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**SURAGRID PROGRAM STRATEGIC PLAN
2008-2012**

Prepared by the SURAgrid Governance Committee

August 19, 2008

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SURAggrid STRATEGIC PLAN 2008-2012

EXECUTIVE SUMMARY

SURAggrid is an initiative of SURA originating from the volunteer collaboration of several institutions involved in the NSF Middleware Initiative (NMI) Integration Testbed Program operated by SURA under NSF Cooperative Agreement ANI-0123937, in partnership with Internet2 and EDUCAUSE.

SURAggrid adopted a formal governance structure in 2007 with the intent of supporting two core purposes: ensuring that institutions and organizations investing in SURAggrid have an appropriate role in its governance; and sustaining the growth of active community participation and cooperative engagement in enhancing the SURAggrid infrastructure.

The SURAggrid Governance Committee (SGC) has completed this multi-year strategic plan to provide overall guidance for SURAggrid's continued growth in alignment with SURA's broad mission to foster excellence in scientific research, to strengthen the scientific and technical capabilities of the nation and of the Southeast, and to provide outstanding training opportunities for the next generation of scientists and engineers.

The vision and mission for SURAggrid that has evolved from this process represents a maturing of the SURAggrid program and suggests leveraging the SURAggrid infrastructure that has been built over the past several years to create a new focus on community development and researcher engagement.

SURAggrid Vision

Promote excellence for research and education enterprises by fostering collaborative engagement in cyberinfrastructure across the SURA region.

SURAggrid Mission

SURAggrid provides a community for collaborative development and use of cyberinfrastructure services to support the research and education missions of our membership.

To realize this vision and carry out our mission, the SGC has identified the following **five goals** through our strategic planning process:

- 1) Develop a research outreach program to identify new users and new uses for the evolving regional and national computational and collaborative cyberinfrastructure available to the SURA region.
- 2) Plan, manage and support the SURAggrid infrastructure to provide a solid foundation for the evolution of SURA region research and education programs.
- 3) Develop a communications strategy for SURAggrid.
- 4) Develop a sustainability model for SURAggrid.
- 5) Strengthen existing and develop new corporate and organizational partnerships focused on improving regional use of Cyberinfrastructure (CI) services.

The SGC recommends an annual review and update of the SURAggrid strategic plan and associated program goals, action items and milestones. Revisiting this multi-year plan on an annual basis will allow the SURAggrid community to incorporate local, regional and national developments into the direction of SURAggrid as it continues to evolve and grow as part of the rapidly evolving academic cyberinfrastructure environment.

TABLE OF CONTENTS

<i>SURAGRID PROGRAM STRATEGIC PLAN</i>	1
<i>SURAggrid Governance Committee Participants</i>	1
<i>SURA Staff Participants</i>	1
<i>SURAggrid Strategic Plan 2008-2012</i>	2
<i>Executive Summary</i>	2
<i>Table of Contents</i>	3
<i>Table of Tables</i>	3
<i>I. SURAggrid Background</i>	4
<i>II. 2008 Strategic Planning Process</i>	4
<i>III. SURAggrid Cyberinfrastructure Development Program</i>	4
<i>SURAggrid Vision and Mission</i>	5
<i>IV. SURAggrid Goal Statements and Milestones</i>	6
<i>Goals and Milestones</i>	6
<i>V. Resource Requirements</i>	8
<i>VI. Conclusions</i>	8
<i>Appendix A. History of SURAggrid Growth and Development</i>	9
<i>Past SURAggrid Strategic Planning Efforts</i>	10
<i>Appendix B. SURAggrid and the National Cyberinfrastructure</i>	11
<i>SURA Region Cyberinfrastructure</i>	11
<i>National Science Foundation Cyberinfrastructure Investments and SURA region</i>	12
<i>Appendix C. Past SURAggrid Strategic Planning Efforts</i>	13
<i>SURAggrid Advisory Group (2006-2007)</i>	13
<i>Near-term Objectives 2007</i>	13
<i>Ongoing Objectives 2007</i>	13
<i>Outcomes of 2007 Objectives</i>	13

TABLE OF TABLES

Table 1. SURAggrid Resource Goal	7
Table 2. SURAggrid Resources	10
Table 3. SURAggrid Membership	10
Table 4. SURAggrid Applications	10

I. SURAGRID BACKGROUND

SURAggrid¹ is a consortium of institutions and organizations collaborating and combining resources to create a distributed high performance computing (HPC) infrastructure (cyberinfrastructure) for the Southeastern Universities Research Association² (SURA) region. The **Report of the National Science Foundation Blue-Ribbon Advisory Panel on Cyberinfrastructure**³ and the recent final report of the **Commission on Cyberinfrastructure for the Humanities & Social Sciences**⁴ emphasize the pervasive importance of cyberinfrastructure for research and education. SURAggrid is deploying a regional grid cyberinfrastructure that is positioned to become an essential tool for research and development, allowing the SURA community to take a leadership role in building the scientific capacity and knowledge base of the region.

