

Models for Supporting New Technologies in Emerging Communities

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1. Summary

Through funding provided by the National Science Foundation (award SCI-0439202), a series of site visits was held in 2004 and 2005 at organizations participating in the Minority Serving Institutions Consortium (MSIC)¹, as a pilot for support of new technologies in emerging communities. These site visits provided training, support for executive awareness, and encouragement for building relationships with others in the Access GridTM² (AG) community. These visits were tailored to the needs of each site, and also contained an evaluation component, for better understanding both of the relevant technologies and of the deployment process overall.

The MSIC encompasses a broad variety of institutions and organizations, with widely differing needs. The MSIC members described in this paper include large research universities, small teaching colleges, and rural community centers. (A full description is contained in Appendix A.)

It is important to note that these site visits took place in the context of existing organizational relationships: The MSIC and the Tribal Virtual Network (TVN)³. AG technology was deployed to both of these

organizations in order to support existing and nascent collaborations among their respective members. (TVN is represented on the MSIC by University of New Mexico, a Minority Serving Institution (MSI)).

We present two models for ongoing support of existing AG deployments at Minority Serving Institutions and related organizations. It is hoped that these models will be applicable (and beneficial) in other settings, where the organizational needs and/or technologies being deployed are sufficiently similar.

- **Distributed workshop on “Discovering Collaborative Workspaces in Research and Education”**

A multi-day, distributed workshop on developing remote collaborations, designed both to encourage use of Access Grid, and to provide a catalyst for technology transfer and training.

- **“Two Techs in a Truck”**

Meeting the need for focused, co-located technical assistance.

¹ <http://www.msihpc.org/>

² The Access Grid is developed by Argonne National Laboratory, and is a product of University of Chicago.

³ <http://www.unm.edu/~nasinfo/tvn/>



Figure 1: An AG meeting of the Minority Serving Institutions Consortium

2. Pre-visit surveys

Prior to the visits, a survey was sent to the primary contacts at participating sites, in order to get a snapshot of current issues and AG usage (see Appendix C). This survey was used not only to prepare for the visits, but also to get a baseline for comparison after the visit. Six months after each visit, these same primary site contacts will receive the same survey, so that the impact of the visit can be measured.

Interesting findings from the pre-visit survey include:

- “Relationship building with others in AG community” was unanimously ranked as the most important of the three listed site visit activities, with “Promoting executive awareness” barely nudging “Training” out of second place.
- Demonstrations and “advanced content presentations given by the AG community in diverse disciplines” were cited as effective ways to market the AG.
- Sites had participated in an average of 4.1 AG events or meetings in the past month, with a high of 12 and a low of 0. An average of 2.1 of these events or meetings had been organized by the site responding to the survey.

3. Visit descriptions

Tribal Virtual Network

In October, 2004, Teig von Hoffman and Miller visited four members of the Tribal Virtual Network (TVN), at the invitation of Dr. Maria Williams. TVN members have been using the Access Grid since 2003 to support collaboration among member organizations.

The TVN is a consortium of five tribes in New Mexico who have worked in partnership with the University of New Mexico to establish AG technology. The tribal partners include the Jemez Department of Education (Pueblo of Jemez), the tribal office at the Pueblo of Zuni, the Poeh Arts Center (Pojoaque Pueblo), the Indian Pueblo Cultural Center (Albuquerque) and the Jicarilla Apache Cultural Center (Dulce). All five tribal partners have achieved their goals which include a dedicated T-1 line, equipment, and a trained systems person. New Mexico is a rural state that has a large Native American population with 22 reservations located all over the state. AG technology enables multiple sites to share in education and training programs, special presentations, and meetings. The additional T-1 connectivity has also improved each of the members IT. The University of New Mexico’s Native American Studies program and Arts of the Americas Institute have provided a great deal of support and guidance for this project, under the direction of Dr. Williams. The project has been supported by a grant from the Department of Commerce’s Technology Opportunities Program. Activities on the TVN/AG have included programs on Diabetes awareness, fire safety training, traditional drum making processes, and several professional artist development seminars.

As TVN member organizations are spread over a large geographical area, visits were

scheduled at each of four sites over the course of a four-day trip. The following sites participated in the visits:

- Jicarilla Apache Cultural Center (JACC)⁴
- Jemez Educational Center⁵
- Indian Pueblo Cultural Center (IPCC)⁶
- Poeh Center⁷

In addition, the team visited the University of New Mexico, to meet with Maria Williams (UNM's TVN Coordinator), as well as other faculty and staff.

This trip was scheduled to coincide with a fire safety event being held over the Access Grid by Indian Pueblo Cultural Center, organized by Travis Suazo of IPCC, with instruction from Amerind Risk Management⁸. On Wednesday, October 6, Amerind representatives led a class at IPCC for second-grade students; additional students participated over the AG from TVN member sites. Amerind representatives commented that they were pleased to reach as many children as they did that day, without having to travel the many hours to remote locations (JACC, for example, is approximately a 3 hour drive from Albuquerque, where IPCC is located).



