

Bull

Site Monitoring for Disaster Recovery User's Guide

AIX

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AIX

Software

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About This Book

This manual will help you to install, configure and use the Site Monitoring for Geographic Disaster Recovery application.

For definitions of abbreviations, see Glossary

Who Should Use This Book

This manual is intended for cluster administrators and anyone who monitors HACMP configuration.

This manual assumes that you are familiar with the HACMP product and your host operating system. You should also know how to perform a basic set of actions in a Windows-type environment, including:

- choosing menu commands,
- moving and resizing windows,
- opening icon windows,
- dragging and dropping icons,
- using mouse controls for your system.

Overview

The manual is organized as follows:

- Overview of Disaster Recovery Solutions,
- Installation and Configuration,
- Modem Configuration,
- Site Monitoring Daemon Configuration,
- Monitoring Daemon Services,
- Disaster Recovery Event History,
- Disaster Alert,
- Troubleshooting,
- Configuration of the Predefined Types of Modems,
- Glossary.

Related Publications

- Recovery from Cluster Site Disaster User's Guide, 86 A2 86JX.
- HACMP Concepts and Facilities, 86 A2 54KX.
- HACMP Enhanced Scalability Installation and Administration Guide, Vol. 1, 86 A2 62KX.
- HACMP Enhanced Scalability Installation and Administration Guide, Vol. 2, 86 A2 89KX.
- PowerConsole & Cluster Assistant Setup Guide, 86 A2 81HX.
- EPC & HA Solutions Setup Guide, 86 A2 79HX05.
- OSM SRDF Components for UNIX Product Guide, P/N 200-999-565.
- System Management Design and Development Guidelines – IBM.

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Chapter 1. Overview of Disaster Recovery Solutions

Disaster recovery is a generic name that encompasses various options, with one goal in mind, answering customers number one issues: the recovery of their data or business exploitation in case of major natural disasters. These disasters can be classified from water flooding of an Information System, through fire disaster, up to earthquake ... etc.

Whatever the nature of the disaster, two main types of recovery needs can be identified:

- **APPLICATION and DATA recovery:** This gives total recovery of the business environment. The customer requires all applications and critical data to his business environment to be recovered and up and running again as fast as possible on the back-up site,
- **DATA ONLY recovery:** This gives recovery of business critical data only (database, plus a variable part of the data archived for business sake).

Depending on the type of disaster which is being targeted, the customer may add a requirement of distance between the master/backup site for both types of disaster recovery.

| distance resource | room | building | campus | geographic | geographic |
|-------------------|--|---|---|--|--|
| APPLI + DATA | Bull HA Configuration with DAS (SCSI) or SSA | Bull HA Configuration with DAS (FC) or SSA | Bull HA Configuration with DAS (FC) | To be evaluated on a case per case basis | To be evaluated on a case per case basis |
| DATA ONLY | Bull ESCALA Systems with DAS (SCSI) or SSA or SRDF/SYMMETRIX or Oracle replication | BULL ESCALA Systems with DAS (FC) SSA or SRDF/SYMMETRIX or Oracle replication | BULL ESCALA Systems with DAS (FC) SSA or SRDF/SYMMETRIX or Oracle replication | BULL ESCALA Systems with DAS SRDF/SYMMETRIX or Oracle replication (ESCON link) | BULL ESCALA Systems with DAS SRDF/SYMMETRIX or Oracle replication (ATM link) |
| Metric distance | < 25 m | < 1000 m | < 10 km | < 60 km limitation due to ESCON link | > 60 km no limitation |

Note: Oracle replication solution is explained in the white paper document available on the Bull web site: **Keep disaster at a distance**

<http://www-frec.bull.com> -> White papers -> Keep disaster at distance

Bull Disaster Recovery Solutions

There are two Bull disaster recovery solutions depending on the range of the disaster:

- Campus disaster recovery.
- Geographic disaster recovery: inter site monitoring and recovery from cluster site disaster.

Campus Disaster Recovery

The **Campus Disaster Recovery** allows data mirroring on an extended cluster.

Each node in a cluster is defined over two sites, and must belong to the same subnet to respect HA requirement for public network connection even if only Applications and Data Takeover is possible.

Serial networks used for HACMP heartbeat between cluster nodes must be extended using RS232 micro-modems.

If a disaster is diagnosed, HACMP on the surviving node will take over all the resources of the failed node.

For distances over 1 km and under 10 km, Bull delivers a recovery method based on the technology of Fibre-Channel (FC), fiber disks subsystems, optical adapters and fiber links.

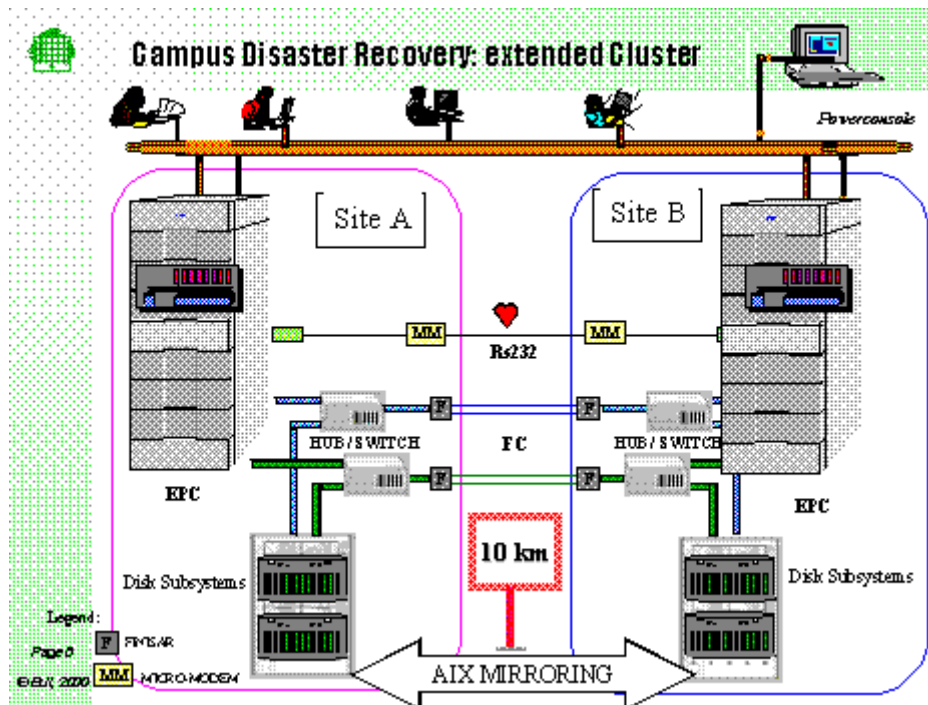


Figure 1. Campus Disaster Recovery

Geographic Disaster Recovery

Geographic recovery is specifically targeted at Disaster Recovery requirements over long or very long distances:

- For distances over 10km, Bull provides DATA Disaster Recovery solutions in partnership with EMC and ORACLE and can answer DATA and APPLICATION Disaster Recovery Solutions on a case by case basis.

The clustering software HACMP is easily adaptable to local site monitoring, allowing:

- diagnosis of system errors and network errors,
- high availability of data (external disk subsystems) by using data mirroring.

But, this functionality is not well adapted to the inter site availability (heavy infrastructure constraints, no data mirroring integration...).

Inter Site Monitoring and Recovery from Cluster Site Disaster

To take into account the inter site availability, some mechanisms are proposed:

- The **Inter Site Monitoring** mechanism.
- The **Recovery from Cluster Site Disaster** mechanism:
 - to define the methods of replication of data and applications from one site to another,
 - to allow the reconfiguration and the restart of activities (applications) on the mirror site when the system administrator makes the decision to proceed with the site takeover,
 - to restore the initial configuration.

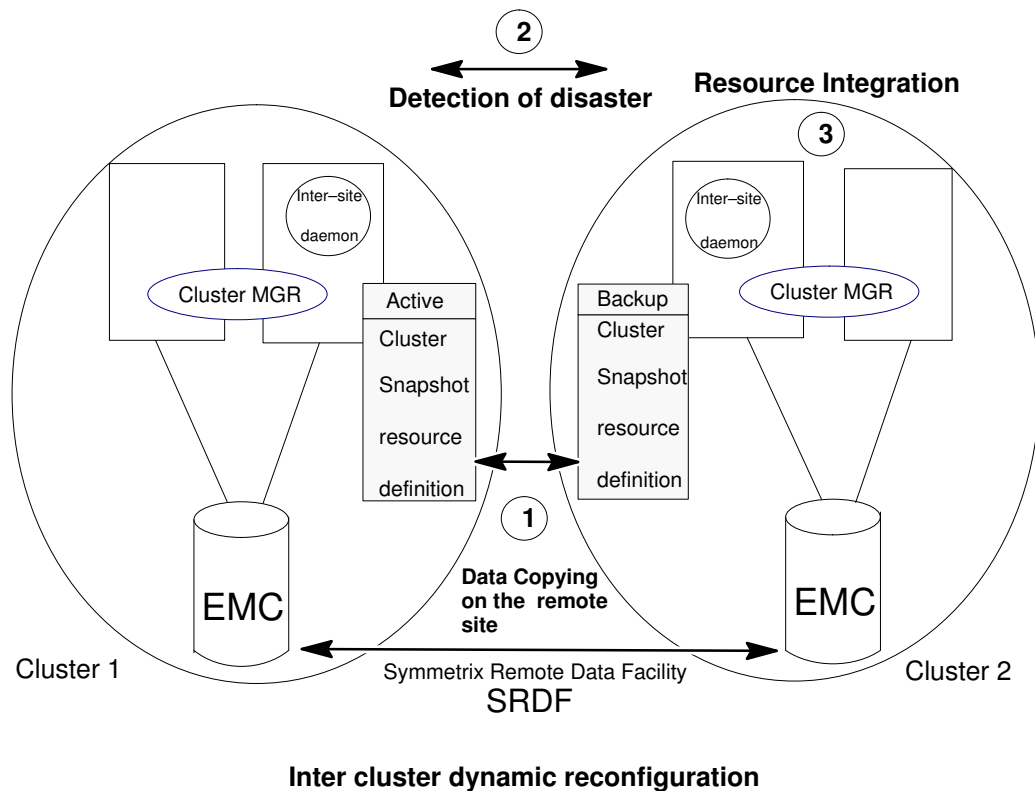


Figure 2. Inter-site monitoring and Recovery from cluster site disaster

The Geographic Disaster Recovery allows data mirroring between clusters on separate sites.

In case of disaster, the failing cluster site can be reconfigured on the surviving cluster site, and the activities can be restarted.

Inter Site Monitoring

The site monitoring functionality allows all the clusters to be monitored to detect a disaster.

A disaster is diagnosed by the monitoring daemon when the site is unreachable.

On each site, a daemon runs on one cluster node. If the cluster node (on which the monitoring daemon is running) is stopped (due to a normal or abnormal reason) using HACMP feature, this daemon is restarted on another cluster node.

To exchange heartbeats, monitoring daemons use a public IP network and a telephone network in case of an IP network failure.

To manage the cluster and to monitor the other site during a maintenance operation on the cluster, a Bull PowerConsole (on which a monitoring daemon is running) is required on each site.

If a disaster is diagnosed by the monitoring daemon, an appropriate alert is sent to the system administrator.

For more information about the **Inter Site Monitoring** facility, see page 1-6.

Recovery from Cluster Site Disaster

When the system administrator makes the decision to proceed with the site takeover, the failing cluster site is automatically reconfigured on the surviving site and the activities are restarted.

For more information about the **Recovery from Cluster Site Disaster** facility, refer to "Recovery from Cluster Site Disaster" user's guide, 86 A2 86JX.

The following diagram shows the different components of the geographic disaster recovery infrastructure:

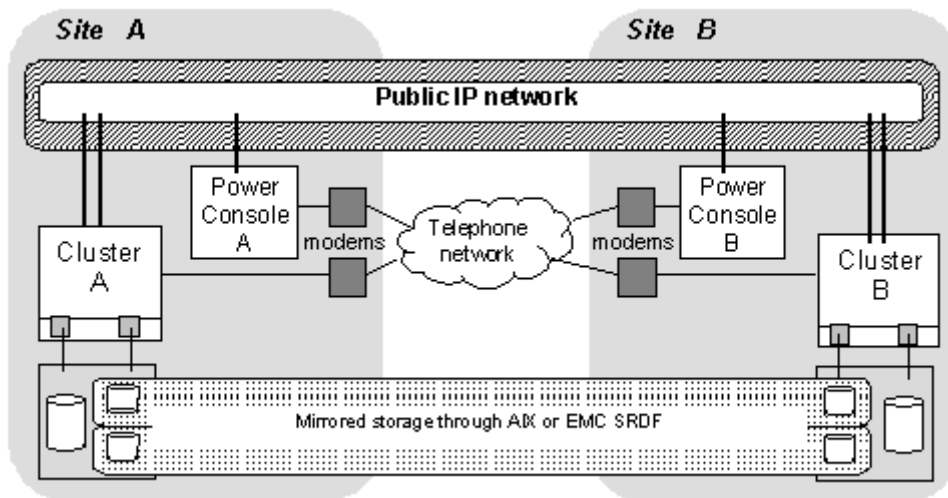


Figure 3. The geographic disaster recovery infrastructure

Hereafter, a configuration of two sites is shown. An external IP network (for example Internet) links the two LAN's.

The EMC Symmetrix subsystems are connected by an SRDF link. Each Cluster site can communicate with the other one and its PowerConsole through a phone link.

