

Ohio Supercomputer Center

An **OH·TECH** Consortium Member

Open OnDemand: Open Source General Purpose HPC Portal

Basil Mohamed Gohar
Web and Interface Applications Manager

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Open OnDemand Overview

- ✓ About Open OnDemand
 - Using Apps
 - How does it work?
 - Installation Procedure
 - Site Integration
 - Extending the Platform



About Open OnDemand

- Open source software project
- Installable for an HPC cluster (or clusters)
 - Standalone system, Lab, Department, University or National Resources
- More than just an “out of the box” solution
 - OnDemand is a platform that can be extended through additional and custom apps



OnDemand Features

- Single point of entry for HPC Center's services
- User needs three things
 - URL: `ondemand.xxx.edu`
 - Username
 - Password
- Zero install (Completely browser based)
- Single sign-on
- Firewall friendly (Keep traffic on https port)



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Open OnDemand App Features

App	Features
Dashboard	Browse and Launch Apps.
File Browser	Browse directories. Upload/Download. Move and Rename.
File Editor	Multiple themes. Key bindings. Syntax highlighting.
Terminal	SSH session to login node.
My Jobs	Create and submit jobs to cluster.
Active Jobs	Display job queue.





Open OnDemand App Features

- Interactive Demo #1



Open OnDemand Overview

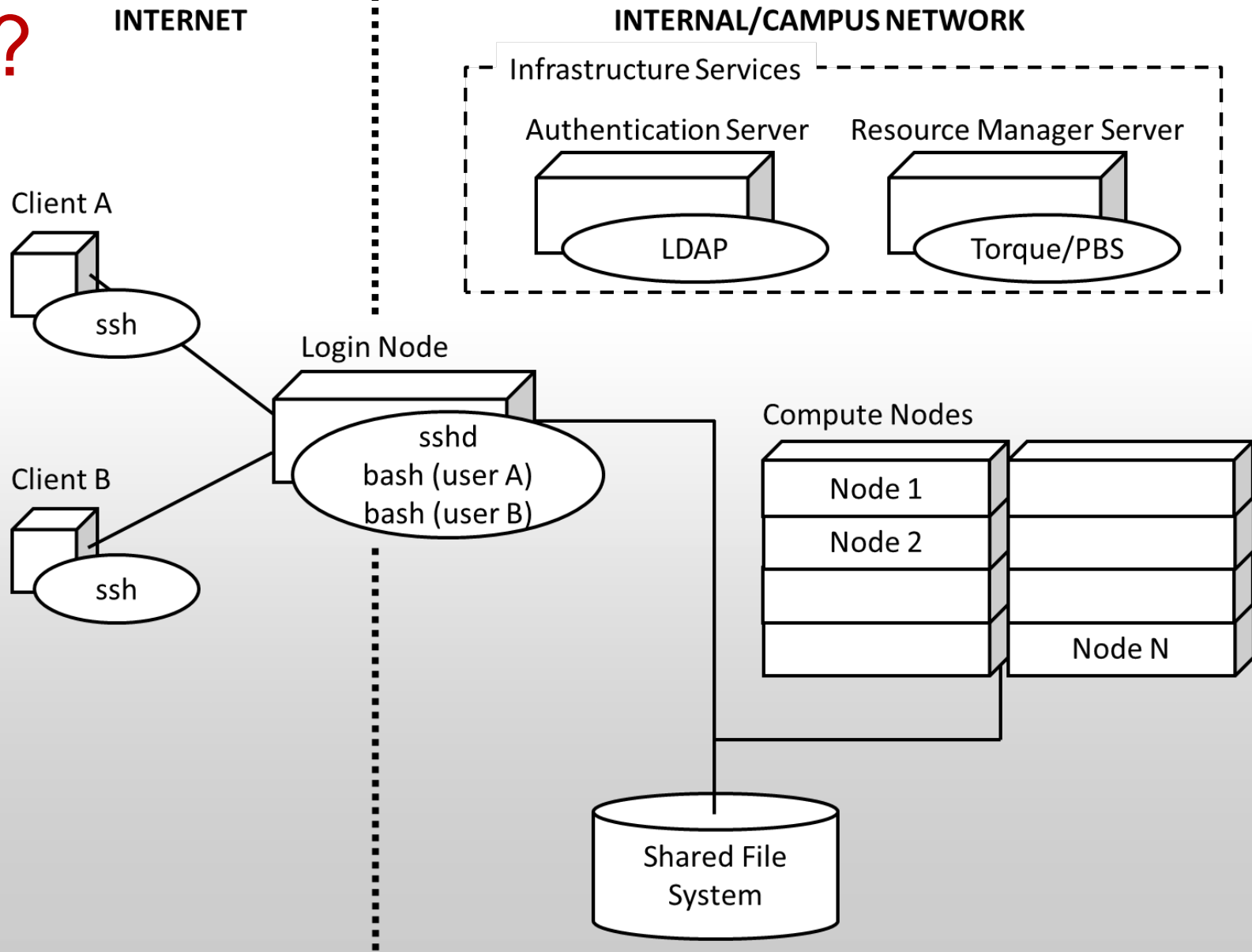
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How does it work?

