NUTANIX™

DEFINITIVE GUIDE TO
Private Cloud

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What **This Book** Covers

Almost 85% of enterprises plan to adopt a hybrid cloud strategy that fuses private and public cloud, according to the **Nutanix 2019 Enterprise Cloud Index Survey**. An effective private cloud that incorporates the right capabilities—including self-service, intelligent automation, dynamic scalability, and chargeback—is the foundation of this strategy.

A properly designed private cloud will increase IT efficiency and accelerate the pace of digital innovations that enhance the customer experience and streamline business operations. The right private cloud eliminates complexity, frees up staff time, and reduces IT costs so that more budget can be allocated to innovation.

However, many enterprises have struggled with private cloud implementations, falling short of these goals due to inflexible legacy IT architectures with unpredictable scaling, complex data services, and incomplete or brittle automation. Management complexity and poor performance and availability reduce agility, and the expected budget savings often simply evaporate.

This eBook explains how **private cloud** can deliver a **well-rounded, flexible experience** complete with the **agility** and **security** you want and expect.
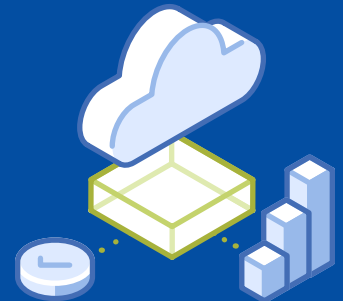
CHAPTER ONE

Datacenter **Evolution**

Enterprises today are on a digital transformation journey, seeking the best strategies and technologies to enable them to thrive in a digital economy. One of the biggest keys to success is a more agile approach to IT that can:

- Deliver new digital services more quickly and with higher quality
- Ingest growing volumes of data and provide timely insights

Cloud technologies play a critical role in solving agility problems. But the results of moving enterprise workloads to the public cloud have been mixed.

This eBook describes a smarter approach to assessing cloud needs and implementing cloud solutions. Deploying the right private cloud technologies can deliver the agility your business needs now—without sacrificing security or control—creating an on-ramp to the public cloud that facilitates intelligent and cost-effective hybrid cloud operations in the future.

The final chapter explains why the Nutanix Private Cloud solution, based on the industry leading Nutanix hyperconverged architecture, is the ideal problem for solving private cloud and hybrid cloud challenges.

IT IS THE ENABLER OF BUSINESS OUTCOMES

Delight customers for retention, growth, and advocacy

Rapid innovation to grow revenue

Simplify IT operations for efficiency

Figure 1. The digital economy has expanded the role of IT in all industries.

The Advent of Cloud Computing

The promise of cloud computing is that it increases agility by making infrastructure and other services available whenever they're needed with much less friction, while offloading much of the cumbersome infrastructure management and near-constant software patching and update cycles that can bog down IT organizations.
Cloud technology may enable your team to:

- Scale quickly and easily
- Respond rapidly to business changes and directives
- Support your developers and DevOps efforts
- Accelerate the process of application deployment and management

However, while public cloud providers such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP) create opportunities for enterprises to innovate and move faster, they can also introduce constraints:

- **Costs.** Public cloud spending can increase rapidly and may be difficult to limit without the right tools for cost control.

- **Availability.** Public cloud availability may not meet enterprise expectations, especially for applications that aren't built to be cloud native.

- **Security.** Security in the cloud is different than datacenter security which can result in user errors. A majority of enterprises (60%) said security is the biggest factor impacting their future cloud strategies in our **recent cloud survey**.

- **Control.** No matter how good your cloud operations are, some things are out of your control. Many enterprises aren't willing to sacrifice control, especially for mission-critical applications.

Because of these constraints, a number of different cloud models have emerged. While terms like private cloud, hybrid cloud, etc. are now part of the IT lexicon, they are briefly defined below so there's no confusion about how this book uses these terms.

PRIVATE CLOUD
A cloud-enabled IT infrastructure running in a corporate datacenter or privately hosted by a third-party service provider.
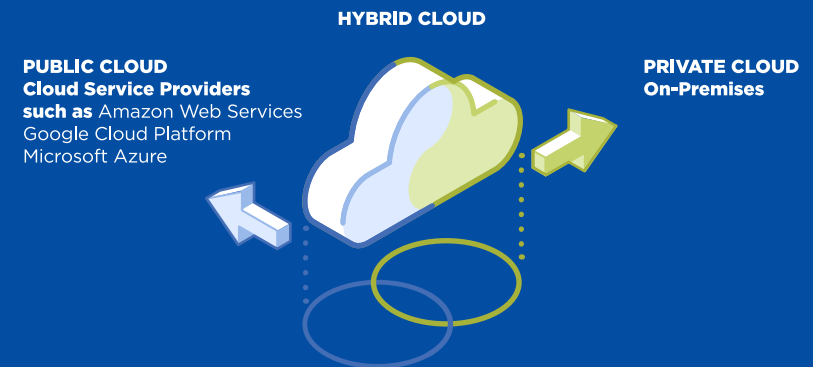
PUBLIC CLOUD
Infrastructure-as-a-service (IaaS) and platform-as-a-service (PaaS) offerings from third-party cloud service providers. Examples of these offerings are Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform.

HYBRID CLOUD
A combination of private and public cloud environments, with some level of interoperability between them.

MULTI-CLOUD
An IT environment that uses multiple public cloud services, with some level of interoperability between them.

HYBRID CLOUD

PUBLIC CLOUD
Cloud Service Providers
such as Amazon Web Services
Google Cloud Platform
Microsoft Azure

PRIVATE CLOUD
On-Premises

PUBLIC CLOUD
- Offered by third-party providers
- Available to anyone over the public internet
- Scales quickly and conveniently
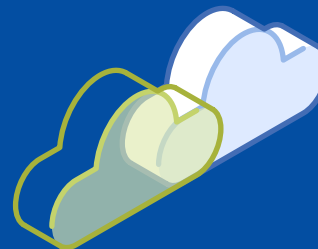
HYBRID CLOUD
- Combination of both public and private cloud
- Shared security responsibility
- Helps maintain tighter controls over sensitive data and processes

PRIVATE CLOUD
- Offered to select users over the internet or a private internal network
- Provides greater security controls
- Requires traditional datacenter staffing and maintenance

Which Cloud Model Should You Choose?

So which cloud approach is best for your organization? While the decision is ultimately one that must be made based on the requirements of your business, it may be helpful to understand what your peers are doing and why.

According to a recent **Nutanix study**, 52% of enterprises surveyed are already running private cloud in some form. A 2019 **Forrester survey** found that 79% of IT leaders are investing in private cloud. Up to 75% of enterprise workloads are predictable, making them well-suited for a cost-efficient private cloud.

