Large Output and Shared File Systems

Thursday PM, Lecture 2

Derek Weitzel

OSG

Per-job transfer limits

<10MB/file, 1GB total

submit server

HTCondor

exec server

<1GB/file and total

submit file
executable
dir/ input
output

(exec dir)/
executable
input
output
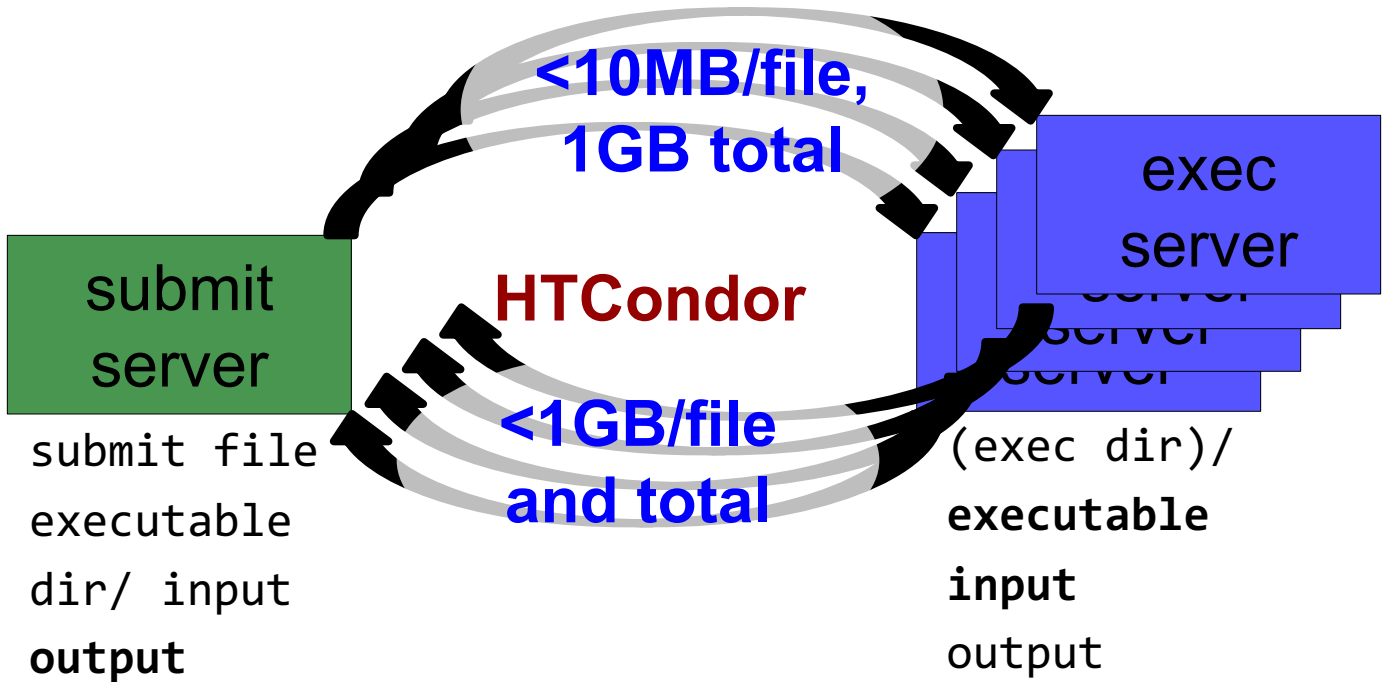
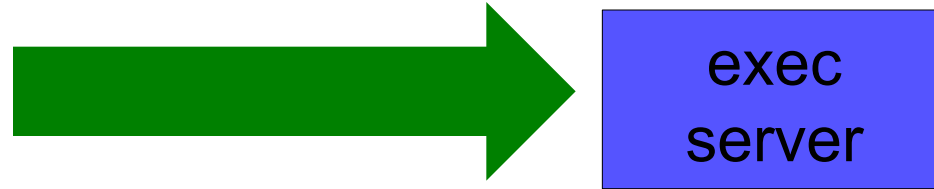# What's Different for Output?

- always unique (right?)

- caching won't help

- files not associated with your local username
  - security barriers outside of local context

- security issues with world-writability
  - (versus okay world-readability for input)

Output for HTC and OSG

file size	method of delivery
~~words~~	~~within executable or arguments?~~
tiny – 1GB	HTCondor file transfer (up to 1 GB total per-job)
1GB+	**shared file system (local execute servers)**

Large input in HTC and OSG

exec server

file size	method of delivery
words	within executable or arguments?
tiny – 10MB per file	HTCondor file transfer (up to 1GB total per-job)
10MB – 1GB, shared	download from web proxy (network-accessible server)
1GB - 10GB, unique or shared	StashCache (regional replication)
10 GB – TBs, unique or shared	**shared file system (local copy, local execute servers)**

(Local) Shared Filesystems

- data stored on file servers, but network-mounted to local submit and execute servers

- use local user accounts for file permissions
  - Jobs run as YOU!
  - readable (input) and writable (output, most of the time)

- *MOST* perform better with fewer large files (versus many small files of typical HTC)

