

iTX

4K/HD/SD Integrated Payout with IP/SDI Flexibility & Advanced Workflow Automation



Updated for iTX software version 2.9.

iTX integrated payout offers outstanding future readiness with full IP/SDI format flexibility, as well as 4K/HD/SD multiresolution support and exceptional scalability. It also delivers advanced, end-to-end workflow tools for a higher level of process automation.

iTX from Grass Valley, a Belden Brand, combines all the payout capabilities above with a proven track record, delivering more than 17.5 million hours of broadcast television each year. These channels range from national broadcasters and global brands to local stations, and they carry many of the biggest live events on television. With iTX, broadcasters are assured that commercial revenues are protected, while the costs of operation are minimized.

Lower OPEX with Workflow Automation

OPEX reduction has always been a core strength of iTX, with major broadcasters realizing a real-world 20 percent saving through a higher level of workflow unification and automation. Recent iTX enhancements have included strengthened file ingest, automated quality control and transcoding integration, which have all extended the level of workflow automation.

IP/SDI Format Flexibility

iTX's IP/SDI format flexibility makes it ideal for broadcasters who are aiming to migrate to IP-based payout. It offers SMPTE ST 2022-2 MPEG-2 and H.264 compressed IP inputs/outputs, as well as SDI I/O. Version 2.9 introduces SMPTE ST 2022-6 input to support IP production systems. This flexible configuration means there's no need to change payout hardware as formats evolve.

4K/HD/SD Multi-resolution Support

iTX also provides a natural transition to 4K/UHD content payout for more engaging television. This is delivered directly from the iTX Appliance 2 platform, using square division quad-split or 2-sample interleave over SDI I/O for outstanding 4K picture quality.

Exceptional Scalability

The iTX system offers exceptional infrastructure scalability, with proven support for facilities with more than 250 channels. This scalability stems from a higher level of functional integration within the Appliance 2 platform, which streamlines the payout chain and results in fewer devices overall.

Fully Featured Captioning/Subtitling

The Softel captioning/subtitling option extends iTX's functional integration further, and represents the first time a premium subtitle engine has been incorporated within an integrated payout system. It delivers up to 20 languages per channel, including the major worldwide languages.

KEY FEATURES

Unified, end-to-end workflow from ingest to playout

- The iTX workflow spans ingest, quality control, content management, archiving, traffic interface, audio/video processing, graphics/subtitling, transmission control, transcoding and monitoring

iTX broadcast engine delivers greater scalability, lower cost of ownership

- The iTX broadcast engine integrates all core playout functions (source selection/mixing, file playout, up/downconversion, ARC, audio processing & up/down mixing, graphics, subtitling/captioning, Nielsen watermarking and automation)
- The iTX broadcast engine's dual channel capability delivers more streamlined, high performance HD/SD simulcast with fully independent processing of both outputs, including independent graphics

Flexible migration path to IP

- iTX is ideally suited to broadcasters who are aiming to migrate to IP, with its support for SMPTE ST 2022-2 MPEG-2 and H.264 compressed IP outputs plus simultaneous SDI playout
- iTX can mix IP (both SMPTE ST 2022-2 and 2022-6) and HD-SDI live inputs, using back-to-back IP and SDI clips. This allows an easy introduction of IP feeds into a basebase oriented system
- Alternatively, iTX can be used in a pure IP environment

4K/HD/SD multiformat performance

- iTX broadcast engine offers outstanding 4K playout picture quality using square division quad-split or 2-sample interleave (configurable at channel level; one input, one output)
- Audio playback using PCM, Dolby Digital (5.1) or Dolby Digital Plus (7.1)

Advanced subtitling/captioning

- Fully featured integrated Softel subtitling/captioning with support for up to 20 languages per channel, including major worldwide languages
- Supports the import of subtitle files from third-party subtitling vendors, including Screen, Cavena and EBU
- Output of World Standard Teletext, OP42, OP47, EIA-608/EIA-708 closed captions Open (burnt-in, 2 languages) and DVB/teletext subtitles within an IP stream

Seamless handling of dynamic schedules & live content

- iTX manages highly dynamic schedules and late arriving media by supporting multiple video format playbacks without the need to transcode
- File wrapper support for popular formats, including IMX, XDCAM HD, AVC-Intra 100, QuickTime, MXF, GXF, DNxHD and XAVC
- Responsive transmission control of live content, using GUI or a traditional master control panel. The GUI simplifies last minute schedule changes with instant recalculation of schedules
- Internal secondary record enables live events to be captured, with or without graphics, removing the need for additional record ports

