



# **system ha commands**

## **ONTAP 9.5 commands**

NetApp  
November 11, 2022

# Table of Contents

- system ha commands ..... 1
- system ha interconnect config show ..... 1
- system ha interconnect link off ..... 3
- system ha interconnect link on ..... 4
- system ha interconnect ood clear-error-statistics ..... 5
- system ha interconnect ood clear-performance-statistics ..... 5
- system ha interconnect ood disable-optimization ..... 6
- system ha interconnect ood disable-statistics ..... 6
- system ha interconnect ood enable-optimization ..... 7
- system ha interconnect ood enable-statistics ..... 7
- system ha interconnect ood send-diagnostic-buffer ..... 8
- system ha interconnect ood status show ..... 8
- system ha interconnect port show ..... 9
- system ha interconnect statistics clear-port-symbol-error ..... 11
- system ha interconnect statistics clear-port ..... 12
- system ha interconnect statistics show-scatter-gather-list ..... 12
- system ha interconnect statistics performance show ..... 14
- system ha interconnect status show ..... 20

# system ha commands

## system ha interconnect config show

Display the high-availability interconnect configuration information

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The `system ha interconnect config show` command displays the high-availability interconnect device basic configuration information.

### Parameters

**{ [-fields <fieldname>,...]**

If you specify the `-fields <fieldname>,...` parameter, the command displays only the fields that you specify.

**| [-instance ] }**

Use this parameter to display all the fields from all nodes in cluster.

**[-node {<nodename>|local}] - Node**

Use this parameter to display all the fields from the specified node in the cluster.

**[-transport <text>] - Interconnect Type**

Selects the nodes that match this HA interconnect transport type.

**[-local-sysid <integer>] - Local System ID**

Selects the nodes that match this local system unique identifier.

**[-partner-sysid <integer>] - Partner System ID**

Selects the nodes that match this partner system unique identifier.

**[-initiator {local|partner}] - Connection Initiator**

Selects the nodes that match this parameter value. The value is the initiator of the connection request.

**[-port-name <text>,...] - Port**

Selects the nodes that match this port name.

**[-ipaddress <text>,...] - IP Address**

Selects the nodes that match this IP address.

**[-interface {backplane|external}] - Interface**

Selects the nodes that match this parameter value. *external* means the HA interconnect links between partner nodes are connected externally. *backplane* means the HA interconnect links between partner nodes are connected over the backplane.

## Examples

The following example displays the HA interconnect configuration information on FAS8000 series nodes in the cluster:

```
cluster1::*> system ha interconnect config show
Node: ic-f8040-01
    Interconnect Type: Infiniband (Mellanox ConnectX)
    Local System ID: 536875713
    Partner System ID: 536875678
    Connection Initiator: local
    Interface: backplane

Port   IP Address      Flags
----   -
ib0a   192.0.3.236    0x0
ib0b   192.0.3.237    0x0
Node: ic-f8040-02
    Interconnect Type: Infiniband (Mellanox ConnectX)
    Local System ID: 536875678
    Partner System ID: 536875713
    Connection Initiator: partner
    Interface: backplane

Port   IP Address      Flags
----   -
ib0a   192.0.3.96     0x0
ib0b   192.0.3.97     0x0

2 entries were displayed.
```

The following example displays the HA interconnect configuration information on FAS2500 series nodes in the cluster:

```
cluster1::*> system ha interconnect config show
Node: ic-f2554-03
    Interconnect Type: Infiniband (Mellanox Sinai)
    Local System ID: 1781036608
    Partner System ID: 1780360209
    Connection Initiator: local
    Interface: backplane
```

Port	IP Address	Flags
ib0a	ib0a	-

```
Node: ic-f2554-04
```

```
    Interconnect Type: Infiniband (Mellanox Sinai)
    Local System ID: 1780360209
    Partner System ID: 1781036608
    Connection Initiator: partner
    Interface: backplane
```

Port	IP Address	Flags
ib0a	ib0a	-

2 entries were displayed.

## system ha interconnect link off

Turn off the interconnect link

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The `system ha interconnect link off` command turns off the specified link on the high-availability interconnect device. For the nodes in the cluster with two external high-availability interconnect links, you must specify the link number (0-based) to turn off the specified link. For the nodes in the cluster with interconnect links over the backplane, you must specify the link number 1 to turn off the link.

### Parameters

**-node <nodename> - Node**

This mandatory parameter specifies the node on which the interconnect link is to be turned off. The value "local" specifies the current node.

**-link {0|1} - Link**

This mandatory parameter specifies the interconnect link number (0-based) to turn off.

