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Hitachi Dynamic Replicator
DR - Scout ICAT Utility Guide

Hitachi Data Systems

MK-98DF8216-00

Contents

Conventions

Keywords, command buttons and other such fields are enclosed in " " while being bold, for example, to denote 

"**Next**" is used

Inputs for commands and Variables are shown in ***Italics***
File names and paths are shown in **bold**
Commands are shown in `Courier new font`
Optional keywords and arguments are enclosed within [ ].


Notes:

Contain suggestions or tips.


Caution:

Contains critical information

References

Installation guide: For pre-requisites, installation steps etc
Administration guide for DR - Scout components, protection, and recovery operations through CX user interface and cdpcli.
Troubleshooting guide: for possible issues and workarounds

1 Introduction to ICAT

Icat is a command line tool used to archive content to multiple archival repositories at the same time. This utility is used in combination with an event based scheduled snapshot to periodically update content archival repositories with latest data.

This solution is deployed in two phases

Configure:
Ensure that the FX and VX agents on the production and DR servers are up and running.
Configure the "**ICAT.conf"** file as described in the section Configure the icat.conf configuration file on page 7 file keeping in mind the path which the ICAT functionality reads from.

Integrating with CX UI

Set the VX replication pair from the production server to the DR server. Please refer to the Hitachi Dynamic Replicator Administration Guide for further details

Schedule an event based snapshot, preferably a virtual snapshot for faster execution. Specify the ICAT utility in the post script of the schedule snapshot.
Finally set the FX job for ICAT consistency, you should find two templates for ICAT consistency, one for windows platform and the other for Linux platforms.

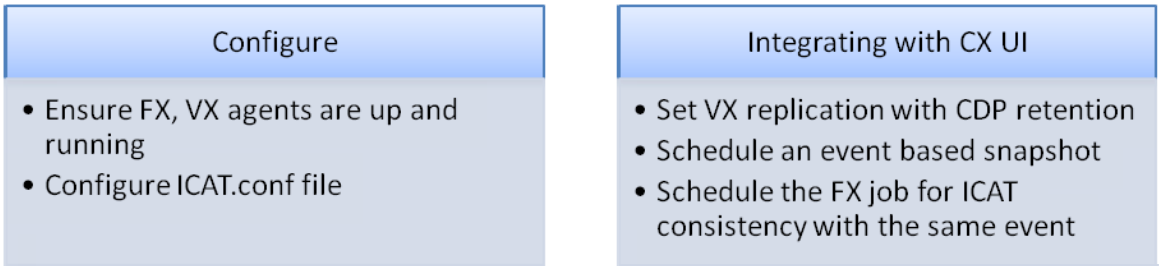

Figure 1

2 How the solution works

When the FX job for ICAT consistency starts it issues a consistency tag on the production server. Once this consistency tag reaches the DR server, an event based snapshot is fired (ensure that you specify the same tag name in the FX consistency job and the scheduled snapshot). When the snapshot is complete, the ICAT command is executed.

The ICAT functionality reads from the snapshot and updates the archival repositories.

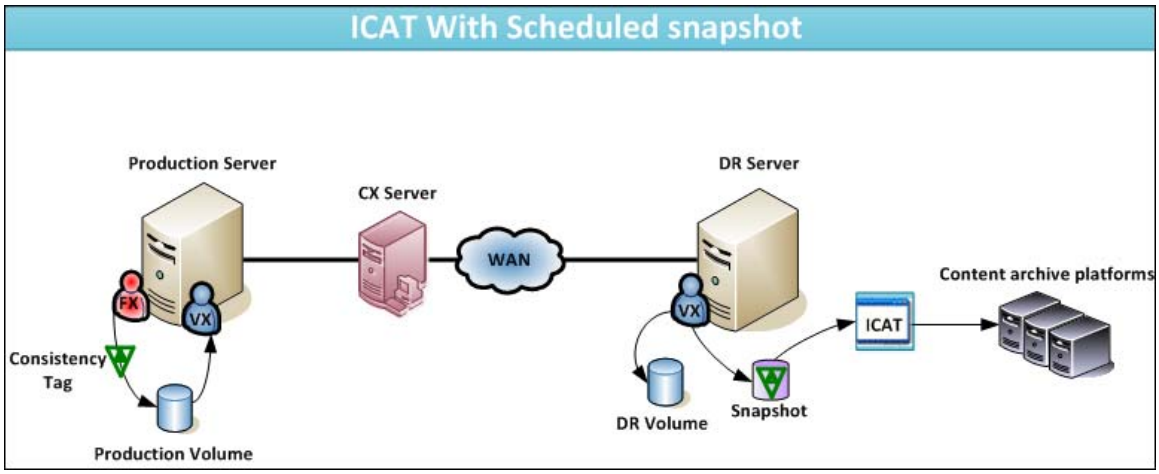

Figure 2

3 Before you begin

- Hitachi Dynamic Replicator - Scout is deployed and actively protecting at least one volume on the production server
- Consistency tags are being issued on the production volumes at regular intervals through FX job.
- Ensure that no firewall is blocking any of the Hitachi Dynamic Replicator - Scout components
- Determine on the volume on which a snapshot will be performed
- Determine on the name of the consistency tag

4 Configure

Usage

Often icat may require several inputs as part of the command. Executing it through CLI at times may be time consuming and error prone. We recommend that you use the "**icat.conf**" configuration file as an input to the icat.exe. This will simplify the command to a large extent, an example is below

```
<FX installation path>icat.exe --config=icat.conf
```

4.1 Configure the icat.conf configuration file

This configuration file is found under the FX agent installation folder and bundled with both the VX and FX agents. There are six major sections in this configuration file.

4.1.1 Remote Office

This section consists of the remote office details for which the data being archived/backed up. The following details would have to be furnished.

- **"Branchname"** = Enter the name of the location where the source server is placed. A separate folder is created on the archival repository under which all the data will be copied to.
- **"Servername"** = you may enter the source server for the VX replication pair.
- **"Sourcevolume"** = Enter the volume that is being replicated

```
[remoteoffice]
branchname= Eastcoast_Branch
servername= Logistics_server
sourcevolume= E_Volume
```

The above details would be used in creating target directory in the archive repository. On the remote target, data is stored under "**<rootdir under [Archiverepository]> /branchname /servername/sourcevolume/*time of executing the icat script*>**". The format of the time stamp is YYYY_MM_DD_HH_MM_SEC

4.1.2 Archiverepository

- **"Transport"** = Indicates the type of transport protocol to be used by ICAT to archive/transfer files to the desired destination. By default the HTTP protocol is used while CIFS is used for windows platforms and NFS is used for Linux platforms.

