**Future Grid Report January 9 2012**

*Geoffrey Fox*

**Introduction**

This report is the fifty-eighth for the project and now continues with status of each team/committee and the collaborating sites. We note that our NSF funding has only been committed thru Dec 31, 2011 and so we are passed limit. Currently IU has fully expended its portion but all other partners have funds available.

**Summary**

**Operations and Change Management Committee**We hired Barbara O’Leary as our new FutureGrid Outreach Support Consultant. Hired two additional support staff to handle FutureGrid ticket system coverage. Placed partial order for ten (10) GPU systems with International Computer Concepts (ICC). Operations Committee met on 1/3/12 (details below). Partner invoice processing on-going.

**Software Team (includes Performance and Systems Management Teams)**We conducted a scalability experiment to evaluate our dynamic provisioning solution. We found our solution is working, but software such as Eucalyptus and OpenStack have some issues when run at scale. The RabbitMQ server being used for Netlogger usage monitoring was upgraded to version 2.7.0 for expanded use in the Experiment Management component. Similarly, work continued on a prototype to integrate Inca monitoring data with the Experiment Management component. Also initial collaboration began with the XSEDE networking group to coordinate perfSONAR deployments. We are developing a PAPI component for virtual environments that can provide accurate measurements of I/O performance at the application level. USC created its first version of a tutorial on how to use Pegasus in a FutureGrid context.

**Hardware and Network Team**

* The RFP for a GPU cluster has been awarded for a 16-node system targeted for deployment in 1Q2012.
* RHEL 6 being widely tested at IU, TACC, UC, and SDSC for deployment.
* Clemson has offered Opennebula services through XSEDE for FutureGrid users
* New storage is operational at IU
* GPFS scratch has been rebuilt at UC for an increase in performance

**Training, Education and Outreach Team**

TEOS team member activities have focused on development/improvements of a “Getting started” page for new users, and planning for outreach processes and activities.

**User Support Team**Excellent progress with knowledge base and coordinator hired

**Site Reports**

**University of Virginia**

No report received

**University of Southern California Information Sciences**USC created its first version of a tutorial on how to use Pegasus in a FutureGrid context.

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

* Alamo unavailable for several days (scheduled chilled water outage).
* Minor progress in portal and experiment harness.

**University of Chicago/Argonne National Labs**This reporting period was devoted to continuing work on existing threads: preparing a new Nimbus Infrastructure release and writing report from the SC11 FG/G5K workshop, as well as initiating a new project designed to make all Nimbus clouds more accessible to FG users. We also spent some time on various small maintenance activities and worked on Hotel upgrades with good success.

**University of Florida**

The UF team performed a replacement of the Force10 S50 switch that provides connectivity to foxtrot following a system maintenance event that prevented a restart. The team has worked on documentation of ViNe and in identifying projects for outreach. The educational Grid appliance has been deployed on FG OpenStack resources and is under testing. Fortes chaired the operations committee, and Figueiredo chaired the TEOS team.

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

UCSD worked with TACC to upgrade the RabbitMQ server being used for Netlogger usage monitoring and continued work to integrate Inca monitoring results with the Experiment Management component.

**University of Tennessee Knoxville**We are developing a PAPI component for virtual environments that can provide accurate measurements of I/O performance at the application level .

**Detailed Descriptions**

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

* We have hired Barbara O’Leary as the new FutureGrid Outreach Support Consultant. One of the first tasks of this new position will be the finalization and processing of the first FutureGrid user survey. We also hired two additional staff as “tier 1” support for the FutureGrid ticket system.
* Purchase order for 10 GPU systems finalized and sent to International Computer Concepts (ICC), based out of Lake Zurich, IL. Each system will have 192GB RAM. An order for eight (8) additional systems will follow, with ICC honoring the same pricing.
* The Operations Committee met on Tue 1/3/2012 and finalized the discussion on “international” accounts. A draft policy document will be crafted for review and formal approval. Future meetings with agenda items and topic ownership will be posted on the Telecenter. Next OC call is Tue 1/17/2012.
* Financials. 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)**

We have upgraded our jira server and also installed a confluence service. However, integration with crowd and SSO has not yet been achieved.

A new confluence server will need to be setup, as the backup we used from our old server can not be used because it depends on crowd to be integrated with confluence. Gary Miksik expressed explicitly that he likes to have jira and confluence up before we integrate with crowd.