To deliver on the promise of digital transformation, **85% of enterprises surveyed said they plan to adopt a hybrid cloud strategy** that fuses private and public cloud while supporting technology trends such as distributed and edge computing. This is often the best way to enable your IT organization to:

- Deliver the services and user experience customers want
- Flexibly support new technologies and data driven analytics
- Avoid the problems associated with shadow IT
- Move from CapEx to OpEx through use of subscription-based software services. Subscription models offer the agility required to meet changing needs.

However, simply adopting a strategy in no way guarantees success. A successful cloud strategy should combine:

- A properly designed and architected private cloud
- Targeted public cloud deployment for select applications and services
- Mobility of applications and data between environments
- Unified management across clouds

These topics are explored further in this eBook.
The following chapter digs deeper into the reasons and requirements for a private cloud, while Chapter 3 explains how to extend private cloud success to hybrid cloud.

75%
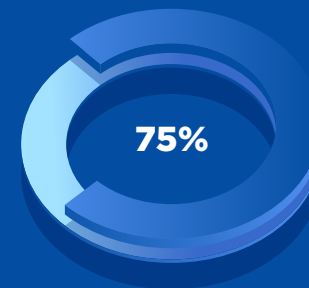
Up to 75% of enterprise workloads are predictable and well-suited to private cloud

79%
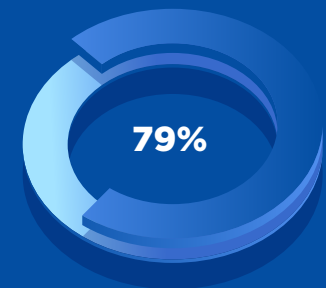
79% of IT leaders are investing in private cloud

Swineburn University
turns to Nutanix for Self-Service Private Cloud

With Nutanix, Australia's **Swinburne University** was able to build an all-encompassing private cloud, complete with automation capabilities to make their lives (and the lives of their students) much simpler. Solution benefits include:

- Students can choose and deploy necessary development stacks with ease.

- A more predictable spending model enables fairer, more effective resource provisioning.

- Swinburne's IT team is better able to identify and assess where time is spent, which workloads need to be automated, and which could use human help.

❝ Nutanix has become **part of our self-service suite**, within which students can browse and pick development stacks they need for their projects and deploy them with **one click**, similar to an app store. ❞

— Simon Naughton, IT Director, Swinburne University

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SWINBURNE UNIVERSITY OF TECHNOLOGY

CHAPTER TWO

The **Private Cloud**

Designing an effective private cloud requires careful planning and consideration of your current and future needs and priorities. A private cloud for enterprise needs should be built on a foundation of HCI and should provide self-service capabilities, app-centric security, and reliable data protection and disaster recovery.

This chapter explores a number of topics that affect private cloud decision making:
- What constitutes a private cloud?
- What business needs does private cloud solve?
- Where are enterprises running applications and services today?
- What challenges are associated with private cloud?
- How does hyperconverged infrastructure solve private cloud challenges?

The Business Need for Private Cloud

There are two pressing needs for any enterprise to succeed in the digital economy:
- Increase IT efficiency
- Enable digital innovation

A properly designed private cloud helps address both of these needs. Increasing IT efficiency is a prerequisite for accelerating innovation. A successful private cloud:

- **Frees up budget.** In most enterprises, traditional IT still consumes the majority of the IT budget, leaving only a small percentage to dedicate to innovation. **Gartner reported** that traditional IT accounted for 81% of spending on average, with just 19% going to cloud spending. Traditional spending is forecast to drop to 72% by 2022. If you can drive down spending by shifting workloads from traditional IT to private cloud, more budget becomes available to allocate elsewhere.

- **Frees up staff time.** If your IT staff spends all of its time on infrastructure management tasks like provisioning, updates, data protection, and troubleshooting to address operational requirements and satisfy user requests, that leaves very little time or focus for innovation. Rationalizing and automating operations with a private cloud and enabling self-service so that developers and other users can satisfy more of their needs themselves can get your team off the treadmill.

- **Eliminates complexity.** Traditional IT environments often have silos of dedicated compute and storage infrastructure around important applications like databases, an approach that is both complex and inefficient. Silos of storage for unstructured data—including file shares and object storage—add to operational complexity. Established enterprises may have heterogeneous infrastructure and technical debt dating back years. This is not only expensive, it's a substantial barrier to innovation.

Unless you can remove the friction from your on-premises operations, your digital transformation will never be complete, and your business objectives will remain at risk. **A properly designed private cloud fosters innovation by:**

- **Enabling self-service access to resources.** Many developers say the biggest impediment to their productivity is lack of access to resources. Developers and testers, for example, need easy, on-demand access to development and test environments—with up-to-date test data—to be productive. A private cloud that enables self-service access to these resources, can reduce time to market, increasing the cadence at which your company delivers new services and features.

  Many IT teams rely on IT service management (ITSM) services such as ServiceNow. Your private cloud should integrate with any ITSM solution you use.

- **Rationalizing deployment.** Accelerating the rate of software development is little use if it takes days or weeks to stand up a production environment for a new application. By standardizing infrastructure services—and developing with those services in mind—a private cloud can support more rapid deployment and enable CI/CD.

- **Increasing automation.** As enterprises run more and more applications and services at scale, manual tasks and workflows become a huge impediment. It's impractical, and quite likely impossible, to grow your IT staff at the same pace as infrastructure services. A private cloud should enable automation so that IT teams can deploy, operate, and scale infrastructure and application stacks with less effort, while providing IT-as-a-Service (ITaaS) to empower development and business teams.

- **Facilitating data access and analysis.** A private cloud should help consolidate your data and make it more accessible and easier to integrate, accelerating analysis and deepening insight.

- **Supporting both traditional and cloud native applications.** Established enterprises often have tens or hundreds of traditional business applications that they need to continue to support, even as they make new investments in cloud native applications. You may need a private cloud that flexibly supports both models with a common operational model and a single management console.

Not all innovation projects are destined to succeed. Failure is a part of innovation. A private cloud makes it easier to resource new development and application projects quickly. Fruitful ideas grow and add resources by scaling out, unsuccessful ideas release their resources and make room for the next effort.

To sum up, private cloud makes IT operations more efficient by freeing up budget, saving staff time, and eliminating complexity. It fosters agility by enabling fast and easy resource access, simplifying deployments, supporting traditional and cloud native application models, and delivering meaningful automation.

Where are Businesses Running Apps and Workloads?

So where are enterprises on their cloud journeys, and where do they run important apps and workloads today?
This is a question that has as many answers as there are enterprises, but, once again, it's instructive to understand the trends. As you already learned, the lion's share of enterprise IT budgets are still being spent on-premises, but let's examine some of the macro trends around public cloud, software-as-a-service (SaaS), private cloud, and traditional infrastructure.

PUBLIC CLOUD
Enterprises utilize the public cloud to address a variety of use cases, such as:

- **Customer-facing apps.** Global public clouds can enable you to get apps and services "closer" to the customers that need them.

