Reach new heights with Nutanix

Nutanix Enterprise Cloud helps a major airline improve business productivity

What do the IT teams that use the Nutanix® Enterprise Cloud Platform™ think about deploying and using the hyperconverged infrastructure? Our analysts here at Principled Technologies interviewed a real-world user to find out.

In October 2018, we interviewed a senior systems engineer at a major airline serving over 40 destinations across the Americas and the Caribbean. We asked him to detail his Nutanix solution deployment and ongoing management experience.

The senior systems engineer is one of a four person IT team that oversees the server infrastructure and systems for the entire transportation organization. Upper management approved the Nutanix Enterprise Cloud investment because the engineering team wanted a single point of control to manage IT infrastructure and applications at any scale. This single point of control was especially important because the airline relied on a variety of transportation- and company-specific applications spread across multiple hardware systems that were not playing well together.

According to the senior systems engineer, switching to the Nutanix Enterprise Cloud exceeded his expectations and has improved business productivity.

Read on for a detailed look at the senior systems engineer's personal experiences with Nutanix in his organization—from initial deployment and day-to-day management to benefits while addressing various workloads.

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Executive summary

To meet growing demand over the years, the IT department for this major airline implemented a mixture of traditional hardware solutions that made data center management a nightmare. A few years ago, they decided to relocate their data center and took a fresh look at how to architect the new infrastructure to better meet their needs. They determined, after researching options, that a Nutanix Enterprise Cloud hyperconverged infrastructure was the best solution.

Because they were battling significant resource contention in their existing environment, the IT team decided to build a Nutanix proof of concept before making the big move. The senior systems engineer was concerned that the Nutanix solution, which has half the servers and capacity as their legacy environment, would not be able to handle their production and PCI environments. However, Nutanix had no trouble handling the workloads, delivering on all the key must-haves—and the team discovered additional benefits to choosing Nutanix.

In the end, the move to Nutanix delivered on performance and decreased application latency, while minimizing unexpected downtimes. It also allowed the team to change the way that they worked. They're no longer spending their days, nights, and weekends addressing performance and maintenance issues. The solution keeps day-to-day management simple, and the team can focus on implementing new strategic initiatives that benefit the business.

Reasons for shifting away from a traditional architecture

The airline's IT department needed to refresh their data center primarily because of performance concerns: Application latency had crept up beyond optimal levels and VMs were experiencing unexpected downtime. Insufficient and disparate hardware resources created both I/O and network contention that caused these hardships.

Their workloads at the time of the upgrade consisted of approximately 275 virtual machines, including:

- A mixture of Windows Server 2008, 2012, and 2012 R2
- Various database applications
- Email (Microsoft Exchange Server)
- File services
- A mixture of Linux VMs running Red Hat®, CentOS, and Ubuntu

Note: They were also planning to deploy a SQL Server-based data warehouse solution, which would require significant additional I/O capabilities to run.

> ***"We were running out of Band-Aids. Over the years, we'd put together a hodge-podge consisting of an HP blade enclosure, a Cisco Blade Center, NetApp, and Compellent. But it was a management nightmare—they don't play nice together. Getting that down to a single solution was huge."***
>
> ***—Senior Systems Engineer***

Their legacy hardware consisted of a mixture of hardware, including the following:

Production environment	Age
HPE BladeSystem c7000 Enclosure and servers (four years old)	Four years old
Cisco® UCS™ 5108 Blade Server Chassis and servers (two years old)	Two years old
NetApp® storage solutions	Five years old
Dell™ Compellent storage solution	Four years old

Payment Card Industry (PCI) environment	Age
Mixture of IBM 2U servers	Five years old
NetApp storage solution	Five years old

Added complexities of the existing environment

The company had been using stop-gap measures over the years to meet demand—resulting in multiple storage solutions with disparate storage protocols implemented across their legacy environment:

- Fibre Channel
- Fibre Channel over Ethernet
- iSCSI
- NFS
- Raw device mappings

Complexity 1: Storage protocols

Multiple storage protocols added layers of complexity to their legacy environment. Each protocol had its own best practice and the team tuned it for performance accordingly. Some solutions also required dedicated infrastructure.

