

## Tru64 UNIX Best Practice

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### *Changing a Cluster Member's Host Name or IP Address, or Cluster Interconnect Name or IP Address, in a TruCluster Server Version 5.0A Cluster*

**November 2000**

This Best Practice describes how to change the host name or IP address of a cluster member, or the cluster interconnect name or IP address, in a TruCluster™ Server Version 5.0A cluster for the Tru64™ UNIX Version 5.0A operating system.



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## ***Changing a Cluster Member's Host Name, Host Name IP Address, Interconnect Name, or Interconnect IP Address in a Version 5.0A TruCluster Server Cluster***

See the Tru64 UNIX Best Practices Web page for more information about Best Practices documentation.

### **Is This Best Practice Right for You?**

Not all Best Practices apply to all configurations, so you must be sure that it is appropriate for your system and circumstances. To use this Best Practice, you must meet the requirements described in the following table:

| <b>Requirement</b>     | <b>Description</b>   |
|------------------------|--|
| Operating System       | You must have an operational Version 5.0A TruCluster Server cluster.   |
| System Configuration   | Your configuration must adhere to the requirements and restrictions that are listed in Chapter 2 of the Version 5.0A TruCluster Server <i>Hardware Configuration</i> manual and be a supported configuration as described in other chapters of that manual.  |
| Impact on Availability | In this procedure, you delete the member system from the cluster, then add the member back into the cluster. If the cluster has more than one member, and quorum votes are properly assigned, cluster availability is not affected. Availability to the cluster over the network might be affected as follows: |

| Requirement | Description   |
|-------------|---|
|             | <p>If clients are accessing the cluster in the recommended manner, where all access is through the cluster alias, the client is not aware that a cluster member's name or IP address, or a cluster interconnect name or IP address, has changed.</p> <p>If an application has a restricted placement policy, and is restricted to the member whose name or IP address is changing, you must add another member to the <code>HOSTING_MEMBERS</code> resource list for the application. Relocate the application to the other member system for the duration of time that it takes to perform this procedure.</p> |

## Before You Begin

Before you apply the Best Practice to change a cluster member's name or IP address, or the cluster interconnect name or IP address, in a Version 5.0A TruCluster Server cluster, you must understand some background information and perform some preliminary tasks:

- You must have received a new valid host name or IP address from your network administrator.

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### Note

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Before you request a new host name or IP address, use the `/usr/bin/nslookup` command to verify that the new host name or IP address is not already in use:

```
# /usr/bin/nslookup deli.zk3.dec.com
Server:  nserver.zk3.dec.com
Address:  16.140.140.3
```

```
*** nserver.zk3.dec.com can't find deli.zk3.dec.com:
Non-existent host/domain
```

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- Enough voting members must be operating in the cluster so that, in concert with any configured quorum disk vote, the cluster has sufficient votes to survive the deletion of the member.
- You must determine whether any CAA profiles use the restricted placement policy, and if so, whether the `HOSTING_MEMBERS` resource contains only the name of the member system whose name you want to change.

Use the `/usr/sbin/caa_profile -print` command to display the CAA profiles. If the application `PLACEMENT` resource is restricted (`PLACEMENT=restricted`) for an application, and the `HOSTING_MEMBERS` resource contains only the name of the member whose name or address is going to change, do the following:

1. Add another member system to the list of members that can run this application by updating the application resource profile. For example, if the `HOSTING_MEMBERS` resource presently indicates that member `provolone` is restricted to run an application, add `pepicelli` to the `HOSTING_MEMBERS` resource as follows:

```
# /usr/sbin/caa_profile -update resource_name -h provolone pepicelli
```

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**Note**

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Do not remove the name of the system whose name or address is changing (`provolone`).

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2. To prevent inconsistencies across cluster members, update the existing CAA registry entries with the latest resource profile, as follows:

```
# /usr/sbin/caa_register resource_name -u
```

3. Relocate the application to the system that was added to the `HOSTING_MEMBERS` resource:

```
# /usr/sbin/caa_relocate resource_name -c pepicelli
```

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**Note**

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For more information on these commands, see their reference pages.

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- You must determine whether the system whose name or address is changing is the system that was used to create the cluster (usually member system 1) or a system that was added to the cluster (usually member systems 2, 3, and so on).

The first two lines in the member system configuration file, `/cluster/admin/.member $n$ .cfg` provide the key.

