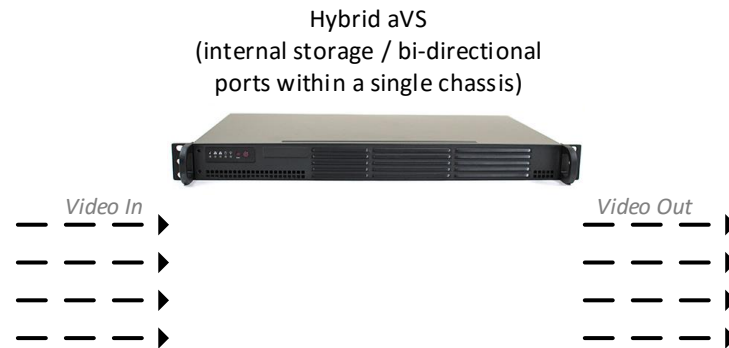# aQ Broadcast Engine (QuBE): System Examples & Block Diagrams

April 2016

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@aqbroadcast

'making broadcast magic'

Hybrid aVS
(internal storage / bi-directional
ports within a single chassis)

Video In

Video Out

A Hybrid aVS provides storage and I/O within a single chassis. Size, capacity and the number of ports is flexible. A 1U chassis can provide two or four ports with typically 2 / 3 / 6 TB internal storage. A 2U chassis can provide four or six ports, with typically 5 / 10 / 15 / 20 TB internal storage.

Input/output connections are normally SDI with embedded audio, but an option for the 2U chassis includes analogue video and audio connections. All ports are bi-directional – their individual operation can be switched immediately between recording and playback.

The Storage is accessible over the network as a standard SAMBA/SMB share and optionally via FTP.

In some cases, Hybrid units can support additional functionality, such as sub-clip, trim, transcoding, upload, stream, etc.

aQ Broadcast system examples – standalone aVS Hybrid unit		
NH	3 Feb '16	v1

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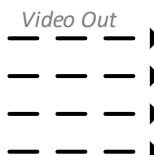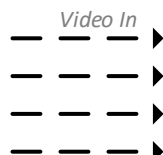
aVS Store node
(internal storage but no I/O ports)

An aVS Store node provides dedicated storage. Size and capacity is flexible, but will typically be 2 – 4U, and from 5 TB to many hundreds of TB. All units have redundant PSUs and storage is always provided based on hardware RAID configurations.

The Storage is accessible over the network as a standard SAMBA/SMB share and optionally via FTP. Standard units provide multiple 1GigE network connections, but an option for dual 10GigE connections is available.
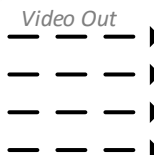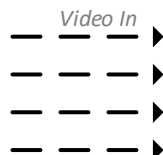
In most cases, Store nodes can support additional functionality, such as sub-clip, trim, transcoding, upload, stream, etc. Proxy viewing is also available in various forms.

Media
content

aVS Port node
(bi-directional ports but no internal storage)

Video In   Video Out

aVS Port node
(bi-directional ports but no internal storage)

Video In   Video Out

Information provided by this drawing is for proposal purposes only and is subject to change without notice. All details will be confirmed as part of the order process.

This drawing is intended to promote understanding of the overall system and to indicate a proposed configuration. It is not intended as a complete engineering drawing. The images used are for representation purposes only.

An aVS Port node provides dedicated I/O, typically two or four ports in a 1U chassis with redundant PSU. Input/output connections are normally SDI with embedded audio, but an option for the 2U chassis includes analogue video and audio connections. All ports are bi-directional – their individual operation can be switched immediately between recording and playback. Alpha channel support is available as an option, with two ports configurable as linked key+fill or as independent connections.

aVS Port nodes are connected to an aVS Store node via a private network link. Port and Store nodes can be connected in any combination – multiple Ports -> one Store, one Port -> multiple Stores or multiple Ports -> multiple Stores. Any port can record content to, or playback content from, any Store.

aQ Broadcast system examples –
Store and Port node configuration

| NH | 3 Feb '16 | v1 |

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Store Y (mirrored)

Store X (single)

Store Z (single)

Stores are accessible on the network via standard SMB / SAMBA file sharing and via FTP. Stores can be configured as standalone or mirrored. Each Store is aware of other Stores on the network and automatically supports the direct movement of content between units – transferred point-to-point rather than via an intermediary workstation. Stores are typically available in capacities from 5 TB up to many hundreds of TB, in rack sizes from 2U upwards.

Input / Output
Port Node F

Input / Output
Port Node H

Input / Output
Port Node G

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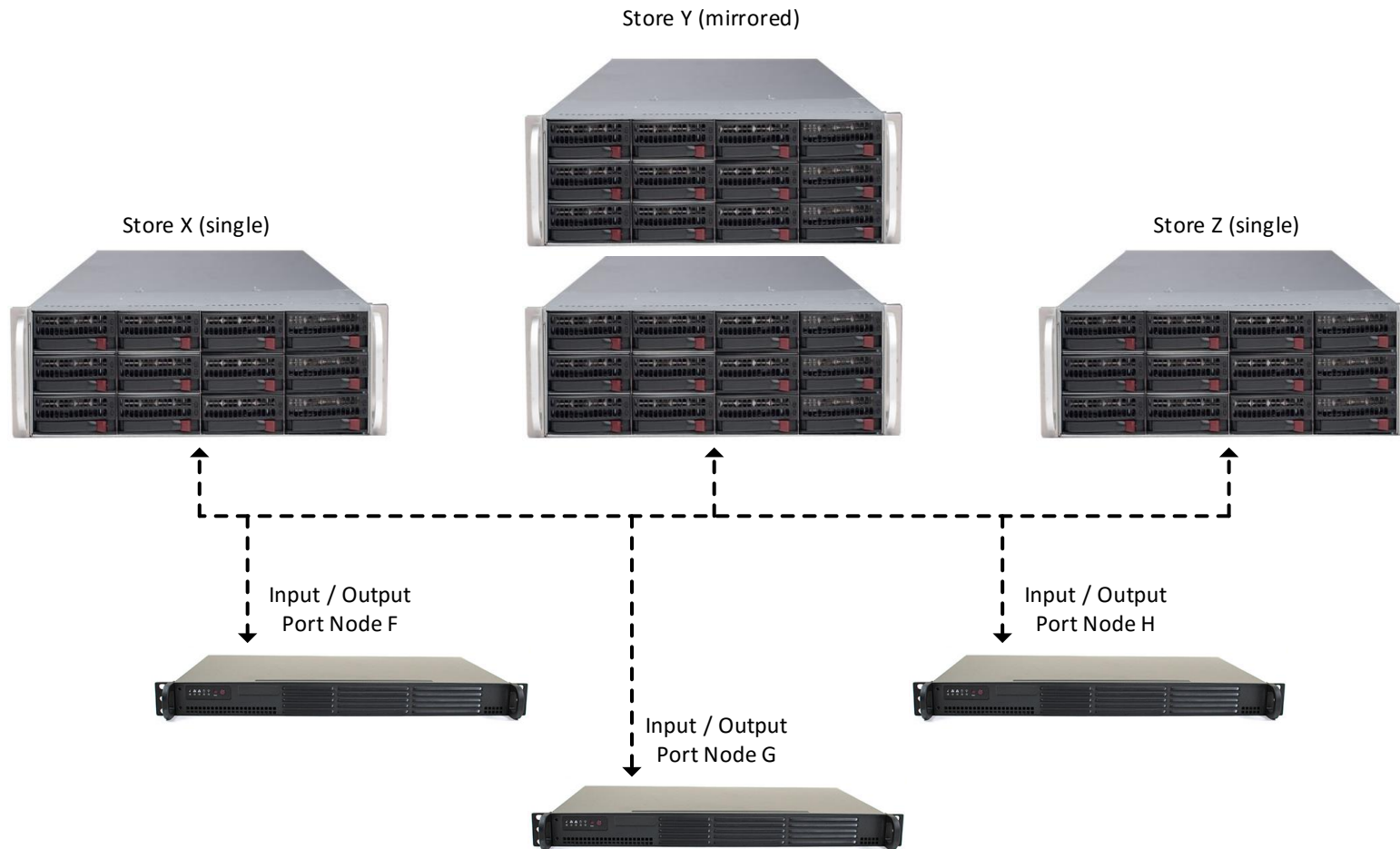
This drawing is intended to promote understanding of the overall system and to indicate a proposed configuration. It is not intended as a complete engineering drawing. The images used are for representation purposes only.

