# Frequently Asked Questions (FAQ)

Common requests for information made during project proposals

**CONFIDENTIAL DOCUMENT**

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# Frequently Asked Questions

## Contents

# 1 Introduction

This document provides general responses to some of the questions frequently asked during project proposals. Of course, not every answer will apply in every case, and we will always do our best to clarify details based on each individual requirement. And we do not expect this list to be exhaustive – we will always be happy to answer any other query about how our products and systems work.

As far as possible, the questions have been divided up based on product area, but as our range is extremely integrated there will always be overlap and some elements will apply equally in different areas.

## 1.1 Further Information

For questions that are not covered here, either entirely or in relation to your particular project, please contact sales@aq-broadcast.com for specific information.

# 2 Broadcast Engine Hardware

This section covers the aQ Broadcast Engine (QuBE), Video Server (aVS) and Media System (aMS), all of which currently run v4 firmware.

## 2.1 General System

| Ref | Enquiry | Response |
|---|---|---|
| 1. | Does the system allow for recording and playback of baseband SD-SDI, HD-SDI and UHD? | All Input/Output (I/O) ports support SD and HD.<br>It is assumed that "4K-UHD" is meant in this context. 4K-UHD has different connection options from HD, including single link, dual link and quad link. The aQ system can offer solutions for any of these connection options depending upon customer requirements, but only one type of connection can be supported for each individual I/O port. |
| 2. | Does the system allow for ingest and playback of SD-SDI, HD-SDI and UHD file-based content? | The aQ Store node is largely agnostic to video format. The core infrastructure is already capable of processing 4K-UHD material - fundamentally, it is resolution neutral, and will in fact process any frame size. Video encoders and decoders that work at 4K-UHD resolutions also exist already. |
| 3. | Are common formats supported, including DNxHD, MPEG4, MPEG2, ProRes, AVC, XDCAM wrapped in .mxf, gxf, QuickTime, or MP4, MP2? | The aQ system can store and play back almost any file / video format, including content with a wide range of resolution, frame rates and standards. In addition to the formats listed here, the system can also handle AVI, DV-DIF, FLAC, FLV, LXF (Nexio Native Format), MP3, MXF (OP-1a and Op-Atom), .seq, .wav, Y4M uncompressed video, XML Clip Description (.clip), JPEG/JFIF, Bitmap, PNG, SGI, AIFF, ASF, GXF, MPEG stream (PS, TS, ES) and MKV (Matroska) (different formats are supported to different extents). |
| 4. | Which Operating System is used? | All aQ back-end firmware runs under a specific Linux distribution which has been optimised for aQ's specific requirements. The associated GUI components run under Windows and also the same specific Linux version. A number and variety of gateways and protocols are provided to enable integration with third-party systems and software. |
| 5. | Is the system scalable to allow for storage, I/O and editing expansion without loss of media and without restriping? | Additional storage can be added as complete Storage nodes without loss of media or interruption to the existing system. Additional I/O ports can be added at any time. The ability for any Port to record to any Store and to playback from any Store offers extremely flexible configuration and operation. |
| 6. | Is the system resilient? | The aQ system is extremely modular, in terms of hardware servers, firmware services and software Graphical User Interface (GUI) components. This makes it very resilient to component and system failures and also straightforward to build / configure parallel systems. |

