THE ESSENTIAL GUIDE TO

Enterprise Cloud

Contents

Is your head in the cloud?

Ever had an elementary school teacher accuse you of having your head in the clouds? It's a phrase associated with someone who's unfocused ... an impractical dreamer.

Today though—with so much emphasis on cloud initiatives—if your co-worker will to tell you that you had your head in the clouds, well you might take it as a complement.

But the more cloud becomes part of conference room conversations, the more its meaning is stretched. It seems every vendor is promising cloud benefits and every new data center project is pursued in the name of cloud.

That's why it's important to reset sometimes, to agree on definitions, deployments and practical use cases. Regardless of your motivations to cloud—long-time builder or relative newcomer—we will use the Essential Guide to get on the same page.

Is your head in the clouds? Good. Then dig in.

Defining cloud models

Cumulus, cirrus, public, private, hybrid, enterprise, multi … there are MANY types of clouds. So, when you're talking about cloud, it's important to be clear what defines each of these models. Here's a quick layman's explanation of each:

PUBLIC

A service provider makes resources, such as compute and storage, available to the public over the internet—either free or in a pay-per-usage model. Amazon Web Services and Azure are the most recognized and dominant public cloud providers, but there is an ecosystem of smaller service providers offering regional, industry-specific or other niche services.

PRIVATE

Unlike public clouds, which deliver services to multiple organizations, a private cloud is dedicated to a single organization. Private cloud can be delivered on-premise or off-premise via a service provider. Now, a lot of organizations might call their data center a private cloud, but unless it's delivering cloud capabilities (outlined in the next section), it's a stretch to call it private cloud—it's more likely a highly virtualized environment.

HYBRID

Hybrid cloud is a combination of public and private cloud—working in concert. To be a hybrid cloud, the public and private footprints must have a degree of integration, with application mobility (the ability to move data and applications) between public and private.

MULTI

Multi cloud also refers to the use of multiple models—some mix of public, private on-premise, private off-premise, etc. The difference between multi and hybrid, is that a multi-cloud model doesn't presume any integration between the various cloud footprints.

ENTERPRISE

Enterprise cloud is the delivery of public cloud capabilities within the control of the enterprise data center. It is distinguished by its design—typically akin to Lego building blocks that can be easily scaled up, reconfigured and torn down according to business need. This design supports the use of web services, such as analytics, automation and self-service.

Enterprise cloud momentum. Of the above cloud models, it can be argued that enterprise cloud has the most momentum. According to IDC, 83% of organizations have moved some compute and storage resources OUT of public cloud in the past 12 months. 3-in-4 of these organizations moved some or all of those resources back on premise. Far and away the top two reasons for this boomerang are (1) lack of predictable performance in public cloud, and (2) unexpectedly high cost of public cloud.

Organizations have a need for public cloud capabilities (as demonstrated by their initial move to public cloud), but with the control of performance and cost only available in their data center. That's the business case for enterprise cloud.

83%

Enterprise cloud pillars. Enterprise cloud also has the benefit of being formally defined by the National Institute of Standards and Technology (NIST). NIST defines the following five essential characteristics of enterprise cloud:

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On-demand self-service: Cloud computing services, such as server time and network storage, can be automatically provisioned without requiring IT support.

Broad network access: Services are available over the network and accessed through standard mechanisms (such as open application programming interfaces, or APIs).

Resource pooling: Computing resources are pooled to serve many customers (multi-tenancy) and demand levels, and are dynamically assigned and reassigned, as needed.

Rapid elasticity: Services can be provisioned and released, in some cases automatically, to scale (up/down and in/out) with demand.

Measured service: Resource usage can be monitored, controlled, optimized, and reported.

You'd be right to think an organization like NIST that defines enterprise cloud would be pretty choosy about the platform they use in their own data center (to deliver their internal enterprise cloud). Can you guess who they depend on? Yep, Tintri.

Beware of cloud washing

When a term like enterprise cloud has so much momentum, you know it's going to be used more widely—often to buoy technologies to which it really does not apply. That's called cloud-washing. Expect to see providers with very traditional technologies trying to attach themselves to cloud. When it comes to enterprise cloud, you can quickly filter out the fakers—just look for the three must-haves for enterprise cloud in the next section.

