Overview of NSF Cyberinfrastructure and Perspectives

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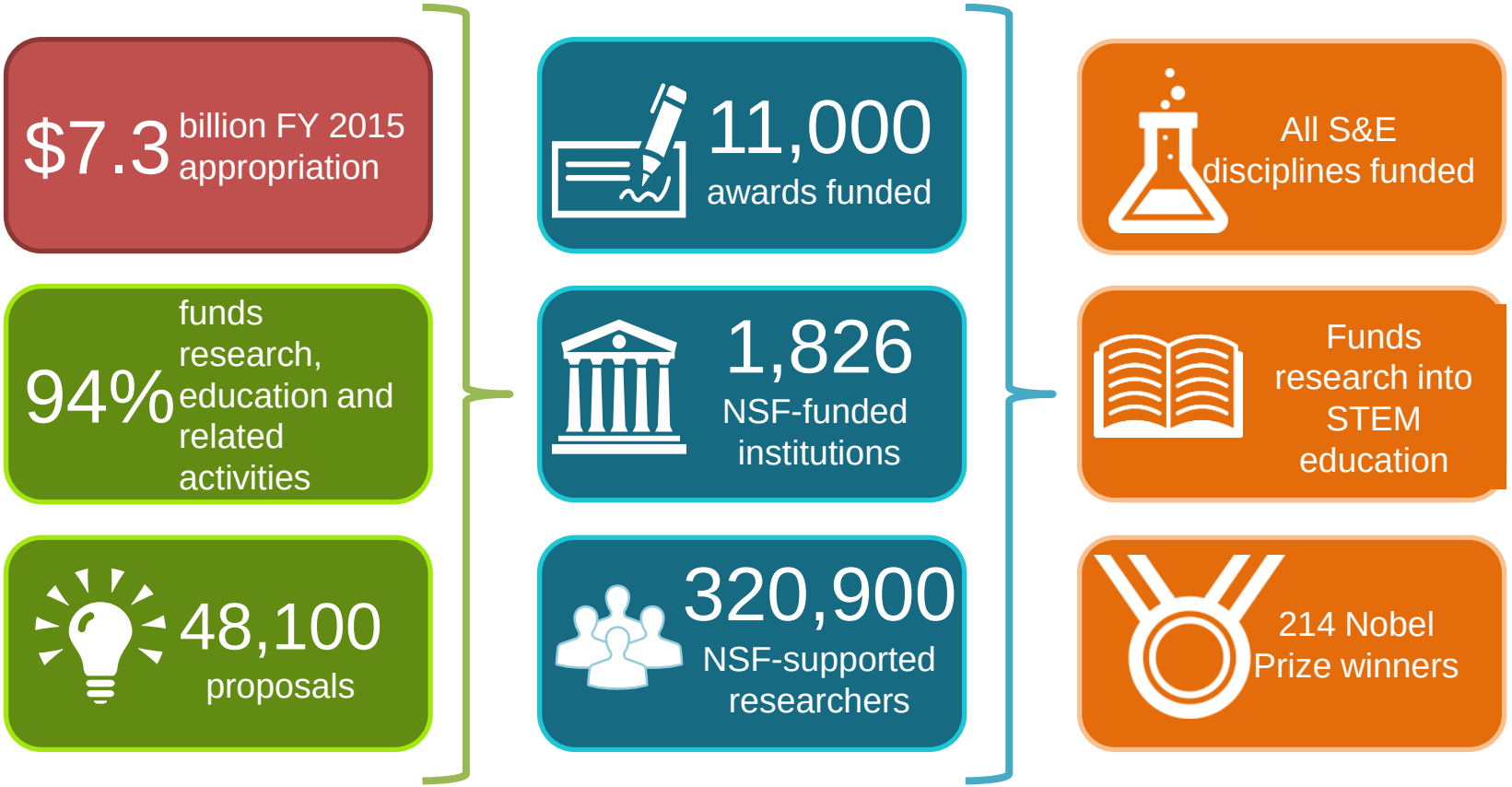
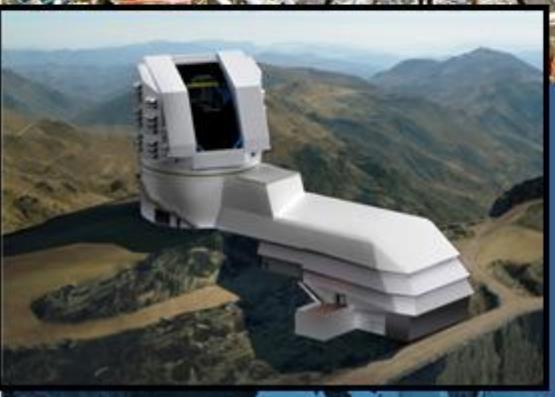
National Science Foundation, USA

