Geophysical Fluid Dynamics Laboratory Review

June 30 - July 2, 2009

NOAA's High-Performance Computing Infrastructure

Presented by

Brian Gross

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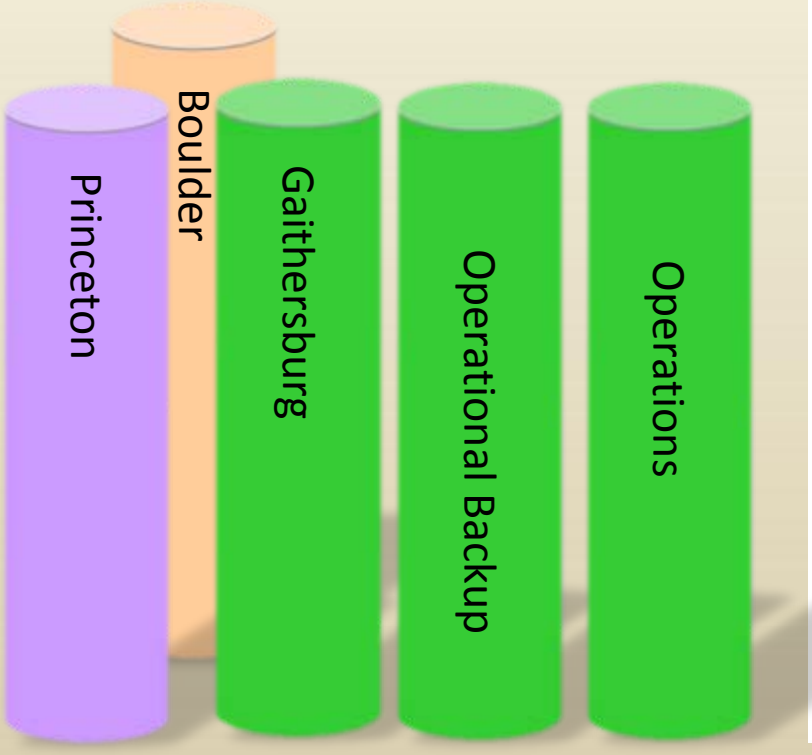
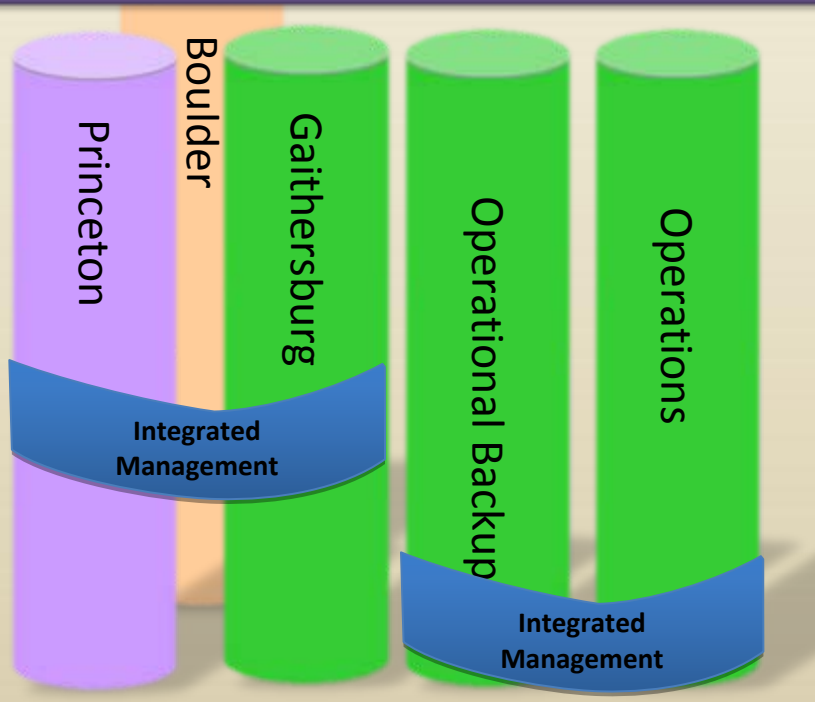
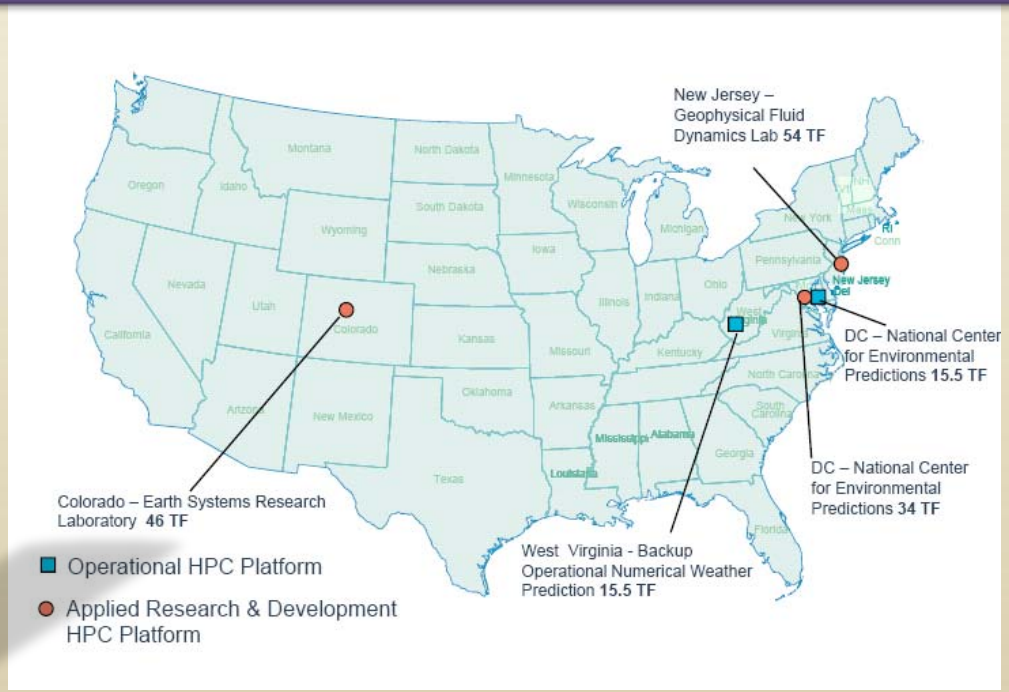
NOAA's Previous HPC Architecture



