

OpenStack Is Ready — Are You?

by Lauren E. Nelson, May 18, 2015

KEY TAKEAWAYS

OpenStack Is Ready For The Enterprise That Was Not Born Digital

Notable Fortune 100 enterprises like BMW, Disney, and Wal-Mart have irrefutably proven that OpenStack is viable for production environments. These are regular companies, not firms that were born digital like Etsy, Facebook, and Netflix. OpenStack's presence in the market is now accelerating, leveraging the success of these pioneers.

Easy, Cheap, And Self-Service Developer Access Is The Dominant Use Case

I&O pros use OpenStack for creating a self-service, agile platform using open source and commodity-based resources for net-new workloads, which stay in this environment into production. But most enterprises are developing at least one other cloud deployment on-premises for traditional workloads.

OpenStack Has Its Flaws, But That's Not A Showstopper

This shouldn't come as a surprise. All software has its issues. Open source efforts typically suffer from transparency where issues and bugs get blown out of proportion. OpenStack adopters are fully aware of this and continue forward regardless.



OpenStack Is Ready — Are You?

Learn From The Lessons Of The OpenStack Masters To Help You Succeed With The Popular Private Cloud Platform

by [Lauren E. Nelson](#)

with [Glenn O'Donnell](#), [Andre Kindness](#), and Michael Caputo

WHY READ THIS REPORT

OpenStack is an open source cloud platform that has become a compatibility standard for the private cloud market. Despite its headway into the Fortune 100 and long list of notable vendor supporters, coverage thus far has been limited to media articles and vendor propaganda that disproportionately inflate both the strengths and shortcomings of OpenStack. For infrastructure and operations (I&O) professionals about to kick off their OpenStack initiatives, it's hard to make sense of the key decisions, top challenges, and the team you need to get started. Forrester interviewed eight OpenStack end users and 10 OpenStack ecosystem vendors to discuss the best practices and common pitfalls I&O pros face when adopting OpenStack. This report guides I&O pros along the early days of their OpenStack deployment to set them off on the right path to success in winning, serving, and retaining customers as part of the larger BT agenda.

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Forrester interviewed eight OpenStack end users and 10 OpenStack ecosystem vendors to discuss the best practices and common pitfalls faced when adopting OpenStack. Information from these interviews was completely anonymized. All specific customer examples were drawn from public OpenStack summit sessions. Our interview pool did not consist of these examples.

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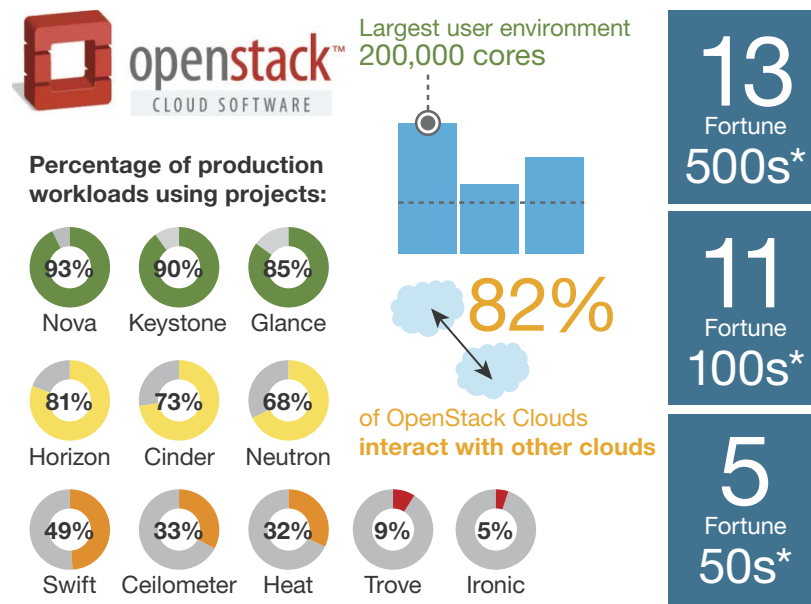
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FORTUNE 100 FIRMS HAVE PROVEN OPENSTACK'S ENTERPRISE READINESS

OpenStack is here, and it's ready.¹ Eleven Fortune 100 firms (e.g., Best Buy, BMW, Comcast, Disney, Wal-Mart) are already using OpenStack for production environments, making its viability and presence in the market irrefutable (see Figure 1).² However, OpenStack isn't your only private cloud or virtual environment designed to be your orchestrator across your traditional workloads.³ Rarely does one place OpenStack in front of legacy or traditional workloads in lieu of a proprietary private cloud suite. In reality, OpenStack sits behind *net-new* environments designed to launch your enterprise into a revolutionized continuous development experience.⁴ Its adoption supports a much larger transformation toward agility and development efficiency and is not tied to virtualization or consolidation efforts. For some, OpenStack adoption starts after the organization's aha moment about the fundamental transformation to the age of the customer, where the standard for customer experience (CX) is set by the Facebooks and Pinterests of the world, regardless of industry.

