**Future Grid Report April 30 2012**

*Geoffrey Fox*

**Introduction**

This report is the sixty-sixth for the project and now continues with status of each team/committee and the collaborating sites.

**Summary**

**Operations and Change Management Committee**Large memory echo cluster (extending Bravo) bids received. Partner invoice processing.

**Software Team (includes Performance and Systems Management Teams)**

* OpenMPI 1.5.4 (Vampir 5.8.4) and PAPI 4.2.0 were deployed to the Bravo nodes after testing on the Redhat 6 test nodes of India. An abstract describing the integration of monitoring services using RabbitMQ was submitted for XSEDE’12. The Inca Nimbus tests were also updated to use the latest Nimbus client version; Inca tests were also deployed for the new installations of VampirTrace and PAPI on Bravo.
* ViNe management database has been updated to hold more information and more complex queries. This revision will enable automation of network overlay management tasks and make it easier for FG users to deploy ViNe.
* The UC Nimbus team worked with the ATLAS project to use hotel's private network, sierra's public and potentially foxtrot as well.
* In the Portal project page updates and update menu structures have been put into the test Web server.
* Gregor von Laszewski attended the Eucalyptus and OpenStack users group meeting and presented results form FuturGrid to both communities. We conducted a performance experiment using RAIN to conduct the experiment. It showed that Eucalyptus 2 is not competitive. It also showed that OpenStack Cactus and Eucalyptus 3 are on par for image staging. Slides we developed will be made available in our portal in the next reporting period. As part of the software development we are working on improvements to integrate kernel and ram disk defaults for the various clouds. Hadoop was integrated into the RAIN services.

**Hardware and Network Team**

* GPU Cluster, delta, in initial testing, all nodes are accessible for HPC testing. Integrated into India scheduler.
* RHEL 6 or CentOS being widely tested at IU, TACC, UC, and SDSC for deployment. Sierra will be upgraded first in preparation for an upgrade of India after next large software release is completed in May. New Moab license is in place at TACC for CentOS upgrade.
* UC implementing new monitoring scripts that initiate shutdown/startup to mitigate problems from local data center cooling issues.
* New HP switches to be installed for Delta during May maintenance.

**Training, Education and Outreach Team (includes user support)**

TEOS team activities have focused on improvements in the FG portal, documentation, and outreach through social media and news, and preparation of abstract submitted to XSEDE’12.

**Knowledgebase Team**13 new documents this biweekly

**Site Reports**

**University of Virginia**

Extensions of Cross Campus Grid described below

**University of Southern California Information Sciences**USC reported no progress reports due to lack of funding of this activity by NSF.

**University of Texas at Austin/Texas Advanced Computing Center**

Extended abstract submitted to the XSEDE 12 conference

**University of Chicago/Argonne National Labs**Attended OpenStack Summit and multiple support and exploratory activities

**University of Florida**

UF collaborated with IU on an abstract submission on education and training using FutureGrid to the XSEDE’12 conference. UF worked on updating the information system used as a basis for ViNe management. Fortes chaired the operations committee, and Figueiredo chaired the TEOS team and participated as a deputy in the EOT track of the XSEDE’12 conference.

**San Diego Supercomputer Center at University of California San Diego**

UCSD helped deploy OpenMPI 1.5.4 and PAPI 4.20 to Bravo, deployed two new Inca tests, helped write an abstract for XSEDE 12, and worked with the GRNOC to price out 10G capabilities for the perfSONAR boxes.

**University of Tennessee Knoxville**We continued to explore ways of getting PAPI to work with different VMs and to  
compare the results we get on the different alternatives. KVM is our main FG  
target, and VMware is our object of comparison.

**Detailed Descriptions**

**Operations and Change Management Committee**Operations Committee Chair: Jose Fortes  
Change Control Board Chair: Gary Miksik, Project Manager

* Vendors Dell, HP(Matrix), IBM, and ICC responded with revised quotes for a new ScaleMP cluster based on Intel’s latest Sandy Bridge architecture. We will be reviewing these responses carefully, as the architecture is new and the pricing is extremely competitive.
* XSEDE quarterly report for January-March 2012 timeframe completed. This was the first quarterly report submitted as FutureGrid service provider. Items still to be worked out are the specific system metrics to report each quarter and the nature of the ticket system interface from FutureGrid to XSEDE (and back).
* Financials. Note: NSF spending authority is thru December 31, 2011.