## Examples

The following example displays output of the command on the nodes with a single interconnect link or nodes with interconnect links over the backplane:

```
cluster1::*> system ha interconnect link off -node ic-f3250-02 -link 0

Error: command failed: Invalid link value 0. Specify 1.

cluster1::*> system ha interconnect link off -node ic-f3250-02 -link 1
```

The following example displays output of the command on the nodes with two interconnect links connected externally:

```
cluster1::*> system ha interconnect link off -node ic-f3250-02 -link 0

cluster1::*> system ha interconnect link off -node ic-f3250-02 -link 1
```

## system ha interconnect link on

Turn on the interconnect link

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The `system ha interconnect link on` command turns on the specified link on the high-availability interconnect device. For the nodes in the cluster with two external high-availability interconnect links, you must specify the link number (0-based) to turn on the specified link. For the nodes in the cluster with interconnect links over the backplane, you must specify the link number 1 to turn on the link.

### Parameters

**-node <nodename> - Node**

This mandatory parameter specifies the node on which the interconnect link is to be turned on. The value "local" specifies the current node.

**-link {0|1} - Link**

This mandatory parameter specifies the interconnect link number (0-based) to turn on.

### Examples

The following example displays output of the command on the nodes with a single interconnect link or nodes with interconnect links over the backplane:

```
cluster1::*> system ha interconnect link on -node ic-f3250-02 -link 0

Error: command failed: Invalid link value 0. Specify 1.

cluster1::*> system ha interconnect link on -node ic-f3250-02 -link 1
```

The following example displays output of the command on the nodes with two interconnect links connected externally:

```
cluster1::*> system ha interconnect link on -node ic-f3250-02 -link 0

cluster1::*> system ha interconnect link on -node ic-f3250-02 -link 1
```

## system ha interconnect ood clear-error-statistics

### Clear error statistics

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The `system ha interconnect ood clear-error-statistics` command enables you to clear all the error statistics collected for the out-of-order delivery-capable high-availability interconnect device. This command is only supported on FAS2500 series nodes in the cluster.

### Parameters

**-node <nodename> - Node**

This mandatory parameter specifies which node will have the error statistics cleared. The value "local" specifies the current node.

### Examples

```
cluster1::*> system ha interconnect ood clear-error-statistics -node ic-
f2554-03
```

## system ha interconnect ood clear-performance-statistics

### Clear performance statistics

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect ood clear-performance-statistics` command enables you to clear all the performance statistics collected for the out-of-order delivery-capable high-availability interconnect device. This command is only supported on FAS2500 series nodes in the cluster.

## Parameters

### **-node <nodename> - Node**

This mandatory parameter specifies which node will have the performance statistics cleared. The value "local" specifies the current node.

## Examples

```
cluster1::*> system ha interconnect ood clear-performance-statistics -node
ic-f2554-03
```

## system ha interconnect ood disable-optimization

Disable coalescing work requests

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect ood disable-optimization` command disables the optimization capability on the high-availability interconnect device. The command is only supported on FAS2500 series nodes in the cluster.

## Parameters

### **-node <nodename> - Node**

This mandatory parameter specifies which node will have the optimization disabled. The value "local" specifies the current node.

## Examples

```
cluster1::*> system ha interconnect ood disable-optimization -node ic-
f2554-03
```

## system ha interconnect ood disable-statistics

Disable detailed statistics collection

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.



## Description

The `system ha interconnect ood disable-statistics` command disables collection of the statistics on the out-of-order delivery-capable high-availability interconnect device. This command is only supported on FAS2500 series nodes in the cluster.

## Parameters

### **-node <nodename> - Node**

This mandatory parameter specifies which node will have the statistics collection disabled. The value "local" specifies the current node.

## Examples

```
cluster1::*> system ha interconnect ood disable-statistics -node ic-f2554-03
```

## system ha interconnect ood enable-optimization

Enable coalescing work requests

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect ood enable-optimization` command enables you to turn on optimization (coalescing out-of-order delivery requests) on the high-availability interconnect device. This command is only supported on FAS2500 series nodes in the cluster.

## Parameters

### **-node <nodename> - Node**

This mandatory parameter specifies which node will have the optimization enabled. The value "local" specifies the current node.

## Examples

```
cluster1::*> system ha interconnect ood enable-optimization -node ic-f2554-03
```

## system ha interconnect ood enable-statistics

Enable detailed statistics collection

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect ood enable-statistics` command enables collection of the statistics on the out-of-order delivery-capable high-availability interconnect device. This command is only supported on FAS2500 series nodes in the cluster.

