

# xCAT 2 How to Install Additional Software

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## 1.0 Introduction

xCAT 2 Cookbook illustrates how you can install the operating systems on the nodes. There are times you want to install addition software. This document explains how you can add additional software into the cluster for stateful, stateless and stalelite cases. It will also introduce a new command called 'updatenode' to allow you to configure or reconfigure the nodes. Please note all the discussion below except chapter 5 is for Linux only. There are a lot of differences in AIX. Please refer to “xCAT2 AIX Cookbook” for related topics in AIX.

### 1.1 Package list file and other package list files

The name of the rpms that will be installed to the node are stored in the packages list files. There are two kinds of package list files. The names of the rpms that comes from the os destro are stored in `.pkglist` file. It is called a **package list file**. The name of the rpms that do NOT come from the os distro are stored in `.otherpkgs.pkglist` file. It is called a **other package list file**. These files are located under the following directories:  
For statefull:

Customized file location: `/install/custom/install/<ostype>`

Default file location: `/opt/xcat/share/xcat/install/<ostype>`

For stateless and stalelite:

Customized: `/install/custom/netboot/<ostype>`

Default file location: `/opt/xcat/share/xcat/netboot/<ostype>`

Where `<ostype>` can have the following values:

rh  
centos  
fedora  
sles  
SL (For Scientific Linux)

xCAT's searching order for the package list file is to search customized file location first, then the default file location. For each location, the file name is searched by the following order:

```
<profile>.<os>.<arch>.extension
<profile>.<os>.extension
<profile>.<arch>.extension
<profile>.extension
```

where extension can be *pkglist* or *otherpkgs.pkglist*.

Use the following command to find out *<profile>*, *<os>* and *<arch>* for a node.

```
lsdef node1 -i profile,os,arch
```

For example,

```
# lsdef xcatsn22 -i profile,os,arch
Object name: xcatsn22
  arch=ppc64
  os=sles11
  profile=service-xcattest
```

File */install/custom/install/sles/service-xcattest.sles11.pkglist* and */install/custom/install/sles/service-xcattest.sles11.otherpkgs.pkglist* are the package list and other package list files for node *xcatsn22*.

In the following chapters, you will need to modify these two files to install more rpms to the node.

## 1.2 OS rpm file location and other rpm file location

The rpm files from the OS distro are located in the subdirectories under */install/<os>/<arch>*. They got copied to this location by the *copycds* command. The non OS distro rpms are located in the base or subdirectories under */install/post/otherpkgs/<os>/<arch>*. The user needs to copy the rpms to this location manually.

## 2.0 Install Additional Software for Stateless and Stalite Nodes

1. For rpms from the OS distro, add the new rpm names (without the version number) in the *.pkglist* file.

For example, file */install/custom/netboot/sles/compute.pkglist* will look like this after adding *perl-DBI*:

```
bash
nfs-utils
openssl
dhcpd
kernel-smp
openssh
procps
psmisc
resmgr
wget
```

```
rsync
timezone
perl-DBI
```

Please see Appendix B for the format of a `.pkglist` file.

Update the OS distro rpms on the management node using the `copycds` command.

2. For non OS distro rpms, add the new rpm names (without version number) with their subdirectories into the `.otherpkgs.pkglist` file.

Copy the new or updated rpms you are going to add/update to

```
/install/post/otherpkgs/<os>/<arch>/* directory or its subdirectories.
```

For example, file `/install/custom/netboot/sles/compute.otherpkgs.pkglist` will look like this if you want to add RSCT packages (`src`, `rsct.core` and `rsct.core.utils`):

```
src
rsct.core
rsct.core.utils
```

If you have copied the rpms into a subdirectory, say `rsct`, then the file should be look like this:

```
rsct/src
rsct/rsct.core
rsct/rsct.core.utils
```

Please see Appendix A for the format of a `otherpkgs.pkglist` file.

3.run `/opt/xcat/share/xcat/netboot/<ostype>/genimage`, the extra rpms are automatically installed into the image. Then run `packimage`.

4. if you have additional configuration scripts for the software that would like to run after the node is boot up, copy the script to `/install/postscripts` directory and add the confirmation script to the `postscripts` table.

```
cp myconfigscript /install/postscripts/
chtab node=compute postscripts.postbootscripts=myconfigscript
```

5. Run `nodeset` command

```
nodeset <nodelist> netboot
```

or

```
nodeset <nodelist> statelite
```

After setting up, deploy the node as usual. The addition software will be installed and configured during the node deployment.

### 3.0 Install Additional Software for Stateful Nodes

1. For rpms from the OS distro, add the new rpm names (without the version number) in the `.pkglist` file. Also add new group/pattern names in the `.pkglist` file.

For example, file `/install/custom/install/sles/compute.pkglist` will look like this after adding `perl-DBI`:

```
@ base
@ x11
openssl
xntp
rsync
perl-DBI
```

Please see Appendix B for the format of a `.pkglist` file.

