Node-Level Systems Research Breakout

NSFCloud Workshop

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Participants

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Motivating Research Areas/Experiments

- **OS/VM Design and Implementation**
- **Performance Engineering**
- **System-level resource allocation**
- **Heterogeneous systems**
- **Power and energy management**
- **Modeling and simulation of networks**

What's currently provided

- **90% is all the way there:**
  - Bare metal access
  - Low-level debugging support/access
  - Performance counter access and control
- **Some things are 90% there**
  - Specialized hardware
  - Accelerators
  - Power/thermal Instrumentation Image deployment support

All I want for Christmas

- **Hardware – specialized storage, accelerators, etc.**
- **System configuration**
  - Online access to full system configuration (hardware and firmware versions, system settings, etc.)
  - Full specification and programmer documentation of hardware system
  - Capture/snapshot full system image including BIOS, etc.
  - Reference images
- **Resource allocation/management**
  - Rerun on exactly the same hardware
  - Dynamic topology and node allocation
- **Instrumentation/Control**
  - Full system view of resource allocation, performance
  - Potential use or development of a common API
  - Chassis-level monitoring and control?
- **Network control boxes for traffic control, etc.**
- **Global, long-term system traces and performance information**

Ecosystem Issues

- **Support**
  - Need a broad set of applications/runtimes/data/workloads
  - Licenses and support for common tools on the system
  - Compatibility or transition process to commercial clouds
- **Community Development**
  - Ticket/Trouble management system
  - Forums/discussion/community support
- **We've missed things: Need a longer-term process for addressing/adding missing platform features and capabilities**