

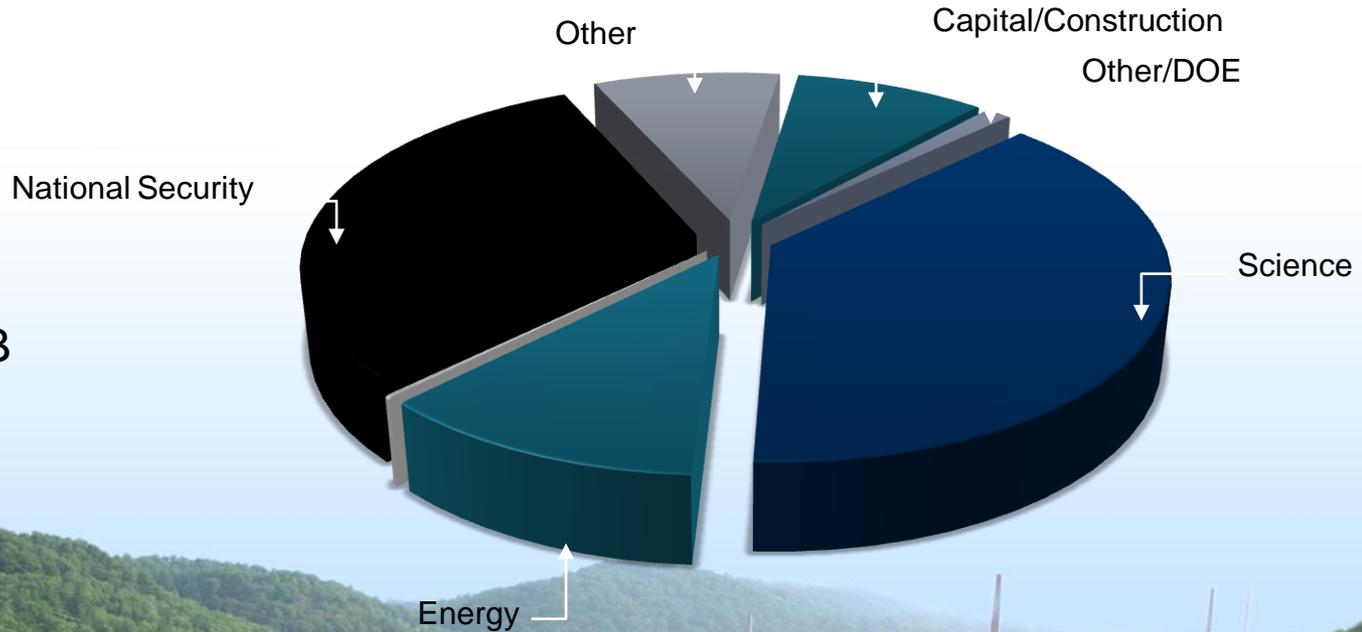
ORNL Site Update

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NLIT 2009



Oak Ridge National Laboratory

Mission: Conduct basic and applied research and development to create scientific knowledge and technological innovations that enable the solution of compelling national problems



