-group :  nntp-group
           encrypted :  encrypted-yes
Device# end
```

# Example: Attaching an Attribute Profile to a Protocol

The following example shows how to set an attribute profile to the Application Communication Protocol (ACP) protocol:

```
Device> enable
Device# configure terminal
Device(config)# ip nbar attribute-set acp test-profile
Device(config)# exit
```

# Additional References for NBAR2 Custom Protocol

### Related Documents

| Related Topic | Document Title |
|---|---|
| Cisco IOS commands | Cisco IOS Master Command List, All Releases |
| Cisco IOS LAN switching commands | Cisco IOS LAN Switching Command Reference |
| Cisco IOS QoS configuration information | *QoS Configuration Guide* |

### Technical Assistance

| Description | Link |
|---|---|
| The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password. | http://www.cisco.com/cisco/web/support/index.html |

# Feature Information for NBAR Categorization and Attributes

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

***Table 1: Feature Information for NBAR2 Custom Protocol***

| Feature Name | Releases | Feature Information |
|---|---|---|
| NBAR Categorization and Attributes | Cisco IOS XE Release 3.4S | This feature was introduced on Cisco ASR 1000 series Aggregation Services Routers.<br>The following command was introduced or modified: **ip nbar custom** |

| Feature Name | Releases | Feature Information |
|---|---|---|
| NBAR2 Custom Protocol | Cisco IOS XE Release 3.8S | The NBAR2 Custom Protocol feature configures attributes profiles for protocols, and maps profiles to protocols.<br><br>The following command was introduced or modified: **ip nbar attribute-map**, **ip nbar attribute-set**. |