Any Port Node can record content into any Store, and play back content from any Store. Port Nodes are typically available as 1U units with two or four bi-directional ports (SDI with embedded audio, plus genlock input). An option for key + fill output is available if required.

aQ Broadcast system examples – large network configuration		
NH	28 Jan 2016	v1

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Central Store

Media content

News A

Video Out

Media content

News B

Video Out

A single clip can be played out in parallel across both playout servers – all actions (e.g. load, cue, play, re-cue, etc.) will be automatically mirrored on both servers.

Broadcast

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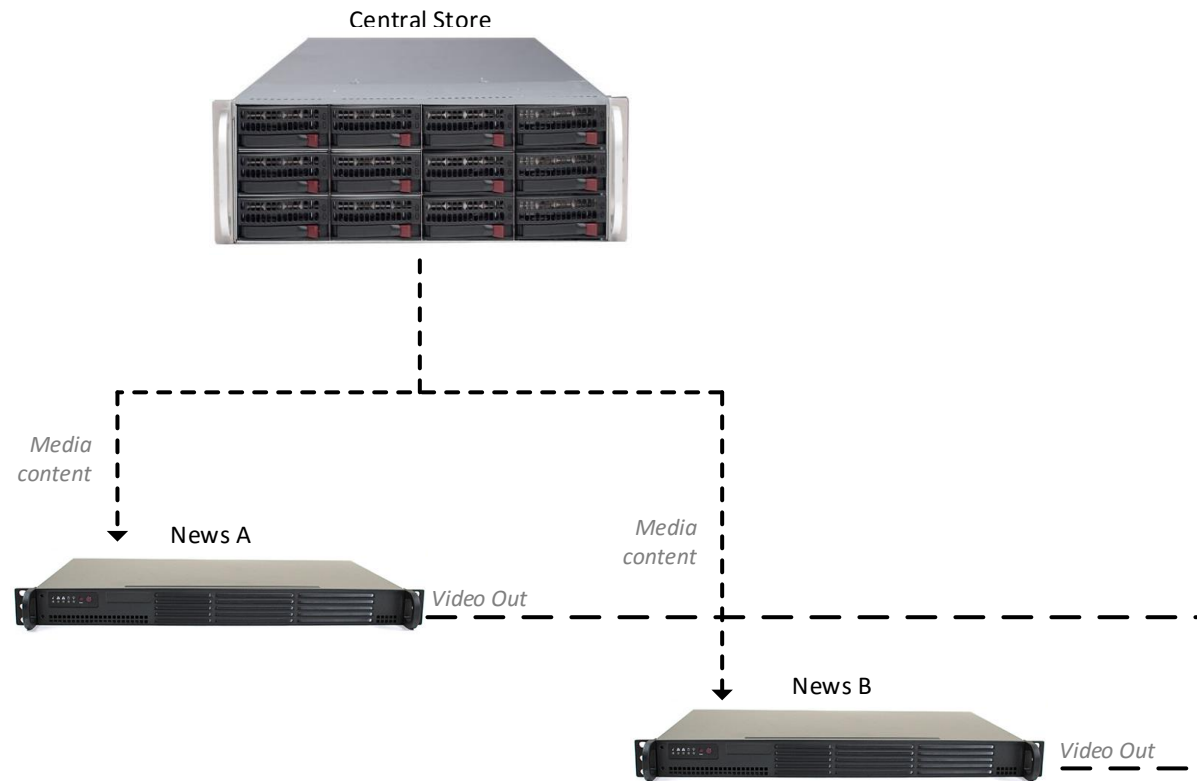
aQ Broadcast system examples – redundant news playout		
NH	28 Jan 2016	v1
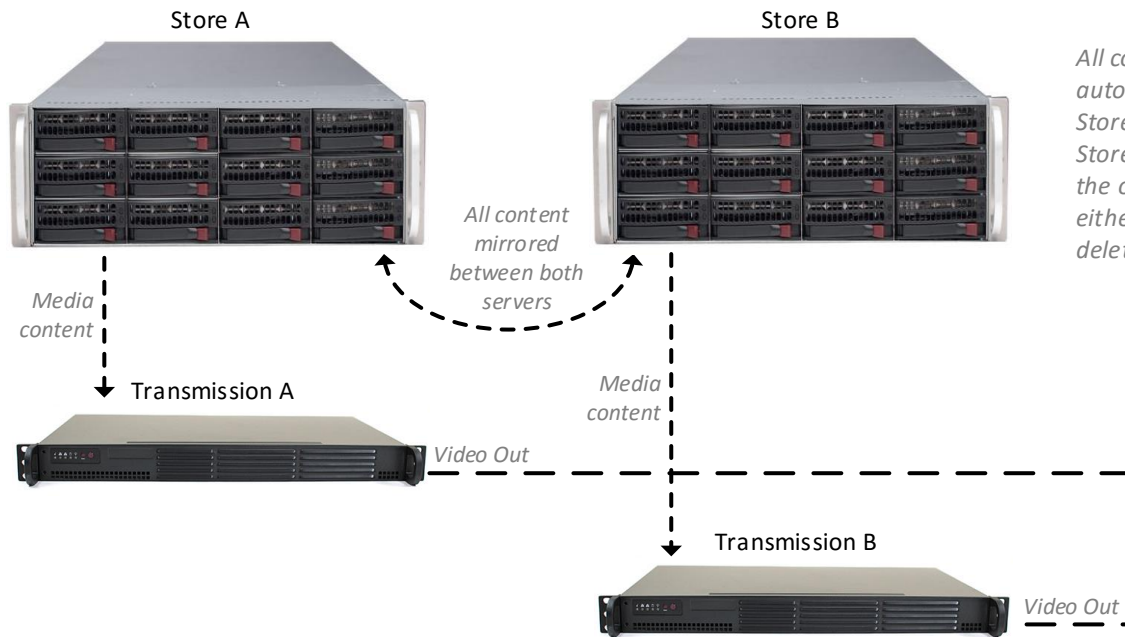
Newsroom, Video Server & Media Management Broadcast Solutions

