IPM 6.600 SOLVUTIL Addendum

Abstract

The HPE Shadowbase™ for NonStop SOLVUTIL product used to load target OSS regular files in order to match their corresponding source entities. This manual describes the basic functionality of HPE NonStop Shadowbase SOLVUTIL, how to configure for LOADing, and also how to monitor and manage these environments.

Product Version

HPE Shadowbase Version 6.600\T1122H06^AAN

Supported Release Version Updates (RVUs)

This manual applies to all currently supported versions as described by the Shadowbase Supported Versions Cross-Reference,unless otherwise noted by a superseding document. Alternatively, visit the http://www.ShadowbaseSoftware.com website for the list of supported platforms and databases.

Legal Notices

HPE NonStop Shadowbase SOLVUTIL Addendum

Table of Figures

Notation Conventions

Hypertext Links

Blue underline is used to indicate a hypertext link within text. By clicking a passage of text with a blue underline, you are taken to the location described. For example:

To preserve the modification timestamp, see….on page ___.

General Syntax Notation

The following list summarizes the conventions for syntax notation and presentation in the HPE Shadowbase manual collection.

UPPERCASE LETTERS. Uppercase letters indicate keywords and reserved words; enter these items exactly as shown. Items not enclosed in brackets are required For example:

```
PARAM SBCMDFILE
```

lowercase letters: Represent variable entries to be supplied by user. For example:

```
<file name>
```

Computer type. `Computer type` letters within text indicate C and Open System Services (OSS) keywords and reserved words. Type these items exactly as show. Items not enclosed in brackets are required. For example

```
RUN LOADHELP
```

Italic computer type. Italic computer type letters within text indicate C and Open System Services (OSS) variable items that you supply. Items not enclosed in brackets are not required. For example:

```
pathname
```

Brackets [ ]: Enclose optional syntax. A vertically aligned group of items enclosed in brackets represents a list of selections from which one, or none, can be chosen. For example:

```
CKPTFNAME      [\system.] [$volume.] [subvolume.]
filename
```

Braces { }: Enclose required syntax. A vertically aligned group of items enclosed in braces represents a list of selections from which exactly one must be chosen. For example:

```
CHECKCONFIG    { ON }
                            { OFF }
```

Ellipses …: The enclosed syntax can be repeated a number of times. For example:

```
KEYVALUESTART < <string> | <byte> > [, <string> |
<byte> ] ...
```

Punctuation: All punctuation and symbols other than those described above must be entered precisely as show For example:

```
error := NEXTFILENAME ( file-name ) ;
LISTOPENS SU $process-name. #su-name
```

Quotation marks around a symbol such as a bracket or brace indicate the symbol is a required character that you must type as shown. For example:

`"{" ` *`repetition-constant-list`* ` "}"`

Item Spacing. Spaces shown between items are required unless one of the items is a punctuation symbol such as a parenthesis or a comma. For example:

`CALL STEPMOM ( ` *`process-id`* ` ) ;`

If there is no space between two items, spaces are not permitted. In this example, no spaces are permitted between the period and any other items:

`$`*`process-name`*`.#`*`su-name`*

Line Spacing. If the syntax of a command is too long to fit on a single line, each continuation line is indented three spaces and is separated from the preceding line by a blank line this spacing distinguishes items in a continuation line from items in a vertical list of selections. For example:

`ALTER [ ` *`/ OUT file-spec /`* ` ] LINE`
`            [ , ` *`attribute-spec`* ` ] …`

SOLVUTIL

Introduction

SOLVUTIL is a process used to "chase" OSS regular files that have data continually appended to the end of them. As data is appended to the source file, the file is periodically checked for updates. Any new data that has been identified is then replicated to the target file by SOLVUTIL. It is not limited to a single file as SOLVUTIL can track updates to a set of files that are updated in sequence. A sequence or set of files can contain any number of files. It is also permissible for any file in the set to be reused. In this instance the file will again be replicated in its entirety.

SOLVUTIL is configured and runs in the Guardian environment even though the OSS regular files that are replicated reside in the OSS environment. SOLVUTIL runs as a standalone guardian process. Figure 1 depicts SOLVUTIL running on a NonStop system. A HPE Shadowbase replication environment with a monitor, collectors, consumers and the like is not used nor required.
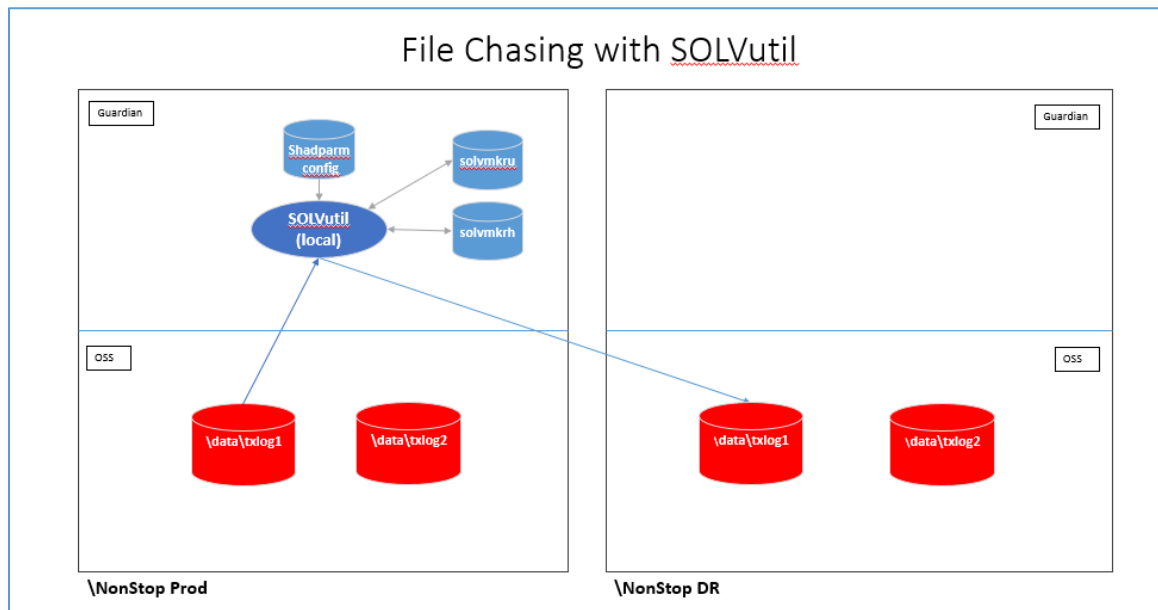
Figure 1 – SOLVUTIL Overview

Because SOLVUTIL is currently not monitored by a HPE Shadowbase AUDMON process, persistence can only be achieved with the use of Guardian's Subsystem Control Facility, SCF.

