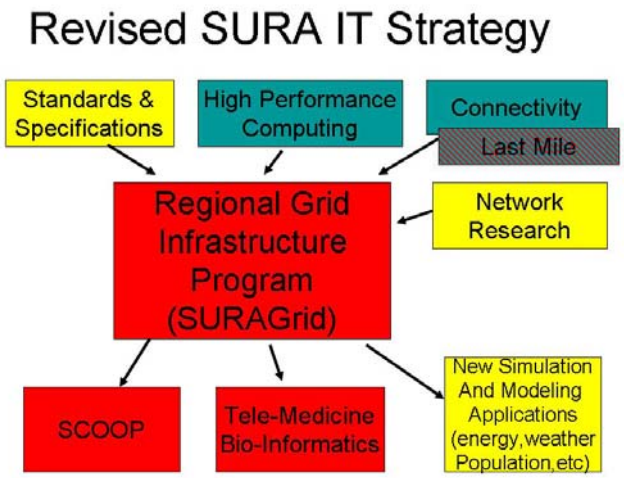
IT Update SURA Board of Trustees Meeting, May 2-3, 2006

SURA IT STRATEGY UPDATE

The SURA IT Program strategy was most recently updated and presented to the SURA Board of Trustees at their Fall 2005 meeting. The goal of this updated strategy was to focus SURA's IT initiatives on the growth of a regional grid computing capability through the continued development of the SURAgrid initiative. The SURA IT Program is managed against the goals that are incorporated into this strategic plan, which is reviewed annually by the SURA IT Committee. The revised SURA IT strategy focuses on the following three high priority areas, which are linked to the growth and development of a regional grid computing capability:

1. Regional HPC Grid Infrastructure Program (SURAgrid)
2. Support for the SURA Coastal Ocean Observation and Prediction (SCOOP) program
3. The creation of a Biomedical / BioInformatics initiative that is supported by SURAgrid.



Several emerging areas of interest to the SURA IT community were identified as part of this planning process and will be explored and developed as time and resources permit. These areas include:

1. The development of a SURA community network research program
2. The creation of a program to explore new simulation and computer modeling capabilities
3. A SURA program to engage in the development of national and international standards and specifications in grid computing.

SURAgrid-related Activities

GENERAL SURAGRID UPDATE

SURAgrid is continuing to make progress in its efforts to develop a foundational model for a SURA shared regional grid infrastructure. Twenty-five institutions are now collaborating in the SURAgrid initiative, with three major goals that reflect the diverse community that is currently engaged:

- To develop a scalable infrastructure that leverages local institutional identity and authorization while managing access to shared resources across institutional boundaries.
- To promote the use of this infrastructure for the broad research and education community, creating a whole that is greater than the sum of its parts.

- To provide a forum for participating institutions to gain additional experience with grid technology and to promote collaborative project development.

SURAgrid participants as of March 2006 (* indicates SURA member):

University of Alabama at Birmingham*
University of Alabama in Huntsville*
University of Arkansas*
University of Florida*
George Mason University*
Georgia State University*
Great Plains Network
University of Kentucky*
University of Louisiana at Lafayette*
Louisiana State University*
Louisiana Tech University*
University of Maryland*
University of Michigan
University of North Carolina, Charlotte
Mississippi Center for SuperComputing Research*
North Carolina State University*
Old Dominion University*
University of South Carolina*
University of Southern California
SURA
Texas A&M University*
Texas Advanced Computing Center/UT Austin*
Texas Tech University
Tulane University*
Vanderbilt University*
University of Virginia*

Twelve of the participating institutions have made compute resources available through the SURAgrid portal (see gridportal.sura.org), for a total of fifteen shared nodes representing an aggregate capability of 866 processors (over 2.5 Teraflops).