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| 7. | Can a redundant system be built to avoid any single point of failure? | Critical system elements can be mirrored/duplicated, which allows parallel operation to take place separately and independently. Other components are typically software elements which can run on any suitable back-end server, so the loss of one unit can be mitigated immediately simply by running the same element on a different server. |
| 8. | Are virtualized systems supported? | The aQ server system does not run under a virtualized environment, other than for specific elements of the QSeries software range. However, multiple back-end firmware services can typically run together on the same standard hardware server (typically Linux-based), which allows for large systems to be built without requiring large numbers of servers. |
| 9. | Does the solution provide a centralized infrastructure? | The aQ system consists of modules which can operate locally and/or centrally. This flexible approach allows a range of configurations, including heavily centralised systems, to be built and operated effectively. |
| 10. | Can the system provide at least 99.999% uptime including during regular maintenance and management activities? | 99.999% uptime equates to a downtime of around 5 minutes per year. It isn't possible to provide that commitment for any single unit - a single firmware upgrade for one server could take longer than 5 minutes including the unit reboot, for instance - but it could be legitimately applied to a system as a whole. The modular / component-based approach ensures that individual failures will not prevent the system as a whole from functioning, and critical operations can be protected with mirrored Stores, mirrored/parallel I/O Nodes and duplicate services. For firmware upgrades, the parallel configurations can mean that it would be possible to leave one side running whilst the other side is being upgraded, for instance. |
| 11. | Are critical components equipped with dual (redundant) power supplies? | All 'gen3' hardware servers (apart from entry level units) are equipped with dual PSUs with hot-swappable modules. |
| 12. | Do you recommend any specific network switches for the configuration? (like separate switches for data and control network)? | We always provide all of the networking (i.e. switches and cables) required for the aVS Store and Port units to connect on their own private video network. All servers (PC and aVS) would also need to connect to the public network, but any standard hardware can be used for that. |

## 2.2 Media Storage

| *Ref* | *Enquiry* | *Response* |
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| 1. | Is it possible to play/ingest directly from/to shared media storage? | Yes - this is a fundamental way in which the aQ system operates. |

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| 2. | Can there be a clear backup strategy for media and metadata? | Two Store Nodes can be provided to offer a mirrored storage. In this case, media movement can take place automatically (e.g. so that content is mirrored at all times across two Stores), based on rules (e.g. so that content can be deleted or archived automatically after a set date, for instance) or manually (e.g. so that an administrator can select specific items to be deleted). |
| 3. | Is there any performance impact during storage drive failures/rebuilds? | The precise behaviour here will vary according to the exact specification of the Store, but in principle at least two hard drives can fail without any loss or corruption of media. Volume rebuilds will increase the resource utilisation within the server, but not to such an extent as to impact performance related to media handling. |
| 4. | Are multiple high-speed network connections to shared storage available to provide high-efficiency throughput when transferring media? | The aQ Store units have a range of network connection options, including multiple 10Gig and 1Gig NICs.<br>The standard gen3 units (apart the entry-level models) have two 1GigE connections. More and/or faster (e.g. 10GigE) connection options are available if required. |
| 5. | Can an indication of bandwidth / throughput be provided? | Bandwidth figures apply to a number of areas (including network traffic and throughput to and from the disk arrays) and is dependent on a large number of factors. In relation to disk access, the total bandwidth can be in excess of 48 Gbits/sec - approx. 40 Gb/s read bandwidth and approx. 8 Gb/s for write bandwidth, although both figures are conservative values for maximum sustained traffic. Actual peak values will be considerably higher. However, the exact throughput figures will vary depending upon the exact configuration of the Store. For instance, increased throughput can be provided by configuring a larger number of smaller drives or by specifying faster drives. |
| 6. | Is CIFS/SMB file access available? | Yes, the media is accessible from other devices (e.g. PCs elsewhere on the network) via SMB, although FTP is also available as an option. However, internal file access (e.g. during recording and playback) is provided by dedicated handing. |
| 7. | Is there the ability to extract clips of various formats from the shared storage without requiring Editor interaction? | Media is accessible directly in a number of ways, including via SMB/SAMBA file sharing and FTP over the network, direct export to USB drive and transfer as a 'send-to' function under user control within the GUI tools. |
| 8. | Is there the ability to extract portions of longer clips without creating new media on shared storage? | The aQ system has always had the ability to generate sub-clips - items which exist in their own right as separate files within the media volume. But new functionality has been added recently, whereby sub-clips can be created by reference to the original media as an alternative. For instance, if clip 'A' is 30 minutes long, then virtual clip 'B' could be created which refers to the middle 26 minutes without having to generate a new copy. Importantly, if clip 'A' is deleted, the content relating to 'B' will be retained automatically, so there is no risk that a 'master' item can be deleted, leaving 'orphaned' sub-clips behind. |