SOLVUTIL
Introduction

TACL environment variables are used to configure SOLVUTIL. Optionally, a
SHADPARM initialization file with sections can also be used to maintain the
configuration. These parameters are used to configure such things as the source
file set, target mappings, target file existence options, start controls, stop
controls, file switch-over settings, throttling, various logging options, buffer usage
options, marker prefix and license location.

Two SOLV marker files are maintained by SOLVUTIL. One contains the current
restart position that is maintained and written to by SOLVUTIL as it is
progressing. This file is referred to as SOLVMKRU or unaudited marker file.
This file will also be used by SOLVUTIL on startup to continue from a point where
previous load left off. The seconds marker file contains an archive or history of all
replication activity. This file is referred to as the SOLVMKRH or history marker
file. When SOLVUTIL switches from replicating the current file to the next file,
the SOVLMKRU record is moved to the SOLVMKRH file. The SOLVMKRH file
maintains an archive of all SOLVUTIL activity. The Guardian process name
given to SOLVUTIL at startup is used to link the running process to the records in
both SOLV marker files.

SOLVCOM is used as an interface to an active SOLVUTIL process and the two
marker files. Supplying SOLVCOM with the process name of a running
SOLVUTIL will produce output that consists of details about the running
SOLVUTIL process. SOLVCOM can also be used to query either of the two
marker files. Using SOLVCOM to query the SOLVMKRU file is similar to
querying the SOLVUTIL process regardless if SOLVUTIL is running. Querying
the SOLVMKRH file will result in a log of all the individual files that have been
loaded in the past. See Figure 2 for an overview of SOLVCOM.
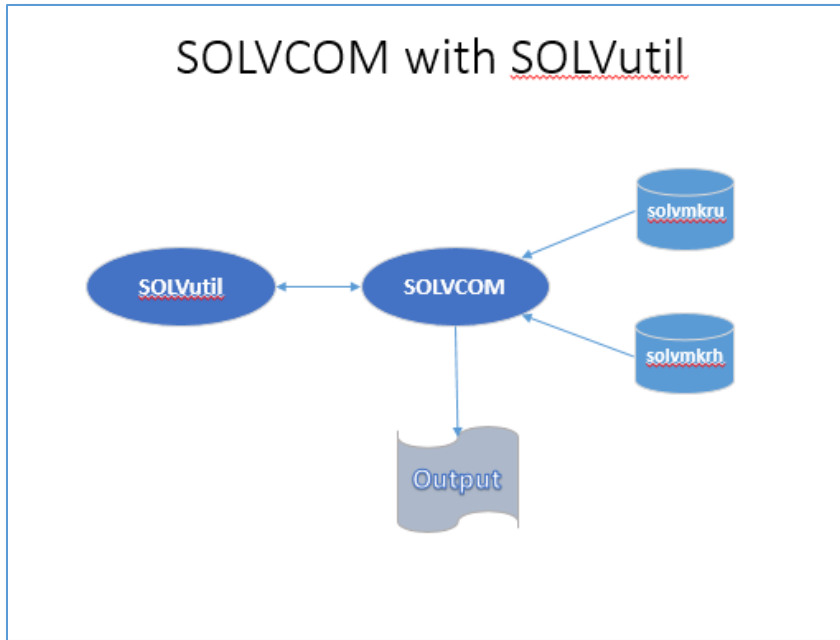
Figure 2 - SOVLCOM Reporting Overview

SOLVCOM can also be used to display and change the dynamically configurable parameters. It doesn't matter if the parameters came from TACL or the shadparm files. Just remember that dynamically changed parameters are not persistent. The TACL param or SHADPARM file will need to be updated with the change before restarting SOLVUTIL.

By default, the SOLVUTIL will start by loading the file in the file set with the earliest last modified time. This behavior can be controlled through parameters, and changed to start on a specific file or on the first file with a specific modified time. If SOLVUTIL ran previously and the restart information is found, SOLVUTIL will start at the last saved restart point instead. In order for a STARTxxx parameter to be used by SOLVUTIL, there can be no restart information in either of the two marker files.

SOLVUTIL does pay attention to the filename as it is sequencing through its file set. The internal logic always uses the last modified time of the source filenames for sequencing.

Running SOLVUTIL

Before running SOLVUTIL to perform a load, use the SOLVUTEX template to generate an edit file that contains the appropriate configuration parameters. Duplicate the SOLVUTEX file to SHADPARM and make the configuration changes to SHADPARM.

The syntax to start SOLVUTIL is as follows:

```
>run solvutil/name <process-name>, <run-options>/ &
            [-s<shadutil-section-name>]        &
            [-f<shadutil-filename>] [-v] [-d]

      where <sharutil-section-name>  defaults to 'SOLVUTIL'
            <shadutil-filename>      defaults to '<default-subvol>.shadparm'

   i.e. >run solvutil/name $solvu/-smysection -f$myvol.mysub.myconfig
```

It is highly recommended that the user supply a valid process name when starting SOLVUTIL. The process name is used to uniquely identify a particular load over the course of its lifetime. This is very important for the purpose of restarting an existing load as the process name is used as a key field in the marker files. When a process name is not supplied, a system-generated process name is created and used to maintain control information for the load. This will make if cumbersome in the event that a restart of a continuation load is required. The process name from the previous SOLVUTIL run will have to be manually identified.