Budget ~\$1.3B
4,350 staff

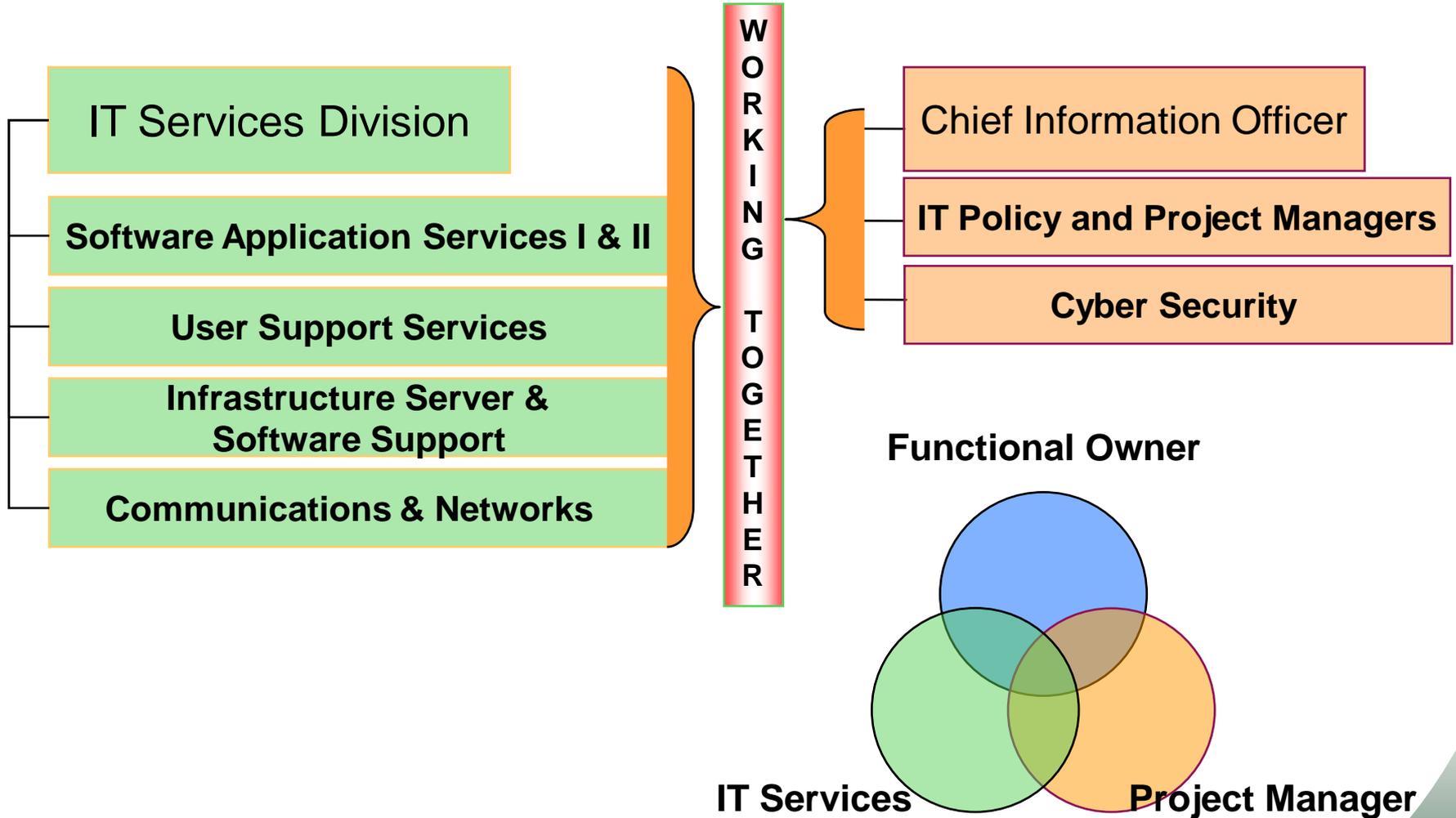
Spallation Neutron Source (SNS)

- **National User Facility: 2,000+ external visitors per year from all over the world – most physical visits are followed up with remote network accesses**
- **With the University of Tennessee, developing the Joint Institute for Neutron Sciences for education and incubation of new science**
- **All of these people EXPECT a presence on the same network as their ORNL hosts, along with access to data acquisition and analysis systems**

A Cyber Security Challenge !!!



ORNLIT Organization



ORNL IT Long Range Plan

Consolidate IT Staff

Cyber Security Revitalization

Desktop management & standards

Network segmentation

Self Assessments, Audits, Corrective Actions, POAMs, etc.

IT Governance & Standards

Customer relations (SLA)

Standards to cost.

Application Transformation

IT architecture and standards

Update infrastructure to standards

Standardize business applications

Modernize user tools

**Improved Network
& Collaboration Tools**

Stabilization



2006

2007

2008

2009

2010

FY09 and Long Term - Knowledge Sharing (and Stability!!!)

