

# Using Golden Images with Virtual Partitions



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## Abstract

This whitepaper describes how to create and use your own Ignite-UX installation archives. Topics include:

- "Installing from Golden Images"
- "Creating a Golden Image Archive"
- "Configuring the Ignite-UX Server to Recognize the Golden Image Archive"
- "Enabling the Client"
- "Installing the Golden Image Archive on the Client"

A **golden image** is a snapshot of a known, good operating system installation and configuration that is archived for use in installing other clients. This archive is called a golden image. The operating system archive is a compressed tar or cpio archive that Ignite-UX can recognize and can be installed on other client machines.

Ignite-UX does not require creating a golden image to install an operating system on clients; however it is a very powerful tool for system administrators. The use of golden images facilitates the following:

- Increased installation speed versus installing the operating system using swinstall.
- Exact replication of customized system configurations to clients.
- Mass deployment of operating system configurations to clients.
- One single, self-contained client image that could also be used for disaster recovery purposes.

## Installing from Golden Images

In addition to supporting the standard operating system installations from a Software Distributor (SD) depot, Ignite-UX supports installing from system images. This method recognizes that many, if not all, clients in a network may be identical (or almost identical) to each other. It is possible to take advantage of this fact by building an archive that contains all of the files you want installed on each of the clients and then using Ignite-UX to install them.

This approach can have several advantages:

- Because the compressed system image is unpacked directly to disk over the network, the installation process can be much faster than an equivalent process using SD. The time savings depends on the size of the installation and the capacity of the network, but a typical system image can be extracted in about 20 minutes compared to about an hour for a SD install.
- Instead of troubleshooting a client, it is often more cost effective to completely reinstall the operating system with a known, good system image.
- When coupled with dataless nodes (all volatile data is on a separate file server), system replacement time or move time is drastically reduced.
- Once a golden image has been created, it is easy to apply it to multiple clients. Very little or no user interaction is required during these subsequent installations, reducing the chance of error. Building this golden image is done by setting up a single system the way that you want all of your systems to look, and then by creating an archive of that system. Follow instructions in this whitepaper to set up the first system.

## Creating a Golden Image Archive

In general, the golden image is simply a system configured with all the software and customizations needed to distribute to a group of clients. The golden image can be saved to media from the golden system and installed on individual systems. Or, the golden image can be stored on another system and installed remotely over the network.

You may have already created the equivalent of a golden system on which you have configured modifications relating to your environment on top of a base HP-UX operating-system release. Critical patches are installed onto the operating system. Local, common software that is used generically is also layered on the operating system. The resulting system is tested to ensure proper operation in your environment.

These systems represent a prototype or starting point for all users. The steps needed for installation customizations are normally captured and are well known. They make good candidates for a golden image archive as explained here.

Once you have a golden system with the base operating system, use Ignite-UX to create an operating system archive. It is up to the administrator to define exactly what constitutes a golden system. You may choose to place patches, applications, kernel configurations, etc. on the golden system, or just include the core operating system. In our example, we only include the core operating system. For speed, you may want to place all of your common applications, patches and tools onto the golden system.

Ignite-UX is capable of installing systems from SD depots and/or archives. You may want to use this capability when setting up your golden system, since you must have a system installed before you can get an image.

Perform any customizations that you want to distribute to all clients. These might include customized CDE login dialog boxes, base `/etc/passwd` files, additional phone tools and manpages, or corporate-wide default DNS and NIS setup. It would *not* include system, work-group or site-specific changes such as gateways, user accounts, or machine-specific networking; these are taken care of by Ignite-UX later.

Use the next steps to create the golden image from the golden system, and configure Ignite-UX to use it. The `make_sys_image` command is provided to assist in creating the operating system archive. For more information, refer to *make\_sys\_image* (1M).

**Step 1.** Copy `/opt/ignite/data/scripts/make_sys_image` to `/tmp` on the golden system. (Optionally, you may install the Ignite-UX product on the golden system.) Set the permissions of `/tmp/make_sys_image` so that you can execute it. The `/var/tmp` directory is the default location where `make_sys_image` stores the archive image. You can also

have it save the image to a remote server that enables remote access from this client. Whichever method you choose, you will need to have sufficient disk space to hold the image. The amount of disk space will be approximately one half the amount of data contained on your golden system (assuming a 50% compression ratio).

**IMPORTANT:** Do not use the system while `make_sys_image` is executing in the next step. Device files are removed, and the host and/or networking information on the system is reset. After the command is complete, these files are put back in place.

**Step 2.** On the Ignite-UX server, create an archives directory to store the golden image:

```
mkdir -p /var/opt/ignite/archives/Rel_B.11.23
```

The `-p` option creates intermediate directories. It is best to keep the naming conventions `Rel_B.11.23` (or the release you are using). This directory must be NFS exported if you are using NFS to transfer the archive to the client.

