How to sync files in xCAT release 2.3 or later

08/18/10, 11:03:09 AM

1.Overview....1
2.The synclist file....2
  2.1.The Format of synclist file....2
  2.2.An example of synclist file....2
  2.3.The location of synclist file for updatenode and install process....3
3.Run xdcp command to perform Syncing File action....4
4.Run the Syncing File action in the installation process....5
5.Run the Syncing File action in the creating diskless image process....5
6.Run the Syncing File action in the updatenode process....6
7.Run the Syncing File action periodically 6

1.Overview

Sync files to the nodes is a feature of xCAT used to distribute specific files from the management node to the new-installing or installed nodes. Generally, the specific files are usually the system configuration files for the nodes in the /etc/directory, like /etc/hosts, /etc/resolve.conf; it also could be the application programs configuration files for the nodes. The advantages of this function are: it can parallel sync files to the nodes or nodegroup for the installed nodes; it can automatically sync files to the newly-installing node after the installation. Additionally, this feature also supports the flexible format to define the sync'd files in a configuration file, called 'synclist'.
The synclist file can be a common one for a group of nodes using the same profile or osimage, or can be the special one for a particular node. Since the location of the synclist file will be used to find the synclist file, the common synclist should be put in a given location for Linux nodes or specified by the osimage.synclists attribute for the AIX nodes, The special synclist file for a certain node only can be accepted in the 'xdcp -F synclist' command.

xdcp command supplies the basic Syncing File function. If the '-F synclist' option is specified in the xdcp command, it syncs files configured in the synclist to the nodes. If the '-i PATH' option is specified with '-F synclist', it syncs files to the root image located in the PATH directory. (Note: the '-i PATH' option is only supported for Linux nodes)
xdcp supports hierarchy where service nodes are used. If a node is serviced by a service node, xdcp will sync the files to the service node firstly, then sync the files from service node to the compute node.
Since 'updatenode -F' calls the xdcp to handle the Syncing File function, the 'updatenode -F' also supports the hierarchy.

For a new-installing nodes, the Syncing File action will be triggered when performing the postscripts for the nodes. A special postscript named 'syncfiles' is used to initiate the Syncing File process.
The postscript 'syncfiles' is located in the /install/postscripts/. When running, it sends a message to the xcatd on the management node or service node, then the xcatd figures out the corresponding synclist file for the node and calls the xdcp command to sync files in the synclist to the node.

For a installed nodes, the Syncing File action happens when performing the 'updatenode -F' or 'xdcp -F synclist' command to update a nodes. If performing the 'updatenode -F', it figures out the location of the synclist files for all the nodes and classify the nodes which using same synclist file and then calls the 'xdcp -F synclist' to sync files to the nodes.

2.The synclist file

2.1.The Format of synclist file

The synclist file contains the configuration entries that specify where the files should be synced to. In the synclist file, each line is an entry which describes the location of the source files and the destination location of files on the target node.

The basic entry format looks like following:

```
path_of_src_file1  -> path_of_dst_file1
path_of_src_file1  -> path_of_dst_directory  ( must end in /)   2.5 or later
path_of_src_file1  path_of_src_file2 ... -> path_of_dst_directory
```

The path_of_src_file* should be the full path of the source file on the Management Node.
The path_of_dst_file* should be the full path of the destination file on target node.
The path_of_dst_directory should be the full path of the destination directory.
Since the synclist file is for common purpose, the target node need not be configured in it.

Example: the following synclist formats are supported:

1) sync file /etc/file2 to the file /etc/file2 on the node (with same file name)
   /etc/file2 -> /etc/file2
2) sync file /etc/file2 to the file /etc/file3 on the node (with different file name)
   /etc/file2 -> /etc/file3
3) sync file /etc/file4 to the file /etc/tmp/file5 on the node (different file name and directory). The directory will be automatically created for you.
   /etc/file4 -> /etc/tmp/file5
4) sync the multiple files /etc/file1, /etc/file2, /etc/file3, ... to the directory /tmp/etc (/tmp/etc must be a directory when multiple files are sync'd at one time). If the directory does not exist, xdcp will create it.
   /etc/file1 /etc/file2 /etc/file3 -> /tmp/etc
5) sync file /etc/file2 to the file /etc/file2 on the node (with the same file name) (2.5 or later)
   /etc/file2 -> /etc/
6) sync all files in /etc to directory /home/mikev on the node (2.5 or later)
   /etc/* -> /home/mikev/

Note: Don't try to sync files to the read only directory on the target node.

