

Joint Task Force on Networked Media Report on User Requirements

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The primary objective of the Joint Task Force on Networked Media (JT-NM) is to ensure interoperability in packet-based systems (networking, equipment and software) for professional media. This includes defining an agile, on-demand, packet-based network infrastructure designed to support a variety of distributed, automated, professional media (file- and stream-based) workflows for local, regional and global production supporting any format, standards-based, for interoperability to facilitate new workflows and reduce total cost of ownership and to speed-up content time-to-market.

The JT-NM collected 136 unique user stories from media companies, manufacturers and consultants that identified a number of user requirements for networked professional media. This report summarizes these stories into seventeen categories. The authors have attempted to capture the overall spirit of these categories by writing “super stories” which are composites of the original 136 stories. All of the originally submitted stories are published at the end of this report.

Super User Stories

Requirement 1: Commercial Off-The-Shelf (COTS)

As a systems designer I would like to deploy commercial IT technology for use in professional media applications to:

1. take advantage of the marketplace economics of IT technology;
2. make use of the extensive and well trained base of design and maintenance personnel available in this field;
3. deploy enterprise-class capabilities and redundancy options;
4. use any one of a number of monitoring, diagnostic and troubleshooting tools that currently exist for enterprise deployments of IT infrastructure;

So that I can reduce the total cost of ownership of my professional media operations.

Category Legend

Serial Number	Reviewer	Timestamp	Last Name	First Name	Company	Affiliation - consultants, please let us know who you are representing	email address	As a (ROLE)	I want to (FUNCTION)	so that (BUSINESS VALUE)	Notes	Category 1	Category 2	Category 3
1	bg	5/2/2013 15:35:07	Gilmer	Brad	Gilmer & Associates, Inc.	VSP	brad@gilmer.tv	Product designer	Take advantage of commodity networking chipsets	I can lower costs and take advantage of R&D expenditures in this area.	This is a note.	costs		
2	bg	5/2/2013 15:38:04	Gilmer	Brad	Gilmer & Associates, Inc.	VSP	brad@gilmer.tv	[Duplicate]	[Deleted as Duplicate]	[Deleted as Duplicate]	[Deleted as Duplicate]	Duplicate		
3	bg	5/7/2013 12:00:39	Luff	John	HD Consulting	Public TV Stations	john.luff@hdconsulting.tv	System Designer	.connect playout devices to graphics engines in master control sources with only one I/O port	virtualized master control will allow real time content to be shared both in and out over IP hardware.	This will facilitate virtualizing the "broadcast factory" completely with the flexibility to build up new segments and live them down on short notice.	stream		
4	bg	5/7/2013 15:06:23	Reuss	Edward	Consultant	DoCo, Signal Share, Clair Global	edreuss@gmail.com	As a news reporter reporting a live event	want to avoid looking like a total doofus standing in front of the ENG camera with the lights in my face through several seconds of dead air after the studio talent asks me a question	so that the covered event looks professional with a high production value, and attracts more viewers and therefore more sponsors.	Overall latency and lip sync are critical to ENG and other contribution links, but coding/decoding and network buffering work against this goal when using IP networks.	CoQs	time	
5	bg	5/7/2013 15:51:49	Daniel	MIner	DIRECTV		dminer@directv.com	As a broadcast system design engineer	want to be able to carry video/audio between real time equipment within my broadcast center. This equipment includes video/audio processing equipment to perform format conversions (e.g. 50fps to 60fps), production (e.g. square waves, bars, and graphics insertion), and encoding.	So that cheap Ethernet connections can be used instead of more expensive SDI interfaces		costs		
6	bg	5/8/2013 7:19:53	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	ensure that the facility does not contain single points of failure which can impact the work in multiple studios simultaneously	broadcasting can continue without interruption even in the event of failures (including configuration errors of shared systems)		costs		
7	bg	5/8/2013 7:22:18	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	to ensure that a failure of one system in a studio is contained within that system and cannot affect other systems in that studio, or other studios in that facility	costs	conf			
8	bg	5/8/2013 7:24:19	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	ensure that all network aware systems align with network engineering best practice (e.g. avoiding non-standard extensions such as jumbo frames, layer 2 discovery, broadcast packets etc.)	standard network hardware can be used reliably		costs		
9	bg	5/8/2013 7:34:12	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	ensure that all network switched devices operate correctly in busy near-world scenarios, including dropped packets, and out-of-order delivery	support effort is not squandered identifying poor network stack implementations.		interop	conf	
