HTCon-Door

Opening Your HTC Cluster to the World via Open OnDemand

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Throughput Computing 2026

CHTC HTCondor Software Suite PATh

Background

- Who am I?

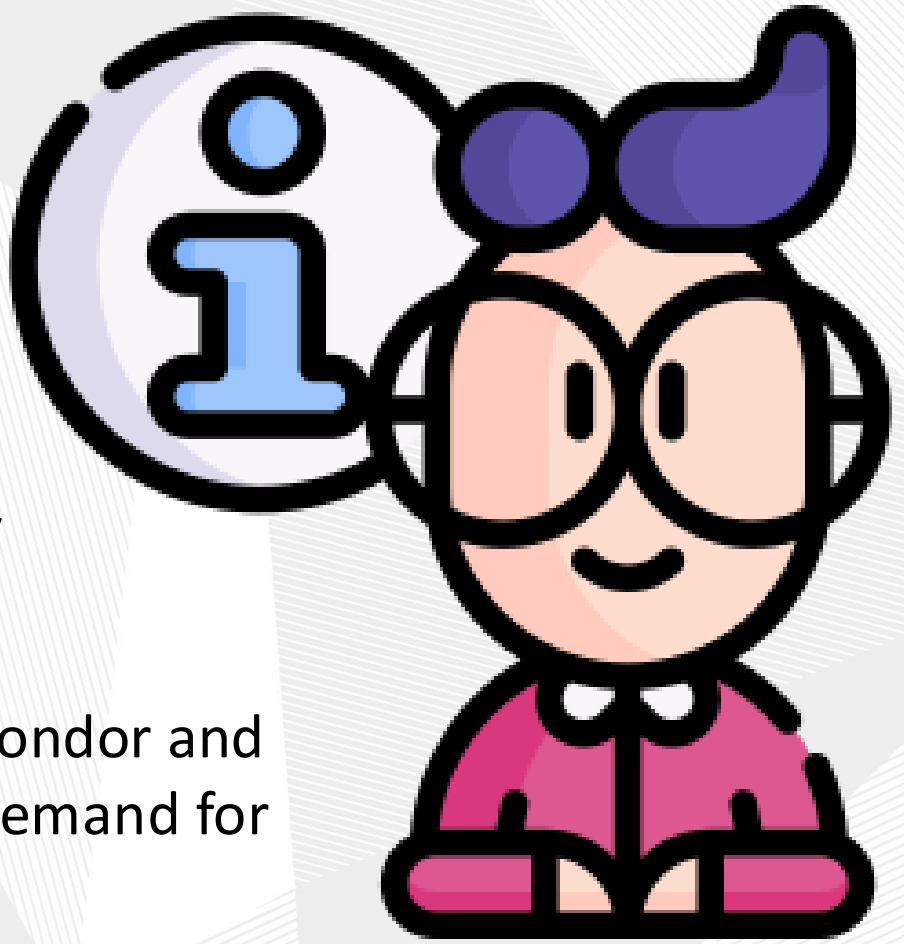
  CHTC developer for the HTCondor Software Suite

- Why this matters?