## Parameters

### `-node <nodename>` - Node

This mandatory parameter specifies which node will have the statistics collection enabled. The value "local" specifies the current node.

## Examples

```
cluster1::*> system ha interconnect ood enable-statistics -node ic-f2554-03
```

## system ha interconnect ood send-diagnostic-buffer

Send diagnostic buffer to partner

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect ood send-diagnostic-buffer` command enables you to run a short out-of-order delivery diagnostic test. The command sends a buffer to the partner controller over the high-availability interconnect. This command is only supported on FAS2500 series nodes in the cluster.

## Parameters

### `-node <nodename>` - Node

This mandatory parameter specifies which node will send the diagnostic buffer to its partner. The value "local" specifies the current node.

## Examples

The following example demonstrates how to use this command to send a diagnostic buffer to the partner:

```
cluster1::*> system ha interconnect ood send-diagnostic-buffer -node ic-f2554-03
```

## system ha interconnect ood status show

Display the high-availability interconnect device out-of-order delivery (OOD) information

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect ood status show` command displays configuration information of the out-of-order delivery-capable high-availability interconnect devices. This command is supported only on FAS2500 series nodes in the cluster.

## Parameters

**{ [-fields <fieldname>,...]**

If you specify the `-fields <fieldname>,...` parameter, the command displays only the fields that you specify.

**| [-instance ] }**

Use this parameter to display all the fields from all nodes in cluster.

**[-node {<nodename>|local}] - Node**

Use this parameter to display all the fields from the specified node in the cluster.

**[-is-ood-enabled {true|false}] - Is OOD Enabled**

Selects the nodes that match this parameter value.

**[-is-coalescing-enabled {true|false}] - Is Coalescing Enabled**

Selects the nodes that match this parameter value.

## Examples

The following example displays the HA interconnect device out-of-order delivery configuration information on FAS2500 series nodes in the cluster.

```
cluster1::*> system ha interconnect ood status show
Node: ic-f2554-03
    NIC Used: 0
    Is OOD Enabled: true
    Is Coalescing Enabled: true
Node: ic-f2554-04
    NIC Used: 0
    Is OOD Enabled: true
    Is Coalescing Enabled: true
2 entries were displayed.
```

## system ha interconnect port show

Display the high-availability interconnect device port information

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect port show` command displays the high-availability interconnect device port physical layer and link layer status information.

## Parameters

**{ [-fields <fieldname>,...]**

If you specify the `-fields <fieldname>,...` parameter, the command displays only the fields that you specify.

**[-instance ] }**

Use this parameter to display all the fields from all nodes in the cluster.

**[-node {<nodename>|local}] - Node**

Use this parameter to display all the fields from the specified node in the cluster.

**[-link-monitor {on|off}] - Link Monitor Detection**

Selects the nodes that match this parameter value.

**[-port <integer>,...] - Port Number**

Selects the nodes that match this parameter value.

**[-phy-layer-state {invalid|sleep|polling|disabled|port-configuration-testing|linkup|link-error-recovery|phytest|reserved}] - Physical Layer State**

Selects the nodes that match this parameter value.

**[-link-layer-state {invalid|down|initialize|armed|active|reserved}] - Link Layer State**

Selects the nodes that match this parameter value.

**[-phy-link-up-count <integer>,...] - Physical Link Up Count**

Selects the nodes that match this parameter value. The value is total number of times the link on a given port is transitioned up.

**[-phy-link-down-count <integer>,...] - Physical Link Down Count**

Selects the nodes that match this parameter value. The value is total number of times the link on a given port is transitioned down.

**[-is-active-link {true|false}] - Is the Link Active**

Selects the nodes that match this parameter value. The value `true` means the interconnect data channels are established on this link.

## Examples

The following example displays the HA interconnect device port information on FAS8000 series nodes in the cluster:

```

cluster1::*> system ha interconnect port show
                Physical Link
                Layer Layer   Physical   Physical
Active
Node           Monitor Port  State     State     Link Up   Link Down
Link
-----
ic-f8040-01    on
                0  linkup   active    1         0
true
                1  linkup   active    1         0
false
ic-f8040-02    on
                0  linkup   active    1         0
true
                1  linkup   active    1         0
false
2 entries were displayed.

```

## system ha interconnect statistics clear-port-symbol-error

Clear the high-availability interconnect port symbol errors

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The `system ha interconnect statistics clear-port-symbol-error` command clears the high-availability interconnect device port symbol errors. This command is supported only on FAS2500 series nodes in the cluster.



To display the high-availability interconnect device port statistics, use the [statistics show -object ic\\_hw\\_port\\_stats](#) command.

