Tina for Cluster Documentation

Tina 4.7.0

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Atempo SAS
23 Avenue Carnot
91300 Massy - France

Contents

CHAPTER 1 - Installing Tina for Cluster

This chapter describes the Tina for Cluster software installation. It also explains cluster resource configuration procedures in Web Administration.

You must have a good knowledge of the cluster technology to install and use Tina for Cluster.

> **Important**: Although the new Web Administration Console is used to perform most of the operations in Tina, references to the old Web Administration Interface may still be present in this guide. These parts will be progressively updated in future versions of Tina.

Installing Tina for Cluster on Windows

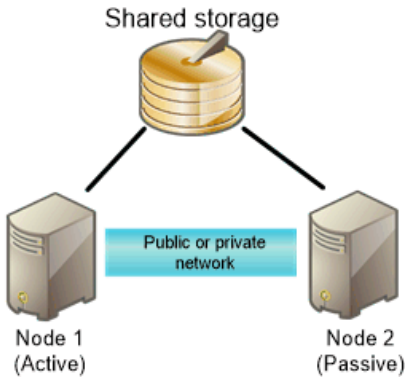
There are two different procedures to install a cluster depending on whether it is a cluster of Single Copy Cluster (SCC) or Continuous Cluster Replication (CCR) type.

Single Copy Cluster (SCC)

In the Single Copy Cluster architecture, a shared storage enables multiple servers to manage a single copy of the data. In this architecture, all cluster nodes have access to shared data, but not at the same time.

Failover process. In a SCC layout, the node running a clustered service is the active node for this service. If the active node fails, another node takes control of the service and brings it online; this process is known as failover. As the failover happens, the storage associated with the clustered service is logically detached from the failed node and placed under the control of the new host node.

This is the standard Single Copy Cluster (SCC) layout:

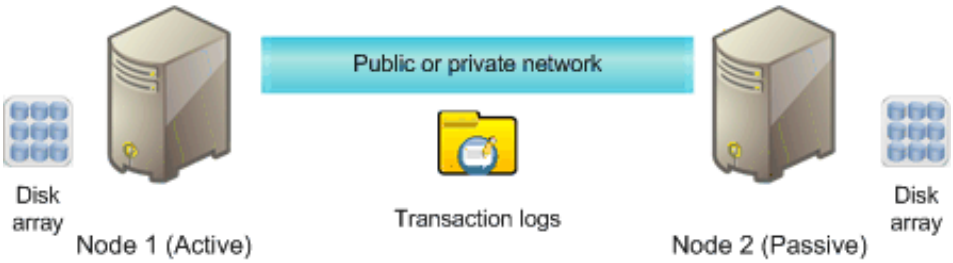


Continuous Cluster Replication (CCR)

In a CCR cluster, the data is duplicated from the active node to the passive node. If the active node fails, the passive node takes over; since the data is replicated, this cluster configuration can work even if the disk itself fails; however, to avoid copying a huge amount of data, the duplication

takes place at the application level (Exchange database typically), using transactions. Therefore, this solution is only suited for specific applications which support the transactions.

This is the standard Continuous Cluster Replication (CCR) layout:



Installing on a SCC Cluster Configuration

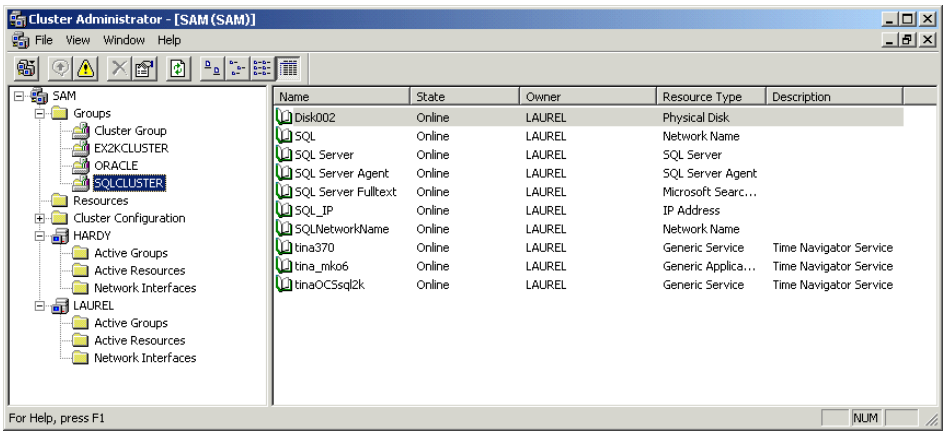
Perform the installation only on the active node of the SCC Cluster and then run Cluster Configuration Tool. This tool updates the passive node so it can take over the Tina service, when the active node fails.

