



# Classifying Network Traffic Using NBAR in Cisco IOS XE Software

---

**First Published: April 4, 2006**

**Last Updated: March 14, 2011**

Network-Based Application Recognition (NBAR) is a classification engine that recognizes and classifies a wide variety of protocols and applications. When NBAR recognizes and classifies a protocol or application, the network can be configured to apply the appropriate quality of service (QoS) for that application or traffic with that protocol.

This module contains an overview of classifying network traffic using NBAR using Cisco IOS XE software.

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the “[Feature Information for Classifying Network Traffic Using NBAR](#)” section on [page 75](#).

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

## Contents

- [Restrictions for Classifying Network Traffic Using NBAR, page 2](#)
- [Information About Using NBAR, page 2](#)
- [Additional References, page 72](#)
- [Feature Information for Classifying Network Traffic Using NBAR, page 75](#)
- [Glossary, page 77](#)



---

**Americas Headquarters:**

**Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA**

# Restrictions for Classifying Network Traffic Using NBAR

NBAR does not support the following:

- Non-IP traffic.
- Multiprotocol Label Switching (MPLS)-labeled packets. NBAR classifies IP packets only. You can, however, use NBAR to classify IP traffic before the traffic is handed over to MPLS. Use the modular QoS CLI (MQC) to set the IP differentiated services code point (DSCP) field on the NBAR-classified packets and make MPLS map the DSCP setting to the MPLS experimental (EXP) setting inside the MPLS header.
- NBAR processing. By design, NBAR processing is temporarily disabled during the In-Service Software Upgrade (ISSU). The following syslog message indicates restart of NBAR classification once ISSU is complete.  

```
"%NBAR_HA-5-NBAR_INFO: NBAR sync DONE!"
```
- Multicast packet classification.
- Asymmetric flows with stateful protocols.



## Note

In the NBAR context, asymmetric flows are the flows in which different packets of the flow go through different routers, for reasons such as load balancing implementation or asymmetric routing where packets flow through different routes in different directions.

- Packets that originate from or that are destined to the router running NBAR.

NBAR is not supported on the following logical interfaces:

- Dialer interfaces
- Fast Etherchannel
- Interfaces where tunneling or encryption is used
- Multilink Point-to-Point Protocol (MLPPP)
- MPLS VPN Routing and Forwarding (VRF)
- Port channel
- Tunneled interfaces (Generic Routing Encapsulation [GRE], IP-IP, Layer 2 Tunneling Protocol [L2TP])



## Note

You cannot use NBAR to classify output traffic on a WAN link where tunneling or encryption is used. Therefore, you should configure NBAR on other interfaces of the router (such as a LAN link) to perform input classification before the traffic is switched to the WAN link.

## Information About Using NBAR

- [NBAR Functionality, page 3](#)
- [NBAR Benefits, page 4](#)
- [NBAR and Classification of HTTP Traffic, page 4](#)
- [NBAR and Classification of Citrix ICA Traffic, page 6](#)

- [NBAR and RTP Payload Type Classification](#), page 9
- [NBAR and Classification of Custom Protocols and Applications](#), page 9
- [NBAR and Classification of Peer-to-Peer File-Sharing Applications](#), page 10
- [NBAR Scalability](#), page 11
- [NBAR-Supported Protocols](#), page 12
- [NBAR Protocol Discovery](#), page 67
- [NBAR Protocol Discovery MIB](#), page 67
- [NBAR Configuration Processes](#), page 67
- [Restarting NBAR](#), page 67
- [NBAR Protocol Pack](#), page 68
- [NBAR and Multipacket Classification](#), page 68
- [NBAR on VRF Interfaces](#), page 68
- [NBAR and IPv6](#), page 69

## NBAR Functionality

NBAR is a classification engine that recognizes and classifies a wide variety of protocols and applications, including web-based and other difficult-to-classify applications and protocols that use dynamic TCP/UDP port assignments.

When NBAR recognizes and classifies a protocol or application, the network can be configured to apply the appropriate QoS for that application or traffic with that protocol. The QoS is applied using the MQC.

**Note**

---

For more information about the MQC, see the [“Applying QoS Features Using the MQC”](#) module.

---

NBAR introduces several classification features that identify applications and protocols from Layer 4 through Layer 7. These classification features are as follows:

- Statically assigned TCP and UDP port numbers.
- Non-TCP and non-UDP IP protocols.
- Dynamically assigned TCP and UDP port numbers. This kind of classification requires stateful inspection, that is, the ability to inspect a protocol across multiple packets during packet classification.
- Subport classification or classification based on deep packet inspection, that is, classification inspecting the packets.

**Note**

---

Access Control Lists (ACLs) can also be used for classifying static port protocols. However, NBAR is easier to configure, and NBAR can provide classification statistics that are not available when ACLs are used.

---

NBAR includes a Protocol Discovery feature that provides an easy way to discover application protocols that are operating on an interface. For more information about Protocol Discovery, see the [“Enabling Protocol Discovery”](#) module.

**Note**

NBAR classifies network traffic by application or protocol. Network traffic can be classified without using NBAR. For information about classifying network traffic without using NBAR, see the [“Classifying Network Traffic”](#) module.

NBAR includes the Protocol Pack feature that provides an easy way to load protocols and helps NBAR recognize additional protocols for network traffic classification. A protocol pack is set a of protocols developed and packed together. A new protocol pack can be loaded on the router to replace the default IOS protocol pack that is already present in the router.

## NBAR Benefits

Identifying and classifying network traffic is an important first step in implementing QoS. A network administrator can more effectively implement QoS in a networking environment after identifying the number and the variety of applications and protocols that are running on a network.

NBAR gives network administrators the ability to see the variety of protocols and the amount of traffic generated by each protocol. After NBAR gathers this information, users can organize traffic into classes. These classes can then be used to provide different levels of service for network traffic, thereby allowing better network management by providing the appropriate level of network resources for network traffic.

## NBAR and Classification of HTTP Traffic

This section includes information about the following topics:

- [Classification of HTTP Traffic by URL, Host, or MIME, page 4](#)
- [Classification of HTTP Traffic Using the HTTP Header Fields, page 5](#)
- [Combinations of Classification of HTTP Headers and URL, Host, or MIME Type to Identify HTTP Traffic, page 6](#)

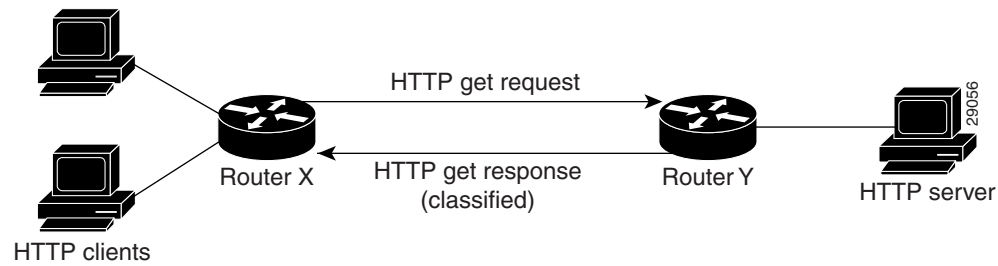
### Classification of HTTP Traffic by URL, Host, or MIME

NBAR can classify application traffic by looking beyond the TCP/UDP port numbers of a packet. This is called subport classification. NBAR looks into the TCP/UDP payload itself and classifies packets based on content within the payload such as the transaction identifier, message type, or other similar data.

Classification of HTTP traffic by URL, host, or Multipurpose Internet Mail Extension (MIME) type is an example of subport classification. NBAR classifies HTTP traffic by text within the URL or host fields of a request using regular expression matching. HTTP client request matching in NBAR supports most HTTP request methods such as GET, PUT, HEAD, POST, DELETE, OPTIONS, CONNECT, and TRACE. The NBAR engine then converts the specified match string into a regular expression.

[Figure 1](#) illustrates a network topology with NBAR in which Router Y is the NBAR-enabled router.

**Figure 1** Network Topology with NBAR



When specifying a URL for classification, include only the portion of the URL that follows the `www.hostname.domain` in the **match** statement. For example, for the URL `www.cisco.com/latest/whatsnew.html`, include only `/latest/whatsnew.html` with the **match** statement (for instance, **match protocol http url /latest/whatsnew.html**).

Host specification is identical to URL specification. NBAR performs a regular expression match on the host field contents inside an HTTP packet and classifies all packets from that host. For example, for the URL `www.cisco.com/latest/whatsnew.html`, include only `www.cisco.com`.

For MIME type matching, the MIME type can contain any user-specified text string. A list of the Internet Assigned Numbers Authority (IANA) supported MIME types can be found at the following URL:

<http://www.iana.org/assignments/media-types/>

When matching by MIME type, NBAR matches a packet containing the MIME type and all subsequent packets until the next HTTP transaction.

NBAR supports URL and host classification in the presence of persistent HTTP. NBAR does not classify packets that are part of a pipelined request. With pipelined requests, multiple requests are pipelined to the server before previous requests are serviced. Pipelined requests are not supported with subclassification and tunneled protocols that use HTTP as the transport protocol.

The NBAR Extended Inspection for HTTP Traffic feature allows NBAR to scan TCP ports that are not well-known and to identify HTTP traffic that traverses these ports. HTTP traffic classification is no longer limited to the well-known and defined TCP ports.

## Classification of HTTP Traffic Using the HTTP Header Fields

NBAR introduces expanded ability for users to classify HTTP traffic using information in the HTTP header fields.

HTTP works using a client/server model. HTTP clients open connections by sending a request message to an HTTP server. The HTTP server then returns a response message to the HTTP client (this response message is typically the resource requested in the request message from the HTTP client). After delivering the response, the HTTP server closes the connection and the transaction is complete.

HTTP header fields are used to provide information about HTTP request and response messages. HTTP has numerous header fields. For additional information on HTTP headers, see section 14 of RFC 2616: *Hypertext Transfer Protocol—HTTP/1.1*. This RFC can be found at the following URL:

<http://www.w3.org/Protocols/rfc2616/rfc2616-sec14.html>

NBAR is able to classify the following HTTP header fields:

- For request messages (client to server), the following HTTP header fields can be identified using NBAR:
  - User-Agent

- Referer
- From
- For response messages (server to client), the following HTTP header fields can be identified using NBAR:
  - Server
  - Location
  - Content-Base
  - Content-Encoding

**Note**

In Cisco IOS XE Release 3.1S and later releases, up to 56 parameters or subclassifications per protocol per router can be specified with the **match protocol http** command. These parameters or subclassifications can be a combination of any of the available match choices, such as host matches, MIME matches, server matches, and URL matches. For other Cisco IOS XE releases and platforms, the maximum is 24 parameters or subclassifications per protocol per router.

Within NBAR, the **match protocol http c-header-field** command is used to specify that NBAR identify request messages (the “c” in the **c-header-field** portion of the command is for client). The **match protocol http s-header-field** command is used to specify response messages (the “s” in the **s-header-field** portion of the command is for server).

**Note**

In Cisco IOS XE Release 3.1S and later releases, the **c-header-field** and **s-header-field** keywords and associated arguments in the **match protocol http** command are not available. The same functionality is achieved by using the individual keywords and arguments. For more information, see the syntax of the **match protocol http** command in the [Cisco IOS Quality of Service Solutions Command Reference](#).

**Note**

The **c-header-field** performs subclassifications based on a single value in the user-agent, the referrer, or from header field values. The **s-header-field** performs subclassifications based on a single value in the server, location, content-encoding, or content-base header field values. These header field values are not related to each other. Hence, the **c-header** and **s-header** fields are replaced by the user-agent, referrer, from, server, content-base, content-encoding, and location parameters as per the intent and need of HTTP subclassification.

## Combinations of Classification of HTTP Headers and URL, Host, or MIME Type to Identify HTTP Traffic

Note that combinations of URL, Host, MIME type, and HTTP headers can be used during NBAR configuration. These combinations provide customers with more flexibility to classify specific HTTP traffic based on their network requirements.

## NBAR and Classification of Citrix ICA Traffic

NBAR can classify Citrix Independent Computing Architecture (ICA) traffic and perform subport classification of Citrix traffic based on the published application name or ICA tag number.

This section includes information about the following topics:

- [Classification of Citrix ICA Traffic by Published Application Name, page 7](#)
- [Classification of Citrix ICA Traffic by ICA Tag Number, page 8](#)

## Classification of Citrix ICA Traffic by Published Application Name

NBAR can monitor Citrix ICA client requests for a published application destined to a Citrix ICA Master browser. After the client requests the published application, the Citrix ICA Master browser directs the client to the server with the most available memory. The Citrix ICA client then connects to this Citrix ICA server for the application.



### Note

For Citrix to monitor and classify traffic by the published application name, Server Browser Mode on the Master browser must be used.

In Server Browser Mode, NBAR statefully tracks and monitors traffic and performs a regular expression search on the packet contents for the published application name specified by the **match protocol citrix** command. The published application name is specified by using the **app** keyword and the *application-name-string* argument of the **match protocol citrix** command. For more information about the **match protocol citrix** command, see the [Cisco IOS Quality of Service Solutions Command Reference](#).

The Citrix ICA session triggered to carry the specified application is cached, and traffic is classified appropriately for the published application name.

## Citrix ICA Client Modes

Citrix ICA clients can be configured in various modes. NBAR cannot distinguish among Citrix applications in all modes of operation. Therefore, network administrators might need to collaborate with Citrix administrators to ensure that NBAR properly classifies Citrix traffic.

A Citrix administrator can configure Citrix to publish Citrix applications individually or as the entire desktop. In the Published Desktop mode of operation, all applications within the published desktop of a client use the same TCP session. Therefore, differentiation among applications is impossible, and NBAR can be used to classify Citrix applications only as aggregates (by looking at port 1494).

The Published Application mode for Citrix ICA clients is recommended when you use NBAR. In Published Application mode, a Citrix administrator can configure a Citrix client in either seamless or nonseamless (windows) modes of operation. In nonseamless mode, each Citrix application uses a separate TCP connection, and NBAR can be used to provide interapplication differentiation based on the name of the published application.

Seamless mode clients can operate in one of two submodes: session sharing or nonsession sharing. In seamless session sharing mode, all clients share the same TCP connection, and NBAR cannot differentiate among applications. Seamless sharing mode is enabled by default in some software releases. In seamless nonsession sharing mode, each application for each particular client uses a separate TCP connection. NBAR can provide interapplication differentiation in seamless nonsession sharing mode.



### Note

NBAR operates properly in Citrix ICA secure mode. Pipelined Citrix ICA client requests are not supported.

## Classification of Citrix ICA Traffic by ICA Tag Number

Citrix uses one TCP session each time an application is opened. In the TCP session, a variety of Citrix traffic may be intermingled in the same session. For example, print traffic may be intermingled with interactive traffic, causing interruption and delay for a particular application. Most users likely would prefer that printing be handled as a background process and that printing not interfere with the processing of higher-priority traffic.

To accommodate this preference, the Citrix ICA protocol includes the ability to identify Citrix ICA traffic based on the ICA tag number of the packet. The ability to identify, tag, and prioritize Citrix ICA traffic is referred to as ICA Priority Packet Tagging. With ICA Priority Packet Tagging, Citrix ICA traffic is categorized as high, medium, low, and background, depending on the ICA tag of the packet.

When ICA traffic priority tag numbers are used, and the priority of the traffic is determined, QoS features can be implemented to determine how the traffic will be handled. For example, QoS traffic policing can be configured to transmit or drop packets with a specific priority.

### Citrix ICA Packet Tagging

The Citrix ICA tag is included in the first two bytes of the Citrix ICA packet, after the initial negotiations are completed between the Citrix client and server. These bytes are not compressed or encrypted.

The first two bytes of the packet (byte 1 and byte 2) contain the byte count and the ICA priority tag number. Byte 1 contains the low-order byte count, and the first two bits of byte 2 contain the priority tags. The other six bits contain the high-order byte count.

The ICA priority tag value can be a number from 0 to 3. The number indicates the packet priority, with 0 being the highest priority and 3 being the lowest priority.

To prioritize Citrix traffic by the ICA tag number of the packet, you must specify the tag number using the **ica-tag** keyword and the *ica-tag-value* argument of the **match protocol citrix** command. For more information about the **match protocol citrix** command, see the [Cisco IOS Quality of Service Solutions Command Reference](#).

Table 1 contains information about different Citrix traffic and the respective priority tags.

**Table 1** Citrix ICA Packet Tagging

| Priority   | ICA Bits (decimal) | Sample Virtual Channels   |
|------------|--------------------|---|
| High       | 0                  | Video, mouse, and keyboard screen updates   |
| Medium     | 1                  | Program neighborhood, clipboard, audio mapping, and license management                          |
| Low        | 2                  | Client common equipment (COM) port mapping, client drive mapping                                |
| Background | 3                  | Auto client update, client printer mapping, and original equipment manufacturers (OEM) channels |

## NBAR and RTP Payload Type Classification

RTP is a packet format for multimedia data streams. It can be used for media-on-demand and for interactive services such as Internet telephony. RTP consists of a data and a control part. The control part is called Real-Time Transport Control Protocol (RTCP). RTCP is a separate protocol that is supported by NBAR. It is important to note that the NBAR RTP Payload Type Classification feature does not identify RTCP packets and that RTCP packets run on odd-numbered ports and RTP packets run on even-numbered ports.

The data part of RTP is a thin protocol that provides support for applications with real-time properties such as continuous media (audio and video), which includes timing reconstruction, loss detection, and security and content identification. RTP is discussed in RFC 1889 (*A Transport Protocol for Real-Time Applications*) and RFC 1890 (*RTP Profile for Audio and Video Conferences with Minimal Control*).

The RTP payload type is the data transported by RTP in a packet, for example audio samples or compressed video data.

NBAR RTP Payload Type Classification feature not only allows real-time audio and video traffic to be statefully identified, but can also differentiate on the basis of audio and video codecs to provide more granular QoS. The RTP Payload Type Classification feature, therefore, looks deep into the RTP header to classify RTP packets.

For more information on the classification of RTP with NBAR, see [http://www.cisco.com/en/US/products/ps6616/products\\_white\\_paper09186a0080110040.shtml](http://www.cisco.com/en/US/products/ps6616/products_white_paper09186a0080110040.shtml)

## NBAR and Classification of Custom Protocols and Applications

NBAR supports the use of custom protocols to identify custom applications. Custom protocols support static port-based protocols and applications that NBAR does not currently support. You can add to the set of protocols and application types that NBAR recognizes by creating custom protocols.

Custom protocols extend the capability of NBAR Protocol Discovery to classify and monitor additional static port applications and allow NBAR to classify nonsupported static port traffic.

Once the custom protocols are defined, you can then use them with the help of NBAR Protocol Discovery and the MQC to classify the traffic.

With NBAR supporting the use of custom protocols, NBAR can map static TCP and UDP port numbers to the custom protocols.

There are two types of custom protocols:

- Predefined custom protocols
- User-defined custom protocols

NBAR includes the following features related to predefined custom protocols and applications:

- Custom protocols have to be named custom-xx, with xx being a number.
- Ten custom applications can be assigned using NBAR, and each custom application can have up to 16 TCP and 16 UDP ports each mapped to the individual custom protocol. The real-time statistics of each custom protocol can be monitored using Protocol Discovery.
- After creating a variable when creating a custom protocol, you can use the **match protocol** command to classify traffic on the basis of a specific value in the custom protocol.

NBAR includes the following features related to user-defined custom protocols and applications:

- The ability to inspect the payload for certain matching string patterns at a specific offset.

- The ability to allow users to define the names of their custom protocol applications. The user-named protocol can then be used by Protocol Discovery, the Protocol Discovery MIB, the **match protocol** command, and the **ip nbar port-map** command as an NBAR-supported protocol.
- The ability of NBAR to inspect custom protocols specified by traffic direction (that is, traffic heading toward a source or destination rather than traffic in both directions), if desired by the user.
- CLI support that allows a user configuring a custom application to specify a range of ports rather than to specify each port individually.
- The **variable** keyword, the *field-name* argument, and the *field-length* argument were added to the **ip nbar custom** command.

This additional keyword and two additional arguments allow for creation of more than one custom protocol based on the same port numbers.

**Note**

Defining a user-defined custom protocol restarts the NBAR feature, whereas defining predefined custom protocol does not restart the NBAR feature.

## NBAR and Classification with Dynamic PDLMs

Dynamic Packet Description Language Modules (PDLM) allow new protocol support or enhance existing protocol support for NBAR without the requirement of a Cisco IOS XE release upgrade and router reload. If the support is for enhancing protocols for NBAR, then the module version of the PDLM should be greater than the existing version of the PDLM. Subsequent Cisco IOS XE releases incorporate support for these new protocols.

**Note**

PDLMs must be loaded on both Route Processors (RPs) when using the ASR 1006 redundant hardware setup.

Dynamic PDLMs are platform-specific and have Software Family Identifier (SFI) embedded in them. Dynamic PDLMs of other platforms cannot be loaded on Cisco ASR1000 Series Routers.

## NBAR and Classification of Peer-to-Peer File-Sharing Applications

The following are the most common peer-to-peer file-sharing applications supported by NBAR:

- BitTorrent
- DirectConnect
- eDonkey
- eMule
- FastTrack
- KazaA (and KazaA Lite and KazaA Lite Resurrection)
- Win MX
- POCO

In Cisco IOS XE Release 2.5 the DirectConnect and the eDonkey P2P protocols support the following subclassifications:

- eDonkey supports the following subclassification options:
  - file-transfer
  - search-file-name
  - text-chat
- KazaA, FastTrack, and Gnutella support the file-transfer subclassification.

The Gnutella file sharing became classifiable using NBAR in Cisco IOS XE Release 2.5.

Applications that use the Gnutella protocol are Bearshare, Gnewtellium, Gnucleus, Gtk-Gnutella, Limewire, Mutella, Phex, Qtella, Swapper, and Xolo.

## NBAR Scalability

### Interface Scalability

In Cisco IOS XE Release 2.4 and earlier releases, there is no limit on the number of interfaces on which protocol discovery can be enabled.

[Table 2](#) provides the details of the protocol discovery supported interface and the release number.

**Table 2** *Release and Protocol Discovery Interface Support*

| Release                   | Number of Interfaces Supported with Protocol Discovery |
|---------------------------|--|
| Cisco IOS XE Release 2.5  | 128  |
| Cisco IOS XE Release 2.6  | 256  |
| Cisco IOS XE Release 2.7  | 32   |
| Cisco IOS XE Release 3.2S | 32   |
| Cisco IOS XE Release 3.3S | 32   |

### Flow Scalability

In Cisco IOS XE Release 2.5, the following are supported:

- A maximum of 250K bidirectional flows on Edge Services Processor (ESP)10 and ESP20 hardware.
- A maximum of 125K bidirectional flows on ESP5.

If this limit is exceeded or there is a flow memory constraint, new flows will be classified as Unknown.

In Cisco IOS XE Release 3.1, the following are supported:

- A maximum of 125K bidirectional flows on Forwarding Processor (FP)5 platform.
- A maximum of 250K bidirectional flows on FP10, FP20, and FP40 platform.

If this limit is exceeded or there is a flow memory constraint, new flows will be classified as Unknown.

In Cisco IOS XE Release 3.2, the following are supported:

- A maximum of 500K bidirectional flows on FP5/1Rack Units (RU) platform.
- A maximum of 1M bidirectional flows on 10/10/40 platform.

If this limit is exceeded or there is a flow memory constraint, new flows will be classified as Unknown. In Cisco IOS XE Release 3.3S, the number of bidirectional flows and the platforms supported are the same as Cisco IOS XE Release 3.2. A new method to reduce the number of active flows based on quick aging is introduced.

The quick aging occurs under the following conditions:

- TCP flows that do not reach the established state.
- UDP flows with fewer than five packets that are not classified within the specified quick aging timeout.
- Flows that are not classified within the specified quick aging timeout.

The quick aging method reduces the number of flows required for NBAR operation up to three times or more depending on the network behavior.