Store A

Store B

All content is mirrored automatically between the two Stores – any clip added to either Store will be copied automatically to the other, and any clip deleted from either Store will be automatically deleted from the other.

All content mirrored between both servers

Media content

Transmission A

Media content

Video Out

Transmission B

Video Out

Transmission Server A prefers to play clips from Store A, and Transmission Server B prefers to play clips from Store B. But if a Store becomes inaccessible, a Transmission Server will begin to load clips from the other.

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aQ Broadcast system examples – redundant transmission playout		
NH	28 Jan 2016	v1

Playlist / Remote Control (FMC) sessions

Lo-Res Viewing sessions

Lo-Res Editing

High-Res Editing with I/O

High-Res Editing without I/O

User Environment

MAM DBServer A (QSIA)

MAM DBServer B (QSIA)

Job Queue Server

Auto-Ingest Server

WAN Gateway Server

MOS Gateway Server

Low-Res Proxy Management

NRCS Integration Server

Administration

Field / WAN

Other locations

Mirrored Lo-Res Store A

Mirrored Lo-Res Store B

Mirrored Hi-Res Store A

Mirrored Hi-Res Store B

All content mirrored between both systems

All content mirrored between both servers

Node 1 (ports 1 – 4)

....

Node x

Backup Management

Backup Store

Node 1 (ports 1 – 4)

...

Node x

Backup / Independent System

Main System (Mirrored storage, multiple ports)

aQ Broadcast system examples – enterprise system illustration
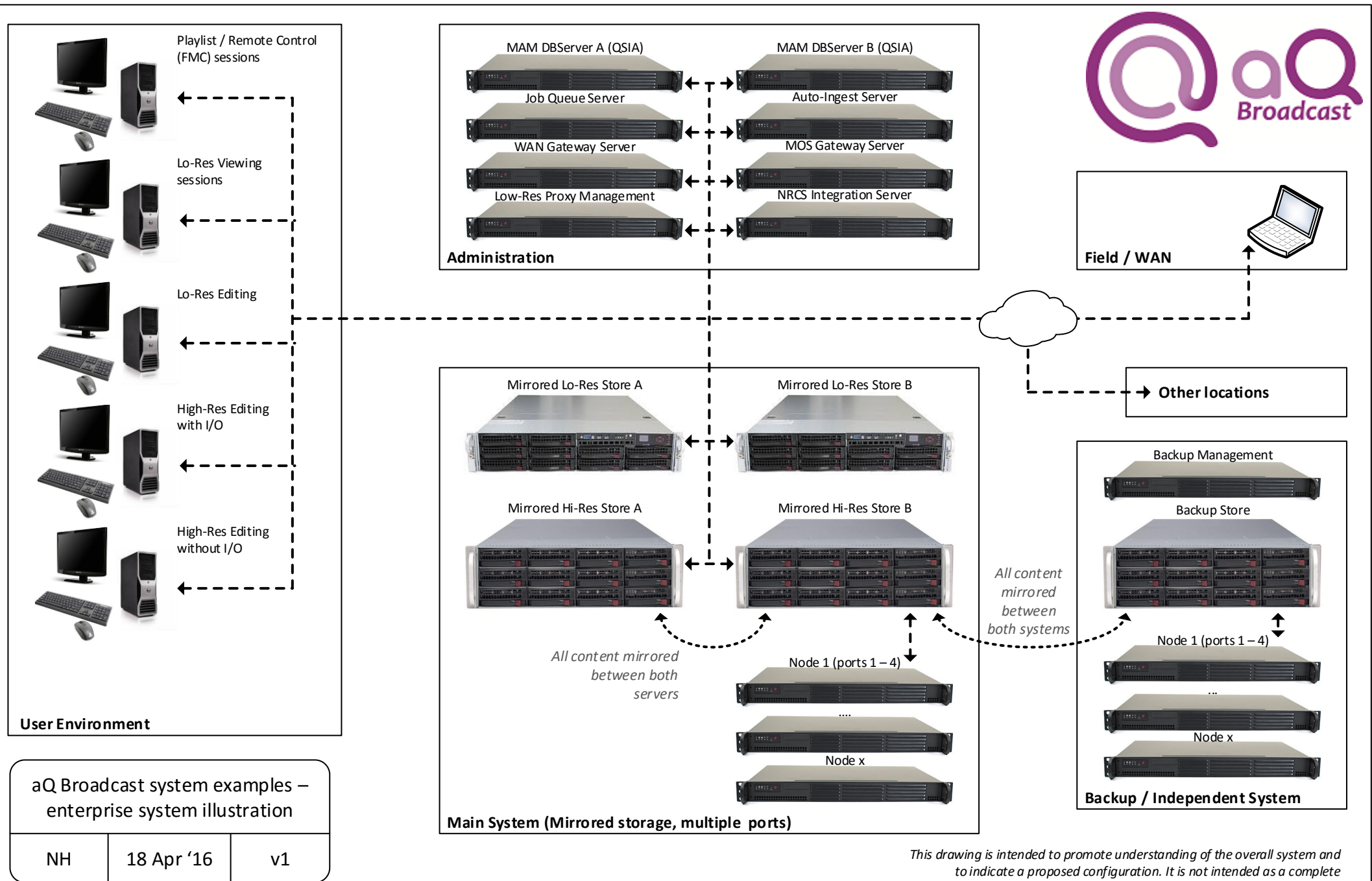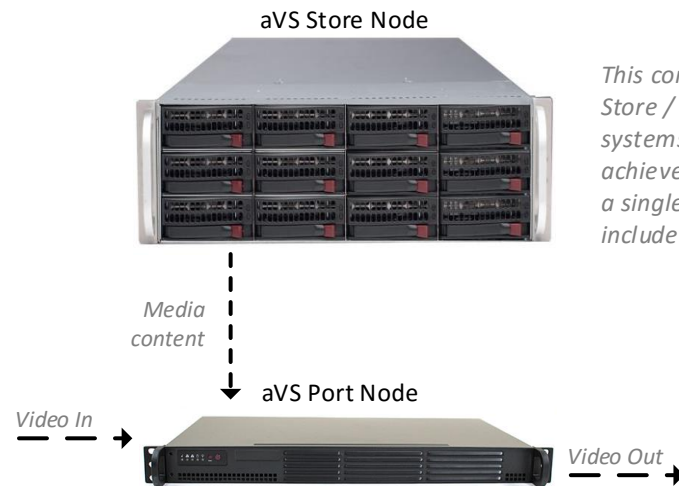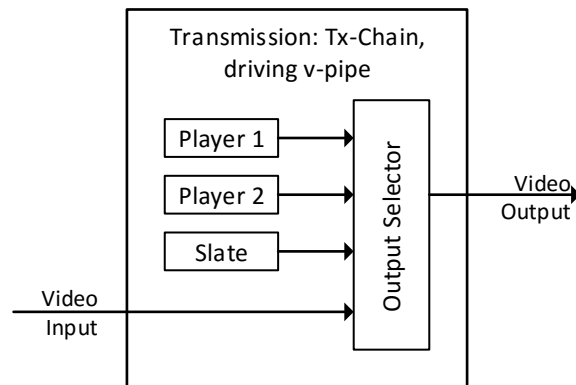
| NH | 18 Apr '16 | v1 |

