

# DECnet Commands

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Digital Equipment Corporation developed the DECnet protocol to provide a way for its computers to communicate with one another. Currently in its fifth major product release, DECnet Phase V is a superset of the Open System Interconnection (OSI) protocol suite, supports all OSI protocols, and is compatible with the previous release (Phase IV). DECnet Phase IV Prime supports inherent MAC addresses, which allow DECnet nodes to coexist with systems running other protocols that have MAC address restrictions. DECnet support on Cisco routers includes local-area and wide-area DECnet Phase IV routing over Ethernet, Token Ring, FDDI, and serial lines such as X.25, Frame Relay, and Switched Multimegabit Data Service (SMDS).

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

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**Note** Not all Cisco access servers support DECnet. For more information, refer to the release notes for the current Cisco IOS release.

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## access-list (extended)

To create an extended access list, use the **access-list** global configuration command. To delete the entire access list, use the **no** form of this command.

```
access-list access-list-number {permit | deny} source source-mask [destination  
destination-mask]  
no access-list
```

### Syntax Description

|                           |   |
|---------------------------|---|
| <i>access-list-number</i> | Integer you choose between 300 and 399 that uniquely identifies the access list.  |
| <b>permit</b>             | Permits access when there is an address match.  |
| <b>deny</b>               | Denies access when there is an address match.   |
| <i>source</i>             | Source address. DECnet addresses are written in the form <i>area.node</i> . For example, 50.4 is node 4 in area 50. All addresses are in decimal.                   |
| <i>source-mask</i>        | Mask to be applied to the address of the source node. All masks are in decimal.   |
| <i>destination</i>        | (Optional) Destination node's DECnet address in decimal format. DECnet addresses are written in the form <i>area.node</i> . For example, 50.4 is node 4 in area 50. |
| <i>destination-mask</i>   | (Optional) Destination mask. DECnet addresses are written in the form <i>area.node</i> . For example, 50.4 is node 4 in area 50. All masks are in decimal.          |

### Default

No access list is defined.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

In the following example, access list 301 is configured to allow traffic from any host in networks 1 and 3. It implies no other traffic is permitted. (The end of a list contains an implicit “deny all else” statement.)

```
access-list 301 permit 1.0 0.1023 0.0 63.1023  
access-list 301 permit 3.0 0.1023 0.0 63.1023
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**access-list (filter connect initiate packets)**

**access-list (standard)**

**decnet access-group**

**decnet in-routing-filter**

**decnet out-routing-filter**

**show decnet interface**

## access-list (filter connect initiate packets)

To create an access list that filters *connect initiate* packets, use this version of the **access-list** global configuration command. To disable the access list, use the **no** form of this command.

```
access-list access-list-number {permit | deny} source source-mask
  [destination destination-mask] {eq | neq} [[source-object] [destination-object]
  [identification] any]
```

**no access-list**

The optional argument *source-object* consists of the following string:

```
src [{eq | neq | gt | lt} object-number] [exp regular-expression] [uic [group, user]]
```

The optional argument *destination-object* consists of the following string:

```
dst [{eq | neq | gt | lt} object-number] [exp regular-expression] [uic [group, user]]
```

The optional argument *identification* consists of the following string:

```
[id regular-expression] [password regular-expression] [account regular-expression]
```

### Syntax Description

|                           |   |
|---------------------------|---|
| <i>access-list-number</i> | Integer you choose between 300 and 399 that uniquely identifies the access list.  |
| <b>permit</b>             | Permits access when there is an address match.  |
| <b>deny</b>               | Denies access when there is an address match.   |
| <i>source</i>             | Source address. DECnet addresses are written in the form <i>area.node</i> . For example, 50.4 is node 4 in area 50. All addresses are in decimal.   |
| <i>source-mask</i>        | Mask to be applied to the address of the source node. All masks are in decimal.   |
| <i>destination</i>        | (Optional) Destination node's DECnet address in decimal format. DECnet addresses are written in the form <i>area.node</i> . For example, 50.4 is node 4 in area 50. All addresses are in decimal.   |
| <i>destination-mask</i>   | (Optional) Destination mask. DECnet addresses are written in the form <i>area.node</i> . For example, 50.4 is node 4 in area 50. All masks are in decimal.  |
| <b>eq</b>   <b>neq</b>    | Use either of these keywords: <ul style="list-style-type: none"> <li><b>eq</b>—Item matches the packet if <i>all</i> the specified parts of <i>source-object</i>, <i>destination-object</i>, and <i>identification</i> match data in the packet.</li> <li><b>neq</b>—Item matches the packet if <i>any</i> of the specified parts do <i>not</i> match the corresponding entry in the packet.</li> </ul> |

|                           |  |
|---------------------------|--|
| <i>source-object</i>      | <p>(Optional) Contains the mandatory keyword <b>src</b> and one of the following optional keywords:</p> <ul style="list-style-type: none"> <li>• <b>eq</b>   <b>neq</b>   <b>lt</b>   <b>gt</b>—Equal to, not equal to, less than, or greater than. These keywords must be followed by the argument <i>object-number</i>, a numeric DECnet object number.</li> <li>• <b>exp</b>—Stands for expression; followed by a regular expression that matches a string. See the “Regular Expressions” appendix in the <i>Dial Solutions Command Reference</i> for a description of regular expressions.</li> <li>• <b>uic</b>—Stands for user identification code; followed by a numeric user ID (UID) expression. The argument [<i>group, user</i>] is a numeric UID expression. In this case, the bracket symbols are literal; they must be entered. The group and user parts can either be specified in decimal, in octal by prefixing the number with a 0, or in hex by prefixing the number with 0x. The <i>uic</i> expression displays as an octal number.</li> </ul> |
| <i>destination-object</i> | <p>(Optional) Contains the mandatory keyword <b>dst</b> and one of the following optional keywords:</p> <ul style="list-style-type: none"> <li>• <b>eq</b>   <b>neq</b>   <b>lt</b>   <b>gt</b>—Equal to, not equal to, less than, or greater than. These keywords must be followed by the argument <i>object-number</i>, a numeric DECnet object number.</li> <li>• <b>exp</b>—Stands for expression; followed by a regular expression that matches a string. See the “Regular Expressions” appendix in the <i>Dial Solutions Command Reference</i> for a description of regular expressions.</li> <li>• <b>uic</b>—Stands for user identification code; followed by a numeric user ID (UID) expression. In this case, the bracket symbols are literal; they must be entered. The group and user parts can either be specified in decimal, in octal by prefixing the number with a 0, or in hex by prefixing the number with 0x. The <i>uic</i> expression displays as an octal number.</li> </ul>  |
| <i>identification</i>     | <p>(Optional) Uses any of the following three keywords:</p> <ul style="list-style-type: none"> <li>• <b>id</b>—Regular expression; refers to user ID.</li> <li>• <b>password</b>—Regular expression; the password to the account.</li> <li>• <b>account</b>—Regular expression; the account string.</li> </ul>   |
| <b>any</b>                | <p>(Optional) Item matches if <i>any</i> of the specified parts <i>do</i> match the corresponding entries for <i>source-object</i>, <i>destination-object</i>, or <i>identification</i>.</p>   |
| <b>Default</b>            | <p>No access list is defined.</p>  |

## Command Mode

Global configuration

## Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Depending upon the arguments you use, you can define access lists in three ways:

- Restrict access based on source addresses  
Use the *source* and *source-mask* arguments only.
- Restrict access based on destination addresses  
Use the *source*, *source-mask*, *destination*, and *destination-mask* arguments.
- Add filters to further narrow access  
Use the *source*, *source-mask*, *destination*, and *destination-mask* arguments, the **eq**, **neq**, or **any** keywords and any or all of the following arguments: *source-object*, *destination-object*, and *identification*.

Table 19 lists the DECnet object numbers.

**Table 19 Common DECnet Object Numbers**

| Name   | Number | Description                 |
|--------|--------|-----------------------------|
| FAL    | 17     | File Access Listener        |
| HLD    | 18     | Host Loader                 |
| NML    | 19     | Network Monitor Link/NICE   |
| MIRROR | 25     | Loopback mirror             |
| EVL    | 26     | Event logger                |
| MAIL   | 27     | Mail                        |
| PHONE  | 29     | Phone                       |
| NOTES  | 33     | VAX Notes                   |
| CTERM  | 42     | Terminal sessions           |
| DTR    | 63     | DECnet Test Sender/Receiver |

## Examples

The following example illustrates an access list for matching all connect packets for object number 27:

```
access-list 300 permit 0.0 63.1023 eq dst eq 27
```

The following example illustrates an access list for matching all connect packets *except* for the object number 17:

```
access-list 300 permit 0.0 63.1023 neq dst eq 17
```

The following example illustrates an access list for matching all connect packets where the access identification was *SYSTEM*:

```
access-list 300 permit 0.0 63.1023 eq id ^SYSTEM$
```

The following example illustrates an access list for matching all connect packets from area 1 to object number 27 (27 = VAX/VMS Personal Utility or MAIL) where *SYSTEM* is the originating user:

```
access-list 300 permit 1.0 0.1023 eq src exp ^SYSTEM$ dst eq 27
```

The following example illustrates an access list for matching any connect packet and can be used at the end of a list to permit any packets not already matched:

```
access-list 300 permit 0.0 63.1023 eq any
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

- access-list (extended)**
- access-list (standard)**
- decnet access-group**
- decnet in-routing-filter**
- decnet out-routing-filter**
- show decnet interface**

## access-list (standard)

To create a standard access list, use the standard version of the **access-list** global configuration command. To delete the entire access list, use the **no** form of this command.

```
access-list access-list-number {permit | deny} source source-mask  
no access-list
```

### Syntax Description

|                           |  |
|---------------------------|--|
| <i>access-list-number</i> | Integer you choose between 300 and 399 that uniquely identifies the access list.   |
| <b>permit</b>             | Permits access when there is an address match.   |
| <b>deny</b>               | Denies access when there is an address match.  |
| <i>source</i>             | Source address. DECnet addresses are written in the form <i>area.node</i> . For example, 50.4 is node 4 in area 50. All addresses are in decimal.              |
| <i>source-mask</i>        | Mask to be applied to the address of the source node. Bits are set wherever the corresponding bits in the address should be ignored. All masks are in decimal. |

### Default

No access list is defined.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

In contrast with IP masks, a DECnet mask specification of “all ones” is entered as the decimal value 1023. In IP, the equivalent is 255.