Shared FS Technologies

- *via network mount*
  - NFS
  - AFS
  - Lustre
  - Gluster (may use NFS mount)
  - Isilon (may use NSF mount)
- *distributed files systems (data on many exec servers)*
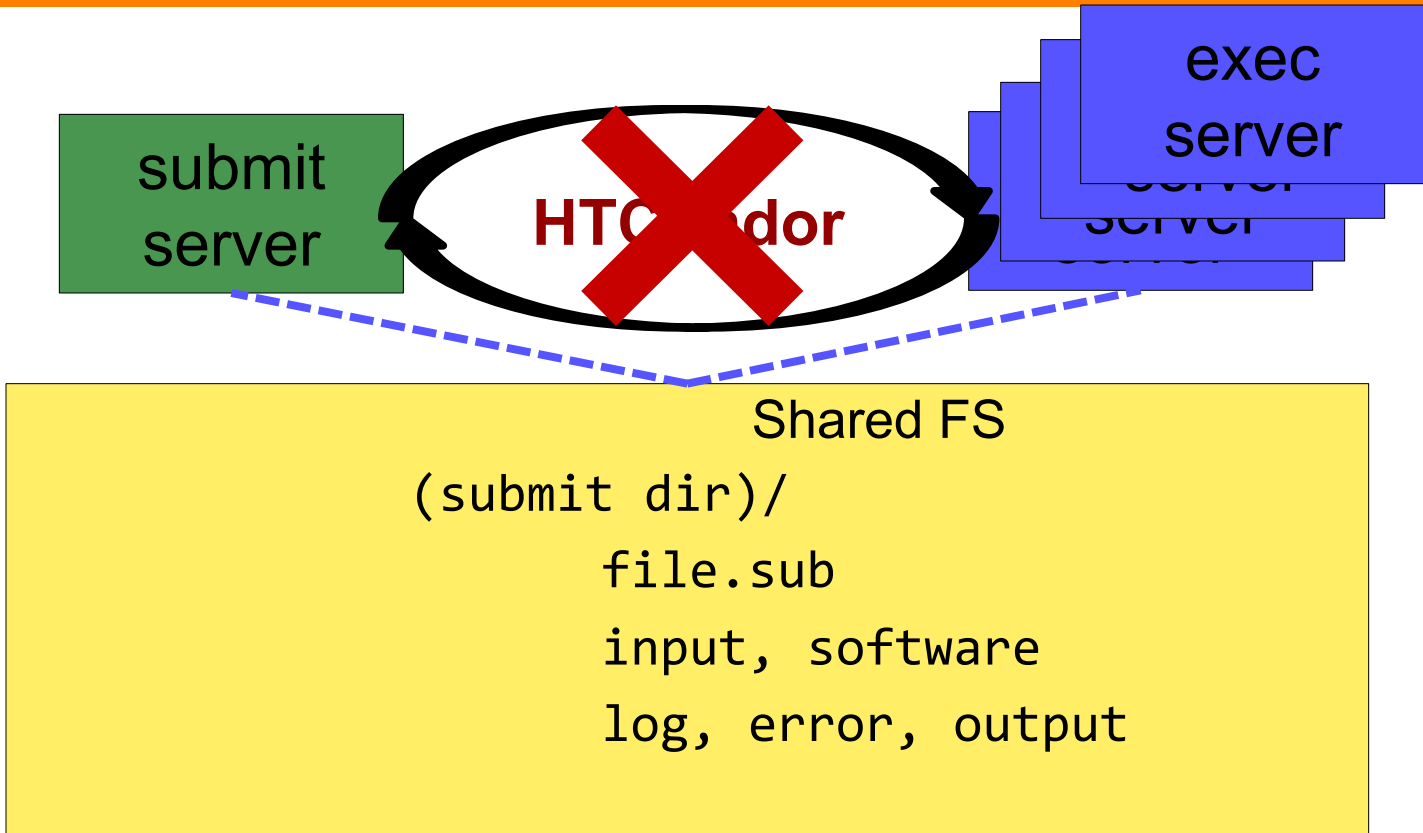 - HDFS (Hadoop)
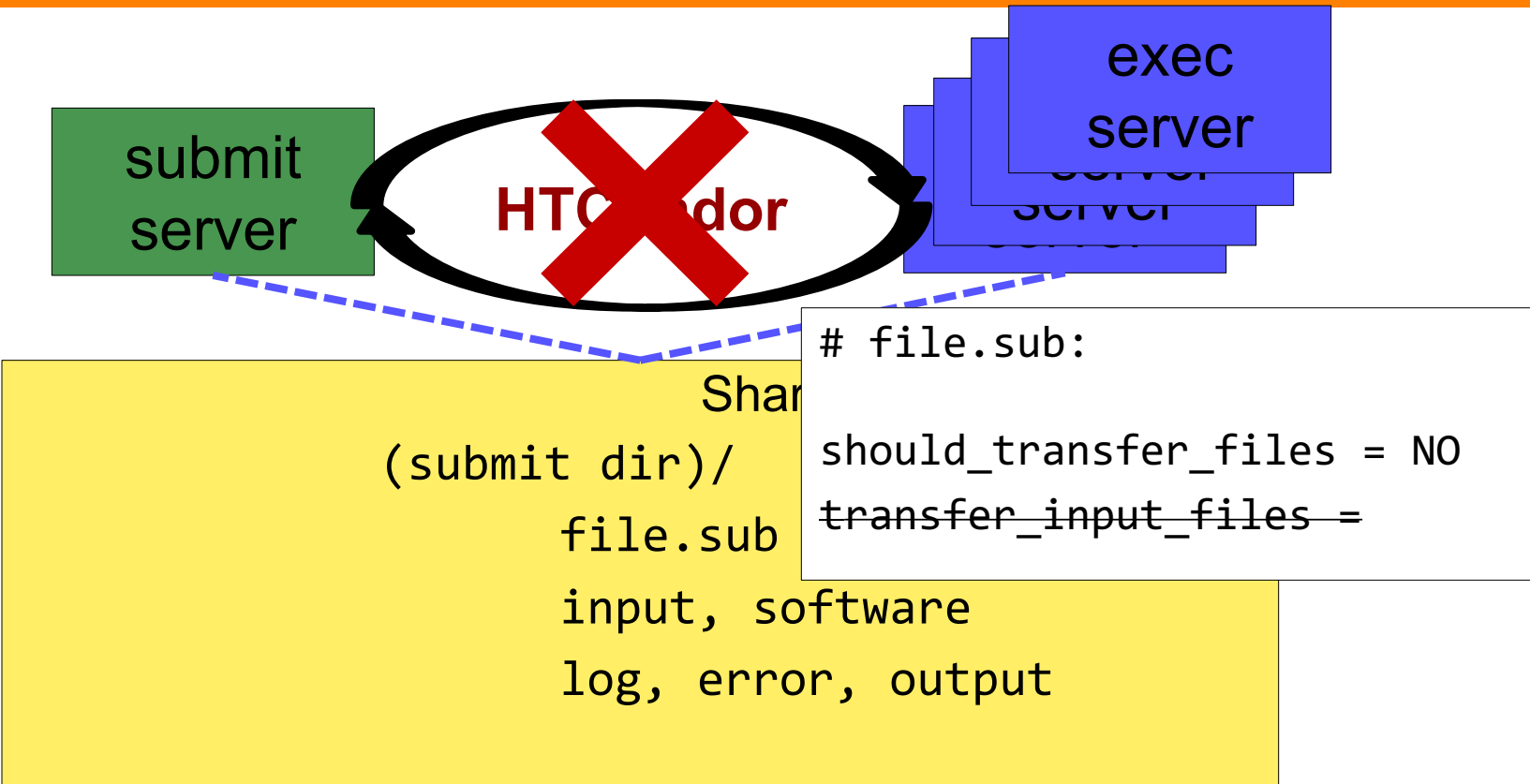 - CEPH

