SC18 Network Research Exhibition

IRNC Software Defined Exchange (SDX) Services Integrated With 100 Gbps Data Transfer Nodes (DTNs) for Petascale Science

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Abstract

iCAIR is designing, developing, implementing and experimenting with an international Software Defined Exchange (SDX) at the StarLight International/National Communications Exchange Facility, which integrates services based on 100 Gbps Data Transfer Nodes (DTNs) for Wide Area Networks (WANs), including trans-oceanic WANs, to provide high performance transport services for petascale science, controlled using Software Defined Networking (SDN) techniques. These SDN enabled DTN services are being designed specifically to optimize capabilities for supporting large scale, high capacity, high performance, reliable, high quality, sustained individual data streams for science research.

Goals

1 As a part of an initiative funded by the National Science Foundation's (NSF) International Research Network Connections (IRNC) program, iCAIR is designing, creating and implementing as a prototype, and experimenting with an international Software Defined Exchange (SDX) at the StarLight International/National Communications Exchange Facility (StarLight), which provides WAN services that enable Software Defined Networking (SDN) techniques to be used to control 100 Gbps Data Transfer Nodes (DTNs) for petascale science.

2 This SDX has been optimized for supporting high capacity individual data streams for science research over many thousands of miles.

3 The integration of these services with DTN based services using SDN has also been designed to ensure high performance for those streams and to support highly reliable services for long duration data flows.

4 End-To-End (E2E) high performance, reliable data transfer for large scale individual data streams has been a major challenge for science community for many years.

5 Resolving this issue requires addressing and optimizing multiple components in an E2E path, processing pipelines, high performance protocols, kernel tuning, OS bypass, path architecture, buffers, memory used for transport, and many other individual components.

6 iCAIR has developed and is experimenting with a prototype model for an integrated SDN/SDX/DTN design, which will be demonstrated at SC18

Resources

Required resources from SCinet are 12*100 Gbps circuits from the StarLight facility in Chicago to the StarLight booth on the SC18 showfloor

Involved Parties

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