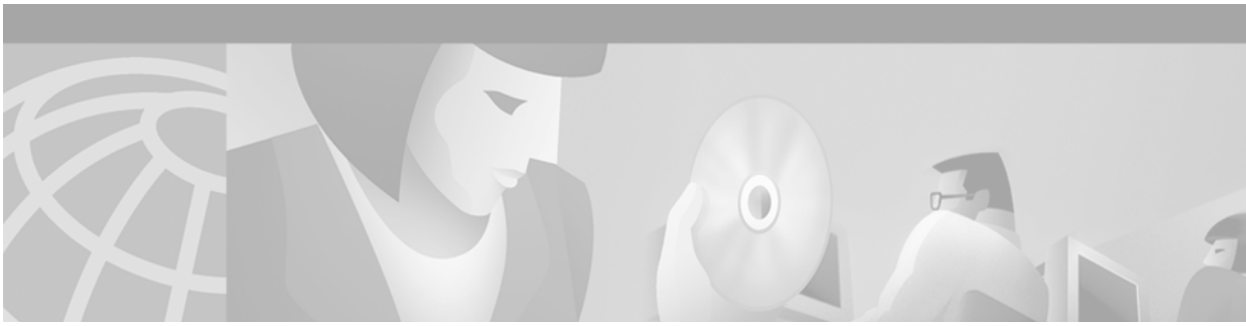

ISO CLNS Commands

The International Organization for Standardization (ISO) Connectionless Network Service (CLNS) protocol is a standard for the network layer of the OSI model.

Use the commands in this chapter to configure and monitor ISO CLNS networks. For ISO CLNS protocol configuration information and examples, refer to the "Configuring ISO CLNS" chapter of the *Network Protocols Configuration Guide, Part 3*.

Note Cisco access servers currently support End System-to-Intermediate System (ES-IS), but not Intermediate System-to-Intermediate System (IS-IS).

clear clns cache

To clear and reinitialize the CLNS routing cach, use the **clear clns cache** EXEC command.

clear clns cache

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example clears the CLNS routing cache:

```
clear clns cache
```

Related Commands

Command	Description
show clns cache	Displays the CLNS routing cache.

clear clns es-neighbors

To remove end system (ES) neighbor information from the adjacency databasse, use the **clear clns es-neighbors** EXEC command.

clear clns es-neighbors

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example removes the ES neighbor information from the adjacency database:

```
clear clns es-neighbors
```

Related Commands

Command	Description
clear clns neighbors	Removes CLNS neighbor information from the adjacency database.
show clns es-neighbors	Lists the ES neighbors that this router knows.

clear clns is-neighbors

To remove intermediate system (IS) neighbor information from the adjacency database, use the **clear clns is-neighbors** EXEC command.

clear clns is-neighbors

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example removes the IS neighbor information from the adjacency database:

```
clear clns is-neighbors
```

Related Commands

Command	Description
clear clns neighbors	Removes CLNS neighbor information from the adjacency database.
show clns is-neighbors	Displays IS-IS related information for IS-IS router adjacencies.

clear clns neighbors

To remove CLNS neighbor information from the adjacency database, use the **clear clns neighbors** EXEC command.

clear clns neighbors

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example removes the CLNS neighbor information from the adjacency database:

```
clear clns neighbors
```

Related Commands

Command	Description
clear clns es-neighbors	Removes ES neighbor information from the adjacency database.
clear clns is-neighbors	Removes IS neighbor information from the adjacency database.
show clns neighbors	Displays both ES and IS neighbors.

clear clns route

To remove all of the dynamically derived CLNS routing information, use the **clear clns route** EXEC command.

clear clns route

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example removes all of the dynamically derived CLNS routing information:

```
clear clns route
```

Related Commands

Command	Description
show clns route	Displays all of the destinations to which this router knows how to route packets.

clear tarp counters

To clear all Target Identifier Address Resolution Protocol (TARP) counters that are shown with the **show tarp traffic** command, use the **clear tarp counters** EXEC command.

clear tarp counters

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

Clearing the counters can assist you with troubleshooting. For example, you may want to clear the counter and then check to see how many PDUs the router is originating.

Examples

The following example clears the TARP counters:

```
clear tarp counters
```

Related Commands

Command	Description
show tarp traffic	Displays statistics about TARP PDUs since the last time the counters were cleared.

clear tarp ldb-table

To clear the system ID-to-sequence number mapping entries stored in the TARP loop-detection buffer table, use the **clear tarp ldb-table** EXEC command.

clear tarp ldb-table

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

The loop-detection buffer table prevents TARP packets from looping.

Clearing the counters assists you with troubleshooting. For example, clear the loop-detection buffer table and assign a new sequence number (using the **tarp sequence-number** command) to ensure that other hosts update their entries.

Examples

The following example clears the TARP loop-detection buffer table:

```
clear tarp ldb-table
```

Related Commands

Command	Description
show tarp ldb	Displays the contents of the loop-detection buffer table.
tarp ldb-timer	Specifies the length of time that a system ID-to-sequence number mapping entry remains in the loop-detection buffer table.

clear tarp tid-table

To clear the dynamically created TARP target identifier (TID)-to-NSAP address mapping entries stored in TID cache, use the **clear tarp tid-table** EXEC command.

clear tarp tid-table

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

Clearing the TID cache is one method to remove old entries. Another method is to set the length of time a dynamically created TARP entry remains in the TID cache using the **tarp-cache-timer** command.

The **clear tarp tid-table** command does not delete the cache entry for its own TID or the cache entries explicitly configured with the **tarp map** command**.**

Examples

The following example clears the TARP TID table:

```
clear tarp tid-table
```

Related Commands

Command	Description
show tarp map	Lists all static entries in the TID cache that were configured with the tarp map command.
show tarp tid-cache	Displays information about the entries in the TID cache.
tarp allow-caching	Reenables the storage of TID-to-NSAP address mapping in the TID cache.
tarp cache-timer	Specifies the length of time that a dynamically created TARP entry remains in the TID cache.
tarp map	Enters a TID-to-NSAP static route in the TID cache.

clns access-group

To filter transit CLNS traffic going either into or out of the router or both on a per-interface basis, use the **clns access-group** interface configuration command. Use the **no** form of this command to disable filtering of transit CLNS packets.

clns access-group *name* [**in** | **out**]

no clns access-group *name* [**in** | **out**]

Syntax Description

name	Name of the filter set or expression to apply.
in	(Optional) Filter should be applied to CLNS packets entering the router.
out	(Optional) Filter should be applied to CLNS packets leaving the router. If you do not specify an **in** or **out** keyword, **out** is assumed.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command has no effect on any CLNS packets sourced by the Cisco IOS software. It applies only to packets forwarded by the software. Fast switching is still supported with access groups in place, but its performance will be impacted based on the complexity of the filters.

For descriptions of filter sets and expressions, refer to the **clns filter-expr**, **clns filter-set**, and **clns template-alias** global configuration commands in this chapter.

Examples

The following example enables forwarding of frames received on Ethernet 0 that had a source address of anything other than 38.840F, and a destination address that started with 47.0005 or 47.0023, but nothing else:

```
clns filter-set US-OR-NORDUNET permit 47.0005...
clns filter-set US-OR-NORDUNET permit 47.0023...
clns filter-set NO-ANSI deny 38.840F...
clns filter-set NO-ANSI permit default
clns filter-expr STRANGE source NO-ANSI and destination US-OR-NORDUNET

interface ethernet 0
 clns access-group STRANGE in
```

Related Commands

Command	Description
clns filter-expr	Combines CLNS filter sets and CLNS address templates to create complex logical NSAP pattern-matching expressions.
clns filter-set	Builds a list of CLNS address templates with associated permit and deny conditions for use in CLNS filter expressions.
clns template-alias	Builds a list of alphanumeric aliases of CLNS address templates for use in the definition of CLNS filter sets.

clns adjacency-filter

To filter the establishment of CLNS ES and IS adjacencies, use the **clns adjacency-filter** interface configuration command. Use the **no** form of this command to disable this filtering.

clns adjacency-filter {**es** | **is**} *name*

no clns adjacency-filter {**es** | **is**} *name*

Syntax Description

es	ES adjacencies are to be filtered.
is	IS adjacencies are to be filtered.
name	Name of the filter set or expression to apply.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Filtering is performed on full NSAP addresses. If filtering should only be performed on system IDs or any other substring of the full NSAP address, the wildcard-matching capabilities of filter sets should be used to ignore the insignificant portions of the NSAP addresses.

For descriptions of filter sets and expressions, refer to the **clns filter-expr**, **clns filter-set**, and **clns template-alias** global configuration commands in this chapter.

Examples

The following example builds a filter that accepts end system adjacencies with only two systems, based only on their system IDs:

```
clns filter-set ourfriends...0000.0c00.1234.**
clns filter-set ourfriends...0000.0c00.125a.**

interface ethernet 0
 clns adjacency-filter es ourfriends
```

Related Commands

Command	Description
clns filter-expr	Combines CLNS filter sets and CLNS address templates to create complex logical NSAP pattern-matching expressions.
clns filter-set	Builds a list of CLNS address templates with associated permit and deny conditions for use in CLNS filter expressions.
clns template-alias	Builds a list of alphanumeric aliases of CLNS address templates for use in the definition of CLNS filter sets.

clns cache-invalidate-delay

To control the invalidation rate of the CLNS route cache, use the **clns cache-invalidate-delay** global configuration command. To allow the CLNS route cache to be immediately invalided, use the **no** form of this command.

clns cache-invalidate-delay [*minimum maximum quiet threshold*]

no clns cache-invalidate-delay

Syntax Description

minimum	(Optional) Minimum time (in seconds) between invalidation request and actual invalidation. The default is 2 seconds.
maximum	(Optional) Maximum time (in seconds) between invalidation request and actual invalidation. The default is 5 seconds.
quiet	(Optional) Length of time (in seconds) before invalidation.
threshold	(Optional) Maximum number of invalidations considered to be quiet.

Defaults

minimum = 2 seconds

maximum = 5 seconds

quiet = 3 seconds

threshold = 0 invalidations

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

All cache invalidation requests are honored immediately.

This command should typically not be used except under the guidance of technical support personnel. Incorrect settings can seriously degrade network performance.

In an environment with heavy traffic, the CLNS cache can get invalidated (purged) too frequently. Frequent cache invalidations will cause the CPU to spend too much time purging and repopulating the cache.

The **clns cache-invalidate-delay** command controls how the CLNS route cache is purged. The intent is to delay invalidation of the cache until after routing has settled down. Because the routing table changes tend to be clustered in a short period of time, and the cache may be purged repeatedly, a high CPU load might be placed on the router.

When this feature is enabled, and the system requests that the route cache be purged, the request is held for at least the *minimum* seconds. Then the system determines whether the cache has been "quiet" (that is, less than *threshold* invalidation requests in the last *quiet* seconds). If the cache has been quiet, the cache is then purged. If the cache does not become quiet within *maximum* seconds after the first request, it is purged unconditionally.

Manipulation of these parameters trades off CPU utilization versus route convergence time. The timing of routing protocols is not affected, but the removal of stale cache entries is affected.

Examples

The following example sets a minimum delay of 5 seconds, a maximum delay of 30 seconds, and quiet threshold of no more than 5 invalidation requests in the previous 10 seconds:

```
clns cache-invalidate-delay 5 30 10 5
```

Related Commands

Command	Description
clns route-cache	Allows fast switching through the cache.
show clns cache	Displays the CLNS route cache.

clns checksum

To enable checksum generation when ISO CLNS routing software sources a CLNS packet, use the **clns checksum** interface configuration command. Use the **no** form of this command to disable checksum generation.

clns checksum

no clns checksum

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command has no effect on routing packets, such as ES-IS, ISO-Interior Gateway Routing Protocol (IGRP) and IS-IS, sourced by the system. It applies to pings and trace route packets.

Examples

The following example enables checksum generation:

```
interface ethernet 0
 clns checksum
```

clns cluster-alias

To advertise the same system ID as other systems in ES hello messages, use the **clns cluster-alias** interface configuration command to allow multiple systems. Use the **no** form of this command to disable cluster aliasing.

clns cluster-alias

no clns cluster-alias

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This feature caches multiple ES adjacencies with the same NSAP, but with different SNPA addresses. When a packet is destined to the common NSAP address, the Cisco IOS software load-splits the packets among the different SNPA addresses. A router that supports this capability forwards traffic to each system.

If DECnet Phase V cluster aliases are disabled on an interface, ES hello packet information is used to replace any existing adjacency information for the NSAP. Otherwise, an additional adjacency (with a different SNPA) is created for the same NSAP.

Examples

The following example enables cluster aliasing on specified interfaces:

```
clns nsap 47.0004.004d.0001.0000.0c00.1111.00
clns routing

interface ethernet 0
 clns cluster-alias

interface ethernet 1
 clns cluster-alias
```

clns configuration-time

To specify the rate at which ES hellos and IS hellos are sent, use the **clns configuration-time** global configuration command. Use the **no** form of this command to restore the default value.

clns configuration-time *seconds*

no clns configuration-time

Syntax Description

seconds	Rate in seconds at which ES and IS hello packets are sent.

Defaults

60 seconds

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example specifies that ES hellos and IS hellos are to be sent every 100 seconds:

```
clns configuration-time 100
```

Related Commands

Command	Description
clns esct-time	Supplies an ES configuration timer option in a sent IS hello packet that tells the ES how often it should send ES hello packet PDUs.
clns holding-time	Allows the sender of an ES hello or IS hello packet to specify the length of time you consider the information in the hello packets to be valid.

clns congestion-threshold

To set the congestion experienced bit if the output queue has more than the specified number of packets in it, use the **clns congestion-threshold** interface configuration command. A *number* value of zero or the **no** form of this command prevents this bit from being set. Use the **no** form of this command to remove the parameter setting and set it to 0.

clns congestion-threshold *number*

no clns congestion-threshold

Syntax Description

number	Number of packets that are allowed in the output queue before the system sets the congestion-experienced bit. The value zero (0) prevents this bit from being set.

Defaults

4 packets

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

If a router configured for CLNS experiences congestion, it sets the congestion experienced bit. The congestion threshold is a per-interface parameter set by this interface configuration command. An error PDU (ERPDU) is sent to the sending router and the packet is dropped if the number of packets exceeds the threshold.

Examples

The following example sets the congestion threshold to 10:

```
interface ethernet 0
 clns congestion-threshold 10
```

clns dec-compatible

To allow IS hellos sent and received to ignore the N-selector byte, use the **clns dec-compatible** interface configuration command . Use the **no** form of this command to disable this feature.

clns dec-compatible

no clns dec-compatible

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example enables DEC-compatible mode:

```
interface ethernet 0
 clns dec-compatible
```

clns enable

If you do not intend to perform any static or dynamic routing on an interface, but intend to pass ISO CLNS packet traffic to end systems, use the **clns enable** interface configuration command. Use the **no** form of this command to disable ISO CLNS on a particular interface.

clns enable

no clns enable

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example enables ISO CLNS on Ethernet interface 0:

```
interface ethernet 0
 clns enable
```

clns erpdu-interval

To determine the minimum interval time, in milliseconds, between error ERPDUs, use the **clns erpdu-interval** interface configuration command. A *milliseconds* value of zero or the **no** form of this command turns off the interval and effectively sets no limit between ERPDUs.

clns erpdu-interval *milliseconds*

no clns erpdu-interval *milliseconds*

Syntax Description

milliseconds	Minimum interval time (in milliseconds) between ERPDUs.

Defaults

10 ms

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command does not send ERPDUs more frequently than 1 per interface per 10 ms. It is wise not to send an ERPDU frequently if bandwidth is precious (such as over slow serial lines).

Examples

The following example sets the ERPDU interval to 30 ms:

```
interface ethernet 0
 clns erpdu-interval 30
```

Related Commands

Command	Description
clns send-erpdu	Allows CLNS to send an error PDU when the routing software detects an error in a data PU.

clns esct-time

To supply an ES configuration timer option in a transmitted IS hello packet that tells the ES how often it should transmit ES hello packet PDUs, use the **clns esct-time** interface configuration command. Use the **no** form of this command to restore the default value and disable this function.

clns esct-time *seconds*

no clns esct-time *seconds*

Syntax Description

seconds	Time, in seconds, between ES hello PDUs. Range is 0 to 65535.

Defaults

0 seconds (disabled)

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example sets the ES configuration time to 10 seconds:

```
interface ethernet 0
 clns esct-time 10
```

Related Commands

Command	Description
clns configuration-time	Specifies the rate at which ES hello mesages and IS hello messages are sent.
clns holding-time	Allows the sender of an ES hello or IS hello packet to specify the length of time you consider the information in the hello packets to be valid.

clns es-neighbor

To list all systems that will be used when you manually specify the NSAP-to-SNPA mapping, use the **clns es-neighbor** interface configuration command. The SNPAs are the MAC addresses. Use the **no** form of this command to delete the ES neighbor.

clns es-neighbor *nsap snpa*

no clns es-neighbor *nsap*

Syntax Description

nsap	Specific NSAP to map to a specific MAC address.
snpa	Data link (MAC) address.

Defaults

No end systems are listed.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

If you have configured either the **clns router iso-igrp** or **clns router isis** interface configuration commands for a particular interface, the ES-IS routing software automatically turns ES-IS on for that interface.

It is only necessary to use static mapping for those end systems that do *not* support ES-IS. The Cisco IOS software will continue to discover dynamically those end systems that *do* support ES-IS.