Shared FS Configurations

1. Submit directories *WITHIN* the shared filesystem
   - most campus clusters
   - limits HTC capabilities!!

2. Shared filesystem separate from local submission directories
   - supplement local HTC systems
   - treated more as a repository for VERY large data (>GBs)

3. Read-only (input-only) shared filesystem
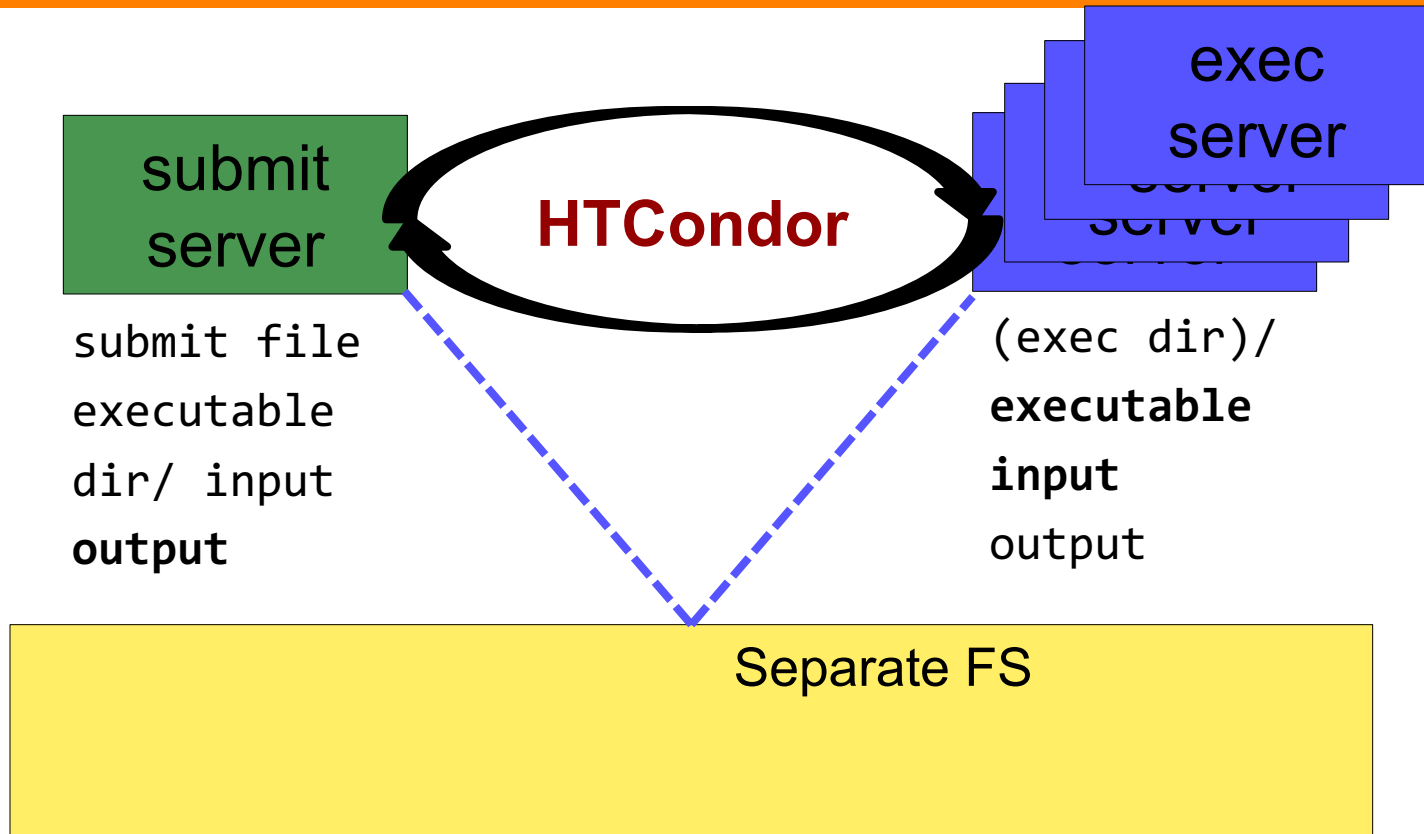   - Treated as a repository for VERY large input, only
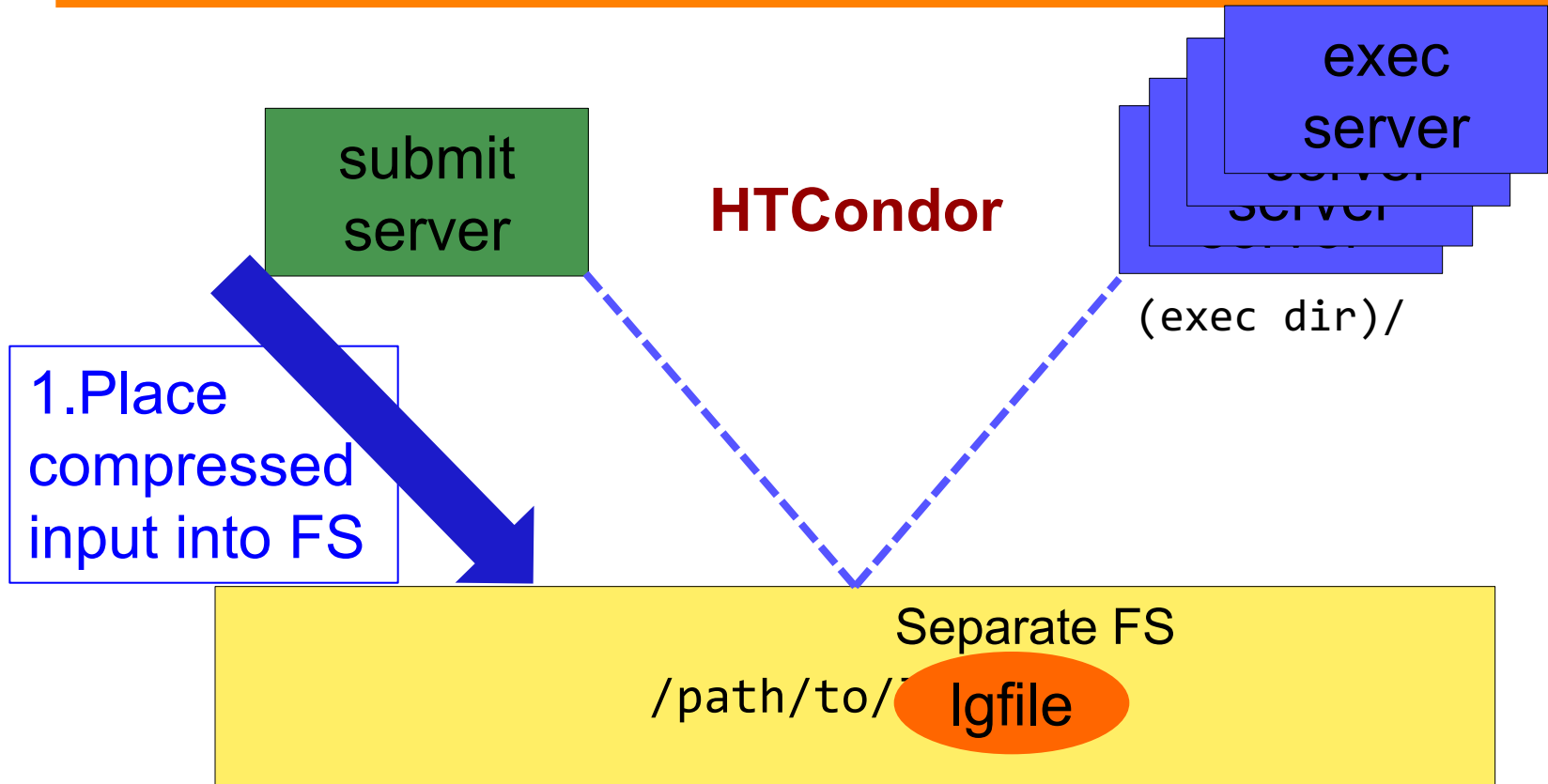
Submit dir within shared FS