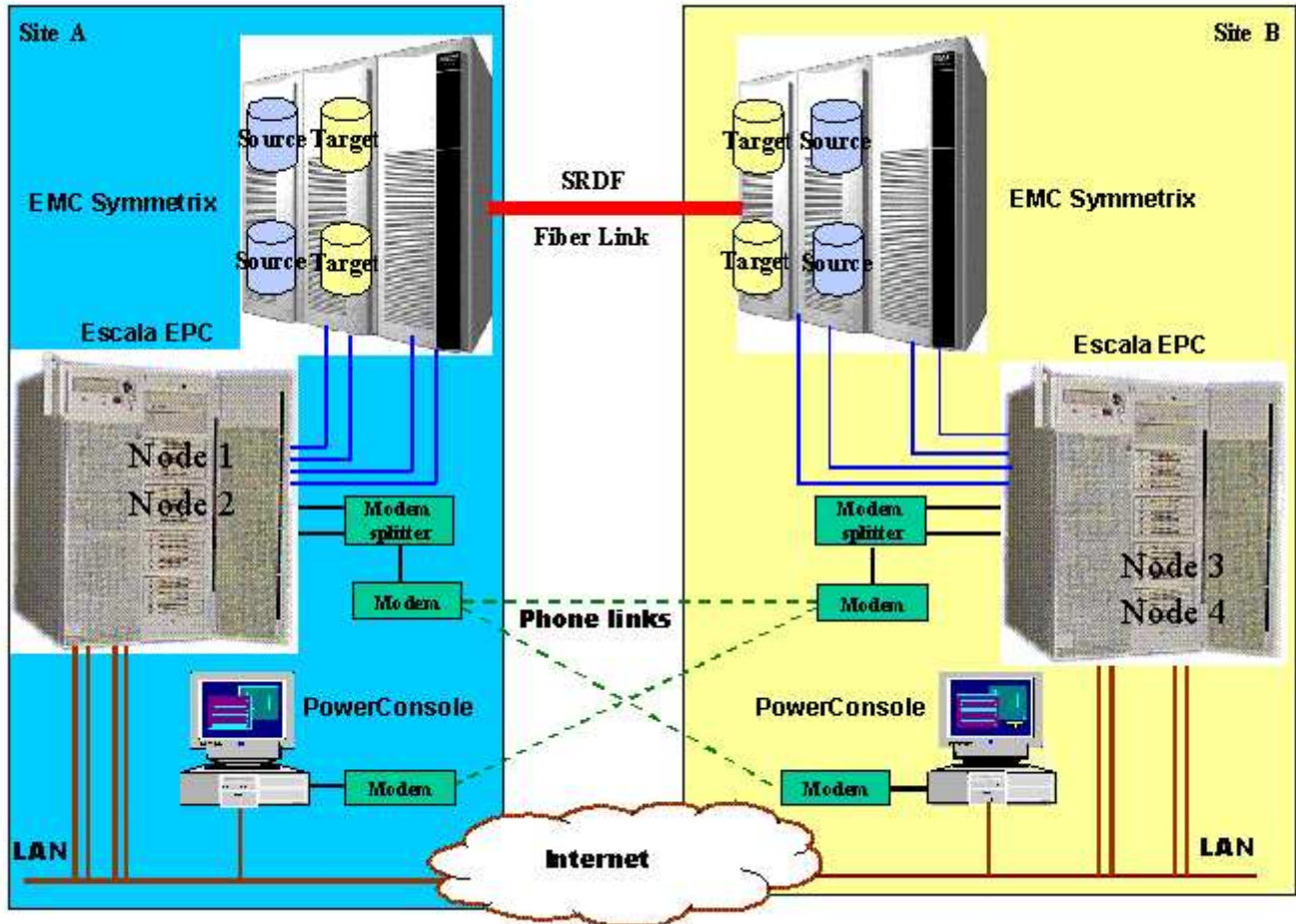


Figure 4. Geographic disaster recovery: distant clusters

Overview of Site Monitoring for Disaster Recovery

The **site monitoring** functionality allows all the clusters to be monitored to detect a disaster and warn the system administrator in case a disaster is diagnosed.

On each site, a monitoring daemon runs on one cluster node and on the PowerConsole to check if the other site is reachable.

To exchange heartbeats, monitoring daemons use a public IP network and a telephone network in case of an IP network failure. The following parameters are configurable via the configuration tools included in the Site Monitoring Bull software:

- The frequency to exchange heartbeats between cluster sites,
- The monitoring daemon addresses to exchange heartbeats,
- Some other parameters.

To manage the cluster and to monitor the other site during a maintenance operation on the cluster, a Bull PowerConsole (on which a monitoring daemon is running) is required on each site.

In normal operation mode, the Cluster Monitoring Daemon is running on each Cluster Site (only one Cluster Node at a time). In this case, the PowerConsole Monitoring Daemon on each site is in standby state.

In maintenance operation mode, the Cluster Monitoring Daemon is stopped. The PowerConsole is used to continue to monitor the other cluster site. So, another monitoring daemon has to be running on the PowerConsole, but it is really active when no Monitoring Daemon on the Cluster of the same site is running.

During the startup phase of HACMP, the HACMP BULL event:

bcl_d_post_acquire_service_addr will alias the Cluster Monitoring Daemon address with the adapter on which the service address is configured, and will start the Cluster Monitoring Daemon.

During the shutdown phase of HACMP, the HACMP BULL event:

bcl_d_pre_release_service_addr will unalias the Cluster Monitoring Daemon address with the adapter on which the service address is configured, and will stop the Cluster Monitoring Daemon.

If the cluster node (on which the monitoring daemon is running) is stopped (due to a normal or abnormal reason), using HACMP feature, this daemon is restarted on another cluster node.

In case of no response (via the IP link) from the remote cluster site, the local monitoring daemon will use the phone link via the modem.

If the remote cluster responds, the failure is probably due to a network failure.

In case of no response (via the phone link) from the remote cluster site, the local monitoring daemon will warn the system administrator that a disaster has been diagnosed.

An Alarm will be reported by a red zigzag superimposed on the Disaster Recovery icon on the CDE desktop front panel of the Cluster Assistant (of the local PowerConsole). It is also possible to send an email or a script to perform actions automatically.

After disaster is diagnosed, the system administrator of the surviving cluster site will decide whether or not to activate the reconfiguration of resources of the failing cluster site.

Chapter 2. Installation and Configuration

Installation

Prerequisites

- AIX 4.3.3 minimum
- HACMP/ES 4.3.1 minimum
- Bullcluster 4.3.3 minimum with following minimum fileset release:
 - *bullcluster.basic_soft.ha_cmp* 4.3.3.7
 - *bullcluster.classistant.Dt* 4.3.3.7
 - *bullcluster.classistant.help.en_US* 4.3.3.6

Software Delivery

The Site Monitoring for geographic Disaster Recovery software is available on the Site Monitoring 4.3.3 CD-ROM.

Software Installation

The prerequisites and Site Monitoring for geographic Disaster Recovery are AIX LPPs which can be installed with install (or SMIT install) as follows:

1. `smit install_all`

- Select either *bullcluster.bundles.sitemon.cons* on the PowerConsole, or *bullcluster.bundles.sitemon.node* on the nodes.

2. `smit install_bundle`

- Select either *sitemon.cons* on the PowerConsole, or *sitemon.node* on the nodes.

Note: After bundle installation on the Powerconsole, check if the disaster recovery icon appears on the C.D.E. frontpanel (see figure 5). If not, you can log-out and log-in.

Configuration

To have a correct behavior, the Modems and the Site Monitoring Daemons have to be configured.

For each site, the modems have to be configured on the PowerConsole and on one Cluster Node.

The Site Monitoring Daemon must be configured on each Cluster Node and each PowerConsole of each Site.

Note: As explained in “Overview of Site Monitoring for Disaster Recovery” page 1-6, the Cluster Monitoring Daemon address is aliased with the adapter on which the service address is configured.
To do this, it is mandatory to register the Cluster Monitoring Daemon address in the */etc/hosts* file.

Modem Configuration

For each site, the modems have to be configured on the PowerConsole and on one Cluster Node.

Modem Configuration on the PowerConsole / on a Node with ClusterAssistant

When the predefined types of modem are used, you can configure the modems by using the procedure described hereafter.

In the other cases, you must define a new type of modem. Refer to chapter 3. Modem Configuration for more information.

To configure the modem on the PowerConsole or on a node, proceed as follows:

1. From the C.D.E. front panel of the ClusterAssistant, click on the “**Disaster Recovery**” icon:

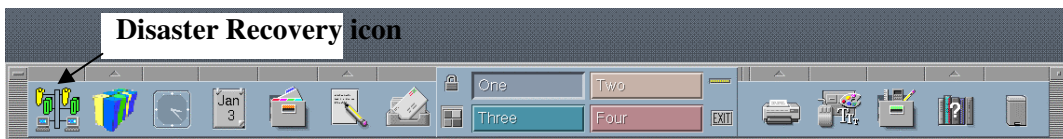


Figure 5. Application entry window

The following window is displayed:

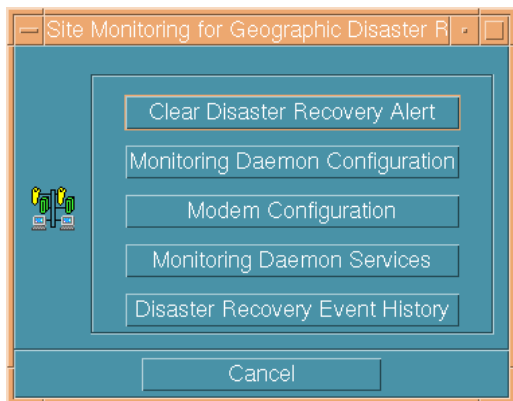


Figure 6. Site monitoring for geographic Disaster Recovery window: modem configuration

2. Click on the “**Modem Configuration**” button, the following window is displayed:

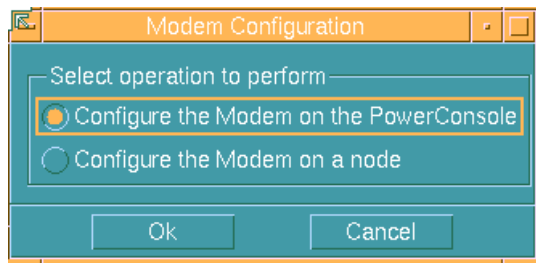


Figure 7. Geographic Disaster Recovery window: configure the modem on the PowerConsole

3. Enable the “**Configure the Modem on the PowerConsole**” button to configure the modem on the PowerConsole or enable the “**Configure the Modem on a node**” button to configure the modem on a node.

Click on **OK** to validate the choice.

The following window is displayed:

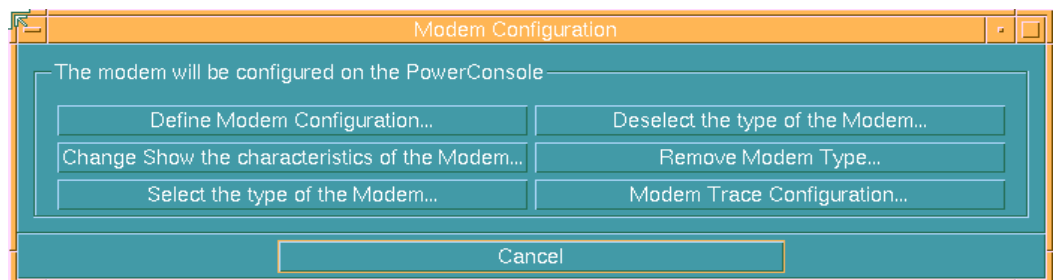


Figure 8. Geographic Disaster Recovery window: configure the modem on the PowerConsole

4. Click on the “**Select the Type of the Modem...**” button. The following window is displayed:

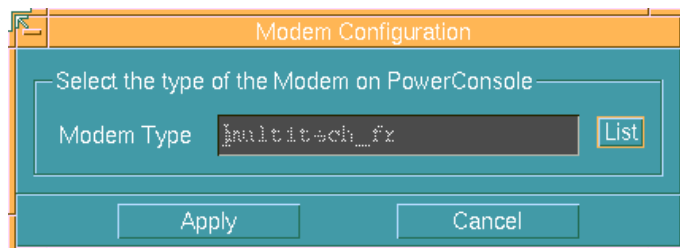


Figure 9. Geographic Disaster Recovery window: modem type selection on PowerConsole

By default, a configuration list of three predefined types of modems is given:

- Multitech_fr for Multi–Tech modems MT2834ZDXF
- Sportster_fr for USRobotics modems: Sportster voice 33.600
- MT2834ZDXIe–33_fr for Multi–Tech modems MT2834ZDXIe–33

5. Click on “**List**” to display the list of predefined modems:

If the modem corresponds to one of the predefined type list, select from the list the appropriate type of the modem to apply the configuration.

If the modem does not correspond to one of the predefined type list, define a configuration for the new type of modem with the “**Define Modem Configuration**” button (see figure 8). To specify the field desired, carefully read the explanation described in the section Define Modem Configuration, on page 3-5 and read the user’s guide documentation associated with the modem.

Modem Configuration on a Cluster Node with SMIT

1. On one Cluster Node, enter the smit line command:

```
smit hacmp
```

2. Select **“Bull Cluster Easy Configuration”**, the following window is displayed:

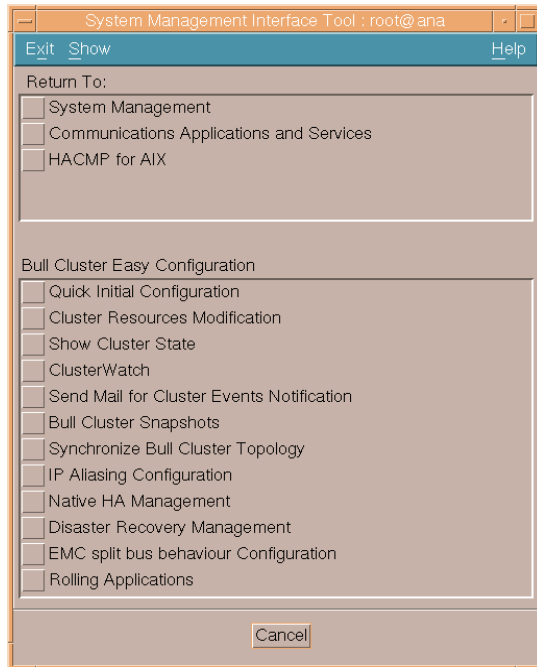


Figure 10. Smit: Modem configuration

3. Select **“Disaster Recovery Management”**. Then from the new screen displayed, select **“Site Monitoring for Disaster Recovery”** to display the following screen:

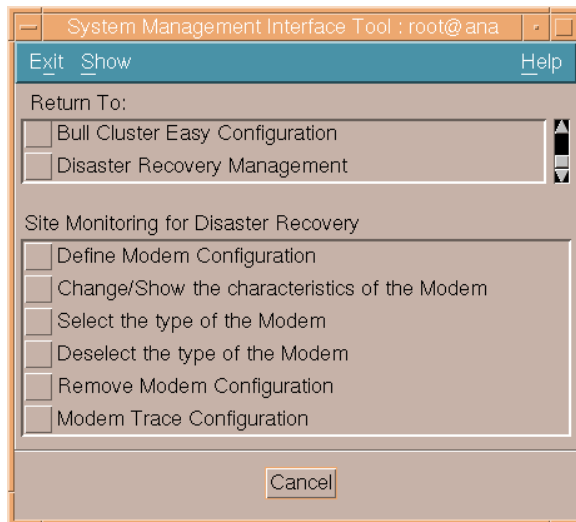


Figure 11. Disaster Recovery Management window

4. Click on the “**Select the Type of the Modem**” button. The following window is displayed:

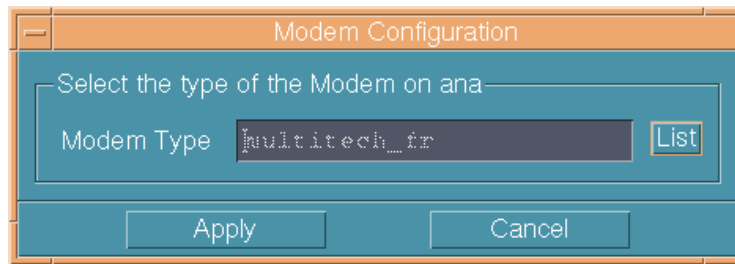


Figure 12. Modem type selection

By default, a configuration list of three predefined types of modems is given:

- Multitech_fr for Multi-Tech modems MT2834ZDXF
- Sportster_fr for USRobotics modems: Sportster voice 33.600
- MT2834ZDXle-33_fr for Multi-Tech modems MT2834ZDXle-33

If the Modem corresponds to one of the predefined type list, select from the list the appropriate type of the modem to apply the configuration.