Table 1

Transport	Mandatory parameters
http	Rootdir = fcfs_Data Nodes = <IP address>:<port number> of archival repository Or Dnsname = <domain name of the archival repository>
nfs	Rootdir = mounted volume
cifs	Rootdir = <root directory of share path> Nodes = <IP address> Or Dnsname = <domain name of the archival repository>

- **"Nodes"** = List of nodes to whom data being archived/replicated, you will need to enter the IP address of the archival repository. You may enter multiple node's IP address separated by a comma. When the http port of the node is other than the default port 80, you will need to specify the port number in the format of IP: Port number. For example, 10.0.164.21:564

- **"Dnsname"** = DNS name of the archive repository. DNS name represents group of nodes in the repository

- **"Rootdir"** = This is the root directory of the archival repository. In case of http it should be entered as "fcfs_data". While using cifs enter the shared directory of the remote machine. While using NFS enter the mount point of the remote share and ignore the "**Nodes**" and "Dnsname" details.

```
[archiverepository]
Transport = http
Nodes = 10.0.164.21
Dnsname =
Rootdir = fcfs_data
```

4.1.3 Tunables

The tunable parameters may be tweaked for retry attempts, connection timeout parameters and better performance. There are eleven parameters in the "**tunables**" section as explained below.

- **Retryonfailure** = During the course of execution, icat may occasionally fail to copy one or more files, at this point of time, depending on the value set here, icat may either continue with the rest of the files or exit as soon as it encounters this error. To retry on the error you will need to let the default stay as 1. For icat to exit its operation on error, set the value as 0
- **Retrylimit** = the number of times icat will try before reporting a failure, defaulted to 5.
- **Retryinterval** = the number of seconds icat will wait before retry, defaulted to 0.
- **Exitonretryexpiry** = This parameter determines whether the icat operation should exit when one of the file is not replicated after the specified retrylimit. This is defaulted to 0, indicating that the icat will not exit.
- **Maxconnects** = Maximum number of threads to be spawned to archive/replicate files.
- **Maxfilelisters** = Number of threads to be spawned to create file listers. File listers feed file paths to processor threads. The value should not be greater than "**Maxconnects**"
- **Tcprecvbuffer** = TCP receive window size for optimized bandwidth utilization
- **Tcpsendbuffer** = TCP send window size for optimized bandwidth utilization
- **Lowspeedlimit**= Number of bytes that should be transferred per second to make sure the connection is alive.
- **Lowspeedtime** = Number of seconds that ICAT is unable to meet "**lowspeedlimit**" barrier.
- **Connectiontimeout** = Number of seconds that ICAT need to wait to establish a connection.

```
[tunables]
retryonfailure=1
retrylimit=5
retryinterval=0
exitonretryexpiry=0
maxconnects=10
Maxfilelisters = 1
tcprecvbuffer = 36782
tcpsendbuffer = 78340
lowspeedlimit = 7489
lowspeedtime = 10
connectiontimeout = 180
```

4.1.4 Content.source

This section consists of the source directories to be archived. You may add include/exclude filters for files and can exclude some of the sub directories. At least one "**content.source**" is required. You may create more content sources such as "**[content.source2]**" and so on. Each content source contains four parameters described below.

- **"Directoryname"** = Folder on the DR server (target host of the VX replication) which will be replicated to the archival repository. Specify the directory path on the snapshot volume as the path here. You may enter multiple directories here by separating them with a comma (,)

- **"Excludelist"** = the list of subdirectories that are ignored by icat while replicating from the directoryname. You may separate multiple directories by a comma here.

- **"Filefilter"** = pattern=<file patterns> and/or date=<file last modified date> and/or size=<size of the file in bytes>. While using multiple patterns values use the comma delimiter. You may also use the "=" and "**!=**" operators.
  date format should be YYYY-MM-DD and allows " =", ">", "<", ">=", "<=" operators
  size should be given in terms bytes and allows "=", ">", "<",">=", "<=" operators.

  If any one of them not available, the following default values would be considered:
  pattern=*.*, size=any, date=any

- **"Include"** = Enter "**true**" to replicate all the files matching the filefilter set. When include is "**false**", all the files that are successfully passed through the filter would be excluded from archival

```
[content.source1]
Directoryname = /tmp/source
excludelist =
filefilter = pattern =
include = true
```

 **Notes:**

The pattern, date and size fields are optional, they may be in any order and should be separated by a space or tab.

4.1.5 Config

- **Fromlastrun** = Enter the value as 1 when you need to perform incremental backup from the last time ICAT has run. ICAT replicates all the files that has later time stamp than last run start time stamp and checks the latest file timestamps with already transferred. This is defaulted to 0 to replicate all files to a new location.

- **Forcerun** = When the value is set to 1 ICAT resumes archival process even though resume information is not found.

- **Overwrite** = To overwrite existing files enter the value as 1 and 0 to skip overwriting existing files. This is defaulted to 0

- **Autogendestdirectory =** Enter the value as 1 to generate the folder name as specified under the [remote office] "**branchname/servername/volname/timestamp**" under "rootdir". Enter 0 to use an alternative folder name "**targetdirectory**" under "rootdir". The delete options do not work when autogendestdirectory value is set to 0.

- **Targetdirectory** = This is used when **Autogendestdirectory** is set to 0. Specify the directory name where the files will be replicated to an alternative folder name "**targetdirectory**" under "rootdir".

- **Logfilepath** = All log files are created under this folder on the host where icat runs. The log file is normally named as <***branchname_servername_volumename_executed_time***> of the remote office section. However when the Remote Office section is left blank and the "**autogendestdirectory**" is set to 0 the log file is named after "**targetdirectory"** with the executed time appended to it (e.g., <***targetdirectory_executed_time***>)

- **Loglevel** = 0 to 7, defaulted to 3.

```
[config]
fromlastrun = 0
forcerun=1
overwrite=0
autogendestdirectory=0
targetdirectory=UDF
logfilepath=/tmp/logpath
loglevel = 7
```

Table 2: Log levels

Debug Log Level	Severity of Messages logged into the log file
0	Logging is disabled
1	Only FATAL messages are logged
2	Only FATAL and SEVERE messages are logged
3	Only FATAL, SEVERE and ERROR messages are logged
4	Only FATAL, SEVERE, ERROR and WARNING messages are logged
5	Only FATAL, SEVERE, ERROR, WARNING & INFO messages are logged
6	Only FATAL, SEVERE, ERROR, WARNING, INFO & DEBUG messages are logged
7	All messages will be logged

4.1.6 Delete

- **Maxlifetime** = The life time of any entity in the archive repository. ICAT removes the older entities once their lifetime is greater than the Maxlifetime.