Selecting the Installation Node

To install Tina on the cluster, determine the node where the resource to be backed up is active, i.e., the node owning the group containing the disks to back up. You must install a Tina agent on that node.

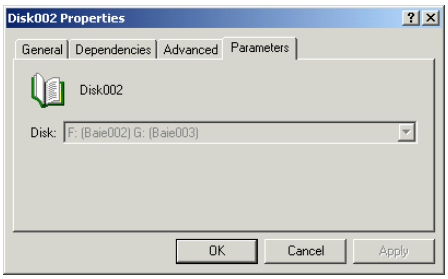
To determine where to install Tina

1. Open the Cluster Administrator and select the group representing the virtual machine on which you must install Tina.
   Example. We want to install Tina on the SQLCLUSTER group:



2. Within that group, right-click the disk component, select Properties and click the Parameters tab.
3. Make a note of the disk letters available for the installation of Tina on the virtual machine.

For example, this window shows that you can install Tina on either the `F:` or the `G:` volumes:

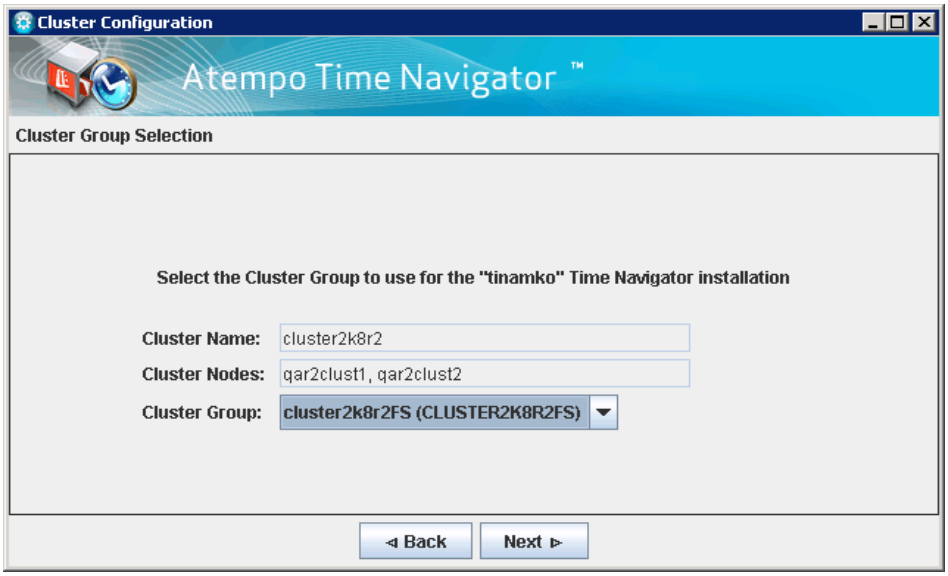


4. Install a Tina agent on one of these disks.

Launching the Cluster Configuration Tool

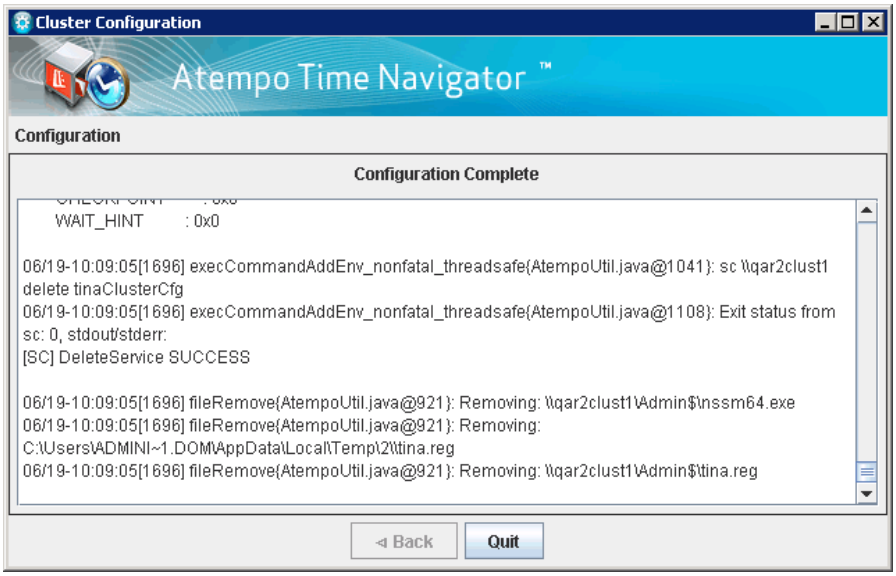
To launch the Cluster configuration tool