In parallel with ongoing infrastructure development, SURAgrid representatives are working with various research leads to port applications to SURAgrid, in order to provide immediate benefits to science while providing tangible drivers for SURAgrid development. A second SURAgrid in-person meeting was held in February 2006 to bolster application deployment and several applications are now running (or nearly so) at a subset of sites, with steps identified to expand to additional resources:

- **SCOOP/ADCIRC -** UNC Marine Science/RENCI/MCNC – SCOOP storm surge model application - ensemble ADCIRC runs in response to data input triggered by storm events. Initial sites: TACC, UKY, TAMU, USC, ULL, LSU
- **ENDYNE** - Texas Tech University – Grid implementation of electron nuclear dynamics (END) theory; multiple trajectory calculations in quantum phase space. Initial sites: TTU, GSU, TACC, TAMU
- **Multiple Genome Alignment** - Georgia State University – Evaluation and refinement of algorithms for multiple genome sequence alignment in grid and cluster environments. Initial sites: GSU, USC, UVA, TACC
- **UCoMs -** Louisiana State University – Grid-based task farming of specific computational components of a petroleum reservoir simulation. Initial sites: LSU, TACC, GSU

SURA has also begun leading working groups from within the SURAgrid community to develop documentation that will enable more systematic and scalable deployment of both resources and applications. These documents include “SURAgrid Environment Variable Specification,

v1.0"(completed January 2006), "Adding Resources to SURAgrid", "Running Your Application on SURAgrid" (estimated completion April 2006), and "Joining the SURAgrid Trust Fabric" (estimated completion June 2006) and will be made available via the SURAgrid website.

Three specific areas of development within SURAgrid have progressed over the past year through contracts to three participating SURA member institutions. Funding for these development efforts was provided through SURA and ended March 31, 2006. Focus areas for these contracted efforts include:

Texas Advanced Computing Center (TACC) – Hosting and maintenance of the SURAgrid portal, plans for portal development in response to evolving needs of SURAgrid community, tracking of progress and providing assistance to sites that are adding resources to SURAgrid.

University of Virginia – Hosting and maintenance of the SURAgrid Bridge CA, consultation towards evolution of SURAgrid authentication and authorization in keeping with national and international directions, exploration of mechanisms to automate SURAgrid-wide account and access management.

Georgia State University – "SURAgrid application evangelism," including identification and follow-up with researchers interested in using SURAgrid, close coordination with SURA in defining a SURAgrid application intake process, collaboration in related grants (e.g., TATRC, SGER – see funding update below.)

More information on SURAgrid is available on the SURAgrid Web site at http://www.sura.org/suragrid. To learn more or to join SURAgrid, contact SURA IT Program Coordinator, Mary Fran Yafchak, maryfran@sura.org.

SURAgrid Funding Activities

As part of the ongoing pursuit of external funding for SURAgrid, SURA is leading regular meetings of interested SURAgrid participants to review funding opportunities from federal agencies. A small group meets periodically (typically quarterly) to assess the potential for near-term collaborative proposal development in keeping with SURAgrid strengths and directions. These opportunities are then summarized for the full SURAgrid community and teams are formed to develop and submit proposals for ideas where there is sufficient interest and resources to pursue. Recent funding activities have included:

- SURA has been awarded $50,000 from the National Science Foundation (NSF Award No. OCI-0545550) through the Small Grants for Experimental Research (SGER) program. This funding will support an expanded effort to identify research applications that can take advantage of the SURAgrid infrastructure.
- SURA is in the process of finalizing an award from the Army's Telemedicine & Advanced Technology Research Center (TATRC) submitted in August 2005. Proposed work will be completed by SURA, GSU and LSU and includes an analysis of TATRC-funded research projects among SURA members with the intent to develop demonstrations to highlight benefits of grid technology for applicable TATRC projects. A first version of a SURA Grid Technology Cookbook will also be supported by TATRC funds.

- Funding in support of SURAgrid was written into several NSF proposals that were submitted by SURA members over the past six months. Those efforts included:
    - A proposal to the NSF Broadening Participation in Computing program (NSF 05-562) led by the University of Alabama at Birmingham. Proposed work included the use of SURAgrid to grid-enable computational fluid dynamics software tools for undergraduate teaching. This proposal was not funded.
    - A proposal to the NSF Computing Research Infrastructure program (NSF 04-588) led by Georgia State University. This proposal requested funding for the use of SURAgrid as a platform for the development of key grid technologies needed to create a stable and secure grid computing service. This proposal was not funded.
    - A Louisiana State University led proposal to the NSF High Performance Computing Acquisition Program (NSF 05-625) that included SURAgrid as a significant component of the outreach and extended impact of the proposed program. This proposal is currently under review.