- **Disaster recovery.** Many enterprises opt for DR in the cloud as an alternative to maintaining secondary data-centers for DR.

- **Software development.** Developers often utilize public cloud resources to accelerate delivery of new apps and features.

- **Peak resource demands.** Many enterprises use cloud resources to address peak demands rather than purchasing and deploying the necessary equipment in a datacenter.

- **Geographic limits.** Cloud resources can be used to support operations in geographies that are far from an existing datacenter.

However, the public cloud is not suitable for all types of workloads or use cases due to:

- **Data gravity.** Applications have to run where the data is generated. Moving data far from its source—whether the source is applications, machine data, or employee and customer data—can be expensive and time consuming.

- **Legacy design.** It can be difficult and expensive to move legacy applications to the public cloud. Even when you succeed, they may not run as well as they did in the datacenter.

- **Regulatory concerns.** Regulations, including GDPR and others, may severely limit your ability to run applications in the public cloud or store data there.

- **Loss of control.** Many IT teams are unwilling to give up control to the public cloud when it comes to deploying and operating custom applications.

- **Unpredictable cost.** Egress charges and getting data out cannot be overlooked and costs can be quite high.

SaaS

Almost all enterprises are adopting software-as-a-service for some applications, offloading the management burden for these services from datacenters and IT teams. This trend came across very clearly in our 2018 report:

88% of respondent organizations have adopted at least one "as-a-service" product. This could be as simple as Dropbox or could indicate adoption of Office 365, Salesforce, WorkDay, or some other software-as-a-service tool.

As enterprises focus on digital transformation and operating agility, SaaS is a way to "clear the decks" so that teams can focus attention on critical services and innovation in areas that provide the greatest differentiation for your business.
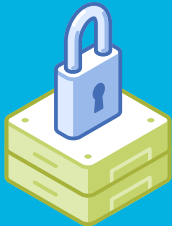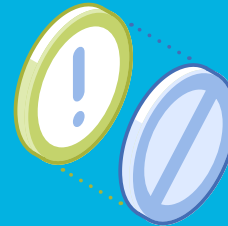
DATA GRAVITY & LEGACY APPS
Make migrations hard plus fear of vendor lock-in where data resides

REGULATORY CONCERNS
That do not permit hosting data outside of an org's geography

LOSS OF CONTROL
From being able to deploy custom solutions to protect your apps and data

UNPREDICTABLE COSTS
Overruns due to limitless resources and high egress charges

Figure 2. Enterprises report a number of impediments when it comes to public cloud.

PRIVATE CLOUD AND TRADITIONAL IT

Private cloud and traditional IT are combined under a single heading because the line between the two remains a bit blurry. This is because not everyone defines private cloud the same way. When we asked about infrastructure environments, 52% said they were running on-premises private cloud, 37% said they were running hybrid cloud, and only 11% said they were running traditional IT.

However, the 52% number for private cloud still seems optimistic. This number is likely more aspirational than a reflection of the current reality. By most definitions, a private cloud should include capabilities such as:

• Self-service
• Automation and orchestration via APIs
• Dynamic scalability
• Chargeback/showback

When the same survey asked respondents about these capabilities, only about 27% indicated that they had fully implemented each feature or were close. Roughly 50% said they were getting there, while 22% didn't have the capability or were just starting. While it's up to you to define the capabilities of your private cloud, Nutanix believes that these four capabilities should be priorities for anyone planning a private cloud deployment.

Private cloud on-premises infrastructure

Non-private cloud on-premises infrastructure

11%

52%

WHAT TYPE OF INFRASTRUCTURE ENVIRONMENT ARE YOU RUNNING?

Hybrid cloud (combination of on-premises/private cloud and public cloud)

37%
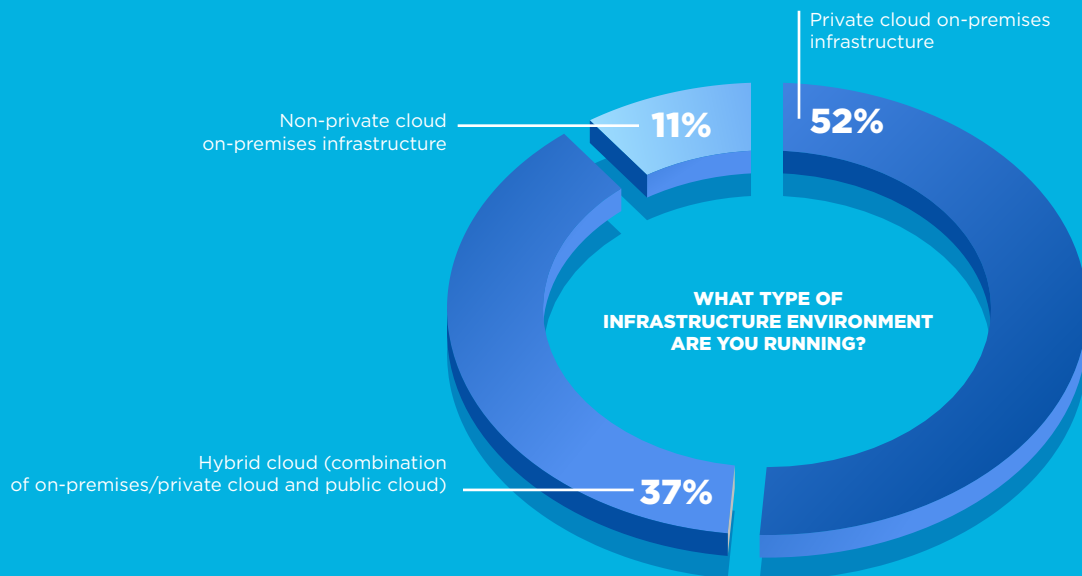
Figure 3. How enterprises report using on-premises infrastructure

Private Cloud Challenges

An on-premises private cloud should provide your business the same agility as the public cloud—with the slight exception that your IT team is responsible for physical infrastructure. As you've seen, overarching private cloud goals are to make your IT operations more efficient and to enable greater innovation.

However, it probably won't surprise you to learn (assuming you don't already know) that enterprises have struggled with private cloud implementations, falling short of their goals in important ways. Many existing private clouds suffer from one or more of the following challenges:

- **Inflexible architecture.** Your private cloud may need to adapt to a variety of application needs from traditional enterprise applications to cloud native applications. Inflexible infrastructure software and 3-tier architectures can make that difficult.

- **Complex data services.** Enterprise environments typically have a need for a private cloud with block and file storage services in addition to the object storage common in the public cloud. Meeting those needs may require deploying and managing different hardware for each data service, adding cost and complexity. Separate storage pools decrease overall capacity utilization and limit flexibility. With data playing such a critical role in digital transformation, the importance of addressing this challenge shouldn't be overlooked.

