Open Science Grid

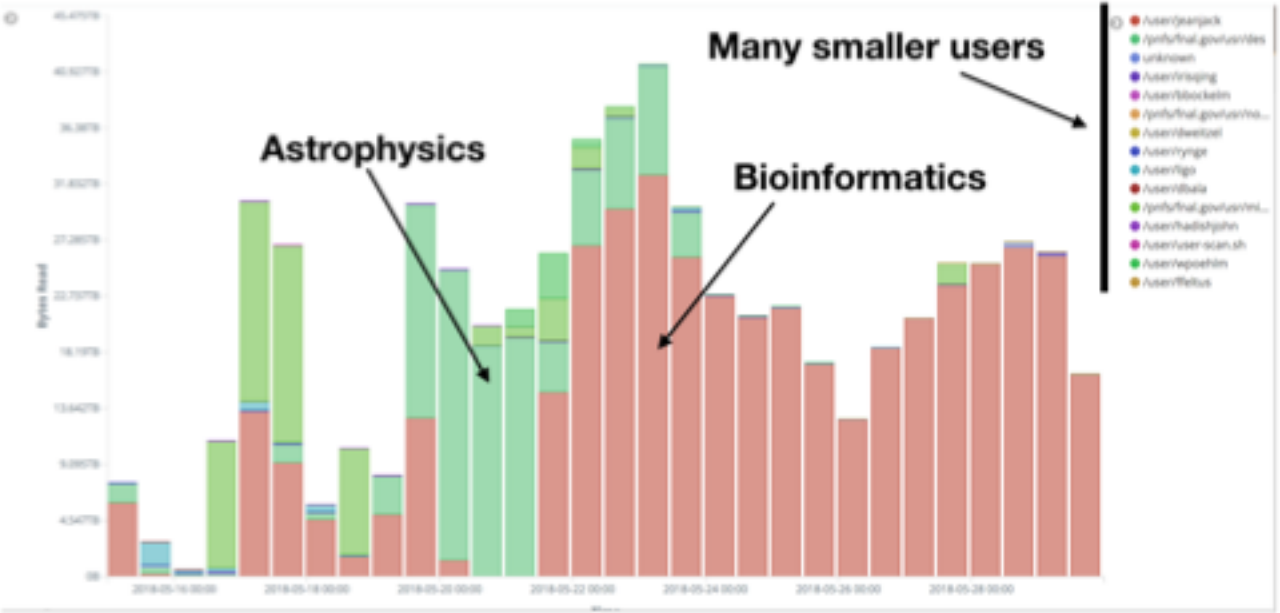
Large Output and Shared File Systems

Thursday PM, Lecture 2

Derek Weitzel
OSG

StashCache

- Lots of experiments also use StashCache



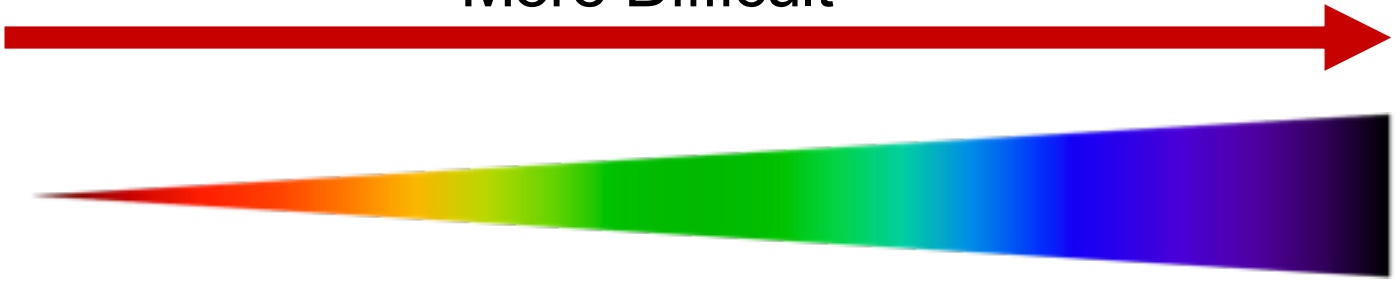
Like all things

More Resources

Laptop Cluster OSG

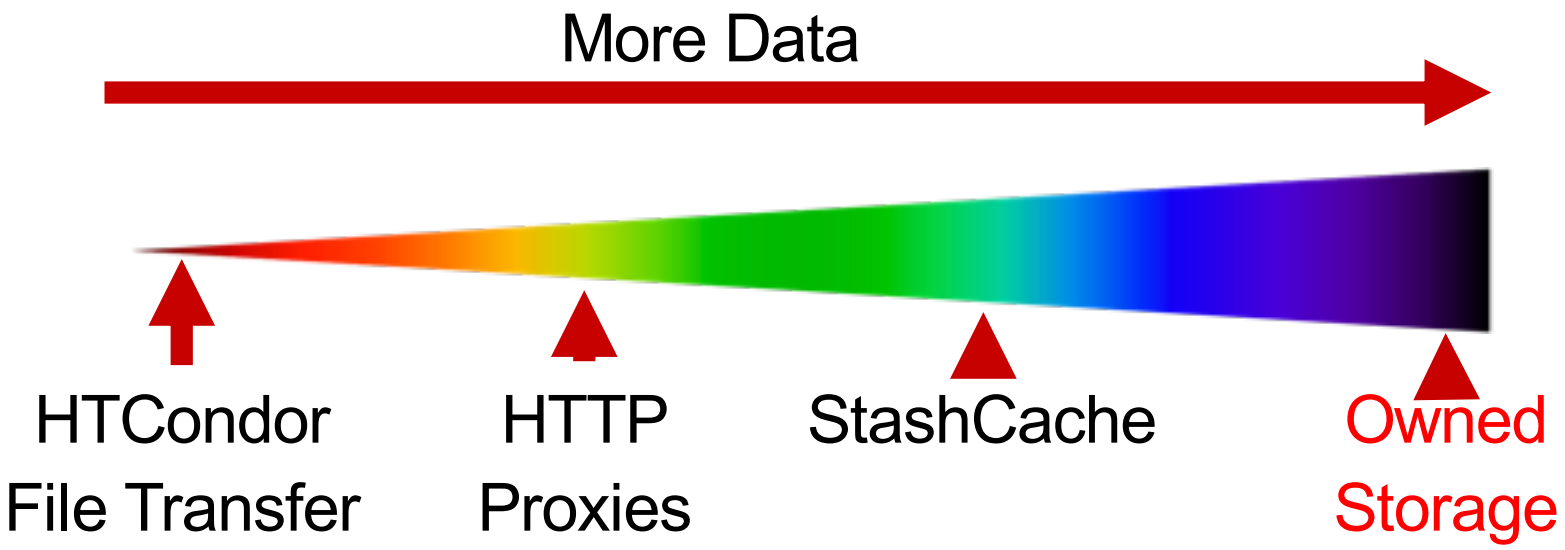