Figure 2: Fire safety presentation by Amerind Risk Management, at Indian Pueblo Cultural Center, Albuquerque, New Mexico

Another highlight of the trip was hearing from Vernon Lujan of Poeh Center about the use of the Poeh Center AG node for telemedicine; it is being used for remote consultation of medical experts. As rural health providers frequently need to address a wide variety of situations, remote medical consultation can support some of their needs.

Florida A&M University

In December of 2004, Teig von Hoffman and McLean visited Florida A&M University (FAMU), at the invitation of Dr. Tiki Suarez. Installation of the AG node at FAMU was funded through the EOT-PACI/AN-MSI project, led by McLean. This node was installed in 2004.

Florida A&M University and its newly installed full node participated in "Community Collaborations: Impact of the Access Grid in the MSI Community" in October 2004. This event was organized by the MSIC as a platform for senior level administrators and faculty to discuss how emerging technologies such as the Access Grid have affected campus operations, research and teaching at Minority Serving Institutions (MSIs). Florida A&M University's Vice President of

⁴ <http://www.jicarilla.net/>

⁵ <http://www.jemezueblo.org/education/home/index.html>

⁶ <http://www.indianpueblo.org/intro/index.cfm>

⁷ <http://www.poeharts.com/>

⁸ <http://www.amerind-corp.org>

Administration and CIO, Dr. Kenneth Perry was a panel participant. From December 6 through December 8, 2004, Florida A&M University hosted a three-day site visit/workshop entitled “Access Grid for High Performance Computing, Computational Science and Instructional Technology.” The event included presentations, discussions and training and education in the areas of high performance computing (HPC), computational science, instructional technology/distance education and AG technology and was open to all faculty staff and administrators. Since its installation, the goal of individuals promoting the technology is to encourage educators and researchers to integrate all the benefits and tools of the AG into their instruction, research, and communication activities. The full AG node is currently being used on a regular basis during weekly MSIC meetings, summit and research meetings. FAMU has also been a consistent participant of SC Global both in 2003 and 2004 as a constellation site. In 2004 FAMU was noted as the constellation site with the largest audience.

During the visit, McLean and Teig von Hoffman gave presentations (The Access Grid as a Tool for Collaborative Research and Education, and Collaboration over Internet2) about the MSIC and AG, with participation both from the local FAMU community and from other members of the MSIC over the AG. Mullen also gave a presentation (Access Grid Education and Training) over the AG for interested parties from FAMU, focused on use of the AG for collaborative education.

A great number of meetings were arranged during this visit, improving executive awareness of the AG, as well as exploring collaboration ideas with members of the

FAMU faculty and staff.

Our Lady of the Lake

In January of 2004, Teig von Hoffman visited Our Lady of the Lake University (OLLU), at the invitation of Dr. Johnnie Spraggins. Installation of the AG node at OLLU was funded through the EOT-PACI/AN-MSI project, led by McLean. This node was installed in 2004

The AG has been used at Our Lady of the Lake University (OLLU) for weekly participation in MSIC meetings, and representation at the meetings has come from disparate parts of the University. Students have participated in some of the weekly meetings, as well as other events over the Grid. A highly anticipated, well-attended talk by a Curandera⁹ on campus was advertised and broadcast over the Access Grid, one of the unique cultural events possible due to the composition and location of Our Lady of the Lake, supported by the university’s mission.

This visit experienced serious scheduling problems; due to weather-related delays, Teig von Hoffman arrived in San Antonio two days later than originally planned. As a result, far fewer meetings were held than anticipated, and attendance at talks was low.

This visit underscored the usefulness of remote participation in the site visit via the Access Grid. An AG test session with Miller went on as planned, despite Teig von Hoffman still being in transit. During the test session significant technical issues were identified, and technical staff at OLLU received valuable training in recognizing and resolving such issues. The visit also

⁹ Curandera: a Mexican woman who practices healing techniques inherited from the Mayans (definition courtesy of www.cogsci.princeton.edu/cgi-bin/webwn)

included a talk by Mullen on collaborative education which was well-received by the distance education administrators. Both the test session and the talk theoretically could have happened without the site visit, especially as the need and interest existed at OLLU but the site visit provided essential motivation and catalyst.

Bethune Cookman College

In February of 2004, Teig von Hoffman and Mullen visited Bethune Cookman College (B-CC), at the invitation of Mr. Alson Been. Installation of the AG node at B-CC was funded through the EOT-PACI/AN-MSI project, led by McLean. This node was installed in July, 2003.

Since the initial installation of the AG at B-CC in 2003 (which included a three day workshop with participants from various MSIs), the AG has been used in a variety of ways. The most visible usage of the AG is the weekly MSI meetings with the MSIC (Minority Serving Institutions Consortium) and with other scheduled AG events which B-CC is invited to participate and address various audiences who are looking to become a part of the AG community. In 2003 and 2004 we participated in SC Global as a constellation site. In June of 2004 B-CC participated in the Joint Educational Facilities Workshop along with NCSA, FIU and TRECC. The week long event dealt with cluster and high performance computing using various software tools and consisted of hands-on and over the AG presentations and instruction by Alson Been and Amado Gonzales from their AG nodes in Florida. Joint Educational Facilities, Inc. (JEF) is an all volunteer non-profit community-based K-12 organization that works primarily with junior and senior high school students and teaches them advanced computing sciences and contemporary mathematics topics with an emphasis on Intelligent Technologies.