Examples

The following example defines an ES neighbor on Ethernet interface 0:

```
interface ethernet 0
 clns es-neighbor 47.0004.004D.0055.0000.0C00.A45B.00 0000.0C00.A45B
```

In this case, the end systems with the following NSAP, or network entity title (NET), are configured with an Ethernet MAC address of 0000.0C00.A45B:

```
47.0004.004D.0055.0000.0C00.A45B.00
```

Related Commands

Command	Description
clns host	Defines a name-to-NSAP mapping that can then be used with commands requiring NSAPs.
clns is-neighbor	Lists all intermediate systems that will be used when you manually specify the NSAP-to-SNPA mapping.

clns filter-expr

To combine CLNS filter sets and CLNS address templates to create complex logical NSAP pattern-matching expressions, use one or more **clns filter-expr** global configuration commands. Use the **no** form of this command to delete the expression.

clns filter-expr *ename* [**not** | **or** | **and** | **xor**] *term*

no clns filter-expr *ename*

Syntax Description

ename	Alphanumeric name to apply to this filter expression.
not	(Optional) Defines a filter expression that is pattern matched only if the pattern given by *term* is not matched.
or	(Optional) Defines a filter expression that is pattern matched if either of the patterns given by the two terms is matched.
and	(Optional) Defines a filter expression that is pattern matched only if both of the patterns given by the two terms are matched.
xor	(Optional) Defines a filter expression that is pattern matched only if one of the patterns, but not both, given by the two terms are matched.
term	Filter expression term. A term can be any of the following: *ename*—Another, previously defined, filter expression. *sname* (or **destination** *sname*)—A previously defined filter set name, with the filter set applied to the destination NSAP address. **source** *sname*—A previously defined filter set name, with the filter set applied to the source NSAP address.

Defaults

No filter expression is defined.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Filter expressions can reference previously defined filter expressions, so you can build arbitrarily complex expressions.

If none of the optional keywords is used, then the command defines a simple filter expression that is pattern matched only if the pattern given by *term* is matched.

Use this command to define complex filter expressions. See the description of the **clns filter-set** global configuration command to learn how to define filter sets.

Examples

The following example defines a filter expression that matches addresses with a source address of anything besides 39.840F, and a destination address that started with 47.0005 or 47.0023, but nothing else:

```
clns filter-set US-OR-NORDUNET permit 47.0005...
clns filter-set US-OR-NORDUNET permit 47.0023
clns filter-set NO-ANSI deny 38.840F...
clns filter-set NO-ANSI permit default
!
clns filter-expr STRANGE source NO-ANSI and destination US-OR-NORDUNET
```

Related Commands

Command	Description
clns filter-set	Builds a list of CLNS address templates with associated permit and deny conditions for use in CLNS filter expressions.
clns template-alias	Builds a list of alphanumeric aliases of CLNS address templates for use in the definition of CLNS filter sets.
show clns filter-expr	Displays one or all currently defined CLNS filter expressions.

clns filter-set

To build a list of CLNS address templates with associated permit and deny conditions for use in CLNS filter expressions, use the **clns filter-set** global configuration command. CLNS filter expressions are used in the creation and use of CLNS access lists. Use the **no** form of this command to delete the entire filter set.

clns filter-set *name* [**permit | deny**] *template*

no clns filter-set *name*

Syntax Description

name	Alphanumeric name to apply to this filter set.
permit | deny	(Optional) Addresses matching the pattern specified by *template* are to be permitted or denied. If neither **permit** nor **deny** is specified, **permit** is assumed.
template	Address template, template alias name, or the keyword **default**. Address templates and alias names are described under the description of the **clns template-alias** global configuration command. The **default** keyword denotes a zero-length prefix and matches any address.

Defaults

No address templates are defined.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use this command to define a list of pattern matches and permit/deny conditions for use in CLNS filter expressions. Filter expressions are used in the creation and use of CLNS access lists. See the description of the **clns filter-expr** global configuration command to learn how to define filter expressions and the **clns template-alias** global configuration command to learn how to define address templates and address template aliases.

Each address that must be matched against a filter set is first compared against all the entries in the filter set, in order, for an exact match with the address. If the exact match search fails to find a match, then the entries in the filter set containing wildcard matches are scanned for a match, again, in order. The first template that matches is used. If an address does not match any of the filter set entries, an implicit “deny” is returned as the permit/deny action of the filter set.

Examples

The following example returns a permit action if an address starts with either 47.0005 or 47.0023. It returns an implicit deny action on any other address.

```
clns filter-set US-OR-NORDUNET permit 47.0005...
clns filter-set US-OR-NORDUNET permit 47.0023...
```

The following example returns a deny action if an address starts with 39.840F, but returns a permit action for any other address:

```
clns filter-set NO-ANSI deny 38.840F...
clns filter-set NO-ANSI permit default
```

Related Commands

Command	Description
clns filter-expr	Combines CLNS filter sets and CLNS address templates to create complex logical NSAP pattern-matching expressions.
clns template-alias	Builds a list of alphanumeric aliases of CLNS address templates for use in the definition of CLNS filter sets.
show clns filter-set	Displays one or all currently defined CLNS filter sets.

clns holding-time

To allow the sender of an ES hello or IS hello to specify the length of time you consider the information in the hello packets to be valid, use the **clns holding-time** global configuration command. Use the **no** form of this command to restore the default value (300 seconds, or 5 minutes).

clns holding-time *seconds*

no clns holding-time

Syntax Description

seconds	Length of time in seconds during which the information in the hello packets is considered valid.

Defaults

300 seconds (5 minutes)

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Setting this value too high puts extra traffic on a line and adds time to process hellos. However, you want to avoid setting it too low if your topology changes more often than the Cisco IOS software sends updates.

Examples

The following example sets the holding time at 150 seconds:

```
clns holding-time 150
```

Related Commands

Command	Description
clns configuration-time	Specifies the rate at which ES hello mesages and IS hello messages are sent.
clns esct-time	Supplies an ES configuration timer option in a sent IS hello packet that tells the ES how often it should send ES hello packet PDUs.

clns host

To define a name-to-NSAP mapping that can then be used with commands requiring NSAPs, use the **clns host** global configuration command.

clns host *name nsap*

Syntax Description

name	Desired name for the NSAP. The first character can be either a letter or a number, but if you use a number, the operations you can perform are limited.
nsap	NSAP to which that the name maps.

Defaults

No mapping is defined.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The assigned NSAP name is displayed, where applicable, in **show** and **debug** EXEC commands. There are some effects and requirements associated with using names to represent network entity titles (NETs) and NSAPs, however. Although using names as proxies for addresses is allowed with CLNS commands, they are never written out to nonvolatile random-access memory (NVRAM).

The first character can be either a letter or a number, but if you use a number, the operations you can perform (such as **ping**) are limited.

The **clns host** command is generated after all other CLNS commands when the configuration file is parsed. As a result, the NVRAM version of the configuration cannot be edited to specifically change the address defined in the original **clns host** command. You must specifically change any commands that refer to the original address. This affects all commands that accept names.

The commands that are affected by these requirements include the following:

- **net** (router configuration command)
- **clns is-neighbor** (interface configuration command)
- **clns es-neighbor** (interface configuration command)
- **clns route** (global configuration command)

Examples

The following example defines names to NSAPs:

```
clns host cisco1 39.0001.0000.0c00.1111.00
clns host cisco2 39.0002.0000.0c00.1111.00
router iso-igrp
 net cisco1
!
interface ethernet 0
 clns net cisco2
```

Related Commands

Command	Description
clns es-neighbor	Lists all systems that will be used when you manually specify the NSAP-to-SNPA mapping.
clns is-neighbor	Lists all intermediate systems that will be used when you manually specify the NSAP-to-SNPA mapping.

clns is-neighbor

To list all intermediate systems that will be used when you manually specify the NSAP-to-SNPA mapping, use the **clns is-neighbor** interface configuration command. The SNPAs are the MAC addresses. Use the **no** form of this command to delete the specified IS neighbor.

clns is-neighbor *nsap snpa*

no clns is-neighbor *nsap*

Syntax Description

nsap	NSAP of a specific intermediate system to enter as neighbor to a specific MAC address.
snpa	Data link (MAC) address.

Defaults

No intermediate systems are listed.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

It is sometimes preferable for a router to have a neighbor entry statically configured rather than learned through ES-IS, ISO IGRP, or IS-IS. This interface configuration command enters an IS neighbor.

Examples

The following example defines an IS neighbor on Ethernet interface 0:

```
interface ethernet 0
 clns is-neighbor 47.0004.004D.0055.0000.0C00.A45B.00 0000.0C00.A45B
```

Related Commands

Command	Description
clns es-neighbor	Lists all systems that will be used when you manually specify the NSAP-to-SNPA mapping.
clns host	Defines a name-to-NSAP mapping that can then be used with commands requiring NSAPs.

clns mtu

To set the maximum transmission unit (MTU) packet size for the interface, use the **clns mtu** interface configuration command. Use the **no** form of this command to restore the default and maximum packet size.

clns mtu *bytes*

no clns mtu

Syntax Description

bytes	Maximum packet size in bytes. The minimum value is 512; the default and maximum packet size depend on the interface type.

Defaults

Depends on interface type

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

All interfaces have a default maximum packet size. You can set the MTU size of the packets sent on the interface with the **mtu** interface configuration command.

All routers on a physical medium must have the same protocol MTU in order to operate.

The CTR card does not support the switching of frames larger than 4472 bytes. Interoperability problems can occur if CTR cards are intermixed with other Token Ring cards on the same network. These problems can be minimized by lowering the CLNS MTUs to be the same on all routers on the network with the **clns mtu** command.

Note Changing the MTU value with the **mtu** interface configuration command can affect the CLNS MTU value. If the CLNS MTU is at its maximum given the interface MTU, the CLNS MTU will change with the interface MTU. However, the reverse is not true; changing the CLNS MTU value has no effect on the value for the **mtu** interface configuration command.

Examples

The following example sets the MTU packet size to 1000 bytes:

```
interface ethernet 0
 clns mtu 1000
```

Related Commands

Command	Description
mtu	Adjusts the maximum packet size or MTU size.

clns net (global configuration command)

To assign a static address for a router, use the **clns net** global configuration command. If the Cisco IOS software is configured to support ISO CLNS, but is not configured to dynamically route CLNS packets using ISO IGRP or IS-IS, use this command to assign an address to the router. Use the **no** form of this command to remove any previously configured NET or NSAP address.

clns net {*net-address* | *name*}

no clns net {*net-address* | *name*}

Syntax Description

net-address	NET address. Refer to the "Usage Guidelines" section.
name	CLNS host name to be associated with this interface.

Defaults

No static address is assigned.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

A CLNS packet sent to any of the defined NSAPs or NETs will be received by the router. The Cisco IOS software chooses the NET to use when it sends a packet with the following algorithm:

- If no dynamic routing protocol is running, use the NET defined for the outgoing interface if it exists; otherwise, use the NET defined for the router.
- If ISO IGRP is running, use the NET of the routing process that is running on this interface.
- If IS-IS is running, use the NET of the IS-IS routing process that is running on this interface.

Examples

The following example assigns a static address:

```
clns net 49.0001.aa00.0400.9105.00
```

clns net (interface configuration command)

To assign an NSAP address or name to a router interface, use the **clns net** interface configuration command. If the Cisco IOS software is configured to support ISO CLNS, but is not configured to dynamically route CLNS packets using an ISO IGRP or IS-IS, use this command to assign an address to the router. Use the **no** form of this command to remove any previously configured NSAP address.

clns net {*nsap-address* | *name*}

no clns net {*nsap-address* | *name*}

Syntax Description

nsap-address	Specific NSAP address.
name	Name to be associated with this interface.

Defaults

No address or name is assigned.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command is useful if you are doing static routing and need to control the source NET used by the router on each interface.

Examples

The following example assigns an NSAP address to a router interface:

```
interface ethernet 0
 clns net 49.0001.0000.0c00.1111.00
```

The following example assigns a name to a router interface:

```
interface ethernet 0
 clns net cisco
```

clns packet-lifetime

To specify the initial lifetime for locally generated packets, use the **clns packet-lifetime** global configuration command. Use the **no** form of this command to remove the parameter's settings.

clns packet-lifetime *seconds*

no clns packet-lifetime

Syntax Description

seconds	Packet lifetime in seconds.

Defaults

32 seconds

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example sets a packet lifetime of 120 seconds:

```
clns packet-lifetime 120
```

Related Commands

Command	Description
clns want-erpdu	Specifies whether to request ERPDUs on packets sourced by the router.

clns rdpdu-interval

To determine the minimum interval time (in milliseconds) between redirect PDUs (RDPDUs), use the **clns rdpdu-interval** interface configuration command. A *milliseconds* value of zero or the **no** form of this command turns off the interval rate and effectively sets no limit between RDPDUs.

clns rdpdu-interval *milliseconds*

no clns rdpdu-interval *milliseconds*

Syntax Description

milliseconds	Minimum interval time (in milliseconds) between RDPDUs.

Defaults

100 ms

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

An RDPDU is rate-limited and is not sent more frequently than one per interface per 100 ms. There is no need to change the default. This setting will work fine for most networks.

Examples

The following example sets an interval of 50 ms:

```
interface ethernet 0
 clns rdpdu-interval 50
```

Related Commands

Command	Description
clns send-rdpdu	Allows CLNS to send RPDUs when a better route for a given host is known.

clns route (interface static route)

To create an interface static route, use this form of the **clns route** global configuration command. Use the **no** form of this command to remove this route, use this form of the **clns route** global configuration command.

clns route *nsap-prefix type number* [*snpa-address*]

no clns route *nsap-prefix*

Syntax Description

nsap-prefix	Network service access point prefix. This value is entered into a static routing table and used to match the beginning of a destination NSAP. The longest NSAP-prefix entry that matches is used.
type	Interface type.
number	Interface number.
snpa-address	(Optional) Specific SNPA address. Optional for serial links; required for multiaccess networks.

Defaults

No interface static routes are created.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

If you do not specify an SNPA address when you have a multiaccess network, you will receive an error message indicating a bad SNPA.

Examples

The following example creates a static route for an Ethernet interface:

```
clns route 39.0002 ethernet 3 aa00.0400.1111
```

The following example creates a static route for a serial interface:

```
clns route 39.0002 serial 0
```

Related Commands

Command	Description
clns route (to enter a static route)	Enters a specific static route.
clns route default	Configures a default zero-length prefix rather than typing an NSAP prefix.
clns route discard	Explicitly tells a router to discard packets with NSAP addresses that match the specified nsap-prefix.

clns route (to enter a static route)

To enter a specific static route, use this form of the **clns route** global configuration command. NSAPs that start with *nsap-prefix* are forwarded to *next-hop-net* or the *name* of the next hop. Use the **no** form of this command to remove this route.

clns route *nsap-prefix* {*next-hop-net* | *name*}

no clns route *nsap-prefix*

Syntax Description

nsap-prefix	Network service access point prefix. This value is entered into a static routing table and used to match the beginning of a destination NSAP. The longest NSAP-prefix entry that matches is used.
next-hop-net	Next-hop NET. This value is used to establish the next hop of the route for forwarding packets.
name	Name of the next hop node. This value can be used instead of the next-hop NET to establish the next hop of the route for forwarding packets.

Defaults

No static route is entered.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example forwards all packets toward the specified route:

```
clns route 39.840F 47.0005.80FF.FF00.0123.4567.89AB.00
```

Related Commands

Command	Description
clns route (interface static route)	Creates an interface static route.
clns route default	Configures a default zero-length prefix rather than typing an NSAP prefix.
clns route discard	Explicitly tells a router to discard packets with NSAP addresses that match the specified nsap-prefix.

clns route-cache

To allow fast switching through the cache, use the **clns route-cache** interface configuration command. Use the **no** form of this command to disable fast switching.

clns route-cache

no clns route-cache

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The cache still exists and is used after the **no clns route-cache** command is used; the software just does not do fast switching through the cache.

Examples

The following example allows fast switching through the cache:

```
interface ethernet 0
 clns route-cache
```

clns route default

To configure a default zero-length prefix rather than type an NSAP prefix, use the **clns route default** global configuration command. Use the **no** form of this command to remove this route.

clns route default *nsap-prefix type number*

no clns route default

Syntax Description

nsap-prefix	Network service access point prefix that is a default zero-length prefix.
type	Interface type. Specify the interface type immediately followed by the interface number; there is no space between the two.
number	Interface number.

Defaults

No default prefix is configured.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example configures a default zero-length prefix:

```
clns route default 39.840F ethernet0
```

Related Commands

Command	Description
clns route (interface static route)	Creates an interface static route.
clns route (to enter a static route)	Enters a specific static route.
clns route discard	Explicitly tells a router to discard packets with NSAP addresses that match the specified nsap-prefix.

clns route default discard

To assign a default discard route and automatically discard packets with NSAP addresses that do not match any existing routes, use the **clns route default discard** global configuration command. To remove the default discard route, use the **no** form of this command.

clns route default discard

no clns route default discard

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.0	This command was introduced.

Usage Guidelines

The only time you would use this command is if you are using static routing and ES-IS and you wish disable ES-IS and therefore reduce the router to using purely static routing. Using this command will reduce the functionality of the router by forcing ISO CLNS to ignore all nodes that were learned through ES-IS.

Note This command will have little or no affect if you are using a dynamic routing process such as IS-IS or ISO-IGRP, as the router will discard any packets for which it does not have a route, even if this command has not been entered.

Examples

The following example assigns a default discard route:

```
clns route default discard
```

When you enter the enter the **show clns route** command, you will see the following default discard route information:

```
#show clns route
Codes: C - connected, S - static, d - DecnetIV
I - ISO-IGRP, i - IS-IS, e - ES-IS
S Default Prefix [10/0], Discard Entry
```

Related Commands

Command	Description
clns route discard	Explicitly tells a router to discard packets with NSAP addresses that match the specified nsap-prefix.
show clns route	Displays all of the destinations to which this router knows how to route packets.

clns route discard

To explicitly tell a router to discard packets with NSAP addresses that match the specified *nsap-prefix*, use the **clns route discard** global configuration command. Use the **no** form of this command to remove this route.

clns route *nsap-prefix* **discard**

no clns route *nsap-prefix*

Syntax Description

nsap-prefix	Network service access point prefix. This value is entered into a static routing table and used to match the beginning of a destination NSAP. The longest NSAP-prefix entry that matches is used.
discard	The router discards packets with NSAPs that match the specified *nsap-prefix*.

Defaults

No NSAP addresses are identified.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The **decnet advertise** command and the **clns route discard** command work together when DECnet Phase IV/V conversion is enabled. Any packet with the specified CLNS NSAP prefix causes CLNS to behave as if no route were found. Because DECnet Phase IV/V conversion is enabled, the route is then looked up in the Phase IV routing table. The router that is advertising the DECnet Phase IV route converts the packet to OSI and sends it to the router that is advertising the CLNS discard static route. Once it gets there, the packet is converted back to Phase IV.

