SC18 Network Research Exhibition: Demonstration Preliminary Abstract

# SCinet Multi 100G Data Transfer Node for Multi Tenant Production Environment

Jim Chen, iCAIR/Northwestern University, jim-chen@northwestern.edu

**Abstract**

Multi-tenant services and user environments for high performance network and data intensive workflows present emerging network service challenges. These challenges are even more complex in the dynamic experimental environment at the SC conference series. This NRE describes approaches to address them.

We are building on efforts from SC17, for which we implemented a 4x100G Data Transfer Node (DTN). This experience showed the required advances to facilitate its use, to collocate more researchers, and to streamline the process to schedule more experiments and demonstrations: We discovered the difficulty to divide each 2 x 100G DTN to support more than one project simultaneously because different experiments overlapped in software, hardware or network requirements. To avoid this issue and increase efficiency, in SC18, experiments will be able to use all resources in their time slot.

To support that objective we will use a more advance setup verification process to test and verify network routes in advance. Also, to improve experiment deployment, we will use application isolation systems and orchestration tools such as: Docker, virtualization, Kubernetes, and Rancher.

Finally, an additional objective for SC18's SCinet DTN is to provide AI-Enabled DTN services at two levels: 1) AI-ready hardware to support user experiments; 2) DTN performance data capture, analytics, and, (when possible) machine learning/AI based autonomous tuning of the DTN. (implementation of this objective depends on hardware availability).

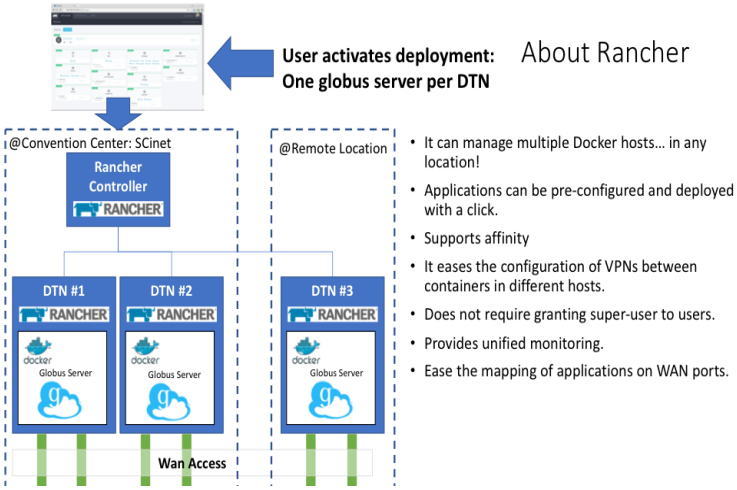
For SC18, the DTN work plan will be similar SC17's: SCinet DTNs will be implemented in pre-staging, and continuously improved during staging, setup, and show.

**Goals**

1. Provide SCinet DTN services to SC18 conference participants, exhibitors and research projects before and during the SC18 conference.
2. Build a SCinet DTN multi-tenant user environment to better support users before and during the SC18 conference.
3. Create tools and workflows for better provisioning, testing, and to monitoring high performance networking (100G) with data intensive workflows.
4. Prototype an AI-Enabled DTN to support emerging demands for high performance DTN integration with AI if hardware is available.
5. Create a AI-powered data pipeline to capture and analyze DTN performance metrics..

**Resources**

- The project team will develop a multi-tenant user environment building on software package similar to Rancher. This will support better experiment isolation and enable user based container environments.




- The project team will work with vendors to provide 4-8 X 100G DTN and AI-enabled DTN prototype.
- The project team will build tools and workflows for better 100G networking & network services testing support
- One 100G switch will have 6-10 100GE up links to SC18 SCinet

**Involved Parties**

- Gonzalo Rodrigo, LBNL, gprodrigoalvarez@lbl.gov
- Anna Giannakou, LBNL, AGiannakou@lbl.gov
- FeiYeh, iCAIR/Northwestern University, fyeh@northwestern.edu
- Se-Young Yu, iCAIR/Northwestern University, young.yu@northwestern.edu
- Eric Pouyoul, ESnet, lomax@es.net