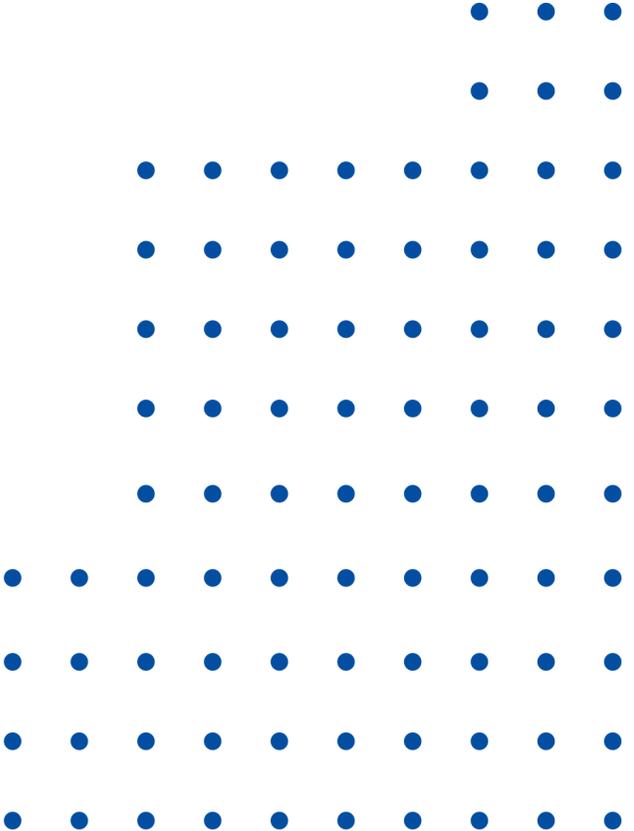


Building the Ideal Foundation for Your Cloud Native Datacenter

An IT Ops Guide to On-Prem Kubernetes Success

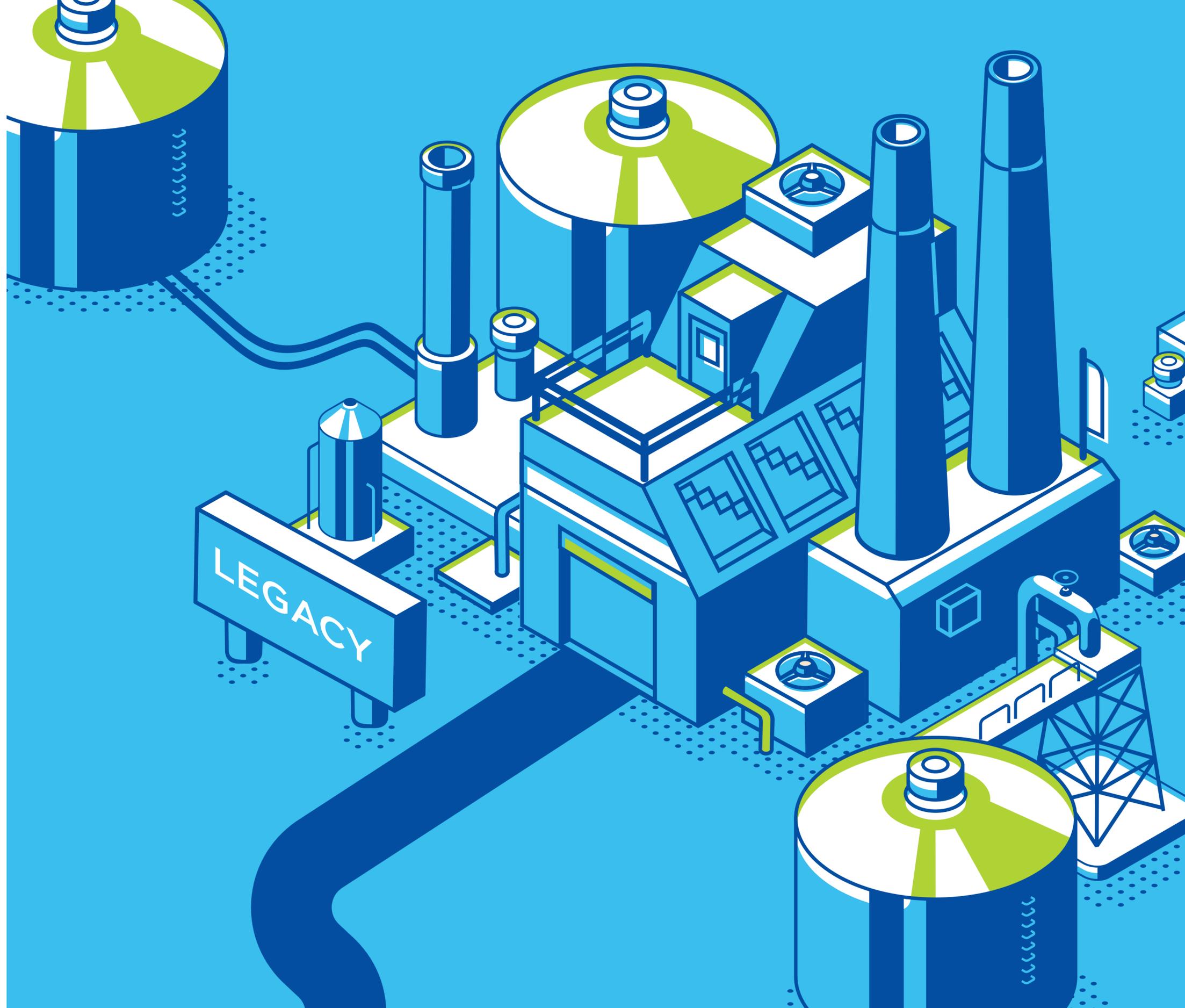


CHAPTER 1:

Brief History: Hyperconverged Infrastructure Shatters Silos

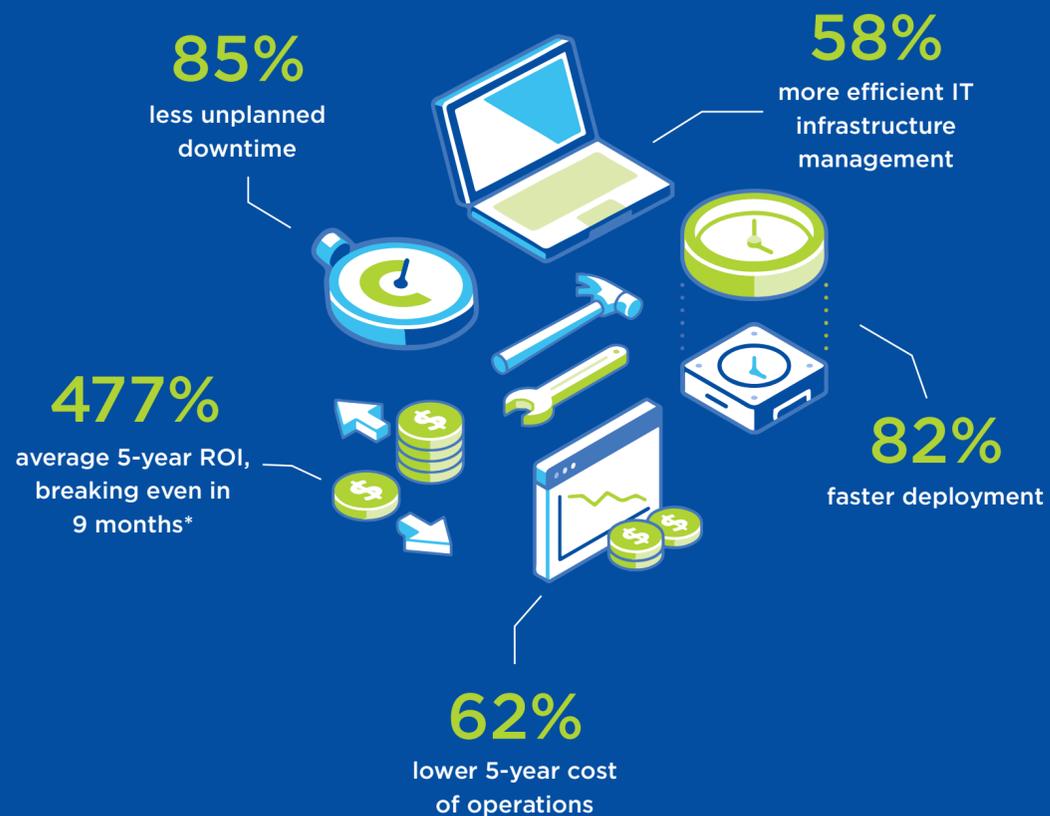
Back in the 1990s—before computer science grew into what it is today—legacy infrastructures were developed. In a legacy architecture, storage, compute, and networking are broken up into separate silos, which require a high degree of specialization to manage. The cost of maintaining these legacy systems has grown over the years, and due to the significant management burden, their impact on IT innovation can be stifling.

Burdened by complexity, the three-tier infrastructure model is nearly the antithesis of modern IT—and definitely runs counter to the agility that enterprises are seeking as they adopt cloud native technologies. Today, hyperconverged infrastructure (HCI) is rapidly replacing these traditional legacy environments with a centralized, easily managed system that can support the growing demand for automation and cloud-based applications.



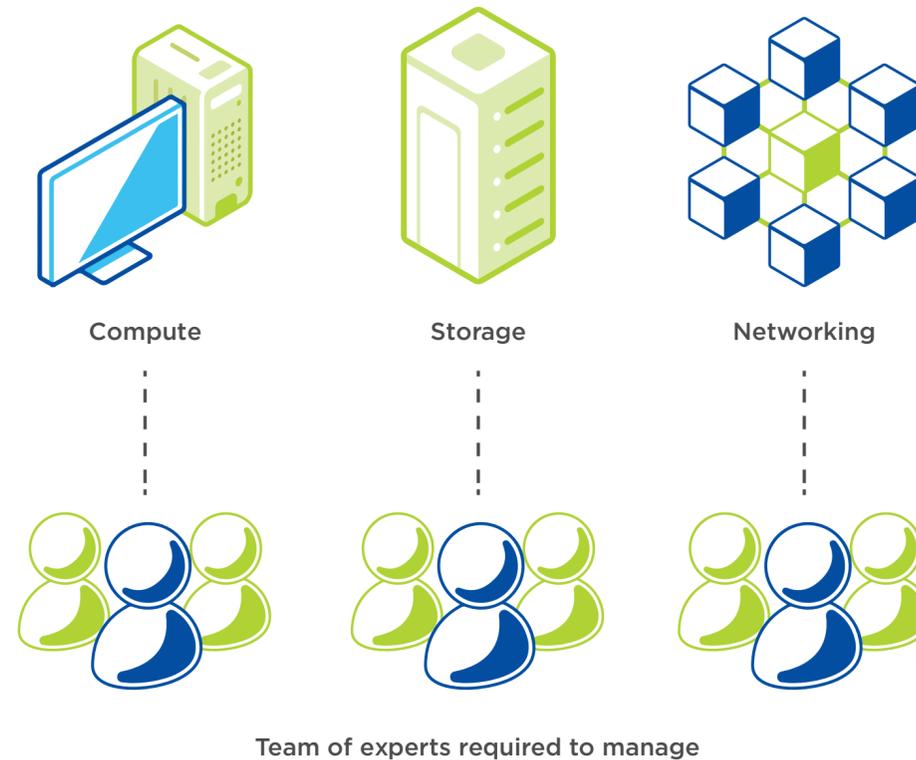
In the traditional model, each area of the IT environment required a specialist. But because HCI unifies every part of an enterprise IT environment, it can be managed by a single person—a breakthrough for many companies struggling with Kubernetes or cumbersome legacy systems. Organizations that want to make the most of their IT infrastructure investment see hyperconvergence as the best way to ease management constraints and save on costs.