CLNS discard routes cannot be used to discard packets that are addressed to a destination for which there is a dynamic route, if that destination is within the domain (ISO-IGRP) or area (IS-IS) of the router.

Examples

The following example discards packets with a destination NSAP address that matches the prefix 47.0005:

```
clns route 47.0005 discard
```

Related Commands

Command	Description
clns route (interface static route)	Creates an interface static route.
clns route (to enter a static route)	Enters a specific static route.
clns route default	Configures a default zero-length prefix rather than typing an NSAP prefix.

clns router isis

To enable IS-IS routing for OSI on a specified interface, use the **clns router isis** interface configuration command. Use the **no** form of this command with the appropriate area tag to disable IS-IS routing for the system.

clns router isis [*tag*]

no clns router isis [*tag*]

Syntax Description

tag	(Optional) Meaningful name for a routing process. If not specified, a null tag is assumed. It must be unique among all CLNS router processes for a given router. Use the same text for the argument *tag* as specified in the **router isis** global configuration command.

Defaults

IS-IS routing is not specified for any interface.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Creating a name for a routing process means that you use names when configuring routing. You can specify *only one* IS-IS process per router.

Examples

The following example enables IS-IS routing for OSI on Ethernet interface 0:

```
router isis cisco
 net 39.0001.0000.0c00.1111.00
interface ethernet 0
 clns router isis cisco
```

Related Commands

Command	Description
router isis	Enables the IS-IS routing protocol and specifies an IS-IS process for IP.

clns router iso-igrp

To specify ISO IGRP routing on a specified interface, use the **clns router iso-igrp** interface configuration command. Use the **no** form of the global configuration command with the appropriate tag to disable ISO IGRP routing for the system.

clns router iso-igrp *tag* [**level 2**]

no clns router iso-igrp *tag*

Syntax Description

tag	Meaningful name for routing process. It must be unique among all CLNS router processes for a given router. This tag should be the same as defined for the routing process in the **router iso-igrp** global configuration command.
level 2	(Optional) Allows the interface to advertise Level 2 information.

Defaults

ISO IGRP routing is not specified on any interface.

Command Modes

Interface configuration. Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

If you want this interface to advertise Level 2 information only, use the **level 2** keyword. This option reduces the amount of router-to-router traffic by telling the Cisco IOS software to send out only Level 2 routing updates on certain interfaces. Level 1 information is not passed on the interfaces for which the Level 2 option is set.

Examples

In the following example, the interface advertises Level 2 information only on serial interface 0:

```
router iso-igrp marketing
 net 49.0001.0000.0c00.1111.00
interface serial 0
 clns router iso-igrp marketing level 2
```

Related Commands

Command	Description
router iso-igrp	Identifies the area the router will work in and informs it that it will route dynamically using the ISO IGRP protocol.

clns routing

To enable routing of CLNS packets, use the **clns routing** global configuration command. Use the **no** form of this command to disable CLNS routing.

clns routing

no clns routing

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example enables routing of CLNS packets:

```
clns routing
```

Related Commands

Command	Description
clns security pass-through	Allows the Cisco IOS software to pass packets that have security options set.

clns security pass-through

To allow the Cisco IOS software to pass packets that have security options set, use the **clns security pass-through** global configuration command. Use the **no** form of this command to disable this function.

clns security pass-through

no clns security pass-through

Syntax Description

This command has no arguments or keywords.

Defaults

The software discards any packets it sees as set with security options.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example allows the Cisco IOS software to pass packets that have security options set:

```
clns routing
router iso-igrp
 net 47.0004.004d.0001.0000.0c11.1111.00
clns security pass-through
```

Related Commands

Command	Description
clns routing	Enables routing of CLNS packets.

clns send-erpdu

To allow CLNS to send an error PDU when the routing software detects an error in a data PU, use the **clns send-erpdu** interface configuration command. Use the **no** form of this command to disable this function.

clns send-erpdu

no clns send-erpdu

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

When a CLNS packet comes in, the routing software looks in the routing table for the next hop. If it does not find the next hop, the packet is discarded and an ERPDU can be sent.

Examples

The following example allows CLNS to send an error PDU when it detects an error in a data PDU:

```
interface ethernet 0
 clns send-erpdu
```

Related Commands

Command	Description
clns erpdu-interval	Determines the minimum interval time, in milliseconds, between error ERPDUs.

clns send-rdpdu

To send redirect PDUs (RPDUs) when a better route for a given host is known, use the **clns send-rdpdu** interface configuration command to allow CLNS. Use the **no** form of this command to disable this function.

clns send-rdpdu

no clns send-rdpdu

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

If a packet is sent out the same interface it came in on, an RDPDU can also be sent to the sender of the packet.

Examples

The following example allows CLNS to send RPDUs:

```
interface ethernet 0
 clns send-rdpdu
```

Related Commands

Command	Description
clns rdpdu-interval	Determines the minimum interval time (in milliseconds) between RDPDUs.

clns split-horizon

To implement split horizon for ISO IGRP updates, use the **clns split-horizon** interface configuration command. Use the **no** form of this command to disable this function.

clns split-horizon

no clns split-horizon

Syntax Description

This command has no arguments or keywords.

Defaults

For all LAN interfaces—enabled
For WAN interfaces on X.25, Frame Relay, or SMDS networks—disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Normally, routers that are connected to broadcast-type OSI networks and that use distance vector routing protocols employ the split-horizon mechanism to prevent routing loops. Split-horizon blocks information about routes from being advertised by a router out any interface from which that information originated. This behavior usually optimizes communications among multiple routers, particularly when links are broken. However, with nonbroadcast networks, such as Frame Relay and SMDS, situations can arise for which this behavior is less than ideal. For all interfaces except those for which either Frame Relay or SMDS encapsulation is enabled, the default condition for this command is for split horizon to be enabled.

If your configuration includes either the **encapsulation frame-relay** or **encapsulation smds** interface configuration commands, the default is for split horizon to be disabled. Split horizon is not disabled by default for interfaces using any of the X.25 encapsulations.

For networks that include links over X.25 PSNs, the **neighbor** interface configuration command can be used to defeat the split horizon feature. You can as an alternative explicitly specify the **no clns split-horizon** command in your configuration. However, if you do so, you must similarly disable split horizon for all routers in any relevant multicast groups on that network.

Split horizon for ISO IGRP defaults to off for X.25, SMDS, and Frame Relay. Thereby, destinations are advertised out the interface for which the router has a destination.

In general, changing the state of the default for this interface configuration command is not recommended, unless you are certain that your application requires making a change in order to properly advertise routes. Remember that if split horizon is disabled on a serial interface (and that interface is attached to a packet-switched network), you must disable split horizon for all routers in any relevant multicast groups on that network.

Examples

The following example disables split horizon on a serial link connected to an X.25 network:

```
interface serial 0
 encapsulation x25
 no clns split-horizon
```

clns template-alias

To build a list of alphanumeric aliases of CLNS address templates for use in the definition of CLNS filter sets, use one or more **clns template-alias** global configuration commands. Use the **no** form of this command to delete the alias.

clns template-alias *name template*

no clns template-alias *name*

Syntax Description

name	Alphanumeric name to apply as an alias for the template.
template	Address template, as defined in the "Usage Guidelines" section.

Defaults

No alias list is defined.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Address templates are "pattern forms" that match one or more CLNS addresses. They can be simple single CLNS addresses, which match just themselves, or contain *wildcards*, *prefixes*, and *suffixes*, allowing a single template to match many addresses.

The simplest address template matches just a single address, as shown in this example:

```
47.0005.1234.5678.9abc.def0.00
```

Wildcard digits, which can match any value, are indicated with asterisks (*). The following template matches the above address and any other 12-byte long address that starts with 47.0005.1234.5678:

```
47.0005.1234.5678.****.****.**
```

Because OSI addresses are variable in length, it is often useful to build templates that match addresses that share a common prefix. The following template matches any address of any length that begins with the prefix 47.0005.1234.5678:

```
47.0005.1234.5678...
```

In other instances, matching a suffix of the address is also important, such as when matching system IDs. The following template matches any address that ends with the suffix 0000.0c01.2345.00:

```
...0000.0c01.2345.00
```

In other cases, you might want to match addresses on a single-bit granularity, rather than half-byte (four-bit, or *nibble*) granularity. This pattern matching is supported by allowing the hex digits that represent four bits to be replaced by groups of four binary bits, represented by 0s and 1s. These four

binary digits are enclosed within parentheses. The following template matches any address that starts with 47.0005 followed by the binary bits 10. The final two binary bits in the nibble can be either 0 or 1, and are represented with asterisks.

```
47.0005.(10**)...
```

Use this command to define aliases for commonly referenced address templates. The use of these aliases reduces the chances for typographical error in the creation of CLNS filter sets.

Examples

The following command defines a filter set called COMPLEX-PREFIX for the last example given in the "Usage Guidelines" section:

```
clns template-alias COMPLEX-PREFIX 47.0005.(10**)...
```

Related Commands

Command	Description
clns filter-expr	Combines CLNS filter sets and CLNS address templates to create complex logical NSAP pattern-matching expressions.
clns filter-set	Builds a list of CLNS address templates with associated permit and deny conditions for use in CLNS filter expressions.

clns want-erpdu

To specify whether to request ERPDUs on packets sourced by the router, use the **clns want-erpdu** global configuration command. Use the **no** form of this command to remove the parameter's settings.

clns want-erpdu

no clns want-erpdu

Syntax Description

This command has no arguments or keywords.

Defaults

To request ERPDUs

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command has no effect on routing packets (ES-IS, ISO IGRP, and IS-IS) sourced by the system. It applies to pings and trace route packets.

Examples

The following example requests EPDUs on packets sourced by the router:

```
clns want-erpdu
```

Related Commands

Command	Description
clns packet-lifetime	Specifies the initial lifetime for locally generated packets.

distance (ISO CLNS)

To configure the administrative distance for CLNS routes learned, use the **distance** router configuration command. Use the **no** form of this command to restore the administrative distance to the default.

distance *value* [**clns**]

no distance *value* [**clns**]

Syntax Description

value	Administrative distance, indicating the trustworthiness of a routing information source. This argument has a numerical value between 0 and 255. A higher relative value indicates a lower trustworthiness rating. Preference is given to routes with smaller values. The default, if unspecified, is 110.
clns	(Optional) CLNS-derived routes for IS-IS.

Defaults

Static routes—10
ISO IGRP routes—100
IS-IS routes—110

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

When multiple routing processes are running in the same router for CLNS, it is possible for the same route to be advertised by more than one routing process. The Cisco IOS software always picks the route whose routing protocol has the lowest administrative distance.

The **show clns protocol** EXEC command displays the default administrative distance for a specified routing process.

Examples

In the following example, the distance value for CLNS routes learned is 90. Preference is given to these CLNS routes rather than routes with the default administrative distance value of 110.

```
router isis
 distance 90 clns
```

ignore-lsp-errors

To allow the router to ignore IS-IS link-state packets that are received with internal checksum errors rather than purging the link-state packets, use the **ignore-lsp-errors** router configuration command. Use the **no** form of this command to disable this function.

ignore-lsp-errors

no ignore-lsp-errors

Syntax Description

This command has no arguments or keywords.

Defaults

This command is enabled by default; that is, corrupted LSPs are dropped instead of purged for network stability.

Command Modes

Router configuration

Command History

Release	Modification
11.1	This command was introduced.
12.0	This command is now enabled by default.

Usage Guidelines

The IS-IS protocol definition requires that a received link-state packet with an incorrect data-link checksum be purged by the receiver, which causes the initiator of the packet to regenerate it. However, if a network has a link that causes data corruption while still delivering link-state packets with correct data link checksums, a continuous cycle of purging and regenerating large numbers of packets can occur. Because this could render the network nonfunctional, use the **ignore-lsp-errors** command to ignore these link-state packets rather than purge the packets.

Link-state packets are used by the receiving routers to maintain their routing tables.

If you want to explicity purge the corrupted LSPs, issue the **no ignore-lsp-errors** command.

Examples

The following example instructs the router to ignore link-state packets that have internal checksum errors:

```
router isis
 ignore-lsp-errors
```

ip domain-lookup nsap

To allow Domain Name System (DNS) queries for CLNS addresses, use the **ip domain-lookup nsap** global configuration command. Use the **no** form of this command to disable this function.

ip domain-lookup nsap

no ip domain-lookup nsap

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

With both IP and ISO CLNS enabled on a router, this feature allows you to discover a CLNS address without having to specify a full CLNS address given a host name. This feature is useful for the ISO CLNS **ping** EXEC command and when making CLNS Telnet connections.

Examples

The following example disables DNS queries of CLNS addresses:

```
no ip domain-lookup nsap
```

Related Commands

Command	Description
ip domain-lookup	Enables the IP DNS-based host name-to-address translation.
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
ping (privileged)	Diagnoses basic network connectivity on Apollo, AppleTalk, Connectionless Network Service (CLNS), DECnet, IP, Novell IPX, VINES, or XNS networks.
ping (user)	Diagnoses basic network connectivity on AppleTalk, CLNS, IP, Novell, Apollo, VINES, DECnet, or XNS networks.

isis adjacency-filter

To filter the establishment of IS-IS adjacencies, use the **isis adjacency-filter** interface configuration command. Use the **no** form of this command to disable filtering of the establishment of IS-IS adjacencies.

isis adjacency-filter *name* [**match-all**]

no isis adjacency-filter *name* [**match-all**]

Syntax Description

name	Name of the filter set or expression to apply.
match-all	(Optional) All NSAP addresses must match the filter in order to accept the adjacency. If not specified (the default), only one address need match the filter in order for the adjacency to be accepted.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Filtering is performed by building NSAP addresses out of incoming IS-IS hello packets by combining each area address in the hello with the system ID. Each of these NSAP addresses is then passed through the filter. If any one NSAP matches, the filter is considered "passed," unless the **match-all** keyword was specified, in which case all addresses must pass. The functionality of the **match-all** keyword is useful in performing "negative tests," such as accepting an adjacency only if a particular address is *not* present.

Filtering is performed on full NSAP addresses. If filtering should only be performed on system IDs, or any other substring of the full NSAP address, the wildcard matching capabilities of filter sets should be used to ignore the insignificant portions of the NSAP addresses.

Filter sets and expressions are described in this manual in the descriptions for the **clns filter-expr**, **clns filter-set**, and **clns template-alias** global configuration commands.

Examples

The following example builds a filter that accepts adjacencies with only two systems, based only on their system IDs:

```
clns filter-set ourfriends...0000.0c00.1234.**
clns filter-set ourfriends...0000.0c00.125a.**
!
interface ethernet 0
 isis adjacency-filter ourfriends
```

Related Commands

Command	Description
clns filter-expr	Combines CLNS filter sets and CLNS address templates to create complex logical NSAP pattern-matching expressions.
clns filter-set	Builds a list of CLNS address templates with associated permit and deny conditions for use in CLNS filter expressions.
clns template-alias	Builds a list of alphanumeric aliases of CLNS address templates for use in the definition of CLNS filter sets.

iso-igrp adjacency-filter

To filter the establishment of ISO IGRP adjacencies, use the **iso-igrp adjacency-filter** interface configuration command. Use the **no** form of this command to disable filtering of the establishment of ISO IGRP adjacencies.

iso-igrp adjacency-filter *name*

no iso-igrp adjacency-filter *name*

Syntax Description

name	Name of the filter set or expression to apply.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Filtering is performed on full NSAP addresses. If filtering should only be performed on system IDs, or any other substring of the full NSAP address, the wildcard matching capabilities of filter sets should be used to ignore the insignificant portions of the NSAP addresses.

For descriptions of filter sets and expressions, refer to the **clns filter-expr**, **clns filter-set**, and **clns template-alias** global configuration commands in this chapter.

Examples

The following example builds a filter that accepts adjacencies with only two systems, based only on their system IDs:

```
clns filter-set ourfriends...0000.0c00.1234.**
clns filter-set ourfriends...0000.0c00.125a.**
!
interface ethernet 0
 iso-igrp adjacency-filter ourfriends
```

Related Commands

Command	Description
clns filter-expr	Combines CLNS filter sets and CLNS address templates to create complex logical NSAP pattern-matching expressions.
clns filter-set	Builds a list of CLNS address templates with associated permit and deny conditions for use in CLNS filter expressions.
clns template-alias	Builds a list of alphanumeric aliases of CLNS address templates for use in the definition of CLNS filter sets.

log-adjacency-changes (ISO CLNS)

To cause IS-IS to generate a log message when an NLSP IS-IS adjacency changes state (up or down), use the **log-adjacency-changes** router configuration command. Use the **no** form of this command to disable this function.

log-adjacency-changes

no log-adjacency-changes

Syntax Description

This command has no arguments or keywords.

Defaults

Does not log adjacency changes.

Command Modes

Router configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command allows the monitoring of IS-IS adjacency state changes. This may be very useful when monitoring large networks. Messages are logged using the system error message facility. Messages are of the form:

```
%CLNS-5-ADJCHANGE: ISIS: Adjacency to 0000.0000.0034 (Serial0) Up, new adjacency
%CLNS-5-ADJCHANGE: ISIS: Adjacency to 0000.0000.0034 (Serial0) Down, hold time expired
```

Examples

The following example instructs the router to log adjacency changes:

```
router isis
 log-adjacency-changes
```

Related Commands

Command	Description
logging	Logs messages to a syslog server host.

lsp-mtu (ISO CLNS)

To set the maximum transmission unit (MTU) size of IS-IS link-state packets (LSPs), use the **lsp-mtu** router configuration command. Use the **no** form of this command to disable this function.

lsp-mtu *size*

no lsp-mtu

Syntax Description

size	Maximum packet size in bytes. The size must be less than or equal to the smallest MTU of any link in the network. The default size is 1497 bytes.

Defaults

1497 bytes

Command Modes

Router configuration

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

Under normal conditions, the default MTU size should be sufficient. However, if the MTU of a link is below 1500 bytes, the link-state packet MTU must be lowered accordingly on each router in the network. If this is not done, routing becomes unpredictable.

Note This rule applies for all routers in a network. If any link in the network has a reduced MTU, all routers must be changed, not just the routers directly connected to the link.

