

NUTANIX PRIVATE CLOUD DESIGN GUIDE:

Automation



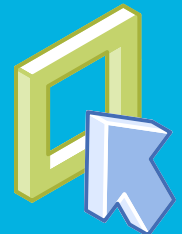
Private Cloud Automation Design Guide

Automate private cloud operations with Nutanix to reduce IT complexity and empower cloud users with one-click resource access.

To deliver on business needs and accelerate digital transformation, enterprises need private cloud infrastructure that offers the simplicity and scalability of public clouds and the security and control of on-premises datacenters. However, many private cloud deployments on traditional IT infrastructure have deficiencies in key areas, resulting in:

- Unexpected high costs and lack of cost control
- Insufficient business continuity
- Cumbersome or brittle automation
- Complex, siloed storage infrastructure

Built on the industry's leading hyperconverged infrastructure (HCI) software, Nutanix private cloud solutions address these limitations and extends easily to encompass hybrid cloud deployments.



Automation is Critical for Private Cloud

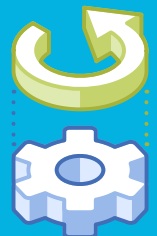
A private cloud provides the versatility of cloud computing while preserving control, efficiency, and security. No matter how good the underlying infrastructure is, your private cloud won't succeed without the right automation. Without cloud automation, IT teams must deploy, manage, and monitor workloads manually, a process that is, unsurprisingly, tedious and slow. Private cloud automation should help IT teams:

- Manage resources
- Set up virtual machine (VM) clusters
- Create virtual networks
- Deploy application workloads
- Enable infrastructure and app self-service for cloud users
- Meet availability and performance SLAs
- Monitor resource usage and plan for growth

The right automation can reduce IT complexity and free IT staff from mundane, repetitive tasks allowing you to focus on more critical, high-value projects.

In a private cloud operating at scale, every routine IT task should be automated. This not only ensures you can accommodate growth, it eliminates the inconsistency and risk created by manual processes.

In addition, developers and business teams need self-service access to private cloud infrastructure and services to accelerate time to market. Empowering end-users with one-click access to IT resources, applications, and common operations like snapshots—all through a single interface—eliminates complexity and roadblocks to productivity.



Nutanix Private Cloud Solutions

By simplifying infrastructure management across the entire lifecycle, automating operations, and enabling self-service, Nutanix helps you create a private cloud that delivers the scalability, availability, and flexibility to enable business success. Nutanix tools automate otherwise laborious manual tasks, increasing the success of your private cloud by delivering all the capabilities necessary to be effective:

- Nutanix Prism manages all infrastructure and virtualization, including single- and multi-cluster management, VM management, storage management, and one-click upgrades.
- Prism's Pro tier enables intelligent IT operations by optimizing capacity and monitoring, resolving anomalies proactively, and automating remediation and operations tasks.
- Calm is a multi-cloud application management framework providing application-level automation and lifecycle management. With Calm, all elements of an infrastructure or application deployment are defined via easily created blueprints. A blueprint is published to the Nutanix Marketplace for consumption by cloud users, instantly transforming a complex service ticket into a one-click request.

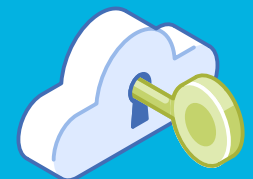
This guide describes the Nutanix tools that enable you to streamline private cloud automation for better results and provides some guidelines for setting priorities and choosing tools.

Prism has three tiers:

- **Starter.** Always included; provides single and multi-cluster infrastructure management and one-click upgrades
- **Pro.** Codeless automation, capacity planning; ML-driven anomaly detection
- **Ultimate.** Auto KPI management; application insights, cost metering and chargeback. (Available in AOS version 5.18 and later)

Find Out More:

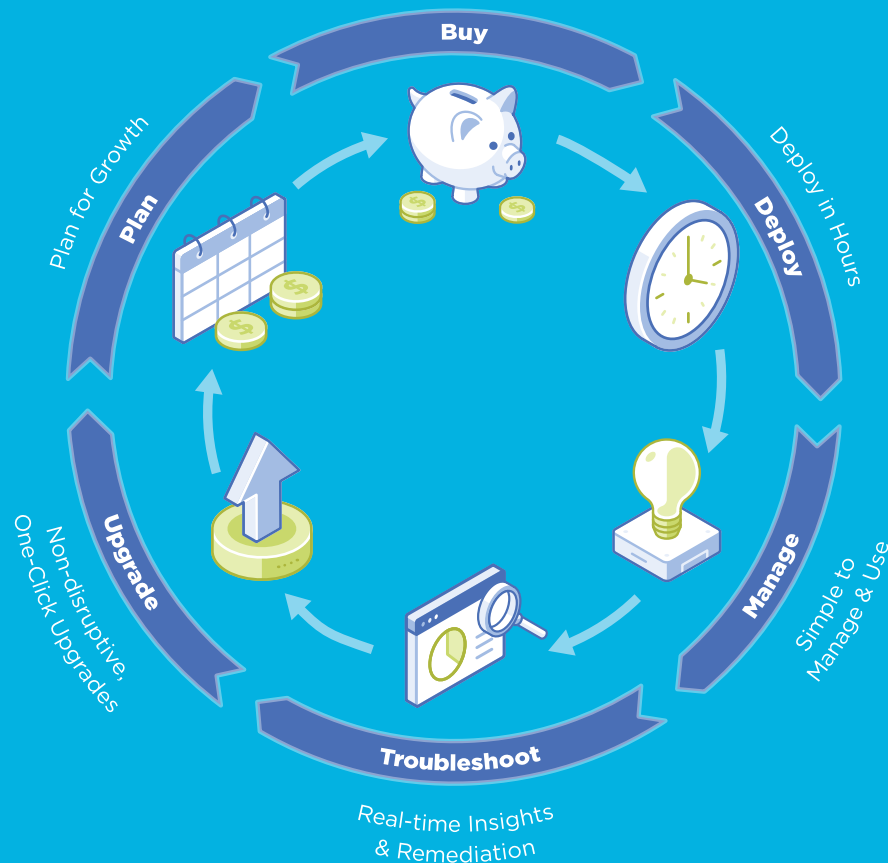
- [Nutanix Private Cloud Solutions](#)
- [Private Cloud Demo](#) (video)



Automating IT Operations

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

Streamline IT activities across your private cloud. Intelligent, one-click operations take the pain and effort out of daily activities, including installs, upgrades, and workload placement.



IT Infrastructure Management

Efficient infrastructure management is essential for teams operating a private cloud at scale. [Nutanix Prism](#) brings one-click simplicity to private cloud, enabling you to manage compute, networking, and storage needs from a single console. Prism sets the standard for one-click management.

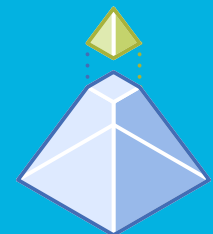
- One-Click Cluster management gives you the ability to deploy clusters in minutes with full control via virtual networking, network visualization, and one-click nondisruptive software and firmware upgrades.
- One-Click VM and container management simplifies workflows throughout the entire VM life cycle, from creation and initial placement, to IP network configuration, to protection and migration. Resource scheduling dynamically balances load across a cluster for optimal performance
- One-Click Storage management provides intuitive workflows for all administrative tasks related to block, file, and object storage deployment, management, scaling, data protection, and disaster recovery.

Nutanix Prism Pro Tier Delivers Capacity Planning, Automated Optimization, and Task Automation

Prism Pro is the Intelligent Automation tier of Prism. It enhances the quality and efficiency of IT operations for your private cloud. The Pro tier lets you intelligently optimize capacity, proactively detect performance anomalies, and automate operations tasks with ease and confidence.

Capacity Planning. The Prism Pro tier includes a powerful application and capacity forecasting, planning, and optimization engine for large-scale private cloud operations:

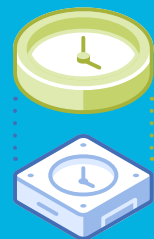
- **Capacity Behavior Analytics.** Predictive analysis of capacity usage and trends based on workload behavior, enabling pay-as-you-grow scaling.
- **Capacity Optimization.** Inefficiency detection in resource usage and automated optimization of VM sizing based on VM behavioral analysis.
- **Just-in-Time Forecast.** Capacity expansion forecasts to satisfy future workload growth.