SURAgrid Corporate Partnership Development

Plans to expand the existing SURAgrid infrastructure include the development of non-exclusive corporate partnerships with commercial developers of HPC systems and software. Leveraging the well-developed corporate relationships of the SURA membership, SURA is engaging interested commercial entities with the dual goals of expanding the physical resources available to SURAgrid through substantial product discounts or donations, and the development of mutually beneficial joint research and development partnerships.

This effort took shape in the Fall of 2005 with a series of discussions with Sun Microsystems that resulted in a meeting at Sun's corporate headquarters in California that was attended by more that 20 members of the SURAgrid community. Discussions with Sun are continuing, however, no definitive partnership program has yet evolved. The concepts that were developed as a result of our discussions with Sun have positioned SURA well to conduct discussions with other potential corporate partners.

Discussions with IBM developed through existing relationships that were in place between LSU and IBM. These discussions have developed rapidly and the formation of a partnership with IBM is the subject of a proposal to the SURA Board that is being presented at the Spring 2006 SURA Board of Trustees meeting. IBM has agreed to enter into a relationship with SURA to jointly develop, port, optimize and benchmark grid applications in the SURAgrid environment. IBM is also making deeply discounted HPC systems available to SURA members that are participating in SURAgrid. Details of this developing relationship were discussed at the third annual meeting of the combined SURA IT Committee / SURA members of CASC (Coalition for Academic Scientific Computation) held in Washington, DC on March 7, 2006 (see: http://www1.sura.org/3000/3200_ITComm.html for details of that meeting). Contact Gary Crane (gcrane@sura.org) for details of the SURA – IBM Partnership.

SURA intends to seek additional corporate partnerships with other providers of HPC hardware and software as opportunities and resources allow.

SURA CYBERINFRASTRUCTURE WORKSHOP SERIES

SURA is developing the SURA Cyberinfrastructure Workshop Series to provide broad education and community building in support of effective grid deployment. The series is anticipated to span a number of years and include training on grid technologies and deployment as well as topical conferences geared to scientific disciplines poised to benefit from grid-based resources. Two recent workshops are summarized below:

- A second *Grid Application Planning & Implementation* workshop was held December 6 – 9, 2005 at the University of Texas at Austin. Approximately 70 people attended this workshop the Texas Advanced Computing Center (TACC) as the hosting, site provided extraordinary support that enabled the workshop to continue as planned despite official closings of the conference center due to inclimate weather. Corporate sponsorship was also instrumental in the success of this event, with contributions from Cisco Systems, IBM Corporation, Sun Microsystems, and United Devices.

  This workshop was designed to raise awareness of the diverse set of projects and initiatives that are helping to mature grid technologies while encouraging collaboration across areas of grid and application deployment. Presenters described the efforts of several grid initiatives, with a variety of objectives and timelines - Open Science Grid, DOSAR (Distributed Organization of Scientific and Academic Research, UT Austin's UTGrid, University of Michigan's MGRID) - followed by case studies in grid-enabling specific applications. Presentations for support in building and operating grids were also provided, including a preview of the Grid Technology Cookbook, which is currently under development by SURA, the Open Science Grid, and IT consultant Mary Trauner.

  This workshop also featured the debut of a small group training class that focused on attendees gaining practical experience installing and configuring a grid node. The focus and format were well-received and SURA is planning to use this successful early experience as the basis for the development of additional training opportunities.

  Copies of materials from both workshops are available on the SURA Web site at http://www1.sura.org/6000/gridagendaDec05.html. Science Grid This Week also published a follow-up article on the event, "Workshop Encourages Collaborative Grid Deployment", which is available at http://www.interactions.org/sgtw/2005/1221.