- **Brittle automation.** A private cloud with an inflexible architecture and complex data services inevitably makes automation harder. As a result, it is more time consuming to create automations, automation failures are more likely, and troubleshooting and maintenance is more complex.

- **Inadequate performance and/or availability.** In a private cloud environment, you may have less visibility of the performance requirements of each workload, and workloads can also change more quickly as users start and stop VMs and applications. As a result, one workload may negatively impact the performance of another. If your private cloud is poorly architected, it may also introduce single points of failure, bottlenecks, and other flaws that affect availability.

- **Unpredictable scaling.** In a busy and growing private cloud environment, it can be difficult to predict when you'll run out of performance, especially I/O performance. With multiple types of storage needed, scaling can be disruptive and expensive. The right architecture should simplify scaling, and the right tools should simplify monitoring resource consumption and facilitate capacity planning.

In addition, private cloud implementations may fail to provide a number of things that enterprises need. Shortcomings may include:

- **Lack of "enterprise" services.** Traditional enterprise applications often rely on external data protection and DR services. Private clouds modeled on public cloud may lack the robust snapshots, replication, cloning and other services that many enterprise IT teams utilize and may not integrate with existing third-party data protection solutions.

- **Lack of public cloud integration.** Finally, you will eventually want your private cloud to integrate with public cloud services. A private cloud environment that lacks integration points makes this more difficult and private cloud versus public cloud operations remain disjointed.

The more of these challenges and deficiencies your private cloud is burdened with, the more complex the environment is to manage and the more expensive it becomes in terms of both CapEx and OpEx.
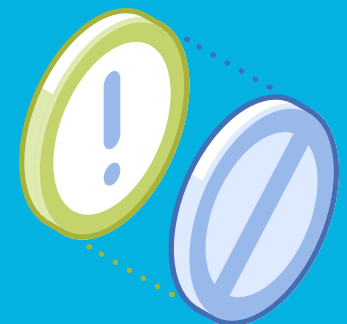
Hyperconverged Infrastructure at the Core

It can be a struggle to implement a private cloud on top of traditional 3-tier enterprise IT infrastructure with separate servers and storage connected by storage networks. Despite its familiarity, this type of infrastructure leads directly to many of the challenges described in the previous section. Different VMs may impact each other and it is difficult to scale, slow to respond to business needs, and complicated to manage. Traditional infrastructure is one of the primary reasons that many early private cloud deployments have not delivered on their promise.

Enterprises are discovering that they can achieve better private cloud results more quickly using hyperconverged building blocks that provide compute capacity and storage capacity on each node—similar to the approach used by many of the large public clouds. The right hyperconverged infrastructure (HCI) solution provides the cardinal virtues of cloud including self-healing, simplified capacity planning, easier automation, and reduced management overhead.

When Nutanix compared enterprise HCI adopters to non-adopters, we found that HCI adopters were much further along in delivering the key private cloud capabilities identified earlier: self-service, automation, dynamic scalability, and chargeback. We believe this is because HCI makes it simpler to deliver those capabilities; some HCI offerings include these capabilities out of the box.

As Figure 3 illustrates, HCI adopters were far more likely to report that they had fully implemented the key capabilities, and much less likely to have reported little or no progress.

The simplified HCI architecture lends itself to self-service, automation, and dynamic scalability. Chargeback can also be much easier to implement since everything is under a single point of control. As you'll learn in chapter 4, the right HCI architecture eliminates the most pressing private cloud challenges with a flexible architecture that adapts to a variety of needs and greatly simplified management.

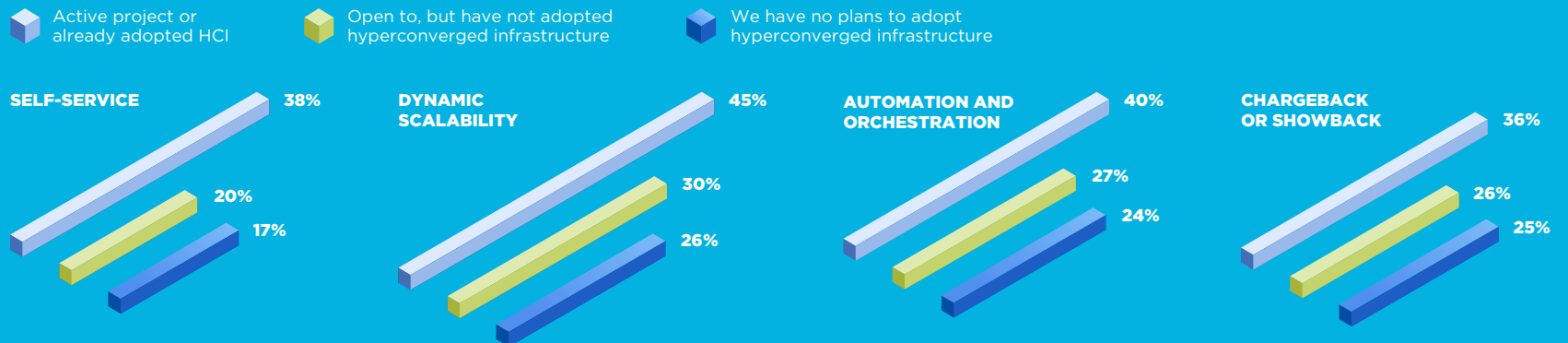## WE ARE VERY CLOSE OR HAVE FULLY IMPLEMENTED:

- Active project or already adopted HCI
- Open to, but have not adopted hyperconverged infrastructure
- We have no plans to adopt hyperconverged infrastructure

SELF-SERVICE		DYNAMIC SCALABILITY		AUTOMATION AND ORCHESTRATION		CHARGEBACK OR SHOWBACK	
38%		45%		40%		36%	
20%		30%		27%		26%	
17%		26%		24%		25%	

Figure 4. HCI adopters are far more likely to have implemented key private cloud capabilities

Bottomline Technologies
Relies on Nutanix for Online Payments Processing

Businesses around the world depend on **Bottomline Technologies** solutions to help them **make complex business payments simple, smart, and secure**, including some of the world's largest banks, and private and publicly traded companies.

The company now runs core business applications that are responsible for revenue generation on Nutanix Enterprise Cloud, replacing its legacy server and SAN environment. With Nutanix, the company:

- Delivered its cloud-based service from a secure datacenter environment

- Increased customer adoption and satisfaction by eliminating the need for on-premises infrastructure at customer sites

- Significantly reduced support and maintenance, freeing resources for other projects

- Quickly and easily handles service growth with predictable, linear scaling

> As far as the customer is concerned payment processing is all done in the cloud but with none of the **security**, **governance** and **compliance issues** associated with public cloud platforms.

— Peter Marshall, Head of Infrastructure, Bottomline Technologies Inc.

