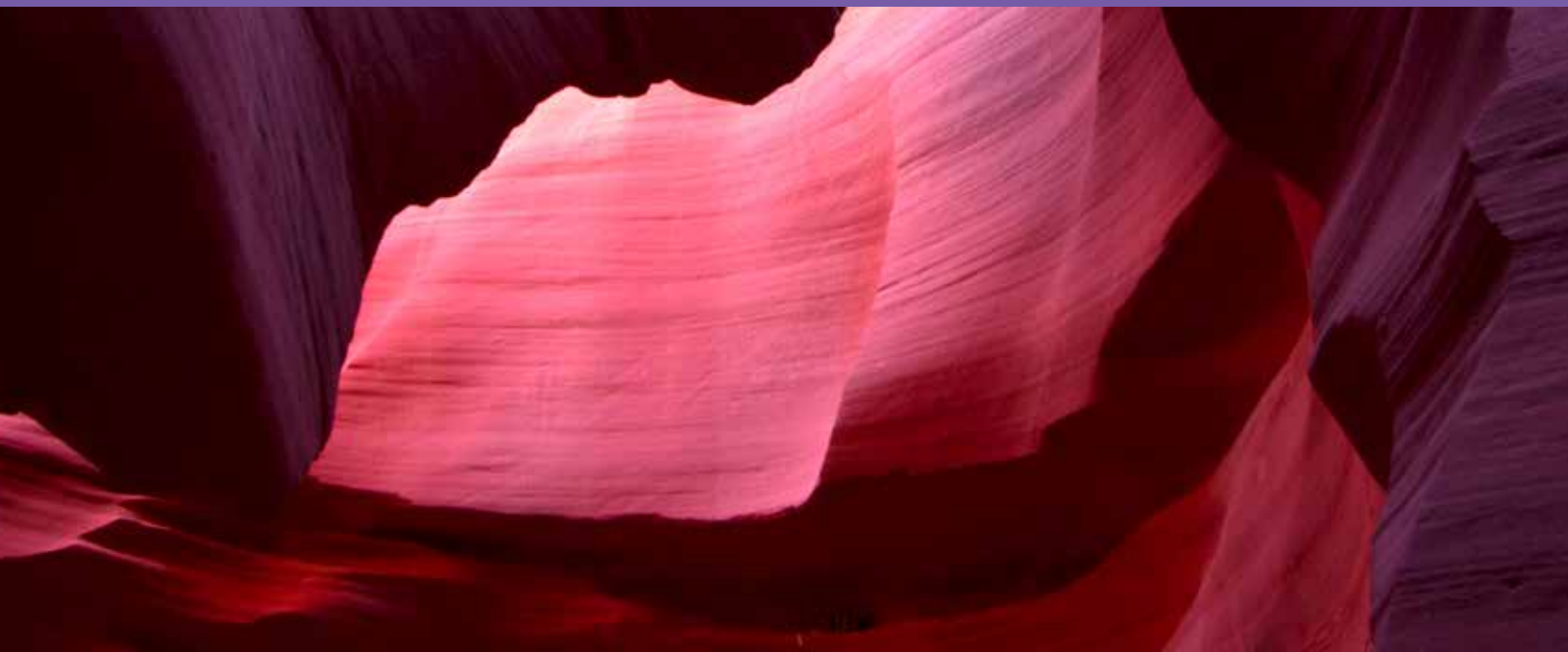


Top 5 Citrix Cost Optimization Tools You Need to Use

Getting the most out of your Citrix Subscription.



Your Citrix subscription comes with a lot of features. And no matter if you've had your subscription for a while or if you're new to Citrix technology, there might be some features that you haven't taken full advantage of yet. Some of our features help your IT admins save time and effort on deployments. Many of our features can also help your business save money by simplifying machine creation, bursting into the cloud only when necessary, controlling cloud spend, and maximizing the resources you already pay for.