- A first *Life Sciences on the Grid* workshop took place Jan 9 – 11, 2006, at Virginia Commonwealth University, with sponsorship from Sun Microsystems and IBM Corporation. Highly specialized content was presented to an audience of approximately 70 researchers and IT specialists, focused on the unique needs of the life science community involved in data and computationally intensive areas of study (e.g., genetics, neuroscience, biomedical imaging, drug discovery, translational research, molecular chemistry, zoology and botany).

  The workshop was designed to raise awareness of the need and potential for grid technology to solve problems in a specific field versus an IT-focused perspective on grid deployment. Attendees were not required to have prior knowledge or experience involving computer science, research computing or the grid. Featured speakers, Dr. John Wooley (Associate Vice Chancellor of Research, University of California, San Diego)

and Dr. Daniel Reed (Director, The Renaissance Computing Institute - RENCI), set the stage by establishing a framework for understanding grids as a component of the emerging cyberinfrastructure.

Copies of materials from this workshop are available on the SURA Web site at http://www1.sura.org/6000/biogridagendaJan06.html.

BIOHEALTH / BIOINFORMATICS PROGRAM DEVELOPMENT

Robert Reynolds (UVA CIO and SURA IT Steering Group member), Jay Sanders (Telemedicine Consultant) and SURA staff have been working with members academic health centers within the SURA community to explore the utilization of SURAgrid and grid technologies in support of biomedical applications. Current candidates include: (1) engaging the SURA research community in exploring grid-enabled data mining capabilities using large healthcare data repositories; (2) development, testing and production of medical simulation and modeling programs that can be shared and operated via the grid; (3) linkage of regional medical modeling and simulation capabilities with the delivery of improved training & education applications for medical and military personnel.

Applications are expected to require access to high performance computing resources, use parallel processing techniques requiring considerable storage capacity, be geographically decentralized, and be scientifically demanding and valuable applications. SURA is seeking collaborators from within the SURA membership and is prepared to assist in seeking funding to support the development of targeted projects in this area.

NETWORK INFRASTRUCTURE ACTIVITIES

Atlantic Wave

AtlanticWave (A-Wave) represents a distributed exchange and peering fabric along the Atlantic coast of North and South America to facilitate exchange and peering services for the national and international networks that interconnect at the international exchange and peering points at MANLAN in NYC, MAX in Washington DC, AMPATH in Miami, and ANSP (the Academic Network of Sao Paulo) and RedCLARA (Cooperação Latino-Americana de Redes Avançadas – Latin American Cooperation of Advanced Networks) in Sao Paulo. The A-Wave service on the East Coast will also link to the StarLight international exchange in Chicago and the PacificWave (P-Wave) service, led by CENIC and the Pacific Northwest GigaPoP (PNWGP), which links the international exchanges in LA and Seattle. FIU and CENIC, with support from SURA, described the concept and a commitment to the implementation of the A-Wave in their successful proposal to the NSF International Research Network Connections (IRNC) program. In particular, the FIU-CENIC led proposal describes the importance of establishing a 10G wave service between Miami, Washington DC, and New York, and having it interconnect with the NSF-funded link from Miami to Sao Paulo to enable a hybrid of scheduled temporary use and permanent use network services to support discipline-specific and general-purpose high performance computing and networking research collaborations between North and South America and Europe.

The NLR backbone to NYC is now complete, so that the needed 10GigE wave all the way to New York City can now be acquired. An upgrade by NLR of the backbone equipment between

Jacksonville and DC has resulted in a reduction in the cost to SURA of provisioning this service. TheA-Wave engineering committee has reached consensus on the design and an initial operations plan; a revised budget has been agreed to by the AWave governance committee. Two documents are being drafted: an MoU between SURA and the AWave partners; and a "governance document" that will guide the collaborative management of the operation of AWave. Additional meetings of the governance and technical committees are now being planned. The estimated plan is to have A-Wave in pre-production service sometime this summer.

International Connectivity

Dr. Riley participated in the organizing committee and was conference co-chair for CANS 2005, Chinese American Networking Symposium, held in Hong Kong and Shenzhen, China, October 31-November 2, 2005. He is now playing a similar role in CANS 2006, to be held in conjunction with the Internet2 Fall Member Meeting in Chicago, in December.