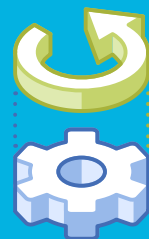
Automated Resource Optimization. Prism Pro tier functionality learns the real-time performance behavior of VMs, detects anomalies automatically, and enables the IT team to automate remediation.

- **Anomaly Detection.** Predictive monitoring based on behavioral analysis to generate actionable signals and provide early warnings.
- **Bottleneck Detection.** Intelligent detection of VM performance bottleneck using machine learning.
- **Remediation.** IT teams can create playbooks for common remediation or troubleshooting steps. Playbooks can be triggered automatically based on alert policies.

Operational task automation. The Prism Pro tier includes a code-free, visual approach to task automation, enabling any administrator to build, maintain, and troubleshoot automations. Common admin tasks, like adjusting resources allocated to a VM in response to a constraint, are easily automated. Even the most complex, multi-step procedures can be turned into one-click operations.



Set a Trigger



Define Actions



Save and enable

What is capacity planning?

- Detailed capacity forecast
- Scenario based analysis
- One-click recommendations
- Ready-to-present reports
- Powered by X-FIT machine learning engine

Benefits:

- Early shortage warnings
- Eliminates guesswork and waste
- Enables pay-as-you-grow

What is resource optimization?

- Automated learning of VM behavior powered by X-FIT
- Detection of behavior anomalies

Benefits:

- Early performance warnings
- Reduces admin overhead by eliminating alert storms

What is task automation?

- Links an intelligent signal to automated actions
- Powered by X-PLAY playbooks for codeless task automation
- Perform one-click upgrades to hundreds of clusters without disruption

Benefits:

- Smart automation for at-scale operation
- Reduces admin overhead by eliminating alert storms
- Integrates with ServiceNow

Enable autonomous IT

Nutanix X-FIT detects performance anomalies and identifies inefficiencies, triggering X-PLAY *Playbooks*. Simple but powerful approaches like this allow your operations to evolve from manual tasks and written procedures to autonomous IT operations.



Application Management

To deliver on their full promise, private clouds also need to streamline application and service provisioning and simplify lifecycle management.

Nutanix Calm is a multicloud application management framework. Calm provides application automation and lifecycle management integrated with the Nutanix platform:

- **Improve IT agility and eliminate human errors.** Simplify the set-up and management of custom enterprise applications by incorporating all elements of each app— including relevant VMs, configurations, and related binaries—into an easy-to-use blueprint managed by the infrastructure team.
- **Application development and modernization.** Combined with Nutanix Karbon or your choice of certified Kubernetes, Calm provides the tools required to modernize applications without losing control of policy.
- **Automated self-service with centralized control.** Empower cloud users across different groups in your organization to provision and manage their own applications.

Calm, automates all aspects of how applications are created, consumed and governed across the infrastructure stack, integrating application-level orchestration with your private cloud infrastructure.

Calm offers a way to model applications using a logical and visual construct. Blueprints capture all elements of each application, including VMs, related binaries, sequences of operations, and configurations—everything needed to provision an application.

In addition to the visual interface, blueprints can also be created in code using a Python-based domain-specific language (DSL), satisfying the needs of users familiar with infrastructure-as-code (IaC) and addressing the most complex scenarios. IaC also enables teams to take advantage of version control; blueprints can be seamlessly converted from one form to the other for different user needs.

Calm's application blueprints span multiple teams and IT disciplines, capturing the latest organizational knowledge so that best practices can be shared and institutionalized. When blueprints are launched, Calm initiates the provisioning process by automating the steps needed for deployment and ensures reliable execution by taking into account the entire application, including the latest binaries and configuration details.

IT managers can utilize pre-integrated blueprints from Nutanix and a variety of partners to simplify the set-up of popular applications.

[Calm Runbooks](#) help orchestrate automation tasks across infrastructure and applications in a hybrid cloud infrastructure. Runbooks provides users an easily scalable way to orchestrate tasks outside the lifecycle management enabled by Calm blueprints. Runbooks simplify lifecycle management across hundreds of application instances or shared resources.