10	bg	5/8/2013 9:07:12	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	ensure that multiple independent video streams (e.g. cameras) remain temporally correlated with multiple independent audio streams (e.g. microphones) such that the combined output maintains accurate lipsync even when switching/mixing between different sources	the production quality of the final output is not compromised.		time		
11	bg	5/8/2013 9:08:57	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	ensure that the total delay from camera/microphone to studio output is as short as possible and constant	the production values of the content produced are maintained, e.g. short challenge-response times during two-way down the line interviews.		CoQs	time	
12	bg	5/8/2013 9:12:12	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	ensure that multiple production processes (capture, effects, edit, etc.) can be cascaded with no quality loss due to generation loss effects	the production value of the final content is maintained without compromising the desired workflow(s)		time		
13	bg	5/8/2013 9:15:31	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	enable all systems to co-exist on standard network hardware using well-supported protocols i.e. protocols such as RTP which rely on special features in network switches should be avoided	the widest range of network hardware can be used, leveraging the mass-market rather than creating a new "broadcast niche"		costs		
14	Walker	5/13/2013 8:14:24	Walker	Gavin	Snell	Representing myself	gavin.walker@snellgroup.com	manipulator	ensure that signals that designate an high priority (such as my main linear payload signal) are transmitted with low latency and interruptions over a compressed packet-based infrastructure	economic delivery of current and higher resolution TV		interop	time	
15	bg	5/13/2013 8:17:11	Walker	Gavin	Snell	Representing myself	gavin.walker@snellgroup.com	manipulator	want my free-lance contributors to be able to send any standard content directly over IP links (wired and wireless), including broadcast metadata	I can avoid the cost of deploying and maintaining a separate overlay network to perform that function.		costs	time	
16	bg	5/13/2013 8:52:18	Simpson	Wes	Helicon Product Consulting	Representing myself	wsimpson@helicon.net	Facility Designer	distribute synchronization and time code signals with high accuracy to cameras and other devices over a converged packet-based infrastructure	I can avoid the cost of deploying and maintaining a separate overlay network to perform that function.		time		
17	bg	5/13/2013 8:54:16	Simpson	Wes	Helicon Product Consulting	Representing myself	wsimpson@helicon.net	Broadcaster	ensure that signals that designate an high priority (such as my main linear payload signal) are transmitted with low latency and interruptions over a converged packet-based infrastructure	I do not experience signal dropouts or distortions that could cause me to lose viewers or advertising revenues.		time		
18	bg	5/13/2013 11:24:40	Walker	Gavin	Snell		gavin.walker@snellgroup.com	a news agency	want to stream content directly over IP from my studio cameras so that I can integrate the content (wired and wireless), including broadcast metadata	so that I can be first to market with breaking news.		prov	conf	costs
19	bg	5/13/2013 11:33:58	Walker	Gavin	Snell		gavin.walker@snellgroup.com	a small production company	want to stream content directly over IP from my studio cameras so that I can integrate the content (wired and wireless), including broadcast metadata	This allows me to achieve a finished product faster and cheaper than my competitors which will win me more business		stream		
20	bg	5/13/2013 11:38:24	Walker	Gavin	Snell		gavin.walker@snellgroup.com	an international broadcaster	want to access content contributed by third parties over IP links, which gives me flexibility over when and where I received the content	so that my programme schedules can be more dynamic and so that I can receive high value overseas content last minute		reach	prov	conf
21	bg	5/13/2013 11:36:37	Walker	Gavin	Snell		gavin.walker@snellgroup.com	large broadcast facility owner	want to stream content directly over IP from any of my studios. Outside Broadcast locations or off-site facilities, so that I can connect communication links and more rapidly integrate the most relevant content into my live schedules wherever I wish.	in this way, my channels will be more popular and I can generate more advertising revenue.		reach		
22	bg	5/13/2013 11:40:50	Walker	Gavin	Snell		gavin.walker@snellgroup.com	playout facility/uplink facility/teleport centre	want to monitor content over IP networks anywhere in the workflow/broadcast chain, using standard IP equipment, so that I can be sure that the correct signals are being passed with the correct quality from anywhere I choose to monitor.	This will save me staff and equipment costs which will make my business more competitive.		mon	costs	
23	bg	5/13/2013 11:41:47	Walker	Gavin	Snell		gavin.walker@snellgroup.com	a small broadcaster	want to distribute content to end users and to content aggregators over public IP networks, with clear traceability and rights management	so that I can gain more revenue from each of my content sources, through larger numbers of subscribers.		security	accounting	
24	bg	5/13/2013 12:10:53	Wadjet	Robert	BBC		robert.wadjet@bbc.co.uk	System Engineer	want control surfaces that are conceptually decoupled from the software control API of the underlying infrastructure.	so that I can choose the human interfaces appropriate to my evolving workflows without changing the core infrastructure	implication is that the core concepts of the software control API must be standardized	interop		
