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From Just-in-Case to Just-in-Time — ONStor and 3PAR Use Resources Wisely

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The Need to Rethink Data Center Processes

There was a time, not so long ago, when deploying a new application could be an education in itself. Litanies of manual procedures (configuration, troubleshooting) were developed to prevent errors. Over-provisioning was a tool often used to prevent various sorts of bad things from happening. It was an approach similar to that of farmers who pro-actively use pesticides and fertilizers, whether or not they are needed, because they prevent infestations and promote growth. The temptation is to use more - *just in case*. **But, when overused, prevention becomes a problem, not a solution.**

Take a look back at the way data centers used to operate – before the pragmatics of cost became so important. It was a world where the risk of running out was high and *more* was always desirable – more performance, more capacity. Now we are suffering from a glut of *more*, and the dependencies on high-touch administration (and the preoccupation with file systems and search and synchronization) that result from a scaled-out environment rich in *stuff*. Many enterprises have already begun, through consolidation and virtualization, to tread more lightly on the data center landscape.

With remote monitoring, instrumentation, metrics, and automation, the data center has a similar opportunity to identify areas of just-in-case waste – like over-provisioning of capacity and overly-complex products, that pollute data center processes. With processor cycles to spare and pervasive networking, it is an occasion to rethink how to avoid risk, facilitate change, *and* get more out of existing assets.

A number of new start-ups, also, are taking this approach. Some are driven by the need to bring a product to market quickly at an attractive price, while others were born to build lean and optimized. But most are driven by the ideals of doing things *right*. 3PAR and ONStor are two of these companies, both involved in data storage. Both have focused on tailoring the product to what is needed, and optimizing the product for working with a range of resources. While risks are avoided, so is waste. And the solution is demonstrably scalable, too. For more details, read on.

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From Just-in-Case to Just-in-Time

Many centuries ago, manufacturers saw the efficiency of offloading parts of their processes – and so the problem of inventory was born - inventory that has been paid for, but has not been used to produce revenue. Today, lean manufacturing processes use tight cooperation between manufacturer and supplier to decrease held inventory. 3PAR's *Thin Provisioning* in their *InServ Storage Server*[1] is the storage provisioning equivalent of lean manufacturing. The provisioning and configuration to meet the needs of the application is done up front, but the actual dedication of physical space is only done when the data is written to disk. This *just-in-time* approach, incorporated into array functionality, makes for leaner application volumes, snapshots and back-ups, and maximizes the usable storage in the array. Most importantly, it can drastically cut the capacity needed to maintain the same or better quality of service to an enterprise's applications.

Distributing the Process

Use Less

If the only way you could accomplish lean manufacturing was by adding a lot of infrastructure and complexity, it would be self-defeating. In the past, data centers have been built out to handle the maximum anticipated loads on an application-by-application basis. Recently, virtualization and grid initiatives have pooled processor and storage capacity to be shared, as needed to meet the total aggregated need,. Less excess is needed.

Reduce Complexity

There is enough pervasive intelligence in enterprise arrays, as well as servers, so that a process can be choreographed between them. By spreading the load, you can simplify some of the infrastructure needed for the process. Take the case of ONStor.

ONStor has rethought file serving by reducing what is done on their *SF 4400 SAN Filer*[2]. This filer has no disk, only solid-state memory that contains a map of the file system that is shared across nodes and failover functionality. All else that traditionally is found on a file server, including cache, metadata. and locking systems, is sited instead on the storage arrays (SANs or, in this partnership, 3PAR's InServ Storage Server) that sit behind it. With no cache, failover is instantaneous and transparent to the user.

From Just-in-Case to Just-as-Needed

The file serving processors are only dedicated to files for the duration of the session – an approach that allows them to support a huge number of files. To add more file serving capacity, the ONStor filer can partition their processors to support up to 256 virtual file servers. This gives an ability to manage multiple file serving requests to meet multiple service levels. All these emulations are managed by the Filer OS, and the device complies with open standards and can be managed as part of a larger environment.

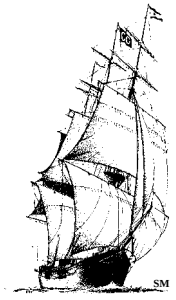
ONStor's rethink precipitates local functionality, where possible. It exploits the concept of sessions to achieve scale, much in the way telephone systems have used phone lines. (The virtualization adds multiplexing to the metaphor.) 3PAR's Thin Provisioning is another case of acting locally. Both 3PAR and ONStor use automation and virtualization to give the customer (the application server and the system management, as well as the end user) all that they expect while allowing the capability, whether storage capacity or file serving throughput, to be used as needed, when needed. And, together, they have produced proven scalability.

Proving the Case

SPEC SFS97 Test Suite 3.0, a file services throughput and response time benchmark, achieved a whopping 71,334 operations per second on a dual node ONStor SAN Filer with 3PAR's InServ Storage Server with Thin Provisioning,. A single ONStor SF 4440 SAN Filer benchmarked at 35,624. The 2000 GB of logical capacity consumed only 680 GB of physical capacity with 3PAR's thin provisioning.

Conclusion

There is a place for just-in-case redundancy, but with monitoring and automation, redundancy can be lean. **Think about the virtue and prudence of *less.***



[1] For more details of 3Par's InServ Storage Server, see **The Clipper Group Navigator™** dated *July 25, 2003*, entitled *3PARdata's Utility Storage Takes a Unique Approach to Attacking Cost and Complexity* at http://www.clipper.com/research/TCG2003032.pdf

[2] For more details about ONStor's SAN Filer, see **The Clipper Group Navigator™** dated December 19, 2003, entitled *ONStor: The Purpose Built NAS Head* at http://www.clipper.com/research/TCG2003074.pdf

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