Caution The CLNS MTU of a link (which is the applicable value for IS-IS, even if it is being used to route IP) may differ from the IP MTU. To be certain about a link MTU as it pertains to IS-IS, use the **show clns interface** command to display the value.

Examples

The following example sets the MTU size to 1300 bytes:

```
router isis
 lsp-mtu 1300
```

Related Commands

Command	Description
mtu	Adjusts the maximum packet size or MTU size.
clns mtu	Sets the MTU packet size for the interface.

match clns address

To define the match criterion, use the **match clns address** route-map configuration command; routes that have a network address matching one or more of the names—and that satisfy all other defined match criteria—will be redistributed. Use the **no** form of this command to remove the match criterion.

match clns address *name* [*name...name*]

no match clns address *name* [*name...name*]

Syntax Description

name	Name of a standard access list, filter set, or expression.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands may be given in any order, and *all* defined **match** criteria must be satisfied to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

Related Commands

Command	Description
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.
set level (ISO CLNS)	Specifies the routing level of routes to be advertised into a specified area of the routing domain.

match clns next-hop

To define the next-hop match criterion, use the **match clns next-hop** route-map configuration command; routes that have a next-hop router address matching one of the names—and that satisfy all other defined match criteria—will be redistributed. Use the **no** form of this command to remove the match criterion.

match clns next-hop *name* [*name...name*]

no match clns next-hop *name* [*name...name*]

Syntax Description

name	Name of an access list, filter set, or expression.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands may be given in any order, and *all* defined **match** criteria must be satisfied to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

Related Commands

Command	Description
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.
set level (ISO CLNS)	Specifies the routing level of routes to be advertised into a specified area of the routing domain.

match clns route-source

To define the route-source match criterion, use the **match clns route-source** route-map configuration command; routes that have been advertised by routers at the address specified by the name—and that satisfy all other defined match criteria—will be redistributed. Use the **no** form of this command to remove the specified match criterion.

match clns route-source *name* [*name...name*]

no match clns route-source *name* [*name...name*]

Syntax Description

name	Name of access list, filter set, or expression.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands may be given in any order, and *all* defined **match** criteria must be satisfied to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

Related Commands

Command	Description
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.
set level (ISO CLNS)	Specifies the routing level of routes to be advertised into a specified area of the routing domain.

match interface (ISO CLNS)

To define the interface match criterion, use the **match interface** route-map configuration command; routes that have the next hop out one of the interfaces specified—and that satisfy all other defined match criteria—will be redistributed. Use the **no** form of this command to remove the specified match criterion.

match interface *type number* [*type number...type number*]

no match interface *type number* [*type number...type number*]

Syntax Description

type	Interface type.
number	Interface number.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands may be given in any order, and *all* defined **match** criteria must be satisfied to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

Related Commands

Command	Description
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.
set level (ISO CLNS)	Specifies the routing level of routes to be advertised into a specified area of the routing domain.

match metric (ISO CLNS)

To define the metric match criterion, use the **match metric** route-map configuration command; routes that have the specified metric—and satisfy all other defined match criteria—will be redistributed. Use the **no** form of this command to remove the specified match criterion.

match metric *metric-value*

no match metric *metric-value*

Syntax Description

metric-value	Route metric. This can be an Interior Gateway Routing Protocol (IGRP) five-part metric.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands may be given in any order, and *all* defined **match** criteria must be satisfied to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

Related Commands

Command	Description
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.
set level (ISO CLNS)	Specifies the routing level of routes to be advertised into a specified area of the routing domain.

match route-type (ISO CLNS)

To define the route-type match criterion, use the **match route-type** route-map configuration command; routes that have the specified route type—and satisfy all other defined match criteria—will be redistributed. Use the **no** form of this command to remove the specified match criterion.

match route-type {**level-1** | **level-2**}

no match route-type {**level-1** | **level-2**}

Syntax Description

level-1	IS-IS Level 1 routes.
level-2	IS-IS Level 2 routes.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **match** route-map configuration command has multiple formats. The **match** commands may be given in any order, and *all* defined **match** criteria must be satisfied to cause the route to be redistributed according to the *set actions* given with the **set** commands. The **no** forms of the **match** commands remove the specified match criteria.

Related Commands

Command	Description
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.
set level (ISO CLNS)	Specifies the routing level of routes to be advertised into a specified area of the routing domain.

metric weights (ISO CLNS)

To specify different metrics for the ISO IGRP routing protocol on CLNS, use the **metric weights** router configuration command. This command allows you to configure the metric constants used in the ISO IGRP composite metric calculation of reliability and load. Use the **no** form of this command to return the five *k* constants to their default values.

metric weights *qos k1 k2 k3 k4 k5*

no metric weights

Syntax Description

qos	QOS defines transmission quality and availability of service. The argument must be 0, the *default metric*.
k1, k2, k3, k4, k5	Values that apply to ISO IGRP for the default metric QOS. The *k* values are metric constants used in the ISO IGRP equation that converts an IGRP metric vector into a scalar quantity. They are numbers from 0 to 127; higher numbers mean a greater multiplier effect.

Defaults

qos = **0**
k1 = **1**
k2 = **0**
k3 = **1**
k4 = **0**
k5 = **0**

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Two additional ISO IGRP metrics can be configured. These are the bandwidth and delay associated with an interface.

Note Using the **bandwidth** and **delay** interface configuration commands to change the values of the ISO IGRP metrics also changes the values of IP IGRP metrics.

By default, the IGRP composite metric is a 24-bit quantity that is a sum of the segment delays and the lowest segment bandwidth (scaled and inverted) for a given route. For a network of homogeneous media, this metric reduces to a hop count. For a network of mixed media (FDDI, Ethernet, and serial lines running from 9600 bps to T1 rates), the route with the lowest metric reflects the most desirable path to a destination.

Use this command to alter the default behavior of IGRP routing and metric computation and allow the tuning of the IGRP metric calculation for QOS.

If k5 equals 0, the composite IGRP metric is computed according to the following formula:

```
metric = [K1 * bandwidth + (K2 * bandwidth) / (256 - load) + K3 * delay]
```

If k5 does not equal zero, the following additional operation is done:

```
metric = metric * [K5 / (reliability + K4)]
```

The default version of IGRP has both k1 and k3 equal to 1, and k2, k4, and k5 equal to 0.

Delay is in units of 10 microseconds. This gives a range of 10 microseconds to 168 seconds. A delay of all ones indicates that the network is unreachable.

Bandwidth is inverse minimum bandwidth of the path in bits per second scaled by a factor of 10^e10. The range is 1200 bps to 10 Gbps.

Table 342 lists the default values used for several common media.

Table 342 Bandwidth Values by Media Type

Media Type	Delay	Bandwidth
Satellite	200,000 (2 sec)	20 (500 Mbit)
Ethernet	100 (1 ms)	1,000
1.544 Mbps	2000 (20 ms)	6,476
64 kbps	2000	156,250
56 kbps	2000	178,571
10 kbps	2000	1,000,000
1 kbps	2000	10,000,000

Reliability is given as a fraction of 255. That is, 255 is 100 percent reliability or a perfectly stable link. Load is given as a fraction of 255. A load of 255 indicates a completely saturated link.

Examples

The following example sets all five metric constants:

```
router iso-igrp
 metric weights 0 2 0 1 0 0
```

Related Commands

Command	Description
bandwidth	Sets a bandwidth value for an interface.
delay	Sets a delay value for an interface.

redistribute (ISO CLNS)

To redistribute routes from one routing domain into another routing domain, use the **redistribute** router configuration command. Use the **no** form of this command to disable redistribution, or to disable any of the specified keywords.

redistribute *protocol* [*tag*] [**route-map** *map-tag*]

no redistribute *protocol* [*tag*] [**route-map** *map-tag*]

redistribute static [**clns** | **ip**]

Syntax Description

protocol	Type of other routing protocol that is to be redistributed as a source of routes into the current routing protocol being configured. The keywords supported are **iso-igrp**, **isis**, and **static**.
tag	(Optional) Meaningful name for a routing process.
route-map *map-tag*	(Optional) Route map should be interrogated to filter the importation of routes from this source routing protocol to the current routing protocol. If not specified, all routes are redistributed. If this keyword is specified, but no route map tags are listed, no routes will be imported. The argument *map-tag* is the identifier of a configured route map.
static	Keyword **static** is used to redistribute static routes. When used without the optional keywords, this causes the Cisco IOS software to inject any OSI static routes into an OSI domain.
clns	(Optional) Keyword **clns** is used when redistributing OSI static routes into an IS-IS domain.
ip	(Optional) Keyword **ip** is used when redistributing IP into an IS-IS domain.

Defaults

Disabled, except for static routes, which by default are redistributed into IS-IS routing domains but are not redistributed into ISO IGRP domains. The keyword **clns** is the default with the keyword **static**.

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

When used with IS-IS, the **redistribute** command causes the routes learned by the routing process tag to be advertised in the IS-IS routing process. Static routes are always redistributed into IS-IS unless a **no redistribute static** command is performed. Redistribution only occurs for Level 2 routing.

You can specify only one IS-IS process per router. Creating a name for a routing process means that you use names when configuring routing. If the *tag* argument is not specified, a null tag is assumed. It must be unique among all CLNS router processes for a given router.

When used with ISO IGRP, if you have a router that is in two routing domains, you might want to redistribute routing information between the two domains. The **redistribute** router configuration command configures which routes are redistributed into the ISO IGRP domain. It is not necessary to use redistribution between areas.

The *tag* argument must be unique among all CLNS router processes for a given router. This tag should be the same as defined for the routing process in the **router iso-igrp** global configuration command.

Static routes are only redistributed into ISO IGRP when a **redistribute static** command is entered. The default is to not redistribute static routes into ISO IGRP. Only the router that injects the static route needs to have a **redistribute static** command defined. This command is needed only when you run ISO IGRP.

Examples

The following example illustrates redistribution of ISO IGRP routes of Michigan and ISO IGRP routes of Ohio into the IS-IS area tagged `USA`:

```
router isis USA
 redistribute iso-igrp Michigan
 redistribute iso-igrp Ohio
```

The following example illustrates redistribution of IS-IS routes of France and ISO IGRP routes of Germany into the ISO IGRP area tagged `Backbone`:

```
router iso-igrp Backbone
 redistribute isis France
 redistribute iso-igrp Germany
```

In the following example, the router advertises any static routes it knows about in the Chicago domain:

```
router iso-igrp Chicago
 redistribute static
```

Related Commands

Command	Description
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.

route-map (ISO CLNS)

To define the conditions for redistributing routes from one routing protocol into another, use the **route-map** global configuration command. Use the **no** form of this command to delete the route map.

route-map *map-tag* {**permit** | **deny**} *sequence-number*

no route-map *map-tag* {**permit** | **deny**} *sequence-number*

Syntax Description

map-tag	Meaningful name for the route map. The **redistribute** command uses this name to reference this route map. Multiple route-maps can share the same map tag name. Can either be an expression or a filter set.
permit	If the match criteria are met for this route map, and **permit** is specified, the route is redistributed as controlled by the set actions. If the match criteria are not met, and **permit** is specified, the next route map with the same map-tag is tested. If a route passes none of the match criteria for the set of route maps sharing the same name, it is not redistributed by that set.
deny	If the match criteria are met for the route map, and **deny** is specified, the route is not redistributed, and no further route maps sharing the same map tag name will be examined.
sequence-number	Number that indicates the position a new route map is to have in the list of route maps already configured with the same name. If given with the **no** form of this command, it specifies the position of the route map that should be deleted.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met.

Related Commands

Command	Description
match clns address	Defines the match criterion.
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
set level (ISO CLNS)	Specifies the routing level of routes to be advertised into a specified area of the routing domain.

router iso-igrp

To identify the area the router will work in and let it know that it will be routing dynamically using the ISO IGRP protocol, use the **router iso-igrp** global configuration command. Use the **no** form of this command with the appropriate tag to disable ISO IGRP routing for the system.

router iso-igrp [*tag*]

no router iso-igrp [***tag***]

Syntax Description

tag	(Optional) Meaningful name for a routing process. For example, you could define a routing process named *Finance* for the Finance department, and another routing process named *Marketing* for the Marketing department. If not specified, a null tag is assumed. The *tag* argument must be unique among all CLNS router processes for a given router.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Creating a name for a routing process means that you use names when configuring routing. You can specify up to ten ISO IGRP processes.

Examples

The following example specifies a router in *Manufacturing*. The command must be typed on one line.

```
router iso-igrp Manufacturing
```

Related Commands

Command	Description
clns router iso-igrp	Specifies ISO IGRP routing on a specified interface.
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.

set level (ISO CLNS)

To specify the routing level of routes to be advertised into a specified area of the routing domain, use the **set level** route-map configuration command. Use the **no** form of this command to disable advertising the specified routing level into a specified area.

set level {**level-1** | **level-2** | **level-1-2**}

no set level {**level-1** | **level-2** | **level-1-2**}

Syntax Description

level-1	Inserted in IS-IS Level 1 link-state PDUs.
level-2	Inserted in IS-IS Level 2 link-state PDUs. For IS-IS destinations, **level-2** is the default.
level-1-2	Inserted into both Level 1 and Level 2 IS-IS link-state PDUs.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the redistribution *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. When all match criteria are met, all set actions are performed. The **no route-map** command deletes the route map.

Examples

Given the following configuration, a RIP-learned route for network 160.89.0.0 and an ISO IGRP-learned route with prefix 49.0001.0002 will be redistributed into an IS-IS Level 2 link-state PDU with metric 5:

```
router isis
 redistribute rip route-map ourmap
 redistribute iso-igrp remote route-map ourmap
route-map ourmap permit
 match ip address 1
 match clns address ourprefix
 set metric 5
 set level level-2
 access-list 1 permit 160.89.0.0 0.0.255.255
 clns filter-set ourprefix permit 49.0001.0002...
```

Related Commands

Command	Description
match clns address	Defines the match criterion.
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.

set metric (ISO CLNS)

To set the metric value to give the redistributed routes, use the **set metric** route-map configuration command. Use the **no** form of this command to disable redistributing routes of a specific metric.

set metric *metric-value*

no set metric *metric-value*

Syntax Description

metric-value	Route metric. This can be an IGRP five-part metric.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the redistribution *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. When all match criteria are met, all set actions are performed. The **no route-map** command deletes the route map.

Examples

Given the following configuration, a RIP-learned route for network 160.89.0.0 and an ISO IGRP-learned route with prefix 49.0001.0002 will be redistributed into an IS-IS Level 2 link-state PDU with metric 5:

```
router isis
 redistribute rip route-map ourmap
 redistribute iso-igrp remote route-map ourmap
!
route-map ourmap permit
 match ip address 1
 match clns address ourprefix
 set metric 5
 set level level-2
!
 access-list 1 permit 160.89.0.0 0.0.255.255
 clns filter-set ourprefix permit 49.0001.0002...
```

Related Commands

Command	Description
match clns address	Defines the match criterion.
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.

set metric-type (ISO CLNS)

To set the metric type to give redistributed routes, use the **set metric-type** route-map configuration command. Use the **no** form of this command to disable redistributing routes of a specific metric type.

set metric-type {**internal** | **external**}

no set metric-type {**internal** | **external**}

Syntax Description

internal	IS-IS internal metric.
external	IS-IS external metric.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the redistribution *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. When all match criteria are met, all set actions are performed. The **no route-map** command deletes the route map.

Examples

The example sets the metric typy of the destination protocol to IS-IS internal metric.

```
route-map map-type
    set metric-type internal
```

Related Commands

Command	Description
match clns address	Defines the match criterion.
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.

set tag (ISO CLNS)

To set a tag value to associate with the redistributed routes, use the **set tag** route-map configuration command. Use the **no** form of this command to disable redistributing routes with the specific tag.

set tag *tag-value*

no set tag *tag-value*

Syntax Description

tag-value	Name for the tag. The tag value to associate with the redistributed route. If not specified, the default action is to *forward* the tag in the source routing protocol onto the new destination protocol.

Defaults

Disabled

Command Modes

Route-map configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Use the **route-map** global configuration command, and the route-map configuration commands **match** and **set**, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria*—the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the redistribution *set actions*—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. When all match criteria are met, all set actions are performed. The **no route-map** command deletes the route map.

Examples

The example sets the tag value of the destination routing protocol to 5.

```
route-map tag
    set tag 5
```

Related Commands

Command	Description
match clns address	Defines the match criterion.
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.

show clns

To display information about the CLNS network, use the **show clns** EXEC command.

show clns

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns** command:

```
router# show clns

Global CLNS Information:
  2 Interfaces Enabled for CLNS
  NET: 39.0004.0030.0000.0C00.224D.00
  NET: 39.0003.0020.0000.0C00.224D.00
  Configuration Timer: 60, Default Holding Timer: 300, Packet Lifetime 64
  ERPDU's requested on locally generated packets
  Intermediate system operation enabled (forwarding allowed)
  ISO IGRP level-1 Router: remote
     Routing for Domain: 39.0003, Area: 0020
  ISO IGRP level-2 Router: DOMAIN_remote
     Routing for Domain: 39.0003
  IS-IS level-1-2 Router:
     Routing for Area: 39.0004.0030
```

Table 343 describes significant fields shown in the display.

Table 343 show clns Field Descriptions

Field	Description
2 Interfaces Enabled for CLNS	Indicates how many interfaces have the CLNS routing protocol enabled.
NET: 39.0004.0030.0000.0C00.224 D.00	First of two NETs for this router.
Configuration Timer: 60	Displays the interval (in seconds) after which the router sends out IS hello packets.
Default Holding Timer: 300	Length of time (in seconds) hello packets are remembered.
Packet Lifetime 64	Default value used in packets sourced by this router.

