



February 12th 2010 - LHCOPN

Eric Boyd - Internet2

Jason Zurawski - Internet2

Artur Barczyk – USLHCnet/Caltech

NSF MRI-R2: DYnamic NEtwork System (DYNES, NSF #0958998)

DYNES Summary

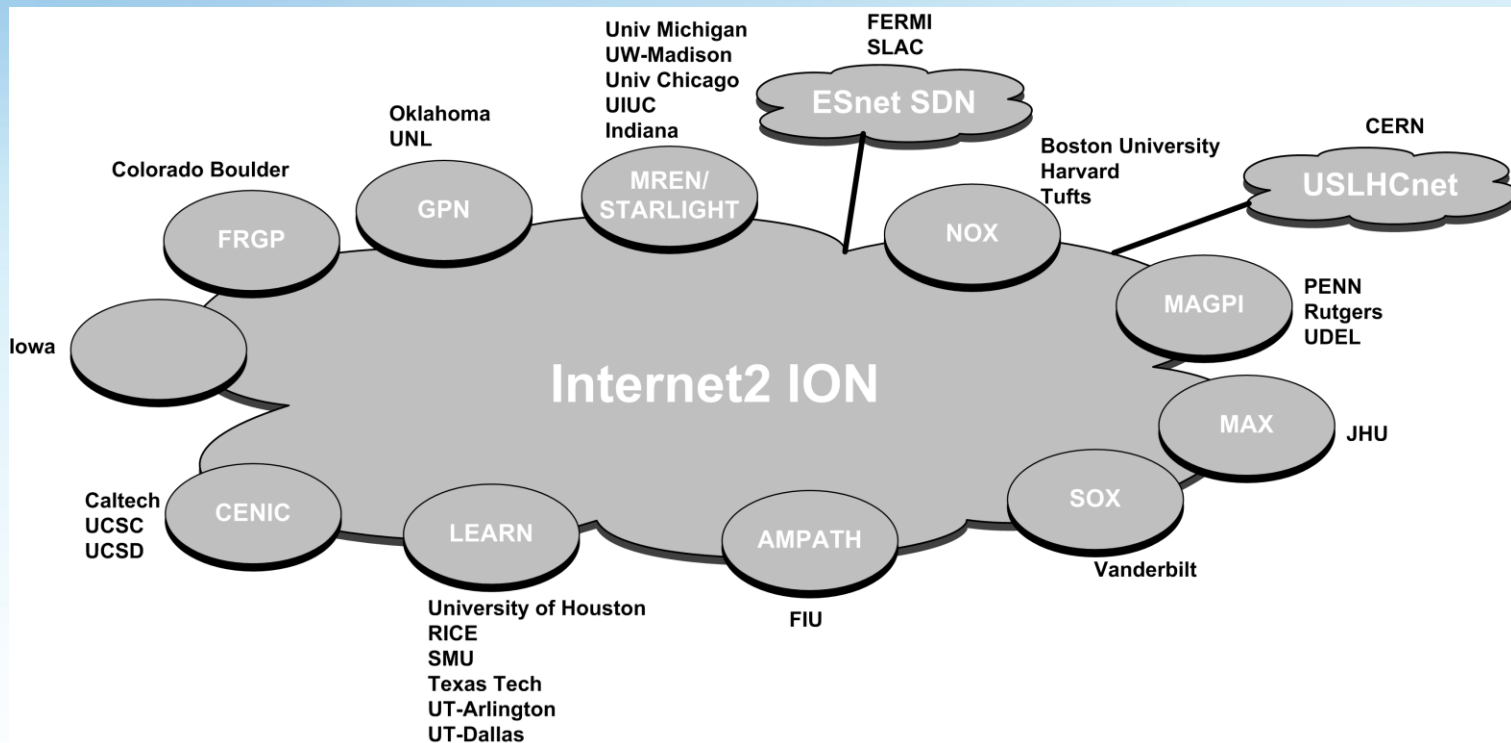
- What is it?:
 - A nationwide cyber-instrument spanning up to ~40 US universities and ~14 Internet2 connectors
 - Extends Internet2s ION service into regional networks and campuses, based on OSCARS implementation of IDC protocol (developed in partnership with ESnet)
- Who is it?
 - A collaborative team including **Internet2, Caltech, University of Michigan, and Vanderbilt University**
 - Community of regional networks and campuses
 - LHC, astrophysics community, OSG, WLCG, other virtual organizations
- What are the goals?
 - Support large, long-distance scientific data flows in the LHC, other leading programs in data intensive science (such as LIGO, Virtual Observatory, and other large scale sky surveys), and the broader scientific community
 - Build a distributed virtual instrument at sites of interest to the LHC but available to R&E community generally

