HOW OPEN SOURCE CLOUD TECHNOLOGY CAN ELIMINATE IT SILOS & CENTRALIZE WORKLOADS

redhat.

EXECUTIVE SUMMARY

Imagine a government in which IT systems connect citizens to services, data moves easily among agencies and public-sector employees, and information is truly open and accessible. A government with systems like these would better serve its citizens, be more efficient, and free agencies to focus more on agency mission.

Information technology administrators are getting close to making that vision a reality as they turn to open source technology – especially technologies like OpenStack. OpenStack is an open source cloud computing software platform, created through a publicly accessible, collaborative process in which everyone is free to make improvements.

Features of OpenStack include letting users deploy virtual machines and other instances that handle different tasks for managing a cloud environment on-the-fly and making horizontal scaling easy. This means tasks that benefit from running simultaneously can serve more or fewer users quickly by spinning up more virtual instances.

Because OpenStack is open source, communities can access the source code, make edits or modifications as they see fit, and share the changes with the developer community to help improve the software. Partnering with the private sector is important, too -- experts like Red Hat help make an open source collaboration a stable and secure platform that is commercially supported for the long term.

To learn how OpenStack can help government overcome some of its biggest challenges, we sat down with David Egts, Chief Technologist of Public Sector at Red Hat, the world's leading provider of open source solutions, and Jason Kincl, Systems Administrator at Oak Ridge National Laboratory (ORNL), to produce a GovLoop Industry Perspective.

Read on for further benefits of open source and OpenStack technology, especially as it relates to cloud implementation; a case study from ORNL on adapting OpenStack; how industry partners can help you best implement open source technology; and best practices on using OpenStack and open source at your agency.

"There are three main reasons organizations choose to deploy OpenStack: cost, efficiency and that it's an open platform.

David Egts,
Chief Technologist of Public Sector, Red Hat

WHY OPENSTACK FOR GOVERNMENT?

Over the years, cloud technology has grown immensely in government usage. Currently, agencies are moving their IT operations to the cloud to take advantage of agile development, streamlined operations and next-generation applications. And now, open source is emerging as a catalyst for cloud innovation.

"The IT challenges faced by government aren't getting smaller or going away," said Red Hat's Egts. "Open source can address many of these challenges. And there's no need to go it alone — industry partnerships in open source get you where you want to be faster."

That's why more and more agencies are looking at OpenStack. Because it's a large-scale open source cloud computing initiative, the OpenStack community hopes to create industry standards, end vendor lock-in and accelerate adoption of cloud technologies.

As a cloud software platform, OpenStack automatically manages pools of compute, storage and networking resources at scale. Its projects are built through a worldwide alliance of developers and cloud computing technologists.

"There are three main reasons organizations choose to deploy OpenStack: cost, efficiency and that it's an open platform," Egts said.

The one downside to OpenStack? It can be complicated to implement without additional expertise. Many officials, though they are aware of the benefits that OpenStack provides, struggle with where to begin. They need help to successfully implement OpenStack – and that's where Red Hat comes in.

Red Hat's open hybrid cloud portfolio helps enterprises benefit from cloud computing across a range of physical, virtual and public cloud infrastructures — without lock-in. With that portfolio and the company's position as a leader in the open source community, Red Hat can help government transfer from traditional workloads to cloud-enabled ones following their own timelines and needs.

Red Hat works with communities of open source developers on the technologies that are used as testing groups for development and packaging of projects like GlusterFS for Red Hat Storage, oVirt for Red Hat Enterprise Virtualization, or RDO for Red Hat Enterprise Linux OpenStack Platform. Then, the company works to stabilize the technologies, confirms they are ready for enterprise deployment and releases them as Red Hat Enterprise Linux OpenStack Platform, a stable, secure and certified technology.

