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Chapter 1. Overview

The general steps for building and installing the HSI-HTAR interface are similar to other software packages. They are as follows and provide the general organization of this document:

1. Obtain HSI-HTAR source tree
2. Run ./Configure (see Appendix A)
3. Perform installation of server and client
Chapter 2. HSI-HTAR Source Tree

The source code for the HSI-HTAR client can be obtained from HPSS Admin Wiki as a tarball:


Select the "docs" folder then select the "tar_file" folder. Select the appropriate HSI-HTAR release from the list.

NOTE: HSI-HTAR 6.3_U2 is compatible with HPSS 7.5.3.
All following HSI-HTAR versions will match the HPSS version that it is compatible with.

The following command shows how to unpack the first tarball.

tar -xvzf <hsi version #> X.X.tar

The tarball will further unpack into two gzip compressed files:

Server:  hsihtarsrvr.<hsi version #>.tar.gz (previously X.X.hsigwd.tar.gz)
Client:  hsihtarclnt.<hsi version #>.tar.gz (previously X.X.tar.gz)

The hsihtarclnt.tar.gz file can be installed separately on the client. To get a complete source tree, uncompress hsihtarclnt.tar.gz, and then hsihtarsrv.tar.gz.

For HSI-HTAR version 9.X and later, the resulting source tree should look similar to the one below.

drwxrwx--- 2 root hpss 4096 Jun 25 10:47 api_extensions
drwxrwx--- 2 root hpss  29 Jun 25 10:22 code_templates
  -rw-r-x--- 1 root hpss  58258 Jun 25 10:22 Compile
drwxrwxr-x 3 root hpss  101 Jun 25 10:47 config
  -rw-r-x--- 1 root hpss 298633 Jun 25 10:22 Configure
drwxrwx--- 7 root hpss  82 Jun 25 10:22 hsi
drwxrwx--- 5 root hpss  43 Jun 25 10:22 htar
drwxrwx--- 2 root hpss 4096 Jun 25 10:22 include
drwxrwx--- 2 root hpss  73 Jun 25 10:47 lib
  -rw-r----- 1 root hpss  9969 Jun 25 10:22 Makefile
drwxrwx--- 4 root hpss  41 Jun 25 10:22 misc
drwxrwx--- 10 root hpss 149 Jun 25 10:22 ndapi
  -rw-r----- 1 root hpss  2662 Jun 25 10:22 version

For hsihtar 6.3, the resulting source tree should look similar to the one below.

lrwxrwxrwx 1 root hpss   21 Nov  9 17:20 api_extensions -> api_extensions.6.3.0/
drwxr-xr-x 1 root hpss   936 Nov  9 17:20 api_extensions.6.3.0
drwxr-xr-x 1 root hpss   30 Nov  9 17:20 code_templates
  -rw-r-xr-x 1 root hpss  57430 Jun 10 2019 Compile
  -rw-r-xr-x 1 root hpss  54 Nov  9 17:20 config
  -rw-r-xr-x 1 root hpss 298396 Jun 10 2019 Configure
lrwxrwxrwx 1 root hpss   10 Nov  9 17:20 hsi -> hsi.6.3.0/
drwxr-xr-x 1 root hpss   66 Nov  9 17:20 hsi.6.3.0
lrwxrwxrwx 1 root hpss   11 Nov  9 17:20 htar -> htar.6.3.0/
drwxr-xr-x 1 root hpss   26 Nov  9 17:20 htar.6.3.0
drwxr-xr-x 1 root hpss   790 Nov  9 17:20 include
drwxr-xr-x 1 root hpss   12 Nov  9 17:20 libr
  -rw-r--r-- 1 root hpss   2662 Jun 10 2019 Makefile
  -rw-r--r-- 1 root hpss   8864 Jun 10 2019 Misc
Refer to the HSI-HTAR 9.2 Release Notes for prerequisites and packages supported and required to build and install HSI-HTAR.

Proceed to the next two chapters if you plan to build and install HSI-HTAR server components. However, if you are only interested HSI-HTAR client components, skip to the Client Build Configuration chapter.
Chapter 3. Server Build Configuration

The server build will need both client and server tarballs. Build configuration is primarily done through a Perl script called Configure. To run the Configure script, change the directory into the HSI_HTAR source tree, and do the following:

```
cd <hsi version #>
./Configure
```

This script will present the user with questions regarding build system configuration options. The questions are grouped into various sections, with section headers that explain the nature of the questions that follow. To cancel out of the Configure script use <ctrl-c>.

An example of running this script is given in Appendix A to follow along. The proceeding instructions highlight areas that require special attention or to show differences between a server build versus a client build.

After the welcome screen, a list of configuration choices is presented. For server build, select option 2 (server) or option 3 (both client and server) For purposes of this example, option 3 (both client and server) is used.

Would you like to configure the HSI client packages, the server package, or both?
Enter  1  : to configure just the client
2  : to configure just the server
3  : to configure both client and server
Enter selection: Choose 2 or 3 for a server build configuration

The next set of questions deal with configuring encryption/decryption cipher methods. You must choose either the default setting (yes) or at least one of the ciphers to enable authentication: GARBLE, AES, Blowfish, or 3DES cipher.

```
Default Cipher Method Settings
GARBLE cipher................. enabled
AES cipher.................... enabled
Blowfish cipher............... enabled
3DES cipher................... enabled
Use above settings? (yes/no) [yes]: Choose default yes or at least one of the four, GARBLE, AES, Blowfish, or 3DES
```

The next set of questions deal with authentication methods. Note that if a site plans to use the SU/SUDO feature, the COMBO authentication method must be enabled during the Configuring Authentication Method Items step.

```
NOTE:
If you are planning on using RSA Securid fobs, you must enable the COMBO authmethod, below.
```

```
Note: Enter "no" below if you would like an explanation of
```
You can just enter "yes" at this point to use the default settings.

Default Authmethod Settings

COMBO authmethod........... disabled
GLOBUS GSI authmethod...... disabled
IDENT authmethod.......... disabled
KERBEROS authmethod........ disabled
KEYTAB authmethod.......... disabled
MUNGE authmethod.......... disabled
PAM authmethod............. disabled

Use above settings?  (yes/no) [yes]: Type "no" to change the settings.
This will cycle through each authmethod and ask if you wish to enable.

Choose the settings that make sense for your site. In this example, Kerberos authentication method with kerberos-style keytabs is enabled.

The "KERBEROS" authmethod allows users to automatically authenticate without requiring a password, after they use the Kerberos "kinit" command to create a ticket-granting ticket. This method requires the Kerberos package to be installed. Both MIT and Heimdal Kerberos as recognized, although Heimdal Kerberos has not yet been tested.

This method must be enabled in order to enable the "keytab" authentication method for use with kerberos-style keytabs. It is _not_ required if you are planning to enable the "keytab" authentication method just for unix-style keytabs.

Enable "KERBEROS" authmethod? (yes/no) [yes]: Choose "yes" to enable kerberos

The "KEYTAB" authmethod allows users to authenticate automatically without requiring a password, after they either use the kerberos <ktutil> or the <hpss_unix_keytab> program (if using unix authentication) to extract a "keytab" file containing their encrypted password.

This method requires the Kerberos authmethod to be enabled if using kerberos-style keytabs.

Enable "KEYTAB" authmethod? (yes/no) [yes]: Type "yes" to enable

During the Configuring API Library-Specific Items stage, make sure the NDAPI_SERVER_HOST field is populated with the server host full name. It will be blank for first time through or if the hsi_pkg_includes is deleted under the config directory.

In the next screen you will be given the option of changing items that are specific to the HSI Gateway Client API Library.

Once you have made all the changes that you wish to make (if any), enter "a" at the prompt to continue.

Press <enter> to continue to the next screen:
If you wish to change an item, enter "c" followed by an optional
space and the item number, or just the item number.
For example:
"2" or "c 2" or "c2"

If you would like to get help on an item, enter "h" followed by
an optional space and the number, for example:
"h 3" or "h3"

1 MAX_RESTRICTED_PORT ...........65535
2 MIN_RESTRICTED_PORT ...........0
3 NDAPI_DEFAULT_ADDR_FAMILY ...ipv4_only
4 NDAPI_DEFAULT_AUTH_TYPE .......PAM,COMBO,KEYTAB,KRB_PREEXIST,KERBEROS
5 NDAPI_LOCAL_LOGFILE ........../dev/null
6 NDAPI_SERVER_HOST .............
7 NDAPI_SERVER_PORT ............1217

[a=accept] [c N] or [N]->change item N  [h N]->help for item N
Your choice: Type c 6 to add the server full name.