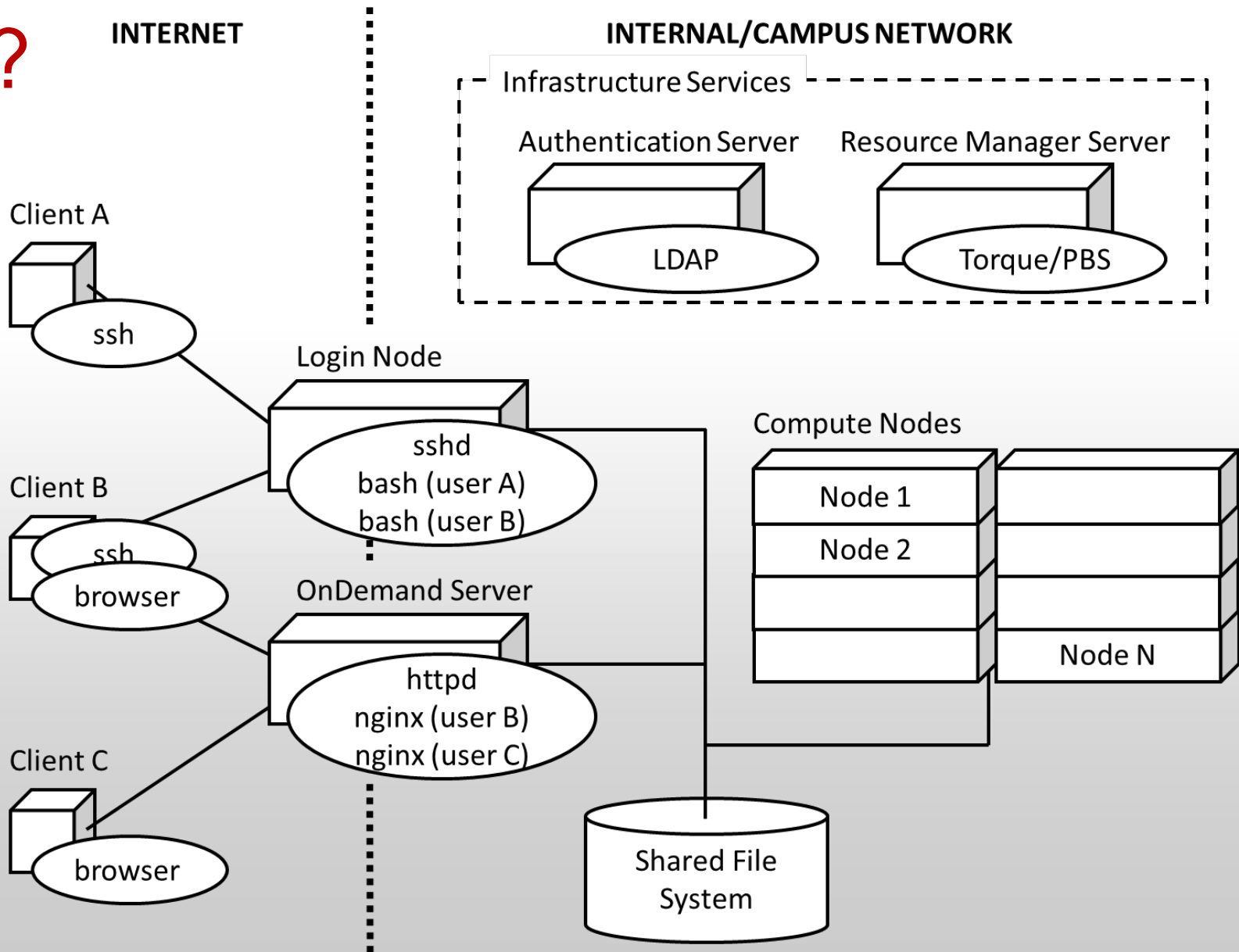
Our View of the World

- Clients connect to login node through SSH
- Interact with batch