Automated ingest, quality control & transcoding

- iTX Delivery Manager supports a wide number of asset delivery partners for automating the ingest of media and metadata, including PathFire, PitchBlue and CatchBLUE for file delivery
- Automated quality control via Interra Baton file-based QC
- Extended transcoding with Telestream Vantage enables content to be automatically transcoded

Advanced real-time graphics

- Real-time rendering using Vertigo XG graphics processor
- Powerful, HD/SD character generator allows the playout of virtually unlimited layers of animated and dynamically updated text

Integrated, playlist-aware monitoring

- Integration with iControl Playout monitoring and Kaleido multiviewers enables better anticipation of potential transmission errors by operators, as well as faster fault finding
- Publishing of real-time playlist data to the multiviewer, including now/next countdown information and missing media alerts

Automated VOD asset preparation and publishing

- iTX On-Demand option reduces VOD preparation time for pre-recorded and live content and enables new revenue streams.

Enterprise-level resilience & redundancy

- Fault-tolerant framework with redundant playout configuration
- Each output channel contains a local media cache, plus an automation engine that holds the playlist for that channel. This architecture allows playout to run standalone in the event of the iTX Framework becoming unavailable, until the local schedule and content cache have been exhausted
- Optional multisite disaster recovery

Global support

- Peace-of-mind from an enterprise level software with sophisticated upgrade management and version control plus detailed system health monitoring
- Wide range of Grass Valley services for project management, training and 24/7 technical support

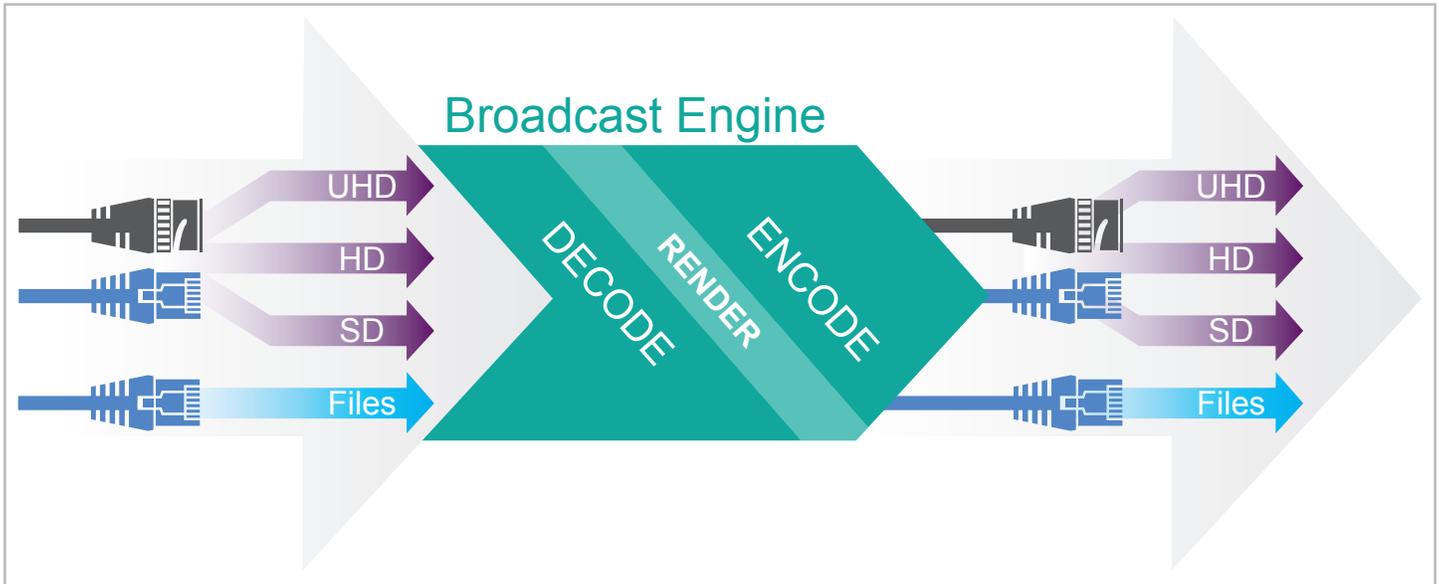


Play IP and SDI Back-to-Back

The iTX broadcast engine supports compressed IP I/O, using SMPTE ST 2022-2 MPEG-2 and H.264, as well as SDI I/O. This means that iTX can play out both IP and SDI simultaneously, which is valuable in mixed environments. iTX can also mix IP (SMPTE ST 2022-2 and 2022-6) and HD-SDI live inputs, using back-to-back IP and SDI clips, for easy introduction of IP feeds into a baseband-oriented facility.