A number of key meetings were held during this visit, perhaps most notably a brief conversation with the college president, Dr. Trudie Kibbe Reed. The keystone of the visit was day one of a multi-day distributed workshop, led by Teig von Hoffman and Mullen, with participation from several MSIC members. This workshop was continued 48 hours later during the site visit at Florida International University, with Teig von Hoffman presenting from the second location and Mullen joining the proceedings through a telephone bridge into the AG, provided by her home institution Worcester Polytechnic Institute.

From the workshop announcement:

This two-part workshop will encourage you to develop collaborations over the Access Grid, including collaborative education, working groups, conferences, and ideas only you can bring to the table. Topics to be discussed include: collaborative teaching, international working groups, and the latest uses of emerging technologies. Day one will focus on a current snapshot of Access Grid uses; day two offers the opportunity to explore collaboration ideas with the help of Access Grid pioneers.



Figure 3: Mullen and Teig von Hoffman, leading day one of the workshop at Bethune Cookman College



Figure 4: Workshop participants at Bethune Cookman College

Florida International University

In February of 2004, Teig von Hoffman visited Florida International University (FIU), at the invitation of Mr. Amado Gonzalez. Installation of the AG node at FIU was funded through the EOT-PACI/AN-MSI project, led by McLean. This node was installed July, 2003.

The Engineering Center at Florida International University is utilizing the Access Grid for its research, education, and outreach mission. The AG is being used to collaborate in research and showcase new technologies being discovered at FIU, FIU's Internet 2 membership, and FIU's Abilene connection. The College of Engineering is closely analyzing the integration of the AG with current courses, the development of new AG-related and Computational Science courses, workshops, and seminars. Notable

Access Grid activities that have taken place at the Engineering Center include:

- the United States Department of Defense High Performance Computing Modernization Program HPC Summer Institute in August 2004 under the Programming, Environment and Training Program in collaboration with the University of Hawaii and Jackson State Mississippi
- a National Science Foundation workshop for the new Course, Curriculum, and Laboratory Improvements (CCLI) grant
- Joint Education Facilities workshop in collaboration with ACCESS DC, NCSA, and Bethune Cookman College
- a full day "Vote Protection" lead by ACCESS DC during the vote for US Presidency
- Engineering Center participation in SC Global 2003 and 2004

Regular AG activities attended are weekly MSIC meetings and ArtGrid meetings, monthly Argonne National Laboratory AG Town Hall meetings; FIU has also used the AG to communicate with the Alaska Virtual Reality Center in Fairbanks for collaborative 3D Sculpting. A key effort is beginning soon: The FIU Engineering Center will lead a 15 month Access Grid Virtual Institute covering advanced topics in diverse disciplines including Mechanical and Materials Engineering, Biomedical and Tissue Engineering, Assistive Technologies and Neuroscience research, Digital Signal Processing, 3D Modeling and Visualization, Nanotechnology and Nanofabrication in collaboration with the Motorola Nanofabrication Facilities located at the FIU Engineering Center. FIU's additional close collaborators include University of Wisconsin Madison, Latin American and

Caribbean Consortium of Engineering Institutions, Argonne National Laboratory, and the Department of Energy.

This visit also included a good deal of executive awareness activities, plus a visit to the Alienware¹⁰ factory (a local minority-run business). Day two of the workshop described above from the B-CC visit was presented from FIU, and included a summary of day one, reports back from participants, and a brief demonstration of a guitar master class by Miller.

4. Models for supporting existing deployments of AG in emerging communities

If we assume that AG will become a ubiquitous technology, MSIC members deploying AG today are “innovators” in their communities, as defined in “Diffusion of Innovations” (Rogers, 2003)¹¹:

Venturesomeness [sic] is almost an obsession with innovators. . . . Communication patterns and friendships among a clique of innovators are common, even though these individuals may be quite geographically distanced. Being an innovator has several prerequisites. Control of substantial financial resources is helpful in absorbing the possible losses from an unprofitable innovation. The ability to understand and apply complex technical knowledge is also needed. The innovator must be able to cope with a high degree of uncertainty about an innovation at the time he or she adopts.

Innovators need a different level of support, financial and otherwise, to venture forth

¹⁰ <http://www.alienware.com>

¹¹ Rogers, Everett M. Diffusion of Innovations, Fifth Edition. New York: Simon & Schuster, Inc, 2003.

with implementing new technologies. Distributed groups such as MSIC and TVN create an environment for support among members; mechanisms such as site visits can be an important supplement to these distributed supports.

Based on the experiences and commonality among the site visits described above, we suggest two support models for emerging AG communities. The pre-site visit questionnaire indicated that the AG team at each site was interested in encouraging the development of collaboration between their institution and other institutions in the AG community. The question ‘how do I get other people to come work with me?’ is repeated at every site when the Access Grid arrives. In addition, due to varied resource levels, and time of adoption, some sites require slightly more technical assistance. These two themes, common across the visits, lead to the development of our support models. The models described below would not scale well to the AG user community as a whole, nor are they likely to be needed by the experienced AG users, (which again, assuming eventual ubiquity will be quite large). The aim of these models is to assist new member groups as they enter into the existing AG community.