Like all things

More Difficult

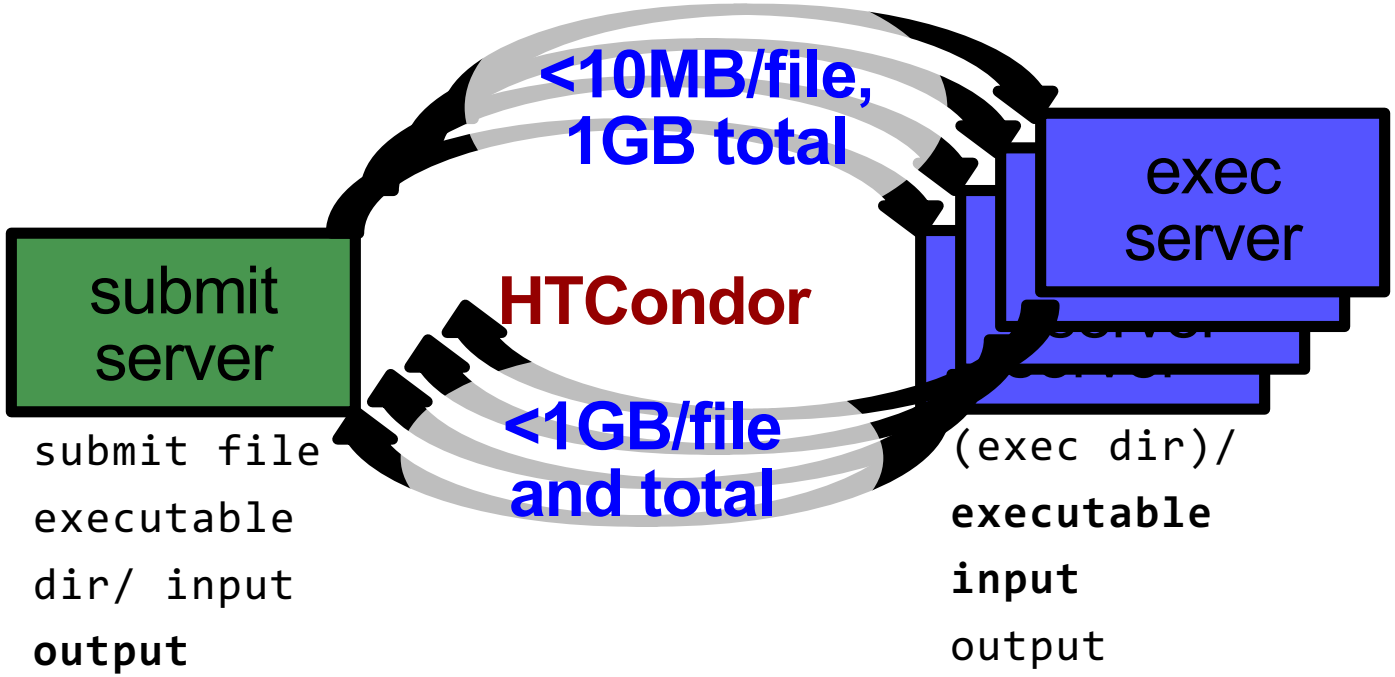


Laptop Cluster OSG

Transfers


More Data
HTCondor File Transfer
HTTP Proxies
StashCache
Owned Storage

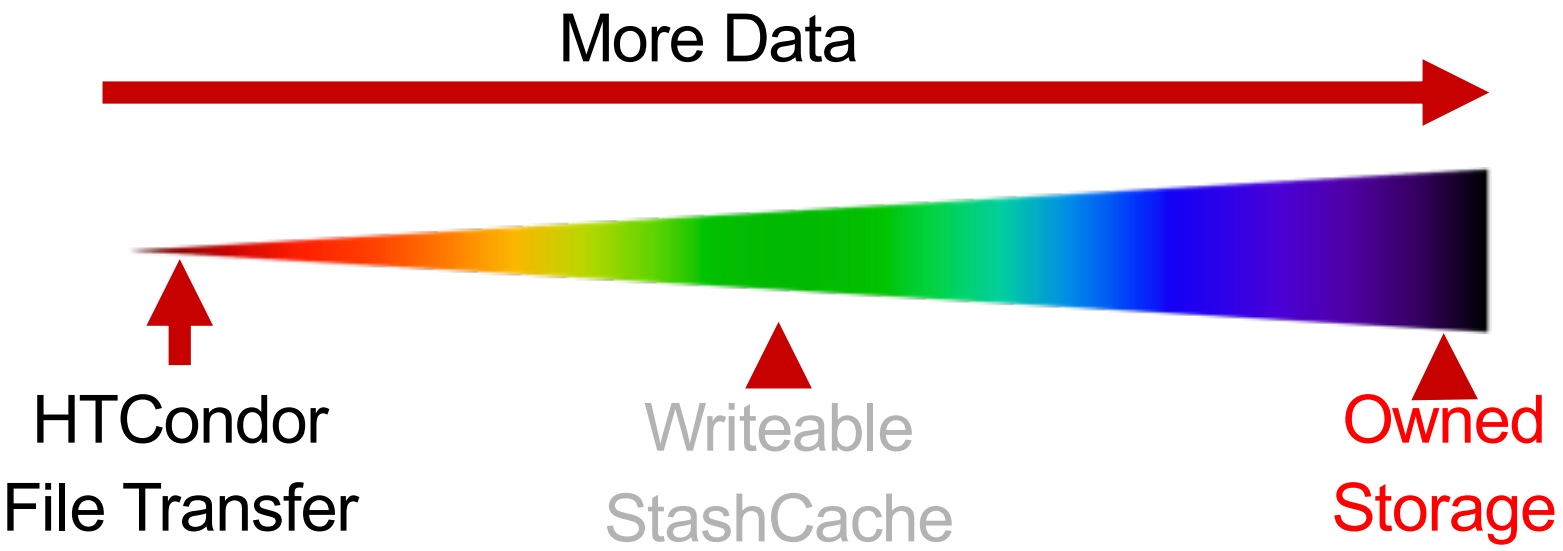
Per-job transfer limits



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)

