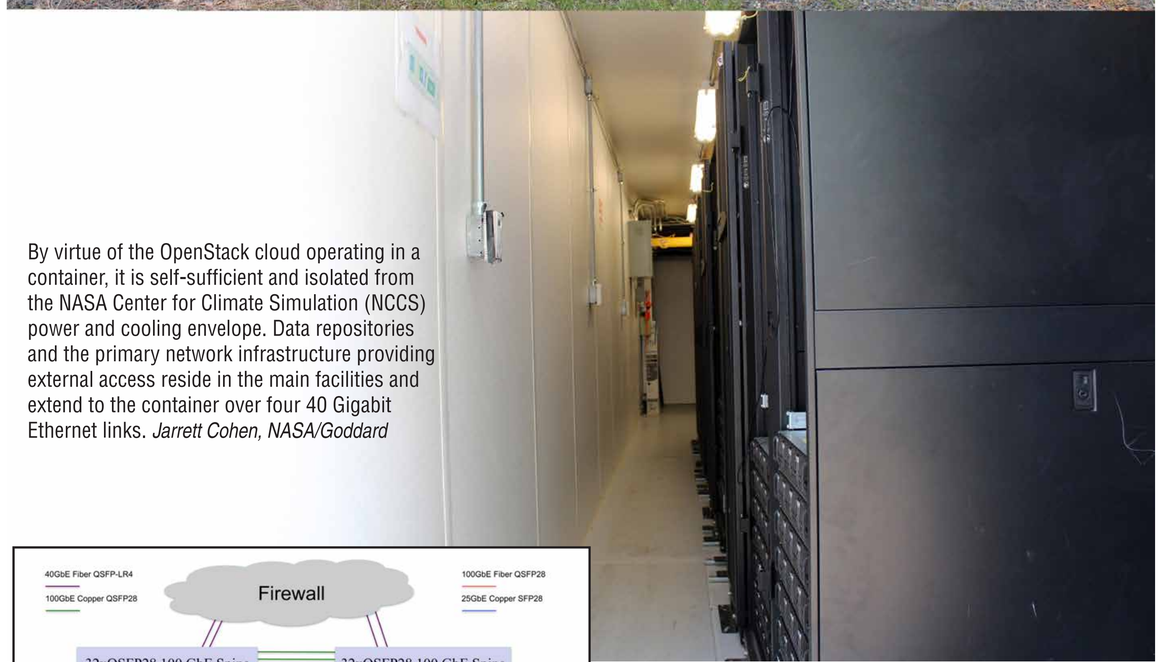
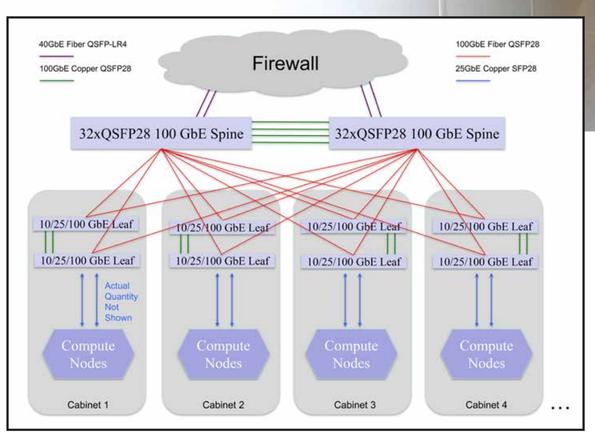


By virtue of the OpenStack cloud operating in a container, it is self-sufficient and isolated from the NASA Center for Climate Simulation (NCCS) power and cooling envelope. Data repositories and the primary network infrastructure providing external access reside in the main facilities and extend to the container over four 40 Gigabit Ethernet links. *Jarrett Cohen, NASA/Goddard*



The OpenStack architecture leverages a high-performance Ethernet network with a full leaf-spine architecture, ensuring that cloud instances can access petabytes of storage at speeds much faster than an average cloud. The switches run the Cumulus operating system, enabling a flexible, software-defined networking topology. Most hypervisors are configured with dual, bonded 10 Gigabit Ethernet interfaces, while 32 hypervisors have single-ended 25 Gigabit Ethernet connections. *Hoot Thompson, Garrison Vaughan, NASA/Goddard*

National Aeronautics and Space Administration

Cloud in a Container Deploying OpenStack

In 2017, the NASA Center for Climate Simulation (NCCS) deployed an operational, on-campus OpenStack cloud. The cloud is housed in a data center container outside the bounds of the NCCS proper. It provides users with self-provisioned resources via the Dynamic Computing Cloud (DC2) interface developed by Spatiotemporal Information Systems. DC2 not only provides system instance management but also collects usage statistics and provides resource governance. The NCCS cloud is a flexible environment that is best suited for more embarrassing parallel, loosely coupled data processing that often requires instance customization and unique software packages. The hardware architecture features 144 Dell c6320 dual-socket hypervisors with 256 gigabytes of memory and a high-speed network based on Mellanox switches running the Cumulus operating system.

Hoot Thompson, NASA Goddard Space Flight Center
Garrison Vaughan, NASA Goddard Space Flight Center