SC16 BoF SIGHPC-Resource Constrained Environment
Start. 12:15 End.13:15

Attendees
See attachment "attendee Data"

BoF

1. Introduction of the chapter- Presenter Hensley Omorodion
Outline of presentation
Vision and mission of SIGHPC-RCE
Current sighpc-rce leadership
Chair
Hensley Omorodion
University of Benin, Nigeria, Network Engineer
hensley@uniben.edu
Vice--Chair
Elizabeth Leake
STEM TREK, Founder and President
itbeth2@gmail.com
Treasurer and Education Adviser
Rachel Vincent--Finley
Southern University and A & M College, Baton Rouge, Associate Professor of Mathematics
rachel_finley@subr.edu

Current membership demographics
Major activities of the chapter in 2016, as a follow-up on SC15-BoF's call to action.
Introduction of other presenters

Report on HPC Donation-Adoption Survey.-Elizabeth Leake (Founder and President STEM-Trek)

Prescription for Sustainable Engagement with e-Infrastructures in Resource Constrained Environments (P-SCRIP)-Elizabeth Leake (Founder and President STEM-Trek)

Computational Resource Sharing (CRS)- Rachel Vincent-Finley (Southern University and A & M College, Baton Rouge, Associate Professor of Mathematics)

1. **HPC4Abe Hardware Donation/Adoption Program Concept**-Presenter Elizabeth Leake

   Why is an HPC recycling program needed?

   Critical shortage of skilled personnel—workforce development focus.
   Adoptive sites will become training centers.

   "Well-prepared high-tech workforce" established as national priority via Executive Order in National Strategic Computing Initiative of 2015.
   "well-educated, capable, and practically trained systems administrators" identified in the "Future Directions for NSF Advanced Computing Infrastructure to Support U.S Science and Engineering in 2017-2020."
   Only 23 percent of NSF grants are supported—extending the life of hardware and public investment in

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HPC will reduce the number of proposals and competition for assets.
We lack a plan or process for responsible end-of-life e-waste disposal.
Capacity systems decommissioned every 2-5 years
Stewardship of e-waste is uncertain; some is shipped to third-world countries.
Up-cycled systems have another 5-7 productive years in education and research settings!!!

Survey launched to benchmark adoption interest March 27, 2016

- Disseminated via STEM-Trek (8,500). XSEDE Campus Champions (200+), Small HPC Center Challenge Google Group (249) and Retweeted by HPCwire (11.4k).
- 77 respondents (resource-constrained US universities and government sites, plus 12 international sites).
- 98 percent want to adopt; 2 percent didn't currently want or need hardware.

2.1 Prescription for Sustainable Engagement with e-Infrastructures in Resource Constrained Environments (P-SCRIP) is a self-driven assessment instrument that will help colleges and Universities in RCEs build a case for human capital development (HCD) and sustainable engagement with advanced CI

New Mexico Consortium and Illinois-based **STEM-Trek Nonprofit** could host two national depots where large decommissioned systems could be shipped, stored and split into small, two- to four-rack independent systems. The depots would work with regional workforce development programs to train electrical engineering students on how to assemble HPC/HTC systems. STEM-Trek could provide external relations and communications services and assist with beneficiary assignments and training in the Illinois depot. NMC would provide project management, training rubric and logistics oversight. By allowing a third-party NGO to handle assignments, it relieves donor agencies from having to choose. Blind adoptions can be arranged, or donors can opt to mentor beneficiaries to ensure successful deployment.

U.S. CATEGORY 1, 20%. Established centers that are adequately staffed and could shoulder the time/materials it would take to configure their own racks. Hardware could ship directly from the donor source without any pre-configuring. The beneficiary institution might be asked to cover shipping, if they are not resource-constrained. This is the fastest adoption process, but it would require the largest beneficiary investment. Non-EPSCoR.

U.S. CATEGORY 2, 40%. These sites have skilled labor, but they are too busy to pre-configure (or lack engineering expertise), and can't afford shipping. They would benefit from turn-key, fully-loaded community clusters (OSG/XSEDE). They will need minimal, if any training. Resource-constrained; some EPSCoR.

