

EduHPC Workshop

OnRamp to Parallel and Distributed Computing

<https://github.com/ssfoley/onramp>

Samantha Foley

ssfoley@cs.uwlax.edu

<http://faculty.cs.uwlax.edu/~ssfoley>

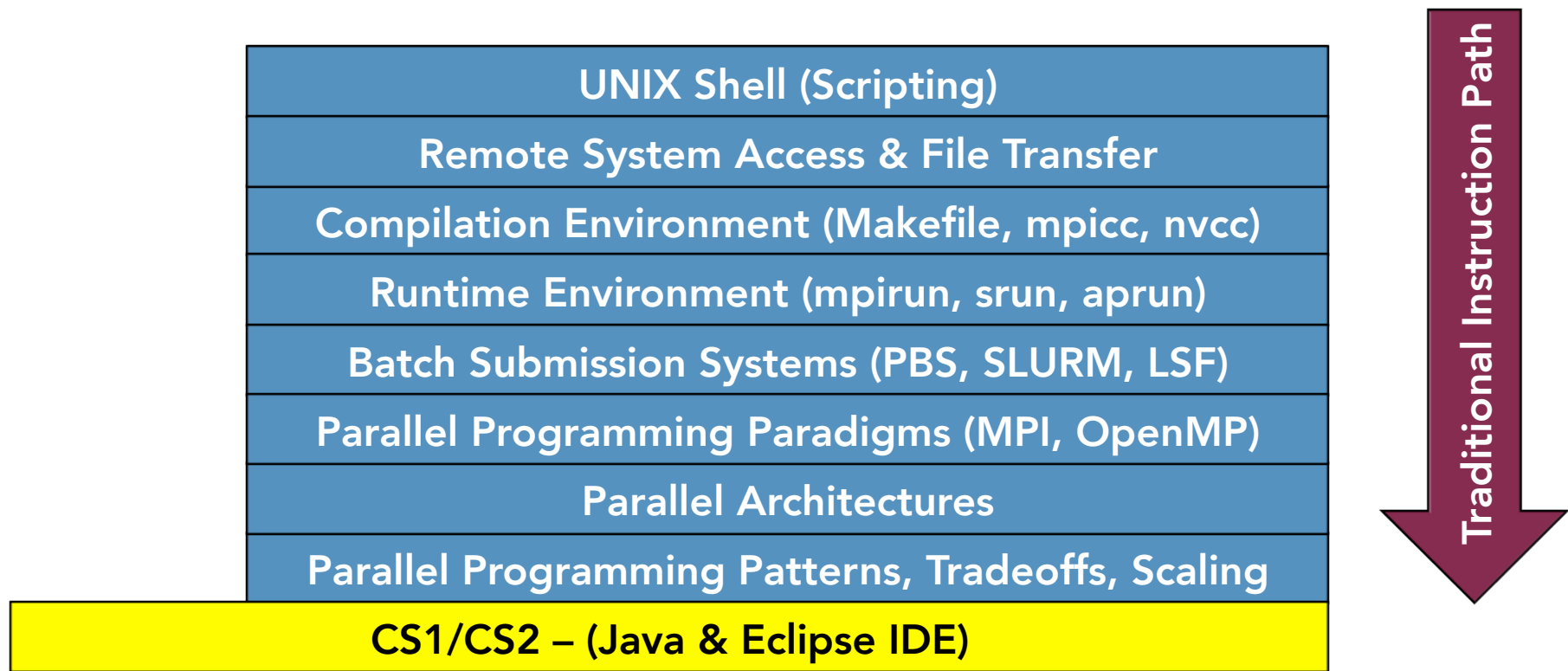
Josh Hursey

jjhursey@cs.uwlax.edu

<http://faculty.cs.uwlax.edu/~jjhursey/>

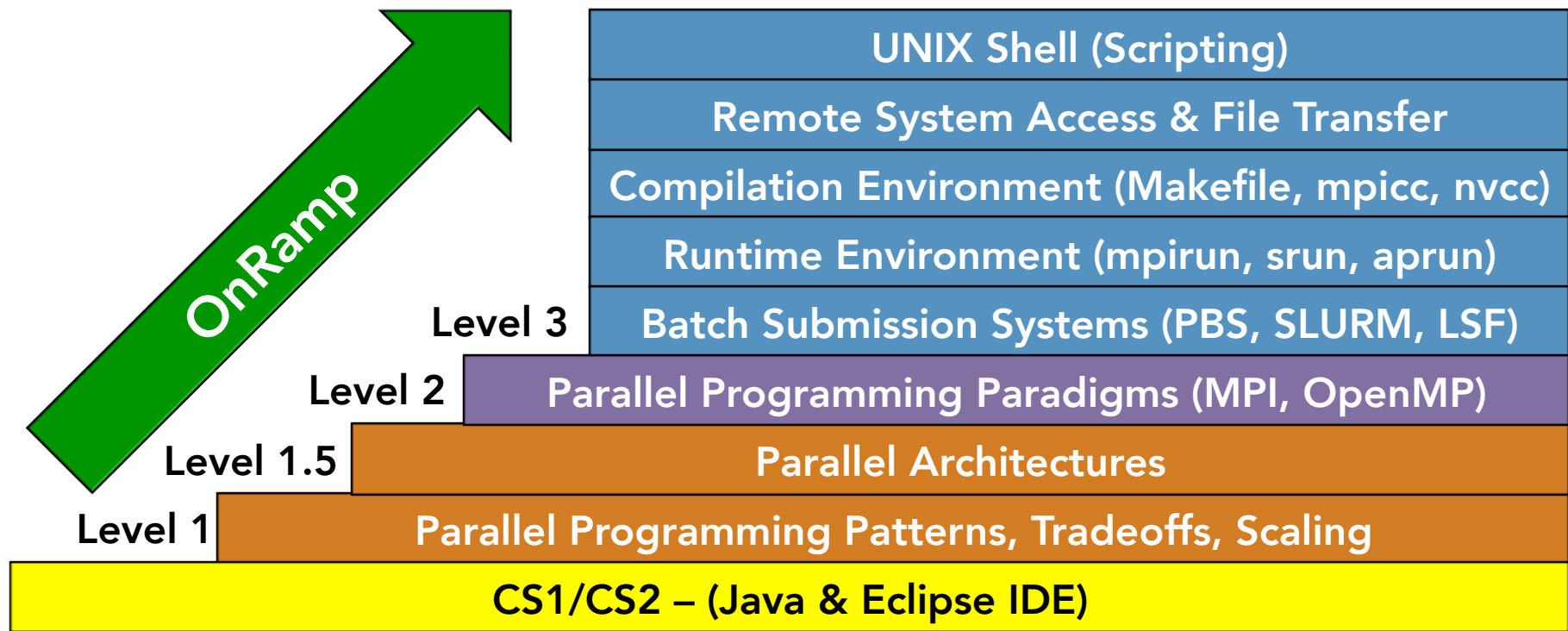
OnRamp to Parallel Computing Project

There exists a **significant barrier to entry** for learning how to become productive in a Parallel Computing Environment (PCE) due to often unfamiliar and complex system software, programming interfaces, and tools.



OnRamp to Parallel Computing Project