## NBAR-Supported Protocols

The **match protocol** (NBAR) command is used to classify traffic on the basis of protocols supported by NBAR. NBAR can classify the following types of protocols:

- Non-UDP and non-TCP IP protocols
- TCP and UDP protocols that use statically assigned port numbers
- TCP and UDP protocols that use statically assigned port numbers, but still require stateful inspection.
- TCP and UDP protocols that dynamically assign port numbers and therefore require stateful inspection

[Table 3](#) lists the NBAR-supported protocols available in Cisco IOS XE software, sorted by category. The table also provides information about the protocol type, the well-known port numbers (if applicable), the syntax for entering the protocol in NBAR, and the Cisco IOS XE software release in which the protocol was initially supported. This table is updated when a protocol becomes supported in Cisco IOS XE software.

**Table 3** NBAR-Supported Protocols

| Category                | Protocol                   | Type     | WKP/IP Protocol                          | Description   | Syntax                                 | Cisco IOS XE Release     |
|-------------------------|----------------------------|----------|--|---|--|--------------------------|
| Enterprise Applications | Novadigm                   | TCP/ UDP | 3460–3465                                | Novadigm Enterprise Desktop Manager (EDM)           | novadigm                               | Cisco IOS XE Release 2.3 |
|                         | Citrix (ICA, CGP, IMA, SB) | TCP/ UDP | TCP: 1494, 2512, 2513, 2598<br>UDP: 1604 | Citrix ICA traffic                                  | citrix<br>citrix app<br>citrix ica-tag | Cisco IOS XE Release 2.5 |
|                         | Oracle                     | TCP      | 1525                                     | Oracle  | ora-srv                                | Cisco IOS XE Release 2.3 |
|                         | PCAnywhere                 | TCP/UDP  | TCP: 5631, 65301<br>UDP: 22, 5632        | Symantic PCAnywhere                                 | pcanywhere                             | Cisco IOS XE Release 2.3 |
|                         | SAP                        | TCP      | 3300–3315<br>3200–3215<br>3600–3615      | SAP Systems Applications Product in Data processing | sap                                    | Cisco IOS XE Release 2.5 |
|                         | Exchange <sup>1</sup>      | TCP      | 135                                      | MS-RPC for Exchange                                 | exchange                               | Cisco IOS XE Release 2.5 |
| Routing Protocols       | BGP                        | TCP/ UDP | 179                                      | Border Gateway Protocol                             | bgp                                    | Cisco IOS XE Release 2.3 |
|                         | EGP                        | IP       | 8  | Exterior Gateway Protocol                           | egp                                    | Cisco IOS XE Release 2.3 |
|                         | EIGRP                      | IP       | 88                                       | Enhanced Interior Gateway Routing Protocol          | eigrp                                  | Cisco IOS XE Release 2.3 |
|                         | OSPF                       | IP       | 89                                       | Open Shortest Path First                            | ospf                                   | Cisco IOS XE Release 2.3 |
|                         | RIP                        | UDP      | 520                                      | Routing Information Protocol                        | rip                                    | Cisco IOS XE Release 2.3 |
| Database                | SQL-exec                   | TCP/UDP  | 9088                                     | SQL Exec  | sqlexec                                | Cisco IOS XE Release 2.3 |

**Table 3** NBAR-Supported Protocols (continued)

| Category               | Protocol | Type     | WKP/IP Protocol         | Description  | Syntax                   | Cisco IOS XE Release                                  |
|------------------------|----------|----------|-------------------------|--|--------------------------|---|
|                        | SQL*NET  | TCP/ UDP | 1521                    | SQL*NET for Oracle                                       | sqlnet                   | Cisco IOS XE Release 2.5                              |
| Financial              | FIX      | TCP      | Heuristic               | Financial Information Exchange                           | fix                      | Cisco IOS XE Release 2.5                              |
| Security and Tunneling | GRE      | IP       | 47                      | Generic Routing Encapsulation                            | gre                      | Cisco IOS XE Release 2.3                              |
|                        | IPINIP   | IP       | 4                       | IP in IP   | ipinip                   | Cisco IOS XE Release 2.3                              |
|                        | IPsec    | IP/TCP   | 50, 51<br>TCP-Heuristic | IP Encapsulating Security Payload/ Authentication-Header | ipsec                    | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.3S |
|                        | L2TP     | UDP      | 1701                    | L2F/L2TP Tunnel  | l2tp                     | Cisco IOS XE Release 2.3                              |
|                        | PPTP     | TCP      | 1723                    | Point-to-Point Tunneling Protocol for VPN                | pptp                     | Cisco IOS XE Release 2.3                              |
|                        | SFTP     | TCP      | 990                     | Secure FTP   | secure-ftp               | Cisco IOS XE Release 2.3                              |
|                        | SHTTP    | TCP      | 443                     | Secure HTTP  | secure-http              | Cisco IOS XE Release 2.1                              |
|                        | SIMAP    | TCP/ UDP | 585, 993                | Secure Internet Message Access Protocol                  | secure-imap              | Cisco IOS XE Release 2.3                              |
|                        | SIRC     | TCP/ UDP | 994                     | Secure Internet Relay Chat                               | secure-irc               | Cisco IOS XE Release 2.3                              |
|                        | SLDAP    | TCP/ UDP | 636                     | Secure Lightweight Directory Access Protocol             | secure-ldap              | Cisco IOS XE Release 2.3                              |
|                        | SNNTTP   | TCP/ UDP | 563                     | Secure Network News Transfer Protocol                    | secure-nntp              | Cisco IOS XE Release 2.3                              |
|                        | SOCKS    | TCP      | 1080                    | Firewall Security Protocol                               | socks                    | Cisco IOS XE Release 2.3                              |
|                        | SPOP3    | TCP/ UDP | 995                     | Secure POP3  | secure-pop3              | Cisco IOS XE Release 2.3                              |
| SSH                    | TCP      | 22       | Secured Shell           | ssh  | Cisco IOS XE Release 2.3 |   |
| STELNET                | TCP      | 992      | Secure Telnet           | secure-telnet  | Cisco IOS XE Release 2.3 |   |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category              | Protocol   | Type    | WKP/IP Protocol | Description  | Syntax   | Cisco IOS XE Release     |
|-----------------------|------------|---------|-----------------|--|----------|--------------------------|
| Network Management    | ICMP       | IP      | 1               | Internet Control Message Protocol                      | icmp     | Cisco IOS XE Release 2.3 |
|                       | SNMP       | TCP/UDP | 161, 162        | Simple Network Management Protocol                     | snmp     | Cisco IOS XE Release 2.3 |
|                       | Syslog     | UDP     | 514             | System Logging Utility                                 | syslog   | Cisco IOS XE Release 2.3 |
| Network Mail Services | IMAP       | TCP/UDP | 143, 220        | Internet Message Access Protocol                       | imap     | Cisco IOS XE Release 2.3 |
|                       | Notes      | TCP/UDP | 1352            | Lotus Notes  | notes    | Cisco IOS XE Release 2.3 |
|                       | POP3       | TCP/UDP | 110, Heuristic  | Post Office Protocol                                   | pop3     | Cisco IOS XE Release 2.1 |
|                       | SMTP       | TCP     | 25, Heuristic   | Simple Mail Transfer Protocol                          | smtp     | Cisco IOS XE Release 2.3 |
| Directory             | DHCP/BOOTP | UDP     | 67, 68          | Dynamic Host Configuration Protocol/Bootstrap Protocol | dhcp     | Cisco IOS XE Release 2.1 |
|                       | DNS        | TCP/UDP | 53              | Domain Name System                                     | dns      | Cisco IOS XE Release 2.1 |
|                       | Finger     | TCP     | 79              | Finger User Information Protocol                       | finger   | Cisco IOS XE Release 2.3 |
|                       | Kerberos   | TCP/UDP | 88, 749         | Kerberos Network Authentication Service                | kerberos | Cisco IOS XE Release 2.3 |
|                       | LDAP       | TCP/UDP | 389             | Lightweight Directory Access Protocol                  | ldap     | Cisco IOS XE Release 2.3 |

**Table 3** *NBAR-Supported Protocols (continued)*

| <b>Category</b> | <b>Protocol</b> | <b>Type</b> | <b>WKP/IP Protocol</b> | <b>Description</b>             | <b>Syntax</b> | <b>Cisco IOS XE Release</b>                          |
|-----------------|-----------------|-------------|------------------------|--------------------------------|---------------|--|
| Internet        | FTP             | TCP         | 21, 21000, Heuristic   | File Transfer Protocol         | ftp           | Cisco IOS XE Release 2.1                             |
|                 | Gopher          | TCP/ UDP    | 70                     | Internet Gopher Protocol       | gopher        | Cisco IOS XE Release 2.3                             |
|                 | HTTP            | TCP         | 80, Heuristic          | Hypertext Transfer Protocol    | http          | Cisco IOS XE Release 2.1<br>Cisco IOS XE Release 2.5 |
|                 | IRC             | TCP/ UDP    | 194                    | Internet Relay Chat            | irc           | Cisco IOS XE Release 2.3                             |
|                 | NNTP            | TCP/ UDP    | 119, Heuristic         | Network News Transfer Protocol | nntp          | Cisco IOS XE Release 2.3                             |
|                 | Telnet          | TCP         | 23                     | Telnet Protocol                | telnet        | Cisco IOS XE Release 2.1                             |
|                 | TFTP            | UDP         | 69                     | Trivial File Transfer Protocol | tftp          | Cisco IOS XE Release 2.5                             |

**Table 3** NBAR-Supported Protocols (continued)

| Category  | Protocol  | Type                      | WKP/IP Protocol               | Description   | Syntax                   | Cisco IOS XE Release     |
|-----------|-----------|---------------------------|-------------------------------|---|--------------------------|--------------------------|
| Signaling | AppleQTC  | TCP/UDP                   | 458                           | Apple Quick Time  | appleqtc                 | Cisco IOS XE Release 2.3 |
|           | Chargen   | TCP/UDP                   | 19                            | Character Generator                                       | chargen                  | Cisco IOS XE Release 2.3 |
|           | ClearCase | TCP/UDP                   | 371                           | Clear Case Protocol Software Informer                     | clearcase                | Cisco IOS XE Release 2.3 |
|           | Corba     | TCP/UDP                   | 683, 684                      | Corba Internet Inter-Orb Protocol (IIOP)                  | corba-iiop               | Cisco IOS XE Release 2.3 |
|           | Daytime   | TCP/UDP                   | 13                            | Daytime Protocol  | daytime                  | Cisco IOS XE Release 2.3 |
|           | Doom      | TCP/UDP                   | 666                           | Doom  | doom                     | Cisco IOS XE Release 2.3 |
|           | Echo      | TCP/UDP                   | 7                             | Echo Protocol   | echo                     | Cisco IOS XE Release 2.3 |
|           | IBM DB2   | TCP/UDP                   | 523                           | IBM Information Management                                | ibm-db2                  | Cisco IOS XE Release 2.3 |
|           | IPX       | TCP/UDP                   | 213                           | Internet Packet Exchange                                  | server-ipx               | Cisco IOS XE Release 2.3 |
|           | ISAKMP    | TCP/UDP                   | 500                           | Internet Security Association and Key Management Protocol | isakmp                   | Cisco IOS XE Release 2.3 |
|           | ISI-GL    | TCP/UDP                   | 55                            | Interoperable Self Installation Graphics Language         | isi-gl                   | Cisco IOS XE Release 2.3 |
|           | KLogin    | TCP                       | 543                           | KLogin  | klogin                   | Cisco IOS XE Release 2.3 |
|           | KShell    | TCP                       | 544                           | KShell  | kshell                   | Cisco IOS XE Release 2.3 |
|           | LockD     | TCP/UDP                   | 4045                          | LockD   | lockd                    | Cisco IOS XE Release 2.3 |
|           | MSSQL     | TCP                       | 1433                          | Microsoft Structured Query Language (SQL) Server          | mssql                    | Cisco IOS XE Release 2.3 |
| RSVP      | IP/UDP    | IP: 46<br>UDP: 1698, 1699 | Resource Reservation Protocol | rsvp  | Cisco IOS XE Release 2.3 |                          |

**Table 3** NBAR-Supported Protocols (continued)

| Category              | Protocol           | Type    | WKP/IP Protocol               | Description   | Syntax   | Cisco IOS XE Release                                 |
|-----------------------|--------------------|---------|-------------------------------|---|----------|--|
| RPC                   | NFS                | TCP/UDP | 2049                          | Network File System                                 | nfs      | Cisco IOS XE Release 2.3                             |
|                       | Sunrpc             | TCP/UDP | 111, Heuristic                | Sun Remote Procedure Call                           | sunrpc   | Cisco IOS XE Release 2.5                             |
| Non-IP and LAN/Legacy | NetBIOS            | TCP/UDP | TCP-137, 138<br>UDP-137, 139  | NetBIOS over IP (MS Windows)                        | netbios  | Cisco IOS XE Release 2.3                             |
|                       | Nickname           | TCP/UDP | 43                            | Nickname  | nickname | Cisco IOS XE Release 2.3                             |
|                       | NPP                | TCP/UDP | 92                            | Network Payment Protocol                            | npp      | Cisco IOS XE Release 2.3                             |
| Voice                 | H.323              | TCP     | Heuristic                     | H.323 Teleconferencing Protocol                     | h323     | Cisco IOS Release XE 2.1                             |
|                       | SIP                | TCP/UDP | 5060                          | Session Initiation Protocol                         | sip      | Cisco IOS XE Release 2.1                             |
|                       | Skype <sup>2</sup> | TCP/UDP | TCP-80, Heuristic             | VoIP Client Software                                | skype    | Cisco IOS XE Release 2.1<br>Cisco IOS XE Release 2.5 |
|                       | RTP                | TCP/UDP | Heuristic                     | Real-Time Transport Protocol Payload Classification | rtp      | Cisco IOS XE Release 2.5                             |
| Desktop Media         | CUSEEME            | TCP/UDP | TCP: 7648, 7649<br>UDP: 24032 | CU-SeeMe Desktop Video Conference                   | cuseeme  | Cisco IOS XE Release 2.3                             |
| Streaming Media       | RTSP               | TCP     | 554, 8554                     | Real-Time Streaming Protocol                        | rtsp     | Cisco IOS XE Release 2.3                             |

**Table 3** NBAR-Supported Protocols (continued)

| Category                               | Protocol                   | Type    | WKP/IP Protocol   | Description  | Syntax           | Cisco IOS XE Release      |
|--|----------------------------|---------|---|--|------------------|---------------------------|
| Peer-to-Peer File-Sharing Applications | BitTorrent <sup>3</sup>    | TCP     | Heuristic, or 6881–6889                                     | BitTorrent File Transfer Traffic   | bittorrent       | Cisco IOS XE Release 2.5  |
|  | DirectConnect              | TCP     | 80, 411–413, Heuristic                                      | Direct Connect File Transfer Traffic   | directconnect    | Cisco IOS XE Release 2.5  |
|  | eDonkey/eMule <sup>4</sup> | TCP     | 80, 4662, Heuristic   | eDonkey File-Sharing Application<br>eMule traffic is also classified as eDonkey traffic in NBAR. | edonkey          | Cisco IOS XE Release 2.5  |
|  | eDonkey-static             | TCP     | 80, 4662  | Classifies some of the edonkey traffic based on WKP only.  | edonkey-static   | Cisco IOS XE Release 3.3S |
|  | FastTrack                  | N/A     | Heuristic   | FastTrack traffic  | fasttrack        | Cisco IOS XE Release 2.5  |
|  | FastTrack Static           | N/A     | Heuristic   | FastTrack Static   | fasttrack-static | Cisco IOS XE Release 3.3S |
|  | Gnutella                   | TCP/UDP | Heuristic, or TCP-80, 6346-6349, 6355,5634<br>UDP-6346-6348 | Gnutella traffic   | gnutella         | Cisco IOS XE Release 2.5  |
|  | KaZaA                      | TCP/UPD | Heuristic   | KaZaA<br>Note that earlier KaZaA version 1 traffic can be classified using FastTrack.            | kazaa2           | Cisco IOS XE Release 2.5  |
|  | WinMX                      | TCP     | 6699  | WinMX Peer-to-Peer File-Sharing  | winmx            | Cisco IOS XE Release 2.5  |