Pre-RDA E-Infrastructures Workshops
September 22, 2015

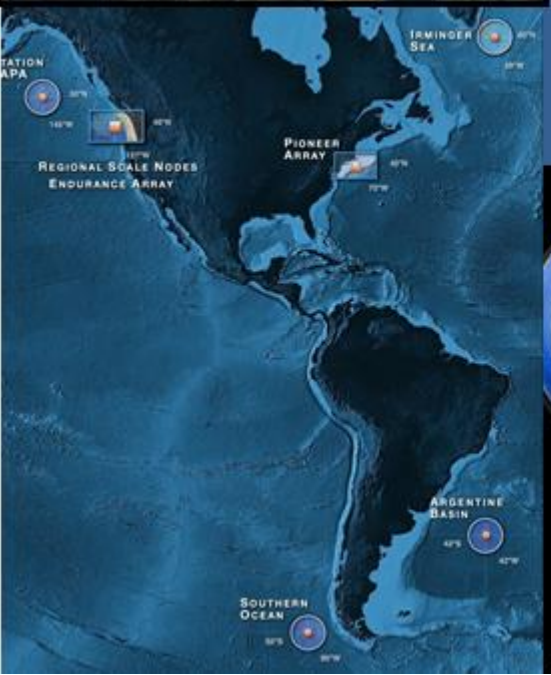
NSF: Advancing Fundamental Science & Engineering (S&E) Research & Education

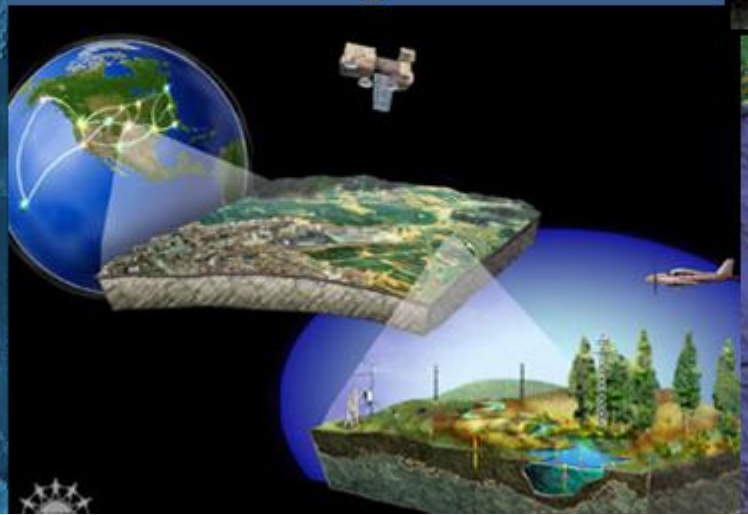


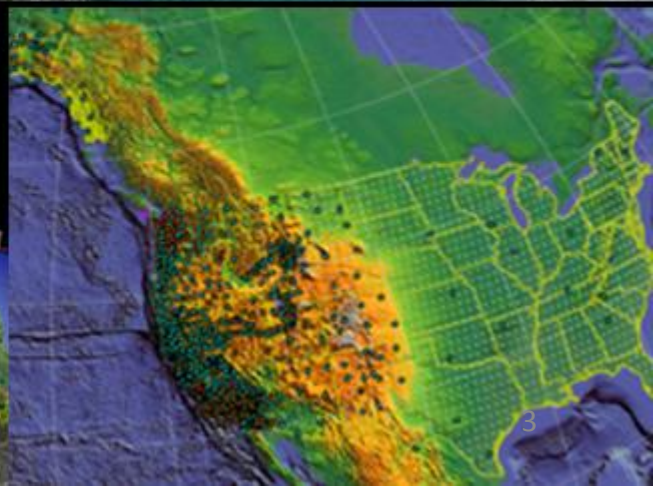
Other than the FY 2015 appropriation, numbers shown are based on FY 2014 activities.