Note: USC spending authority has been reached. U Virginia is close.

Note: We submitted formal request to NSF to increase spending authority thru end of PY3.

Partner Invoice Processing to Date:



**Software Team**

Lead: Gregor von Laszewski

**ADMINISTRATION (**[**FG-907**](http://jira.futuregrid.org/browse/FG-907) **- IU Gregor von Laszewski)**

This period we asked all members to have individual meetings with Gregor von Laszewski to provide updates for our FutureGrid 2.0 release and to discuss items that need to be conducted for te individual activities. We asked that highlights be developed and to summarize activities that will be available. Through Geoffrey C. Fox it was emphasized that some groups need to improve their biweekly summary statements.

Due to the use of jira we have eliminated much of the double reporting. Thus site reports for ISI, UTK, and UC are essentially identical to the once reported in the software section. Geoffrey C. Fox asked to remove the duplicated information as they no longer constitute to more information within the report.

**Defining Activities (**[**FG-1223**](http://jira.futuregrid.org/browse/FG-1223) **- Gregor von Laszewski)**

Updated: 53 issues includes closed and resolved tasks   
Closed: 0 issues   
Resolved: 6 issues   
Created: 8 issues

**Improving development infrastructure (**[**FG-1204**](http://jira.futuregrid.org/browse/FG-1204) **- Gregor von Laszewski)**

A test LDAP server using Ubuntu was set up on devops.futuregrid.org. The Unbuntu installation defaults are somewhat different from Redhad/Futuregrid. The directory configuration files are in /etc/ldap/slapd.d instead of /etc/openldap.   
The following schemas were added that are stored in our local github repository: samba.schema, nova\_openldap.schema, openssh.schema, gridaccount.schema, autofs.schema.We noted that the version of the nis.schema used by Futuregrid is different than the Ubuntu standard version. This will require further investigation. The test server was initialized with the production server data. We were able complete the testing of the initial fg-manage python script.

A misconfiguration in conjunction with the new crowd server resulted in loss of access to jira for key personnel in jira. The crowd server was temporarily disabled as to be able to write the bi-weekly report that relies on access to jira.

**HPC SERVICES**

* **Unicore (**[**FG-927**](http://jira.futuregrid.org/browse/FG-927)**) (Vanamala Venkataswamy UVA).** *Please see site report from UVA.*
* **Genesis (**[**FG-933**](http://jira.futuregrid.org/browse/FG-933)**) (Vanamala Venkataswamy UVA).** *Please see site report from UVA.*
* **HPC Globus (**[**FG-1235**](http://jira.futuregrid.org/browse/FG-1235)**)** The Globus LDAP schema was uploaded as to be able to manage DNs via LDAP.

**EXPERIMENT MANAGEMENT**

**Experiment Management (**[**FG-518**](http://jira.futuregrid.org/browse/FG-518) **Warren Smith, Mats Rynge)**

* **ISI:** No progress reports due to lack of funding of this activity by NSF.
* **TACC:** *Please see site report from TACC.*

**Image Management (**[**FG-899**](http://jira.futuregrid.org/browse/FG-899) **- Creation, Repository, Provisioning - IU Javier Diaz)**

We have added new functionality to Rain to enable the creation of hadoop environments on demand. Users can utilize this tool to start a Hadoop cluster in VMs or bare-metal machines using a specific OS. They can choose to run a job or to enter in interactive mode. For this activity we have reused the code that a student created to run hadoop cluster in HPC. However, we have enhanced the functionality to enable VMs and we have integrated it with the rest of the Rain toolkit.

We have added new functionality to the Image Registration tool. The new functionality allows users to upload images that do not require customization to the cloud infrastructures. Therefore, our tool assumes that the image is ready for the targeted infrastructure.