**Table 3** NBAR-Supported Protocols (continued)

| Category      | Protocol      | Type    | WKP/IP Protocol | Description                    | Syntax        | Cisco IOS XE Release      |
|---------------|---------------|---------|-----------------|--------------------------------|---------------|---------------------------|
| Miscellaneous | 3Com AMP3     | TCP/UDP | 629             | 3Com AMP3                      | 3com-amp3     | Cisco IOS XE Release 3.1S |
|               | 3Com TSMUX    | TCP/UDP | 106             | 3Com TSMUX                     | 3com-tsmux    | Cisco IOS XE Release 3.1S |
|               | 3PC           | TCP/UDP | 34              | Third Party Connect Protocol   | 3pc           | Cisco IOS XE Release 3.1S |
|               | 914 C/G       | TCP/UDP | 211             | Texas Instruments 914 Terminal | 914c/g        | Cisco IOS XE Release 3.1S |
|               | 9PFS          | TCP/UDP | 564             | Plan 9 file service            | 9pfs          | Cisco IOS XE Release 3.1S |
|               | ACAP          | TCP/UDP | 674             | ACAP                           | acap          | Cisco IOS XE Release 3.1S |
|               | ACAS          | TCP/UDP | 62              | ACA Services                   | acas          | Cisco IOS XE Release 3.1S |
|               | AccessBuilder | TCP/UDP | 888             | Access Builder                 | accessbuilder | Cisco IOS XE Release 3.1S |
|               | AccessNetwork | TCP/UDP | 699             | Access Network                 | accessnetwork | Cisco IOS XE Release 3.1S |
|               | ACP           | TCP/UDP | 599             | Aeolon Core Protocol           | acp           | Cisco IOS XE Release 3.1S |
|               | ACR-NEMA      | TCP/UDP | 104             | ACR-NEMA Digital Img           | acr-nema      | Cisco IOS XE Release 3.1S |
|               | AED-512       | TCP/UDP | 149             | AED 512 Emulation service      | aed-512       | Cisco IOS XE Release 3.1S |
|               | Agentx        | TCP/UDP | 705             | AgentX                         | agentx        | Cisco IOS XE Release 3.1S |
|               | Alpes         | TCP/UDP | 463             | Alpes                          | alpes         | Cisco IOS XE Release 3.1S |
|               | AMInet        | TCP/UDP | 2639            | AMInet                         | aminet        | Cisco IOS XE Release 3.1S |
|               | AN            | TCP/UDP | 107             | Active Networks                | an            | Cisco IOS XE Release 3.1S |
|               | ANET          | TCP/UDP | 212             | ATEXSSTR                       | anet          | Cisco IOS XE Release 3.1S |
|               | ANSANotify    | TCP/UDP | 116             | ANSA REX Notify                | ansanotify    | Cisco IOS XE Release 3.1S |
|               | ANSATrader    | TCP/UDP | 124             | ansatrader                     | ansatrader    | Cisco IOS XE Release 3.1S |
|               | AODV          | TCP/UDP | 654             | AODV                           | aodv          | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                    | Syntax             | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|--------------------------------|--------------------|---------------------------|
|          | Apertus-LDP    | TCP/UDP | 539             | Apertus Tech Load Distribution | apertus-ldp        | Cisco IOS XE Release 3.1S |
|          | AppleQTC       | TCP/UDP | 458             | apple quick time               | appleqtc           | Cisco IOS XE Release 3.1S |
|          | AppleQTSRVR    | TCP/UDP | 545             | appleqtcsrvr                   | appleqtcsrvr       | Cisco IOS XE Release 3.1S |
|          | Applix         | TCP/UDP | 999             | Applix ac                      | applix             | Cisco IOS XE Release 3.1S |
|          | ARCISDMS       | TCP/UDP | 262             | arcisdms                       | arcisdms           | Cisco IOS XE Release 3.1S |
|          | ARGUS          | TCP/UDP | 13              | ARGUS                          | argus              | Cisco IOS XE Release 3.1S |
|          | Ariel1         | TCP/UDP | 419             | Ariel1                         | ariel1             | Cisco IOS XE Release 3.1S |
|          | Ariel2         | TCP/UDP | 421             | Ariel2                         | ariel2             | Cisco IOS XE Release 3.1S |
|          | Ariel3         | TCP/UDP | 422             | Ariel3                         | ariel3             | Cisco IOS XE Release 3.1S |
|          | ARIS           | TCP/UDP | 104             | ARIS                           | aris               | Cisco IOS XE Release 3.1S |
|          | ARNS           | TCP/UDP | 384             | A remote network server system | arns               | Cisco IOS XE Release 3.1S |
|          | ASA            | TCP/UDP | 386             | ASA Message router object def  | asa                | Cisco IOS XE Release 3.1S |
|          | ASA-Appl-Proto | TCP/UDP | 502             | asa-appl-proto                 | asa-appl-prot<br>o | Cisco IOS XE Release 3.1S |
|          | ASIPRegistry   | TCP/UDP | 687             | asipregistry                   | asipregistry       | Cisco IOS XE Release 3.1S |
|          | ASIP-Webadmin  | TCP/UDP | 311             | AppleShare IP WebAdmin         | asip-webadm<br>in  | Cisco IOS XE Release 3.1S |
|          | AS-Servermap   | TCP/UDP | 449             | AS Server Mapper               | as-servermap       | Cisco IOS XE Release 3.1S |
|          | AT-3           | TCP/UDP | 203             | AppleTalk Unused               | at-3               | Cisco IOS XE Release 3.1S |
|          | AT-5           | TCP/UDP | 205             | AppleTalk Unused               | at-5               | Cisco IOS XE Release 3.1S |
|          | AT-7           | TCP/UDP | 207             | AppleTalk Unused               | at-7               | Cisco IOS XE Release 3.1S |
|          | AT-8           | TCP/UDP | 208             | AppleTalk Unused               | at-8               | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol    | Type    | WKP/IP Protocol | Description                             | Syntax      | Cisco IOS XE Release      |
|----------|-------------|---------|-----------------|---|-------------|---------------------------|
|          | AT-Echo     | TCP/UDP | 204             | AppleTalk Echo                          | at-echo     | Cisco IOS XE Release 3.1S |
|          | AT-NBP      | TCP/UDP | 202             | AppleTalk Name Binding                  | at-nbp      | Cisco IOS XE Release 3.1S |
|          | AT-RTMP     | TCP/UDP | 201             | AppleTalk Routing Maintenance           | at-rtmp     | Cisco IOS XE Release 3.1S |
|          | AT-ZIS      | TCP/UDP | 206             | AppleTalk Zone Information              | at-zis      | Cisco IOS XE Release 3.1S |
|          | Audit       | TCP/UDP | 182             | Unisys Audit SITP                       | audit       | Cisco IOS XE Release 3.1S |
|          | Auditd      | TCP/UDP | 48              | Digital Audit daemon                    | auditd      | Cisco IOS XE Release 3.1S |
|          | Aurora-CMGR | TCP/UDP | 364             | Aurora CMGR                             | aurora-cmgr | Cisco IOS XE Release 3.1S |
|          | AURP        | TCP/UDP | 387             | Appletalk Update-Based Routing Protocol | aurp        | Cisco IOS XE Release 3.1S |
|          | AUTH        | TCP/UDP | 113             | Authentication Service                  | auth        | Cisco IOS XE Release 3.1S |
|          | Avian       | TCP/UDP | 486             | avian                                   | avian       | Cisco IOS XE Release 3.1S |
|          | AX25        | TCP/UDP | 93              | AX.25 Frames                            | ax25        | Cisco IOS XE Release 3.1S |
|          | Banyan-RPC  | TCP/UDP | 567             | Banyan-RPC                              | banyan-rpc  | Cisco IOS XE Release 3.1S |
|          | Banyan-VIP  | TCP/UDP | 573             | Banyan-VIP                              | banyan-vip  | Cisco IOS XE Release 3.1S |
|          | BBNRCCMON   | TCP/UDP | 10              | BBN RCC Monitoring                      | bbnrccmon   | Cisco IOS XE Release 3.1S |
|          | BDP         | TCP/UDP | 581             | Bundle Discovery protocol               | bdp         | Cisco IOS XE Release 3.1S |
|          | BFTP        | TCP/UDP | 152             | Background File Transfer Program        | bftp        | Cisco IOS XE Release 3.1S |
|          | BGMP        | TCP/UDP | 264             | Border Gateway Multicast Protocol       | bgmp        | Cisco IOS XE Release 3.1S |
|          | BGP         | TCP/UDP | 179             | Border Gateway Protocol                 | bgp         | Cisco IOS XE Release 3.1S |
|          | BGS-NSI     | TCP/UDP | 482             | BGS-NSI                                 | bgs-nsi     | Cisco IOS XE Release 3.1S |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol     | Type    | WKP/IP Protocol | Description                             | Syntax       | Cisco IOS XE Release      |
|----------|--------------|---------|-----------------|---|--------------|---------------------------|
|          | Bhevent      | TCP/UDP | 357             | Bhevent                                 | bhevent      | Cisco IOS XE Release 3.1S |
|          | BHFHS        | TCP/UDP | 248             | BHFHS                                   | bhfhs        | Cisco IOS XE Release 3.1S |
|          | BHMDS        | TCP/UDP | 310             | BHMDS                                   | bhmnds       | Cisco IOS XE Release 3.1S |
|          | BL-IDM       | TCP/UDP | 142             | Britton Lee IDM                         | bl-idm       | Cisco IOS XE Release 3.1S |
|          | BMPP         | TCP/UDP | 632             | BMPP                                    | bmpp         | Cisco IOS XE Release 3.1S |
|          | BNA          | TCP/UDP | 49              | BNA                                     | bna          | Cisco IOS XE Release 3.1S |
|          | Bnet         | TCP/UDP | 415             | BNET                                    | bnet         | Cisco IOS XE Release 3.1S |
|          | Borland-DSJ  | TCP/UDP | 707             | Borland-dsj                             | borland-dsj  | Cisco IOS XE Release 3.1S |
|          | BR-SAT-Mon   | TCP/UDP | 76              | Backroom SATNET Monitoring              | br-sat-mon   | Cisco IOS XE Release 3.1S |
|          | Cableport-AX | TCP/UDP | 282             | Cable Port A/X                          | cableport-ax | Cisco IOS XE Release 3.1S |
|          | Cab-Protocol | TCP/UDP | 595             | CAB Protocol                            | cab-protocol | Cisco IOS XE Release 3.1S |
|          | Cadlock      | TCP/UDP | 770             | Cadlock                                 | cadlock      | Cisco IOS XE Release 3.1S |
|          | CAIlic       | TCP/UDP | 216             | Computer Associates Intl License Server | CAIlic       | Cisco IOS XE Release 3.1S |
|          | CBT          | TCP/UDP | 7               | CBT                                     | cbt          | Cisco IOS XE Release 3.1S |
|          | CDC          | TCP/UDP | 223             | Certificate Distribution Center         | cdc          | Cisco IOS XE Release 3.1S |
|          | CFDPTKT      | TCP/UDP | 120             | cfdpkt                                  | cfdpkt       | Cisco IOS XE Release 3.1S |
|          | CFTP         | TCP/UDP | 62              | CFTP                                    | cftp         | Cisco IOS XE Release 3.1S |
|          | CHAOS        | TCP/UDP | 16              | Chaos                                   | chaos        | Cisco IOS XE Release 3.1S |
|          | CharGen      | TCP/UDP | 19              | Character Generator                     | chargen      | Cisco IOS XE Release 3.1S |
|          |              |         |                 |   |              |                           |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol      | Type    | WKP/IP Protocol | Description          | Syntax        | Cisco IOS XE Release      |
|----------|---------------|---------|-----------------|----------------------|---------------|---------------------------|
|          | ChShell       | TCP/UDP | 562             | chemd                | chshell       | Cisco IOS XE Release 3.1S |
|          | Cimplex       | TCP/UDP | 673             | Cimplex              | cimplex       | Cisco IOS XE Release 3.1S |
|          | Cisco-FNA     | TCP/UDP | 130             | Cisco FNATIVE        | cisco-fna     | Cisco IOS XE Release 3.1S |
|          | Cisco-SYS     | TCP/UDP | 132             | Cisco SYSMANT        | cisco-sys     | Cisco IOS XE Release 3.1S |
|          | Cisco-TDP     | TCP/UDP | 711             | Cisco TDP            | cisco-tdp     | Cisco IOS XE Release 3.1S |
|          | Cisco-TNA     | TCP/UDP | 131             | Cisco TNATIVE        | cisco-tna     | Cisco IOS XE Release 3.1S |
|          | Clearcase     | TCP/UDP | 371             | Clearcase            | clearcase     | Cisco IOS XE Release 3.1S |
|          | Cloanto-Net-1 | TCP/UDP | 356             | Cloanto-net-1        | cloanto-net-1 | Cisco IOS XE Release 3.1S |
|          | CMIP-Agent    | TCP/UDP | 164             | CMIP/TCP Agent       | cmip-agent    | Cisco IOS XE Release 3.1S |
|          | CMIP-Man      | TCP/UDP | 163             | CMIP/TCP Manager     | cmip-man      | Cisco IOS XE Release 3.1S |
|          | Coauthor      | TCP/UDP | 1529            | Oracle               | coauthor      | Cisco IOS XE Release 3.1S |
|          | Codaaauth2    | TCP/UDP | 370             | Codaaauth2           | codaaauth2    | Cisco IOS XE Release 3.1S |
|          | Collaborator  | TCP/UDP | 622             | Collaborator         | collaborator  | Cisco IOS XE Release 3.1S |
|          | Commerce      | TCP/UDP | 542             | Commerce             | commerce      | Cisco IOS XE Release 3.1S |
|          | Compaq-Peer   | TCP/UDP | 110             | Compaq Peer Protocol | compaq-peer   | Cisco IOS XE Release 3.1S |
|          | Compressnet   | TCP/UDP | 2               | Management Utility   | compressnet   | Cisco IOS XE Release 3.1S |
|          | COMSCM        | TCP/UDP | 437             | COMSCM               | comscm        | Cisco IOS XE Release 3.1S |
|          | CON           | TCP/UDP | 759             | Con                  | con           | Cisco IOS XE Release 3.1S |
|          | Conference    | TCP/UDP | 531             | Chat                 | conference    | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                         | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|-------------------------------------|----------------|---------------------------|
|          | Connendp       | TCP/UDP | 693             | Almanid Connection Endpoint         | connendp       | Cisco IOS XE Release 3.1S |
|          | ContentServer  | TCP/UDP | 3365            | Contentserver                       | contentserver  | Cisco IOS XE Release 3.1S |
|          | CoreRJD        | TCP/UDP | 284             | Corerjd                             | corerjd        | Cisco IOS XE Release 3.1S |
|          | Courier        | TCP/UDP | 530             | RPC                                 | courier        | Cisco IOS XE Release 3.1S |
|          | Covia          | TCP/UDP | 64              | Communications Integrator           | covia          | Cisco IOS XE Release 3.1S |
|          | CPHB           | TCP/UDP | 73              | Computer Protocol Heart Beat        | cphb           | Cisco IOS XE Release 3.1S |
|          | CPNX           | TCP/UDP | 72              | Computer Protocol Network Executive | cpnx           | Cisco IOS XE Release 3.1S |
|          | Creativepartnr | TCP/UDP | 455             | Creativepartnr                      | creativepartnr | Cisco IOS XE Release 3.1S |
|          | Creativeserver | TCP/UDP | 453             | Creativeserver                      | creativeserver | Cisco IOS XE Release 3.1S |
|          | CRS            | TCP/UDP | 507             | CRS                                 | crs            | Cisco IOS XE Release 3.1S |
|          | CRTP           | TCP/UDP | 126             | Combat Radio Transport Protocol     | crtip          | Cisco IOS XE Release 3.1S |
|          | CRUDP          | TCP/UDP | 127             | Combat Radio User Datagram          | crudp          | Cisco IOS XE Release 3.1S |
|          | CryptoAdmin    | TCP/UDP | 624             | Crypto Admin                        | cryptoadmin    | Cisco IOS XE Release 3.1S |
|          | CSI-SGWP       | TCP/UDP | 348             | Cabletron Management Protocol       | csi-sgwp       | Cisco IOS XE Release 3.1S |
|          | CSNET-NS       | TCP/UDP | 105             | Mailbox Name Nameserver             | csnet-ns       | Cisco IOS XE Release 3.1S |
|          | CTF            | TCP/UDP | 84              | Common Trace Facility               | ctf            | Cisco IOS XE Release 3.1S |
|          | CUSTIX         | TCP/UDP | 528             | Customer Ixchange                   | custix         | Cisco IOS XE Release 3.1S |
|          | CVC_Hostd      | TCP/UDP | 442             | CVC_Hostd                           | cvc_hostd      | Cisco IOS XE Release 3.1S |
|          | Cybercash      | TCP/UDP | 551             | Cybercash                           | cybercash      | Cisco IOS XE Release 3.1S |
|          | Cycleserv      | TCP/UDP | 763             | Cycleserv                           | cycleserv      | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol       | Type    | WKP/IP Protocol | Description                               | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|---|----------------|---------------------------|
|          | Cycleserv2     | TCP/UDP | 772             | Cycleserv2                                | cycleserv2     | Cisco IOS XE Release 3.1S |
|          | Dantz          | TCP/UDP | 497             | Dantz                                     | dantz          | Cisco IOS XE Release 3.1S |
|          | DASP           | TCP/UDP | 439             | Dasp                                      | dasp           | Cisco IOS XE Release 3.1S |
|          | DataSurfSRV    | TCP/UDP | 461             | DataRamp Svr                              | datasurfsrv    | Cisco IOS XE Release 3.1S |
|          | DataSurfSRVSec | TCP/UDP | 462             | DataRamp Svr svcs                         | datasurfsrvsec | Cisco IOS XE Release 3.1S |
|          | Datex-ASN      | TCP/UDP | 355             | datex-asn                                 | datex-asn      | Cisco IOS XE Release 3.1S |
|          | Daytime        | TCP/UDP | 13              | Daytime (RFC 867)                         | daytime        | Cisco IOS XE Release 3.1S |
|          | Dbase          | TCP/UDP | 217             | dBASE Unix                                | dbase          | Cisco IOS XE Release 3.1S |
|          | DCCP           | TCP/UDP | 33              | Datagram Congestion Control Protocol      | dccp           | Cisco IOS XE Release 3.1S |
|          | DCN-Meas       | TCP/UDP | 19              | DCN Measurement Subsystems                | dcn-meas       | Cisco IOS XE Release 3.1S |
|          | DCP            | TCP/UDP | 93              | Device Control Protocol                   | dcp            | Cisco IOS XE Release 3.1S |
|          | DCTP           | TCP/UDP | 675             | DCTP                                      | dctp           | Cisco IOS XE Release 3.1S |
|          | DDM-DFM        | TCP/UDP | 447             | DDM Distributed File management           | ddm-dfm        | Cisco IOS XE Release 3.1S |
|          | DDM-RDB        | TCP/UDP | 446             | DDM-Remote Relational Database Access     | ddm-rdb        | Cisco IOS XE Release 3.1S |
|          | DDM-SSL        | TCP/UDP | 448             | DDM-Remote DB Access Using Secure Sockets | ddm-ssl        | Cisco IOS XE Release 3.1S |
|          | DDP            | TCP/UDP | 37              | Datagram Delivery Protocol                | ddp            | Cisco IOS XE Release 3.1S |
|          | DDX            | TCP/UDP | 116             | D-II Data Exchange                        | ddx            | Cisco IOS XE Release 3.1S |
|          | DEC_DLM        | TCP/UDP | 625             | dec_dlm                                   | dec_dlm        | Cisco IOS XE Release 3.1S |
|          | Decap          | TCP/UDP | 403             | Decap                                     | decap          | Cisco IOS XE Release 3.1S |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol       | Type    | WKP/IP Protocol | Description                                    | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|--|----------------|---------------------------|
|          | Decauth        | TCP/UDP | 316             | Decauth  | decauth        | Cisco IOS XE Release 3.1S |
|          | Decbsrv        | TCP/UDP | 579             | Decbsrv  | decbsrv        | Cisco IOS XE Release 3.1S |
|          | Decladebug     | TCP/UDP | 410             | DECLadebug Remote Debug Protocol               | decladebug     | Cisco IOS XE Release 3.1S |
|          | Decvms-sysmgt  | TCP/UDP | 441             | Decvms-sysmgt                                  | decvms-sysmgt  | Cisco IOS XE Release 3.1S |
|          | DEI-ICDA       | TCP/UDP | 618             | dei-icda                                       | dei-icda       | Cisco IOS XE Release 3.1S |
|          | DEOS           | TCP/UDP | 76              | Distributed External Object Store              | deos           | Cisco IOS XE Release 3.1S |
|          | Device         | TCP/UDP | 801             | Device   | device         | Cisco IOS XE Release 3.1S |
|          | DGP            | TCP/UDP | 86              | Dissimilar Gateway Protocol                    | dgp            | Cisco IOS XE Release 3.1S |
|          | DHCP-Failover  | TCP/UDP | 647             | DHCP Failover                                  | dhcp-failover  | Cisco IOS XE Release 3.1S |
|          | DHCP-Failover2 | TCP/UDP | 847             | dhcp-failover2                                 | dhcp-failover2 | Cisco IOS XE Release 3.1S |
|          | DHCPv6-client  | TCP/UDP | 546             | DHCPv6 Client                                  | dhcpv6-client  | Cisco IOS XE Release 3.1S |
|          | DHCPv6-server  | TCP/UDP | 547             | DHCPv6 Server                                  | dhcpv6-server  | Cisco IOS XE Release 3.1S |
|          | Dicom          | TCP/UDP | Heuristic       | Digital Imaging and Communications in Medicine | dicom          | Cisco IOS XE Release 3.3S |
|          | Digital-VRC    | TCP/UDP | 466             | digital-vrc                                    | digital-vrc    | Cisco IOS XE Release 3.1S |
|          | Directplay     | TCP/UDP | 2234            | DirectPlay                                     | directplay     | Cisco IOS XE Release 3.1S |
|          | Directplay8    | TCP/UDP | 6073            | DirectPlay8                                    | directplay8    | Cisco IOS XE Release 3.1S |
|          | Directv-Catlg  | TCP/UDP | 3337            | Direct TV Data Catalog                         | directv-catlg  | Cisco IOS XE Release 3.1S |
|          | Directv-Soft   | TCP/UDP | 3335            | Direct TV Software Updates                     | directv-soft   | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol     | Type    | WKP/IP Protocol | Description                        | Syntax       | Cisco IOS XE Release      |
|----------|--------------|---------|-----------------|------------------------------------|--------------|---------------------------|
|          | Directv-Tick | TCP/UDP | 3336            | Direct TV Tickers                  | directv-tick | Cisco IOS XE Release 3.1S |
|          | Directv-Web  | TCP/UDP | 3334            | Direct TV Webcasting               | directv-web  | Cisco IOS XE Release 3.1S |
|          | Discard      | TCP/UDP | 9               | Discard                            | discard      | Cisco IOS XE Release 3.1S |
|          | Disclose     | TCP/UDP | 667             | campaign contribution disclosures  | disclose     | Cisco IOS XE Release 3.1S |
|          | Dixie        | TCP/UDP | 96              | DIXIE Protocol Specification       | dixie        | Cisco IOS XE Release 3.1S |
|          | DLS          | TCP/UDP | 197             | Directory Location Service         | dls          | Cisco IOS XE Release 3.1S |
|          | DLS-Mon      | TCP/UDP | 198             | Directory Location Service Monitor | dls-mon      | Cisco IOS XE Release 3.1S |
|          | DN6-NLM-AUD  | TCP/UDP | 195             | DNSIX Network Level Module Audit   | dn6-nlm-aud  | Cisco IOS XE Release 3.1S |
|          | DNA-CML      | TCP/UDP | 436             | DNA-CML                            | dna-cml      | Cisco IOS XE Release 3.1S |
|          | DNS          | TCP/UDP | 53              | Domain Name Server lookup          | dns          | Cisco IOS XE Release 3.1S |
|          | DNSIX        | TCP/UDP | 90              | DNSIX Security Attribute Token Map | dnsix        | Cisco IOS XE Release 3.1S |
|          | DOOM         | TCP/UDP | 666             | Doom Id Software                   | doom         | Cisco IOS XE Release 3.1S |
|          | DPSI         | TCP/UDP | 315             | DPSI                               | dpsi         | Cisco IOS XE Release 3.1S |
|          | DSFGW        | TCP/UDP | 438             | DSFGW                              | dsfgw        | Cisco IOS XE Release 3.1S |
|          | DSP          | TCP/UDP | 33              | Display Support Protocol           | dsp          | Cisco IOS XE Release 3.1S |
|          | DSP3270      | TCP/UDP | 246             | Display Systems Protocol           | dsp3270      | Cisco IOS XE Release 3.1S |
|          | DSR          | TCP/UDP | 48              | Dynamic Source Routing Protocol    | dsr          | Cisco IOS XE Release 3.1S |
|          | DTAG-DTE-SB  | TCP/UDP | 352             | DTAG                               | dtag-ste-sb  | Cisco IOS XE Release 3.1S |
|          |              |         |                 |                                    |              |                           |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol     | Type    | WKP/IP Protocol | Description                                | Syntax       | Cisco IOS XE Release      |
|----------|--------------|---------|-----------------|--|--------------|---------------------------|
|          | DTK          | TCP/UDP | 365             | DTK  | dtk          | Cisco IOS XE Release 3.1S |
|          | DWR          | TCP/UDP | 644             | DWR  | dwr          | Cisco IOS XE Release 3.1S |
|          | Echo         | TCP/UDP | 7               | Echo                                       | echo         | Cisco IOS XE Release 3.1S |
|          | EGP          | TCP/UDP | 8               | Exterior Gateway Protocol                  | egp          | Cisco IOS XE Release 3.1S |
|          | EIGRP        | TCP/UDP | 88              | Enhanced Interior Gateway Routing Protocol | eigrp        | Cisco IOS XE Release 3.1S |
|          | ELCSD        | TCP/UDP | 704             | errlog copy/server daemon                  | elcsd        | Cisco IOS XE Release 3.1S |
|          | EMBL-NDT     | TCP/UDP | 394             | EMBL Nucleic Data Transfer                 | embl-ndt     | Cisco IOS XE Release 3.1S |
|          | EMCON        | TCP/UDP | 14              | EMCON                                      | emcon        | Cisco IOS XE Release 3.1S |
|          | EMFIS-CNTLI  | TCP/UDP | 141             | EMFIS Control Service                      | emfis-ctl    | Cisco IOS XE Release 3.1S |
|          | EMFIS-Data   | TCP/UDP | 140             | EMFIS Data Service                         | emfis-data   | Cisco IOS XE Release 3.1S |
|          | Encap        | TCP/UDP | 98              | Encapsulation Header                       | encap        | Cisco IOS XE Release 3.1S |
|          | Entomb       | TCP/UDP | 775             | Entomb                                     | entomb       | Cisco IOS XE Release 3.1S |
|          | Entrust-AAAS | TCP/UDP | 680             | Entrust-aaas                               | entrust-aaas | Cisco IOS XE Release 3.1S |
|          | Entrust-AAMS | TCP/UDP | 681             | Entrust-aams                               | entrust-aams | Cisco IOS XE Release 3.1S |
|          | Entrust-ASH  | TCP/UDP | 710             | Entrust Administration Service Handler     | entrust-ash  | Cisco IOS XE Release 3.1S |
|          | Entrust-KMSH | TCP/UDP | 709             | Entrust Key Management Service Handler     | entrust-kmsh | Cisco IOS XE Release 3.1S |
|          | Entrust-SPS  | TCP/UDP | 640             | entrust-sps                                | entrust-sps  | Cisco IOS XE Release 3.1S |
|          | ERPC         | TCP/UDP | 121             | Encore Expedited Remote Pro.Call           | erpc         | Cisco IOS XE Release 3.1S |
|          | ESCP-IP      | TCP/UDP | 621             | escp-ip                                    | escp-ip      | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol    | Type    | WKP/IP Protocol | Description                       | Syntax      | Cisco IOS XE Release      |
|----------|-------------|---------|-----------------|-----------------------------------|-------------|---------------------------|
|          | ESRO-GEN    | TCP/UDP | 259             | Efficient Short Remote Operations | esro-gen    | Cisco IOS XE Release 3.1S |
|          | ESRP-EMSDP  | TCP/UDP | 642             | ESRO-EMSDP V1.3                   | esro-emsdp  | Cisco IOS XE Release 3.1S |
|          | EtherIP     | TCP/UDP | 97              | Ethernet-within-IP Encapsulation  | etherip     | Cisco IOS XE Release 3.1S |
|          | Eudora-Set  | TCP/UDP | 592             | Eudora Set                        | eudora-set  | Cisco IOS XE Release 3.1S |
|          | EXEC        | TCP/UDP | 512             | remote process execution;         | exec        | Cisco IOS XE Release 3.1S |
|          | Fatserv     | TCP/UDP | 347             | Fatmen Server                     | fatserv     | Cisco IOS XE Release 3.1S |
|          | FC          | TCP/UDP | 133             | Fibre Channel                     | fc          | Cisco IOS XE Release 3.1S |
|          | FCP         | TCP/UDP | 510             | FirstClass Protocol               | fcp         | Cisco IOS XE Release 3.1S |
|          | Finger      | TCP/UDP | 79              | Finger                            | finger      | Cisco IOS XE Release 3.1S |
|          | FIRE        | TCP/UDP | 125             | FIRE                              | fire        | Cisco IOS XE Release 3.1S |
|          | FlexLM      | TCP/UDP | 744             | Flexible License Manager          | flexlm      | Cisco IOS XE Release 3.1S |
|          | FLN-SPX     | TCP/UDP | 221             | Berkeley rlogind with SPX auth    | fln-spx     | Cisco IOS XE Release 3.1S |
|          | FTP-Agent   | TCP/UDP | 574             | FTP Software Agent System         | ftp-agent   | Cisco IOS XE Release 3.1S |
|          | FTP-Data    | TCP/UDP | 20              | File Transfer                     | ftp-data    | Cisco IOS XE Release 3.1S |
|          | FTPS-Data   | TCP/UDP | 989             | ftp protocol, data, over TLS/SSL  | ftps-data   | Cisco IOS XE Release 3.1S |
|          | Fujitsu-Dev | TCP/UDP | 747             | Fujitsu Device Control            | fujitsu-dev | Cisco IOS XE Release 3.1S |
|          | GACP        | TCP/UDP | 190             | Gateway Access Control Protocol   | gacp        | Cisco IOS XE Release 3.1S |
|          | GDOMAP      | TCP/UDP | 538             | gdomap                            | gdomap      | Cisco IOS XE Release 3.1S |
