

# Automation: The Key to a Successful Hybrid Cloud

## Introduction

As organizations examine their options for the cloud, many are selecting a hybrid cloud architecture. This decision is typically made as there are advantages that both the private and public cloud bring to the table. But as the adoption of hybrid cloud increases, organizations are also discovering the complexities that come along with that decision due to the need to manage both private and public clouds as a cohesive entity.

In order to achieve the benefits of a hybrid cloud, organizations must:

- Be able to quickly scale infrastructure resources
- Address the governance of both private and public clouds
- Manage where application workloads are placed and be prepared to move workloads between private and public as needed
- Provide a configuration management solution that works in both clouds to ensure consistency
- Develop and execute IT process runbooks for both clouds so that there is commonality of support across both clouds

Organizations that have embraced a DevOps mentality must also be ready to templatize deployments into code for both private and public clouds.

While you could address these items through manual processes, it would be challenging to do this at any significant scale. This is where automation makes a sizable impact. Automation is a critical tool organizations must wield if they are to be successful in realizing the benefits of the hybrid cloud.

This whitepaper examines how hybrid cloud has evolved and why automation is key to maximizing the potential of hybrid cloud.

## Public cloud adoption

As is common with new technologies, we've seen a pendulum-type swing with the adoption of public cloud. Adoption was slow and steady at first. It peaked during a phase of "over-adoption," everyone getting on the bandwagon. Now, we're entering a phase of normalization wherein the reality of how to best utilize public cloud has been better defined. As the availability of public cloud continues to increase, organizations are embracing it for a variety of reasons including:



Improved availability and regional presence in places where data centers do not exist today



Cloud elasticity, or the ability to quickly spin up and release resources as needed



Financial reasons, where an OpEx/pay-as-you-go model makes sense for the organization



Availability of platforms/solutions not present in the data center today (e.g. Artificial Intelligence/ Machine Learning, analytics platforms for processing large data sets, etc.)

While these are all good motivators for why public cloud can be a game-changer for an organization, adoption of the public cloud can also create problems. This typically occurs when solutions are moved to public cloud without clearly understanding the best use cases for this type of platform. Additionally, many organizations are not ready for the challenges that public cloud can present that are unique from those experienced when managing a legacy data center.

## Growth of hyperconverged private clouds

Better understanding that public clouds are not always the answer has led organizations toward the deployment of private clouds, which are cloud-like environments that operate within a company's own data center. In tandem, hyperconverged infrastructure (HCI) has provided a level of flexibility and growth acceleration in the private data center similar to the agility found in public clouds. The global HCI market is expected to grow at a Compound Annual Growth Rate (CAGR) of 32.9% over the next four years, from \$4.1 billion in 2018 to \$17.1 billion by 2023.<sup>1</sup>

In the past, a traditional data center environment did not have the flexibility of the public cloud and would be provisioned with separate stacks of compute, storage, and network. This legacy methodology was expensive and required many months of meetings, procurement, and resources to build. This led us to the advent of HCI, where compute, network, and storage became a consolidated and software-managed set of resources. The benefits of HCI include:



### Flexibility in design and growth

Because of the software-defined architecture of HCI, clusters are designed to scale out with ease, similar to the public cloud. Expansion of additional compute and storage is done in a fraction of the time it would take in a converged or traditional data center environment, and without any system downtime.



### Lower Total Cost of Ownership (TCO)

The cost of operating and owning an HCI system is much lower when compared to traditional and converged systems. Instead of paying the salary of a high-priced storage and network engineer or team of engineers that only know one product or technology, businesses can employ virtualization engineers that know how to manage all aspects of an HCI environment with the tools included within the HCI system. The time savings in planning, design, and deployment, alone, are astronomical when compared with legacy data center systems. The management capabilities of HCI systems also enable ease of use and allow companies to administer and perform maintenance from a single management tool.

## The primary use cases for HCI in the private cloud are:

- **Server virtualization and Virtual Desktop Infrastructure (VDI)** — Use of HCI in the core data center for virtualization can significantly reduce the physical footprint of infrastructure while providing greater density of resources at the application and user levels.
- **Containers** — Container technology, while already available in public cloud, is starting to gain traction in the private cloud as businesses look to decouple services and make them more portable for use across applications.
- **Remote branch office/edge** — HCI gives remote locations the option of a small-footprint, on-premises solution without the typical operating and maintenance costs of a traditional data center or the need for localized resources.