The broadcast engine's IP outputs support MPEG-2 and H.264 bitrates from 3 Mb/s to 50 Mb/s, so that OTT platforms can be fed without separate encoders. Facilities can also run IP-only channels with the output broadcast as a Source Specific Multicast directly to their choice of CDN (content delivery network).

The IP outputs of iTX comprise fully composed MPEG transport streams. The entire set of program elements, including video, multichannel audio, captions and the full complement of signal metadata are encoded and output by iTX as a complete multiplex and fully-compliant DVB table structure. For convenience in network management, IP streams from iTX are accessible as multicast or unicast streams in UDP or RTP.



iTX allows effortless mixing of IP and HD-SDI inputs, using back-to-back IP and SDI clips.

4K/UHD Integrated Playout for Ultimate Picture Quality

When used for 4K/UHD playout, iTX supports both square division quad-split or 2-sample interleave over SDI I/O with the Appliance 2 platform; this provides a single 4K input and a single 4K output per channel.

Audio playback is performed with PCM, Dolby Digital (5.1) or Dolby Digital Plus (7.1). When handling 4K workflows, the iTX Desktop offers media browsing of proxy media.

Multilayer, pre-rendered 4K graphics can be inserted by the iTX broadcast engine, and these are created using the same graphics preparation workflows as HD/SD.



iTX offers outstanding 4K/UHD playout picture quality.

Picture courtesy: Blender Foundation.

Fast Service Launches

The iTX system architecture has been designed from the outset to offer rapid linear scaling for fast service launches from a single channel to hundreds of channels.

With iTX, broadcasters are able to launch new services, or add more functionality, within hours using software-based licensing and a centralized installer.



iTX offers rapid, linear scaling for fast service launches.

Integrated, Fully Featured Subtitling/Captioning

The integrated Softel subtitling/captioning option for iTX can deliver up to 20 languages per channel, with support for non-Latin character sets. Languages supported include Arabic and Chinese (Simplified and Traditional).

Softel subtitling provides both automated time-of-air file replay and live caption input, and offers seamless integration with caption files from other third-party vendors, including Screen, Cavena and EBU, for streamlined subtitling/caption insertion workflows.

iTX outputs World Standard Teletext, OP42, OP47, EIA 608 / EIA708 closed captions, Open (burnt-in, 2 languages), DVB/teletext and subtitles within an IP stream. High quality subtitling characters are output, with character and space kerning, Edging, Drop Shadow, Glyph combining, Vertical Rendering and Boxing.



Softel subtitling/captioning represents the first time a premium subtitle engine has been incorporated within integrated playout.

Seamless Handling of Dynamic Schedules & Live Content

Another strength of iTX is that it is designed for handling the most complex television, with live content and highly dynamic schedules. There are many factors behind this capability, including support for multiple video format playbacks, which avoids the need to transcode and simplifies and speeds the playout chain.

There is also a choice of highly responsive control surfaces that are designed for live operation. The range includes a GUI panel and a traditional master control panel, which can be operated in automated, automated-assist or manual operation modes.

The iTX Desktop GUI provides easy access to key transmission functions, and simplifies last minute schedule changes with instant recalculation of schedules.



Familiar manual control panel for rapid intervention.