|          | Genie       | TCP/UDP | 402             | Genie Protocol                    | genie       | Cisco IOS XE Release 3.1S |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol   | Type    | WKP/IP Protocol | Description                      | Syntax     | Cisco IOS XE Release      |
|----------|------------|---------|-----------------|----------------------------------|------------|---------------------------|
|          | Genrad-MUX | TCP/UDP | 176             | Genrad-mux                       | genrad-mux | Cisco IOS XE Release 3.1S |
|          | GGF-NCP    | TCP/UDP | 678             | GNU Generation Foundation NCP    | ggf-ncp    | Cisco IOS XE Release 3.1S |
|          | GGP        | TCP/UDP | 3               | Gateway-to-Gateway               | ggp        | Cisco IOS XE Release 3.1S |
|          | Ginad      | TCP/UDP | 634             | ginad                            | ginad      | Cisco IOS XE Release 3.1S |
|          | GMTP       | TCP/UDP | 100             | GMTP                             | gmtp       | Cisco IOS XE Release 3.1S |
|          | Go-Login   | TCP/UDP | 491             | Go-login                         | go-login   | Cisco IOS XE Release 3.1S |
|          | Gopher     | TCP/UDP | 70              | Gopher                           | gopher     | Cisco IOS XE Release 3.1S |
|          | Graphics   | TCP/UDP | 41              | Graphics                         | graphics   | Cisco IOS XE Release 3.1S |
|          | GRE        | TCP/UDP | 47              | General Routing Encapsulation    | gre        | Cisco IOS XE Release 3.1S |
|          | Groove     | TCP/UDP | 2492            | Groove                           | groove     | Cisco IOS XE Release 3.1S |
|          | GSS-HTTP   | TCP/UDP | 488             | gss-http                         | gss-http   | Cisco IOS XE Release 3.1S |
|          | GSS-XLICEN | TCP/UDP | 128             | GNU Generation Foundation NCP    | gss-xlicen | Cisco IOS XE Release 3.1S |
|          | GTP-User   | TCP/UDP | 2152            | GTP-User Plane                   | gtp-user   | Cisco IOS XE Release 3.1S |
|          | HA-Cluster | TCP/UDP | 694             | ha-cluster                       | ha-cluster | Cisco IOS XE Release 3.1S |
|          | HAP        | TCP/UDP | 661             | hap                              | hap        | Cisco IOS XE Release 3.1S |
|          | Hassle     | TCP/UDP | 375             | Hassle                           | hassle     | Cisco IOS XE Release 3.1S |
|          | HCP-Wismar | TCP/UDP | 686             | Hardware Control Protocol Wismar | hcp-wismar | Cisco IOS XE Release 3.1S |
|          | HDAP       | TCP/UDP | 263             | hdap                             | hdap       | Cisco IOS XE Release 3.1S |
|          | Hello-port | TCP/UDP | 652             | HELLO_PORT                       | hello-port | Cisco IOS XE Release 3.1S |
|          | HEMS       | TCP/UDP | 151             | hems                             | hems       | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol        | Type    | WKP/IP Protocol | Description                         | Syntax          | Cisco IOS XE Release      |
|----------|-----------------|---------|-----------------|-------------------------------------|-----------------|---------------------------|
|          | HIP             | TCP/UDP | 139             | Host Identity Protocol              | hip             | Cisco IOS XE Release 3.1S |
|          | HMMP-IND        | TCP/UDP | 612             | HMMP Indication                     | hmmmp-ind       | Cisco IOS XE Release 3.1S |
|          | HMMP-OP         | TCP/UDP | 613             | HMMP Operation                      | hmmmp-op        | Cisco IOS XE Release 3.1S |
|          | HMP             | TCP/UDP | 20              | Host Monitoring                     | hmp             | Cisco IOS XE Release 3.1S |
|          | HOPOPT          | TCP/UDP | 0               | IPv6 Hop-by-Hop Option              | hopopt          | Cisco IOS XE Release 3.1S |
|          | Hostname        | TCP/UDP | 101             | NIC Host Name Server                | hostname        | Cisco IOS XE Release 3.1S |
|          | HP-Alarm-Mgr    | TCP/UDP | 383             | HP performance data alarm manager   | hp-alarm-mgr    | Cisco IOS XE Release 3.1S |
|          | HP-Collector    | TCP/UDP | 381             | HP performance data collector       | hp-collector    | Cisco IOS XE Release 3.1S |
|          | HP-Managed-Node | TCP/UDP | 382             | HP performance data managed node    | hp-managed-node | Cisco IOS XE Release 3.1S |
|          | HTTP-ALT        | TCP/UDP | 8080            | HTTP Alternate                      | http-alt        | Cisco IOS XE Release 3.1S |
|          | HTTP-Mgmt       | TCP/UDP | 280             | http-mgmt                           | http-mgmt       | Cisco IOS XE Release 3.1S |
|          | HTTP-RPC-EPMAP  | TCP/UDP | 593             | HTTP RPC Ep Map                     | http-rpc-epmap  | Cisco IOS XE Release 3.1S |
|          | Hybrid-POP      | TCP/UDP | 473             | Hybrid-pop                          | hybrid-pop      | Cisco IOS XE Release 3.1S |
|          | Hyper-G         | TCP/UDP | 418             | Hyper-g                             | hyper-g         | Cisco IOS XE Release 3.1S |
|          | Hyperwave-ISP   | TCP/UDP | 692             | Hyperwave-isp                       | hyperwave-isp   | Cisco IOS XE Release 3.1S |
|          | IAFDBase        | TCP/UDP | 480             | iafdbase                            | iafdbase        | Cisco IOS XE Release 3.1S |
|          | IAFServer       | TCP/UDP | 479             | iafserver                           | iafserver       | Cisco IOS XE Release 3.1S |
|          | IASD            | TCP/UDP | 432             | iasd                                | iasd            | Cisco IOS XE Release 3.1S |
|          | IATP            | TCP/UDP | 117             | Interactive Agent Transfer Protocol | iatp            | Cisco IOS XE Release 3.1S |
|          | IBM-App         | TCP/UDP | 385             | IBM Application                     | ibm-app         | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                             | Syntax        | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|---|---------------|---------------------------|
|          | IBM-DB2        | TCP/UDP | 523             | IBM-DB2                                 | ibm-db2       | Cisco IOS XE Release 3.1S |
|          | IBProtocol     | TCP/UDP | 6714            | Internet Backplane Protocol             | ibprotocol    | Cisco IOS XE Release 3.1S |
|          | ICLCNet-Locate | TCP/UDP | 886             | ICL coNETion locate server              | iclnet-locate | Cisco IOS XE Release 3.1S |
|          | ICLNet_SVInfo  | TCP/UDP | 887             | ICL coNETion server info                | iclnet_svinfo | Cisco IOS XE Release 3.1S |
|          | ICMP           | TCP/UDP | 1               | Internet Control Message                | icmp          | Cisco IOS XE Release 3.1S |
|          | IDFP           | TCP/UDP | 549             | idfp                                    | idfp          | Cisco IOS XE Release 3.1S |
|          | IDPR           | TCP/UDP | 35              | Inter-Domain Policy Routing Protocol    | idpr          | Cisco IOS XE Release 3.1S |
|          | IDPRr-CMTP     | TCP/UDP | 38              | IDPR Control Message Transport Protocol | idpr-cmtp     | Cisco IOS XE Release 3.1S |
|          | IDRP           | TCP/UDP | 45              | Inter-Domain Routing Protocol           | idrp          | Cisco IOS XE Release 3.1S |
|          | IEEE-MMS       | TCP/UDP | 651             | ieee-mms                                | ieee-mms      | Cisco IOS XE Release 3.1S |
|          | IEEE-MMS-SSL   | TCP/UDP | 695             | ieee-mms-ssl                            | ieee-mms-ssl  | Cisco IOS XE Release 3.1S |
|          | IFMP           | TCP/UDP | 101             | Ipsilon Flow Management Protocol        | ifmp          | Cisco IOS XE Release 3.1S |
|          | IGRP           | TCP/UDP | 9               | Cisco interior gateway                  | igrp          | Cisco IOS XE Release 3.1S |
|          | IIOP           | TCP/UDP | 535             | iiop                                    | iiop          | Cisco IOS XE Release 3.1S |
|          | IL             | TCP/UDP | 40              | IL Transport Protocol                   | il            | Cisco IOS XE Release 3.1S |
|          | IMSP           | TCP/UDP | 406             | Interactive Mail Support Protocol       | imsp          | Cisco IOS XE Release 3.1S |
|          | InBusiness     | TCP/UDP | 244             | Inbusiness                              | inbusiness    | Cisco IOS XE Release 3.1S |
|          | Infoseek       | TCP/UDP | 414             | InfoSeek                                | infoseek      | Cisco IOS XE Release 3.1S |
|          | Ingres-Net     | TCP/UDP | 134             | INGRES-NET Service                      | ingres-net    | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol    | Type    | WKP/IP Protocol | Description                             | Syntax      | Cisco IOS XE Release      |
|----------|-------------|---------|-----------------|---|-------------|---------------------------|
|          | I-NLSP      | TCP/UDP | 52              | Integrated Net Layer Security TUBA      | i-nlsp      | Cisco IOS XE Release 3.1S |
|          | Intecourier | TCP/UDP | 495             | Intecourier                             | intecourier | Cisco IOS XE Release 3.1S |
|          | Integra-SME | TCP/UDP | 484             | Integra Software Management Environment | integra-sme | Cisco IOS XE Release 3.1S |
|          | Intrinsa    | TCP/UDP | 503             | intrinsa                                | intrinsa    | Cisco IOS XE Release 3.1S |
|          | IPCD        | TCP/UDP | 576             | ipcd                                    | ipcd        | Cisco IOS XE Release 3.1S |
|          | IPComp      | TCP/UDP | 108             | IP Payload Compression Protocol         | ipcomp      | Cisco IOS XE Release 3.1S |
|          | IPCServer   | TCP/UDP | 600             | Sun IPC server                          | ipcserver   | Cisco IOS XE Release 3.1S |
|          | IPCV        | TCP/UDP | 71              | Internet Packet Core Utility            | ipcv        | Cisco IOS XE Release 3.1S |
|          | IPDD        | TCP/UDP | 578             | ipdd                                    | ipdd        | Cisco IOS XE Release 3.1S |
|          | IPINIP      | TCP/UDP | 4               | IP in IP                                | ipinip      | Cisco IOS XE Release 3.1S |
|          | IPIP        | TCP/UDP | 94              | IP-within-IP Encapsulation Protocol     | ipip        | Cisco IOS XE Release 3.1S |
|          | IPLT        | TCP/UDP | 129             | IPLT                                    | iplt        | Cisco IOS XE Release 3.1S |
|          | IPP         | TCP/UDP | 631             | Internet Printing Protocol              | ipp         | Cisco IOS XE Release 3.1S |
|          | IPPC        | TCP/UDP | 67              | Internet Pluribus Packet Core           | ippc        | Cisco IOS XE Release 3.1S |
|          | Ipv6-Frag   | TCP/UDP | 44              | Fragment Header for IPv6                | ipv6-frag   | Cisco IOS XE Release 3.1S |
|          | Ipv6-ICMP   | TCP/UDP | 58              | ICMP for IPv6                           | ipv6-icmp   | Cisco IOS XE Release 3.1S |
|          | Ipv6INIP    | TCP/UDP | 41              | Ipv6 encapsulated                       | ipv6inip    | Cisco IOS XE Release 3.1S |
|          | ipv6-NonXT  | TCP/UDP | 59              | No Next Header for IPv6                 | ipv6-nonxt  | Cisco IOS XE Release 3.1S |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol    | Type    | WKP/IP Protocol | Description   | Syntax      | Cisco IOS XE Release      |
|----------|-------------|---------|-----------------|---|-------------|---------------------------|
|          | Ipv6-OPTS   | TCP/UDP | 60              | Destination Options for IPv6                            | ipv6-opts   | Cisco IOS XE Release 3.1S |
|          | Ipv6-Route  | TCP/UDP | 43              | Routing Header for IPv6                                 | ipv6-route  | Cisco IOS XE Release 3.1S |
|          | IRC         | TCP/UDP | 194             | Internet Relay Chat                                     | irc         | Cisco IOS XE Release 3.1S |
|          | IRC-SERV    | TCP/UDP | 529             | IRC-SERV  | irc-serv    | Cisco IOS XE Release 3.1S |
|          | IRTP        | TCP/UDP | 28              | Internet Reliable Transaction                           | irtp        | Cisco IOS XE Release 3.1S |
|          | IS99C       | TCP/UDP | 379             | TIA/EIA/IS-99 modem client                              | is99c       | Cisco IOS XE Release 3.1S |
|          | IS99S       | TCP/UDP | 380             | TIA/EIA/IS-99 modem server                              | is99s       | Cisco IOS XE Release 3.1S |
|          | ISAKMP      | UDP     | 500, 4500       | Internet Security Association & Key Management Protocol | isakmp      | Cisco IOS XE Release 3.1S |
|          | ISI-GI      | TCP/UDP | 55              | ISI Graphics Language                                   | isi-gl      | Cisco IOS XE Release 3.1S |
|          | ISIS        | TCP/UDP | 124             | ISIS over IPv4  | isis        | Cisco IOS XE Release 3.1S |
|          | ISO-ILL     | TCP/UDP | 499             | ISO ILL Protocol  | iso-ill     | Cisco IOS XE Release 3.1S |
|          | ISO-IP      | TCP/UDP | 147             | iso-ip  | iso-ip      | Cisco IOS XE Release 3.1S |
|          | ISO-TP0     | TCP/UDP | 146             | iso-tp0   | iso-tp0     | Cisco IOS XE Release 3.1S |
|          | ISO-TP4     | TCP/UDP | 29              | ISO Transport Protocol Class 4                          | iso-tp4     | Cisco IOS XE Release 3.1S |
|          | ISO-TSAP    | TCP/UDP | 102             | ISO-TSAP Class 0  | iso-tsap    | Cisco IOS XE Release 3.1S |
|          | ISO-TSAP-C2 | TCP/UDP | 399             | ISO Transport Class 2 Non-Control                       | iso-tsap-c2 | Cisco IOS XE Release 3.1S |
|          | ITM-MCELL-S | TCP/UDP | 828             | itm-mcell-s   | itm-mcell-s | Cisco IOS XE Release 3.1S |
|          | IXP-IN-IP   | TCP/UDP | 111             | IPX in IP   | ixp-in-ip   | Cisco IOS XE Release 3.1S |
|          | Jargon      | TCP/UDP | 148             | Jargon  | jargon      | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol   | Type    | WKP/IP Protocol | Description                           | Syntax     | Cisco IOS XE Release      |
|----------|------------|---------|-----------------|---------------------------------------|------------|---------------------------|
|          | Kali       | TCP/UDP | 2213            | Kali                                  | kali       | Cisco IOS XE Release 3.1S |
|          | K-Block    | TCP/UDP | 287             | K-block                               | k-block    | Cisco IOS XE Release 3.1S |
|          | Keyserver  | TCP/UDP | 584             | Key Server                            | keyserver  | Cisco IOS XE Release 3.1S |
|          | KIS        | TCP/UDP | 186             | KIS Protocol                          | kis        | Cisco IOS XE Release 3.1S |
|          | Klogin     | TCP/UDP | 543             | klogin                                | klogin     | Cisco IOS XE Release 3.1S |
|          | Knet-CMP   | TCP/UDP | 157             | KNET/VM Command/Message Protocol      | knet-cmp   | Cisco IOS XE Release 3.1S |
|          | Konspire2b | TCP/UDP | 6085            | Konspire2b p2p network                | Konspire2b | Cisco IOS XE Release 3.1S |
|          | Kpasswd    | TCP/UDP | 464             | Kpasswd                               | kpasswd    | Cisco IOS XE Release 3.1S |
|          | Kryptolan  | TCP/UDP | 398             | Kryptolan                             | kryptolan  | Cisco IOS XE Release 3.1S |
|          | Kshell     | TCP/UDP | 544             | Kshell                                | kshell     | Cisco IOS XE Release 3.1S |
|          | L2TP       | TCP/UDP | 1701            | l2tp                                  | l2tp       | Cisco IOS XE Release 3.1S |
|          | LA-Maint   | TCP/UDP | 51              | IMP Logical Address Maintenance       | la-maint   | Cisco IOS XE Release 3.1S |
|          | LANServer  | TCP/UDP | 637             | lanserver                             | lanserver  | Cisco IOS XE Release 3.1S |
|          | LARP       | TCP/UDP | 91              | Locus Address Resolution Protocol     | larp       | Cisco IOS XE Release 3.1S |
|          | LDAP       | TCP/UDP | 389             | Lightweight Directory Access Protocol | ldap       | Cisco IOS XE Release 3.1S |
|          | LDP        | TCP/UDP | 646             | LDP                                   | ldp        | Cisco IOS XE Release 3.1S |
|          | Leaf-1     | TCP/UDP | 25              | Leaf-1                                | leaf-1     | Cisco IOS XE Release 3.1S |
|          | Leaf-2     | TCP/UDP | 26              | Leaf-2                                | leaf-2     | Cisco IOS XE Release 3.1S |
|          | Legent-1   | TCP/UDP | 373             | Legent Corporation                    | legent-1   | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                       | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|-----------------------------------|----------------|---------------------------|
|          | Legent-2       | TCP/UDP | 374             | Legent Corporation                | legent-2       | Cisco IOS XE Release 3.1S |
|          | LJK-Login      | TCP/UDP | 472             | ljk-login                         | ljk-login      | Cisco IOS XE Release 3.1S |
|          | Lockd          | TCP/UDP | 4045            | NFS Lock Daemon Manager           | lockd          | Cisco IOS XE Release 3.1S |
|          | Locus-Con      | TCP/UDP | 127             | Locus PC-Interface Conn Server    | locus-con      | Cisco IOS XE Release 3.1S |
|          | Locus-Map      | TCP/UDP | 125             | Locus PC-Interface Net Map Ser    | locus-map      | Cisco IOS XE Release 3.1S |
|          | MAC-SRVR-Admin | TCP/UDP | 660             | MacOS Server Admin                | mac-srvr-admin | Cisco IOS XE Release 3.1S |
|          | Magenta-Logic  | TCP/UDP | 313             | Magenta-logic                     | magenta-logic  | Cisco IOS XE Release 3.1S |
|          | Mailbox-LM     | TCP/UDP | 505             | Mailbox-lm                        | mailbox-lm     | Cisco IOS XE Release 3.1S |
|          | Mailq          | TCP/UDP | 174             | MAILQ                             | mailq          | Cisco IOS XE Release 3.1S |
|          | Maitrd         | TCP/UDP | 997             | Maitrd                            | maitrd         | Cisco IOS XE Release 3.1S |
|          | MANET          | TCP/UDP | 138             | MANET Protocols                   | manet          | Cisco IOS XE Release 3.1S |
|          | MasqDialer     | TCP/UDP | 224             | Masqdialer                        | masqdialer     | Cisco IOS XE Release 3.1S |
|          | Matip-Type-A   | TCP/UDP | 350             | MATIP Type A                      | matip-type-a   | Cisco IOS XE Release 3.1S |
|          | Matip-Type-B   | TCP/UDP | 351             | MATIP Type B                      | matip-type-b   | Cisco IOS XE Release 3.1S |
|          | MCIDAS         | TCP/UDP | 112             | McIDAS Data Transmission Protocol | mcidas         | Cisco IOS XE Release 3.1S |
|          | MCNS-Sec       | TCP/UDP | 638             | mcns-sec                          | mcns-sec       | Cisco IOS XE Release 3.1S |
|          | MDC-Portmapper | TCP/UDP | 685             | mdc-portmapper                    | mdc-portmapper | Cisco IOS XE Release 3.1S |
|          | MeComm         | TCP/UDP | 668             | MeComm                            | mecomm         | Cisco IOS XE Release 3.1S |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol       | Type    | WKP/IP Protocol | Description                         | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|-------------------------------------|----------------|---------------------------|
|          | MeRegister     | TCP/UDP | 669             | MeRegister                          | meregister     | Cisco IOS XE Release 3.1S |
|          | Merit-INP      | TCP/UDP | 32              | MERIT Internodal Protocol           | merit-inp      | Cisco IOS XE Release 3.1S |
|          | Meta5          | TCP/UDP | 393             | Meta5                               | meta5          | Cisco IOS XE Release 3.1S |
|          | Metagram       | TCP/UDP | 99              | Metagram                            | metagram       | Cisco IOS XE Release 3.1S |
|          | Meter          | TCP/UDP | 570             | Meter                               | meter          | Cisco IOS XE Release 3.1S |
|          | Mfcobol        | TCP/UDP | 86              | Micro Focus Cobol                   | mfcobol        | Cisco IOS XE Release 3.1S |
|          | MFE-NSP        | TCP/UDP | 31              | MFE Network Services Protocol       | mfe-nsp        | Cisco IOS XE Release 3.1S |
|          | MFTP           | TCP/UDP | 349             | mftp                                | mftp           | Cisco IOS XE Release 3.1S |
|          | Micom-PFS      | TCP/UDP | 490             | Micom-pfs                           | micom-pfs      | Cisco IOS XE Release 3.1S |
|          | MICP           | TCP/UDP | 95              | Mobile Internetworking Control Pro. | micp           | Cisco IOS XE Release 3.1S |
|          | Micromuse-LM   | TCP/UDP | 1534            | micromuse-lm                        | micromuse-lm   | Cisco IOS XE Release 3.1S |
|          | MIT-DOV        | TCP/UDP | 91              | MIT Dover Spooler                   | mit-dov        | Cisco IOS XE Release 3.1S |
|          | MIT-ML-Dev     | TCP/UDP | 83              | MIT ML Device                       | mit-ml-dev     | Cisco IOS XE Release 3.1S |
|          | Mobile         | TCP/UDP | 55              | IP Mobility                         | mobile         | Cisco IOS XE Release 3.1S |
|          | MobileIP-Agent | TCP/UDP | 434             | mobileip-agent                      | mobileip-agent | Cisco IOS XE Release 3.1S |
|          | MobilIP-MN     | TCP/UDP | 435             | mobilip-mn                          | mobilip-mn     | Cisco IOS XE Release 3.1S |
|          | Mondex         | TCP/UDP | 471             | Mondex                              | mondex         | Cisco IOS XE Release 3.1S |
|          | Monitor        | TCP/UDP | 561             | Monitor                             | monitor        | Cisco IOS XE Release 3.1S |
|          | Mortgageware   | TCP/UDP | 367             | Mortgageware                        | mortgageware   | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                            | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|--|----------------|---------------------------|
|          | MPLS-IN-IP     | TCP/UDP | 137             | MPLS-in-IP                             | mpls-in-ip     | Cisco IOS XE Release 3.1S |
|          | MPM            | TCP/UDP | 45              | Message Processing Module              | mpm            | Cisco IOS XE Release 3.1S |
|          | MPM-Flags      | TCP/UDP | 44              | MPM FLAGS Protocol                     | mpm-flags      | Cisco IOS XE Release 3.1S |
|          | MPM-SND        | TCP/UDP | 46              | MPM [default send]                     | mpm-snd        | Cisco IOS XE Release 3.1S |
|          | MPP            | TCP/UDP | 218             | Netix Message Posting Protocol         | mpp            | Cisco IOS XE Release 3.1S |
|          | MPTN           | TCP/UDP | 397             | Multi Protocol Transport Network       | mptn           | Cisco IOS XE Release 3.1S |
|          | MRM            | TCP/UDP | 679             | mrm                                    | mrm            | Cisco IOS XE Release 3.1S |
|          | MSDP           | TCP/UDP | 639             | msdp                                   | msdp           | Cisco IOS XE Release 3.1S |
|          | MSExch-Routing | TCP/UDP | 691             | MS Exchange Routing                    | msexch-routing | Cisco IOS XE Release 3.1S |
|          | MSFT-GC        | TCP/UDP | 3268            | Microsoft Global Catalog               | msft-gc        | Cisco IOS XE Release 3.1S |
|          | MSFT-GC-SSL    | TCP/UDP | 3269            | Microsoft Global Catalog with LDAP/SSL | msft-gc-ssl    | Cisco IOS XE Release 3.1S |
|          | MSG-AUTH       | TCP/UDP | 31              | msg-auth                               | msg-auth       | Cisco IOS XE Release 3.1S |
|          | MSG-ICP        | TCP/UDP | 29              | msg-icp                                | msg-icp        | Cisco IOS XE Release 3.1S |
|          | MSNP           | TCP/UDP | 1863            | msnp                                   | msnp           | Cisco IOS XE Release 3.1S |
|          | MS-OLAP        | TCP/UDP | 2393            | Microsoft OLAP                         | ms-olap        | Cisco IOS XE Release 3.1S |
|          | MSP            | TCP/UDP | 18              | Message Send Protocol                  | msp            | Cisco IOS XE Release 3.1S |
|          | MS-Rome        | TCP/UDP | 569             | Microsoft rome                         | ms-rome        | Cisco IOS XE Release 3.1S |
|          | MS-Shuttle     | TCP/UDP | 568             | Microsoft shuttle                      | ms-shuttle     | Cisco IOS XE Release 3.1S |
|          | MS-SQLI-M      | TCP/UDP | 1434            | Microsoft-SQL-Monitor                  | ms-sql-m       | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol       | Type    | WKP/IP Protocol | Description                      | Syntax        | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|----------------------------------|---------------|---------------------------|
|          | MTP            | TCP/UDP | 92              | Multicast Transport Protocol     | mtp           | Cisco IOS XE Release 3.1S |
|          | Multiling-HTTP | TCP/UDP | 777             | Multiling HTTP                   | multiling-htp | Cisco IOS XE Release 3.1S |
|          | Multiplex      | TCP/UDP | 171             | Network Innovations Multiplex    | multiplex     | Cisco IOS XE Release 3.1S |
|          | Mumps          | TCP/UDP | 188             | Plus Fives MUMPS                 | mumps         | Cisco IOS XE Release 3.1S |
|          | MUX            | TCP/UDP | 18              | Multiplexing                     | mux           | Cisco IOS XE Release 3.1S |
|          | Mylex-MAPD     | TCP/UDP | 467             | mylex-mapd                       | mylex-mapd    | Cisco IOS XE Release 3.1S |
|          | MySQL          | TCP/UDP | 3306            | MySQL                            | mysql         | Cisco IOS XE Release 3.1S |
|          | Name           | TCP/UDP | 42              | Host Name Server                 | name          | Cisco IOS XE Release 3.1S |
|          | NAMP           | TCP/UDP | 167             | namp                             | namp          | Cisco IOS XE Release 3.1S |
|          | NARP           | TCP/UDP | 54              | NBMA Address Resolution Protocol | narp          | Cisco IOS XE Release 3.1S |
|          | NAS            | TCP/UDP | 991             | Netnews Administration System    | nas           | Cisco IOS XE Release 3.1S |
|          | NCED           | TCP/UDP | 404             | nced                             | nced          | Cisco IOS XE Release 3.1S |
|          | NCLD           | TCP/UDP | 405             | ncld                             | ncld          | Cisco IOS XE Release 3.1S |
|          | NCP            | TCP/UDP | 524             | NCP                              | ncp           | Cisco IOS XE Release 3.1S |
|          | NDSAAuth       | TCP/UDP | 353             | NDSAUTH                          | ndsauth       | Cisco IOS XE Release 3.1S |
|          | Nest-Protocol  | TCP/UDP | 489             | Nest-protocol                    | nest-protocol | Cisco IOS XE Release 3.1S |
|          | Net8-CMAN      | TCP/UDP | 1830            | Oracle Net8 CMan Admin           | net8-cman     | Cisco IOS XE Release 3.1S |
|          | Net-Assistant  | TCP/UDP | 3283            | net-assistant                    | net-assistant | Cisco IOS XE Release 3.1S |
|          | Netblt         | TCP/UDP | 30              | Bulk Data Transfer Protocol      | netblt        | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol   | Type    | WKP/IP Protocol | Description              | Syntax     | Cisco IOS XE Release      |
|----------|------------|---------|-----------------|--------------------------|------------|---------------------------|
|          | NetGW      | TCP/UDP | 741             | netgw                    | netgw      | Cisco IOS XE Release 3.1S |
|          | NetNews    | TCP/UDP | 532             | readnews                 | netnews    | Cisco IOS XE Release 3.1S |
|          | NetRCS     | TCP/UDP | 742             | Network based RCS        | netrcs     | Cisco IOS XE Release 3.1S |
|          | NetRJS-1   | TCP/UDP | 71              | Remote Job Service       | netrjs-1   | Cisco IOS XE Release 3.1S |
|          | NetRJS-2   | TCP/UDP | 72              | Remote Job Service       | netrjs-2   | Cisco IOS XE Release 3.1S |
|          | NetRJS-3   | TCP/UDP | 73              | Remote Job Service       | netrjs-3   | Cisco IOS XE Release 3.1S |
|          | NetRJS-4   | TCP/UDP | 74              | Remote Job Service       | netrjs-4   | Cisco IOS XE Release 3.1S |
|          | NETSC-Dev  | TCP/UDP | 155             | NETSC                    | netsc-dev  | Cisco IOS XE Release 3.1S |
|          | NETSC-Prod | TCP/UDP | 154             | NETSC                    | netsc-prod | Cisco IOS XE Release 3.1S |
|          | NetViewDM1 | TCP/UDP | 729             | IBM NetView M            | netviewdm1 | Cisco IOS XE Release 3.1S |
|          | NetviewDM2 | TCP/UDP | 730             | IBM NetView DM           | netviewdm2 | Cisco IOS XE Release 3.1S |
|          | NetviewDM3 | TCP/UDP | 731             | IBM NetView DM           | netviewdm3 | Cisco IOS XE Release 3.1S |
|          | Netwall    | TCP/UDP | 533             | for emergency broadcasts | netwall    | Cisco IOS XE Release 3.1S |
|          | Netware-IP | TCP/UDP | 396             | Novell Netware over IP   | netware-ip | Cisco IOS XE Release 3.1S |
|          | New-RWHO   | TCP/UDP | 550             | new who                  | new-rwho   | Cisco IOS XE Release 3.1S |
|          | NextStep   | TCP/UDP | 178             | NextStep Window Server   | nextstep   | Cisco IOS XE Release 3.1S |
|          | NFS        | TCP/UDP | 2049            | Network File System      | nfs        | Cisco IOS XE Release 3.1S |
|          | NicName    | TCP/UDP | 43              | Who Is                   | nicname    | Cisco IOS XE Release 3.1S |
|          | NI-FTP     | TCP/UDP | 47              | NI FTP                   | ni-ftp     | Cisco IOS XE Release 3.1S |
|          | NI-Mail    | TCP/UDP | 61              | NI MAIL                  | ni-mail    | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol       | Type    | WKP/IP Protocol | Description                               | Syntax        | Cisco IOS XE Release                                  |
|----------|----------------|---------|-----------------|---|---------------|---|
|          | Nlogin         | TCP/UDP | 758             | nlogin                                    | nlogin        | Cisco IOS XE Release 3.1S                             |