### Example

The following example sets up access list 300 to deny packets coming from node 4.51 and permit packets coming from 2.31:

```
access-list 300 deny 4.51 0.0  
access-list 300 permit 2.31 0.0
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**access-list (extended)**

**access-list (filter connect initiate packets)**

**decnet access-group**

**decnet in-routing-filter**

**decnet out-routing-filter**

**show decnet interface**

## clear decnet accounting

Use the **clear decnet accounting** EXEC command to delete all entries in the accounting database when DECnet accounting is enabled.

**clear decnet accounting** [**checkpoint**]

### Syntax Description

**checkpoint** (Optional) Clears the checkpoint database.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

Specifying the **clear decnet accounting** command without the **checkpoint** keyword copies the active database to the checkpoint database and clears the active database.

The active data set is copied to the checkpoint database; the active database entry values are reset to zero. If there are entries in the database that were found dynamically, they are deleted. If there are entries that were entered statically, such as decnet accounting list 5.3.17.26, they are not removed. Their values are reset to zero.

Any traffic that traverses the router after the **clear decnet accounting** command has been issued is saved in the active database. Accounting information in the checkpoint database at that time reflects traffic prior to the most recent **clear decnet accounting** command.

You can also delete all entries in both the active and the checkpoint databases by issuing the **clear decnet accounting** command twice in succession.

### Example

In the following example, the first display from the **show decnet accounting** command shows the active database before a clear command is issued. The clear decnet accounting command is issued and a second show display shows no accounting information in the active database. The display from the **show decnet accounting checkpoint** command shows the data collected in the active database prior to the **clear decnet accounting** command.:

```
Router# show decnet accounting

Source  Destination  Bytes  Packets
-----  -
2.329   37.4         153    6
5.7     7.8         326    4
27.100  27.107      145    5
7.8     5.7         152    12
27.107  27.100      500    5
37.4    2.329       78     4

Accounting data age is 12.41
```

```
Router# clear decnet accounting
Router# show decnet accounting

Source Destination Bytes Packets

Accounting data age is 0
Router# show decnet accounting checkpoint

Source Destination Bytes Packets
2.329 37.4 153 6
5.7 7.8 326 4
27.100 27.107 145 5
7.8 5.7 152 12
27.107 27.100 500 5
37.4 2.329 78 4

Accounting data age is 12.41
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

- decnet accounting**
- decnet accounting list**
- decnet accounting threshold**
- decnet accounting transits**
- show decnet accounting**

## clear decnet counters

To clear DECnet counters that are shown in the output of the **show decnet traffic** EXEC command, use the **clear decnet counters** EXEC command.

**clear decnet counters**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

The following example zeros all DECnet counters:

```
clear decnet counters
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show decnet traffic**

## decnet access-group

To create a DECnet access group, use the **decnet access-group** interface configuration command.

**decnet access-group** *access-list-number*

### Syntax Description

*access-list-number* Either a standard or extended DECnet access list. A standard DECnet access list applies to source addresses. The value (or values in the case of extended lists) can be in the range 300 to 399.

### Default

No access group is defined.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

The following example applies access list 389 to Ethernet interface 1:

```
interface ethernet 1
  decnet access-group 389
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**access-list (standard)**  
**show decnet interface**

## decnet accounting

To enable DECnet accounting, use the **decnet accounting** interface configuration command. To disable DECnet accounting, use the **no** form of this command.

**decnet accounting**  
**no decnet accounting**

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

The Cisco IOS software maintains two accounting databases: an active database and a checkpoint database. The active database contains accounting data tracked until the database is cleared. When the active database is cleared, its contents are copied to the checkpoint database. Using these two databases together allows you to monitor both current traffic and traffic which has previously traversed the router.

DECnet accounting statistics will be accurate, even if DECnet fast switching is enabled, or if DECnet access lists are being used.

Enabling DECnet accounting significantly decreases the performance of a fast-switched interface.

DECnet accounting is disabled if autonomous or SSE switching is enabled.

### Example

This example shows DECnet accounting enabled on a serial interface 0:

```
interface serial 0
  decnet accounting
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**clear decnet accounting**  
**decnet accounting list**  
**decnet accounting threshold**  
**decnet accounting transits**  
**show decnet accounting**

## decnet accounting list

Use the **decnet accounting list** global configuration command to specify the source and destination address pairs for which DECnet accounting information is kept. DECnet accounting tracks all traffic that traverses the router between the source and destination address pairs specified with this command. To remove the accounting filter, use the **no** form of this command.

```
decnet accounting-list src-dec-address dest-dec-address  
no decnet accounting list {src-dec-address dest-dec-address | all}
```

### Syntax Description

|                         |  |
|-------------------------|--|
| <i>src-dec-address</i>  | DECnet address for the source. The address is in the form <i>area.node</i> , for example, 5.3.   |
| <i>dest-dec-address</i> | DECnet address for the destination. The address is in the form <i>area.node</i> , for example, 5.3.  |
| <b>all</b>              | Disables DECnet accounting for all source and destination address pairs specified previously with the <b>decnet accounting list</b> command. |

### Default

No filters are predefined.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

The source and destination addresses of each DECnet packet are paired to create an entry in the database. When DECnet traffic traverses the router and a match is found, accounting information about the DECnet packet is entered into the accounting database. If DECnet accounting is enabled on an interface, but no accounting list is specified, the transit parameter does not come into play. DECnet accounting will track all traffic through the interface, up to the accounting threshold limit. All traffic up to the threshold limit is collected and added to the aggregate value for all DECnet traffic passing through the router.

Use the **no decnet accounting list all** to delete the entire entry list.

### Example

The following example adds DECnet host pair 5.37 and 6.126 to the list of networks for which accounting information is kept:

```
decnet accounting list 5.37 6.126
```

**Related Commands**

You can use the master indexes or search online to find documentation of related commands.

**clear decnet accounting**

**decnet accounting**

**decnet accounting threshold**

**decnet accounting transits**

**show decnet accounting**

## decnet accounting threshold

To set the maximum number of accounting database entries, use the **decnet accounting threshold** global configuration command. To restore the default, use the **no** form of this command.

**decnet accounting threshold** *threshold*  
**no decnet accounting threshold** *threshold*

### Syntax Description

*threshold* Maximum number of entries (source and destination address pairs) that the Cisco IOS software can accumulate.

### Default

512 entries

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

The accounting threshold defines the maximum number of entries (source and destination address pairs) that the software accumulates. The threshold is designed to prevent DECnet accounting from consuming all available free memory. This level of memory consumption could occur in a router that is switching traffic for many hosts. To determine whether overflows have occurred, use the **show decnet accounting EXEC** command.

### Example

The following example sets the DECnet accounting database threshold to 256 entries:

```
decnet accounting threshold 256
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**clear decnet accounting**  
**decnet accounting**  
**decnet accounting list**  
**decnet accounting transits**  
**show decnet accounting**

## decnet accounting transits

To set the maximum number of transit entries that will be stored in the DECnet accounting database, use the **decnet accounting transits** global configuration command. To disable this function, use the **no** form of this command.

**decnet accounting transits** *count*  
**no decnet accounting transits**

### Syntax Description

*count*                      Number of transit entries that will be stored in the DECnet accounting database.

### Default

0 entries

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

Transit entries are those that do not match any of the source and destination address pair filters specified by **decnet accounting list** global configuration commands. If an accounting list is not defined, DECnet accounting will track all traffic through the interface (all transit entries) up to the accounting threshold limit.

To maintain accurate accounting totals, the Cisco IOS software maintains two accounting databases: an active database and a checkpoint database.

### Example

The following example specifies a maximum of 100 transit records to be stored in the DECnet accounting database:

```
decnet accounting transits 100
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**clear decnet accounting**  
**decnet accounting list**  
**decnet accounting threshold**  
**show decnet accounting**

## decnet advertise

To configure border routers to propagate Phase IV areas through an OSI backbone, use the **decnet advertise** global configuration command. To disable this feature, use the **no** form of this command.

```
decnet advertise decnet-area hops cost  
no decnet advertise [decnet-area]
```

### Syntax Description

|                    |   |
|--------------------|---|
| <i>decnet-area</i> | Phase IV area that you want propagated.                                   |
| <i>hops</i>        | Hop count to be associated with the route being advertised. Default is 0. |
| <i>cost</i>        | Cost to be associated with the route being advertised. Default is 0.      |

### Default

Disabled

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The output from the **show decnet route EXEC** command shows the cost and hop count for routes.

The **decnet advertise** command is used by border routers for propagating Phase IV areas through an OSI backbone.

The **decnet advertise** command and the **clns route nsap-prefix discard** command work together. When a router has DECnet Phase IV/V conversion enabled, any packet with the specified Connectionless Network Service (CLNS) Network Service Access Point (NSAP) prefix will cause CLNS to behave as if no route were found. That router then looks up the route to the border router that is advertising the Phase IV route. In turn, the router that is advertising the DECnet Phase IV route converts the packet to Phase V and sends it through the OSI cloud to the border router that is advertising the CLNS discard static route. After the packet gets to the border router, it is converted back to Phase IV.

The CLNS discard routes are created dynamically when the advertised adjacencies are propagated through the CLNS cloud. When a DECnet interface is disabled, the adjacencies are lost and the CLNS discard route is deleted. The DECnet area routing states are displayed in the output from the **show decnet route EXEC** command.

### Example

The following example shows a partial use of the **decnet advertise** command:

```
decnet conversion 49  
decnet advertise 4  
clns route 49.0001 discard
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**cls route discard**  
**show decnet route**

## decnet area-max-cost

To set the maximum cost specification value for *interarea* routing, use the **decnet area-max-cost** global configuration command.

```
decnet [network-number] area-max-cost value
```

### Syntax Description

|                       |   |
|-----------------------|---|
| <i>network-number</i> | (Optional) Network number from 0 to 3. Specified when using Address Translation Gateway (ATG). If not specified, the default is network 0.  |
| <i>value</i>          | Maximum cost for a route to a distant area that the Cisco IOS software may consider usable; the software treats as unreachable any route with a cost greater than the value you specify. A valid range for cost is 1 to 1022. This parameter is only valid for area routers. The default is 1022. |

### Defaults

```
network-number: 0  
value: 1022
```

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Be sure that you have used the **decnet node-type area** global configuration command before using this command.

### Example

In the following example, the node type is specified as area and the maximum cost is set to 500. Any route with a cost exceeding 500 is considered unreachable by this router.

```
decnet node-type area  
decnet area-max-cost 500
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
decnet area-max-hops  
decnet node-type  
show decnet interface
```

## decnet area-max-hops

To set the maximum hop count value for *interarea* routing, use the **decnet area-max-hops** global configuration command.

```
decnet [network-number] area-max-hops value
```

### Syntax Description

*network-number* (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0.