Type in the the server host full name when presented with the following prompt:

NDAPI_SERVER_HOST Current setting: [] Enter new setting: (e.g. elayne.clearlake.ibm.com)

Then press "a" to accept.

Once all the configuration prompts have been completed, Configure prompts to allow you to go
back and make changes by letting you edit the configuration file directly. If you are satisfied with the
choices and answers provided, then press Enter to accept the default selection of "no".

Writing Makefile include file (config/hsi_pkg_includes)
Creating symlink (config/mach_compile_flags) for linux
... Removing existing symlink

Would you like to edit the configuration file? (yes/no) [no]:
Would you like to compile now? (yes/no) [yes]:

This indicates that the configuration is done, and the build is beginning.

The build configuration is stored in the following files, after the initial run of Configure:
<hsi version #>/config/hsi_pkg_includes
<hsi version #>/config/globus_makefile_defs

These files constitute the build configuration. They are read on subsequent runs of Configure, so that
previous answers are retained in config/hsi_pkg_includes file. Once created, these files can be updated
manually and used to automate the configuration and build process, if needed.

It is not necessary to run Configure and reconfigure the build if a subsequent rebuild is desired.
Simply run:

            [-pkg] [-server] [-ssl SSLDIR]

Compile -- wrapper to build HSI/HTAR software
Optional arguments:

- `-h, --help`  show this help message and exit
- `-a ARCH`  Build Platform Architecture
- `-b BDIR`  User Build Directory. Should be a scratch directory or not exist
- `-c CFILE`  A Configuration file. Works best as an absolute path
- `-client`  Build Client
- `-docs`  Build Formatted Documentation
- `-noarch`  Creates the noarch RPM packages associated with HSI-HTAR. This option implies `-pkg`
- `-pkg`  Creates the native installation package (i.e. RPM) for the build platform.
- `-server`  Build Server (hsigwd)
- `-ssl SSLDIR`  OpenSSL Installation Directory

Note: The user build directory must be empty or does not exist in order for the compile to execute.

After a build using the default build directory (no options specified), the server and client executables are located at:

```
<hsi source directory>/bld-<hostname>-<architecture>-<OSversion>/bin/hpss_hsigwd.<hsi version #>
```

After a build using the default build directory (no options specified), the hsi and htar executables are located at:

```
<hsi source directory>/bld-<hostname>-<architecture>-<OSversion>/bin/hsi
<hsi source directory>/bld-<hostname>-<architecture>-<OSversion>/bin/htar
```

If the Kerberos authentication was configured, there will be an additional executable called:

```
<hsi source directory>/bld-<hostname>-<architecture>-<OSversion>/bin/hsigwd_kchild.<hsi version #>
```

If the Globus authentication was configured, there will be an additional executable called:

```
<hsi source directory>/bld-<hostname>-<architecture>-<OSversion>/hsigwd_gsichild.<hsi version #>
```

Example run of Compile with -b, -server, and -client options:

```bash
$ ./Compile -b /tmp/hsi_server_client -server -client
```

After a build using the -b, -server, and -client options, the server, hsi, and htar executables are located:

```
/tmp/hsi_serverclient/bin/hpss_hsigwd.9.2.0
/tmp/hsi_serverclient/bin/hsi
/tmp/hsi_serverclient/bin/htar
```
Chapter 4. Server Installation

The HSI/HTAR server is invoked via `xinetd`. It needs to run on a machine that has access to an HPSS instance’s configuration files, typically found in `/var/hpss/etc`. The machine also has to have runtime access to the HPSS API libraries, typically located in `/opt/hpss/lib`.

The following steps need to be completed in order to run the HSI-HTAR server. Some example commands are given with each step. They typically run as root. Some examples of the various system configuration files needed for a server installation can be found at `<hsi version #>/misc/templates`.

In our example moving forward, soft link paths to the executables will be used and are mapped in the following manner:

```
/opt/hsi -> /hsihtar_src/9.2/bld-elayne-linux_ppc64le-redhat7.9/bin/hssi
/opt/hsigwd -> /hsihtar_src/9.2/bld-elayne-linux_ppc64le-redhat7.9/bin/hpss_hsigwd.9.2.0
```

- Configure the server log. Create the ndapi log directory based on the HSI configuration. The default location of `HSIGWD_LOG_DIR` is `/var/hpss/ndapi`.

  ```
  cd /hsihtar_src/X.X/config
  root@elayne > grep HSIGWD_LOG_DIR hsi_pkg_includes
  HSIGWD_LOG_DIR = /var/hpss/ndapi
  #If /var/hpss/ndapi does not exist create it
  root@elayne > mkdir /var/hpss/ndapi
  ```

- Modify the syslog utility configuration as needed, and restart the syslog service.

  ```
  root@elayne > vi /etc/rsyslog.conf
  72    # Save boot messages also to boot.log
  73    local7.* /var/log/boot.log
  74
  75    # For hsihtar:
  76    local1.* /var/hpss/ndapi/ndapi.log
  77    local2.* /var/hpss/ndapi/hgs.log
  78    local3.* /var/hpss/ndapi/xferlog
  79
  root@elayne > systemctl restart rsyslog.service
  ```

- Configure `/etc/services` so that port 1217 exists for the HPSS HSI Gateway. If not, add one line:

  ```
  #Check for port 1217
  root@elayne > grep 1217 /etc/services
  root@elayne >
  #If the grep returns empty or no match then add the following line
  root@elayne > vi /etc/services
  // Add line below
  hpss-ndap 1217/tcp    # HPSS HSI Gateway
  ```
Server Installation

• Configure the `xinetd` service and restart. Copy the template from HSI/HTAR source tree `<hsi version>/misc/templates/xinetd.d` to `/etc/xinetd.d/<services entry>`. Modify as needed. Make sure the name of the `xinetd` script matches the entry in `/etc/services (hpss-ndapi):

```
root@elayne > cp /hsihtar_src/9.2/misc/templates/xinetd.d /etc/xinetd.d/hpss-nadi
# Make sure line 14 service matches /etc/services entry of hpss-nadi
# Revise line 25 to the directory of your hpss_hsigwd.9.2.0 executable
# Review and modify as necessary

root@elayne > cat /etc/xinetd.d/hpss-ndapi
14 service hpss-ndapi
15 {
16    flags           =NODELAY,KEEPALIVE
17    # --- Uncomment one of the following flags if desired.
18    flags           += IPv4
19    flags           += IPv6
20    port            = 1217
21    protocol        = tcp
22    socket_type     = stream
23    wait            = no
24    user            = root
25    server          = /opt/hsigwd
26    log_on_failure  += USERID
27    disable         = no
28 # hsigwd settings
29    umask           = 022
30    instances       = UNLIMITED
31    server_args     = -d -f /var/hpss/ndapi/ndapi.log -Pftp -phpssftp -V1mb
32    per_source      = UNLIMITED
33 # Add GLOBUS runtime library path (needed for gsichild)
34    env             = LD_LIBRARY_PATH=/opt/hpss/lib:/usr/local/globus/globus_2.4.3/lib
35 # Set the default network family if running the unxserver. This should be
36 # already set up for the HPSS gateway, either in the compile-time
37 # definitions, or in the env.conf file.
38 # env             +=HPSS_NET_FAMILY=ipv4_only
39    #xinetd logging
40    log_type        = FILE /var/hpss/ndapi/xinet.log
41    log_on_success  = PID HOST EXIT DURATION
42    log_on_failure  = HOST ATTEMPT
43 }
#Restart xinetd.service
root@elayne > systemctl restart xinetd.service
# Check status and make sure it's active

root@elayne > systemctl status xinetd.service
* xinetd.service - Xinetd A Powerful Replacement For Inetd
 Loaded: loaded (/usr/lib/systemd/system/xinetd.service; enabled; vendor preset: enabled)
 Active: active (running) since Fri 2020-06-12 15:06:41 CDT; 6 days ago
 Process: 51763 ExecStart=/usr/sbin/xinetd -stayalive -pidfile /var/run/xinetd.pid $EXTRAOPTIONS (code=exited, status=0/SUCCESS)
```