If the modem does not correspond to one of the predefined type list, define a configuration for the new type of modem with the “**Define Modem Configuration**” button (see figure 8). To specify the field desired, carefully read the explanation described in the section Define Modem Configuration, on page 3-5 and read the user’s guide documentation associated with the modem.

Site Monitoring Daemon Configuration

The Site Monitoring Daemon must be configured on each Cluster Node and each PowerConsole of each Site.

The configuration is stored in the configuration file: `/usr/sbin/bullcluster/etc/disaster/smd.cfg`.

Note: A configuration template file `/usr/sbin/bullcluster/etc/disaster/smd.cfg_template` is also given to help you to configure the Site Monitoring Daemon.

Site Monitoring Daemon Configuration with ClusterAssistant

1. From the C.D.E. front panel of the ClusterAssistant, click on the Disaster Recovery icon:

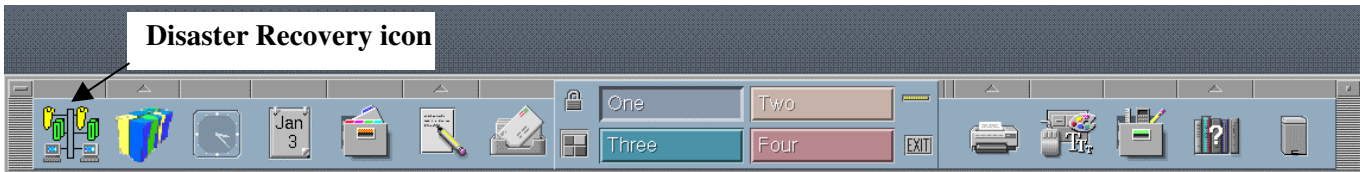


Figure 13. Application entry window

The following window is displayed:

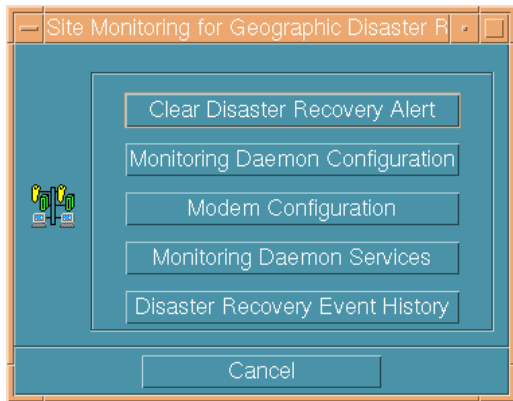


Figure 14. Site monitoring for geographic Disaster Recovery window: Monitoring daemon configuration

2. To configure the Monitoring Daemon, click on the "Monitoring Daemon Configuration" button. The following window is displayed:

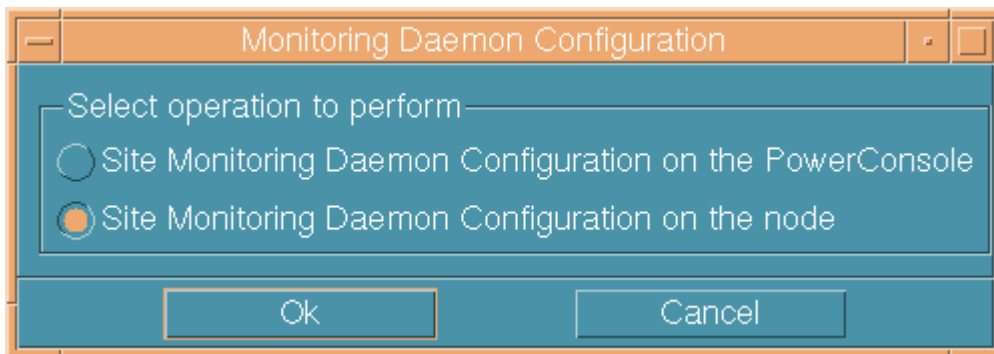


Figure 15. Site monitoring daemon window

Site Monitoring Daemon Configuration on the PowerConsole / on a node

1. To configure the PowerConsole Daemon, select the “Site Monitoring Daemon Configuration on the PowerConsole”, or to configure the Power Cluster Daemon, select the “Site Monitoring Daemon Configuration on the node” (see figure 15).

For details, see Chapter 4. “Site Monitoring Daemon Configuration”.

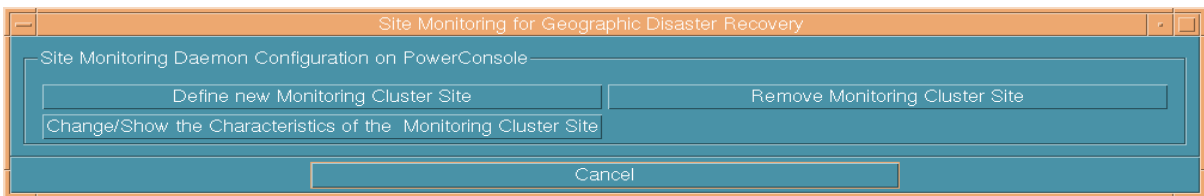


Figure 16. Site monitoring daemon window: configuration on the PowerConsole

2. Define a new Monitoring Cluster Site:

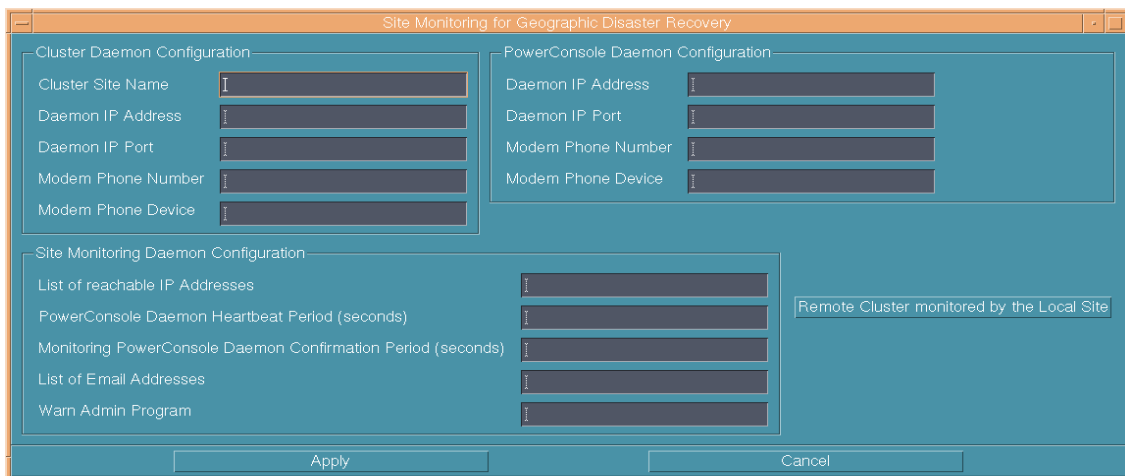


Figure 17. Define a new daemon configuration

Cluster Daemon Configuration

1. Enter the name of the Cluster (identifier composed of letters, numbers and underscore “_”).
2. Enter the IP address of the Cluster Daemon. **This address is specific to the Cluster Daemon and must be registered in the *etc/hosts* file.** During the launching of HACMP, this address will be aliased with the adapter on which the service address is configured (by HACMP) (dotnumber composed of four numbers of 3 digits maximum each).
3. Enter the IP port of the Cluster Daemon (numbers composed of digits).
4. Enter the phone number corresponding to the modem link with the splitter of the Cluster (phone numbers composed of digits, “,” and “/” used to pause during dialing).
5. Enter the TTY device of the cluster node corresponding to the serial line of the modem (full path name composed of letters, digits and “/”).

PowerConsole Daemon Configuration

1. Enter the IP address of the PowerConsole (dotnumber composed of four numbers of 3 digits maximum each).
2. Enter the IP port of the PowerConsole Daemon (numbers composed of digits).
3. Enter the phone number corresponding to the modem of the PowerConsole (phone numbers composed of digits, “,” and “/” used to pause during dialing).
4. Enter the TTY device corresponding to the serial line of the PowerConsole modem (full path name composed of letters, digits and “/”).

Site Monitoring Daemon Configuration

1. Enter the list of all the addresses to be reachable by the Cluster Daemon. Generally, the Cluster Daemon must reach the PowerConsole address and the service address of each cluster node (dotnumber composed of four numbers of 3 digits maximum each). Each address is separated by a comma followed by a space “, ”.
2. Enter the time (in seconds) between the sending of two heartbeats of the PowerConsole Daemon (time composed of digits).
3. Enter the time (in seconds) to wait for the acknowledgement of the PowerConsole Daemon (time composed of digits).
4. Enter the list of email addresses to send to the system administrator when a disaster is diagnosed (legal e-mail addresses). Each email address is separated by a comma followed by a space “, ”.
5. Enter the full path of the user-defined program to be run by the daemon when a disaster is diagnosed. For example, this program can send a message to the system administrator’s beeper (full path name composed of letters, digits and “/”).

To configure the remote Cluster, click on **Remote Cluster monitored by the local site** button. The following window appears:

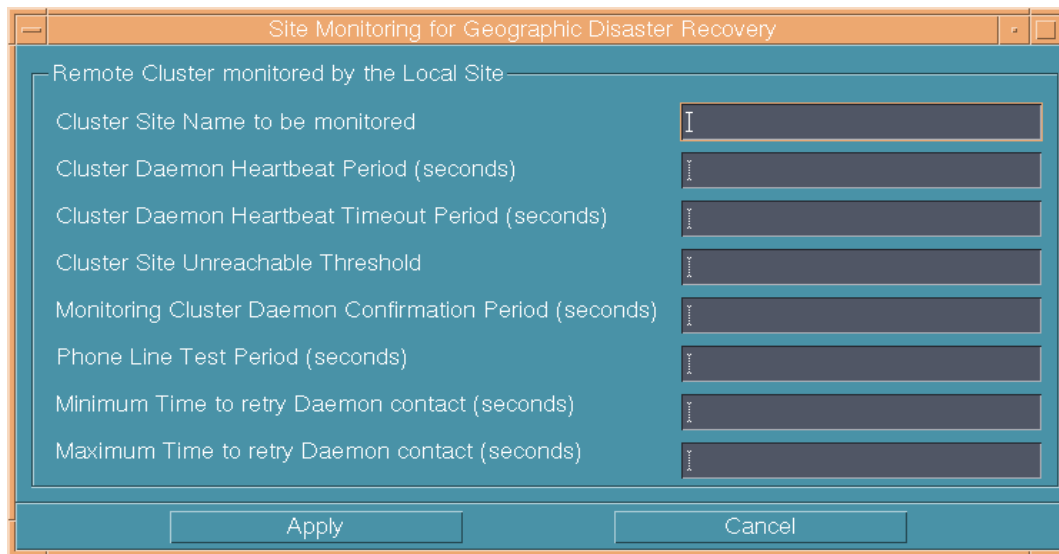


Figure 18. Site monitoring daemon configuration

6. Enter the remote Cluster name to be monitored by the local site (identifier composed of letters, numbers and underscores “_”).
7. Enter the time (in seconds) between the sending of two heartbeats of the Cluster Daemon (time composed of digits). The period of sending a heartbeat will be the maximum of the Heartbeat Timeout divided by two. ($\text{Heartbeat} < \text{Heartbeat Timeout}/2$). The loss of one heartbeat could trigger the phone call by the other site.

8. Enter the time (in seconds) to wait for a heartbeat from the monitoring daemon on the other site (time composed of digits). As during the wait of the acknowledgement no heartbeat is sent, the confirmation period must be less than the heartbeat timeout (confirmation period < heartbeat timeout).
9. Enter the acceptable number of times that a remote cluster is unreachable, before being diagnosed as a disaster. The elapsed time is equal to the Cluster heartbeat + the Cluster heartbeat timeout + the Cluster confirmation period (described hereafter).
10. Enter the time (in seconds) to wait for an acknowledgement from the monitoring daemon on the other site.
11. Enter the time (in seconds) between the two tests of the phone line Daemon (time composed of digits). To avoid test collision, Phone line test period >> heartbeat timeout.
12. Enter the minimal time (in seconds) before retrying to contact the daemon on the other site when the phone was busy during dialing (time composed of digits).
13. Enter the maximal time (in seconds) before retrying to contact the daemon on the other site when the phone was busy during dialing (time composed of digits).
14. After you have specified the fields, validate the screen by clicking the apply button of the monitors screen and then clicking on the apply button of the main screen to validate your settings.

Note: To monitor several remote cluster by one local cluster, click on **Remote Cluster monitored by the local site** button again and repeat steps 6 → 14.
At least, two Clusters sites have to be configured (see *smd.cfg_template* file, for more information).
You have to define the new monitoring site for each cluster site.

Site Monitoring Daemon Configuration without ClusterAssistant

With your favorite editor, you can copy the `/usr/sbin/bullcluster/etc/disaster/smd.cfg_template` file in the:
`/usr/sbin/bullcluster/etc/disaster/smd.cfg` file.

Warning: As the First word of each line is a keyword, do not modify this first word!

1. After the *site* keyword, enter the name of the Cluster (identifier composed of letters, numbers and underscore “_”).
2. After the *ipAddr* keyword, enter the IP address of the Cluster Daemon. This address is specific to the Cluster Daemon and must be registered in the `etc/hosts` file. During the launching of HACMP, this address will be aliased with the adapter on which the service address is configured (by HACMP) (dotnumber composed of four numbers each of 3 digits maximum).
3. After the *ipPort* keyword, enter the IP port of the Cluster Daemon (numbers composed of digits).
4. After the *phoneNumber* keyword, enter the phone number corresponding to the modem link with the splitter of the Cluster (phone numbers composed of digits, “,” and “/” used to pause during dialing).
5. After the *phoneDevice* keyword, enter the TTY device corresponding to the serial line of the Cluster modem (full path name composed of letters, digits and “/”).
6. After the *ipAddr* keyword, enter the IP address of the PowerConsole (dotnumber composed of four numbers each of 3 digits maximum).
7. After the *ipPort* keyword, enter the IP port of the PowerConsole Daemon (numbers composed of digits).
8. After the *phoneNumber* keyword, enter the phone number corresponding to the modem of the PowerConsole (phone numbers composed of digits, “,” and “/” used to pause during dialing).
9. After the *phoneDevice* keyword, enter the TTY device corresponding to the serial line of the PowerConsole modem (full path name composed of letters, digits and “/”).
10. After the *ipPing* keyword, enter the list of all the addresses to be reachable by the Cluster Daemon. Generally, the Cluster Daemon must reach the PowerConsole address and the service address of each cluster node (dotnumber composed of four numbers of 3 digits maximum each). Each address is separated by a comma followed by a space “, ”.
11. After the *consoleFreq* keyword, enter the time (in seconds) between the sending of two heartbeats of the PowerConsole Daemon (time composed of digits).
12. After the *consoleAckTimeout* keyword, enter the time (in seconds) to wait for the acknowledgement of the PowerConsole Daemon (time composed of digits).
13. After the *emailAdmin*, enter the list of email addresses to send to the system administrator when a disaster is diagnosed (legal e-mail addresses). Each email address is separated by a comma followed by a space “, ”.
14. After the *emailAdmin* keyword, enter the full path of the user-defined program to be run by the daemon when a disaster is diagnosed. For example, this program can send a message to the system administrator’s beeper (full path name composed of letters, digits and “/”).
15. After the *monitors* keyword, enter the remote Cluster name to be monitored by the local site (identifier composed of letters, numbers and underscores “_”).
16. After the *hbFreq* keyword, enter the time (in seconds) between the sending of two heartbeats of the Cluster Daemon (time composed of digits). The period of sending

heartbeats will be the maximum of the Heartbeat Timeout divided by two ($\text{Heartbeat} < \text{Heartbeat Timeout}/2$). The loss of one heartbeat could trigger the phone call by the other site.