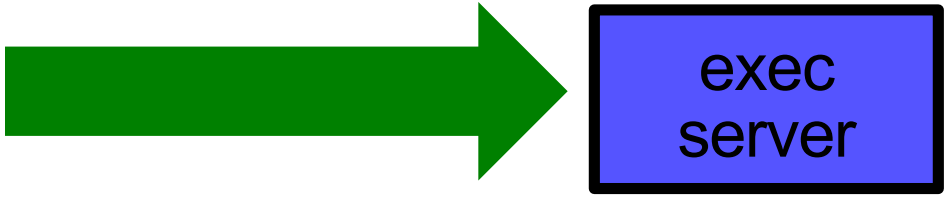
Output


More Data
HTCondor
File Transfer
Writeable
StashCache
Owned
Storage

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



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

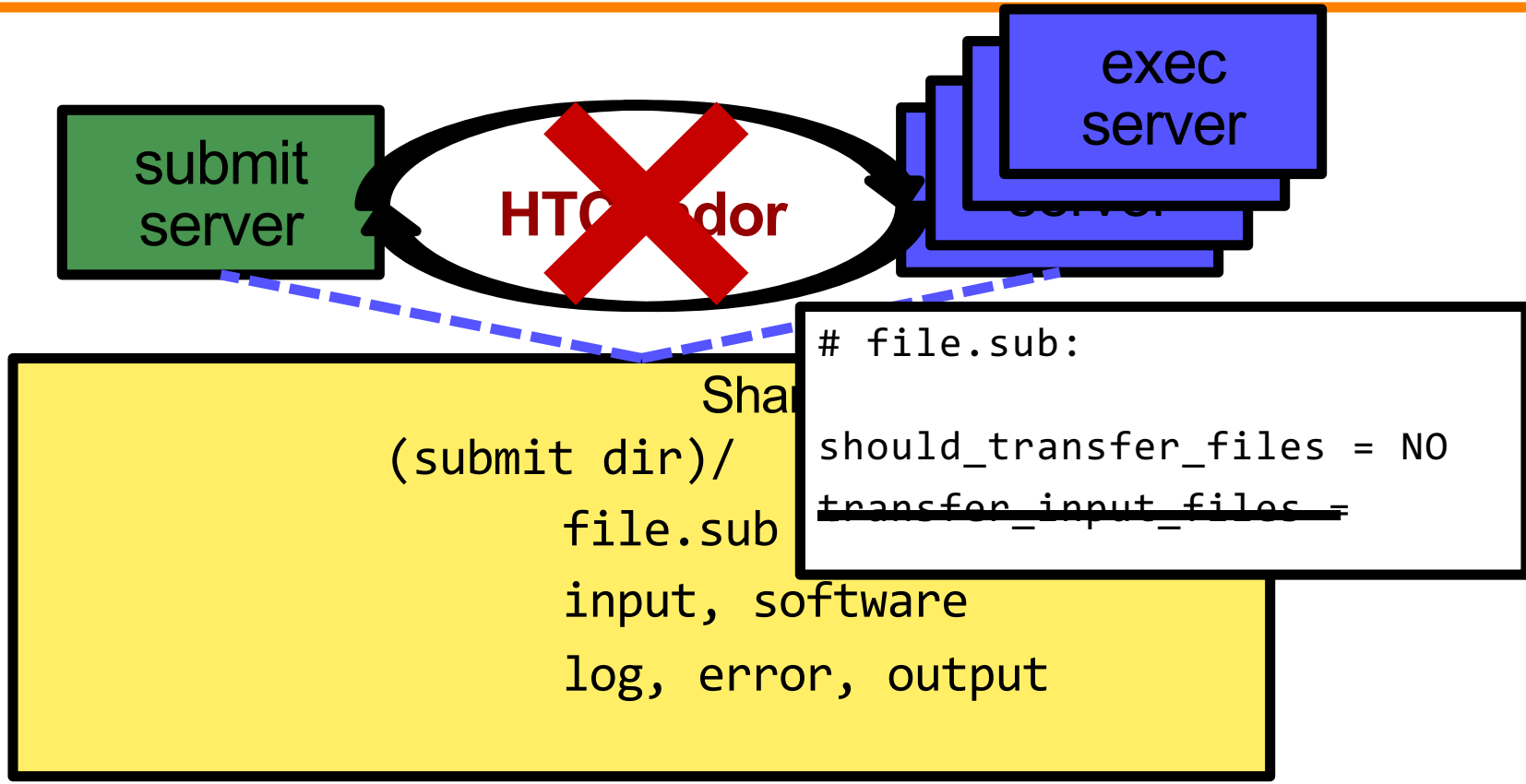
1. Submit directories *WITHIN* the shared filesystem
   - most campus clusters
   - limits HTC capabilities!!
2. Shared filesystem separate from local submission directories
   - supplement local HTC systems
   - treated more as a repository for VERY large data (>GBs)
3. Read-only (input-only) shared filesystem
   - Treated as a repository for VERY large input, only