CHAPTER THREE

# Creating an On-Ramp to **Hybrid Cloud**

Although some enterprises are migrating applications back on premises, public cloud still plays an important role in your overall IT strategy. In this chapter we'll explore:

- Why hybrid cloud is the preferred enterprise model
- How private cloud choices affect hybrid cloud success
- Practical ways to move from private to hybrid cloud
- Deciding where to deploy an application

Why Hybrid Cloud?

If you've made—or are going to make—the necessary investments to deploy an effective private cloud, it's natural to ask whether you need a hybrid cloud at all. Although you may not be ready to adopt hybrid cloud today, what if your dev team comes to you in 6 months with a new cloud native customer application that is expected to see huge traffic during the holiday season? Where will you get the resources to support it? Enterprise IT teams have to be ready for these types of surprises.

It's become clear that hybrid cloud is by far the preferred operating model. As already noted, **our 2019 study** found that 85% of enterprises rank hybrid cloud as the ideal IT operating model. This extensive report surveyed 2,650 IT decision makers around the world about where they're running their business applications today, where they plan to run them in the future, what their cloud challenges are, and how their cloud initiatives stack up against other IT projects and priorities.
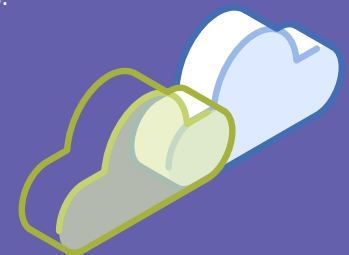
Assuming that your private cloud is able to run all your work-loads, why would you need a hybrid strategy? A hybrid cloud gives you access to the resources of both your private cloud and the public cloud. This has a number of advantages:

• **Flexibility and agility.** Ready access to resources to support new applications, accommodate development and testing projects, or to quickly address unanticipated needs. Your private cloud flexibly meets resource needs for most situations—with access to unlimited public cloud resources if and when needed.

• **Elasticity.** The hybrid cloud model gives you the ability to respond elastically to seasonal resource demands. Also, some individual applications experience big resource fluctuations and run best in a public cloud where they can grab resources when they are needed and release them when they are not.

• **Cost control.** Designing datacenters to accommodate peak loads only to have infrastructure sitting idle much of the time is a poor choice versus using public cloud resources to accommodate peak loads.

• **User experience.** You can't defy the laws of physics. Trying to deliver IT services to customers or employees from a distant datacenter simply introduces too much latency to be effective. Public cloud can make it possible to expand quickly into new geographies where you don't have a data-center and to bring digital services closer to customers.

The results you ultimately achieve depend on how mature your hybrid cloud operations are.

Increasingly, applications incorporate data and services from multiple places. For instance, in a 3-tier application stack, the presentation service might be on a public cloud close to the consumer, the application service might reside in a private cloud, while the database service might remain on legacy infrastructure. Hybrid cloud should give you the flexibility to bring together the right application components based on capabilities and needs to deliver each application at the optimum cost.

Private Cloud is an On-Ramp to Hybrid Cloud

Having a well-architected private cloud will make your hybrid cloud deployment easier and help ensure success. Some of the reasons for this are just common sense. If your private cloud is burdened by the challenges described in Chapter 2, your team is going to have a lot less time to devote to hybrid cloud as well. Hybrid applications that are dependent on services from your private cloud will suffer the effects of its limitations, especially performance, automation, or integration challenges.

The right private cloud solution should actively facilitate integration with the public cloud. This includes tools for copying, replicating, or migrating VMs and data from one location to another, support for different hypervisors, and the ability to support both VMs and containers.

One of the biggest challenges for any hybrid cloud deployment is that your private cloud and public cloud(s) may have completely different management environments. This makes deployment and ongoing management more difficult and increases the potential for operator errors, security vulnerabilities, and cost overruns. It can be difficult to size equivalent VMs and storage across environments or map functionality in your private cloud to equivalent functionality in a public cloud.

The ideal private cloud solution includes tools that simplify and unify management of the private and public cloud components of your hybrid cloud environment, including:

- Application and lifecycle management
- Security governance
- Cost governance

By choosing the right private cloud solution, you effectively create an on-ramp to the hybrid cloud that makes hybrid operations easier and more cost effective, delivering better results.

A Practical Approach to Hybrid Cloud Adoption

Guidelines for assessing hybrid cloud maturity stress the need for automation, visibility, and consistency across all environments, private and public. But, most approaches to hybrid cloud are based on just trying to figure out how to get all the pieces to work together. Based on the realities of the current cloud environment, Nutanix recommends a different approach:

- Choose a single framework—a "cloud operating system" —that will let you manage workloads both on-premises and in the public cloud.
- Deploy your private cloud using that framework.
- Choose only public clouds compatible with that framework.

This approach is described in more detail in the recent book, **"Designing and Building a Hybrid Cloud"**.

Aligning Applications to Clouds

Enterprises pursuing a hybrid cloud strategy have to decide which applications (or parts of applications) to deploy in which clouds.

Private cloud infrastructure is usually the most economical option for predictable enterprise workloads and development needs, while the cloud supports elastic workloads, cloud native applications, and accommodates unforeseen resource needs.

When organizations consider which applications and workloads to run in the public cloud, they often look at the following opportunities first:

- **Disaster Recovery and Data Protection.** By eliminating the need for a secondary datacenter with resources dedicated for disaster recovery, DR in the cloud can be very cost-effective.

- **Software-as-a-Service.** Increasingly, enterprises choose a variety of applications to provide non-critical services. SaaS services can often eliminate much of the infrastructure and administrative overhead, allowing your IT team to focus onservices that differentiate your business.

- **Development and Test.** Development work can often be supported economically in the cloud. This is especially true for new projects that might not succeed.

This is not to say that your organization should move these workloads to the cloud, just that many organizations see them as potentially low hanging fruit.

How to Best Take Advantage of **Public Cloud**

Take a strategic look at what you want to accomplish before considering individual applications and create a cloud decision matrix that includes all the factors that need to go into your decision to move an application from your datacenter to a cloud service provider. This includes assessing likely costs and whether an application is ready for the cloud:

- Does the application consume and release resources as needed or is it persistent?
- What's the I/O pattern? Steady or fluctuating? High or low?
- Does the application scale vertically or horizontally?
- Does the application consume more and more resources over time in a way that you can't control or limit?
- Does the application depend on an ecosystem of other applications?
- Does the application have stringent compliance requirements?
- What is the impact to your business if the application is up but unreachable?

These factors tend to be interrelated. High I/O requirements or the need to run as part of an ecosystem will affect the cost of running an application in the cloud.