• Copy the HSI `HPSS.conf` template to `/var/hpss/etc` and modify it as needed. Make a copy before appending.
For sites using Kerberos authentication, make sure that the Server Auth krb5 is turned on. If a krb5 password is being used, make sure that is also turned on. Likewise, for sites using unix authentication, make sure that the Server Authentication Mechanism unix is turned on. For keytab authentication, select, uncomment, and if necessary edit the pathname. In HPSS.conf, see the following example and remove the ";" to uncomment the configuration lines.

```
850   # Authentication mechanism that server uses to get HPSS creds
851   # Valid settings are "unix" and "krb5"
852   ;Server Authentication Mechanism = unix
853   Server Authentication Mechanism = krb5
854
855   # Authenticator type that server uses to prove its identity
856   # Legal values are auth_none, auth_keytab, auth_keyfile, auth_key, auth_passwd
857   # Currently, the only supported value is "auth_keytab"
858   Server Authenticator Type = auth_keytab
859
860   # Authenticator that server uses to prove its identity.
861   # The value of this flag depends upon the Server Authenticator Type.
862   # For auth_keytab, it is the pathname of the keytab file for the server
863   ;Server Authenticator = /var/hpss/etc/hpss.unix.keytab
864   Server Authenticator = /var/hpss/etc/hpss.keytab

• Create the COS list used by HSI, and move it into /var/hpss/etc. The /opt/hpss/bin/lshpss executable needs to be on the machine that the make_cos.py runs on, as that script calls lshpss.

<hsi version #>/hsi/templates/make_cos.py
cp cos /var/hpss/etc

Note: HSI/HTAR versions 6.3 and 8.X use make_cos.pl
When Force Selection is turned on in a COS, an HSI COS configuration file must be updated with noauto in order for that COS to be blocked, except when explicitly called with COSID or the set HSI command.

Example of COS configuration to enable blocking of a COS

```
cat /var/hpss/etc/cos
# HSI Class of Service Definitions
# Auto-generated on host elayne.clearlake.ibm.com on Mon Feb 1 09:58:25 CST 2021
1:     type            = cos
       id              = 1
       noauto
       cosname          = "1wd"
       comment          = "1wd"
       hierarchy        = "1: 1wd"
       access_size      = 4194304
       min_size         = 0
       max_size         = 33554432000
       transfer_rate    = 4096
       latency          = "0"
```
Chapter 5. Client Build Configuration

To install the client tarball, hsihtarclnt.<hsi version #>.tar.gz (previously X.X.tar.gz) is the only package needed. Build configuration is primarily done through a Perl script called Configure. To run the Configure script, change the directory into the HSI/HTAR source tree, and do the following:

```
cd <hsi version #>
./Configure
```

This script will present the user with questions to answer regarding their build system’s configuration. The questions are grouped into various sections, with section headers that explain the nature of the questions that follow. To cancel out of the Configure script, use <ctrl-c>.

An example of running this script is given in Appendix A. The proceeding instructions highlight areas that require special attention or to show differences between a server build versus a client build.

After the welcome screen, a list of configuration choices is presented. Pick 1 for client.

Would you like to configure the HSI client packages, the server package, or both?

Enter 1 : to configure just the client
Enter 2 : to configure just the server
Enter 3 : to configure both client and server

Enter selection: 1

The next panel of questions deal with configuring encryption/decryption cipher methods. If building the client alone, then the ciphers used by the HSIGWD to connect to the client should be chooseen. If this is not known, then select the default which is all of the ciphers. Even though your site may not use any of the four choices given, you must choose at least one of the four ciphers GARBLE, AES, Blowfish, or 3DES to enable authentication. Another option is to take the default setting and keep all the cipher options enabled.

Default Cipher Method Settings

GARBLE cipher................. enabled
AES cipher.................... enabled
Blowfish cipher............... enabled
3DES cipher................... enabled

Use above settings? (yes/no) [yes]: Choose default yes or at least one of the four GARBLE, AES, Blowfish, or 3DES

The next panel of questions deal with authentication methods. Note that if a site plans to use the SU/SUDO feature, the COMBO authentication method must be enabled during the Configuring Authentication Method Items step.

NOTE:
If you are planning on using RSA Securid fobs, you must enable the COMBO authmethod, below.
Note: Enter "no" below if you would like an explanation of each method, as well as an option to enable/disable it.

You can just enter "yes" at this point to use the default settings.

Default Authmethod Settings

COMBO authmethod........... disabled
GLOBUS GSI authmethod...... disabled
IDENT authmethod............ disabled
KERBEROS authmethod........ disabled
KEYTAB authmethod.......... disabled
MUNGE authmethod........... disabled
PAM authmethod............. disabled

Use above settings? (yes/no) [yes]: Type "no" to change the settings. This will cycle through each authmethod and ask if you wish to enable.

Choose the settings that make sense for your site. In this example, Kerberos authentication method with kerberos-style keytabs is enabled.

++++++++++++++++++
The "KERBEROS" authmethod allows users to automatically authenticate without requiring a password, after they use the Kerberos "kinit" command to create a ticket-granting ticket. This method requires the Kerberos package to be installed. Both MIT and Heimdal Kerberos as recognized, although Heimdal Kerberos has not yet been tested.

This method must be enabled in order to enable the "keytab" authentication method for use with kerberos-style keytabs. It is _not_ required if you are planning to enable the "keytab" authentication method just for unix-style keytabs.

Enable "KERBEROS" authmethod? (yes/no) [yes]: Choose "yes" to enable kerberos

++++++++++++++++++
The "KEYTAB" authmethod allows users to authenticate automatically without requiring a password, after they either use the kerberos <ktutil> or the <hpss_unix_keytab> program (if using unix authentication) to extract a "keytab" file containing their encrypted password.

This method requires the Kerberos authmethod to be enabled if using kerberos-style keytabs.

Enable "KEYTAB" authmethod? (yes/no) [yes]: Type "yes" to enable kerberos

Summary of example settings of Authentication Methods:

```
# ------------ Authentication Methods ------------
HSI_COMBO_AUTH_SUPPORT = on
HSI_GSI_AUTH_SUPPORT = off
HSI_IDENT_AUTH_SUPPORT = off
HSI_KERBEROS_AUTH_SUPPORT = on
HSI_KEYTAB_AUTH_SUPPORT = on
HSI_MUNGE_AUTH_SUPPORT = off
HSI_PAM_AUTH_SUPPORT = on
```

During the Configuring API Library-Specific Items stage, make sure the NDAPI_SERVER_HOST field is populated with the server host full name. It will be blank for first time through or if the hsi_pkg_includes is deleted under the config directory.
Configuring API Library-Specific Items

In the next screen you will be given the option of changing items that are specific to the HSI Gateway Client API Library.

Once you have made all the changes that you wish to make (if any), enter "a" at the prompt to continue.

Press <enter> to continue to the next screen:
If you wish to change an item, enter "c" followed by an optional space and the item number, or just the item number.
For example:
   "2" or "c 2" or "c2"

If you would like to get help on an item, enter "h" followed by an optional space and the number, for example:
   "h 3" or "h3"

1 MAX_RESTRICTED_PORT .........65535
2 MIN_RESTRICTED_PORT .........0
3 NDAPI_DEFAULT_ADDR_FAMILY ...ipv4_only
4 NDAPI_DEFAULT_AUTH_TYPE .....PAM,COMBO,KEYTAB,KRB_PREEXIST,KERBEROS
5 NDAPI_LOCAL_LOGFILE ......./dev/null
6 NDAPI_SERVER_HOST ...........
7 NDAPI_SERVER_PORT ..........1217

[a=accept] [c N] or [N]->change item N  [h N]->help for item N]
Your choice: Type c 6 to add the server full name.

Type in the the server host full name when presented with the following prompt:

NDAPI_SERVER_HOST Current setting: [] Enter new setting: elayne.clearlake.ibm.com

Then press "a" to accept.

Once all the configuration prompts have been completed, Configure prompts to allow you to go back and make changes by letting you edit the configuration file directly. If you are satisfied with the choices and answers provided, then press Enter to accept the default selection of "no".

Writing Makefile include file (config/hsi_pkg_includes)
Creating symlink (config/mach_compile_flags) for linux
... Removing existing symlink
Would you like to edit the configuration file? (yes/no) [no]:
Would you like to compile now? (yes/no) [yes]:

This indicates that the configuration is done, and the build is beginning.

The build configuration is stored in the following files, after the initial run of Configure:
<hsi version #>/config/hsi_pkg_includes
<hsi version #>/config/globus_makefile_def
These files constitute the build configuration. They are read on subsequent runs of **Configure**, so that previous answers are retained. Once created, these files can be updated manually and used to automate the configuration and build process, if needed.

It is not necessary to run **Configure**, and reconfigure the build if a subsequent rebuild is desired. Simply run Compile:

```
             [-ssl SSLDIR]

Compile -- wrapper to build HSI/HTAR software

optional arguments:
  -h, --help       show this help message and exit
  -a ARCH          Build Platform Architecture
  -b BDIR          User Build Directory
  -client          Build Client
  -docs            Build Formatted Documentation
  -server          Build Server (hsigwd)
  -ssl SSLDIR      OpenSSL Installation Directory
```

Note: The user build directory must be empty or does not exist in order for the compile to execute.

After a build using the default build directory, the hsi and htar executables are located at:

```
<hsi source directory>/bld-<hostname>-<architecture>-<OSversion>/bin/hsi
<hsi source directory>/bld-<hostname>-<architecture>-<OSversion>/bin/htar
```

Example run of Compile with the -b and -client options:

```
$ ./Compile -b /tmp/hsi_client -client
```

After a build using the -b and client options, the hsi and htar executables are located at:

```
/tmp/hsi_client/bin/hsi
/tmp/hsi_client/bin/htar
```
Chapter 6. Client Installation

To install the client, move these executables to an appropriate destination directory such as /usr/local/bin or /opt/bin or /usr/local/apps/hsi.

Typically, wrapper scripts are used to run the HSI-HTAR clients. This allows for the setting and management of the HSI-HTAR runtime environment. An example of a wrapper script can be found in: <hsi version #>/hsi/templates/hsi.wrapper.template

- Copy the HPSS.conf template to /var/hpss/etc and modify it as needed. Make a copy before appending.

```bash
cp /var/hpss/etc/HPSS.conf /var/hpss/etc/HPSS.conf.ori
cat <hsi version #>/misc/templates/HPSS.conf.template >> /var/hpss/etc/HPSS.conf
```

For sites using Kerberos authentication, make sure that the Server Auth krb5 is turned on. If a krb5 password is being used, make sure that is also turned on. Likewise, for sites using unix authentication, make sure that the Server Authentication Mechanism unix is turned on. For keytab authentication, select, uncomment, and if necessary edit the pathname. In HPSS.conf, see the following example and remove the ";" to uncomment the configuration lines.