U.S. CATEGORY 3, 30%. These sites require a thorough assessment to make sure they have an adequate facility and administrative support (P-SCRIP). They can't afford to pay for configuration or shipping, and could be candidates for a sustained mentoring and training effort. They are likely candidates for cloud HaaS, Jetstream or other remotely-managed services. Many are EPSCoR resource-constrained

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sites, but not all of them are. Some are close to major research institutions and could possibly be paired for a regional mentoring arrangement.

International Collaborators, 10%. These sites have an affiliation with a U.S. research project and must have a U.S. co-PI in order to leverage federated resources, or adopt decommissioned hardware. In addition to fully-configured systems, they would be offered the same training and support provisions as sites found under category three.

NSF-XSEDE potential donor (or beneficiary) sites. Some have resources, and all have training and outreach potential.

DOE National Labs. Most are prospective donor sites.

Why would universities adopt? Emerging themes:

- "Gift-and grant-funded" model isn't sustainable. Too much competition for NSF grants in US. Extends public investment.
- Many use antiquated hardware and lack plan or process for growth/replacement (spend too much time maintaining, not training others).
- Universities leadership has bigger worries. All budgets are thin, and there are more urgent and immediate priorities.
- Presidents/Chancellors don't always understand the ROI of an HPC investment.
  - Many tech personnel lack the advocacy and communication skills necessary to educate them.
- African consumer prices 80—90 percent lower than US and Europe in some cases—New hardware is extremely expensive to procure.

Overcoming objections; myths

- No post-warranty support.
  - *So what? We have lots of hot spares.*
- You could buy a new commodity cluster with power savings!
  - *Few have a budget for new hardware purchases.*
  - *Power usage isn't the same as a capacity system. Ad-hoc power consumption.*

HPC4Abe would employ PRObE's model: Education in Every Phase

- High School students refurbish the systems; learn electrical engineering and programming skills
- Return on Investment derived from human capacity, not machine capacity.
- PRObE: High school student work-study

A sampling of use-cases and testimonials that accompanied survey feedback…

Next steps…

- Survey prospective donors (govt.)
- Identify transportation partners (ongoing)
- Appeal to industry partners (ongoing)
  - They also need a well-prepared workforce
- Seek govt. support (ongoing):
  - Need policy making it easier to donate hardware purchased with public funds.

Suggest grant funding provision; require an e-waste stewardship plan for equipment purchased with public funds.

Conclusion

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2016/11/16

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Contact Elizabeth Leake, STEM-Trek itbeth2@gmail.com www.stem-trek.org

2. **COMPUTATIONAL RESOURCE SHARING (CRS)**- Presenter Rachel Vincent-Finley (Southern University and A & M College, Baton Rouge, Associate Professor of Mathematics)

   Using Southern University at Baton Rouge as a case model for computational sharing.

   Challenges to computational resource sharing
   - Need for curricular review to build the right competency
   - Existing campus network provisioning to support regional or inter-continental network connectivity of remote HPC centre
   - Locating common research focus for Principal Investigators among Resource Constrained Environments.

   Leveraging on existing XSEDE Campus Champion model, to facilitate computational resource sharing among SIGHPC-RCE members.

3. Feedback and suggestion from the audience, Q and A Session.

Christopher Harrison
Comment.
- Appreciates the presentation, but raises the need for competency building-up to solicitation for hardware donations rather than vice versa.

Tshiamo Motshegwa
Comment.
- Expects that the commonality among member region of RCEs translates to a common perspective of approach in solving RCE's challenge.
- Appreciates the PRObE's model for competency development
- Identifies the need for policy reforms, the inclusion of policy makers in the initiative of HPC workforce and infrastructural development in RCEs.

Catherine
Comment.
- Most RCE are not entirely cut from access to infrastructure, challenges are, understanding the modality to access these resources within regions.
- Emphasized the need to encourage RCE researchers to engage more with available HPC resources to develop a use case for existing infrastructure.

4. Conclusion – presenter **Hensley Omorodion**

There is need for all to engage our community to access regional resources.
Organize training workshop for competency development.
Employ a match-making model to develop more co-PI from RCE with United States PI to explore regionally barrier-HPC- resources.
All members should be involved in every stage of the ongoing HPC Donation and Adoption survey.
Membership to the chapter is open to all; complimentary membership can be requested via a mail to the Chair and Vice-Chair.

Scribe. H. Omorodion