Once you have the right cloud decision matrix for your organization, you can evaluate individual applications against it. Some applications will rank as prime candidates; some applications will clearly not be well-suited to move to the cloud and will probably never be moved; others may require work to make them cloud ready.
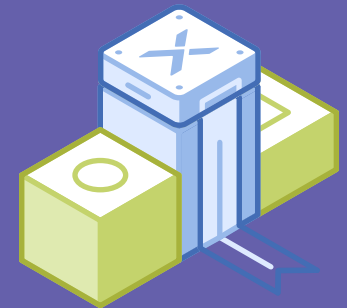
Fast-Growing Online Retailer Puts **Nutanix** at the Core of **Hybrid Cloud**

vida**XL**

In little over a decade, Netherlands-based **vidaXL** has grown to become an **international online retailer** with multiple fulfillment centers across Europe, Australia, and the USA. The company chose Nutanix to replace its existing, fragmented infrastructure with a hybrid cloud, combining best-of-breed public cloud services with on-premises Nutanix infrastructure.

Nutanix now supports a variety of critical workloads including SAP, Linux databases, Genesys PureCloud contact centre, and Citrix Virtual Apps and Desktops. The company saw immediate benefits from this approach including:

- Integrated management across its distributed private cloud using Prism Central
- Simplified support with a single point of contact across all operations
- Cost savings from reduced footprint, maintenance, power, and cooling
- Reduced virtualization costs due to Nutanix AHV hypervisor
- Built-in tools for public cloud integration as part of hybrid cloud

❝ Using the **Nutanix Enterprise Cloud Platform** to build a private cloud has enabled us to address all the issues around performance, scalability, management and support associated with our previous, diverse and fragmented, IT infrastructure. It has also made **our IT much more stable** and provided a **firm foundation** for a hybrid cloud, able to further **scale** and cope with **growth** where required. **❞**

— Bart van Es, IT Manager, vidaXL

CHAPTER FOUR

Choosing the Right HCI Solution for Your **Private Cloud**

Not all HCI architectures are equally well suited to solve your company's private cloud and hybrid cloud challenges. Built on the industry's leading hyperconverged infrastructure (HCI) software, the Nutanix Private Cloud solution is designed to deliver unparalleled private cloud operations while creating an on-ramp to hybrid cloud. **Nutanix enables you to run any application on one platform in any location.**

Nutanix provides a high degree of infrastructure and application automation, ensuring that your infrastructure investments keep pace with changing workload requirements. Simple, scalable infrastructure is combined with consolidated data services, intelligent operations, and native business continuity options. Security and governance are built into every facet of the solution.

The Nutanix solution is designed to accommodate all the applications that enterprises care about, from traditional database applications to end-user computing to the latest cloud native apps.

PRIVATE, PUBLIC, HYBRID. ALL TOGETHER NOW.
NUTANIX CLOUD PLATFORM

End User Computing /VDI | Database | Business Critical Apps | Analytics & Big Data | Cloud Native | ROBO/ Edge Computing | General Compute/ Dev&Test

SEAMLESS HYBRID CLOUD OPERATIONS

PUBLIC CLOUD

PRIVATE CLOUD

OPERATIONS AND AUTOMATION
BUSINESS CONTINUITY
STORAGE CONSOLIDATION
NETWORK AND CLOUD SECURITY
HYPERCONVERGED INFRASTRUCTURE (HCI)

Figure 5. Nutanix Private Cloud solution delivers the capabilities to support diverse enterprise workloads and cloud native applications. Run any app on one platform in any location.

And Nutanix Private Cloud is easy and fast to deploy and scale. You can start small and grow your environment incrementally as needed, and you can accomplish large-scale deployments quickly—without requiring six months of professional services. Nutanix uses a subscription software model that delivers economic and provisioning flexibility for your private cloud.

As a result, Nutanix delivers the private cloud capabilities you need to succeed in an **extremely cost-effective solution.** A recent IDC study demonstrates how Nutanix benefits exceed the capabilities of other architectures on a range of important metrics.

Designed for Cloud

Nutanix infrastructure software is engineered to deliver highly scalable, available, and efficient cloud services. Nutanix has helped thousands of customers eliminate legacy compute and storage silos and modernize infrastructure for innovation, while delivering high performance, always-on self-service, and efficient storage consolidation from a single platform.

Unlike the traditional piecemeal approach with disparate storage, compute, virtualization solutions, the Nutanix Private Cloud solution is optimized to connect and consolidate IT silos, streamlining management, accelerating the delivery of business services, eliminating complexities, and simplifying cloud deployment.

Because Nutanix solutions are 100% software-defined, we enable you to create a private cloud that is:

- **Easy.** Deploy, expand, and upgrade quickly and non-disruptively from a single pane of glass

- **Intelligent.** Automate day-to-day operations and place apps and data intelligently to maximize performance

- **Resilient.** Secure and protect apps and data and pro-actively recover from failure with less time and effort

And Nutanix enables you to integrate with the public cloud more easily, creating an on ramp for hybrid cloud operations.
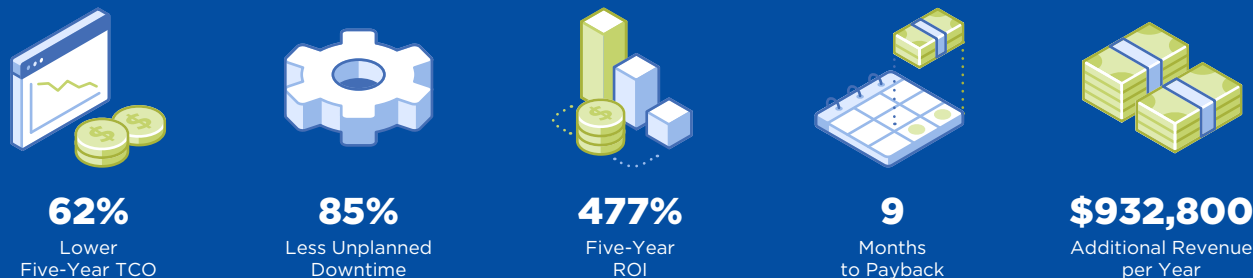

| **62%** | **85%** | **477%** | **9** | **$932,800** |
| Lower Five-Year TCO | Less Unplanned Downtime | Five-Year ROI | Months to Payback | Additional Revenue per Year |

Figure 6. Nutanix Private Cloud solution outperforms alternative architectures on a variety of critical business metrics.