*value* Maximum number of hops for a usable route to a distant area. The Cisco IOS software treats as unreachable any route with a count greater than the value you specify. A valid range for the hop count is 1 to 30. The default is 30 hops.

### Default

30 hops

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is only valid for area routers. Be sure that you have issued the **decnet node-type area** global configuration command before using this command.

### Example

The following example sets the router to be a Level 2 router, then sets a maximum hop count of 21:

```
decnet node-type area
decnet area-max-hops 21
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
decnet area-max-cost  
decnet node-type  
show decnet interface
```

## decnet congestion-threshold

To set the congestion- experienced bit if the output queue has more than the specified number of packets in it, use the **decnet congestion-threshold** interface configuration command. To remove the parameter setting and set it to 0, use the **no** form of this command.

**decnet congestion-threshold** *number*  
**no decnet congestion-threshold**

### Syntax Description

*number*                      Number of packets that are allowed in the output queue before the system sets the congestion experience bit. This value is an integer between 0 and 0x7fff. The value zero prevents this bit from being set. Only relatively small integers are reasonable. The default is 1 packet.

### Default

1 packet

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

If a router configured for DECnet experiences congestion, it sets the congestion-experienced bit. A *number* value of zero or the **no** form of the command prevents this bit from being set.

### Example

The following example sets the congestion threshold to 10:

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

## decnet conversion

To allow Phase IV routers (running Cisco Release 9.1 or higher) to run in a Phase V network and vice versa, enable conversion with the **decnet conversion** global configuration command. To disable conversion, use the **no** form of this command.

```
decnet conversion nsap-prefix  
no decnet conversion nsap-prefix
```

### Syntax Description

|                    |   |
|--------------------|---|
| <i>nsap-prefix</i> | Value used for the IDP field when constructing NSAPs from a Phase IV address. |
|--------------------|---|

### Default

Disabled

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

To enable DECnet conversion, you must configure both DECnet and ISO CLNS on your router.

DECnet Phase V is OSI-compatible and conforms to the ISO 8473 (CLNP/CLNS) and ISO 9542 (ES-IS) standards. Digital has defined algorithms for mapping a subset of the Phase V address space onto the Phase IV address space and for converting Phase IV and Phase V packets back and forth. This allows a network administrator to support both Phase IV hosts in Phase V networks and Phase V hosts in Phase IV networks.

Cisco's implementation differs from Digital's in how reachability information is advertised. Cisco's implementation allows you to add Phase V support without modifying your existing Phase IV support. It also delays converting packets from Phase IV to Phase V, while Digital's implementation converts as soon as possible.

It is essential that the area you specify in the **decnet routing** global configuration command is the same as the local area you specified with the **net** router configuration command for the CLNS network.

Be sure that the area you specify in the **decnet conversion** command is the same as the area you specified for the CLNS network. Also note that the DECnet area is specified in decimal, and the CLNS area is specified in hexadecimal.

The **decnet routing** command is specified with a decimal address, while the **net** command address is specified in hexadecimal. In addition, the *nsap-prefix* specified on the **decnet conversion** command must match one of the NETs for this router.

The following guidelines apply:

- Host connectivity across multiple areas is only possible if a Level 2 path exists for which every Level 2 router in the path supports a common protocol: Phase IV or Phase V. If not all routers support both protocols, those routers that do *must* have conversion enabled.
- Host connectivity across a single area is only possible if a Level 1 path exists for which every Level 1 router in the path supports a common protocol: Phase IV or Phase V. If not all routers support both protocols, those routers that do *must* have conversion enabled.
- The Level 2 backbone *must* have conversion enabled in all Level 2 routers that support an area that needs conversion.

### Example

The following example enables DECnet conversion on a router with the area tag *xy* and Phase IV address 20.401 using an ISO IGRP router:

```
clns routing
decnet routing 20.401
decnet max-address 600
!
router iso-igrp xy
 net 47.0004.004d.0014.aa00.0400.9151.00
!
decnet conversion 47.0004.004d
!
interface ethernet 0
 decnet cost 4
 clns router iso-igrp xy
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**net**

**show decnet interface**

**show decnet route**

## decnet cost

To set a cost value for an interface, use the **decnet cost** interface configuration command. To disable DECnet routing for an interface, use the **no** form of this command.

**decnet cost** *cost-value*  
**no decnet cost**

### Syntax Description

*cost-value* Integer from 1 to 63. There is no default cost for an interface, although a suggested cost for FDDI is 1, for Ethernet is 4, and for serial links is greater than 10.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The decnet cost command is required for all interfaces on which DECnet routing is configured.

After DECnet routing has been enabled, you must assign a cost to each interface over which you want DECnet to run. Assigning a cost in effect enables DECnet routing for an interface. Most DECnet installations have an individualized routing strategy for using costs. Therefore, check the routing strategy used at your installation to ensure that costs you specify are consistent with those set for other hosts on the network.

### Example

The following example establishes a DECnet routing process for a router and sets the router's DECnet address to 21.456, then sets a cost of 4 for the Ethernet interface 0:

```
decnet routing 21.456
interface ethernet 0
  decnet cost 4
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet encapsulation**  
**decnet node-type**  
**decnet routing**  
**show decnet interface**  
**show decnet route**

## decnet encapsulation

To provide DECnet encapsulation over Token Ring, use the **decnet encapsulation** interface configuration command.

**decnet encapsulation {pre-dec | dec}**

### Syntax Description

|                |   |
|----------------|---|
| <b>pre-dec</b> | Configures routers for operation on the same Token Ring with routers running software versions prior to Cisco IOS Release 9.1. In this mode, Cisco routers cannot communicate with non-Cisco equipment. Referred to as Cisco-style encapsulation. |
| <b>dec</b>     | Provides encapsulation that is compatible with other Digital equipment. All Cisco routers must be running Cisco IOS Release 9.1 or later.   |

### Default

Encapsulation is compatible with other Digital equipment.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

If you have both Release 9.0 and 9.1 routers in the same network, you must use the **pre-dec** encapsulation type on the 9.1 routers.

---

**Note** You must first enable DECnet routing on the selected Token Ring interface before you can configure the DECnet encapsulation mode.

---

### Example

The following example sets Cisco-style encapsulation for DECnet routing, which means that Cisco and Digital equipment will not interoperate over Token Ring:

```
interface tokenring 0
  decnet encapsulation pre-dec
  decnet cost 4
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet cost**  
**show decnet interface**

## decnet hello-timer

To change the interval for sending broadcast hello messages, use the **decnet hello-timer** interface configuration command. To restore the default value, use the **no** form of this command.

**decnet hello-timer** *seconds*  
**no decnet hello-timer**

### Syntax Description

*seconds* Interval at which the Cisco IOS software sends hello messages. It can be a decimal number in the range 1 to 8191 seconds. The default is 15 seconds.

### Default

15 seconds

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The Cisco IOS software broadcasts hello messages on all interfaces with DECnet enabled. Other hosts on the network use the hello messages to identify the hosts with which they can communicate directly. On extremely slow serial lines, you may want to increase the default value to reduce overhead on the line.

### Example

The following example increases the hello interval to 2 minutes (120 seconds) on serial interface 1:

```
interface serial 1
  decnet hello-timer 120
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show decnet interface**

## decnet host

To associate a name-to-DECnet address mapping, use the **decnet host** global configuration command, which shows up in the output of various commands. To disable name mapping, use the **no decnet host** form of this command.

```
decnet host name decnet-address  
no decnet host name
```

### Syntax Description

|                       |   |
|-----------------------|---|
| <i>name</i>           | A name you choose that uniquely identifies this DECnet address.   |
| <i>decnet-address</i> | Source address. DECnet addresses are written in the form <i>area.node</i> . For example, 50.4 is node 4 in area 50. All addresses are in decimal. |

### Default

No name is defined.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

The assigned name is displayed, where applicable, in **show decnet route** and **show hosts EXEC** command output.

The name can also be used with the **ping decnet** command.

### Example

The following example defines name-to-DECnet address mapping:

```
decnet host cisco1 3.33
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
ping (privileged)  
show decnet route  
show hosts
```

## decnet in-routing-filter

To provide access control to hello messages or routing information received on an interface, use the **decnet in-routing-filter** interface configuration command. To remove access control, use the **no** form of this command.

```
decnet in-routing-filter access-list-number  
no decnet in-routing-filter
```

### Syntax Description

*access-list-number* Standard DECnet access list. This list applies to source addresses. The value can be in the range 300 to 399.

### Default

No access control is defined.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

In the following example, Ethernet interface 0 is set up with a DECnet in-routing filter of 321, which means that any hello messages sent from addresses that are denied in list 321 are ignored. Additionally, all node addresses listed in received routing messages on this interface are checked against the access list, and only routes passing the filter are considered usable.

```
interface ethernet 0  
  decnet in-routing-filter 321
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
access-list (standard)  
decnet out-routing-filter  
show decnet interface
```

## decnet map

To establish an address translation for selected nodes, use the **decnet map** global configuration command.

```
decnet first-network map virtual-address second-network real-address
```

### Syntax Description

|                        |  |
|------------------------|--|
| <i>first-network</i>   | DECnet network numbers in the range 0 to 3.                    |
| <i>virtual-address</i> | Numeric DECnet address (10.5, for example).                    |
| <i>second-network</i>  | DECnet network number you map to; DECnet numbers range 0 to 3. |
| <i>real-address</i>    | Numeric DECnet address (10.5, for example).                    |

### Default

No address translation is defined.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Keep the following limitations in mind when configuring the address translation gateway (ATG):

- Both nodes that want to communicate across the ATG must exist in the translation map. Other nodes outside of the map will see route advertisements for the mapped address, but will be unable to communicate with them. An unmapped node trying to communicate with a mapped node will always get the message, "Node unreachable." This can be confusing if another nearby node can communicate with mapped nodes because it is also a mapped node.
- Third-party DECnet applications could fail if they pass node number information in a data stream (most likely a sign of a poorly designed application).
- Routing information for mapped addresses is static and does not reflect the reachability of the actual node in the destination network.

As an additional feature and security caution, DECnet "Poor Man's Routing" can be used between nodes outside of the translation map as long as those nodes have access to nodes that are in the map, so that a user on node B could issue the following VMS command:

```
$ dir A::D::E::
```

When a Poor Man's Routing connection is made between two networks, only the two adjacent nodes between the networks will have any direct knowledge about the other network. Application-level network access may then be specified to route through the connection.

