1
New DECamds Features

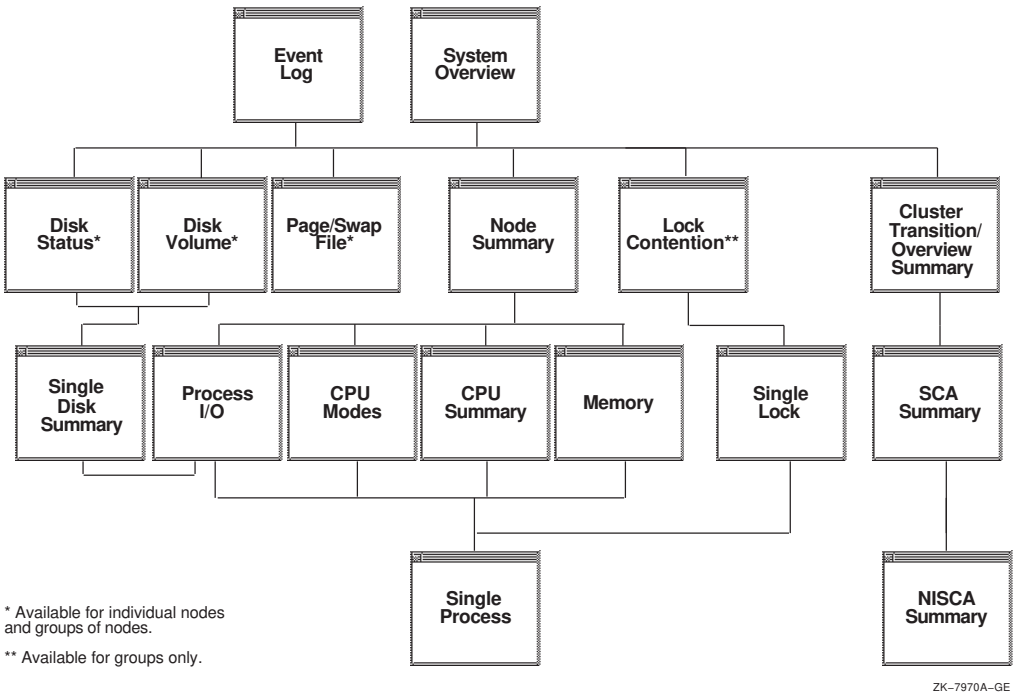
This chapter contains sections that explain the following new features of DECamds:

- New fields in the System Overview window: Number of Processes in CPU Queues, Operating System Version, Hardware Model
- New Single Disk Summary window: provides summary data about each node in the group in which a disk is available
- New cluster windows:
  - Cluster Transition/Overview Summary window: provides summary information about each node's membership in a VMScluster
  - System Communication Summary (SCA Summary) window: provides System Communication Architecture (SCA) information about a selected node's connection or connections to other nodes in a cluster
  - NISCA Summary window: provides summary information about the Network Interconnect System Communication Architecture (NISCA) protocol, which is responsible for carrying messages to other nodes in the cluster

These new features are documented in Version 7.0 of the *DECamds User's Guide*.

Figure 1–1 shows where the new windows fit into the hierarchy of DECamds data windows.

