

Tru64 UNIX

Cloning System Configurations

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This Best Practice describes how to replicate the network, print, and mail services from one configured system to one or more similar unconfigured systems.

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Cloning System Configurations

Configuration Cloning lets you replicate the network configuration, print services, and mail services from an already-configured system onto one or more target systems, eliminating the need to perform the setup tasks as a separate operation.

When a system is installed and fully configured with services, you use the `sysman -clone -save` command to save the configuration data to a Configuration Description File (CDF) called `config.cdf`. The `config.cdf` file is then applied, either manually to an installed system or automatically during a Full Installation, to one or more target systems to clone the same configuration.

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:

Requirement	Description
Operating System	Configuration cloning is not supported between different releases of the operating system. If you want to clone a configuration onto a system running Version 5.0A, the <code>config.cdf</code> file you use must be created from a model system that is installed and configured with Version 5.0A.

Requirement	Description
System Configuration	<p>The system or systems to be cloned must be similar in the following ways to the model system where the <code>config.cdf</code> file was created:</p> <ol style="list-style-type: none"> 1. Same model number or similar class machine 2. Same type of network adapter (<code>tu0</code>, <code>ln0</code>, or <code>fddi0</code>) 3. Same number of network adapters
Impact on Availability	<p>System availability depends upon how the cloning is accomplished:</p> <ul style="list-style-type: none"> • If the cloning is done manually on an already installed system, the system will be unavailable for approximately five to ten minutes, including the network restart.
<p>Note</p> <p>If users happened to be logged in to a system that is about to be cloned, it is recommended that they log off.</p>	
	<ul style="list-style-type: none"> • If the cloning is done during a Full Installation of the operating system, the system is unavailable from 45 to 90 minutes, depending upon the type of distribution media, number of subsets to install, and speed of the CD-ROM (or network traffic).
Recommendations	<p>It is recommended to use a CDF created from a server class system to clone servers and to use a CDF from a workstation class system to clone other workstations.</p>

If you do not meet the previous requirements, see *Alternative Practices* for information.

Before You Begin

Before you apply the best practice for cloning system configurations, read the following topics:

- Background information
- Cloning restrictions

Configuration Cloning Overview

When a system you designate to be a model system has been fully configured the way you want it, you use the `sysman -clone -save` command to save a snapshot of the system configuration data into a configuration description file (CDF). This file is named `config.cdf`, and it is saved in the `/var/adm/smlogs` directory by default. For more information about the format and content of the `config.cdf` file, refer to the *Installation Guide – Advanced Topics*.

The information saved in the `config.cdf` file is used to duplicate the same configuration on similar systems. Some values in the `config.cdf` file are machine-specific (the system name, for example), and so you must change them as described in Table 2. However, you are free to edit any value except the checksum number at the top of the file.

These are your options for applying a CDF to a target system:

- To manually clone one system at a time, edit the `config.cdf` file to set host- and site-specific attributes, copy the CDF to the target system, and manually apply the CDF to an installed target system using the `sysman -clone -apply` command.
- To clone a single system during a Full Installation, which enables you to install and configure the system at the same time, edit the `config.cdf` file to set host- and site-specific attributes, and then position the `config.cdf` file in one of the four acceptable locations so the Full Installation process finds and applies the CDF to the target system.
- To clone multiple systems during a Full Installation, write a `postload` script to define each system to be cloned and set values for host- and site-specific attributes in the `config.cdf` file. The `config.cdf` file and the `postload` script are executed automatically by a Full Installation when they are placed in one of the four acceptable locations.

Search Locations for the config.cdf File

When you begin a Full Installation on a system you want to clone, the installation process looks for the `config.cdf` file in the order shown in Table 1.

Table 1: Search Locations and Order

Search Order	Location
1	On a diskette in diskette drive <code>floppy0</code> or <code>floppy1</code> .
2	In the <code>/var/adm/ris/clients/sets/profile_set</code> directory on a RIS server. During the RIS client registration process, the target system must be registered to the <code>profile_set</code> directory that contains the <code>config.cdf</code> file you want to use.
3	In the <code>/var/tmp</code> memory file system (MFS) on the system to be cloned.
4	In the <code>/is1</code> directory on the distribution media (local CDROM or extracted RIS area).

If the cloning process finds a `config.cdf` file in any one of the locations, it stops looking in the remaining locations. For example, if a `config.cdf` file is found on a diskette, which is the first search location, it does not look at the RIS server.

Cloning Restrictions

It is recommended to adhere to the following restrictions when selecting or generating a `config.cdf` file to clone other systems:

- A `config.cdf` file that was created on a system with multiple network interfaces (adapters) should not be used to clone the configuration on a system with only one network adapter. If you decide to do this, be careful to remove the extra adapter information from the CDF or the CDF will fail validation.
- Configuration cloning is best suited for cloning similar class machines. It is recommended to use a CDF created from a server class system to clone servers and to use a CDF from a workstation class system to clone other workstations.

You do not want to clone a workstation class system with a CDF that was taken from a machine that is configured to be any type of server because the CDF contains too much server setup information that is not necessary on a workstation. This unnecessary information can prove

harmful to the network. For example, if a system is configured to be the primary IP router for your site, you do not want to clone another one.

- Configuration Cloning is not supported in a cluster environment. Do not save the configuration of a cluster member because individual cluster members share disks and files, and the information saved in the CDF relates to the entire cluster, not to individual members.
- Software licenses are not cloned. The product authorization codes that you installed and registered on the original system are not cloned on the target system. You must run the License Manager application or the `lmfsetup` script on the cloned system to install and register software licenses.

