

Tru64 UNIX

Best Practice for Installing Large Numbers of Systems

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This best practice describes how to clone installations of the Tru64 UNIX operating system.

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Installing Large Numbers of Systems

This best practice describes the recommended method for cloning installations of the Tru64 UNIX operating system onto systems with the same disk configuration.

It is typical to order and receive many similar systems at one time or to already have many similar systems on site. Whether the systems are brand new or are currently running an older version of the operating system, you may to have install Version 5.0 on each of these systems.

Instead of installing each system individually, you can install Version 5.0 onto a single system and then use the Installation Cloning process to replicate that model installation to one or more systems.

Not all best practices apply to all configurations, so you must be sure that it is appropriate for your system and circumstances. See *Is This Best Practice Right for You?* for more information.

See

http://www.zk3.dec.com/~mrogers/template/templates/new_bp.htm
(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.

Operating System	Tru64 UNIX Version 5.0
------------------	------------------------

System Configuration	Installation Cloning only can be performed among systems with the same type of internal disks that have the same device name. The internal disks on the system on which the <code>install.cdf</code> file was generated and the systems to be cloned must use the same disk type and device names for the <code>/</code> (root), <code>/usr</code> , <code>/var</code> , and <code>/usr/i18n</code> file systems and swap areas.
Impact on Availability	Systems are unavailable during the Installation Cloning process. To minimize disruption to your work environment, schedule this process for an off peak time. Depending upon the number of software subsets to install and the speed of the distribution method, a system cloning can take from 45 to 60 minutes.
Special Requirements	To clone Version 5.0 of the operating system onto a target system, the <code>install.cdf</code> file must be created by a Version 5.0 Full Installation.

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

Before You Begin

Before you apply the best practice for cloning installations, you must understand some background information and special considerations for cloning systems.

Installation Cloning Overview

When you install Version 5.0 of the operating system, the Full Installation process automatically generates a configuration description file (CDF) called `/var/adm/smlogs/install.cdf`, which captures the installation data you specified. The `install.cdf` file contains the installation information necessary to perform the same installation on one or more target systems.

When the Full Installation process finds an `install.cdf` file, it uses the information in the `install.cdf` file to replicate the installation on the target system.

Using the Installation Cloning process to install systems has the following benefits:

- You produce identical installations with less effort
- You can set up the Installation Cloning process to run with little or no user intervention
- You save time and reduce the chance of error in environments because Installation Cloning eliminates the need to manually perform duplicate installations on all systems
- You can administer software centrally, instead of attempting concurrent installations with locally-mounted removable media such as CD-ROMs

Special Considerations for Cloning

Before cloning an installation, there are special considerations for disk configurations, software requirements of the target system, and customizing the CDF for the target system.

Is the Disk Configuration Suitable?

The critical element that makes systems suitable for cloning is matching disk configurations on the model and target systems. The disk type (for example, RZ28) and device names (for example, `dsk0`) used for file systems and swap areas must be the same.

Table 1 shows an acceptable disk configuration for cloning a target system from a model system. Assume that the `/` (root), `/usr`, and `/var` file systems and the swap areas are located on `dsk0` of the model system.

Table 1: Acceptable Differences in Disk Configuration

System	Disk Type	Device Name
Model System	RZ28	<code>dsk0</code>
	RZ25	<code>dsk1</code>
Target System	RZ28	<code>dsk0</code>
	RZ58	<code>dsk1</code>

The target system can use the CDF generated from the model system because both systems have an RZ28 disk at device name `dsk0`. The disk type at device name `dsk1` can be different; it will not be used during the installation process because no file systems or swap space will be installed

there. If the disk device at `dsk0` were different, however, the CDF created by the model system installation is not suitable to clone the target system.

Use the following commands to determine disk types, device names, and the locations of file systems and swap areas:

- For systems using the Advanced File System type (AdvFS), enter:

```
# ls -R /etc/fdmns
```
- For systems using the UNIX File System type (UFS), enter:

```
# cat /etc/fstab
```
- For systems using the Logical Storage Manager (LSM), regardless of file system type, enter:

```
# volprint -t
```

Software Requirements of the Target System

Whether you intentionally are installing a model system to generate an `install.cdf` file or you are selecting an existing `install.cdf` file to use to clone target systems, you must consider the graphics adapter, font sizes, and keyboard types of the systems to be cloned. Ideally, you should clone systems with identical hardware configurations.

During a regular Full Installation of a model system, the installation process automatically determines the mandatory software subsets required to support the graphics adapters, font sizes, and keyboard types resident on the system. All other software subsets are considered optional and are not installed unless you specifically select them.

When cloning a system, the `install.cdf` file defines the software subsets to be installed on the target system. Therefore, if the target system has a different graphics adapter, font size, or keyboard type from the model system on which the `install.cdf` file was created, the right software subsets will not be installed, and the cloned system may not be usable.

Therefore, if you are installing a system with the intention of using the resulting `install.cdf` file to install other systems, it is recommended that you select all optional and all mandatory software subsets for graphics adapters, keyboards, and fonts during the Full Installation of the model system.