DYNES Project Schedule

- All applications has been reviewed.
 - Clarifications are needed for some. This could require some changes to the proposed configuration
 - Teleconferences with individual sites will be arranged
- A draft DYNES Program Plan document is available with additional details on the project plan and schedule:
 - <http://www.internet2.edu/dynes>

DYNES Infrastructure Overview

- DYNES Topology
 - based on Applications received
 - plus existing peering wide area Dynamic Circuit Connections (DCN)



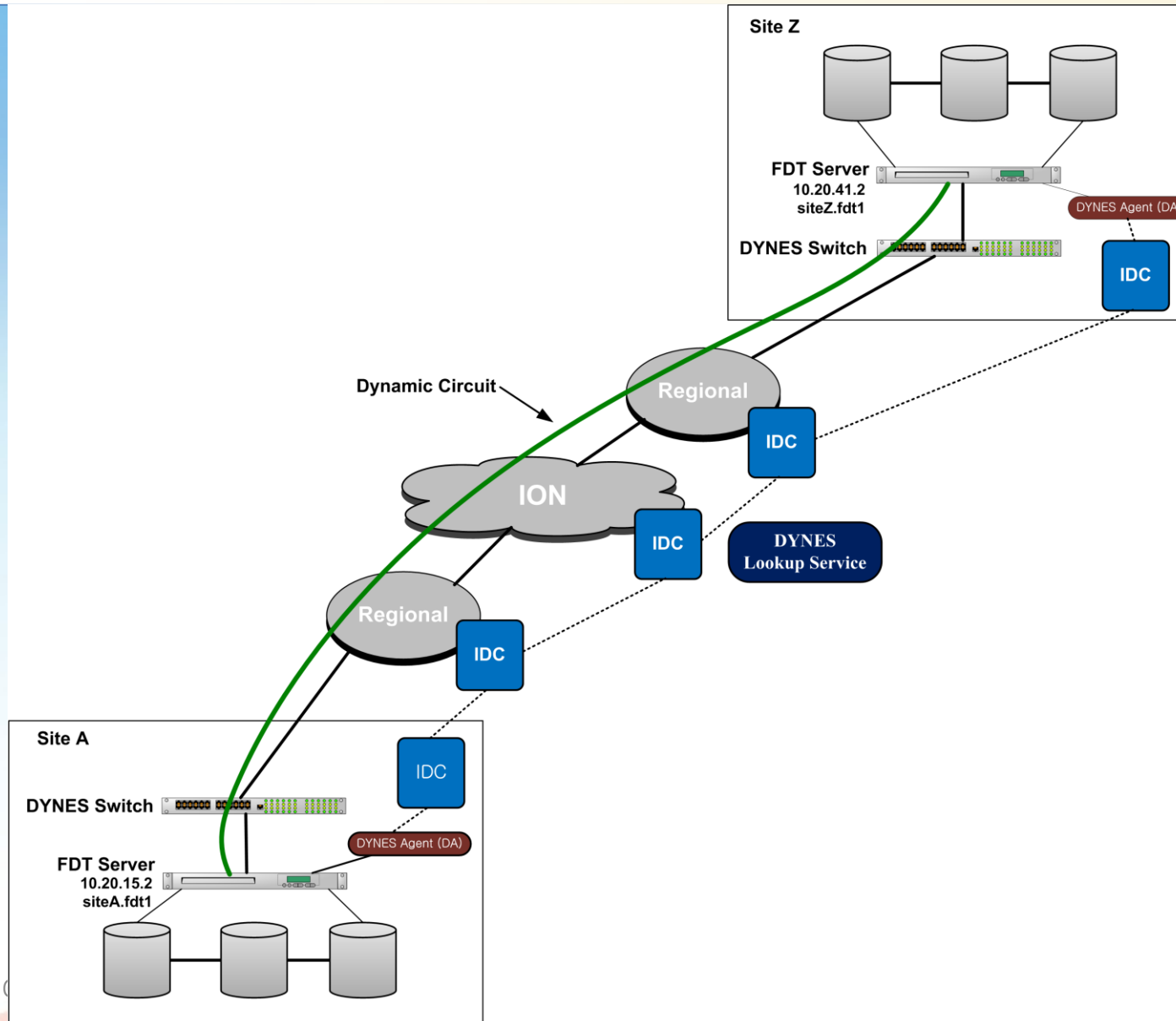
NSF proposal defined four project phases