```
850   # Authentication mechanism that server uses to get HPSS creds
851   # Valid settings are "unix" and "krb5"
852   ;Server Authentication Mechanism = unix
853       Server Authentication Mechanism = krb5
854
855   # Authenticator type that server uses to prove its identity
856   # Legal values are auth_none, auth_keytab, auth_keyfile, auth_key, auth_passwd
857   # Currently, the only supported value is "auth_keytab"
858       Server Authenticator Type = auth_keytab
859
860   # Authenticator that server uses to prove its identity.
861   # The value of this flag depends upon the Server Authenticator Type.
862       ;Server Authenticator = /var/hpss/etc/hpss.unix.keytab
863       Server Authenticator = /var/hpss/etc/hpss.keytab
```
Appendix A. Example run of Configure

The following is a sample run of Configure for configuring and building HSI/HTAR Client software.

Starting...
Searching for ar...../usr/bin/ar
Searching for chmod...../bin/chmod
Searching for cp...../bin/cp
Searching for echo...../bin/echo
Searching for ln...../bin/ln
Searching for make...../usr/bin/make
Searching for mkdir...../bin/mkdir
Searching for ranlib...../usr/bin/ranlib
Searching for rm...../bin/rm

Welcome to the HSI Package Installation script.
To cancel this script at any time, enter <ctrl-c>.

This script will allow you to customize most default options, as well as allowing you to specify or override pathnames for default settings. You can enter a shell command prefixed by the "!" character any time you are prompted to enter something from the terminal. For example, at the prompt:

Hit <enter> to continue:

You might enter
!/bin/ksh

After successful execution of this script, a "config" directory will be created if it doesn't already exist, and the file "config/hsi_pkg_includes" will be created. To start over, simply remove the file and rerun Configure. If the file is present when this script is started, the values in it will be used as defaults for the current execution of this script.

You will be given an opportunity at the end of the script to edit the configuration file, and also to compile the package. If you choose not to compile after configuring, you can run the "Compile" script at a later time.

Press <enter> to continue

OS is LINUX machine type is x86_64, compflags=compflags.linux_x86_64
Would you like to configure the HSI client packages, the server package, both or neither?

Enter 1 : to configure just the client
Enter 2 : to configure just the server
Enter 3 : to configure both client and server

Enter selection: 3

Configuring client for linux

searching for compiler "cc"...found [/usr/bin/cc]
Enter compiler to be used [/usr/bin/cc]:
(/usr/bin/cc is gcc in disguise)

+)---------------------------------------------------------------------------+
Example run of Configure

Configuring ENCRYPTION/DECRIPTION CIPHER METHODS
+++++++++++++++++++++++++++++++++++++++++++++++++

In the next screen, you will specify which encryption/decryption ciphers will be enabled when the client and server are built.

Note that only methods which are supported in the server will be used, even if other methods are supported in the client.

If the package is being built for use at a single site, then it's best to just specify the same set of methods for both the client and server (you may have to check with your HPSS administrator if you are building HSI on a client machine and you do not know which cipher(s) to enable).

If you are building the client part of the package and expect to use the same executable to connect to multiple HPSS systems, then you should enable all of the cipher methods that will be supported at any of the HPSS sites.

Press <enter> to continue to the next screen:
-----------------------------------------------------
Note: Enter "no" below if you would like an explanation of each method, as well as an option to enable/disable it.

You can just enter "yes" to use the default settings.
--------------- Default Cipher Method Settings ---------------

GARBLE cipher............. enabled
AES cipher.................... enabled
Blowfish cipher............. enabled
3DES cipher.................. enabled

Use above settings? (yes/no) [yes]: no
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++

The "GARBLE" cipher is a relatively weak encryption mechanism that uses a time-based algorithm for encryption/decryption. It is very fast, but is not recommended for environments where strong security is required.

Enable "GARBLE" cipher? (yes/no) [yes]: no
Package will be built with GARBLE cipher disabled

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++

The "AES" cipher is an implementation of the Rijndael encryption algorithm as specified in FIPS-197.

Enable "AES" cipher? (yes/no) [yes]:
Package will be built with AES cipher enabled

+++++++++++++++++++++++++++++++++++++++++++++++++++++++++

The "blowfish" cipher is a block cipher designed by Bruce Schneier of "Applied Cryptography" fame. This algorithm has a good security margin and is the fastest block cipher provided by OpenSSL.

Enable "blowfish" cipher? (yes/no) [yes]: no
Package will be built with blowfish cipher disabled
The "3DES" cipher (also commonly referred to as "triple-DES") is the most widely popular variant of DES ("Data Encryption Standard"). This is probably the most conservative symmetric cipher available, due to the wide scrutiny of DES, but is also the slowest algorithm available.

Enable "3DES" cipher? (yes/no) [yes]: no
Package will be built with 3DES cipher disabled

OpenSSL will be required

Configuring AUTHENTICATION METHOD Items

In the next screen, you will specify which authentication methods will be enabled when the client and server are built. Note that only methods which are supported in the server will be used, even if other methods are supported in the client.

If the package is being built for use at a single site, then it is best to just specify the same set of methods for both the client and server (you may have to check with your HPSS administrator if you are building HSI on a client machine and you do not know which authmethod(s) should be enabled for your site).*

If you are building the client part of the package and expect to use the same executable to connect to multiple HPSS systems, then you should enable all of the auth methods that will be supported at any of the HPSS sites.

Press <enter> to continue to the next screen:*

NOTE:
If you are planning on using RSA Securid fobs, you must enable the COMBO authmethod, below.

--------------------------------------------
Note: Enter "no" below if you would like an explanation of each method, as well as an option to enable/disable it.
You can just enter "yes" at this point to use the default settings.
--------------------------------------------

COMBO authmethod........... disabled
GLOBUS GSI authmethod...... disabled
IDENT authmethod............ disabled
KERBEROS authmethod........ enabled
KEYTAB authmethod.......... enabled
LOCAL authmethod............ disabled
MUNGE authmethod.......... disabled
PAM authmethod............. enabled

Use above settings? (yes/no) [yes]: no

The "COMBO" authmethod allows users to authenticate by entering a username and password (these are NOT sent in plaintext across the network). This method is often enabled for use by administrators.

Notes:
1. As of HPSS 7.4.3, sites should consider PAM support instead of enabling this option. If both are enabled, then PAM authentication will be used instead of this option.
2. Either this option or PAM must be enabled when building the HSIGND server if RSA Securid one-time-password checking is to be used.

Enable "COMBO" authmethod? (yes/no) [no]:
Package will be built with COMBO authmethod disabled

The "IDENT" authmethod allows users to authenticate automatically without requiring a password if they are running on trusted machines that support the IDENT protocol. This authmethod is currently implemented for the LLNL variant of IDENT, and probably is not useful at other sites.

Enable "IDENT" authmethod? (yes/no) [no]: yes
Package will be built with IDENT authmethod enabled

The "GLOBUS GSI" authmethod allows users to authenticate automatically without requiring a password, after they use the GLOBUS "grid-proxy-init" command to create a GLOBUS proxy. This method requires the GLOBUS package to be installed, and the GLOBUS packages for the client and server must be at a compatible level. (Check with the local GLOBUS administrator if need be). The user’s Globus certificate DN must also be added to the grid-mapfile on the HSIGW server machine.

Enable "GLOBUS GSI" authmethod? (yes/no) [no]:
Package will be built with GLOBUS GSI authmethod disabled

The "KERBEROS" authmethod allows users to automatically authenticate without requiring a password, after they use the Kerberos "kinit" command to create a ticket-granting ticket. This method requires the Kerberos package to be installed. Both MIT and Heimdal Kerberos as recognized, although Heimdal Kerberos has not yet been tested.

This method must be enabled in order to enable the "keytab" authentication method for use with kerberos-style keytabs. It is _not_ required if you are planning to enable the "keytab" authentication method just for unix-style keytabs.

Enable "KERBEROS" authmethod? (yes/no) [yes]:
Package will be built with KERBEROS authmethod enabled

The "KEYTAB" authmethod allows users to authenticate automatically without requiring a password, after they either use the kerberos <ktutil> or the <hpss_unix_keytab> program (if using unix authentication) to extract a "keytab" file containing their encrypted password.

This method requires the Kerberos authmethod to be enabled if using kerberos-style keytabs.

Enable "KEYTAB" authmethod? (yes/no) [yes]: no
Package will be built with KEYTAB authmethod disabled
The "MUNGE" authmethod allows users to authenticate within a security domain by obtaining a security context from a munge daemon that runs on the same host as the client, and then sending the encrypted contents to the server, which uses the munge daemon on its machine to decrypt the context, and obtain the uid and gid of the user on the client machine.

Enable "MUNGE" authmethod? (yes/no) [no]:
Package will be built with MUNGE authmethod disabled

The "PAM" authmethod enables use of Pluggable Authentication Modules on the HSI Gateway Server for Authentication. This in turn provides a variety of possible site-defined mechanisms, such as passwords, RSA SecurID fobs, etc. If available and configured on the HSI Gateway Server, it is recommended that this method be enabled and COMBO method be disabled.

Enable "PAM" authmethod? (yes/no) [yes]: yes
Package will be built with PAM_EOF authmethod enabled

Now you will enter the Kerberos service name that will be used for obtaining a service ticket when authenticating with the HSI Gateway Process. This same service name is used on both the client and server. It is usually "ftp" or "host".
(Some sites also use "hpss_hsigwd" or "hpss_ndapid")
If you are using kerberized pftp, you will probably want to use "ftp" for this.
If you are uncertain as to what to specify here, you should ask your kerberos administrator to check the keytab entries in /etc/v5srvtab on the machine that hosts the HSI Gateway Daemon process.

Kerberos service name: [ftp] host
Looking for kerberos base installation path....
Looks like the kerberos base path on this system is "/usr", and include path is "/usr/include"
Use "/usr" as the base path? (no to specify your own) (yes/no) [yes]:
Checking which version of the crypto library to use....Using k5crypto
Choosing whether to automatically run kinit if needed to obtain credentials...
Automatically run kinit if needed? (yes/no) [yes]:
kinit will automatically be run if needed to obtain credentials
Found kinit: /usr/bin/kinit
Looking for OpenSSL base installation path....
Looks like the OpenSSL base path on this system is "/usr"
Use "/usr" as the base path? (no to specify your own) (yes/no) [yes]:

Example run of Configure

The "MUNGE" authmethod allows users to authenticate within a security domain by obtaining a security context from a munge daemon that runs on the same host as the client, and then sending the encrypted contents to the server, which uses the munge daemon on its machine to decrypt the context, and obtain the uid and gid of the user on the client machine.

Enable "MUNGE" authmethod? (yes/no) [no]:
Package will be built with MUNGE authmethod disabled

The "PAM" authmethod enables use of Pluggable Authentication Modules on the HSI Gateway Server for Authentication. This in turn provides a variety of possible site-defined mechanisms, such as passwords, RSA SecurID fobs, etc. If available and configured on the HSI Gateway Server, it is recommended that this method be enabled and COMBO method be disabled.

Enable "PAM" authmethod? (yes/no) [yes]: yes
Package will be built with PAM_EOF authmethod enabled

Now you will enter the Kerberos service name that will be used for obtaining a service ticket when authenticating with the HSI Gateway Process. This same service name is used on both the client and server. It is usually "ftp" or "host".
(Some sites also use "hpss_hsigwd" or "hpss_ndapid")
If you are using kerberized pftp, you will probably want to use "ftp" for this.
If you are uncertain as to what to specify here, you should ask your kerberos administrator to check the keytab entries in /etc/v5srvtab on the machine that hosts the HSI Gateway Daemon process.

Kerberos service name: [ftp] host
Looking for kerberos base installation path....
Looks like the kerberos base path on this system is "/usr", and include path is "/usr/include"
Use "/usr" as the base path? (no to specify your own) (yes/no) [yes]:
Checking which version of the crypto library to use....Using k5crypto
Choosing whether to automatically run kinit if needed to obtain credentials...
Automatically run kinit if needed? (yes/no) [yes]:
kinit will automatically be run if needed to obtain credentials
Found kinit: /usr/bin/kinit
Looking for OpenSSL base installation path....
Looks like the OpenSSL base path on this system is "/usr"
Use "/usr" as the base path? (no to specify your own) (yes/no) [yes]:
In the next screen you will be given the option of changing items that are specific to the HSI Gateway Client API Library.

Once you have made all the changes that you wish to make (if any), enter "a" at the prompt to continue.

Press <enter> to continue to the next screen:
If you wish to change an item, enter "c" followed by an optional space and the item number, or just the item number.
For example:
"2" or "c 2" or "c2"