|          | NMAP           | TCP/UDP | 689             | nmap                                      | nmap          | Cisco IOS XE Release 3.1S                             |
|          | NMSP           | TCP/UDP | 537             | Networked Media Streaming Protocol        | nmosp         | Cisco IOS XE Release 3.1S                             |
|          | NNSP           | TCP/UDP | 433             | nmsp                                      | nmsp          | Cisco IOS XE Release 3.1S                             |
|          | Notes          | TCP/UDP | 1352            | Lotus Notes(R)                            | notes         | Cisco IOS XE Release 3.1S                             |
|          | NovaStorBackup | TCP/UDP | 308             | Novastor Backup                           | novastorbakup | Cisco IOS XE Release 3.1S                             |
|          | NPMP-GUI       | TCP/UDP | 611             | npmp-gui                                  | npmp-gui      | Cisco IOS XE Release 3.1S                             |
|          | NPMP-Local     | TCP/UDP | 610             | npmp-local                                | npmp-local    | Cisco IOS XE Release 3.1S                             |
|          | NPMP-Trap      | TCP/UDP | 609             | npmp-trap                                 | npmp-trap     | Cisco IOS XE Release 3.1S                             |
|          | NPP            | TCP/UDP | 92              | Network Printing Protocol                 | npp           | Cisco IOS XE Release 3.1S                             |
|          | NQS            | TCP/UDP | 607             | nqs                                       | nqs           | Cisco IOS XE Release 3.1S                             |
|          | NS             | TCP/UDP | 760             | ns  | ns            | Cisco IOS XE Release 3.1S                             |
|          | NSFNET-IGP     | TCP/UDP | 85              | NSFNET-IGP                                | nsfnet-igp    | Cisco IOS XE Release 3.1S                             |
|          | NSIIOPS        | TCP/UDP | 261             | IIO Name Service over TLS/SSL             | nsiiops       | Cisco IOS XE Release 3.1S                             |
|          | NSRMP          | TCP/UDP | 359             | Network Security Risk Management Protocol | nsrmp         | Cisco IOS XE Release 3.1S                             |
|          | NSS-Routing    | TCP/UDP | 159             | NSS-Routing                               | nss-routing   | Cisco IOS XE Release 3.1S                             |
|          | NSW-FE         | TCP/UDP | 27              | NSW User System FE                        | nsw-fe        | Cisco IOS XE Release 3.1S                             |
|          | Ntalk          | TCP/UDP | 518             | Ntalk                                     | ntalk         | Cisco IOS XE Release 3.1S                             |
|          | NTP            | TCP/UDP | 123             | Network Time Protocol                     | ntp           | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                               | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|---|----------------|---------------------------|
|          | NVP-II         | TCP/UDP | 11              | Network Voice Protocol                    | nvp-ii         | Cisco IOS XE Release 3.1S |
|          | NXEdit         | TCP/UDP | 126             | nxedit                                    | nxedit         | Cisco IOS XE Release 3.1S |
|          | OBCBinder      | TCP/UDP | 183             | ocbinder                                  | ocbinder       | Cisco IOS XE Release 3.1S |
|          | OBEX           | TCP/UDP | 650             | obex                                      | obex           | Cisco IOS XE Release 3.1S |
|          | ObjCall        | TCP/UDP | 94              | Tivoli Object Dispatcher                  | objcall        | Cisco IOS XE Release 3.1S |
|          | OCS_AMU        | TCP/UDP | 429             | ocs_amu                                   | ocs_amu        | Cisco IOS XE Release 3.1S |
|          | OCS_CMU        | TCP/UDP | 428             | ocs_cmu                                   | ocs_cmu        | Cisco IOS XE Release 3.1S |
|          | OCServer       | TCP/UDP | 184             | ocserver                                  | ocserver       | Cisco IOS XE Release 3.1S |
|          | ODMR           | TCP/UDP | 366             | odmr                                      | odmr           | Cisco IOS XE Release 3.1S |
|          | OHIMSRV        | TCP/UDP | 506             | ohimsrv                                   | ohimsrv        | Cisco IOS XE Release 3.1S |
|          | OLSR           | TCP/UDP | 698             | olsr                                      | olsr           | Cisco IOS XE Release 3.1S |
|          | OMGInitialRefs | TCP/UDP | 900             | omginitialrefs                            | omginitialrefs | Cisco IOS XE Release 3.1S |
|          | OMServ         | TCP/UDP | 764             | omserv                                    | omserv         | Cisco IOS XE Release 3.1S |
|          | ONMUX          | TCP/UDP | 417             | onmux                                     | onmux          | Cisco IOS XE Release 3.1S |
|          | Opalis-RDV     | TCP/UDP | 536             | Opalis-rdv                                | opalis-rdv     | Cisco IOS XE Release 3.1S |
|          | Opalis-Robot   | TCP/UDP | 314             | Opalis-robot                              | opalis-robot   | Cisco IOS XE Release 3.1S |
|          | OPC-Job-Start  | TCP/UDP | 423             | IBM Operations Planning and Control Start | opc-job-start  | Cisco IOS XE Release 3.1S |
|          | OPC-Job-Track  | TCP/UDP | 424             | IBM Operations Planning and Control Track | opc-job-track  | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                     | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|---------------------------------|----------------|---------------------------|
|          | Openport       | TCP/UDP | 260             | Openport                        | openport       | Cisco IOS XE Release 3.1S |
|          | OpenVMS-Sysipc | TCP/UDP | 557             | Openvms-sysipc                  | openvms-sysipc | Cisco IOS XE Release 3.1S |
|          | OracleNames    | TCP/UDP | 1575            | Oraclenames                     | oraclenames    | Cisco IOS XE Release 3.1S |
|          | OracleNet8CMAN | TCP/UDP | 1630            | Oracle Net8 Cman                | oraclenet8cman | Cisco IOS XE Release 3.1S |
|          | ORA-Srv        | TCP/UDP | 1525            | Oracle TCP/IP Listener          | ora-srv        | Cisco IOS XE Release 3.1S |
|          | Orbix-Config   | TCP/UDP | 3076            | Orbix 2000 Config               | orbix-config   | Cisco IOS XE Release 3.1S |
|          | Orbix-Locator  | TCP/UDP | 3075            | Orbix 2000 Locator              | orbix-locator  | Cisco IOS XE Release 3.1S |
|          | Orbix-Loc-SSL  | TCP/UDP | 3077            | Orbix 2000 Locator SSL          | orbix-loc-ssl  | Cisco IOS XE Release 3.1S |
|          | OSPF           | TCP/UDP | 89              | Open Shortest Path First        | ospf           | Cisco IOS XE Release 3.1S |
|          | OSU-NMS        | TCP/UDP | 192             | OSU Network Monitoring System   | osu-nms        | Cisco IOS XE Release 3.1S |
|          | Parsec-Game    | TCP/UDP | 6582            | Parsec Gameserver               | parsec-game    | Cisco IOS XE Release 3.1S |
|          | Passgo         | TCP/UDP | 511             | Passgo                          | passgo         | Cisco IOS XE Release 3.1S |
|          | Passgo-Tivoli  | TCP/UDP | 627             | Passgo-tivoli                   | passgo-tivoli  | Cisco IOS XE Release 3.1S |
|          | Password-Chg   | TCP/UDP | 586             | Password Change                 | password-chg   | Cisco IOS XE Release 3.1S |
|          | Pawserv        | TCP/UDP | 345             | Perf Analysis Workbench         | pawserv        | Cisco IOS XE Release 3.1S |
|          | PCMail-SRV     | TCP/UDP | 158             | PCMail Server                   | pcmail-srv     | Cisco IOS XE Release 3.1S |
|          | PDAP           | TCP/UDP | 344             | Prospero Data Access Protocol   | pdap           | Cisco IOS XE Release 3.1S |
|          | Personal-link  | TCP/UDP | 281             | Personal-link                   | personal-link  | Cisco IOS XE Release 3.1S |
|          | PFTP           | TCP/UDP | 662             | Parallel File Transfer Protocol | pftp           | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                        | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|------------------------------------|----------------|---------------------------|
|          | PGM            | TCP/UDP | 113             | PGM Reliable Transport Protocol    | pgm            | Cisco IOS XE Release 3.1S |
|          | Philips-VC     | TCP/UDP | 583             | Philips Video-Conferencing         | philips-vc     | Cisco IOS XE Release 3.1S |
|          | Phonebook      | TCP/UDP | 767             | Phone                              | phonebook      | Cisco IOS XE Release 3.1S |
|          | Photuris       | TCP/UDP | 468             | Photuris                           | photuris       | Cisco IOS XE Release 3.1S |
|          | PIM            | TCP/UDP | 103             | Protocol Independent Multicast     | pim            | Cisco IOS XE Release 3.1S |
|          | PIM-RP-DISC    | TCP/UDP | 496             | PIM-RP-DISC                        | pim-rp-disc    | Cisco IOS XE Release 3.1S |
|          | PIP            | TCP/UDP | 1321            | pip                                | pip            | Cisco IOS XE Release 3.1S |
|          | PIPE           | TCP/UDP | 131             | Private IP Encapsulation within IP | pipe           | Cisco IOS XE Release 3.1S |
|          | PIRP           | TCP/UDP | 553             | pirp                               | pirp           | Cisco IOS XE Release 3.1S |
|          | PKIX-3-CA-RA   | TCP/UDP | 829             | PKIX-3 CA/RA                       | pkix-3-ca-ra   | Cisco IOS XE Release 3.1S |
|          | PKIX-Timestamp | TCP/UDP | 318             | pkix-timestamp                     | pkix-timestamp | Cisco IOS XE Release 3.1S |
|          | PNNI           | TCP/UDP | 102             | PNNI over IP                       | pnni           | Cisco IOS XE Release 3.1S |
|          | Pop2           | TCP/UDP | 109             | Post Office Protocol - Version 2   | pop2           | Cisco IOS XE Release 3.1S |
|          | Pop3           | TCP/UDP | 110, Heuristic  | Post Office Protocol 3             | pop3           | Cisco IOS XE Release 3.1S |
|          | POV-Ray        | TCP/UDP | 494             | pov-ray                            | pov-ray        | Cisco IOS XE Release 3.1S |
|          | Powerburst     | TCP/UDP | 485             | Air Soft Power Burst               | powerburst     | Cisco IOS XE Release 3.1S |
|          | PPStream       | TCP/UDP | Heuristic       | P2P TV Application                 | ppstream       | Cisco IOS XE Release 3.3S |
|          | PPTP           | TCP/UDP | 1723            | Point-to-Point Tunneling Protocol  | pptp           | Cisco IOS XE Release 3.1S |
|          |                |         |                 |                                    |                |                           |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol       | Type    | WKP/IP Protocol | Description                        | Syntax         | Cisco IOS XE Release                                  |
|----------|----------------|---------|-----------------|------------------------------------|----------------|---|
|          | Printer        | TCP/UDP | 515             | spooler                            | printer        | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |
|          | Print-SRV      | TCP/UDP | 170             | Network PostScript                 | print-srv      | Cisco IOS XE Release 3.1S                             |
|          | PRM            | TCP/UDP | 21              | Packet Radio Measurement           | prm            | Cisco IOS XE Release 3.1S                             |
|          | PRM-NM         | TCP/UDP | 409             | Prospero Resource Manager Node Man | prm-nm         | Cisco IOS XE Release 3.1S                             |
|          | PRM-SM         | TCP/UDP | 408             | Prospero Resource Manager Sys. Man | prm-sm         | Cisco IOS XE Release 3.1S                             |
|          | Profile        | TCP/UDP | 136             | PROFILE Naming System              | profile        | Cisco IOS XE Release 3.1S                             |
|          | Prospero       | TCP/UDP | 191             | Prosper Directory Service          | prospero       | Cisco IOS XE Release 3.1S                             |
|          | PTCNameService | TCP/UDP | 597             | PTC Name Service                   | ptcnameservice | Cisco IOS XE Release 3.1S                             |
|          | PTP            | TCP/UDP | 123             | Performance Transparency Protocol  | ptp            | Cisco IOS XE Release 3.1S                             |
|          | PTP-Event      | TCP/UDP | 319             | PTP Event                          | ptp-event      | Cisco IOS XE Release 3.1S                             |
|          | PTP-General    | TCP/UDP | 320             | PTP General                        | ptp-general    | Cisco IOS XE Release 3.1S                             |
|          | Pump           | TCP/UDP | 751             | Pump                               | pump           | Cisco IOS XE Release 3.1S                             |
|          | PUP            | TCP/UDP | 12              | PUP                                | pup            | Cisco IOS XE Release 3.1S                             |
|          | Purenoise      | TCP/UDP | 663             | purenoise                          | purenoise      | Cisco IOS XE Release 3.1S                             |
|          | PVP            | TCP/UDP | 75              | Packet Video Protocol              | pvp            | Cisco IOS XE Release 3.1S                             |
|          | PWDGen         | TCP/UDP | 129             | Password Generator Protocol        | pwdgen         | Cisco IOS XE Release 3.1S                             |
|          | QBIKGDP        | TCP/UDP | 368             | qbikgdp                            | qbikgdp        | Cisco IOS XE Release 3.1S                             |
|          | QFT            | TCP/UDP | 189             | Queued File Transport              | qft            | Cisco IOS XE Release 3.1S                             |
|          | QMQP           | TCP/UDP | 628             | qmqp                               | qmqp           | Cisco IOS XE Release 3.1S                             |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol     | Type    | WKP/IP Protocol | Description                      | Syntax       | Cisco IOS XE Release                                  |
|----------|--------------|---------|-----------------|----------------------------------|--------------|---|
|          | QMTP         | TCP/UDP | 209             | The Quick Mail Transfer Protocol | qmtp         | Cisco IOS XE Release 3.1S                             |
|          | QNX          | TCP/UDP | 106             | QNX                              | qnx          | Cisco IOS XE Release 3.1S                             |
|          | QoTD         | TCP/UDP | 17              | Quote of the Day                 | qotd         | Cisco IOS XE Release 3.1S                             |
|          | QRH          | TCP/UDP | 752             | qrh                              | qrh          | Cisco IOS XE Release 3.1S                             |
|          | QUOTD        | TCP/UDP | 762             | quotad                           | quotad       | Cisco IOS XE Release 3.1S                             |
|          | RAP          | TCP/UDP | 38              | Route Access Protocol            | rap          | Cisco IOS XE Release 3.1S                             |
|          | RCMD         | TCP     | 512-514         | BSD r-commands                   | rcmd         | Cisco IOS XE Release 3.3S                             |
|          | RCP          | TCP/UDP | 469             | Radio Control Protocol           | rcp          | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |
|          | RDA          | TCP/UDP | 630             | rda                              | rda          | Cisco IOS XE Release 3.1S                             |
|          | RDB-DBS-DISP | TCP/UDP | 1571            | Oracle Remote Data Base          | rdb-dbs-disp | Cisco IOS XE Release 3.1S                             |
|          | RDP          | TCP/UDP | 27              | Reliable Data Protocol           | rdp          | Cisco IOS XE Release 3.1S                             |
|          | Realm-RUSD   | TCP/UDP | 688             | ApplianceWare managment protocol | realm-rusd   | Cisco IOS XE Release 3.1S                             |
|          | RE-Mail-CK   | TCP/UDP | 50              | Remote Mail Checking Protocol    | re-mail-ck   | Cisco IOS XE Release 3.1S                             |
|          | RemoteFS     | TCP/UDP | 556             | rfs server                       | remotefs     | Cisco IOS XE Release 3.1S                             |
|          | Remote-KIS   | TCP/UDP | 185             | Remote-kis                       | remote-kis   | Cisco IOS XE Release 3.1S                             |
|          | REPCMD       | TCP/UDP | 641             | repcmd                           | repcmd       | Cisco IOS XE Release 3.1S                             |
|          | REPCMD       | TCP/UDP | 653             | repscmd                          | repscmd      | Cisco IOS XE Release 3.1S                             |
|          | RESCAP       | TCP/UDP | 283             | rescap                           | rescap       | Cisco IOS XE Release 3.1S                             |
|          | RIP          | TCP/UDP | 520             | Routing Information Protocol     | rip          | Cisco IOS XE Release 3.1S                             |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol        | Type    | WKP/IP Protocol | Description                       | Syntax          | Cisco IOS XE Release                                  |
|----------|-----------------|---------|-----------------|-----------------------------------|-----------------|---|
|          | RIPING          | TCP/UDP | 521             | ripng                             | ripng           | Cisco IOS XE Release 3.1S                             |
|          | RIS             | TCP/UDP | 180             | Intergraph                        | ris             | Cisco IOS XE Release 3.1S                             |
|          | RIS-CM          | TCP/UDP | 748             | Russell Info Sci Calendar Manager | ris-cm          | Cisco IOS XE Release 3.1S                             |
|          | RJE             | TCP/UDP | 5               | Remote Job Entry                  | rje             | Cisco IOS XE Release 3.1S                             |
|          | RLP             | TCP/UDP | 39              | Resource Location Protocol        | rlp             | Cisco IOS XE Release 3.1S                             |
|          | RLZDBASE        | TCP/UDP | 635             | rlzdbase                          | rlzdbase        | Cisco IOS XE Release 3.1S                             |
|          | RMC             | TCP/UDP | 657             | rmc                               | rmc             | Cisco IOS XE Release 3.1S                             |
|          | RMIActivation   | TCP/UDP | 1098            | rmiactivation                     | rmiactivation   | Cisco IOS XE Release 3.1S                             |
|          | RMIRegistry     | TCP/UDP | 1099            | rmiregistry                       | rmiregistry     | Cisco IOS XE Release 3.1S                             |
|          | RMonitor        | TCP/UDP | 560             | Rmonitord                         | rmonitor        | Cisco IOS XE Release 3.1S                             |
|          | RMT             | TCP/UDP | 411             | Remote MT Protocol                | rmt             | Cisco IOS XE Release 3.1S                             |
|          | RPC2Portmap     | TCP/UDP | 369             | rpc2portmap                       | rpc2portmap     | Cisco IOS XE Release 3.1S                             |
|          | RRH             | TCP/UDP | 753             | rrh                               | rrh             | Cisco IOS XE Release 3.1S                             |
|          | RRP             | TCP/UDP | 648             | Registry Registrar Protocol       | rrp             | Cisco IOS XE Release 3.1S                             |
|          | RSH-SPX         | TCP/UDP | 222             | Berkeley rshd with SPX auth       | rsh-spx         | Cisco IOS XE Release 3.1S                             |
|          | RSVD            | TCP/UDP | 168             | rsvd                              | rsvd            | Cisco IOS XE Release 3.1S                             |
|          | RSVP_Tunnel     | TCP/UDP | 363             | rsvp_tunnel                       | rsvp_tunnel     | Cisco IOS XE Release 3.1S                             |
|          | RSVP-E2E-Ignore | TCP/UDP | 134             | RSVP-E2E-IGNORE                   | rsvp-e2e-ignore | Cisco IOS XE Release 3.1S                             |
|          | Rsync           | TCP/UDP | 873             | Rsync                             | rsync           | Cisco IOS XE Release 3.1S                             |
|          | RTelnet         | TCP/UDP | 107             | Remote Telnet Service             | rtelnet         | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol       | Type    | WKP/IP Protocol | Description                            | Syntax          | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|--|-----------------|---------------------------|
|          | RTIP           | TCP/UDP | 771             | rtip                                   | rtip            | Cisco IOS XE Release 3.1S |
|          | RTSPS          | TCP/UDP | 322             | RTSPS                                  | rtsp            | Cisco IOS XE Release 3.1S |
|          | Rushd          | TCP/UDP | 696             | Rushd                                  | rushd           | Cisco IOS XE Release 3.1S |
|          | RVD            | TCP/UDP | 66              | MIT Remote Virtual Disk Protocol       | rvd             | Cisco IOS XE Release 3.1S |
|          | RXE            | TCP/UDP | 761             | rx                                     | rx              | Cisco IOS XE Release 3.1S |
|          | SAFT           | TCP/UDP | 487             | saft Simple Asynchronous File Transfer | saft            | Cisco IOS XE Release 3.1S |
|          | Sanity         | TCP/UDP | 643             | Sanity                                 | sanity          | Cisco IOS XE Release 3.1S |
|          | SAT-EXPAK      | TCP/UDP | 64              | SATNET and Backroom EXPAK              | sat-expak       | Cisco IOS XE Release 3.1S |
|          | SAT-Mon        | TCP/UDP | 69              | SATNET Monitoring                      | sat-mon         | Cisco IOS XE Release 3.1S |
|          | SCC-Security   | TCP/UDP | 582             | scc-security                           | scc-security    | Cisco IOS XE Release 3.1S |
|          | SCC-SP         | TCP/UDP | 96              | Semaphore Communications Sec. Pro.     | scc-sp          | Cisco IOS XE Release 3.1S |
|          | SCO-DTMgr      | TCP/UDP | 617             | SCO Desktop Administration Server      | sco-dtmgr       | Cisco IOS XE Release 3.1S |
|          | SCOHELP        | TCP/UDP | 457             | scohelp                                | scohelp         | Cisco IOS XE Release 3.1S |
|          | SCOI2ODialog   | TCP/UDP | 360             | scoi2odialog                           | scoi2odialog    | Cisco IOS XE Release 3.1S |
|          | SCO-Inetmgr    | TCP/UDP | 615             | Internet Configuration Manager         | sco-inetmgr     | Cisco IOS XE Release 3.1S |
|          | SCO-SysMgr     | TCP/UDP | 616             | SCO System Administration Server       | sco-sysmgr      | Cisco IOS XE Release 3.1S |
|          | SCO-WebsrvrMg3 | TCP/UDP | 598             | SCO Web Server Manager 3               | sco-websrvr mg3 | Cisco IOS XE Release 3.1S |
|          | SCO-WebsrvrMgr | TCP/UDP | 620             | SCO WebServer Manager                  | sco-websrvr mgr | Cisco IOS XE Release 3.1S |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol      | Type    | WKP/IP Protocol | Description                           | Syntax        | Cisco IOS XE Release      |
|----------|---------------|---------|-----------------|---------------------------------------|---------------|---------------------------|
|          | SCPS          | TCP/UDP | 105             | SCPS                                  | scps          | Cisco IOS XE Release 3.1S |
|          | SCTP          | TCP/UDP | 132             | Stream Control Transmission Protocol  | sctp          | Cisco IOS XE Release 3.1S |
|          | SCX-Proxy     | TCP/UDP | 470             | scx-proxy                             | scx-proxy     | Cisco IOS XE Release 3.1S |
|          | SDNSKMP       | TCP/UDP | 558             | SDNSKMP                               | sdnskmp       | Cisco IOS XE Release 3.1S |
|          | SDRP          | TCP/UDP | 42              | Source Demand Routing Protocol        | sdrp          | Cisco IOS XE Release 3.1S |
|          | Secure-ftp    | TCP/UDP | 990             | ftp protocol, control, over TLS/SSL   | secure-ftp    | Cisco IOS XE Release 3.1S |
|          | Secure-IRC    | TCP/UDP | 994             | irc protocol over TLS                 | secure-irc    | Cisco IOS XE Release 3.1S |
|          | Secure-LDAP   | TCP/UDP | 636             | ldap protocol over TLS                | secure-ldap   | Cisco IOS XE Release 3.1S |
|          | Secure-NNTP   | TCP/UDP | 563             | nntp protocol over TLS                | secure-nntp   | Cisco IOS XE Release 3.1S |
|          | Secure-Pop3   | TCP/UDP | 995             | pop3 protocol over TLS                | secure-pop3   | Cisco IOS XE Release 3.1S |
|          | Secure-Telnet | TCP/UDP | 992             | telnet protocol over TLS              | secure-telnet | Cisco IOS XE Release 3.1S |
|          | Secure-VMTP   | TCP/UDP | 82              | SECURE-VMTP                           | secure-vmtp   | Cisco IOS XE Release 3.1S |
|          | Semantix      | TCP/UDP | 361             | Semantix                              | semantix      | Cisco IOS XE Release 3.1S |
|          | Send          | TCP/UDP | 169             | SEND                                  | send          | Cisco IOS XE Release 3.1S |
|          | Server-IPX    | TCP/UDP | 213             | Internetwork Packet Exchange Protocol | server-ipx    | Cisco IOS XE Release 3.1S |
|          | Servstat      | TCP/UDP | 633             | Service Status update                 | servstat      | Cisco IOS XE Release 3.1S |
|          | SET           | TCP/UDP | 257             | Secure Electronic Transaction         | set           | Cisco IOS XE Release 3.1S |
|          | SFS-Config    | TCP/UDP | 452             | Cray SFS config server                | sfs-config    | Cisco IOS XE Release 3.1S |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol     | Type    | WKP/IP Protocol | Description                                | Syntax       | Cisco IOS XE Release      |
|----------|--------------|---------|-----------------|--|--------------|---------------------------|
|          | SFS-SMP-Net  | TCP/UDP | 451             | Cray Network Semaphore server              | sfs-smp-net  | Cisco IOS XE Release 3.1S |
|          | SFTP         | TCP/UDP | 115             | Simple File Transfer Protocol              | sftp         | Cisco IOS XE Release 3.1S |
|          | SGCP         | TCP/UDP | 440             | sgcp                                       | sgcp         | Cisco IOS XE Release 3.1S |
|          | SGMP         | TCP/UDP | 153             | sgmp                                       | sgmp         | Cisco IOS XE Release 3.1S |
|          | SGMP-Traps   | TCP/UDP | 160             | sgmp-traps                                 | sgmp-traps   | Cisco IOS XE Release 3.1S |
|          | Shockwave    | TCP/UDP | 1626            | Shockwave                                  | shockwave    | Cisco IOS XE Release 3.1S |
|          | Shrinkwrap   | TCP/UDP | 358             | Shrinkwrap                                 | shrinkwrap   | Cisco IOS XE Release 3.1S |
|          | SIAM         | TCP/UDP | 498             | siam                                       | siam         | Cisco IOS XE Release 3.1S |
|          | SIFT-UFT     | TCP/UDP | 608             | Sender-Initiated/Unsolicited File Transfer | sift-uft     | Cisco IOS XE Release 3.1S |
|          | SILC         | TCP/UDP | 706             | silc                                       | silc         | Cisco IOS XE Release 3.1S |
|          | SitaraDir    | TCP/UDP | 2631            | Sitaradir                                  | sitaradir    | Cisco IOS XE Release 3.1S |
|          | SitaraMgmt   | TCP/UDP | 2630            | Sitarangmt                                 | sitarangmt   | Cisco IOS XE Release 3.1S |
|          | Sitaraserver | TCP/UDP | 2629            | sitaraserver                               | sitaraserver | Cisco IOS XE Release 3.1S |
|          | SKIP         | TCP/UDP | 57              | SKIP                                       | skip         | Cisco IOS XE Release 3.1S |
|          | SKRONK       | TCP/UDP | 460             | skronk                                     | skronk       | Cisco IOS XE Release 3.1S |
|          | SM           | TCP/UDP | 122             | SM   | sm           | Cisco IOS XE Release 3.1S |
|          | Smakynet     | TCP/UDP | 122             | Smakynet                                   | smakynet     | Cisco IOS XE Release 3.1S |
|          | SmartSDP     | TCP/UDP | 426             | Smartsdp                                   | smartsdp     | Cisco IOS XE Release 3.1S |
|          | SMP          | TCP/UDP | 121             | Simple Message Protocol                    | smp          | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol       | Type    | WKP/IP Protocol | Description                          | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|--------------------------------------|----------------|---------------------------|
|          | SMPNameRes     | TCP/UDP | 901             | smpnameres                           | smpnameres     | Cisco IOS XE Release 3.1S |
|          | SMSD           | TCP/UDP | 596             | smsd                                 | smsd           | Cisco IOS XE Release 3.1S |
|          | SMSP           | TCP/UDP | 413             | Storage Management Services Protocol | smsp           | Cisco IOS XE Release 3.1S |
|          | SMUX           | TCP/UDP | 199             | SMUX                                 | smux           | Cisco IOS XE Release 3.1S |
|          | SNAGas         | TCP/UDP | 108             | SNA Gateway Access Server            | snagas         | Cisco IOS XE Release 3.1S |
|          | Snare          | TCP/UDP | 509             | Snare                                | snare          | Cisco IOS XE Release 3.1S |
|          | S-Net          | TCP/UDP | 166             | Sirius Systems                       | s-net          | Cisco IOS XE Release 3.1S |
|          | SNP            | TCP/UDP | 109             | Sitara Networks Protocol             | snp            | Cisco IOS XE Release 3.1S |
