# Deploying HPC for Interactive Simulation

## Birds-of-a-Feather

**12:15 – 1:15, Tuesday November 18th, Room 9B**

**hpcsim.wordpress.com**

# BOF Summary

- This BOF will discuss the problem-space and experiments that have been conducted in applying HPCs to interactive applications, such as military simulation.

- Traditional networks of computing assets are challenged to support simulation scenarios of sufficient breadth, fidelity, and number. Several organizations have turned to high performance computing for a platform that is powerful enough to run these interactive simulations.

- This BOF continues the discussions and community building that began at SC'07.

# BOF Objectives

- Identify the organizations and projects that are actively applying HPC to interactive simulations – e.g. training simulation, military experimentation, online computer games.
- Exchange lessons learned on the work that has been done.
- Build a community of practice in this area.
- Seek advice from the leaders in traditional HPC applications.
- Expose this application area to the larger HPC community.

# Kick-Off Speaker
## Dr. Tom Jackman,
## IBM Research, Visualization Science

**What kind of research is happening in this area?**
**What have other domains wrestled with and solved?**

Tom Jackman is currently a Research Staff Member and Manager of the Visualization Systems Group at IBM's T.J. Watson Research Center in New York. He manages a team of scientists and engineers that are tasked to investigate improvements to all aspects of the graphics experience for high performance visualization, including collaboration, scalability, virtualization, performance and delivery. He has over twenty years of experience in high performance computing and is currently most interested in the emerging convergence between computing and visualization called visual computing. Tom began work at IBM Research in 1990, first as an Academic Visitor and then as a Visiting Scientist, in the Computing Systems Department while teaching at two nearby colleges. He left academia to accept a permanent position as a research scientist in the Physical Sciences Department at IBM Research where he did work in various aspects in computational science, especially computational chemistry, statistical and visual analysis, and scientific visualization. During this time he also served as a special consultant and Associated Researcher to the University of New Mexico's High Performance Computing Center in Albuquerque, NM. Tom has a B.A. in Biochemistry, and an M.S. and Ph.D. in Chemical Physics, all from New York University.

# Technical Challenges

1. **Interactive HPC** – exploring bandwidth sufficiency from the computational elements to multiple external users.
2. **HPC I/O Structure** – HPC structure that best supports interactive users.
3. **Simulation as an IT Service** – using HPC as the server-side of a ubiquitous software service.
4. **Fault Tolerance** – auto restarting a job when a processor dies, and doing so without losing the partial data that was in the works.
5. **Processing Hierarchy** - introduction of a processing hierarchy in the logic of simulation architecture design.
6. **Organizational Acceptance** - technical and organizational challenges of using a shared resource for interactive simulation, rather than distributed commodity hardware.
7. **Parallel Programming** – training the simulation industry in parallel programming techniques, vs. the network programming that has dominated for 20 years.
8. **Cloud Compute Environments** – load-balancing and task assignment in a network of HPCs and traditional workstations.
9. **Interactive User Security** – verification of users communicating with jobs on open ports.

# Building a Community

- Collecting Names & Email
- Blog: hpcsim.wordpress.com

- Lunch: If you are hungry, let's group up and find a place

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