Appendix A includes additional background on the historical development of SURAggrid.
Appendix B describes SURAggrid in the context of national Cyberinfrastructure.

II. 2008 STRATEGIC PLANNING PROCESS

In the Spring of 2008 the SURAggrid Governance Committee (SGC) agreed that a SURAggrid Strategic Plan should be developed with opportunity for member input and comment. Further, that this plan should be reviewed annually with updates made available to the SURAggrid community in Spring each year prior to the annual SURAggrid Governance Committee elections. To develop this strategic plan, the SGC considered past input from several sources (SURAggrid community, SURAggrid Advisory Group, interactions and alignment with the SURA IT Committee) input and review from current SURAggrid members, and used a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis to help identify and prioritize goals and action items for the SURAggrid program.

III. SURAGRID CYBERINFRASTRUCTURE DEVELOPMENT PROGRAM

The SURAggrid Governance Committee undertook a review of the SURAggrid program in the context of a rapidly developing cyberinfrastructure environment at the campus, regional and national levels.

SURAggrid seeks to provide a program that aligns the cyberinfrastructure of member organizations in order to build a shared infrastructure that enables scientific discovery, research collaboration, and education.

SURAggrid is defining an inter-operable infrastructure that enables institutions to incorporate their existing resources into a resilient and sustainable collaboration framework, where the resources needed to drive advanced collaborative research can be accessible to the membership across organizational boundaries.

This program will expand access to the emerging national, high-capacity computational infrastructure by helping institutions identify and acquire the necessary resources to interface with this national cyberinfrastructure.

SURAggrid's key program concept is in recognizing the need to collaborate on the construction of an open infrastructure to enable the development of competitive capabilities at the application level. SURAggrid recognizes that cooperation at the organizational infrastructure level is the smart strategy that focuses resources on accomplishing the science needed to make significant transformational advances.

A recent EDUCAUSE Quarterly article defines cyberinfrastructure (after Atkins⁵) and states its importance to higher education research:

Cyberinfrastructure includes computing cycles and broadband networking, massive storage and managed information, observation and measurement tools, and leadership on shared standards, middleware, and common applications for scientific computation. It also focuses on sharing efficiency and making greater capabilities available across the science and engineering research communities. It facilitates new applications, collaboration, and interoperability across institutions and disciplines. It can be summed up as follows: Cyberinfrastructure is the IT infrastructure that enables scientific inquiry...

¹ <http://www.sura.org/suragrid>

² <http://www.sura.org>

³ <http://www.nsf.gov/od/oci/reports/toc.jsp>

⁴ <http://www.acls.org/cyberinfrastructure/index.htm>

⁵ <http://www.nsf.gov/od/oci/reports/toc.jsp>

In higher education, cyberinfrastructure is required for conducting research, obtaining a competitive edge, participating in national and global projects, and addressing important trends⁶.

Implementing this vision via SURAggrid requires evolving the SURAggrid environment to support the collaboration of the membership to define, organize, implement and then manage an integrated infrastructure. This environment itself can be seen as an *advanced application instance* that is used both to create and operate SURAggrid in support of the research collaborations of its membership.

In this context, SURAggrid itself may be considered a virtual organization (VO), using the integrated infrastructure like any other research VO among its membership, and, in doing so, ensuring the SURAggrid infrastructure meets the requirements for VO operation. SURAggrid would help guide others in implementing their applications using SURAggrid infrastructure, promoting SURAggrid as an integral component of each member's core infrastructure.

A close analogy to this type of program may be seen in the cancer research community's caBIG™ project (<https://cabig.nci.nih.gov/>). The caBIG™ program is focused on building an integrated cancer research community so they are necessarily focused on a specific application domain. However, the elements of the program can readily be expanded to support related application domains. The caBIG™ Primer⁷ provides a solid overview of caBIG™ goals, including the statement:

NCI welcomes new adopters of and participants in the caBIG™ program. In fact, given the applicability of caBIG™'s foundational infrastructure and tools, it is anticipated that caBIG™ will readily accommodate not only the broader cancer research community, but the biomedical research community at large.