system and shared file system through the “bash” user process



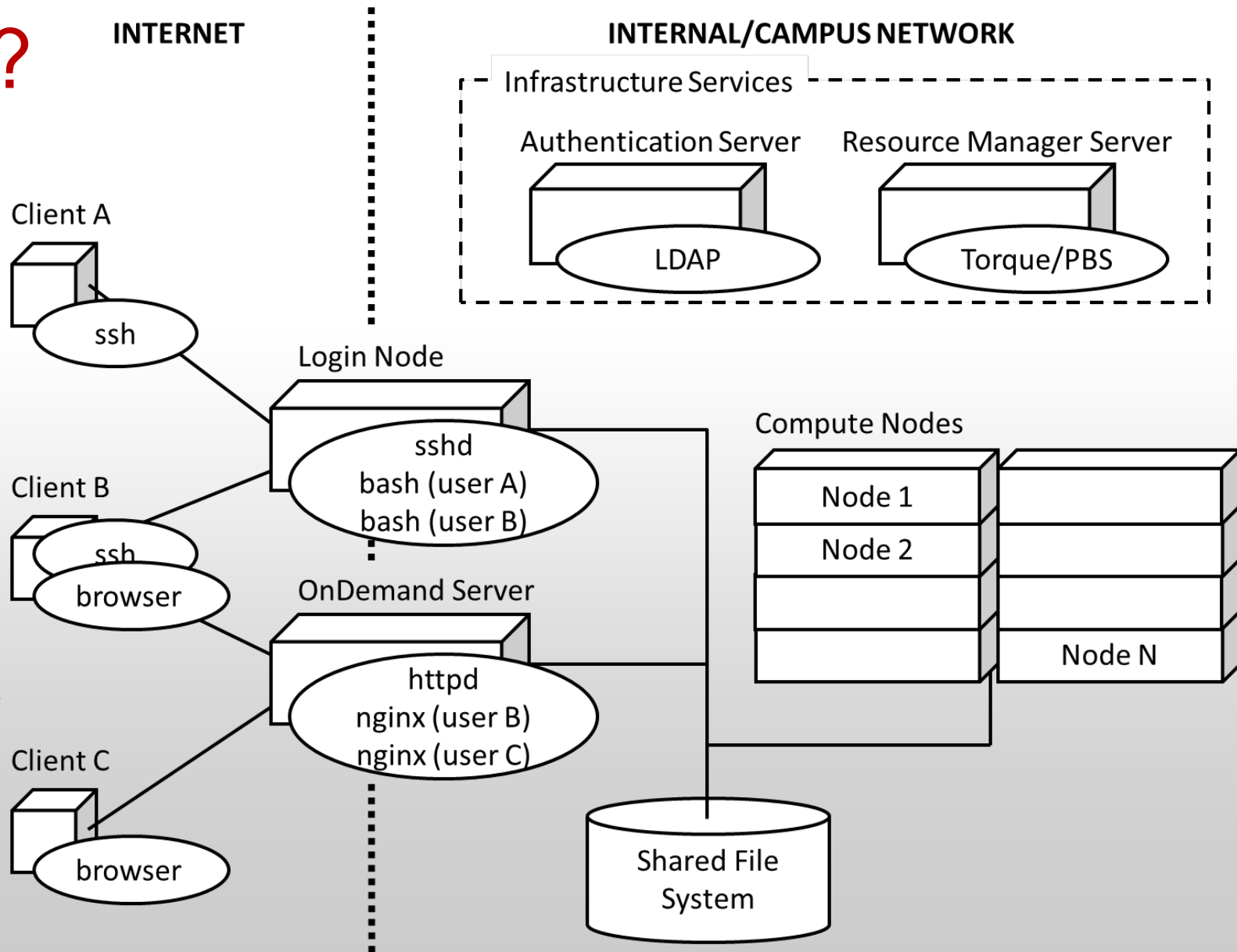
How does it work?