Figure 1–1 DECamds Data Window Hierarchy

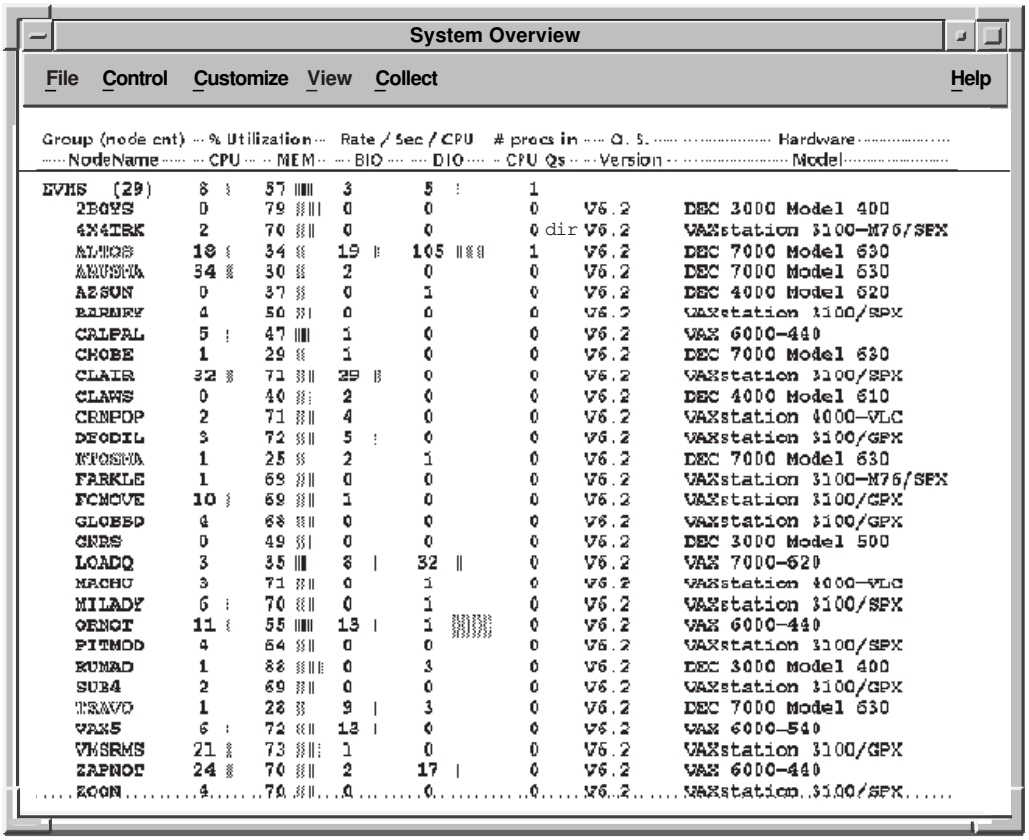


1.1 New Fields in the System Overview Window

Three new fields have been added to the System Overview window, which is described in Section 2.2 of the *DECamds User's Guide*.

The screen in Figure 1–2 includes the new fields in the System Overview window. This window shows the nodes that DECamds can currently reach and monitor.

Figure 1–2 System Overview Window



ZK–8543A–GE

Table 1–1 describes the new fields in the System Overview window.

Table 1–1 New Fields in the System Overview Window

Field	Description
# procs in CPU Qs (number of processes in CPU queues)	Represents the number of processes the Node Summary data collection found in the COM, COMO, MWAIT, and PWAIT CPU queues.
O.S. Version (version of the operating system)	Lists the currently loaded version of OpenVMS on the node being monitored (not the node doing the monitoring).
Hardware Model	Lists the hardware model of the node.

1.2 Single Disk Summary Window

The description of this new window follows Sections 3.3 and 3.4 in the *DECamds User's Guide*. These sections describe, respectively, the Disk Status Summary window and the Disk Volume Summary window. You can access the Single Disk Summary window from either window, as shown in Figure 1–1.

The Single Disk Summary window shown in Figure 1–3 displays summary data about each node in the group in which a disk is available. This window is a node-by-node display of the data that is summarized in the Group Disk Status and Volume Summary windows. The values displayed are those you would see

if you displayed Disk Status Summary or Disk Volume Summary for each node within the group.

You can use this display to determine both of the following:

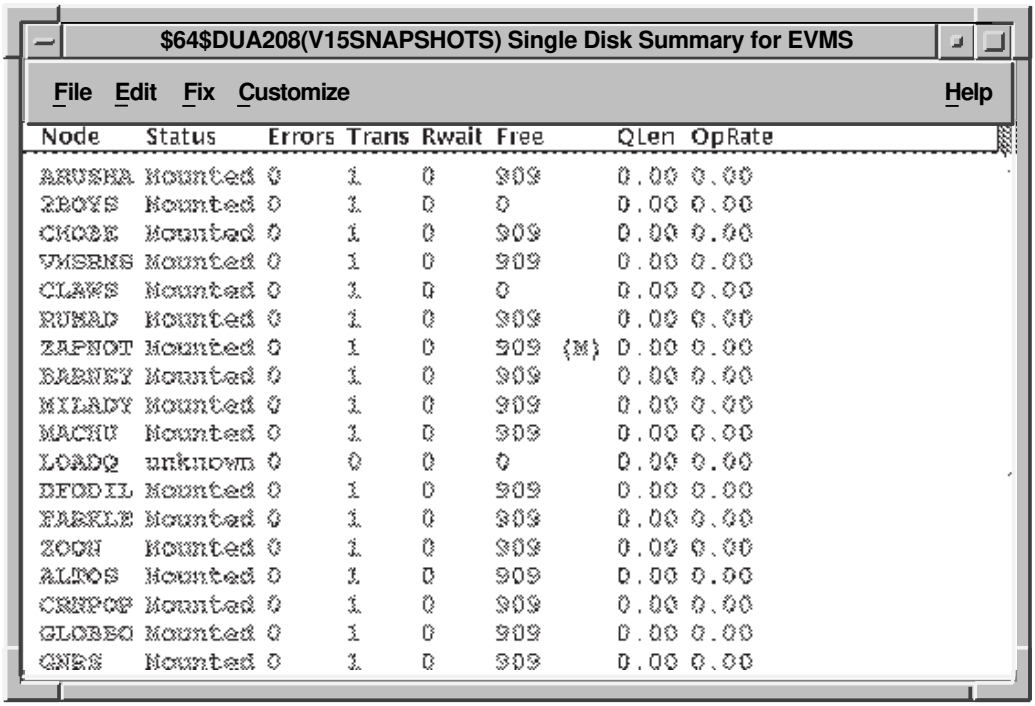
- Which node in the group has a disk with high I/O rates

  Determining which node has a high I/O rate to the disk is useful because you can sort by Direct I/O rate and learn which process or processes are causing the high I/O rates to the disk.