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

Due to the continuous work on jira we advised our team members during this period to hold of using our task system in order to accelerate our update. Now that jira is operational, we recommended to all team members to continue using jira.

**EXPERIMENT MANAGEMENT**

**Experiment Management (Warren Smith, Jens Vöckler)**

**Integration of Pegasus into Experiment Management (**[**FG-412**](http://jira.futuregrid.org/browse/FG-412) **- ISI Jens Vöckler)**

To create a tutorial about Pegasus in the FutureGrid cloud environment, we branched the virtual machine from the last report into a more specialized version pegasus-tutorial.x64.gz. Among the obstacles overcome was to work around a new and now confirmed Condor bug, requiring a downgrade from 7.7.2 to 7.6.4. Due to the simplicity with which Nimbus permits to capture the current state of a live image, we focused our current efforts on Nimbus, but kept notes to be able to reproduce the virtual machine state on the other middlewares like Eucalyptus and OpenStack. <http://pegasus.isi.edu/futuregrid/tutorials> points to the first prototype of the tutorial.

**Experiment management with support of Experiment Harness (**[**FG-906**](http://jira.futuregrid.org/browse/FG-906) **- TACC Warren Smith)**

See TACC report.

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

We have been doing some scalabilty tests to study the behavior of the infrastructures installed in India. Here we include a summary of the results that we got.

* HPC: dynamic provisioning of netboot images scales with no problem to 111 nodes (maximum of machines that we had)
* OpenStack (cactus version): OpenStack caches images in the computes nodes to boot the VMs faster. So, in the case where the image was not cached and trying to boot 16 VMs or more, we got around a 50% of failed tests because several VMs were stuck in the launching status (this is the status where the image is copied to the compute node). Once we had the image cached we were able to boot up to 64 VMs simultaneously, but again more than a 50% of the tests failed because the VMs were stuck in launching status or because it was in running status but not ssh access. The ssh access problem is because OpenStack does not inject the public network configuration inside the VM. So, it creates bridges and do ip forwarding to the private IP. Therefore some times either the bridges or iptables entries are not created propertly
* Eucalyptus: We could not get more than 16 VM running at the same time and the failure rate is very high. Here, like in OpenStack, the public network configure with IP forwarding and the bridges are created at running time. So, the errors that we got were because the bridges were not created or because the VM did not get a public IP. Another annoying problem of Eucalyptus is that you cannot execute the same command several times in a short period of time.
* OpenNebula: We were able to boot 148 VMs at the same time with almost a 100% of success. In fact, I only got 1 error in the case of 148 VMs. In our tests we used the ssh plugin to transfer the images to the compute nodes. Since it does not uses cache it was pretty slow and limited by the network.

**Accounting for HPC (**[**FG-1081**](http://jira.futuregrid.org/browse/FG-1081) **- IU Andrew Younge)**

Gary Miksik has reassigned the task of adding groups to the LDAP server that correspond to projects in FG to Allen Streib. This task of deploying and completing the use of Gold in FG is continued there after. This activity has high priority and will be started in the second week of January 2012.

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

Our script to analyses Eucalyptus log files has been revised and improved. We have now data available from Eucalyptus since Nov. 2011. The analysis starts with merging the log files and removing duplicated entries. Than the data is used to create a number of graphical charts to indicate ussage of VMs, as well as actions such as starting and shutting down VMs.

**FG SUPPORT SOFTWARE AND FG CLOUD SERVICES**

**Account Metrics (**[**FG-1377**](http://jira.futuregrid.org/browse/FG-1377) **- Gregor von Laszewski IU, Hyungro Lee, John Bresnahna, Shava Smallen)**

Hyungro Lee has been tasks to look at account metrics for Eucalyptus and OpenStack.

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

The Nimbus team reports the following activities:

* post maintenance cleanup
	+ design scaling service
* LANTorrent bug
	+ prepare release
	+ fix bug in describe instance listing

**Eucalyptus (**[**FG-1202**](http://jira.futuregrid.org/browse/FG-1202) **- IU Sharif Islam)**

No activities have been reported during this biweekly period other than those provided by the scalability experiment.

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

No activities have been reported during this biweekly period other than those provided by the scalability experiment.

