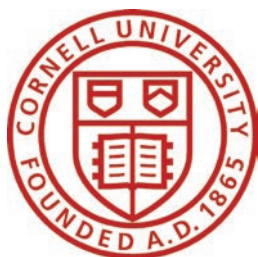




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Cornell's Red Cloud: a model for the future of research

Hybrid cloud meets demands of academia

Objective

Support scientific research with scalable, on-demand computing resources

Approach

Build a hybrid cloud that can scale, with a subscription-based allocations and accounting model that meets the requirement of CAC's cost recovery model

IT Matters

- Deliver elastic, on-demand computing and data analysis resources for faster "time to science"
- Provide more memory per core at a lower price than public cloud
- Optimize resource allocation and spending whenever possible, including an additional layer of shared resources among partner institutions
- Build a true hybrid environment that enables users to burst to a public cloud when necessary

Business Matters

- Save money by only investing in hardware that can be fully utilized
- Support ongoing scientific research at a local and national level with advanced computing and data analysis resources
- Offer enough flexibility and control to serve the university's wide range of needs
- Recover costs of all services delivered to end users without diminishing performance



By eliminating capital expenditures for on-premise hardware that is not used 80 percent of the time or more and removing associated refresh costs, cloud solves two problems for researchers in higher education, according to David Lifka, Director, Cornell University Center for Advanced Computing (CAC).

Easing hardware headaches

"Researchers will adjust to the best computing paradigm to get their science done fast and at the optimal price," Lifka says. "If cloud computing provides the best value, they will move to it."

Lifka is referring to Red Cloud, the hybrid cloud environment his team built five years ago on HPE Helion Eucalyptus. Red Cloud has become an unqualified success and continues to spawn new initiatives, including a National Science Foundation-funded program that serves as a model for how university researchers maximize cloud computing resources while minimizing costs.

Case study

Cornell University
Center for Advanced
Computing (CAC)

Industry

Public Sector &
Education

**Greater flexibility
with cost controls**

Cornell built Red Cloud when researchers began to turn to public cloud as an alternative to buying and maintaining on-premises hardware for research. But that flexibility came with challenges, including potential cost overruns. What researchers liked about Amazon Web Services (AWS) was its consumption-based model for utilizing its hardware. CAC offered a solution as easy to use as AWS, but with cost controls in the form of subscriptions that provided Cornell researchers with the ability to manage cost overrun risks. Red Cloud has been growing ever since.

A key advantage of Red Cloud is its on-demand elasticity. With its HPE Helion Eucalyptus-powered hybrid cloud, researchers have the flexibility to seamlessly burst to a public cloud if necessary. A hybrid approach is conducive to CAC's cost-recovery model.

"The fact that we've been successful with Eucalyptus for five years, and it continues to grow, is the best sign that things are working well—that there are people spending research dollars to use this resource," Lifka says.

"The HPE Helion Eucalyptus team works closely with us to ensure we have the latest software and support for our on-premise deployments," says Lifka. "HPE also partnered with us on our Aristotle Cloud Federation proposal, a National Science Foundation award focused on sharing cloud resources between academic institutions, and bursting to public and NSF clouds."

Red Cloud can provide a lot more memory per core at a lower price compared to most public clouds, according to Lifka. In addition, Red Cloud CPU cores and memory are not oversubscribed. An Intel® Xeon® processor core is behind each core on the virtual server for fast, consistent performance. Users also appreciate the 10-Gigabit connectivity to every Red Cloud server and that there are no fees for network traffic.

Red Cloud serves a wide range of university needs. Many researchers share their data openly. Others, such as those at Cornell's medical school, use Red Cloud Secure, a HIPAA-compliant cloud with a separate secure network.

Case study

Cornell University
Center for Advanced
Computing (CAC)

Industry

Public Sector &
Education

Customer at a glance**HPE Helion Cloud solution**

- Hybrid cloud

Software

- HPE Helion Eucalyptus

“By creating a pool of hardware that’s flexible and allowing faculty to use it for labs, classes, simulations, data analytics—whatever they want—you’re creating an economy of scale and scope that lets the institution as a whole leverage that investment. And you’re optimizing your capital expenditures. That’s really the key.”

– David Lifka, Director, Cornell University Center for Advanced Computing

The next wave of cloud success

Red Cloud’s growth seems to have a ripple effect: Cornell—along with the University of California, Santa Barbara, and the University at Buffalo—won a National Science Foundation (NSF) award that allowed them to develop a federated model called the Aristotle Cloud Federation for sharing data analysis resources among scientific researchers. The goal is to create an extra layer of available resources before bursting to a public cloud.

In the past, it would have been difficult to persuade university leaders to share hardware investments with other institutions. Aristotle will allow member institutions to share resources across institutional boundaries, creating the option for researchers to use them by trading resource service units before having to burst to a fee-based public cloud.

Collaborating institutions will be able to track who is using resources across the federation. Aristotle lays the groundwork for what could likely become a national model for cloud-based collaboration and resource sharing among academic institutions.

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4AA6-5086ENW, April 2016