> **Ramifications:** There were more hardware and multiple protocols to keep up with from a management standpoint.

Complexity 2: Routine backups

Prior to the migration, the airline relied on Veeam and Symantec™ software for backups.

> **Ramifications:** Multiple backup software solutions meant additional IT maintenance duties.

Complexity 3: Unexpected downtime

Scalability and capacity were just about tapped out with the existing legacy storage solutions.

> **Ramifications:** The IT team faced unexpected downtime when resource contention caused VMs to shut down or fall behind in meeting workload demands.

These added complexities meant the existing environment required significant administrative time and effort, which affected the cost required to manage and maintain the aging and contentious infrastructure.

The Nutanix Enterprise Cloud journey

After experiencing the management challenges of disparate hardware from multiple vendors of blade servers and storage, the airline didn't want to go that same traditional route again when the time came to refresh. The ideal time to perform this hardware refresh and migration was coming up, as they would be physically moving their data center to a new location. The CEO had already done the research and believed Nutanix was the right direction to take. They already had a small Nutanix cluster reliably running a purpose-built application at the time, and they believed they could see similar success at a larger scale. The IT infrastructure team, including the senior systems engineer we interviewed—newly hired at the time—chose to do a proof of concept to evaluate whether a hyperconverged solution would fit their needs for the larger production environment.

> ***"Going into the proof of concept, I was the most disgruntled person you could ever find. I had just started at the company—coming off my old job where I installed Compellent solutions for 15 years. And it was the easiest transition that I've had. It was straightforward, the hyperconvergence was easy to understand, and it was easy to figure out the performance. I was also pleasantly surprised at the compression factor and how well Nutanix handled ESXi® from a disk space standpoint. When we made our initial purchase, I didn't think it would be enough. I was wrong."***

The IT team considered the following criteria during their evaluation:

- **Performance & availability:** Would Nutanix be able to provide sufficient hardware resources to run the 275 virtual workloads and meet future demand?
  - Their disparate infrastructure was causing unplanned downtime, as VMs did not have sufficient hardware resources to run adequately. Existing storage was highly I/O-bound in addition to being network- and port-contentious.
- **Capacity & storage efficiency:** Was Nutanix storage compression efficient enough to house all their workloads in a lower capacity cluster than their legacy infrastructure?
  - Their existing workloads would be moving to a cluster with half the actual capacity, really putting the compression factor of the Nutanix solution to the test.
- **Compatibility & ease of migration:** Would they be able to easily migrate their existing VMware vSphere® virtualized workloads onto Nutanix? Was Nutanix compatible with the other software tools they wanted to keep in place?
  - They wanted a solution that would allow them to stay in a VMware vSphere environment for the time being and be compatible with the data protection software they already had.
- **Ease of management:** Would Nutanix free up their IT administrators to start taking on essential projects they had put on the backburner, instead of constantly having to address support issues, compatibility, and maintenance for disparate server and storage solutions?
  - Their small IT team could significantly benefit from using a single management console as opposed to managing various sets of disparate hardware, each with their own management interface, storage protocol, and separate support team. It could mean finally having the time to update VMs and software applications and implement tools that could provide smart insight into their business, such as business intelligence software.

The proof of concept worked—Nutanix delivered on all the key must-haves for the upcoming data center move, and the team discovered additional benefits to choosing Nutanix:

> *"We also looked at Dell storage, NetApp, and Pure Storage. And those were kind of the three major competitors. However, once we did the proof of concept, all we wanted was Nutanix."*

- **Delivers robust storage performance**—No more I/O contention and unplanned downtime.
- **Provides an excellent number of storage efficiency features and integrations**—Storage efficiency means they cut their required storage capacity after their refresh by over 50 percent.
- **Nutanix offers compatibility with many software tools**—It supports VMware vSphere, Zerto, and Veeam, all tools they planned to use to simplify the data migration. After their hardware refresh, they continued to use some of these tools for virtualization and data protection.
- **Easier to maintain and manage**—No more downtime due to resource contention, and no more having to maintain multiple hardware solutions by multiple vendors.
- **Additional benefits:**
  - The management interface is independent and HTML-based, so it's not affected by or dependent on a specific hypervisor, giving them the flexibility to choose whatever hypervisor works best for them now or in the future.
  - Administrators can issue commands through the APIs, which provide a modern and reliable way to manage the solution.