2.2.An example of synclist file

Assume a user wants to sync files to a node as following, the corresponding entries should be added in a synclist file.
1) Sync the file /etc/common_hosts to the two places on the target node: put one to the /etc/hosts, the other to the /tmp/etc/hosts.
Following configuration entries should be added:

```
/etc/common_hosts -> /etc/hosts
/etc/common_hosts -> /tmp/etc/hosts
```

2) Sync files in the directory/tmp/prog1 to the directory /prog1 on the target node, and the postfix '.tmpl' needs to be removed on the target node. (directory /tmp/prog1/ contains two files: conf1.tmpl and conf2.tmpl)
Following configuration entries should be added:

```
/tmp/prog1/conf1.tmpl -> /prog1/conf1
/tmp/prog1/conf2.tmpl -> /prog1/conf2
```

3) Sync the files in the directory /tmp/prog2 to the directory /prog2 with same name on the target node. (directory /tmp/prog2 contains two files: conf1 and conf2)
Following configuration entries should be added:

```
/tmp/prog2/conf1  /tmp/prog2/conf2 -> /prog2
```

4) Sample synclist file

```
/etc/common_hosts -> /etc/hosts
/etc/common_hosts -> /tmp/etc/hosts
/tmp/prog1/conf1.tmpl -> /prog1/conf1
/tmp/prog1/conf2.tmpl -> /prog1/conf2
/tmp/prog2/conf1  /tmp/prog2/conf2 -> /prog2
/tmp/* -> /tmp/     ( 2.5 or later)
/etc/testfile -> /etc/   ( 2.5 or later)
```

If the above syncfile is performed by the updatenode/xdcp commands, or performed in a node installation process, the following files will exist on the target node with the following contents.

/etc/hosts	(It has the same content with /etc/common_hosts on the MN)
/tmp/etc/hosts	(It has the same content with /etc/common_hosts on the MN)
/prog1/conf1	(It has the same content with /tmp/prog1/conf1.tmpl on the MN)
/prog1/conf2	(It has the same content with /tmp/prog1/conf2.tmpl on the MN)
/prog2/conf1	(It has the same content with /tmp/prog2/conf1 on the MN)
/prog2/conf2	(It has the same content with /tmp/prog2/conf2 on the MN)

2.3.The location of synclist file for updatenode and install process

For Linux and AIX nodes, xCAT uses different approach to figure out the location of the common synclist file, the method for each platform will be introduced respectively.

[Linux]
In the installation process or updatenode process, xCAT needs to figure out the location of the synclist file automatically, so the synclist should be put into the specified place with the proper name.
The path of the synclist should be following format:

/install/custom/<inst_type>/<distro>/<profile>.<os>.<arch>.synclist
<inst_type>: "install", "netboot"
<distro>: "rh", "centos", "fedora", "sles"
<profile>,<os> and <arch> are what you set for the node

For example:
1) The location of synclist file for the diskfull installation of sles11 with 'compute' as the profile

```
/install/custom/install/sles/compute.sles11.synclist
```

2) The location of synclist file for the diskless netboot of sles11 with 'service' as the profile

```
/install/custom/netboot/sles/service.sles11.synclist
```

[AIX]
For the AIX platform, the common synclist file is created base on the definition of nim image. The nim images are defined in the 'osimage' table, and the attribute of osimage.synclists is used to identify the location of the common synclist for the nodes which use this nim image to install/netboot the system.

For example:
If you want to sync files to the node 'node1' which uses the '61cosi' nim image as its profile (The profile attribute is set the osimage for an AIX node), you need to do following things to set the synclist.

1)Create a synclist file in any directory. For example: /tmp/61cosi.AIX.synclist
2)Set the full path of the synclist file in the attribute osimage.synclists for the nim image '61cosi' in the osimage table.

```
chdef -t osimage -o 61cosi synclists=/tmp/61cosi.AIX.synclist
```

3.Run xdcp command to perform Syncing File action

xdcp command supplies three options '-F' , -s, and '-i' to support the Syncing File function.

- -F|--File rsync input file
  Specifies the full path to the synclist file that will be used to build the rsync command
- -s
  Specifies to rsync to the service nodes only for the input compute noderange.
- -i|--rootimg install image for Linux
  Specifies the full path to the install image on the local node.

By default, if the -F option is specified, the 'rsync' command is used to perform the syncing file function. For the rsync in xdcp, only the ssh remote shell is supported for rsync.
xdcp uses the '-Lpotz' as the default flags to call the rsync command. More flags for rsync command can be specified by adding '-o' flag to the call to xdcp.

Refer to section 2.1 and 2.2 for how to create the synclist file.

For example:

1) Using '-F' option to sync files which are listed in the /install/custom/commonsyncfiles/compute.synclist to the node group named 'compute'. If the node group compute is serviced by servicenodes, then the files will be automatically staged to the correct service nodes, and then sync'd to the compute nodes from those service nodes. The files will be stored in /var/xcat/syncfiles directory on the service nodes by default, or in the directory indicated in the site.SNsyncfiledir attribute, if defined. See -s option below.

```
xdcp compute -F /install/custom/commonsynfiles/compute.synclist
```

2) For Linux node, using '-i' option with '-F' to sync files which created in the /install/custom/install/sles11/compute.synclist to the root image in the directory /install/netboot/sles11/ppc64/compute/rootimg

```
xdcp -i /install/netboot/sles11/ppc64/compute/rootimg -F
/install/custom/install/sles11/compute.synclist
```