---

**Note** Cisco does not support "Poor Man's Routing" directly; the intermediate nodes must be VMS systems with "Poor Man's Routing" enabled in file-access language.

---

### Example

In the following example, packets in Network 0 sent to address 19.5 will be routed to Network 1, and the destination address will be translated to 50.1. Packets sent to address 47.1 in Network 1 will be routed to Network 0 as 19.1.

```
decnet 0 map 19.5 1 50.1
decnet 1 map 47.1 0 19.1
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show decnet map**

## decnet max-address

To configure the Cisco IOS software with a maximum number of node addresses, use the **decnet max-address** global configuration command.

```
decnet [network-number] max-address value
```

### Syntax Description

|                       |   |
|-----------------------|---|
| <i>network-number</i> | (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0.  |
| <i>value</i>          | A number less than or equal to 1023 that represents the maximum address possible on the network. In general, all routers on the network should use the same value for this argument. The default is 1023. |

### Default

1023 node addresses

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

DECnet routers do not have the concept of aging out a route. Therefore, all possible areas or nodes must be advertised as unreachable if they cannot be reached. Since it is best to keep routing updates small, you must indicate the default maximum possible node and area numbers that can exist in the network.

### Example

The following example configures a small network to a maximum address value of 300:

```
decnet max-address 300
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet max-area**

## decnet max-area

To set the largest number of areas that the Cisco IOS software can handle in its routing table, use the **decnet max-area** global configuration command.

```
decnet [network-number] max-area area-number
```

### Syntax Description

*network-number* (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0.

*area-number* Area number from 1 to 63. Like the **decnet max-address** global configuration command value, this argument controls the sizes of internal routing tables and of messages sent to other nodes. All routers on the network should use the same maximum address value. The default is 63.

### Default

63 areas

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

In the following example, the largest area to be stored in the routing table is 45:

```
decnet max-area 45
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet max-address**  
**show decnet interface**

## decnet max-cost

To set the maximum cost specification for *intra-area* routing, use the **decnet max-cost** global configuration command.

```
decnet [network-number] max-cost cost
```

### Syntax Description

*network-number* (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0.

*cost* Cost from 1 to 1022. The default is 1022.

### Default

1022

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The Cisco IOS software ignores routes within its local area that have a cost greater than the value you specify.

### Example

In the following example, the node type is specified as a Level 1 router and the maximum cost is set to 335. Any route whose cost exceeds 335 is considered unreachable by this router.

```
decnet node-type routing-iv  
decnet max-cost 335
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
decnet max-hops  
decnet max-paths  
decnet node-type  
decnet path-split-mode  
show decnet interface
```

## decnet max-hops

To set the maximum hop count specification value for *intra-area* routing, use the **decnet max-hops** global configuration command.

```
decnet [network-number] max-hops hop-count
```

### Syntax Description

|                       |   |
|-----------------------|---|
| <i>network-number</i> | (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0.  |
| <i>hop-count</i>      | Hop count from 1 to 30. The Cisco IOS software ignores routes that have a hop count greater than the corresponding value of this parameter. The default is 30 hops. |

### Default

30 hops

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

The following example sets the router to be a Level 1 router, then sets a maximum hop count of 2:

```
decnet node-type routing-iv  
decnet max-hops 2
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet max-cost**  
**decnet max-paths**  
**decnet multicast-map**  
**decnet node-type**

## decnet max-paths

To define the maximum number of equal-cost paths to a destination that the Cisco IOS software keeps in its routing table, use the **decnet max-paths** global configuration command.

```
decnet [network-number] max-paths value
```

### Syntax Description

|                       |  |
|-----------------------|--|
| <i>network-number</i> | (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0.                 |
| <i>value</i>          | Decimal number equal to the maximum number of equal-cost paths the software will save. The valid range is 1 to 31. The default is 1. |

### Default

1 equal-cost path

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Limiting the number of equal-cost paths can save memory on routers with limited memory or very large configurations. Additionally, in networks with a large number of multiple paths and end-systems with limited ability to cache out-of-sequence packets, performance may suffer when traffic is split between many paths.

Limiting the size of the routing table does not affect your routers's ability to recover from network failures transparently, provided that you do not make the maximum number of paths too small. If more than the specified number of equal-cost paths exist, and one of those paths suddenly becomes unusable, the software will discover an additional path from the paths it has been ignoring.

### Example

In the following example, the software will save no more than three equal-cost paths:

```
decnet max-paths 3
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
decnet max-cost  
decnet max-hops  
decnet path-split-mode  
show decnet interface  
show decnet route
```

## decnet max-visits

To set the limit on the number of times a packet can pass through a router, use the **decnet max-visits** global configuration command.

```
decnet [network-number] max-visits value
```

### Syntax Description

|                       |   |
|-----------------------|---|
| <i>network-number</i> | (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0.  |
| <i>value</i>          | Number of times a packet can pass through a router. It can be a decimal number in the range 1 to 63. If a packet exceeds <i>value</i> , the Cisco IOS software discards the packet. Digital recommends that the value of the <b>max-visits</b> parameter be at least twice that of the <b>max-hops</b> parameter, to allow packets to still reach their destinations when routes are changing. The default is 63 times. |

### Default

63 times

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

The following example of intra-area routing configuration specifies Level 1 routing, a maximum hop count of 28, and maximum number of visits of 62 (which is more than twice 28):

```
decnet node-type routing-iv
decnet max-hops 28
decnet max-visits 62
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
decnet max-hops
show decnet interface
show decnet traffic
```

## decnet multicast-map

To specify a mapping between DECnet multicast addresses and Token Ring functional addresses, other than the default mapping, use the **decnet multicast-map** interface configuration command. To delete the specified information, use the **no** form of this command.

**decnet multicast-map** *multicast-address-type* *functional-address*  
**no decnet multicast-map** *multicast-address-type* *functional-address*

### Syntax Description

|                               |  |
|-------------------------------|--|
| <i>multicast-address-type</i> | Type of multicast address that is used. The following are valid values for the argument: <ul style="list-style-type: none"> <li>• <b>iv-all-routers</b> (All Phase-IV routers)</li> <li>• <b>iv-all-endnodes</b> (All Phase-IV end nodes)</li> <li>• <b>iv-prime-all-routers</b> (All Phase IV Prime routers)</li> </ul> |
| <i>functional-address</i>     | Functional MAC address to which this multicast ID maps; in the form of “c000.xxxx.yyyy.”   |

### Default

Enabled, with the default mapping listed in Table 20.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is valid for Token Ring interfaces only. The command will reject a functional address that does not start with “C000” or “c000.”

Routing multicasts and end node multicasts must be on different functional addresses.

**Table 20** Default Mapping of DECnet Multicast Address Types and Token Ring Functional Addresses

| DECnet Multicast Address Type | Token Ring Functional Address |
|-------------------------------|-------------------------------|
| L1 router                     | C000.1000.0000                |
| L2 router                     |                               |
| End node                      | C000.0800.0000                |
| DECnet Phase IV-Prime router  | C000.1000.0000                |

### Example

In the following example, Token Ring interface 1 is configured for multicasts of all Phase IV end nodes and the multicast ID is configured to map to MAC address c000.2222.3333.

```
interface tokenring 1
  decnet multicast-map iv-all-endnodes c000.2222.3333
```

## decnet node-type

To specify the node type, use the **decnet node-type** global configuration command.

```
decnet [network-number] node-type {area | routing-iv}
```

### Syntax Description

*network-number* (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0.

**area** Router participates in the DECnet routing protocol with other area routers, as described in the Digital documentation, and routes packets from and to routers in other areas. This is sometimes referred to as Level 2 (or *interarea*) routing. An area router does not just handle interarea routing, it also acts as an intra-area or Level 1 router in its own area.

**routing-iv** Router acts as an intra-area (standard DECnet Phase IV, Level 1 router) and ignores Level 2 routing packets. In this mode, it routes packets destined for other areas to a designated interarea router, exchanging packets with other end nodes and routers in the same area.

### Default

No node type is specified.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

In the following example, the router node type is specified as *area*, or Level 2:

```
decnet node-type area
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet cost**  
**decnet routing**  
**show decnet interface**

## decnet out-routing-filter

To provide access control to routing information being sent out on an interface, use the **decnet out-routing-filter** interface configuration command. To remove access control, use the **no** form of this command.

**decnet out-routing-filter** *access-list-number*  
**no decnet out-routing-filter**

### Syntax Description

*access-list-number* Standard DECnet access list applying to source addresses.  
The value can be in the range 300 to 399.

### Default

No access control to routing information is defined.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Addresses that fail this test are shown in the update message as unreachable.

### Example

In the following example, Ethernet interface 1 is set up with a DECnet out-routing filter of 351. This filter is applied to addresses in the transmitted routing updates. Transmitted hello messages are not filtered.

```
interface ethernet 1
  decnet out-routing-filter 351
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**access-list (standard)**  
**decnet in-routing-filter**  
**show decnet interface**

## decnet path-split-mode

To specify how the Cisco IOS software splits the routable packets between equal-cost paths, use the **decnet path-split-mode** global configuration command with the appropriate keyword.

```
decnet path-split-mode { normal | interim }
```

### Syntax Description

|                |  |
|----------------|--|
| <b>normal</b>  | Normal mode, where equal-cost paths are selected on a round-robin basis. This is the default.  |
| <b>interim</b> | Traffic for any particular (higher-layer) session is always routed over the same path. This mode supports older implementations of DECnet (VMS Versions 4.5 and earlier) that do not support out-of-order packet caching. Other sessions may take another path, thus using equal-cost paths that a router may have for a particular destination. |

### Default

Normal mode

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Example

In the following example, a router will split routable packets between equal-cost paths using the round-robin (or first-come, first-served) basis:

```
decnet path-split-mode normal
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet max-cost**  
**decnet max-paths**

## decnet propagate static

To enable static route propagation, use the **decnet propagate static** global configuration command. To disable propagation, use the **no** form of this command.

**decnet propagate static**  
**no decnet propagate static**

### Syntax Description

This command has no arguments or keywords.

### Default

No default routes are propagated.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.0

By default, DECnet static routes are not propagated to other routers. Use the **decnet propagate static** command to enable static route propagation. A default route is used only after DECnet conversion is checked.

### Example

The following example shows how to enable static route propagation for the specified static and default routes:

```
decnet propagate static
!
decnet route 3.0 ethernet 0 aa00.0400.0404
decnet route 5.0 serial 0
decnet route 5.100 serial 2
decnet route default 2.100
decnet route 6.0 2.3 4 5
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet route (interface static route)**  
**decnet route (to enter a static route)**  
**show decnet**  
**show decnet static**

## decnet route (interface static route)

To create an interface static route, use this version of the **decnet route** global configuration command. To remove this route, use the **no** form of this command.

```
decnet route decnet-address next-hop-type number [snpa-address] [hops [cost]]
no decnet route decnet-address next-hop-type number
```

### Syntax Description

|                       |  |
|-----------------------|--|
| <i>decnet-address</i> | DECnet address. This value is entered into a static routing table and used to match a destination DECnet address. Use a node address value of 0 to specify an area static route. |
| <i>next-hop-type</i>  | Interface type.  |
| <i>number</i>         | Interface number.  |
| <i>snpa-address</i>   | (Optional) Optional for serial links; required for multiaccess networks.   |
| <i>hops</i>           | (Optional) Hop count to be associated with the route being advertised. Default is 0.   |
| <i>cost</i>           | (Optional) Cost to be associated with the route being advertised. Default is 0.  |

### Default

No interface static routes are created.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

If you do not specify a Subnetwork Point of Attachment (SNPA) address when you have a multiaccess network, you receive an error message indicating a bad SNPA. By default, DECnet static routes are not propagated to other routers. Use the **decnet propagate static** command to enable propagation.