- We introduced an “OnDemand” server
 - Similar to a traditional login node
 - Same authentication
 - Talks to the same resource manager
 - Mounts the same shared file system



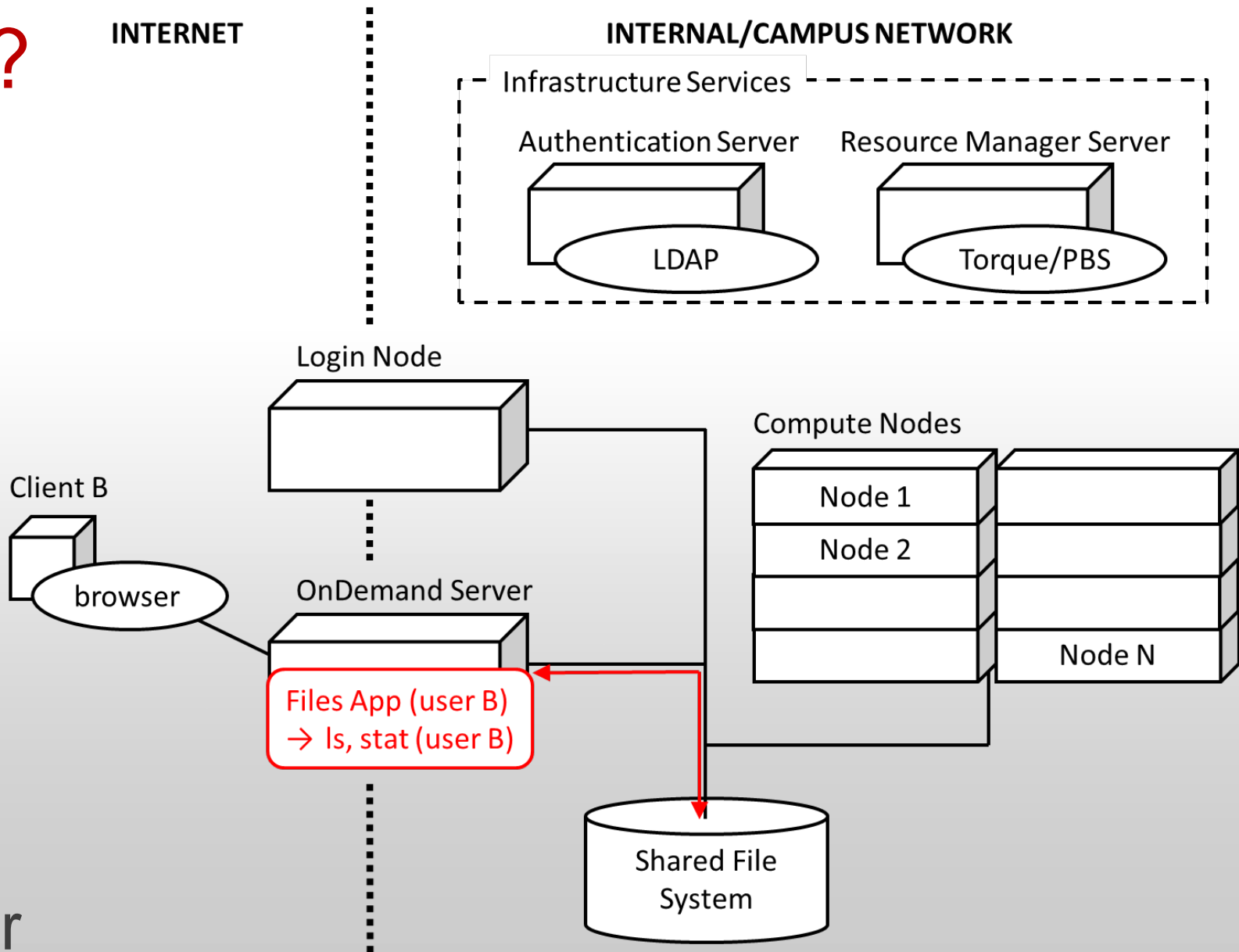
How does it work?