Update the OS distro rpms on the management node using the `copycds` command.

2. For non OS distro rpms, add the new rpm names (without version number) with their subdirectories into the `.otherpkgs.pkglist` file.

Copy the new or updated rpms you are going to add/update to

`/install/post/otherpkgs/<os>/<arch>/*` directory or its subdirectories.

For example, file `/install/custom/install/sles/compute.otherpkgs.pkglist` will look like this if you want to add RSCT packages (`src`, `rsct.core` and `rsct.core.utils`):

```
src
rsct.core
rsct.core.utils
```

If you have copied the rpms into a subdirectory, say `rsct`, then the file should be look like this:

```
rsct/src
rsct/rsct.core
rsct/rsct.core.utils
```

Please see Appendix A for the format of a `otherpkgs.pkglist` file.

You should create `repodata` for the `/install/post/otherpkgs/<os>/<arch>/` directory. The `repodata` is necessary for “yum” and “zypper” to know about the repository.

The command “`createrepo`” is used to create `repodata`, before executing the command, please make sure the “`createrepo`” rpm package is installed. Remember that on SLES11, the “`createrepo`” rpm package is in the SLE-11-SDK-DVD Media 1 ISO, not in the install ISO.

After “`createrepo`” is installed, you need to create one text file which contains the complete list of files to include in the repository. For example, the name of the text file is “`rpms.list`” in “`/install/post/otherpkgs/<os>/<arch>`” directory, please follow this command to include the list into “`rpms.list`”:

```
cd /install/post/otherpkgs/<os>/<arch>
ls *.rpm >rpms.list
```

Or, if you create one sub-directory to contain the rpm packages, for example, one directory named “`other`” in “`/install/post/otherpkgs/<os>/<arch>`”. Please run the following commands to add the rpm packages under “`other`” directory to this repo:

```
cd /install/post/otherpkgs/<os>/<arch>
ls other/*.rpm >>rpms.list
```

run the following command to create repodata for the directory  
/install/post/otherpkgs/<os>/<arch>/.

```
createrepo -i rpms.list /install/post/otherpkgs/<os>/<arch>/
```

The “createrepo” command with “-i rpms.list” option will create the repository for the rpm packages listed in the “rpms.list” file. It won't destroy and affect the rpm packages which is in the same directory but have been included into another repository.

3. If 'otherpkgs' is not already in the `postscripts` table, add it to either the `xcatdefaults` row or a row specifically for your node or nodegroup. The `otherpkgs` script name should be added to the `postbootscripts` attribute (for newer xcat releases) or the `postscripts` attribute (for older xcat releases). For example:

```
chtab node=compute postscripts.postbootscripts+=otherpkgs
```

4. If you have additional configuration scripts for the software that would like to run after the node is booted up, copy the script to `/install/postscripts` directory and add the configuration script to the `postscripts` table. For example:

```
cp myconfigscript /install/postscripts/
chtab node=compute postscripts.postbootscripts+=myconfigscript
```

5. Run `nodeset` command

```
nodeset <nodelist> install
```

After setting this up, deploy the node as usual. The addition software will be installed and configured during the node deployment.

## 4.0 Install Additional Software for Stateful Nodes after the Nodes are Up and Running

1. follow step 1-5 in chapter 3.

2. run `updatenode` command

```
updatenode <noderange> -S
```

The `-s` flag updates the nodes with all the new or updated rpms specified in both `.pkglist` and `.otherpkgs.pkglist`.

If you just want the rpms from the os distro get updated on the nodes, run

```
updatenode <noderange> ospkgs
```

If you just want the rpms from non os distro get updated on the nodes, run

```
updatenode <noderange> otherpkgs
```

If you have a configuration script (as mentioned in step 4 of the previous chapter), run

```
updatenode <noderange> ospkgs,otherpkgs,myconfigscript
```

## 5.0 Install Additional Software for Stalite Nodes after the Nodes are Up and Running

Please refer to chapter 5 of [the stalite cookbook](#) for “Adding/updating software and files for the running nodes”.

## 6.0 Rerun Postscripts or Run Additional Scripts with the updatenode Command

You can use `updatenode` command to perform the following functions after the nodes are up and running:

- install additional software for stateful nodes (described in chapter 4)
- run postscripts defined in the `postscripts` table for stateful, stateless and stalite nodes.
- run any script for both stateful, stateless and stalite nodes.

The later 2 functions works on AIX as well.

The following are some examples of how to use it:

To re-run all the postscripts for the nodes:

```
updatenode <noderange>
```

To re-run the syslog postscripts for the nodes:

```
updatenode <noderange> syslog
```

To run a list of scripts, make sure the scripts are copied to `/install/postscripts` directory, then

```
updatenode <noderange> script1,script2
```

Note: `script1,script2` may or may not be defined in the `postscripts` table. However if you want `script1` and `script2` get invoked next time the nodes are deployed, add them into the `postscripts` table.