### Examples

The following example shows how to create a static route for a serial interface. No SNPA need be specified for point-to-point interfaces.

```
decnet route 3.1 serial 1
```

The following example shows how to create a static route for an Ethernet interface. The SNPA must be specified for an interface that is not point-to-point.

```
decnet route 3.2 ethernet 1 aa00.0400.0104
```

**Related Commands**

You can use the master indexes or search online to find documentation of related commands.

**decnet propagate static**

**decnet route (to enter a static route)**

**decnet route default (interface default route)**

**decnet route default (to enter a default route)**

**show decnet static**

## decnet route (to enter a static route)

To enter a specific static route, use this version of the **decnet route** global configuration command. DECnet addresses that match are forwarded to the *next-hop-address*. To remove this route, use the **no** form of this command.

```
decnet route decnet-address next-hop-address [hops [cost]]  
no decnet route decnet-address next-hop-address
```

### Syntax Description

|                         |  |
|-------------------------|--|
| <i>decnet-address</i>   | DECnet address. This value is entered into a static routing table and used to match a destination DECnet address. Use a node address value of 0 to specify an area static route. |
| <i>next-hop-address</i> | This value is used to establish the next hop of the route for forwarding packets.  |
| <i>hops</i>             | (Optional) Hop count to be associated with the route being advertised. Default is 0.   |
| <i>cost</i>             | (Optional) Cost to be associated with the route being advertised. Default is 0.  |

### Default

No interface static routes are created.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Area static routes can be configured by specifying a DECnet node address of 0. By default, DECnet static routes are not propagated to other routers. Use the **decnet propagate static** command to enable propagation.

### Examples

The following example shows how to create a static route for 1.1 that points to 1.9 and uses default values of 0 for the *hops* and *cost*:

```
decnet route 1.1 1.9
```

The following example shows how to create a static route for 3.100 that points to 3.4 and specifies values for the *hops* and *cost*:

```
decnet route 3.100 3.4 9 8
```

The following example shows how to create a static route for area 1 that points to 2.999:

```
decnet route 1.0 2.999
```

**Related Commands**

You can use the master indexes or search online to find documentation of related commands.

**decnet propagate static**

**decnet route (interface static route)**

**decnet route default (interface default route)**

**decnet route default (to enter a default route)**

**show decnet static**

## decnet route default (interface default route)

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

```
decnet route default next-hop-type number [snpa-address] [hops [cost]]
no decnet route default next-hop-type number
```

### Syntax Description

|                      |  |
|----------------------|--|
| <i>next-hop-type</i> | Interface type.  |
| <i>number</i>        | Interface number.  |
| <i>snpa-address</i>  | (Optional) Optional for serial links; required for multiaccess networks.             |
| <i>hops</i>          | (Optional) Hop count to be associated with the route being advertised. Default is 0. |
| <i>cost</i>          | (Optional) Cost to be associated with the route being advertised. Default is 0.      |

### Default

No interface default routes are created.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.0

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

A default route is used only after DECnet conversion is checked. DECnet default routes are not propagated to other routers.

### Examples

The following example shows how to create a default route for a serial interface. No SNPA need be specified for point-to-point interfaces.

```
decnet route default serial 1
```

The following example shows how to create a default route for an Ethernet interface. The SNPA must be specified for an interface that is not point-to-point.

```
decnet route default ethernet 1 aa00.0400.0104
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

## **decnet route default (interface default route)**

---

**decnet propagate static**  
**decnet route (interface static route)**  
**decnet route default (interface default route)**  
**decnet route default (to enter a default route)**  
**show decnet static**

## decnet route default (to enter a default route)

To enter a specific default route, use this version of the **decnet route default** global configuration command. To remove this route, use the **no** form of this command.

```
decnet route default next-hop-address [hops [cost]]  
no decnet route default next-hop-address
```

### Syntax Description

|                         |  |
|-------------------------|--|
| <i>next-hop-address</i> | This value is used to establish the next hop of the route for forwarding packets.    |
| <i>hops</i>             | (Optional) Hop count to be associated with the route being advertised. Default is 0. |
| <i>cost</i>             | (Optional) Cost to be associated with the route being advertised. Default is 0.      |

### Default

No interface default routes are created.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

A default route is used only after DECnet conversion is checked. By default, DECnet static routes are not propagated to other routers. Use the **decnet propagate static** command to enable propagation.

DECnet packets not for the current area are forwarded to the *next-hop-address*.

### Example

The following example shows how to create a default route for 1.3 which uses default values of 0 for hops and cost:

```
decnet route default 1.3
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
decnet propagate static  
decnet route (interface static route)  
decnet route (to enter a static route)  
decnet route default (interface default route)  
show decnet static
```

## decnet route-cache

To enable fast switching, use the **decnet route-cache** interface configuration command. To disable fast switching, use the **no** form of this command.

**decnet route-cache**  
**no decnet route-cache**

### Syntax Description

This command has no arguments or keywords.

### Default

Enabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

By default, Cisco's DECnet routing software implements fast switching of DECnet datagrams. There are times when it makes sense to disable fast switching. This is especially important when using rates slower than T1.

Fast switching uses memory space on interface cards. In situations where a high-bandwidth interface is writing large amounts of information to a low-bandwidth interface, additional memory could help avoid congestion on the slow interface.

### Example

In the following example, fast switching is disabled on Ethernet interface 0:

```
interface ethernet 0
  no decnet route-cache
```

## decnet router-priority

To elect a designated router to which packets are sent when no destination is specified, use the **decnet router-priority** interface configuration command.

**decnet router-priority** *value*

### Syntax Description

*value*                      Priority of the router. This can be a number in the range 0 to 127. The larger the number the higher the priority. The default priority is 64.

### Default

64

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The *designated* router is the router to which all end nodes on an Ethernet communicate if they do not know where else to send a packet. The designated router is chosen through an election process in which the router with the highest priority gets the job. When two or more routers on a single Ethernet in a single area share the same highest priority, the unit with the highest node number is elected. You can reset a router's priority to help ensure that it is elected designated router in its area.

On a LAN with both DECnet IV and DECnet IV Prime hosts, make sure that a bilingual router always becomes the designated router.

DECnet end systems use the designated router only when they have no other information about how to reach a particular system. The end systems maintain a cache of how to reach other systems on the network. The cache contains the following information:

```
<remote system DECnet address> <next hop DECnet address>
```

When an end system receives a packet, it examines three pieces of information: the intra-LAN bit, the source address, and the previous hop. If the intra-LAN bit is set, indicating that the packet has never left this wire (and, thus, the remote system is reachable without a router), a cache entry is created as follows:

```
<remote system DECnet address> = <source address>
<next hop DECnet address> = <source address>
```

If the intra-LAN bit is not set, indicating that the packet has come from another network, the cache entry is created as follows:

```
<remote system DECnet address> = <source address>
<next hop DECnet address> = <previous hop>
```

If there is no cache entry, then the designated router is used. This means that when starting a session, the designated router is used, but the reverse traffic will populate a cache entry so that the router can later communicate directly.

A DECnet IV Prime end node sends a packet to the Unknown Destination multicast if it has no cache entry for the destination and has no designated router.

### Example

In the following example, DECnet priority for this router is set to 110 on Ethernet interface 1:

```
interface ethernet 1
  decnet router-priority 110
```

## decnet routing

To enable DECnet routing, use the **decnet routing** global configuration command. To disable DECnet routing, use the **no** form of this command.

```
decnet [network-number] routing [iv-prime] decnet-address  
no decnet routing
```

### Syntax Description

|                       |  |
|-----------------------|--|
| <i>network-number</i> | (Optional) Network number in the range 0 to 3. Specified when using ATG. If not specified, the default is network 0. |
| <b>iv-prime</b>       | (Optional) Enables DECnet Phase IV Prime routing.  |
| <i>decnet-address</i> | Address in DECnet format X.Y, where X is the area number and Y is the node number.                                   |

### Default

Disabled

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Enabling DECnet changes the MAC addresses of the router's interfaces. This is not a problem on routers equipped with nonvolatile memory. On systems that attempt to get their IP network addresses from network servers rather than from nonvolatile memory, there may be a problem as with the hardware addresses changing and confusing other IP-speaking hosts. This potential problem can be avoided by configuring and enabling DECnet before enabling other protocols.

---

**Note** You can configure up to four DECnet networks (numbered 0 to 3). To set up multiple DECnet networks, use the **decnet** global configuration commands with the appropriate network number and keywords. If the network number is omitted from the commands, network 0 is configured for DECnet routing.

---

DECnet Phase IV Prime eliminates the DEC addressing restrictions so that DECnet nodes can coexist with systems running other protocols that have other MAC address restrictions. If **iv-prime** is not specified, only Phase IV is enabled; configuring the MAC address will then make DECnet inoperable. The standard "AA-00-04-00" form will be set as the address of the interface on which DECnet is enabled. If Phase IV Prime was already running and this command is reissued without the **iv-prime** keyword (that is, going from Phase IV Prime to Phase IV), the command returns an error if any of the interfaces that have DECnet enabled have MAC addresses that are not compliant with DECnet Phase IV, requiring the user to evaluate conflicting interface commands.

The **no** form of this command disables Phase IV and Phase IV Prime routing.

### Example

In the following example, DECnet routing is enabled for the router in area 21 with node number 456:

```
decnet routing 21.456
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**decnet cost**

**decnet node-type**

## deccnet routing-timer

To specify how often the Cisco IOS software sends routing updates that list the hosts that the router can reach, use the **deccnet routing-timer** interface configuration command. Use the **no** form of this command to disable the routing update timer.

```
deccnet routing-timer seconds  
no deccnet routing-timer
```

### Syntax Description

*seconds* Time, in seconds, from 1 to 65535. The default is 40 seconds.

