

*September 17-18, 2008 in San Francisco, California*

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

# Track 1, Session 2

## Tailoring Risk Management to HPCCs

**Risk Identification and analysis:  
the classic categories  
Are we covering all the bases?**

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- Session 2 will focus on risk identification, with a discussion of risk ownership and risk analysis if time permits.
- In this session, the team will cover the standard categories, what areas fit the HPC and what ones do not, focusing on where the HPC community might be unique.
- We will move from the general categories, to more focused and tailored categories with a goal of answering a number of questions, including: although the categories are broad, do they really cover HPC and what types of risks fall into each category.
- If the risk categorization topic is not sufficient to fill the time, the team will continue the discussion with risk ownership and risk analysis (how to measure and rank).

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# Session 2 Participants

- Boudwin            Kathlyn    ORNL            LEAD
- Kovatch           Patricia    UTenn/NICS    LEAD
- Butler             Tina        NERSC          NOTES
  
- Bettge             Thomas    NCAR
- Dattoria           Vince      ASCR, DOE/HQ
- Kasdof            James     PSC
- McKenna          Thomas    PNNL
- Minyard           Tommy     TACC
- Morton            David      SGI
- Munoz             Jose        NSF, HQ
- Quinn             Terri      LLNL
- Skouson           Gary       PNNL
- Blaine             Brad       HP

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# What is project risk?

- Uncertain event or condition that impacts project objective
- Risk identification determines which risk might affect the project and documents their characteristics
- Risk identification is an iterative process
- *How often do you review risks, add risks, and retire risks?*

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# Tools/Techniques to Identify Project Risks

- Brainstorming
- Checklist Analysis
- Assumptions Analysis
- Diagramming Technique
  
- *Has anyone used any of these techniques? Were they successful at identifying project risks? Were other techniques used to identify risks? What works best?*

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# Common Sources of Project Risk

Exam Cram 2 PMP by D. Francis and G. Horine

- Project Management
- Organization
- Stakeholders
- Project Charter
- Scope Statement
- WBS
- Project Schedule
- Cost Baseline
- Requirements
- Product Design
- Team
- Technology
- Network Diagram
- Assumptions
- Constraints
- External Dependencies

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# Common Risk Areas

DOE Professional Skills Training

- Requirements Definition
- Design, Modeling and Simulation
- Technology
- Safeguards and Security
- Production
- Capability of Developer/Contractor
- Cost/Funding and Budget Management
- Management Interface/Interaction
- Funding and Budget Management
- Schedule
- Stakeholder, Legal, and Regulatory

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# Examples

<b>Risk</b>	<b>Risk Description</b>	<b>Classic Category</b>
Increased Facility Costs	Budget does not meet the increased facility costs over time (utilities, etc.)	Cost Baseline
Processor Availability	Processor is not available on schedule or does not meet performance expectations	External Dependencies or Technology
User Application Scaling	Challenge of preparing applications to run at scale	Technology or Organization
System is not reliable	The MTTF or MTTI is insufficient to execute science-at-scale	Product Design

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# Questions for Session 2

- *How well do the common sources of project risk fit HPC projects? Are there unique areas of HPC risk not covered by these broad categories?*
- *What are the key lessons learned in risk identification?*
- *What are best practice risk models for HPC in the area of risk identification?*
- *What opportunities exist to share or improve practices and terminology?*

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# *How well do the common sources of project risk fit HPC projects?*

- They fit, but HPC-specific categories would help to more clearly define/generate the risks, especially within the “Technology” category as follows:
  - Scalability
  - Reliability (MTBF/MTTI), (single point of failure and scalability)
  - Vendor testing/support for system at scale
  - Data integrity
- Other risk categories to be included:
  - Infrastructure/Facilities
  - Business (vendor viability, market fluctuations)
  - Customer preparation (esp with respect to code scalability)
  - Experienced/trained staff (single source of expertise)

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# *What are the key lessons learned in risk identification?*

- Brainstorming and historical review are effective tools for identifying risks
- Experienced staff help to identifying risk
- Risks occur that cannot be identified in advance
- Not all individual component (hw+sw) risks can be predicted but general mitigations can be developed
- Communication of risks is filtered through the management chain and vendor/customer
- Monitor risks continuously; risks are not static
- A serious consideration and process of identifying risks is important and helpful (not just “check the box”)

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# *What are best practice risk models for HPC in the area of risk identification?*

- Identifying, documenting and reviewing historical data is helpful (even if the risk never occurs)
- Regular reviews and communication of risks with both customer and vendor
- Lessons learned/Postmortems are helpful
- Process of identifying risk is as important as the product (developing a Risk Register)
- Use WBS milestones to define trigger/decision points to start/stop risk mitigation
- Include stakeholders to help identify risks

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# *What opportunities exist to share or improve practices and terminology?*

- A “master list” of risk categories could be compiled from the community
- A centralized website could be created to learn/share information about risks
- Create a lexicon/glossary of HPC-specific terms to help the community understand project management/risk terms
- Inter-agency program managers should be encouraged to share info
- Create a risk tutorial/BOF/panel at SC