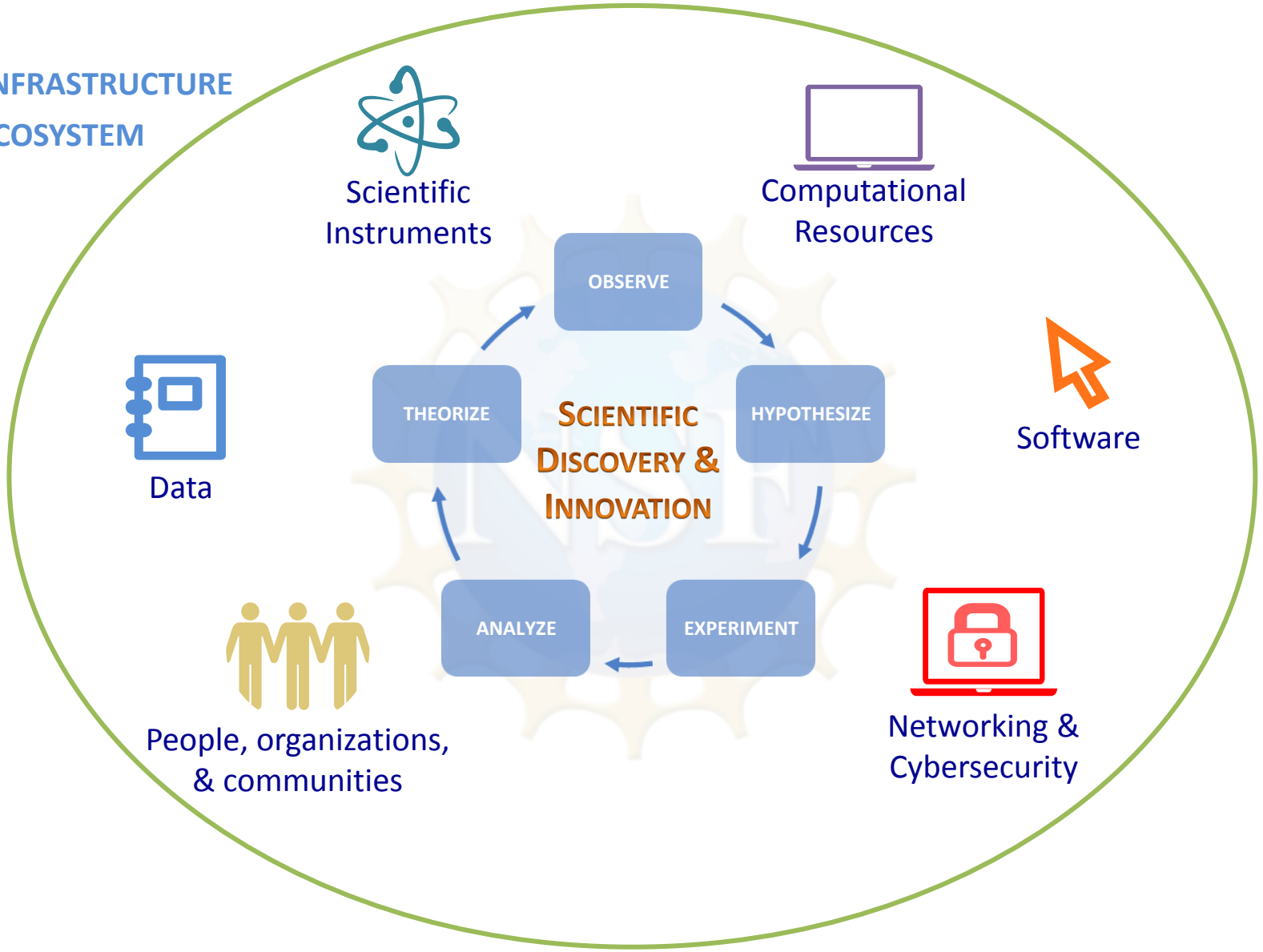
NSF


Irminger Sea
Pioneer Array
Regional Scale Nodes
Endurance Array
Argentine Basin
Southern Ocean





NSF embraces an expansive view of cyberinfrastructure motivated by research priorities and the scientific process



NSF cyberinfrastructure investments led by the Division of Advanced Cyberinfrastructure (ACI)

ACI Mission: To support advanced cyberinfrastructure to accelerate discovery and innovation across all disciplines

Division Director: Irene Qualters
Deputy Division Director (Acting): Amy Friedlander

Science Advisor for Cross-cutting CI: Bill Miller

High Performance Computing	Data	Networking/ Cybersecurity	Software
Bob Chadduck Rudi Eigenmann Ed Walker	Bob Chadduck Amy Walton	Anita Nikolich Kevin Thompson	Dan Katz Rajiv Ramnath

Learning/Workforce Development

Sushil Prasad

ACI Website: http://www.nsf.gov/dir/index.jsp?org=CISE

National Strategic Computing Initiative (NSCI)

Executive Order, July 29 2015 — Lead Agencies: DOD, DOE, NSF

Create a coordinated Federal strategy in High Performance Computing research, development, and deployment to maximize the benefits of HPC for economic competitiveness and scientific discovery.

