



MAGIC Meeting Minutes

June 1, 2016

Attendees

Shantenu Jha	Rutgers
Peter Lyster	NCO
David Martin	ANL
Grant Miller	NCO
Lavanya Ramakrishnan	LBL
Derek Simmel	PSC
Rangan Sukmar	ORNL

Action Items

Proceedings

This MAGIC meeting was coordinated by Grant Miller of the NCO. Lavanya Ramakrishnan of LBL gave a presentation on their Tigres system.

Tigres: Lavanya Ramakrishnan

Tigres provides template interfaces for agile parallel data-intensive science. While there are lots of workflow tools in existence, big science users are asking for tools to expedite their applications. Tigres provides templates for common scientific workflow patterns. The templates are implemented as a library in an existing language (currently Python and C) to implement sequential, parallel, split, and merged approaches to computation. It focuses on large-scale data-intensive work flows based on the MapReduce model. It extends current scripting/programming tools and is as easy to run as an MPI program on an HPC resource. Tigres provides a user-centric design process with constant feedback from the users. There are 4 Tigres templates for :Sequence, Parallel, Split, and Merge applications. Tigres provides a programming interface to support workflows, to optimize execution semantics on HPC systems, and to provide usability processes for API design and development.

Tigres provides a library to support iterative workflow development for Design, Development, Run, and Feedback. It supports recovery from logs based on the monitoring API.

For parallel sequential applications Tigres has demonstrated a reduction in resource usage/wastage of 65%.

User interaction is a core element of Tigres and is an integral part of Tigres R&D. Usability studies provide feedback from end-users. An online questionnaire provides user feedback on their experience with Tigres. Interviews with users identify future capabilities that would be useful including: support for nested templates, running loops in Tigres, and improvements in syntax.

Tigres has been effective in supporting bioinformatics (BLAST), satellite image re-projection (CAMP), astronomical image mosaic engine (Montage) and cosmology (SNe simulation).

Experience with Tigres has shown that:

- Setup of workflows is tedious
- Code is not always portable from desktop to HPC
- Achieving efficiency is non-trivial: different file systems performance needs to be tested.

Analysis of Tigres usage indicates that 79% of jobs with Tigres were successful out of 1982 workflows.

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Tigres features include:

- Iterative workflow development
- Execution of existing application binaries and functions seamlessly run on desktops, clusters, and HPC
- Monitoring and Provenance with visual representations
- Documentaiton, examples and tutorials
- Recovery of failed workflows from logs
- The C API is limited

Research topics include:

- Active Code generation
- Intelligent and improved workflow management
- Deployment configuration: Tigres + Shifter
- Better failure detection and reporting
- Synergism: workflow scheduler, managing data space, and managing elastic tigres environments.

Tigres has effectively supported CAMP, TAKO, ARES/BDC, Earth system simulation, and Inria Associated Team

Lessons learned include:

- Python is attractive for users
- Template interface was attractive
- Nested templates are needed
- User-centered design enables early user feedback

For minformation on Tigres please contact:

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<http://tigres.lbl.gov>

For the full presentation, please see the MAGIC Website at:

https://www.nitrd.gov/nitrdgroups/index.php?title=MAGIC_Meetings_2016#June_2016
https://www.nitrd.gov/nitrdgroups/index.php?title=MAGIC_Meetings_2016#June_2016

Next MAGIC Meeting

July 6, 2016, 2:00-4:00 Eastern, NSF Room TBD