HCI is not without its challenges though. It is important to look at available HCI vendor offerings to determine which is the best fit for your environment. Depending on the vendor, it may or may not easily integrate with your existing systems and management plane. There are also limitations to consider, as some HCI hardware platforms are designed to only run a specific hypervisor. Additionally, if you are considering an HCI platform for an application with specific performance requirements, many vendors have validated designs that have already been proven and approved by the application vendor.

## Evolution of the hybrid cloud

Similar to public clouds, only utilizing an HCI-enabled private cloud is also not often the best option. Enter hybrid cloud, combining both public and private clouds together. Hybrid cloud can be viewed as the pendulum swinging back toward center, basically right-sizing your usage of both public and private clouds. This hybrid strategy has resonated with organizations. According to the RightScale 2019 State of the Cloud Report from Flexera, of the 786 professionals interviewed, 58% of organizations in 2019 have a hybrid cloud strategy, while the number of organizations with either public or private clouds, only, is declining.<sup>2</sup>

The trick with hybrid cloud is understanding the best way to co-exist in both environments and then manage that co-existence. **Two common adoption methodologies used are either creating a distributed architecture or using the public cloud as a Disaster Recovery as a Service (DRaaS) solution.**



The **distributed model** is when a multiple component application is implemented in both the private and public clouds. One example of this would be big data/analytics processing. In this architecture, data creation/capture occurs in the private cloud environment but is then moved into the public cloud for data warehousing and analysis.



With the **DRaaS architecture**, production application instances remain in the private cloud, with constant replication of the environment into the public cloud in the case of a private cloud outage.

Cloud bursting is another possible hybrid cloud architecture. In this situation, applications are maintained in the private cloud under normal situations. But when planned or unexpected demand on applications occurs, a portion of that load is shifted to the public cloud to leverage the elastic benefits that public cloud provides.

So, do you simply create a hybrid cloud by adopting one of these architectures, owning assets in both public and private clouds? Not really. While you could do this, all you end up with is two environments that are managed separately.

What you really need is a common platform for management, orchestration, and automation that allows you to operate two or more clouds as a single entity. A common management platform can be achieved by having a similar or common API in both the public and private clouds. One example of this is Microsoft® Azure® as a public cloud and Microsoft Azure Stack Hub as a private cloud solution. The recently announced Microsoft Azure Arc provides a solution for common management/policy of not just Azure resources, but AWS® and on-premises resources as well. Additionally, HCI vendors are integrating more closely with some of the biggest public cloud environments. This integration gives businesses the ability to move things into the public cloud and back to private cloud as workloads change. It also provides a mechanism for disaster recovery and data protection. But the key to getting hybrid cloud running efficiently is automation.

## Automating the hybrid cloud

While individually, most private cloud/HCI and public cloud solutions have their own automation platforms and many third-party and open source automation tools to integrate with them, there is still a gap in what is easily delivered out-of-the-box and what truly secures value in a hybrid cloud solution. Many challenges still exist in taking a hybrid cloud solution from inception to reality. These challenges are brought on by questions IT managers should be asking themselves, such as:



How can I achieve a better ROI from my hybrid cloud solution?



How do I integrate cloud with existing processes and policies?



How do I ensure governance and compliance across all of my clouds?



How do I present cloud resources and services to my end users? In a timely manner?



How do I manage cloud resources over time so that legacy problems like data center sprawl don't spread to the cloud?



How do I give IT resources to my developers and allow those resources to be incorporated into development cycles?

Addressing these questions, overcoming the challenges, and increasing ROI can largely be achieved with automation. Layered automation can help take a hybrid cloud from design to implementation and configuration. Automation can further be used to integrate new clouds with existing technologies, provide a mechanism for transformation from legacy environments while incorporating operational and support processes, and offer cloud management capabilities to end users while still providing visibility, proactive monitoring, resource management, security, and cost control.

Various types of automation are suited to bridging the gap in a hybrid cloud solution:



### Initial deployment automation

For greenfield data centers (built from the ground up) and expanding brownfield data centers (those being upgraded or modernized), one of the first areas where value can be added is in the automation of the infrastructure deployment. While many vendors have their own automation tool sets for buildouts, rarely is this enough. And understanding which pieces should do the work in the correct order can be a daunting task for IT managers. A well-led and automated initial deployment can eliminate technology silos by asking the right questions upfront, decrease the time to delivery, and improve the integration of on- and off-premises data centers.

Standing up networking, storage, compute, firewall, and load-balancing across multiple regions can be shortened from months (or years) to weeks. Approaching greenfield deployments with a "cloud-in-a-box" style delivery can be especially effective and lends itself well to another valuable automation capability: configuration management.