If you would like to get help on an item, enter "h" followed by an optional space and the number, for example:
"h 3" or "h3"

---------------------------
1 MAX_RESTRICTED_PORT .........65535
2 MIN_RESTRICTED_PORT .........0
3 NDAP_DEFAULT_ADDR_FAMILY ...ipv4_only
4 NDAP_DEFAULT_AUTH_TYPE .....KRB_PREEXIST,KERBEROS,IDENT
5 NDAP_LOCAL_LOGFILE ........../dev/null
6 NDAP_SERVER_HOST ...........
7 NDAP_SERVER_PORT ...........1217
---------------------------
[a=accept] [c N] or [N]->change item N [h N]->help for item N
Your choice: 6
NDAP_SERVER_HOST Current setting: []
Enter new setting: elayne.clearlake.ibm.com
---------------------------
1 MAX_RESTRICTED_PORT .........65535
2 MIN_RESTRICTED_PORT .........0
3 NDAP_DEFAULT_ADDR_FAMILY ...ipv4_only
4 NDAP_DEFAULT_AUTH_TYPE .....KRB_PREEXIST,KERBEROS,IDENT
5 NDAP_LOCAL_LOGFILE ........../dev/null
6 NDAP_SERVER_HOST ...........elayne.clearlake.ibm.com
7 NDAP_SERVER_PORT ...........1217
---------------------------
[a=accept] [c N] or [N]->change item N [h N]->help for item N
Your choice: 4
NDAP_DEFAULT_AUTH_TYPE Current setting: [KRB_PREEXIST,KERBEROS,IDENT]
Choose default auth method(s) to be used by the client library:
They will be tried in the order that you specify them.
Hit <enter> by itself to terminate selection
Enter -1 to clear the list and start over

Current setting: []
(Hit <enter> by itself to terminate selection)
0 ............. IDENT
1 ............. KRB_PREEXIST
2 ............. KERBEROS
Choose: 0
Current setting: [IDENT]
(Hit <enter> by itself to terminate selection)
0 ............. IDENT
Example run of Configure

1 ............. KRB_PREEXIST
2 ............. KERBEROS
Choose: 1
Current setting: [IDENT,KRB_PREEXIST]
(Hit <enter> by itself to terminate selection)
0 ............. IDENT
1 ............. KRB_PREEXIST
2 ............. KERBEROS
Choose:

---------------------------
1 MAX_RESTRICTED_PORT .........65535
2 MIN_RESTRICTED_PORT .........0
3 NDAPI_DEFAULT_ADDR_FAMILY ...ipv4_only
4 NDAPI_DEFAULT_AUTH_TYPE ......IDENT,KRB_PREEXIST
5 NDAPI_LOCAL_LOGFILE ........../dev/null
6 NDAPI_SERVER_HOST ...........hpss.lanl.gov
7 NDAPI_SERVER_PORT ..........1217
---------------------------
[a=accept] [c N] or [N]->change item N [h N]->help for item N
Your choice: a

+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
Configuring HSI-Specific Items
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

In the next screen, you will be given the option of changing items that are specific to the HSI program. Once you have made all the changes that you wish to make (if any), enter "a" at the prompt to continue.

Press <enter> to continue to the next screen:

If you wish to change an item below, enter "c" followed by an optional space and the item number, or just the item number.
For example:
"5" or "c 5" or "c5"

If you would like to get help on an item, enter "h" followed by an optional space and the number, for example:
"h 3" or "h3"

+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
1 HSI_CKSUM_HASHTYPE ...........MD5
2 HSI_CKSUM_ONOFF ..............off
3 HSI_DEFAULT_IO_BUFSIZE ......8388608
4 HSI_HPSS_CONFIG_DIR ........../var/hpss/etc
5 HSI_INTER_HPSS_PORT ...........1217
6 HSI_LIBEDIT_SUPPORT ..........off
7 HSI_LOCAL_CONFIG_DIR ........./usr/local/etc
8 HSI_MAX_IO_BUFSIZE ..........33554432
9 HSI_MIN_IO_BUFSIZE ..........1048576
10 HSI_SITENAME .................HOUSTON
11 HSI_TRANSFER_AGENT_SUPPORT ...off
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

[a=accept] [c N] or [N]->edit item N [h N]->help for item N
Your choice: a

+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
Configuring HTAR-Specific Items
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
Example run of Configure

In the next screen, you will be given the option of changing items that are specific to the HTAR program. Once you have made all the changes that you wish to make (if any), enter "a" at the prompt to continue.

Press <enter> to continue:
If you wish to change an item, enter "c" followed by an optional space and the item number, or just the item number.
For example:
"5" or "c 5" or "c5"

If you would like to get help on an item, enter "h" followed by an optional space and the number, for example:
"h 3" or "h3"

---------------------------
1 HTAR_ABS_MAX_MEMBER_FILES ...5000000
2 HTAR_ARCHIVE_COPY_COUNT .....1
3 HTAR_ARCHIVE_COS ............NONE
4 HTAR_DEFAULT_IOBUF ..........8388608
5 HTAR_DEF_MAX_MEMBER_FILES ...1000000
6 HTAR_ENABLE_PREALLOCATION ...off
7 HTAR_LOCAL_FILE_THREADS .....50
8 HTAR_NDAPI_REQUIRED_OPT .....yes
---------------------------
[a=accept] [c N] or [N]->edit item N [h N]->help for item N]
Your choice: a
Writing Makefile include file (config/hsi_pkg_includes)
Creating symlink (config/mach_compile_flags) for linux ...
... Removing existing symlink
Would you like to edit the configuration file? (yes/no) [no]:
Would you like to compile now? (yes/no) [yes]:

Generating Build: cmake -S. -Bbld-elayne-linux_ppc64le-redhat7.9 -DSERVER=1 -DCLIENT=1
-- The C compiler identification is GNU 4.8.5
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Check for working C compiler: /usr/bin/cc - skipped
-- Detecting C compile features
-- Detecting C compile features - done
-- Found OpenSSL: /usr/lib64/libcrypto.so (found version "1.0.2k")
-- Use _DEFAULT_SOURCE? no
-- MACH_C_FLAGS: -DLINUX -Dlinux_ppc64 -DHAS_STDINT_XDR -DSAN3P_ENABLED -pthread -DPTHREADS -D_THREAD_SAFE -D крупный -D_LARGEFILE_SOURCE -D_LARGEFILE64_SOURCE - DLITTLEENDIAN -D_FILE_OFFSET_BITS=64
-- CONFIG_C_FLAGS: -DENABLE_OPENSSL_SUPPORT -UENABLE_GARBLE_ENCRYPTION -DENABLE_AES_ENCRYPTION ...
-- CONFIG_LD_FLAGS: -lpam -ltirpc
Configuring HSI/HTAR CLIENT build
Configuring HSI/HTAR SERVER build
-- Configuring done
-- Generating done
-- Build files have been written to: /hsihtar_src/9.2/bld-elayne-linux_ppc64le-redhat7.9
Running Build: cmake --build bld-elayne-linux_ppc64le-redhat7.9 --clean-first
Scanning dependencies of target hpss_extensions_srvr
[ 0%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_auth_funcs.c.o
[ 0%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_cosparse.c.o
[ 0%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_motd.c.c.o
[ 1%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_auth_funcs.c.o
[ 1%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_motd.c.c.o
[ 1%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_cosparse.c.o
[ 1%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_crypto funcs.c.o
[ 1%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_motd.c.c.o

---
Example run of Configure

[ 1%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_openssl.c.o
[ 2%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_record.c.o
[ 2%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpsscfgx_restricted_addr.c.o
[ 2%] Building C object CMakeFiles/hpss_extensions_srvr.dir/api_extensions/hpss_site_info.c.o
[ 3%] Linking C static library lib/libhpss_extensions_srvr.a
[ 3%] Built target hpss_extensions_srvr

Scanning dependencies of target hpssapi
[ 4%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hpss_hash.c.o
[ 4%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hpss_interop.c.o
[ 4%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hpss_MemAlign.c.o
[ 4%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hpss_net.c.o
[ 5%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hpssoid.c.o
[ 5%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hpss_UUID.c.o
[ 5%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/mvrprotocol.c.o
[ 6%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/mvrsckt.c.o
[ 6%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/pdata.c.o
[ 6%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/san3p.c.o
[ 6%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/san3p_util.c.o
[ 7%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_init.c.o
[ 7%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Apiconfig.c.o
[ 7%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_authenticate.c.o
[ 8%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_access.c.o
[ 8%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_acct.c.o
[ 8%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_acl.c.o
[ 9%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw bfsattr.c.o
[ 9%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Chdir.c.o
[ 9%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Chown.c.o
[ 9%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Chmod.c.o
[ 10%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Chroot.c.o
[ 10%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw clit.c.o
[ 10%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Closedir.c.o
[ 10%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Convertids.c.o
[ 11%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Copyfile.c.o
[ 11%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Fclear.c.o
[ 11%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Fdigest.c.o
[ 11%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Fgetattr.c.o
[ 12%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw FileExtensions.c.o
[ 12%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Filesets.c.o
[ 12%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Fsetattr.c.o
[ 13%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Getcwd.c.o
[ 13%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Group.c.o
[ 13%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Io_misc.c.o
[ 13%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Juncions.c.o
[ 14%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Chmod.c.o
[ 14%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Chown.c.o
[ 14%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Getcwd.c.o
[ 15%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Io.c.o
[ 15%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Mkdir.c.o
[ 15%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Rmdir.c.o
[ 15%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Readdir.c.o
[ 16%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Rename.c.o
[ 16%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Stat.c.o
[ 16%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lfx Unlink.c.o
[ 17%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Link.c.o
[ 17%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Logging.c.o
[ 17%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lookup.c.o
[ 17%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Lseek.c.o
[ 18%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Map_errno.c.o
[ 18%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw Mkdir.c.o
Example run of Configure

[ 18%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_motd.c.o
[ 18%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_msgprocs.c.o
[ 19%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_multi_hpss.c.o
[ 19%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_open.c.o
[ 20%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_openlog.c.o
[ 20%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_purge.c.o
[ 20%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_rddir.c.o
[ 20%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_rdlink.c.o
[ 21%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_read.c.o
[ 21%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_reconnect.c.o
[ 21%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_rename.c.o
[ 22%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_requestId.c.o
[ 22%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_rewind.c.o
[ 22%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_rmdir.c.o
[ 23%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_setcos.c.o
[ 23%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_sethost.c.o
[ 23%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_siteinfo.c.o
[ 24%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_sockets.c.o
[ 24%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_stage.c.o
[ 24%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_stat.c.o
[ 24%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_statsfs.c.o
[ 25%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_su.c.o
[ 25%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_subsysstats.c.o
[ 25%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_syslink.c.o
[ 26%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_threads.c.o
[ 26%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_trunc.c.o
[ 26%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw uda_expire.c.o
[ 26%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw_umask.c.o
[ 27%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw unlink.c.o
[ 27%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw utime.c.o
[ 27%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw write.c.o
[ 27%] Building C object CMakeFiles/hpssapi.dir/ndapi/ndclient/hsigw xfer_concur.c.o
[ 28%] Building C object CMakeFiles/hpssapi.dir/ndapi/common/u_signed64.c.o
[ 28%] Building C object CMakeFiles/hpssapi.dir/ndapi/common/hsigw xdr.c.o
[ 28%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss auth funcs.c.o
[ 29%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss cos functions.c.o
[ 29%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss cos.c.o
[ 29%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss cpumap.c.o
[ 30%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpsscfgx config api.c.o
[ 30%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpsscfgx cfg_functions.c.o
[ 30%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpsscfgx_getClientInterface.c.o
[ 31%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpsscfgx restricted ports.c.o
[ 31%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss conv.c.o
[ 31%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss crypt funcs.c.o
[ 31%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss expire.c.o
[ 32%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss motd.c.o
[ 32%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss netrc.c.o
[ 33%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss cfgx pattern match.c.o
[ 33%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss record id.c.o
[ 33%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss restricted addr.c.o
[ 33%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss site info.c.o
[ 34%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss scheduler.c.o
[ 34%] Building C object CMakeFiles/hpssapi.dir/api_extensions/hpss u64conv.c.o
[ 34%] Linking C static library lib/libhpssapi.a
[ 34%] Built target hpssapi

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Example run of Configure