### Parameters

**-node <nodename> - Node**

Selects the nodes that match this parameter value.

### Examples

```

cluster1::*> system ha interconnect statistics clear-port-symbol-error
-node ic-f2554-03

```

## Related Links

- [statistics show](#)

# system ha interconnect statistics clear-port

Clear the high-availability interconnect port counters

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect statistics clear-port` command clears the high-availability interconnect device port statistics. This command is supported only on FAS2500 series and FAS8000 series nodes in the cluster.



To display the high-availability interconnect device port statistics, use the [statistics show -object ic\\_hw\\_port\\_stats](#) command.

## Parameters

**-node <nodename> - Node**

Selects the nodes that match this parameter value.

## Examples

```
cluster1::*> system ha interconnect statistics clear-port -node ic-f8040-01
```

## Related Links

- [statistics show](#)

# system ha interconnect statistics show-scatter-gather-list

Display the high-availability interconnect scatter-gather list entry statistics

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

The `system ha interconnect statistics show-scatter-gather-list` command displays the high-availability interconnect device scatter-gather list entry statistics. Out of all possible 32 entries in a scatter-gather list, the command displays only the entries that have valid data.

## Parameters

**{ [-fields <fieldname>,...]**

If you specify the `-fields <fieldname>,...` parameter, the command displays only the fields that you specify.

**| [-instance ] }**

Use this parameter to display all the fields from all nodes in cluster.

**[-node {<nodename>|local}] - Node**

Use this parameter to display all the fields from the specified node in the cluster.

**[-sge <integer>,...] - Scatter-Gather Entry**

Selects the nodes that match this scatter-gather element index value.

**[-total-count <integer>,...] - Total Count**

Selects the nodes that match this parameter value. The value is the total number of times a particular scatter-gather list element is used.

**[-total-size <integer>,...] - Total Size**

Selects the nodes that match this parameter value. The value is the total number of bytes written by the high-availability interconnect device using a particular scatter-gather list element.

## Examples

```

cluster1::*> system ha interconnect statistics show-scatter-gather-list
Node: ic-f8040-01
Entry          Count          Size
-----
1              410925         77344493
2               988            1246987
3               72             747325
4             93264          1527155579
8                9             294912
9                9             294912

Node: ic-f8040-02
Entry          Count          Size
-----
1             1544405         310004390
2              6217           16779908
3              1222           12003411
4             338606         5543436659
6                2             41980
7                2             46136
8                18            589824
9                18            589824

2 entries were displayed.

```

## system ha interconnect statistics performance show

Display the high-availability interconnect device performance statistics

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The `system ha interconnect statistics performance show` command displays the high-availability interconnect device performance statistics.

### Parameters

**{ [-fields <fieldname>,...]**

If you specify the `-fields <fieldname>,...` parameter, the command displays only the fields that you specify.

**| [-instance ] }**

Use this parameter to display all the fields from all nodes in cluster.



**[-node {<nodename>|local}] - Node**

Use this parameter to display all the fields from the specified node in the cluster.

**[-elapsed <integer>] - Elapsed Time (secs)**

Selects the nodes that match this parameter value. Displays the total elapsed time between statistics collection start time to end time. During the initialization stage, statistics collection starts when the partner node is up and ready. After the initialization stage, the statistics collection start time is reset after every execution of this command. This means that after the initialization stage, elapsed time represents the time between current command execution and previous command execution.

**[-qmax-wait <integer>] - Maximum Queue Wait Count**

Selects the nodes that match this wait value. The queue maximum wait value is the total number of times the interconnect device waited to post requests on the send queue.

**[-qmax-wait-time <integer>] - Average Queue Wait Time (usecs)**

Selects the nodes that match this average wait time value. The queue maximum wait time is the average amount of time the interconnect device waited to post requests on the send queue.

**[-qmax-timeout <integer>] - Maximum Queue Timeouts**

Selects the nodes that match this parameter value. The queue maximum timeout value is the total number of times the interconnect device timed out waiting to post requests on the send queue.

**[-preempt-timeout <integer>] - Preempt Timeouts**

Selects the nodes that match this parameter value. The timeout value is the total number of times polling on the given transfer ID is preempted.

**[-nonpreempt-timeout <integer>] - Non-Preempt Timeouts**

Selects the nodes that match this parameter value. The timeout value is the total number of times polling on the given transfer ID stopped due to interconnect device read/write timeout.

**[-notify-timeout <integer>] - Notify Timeouts**

Selects the nodes that match this parameter value. The timeout value is the total number of times data transfer on the HA interconnect timed out.