|          | SNPP           | TCP/UDP | 444             | Simple Network Paging Protocol       | snpp           | Cisco IOS XE Release 3.1S |
|          | SNTP-Heartbeat | TCP/UDP | 580             | SNTP HEARTBEAT                       | sntp-heartbeat | Cisco IOS XE Release 3.1S |
|          | SoftPC         | TCP/UDP | 215             | Insignia Solutions                   | softpc         | Cisco IOS XE Release 3.1S |
|          | Sonar          | TCP/UDP | 572             | Sonar                                | sonar          | Cisco IOS XE Release 3.1S |
|          | SPMP           | TCP/UDP | 656             | spmp                                 | spmp           | Cisco IOS XE Release 3.1S |
|          | Sprite-RPC     | TCP/UDP | 90              | Sprite RPC Protocol                  | sprite-rpc     | Cisco IOS XE Release 3.1S |
|          | SPS            | TCP/UDP | 130             | Secure Packet Shield                 | sps            | Cisco IOS XE Release 3.1S |
|          | SPSC           | TCP/UDP | 478             | spsc                                 | spsc           | Cisco IOS XE Release 3.1S |
|          | SQL*Net        | TCP/UDP | 66              | Oracle SQL*NET                       | sql*net        | Cisco IOS XE Release 3.1S |
|          | SQLExec        | TCP/UDP | 9088            | SQL Informix                         | sqlexec        | Cisco IOS XE Release 3.1S |
|          | SQL-Net        | TCP/UDP | 150             | SQL-NET                              | sql-net        | Cisco IOS XE Release 3.1S |
|          |                |         |                 |                                      |                |                           |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol   | Type    | WKP/IP Protocol | Description                       | Syntax     | Cisco IOS XE Release      |
|----------|------------|---------|-----------------|-----------------------------------|------------|---------------------------|
|          | SQLServ    | TCP/UDP | 118             | SQL Services                      | sqlserv    | Cisco IOS XE Release 3.1S |
|          | SQLServer  | TCP/UDP | 1433            | Microsoft-SQL-Server              | sqlserver  | Cisco IOS XE Release 3.1S |
|          | SRC        | TCP/UDP | 200             | IBM System Resource Controller    | src        | Cisco IOS XE Release 3.1S |
|          | SRMP       | TCP/UDP | 193             | Spider Remote Monitoring Protocol | srmpp      | Cisco IOS XE Release 3.1S |
|          | SRP        | TCP/UDP | 119             | SpectraLink Radio Protocol        | srp        | Cisco IOS XE Release 3.1S |
|          | SRSSend    | TCP/UDP | 362             | srssend                           | srssend    | Cisco IOS XE Release 3.1S |
|          | SS7NS      | TCP/UDP | 477             | ss7ns                             | ss7ns      | Cisco IOS XE Release 3.1S |
|          | SSCOPMCE   | TCP/UDP | 128             | SSCOPMCE                          | sscopmce   | Cisco IOS XE Release 3.1S |
|          | SSH        | TCP/UDP | 22              | Secure Shell Protocol             | ssh        | Cisco IOS XE Release 3.1S |
|          | Sshell     | TCP/UDP | 614             | SSLshell                          | sshell     | Cisco IOS XE Release 3.1S |
|          | SST        | TCP/UDP | 266             | SCSI on ST                        | sst        | Cisco IOS XE Release 3.1S |
|          | ST         | TCP/UDP | 5               | Stream                            | st         | Cisco IOS XE Release 3.1S |
|          | StatSRV    | TCP/UDP | 133             | Statistics Service                | statsrv    | Cisco IOS XE Release 3.1S |
|          | STMF       | TCP/UDP | 501             | stmf                              | stmf       | Cisco IOS XE Release 3.1S |
|          | STP        | TCP/UDP | 118             | Schedule Transfer Protocol        | stp        | Cisco IOS XE Release 3.1S |
|          | StreetTalk | TCP/UDP | 566             | Streetwork                        | streettalk | Cisco IOS XE Release 3.1S |
|          | Stun-NAT   | TCP/UDP | 3478            | STUN                              | stun-nat   | Cisco IOS XE Release 3.1S |
|          | STX        | TCP/UDP | 527             | Stock Exchange                    | stx        | Cisco IOS XE Release 3.1S |
|          | Submission | TCP/UDP | 587             | Submission                        | submission | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol        | Type    | WKP/IP Protocol | Description                                      | Syntax          | Cisco IOS XE Release                                  |
|----------|-----------------|---------|-----------------|--|-----------------|---|
|          | Subntbcest_TFTP | TCP/UDP | 247             | subntbcest_tftp                                  | subntbcest_tftp | Cisco IOS XE Release 3.1S                             |
|          | SU-MIT-TG       | TCP/UDP | 89              | SU/MIT Telnet Gateway                            | su-mit-tg       | Cisco IOS XE Release 3.1S                             |
|          | Sun-DR          | TCP/UDP | 665             | sun-dr   | sun-dr          | Cisco IOS XE Release 3.1S                             |
|          | Sun-ND          | TCP/UDP | 77              | SUN ND PROTOCOL-Temporary                        | sun-nd          | Cisco IOS XE Release 3.1S                             |
|          | SupDup          | TCP/UDP | 95              | SUPDUP   | supdup          | Cisco IOS XE Release 3.1S                             |
|          | Surf            | TCP/UDP | 1010            | Surf   | surf            | Cisco IOS XE Release 3.1S                             |
|          | Sur-Meas        | TCP/UDP | 243             | Survey Measurement                               | sur-meas        | Cisco IOS XE Release 3.1S                             |
|          | Svrloc          | TCP/UDP | 427             | Server Location                                  | svrloc          | Cisco IOS XE Release 3.1S                             |
|          | Swift-RVF       | TCP/UDP | 97              | Swift Remote Virtual File Protocol               | swift-rvf       | Cisco IOS XE Release 3.1S                             |
|          | Swipe           | TCP/UDP | 53              | IP with Encryption                               | swipe           | Cisco IOS XE Release 3.1S                             |
|          | Synoptics-Trap  | TCP/UDP | 412             | Trap Convention Port                             | synoptics-trap  | Cisco IOS XE Release 3.1S                             |
|          | Synotics-Broker | TCP/UDP | 392             | SynOptics Port Broker Port                       | synotics-broker | Cisco IOS XE Release 3.1S                             |
|          | Synotics-Relay  | TCP/UDP | 391             | SynOptics SNMP Relay Port                        | synotics-relay  | Cisco IOS XE Release 3.1S                             |
|          | Systat          | TCP/UDP | 11              | Active Users                                     | systat          | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |
|          | TACACS          | TCP/UDP | 49, 65          | Terminal Access Controller Access Control System | tacacs          | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |
|          | TAC News        | TCP/UDP | 98              | TAC News   | tacnews         | Cisco IOS XE Release 3.1S                             |
|          | Talk            | TCP/UDP | 517             | Talk   | talk            | Cisco IOS XE Release 3.1S                             |
|          | TCF             | TCP/UDP | 87              | TCF  | tcf             | Cisco IOS XE Release 3.1S                             |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol   | Type    | WKP/IP Protocol | Description                               | Syntax     | Cisco IOS XE Release                                  |
|----------|------------|---------|-----------------|---|------------|---|
|          | TD-Replica | TCP/UDP | 268             | Tobit David Replica                       | td-replica | Cisco IOS XE Release 3.1S                             |
|          | TD-Service | TCP/UDP | 267             | Tobit David Service Layer                 | td-service | Cisco IOS XE Release 3.1S                             |
|          | Teedtap    | TCP/UDP | 559             | Teedtap                                   | teedtap    | Cisco IOS XE Release 3.1S                             |
|          | Tell       | TCP/UDP | 754             | Send                                      | tell       | Cisco IOS XE Release 3.1S                             |
|          | Telnet     | TCP/UDP | 23              | Telnet                                    | telnet     | Cisco IOS XE Release 3.1S                             |
|          | Tempo      | TCP/UDP | 526             | newdate                                   | tempo      | Cisco IOS XE Release 3.1S                             |
|          | Tenfold    | TCP/UDP | 658             | Tenfold                                   | tenfold    | Cisco IOS XE Release 3.1S                             |
|          | Texar      | TCP/UDP | 333             | Texar Security Port                       | texar      | Cisco IOS XE Release 3.1S                             |
|          | TICF-1     | TCP/UDP | 492             | Transport Independent Convergence for FNA | ticf-1     | Cisco IOS XE Release 3.1S                             |
|          | TICF-2     | TCP/UDP | 493             | Transport Independent Convergence for FNA | ticf-2     | Cisco IOS XE Release 3.1S                             |
|          | Timbuktu   | TCP/UDP | 407             | Timbuktu                                  | timbuktu   | Cisco IOS XE Release 3.1S                             |
|          | Time       | TCP/UDP | 37              | Time                                      | time       | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |
|          | Timed      | TCP/UDP | 525             | Timeserver                                | timed      | Cisco IOS XE Release 3.1S                             |
|          | TINC       | TCP/UDP | 655             | tinc                                      | tinc       | Cisco IOS XE Release 3.1S                             |
|          | TLISRV     | TCP/UDP | 1527            | Oracle                                    | tlisrv     | Cisco IOS XE Release 3.1S                             |
|          | TLSP       | TCP/UDP | 56              | Transport Layer Security Protocol         | tlsp       | Cisco IOS XE Release 3.1S                             |
|          | TNETOS     | TCP/UDP | 377             | NEC Corporation                           | tnETOS     | Cisco IOS XE Release 3.1S                             |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol    | Type    | WKP/IP Protocol | Description                                       | Syntax      | Cisco IOS XE Release      |
|----------|-------------|---------|-----------------|---|-------------|---------------------------|
|          | TNS-CML     | TCP/UDP | 590             | tns-cml   | tns-cml     | Cisco IOS XE Release 3.1S |
|          | TN-TL-FD1   | TCP/UDP | 476             | tn-tl-fd1   | tn-tl-fd1   | Cisco IOS XE Release 3.1S |
|          | TP++        | TCP/UDP | 39              | TP++ Transport Protocol                           | tp++        | Cisco IOS XE Release 3.1S |
|          | TPIP        | TCP/UDP | 594             | tpip  | tpip        | Cisco IOS XE Release 3.1S |
|          | Trunk-1     | TCP/UDP | 23              | Trunk-1   | trunk-1     | Cisco IOS XE Release 3.1S |
|          | Trunk-2     | TCP/UDP | 24              | Trunk-2   | trunk-2     | Cisco IOS XE Release 3.1S |
|          | TServer     | TCP/UDP | 450             | Computer Supported Telecommunication Applications | tserver     | Cisco IOS XE Release 3.1S |
|          | TTP         | TCP/UDP | 84              | TTP   | ttp         | Cisco IOS XE Release 3.1S |
|          | UAAC        | TCP/UDP | 145             | UAAC Protocol                                     | uaac        | Cisco IOS XE Release 3.1S |
|          | UARPs       | TCP/UDP | 219             | Unisys ARPs                                       | uarps       | Cisco IOS XE Release 3.1S |
|          | UDPLite     | TCP/UDP | 136             | UDPLite   | udplite     | Cisco IOS XE Release 3.1S |
|          | UIS         | TCP/UDP | 390             | uis   | uis         | Cisco IOS XE Release 3.1S |
|          | uLISTProc   | TCP/UDP | 372             | List Processor                                    | ulistproc   | Cisco IOS XE Release 3.1S |
|          | ULP         | TCP/UDP | 522             | ulp   | ulp         | Cisco IOS XE Release 3.1S |
|          | ULPNet      | TCP/UDP | 483             | ulpnet  | ulpnet      | Cisco IOS XE Release 3.1S |
|          | Unidata-LDM | TCP/UDP | 388             | Unidata LDM                                       | unidata-ldm | Cisco IOS XE Release 3.1S |
|          | Unify       | TCP/UDP | 181             | Unify   | unify       | Cisco IOS XE Release 3.1S |
|          | UPS         | TCP/UDP | 401             | Uninterruptible Power Supply                      | ups         | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol    | Type    | WKP/IP Protocol  | Description                             | Syntax      | Cisco IOS XE Release      |
|----------|-------------|---------|------------------|---|-------------|---------------------------|
|          | URM         | TCP/UDP | 606              | Cray Unified Resource Manager           | urm         | Cisco IOS XE Release 3.1S |
|          | UTI         | TCP/UDP | 120              | UTI                                     | uti         | Cisco IOS XE Release 3.1S |
|          | Utime       | TCP/UDP | 519              | Unixtime                                | utime       | Cisco IOS XE Release 3.1S |
|          | UTMPCD      | TCP/UDP | 431              | utmpcd                                  | utmpcd      | Cisco IOS XE Release 3.1S |
|          | UTMPSD      | TCP/UDP | 430              | utmpsd                                  | utmpsd      | Cisco IOS XE Release 3.1S |
|          | UUCP        | TCP/UDP | 540              | uucpd                                   | uucp        | Cisco IOS XE Release 3.1S |
|          | UUCP-Path   | TCP/UDP | 117              | UUCP Path Service                       | uucp-path   | Cisco IOS XE Release 3.1S |
|          | UUCP-rLogin | TCP/UDP | 541              | uucp-rlogin                             | uucp-rlogin | Cisco IOS XE Release 3.1S |
|          | UUIDGEN     | TCP/UDP | 697              | UUIDGEN                                 | uuidgen     | Cisco IOS XE Release 3.1S |
|          | VACDSM-App  | TCP/UDP | 671              | VACDSM-APP                              | vacdsm-app  | Cisco IOS XE Release 3.1S |
|          | VACDSM-SWS  | TCP/UDP | 670              | VACDSM-SWS                              | vacdsm-sws  | Cisco IOS XE Release 3.1S |
|          | VATP        | TCP/UDP | 690              | Velazquez Application Transfer Protocol | vatp        | Cisco IOS XE Release 3.1S |
|          | VEMMI       | TCP/UDP | 575              | vemmi                                   | vemmi       | Cisco IOS XE Release 3.1S |
|          | VID         | TCP/UDP | 769              | vid                                     | vid         | Cisco IOS XE Release 3.1S |
|          | Videotex    | TCP/UDP | 516              | videotex                                | videotex    | Cisco IOS XE Release 3.1S |
|          | VISA        | TCP/UDP | 70               | VISA Protocol                           | visa        | Cisco IOS XE Release 3.1S |
|          | VNC         | TCP/UDP | 5800, 5900, 5901 | Virtual Network Computing               | vnc         | Cisco IOS XE Release 2.3  |
|          | VMNet       | TCP/UDP | 175              | vmnet                                   | vmnet       | Cisco IOS XE Release 3.1S |
|          | VMPWCS      | TCP/UDP | 214              | vmpwscs                                 | vmpwscs     | Cisco IOS XE Release 3.1S |
|          | VMTP        | TCP/UDP | 81               | VMTP                                    | vmtp        | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol       | Type    | WKP/IP Protocol | Description                               | Syntax         | Cisco IOS XE Release      |
|----------|----------------|---------|-----------------|---|----------------|---------------------------|
|          | VNAS           | TCP/UDP | 577             | vnas                                      | vnas           | Cisco IOS XE Release 3.1S |
|          | VPP            | TCP/UDP | 677             | Virtual Presence Protocol                 | vpp            | Cisco IOS XE Release 3.1S |
|          | VPPS-QUA       | TCP/UDP | 672             | vpps-qua                                  | vpps-qua       | Cisco IOS XE Release 3.1S |
|          | VPPS-VIA       | TCP/UDP | 676             | vpps-via                                  | vpps-via       | Cisco IOS XE Release 3.1S |
|          | VRRP           | TCP/UDP | 112             | Virtual Router Redundancy Protocol        | vrrp           | Cisco IOS XE Release 3.1S |
|          | VSINet         | TCP/UDP | 996             | vsinet                                    | vsinet         | Cisco IOS XE Release 3.1S |
|          | VSLMP          | TCP/UDP | 312             | vslmp                                     | vslmp          | Cisco IOS XE Release 3.1S |
|          | WAP-Push       | TCP/UDP | 2948            | WAP PUSH                                  | wap-push       | Cisco IOS XE Release 3.1S |
|          | WAP-Push-HTTP  | TCP/UDP | 4035            | WAP Push OTA-HTTP port                    | wap-push-htp   | Cisco IOS XE Release 3.1S |
|          | WAP-Push-HTTPS | TCP/UDP | 4036            | WAP Push OTA-HTTP secure                  | wap-push-https | Cisco IOS XE Release 3.1S |
|          | WAP-Pushsecure | TCP/UDP | 2949            | WAP PUSH SECURE                           | wap-pushsecure | Cisco IOS XE Release 3.1S |
|          | WAP-VACL-S     | TCP/UDP | 9207            | WAP vCal Secure                           | wap-vcal-s     | Cisco IOS XE Release 3.1S |
|          | WAP-VCAL       | TCP/UDP | 9205            | WAP vCal                                  | wap-vcal       | Cisco IOS XE Release 3.1S |
|          | WAP-VCARD      | TCP/UDP | 9204            | WAP vCard                                 | wap-vcard      | Cisco IOS XE Release 3.1S |
|          | WAP-VCARD-S    | TCP/UDP | 9206            | WAP vCard Secure                          | wap-vcard-s    | Cisco IOS XE Release 3.1S |
|          | WAP-WSP        | TCP/UDP | 9200            | WAP connectionless session service        | wap-wsp        | Cisco IOS XE Release 3.1S |
|          | WAP-WSP-S      | TCP/UDP | 9202            | WAP secure connectionless session service | wap-wsp-s      | Cisco IOS XE Release 3.1S |
|          | WAP-WSP-WTP    | TCP/UDP | 9201            | WAP session service                       | wap-wsp-wtp    | Cisco IOS XE Release 3.1S |
|          | WAP-WSP-WTP-S  | TCP/UDP | 9203            | WAP secure session service                | wap-wsp-wtp-s  | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol    | Type    | WKP/IP Protocol | Description                        | Syntax      | Cisco IOS XE Release                                  |
|----------|-------------|---------|-----------------|------------------------------------|-------------|---|
|          | WB-Expak    | TCP/UDP | 79              | WIDEBAND EXPAK                     | wb-expak    | Cisco IOS XE Release 3.1S                             |
|          | WB-Mon      | TCP/UDP | 78              | WIDEBAND Monitoring                | wb-mon      | Cisco IOS XE Release 3.1S                             |
|          | Webster     | TCP/UDP | 765             | Webster                            | webster     | Cisco IOS XE Release 3.1S                             |
|          | WhoAmI      | TCP/UDP | 565             | whoami                             | whoami      | Cisco IOS XE Release 3.1S                             |
|          | Whois++     | TCP/UDP | 63              | whois++ Service                    | whois++     | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |
|          | WorldFusion | TCP/UDP | 2595            | World Fusion                       | worldfusion | Cisco IOS XE Release 3.1S                             |
|          | WPGS        | TCP/UDP | 780             | wpgs                               | wpgs        | Cisco IOS XE Release 3.1S                             |
|          | WSN         | TCP/UDP | 74              | Wang Span Network                  | wsn         | Cisco IOS XE Release 3.1S                             |
|          | XAct-Backup | TCP/UDP | 911             | Xact-backup                        | xact-backup | Cisco IOS XE Release 3.1S                             |
|          | X-Bone-CTL  | TCP/UDP | 265             | Xbone CTL                          | x-bone-ctl  | Cisco IOS XE Release 3.1S                             |
|          | XDMCP       | TCP/UDP | 177             | X Display Manager Control Protocol | xdmcp       | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |
|          | XDTP        | TCP/UDP | 3088            | eXtensible Data Transfer Protocol  | xdtp        | Cisco IOS XE Release 3.1S                             |
|          | XFER        | TCP/UDP | 82              | XFER Utility                       | xfer        | Cisco IOS XE Release 3.1S                             |
|          | XNET        | TCP/UDP | 15              | Cross Net Debugger                 | xnet        | Cisco IOS XE Release 3.1S                             |
|          | XNS-Auth    | TCP/UDP | 56              | XNS Authentication                 | xns-auth    | Cisco IOS XE Release 3.1S                             |
|          | XNS-CH      | TCP/UDP | 54              | XNS Clearinghouse                  | xns-ch      | Cisco IOS XE Release 3.1S                             |
|          | XNS-Courier | TCP/UDP | 165             | Xerox                              | xns-courier | Cisco IOS XE Release 3.1S                             |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol                  | Type     | WKP/IP Protocol | Description                       | Syntax       | Cisco IOS XE Release                                  |
|----------|---------------------------|----------|-----------------|-----------------------------------|--------------|---|
|          | XNS-IDP                   | TCP/UDP  | 22              | XEROX NS IDP                      | xns-idp      | Cisco IOS XE Release 3.1S                             |
|          | XNS-Mail                  | TCP/UDP  | 58              | XNS mail                          | xns-mail     | Cisco IOS XE Release 3.1S                             |
|          | XNS-Time                  | TCP/UDP  | 52              | XNS Time Protocol                 | xns-time     | Cisco IOS XE Release 3.1S                             |
|          | XTP                       | TCP/UDP  | 36              | XTP                               | xtp          | Cisco IOS XE Release 3.1S                             |
|          | XVTTP                     | TCP/UDP  | 508             | xvttp                             | xvttp        | Cisco IOS XE Release 3.1S                             |
|          | XYplex-Mux                | TCP/UDP  | 173             | Xyplex                            | xplex-mux    | Cisco IOS XE Release 3.1S                             |
|          | X Windows                 | TCP      | 6000–6003       | X Window System                   | xwindows     | Cisco IOS XE Release 2.3<br>Cisco IOS XE Release 3.1S |
|          | z39.50                    | TCP/UDP  | 210             | ANSI Z39.50                       | z39.50       | Cisco IOS XE Release 3.1S                             |
|          | Zannet                    | TCP/UDP  | 317             | Zannet                            | zannet       | Cisco IOS XE Release 3.1S                             |
|          | ZServ                     | TCP/UDP  | 346             | Zebra server                      | zserv        | Cisco IOS XE Release 3.1S                             |
|          | AN                        | IP       | 107             | Active Networks                   | an           | Cisco IOS XE Release 3.1S                             |
|          |                           |          |                 |                                   |              |   |
|          | AOL-Protocol <sup>5</sup> | TCP      | 5190            | America OnLine Protocol           | aol-protocol | Cisco IOS XE Release 3.3S                             |
|          | ARGUS                     | IP       | 13              | ARGUS                             | argus        | Cisco IOS XE Release 3.1S                             |
|          | ARIS                      | IP       | 104             | ARIS                              | aris         | Cisco IOS XE Release 3.1S                             |
|          | AX25                      | IP       | 93              | AX.25 Frames                      | ax25         | Cisco IOS XE Release 3.1S                             |
|          | BBNR RCC Mon              | IP       | 10              | BBN RCC Monitoring                | bbnrccmon    | Cisco IOS XE Release 3.1S                             |
|          | BLIZWOW                   | TCP, UDP | 3724            | World of Warcraft Gaming Protocol | blizwow      | Cisco IOS XE Release 3.3S                             |
|          | BNA                       | IP       | 49              | BNA                               | bna          | Cisco IOS XE Release 3.1S                             |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol    | Type | WKP/IP Protocol | Description                                | Syntax      | Cisco IOS XE Release      |
|----------|-------------|------|-----------------|--|-------------|---------------------------|
|          | BR-SAT-Mon  | IP   | 76              | Backroom SATNET Monitoring                 | br-sat-mon  | Cisco IOS XE Release 3.1S |
|          | CBT         | IP   | 7               | CBT  | cbt         | Cisco IOS XE Release 3.1S |
|          | CFTP        | IP   | 62              | CFTP                                       | cftp        | Cisco IOS XE Release 3.1S |
|          | Choas       | IP   | 16              | Chaos                                      | chaos       | Cisco IOS XE Release 3.1S |
|          | Compaq-Peer | IP   | 110             | Compaq Peer Protocol                       | compaq-peer | Cisco IOS XE Release 3.1S |
|          | CPHB        | IP   | 73              | Computer Protocol Heart Beat               | cphb        | Cisco IOS XE Release 3.1S |
|          | CPNX        | IP   | 72              | Computer Protocol Network Executive        | cpnx        | Cisco IOS XE Release 3.1S |
|          | CRTP        | IP   | 126             | Combat Radio Transport Protocol            | crtip       | Cisco IOS XE Release 3.1S |
|          | CRUDP       | IP   | 127             | Combat Radio User Datagram                 | crudp       | Cisco IOS XE Release 3.1S |
|          | DCCP        | IP   | 33              | Datagram Congestion Control Protocol       | dccp        | Cisco IOS XE Release 3.1S |
|          | DCN-Meas    | IP   | 19              | DCN Measurement Subsystems                 | dcn-meas    | Cisco IOS XE Release 3.1S |
|          | DDP         | IP   | 37              | Datagram Delivery Protocol                 | ddp         | Cisco IOS XE Release 3.1S |
|          | DDX         | IP   | 116             | D-II Data Exchange                         | ddx         | Cisco IOS XE Release 3.1S |
|          | DGP         | IP   | 86              | Dissimilar Gateway Protocol                | dgp         | Cisco IOS XE Release 3.1S |
|          | DSR         | IP   | 48              | Dynamic Source Routing Protocol            | dsr         | Cisco IOS XE Release 3.1S |
|          | EGP         | IP   | 8               | Exterior Gateway Protocol                  | egp         | Cisco IOS XE Release 3.1S |
|          | EIGRP       | IP   | 88              | Enhanced Interior Gateway Routing Protocol | eigrp       | Cisco IOS XE Release 3.1S |
|          | EMCON       | IP   | 14              | EMCON                                      | emcon       | Cisco IOS XE Release 3.1S |
|          | Encap       | IP   | 98              | Encapsulation Header                       | encap       | 15.1(3)T                  |
|          | EtherIP     | IP   | 97              | Ethernet-within-IP Encapsulation           | etherip     | Cisco IOS XE Release 3.1S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol  | Type | WKP/IP Protocol | Description                             | Syntax    | Cisco IOS XE Release      |
|----------|-----------|------|-----------------|---|-----------|---------------------------|
|          | FC        | IP   | 133             | Fibre Channel                           | fc        | Cisco IOS XE Release 3.1S |
|          | FIRE      | IP   | 125             | FIRE                                    | fire      | Cisco IOS XE Release 3.1S |
|          | GGP       | IP   | 3               | Gateway-to-Gateway                      | ggp       | Cisco IOS XE Release 3.1S |
|          | GMTP      | IP   | 100             | GMTP                                    | gmtp      | Cisco IOS XE Release 3.1S |
|          | GRE       | IP   | 47              | General Routing Encapsulation           | gre       | Cisco IOS XE Release 3.1S |
|          | HIP       | IP   | 139             | Host Identity Protocol                  | hip       | Cisco IOS XE Release 3.1S |
|          | HMP       | IP   | 20              | Host Monitoring                         | hmp       | Cisco IOS XE Release 3.1S |
|          | HopOpt    | IP   | 0               | IPv6 Hop-by-Hop Option                  | hopopt    | Cisco IOS XE Release 3.1S |
|          | ICQ       | TCP  | 80, Heuristic   | I seek you Instant Messaging Protocol   | icq       | Cisco IOS XE Release 3.3S |
|          | IATP      | IP   | 117             | Interactive Agent Transfer Protocol     | iatp      | Cisco IOS XE Release 3.1S |
|          | ICMP      | IP   | 1               | Internet Control Message                | icmp      | Cisco IOS XE Release 3.1S |
|          | IDPR      | IP   | 35              | Inter-Domain Policy Routing Protocol    | idpr      | Cisco IOS XE Release 3.1S |
|          | IDPR-CMTP | IP   | 38              | IDPR Control Message Transport Protocol | idpr-cmtp | Cisco IOS XE Release 3.1S |
|          | IDRP      | IP   | 45              | Inter-Domain Routing Protocol           | idrp      | Cisco IOS XE Release 3.1S |
|          | IFMP      | IP   | 101             | Ipsilon Flow Management Protocol        | ifmp      | Cisco IOS XE Release 3.1S |
|          | IGRP      | IP   | 9               | Cisco interior gateway                  | igrp      | Cisco IOS XE Release 3.1S |
|          | IL        | IP   | 40              | IL Transport Protocol                   | il        | Cisco IOS XE Release 3.1S |
|          | I-NLSP    | IP   | 52              | Integrated Net Layer Security TUBA      | i-nlsp    | Cisco IOS XE Release 3.1S |
|          | IMPCOMP   | IP   | 108             | IP Payload Compression Protocol         | ipcomp    | Cisco IOS XE Release 3.1S |

