A Lightweight Scheduler for PRAGMA Testbed

Shava Smallen Montoya,
Nadya Williams, Phil Papadopoulos,
Mauricio Tsugawa, Jose Fortes

Last PRAGMA meeting…

Rebooting the Persistent PRAGMA Testbed

- PRAGMA-wide persistent testb
  - Various technologies are now "g can profitably revisit.
    - PRAGMA Boot, Cloud Controller, C
  - Discussion was about
    - What, How, Who
  - Two types of natural testbed res
    - Pure VM and Virtual Cluster Hostir
    - VM and Virtual Cluster Hosting w/ networking.
  - Need to be able to integrate dat (particularly important in Biodiv

Notes from Resources WG discussion meeting at PRAGMA27

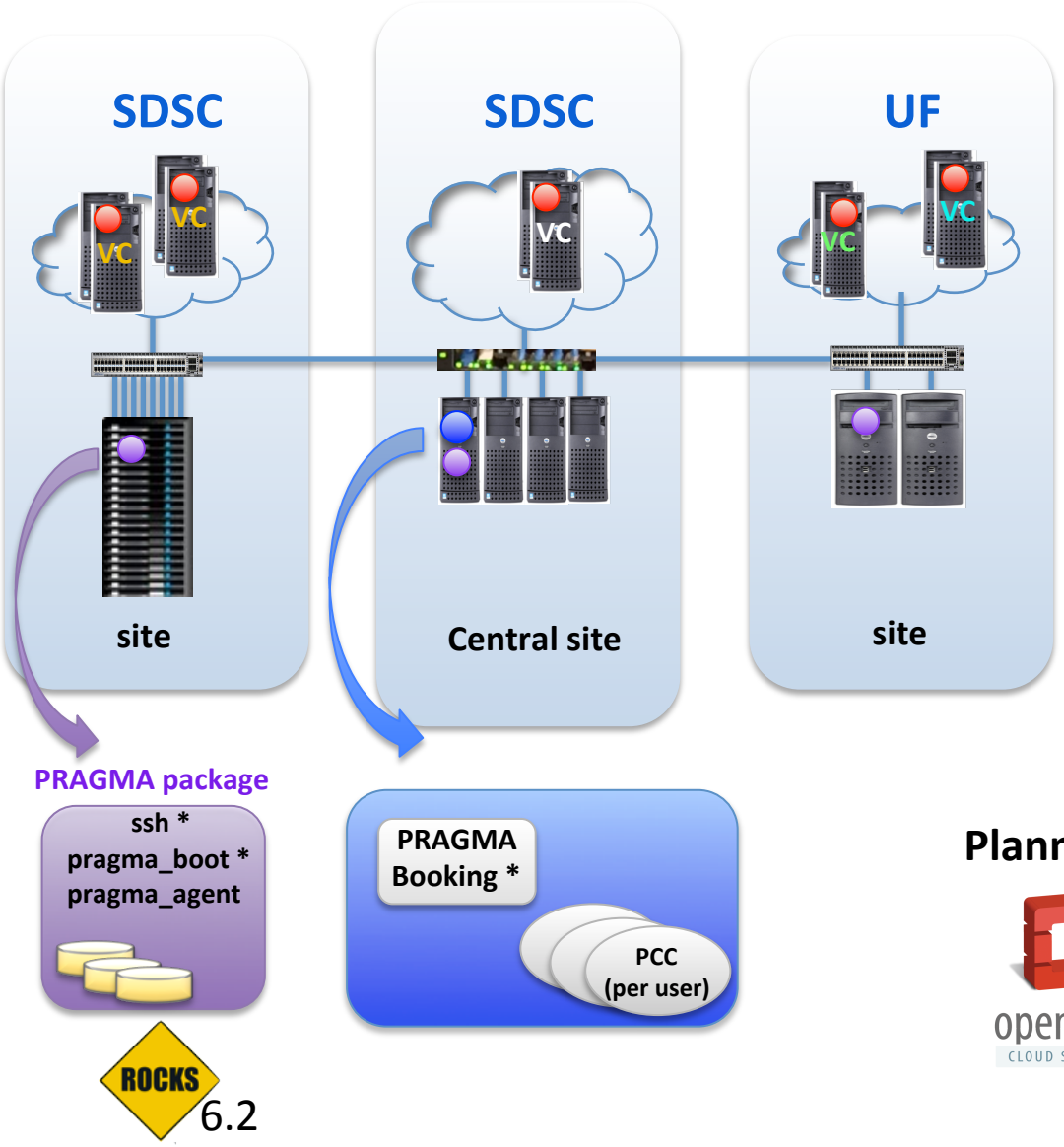
Areas of Discussions

- **What cloud deployment technologies are people using today?**
  - Rocks (UCSD), OpenStack, OpenNebula (NCHC),CloudStack (AIST, UFL, KU (thai),
- **How should we handle accounts?**
  - something simple. Recognize that we don't need to scale to 1000s of users.
    - Central place for usernames, contacts, public ssh keys?
    - Eduroam? Leveraging FutureGrid? OpenID? (weicheng to investigate)
    - Centralized SSH pubkey list via private GitHub Repository (Via an academic)