Three must-haves for enterprise cloud

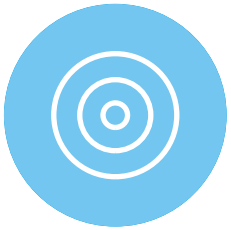
In the previous section, we noted that enterprise cloud has five pillars. What does it take to build those pillars? To answer that we've got to get a little geeky. There are three must-have technical elements to fully realize the pillars—and the potential—of enterprise cloud.

Web services architecture:

An enterprise cloud should be built using building blocks of interchangeable components that can be easily connected together to create a large number of useful web services. This design provides a common platform that allows multiple infrastructure components to communicate with each other. Infrastructure systems built this way can be broken down into multiple component web services, so that each of these services can be automated, deployed, modified, and then redeployed independently, without compromising the operation of the infrastructure.

Comprehensive suite of APIs:

An enterprise cloud should be based on a comprehensive set of modern, web-based APIs, including Representational State Transfer (REST), that provide programmatic access to a wide range of web services and third-party ecosystems. While non-web APIs are structured and rigid, requiring strict programming models, modern APIs designed for cloud are open and flexible. These modern APIs, which are easy to assemble, integrate, tear down, reconfigure, and connect to other services, underpin today's web services.



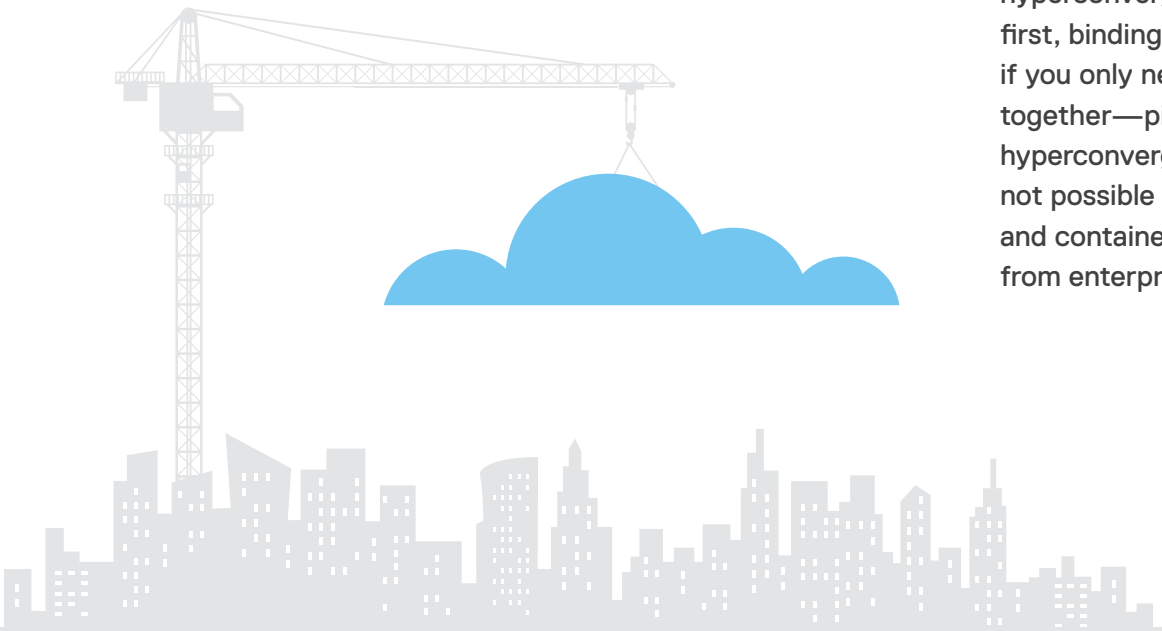
Right level of abstraction:

An enterprise cloud should support virtual machine (VM) and container level operations, which provides programmability at the level of individual applications. VM and container-level abstraction allows performance isolation at a granular level, making it possible to ensure performance of applications without manual intervention through automatic, policy-based quality of service (QoS) for performance tiers. The right level of abstraction is a prerequisite for automating many operational and technical processes, and self-service.

So, wait ... can I build an enterprise cloud with:

Conventional storage infrastructures?

Sadly, this is an easy answer—no. Conventional infrastructures from BOTH legacy players and emerging vendors lack all three of the must-have ingredients. Rather than a web services architecture, they are built with LUNs and volumes. As a result, it's very difficult to tie conventional storage to the other elements of your enterprise cloud, and even more challenging to build in meaningful automation or analytics.



Hyperconverged infrastructures?

