



A Lightweight Scheduler for PRAGMA Testbed

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Last PRAGMA meeting...



Rebooting the Persistent PRAGMA Testbed

- PRAGMA-wide persistent testbed
 - Various technologies are now “good” and can profitably revisit.
 - PRAGMA Boot, Cloud Controller, CloudStack
 - Discussion was about
 - What, How, Who
 - Two types of natural testbed resources
 - Pure VM and Virtual Cluster Hosting
 - VM and Virtual Cluster Hosting w/ networked storage
 - Need to be able to integrate data (particularly important in Biodiversity)

Areas of Discussions

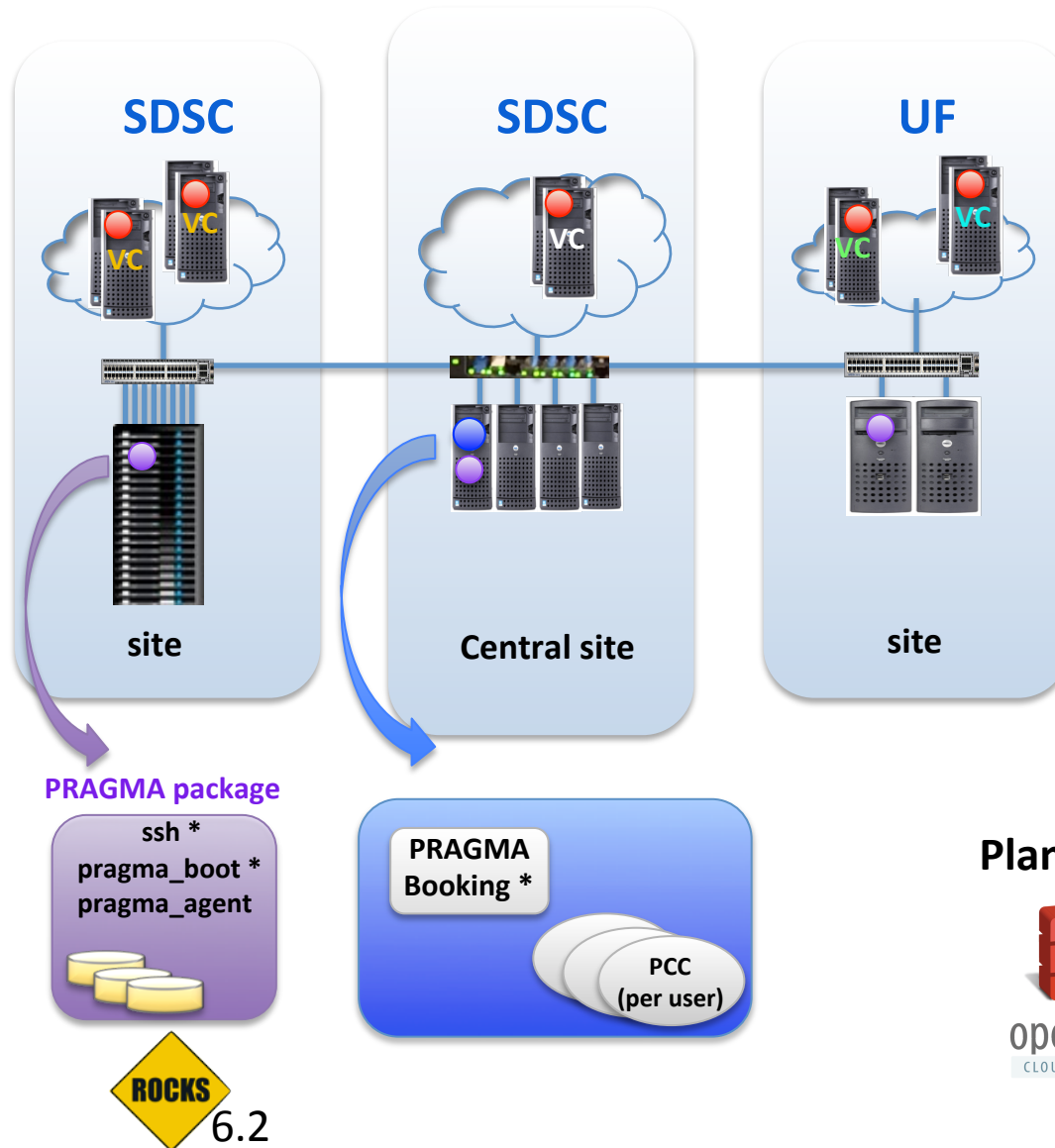
- **What cloud deployment technologies are people using today?**
 - Rocks (UCSD), OpenStack, OpenNebula (NCHC), CloudStack (AIST, UFL, KU (thai)), etc.
- **How should we handle accounts?**
 - something simple. Recognize that we don't need to scale to 1000s of users.
 - Central place for usernames, contacts, 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).