We have successfully tested our software with the new Eucalyptus 3 infrastructure and performed some scalability tests that demonstrate the great improvement of the new Eucalyptus framework. We only had 15 physical machines, and we were able to run 64 instances with no problems. We will try again once we have access to more physical machines.

The Image Registration server only allows configuring kernels and ramdisks for one cloud infrastructure of each type. That means that users cannot use the same server to register images in the Eucalyptus infrastructure deployed on India and in the Eucalyptus infrastructure deployed on Sierra. The problem is that the server will return the wrong kernel and ramdisk ids when registering the image. However, a workaround is possible with the -g option to adapt the image to the infrastructure and then register the image manually using the euca2ools. We plan to improve usability of our tools by adding sections in the configuration file to specify default kernel/ramdisk for each infrastructure. This way the user will just have to specify the name of the FutureGrid site (India, Sierra,...) and the kernel/ramdisk is chosen based on the target cloud.

**ACCOUNTING**

**Accounting for Clouds (**[**FG-1301**](http://jira.futuregrid.org/browse/FG-1301) **- IU Hyungro Lee)**

Gregor von Laszewski introduced our accounting tool for Eucalyptus at the Eucalyptus users meeting in NYC. A meeting with Hyungro Lee took place to discuss progress on additional metrics suggested by Gregor. However due to scheduling conflict with classes no progress over this period and the next period will be possible by Hyungro Lee.

**Accounting for HPC**

We installed a version of UBMod and are able now to generate reports for time periods for India and Alamo. We will add Sierra to this also. We contacted Ti Legget to deploy his usage software in addition to UBMod.

**FG SUPPORT SOFTWARE AND FG CLOUD SERVICES**

**Nimbus (**[**FG-842**](http://jira.futuregrid.org/browse/FG-842) **- John Bresnahan)**

The UC Nimbus team worked with the ATLAS project to use hotel's private network, sierra's public and potentially foxtrot as well. This is a very interesting intercloud experiment and required reconfiguring the clouds. We began reinvestigating our usage reporting tools and upgraded a CentOS VM to include python 2.7. This is important for upcoming projects. We repaired and cleaned up hotel after an outage. Experiments were run to investigate the performance of a autoscaling service and we worked with admins to find hardware for this autoscaling service. Additionally we helped users with bugs, most notably fixing a bug in Cumulus that prevented use with jets3t.

**Eucalyptus (**[**FG-1429**](http://jira.futuregrid.org/browse/FG-1429) **- IU Sharif Islam)**

* Version 2.0: See RAIN and MISC sections
* Version 3.0 [FG-1202](http://jira.futuregrid.org/browse/FG-1202). Eucalyptus 3.0.1 has been installed in sierra with 14 node controllers and one management node with cluster controller, walrus and storage controller in the same node. For the initial test we are using MANAGED-NOVLAN networking mode.

**OpenStack (**[**FG-1203**](http://jira.futuregrid.org/browse/FG-1203) **IU - Sharif Islam)**

*No update reported.*

**Inca (**[**FG-877**](http://jira.futuregrid.org/browse/FG-877) **- Shava Smallen, UCSD)**

In the last few weeks, the Inca Nimbus tests were upgraded to use version 021 of the Nimbus client. Also, the PAPI and VampirTrace Inca tests were also deployed to Bravo following the deployment of versions 4.2.0 and 5.8.4 respectively.

**ViNe: (**[**FG-140**](http://jira.futuregrid.org/browse/FG-140) **- UF Renato F. Mauricio T. Jose Fortes)**

The UF team worked on updating the information system of ViNe management component. The database schema has been fully revised in order to capture and hold more information compared to the previous prototype. The new schema also supports more complex queries to the database, allowing ViNe management software to manipulate a large amount of overlay parameters. In order to be (partially) database engine independent, it has been decided to use Java standard database APIs. Moreover, in the interest of quick development, Java persistency APIs were used to write the code to access the database. Although heavy database traffic is not expected, some code optimization might be needed in the future if better database access performance becomes necessary.

**WEB SITE AND SUPPORT**

**Portal and Web Site - Mathew Hanlon (TACC)**

[FG-1311](http://jira.futuregrid.org/browse/FG-1311): Project page updates and update menu structures have been put into testing on webdev.futuregrid,org. Barbara is evaluating and will make final suggestions before we put this into production.