The OnRamp Project, provides a web-based portal that **coaches users through interactive tutorials** that teach them about the software ecosystem and parallel computing while allowing them to **launch & explore parallel applications from day one.**

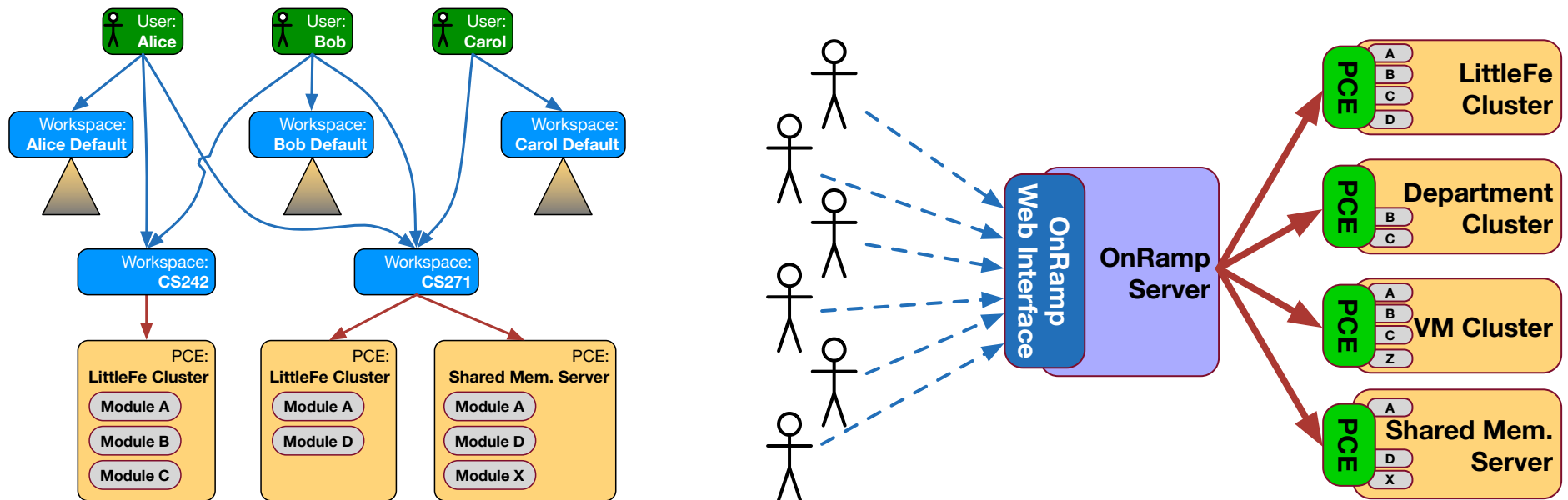


OnRamp to Parallel Computing Project

• High-Level Goals

- Encourage students to explore parallel and distributed computing concepts without the overhead of PCE system software peculiarities.
- Help students transition to using the native PCE, eventually.
- Bring together existing educational hardware & curriculum modules efforts into a flexible, portable architecture.