1. On the first cluster node, select Start ▸ Programs ▸ Tina ▸ Utilities ▸ Cluster Configuration.
2. The Cluster Configuration window opens. Click Next.
3. In the Cluster Group Selection window, select the cluster group you want to associate with the Tina server (e.g., SQLCLUSTER) and click Next.
   This is the Cluster Group Selection window of the Cluster Configuration Tool:



4. Once the Cluster Configuration Tool has associated the cluster with Tina, it opens the Configuration Complete window that displays a log with all the configuration events. If any issue occurs during the configuration and you need assistance from the Atempo Customer Support, send a copy of this log.

This is the Configuration Complete window:



5. Click Quit.

> **Note**: If you want to perform a restore operation while you are logged on the cluster agent, go to your server and select the *Connect to any platform via Restore & Archive Manager* check box to be able to launch the Restore & Archive Manager.

Installation on a CCR Cluster Configuration

To install on a CCR Cluster configuration

1. Install a Tina agent on each node of the cluster and run Cluster Configuration Tool for each installed node.
2. Repeat the procedure described in Installing on a SCC Cluster Configuration for each node.

Configuring Tina for Cluster

> **Note**: The configuration procedures are described at length in the Tina Administration Documentation. This topic only describes the points specific to the cluster configuration.

Creating Hosts

You must create hosts for all physical nodes and virtual machines.

To create a host

1. In Web Administration, select Platform ▸ New ▸ Host. The New Host window opens.
2. For a virtual resource, select the cluster type corresponding to your cluster in the Type list. For a physical host, select the host type.
3. Enter the physical node or virtual resource name in the Host Name textbox. The host name corresponds to the value entered in the `%TINA_HOME\Conf\hosts.txt` file.
4. Click OK to validate.
5. Right-click the host icon that you have just created and select Enable to enable the host.

> **Note**: If you have a lot of hosts to enable, use the Platform ▸ Use ▸ Enable ▸ Host menu that enable you to select several hosts.

Creating a SRA Application (from Windows 2003)

See the Atempo-Tina System Recovery Agent User's Guide for details about the SRA application.

CHAPTER 2 - Managing Clusters

This topic presents the principles involved in managing clusters with Tina.

Using a Cluster

Managing a Cluster Agent

Cluster agents under Tina are used as standard agents.

For more information on how to manage standard agents, see the topic on agents in the Tina Administration Documentation.

Managing Application Modules

Depending on your platform type (static or dynamic binaries), you can only install one type of Tina application per group.

> **Note**: With Windows, some applications have cluster specific versions, e.g., Exchange module cluster.

Managing Node Failures

If a node fails (e.g., a disk crash), all cluster resources, including the virtual IP address and the mount points switch to the second node. The start-up script of the virtual resource (including Tina) is then run from this second node. Tina can restart backups of this node with the virtual IP address if you have set the Retry on Incident option.

For more information on the Retry on Incident option, see the Tina Administration Documentation.

Backup

Method

These are the backup methods:

- To back up a cluster agent, you must schedule one or several strategies associated with one or several backup selections on the virtual resource directories.

  See the Tina Administration Documentation for details.
- To back up an application located on the virtual resource, select the host representing the virtual resource in Web Administration (not one of the nodes), select Platform ▸ New ▸ Application and define the required parameters for the application.

  See the Tina corresponding application guides for details.

> **Note**: The user interface gives the list of all the disk resources accessible by the virtual machine; however, you must not back up the disks belonging to a different virtual machine nor the local node disks. The reason is that when the resource switches, only shared disks are switching.

Retry on Incident

When a resource is switched during backup, an error happens and the backup fails. You must plan a retry on incident to enable backing up to start again. The delay before the retry takes place must be greater than the resource switching time.

Resource Switch Mode

The switch of the group resource can be automatic (if a node overload is detected or following a disk crash) or manual (depending on the administrator).

