

September 17-18, 2008 in San Francisco, California

Risk Management Techniques and Practice Workshop
for High-Performance Computing Centers

Track 2, Session 2

Real Life Risk Experience

**Management of System R&D from Contract Award
through Build:
"Moore's Law meets Murphy's Law"**

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Session 2 Guidance

- Leading-edge systems often have a long lead time and require a significant amount of new technology that must be developed and deployed
- This session will address how risks are identified, tracked, and managed during this phase when the system is still in the vendor's hands.
- What are the major risks in this phase of the acquisition and who owns them?
- This session will cover real-life experiences and examples regarding risks, including tips and suggestions on how to prepare for situations that **will** occur, usually at the most inopportune time.

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Session 2 Participants

Manuel Vigil	LANL LEAD
Ann Baker	ORNL LEAD
Matt Leininger	LLNL NOTES
Cristina Beldica	NCSA
James D'Aoust	SDSC
Vince Dattoria	ASCR, DOE/HQ
Jim Foster	TACC
Mark Seager	LLNL
Francesca Verdier	NERSC
Mary Zosel	LLNL

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What are our top 3-5 risks?

1. If vendor encounters technical/business problems
 - HW/SW development
 - Unknown technology
 - Changing roadmap
 - Performance does not meet requirements
 - Component pricing variability
 - Parts availability and schedule issues
 - Vendor strength, breadth, and depth
 - Integration issues

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What are our top 3-5 risks?

2. If there is a schedule deviation

- Slippages
- Something better comes along
- Facility availability

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What are our top 3-5 risks?

3. If system encounters scaling issues

- Inability for early scaling testing
- Software does not scale as expected
- Usability at scale
- OEM provisions don't function at scale
- Applications scaling

4. If there is funding turbulence

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- What are the most effective risk management/mitigation techniques addressing these risks?
 - trust and VERIFY
 - Formal risk monitoring, including ranking of risks by likelihood and impact and defining mitigations for those risks with higher consequence and probability
 - Vendor communications and monitoring
 - Early delivery of a test system in order to perform internal testing
 - Actively track top 10-20 risks
 - Receive, approve, and monitor the vendor's risk plan
 - Obtain high-level executive buy-in from both sides
 - Regular communication between customer and vendor executives
 - Build and test at factory at scale
 - Interim option execution, both in RFP and in SOW
 - Interim go/no-go decision points, both in RFP and in SOW
 - Visibility of progress/failure and sharing of solutions/problems among HPC sites
 - Pre-delivery testing to include applications

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- **For the top risks, how well does risk management practice fit?**
 - Not all funding profiles allow for funding contingency.
 - Most parts of the standard process work in terms of using this as a tool for managing mitigations.
 - Use contingency where applicable for either schedule or scope.
 - HQ management reporting model hinders programmatic flexibility and that increases risk, e.g. get-well plans that must be done for early success.
 - Government bureaucracy can insert time delay into processes that must occur quickly. (Said with passion....)

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- **What are key lessons learned?**

- You must be willing to pull the trigger on your risk mitigation strategy on the actual date as planned.
- Establish the vendor partnership early and explicitly share the risk appropriately.
- The build phase will be easier if we reduce technology risk by taking advantage of things like incremental deliveries, open source, and commodity parts.
- Software stability and scaling testing always get squeezed. Guard against this vigorously.
- Communicate effectively and often.
- Prepare applications and end users for change.

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- **What are some risk management success stories?**
 - Road Runner assessment positive review was a result of careful project planning and risk management.
 - ASCI Blue-Pacific came in three months early and achieved 20% over the performance requirement as a result of careful risk management.
 - We did not execute an option when we realized the risk was too high.
 - A financial risk was managed by changing node architectures for ASCI Purple, delivering on-time meeting programmatic requirements for significantly less money.
 - NERSC used risk management processes to implement Compute Node Linux nine months earlier than scheduled.

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- **What areas of HPCCC risk management techniques have the most opportunity for improvement?**
 - We realize that we are in a high-risk area and we manage this accordingly. However, many of the processes imposed upon us do not allow us to be agile.
 - EVMS and other processes--a hindrance and increase the risk of failure. (Resume passion.) This inserts delays at critical decision points that need to be made quickly.