We present two models, which are meant to be complementary rather than mutually exclusive. A given organization or institution may benefit from either or both approach. The key factor in determining which model is most appropriate in a given situation should be the expressed needs of the site in question.

Distributed workshop on “Discovering Collaborative Workspaces in Research and Education”

Many sites with AG nodes face a significant

Catch-22: They need support from their institution to make their AG facility an easy-to-use resource, yet such support may not be readily forthcoming without evidence of regular AG usage, which is unlikely to occur without the facility becoming an easy-to-use resource.

In February of 2005, Mullen and Teig von Hoffman presented a distributed workshop at B-CC and FIU, in close collaboration with Been and Gonzalez. Additional participating sites included FAMU, Clark Atlanta University, University of Hawaii, Our Lady of the Lake University-San Antonio, Winston Salem State University, and NCSA. This workshop can serve as a model for encouraging AG use, supporting local personnel in making their AG facility easier to use, and improving executive awareness of Access Grid and cyberinfrastructure in general. Materials for this workshop were developed over the course of the previous site visits; this workshop was in many ways the culmination of this round of visits.

This workshop features the creation and use of distributed working groups, to allow participants to experience remote collaboration during the course of the workshop itself, and play leadership roles in creating new projects (theoretical or actual). Through this methodology, some projects may already be in development by the end of the workshop, and all participants have the opportunity for first-hand experience collaborating at a distance.

Based on the workshop presented at B-CC and FIU, and incorporating lessons learned from this experience, the following structure is proposed for future versions:

Workshop roles (leaders, hosts, technical staff)

Workshop leaders

This workshop should be led by two or three people with substantial experience collaborating over the Access Grid. The workshop leaders should be co-located with workshop participants, but should not be co-located with each other – it is preferable that they lead the workshop in a distributed manner so as to model distance collaboration.

Workshop leaders are responsible for developing training materials and leading workshop sessions.

Host sites

Each workshop should have two or three host sites, preferably the same number of sites as the number of workshop leaders described above.

Sites hosting this workshop must have AG room nodes which seat at least 15 people (preferably more), and have sufficient microphone and camera coverage to allow participants to focus on the content of the workshop without concern for managing audio and video. Microphones should be arranged so that all participants can be heard from their seat, without having to request a microphone.

At least one representative should be designated from each host site to manage technical preparations, marketing and PR to attract participants, and any other logistical and technical issues.

Other participating sites

If other sites wish to participate, it should be only as guest speakers or others invited to share their expertise with the workshop participants. By focusing this workshop on only two or three sites at a time, participants are able to get focused attention from the

workshop leaders.

Technical director

Each workshop should have a technical director designated to ensure that technical problems do not disrupt the workshop. This technical director does not need to be co-located at any of the host sites; technical debugging can be done over the AG.

The technical director is responsible for managing all technical preparations, including arranging the test sessions described below.

Technical Preparations

A series of test sessions should be held before each workshop, to ensure that the AG nodes at all host sites are functioning properly, and that the network is sufficient to support the needs of the workshop.

The exact number of test sessions required will vary, depending on the specific sites involved in the workshop. The technical director should hold a test session one month before the workshop, to determine the current status of the host sites AG nodes, and determine the appropriate strategy for test sessions.

The test sessions should take place using the same nodes that will be used during the workshop itself. During these sessions, the technical director should ensure that audio, video, and shared applications are all working well, and that node operators at all test sites have appropriate text chat available and will use it for backchannel communications during the workshop.

Facilitator Training/Dry Run

Shortly before the meeting, a meeting should be held on the AG for the technical director and workshop leaders to provide any necessary final training or orientation to

staff at all participating sites. Depending on the experience level of the specific sites in the workshop, this can be as simple as a 30 minute session immediately preceding the first workshop session, or a 90 minute session the day before.

Day One: Orientation, background, creation of working groups

A two-hour session is held over the Access Grid. At least one workshop leader is co-located at each host site.

Introductions are held, with all participants at all sites encouraged to give their name, role within their organization, and their interest and/or experience with AG and cyberinfrastructure.

An overview is presented of AG and cyberinfrastructure, with a special focus on any particular resources available at the various participating institutions (i.e., clusters or advanced visualization environments).

A more detailed presentation is made on a topic identified to be of interest to participants, such as collaborative education or scientific visualization. This presentation should focus on the ways in which AG and other cyberinfrastructure can be leveraged to make collaboration more efficient and/or enable new possibilities.

Participants are encouraged to create distributed working groups, with the goal of reporting back on Day Three with plans to pursue particular collaborations. It is recommended that these working groups consider actual projects for implementation, but it is also possible for them to consider theoretical projects, as thought experiments to broaden their understanding of distributed teams.

After working groups have been formed, a schedule is developed by and with the participants for working group sessions over the AG on the following day. Working groups are encouraged to sign up for 45 minute time slots, and to supplement this meeting time with email, phone, or any other means of communication they prefer (such as IM or message boards).

