VOICE MAIL SURVIVABILITY WITH MULTI-SITE DIRECT CLUSTER NETWORKING (DCN)

IPedge Messaging supports voice mail survivability by using a feature called Direct Cluster Networking (DCN). DCN allows joining the Messaging application of two or more IPedge systems (individually referred to as Nodes) into a cluster. These clusters act in unison to maintain the integrity of the messaging database of the entire network. Each node configured into the cluster has a copy of the database of the other participating nodes. If one node fails all of the user's greetings and messages are available when the IPedge telephones register into another node.

Nodes can be geographically distributed in various configurations. Each node contains the complete database for the entire cluster, and the Messaging application residing on each node only uses the local copy of the database. Each node is identified by a NODE ID. In addition all files, including system greetings, user greetings and messages can be replicated to all nodes (standard cluster) or replicated to a designated subset of nodes (hybrid cluster), depending on cluster size and network capability.
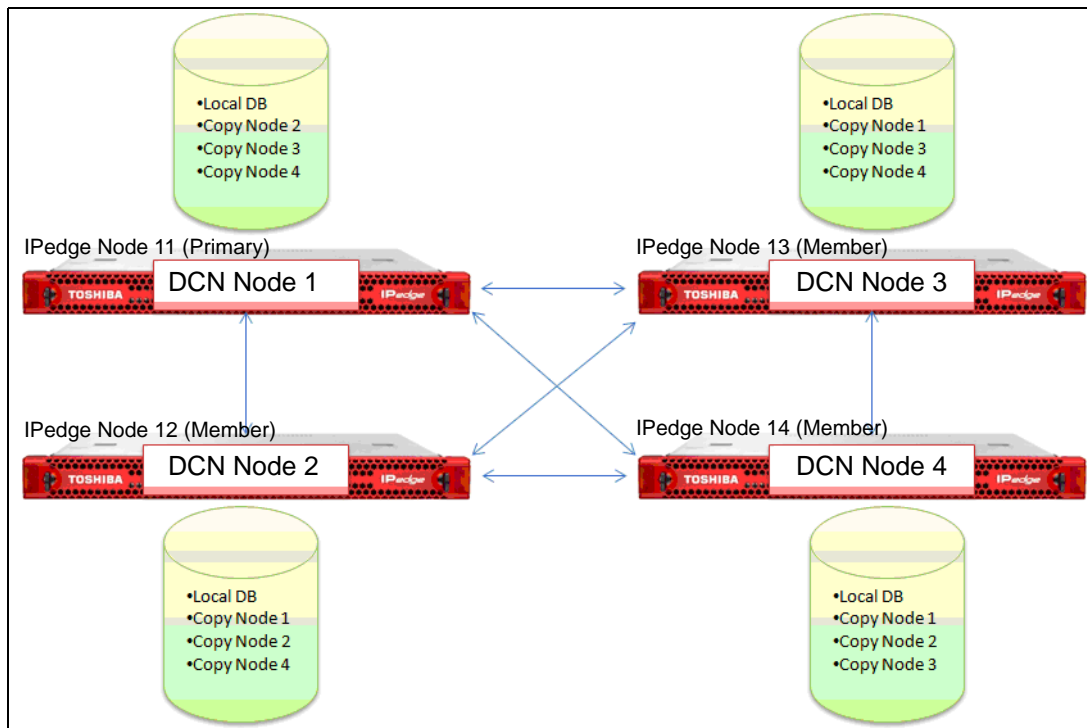
Figure 1   Four Node System Configuration

Figure 1 illustrates how the DCN stores and synchronizes the clusters database in all systems that are licensed for DCN. Should one node fail, one of the other nodes can be used as a backup mailbox for the surviving IPedge telephones.