Windows Backup

To be able to restore all the cluster elements (quorum, disaster recovery of one node or of the entire cluster) in addition to the data located on the share resources, perform these backups:

- For each cluster node on Windows hosts: System State and Filesystem applications through Atempo-Tina Agent for Windows. The Filesystem application should exclude the system disk.
- For subsequent versions of Windows: Tina System Recovery Agent for each cluster node.

Restore

Method

The overall restore method is identical to the standard client restore. You must select the data to restore, synchronize, and start the restore; however, if switching occurs, the restore job is canceled. You must wait for the switch to be finished, restart restore deselecting the data already restored.

Prerequisite

To perform a restore operation while you are logged on the cluster agent, you must have the corresponding rights. To be able to launch the Restore & Archive Manager, the Tina administrator must grant you these rights:

- Restore from a remote platform.
- Cross-restore.

On the Web Administration explorer, the Tina administrator must select Users ▸ your profile ▸ User Details ▸ Profile and ensure that the check boxes corresponding to those rights are selected.

For more information on Restore, see to the Tina Administration Documentation and the Tina Restore Documentation.

Restore of a Single Windows Cluster Node

Prerequisites

To restore a single cluster node, you must have access to these elements:

- Windows installation media.
- Tina installation media.
- Login information for a user with Administrator's rights on the cluster.
- Disaster recovery backup of the cluster node as well as the disaster disk for that node (according to your disaster recovery solution).

> **Note**: If you are unable to use any Tina Disaster Recovery solution, see in Restoring a Microsoft Cluster Node without a Tina Disaster Recovery Solution the description of the node restore procedure.

To restore a single node

1. Perform a recovery of the node. Use Tina System Recovery Agent.
2. Restore the node file system using the Restore & Archive Manager.
3. Restart the node and verify that the other cluster nodes can communicate with it.
4. Verify that the cluster works properly, especially when the active node switches.

> **Note**: If all the other nodes are shut down when you perform the restore, the quorum is restored along with the node. If another node is active when you perform the restore, the quorum is not restored.

Complete Restore of a Windows Cluster

Prerequisites

To completely restore a Windows cluster, you must have access to these elements:

- Windows installation media
- Tina installation media
- Login information for a user with Administrator's rights on the cluster
- All necessary drivers for the server
- Disaster recovery backup of each cluster node as well as the disaster disk for each node (according to your disaster recovery solution).

> **Note**: If you are unable to use any Tina Disaster Recovery solution, see in Restoring a Microsoft Cluster Node without a Tina Disaster Recovery Solution the description of the node restore procedure.

When you completely restore a cluster, two procedures are available: one without hardware modification of the shared resource and a second one to use if the disk array hosting the shared resources has changed since the backup.

To completely restore a Cluster with identical hardware configuration of the shared resource

1. Perform a recovery of one of the nodes. Use Tina System Recovery Agent.

2. Restore the node file system using the Restore & Archive Manager.
3. Perform steps 1 and 2 for all the nodes in the cluster.
4. Verify that the cluster works properly including in cases of active node switch.

To completely restore a Cluster with a different hardware configuration of the shared resource

If you are using Tina System Recovery Agent (from Windows 2003)

1. Perform an SRA recovery of one of the nodes. See the Atempo-Tina System Recovery Agent User's Guide guide for details on the procedure and on the required environment variables.
2. Restore the node file system using the Restore & Archive Manager.
3. Verify that the cluster is running.
4. Perform an SRA recovery of all the other nodes.
5. Verify that the cluster works properly when the active node switches.

Restore of the Windows Cluster Quorum (Windows 2003)

This topic applies to situations where you must restore the quorum. These are the cases described:

- The disk hosting the quorum has crashed.
- The quorum is corrupted.
- You want to return to a previous quorum version.

Prerequisites

To restore the cluster quorum, you must have access to these elements:

- Tina System Recovery Agent backup of one of the nodes.
- Disk signature file updated after the cluster installation with the DUMPCFG tool of the Windows Resource Kit.

To restore the quorum after a disk crash

In this situation, the solution consists in moving the quorum rather than actually restoring it.

1. Stop the Cluster service on every cluster node, using the Services snap-in.
2. On one of the nodes, specify `/fixquorum` as a start parameter for the Cluster service, and restart that service.

   > **Note**: This parameter enables the Cluster service to start on the node even though the quorum is not available.

3. In the Cluster Administrator interface, right-click the cluster (at the root of the tree) and select Properties.
4. Click the Quorum tab and select a different physical resource for the quorum.
5. Stop the Cluster service again on the node. Remove the start parameter and restart the Cluster service.
6. Restart the Cluster service on all other nodes.