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aVS Store Node

This configuration shows a standard Store / Port combination. For small systems, it is also possible to achieve the same functionality with a single Hybrid (Storage and I/O included within the same chassis).

Media content

aVS Port Node

Video In →

Video Out →

The standard Port node can be configured to run the 'video-pipeline' components, which includes virtual internal players, still stores and routers. This allows the single video output to be switched between a live input, a manual player, an image (e.g. station logo) and a player under control of the transmission sequence handling.

Transmission: Tx-Chain, driving v-pipe

Player 1	→	Output Selector	→	Video Output
Player 2	→		
Slate	→		

Video Input →

aQ Broadcast system examples – transmission playout (virtual player)		
NH	3 Feb '16	v1
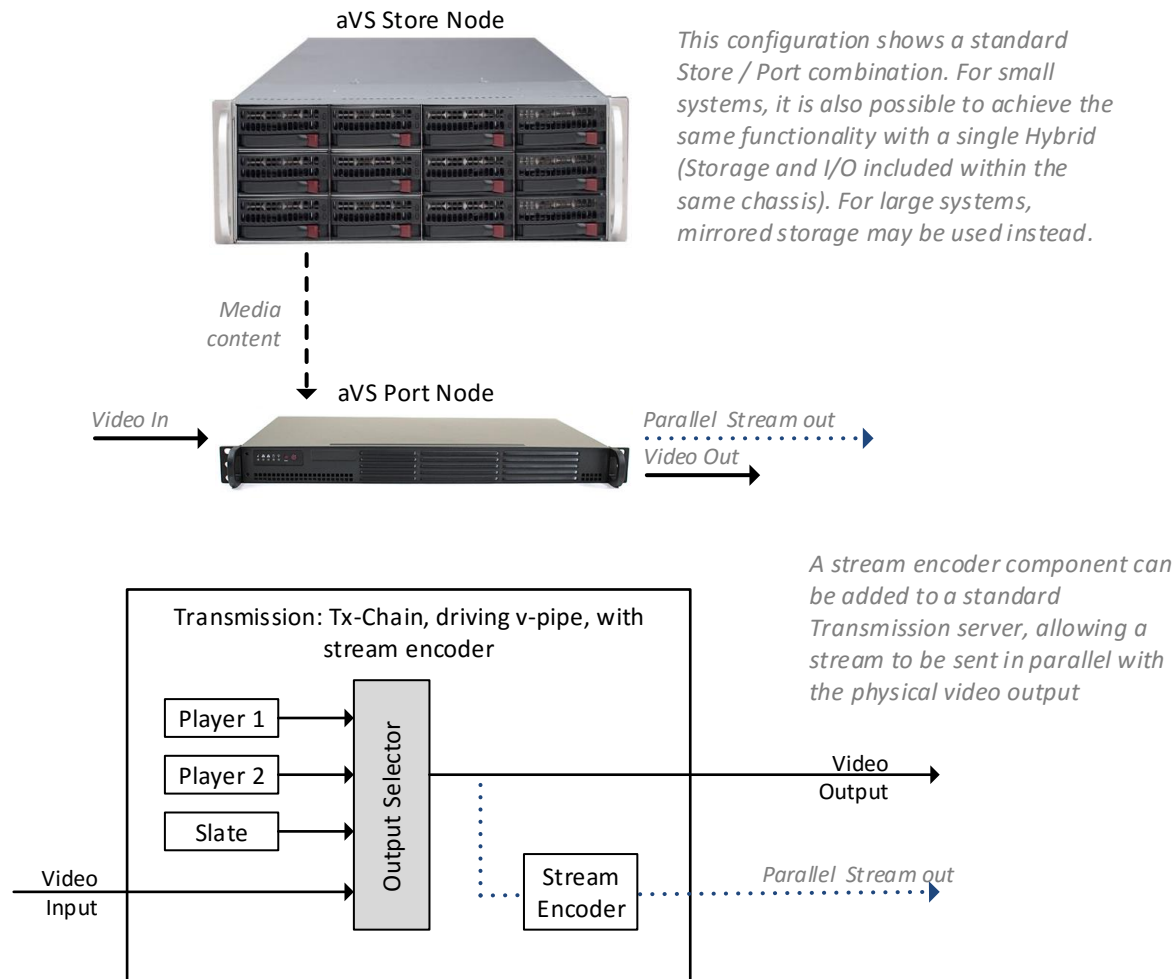
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QaQ Broadcast

aVS Store Node

This configuration shows a standard Store / Port combination. For small systems, it is also possible to achieve the same functionality with a single Hybrid (Storage and I/O included within the same chassis). For large systems, mirrored storage may be used instead.

Media content

aVS Port Node

Video In

Parallel Stream out
Video Out

A stream encoder component can be added to a standard Transmission server, allowing a stream to be sent in parallel with the physical video output

Transmission: Tx-Chain, driving v-pipe, with stream encoder

Player 1

Player 2

Slate

Output Selector

Video Input

Stream Encoder

Video Output

Parallel Stream out

aQ Broadcast system examples – transmission (with streaming)		
NH	22 Mar '16	v1

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Store A

Store B

All content is mirrored automatically between the two Stores – any clip added to either Store will be copied automatically to the other, and any clip deleted from either Store will be automatically deleted from the other.