17. After the *hbTimeout* keyword, enter the time (in seconds) to wait for a heartbeat from the monitoring daemon on the other site (time composed of digits). As during the wait of the acknowledgement no heartbeat is sent, the confirmation period must be less than the heartbeat timeout ($\text{confirmation period} < \text{heartbeat timeout}$).

18. After the *disasterTimeout* keyword, enter the acceptable number of times that a remote cluster is unreachable, before being diagnosed as a disaster.

The elapsed time is equal to the Cluster heartbeat + the Cluster heartbeat timeout + the Cluster confirmation period (described hereafter).

19. After the *ackTimeout* keyword, enter the time (in seconds) to wait for an acknowledgement from the monitoring daemon on the other site.

20. After the *phoneFreq* keyword, enter the time (in seconds) between the two tests of the phone line Daemon (time composed of digits).

To avoid test collision, Phone line test period \gg heartbeat timeout.

21. After the *minRetryTime* keyword, enter the minimal time (in seconds) before retrying to contact the daemon on the other site when the phone was busy during dialing (time composed of digits).

22. After the *maxRetryTime* keyword, enter the maximal time (in seconds) before retrying to contact the daemon on the other site when the phone was busy during dialing (time composed of digits).

Note: To monitor several remote clusters by one local cluster, you can repeat this last phase (steps 15 \rightarrow 22). At least, two Clusters sites have to be configured (see *smd.cfg_template* file, for more information). You have to define the new monitoring site for each cluster site.

Starting Site Monitoring Daemons

After Configuring Modems and Site Monitoring Daemons:

1. Start PowerConsole Monitoring Daemons on each site by clicking on the Monitoring Daemon Services (see page 5-2).
2. Start HACMP on each Cluster Site (The Cluster Monitoring Daemon will be automatically started by HACMP).

Chapter 3. Modem Configuration

For each site, the modems have to be configured on the PowerConsole and only on one Cluster node.

1. From the C.D.E. front panel of the ClusterAssistant, click on the “**Disaster Recovery**” icon:

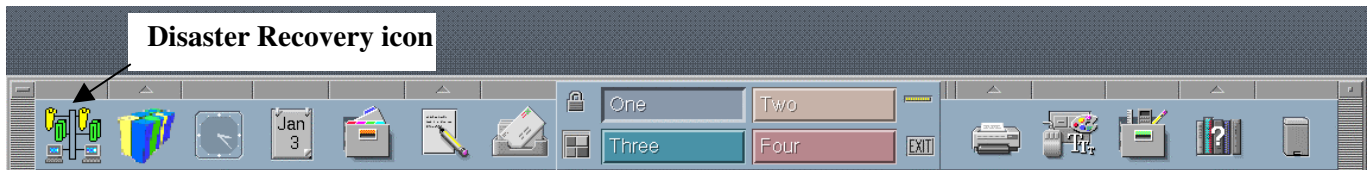


Figure 19. Application entry window

The following window is displayed:

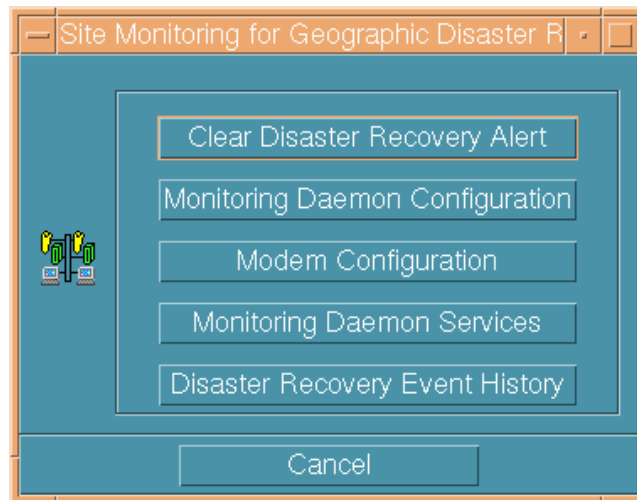


Figure 20. Site monitoring for geographic Disaster Recovery window: modem configuration

2. Click on the “**Modem Configuration**” button, a “**Select Operation**” window prompts you to configure a modem either on the PowerConsole or on a node.

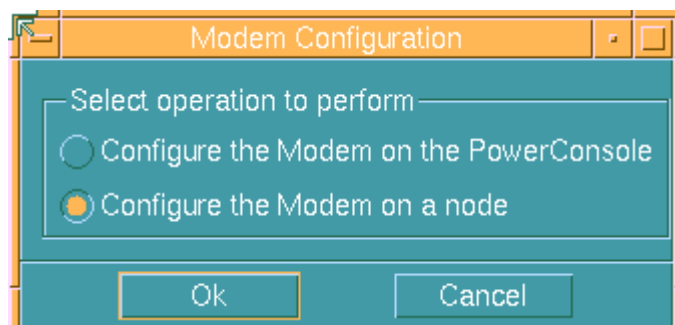


Figure 21. Modem configuration: select operation

3. To configure the modem on a node, select a node from the list of domains.

After selecting the node or the PowerConsole, the "**Modem Configuration**" window is displayed:

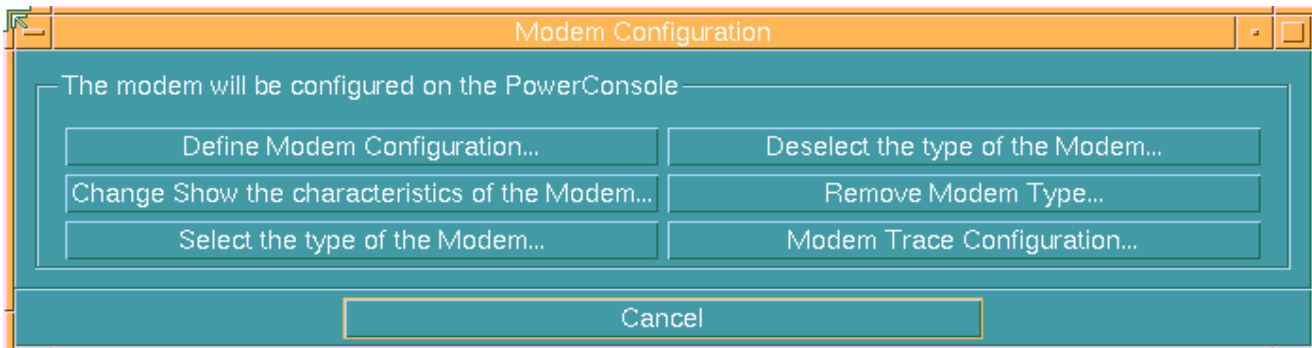


Figure 22. Modem Configuration window

This window provides menus which enable you to:

- Define the configuration of a new type of modem.
- Modify or/and View the characteristics of the configuration of an existing modem.
- Select from a list, a type of Modem to be configured.
- Deselect the type of the Modem already configured.
- Remove the configuration of the given type (selected from a list) of the Modem.
- Enable/Disable the Modem mode trace to store the message exchanged between modems.

How to configure the Modem for Site Monitoring

Modems provide serial communication across ordinary telephone lines.

This configuration tool works with the standard AT command used by many popular modems.

The following is a summary of the AT command set:

| Commands | Meaning |
|----------|---|
| at | Command prefix – precedes command line. |
| a | Go off-hook; remain in command mode (Answer mode). |
| d | Enter originate mode, dial the number that follows, and attempt to go online. |
| e0 | Disable character echo in the command state. |
| e1 | Enable character echo in the command state. |
| h0 | Go on-hook (hang up the phone). |
| m0 | Speaker off. |
| q0 | Modem return result codes in numeric form. |
| q1 | Modem does not return result codes. |
| v0 | Display result codes in numeric form. |
| z | Reset Modem. |
| +++ | Escape to command mode. |
| &c0 | Assume data carrier always present. |
| &c1 | Track presence of data carrier. |
| &f | Recall the factory settings as the active configuration. |
| &q1 | Operate in synchronous mode 1. |

The following is a summary of the S-Register commands:

| Register | Meaning |
|----------|--|
| S0 | Select number of rings before answer. |
| S7 | Select wait-time in seconds for carrier/dial tone. |

The following is a summary of the Result Codes.

| Number | Word | Meaning |
|--------|--------------|---|
| 0 | OK | Command executed. |
| 2 | RING | Ring signal detected. |
| 3 | NO CARRIER | Carrier signal lost or not detected. |
| 4 | ERROR | Invalid command, checksum, error in command-line... |
| 6 | NO DIAL TONE | No Dial Tone detected. |
| 7 | BUSY | Busy signal detected. |
| 8 | NO ANSWER | No response when dialing a system. |

To define a new Modem configuration, you must fill the following Modem attribute fields:

| Modem Attribute | Meaning |
|------------------------|--|
| Modem Type | Specifies the type of the Modem (e.g.: multitech_fr...) |
| Modem Configured | Specifies which type of the Modem is configured. Only one modem can be configured at a time (values: yes or no) |
| Modem Trace | Allows storage of the message exchanges between modems (values: yes or no) |
| Modem Reset | Reset Modem Command (e.g.: atz) |
| Modem Initialization | <p>Initialize Modem Command. This command is composed of several modem commands:</p> <ul style="list-style-type: none"> + Command prefix (e.g.: at) + Recall the factory settings as the active configuration (e.g.: &f) + The Modem will not answer automatically (e.g.: S0 = 0) + Select wait-time in seconds for carrier/dial tone (e.g.: S7 = 30) + Select wait-time in minutes for inactivity (e.g.: S30 = 1 for multitech_fr, S19 = 1 for sportster_fr) + Disable character echo in the command state (e.g.: e0) + Display result codes in numeric form (e.g.: vo) + Speaker off (e.g.: mo) <p>Note: The following five fields are proprietary commands (not mandatory) and depend on modem user's guide. (e.g.: These fields are not used by the sportster modems, but used by the multitech modems.)</p> <ul style="list-style-type: none"> + The Escape command is +++ (e.g.: %e1) + Turn on responses on +++ (e.g.: %e5) + Phone link at 9600 bps (e.g.: \$mb9600) + Message response in synchronous mode (e.g.: &q1) + Track presence of data carrier (e.g.: &c1) |
| Modem Dial | <p>Dial the number: %s (do not enter a real phone number, enter %s. The real phone number will be retrieved from the Monitoring Daemons Configuration file)</p> <p>(e.g.: at\$v4d%s for multitech_fr, Ats40=2d%s for sportster_fr)</p> |
| Modem Answer | Go off-hook (Answer mode) (e.g.: ata) |
| Modem Escape | Escape to Command mode (e.g.: +++) |
| Modem Hang Up | Go on-hook (hang up the phone) (e.g.: ath) |
| Modem Ok | Modem Ok result code (e.g.: 0) |
| Modem Ring | Ring signal detected (e.g.: 2) |
| Modem No Carrier | Carrier signal detected (e.g.: 3) |
| Modem No Dial Tone | No Dial Tone detected (e.g.: 6) |
| Modem Busy | Busy signal detected (e.g.: 7) |
| Modem No Answer | No response when dialing a system (e.g.: 8) |
| Modem Ringing | <p>Modem is ringing (e.g.: 11 for sportster_fr -1 for multitech_fr because this result is not returned by the multitech modems)</p> |
| Modem Connected | Connection established at 9600 bps (e.g.: 17 for sportster_fr, 12 for multitech_fr) |

For more information about the attributes of the predefined types of modems, see Appendix B.

Define Modem Configuration

To define the configuration of a new type of modem, click on “**Define Modem Configuration**” button of the “**Modem Configuration**” window (see figure 22 page 3-2).

Modem Configuration

Define Modem Configuration on PowerConsole

Modem Type

Modem Configured

Modem Trace

Modem Reset

Modem Initialization

Modem Dial

Modem Answer

Modem Escape

Modem Hang Up

Modem Ok

Modem RING

Modem No Carrier

Modem No Dial Tone

Modem Busy

Modem No Answer

Modem Ringing

Modem Connected

Apply Cancel

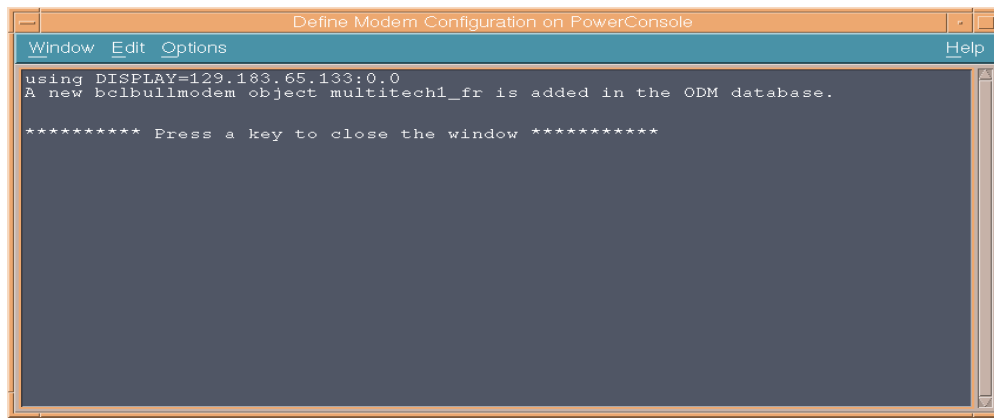
Figure 23. Modem configuration: define a new modem

1. Enter the name of the Modem Type (this field is customizable).
2. Enable or Disable the configuration of this type of Modem. Remember that if you want to use this new configuration, you have to validate the “**Modem Configured**” button.

Warning: remember that only one type of Modem can be configured at a time. The configuration of the Modem type is disabled by default.

3. Enable or Disable the Modem mode trace. The mode trace is disabled by default.
4. For all the fields, carefully read the explanation described in the chapter **How to configure Modem for Site Monitoring**, on page 3-3 of this document, and read the user’s guide documentation associated with the Modem.
5. Once you have specified the field desired, click on “**Apply**” to validate your settings.

6. The following window appears to inform you of the result of the command:



```
using DISPLAY=129.183.65.133:0.0
A new bcibullmodem object multitech1_fr is added in the ODM database.

***** Press a key to close the window *****
```

Figure 24. Modem configuration: define a new modem result screen

Change/Show the Characteristics of the Modem

This action allows you to change or show the characteristics of a type of Modem (see figure 22 page 3-2).

To be able to change the characteristics of the type of modem, this type must not be configured.

If a type of modem is configured, the characteristic of this configured type of modem is displayed. Otherwise, if no type of modem is configured, all the fields are empty.