25	bg	5/13/2013 12:13:42	Wadjet	Robert	BBC		robert.wadjet@bbc.co.uk	User	want to be able to separate the physical locations of control surfaces, capture, routing and processing resources	so that I have the freedom to deploy people and technology in the most cost- and process-efficient way.		Accounting	reach	
26	bg	5/13/2013 13:48:43	Hughes	Kilroy	Microsoft		kilroy.hughes@microsoft.com	Cloud service	ingest live broadcast streams over generic internet bandwidth terminating in generic virtual machines in data centers with high reliability and low latency for live encoding and adaptive streaming of audio, video, and subtitles at approximately 1080 line resolution and up to 10Mbps long GOP AVC output quality (i.e. requiring input quality roughly 2X output quality).	Enable scalable internet TV streaming of thousands of channels worldwide using generic internet bandwidth and uplink terminators in existing data centers that provide cloud hosted computation, storage, and egress without the business barriers to adoption of leased lines, special termination equipment, and broadcast CAPEX.		streams	time	rel
27	fp	5/13/2013 13:52:55	Brightwell	Peter	BBC		peter.brightwell@bbc.co.uk	facility operator	have the systems I use automatically discover what resources are available, and how they can be configured.	I am presented with the high-level information I need to set systems up, and spend less time on low-level configuration. This will be particularly important when I need to rapidly deploy new facilities say on a cloud infrastructure.	Resources here could include for example video feeds and transformation services.	Conf		
28	fp	5/14/2013 2:46:22	Thomas	Edwards	FOX		thomas.edwards@fox.com	broadcaster	send high-quality video streams over a packetized network (in a similar fashion to my use of SDI/HD-SDI today over coaxial cables)	I can flexibly and rapidly reconfigure video flows in my broadcast plant to meet business needs with enhanced agility	This could also be presented in terms of a system designer or user.	time	Streams	
29	fp	5/14/2013 2:47:16	Thomas	Edwards	FOX		thomas.edwards@fox.com	broadcaster	send high-quality video streams over a packetized network (in a similar fashion to my use of SDI/HD-SDI today over coaxial cables)	I can reduce the cost of my infrastructure by leveraging commodity IT networking products that are in wide use in many industries and thus are priced based on large economies of scale.		COTS	Streams	CoQs
30	fp	5/14/2013 2:48:10	Thomas	Edwards	FOX		thomas.edwards@fox.com	broadcaster	send multiple high-quality video streams at the same time over a single network link using statistical multiplexing	I can reduce the cost and complexity of my wiring infrastructure.		Streams		
31	fp	5/14/2013 2:50:10	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster	send high-quality video streams over a network in a form that carries the uncompressed video data payload of SDI/HD-SDI such that there is no quality loss due to video compression at all	my video emissions are pristine under any analysis by our most demanding business partners.		time	Streams	
32	fp	5/14/2013 2:51:15	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster	send high-quality video streams over a network in a form that carries the video data in a very mild ("mezzanine") compression that shows no perceivable visual difference after a typical number of codec generations experienced in our plant, and has a low enough latency to meet all other business requirements	my video emissions are pristine under typical visual viewing analysis, and so that more efficient use is made of our broadcast data network.		time	Streams	
33	fp	5/14/2013 2:52:15	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster	send audio along with high-quality video over a network and be assured that adequate synchronization between audio and video is maintained	so that our programming remains enjoyable to watch without annoying audio/video synchronization loss.		Streams	time	CoQs
34	fp	5/14/2013 2:53:28	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster	can send high-quality video streams over a packetized network without dropping any between the sender and the receiver	I can have a high degree of confidence in this infrastructure and can enter into business contracts with vendors and advertisers regarding media products that rely on this infrastructure.		CoQs		
35	fp	5/14/2013 2:54:08	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster	can send high-quality video streams over a network with redundancy against single-point failures	our business operational continuity is maintained.		Rel		
36	fp	5/14/2013 2:54:50	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster	send high-quality video and audio streams over a network such that "video switches/vision mixers" and "audio mixers" can still perform their job properly	our programs continue to have the same quality of production that they have today.		Rel	Streams	CoQs
37	fp	5/14/2013 2:56:06	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster	ensure high-quality video elements carried over a network can be carried from any source to any destination in the broadcast plant (as I can today using SDI/HD-SDI over coaxial cable with a crosspoint video router)	I can route video streams from all devices as the business requires.		Prov		
