

EASE VM STORAGE WITH CONVERGED AND CLOUD OPTIONS

Storage professionals are increasingly adopting the trend of converged infrastructure and hyper-converged technologies. For good reason—preconfigured systems can lighten the load of complicated storage deployment for virtual machines. BY ANDREW REICHMAN





Home

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N THE WORLD of physical servers, each workload required a compatible server that was configured and tuned to optimize results for that particular application. You would often find Exchange servers on one platform, Oracle database servers on another, and so on, each living on the type of machine that engineers determined would be optimal for that particular use case, and configured optimally just for that workload.

From the perspective of optimizing each workload, it makes sense—you want to build the app on the best possible platform for the best results. The bigger picture is not so rosy. Keeping the physical layout and configuration for each particular machine—and to order them, build them and implement them on a custom basis for each workload—creates a tremendous amount of variability and complexity across the environment.

Take that concept beyond the server, and you find that—because it's very difficult—IT staff is spending a tremendous amount of time and energy making the key pieces of the data center (server, storage, network) fit together and work well. It's one thing for a vendor to make things work in their controlled factory environment, but it's much harder to do on a [data center floor](#) where there's a mix of new and old systems, inconsistent skills, procedures and approaches. Firms pull their hair out trying to get it to work initially, and struggle even more trying to keep it all running over the long term as things break and change.

Buying separate software, servers, storage and networking and then attempting to make them all fit together is akin to buying a car by ordering an engine from one manufacturer, a chassis from another, and wheels, seats and body from additional vendors. While theoretically it might be possible to get better results than trusting the combination

STORAGE FOR VIRTUAL SERVER ENVIRONMENTS



Home

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recommended by a single vendor, the likelihood of that result coming about is extremely low. With improvements in the ability of [industry standard x86 components](#) to handle demanding workloads, and the standardization of components from one vendor to another, many IT architects are realizing that there's more value in making things consistent and eliminating variability, rather than striving for the absolute "best" architecture for each individual workload.

[Converged storage options](#) are a natural outcome of this line of thinking. The [rise of virtual servers](#) has had a homogenizing effect on IT requirements. Today, you just need to know that your workload is compatible with virtualization, and that your server is compatible with your virtual server technology, and that's how you build the server. The specific requirements of each application in the virtual server environment become, to some extent, less important. And as organizations [use virtual server technology](#) for a bigger percentage of the workloads they run, the need for customized configurations that differ by workload.

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Entrenched and emerging vendors are aware of this, and have begun to offer converged infrastructure—products that combine servers, storage and networking from different vendors. These products can be sold as a pre-configured package, or as reference architectures that customers then

have to assemble themselves. Both options are designed and assembled to deliver consistently good results for all the workloads that fit within the target of the particular package. In a similar trend, other vendors have chosen to sell [hyper-converged products](#), which package servers, storage, networking and hypervisor in one box. All of these converged systems generally focus around a particular virtual server technology, like [VMware](#) or [Microsoft Hyper-V](#), or for a particular application like desktop virtualization.

With physical servers, you have to optimize the server and storage environment to fit the needs of the workload running on each individual machine, and take a wide range of variability in needs into account. Virtual server technology acts as a homogenizing factor, removing complexity of variability and interoperability from the equation. When organizations standardize on a virtual server technology, and run a majority of production workloads in such an environment, it allows for a much higher level of infrastructure consistency from workload to workload.

When you have this increased level of consistency within your IT infrastructure, the focus on best in class individual components, capable of high levels of bare-metal customization and broad fit for many configurations diminishes significantly. This shift in focus, along with industry-wide consistency in choosing a small number of virtual server options, has led to the prevalence of options for pre-integrated "converged systems" that offer a blueprint and order

STORAGE FOR VIRTUAL SERVER ENVIRONMENTS



Home

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sheet that acts as a cookbook for users to assemble a pre-defined combination, or [hyper-converged systems](#) that assemble the server, storage, network and management tools in the factory. These products allow users to bring virtual server environments online more quickly and with less effort and integration risk.