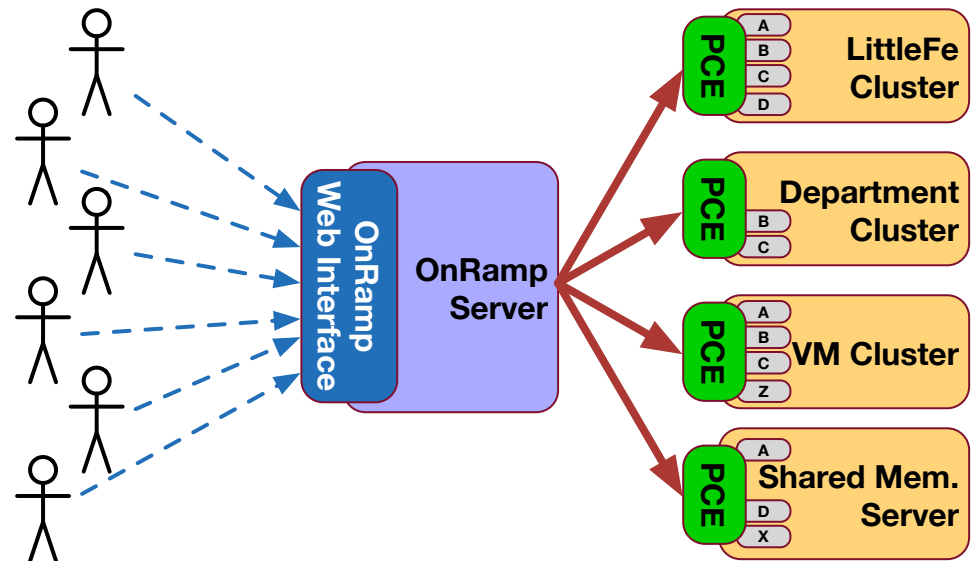
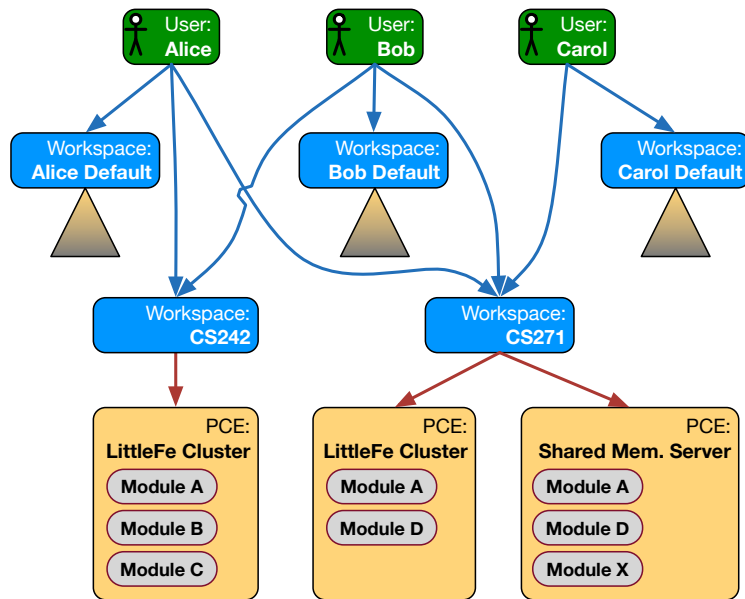
• Basic Architecture



OnRamp to Parallel Computing Project

- **Web Portal (client facing side of the OnRamp Server)**

- Users do not need accounts on each PCE (use a shared UNIX account).
- Users can be grouped into one or more Workspaces.
 - Workspaces are assigned PCE & Module combinations.
- Users view Module instructions, launch jobs, view results, transfer files.
 - Automatically generated & validated custom forms for each Module.
- Administrative panel to manage PCEs, one-click deploy Modules, manage Users, manage Workspaces, monitor usage, ...