Well, this is a little less obvious—especially since many hyperconverged providers market themselves as offering enterprise cloud. A core tenant of hyperconverged infrastructure is that compute and storage are tightly integrated. That resolves the difficulty of tying conventional storage to compute ... BUT, it doesn't mean that hyperconverged solutions can be easily integrated into all your other cloud components (e.g. hypervisors, cloud management software, etc.) The truth is that hyperconverged is not well suited to enterprise cloud for two reasons: first, binding compute to storage limits flexibility when scaling. Even if you only need more compute, you must buy compute and storage together—piling up expensive resources you don't need. Second, hyperconverged does not use the right level of abstraction, and so it's not possible to take actions on the individual units—virtual machines and containers—that allow for the efficiencies and control you expect from enterprise cloud.

Sorry to be a buzzkill. Let's turn this enterprise cloud party around. Look, all you need to do is find yourself a platform that includes the above three 'must-haves'. And when you do, you'll enjoy all the benefits of enterprise cloud, which—not coincidentally—we'll share in the next section.

Four business benefits of enterprise cloud

Why is spend on enterprise cloud twice that invested in public cloud? And why is that spend growing at a 50% clip year over year? Well, it must be because enterprise cloud delivers some benefits. While there are many we could point to, there are three that are most sought-after because they are the most distinct from what's possible in a conventional data center.

Automation. Surely you wouldn't pursue enterprise cloud if it would take more work to manage. The idea behind enterprise cloud is that you can scale your footprint as needed—so, the success of your enterprise cloud is dependent on your ability to leverage automation to do things like:

Manage QoS

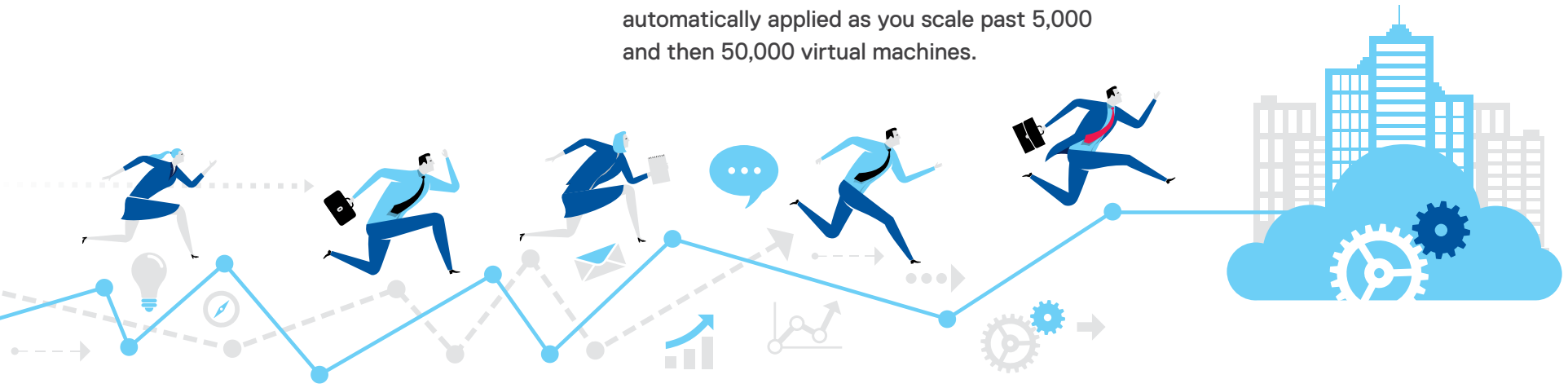
You won't need to worry about noisy neighbors any longer (when the erratic behavior of one virtual machine negatively impacts the performance of its neighboring virtual machines). Your enterprise cloud will automatically assign every virtual machine to its own neighborhood to eliminate conflict and guarantee predictable performance.

Define data protection

Establishing a snapshot schedule and replication policies can be a pain when using conventional storage. You have to make sure a LUN or volume with the correct schedule exists and that you have sufficient capacity and performance resources on the destination device. Conversely, enterprise cloud either eliminates (no LUNs or volumes to gum things up) or automates this type of policy application. The data protection policies you put in place when you have 500 virtual machines are automatically applied as you scale past 5,000 and then 50,000 virtual machines.

Move virtual machines

You won't have to manually move virtual machines or containers around your footprint to tune performance. Instead, your enterprise cloud will identify the optimal placement for every virtual machine—based on sophisticated analysis of available capacity, performance, resource costs and more—and move it to that location.