  Open OnDemand is a separate project/technology

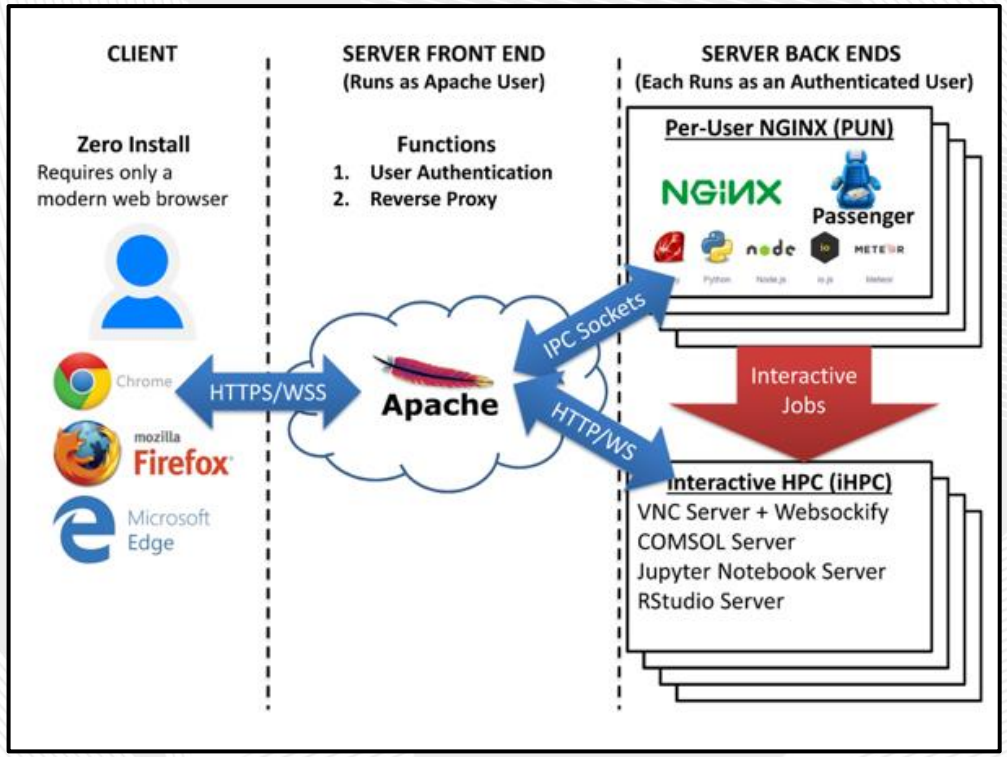
- What is this presentation about?

  Report of Open OnDemand's integration with HTCondor and other exploratory projects into utilizing Open OnDemand for High Throughput Computing



Background: Open OnDemand (OOD)

- Developed by Ohio Supercomputer Center
- Goal: Make all their supercomputing resources available to users anywhere at anytime with no client-side installation
- Users simply access via a web browser
- Provides ‘applications’ to interact with compute clusters



Open OnDemand Website

Open OnDemand Architecture Diagram

Background: OOD Apps

Passenger Apps

Functionality executed by the Per User NGINX (PUN)

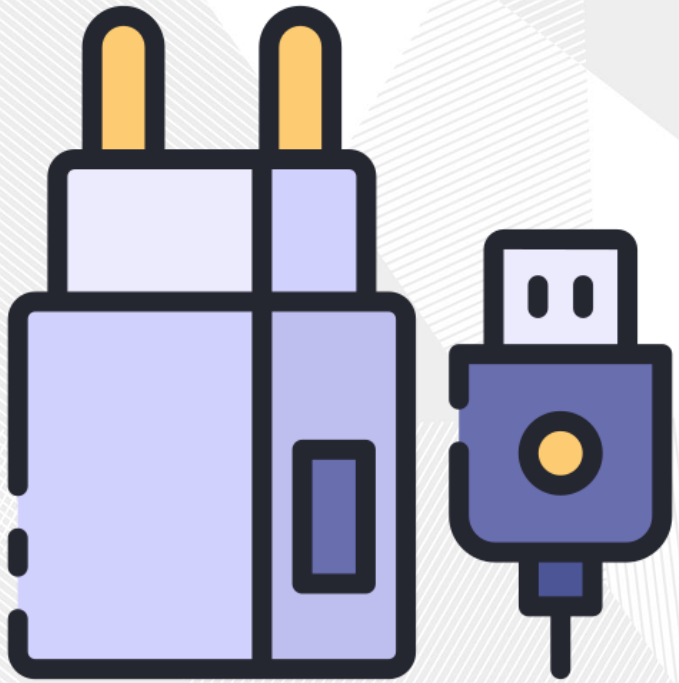
- Filesystem management
- Cluster status information
- Job composer
- Shell access to submit host

Interactive Apps

Functionality launched as a job to the compute cluster

- Jupyter Notebooks
- Virtual Desktop
- MATLAB
- VS Code
- HTCondor Annex?
- Dozens More…

HTCondor Adapter



- Adapter: Software part of OOD that knows how to speak one type of batch system (i.e. slurm, Kubernetes, LSF, etc.)
- New HTCondor Adapter (current state)
  - Released in v4.0.0 of OOD (January 27, 2025)
  - **Community contributed**
  - No documentation
  - Experimental
- Easy to configure OOD to point to an HTCondor pool AP with the new adapter