Figure 1 The Statistics Signal OpenStack's Enterprise Readiness



Source: OpenStack User Survey, November 2014

*Number of companies in each category using OpenStack

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An increasing number of large enterprises are seeking open source technology to launch this transformational journey. The goal is to avoid vendor lock-in and mitigate expensive licensing costs.⁵ Others see it as the promise of portability and interoperability of applications embracing a “design-once, run anywhere” solution — a reality that hasn’t come to fruition yet.⁶ Regardless, OpenStack’s own continuous release cycle of new OpenStack modules reflects the agile, continuous delivery that many evolving BT organizations look to mirror (see Figure 2). Whether enterprises establish and build a center of OpenStack excellence internally or leverage it through a series of vendor partners, they are turning to OpenStack as the platform layer of their solutions across core projects tying into the larger BT agenda.

Figure 2 OpenStack Projects And Releases Continue To Evolve And Expand The Platform’s Value

	Component code name	Release date	
Current release: Kilo (April 2015) Next release: Liberty (Oct. 2015) Past releases: Austin (Oct. 2010) Bexar (Feb. 2011) Cactus (April 2011) Diablo (Sept. 2011) Essex (April 2012) Folsom (Sept. 2012) Grizzly (April 2013) Havana (Oct. 2013) Icehouse (April 2014) Juno (Oct. 2014)	Nova	Oct. 2010	Compute
	Swift	Oct. 2010	Object storage
	Glance	Feb. 2011	Image service
	Horizon	April 2012	Dashboard
	Keystone	April 2012	Identity
	Cinder	April 2013	Block storage
	Neutron*	Sept. 2012	Networking
	Ceilometer	Oct. 2013	Metering
	Heat	Oct. 2013	Orchestration
	Trove	April 2014	Database
	Sahara	Oct. 2014	Data processing
	Ironic	Incubating	Bare metal
	Zaqar	Incubating	Queuing service

*Quantum renamed Neutron

OpenStack Is A Good Fit For New Application Development

OpenStack is rarely the only private cloud and enhanced virtualization effort within a technology management organization. Although most OpenStack engineers have the hopes of someday rolling the entire virtual environment into the OpenStack environment, that's far from realistic. Doing so would require rewriting applications to avoid performance degradation. This generally falls into the "if it's not broken, don't fix it" category. Tech management instead introduces OpenStack to enable new, previously unattainable objectives while maintaining the current state for the rest of the environment. I&O pros currently use OpenStack for two common scenarios:

- **Enabling self-service developer access for DevOps developers.** Some private clouds are built for the sole purpose of developer enablement. Forrester has long referred to such efforts as *public-cloud lite*.⁷ Unlike many other private cloud implementations, these are built by product teams and are isolated from other traditional environments for the design of net-new applications, which is the major OpenStack use case. Although these private clouds start small, they grow quickly, able to host production applications for the more dynamic systems of engagement. Since OpenStack is a pure infrastructure-as-a-service (IaaS) cloud platform, the interfaces expose infrastructure configuration and IP address assignment. Only the most technical developers will have the skills or desire to interact with this platform directly without abstraction.⁸ Forrester calls this highly skilled developer the *DevOps* developer since this individual has both operations and developer experience.⁹
- **Building a low-cost environment for your systems of engagement apps.** Some view OpenStack as a cost-effective cloud platform in a larger cost-conscious technology build-out. Many OpenStack-focused enterprises on a minimal budget seek to develop a net-new scalable environment to host future use cases. These enterprises anticipate exponential growth with no clean ties to increased revenue. Making the conscious decision at the forefront of this movement to minimize technology dependencies and use open technology is central to many OpenStack build-outs. For many, this exists at the front of a larger DevOps movement built on the philosophy of speed, automation, and open source tools.¹⁰

DO NOT LET OPENSTACK FLAWS SCUTTLE YOUR EFFORTS

News articles emerge every few months warning that OpenStack's "dirty little secrets" make it unfit for production use.¹¹ Problems do remain in its code, but that's nothing new in the private cloud arena. Many of the issues OpenStack adopters are facing aren't OpenStack-specific but characteristics of all core open source communities. From our own findings, the following are the potential pitfalls and challenges that every adopter should understand from the beginning:

1. **Unforeseen downtime during upgrading isn't a resolved issue.** The Icehouse release marked the first platform instance with live update support.¹² Vendors in the space have been successfully running updates since that time. Those adopting the raw direct OpenStack code are just starting to go through their own live updates. As you face near zero downtime for upgrades, look at the interdependencies of the various projects to ensure compatibility.¹³ Failure to do so will mean significant unforeseen downtime. Moving forward, OpenStack will be mapping interdependencies as part of its big tent effort to offset releases on certain projects.
2. **Keeping up with releases and updates is difficult for most enterprises.** In theory, running small monthly upgrades and larger six-month upgrades makes a lot of sense. With development organizations moving toward continuous delivery for internal apps, they're constantly fixing bugs and frequently releasing updates. This high-velocity cadence implies that a frequent update cycle for OpenStack is in everyone's best interest. In reality, most I&O professionals aren't quite ready for this switch. As such, OpenStack users typically stay six months behind releases and worry about their long-term ability to keep on course with the rapid releases. DevOps efforts are helping, but most adherents are not yet able to digest the full impact of continuous delivery.
3. **OpenStack reboots the network interface again and again.** Network interfaces were built within the compute module, Nova, which offered programmers a very simple set of rules for small flat networks that didn't scale. Consequently, a separate network-as-a-service module, Neutron, evolved out of Nicira's work to orchestrate large, complex networks, but has been riddled with hiccups and centered on Nicira's (now VMware NSX) vision.¹⁴ The recent OpenStack release, Juno, helps stabilize Neutron, transition users from Nova to Neutron, and build out more core networking capabilities, such as IPv6 and IP address management.¹⁵ This pain point is on the mend, but it's critical for new OpenStack users to understand the maturity and significant differences in networking structure in the past couple releases.
4. **Provisioning loads of 50 virtual machines (VMs) or more suffer from delays.** Some blame Nova schedulers; others blame Neutron's design.¹⁶ Regardless of which project has the issues, the fact remains that provisioning more than 50 VMs can cause 12-hour delays. OpenStack veterans solve this with batch jobs while they await help from contributors to fix these bugs. Others replace Neutron with OpenDaylight completely.¹⁷ Either way, it isn't a showstopper.
5. **Direct adopter competency takes four to six months.** You've likely heard stories about eBay, CERN, Comcast, and PayPal adopting OpenStack directly to completely avoid vendor lock-in. Their stories didn't happen overnight. It took months for them to develop a center of competence and select the right team to support their efforts. Once enterprises train members of the team, some find it hard to retain them, given the high demand for trained OpenStack engineers. For many enterprises, the challenges ahead seem too daunting without a vendor distribution and/or services to accelerate their journey.

6. **SDN is immature.** Due to the nonexistent programmability of traditional network hardware, OpenStack requires software-defined network (SDN) capabilities, but, more specifically, the ability of the system to automate network infrastructure, orchestrate layer 2 through 7 services, and enable other teams to leverage the network as outlined in Forrester's virtual network infrastructure architecture.¹⁸ You can find some of these basic elements in the market's SDN overlay and underlay solutions. While ultimately customers will need to use both, customers have steered away from investing in underlay solutions, such as Cisco Application Centric Infrastructure (ACI) or Brocade's various solutions, because those solutions require a hardware replacement, which is a big gamble at this point. On the other hand, overlay solutions such as VMware NSX (formerly Nicira), Midokura, or Nuage Networks provide customers immediate access to basic SDN capabilities.¹⁹ OpenStack Neutron sticks to its origins and favors the overlay category.
7. **Security in OpenStack requires due diligence.** As typical with every software solution, security due diligence is required. Leverage traditional security expertise and processes as you roll out your OpenStack implementations while building up OpenStack-specific security expertise. Your security experts will need to be familiar with the varying levels of maturity across projects and know the ins and outs of OpenStack code. Although you'll need to build this competency, you won't be facing this alone. Many security vulnerabilities are well documented, and with every release comes security bug fixes.²⁰
8. **Vendor participation is not altruistic.** It is naïve to believe that all OpenStack vendor community members are friends. Boris Renski of Mirantis described the phenomenon best — cooptation.²¹ No vendor is in this community for its greater good. They view participation as a vehicle to generate revenue. Contributions, summit sessions, and membership are all ways in which vendors market their own products and services. Be aware that each participating vendor adds proprietary extensions to establish its own distribution as the superior OpenStack choice for customers.
9. **Reference architecture improvements lag.** The OpenStack reference architectures don't exploit proprietary extensions, so they deplete vendor revenue. If reference architectures reflected the best implementations currently possible, each vendor's unique contributed value would be diffused. Real revenue potential would drop significantly. Because of this, vendors neglect the reference architectures and they become stale. As you get started on OpenStack, you may face initial challenges using the outdated reference architecture. You'll need to establish your own center of competency or look to leverage vendor partners to get this right.
10. **OpenStack is not a cloud manager or a platform-as-a-service (PaaS).** Behind every cloud environment is one or more cloud platform that connects into element monitoring tools and orchestrates the service delivery process.²² OpenStack is a common cloud platform with some of the lightweight management capabilities typical of this particular cloud technology. If you're

looking to replicate the cloud management of a full private cloud suite or the IDE tool set and abstraction of a PaaS, you're looking in the wrong place. Many distributions of OpenStack and adjacent open source projects solve for management and infrastructure abstraction. Look to these tools to get the right fit for your use case. Also, recognize that these management functions will demand effort on your part. Management and automation are nowhere near ready out of the box.

TAILOR YOUR OPENSTACK TEAM TO THE RIGHT CLOUD CONSUMPTION MODEL

Distros and service providers exist to support OpenStack adoption for one reason — it isn't easy. As I&O pros get started on OpenStack, they'll need to immediately address two big challenges:

1. The consumption model (direct or distro).
2. The team that will help them build and run this environment.

Each has significant interdependencies with the other. Vendor support in the OpenStack ecosystem is an extension of your team. The skill sets of your internal team determine the right level of support. Similarly, where you draw the line in vendor support and your team's own responsibilities will impact how you build out this team as your environment grows over time.