The Nutanix Architecture

Nutanix's hyperconverged platform was designed for a digital, software-defined world, making it an ideal solution for the cloud versus hardware-dependent, 3-tier, and legacy infrastructure options. With Nutanix HCI technology, simple building blocks result in a **powerful and flexible scale-out architecture.** Scaling is predictably linear, so you can add compute and storage resources incrementally as your needs grow—avoiding large, unexpected capital outlays.
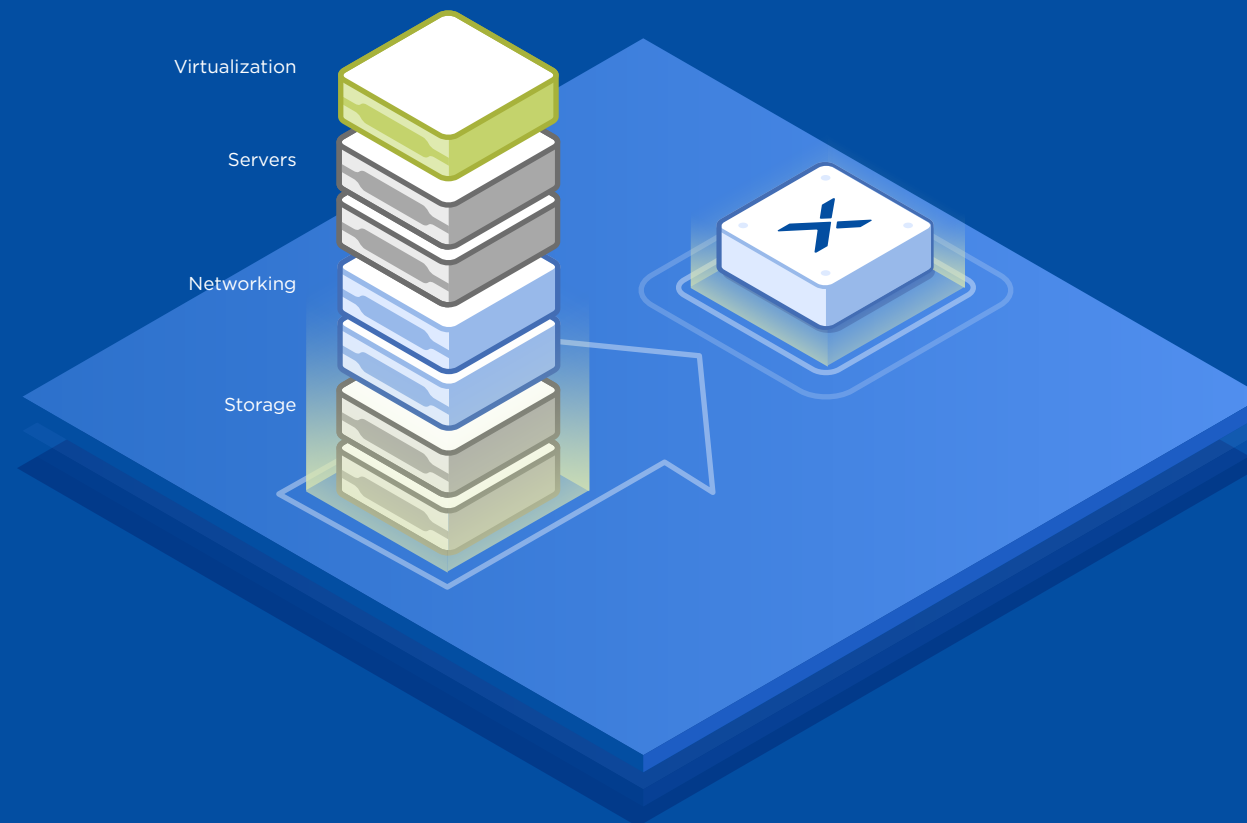
Virtualization

Servers

Networking

Storage

Figure 7. The Nutanix architecture integrates critical capabilities, accelerating infrastructure deployment

The Nutanix Private Cloud solution gives you greater choice and greater flexibility including:

- **Platform choice.** Choose hardware from leading hardware vendors or Nutanix NX appliances.

- **Hypervisor choice.** Nutanix AHV hypervisor is included with purchase at no additional cost, providing full VM and container support. VMware ESXi and Microsoft Hyper-V are fully supported.

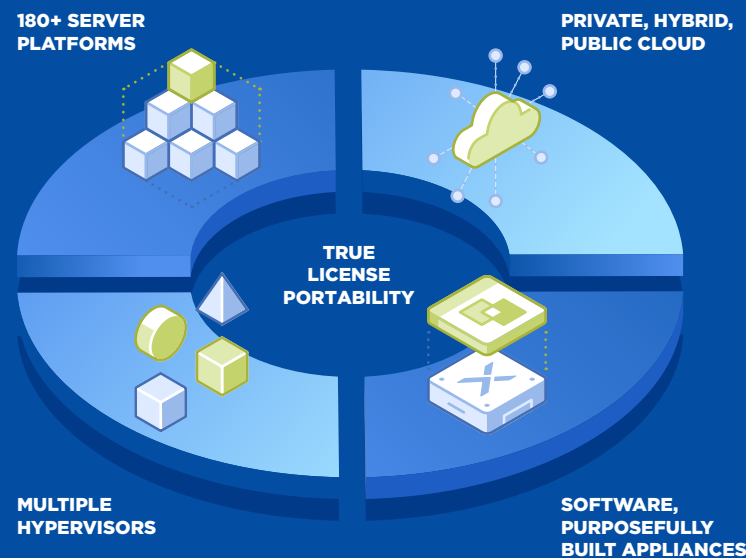- **Public cloud choice.** Enable hybrid cloud operations spanning public clouds.

Consolidated Data Services

Nutanix allows you to consolidate all your data services —including both structured and unstructured data—on the same platform, eliminating the need to architect and manage separate siloed storage solutions for your private cloud. A single, flexible and scalable storage pool simplifies provisioning and management while increasing capacity utilization.

Having all your data on a single platform can simplify data integration and data analysis, yielding greater insight with less effort.
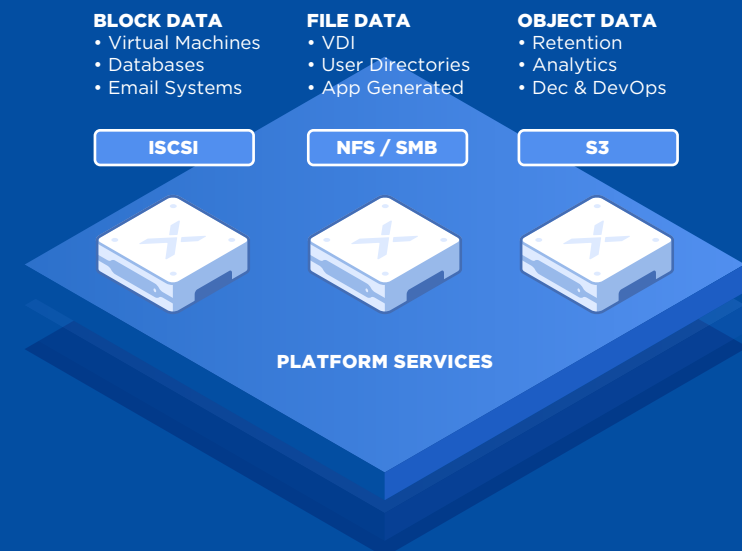

180+ SERVER PLATFORMS

PRIVATE, HYBRID, PUBLIC CLOUD

TRUE LICENSE PORTABILITY

MULTIPLE HYPERVISORS

SOFTWARE, PURPOSEFULLY BUILT APPLIANCES

Figure 8. Nutanix solutions provide greater choice to accommodate diverse enterprise needs.