Submit dir within shared FS

submit
server

HTCndor

exec
server

Shared

(submit dir)/

file.sub

input, software

log, error, output

```
# file.sub:

should_transfer_files = NO
transfer_input_files =
```

Separate shared FS

submit server

HTCondor

exec server

submit file
executable
dir/ input
output

(exec dir)/
executable
input
output

Separate FS

Separate shared FS - Input

submit server

HTCondor

exec server

server

server

(exec dir)/

1.Place compressed input into FS

Separate FS

/path/to/ lgfile

Separate shared FS - Input

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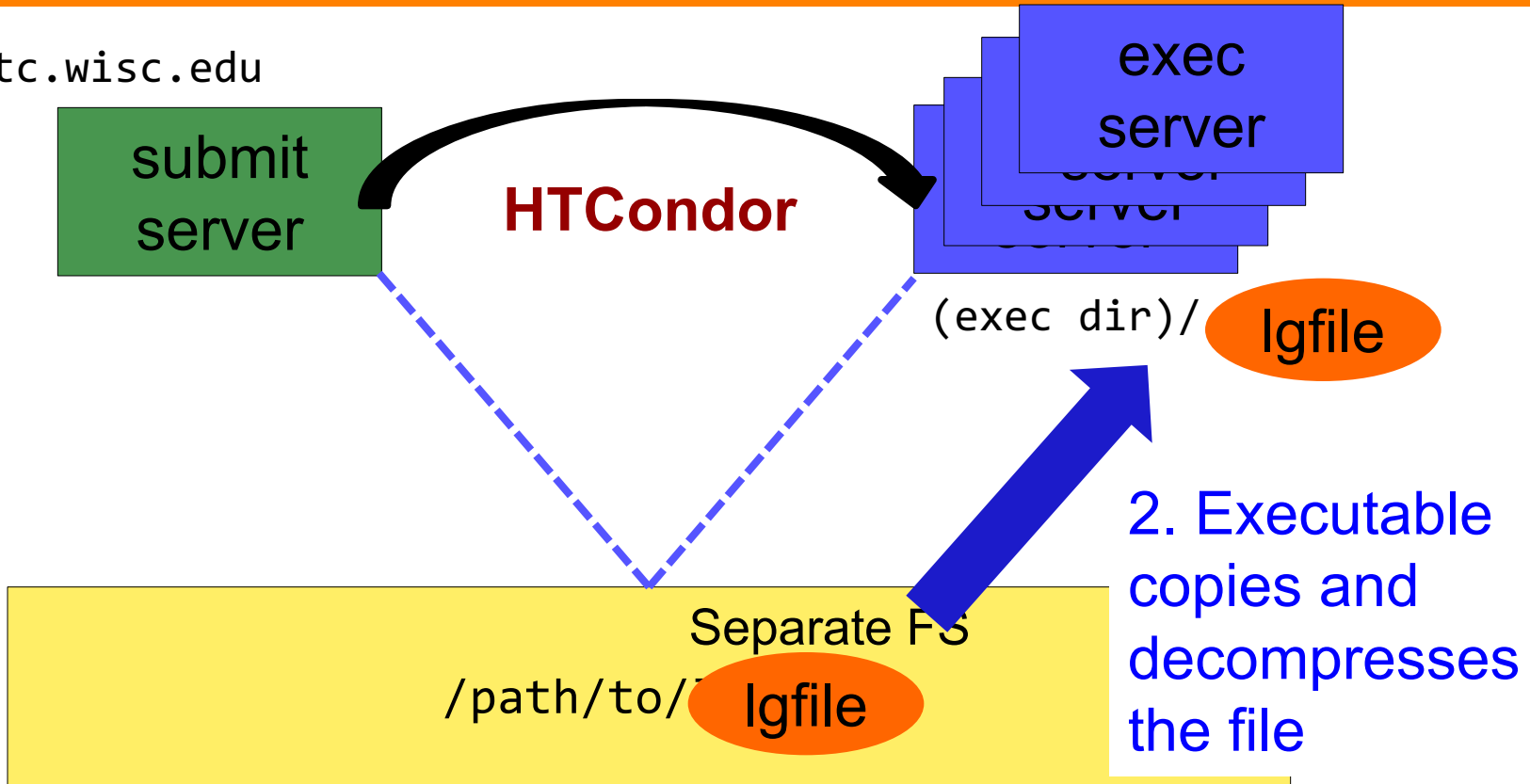
submit server