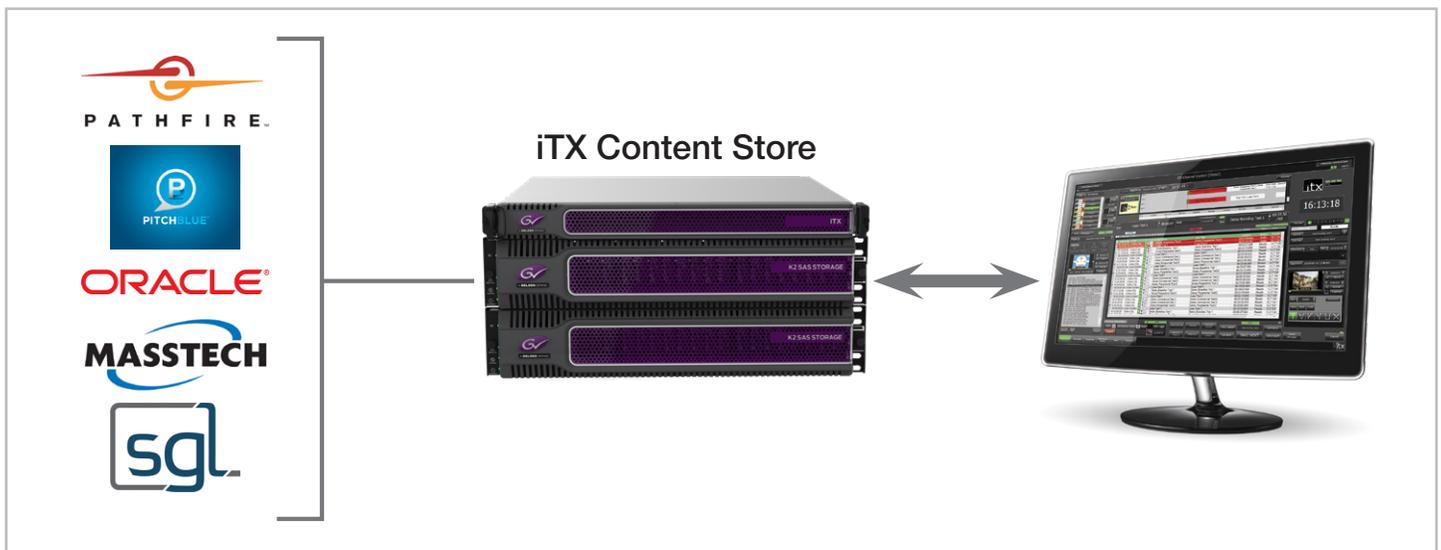
Lower OPEX with integral workflow automation and asset management

iTX offers much more than playout automation; it offers a unified, end-to-end workflow which spans ingest, traffic interface, asset management, archiving and graphics, as well as transmission control and monitoring. Recent iTX enhancements have included strengthened file ingest, automated quality control and transcoding integration, which have all further extended the level of workflow automation.

Automated File Ingest Saves Time

The number of file delivery partners has recently been expanded for iTX, and now includes Pathfire, Pitch Blue and CatchBLUE for incoming files, as well as Oracle DIVA, Masstech and SGL for archival storage. iTX's highly automated file ingest process involves iTX Delivery Manager monitoring content appearing from the third-party file delivery systems. The iTX system offers fast processing of incoming files, and it proactively looks up new content based on playlist needs to feed playout.

iTX can automatically segment an entire show into the iTX playlist, using episode metadata. The net effect of this powerful ingest automation is the elimination of many of the most time-consuming and repetitive manual tasks. This saves operating costs significantly, and also improves accuracy and quality by avoiding error-prone, manual activities.



iTX supports an expanded range of file delivery partners for automated ingest and archiving.

Automated QC and Transcoding

iTX supports the Baton quality control system from Interra Systems, offering automated QC according to the media format, with triggering by media rules driven by iTX Delivery Manager. A QC report is stored with every iTX asset, and can be displayed within the iTX GUI. Again, the net effect is faster, more consistent and lower cost ingest processes.

A further level of iTX workflow automation is provided by integration with Telestream's Vantage transcoder. As media files undergo transcoding, manipulation and formatting in Vantage, iTX can recover all relevant metadata to enrich and accurately synchronize the media clip descriptors — allowing last-minute changes to a playlist to be performed, while ensuring the highest level of performance and accuracy on channel playout.

The screenshot shows the iTX GUI interface. On the left, there is a 'PnPPoint - Video Search' window displaying a list of video assets. The main window shows a video player with a horse and rider. On the right, a '2. Content Summary' window is open, displaying technical details for the selected asset.

2. Content Summary	
Container	
Format	MXF
Video tracks	1
Audio tracks	2
Video	
Format	MPEG2 Video
Profile	High
Resolution	720x480
Chroma format	4:2:0
Frame rate	29.97 fps
Picture scanning type	Interlaced
Bit rate	20.51 Mbps
GOP structure	(M=3 N=12)(3.9%), (M=3 N=15)(85.8%), (M=3 N=3)(1.6%), (M=3 N=6)(4.7%), (M=3 N=9)(3.1%), (M=...
Display aspect ratio	4:3

File QC report is accessible directly from iTX asset management.

The most complete, dual channel integrated playout

iTX broadcast engine delivers the most complete, dual channel playout, using real-time video, audio and metadata processing to provide unprecedented reliability and frame accuracy.