Applying the Best Practice

Before you clone a system configuration, be sure to follow the recommendations in *Before You Begin*.

Follow this procedure to clone a system configuration from a model system to one or more target systems. Any time you need more information, refer to the *Installation Guide – Advanced Topics*.

1. On a fully configured model system, save system configuration information into a `config.cdf` file. The save process takes less than one minute.

```
# sysman -clone -save
```

Unless you specify otherwise, the data is saved to the default location:
`/var/adm/smlogs/config.cdf`

2. Modify the `config.cdf` file to set host-specific attributes, and optionally, site-specific attributes. Table 2 describes the attributes that should be modified to create a unique identity for the cloned system.

All other attributes can be modified, but if you plan to edit the `config.cdf` in any way, it is recommended that you do not modify any attribute or value that you do not understand. Never modify the checksum at the top of the file because it is used for validation purposes. The *Installation Guide – Advanced Topics* contains more information about the format and contents of this file.

Table 2: Host- and Site-Specific Attributes to Be Modified

Attribute Name	Description
systemName=	Sets the name of the system as it is known on the network. Make sure you search the CDF and change all instances of the host name.
networkAddress=	Sets the unique internet protocol (IP) address of the target system as it is identified on a network.
devName= and type=	Defines the network adapter attached to the system. This value is modified only if the network adapter on the target system is different from the one defined in the <code>config.cdf</code> file.

Caution

Do not modify the original `config.cdf` file located in the `/var/adm/smlogs` directory. Instead, make a copy of the file and modify the copy. The original CDF should be retained in the `/var/adm/smlogs` directory because it contains information about the model system configuration that could be valuable for future troubleshooting.

3. Validate the integrity of the modified data in the CDF before you use it to clone another system. If the CDF fails validation, go back to Step 1 and start again, this time being more careful with CDF modifications. Perform this step on the model system. If you do not supply a file name, the `/var/adm/smlogs/config.cdf` file is the default.

```
# sysman -clone -validate [filename]
```

If the CDF fails validation for other reasons, refer to *Troubleshooting*.

4. Optionally write a `postload` script to dynamically set host-specific and site-specific values to clone multiple systems during a Full Installation. Writing and positioning scripts to invoke during a Full Installation is documented in the *Installation Guide – Advanced Topics*.
5. Copy the `config.cdf` file to one of four locations depending upon how it will be applied to the target system or depending upon your distribution media requirements. Refer to *Installation Guide – Advanced Topics* if you need specific copy instructions.

Note

In many cases the target system's network will not yet be configured. Therefore, you will not be able to use typical methods (such as `ftp` or `rcp`) to copy the CDF to the target system. In that case, putting the `config.cdf` file on a diskette is the best method to make the CDF available to the target system (assuming that the target system has a diskette drive). From the target system, you would use the following command syntax to apply the `config.cdf` file:

```
# sysman -clone -apply /devices/rdisk/floppy0
```

6. Use one of these methods to apply the CDF to the target system:
 - Invoke a Full Installation on the target system. When the `config.cdf` file is found, a configuration cloning begins. Follow the instructions in the *Installation Guide* if you do not know how to invoke a Full Installation of the operating system.
 - Enter the following command on the target system:

```
# sysman -clone -apply [filename]
```

If you do not supply a file name, the `/var/adm/smlogs/config.cdf` file is the default.

Verifying Success

After you apply the Best Practice for cloning a system configuration, you can verify whether it was successful by testing the services that are defined in the `config.cdf` file to see if they are functioning.

Perform these tests from the cloned system or systems.

- Test the network connection by communicating with the Distributed Name Services (DNS) server:

```
# ping -c5 dns_server_name
```

- Print a file or document on the printer:

```
# lpr -Pprinter_name file_name
```

- Open the mail application of your choice and send email to someone you know.

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*, use the following table to identify and solve problems:

Problem	Possible Solutions
The target system differs from the source system in some significant way, and the CDF fails validation or the configuration cloning is not successful. One common significant difference is the number of type of network interface cards between the two systems.	You may be able to modify the <code>config.cdf</code> file to accommodate the target system's hardware by deleting, modifying, or adding, CDF data. The validation error message should indicate the problem component.
An error occurred in the editing of the <code>config.cdf</code> file when you were changing system-specific data (such as system name or IP address), and the CDF fails validation.	Use the <code>dxdiff</code> or <code>diff</code> commands to find the differences between the original <code>config.cdf</code> file and the version of the file that you modified. Take a close look at the differences for the component mentioned in the error message. The problem may be as simple as a typographical error. If any part of validation fails, nothing will be cloned. If you cannot fix the problem component, delete it from the <code>config.cdf</code> file. This way, you will have configuration for the other components, and the problem component can be configured afterwards using the standard SysMan network configuration tools.

Alternative Practices

Although this Best Practice is the recommended method for replicating system configurations, if your system does not meet the requirements described in *Is This Best Practice Right for You?*, you can use the following alternative methods to configure system services on a single system:

- Invoke `/usr/sbin/checklist` to open the System Setup application, which is the launch point for the following system configuration tools:

Quick Setup is a wizard-like application that leads you step by step through basic system configuration tasks. If your system

configuration needs are not complicated, using Quick Setup is a way to quickly get your system up and running on the network and configure other services.

- Custom Setup is a launch point for more advanced configuration tasks. The applications that are available from the Custom Setup application are listed in the approximate order in which it is recommended they be run.
- Invoke `/usr/sbin/sysman` to open the SysMan Menu, which provides a menu of system management tasks in a tree-like hierarchy with branches of general categories within which there is another hierarchy of individual tasks.

Comments and Questions

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

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