- If a disk is in a state inconsistent with other nodes

  Determining which node or nodes might be in an abnormal state is useful because you can then discover if, for some reason, one node believes that the disk is in the *MntVerify* or *CluTran* state, thus holding up processing in the cluster in which the node resides.

Figure 1–3 Single Disk Summary Window



ZK–8544A–GE

To open a Single Disk Summary window, follow these steps:

1. In the System Overview window, click MB3 on a group or node name.

   The system displays a pop-up menu.

2. Choose Display from the menu and Disk Status Summary (or Disk Volume Summary) from the submenu.

   The system displays the Disk Status Summary window (or Volume Summary window).

3. In the Disk Status Summary window (or Volume Summary window), click MB3 on a device name.

   The system displays a pop-up menu.

4. Choose Display Disk.

   The system displays the Single Disk Summary window.

As an alternative to steps 3 and 4, you can can double-click MB1 on a line in the Disk Status Summary or Volume Summary window to display the Single Disk Summary window.

Table 1–2 lists the Single Disk Summary window data fields.

Table 1–2 Data Items in the Single Disk Summary Window

Data Item	Description
Node	Name of the node
Status	Status of the disk: mounted, online, offline, and so on
Errors	Number of errors on the disk
Trans	Number of currently-in-progress file system operations on the disk (number of open files on the volume)
Rwait	Indication of an I/O stalled on the disk
Free	Count of free disk blocks on the volume An (M) after the free block count indicates this node holds the lock on the volume that DECamds uses to obtain the true free block count on the volume. Other nodes might not have accessed the disk, so their free block count might not be up to date.
QLen	Average number of operations in the I/O queue for the volume
OpRate	Count of rate of change to operations on the volume

Note: When you click on an item, DECamds temporarily stops updating the window for 15 seconds or until you choose an item from a menu.

From the Single Disk Summary window, you can display the Process I/O Summary window. To do so, follow these steps:

1. Click MB3 anywhere on a node line.

   The system displays a pop-up menu.

2. Choose Display Process I/O Summary.

   The system displays the Process I/O Summary window.

Alternatively, to display the Process I/O Summary window, you can do either of the following:

- Double-click MB1 on a node line.
- Click MB1 on a node line and then select Display Process I/O on the View pulldown menu.

See the *DECamds User's Guide* for information about the Process I/O Summary window.

1.3 New Cluster Windows

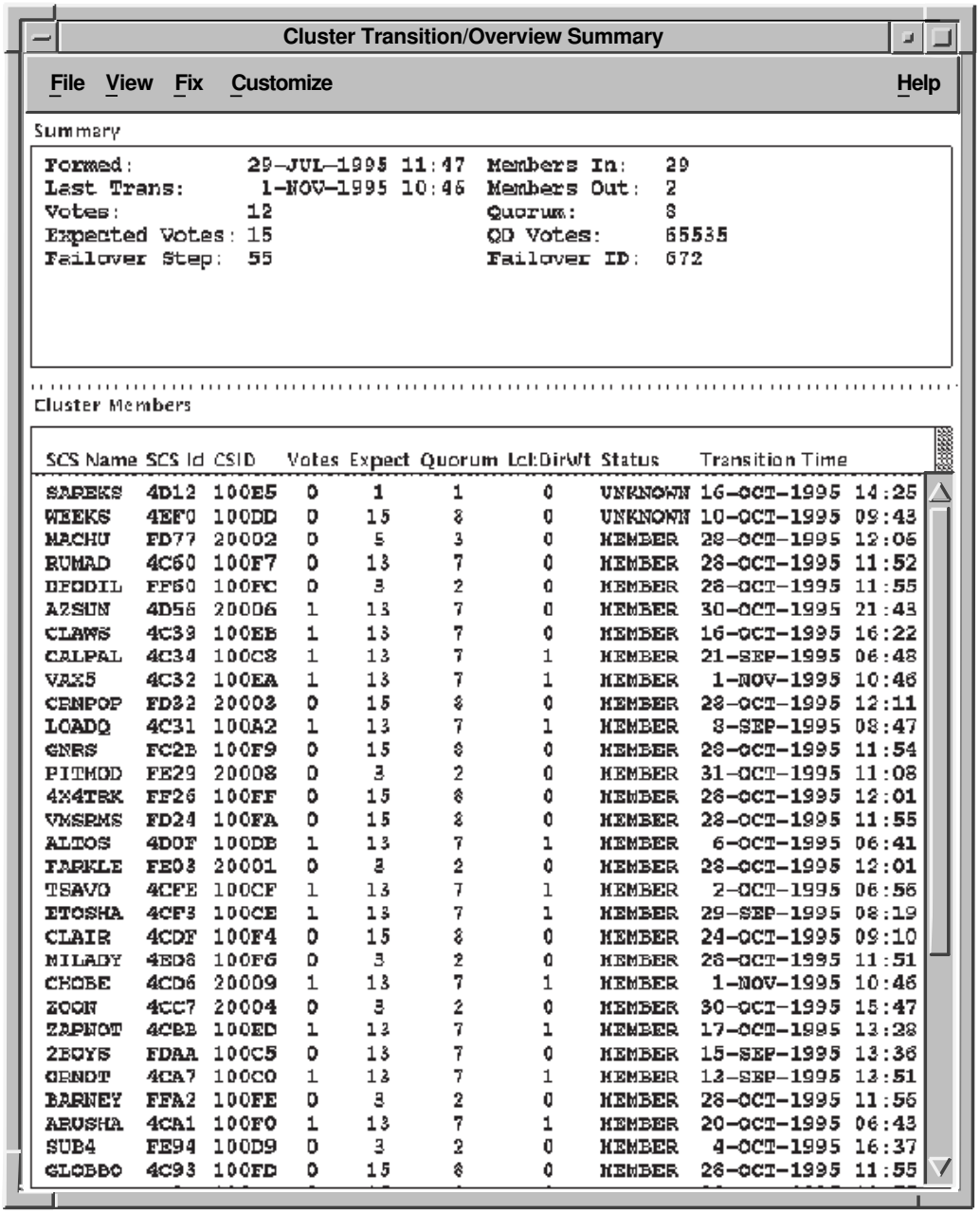
The descriptions of the three new cluster windows shown in the diagram in Figure 1–1 follow the last window described in Chapter 3 of the *DECamds User's Guide*.