Choose Your Consumption Model Early And Carefully Consider A Myriad Of Factors

In the beginning of your private cloud journey, you must evaluate and answer the most basic question regarding OpenStack: "Go direct or use a distro?" Like most open source initiatives, the vendor ecosystem has created enterprise-grade distributions to enable easier adoption, packaging, and enhanced features. In the OpenStack community, the direct versus distro decision is a bit more complex. You can go completely solo with direct adoption of the code, but direct options and vendor-supported distributions vary considerably (see Figure 3).

Each consumption model varies in the following ways: 1) deviation from pure OpenStack code; 2) enhanced features; 3) cost; 4) vendor training; 5) vendor remote management; 6) vendor service support; and 7) location of the cloud environment. Finding the right mix will be different for each organization.

Figure 3 OpenStack Options

Type of OpenStack use	Definition of category	Major cost investment	Vendor examples:
Trunk	Pure OpenStack on current release	Staff, integration	N/A - direct model
Pure OpenStack on previous release	Pure OpenStack using a release six months or older	Staff, integration	N/A - direct model
Community edition	OpenStack lightly packaged for initial deployment ease or increased compatibility or integration	Staff, integration	HP Helion OpenStack, IBM Cloud Manager With OpenStack, Piston OpenStack, Rackspace Private Cloud powered by OpenStack, SUSE Cloud, VMware Integrated OpenStack
Enterprise edition	OpenStack altered for easier enterprise adoption. Alterations are significant enough to disqualify it from being listed in the OpenStack Marketplace.	Software	Piston CloudOS, HP Helion Enterprise Edition, Mirantis OpenStack Software, Red Hat Enterprise Linux OpenStack Platform, SUSE OpenStack Cloud
Remotely manage private cloud	An on-premises private cloud solution that pairs a packaged software solution with ongoing remote management from a vendor	Software, services	Mirantis OpenStack Managed Services, Rackspace Managed Private Cloud, Red Hat OpenStack Services
Appliance or converged-based solution	Fully integrated hardware/software solution that accelerates your journey to cloud	Infrastructure, software	Metacloud OpenStack
Private cloud suite built atop customized OpenStack	Solution built atop OpenStack as its default cloud platform. Suite includes advanced cloud management capabilities.	Software	HP Cloud Service Automation (CSA), IBM Cloud Orchestrator, Red Hat Cloud Infrastructure
OpenStack API compatible	Solution doesn't use OpenStack as its cloud platform but has API compatibility such that a user can decide to swap out its own platform for an OpenStack platform. Level of compatibility varies.	Software, integration	BMC Cloud Lifecycle Management, Cisco Intelligent Automation for Clouds, Microsoft System Center, VMware vRealize Suite
Hosted private	An externally located, service provider run, mostly dedicated IaaS environment. Vendors manage up to the hypervisor.	Infrastructure, services	HP Helion Managed Private Cloud, Rackspace Private Cloud, Blue Box Cloud, IBM Cloud OpenStack Services
Public cloud	An externally located, service provider run, multitenant IaaS environment. Vendors manage up to the hypervisor.	Infrastructure, services	HP Helion Public Cloud, Rackspace Public Cloud

Note: Refer to the OpenStack Marketplace for an updated list in many of these categories.

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Unfortunately, the complexity doesn't stop there. OpenStack is not just a monolithic system. Several components build on the core as related but independent projects. Adopters must make key decisions on the following: 1) which projects (e.g., Cinder, Horizon, Nova, Swift) they want to use; 2) which release to use; 3) how often they plan to upgrade; 4) how much they want to customize; and 5) whether they should also include PaaS or SDN elements in the same RFP. Your vendor and solution decision will greatly affect your environment and speed-to-deploy. As you weigh these key decisions, you should answer the following questions:

- **What is the goal, and is that goal realistic?** For those who see OpenStack as a massive investment pivoting toward open source and commodity infrastructure, developing a center of excellence could be a wise investment. It is extremely important to be realistic about your ability to successfully build and maintain something so big and complex. For others, OpenStack is one of many projects underway, and the existing team doesn't have time to be focused solely on learning the ins and outs of various open source tools. Level-set on where OpenStack sits in the larger scheme of things for your technology management organization and invest appropriately in budget and staff time depending on your organization's goals and realistic abilities.
- **Who is the target audience?** If the goal is developer enablement but you're working with less-technical rapid app or coding developer types, exposing OpenStack to them will do little good.²³ What you likely need is a PaaS abstraction layer using a solution like CloudFoundry or OpenShift atop OpenStack. Packaging and building your own OpenStack while integrating and supporting configuration tools like CloudFoundry or OpenShift is far too ambitious for most enterprises.²⁴ Leveraging a vendor partner to help pair these two solutions and deliver self-service access with speed is likely the right choice for your endeavor. Alternatively, if your users sit within your team and possess deep operations skill sets, you may opt for more choices and less vendor lock-in through a direct OpenStack environment.²⁵
- **What is your budget in cash and staff?** Academic research or product development groups within large organizations often lack the resources to invest in significant vendor support. Although going at it alone will take time and cost the organization in other ways, this is the only path forward for those without cash to spend. Several "unicorns" in the OpenStack space (e.g., CERN, Digital Film Tree, eBay) invested heavily in developing their own staff and hiring from the limited OpenStack talent pool to create their own center of competence. Their needs are often unique and scalable. For most others, the cost associated with slower time-to-market and variability in seasoned staff (e.g., keeping your newly valuable and marketable staff) is reason enough to invest in vendor-supported solutions.
- **What is your current level of expertise and buy-in?** Genuine expertise in OpenStack is limited to a small pool of seasoned veterans. Although your team may be good, significant OpenStack experience is probably not among their skills. Almost equally important for your cloud team is experience working on and with open source projects. These people have worked with

