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What to Look for in Backup Appliances

As enterprise backup appliances mature, a few key features are emerging as differentiators among vendors' offerings. Here, a noted technical expert discusses what organizations need to look for when choosing a backup appliance.

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Considerations for Next Generation Backup Appliances

BY BRIEN M. POSEY

Although enterprise backup appliances have been around for a while, they are really only now beginning to mature. It has been said that IT products take at least three generations to mature, so now that some vendors have begun releasing their third generation enterprise backup appliances, it makes sense to examine the features and capabilities that should be considered essential for those considering purchasing such an appliance.

The backup appliance should act as a compliment to the backup hardware and software that the organization already has in place.

Adherence to Industry Standards

One of the first things that I recommend considering with regard to enterprise backup appliance purchases is the degree to which the appliance adheres to industry standards. Some backup vendors offer appliances that rely heavily on proprietary technologies. This reliance can lead to vendor hardware lock.

An organization should not have to abandon their existing backup application or removable media devices when adopting a new enterprise backup appliance. The backup appliance should act as a compliment to the backup hardware and software that the organization already has in place. Unless an appliance supports a backup application's full range of features the appliance will likely handicap backup operations rather than enhance them. Given the importance of solid backup application support, some backup appliance vendors preload well known enterprise backup applications directly onto their backup appliances.

A good backup appliance should fully support industry standard APIs and protocols. This is especially important when it comes to the task of protecting virtual datacenters. Any good backup appliance should be able to natively protect industry leading hypervisors such as vSphere and Hyper-V.

Flexible Architectures and Appliance Scalability

One of the primary problems with first generation backup appliances was that they didn't scale very well. An appliance's capacity was typically limited by the amount of physical storage that the appliance could accommodate. This meant that organizations sometimes had to structure their backups around hardware limitations rather than planning backups solely around the organization's data protection and recovery requirements.

Like all physical devices, even next generation backup appliances are limited by the hardware that the appliance can accommodate. What makes today's backup appliances different from previous generation appliances is that modern enterprise backup appliances often adhere to a modular architecture that allows multiple appliances to work together to fully address an organization's data protection and recovery needs regardless of scale.

There are a number of benefits to taking a modular approach to the use of enterprise backup appliances. First, if a backup solution can

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take advantage of multiple backup appliances then doing so allows organizations to achieve scalability by adding capacity on demand. Furthermore, this approach also allows organizations to pay for storage as it is needed rather than forcing them to purchase appliances with more capacity than what the organization really needs as a way of attempting to protect against future data growth.

Although the ability to add capacity on demand can be tremendously beneficial, modular backup appliance deployment is often about much more than raw storage capacity. It's more about backup workload management and about adding extra tiers of protection.

A backup appliance that is acting as a backup server for example, can of course be used as a standalone device. However, larger environments typically find it beneficial to deploy multiple backup server appliances in parallel. Doing so is sometimes done for sheer redundancy, but more often the parallel backup servers also work as load balancers.

As previously mentioned, media server devices can also be deployed in parallel as a way of adding capacity. However, some backup appliance manufacturers also allow multiple media servers to be used in a way that provides backup redundancy through replication.

Backup operators know all too well that the only way to truly protect their data is to maintain an on premise backup (that can be accessed quickly) and an offsite copy. A backup appliance that includes a replication feature can be used to automatically copy the protected data to an offsite appliance residing in a secondary datacenter or in the cloud.

As backup administrators compare the feature sets of various backup appliances, they will discover that the manufacturers offer varying degrees of modularity. Prior to making a backup appliance purchase, backup administrators should consider how a modular deployment might be of benefit to their organization and then look for an appliance that provides the appropriate degree of modularity.

Security

Although the suitability of any backup must be judged primarily on how well the appliance can protect an organization's data, it is also important to consider security. Backup appliances act as a repository

for an organization's most sensitive data, and it is critically important to make sure that the data remains secure.