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

Since the last biweekly report, work has continued to develop a prototype of an Inca notifier that publishes monitoring test events to the experiment management framework.  In particular, we have learned about the AMQP protocol and have worked with the experiment management team to setup a topic exchange for Inca and are working on a Inca notifier Python script to publish events to it.  This work corresponds to Jira task FG-1098.

**Unicore (**[**FG-927**](http://jira.futuregrid.org/browse/FG-927)**), Genesis (**[**FG-933**](http://jira.futuregrid.org/browse/FG-933)**), ... (Michael Saravo UV)**

No activities have been reported during this biweekly period.

**Globus Endpoints on FG (IU Gregor von Laszewski)**

We had a meeting in which we discussed the deployment of Globus services on FG. We have decided that TI Legett leads this effort as he has done similar activities at UC. Reporting on this activity will be switched from Gregor von Laszewski to Warren Smith past this week. Our plan is to integrate the user DNs into our LDAP server. We are now in contact with the Globus team to motivate a change in the way authorization is handled in GridFTP while being able to interface directly with an LDAP server. If this however can not be achieved, we will be designing a script that populates gridmap files from LDAP. In addition we will work on a portal interface that allows users to manage their own DNs. The later needs to consider security considerations as it may be possible that users could upload DNs from other users and associating them through this mechanism to their own account. Hence, we may need an approval step to be included to verify that the dn that is uploaded is associated with the specific user.

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

The UF team worked on improving the communication between the ViNe management server and ViNe routers. It is expected that the implementation will be ready for testing within 2 weeks. This feature will enable the ViNe management server to remotely issue configuration change commands to ViNe routers, and make the changes effective immediately. FG users will benefit from this feature by interacting with the ViNe management server and dynamically change ViNe routers configuration.

**Virtual Appliance: (**[**FG-171**](http://jira.futuregrid.org/browse/FG-171) **- UF Renato F., Mauricio T., Jose F.)**

see Education section.

**WEB SITE AND SUPPORT**

**Portal and Web Site (**[**FG-1179**](http://jira.futuregrid.org/browse/FG-1179) **- IU Fugang Wang, Mathew Hanlon (TACC), Gregor von Laszewski)**

Matthew Hanlon has tested and improved the iukb module on the dev machine, and requested the required libraries installed on the production server. Now it's ready to deploy the iukb module and we will enable it very soon. We identified that some information in the IUKB is wrong. As a pathway forward we want the page that shows IUKB entries to be only visible to staff members first so they have a chance to comment on the KB entries.

**Integration into XSEDE Portal (**[**FG-1376**](http://jira.futuregrid.org/browse/FG-1376) **- Gregor von Laszewski IU, Matthew Hanlon TACC, Fugang Wang IU)**

We had an initial discussion about SSO and XSEDE and identified that different SSO solutions are deployed in XSEDE, internet2. Internet2 is proposing a solution based on shiboleth, which would be a valuable solution to explore as it can be also integrated into crowd.

We decided to set up a meeting with the IU network/security team working with internet2 and the integration of iukb into sakai, as well as with Matthew HAnlon who has knowledge about the XSEDE portal authentication.

**KnowledgeBase  ([FG-1222](http://jira.futuregrid.org/browse/FG-1222%22%20%5Co%20%22http%3A//jira.futuregrid.org/browse/FG-1222) - Jonathan Bolte IU)**

See also the activities under FG portal.

The IUKB team reports:

Received request to provide an display of all the FG KB documentation expanded on a single page.  Context provided by Gregor: "We need to be able to print that page in PDF as to simplify our review process of infrmation stored in the IUKB. This page will also be included automatically into our manual and will especially serve for reviewing contributions by staff members that may not be typically using iukb nor the portal."

**PERFORMANCE (UCSD Shava Smallen)**

**Performance Group (UCSD: Shava Smallen)**

Before the holiday break, we worked with the Experiment Management team to upgrade the RabbitMQ server for Netlogger from 1.8.1 to 2.7.0.  This RabbitMQ server will be used to integrate other monitoring data as well (such as Inca) with the Experiment Management component.

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

The Vampir team finished the paperwork for their ePoster submission for SC'11.