- **Access? How do we determine who/when a remote user can spin up a virtual cluster for an experiment.**
  - Can we steal from HPC schedulers? What about Condor Scheduler?
  - Components from INCA that can be used to detect collisions.
  - Central Place for Reservations/Availability? ORCA from GENI/Planetlab?
  - Leases? Shava + Jose to investigate
- Record keeping/performance
  - Tracking.
  - perfSONAR --- mesh config (John Hicks to assist in PRAGMA mesh config).

Requirements for Testbed

1. Scale to tens of users (not necessarily to hundreds or thousands)
2. Leverage existing tools such as PRAGMA Boot, Personal Cloud Controller, and overlay networks to deploy virtual clusters/machines.
3. Needs to work with multiple cloud deployment tools (e.g., Rocks, Openstack, OpenNebula, and CloudStack).
4. Participating sites should only need to install a small amount of software

PRAGMA scheduler architecture



Planned VM/VC provisioners

openstack CLOUD SOFTWARE

apachecloudstack open source cloud computing

one

** Components integrated into prototype*

PRAGMA Booking

Can we leverage an existing room reservation scheduler?

http://www.bookedscheduler.com

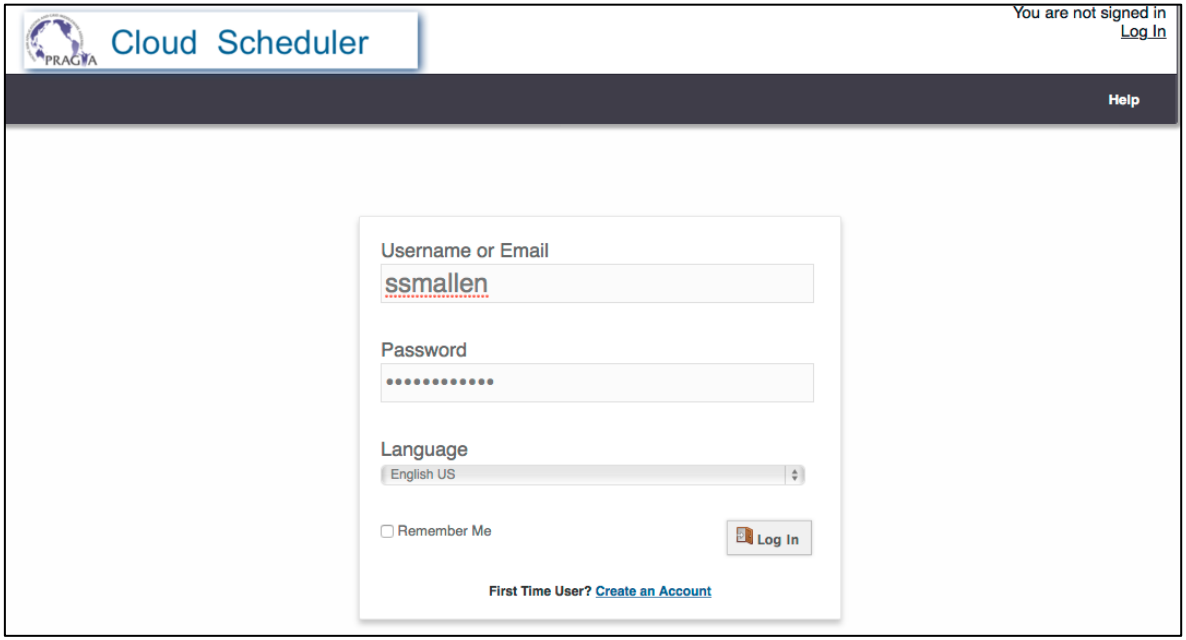
Pros:

- ✓ Open source
- ✓ Easy to setup
- ✓ Nice GUI interface
- ✓ Report features
- ✓ REST API
- ✓ Customizable-*ish*
- ✓ LDAP and Active Directory support.
- ✓ Fine tuned roles and permissions.
- ✓ User and group quotas.

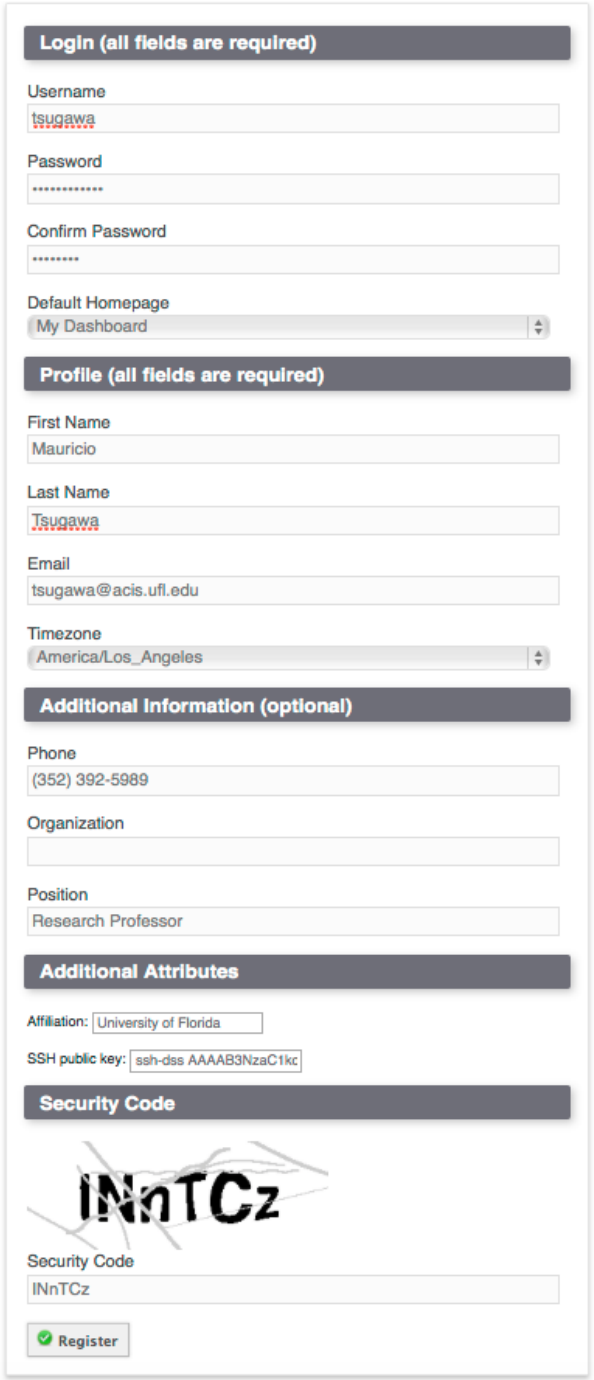
Cons:

- ❖ Can only handle one reservation per resource at a time
- ❖ PHP changes can be painful (heavy OO makes it hard to find right files)
- ❖ Doc is sparse