HTCondor

exec server

server

server

(exec dir)/ lgfile

2. Executable copies and decompresses the file

Separate FS

/path/to/ lgfile

Separate shared FS - Output

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submit server

HTCondor

exec server
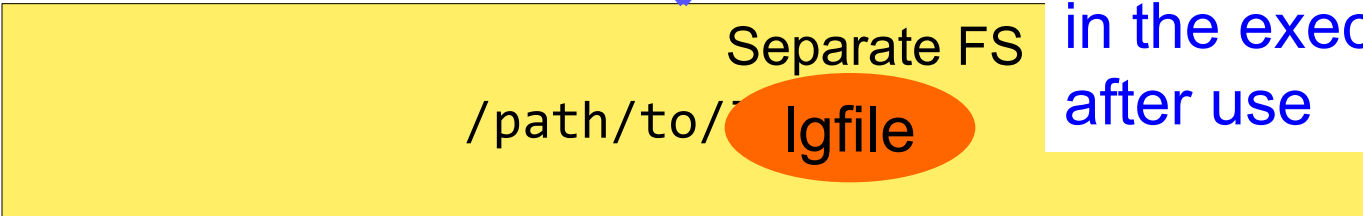
(exec dir)/ ✖

3. Executable removes the file in the exec dir after use

Separate FS
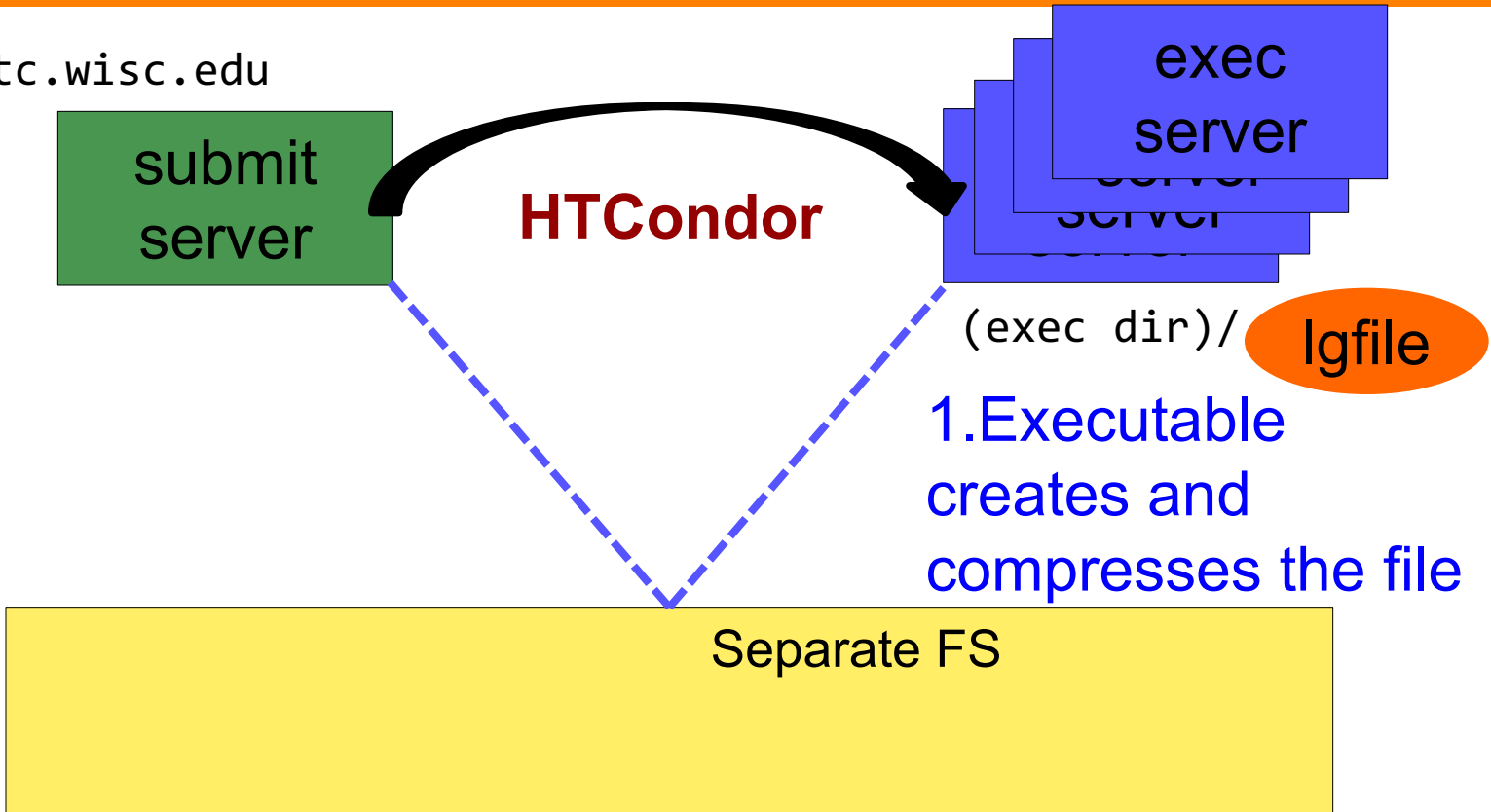
/path/to/ lgfile

Separate shared FS - Output

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submit server

HTCondor

exec server

(exec dir)/ lgfile

1. Executable creates and compresses the file