Deploying Nutanix Enterprise Cloud

Pre-deployment

Because of the transportation- and company-specific applications they rely on, the IT team had to verify Nutanix supported all their tools, software, and applications. These essentials included their VMware tools, Microsoft workloads, and backup software. The IT team met no resistance, as Nutanix supported all the tools and applications they needed.

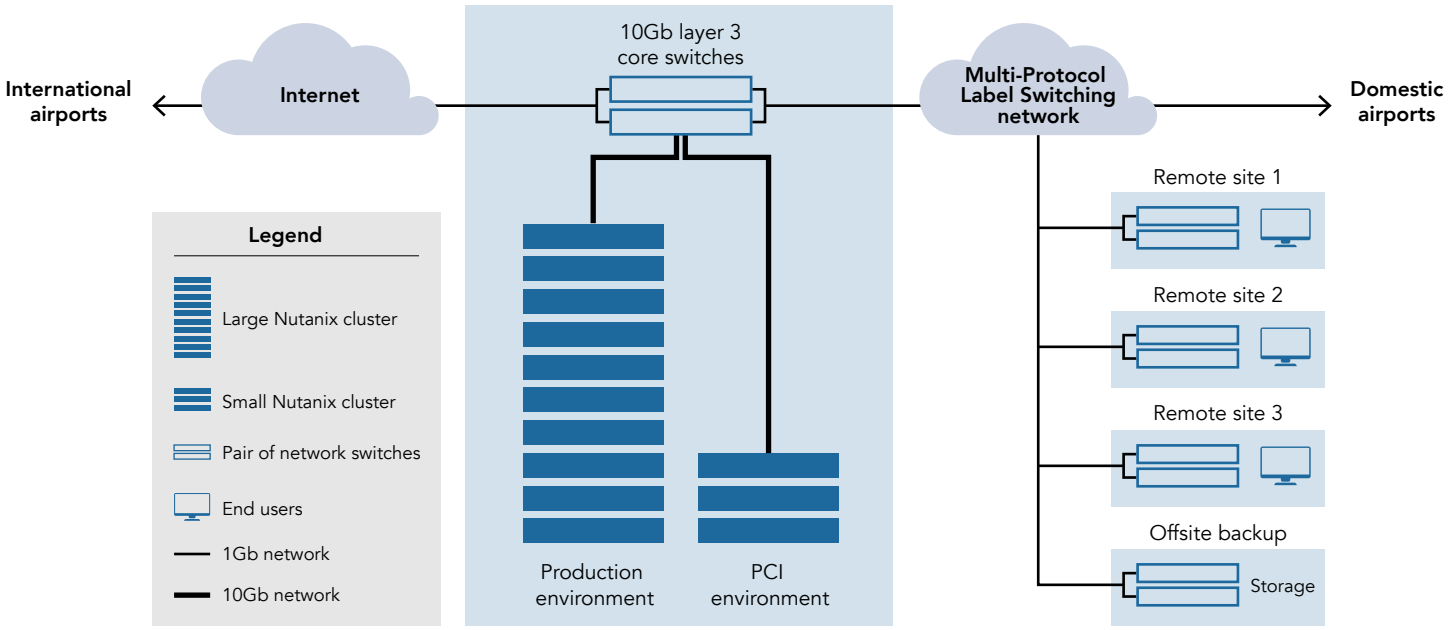
> *"The deployment was simple—you stack 'em and rack 'em. We connected them to the network, ran Foundation, and migrated. It doesn't get any easier than that."*

Prior to deployment, the IT team also had to account for the hurdle of how to migrate the combination of fiber channel, fibre channel over Ethernet, iSCSI, NFS and raw device mapped storage protocols efficiently onto the Nutanix clusters once they were deployed. The team researched and decided to use Zerto Virtual Replication for the eventual migration.

