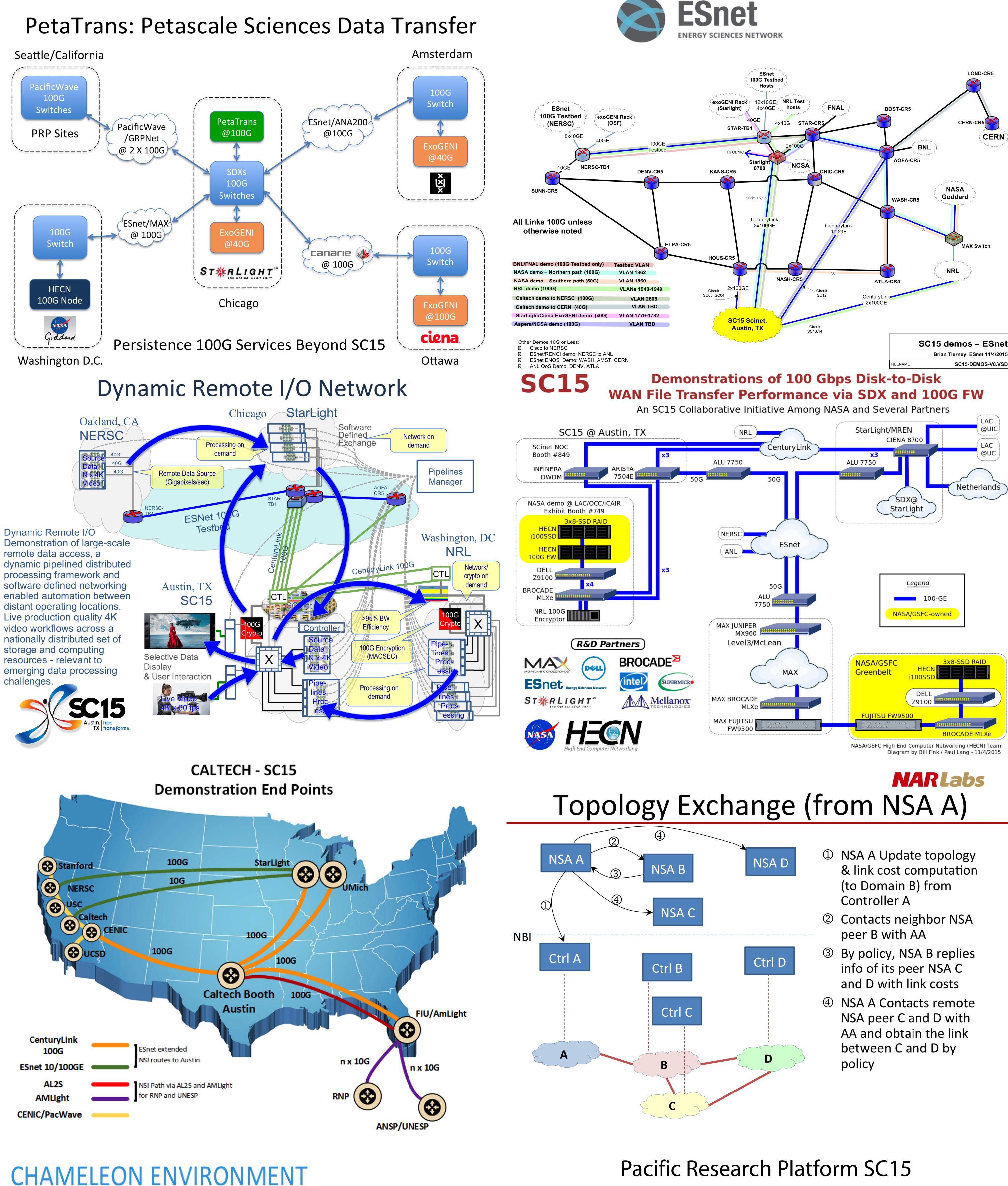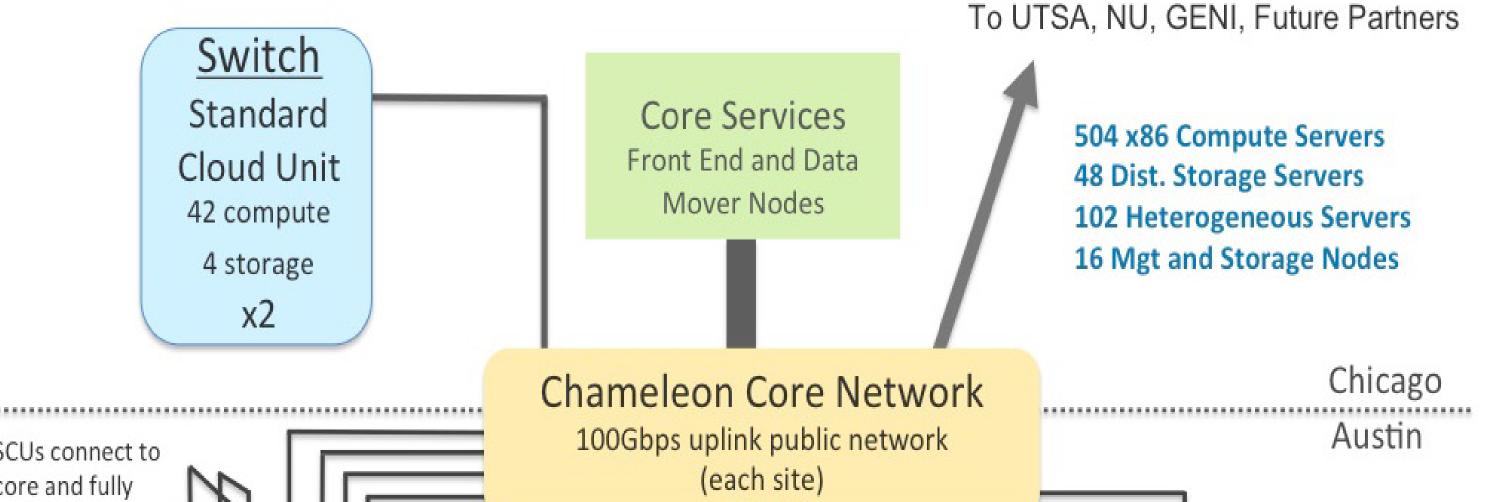# StarLight: Software Defined Network