Expertise from Red Hat is especially critical because as more government agencies look to OpenStack for its benefits, removing as much of the implementation complexity and deployment obstacles as possible is vital to success.
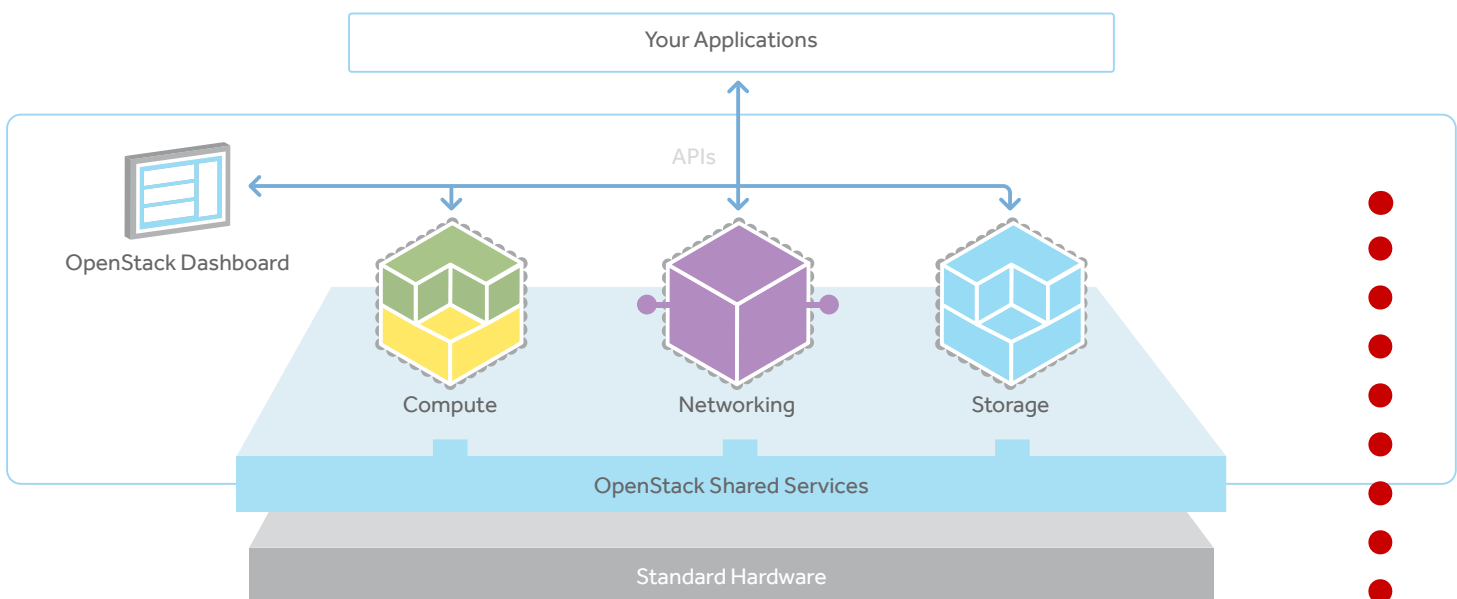

image via OpenStack.org

HOW OPENSTACK HELPED OAK RIDGE NATIONAL LABORATORY CENTRALIZE WORKLOADS

Much has been made of how cloud computing cuts IT costs, helps systems operate more efficiently, and increases agility. But what about its role in scientific efforts? Can the cloud help scientists and researchers? Recent developments at Oak Ridge National Laboratory (ORNL) point to yes.

At Oak Ridge — a lab within the Department of Energy — scientists work on an incredibly diverse portfolio, ranging from nuclear security to material research. Its services are extremely customer-centric and tailored to individual needs – wonderful for the consumer, but tough for the lab because they create hard-to-manage silos of IT. To address this, ORNL pushed toward cloud as a way to centralize workloads.

"Our lab decided to try out OpenStack — an open source cloud infrastructure with a modular architecture that is designed to easily scale out," Kincl said.

To execute this change, ORNL faced three challenges: understanding and deploying an OpenStack-based cloud; designing a hardware vendor-agnostic cloud; and integrating open source into a customized environment.

Below, we'll walk through how ORNL — with the help of Red Hat — successfully navigated these concerns.

» **Understanding and deploying OpenStack-based cloud.**
"This was a massive project with lots of different moving parts," Kincl said. OpenStack is a huge, vibrant community comprised of participants with varying focuses and motivations. Therefore, being able to review and evaluate OpenStack without making any initial financial investment was critical. To get a better feel for the environment, ORNL turned to Red Hat for expertise. Customers are often reluctant to speak with salespeople, wary of their reputation for being duplicitous, but "culturally, we're not like that at Red Hat," Egts said. "We're much more consultative. Customers can speak with a solutions architect to find the right set of options, as we did with ORNL." Red Hat helped amplify ORNL's voice in the community, encouraging users to test the system and identify areas of improvement. This widespread adoption provided long-term supportability.

» **Designing a hardware vendor-agnostic cloud.**
"With different silos of IT that must support a wide range of hardware, it was necessary that ORNL's cloud solution was not tied to one specific vendor," Kincl said. Deploying a cloud solution that met scientists' diverse and demanding needs on varying domains and systems was a significant challenge. "With open source, however, vendors have to deliver value or risk being replaced," Egts said. Red Hat's OpenStack Cloud Infrastructure Partner Network helps deliver this value. It creates an ecosystem for various partners to generate competitive and customer insights, using Red Hat's Enterprise Linux OpenStack Platform. With critical industry perspective and OpenStack expertise from Red Hat and the partner network, ORNL was able to craft a solution to meet its needs that did not require it to be tied to a specific vendor.