**[-avg-rnv-msgs-time <integer>] - Remote NV Messages Average Time (usecs)**

Selects the nodes that match this parameter value. The value is the average time between remote NV messages.

**[-rnv-transfers <integer>] - Total Remote NV Transfers**

Selects the nodes that match this parameter value. The value is the total number of remote NV transfers attempted.

**[-avg-rnv-transfer-size <integer>] - Remote NV Average Transfer Size**

Selects the nodes that match this parameter value. The value is the average remote NV message transfer size.

**[-avg-rnv-transfer-time <integer>] - Remote NV Transfers Average Time (usecs)**

Selects the nodes that match this parameter value. The value is the average transfer time taken by remote NV messages.

**[-ic-waits <integer>] - Total Count of IC waits for Given ID**

Selects the nodes that match this parameter value. The value is the total number of times the interconnect device waits until the transfer of a given ID is successful.

**[-ic-waitdone-time <integer>] - Average IC Waitdone Time (usecs)**

Selects the nodes that match this parameter value. The value is the average time the interconnect device spent waiting for the IDs to be transferred successfully.

**[-ic-isdone <integer>] - Total IC isdone Checks**

Selects the nodes that match this parameter value. The value is the total number of times the interconnect client checked for the completion of a given transfer ID.

**[-ic-isdone-pass <integer>] - Total IC isdone Checks Success**

Selects the nodes that match this parameter value. The value is the total number of times the check for the completion of a given transfer ID is successful.

**[-ic-isdone-fail <integer>] - Total IC isdone Checks Failed**

Selects the nodes that match this parameter value. The value is the total number of times the check for the completion of a given transfer ID is not successful.

**[-ic-small-writes <integer>] - IC Small Writes**

Selects the nodes that match this parameter value. The value is the total number of <4K size writes performed by the interconnect device.

**[-ic-4k-writes <integer>] - IC 4K Writes**

Selects the nodes that match this parameter value. The value is the total number of 4K size writes performed by the interconnect device.

**[-ic-8k-writes <integer>] - IC 8K Writes**

Selects the nodes that match this parameter value. The value is the total number of 8K size writes performed by the interconnect device.

**[-ic-16k-writes <integer>] - IC 16K+ Writes**

Selects the nodes that match this parameter value. The value is the total number of 16K or more size writes performed by the interconnect device.

**[-ic-xorder-writes <integer>] - IC XORDER Writes**

Selects the nodes that match this parameter value. The value is the total number of out-of-order writes performed by the interconnect device.

**[-ic-xorder-reads <integer>] - IC XORDER Reads**

Selects the nodes that match this parameter value. The value is the total number of out-of-order reads performed by the interconnect device.

**[-rdma-read <integer>] - RDMA Reads Count**

Selects the nodes that match this parameter value. The value is the total number of RDMA reads performed by the interconnect device.

**[-rdma-read-waitdone-time <integer>] - Average IC Waitdone RDMA-READ Time (usecs)**

Selects the nodes that match this parameter value. The value is the average time the interconnect device

spent polling for transfer IDs on the RDMA-read channel.

**[-avg-mbytes-second <text>] - Average MegaBytes Transferred per second**

Selects the nodes that match this parameter value. The value is the average megabytes (MB) transferred per second.

**[-avg-bytes-transfer <integer>] - Average Bytes per Transfer**

Selects the nodes that match this parameter value. The value is the average amount of bytes sent per transfer.

**[-total-transfers <integer>] - Total Transfers**

Selects the nodes that match this parameter value. The value is the total number of transfers made through the interconnect device.

**[-avg-nvlog-sync-time <integer>] - Average Time for NVLOG Sync (msecs)**

Selects the nodes that match this parameter value. The value is the average time taken to sync NVLOG between HA partner nodes.

**[-max-nvlog-sync-time <integer>] - Maximum Time for NVLOG Sync (msecs)**

Selects the nodes that match this parameter value. The value is the maximum time taken to sync NVLOG between HA partner nodes.

**[-max-sgl-length <integer>] - Maximum Scatter-Gather Elements in a List**

Selects the nodes that match this parameter value. The value is the maximum length of the scatter-gather list supported by the interconnect device.

**[-ic-recq-waits <integer>] - Total Receive Queue Waits to Post Buffer**

Selects the nodes that match this parameter value. The value is the total number of times the interconnect device waited to post an empty buffer into the receive queue.

**[-avg-recq-wait-time <integer>] - Average Time Receive Queue Waited (usecs)**

Selects the nodes that match this parameter value. The value is the average amount of time the interconnect device waited to post an empty buffer into the receive queue.