38	fp	5/14/2013 2:58:37	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster	Send metadata elements of CEA-608 and CEA-708 Closed Captions, AFD, and video description audio over a network along with my high-quality video	We meet the expectations of the deal community, video distributor customers, and so that we are in compliance with regulations.		Streams		
39	fp	5/14/2013 2:59:57	Edwards	Thomas	FOX		thomas.edwards@fox.com	broadcaster data networking professional	monitor my broadcast data network for usage and problems	I can operate my network to satisfy the business requirements of those who use it.		Mon		
40	fp	5/14/2013 3:46:06	Williams	Richard	Shelter Studios Co.		richard.c.williams@shelterstudios.co	Post Production	I want to be able to connect via any public communications network, with participating sound libraries in order to find, review and retrieve sound stems from any category, online 24x365.	if it were possible to perform the function as described, the speed of production could be significantly enhanced by reducing the time required to gain access to and search multiple sound libraries and acquire the required sound on site. Direct savings could be made through not having to: EITHER: Procure, purchase, store and transport a wider selection of stems to a production site. OR: Pay for the additional labor and third party costs incurred when performing the search and retrieval operations today.		Reach		
41	fp	5/14/2013 9:08:38	McCarthy	Brian	Coral Sea Studios		bimccarty@coralseastudios.com	sound engineers	As a sound engineer for a radio station, I want to connect my radio remote gear directly to wifi or the internet and have my full bandwidth audio broadcasts back to the master control at the station.	This would be easier to access and cheaper than the current need to order a data line from the phone company.		Reach		
42	fp	5/14/2013 9:11:47	McCarthy	Brian	Coral Sea Studios		bimccarty@coralseastudios.com	sound engineers	As the owner of a recording studio in a remote area, I need to interconnect my studio with others around the world to record full bandwidth audio from another studio and drop it into a current recording. This will require the transmission of the current audio to the remote location for synchronization, with the returned "overdub" audio to be coded for sample accurate insertion into the original recording.	high-bandwidth specialty data lines are generally required to do this, although the functionality is contained in current recording technology (ProTools, Explofish System 5).		Reach		
43	fp	5/14/2013 10:33:27	Mahnet	John	Hemslabroadcast		johnmahnet@hemslabroadcast.com	Master Control Operator	I want to be able to watch the incoming live sporting feed from network through the multiviewer, sitting at a traditional master control panel, and drop my local commercials into the telecast at the right times by hand, so that they look uninterrupted to the end viewer.	so that the advertisers feel that their ad can connect, and the as-run log indicates that the ad ran correctly.	this is a timing user story, but with a human in the loop, the latency of the path to the operator's eyeballs and the latency of the control interfaces both matter here.	interop	Accounting	
44	fp	5/21/2013 9:38:22	Arad	Donor	Melanox		donor@melanox.com	System architect	I would like to see equal consideration of IP CoS within the contribution facilities such as IP TV Headends. Specifically, an even distribution whereby the primary signal ingest might be terrestrial with a supporting secondary source ingested via satellite. Areas for consideration would be the preservation of content including metadata in addition to the video and audio.	Complexity and pre-processing requirements are minimized if standards based practices can be adopted. This could lead to an improved VQ experience for the end user, reduced MTBF, and reduced costs.		CoQs	time	reach
45	fp	5/21/2013 15:37:11	Titus	Dave	AT&T		dt1626@att.com	Headend Engineering	Define an "SDI payload" mapping over Ethernet (SPeE) to IP that new packetized streams will more easily interoperate with legacy SDI systems. Key to tempo are AVI and metadata packetized formats being a superset of what SDI systems today. This facility and metadata packetized formats being a superset of what SDI systems today.	I never integration problems with existing SDI systems. Also, leverage existing SMPTE SDI payload standards, tools and knowledge base. Quicker time to market with packetized SDI payload compared to inventing a completely new "SDI like payload" format.	All SPeE user stories are related	time	Stream	CoQs
46	fp	5/24/2013 1:41:15	Kovalick	Al	Media Systems Consulting	Fox	kovalick@pacbell.net	Designer	Define a CoS level for the SDI/Payload over Ethernet (SPeE) format to enable "near SDI equivalence", lossless AV streams. Compared to SDI, this CoS has similar low valued end-to-end latency and allows stream switching during VBI lines based on SMPTE RP188.	Creates the packetized near-equivalence of SDI to leverage the networked infrastructure of a facility and it's advantages. Replaces SDI with SPeE will result in fewer problems given their similar operating parameters.	All SPeE user stories are related	time	Stream	CoQs