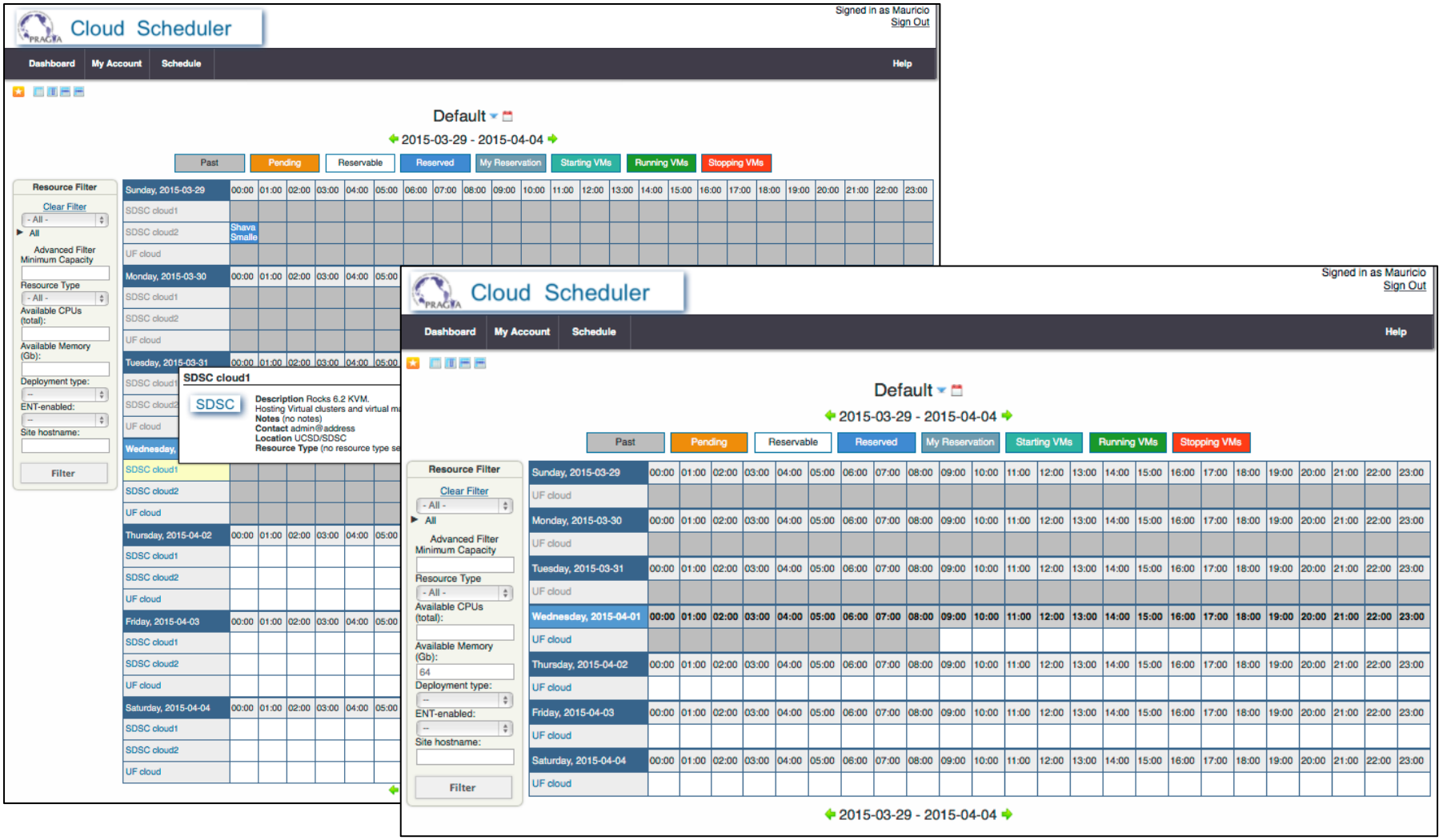
Demo: Login/Register