**Step 3.** On the golden system, execute:

```
/tmp/make_sys_image [options]
```

By default, this creates a gzip-compressed archive in `/var/tmp` with the name `hostname.gz`, and all specific host information, device files, log files, and network information is removed. Optionally, if you do not have enough disk space, or you would like for the archive to be created on a remote server, you may use the following options:

```
/tmp/make_sys_image -d directory_to_place_archive \  
-s destination_system_IP_address
```

For example:

```
/tmp/make_sys_image -d \  
/var/opt/ignite/archives/Rel_B.11.23 -s 10.2.72.150
```

The `make_sys_image` command can also build an archive containing any combination of `tar`, `cpio`, `gzip` and `compressed` formats. HP recommends using `tar` for the archive format and `gzip` for compression.

## Configuring the Ignite-UX Server to Recognize the Golden Image Archive

To create an Ignite-UX configuration file for the golden image archive, use the example file:

```
/opt/ignite/data/examples/ B.11.23.golden_image.cfg
```

**Step 1.** Create a copy of the example configuration file:

```
cp /opt/ignite/data/examples/ B.11.23.golden_image.cfg \  
/var/opt/ignite/data/Rel_B.11.23/golden_image_cfg
```

The destination file name is arbitrary. You can store configuration files anywhere on the system you chose. Ignite-UX manages the names and locations using the `/var/opt/ignite/INDEX` file (see Step 3). This file must be accessible using `tftp`.

**Step 2.** Modify the `golden_image_cfg` section to set up the operating system archive for NFS transfer. Key changes are:

a. In the `sw_source` stanza, change the following:

```
nfs_source = "10.2.72.150:/var/opt/ignite/archives/Rel_B.11.23"
```

to point to the directory where the archive resides. This directory must be NFS exported to allow the client to read it.

b. Remove the `init sw_sel` stanza for the operating system archive you will not be using. For example, if you have created a golden image archive for PA-RISC systems, remove the `is_ia64 sw_sel` stanza. If you have created a golden image archive for Integrity systems, remove the `is_hppa sw_sel` stanza.

c. In the appropriate `init sw_sel` stanza, leave the default description or change it to something representative of your archive:

```
description = "B.11.23 PA golden image archive"
```

d. So that this configuration will appear as an operating system environment choice on the **Basic** tab in the Ignite-UX TUI, point it to the archive:

```
archive_path = "hostname.gz"
```

e. Create impacts lines for the `init sw_sel` stanza by executing:

```
/opt/ignite/sbin/archive_impact -t -g archive_file > temp_impacts
```

and then by including the results in the configuration file by replacing the example impacts lines. By default, this assumes that we created a gzipped tar archive.

Following is the complete `sw_sel stanza` example for a PA-RISC-based golden image archive:

```
init sw_sel "B.11.23 PA golden image archive" {
    description = "B.11.23 PA golden image archive"
    sw_source   = "golden image archive"
    sw_category = "HPUXEnvironments"
    archive_type = gzip tar
    archive_path = "hostname.gz"

    #
    # Here we describe how much space is used in each of the mentioned
    # subdirectories. This information is obtained by running the
    # "archive_impact" command against an archive as follows:
    #   /opt/ignite/sbin/archive_impact -tg hostname.gz
    # The output from the above command should replace the "impacts"
    # statements below.
    #
    impacts    = "/"      7148Kb
    impacts    = "/dev"   13Kb
    impacts    = "/etc"  101325Kb
    impacts    = "/home"  1Kb
    impacts    = "/opt"  1482559Kb
    impacts    = "/sbin"  72389Kb
    impacts    = "/stand" 35589Kb
    impacts    = "/usr"  1478047Kb
    impacts    = "/var"  470006Kb
} = TRUE
```

### **Step 3.** Add the new configuration file to Ignite-UX:

Edit the `/var/opt/ignite/INDEX` file to install a new configuration to Ignite-UX. For this example, add a new `cfg stanza` as follows:

```
cfg "HP-UX B.11.23 PA Golden Image Archive" {
    description "B.11.23 PA golden image archive"
    "/opt/ignite/data/Rel_B.11.23/config"
    "/var/opt/ignite/data/Rel_B.11.23/golden_image_cfg"
    "/var/opt/ignite/config.local"
}
```

The line of most interest is the one containing the `golden_image_cfg`, which is the configuration file we added in the previous step. The `config` and `config.local` files contain default configurations.

The `/var/opt/ignite/config.local` file should be the last file in the `cfg` stanza. The last configuration file has the highest priority and can override values in the configuration files listed before it.

The file `/opt/ignite/data/Rel_B.11.23/config` supplies the disk and file system layout defaults, along with other control information required by Ignite-UX. It must be first in every `cfg` stanza.

