

# SCinet Architecture: Featured at the International Conference for High Performance Computing, Networking, Storage and Analysis 2016

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## I. INTRODUCTION

SCinet is the purpose-built network that operates during the International Conference for High Performance Computing, Networking, Storage and Analysis (Super Computing or SC). Created each year for the conference, SCinet brings to life a high-capacity network that supports applications and experiments that are a hallmark of the SC conference. The network links the convention center to research and commercial networks around the world. This resource serves as a platform for exhibitors to demonstrate the advanced computing resources of their home institutions and elsewhere by supporting a wide variety of applications.

Volunteers from academia, government and industry work together to design and deliver the SCinet infrastructure. Industry vendors and carriers donate millions of dollars in equipment and services needed to build and support the local and wide area networks. Planning begins more than a year in advance of each SC conference and culminates in a high-intensity installation in the days leading up to the conference.

## II. ARCHITECTURE

The SCinet architecture for SC16 illustrates a dramatic increase in participation from the vendor community, particularly those that focus on network equipment. Software-Defined Networking (SDN) and Data Center Networking (DCN) are present in nearly all aspects of the design. The team that designed SCinet's architecture also envisioned an Optical Transport Network (OTN) Infrastructure to deploy capability around the exhibit floor, and then connect to external entities. The use of a metro ring, and data center transport, is a new design element that enabled several demonstrations in booths 2611 and 2537. These booths were defined as Booth Network Operation Centers (BNOCs), an evolution of the classical Distributed Network Operation Center (DNOC), to offer a more concentrated agglomeration of 100GbE uplinks using OTU-4. Additional advancements include the incorporation of external connectivity to cloud providers, a feature used to

support high-capacity data transfer and analysis, required by teams focused on network security. The Network Operation Center (NOC) of the SC16 exhibit floor had a WAN capacity of 3.1 Tb/s, routing and switching capacity of 14 Tb/s, and metro ring distribution of 5 Tb/s. This enabled a total capacity of 22.1 Tb/s for the combined network infrastructure. During a final demonstration push, a measurement of 1.1 Tb/s usage on the WAN was achieved, along with 3.25 Tb/s on the exhibit floor.

## III. CONCLUSION & FUTURE WORK

The SCinet architecture is fluid and modified yearly to support the needs of the conference and the availability of resources within the geographic area of the event. Planning for the next year starts as early as June of the previous year, with volunteers evaluating the conference facility and capability of local network infrastructure.

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1000-TX

- 1 Gigabit Ethernet
- 10 Gigabit Ethernet
- 40 Gigabit Ethernet
- 100 Gigabit Ethernet
- OTN / DWDM
- Wi-Fi Access Point