There is no license required for the mailboxes replicated in the other nodes.
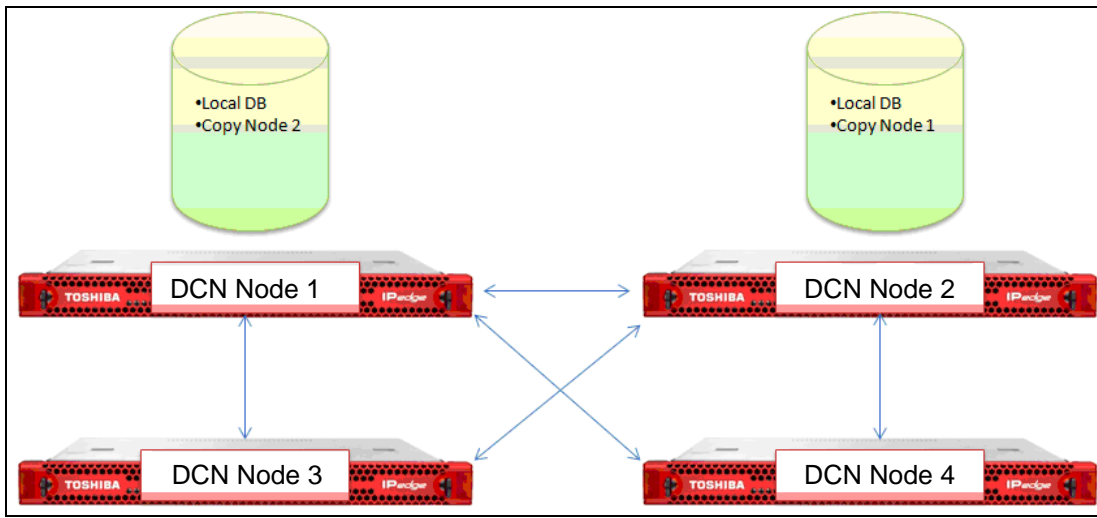
Figure 2   DCN With Centralized Messaging

Figure 2 shows how DCN can work within a centralized voice mail configuration. Should IPedge Node 11 (DCN node 1) fail, Node 13 can use the replicated mailboxes on Node 12.

FUNCTIONAL CONSIDERATIONS

Although DCN provides a robust voice mail survivability solution, there are some functional considerations that need to be understood and communicated to customer users.

1. If a telephone has a Message Waiting Indicator (MWI) illuminated and the system that supports that telephone should fail the MWI will not be reinstated until another new message is received. The telephone survives over to another system that is in the cluster and has its mailbox intact, but the MW light will not light until a new message is received.

2. The voice mail hunt group pilot number should be the same on the different nodes. If the voice mail hunt group pilot number is different on the different nodes incorrect voice mail forwarding after a node failure will occur. For example, station 201 on IPedge Node 11 (DCN Node 1) is set to system call forward to voicemail hunt group pilot 300. The DNs on IPedge Node 12 (DCN Node 2) are set to system call forward to voicemail hunt group pilot 400. If IPedge Node 11 fails and station 201 re-registers with IPedge Node 12, station 201 will not properly forward to voicemail when a call is presented to it.

Note: The Messaging application must be running on every IPedge system that will run DCN.

DCN CONFIGURATION

When setting up a cluster, the original database from one system will be duplicated into the other nodes. Use the Messaging application administrator Site Parameters > Cluster page to define the nodes and copy the database from the original system to the additional nodes. The

programming values only become visible after th system is licensed for DCN. The Database includes all information to be replicated (tables, voice messages, greetings, and names).

Note: The DCN Node ID of the IPedge systems in the cluster must start with 1 and be sequential. The IPedge Node ID is not related to the DCN Node ID. The DCN Node ID does not affect the IPedge dialing plan or flexible access codes. Refer to Figure 1.

OPEN NETWORK PORTS

The network communication between nodes to support DCN require the following ports to be open in any firewalls between the nodes.

- 22 TCP (SSH) - It can be disabled during normal runtime. Port 22 must be open to:
  - Create a cluster
  - Add or Remove a node
  - Check Cluster Integrety
  - Upgrate software
- 3306 TCP (MySQL)

Important System Requirements

1. Prior to setting up the cluster, verify that each node is licensed for DCN. In Enterprise Manager select **Maintenance > Licensing > License Control**.