*Notes from Resources WG
discussion meeting at
PRAGMA27*

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



* 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.

The screenshot shows the homepage of the Booked Scheduler website. The header includes the 'booked' logo and navigation links: Features, What's New, Help, Live Demo, Free Trial, and Download. The main banner features the text 'A Simply Powerful, Reserve Anything Scheduler' and a 'Try It For Free' button with the subtext 'GET STARTED IN SECONDS'. To the right of the banner are five feature icons: 'Book Anything' (calendar), 'Track Everything' (bar chart), 'Securely' (lock), 'In the Cloud' (cloud), and 'With a Ton of Options' (gear). Below the banner, the 'Why Host?' section describes the turn-key hosting solution, mentioning 'Unlimited users, schedules, resources for just \$10 per month.' It then lists benefits for 'Schedule Administrators' (on-site installation, no technical background needed, configuration flexibility, quick setup) and 'System Administrators' (nothing to install, zero maintenance, professional support, domain name options). A rocket icon is positioned to the right of this section.

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

 Cloud Scheduler

You are not signed in
[Log In](#)

Help

Username or Email

ssmallen


Password

.....

Language

English US

☐ Remember Me



First Time User? [Create an Account](#)

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

Login (all fields are required)

Username

tsugawa

Password

.....

Confirm Password

.....

Default Homepage

My Dashboard

Profile (all fields are required)

First Name

Mauricio

Last Name

Tsugawa

Email

tsugawa@acis.ufl.edu

Timezone

America/Los_Angeles

Additional Information (optional)

Phone

(352) 392-5989

Organization

Position

Research Professor

Additional Attributes


Affiliation

University of Florida

SSH public key

ssh-dss AAAAB3NzaC1kc

Security Code




Security Code

INnTCz

☒ Register


Demo: Resources



 Cloud Scheduler

Signed in as Mauricio
[Sign Out](#)

Dashboard My Account Schedule Help



Default ▾

2015-03-29 - 2015-04-04

Past Pending Reservable Reserved My Reservation Starting VMs Running VMs Stopping VMs

Sunday, 2015-03-29	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
SDSC cloud1																								
SDSC cloud2																								
UF cloud																								

Resource Filter

Clear Filter

- All - ▾

All

Advanced Filter

Minimum Capacity

Resource Type

- All - ▾

Available CPUs (total):

Available Memory (Gb):

Deployment type:

ENT-enabled:

Site hostname:


Filter

SDSC cloud1

SDSC


Description Rocks 6.2 KVM.
Hosting Virtual clusters and virtual m
Notes (no notes)
Contact admin@address
Location UCSD/SDSC
Resource Type (no resource type se

Monday, 2015-03-30	00:00	01:00	02:00	03:00	04:00	05:00
SDSC cloud1						
SDSC cloud2						
UF cloud						
Tuesday, 2015-03-31	00:00	01:00	02:00	03:00	04:00	05:00
SDSC cloud1						
SDSC cloud2						
UF cloud						
Wednesday, 2015-04-01	00:00	01:00	02:00	03:00	04:00	05:00
SDSC cloud1						
SDSC cloud2						
UF cloud						
Thursday, 2015-04-02	00:00	01:00	02:00	03:00	04:00	05:00
SDSC cloud1						
SDSC cloud2						
UF cloud						
Friday, 2015-04-03	00:00	01:00	02:00	03:00	04:00	05:00
SDSC cloud1						
SDSC cloud2						
UF cloud						
Saturday, 2015-04-04	00:00	01:00	02:00	03:00	04:00	05:00
SDSC cloud1						
SDSC cloud2						
UF cloud						