**Table 3** *NBAR-Supported Protocols (continued)*

| Category | Protocol           | Type        | WKP/IP Protocol | Description                         | Syntax             | Cisco IOS XE Release      |
|----------|--------------------|-------------|-----------------|-------------------------------------|--------------------|---------------------------|
|          | IPCU               | IP          | 71              | Internet Packet Core Utility        | ipcv               | Cisco IOS XE Release 3.1S |
|          | IPinIP             | IP          | 4               | IP in IP                            | ipinip             | Cisco IOS XE Release 3.1S |
|          | IPIP               | IP          | 94              | IP-within-IP Encapsulation Protocol | ipip               | Cisco IOS XE Release 3.1S |
|          | IPLT               | IP          | 129             | IPLT                                | iplt               | Cisco IOS XE Release 3.1S |
|          | IPPC               | IP          | 67              | Internet Pluribus Packet Core       | ippc               | Cisco IOS XE Release 3.1S |
|          | IPv6-Frag          | IP          | 44              | Fragment Header for IPv6            | ipv6-frag          | Cisco IOS XE Release 3.1S |
|          | IPv6-ICMP          | IP          | 58              | ICMP for IPv6                       | ipv6-icmp          | Cisco IOS XE Release 3.1S |
|          | IPv6INIP           | IP          | 41              | Ipv6 encapsulated                   | ipv6inip           | Cisco IOS XE Release 3.1S |
|          | IPv6-NONXT         | IP          | 59              | No Next Header for IPv6             | ipv6-nonxt         | Cisco IOS XE Release 3.1S |
|          | IPv6-Opts          | IP          | 60              | Destination Options for IPv6        | ipv6-opts          | Cisco IOS XE Release 3.1S |
|          | IPv6-Route         | IP          | 43              | Routing Header for IPv6             | ipv6-route         | Cisco IOS XE Release 3.1S |
|          | IRTP               | IP          | 28              | Internet Reliable Transaction       | irtp               | Cisco IOS XE Release 3.1S |
|          | ISIS               | IP          | 124             | ISIS over IPv4                      | isis               | Cisco IOS XE Release 3.1S |
|          | ISO-TP4            | IP          | 29              | ISO Transport Protocol Class 4      | iso-tp4            | Cisco IOS XE Release 3.1S |
|          | IXP-in-IP          | IP          | 111             | IPX in IP                           | ixp-in-ip          | Cisco IOS XE Release 3.1S |
|          | LARP               | IP          | 91              | Locus Address Resolution Protocol   | larp               | Cisco IOS XE Release 3.1S |
|          | Leaf-1             | IP          | 25              | Leaf-1                              | leaf-1             | Cisco IOS XE Release 3.1S |
|          | 6to4 IPv6 Tunneled | L3 Protocol | —               | 6to4 IPv6 Tunneled                  | 6to4 IPv6 Tunneled | Cisco IOS XE Release 3.2S |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol             | Type        | WKP/IP Protocol                   | Description  | Syntax               | Cisco IOS XE Release      |
|----------|----------------------|-------------|-----------------------------------|--|----------------------|---------------------------|
|          | AYIYA IPv6 Tunneled  | UDP         | 5072                              | IPv6 Tunneled based on AYIYA traffic                                   | AYIYA IPv6 Tunneled  | Cisco IOS XE Release 3.2S |
|          | BabelGum             | TCP, UDP    | 80 + Heuristic                    | BabelGum   | BabelGum             | Cisco IOS XE Release 3.2S |
|          | Baidu Movie          | TCP, UDP    | 80 + Heuristic                    | Baidu Movie  | Baidu Movie          | Cisco IOS XE Release 3.2S |
|          | DHCP                 | UDP         | 67,68                             | Dynamic Host Configuration Protocol                                    | dhcp                 | Cisco IOS XE Release 3.2S |
|          | DHT                  | UDP         | Heuristic                         | Distributed sloppy Hash Table Protocol                                 | DHT                  | Cisco IOS XE Release 3.2S |
|          | Filetopia            | TCP         | Heuristic                         | Filetopia P2P file sharing   | filetopia            | Cisco IOS XE Release 3.2S |
|          | Fring-VoIP           | UDP         | Heuristic                         | Fring VoIP   | fring-voip           | Cisco IOS XE Release 3.3S |
|          | GoogleEarth          | TCP         | 80 + Heuristic                    | GoogleEarth  | GoogleEarth          | Cisco IOS XE Release 3.2S |
|          | Guruguru             | TCP         | Heuristic                         | Guruguru   | guruguru             | Cisco IOS XE Release 3.2S |
|          | IMAP                 | TCP         | 143,220                           | Internet Mail Access Protocol  | imap                 | Cisco IOS XE Release 3.2S |
|          | IRC                  | TCP         | 80 + Heuristic                    | IRC  | IRC                  | Cisco IOS XE Release 3.2S |
|          | ISATAP IPv6 Tunneled | L3 Protocol |                                   | Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) IPv6 Tunneled | ISATAP IPv6 Tunneled | Cisco IOS XE Release 3.2S |
|          | iTunes               | TCP         | 80 + Heuristic                    | iTunes   | iTunes               | Cisco IOS XE Release 3.2S |
|          | Kuro                 | TCP         | Heuristic                         | Kuro   | kuro                 | Cisco IOS XE Release 3.3S |
|          | Manolito             | TCP, UDP    | TCP - Heuristic port, UDP - 41170 | Manolito P2P music sharing protocol                                    | manolito             | Cisco IOS XE Release 3.2S |
|          | MapleStory           | TCP         | Heuristic                         | Maple Story Gaming Protocol  | MapleStory           | Cisco IOS XE Release 3.2S |
|          |                      |             |                                   |  |                      |                           |

**Table 3** NBAR-Supported Protocols (continued)

| Category | Protocol               | Type     | WKP/IP Protocol   | Description   | Syntax                 | Cisco IOS XE Release      |
|----------|------------------------|----------|---|---|------------------------|---------------------------|
|          | MGCP                   | TCP, UDP | UDP<br>2427/2727 - TCP<br>2427/2428/2727 +<br>Heuristic | Media Gateway Control Protocol                      | MGCP                   | Cisco IOS XE Release 3.2S |
|          | Microsoftds            | TCP, UDP | 445   | Microsoft-ds  | microsoftds            | Cisco IOS XE Release 3.3S |
|          | MSN Messenger          | TCP      | 1080,1863, 80,<br>Heuristic                             | MSN Messenger                                       | msn-messenger          | Cisco IOS XE Release 3.3S |
|          | MyJabber File Transfer | TCP      | Heuristic   | MyJabber File Transfer                              | MyJabber File Transfer | Cisco IOS XE Release 3.2S |
|          | Napster                | TCP      | 80 +<br>Heuristic                                       | Napster   | napster                | Cisco IOS XE Release 3.2S |
|          | Netshow                | TCP      | 1755 +<br>Heuristic                                     | Netshow   | netshow                | Cisco IOS XE Release 3.2S |
|          | NNTP                   | TCP      | TCP - 119 +<br>Heuristic,<br>UDP -119                   | Network News Transfer Protocol                      | NNTP                   | Cisco IOS XE Release 3.2S |
|          | NTP                    | UDP      | 123   | Network Time Protocol                               | NTP                    | Cisco IOS XE Release 3.2S |
|          | Pando                  | TCP,UDP  | TCP - 80 +<br>Heuristic,<br>UDP -<br>Heuristic          | Pando   | Pando                  | Cisco IOS XE Release 3.2S |
|          | POCO                   | TCP, UDP | Heuristic   | POCO File-Sharing Application                       | POCO                   | Cisco IOS XE Release 3.2S |
|          | POP3                   | TCP      | 110,<br>Heuristic                                       | POP3  | POP3                   | Cisco IOS XE Release 3.2S |
|          | PPTP                   | TCP      | 1723  | Point-to-Point Tunneling Protocol                   | pptp                   | Cisco IOS XE Release 3.2S |
|          | RADIUS                 | UDP      | 1812,<br>1813   | Remote Authentication Dial In User Service protocol | radius                 | Cisco IOS XE Release 3.3S |
|          |                        |          |   |   |                        |                           |

Table 3 NBAR-Supported Protocols (continued)

| Category | Protocol             | Type     | WKP/IP Protocol                       | Description  | Syntax               | Cisco IOS XE Release      |
|----------|----------------------|----------|---------------------------------------|--|----------------------|---------------------------|
|          | SIP                  | TCP, UDP | TCP/UDP - 5060 + Heuristic            | Session Initiation Protocol                          | sip                  | Cisco IOS XE Release 3.2S |
|          | Skinny               | TCP      | 2000-2002                             | Skinny Call Control Protocol                         | skinny               | Cisco IOS XE Release 3.3S |
|          | Soribada             | TCP      | TCP - 80 + Heuristic, UDP - Heuristic | Soribada, Korean P2P music sharing Protocol          | soribada             | Cisco IOS XE Release 3.2S |
|          | Soulseek             | TCP      | Heuristic                             | SoulSeek internet download manager Protocol          | soulseek             | Cisco IOS XE Release 3.3S |
|          | TeamSpeak            | UDP      | Heuristic                             | TeamSpeak internet based voice-conferencing Protocol | TeamSpeak            | Cisco IOS XE Release 3.2S |
|          | Telepresence-control | TCP,UDP  | TCP-5060, UDP-Heuristic               | Telepresence-control                                 | telepresence-control | Cisco IOS XE Release 3.2S |
|          | Teredo IPv6 Tunneled | TCP,UDP  | TCP-Heuristic, UDP - 3544 + Heuristic | Teredo IPv6 Tunneled                                 | teredo-ipv6-tunneled | Cisco IOS XE Release 3.2S |
|          | TFTP                 | UDP      | 69                                    | Trivial File Transfer Protocol                       | tftp                 | Cisco IOS XE Release 3.2S |
|          | TomatoPang           | TCP      | Heuristic                             | TomatoPang P2P Sharing Protocol                      | TomatoPang           | Cisco IOS XE Release 3.2S |
|          | Tunnel-HTTP          | TCP      | 80 + Heuristic                        | HTTP Tunneling                                       | tunnel-http          | Cisco IOS XE Release 3.2S |
|          | Ventrilo             | TCP, UDP | Heuristic                             | Ventrilo VoIP Protocol                               | Ventrilo             | Cisco IOS XE Release 3.2S |
|          | Waste                | TCP/UDP  | Heuristic                             | Waste  | waste                | Cisco IOS XE Release 3.3S |
|          | WebThunder           | TCP, UDP | TCP-80, UDP-Heuristic                 | WebThunder Peer-to-Peer File Sharing                 | WebThunder           | Cisco IOS XE Release 3.2S |
|          | Yahoo-Messenger      | TCP      | TCP-5050/5101/1080/119/80/Heuristic   | Yahoo Messenger                                      | yahoo-messenger      | Cisco IOS XE Release 3.3S |
|          | Yahoo-Messenger-VoIP | TCP/UDP  | Heuristic                             | Yahoo Messenger VoIP                                 | yahoo-voip-messenger | Cisco IOS XE Release 3.3S |

1. For Cisco IOS XE Release 2.5, Cisco supports Exchange 03 and 07 only. MS client access is recognized, but web client access is not recognized.
2. Cisco software supports Skype 1.0, 2.5, 3.0, and 4.0. In Skype 4.0, the classification may not be complete.
3. BitTorrent classifies only unencrypted traffic.
4. eDonkey classifies only unencrypted traffic.
5. AOL-Protocol classifies traffic shared between ICQ and AOL clients.