For instance, in this first example, assume that the `/cluster/admin/.member1.cfg` file contains the following entries:

```

# clu_create saved configuration values:
# date: Tue Sep 12 08:43:24 EDT 2000 hostname pepicelli.zk3.dec.com
# Previously saved value in this file have been converted to comment lines
clu_alias_ip=16.140.112.209
clu_boot_dev=dsk10
clu_i18n_dev=''
clu_ic_dev=mc0
clu_ic_host=pepicelli-mc0
clu_ic_ip=10.0.0.1
clu_mem_votes=1
clu_memid=1
clu_name=deli.zk3.dec.com
clu_quorum_dev=dsk6
clu_quorum_votes=1
clu_root_dev=dsk7b
clu_usr_dev=dsk7g
clu_var_dev=dsk7h

```

The first two lines in the example show that the `clu_create` command was run on member system `pepicelli` to create the cluster and the file.

In this second example, assume that the `/cluster/admin/.member2.cfg` file contains the following entries:

```

# clu_add_member saved configuration values
# date: Tue Sep 12 09:10:11 EDT 2000 hostname pepicelli.zk3.dec.com
clu_boot_dev=dsk11
clu_ic_dev=mc0
clu_ic_host=provolone-mc0
clu_ic_ip=10.0.0.2
clu_license=''
clu_mem_votes=1
clu_memid=2
unix_dev=''
unix_host=provolone.zk3.dec.com
unix_ip=''

```

In this example, the `clu_add_member` command was run on member system `pepicelli` to add member system `provolone` (`unix_host=provolone.zk3.dec.com`) to the cluster.

- You must determine the host name network interface device for the system that is undergoing the changes. You can use the `grep` command to search the member system's `rc.config` file, as follows:

```

# grep NETDEV_ /cluster/members/membersn/etc/rc.config | grep -v export
# NETDEV_n - network device name for network devices currently
#           for example, NETDEV_0="ln0"
NETDEV_2=
NETDEV_3=
NETDEV_4=
NETDEV_5=
NETDEV_6=
NETDEV_7=
NETDEV_0="mc0"
NETDEV_1="tu0"

```

The previous example shows that there is only one network device besides the Memory Channel cluster interconnect. The network device for this member system is `tu0`.

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**Note**

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You can also use the `ifconfig -a` command to determine the names of all network devices that are on your system.

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- If you have multiple network interface devices on the system that is undergoing the changes, you must copy the member system's `rc.config` file to a directory that is not on the system being modified. You can use the saved file later when you recreate the network interface devices:

```
# mkdir
/saved_rc.config # cp
/cluster/members/memberrn/etc/rc.config
/saved_rc.config/memberrn.rc.config
```

## Applying the Best Practice

Before you change a cluster member's name or IP address, or the cluster interconnect name or IP address, be sure to follow the recommendations in *Before You Begin*.

## Changing a Cluster Member's Host Name or IP Address, or the Cluster Interconnect Name or IP Address

To change a cluster member's host name or IP address, or cluster interconnect name or IP address, you must remove the member from the cluster then add it back into the cluster with the changes. To reapply licenses, you need to save the existing licenses.

In the following procedure, some steps depend on whether the cluster member system was originally used to create the cluster (the first cluster member system), or a member system was added to the cluster.

On the system that will be changing its member name or IP address, or the cluster interconnect name or IP address, follow these steps:

1. Log in to the member system whose host name or IP address, or cluster interconnect name or IP address, you want to change.

2. Use the `lmf` utility to reconstruct product authorization keys (PAKs) for the products that have been licensed to run on the system. The KornShell script in the following example places all of the reconstructed PAKs in the `/licenses` directory:

```
# mkdir /licenses
# for i in `lmf list | grep -v Product | awk '{print $1}'`
> do
> lmf issue /licenses/${i}.license $i
> done
```

3. Make a copy of this member's configuration file, `/cluster/admin/.member $n$ .cfg` (where  $n$  is the member system's ID), as a temporary file, for instance `/cluster/admin/.member $n$ .cfg.sav`.
4. Edit the configuration file as follows. If the system that you are modifying was used to create the cluster, follow step a. If the system that you are modifying is a member system that was added to the cluster, follow step b.
  - a. Edit the configuration file (`/cluster/admin/.member $n$ .cfg`) and make the changes as follows:

| To change...             | Add Resource           | Modify                   |
|--------------------------|------------------------|--------------------------|
| Host name                | <code>unix_host</code> |                          |
| Host IP address          | <code>unix_ip</code>   |                          |
| Network interface device | <code>unix_dev</code>  |                          |
| Interconnect name        |                        | <code>clu_ic_host</code> |
| Interconnect IP address  |                        | <code>clu_ic_ip</code>   |

**Note**

Because the configuration file that is created by `clu_create` does not contain the `unix_host`, `unix_ip`, or `unix_dev` variables, you must add them to the file.