Advantages of deploying HCI^{1*}

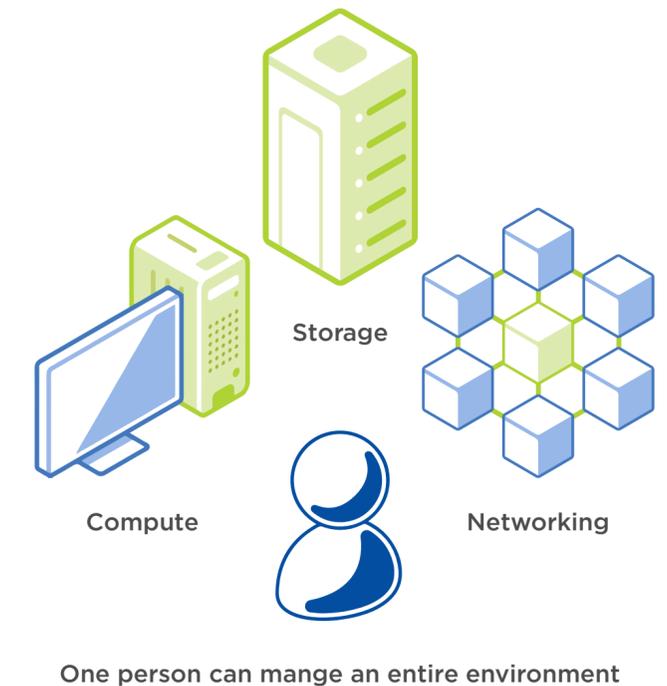


* Among organizations using Nutanix Enterprise Cloud.

Traditional Three-Tier Architecture



Hyperconverged Infrastructure



“In the three-tier model—which operates in separate silos of compute, storage, and networking—we had to have the systems administrator, the network admin, and the storage admin. That’s all converged now. **I need to have one person with a good understanding of technology.**”

— Alon Yampel, VP of IT & Infrastructure, Amdocs

The building blocks of a cloud native enterprise

Containers, Kubernetes, and a broad ecosystem of cloud native technologies offer a competitive advantage to organizations by way of enhanced business agility, efficiency, and speed to market. Let's take a quick look at what it takes to become a cloud native enterprise.

Containers allow for applications to be built as collections of smaller, composable pieces

Containers deliver greater portability across different environments, rapid scalability, non-disruptive upgrades, and improved resource efficiency in a vendor-neutral package. Similar to how virtual machines abstract compute from the underlying hardware layer, containers abstract applications from the underlying operating system. This allows them to be used in hybrid and multicloud environments with a container management platform like Kubernetes.

Kubernetes orchestrates containerized workloads

Kubernetes has rapidly evolved to become the dominant container orchestration platform, providing a programmatic, scalable layer of IT infrastructure. Kubernetes can drastically ease the intensive management requirements of older environments—and because it can operate across on-prem and public clouds, it enables a high degree of flexibility for enterprises that leverage both types of cloud native infrastructure.

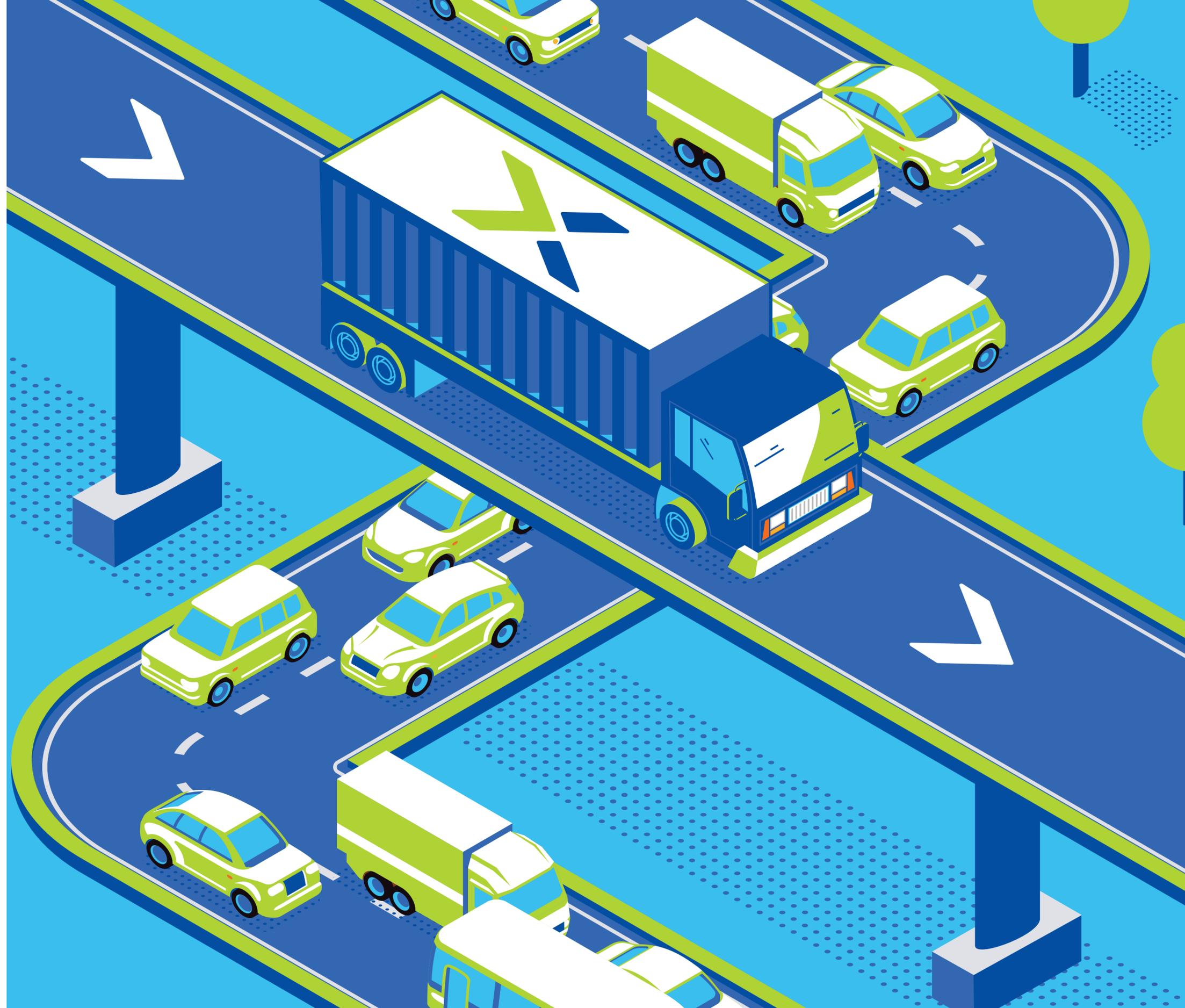


Many organizations with digital transformation initiatives seek to deploy containerized applications on Kubernetes on-prem. In the next chapter, we'll take a look at some common challenges they face and how Nutanix® can help.