## NBAR Protocol Discovery

NBAR includes a feature called Protocol Discovery. Protocol discovery provides an easy way to discover protocol packets passing through an interface. For more information about Protocol Discovery, see the [“Enabling Protocol Discovery”](#) module.

## NBAR Protocol Discovery MIB

The NBAR Protocol Discovery MIB expands the capabilities of NBAR Protocol Discovery by providing the following new functionality through Simple Network Management Protocol (SNMP):

- Enable or disable Protocol Discovery per interface.
- Display Protocol Discovery statistics.
- Configure and display multiple top-n tables that list protocols by bandwidth usage.
- Configure thresholds based on traffic of particular NBAR-supported protocols or applications that report breaches and send notifications when these thresholds are exceeded.

For more information about the NBAR Protocol Discovery MIB, see the [“Network-Based Application Recognition Protocol Discovery Management Information Base”](#) module.

## NBAR Configuration Processes

You can configure NBAR in the following two ways:

- Configuring NBAR using the MQC
- Enabling Protocol Discovery

For more information about the NBAR configuration, see the [Cisco IOS XE QoS Configuration Guide](#).

## Restarting NBAR

NBAR is restarted under the following events described below.

- Custom protocol addition via CLI
- PDLM load
- RP switchover
- FP switchover
- Protocol pack installation
- Link-age change

Restart involves deactivating and reactivating NBAR. During this time, all packets are classified as 'Unknown' by NBAR. Once NBAR is reactivated, classification is activated.

**Note**


---

Protocol Discovery statistics will be lost with RP Switchover.

---

## NBAR Protocol Pack

NBAR Protocol Pack provides an easy way to update the protocols supported by NBAR without replacing the base IOS image that is already present in the router. A protocol pack is a set of protocols developed and packed together. For more information about NBAR Protocol Pack, see the NBAR Protocol Pack feature document in [Cisco IOS XE QoS Configuration Guide](#).

## NBAR and Multipacket Classification

In Cisco IOS XE Release 3.3S, NBAR provides the ability to search large number of multipacket signatures simultaneously. This new technique is supported for many of the new protocols in Cisco IOS XE Release 3.3S and later releases. This technique also provides improved performance and accuracy for other protocols. Along with the support for new signatures, the multipacket classification capabilities change NBAR behavior in the following ways:

1. NBAR classification requires any number of payload packets between 1 and 15 packets in a flow depending on the protocol. Retransmitted packets are not counted in this process of calculation.
2. NBAR will not classify flows without any payload packets or any TCP payload packet with a wrong sequence number even if there are 15 payload packets for classification.
3. TCP retransmitted packets are not counted as valid packets for classification in the Multipacket Engine (MPE) module. These type of packets can delay the classification until a sufficient number of valid payload packets are accumulated.
4. Payload packets with only static signatures in NBAR are classified after the single-packet and multipacket protocols are processed and failed. Therefore, a maximum of 15 payload packets can be classified as unknown until the final (static) classification decision is taken.
5. Due to these restrictions, custom protocols can be used to force the classification of the first packet, ignoring the existence of payload or correct sequence numbers in the port-based classification.

## NBAR on VRF Interfaces

In Cisco IOS XE Release 3.3S and later releases, the NBAR IPv4 and IPv6 classification on VRF interfaces is supported:

**Note**


---

Classification for Citrix protocol with "app" subclassification is not guaranteed on VRF interfaces when NBAR is enabled on VRF interfaces.

---

## NBAR and IPv6

In Cisco IOS XE Release 3.3S and later releases, the following are supported:

- NBAR provides static port-based classification and IP protocol-based classification for IPv6 packets.
- NBAR supports IPv6 classification in protocol discovery mode, but not in MQC mode.
- NBAR always reads the next header field in the fixed IPv6 header to determine the transport layer protocol used by packet's payload for IPv6 packets. If an IPv6 packet contains one or more extension headers, NBAR will not skip to the last IPv6 extension header to read the actual protocol type, but rather classifies the packet as an IPv6 extension header packet.

## Configuration Examples for Classifying Network Traffic Using NBAR in Cisco IOS XE Software

- [Example: Classification of HTTP Traffic Using the HTTP Header Fields, page 69](#)
- [Example: Combinations of Classification of HTTP Headers and URL, Host, or MIME Type to Identify HTTP Traffic, page 70](#)
- [Example: NBAR and Classification of Custom Protocols and Applications, page 70](#)
- [Example: NBAR and Classification of Peer-to-Peer File-Sharing Applications, page 71](#)

### Example: Classification of HTTP Traffic Using the HTTP Header Fields

In the following example, any request message that contains “somebody@cisco.com” in the User-Agent, Referer, or From fields will be classified by NBAR. Typically, a term with a format similar to “somebody@cisco.com” would be found in the From header field of the HTTP request message.

```
class-map match-all class1
  match protocol http from "somebody@cisco.com"
```

In the following example, any request message that contains “http://www.cisco.com/routers” in the User-Agent, Referer, or From fields will be classified by NBAR. Typically, a term with a format similar to “http://www.cisco.com/routers” would be found in the Referer header field of the HTTP request message.

```
class-map match-all class2
  match protocol http referer "http://www.cisco.com/routers"
```

In the following example, any request message that contains “CERN-LineMode/2.15” in the User-Agent, Referer, or From header field will be classified by NBAR. Typically, a term with a format similar to “CERN-LineMode/2.15” would be found in the User-Agent header field of the HTTP request message.

```
class-map match-all class3
  match protocol http user-agent "CERN-LineMode/2.15"
```

In the following example, any response message that contains “CERN/3.0” in the Content-Base (if available), Content-Encoding, Location, or Server header field will be classified by NBAR. Typically, a term with a format similar to “CERN/3.0” would be found in the Server header field of the response message.

```
class-map match-all class4
  match protocol http server "CERN/3.0"
```

In the following example, any response message that contains “http://www.cisco.com/routers” in the Content-Base (if available), Content-Encoding, Location, or Server header field will be classified by NBAR. Typically, a term with a format similar to “http://www.cisco.com/routers” would be found in the Content-Base (if available) or Location header field of the response message.

```
class-map match-all class5
  match protocol http location "http://www.cisco.com/routers"
```

In the following example, any response message that contains “gzip” in the Content-Base (if available), Content-Encoding, Location, or Server header field will be classified by NBAR. Typically, the term “gzip” would be found in the Content-Encoding header field of the response message.

```
class-map match-all class6
  match protocol http content-encoding "gzip"
```

## Example: Combinations of Classification of HTTP Headers and URL, Host, or MIME Type to Identify HTTP Traffic

In the following example, HTTP header fields are combined with a URL to classify traffic. In this example, traffic with a User-Agent field of “CERN-LineMode/3.0” and a Server field of “CERN/3.0,” along with URL “www.cisco.com/routers,” will be classified using NBAR:

```
class-map match-all c-http
  match protocol http user-agent "CERN-LineMode/3.0"
  match protocol http server "CERN/3.0"
  match protocol http url "www.cisco.com/routers"
```

## Example: NBAR and Classification of Custom Protocols and Applications

In the following example, the custom protocol app-sales1 will identify TCP packets that have a source port of 4567 and that contain the term “SALES” in the fifth byte of the payload:

```
Router(config)# ip nbar custom app-sales1 5 ascii SALES source tcp 4567
```

In the following example, the custom protocol virus-home will identify UDP packets that have a destination port of 3000 and that contain “0x56” in the seventh byte of the payload:

```
Router(config)# ip nbar custom virus-home 7 hex 0x56 destination udp 3000
```

In the following example, the custom protocol media\_new will identify TCP packets that have a destination or source port of 4500 and that have a value of 90 at the sixth byte of the payload:

```
Router(config)# ip nbar custom media_new 6 decimal 90 tcp 4500
```

In the following example, the custom protocol msn1 will look for TCP packets that have a destination or source port of 6700:

```
Router(config)# ip nbar custom msn1 tcp 6700
```

In the following example, the custom protocol mail\_x will look for UDP packets that have a destination port of 8202:

```
Router(config)# ip nbar custom mail_x destination udp 8202
```

In the following example, the custom protocol mail\_y will look for UDP packets that have destination ports between 3000 and 4000 inclusive:

```
Router(config)# ip nbar custom mail_y destination udp range 3000 4000
```

## Example: NBAR and Classification of Peer-to-Peer File-Sharing Applications

The **match protocol gnutella file-transfer *regular-expression*** and **match protocol fasttrack file-transfer *regular-expression*** commands are used to enable Gnutella and FastTrack classification in a traffic class. The **file-transfer** keyword indicates that a regular expression variable will be used to identify specific Gnutella or FastTrack traffic. The *regular-expression* variable can be expressed as "\*" to indicate that all FastTrack or Gnutella traffic be classified by a traffic class.

In the following example, all FastTrack traffic is classified into class map nbar:

```
class-map match-all nbar
  match protocol fasttrack file-transfer "*"
```

Similarly, all Gnutella traffic is classified into class map nbar in the following example:

```
class-map match-all nbar
  match protocol gnutella file-transfer "*"
```

Wildcard characters in a regular expression can also be used to identify specified Gnutella and FastTrack traffic. These regular expression matches can be used to match on the basis of a filename extension or a particular string in a filename.

In the following example, all Gnutella files that have the .mpeg extension will be classified into class map nbar.

```
class-map match-all nbar
  match protocol gnutella file-transfer "*.mpeg"
```

In the following example, only Gnutella traffic that contains the characters "cisco" is classified:

```
class-map match-all nbar
  match protocol gnutella file-transfer "**cisco**"
```

The same examples can be used for FastTrack traffic:

```
class-map match-all nbar
  match protocol fasttrack file-transfer "*.mpeg"
```

or

```
class-map match-all nbar
  match protocol fasttrack file-transfer "**cisco**"
```

# Additional References

## Related Documents

| Related Topic   | Document Title   |
|---|--|
| Cisco IOS commands  | <a href="#">Cisco IOS Master Commands List, All Releases</a>             |
| QoS commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples | <a href="#">Cisco IOS Quality of Service Solutions Command Reference</a> |
| Classifying network traffic if not using NBAR   | <a href="#">“Classifying Network Traffic” module</a>                     |
| Marking network traffic   | <a href="#">“Marking Network Traffic” module</a>                         |
| MQC   | <a href="#">“Applying QoS Features Using the MQC” module</a>             |
| Protocol Discovery  | <a href="#">“Enabling Protocol Discovery” module</a>                     |

## Standards

| Standard | Title   |
|----------|---|
| ISO 0009 | <i>File Transfer Protocol (FTP)</i>           |
| ISO 0013 | <i>Domain Names - Concepts and Facilities</i> |
| ISO 0033 | <i>The TFTP Protocol (Revision 2)</i>         |
| ISO 0034 | <i>Routing Information Protocol</i>           |
| ISO 0053 | <i>Post Office Protocol - Version 3</i>       |
| ISO 0056 | <i>RIP Version 2</i>                          |

## MIBs

| MIB   | MIBs Link   |
|---|---|
| No new or modified MIBs are supported, and support for existing MIBs has not been modified. | To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL:<br><a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a> |

## RFCs

| RFC     | Title                                    |
|---------|--|
| RFC 742 | <i>NAME/FINGER Protocol</i>              |
| RFC 759 | <i>Internet Message Protocol</i>         |
| RFC 768 | <i>User Datagram Protocol</i>            |
| RFC 792 | <i>Internet Control Message Protocol</i> |

| <b>RFC</b> | <b>Title</b>   |
|------------|--|
| RFC 793    | <i>Transmission Control Protocol</i>   |
| RFC 821    | <i>Simple Mail Transfer Protocol</i>   |
| RFC 827    | <i>Exterior Gateway Protocol</i>   |
| RFC 854    | <i>Telnet Protocol Specification</i>   |
| RFC 888    | <i>“STUB” Exterior Gateway Protocol</i>  |
| RFC 904    | <i>Exterior Gateway Protocol Formal Specification</i>  |
| RFC 951    | <i>Bootstrap Protocol</i>  |
| RFC 959    | <i>File Transfer Protocol</i>  |
| RFC 977    | <i>Network News Transfer Protocol</i>  |
| RFC 1001   | <i>Protocol Standard for a NetBIOS Service on a TCP/UDP Transport: Concepts and Methods</i>    |
| RFC 1002   | <i>Protocol Standard for a NetBIOS Service on a TCP/UDP Transport: Detailed Specifications</i> |
| RFC 1057   | <i>RPC: Remote Procedure Call</i>  |
| RFC 1094   | <i>NFS: Network File System Protocol Specification</i>   |
| RFC 1112   | <i>Host Extensions for IP Multicasting</i>   |
| RFC 1157   | <i>Simple Network Management Protocol</i>  |
| RFC 1282   | <i>BSD Rlogin</i>  |
| RFC 1288   | <i>The Finger User Information Protocol</i>  |
| RFC 1305   | <i>Network Time Protocol</i>   |
| RFC 1350   | <i>The TFTP Protocol (Revision 2)</i>  |
| RFC 1436   | <i>The Internet Gopher Protocol</i>  |
| RFC 1459   | <i>Internet Relay Chat Protocol</i>  |
| RFC 1510   | <i>The Kerberos Network Authentication Service</i>   |
| RFC 1542   | <i>Clarifications and Extensions for the Bootstrap Protocol</i>                                |
| RFC 1579   | <i>Firewall-Friendly FTP</i>   |
| RFC 1583   | <i>OSPF Version 2</i>  |
| RFC 1657   | <i>Definitions of Managed Objects for the Fourth Version of the Border Gateway Protocol</i>    |
| RFC 1701   | <i>Generic Routing Encapsulation</i>   |
| RFC 1730   | <i>Internet Message Access Protocol—Version 4</i>  |
| RFC 1771   | <i>A Border Gateway Protocol 4 (BGP-4)</i>   |
| RFC 1777   | <i>Lightweight Directory Access Protocol</i>   |
| RFC 1831   | <i>RPC: Remote Procedure Call Protocol Specification Version 2</i>                             |
| RFC 1889   | <i>A Transport Protocol for Real-Time Applications</i>   |
| RFC 1890   | <i>RTP Profile for Audio and Video Conferences with Minimal Control</i>                        |
| RFC 1928   | <i>SOCKS Protocol Version 5</i>  |

## Additional References

| RFC      | Title   |
|----------|---|
| RFC 1939 | <i>Post Office Protocol—Version 3</i>   |
| RFC 1945 | <i>Hypertext Transfer Protocol—HTTP/1.0</i>   |
| RFC 1964 | <i>The Kerberos Version 5 GSS-API Mechanism</i>   |
| RFC 2045 | <i>Multipurpose Internet Mail Extension (MIME) Part One: Format of Internet Message Bodies</i>        |
| RFC 2060 | <i>Internet Message Access Protocol—Version 4 rev1</i>  |
| RFC 2068 | <i>Hypertext Transfer Protocol—HTTP/1.1</i>   |
| RFC 2131 | <i>Dynamic Host Configuration Protocol</i>  |
| RFC 2205 | <i>Resource ReSerVation Protocol (RSVP)—Version 1 Functional Specification</i>                        |
| RFC 2236 | <i>Internet Group Management Protocol, Version 2</i>  |
| RFC 2251 | <i>Lightweight Directory Access Protocol (v3)</i>   |
| RFC 2252 | <i>Lightweight Directory Access Protocol (v3): Attribute Syntax Definitions</i>                       |
| RFC 2253 | <i>Lightweight Directory Access Protocol (v3): UTF-8 String Representation of Distinguished Names</i> |
| RFC 2401 | <i>Security Architecture for the Internet Protocol</i>  |
| RFC 2406 | <i>IP Encapsulating Security Payload</i>  |
| RFC 2453 | <i>RIP Version 2</i>  |
| RFC 2616 | <i>Hypertext Transfer Protocol—HTTP/1.1</i>   |
|          | <b>Note</b> This RFC updates RFC 2068.  |

## 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. | <a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a> |

# Feature Information for Classifying Network Traffic Using NBAR

Table 4 lists the features in this module and provides links to specific configuration information.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



## Note

Table 4 lists 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.

**Table 4** Feature Information for Classifying Network Traffic Using NBAR in Cisco IOS XE software

| Feature Name                                | Releases   | Feature Information   |
|---|--|---|
| Additional PDL Support for NBAR             | Cisco IOS XE Release 3.1S  | Additional PDL Support for NBAR feature provides support for additional PDLs.<br>The following section provides information about this feature: <ul style="list-style-type: none"> <li>• <a href="#">NBAR and Classification of HTTP Traffic, page 4.</a></li> </ul>  |
| Enhanced NBAR                               | Cisco IOS XE Release 3.2S  | The Enhanced NBAR feature provides additional PDLs for Cisco IOS XE Release 3.2S.<br>The following section provides information about this feature: <ul style="list-style-type: none"> <li>• <a href="#">NBAR-Supported Protocols, page 12.</a></li> </ul>  |
| NBAR PDLM Supported in ASR 1000 Release 2.5 | Cisco IOS XE Release 2.5<br>Cisco IOS XE Release 3.1S<br>Cisco IOS XE Release 3.3S | This feature was integrated into Cisco IOS XE Release 2.5. NBAR-supported protocols were added for this release.<br>The following section provides information about this feature: <ul style="list-style-type: none"> <li>• <a href="#">“NBAR-Supported Protocols” section on page 12.</a></li> </ul> The following command was modified: <b>match protocol</b> (NBAR). |
| NBAR Protocols                              | Cisco IOS XE Release 2.3   | This feature was integrated into Cisco IOS XE Release 2.3. NBAR-supported protocols were added for this release.<br>The following section provides information about this feature: <ul style="list-style-type: none"> <li>• <a href="#">“NBAR-Supported Protocols” section on page 12.</a></li> </ul> The following command was modified: <b>match protocol</b> (NBAR). |

**Table 4** Feature Information for Classifying Network Traffic Using NBAR in Cisco IOS XE software (continued)

| Feature Name   | Releases                  | Feature Information  |
|--|---------------------------|--|
| NBAR Real-time Transport Protocol Payload Classification | Cisco IOS XE Release 2.1  | <p>This feature was introduced on Cisco ASR 1000 Series Aggregation Services Routers.</p> <p>The following section provides information about this feature:</p> <ul style="list-style-type: none"> <li>• <a href="#">NBAR-Supported Protocols, page 12.</a></li> </ul> |
| NBAR Static IPv4 IANA Protocols Pack1                    | Cisco IOS XE Release 3.1S | <p>This feature was introduced on Cisco ASR 1000 Series Aggregation Services Routers.</p> <p>The following section provides information about this feature:</p> <ul style="list-style-type: none"> <li>• <a href="#">NBAR-Supported Protocols, page 12.</a></li> </ul> |
| NBAR VRF aware   | Cisco IOS XE Release 3.3S | <p>This feature was introduced on Cisco ASR 1000 Series Aggregation Services Routers.</p> <p>The following section provides information about this feature:</p> <ul style="list-style-type: none"> <li>• <a href="#">NBAR Scalability, page 11</a></li> </ul>          |

# Glossary

**encryption**—Encryption is the application of a specific algorithm to data so as to alter the appearance of the data, making it incomprehensible to those who are not authorized to see the information.

**HTTP**—Hypertext Transfer Protocol. The protocol used by web browsers and web servers to transfer files, such as text and graphic files.

**IANA**—Internet Assigned Numbers Authority. An organization operated under the auspices of the Internet Society (ISOC) as a part of the Internet Architecture Board (IAB). IANA delegates authority for IP address-space allocation and domain-name assignment to the InterNIC and other organizations. IANA also maintains a database of assigned protocol identifiers used in the TCP/IP stack, including autonomous system numbers.

**LAN**—local-area network. A high-speed, low-error data network that covers a relatively small geographic area (up to a few thousand meters). LANs connect workstations, peripherals, terminals, and other devices in a single building or other geographically limited area. LAN standards specify cabling and signaling at the physical and data link layers of the Open System Interconnection (OSI) model. Ethernet, FDDI, and Token Ring are widely used LAN technologies.

**MIME**—Multipurpose Internet Mail Extension. The standard for transmitting nontext data (or data that cannot be represented in plain ASCII code) in Internet mail, such as binary, foreign language text (such as Russian or Chinese), audio, and video data. MIME is defined in RFC 2045, *Multipurpose Internet Mail Extension (MIME) Part One: Format of Internet Message Bodies*.

**MPLS**—Multiprotocol Label Switching. A switching method that forwards IP traffic using a label. This label instructs the routers and the switches in the network where to forward the packets based on preestablished IP routing information.

**MQC**—modular quality of service command-line interface. A command-line interface that allows you to define traffic classes, create and configure traffic policies (policy maps), and then attach the policy maps to interfaces. The policy maps are used to apply the appropriate quality of service (QoS) to network traffic.

**Protocol Discovery**—A feature included with NBAR. Protocol Discovery provides a way to discover the application protocols that are operating on an interface.

**QoS**—quality of service. A measure of performance for a transmission system that reflects its transmission quality and service availability.

**RTCP**—RTP Control Protocol. A protocol that monitors the QoS of an IPv6 Real-Time Transport Protocol (RTP) connection and conveys information about the ongoing session.

**stateful protocol**—A protocol that uses TCP and UDP port numbers that are determined at connection time.

**static protocol**—A protocol that uses well-defined (predetermined) TCP and UDP ports for communication.

**support classification**—The classification of network traffic by information that is contained in the packet payload; that is, information found beyond the TCP or UDP port number.

**TCP**—Transmission Control Protocol. A connection-oriented transport layer protocol that provides reliable full-duplex data transmission. TCP is part of the TCP/IP protocol stack.

**tunneling**—Tunneling is an architecture that is designed to provide the services necessary to implement any standard point-to-point encapsulation scheme.

**UDP**—User Datagram Protocol. A connectionless transport layer protocol in the TCP/IP protocol stack. UDP is a simple protocol that exchanges datagrams without acknowledgments or guaranteed delivery, requiring that error processing and retransmission be handled by other protocols. UDP is defined in RFC 768, *User Datagram Protocol*.

**WAN**—wide-area network. A data communications network that serves users across a broad geographic area and often uses transmission devices provided by common carriers.

Cisco and the Cisco Logo are trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1005R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

© 2006–2011 Cisco Systems, Inc. All rights reserved.