HSI Configuration/Tuning

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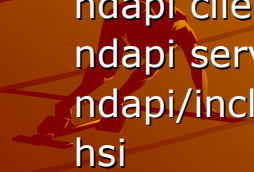
http://www.sdsc.edu/Storage/hsi/Install

HSI Package

- hsi.*version*.tar.Z
  CYGWIN – rpc,kerberos,pdksh
  ai_threads
  api_extensions
  ndapi client library
  ndapi server
  ndapi/include/*hpss_version*/*.h
  hsi
  htar (LLNL version)



HSI Configuration

Non-DCE Components

All:

- compflags.xxx
- api_extensions library
  - restricted ports
- ndapi library
  - default authentication method(s)
    - keytab
    - dce combo
    - kerberos
    - kerberos_preexist
    - ident
    - local
    - gsi

ndapi authentication configuration

- Example (LLNL)

```
DEFAULT_AUTH_TYPE="API_AUTH_TYPE_KRB_PREEXIST,API_AU
  TH_TYPE_IDENT,API_AUTH_TYPE_KERBEROS"

Kerberos:
   service name: "hpss_ndapid" (ORNL,NERSC,SDSC)
                 "ftp" (others)
   requires KDC (or dce registry) principal entry and
     keytab entry (/krb5/v5srvtab) to acquire usable
     service ticket
```

ndapi authentication configuration – kerberos env

- NDAPI-specific environment variables for KERBEROS authentication (client side)
  - KRB_KINIT – path to kinit program (v4 vs. v5 kinit on AIX)
  - KRB_SERVICE – e.g. "*ftp*"
  - HPSS_PRINCIPAL – *user@realm*

NDAPI/API_EXTENSIONS Environment Variables

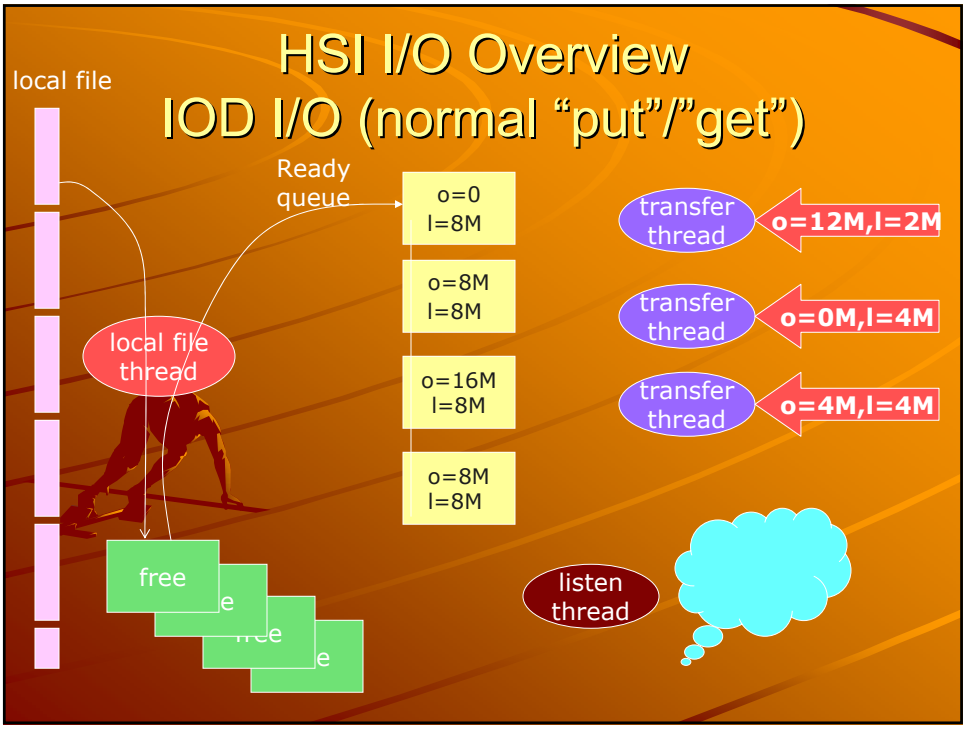
- **HPSS_PRINCIPAL (may be a template name, e.g.,"%U")**
- **HPSS_AUTH_METHOD (dce,ident,kerberos,keytab,local,gsi)**
- **HPSS_KEYTAB_PATH (may include template chars)**
- **HPSS_HOSTNAME**
- **HPSS_CTL_HOSTNAME**
- **HPSS_SERVER_HOST**
- **KRB_KINIT**
- **KRB_SERVICE**
- **HPSS_PFTPC_PORT_RANGE**
- **RPC_RESTRICTED_PORTS**
- **HPSS_TCP_WRITESIZE**
- **HOME**
- **HPSS_PATH_ETC**