CHAPTER 2:

Challenges of running Kubernetes and cloud native applications on-prem

Datacenter modernization is a must these days. Companies are sometimes compelled to run applications on premises (due to regulatory compliance, cost, or other reasons), or need to run certain applications at the edge. However, companies routinely face complex technical issues when setting up Kubernetes environments in their own datacenters.





Legacy infrastructure limits the benefits of Kubernetes

Legacy infrastructure isn't designed for the way Kubernetes and containerized applications use compute, storage, and network resources. Organizations looking to build their own Kubernetes environments on-prem are often confounded by its complexity—along with the different approaches to storage, data management, networking, and security that Kubernetes requires. Developers' productivity is often highly impacted when IT operations isn't able to deliver resources in lock-step with their needs.

Legacy system management is counterproductive for IT innovation

Increasing competition forces businesses to be more efficient, flexible, and innovative in developing new products and services for customers. But with legacy infrastructure's time-consuming lifecycle management needs, IT doesn't have the bandwidth to focus on new projects or technology applications.

Traditional infrastructures aren't built to handle Kubernetes IT resource demands

IT operators who were used to working in legacy VM-based environments are challenged by Kubernetes lifecycle management. Plus, even though Kubernetes uses a simple declarative model for carving out CPU and memory usage, configuring and managing storage, networking, monitoring, and security are much more challenging.

“In the past, it really used to take us weeks before we could provision and enable the user to actually use the infrastructure. **Today, it's a matter of days,**”

says the VP of IT and Infrastructure at a global IT software and services provider.

“**It's really exciting** to push a new solution on emerging technology, to transform, and to have a very ambitious strategy. I think without Nutanix®, it would not be possible,”

says the CTO at an organization that helps other companies achieve digital transformation.

Overcome the challenges of on-prem Kubernetes and cloud native infrastructure

Organizations run into some big challenges along their cloud native journeys, which we'll cover at a high level below.

Managing cloud native application data is challenging and requires a lot of effort

Organizations that use Kubernetes must find a way to manage the critical application data they're working with, which is made challenging by the ephemeral nature of containers. Operators need to figure out what type of storage to use and how to make it available to Kubernetes clusters. But as more applications are refactored or implemented with containers and microservices architecture, configuring different types of storage with Kubernetes can become a roadblock.

Nutanix has a solution for that. Every Nutanix® Karbon cluster is deployed with its full-featured container storage interface (CSI) driver, which natively integrates with Nutanix Volumes and Nutanix Files to easily provide persistent storage for applications. And Nutanix supports persistent Read-Write-Once and Read-Write-Many access modes, with S3-compatible storage options via Nutanix Objects—so storage can be adjusted based on enterprise needs.

Kubernetes is complex and evolves quickly

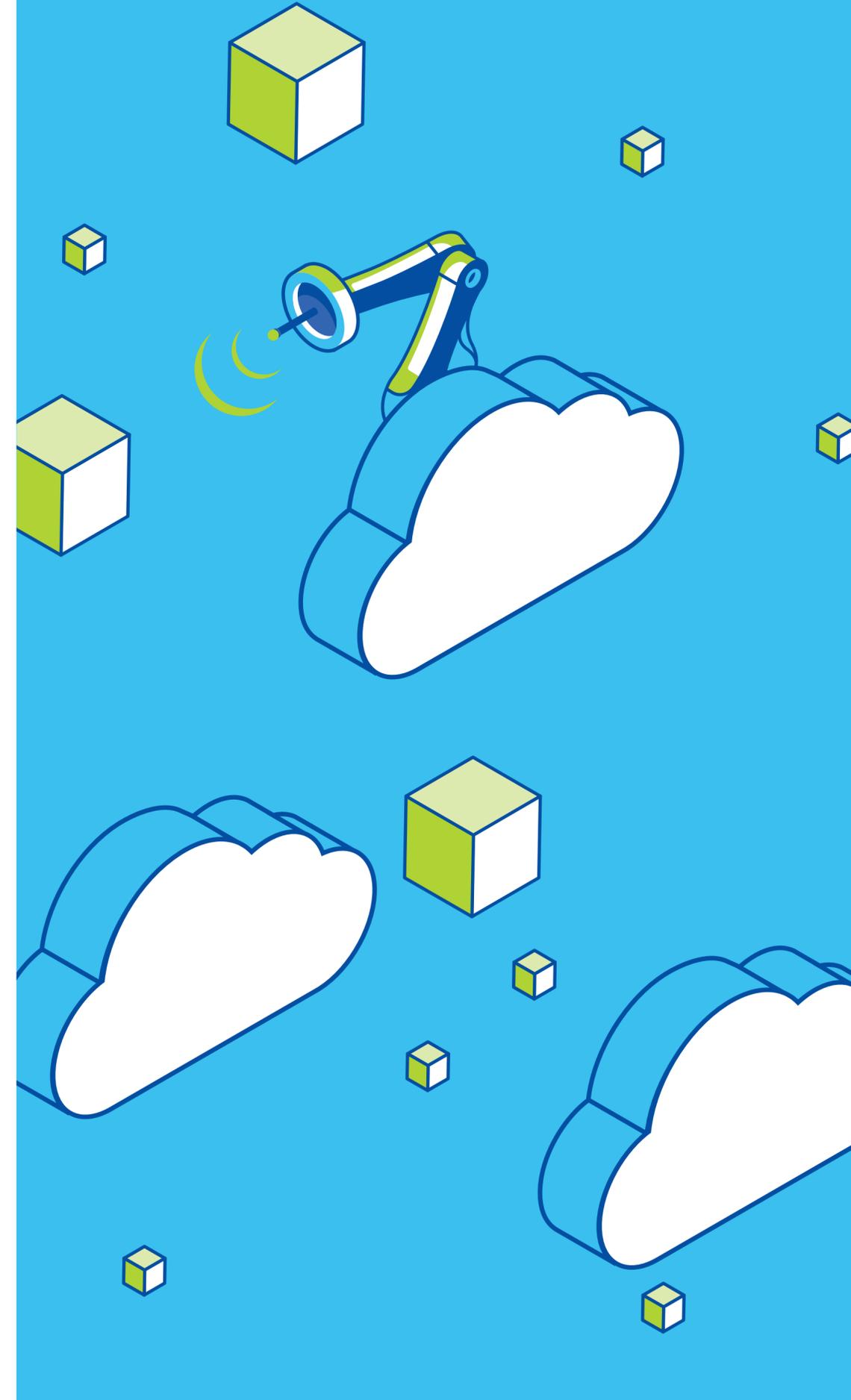
With an average of four major releases every year, Kubernetes and its ecosystem of technologies are quickly evolving. While this creates a lot of choice and options for enterprises running container-based environments, keeping up with the networking, storage, and cloud native services needs of developers is time-consuming.

