

Clackamas County Deploys Converged Storage to Serve its 400,000 Residents

Nimble delivers high-performance, cost-effective storage while improving recovery point objectives.

Clackamas County encompasses the Portland-Beaverton metro area with a population of over 400,000 people. The mission of the Clackamas County Technology Services Department is to provide high-quality, innovative, cost-effective IT services for all of its citizens, county departments, and elected officials. “We are proud of the services we are currently offering our county, but we know that today’s IT practices and technologies will not be adequate to meet tomorrow’s needs,” said David Cummings, chief information officer for Clackamas County. “Therefore, we must continually upgrade our computer systems to take advantage of technology advances, as often as it is financially feasible.”

Challenges: Adding Capacity Despite Declining Budgets

The county’s Technology Services team was struggling to keep up with the continued growth in data and services. “We were constantly chasing capacity, since we were filling our SAN up faster than we could economically purchase new infrastructure,” Fricke noted. “To complicate matters, our budgets were reduced significantly when county fees tumbled during the housing bubble collapse two years ago.”

In order to cut costs and at the same time improve efficiency, Clackamas County implemented a storage tiering strategy for unstructured data, which helped get capacity struggles under control. But one thing that was still just out of reach was the ability to bring in a new performance layer of storage at a cost the county could afford. Fricke explained the challenge facing the county, “Most of the solutions that really start to improve performance, such as solid-state drives or arrays of Fibre Channel disks, have really high infrastructure costs associated with them. They also require you to buy and dedicate an entire enclosure to a particular performance set, even if you don’t have a large enough data volume that requires the power of solid-state performance.”

Challenge: Performance Bottlenecks Emerging

Fricke noted that the cumulative I/O requirements of the county’s database applications were starting to create performance bottlenecks when combined together on the existing iSCSI SAN. “Aggregate requirements were mounting with our databases, user access, and virtualized servers. Things were not breaking yet, but it was getting to the point where application performance was beginning to degrade.”

Challenge: Replication and DR Consumed Too Much Capacity

Due to budget constraints, Clackamas County had insufficient funds to implement its mandated disaster recovery plan. Fricke explains, “We have been using EqualLogic arrays for a number of years and have always been a fan of the platform. But the EqualLogic method for snapshots and replication has always been extremely expensive from a disk capacity point of view. Anytime we create a new service, we build a redundant presence of that service in the other datacenter. We determine on a case-by-case basis whether that data requires an active/active cluster, active/passive failover, or just replication to the second site. But having a second presence in each datacenter uses too much disk space with our EqualLogic systems. It was getting to the point where we had to limit the number of

Storage Profile: Clackamas County

Challenges

- Adding high performance primary storage capacity was cost-prohibitive
- Replication and DR consumed too much disk space
- Application performance was starting to decline

Solution

- Deployed two Nimble CS240 flash-optimized storage arrays

Immediate Benefits

- Cost effectively increased storage capacity with no user impact
- Gained needed data replication capabilities, improved RPO

Long-Term Objective

- Move all user home directories to Nimble high-performance storage
- Place document images and other unstructured data on Nimble’s cost-effective SATA disk layer

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volumes that were replicating. We simply couldn't afford to consume enough capacity to meet our recovery point objectives (RPOs)."

Benefit: Improving Performance

Clackamas County solved its storage dilemmas with the purchase of two Nimble C240 arrays in the fall of 2010. "Nimble has created a multipurpose, end-all, be-all solution that solves all of our storage challenges," stated Fricke. "I really wasn't expecting to want to purchase the Nimble appliances when I agreed to beta test the devices last year. We were in relatively good shape from a storage perspective with our EqualLogic, Data Domain, and file virtualization servers."

But Fricke's opinion changed quickly after testing the new Nimble devices. "As soon as we had the Nimble arrays in-house, we started moving and balancing data onto the new storage appliances. When we moved our user data volumes from our EqualLogic SAN to the Nimble SAN, everyone noticed that performance improved dramatically, even those who weren't complaining before the change. We saw huge differences in raw speed compared to our existing storage."

Benefit: Adding Cost-Effective Capacity without Impacting Users

Clackamas County was impressed with the ROI of the Nimble devices. "With its high-performance flash and high-capacity SATA disks, Nimble provides the ability to place multiple tiers of storage on one device. When we create a volume on the Nimble device, the blocks of data that need high performance dynamically get moved to the solid state cache. Those that don't are placed on cost-effective SATA disks. But the tier-2 data is still online and available for use in a contiguous volume space. Nimble maximizes our dollar per gigabyte without impacting our users on a day-to-day basis."

