

Dynamic Network System for Data Intensive Science (DYNES)

The **Dynamic Network System for Data Intensive Science (DYNES)** is a nationwide cyber-instrument spanning approximately 25 US universities and 8 Internet2 connectors. A collaborative team including Internet2, Caltech, University of Michigan, and Vanderbilt University will work with regional networks and campuses to develop and support this system.

DYNES is based on a “hybrid” packet and circuit architecture composed of Internet2’s ION service and extensions over regional and state networks to US campuses. It will connect with transoceanic (IRNC, USLHCNet), European (GÉANT), Asian (SINET3) and Latin American (RNP and ANSP) R&E networks, and will support the OS3E/NDDI project.

DYNES received National Science Foundation (NSF) funding under the NSF’s Major Research Instrumentation Recovery and Reinvestment (MRI-R2) program, which is funded by federal economic stimulus funds.

Support for Large-Scale Science

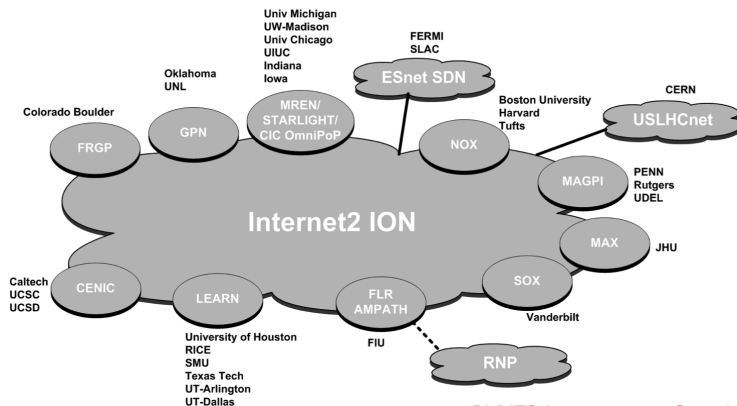
The DYNES team will partner with the Large Hadron Collider (LHC) and astrophysics communities, Open Science Grid (OSG), and Worldwide LHC Computing Grid (WLCG) to deliver these capabilities to the LHC experiment as well as others such as Laser Interferometer Gravitational-Wave Observatory (LIGO),

Large Synoptic Survey Telescope (LSST) and Electronic Very-Long Baseline Interferometry (eVLBI) programs.

DYNES will focus on sites involved in LHC research – specifically researchers involved in the CMS and ATLAS experiments – two of the six experiments taking place at the LHC. DYNES will create a nationwide cyber-instrument designed to span approximately 40 US universities that serve as Tier 2 and Tier 3 data distribution sites, with approximately 11 Internet2 regional connector networks able to be equipped as part of the DYNES cyber-instrument. Once enabled, DYNES will also support research collaborators involved in other large-scale science projects.

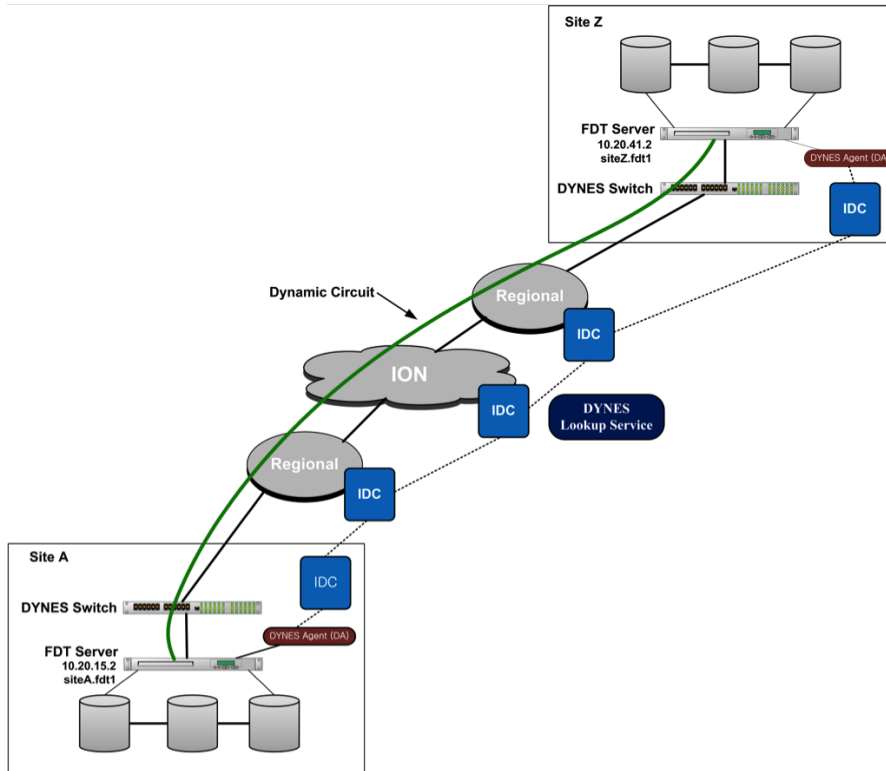
Hybrid Architecture

Implementing a “hybrid” packet and circuit architecture composed of Internet2’s ION service and extensions over US regional and state networks, DYNES will connect with ESnet, transoceanic, European, Asian and Latin American research and education networks, serving as a bridge to the next generation networking technologies. The instrument will integrate existing and emerging protocols and software, including OSCARS, co-developed with ESnet and ISI, for creating and scheduling dynamic circuit provisioning, end-to-end network path and end-system performance monitoring, and services for management on a national scale. In doing so, DYNES will allow scientists to allocate and schedule channels with bandwidth guarantees, prioritize data flows, and share network resources more effectively. Data transfers requiring aggregate network throughputs of 1 to 20 gigabits per second (Gbps) will be supported, rising to the 40–100 Gbps range.

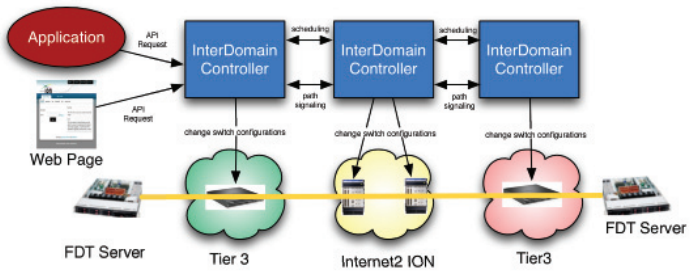


DYNES Infrastructure Overview

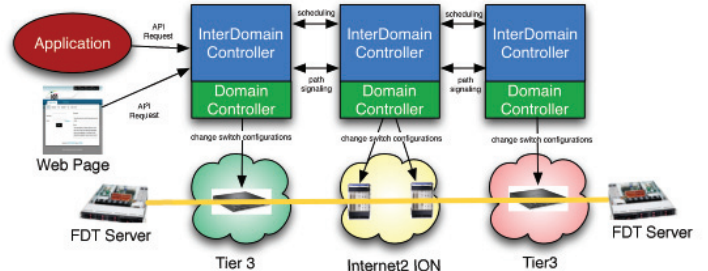
For questions, email: dynes-questions@internet2.edu.



DYNES Data Flow Overview



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CAPTION

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