## Examples

The following example displays the HA interconnect device performance statistics for FAS8000 series nodes in the cluster:

```
cluster1::*> system ha interconnect statistics performance show
Node: ic-f8040-01
Elapsed Time (secs): 6
Maximum Queue Wait Count: 33
Average Queue Wait Time (usecs): 30
Remote NV Messages Average Time (usecs): 1437
Total Remote NV Transfers: 9297
Remote NV Average Transfer Size: 348
Remote NV Transfers Average Time (usecs): 680
Total IC waits for Given ID: 159
```

```

Average IC Waitdone Time (usecs): 5
    Total IC isdone Checks: 608
Total IC isdone Checks Success: 608
    Total IC isdone Checks Failed: 0
        IC Small Writes: 10129
            IC 4K Writes: 10
            IC 8K Writes: 54
            IC 16K+ Writes: 92
        IC XORORDER Writes: 4855
        IC XORORDER Reads: 0
        RDMA Read Count: 172
Average IC Waitdone RDMA-READ Time (usecs): 0
    Average MB/s: 0.98114
    Average Bytes per Transfer: 180
        Total Transfers: 20720
    Average Time for NVLOG Sync (msecs): 1409
    Maximum Time for NVLOG Sync (msecs): 1409
Maximum Scatter-Gather Elements in a List: 32
    Total Receive Queue Waits to Post Buffer: 0
Node: ic-f8040-02
    Elapsed Time (secs): 12
    Maximum Queue Wait Count: 29
    Average Queue Wait Time (usecs): 68
    Remote NV Messages Average Time (usecs): 1386
        Total Remote NV Transfers: 19190
    Remote NV Average Transfer Size: 375
    Remote NV Transfers Average Time (usecs): 670
        Total IC waits for Given ID: 304
    Average IC Waitdone Time (usecs): 5
        Total IC isdone Checks: 1409
    Total IC isdone Checks Success: 1409
    Total IC isdone Checks Failed: 0
        IC Small Writes: 20964
            IC 4K Writes: 5
            IC 8K Writes: 99
            IC 16K+ Writes: 229
        IC XORORDER Writes: 10261
        IC XORORDER Reads: 0
        RDMA Read Count: 337
Average IC Waitdone RDMA-READ Time (usecs): 0
    Average MB/s: 0.57080
    Average Bytes per Transfer: 187
        Total Transfers: 42883
    Average Time for NVLOG Sync (msecs): 1009
    Maximum Time for NVLOG Sync (msecs): 1009
Maximum Scatter-Gather Elements in a List: 32

```

```
Total Receive Queue Waits to Post Buffer: 0
```

```
2 entries were displayed
```

The following example displays the HA interconnect device performance statistics for FAS2500 series nodes in the cluster:

```
cluster1::*> system ha interconnect statistics performance show
```

```
Node: ic-f2554-03
```

```
Elapsed Time (secs): 253
```

```
Maximum Queue Wait Count: 11
```

```
Average Queue Wait Time (usecs): 6837
```

```
Maximum Queue Timeouts: 0
```

```
Preempt Timeouts: 0
```

```
Non-Preempt Timeouts: 0
```

```
Notify Timeouts: 0
```

```
Remote NV Messages Average Time (usecs): 3343
```

```
Total Remote NV Transfers: 59643
```

```
Remote NV Average Transfer Size: 8715
```

```
Remote NV Transfers Average Time (usecs): 4258
```

```
Total IC waits for Given ID: 180
```

```
Average IC Waitdone Time (usecs): 3187
```

```
Total IC isdone Checks: 499981
```

```
Total IC isdone Checks Success: 59922
```

```
Total IC isdone Checks Failed: 440059
```

```
IC Small Writes: 98722
```

```
IC 4K Writes: 5747
```

```
IC 8K Writes: 7719
```

```
IC 16K+ Writes: 25793
```

```
IC XORDER Writes: 66735
```

```
IC XORDER Reads: 0
```

```
RDMA Read Count: 574
```

```
Average IC Waitdone RDMA-READ Time (usecs): 229
```

```
Average MB/s: 2.1207
```

```
Average Bytes per Transfer: 4680
```

```
Total Transfers: 138302
```

```
Average Time for NVLOG Sync (msecs): 1236
```

```
Maximum Time for NVLOG Sync (msecs): 1236
```

```
Maximum Scatter-Gather Elements in a List: 27
```

```
Node: ic-f2554-04
```

```
Elapsed Time (secs): 257
```

```
Maximum Queue Wait Count: 7
```

```
Average Queue Wait Time (usecs): 10172
```

```
Maximum Queue Timeouts: 0
```

```
Preempt Timeouts: 0
```

```
Non-Preempt Timeouts: 0
```

```

Notify Timeouts: 0
Remote NV Messages Average Time (usecs): 4237
    Total Remote NV Transfers: 47134
    Remote NV Average Transfer Size: 9559
Remote NV Transfers Average Time (usecs): 5463
    Total IC waits for Given ID: 178
    Average IC Waitdone Time (usecs): 1890
    Total IC isdone Checks: 393191
    Total IC isdone Checks Success: 47382
    Total IC isdone Checks Failed: 345809
        IC Small Writes: 78369
        IC 4K Writes: 3815
        IC 8K Writes: 6005
        IC 16K+ Writes: 22993
    IC XORDER Writes: 53529
    IC XORDER Reads: 0
    RDMA Read Count: 524
Average IC Waitdone RDMA-READ Time (usecs): 62
    Average MB/s: 2.3682
    Average Bytes per Transfer: 5143
    Total Transfers: 111501
    Average Time for NVLOG Sync (msecs): 822
    Maximum Time for NVLOG Sync (msecs): 822
Maximum Scatter-Gather Elements in a List: 27

2 entries were displayed.