Benefit: Achieving Efficient Replication

Since deploying the Nimble arrays, Fricke has noted major improvements in replication and DR. "It was just too expensive to replicate data frequently on the EqualLogic SAN. And with an insufficient number of backup copies, our recovery point objectives were not being met. That is no longer the case with Nimble because of how efficient it is with taking snapshots. We can go wild with replication and snapshots like never before, because it costs us so little in terms of capacity. As a result, our RPOs have improved significantly."

Benefit: Improving the Stability of the VMware Environment

When the county's IT team moved its VMware volumes off of the EqualLogic array and onto the Nimble array, they noticed that some application issues that had been occurring in the VMware environment immediately stopped happening. Fricke explained, "We are not able to pinpoint exactly what was causing the issues on the older SAN yet, but the issues are simply not happening on the Nimble platform. We made no changes to the underlying network or other VMware components, so we have attributed the stability improvements to the Nimble arrays."

Benefits: Simplified Management

When asked about the stability and manageability of the Nimble platform, Fricke replied, "On a scale of one to ten, I would give them both tens. I did the usual tests, especially when we were beta testing. We went up to the enclosure and started pulling drives and controllers—all while it was live and running data. We never had even a single glitch. And since we have moved the two devices into production, I have not had a single problem."

Fricke was also very impressed with the Nimble user interface. "The management interface is extremely easy to use. It does its job simply, and it does it well. I did ask for a few changes as the interface was being built, but everything has already been implemented.

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There are still one or two things I'd like to see included—a little check box here, a pull down there—but knowing the responsiveness of the Nimble development team, I'm sure those features will be coming very soon."

Future Plans: Moving all Data to the Nimble Arrays

Clackamas County is now planning to use the Nimble arrays for all of its tier 1 and tier 2 data. "We plan to put all of our user drives in tier-1 disk, so that the I/O access can take advantage of Nimble's high-performance solid-state cache. But since the Nimble capacity is so cost-effective, we can use that extra space for our tier-2 applications."

The county is also moving all document images from its Data Domain systems to the Nimble devices. "Our document imaging data doesn't compress very well on our Data Domain deduplication storage. Data Domain achieves a good compression ratio for certain types of data, but not for images and other unstructured data. Unless you get 20x savings from compression, it can be very cost-prohibitive. But with Nimble, we can move those storage volumes onto the cost-effective SATA disks. The minimal I/O access on that archived data will not take away from the performance value that's being given to our active user home drive access."

Concluding Thoughts

Fricke shared some final thoughts on the Nimble devices. "The promise of cost-effective capacity and the ability to balance workloads and performance within the same enclosure was a groundbreaking concept for us. And the Nimble arrays fit seamlessly into the rest of our storage strategy, so adding them into our existing environment was not disruptive. There is nothing that even comes close to the Nimble solution today in terms of performance and price. "

"Nimble is definitely the most exciting storage startup I've seen in quite a while," concluded Fricke. "It's a really elegant blend of some very simple concepts from a user perspective—making them not only accessible and cost-effective—but pretty much brainless from an ROI point of view. That has more value than most people realize, especially in medium and smaller organizations that don't have dedicated storage staff to do nothing but manage and balance storage all day long."

Nimble maximizes the benefits of high performance and easy management, while minimizing the dollars we have to spend."

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Clackamas County, located in north central Oregon, is one of the counties that make up the Portland, Oregon, metropolitan area. With over 400,000 people, it is bounded by Multnomah County to the north, Wasco County to the east, Marion County to the south, and Yamhill and Washington Counties to the west.

The county was named after the Native Americans living in the area, the Clackamas Indians, who were part of the Chinookan people. Oregon City, the first incorporated city west of the Rocky Mountains, is the county seat for Clackamas County. The area has served as a terminus for water transportation on the Willamette River and had been a meeting place for Indians, hunters, trappers, and Hudson's Bay Company voyageurs for many years.

Clackamas County includes parts of two national forests: Mount Hood National Forest and Willamette National Forest. Mount Hood is the only year-round ski resort in the United States and the site of Timberline Lodge, a major attraction for recreation and tourism. The mountain and its rivers and forests offer outdoor recreation activities, from skiing and rafting, to fishing and camping not only to the residents from the county, but to its many visitors from around the world.



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