communities and understand the nuances of leveraging rapidly evolving technology. If your staff's background here is insufficient, you should leverage a vendor partner or immediately look to hire. OpenStack veterans warn that acquiring this talent is a slow and steady process that took far longer than they anticipated. Vendor partners will navigate you through the trickier parts of your initial deployment and steer your team in the right direction with little delay.

Core Requirements For Your OpenStack Team And Supporters

If you've made your decision on your OpenStack consumption model, assemble your internal team with the right mix of skills. This team will start small and ramp up its expertise on whichever portions of OpenStack management it has settled on managing (more or less depending on the role of any vendor provider).²⁶ Building out the rest of your team can be difficult and may take years to slowly develop. According to our OpenStack interviewees, limitations include budget, headcount, approval to move individuals from within the company, personality, and significant open source experience. When asked about the ideal characteristics of their team, OpenStack veterans listed out the following staffing requirements (these will vary based on the OpenStack consumption model):

- **Two or three systems architects who understand distributed systems.** OpenStack requires system-wide efficiency and problem-solving. Technology engineers stepping into this role must shed their technology artistry in favor of a systematic approach and make decisions based on scalability. This requires expertise across multiple technology silos, but it also means pushing the limits on standardization and automation technology throughout the entire environment. This team builds out services to support its OpenStack environment and handles access of large-scale databases. Getting on board for this larger scale technology transformation will be as much of a personality fit as it is a skill fit. This role is far more engineering-centric than other OpenStack roles. Enterprises we spoke with generally evaluate applicants 80% on engineering and 20% on operations skills.
- **Three to five operators with Linux admin and open source experience.** You'll need a core part of your OpenStack team to have platform development skills, significant experience as Linux admins, and a history of open source community involvement. Part of your enterprise's journey will be building up Chef or Puppet scripts, fixing bugs that cause bottlenecks, actively engaging in the community to understand where rework can be avoided, and pushing the organization to this fast-paced technology revolution. This team also functions as your support team that answers help desk tickets related to this environment. This position is a mix of 60% operations and 40% engineering skills according to OpenStack veterans.
- **An infrastructure team on call.** Many OpenStack teams aren't short on infrastructure expertise. With I&O pros leading the charge in many of the larger implementations, this is known territory and an easy item to check off their list. However, when you run up against hardware, network, or data center issues, you'll likely be working with individuals outside of the core OpenStack

group. You'll need strong relations with your infrastructure team to solve some of the tougher performance challenges. Many enterprises use this environment as one of their first ventures into commodity hardware. Having seasoned infrastructure professionals assisting with this new build-out is critical to success for the larger transformational OpenStack environments.

- **A team of modern developers with infrastructure configuration competency.** If you're holding off on self-service due to a lack of developer configuration skills, you're likely behind on the latest in developer abstraction.²⁷ Cloud platforms like OpenStack expose the environment as pure IaaS. It forces your most technical developers to create differentiation via infrastructure configuration.²⁸ You need some of these developers for your OpenStack team to influence the ultimate user experience. They must be familiar with the latest development, deployment, and cloud architecture tools and trends such that they can build lasting applications that will lead your organization forward. For those developers that "aren't ready for self-service access," you will still want to expose a portal to them, but it won't be OpenStack. Likely you'll be pairing a PaaS solution like a CloudFoundry solution or OpenShift to give them a full IDE tool set.
- **A C-level executive who has bought in.** It is no coincidence that the major OpenStack success stories include executive support and recognition of the value proposition of OpenStack adoption. The investment that you need to make for an OpenStack initiative is not trivial. Make sure the relevant executive understands the full value, and make this a very early priority because it will help you avoid major economic and political pain as you progress. Resources will be provided more readily and many roadblocks will fall away. Part of this will require an understanding of how open source communities function and the pros and cons of taking such an approach to support an agile IT project. Most executives like the cloud story, but make sure they are well informed of all aspects — good and bad. Good leaders are fine with battling the issues that will inevitably arise, but they hate nasty surprises. Keep them well-informed and you will enjoy their support.