Distributed working groups do not necessarily need to be confined to those participating in day one of the workshop; working group leaders may choose to invite others to participate in their project planning, either in their AG session planned for Day Two or in email exchange, etc. Participants may also request that the workshop leaders attend their working group AG session, if they would like input from the workshop leaders on their plans.

Day Two: Distributed working groups
Workshop leaders stay available by AG, phone, and email for consultation by the working groups.

Day Three: Reports back
A second two-hour session is held over the Access Grid, with at least one workshop leader at each host site. During this session, working groups report back, presenting their plans for ongoing collaboration.

“Two Techs in a Truck”

In some cases, there is simply no substitute for sitting down one-on-one together with a problem, and bringing the right tools to address it. Sending technical experts with appropriate tools is not a novel approach, yet it bears mentioning.

Staff operating an Access Grid Node may or may not be aware of the high quality audio and video available from the AG. This is

especially the case if they have not had the opportunity to observe well-established AG nodes. As a result, they may not avail themselves of the help readily available in the AG user community, and the quality of the AG sessions at their site may suffer. Also, technical staff may feel uncomfortable reaching out to the ag-tech mailing list, the most highly recommended source of technical help in the AG community, because they may fear appearing unskilled (especially if they are new to the field), or they may otherwise lack confidence in their ability to solve the problem or reach out for help. In addition, many academic cultures do not encourage the type of collaborative problem-solving necessary for troubleshooting AG and other distributed technologies; this may result in staff being afraid of “pestering people” if they ask questions, especially to a large public mailing list such as ag-tech.

In addition, there are many technical issues which are far more easily resolved on-site than remotely, especially regarding audio and video quality and AG technical staff at any given site may or may not have the appropriate equipment available to troubleshoot and/or address the problem.

There were many instances during the course of the site visits when 30 minutes together at the node accomplished what many hours of remote assistance through AG and email could not, and problems were resolved and/or workarounds were identified. It is hard to know whether this troubleshooting was more effective in person because of the physical access to the node by the technical expert, or because of the trust established by the physical proximity and by the commitment implied by the visitor’s travels. Regardless, the face-to-face nature of some of these visits appeared to be crucial.

In addition, sometimes a bit of technical assistance is all that is needed; a workshop would be overkill for the site's needs, or would be inappropriate for their interests. Perhaps they have collaborations ready to launch on the AG, and simply need a boost to remove technical obstacles. In these cases, it would be more direct and cost-effective to simply send a technical expert, and not organize a series of possibly-unnecessary and undesired meetings in order to provide the catalyst for technical assistance.

In the "Two Techs in a Truck" model, AG technical experts would visit sites with existing AG nodes who have asked for technical consultation and support. They

would bring commonly-needed hardware and troubleshooting equipment, and would spend a day at each site which had requested a visit, providing informal one-on-one technical consultation and support. They would also deliver to each site a packet of information regarding technical resources online, AG community events (such as the Town Hall), etc.

5. Conclusion

We have presented two models for ongoing support of existing AG deployments at Minority Serving Institutions and related organizations. It is hoped that these models will be applicable (and beneficial) in other settings, where the organizational needs and/or technologies being deployed are sufficiently similar.

Appendix A: MSIC brochure



Minority Serving Institutions Consortium

<http://www.msihpc.org>

One World, One Cyberinfrastructure, Many Peoples

Cyberinfrastructure--the computers, applications, resources, data, and people that will be linked through the world's fastest networks--will change the way we conduct business, make discoveries, educate our children, and lead our daily lives. Its impact will be felt by people of all races and ethnic backgrounds.

At the Minority Serving Institutions Consortium, we believe that a diverse community of scientists and IT researchers are the key to building a 21st century cyberinfrastructure that best serves our diverse population. That is why we are committed to linking the best faculty, students, and staff at Minority Serving Institutions (MSIs) with top research institutions known for cutting-edge technology development and scientific discovery. We know that minority researchers and students will strengthen the larger research community by contributing new ideas and new perspectives to key projects. We know that by building a comprehensive cyberinfrastructure, we are linking many diverse people, and that people from all backgrounds must contribute to the process.

The MSI Consortium also realizes that faculty, staff, and students from Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs) and Tribal Colleges and Universities (TCUs) want opportunities to use the latest technology tools--including high-performance computing clusters, grid-based applications, and collaborative technologies. For too long, budget limitations have left MSIs unable to take advantage of information technology innovations. For too long, talented MSI faculty and staff have had fewer opportunities to contribute to innovations and breakthroughs because of limited travel budgets, few high-speed Internet connections, and limited IT resources. That unfortunate truth is changing, and the MSI Consortium is at the center of bringing about this change.

A History of Success

The MSI Consortium sprang from the successful Advanced Networking with Minority Serving Institutions (AN-MSI) program, a National Science Foundation effort to assist MSIs in developing the campus infrastructure needed to become full participants in the Information Age. The Education, Outreach and Training component of the Partnerships for Advanced Computational Infrastructure program (EOT-PACI) was a key player in the AN-MSI program, as was the National Center for Supercomputing Applications (NCSA). NCSA heads one of the PACI partnerships and supports an Access and Inclusion program that connects minority researchers to PACI projects.