The SURAggrid cyberinfrastructure can be considered as similarly composed of elements forming and supporting a framework for coordinated collaboration.

The overall intent of the SURAggrid strategic plan is to provide researchers with a cyberinfrastructure strategy that extends local resources through the shared resources of SURAggrid and in doing so provides a gateway to national (and international) infrastructures, and establishes SURAggrid as an integral component of each SURAggrid member's infrastructure solution for competing in the 21st century.

This implies a collaborative effort of the SURAggrid community to articulate a core set of standards, conventions and policies that supports the integration of our member's campus CI resources into a regional whole, under the banner of a regional Virtual Organization.

SURAggrid Vision and Mission

The SURAggrid Governance Committee (SGC) adopted an iterative process with respect to SURAggrid's vision and mission statements. Input from the SURAggrid members leading up to the definition of the March 2007 SURAggrid Governance and Decision-Making Structure resulted in a focus on two core purposes: ensuring that institutions and organizations investing in SURAggrid have an appropriate role in its governance; and sustaining the growth of active community participation and cooperative engagement in enhancing the SURAggrid infrastructure. Ongoing development of these themes led to an initial vision and mission. As the Strategic Plan emerged, the vision and mission were revisited several times with an eye to ensuring they reflected the evolving plan and remained consistent with stated inputs from SURAggrid members.

The vision and mission for SURAggrid that has evolved from this process reflect a maturing of the SURAggrid program, a program that is more than technical infrastructure. SURAggrid embodies a broad cyberinfrastructure – a rich enabling of research and education powered by collaborative engagement of organizations across the SURA region.

SURAggrid Vision

Promote excellence for research and education enterprises by fostering collaborative engagement in cyberinfrastructure across the SURA region.

SURAggrid Mission

⁶ *Creating a Five-Minute Conversation About Cyberinfrastructure*, Klara Jelinkova, Terezsa Carvalho, Dorette Kerian, Boyd Knosp, Kent Percival and Stan Yagi, *Educause Quarterly*, V. 31:2, 2008.

⁷ <https://cabig.nci.nih.gov/overview/cabig-primer/>

SURAggrid provides a community for collaborative development and use of cyberinfrastructure services to support the research and education missions of our membership.

IV. SURAGRID GOAL STATEMENTS AND MILESTONES

In supporting the revised SURAggrid mission, the SURAggrid Governance Committee's strategic planning process arrived at five goal statements and supporting action items. Along with the rest of this Strategic Plan, each of these goal statements will be reviewed on an annual basis, and updated as appropriate.

Goals and Milestones

Measurable milestones are important as they provide a clear mechanism to measure progress in meeting Strategic Goals. Milestones are listed for each Strategic Goal and its associated action items. Measurement implies ongoing monitoring and the adjustments that may be required to better accomplish the strategic elements. The SURAggrid Governance Committee is committed to periodic review, reporting and adjustment of milestones. The active and continuous engagement of the SURAggrid membership is critical in meeting milestones.

The following five goal statements and supporting milestones were developed through the SGC strategic planning process.

Goal 1 – Develop a research outreach program to identify new users and new uses for the evolving regional and national computational and collaborative cyberinfrastructure available to the SURA region.

- Promote use of SURAggrid (SG) as an integral part of regional and national cyberinfrastructure (CI) by creating a community of support to assist members in leveraging SURAggrid as a general-purpose infrastructure for delivering CI services and in grid-enabling SURAggrid member applications.
- Encourage large science teams with distributed, collaborative research programs to use SG resources for their science domain. Examples of such programs would be Coastal Ocean Researchers (SCOOP), Molecular Dynamics, Bioinformatics, Particle Physics (JLab), etc. Furthermore, these teams will be engaged in the development of domain specific methodologies and tools for leveraging SG resources.
- Create a program focused on supporting the use of SURAggrid and other national cyberinfrastructure services by researchers from Minority Serving and EPSCoR Institutions.

MILESTONES

- Identify at least two (2) new distributed, collaborative research programs/projects in the SURA region by May 2009.
- Engage at least five (5) SURA region Minority Serving Institutions in the development of a SURA MSI cyberinfrastructure program.
- Develop a SURA region Experimental Program to Stimulate Competitive Research (EPSCoR) focused cyberinfrastructure program.

Goal 2 – Plan, manage and support the SURAggrid infrastructure to provide a solid foundation for the evolution of SURA region research and education programs.

