



Personal Cloud Controller (PCC)

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DATA TO INSIGHT CENTER

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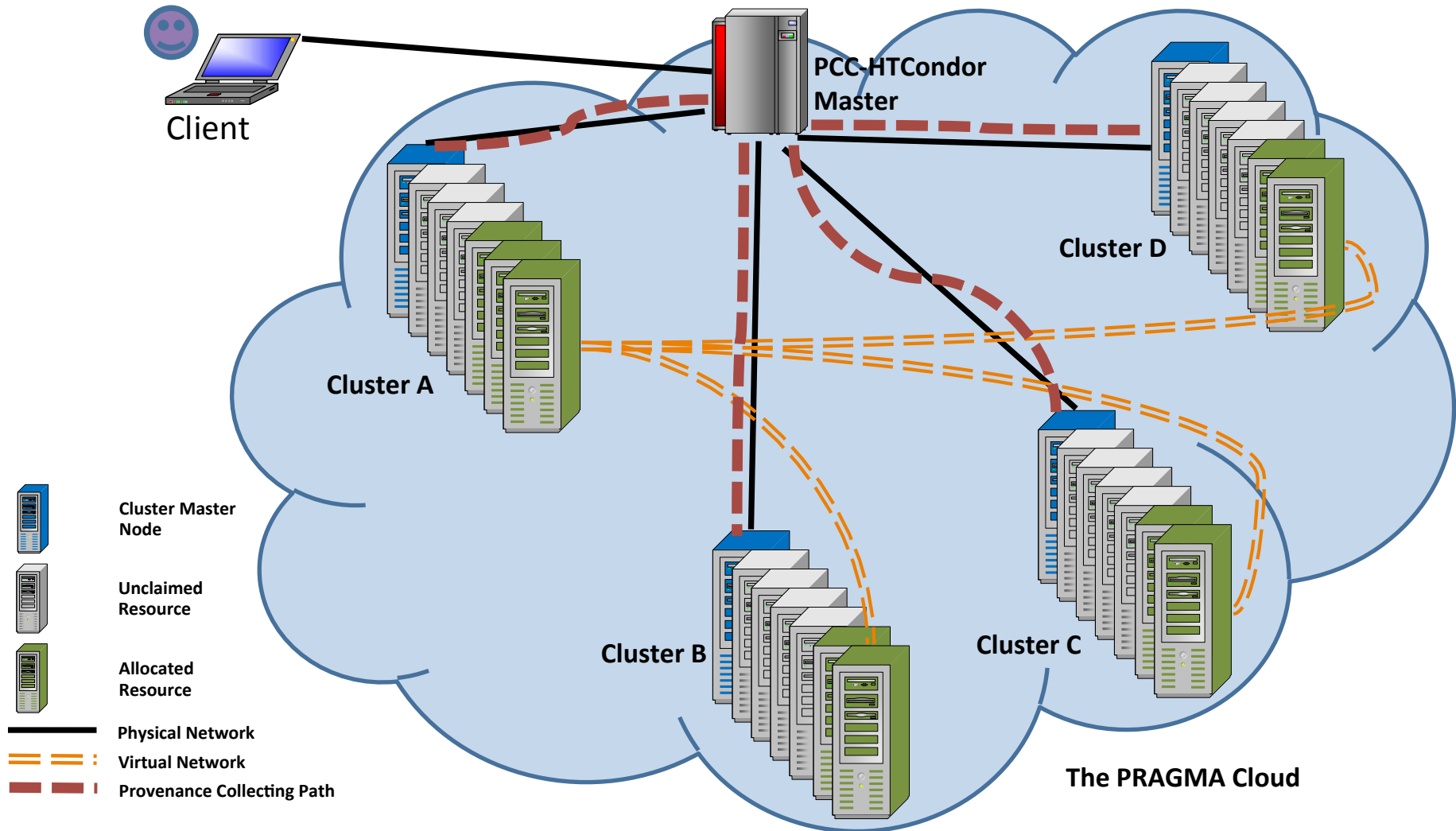
SDSC
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Overview