```

## system ha interconnect status show

Display the high-availability interconnect connection status

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The `system ha interconnect status show` command displays the high-availability interconnect connection status. Connection status information displayed by this command varies by controller model. For nodes with two HA interconnect links over the backplane or connected externally, this command displays the following information:

- Node
- Link status on the first port
- Link status on the second port
- Is the link on first port active?
- Is the link on second port active?

- Interconnect RDMA status

For nodes with a single HA interconnect link, this command displays following the information:

- Node
- Link status
- Interconnect RDMA status

Running the command with the `-instance` or `-node` parameter displays detailed information about the interconnect device and its ports.

## Parameters

**{ [-fields <fieldname>,...]**

If you specify the `-fields <fieldname>,...` parameter, the command displays only the fields that you specify.

**| [-instance ] }**

Use this parameter to display all the fields for the specified node or all the nodes.

**[-node {<nodename>|local}] - Node**

Use this parameter to display all the fields for the specified node.

**[-link-status {up|down}] - Link Status**

Selects the nodes that match this parameter value. The value `up` means link is online.

**[-link0-status {up|down}] - Link 0 Status**

Selects the nodes that match this parameter value. The value `up` means link is online.

**[-link1-status {up|down}] - Link 1 Status**

Selects the nodes that match this parameter value. The value `up` means link is online.

**[-ic-rdma {up|down}] - IC RDMA Connection**

Selects the nodes that match this parameter value. The value `up` means active interconnect connection with its partner.

**[-is-link0-active {true|false}] - Is Link 0 Active**

Selects the nodes that match this parameter value. The value `true` means the interconnect data channels are established on this link.

**[-is-link1-active {true|false}] - Is Link 1 Active**

Selects the nodes that match this parameter value. The value `true` means the interconnect data channels are established on this link.

**[-slot <integer>] - Slot Number**

Selects the nodes that match this PCI slot number.

**[-driver-name <text>] - Driver Name**

Selects the nodes that match this interconnect device driver name.

**[-firmware <text>] - Firmware Revision**

Selects the nodes that match this firmware version.

**[-version <text>] - Version Number**

Selects the nodes that match this parameter value.

**[-device-type <text>] - Device Type**

Selects the nodes that match this interconnect device type.

**[-serial-number <text>] - Serial Number**

Selects the nodes that match this interconnect device serial number.

**[-debug-firmware {yes|no}] - Debug Firmware**

Selects the nodes that match this parameter value.

**[-command-revision <integer>] - Command Revision**

Selects the nodes that match this interconnect device command revision.

**[-hardware-revision <integer>] - Hardware Revision**

Selects the nodes that match this interconnect device hardware revision.

**[-port1 <integer>] - Port Number 1**

Selects the nodes that match this parameter value.

**[-port1-port-name <text>] - Port Name**

Selects the nodes that match this port name.

**[-port1-gid <text>] - Global Identifier**

Selects the nodes that match this global identifier value.

**[-port1-base-lid <text>] - Base Local Identifier**

Selects the nodes that match this base local identifier value.

**[-port1-rm-lid <text>] - Remote Local Identifier**

Selects the nodes that match this remote local identifier value.

**[-port1-mtu <integer>] - Maximum Transmission Unit**

Selects the nodes that match this parameter value.

**[-port1-data-rate <text>] - Data Rate**

Selects the nodes that match this parameter value.