 Cloud Scheduler

Signed in as Mauricio
[Sign Out](#)

Dashboard My Account Schedule Help



Default ▾

2015-03-29 - 2015-04-04

Past Pending Reservable Reserved My Reservation Starting VMs Running VMs Stopping VMs

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UF cloud																								
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UF cloud																								
Wednesday, 2015-04-01	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
UF cloud																								
Thursday, 2015-04-02	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
UF cloud																								
Friday, 2015-04-03	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
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UF cloud																								

Resource Filter

Clear Filter

- All - ▾

All

Advanced Filter

Minimum Capacity

Resource Type

- All - ▾

Available CPUs (total):

Available Memory (Gb):

Deployment type:


ENT-enabled:

Site hostname:

Filter

Demo: Reservations



 **Cloud Scheduler**

Signed in as Shava
[Sign Out](#)

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Create

Cancel

Create a new reservation

Shava Smallen (ssmallen@sdsc.edu)

Resources to be reserved

[SDSC cloud2](#) [More Resources](#)

Accessories [Add](#)

Begin

2015-04-01

11:00

End

2015-04-01

12:00

Reservation Length

0 days, 1 hours

Repeat

Does Not Repeat

Title of reservation

PRAGMA 28 Demo

Description of reservation

Additional Attributes

CPU: 0

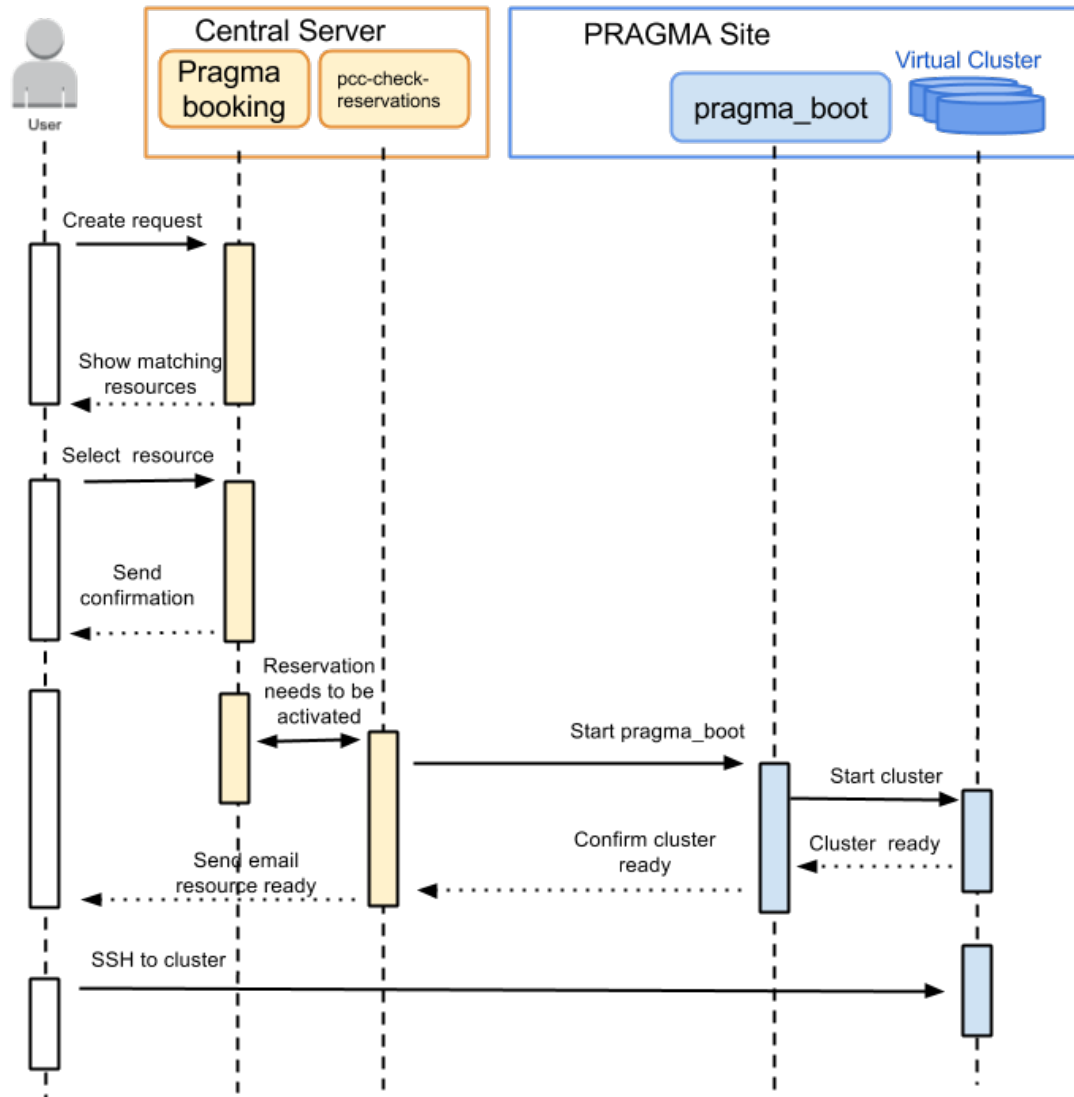
Memory (Gb/host): 8




Your reservation was successfully created!
Your reference number is 551c27900b6a4848456929
2015-04-01
Resources: SDSC cloud2

Close

Activating reservations






Cloud Scheduler

Signed in as pragmatic
[Sign Out](#)

Dashboard

My Account

Schedule



Cloud Scheduler

Signed in as pragmatic
[Sign Out](#)

Dashboard

My Account

Schedule

Application Management

Reports

Help

Common Reports

Reserved Resources

Reserved Accessories

Resource Usage - Time Booked

Resource Usage - Reservation Count

Top 20 Users - Time Booked

Top 20 Users - Reservation Count

User

Shava Smallen

Mauricio Tsugawa

Nadya Williams

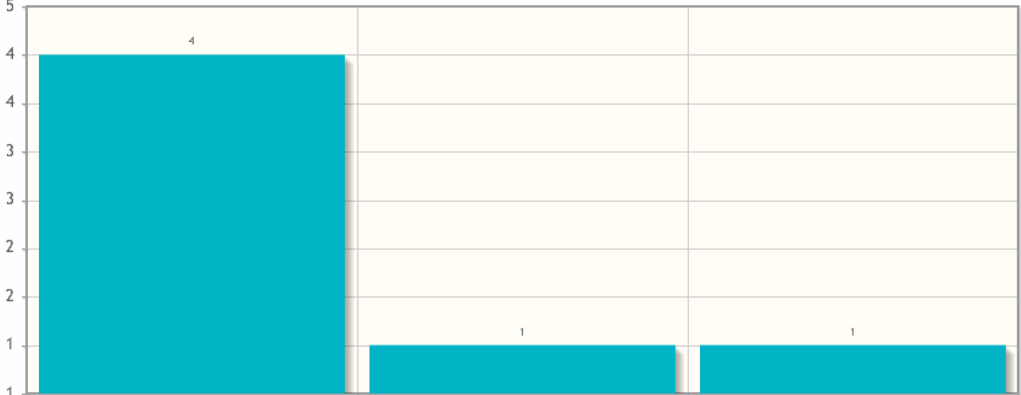
3 Rows | 6 Total

Common Reports

Reserved Resources	Today	Current Week	Current Month
Reserved Accessories	Today	Current Week	Current Month
Resource Usage - Time Booked	All Time	Current Week	Current Month
Resource Usage - Reservation Count	All Time	Current Week	Current Month
Top 20 Users - Time Booked	All Time	Current Week	Current Month
Top 20 Users - Reservation Count	All Time	Current Week	Current Month