- Now clients may also connect to OnDemand server through browser
- The “httpd” proxy starts up a per-user nginx (PUN) process for each user
- The PUN launches apps as children processes



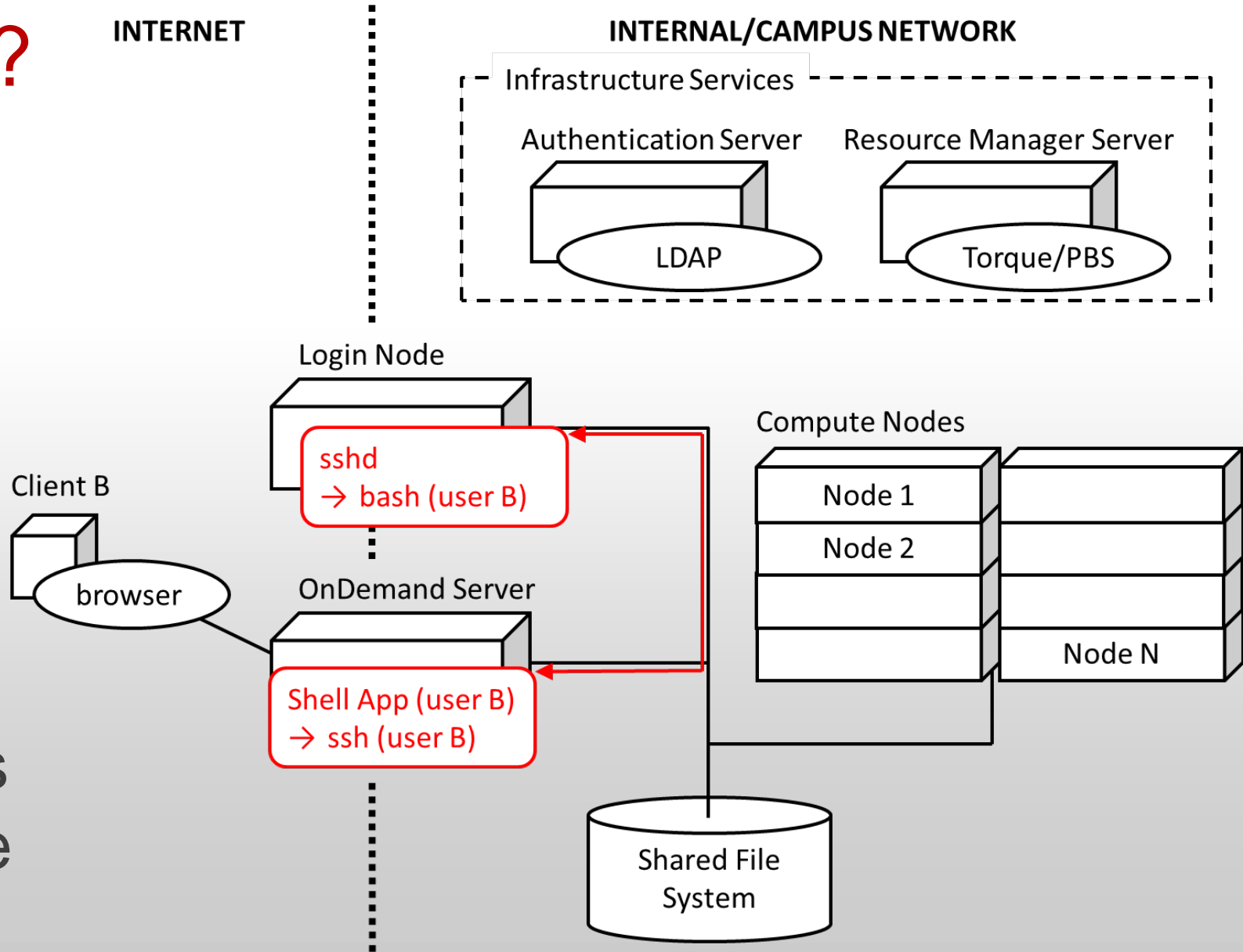
How does it work?