Table 343 show clns Field Descriptions (continued)

Field	Description
ERPDUs requested on locally generated packets	Indicates whether ERPDUs are requested for packets sourced by the router.
Intermediate system operation enabled (forwarding allowed)	Indicates whether this router is configured to be an ES or an IS.
ISO IGRP level-1 Router: remote	Specifies what CLNS routing type (ISO IGRP or IS-IS) and what routing level (Level 1, Level 2, or both) is enabled on the router.
Routing for Domain: 39.0003, Area: 0020	Specifies the domain (39.0003) and area (0020) for which this CLNS routing type and routing level is enabled.
IS-IS level-1-2 Router:	Specifies that IS-IS is running in this router. Its tag is null. It is running Level 1 and Level 2.
Routing for Area: 39.0004.0030	Specifies the IS-IS area this router is in.

show clns cache

To display the CLNS route cache, use the **show clns cache** command in EXEC mode. The cache contains an entry for each destination that recently has been fast-switched. The output of this command includes entries showing each destination for which the router has switched a packet in the recent past. This includes the router itself.

show clns cache [**delay-parameters** | **invalidations**]

Syntax Description

delay-parameters	(Optional) Current settings for delays when entries are invalidated in the CLNS route cache.
invalidations	(Optional) When specified, shows the last time each function purged the CLNS route cache.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns cache** command:

```
Router# show clns cache

CLNS routing cache version 433
Destination -> Next hop @ Interface: SNPA Address => Rewrite / Length
[42] *39.0004.0040.0000.0C00.2D55.00 ISOLATOR
-> 0000.0C00.2D55 @ Ethernet0/1: 0000.0c00.6fa5
```

Table 344 describes significant fields shown in the display.

Table 344 show clns cache Field Descriptions

Field	Description
CLNS routing cache version 433	Number identifying this particular CLNS routing cache.
Destination ->	Destination NSAP for the packet.
Next hop	Next hop system ID used to reach the destination.
@ Interface:	Interface through which the router transmitted the packet.
SNPA Address	The address of the subnetwork point of attachment (SNPA) of the next hop for this destination NSAP.
Rewrite / Length	Interface encapsulation data and length of the cache entry that the cache must overwrite onto the outgoing frame prior to sending it. If the rewrite length of the cache entry is zero, this field will not be displayed.
[42]	Cache location for this entry.

Table 344 show clns cache Field Descriptions (continued)

Field	Description
*39.0004.0040.0000.0C00.2D55.00[1]	NSAP address.
ISOLATOR	NSAP host name.

1. A leading asterisk (*) indicates that the entry is an allowable value.

The following is sample output from the **show clns cache delay-parameters** command:

```
Minimum invalidation interval 2 seconds,
Maximum invalidation interval 5 seconds,
Quiet interval 3 seconds,
Threshold 0 requests
Invalidation rate 3 in last second, 3 in last 3 seconds
```

Table 345 describes significant fields shown in the display.

Table 345 show clns cache delay-parameters Field Descriptions

Field	Description
Minimum invalidation interval	Minimum time (in seconds) between invalidation request and actual invalidation.
Maximum Invalidation interval	Maximum time (in seconds) between invalidation request and actual invalidation.
Quiet interval	Length of time (in seconds) before invalidation.
Threshold	Maximum number of invalidations considered to be quiet.
Invalidation rate	Number of invalidations (route cache purges) per second.

The following is sample output from the **show clns cache invalidations** command:

```
Caller              Count       Last Invalidation
clns_fastsetup      3           20:55:56
clns_route_update   23          20:56:44
clns_route_adjust   2           20:55:52
isis_compute_spt    2017        00:10:13
delete_adjacency    9           1d19h
clns_ager           11          1d19h
```

Table 346 describes significant fields shown in the display.

Table 346 show clns cache invalidations Field Descriptions

Field	Description
Caller	Lists the names of the functions that have purged the CLNS route cache.
Count	Number of times the function has invalidated the CLNS route cache.
Last invalidation	The last time the function invalidated the CLNS route cache.

Related Commands

Command	Description
clear clns cache	Clears and reinitializes the CLNS routing cache.

show clns es-neighbors

To list the ES neighbors that this router knows about, use the **show clns es-neighbors** EXEC command.

show clns es-neighbors [*type number*] [**detail**]

Syntax Description

type	(Optional) Interface type.
number	(Optional) Interface number.
detail	(Optional) When specified, the areas associated with the end systems are displayed. Otherwise, a summary display is provided.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns es-neighbors** command when Ethernet interface 0 is specified:

```
router# show clns es-neighbors

System Id       Interface   State  Type  Format
0800.2B14.060E  Ethernet0   Up     ES    Phase V
0800.2B14.0528  Ethernet0   Up     ES    Phase V
```

Table 347 describes the significant fields shown in the display.

Table 347 show clns es-neighbors Field Descriptions

Field	Descriptions
System Id	Identification value of the system.
Interface	Interface on which the router was discovered.
State	Adjacency state. Up and Init are the states. See the **show clns neighbors** description.
Type	Type of neighbor. Only valid value for the **show clns es-neighbors** EXEC command is ES.
Format	Indicates if the neighbor is either a Phase V (OSI) adjacency or Phase IV (DECnet) adjacency.

The following is sample output from the **show clns es-neighbors detail** command:

```
router# show clns es-neighbors detail

System Id       Interface  State  Type  Format
0800.2B14.060E  Ethernet0  Up      ES   Phase V
Area Address(es): 49.0040
0800.2B14.0528 Ethernet0  Up      ES    Phase V
Area Address(es): 49.0040
```

Notice that the information displayed in **show clns es-neighbors detail** output includes everything shown in **show clns es-neighbors** output, but it also includes the area addresses associated with the ES neighbors.

Related Commands

Command	Description
clear clns es-neighbors	Removes ES neighbor information from the adjacency database.

show clns filter-expr

To display one or all currently defined CLNS filter expressions, use the **show clns filter-expr** EXEC command.

show clns filter-expr [*name*] [**detail**]

Syntax Description

name	(Optional) Name of the filter expression to display. If none is specified, all are displayed.
detail	(Optional) When specified, expressions are evaluated down to their most primitive filter set terms before being displayed.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following displays assume filter expressions have been defined with the following commands. FRED, BARNEY, WILMA, and BETTY are all filter sets.

```
clns filter-expr MEN FRED or BARNEY
clns filter-expr WOMEN WILMA or BETTY
clns filter-expr ADULTS MEN or WOMEN
```

The **show clns filter-expr** command would yield the following output:

```
router# show clns filter-expr

MEN = FRED or BARNEY
WOMEN = WILMA or BETTY
ADULTS = MEN or WOMEN
```

The **show clns filter-expr detail** command would yield the following output:

```
router# show clns filter-expr detail

MEN = FRED or BARNEY
WOMEN = WILMA or BETTY
ADULTS = (FRED or BARNEY) or (WILMA or BETTY)
```

Related Commands

Command	Description
clns filter-expr	Combines CLNS filter sets and CLNS address templates to create complex logical NSAP pattern-matching expressions.

show clns filter-set

To display one or all currently defined CLNS filter sets, use the **show clns filter-set** EXEC command.

show clns filter-set [*name*]

Syntax Description

name	(Optional) Name of the filter set to display. If none is specified, all are displayed.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following display assumes filter sets have been defined with the following commands:

```
clns filter-set US-OR-NORDUNET 47.0005...
clns filter-set US-OR-NORDUNET 47.0023...
clns filter-set LOCAL 49.0003...
```

The following is a sample output from the **show clns filter-set** command:

```
router# show clns filter-set

CLNS filter set US-OR-NORDUNET
permit 47.0005...
permit 47.0023...
CLNS filter set LOCAL
permit 49.0003...
```

Related Commands

Command	Description
clns filter-set	Builds a list of CLNS address templates with associated permit and deny conditions for use in CLNS filter expressions.

show clns interface

To list the CLNS-specific information about each interface, use the **show clns interface** EXEC command.

show clns interface [*type number*]

Syntax Description

type	(Optional) Interface type.
number	(Optional) Interface number.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns interface** command that includes information for Token Ring and serial interfaces:

```
router# show clns interface

TokenRing 0 is administratively down, line protocol is down
  CLNS protocol processing disabled
TokenRing 1 is up, line protocol is up
  Checksums enabled, MTU 4461, Encapsulation SNAP
  ERPDUs enabled, min. interval 10 msec.
  RDPDUs enabled, min. interval 100 msec., Addr Mask enabled
  Congestion Experienced bit set at 4 packets
  CLNS fast switching disabled
  DEC compatibility mode OFF for this interface
  Next ESH/ISH in 18 seconds
  Routing Protocol: ISO IGRP
      Routing Domain/Area: <39.0003> <0020>
  Serial 2 is up, line protocol is up
      Checksums enabled, MTU 1497, Encapsulation HDLC
ERPDUs enabled, min. interval 10 msec.
     RDPDUs enabled, min. interval 100 msec., Addr Mask enabled
     Congestion Experienced bit set at 4 packets
     CLNS fast switching enabled
     DEC compatibility mode OFF for this interface
     CLNS cluster alias enabled on this interface
     Next ESH/ISH in 48 seconds
  Routing Protocol: IS-IS
       Circuit Type: level-1-2
       Level-1 Metric: 10, Priority: 64, Circuit ID: 0000.0C00.2D55.0A
       Number of active level-1 adjacencies: 0
       Level-2 Metric: 10, Priority: 64, Circuit ID: 0000.0000.0000.00
       Number of active level-2 adjacencies: 0
       Next IS-IS LAN Level-1 hello in 3 seconds
       Next IS-IS LAN Level-2 hello in 3 seconds
```

Table 348 describes significant fields shown in the display.

Table 348 show clns interface Field Descriptions

Field	Description
TokenRing 0 is administratively down, line protocol is down	(First interface). Shown to be administratively down with CLNS disabled.
TokenRing 1 is up, line protocol is up/ Serial 2 is up, line protocol is up	(Second, third interfaces). Shown to be up, and CLNS is up.
Checksums enabled	Can be enabled or disabled.
MTU	The number following MTU is the maximum transmission size for a packet on this interface.
Encapsulation	Describes the encapsulation used by CLNP packets on this interface.
ERPDUs	Displays information about the generation of ERPDUs. They can be either enabled or disabled. If they are enabled, they are sent out no more frequently than the specified interval.
RDPDUs	Provides information about the generation of RDPDUs. They can be either enabled or disabled. If they are enabled, they are sent out no more frequently than the specified interval. If the address mask is enabled, redirects are sent out with an address mask.
Congestion Experienced	Tells when CLNS will turn on the congestion experienced bit. The default is to turn this bit on when there are more than four packets in a queue.
CLNS fast switching	Displays whether fast switching is supported for CLNS on this interface.
DEC compatibility mode	Indicates whether DEC compatibility has been enabled.
CLNS cluster alias enabled on this interface	Indicates that CLNS cluster aliasing has been enabled on this interface.
Next ESH/ISH	Displays when the next ES hello or IS hello is sent on this interface.
Routing Protocol	Lists the areas that this interface is in. In most cases, an interface will be in only one area.
Circuit type	Indicates whether the interface has been configured for local routing (Level 1), area routing (Level 2), or local and area routing (Level 1-2).
Remaining fields	Last series of fields displays information pertaining to the ISO CLNS routing protocols enabled on the interface. For ISO IGRP, the routing domain and area addresses are specified. For IS-IS, the Level 1 and Level 2 metrics, priorities, Circuit IDs, and number of active Level 1 and Level 2 adjacencies are specified.

show clns is-neighbors

To display IS-IS related information for IS-IS router adjacencies, use the **show clns is-neighbors** EXEC command. Neighbor entries are sorted according to the area in which they are located.

show clns is-neighbors [*type number*] [**detail**]

Syntax Description

type	(Optional) Interface type.
number	(Optional) Interface number.
detail	(Optional) When specified, the areas associated with the intermediate systems are displayed. Otherwise, a summary display is provided.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns is-neighbors** command:

```
router# show clns is-neighbors

System Id       Interface   State  Type  Priority  Circuit Id         Format
0000.0C00.0C35  Ethernet1   Up     L1    64        0000.0C00.62E6.03  Phase V
0800.2B16.24EA  Ethernet0   Up     L1L2  64/64     0800.2B16.24EA.01  Phase V
0000.0C00.3E51  Serial1     Up     L2    0         04                 Phase V
0000.0C00.62E6  Ethernet1   Up     L1    64        0000.0C00.62E6.03  Phase V
```

Table 349 describes significant fields shown in the display.

Table 349 show clns is-neighbors Field Descriptions

Field	Descriptions
System Id	Identification value of the system.
Interface	Interface on which the router was discovered.
State	Adjacency state. Up and Init are the states. See the **show clns neighbors** description.
Type	L1, L2, and L1L2 type adjacencies. See the **show clns neighbors** description.
Priority	IS-IS priority that the respective neighbor is advertising. The highest priority neighbor is elected the designated IS-IS router for the interface.
Circuit Id	Neighbor's idea of what the designated IS-IS router is for the interface.
Format	Indicates if the neighbor is either a Phase V (OSI) adjacency or Phase IV (DECnet) adjacency.

The following is sample output from the **show clns is-neighbors detail** command:

```
router# show clns is-neighbors detail

System Id       Interface   State  Type  Priority  Circuit Id         Format
0000.0C00.0C35  Ethernet1   Up     L1    64        0000.0C00.62E6.03  Phase V
  Area Address(es): 47.0004.004D.0001 39.0001
  Uptime: 0:03:35
0800.2B16.24EA  Ethernet0   Up     L1L2  64/64     0800.2B16.24EA.01  Phase V
  Area Address(es): 47.0004.004D.0001
  Uptime: 0:03:35
0000.0C00.3E51  Serial1     Up     L2    0         04                 Phase V
  Area Address(es): 39.0004
  Uptime: 0:03:35
000.0C00.62E6  Ethernet1    Up     L1    64        0000.0C00.62E6.03  Phase V
  Area Address(es): 47.0004.004D.0001
  Uptime: 0:03:35
```

Notice that the information displayed in **show clns is-neighbors detail** output includes everything shown in **show clns is-neighbors** output, but it also includes the area addresses associated with the IS neighbors (intermediate-system adjacencies) and how long (uptime) the adjacency has existed.

Related Commands

Command	Description
clear clns is-neighbors	Removes IS neighbor information from the adjacency database.

show clns neighbors

To display both ES and IS neighbors, use the **show clns neighbors** EXEC command.

show clns neighbors [*type number*] [**detail**]

Syntax Description

type	(Optional) Interface type.
number	(Optional) Interface number.
detail	(Optional) When specified, the area addresses advertised by the neighbor in the hello messages is displayed. Otherwise, a summary display is provided.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns neighbors** command. This display is a composite of the **show clns es-neighbor** and **show clns is-neighbor** commands.

```
router# show clns neighbors

System Id          SNPA            Interface    State  Holdtime  Type Protocol
0000.0000.0007     aa00.0400.6408  Ethernet0    Init   277       IS   ES-IS
0000.0C00.0C35     0000.0c00.0c36  Ethernet1    Up     91        L1   IS-IS
0800.2B16.24EA     aa00.0400.2d05  Ethernet0    Up     29        L1L2 IS-IS
0800.2B14.060E     aa00.0400.9205  Ethernet0    Up     698       ES   ES-IS
0000.0C00.3E51     *HDLC*          Serial1      Up     28        L2   IS-IS
0000.0C00.62E6     0000.0c00.62e7  Ethernet1    Up     22        L1   IS-IS
0A00.0400.2D05     aa00.0400.2d05  Ethernet0    Init   24        IS   ES-IS
```

Table 350 describes the fields shown in the display.

Table 350 show clns neighbors Field Descriptions

Field	Description
System Id	Six-byte value that identifies a system in an area.
SNPA	Subnetwork Point of Attachment. This is the data link address.
Interface	Interface in which the system was learned from.
State	State of the ES or IS.
Init	System is an IS and is waiting for an IS-IS hello message. IS-IS regards the neighbor as not adjacent.
Up	Believes the ES or IS is reachable.
Holdtime	Number of seconds before this adjacency entry times out.
Type	The adjacency type. Possible values are as follows:

Table 350 show clns neighbors Field Descriptions (continued)

Field	Description
ES	End-system adjacency either discovered via the ES-IS protocol or statically configured.
IS	Router adjacency either discovered via the ES-IS protocol or statically configured.
L1	Router adjacency for Level 1 routing only.
L1L2	Router adjacency for Level 1 and Level 2 routing.
L2	Router adjacency for Level 2 only.
Protocol	Protocol through which the adjacency was learned. Valid protocol sources are ES-IS, IS-IS, ISO IGRP, Static, and DECnet.

The following is sample output from the **show clns neighbors detail** command:

```
router# show clns neighbors detail

System Id       Interface  SNPA            State  Holdtime  Type  Protocol
0102.5555.0036  Et1/1      0030.80aa.9b81   Up     23        L1    IS-IS
  Area Address(es):49.0002
  IP Address(es): 175.1.19.36*
  Uptime: 00:00:51
0000.0000.0001  Et1/1      0030.9655.201d   Up     23        L1L2  IS-IS
  Area Address(es): 49.0002
  IP Address(es): 175.1.19.22* 123.120.33.54 30.12.33.253
  Uptime: 00:25:30
```

Notice that the information displayed in **show clns neighbors detail** output includes everything shown in **show clns neighbors** output in addition to the area address associated with the IS neighbor and its uptime. When IP routing is enabled, Integrated-ISIS adds information to the output of the **show clns** commands. The **show clns neighbors detail** command output shows the IP addresses that are defined for the directly connected interface and an asterik (*) to indicate which IP address is the next-hop.

Related Commands

Command	Description
clear clns neighbors	Removes CLNS neighbor information from the adjacency database.

show clns protocol

To list the protocol-specific information for each ISO IGRP routing process in the router, use the **show clns protocol** EXEC command. There will always be at least two routing processes, a Level 1 and a Level 2, and there can be more.

show clns protocol [*domain* | *area-tag*]

Syntax Description

domain	(Optional) Particular ISO IGRP routing domain.
area-tag	(Optional) Particular IS-IS area.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns protocol** command:

```
router# show clns protocol

ISO IGRP Level 1 Router: remote
   Routing for domain: 39.0003 area: 0020
   Sending Updates every 45 seconds. Next due in 11 seconds
   Invalid after 135 seconds,
   Hold down for 145 seconds
   Sending Router Hellos every 17 seconds. Next due in 9 seconds
   Invalid after 51 seconds,
   IGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
   Interfaces in domain/area:
        TokenRing1
ISO IGRP Level 2 Router: DOMAIN_remote
   Routing for domain: 39.0003
   Redistribute:
      isis (Null Tag)
   Sending Updates every 45 seconds. Next due in 2 seconds
   Invalid after 135 seconds,
   Hold down for 145 seconds
   Sending Router Hellos every 17 seconds. Next due in 0 seconds
   Invalid after 51 seconds,
   ISO IGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0
   Interfaces in domain/area:
        TokenRing1
IS-IS Router: <Null Tag>
   System Id: 0000.0C00.224D.00 IS-Type: level-1-2
   Manual area address(es):
        39.0004.0030
   Routing for area address(es):
        39.0004.0030
   Interfaces supported by IS-IS:
        Serial2
   Next global update in 530 seconds
   Redistributing:
```

```
    static
    iso-igrp (remote)
Distance: 110
```

Table 351 describes significant fields shown in the display.