With Nutanix, it's possible to streamline node operating system patching and upgrade to the latest version of Kubernetes with no disruption to production applications. Nutanix Karbon clusters are automatically configured and deployed for high availability through a simplified workflow—with or without an external load balancer.

Organizations struggle to build and optimize hybrid cloud Kubernetes

Running cloud native applications in hybrid or multicloud Kubernetes environments requires the right tools and infrastructure, and may come with high overhead costs.

Kubernetes enables application portability—making it possible to move applications across environments like public, private, and hybrid clouds, as well as ROBO and edge locations, without modification. Through partnerships with major public cloud providers, Nutanix makes it simple and seamless to extend public cloud Kubernetes platforms to on-prem datacenters.

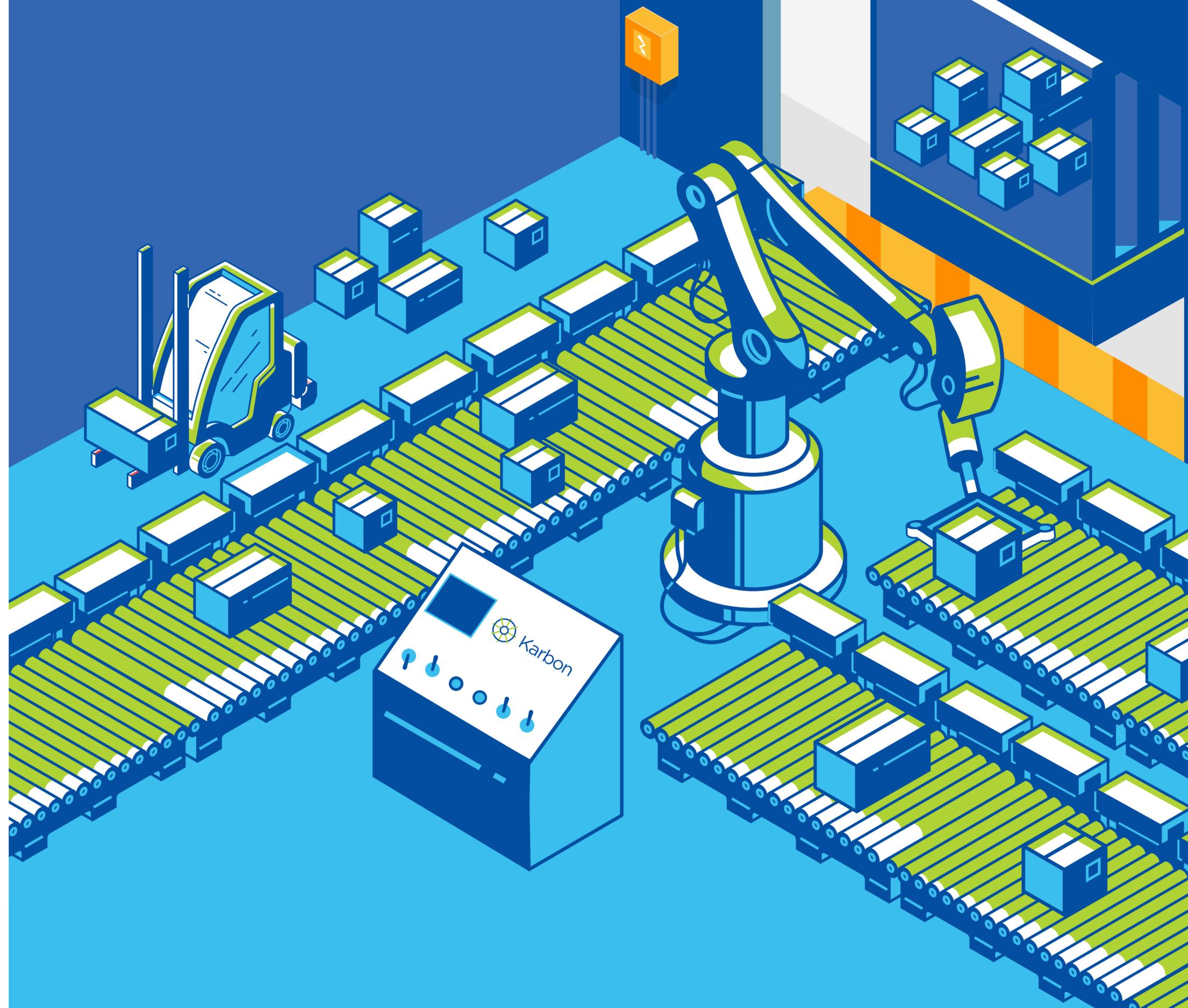


The Kubernetes solutions you choose need to be easily manageable

Karbon clusters, a foundational component of Nutanix's Cloud Native Platform, is an enterprise Kubernetes management solution that dramatically simplifies provisioning, operations, and lifecycle management of Kubernetes.

