

# High Availability For Private Clouds

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## Executive Summary

When moving from traditional IT to private cloud, there is generally a tradeoff between elasticity and availability, so only applications that do not demand the highest levels of availability can move to the cloud. Coding high availability (HA) into cloud applications generally has been complex and laborious; ongoing maintenance creates both a cost and liability for the developer. With their always-on enterprise knowhow, Stratus is now bringing the high availability of their enterprise IT solutions to the world of private clouds. Stratus is developing a suite of software solutions that enable rapid deployment of always-on workloads within OpenStack clouds. With a beta program underway, they are already seeing success and are now expanding their initial offering based on program learnings.

## Elasticity Is Not Availability

Cloud services that enable resources to be quickly spun up or down based on demand are helping businesses drive better agility, but they leave availability to the individual customer. Bringing availability to a cloud solution like Amazon Web Services is difficult, as demonstrated recently by high profile outages of tenants like Netflix. Because of that, businesses today view clouds as a solution for less-critical applications and services; their most critical applications and services still remain on traditional IT platforms where availability, control, and SLA can be quantified and calibrated.

High availability (HA) is generally defined as fault tolerance, clustering, live migration, and disaster recovery. Stratus delivers the first three of these in a manner that allows customers to specify how to apply HA to each application (disaster recovery is planned for a future release). HA applications in the cloud need to be architected for redundancy; some of Stratus' customers have estimated that adding HA functions into applications adds 10% to 40% more code to applications. Along with complexity comes additional time for testing, magnified by trying to cover all of the different outage scenarios. With a host of reasons why applications could be interrupted, HA behavior is difficult to demonstrate; proving out a true HA solution takes time.

Bringing availability in closer to the platform level makes more sense than trying to bring it out to each application. But this has been a difficult task for private clouds, as most choose OpenStack as the "open" path to building private clouds, which requires bringing availability features into OpenStack. To date, there has not been a concerted effort within the OpenStack development community to make this happen at an application instance level or for non-RESTful applications.

For Cloud Service Providers (CSPs), building out availability meant either building and maintaining their own OpenStack distributions or relying on larger providers who are also their competitors (like Verizon or Terramark). But what these CSPs really prefer is

a pre-packaged solution that they can resell, bringing the availability that their customers need without the ownership and ongoing maintenance.

## The Stratus High Availability Cloud Program

With high availability experience on the enterprise side, Stratus has the expertise and the brand to tackle the problem of HA in private clouds. Recently Stratus announced [Software Defined Availability for OpenStack Cloud Infrastructures](#) with a goal to make private cloud infrastructure enterprise-ready. Version 1.0 was available to a select set of customers. Version 1.5 (announced at the OpenStack Summit in Paris, and to be launched in early 2015) will expand that opportunity.

Stratus combines enterprise-class features with OpenStack cost savings and flexibility—without having to worry about coding each application for availability. Using a dashboard to pick the appropriate level of resources, IT can control the granularity of application availability specific to each application and instance. Stratus protects both the cloud layer and the application workloads from single points of failure.

Stratus initially focused on application migration, but the larger overall opportunity for IT customers is the development of new applications (as this has a more immediate impact on their businesses). Migrating older applications typically requires a business case, but most new applications being built today are beginning life as “cloud-ready”.

Stratus is working within the OpenStack framework to make HA transparent to OpenStack application developers. Primary among the learnings is how to deal with the virtual machines that are used to build modern complex applications. To get to market quickly with the initial 1.0 offering, Stratus bypassed OpenStack’s Nova (the compute element of OpenStack), which allowed Stratus to bring a fast solution to market for the start of the program. In practical terms, this was not the most efficient nor the most sustainable path, but it served its purpose in allowing early customers to begin working quickly with an always-on infrastructure.

With version 1.5, at a high level, Stratus is working to upstream critical HA changes to Nova’s code that sits outside of KVM instances. This code and capability will be made available to the entire OpenStack community. Through Stratus’ Nova HA code contributions, Stratus’ KVM (or anyone else’s) has better insight and access to system hardware through Nova, in order to implement HA.

While upstreaming changes into the codebase is more time consuming for Stratus and requires more interaction with the community, we believe that it is a more scalable and sustainable path for Stratus to pursue. This means that a baseline of HA features are shared by the wider community of OpenStack users, and future OpenStack solutions built on Stratus will have the ability to deliver multi-tenancy HA on any OpenStack platform. Because of their time-to-market advantage, this positions Stratus as a *de facto* high availability cloud ingredient moving forward.

Stratus’ version 1.5 runs on Canonical Ubuntu OS and Centos. Stratus is hoping to extend their support, bringing in such distributions as RHEL and SuSE. With the

upstreaming of Nova changes to the common OpenStack codebase, Stratus' version 1.5 KVM should run in any OS vendor's current OpenStack distribution.

## Market Impact

The clear market benefit is a modular and frictionless way to introduce high availability into private cloud applications. With a modular structure, CSPs can implement Stratus' Software Defined High Availability within cloud infrastructures knowing that HA functionality is now much more tightly integrated into OpenStack code. There is no need to change existing applications, and more realistically new applications can be developed without specialized HA architecture or coding experience.

Many customers continue living in a VMware environment today, because OpenStack does not meet their current enterprise-class needs. This situation is similar to the way customers relied on Novell Netware in the 1990s. Microsoft Windows NT Server began capturing low-end, non-critical applications, until eventually its functionality and availability allowed customers to flee Novell. According to Stratus, one major cloud provider (currently 100% VMware) expects 30% of their workloads will be OpenStack in 5 years, as availability allows customers to accelerate a migration from VMware to the cloud.

Unlike VMware, who has built up a successful business around a closed, proprietary ecosystem, Stratus is approaching the market from an open source perspective. Stratus is not only embracing open platforms but also contributing HA functionality to the wider community. With this customer-friendly approach, Stratus is addressing the market as more of an ingredient than a name brand (think Dolby for sound or BASF for chemicals).

For CSPs, building out HA features in their cloud serves their businesses in several ways. From an initial perspective, it helps CSPs "move up" the value chain with customers. They have the ability to deal with more critical applications and environments that may have previously been off limits, because their availability just didn't match traditional enterprise IT capabilities. Additionally, CSPs now have the ability to differentiate by adding Stratus Always-On Cloud Services to their portfolio. This puts them on a more competitive footing with the larger players in the market and distances them from some of the more generic offerings in the market. Finally, because HA will consume more system resources, there is an opportunity to drive higher per-customer revenue through high availability solutions.

## Conclusion

The introduction of high availability (HA) functionality into OpenStack is an important milestone, as this signals the growing maturity of OpenStack as a private cloud alternative—removing one of OpenStack's primary barriers to enterprise adoption.

Cloud Service Providers (CSPs) are well-advised to consider Stratus' plans for HA clouds, both as a direct implementation and as part of the evolving codebase for OpenStack as Stratus' HA changes are upstreamed. Comprehending how HA is coming to OpenStack will be critical, because even if a CSP decides not to go down that path

just yet, the fact that HA is integrated into the OpenStack code means that CSPs at least need to understand the options as customers begin to inquire. Competition will heat up in the CSP space as these capabilities bring HA into the mainstream.

In the most recent OpenStack survey, over 200 enterprises already had OpenStack in production environments. While this is not a huge number, it does signal the market's direction. The addition of high availability brings down a major barrier to adoption. For those who are contemplating a move from VMware environments but had availability requirements that were not covered by the current OpenStack implementation, now is a time to begin assessing Stratus.

Overall we believe that this is just one more indication that cloud technology is filling in the gaps as it continues its march into the datacenter.

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