Deployment

For their new data center deployment, the IT team selected a large Nutanix cluster for production workloads, and a small Nutanix cluster for their PCI environment. They chose VMware vSphere for both clusters since this was already the hypervisor in their legacy environment, which would simplify the initial migration process.

Using Foundation, creating the clusters and deploying the hypervisor took approximately three hours. From there, they were ready to start migrating workloads.



Data migration

Being a transportation company with 24/7 uptime obligations, the team had to plan workload migrations using specific time windows and in stages. Having chosen Zerto Virtual Replication for its ability to handle multiple source storage protocols in the legacy configuration and automatically modify IP addresses, they used its snapshot technology to replicate VMs over to Nutanix. Then, during the appropriate window, the IT team used Zerto failover capabilities to bring up those VMs in the Nutanix cluster. Given the time constraints on the migration, they chose to migrate the applications as they were, and to perform any OS or application upgrades later. They migrated the existing 275 virtual servers at an approximate rate of 6-10 per nightly window, meaning the entire migration took approximately 4-6 weeks total.

> ***"As far as the migration…we were under a time crunch to move because we were selling our building. So, we had a hard stop date. We utilized Zerto Virtual Replication to migrate off the Compellent and NetApp over to Nutanix. It was the easiest process that I've done. And I've migrated quite a few data centers."***

Workloads

Transportation companies typically require a large variety of applications as part of their IT. This particular airline chose to run their transportation-specific applications in a SaaS model, and the remaining workloads on their Nutanix cluster in their primary data center. This section discusses the VMs and applications.

Virtual servers and applications breakdown

Most of their workloads now run on Windows Server 2016 (soon to be upgraded to Windows Server 2019), with approximately 60 GB allocated to boot volumes plus additional data volumes. This includes workloads such as:

- Microsoft SQL Server database
- Microsoft Exchange server
- Microsoft SharePoint server
- Microsoft System Center (SCCM, SCOM,SCORCH)
- Oracle database
- Web server

Additionally, they host a smaller number of Linux-based virtual applications, and also run a Splunk environment.

Service levels

Most of their on-premises applications require 8+ hours for a Recovery Point Objective (RPO)/Recovery Time Objective (RTO). This RPO/RTO allows ample time for the IT team to recover using off-site backups as necessary. While unplanned downtime under the legacy hardware was a fact of life for the IT team, they have yet to experience any unplanned downtime in the 2.5 years since migrating their workloads to Nutanix.

Best practices

When deploying workloads, the IT team follows standard best practices in the same way they would with traditional architecture. They apply hypervisor-specific best practices, such as configuring virtual SCSI adapters for best performance in VMware vSphere. They also apply application-specific best practices, such as separating data and log volumes for a Microsoft SQL Server-based workload.

The senior systems engineer found one set of best practices to be more specific to Nutanix. That came about when he and the team were configuring the clusters to use Veeam for backups, which required some specific tweaks to the Veeam proxy servers. For this exercise, they were able to use documentation from both Nutanix and Veeam to configure backups successfully.

Networking

For their networking, the IT team deployed 10Gb Layer 3 core switches and distribution from the Nutanix environment. These connect to 1Gb end-user switches at three remote sites, as well as an offsite backup.

The Nutanix advantage

Capacity and I/O

The airline's IT team cut data center storage capacity needs in half simply by moving from the legacy architecture to the Nutanix solution—and the move gave them plenty of room for everything. Without making any changes to their existing data, Nutanix compression was more efficient than the legacy Compellent and NetApp solution. Since the initial migration two and a half years ago, capacity demands have increased another 15-20 percent, and they've grown from 275 virtual servers to approximately 300.