- Broaden understanding and adoption of SURAggrid through a statement of current capabilities and services.
- Leverage the broad CI perspective within the SURAggrid community to identify strategic services and align technological foundations, and provide regular assessments of technological trends of cyberinfrastructure initiatives.
- Develop peering relationships with national and international grid efforts such as TeraGrid and Open Science Grid in order to increase the computational and research capacity of our members
- Simplify the use of SURAggrid through improved integration of participant identity services and other CI components.

- Build a collaboration environment that supports the construction, operation, and management of SURAggrid, providing web and grid-based collaboration services for SURA Research Virtual Organizations.

MILESTONES

- Charge a SURAggrid Technology Infrastructure Planning Working Group to help guide the development and expansion of the SURAggrid infrastructure, including strategic relationships with other cyberinfrastructure initiatives such as TeraGrid and Open Science Grid.
- Complete an inventory of SURAggrid (computational resources, storage, visualization capabilities, software, users and applications) by March 2009.
- Align the activities and functions of existing working groups with the goals of this strategic plan.
- Increase SURAggrid resources by at least 50% each year through 2012.

TABLE 1. SURAGRID RESOURCE GOAL

SURAggrid Portal	Institutions	Resources	Cores	Peak (TeraFlops)	Memory (TeraBytes)	Disk (TeraBytes)
May 2009	18	24	3,000	25	7	70
May 2010	27	36	4,500	40	11	105
May 2011	40	52	7,000	60	17	157
May 2012	60	77	10,000	100	25	235

Goal 3 – Develop a communications strategy for SURAggrid.

- Develop and implement a communication strategy that presents the SURAggrid mission, infrastructure, capabilities, and support structure to current and potential users, resource providers, corporate partners and SURA members and management.
- Emphasize research and teaching success stories that are a result of using SURAggrid.
- Enhance SURAggrid’s online presence for both SURAggrid members and first time and repeat visitors to the SURAggrid web site.

MILESTONES

- Establish a Public Relations Working Group drawing upon the experience of SURA, SURAggrid members, and others who have expertise in Public Relations.
- Develop a set of standard SURAggrid talking points that can be presented by any SURAggrid member to the researchers, faculty, students, administration, and technical leadership of their campuses or communities.
- Establish a SURAggrid collaborative web-based environment that enables and enhances (through Wikis, forums or other common collaborative software) the ability of SURAggrid participants to interact and contribute their content.
- Publicize the vision of SURAggrid as a shared infrastructure that enhances and extends the research support infrastructure and organizations of its members in education, research, and industry publications.

Goal 4 – Develop a sustainability model for SURAggrid.

- Develop a sustainable funding model for SURAggrid leveraging national funding opportunities that are consistent and compatible with SURAggrid’s strategic goals and serving to focus the collaborative energy of the SURA region.
- Engage SURA community researchers in funding opportunities related to their usage of SURAggrid and other regional and national cyberinfrastructure services.

MILESTONES

- Establish a SURAgrid Sustainability Working Group to develop, evaluate and recommend a sustainability model for SURAgrid.
- Engage the SURAgrid membership (including the research user community) to complete and adopt a sustainable funding model by January 2010.

Goal 5 – Strengthen existing and develop new strategic partnerships focused on improving regional use of CI services.

- Expand existing corporate partnership program with a focus on offering new CI technologies and services to the SURAgrid community.
- Identify additional strategic partnerships (corporate or other organizational entities with cyberinfrastructure aligned purposes) capable of improving and expanding the SURAgrid infrastructure (computation, storage, visualization, application software, authentication/authorization, portals, and/or collaboration technology.)

MILESTONES

- Establish metrics to evaluate the impact of the SURAgrid Corporate Partnership program on the number of SURAgrid participants and the growth in use of SURAgrid cyberinfrastructure resources for research and education.
- Identify and negotiate specific corporate and organizational partnerships for new SURAgrid services (computation, visualization, distributed storage, systems software, middleware, application software, or support services relevant to SURA region domain science).

V. RESOURCE REQUIREMENTS

Achieving milestones toward goals will require significant resources. These resource requirements will be developed in conjunction with ongoing actions to achieve the Measurable Milestones noted above. It is expected that the SURAgrid Governance Committee members will provide leadership in meeting milestones, but the involvement of SURAgrid community members will be critical to achieving human resource, technical and program requirements.