### Configuration management via desired state configuration

Having a well-designed Configuration Management (CM) system in place is nothing new to IT, however, it still remains one of the more difficult models to implement. In terms of automation, initial implementations can easily incorporate desired state configuration concepts to validate, change, and control configuration drift. Significant ROI can be measured in the savings that is gained in the automation of operational support, security, and audit compliance. Desired state tools can further be integrated with DevOps concepts to support the delivery of Infrastructure as Code (IaC) and a Software-Defined Data Center (SDDC).



### Process automation/Runbook automation

One of the simplest and highest-value entry points into hybrid cloud solutions is IT process automation, also known as runbook automation. In simplest terms, the automation of existing manual IT processes by way of workflow automation tools can generate immediate ROI in cloud and traditional data center environments. IT process automation can also help introduce automation into legacy infrastructure in preparation for migration or transition to the cloud.

High-value targets for process automation include: provisioning, software packaging/patching, configuration management, compliance, monitoring, and disaster recovery.



### Cloud management and brokering

Some of the largest challenges in hybrid cloud implementations can be addressed through automation driven through Cloud Management Platforms (CMPs) and cloud brokering solutions.

CMPs improve the management of cloud services by enabling:

- Service request management
- Provisioning and orchestration
- Monitoring and analytics
- Inventory and classification
- Cost management and resource optimization
- Cloud migration, backup, and disaster recovery
- Identity, security, and compliance

On the front end, CMPs provide self-service capabilities and automated delivery of IT services to provide infrastructure, network, storage, middleware, and software solutions in private and hybrid environments. While self-service catalogs are not new to public clouds, a consistent, front-end abstraction of business rules and intelligence, pricing, and centralized control of end users across private and public clouds can be extremely valuable for IT teams.

On the back end, CMPs provide a framework for the design of multitiered service offerings by integrating workflows with lifecycle management, resource management (reservation and reclamation), and error handling and validation. CMPs can help bridge the gap in multi/hybrid cloud solutions by providing automated integration with internal company asset management, configuration management, change management, monitoring, disaster recovery, showback/chargeback, and other service management, ITIL, and corporate compliance systems.



### IaC/SDDC with DevOps

By embracing principles that traditionally have been reserved for software development, DevOps and other Continuous Integration (CI)/Continuous Development (CD) (CI/CD) models allow automation to take a software-defined approach to infrastructure deployments, management, and configuration. IaC and immutable infrastructure enable multi/hybrid cloud solutions to be managed in source control, and built, tested, and promoted through development, staging/QA, and production environments. Testing suites can be incorporated to find "bugs" early, before infrastructure changes need to be made. Reaching this level of automation can lead to higher-quality outcomes in a hybrid cloud solution by finding problems in build and test phases, before they have a chance to reach production. Similarly, automation is valuable in virtualized and containerized environments, where infrastructure deployments are quick, and resources are commoditized.

## Summary

Hybrid cloud can support organizations on the path to digital transformation, enabling business change and innovation in service delivery at a customizable pace. The right architecture and a management methodology that spans all clouds and on-premises infrastructure are critical. But, the most value from hybrid cloud can be obtained through automation, applied from deployment through continual improvements.

Taking action in any of these areas is a complex endeavor best led by those with ample experience. Insight Cloud + Data Center Transformation (CDCT) can assist you with constructing your own hybrid cloud environment and utilizing automation to manage it. We can help you evaluate options for private cloud, HCI and converged infrastructure, public cloud, and automation, and how each may work synergistically to aid your organization and its objectives.

### Further reading and recommended resources:

- Video: [6 Big Changes in IT — Know Them and use Them to Your Advantage](#)
- Webinar: [How to use Ansible to Automate Your Infrastructure](#)
- Whitepaper: ["Master Your Environment: 6 Key Changes in IT and How to Use Them to Your Advantage"](#)
- Whitepaper: ["7 Core Practices to Achieve Data Center Modernization"](#)
- Whitepaper: ["Migrate to the Cloud Securely: 10 Key Factors"](#)

## Meaningful solutions driving business outcomes

We help our clients modernize and secure critical platforms to transform IT. We believe data is a key driver, hybrid models are accelerators, and secure networks are well integrated. Our end-to-end services empower companies to effectively leverage technology solutions to overcome challenges, support growth and innovation, reduce risk, and transform the business.

Learn more at:  
[insightCDCT.com](https://insightCDCT.com) | [insight.com](https://insight.com)

1. MarketsandMarkets. (January 2019). Hyper-Converged Infrastructure Market by Component, Application, Organization Size, Vertical and Region – Global Forecast to 2023.
2. RightScale from Flexera. (2019). RightScale 2019 State of the Cloud Report from Flexera.

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