Strategic Objectives

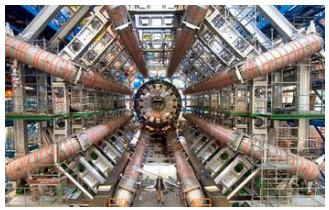
1. Accelerate delivery of a capable exascale computing system to deliver approximately 100X performance of current 10PF systems.

NSF foci

2. Increase coherence between technology base used for modeling and simulation and that used for data analytic computing.
3. Establish, over the next 15 years, a viable path forward for future HPC systems in the post Moore's Law …
4. Increase capacity and capability of an enduring national HPC ecosystem. Use a holistic approach … networking, workflow, downward scaling, foundational algorithms and software, workforce development.
5. Develop enduring public-private partnerships

Researcher-Centric Challenge

Revolution in the scientific workflow: many interfaces to shared cyber resources

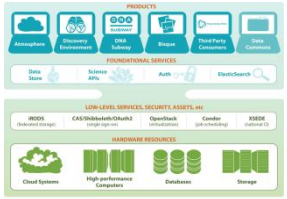


Research Infrastructures

Network

Software

Researcher



Shared Data/Software Gateway Resources

Collaboration Networks

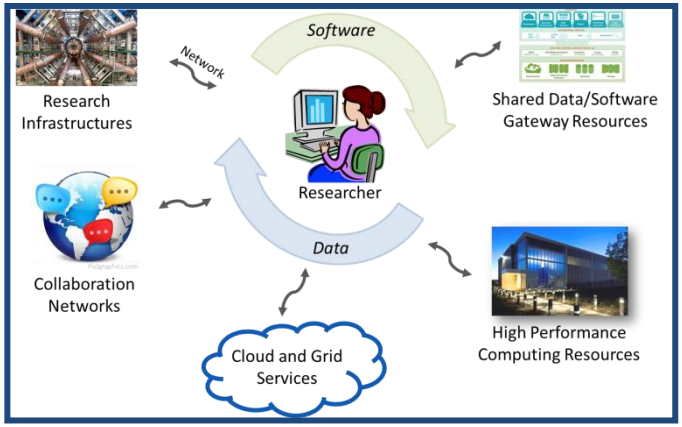
Data

High Performance Computing Resources

Cloud and Grid Services

LHC Atlas image courtesy of CERN

Global Collaboration Challenge



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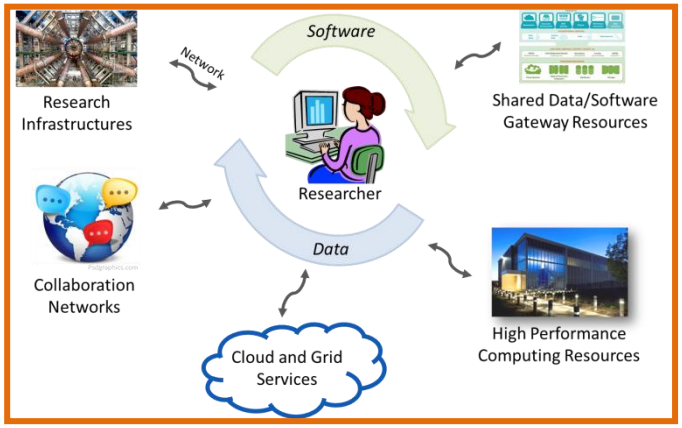

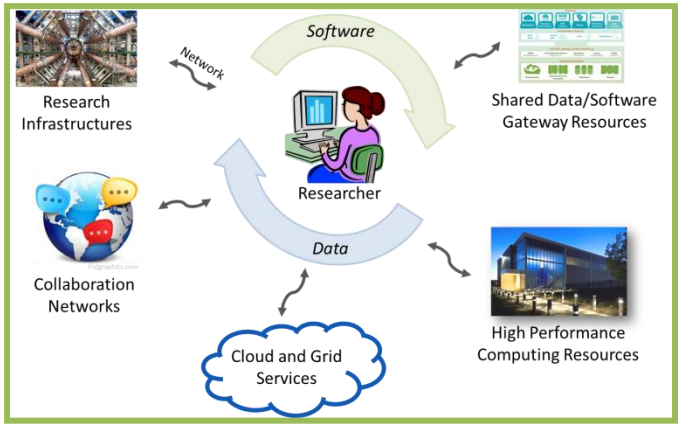

- Compatibility?
- Access, Identity?
- Capacity?
- ….