Analytics. The analytics available from enterprise cloud will make your eyes light up. You'll be able to see across your entire infrastructure, tracing the behavior of any individual application across compute, network and storage. And all the history of application behavior will be compiled and put to good use—you'll be able to:

Anticipate resource needs

Enterprise cloud analytics will show you your most scarce resource(s) and project precisely when you are likely to run out of capacity, performance or working set. That should put an end to over-provisioning—add resources only when needed.

Complete what-if analysis

The next time you're asked whether you can accommodate another 100 development servers, you won't need to guess or perform complex calculations. You just need to punch in a couple of numbers; based on the behavior of existing development servers, you'll immediately know the impact of adding 100 more, so you can make an informed decision.

Self-service. It takes less effort to manage enterprise cloud compared to conventional solutions—in part due to self-service. That's because a conventional infrastructure of LUNs and volumes requires expert management. So, if the line of business or DevOps team needs more virtual machines, a new environment or policy changes, they need to submit a request to those experts. If the queue is long, it slows down decisions and development.

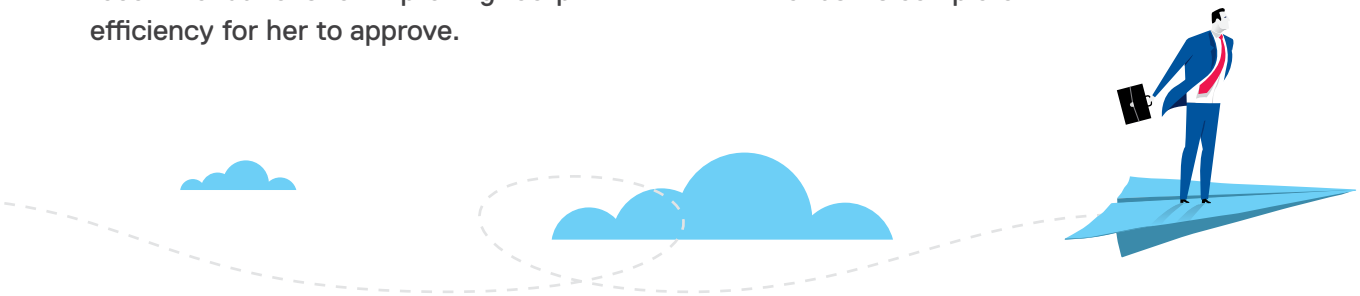
Enterprise cloud doesn't require expert management. The back-end uses built in automations to complete actions, so all that is needed is a familiar front-end. Imagine giving non-experts access to infrastructure as in these scenarios:

Amazon Echo

A cloud architect wants to understand current enterprise cloud performance. So, she makes a verbal request of her nearby Amazon Echo device: "Alexa, how is my enterprise cloud performing today?" An integration with your enterprise cloud means that Alexa can reply with stats about performance and even recommendations for improving footprint efficiency for her to approve.

Slack

A lead developer needs to spin up an environment prior to Black Friday to pressure test the company website before the retail rush. He types his request to a bot via Slack: "Bot—spin up an environment with 200 Black Friday VMs." The bot will open a ticket, provide an ETA, and then a notification once the task is complete.



Note. Self-service should always operate within permissions. In the imagined scenarios above, if either request is outside set permissions, then the request would be routed to the right individual within the organization to approve or deny the request. Now that individual is simply addressing anything outside permissions, rather than taking responsible for completing the request beginning-to-end.

Control. The reason to highlight control as a benefit is the perception that public cloud is eating the world. In a recent study, IDC found that 83% of organizations had moved some applications OUT of public cloud in the past 12 months. 3-in-4 of those organizations moved some or all of those applications back on premise. Why? Control. Specifically, the need for control over:

Costs

It's becoming more commonly accepted that public cloud costs more than enterprise cloud. One reason is that applications consuming 'free' resources in the data center (e.g. network bandwidth) are suddenly charged for all usage in public cloud.

The related challenge is predictability of costs. Sometimes the line of business scales up for a launch, or the DevOps team rapidly grows their footprint for testing exercises—in either case the organization can accrue public cloud costs it didn't see coming.

Service levels

You know how certain applications perform in your data center—you can even guarantee their performance within your enterprise cloud by assigning them a baseline of resources. But, the way they perform in public cloud is an unknown, and it's unlikely you'll be able to assign resources with the same degree of granularity.