Modem Configuration

Change/Show the characteristics of the Modem on PowerConsole

Modem Type: multitech_fr [List]

Modem Configured

Modem Trace

Modem Reset: atz

Modem Initialization: at&fs0=0s7=30s30=1e0v0m0

Modem Dial: at \$v4d%s

Modem Answer: ata

Modem Escape: +++

Modem Hang Up: ath

Modem Ok: OK

Modem RING: 2

Modem No Carrier: 3

Modem No Dial Tone: 6

Modem Busy: 7

Modem No Answer: 8

Modem Ringing: -1

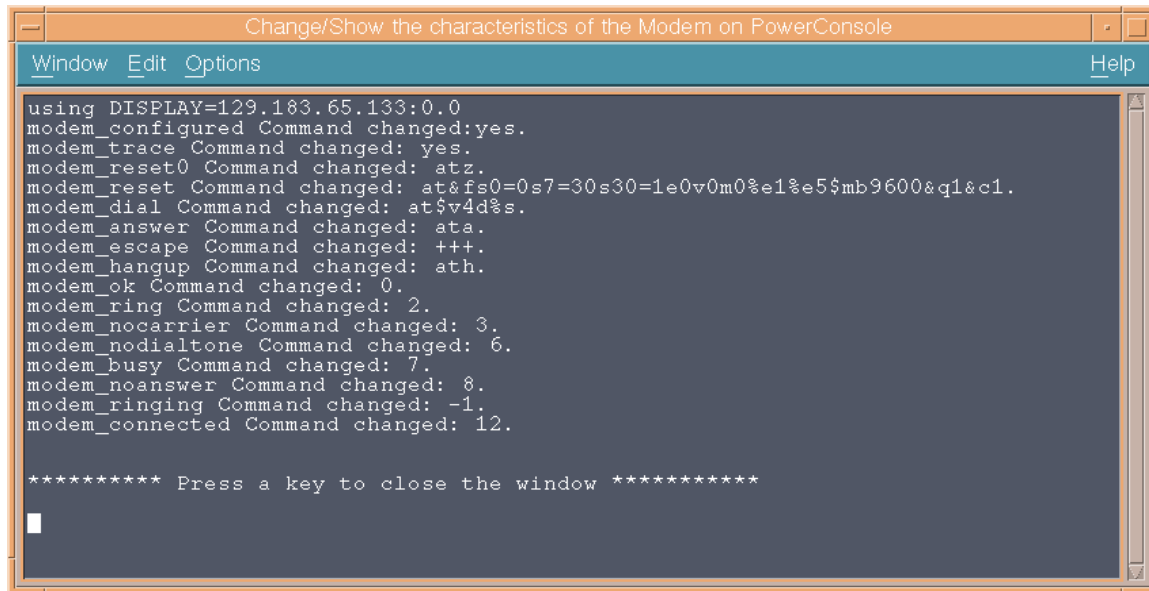
Modem Connected: 12

Apply Cancel

Figure 25. Modem configuration: change/show the characteristics of the modem

1. Select the type of the modem that you want to show or change from the list button.
2. Once you have specified the field desired (if needed), validate the screen (click on Apply) to apply your settings. Remember to configure the desired field accordingly with the explanation described in the chapter **How to configure the Modem for Site Monitoring**, on page 3-3, and the user's guide documentation associated with the Modem.

3. The following window appears to inform you about the result of the command.



```
using DISPLAY=129.183.65.133:0.0
modem_configured Command changed: yes.
modem_trace Command changed: yes.
modem_reset0 Command changed: atz.
modem_reset Command changed: at&fs0=0s7=30s30=1e0v0m0%e1%e5$mb9600&q1&c1.
modem_dial Command changed: at$v4d%s.
modem_answer Command changed: ata.
modem_escape Command changed: +++.
modem_hangup Command changed: ath.
modem_ok Command changed: 0.
modem_ring Command changed: 2.
modem_nocARRIER Command changed: 3.
modem_nodialtone Command changed: 6.
modem_busy Command changed: 7.
modem_noanswer Command changed: 8.
modem_ringing Command changed: -1.
modem_connected Command changed: 12.

***** Press a key to close the window *****
```

Figure 26. Modem configuration: change/show the characteristics of the modem result screen

Select the type of the Modem

This action allows you to select from a list, a type of Modem to be configured (see figure 22 page 3-2).

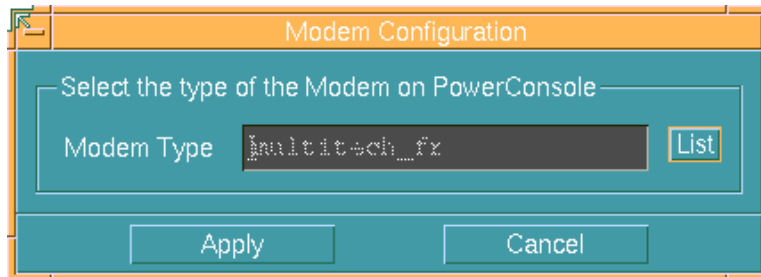


Figure 27. Modem configuration: select the type of the modem

1. Select the type of the Modem that you want to be configured from the “list” button.
2. Once you have specified the field desired (if needed), validate the screen (click on Apply) to apply your settings.
3. Another window appears to inform you about the result of the command. This window is similar to the window displaying the result of the command:
 - Define Modem Configuration or Change/Show the characteristics of the Modem.

Deselect the type of the Modem

This action allows you to deselect the type of the Modem already configured (see figure 22).

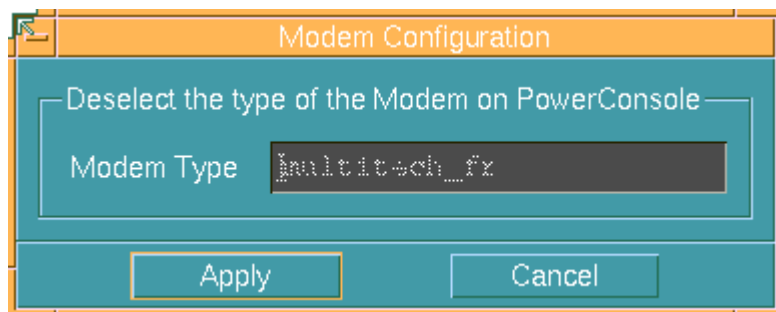


Figure 28. Modem configuration: deselect the type of the modem

1. The type of the Modem already configured is automatically displayed in the field (because, only one type of modem can be configured at a time).
2. If you agree, validate the screen (click on Apply) to apply the setting.
3. Another window appears to inform you about the result of the command. This window is similar to the window displaying the result of the command:
 - Define Modem Configuration or Change/Show the characteristics of the Modem.

Remove the type of the Modem

This action allows you to remove the type of the modem from the list (see figure 22).

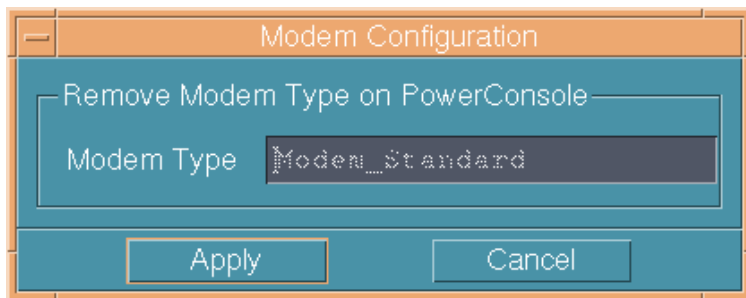


Figure 29. Modem configuration: remove the type of the modem

1. Select the type of the Modem that you want to be removed from the “list” button.
- Note:** The predefined type of Modem cannot be removed, so, only the customized type of Modem can be removed.
2. Once you have specified the field desired (if needed), validate the screen (click on Apply) to apply your settings.
 3. Another window appears to inform you about the result of the command. This window is similar to the windows displaying the result of the command:
 - Define Modem Configuration or Change/Show the characteristics of the Modem.

Modem Trace Configuration

This action allows you to enable or disable the trace of the Modem (see figure 22).

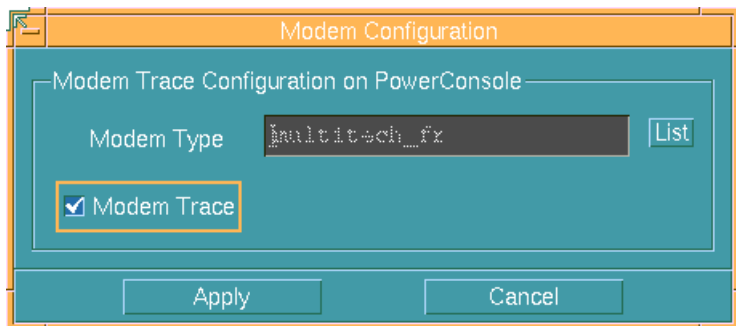


Figure 30. Modem configuration: trace

1. Select the type of the Modem that you want to trace from the “list” button.
 2. Enable or Disable the Modem Trace.
 3. Once you have specified the field desired (if needed), validate the screen (click on Apply) to apply your settings.
 4. Another window appears to inform you about the result of the command. This window is similar to the windows displaying the result of the command:
 - Define Modem Configuration or Change/Show the characteristics of the Modem.
- Note:** By default, a list of predefined type of Modem is given at installation time. If you want to select this predefined type of modem, use the “**Select the type of the Modem**” menu. If you want to configure another type of Modem, use the “**Define Modem Configuration**” menu.

If modem trace is enabled, messages are stored in:

/var/bullcluster/disaster/clsm�.out file for the cluster nodes.

/var/bullcluster/disaster/cosmd.out file for the PowerConsoles.

Chapter 4. Site Monitoring Daemon Configuration

For each site, the Site Monitoring Daemon Configuration has to be done on the PowerConsole and on each Cluster node. The configuration file is stored in the `/usr/sbin/bullcluster/etc/disaster/smd.cfg` file

1. From the C.D.E. front panel of the ClusterAssistant, click on the “**Disaster Recovery**” icon:

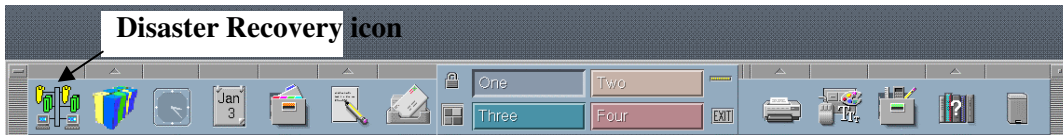


Figure 31. Application entry window

The following window is displayed:

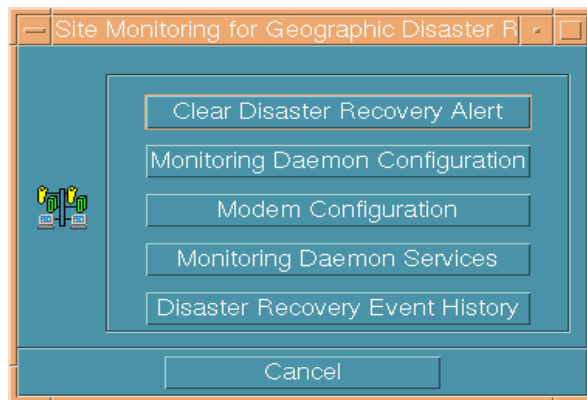


Figure 32. Monitoring daemon configuration

2. Click on the “**Monitoring Daemon Configuration**” button:

A “**Select Operation**” window prompts you to configure the Site Monitoring Daemon on the PowerConsole or on a node:

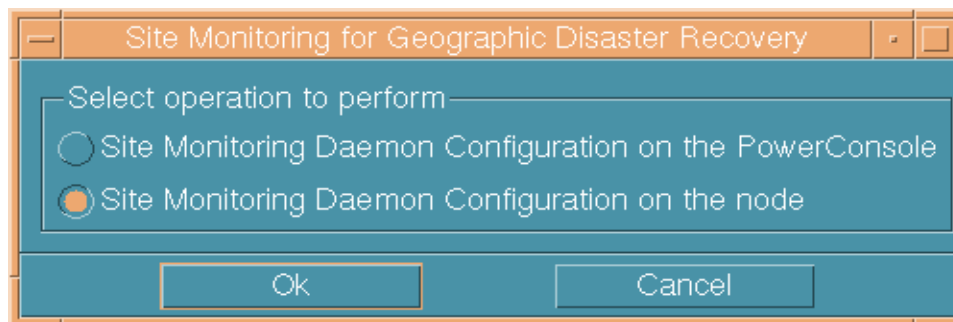


Figure 33. Configure the daemon on the PowerConsole or on a node

3. To configure the Site Monitoring Daemon on a node, select “**Site Monitoring Daemon configuration on a node**”, then from the new window displayed, select a node from the list of domain.

After selecting the node or the PowerConsole, the **Site Monitoring Daemon Configuration** window is displayed.

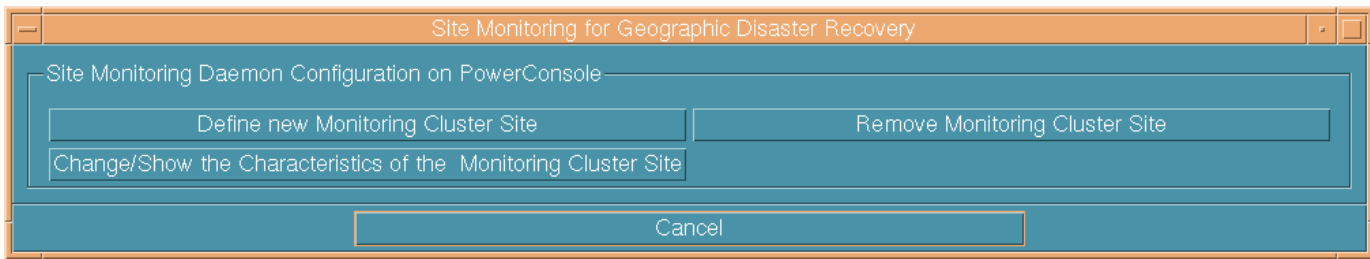


Figure 34. Configure the daemon on the PowerConsole

This menu enables you to:

- Define the configuration of the new Cluster site (see page 4-4).
- Modify or/and view the characteristics of the configuration of an existing cluster site (see page 4-6).
- Remove the given cluster site selected from a list of cluster (see page 4-8).

The configuration of the Site Monitoring Daemons is stored in a configuration file, which is divided in sections.

Each section describes one site (the different IP addresses, phone numbers, e-mail, ...) and which sites have to be monitored.

Each section is divided in 4 sub-sections as follows:

Cluster Daemon Configuration sub-section:

| | |
|----------------------------|--|
| <i>Cluster Site Name:</i> | specifies the cluster name of the site. |
| <i>Daemon IP Address:</i> | specifies the address of the Monitoring Cluster Daemon. |
| <i>Daemon IP Port:</i> | specifies the port of the Monitoring Cluster Daemon. |
| <i>Modem Phone Number:</i> | specifies the modem phone number of the Monitoring Cluster Daemon. |
| <i>Modem Phone Device:</i> | specifies the serial device (/dev/tty) of the Monitoring Cluster Daemon. |

PowerConsole Daemon Configuration sub-section:

| | |
|----------------------------|---|
| <i>Daemon IP Address:</i> | specifies the address of the Monitoring PowerConsole Daemon. |
| <i>Daemon IP Port:</i> | specifies the port of the Monitoring PowerConsole Daemon. |
| <i>Modem Phone Number:</i> | specifies the modem phone number of the Monitoring PowerConsole Daemon. |
| <i>Modem Phone Device:</i> | specifies the serial device (/dev/tty) of the Monitoring PowerConsole Daemon. |

Site Monitoring Daemon Configuration sub-section:

| | |
|--|---|
| <i>List of reachable IP Addresses:</i> | specifies the list of all addresses reachable by the Cluster Daemons. |
|--|---|

PowerConsole Daemon Heartbeat Period:

specifies the time between the sending of two heartbeats of the PowerConsole Daemon.