» **Integrating open source into a customized environment.**
"Integrating the solution with the existing lab infrastructure that scientists depend on was key," Kincl said. Open source enables customization, letting you see the inner workings, make improvements and tailor the software to your environment. Red Hat helped ORNL work through this process, ensuring it wasn't developing another piece of soon-to-be siloed IT. "Red Hat will take a solution, harden it and turn it into a commercialized product," Egts said. "Every piece of hardware or software Red Hat certifies, whatever we support, we can back up."

However, the implementation process was not without its challenges. Culture and resistance to change were difficult to overcome. But Kincl said that despite reservations, agency leaders must adopt an "adapt or die" mentality.

For organizations such as ORNL, "this was a change that was necessary for its success in the long-term," Kincl said. "Failing to act due to fear of the unknown would have been very costly."

BEST PRACTICES FOR USING OPENSTACK TECHNOLOGY AT YOUR AGENCY

Open source technologies such as OpenStack can reduce costs and improve services — but they must be implemented properly to achieve maximum benefits. Kincl walked through the top four steps government IT providers and agencies must take when considering open source solutions and OpenStack implementation:

» **Start a dialogue early and talk often.**
"We took a lot of time trying to understand the ecosystem," Kincl said. "If we would have approached Red Hat earlier, we would have been able to answer our questions sooner, rather than trying to go it alone. We could have accelerated our timeframe."

» **Evaluate options.**
Kincl stressed the importance of looking at a variety of solutions before choosing one technology for implementation — even if it delays your timeline. "You have to evaluate the choices out there," he said. "Even if it takes time, you need to do it."

» **Do not undervalue testing.**
"Being able to put code on a machine without having to go jumping through sales hoops or licensing or the myriad problems with proprietary software allowed us to quickly figure out if OpenStack would work for us," Kincl said.

» **Watch for hidden requirements.**
"We found a lot of problems in requirements in being able to clearly communicate to our customers the service levels," Kincl said. "We really need to have that full integration into our environment and any hidden requirements, and Red Hat was really able to help us with that because of their experience and knowing any pitfalls."

Open source holds great potential to reimagine processes and how services are delivered in the public sector. Examining ORNL and its collaboration with industry, we've seen how agencies can tailor open source solutions to fit organizational needs.

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Systems Administrator, Oak Ridge National Laboratory
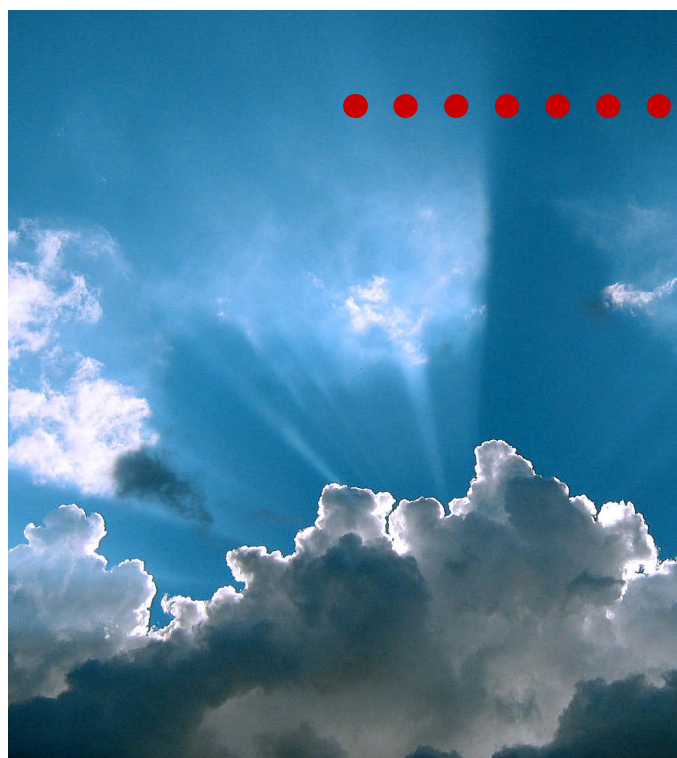
MORE RESOURCES

» [How Open Source Can Help Overcome Government's Biggest Challenges](#) (online training)

» [How Red Hat Brings OpenStack Into the Enterprise](#)

» [Red Hat Enterprise Linux OpenStack Platform Accelerator Service](#)

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Red Hat® is the world's leading provider of open source solutions, using a community-powered approach to provide reliable and high-performing cloud, virtualization, storage, Linux® and middleware technologies. Today, Red Hat is at the forefront of open source software development for enterprise IT, with a broad portfolio of products and services for commercial markets. That vision for developing better software is a reality, as CIOs and IT departments around the world rely on Red Hat to deliver solutions that meet their business needs. Solutions that provide technology leadership, performance, security, and unmatched value to more than 90 percent of Fortune 500 companies.

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GovLoop's mission is to "connect government to improve government." We aim to inspire public-sector professionals by serving as the knowledge network for government. GovLoop connects more than 150,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to connect and improve government.

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