47	fp	5/24/2013 1:44:17	Kovalick	Al	Media Systems Consulting	Fox	kovalick@pacbell.net	Designer	Define a related CoS level for SDI/Payload over Ethernet (SPeE) to enable "good enough" lossless streaming. Compared to SDI, this CoS permits increased end-to-end latency and allows stream switching during VBI lines other than those prescribed by SMPTE RP188.	Defines the implementation costs of basic systems. No requirement for "high end" packet switches to meet the related CoS. Systems are easier to build and test given the wider range of acceptable metrics. The CoS is more cloud friendly.	All SPeE user stories are related	time	Stream	CoQs

Serial Number	Reviewer	Timestamp	Last Name	First Name	Company	Affiliation consultants, please let us know who you are representing	email address	As a (ROLE)	I want to (FUNCTION)	so that (BUSINESS VALUE)	Notes	Category 1	Category 2	Category 3	
49	fp	5/24/2013 15:25	Kovalick	Al	Media Systems Consulting	Fox	kovalick@pacbell.net	Designer	Define CoQs levels for file transfer. Today we often rely on PTHH (PTCP) for reliable transfer but without metrics to guarantee transfer times. So spec. say 4 levels of performance when using local (2 levels) and remote (2 levels) file transfer. The number of levels and their metrics are TBD.	Guaranteed CoQs levels are necessary for deterministic file-based workflows. Providing a choice of CoQs levels permits trading off cost and complexity for reduced/extended transfer times.		File		CoQs	
50	fp	5/24/2013 14:42:16	Simon	Tuff	BBC	EBU SPO STB	simon.tuff@bbc.co.uk	Engineering Manager	To understand and thus reduce the energy consumption of storing, streaming and moving media around the network. We estimate BBC's HD TV uses at least 3 times the energy per user hour over DTT and this is a real issue if we want to scale this technology across the business and to many and points. What techniques are available to design and engineer efficient way to move user behavior to be energy efficient?	In managing this we save money [energy & carbon taxes], we build a reputation as responsible public servants [CSR], we protect ourselves against possible future resource shortages or security issues and we do the right thing!	This may not be quite the type of story you were expecting but I'm happy to refine this to be the most useful if required. Felix Pousin of the made the suggestion to attempt to engage with the process in my role as chair of the EBU SP on sustainable technology	Accounting			
51	fp	5/30/2013 14:41:42	Simpson	Wes	Telecom Product Consulting	Self	wsimpson@optonline.net	broadcaster	How do key system attributes and performance specifications that constitute an "enterprise-class" IP router that will be able to transport high-bitrate video signals in a live television production environment	can effectively communicate with suppliers to explain my requirements and appropriately evaluate products to use in my facility.		CoQs	Rel	CoTS	
52	fp	6/3/2013 9:05:51	Cutler	Craig	HBO		craig.cutler@hbo.com	facility owner	need the streams to identify primary and backup paths of the same content to facilitate redundancy and reliability within a facility / workflow path, switching among those paths should be seamless, (synchronous)	Value of redundancy in a facility is a critical economic and technical value.		Interop	Time	Rel	
53	fp	6/3/2013 9:07:29	Cutler	Craig	HBO		craig.cutler@hbo.com	facility owner	need the streams to be "self-contained" so that I can join a stream via, perhaps, a physical-only connection and know all there is to know about it (for other content consumption, testing, transcoding, downstream processing)	Facility simplicity is a business value that will benefit "small" users and reduce cost and complexity.		Interop	Streams	Prov	
54	fp	6/3/2013 9:08:54	Cutler	Craig	HBO		craig.cutler@hbo.com	facility owner	need the streams to identify what they are along the workflow path with a persistent identifier(s) - internal house number and/or a destination identifier such as SDN and/or external identifier such as Nielsen watermark - both intermediate and/or final distributor codes; however, the streams may be raw material for other feeds (e.g. regional feeds / across regions / sub-zones / time-zones / split / language version)	Value is derived of multiple variants of a workflow can be created and processed in a highly-secure and efficient manner.		Streams	Conf		
55	fp	6/3/2013 9:10:50	Cutler	Craig	HBO		craig.cutler@hbo.com	facility owner	need the system to include an equivalent of the broadcast "only" system in the IP (IT-type) domain so that devices downstream or, in a routing infrastructure, can understand a bidirectional (upstream/downstream and vice-versa) status of "on-air", so that inadvertent system changes could be locked-out (or prioritized to administrative / override) status.	Value of reliability and redundancy needs to be maintained in an IT-type infrastructure to keep "mission critical" nature of content streams.		Interop	Streams	Rel	
56	fp	6/3/2013 9:12:17	Cutler	Craig	HBO		craig.cutler@hbo.com	facility owner	need the system to include provisions for communications to accompany the content streams - this could be a URL/LINK for an origination facility and/or address for a device, or an intercom destination that could be an internal facility communications system and/or speaker-box.	Communications, especially in a live or near-live production environment is an important value in the production process.		Interop	Streams		