Table 351 show clns protocol Field Descriptions

Field	Description
ISO IGRP Level 1 Router:	Indicates what CLNS routing type is enabled on the router. (Always ISO IGRP when the fields in this section are displayed.) Also indicates what routing level (Level 1, Level 2, or both) is enabled on the router.
remote	Process tag that has been configured using the **router iso-igrp** global configuration command.
Routing for domain: 39.0003 area: 0020	Domain address and area number for Level 1 routing processes. For Level 2 routing processes, this command lists the domain address.
Sending Updates every 45 seconds.	Displays when the next routing updates are sent.
Next due in 11 seconds	Indicates when the next update is sent.
Invalid after 135 seconds	Indicates how long routing updates are to be believed.
Hold down for 145 seconds	Indicates how long a route is held down before new information is to be believed.
Sending Router hellos every 17 seconds. Next due in 9 seconds	Indicates how often the Cisco IOS software sends hello packets to each other and when the next is due.
Invalid after 51 seconds	Indicates how long a neighbor entry is remembered.
IGRP metric weight K1=1, K2=0, K3=1, K4=0, K5=0	Displays lists the weights applied to the various components of the metric. These fields are followed by the list of interfaces in this area.
Interfaces in domain/area:	List of interface names for which the router process is configured.

Table 352 describes significant fields shown in the IS-IS portion of the display.

Table 352 show clns protocol with IS-IS Field Descriptions

Field	Description
IS_IS Router: <Null Tag>	Indicates what CLNS routing type is enabled on the router. (Always IS-IS when the fields in this section are displayed.)
System Id: 0000.0C00.224D.00	Identification value of the system.
IS-Type: level-1-2	Indicates what routing level (Level 1, Level 2 or both) is enabled on the router.
Manual area address(es): 39.0004.0030	Area addresses that have been configured.

Table 352 show clns protocol with IS-IS Field Descriptions (continued)

Field	Description
Routing for area address(es): 39.0004.0030	List of manually configured and learned area addresses.
Interfaces supported by IS-IS:	List of interfaces on the router supporting IS-IS.
Next global update in 530 seconds	Next expected IS-IS update (in seconds).
Redistributing:	Configuration of route redistribution.
Distance:	Configured distance.

show clns route

To display all of the destinations to which this router knows how to route packets, use the **show clns route** EXEC command. The **show clns route** command shows the IS-IS Level 2 routing table as well as static and ISO IGRP learned prefix routes. This table stores IS-IS area addresses and prefix routes. Destinations are sorted by category.

show clns route [*nsap*]

Syntax Description

nsap	(Optional) CLNS NSAP address.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns route** command:

```
router# show clns route

ISO IGRP Routing Table for Domain 39.0003, Area 0020
System Id       Next-Hop        SNPA            Interface   Metric  State
0000.0C00.224D  0000.0000.0000  --              --          0       Up

ISO IGRP Routing Table for Domain 39.0003
Area Id         Next-Hop        SNPA            Interface   Metric  State
0020            0000.0000.0000  --              --          0       Up

CLNS Prefix Routing Table
39.0003 [100/0]
  via 39.0004.0030.0000.0C00.224D.00, ISO IGRP, Up
39.0004.0040 [110/10]
  via 0000.0C00.2D55, IS-IS, Up, Serial2
39.0004.0030 [110/0]
  via 0000.0C00.224D, IS-IS, Up
39.0004.0030.0000.0C00.224D.00, Local NET Entry
39.0003.0020.0000.0C00.224D.00, Local NET Entry
39.0001, DECnet discard Entry, Up
```

As the display shows, neighbors are not included in the **show clns route** output.

Table 353 describes significant fields shown in the display.

Table 353 show clns route Field Descriptions

Field	Descriptions
The following are for dynamically learned routes:	
Domain 39.0003	The routing domain for which we are displaying the routes.
Area 0020	The area this portion of the routing table describes.

Table 353 show clns route Field Descriptions (continued)

Field	Descriptions
System Id	Identification value of the system listed in Level 1 forwarding table.
Area Id	The identification value of the area listed in the area forwarding table.
Next-Hop	System ID of best cost next-hop to listed address.
SNPA	SNPA of next-hop system.
Interface	Interface through which next-hop system is known.
Metric	ISO IGRP metric for the route.
State	Up (active) or Down (nonoperational).
The following are for prefix routes:	
39.0003	Destination prefix.
[100/0]	Administrative distance/metric.
Next-hop address	Either an NET (if a static route) or System ID, if route obtained via IS-IS or ISO-IGRP.
ISO IGRP	Indicates whether the route was learned using ISO IGRP or IS-IS.
Up	Link status—Up (active) or Down (nonoperational).
Serial 2 Local NET Entry	Interface type—Only appears if the specific interface through which the destination is reachable is unambiguously known; Local NET Entry indicates destination is on a directly connected network.
DECnet Discard Entry	Static route entry for DECnet.

Output for the **show clns route** *nsap* command is the same as that for **show clns route**, but only lists a single entry.

Related Commands

Command	Description
clear clns route	Removes all of the dynamically derived CLNS routing information.

show clns traffic

To list the CLNS packets this router has seen, use the **show clns traffic** EXEC command.

show clns traffic

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show clns traffic** command:

```
router# show clns traffic

CLNS & ESIS Output: 139885, Input: 90406
CLNS Local: 0, Forward: 0
CLNS Discards:
  Hdr Syntax: 150, Checksum: 0, Lifetime: 0, Output cngstn: 0
  No Route: 0, Dst Unreachable 0, Encaps. Failed: 0
  NLP Unknown: 0, Not an IS: 0
CLNS Options: Packets 19, total 19, bad 0, GQOS 0, cngstn exprncd 0
CLNS Segments: Segmented: 0, Failed: 0
CLNS Broadcasts: sent: 0, rcvd: 0
Echos: Rcvd 0 requests, 69679 replies
  Sent 69701 requests, 0 replies
ESIS(sent/rcvd): ESHs: 0/34, ISHs: 483/1839, RDs: 0/0, QCF: 0/0
ISO IGRP: Querys (sent/rcvd): 0/0 Updates (sent/rcvd): 1279/1402
ISO IGRP: Router Hellos: (sent/rcvd): 1673/1848
ISO IGRP Syntax Errors: 0
IS-IS:Level-1 Hellos(sent/rcvd):0/0
IS-IS:Level-2 Hellos(sent/rcvd):0/0
IS-IS:PTP Hellos(sent/rcvd):0/0
IS-IS:Level-1 LSPs(sent/rcvd):0/0
IS-IS:Level-2 LSPs(sent/rcvd):0/0
IS-IS:Level-1 CSNPs(sent/rcvd):0/0
IS-IS:Level-2 CSNPs(sent/rcvd):0/0
IS-IS:Level-1 PSNPs(sent/rcvd):0/0
IS-IS:Level-2 PSNPs(sent/rcvd):0/0
IS-IS:Level-1 DR Elections:0
IS-IS:Level-2 DR Elections:0
IS-IS:Level-1 SPF Calculations:0
IS-IS:Level-2 SPF Calculations:0
```

Table 354 describes significant fields shown in the display.

Table 354 show clns traffic Field Descriptions

Field	Description
CLNS & ESIS Output	Total number of packets that this router has sent.
Input	Total number of packets that this router has received.
CLNS Local	Lists the number of packets that were generated by this router.
Forward	Lists the number of packets that this router has forwarded.
CLNS Discards	Lists the packets that CLNS has discarded, along with the reason for the discard.
CLNS Options	Lists the options that have been seen in CLNS packets.
CLNS Segments	Lists the number of packets that have been segmented and the number of failures that occurred because a packet could not be segmented.
CLNS Broadcasts	Lists the number of CLNS broadcasts that have been sent and received.
Echos	Lists the number of echo request packets and echo reply packets that have been received. The line following this field lists the number of echo request packets and echo reply packets that have been sent.
ESIS (sent/rcvd)	Lists the number of ESH, ISH, and Redirects sent and received.
ISO IGRP	Lists the number of IGRP queries and updates sent and received.
Router Hellos	Lists the number of IGRP router hello packets that have been sent and received.
IS-IS: Level-1 hellos (sent/rcvd)	Lists the number of Level 1 IS-IS hello packets sent and received.
IS-IS: Level-2 hellos (sent/rcvd)	Lists the number of Level 2 IS-IS hello packets sent and received.
IS-IS: PTP hellos (sent/rcvd)	Lists the number of point-to-point IS-IS hello packets sent and received over serial links.
IS-IS: Level-1 LSPs (sent/rcvd)	Lists the number of Level 1 link-state PDUs sent and received.
IS-IS: Level-2 LSPs (sent/rcvd)	Lists the number of Level 2 link-state PDUs sent and received.
IS-IS: Level-1 CSNPs (sent/rcvd)	Lists the number of Level 1 CSNPs sent and received.
IS-IS: Level-2 CSNPs (sent/rcvd)	Lists the number of Level 2 CSNPs sent and received.
IS-IS: Level-1 PSNPs (sent/rcvd)	Lists the number of Level 1 PSNPs sent and received.
IS-IS: Level-2 PSNPs (sent/rcvd)	Lists the number of Level 2 PSNPs sent and received.

Table 354 show clns traffic Field Descriptions (continued)

Field	Description
IS-IS: Level-1 DR Elections	Lists the number of times Level 1 designated router election occurred.
IS-IS: Level-2 DR Elections	Lists the number of times Level 2 designated router election occurred.
IS-IS: Level-1 SPF Calculations	Lists the number of times Level 1 shortest-path-first (SPF) tree was computed.
IS-IS: Level-2 SPF Calculations	Lists the number of times Level 2 SPF tree was computed.

show isis routes

To display the IS-IS Level 1 forwarding table for IS-IS learned routes, use the **show isis routes** EXEC command.

show isis routes

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show isis routes** command:

```
router# show isis routes

IS-IS Level-1 Routing Table - Version 34
System Id       Next-Hop        SNPA            Interface    Metric    State
0000.0C00.0C35  0000.0C00.0C35  0000.0c00.0c36  Ethernet1    20        Up
0800.2B16.24EA  0800.2B16.24EA  aa00.0400.2d05  Ethernet0    10        Up
0800.2B14.060E  0800.2B14.060E  aa00.0400.9205  Ethernet0    10        Up
0800.2B14.0528  0800.2B14.0528  aa00.0400.9105  Ethernet0    10        Up
0000.0C00.40AF  0000.0000.0000  --              --           0         Up
0000.0C00.62E6  0000.0C00.62E6  0000.0c00.62e7  Ethernet1    10        Up
AA00.0400.2D05  0800.2B16.24EA  aa00.0400.2d05  Ethernet0    10        Up
```

Table 355 describes significant fields shown in the display.

Table 355 show isis routes Field Descriptions

Field	Description
Version 34	Indicates version number of the Level 1 routing table. All Level 1 routes with a version number that does not match this number are flushed from the routing table. The router's version number increments when the configuration changes from Level 1 or Level 1-2 to Level 2 only.
System Id	Identification value of the system listed in Level 1 forwarding table.
Next-Hop	System ID of best-cost next-hop to listed address.
SNPA	SNPA of next-hop system.
Interface	Interface through which next-hop system is known.
Metric	IS-IS metric for the route.
State	Up (active) or Down (nonoperational).

show route-map

To display all route-maps configured or only the one specified, use the **show route-map** EXEC command.

show route-map [*map-name*]

Syntax Description

map-name	(Optional) Name of a specific route map.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show route-map** command:

```
router# show route-map

route-map sid, permit, sequence 10
 Match clauses:
    tag 1 2
 Set clauses:
    metric 5
route-map sid, permit, sequence 20
 Match clauses:
    tag 3 4
 Set clauses:
    metric 6
```

Table 356 describes the fields shown in the display:

Table 356 show route-map Field Descriptions

Field	Description
route-map	Name of the route map.
permit	Indicates that the route is redistributed as controlled by the set actions.
sequence	Number that indicates the position a new route map is to have in the list of route maps already configured with the same name.
Match clauses: tag	Match criteria—conditions under which redistribution is allowed for the current route map.
Set clauses: metric	Set actions—the particular redistribution actions to perform if the criteria enforced by the **match** commands are met.

Related Commands

Command	Description
redistribute (ISO CLNS)	Redistributes routing information from one domain into another routing domain.
route-map (ISO CLNS)	Defines the conditions for redistributing routes from one routing protocol into another.

show tarp

To display all global TARP parameters, use the **show tarp** EXEC command.

show tarp

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp** command:

```
router# show tarp

Global TARP information:
  TID of this station is "cerd"
  Timer T1 (timer for response to TARP Type 1 PDU) is 15 seconds
  Timer T2 (timer for response to TARP Type 2 PDU) is 25 seconds
  Timer T3 (timer for response to ARP request) is 40 seconds
  Timer T4 (timer that starts when T2 expires) is 15 seconds
  Loop Detection Buffer entry timeout: 300 seconds
  TID cache entry timeout: 300 seconds
  This station will propagate TARP PDUs
  This station will originate TARP PDUs
  TID<->NET cache is enabled
  Sequence number that next packet originated by this station will have: 9
  Update remote cache (URC) bit is 0
  Packet lifetime: 100 hops
  Protocol type used in outgoing packets: "FE"
  N-Selector used in TARP PDU's: "AF"
```

Table 357 describes the fields shown in the display.

Table 357 show tarp Field Descriptions

Field	Description
TID	Target identifier assigned to this router by the **tarp tid** command.
Timer T1	Number of seconds that the router will wait to receive a response from a Type 1 PDU. The T1 timer is set by the **tarp t1-response-timer** command.
Timer T2	Number of seconds that the router will wait to receive a response from a Type 2 PDU. The T2 timer is set by the **tarp t2-response-timer** command.

Table 357 show tarp Field Descriptions (continued)

Field	Description
Timer T3	Number of seconds that the router will wait for a response from a Type 5 PDU. The T3 timer is set by the **tarp arp-request-timer** command.
Timer T4	Number of seconds that the router will wait for a response from a Type 2 PDU after the T2 timer has expired. The T4 timer is set by the **tarp post-t2-response-timer** command.
Loop Detection Buffer entry timeout	Number of seconds that a System ID-to-sequence number mapping entry remains in the loop-detection buffer table. The loop-detection buffer timeout is set by the **tarp ldb-timer** command.
TID cache entry timeout	Number of seconds that a dynamically created TARP entry remains in the TID cache. The cache timeout is set by the **tarp cache-timer** command.
Propagate TARP PDUs	Indicates whether the router can propagate TARP PDUs to its TARP neighbors. This field is set by the **tarp global-propagate** command.
Originate TARP PDUs	Indicates whether the router can originate TARP PDUs. This field is set by the **tarp originate** command.
TID<->NET cache	Indicates whether the router will store TID-to-network (NSAP) address mapping in cache. This field is set by the **tarp allow-caching** command.
Sequence number	Number used by the next packet to indicate if the packet is newer than the last information received. This number can be changed by the **tarp sequence-number** command.
Update remote cache	Indicates the setting of the URC bit in outgoing PDUs. When the bit is zero, the receiver of the PDU will update its cache entry. When the bit is one, the receiver of the PDU will not update its cache entry. This URC bit is set by the **tarp urc** command.
Packet lifetime	Number of hosts that a PDU can traverse before the PDU is discarded. The packet lifetime is set by the **tarp lifetime** command.
Protocol type	Hexadecimal representation of the protocol used in outgoing PDUs. The protocol type is set by the **tarp protocol-type** command. Only CLNP (indicated by FE) is supported.
N-selector	Hexadecimal representation of the N-selector used to indicate that the packet is a TARP PDU. The N-selector is set by the **tarp nselector-type** command. The default is “AF.”

show tarp blacklisted-adjacencies

To list all adjacencies that have been blacklisted (that is, adjacencies that this router will not propagate TARP PDUs to) by the **tarp blacklist-adjacency** command, use the **show tarp blacklisted-adjacencies** EXEC command.

show tarp blacklisted-adjacencies

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp blacklisted-adjacencies** command:

```
router# show tarp blacklisted-adjacencies

Adjacencies that we won't propagate TARP PDU's to:

        49.0001.5555.5555.5555.00
```

Table 358 describes the field shown in the display.

Table 358 show tarp blacklisted adjacencies Field Descriptions

Field	Description
49.0001.5555.5555.5555.00	NSAP address of the blacklisted router.

Related Commands

Command	Description
tarp blacklist-adjacency	Blacklists the specified router so that the router does not receive TARP PDUs propagated by this router.

show tarp host

To display information about a specific TARP router stored in the local TID cache, use the **show tarp host** EXEC command.

show tarp host *tid*

Syntax Description

tid	Target identifier of the router from which you want information. Alphanumeric string up to 255 characters.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp host** command:

```
router# show tarp host artemis

TID of entry: artemis
NET of entry: 49.0001.1111.1111.1111.00
Entry type: DYNAMIC
Expiration time: 280 seconds
```

Table 359 describes the fields shown in the display.

Table 359 show tarp host Field Descriptions

Field	Description
TID	Target identifier of the router.
NET	NSAP address of the router.
Entry type	Type of entry in the TID cache. Values are local, dynamic, or static. A static entry is created with the **tarp map** command.
Expiration time	Amount of time that a dynamically created entry will remain in the TID cache. The cache timer is set by the **tarp cache-timer** command.