VI. CONCLUSIONS

SURAgrid is an initiative of SURA originating from the volunteer collaboration of SURA member institutions. Its growth since 2004 reflects a community wide recognition of the importance of cyberinfrastructure as a key competitive advantage for higher education research and education. SURAgrid is recognized by SURA as a strategic activity for the region. Across the SURA region there are some exemplar activities, some regionally broad and others more locally focused, that are good examples of cyberinfrastructure investments by SURA and SURA member institutions.

SURAgrid members and other institutions in the SURA region are significant contributors to the evolving national research and education cyberinfrastructure and yet have not, to date, developed the collaborative research programs to effectively take advantage of available national cyberinfrastructure resources. The Strategic Plan outlined in this document attempts to define specific goals that will establish SURAgrid as an integral component of each SURAgrid member's campus cyberinfrastructure program and increase our members' ability to participate in and lead multi-institutional collaborative research programs that utilize local, regional and national cyberinfrastructure services. These goals are fully aligned with SURA's broader mission to foster excellence in scientific research, to strengthen the scientific and technical capabilities of the nation and of the Southeast, and to provide outstanding training opportunities for the next generation of scientists and engineers.

APPENDIX A. HISTORY OF SURAGRID GROWTH AND DEVELOPMENT

With participating institutions and organizations currently contributing computing resources (over 12 Teraflops as of May 2008), SURAggrid has evolved over the past several years into a significant community of collaborators and HPC resources supporting research and education. Given existing corporate partnerships with IBM^{8,9}, and Dell¹⁰, and with ongoing negotiations for additional vendor partnerships, SURAggrid is positioned for significant growth in the near future.

In May 2006, the Southeastern Universities Research Association (SURA) endorsed SURAggrid as a formal program and approved a significant investment in its growth and expansion¹¹. Originally managed as a consortium of collaborating institutions with facilitation by SURA staff, SURAggrid reached a stage of maturity and investment in 2007 where it adopted a more formal governance and decision-making structure¹², led by an elected SURAggrid Governance Committee (SGC)¹³. As SURAggrid continues to grow, the more formal governance structure will support two core purposes: ensuring that institutions and organizations investing in SURAggrid have an appropriate role in its governance; and sustaining the growth of active community participation and cooperative engagement in enhancing the SURAggrid infrastructure.

SURAggrid members¹⁴ include: SURA, SURAggrid Contributing Members (institutions that contribute to SURAggrid), Participating Members (application users, participants seeking shared knowledge and/or experience with grid computing), and corporate partners.

SURAggrid provides members with valuable benefits that extend beyond access to a basic computational grid. These benefits can be broadly stated as:

- Access to a cyberinfrastructure that includes diverse machines, architectures and services;
- Shared experience, dissemination of best practices;
- Shared contribution and access of data collections;
- Access to aggressive discount programs on high performance computing hardware and services from SURA corporate partners;
- Facilitation of collaboration on research and development of proposals for funding;
- Dissemination of outreach, training and education efforts, and workshops;
- Sponsorship by SURA, a regional consortium of over sixty universities across the US, with the attendant power of group negotiations, peer support and collaboration.

SURAggrid, over the past two years, has increased the number and capacity of the computational resources available to the SURAggrid community (Table 2. SURAggrid Resources), developed governance and operational processes, procedures and documentation¹ and expanded the number of participants (**Error! Reference source not found.**) SURAggrid contributing members provide compute resources, resulting in a capacity of over 12 Teraflops. This capacity will grow as high performance computing systems are acquired through SURA-vendor partnerships. SURAggrid members are also deploying applications (Table 4. SURAggrid Applications.) that are enabled to take advantage of the SURAggrid cyberinfrastructure.

⁸ IBM Supercharges Computing Grid Through University Partnership
<http://sura.org/news/docs/IBMSURAggrid.doc>

⁹ IBM, Universities Expand Grid Computing Partnership
<http://www.sura.org/news/docs/IBMSURAggrid052207.htm>

¹⁰ DELL, SURA Partner for Grid Computing Initiative <http://www.sura.org/news/docs/DellSURAggrid.pdf>

¹¹ Board Resolution: http://www.sura.org/news/docs/sura_grid_bot.pdf

¹² SURAggrid Governance and Decision Making Document <http://www.sura.org/programs/docs/SGGov033107.pdf>

¹³ http://www.sura.org/programs/sura_grid_gov.html

¹⁴ http://www.sura.org/programs/sura_grid.html

TABLE 2. SURAGRID RESOURCES

SURAggrid Portal¹⁵	Institutions	Resources	CPUs	Peak TFlops	GBytes Memory	GBytes disk
September 2005	9	11	490	1.3	548	4,755
October 2006	14	18	910	3.1	950	8,020
April 2007	13	16	1,971	10.5	3,324	45,609
May 2008	12	15	2,035	12.6	3,876	46,437