By moving to Nutanix, the company realized a sevenfold increase in IOPS per day and a 14x increase in peak IOPS, while maintaining a sub-five-millisecond latency on average in all environments. Much of this I/O comes from their new data warehouse/BI environment. Before the move, latency on the fast, primary storage was between 10 and 15 milliseconds and secondary storage latency was between 80 and 90 milliseconds. Because of the high latency, deploying their data warehouse application in the legacy environment would likely not have been possible.

> *"When we switched over to Nutanix, we ended up with less disk space, but way more I/O and way better performance. So, we could do more with less."*

Physical infrastructure

The senior systems engineer, a Compellent veteran, was positive that the Nutanix solution was going to be far too small because the existing system had twice as many legacy servers for both their production and PCI environments. However, the increased efficiency of the hyperconverged nodes had no trouble handling the workloads.

The Nutanix solution also delivered significant space savings, using 75% less space than the legacy hardware. They went from two racks of equipment down to half a rack of equipment—making significant gains in density and consolidation.

> *"Wait a minute — we've cut everything in half. And it works!"*

Ongoing management

IT administrator teams can grow accustomed to constantly battling disparate legacy hardware to keep their workloads running. Simple maintenance can rapidly balloon into a huge undertaking that can swallow entire IT teams with tasks such as:

- Firmware & BIOS upgrades
- Contacting and coordinating technical support across multiple vendors
- Implementing best practices
- Addressing performance issues

As the primary Nutanix administrator, the senior systems engineer—who was initially skeptical about Nutanix—quickly saw the benefits for his team. The legacy hardware required a team of four administrators just to keep the Cisco UCS, HPE, NetApp, and Compellent environments running. The move to Nutanix meant the team could reduce the number of IT admins dedicated to hardware management and upkeep from four to one. This efficiency freed up the rest of the team to focus on their other responsibilities, tackle some of the strategic initiatives that they hadn't been able to before, and even start work on some new projects and innovations. Plus, even with his new responsibility for the entire Nutanix environment, the senior systems engineer went from working a lot of evenings and weekends doing storage upgrades and maintenance to doing the same work during the week.

> ***"No nights, no weekends, no unexpected or unplanned outages. It went from 'I'm on call, I'm going to get calls all night long,' to 'Oh hey, everything works. Everything's stable.'"***

New strategic initiatives

Previously, the IT team's goal was to keep everything running for as long as possible. Thus, many strategic initiatives included delayed projects, shelved either because the hardware could not support them, or because the IT team could not allocate sufficient time and resources to accomplish them. Those projects included:

- Deploying additional workload VMs
- Updating antiquated internal applications
- Updating a 10-year-old Oracle database workload
- Implementing a business intelligence system

> ***"It's really allowed us to change the way that we work because we're not doing nights and weekends or putting out fires. We're letting the system take care of itself to a certain extent and performing other functions of our job."***

Spotlight on business intelligence:

According to the senior systems engineer, the most notable improvement has come from bringing the business intelligence environment online. The number of reports that the developers run daily has grown from 10 or 15 to a couple hundred different reports. Despite the increasing demand—especially since these tasks can be I/O intensive—the IT team hasn't had to worry about the backend infrastructure. Developers now just code and go.

> ***"The CEO came down and said, "Hey, I want to see a report on this," and our development team went "Hmm, no one's ever asked for that. Yeah, we can get you the data on it. We just have to pull the reports together." And that was kind of the start of our BI environment."***

> *"Coming from 15 years of installing Compellent, if you need to add on, that's a day and a half process, and a six-thousand-dollar investment just to have somebody come out and do that for you. Nutanix is a two-hour investment and it doesn't cost you anything."*

Scalability

The increasing demands and new initiatives have also necessitated additional resources. So, the company added four new nodes to their production cluster specifically for the new workloads.

Once the hardware was in place and cabled, adding nodes was a simple process. They ran Foundation, and everything was up and running in about an hour and a half.