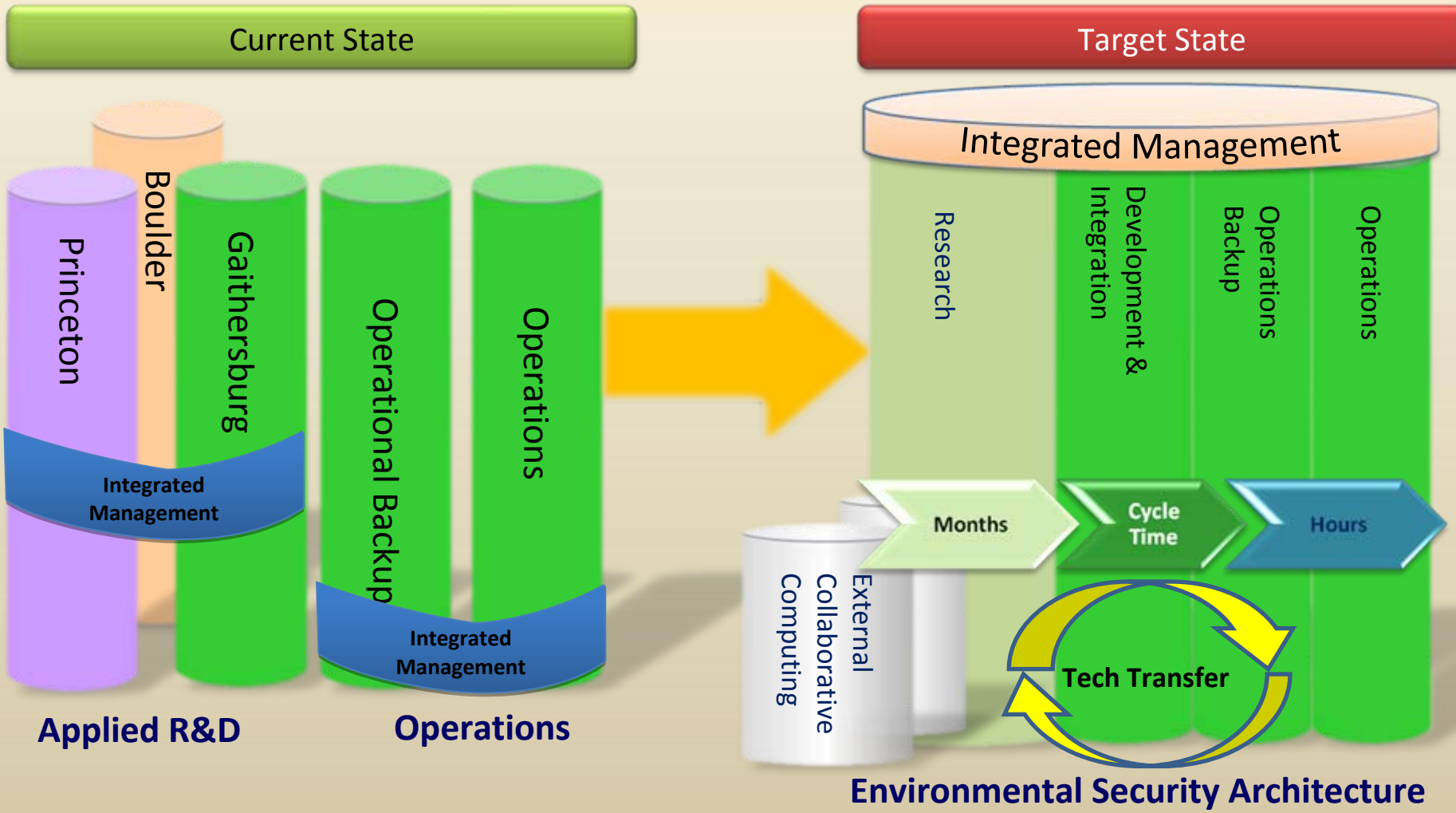
NOAA's Current HPC Architecture

Organizationally Based Architecture Fragments Resources and Limits Mission Capabilities