Submit dir within shared FS

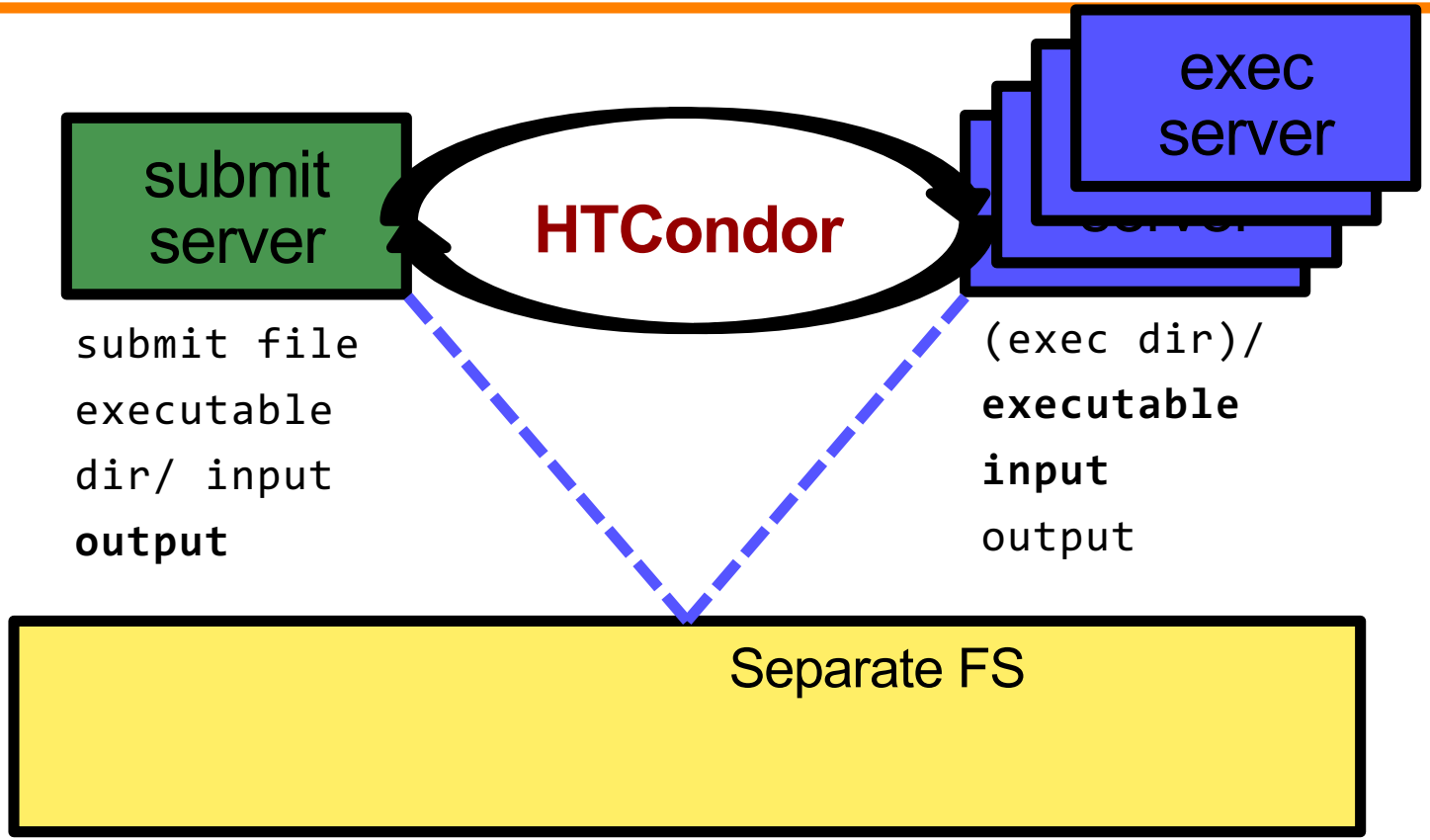
Shared FS

```
(submit dir)/
        file.sub
        input, software
        log, error, output
```