2. Verify that license I-MSG-DCN-xx (xx = system type) is present.

Configure the IPedge Nodes

This procedure is used to setup DCN in the Messaging application in every node.

1. In Enterprise Manager select **Application > Webmin**.

2. In Webmin select **System > Startup and Shutdown**.
   - **t3esync**: Only one node should be running esync, set **Yes** only on that node. Set all other nodes to No. (Check-mark then, click on Disable Now and on boot up.")
   - **t3msync**: Only one node should be running msync, set **Yes** only on that node. Set all other nodes to No. (Check-mark then, click on Disable Now and on boot up.")
   - **sshd**: Check-mark then, Check-mark then, click on Start now and on boot up.

3. Select **Application > Messaging**.

4. In the Messaging interface select **Registry > Parameters** Check-mark the box for **DB Sync**, enter a value of 1 to enable then, enter the DCN Node number for the system node you are programming.

5. Scroll down to check-mark **Node Number** then, enter the Node ID number of this node.

6. Click on **Save**.

7. Select **Mailboxes > Properties**.

8. In the **Home Node** field enter the Node ID of this node.

9. Select **Utilities > Database Maintenance**. Scroll down to **House Keeping**. Set the House Keeping Time.

   – Day = **Daily**

   – Time = Select a time of low system activity.

   – Purge Reports = **3**.

   Note: Ensure that the database housekeeping start times are about one hour apart. The schedule should not overlap the regular IPedge system backup the occurs everyday around 0300.

10. Save then, exit the Messaging application.

11. Repeat for each IPedge node.

Create a Cluster   The cluster is setup in the IPedge Primary node only.

First Node   1. In Enterprise Manager select **Applications > Messaging**.

2. Select the Primary node.

3. in the Messaging menu select **Site Parameters > Cluster**.

4. Click on the **Start Cluster Wizard** icon.

5. In the Node ID field enter the DCN node number. The first node is always 1.

6. In the IP Address field enter the IP address of the node you identified in step 5.

7. Click on **Next**.

Add a Node   8. Enter the next DCN node number (DCN node numbers are consecutive).

9. Enter the IP address of this IPedge node.

10. Enter the IPedge username 'admin'.

11. Enter the password for the account 'admin' (the factory default password should have been changed during IPedge server installation (see chapter 4 in the I&M manual). Confirm the admin password.

12. Enter the admin password for this node.

13. Enter the password for the account 'root' (the factory default password should have been changed during IPedge server installation (see chapter 4 in the I&M manual). Confirm the root password.

14. Click on **Next**.

15. If there is another node go to Step 8. If this was the last node click on **Finish**.

16. The wizard will display a list of the nodes and their IP addresses. If the list is correct click on **Create Cluster**. If there is an error click on **Back**.

17. When the cluster has been created the wizard will display a Cluster created successfully message.

18. Restart Messaging service.

Note: Once the DCN wizard has been run on one of the nodes in the network, it cannot be run on any other nodes in the network. The DCN wizard can only be run again on the same node where the wizard was first run.

Setup Multi-Node Messaging IP Addresses

After the cluster has been created the IP address of each IPedge server must be assigned in the Component Services section of Enterprise Manager. This will allow you to log on to Enterprise Manager on the Primary Node and access the Messaging Application of the Member Node(s).

1. Login to Enterprise Manager on the primary node, select **Administration > Component Services**. Select the Server Application tab.