Separate FS

Separate shared FS - Output

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submit server

HTCondor

exec server

server

server

(exec dir)/ lgfile

2. Executable copies the file

Separate FS

/path/to/ lgfile

Separate shared FS - Output

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submit server

HTCondor

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(exec dir)/ ✖

3. Executable removes the file in the exec dir

Separate FS

/path/to/ lgfile
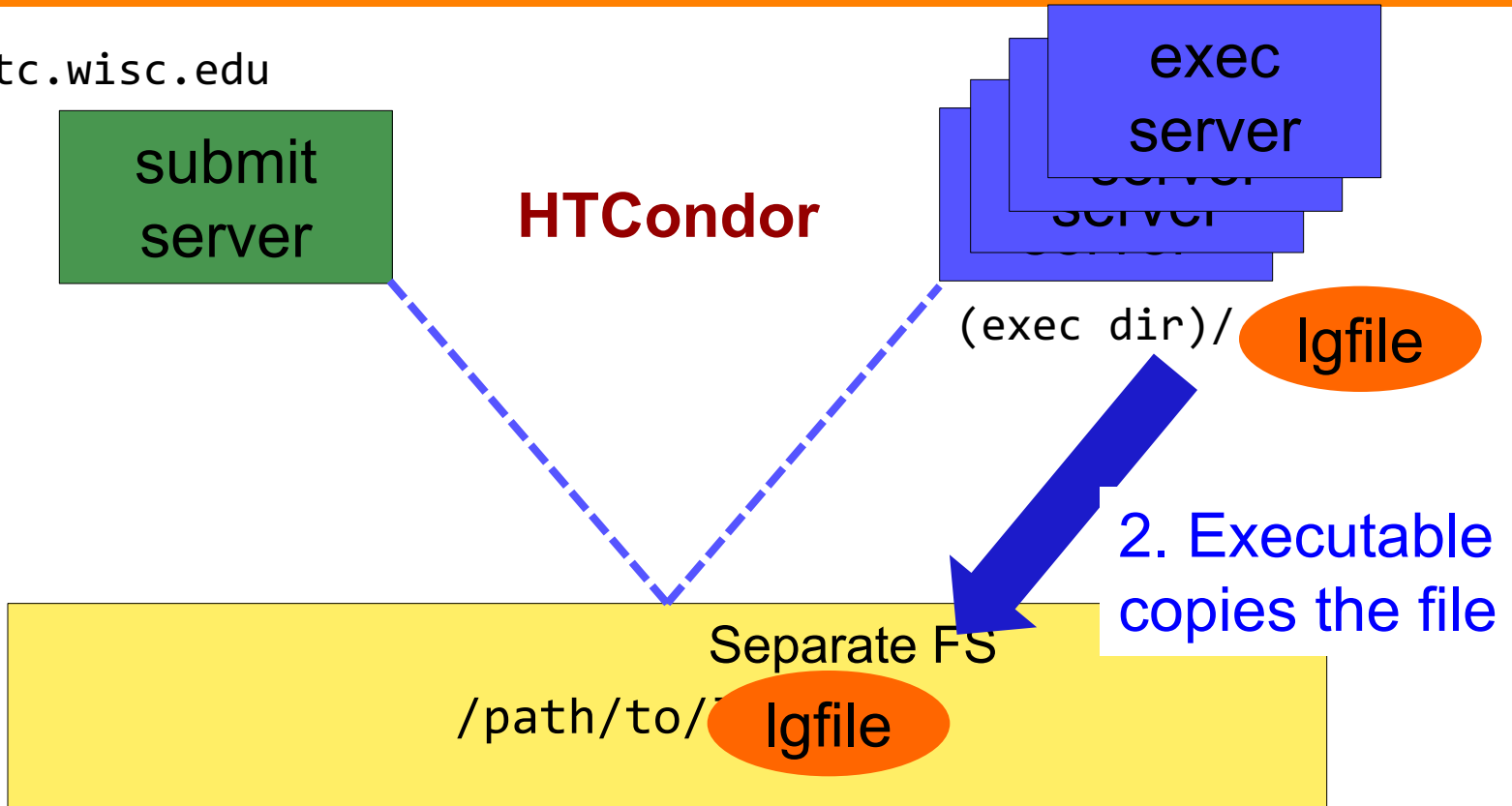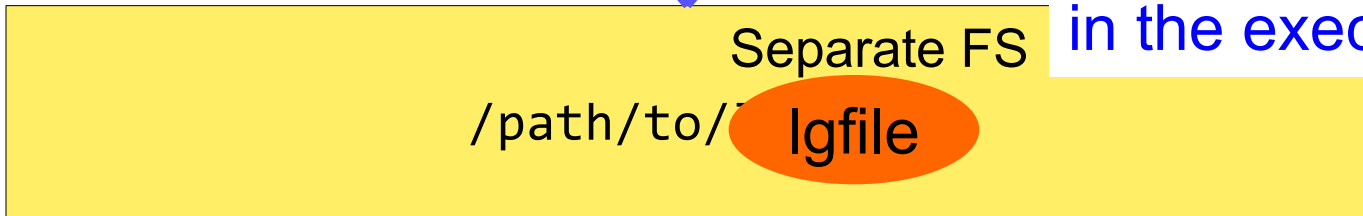
At UW-Madison (Ex. 4.1-4.2)