All content mirrored between both servers

Media content

Transmission Server A prefers to play clips from Store A, and Transmission Server B prefers to play clips from Store B. But if a Store becomes inaccessible, a Transmission Server will begin to load clips from the other.

Transmission A

Video Out

Media content

Media content

Transmission B

Video Out

Stream Server details:
* one video input could be fed by the studio output and another from a generic live source (e.g. a city-view cam) for instance.
* one video output would provide video monitoring of the stream, for instance for display on the MCR video wall
* flexible internal configuration, including one or more virtual players capable of playing back content from the mirrored storage and one or more still/logo images
* the various internal and video sources would be switchable via the internal router, which would control both the output being streamed and the monitoring output.
* the routing and internal clip playback would be controlled using the same Tx-Chain handling as the existing A and B servers, with the schedule originating either from QSeries or from a simpler Tx-Lite sequence list.
* because this unit would have the same basic capability as the main Transmission servers, it could be immediately used as a spare in the event that either failed. It would essentially be a 'Transmission-C' server which could be set to play any schedule when required.

Stream Server

Video In – Source 1
Video In – Source 2

IP Stream Out
Video Out - Monitoring

Information provided by this drawing is for proposal purposes only and is subject to change without notice. All details will be confirmed as part of the order process.
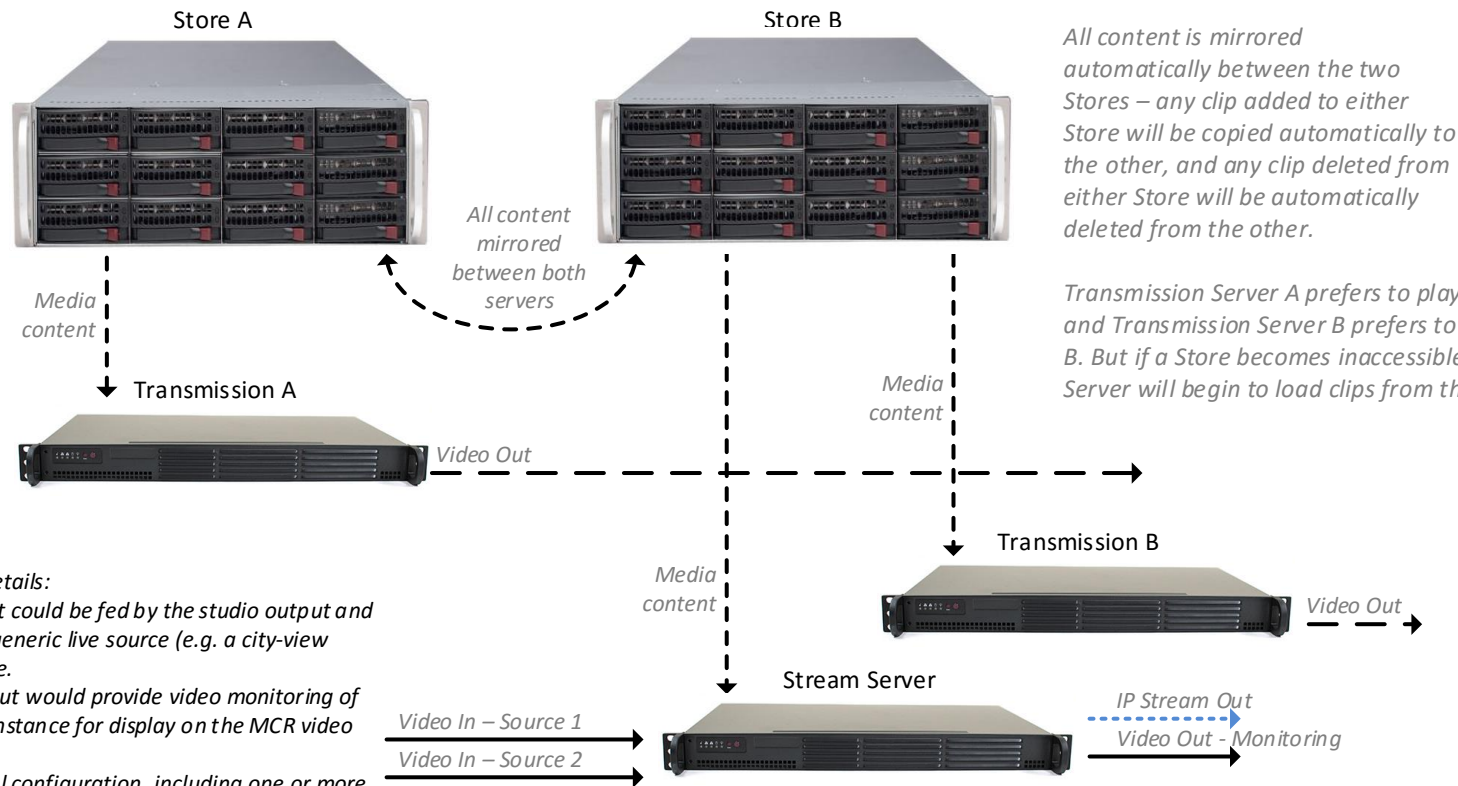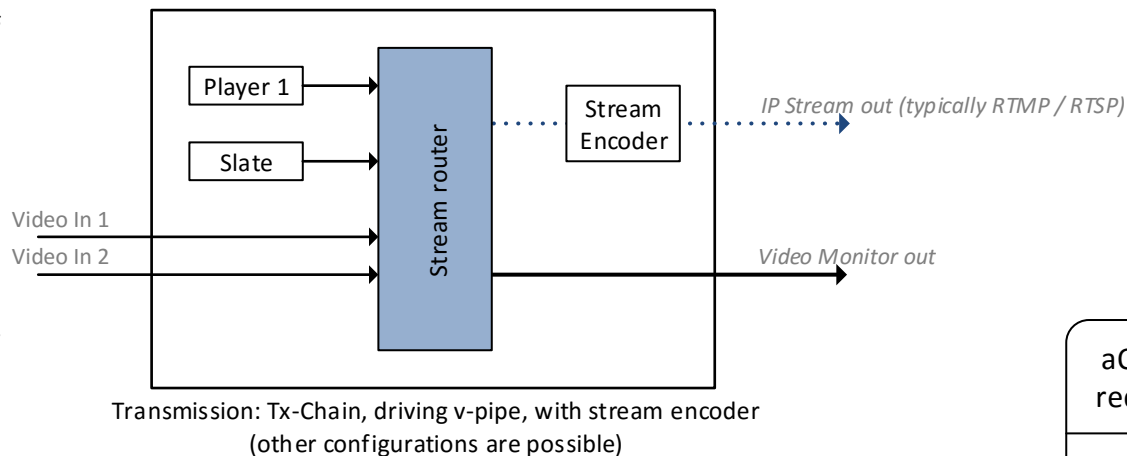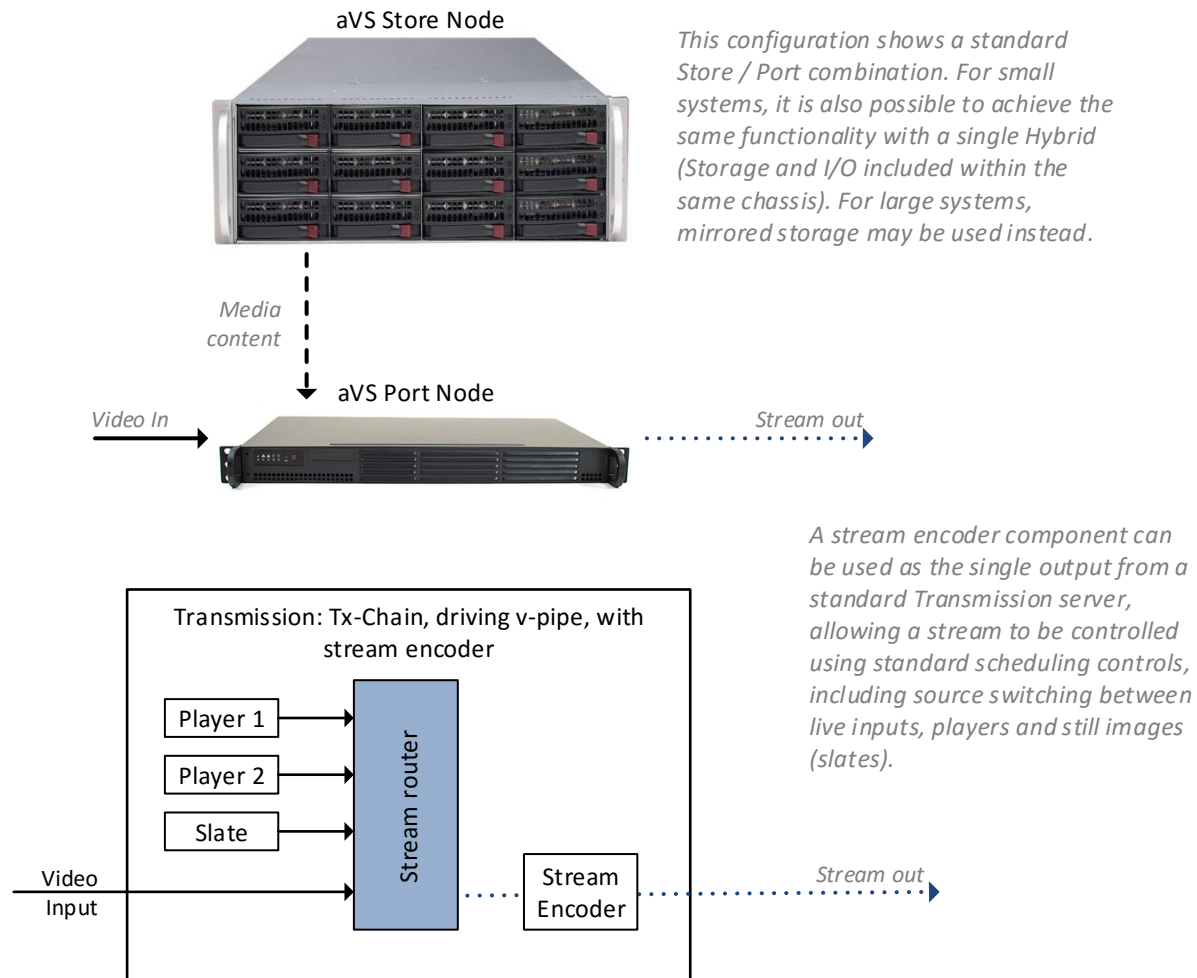
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Player 1