**[-port1-link-info <text>] - Link Information**

Selects the nodes that match this parameter value.



**[-port1-qsfp-vendor <text>] - QSFP Vendor**

Selects the nodes that match this QSFP (Quad Small Form-factor Pluggable) vendor name.

**[-port1-qsfp-part-number <text>] - QSFP Part Number**

Selects the nodes that match this QSFP (Quad Small Form-factor Pluggable) part-number.

**[-port1-qsfp-type <text>] - QSFP Type**

Selects the nodes that match this QSFP (Quad Small Form-factor Pluggable) type.

**[-port1-qsfp-serial-number <text>] - QSFP Serial Number**

Selects the nodes that match this QSFP (Quad Small Form-factor Pluggable) serial number.

**[-port2 <integer>] - Port Number 2**

Selects the nodes that match this parameter value.

**[-port2-port-name <text>] - Port Name**

Selects the nodes that match this port name.

**[-port2-gid <text>] - Global Identifier**

Selects the nodes that match this global identifier value.

**[-port2-base-lid <text>] - Base Local Identifier**

Selects the nodes that match this base local identifier value.

**[-port2-rm-lid <text>] - Remote Local Identifier**

Selects the nodes that match this remote local identifier value.

**[-port2-mtu <integer>] - Maximum Transmission Unit**

Selects the nodes that match this parameter value.

**[-port2-data-rate <text>] - Data Rate**

Selects the nodes that match this parameter value.

**[-port2-link-info <text>] - Link Information**

Selects the nodes that match this parameter value.

**[-port2-qsfp-vendor <text>] - QSFP Vendor**

Selects the nodes that match this QSFP (Quad Small Form-factor Pluggable) vendor name.

**[-port2-qsfp-part-number <text>] - QSFP Part Number**

Selects the nodes that match this QSFP (Quad Small Form-factor Pluggable) part number.

**[-port2-qsfp-type <text>] - QSFP Type**

Selects the nodes that match this QSFP (Quad Small Form-factor Pluggable) type.

**[-port2-qsfp-serial-number <text>] - QSFP Serial Number**

Selects the nodes that match this QSFP (Quad Small Form-factor Pluggable) serial number.

## Examples

The following example displays status information about the HA interconnect connection on FAS8000 series nodes with two HA interconnect links in the cluster:

```
cluster1::*> system ha interconnect status show
Node: ic-f8040-01
    Link 0 Status: up
    Link 1 Status: up
    Is Link 0 Active: true
    Is Link 1 Active: false
    IC RDMA Connection: up
Node: ic-f8040-02
    Link 0 Status: up
    Link 1 Status: up
    Is Link 0 Active: true
    Is Link 1 Active: false
    IC RDMA Connection: up
2 entries were displayed.
```

The following example displays status information about the HA interconnect connection on FAS2500 series nodes with a single HA interconnect link in the cluster:

```
cluster1::*> system ha interconnect status show
Node: ic-f2554-01
    Link Status: up
    IC RDMA Connection: up
Node: ic-f2554-02
    Link Status: up
    IC RDMA Connection: up
2 entries were displayed.
```

The following example displays detailed information about the HA interconnect link when parameters like `-instance` , `-node` are used with the ``system ha interconnect status show`` command

```
cluster1::*> system ha interconnect status show -instance -node ic-f8040-01
```

```
Node: ic-f8040-01
```

```
    Link 0 Status: up
```

```
    Link 1 Status: up
```

```
    Is Link 0 Active: true
```

```
    Is Link 1 Active: false
```

```
    IC RDMA Connection: up
```

```
        Slot: 0
```

```
        Driver Name: IB Host Adapter i0 (Mellanox ConnectX MT27518 rev. 0)
```

```
            Firmware: 2.11.534
```

```
            Debug Firmware: no
```

```
Interconnect Port 0 :
```

```
    Port Name: ib0a
```

```
        GID: fe80:0000:0000:0000:00a0:9800:0030:33ec
```

```
    Base LID: 0x3ec
```

```
    MTU: 4096
```

```
    Data Rate: 40 Gb/s (4X) QDR
```

```
    Link Information: ACTIVE
```

```
Interconnect Port 1 :
```

```
    Port Name: ib0b
```

```
        GID: fe80:0000:0000:0000:00a0:9800:0030:33ed
```

```
    Base LID: 0x3ed
```

```
    MTU: 4096
```

```
    Data Rate: 40 Gb/s (4X) QDR
```

```
    Link Information: ACTIVE
```

## Copyright information

Copyright © 2022 NetApp, Inc. All Rights Reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

## Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.