We'll explore 5 different features below that come with your Citrix subscription. Whether you're on-premises, in the cloud, or in a hybrid environment, these features provide all the resources you need to power and secure your IT environment without compromising on performance. All of the documentation for these features can be found through Citrix Product Documentation to help you get started with these capabilities. To optimize costs, this whitepaper will expand upon Citrix Provisioning, hybrid and multi-cloud deployments, Autoscale, Workspace Environment Management, and the ITSM adapter to make sure you're getting the most from your Citrix deployment.

1. Citrix Provisioning and Machine Creation Services

Citrix Provisioning Services (PVS) is a delivery mechanism for images across your virtual desktop environment. PVS allows you to provision and re-provision applications and desktops from one single shared disk image to multiple machines, reducing the number of disk images that you have to manage. Using a single shared image ensures machine image consistency and shortens time to value. This critical Citrix tool helps your infrastructure team manage thousands of devices with a single image delivering updates, patches, and configuration information to multiple virtual desktop endpoints. This both simplifies operations and enhances security. With Citrix Provisioning, you get high scalability, reduced storage requirements, and support for physical and virtual targets. PVS is also compatible with some public clouds, so you can provision hundreds, or thousands, of cloud-hosted virtual machines (VMs) on demand.

Citrix Provisioning may be well known across the industry, but have you thought about how it is lowering your operating costs? Citrix PVS saves you money by simplifying deployments for faster delivery, so your IT team can focus on value-add projects instead. You can also centralize VM management for simpler updates and configurations through a shared desktop image, which reduces the cost of storage and operation of virtualized desktops. For example, if you need cloud-hosted virtual machines, but only at peak times, PVS can help by deploying those machines on demand, rather than you having to host those VMs all the time.

Slightly different from Citrix Provisioning, Machine Creation Services (MCS), part of Citrix Virtual Apps and Desktops and Citrix DaaS, creates machines from one single image for the central management and rapid

41 percent of businesses saw reduced IT operational expenses as a result of Virtual Desktop Interface and Desktop as a Service use*

delivery of application and desktop workloads via a cloud platform or an on-premises hypervisor. MCS uses the hypervisor or cloud provider APIs to build linked clones from the master image to provision the required desktops. MCS also includes image preparation, which assigns unique IP addresses to each machine, and ensures the correct licensing for each machine.

Your IT team can use this tool to create a master virtual machine with whatever OS you want and then use that to provision, create, configure, start, stop, and delete virtual desktops hosted on-premises, in the cloud, or in hybrid environments. Citrix Machine Creation Services simplifies your image management because it is simple to deploy and manage with Citrix Studio, requires no additional infrastructure, and is ideal for both persistent and non-persistent workloads.

Citrix MCS also has a great set of tools for cost savings. When paired with Autoscale, MCS power management saves money by strategically powering virtual app and desktop workloads up and down to control spending with cloud providers. Your IT team can take advantage of this cost-saving feature to deliver the right amount of desktops at the right time and save money during off hours. But turning off unused machines isn't the only way you can save money with MCS.

When you create new virtual machines, you need storage. You have two options for approaching storage. The first option is a disk-based solution with MCS. The second is a network-based solution with PVS. With Machine Creation Services Storage Optimization (MCSIO), you can manipulate and reduce your virtualization input and output, just like with PVS. MCSIO reduces the input and output load through a two-tier caching system. The temporary memory cache serves as the first tier of storage, and the temporary disk cache serves as the second tier of storage. With the temporary memory cache, you can reduce the input and output load, making it easier to scale hosted machines up or down. With a scaled-down input and output load, you can use local storage for temporary data, which can be a more cost-effective option than using a shared network.

Both Citrix PVS and MCS can help your organization deploy the right number of virtual desktops and applications in less time. If you're not already leveraging the tools built into Citrix PVS and MCS, you could be spending way more on IT than you have to.