- **Maxcopies** = A file cannot occur for more than the specified number of times in the icat database. ICAT removes the entities whose count is greater than Maxcopies.

```
[delete]
maxlifetime = 30
maxcopies =  10
```

 **Notes:**

Entities would be deleted when "maxlifetime" or "maxcopies" is met.

4.1.7 Filelist

- **Filelistfromsource =** The filelist path from which files would be archived. ICAT will archive the files to the root directory from the filelist given at filelistfromsource. ICAT will ignore the content.source details if this option is opted.

- **Filelisttotarget =** The filelist path to which files would be listed. This option provides the filelist of the files as per the content.source details. We can give the path where you want to save the filelist. The list from provided by Filelisttotarget can then be used by Filelistfromsource to archive the files from the filelist.

```
[filelist]
filelistfromsource =
filelisttotarget =
```

 **Caution:**

Both Filelistfromsource and Filelisttotarget options cannot be used in the same icat configuration file. If used it will show the following error message "Configure either filelistfromsource or filelisttotarget"

4.2 Resume mode

A resume mode is used to continue an earlier failed ICAT operation to the same target directory on the archival repository. Adding the "**--resume**" switch to the ICAT command will:-

- Continue the operation from the point where the normal mode failed.
- In resume mode, ICAT not only copies failed files in the last attempt, it also copies modified and newly added files.

For example, <***FX agent install path***>`icat.exe --resume --config=` <***full path of the Icat.conf file***>.

5 Integrating with the CX UI

5.1 Protect

Please refer to the Hitachi Dynamic Replicator administration guide to set the VX replication.

5.2 Schedule an event based snapshot

Step 1. Switch to the CX-configuration server's UI and click on "**Recovery -> Scheduled Snapshots**" then select the desired replication pair and click on "**Create Snapshot"**

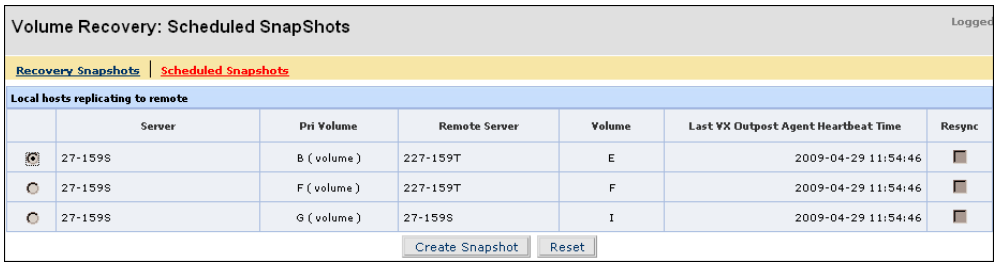

Figure 3

Step 2. Select the "**Event based"** option and enter the name of the event in the text box. Enter the icat command in the post script including the full path.

```
<Full path>\icat.exe --config = <full path of the icat.conf file>
```

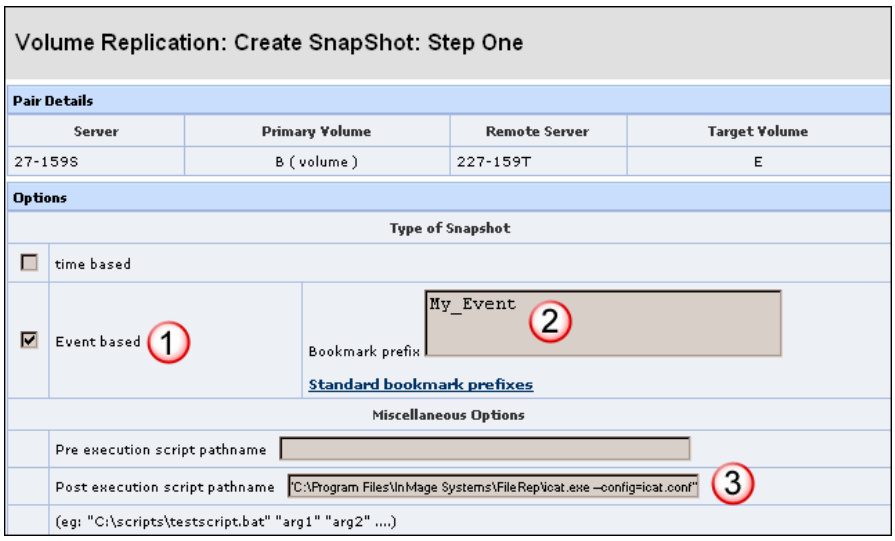

Figure 4

Notes:

Whenever this consistency tag is issued on the production volume, a scheduled snapshot is created triggering the ICAT operation

Step 3. Select the "**Virtual"** option to perform a virtual snapshot then select the virtual drive or use a mount point and click on "**Save"**

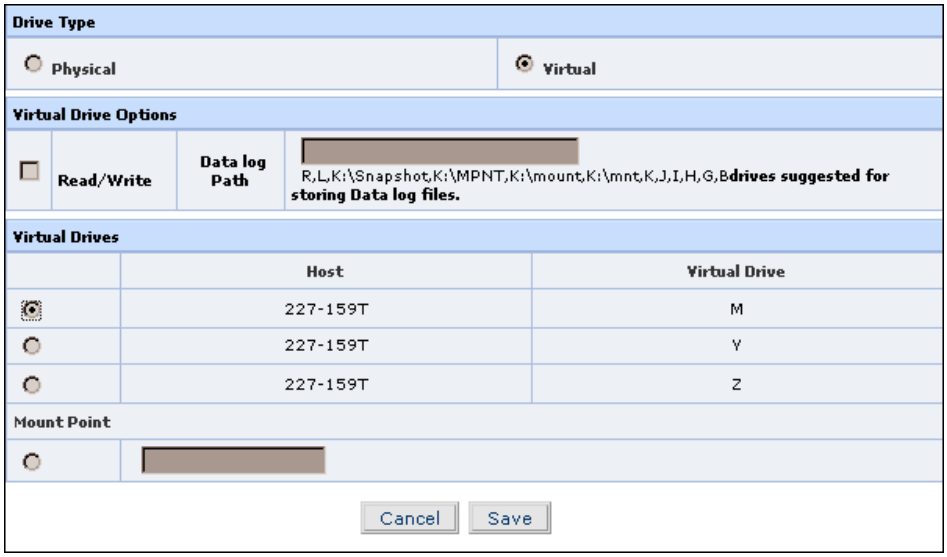

Figure 5

Step 4. You will be returned to the "**Recovery"** screen. You should now see the new entry under the "**Scheduled Snapshots"**

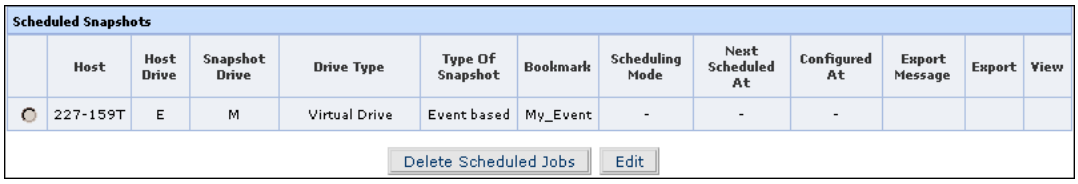

Figure 6

Step 5. Now whenever a consistency tag is issued on the production volume, a snapshot is created and ICAT operates as part of the scheduled snapshot.