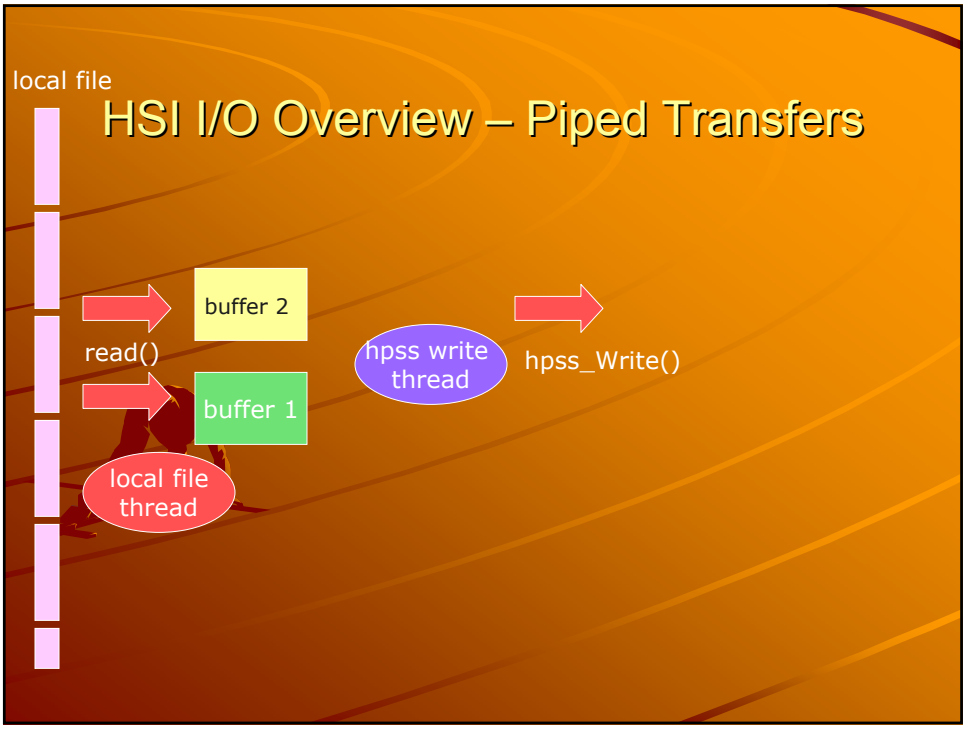
HSI Environment Variables

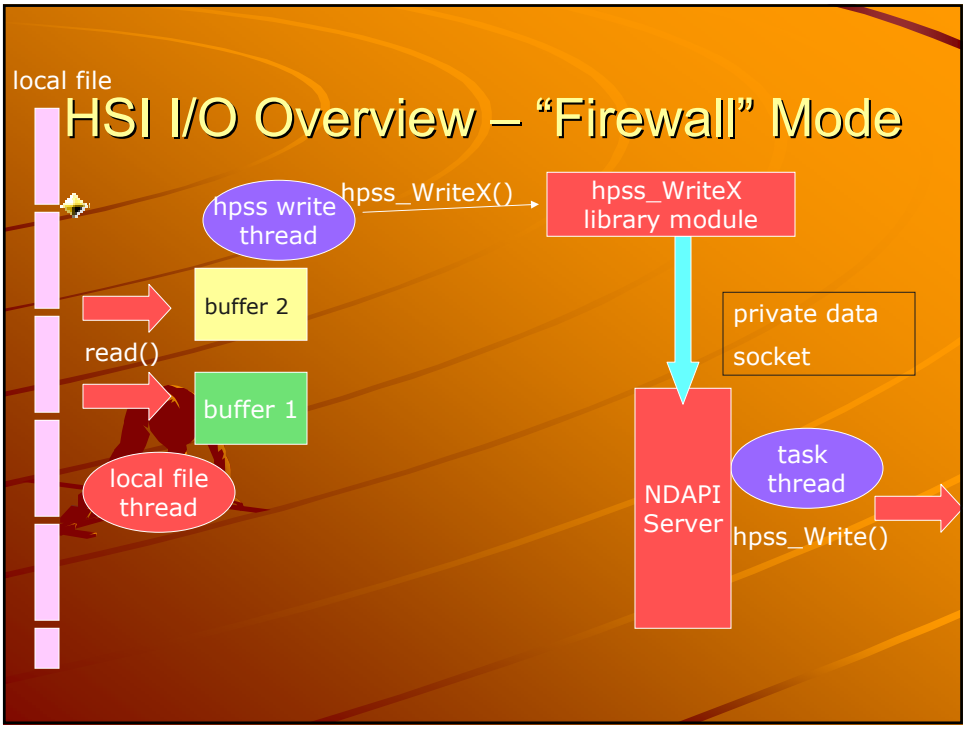
- HSI_NOLOGIN_FILE
- HPSS_HOSTNAME
- HPSS_STRIPE_WIDTH (IHCP, ndapi method)
- HPSS_BLOCKSIZE (IHCP, ndapi method)
- HSI_LOGFILE (may include template chars)
- KRB5CCNAME (Kerberos)
- PFTP_CONFIG_FILE (