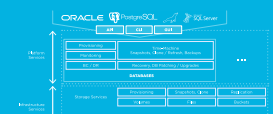
Database Management

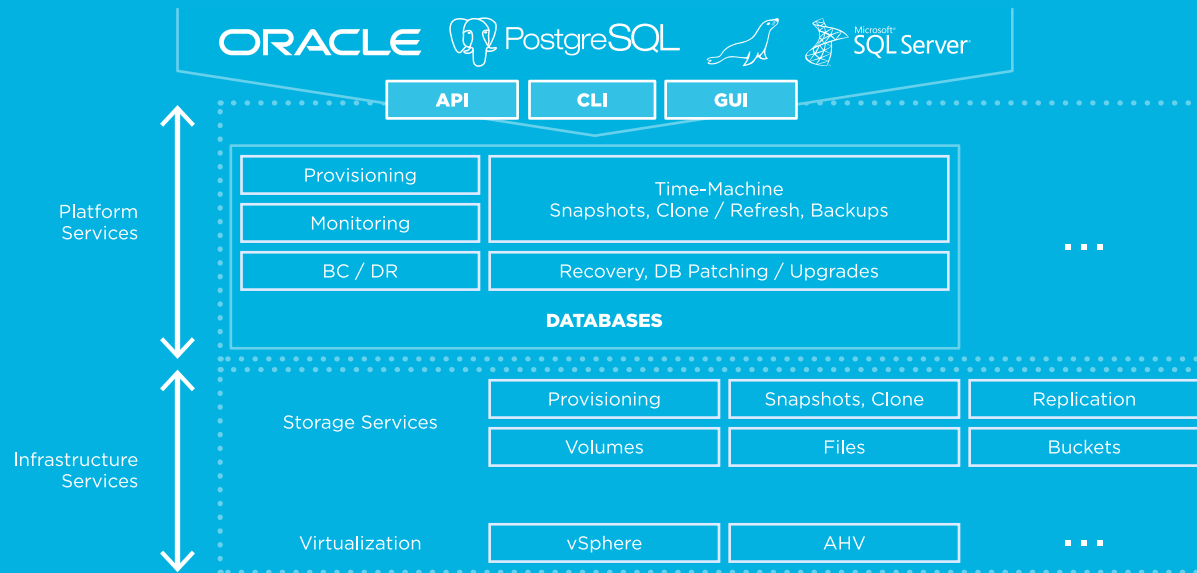
Database complexity hurts your business. Hard to maintain SLAs require specialized IT resources and careful attention to manually applied best practices. Slow database spin-up times, time-consuming recoveries, and complex lifecycle management decrease business agility; maintaining dozens or hundreds of database copies increases costs.

Many organizations are moving to a database as a service (DBaaS) model for managing and operating databases. DBaaS is efficient, agile, cost-effective, and scalable. Nutanix Era makes a Nutanix private cloud the ideal database platform. Era automates and simplifies database administration, bringing one-click simplicity and invisible operations to database provisioning and lifecycle management.

Nutanix Era enables your company to provision new databases, clone existing databases to any point in time, and refresh clones as needed with minimal effort. The Nutanix Era architecture integrates with your preferred tools, and every operation is fully audited. Role-based access control (RBAC) allows you to grant access to a subset of Era features to allow developers and others to accomplish specific tasks.

You can also create Era-focused Calm blueprints, which developers and other cloud users can use to provision or clone Era-managed databases via self-service.





Key Era capabilities include:

- **One-Click Provisioning.** Create a standardized catalog of database services with uniform compute, network, and database parameter sizing. Era makes databases cloud-ready, enables mobility, and offers the ability to create instant clone copies.
- **One-Click Backup.** Back up any size database in a full, database-consistent manner in just minutes with space and time-efficient database snapshots and one-click database snapshots.
- **One-Click Patching.** Streamline software maintenance with immediate or scheduled updates for all provisioned database instances.
- **Copy Data Management.** Capture all database states for any given service-level agreement (SLA). Create fully functional database copies, and quickly refresh existing copies.

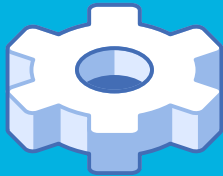
Era drives efficiency, agility, cost-effectiveness, and scalability and provides full support for different production and dev/test use cases.

Delivering Self-Service

Once you've reduced the complexity of infrastructure and application management in your private cloud, the next step is to deliver the full benefits to your community of cloud users. Nutanix improves the efficiency of your private cloud with self-service for infrastructure and applications and complete integration with development pipelines, enabling IT-as-a-Service (ITaaS).

Improve cloud-user satisfaction and the efficiency of your IT operations with meaningful automation, ITaaS, and integration with development pipelines.