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

Variable I/O performance has been found to significantly impact application performance in virtualized environments. For the PAPI component of our FG work, we have been working on extending and providing access to an I/O measurement component in virtualized environments will help applications measure and adapt to changing I/O performance. The goal is to measure I/O from the application level in contrast to the network component, which measures everything from the network interface level. Measuring from an application level means that only the I/O performed by the application is measured. By doing so, PAPI gains the benefit of being able to examine and measure the exact nature of I/O being performed. socket/file/read/write/send/recv/poll/select etc. The implementation is based on a software event model. When completed, we expect APPIO component to do the following:

* Perform per-thread measurements of I/O activity on a per-call type basis
* Support PAPI\_overflow on these events
* Allow for a subset of Glibc I/O routines, which can easily be extended.

The methods we are using are retargetable to nearly any middlew

**perfSonar (**[**FG-1094**](http://jira.futuregrid.org/browse/FG-1094) **- Shava Smallen SDSC)**

Before the holiday break, we made initial contact with the XSEDE networking group who are setting up a perfSONAR deployment for XSEDE.  We hope to be able collaborate with them and leverage their expertise.

**Outreach (ALL):**

**SC11 Demos (**[**FG-92**](http://jira.futuregrid.org/browse/FG-92) **- Gregor von Laszewski)**

John Bresnahan was informed to identify how to best close the SC11 tutorial as a project. We have removed one user from the project as he no longer wanted to receive e-mail about the status of FG. We recommend to close this project, but it requires the task 1206 to be competed first.

**SC11 Account vetting for tutorials (**[**FG-1207**](http://jira.futuregrid.org/browse/FG-1207)**,** [**FG-1206**](http://jira.futuregrid.org/browse/FG-1206) **Gregor von Laszewski)**

Meetings took place with Allen Streib. He will take over the task to create groups in LDAP.

**Hardware and Network Team**

Lead: David Hancock

**Networking**

* All FutureGrid network milestones are complete and networking is in a fully operational state.

**Compute & Storage Systems**

* IU Data Capacitor Storage
	+ A proposal is in progress to refresh the Data Capacitor hardware and expand the available storage. As part of this plan we will explore increasing the network capacity between FutureGrid systems at IU and the Data Capacitor. Increasing this connection requires an upgrade to IU’s core research network hardware that is also part of the same proposal. Additional 10 Gb line cards will be required as well as additional edge switches.
* IU iDataPlex (india)
	+ RHEL6 testing on 4 nodes is progressing well with no user issues yet.
	+ New storage array is in production and provide a 2x increase in space for user home directories and project space.
	+ Openstack is working fine, update to Diablo release in planning for January or February
	+ India was unavailable on 1/4/2012 due to NFS problems on the compute nodes.
	+ System operational for production HPC and Eucalyptus users.
* IU Cray (xray)
	+ No issues during this period.
	+ System operational for production HPC users
* IU HP (Bravo)
	+ Swift test implementation is available on bravo
	+ Bravo is a cluster of 16 large-memory (192GB) nodes each with large local storage (12TB) and has been released to general users.
* SDSC iDataPlex (sierra)
	+ System operational for production Eucalyptus, Nimbus, and HPC users.
	+ The Sierra NAS was unresponsive on 11/27 that caused problems with several nodes in the cluster. The issue was resolved on 11/28.
* UC iDataPlex (hotel)
	+ Deployment plan for Genesis II in progress, waiting on feedback from the Genesis team at UVA.
	+ GRAM/GridFTP services online, setup LDAP schema to store DNs in LDAP
	+ Firmware updates are still required for the Nimbus nodes.
	+ RHEL6 is in initial testing.
	+ GPFS scratch has been rebuilt on the cluster during monthly maintenance resulting in a 7.5x increase in write performance (550MB/s) and a 4x improvement in read performance (900MB/s). The GPFS home, software, and image file systems will be rebuilt during February maintenance.
	+ System operational for production Nimbus and HPC users.
* UF iDataPlex (foxtrot)
	+ System was unavailable on 12/19/2011 for planned power maintenance in the facility, a faulty network switch was also replaced following power maintenance.
	+ No issues during this period.
	+ System operational for production Nimbus users.
* Dell system at TACC (alamo)
	+ Chilled water maintenance in the TACC data center resulted in a scheduled 3-day outage of alamo from 12/27/2011 – 12/30/2011
	+ Planning for RHEL6 or CentOS upgrade, cluster management upgrade will be required as well.
	+ 5 nodes are provisioned for XSEDE TIS testing with SGE & Torque using the same headnode.
	+ Globus is available on Alamo with GRAM and GridFTP services active
	+ 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**

Lead: Renato Figueiredo

The FutureGrid “getting started” page https://portal.futuregrid.org/gettingstarted has been extended to provide “bootstrapping” instructions tailored to new users developed by USC, focusing on account creation and first access to various systems. This material will be complemented with information on generating credentials and using SSH clients, which is important for non-Unix users.