- **The R&D staff are supported by IT in pushing intellectual boundaries. IT will be a key enabler and a central agent for positive change for improved collaboration and R&D delivery**
- **Continue to provide next generation services and further enable R&D**
 - Continue to modernize and standardize enterprise applications
 - Continue to develop and deliver IT application and service standards
 - Continue to enhance cyber security
 - Continue to improve customer service
 - Implement a long term IT investment process
- **Fully engage ORNL IT staff skills, knowledge and abilities**
- **Maturing ORNL IT processes, services, service delivery and user support**
 - Rock solid production services
 - Greater emphasis on communicating with internal and external users
 - Comprehensive user support - Root cause problem management and staff training
- **Continuing to improve Cyber Security**
 - Complete “Red Team” action items
 - Additional infrastructure and tools supporting cyber technical staff
 - Update network infrastructure to support additional security features (e.g. network authentication, greater user/information segregation based on roles, sensitivity, access controls, etc.)
 - Combined IT infrastructure / Network / Cyber operations center

Oak Ridge Peta-Scale Scientific SuperComputing

- Jaguar, the ORNL Cray XT system, has a peak performance of 1.64 petaflops per second
- Jaguar is running scientific applications ranging from materials to combustion at scale on the entire system

“This accomplishment is the culmination of our vision to regain leadership in high-performance computing and harness its potential for scientific investigation.”

**Raymond L. Orbach,
Undersecretary for Science
for the Department of Energy**



Our facilities and power have scaled to support the mission requirements

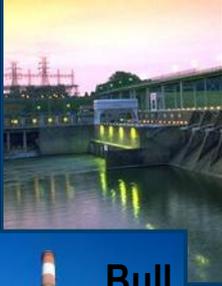


2003	2004	2006	2009	2011	
Computational Sciences Building (CSB) <ul style="list-style-type: none"> • 40,000 square feet • 4 MW • 3,600 cooling tons 	Joint Institute for Computational Sciences (JICS) <ul style="list-style-type: none"> • 1,600 square feet • <500 KW 	Multiprogram Research Facility (MRF) <ul style="list-style-type: none"> • 15,000 square feet • 6.6 MW • 2,200 cooling tons 	CSB upgrades <ul style="list-style-type: none"> • 40,000 square feet • 23 MW • 6,600 cooling tons 	MRF upgrades <ul style="list-style-type: none"> • 32,000 square feet • 20 MW • 8,100 cooling tons 	Multiprogram Computational Data Center <ul style="list-style-type: none"> • 260,000 square feet • Scalable power & cooling