Play Out Mixed Formats and Resolutions on the Same Channel

The broadcast engine can mix video formats on the same channel to simplify highly dynamic playout environments; there is no transcoding, so you get to air faster. The channels can freely mix IMX, XDCAM HD, AVC-Intra 100, QuickTime, MXF, GXF, DNxHD and XAVC in the same playlist, performing up/downconversion as required for SD, HD and even 4K/UHD content. The ability to mix HD and SD content within a single playlist is a big advantage for facilities wanting to incorporate legacy content. The iTX broadcast engine can also mix different resolution files and live sources on the same channel.



Real-time Video Processing and Graphics

Video processing capabilities include up/downconversion and custom aspect ratio conversion with AFD control. The iTX Output Server can also output the most advanced promotional and channel branding graphics, using either a pre-rendered After Effects workflow or a dynamic graphics workflow. The tight integration of the graphics preparation tools with the playout automation simplifies the preparation of schedule awareness graphics, and also allows late schedule changes to be fully addressed.

The iTX Output Server offers a wide mix of graphics options, ranging from an entry level logo generator to the most advanced graphics processing, using the proven Vertigo XG graphics processor.

For the North American market, EAS emergency alert graphics and audio messages are fully integrated, using the Trilithic EASyCAST system.

Advanced Audio Processing

The iTX broadcast engine can perform 16 channel, multilingual embedded audio processing, with flexible channel shuffling. Advanced audio processing extends the audio functionality, allowing a true PCM stereo upmix to 5.1/7.1 utilizing a Grass Valley algorithm, along with true mono-to-stereo audio conversion.

The output servers can also perform Dolby E, Dolby Digital and Dolby Digital Plus decoding and encoding across multiple streams.

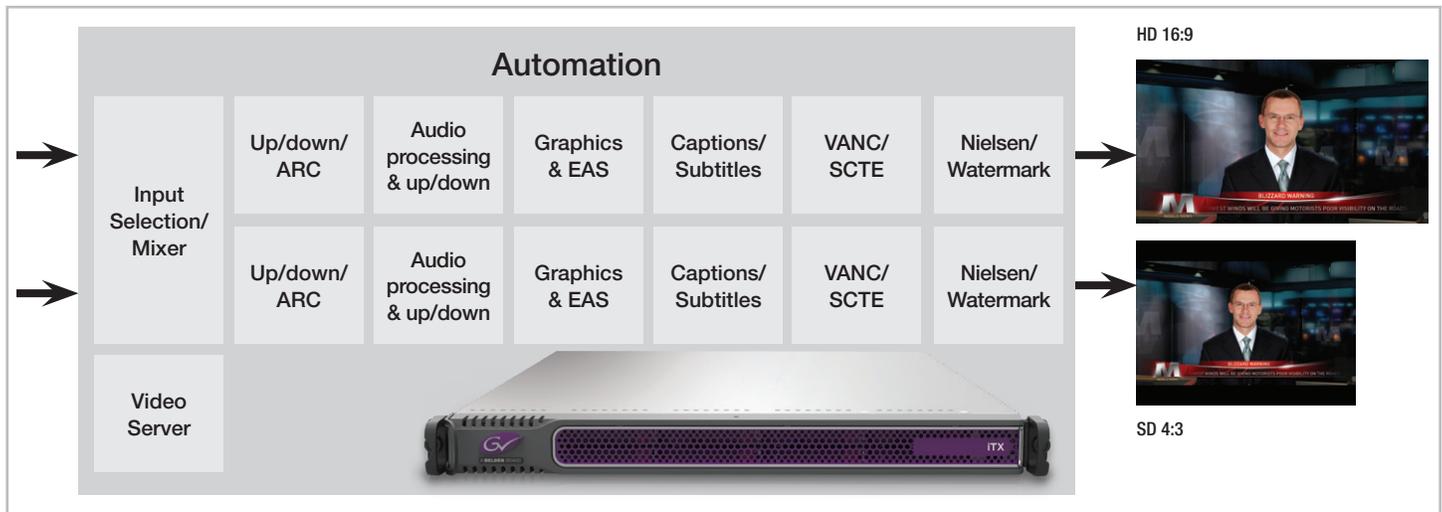


Highly Flexible Ancillary Data Processing

The iTX broadcast engine can insert a wide range of ancillary data, including closed captioning and subtitles, as well as V-Chip information, AFD data and Dolby metadata (AC-3 and Dolby E), including the Dialnorm and Line/RF Mode.

The advanced integrated Softel subtitling/captioning supports up to 20 languages per channel, and operates with automated time-of-air file replay and live caption input. The real-time processing can also perform SCTE-104 program trigger extraction and insertion for controlling downstream advertising insertion.