Exchange (SDX) For Data Intensive Science@100Gbs
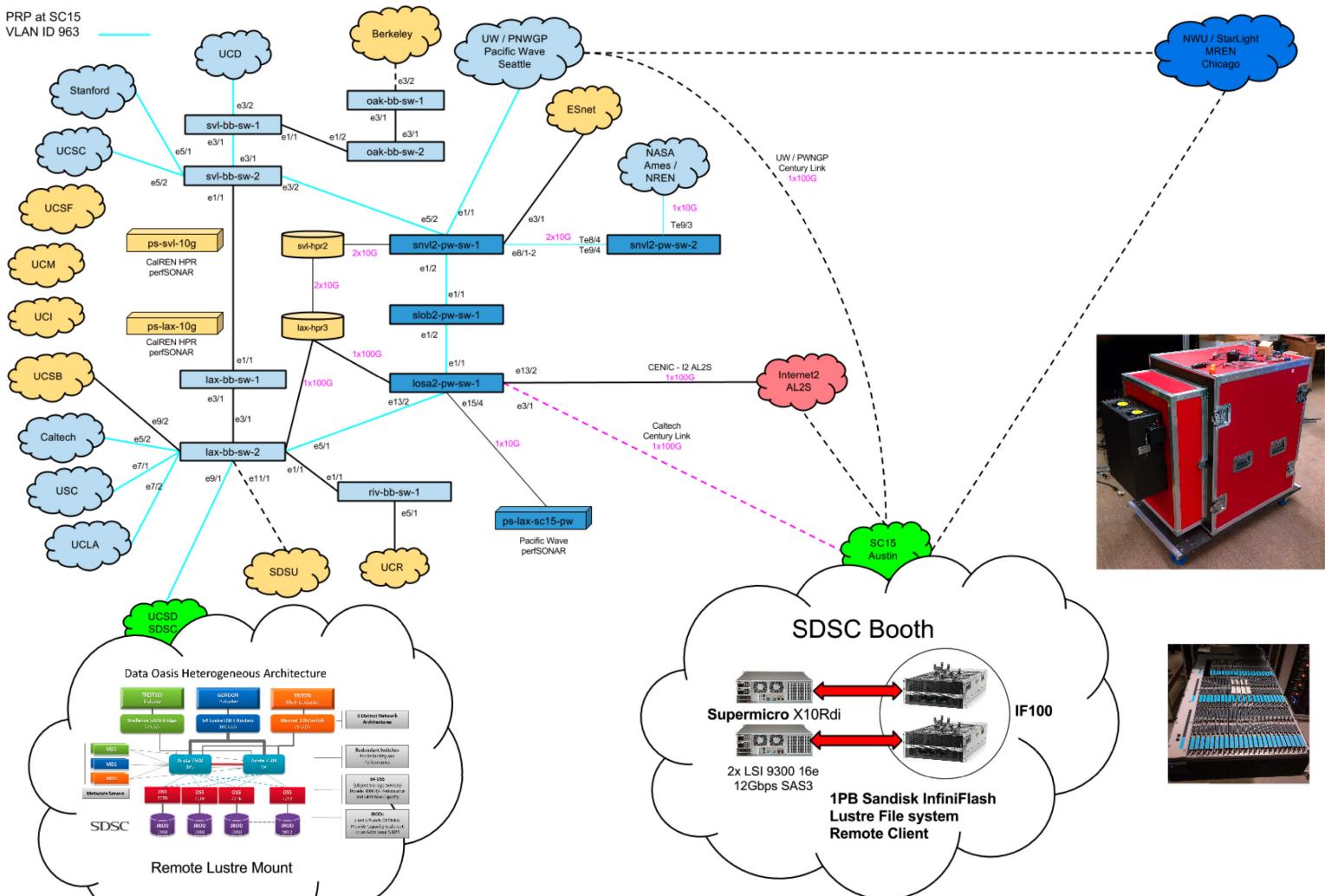
Selected StarLight Networks