3) Using the '-s' option to sync the files only to the service nodes for the node group named 'compute'. The files will be placed in the default /var/xcat/syncfiles directory or in the directory as indicated in the site.SNsyncfiledir attribute, if defined on the service nodes. If you want the files synched to the same directory on the service node that they come from on the Management Node, set site.SNsyncfiledir=/. This can be used to setup before a node install, to have the files available to be sync'd during the install.

```
3)xdcp compute -s  -F /install/custom/install/sles11/compute.synclist
```

4.Run the Syncing File action in the installation process

[Diskfull installation]

If the 'syncfiles' postscript is added to the postscripts.postscript attribute for a node or nodegroup in the postscripts table, at end of the installation process, the 'syncfiles' will be run to initiate the Syncing File action.
The 'syncfiles' postscript sends message to the xcatd, then the xcatd initiates the Syncing File action. The xcatd figures out the location of synclist firstly, then calls the 'xdcp node -F synclist' to perform the Syncing File action.

User need to do following things to make the Syncing File function working in the installation process:
1) Add the postscript 'synclist' to the postscripts.postscripts for the node or nodegroup.
2) Create the synclist file with the entries indicating which files should be synced. (Section 2.1 and 2.2 is a good example for how to create the synclist file.)
3) [Linux]Put the synclist into the proper location (refer to Linux part of section 2.3).
4) [AIX]Set the full path of synclist file as the value of the osimage.synclists attribute (refer to AIX part of section 2.3).

For the hierarchy environment, the files which need to sync should be synced to the service node first, so that the compute node could get them from the service node. Refer to the section 3 of chapter 3 to use the ‘xdcp computenode –s –F synclist’ to just sync the files to the service node before starting the installation of compute node.

[Diskless Installation]

The commands packimage (for Linux) and mkdsklsnode (for AIX) synced files to the root image directories in the create image process, therefore, the files need to be synced will appear on the booted node, so the syncfiles postscript is not needed to be run during the diskless netboot process. The Syncing File action will not run the syncfile postscript for the diskless netboot process, even if you specified the syncfiles postscript in the postscripts table, because the files have already been synced to the nodes by packimage and mkdsklsnode.
See Run the Syncing File action in the creating diskless image process for more information.

5.Run the Syncing File action in the creating diskless image process

For the Linux and AIX nodes, the different approaches are used to create the diskless image, so the

Syncing File action will be performed differently for them.

[Linux]
For Linux nodes, the packimage command is used to prepare the root image files and package the root image. The Syncing File action is performed here.

Steps to make the Syncing File working in the packimage command:
1) Prepare the synclist file and put it into the location which described in the Linux part of section 2.3.
2) Run the packimage as normal.

[AIX]
For AIX nodes, the xCAT **mknimimage** command may be used to synchronize files in an AIX diskless image. The will use the information in the "synclists" file to update the appropriate NIM SPOT resource.

To have files automatically synchronized when creating an AIX diskless image.
1) Prepare the synclist file.
2) Run the **mknimimage** command to create the initial diskless image. Provide the name of the synclist file on the command line using an "attr=val" pair. (ex. synclists="/install/mysyncfile")

The **mknimimage** command can also be used to update an AIX diskless image after it has been defined. See the mknimimage man page for details.

6.Run the Syncing File action in the updatenode process

If run updatenode command with -F option, it syncs files which configured in the synclist to the nodes. updatenode does not sync images, use xdcp -i -F option to sync Linux images.

Steps to make the Syncing File working in the 'updatenode -F' command:
1) Create the synclist file with the entries indicating which files should be synced. (Section 2.1 and 2.2 is a good example for how to create the synclist file.)
2) [Linux]Put the synclist into the proper location (refer to Linux part of section 2.3).
3) [AIX]Set the full path of synclist file as the value of the osimage.synclists attribute (refer to AIX part of section 2.3).
4) Run the 'updatenode node -F' command to initiate the Syncing File action.

Note: Since Syncing File action can be initiated by the 'updatenode -F' flag, the 'updatenode -P' does NOT support to re-run the 'syncfiles' postscript, even if you specify the 'syncfiles' postscript in the updatenode command line or set the 'syncfiles' in the postscripts.postscripts attribute.

7.Run the Syncing File action periodically

If the admins want to run the Syncing File action automatically or periodically, the 'xdcp -F', 'xdcp -i -F' and 'updatenode -F' commands can be used in the script, crontab or FAM directly.

For example:
1) Use the cron daemon to sync files in the /install/custom/install/sles/compute.sles11.synclist to the nodegroup 'compute' every 10 minutes by the xdcp command.
```
*/10 * * * * root /opt/xcat/bin/xdcp compute -F /install/custom/install/sles/compute.sles11.synclist
```
2) Use the cron daemon to sync files for the nodegroup 'compute' every 10 minutes by updatenode

command.

```
*/10 * * * * root /opt/xcat/bin/updatenode compute -F
```