The integration of Nielsen watermarking within iTX offers complete security in asset tracking and ratings compliance, without the need for additional dedicated hardware.



The independent, dual-channel processing of the iTX broadcast engine makes it ideal for HD/SD simulcast.

Scalable, robust playout architecture

The iTX system represents a robust yet simplified playout architecture, which allows rapid, linear expansion for fast service launches.

Framework Services

At the heart of the system are the Framework Servers, which hold the core system database. Framework Services reside on a three-server triplet (Principal-Witness-Mirror) for redundancy.

The addition of a “witness” instance of the database on a third server completes the Microsoft high availability model, and provides automated failover of the database in the event of a hardware or software failure. The Framework Services are shared across multiple ingest and output channels, and handle content registration, traffic interface and the management of transmission schedules, content metadata and storage.

Network

iTX operates on a standard, gigabit Ethernet (1000 Base-T) local area network (LAN), which connects servers, content storage, client workstations and external systems such as traffic and scheduling.

iTX is multidomain capable, allowing geographically separated facilities to share content and tasks. System security ensures that access rights can be assigned to specific users and groups, and Virtual Media Silos can be created to ensure there is no crossover between different channels, content or customers.

Client Workstation

An iTX Client Workstation is a standard PC providing control, monitoring and configuration interfaces for the iTX system. The operator can not only manage real-time playout but also browse all the media on the system, enabling search, preparation, segmentation and preview without needing to tie up playout servers or ports.

Optionally for smaller facilities, an iTX Client can be configured to perform multiple roles like ingest, preparation and playout — all at a single position.

Ingest

To feed content into the system, there are ingest channels for SDI, and an iTX Delivery Manager for accepting files from a wide range of delivery partners, including the PathFire, PitchBlue and CatchBLUE file delivery systems, and archive systems from MassTech, SGL and Front Porch.

The Delivery Manager provides content transfer and cache management services, as well as handling registration in the iTX Content Store of pre-encoded content files. iTX supports the use of a range of network attached storage systems (NAS) as well as broadcast hierarchical storage management systems (HSM). Additionally, every iTX system comes with asset management as standard enabling facilities to have complete control of their media at all times.