57	ks	6/3/2013 9:13:54	Cutler	Craig	HBO		craig.cutler@hbo.com	facility owner	need the streams to facilitate simple identification and testing - i.e. permitting "bridging" a signal that would include a humbong or other "help" to allow a cheap / unsophisticated test device to pass/fail a signal non-destructively (may be multi-level for encrypted signals where health and test signals are open, but the video and audio essence is not), this would include "bad packets" in a stream even if concealed by other error handling mechanisms.	Simple and quick testing / troubleshooting is a great value in complex systems that are over-clocked and minimize overall cost and downtime.		Testing	CoQs	Mon	
58	ks	6/3/2013 9:18:04	Cutler	Craig	HBO		craig.cutler@hbo.com	facility owner	need the system to have one interface (e.g. RJ-45) that can be both "smart" and "dumb" - smart = full host device in a fully-functional network; dumb = RJ-45 plug that auto-configures source-to-sink as easily as a BNC connector connects a baseband video stream from "source" to "sink" device with no configuration of network or other parameters. The "dumb" interface could presume, for transition and legacy, that there is only an IP to HD-SDI device to enable transitioning from legacy infrastructure to IT infrastructure one functional block at a time.	Understanding both the legacy transition as well as a "simple versus complex" facility designs are necessary design values to reduce operational cost.	[ks] sub-category of Interop is simplicity	Conf	Interop		
59	ks	6/3/2013 9:19:32	Cutler	Craig	HBO		craig.cutler@hbo.com	facility owner	need the system to drop and add components, e.g. SCTE triggers, audio metadata and/or other metadata.	Currently, individual "boxes" are needed to perform disparate functionality. Cost and complexity could be reduced if an overall system design took this need into account at this early stage.	[ks] sub-category of Streams is Virtual Bundles	Interop	Open Systems	Streams	
60	ks	6/7/2013 15:16:36	Doan	Michael	Dolby		md.1@newtbit.com	product designer	Send audio metadata (e.g. RDD-6) over a network along with the audio essence.	Maintain audio quality, enable loudness management, comply with US FCC CALM reqs.	[ks] sub-category of Interop is standards	Interop			
61	ks	6/10/2013 5:57:16	Adell	Quarrel	TVC		cadell@t3.cat	system engineer	would like to use a converged network (local and wide) where high-quality video and audio (as HDSDD), time code synchronized in real-time	to decrease media production costs meanwhile increasing functionalities and flexibility.	[ks] sub-category of Streams is Stream Flows	Prov	Conf	Time	
62	ks	6/10/2013 5:58:19	Adell	Christian	TVC		cadell@t3.cat	content provider	would simplify how I deliver media streaming (live and on demand) through Internet, automating coding adaptation and file management (specification) using metadata.	to achieve the production CoQs for end users minimizing our IT system infrastructure.	[ks] I expect that "minimizing our IT..." was meant to be "optimizing our IT..."	Streams	Conf	Prov	
63	ks	6/10/2013 5:59:11	Adell	Christian	TVC		cadell@t3.cat	content provider	would be able to monitor content delivery in real-time and simulate proactively user contexts	to improve content delivery workflows and management	[ks] sub-category of Streams is Virtual Bundles	Mon	CoQs	Conf	
64	ks	6/10/2013 5:59:57	Adell	Christian	TVC		cadell@t3.cat	content provider	would have automatic and complete feedback from end users to control audiences from streaming and broadcasting (connected-TV) and be able to adapt adjustments to end users in real-time	to maximize benefits for us getting better advertiser's satisfaction.	[ks] This one doesn't actually fit any of the categories from v4 directly.	Mon	Accounting		
65	ks	6/10/2013 6:00:42	Adell	Christian	TVC		cadell@t3.cat	system engineer	would want an exchange information between media production systems to achieve a more optimal performance	order to improve media edition workflows.	[ks] sub-category of Interop is Open Systems	CoTS	Interop		
66	ks	6/10/2013 6:01:27	Adell	Christian	TVC		cadell@t3.cat	content provider	would be able to deliver streaming over Internet without previous commitments (CDN), opening media distribution opportunity to whatever platform interested to deliver content to end users (getting reward from content provider depending on dynamic SLAs)	The goal will be decrease streaming costs for content providers or at least not increase costs security to end users because an open environment always favor competence.	[ks] sub-category of Streams is Virtual Bundles	Interop	Open Systems	Streams	
67	ks	6/10/2013 10:42:02	WILLIAMS	Richard	Shelter Studios Co.		rich@shelterstudios.com	As a producer	want to be able to capture 40 discrete channels of HD live sound broadcast, with a worst case concurrent accuracy of 3 samples across all channels and with an inter-channel accuracy of no more than 1 sample. HD in this scenario, is taken as meaning, a sampling rate of at least 192kHz at a depth of 24bits.	So that I can leverage a number of smaller and virtual studio units as part of a production and reduce the associated infrastructure and ancillary costs.	[ks] sub-category of Interop is Standards	Interop	CoQs		
68	ks	6/12/2013 11:08:51	Zheng	Yuanxing	BBC		yuan.xing.zheng@bbc.co.uk	Architect	replace SDN network for both contribution & distribution, audio & video with packeted network. Need to be reliable low delay, and give user confidence.	cost saving, flexible, integrate with business traffic, agile		Fmt	CoQs	Reach	