2. Hybrid and Multi-cloud deployments

Most businesses have a hybrid cloud or multi-cloud solution. When needed, a hybrid cloud strategy moves workloads between on-premises, private, or public clouds. This approach may make sense for businesses that need to store data in a private cloud or a local data center per legislation but still need the powerful computational power only a public cloud can offer. With Citrix solutions, you can utilize both public and private clouds and manage them through a single management plane.

Multi-cloud deployments involve two or more public clouds, often utilizing software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS) solutions from different providers to take advantage of the best each has to offer. A multi-cloud environment may also be a hybrid cloud environment if a business has a private cloud, plus multiple public cloud providers. With multi-cloud, businesses can pick and choose the technologies that best fit their needs and avoid vendor lock-in.

Both hybrid cloud and multi-cloud strategies can save your business money. Most likely, your business has peak hours when you need more computational power. Instead of paying for all the additional resources you would need to support those peaks, all year round, a hybrid cloud allows you to burst into the cloud when you need to. Citrix DaaS helps you manage private and public cloud resources so you get the power you need, when you need it.

Multi-cloud environments can also benefit from Citrix DaaS, which offers unmatched vendor flexibility, so you

can use any cloud providers you want. If your business needs to switch providers for performance reasons, or cost reasons, Citrix DaaS is designed to work with any cloud. Citrix even offers tools for your business to help control cloud spending, like Autoscale and Workspace Environment Management, which we will cover in more detail in the following sections.

3. Autoscale

Autoscale has helped customers achieve significant cost savings — in some cases up to 70 percent.

The most adopted feature in Citrix DaaS is Autoscale and for good reason. Autoscale allows your IT department to allocate computing resources based on demand, so you only pay for what you need. There are three approaches: schedule-based scaling, load-based scaling, and miscellaneous settings. Schedule-based scaling works by defining a schedule for the number or percentage of machines you need to be powered on so that when employees log in, the machines are ready.

With schedule-based scaling, you can set multiple schedules, including days of the week, to adjust the number of machines available at any time. This approach works best for predictable workloads. Autoscale can even help you visualize your capacity utilization to see if you are powering on more or less machines than configured in your schedule, so you can adjust your schedule as needed.

What truly sets Citrix Autoscale apart is load-based scaling. Load-based scaling works well for unpredictable user sessions, as it dynamically scales by powering machines on and off as the load increases and decreases. Dynamic session timeouts allow you to configure relaxed timeouts during peak hours and aggressive timeouts during off-peak hours to power down machines and save money. Load-based and schedule-based scaling can be used together to create

a capacity buffer to accommodate new logins and eliminate wait times for machines to power on.

Miscellaneous settings include idle, disconnect time, power off delay, force log off, and cost of a virtual machine per hour. These fine-grained controls help you optimize and visualize the cost difference between different settings. By forcing end user log off, you can power down machines that are in a drain state. You can also tag machines and apply certain rules to those machines. For example, you can tag on-premises machines to be used before cloud machines to save on cloud computing costs.

Even better, Citrix Autoscale is available across your cloud and on-premises deployments. Autoscale has built-in cost-monitoring tools that can help you see what you're spending and saving with the dynamic scaling features across the entirety of your environment. With all of these tools, it's no wonder that so many Citrix DaaS and Citrix Virtual Apps and Desktops customers have seen immense savings without compromising on computing power.

4. Workspace Environment Management

Workspace Environment Management can enhance your server scalability by up to 70%, based on a WEM engineer study

If you have Citrix DaaS or Citrix Virtual Apps and Desktops, you might have noticed you have access to Workspace Environment Management (WEM). WEM offers intelligent resource management and profile management to help you take control of your consumption and spending and improve end-user experience.

Resource management monitors user and application behavior in real time, and adjusts RAM, CPU, and input

and output in the user workspace environment. It can automatically adjust the settings to improve application performance and share resources between multiple sessions on the same host VM, reducing CPU and RAM bottlenecks that can occur due to overused servers.