Bad News

Issue: Broken Job Composer

- This is fine because Job Composer is officially deprecated
- The issue is a mismatch of in expected & provided job information
  - Bugs in the HTCondor Adapter
  - Issue for other Apps
  - Difficult to debug

Issue: Submit Description Disconnect

- OOD jobs are comprised of scripts + additional batch options
- This works for batch systems such as Slurm where batch options are engrained within the job script
- HTCondor works with submit description files
  - Where to find job executable to run
  - Additional job information
  - The list of jobs to execute
- Users are unable to provide extra job information via submit descriptions since it expects an executable

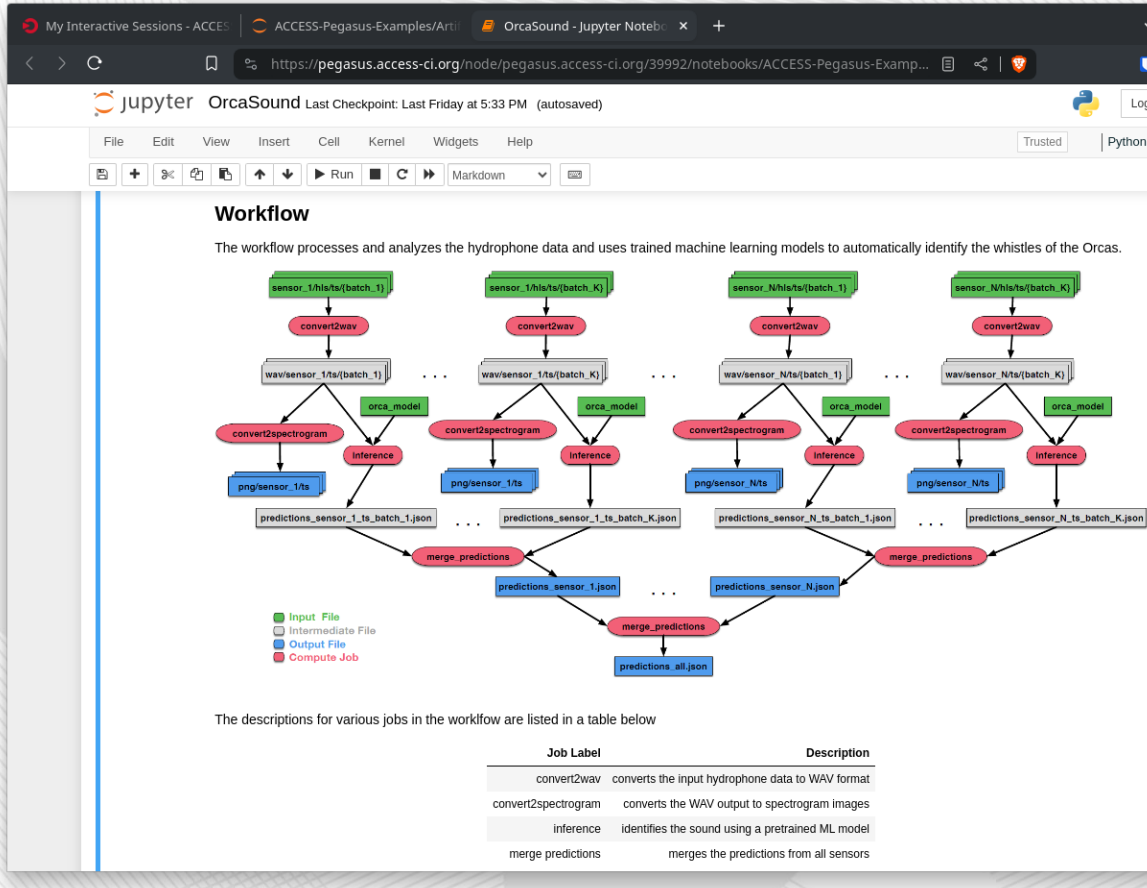
Issue: Assumption of Shared Filesystem

- No way to describe file transfer
  - OOD Adapter will actually stomp any defined input transfer
- HTCondor only has one input file list
  - Non-modular: no multi-source composition
- Interactive Apps are comprised of multiple scripts
  - Only a wrapper script would be transferred
  - Wrapper references other scripts with absolute paths