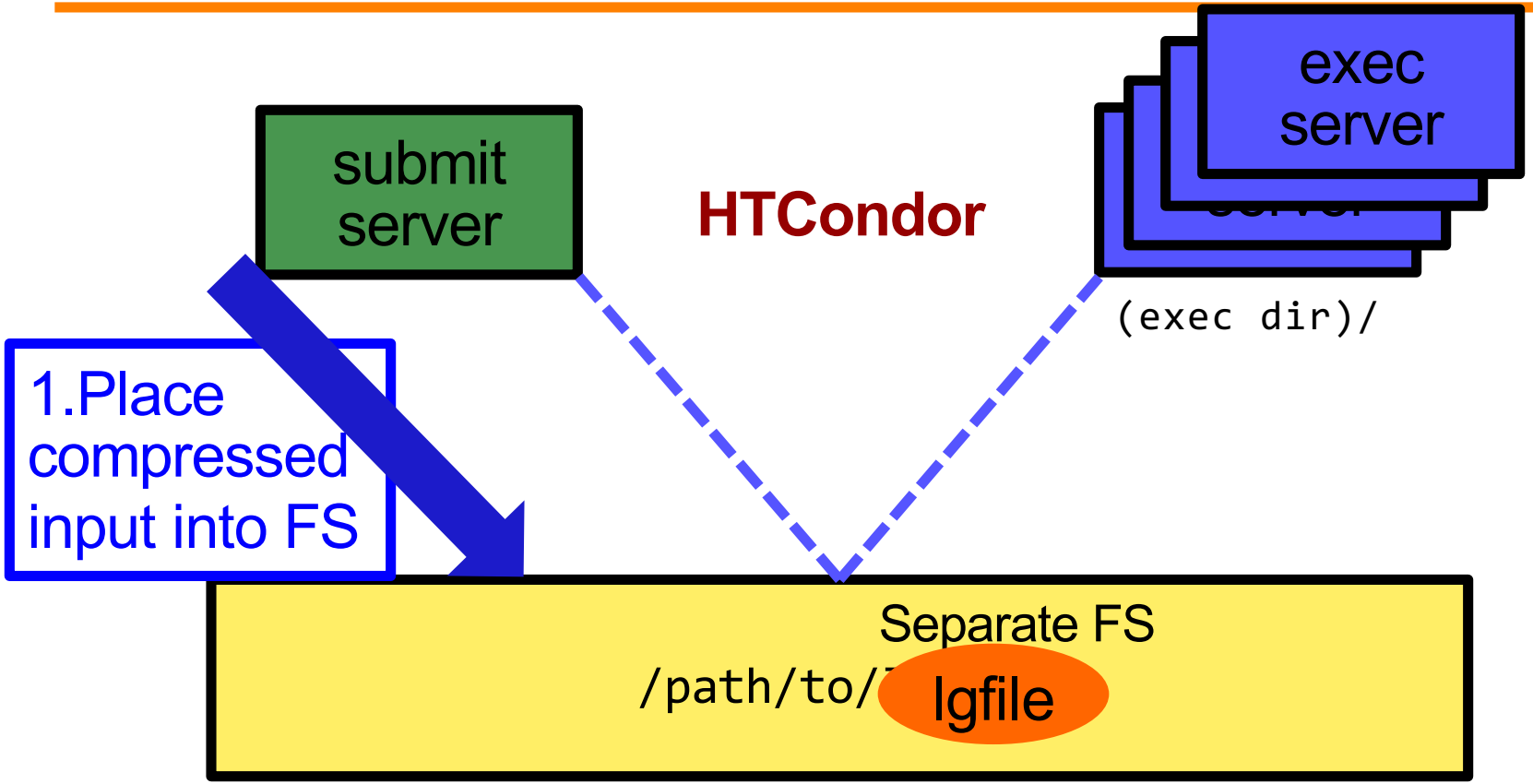
Submit dir within shared FS



Separate shared FS



Separate shared FS - Input



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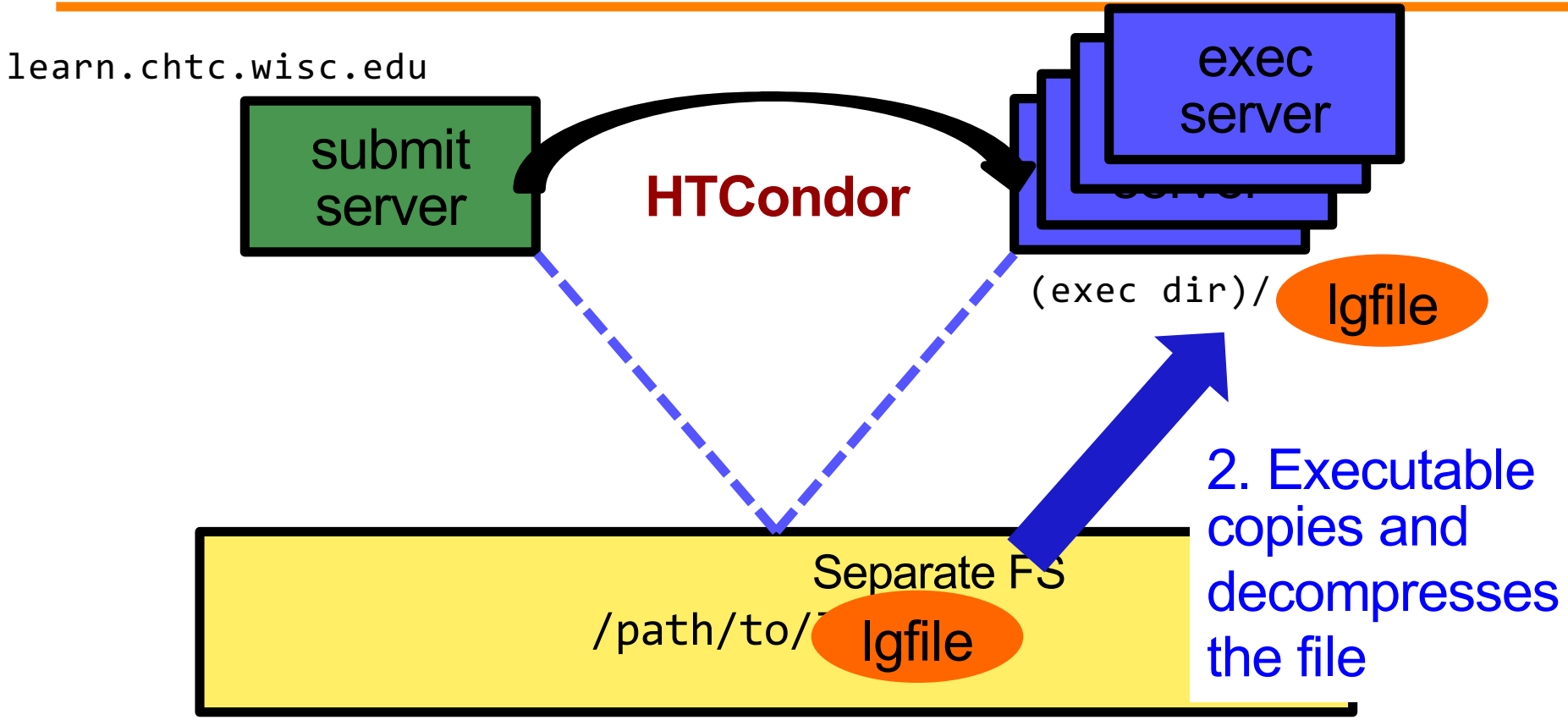