Security

Is public cloud as safe as private cloud? Yes. If you want to debate the point, any public cloud provider will put 12 lawyers on a plane and fly them to a conference room near you. The issue is who is in control when there's a security breach. When AWS and Azure experience outages, all you can do is wait. You don't know what is going on or when it will be fixed—you only know it's affecting your business. That's why many organizations prefer to have their critical applications within the control of their own data center.

So, enterprise cloud has a lot going for it. Who stands to bask in these benefits? Read on.

Five use cases for enterprise cloud

1. SPEED DEVELOPMENT CYCLES

The faster developers can release new builds and products, the greater the revenue opportunity (and competitive advantage) for the business. One of the ways to keep developers moving is to ensure they are ALWAYS working from the most up-to-date 'master' code.

Your enterprise cloud will keep all 'child' virtual machines in sync with one or more 'master' virtual machines. That way developers don't have to worry about whether or not they're working from the right baseline—they just check in new code and continue forward.

2. SPIN-UP TEST ENVIRONMENTS

Speaking of developers, their pals in test / quality assurance are going to need to assess the integrity of all that new code. So, they're going to need to spin up new environments to put products through their paces.

One of our favorite examples here is a technology company that spins up 1,000 virtual machines every 15 minutes so they can continuously check the quality of their software products. They can't afford to wait days for new environments, so they use enterprise cloud to spin up virtual machines and tear them down in minutes.

3. SET DATABASE SERVICE LEVELS

In a conventional data center, databases can make for challenging neighbors. When they're hard at work, other tasks are left waiting their turn for resources. Conversely, at critical times if they're stuck in a queue behind a VDI boot storm or scan, performance can be painful.

Enterprise cloud solves this by assigning every virtual machine to its own lane. That eliminates conflict and allows your footprint to operate autonomously—every applications gets the resources it needs without manual intervention.

4. STAY IN COMPLIANCE

You may have applications that could benefit from the capabilities of public cloud, but if you're in healthcare, financial services or just dealing with sensitive data—moving those applications to public can put you out of compliance.

Those applications are perfectly suited to enterprise cloud. They gain agility and accessibility as if they were sitting in AWS or Azure, but they are within the control and security of your data center.

5. SCALE VIRTUAL DESKTOPS

The use of virtualized desktops is increasingly prevalent, and for organizations with a rapidly changing workforce, it's important that adding and subtracting desktops be a snap.

Consider the case of a retailer adding employees for a holiday rush, or an organization that's highly dependent on a largely contract workforce. With enterprise cloud you can quickly provision, clone and replicate individual virtual machines, making it that much easier to manage a malleable virtual desktop infrastructure.

We hope the above use cases make it clear that most organizations have one or more use cases for enterprise cloud. And they're addressing those use cases with the specific web services discussed in the next section.

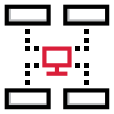
Six web services for enterprise cloud

We've talked about web services frequently throughout this Essential Guide—they are one of the defining characteristics of enterprise cloud. But when we use the term web services, what exactly are we talking about?

SCALE-OUT. A scale-out service makes it easy to expand your footprint by simply adding more capacity or performance—then it automatically re-shuffles all your applications to optimize their placement in the newly expanded footprint (based on their historic requirements and behaviors).

ANALYTICS. An analytics web service will show you—in real-time—the behavior of any individual application across your entire enterprise cloud infrastructure. And it compiles years of historic performance data to make precise predictions about future resource needs. Analytics ensures you never over-provision, troubleshoot in seconds and maintain a finger on the pulse of your enterprise cloud.

COPY DATA MANAGEMENT. This web service helps speed up development cycles by ensuring that all developers are working on 'child' virtual machines that are based on the most up-to-date 'master' virtual machine at all times. And if anything ever goes awry in the development process, the team can roll back to any recovery point.



AUTOMATION. Critical for enterprise cloud is the ability to automate workflows across components. This is especially important as you scale your footprint from hundreds to thousands to millions of virtual machines—and as you extend access to infrastructure to non-experts; automation in the back-end allows for simpler front-end requests.

PUBLIC CLOUD CONNECTION. Since enterprise cloud is part of a multi-cloud strategy, it's important that public cloud connectivity be available as a web service. As an example, this would be used for data protection, to back-up critical data and applications from enterprise cloud to public cloud.

SELF-SERVICE. The right service here makes it possible for non-experts to engage with infrastructure and take ownership of their requests (rather than wait in the IT queue). Now, for self-service to be relevant it has to use constructs that non-experts understand. Those folks won't know what to do with RAID, LUNs or volumes, but they will know how to ask an Amazon Echo or a bot via Slack to provision new VMs or adjust policies.