Slate

Stream router

Stream Encoder

IP Stream out (typically RTMP / RTSP)

Video In 1

Video In 2

Video Monitor out

Transmission: Tx-Chain, driving v-pipe, with stream encoder (other configurations are possible)

aQ Broadcast system examples – redundant transmission & stream

| NH | 3 Apr 2016 | v1 |

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aVS Store Node

This configuration shows a standard Store / Port combination. For small systems, it is also possible to achieve the same functionality with a single Hybrid (Storage and I/O included within the same chassis). For large systems, mirrored storage may be used instead.

Media content

aVS Port Node

Video In

Stream out

A stream encoder component can be used as the single output from a standard Transmission server, allowing a stream to be controlled using standard scheduling controls, including source switching between live inputs, players and still images (slates).

Transmission: Tx-Chain, driving v-pipe, with stream encoder

Player 1

Player 2

Slate

Stream router

Video Input

Stream Encoder

Stream out

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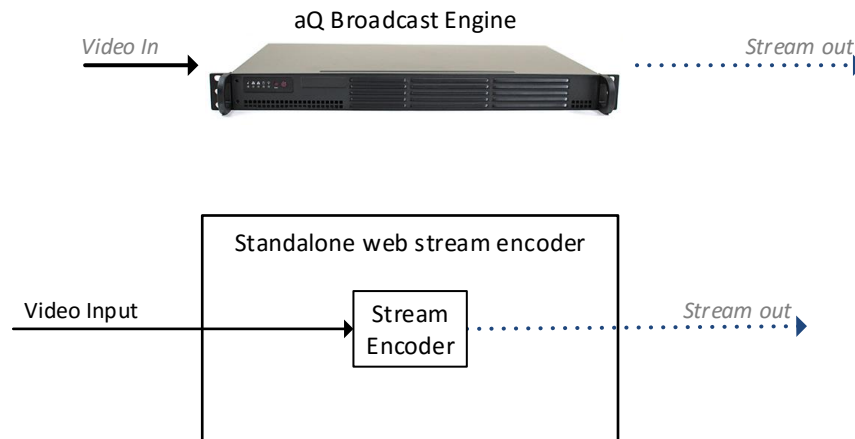
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aQ Broadcast system examples – transmission (stream only)

NH	22 Mar '16	v1

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aQ Broadcast Engine

Video In → [aQ Broadcast Engine] ·········· *Stream out* →

An aQ Broadcast Engine can be used as a standalone web stream encoder, taking a video input and converting it to a web stream in RTMP or RTSP format.