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| 9. | Is it possible to extract still frame(s) from high-res media through an API? | There are a number of protocols and APIs which can be used to obtain information about media on the aQ system, including the native PDC handling used by internal applications, an elaborate XML protocol, two simple text-based protocols for control over a standard network connection and a developing HTTP protocol using JSON GET and POST commands. The PDC handling already implements a method to obtain the thumbnail image, and in principle this could be extended to any of the other protocols to allow any still image to extracted. |
| 10. | Is it possible to control access to assets or to embargo material? | The media asset database provides a great deal of access control, e.g. to control when a clip should not or must not be played or to define when it should be archived or deleted. Content can be set with an expiry date (when it can be played but with a warning) and an embargo date (when it cannot be played). There is also a general flag which can be set to ensure that a clip cannot be played regardless of any other settings. |
| 11. | Is it possible to search and use assets from other Stores (either centrally stored or automatically moved to regional shared storage)? | The FMC GUI provides manual control to copy or move content between locations and underlying job-queue handling provides similarly automatic handling. |
| 12. | How can proxy / low-res functionality be provided? | The aVS firmware can handle proxy material in two ways.<br>1) If required, the system can generate a low-res copy of each high-res item. In this case, the number that can be created in parallel is only restricted by the horsepower of the server producing them. An aVS unit dedicated to transcoding might be able to handle 10 or more parallel conversions as fast as possible, whereas a unit handling other processes – e.g. a Store unit serving a number of Port nodes – might be practically capped at producing a handful of parallel conversions at a specific rate.<br>2) However, it is not necessary to generate low-res copies if the low-res is being used within the confines of our system. In this case, our software – e.g the QNews NRCS Client and the FMC remote GUI – is capable of streaming proxy content on-the-fly, generated in real-time and on-demand by the Store. This is an extremely efficient approach, as it is not necessary to constantly run with the overhead of generating clip copies, nor to provide additional storage for the low-res material. In this case, the system licence controls how many concurrent proxy streams are available.<br>There is a further approach, which is that the FMC application can utilise "null-port" configurations, which allows video and audio to be reviewed at any location without needing to take control of a physical input/output. Any number of null ports can be configured on multiple machines, subject to available resources. |

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| 13. | What is the format of the proxy clips? | If low-res files are being generated, any standard encode profile supported by the firmware can be selected for the file and encode format. If the proxy material is being streamed to the Clients (i.e. generated on-demand) then the type of content streamed to the Clients can be configured according to the capacity of the network. |
| 14. | Can low-Res proxy files be created automatically in standard, non-proprietary file formats, accessible by API, third-party or custom software applications? | Proxy copies can be created in any supported ingest format, including reduced frame size, reduced frame rate and long-GOP configurations. |
| 15. | Can proxy file generation begin immediately after file recording starts and are they accessible whilst growing? | Generation of low-res proxy files can be set to begin automatically, a few seconds after recording of the original content has begun. It is also possible to utilise proxy content which is generated and streamed on-the-fly to reduce the overhead of low-res file production. However the streaming method would not be appropriate in the larger sites, where there might be hundreds of users for the low-res material. |
| 16. | Does the system support low-res editing? | No, not directly, not at the moment – although it is planned for the future. However, it is already possible to carry out simple functions on media, including marking in- and out-points to restrict the amount of a clip that is played and also to enable a new clip to be created from the marked portion (i.e. sub-clipping). It is also possible to create a sequence of clips, which would normally be played out back-to-back (regardless of their individual format) although simple transitions can be inserted if required – and there is a function which enables this sequence to be conformed to a new clip. Some of our customers use this as a very simple shot-selector, as it can be run on any media on any Store and from any location without having to switch to a full craft edit application. |