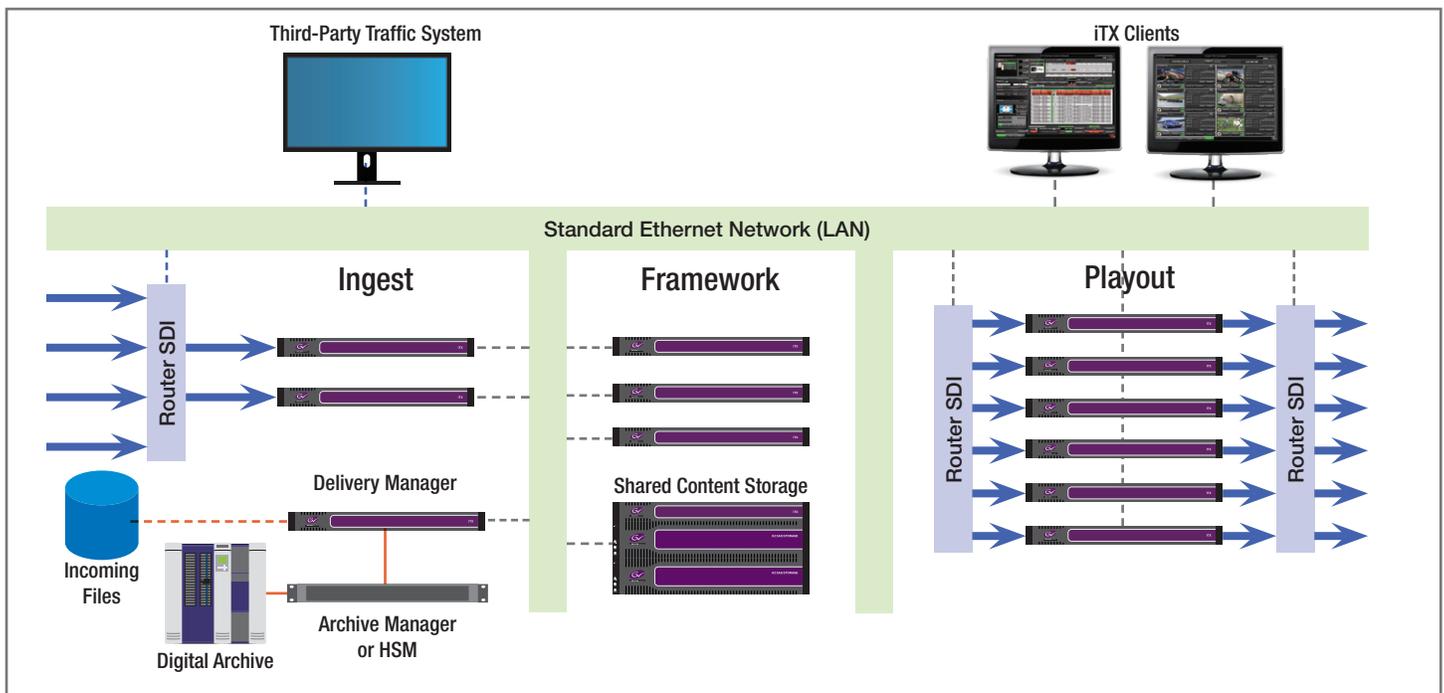
Content Store

iTX caches content from the central Content Store to playout to provide content redundancy. In the event of a failure in the Content Store, playout will continue from the local content cache.

The use of a high availability NAS is recommended for the central Content Store, as this allows iTX to continue the intake and caching of new content, even in the event of a failure of some components in the storage solution.

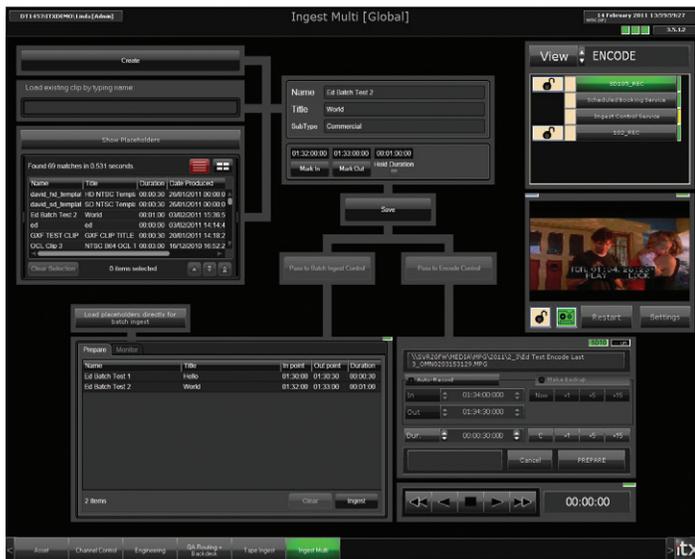
Playout

Each broadcast engine contains a local media cache plus an automation engine that holds the playlist for that channel. This architecture allows the broadcast engine to run stand alone in the event of the iTX Framework becoming unavailable, until the local schedule and content cache have been exhausted.



Ingest: operator interface

iTX integrated playout provides components for a range of ingest workflows. These include scheduled and on-demand feed recording from satellite or live sources, manual encoding at the desktop, unscheduled ad-hoc tape ingest, including batch recordings, support for digital file delivery and clip preparation for all modes of ingest. Basic acquisition components are included as standard, while advanced modes of ingest such as scheduled feed recording are available as add-on components.



Manual ingest

Ad-Hoc Tape Ingest and Clip Preparation

- The iTX Desktop provides intuitive control of ad-hoc tape ingest and clip preparation using a LAN connection
- Desktop tools simplify the identification, timing and annotation of video clips acquired by all methods of acquisition
- Desktop components include controls for the viewing and timing of recorded clips with frame-accurate in, out and segment markers, as well as the capture of clip metadata, such as titles, descriptions and content types
- Requested dubs are carried out as a background task, allowing additional dub requests and clip preparation work to continue in parallel
- When used with the proxy sub-system, clip preparation can be performed using low resolution proxy copies of content, allowing multiple workstations to access and prepare content

Scheduled Recording

- iTX Ingest Manager is designed to support the demanding operational environments of news and sports
- A highly-flexible feed ingest system that combines the management of scheduled and recurring satellite or live feeds



Ingest manager

- Provides dynamic assignment of ingest services resources, along with the ability to carry out simultaneous recordings to multiple ingest servers
- With a master recording schedule, multiple users can view resource allocation and have simultaneous access to record scheduling
- A list view of all scheduled recordings is provided, as well as an active timeline view with color highlighting to indicate the status of each recording at a glance
- Unique dual-timeline display shows the status and time allocation of both record sources and ingest jobs