For conceptual information about cluster data displayed in the windows, refer to *VMScluster Systems for OpenVMS*.

1.3.1 Cluster Transition/Overview Summary Window

The Cluster Transition/Overview Summary window shown in Figure 1–4 displays information about each node in a VMScluster. This window is very similar to System Overview window; however, this window lists only one cluster for each set of nodes in a cluster, while the System Overview window lists all the nodes and the user-defined groups these nodes are in.

Figure 1–4 Cluster Transition/Overview Summary Window



ZK–8545A–GE

The window displays summary information as well as information about individual nodes: System Communication Services (SCS) name, SCS ID, Cluster System ID, Votes, Lock Directory Weight value, cluster status, and last transition time.

The data items shown in the window correspond to data that the Show Cluster utility displays for the SYSTEM and MEMBERS classes. A status field display of "unknown" usually indicates that DECamds is not communicating with the node.

To open a Cluster Transition/Overview Summary window, follow these steps:

1. In the System Overview window, click MB3 on a node line.

   The system displays a pop-up menu.

2. Choose Display from the menu and Cluster Transition Summary from the submenu.

   The system displays the Cluster Transition/Overview Summary window.

Note: The Cluster Transition Summary menu option is not available for nodes that are not in the cluster, nor is it available from group lines in the display.

1.3.1.1 Data Displayed

The Cluster Transition/Overview window has two panel displays:

- Summary (top) panel: displays VMScluster summary information.
- Cluster Members (bottom) panel: lists each node in the cluster.

Table 1–3 describes the Summary panel data fields.

Table 1–3 Data Items in the Summary Panel of the Cluster Transition/Overview Summary Window

Data Item	Description
Formed	Date and time the VMScluster was formed.
Last Trans	Date and time of the most recent VMScluster state transition.
Votes	Total number of quorum votes being contributed by all cluster members and quorum disk.
Expected Votes	Number of votes expected to be contributed by all members of the cluster as determined by the connection manager. This value is based on the maximum of EXPECTED_VOTES and the maximized value of VOTES.
Failover Step	Current failover step index.
Members In	Number of members of the cluster DECamds has a connection to.
Members Out	Number of members of the cluster DECamds either has no connection to or has lost connection to.
Quorum	Number of votes required to keep cluster above quorum.
QD Votes	Number of votes given to Quorum Disk. A value of 65535 means there is no Quorum Disk.
Failover ID	Failover Instance Identification.

Table 1–4 describes the Cluster Members panel data fields.

Table 1–4 Data Items in the Cluster Members Panel of the Cluster Transition /Overview Summary Window

Data Item	Description
SCS Name	System Communication Services name for the node (system parameter SCSNODE)
SCS Id	System Communication Services identification for the node (system parameter SCSYSTEMID)
CSID	Cluster System Identification
Votes	Number of votes the member contributes
Expect	Expected votes to be contributed as set by the EXPECTED_VOTES
Quorum	Recommended quorum value derived from the expected votes
LckDirWt	Lock Manager distributed directory weight as determined by the LCKDIRWT system parameter
Status	Current cluster member status: MEMBER, UNKNOWN, or BRK_NON (break_non-member)
Transition Time	Time cluster member had last transition

1.3.1.2 Notes About the Display

Following are notes about the display of data in the window:

- No highlighting conventions are used in the window; all data items are displayed in bright mode.
- You cannot filter out any data.
- The data items in the window are sorted on an "as-found" basis. You cannot change the sort criteria.
- When you click on an item, DECamds temporarily stops updating the window for 15 seconds or until you choose an item from a menu.
- You can change collection intervals.