- The “Files App” launches as the user under the PUN
- Interacts with the shared file system through the Node.js “fs” core library
- File permissions are maintained as all processes run as user



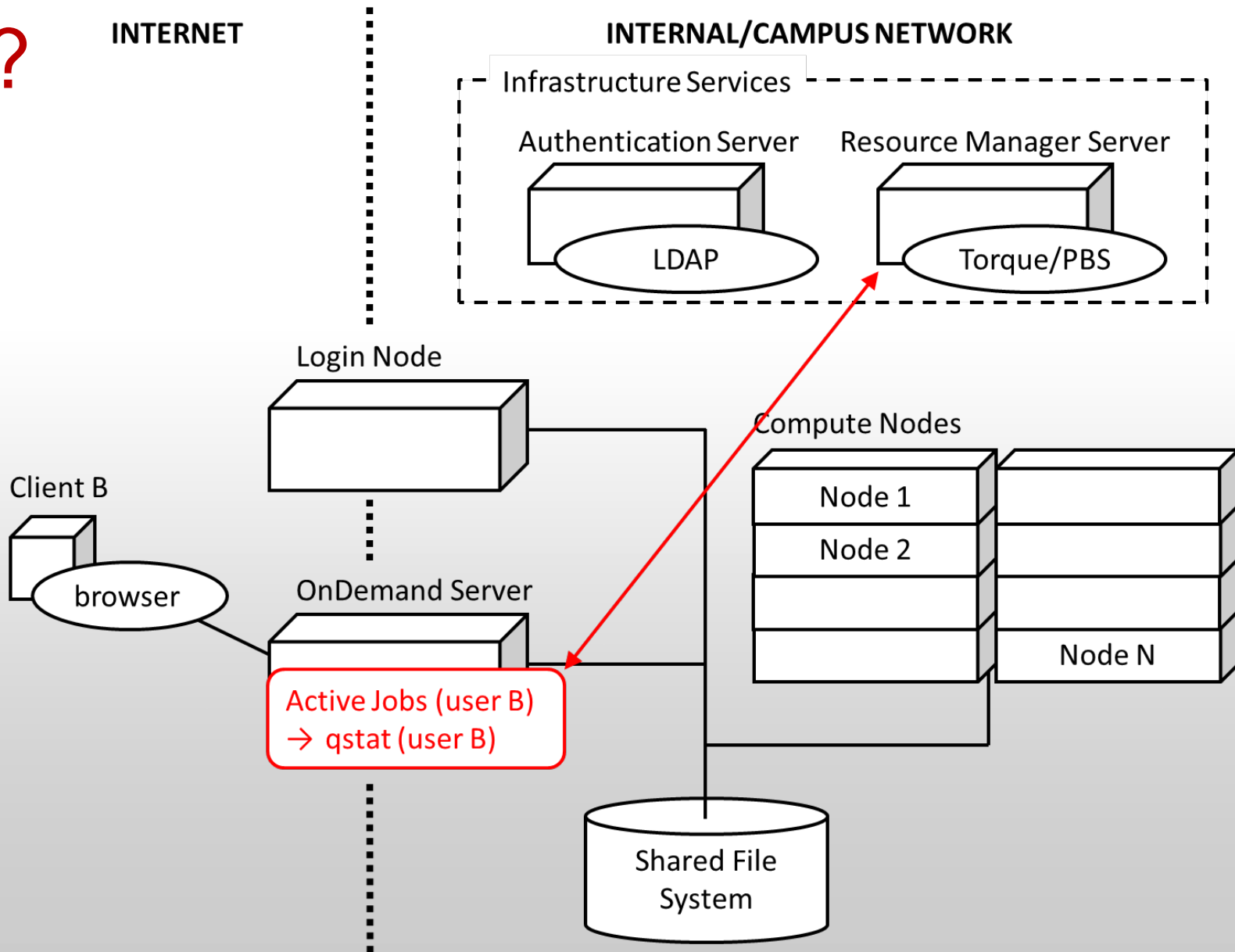
How does it work?