**PERFORMANCE (UCSD Shava Smallen)**

**Vampir (**[**FG-955**](http://jira.futuregrid.org/browse/FG-955) **- Thomas Williams)**

In the last few weeks, final testing was performed for the module files for the OpenMPI 1.5.4 (Vampir 5.8.4) and PAPI 4.2.0 installations on the Redhat 6 test nodes. The software packages were then pushed to the Bravo node and Inca tests were deployed to verify the installations were successful. User documentation for both tools was also updated. Work also continued to get usage information for VampirTrace from Modules commands. A modules alias was changed to log the name of a loaded module, timestamp, and user to syslog. A script is being run now to randomly load a list of modules to get some sample data to process.

**PAPI (**[**FG-957**](http://jira.futuregrid.org/browse/FG-957) **- Piotr Luszczek (UTK))**

We continued to explore ways of getting PAPI to work with different VMs and to  
compare the results we get on the different alternatives. KVM is our main FG  
target, and VMware is our object of comparison.

We installed VMware Workstation Technology Preview 2012, and after resolving  
some license key issues we successfully ran it on our SandyBridge-EP machine.  
It appeareœd that the GUI app to enter the license key is inaccessible, but we  
managed to find a work around that enabled us to start and run VMware  
Workstation 2012.

We were able to successfully compile PAPI from within VMware. The PAPI  
utilities show that we can properly detect that we are running inside of  
VMware and also the setup of the virtual hardware (number of virtual CPUs,  
number of virtual cores per CPUs).

We were able to successfully compile PAPI from within VMware. The PAPI  
utilities show that we can properly detect that we are running inside of  
VMware and also the setup of the virtual hardware (number of virtual CPUs,  
number of virtual cores per CPUs).

Compared to KVM, we don't see the same discrepancy between virtual cycles and  
seconds on the physical platform versus the virtual platform as we encountered  
with KVM. The ratio of virtual cycles to virtual seconds on physical hardware  
is fairly consistent to what we get from within VMware. However, in terms of  
sampling counter events, the PAPI utility papi\_native\_avail reports that there  
are only 8 native counters available. We are able to count some of these  
events; but for others it appears that the underlying hardware counter support  
does not enable us to count them. We are currently investigating why we see  
such a limited list of events and what causes restriction in sampling some of  
the existing events.

**Performance: Interface monitoring data to the Experiment Harness (**[**FG-1098**](http://jira.futuregrid.org/browse/FG-1098) **- Shava Smallen SDSC)**

During the past few weeks, an abstract describing the selection and use of the RabbitMQ messenging service to integrate FutureGrid monitoring data was written and submitted to the XSEDE’12 program.

[**FG-1094 - Performance: Help coordinate setup of perfSONAR**](https://jira.futuregrid.org/browse/FG-1094)

During the past few weeks, we have continued to work with the GRNOC to price out 10G capabilities for the perfSONAR measurement hosts. It is likely that we will price out Myricom Gen3 10G cards as wll as the appropriate optics at each site

**MISC.:**

* Gregor von Laszewski attended a Panel for HPC in the cloud as part of the OpenStack Summit meeting in San Francisco. He plans to organize a paper summarizing results and viewpoints of this with the participants and the community.
* Gregor von Laszewski attended the Eucalyptus users group meeting in New York City. From the many presentations our presentation was identified as one of the once favored by the attendees. In addition our presentation was company wide distributed. One of the highlights of our presentation was the comparison of the OpenSTack and Eucalyptus 2 and Eucalyptus3 image management. We used RAIN to conduct the experiment. It showed that Eucalyptus 2 is not competitive. It also showed that OpenStack Cactus and Eucalyptus 3 are on par for image staging. Slides we developed will be made available in our portal in the next reporting period.

**Hardware and Network Team**

Lead: David Hancock

**Networking**

* All FutureGrid network milestones are complete and networking is in a fully operational state.
* IU’s connection to FG in Chicago was successfully relocated on April 3rd.