```bash
[ 34%] Generating ../../../hsi/src/hsi_version.c
Scanning dependencies of target hsi
[ 35%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi.c.o
[ 35%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_AclCommand.c.o
[ 35%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Account.c.o
[ 36%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Anomate.c.o
[ 36%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_COS.c.o
[ 36%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Debug.c.o
[ 36%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Chdir.c.o
[ 37%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_ChecksumCmd.c.o
[ 37%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Chmod.c.o
[ 37%] Building C object hsi/src/CMakeFiles/hsi dir/hsi_Chown.c.o
[ 38%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_ClientInterface.c.o
[ 38%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_CmdEditor.c.o
[ 38%] Building C object hsi/src/CMakeFiles/hsi dir/hsi_Command.c.o
[ 38%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Crename.c.o
[ 39%] Building C object hsi/src/CMakeFiles/hsi dir/hsi_ControlCmds.c.o
[ 39%] Building C object hsi/src/CMakeFiles/hsi dir/hsi_CopyCommand.c.o
[ 39%] Building C object hsi/src/CMakeFiles/hsi dir/hsi_DirProcs.c.o
/hsihtar_src/9.2/hsi/src/hsi_DirProcs.c: In function ‘readHPSSdir’:
  RETRY(entryCount = hpss_ReadAttrs(Dir,
^  [ 40%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_DuCommand.c.o
[ 40%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_DumpCommand.c.o
[ 40%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_FileCopy.c.o
[ 40%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_FileDigest.c.o
[ 41%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_FileMisc.c.o
[ 41%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_FileRead.c.o
[ 41%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_FileWrite.c.o
[ 42%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Find.c.o
/hsihtar_src/9.2/hsi/src/hsi_Find.c: In function ‘searchDir’:
  RETRY(entryCount = hpss_ReadAttrs(Dir,
^  [ 42%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Firewall.c.o
[ 42%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Getopt.c.o
[ 43%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Glob.c.o
/hsihtar_src/9.2/hsi/src/hsi_Glob.c: In function ‘matchHPSSdir’:
  RETRY(entryCount = hpss_ReadAttrs(Dir,
^  [ 43%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_GlobalLocks.c.o
[ 43%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_GPPS_interface.c.o
[ 43%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_GroupCommand.c.o
[ 44%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_HashCommand.c.o
[ 44%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Help.c.o
[ 44%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_HpspsPioMgr.c.o
[ 45%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_HsigwdCommand.c.o
[ 45%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_IdCommand.c.o
[ 45%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_IHCopyLocalMethod.c.o
[ 46%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_IHCopyNdapidMethod.c.o
[ 46%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_JunctionCommand.c.o
[ 46%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Keyset.c.o
[ 47%] Building C object hsi src/CMakeFiles/hsi.dir/hsi_LFM.c.o
[ 47%] Building C object hsi src/CMakeFiles/hsi.dir/hsi_LfmPathCheck.c.o
[ 47%] Building C object hsi src/CMakeFiles/hsi.dir/hsi_Link.c.o
```
Example run of Configure

[ 47%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Ls.c.o
[ 48%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Local.c.o
[ 48%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_LocalXfers.c.o
[ 48%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Logging.c.o
[ 49%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_LogicalDrives.c.o
[ 49%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_MigratePurge.c.o
[ 49%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Misc.c.o
[ 50%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Mkdir.c.o
[ 50%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_MultiHPSS.c.o
[ 50%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_MvCommand.c.o
[ 51%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_NetIO.c.o
[ 51%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Parse.c.o
[ 52%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_PartialXfers.c.o
[ 52%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_PathProcs.c.o
[ 52%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Perror.c.o
[ 52%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Prompt.c.o
[ 52%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Purgelock.c.o
[ 52%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Rc.c.o
[ 53%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_ReadCommand.c.o
[ 53%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_ReadParallel.c.o
[ 53%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_ReadViaAPI.c.o
[ 54%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Rename.c.o
[ 54%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_RmCommand.c.o
[ 54%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_RmdirCommand.c.o
[ 54%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_RmSite.c.o
[ 55%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Scheduler.c.o
[ 55%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Signals.c.o
[ 55%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Sockets.c.o
[ 56%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Scene.c.o
[ 56%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Su.c.o
[ 56%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_TA_HPSS.c.o
[ 57%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_TA_Local.c.o
[ 57%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_TA_Misc.c.o
[ 57%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_ThreadMisc.c.o
[ 58%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Thread.c.o
[ 58%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_UdaInterface.c.o
[ 58%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Umask.c.o
[ 59%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_version.c.o
[ 59%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_Write.c.o
[ 59%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_WriteParallel.c.o
[ 59%] Building C object hsi/src/CMakeFiles/hsi.dir/hsi_WriteViaAPI.c.o
[ 60%] Building C object hsi/src/CMakeFiles/hsi/dir/hsi_XferProgressThread.c.o
[ 60%] Linking C executable ../bin/hsi
[ 60%] Built target hsi
[ 60%] Generating ../..../htar/src/htar_version.c
Scanning dependencies of target htar
[ 61%] Building C object htar/src/CMakeFiles/htar.dir/htar.c.o
[ 61%] Building C object htar/src/CMakeFiles/htar.dir/htar_Annotate.c.o
[ 61%] Building C object htar/src/CMakeFiles/htar/dir/htar_Append.c.o
[ 61%] Building C object htar/src/CMakeFiles/htar/dir/htar_ArchiveFile.c.o
[ 62%] Building C object htar/src/CMakeFiles/htar/dir/htar_BuildIndex.c.o
[ 62%] Building C object htar/src/CMakeFiles/htar/dir/htar_Compare.c.o
[ 62%] Building C object htar/src/CMakeFiles/htar/dir/htar_CompareCksums.c.o
[ 63%] Building C object htar/src/CMakeFiles/htar/dir/htar_Consistency.c.o
[ 63%] Building C object htar/src/CMakeFiles/htar/dir/htar_Copy.c.o
[ 63%] Building C object htar/src/CMakeFiles/htar/dir/htar_CopyFromHPSSArchive.c.o
Example run of `Configure`