TABLE 3. SURAGRID MEMBERSHIP

SURAggrid Members	Contributing	Participating	Non-SURA
Fall 2003 (startup)	8		25%
Spring 2006	11	8	21%
August 2006	13	8	21%
June 2008	25	8	27%

TABLE 4. SURAGRID APPLICATIONS

UNC Storm Surge Modeling with ADCIRC
GSU Multiple Genome Alignment on the Grid
NCSU Simulation-Optimization for Threat Management in Urban Water Systems
ODU Bio-Sim: Bio-electric Simulator for Whole Body Tissue
UABgrid Dynamic BLAST
SURA: SURAggrid Teaching Environment
LSU Wave Watch 3 for SCOOP
UFL CH3D Storm Surge Monitoring System with Grid Appliance
UDel Climate Modeling with CAM3
GSU Virtual Screening for Chemistry
VCU Virtual Parasite

SURA also develops and participates in various funded research activities that leverage the SURAggrid Program, such as SCOOP¹⁶, CI-enabled application advancement with the Army Telemedicine and Advanced Technology Research Center and a National Science Foundation Small Grant for Exploratory Research to identify potential grid research applications¹⁷ within the SURA membership. SURA currently funds four FTEs and several consultants to help further develop SURAggrid capabilities and operations.

Past SURAggrid Strategic Planning Efforts

Over the past two years SURA facilitated the formation of a SURAggrid Strategic Advisory Group (SAG) to provide the SURAggrid community with strategic advice from regional leaders in high performance and grid computing. The SURAggrid SAG was formed in Fall 2006 and was co-chaired by Ed Seidel (LSU) and Alan Blatecky (UNC). Recommendations from the SAG and actions taken by the SURAggrid community to act on those recommendations are documented in Appendix C.

¹⁵ <https://gridportal.sura.org:443/gridsphere/gridsphere>

¹⁶ SURA Coastal Ocean Observing and Prediction (SCOOP) program <http://scoop.sura.org/>

¹⁷ http://www.sura.org/programs/sura_grid_apps.html

APPENDIX B. SURAGRID AND THE NATIONAL CYBERINFRASTRUCTURE

SURA Region Cyberinfrastructure

SURAGrid currently provides a variety of application users with a common point of access (through the SURAGrid portal) to a set of heterogeneous high performance computing resources. Resources are contributed by participating organizations and remain under autonomous control of the resource owner, with shared access enabled through grid-wide coordination of resource deployment and discovery, acceptable use policies, authentication and authorization mechanisms, and operational and support procedures.

Leveraging the well developed corporate relationships of the SURA membership, SURA has developed industry partnerships with IBM and Dell that provide SURAGrid participants with access to aggressive discount programs on high performance computing hardware. Systems purchased under these partnership programs are added to SURAGrid, providing a sustainable growth path for the SURAGrid resource pool.

Across the SURA region there are some exemplar activities, some regionally broad and others more locally focused, that are good examples of cyberinfrastructure investments by SURA and SURA member institutions.

SURAGrid members and other institutions in the SURA region are playing a major role in the high-end computing portion of the national cyberinfrastructure. The first two NSF Track 2 awards went to institutions in the SURA region, TACC (a SURAGrid member) and NICS (a UTK/ORNL partnership). Additional TeraGrid Resource Providers (RPs) in the SURA region are LONI (with systems run by LSU, a SURAGrid member) and ORNL. TeraGrid RPs are appointed under a variety of processes, including the Track 2 awards, and awards under the HPCOPS program, which include recent awards to LONI and TACC. Additionally, the Blue Waters petascale system at NCSA will be part of the national cyberinfrastructure, although it will come on line after the current TeraGrid project ends. This consortium is focused on identifying new users and new uses for the nation's first petascale computing system for open scientific research and includes a number of partners, such as the Great Lakes Consortium for Petascale Computing (GLCPC, of which SURA is a charter member), LSU (SURA and SURAGrid member), and RENCi (a regular collaborator with SURA in regional developments).