**Compute & Storage Systems**

* IU iDataPlex (india)
  + RHEL6 upgrade is on hold until after the upcoming software releases
  + Openstack Diablo test cluster installed.
  + System operational for production users.
* IU Cray (xray)
  + New software release available (danub, SLES 11 based).
  + Two newest IU admins scheduled to take Cray administration course this summer.
  + System operational for production HPC users
* IU HP (bravo)
  + Swift test implementation is installed on bravo, nodes in use for NID testing currently.
  + 50% of the system being used for testing with network impairment device, HDFS available on the remaining systems.
  + System operational for production users
* IU GPU System (delta)
  + 16 nodes available for testing, cloud software not yet integrated
  + System management switches will be installed during May maintenance day.
  + System integrated into India scheduler.
  + System operational for early users
* SDSC iDataPlex (sierra)
  + Upgrade of two nodes to RHEL6 has been done to prep for upgrade of Sierra & India. Upgrade on hold until after the upcoming software release.
  + RHEL updates performed during maintenance.
  + System operational for production Eucalyptus, Nimbus, and HPC users.
* UC iDataPlex (hotel)
  + Deployment plan for Genesis II in progress, waiting on feedback from the Genesis team at UVA.
  + System operational for production Nimbus and HPC users.
  + Can install RHEL 6 but when deployed doesn't boot properly Diagnosing this put on hold to resolve some other issues.
  + Cooling issues in the data center recently, have had to shutdown systems. Going to set up some automated shutdown/startup scripts based on ganglia data to help assist.
* UF iDataPlex (foxtrot)
  + No issues during this period.
  + System operational for production Nimbus users.
* Dell system at TACC (alamo)
  + Planning for CentOS upgrade. Upgrade should be ready prior to May maintenance day, remaining issue is upgrading the persistent daemon node for Genesis II. Temporary Moab license has been acquired to use during upgrade.
  + 5 nodes are provisioned for XSEDE TIS testing with SGE & Torque using the same headnode.
  + System operational for production Nimbus and HPC users.
* All system outages are posted at <https://portal.futuregrid.org/outages_all>

**Training, Education and Outreach Team (includes user support)**

Lead: Renato Figueiredo

An abstract for a paper on FutureGrid Education was submitted to XSEDE’12; we have invited contributions from users who are leading education/training projects on FutureGrid and, if accepted, plan to highlight experiences with the system in the EOT session of the conference.

**FG Portal**: Designing menu changes to streamline and make information more accessible. The team has discussed and worked through major redesign of projects page, with the intent of using it as a mechanism to attract new users and showcase highlighted projects as successful examples of FutureGrid usage. Upon collecting initial feedback from the TEOS team on a design, plan to implement changes early next week.

**Social Media**: Continuing to build relationships through, and encourage use of, social media, primarily through Twitter. The number of FutureGrid Twitter followers is now 93. We are working on strategy for exploring effective social media engagement for research scientists, and one-to-one training to support more active use of Twitter. Began using Twilert for email notification of FutureGrid-related Twitter activity. Culled positive FutureGrid attention stemming from Gregor's recent presentations at OpenStack and Eucalyptus conferences.

**News**: Posted news of OpenStack FutureGrid User Group the software team is launching. Worked with Shava on news announcement for new software available on Bravo: PAPI 4.2.0 and OpenMPI 1.5.4 (includes VampirTrace 5.8.4).

**Documentation**: towards improving software development project documentation, the team has provided feedback on providing github-housed documentation accessible to FG users in an unambiguous way; Barbara coordinated also with Software, FG Portal development, and KB teams.

**Knowledgebase Team**Lead: Jonathan Bolte, Chuck Aikman

Active document repository increase by = 13  
Documents modified = 11  
Portal document edites = 3

Current Total 'live' FG KB documents: 129  
Target as of 7/1/2012: 175  
Difference between current and target: 46  
Number of KB documents that must be completed per week between now and 7/1/2012 to hit target: (46/10) 5  
Current number of documents in draft status within KB workflow: 36