### Default

40 seconds

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Other routers use this information to construct local routing tables. In a network where changes occur infrequently or do not need to be responded to immediately (it is small and uncomplicated, applications are not particularly sensitive to delays or occasional packet loss, slow serial links, and so on), increasing the time between routing updates reduces the amount of unnecessary network traffic. Digital calls this argument the *broadcast routing timer* because they use a different timer for serial lines; Cisco's DECnet implementation does not make this distinction.

### Example

In the following example, a serial interface is set to broadcast routing updates every 2 minutes (120 seconds):

```
interface serial 0  
  deccnet routing-timer 120
```

## decnet split-horizon

To use split horizon when sending routing updates, use the **decnet split-horizon** interface configuration command. To disable split horizon, use the **no** form of this command.

**decnet split-horizon**  
**no decnet split-horizon**

### Syntax Description

This command has no arguments or keywords.

### Default

Enabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.2.

The **decnet split-horizon** command also affects whether broadcast packets received on an interface are resent on the same interface.

The **decnet split-horizon** command determines how much information is included in routing updates sent out an interface. It also determines whether received broadcasts are retransmitted on the same interface. When you enable split horizon, routing updates sent out on a given interface will not include any information that was originally learned from that interface, and broadcasts will not be retransmitted on the receiving interface. This is because split horizon is designed for networks that are either broadcast networks, or are fully connected mesh networks. In these types of networks, resending this information is a waste of network bandwidth because all other stations on that network have already heard the information. Disabling split horizon causes the Cisco IOS software to include all information in routing updates, and to resend broadcast packets on the network from which they were received.

You can use this command on any interface, but generally it makes sense to use it only for X.25 and Frame Relay interfaces. You should disable split horizon on X.25 and Frame Relay networks that are not fully connected mesh topologies.

### Example

The following example disables split horizon on an X.25 network:

```
interface serial 0
 no decnet split-horizon
```

## lat host-delay

To set the delayed acknowledgment for incoming LAT slave connections, use the **lat host-delay** global configuration command. To restore the default, use the **no** form of this command.

**lat host-delay** *number*

**no lat host-delay**

### Syntax Description

*number*                      Delay in milliseconds.

### Default

Disabled

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

### Example

The following example sets the acknowledgment for incoming LAT slave connections to 100 ms:

```
lat host-delay 100
```

## lat service autocommand

To associate a command with a service, use the **lat service autocommand** global configuration command. To remove the specified autocommand, use the **no** form of this command.

**lat service** *service-name* **autocommand** *command*  
**no lat service** *service-name* **autocommand** *command*

### Syntax Description

*service-name*            Name of the service.  
*command*                Command to be associated with the service.

### Default

No commands are automatically associated with a service.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

When an inbound connection is received for the specified service, the command associated with the service is automatically executed instead of the user receiving a virtual terminal session.

Authentication is bypassed for these services; only the LAT password is checked.

---

**Note** Do not use this option with the **rotary** keyword.

---

### Example

The following example associates the command **telnet readings** to the service *readings*:

```
lat service readings autocommand telnet readings
```

## ping (privileged)

To send DECnet echo packets to test the reachability of a remote host over a DECnet network, use the DECnet **ping** privileged EXEC command.

### ping

#### Syntax Description

This command has no arguments or keywords.

#### Command Mode

Privileged EXEC

#### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

To terminate a **ping** command session, type the escape sequence (by default, Ctrl-^ X, which is done by simultaneously pressing the Ctrl, Shift, and 6 keys, letting go, then pressing the X key).

Table 21 describes the test characters that the ping facility sends.

**Table 21 Ping Test Characters (DECnet Privileged)**

| Character | Description   |
|-----------|---|
| !         | Each exclamation point indicates receipt of a reply.                          |
| .         | Each period indicates the network server timed out while waiting for a reply. |
| U         | A destination unreachable error Protocol Data Unit (PDU) was received.        |
| C         | A congestion-experienced packet was received.                                 |
| I         | User interrupted test.  |
| ?         | Unknown packet type.  |
| &         | Packet lifetime exceeded.   |

#### Sample Display

The following display shows a sample DECnet **ping** session that uses a DECnet address to specify the source:

```
router# ping
Protocol [ip]: decnet
Target DECnet address: 2.16
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Type escape sequence to abort.
Sending 5, 100-byte DECnet Echos to 2.16,
timeout is 2 seconds:
!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/4/8 ms
```

Table 22 describes the fields shown in the display.

**Table 22 Ping Field Descriptions (DECnet)**

| <b>Field</b>            | <b>Description</b>  |
|-------------------------|---|
| Protocol [ip]:          | Default is IP.  |
| Target DECnet address:  | Prompts for the DECnet address of the destination node you plan to test with the <b>ping</b> command. |
| Repeat count [5]:       | Number of <b>ping</b> packets that are sent to the destination address. Default is 5.                 |
| Datagram size [100]:    | Size of the <b>ping</b> packet (in bytes). Default: 100 bytes.  |
| Timeout in seconds [2]: | Timeout interval (in seconds). Default: 2 seconds.  |

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

### **ping decnet (user)**

## ping decnet (user)

To send DECnet echo packets to test the reachability of a remote host over a DECnet network, use the **ping decnet** user EXEC command.

```
ping decnet {host | address}
```

### Syntax Description

|                |   |
|----------------|---|
| <b>decnet</b>  | DECnet protocol keyword.                  |
| <i>host</i>    | DECnet host of system to <b>ping</b> .    |
| <i>address</i> | DECnet address of system to <b>ping</b> . |

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The **ping** EXEC command provides a basic user **ping** facility for DECnet users who do not have system privileges. This feature allows the Cisco IOS software to perform the simple default **ping** functionality for the DECnet protocol. Only the nonverbose form of the **ping** command is supported for user-level pings.

To terminate a **ping** command session, type the escape sequence (by default, Ctrl-^ X, which is done by simultaneously pressing the Ctrl, Shift, and 6 keys, letting go, then pressing the X key).

Table 23 describes the test characters that the **ping** facility sends.

**Table 23 Ping Test Characters (DECnet User)**

| Character | Description   |
|-----------|---|
| !         | Each exclamation point indicates receipt of a reply.                          |
| .         | Each period indicates the network server timed out while waiting for a reply. |
| U         | A destination unreachable error PDU was received.                             |
| C         | A congestion-experienced packet was received.                                 |
| I         | User interrupted test.  |
| ?         | Unknown packet type.  |
| &         | Packet lifetime exceeded.   |

### Sample Display

The following display shows sample ping output when you ping the DECnet address of 2.16:

```
router> ping decnet 2.16
Sending 5, 100-byte DECnet Echos to 2.16,
timeout is 2 seconds:
!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/4/8 ms
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**ping (privileged)**

## show decnet

To display the global DECnet parameters, use the **show decnet** privileged EXEC command.

```
show decnet
```

### Syntax Description

This command has no arguments or keywords.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Sample Display

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

```
router# show decnet

Global DECnet parameters for network 0:
  Local address is 19.15, node type is area (Phase-IV Prime)
  Level-2 'Attached' flag is FALSE, nearest level-2 router is 19.5
  Maximum node is 350, maximum area is 63, maximum visits is 63
  Maximum paths is 1, path split mode is normal
  Local maximum cost is 1022, maximum hops is 30
  Area maximum cost is 1022, maximum hops is 30
  Static routes *NOT* being sent in routing updates
  Default route configured; next hop address of 2.100
```

Table 24 describes significant fields shown in the display.

**Table 24 Show DECnet Field Descriptions**

| Field                                   | Description  |
|---|--|
| Global DECnet parameters for network 0: | Indicates the DECnet network number of the network being described.  |
| Local address is 19.15                  | DECnet address.  |
| node type is area                       | Indicates the DECnet node type with which the interface has been configured. Possible values include area (area router) or routing-iv (intra-area router). |

**Table 24 Show DECnet Field Descriptions (Continued)**

| Field   | Description   |
|---|---|
| Level-2 'Attached' flag is FALSE                    | (DECnet Level-2 routers only) Indicates that this Level-2 router is not "attached" (can not reach other DECnet Phase IV areas). If the "Attached" flag is TRUE, the router has reachability to other areas.<br><br>If the "Attached" flag is FALSE, other displays on this line are the following: <ul style="list-style-type: none"> <li>• Nearest Level-2 router is NONE—(DECnet Level-1 routers only) Indicates that this Level-1 router has not heard from any eligible Level-2 router (to send out-of-area packets to)</li> <li>• Nearest Level-2 router is 1.200—(DECnet Level-1 routers only) Indicates that this router's nearest Level-2 router is 1.200. Any packets received by this router destined for other areas are sent to 1.200.</li> </ul> |
| (Phase-IV Prime)                                    | Indicates that the router is running DECnet Phase IV Prime routing.   |
| Maximum node is 350                                 | Highest node number that the router will recognize.   |
| maximum area is 63                                  | Indicates the maximum DECnet area number, which is used to control the size of internal routing tables and messages sent to other routers. Range: 1 to 63. Default: 63.   |
| maximum visits is 63                                | Indicates the maximum number of times (visits) a packet can pass through a router. Range: 1 to 63. Default: 63.   |
| Maximum paths is 1                                  | Indicates the maximum number of equal-cost paths the router will save. Range: 1 to 31. Default: 1.  |
| path split mode is normal                           | Indicates how the router splits the routable packets among equal-cost paths. Possible values: normal (default) or interim.  |
| Local maximum cost is 1022                          | For intra-area routes. Router ignores routes in its area that have a cost greater than this value.  |
| maximum hops is 30                                  | Indicates the maximum number of hops for a usable route within the local area. The router ignores routes within the local area that use more than this number of hops.  |
| Area maximum cost is 1022                           | Indicates the maximum cost specification for interarea routing. The router ignores routes to other areas that have a cost greater than this value. Range: 1 to 1022; Default: 1022.   |
| maximum hops is 30                                  | Indicates the maximum number of hops for a usable route to other areas. The router ignores routes to other areas that use more than this number of hops.  |
| Static routes *NOT* being sent in routing updates   | Indicates static routes are not included in routing updates.  |
| Default route configured; next hop address of 2.100 | Indicates a default route is configured on this router and shows the next hop address.  |

## show decnet accounting

To display the active accounting or checkpointed database, use the **show decnet accounting EXEC** command.