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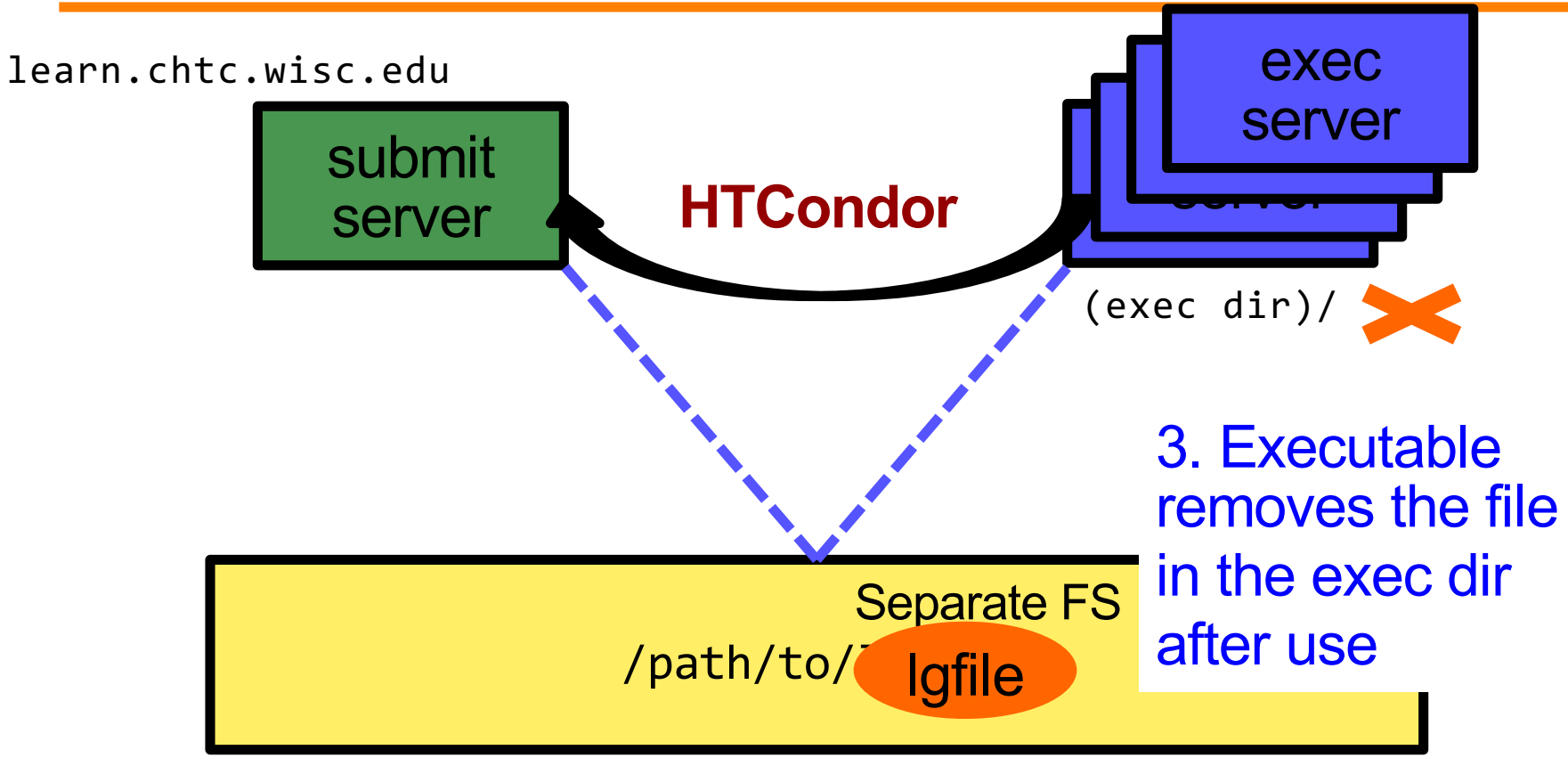

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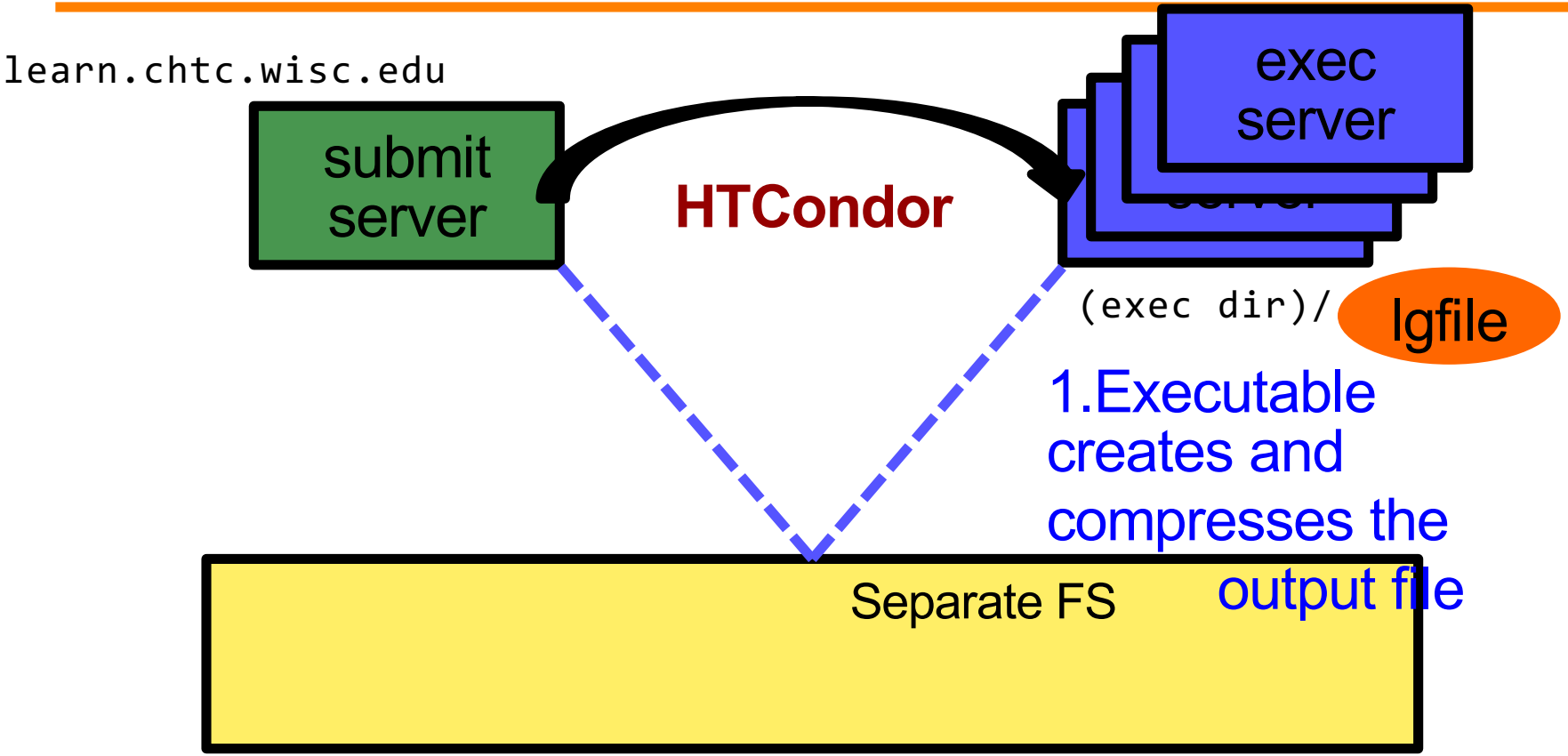