69	ks	6/12/2013 14:26:25	Wallace	Ron	Avid		ron.wallace@avid.com	production equipment manufacturer	need an interoperability standard including a compliance test system	I can manufacture plug-and-play products for professional media customers.	[ks] sub-category of Interop is Standards	Interop	CoQs	Mon	
70	ks	6/12/2013 14:28:24	Wallace	Ron	Avid		ron.wallace@avid.com	production company owner	need a standard packet-based network infrastructure capable of supporting any media format (audio/video/codec/control/metadata) for interoperability	I can facilitate new workflows.	[ks] sub-category of Interop is Open Systems; sub-category of Streams is Virtual Bundles	Interop	Streams	Conf	
71	ks	6/12/2013 14:30:20	Wallace	Ron	Avid		ron.wallace@avid.com	production company owner	need a standard packet-based network infrastructure capable of supporting any media format at greater-than-or-equal real-time	I can accelerate content time-to-market.	[ks] sub-category of Interop is Open Systems; sub-category of Streams is Virtual Bundles	Interop	Streams	Conf	
72	ks	6/12/2013 14:32:03	Wallace	Ron	Avid		ron.wallace@avid.com	production company owner	need a standard packet-based network infrastructure capable of supporting any media format that utilizes off-the-shelf IT equipment, software and services	I can reduce the total cost of ownership.	[ks] sub-category of Interop is Open Systems; sub-category of Streams is Virtual Bundles	CoTS	Interop	Conf	
73	ks	6/12/2013 14:33:21	Wallace	Ron	Avid		ron.wallace@avid.com	media system reseller	verify compliance of end-to-end packet-based network infrastructure installation, certifying functional, performance and reliability to standard interoperability specifications	I can commission new installations.		CoQs	Mon	Testing	
74	ks	6/12/2013 14:35:08	Wallace	Ron	Avid		ron.wallace@avid.com	live production company owner	need an infrastructure that guarantees sub-frame delivery latency and frame accuracy of video, audio and ancillary data	I can increase production value, distribute live content and garner higher revenues for timely program delivery.	[ks] sub-category of Streams is Stream Flows	CoQs	Streams	Time	
75	ks	6/12/2013 14:36:26	Wallace	Ron	Avid		ron.wallace@avid.com	production company owner	need a wireless network that guarantees delivery latency and frame accuracy of video, audio and ancillary data	I can accelerate acquisition set-up, collaboration access, and review & approval workflows to reduce production cost.	[ks] sub-category of Streams is Stream Flows	CoQs	Streams	Time	
76	ks	6/12/2013 14:39:33	Wallace	Ron	Avid		ron.wallace@avid.com	network operator or administrator	need connection setup and teardown times to be 0.25 seconds or less	there is no perceptible lag in the collaboration workflows.	This addresses the case of using the packet protocol for sharing the video playback on box or more editing systems for collaboration during the editing process	CoQs	Conf	Prov	
77	ks	6/12/2013 14:41:11	Wallace	Ron	Avid		ron.wallace@avid.com	network operator or administrator	monitor media network traffic	I can diagnose, support and manage to CoQs agreements.		Mon	CoQs	Testing	
78	ks	6/12/2013 14:42:29	Wallace	Ron	Avid		ron.wallace@avid.com	network operator or administrator	be able to maintain guaranteed latency for media on a mixed-used network	I do not have to bear the cost of a dedicated/private network for media.	[ks] sub-category of Streams is Stream Flows	CoQs	Mon	Streams	
79	ks	6/12/2013 14:43:32	Wallace	Ron	Avid		ron.wallace@avid.com	network operator or administrator	monitor media network usage	I can account and bill to service agreements.	[ks] sub-category of Streams is Virtual Bundles	Mon	Accounting	Streams	
80	ks	6/12/2013 14:44:40	Wallace	Ron	Avid		ron.wallace@avid.com	production company owner	need a scalable infrastructure that load balances to changing simultaneous streams or file transfers and supports auto-configuration of additional resources and functions	my infrastructure can economically match project needs.	[ks] sub-category of Streams is Virtual Bundles	Streams	Prov	Reach	
81	ks	6/12/2013 14:45:54	Wallace	Ron	Avid		ron.wallace@avid.com	production company owner	need an extensible infrastructure that can address evolving media formats, workflows and interoperability standards without requiring equipment replacement	my investment is future-proof to the greatest extent possible.	[ks] sub-category of Interop is Simplicity	Interop	Conf	Reach	
82	ks	6/12/2013 14:46:58	Wallace	Ron	Avid		ron.wallace@avid.com	video editor	be able to begin working with material while it is still being transferred	I can reduce the time to bring a program to air	[ks] sub-category of Streams is Stream Flows	Streams			
83	ks	6/12/2013 14:47:54	Wallace	Ron	Avid		ron.wallace@avid.com	producer	be able to broadcast a program while it is being transferred from editorial	I can reduce the time to bring a program to air	[ks] sub-categories of Streams is Stream Flows & Virtual Bundles	Streams	Prov		
84	ks	6/12/2013 14:48:09	Wallace	Ron	Avid		ron.wallace@avid.com	video editor	transform my material through various error-resilient processes without needing to utilize intermediate files between editing processing steps	can work with large amounts of material of a wide variety of formats more efficiently.	[ks] sub-categories of Streams are Stream Flows & Virtual Bundles	Interop	Streams		