**Tickets**  
Lead: Sharif Islam and Koji Tanaka

**From 04/16 to 04/29**

36 tickets created

21 tickets resolved

**Currently:**

49 tickets total

14 new tickets

32 open tickets

3 stalled tickets

5 unowned tickets

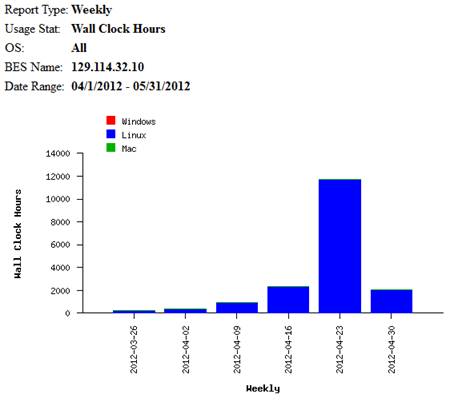
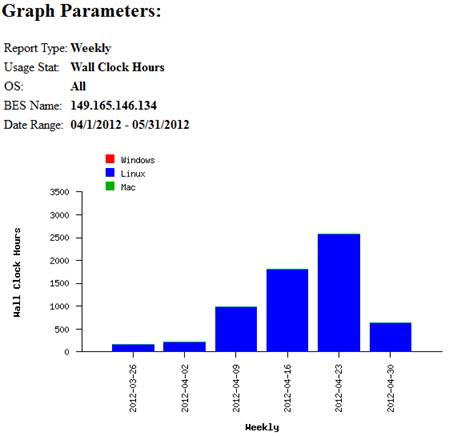
**Site Reports**

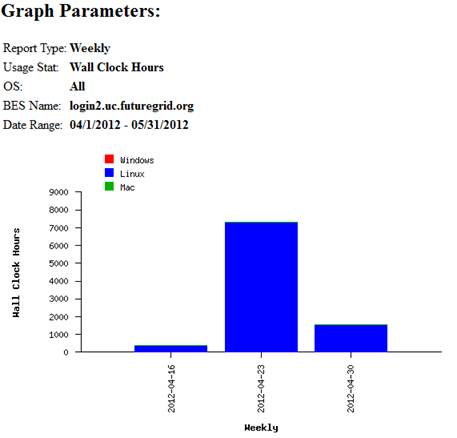
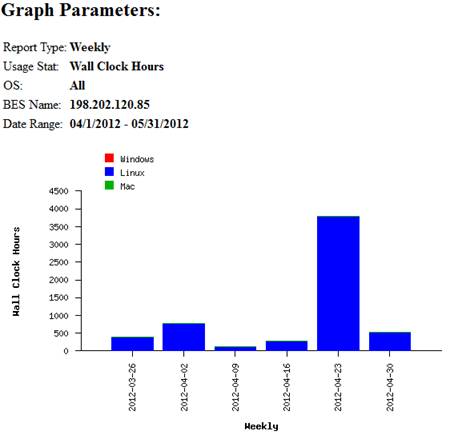
**University of Virginia**

Lead: Andrew Grimshaw

Alamo’s problems have been resolved for now, and we are making good use of the resource. We also have added hotel (see last picture) to the resources being used for applications.

Key: Sierra    198.202.120.85  
India:     149.165.146.134  
Alamo   129.114.32.10

******



**University of Southern California Information Sciences**

Lead: Ewa Deelman

USC reported no progress reports due to lack of funding of this activity by NSF.

**University of Texas at Austin/Texas Advanced Computing Center**

Lead: Warren Smith

**Dell cluster:**

* Nimbus is operating well – the software upgrades during the previous reporting period appear to have resolved the problems
* Replaced a failed hard drive on a compute node
* Continue to work on upgrade to CentOS 6.2

**Experiment harness:**

* Extended abstract submitted to the Technology track of the XSEDE 12 conference:
  + Warren Smith, and Shava Smallen. A Unified Information System for a Distributed Test-Bed.
* Continued to modify the TeraGrid/XSEDE glue2 software for use on FutureGrid
  + Adding support so that this software can provide resource information in JSON