- Deploy production-ready, multi-master Kubernetes clusters in only a few clicks
- Easily configure persistent storage with Nutanix's full-featured CSI driver
- Seamlessly scale without limit, adding nodes or physical resources in minutes
- Integrate best-in-class open-source tools for cluster monitoring, logging, and alerting
- Get expert full-stack support from a proven vendor

Configuring and managing Kubernetes on-prem comes with its own hurdles, but more companies are finding it necessary in order to provide better solutions for their customers. Nutanix's Karbon takes the complexity out of setting up Kubernetes on-prem, helping organizations achieve simple, one-click deployment, persistent storage, and scalability without headaches.

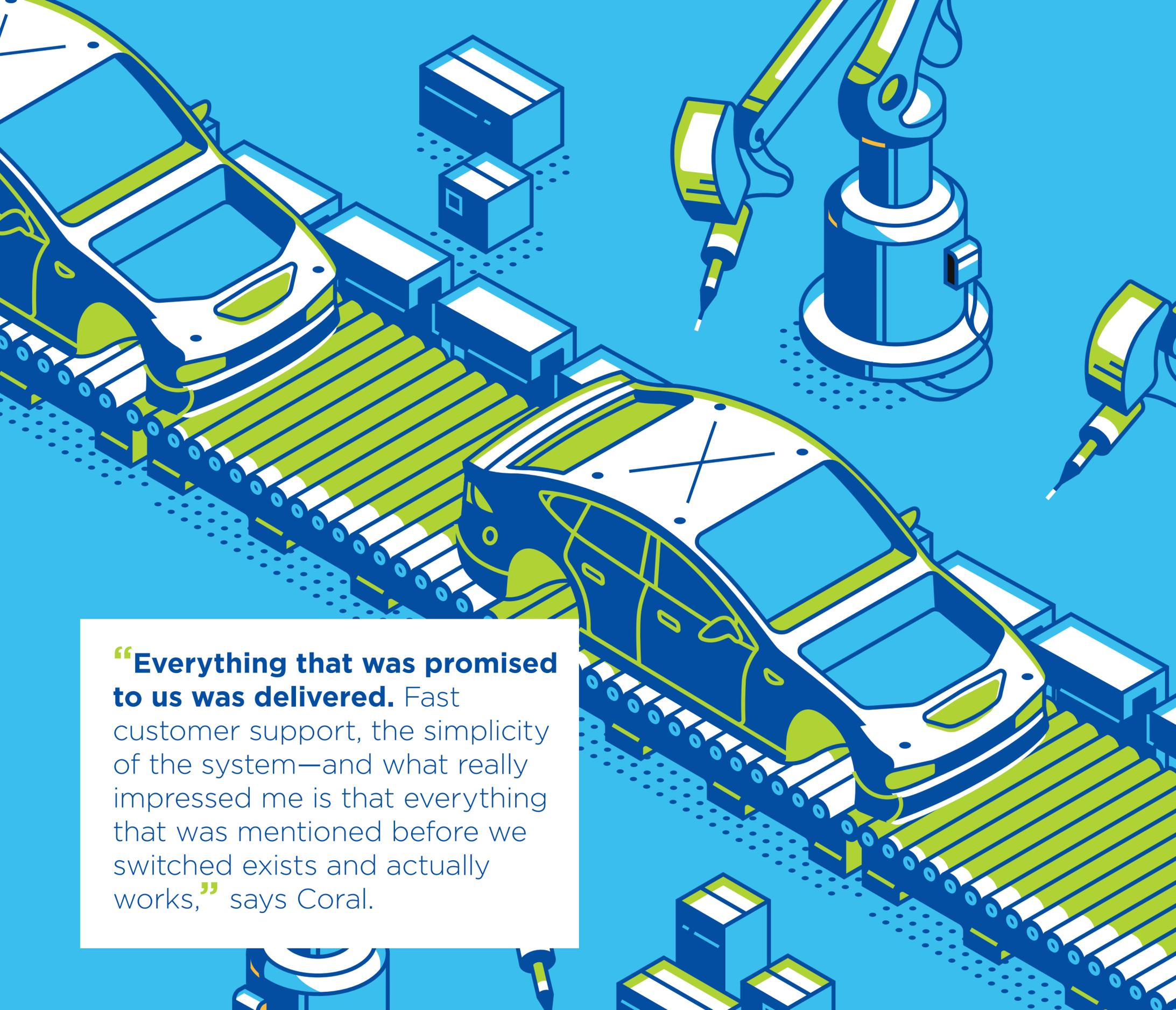


CHAPTER 3:

Nutanix® HCI and Karbon lay the foundation for a cloud native enterprise

Kubernetes and cloud native technologies offer a clear path to faster, more efficient application deployment without the limitations of legacy infrastructure. Many organizations are already well on their way forward on this journey with Nutanix.





“Everything that was promised to us was delivered. Fast customer support, the simplicity of the system—and what really impressed me is that everything that was mentioned before we switched exists and actually works,” says Coral.

Nutanix HCI saves Mercedes-Benz time and effort

Before Nutanix, the Brazilian Mercedes-Benz development team was dependent on a traditional, three-tier legacy environment with a server and SAN storage network. When they saw an opportunity to work with Nutanix HCI, they were hoping it would bring greater efficiency to their IT Ops environment.

“We could see that the environment—not only the applications, but also the infrastructure—was well-developed and offered the simplicity and everything else we needed,” says Aníbal Ulisses Coral, IT Infrastructure Architect at Mercedes-Benz. “We bought nine nodes and set them up to have an availability with two datacenters. Very quickly, we were able to implement Nutanix and have the environment all installed and already working.”

Coral and his team credit Nutanix with helping them overcome cumbersome legacy management issues. “Now that we have Nutanix, troublesome issues in previous environments have been resolved. Some great examples: The installation time of a virtual machine has reduced by 75%, and server reboots only take up to three seconds.”