## 2.3 Port Nodes and Recording / Playout

| *Ref* | *Enquiry* | *Response* |
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| 1. | How is the format of the video output defined? | The output settings for any given port is defined (e.g. as 1080i59.94) as required, but any clip in any format can be played on that port - it will simply be converted on-the-fly. |
| 2. | Is it possible to create sequences/shot lists through the GUI without using an Editor? | Sequences and playlists can be created natively within the FMC GUI on any networked workstation, and sequences in particular can be conformed to a brand new clip, including transitions. |

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| 3. | Are automated, scheduled playout/ingest functions available? | Any single record or playback operation can be set to start at a specified date/time in the future and then run for a specified length of time. It is also possible to set up more complex automatic record operations - e.g. starting at 5pm for 30 minutes every Tuesday. These automated operations can also include router control, allowing a source to be specified and then routed automatically. |
| 4. | Are last-second updates to / revision of items cued for playout possible? | The next item to be played can typically be changed within a few frames of playback. |
| 5. | Is integration with external automation and server systems such as iNews, MOS, Overdrive, VDCP, SMPTE (Timecode trigger), GPI, RS232/RS422, Airspeed, EVS, GVG, etc. possible? | Supported transport / control protocols include Sony P2/P9 (serial), VDCP (serial and IP) and AMP (IP), timecode triggering and GPI triggering (contact closure or active voltage with isolation protection). aQ has extensive previous experience with interfaces to iNews and OverDrive, and has many MOS implementations (both device-end and NRCS-end). |
| 6. | Is it possible to control playout channels through API including ability to: Load/Cue clips within one second, play at any speed/direction (from.1x to 100x), control over audio level on the fly, etc.? | Audio level can be adjusted on the fly, including fade-to-silence (and also optional fade-to-black). As above, there are extensive options for transport control, using both standard (e.g. VDCP / AMP) and proprietary (e.g. XML, HTTP) protocols. |
| 7. | Are manual crash recording and manual playout possible? | Direct port control is available from the FMC GUI running on any networked workstation. |
| 8. | Is it possible to carry out baseband recording continuously for over 12 hours? | Files can be recorded continuously up to the limit of the amount of disk space available. There is also a specific record mode which enables 'chunking', where recorded content is automatically split into blocks of defined length, rather than appearing as one single, large file. |
| 9. | Can playout/ingest channels be mirrored to provide redundancy? | Ports can be mirrored / linked together in a number of ways, including automatic underlying handling for long-term mirroring and GUI-based linking for short-term/occasional use. |
| 10. | Is it possible to begin playback of an in-progress record feed from any/multiple playout channels simultaneously within a few seconds of record-start? | Other actions (including playback, export, transcode, etc.) can be started on an active clip within a few seconds of the recording being started. |
| 11. | How long does it take for the Ingested clip to be available for editing? | A recording clip will typically be ‘committed’ within a couple of seconds of record completion. However, depending upon the exact configuration being used, in some cases an external editor can access content whilst recoding is still taking place. In all cases, a clip being recorded on one port can be loaded into another port for playback within a few seconds of the ingest starting. |

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| 12. | Is there a destructive-loop record function similar to some cameras where a recording can be started in a continuous 2 minute (duration-configurable) loop that when a trigger event occurs, either manual or some programmatic trigger, a clip is created from that point, containing recorded material two minutes back and then becomes an open-ended recording until a record-stop event is triggered? | This is one of the built-in record modes, alongside standard record, chunked recording and time-lapse record. |
| 13. | Can clips be cued quickly to a specific timecode? | Clips can be set with in- and out-marks to allow them to be loaded to a particular point. Frame jump shortcuts allow the user to jump forwards and backwards easily by 1, 10, 100 and 1000 frames at a time. |
| 14. | Is variable speed playback available from .1x to 10x in both directions? | Clip playback can actually be set to use any fractional value, including slow-motion playback, in either direction - e.g. -16/1, -8/1, -4/1, -2/1, -1, -1/2, -1/4, -1/8, -1/16, 0 , 1/16, 1/8, etc. - although any fractional speed can be specified. |
| 15. | Is there any hardware panel available for control of news clips playout during production? | Yes, hardware button boxes are available in a number of formats, including sets of buttons in a variety of layouts, for instance 16 in 1U, 32 in 1U, 24 (4x6) or 60 (10x6) in desktop boxes, and also jog/shuttle controllers with 12 or 68 buttons. |
| 16. | Are linked key+fill outputs supported? | The aVS can provide linked key+fill outputs for clips which contain an alpha channel – i.e. the clip is loaded into one port and the background appears on one video output and the key appears on a second. Both studio and transmission servers can handle some keying internally – for instance when applying lower-thirds/name supers or displaying logos/bugs – but neither currently accept key and fill inputs at the moment. We can explore options for this though if there is a particular requirement for it. |