1.3.1.3 New Event in Window

The following new event has been created for the display in this window:

```
LOVOTE, 'node' VOTES count is close to or below QUORUM
```

DECamds signals this event when the difference between the cluster's QUORUM and VOTES values *is less than* the threshold for the event. The default threshold for the event is 1.

1.3.1.4 From This Window...

From this window, you can do the following:

- Double-click MB1 on a line to open a Node Summary display.
- Highlight a node and select a menu option to display either of the following:
  - Node Summary display of nodes that DECamds recognizes. DECamds ignores nodes that are unknown or break_non-member.
  - SCA Summary display of nodes that DECamds recognizes. DECamds ignores nodes that are unknown or break_non-member.
- Perform the Cluster Quorum Adjustment fix.

This fix forces a cluster quorum adjustment on the entire OpenVMS cluster on which the fix is run.

To perform the fix, first select the Fix option on the menu bar. Then the Quorum option on the menu displayed. DECamds moves through the cluster membership to find the first member node it can communicate with and performs a Quorum Adjustment fix on that node.

1.3.2 SCA Summary Window

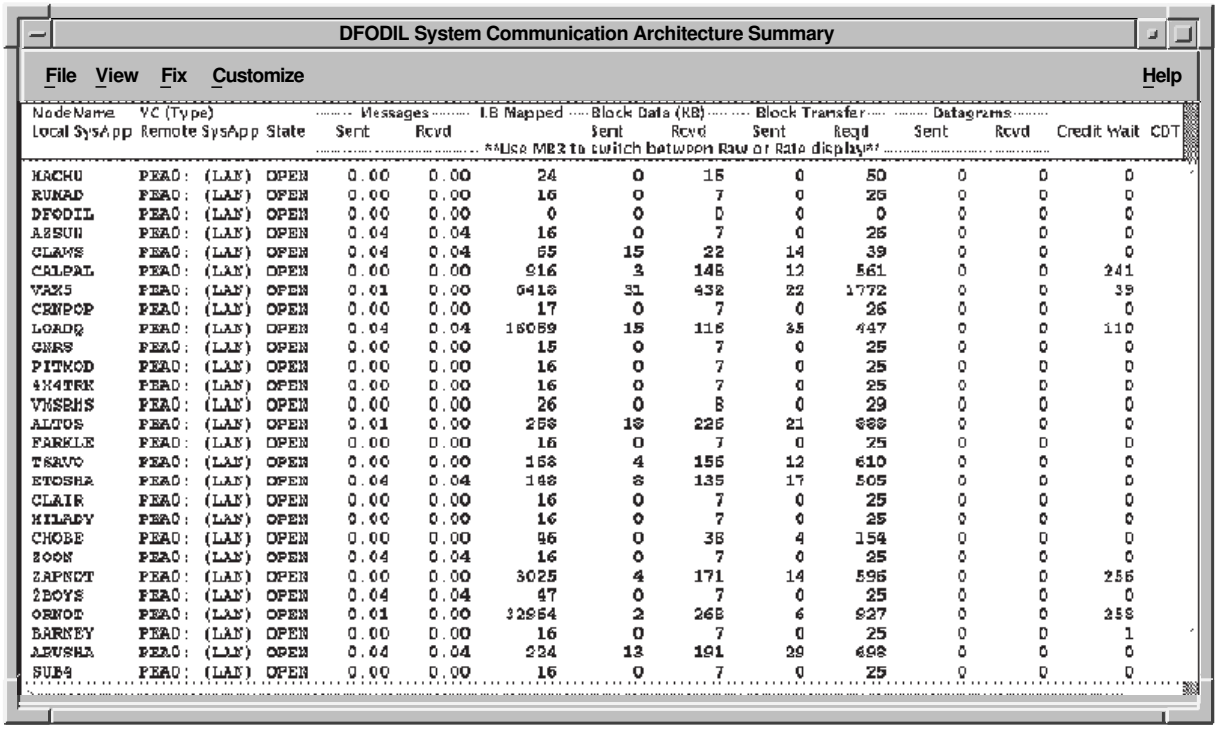
The System Communication Architecture Summary (SCA Summary) window shown in Figure 1–5 displays information about a selected node's virtual circuits and connections to other nodes in a cluster. (The display represents the view one node has of other nodes in the cluster.) More than one type of virtual circuit indicates that more than one path to the remote node exists.