In addition to continued collaboration with the above and similar cyberinfrastructure initiatives, factors that should be considered when evaluating a regional cyberinfrastructure strategy include:

- Investments in advanced networking services across the SURA region:
 - Substantial investments in Regional Optical Networks (RONs) providing aggregated high performance network connectivity to national (I2, NLR) and international networks.
 - Atlantic Wave, a SURA supported international academic peering service is now operational and providing international peering services for networks in Latin America, Europe, Canada and North America.
- SURA's partnership with AT&T has provided access to donated dark fiber assets on AT&T's newest fiber optic infrastructure (AT&T's NexGen Network). These fiber assets are being utilized to build high-speed optical networks that are owned and operated by the academic community in many parts of the US.
- SURA's partnership with the National Center for Supercomputer Applications and the charter membership of SURA in Great Lakes Consortium for Petascale Computing (www.greatlakesconsortium.org). This consortium is focused on identifying new users and new uses for the nation's first petascale computing system for open scientific research; the Blue Waters system (www.ncsa.uiuc.edu/BlueWaters).
- Efforts to coordinate and define an Experimental Program to Stimulate Competitive Research (EPSCoR¹⁸) cyberinfrastructure program. In October of 2007 the University of Kentucky hosted an EPSCoR Cyberinfrastructure Assessment Workshop that brought together CI leaders from EPSCoR states and NSF program officers from the EPSCoR and OCI programs. This workshop resulted in a report that urges the NSF to take advantage of existing multi-state, regional CI collaborations by creating an EPSCoR funding program targeted at leveraging existing regional CI infrastructure and CI communities to lower the barriers for deploying and utilizing local, regional and national CI services for the EPSCoR community.

¹⁸ Department of Energy's Experimental Program to Stimulate Competitive Research (DOE EPSCoR)
<http://www.er.doe.gov/EPSCoR/about.html>

- The recent Federal Communications Commission Rural Telehealth Program has resulted in an infusion of federal dollars for the improvement of the network infrastructure supporting the delivery of telehealth services. 28 of the 69 FCC awards in this program were to organizations in the SURA region. These awards are funding \$121M in new investments targeted at creating new infrastructure for healthcare applications in the SURA region.

National Science Foundation Cyberinfrastructure Investments and SURA region

The National Science Foundation is investing hundreds of millions of dollars to create Track 2 (on the order of one petaflop peak) and Track 1 (greater than 1 petaflop sustained) systems that will be coming on-line over the next several years. There are significant challenges to making these systems available to and usable by researchers. SURA should consider the development of a regional model, scalable to other regions of the U. S., focused on identifying new researchers and research communities and enabling them to adapt their applications to make use of existing and future campus, regional and national cyberinfrastructure (CI) resources.

The SURA region represents a unique cross section of the U. S. academic community. With over one third of the U. S. population, the SURA region contains 92% of the nation's Historically Black Colleges and Universities (HBCUs), 22% of the nation's Hispanic Serving Institutions (HSIs) and 10 of the nation's 25 EPSCoR jurisdictions. Within the SURA region there are twenty-four HBCUs in the top 50 institutions that graduate African Americans with Science Technology Engineering and Math (STEM) degrees¹⁹ and fourteen HSIs in the top 50 institutions that graduate Hispanic students in the STEM disciplines.²⁰

A review of NSF High Performance Computing (HPC) allocation statistics reveals that the percentage of NSF HPC allocations to researchers from SURA states was 17.4% in 2005, 14.4% in 2006²¹, and 12% in 2007. On a per capita basis, in 2007 researchers from non-SURA states were allocated over 4 times as many service units on NSF funded HPC systems as researchers from the SURA region. The fact that this disparity has increased steadily since 2005, suggests a potentially disturbing trend toward a concentration of access to and use of national CI resources by an increasingly smaller portion of the nation's research community. At the least, non-SURA researchers seem to have a head start on making use of such high performance computing – relegating SURA researchers to non-leading roles in research and innovation.

Given the characteristics of SURA (well established organization with a long history of multi-state collaboration) and the SURA region (low historical use of national HPC facilities, high concentration of EPSCoR and MSI institutions and the significant CI investments by states, SURA and SURA members), SURA is extremely well positioned to develop a regional approach to CI-enabled scientific research. Building on the work of the SURAgrid community and the substantial pools of CI resources and expertise at regional centers like RENCi, LSU-CCT, TACC, UTK/ORNL and NCSA, SURA should lead the development of a comprehensive *cyberinfrastructure outreach and enablement program* that will serve as a national model for engaging scientists in the use of CI tools.