Monitoring PowerConsole Daemon Confirmation Period:

specifies the time to wait for the acknowledgement of the PowerConsole Daemon.

List of Email Addresses:

specifies the list of email addresses to send to the system administrator when a disaster is diagnosed.

Warn Admin Program:

Specifies the full path name of the program to be run by the Daemon when a disaster is diagnosed.

Monitors sub-section:

monitors:

specifies the name of the cluster to be monitored.

Cluster Daemon Heartbeat Period:

specifies the period to send Heartbeat to the Monitoring Cluster Daemon.

Cluster Daemon Heartbeat Timeout Period:

specifies the time to wait for the heartbeat of the Monitoring PowerConsole Daemon.

Cluster Site Unreachable Threshold:

specifies the time that a cluster site is unreachable, before it is diagnosed as a disaster.

Monitoring Cluster Daemon Confirmation Period:

specifies the time to wait for the acknowledgement of the Monitoring PowerConsole Daemon.

Phone Line Test Period:

specifies the period to test the phone line.

Minimum Time to retry Daemon contact:

specifies the minimal time before retrying to contact the monitoring daemon on the other site when the phone was busy during dialing.

Maximum Time to retry Daemon contact:

specifies the maximal time before retrying to contact the monitoring daemon on the other site when the phone was busy during dialing.

Define New Monitoring Cluster Site

This action defines the configuration of a new Cluster Site.

Click on “**Define new Monitoring Cluster Site**” (see figure 34). The following screen is displayed:

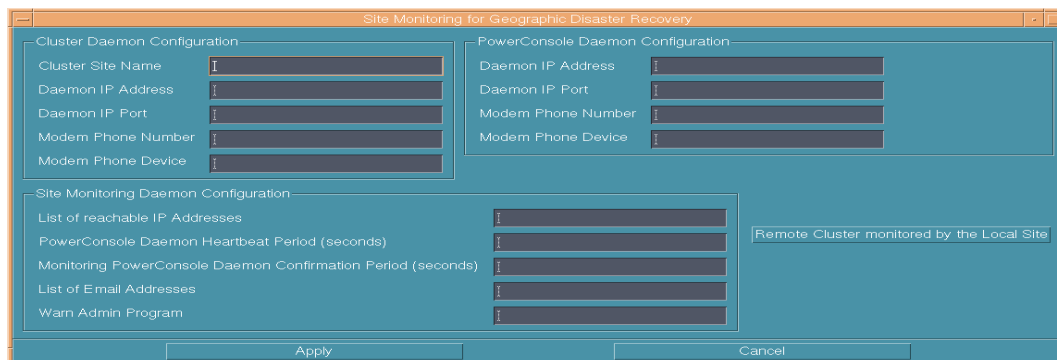


Figure 35. Daemon configuration: define new monitoring cluster site

When you click on the Remote Cluster monitored by the Local site button, the monitors section screen appears:

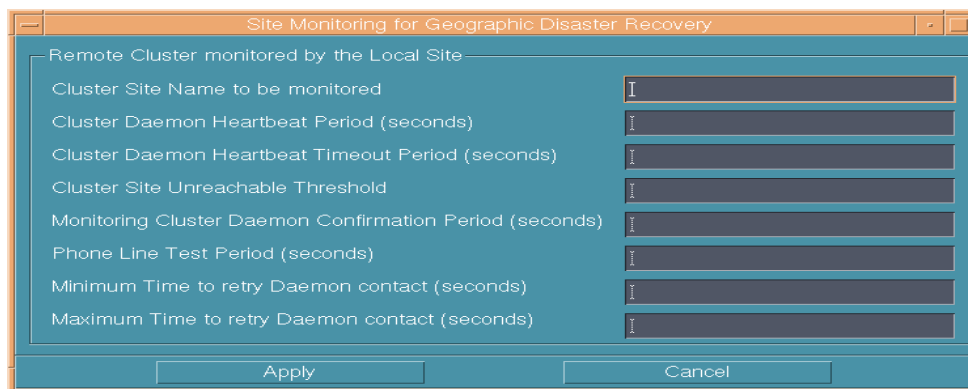


Figure 36. Daemon configuration: configuring a remote cluster monitored by the local cluster

How to Configure the Site Monitoring Daemons

Cluster Daemon Configuration

1. Enter the name of the Cluster (identifier composed of letters, numbers and underscore “_”).
2. Enter the IP address of the Cluster Daemon. This address is specific to the Cluster Daemon and must be registered in the *etc/hosts* file.

During the starting of HACMP, this address will be aliased with the adapter on which the service address is configured (by HACMP) (dotnumber composed of four numbers each of 3 digits maximum).

3. Enter the IP port of the Cluster Daemon (numbers composed of digits).
4. Enter the phone number corresponding to the modem link with the splitter of the Cluster (Phone numbers composed of digits, “,” and “/” used to pause during dialing).
5. Enter the TTY device of the cluster node corresponding to the serial line of the modem (full path name composed of letters, digits and “/”).

PowerConsole Daemon Configuration

6. Enter the IP address of the PowerConsole (dotnumber composed of four numbers each of 3 digits maximum).
7. Enter the IP port of the PowerConsole Daemon (numbers composed of digits).
8. Enter the phone number corresponding to the modem of the PowerConsole (Phone numbers composed of digits, “,” and “/” used to pause during dialing).
9. Enter the TTY device corresponding to the serial line of the PowerConsole modem (full path name composed of letters, digits and “/”).

Site Monitoring Daemon Configuration

10. Enter the list of all the addresses to be reachable by the Cluster Daemon. Generally, the Cluster Daemon must reach the PowerConsole address and the service address of each cluster nodes (dot number composed of four numbers each of 3 digits maximum).
Each address is separated by a comma followed by a space “, ”.
11. Enter the time (in seconds) between the sending of two heartbeats of the PowerConsole Daemon (time composed of digits).
12. Enter the time (in seconds) to wait for the acknowledgement of the PowerConsole Daemon (time composed of digits).
13. Enter the list of email addresses to send to the system administrator when a disaster is diagnosed (legal e-mail addresses). Each email address is separated by a comma followed by a space “, ”.
14. Enter the full path of the user-defined program to be run by the daemon when a disaster is diagnosed. For example, this program can send a message to the system administrator's beeper (full path name composed of letters, digits and “/”).

Remote Cluster monitored by the local cluster

15. Enter the remote Cluster name to be monitored by the local site (identifier composed of letters, numbers and underscores “_”).
16. Enter the time (in seconds) between the sending of two heartbeats of the Cluster Daemon (time composed of digits). The period of sending heartbeats will be the maximum of the Heartbeat Timeout divided by two. $\text{Heartbeat} < \text{Heartbeat Timeout}/2$. The loss of one heartbeat could trigger the phone call by the other site.
17. Enter the time (in seconds) to wait for a heartbeat from the monitoring daemon on the other site (time composed of digits). As during the wait of the acknowledgement no heartbeat is sent, the confirmation period must be less than the heartbeat timeout ($\text{confirmation period} < \text{heartbeat timeout}$).
18. Enter the acceptable number of times that a remote cluster is unreachable, before being diagnosed as a disaster.
The elapsed time is equal to the Cluster heartbeat + the Cluster heartbeat timeout + the Cluster confirmation period (described hereafter).
19. Enter the time (in seconds) to wait for an acknowledgement from the monitoring daemon on the other site.
20. Enter the time (in seconds) between the two tests of the phone line Daemon (time composed of digits).
To avoid test collision, phone line test period \gg heartbeat timeout.
21. Enter the minimal time (in seconds) before retrying to contact the daemon on the other site when the phone was busy during dialing (time composed of digits).
22. Enter the maximal time (in seconds) before retrying to contact the daemon on the other site when the phone was busy during dialing (time composed of digits).

After you have specified the fields, validate the screen by clicking the apply button of the monitors screen and then click on the apply button of the main screen to validate your settings.

Note: To monitor several remote clusters by one local cluster, you can repeat this last phase (step 15 → 22). At least, two cluster sites have to be configured. You have to define the new monitoring site for each cluster site.

Note: The configuration file is stored under the name:
/usr/sbin/bullcluster/etc/disaster/smd.cfg.
The template of the configuration file is stored under the name:
/usr/sbin/bullcluster/etc/disaster/smd.cfg_template.

This template allows the system administrator to see an example of a Site Monitoring configuration file.

Change/Show the characteristics of the Monitoring Cluster Site

This action allows you to change or show the characteristics of the Monitoring Cluster Site.

Click on “**Change/Show the characteristics of the Monitoring Cluster Site**” (see figure 34). The following screen is displayed:.

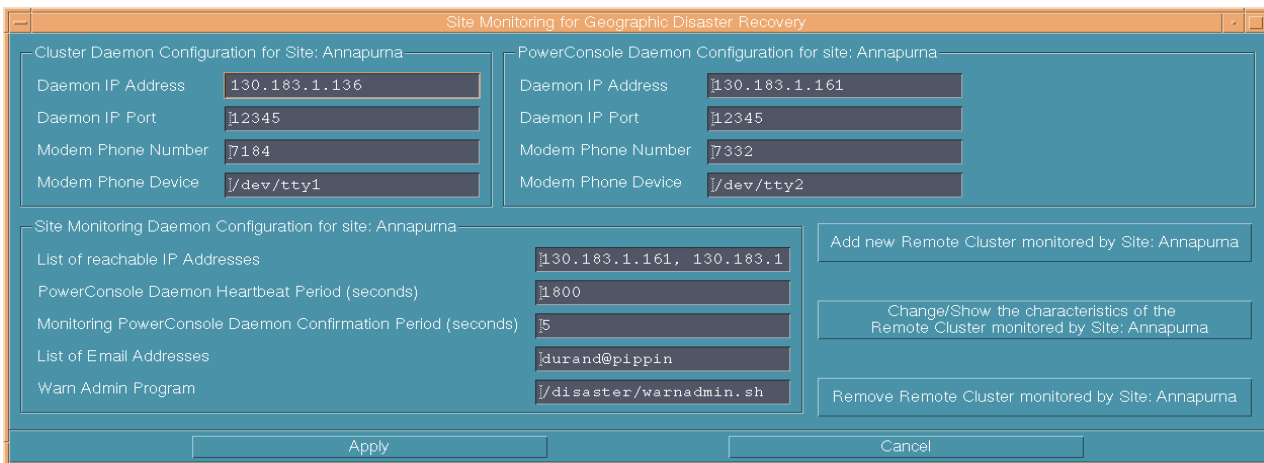


Figure 37. Daemon configuration: change/show the characteristics of the monitoring cluster site

When you click on the Change/Show the characteristics of the Remote Cluster monitored by Site Annapurna button, the monitors section screen appears:

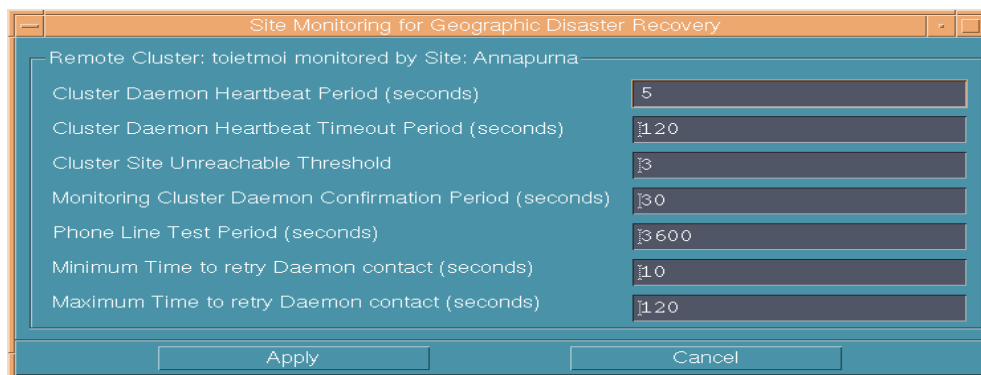


Figure 38. Daemon configuration: change/show the characteristics of the remote cluster monitored by the local cluster

When you click on the “Add new Remote Cluster monitored by Site Annapurna” button (see figure 37), the new monitors section screen appears:

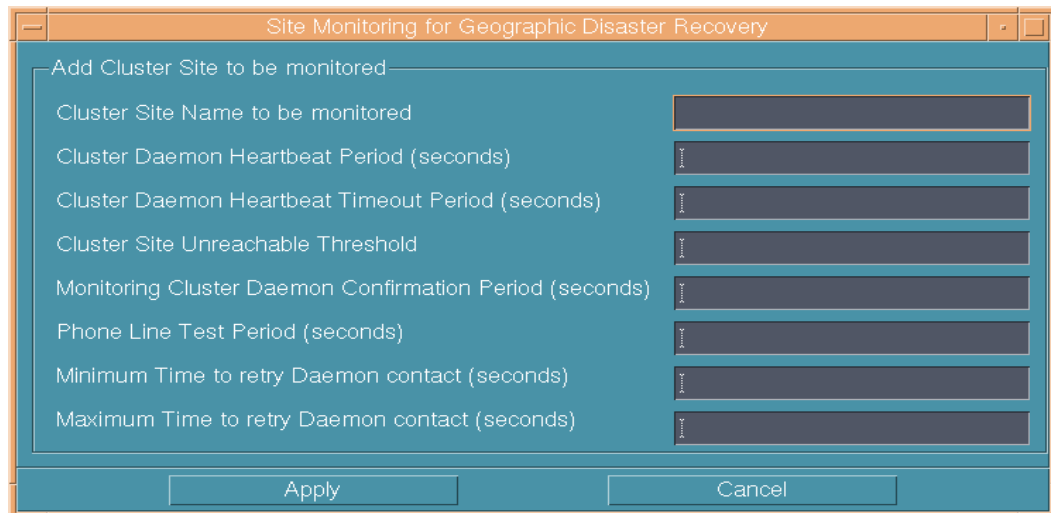


Figure 39. Daemon configuration: add a new remote cluster monitored by the local cluster

When you click on the “Remove Remote Cluster monitored by Site Annapurna” button (see figure 37), the remove monitors screen appears:

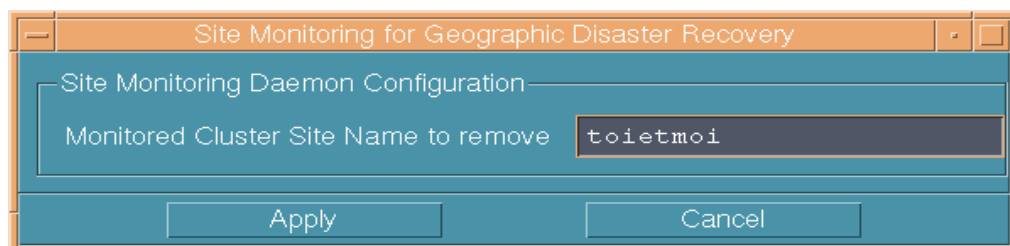


Figure 40. Daemon configuration: remove remote cluster monitored by the local cluster

After you have specified the fields, validate the screen by clicking the apply button of the appropriate monitors screen and then click on “**Apply**” to validate your settings.