## 7.0 Appendix A: File Format for otherpkgs.pkglist File

The `otherpkgs.pkglist` file can contain the following types of entries:

- rpm name without version numbers
- otherpkgs subdirectory plus rpm name
- blank lines
- comment lines starting with “#”
- `#INCLUDE: <full file path>#` to include other pkglist files
- `#NEW_INSTALL_LIST#` to signify that the following rpms will be installed with a new rpm install command (zypper, yum, or rpm as determined by the function using this file)

- rpms to remove *before* installing marked with a “-”
- rpms to remove *after* installing marked with a “--”

These are described in more details in the following sections.

## 7.1 RPM Names

A simple `otherpkgs.pkglist` file just contains the the name of the rpm file without the version numbers.

For example, if you put the following three rpms under

`/install/post/otherpkgs/<os>/<arch>/` directory,

```
rsct.core-2.5.3.1-09120.ppc.rpm
rsct.core.utils-2.5.3.1-09118.ppc.rpm
src-1.3.0.4-09118.ppc.rpm
```

The `otherpkgs.pkglist` file will be like this:

```
src
rsct.core
rsct.core.utils
```

## 7.2 RPM Names with otherpkgs Subdirectories

If you create a subdirectory under `/install/post/otherpkgs/<os>/<arch>/`, say `rsct`, the `otherpkgs.pkglist` file will be like this:

```
rsct/src
rsct/rsct.core
rsct/rsct.core.utils
```

## 7.3 Include Other pkglist Files

*The #INCLUDE statement is supported in xCAT 2.3 and later.*

You can group some rpms in a file and include that file in the `otherpkgs.pkglist` file using `#INCLUDE:<file>#` format.

```
rsct/src
rsct/rsct.core
rsct/rsct.core.utils
#INCLUDE:/install/post/otherpkgs/myotherlist#
```

where `/install/post/otherpkgs/myotherlist` is another package list file that follows the same format.

Note the trailing “#” character at the end of the line. It is important to specify this character for correct pkglist parsing.

## 7.4 Multiple Install Lists

*The #NEW\_INSTALL\_LIST# statement is supported in xCAT 2.4 and later.*

You can specify that separate calls should be made to the rpm install program (zypper, yum, rpm) for groups of rpms by specifying the entry “#NEW\_INSTALL\_LIST# on a line by itself as a separator in your pkglist file. All rpms listed up to this separator will be installed together. You can have as many separators as you wish in your pkglist file, and each sublist will be installed separately in the order they appear in the file.

For example:

```
compilers/vacpp.rte
compilers/vac.lib
compilers/vacpp.lib
compilers/vacpp.rte.lnk
#NEW_INSTALL_LIST#
pe/IBM_pe_license
```

## **7.5 Remove RPMs Before Installing**

*The “-” syntax is supported in xCAT 2.3 and later.*

You can also specify in this file that certain rpms to be removed before installing the new software. This is done by adding '-' before the rpm names you want to remove. For example:

```
rsct/src
rsct/rsct.core
rsct/rsct.core.utils
#INCLUDE:/install/post/otherpkgs/myotherlist#
-perl-doc
```

If you have #NEW\_INSTALL\_LIST# separators in your pkglist file, the rpms will be removed before the install of the sublist that the “-<rpmname>” appears in.

## **7.6 Remove RPMs After Installing**

*The “--” syntax is supported in xCAT 2.3 and later.*

You can also specify in this file that certain rpms to be removed after installing the new software. This is done by adding '--' before the rpm names you want to remove. For example:

```
pe/IBM_pe_license
--ibm-java2-ppc64-jre
```

If you have #NEW\_INSTALL\_LIST# separators in your pkglist file, the rpms will be removed after the install of the sublist that the “--<rpmname>” appears in.

## 8.0 Appendix B: File Format for .pkglist File

The .pkglist file is used to specify the rpm and the group/pattern names from os distro that will be installed on the nodes. It can contain the following types of entries:

- rpm name without version numbers
- group/pattern name marked with a '@' (for full install only)
- rpms to removed after the installation marked with a “-” (for full install only)

These are described in more details in the following sections.

### 8.1 RPM Names

A simple .pkglist file just contains the the name of the rpm file without the version numbers.

For example,

```
openssl
xntp
rsync
```

### 8.2 Group/Pattern Names

It is only supported for statefull deployment.

In Linux, a groups of rpms can be packaged together into one package. It is called a **group** on RedHat, CentOS, Fedora and Scientific Linux. To get the a list of available groups, run

```
yum grouplist
```

On SLES, it is called a **pattern**. To list all the available patterns, run

```
zypper se -t pattern
```

You can specify in this file the group/pattern names by adding a '@' and a space before the group/pattern names. For example:

```
@ base
```

### 8.3 Remove RPMs After Installing

It is only supported for statefull deployment.

You can specify in this file that certain rpms to be removed after installing the new software. This is done by adding '-' before the rpm names you want to remove. For example:

```
-wget
```