5.3 Set FX job for consistency

Step 1. Login to the CX server's user interface and click on "**File Protection -> New Job Group Wizard"**

Figure 7

Step 2. The next screen opens up, click on "**Add Job**"

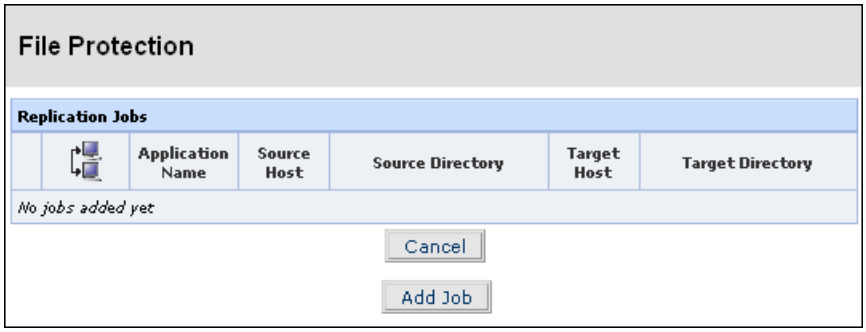

Figure 8

Step 3. Enter the "**Application Name"**, "**Job Description"** then select the Source and Destination as the production server and select the FX template as "**ICAT consistency for Linux**" for Linux production servers and "**ICAT consistency for Windows**" for windows platform and click on "**Next"** to continue

Figure 9

Step 4. You should now see the FX job options screen, scroll down to "**Miscellaneous Options**" and change the consistency name from "**Archive"** to an event used to schedule the event based snapshot in the previous step and enter the production volume name for the –v switch. Click on "**Finish"** to continue.

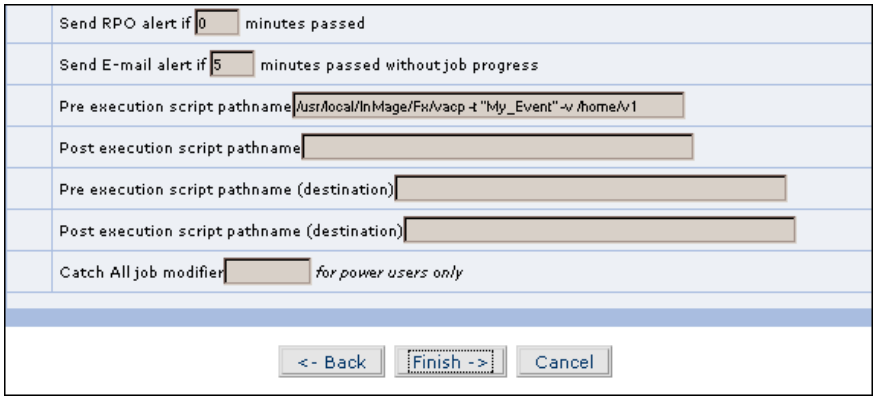

Figure 10

Step 5. The FX job is scheduled to execute once a week on the Sunday at 12:00 noon. You may choose to change the schedule by clicking on the "**Set Schedule**" button. Click on "**Finish"** to save the job

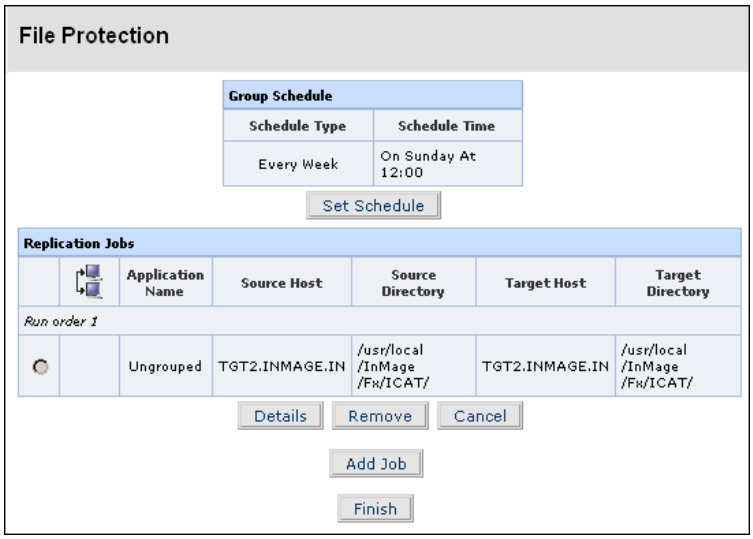

Figure 11

The FX job starts off as scheduled by issuing a consistency tag on the production volumes, as a result an event based scheduled snapshot is fired off on the DR server. The post script of the snapshot calls the ICAT operation. The ICAT operation reads from the configuration file and updates the archival repositories.

6 Using through command line

You may also run the ICAT utility through command line. Access the DR server's command prompt and navigate to the agent installation folder to find the icat.exe. The syntax is shown below

```
icat.exe {--nodes [ip:port]+ | --dnsname } [--transport] [--uid] [--gid] {--
autogendestdirectory=1 --branchname --servername --sourcevolume | --
autogendestdirectory=0 --targetdirectory | --targetdirectory | --branchname --servername
--sourcevolume} { { --directory [--excludelist] [--include] --namepattern --comp --
op=and/or --date --comp --op=and/or --size] | --filelisttotarget} | --filelistfromsource}
+ [--overwrite=1][--retryonfailure][--maxretries] [--maxfilelisters] [--retryinterval] [-
-exitonretryexpiry=1] [--logpath][--fromlastrun][--forcerun] [--sendtcpbuffer] [--
recvtcpbuffer][--connectiontimeout][--lowspeedlimit][--lowspeedtime][--connects][--
lifetime][--copies][--rootdir][--loglevel]
```