The MSI Consortium seeks to continue the work begun by EOT-PACI and NCSA by making MSIs full participants in the effort to build and deploy our nation's cyberinfrastructure. The group is an interdisciplinary community of scholars from MSIs that works to increase the participation of underrepresented minority women and men in computational science and high performance computing. The Consortium is organized into working groups that will drive its programs:

*The **Executive Awareness** Working Group uses print, electronic and one-on-one communications to make MSIs aware of the Consortium and its benefits.

*The **Training & Education** Working Group supports collaborative research for students, faculty, and staff through peer-to-peer resource networks, grant programs, conferences, internships, training sessions, and outreach programs.

*The **Cyberinfrastructure** Working Group helps connect MSIs to major high-performance research networks and promotes collaborative technologies, such as the Access Grid. It also pushes for better representation of minority researchers in the development of cyberinfrastructure.

*The **Assessment** Working Group supports the Consortium's efforts to incorporate continuous and ongoing evaluation methods into its programs, in order to understand what efforts works well and where improvements can be made.

The Consortium also provides an **information clearinghouse**, where MSI researchers can find up-to-date information on high-performance research projects and the latest developments in the MSI and HPC communities. Those interested in connecting with a virtual community of MSI scholars, students, and specialists can ask to be added to the Consortium's list serv by sending email to <mailto:msic@ncsa.uiuc.edu>. To be added to the Consortium's discussion group, send your request to <mailto:mclean@ncsa.uiuc.edu>.

Leadership in Action

The Consortium is led by NCSA and many EOT-PACI partners participate in setting the Consortium's goals and tracking its progress. A key focus of the consortium in the MSI Cyberinfrastructure Initiative (CI), which works to:

- **Create conditions and opportunities for broader participation** in the entire spectrum of CI activities by MSI-based researchers and educators. The Consortium believes the ultimate indicator of successful inclusion efforts is the level of participation in high-performance computing and its applications by members of the MSI community.
- **Foster and recognize leadership** by MSIs in activities that assist in developing the infrastructure, skills, and awareness needed to take full advantage of advanced information and communications technologies. Leadership development and recognition will also include providing a strong, open, system

for Consortium members and others at MSIs to interact and collaborate as part of a nationwide virtual partnership.

- **Foster the transformation of MSIs** into institutions that are equipped to take full advantage of advanced cyberinfrastructure. Concerted institutional support for cyberinfrastructure initiatives have been proven effective. These efforts include assistance with "last mile" issues, identification of best practices, assisting with institutional reform relative to funding, how to apply existing and emerging technologies, and developing executive awareness of the promise and possibility of CIs.
- **Develop collaborative research involving MSIs.** The potential impacts of collaborative and distributed research tools

on MSIs are immense and promise to support and stimulate high-performance computing at MSIs. Collaborative research will further expand the competitiveness of MSIs in cutting-edge technology, including advanced computing resources and research, digital libraries, data mining, and shared databases.

- **Develop systematic evaluation and assessment procedures for all programs.** As work evolves in new areas with expected high-impact successes and failures, it is critical to incorporate continuous and ongoing formative evaluation efforts.

MSIC Institutions:

Hispanic Serving Institutions (HSIs)

California State University-Bakersfield
California State University-Dominguez Hills
California State University-Fresno
California State University-Los Angeles
California State University-San Bernardino
College of Santa Fe
Florida International University
Herbert H. Lehman College (CUNY)
Inter American University of Puerto Rico-Arecibo
New Mexico Highlands University
New Mexico Technical University
Our Lady of the Lake University
University of Houston-Downtown
University of Puerto Rico-Mayaguez
University of Texas Pan American
University of Texas El Paso
University of Texas-San Antonio
Universidad del Sagrado Corazon

Historically Black Colleges & Universities (HBCU)

Bethune-Cookman College
Clark Atlanta University
Coppin State University
Dillard University
Fayetteville State University
Fisk University
Florida A&M University
Florida Memorial College
Hampton University
Howard University
Jackson State University
Langston University
LeMoyne-Owen College
Morehouse College
Morgan State University
Norfolk State University
North Carolina A&T State University
Prairie View A&M University
Rust College
Southern A&M University
Spelman College
Tennessee State University

Tuskegee University
Winston-Salem State University
Saint Augustine's College
University of the District of Columbia

Tribal Colleges and Universities (TCU)

College of Menominee Nation
Fond du Lac Tribal Community College
Fort Belknap College
Kumeyaa Community College
Lac Courte Oreilles Ojibwa Community College
Little Priest Tribal College
Northwest Indian College
Oglala Lakota College
Salish Kooteni College
Sinte Gleska University
Sitting Bull College
Turtle Mountain Community College
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<http://www.msihpc.org>

--Americans cannot create the future if a significant portion of the American population is left out of the creative process. The MSI Consortium seeks to include all groups in this creative process and to help build a 21st century cyberinfrastructure that serves all.