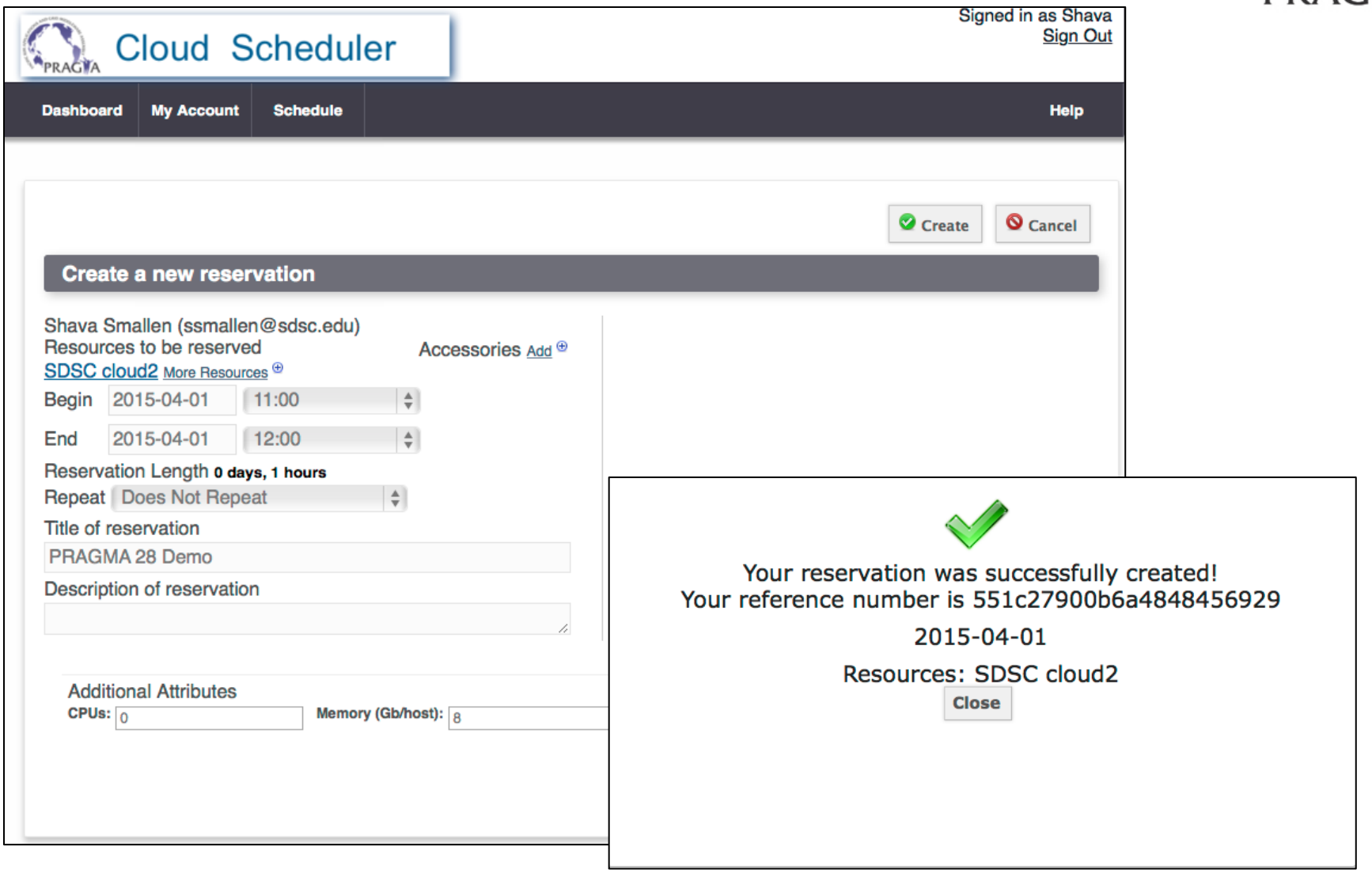
http://calit2-119-121.ucsd.edu/cloud-scheduler