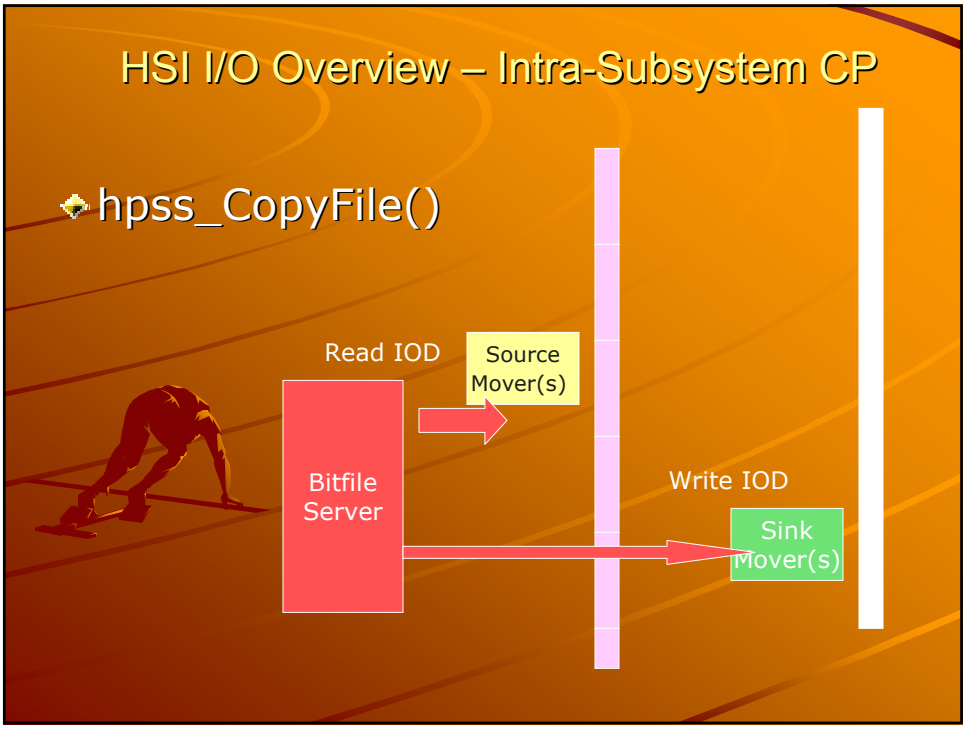
NDAPI Server

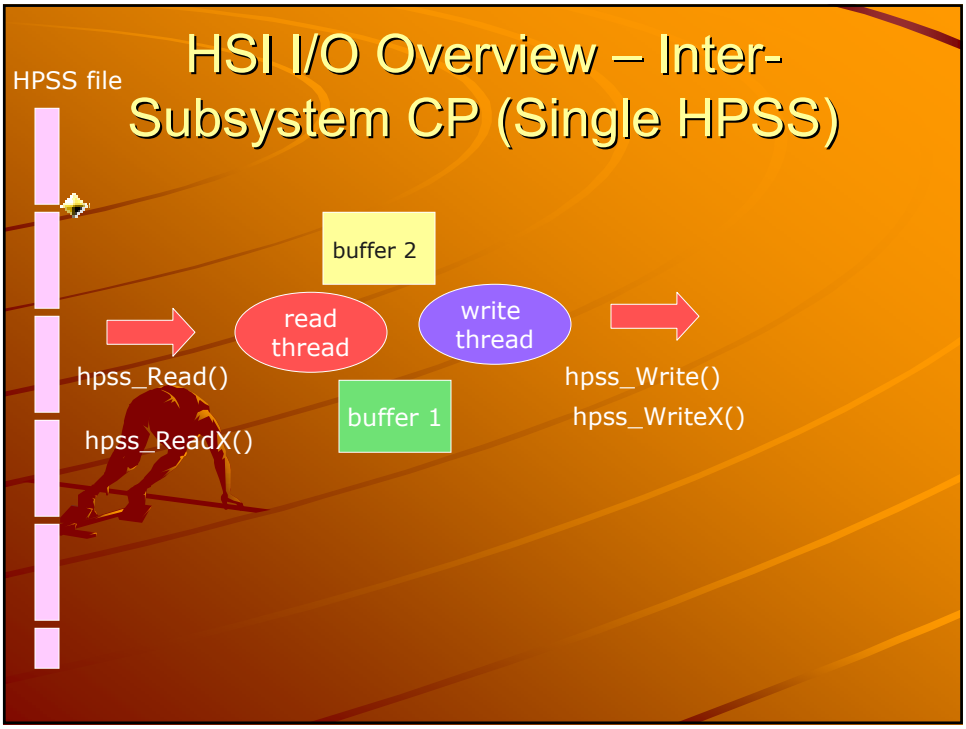
- Configuration files (COS, MOTD,HPSS.conf)
- -H vs. HPSS_HOSTNAME (diagram of SP with HSI onboard)