Appendix B: Call for participation that was sent to MSIC for site visit applications

[Sent 8/19/2004 to MSIC mailing list]

Through a grant by the National Science Foundation (NSF), a series of site visits will be conducted at selected Minority Serving Institutions Consortium (MSIC) member schools that are actively using Access Grid (AG) Nodes. MSIC is made up of colleges and universities from Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCU), Hispanic Serving institutions (HSIs) and Native Alaskan/Hawaiian Universities (NAHU).

These site visits will include a combination of training, executive awareness, and evaluation activities. The focus of these visits will be on the access grid activities but will also build upon awareness of the broader Cyberinfrastructure. Site visit will be tailored to each campus and could last between one to three days depending on the needs of that school. Site visits will be scheduled following the MSI Executive Awareness Event to be held over the Access Grid on September 9, 2004. This event is being organized by the MSI Consortium as a platform for senior level administrators and faculty to discuss how emerging technology has effected campus operations, research and teaching at MSIs. For more information will be uploaded to www.accessgrid.org.

MSIs that have been deployed AG equipment through the NSF funded Education, Outreach and Training- Partnership for Advanced Computational Infrastructure(EOT-PACI)/Advanced Networking with Minority Serving Institutions (AN-MSI) Program will have top priority for these visits, however all MSIs with access grid nodes are encouraged to make a request.

Jennifer Teig von Hoffman, of Boston University, will be conducting these site visits. She is a key collaborator with MSIs and will work directly with institutions to develop these visits. Jennifer is a long-time member of the AG community, and has played a key role in training, documentation, event planning, and community building. Sample activities which could be incorporated into site visits include:

- Meetings with key decision-makers, to help them better understand how the AG can be used for research and other collaborative activities as well as a platform for dissemination.
- Interactive workshops with event planners, to help them create new events on the AG or expand their existing events to include remote participants the AG.
- Trainings for new AG node operators, to introduce them to basic AG operations and to the various sources of help within the AG community.

If your institution is interested in having us conduct a site visit, please send an e-mail to Jennifer at jtvh@bu.edu by August 31st with responses to the following questions.

- 1) What activities would you propose during your site visit? Please include a list of senior administrators, technical staff, faculty, or others at your site who would participate in the visit; a brief overview of the proposed activities; and any information about proposed dates.
- 2) How would this site visit improve and enhance the use of the AG at your site, and help you and your staff to better support existing activities?

- 3) What skills and experience at your site could be better shared over the AG as the result of this site visit?
- 4) Please confirm that you are willing to participate in an evaluation survey as part of this site visit. This survey may include both written and verbal components. The results of the survey will be shared with the MSIC and the cyberspace community, with identifying details withheld or obscured to protect the privacy of participating institutions.
- 5) If your campus currently has an active AG node, please list in detail the dates and (informal/formal) sessions/meetings in which your school has participated.
- 6) Please propose at least two alternative sets of dates for a visit to your site. Site visits will be scheduled for times that are mutually convenient, and not before the week of September 13th.

Jennifer and I look forward to visiting your campus. The deadline to request a site visit is August 31st. If you have any questions please e-mail Jennifer (jtvh@bu.edu) or Stephenie (mclean@ncsa.uiuc.edu).

Thank you!

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Appendix C: Pre- and post-visit survey, with data [obscuring details that would identify specific respondents]

[The survey shown below will be sent again to each of the participating organizations and institutions six months after their visit, to estimate the impact of the visit. Details that would identify any particular organization have been obscured to protect the privacy of respondents.]

MSIC Site Visit Survey

You will be asked to respond to these questions twice, in two different surveys:

1. The week before your site hosts a visit (**which you are filling out now**).
2. Six months after your site hosts a visit.

This survey should be filled out only once per site, by the person or people most directly responsible for requesting and organizing the visit hosted by your institution. The results of this survey will be useful to those developing, deploying, and designing implementation strategies for new technologies, especially in emerging communities.

Please indicate the order of importance of the following site-visit activities, rating as 1, 2, or 3 (with 1 being most important):

Promoting executive awareness
Training
Relationship building with others in AG community

Responses cited “Relationship building with others in AG community” as the most important by a large margin, with “Training” barely nudging “Promoting executive awareness” out of second place

Are site visits an effective tool in marketing the AG to your organization? Yes/ No

Yes: 6

No: 0

No response: 1

In your experience what has been effective in marketing the AG (in addition to or in place of site visits)?

“Inviting VIPs to sit in on AG meetings and events”

“The most effective tool for us has been the demonstration of the technology. One organizations see the AG sessions up and running, they are able to realize the various uses within their orgs. for utilizing this medium.”

“showing/illustrating the capability of the technology”

“Personal and formal demonstrations of the technology to individuals and groups”

“advanced content presentations given by the AG community in diverse disciplines”

“Sharing the information about it with my peers and allowing them to see and participate in AG events.”

Do site visits make it likelier that people at your organization attend AG events such as lectures, workshops, and tutorials? Yes/No

Yes: 7

No: 0

Are people in your organization more likely to attend AG events if it is during a site visit? Yes/No

Yes: 7

No: 0

If not, then when are they likely to attend?