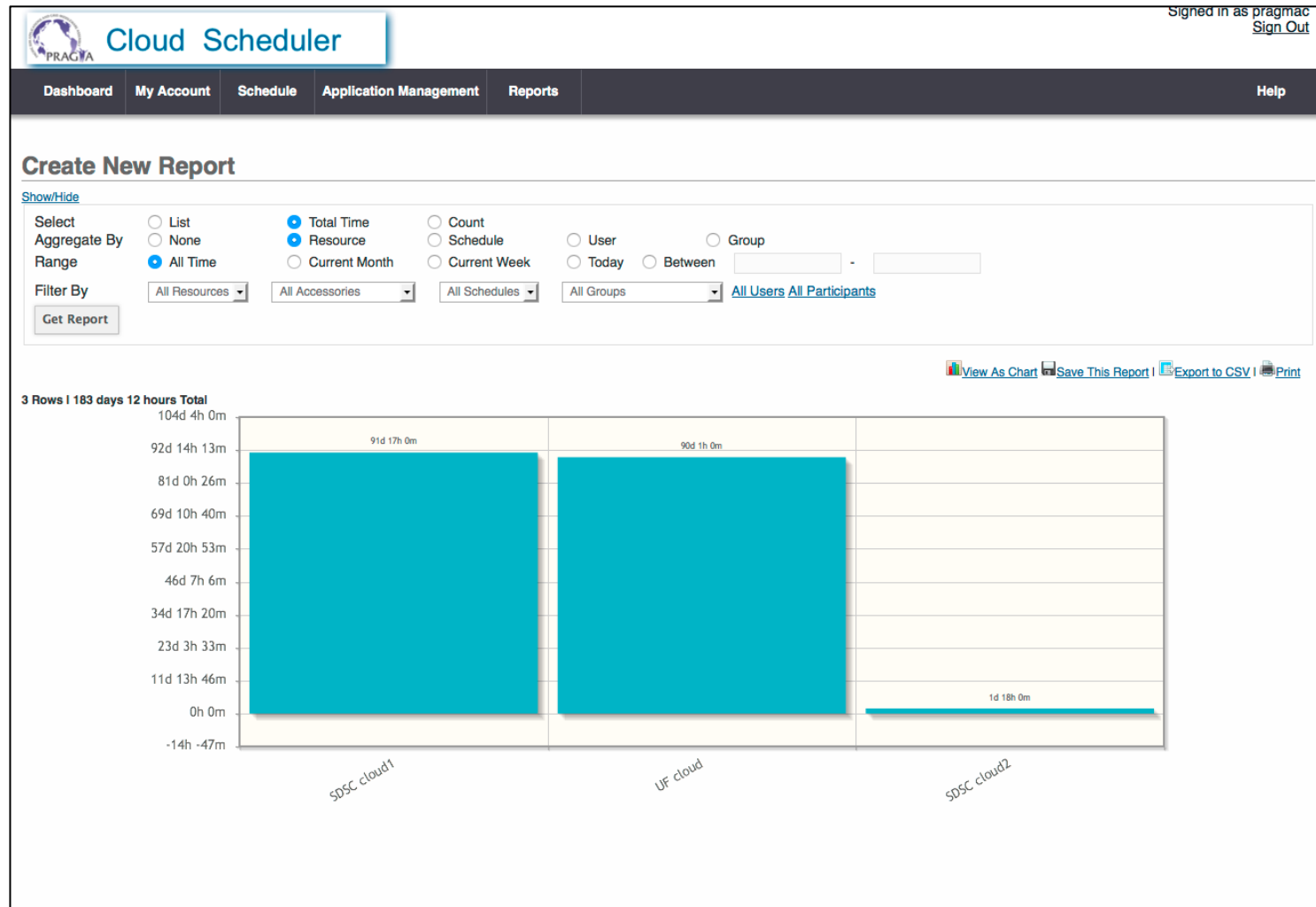
[View As Chart](#)
[Export to CSV](#)
[Print](#)

3 Rows | 6 Total



User	Count
Shava Smallen	4
Mauricio Tsugawa	1
Nadya Williams	1

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 testbed to be a beta tester?
- What additional features would you like?