Who's putting these types of web services to work? Next up we share stories of early adopters.

Peers who built enterprise cloud and lived to share their stories

Sorry Star Trek fans, when it comes to enterprise cloud, you're not "going where no one has gone before". The good news is that you can learn from peer examples to see what's truly possible with the right enterprise cloud platform.

BNY MELLON

Bank of New York Mellon Saves Time with Self-Service

BNY Mellon is building a voice-controlled artificial intelligence platform that can help the firm's IT staff manage their infrastructure.

"Instead of having to find out and memorize how to do very mundane tasks, somebody will be able to ask a question or pose a command in a very natural way and then have that action be completed," explains Marek Kwasniewski, vice president and head of platform architecture eat BNY Mellon.

The beauty of using the right enterprise cloud architecture is the simplicity with which a web service like self-service can be rolled out. BNY Mellon is a large and complex organization, but the first iteration of its self-service capability was created by summer interns.

Now, BNY Mellon is working to deploy self-service to 10,000 IT employees so they can ask questions like "How much performance is my array giving me?" and "How's my de-duplication rate?" And eventually, this capability could be expanded to 55,000 employees to respond to Human Resources questions and to provide technical help. With self-service deployed, action comes faster and employees get time back that they can use for other more important tasks.

Shire Pharmaceuticals Saves Money through Scale-out

Shire is a multi-billion-dollar pharmaceutical company with global operations. They had previously invested in hyperconverged (HCI) solutions under the premise that HCI is self-contained and easy to deploy as needed. Unfortunately, they discovered that HCI was also unable to support their varied workloads or deliver predictable performance at scale.

That prompted Shire to invest in an enterprise cloud platform with a more Lego-like architecture. This allowed them to build 'pods' of all-flash storage and Cisco UCS compute.

What they found is that a pod can be deployed in production in a few days, whereas HCI required four weeks. And it gave them the flexibility to scale storage and compute separately. As resources are added, enterprise cloud scale-out automatically re-distributes every single VM to a location that optimizes the pool—ensuring performance is predictably fast.

With a shift to enterprise cloud, Shire slashed their infrastructure costs to one-third of HCI (and 25% less than public cloud, based on their estimates), since they only acquire the resources they need, when they need them.

Mentor Graphics Saves Cycles with Automation

Mentor Graphics is a leader in electronic hardware and software design. They operate in markets that put them under increasing pressure to shorten development cycles to compete. That's why they have been quick to embrace the automation capabilities of enterprise cloud.

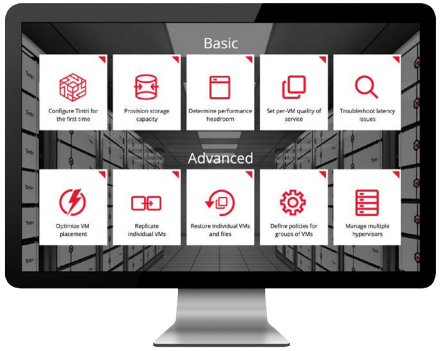
First, Mentor Graphics is using automation to speed processes. Instead of the 17 steps required by their previous solution to replicate a VM, replication policies are automatically applied to types of VMs as they are created. Repeated tens or hundreds of times a day—and across many more processes beyond replication—the impact is substantial.

Second, Mentor Graphics has applied automation to speed testing processes. They now spin up more than 10,000 VMs every day, which they use to continuously test their software. And these environments are torn down once testing is complete—all in automated cycles.

The result is far faster testing and quality assurance—and more importantly, more freedom for developers to spend their time writing code not waiting in queues.

Summary. Those are just three stories from among the thousands of organizations that have embraced enterprise cloud. You can join them add your successes to a growing list—but you need the right platform, and Tintri is uniquely positioned to deliver.

Thanks for reading!



We hope the Essential Guide to Enterprise Cloud got you thinking. Now it's time to make those wheels turn even faster with an up-close look at the Tintri Enterprise Cloud platform.

Email info@tintri.com to schedule a demo
Visit www.tintri.com to learn more
Follow @Tintri on Twitter to stay in touch

Tintri delivers the agility and scale of public cloud with the control of cost and performance only possible in your data center. Comcast, Chevron, NASA, Toyota and more than 20% of the Fortune 100 trust Tintri with enterprise cloud.

Tintri