As Mercedes-Benz continues to innovate, Nutanix is proud to be by their side. According to Leonel Oliveira, Nutanix General Manager in Brazil, “The Mercedes-Benz project is pioneering, a digital leap for new times, and we hope to grow even more.”

Elosi struggled with Kubernetes, but since Nutanix, it's smooth sailing

Elosi is a French IT services organization that was an early adopter of containers and cloud native infrastructure. When they first attempted to use Kubernetes, however, the Elosi development team struggled with the extra tools and complicated code changes it required. Frustrated by the experience, Elosi decided to give Nutanix a try, but it required on-prem services to meet clients' data locality needs.

“With Kubernetes and Karbon, we could understand what was going on, and we could also provide the service and manage it closer to our customers,” says François Delbouve, Director of Operations at Elosi. “We took a week to make [our first cluster] run. On Kubernetes, we had something in half an hour, so it was really a great improvement.”

“Everything is deployed automatically in a **few seconds**—without downtime,” says Delbouve.

Before Nutanix, Elosi struggled with the most common challenges of Kubernetes—networking, storage, and visibility—but the simplicity Nutanix brought to Kubernetes lifecycle management made it a feasible option.

“[DevOps] doesn't have to disturb the IT team with deployment every day, and we can do that with a lot of security, because everything is checked during the pipeline. They can do that with just a few clicks,” Delbouve says.

Nutanix is thrilled to see the value Elosi has received from using Karbon to simplify Kubernetes and encourages like-minded companies to [test-drive Karbon for free](#).

Nutanix's cloud native stack, run on Nutanix HCI and Karbon clusters, frees IT operations from the constraints of legacy architecture—supporting Kubernetes in the best way possible.

In the next chapter, we'll take a closer look at why Nutanix HCI is the best infrastructure for Kubernetes.



CHAPTER 4:

Nutanix HCI is the ideal infrastructure for Kubernetes

A hyperconverged platform provides the foundation upon which organizations can build a robust cloud native enterprise. But Kubernetes has certain requirements that must be considered and, as such, relies on an infrastructure that's well-suited for its needs.



Nutanix HCI: Ideal for Kubernetes, designed for usability

Kubernetes is a dynamic environment where applications need to scale rapidly. With its high availability, near-limitless linear scalability, and easy management, Nutanix HCI is the ideal infrastructure to support dynamic distributed systems like Kubernetes.

No single point of failure

Lifecycle management is one of the greatest challenges facing companies that are implementing Kubernetes and cloud native technologies. By creating redundancies across nodes, Nutanix reduces the risk of any single point of failure, allowing IT to mix nodes and designate them for specific purposes as needed.

Run legacy and cloud native apps simultaneously

Part of the Nutanix cloud native stack can be run on-prem as part of it runs on public cloud providers—enabling enterprises to run both legacy and cloud native apps at the same time, on the same infrastructure. This leads the way for a multicloud architecture that increases responsiveness and flexibility.

Preserve choice in Kubernetes distributions

There are many different distributions of Kubernetes across open-source and commercial categories.

No matter what combination of clouds or Kubernetes distributions an organization requires, the native user experience provided by Nutanix Karbon eases scaling and management while also eliminating lock-in.

Integrate with any hypervisor

Nutanix HCI works with any kind of hypervisor IT may be running. Although there's no need to replace an existing virtualization layer, Acropolis™ (Nutanix's HCI software platform) works within the cloud native stack to ease lifecycle management with visibility for administrators in a user-friendly interface.

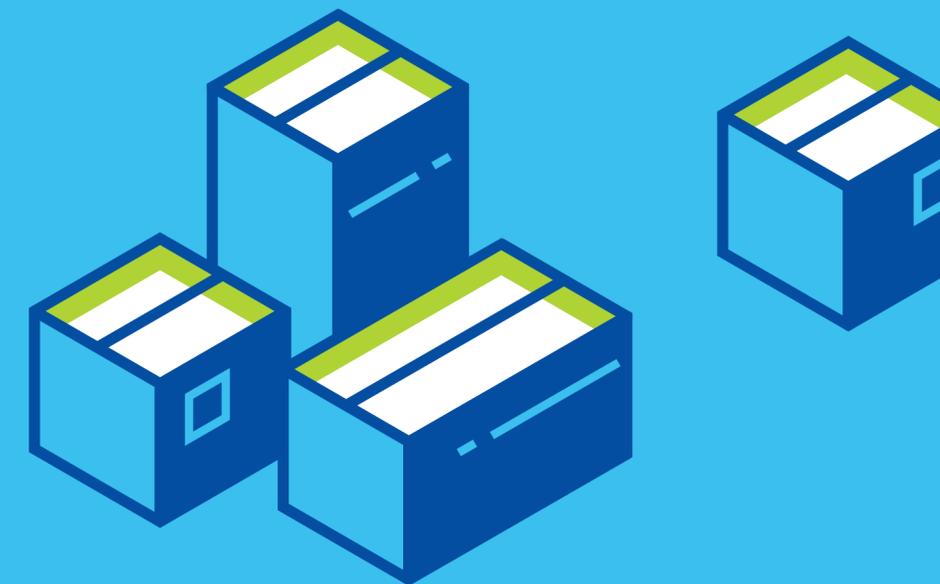
With a zero-trust datacenter model utilizing micro-segmentation, enterprises can use service chaining to increase flexibility without security risk. Nutanix HCI reinforces security by limiting access to other information running in the same datacenter, without ever allowing any application to have full, unrestricted access.

Nutanix HCI and Karbon remove the complexity from infrastructure management while avoiding vendor lock-in—preserving user choice while serving the needs of customers' preferred Kubernetes distributions.

- Run legacy and containerized applications in the same infrastructure
- Provide a native user experience
- Never be limited by a particular distribution
- Easily port across different Kubernetes environments

Avoid the complexity of Kubernetes storage:

- Fully integrated persistent storage solutions
- High-performance S3 storage services
- Unstructured data service for modern applications
- One-click scaling, auto-rebalance, and upgrades



CHAPTER 5:

Simplify Kubernetes with Nutanix HCI and Karbon

Nutanix's cloud native stack—based on HCI and Kubernetes—is ideal for running any Kubernetes distribution and is certified to integrate with major public cloud Kubernetes platforms and services.