The optional <run-options> are the standard Guardian process run time options such as process name, priority, cpu, nowait, etc.

Messages will be logged to the location of the OUT filename if the CONSOLELOGGING parameter is enabled. CONSOLELOGGING is enabled by default. Messages will be sent to the home terminal unless another file name or process name is set in the OUT filename. Optionally, the EMSLOGGING and FILELOGGING parameters can also be set to allow messages to be written to different and/or multiple locations.

The majority of the SOLVUTIL configuration is accomplished with parameters. These can be standard TACL PARAMS. As an alternative, the parameter settings can also be set in a SHADPARM file. SHADPARM is an edit file that contains one or more configuration sections. Each section contains a list of the parameter names and their assigned values. Any existing TACL parameters that are set before running SOLVUTIL will override the parameters set in the SHADPARM file.

The SHADPARM filename can be specified to SOLVUTIL in the run command with the '-f' switch. If not specified, the default will be the SHADPARM file in the current default subvolume. In addition, a section name can be specified with the '–s' switch. The section name SOLVUTIL will be used if not specified.

SOLVUTIL
Running SOLVUTIL

A '–d' switch is provided to disable the printing of the message prefix on every message. The message prefix consists of the system time and process name. In addition, there exists a '-v' switch to enable verbose messages.

SOLVUTIL is also capable of comparing two OSS regular files. The results of the compare will show that the two files are identical or the offset of the first byte that mismatches. Use the COMMAND parameter and change the default value from DIRECT (loading) to COMPARE to run SOLVUTIL in compare mode.

SOLVUTIL would normally be run in production with the NOWAIT process run time option. CONSOLELOGGING would be disabled to prevent SOLVUTIL from failing when a TACL session would go away. Either EMSLOGGING, FILELOGGING or both would be enabled to keep a history of activity.

In the event that CONSOLELOGGING is disabled and there is a problem logging to a configured EMS collector or a file, SOLVUTIL will fail and generate a save-abend file. The stack trace of the ZZSAnnnn will give the user an idea of what caused the problem. Use these procedures to view a zzsa file for more information.

```
4> xinspect

TNS/X xInspect gdb Debugger [T0903 - 25-Jan-2019 12:40]
Copyright (C) 2016 Free Software Foundation, Inc.
Copyright 2018 Hewlett Packard Enterprise Development Company LP

xInspect (based on GDB) is covered by the GPLv3+ License:
GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.  Type "show copying"
and "show warranty" for details.

Working directory \VIV1.$GPJ.DEV6600.
(xInspect 1,-2):snapshot zzsa7919
Loaded snapshot file \VIV1.$GPJ.DEV6600.zzsa7919 for program \VIV1.$GPJ.DEV6600.
SOLVUTIL (cpu:1,pin:982).
Created by SUPER.GPJ at time 2019-07-12 11:05:04
Symbols read in for program loadfile \VIV1.$GPJ.DEV6600.SOLVUTIL.
Type 'info target' for additional details.
(xInspect 1,982):backtrace
…
#10 0xffffffffff26dd1ce in exit () in \VIV1.$SYSTEM.ZDLL024.XCRTLDLL
#11 0x7003f783 in cannot_log_to_ems_or_console (
    Buffer=0x6fffe2f0 "Fatal error in C:\\Dev\\NSB6600\\solvutil\\TNS-X\\../src/
log.c:SendToEms:126\n") at C:\Dev\NSB6600\solvutil\TNS-X\../src/log.c:283
#12 0x7003eb59 in LogMessage (
    Module=0x8012320 "C:\\Dev\\NSB6600\\solvutil\\TNS-X\\../src/log.c",
    Proc=0x8012350 "SendToEms", Line=126, ExitFlag=1,
    format=0x80123f0 "Error opening collector: %s, FS error: %d\n")
    at C:\Dev\NSB6600\solvutil\TNS-X\../src/log.c:389
…
```

SOLVUTIL Example Configuration (SOLVUTEX)

The SOLVUTEX file can be found in the install sub-volume after installing HPE Shadowbase. SOLVUTEX is an edit file that can be used as a template for configuring SOLVUTIL. The file contains a list of all parameters that could be used in a configuration.

A description of all the parameters can be found in a section that follows. This is the contents of the SOLVUTEX file.

```
###############################################################################
#
# This is an example of a shadparm file for use by SOLVUTIL.
#
# ---Date--- -Ver- Change history------------------------------------------
# 06/31/2019 6.600 Original release
#
###############################################################################

# This is a comment to end of line

###params that apply to all sections can be supplied in the GENERAL section
[GENERAL]

###default section name used by solvutil is SOLVUTIL
[SOLVUTIL]

###example section named 'directload' for expand replication.
[DIRECTLOAD]
#paramname=value                          ---default value---
#CONSOLELOGGING=<ENABLE|DISABLE>          ENABLE
#FILELOGGING=<guardian-fname>             Disabled
#EMSLOGGING=<ems-pname>                   Disabled
#COMMAND=DIRECT                           DIRECT
#LICENSEFNAME=<guardian-fname>            SHADPASS
#MARKERPREFIX=<guardian-fname>            SUMKR

#ACTIVITYDELAYSECONDS=<seconds>           60
#INACTIVITYDELAYSECONDS=<seconds>         60
#SOLVMGRDELAYSECONDS=<seconds>            60
#SOLVRECDELAYCENTISECONDS=<.01 seconds>   0

#IOSIZE=<bytes>                           57344 (<57344 and divisible by 4096)
#IOBUFFERS=<buffers>                      16

#SOURCEPATHNAMES=<colon separated pathname(s) and/or directory(ies)>
#MAPPATHNAMES=<colon separated search/replace paired values>
#for example...
#SOURCEPATHNAMES=/E/gravic1/dir:E/gravic1/file  #all files in 'dir' and 'file'
#MAPPATHNAMES=/E/gravic1:/E/viv1                #replace system names in targets


#PURGEDATAONSTART=<YES|NO>                NO
#CREATEONSTART=<YES|NO>                   NO

#note that the marker files (SUMKRU and SUMKRH) must not contain entries for
#the SOLVUTIL process name in order for the START... parameters to be used.
#STARTPATHNAME=<pathname>                 none
#STARTRBA=<rba>                           none  (must specify STARTPATHNAME)
#STARTLASTMODTIME=<YYYYD-MM-DD HH:MM:SS>  none

#STOPPATHNAME=<pathname>                  none
#STOPTIME=<YYYYD-MM-DD HH:MM:SS>          none
#STOPLASTMODTIME=<YYYYD-MM-DD HH:MM:SS>   none

### example section named compare for comparing source to target
[COMPARE]
#COMMAND=COMPARE                          must specify COMPARE, default is DIRECT
#SOURCEPATHNAME=<pathname>                none
#TARGETPATHNAME=<pathname>                none
```