Consumer-grade ITaaS powered by Intelligent Automation



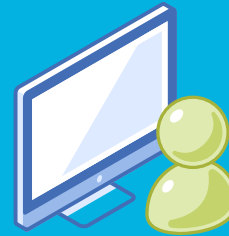
Efficient Resource Utilization
Automated Optimization



Better Service Quality
Proactive Operations



Higher Operations Productivity
Operational Automation



On-Demand Access
Self-Service Delivery

Find Out More:

- [Nutanix Prism](#)
- [Nutanix Calm](#)
- [Nutanix Era](#)
- [Automate app management \(blog\)](#)
- [Calm 3.0 is Here! \(blog\)](#)

Self-Service with Calm

Private cloud customers, such as developers and business teams, need self-service access to infrastructure and services to accelerate time to market. With Nutanix Calm, you can create blueprints for the infrastructure and application services your users need and publish them to an internal marketplace or add them to the growing collection of pre-integrated, validated blueprints on the Nutanix Marketplace. Your application owners and developers can then request IT services from the marketplace whenever needed.

Calm offers several advantages for your IT team and cloud users:

- Calm blueprints can be created for both simple infrastructure services—such as a VM running a particular OS—and more complex application deployments.
- Calm blueprints incorporate your team's best practices including security and data protection policies, ensuring they aren't overlooked.
- Once a user launches a Calm blueprint and receives the application, the user has direct access to a variety of lifecycle tasks such as scaling the application up or down, upgrading software, and other capabilities. This gives users greater control and offloads these tasks from IT.
- Many IT organizations have datacenter and cloud operations. Calm blueprints are inherently multi-cloud. You can give users the option of launching a service in a private or public cloud.
- Calm integrates with ITSM providers such as ServiceNow. Users who are familiar and comfortable with chosen ITSM tool can access Calm blueprints from its service catalog.



Streamlined Development and DevOps

Nutanix eliminates the complexity of test and development automation, allowing developers and administrators to work more efficiently. A Nutanix Calm blueprint can deploy a custom CI/CD pipeline and/or custom developer workspaces. Developers can directly deploy and maintain a CI/CD pipeline with continuous application deployment across multiple on-premises and cloud locations.

Calm offers a number of additional capabilities to streamline the work of development teams:

- Support for VM and container-based deployments
- Ability to deploy fully functioning Kubernetes clusters, on-premises or in the cloud
- Visual and coding tools for blueprint creation to support the needs and capabilities of diverse users

Find Out More:

- [Nutanix Calm](#)
- [Nutanix Era](#)
- [CI/CD Pipeline with Calm \(video\)](#)
- [Containerized App Deployment on Kubernetes \(video\)](#)



Simplify Automation with Nutanix Private Cloud Solutions

The Nutanix private cloud solution is uniquely suited to meet your company's needs. Because Nutanix brings one click simplicity to almost every aspect of IT operations and enables self-service for cloud users, Nutanix helps you create a private cloud that delivers the efficiency, flexibility, and agility your organization needs.

To begin designing and automating your private cloud you can start by answering a few simple questions:

- What are the largest money sinks in your IT department?
- What are your largest IT management pain points?
- Do your IT teams spend too much time:
 - Managing cloud resources?
 - Setting up virtual machine (VM) clusters?
 - Creating and managing virtual networks?
 - Deploying and managing application workloads?
 - Staying on top of availability and performance?
- If your IT team wasn't tied up performing routine tasks and fighting fires, what could they be doing?
- What's the average wait time for resolution of a user service ticket?
- What infrastructure and/or application services do users request the most?
- What new services would help your company catalyze innovation?



Using the information discussed in this guide, you can begin thinking about and planning a private cloud that meets these needs. Use the links provided in each section to dig deeper into specific topics.

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](https://twitter.com/nutanix), or send us a request at www.nutanix.com/demo to set up your own customized briefing.

Take a Test Drive

You can [take a test drive](#) of Nutanix infrastructure with no hardware, setup, or cost. Experience the simplicity and agility of public cloud combined with on premises performance, security, and control via an easy-to-follow guided tour.

Test Drive

Private Cloud Design Guides in this Series:

- [Security](#)
- [Business Continuity](#)
- [Cost Governance](#)
- [Storage Consolidation](#)