## 2.4 User Operation

| *Ref* | *Enquiry* | *Response* |
|---|---|---|
| 1. | Are low-res or proxy editing, screening, and journalistic functions available? | The FMC GUI already uses original high-res, file-based low-res or streamed proxy content depending upon availability. |
| 2. | Is there support to enable high-res material to be uploaded back to a central Store? | Any FMC GUI session can upload content (e.g. from a local USB drive) to a remote Store. |

## 2.5 Transmission (MCR) Playout Operation

| Ref | Enquiry | Response |
|---|---|---|
| 1. | Can the transmission server do logo insertion on the live feeds? | Yes, the transmission server can apply a wide range of graphics if required, including bug/logo, ticker, clock, sidebar, headline box, lower-thirds etc. It can also handle squeeze-backs and other effects, including adding an animated background in the space left after a squeeze-back move. |

# 3 Broadcast Workflow Software

This section covers the QSeries and QMedia software products.

## 3.1 General System

| Ref | Enquiry | Response |
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| 1. | Which Operating System is used? | aQ Client applications typically run under Windows on a PC or on a Mac under a Windows emulator. Extensive development work is currently underway to enable the server GUI components to run within a standard web browser, which will extend support to any platform capable of running a browser application. |
| 2. | | |

# 4 Complete System Solutions – Integrated Software & Hardware Packages

This section covers the integrated systems built entirely using aQ's software and hardware components.

## 4.1 General System

| Ref | Enquiry | Response |
|---|---|---|
| 1. | How many client PCs are recommended for the overall system (News + Automation & playout)? | This would be entirely down to the number of users and the required workflow in terms of who manages/operates what. Our QNews and QTx software is entirely client-server based, and applications such as the ACC and FMC can be run on any workstation, which provides a very flexible approach. But, as a broad example, the following might be an approximate starting point:<br>x - QNews Client workstations, based on the number of concurrent users / desks in the newsroom<br>x - QTx Client workstations, based on the number of concurrent users / desks<br>2 - ACC workstations - one for each studio gallery<br>x - QNews workstations in each gallery, e.g. for the producer, PA, etc. as required – alternatively, for small operations, sometimes a single PC with dual screens is used, so that one person can see both the QNews Client and the ACC at the same time.<br>1 - QNews prompter workstation for each studio<br>3 workstations for the MCR/transmission operator, one for QTx scheduling, one for FMC for main output and one for FMC for backup output. This number could be reduced if required by using one or more PCs with dual screens. |
| 2. | Is there any separate automation device server which controls the playout ports of video server? What is the connectivity? | There is a range of communication between our various systems, including media scanning and port control, all handled using direct native protocols over IP. The media scanning in particular would be handled via a service running on an appropriate PC server, but playout for studio applications (e.g. loading and playing clips based on automation events within the news rundown) would be handled by direct communication between the ACC (Automation Control Centre client application) and the output ports. Transmission playout is handled by a process running on the transmission servers themselves – the Tx-Chain engine retrieves the schedule dynamically from the QSeries database (i.e. any change from any QTx Client will be updated immediately in the transmission schedule) but in the event of a server or network problem transmission output will continue based on the last available version of the list. |

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