Digital Content File Delivery

- iTX Delivery Manager provides support for file-based delivery, including spot, program and news content delivery services such as PathFire, PitchBlue and CatchBLUE (delivery) and SGL, Oracle DIVA and MassTech (archive)
- By communicating with the delivery services' edge servers, the Delivery Manager extracts pre-encoded digital content files and associated metadata from content packages, and registers delivered content in the iTX database
- Content selection from delivered packages can be filtered by site-specified rules, or by required content lists, provided by traffic or program management systems

Advanced system health & playout monitoring

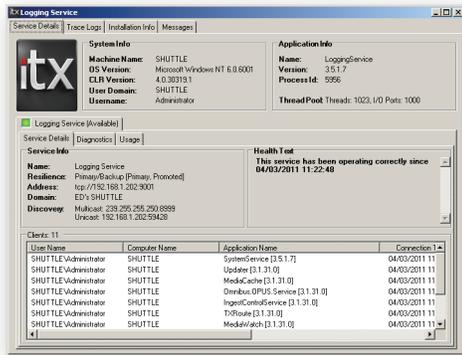
iTX integrated playout offers an array of powerful tools to administer the infrastructure, optimize the health of the system and monitor on-air performance.



Configurable Alerts

Configurable alert buttons are provided to indicate potential problems within the system, such as an empty or low schedules, items which are not ready, faults on the Appliance 2 platform, or automation engine failures.

The properties of these buttons can be modified, for example, to restrict errors to specific channels, or to change the audio files associated with each alert.



Logging Service

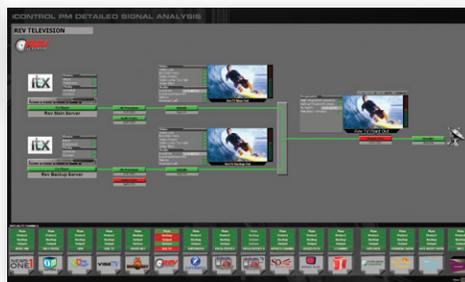
A central logging service registers all operations performed by the system and any corresponding human intervention. This central service can be monitored in real-time and log snapshots can be viewed and saved to files. The advanced search and filter functionality simplifies monitoring processes. Users can search for specific log items, and filter the display to show only certain message categories, or messages from a particular application, and then perform further searches on the logged data.



Engineering Views

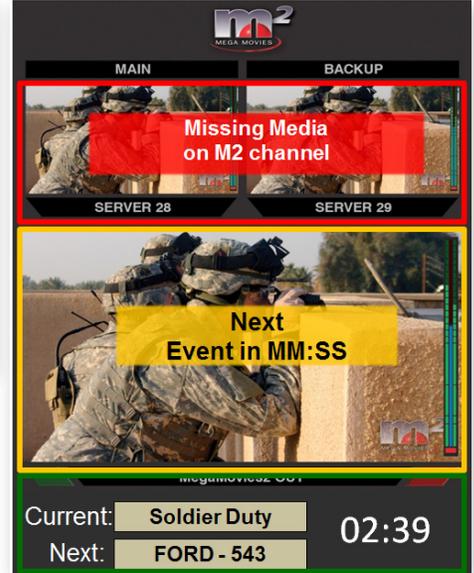
Engineering Desktop layouts, with a graphic representation of the servers in a facility, can be used for obtaining diagnostics and status information.

Channel Server indicators allow the status of an individual Appliance 2 platform to be monitored. The health of the services running on the hardware is shown graphically, and a context-sensitive menu allows certain functions, such as restarting the server applications or capturing log files, to be carried out remotely.



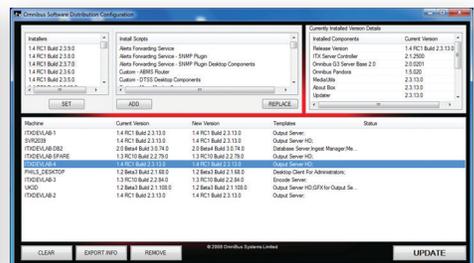
Integration with iControl Playout

The iTX SNMP Service allows Grass Valley's iControl Playout solution to query and monitor the health of iTX channels. iControl can present alarms from iTX, and provide automatic pop-ups of iTX health and media management tools.



Integration with Kaleido Multiviewers

iTX integrates with Kaleido multiviewers, enabling alert and playlist data such as now/next countdowns to be displayed alongside video monitoring.



Distribution Control

The system management console enables remote upgrading of system software, with a batch mode that allows multiple channels to be upgraded simultaneously. This makes it possible for an entire facility to be upgraded within minutes.