The International Center for Advanced Internet Research (iCAIR) at Northwestern University and its world-wide research partners are engaged in multiple initiatives that are creating 21st century communication services, architecture, and technologies in response to the demands of emerging and anticipated applications. This community is developing a new communication design model based on multiple emerging trends in advanced network research, including ultra scale capacity, high degrees of programmability, large scale distributed environments using service-oriented architecture along with sophisticated intermediate network middleware, which provides for exceptional performance, flexibility, adjustability, and customization. This new model has been implemented at the StarLight International/National Communications Exchange Facility, which is part of the Global Lambda Integrated Facility (GLIF). Through its National Science Foundation funded Software Defined Networking Exchange (SDX), StarLight enables the development of globally distributed network environments within which it is possible to create customized integrated heterogeneous networks, which today supports dozens of major national and international advanced networks as well as many major experimental network research testbeds. Below are selected examples of StarLight supported testbeds.

PetaTrans: Petascale Sciences Data Transfer

Persistence 100G Services Beyond SC15

ESnet — ENERGY SCIENCES NETWORK

Dynamic Remote I/O Network

Dynamic Remote I/O Demonstration of large-scale remote data access, a dynamic pipelined distributed processing framework and software defined networking enabled automation between distant operating locations. Live production quality 4K video workflows across a nationally distributed set of storage and computing resources - relevant to emerging data processing challenges.

SC15

Demonstrations of 100 Gbps Disk-to-Disk WAN File Transfer Performance via SDX and 100G FW
An SC15 Collaborative Initiative Among NASA and Several Partners

CALTECH - SC15 Demonstration End Points

Topology Exchange (from NSA A)

① NSA A Update topology & link cost computation (to Domain B) from Controller A
② Contacts neighbor NSA peer B with AA
③ By policy, NSA B replies info of its peer NSA C and D with link costs
④ NSA A Contacts remote NSA peer C and D with AA and obtain the link between C and D by policy

CHAMELEON ENVIRONMENT

Pacific Research Platform SC15