“when it pertains most to their area of research”

What is the evidence that there is interest in high performance computing and grid technologies at your institution?

“[Our parent organization] has committed a full time computer technician to the project.”

“The evidence that we see is 1) Increased interest in the technology- wanting to see it in operation and 2) Expressed interest by [related] organizations in developing programs using the [AG]”

“There exists a High Performance Computing Center”

“Faculty, Researchers and organization support for collaboration, presentations, forums utilizing the technology”

“Support of [some] interested parties.”

“Already have 96 node AMD Opteron 64 bit cluster, which is already at 100% use, and in the process of building two more clusters for Computational Nanotechnology and Assistive technologies”

“A sixteen node cluster in our science and mathematics department, built by a professor and students.”

How many meetings or other events has your AG node participated in over the AG in the past month, which were organized at other institutions? Please do not include demos or test sessions in this total.

The average (mean) response was 4.14, with a high of 12 and a low of 0.

How many meetings or other events have people at your institution (including yourself) scheduled and organized on the AG in the past month?

The average (mean) response was 2.14, with a high of 7 and a low of 0.

How many people at your institution attended the last AG Retreat?

The average (mean) response was 1.71, with a high of 5 and a low of 0.

How many people at your institution plan to attend the next AG Retreat?

The average (mean) response was 2.14, with a high of 4 and a low of 0.

How many people at your institution attended the last SC conference?

The average (mean) response was 4, with a high of 10 and a low of 1.

How many people at your institution plan to attend the next SC conference?

The average (mean) response was 4.14, with a high of 10 and a low of 1.

What contributions has your institution made to the grid and high performance computing communities? (Examples could include such things as helping other sites install or troubleshoot new technologies; developing software; writing documentation which is shared beyond your local organization.)

“[public health activities, native language promotion activities, collaboration with the public schools]. We have set up our website, that provides information regarding events and cultural protocols.”

“Due to our recent introduction to the AG technology, we are still learning the "in's & out's of it and have not contributed to the community.”

“Establishing low bandwidth AG's at five tribal sites in New Mexico”

“ITS our networking department has given their full support to bring the AG online (i.e. multicast, I2, etc.) - Instructional Media Center - use of facilities and node operators - AG is currently housed in the brand [new] part of [our library, in] the Instructional Media new wing.”

“Participation in the MSIC; drafting documents; participation in the SuperComputing Conferences.”

“Helped other sites with technical issues, installation, hardware, and have published work in AccessGrid and Latin American and Caribbean research institutions. Also [our institution] provides Internet 2 connectivity to various institutions in Florida, participating in GRIPHYN (Physics Grid) and working to connect to Lambda Rail.”

“Writing a paper on setting up a Linux Cluster using OSCAR. Assisting other sites with questions on how they can go about getting the AG equipment and help in setting it up.”

Please indicate your level of agreement with the following statements:

| Statement | Strongly Agree (4) | Agree (3) | Disagree (2) | Strongly Disagree (1) |
|--|-------------------------------|----------------------|-------------------------|-------------------------------------|
| I can use the Access Grid without any help. | | | | |
| <i>Average response was “Agree” (3), with responses ranging from 2 – 4.</i> | | | | |
| I would be happy to use the Access Grid frequently. | | | | |
| <i>Average response was close to “Strongly Agree” (3.67), with responses ranging from 3 – 4.</i> | | | | |
| I find the Access Grid difficult to use. | | | | <input checked="" type="checkbox"/> |
| <i>Average response was close to “Disagree” (2.14, with responses ranging from 2 – 3.</i> | | | | |
| I feel very confident about using the Access Grid. | | | | |
| <i>Average response was “Agree” (3), with responses ranging from 2 – 4.</i> | | | | |
| I needed to learn a lot of things before I could get going on the Access Grid. | | | | |
| <i>Average response was “Agree” (3), with responses ranging from 1 – 4.</i> | | | | |
| I am comfortable troubleshooting Access Grid when problems arise. | | | | |
| <i>Average response was close to “Disagree” (2.29), with responses ranging from 2 – 3.</i> | | | | |

What technologies are you most interested in deploying in the next 18 months?

“Work toward obtaining a T3 line that will allow us access without the limitations of T1 line bandwidth.”

“Shared Apps programs is a major interest.”

“Long distance education programs, workshops, etc.”

“additional AG technology throughout campus (the room is small, so we want to broadcast to additional rooms)”

“Advanced Collaboration Environment (ACE)”

“Faculty and student collaboration and research over the AG.”

What other comments would you like to share with us?

“We are fortunate and appreciative that our rural, remote community is able to provide technology that is on the cutting edge. We hope to gain more expertise in its use and becoming more active in the high performance computing communities.”

“Looking forward to the site visit!”

“[our institution] has been truly blessed - thanks for all of your assistance! To God be the Glory!”

“Gaining support among the University is a challenge. The applications of SuperComputing are not generally known/well understood across disciplines generally. Support at my institution is uneven and sporadic.”

“The AccessGrid[sic] and its global community has made a tremendous impact on my life, research, and overall understanding of different cultures, means of communication, research and education”

“How can we make the AG available to all especially academia at a reasonable cost?”