Customizing the CDF for the Target System

You should modify the `install.cdf` file so that the Full Installation bypasses all user responses required during a Full Installation process. It

is also recommended to modify host- and site-specific attributes (such as host name, root password, and geographic location and area) so that the target system has a unique identity when the cloning process is complete. Refer to the *Installation Guide — Advanced Topics* for information about modifying host- and site-specific attributes in the `install.cdf` file.

Applying the Best Practice

Before you perform an Installation Cloning, be sure to follow the recommendations in *Before You Begin*.

The procedure in this section describes how to set up and perform a basic Installation Cloning. Repeat this process for every system you want to clone. Using *Advanced Features to Clone Multiple Systems* describes how to use advanced features to automatically clone many target systems without manually modifying the `install.cdf` file for every target system.

To set up and perform a basic Installation Cloning:

1. Create or select a suitable `install.cdf` file. The `install.cdf` file you use must have been created from a Version 5.0 Full Installation, and the file must be named `install.cdf`.
2. Modify the `install.cdf` file to set host- and site-specific attributes and to include certain attributes to eliminate the need for user intervention at the cloned system. Refer to the *Installation Guide — Advanced Topics* if you need more information about modifying this file.

Note

It is recommended that you copy the original `install.cdf` file located in the `/var/adm/smlogs` directory of an installed system and modify the copy. The original CDF should be retained because it contains information about the initial system installation that could be valuable for future troubleshooting.

3. Copy the `install.cdf` file to one of the following locations depending upon your distribution needs. The cloning process looks for the `install.cdf` file in the order shown in the following table:

Table 2: Acceptable Locations of the install.cdf File

Search Order	Location
1	In the / (root) directory of a diskette in diskette drive floppy0 or floppy1.
2	In the /var/adm/ris/clients/sets/ profile set directory on a Remote Installation Services (RIS) server. During the RIS client registration process, the target system must be registered to the profile set directory that contains the install.cdf file you want to use. Refer to <i>Sharing Software on a Local Area Network</i> if you need more information about creating profile set directories on a RIS server.
3	In the /var/tmp memory file system (MFS) on the system to be cloned. A CDF can only be put into the /var/tmp MFS by using a user-supplied preinstall file. Refer to the <i>Installation Guide — Advanced Topics</i> for more information about creating this file.
4	In the /isl directory on the distribution media (local CD-ROM or extracted RIS area). You cannot physically modify a CD-ROM unless you have created your own custom distribution and burned your own CD-ROM. Refer to the <i>Installation Guide — Advanced Topics</i> for more information about created your own distribution media.

As soon as the file is found, the installation process stops looking in the remaining locations. For example, if the installation process finds the install.cdf file on diskette, it does not look on the RIS server.

For detailed copy instructions for each location, refer to the *Installation Guide — Advanced Topics*.

4. Start a Full Installation on the target system. When the installation process finds the install.cdf file, an Installation Cloning process begins on the target system. Full Installation procedures are documented in the *Installation Guide*.

Using Advanced Features to Clone Multiple Systems

This section describes how advanced installation features can be used to further automate cloning multiple systems. The advanced features are described in detail in the *Installation Guide — Advanced Topics*.

The Full Installation process has the built-in capability to look for certain files at predefined times. This gives you the flexibility to further automate and customize the installation process.

One of these files is the `install.cdf` file. The other user-supplied files that are searched for are the `preinstall`, `postload`, and `postreboot` files. These files are so named to signify their relative location in the installation process. These files are supplied by you and can contain scripts, executables, or programs. These files are a way to customize the installed system beyond the capabilities of the Full Installation process. During a Full Installation, these user-supplied files are searched for in the same order and location as the `install.cdf` file

One important use of the `postload` file is the ability to dynamically modify the host- and site-specific attributes of an `install.cdf` file that will be applied to more than one target system. Using a script eliminates the need for you to manually modify host- and site-specific attributes for every target system and also fully automates the cloning process.

If you want to use this feature, refer to the *Installation Guide — Advanced Topics*, which contains a sample `postload` script that dynamically modifies a CDF during a Full Installation. Use this sample script as a guideline.

Verifying Success

After you apply the best practice for cloning a system installation, you know the cloning process was successful when the login screen on the system or systems that were cloned is displayed and you can log in as the user `root`.

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.

When a Full Installation is started on the target system, the cloning process does not begin, and the Full Installation user interface is displayed instead.	The <code>install.cdf</code> file was not located in one of the four supported locations. In that case, copy the <code>install.cdf</code> file to one of the locations shown in Table 2, and restart the Full Installation on the target system.
A message similar to the following is displayed: <code>SetItmAttr: invalid attribute value kernel_option=all</code>	The CDF validation process found a trailing blank space after the word <code>all</code> in the <code>kernel_option=all</code> attribute-value pair. The corrective action is to edit the <code>install.cdf</code> file and remove the blank space. Then, restart the Full Installation on the target system.

Alternative Practices

Although this best practice is the recommended method for cloning installations among systems, if your system does not meet the requirements described in *Is This Best Practice Right for You?*, follow the instructions in the *Installation Guide* to perform a Full Installation on each system.

If the system or systems you wanted to install by the cloning process are already running a version of the operating system, another alternative is to perform an Update Installation to install Version 5.0 of the operating system. Update Installation procedures are documented in the *Installation Guide*.

Comments and Questions

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

`readers_comment@zk3.dec.com`

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