Robert W. Wisniewski
Chief Software Architect
Blue Gene Supercomputer Research

Things to think about:
Codesign and IP
Thoughts on codesign and community development

- Big part of codesign is passing on bad news 😊, and then working together on alternatives
- Frequently interlocked milestones (no more than 6 months)
- Open source is misleading, what is really desired is community development
- Open source/community development is not necessarily cheaper for vendor
- Just providing common API is not sufficient
  - What is participating model for defining, must have stability
- Fragmentation
  - Must balance early investigation against significant investment: Lustre, Panasas, PVFS
- Can do codesign on individual application, but need to abstract out key application requirements across a suite application
  - Can not be all things to all applications
  - What are most important bottlenecks
- Model development work after successful models
  - Examples from IBM’s perspective: MPICH, PAPI, Valgrind
- Support is challenging
  - Customers want vendor support, but without active involvement that is difficult
- Chicken and egg problem
  - Application developers do not want to commit to a model unless they know it is supported
  - Vendors do not want to support a model until they have commitment from customers that it is important and will be used
Thoughts on IP

- Some areas should remain proprietary for differentiation
  - IBM examples: GPFS, XL

- Corollary: have solutions that leverage commercial solutions

- Community should specify requirements not solutions
  - Allow alternative solutions

- Vendors most concerned about contamination
  - Accidental inclusion of other IP

- Open source license should be vendor friendly
  - Track pedigree of code – contributor agreement
  - License non-viral
    - If incorporated into product need to be able to charge for product

- IP agreements will take a *long* time – start now or better yesterday
‘Virtual’ co-design center - proposed structure

- co-design broader team - Scientists, domain experts, computer scientists
  - No NDA

- Codesign performance team
  - Application experts, computer scientists etc
  - Full NDA

- Apps Experts
  - Core vendor platform team
  - HW, System architects, node architects, network architects, memory, OS, communications, programming models, compilers and tools.

- Firewall

- Codesign performance team
  - Application experts, computer scientists etc
  - Full NDA

- Apps Experts
  - Core vendor platform team
  - HW, System architects, node architects, network architects, memory, OS, communications, programming models, compilers and tools.
One Model How This Might Work

Codesign Centers, IESP, etc., code

Auto – Generated Code*

Generalized API

PS API

Code specific to Platform 1

Firewall

Code specific to Platform 2

*idea from Chemistry Exascale Codesign Center – thanks to Robert Harrison
To Make it All Work

- Need a working agreement of the process behind codesign
  - Will be harder when everyone can not be in the same room

- Vendors need to be fully engaged
  - And funded 😊

- Exposure of the co-design team to confidential design consideration

- Design constraints and proposed solutions must flow both ways

- Will require a considerable resource expenditure

- Needs to be uniform and centralized across codesign centers and IESP participants