Computing Facilities



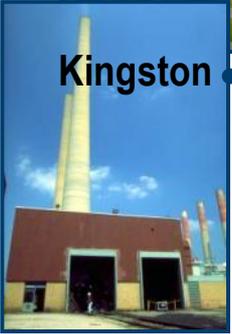
Ft. Loudon



Bull Run



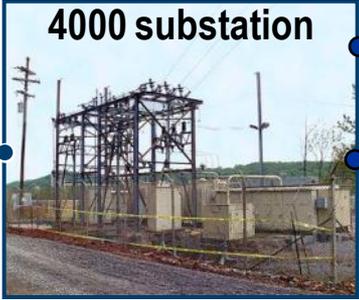
Kingston



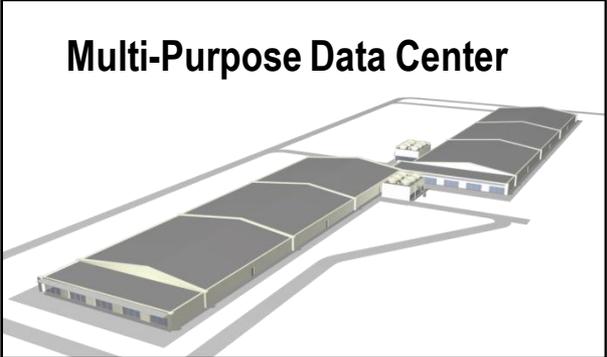
210/280-MW substation



4000 substation



Multi-Purpose Data Center



Computational Sciences Building



Multipurpose Research Facility

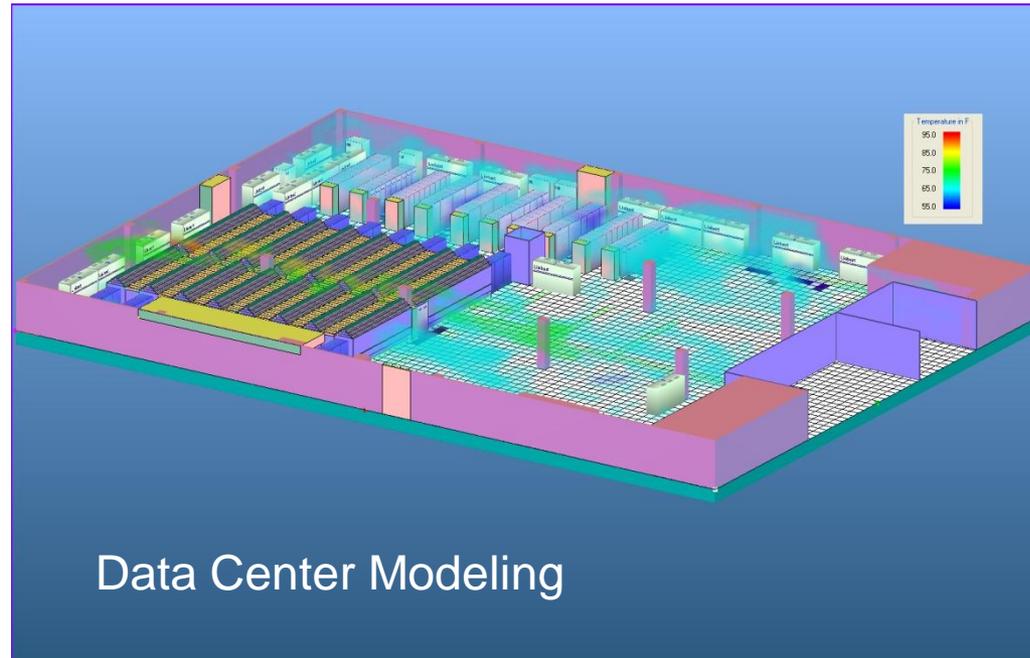


SuperComputing Infrastructure



“Green” Data Center Initiatives

- **Minimize supply losses**
 - Substation adjacent to the data center to minimize supply losses
 - 480V power distribution directly to system cabinets
- **Higher cooling water temperatures – higher operating temperatures**
- **Variable speed drives and automatic controls on CRAC units**
- **Sensors and data analytics for tighter control**



Multiprogram Computational Data Center

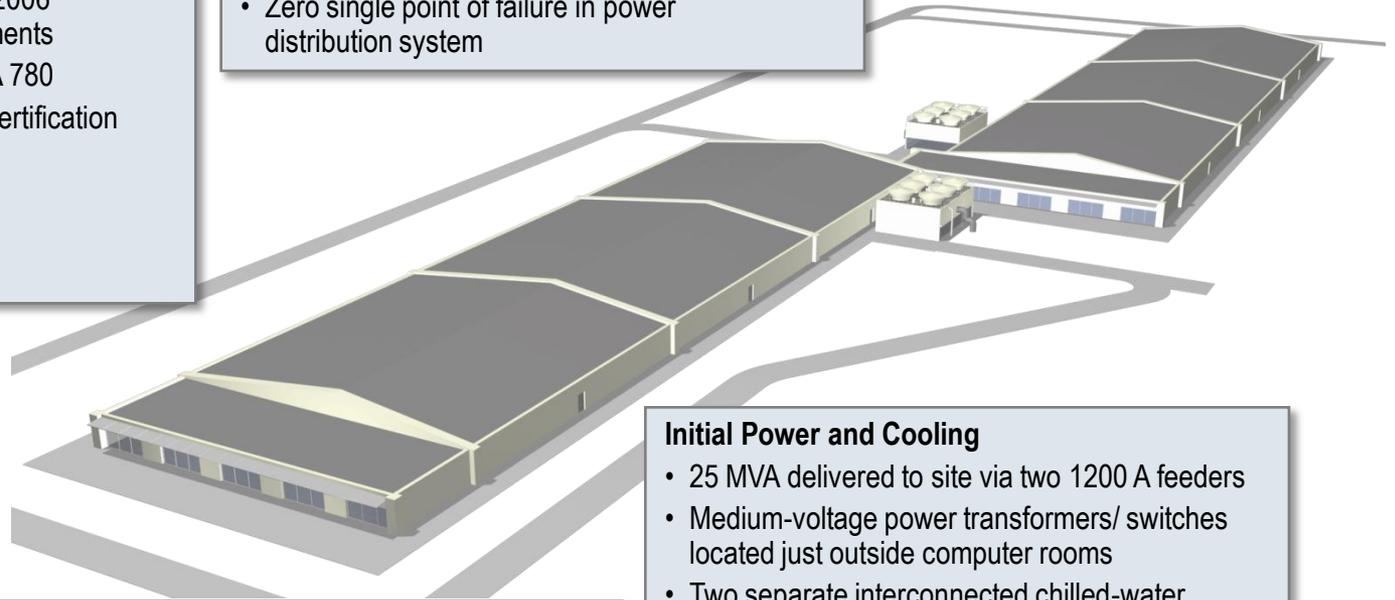
A 260,000 ft² state-of-the-art data center engineered for scalable computing