Award-winning architecture, built for Kubernetes

Built from technologies that power the world's largest datacenters, Nutanix combines all infrastructure resources into a single stack using best-in-class hyperconvergence software. This provides simplified management for both infrastructure and applications, with scale-out storage, server compute, and zero-trust datacenter security.

“One of the most comprehensive HCI software capabilities²”

Gartner recognizes Nutanix as a Magic Quadrant Leader for Hyperconverged Infrastructure.

“Marching with a vision to serve enterprise IT beyond HCI³”

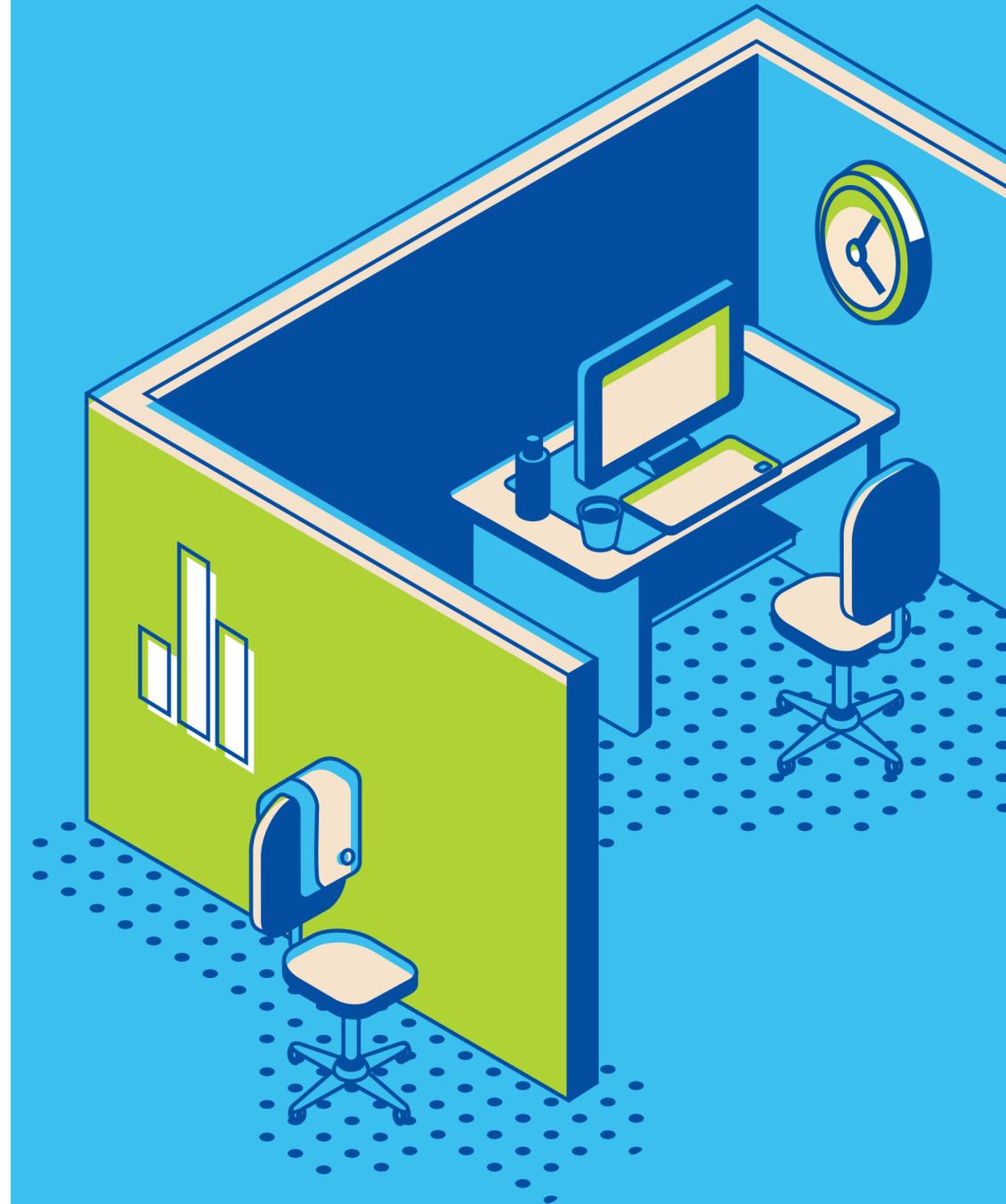
Forrester places Nutanix as a Leader in Hyperconverged Infrastructure.

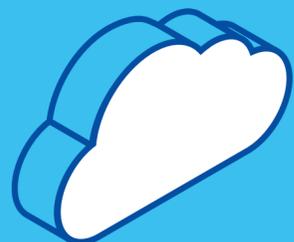
Industry-leading Net Promoter Score of 90+ since 2013

Nutanix HCI and Karbon dramatically simplify Kubernetes lifecycle management:

- Configure and deploy highly available Kubernetes clusters in 15 minutes or less
- Manage workflows with public cloud-like simplicity
- Seamlessly scale the cluster without heavy planning upfront
- Upgrade Kubernetes versions and node operating system versions in a single click, without disruption
- Get expert support across the stack from a single leading vendor
- Operate with a native Kubernetes user experience

Deliver corporate IT operations with the power and intelligence of a software-defined approach





Why Nutanix?

Kubernetes and cloud native technologies can be challenging to configure and use in ways that drive business benefits. To simplify management across the entire lifecycle, you need an infrastructure built for Kubernetes.

Unlike other managed Kubernetes solutions, Nutanix HCI and Karbon enable IT operations to deliver and manage an end-to-end production-ready enterprise Kubernetes environment while preserving a native user experience.

Increase your productivity with Nutanix HCI—the ideal infrastructure for Kubernetes.

Ready to try Nutanix?

Take a Test Drive

NUTANIXTM