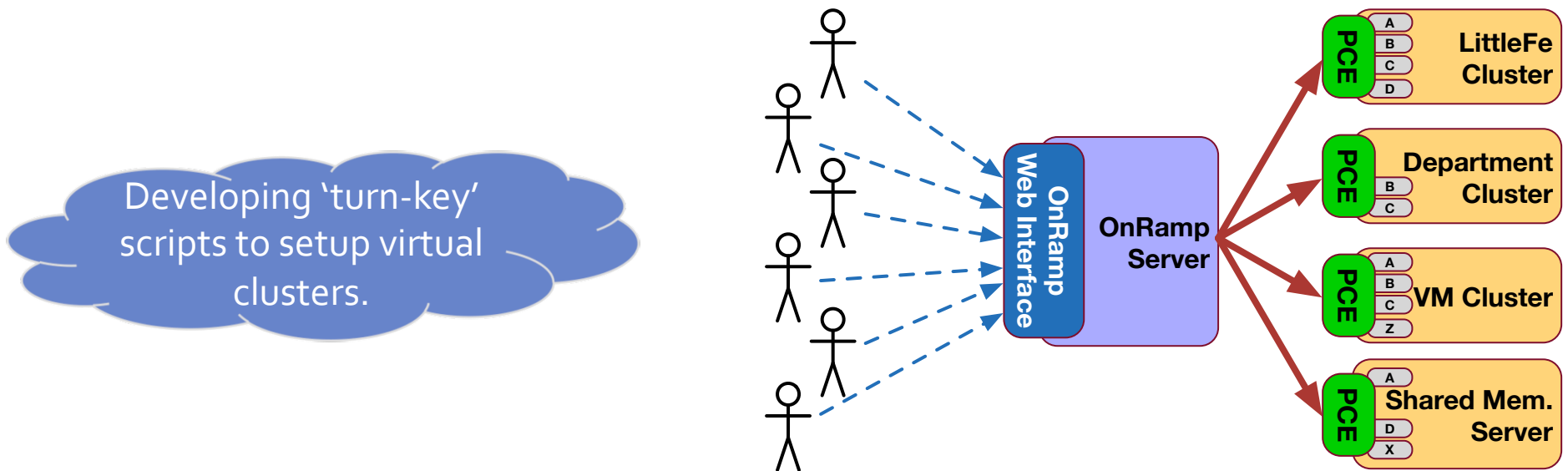
OnRamp to Parallel Computing Project

- **OnRamp Server**

- Broker between the users of the OnRamp Portal and the PCEs.
- Enforce policy, authenticate users, and manage security.
- Cache files between Users and PCEs.

- **OnRamp PCE**

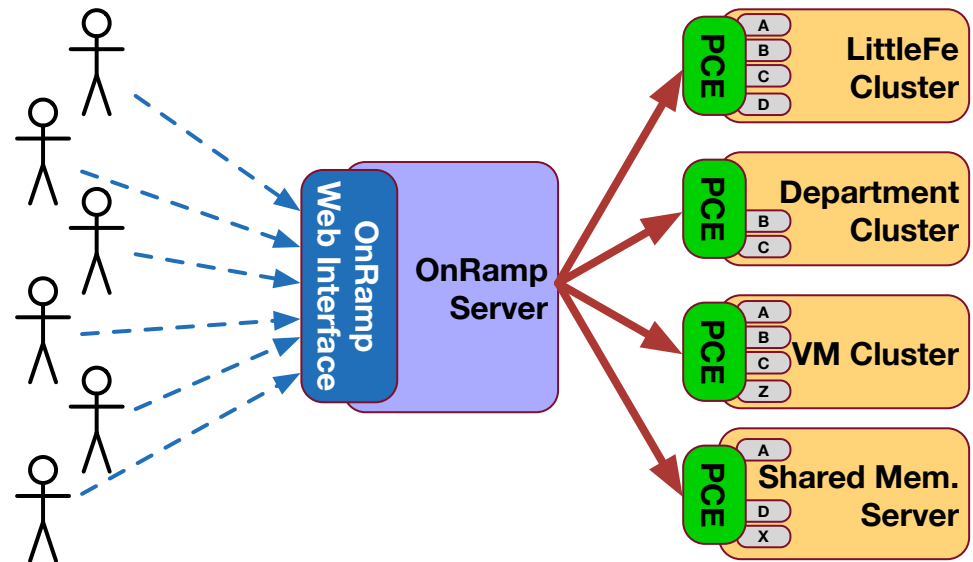
- Custom drivers for each type of software environment (SLURM, PBS, LSF).
- Manage modules, and user files associated with jobs.
- Launch and monitor jobs on the system.



OnRamp to Parallel Computing Project

- **Curriculum Modules**

- Complete freedom to structure the module as you like.
- Write a few Python scripts to 'hook' into the OnRamp architecture.
- Configuration files allow you to specify custom, module-specific parameters and validation requirements for users running the code.
- Custom documentation/instructions
 - Can be tailored to the PCE environment



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