Technical support

When interviewed about Nutanix technical support through the phone or online, the senior systems engineer provided positive feedback of his experiences—although he admitted that he hasn't had to engage support for any major issues, adding, "When you have a product that performs well, it does make support that much easier."

> *"Nutanix support is a very simple concept: Customer has a problem, support responds to the problem, support fixes the problem. I don't know why every other company can't do it—it's the easiest concept there is out there. You don't have four-hour long hold times."*
>
> *"It's nice to be able to go online and open up a case and just give support all the information they need. Typically, I have an e-mail introducing me to the person handling my case within 15 minutes. Then, I receive an e-mail from that person asking how they can help me and what times do I have open. It doesn't get any easier than that."*

Data protection

Since their offsite backup location uses traditional architecture with approximately 400 TB of storage between primary backup and replication, the team utilizes Veeam Software to back up the Nutanix cluster offsite, with:

- 24-hour backup schedule for most workloads
- Five-minute backups for Microsoft SQL Server database workloads
- Transaction log backups using Microsoft SQL Server log shipping

Manageability

The hyperconverged design of Nutanix has simplified both the technical issues the company faced prior to the refresh, and the IT team's approach to management.

- Improved performance and capacity efficiency mean not having to constantly wrangle peaking workloads without sufficient resources while trying to avoid downtime.
- The "all in one package" approach means the team's day-to-day management tasks are primarily focused on the hypervisor. They no longer have to manage the many, disparate interfaces that come with separate servers, SAN storage, and networking/connectivity.
- Having all workloads within a single environment means a simplified approach to backups. They went from two separate backup software solutions to a single one.

> ***"Switching to Nutanix made it simple because it's one system vs. having to go to HP and verify everything, go to Cisco verify everything, go to Dell verify everything. It's so much easier when you have integrated services from one vendor."***

Compliance

As a transportation company, this company is required to meet PCI and NIST military compliance. The simplicity of the hyperconverged Nutanix architecture means they now operate a single platform that verifies for compliance standards as opposed to having to verify each individual server and storage platform separately.

Current evaluations and future plans

The Nutanix solution simplified day-to-day management enough that the team can really focus on implementing new strategic initiatives that benefit the business. This section covers some of the team's ongoing evaluations around Nutanix functionality, implementations that are just getting started, and future plans.

Advanced functionality

The company has considered advanced functionality options available through Nutanix, such as Capacity Advisor or Calm™, but has not implemented either of these and continues to use their existing toolsets. Because they don't build new VMs or add workloads very frequently, they chose to keep using Microsoft System Center Orchestrator and Configuration Manager for tasks such as server builds, new workload VMs, and capacity planning.

Changing workloads

The IT team has plans to start migrating their on-site Microsoft Exchange mail servers to a cloud-based solution, such as Microsoft Office 365. They're also considering bringing some additional workloads onto the Nutanix cluster, including both a SaaS-based application and their website, once plans to redesign are complete.

Disaster recovery

The IT team has plans to start working on a full disaster recovery implementation in the coming year. The next round of planning will involve making the decision between a cloud-hosted solution or a secondary data center.

Development/test

The IT team is currently conducting a Nutanix AHV™ proof of concept by migrating some workloads from VMware vSphere to AHV. One of the major hurdles they had initially was that their Veeam backup software wasn't compatible with AHV; however, the two are now compatible. The team has repurposed the smaller purpose-built application cluster and are using this to test out AHV.

Machine learning

The company is exploring added functionality using Splunk. They're in the early stages of using logs to implement machine learning and currently identifying business uses they want to explore.

Conclusion

Switching to Nutanix Enterprise Cloud addressed the airline's data center performance concerns and delivered on all the IT team's key must-haves.

As an added bonus, Nutanix Enterprise Cloud management is simple and only requires one administrator instead of four. This means the IT team, including the single Nutanix administrator, no longer spend their days, nights, and weekends addressing performance and maintenance issues. Now, the team has time to focus on planning and implementing actions that further benefit the business.

This project was commissioned by Nutanix.

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