- ~~Phase 1: Site Selection and Planning (4 months) (Sep-Dec 2010)~~
 - Participant Selection Announcement: February 1, 2011
 - 33 Total Applications
 - 8 Regional Networks
 - 25 Site Networks
- Phase 2: Initial Development and Deployment (6 months) (Jan 1-Jun 30, 2011)
 - Development of DYNES at a limited number of sites (February 28, 2011)
 - Caltech, Vanderbilt, University of Michigan, Internet2, USLHCnet
 - Regional networks as needed
 - Initial Site Systems Testing and Evaluation Complete: March 28, 2011
 - Phase 3-Group A Deployment (10 Sites) (March 1-July 1, 2011)
- Phase 3-Group A Deployment (10 Sites) (March 1-July 1, 2011)
 - Receive DYNES Equipment: April 15, 2011
 - Ship Configured Phase 3-Group A Equipment to sites: May 6 2011
 - Deploy and Test at Phase 3-Group A Sites: May 16-June 30, 2011

DYNES Phase 3 & 4 Project Schedule

- Phase 3: Scale Up to Full-scale System Development (14 months) (July 1, 2011-August 31, 2012)
 - Phase 3-Group A Deployment (10 Sites): Moved to Phase 2
 - Moving this to Phase 2 represents a more ambitious schedule than the original proposal plan. This will allow for some buffer in case unexpected issues are uncovered as part of the initial deployment and testing.
 - Phase 3-Group B Deployment (10 Sites): July 18-August 26, 2011
 - Phase 3-Group C Deployment (15 Sites): September 5-October 14, 2011
- Full-scale System Development, Testing, and Evaluation (October 17 2011- August 31, 2012)
 - Phase 4: Full-Scale Integration At-Scale; Transition to Routine O&M (12 months) (September 1, 2012-August 31, 2013)
 - DYNES will be operated, tested, integrated and optimized at scale, transitioning to routine operations and maintenance as soon as this phase is completed

DYNES Data Flow Overview



DYNES Standard Equipment

- Inter-domain Controller (IDC) Server and Software
 - IDC creates virtual LANs (VLANs) dynamically between the FDT server, local campus, and wide area network
 - IDC software is based on the OSCARS and DRAGON software which is packaged together as the DCN Software Suite (DCNSS)
 - DCNSS version correlates to stable tested versions of OSCARS. The current version of DCNSS is v0.5.3.
 - It expected that DCNSSv0.6 will be utilized for Phase 3-Group B deployments and beyond. DCNSSv0.6 will be fully backward compatible with v0.5.3. This will allow us to have a mixed environment as may result depending on actual deployment schedules.
 - The IDC server will be a Dell R610 1U machine.

DYNES Standard Equipment

- Fast Data Transfer (FDT) server
 - Fast Data Transfer (FDT) server connects to the disk array via the SAS controller and runs the FDT software
 - FDT server also hosts the DYNES Agent (DA) Software
- The standards FDT server will be a DELL 510 server with dual-port Intel X520 DA NIC. This server will a PCIe Gen2.0 card x8 card along with 12 disks for storage.
- DYNES Ethernet switch options:
 - Dell PC6248 (48 1GE ports, 4 10GE capable ports (SFP+, CX4 or optical))
 - Dell PC8024F (24 10GE SFP+ ports, 4 “combo” ports supporting CX4 or optical)

DYNES References

- DYNES
 - <http://www.internet2.edu/dynes>
- OSCARS
 - <http://www.es.net/oscars>
- DRAGON
 - <http://dragon.east.isi.edu>
- DCN Software Suite (DCNSS)
 - <http://wiki.internet2.edu/confluence/display/DCNSS/>
- FDT
 - <http://monalisa.cern.ch/FDT/>
- REDDnet
 - <http://www.reddnet.org>



NSF MRI-R2: DYnamic NETwork System (DYNES, NSF #0958998)

February 12th 2010 - LHCOPN

Eric Boyd – Internet2

Jason Zurawski – Internet2

Artur Barczyk – USLHCnet/Caltech

For more information, visit <http://www.internet2.edu/dynes>