Related Commands

Command	Description
tarp tid	Assigns a TID to the router.

show tarp interface

To list all interfaces that have TARP enabled, use the **show tarp interface** EXEC command.

show tarp interface [*type number*]

Syntax Description

type	(Optional) Interface type.
number	(Optional) Interface number.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp interface** command:

```
router# show tarp interface

Ethernet0 is up, line protocol is up, encapsulation is ARPA
TARP propagation is enabled on this interface
```

Table 360 describes the fields shown in the display.

Table 360 show tarp interface Field Descriptions

Field	Description
Ethernet...is {up | down} ...is administratively down	Indicates whether the interface hardware is currently active (whether carrier detect is present) or if it has been taken down by an administrator.
line protocol is {up | down | administratively down}	Indicates whether the software processes that handle the line protocol think the line is usable (that is, whether keepalives are successful).
Encapsulation	Indicates the encapsulation method assigned to the interface.
TARP propagation	Indicates whether this interface can propagate TARP PDUs. The propagation is set by the **tarp propagate** command.

Related Commands

Command	Description
tarp enable	Enables the TARP on an interface.
tarp propagate	Reenables propagation of TARP PDUs on an interface.

show tarp ldb

To display the contents of the loop-detection buffer table, use the **show tarp ldb** EXEC command.

show tarp ldb

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp ldb** command:

```
router# show tarp ldb

   System ID          Sequence Number      Expiration (sec)
  1111.1111.1111              4            240
```

Table 361 describes the fields shown in the display.

Table 361 show tarp ldb Field Descriptions

Field	Description
System ID	System ID of the router.
Sequence Number	Sequence number of the last packet sent by the router specified by the system ID.
Expiration (sec)	Time, in seconds, left before this entry in the loop-detection buffer table is cleared. The time is set by the **tarp ldb-timer** command.

Related Commands

Command	Description
clear tarp ldb-table	Clears the system ID-to-sequence number mapping entries stored in the TARP loop-detection buffer table.
tarp sequence-number	Specifies the sequence number to be used in the next outgoing TARP PDU.

show tarp map

To list all static entries in the TID cache that were configured with the **tarp map** command, use the **show tarp map** EXEC command.

show tarp map

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp map** command:

```
router# show tarp map

        Static MAP entries:

shashi                          49.0001.6666.6666.6666.00
sonali                          49.0001.7777.7777.7777.00
```

Table 362 describes the fields shown in the display.

Table 362 show tarp map Field Descriptions

Field	Description
shashi	TID of the static entry.
49.0001.6666.6666.6666.00	NSAP address of the static entry.

Related Commands

Command	Description
clear tarp tid-table	Clears the dynamically created TARP TID-to-NSAP address mapping entries stored in TID cache.
tarp map	Enters a TID-to-NSAP static route in the TID cache.

show tarp static-adjacencies

To list all static TARP adjacencies that are configured with the **tarp route-static** command, use the **show tarp static-adjacencies** EXEC command.

show tarp static-adjacencies

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp static-adjacencies** command:

```
router# show tarp static-adjacencies

        Manual (static) TARP adjacencies:

        55.0001.0001.1111.1111.1111.1111.1111.1111.1111.00
```

Table 363 describes the field shown in the display.

Table 363 show tarp static-adjacencies Field Descriptions

Field	Description
55.0001.0001.1111.1111.1111.1111.1111.1111.1111.0	NSAP address of the TARP adjacency.

Related Commands

Command	Description
tarp route-static	Configures a static TARP adjacency.

show tarp tid-cache

To display information about the entries in the TID cache, use the **show tarp tid-cache** EXEC command. Entries are created dynamically, statically, or as a result of assigning a TID to the device by using the **tarp tid** command.

show tarp tid-cache [**detail**]

Syntax Description

detail	(Optional) List additional information in the TID/NET cache (such as the expiration time for dynamic entries).

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp tid-cache** command:

```
router# show tarp tid-cache

TID ('*' : static; & : local)              NSAP
* shashi                        49.0001.6666.6666.6666.00
& router                        49.0001.3333.3333.3333.00
* sonali                        49.0001.7777.7777.7777.00
  artemis                       49.0001.1111.1111.1111.00
```

The following is sample output from the **show tarp tid-cache detail** command:

```
router# show tarp tid-cache detail

TID ('*': static; &: local)               NSAP
& router                        49.0001.3333.3333.3333.00
 Expiration time: NONE
```

Table 364 describes the fields shown in the displays.

Table 364 show tarp tid-cache Field Descriptions

Field	Description
TID	Target identifier assigned to the TID cache entry. Static entries are flagged with an asterisk (*). The local entry is flagged with an ampersand (&).
NSAP	NSAP address of the TID cache entry.
*	An asterisk (*) indicates that the entry in the TID cache is static (that is, you have created an entry in the TID cache with the **tarp map** command.

Table 364 show tarp tid-cache Field Descriptions (continued)

Field	Description
&	An ampersand (&) indicates that the entry in the TID cache is the local entry (that is, the router to which you are connected).
Expiration time	Amount of time the entry remains in the TID cache. When this time expires, the entry is removed from the TID cache. Only dynamic entries have an expiration time. The local entry indicated by an ampersand (&) and static entries indicated by an asterisk (*) are not removed from the TID cache.

Related Commands

Command	Description
clear tarp tid-table	Clears the dynamically created TARP TID-to-NSAP address mapping entries stored in TID cache.
tarp cache-timer	Specifies the length of time that a dynamically created TARP entry remains in the TID cache.
tarp map	Enters a TID-to-NSAP static route in the TID cache.
tarp tid	Assigns a TID to the router.

show tarp traffic

To display statistics about TARP PDUs since the last time the counters were cleared, use the **show tarp traffic** EXEC command.

show tarp traffic

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show tarp traffic** command:

```
router# show tarp traffic

TARP counters:
        Packets output: 11, Input: 5
        Hdr syntax: 0
        No memory: 0, Invalid packet: 0
        Lifetime exceeded: 0
```

Table 365 describes the fields shown in the display.

Table 365 show tarp traffic Field Descriptions

Field	Description
Packets output	Indicates the number of PDUs that this router has originated.
Input	Indicates the number of PDUs that this router has received.
Hdr syntax	Number of PDUs with bad header information.
No memory	Number of times a request for memory failed (because of insufficient memory).
Invalid packets	Number of received PDUs that contained invalid information.
Lifetime exceeded	Number of received PDUs with zero lifetime.

Related Commands

Command	Description
clear tarp counters	Clears all TARP counters that are displayed with the show tarp traffic command.

tarp allow-caching

To re-enable the storage of TID-to-NSAP address mapping in the TID cache, use the **tarp allow-caching** global configuration command. Use the **no** form of this command to disable this function and clear the TID cache.

tarp allow-caching

no tarp allow-caching

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

By default, storing TID-to-network (NSAP) address mapping in cache is enabled unless you specifically disable the capability with the **no tarp allow-caching** command. If you disable this capability, you must use the **tarp allow-caching** command to re-enable storage of TID-to-network address mapping in cache. After re-enabling this capability, any previously cleared local entry and all static entries are restored.

Examples

The following example disables storage of TID-to-NSAP address mapping in cache on the router:

```
no tarp allow-caching
```

Related Commands

Command	Description
clear tarp tid-table	Clears the dynamically created TARP TID-to-NSAP address mapping entries stored in TID cache.
show tarp map	Lists all static entries in the TID cache that were configured with the tarp map command.
show tarp tid-cache	Displays information about the entries in the TID cache.
tarp cache-timer	Specifies the length of time that a dynamically created TARP entry remains in the TID cache.
tarp map	Enters a TID-to-NSAP static route in the TID cache.

tarp arp-request-timer

To set the timeout for TARP Type 5 PDUs, use the **tarp arp-request-timer** global configuration command. Use the **no** form of this command to set the timeout to the default value.

tarp arp-request-timer *seconds*

no tarp arp-request-timer

Syntax Description

seconds	Number of seconds that the router will wait for a response from a TARP Type 5 PDU. The range is 0 to 3600 seconds. The default is 40 seconds.

Defaults

40 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

You may want to increase the time if your network has a slow link or there are long delay times on the link.

TARP Type 5 PDUs are sent by the **tarp query** command to determine a TID that corresponds to a particular NSAP.

Examples

The following example sets the timeout for TARP Type 5 PDUs to 60 seconds (one minute):

```
tarp arp-request-timer 60
```

Related Commands

Command	Description
tarp lifetime	Specifies the lifetime for locally generated TARP PDUs based on the number of hops.
tarp query	Determines a TID corresponding to a specific NSAP address.

tarp blacklist-adjacency

To blacklist the specified router so that the router does not receive TARP PDUs propagated by this router, use the **tarp blacklist-adjacency** global configuration command. Use the **no** form of this command to remove the specified router from the blacklist so that the router can once again receive propagated TARP PDUs.

tarp blacklist-adjacency *nsap*

no tarp blacklist-adjacency *nsap*

Syntax Description

nsap	NSAP address that cannot receive TARP PDUs. Use the full NSAP address.

Defaults

All hosts receive propagated TARP PDUs.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

A TARP router propagates PDUs to all its TARP adjacencies (both dynamic and static). Use the **tarp blacklist-adjacency** command to bypass hosts that may not have TARP running or to bypass hosts to which you do not want to propagate TARP PDUs.

Examples

The following example specifies that the router 49.0001.0000.0c00.1111.1234.00 will not receive propagated TARP PDUs:

```
tarp blacklist-adjacency 49.0001.0000.0c00.1111.1234.00
```

Related Commands

Command	Description
show tarp blacklisted-adjacencies	Lists all blacklisted adjacencies (to which this router will not propagate TARP PDUs) by the tarp blacklist-adjacency command.

tarp cache-timer

To specify the length of time that a dynamically created TARP entry remains in the TID cache, use the **tarp cache-timer** global configuration command. Use the **no** form of this command to set the timer to the default value.

tarp cache-timer *seconds*

no tarp cache-timer

Syntax Description

seconds	Number of seconds an entry remains in the TID cache. The range is 30 to 86,400 seconds. The default is 3,600 seconds (one hour).

Defaults

3,600 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

Static entries (those created with the **tarp map** command) remain in the TID cache unless cleared by the **no tarp map** command.

If entries frequently change, you may want to use a shorter time period. If entries are stable, you may want to use a longer time period.

Examples

The following example limits the time an entry remains in the TID cache to 1,800 seconds (30 minutes):

```
tarp cache-timer 1800
```

Related Commands

Command	Description
clear tarp tid-table	Clears the dynamically created TARP TID-to-NSAP address mapping entries stored in TID cache.
show tarp tid-cache	Displays information about the entries in the TID cache.

tarp enable

To enable the TARP on an interface, use the **tarp enable** interface configuration command. Use the **no** form of this command to disable TARP on a particular interface.

tarp enable

no tarp enable

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

Enabling TARP allows the interface to request and respond to TARP PDUs. TARP PDUs are identified by a unique N-selector in the NSAP address. You must also have the TARP process running on the router by using the **tarp run** command.

Examples

The following example enables TARP on Ethernet interface 0:

```
interface ethernet 0
 tarp enable
```

Related Commands

Command	Description
show tarp interface	Lists all interfaces that have TARP enabled.
tarp nselector-type	Specifies the N-selector to be used in CLNP PDUs to indicate that the packet is a TARP.
tarp propagate	Reenables propagation of TARP PDUs on an interface.
tarp run	Starts the TARP process on the router.

tarp global-propagate

To re-enable the capability to propagate TARP PDUs globally, use the **tarp global-propagate** global configuration command. Use the **no** form of this command to disable global propagation of TARP PDUs.

tarp global-propagate

no tarp global-propagate

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

TARP PDUs are globally propagated to all TARP neighbors by default unless you specifically disable the capability with the **no tarp global-propagate** command. If you disable this capability, you must use the **tarp global-propagate** command to re-enable global purgation of TARP PDUs.

TARP PDUs are propagated on all interfaces by default unless you specifically disable the capability on a specific interface with the **no tarp propagate** command.

Note The **no tarp global-propagate** command disables propagation of TARP PDUs on the router (and thus on all interfaces).

Examples

The following example disables global propagation of TARP PDUs on this router:

```
no tarp global-propagate
```

Related Commands

Command	Description
tarp propagate	Reenables propagation of TARP PDUs on an interface.

tarp ldb-timer

To specify the length of time that a system ID-to-sequence number mapping entry remains in the loop-detection buffer table, use the **tarp ldb-timer** global configuration command. Use the **no** form of this command to set the timer to the default value.

tarp ldb-timer *seconds*

no tarp ldb-timer

Syntax Description

seconds	Number of seconds that a system ID-to-sequence number mapping entry remains in the loop-detection buffer table. The range is 0 to 86,400 seconds. The default is 300 seconds.

Defaults

300 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

The loop-detection buffer table prevents TARP PDUs from looping.

Examples

The following example limits the time an entry remains in the loop-detection buffer table to 600 seconds (10 minutes):

```
tarp ldb-timer 600
```

Related Commands

Command	Description
clear tarp ldb-table	Clears the system ID-to-sequence number mapping entries stored in the TARP loop-detection buffer table.
show tarp ldb	Displays the contents of the loop-detection buffer table.
tarp lifetime	Specifies the lifetime for locally generated TARP PDUs based on the number of hops.

tarp lifetime

To specify the lifetime for locally generated TARP PDUs based on the number of hops, use the **tarp lifetime** global configuration command. Use the **no** form of this command to set the PDU lifetime to the default value.

tarp lifetime *hops*

no tarp lifetime

Syntax Description

hops	Number of hosts that a PDU can traverse before it is discarded. Each router represents one hop. The range is 0 to 65535 hops. The default is 100 hops.

Defaults

100 hops

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

The number of hops specified is decremented after every hop. A PDU with a lifetime of zero is discarded.

Examples

The following example specifies that the TARP PDU can traverse 150 hosts before it is discarded:

```
tarp lifetime 150
```

Related Commands

Command	Description
tarp arp-request-timer	Sets the timeout for TARP Type 5 PDUs.
tarp ldb-timer	Specifies the length of time that a system ID-to-sequence number mapping entry remains in the loop-detection buffer table.

tarp map

To enter a TID-to-NSAP static route in the TID cache, use the **tarp map** global configuration command. Use the **no** form of this command to remove a static map entry from the TID cache.

tarp map *tid nsap*

no tarp map *tid nsap*

Syntax Description

tid	Target identifier to be mapped to the specified NSAP. Alphanumeric string up to 255 characters.
nsap	NSAP address to map to the specified TID. Use the full NSAP address.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

Use the **tarp map** command to map multiple NSAP addresses on a router. For example, using the **tarp resolve** to get the NSAP for a known TID will always return the first NSAP address. If the router has multiple NSAP addresses, you can use the **tarp map** command to map the TID to multiple NSAP addresses. If a router has NSAP addresses 1, 2, 3, the **tarp resolve** command will always return NSAP address 1. Use the **tarp map** command to map the router to NSAP addresses 2 and 3 so the **tarp query** command will return the TID corresponding to the other NSAP addresses.

Examples

The following example maps the NSAP address 49.0001.000.1111.1111.1234.00 to TID SJ1:

```
tarp map sj1 49.0001.0000.1111.1111.1234.00
```

Related Commands

Command	Description
clear tarp tid-table	Clears the dynamically created TARP TID-to-NSAP address mapping entries stored in TID cache.
show tarp map	Lists all static entries in the TID cache that were configured with the tarp map command.
tarp query	Determines a TID corresponding to a specific NSAP address.
tarp resolve	Determines an NSAP address corresponding to a specified TID.

tarp nselector-type

To specify the N-selector to be used in CLNP PDUs to indicate that the packet is a TARP, use the **tarp nselector-type** global configuration command. Use the **no** form of this command to set the N-selector to the default value.

tarp nselector-type *hex-digit*

no tarp nselector-type

Syntax Description

hex-digit	Digit in hexadecimal format to be used to identify TARP PDUs. The default is AF.

Defaults

AF

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This feature provides flexibility in using the N-selector field to indicate TARP PDUs. The N-selector must be the same on all hosts running the TARP process.

Examples

The following example changes the N-selector used in CLNP PDUs to BC:

```
tarp nselector-type BC
```

Related Commands

Command	Description
show tarp	Displays all global TARP parameters.

tarp originate

To re-enable the router to originate TARP PDUs, use the **tarp originate** global configuration command. Use the **no** form of this command to disable the capability to originate TARP PDUs.

tarp originate

no tarp originate

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

Origination of TARP PDUs is enabled by default unless you specifically disable the capability with the **no tarp originate** command. If you disable this capability, you must use the **tarp originate** command to re-enable origination of TARP PDUs.

Examples

The following example disables the origination of TARP PDUs on this router:

```
no tarp originate
```

Related Commands

Command	Description
show tarp	Displays all global TARP parameters.

tarp post-t2-response-timer

To specify the length of time that a router waits for a response to a Type 2 PDU after the default timer expires, use the **tarp post-t2-response-timer** global configuration command. Use the **no** form of this command to set the timer to the default value.

tarp post-t2-response-timer *seconds*

no tarp post-t2-response-timer

Syntax Description

seconds	Number of seconds that the router will wait for a response for a Type 2 PDU after the default timer has expired. The range is 0 to 3,600 seconds. The default is 15 seconds.

Defaults

15 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

A Type 1 PDU is sent to all Level 1 (IS-IS and ES-IS) neighbors when a router has a TID for which it has no matching NSAP information. If no response is received within the specified timeout period, a Type 2 PDU is sent to all Level 1 and Level 2 neighbors. If no response is received within the specified timeout period, additional time is allocated based on the number specified in the **tarp post-t2-response-timer** command.

Examples

The following example sets the additional time to wait for a response from a Type 2 PDU to 60 seconds:

```
tarp post-t2-response-timer 60
```

Related Commands

Command	Description
tarp t2-response-timer	Specifies the length of time the router will wait for a response from a Type 2 PDU.

tarp propagate

To propagation of TARP PDUs on an interface, use the **tarp propagate** interface configuration command. Use the **no** form of this command to disable propagation of TARP PDUs on one or more interfaces.

tarp propagate [**all** | **message-type** *type-number* [*type-number*] [*type-number*]]

no tarp propagate [**all** | **message-type** *type-number* [*type-number*] [*type-number*]]

Syntax Description

all	(Optional) Specifies all TARP PDUs.
message-type *type-number*	(Optional) Specifies only *type-number* broadcast PDUs. Valid values are 1, 2, and 4. You may enter more than one *type-number*.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
11.1	This command was introduced.
12.0	The following keywords and arguments were added: • **all** • **message-type** *type-number*

Usage Guidelines

Pressing Return or Enter after **tarp propagate** is the same as typing the keyword **all**.