Standalone web stream encoder

Video Input → | Stream Encoder | ·········· *Stream out* →

aQ Broadcast system examples – standalone Web Stream encoder		
NH	22 Mar '16	v1

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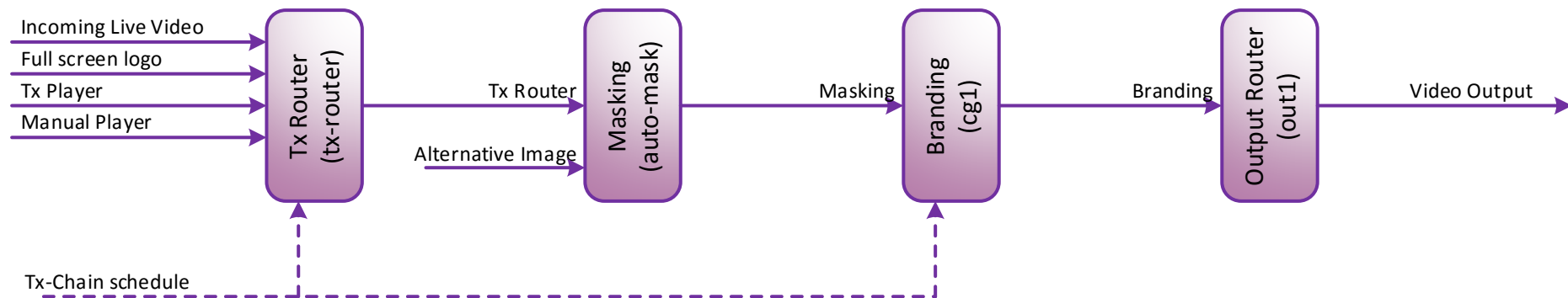
When running under control of an automation sequence, tx-router is switched by tx-chain in order to select the correct input based on the active schedule.

This 'mask' processor overlays the 'slate' graphic automatically when the incoming video matches the stored reference frame within the defined active detection area.

This 'cg' processor can add branding elements such as logo, clock, ticker, etc. Elements can be shown/ hidden manually or under control of the active schedule

The output router controls the ultimate output from the server. Any of the inputs and internal sources can be switched directly to the output, bypassing any other internal routing and processing.

Incoming Live Video
Full screen logo
Tx Player
Manual Player

Tx Router (tx-router)

Tx Router

Alternative Image

Masking (auto-mask)

Masking

Branding (cg1)

Branding

Output Router (out1)

Video Output

Tx-Chain schedule

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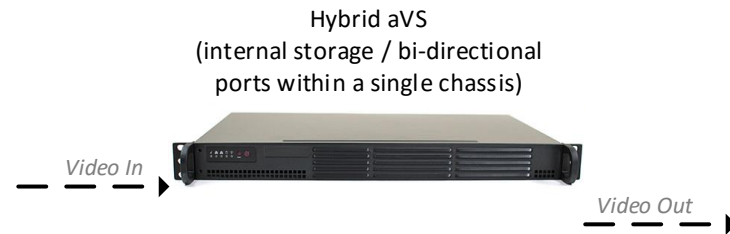
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aQ Broadcast system examples – Video Pipeline illustration

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Hybrid aVS
(internal storage / bi-directional
ports within a single chassis)

Video In

Video Out

Simple delay application – e.g. profanity delay for live shows.

The incoming live video is buffered for a set period (e.g. 5 seconds) and then emitted from the video output. In the event of a problem, the audio may be muted on the output or replaced with a generic looped track, or both the video and audio can be replaced.

Hybrid aVS
(internal storage / bi-directional
ports within a single chassis)
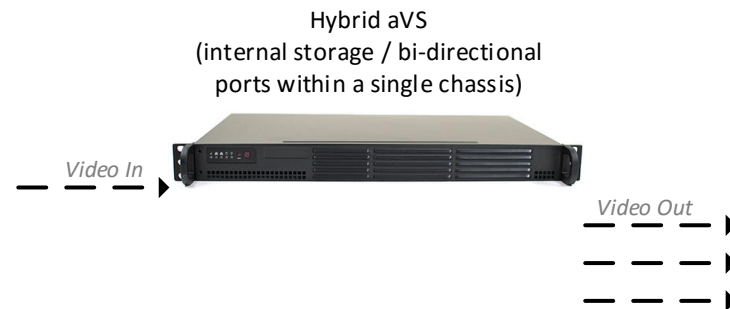
Video In

Video Out

Multiple delay application – e.g. station output delayed for different time-zones

The incoming live video is buffered for a set period and then emitted from each video output after a set period. For instance, one output could provide a delay of one hour, a second output could provide a two-hour delay and another output could provide a three-hour delay.

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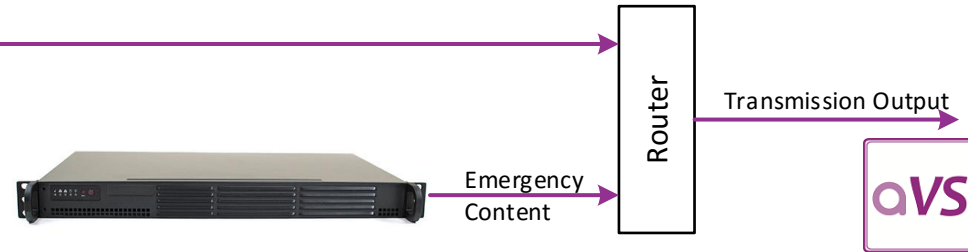aQ Broadcast system examples –
standalone aVS Delay units

| NH | 3 Feb '16 | v1 |

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Option 1

Normal source →

Server is operated manually, and the router switchover to the emergency content is triggered by hand

Emergency Content →

Router
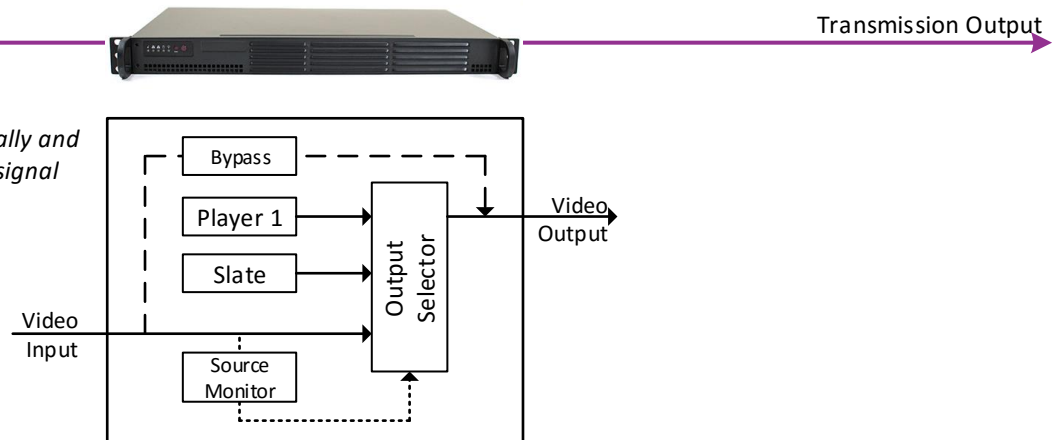
Transmission Output →

aVS

Option 2

Normal source →

Source is monitored and a switch to emergency content is triggered automatically via the external router on lost, black or frozen signal