Table 3

Mandatory switches	Value	Dependent switches	Optional switches	Example
--transport	http	--rootdir --nodes [ip:port]	--dnsname --uid --gid	{ -- nodes [10.0.164.21:81] + | -- dnsname inmage.in} [-- transport http] [--rootdir fcfs_data]
--transport	nfs	--rootdir		[--transport nfs] [-- rootdir /mnt/share/]
--transport	cifs	--rootdir --nodes [ip]	--dnsname	{ --nodes [10.0.1.81] + | --dnsname inmage.in} [-- transport cifs] [--rootdir share]
-- autogendestdirectory	1	-- branchname --servername -- sourcevolume		{--autogendestdirectory=1 --branchname Santaclara -- servername Leo -- sourcevolume /dev/volume1/}
-- autogendestdirectory	0	-- targetdirectory	--branchname --servername --sourcevolume	{--autogendestdirectory=0 --targetdirectory /mnt/targetarchive | -- branchname Santaclara -- servername Leo -- sourcevolume /dev/volume1/}
--directory			--excludelist --include --namepattern -- comp --op=and/or --date --comp -- op=and/or --size -- comp	{ --directory /mnt/vsnap1/ [--excludelist /temp/] [-- include true] -- namepattern --comp = *.xls --op=and --date --comp <=2009-06-09 --op=and -- size --comp <=1048576}
--overwrite				[--overwrite=0]
--retryonfailure				[--retryonfailure 0]
--retryonfailure	1	--maxretries -- retryinterval	--exitonretryexpiry	[--retryonfailure 1][-- maxretries 5] [-- retryinterval 1] [-- exitonretryexpiry=0]

--logpath				**[--logpath /home/icatlog/]**
--fromlastrun				**[--fromlastrun 1]**
--forcerun				**[--forcerun 0]**
--sendtcpbuffer --recvtcpbuffer				**[--sendtcpbuffer 36782] [--recvtcpbuffer 78340]**
--connectiontimeout				**[--connectiontimeout 180]**
--lowspeedlimit --lowspeedtime				**[--lowspeedlimit 7489][--lowspeedtime 10]**
--connects				**[--connects 10]**
--lifetime			--copies	**[--lifetime 30][--copies 4]**
--copies			--lifetime	**[--lifetime 30][--copies 4]**
--loglevel				**[--loglevel 7]**
--filelistfromsource			--autogendestdirectory	**--filelistfromsource /home/datapaths/booklist.txt}**
--filelisttotarget		--directory --excludelist --include --namepattern --comp --op=and/or --date --comp --op=and/or --size	--autogendestdirectory	**--filelisttotarget /home/datapaths/booklist.txt }**

7 ICAT usage examples

7.1 Scenario 1: Archive Repository operation

There are three supported transport protocols. While using the http protocol, you will need to specify the rootdir as fcfs_data along with the node IP or the DNS name. However while using the nfs or cifs you will need to specify the rootdir as a mounted volume.

The table below shows the transport and their parameters that are needed here.

Table 4

Transport	Mandatory parameters
http	Rootdir = fcfs_Data Nodes = <IP address>:<port number> of archival repository Or Dnsname = <domain name of the archival repository>
nfs	Rootdir = mounted volume
cifs	Rootdir = <root directory of share path> Nodes = <IP address> Or Dnsname = <domain name of the archival repository>

Http example

```
[archiverepository]
Transport = http
Nodes = 10.0.164.21:8080
Dnsname = InMserv
Rootdir = fcfs_data
```

nfs example

```
[archiverepository]
Transport = nfs
Rootdir = /mnt/archive
```

cifs example

```
[archiverepository]
Transport = cifs
Nodes = 10.0.1.30
Dnsname = InMBkp
Rootdir = fcfs_data
```

Notes:

Fcfs_data is default for HCAP systems and while using the transport protocol as http and cifs

7.2 Scenario 2: Default target directory

Recall that the remoteoffice section in the "**icat.conf**" file determines the target directory structure. To learn more, refer to the Remote Office section on page 7.

icat.conf contents

Table 5

Default values	Modified values	Dependent values
[remoteoffice] **servername =** **branchname =** **sourcevolume =**	[remoteoffice] servername= Logistics_server branchname= Eastcoast_Branch sourcevolume= E_Volume	[config] autogendestdirectory=1

After modifying the configuration file as required, proceed to execute the icat command, each time the icat command is executed, the data is replicated to "<**Rootdir under** [archiverepository]**/branchname/servername/sourcevolume/time of executing the icat script>".**

Command

<*Agent installation path***>icat --config=icat.conf**

Example

```
qs10pa1088:# ls Eastcoast_Branch/Logistics_server/E_Volume/
2009_07_02_22_24_43  2009_07_05_21_41_53  2009_07_05_21_46_29  2009_07_05_21_47_22
qs10pa1088: # cd 2009_07_05_21_47_22/
qs10pa1088: # ls
EULA.txt                 InMageVx-5.10-1.i586.rpm
OS_details.sh
InMageFx-5.10-1.i586.rpm  InMage_UnifiedAgent_5.10.1_i586_SLES10-
32_BETA0_01Jul2009_release.tar.gz  uninstall.sh
```

7.3 Scenario 3: User defined target directory

By default the target directory structure is auto generated by reading the "**Remote Office**" section in the "**icat.conf"** file. You may change this by setting the "**autogendestdirectory"** under the "**config"** section to 0. The icat will immediately look for the "**targetdirectory**" parameter under the "**config"** section for an alternate name. This new target directory is created under the rootdir of the Archiverepository section.

icat.conf contents

Table 6

Default values	Modified values	Dependant values
[config] autogendestdirectory=1 targetdirectory=	[config] autogendestdirectory=0 targetdirectory=UDF	none

Command

```
<Agent installation path>icat --config=icat.conf
```

Example

```
qs10pa1088: # ls UDF/
qs10pa1088:# ls UDF/
EULA.txt                  InMageVx-5.10-1.i586.rpm
OS_details.sh
InMageFx-5.10-1.i586.rpm  InMage_UnifiedAgent_5.10.1_i586_SLES10-
32_BETA0_01Jul2009_release.tar.gz  uninstall.sh
qs10pa1088: #
```

7.4 Scenario 4: Multiple content.source and source directories

The example here shows more than one content sources in the same configuration file. Recall that the content source may have multiple directory names to act as source folder and an "**excludelist"** (content.source1) parameter to ignore specific folders.

```
[content.source1]
directoryname= /mnt/dir1/
excludelist= /results, /reports

[content.source2]
directoryname= /mnt/dir2/, /mnt/dir3/, /home/vsnap1/
excludelist= /tax
```

Notes:

Absolute paths would be converted to relative paths by removing the leading "/" for the "excludelist"

In the above example, the directories "**/mnt/dir1**","**/mnt/dir2**", "**/mnt/dir3**" and "**/home/vsnap1**" are replicated while ignoring "**/results**", "**/reports**" and "**/tax**" folders.

```
qs10pa1088:/tmp/target/tester/2009_07_06_01_34_53 # ls
animals     bills         goodluck.txt  invoice   tax
audits.doc  booklist.txt  health.doc    pets.txt  yoga.doc
qs10pa1088:/tmp/target/tester/2009_07_06_01_34_53 #
```