Real World Examples

ACCESS Pegasus - https://pegasus.access-ci.org

- ACCESS user authenticated via ACCESS IdP
- Jupyter Notebooks for workflow development, execution, debugging
- HTCondor AP, with many options to use allocations.
  - TestPool
  - HTCondor Annex (ACCESS HPC sites)
  - Jetstream2 Image (ACCESS Cloud)
  - OSPool
  - pegasus-glidein (campus clusters)



Supported by NSF #2138286

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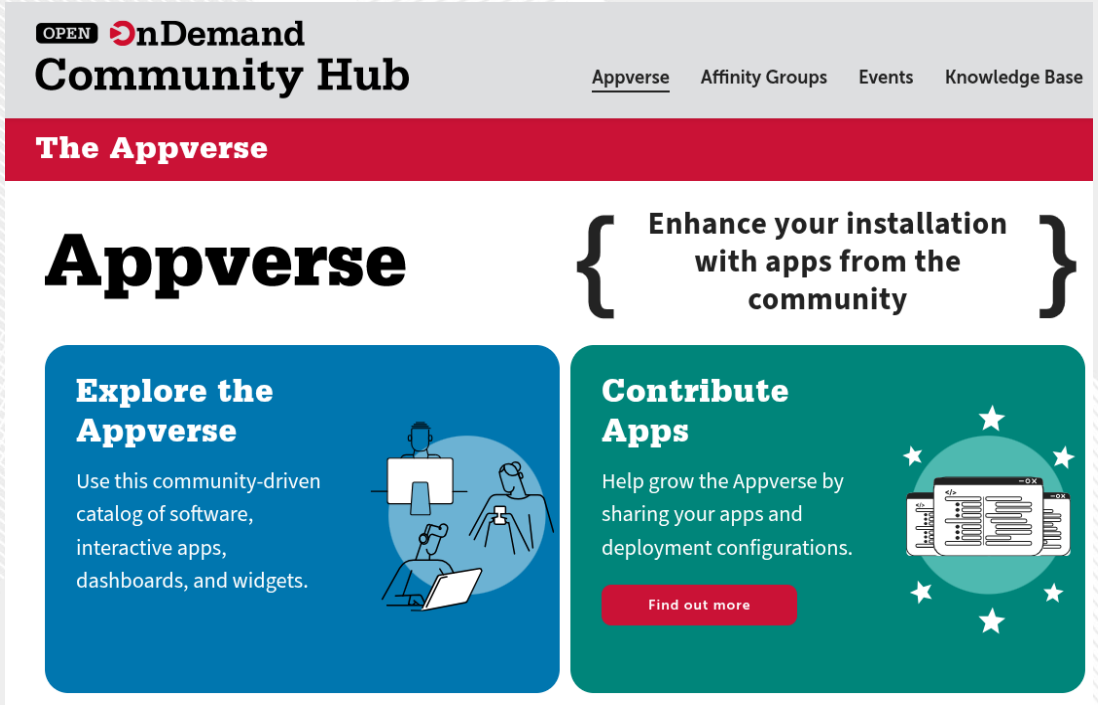
Pegasus+HTCondor in OOD Appverse

“Apps make it easy to add software to your Open OnDemand instance. Repositories hold the code and setup details to make that happen. If you’ve built an app, share your repo with the community—open source is all about working together and avoiding duplicate effort!”



Pegasus team is working on an app for Pegasus+HTCondor to deploy on HPC resources.

When launched on a HPC worker node, will start a Jupyter notebook, personal HTCondor (translates jobs to Slurm) and set up an environment for Pegasus workflows.