```
show decnet accounting [checkpoint]
```

### Syntax Description

**checkpoint** (Optional) Displays entries in the checkpoint database.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

### Sample Display

This sample output from the **show decnet accounting** command shows accounting data collected for traffic passing between the DECnet address pair 27.100 and 27.107:

```
Router# show decnet accounting

Source  Destination  Bytes    Packets
27.100  27.107      145      5
27.107  27.100      500      5

Accounting data age is 5
```

Table 25 describes the fields shown in the display.

**Table 25 Show DECnet Accounting Field Descriptions**

| Field                      | Description  |
|----------------------------|--|
| Source                     | Source address of the packet.  |
| Destination                | Destination address of the packet.   |
| Bytes                      | Number of bytes transmitted from the source address to the destination address.  |
| Packets                    | Number of packets transmitted from the source address to the destination address.  |
| Accounting data age is ... | Time reported since the accounting database has been cleared. It can be in one of the following formats: <i>mm</i> , <i>hh:mm</i> , <i>dd:hh</i> , and <i>ww:dd</i> , where <i>m</i> is minutes, <i>h</i> is hours, <i>d</i> is days, and <i>w</i> is weeks. |

**Related Commands**

You can use the master indexes or search online to find documentation of related commands.

- clear decnet accounting**
- decnet accounting**
- decnet accounting list**
- decnet accounting threshold**
- decnet accounting transits**
- show decnet accounting**

## show decnet interface

To display the global DECnet status and configuration for all interfaces, or the status and configuration for a specified interface, use the **show decnet interface** EXEC command.

```
show decnet interface [type number]
```

### Syntax Description

*type* (Optional) Interface type.

*number* (Optional) Interface number.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Sample Displays

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

```
router# show decnet interface

Global DECnet parameters for network 0:
  Local address is 19.15, node type is area
  Maximum node is 350, maximum area is 63, maximum visits is 63
  Maximum paths is 1, path split mode is normal
  Local maximum cost is 1022, maximum hops is 30
  Area maximum cost is 1022, maximum hops is 30
Ethernet 1 is up, line protocol is up, encapsulation is ARPA
  Interface cost is 4, priority is 64, DECnet network: 0
  The designated router is 1.9
  Sending HELLOs every 15 seconds, routing updates 40 seconds
  Smallest router blocksize seen is 1498 bytes
  Routing input list is not set, output list is not set
  Access list is not set
  DECnet fast switching is enabled
  Number of L1 router adjacencies is: 3
  Number of non-PhaseIV+ router adjacencies is: 3
  Number of PhaseIV+ router adjacencies is: 0
  Router is bilingual
```

Table 26 describes significant fields shown in the display.

**Table 26 Show DECnet Interface Field Descriptions—Interface Not Specified**

| Field                                   | Description   |
|---|---|
| Global DECnet parameters for network 0: | Indicates the DECnet network number of the network being described.   |
| Local address is 19.15                  | DECnet address of the router.   |
| node type is area                       | Indicates the DECnet node type with which the interface has been configured. Possible values include area (area router) or routing-iv (intra-area router).  |
| Maximum node is 350                     | Highest node number that the router will recognize.   |
| maximum area is 63                      | Indicates the maximum DECnet area number, which is used to control the size of internal routing tables and messages sent to other routers. Range: 1 to 63. Default: 63.   |
| maximum visits is 63                    | Indicates the maximum number of times (visits) a packet can pass through a router. Range: 1 to 63. Default: 63.   |
| Maximum paths is 1                      | Indicates the maximum number of equal-cost paths the router will save. Range: 1 to 31. Default: 1.  |
| path split mode is normal               | Indicates how the router splits the routable packets among equal-cost paths. Possible values: normal (default) or interim.  |
| Local maximum cost is 1022              | For intra-area routes. Router ignores routes in its area that have a cost greater than this value.  |
| maximum hops is 30                      | Indicates the maximum number of hops for a usable route within the local area. The router ignores routes within the local area that use more than this number of hops.  |
| Area maximum cost is 1022               | Indicates the maximum cost specification for interarea routing. The router ignores routes to other areas that have a cost greater than this value. Range: 1 to 1022; Default: 1022.                               |
| maximum hops is 30                      | Indicates the maximum number of hops for a usable route to other areas. The router ignores routes to other areas that use more than this number of hops.  |
| Ethernet 0 is up                        | Indicates whether the interface hardware is currently active and if it has been taken down by an administrator.   |
| line protocol is up                     | Indicates whether the software processes that handle the line protocol believe the interface is usable (that is, whether keepalives are successful).  |
| encapsulation is ARPA                   | Indicates the encapsulation type.   |
| Interface cost is 4                     | Indicates the cost that has been assigned to this interface using the <b>decnet cost</b> interface configuration command. If there are multiple paths to a destination, the one with the lowest cost is selected. |
| priority is 64                          | Indicates the priority that has been assigned to this router on this interface. End systems select the router with the highest priority as their designated router.   |
| DECnet network: 0                       | Indicates that this interface is on DECnet network 0. This fact is significant only if ATG is turned on.  |
| The designated router is 1.3            | Indicates the designated router on this particular LAN.   |

**Table 26 Show DECnet Interface Field Descriptions—Interface Not Specified (Continued)**

| Field   | Description  |
|---|--|
| Sending HELLOs every 15 seconds                       | Indicates the frequency of hello packets.  |
| routing updates 40 seconds                            | Indicates the frequency of routing updates.  |
| Smallest router blocksize seen is 1498 bytes          | Indicates the largest size of packets being sent on all routers on the LAN.  |
| Routing input list is not set, output list is not set | Indicates that no access restrictions on incoming (or outgoing) router update or hello messages have been set for this interface.  |
| Access list is not set                                | Indicates that no access lists have been configured for the interface.   |
| DECnet fast switching is enabled                      | Indicates that fast switching is enabled.  |
| Number of L1 router adjacencies is : 3                | Indicates how many Level 1 adjacencies the router has on this interface.   |
| Number of non-PhaseIV+ router adjacencies is: 3       | Number of L1 and L2 routers on this interface that are not running Phase IV+.  |
| Number of PhaseIV+ router adjacencies is: 0           | Number of L2 routers on this interface that are running Phase IV+.   |
| Router is bilingual                                   | The router's MAC address on this interface is Phase IV-compatible (that is, it takes the form AA-00-04-00-xx-yy or 55-00-20-00-aa-bb on interfaces where the address is bit swapped). This means that the router behaves as both a Phase IV and a Phase IV Prime router. |

The following is sample output from the **show decnet interface** command when you specify an interface:

```
router# show decnet interface ethernet 0

Ethernet0 is up, line protocol is up, encapsulation is ARPA
Interface cost is 4, priority is 64, DECnet network: 0
The designated router is 1.3
Sending HELLOs every 15 seconds, routing updates 40 seconds
Smallest router blocksize seen is 1498 bytes
Routing input list is not set, output list is not set
Access list is not set
DECnet fast switching is enabled
Number of L1 router adjacencies is: 1
Number of non-PhaseIV+ router adjacencies is: 3
Number of PhaseIV+ router adjacencies is: 0
Router is bilingual
```

Table 27 describes significant fields shown in the display.

**Table 27 Show DECnet Interface Field Descriptions—Interface Specified**

| Field                 | Description  |
|-----------------------|--|
| Ethernet 0 is up      | Indicates whether the interface hardware is currently active and if it has been taken down by an administrator.                                      |
| line protocol is up   | Indicates whether the software processes that handle the line protocol believe the interface is usable (that is, whether keepalives are successful). |
| encapsulation is ARPA | Indicates the encapsulation type.  |

**Table 27 Show DECnet Interface Field Descriptions—Interface Specified (Continued)**

| <b>Field</b>  | <b>Description</b>   |
|---|--|
| Interface cost is 4                                   | Indicates the cost that has been assigned to this interface using the <b>decnet cost</b> interface configuration command. If there are multiple paths to a destination, the one with the lowest cost is selected.  |
| priority is 64  | Indicates the priority that has been assigned to this router on this interface. End systems select the router with the highest priority as their designated router.  |
| DECnet network: 0                                     | Indicates that this interface is on DECnet network 0. This fact is significant only if ATG is turned on.   |
| The designated router is 1.3                          | Indicates the designated router on this particular LAN.  |
| Sending HELLOs every 15 seconds                       | Indicates the frequency of hello packets.  |
| routing updates 40 seconds                            | Indicates the frequency of routing updates.  |
| Smallest router blocksize seen is 1498 bytes          | Indicates the largest size of packets being sent on all routers on the LAN.  |
| Routing input list is not set, output list is not set | Indicates that no access restrictions on incoming (or outgoing) router update or hello messages have been set for this interface.  |
| Access list is not set                                | Indicates that no access lists have been configured for the interface.   |
| DECnet fast switching is enabled                      | Indicates that fast switching is enabled.  |
| Number of L1 router adjacencies is : 1                | Indicates how many Level 1 adjacencies the router has on this interface.   |
| Number of non-PhaseIV+ router adjacencies is: 3       | Number of L1 and L2 routers on this interface that are not running Phase IV+.  |
| Number of PhaseIV+ router adjacencies is: 0           | Number of L2 routers on this interface that are running Phase IV+.   |
| Router is bilingual                                   | The router's MAC address on this interface is Phase IV-compatible (that is, it takes the form AA-00-04-00-xx-yy or 55-00-20-00-aa-bb on interfaces where the address is bit swapped). This means that the router behaves as both a Phase IV and a Phase IV Prime router. |

## show decnet map

To display the address mapping information used by the DECnet Address Translation Gateway, use the **show decnet map** EXEC command.

**show decnet map**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Sample Display

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

```
router# show decnet map

Net Node  -> Net Node  Uses      Cost Hops
   0 1.100      1 2.100    0
```

Table 28 describes significant fields shown in the display.

**Table 28 Show DECnet Map Field Descriptions**

| Field                | Description                         |
|----------------------|-------------------------------------|
| Net Node -> Net Node | Network number and node address.    |
| Uses                 | Number of times this map was used.  |
| Cost                 | Cost associated with the route.     |
| Hops                 | Number of hops to destination node. |

## show decnet neighbors

To display all Phase IV and Phase IV Prime adjacencies and the MAC address associated with each neighbor, use the **show decnet neighbors** privileged EXEC command.

### show decnet neighbors

#### Syntax Description

This command has no arguments or keywords.

#### Command Mode

Privileged EXEC

#### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

#### Sample Display

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

```
router# show decnet neighbors

Net Node      Interface    MAC address   Flags
0   3.11      Ethernet0    aa00.0400.0b0c A
0   1.1       Ethernet0    aa00.0400.0104 V
0   1.3       Ethernet1    aa00.0400.0304 V
0   1.6       Ethernet1    aa00.0400.0604 V
0   2.2       TokenRing    5500.2000.4020 V IV-PRIME
```

Table 29 describes the fields shown in the display.

**Table 29 Show DECnet Neighbors Field Descriptions**

| Field       | Description  |
|-------------|--|
| Net         | Number of the DECnet network this adjacency is in.                                 |
| Node        | DECnet address of the adjacency.   |
| Interface   | Interface over which this adjacency was heard.                                     |
| MAC address | MAC address that this adjacency is using on this interface.                        |
| Flags       | A: L2 adjacency.<br>V: L1 adjacency.<br>IV-PRIME: DECnet Phase IV Prime adjacency. |

## show decnet route

To display the DECnet routing table, use the **show decnet route** EXEC command.