When you need to apply the same "**filefilter"** options for all directories specified in the "**directoryname**", you can use a common content.source. Multiple content sources are used to specify different file filters for different sets of "**directorynames"**. Refer to the below example for more information

7.5 Scenario 5: Applying file filters

At times you will need to replicate a set of folders while ignoring specific set of files. Just as you can ignore folders you may also include/exclude specific files/file types by specifying the file pattern for the "**filfilter"**. For example, filefilter=patter= <file pattern>. To learn more about file filters refer to the section Content.source on page 10

```
[content.source1]
directoryname= /mnt/dir1/
excludelist= /results, /reports
filefilter=pattern=*.txt
include= false

[content.source2]
directoryname= /mnt/dir2/, /mnt/dir3/, /home/vsnap1/
excludelist= /tax
filefilter=pattern=*.txt and date<=2009-07-06 and size<1073741824
include= true
```

The values in the [content.source1] would replicate all the files except txt files irrespective of their size and modified times.

The values in the [content.source2] would replicate all doc files which were modified before the 6th July 2009 and with size less than 1073741824 bytes.

Example

```
qs10pa1088:/tmp/target/tester/2009_07_06_02_03_26 # ls
animals  audits.doc  health.doc  invoice  pets.doc  tax  yoga.doc
```

Typical filefilter
filefilter=pattern=<file patterns> and/or date=<file last modified date> and/or size=<size of the file>
To learn more refer to the "filefilter" option in the Content.source section on page 10

7.6 Scenario 6: Tunables

7.6.1 retryonfailure

Here "**retryonfailure"** is set to 0 indicating that icat will not retry to replicate if one of the file fails which ignores "**retrylimit"**, "**retryinterval"** and "**exitonretryfailure"**. This means icat instance will exit if one of the file fails to replicate.

```
retryonfailure=0
retrylimit=0
retryinterval=0
exitonretryexpiry=0
```

Here "**retryonfailure"** is set to 1 indicating that icat will retry to replicate the file which has failed for the first time and it will continue to retry for 5 times and for every 1 sec till the file has been replicated successfully. "**Exitonretryexpiry"** is set to 0 will skip that file and will continue to replicate other files.

```
retryonfailure=1
retrylimit=5
retryinterval=1
exitonretryexpiry=0
```

7.6.2 exitonretryexpiry

Here "**retryonfailure"** is set to 1 indicating that icat will retry to replicate the file which has failed for the first time and it will continue to retry for 5 times and for every 1 sec till the file has been replicated successfully. "**Exitonretryexpiry"** is set to 1 will exit the icat instance if the "**retrylimit"** has crossed.

```
retryonfailure=1
retrylimit=5
retryinterval=1
exitonretryexpiry=1
```

7.6.3 maxconnects and maxfilelisters

"Maxconnects" set to 10 implies number of threads to be spawned to archive/replicate files and Maxfilelisters set to 10 implies number of threads to be spawned to create file listers
Each thread can make a single connection therefore "**maxfilelisters"** cannot exceed "**maxconnects"**.

```
maxconnects=10
Maxfilelisters = 10
```

7.6.4 tcprecvbuffer and tcpsendbuffer

"Tcprecvbuffer" and "**tcpsendbuffer"** values can be configured as per the bandwidth of the network and desired latency. The values for these can be identified using a formula [Bandwidth * Delay (Latency)]

Bandwidth is 1 Gbps and Delay is 32 ms between your source machine and the archival node. Your tcp window size should be 1 Gbps * 32 ms= 4000000 bytes

```
tcprecvbuffer = 36782
tcpsendbuffer = 78340
```

7.6.5 lowspeedlimit

lowspeedlimit =1 bytes/sec indicates should be transferred bytes per second and **lowspeedtime** = 10 indicates icat will wait for 10 secs before in exits if the desired speedlimit of 7489 bytes/sec is not met.

```
lowspeedlimit = 1
lowspeedtime = 10
```

The "**connectiontimeout"** is set to 180 seconds indicating that if the connection has not been established by icat in 180 seconds, icat instance will exit.

```
connectiontimeout = 180
```

7.7 Scenario 7: Config

"**Fromlastrun = 0**" indicates that incremental backup is disabled by default. Set the value to 1 to perform an incremental backup of the last icat execution. All new files created on the source folder after the last icat execution will be replicated to a separate target folder by the subsequent icat execution. Any changes in the existing files will be replicated to the same target location.

Contents of icat.conf

```
[config]
fromlastrun = 1
```

List of files on the source

```
qs10pa1088: #ls
animals     bills         goodluck.txt  invoice   tax
audits.doc  booklist.txt  health.doc    pets.txt  yoga.doc
```

Syntax: <***Agent installation path***>icat --config=icat.conf

Performing initial copy
./icat --config=icat.conf

```
qs10pa1088:/tmp/target/tester/2009_07_06_01_34_53 # ls
animals     bills         goodluck.txt  invoice   tax
audits.doc  booklist.txt  health.doc    pets.txt  yoga.doc
```

Updates on the source directory
Two new files (cpu.txt and monitor.doc) were added to the source directory and one of the existing file (booklist.txt) is modified.

Performing another copy

```
./icat  --config=icat.conf
```

After executing the icat command the newly created files along with the modified files are copied to a new directory

```
qs10pa1088: #cd /tmp/target/tester/
qs10pa1088: # ls
qs10pa1088: # 2009_07_06_01_34_53   2009_07_06_02_14_11
qs10pa1088:/tmp/target/tester/2009_07_06_02_14_11 # ls
cpu.txt     monitor.doc     booklist.txt
```

7.8 Scenario 8: Resume mode

You may use the "**--resume"** switch to continue retry the failed replication right from its point of failure. Observe the screen below showing files on the source directory

```
[root@imits130 icat1]# ls -l
-rw-r--r-- 1 root root 2054454 May 16 10:45 latency_nfs_mp3_2009-05-16-10-42-40_icat.log
-rw-r--r-- 1 root root 2052853 May 16 10:50 latency_nfs_mp3_2009-05-16-10-47-54_icat.log
-rw-r--r-- 1 root root 2050485 May 16 11:06 latency_nfs_mp3_2009-05-16-11-03-26_icat.log
-rw-r--r-- 1 root root 2052114 May 16 11:09 latency_nfs_mp3_2009-05-16-11-07-20_icat.log
-rw-r--r-- 1 root root 2051068 May 16 11:14 latency_nfs_mp3_2009-05-16-11-12-22_icat.log
-rw-r--r-- 1 root root 2051068 May 16 11:18 latency_nfs_mp3_2009-05-16-11-15-48_icat.log
```