**FutureGrid user portal:**

* See software committee section

**University of Chicago/Argonne National Labs**

Lead: Kate Keahey

* Supported ATLAS users to work on a proof of concept on hotel
* Worked with foxtrot admins to setup Nimbus for use with ATLAS
* Preliminary investigation of usage data
* Updated a centos image for use with python 2.7
* Repaired and cleanup hotel after outage
* created JIRA task documentation for the May 1 deliverables.
* Fixed a Cumulus bug preventing the use of the jets3t client.
* Attended OpenStack summit to interact with OpenStack developers and explore options of setting up an infrastructure for FG where Nimbus and OpenStack could interact
* Ran experiments relating to the construction of a multi-cloud service for FG

**Details:** The UC Nimbus team worked with the ATLAS project to use hotel's private network, sierra's public and potentially foxtrot as well. This is a very interesting intercloud experiment and required reconfiguring the clouds. We began reinvestigating our usage reporting tools and upgraded a CentOS VM to include python 2.7. This is important for upcoming projects. We repaired and cleaned up hotel after an outage. Experiments were run to investigate the performance of a autoscaling service and we worked with admins to find hardware for this autoscaling service. Additionally we helped users with bugs, most notably fixing a bug in Cumulus that prevented use with jets3t.

**University of Florida**

Lead: Jose Fortes

The UF team worked on updating the information system of ViNe management component. The database schema has been fully revised in order to capture and hold more information compared to the previous prototype. The new schema also supports more complex queries to the database, allowing ViNe management software to manipulate a large amount of overlay parameters. In order to be (partially) database engine independent, it has been decided to use Java standard database APIs. Moreover, in the interest of quick development, Java persistency APIs were used to write the code to access the database. Although heavy database traffic is not expected, some code optimization might be needed in the future if better database access performance becomes necessary.

The new information system can already collect data from newly started ViNe routers, and automatically generate default overlay parameters. This process allows FG users to start ViNe routers, and connect to ViNe overlays without specialized knowledge of the technology. Current development focuses on ViNe management services that will respond to changes in the overlay (e.g., start of new ViNe routers, creation of new overlay networks) and automatically notify/reconfigure participating ViNe routers. This component requires a notification system that is able to directly reach all ViNe routers – the plan is to reuse the ViNe overlay that already addresses firewall traversal.

**San Diego Supercomputer Center at University of California San Diego**

Lead: Shava Smallen

In the past few weeks, UCSD worked with the Systems team to deploy OpenMPI 1.5.4 and PAPI 4.2.0 to Bravo as well as updated the related documentation. New Inca tests were also deployed on Bravo for the two new performance tools as well and the Nimbus client was updated to 021 for its Inca tests. We also worked with TACC to submit a paper abstract to XSEDE’12 about using a messaging system to get monitoring information from each of the deployed monitoring tools. UCSD continues work with GRNOC to price out adding 10G capabilities to the perfSONAR machines. All activities are described further in the software section of this report. UCSD continues to lead the performance group and held a group call on April 18th as well as attended the TEOS and All Hands calls.

**University of Tennessee Knoxville**

Lead: Jack Dongarra

We continued to explore ways of getting PAPI to work with different VMs and to  
compare the results we get on the different alternatives. KVM is our main FG  
target, and VMware is our object of comparison.

We installed VMware Workstation Technology Preview 2012, and after resolving  
some license key issues we successfully ran it on our SandyBridge-EP machine.  
It appeareœd that the GUI app to enter the license key is inaccessible, but we  
managed to find a work around that enabled us to start and run VMware  
Workstation 2012.

We were able to successfully compile PAPI from within VMware. The PAPI  
utilities show that we can properly detect that we are running inside of  
VMware and also the setup of the virtual hardware (number of virtual CPUs,  
number of virtual cores per CPUs).

Compared to KVM, we don't see the same discrepancy between virtual cycles and  
seconds on the physical platform versus the virtual platform as we encountered  
with KVM. The ratio of virtual cycles to virtual seconds on physical hardware  
is fairly consistent to what we get from within VMware. However, in terms of  
sampling counter events, the PAPI utility papi\_native\_avail reports that there  
are only 8 native counters available. We are able to count some of these  
events; but for others it appears that the underlying hardware counter support  
does not enable us to count them. We are currently investigating why we see  
such a limited list of events and what causes restriction in sampling some of  
the existing events.