Through the IEEAF, Dr. Riley is also participating in helping to launch a new initiative for high speed network connectivity for R&E to India – in partnership with Internet2, Stanford University, MIT and a number of Indian institutions and organizations. Among the participants on the Indian side are the Center for Development of Advanced Computation (CDAC). A workshop was held in Mumbai India on February 18 which included live demonstrations of high performance networking applications. These were supported by the first ever 622 Mbps link to India in support of research and education, made possible by the efforts of IEEAF and other partners. Plans are now underway to make the link permanent and to upgrade to 10 Gbps.

The head of CDAC attended the SURAgrid presentation at the Internet2 Fall Member Meeting. India has now announced the launch of their GARUDA grid initiative and we will be looking for possible ways to link up that effort and the SURAgrid effort.

AT&T Collaboration Update

In December of 2003, AT&T and SURA announced the AT&T – SURA GridFiber Collaboration Agreement that allows the nation's research and education community to use AT&T's newest national network infrastructure (NexGen Network) for the development of regional network initiatives. Below is a summary of the current status of the use of the AT&T fiber:

Committed AT&T Fiber Routes

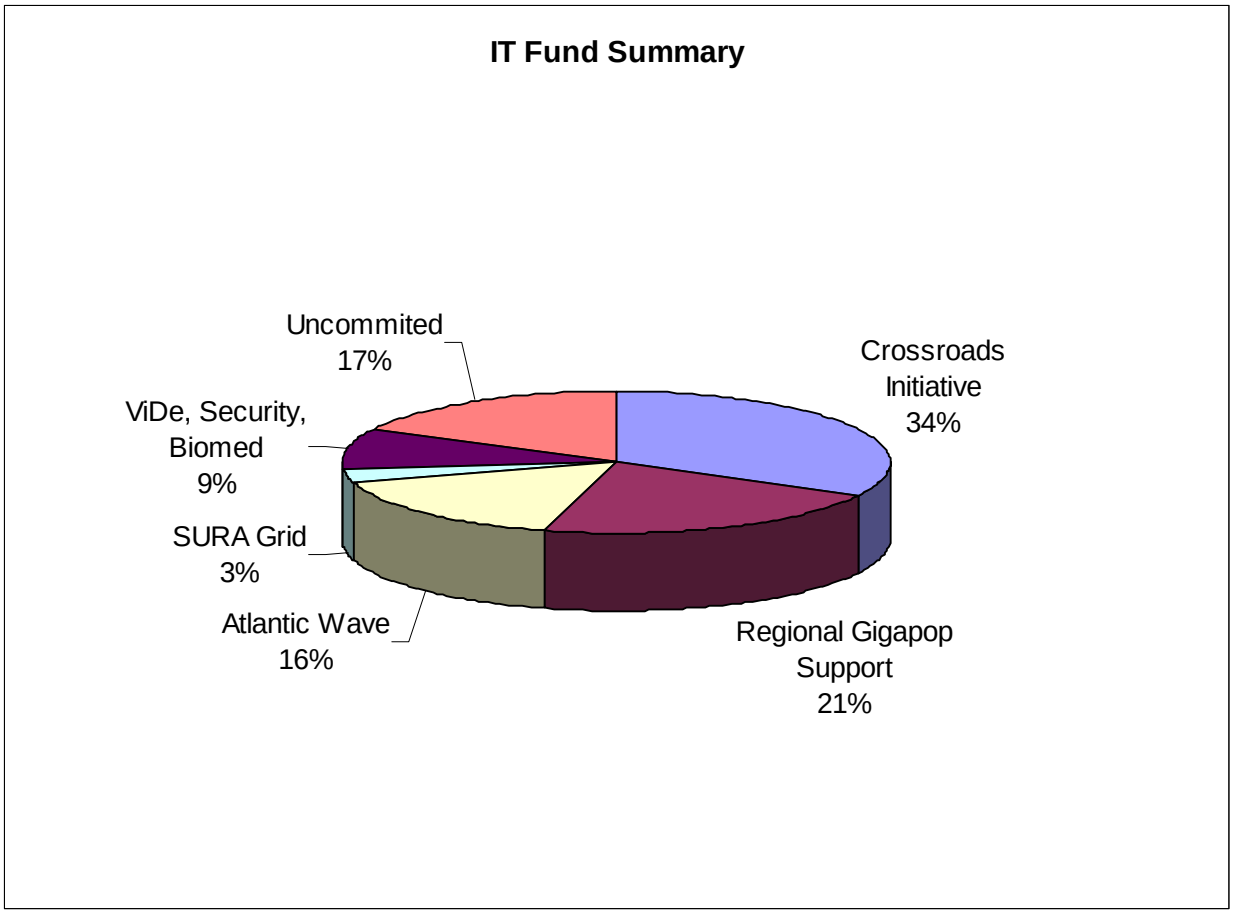
Segment	Miles	Committed	Planned Implementation	Comments
Jacksonville - Houston	1004	NLR	No	Used alt fiber-No planned use
New Orleans - Lake Charles	234	LONI	Yes	In planning phase
Shreveport - Monroe	108	LONI	Yes	In planning phase
Houston - San Antonio - Dallas	599	LEARN	No	Used alt fiber - No planned use
HOU -BEAU, DAL - LONG	244	LEARN	Yes	Possible future use
Monroe, LA - Little Rock	169	LOTA	Yes	Possible future use
Little Rock - Tulsa	338	LOTA	No	AT&T not completing route
Eugene - Portland	147	NERO	Yes	Implementation complete
Portland - Seattle	213	NERO	Yes	In progress
Seattle - Spokane	433	PNWGP	Yes	In progress
Spokane - Bozeman	472	PNWGP		Future plans for completion
Bozeman - Billings	152	PNWGP	Yes	In progress
Salt Lake City - Ely	282	Utah	Yes	Possible future use
Kansas City - Frontenac, KS	119	KANREN	Yes	In early planning phase
Total Committed	4513			
Total Planned Use	2426			
Total Completed	147			
Total Uncommitted	1487			
Committed but no Planned Use	1941			
Uncommitted Plus No Planned Use	3427			
Potential Future Requests (based on recent inquiries)				
MoreNet: St Louis-Chicago	351			
MoreNet: Kansas City-St Louis	283			
CENIC: SF-Cloverdale, CA	107			
CENIC: Cloverdale-Eugene, OR	723			
Northern Tier: Billings-Fargo	670			
Potential Future Requests	2134			