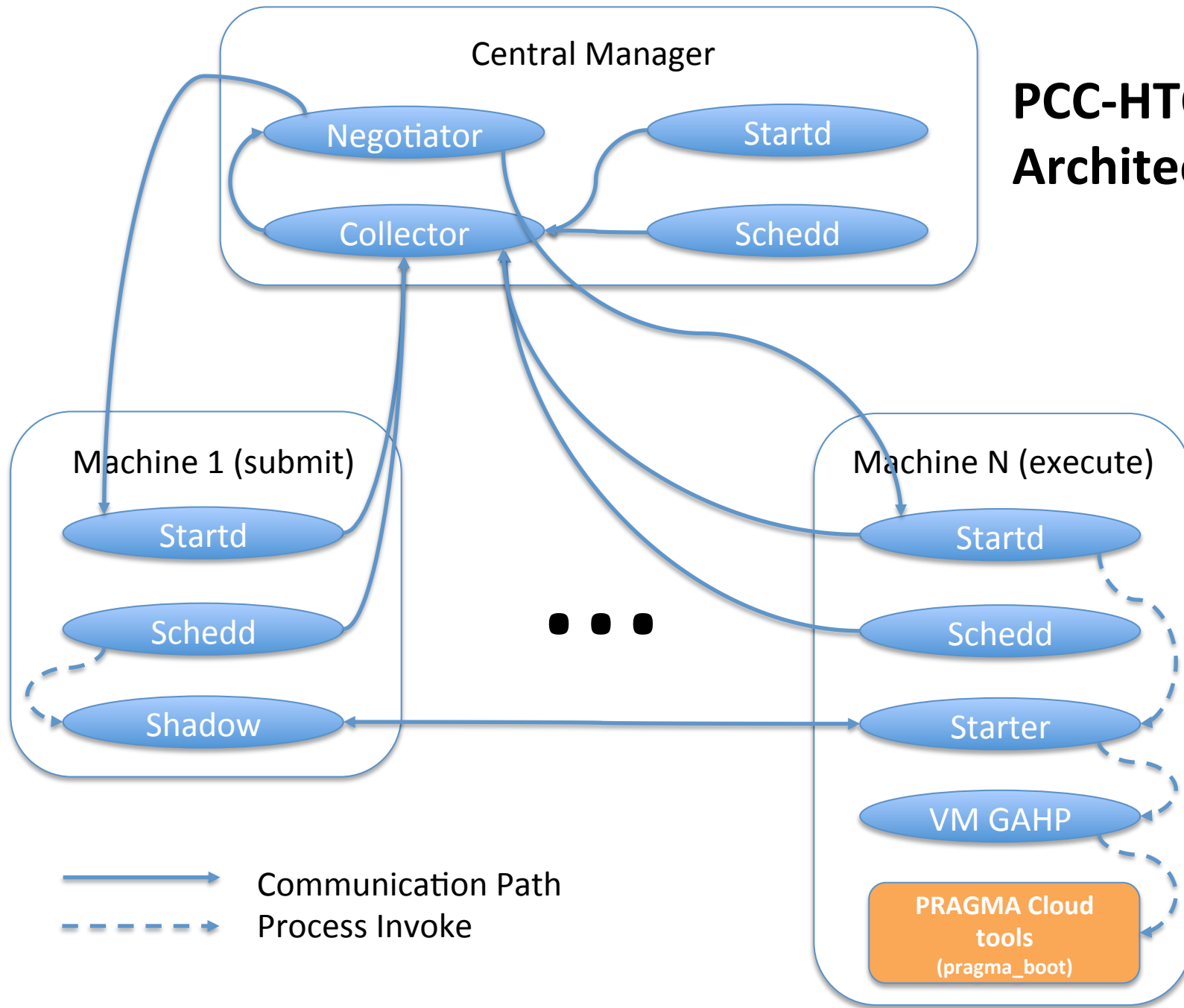
- Goals:
 - Enable **lab/group** to easily **manage** application **virtual clusters** on available resources
 - Leverage PRAGMA Cloud tools: pragma_bootstrap, IPOP, ViNE.
 - Lightweight, extends HTCondor from U Wisc.
 - Provide command-line and Web interfaces
- Working Group: Resources