7. You must imperatively perform a new Tina System Recovery Agent backup to ensure that it contains the correct quorum configuration. Previous backups are valid only if the new quorum disk has the same letter and the same signature as the pre-crash one.
8. If you want to assign the same letter and signature to the new quorum disk, proceed as follows:
   a. Start the Cluster service on every nodes.
   b. Remove the resource corresponding to the crashed disk.
   c. Replace the disk.
   d. Restore the disk signature using the command:

      `DUMPCFG -S<signature><physical disk number>`.
   e. Recreate the disk in the cluster.
   f. Switch the quorum to that disk: in the Cluster Administrator interface, right-click the cluster (at the root of the tree) and select Properties.
   g. Click the Quorum tab and select the new disk for the quorum.

To restore a corrupted quorum with Tina System State Application

1. As Local Administrator, open a session on the active node using the `/noquorumlogging` option.
2. Open the Tina System Recovery Agent application on the node containing the latest backup.
3. Restore the Quorum. Select these elements:
   - Registry
   - Boot Files
   - COM+ Class Registration
   - Cluster Configuration

   Tina stops the service on the node and restores the cluster configuration in the ClusDB file in the `systemroot\cluster` registry directory.
   The cluster service automatically restarts when the restore is complete.
4. Start the Cluster service on the other nodes.

To restore a corrupted quorum through the recreation of the quorum.log file

If you do not have a System State or Tina System Recovery Agent node backup available to perform the corrupted quorum restore, you can recreate a log file associated with the quorum:

1. If the service is started on the cluster node, shut it down and open the administration console.
2. In the console tree structure, double-click Services and Applications, then click Services.
3. In the Details area, click Cluster Service. In the Action menu, click Stop.
4. Open the Cluster Service Properties.
5. In the General tab, enter `/resetquorumlog` in the Starting Parameters field of the Service Status area, then click Start.

   > **Note**: This step forces the quorum log restore from the information contained in the local node registry.

6. Use the ClusterRecovery tool located in the Microsoft Windows Resource Kit to restore the additional quorum files.

7. Start the Cluster service on the other cluster nodes.
8. Remove the `/resetquorumlog` Starting Parameter on the first node.

To restore a previous version of the quorum

1. Open the Tina System Recovery Agent application on the node where the quorum version you want to restore was backed up, and set to `yes` the `TINA_SRA_FORCE_CLUSTER` environment variables.

   See the Atempo-Tina Agent for Windows or Atempo-Tina System Recovery Agent User's Guide guides for details.
2. Restore the Quorum. Select these elements:
   - Registry
   - Boot Files
   - COM+ Class Registration
   - Cluster Configuration

   Tina stops the service on the node and restores the cluster configuration.
   The cluster service restarts on that node and stops all the other cluster nodes. Windows copies the restored quorum from the running node to the Cluster quorum disk and to all other nodes.
3. Start the Cluster service on the other cluster nodes.
4. Verify that the cluster configuration is correct and that it works properly including in cases of active node switch.
5. Once the restore is complete, set to `no` the `TINA_SRA_FORCE_CLUSTER` environment variable.

CHAPTER 3 - Tina Storage Node for Cluster

In addition to the agent mode, you can use Tina for Cluster as a Storage Node. The storage node provides all the Tina agent functionalities as well as media management capabilities.

Installation

The Tina Storage Node for Cluster installation procedure is identical to the agent installation. Launching the Cluster Configuration Tool for details.

> In the Installation Type window, select Storage Node Installation.

Backup and Restore

For the backup and restore procedures, see Backup and Restore.

Also ensure you are familiar with the Storage Node concepts and procedures described in the Tina in SAN Environment topic of the Tina Administration Documentation.

CHAPTER 4 - Additional Information

This topic lists the frequently asked questions and gives more details on how to restore Microsoft Cluster MSCS as well as how to restore a Microsoft Cluster Node without a Time Navigator Disaster Recovery Solution.

Frequently Asked Questions

Q : How many machines must I create in Web Administration to back up the cluster?

A : You must declare as many clients as there are virtual resources, i.e. cluster groups containing disks to back up.

Q : Under what name must I create a machine in Web Administration to back up a virtual resource?

A : You must use the name corresponding to the virtual IP address.

Q : What happens if a group switches during a backup?