For example, assume that you are making the changes that are indicated in the following two tables:

| Add Resource | Of:                |
|--------------|--------------------|
| unix_host    | salami.zk3.dec.com |
| host_ip      | 16.140.112.110     |
| unix_dev     | tu0                |

| Modify:     | From:         | To:        |
|-------------|---------------|------------|
| clu_ic_host | pepicelli-mc0 | salami-mc0 |
| clu_ic_ip   | 10.0.0.1      | 10.0.0.4   |

The following example shows a modified `/cluster/admin/.member1.cfg` configuration file that incorporates the changes from the previous two tables. Modified items are shown in bold type.

```
# clu_create saved configuration values:
# date: Tue Sep 12 08:43:24 EDT 2000 hostname pepicelli.zk3.dec.com
# Previously saved value in this file have been converted to comment lines
clu_alias_ip=16.140.112.209
clu_boot_dev=dsk10
clu_i18n_dev=''
clu_ic_dev=mc0
clu_ic_host=salami-mc0
clu_ic_ip=10.0.0.4
clu_mem_votes=1
clu_memid=1
clu_name=deli.zk3.dec.com
clu_quorum_dev=dsk6
clu_quorum_votes=1
clu_root_dev=dsk7b
clu_usr_dev=dsk7g
clu_var_dev=dsk7h
unix_host=salami.zk3.dec.com
host_ip=16.140.112.110
unix_dev=tu0
```

- b. Edit the configuration file (`/cluster/admin/.membern.cfg`) and make the following addition and changes:

First, add the type of network device to the `unix_dev` variable to allow setting up the network interface device. Then make the changes that are indicated in the following table:

| To Change...    | Modify    |
|-----------------|-----------|
| Host name       | unix_host |
| Host IP address | unix_ip   |

| To Change...            | Modify      |
|-------------------------|-------------|
| Interconnect name       | clu_ic_host |
| Interconnect IP address | clu_ic_ip   |

For example, assume that you are making the following changes to the cluster member system:

| Change:     | From:                 | To:                |
|-------------|-----------------------|--------------------|
| unix_host   | provolone.zk3.dec.com | salami.zk3.dec.com |
| host_ip     | 16.140.112.176        | 16.140.112.110     |
| clu_ic_host | provolone-mc0         | salami-mc0         |
| clu_ic_ip   | 10.0.0.2              | 10.0.0.4           |

Add the type of network device (for example tu0) to the unix\_dev variable.

The following example shows an edited /cluster/admin/.member2.cfg configuration file that incorporates the changes from the previous table. Modified items are shown in bold type.

```
# clu_add_member saved configuration values
# date: Thu Sep 28 16:04:27 EDT 2000 hostname polishham.zk3.dec.com
# Previously saved values in this file have been converted to comment lines
clu_boot_dev=dsk11
clu_ic_dev=mc0
clu_ic_host=salami-mc0
clu_ic_ip=10.0.0.4
clu_license=''
clu_mem_votes=1
clu_memid=2
unix_dev=tu0
unix_host=salami.zk3.dec.com
unix_ip=16.140.112.110
```

5. Halt the cluster member system that will be changing its member name or IP address, or its cluster interconnect name or address. See Section 5.5 of the Version 5.0A TruCluster Server *Cluster Administration* manual for information on shutting down one cluster member.
6. On an active cluster member, use the `clu_delete_member` command to delete the member that you just halted:

```
# /usr/sbin/clu_delete_member -m 2
```

See Section 5.6 of the Version 5.0A TruCluster Server *Cluster Administration* manual or the `clu_delete_member(8)` reference page for details on using the `clu_delete_member` command.

7. Use the `/usr/sbin/clu_add_member -c member configuration file` command to add the system back into the cluster. For example:

```
# /usr/sbin/clu_add_member -c /cluster/admin/.member2.cfg
```

See Section 5.3 of the Version 5.0A TruCluster Server *Software Installation* manual or the `clu_add_member(8)` reference page for details on using the `clu_add_member` command.