SOLVUTIL currently has two modes of operation. The first mode is used to
replicate changes to a set of OSS regular files. Set the parameter named
COMMAND to DIRECT for chasing file changes using a single copy of

SOLVUTIL
Running SOLVUTIL

SOLVUTIL and Expand. The second mode will compare two OSS regular files.
Set the COMMAND parameter to COMPARE.

Only the SOURCEPATHNAMES and MAPPATHNAMES are required to replicate
or 'chase' a particular set of OSS regular files. All other parameters will use
default values. The following is a simple example for replicating all the file in the
data directory from one NonStop system to another. TACL params are used for
simplicity. Messages are written to the home terminal (console).
CREATEONSTART is necessary if the target file(s) do not already exist.

```
>param SOURCEPATHNAMES /E/viv1/home/data
>param MAPPATHNAMES /E/viv1:/E/gravic1
>param CREATEONSTART YES
>run solvutil/name $solvu/
SOLVUTIL - T1122 - V6600H06 - (01JUN19), COPYRIGHT GRAVIC, INC.
1995-2019. PORTIONS COPYRIGHTED BY AND LICENSED FROM THIRD PARTIES. SEE
README FILE. USAGE SUBJECT TO THE TERMS OF A WRITTEN LICENSE AGREEMENT.
PATENTS: SEE WWW.GRAVIC.COM/GRAVICLABS/PATENTS/PRODUCTS.

Started \GRAVIC1.$X5BY:500302533 at 2019-06-24:15:49:29.504078
\GRAVIC1.$DATA.DEV6600.SOLVUTIL|CPU 0|Node 222|Pri 148|Build Jun 24 2019 15:38:24
…
```

In a production system a user would want console logging disabled with
message written to EMS or a log file. SOLVUTIL would also be started nowaited.

```
>param SOURCEPATHNAMES /E/viv1/home/data
>param MAPPATHNAMES /E/viv1:/E/gravic1
>param CREATEONSTART YES
>param CONSOLELOGGING DISABLE
>param FILELOGGING log
>param EMSLOGGING $0
>run solvutil/name $solvu,nowait/
```

A running SOLVUTIL process can be stopped from TACL with the stop
command. This will stop SOLVUTIL immediately. Restarting SOLVUITL with the
same process name will force it to use the saved restart position and continue
replicating from where it last left off. Alternatively, SOLVUTIL can be stopped
using SOLVCOM with the '–h' switch. SOLVUTIL will drain any work in progress
and then stop. Note that if SOVLUTIL is sleeping when told to stop, the stop will
not go in effect until the sleep completes.

```
6> run solvcom $solvu -h
SOLVCOM - T1122 - V6600L06 - (01JUN19), COPYRIGHT GRAVIC, INC.
1995-2019. PORTIONS COPYRIGHTED BY AND LICENSED FROM THIRD PARTIES. SEE
README FILE. USAGE SUBJECT TO THE TERMS OF A WRITTEN LICENSE AGREEMENT.
PATENTS: SEE WWW.GRAVIC.COM/GRAVICLABS/PATENTS/PRODUCTS.
SIGNALLING SOLV TO STOP
SOLV SIGNALLED TO STOP
```

SOLVUTIL
Running SOLVUTIL

SOLVCOM can also be used to report on a running SOLVUTIL process or display information in either of the two marker file. In addition, SOLVCOM can be used to display and change the dynamically configurable parameters. See the sections on 'Monitoring SOLV with SOLVCOM' and 'SOLV Marker File Processing' in *HPE NonStop Shadowbase SOLV Manual* for more details.

To run SOLVUTIL in compare mode, set the COMMAND parameter to COMPARE. In addition, set the SOURCEPATHNAME and TARGETPATHNAME appropriately. The –d switch disables the printing of the message prefix.

```
> param sourcepathname /home/osstest/gig
> param targetpathname /home/osstest/gigcopy
> param command compare
> run solvutil  -d
SOLVUTIL - T1122 - V6600L06 - (01JUN19), COPYRIGHT GRAVIC, INC.
1995-2019. PORTIONS COPYRIGHTED BY AND LICENSED FROM THIRD PARTIES. SEE
README FILE. USAGE SUBJECT TO THE TERMS OF A WRITTEN LICENSE AGREEMENT.
PATENTS: SEE WWW.GRAVIC.COM/GRAVICLABS/PATENTS/PRODUCTS.

Started \VIV1.$Z9XA:24949245 at 2019-06-25:17:25:14.928671
\VIV1.$GPJ.DEV6600.SOLVUTIL|CPU 0|Node 254|Pri 158|Build Jun 24 2019 16:58:31
-f=SHADPARM -s=SOLVUTIL -verbose=FALSE -disablelogprefix=TRUE
file:SHADPARM section:SOLVUTIL - file and section exist
CONSOLELOGGING = enable
FILELOGGING = '' (not specified, using default)
EMSLOGGING = '' (not specified, using default)
COMMAND = compare
LICENSEFNAME = 'SHADPASS' (not specified, using default)
SOURCEPATHNAME = /home/osstest/gig
TARGETPATHNAME = /home/osstest/gigcopy
SOURCEFILENAME = \VIV1.$OSS.ZYQ00001.Z0000728
TARGETFILENAME = \VIV1.$SAS4.ZYQ00001.Z00007FR
Files compare for length of 1073741824
Program ending at 2019-06-25:17:25:30.628376
```