Each line in the window shows either a summary of all system applications (SysApps) using the virtual circuit communication or the communication on the connection between a local and a remote SysApp. The data displayed in the window is similar to the information that the Show Cluster utility displays for the CIRCUITS, CONNECTIONS, and COUNTERS classes. Unlike Show Cluster, however, this display shows only SCA connections to other OpenVMS nodes; it does not show SCA connections to the Disk Storage Architecture (DSA) or to devices such as FDDI or DSSI disk controllers.

By clicking MB3 on a node name and choosing View SysApps from the pop-up menu, you can display the system applications that are using virtual circuits. This option expands the list below a virtual circuit to all the system applications that contribute to that virtual circuit. (The SysApp lines are dimmed and right-justified.)

To hide the display of system applications, you can click MB3 and choose Hide SysApps from the pop-up menu.

Figure 1–5 SCA Summary Window



ZK–8546A–GE

You can click MB3 on the data to the right of "State" to display a menu allowing you to toggle between Raw and Rate data. (For messages, the default is the display of rate data; raw data is the default for all other types of data.)

To open an SCA Summary window, follow these steps:

1. In the Cluster Transition/Overview Summary window, click MB1 or MB3 on an SCS name.

   The system displays a pop-up menu.

2. Choose Display SCA Summary.

   The system displays the System Communication Architecture (SCA) Summary window.

Table 1–5 describes the SCA Summary window data fields.

Table 1–5 Data Items in the SCA Summary Window

Data Item	Description
NodeName	SCS name of the remotely connected node.
VC(Type)	The virtual circuit being used and its type.
State	The state of the virtual circuit connection.
Messages	Relatively small data packets sent and received between nodes for control information.

(continued on next page)

Table 1–5 (Cont.) Data Items in the SCA Summary Window

Data Item	Description
Block Transfer	Fields listing the count of the number of block data transfers and requests initiated.
KB Mapped	Field listing the number of kilobytes mapped for block data transfer. Note: This field is available in RAW format only.
Block Data (KB)	Fields listing in kilobytes the data transferred via block data transfer.
Datagrams	Number of unacknowledged messages sent between virtual circuits.
Credit Wait	Number of times the connection had to wait for a send credit.
BDT Wait	Number of times the connection had to wait for a buffer descriptor.
Local SysApp	Name of the local system application using the virtual circuit.
Remote SysApp	Name of the remote system application being communicated to.

1.3.2.1 Notes About the Display

Following are notes about the display of data in the window:

- The window does not follow highlighting conventions: virtual circuit lines are displayed brightly and are left-aligned; SysApp lines are dimmed and are indented by a column.
- You cannot filter out any data.
- The data items in the window are sorted on an "as-found" basis. You cannot change sort criteria at this time.
- You can change collection intervals.

1.3.2.2 New Event in Window

The following new event has been created for the display in this window:

```
LOSTVC, <node> lost virtual circuit (<string>) to node <node>
```

DECamds signals this event when a virtual circuit between two nodes has been lost. This loss might be due either to a cluster node crashing or to cluster problems that caused the virtual circuit to close.

1.3.2.3 From This Window...

From this window, you can display the Network Interconnect System Communication Architecture (NISCA) Summary window. DECamds displays one window per virtual circuit provided the virtual circuit is running over a PEA0: device. See Section 1.3.3 for instructions.