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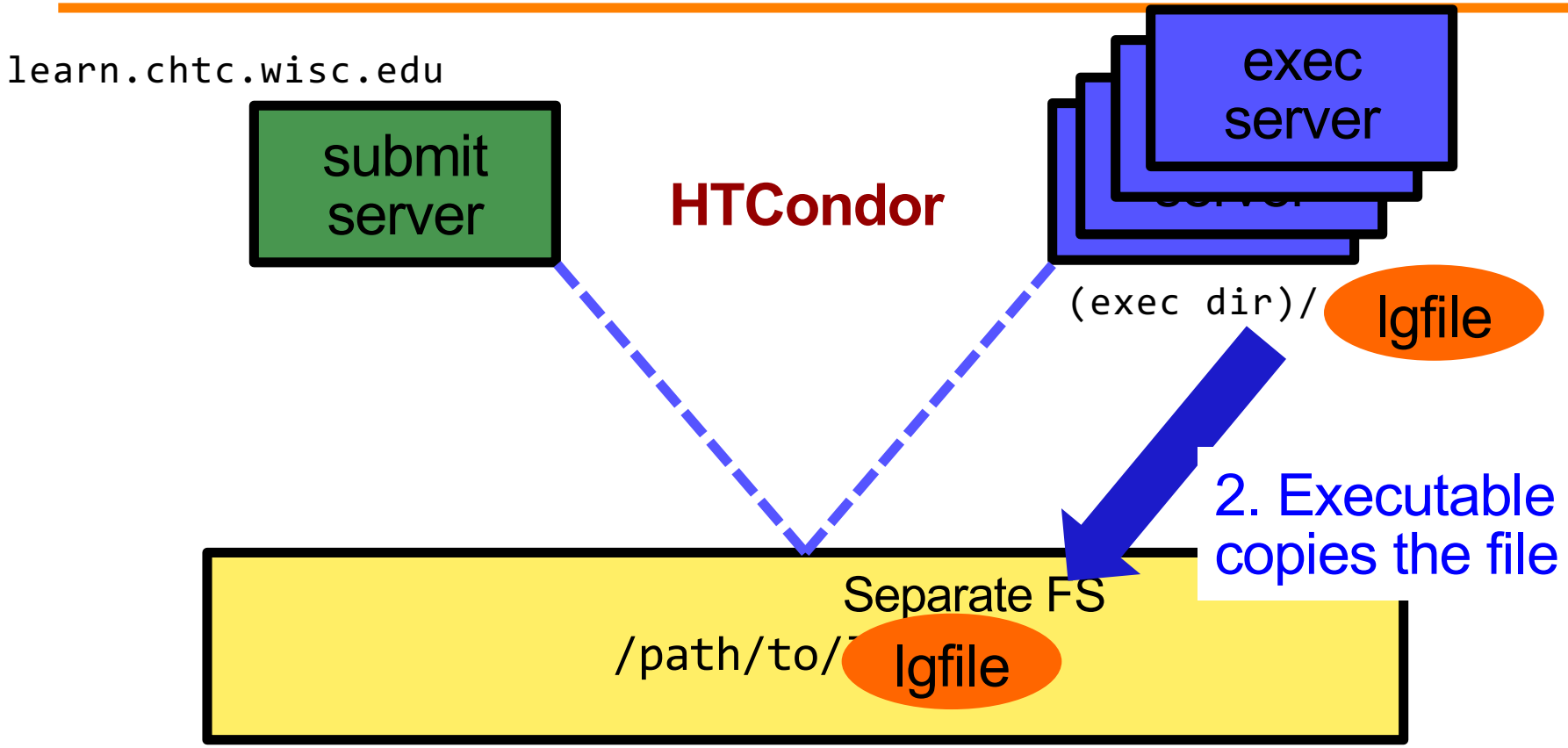