Remove Monitoring Cluster Site

This action allows you to remove the Monitoring Cluster Site.

Click on “**Remove Monitoring Cluster Site**” (see figure 34). The following screen is displayed:.

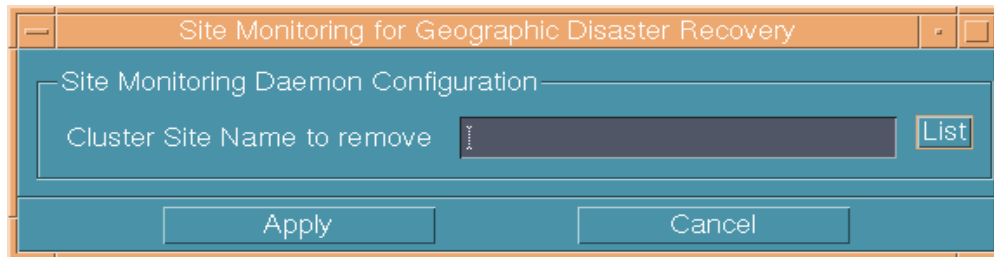


Figure 41. Daemon configuration: remove monitoring cluster

1. Select from the “**list**” button, the Cluster name to remove.
2. Once you have specified the field desired, click on “**Apply**” to validate.

Chapter 5. Monitoring Daemon Services

This utility allows the system administrator to start or stop the Site Monitoring Daemons on the PowerConsole.

On the Cluster, the Site Monitoring Daemons are automatically started or stopped by HACMP.

An HACMP BULL event is processed during the startup or shutdown phase of HACMP.

During the startup phase of HACMP, the HACMP BULL event:

bcl_post_acquire_service_addr allows the Cluster Daemon address to be aliased with the adapter on which the service address is configured and to start the Cluster Site Monitoring Daemon.

During the shutdown phase of HACMP, the HACMP BULL event:

bcl_pre_release_service_addr allows the Cluster Daemon address to be unaliased with the adapter on which the service address is configured and to stop the Cluster Site Monitoring Daemon.

On the PowerConsole, the Site Monitoring Daemons are not automatically started or stopped. So, the system administrator will explicitly start or stop the Site Monitoring Daemons.

1. From the C.D.E. front panel of the ClusterAssistant, click on the Disaster Recovery icon:

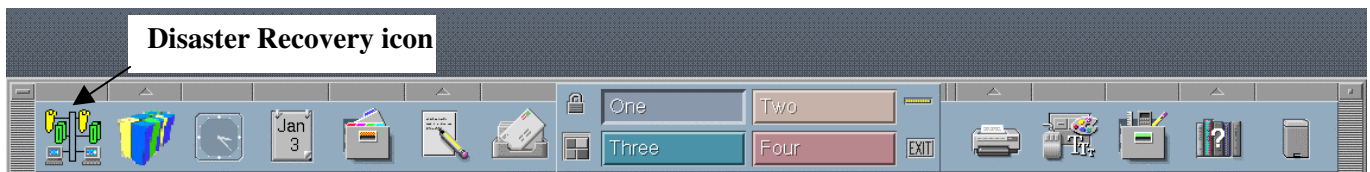


Figure 42. Application entry window

The following window is displayed:

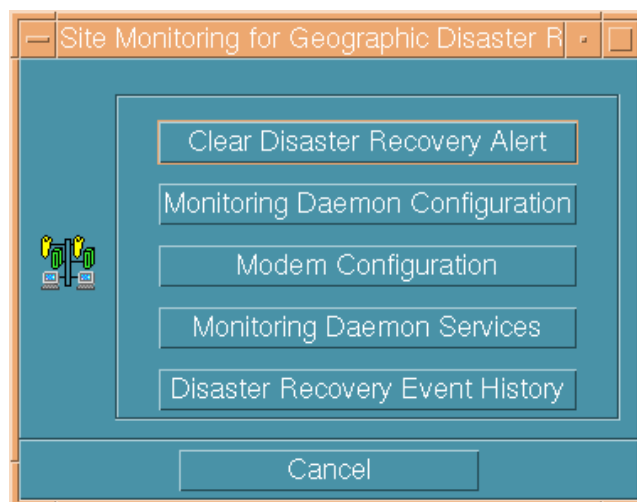


Figure 43. Monitoring Daemon Configuration

2. Click on the **“Monitoring Daemon Services”** button. A Select Operation window prompts you to Start/Stop the Monitoring Daemons on the PowerConsole.



Figure 44. Monitoring Daemon Services: start/stop on PowerConsole

After selecting the PowerConsole, the following window is displayed:

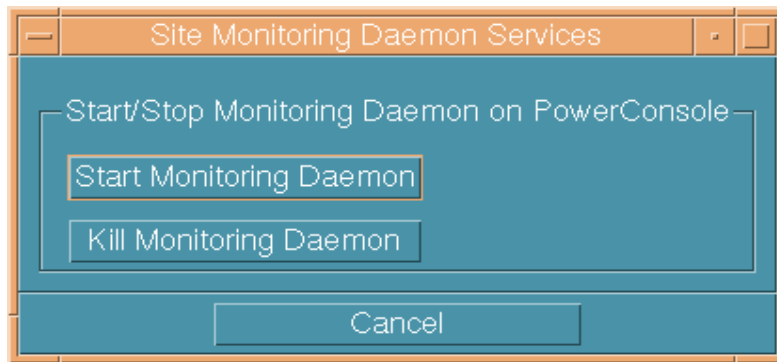


Figure 45. Monitoring Daemon Services: start/kill monitoring

You can start the PowerConsole Monitoring Daemons by clicking on the **“Start Monitoring Daemons”** button.

A Dialog Information window is displayed to inform you of the result of the command.



Figure 46. Monitoring Daemon Services: start result screen

You can kill the monitoring Daemons by clicking on the **“Kill Monitoring Daemons”** button. In this case, no other daemon on the remote site is warned that a remote monitoring Daemons has stopped.

After selecting the PowerConsole, the Site Monitoring Daemon is killed.

Chapter 6. Disaster Recovery Event History

This function allows the System Administrator to display the Disaster Recovery Event History.

1. From the C.D.E. front panel of the ClusterAssistant, click on the Disaster Recovery icon:

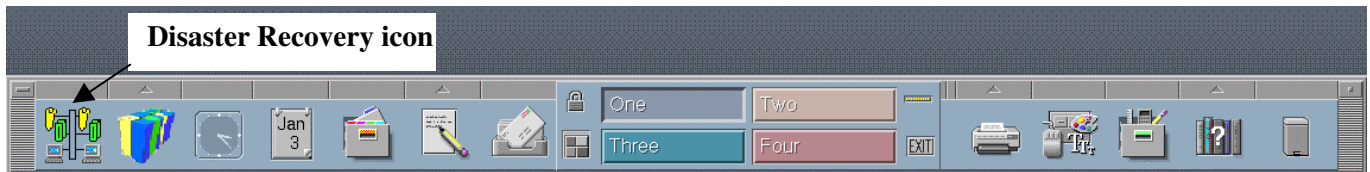


Figure 47. Application entry window

The following window is displayed:

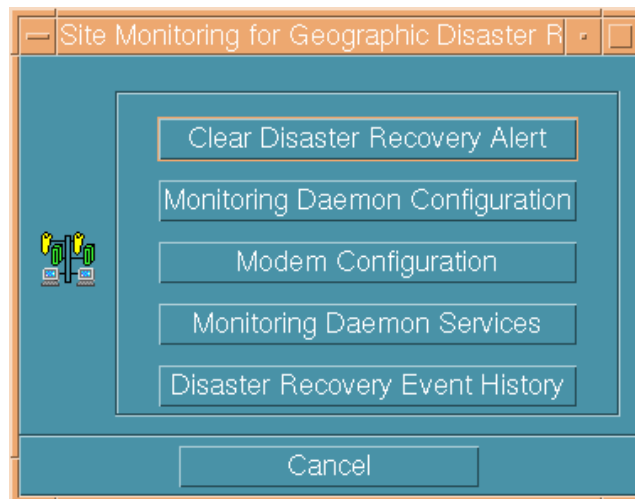


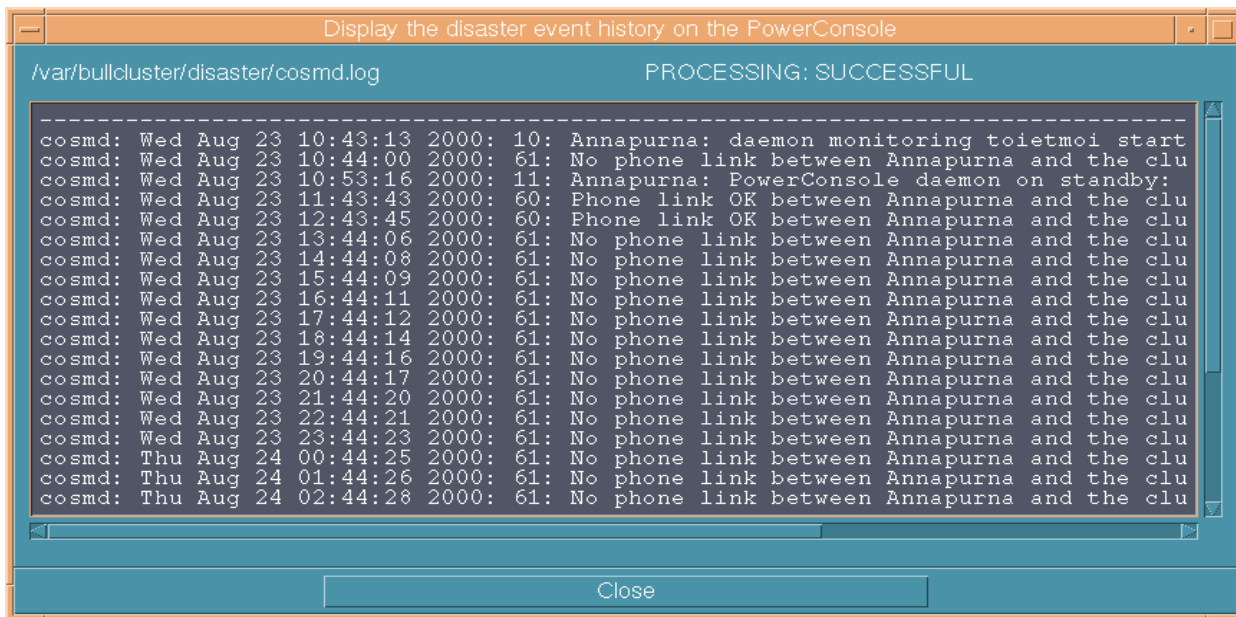
Figure 48. Monitoring Daemon Configuration

2. Click on the "**Disaster Recovery Event History**" button, the following screen appears:



To display the Event History on a node, select a node from the list of domain.

After selecting the node or the PowerConsole, the Event History screen appears:



Event History and its associated status are logged onto the file system:

- On the node on which the cluster daemon is running under the name:

/var/bullcluster/disaster/clsmd.log.

- On the PowerConsole under the name:

/var/bullcluster/disaster/cosmd.log.

Structure of Event history file is as follows:

monitoring daemon (*clsmd* or *cosmd*): date hour:minute:second year: daemon status:
message text

ex: cosmd: Wed Aug 23 10:43:13 2000: 10: Annapurna: daemon
monitoring toietmoi started on PowerConsole.

The different daemon status are (<local site> stands for the local site name and <distant site> for the remote site name) described in the following table:

| Daemon Status | Signification | Message text | Comment |
|---------------|------------------------------------|--|--|
| 0 | Cluster started | <local site>: daemon monitoring <distant site> started on cluster. | The monitoring daemon is started on the cluster. |
| 1 | Cluster standby mode | <local site>: cluster daemon on standby: waiting for heartbeats from <distant site>. | The cluster daemon is waiting for heartbeats from the other site to begin the monitoring. |
| 2 | Cluster normal mode | <local site>: cluster daemon monitoring <distant site>. | The cluster daemon is monitoring the other site. |
| 3 | Cluster maintenance mode | <local site>: cluster daemon monitoring the PowerConsole of <distant site> (maintenance mode). | The cluster on the other site has been stopped for maintenance operations. The daemon is now monitoring the PowerConsole on the other site. |
| 4 | Cluster stopped | <local site>: cluster daemon monitoring <distant site> stopped. | The monitoring daemon running on the cluster has been stopped. |
| 10 | Console started | <local site>: daemon monitoring <distant site> started on PowerConsole. | The monitoring daemon is started on the PowerConsole. |
| 11 | Console standby mode | <local site>: PowerConsole daemon on standby: waiting for heartbeats from <distant site>. | The PowerConsole daemon is ready to monitor the other site in case the local cluster is stopped for maintenance operation. |
| 12 | Console maintenance mode | <local site>: PowerConsole daemon monitoring <distant site> (local cluster in maintenance). | The monitoring daemon on the local cluster has been stopped for maintenance operation. The other site is now monitored by the PowerConsole daemon. |
| 13 | Console stopped | <local site>: PowerConsole daemon monitoring <distant site> stopped. | The PowerConsole daemon has been stopped. |
| 20 | Monitoring begins | <local site> monitored by <distant site>. | The cluster is monitored by a daemon on the other site. |
| 21 | Local cluster ready | <local site>: local cluster ready. | The monitoring daemon has been started on the local cluster. |
| 22 | Backup cluster ready | Cluster on <distant site> ready. | The daemon on the other cluster is started. |
| 23 | Backup cluster in maintenance | Cluster on <distant site> in maintenance. | The daemon on the other cluster is stopped because the cluster has to be maintained. |
| 24 | No more monitoring | <local site> no more monitored by <distant site>. | The daemon on the other cluster is stopped and the daemon on the PowerConsole is not monitoring. |
| 30 | Stop with monitoring successful | <local site>: cluster daemon stopped. The PowerConsole daemon monitors <distant site>. | The daemon has been stopped successfully. The PowerConsole daemon is monitoring the other site. |
| 31 | Stop without monitoring successful | <local site>: daemon stopped. <distant site> is no longer monitored. | The daemon has been stopped successfully. The other site is no longer monitored. |