```
show decnet route [decnet-address]
```

### Syntax Description

*decnet-address* (Optional) DECnet address and, when specified, the first hop route to that address is displayed.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Sample Display

The following is sample output from the **show decnet route** command when a DECnet address name was not specified, so the entire routing table is displayed:

```
router# show decnet route

Area          Cost  Hops  Next Hop to Node      Expires  Prio
-----
1             4     1     Ethernet1 -> 1.300    26      64   A
*1            4     1     Ethernet1 -> 1.400    37      64   A
*2            8     2     Ethernet1 -> 1.400
*5            0     0     (Local) -> 5.5
*10           4     1     Ethernet2 -> 10.1     36      64   A
*13           11    3     Ethernet1 -> 1.400
*44           22    6     Ethernet1 -> 1.400
*51           18    4     Ethernet1 -> 1.400
*61           1     1     (OSI) -> 5.5
*62           1     1     (OSI) -> 5.5
*3            0     0     (STATIC) Ethernet0, snpa aa00.0400.0404
*4            0     0     (STATIC) Serial0
*6            5     4     (STATIC) forwarding to 2.3

Node          Cost  Hops  Next Hop to Node      Expires  Prio
-----
*(Area)       0     0     (Local) -> 5.5
*5.5          0     0     (Local) -> 5.5      32      64   A+

*DEFAULT*:   0     0     using next hop address of 2.100
```

As the display shows, the **show decnet route** command can display more than one route for a destination when equal-cost paths have been set with the **decnet max-paths** global configuration command, and when there is more than one equal-cost path to a destination. The display also shows that this node is an area router.

Table 30 describes significant fields shown in the display.

**Table 30 Show DECnet Route Field Descriptions**

| <b>Field</b>     | <b>Description</b>  |
|------------------|---|
| *                | Currently selected route for a particular destination. In interim mode, the selected route will never appear to change.   |
| Node             | DECnet address of this (reachable) destination.   |
| (Area)           | All Level 1 routes are displayed in this section except for this the first entry, which points to the nearest Level 2 router.   |
| Cost             | Assigned cost for the interface, based on a recommended value for the underlying media. Range: 1 to 63. No default.   |
| Hops             | Number of hops to this node from the router being monitored.  |
| Next Hop to Node | DECnet address of the next hop a packet will take to get to the final destination as well as the interface.   |
| (Local)          | The address that the router is configured with.   |
| (OSI)            | Indicates that this entry was created by the <b>decnet accounting list</b> command.   |
| (STATIC)         | Indicates that this entry was created by the <b>decnet route</b> command.   |
| Expires          | Displays how many seconds from now this entry expires.  |
| Prio             | Router priority of this node.   |
| V                | Adjacent Level 1 router.  |
| A+               | Adjacent Level 2 (area) router; A indicates that this is an adjacency created from a Phase IV hello, A+ indicates that this is an adjacency created from a Phase IV+ hello. |

## show decnet static

To display all statically configured DECnet routes, use the **show decnet static** privileged EXEC command.

**show decnet static**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

All static routes are stored in a static route queue, which allows static routes to be reinstated when DECnet routing is turned off then on again.

Not all routes in the static route queue will show up in the routing table. This happens under the following conditions:

- The router is a Level 1 router and any of the following apply. Assume the router DECnet address is 1.1:
  - A Level 2 area static route is configured.  

```
decnet route 2.0 1.2
```
  - A static route is configured not in the same area as the router.  

```
decnet route 3.10 1.200
```
  - A static route is configured for the same address as the router.  

```
decnet route 1.1 1.200
```
- The router is a Level 2 router and any of the following apply. Assume the router DECnet address is 2.1:
  - A Level 1 static router is not in the same area as the router.  

```
decnet route 4.1 10.200
```

A static route appears because a Level 2 route is installed to area 4.

```
decnet route 4.0 10.200
```
  - A Level 2 static route is configured for the router's own area.  

```
decnet route 2.0 10.200
```
  - A static route is configured for the same address as the router.  

```
decnet route 2.1 5.4 s 1
```

### Sample Display

The following is sample output from the **show decnet static** command:

```
router# show decnet static
```

| Address | Cost | Hops | Next hop  | SNPA           |
|---------|------|------|-----------|----------------|
| 3       | 0    | 0    | Ethernet0 | aa00.0400.0404 |
| 5       | 0    | 0    | Serial0   |                |
| 5.100   | 0    | 0    | Serial2   |                |
| DEFAULT | 0    | 0    | 2.100     |                |
| 6       | 5    | 4    | 2.3       |                |

Note that this router is a Level 2 router with DECnet address of 1.2, so a static route configured for 5.100 is not relevant here. This route appears in the **show decnet static** display, but not in the routing table.

## show decnet traffic

To show the DECnet traffic statistics (including datagrams sent, received, and forwarded), use the **show decnet traffic EXEC** command.

**show decnet traffic**

### Syntax Description

This command has no arguments or keywords.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

### Sample Display

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

```
router# show decnet traffic

Total: 42 received, 0 format errors, 0 unimplemented
0 not a gateway, 0 no memory, 0 no routing vector
0 congestion encountered
Hellos: 21 received, 0 bad, 0 other area, 16 sent
Level 1 routing: 14 received, 0 bad, 0 other area, 16 sent
Level 2 routing: 7 received, 0 not primary router, 8 sent
Data: 0 received, 0 not long format, 0 too many visits
0 forwarded, 0 returned, 0 converted, 0 local destination
0 access control failed, 0 no route, 0 encapsulation failed
0 inactive network, 0 incomplete map
```

Table 31 describes the fields shown in the display.

**Table 31 Show DECnet Traffic Field Descriptions**

| Field           | Description  |
|-----------------|--|
| Total:          | Displays the totals of packet types received.  |
| received        | Total of all types of DECnet packets received.   |
| format errors   | Lists the number of packets that appeared to be DECnet, but were formatted incorrectly. The number in the received field includes these packets.   |
| 0 unimplemented | Reports the number of incoming packets that are DECnet control packets, and how many specify a service that the router does not implement. This includes services implemented to forward Level 1 and Level 2 routing information, and router and end-system hello packets. |
| 0 not a gateway | Reports the total number of packets received while not routing DECnet.   |
| 0 no memory     | Records transaction attempts when the system has run out of memory.  |

**Table 31 Show DECnet Traffic Field Descriptions (Continued)**

| <b>Field</b>             | <b>Description</b>  |
|--------------------------|---|
| 0 no routing vector      | Indicates that either a routing update came in from another router when the router did not have an adjacency for it, or it had no routing vector for the type of routing update. Use the <b>debug decnet-routing EXEC</b> command for more information. |
| 0 congestion encountered | Number of times the DECnet output process encounters a non-empty interface output queue.  |
| HELLOs:                  | Displays the number of hello messages received and sent.  |
| received                 | Displays the total number of hello messages received. All protocol types are included.  |
| bad                      | Displays the total number of “bad” hello messages received. Invoke the EXEC command <b>debug decnet</b> to display more information about why the hello message was judged as bad.  |
| other area               | Displays the total number of hello messages received from nodes on other areas when the router is a Level 1 router only.  |
| sent                     | Displays the total number of hello messages sent.   |
| Level 1 routing:         | Displays the Level 1 routing updates received and sent.   |
| received                 | Displays the total number of Level 1 routing updates received.  |
| bad                      | Displays the total number of Level 1 updates received that were judged to be bad.   |
| other area               | Displays the total number of Level 1 updates from nodes in other areas.   |
| sent                     | Displays the total number of Level 1 updates sent.  |
| Level 2 routing:         | Displays the Level 2 routing updates received and sent.   |
| received                 | Displays the total number of Level 2 updates received.  |
| not primary router       | Should always be zero.  |
| sent                     | Displays the total number of Level 2 updates sent.  |
| Data:                    | Displays the number of data packets received and sent.  |
| received                 | Displays the total number of noncontrol (data) packets received.  |
| not long format          | Displays the number of packets received which are not in the long DECnet format. This number should always be zero. If it is not, investigate the source of the improperly formatted packets.   |
| too many visits          | Lists the number of packets received which have visited too many routers and have been flushed.   |
| forwarded                | Lists the total number of packets forwarded.  |
| returned                 | Lists the total number of packets returned to the sender at the senders’ request.   |
| converted                | Displays the number of Phase IV packets converted to Phase V packets.   |
| local destination        | Packets received that are destined for this router.   |
| access control failed    | Lists the packets dropped because access control required it.   |
| no route                 | Lists the total packets dropped because the router did not know where to forward them.  |

**Table 31 Show DECnet Traffic Field Descriptions (Continued)**

| <b>Field</b>         | <b>Description</b>   |
|----------------------|--|
| encapsulation failed | Lists the number of packets that could not be encapsulated. This usually happens where there are entries missing in a map for a public data network, such as X.25 or Frame Relay. This can also occur if an interface is set for an encapsulation for which there is no defined DECnet encapsulation, such as Point-to-Point Protocol (PPP) on serial interfaces). |
| inactive network     | Displays the number of packets that appear to come from a known interface, or that ATG returned because they did not make sense.   |
| incomplete map       | Counts the number of packets that failed address translation. This usually means a node that is not in the ATG map is trying to access a node in another network advertised by the ATG.  |

**show decnet traffic**

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