RECOMMENDATIONS

I&O PROS HEADED TO OPENSTACK SHOULD FOLLOW THE PATH OF THE MASTERS

Forrester posed the question to OpenStack users and vendors alike about the best practices and top recommendations for those about to follow them down the OpenStack path. The following were the top four recommendations that emerged from our research:

1. **Go to OpenStack summits.** OpenStack users stated that the single most important learning opportunities at all levels of OpenStack expertise are the community events. OpenStack hosts two large summits in May and November each year, where sessions include an introduction to OpenStack to get users started, user stories, and technical deep dives into OpenStack problem-solving. The sessions are high on quality and low on marketing pitches for an overall high-quality experience. Most of these sessions are then posted on the OpenStack website for those unable to attend the events. Outside of the major release summits, there are also user committee summits every few months in all the major regions. The perk is that these are end-user-only summits — no vendors may attend. The community can also help you secure budget to travel to the major events in person.
2. **Upstream your custom code.** Most I&O professionals know that if you customize, you may be at risk of incompatibility once the new release comes around. For OpenStack users, this means slower upgrades and falling further behind on releases. Top OpenStack users deliberate on what features they would like to see in OpenStack and divide these between must-have and nice-to-have capabilities. Based on their own internal competency, they determine if they should write the feature themselves or ask vendor partners to target this use case. Contributing upstream requires a significant knowledge of the structure and about the inner workings of the OpenStack architecture and the general DefCore direction.²⁹
3. **Don't fight the community.** Adding features or enhancements is one thing, but directly challenging a structural approach that is highly contentious is a completely different story. Being headstrong about a particular approach when the community has very publicly disagreed with this approach is a wasted effort. You'll waste months trying to develop or contradict the approach OpenStack has taken, with little to no reward. Let go of your ambition to attach more drivers to Cinder or develop support for non-SDN solutions. Part of being involved in an open community with a great deal of momentum is following the momentum despite your own architectural demands.
4. **Don't be alarmed by the transparency of bugs.** All solutions have bugs, but open source removes the curtain. Culturally, I&O professionals aren't accustomed to bug transparency. For open source newbies, it's always a shock that thousands of OpenStack bugs exist and that they are documented for all to see. Vendors in this space spend a significant amount of time rescuing adopters with such trepidations. Get comfortable looking at transparency as an advantage rather than a sign of instability.

WHAT IT MEANS

TWO BIGGER QUESTIONS WILL DETERMINE OPENSTACK'S LASTING POTENTIAL

Enterprises that were holding back on OpenStack to reach a certain maturity no longer have any excuse to delay adoption. As enterprise adoption ramps up, there are two interesting questions circling the industry regarding OpenStack:

- **Will OpenStack become one of five public cloud camps?** In many industry minds, public cloud camps are forming. Amazon Web Services (AWS) has long since established its application programming interfaces (APIs) as a standard in the space. Microsoft Azure has gained significant ground among its .NET user base. Google is trying to catch up with its AWS-like hyperscale approach. VMware's vCloud Air solution seems a likely fit for enterprise workloads built on VMware ESX among its massive user base. OpenStack is positioned to become the fifth major public cloud camp. Although HP and Rackspace are the only major OpenStack-based public cloud providers, it's likely that others will gravitate around this fifth camp in the next few years, since membership to this camp offers greater benefits and less controlling groundskeepers. Less profit sharing, greater ability to differentiate, and a community to help decide changes all make OpenStack far more appealing than obeying the whims of the proprietary camps.
- **Will OpenStack ever be carrier grade?** Public cloud requires scale and a delicate balance between fast and cheap storage options for its users. Thus far, public cloud providers have been successful at building out the scalable storage options for OpenStack. Networking in OpenStack is currently one of the largest remaining pain points. For end users, this is seen through the transition from Nova to Neutron and various bottlenecks for large deployment quantities and the ever-shifting balance of various SDN technologies. For carriers, it's a barrier. Neutron simply can't handle what's required. The next year for Neutron will be critical: It will need to improve radically enough to fit this use case. Vendors tuned into this shortcoming have committed to one year of Neutron remediation support while also hedging their bets with Neutron alternatives like OpenDaylight. Nothing will be decided within the next year, but this will be a critical deciding point for OpenStack over the next year.

ENDNOTES

¹ The buzz has been growing about OpenStack's readiness for enterprise use through articles such as the one by Mirantis' Nick Chase. Source: Nick Chase, "Ask Not Whether OpenStack is Ready for the Enterprise..." Mirantis, January 17, 2014 (<https://www.mirantis.com/blog/ask-whether-openstack-ready-enterprise/>).

Also, please check out the following blog post for further exposition. Source: Matthias Ankli, "Is OpenStack Ready for Primetime?" StackIQ blog, July 8, 2014 (<http://web.stackiq.com/blog/is-openstack-ready-for-primetime>).