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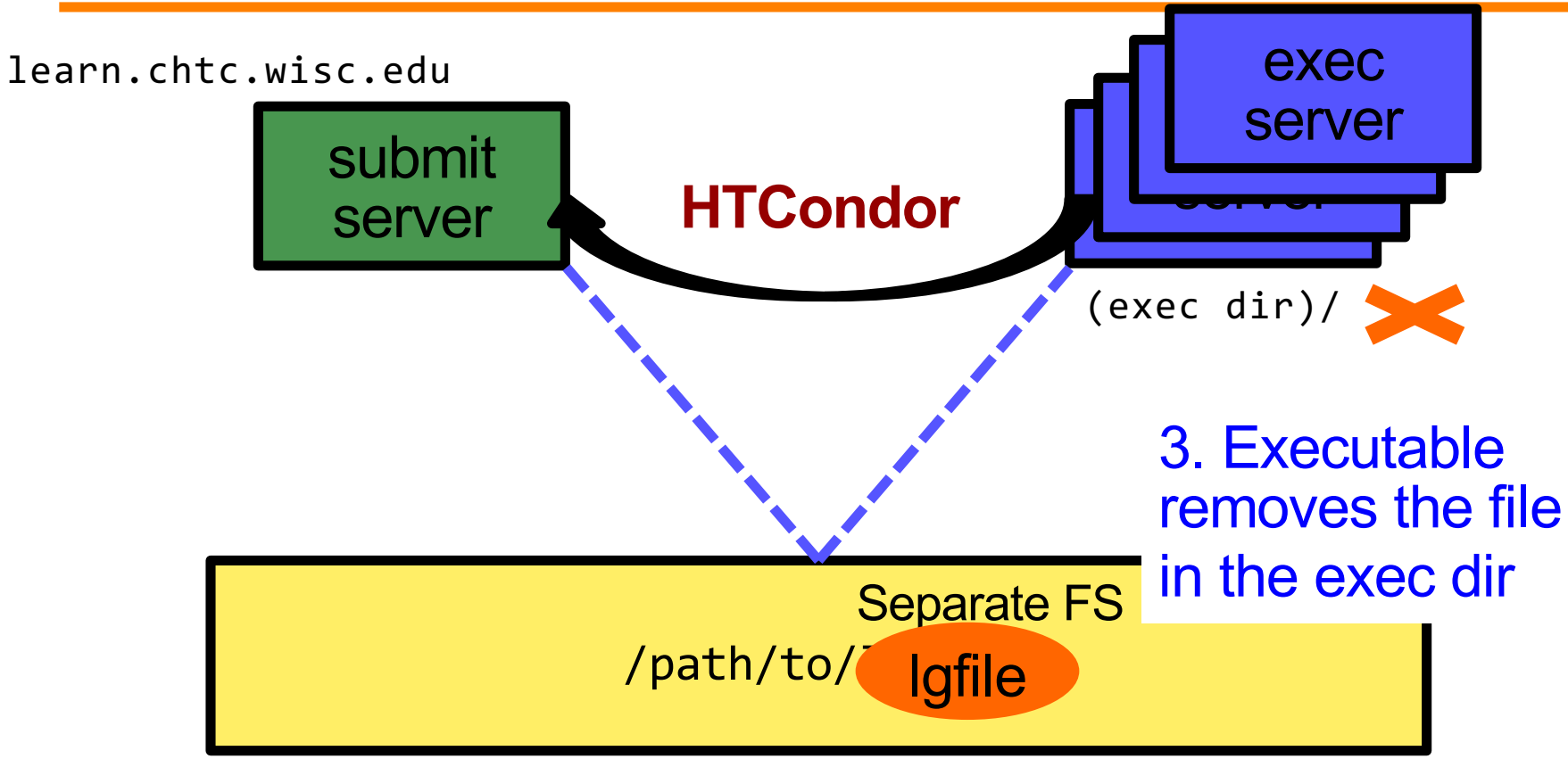
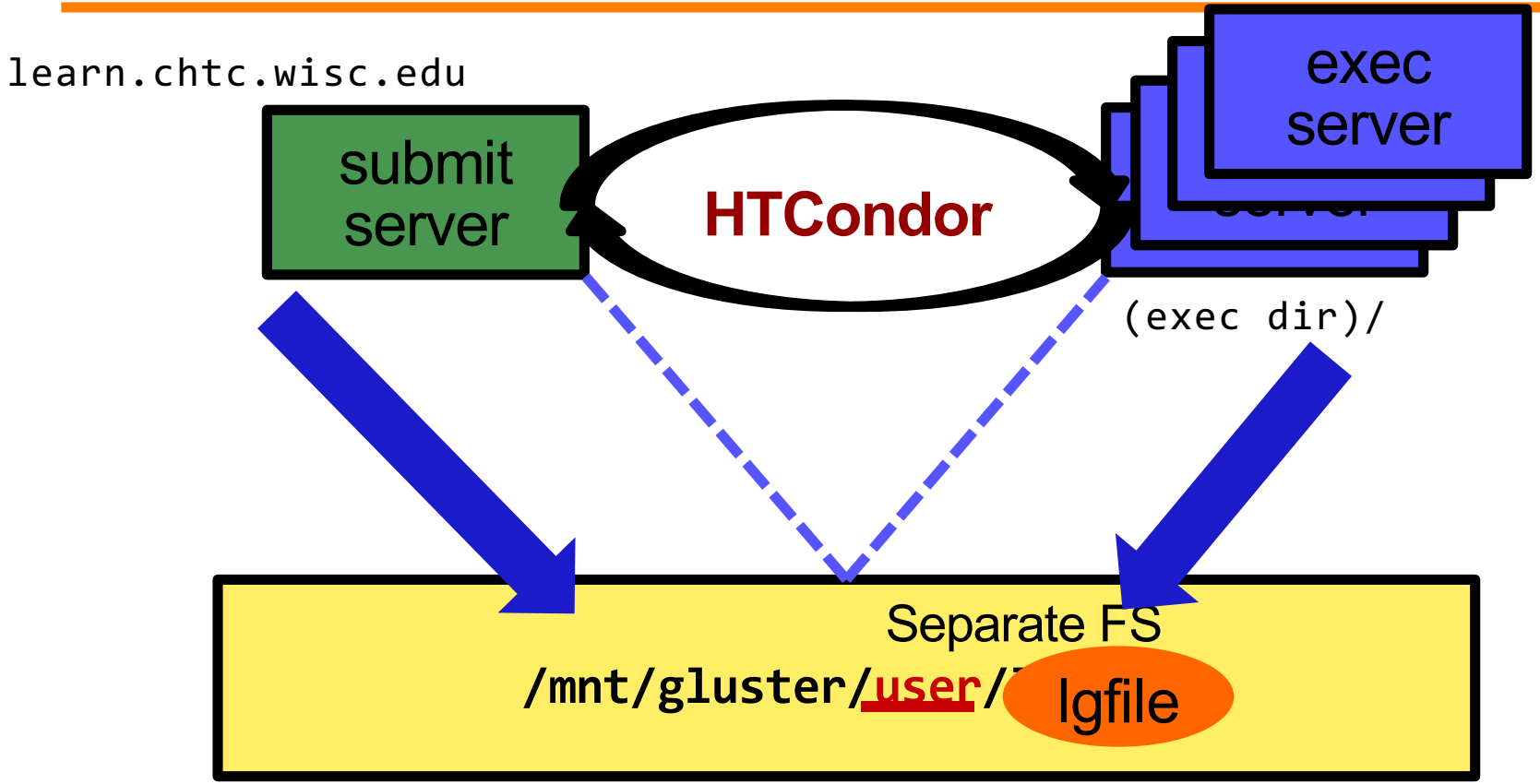


At UW-Madison (Ex. 4.1-4.2)



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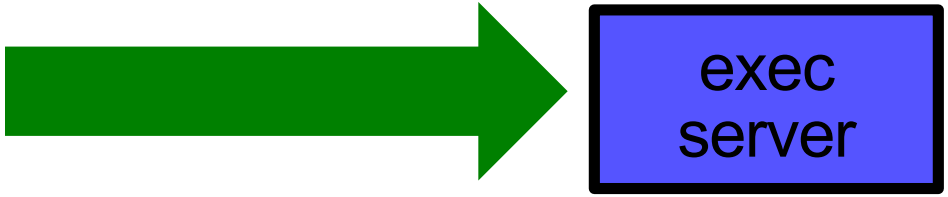

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Review

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