This is an example of running a compare in verbose mode (-v).

```
> param sourcepathname /home/osstest/gig
> param targetpathname /home/osstest/gigcopy
> param command compare
> run solvutil   -d -v
SOLVUTIL - T1122 - V6600L06 - (01JUN19), COPYRIGHT GRAVIC, INC.
1995-2019. PORTIONS COPYRIGHTED BY AND LICENSED FROM THIRD PARTIES. SEE
README FILE. USAGE SUBJECT TO THE TERMS OF A WRITTEN LICENSE AGREEMENT.
PATENTS: SEE WWW.GRAVIC.COM/GRAVICLABS/PATENTS/PRODUCTS.

Started \VIV1.$Z9YA:24988669 at 2019-06-25:17:29:13.237112
\VIV1.$GPJ.DEV6600.SOLVUTIL|CPU 0|Node 254|Pri 158|Build Jun 24 2019 16:58:31
-f=SHADPARM -s=SOLVUTIL -verbose=TRUE -disablelogprefix=TRUE
file:SHADPARM section:SOLVUTIL - file and section exist
CONSOLELOGGING = enable
FILELOGGING = '' (not specified, using default)
EMSLOGGING = '' (not specified, using default)
COMMAND = compare
LICENSEFNAME = 'SHADPASS' (not specified, using default)
SOURCEPATHNAME = /home/osstest/gig
TARGETPATHNAME = /home/osstest/gigcopy
SOURCEFILENAME = \VIV1.$OSS.ZYQ00001.Z0000728
TARGETFILENAME = \VIV1.$SAS4.ZYQ00001.Z00007FR
              \VIV1.$OSS.ZYQ00001.Z0000728       \VIV1.$SAS4.ZYQ00001.Z00007FR
IsOSS                              1                                  1
OSSMode                       100770                             100644
NumLink                            1                                  1
SqlType                            0                                  0
F Type                             0                                  0
F Code                           100                                100
Audit                              0                                  0
Format                             2                                  2
Group                            255                                255
User                           65288                              65288
EOF                       1073741824                         1073741824
BlkLen                          4096                               4096
OddUnst                            1                                  1
Refresh                            0                                  0
WriteTh                            0                                  0
Verify                             0                                  0
Serial                             0                                  0
Extent           (412818,2060100,922)               (412818,2060100,922)
Create            02/12/2019 07:49:39.629            06/18/2019 17:29:20.169
LastMod           02/27/2019 01:39:08.260            06/24/2019 11:21:58.176
LstOpen           06/25/2019 17:25:15.006            06/25/2019 17:25:15.007
Expire            ??/??/????:??:??:??.???            ??/??/????:??:??:??.???
Files compare for length of 1073741824
Program ending at 2019-06-25:17:29:29.239264
```

SHADPARM File

SOLVUTIL configuration parameters can be set with standard TACL parameters, entries in the labeled sections of a SHADPARM file or a combination of both. TACL parameters will always override entries in the SHADPARM file.

The SOLVUTEX (SOLVUTIL example) can be used as a template to create a new SHADPARM file. The SOLVUTEX file is an edit file (file code 101). A line in an edit file is limited to roughly 230 characters. As an alternative to edit files,

SOLVUTIL is also capable of reading text files (file code 180). Each line in a text file is limited to 32,767 characters. This limit is a program limit.

SOLVUTIL Configuration Parameters

SOLVUTIL is designed to be configured with TACL parameters or ideally with parameters that are specified in a SHADPARM file.

COMMAND is the main configuration parameter in SOLVUTIL. It determines which function SOLVTUTIL will perform. There are currently two setting for COMMAND. They consist of DIRECT and COMPARE. DIRECT puts SOLVUTIL into 'chaser' mode using only one local process that usually runs on the source node. In this mode, Guardian procedures and Expand are used to perform the target write operations.

COMMAND DIRECT

This is a list of all the SOLVUTIL parameters classified into groups for the DIRECT command.

File Set Replication
SOURCEPATHNAMES
MAPPATHNAMES
PURGEDATAONSTART
CREATEONSTART

Starting and Stopping Points
STARTPATHNAME
STARTRBA
STARTLASTMODTIME
STOPPATHNAME
STOPTIME
STOPLASTMODTIME

Delays
ACTIVITYDELAYSECONDS
INACTIVITYDELAYSECONDS
SOLVMGRDELAYSECONDS
SOLVRECDELAYCENTISECONDS

 Logging
CONSOLELOGGING
FILELOGGING

SOLVUTIL
SOLVUTIL Configuration Parameters

EMSLOGGING

Miscellaneous
LICENSEFNAME
MARKERPREFIX
IOSIZE
IOBUFFERS

COMMAND COMPARE

There are only two parameters that are required when running SOLVUTIL in compare mode

SOURCEPATHNAME
TARGETPATHNAME

SOLVUTIL Parameters

ACTIVITYDELAYSECONDS   < delay-time >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		60	1		YES

This parameter is used in conjunction with INACTIVITYDELAYSECONDS. Both are used to determine when replication of the currently active file can be switched the next file in the file set. The INACTIVITYDELAYSECONDS must pass first before the ACTIVITYDELAYSECONDS is taken into account in order to switch to the next file in the file set. ACTIVITYDELAYSECONDS is calculated by taking the difference between the last-modified-times of the current file and the next file in the file set. Use SOLVCOM to alter this setting dynamically.