8. At the halted member's console, boot `genvmunix` from the newly reinstalled boot disk:

```
>>> boot -file /genvmunix member_boot_disk
```

9. During the boot, the new member automatically configures subsets and builds a customized kernel, then continues to boot to multiuser mode.

10. Log in and register the saved licenses, as follows:

```
# for i in /licenses/*.license
> do
> lmf register - < $i
> done
# lmf reset
```

11. Reboot the system so that it is using its customized cluster kernel:

```
# shutdown -r now
```

12. If the placement policy for any application is favored or restricted, and the cluster member system had its name changed and is listed in the `HOSTING_MEMBERS` resource for that application, remove the old name and add the new name to the resource, as follows:

- a. Modify the `HOSTING_MEMBERS` resource to remove the old name and add the new name. For example, if you changed a cluster member system's name from `provolone` to `salami`, and `provolone` and `pepicelli` are presently listed in the `HOSTING_MEMBERS` resource list for the application, delete `provolone` and add `salami` to the `HOSTING_MEMBERS` resource, as follows:

```
# /usr/sbin/caa_profile -update resource_name -h salami pepicelli
```

- b. Update the existing CAA registry entries with the latest resource profile, as follows:

```
# /usr/sbin/caa_register resource_name -u
```

## Verifying Success

After you apply the Best Practice for changing a cluster member's host name or IP address, or the cluster interconnect name or IP address, in a Version 5.0A TruCluster Server cluster, you can verify whether it was successful.

Use the `/usr/sbin/clu_get_info -full` command to verify that a cluster member's host name, or the cluster interconnect name or IP address, has changed. Look for the Member name, Cluster interconnect IP name, or Cluster interconnect IP address values:

```
# /usr/sbin/clu_get_info -full
    Cluster information for cluster deli

    Number of members configured in this cluster = 3
    memberid for this member = 1
    Cluster incarnation = 0x31363
    Cluster expected votes = 4
    Current votes = 4
    Votes required for quorum = 3
    Quorum disk = dsk5h
    Quorum disk votes = 1

    Information on each cluster member

    Cluster memberid = 1
    Hostname = pepicelli.zk3.dec.com
    Cluster interconnect IP name = pepicelli-mc0
    Cluster interconnect IP address = 10.0.0.1
    Member state = UP
    Member base O/S version = Compaq Tru64 UNIX V5.0A (Rev. 1094)
    Member cluster version = TruCluster Server V5.0A (Rev. 354)
    Member running version = INSTALLED
    Member name = pepicelli
    Member votes = 1
    csid = 0x20001

    Cluster memberid = 2
    Hostname = salami.zk3.dec.com
    Cluster interconnect IP name = salami-mc0
    Cluster interconnect IP address = 10.0.0.2
    Member state = UP
    Member base O/S version = Compaq Tru64 UNIX V5.0A (Rev. 1094)
    Member cluster version = TruCluster Server V5.0A (Rev. 354)
    Member running version = INSTALLED
    Member name = salami
    Member votes = 1
```

```
csid = 0x50003

Cluster memberid = 3
Hostname = polishham.zk3.dec.com
Cluster interconnect IP name = polishham-mc0
Cluster interconnect IP address = 10.0.0.3
Member state = UP
Member base O/S version = Compaq Tru64 UNIX V5.0A (Rev. 1094)
Member cluster version = TruCluster Server V5.0A (Rev. 354)
Member running version = INSTALLED
Member name = polishham
Member votes = 1
csid = 0x20002
```

To verify that the member IP address has changed, log in to the newly changed member system and run the `/usr/sbin/ifconfig interface_name` command to display the network interface parameters for the configured network interface:

```
# /usr/sbin/ifconfig tu0
tu0: flags=c63<UP,BROADCAST,NOTRAILERS,RUNNING,MULTICAST,SIMPLEX>
    inet 16.140.112.110 netmask ffffffff broadcast 16.140.112.255 ipmtu 1500
```

If the Best Practice was not successful, see *Troubleshooting* for information about identifying and solving problems.

## Troubleshooting

If you determine that the Best Practice was not successful, as described in *Verifying Success*, repeat the steps in *Changing a Cluster Member's Host Name or IP Address*, or the *Cluster Interconnect Name or IP Address*. Make sure that you edit the `/cluster/admin/.membern.cfg` file correctly.

## Comments and Questions

We value your comments and questions on the information in this document. Please mail your comments to us at this address:

```
best_practices@zk3.dec.com
```

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