2. Click on the **New** icon. The Server Application dialog box will open.

3. In the **Application IP Address** field enter the IP address of one IPedge member server. You must enter the IP address, do not enter the 127.0.0.1 loop-back address.
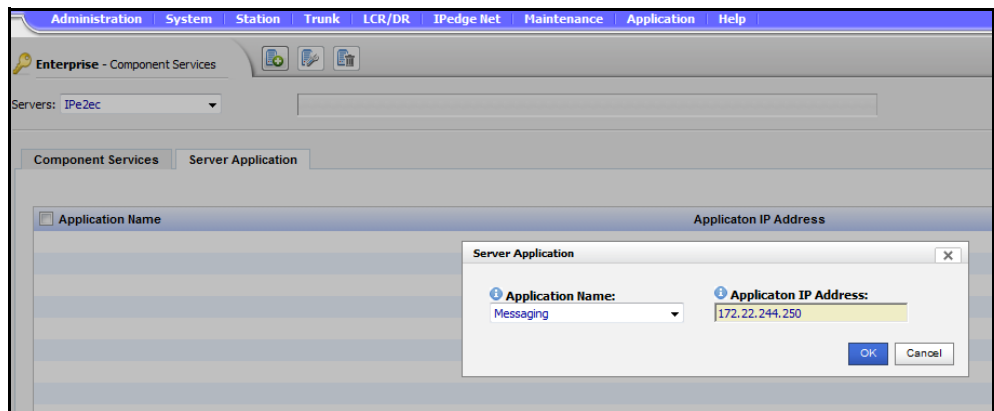
4. The Messaging application will now be listed in the Component Services.
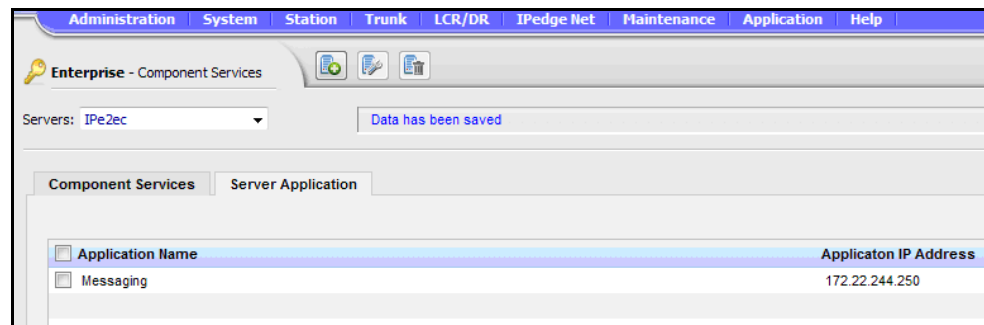
5. Repeat steps 2 through 4 for each member server.

Important! Keep in mind that the first time setup of clustering will delete all existing mailboxes on the member node(s).

VERIFY CLUSTER WORKING STATUS

When the Messaging service has restarted on all nodes use the following procedure to verify that the cluster is functioning correctly.

1. Login to Enterprise Manager. Select **Application > Messaging**.

2. Select a node. Start with the Primary IPedge node.

3. In the Messaging screen select **Site Parameters > Cluster**.

4. The screen will show the status of all of the nodes in the cluster except the one you are logged in to.

   The status indicator meaning is shown in the table below.

Color	Meaning	Action
Green	OK - The node is accessible and Operational	None
Red (2)	Database connectivity to the indicated node is successful but the Messaging service is down.	Start Messaging on the indicated node.
Red (1)	No connectivity to the indicated node	1. Verify that the IP address entered for this node is correct 2. Verify that the server is running.
No nodes found	The **Registry > DBsync** parameter is not activated.	Activate the DBsync parameter.

5. Repeat for one other node.

6. Record a department greeting on one node and verify that it is applied to the other nodes.

7. Record a mailbox greeting on one node and verify that it is applied to the other nodes.

8. Leave a message in a mailbox on one node then, access the mailbox on another node. The same message should be there.

Cluster Information

In addition to the status indications detailed in the previous section, the **Site Parameters > Cluster** page allows you to change the database information for each node as well as define the Message Synchronization method between the local node and the other nodes in the cluster using the Automatic Message Synch check-box. The two methods are:

1. Checked — All messages recorded in the local node will be automatically copied to the remote node. The benefit of this method is that there are multiple copies of each message in separate locations. This allows for redundancy and disaster recovery.