BLOCK DATA
- Virtual Machines
- Databases
- Email Systems

FILE DATA
- VDI
- User Directories
- App Generated

OBJECT DATA
- Retention
- Analytics
- Dec & DevOps

ISCSI

NFS / SMB

S3

PLATFORM SERVICES

Figure 9. The Nutanix Private Cloud solution integrates block, file, and object data services as part of the platform.

Intelligent IT Operations, Automation, and Self Service

With Nutanix, your private cloud benefits from streamlined IT activities across the infrastructure lifecycle. Intelligent, one-click operations take the pain and effort out of daily activities, including software installs, upgrades, and workload placement.

- **Infrastructure optimization.** Nutanix provides advanced analytics and intelligent insights into your private cloud environment, so you can quickly identify under-utilized resources, overprovisioned VMs, and other cost sinks.

- **Multi-cloud management.** Nutanix brings one-click simplicity to hybrid cloud environments, enabling you to deploy and manage applications in nearly any cloud without losing control, visibility, or capabilities.

- **Flexible task automation.** Nutanix provides a code-free, visual approach to task automation, enabling any administrator to build, maintain, and troubleshoot automations.

- **Self-service with no loss of control.** With Nutanix Calm, you can create blueprints that model applications and tasks and publish them to a marketplace. Application owners and developers request these IT services from the marketplace whenever needed.

- **Simplified CI/CD.** Your teams can deploy and maintain a fully automated CI/CD pipeline with continuous application deployment across multiple on-premises and cloud locations.

Backup and Disaster Recovery

Nutanix provides native data protection that simplifies your infrastructure, eliminates bottlenecks, and streamlines backup management. Full integration with third-party backup solutions lets you continue to use your preferred solution or standardize operations across your entire environment.

Monitoring, Metering, and Chargeback

Nutanix provides deep visibility into consumption patterns across your private cloud and public cloud deployments. From a single pane of glass, you can optimize cloud spend, perform compliance checks, and provide 1-click remediation.
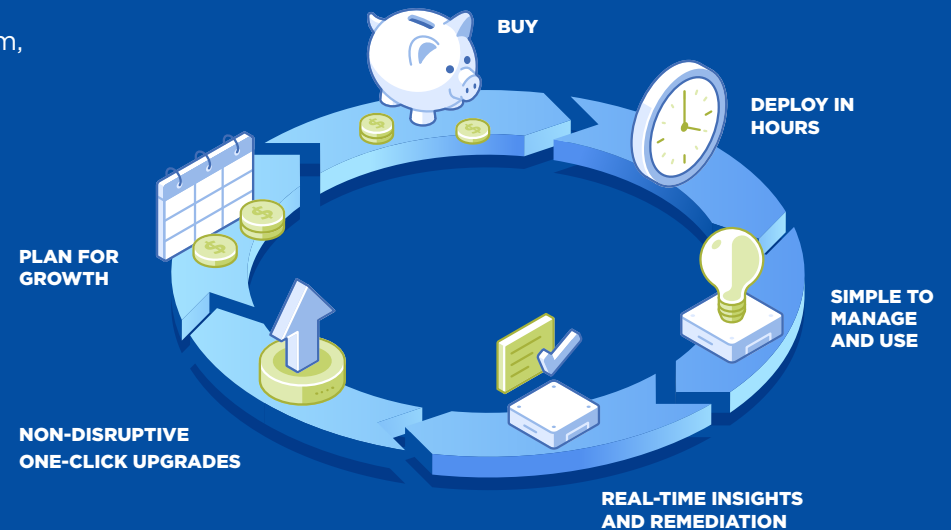

BUY

DEPLOY IN HOURS

SIMPLE TO MANAGE AND USE

REAL-TIME INSIGHTS AND REMEDIATION

NON-DISRUPTIVE ONE-CLICK UPGRADES

PLAN FOR GROWTH

Figure 9. Nutanix simplifies every aspect of infrastructure deployment and management.

Security and Governance

Ensuring that a private cloud meets security, corporate governance, and regulatory requirements is a significant challenge. Nutanix provides native capabilities that greatly simplify the process of ensuring infrastructure security. Powerful security automation monitors the health of your storage and VMs, automatically healing any deviations from the security baseline. Nutanix complies with the strictest international security standards, and an ecosystem of security partners makes it simple to add other security services to your environment.

In private cloud environments—where you may lack full workload visibility and control—data encryption and policy-based microsegmentation are extremely valuable:

- **Data Encryption.** Nutanix provides flexible methods for encrypting data at rest for compliance and security.

- **Policy-based Microsegmentation.** Protect individual applications and groups of applications, from internal and external security threats. Fine-grained microsegmentation rules control east-west traffic between VMs. Policy definition is made simple with Nutanix's ability to visualize traffic flows within the private cloud environment.

Easier Application and Workload Mobility

Enterprises place increasing value on having the flexibility to match a given application or workload to the best infrastructure resource dynamically; 85% say app mobility across clouds is essential. Nutanix simplifies hybrid cloud operations, providing the ability to easily move applications across clouds with less time and effort. And Nutanix tools make it easier to assess the cost of an application both on-premises and in the cloud.

Getting Started with Nutanix Private Cloud

To learn more about how Nutanix can help you transform your private cloud, visit **nutanix.com/private-cloud**. You can contact Nutanix at **info@nutanix.com**, follow us on **Twitter @nutanix,** or send us a request at **www.nutanix.com/demo** to set up your own customized briefing.

You can also take a **test drive** of Nutanix infrastructure with no hardware, setup, or cost. Experience the simplicity and agility of public cloud combined with the performance, security, and control of private cloud via an easy-to-follow guided tour.

START YOUR TEST DRIVE

Trek Bicycles Modernizes with Nutanix Enterprise Cloud

Trek **is a 40-year-old, privately held company that is world renowned for its high-quality bicycles.** After an extensive proof-of-concept, Trek enlisted the help of Nutanix Consulting Services for its datacenter infrastructure modernization project. Trek now relies on Nutanix to run all of its on-premises workloads, including the company's design and manufacturing applications and product lifecycle management (PLM) software, delivering substantial and far-reaching benefits:

- 66% reduction in number of employees needed to manage infrastructure, lowering IT costs and allowing focus on strategic projects

- Cut turnaround time for IT requests from weeks to hours, freeing engineers to work on innovative new products

- 75% reduction in storage/compute datacenter footprint, lowering overall datacenter costs significantly

- Provided Trek employees with positive work-life balance

" Technology goes into every part of designing and building a bike—making it more efficient, aerodynamic, lighter, stronger, and faster. Our bikes are as advanced as possible and **all of our design and manufacturing processes** are now being **powered by Nutanix**. **"**

— Dane Sandersen, Global Security and Infrastructure Director, Trek Bikes