Facility

- Two 110,000 ft² computer rooms; 15,000 ft² for general purpose space
- Power distribution scalable for greater computing technical power
- Designed in accordance with IBC 2006 to meet wind and seismic requirements
- Lightning protection meeting NFPA 780
- Registered to obtain LEED Gold Certification
- Emergency diesel generators
- Network systems and facility infrastructure monitored 24/7

Computer Rooms

- 36 in. raised access floor, recessed pipe troughs, clear spans
- 15 ft clear access from raised floor to ceiling
- Under-floor wet fire suppression system
- Zero single point of failure in power distribution system



Security and Safety

- Perimeter fencing for property protection and standard security access
- 24/7 security and camera surveillance
- Will meet DOE requirements for classified computing
- Unassuming facility with limited view from roads

Initial Power and Cooling

- 25 MVA delivered to site via two 1200 A feeders
- Medium-voltage power transformers/ switches located just outside computer rooms
- Two separate interconnected chilled-water energy plants delivering 10 MW scalable cooling with two 2000 ton chillers
- Cooling, cooling towers, and supporting mechanical systems with N+1 reliability
- 24/7 building HVAC, power distribution, and chilled water systems monitoring

Other ORNL Presentations of Interest

SharePoint

- Monday, 11:45-Using SharePoint UI to Deliver General Use Applications, Connie Begovich
- Tuesday, 11:45-SharePoint at ORNL, Brett Ellis

Cyber Security

- Monday, 1:30-Development of a Process for Phishing Awareness Activities, Philip Arwood & John Gerber
- Monday, 2:15-How I Learned to Embrace the Chaos, Mark Lorenc
- Monday, 4:15-TOTEM:The ORNL Threat Evaluation Method, John Gerber & Mark Floyd

Desktop Management

- Monday 4:15-On the Fly Management of UNIX Hosts using CFEngine, Ryan Adamson
- Tuesday, 11:00-Implementation of Least User Privileges, Doug Smelcer
- Wednesday, 11:45, Microsoft Deployment Using MDT and SCCM, Chad Deguira

Incident Management

- Wednesday, 11:00-Helpdesk Operations for Clients Without Admin Privileges, Bob Beane & Tim Guilliams

IT Modernization

- Monday, 2:15-12 Months of Technology, Lara James

Other Major Contributors to Making this Conference a Success!

- **Becky Verastegui**
- **Suzanne Willoughby**
- **Tom Willoughby**
- **Linda Duncan**
- **Judy Burns**
- **Terry Scoggins**
- **Jim Trater**
- **Jim Ryan**
- **Tina Overby**
- **Paige Stafford**
- **Bruce Johnston**
- **Clark Piercy**
- **Janice Greenwood**
- **Sheila Causby**
- **Judy Green**

- **We hope you enjoyed your time at NLIT09!**
- **Come visit us again at ORNL!**



Thank You!!!

