

Streams vs. Storage

Separation of Streams and Storage

- **Choice and flexibility**
- **Sophisticated on demand media systems and digital advertising systems**
- **Powerful, scalable on demand management and technical business tools**

Overview

Cable operators are looking to find ways to deploy VOD at the lowest operational cost. One area being examined is the separation of video streams from content storage and the suggested advantages of Storage Area Networks (SANs). The arguments presented for separating streams and storage are:

- As streaming requirements grow, operators will be forced to pay for additional storage when adding streaming capacity.
- If storage needs grow faster than streams, operators will be required to pay for unneeded streaming capacity in order to meet their storage needs.

The first argument is true regardless of how storage is packaged; the second turns out to be more myth than fact. Separation of streams and storage has no significant effect on capital costs or scalability of VOD systems. In planning for VOD growth, the real cost factors for storage are the operational costs, upgradability, and flexibility of storage in VOD systems.

Growing Streams: All Disks Are Created Equal

Regardless of architecture, all VOD servers from the major vendors store content on disk drives. There may be varying forms of switches between the disk drives and the subscriber, but the content still flows from the disks to the subscribers. All the major VOD servers use the same disk technology—typically 10K RPM 73GB disks—read these disks at about the same speed. No matter what the architecture, the major video servers all require at least one disk drive per 30 streams.

A 73GB disk can store about 35 hours of standard-definition MPEG content and a 146GB disk can store about 70 hours (or 9 hours and 18 hours, respectively, for high-definition content). As a rough approximation, all video servers using 73GB disks must have enough disk storage for at least 1 hour of content per stream. More disks can be added, but no fewer can be configured.

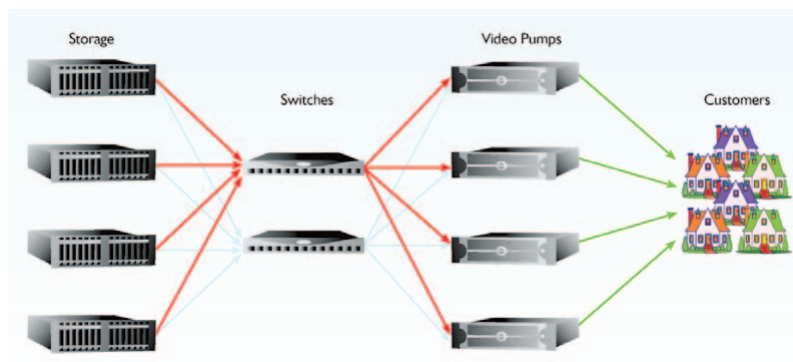
The average VOD installation today requires about 3,000 streams and around 2,000 hours of unique content storage. At 30 streams per disk, the average installation will need around 100 disks to support 3,000 streams, but only 58, 73GB disks to deliver the corresponding 2,000 hours of unique content. Since streaming bandwidth needs are the determining factor in disk requirements, operators always have to buy enough storage capacity to support streams, regardless of how the storage is packaged. As the VOD usage rate continues to grow, the demand for streams will continue to outrun storage demand.

Growing Content: Integrated Systems Cost Less to Scale

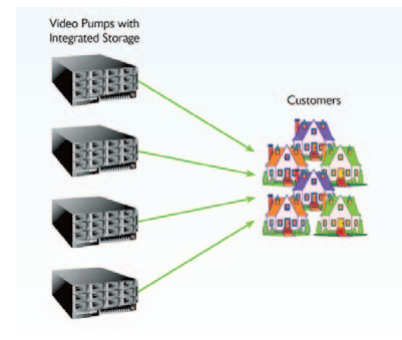
All VOD servers consist of streaming engines (video pumps), switches, and disks. Some servers package these components in different boxes, and some integrate them in a single box.

Integrated systems that combine these components in a single package are actually cheaper to own and operate because they require only a third as much memory and a third as many power supplies, CPUs, and fans as the separately packaged systems. So far, streaming requirements are growing faster than content requirements, but if this situation changes at some future time, an integrated, centralized VOD system such as the C-COR n4x On Demand Server can scale farther with existing storage and can be upgraded more easily and cost-effectively than unbundled systems.

The n4x On Demand Server's unique centralized architecture lets operators deliver VOD to many customers from a single copy of content. Centralized storage and delivery completely avoids content replication, and there are no hidden limits to the number of streams that can be delivered for any specific title. Operators can scale content delivery without buying additional storage. If additional storage is needed for either content or streaming capacity, additional disks can be slipped into expansion slots while the server is running, and the system automatically reconfigures to use the additional capacity. Storage capacity for each hub can be increased up to 600 hours for no more than the cost of commodity disk drives. If even more storage capacity is needed, operators can add C-COR's low-cost external SAN components to store up to 170,000 hours of original content in a single, integrated file system.



Separate Storage Area Network



Integrated Storage

Packaging Versus the Bottom Line

The real issue is not whether a VOD platform packages storage and streams separately, but how cost-effectively the system scales to support increasing demand. An integrated, centralized platform such as the nCUBE n4x On Demand server scales farther with existing storage, lowers operating costs, and upgrades smoothly and cost-effectively, providing a painless path to business growth.

Americas Headquarters

60 Decibel Road • State College • Pennsylvania • 16801 • USA
T: 1-814-238-2461 T: 1-800-233-2267 F: 1-814-238-4065

EuroPacific Headquarters

Transistorstraat 44-V • 1322 CG Almere • The Netherlands
T: 31-36-546 1111 F: 31-36-536 4255

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