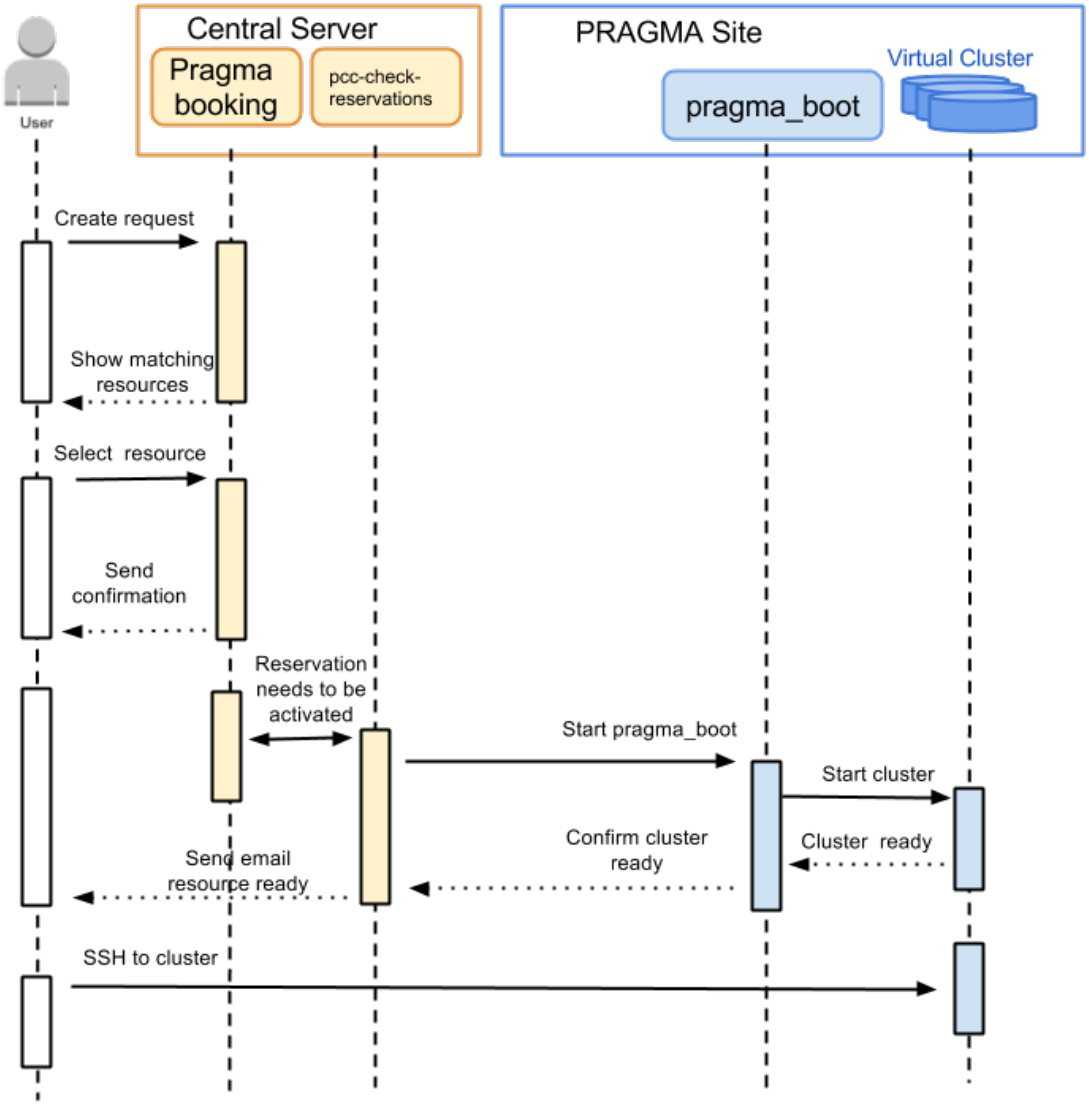
Demo: Resources



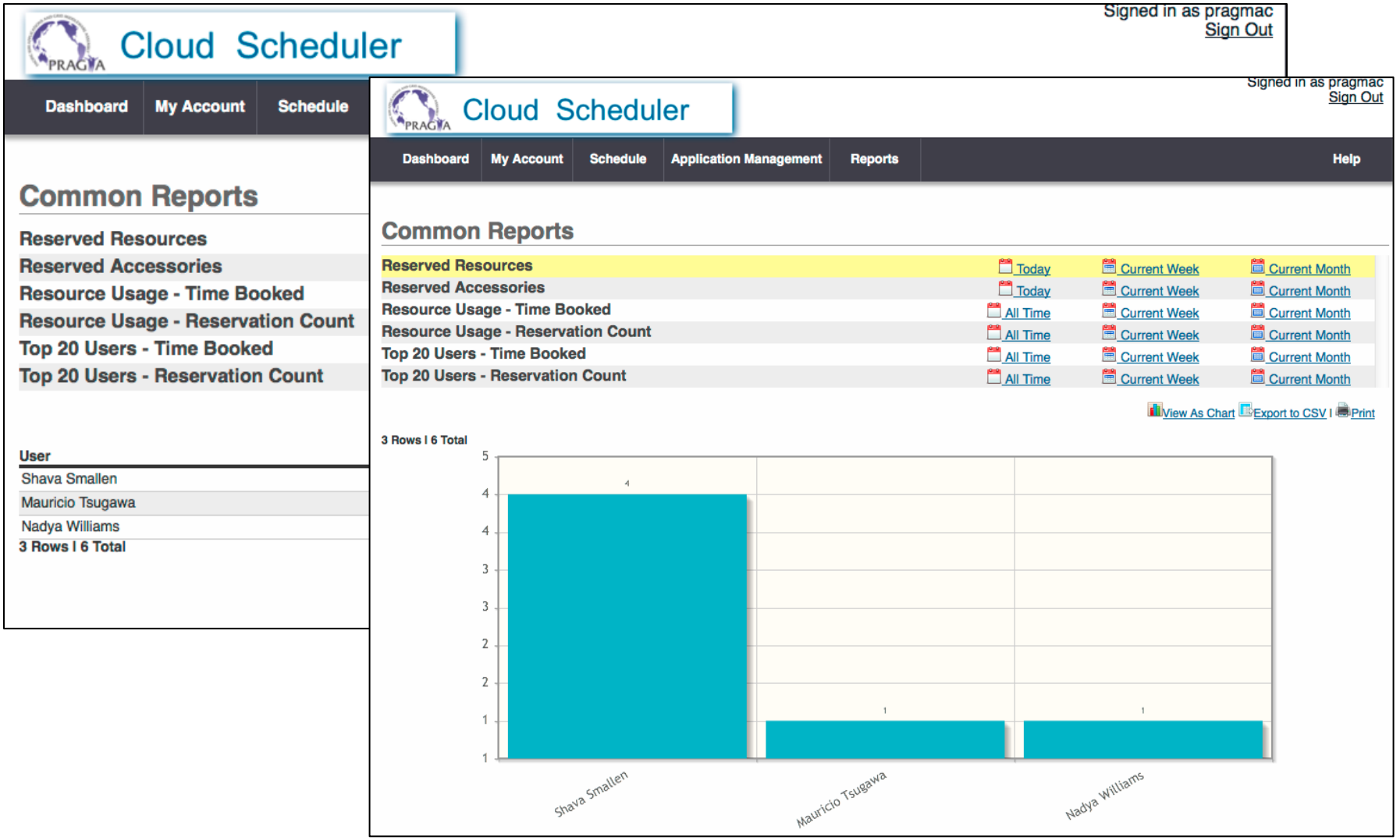
Demo: Reservations



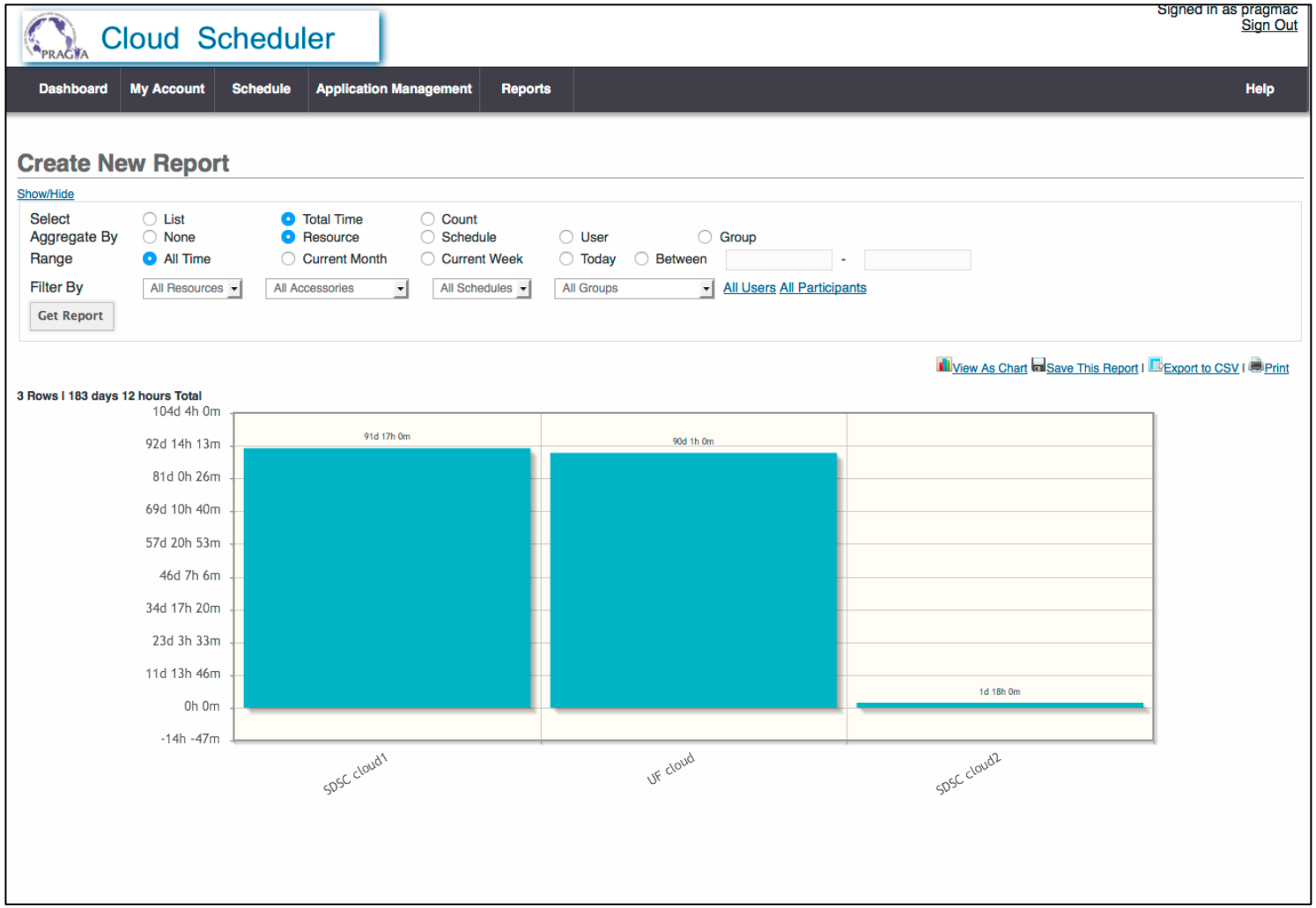
Activating reservations



Demo: Common Reports



Demo: Custom Report



Implementation status

- **Prototype code available at:**
  - https://github.com/pragmagrid/cloud-scheduler
  - https://github.com/pragmagrid/pcc
- **Several Missing Pieces**

Component	Features
Booking (GUI)	Ability to reserve more than one virtual cluster per resource, integration with OpenID?
PCC	Enable Condor Glide-in, automatic shutdown of reservations, enabling extension of reservations, network overlay/ENT integration
pragma_boot	Efficient VM/VC startup, port to other provisioners (OpenNebula, Openstack, Cloudstack)
pragma_agent	Needs to be written and ported to other provisioners too
Images	storage and management, library of base images
Doc	How to guides for sites and users

Discussion (for Resources WG)

- Does Booking GUI seem intuitive / sufficient? What is missing?
- Would you be willing to participate as a resource provider?
- What would make it difficult for you to participate as site or user?
- What hypervisor/provisioner do you use? Willing to port pragma_boot to it?

Discussion (for main session)

- What applications would you like to run?
- Would you be willing to volunteer to run application across testbedto be a beta tester?
- What additional features would you like?