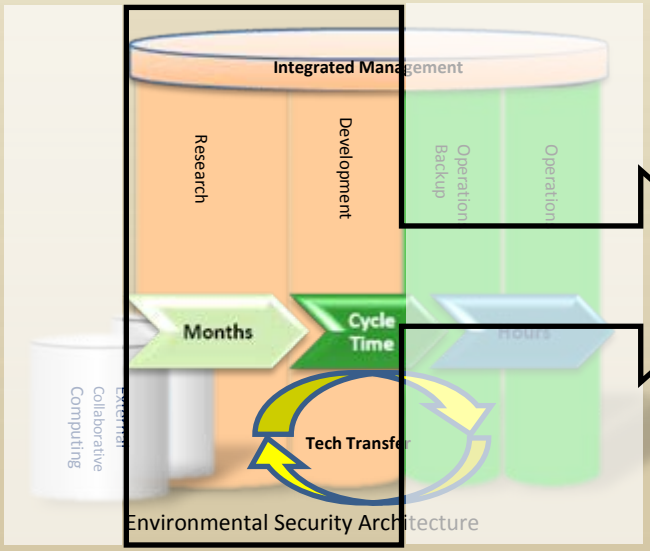
NOAA's Future HPC Architecture



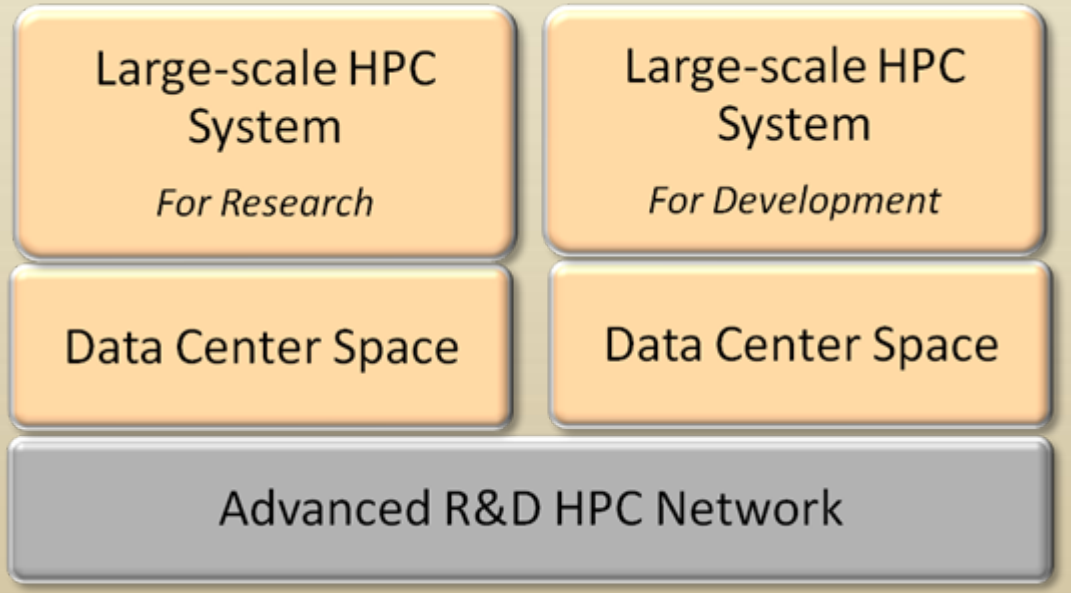
http://www.cio.noaa.gov/HPCC/pdfs/HPC_Strategic_Plan.pdf

The Recovery Act Accelerates the Implementation of NOAA's Future HPC Architecture

- The American Recovery and Reinvestment Act provides $170M for climate modeling ($165M toward R&D HPC Implementation; $5M Climate Data Records)
- Developed acquisition plan to implement
  - Two R&D HPC systems and associated operations and maintenance
  - Storage and Analysis to remain a local activity
  - Enhanced NOAA R&D HPC network to support this



Recovery Act Implementation



How will NOAA Reduce Risk?

- **Partner with other organizations**
  - A very modest computing increment (~5% of current capability) using DOE systems is available to prototype next-generation climate and hurricane models
  - In 2009, GFDL doubles its computing capability with computing grants at Oak Ridge National Laboratory
  - NASA has supported data assimilation research
- **Build agency-wide capability for software engineering**
  - ESMF-based NOAA Environmental Modeling Framework (NEMS)
    - Interoperability and platform independence
    - Support for mega-processor production computing
  - Generalized runtime services for models and data

Summary

- NOAA has moved from organization-based acquisition, management, and operation of HPC to an agency-wide approach
- NOAA's future HPC architecture reflects its environmental mission and consolidates large-scale R&D computing to permit the largest possible jobs to execute
- Current partnerships reduce the risk in moving to this new architecture while promoting ground-breaking climate simulations with new models

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