Global Research Platform & SC20 NRE Demonstrations And Experiments

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International Conference On High Performance Computing Networking, Storage and Analytics
November 9-20, 2020
Global Research Platform (GRP)

- The Global Research Platform (GRP) Is An International Scientific Collaboration
- This Initiative Is Creating A Distributed Environment For Data Intensive Science
- The GRP Provides Advanced Ubiquitous Services That Integrate Resources Around the Globe At Light Speed (100 Gbps Or Faster)
- GRP Facilitates High-Performance Data Gathering, Analytics, Transport, Computing, and Storage.
- Ref www.theglobalresearchplatform.net
Selected Applications

Compilation by Maxine Brown and Joe Mambretti
GRP: Services, Architecture, Technology

- Architecture: “Global Science DMZ”
- Services Optimized For Science Workflows
- High Performance Transport Over WANs For Large Capacity Data Streams E2E
- Enhanced Virtualization
- Highly Programmable
- Specialized Components (Software Stacks, Next Gen DTNs, Advanced APIs, Customized Devices, Federation, INT, P4, etc.)
- Interdomain Dynamic Provisioning
- Production Resources Adjacent to Testbeds
Positioning And Integrating Building Blocks

Global Research Platform Network

100 Gbps

StarLight
Global Research Platform: Global Lambda Integrated Facility Available Advanced Network Resources

Visualization courtesy of Bob Patterson, NCSA; data compilation by Maxine Brown, UIC.

www.glif.is
AutoGOLE Fabric 2020
Emerging US SDX Interoperable Fabric
StarLight – “By Researchers For Researchers”

StarLight: Experimental Optical Infrastructure/Proving Ground For Next Gen Network Services
Optimized for High Performance Data Intensive Science
Multiple 100 Gbps (60+ Paths)
StarWave
100 G Exchange
World’s Most Advanced Exchange
Multiple First of a Kind
Services and Capabilities

View from StarLight
Abbott Hall, Northwestern University’s Chicago Campus
PetaTrans: Petascale Sciences Data Transfer

Singapore
- DTN @100G
- SingAREN @100G

Sydney/Brisbane
- DTN @100G
- NCI
- aarnet

Daejeon
- DTN @100G
- KiSTI

CERN
- DTN @100G
- NERSC

Seattle/L.A./SunnyVille
- PacificWave & PRP DTNs @40G/100G
- PRP Sites

Washington D.C.
- NRL 200G Node
- GSFC 400G Node

Dallas
- CENI/Max @2X100G
- SCinet & Booth DTNs @6+13X100G

Chicago
- SDXs 100G Switches
- STARLIGHT
- NAR Labs
- NCHEC

Taichung/Hsinchu
- CKAN @10G
- NAR Labs

Amsterdam
- SURF NET
- NORDUnet NL

Ottawa/Hanover
- DTN @300G

Vancouver/Victoria/Montreal
- DTN @300G
- CENI/ciena
CENI NRE Map for SC20

List of NREs:
- NRE NRL 8: SL-3
- NRE 10: SL-4
- NRE 12: SL-5
- NRE 18: SL-7
- NRE 55: SL-9
- NRE-12: SL-8

[Map showing network connections with various labels and cities]
SC20 Experiments/Demonstrations Testbed
NRE09-GRP Service: DTNaaS for Petascale Sciences Data Transfer

As 10/09 Supports

NRE03, NRE04
NRE05, NRE06
NRE10, NRE11
NRE12, NRE13
NRE14
indis104s1

Source: Jim Chen, iCAIR
For SC20, DaaS supports XNET Experiments, 12+ NREs: ROCE over WAN, P4 Experiments/Demonstrations, SENSE/openNSA integration, Kubernetes Federation, PCI-e Gen4 DTNs and Many More, Including The “Bring-Your-Own-Testbed Concept”
International/National Testbeds

- IRNC Software Defined Exchange (SDX) International Testbed Integration
- (Supported By GRP)
- ~25 Major Computer Science/Networking Research Testbeds Are Supported By The StarLight Exchange
- Federation Architecture Beginning To Emerge
ROBIN Cross-Atlantic Testbed

**StarLight site:**
- DTN: `dtn110.sl.startap.net`, with several Intel NVMe drives for data storage, a 100GE Mellanox NIC for data transfer, and a 1G NIC for control.
- Head node: `165.x.x.157`, with a 1G NIC for control.

**CERN site:**
- DTN: `dtn01.cern.ch`, with a rotational disk for data storage, a 10GE Mellanox NIC for data transfer, and 1G NIC for control.
- Head node: `cixp-urfnet.cern.ch`, with a 1G NIC for control.
Next GRP Workshop

- Date: September 13-17, 2021
- Place: Innsbruck Austria, Co Located With eSCience Conference

- Global Research Platform Website:
- www.theglobalresearchplatform.net
THANKS!

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