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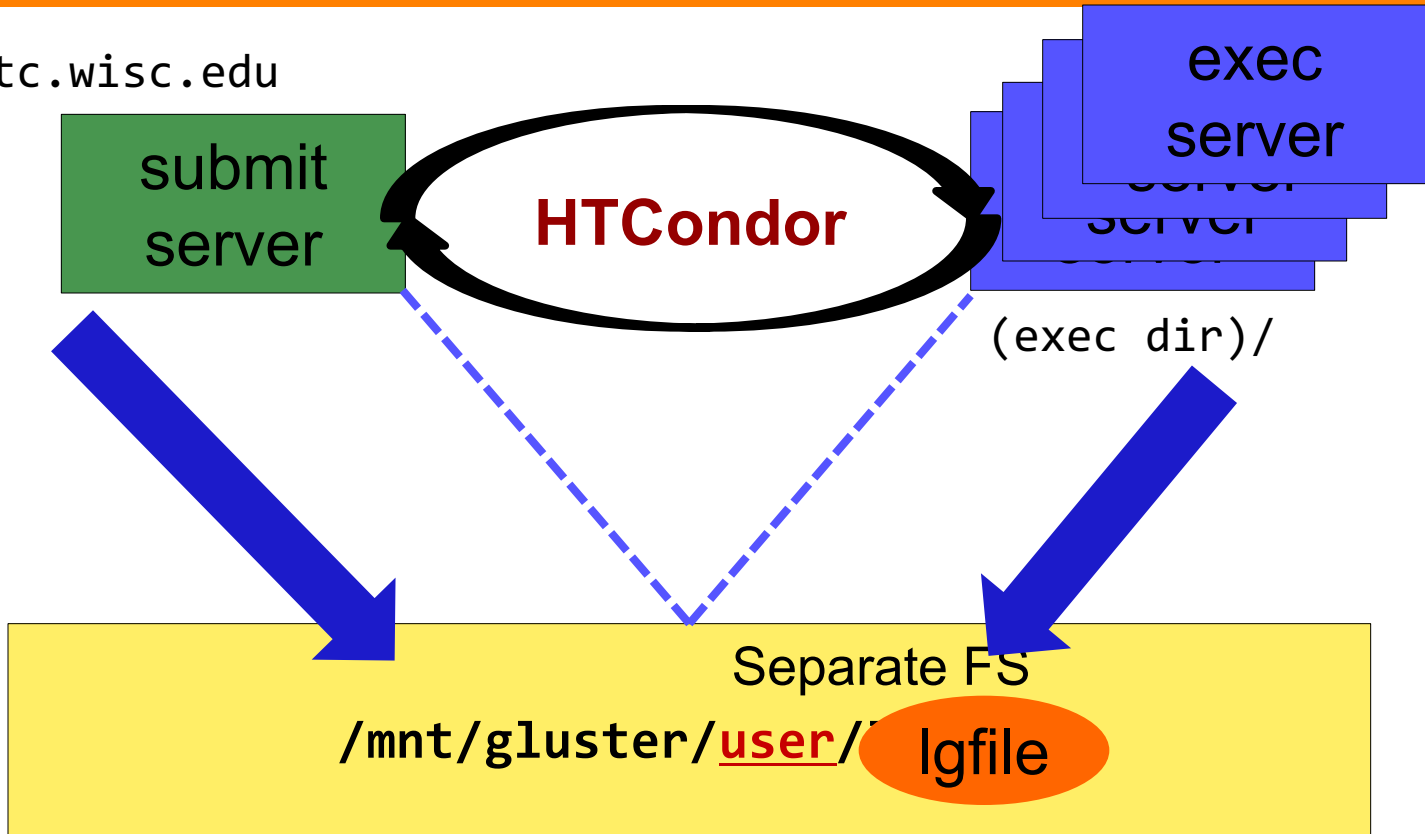
submit server

HTCondor

exec server

server

server

(exec dir)/

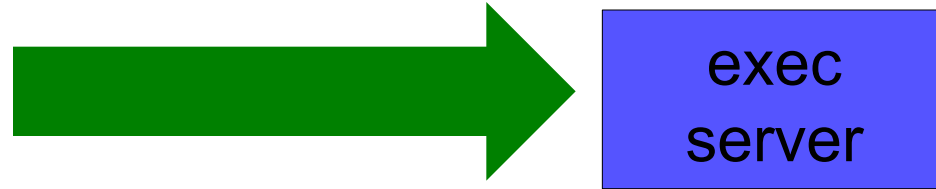Separate FS

/mnt/gluster/_user_/ lgfile

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Review

Option	Input or Output?	File size limits	Placing files	In-job file movement	Accessibility?
HTCondor file transfer	Both	10 MB/file (in), 1 GB/file (out); 1 GB/tot (either)	via HTCondor submit node	via HTCondor submit file	anywhere HTCondor jobs can run
Web proxy	Shared input only	1 GB/file	specific to VO	HTTP download	anywhere, by anyone
StashCache	Shared and unique input	10 GB/file (will increase!)	via OSG Connect submit server	via `stashcp` command (and module)	OSG-wide (90% of sites), by anyone
Shared filesystem	Input, likely output	TBs (may vary)	via mount location (may vary)	use directly, or copy into/out of execute dir	local cluster, only by YOU (usually)

Exercises

- 4.1 Shared Filesystem for Large Input

- 4.2 Shared Filesystem for Large Output

Questions?

- Feel free to contact me:
  - dweitzel@cse.unl.edu

- Next: Exercises 4.1-4.2
- Later: Wrap-up