A : The backup fails. You must plan a retry on incident to enable backup to start again. The delay before the retry on incident takes place must be greater than the resource switching time.

Q : What happens if a group switches during a restore?

A : The restore job is cancelled on error. You must wait for the switch to be finished, restart restoring, unselecting the data already restored.

Q : When I start the `tina_daemon` of a second virtual resource, I get the following error: "Bind socket impossible".

A : You must update the hosts file with the following line:

```
localhostname <virtual_resource_name>.
```

Q : How can I back up the cluster nodes local disks?

A : You must install a Tina agent on each node local disk, the hosts file must contain the following line:

```
localhostname <node_name>.
```

Q : What directories can I back up for each virtual resource?

A : Only the directories belonging to that resource. You must declare a backup selection for each directory.

Q : When I start a cluster nodes backup, I cannot back up the nodes local disks. Why?

A : You must verify that the node name is not associated with the cluster private network interface, since no communication is possible between public and private networks.

Q : How can I automatically start the `tina_daemon` on each virtual resource?

A : You must integrate the `tina_daemon` starting and stopping with the virtual resource starting and stopping scripts (see the System Administrator).

In Windows, the cluster automatically starts the Tina services.

Restoring Microsoft Cluster MSCS

Principles

The procedure to restore a cluster is identical to restoring a standard Tina agent. You must first select the data to restore, synchronize in time and then start the restore.

However, if a switchover occurs while you are restoring, the restore process stops on error. You must wait until the switchover is complete and resume restoring.

Quorum Restore

To restore a cluster, you must restore the cluster physical nodes.

Node Restore (from Windows 2003)

To restore the physical nodes, you use the Tina System Recovery Agent application.

See the Tina Restore Documentation and the Atempo-Tina Disaster Recovery for Windows (Powered by WinPE) and Atempo-Tina System Recovery Agent User's Guide for details.

Cluster Restore

Automatically, Tina tries to restore the Quorum on a shared resource with this name: `\\Group_Virtual_Name\\CLUSTINA`; however, at this point in time, the cluster is not operational yet.

To reset the cluster in the Quorum, start the cluster service with the following option: `clussvc -debug noquorumlogging`.

Once started, the cluster uses the local node registry configuration.

You can then proceed with the Quorum restore using Tina. Tina restores the quorum in the `TINA_HOME\Clustina` directory.

You must imperatively perform these operations:

- Rename the Quolog.log file if it is present on the quorum disk.
- Stop the cluster service.
- Restart the cluster with this option: `clussvc -debug -resetquorumlog`.

The Quorum is reset and the cluster is operational.

Restoring a Microsoft Cluster Node without a Tina Disaster Recovery Solution

If you are unable to back up your cluster with a Tina Disaster Recovery solution (i.e., SRA for Windows 2003 onward), use this procedure to restore a cluster node.

To restore a cluster node without SRA

Install Windows

1. Install exactly the same Windows version as the one backed up, i.e., same Windows family, same language, etc.
2. Install all available Windows service packs and updates.
3. Include the node in the domain.

Add the Cluster Node

1. Ensure that the cluster is running with at least one active node.
2. Open the cluster administration console on the active node and remove the node to restore from the cluster.
3. On the node you have just installed (same Windows version as the one backed up), open the cluster administration console and open a connection on the cluster (File-Open a Connection).
4. Add a new node (File ▸ New ▸ Node). Enter the newly installed node name (the field is case sensitive).

> **Note**: If you are unable to add the node, try updating your system with Windows Update and restart your system. Retry to add the node.

Restore the node with Tina

1. According to your OS, install Atempo-Tina Agent for Windows or Tina System Recovery Agent on the node.
2. Restore the node file system: select `/c` to restore the entire file system.
3. When a message asks you if you want to stop restoring due to locked files, select to continue.

> **Note**: Do not take into account the errors that locked files generate.

4. Open the Tina System Recovery Agent application on the node where you have backed up the Quorum version to be restored, and to `yes` the `TINA_SRA_FORCE_CLUSTER` environment variable.
5. Restore the root of your application.
6. Restart the node.

> **Note**: If you keep getting a blue screen, it could be an issue with the operating system. Either, it is not the same as the one backed up or you did not install the latest service pack and updates.

7. Ensure that you included the machine in the domain again. If not, add it.
8. Verify that the cluster works correctly when a node switch occurs.
9. When you have finished your verifications, set to `no` the `TINA_SRA_FORCE_CLUSTER` environment variable.