https://openondemand.connectci.org/appverse

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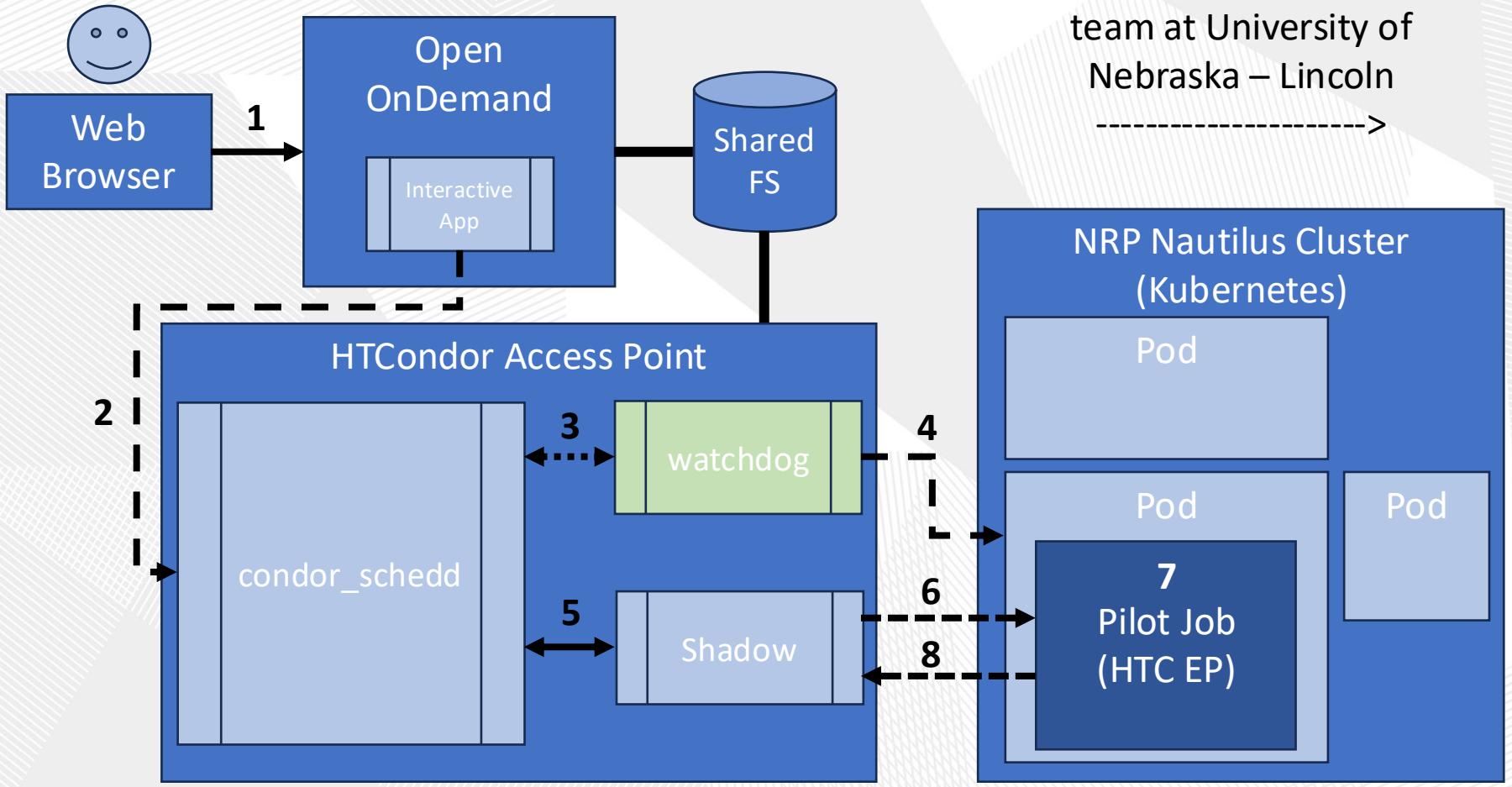
Alphafold on NRP Nautilus

Work done by CS capstone team at University of Nebraska – Lincoln ---------->



1. User connects to OOD
2. User places Alphafold batch job to AP via OOD interactive app
3. Watchdog sees job pressure in queue
4. Watchdog starts pilot EP in k8s pod
5. Schedd spawn's shadow
6. Input file transfer
7. Job executes
8. Output file transfer