1.3.3 NISCA Summary Window

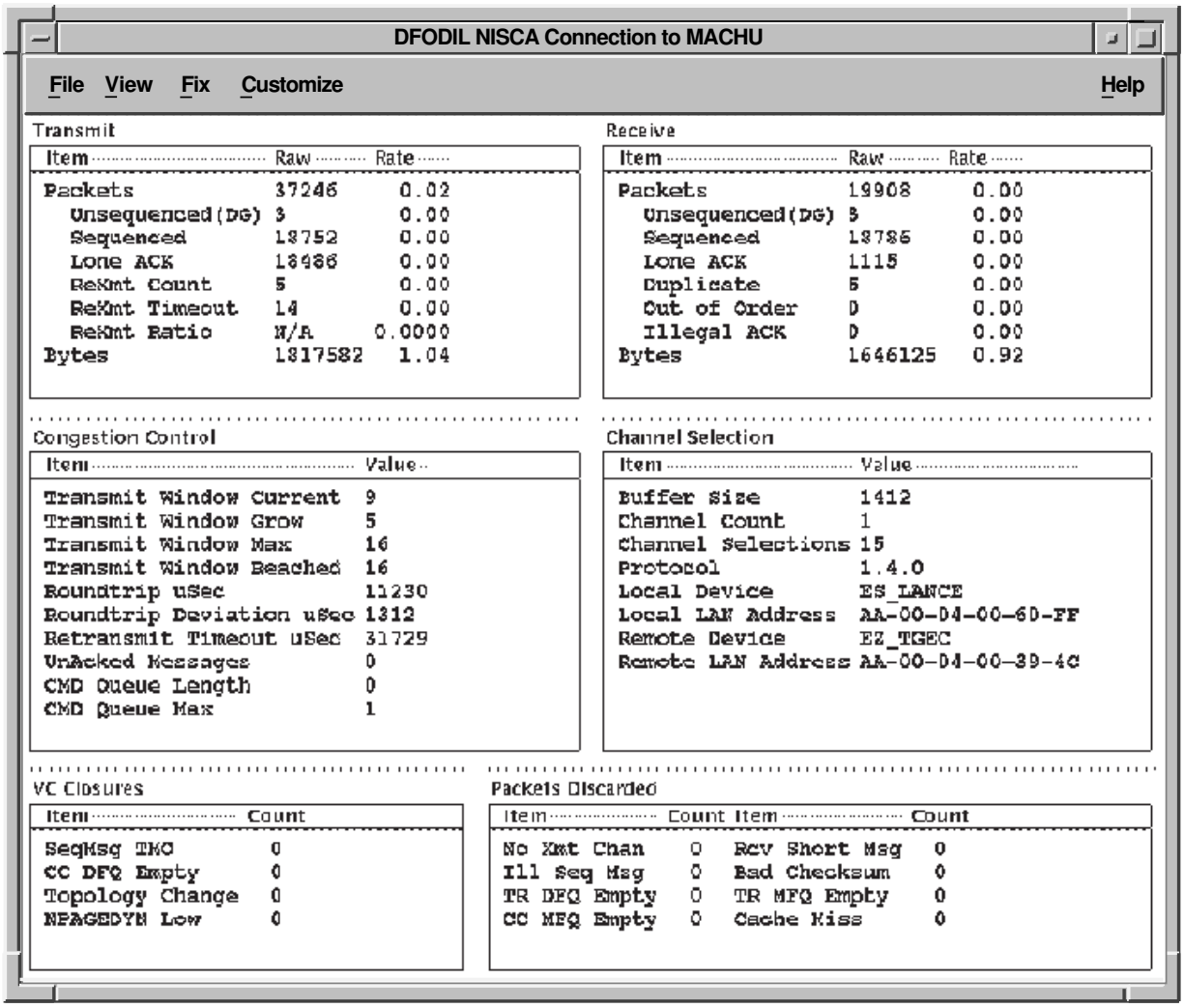
The Network Interconnect System Communication Architecture (NISCA) is the transport protocol responsible for carrying messages such as disk I/Os and lock messages across Ethernet and FDDI LANs to other nodes in the cluster. More detailed information about the protocol is in *VMScluster Systems for OpenVMS* in the OpenVMS documentation set.

The NISCA Summary window shown in Figure 1–6 displays detailed information about the LAN (Ethernet or FDDI) connection between two nodes. DECamds displays one window per virtual circuit provided the virtual circuit is running over a PEA0: device.

This window is designed to view statistics in real time and to troubleshoot problems found in the NISCA protocol. The window is intended primarily as an aid to diagnosing LAN-related problems. Section F.4 in Appendix F of the *VMScluster Systems for OpenVMS* describes the parameters shown in this window and tells how to use them to diagose LAN-related cluster problems.

The window provides the same information as the OpenVMS System Dump Analyzer (SDA) command SHOW PORTS/VC=VC_nodex. (Nodex is a node in the cluster; the system defines VC-nodex after a SHOW PORTS command is issued from SDA.)

Figure 1–6 NISCA Summary Window



ZK–8547A–GE

To open an NISCA Summary window, follow these steps:

1. In the SCA Summary window, click MB3 on a row with the PEA0: Virtual Circuit.

   The system displays a pop-up menu.

2. Choose View SysApps.

The system displays an expanded list below the node name.

3. Click MB3 on a SysApps node.

   The system displays a pop-up menu.

4. Choose Display NISCA.

   The system displays the NISCA Summary window.

Note: If the Display NISCA option is dimmed, the NISCA protocol is not running for that system application.

Alternatives:

- Instead of steps 1 and 2, you can double-click MB1 on a row with a PEA0: to display an expanded list below the node name.
- Instead of step 3, you can double-click MB1 on a SysApps node to display the NISCA Summary window.

1.3.3.1 Data Displayed

Panels in the NISCA Summary window contain the data described in the following tables.

Table 1–6 lists data items displayed in the Transmit Panel, which contains data packet transmission information.

Table 1–6 Data Items in the Transmit Panel

Data Item	Description
Packets	Number of packets transmitted through the virtual circuit to the remote node, including both sequenced and unsequenced (channel control) messages, and lone acknowledgments.
Unsequenced (DG)	Count and rate of the number of unsequenced datagram packages transmitted.
Sequenced	Count and rate of the number of sequenced packages transmitted. Sequenced messages are used for application data.
Lone ACK	Count and rate of the number of lone acknowledgments.
ReXmt Count	Number of packets retransmitted. Retransmission occurs when the local node does not receive an acknowledgment for a transmitted packet within a predetermined timeout interval.
ReXmt Timeout	Number of retransmission timeouts that have occurred.
ReXmt Ratio	Ratio of ReXmt Count current and past to the current and past number of sequenced messages sent.
Bytes	Count and rate of the number of bytes transmitted through the virtual circuit.