With the addition of Barbara O’Leary at IU, the team has begun focusing on outreach activities and processed for the year. With a key goal of increase the number of users that are brought to FutureGrid, the team has discussed surveying of existing users to help understand how to reach out to new users, highlighting unique aspects of the infrastructure (e.g. infrastructure- and platform-as-a-service) and ways that the system has been successfully used. Key activities identified include outreach to a broad set of potential users in computer science, domain sciences, and education, including XSEDE users, collaborators, educators teaching cloud computing courses, potential users of commercial clouds, among others. The team is beginning to assign priorities of the various activities that have been discussed.

**User Support Team**Lead: Jonathan Bolte, Chuck Aikman

Documents created = 21
Documents modified = 22
Portal documents edited = 11
Current Total 'live' FG KB documents: 84 (target 175 by July 1 2012)
Current number of documents in draft status within KB workflow: 48

**Tickets**
Lead: Greg Pike

Tickets (past 4 weeks):

33 tickets created

18 tickets resolved

Currently:

71 tickets total

29 new tickets

40 open tickets

2 stalled tickets

25 unowned tickets

**Site Reports**

**University of Virginia**

Lead: Andrew Grimshaw

No report received

**University of Southern California Information Sciences**

Lead: Ewa Deelman

USC continued to participate in the conference calls for FG Software and FG TEOS.

To create a tutorial about Pegasus in the FutureGrid cloud environment, we branched the virtual machine from the last report into a more specialized version *pegasus-tutorial.x64.gz.* Among the obstacles overcome was to work around a new and now confirmed Condor bug, requiring a downgrade from 7.7.2 to 7.6.4.

Due to the simplicity with which Nimbus permits to capture the current state of a live image, we focused our current efforts on Nimbus, but kept notes to be able to reproduce the virtual machine state on the other middlewares like Eucalyptus and OpenStack.

<http://pegasus.isi.edu/futuregrid/tutorials> points to the first prototype of the tutorial, working on a Nimbus-based cloud image in FutureGrid:

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

Lead: Warren Smith

**Dell cluster:**

* Alamo was unavailable to users between December 27 and December 30.
	+ This outage was scheduled and users were notified several weeks in advance.
	+ There was a chilled water outage during this time in the TACC ROC machine room due to an expansion of that machine room.
	+ The Alamo login node was available to users for most of these days, but the compute nodes were not.
* Two hard drives and 2 DIMMs were replaced on compute nodes due to failures.
* The chilled water outage has prompted us to work on automated tools for shutting down and powering up the cluster.

**Experiment harness:**

* Deployed an up to date version of the RabbitMQ messaging server on FutureGrid.
	+ Will be used by message-based experiment management
	+ Is being used by the NetLogger deployment on FutureGrid
	+ Inca messages will be sent to it (in addition to the current Inca notification mechanisms such as email and web pages)
* Discussed Globus deployment across FutureGrid in support of Pegasus-based experiment management.
	+ Methods to go about the installation (e.g. software directly from Globus or using the TeraGrid packages)
	+ Methods for maintaining mappings between X.509 certificate subjects an FutureGrid unix accounts for users (e.g. gx-map from TeraGrid, GUMS/VOMS as used by OSG, or a custom approach).

**FutureGrid user portal:**

* Worked on the knowledge base module.
	+ Updating the module.
	+ Connecting the module to the FutureGrid domain in the IU knowledge base.
	+ Available on the portal now, but access is restricted to staff while documents are brought up to date
* Worked on improved displays of Inca information.
* Updated many of the PhP modules on the production portal.
* Updated Drupal on the development portal, but updates to the production portal are delayed due to issues with some of the updates and a module that we are using.
* Other minor updates to the production portal were performed.