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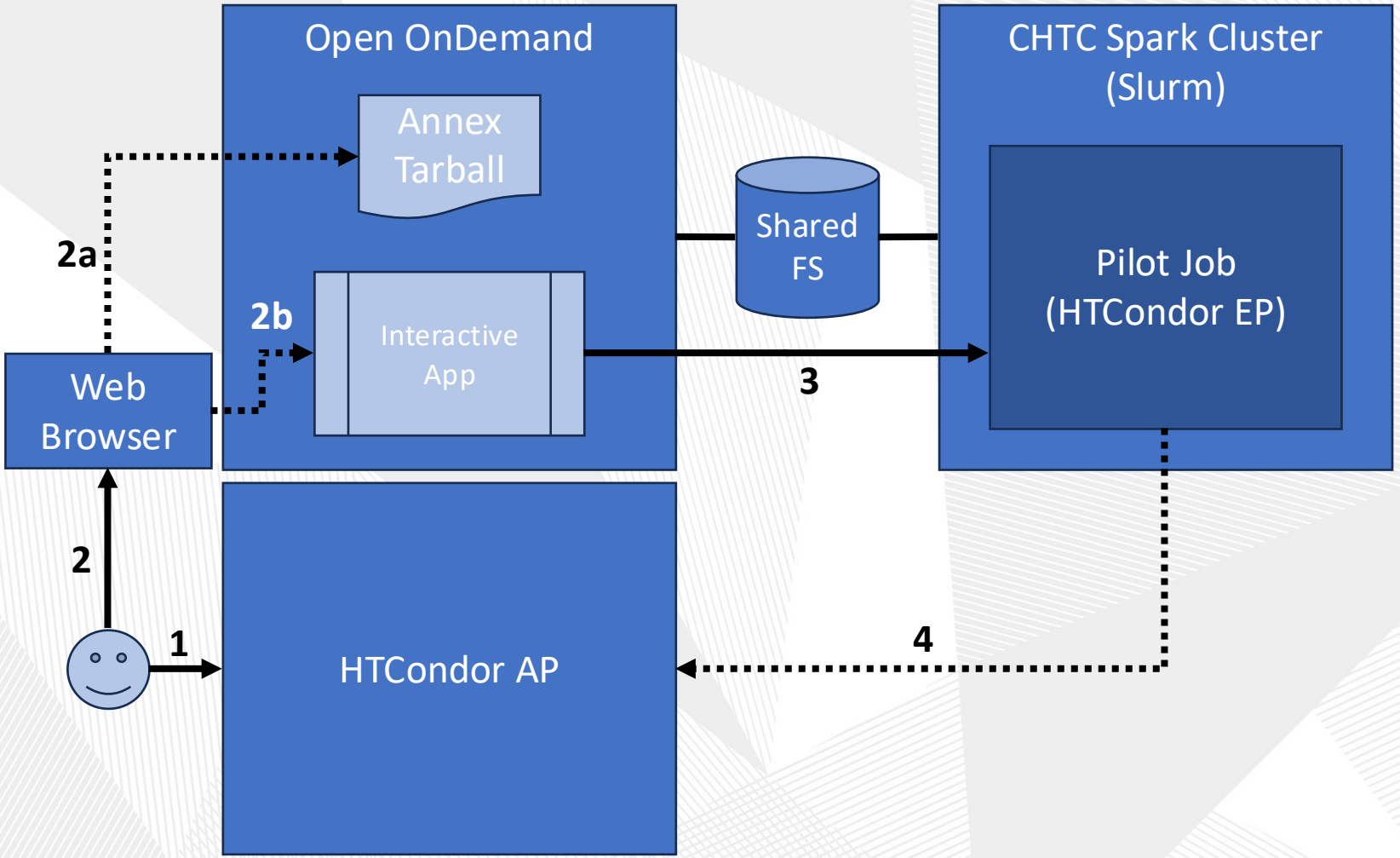
Launching an HTCondor Annex

1. User creates annex at AP
2. User interacts with OOD
   a. Copy annex tarball from AP to OOD host
   b. Launch annex via interactive App
3. Slurm job starts executing and launches pilot EP
4. EP connects back to AP



What's next?

- Potential for accessing HTC resources directly via OOD
  - Some simple bugs that need patching
  - Some fundamental differences in ideology
- Hopefully, community interest
  - High interest -> more investment
  - Get feedback on functionality
  - Even code contribution
- Potentially more interaction between developers (OOD & CHTC)

[Docker Playground of Open OnDemand and Mini-Condor]

[Full Report on Open OnDemand HTCondor Adapter]

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Funding Acknowledgements

This work is supported by NSF under Cooperative Agreement OAC-2030508 as part of the PATh Project. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the NSF.