¹⁹ NSF 06-319 **US Doctorates in the 20th Century** Appendix B. Tables B-8, <http://www.nsf.gov/statistics/nsf06319/appb.cfm>

²⁰ NSF 06-319 **US Doctorates in the 20th Century** Appendix B. Table B-9, <http://www.nsf.gov/statistics/nsf06319/appb.cfm>

²¹ Derived from TeraGrid allocation statistics available from CyberInfrastructure Partnership <http://www.ci-partnership.org/Allocations/awards.html> and population statistics from the US Census Bureau <http://www.census.gov/>

APPENDIX C. PAST SURAGRID STRATEGIC PLANNING EFFORTS

SURAggrid Advisory Group (2006-2007)

Over the past two years (2006-2007) SURA facilitated the formation of a SURAggrid Strategic Advisory Group (SAG) to provide the SURAggrid community with strategic advice from regional leaders in high performance and grid computing. The SURAggrid SAG was formed in the Fall of 2006 and was co-chaired by Ed Seidel (LSU) and Alan Blatecky (UNC).

The SURAggrid Strategic Advisory Group has provided guidance to the SURAggrid project by:

- Providing technical and programmatic advice to the SURAggrid community regarding the evolution of regional, national and international grid technologies,
- Working with the SURAggrid Governance Committee to help set the direction for future development of SURAggrid.
- Providing input and review to SURAggrid Governance Committee for the *SURAggrid Strategic Plan* to guide SURAggrid strategy and operations.
- Providing input and review to the SURAggrid *Annual Report of SURAggrid Status*.

The SURAggrid Strategic Advisory Group report from November 2006 recommended a set of near-term and long-term objectives:

Near-term Objectives 2007

1. Engage SURAggrid Strategic Advisory Group for high level input into SURAggrid.
2. Review current organizational and governance structure to establish formal model.
3. Investigate and recommend strategic steps for alignment with other grid infrastructures.

Ongoing Objectives 2007

1. Expansion of SURAggrid corporate partnerships that bring special relationships, products, services and pricing to the SURA community.
2. Inventory extant data collections and recommend strategy for sharing model via SURAggrid.
3. Continued community building, collaboration and development through collaborative joint funding proposals.
4. Outreach and awareness via educational workshops focused on raising the level of awareness of high performance computing resources in the region (and nation) and the use of such in research applications.
5. Development of metrics to measure and evaluate success of SURAggrid (capacity, applications, people on SURAggrid; proposals generated and funded; outreach events).
6. Establish annual review of goals and objectives.

Outcomes of 2007 Objectives

During 2007 these recommendations were addressed with substantial progress made on most items:

- The SURAggrid Advisory Group was engaged as a group in November 2007 for input on strategic funding and long term support for SURAggrid, as well as providing advice and comment by individual SAG members during the year.
- The SURAggrid Governance and Decision Making Structure was adopted after input, discussion and voting of SURAggrid members.
- The SURAggrid Governance Committee has explored the options for alignment with other grid infrastructures, with particular attention paid to how SURAggrid can better serve as an on-ramp for TeraGrid and the developing Petascale initiative funded by the National Science Foundation (for which SURA is an education and outreach partner²².)

²² National Science Board Approves Funds for Petascale Computing Systems:
http://www.nsf.gov/news/news_summ.jsp?cntn_id=109850

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- SURAGrid computational resources increased from 3.1 TFlops in October 2006 to 12.4 in November 2007; additional partnership agreements with IBM and DELL made available discounted HPC resources to the SURA community.
 - Inventory of data sets was not substantially advanced.
 - A number of joint funding proposals were submitted during 2007²³ including the petascale award¹⁰. Two funded awards completed during 2007 (“Developing Regional Grid Technology Support for TATRC Programs,” funded under TATRC (Telemedicine & Advanced Technology Research Center), Award W81XWH-06-0419; “Creating a Catalyst Application Set for the Development of Large-Scale Multi-purpose Grid Infrastructure,” funded under NSF SGER (Small Grants for Experimental Research), Award OCI-0545550.)
 - Outreach and awareness continued with semi-annual SURAGrid All Hands meetings and with SURA’s hiring of an IT Applications and Outreach Specialist. The SURA Grid Technology Cookbook (www.sura.org/cookbook/gtcb) was released in November 2007.
 - SURAGrid tracked several metrics, including the number of computational resources (by number of institutions, resources, CPUs, Peak TFlops, GBytes memory and GBytes disk) and SURAGrid applications added to SURAGrid. The SURAGrid Accounting Working Group recommended metadata standard for tracking usage on SURAGrid systems.
 - The SURAGrid Governance Committee began a strategic planning process (of which this document is outcome.)

²³ SURA Board IT Committee Report, external funding <http://www.sura.org/news/2007/board/IT/IT.pdf>