2. Unchecked — Messages will not be automatically copied to the remote node. Messages will only be copied as needed, i.e. when a user on the remote node attempts to listen to a message that was recorded on the local node. The benefit of this method is reduced network traffic, as not all messages are copied.

The synchronization method is set per node. This allows for a 'Hybrid' Cluster, where some nodes are fully duplicated and others are partially duplicated (messages are duplicated on-demand but database, personal greetings and system greetings are automatically duplicated). A Hybrid cluster is useful for balancing between network traffic limitations and redundancy requirements.

Replicated Files   The table below shows a summary of the data that is replicated and not replicated in the cluster.

Data	Replicated	Not Replicated
PBX parameters		X
Site parameters		X
System Logs		X
Message History Logs		X
Mailbox Properties	X	
Mailbox Greetings/Name	X	
Mailbox Scripts/PIN/Greeting	X	
Messages	X	
Department Settings	X	
Department Greetings	X	
Class Of Service Settings	X	
Reports		X
Registry		X

Verifying Cluster Integrity   While the cluster operates normally, all database records are duplicated across all nodes. To verify this operation login to Enterprise Manager, navigate to the Messaging administration and select **Site Parameters > Cluster** page, click on check **Cluster Integrity** icon.

If records are missing or not updated on any of the nodes, the database will show as NOT synchronized. This may be a result of a network outage or a node that is off-line. Once the node is back on-line, this condition will be automatically corrected. Another option to correct this condition is to re-introduce the node to the cluster (as described in the "Add a Node" on Page -4 section).

MySQL Ports And Permissions All Cluster nodes use MySQL on port 3306. The setup process automatically adds all nodes to the allowed hosts in the MySQL "user" table.

Mailbox Home Node Because any mailbox may receive, playback, save or delete a message from any node, Message Waiting Indications and Message Notification may be triggered from any node; depending on where the message was accessed. However, this may cause a problem in some cases. For example:

1. If a Message Waiting Light can only be deactivated by the device that activated it.

2. If only a specific node is attached to the PBX that can trigger MWI for a user.

To overcome these potential issues, a Home Node can be specified in the Mailbox > Parameters page. This will guarantee that MWI would only be activated and deactivated from the Node connected to the preferred PBX (the Node Number that was designated at the time the cluster was created). It would also guarantee that Message Notification attempts will be made from this node. If the Home Node field is set to 0 (default), MWI and Message Notification would be sent from the node in which the mailbox is currently being accessed.

DCN Cluster and Esync Unified Messaging When using Esync in a DCN environment, only one of the nodes should be running the Esync service and it should be turned off for all other nodes. SMTP messages will be sent from all nodes, however, only one node will synchronize the message status.

DCN Cluster and Msync Unified Messaging When using Msync in a DCN environment, only one of the nodes should be running the Msync service and it should be turned off for all other nodes.

Add Msync Node Select **Registry > Msync**. To support the DCN cluster.

To configure click the **Add Msync Node** icon. The primary node displays as 'Node 0.'

The default field entries are:

Messaging Server = Localhost

Message DB = vmuser

Messaging user = gumadmin

Messing Pass = gumAdminPassword

When adding a node input the remote IP address for Messaging Server.

For Messaging DB enter vmuser

For Messaging user enter gumadmin

For Messaging Pass enter gumAdminPassword

Cluster Housekeeping   The nightly housekeeping routine cleans both database information as well as system specific information. It is recommended to run the housekeeping routine on all nodes in staggered timing. Allow each node enough time to complete before the housekeeping on the next node starts. Refer to "Configure the IPedge Nodes" on Page -3.

CAPACITY   N/A

AVAILABILITY   Multi-Node IPedge R3.0 and later systems.

                          Each node requires a I-MSG-DCN-xx (xx = system type) license.

                          The Messaging application must be running on every IPedge system that
                          will run DCN.

RESTRICTION   N/A