PCC Enabled PRAGMA Cloud



PCC-HTCondor Architecture



PCC-HTCondor Job Submission

Sample PCC-HTCondor submission script

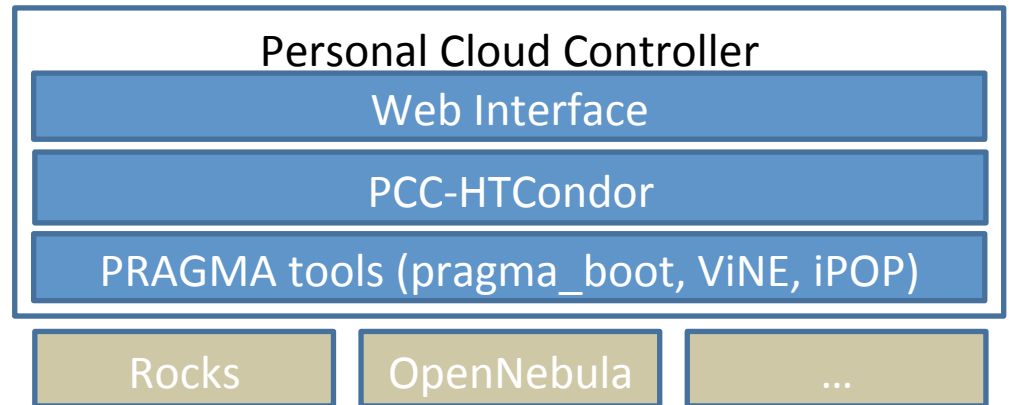
```
universe                = vm
executable              = lifemapper
log                    = simple.condor.log
vm_type                = rocks
rocks_job_dir          = /path/to/the/job/dir
queue
```

.vmconf file in the rocks job directory

```
executable              = pragma_boot
basepath                = /opt/pragma_boot/vm-images
key                    = ~/.ssh/id_rsa.pub
num_cores              = 2
vcname                  = lifemapper
logfile                 = pragma_boot.log
```

Status and Future Plans

- Initial prototype implemented
 - Start and monitor virtual cluster using `pragma_bootstrap` via HTCondor (VM GAHP)
 - Web interface prototype (PHP)
- Near-term goals
 - Add increased controllability and robustness (April – June)
 - Multi-site clusters (July – Sept)



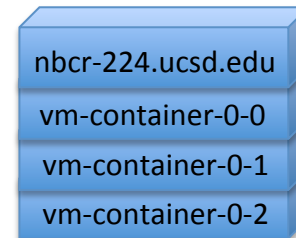
- Longer-term goals
 - Data-aware scheduling
 - Fault tolerance
 - Provenance

PCC Demo Overview and Setup



1. View PCC Web interface

- a. Fully launched “lifemapper” 8-core virtual cluster
- b. Just launched “dock6” 4-core virtual cluster




2. View Condor pieces

- a. Submit scripts
- b. `condor_status`
- c. `condor_q`

nbc-224.ucsd.edu

- 4 x Dell PowerEdge SC1435
 - 2 x Dual-Core 2.4 GHz AMD Opteron
 - 8 GB Memory
 - 250 GB Disk
- Rocks 6.1 with KVM roll
- Condor 8.0.6
- Pragma_bootstrap + 3 public IPs
- PCC + web frontend


Show web interface and ability to view running virtual clusters

**Personal Cloud Controller**
Introduction
Launch a Virtual Cluster
View Virtual Clusters

Introduction

The **PRAGMA Cloud** is multi-provider cloud technology development testbed with sites around the Pacific Rim. One of the goals of PRAGMA is to enable users to author their own application virtual machines (VMs) once using their preferred VM platforms and then use PRAGMA tools to easily deploy their VMs as virtual clusters (VCs) anywhere on PRAGMA sites.

Today, there are a number of PRAGMA tools such as **pragma_boot**, **iPOP**, etc. that provide pieces of the functionality needed to enable VCs to run anywhere on PRAGMA. The goal of this effort is to create a lightweight VC management tool, that integrates the various PRAGMA tools with a well known resource management tool called **HTCondor** to provide users with an easy-to-use interface for VC management. Users will have a high degree of controllability for managing their VCs as well as access detailed status data to monitor the health of the VCs.

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View Virtual Clusters

▼ nbc-225

Status: active
Client Nodes:
 hosted-vm-0-1-0: active
 hosted-vm-0-0-0: active

Status loaded at: Wed, 02 Apr 2014 19:22:22 -0700

Show launch interface

**PRAGMA**
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Launch a Virtual Cluster

Step 1: Select an Image

lifemapper

dock6

lifemapper

The Lifemapper Project (www.lifemapper.org) is a computational and data resource for biogeographic research and education on ecological models of species distribution. Lifemapper's architecture is composed of back end computational modeling linked through web services to front end research clients.