At a bare minimum, a backup appliance should offer storage level encryption and some form of authentication. Such mechanisms are essential for ensuring that no data will be compromised in the event that the appliance or its disks are stolen.

In addition to basic authentication and encryption mechanisms, some next generation backup appliance include mechanisms that protect against malware and against network based attacks. Such mechanisms are critical for ensuring data integrity and for preventing unwanted data exposure. Some appliances even go so far as to use heuristics and other mechanisms to help guard against zero day attacks.

A solid set of security features should be considered an absolute must for any enterprise backup appliance.

A solid set of security features should be considered an absolute must for any enterprise backup appliance. Although appliances that go the extra mile to provide good security might sometimes cost slightly more than appliances that offer only basic functionality any extra cost is usually trivial when compared against the cost of a security breach, especially one in which personally identifiable customer data is exposed.

Deduplication

One of the most important features to consider when shopping for a backup appliance is the device's deduplication capabilities. Deduplication has been a standard feature for backup appliances for quite some time. As such, it might at first seem that deduplication is more of a checklist item than a major consideration. However, deduplication comes in many different forms so simply verifying that an appliance has built-in deduplication capabilities is inadequate. It's more important to determine how the appliance actually uses its deduplication engine.

History has shown that in most organizations, the backup requirements evolve over time. Taking a modular approach to backup appliance usage as described earlier can certainly help an organization to more easily adapt to ever changing data protection requirements. However, it is often the deduplication engine that often makes modular data protection approaches practical.

Previous generation backup appliances typically used data deduplication as a way of overcoming an appliance's physical storage limits. Since a backup appliance can physically accommodate a limited number of disks, deduplication helps the device's somewhat limited capacity to be utilized more efficiently, thus reducing backup storage costs.

Although data deduplication remains one of the best tools for making the most efficient possible use of storage capacity, next generation backup appliances sometimes use deduplication to improve efficiency in other areas. As previously mentioned however, it is becoming more common for larger organizations to utilize multiple backup appliances. In these situations, deduplication can help to improve the efficiency of the communications between these appliances.

Although global deduplication comes in many different forms, the basic concept is that data is deduplicated at the source prior to being sent to the appliance that is acting as a media server.

One of the more common examples of the way that deduplication can be used in multi appliance environments involves the use of global deduplication. Although global deduplication comes in many different forms, the basic concept is that data is deduplicated at the source (often at the backup server level) prior to being sent to the appliance that is acting as a media server.

The source side deduplication eliminates data redundancy on a per server basis, but there may be cross server data redundancy that still exists as a result of backing up multiple servers with redundant content (such as operating system files). The target level deduplication pass (which typically occurs on the appliance that is acting as a media server) eliminates cross server redundancy.

It is easy to see how this multi-step approach to deduplication improves storage efficiency, but global deduplication also provides a second benefit. When the backup server and the media server are specifically designed to work with one another then the backup data can be transmitted to the media server in its compressed form, without the need for rehydration. This allows network bandwidth to be used more efficiently, thereby allowing a higher volume of data to be transmitted to the backup appliance than what the network would ordinarily be able to handle had the data not been compressed.

Some next generation backup appliances extend this same concept to backup replication. Once a local backup is created, the backup data can be replicated to a remote office or to the cloud without the data being rehydrated prior to transmission. This approach goes a

long way toward eliminating the problem of WAN congestion as a result of the backup replication process.

Obviously data deduplication can be performed in a number of different ways, and there is really no such thing as a deduplication method that perfectly addresses the needs of every organization. Being that every organization's needs are unique, it is important for a backup appliance's deduplication engine to be flexible enough to allow those organizations making use of the appliance to enable deduplication in a way that makes the most sense for them.

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A Final Word

The latest generation of backup appliances offers an array of features that are designed to provide a higher degree of control over the backup process while also allowing backups to be created more securely and more reliability. When shopping for a backup appliance, some of the most important features to consider are security, scalability, deployment flexibility, effective use of deduplication, and an adherence to industry standards. **R**

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