- ² There are at least 11 Fortune 500 firms using OpenStack today, and the largest OpenStack environment consists of over 200,000 cores.
- ³ OpenStack-based environments are an excellent choice for certain use cases, but they are not a panacea for every private cloud usage scenario. In surveys, interviews, and inquiry calls, Forrester has observed a distinct set of private cloud strategies that come up time and again. To make sure your organization picks the optimal private cloud environment for your business and technical needs, please see the “[Four Common Private Cloud Strategies](#)” Forrester report.
- ⁴ Organizations can’t always start at square one when creating a cloud strategy, since most already make use of cloud in a variety of contexts. Cloud is not just one thing. Different cloud models like software-as-a-service (SaaS) and IaaS have very different dynamics and implications for the business enterprise. The cloud ecosystem also consists of numerous constituencies, which are only now beginning to coalesce into a coherent governance structure. To optimize your organization’s approach to cloud, please see the “[Organize The Chaos Of Cloud With A Realistic And Effective Strategy](#)” Forrester report.
- ⁵ Justifying a significant technology investment with minimal immediate hard cost savings isn’t easy. Agile IT’s ROI is centered on employee productivity and a differentiated CX. Avoiding hefty infrastructure and software costs upfront could justify its value down the road while minimizing its risk in the near-term.
- ⁶ For more information on the state of cloud platform standards, please see the “[The State Of Cloud Platform Standards: Q2 2015](#)” Forrester report.
- ⁷ Public cloud lite is one of the four archetypical private cloud approaches Forrester has observed through surveys, interviews, and inquiry calls. For more information on this approach, as well as the other three frequently encountered by our analysts, please see the “[Four Common Private Cloud Strategies](#)” Forrester report.
- ⁸ Few enterprises offer developer self-service to their private clouds, dramatically reducing the relevance of those projects to application delivery strategies. Yet rising numbers of client inquiries on the topic and progress by some private cloud initiatives suggest that a new wave of self-service adoption has begun. For more information on this phenomenon and how to enable maximum performance from your developers, please see the “[How Will Your Private Cloud Pass The Developer Self-Service Litmus Test?](#)” Forrester report.
- ⁹ DevOps in this context describes a developer role, not the larger DevOps movement. In fact, many individual product teams hire developers with operations experience to remove the bottleneck of communicating between these two groups. For more information, please see the “[How Will Your Private Cloud Pass The Developer Self-Service Litmus Test?](#)” Forrester report.
- ¹⁰ For a good description of DevOps and a vision for the future of this movement, see the “[What Makes Modern Service Delivery Modern?](#)” Forrester report.
- ¹¹ In the following blog, Matt Asay discusses an “OpenStack secret”: the lack of scalability for plain OpenStack software. Source: Matt Asay, “OpenStack’s Dirty Little Secret: It Doesn’t Scale,” ReadWrite, March 19, 2015 (<http://readwrite.com/2015/03/19/open-stack-scale-lock-in-sdn>).

In the following article, Ihab Tarazi of Equinix talks about the issues that he believes OpenStack faces right now and needs to resolve for sustained success. Source: Ihab Tarazi, “Is OpenStack Ready for Enterprises?” Equinix blog, December 12, 2014 (<https://blog.equinix.com/2014/12/is-openstack-ready-for-enterprises/>).

¹² Source: “Voice of the User Reflected in New Features of OpenStack Icehouse Release,” OpenStack press release, April 17, 2014 (<http://www.openstack.org/software/icehouse/press-release/>).

¹³ Please read the following article for the perspective of two engineers and their experiences with OpenStack private clouds. Source: Jordan Bresler, “Tales from the Trenches: The Good, the Bad, and the Ugly of OpenStack Operations,” OpenStack Superuser, January 22, 2015 (<http://superuser.openstack.org/articles/tales-from-the-trenches-the-good-the-bad-and-the-ugly-of-openstack-operations>).

¹⁴ Source: Jack Clark, “HP: OpenStack’s networking nightmare Neutron ‘was everyone’s fault,’” The Register, May 13, 2014 (http://www.theregister.co.uk/2014/05/13/openstack_neutron_explainer/).

¹⁵ Source: Nir Yechiel, “What’s Coming in OpenStack Networking for Juno Release,” Red Hat Stack: An OpenStack Blog, September 11, 2014 (<http://redhatstackblog.redhat.com/2014/09/11/whats-coming-in-openstack-networking-for-juno-release/>).

¹⁶ These videos from the OpenStack Foundation discuss some of the issues with provisioning Nova and Neutron. Source: OpenStack Foundation, “Profiling the Nova Scheduler,” YouTube, October 26, 2012 (<https://www.youtube.com/watch?v=k1A2zb7BC2k>) and OpenStack Foundation, “Troubleshooting Neutron Virtual Networks,” YouTube, May 13, 2014 (https://www.youtube.com/watch?v=frUF6IuW_QM).

¹⁷ OpenDaylight is an open-source platform that enables SDN and NFV functionality that can be used in lieu of Nova or Neutron. For more information, please visit the following project website. Source: OpenDaylight (<http://www.opendaylight.org/>).

¹⁸ Forrester’s virtual network infrastructure (VNI) architecture is based on five principles: 1) leverages virtualized and physical infrastructure; 2) acts as a vertically integrated layer 2 to layer 7 module within the infrastructure; 3) creates a fabric of horizontally interwoven networking components; 4) automates and orchestrates the infrastructure to deliver the right services for each user; and 5) allows management and usage by business units. For more information on the virtual network infrastructure (VNI), see the “[Virtual Network Infrastructure](#)” Forrester report.

¹⁹ An overlay network is a telecommunications network that runs independently on top of another one, although supported by its infrastructure. Examples of overlay networks include cloud provider networks, peer-to-peer (P2P) networks, virtual private networks (VPNs), content delivery networks (CDNs), experimental networks, and voice over IP (VoIP) services such as Skype.