COMMAND   { DIRECT | COMPARE }

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		DIRECT			NO

This parameter determines the run mode of SOLVUTIL. The DIRECT setting is for file chasing using only one SOLVUTIL process. SOLVUTIL usually runs on the source system. The target files will be access via Expand. The COMPARE mode will compare the two files whose SOURCEPATHNAME and TARETPATHNAMES are supplied.

CONSOLELOGGING   { ENABLE | DISABLE }

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		ENABLE			NO

This parameter is used to open the OUT file name for logging messages. The default is ENABLE. When SOLVUTIL is started no-waited, the OUT file may not be available for the entire time that the program is running. If this occurs, SOVLUTIL will most likely fail with a device is down error trying to write a message. It is advisable to disable CONSOLELOGGING when running SOLVUTIL nowaited. The OUT file can certainly be changed to another terminal or $VHS. Use FILELOGGING for logging to file and/or EMSLOGGING to send messages to an EMS collector.

CREATEONSTART   { YES | NO }

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		NO			NO

This parameter will create the target file with it does not exist. The default if NO.

EMSLOGGING   < EMS-process-name >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		none			NO

This optional parameter will enable logging to EMS. By default EMS logging is disabled. This parameter can be set to $0 to send message to the standard system EMS collector. This parameter can be set to any existing EMS collector.

FILELOGGING   < guardian-file-name >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		ON			NO

This optional parameter will enable logging to a guardian file By default file logging is disabled. This parameter can be set to any file name not in use by any other process. When SOLVUTIL is started, any existing log files will be renamed with a unique sequence number appended to the end.

INACTIVITYDELAYSECONDS   < delay-time >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter

| 6.600 | 60 | | | | YES |

This parameter is used in conjunction with ACTIVITYDELAYSECONDS. It used to determine when replication of the currently active file can be switched the next file in the file set. The INACTIVITYDELAYSECONDS must pass before the ACTIVITYDELAYSECONDS is taken into account in order to switch to the next file in the file set. INACTIVITYDELAYSECONDS is calculated by taking the difference between the last-modified-times of the current file and the current wall clock time. The switch over to the new file will occur if both the ACTIVITYDELAYSECONDS and INACTIVITYDELSECONDS are surpassed when a new file to replicate exists. Use SOLVCOM to alter this setting dynamically.

IOSIZE   < byte-size >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		57344	4096	57344	NO

This optional parameter sets the read and write buffer size that SOLVUTIL uses for replicating OSS regular files. Currently, the maximum size 57,344 bytes. It must be a multiple of 4096.

IOBUFFERS   < count >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		16			NO

This optional parameter specifies the maximum number read buffers that SOLVUTIL will manage while waiting for the data to be safe stored in the target OSS regular file. SOLVUTIL performs all file IO and communication calls nowaited (nonblocking). Thus, performing all these operations in parallel. Setting IOBUFFERS to 1 will essentially make the processing synchronous.

LICENSEFNAME   < guardian-file-name >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		SHADPASS			NO

This optional parameter overrides the location of the license file. The default location is the edit file named SHADPASS in the _DEFAULTS location.

MAPPATHNAMES   < search-and-replace-pair >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		ON			NO

This is a required parameter for file chasing. This parameter is used to configure the target path names from the set of files supplies in the source path names. It must contain at least one pair of search-and-replace strings. The strings need to be separated by colons.

MARKERPREFIX   < guardian-file-name

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		ON			NO

This optional parameter will change the default location of the restart (marker) files. By default the marker prefix will be 'sumkr'. As a result, SOLVUTIL will create the SUMKRU and SUMKRH files in the _DEFAULTS location.

PURGEDATAONSTART   < YES | NO >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		NO			NO

This optional parameter will cause SOLVUTIL to do a purgedata on the target when a new file begins to be replicated. Note that if the target file has data in it and this parameter is set to NO, the eof will not be updated until replication surpasses the exiting eof.

SOURCEPATHNAMES   < pathname-list >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		None			NO

This is a required parameter used to specify the source path name(s) to add to the replication file set. The pathnames must include the file name.

The filename portion of the pathname can be wildcarded. The directory portion of the pathname cannot be wildcarded. Each pathname in the list is separated by a colon.

Standard Unix shell-style wildcarding is supported

```
PATTERN        MEANING
*              matches everything
?              matches any single character
[seq]          matches any character in seq
[!seq]         matches any character not in seq
```

SSHSINGLELINECOMMAND   < command >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		None			NO

A string containing part of the SSH command to execute the OSS command *chown* on the target system. The syntax must be valid SSH command-line arguments (see the *SSH Client Command Reference* section of the *HPE NonStop SSH Reference Manual* for more details on syntax).

As of the Shadowbase version 6600, SSH and this parameter are required for all SOLVUTIL configurations. Please, see the Granting OSS Permissions to Run chown and the Configuring SSH to Run chown Remotely sections to learn how to prepare the source and target systems to use SSH with SOLVUTIL.

This is an example of how to set this parameter. The double quotes are necessary if using a tacl param. The double quote is not necessary if using a SHADPARAM file for the configuration settings.

```
param SSHSINGLELINECOMMAND "$system.zssh.ssh -Z -S <process> <rmt-user>@<rmt-addr>"

where
 -Z           Suppress ssh client banner
 -S <process> A running SSH2 process. See the Configuring SSH for Remote
              chown Command Execution section for details
 <rmt-user>   Remote system user name
 <rmt-addr>   Remote tcp/ip address
```

STARTPATHNAME   < pathname >

Initial	Changed

Version	Version	Values Default	Minimum	Maximum	Alter
6.600		none			NO

This optional parameter is used to tell SOLVUTIL the starting pathname
when there is no restart information in the marker files. If restart
information exists in the marker files for the SOLVUTIL process name,
then all STARTxxx parameters are ignored.