**University of Chicago/Argonne National Labs**

Lead: Kate Keahey

**Nimbus**

* Prepare the RC2 2.9 release of Nimbus Infrastructure (to go out today)
* Fixed bugs in describe instance listing and LANTorrent
* post maintenance cleanup
* Initiated design discussion on a Nimbus Platform multi-cloud service that will enable users to use multiple Nimbus clouds as well as expand their platform on FG
* Conducted discussions with some potential user groups and projects interested in FG
* Worked on report from the SC11 workshop
* Developed new LDAP schema to allow Grid DNs to be stored in LDAP and developed a plan to use those for GridFTP and GRAM services.

**Hotel maintenance**

* A lot of (unfruitful) work was spent on RHEL6 (something in the configuration is causing the machine to hang at boot).
* Prepping for scratch filesystem rebuild in January. Deployed GridFTP and GRAM services on storage servers and scheduler, respectively.
* Started installing the requirements for the FG Toolkit.
* January's monthly maintenance yesterday including re-building the scratch filesystem which resulted in significant performance increases (almost 7.5x better write performance: 550 MB/s as opposed to 75 MB/s before, almost 4x better read performance: 900 MB/s as opposed to 230 MB/s before)

**University of Florida**

Lead: Jose Fortes

**System maintenance activities**
After the electrical power maintenance (on Dec-19), the Force10 S50 switch that provides public VLAN to foxtrot did not come back (it lost all configuration and all ports were disabled). Due to this failure foxtrot was not accessible until Dec-23 when a replacement switch has been received from Force10. UF network services delegates L3 processing/routing to this switch, which makes it difficult to have a temporary switch while waiting for a replacement. Moreover, this switch is the only one receiving a 10Gbps single-mode optical fiber uplink. Having an alternate switch on a 1Gbps uplink to receive the UF FG VLAN is being planned to avoid long foxtrot downtime in the case of recurring failure of the Force10 switch.

**ViNe activities**:

With respect to documentation, UF is preparing detailed documentation and user manual for ViNe; the current ViNe documentation on FG portal does not describe complex details of the system as it targets novice users.

With respect to outreach, in an effort to identify adopters of ViNe within the current set of FG users, UF also reviewed the current 156 projects on FG portal and identified 7 projects that can potentially benefit from ViNe (FG-144, FG-163, FG-164, FG-174, FG-93, FG-53, FG-52); we plan to contact project leaders to discuss ViNe adoption.

With respect to resources for education, training and user support, a tutorial that combines Hadoop and ViNe to deploy an elastic map-reduce cluster across multiple nimbus sites is being prepared.

With respect to development of capabilities addressing FG-specific needs, UF has worked on improving the communication between the ViNe management server and ViNe routers. It is expected that the implementation will be ready for testing within two weeks. This feature will enable the ViNe management server to remotely issue configuration change commands to ViNe routers, and make the changes effective immediately. FG users will benefit from this feature by interacting with the ViNe management server and dynamically change ViNe routers configuration.

**Appliance activities**:

The UF team has been able to configure and deploy a Grid appliance image on the OpenStack resources configured on FutureGrid. The integration of the deployed system with appliances running on other resources is currently being tested.

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

Lead: Shava Smallen

In the past few weeks, UCSD worked with TACC to upgrade the RabbitMQ server on inca.futuregrid.org and test that the Netlogger usage monitoring component worked with it. UCSD also continued work to integrate Inca monitoring data with the Experiment Management component by publishing motoring test results to the RabbitMQ server. UCSD continues to lead the performance group activities and led a group call on December 14th as well as attended the Software, Systems, Operations, and TEOS meeting calls.

**University of Tennessee Knoxville**

Lead: Jack Dongarra

Variable I/O performance has been found to significantly impact application performance in virtualized environments. For the PAPI component of our FG work, we have been working on extending and providing access to an I/O measurement component in virtualized environments will help applications measure and adapt to changing I/O performance.

The goal is to measure I/O from the application level in contrast to the network component, which measures everything from the network interface level. Measuring from an application level means that only the I/O performed by the application is measured. By doing so, PAPI gains the benefit of being able to examine and measure the exact nature of I/O being performed. socket/file/read/write/send/recv/poll/select etc. The implementation is based on a software event model. When completed, we expect APPIO component to do the following:

* Perform per-thread measurements of I/O activity on a per-call type basis
* Support PAPI\_overflow on these events
* Allow for a subset of Glibc I/O routines, which can easily be extended.

The methods we are using are retargetable to nearly any middleware or API that needs to be monitored.