Step 2: Select a Resource

nbc-224

nbc-224

Name: PRAGMA Virtual Cluster Manager Test Cluster
URL: <http://www.sdsc.edu/>
Organization: SDSC
Location: San Diego, California, US (N32.87 W117.22)
Capacity: 4 Virtual Clusters, 12 core(s)
Load: 1 Virtual Clusters, 8 core(s)
Available: 4 core(s)
Select # of cores:

Add to virtual cluster

Step 3: Submit Virtual Cluster Job Request

Image selected: lifemapper
Resource selected: None

Submit virtual cluster

Show launching virtual cluster

PRAGMA

Personal Cloud Controller

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Step 1: Select an Image

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Step 2: Select a Resource

nbc-224

Name: PRAGMA Virtual Cluster Manager Test Cluster
URL: <http://www.sdsc.edu/>
Organization: SDSC
Location: San Diego, California, US (N32.87 W117.22)
Capacity: 4 Virtual Clusters, 12 core(s)
Load: 0 Virtual Clusters, 0 core(s)
Available: 12 core(s)
Select # of cores:

Step 3: Submit Virtual Cluster Job Request

Image selected: lifemapper
Resource selected: nbc-224, 8 cores
Submit time: Tue, 01 Apr 2014 19:01:19 -0700
Created submit directory /var/log/pcc/submit/job/20140401.1396404079/
Submitting job(s).
1 job(s) submitted to cluster 71.

72%

Progress: Booting 'compute-1'...
Elapsed time: 44.12 minutes

Show running virtual cluster

```
[root@nbc-224 ~]# ssh nbc-225.ucsd.edu
Last login: Wed Apr  2 19:42:33 2014 from nbc-224.ucsd.edu
Rocks 6.1 (Emerald Boa)
Profile built 20:36 09-Oct-2013

Kickstarted 14:19 09-Oct-2013

-----

Rocks 6.1 (Emerald Boa)
Profile built 20:56 01-Oct-2013

Kickstarted 14:38 01-Oct-2013

-----

Rocks 6.1 (Emerald Boa)
Profile built 20:21 19-Aug-2013

Kickstarted 14:07 19-Aug-2013
[root@nbc-225 ~]# rocks list host
HOST      MEMBERSHIP CPUS RACK RANK RUNACTION INSTALLACTION
nbc-225:  Frontend   1   0   0   os       install
compute-1: Compute  4   0   1   os       install
compute-0: Compute  4   0   0   os       install
[root@nbc-225 ~]# ssh compute-0
Last login: Wed Apr  2 19:42:43 2014 from nbc-225.ucsd.edu
Rocks Compute Node
Rocks 6.1 (Emerald Boa)
Profile built 15:48 09-Oct-2013

Kickstarted 15:55 09-Oct-2013
[root@compute-0 ~]#
```

Show condor status

```
[root@nbc-224 html]# condor_status -wide
```

Name	OpSys	Arch	State	Activity	LoadAv	Mem	ActivityTime
slot1@nbc-224.ucsd.edu	LINUX	X86_64	Claimed	Busy	0.110	2015	1+00:31:28
slot2@nbc-224.ucsd.edu	LINUX	X86_64	Unclaimed	Idle	0.000	2015	1+01:42:25
slot3@nbc-224.ucsd.edu	LINUX	X86_64	Unclaimed	Idle	0.000	2015	1+01:42:26
slot4@nbc-224.ucsd.edu	LINUX	X86_64	Unclaimed	Idle	0.240	2015	1+01:42:22

```
      Machines Owner Claimed Unclaimed Matched Preempting
```

```
      X86_64/LINUX      4      0      1      3      0      0
```

```
      Total      4      0      1      3      0      0
```

```
[root@nbc-224 html]#
```

```
[root@nbc-224 html]# condor_q -wide
```

```
-- Submitter: nbc-224.ucsd.edu : <169.228.41.224:45475> : nbc-224.ucsd.edu
```

ID	OWNER	SUBMITTED	RUN_TIME	ST	PRI	SIZE	CMD
71.0	yuanluo	4/1 19:01	1+00:35:25	R	0	2197.3	rocks_vm_1

```
1 jobs; 0 completed, 0 removed, 0 idle, 1 running, 0 held, 0 suspended
```

```
[root@nbc-224 html]#
```

Show submit files

```
[root@nbc-224 20140401.1396404079]# cat condor.sub
universe                = vm
vm_type                 = rocks
executable              = rocks_vm_1
log                     = condor.vm.log.txt
vm_memory               = 64
rocks_job_dir           = /var/log/pcc/submit/job/20140401.1396404079/
JobLeaseDuration        = 7200
RequestMemory = 64
rocks_should_transfer_files = True
queue
[root@nbc-224 20140401.1396404079]#
```

```
[root@nbc-224 20140401.1396404079]# cat test.vmconf
executable              = pragma_boot
basepath                = /opt/pragma_boot/vm-images
key                     = ~/.ssh/id_rsa.pub
num_cores               = 8
vcname                  = lifemapper
logfile                 = shava_pragma_boot.log
[root@nbc-224 20140401.1396404079]#
```