Due to an external interruption, only four out of six files were replicated on the target as shown below

```
[root@imits130 2009_07_08_12_20_22]# ls -l
-rw-r--r-- 1 root root 2054454 Jul  8 12:20 latency_nfs_mp3_2009-05-16-10-42-40_icat.log
-rw-r--r-- 1 root root 2052853 Jul  8 12:20 latency_nfs_mp3_2009-05-16-10-47-54_icat.log
-rw-r--r-- 1 root root 2050485 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-03-26_icat.log
-rw-r--r-- 1 root root 2052114 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-07-20_icat.log
```

Execute the following command to resume the replication

`icat.sh --resume --config= <full path of the Icat.conf file>`

After the command is successful, observe that all the files are now replicated to the target directory.

```
[root@imits130 2009_07_08_12_20_22]# ls -l
-rw-r--r-- 1 root root 2054454 Jul  8 12:20 latency_nfs_mp3_2009-05-16-10-42-40_icat.log
-rw-r--r-- 1 root root 2052853 Jul  8 12:20 latency_nfs_mp3_2009-05-16-10-47-54_icat.log
-rw-r--r-- 1 root root 2050485 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-03-26_icat.log
-rw-r--r-- 1 root root 2052114 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-07-20_icat.log
-rw-r--r-- 1 root root 2051068 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-12-22_icat.log
-rw-r--r-- 1 root root 2051068 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-15-48_icat.log
```

Notes:

You may continue to issue the same command until all the files are successfully replicated to the target directory.

7.9 Scenario 9: Incremental backup (using resume switch)

You may also use the --resume switch to perform an incremental backup to save network resources.

After the initial copy, you should see all the files on the source and target directory. The example below shows the list of files on the target directory.

```
[root@imits130 2009_07_08_12_20_22]# ls -l
-rw-r--r-- 1 root root 2054454 Jul  8 12:20 latency_nfs_mp3_2009-05-16-10-42-40_icat.log
-rw-r--r-- 1 root root 2052853 Jul  8 12:20 latency_nfs_mp3_2009-05-16-10-47-54_icat.log
-rw-r--r-- 1 root root 2050485 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-03-26_icat.log
-rw-r--r-- 1 root root 2052114 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-07-20_icat.log
-rw-r--r-- 1 root root 2051068 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-12-22_icat.log
-rw-r--r-- 1 root root 2051068 Jul  8 12:20 latency_nfs_mp3_2009-05-16-11-15-48_icat.log
```

On the source directory two new files are added, which need to be replicated to the same target directory. Rather than perform a fresh replication by creating a new target directory, you may use the "**--resume**" switch to perform an incremental backup which updates the existing files and replicates new files to the target directory

```
[root@imits130 icat1]# ls -l
-rw-r--r-- 1 root root 2054454 May 16 10:45 latency_nfs_mp3_2009-05-16-10-42-40_icat.log
-rw-r--r-- 1 root root 2052853 May 16 10:50 latency_nfs_mp3_2009-05-16-10-47-54_icat.log
-rw-r--r-- 1 root root 2050485 May 16 11:06 latency_nfs_mp3_2009-05-16-11-03-26_icat.log
-rw-r--r-- 1 root root 2052114 May 16 11:09 latency_nfs_mp3_2009-05-16-11-07-20_icat.log
-rw-r--r-- 1 root root 2051068 May 16 11:14 latency_nfs_mp3_2009-05-16-11-12-22_icat.log
-rw-r--r-- 1 root root 2051068 May 16 11:18 latency_nfs_mp3_2009-05-16-11-15-48_icat.log
-rw-r--r-- 1 root root 1072128 Jul  8 12:20 latency_nfs_mp3_icat.mdb
-rw-r--r-- 1 root root    5152 Jul  8 12:20 latency_nfs_mp3_icat.mdb-journal
```

icat.sh --resume --config= <*full path of the Icat.conf file*>

```
[root@imits130 2009_07_08_12_20_22]# ls -l
-rw-r--r-- 1 root root 2054454 May 16 10:45 latency_nfs_mp3_2009-05-16-10-42-40_icat.log
-rw-r--r-- 1 root root 2052853 May 16 10:50 latency_nfs_mp3_2009-05-16-10-47-54_icat.log
-rw-r--r-- 1 root root 2050485 May 16 11:06 latency_nfs_mp3_2009-05-16-11-03-26_icat.log
-rw-r--r-- 1 root root 2052114 May 16 11:09 latency_nfs_mp3_2009-05-16-11-07-20_icat.log
-rw-r--r-- 1 root root 2051068 May 16 11:14 latency_nfs_mp3_2009-05-16-11-12-22_icat.log
-rw-r--r-- 1 root root 2051068 May 16 11:18 latency_nfs_mp3_2009-05-16-11-15-48_icat.log
-rw-r--r-- 1 root root 1072128 Jul  8 12:20 latency_nfs_mp3_icat.mdb
-rw-r--r-- 1 root root    5152 Jul  8 12:20 latency_nfs_mp3_icat.mdb-journal
```

7.10 Scenario 10: Delete options

You may choose to delete older target directories based on the number of copies or the lifetime of the target directory. Refer to the Delete section on page 12 to set the parameter value.

7.10.1 Using Maxlifetime

When icat is executed, it deletes all folders older than the "**maxlifetime"** from the target directory.

```
Maxlifetime = 2
Maxcopies = 0
```

The example below shows the list of target directories before icat is executed

```
[root@imits130 E]# ls -l
drwxr-xr-x 2 root root 4096 Jul  6 12:20 2009_07_06_12_20_22
drwxr-xr-x 3 root root 4096 Jul  6 12:27 2009_07_06_12_27_01
drwxr-xr-x 3 root root 4096 Jul  7 12:30 2009_07_07_12_30_23
drwxr-xr-x 3 root root 4096 Jul  7 12:32 2009_07_07_12_32_18
drwxr-xr-x 2 root root 4096 Jul  7 12:35 2009_07_07_12_35_30
```

After icat is executed it deleted all the target directories older than two days as specified for the "**maxlifetime"** (e.g., 2 days)

```
[root@imits130 E]# ls -l
drwxr-xr-x 3 root root 4096 Jul  7 12:30 2009_07_07_12_30_23
drwxr-xr-x 3 root root 4096 Jul  7 12:32 2009_07_07_12_32_18
drwxr-xr-x 2 root root 4096 Jul  7 12:35 2009_07_07_12_35_30
drwxr-xr-x 2 root root 4096 Jul  8 12:35 2009_07_08_12_42_50
```

7.10.2 Using maxcopies

Alternatively you may choose to use the number of copies to delete older target directories.

```
maxlifetime= 0
maxcopies=   5
```