TARP PDUs are propagated on all interfaces by default unless you specifically disable the capability on a specific interface with the **no tarp propagate** command. If you disable this capability, you must use the **tarp propagate** command to reenable propagation of TARP PDUs. Enabling propagation of TARP PDUs allows the interface to propagate PDUs to all neighbors on this interface. TARP PDUs are identified by a unique N-selector in the NSAP.

Note The **no tarp global-propagate** command disables propagation of TARP PDUs on the router (and, thus, on all interfaces).

Examples

The following example starts the TARP process on the router and enables TARP propagation on Ethernet interface 0:

```
interface ethernet 0
 tarp propagate
```

Related Commands

Command	Description
show tarp interface	Lists all interfaces that have TARP enabled.
tarp enable	Enables the TARP on an interface.
tarp global-propagate	Reenables the capability to propagate TARP PDUs globally.
tarp nselector-type	Specifies the N-selector to be used in CLNP PDUs to indicate that the packet is a TARP.
tarp run	Starts the TARP process on the router.

tarp protocol-type

To specify the network protocol type to be used in outgoing TARP PDUs, use the **tarp protocol-type** global configuration command. Use the **no** form of this command to set the protocol type to the default value.

tarp protocol-type *hex-digit*

no tarp protocol-type

Syntax Description

hex-digit	Digit in hexadecimal format to be used to identify the protocol used in outgoing TARP PDUs. The default is FE (for CLNP).

Defaults

FE

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

Only FE is supported.

Related Commands

Command	Description
show tarp	Displays all global TARP parameters.

tarp query

To a specific NSAP address, use the **tarp query** EXEC command to determine a TID corresponding.

tarp query *nsap*

Syntax Description

nsap	NSAP address that you want the TID for. Use the full NSAP address.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

If there is a TID entry in the local TID cache, the requested information is displayed.

If there is no TID entry in the local TID cache, a TARP Type 5 PDU is sent to the specified NSAP address. Because the NSAP address is specified, the PDU is unicast to the particular NSAP address. If a response is received (in the form of a Type 3 PDU), the local TID cache is updated and the requested information is displayed.

The length of time that the router will wait for a response to a Type 5 PDU is controlled by the **tarp arp-request-timer** command.

Examples

The following is sample output from the **tarp query** command:

```
router# tarp query 49.0001.3333.3333.3333.00

Type escape sequence to abort.
Sending TARP type 5 PDU, timeout 40 seconds...

 TID corresponding to NET 49.0001.3333.3333.3333.00 is cerd
```

Table 366 describes the fields shown in the display.

Table 366 tarp query Field Descriptions

Field	Description
Sending TARP type 5 PDU	PDU requesting the TID of the specified NSAP.
Timeout...	Number of seconds the router will wait for a response from the Type 5 PDU. The timeout is set by the **tarp arp-request-timer** command.
TID corresponding to... is...	Indicates the TID for the specified NSAP address.

Related Commands

Command	Description
show tarp	Displays all global TARP parameters.
tarp arp-request-timer	Sets the timeout for TARP Type 5 PDUs.

tarp resolve

To determine an NSAP address corresponding to a specified TID, use the **tarp resolve** EXEC command.

tarp resolve *tid* [**1** | **2**]

Syntax Description

tid	Target identifier to be mapped to the specified NSAP. Alphanumeric string up to 255 characters.
1	(Optional) Send a Type 1 PDU. The default is a Type 1 PDU. If a response is not received before the timeout period, a Type 2 PDU is sent.
2	(Optional) Send only Type 2 PDU.

Command Modes

EXEC

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

If there is an NSAP entry in the local TID cache, the requested information is displayed.

If there is no NSAP entry in the local TID cache, a TARP Type 1 or Type 2 PDU is sent out. By default a Type 1 PUD is sent. A Type 1 PDU is sent to all Level 1 (IS-IS and ES-IS) neighbors. If a response is received (in the form of a Type 3 PDU), the local TID cache is updated and the requested information is displayed.

If a response from the Type 1 PDU is not received within the timeout period, a Type 2 PDU is sent to all Level 1 and Level 2 neighbors. If a response is received (in the form of a Type 3 PDU), the local TID cache is updated and the requested information is displayed.

The length of time that the router will wait for a response to a Type 1 PDU is controlled by the **tarp t1-response-timer** command. The length of time that the router waits for a response to a Type 2 PDU is controlled by the **tarp t2-response-timer** command and the **tarp-post-t2-response-timer** command.

Examples

The following is sample output from the **tarp resolve** command:

```
router# tarp resolve artemis

Type escape sequence to abort.
Sending TARP type 1 PDU, timeout 15 seconds...

 NET corresponding to TID artemis is 49.0001.1111.1111.1111.00
```

Table 367 describes the fields shown in the display.

Table 367 tarp resolve Field Descriptions

Field	Description
Sending TARP type 1 PDU	PDU requesting the NSAP of the specified TID.
timeout...	Number of seconds the router will wait for a response from the Type 1 PDU. The timeout is set by the **tarp t1-response-timer** command.
NET corresponding to... is...	Indicates the NSAP address (in this case, 49.0001.1111.1111.1111.00) for the specified TID.

Related Commands

Command	Description
tarp map	Enters a TID-to-NSAP static route in the TID cache.
tarp post-t2-response-timer	Specifies the length of time that a router waits for a response to a Type 2 PDU after the default timer expires.
tarp t1-response-timer	Specifies the length of time the router will wait for a response from a Type 1 PDU.
tarp t2-response-timer	Specifies the length of time the router will wait for a response from a Type 2 PDU.

tarp route-static

To configure a static TARP adjacency, use the **tarp route-static** global configuration command. Use the **no** form of this command to remove a static TARP adjacency from the TARP queue.

tarp route-static *nsap* [**all** | **message-type** *type-number* [*type-number*] [*type-number*]]

no tarp route-static *nsap* [**all** | **message-type** *type-number* [*type-number*] [*type-number*]]

Syntax Description

nsap	NSAP address to create a static TARP adjacency. Use the full NSAP address.
all	(Optional) Specifies all TARP PDUs.
message-type *type-number*	(Optional) Specifies only *type-number* broadcast PDUs. Valid values are 1, 2, and 4. You may enter more than one *type-number*.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.0	The following keywords and arguments were added: • **all** • **message-type** *type-number*

Usage Guidelines

Pressing Return or Enter after **tarp route-static** is the same as typing the keyword **all**.

A TARP router propagates PDUs to all its adjacencies and static TARP adjacencies.

If a router is not running TARP, the router discards TARP PDUs rather than propagating the PDUs to all its adjacencies. To allow propagation of the PDU to hosts that are "beyond" a non-TARP router, you must use the **tarp route-static** command to ensure that the hosts receive PDUs. The **tarp route-static** command allows TARP PDUs to "tunnel" through hosts that are not running TARP.

The specified router, as identified by the NSAP address, is stored in a TARP static adjacencies queue.

Use the **tarp blacklist-adjacency** command to bypass hosts that may not have TARP running.

Examples

The following example adds 49.0001.0000.0c00.1111.1234.00 as a static TARP adjacency to the TARP queue:

```
tarp route-static 49.0001.0000.0c00.1111.1234.00
```

Related Commands

Command	Description
show tarp static-adjacencies	Lists all static TARP adjacencies that are configured with the tarp route-static command.
tarp blacklist-adjacency	Blacklists the specified router so that the router does not receive TARP PDUs propagated by this router.

tarp run

To start the TARP process on the router, use the **tarp run** global configuration command. Use the **no** form of this command to stop the TARP process.

tarp run

no tarp run

Syntax Description

This command has no arguments or keywords.

Defaults

No TARP process (unless configured to start in NVRAM).

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

You must also enable TARP on the individual interfaces by using the **tarp enable** command.

Examples

The following example starts the TARP process on the router:

```
tarp run
```

Related Commands

Command	Description
tarp enable	Enables the TARP on an interface.
tarp propagate	Reenables propagation of TARP PDUs on an interface.

tarp sequence-number

To specify the sequence number to be used in the next outgoing TARP PDU, use the **tarp sequence-number** global configuration comman . Use the **no** form of this command to return to the default value.

tarp sequence-number *number*

no tarp sequence-number *number*

Syntax Description

number	Number from 0 to 65535 that will be used as the sequence number in the next outgoing PDU. The default is zero.

Defaults

Zero

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

The sequence number lets the router determine if information received in the PDU is newer than the last information received. You may want to increase the sequence number to ensure that other hosts update their entries in TID cache.

Examples

The following example causes a sequence number of 10 to be assigned to the next TARP PDU:

```
tarp sequence-number 10
```

Related Commands

Command	Description
show tarp	Displays all global TARP parameters.
show tarp ldb	Displays the contents of the loop-detection buffer table.

tarp t1-response-timer

To specify the length of time the router will wait for a response from a Type 1 PDU, use the **tarp t1-response-timer** global configuration command. Use the **no** form of this command to set the timer to the default value.

tarp t1-response-timer *seconds*

no tarp t1-response-timer

Syntax Description

seconds	Number of seconds that the router will wait to receive a response from a Type 1 PDU. The range is 0 to 3600 seconds. The default is 15 seconds.

Defaults

15 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

A Type 1 PDU is sent to all Level 1 (IS-IS and ES-IS) neighbors when a router has a TID for which it has no matching NSAP information. If no response is received within the timeout period (specified by the **tarp t1-response-timer** command), a Type 2 PDU is sent to all Level 2 neighbors.

Examples

The following example sets the timeout period for a Type 1 PDU to 60 seconds:

```
tarp t1-response-timer 60
```

Related Commands

Command	Description
tarp t2-response-timer	Specifies the length of time the router will wait for a response from a Type 2 PDU.

tarp t2-response-timer

To specify the length of time the router will wait for a response from a Type 2 PDU, use the **tarp t2-response-timer** global configuration command. Use the **no** form of this command to set the timer to the default value.

tarp t2-response-timer *seconds*

no tarp t2-response-timer

Syntax Description

seconds	Number of seconds that the router will wait to receive a response from a Type 2 PDU. The range is 0 to 3600 seconds. The default is 25 seconds.

Defaults

25 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

A Type 1 PDU is sent to all Level 1 (IS-IS and ES-IS) neighbors when a router has a TID for which it has no matching NSAP information. If no response is received within the timeout period (specified by the **tarp t1-response-timer** command), a Type 2 PDU is sent to all Level 2 neighbors. If no response is received within the timeout period (specified by the **tarp t2-response-timer** command), additional time can be allocated by using the **tarp post-t2-response-timer** command.

Examples

The following example sets the timeout period for a Type 2 PDU to 60 seconds:

```
tarp t2-response-timer 60
```

Related Commands

Command	Description
tarp post-t2-response-timer	Specifies the length of time that a router waits for a response to a Type 2 PDU after the default timer expires.
tarp t1-response-timer	Specifies the length of time the router will wait for a response from a Type 1 PDU.

tarp tid

To assign a TID to the router, use the **tarp tid** global configuration command. Use the **no** form of this command to remove the TID from the router.

tarp tid *tid*

no tarp tid *tid*

Syntax Description

tid	Target identifier to be used by this router. Alphanumeric string up to 255 characters.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

All hosts using TARP must have a unique TID assigned.

Examples

The following example assigns the TID SJ3 to the router:

```
tarp tid sj3
```

Related Commands

Command	Description
show tarp	Displays all global TARP parameters.
show tarp host	Displays information about a specific TARP router stored in the local TID cache.
show tarp tid-cache	Displays information about the entries in the TID cache.

tarp urc

To set the update remote cache bit in all subsequent outgoing PDUs, use the **tarp urc** global configuration command. Use the **no** form of this command to set the update remote cache bit to the default value.

tarp urc {**0** | **1**}

no tarp urc

Syntax Description

0	Set the update remote cache bit to 0, which is the default value. When the bit is zero, the receiver's PDU will update its TID cache entry.
1	Set the update remote cache bit to 1. When the bit is 1, the receiver's TID cache is not updated.

Defaults

The default value is 0.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

If you do not specify either 0 or 1, the default value 0 is used.

Examples

The following example sets the update remote cache bit in the outgoing PDU to 1, so the cache at the receiver's end is not updated:

```
tarp urc 1
```

Related Commands

Command	Description
show tarp	Displays all global TARP parameters.

timers basic (ISO CLNS)

To configure ISO IGRP timers, use the **timers basic** router configuration command. Use the **no** form of this command to restore the default values, use the **timers basic** router configuration command.

timers basic *update-interval holddown-interval invalid-interval*

no timers basic *update-interval holddown-interval invalid-interval*

Syntax Description

update-interval	Time, in seconds, between the sending of routing updates. The default value is 90 seconds.
holddown-interval	Time, in seconds, a system or area router is kept in holddown state, during which routing information regarding better paths is suppressed. (A router enters into a holddown state when an update packet is received that indicates the route is unreachable. The route is marked inaccessible and advertised as unreachable. However, the route is still used for forwarding packets.) When the holddown interval expires, routes advertised by other sources are accepted and the route is no longer inaccessible. The default value is 145 seconds.
invalid-interval	Time, in seconds, that a route remains in the routing table after it has been determined that it is not reachable. After that length of time, the route is removed from the routing table. The default value is 135 seconds.

Defaults

update-interval = 90 seconds
holddown-interval = 145 seconds
invalid-interval = 135 seconds

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Because the ISO IGRP routing protocol executes a distributed, asynchronous routing algorithm, it is important that these timers be the same for all routers in the network.

Examples

In the following example, updates are broadcast every 60 seconds. When an update packet is received that indicates the router is unreachable, the router will be in holddown state for 100 seconds before once more becoming accessible. If a router is not heard from in 130 seconds, the route is removed from the routing table.

```
router iso-igrp
 timers basic 60 100 130
```

which-route

If you want to know which next-hop router will be used or if you have multiple processes running and want to troubleshoot your configuration, use the **which-route** EXEC command. This command displays the routing table in which the specified CLNS destination is found.

which-route {*nsap-address* | *clns-name*}

Syntax Description

nsap-address	CLNS destination network address.
clns-name	Destination host name.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Route information can reside in the following tables:

- IS-IS Level 1 routing table
- ISO IGRP system-id or area routing table
- Prefix routing table (IS-IS Level 2 routes, ISO IGRP domain routes, and static routes)
- Adjacency database

Examples

The following example shows that destination information for router gray is found in the IS-IS Level 1 routing table. The destination is on the local system.

```
gray# which-route gray
Route look-up for destination 39.0001.0000.0c00.bda8.00, GRAY
 Found route in IS-IS level-1 routing table - destination is local
```

The following example shows that destination information for NSAP address 49.0001.0000.0c00.bda8.00 is found in the ISO IGRP Level 1 routing table. The destination is on the local system.

```
gray# which-route 49.0001.0000.0c00.bda8.00
Route look-up for destination 49.0001.0000.0c00.bda8.00
 Found route in ISO IGRP routing table - destination is local
```

The following example shows that destination information for router `green` is found in the IS-IS Level 1 routing table. The destination is not on the local system.

```
gray# which-route green
Route look-up for destination 39.0001.0000.0c00.7f06.00, GREEN
 Found route in IS-IS level-1 routing table

Adjacency entry used:
System Id       SNPA            Interface   State Holdtime Type Protocol
GREEN           0000.0c00.2d55   Ethernet0   Up     91        L1L2  IS-IS
  Area Address(es): 39.0001
```

Table 368 describes the display fields in the adjacency entry used to reach system green.

Table 368 which-route Field Descriptions

Field	Description
System ID	Six-byte value that identifies a system in an area. A name is displayed in this field if one has been assigned with the **clns host** global configuration command.
SNPA	SNPA data link address.
Interface	Interface from which system information was learned.
State	State of the ES or IS. Possible values are as follows: Init—The system is an IS and is waiting for an IS-IS hello message. The neighbor to the IS-IS is not adjacent. Up—The ES or IS is reachable.
Holdtime	Number of seconds for which the information is valid.
Type	Adjacency type. Possible values are as follows: ES—An end-system adjacency that is either discovered by the ES-IS protocol or statically configured. IS—A router adjacency that is either discovered by the IS-IS protocol or is statically configured. L1—A router adjacency for Level 1 routing only. L1L2—A router adjacency for Level 1 and Level 2 routing. L2—A router adjacency for Level 2 only.
Protocol	Protocol through which the adjacency was learned. Valid protocol sources are ES-IS, IS-IS, ISO IGRP, and Static.

The following example shows that destination information for NSAP address 49.0001.1111.1111.1111.00 is found in the ISO IGRP routing table. Table 368 describes the display fields in the adjacency entry used to reach NSAP address 49.0001.1111.1111.1111.00.

```
gray# which-route 49.0001.1111.1111.1111.00
Route look-up for destination 49.0001.1111.1111.1111.00
 Found route in ISO IGRP routing table

Adjacency entry used:
System Id       SNPA             Interface   State Holdtime Type Protocol
1111.1111.1111 0000.0c01.151d   Ethernet1   Up     38        L1L2 ISO IGRP
 Area Address(es): 49.0001
```

The following example indicates that the specified address is not found in a routing table:

```
gray# which-route 47.0003.0000.0000.0000.00
Route look-up for destination 47.0003.0000.0000.0000.00
 Route not found
```

The following example indicates that the specified NSAP address was found in the CLNS prefix routing table. This information is followed by the route entry used to reach NSAP address 49.0003.0000.0000.0000.00.

```
gray# which-route 49.0003.0000.0000.0000.00
Route look-up for destination 49.0003.0000.0000.0000.00
 Found route in CLNS prefix routing table

Route entry used:
49 [10/0]
  via 1111.1111.1111, Ethernet1, Static
```

Related Commands

Command	Description
clns host	Defines a name-to-NSAP mapping that can then be used with commands requiring NSAPs.