STARTRBA   < relative-byte-address >

Initial	Changed				
Version	Version	Values Default	Minimum	Maximum	Alter
6.600		ON			NO

This optional parameter is used to tell SOLVUTIL the starting RBA when
STARTPATHNAME is used.

STARTLASTMODTIME   < YYYY-MM-DD HH:MM:SS>

Initial	Changed				
Version	Version	Values Default	Minimum	Maximum	Alter
6.600		ON			NO

This optional parameter is used to tell SOLVUTIL the last modified time of
the file to use as a starting point. On startup, SOLVUTIL will search the
file set for the first file whose last-modified-time is less than the supplied
STARTLASTMODTIME. This parameter only applies when there is no
restart information in the marker files for the SOLVUITL process name.

STOPPATHNAME   < pathname >

Initial	Changed				
Version	Version	Values Default	Minimum	Maximum	Alter
6.600		ON			NO

This optional parameter is used to tell SOLVUTIL the pathname when
replication is to stop. The data in this specified pathname is replicated to
the target. SOLVUTIL will stop after it hits eof of this pathname.

STOPTIME   < YYYY-MM-DD HH:MM:SS>

Initial	Changed				
Version	Version	Values Default	Minimum	Maximum	Alter
6.600		ON			NO

This optional parameter is used to tell SOLVUTIL when to stop based on wall clock time. Each time SOLVUTIL reaches eof of the file it is working on, this time is check. When the wall clock time exceeds this time, SOLVUTIL will stop processing.

STOPLASTMODTIME   < YYYY-MM-DD HH:MM:SS>

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		ON			NO

This optional parameter is used to tell SOLVUTIL the last modified time of the file to use as a stopping point. Each time SOLVUTIL reaches eof, it will check the last modified time of the file it is working on. SOLVUTIL will stop processing when this time exceeds the STOPLASTMODTIME.

SOLVMGRDELAYSECONDS   < delay-time >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		60			YES

This optional parameter determines how often SOLVUTIL will check the source file set for more data to replicate. By default, SOLVUTIL will sleep for 60 seconds after hitting eof before checking if there is more work to perform.

SOLVRECDELAYCENTISECONDS   < delay-time >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		0			YES

This optional parameter is used to throttle SOLVUTIL. If SOLVREDELAYCENTISECONDS is set, SOLVUTIL will delay that number of 0.01 seconds between each read of the source file.

SOURCEPATHNAME   < pathname >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		none			NO

SOURCEPATHNAME is a required parameter when the COMMAND parameter is set to COMPARE.   SOURCEPATHNAME is use in the

compare function to specify one of the two pathnames to compare. TARGETPATHNAME must also be specified.

TARGETPATHNAME   < pathname >

Initial Version	Changed Version	Values Default	Minimum	Maximum	Alter
6.600		none			NO

TARGETPATHNAME is a required parameter when the COMMAND parameter is set to COMPARE. TARGETPATHNAME is use in the compare function to specify one of the two pathnames to compare. SOURCEPATHNAME must also be specified.

Known Problems

1) SOLVUTIL cannot change the owner of a remote file. This is a known limitation of OSS. There is an existing RFE, Case 10-190710-4701, to have this behavior corrected. If the owner of the target file must be different from the owner of the SOLVUTIL process, there are two workarounds.
   a. Pre-create the target files using the appropriate owner
   b. Enable SOLVUTIL to perform the chown using SSH. See the following sections for details.
      - Appendix A. Enabling OSS for Change Owner
      - Appendix B. SSH for Remote Command execution
      - SSHSINGLELINECOMMAND in the configuration parameters

Appendix

A. **Granting OSS Permissions to Run** *chown*

By default only super.super possesses the OSS privileges to run the *chown* command. To allow other users to run *chown*, they must be given the privilege through Safeguard.

To grant a user the OSS privileges to run *chown*, do the following on both the source and target systems:

    1) Enter Safecom

```
101> SAFECOM
SAFEGUARD COMMAND INTERPRETER - T9750L01^AIF - (17MAR2019)    SYSTEM  \VIV1
=
```

    2) Alter the *SECURITY-GROUP SECURITY-OSS-ADMINISTRATOR* to give access to the SOVLUTIL user

```
=ALTER SECURITY-GROUP SECURITY-OSS-ADMINISTRATOR ACCESS SUPER.JAW *
=
```

A user can be given execute access with E, owner access with O, or both with *. In this example, the user SUPER.JAW was given both kinds of access with *.

    3) Verify that the SOLVUTIL user is on the *SECURITY-OSS-ADMINISTRATOR* list

```
=info SECURITY-GROUP SECURITY-OSS-ADMINISTRATOR

               LAST-MODIFIED      OWNER     STATUS
SECURITY-OSS-ADMINISTRATOR
               19JUL19, 18:54     255,255   THAWED

             255,008             E,    O
             255,023             E,    O
=
```

Appendix
A. Granting OSS Permissions to Run chown

In this example, the user SUPER.JAW is ID 255,023. This user is now in the SECURITY-OSS-ADMINISTRATOR group and can now run *chown.*

See the *HPE Safeguard Reference Manual* for more details on adding or altering users in Safecom.

B. Configuring SSH to Run *chown* Remotely

SOLVUTIL executes remote *chown* commands on the target system after it creates new files. This allows the user to run SOLVUTIL as a user other than the user who owns the OSS files being replicated by SOLVUTIL. However, as of the version 6600 release of Shadowbase, there is a bug in OSS that prevents *chown* commands from being executed remotely. *chown* commands can only be executed locally, even by the super.super user.

To bypass this issue a SSH client and server can be configured to allow for a remote system (client) to run commands locally on the other system (server). This SSH configuration is required to use the SSHSINGLELINECOMMAND parameter.

The following procedure details the following:
- Configuring a SSH client on the source system and a SSH server on the target system.
- Generating a key to be used as the authentication method between the SSH client and server.

Note that "source" system refers to the system where SOLVUTIL is running, and "target" system refers to the system that SOLVUTIL is replicating.