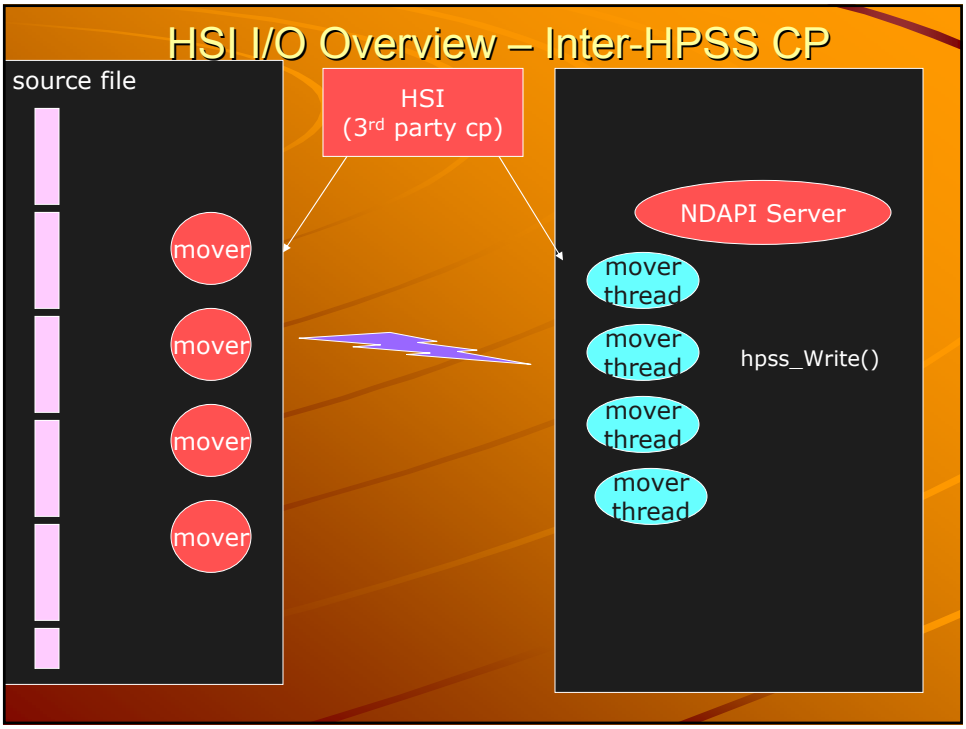

HSI I/O Overview
IOD I/O (normal "put"/"get")
local file
Ready queue
o=0 l=8M
o=8M l=8M
o=16M l=8M
o=8M l=8M
transfer thread
o=12M,l=2M
transfer thread
o=0M,l=4M
transfer thread
o=4M,l=4M
local file thread
free
listen thread


local file
HSI I/O Overview – Piped Transfers
buffer 2
read()
buffer 1
local file thread
hpss write thread
hpss_Write()


local file
HSI I/O Overview – "Firewall" Mode
hpss write thread
hpss_WriteX()
hpss_WriteX library module
buffer 2
private data
socket
read()
buffer 1
local file thread
NDAPI Server
task thread
hpss_Write()

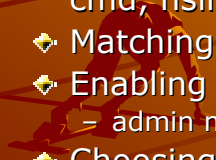

HSI I/O Overview – Intra-Subsystem CP
hpss_CopyFile()
Read IOD
Source Mover(s)
Bitfile Server
Write IOD
Sink Mover(s)


HSI I/O Overview – Inter-Subsystem CP (Single HPSS)
HPSS file
buffer 2
read thread
write thread
hpss_Read()
hpss_ReadX()
buffer 1
hpss_Write()
hpss_WriteX()


HSI I/O Overview – Inter-HPSS CP
source file
HSI
(3rd party cp)
mover
mover
mover
mover
NDAPI Server
mover thread
mover thread
mover thread
mover thread
hpss_Write()

HSI Performance Considerations

- Determine optimal network options (HPSS.conf)!! (Server/client)
- Selecting correct NIC for HPSS_HOSTNAME
  - PFTP_CONFIG file for multiple striped NICs
- Set HSI default buffersize (compile-time, "iobuf" cmd, hsirc (future)
- Matching HSI/Mover buffer sizes
- Enabling shared mem
  - admin max shmem (Solaris, SGI (?), …)
- Choosing optimal VV blocksize
  - too large-> inhibits parallel xfers



Multi-HPSS

- multiple NICs
- multiple sockets
- ndapi server buffer size