Each configuration stanza appears as an available configuration to Ignite-UX. Therefore, the string **“HP-UX B.11.23 PA Golden Image Archive”** now appears as a valid configuration.

**Step 4.** Verify that the `/var/opt/ignite/INDEX` syntax is correct:

```
/var/opt/ignite/bin/instl_adm -T
```

Fix any errors found by `instl_adm`, and execute the command again to verify any changes.

**Step 5.** Ensure that the NFS file system is exported correctly. In the `sw_source` stanza in the example in the previous step, we specified the location of the operating system archive to be a file on an NFS server. You need to ensure clients have access to this directory.

Make sure the NFS configuration is correct. To view the current status and ensure the directory containing the archive is correctly exported, enter:

```
exportfs -v
```

Ignite-UX automatically tries to export `/var/opt/ignite/clients` for its use. In our example, `/var/opt/ignite/archives/Rel_B.11.23` must also be exported because that is where we placed the operating system archive. Here is our `/etc/exports` file:

```
/var/opt/ignite/clients -anon=2  
/var/opt/ignite/archives/Rel_B.11.23 -ro,anon=2
```

If you added new content to the `/etc/exports` file as above, re-export it as follows:

```
exportfs -av
```



## Enabling the Client

Since the Ignite-UX server now knows about the new golden image archive, you can use Ignite-UX to install it onto a client. To do this, you need to get the client to inform the Ignite-UX server that it is ready to install a new operating system.

**From the console**, start by shutting down the virtual partition that you are going to ignite. For example, if you are going to install the golden image onto the virtual partition `vprobin2`, the command executed from the virtual partition `vprobin2` is:

```
vprobin2# shutdown -h
```

Once you have shut down the virtual partition, change to a running (up) virtual partition using Ctrl-A. Then, start the installation by performing a `vparboot -l`. The `-l` (dash capital i) boots the virtual partition you wish to ignite using the Ignite-UX server that contains your golden image archive:

- PA-RISC-Based Systems

With Ignite-UX versions prior to C.06.xx, execute the command as follows:

```
vparboot -p <partition> -l <ignite_server>,/opt/ignite/boot/WINSTALL
```

With Ignite-UX versions C.06.xx and newer, execute the command as follows:

```
vparboot -p <partition> -l <ignite_server>,/opt/ignite/boot/Rel_B.11.??/WINSTALL
```

where `??` represents the OS version (for example, `Rel_B.11.23`)

Example: if the Ignite-UX server has the IP of `ww.xx.yy.zz` and is running Ignite-UX version C.06.xx, from the virtual partition `vprobin1` that is up and running HP-UX 11i v2, to ignite of a golden image onto the virtual partition `vprobin2`:

```
vprobin1# vparboot -p vprobin2 -l ww.xx.yy.zz,/opt/ignite/boot/WINSTALL
```

- Integrity Systems

For vPars on Integrity systems, the command is:

```
vparboot -p <partition> -l
```

Example:

```
vprobin1# vparboot -p vprobin2 -l
```

## Installing the Golden Image Archive on the Client

In this section, we will use Ignite-UX to customize the golden image archive installation. Once the client has booted from the previous step into the Ignite-UX TUI, follow the steps below:

- Step 1.** From the TUI menu, select **Install HP-UX**.
- Step 2.** From the **User Interface and Media Options** menu, select **Ignite-UX server based installation** and then **Guided Installation**.
- Step 3.** From **LAN Interface Selection**, choose an appropriate LAN.
- Step 4.** From the **NETWORK CONFIGURATION** menu, enter all of the correct system information, and select **OK**.
- Step 5.** On the **Basic** tab, select the **HP-UX 11.23 Golden Image Archive** configuration.
- Step 6.** Ensure that the **Root Disk**, **Root Swap** and other fields are correct for your installation.
- NOTE:** Any disks you select here are overwritten. If you have a disk with existing user information that you do not want to modify, add it manually after Ignite-UX has installed the operating system.
- Step 7.** On the **Software** tab, there are no changes needed because there is an archive selected. All information on the dialog box is blank.
- Step 8.** On the **System** tab, select **Set parameters now** from **Final System Parameters:**.
- Fill in the appropriate data under **Set Time Zone, Network Services...** and, optionally, **Set Root Password**.
- Step 9.** On the **File System** tab, verify the correct disk usage parameters are set. At this point, you can also add disks or modify the disk and file system parameters.
- Step 10.** No changes are needed on the **Advanced** tab.

**Step 11.** When you have finished entering data, select **Go!**. Review the data in the configuration dialog box and select **Go!** again.

When the installation process is complete, the client should have the new golden archive installed, a new kernel built, and the virtual partition rebooted and ready for use.