VIDE (VIDEO DEVELOPMENT INITIATIVE)

ViDe held its 8th Annual Digital Video Conference on March 27-30. The conference, named "Facing Tomorrow's Problems Today: Best Practices and New Techniques for Internet-Based Video", was attended by 124 people. The event started Monday evening and included a keynote address by Rick Prelinger, an archivist, writer and filmmaker, and who founded Prelinger Archives, whose collection of 51,000 advertising, educational, industrial, and amateur films was acquired by the Library of Congress in 2002 after 20 years' operation. (See http://vide.net/conferences/spr2006/keynote.shtml for more information.) The next two days held some 13 topic sessions with 41 presentations. This year's event included 10 vendor exhibitors. A total of 43 people attended a follow-up workshop, Advanced Topics in Audio/Video Conferencing, on March 30. This workshop was taught by Kewin Stoeckigt, Australian Academic and Research Network (AARNet) and Jill Gemmill, University of Alabama at Birmingham.

ViDe has recently undergone several organizational changes which are defined in a new set of bylaws and a ViDe business plan. These changes include a new membership scheme that involves membership fees with associated benefits. The new membership plan began via a membership drive at the Spring 2006 conference. As of conference close, ViDe now has a base of 64 paid memberships (approximately half of the conference attendees). The ViDe membership drive will continue through the Internet2 Spring Member Meeting.

IT FUND UPDATE – MAY 2006



Total IT Initiatives Fund	**$3,000,000**
Total Committed IT Funds	**$2,484,542**
IT Initiatives Fund Balance	**$515,458**