Tyrone®

Case Study:

Achieving higher IOPS for NAS at reasonable cost

Renowned film media company posed a unique challenge to Netweb Technologies for upgrading their NAS environment to higher capacity and to deliver very high IOPS without increasing the costs by much; Netweb provided the solution through SSD Caching

CHALLENGE:

- Required a NAS solution with very high capacity that delivers greater than 10,000 IOPS, which can cater to hundreds of users simultaneously.
- Wanted the solution that would provide them high IOPS but at a reasonable cost.

SOLUTION:

- Opslag FS2, a unified storage solution from Tyrone Systems was chosen.
- The solution delivers more than 10k IOPS within the same envelope of space and power consumption at a very little additional cost.

BUSINESS RESULTS:

- As the solution delivers more than 10k IOPS, it can cater to 200+ users of the company who do not experience lag or downtime now.
- The solution with SSD caching has proved to be cost efficient as compared to other options.
- As the NAS solution is within the same envelope of space and power consumption, the company also saved costs in terms of rack space and power consumption.

DEPLOYMENT ENVIRONMENT:

- Tyrone Opslag FS2 boxes configured on NAS platform and expanded using JBOD to deliver 300+ TB of storage.
- The storage box is uplinked via 10 GbE to a switch and then connected to users through a 1 GbE network.

TYRONE OPSLAG FS2 UNIFIED STORAGE

- FS2 is a unified storage solution that offers high performance, high availability and flexibility through multiple configuration options as the storage box supports variety of protocols and interconnects.

For complete information on Tyrone Opslag FS2 unified storage,

visit http://www.tyronesystems.com/unifiedstorage.html

EXECUTIVE SUMMARY

Customer Name:

A renowned media company

Industry:

Film and Media Content

Corporate Office:

Mumbai, India

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The company is an established integrated media content house in India with activities across content acquisition, value addition to content and content distribution. Their content library consists of more than 2500 titles ranging from classic Hindi movies to new Hindi movies. They also own movie titles from regional languages like Marathi, Gujarati, and Bengali etc. They distribute their content library through Television, online, mobile and other media.

Challenges:

Keeping pace with new emerging business opportunities, the company too has expanded their content distribution to platforms of new media like internet and mobile. Wherein, they are creating content from their vast content library of over 2,500 movie titles. The content is in form of clips of famous movie scenes, comedy scenes and songs. Though the file sizes of such movie clips is small, but considering the content is to be consumed by various different kind of media like on YouTube, mobile or tablets; therefore, each of these movie clips has to be made available in different format and resolutions that would cater to respective media delivery type. The challenge here was not of bandwidth or throughput of the storage solution, since the file size was very small; the issue was of IOPS.

The company had already bought Tyrone Opslag FS2 unified storage solution of 48TB from Netweb Technologies, and was using it in NAS environment for storing the movie clips for consumption in mobile and online media. They had a dedicated team of over 200 content developers who would access the NAS storage for editing and converting the movie clips to various formats and resolutions. As the number of users accessing the NAS storage was very high, it was limiting the performance of the NAS box; and because of this their main requirement was to have NAS storage with high IOPS that would not hamper the NAS performance. Considering their future requirement for storage for content delivery to mobile and online platforms, the companydecided to upgrade their NAS to fulfill following requirements:-

- They wanted to expand the NAS capacity to up to 300TB by including new Opslag FS2 storage boxes.
- The new NAS system should be able to deliver in excess of 10,000 IOPS, without significant increase in cost that would be required for NAS capacity expansion.

Solution:

The main challenge for Netweb Technologies was not of increasing the NAS capacity, but to derive to a solution which would address the main requirement laid by the company, i.e. to have a NAS box that delivers up to 10k IOPS at a reasonable cost.