Requirements Before Configuring SSH

- Install SSH on both source and target system. See the *HPE NonStop SSH Reference Manual* for details.

Configuring SSH Client and Server

1) Select a sub-volume on both the source and target system where all the subsequent commands will be run. When creating the SSH2 processes, files will be created that store information relevant to ssh.

2) On the source system as super.super, start a SSH2 process.

```
CLEAR ALL PARAM

delete define =*

RUN $system.zssh.SSH2/NAME $SSHC1,CPU 1,PRI 160,nowait,term $zhome/&
                    ALL;LOGCONSOLE *;LOGEMS $0;&
                    SUBNET $ZTC1; PORT 22;&
                    AUTOADDSYSTEMUSERS true;&
                    ALLOWTCPFORWARDING true;&
```

```
                              STRICTHOSTKEYCHECKING false
```

- The *name, cpu, pri, term, subnet,* and *port* parameters are all configurable. The names and values used for these parameters above are just examples.

3) Verify with EMS that the SSH2 process is listening on the address and port specified in the previous step.

```
19-08-01 15:52:18 \VIV1.$SSHC1   COMFORTE.201.1        001000 10|SSH2
  Server listening on process $ZTC1, interface 0.0.0.0, port 22
```

4) On the target system as super.super, start a SSH2 process.

```
CLEAR ALL PARAM

delete define =*

RUN $system.zssh.SSH2/NAME $SSH2B,CPU 1,PRI 160,nowait,term $zhome/&
                      ALL;LOGCONSOLE *;LOGEMS $0;&
                      SUBNET $ZJ02B; PORT 22;&
                      AUTOADDSYSTEMUSERS true;&
                      ALLOWTCPFORWARDING true;&
                      STRICTHOSTKEYCHECKING false
```

- Like the example used for starting the SSH2 process on the source system, the *name, cpu, pri, term, subnet*, and *port* parameters are all configurable.

5) Verify with EMS that the SSH2 process is listening on the address and port specified in the previous step.

```
19-08-01 15:54:31 \GRAVIC1.$SSH2B   COMFORTE.201.1        001000 10|SSH2
  Server listening on process $ZJ02B, interface 0.0.0.0, port 22
```

Generate Key

1) On the source system as the SOLVUTIL user, execute the following command for the SSH client. This will perform the first authentication between the client and server, and this authentication is based on the user's password.

```
ssh -Z -S $sshc1 -p 22 super.shadow@10.1.50.80 pwd
```

- Please see the *SSH Client Command Reference* section of the *HPE NonStop SSH Reference Manual* for more details on the command-line parameters used in this example.
- If the port parameter (-p) is omitted, the port defaults to 22
- The SSH2 process name (-S) must match the SSH2 process started on the source system
- The user specified in this command must be the user who is running SOLVUTIL
- The IP address here must be the IP address of the target system
- The *pwd* argument is the OSS command that will get executed upon a successful authentication. This is case sensitive.

2) The following is the output that follows the execution of the previous ssh command. Answer the prompts as indicated by the highlighted below.

```
WARNING: REMOTE HOST IDENTIFICATION UNKNOWN!
The host public key fingerprint is
  babble: xoled-fygyh-guren-sypuz-rynef-civoc-vomal-tovol-vehec-hyhoh-pixyx
  MD5:    c2:b0:ef:7b:16:8d:58:0b:99:c8:d8:62:17:7f:2d:45
Continue and add the host to the knownhost store(yes/no)? yes
GSSAPI authentication disabled.
You have no private keys in the key store.
Trying password authentication.
Enter super.shadow@10.1.50.80's password: yourpassword
Add password for super.shadow@10.1.50.80 to the password store (yes/no)? no
/home/shadow
147>
```

- *yourpassword* should be the password of the user specified in the ssh command executed in the previous step

3) On the source system as the SOLVUTIL user, open the SSH2 process on the source system with sshcom and then generate and export a key with the commands highlighted below.

```
65> sshcom $sshc1
SSHCOM T0801L02_28FEB2019_ACP - 2019-07-20 00:27:00.838
OPEN $sshc1
% generate key srckey,type rsa
generate key srckey,type rsa
OK, key super.shadow:srckey successfully generated
% export key super.shadow:srckey, file srckey
export key super.shadow:srckey, file srckey
OK, key super.shadow:srckey exported
%
```

- The key will be contained in a file called *srckey* after generating and exporting with the above commands

4) FUP DUP or FTP the file *srckey* from the source system to the sub-
    volume where the SSH2 process was started on the target system.

5) On the target system as super.super, open the SSH2 process on the
    target system with sshcom and then add the following profile restrictions
    with the commands as highlighted below.

```
203> sshcom $ssh2b
SSHCOM T0801H01_01MAY2018_ACI - 2019-07-20 02:24:07.594
OPEN $ssh2b
% mode daemon
mode daemon
OK, switched to daemon mode
% add restriction-profile restrict
add restriction-profile restrict
OK, restriction profile restrict added
% alter user super.shadow,publickey srckey (file srckey, restriction-profile
restrict)
alter user super.shadow,publickey srckey (file srckey, restriction-profile
restrict)
OK, user super.shadow altered
%
```

-   The user *super.shadow* should be replaced with the user running
    SOLVUTIL on the target system. This is the only thing that needs to
    be modified in this example.

6) On the source system as the SOLVUTIL user, execute the following ssh
    command. If the key was generated, exported, and copied correctly then
    there should not be a prompt for the user's password upon executing this
    command.

```
155> ssh -Z  -S $sshc1 -p 22 super.shadow@10.1.50.80 pwd
/home/gpj
156>
```

Messages

SOLVUTIL Informational/Warning/Error Messages

All SOLVUTIL messages are contained in the *HPE Shadowbase NonStop Messages Manual*. Reference that manual for any messages logged by SOLVUTIL.

*** Note that messages are still under development and have not been documented. ***