The example here shows the list of target directories before executing icat

```
[root@imits130 E]# ls -l
drwxr-xr-x 2 root root 4096 Jul  6 12:20 2009_07_06_12_20_22
drwxr-xr-x 3 root root 4096 Jul  6 12:27 2009_07_06_12_27_01
drwxr-xr-x 3 root root 4096 Jul  7 12:30 2009_07_07_12_30_23
drwxr-xr-x 3 root root 4096 Jul  7 12:32 2009_07_07_12_32_18
drwxr-xr-x 2 root root 4096 Jul  7 12:35 2009_07_07_12_35_30
```

After icat is executed, the oldest copy is deleted in favor of the new target directory thus maintaining the "**maxcopies"** (for example, 5)

```
[root@imits130 E]# ls –l
drwxr-xr-x 3 root root 4096 Jul  6 12:27 2009_07_06_12_27_01
drwxr-xr-x 3 root root 4096 Jul  7 12:30 2009_07_07_12_30_23
drwxr-xr-x 3 root root 4096 Jul  7 12:32 2009_07_07_12_32_18
drwxr-xr-x 2 root root 4096 Jul  7 12:35 2009_07_07_12_35_30
drwxr-xr-x 2 root root 4096 Jul  8 12:35 2009_07_08_12_42_50
```

7.10.3 Using both maxlifetime and maxcopies

You may also use both "**maxlifetime"** and "**maxcopies"** to delete older target directories

```
maxlifetime= 2
maxcopies=   3
```

The below example shows five target directories out of which two directories are older than the "**maxlifetime"** and three of them overshot the "**maxcopies"**

```
[root@imits130 E]# ls -l
drwxr-xr-x 2 root root 4096 Jul  6 12:20 2009_07_06_12_20_22
drwxr-xr-x 3 root root 4096 Jul  6 12:27 2009_07_06_12_27_01
drwxr-xr-x 3 root root 4096 Jul  7 12:30 2009_07_07_12_30_23
drwxr-xr-x 3 root root 4096 Jul  7 12:32 2009_07_07_12_32_18
drwxr-xr-x 2 root root 4096 Jul  7 12:35 2009_07_07_12_35_30
```

After the icat is executed, you will find three directories including a newly created directory. This is because icat has deleted the directories that are older than the "**maxlifetime"** and to maintain the "**maxcopies"** it has deleted older directories to accommodate new directory

```
[root@imits130 E]# ls –l
drwxr-xr-x 3 root root 4096 Jul  7 12:32 2009_07_07_12_32_18
drwxr-xr-x 2 root root 4096 Jul  7 12:35 2009_07_07_12_35_30
drwxr-xr-x 2 root root 4096 Jul  8 12:35 2009_07_08_12_42_50
```

7.11 Scenario11: Filelist options

7.11.1 Using Filelisttotarget

You may use filelisttotarget to list the files of the content.source to filelist path where the files would be listed.

The below example shows the content.source details and the filelisttotarget option enabled

```
 [content.source1]
directoryname = /home/run1
excludelist=
filefilter=pattern=
include= true
```

```
[filelist]
filelistfromsource =
filelisttotarget = /home/newlist.txt
```

After icat is executed, you can see the filelist in the path given at filelisttotarget

```
root@imits107 Fx]# cat /home/newlist.txt
/home/run1/vsnap3_track.txt
/home/run1/temp2.txt
/home/run1/sysstat-7.0.2-1.el5.x86_64.rpm
/home/run1/temp3.txt
/home/run1/vsnap2_track.txt
/home/run1/md5_vsnap2.txt
/home/run1/vsnap1_track.txt
/home/run1/md5_vsnap3.txt
/home/run1/md5_vsnap1.txt
/home/run1/temp1.txt
```

7.11.2 Using Filelistfromsource

You may use filelistfromsource option to archive the files from the list provided by filelisttotarget in the earlier example
The below example shows archiving files from the filelist to root directory using filelistfromsource option

```
[filelist]
filelistfromsource = /home/newlist.txt
filelisttotarget =
```

```
root@imits107 Fx]# cat /home/newlist.txt
/home/run1/vsnap3_track.txt
/home/run1/temp2.txt
/home/run1/sysstat-7.0.2-1.el5.x86_64.rpm
/home/run1/temp3.txt
/home/run1/vsnap2_track.txt
/home/run1/md5_vsnap2.txt
/home/run1/vsnap1_track.txt
/home/run1/md5_vsnap3.txt
/home/run1/md5_vsnap1.txt
/home/run1/temp1.txt
```

After icat is executed, you can see the files archived to the root directory picked from the filelist provided at filelistfromsource

```
[root@imits107 2009_09_11_15_29_56]# cd /home/run1/
md5_vsnap1.txt          sysstat-7.0.2-1.el5.x86_64.rpm  temp3.txt          vsnap3_track.txt
md5_vsnap2.txt          temp1.txt                       vsnap1_track.txt
md5_vsnap3.txt          temp2.txt                       vsnap2_track.txt
```

7.12 Scenario 12: log files

Logfilepath:
The log files and the icat database are stored under logfilepath. This is defaulted to "**/tmp/logpath**"

```
[config]
logfilepath=/tmp/logpath
loglevel = 7
```

Table 7

Case	Autogendirectory	Target directory	Remote office	Log file name under the "logfilepath"
1	1	Not applicable	Details available in config file	branchname_servername_volname_time stamp_icat.log
2	0	Details available in icat.conf file	Details available in config file	branchname_servername_volname_time stamp_icat.log
3	0	Details available in icat.conf file	Details not available in config file	<Targetdirectory>_timestamp_icat.log

7.12.1 Case 1

Contents of icat.conf

```
[remoteoffice]
servername = inmage
branchname = Hyderabad
sourcevolume = E
```

```
[config]
autogendestdirectory=1
logfilepath=/home/icatlog
loglevel = 7
```

Name of the log file: Hyderabad_inmage_E_2009-07-13-13-25-01_icat.log

7.12.2 Case 2

Contents of icat.conf

```
[remoteoffice]
servername = inmage
branchname = Hyderabad
sourcevolume = E
```

```
[config]
autogendestdirectory=0
targetdirectory=VTEST
logfilepath=/home/icatlog
loglevel = 7
```

Name of the log file: Hyderabad_inmage_E_2009-07-13-13-25-01_icat.log

7.12.3 Case 3

Contents of icat.conf

```
[remoteoffice]
servername =
branchname =
sourcevolume =
```

```
[config]
autogendestdirectory=0
targetdirectory=VTEST
logfilepath=/home/icatlog
loglevel = 7
```

Name of the log file: VTEST_2009-07-13-13-25-01_icat.log

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