- The “Shell App” launches as the user under the PUN
- Within the shell app an “ssh” process is started connecting to the login node
- The browser behaves as the terminal for the “ssh” process



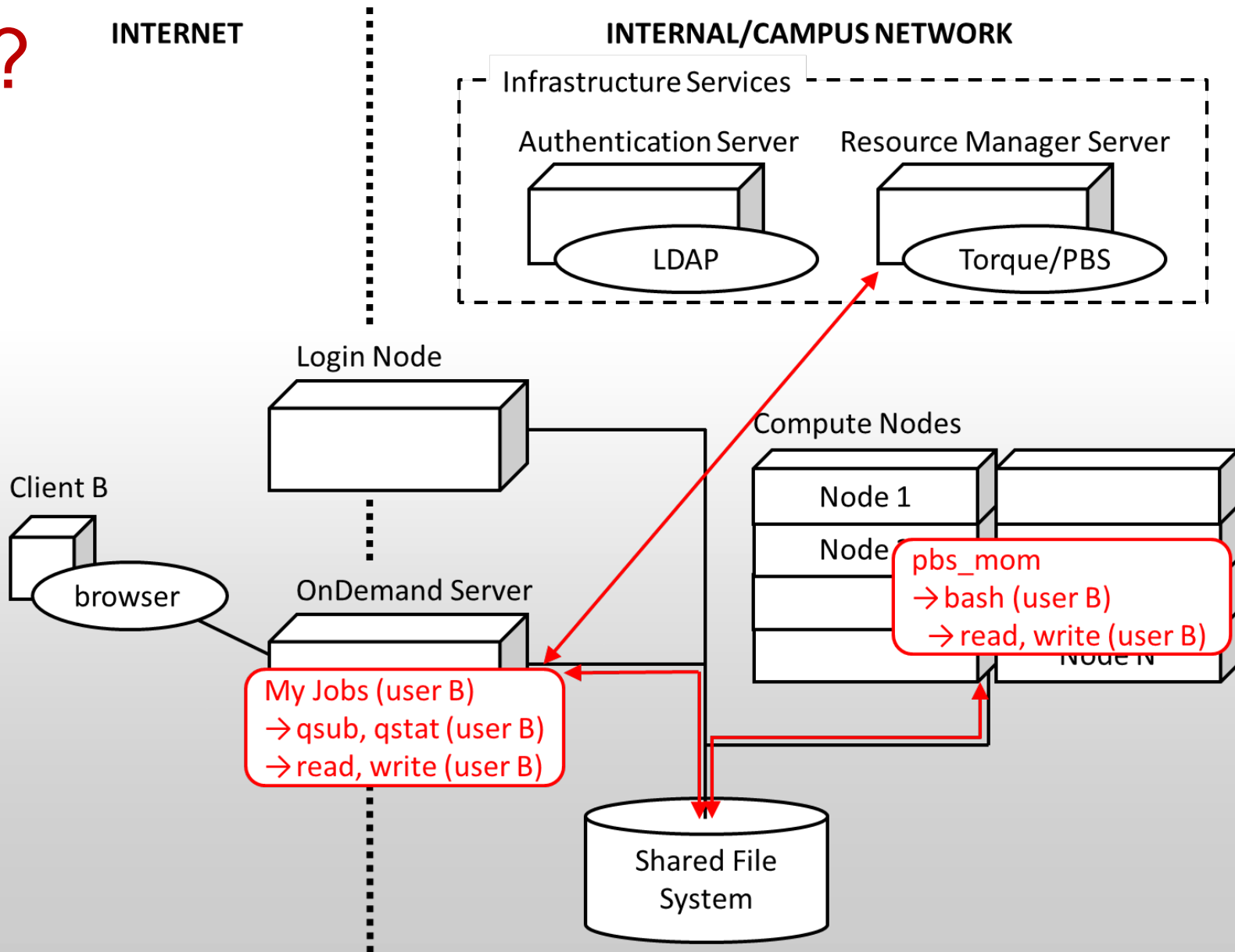
How does it work?