²⁰ OpenStack has a security guide available. Source: OpenStack (<http://docs.openstack.org/sec/>).

Also, please check out the following slide show on OpenStack security from the CTO of Canonical. Source: Giuseppe Paterno, “OpenStack: Security Beyond Firewalls,” SlideShare, June 6, 2014 (<http://www.slideshare.net/gpaterno1/open-stack-security-beyond-firewalls>).

Finally, we encourage you to review this site containing a list of OpenStack security vulnerabilities. Source: CVE Details (http://www.cvedetails.com/vulnerability-list/vendor_id-11727/Openstack.html).

²¹ In the following YouTube video, Boris Renski, co-founder and CMO of Mirantis, discusses “coopetition” and how open-source innovation drives itself. Source: Percona MySQL, “Keynote: OpenStack CoOpetition, A View from Within,” YouTube, April 4, 2014 (<https://www.youtube.com/watch?v=i7HXu2abNj0>).

²² In November 2013, Forrester published “The Forrester Wave™: Private Cloud Solutions, Q4 2013,” which evaluated the top software-only private infrastructure-as-a-service solutions in the market. Since then, there’s been demand for a portrait of the entire private cloud software market — not just the leaders. For a high-level overview of more than 30 software-only private cloud service providers, please see the “[Vendor Landscape: Private Cloud Software](#)” Forrester report.

²³ Public cloud platforms take several forms, including those providing basic infrastructure-as-a-service up through those providing full or partial platform services and tools. Each of these types of platforms is best suited to a distinct type of application development and delivery (AD&D) pro within your ranks. In Forrester’s 19-criteria evaluation of public cloud vendors, we identified the 16 most significant public cloud platform providers for large enterprises; additionally, we provided vendor selection tools so that you can make the best selection, whether you are a CIO, developer, coder, or DevOps pro. For more information, please see the “[The Forrester Wave™: Enterprise Public Cloud Platforms, Q4 2014](#)” Forrester report.

For a deep dive into the tools and services for AD&D pros provided by 22 public cloud platforms, we also recommend that you see the “[Which Public Cloud Platforms Have The Right Developer Tools And Services?](#)” Forrester report.

²⁴ For more information on how to implement private cloud for optimal developer success, please see the “[How Will Your Private Cloud Pass The Developer Self-Service Litmus Test?](#)” Forrester report.

²⁵ Customer-facing apps elastically scale on cloud platforms, are composed of services, and are delivered and improved through continuous delivery. Public cloud platforms are an ideal environment for this type of model, and Forrester details the tools and services for application development and delivery (AD&D) pros in the following report. See the “[Which Public Cloud Platforms Have The Right Developer Tools And Services?](#)” Forrester report.

Developers of modern applications value the agility and abstraction that public cloud platforms provide, but there are vast differences in the degree of control and configurability each platform exposes. In the following report, we examine the different platform configuration, application deployment, and autoscaling controls that a variety of leading public cloud platforms provide. See the “[Which Public Cloud Platforms Offer The Right Configuration Controls?](#)” Forrester report.

²⁶ We encourage you to watch the following video from an OpenStack Summit that discusses development and operations teams for OpenStack within organizations. Source: OpenStack Foundation, “Your OpenStack DevOps Team: Encouraging Innovation with Open Source Development,” YouTube, May 14, 2014 (<https://www.youtube.com/watch?v=QjLM3JY63kI>).

We also recommend that you read the following article by OpenStack super user Sam Charrington on best practices for introducing OpenStack to the enterprise. Source: Sam Charrington, “How to Introduce OpenStack in Your Organization,” OpenStack Superuser, November 14, 2014 (<http://superuser.openstack.org/articles/how-to-introduce-openstack-in-your-organization>).

²⁷ Developers judge private cloud initiatives by the degree of autonomous access they get to environments and resources that tech management provides. Few enterprises offer developer self-service to their private clouds, dramatically reducing the relevance of those projects to application delivery strategies. To maximize the effectiveness of developers, I&O pros need to understand how to implement an approach that delivers the best level of self-service in their internal private clouds for enterprise needs. For more information, please see the “[How Will Your Private Cloud Pass The Developer Self-Service Litmus Test?](#)” Forrester report.

²⁸ For more on this concept of more integrated systems engineering for your infrastructure and services in general, see the “[Service Design Is Your New Approach To Infrastructure](#)” Forrester report.

²⁹ For more information on contributing upstream to the OpenStack community, please visit the following link. Source: “Chapter 16. Upstream OpenStack,” OpenStack (http://docs.openstack.org/openstack-ops/content/upstream_openstack.html).

Further information on how to do this can be found in the following link. Source: “How To Contribute,” OpenStack Wiki (https://wiki.openstack.org/wiki/How_To_Contribute).

We also recommend that you read an OpenStack super user’s perspective on how to contribute to OpenStack. Source: Kyle Mestery, “How to Effectively Contribute to An Open Source Project Such As OpenStack Neutron,” OpenStack Superuser, July 31, 2014 (<http://superuser.openstack.org/articles/how-to-effectively-contribute-to-an-open-source-project-such-as-openstack-neutron>).

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