As the number of users increase, even an access pattern which is sequential from the storage point of view becomes random access. Traditional rotational HDDs have limited IOPS capability; a regular 7200 RPM drive would deliver 70 IOPS, while a 15k RPM SAS drive could deliver 200 IOPS. Therefore, the options available to achieve the high level of IOPS were to either:-

- Use SSDs as storage drives in place of rotational HDDs. As, SSDs are capable of delivering very high IOPS, they would have delivered IOPS in excess of 100k, but that would also have spiraled the cost beyond budget.
- Increase the IOPS by using large number of enterprise class HDDs. The increase in number of HDDs would have resulted in achieving the higher number of IOPS, but in turn would have also increased the storage capacity as well as the cost very significantly.
- Use caching, by allocating more RAM in the box. But this was limited to the box's capability to accommodate more memory modules. Also, additional

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RAM modules to increase the capacity to up to 128 or 256 GB would have increased the cost significantly.

As the NAS solution had to be at a reasonable cost, the options of having SSDs in place of HDDs and to adopt enterprise class HDDs were dropped as they would have significantly increased the cost of the deployment. Therefore, the solution to be deployed was required to be within the cost envelope for which the company would have got the regular NAS capacity expansion.

Knowing that if the capacity of cache is higher, then the data delivery is from cache to the user request (if that data is in cache), so transfer time is much faster than in comparison of fetching the data from actual location on the drives.Netweb Technologies decided to club the benefits of caching and high IOPS delivering capability of SSDs; and hence, adopted SSD caching to increase the IOPS delivery while keeping the cost of the NAS solution at reasonable level.

The NAS solution which Netweb Technologies designed to deliver very high IOPS comprised of Opslag FS2 solution populated with regular 7200 RPM nearline disks, which offer large capacity at reasonable cost along with SSDs acting as a second level cache. They used four SSDs in RAID 10 configuration as a second level cache. The advantage with SSD caching was that greater than 10k IOPS were achieved at a reasonable cost with the storage space size remaining practically the same.Additionally, as the SSDs were configured on RAID 10, it ensured that the integrity of cached data is maintained even after the failure or loss of one SSD. Just by keeping everything else same in the NAS box, and just incorporating SSDs as additional cost in form of second level cache, the IOPS performance was dramatically increased.

The one difference of SSD caching provided by Netweb Technologies and that provided by other NAS solution providers is that, most of NAS solution in market are based on Solaris ZFS file system. And one of the salient features of ZFS is the file system level support for SSD caching. While the SSD caching solution provided by Netweb Technologies is at the hardware level irrespective of the file system being used, therefore it is much better and faster than the SSD caching done at the file system level.

Thus, with SSD caching, Netweb Technologies was able to deliver a NAS solution that delivers 10000 IOPS performance and is within the same cost envelope of just NAS capacity expansion.

Benefits:

With this deployment, the media company has been able to upgrade their NAS storage capacity to 300 TB, while also increasing the number of IOPS capability to above 10,000; and achieving all this at a marginal higher cost of a simple NAS capacity expansion. The benefits that the media company is availing after deploying SSD caching enabled NAS solution can be summed up as follows:-

- **High Performance:**
    - As large number of users access the NAS storage simultaneously; now with higher IOPS capability because of SSD caching, the user's requests can be addressed fast and there is no drop in performance of NAS under high data requests coming from users.
- **Cost Benefits:**
    - Instead of going for complete SSD or enterprise class HDD deployment, which would have cost significantly for 300 TB of storage; than including four SSDs in the NAS box as cache proved much more feasible to keep the costs down at reasonable level.

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- **Power and Space savings:**
  - Suppose, if the same IOPS performance has to be delivered through enterprise class disks, it would have required many more HDDs to be installed in the box so as the increase the IOPS counts. With each additional HDD the power consumption of the whole setup would have also increased, and as the number of drives would have also increased then additional rack space would have been needed to accommodate the same. Therefore, by incorporating SSD caching, Netweb Technologies have kept the NAS solution's power and space profile similar; thus providing additional cost savings.

*** Disclaimer for Case Study**

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