- The “Active Jobs App” launches as the user under the PUN
- Interacts with a Torque batch server
- Equivalent to a “qstat” command called by the user



How does it work?

- The “My Jobs App” launches as the user under the PUN
- Submits jobs to Torque batch server
- Writes input files and reads output files generated by batch jobs through shared file system



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Installation Procedure

<https://osc.github.io/Open-OnDemand/installation>

Installation steps limited to OnDemand server

- Install system dependencies
 - Apache, Ruby, NodeJS, Passenger, git (we use Software Collections)
 - Client libraries for authentication, resource manager, and shared file system access (like any login node)
- Install Open OnDemand infrastructure from GitHub
 - Sets up web server to run apps
- Install Open OnDemand apps from GitHub
 - Dashboard, Shell, Files, Editor, Active Jobs, My Jobs



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Site Integration

- Authentication setup
 - Connect to existing user directory (LDAP)
 - Federated authentication (CILogon)
 - OpenID Connect (CILogon, Keycloak)
 - Shibboleth
- Batch setup
 - PBS/TORQUE
 - SLURM and LSF sites needed, we want to work with you



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Extending the Platform

- Vision: not just to provide these 6 apps, but to create a platform so any HPC user can build an app
- All apps in Open OnDemand are Phusion Passenger apps
 - Using Passenger app server, Open OnDemand lets a developer drop a new app's files into a directory and access it via a URL without requiring a manual server configuration or restart
 - NOTE: certain app changes may require a user-initiated app restart
 - Ruby, Node.js, Python-based apps are supported
- Any user can write an app and use it without any help from the sys admin
- Sys admin can deploy any app so that everyone can access it through the dashboard



Extending the Platform: Creating an App

1. Drop an app in \$HOME
 - \$HOME/ondemand/dev/**APP**
2. Install app specific dependencies (if any) in app subdirectory
3. Access app via URL
 - <https://ondemand.xxx.edu/pun/dev/APP>



Extending the Platform: Publishing an App

1. Add dashboard configuration manifest.yml file
 - \$HOME/ondemand/dev/**APP**/manifest.yml
2. Copy app to production location
 - /var/www/ood/apps/sys/**APP**
3. Access dashboard (may require reload)



Getting Open OnDemand Installed at your Center

- If you already run EL and PBS/TORQUE, you can download and install Open OnDemand now and try for yourself
- If not, then we can try to work with you to get Open OnDemand extended to support your setup
 - Tell us how we can help!



Next Webinar/Staying in Touch

- Our webinars are planned roughly quarterly
 - Let us know what you'd like to learn about next
- Visit our website
 - <https://osc.github.io/Open-OnDemand/>
- Join our mailing list
 - <https://lists.osu.edu/mailman/listinfo/ood-users>
- Get Open OnDemand!
 - <https://github.com/OSC/Open-OnDemand>



Thank you! Any questions?

Basil Mohamed Gohar

Web and Interface Applications Manager

Ohio Supercomputer Center

bgohar@osc.edu

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go.osu.edu/ood