Based on a WEM engineer study, if you enable CPU spike prevention and auto-prevent CPU spikes, then add processes with high CPU usage to an exclusion list, you can increase session density by more than 15 percent. That's either 15 percent savings on cloud computing costs or 15 percent more users for the same cost. By intelligently adjusting your system based on demand, you can free up resources for better server scalability and reduced infrastructure costs.

For environments that use multi-session, like Windows Server and Windows 10 in Azure, best practice is generally to maximize user density and fair resource sharing. However, some applications will be more CPU intensive than others, which may affect other users' performance. Workspace Environment Management can result in greater scalability savings if your environment has more applications with high loads.

There are more benefits to using WEM too, including shorter log on times with profile management, which speeds up log on time by loading a portion of the profile at logon, and the rest loaded when a user accesses them. Profile management can also be used in conjunction with action configurations. Action configurations include managing applications, printers, network drives, registry keys, and external tasks, which are applied to user profiles at login. By applying these actions with WEM agents, you can decrease logon times by more than 60 percent, so your employees spend less time waiting for necessary applications to be ready to use.

5. ITSM Adapter

The Citrix ITSM adapter for ServiceNow can reduce desktop reset times from 15 minutes to 30 seconds

The final capability we are highlighting is the much loved IT Service Management (ITSM) adapter for ServiceNow. This premium-entitled capability is great for organizations leveraging Citrix and ServiceNow as it automates the provisioning of Citrix resources, enables self-service for employees, and features a centralized dashboard to monitor Citrix DaaS incidents and notify admins of any issues. ServiceNow incident management works across Citrix deployments so that admins can automate session resets for employees from one location with the ITSM adapter. With automated session resets, the ITSM adapter can reduce the burden on IT teams by resolving reset and authentication issues without manual IT intervention.

One customer, Novant Health, saw a significant drop in the amount of time it took to resolve desktop session resets that were caused by network issues, forgotten passwords, and authentication problems. With legacy technology, manual resets were taking up to 15 minutes to be resolved, stealing valuable time away from doctors and nurses. With the Citrix ITSM adapter, users can now perform a self-service reset in 30 seconds. This means Novant Health professionals are able to get back to caring for patients faster, unlocking thousands of hours of productive time.

Increasing IT automation to resolve issues faster saves both time and money. For example, in a situation similar to the above, let's say there are 16,000 Citrix users getting paid \$30/hour to perform their essential jobs. If 100 incidents were reported each day, and we assume 50% of those incidents can be resolved with a self-service reset, which resolves the issue in a matter of seconds, rather than 15 minutes of idle time. That means that the ITSM adapter could save the organization up

to \$130,000 dollars of lost time! Savings could be even greater for organizations that have longer wait times for manual resets.

The ITSM adapter can do more with ServiceNow than just automate session resets with admin service workflows. Admins can add MCS-created machines when there aren't enough resources to support the end user's desktop requirements, reducing manual IT processes to create more machines. The ITSM adapter for ServiceNow can not only create machines without manual intervention, but it can also delete them too. Idle virtual desktop infrastructure (VDI) sessions can sometimes occur when employees leave an organization, wasting computing resources and desktop licenses. Admins can use the ITSM adapter to create a list of desktops to be deprovisioned based on how long they have remained idle.

The ITSM adapter ultimately can save admins tons of time by simplifying the process of getting the resources that employees need to their desktops. It can also save you money by showing you which desktops have been idle for a long time, so you can de-provision any resources not in use, and save money.

The tools you need to save money, already in your toolbox

If you haven't already, make the most out of your Citrix technology by implementing these 5 capabilities. Citrix solutions were built to give you control over your environment, so you have the power to build a customized solution based on your needs while controlling what you spend and maximizing your resources. Find more information on the technical aspects of these features on [Citrix Features Explained](#), and if you're ready to deploy, you can find instructions on implementation in the [Citrix Product Documentation](#).