```plaintext
[ 63%] Building C object htar/src/CMakeFiles/htar.dir/htar_CopyToHPSSArchive.c.o
[ 64%] Building C object htar/src/CMakeFiles/htar.dir/htar_Create.c.o
[ 64%] Building C object htar/src/CMakeFiles/htar.dir/htar_Debug.c.o
[ 64%] Building C object htar/src/CMakeFiles/htar.dir/htar_DirProcs.c.o

/hsihtar_src/9.2/htar/src/htar.DirProcs.c: In function `htar_ReadHpssDir':
  entryCount = hpss_ReadAttrs(Dir,
                             ^
[ 65%] Building C object htar/src/CMakeFiles/htar.dir/htar_Delete.c.o
[ 65%] Building C object htar/src/CMakeFiles/htar.dir/htar_DumpState.c.o
[ 65%] Building C object htar/src/CMakeFiles/htar.dir/htar_Exclude.c.o
[ 65%] Building C object htar/src/CMakeFiles/htar.dir/htar_Expire.c.o
[ 66%] Building C object htar/src/CMakeFiles/htar.dir/htar_Extract.c.o
[ 66%] Building C object htar/src/CMakeFiles/htar.dir/htar_FileMisc.c.o
[ 66%] Building C object htar/src/CMakeFiles/htar.dir/htar_GenLists.c.o
[ 67%] Building C object htar/src/CMakeFiles/htar.dir/htar_Glob.c.o

/hsihtar_src/9.2/htar/src/htar.Glob.c: In function `matchHPSSdir':
  entryCount = hpss_ReadAttrs(Dir,
                             ^
[ 67%] Building C object htar/src/CMakeFiles/htar.dir/htar_GlobalLocks.c.o
[ 67%] Building C object htar/src/CMakeFiles/htar.dir/htar_IndexFile.c.o
[ 68%] Building C object htar/src/CMakeFiles/htar.dir/htar_LfxXfer.c.o
[ 68%] Building C object htar/src/CMakeFiles/htar.dir/htar_LfxXferMisc.c.o
[ 68%] Building C object htar/src/CMakeFiles/htar.dir/htar_List.c.o
[ 68%] Building C object htar/src/CMakeFiles/htar.dir/htar_LocalArchive.c.o
[ 69%] Building C object htar/src/CMakeFiles/htar.dir/htar_LocalFileReadThread.c.o
[ 69%] Building C object htar/src/CMakeFiles/htar.dir/htar_Memmgr.c.o
[ 70%] Building C object htar/src/CMakeFiles/htar.dir/htar_Memmgr.c.o
[ 70%] Building C object htar/src/CMakeFiles/htar.dir/htar_Misc.c.o
[ 70%] Building C object htar/src/CMakeFiles/htar.dir/htar_ParseCmdLine.c.o
[ 70%] Building C object htar/src/CMakeFiles/htar.dir/htar_ParseExcludes.c.o
[ 71%] Building C object htar/src/CMakeFiles/htar.dir/htar_PathProcs.c.o
[ 71%] Building C object htar/src/CMakeFiles/htar.dir/htar_Rc.c.o
[ 71%] Building C object htar/src/CMakeFiles/htar.dir/htar_ReadArchive.c.o
[ 72%] Building C object htar/src/CMakeFiles/htar.dir/htar_ReadIoError.c.o
[ 72%] Building C object htar/src/CMakeFiles/htar.dir/htar_RemoteArchive.c.o
[ 72%] Building C object htar/src/CMakeFiles/htar.dir/htar_Repack.c.o
[ 72%] Building C object htar/src/CMakeFiles/htar.dir/htar_Shutdown.c.o
[ 73%] Building C object htar/src/CMakeFiles/htar.dir/htar_Signal.c.o
[ 73%] Building C object htar/src/CMakeFiles/htar.dir/htar_StatusFuncs.c.o
[ 73%] Building C object htar/src/CMakeFiles/htar.dir/htar_Update.c.o
[ 74%] Building C object htar/src/CMakeFiles/htar.dir/htar_UidGidToName.c.o
[ 74%] Building C object htar/src/CMakeFiles/htar.dir/htar_Verify.c.o
[ 74%] Building C object htar/src/CMakeFiles/htar.dir/htar_VerifySupport.c.o
[ 74%] Building C object htar/src/CMakeFiles/htar.dir/htar_version.c.o
[ 75%] Building C object htar/src/CMakeFiles/htar.dir/htar_WriteIoError.c.o
[ 75%] Building C object htar/src/CMakeFiles/htar.dir/htar_WriteLocalArchive.c.o
[ 76%] Building C object htar/src/CMakeFiles/htar.dir/htar_WriteXferThread.c.o

[ 76%] Linking C executable ..../bin/htar
CMakeFiles/htar.dir/htar_IndexFile.c.o: In function `htar_CopyAndAdjustLocalIndex':
/hsihtar_src/9.2/htar/src/htar_IndexFile.c:468: warning: the use of `mktemp' is dangerous, better use `mkstemp'

[ 76%] Built target htar
Scanning dependencies of target hpss_hsigwd.9.2.0
[ 76%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsigwd.c.o
[ 76%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsigwd_acct.c.o
[ 76%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsigwd_admin.c.o
```
Example run of Configure

```c
result = hpss_Statfs(param->CosId, &buf);
```

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Example run of Configure

[92%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_DuCommand.c.o
[92%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_DumpCommand.c.o
[93%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_FileMisc.c.o
[93%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_Getopt.c.o
[94%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_GiveCommand.c.o
[94%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_Glob.c.o
[94%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_HashCommand.c.o
[94%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_Keyset.c.o
[95%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_Logging.c.o
[95%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_LnCommand.c.o
[95%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_LsaclCommand.c.o
[96%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_LsCommand.c.o
[96%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_Memmgr.c.o
[96%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_Misc.c.o
[96%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_MkdirCommand.c.o
[97%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_MvCommand.c.o
[97%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_Parser.c.o
[97%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_PathProcs.c.o
[98%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_Perror.c.o
[98%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_PrintFuncs.c.o
[98%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_PurgeLock.c.o
[99%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_RenameCommand.c.o
[99%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_RmdirCommand.c.o
[99%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_RndirCommand.c.o
[99%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_SystemCmd.c.o
[99%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/hsi_cli_TrashCommand.c.o
[100%] Building C object ndapi/ndserver/CMakeFiles/hpss_hsigwd.9.2.0.dir/__common/hsigw_xdr.c.o
[100%] Linking C executable ../../bin/hpss_hsigwd.9.2.0
[100%] Built target hpss_hsigwd.9.2.0

Build complete. All executables are located in ./bld-elayne-linux_ppc64le-redhat7.9/bin
root@elayne /hsihtar_src/9.2