GETTING BY WITH A LITTLE HELP FROM THE CLOUD

If you think of convergence as getting to use the virtual server technology of your choice, but with a pre-designed infrastructure combination that you can buy behind it,

public cloud becomes a further extension of that same concept. With the cloud, you decide on the type and configuration of virtual servers you need to solve a given business problem, and then simply gain access to that virtual server via a network connection to the cloud provider. You give up the ability to build, customize or even see or touch the infrastructure, but you get a pre-designed architecture that the service provider worries about. Cloud providers, like converged systems vendors, will likely give you a list of choices when it comes to the infrastructure, the amount of RAM or disk space associated, for example, but not a choice of which vendors' components go into the solution, or where specifically it resides within the remote data center.

Converged vs Hyper-Converged

| CONVERGED | HYPER-CONVERGED |
|---|---|
| <ul style="list-style-type: none">■ Includes servers, storage, networking | <ul style="list-style-type: none">■ Includes hypervisor, servers, storage and networking |
| <ul style="list-style-type: none">■ Can include hypervisor software, which resides on a server separate from the array | <ul style="list-style-type: none">■ Hypervisor is installed in the same box as storage |
| <ul style="list-style-type: none">■ Uses products from different vendors that are pre-approved to work together | <ul style="list-style-type: none">■ Purchase through a single vendor rather than buying components separately |
| <ul style="list-style-type: none">■ Are either pre-assembled or may require customer assembly based on a provided set of guidelines | <ul style="list-style-type: none">■ All components are pre-assembled and sold in one box |



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Convergence can radically simplify the process of choosing infrastructure and building solutions, but cloud can go further by allowing users to:

■ **Use trial and error to find the right solution.** Let's face it, it's hard to hit the nail on the head every time when you're building out a storage architecture, especially if it's new and the requirements aren't fully clear. The cloud allows you to build out a solution, and then swap it for another approach if it's not quite right. With traditional or converged infrastructure, you still own gear for 3-5 years; you may be able to re-purpose it for another solution (if it's a good fit for what you bought) but it's a tricky proposition and the hardware you bought but didn't like may end up being wasted. With the cloud, you simply get something else and shut off the initial try.

■ **Scale up and down to meet demand spikes.** Many business situations create spikey demand for IT. Whether it's retail demand around Christmas, processing for a month-end close, or just the variability from daytime business hours to nighttime slowdown, demand increases and decreases continually. With traditional or converged products, you have to buy infrastructure scalable enough to run as many virtual servers as you will ever run. With cloud, you can start with a number, and then scale up or down to meet demand as it comes, and pay less when you use less.

Cloud Provider Considerations

PERSISTENT VS. EPHEMERAL: Data can either be continuously retained or stored temporarily. The latter can be a cost-efficient option if data is not read and write-heavy.

HARD DISK VS. SSD: Just like in traditional on-premises environments, cloud customers can choose to use solid-state drives if they are looking for faster performance.

GUARANTEED IOPS: Some cloud providers give the option of building a specified number of IOPS into their QoS agreements; others have a "best effort" IOPS policy.

THROUGHPUT LEVELS: Throughput varies by provider and can have a big impact on performance; test these levels when possible to determine if they're adequate for your business processes.

DURABILITY LEVELS: Providers determine this based on the annual failure rate of their hardware, and can vary from one to the next. The more critical your data, the more important this becomes. ■

STORAGE FOR VIRTUAL SERVER ENVIRONMENTS



Home

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■ **Set up the environment quickly.** Converged systems can reduce the lead time of buying from many suppliers and the effort time of putting it all together, but in the end, you're still ordering, standing up and deploying products when the demand arises. Most cloud providers have systems ready and waiting, especially in the case of frequently used storage types, and measure turnaround in minutes or hours, rather than days or weeks. ■

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