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Tom Hall, Senior Director of Information Services, Orbital

Orbital Sciences Corporation Takes Control of Storage Growth with F5 ARX

One of the world's leading space technology companies, **Orbital Sciences Corporation** has pioneered new classes of rockets, satellites, and other technologies that help make the benefits of space more affordable, accessible, and useful to millions of people on Earth.

As the business has grown, its use of complex engineering applications and the need to keep data accessible for up to 20 years was pushing its storage environment to the limit. Annual data growth rates of 60 percent were the norm. By virtualizing its file storage environment with F5® ARX®, Orbital has been able to boost operational efficiencies, minimize disruptive downtime, and significantly reduce overall storage costs.

Business Challenges

Orbital maintains two data centers to support its 3,500 employees in three main business groups. In 2006, the company's NetApp storage environment contained 33 terabytes (TB) of data. By the end of 2009, it had grown to 120 TB. Volume size limitations were constantly being reached, forcing the company to routinely invest in new storage to keep up with demand or to undertake complex steps to relocate and present data.

"Our budget requirements to sustain growth levels have been extraordinary. We

had to reshape the growth curve," recalled Tom Hall, Senior Director of Information Services at Orbital. "We've been actively examining approaches to manage storage growth and presentation for several years, including global name space, deduplication and document management products. The problem was clearly growing at a rate that would exceed reasonable and acceptable cost growth rates. We realized we just couldn't sustain that growth."

The company's data retention policies added to the pressure. Orbital typically

Overview

Industry

Aerospace and Defense

Challenges

- Control rising storage costs
- Eliminate disruptions created by data migrations
- Scale storage capacity to meet demands
- Reduce size and length of data backups

Solution

- ARX
- Data Manager
- Automated storage tiering and data migration policies

Benefits

- Reclaimed valuable Tier 1 capacity
- Minimized downtime with non-disruptive data migrations
- Streamlined storage provisioning and capacity balancing
- Significantly shorter backups

Partner

TRACE|3

develops, manufactures, and deploys a new product within two to three years. But product lifespans can extend to 15 or more years, and subsequent products can be based on prior designs. As a result, the lifecycle of its product data—most of which is unstructured data—can be 15 to 20 years.

“We don’t want to archive that data offline because we are concerned that we will not be able to access it quickly enough,” Hall explained. “We’re also aware that changes in backup technologies over the years could create accessibility issues.”

As storage volumes grew, provisioning storage and migrating data manually became increasingly difficult, often requiring extensive downtime. Backup windows stretched to 72 hours or more. When a three-year capital expenditure projection for storage hit \$2,000,000, the IT team knew it was time to make the decision on a new approach.

Solution

Orbital’s long-time technology solutions partner, **Trace3**, worked closely with the IT team to fully define the problem and architect a solution. Orbital and Trace3 agreed that the best approach would be to virtualize its file storage environment with F5 ARX.

ARX created a global namespace, which is, in effect, a federation of multiple file systems. Rather than accessing the physical file structure, clients now access the global namespace. This has dramatically simplified access to files, and enables file movement between devices to take place without requiring reconfiguration of client drive mappings.

“To be honest, at first we really wanted to avoid in-line devices,” Hall said. “However, as we explored different options and worked through our long-term objectives, we realized that we needed the global namespace and transparency that you get with an in-line device.”

ARX moved 672,175 files in 24 minutes, without impacting users’ ability to access those files.

Some members of the technical team were initially concerned that putting ARX in line would slow response times on an extremely high performance computational cluster with 96 compute nodes dedicated to demanding engineering applications, Hall noted. Surprisingly, tests conducted after the ARX deployment showed there was no impact on response times.

Benefits

Since implementing ARX, Orbital has established automated file management policies to free up valuable Tier 1 capacity and reduce the backup burden. It has also dramatically simplified storage provisioning, eliminating the need for manual data migrations and minimizing downtime.

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Streamlined storage provisioning

Before implementing ARX, when Orbital hit its volume limitations, the IT organization had to plan and manually execute a strategy to migrate files. This process, repeated over and over as capacity demands increased or unplanned spikes in usage occurred, inevitably required downtime that could last from a few hours to several days. With ARX, all volumes are presented as a virtual storage pool. This has made storage provisioning fast and non-disruptive, and enables Orbital to quickly scale to meet business needs.

Reclaimed Tier 1 capacity

During the early stages of the project, Trace3 used F5 Data Manager storage management software to analyze Orbital’s file storage environment. The software, which reports on existing file types, age, and resource consumption, confirmed the team’s suspicions: 70 percent of Orbital’s unstructured data had not been modified in 180 days—consistent with the nature of the business.

Using ARX policy-based management capabilities, Orbital wrote a policy that moves all files that haven’t been modified in 180 days or more to its Tier 2 NetApp clusters. The first production use of the policy moved 9 TB of data from an 11 TB volume.

“That was a huge first step. As we’ve continued to migrate data, we are consistently seeing 70-75 percent reclamation of Tier 1 disk space. This is going to allow us to reserve our Tier 1 storage for the data that really demands it,” Hall said.

This policy also helps Orbital meet its data retention requirements without breaking the bank. Files archived on Tier 2 are always instantly accessible to the business and, once modified, are automatically moved back to Tier 1. If they remain unmodified for another 180 days, they are automatically moved back to Tier 2.

Optimized data backups

The tiered storage strategy has also addressed many of Orbital’s backup challenges. Before implementing ARX, the weekly backup began on Friday afternoon and often ran through Monday. Since nearly 70 percent of its data was unmodified, Orbital was backing up the same, unchanged files every week, expanding the backup window and driving up costs. Now, Orbital backs up a much smaller Tier 1 data set weekly, and backs up Tier 2 data quarterly. For example, in Orbital’s Virginia office, weekend backups that previously took an accumulated 88 hours dropped to 26 hours as a result of the initial 76 percent reduction in Tier 1 data.

"These were exactly the kinds of results we had hoped for," Hall said.

Seamless data migrations

Data migrations now take place without downtime or disruption. In one project, a file structure of CIFS and NFS data that was over 180 days had already been migrated to Tier 2. The company then wrote a policy to move the NFS data to another aggregate on Tier 2. ARX moved 672,175 files in 24 minutes, without impacting users' ability to access those files.

"The migrations are truly seamless," added Bryan Pretre, Senior Manager of Information Services at Orbital. "We haven't had any issues with people not being able to find their data after it is migrated. ARX migrates data much faster than a standard file or block copy method. ARX does what it's intended to do."

Looking ahead

Orbital continuously seeks to optimize its environment for maximum performance and ease of management. Now that it is on plan for this next generation of storage management technology, the team is evaluating other ways to use ARX. One project under consideration is creating policies to automatically tier data by file type, such as moving all email archives to a separate volume to simplify eDiscovery requests.

"Initially, we were looking to just address the migration and namespace challenges, but now we're seeing that it has a lot of additional features," said Alan McHood, Storage Architect. "We are just getting started thinking about all the other ways we can use it. We've been really impressed with ARX."

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