Table 1–7 describes data items displayed in the Receive Panel, which contains data packet reception information.

Table 1–7 Data Items in the Receive Panel

Data Item	Description
Packets	Number of packets transmitted through the virtual circuit to the remote node, including both sequenced and unsequenced (channel control) messages, and lone acknowledgments.
Unsequenced (DG)	Count and rate of the number of unsequenced packages received.
Sequenced	Count and rate of the number of sequenced packages received. Sequenced messages are used for application data.
Lone ACK	Count and rate of the number of lone acknowledgments.
Duplicate	Number of redundant packets received by this system.
Out of Order	Number of packets received out of order by this system.
Illegal Ack	Number of illegal acknowledgments received.
Bytes	Count and rate of the number of bytes received through the virtual circuit.

Table 1–8 describes data items displayed in the Congestion Control Panel, which contains transmit congestion control information.

The values in the panel list the number of messages that can be sent to the remote node before receiving an acknowledgment and the retransmission timeout.

The system parameter PEDRIVER varies the pipe quota and the timeout value to control the amount of network congestion.

Table 1–8 Data Items in the Congestion Control Panel

Data Item	Description
Transmit Window Current	Current value of the pipe quota (transmit window). After a timeout, the pipe quota is reset to 1 to decrease congestion and is allowed to increase quickly as acknowledgments are received.
Transmit Window Grow	The slow growth threshold: size at which the rate of increase is slowed to avoid congestion on the network again.
Transmit Window Max	Maximum value of pipe quota currently allowed for the virtual circuit based on channel limitations.
Transmit Window Reached	Number of times the entire transmit window was full. If this number is small as compared with the number of sequenced messages transmitted, the local node is not sending large bursts of data to the remote node.
Roundtrip uSec	Average roundtrip time for a packet to be sent and acknowledged. The value is displayed in microseconds.
Roundtrip Deviation uSec	Average deviation of the roundtrip time. The value is displayed in microseconds.
Retransmit Timeout uSec	Value used to determine packet retransmission timeout. If a packet does not receive either an acknowledging or a responding packet, the packet is assumed to be lost and will be resent.
UnAcked Messages	Number of unacknowledged messages.
CMD Queue Length	Current length of all command queues.

(continued on next page)

Table 1–8 (Cont.) Data Items in the Congestion Control Panel

Data Item	Description
CMD Queue Max	Maximum number of commands in queues so far.

Table 1–9 describes data items displayed in the Channel Selection Panel, which contains channel selection information.

Table 1–9 Data Items in the Channel Selection Panel

Data Item	Description
Buffer Size	Maximum PPC data buffer size for this virtual circuit
Channel Count	Number of channels connected to this virtual circuit
Channel Selections	Number of channel selections performed
Protocol	NISCA Protocol version
Local Device	Name of the local device that the channel uses to send and receive packets
Local LAN Address	Address of the local LAN device that performs sends and receives
Remote Device	Name of the remote device that the channel uses to send and receive packets
Remote LAN Address	Address of the remote LAN device performing the sends and receives

Table 1–10 describes data items displayed in the VC Closures Panel, which contains information about the number of times a virtual circuit has closed for a particular reason.

Table 1–10 Data Items in the VC Closures Panel

Data Item	Description
SeqMsg TMO	Number of sequence transmit timeouts
CC DFQ Empty	Number of times the channel control DFQ was empty
Topology Change	Number of times PEDRIVER performed a failover from FDDI to Ethernet, necessitating the closing and reopening of the virtual circuit
NPAGEDYN Low	Number of times the virtual circuit was lost because of a pool allocation failure on the local node

Table 1–11 lists data items displayed in the Packets Discarded Panel, which contains information about the number of times packets were discarded for a particular reason.

Table 1–11 Data Items in the Packets Discarded Panel

Data Item	Description
No Xmt Chan	Number of times there was no transmit channel

(continued on next page)

Table 1–11 (Cont.) Data Items in the Packets Discarded Panel

Data Item	Description
Ill Seq Msg	Number of times an illegal sequenced message was received
TR DFQ Empty	Number of times the Transmit DFQ was empty
CC MFQ Empty	Number of times the Channel Control MFQ was empty
Rcv Short Msg	Number of times a short transport message was received
Bad Checksum	Number of times there was a checksum failure
TR MFQ Empty	Number of times the Transmit MFQ was empty
Cache Miss	Number of messages that could not be placed in the cache

1.3.3.2 Notes About the Display

Following are notes about the display of data in the window:

- No highlighting conventions are used within the NISCA Summary window.
- You cannot sort or filter the data displayed in this window.
- You can change collection intervals.