| Daemon Status | Signification | Message text | Comment |
|---------------|--|---|--|
| 32 | PowerConsole daemon stopped successfully | <local site>: PowerConsole daemon stopped successfully. | The daemon on the PowerConsole has been stopped. |
| 33 | Forced stop successful | <local site>: stop successful. Warning: <distant site> was not informed. | The daemon has been stopped but the daemon on the other site does not know it. |
| 34 | Stop operation canceled | <local site>: stop operation canceled because <distant site> is unreachable. | In case of a stop with monitoring, the daemon to be stopped cannot contact the daemon on the other site. |
| 35 | Stop operation canceled: console unreachable | <local site>: stop operation canceled because the local PowerConsole daemon is unreachable. | The stop operation cannot be performed because the local PowerConsole daemon is unreachable. |
| 36 | Stop with monitoring impossible | <local site>: stop with monitoring impossible because <distant site> is in maintenance. | When in maintenance operation mode, it is impossible to perform a stop with monitoring. |
| 37 | Stop with monitoring impossible: standby | <local site>: stop with monitoring impossible because <distant site> is not monitored. | The daemon is not monitoring the other site. A stop with monitoring operation is impossible. |
| 40 | No more heartbeat | <local site>: no more heartbeat received from <distant site>. Try to contact by the phone link. | The two sites were exchanging heartbeats. A heartbeat timeout occurred because no more heartbeats were received. The daemon will contact the other site to diagnose the failure. |
| 41 | Heartbeat received | <local site> is receiving heartbeats again from <distant site>. | After a heartbeat timeout has occurred, the heartbeats are received again. |
| 50 | LAN failure | <local site>: LAN failure. | The cluster daemon cannot ping any other host. |
| 51 | External network failure | Failure on the external network between <local site> and <distant site>. | Each cluster daemon can ping other hosts on their respective LAN but network communications are impossible. |
| 52 | Distant LAN failure | <distant site>: LAN failure. | The LAN on the other site does not work. |
| 53 | Network failure | Failure on a network between <local site> and <distant site>. | There is a network failure but it is not possible to determine if the problem is due to the LAN or the external network. |
| 60 | Phone link OK cluster | Phone link OK between <local site> and the cluster on <distant site>. | The test of the phone link between the local site and the cluster on the other site is successful. |
| 61 | No phone link cluster | No phone link between <local site> and the cluster on <distant site>. | The cluster daemon on the other site cannot be reached by using the phone link. |
| 62 | Phone link OK console | Phone link OK between <local site> and the PowerConsole on <distant site>. | The test of the phone link between the local site and the PowerConsole on the other site is successful. |
| 63 | No phone link console | No phone link between <local site> and the PowerConsole on <distant site>. | The PowerConsole daemon on the other site cannot be reached by using the phone link. |
| 70 | Error during communication with cluster | <local site>: cluster on <distant site> contacted by phone link but the answer is incorrect. | The monitoring daemon running on the cluster of the other site is reachable but an error occurred during message exchange. |

| Daemon Status | Signification | Message text | Comment |
|----------------------|---|---|---|
| 71 | Error during communication with console | <local site>: PowerConsole on <distant site> contacted by phone link but the answer is incorrect. | The monitoring daemon running on the PowerConsole of the other site is reachable but an error occurred during message exchange. |
| 80 | Distant cluster unreachable | <local site>: cluster on <distant site> unreachable. | The monitoring daemon on the cluster or the PowerConsole cannot communicate with the daemon running on the cluster on the other site. |
| 81 | Local cluster unreachable | <local site>: local cluster unreachable. | The PowerConsole daemon cannot communicate with the daemon running on the local cluster. |
| 82 | Distant PowerConsole daemon unreachable | <local site>: PowerConsole daemon on <distant site> unreachable. | The cluster daemon cannot communicate with the monitoring daemon running on the PowerConsole on the other site. |
| 83 | Local PowerConsole daemon unreachable | <local site>: local PowerConsole daemon unreachable. | The cluster cannot communicate with the monitoring daemon running on the local PowerConsole. |
| 84 | Disaster | <local site>: disaster detected on <distant site>. | A disaster has been diagnosed: the monitoring daemon on the other site has been unreachable by network and phone link too many times. |
| 90 | Cluster daemon not running | <local site>: the cluster daemon on <distant site> is not running. | The cluster on the other site is reachable but there is no daemon monitoring the local site. |
| 91 | PowerConsole daemon not running | <local site>: the PowerConsole daemon on <distant site> is not running. | The PowerConsole on the other site is reachable but there is no daemon monitoring the local site. |
| 100 | Modem server blocked | Problem when using the modem. If the problem persists, verify the modem. | The daemon was waiting for an answer from the modem but it received nothing. Verify that the modem is turned on and works. |

Chapter 7. Disaster Alert

This functionality warns the system administrator when a disaster is diagnosed.
A Disaster Recovery icon is added to the CDE desktop front panel.

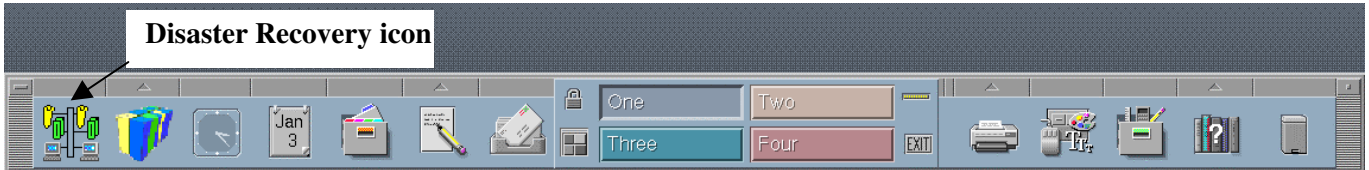


Figure 49. Disaster Recovery Icon on the front panel of the ClusterAssistant

A Disaster Alert file on the PowerConsole is associated with the control (Disaster Recovery icon) on the front panel, which changes appearance when the file is modified to alert the user.

When a Disaster Alarm is detected:

- a red zigzag is superimposed on this icon as shown in figure 50:



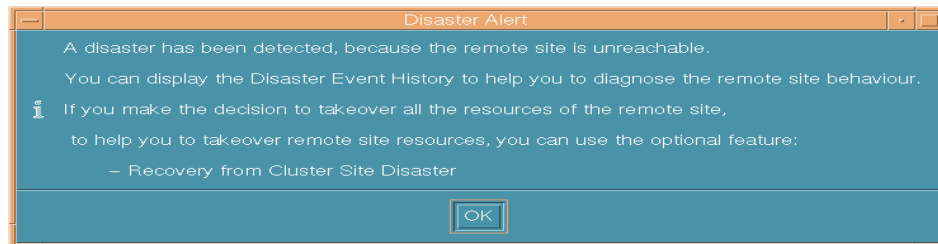
Figure 50. Disaster Alert on the frontpanel of the ClusterAssistant

- a *Disaster Alert* window is displayed on the current workspace of each opened C.D.E.



Figure 51. Disaster Alert window

If the System Administrator clicks the Ok button, a Dialog Information window is displayed:



If the System Administrator clicks **Ok**, the *Disaster Alert* window on the current workspace of the current C.D.E. session is removed (the *Disaster Alert* window is only removed for the current C.D.E. session, not for all C.D.E. sessions).

Removing the Disaster Alert Window for all C.D.E. Sessions

To remove the “**Disaster Alert**” window on the current workspace of all C.D.E. sessions, and to reset the *Disaster Alert* icon on the desktop (the red zigzag is removed):

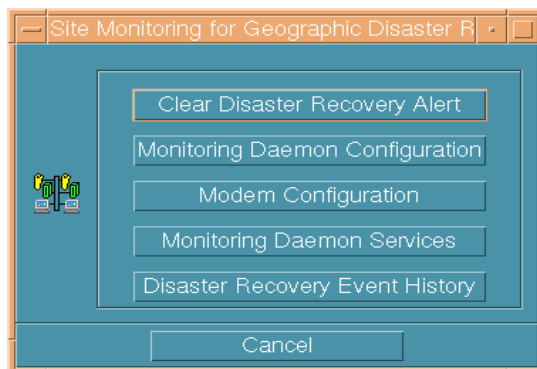
Click on the “**Clear Disaster Alert**” button of the “**Disaster Recovery**” icon (see figure 49).

or

Click on the “**Site Monitoring**” icon in the “**Disaster Recovery**” folder of the ClusterAssistant Application Manager.



The following window is displayed:



Click on the “**Clear Disaster Recovery Alert**” button. The following window is displayed:



If **Ok** is clicked, no further Disaster Recovery Alert will be sent to the PowerConsole, until the failed site has become operational again.

Appendix A. Troubleshooting

Start/Stop Cluster Monitoring Daemons (debugging purpose)

For debugging purposes, this utility allows the system administrator to start or stop the Site Monitoring Daemons on the Cluster nodes.

In normal mode, on the Cluster, the Site Monitoring Daemons are automatically started or stopped by HACMP.

An HACMP BULL event is processed during the startup or shutdown phase of HACMP.

During the startup phase of HACMP, the HACMP BULL event:

bcl_post_acquire_service_addr allows the Cluster Daemon address to be aliased with the adapter on which the service address is configured and to start the Cluster Site Monitoring Daemon.

During the shutdown phase of HACMP, the HACMP BULL event:

bcl_pre_release_service_addr allows the Cluster Daemon address to be unaliased with the adapter on which the service address is configured and to stop the Cluster Site Monitoring Daemon.

For debugging purposes, you can use the following utility:

`/usr/sbin/bullcluster/classistant/utis/bclt_dbg_disaster_smd_services`

When you launch this utility, a “Select Operation” window prompts you to Start/Stop the Monitoring Daemons on the node.



Figure 52. start/stop Site Monitoring Daemon on a node

If you want to start/stop Monitoring Daemon on a node, click on OK then select a node from the list of domains. The following windows is displayed:

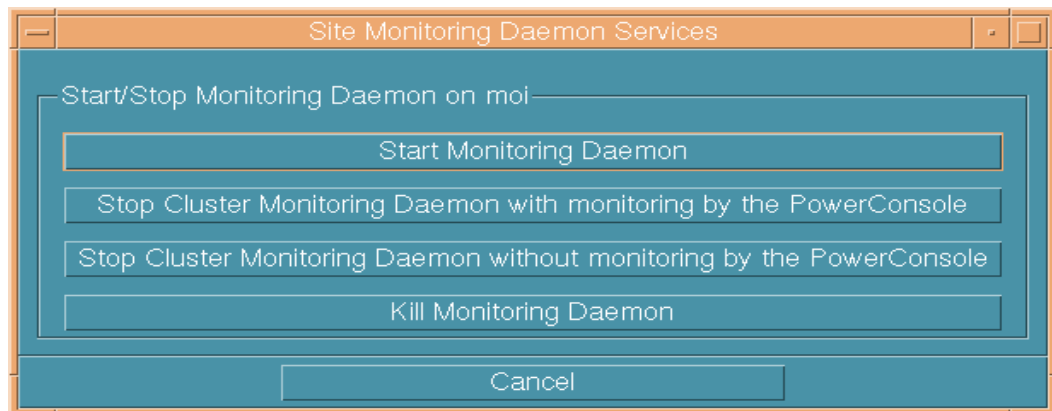


Figure 53. Start/stop monitoring daemon

- If you want to start the Site Monitoring Daemon on a node, select a node from the list of domains.

As the Cluster Daemon is automatically started by HACMP, this action would not be done very often, but just on a case by case basis for debugging purposes.

If you want to start it manually, don't forget to alias the Cluster Daemon address with the adapter on which the service address is configured.

After selecting the node, the Site Monitoring Daemon is started.

- You can stop the Cluster Daemon with monitoring by the PowerConsole Daemon. This mode is also called "Maintenance Mode".

As the Cluster Daemon is automatically stopped by HACMP, this action would not be done very often, but just on a case by case basis for debugging purposes.

After selecting the node from the list of domains, the Cluster Daemon is stopped, and the local PowerConsole monitors the Cluster Daemon on the remote site.

If you want to stop it manually, don't forget to unalias the Cluster Daemon address with the adapter on which the service address is configured.

- You can stop the Cluster Daemon without monitoring by the PowerConsole Daemon.

If you want to stop the Site Monitoring Daemon on a node, select a node from the list of domains.

As the Cluster Daemon is automatically stopped by HACMP, this action would not be done very often, but just on a case by case basis for debugging purposes.

After selecting the node from the list of domains, the Cluster Daemon is stopped, and the Cluster Daemon on the remote site is warned that the other Cluster Daemon is stopped.

If you want to stop it manually, don't forget to unalias the Cluster Daemon address with the adapter on which the service address is configured.

- You can kill the monitoring Daemons by clicking the "**Kill Monitoring Daemons**" button. In this case, no other daemon on the remote site is warned that a remote monitoring Daemons is stopped.

If you want to kill the Site Monitoring Daemon on a node, select a node from the list of domains.

As the Cluster Daemon is automatically stopped by HACMP, this action would not be done very often, but just on a case by case basis for debugging purposes.

After selecting the node, the Site Monitoring Daemon is killed.

If you want to stop it manually, don't forget to unalias the Cluster Daemon address with the adapter on which the service address is configured.

Appendix B. Configuration of the Predefined Types of Modems

Multi-Tech Modem: MT2834ZDXF

```
modem_type = "multitech_fr"  
modem_configured = "no"  
modem_trace = "no"  
modem_reset0 = "atz"  
modem_reset = "at&fs0=0s7=30s30=1e0v0m0%e1%e5$mb9600&q1&c1"  
modem_dial = "at$v4d%s"  
modem_answer = "ata"  
modem_escape = "+++"  
modem_hangup = "ath"  
modem_ok = 0  
modem_ring = 2  
modem_nocarrier = 3  
modem_nodialtone = 6  
modem_busy = 7  
modem_noanswer = 8  
modem_ringing = -1  
modem_connected = 12  
Rfu = 0
```

U.S.Robotics Modem: SPORTSTER

```
modem_type = "sportster_fr"  
modem_configured = "no"  
modem_trace = "no"  
modem_reset0 = "atz"  
modem_reset = "at&fs0=0s7=30s19=1e0v0m0&c1"  
modem_dial = "ats40=2d%s"  
modem_answer = "ata"  
modem_escape = "+++"  
modem_hangup = "ath"  
modem_ok = 0  
modem_ring = 2  
modem_nocarrier = 3  
modem_nodialtone = 6  
modem_busy = 77  
modem_noanswer = 8  
modem_ringing = 11  
modem_connected = 17  
Rfu = 0
```

Multi-Tech Modem: MT3834ZDXle-33

```
modem_type = "MT2834ZDXle-33_fr"  
modem_configured = "no"  
modem_trace = "no"  
modem_reset0 = "atz"  
modem_reset = "at&fs0=0s7=30s30=1e0v0m0%e1%e5$mb9600&q1&c1"  
modem_dial = "at$v4d%s"  
modem_answer = "ata"  
modem_escape = "+++"  
modem_hangup = "ath"  
modem_ok = 0  
modem_ring = 2  
modem_nocarrier = 3  
modem_nodialtone = 6  
modem_busy = 7  
modem_noanswer = 8  
modem_ringing = -1  
modem_connected = 1  
Rfu = 0
```

Glossary

This glossary contains abbreviations, key-words and phrases that can be found in this documentation.

AIX

Advanced Interactive Executive

API

Application Programming Interface

ATF

Application Transparent Failover

CDE

Common Desktop Environment

DAS

Disk Array Subsystem

EPC

Escala PowerCluster

GUI

Graphical User Interface

HA

High Availability/ Highly Available

HACMP

High Availability Cluster Multi-Processing

HACMP/ES

High Availability Cluster Multi-Processing
Enhanced Scalability

HAS

The High Availability Solution Project

LPP

Licensed Program Product

ODM

Object Data Manager

PTF

Program Temporary Fix

SRDF

Symmetrix Remote Data Facility

SMIT

System Management Interface Tool

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