Monitoring Input →

Emergency Content →

Router

Transmission Output →

Router Control

aVS
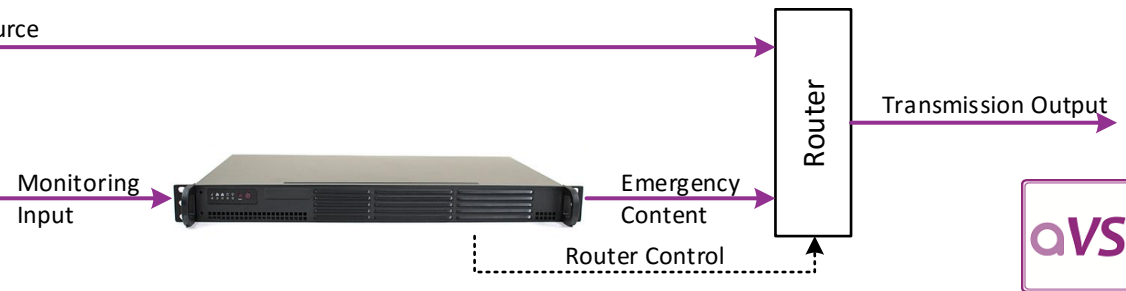
Option 3

Normal source →

Transmission Output →

Source is monitored and a switch to emergency content is triggered internally and automatically on lost, black or frozen signal

Bypass

Player 1

Slate

Video Input →

Source Monitor

Output Selector

Video Output →

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aQ Broadcast system examples – Disaster Recovery options

NH	3 Apr '16	v2

QaQ Broadcast

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Asset Transcoding (media volume handling)

aVS Store

aVS

Media Volume

Media Folder Structure

Select Clip(s) to be transcoded → Right-click to select transcode job → Transcode operation handled by Job Queue

New clip generated within Media Volume

Any clip (accessible from any Asset List – locally on the server or remotely via FMC) can be transcoded to another format, triggered by the user from the right-click context menu.

File Transcoding (watch-folder handling)
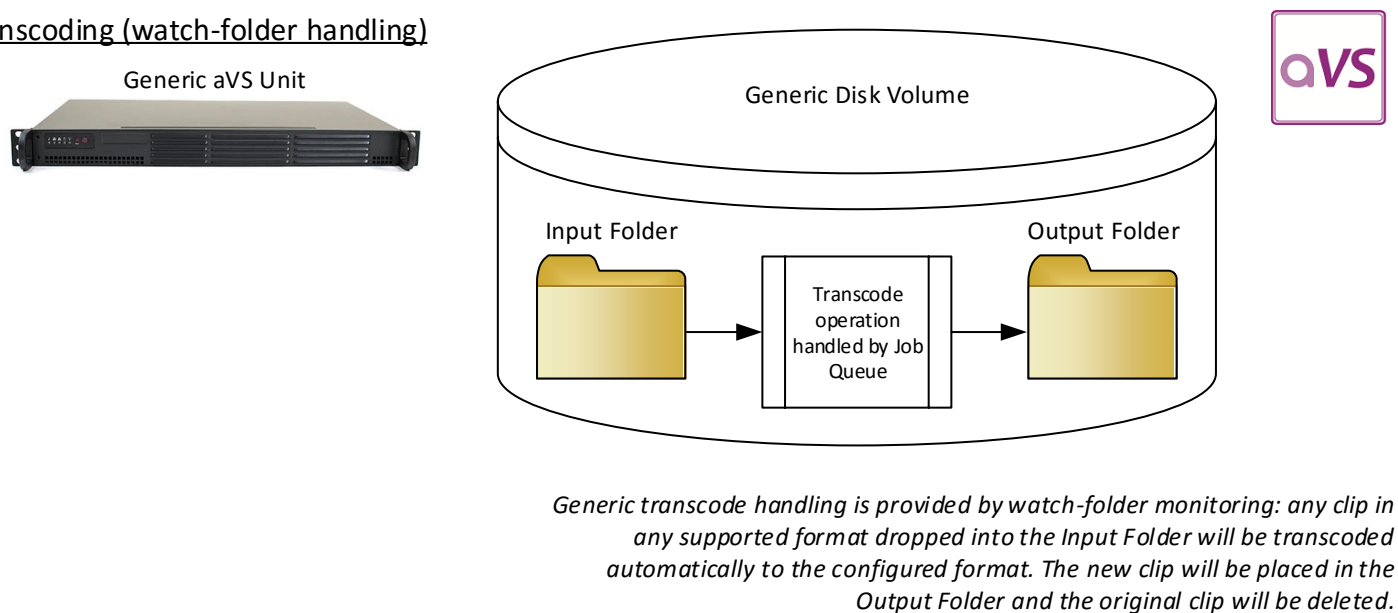
aVS

Generic aVS Unit

Generic Disk Volume

Input Folder → Transcode operation handled by Job Queue → Output Folder

Generic transcode handling is provided by watch-folder monitoring: any clip in any supported format dropped into the Input Folder will be transcoded automatically to the configured format. The new clip will be placed in the Output Folder and the original clip will be deleted.

aQ Broadcast system examples – File & Asset Transcoding

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QaQ Broadcast

Newsroom, Video Server & Media Management Broadcast Solutions

'Send-To' Handling (Transfer with optional transcode)

aQ Broadcast

aVS Store / Generic aVS unit

Media Volume

Media Folder Structure

Generic Disk

Input Folder

Automatic watch folder monitoring

Select Clip(s) to be transcoded

Right-click to select function

Transcode operation handled by Job Queue

Transfer operation handled by Task Manager

FTP transfer (e.g. 3rd party)

Upload (e.g. YouTube)

Upload (e.g. Web Site)

Output Folder

3rd Party workstation or server (file transfer)

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'Send-To' handling provides transfer to a variety of sources using a specified format. Existing media can be selected from the Media Volume (via any Asset list) or generic clips can be dropped into a watch-folder to be processed automatically. The items are transcoded to the required format (if necessary) and are then transferred to the specified destination, using the selected mechanism.

aQ Broadcast system examples – 'Send-To' Functions		
NH	3 Apr '16	v1

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