85	ak	6/12/2013 14:50:47	Wallace	Ron	Avid		ron.wallace@avid.com	facility / plant owner-operator	synchronize video/audio equipment using the network infrastructure	I do not need a separate infrastructure for synchronization in order to reduce cost of ownership.		Time			
86	ak	6/12/2013 14:52:01	Wallace	Ron	Avid		ron.wallace@avid.com	facility / plant owner-operator	utilize a protocol for encoding the media signal in such a way that would be suitable for IT equipment to do synchronous switching and routing	I can avoid the cost of dedicated routing equipment.		Time	CoQs		
87	ak	6/12/2013 14:53:49	Wallace	Ron	Avid		ron.wallace@avid.com	facility / plant owner-operator	implement redundant paths in my network	I can recover from a link failure without having time gaps in the media.		rel			
88	ak	6/12/2013 14:56:36	Wallace	Ron	Avid		ron.wallace@avid.com	video editor	be the network infrastructure to be able to mix various qualities of signal in order to change between streaming and high-quality transfers	I can get the best quality while editing on low-bandwidth connections.		streams	file	CoQs	
89	ak	6/13/2013 4:52:24	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to record SMPTE2022 stream to the server directly via 10G Ethernet network.	We can remove BNC cable from the server and can connect the stream distribution network	We can remove BNC cable from the server and can connect the stream distribution network. In video editing system,	streams	fmt		
90	ak	6/13/2013 4:54:19	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to get the data broadcasting of ISDB for monitoring use in a IP based broadcasting station.	Broadcaster people can check the exact content they are broadcasting.		streams			
91	ak	6/13/2013 4:59:19	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to ensure that all video transmitting/receiving products are fully interoperable with SMPTE2022 specifications.	Using many vendors product in one system is possible and the cost can be reduced.		interop	fmt		
92	ak	6/13/2013 5:00:28	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to place TS over IP traffic and standard IP traffic on the same network.	Hybridcasting can be done over one IP network.		streams	fmt		
93	ak	6/13/2013 5:02:32	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to use IPv6 in the broadcasting station.	We can avoid IP address number issue of IPv4		interop			
94	ak	6/13/2013 5:04:36	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to use 4K and 8K contents which can be upconverted or downconverted from current contents.	4K and 8K can be supported on the existing network in future.		fmt			
95	ak	6/13/2013 5:06:40	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to get the specifications of operation for mixing use of uncompressed and compressed contents in unified IP based system	We can change all system to IP based and reduce total cost.		fmt	streams		
96	ak	6/13/2013 5:06:49	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to have IP based monitoring system which supports program selection and daisy-casting and EPO like with STB for PTV.	New monitor wall system can be built with lower cost.		streams			
97	ak	6/13/2013 5:08:17	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to get the specifications of operation for mixing use of streaming contents and file based contents in unified IP based system	All system can be moved to IP based and total cost can be reduced.		streams	file		
98	ak	6/13/2013 5:09:19	Kazunori	Nakamura	Media Global Links		kazu_nakamura@medialinks.co.jp	Product Marketing	want to get the recommended specifications of the network design and multicast method for streaming contents to wide area	Unified inter-broadcaster network with lower cost can be built.		streams			
99	ak	6/13/2013 5:40:52	Fletcher	John	BBC		john.fletcher@bbc.co.uk	Camera Operator	Connect my camera to a packet-based network and have it operational within 10 seconds.	There is no undue delay when re-positioning a camera.	With current analog/digital connections for video, sync and timecode, there is very little delay from plugging in a camera to it being operational. A packet-based network architecture should maintain this performance.	interop	conf	prov	
100	ak	6/13/2013 6:56:22	Fletcher	John	BBC		john.fletcher@bbc.co.uk	Facility Operator	Send video and other streams efficiently to multiple destinations.	Best use is made of available network bandwidth.	Looking for best practice on use of multicast.	interop			

Serial Number	Reviewer	Timestamp	Last Name	First Name	Company	Affiliation - consultants, please let us know who you are representing	email address	As a (ROLE)	I want to (FUNCTION)	so that (BUSINESS VALUE)	Notes	Category 1	Category 2	Category 3	
101	ak	6/13/2013 9:39:48	Wadge	Robert	BBC		robert.wadge@bbc.co.uk	studio engineer	want to be able to reference and access my media as individual elemental streams of video, audio and data	so that I preserve as much flexibility as possible to mix, switch and recombine at any point in the broadcast chain		streams	int		
102	ak	6/13/2013 9:40:44	Wadge	Robert	BBC		robert.wadge@bbc.co.uk	studio engineer	want to be able to group my individual elemental streams of video, audio and data into bundles of heterogeneous content	so that I can simplify my routing configuration by reducing the number of independent entities where possible		streams	int		
103	ak	6/13/2013 9:42:02	Wadge	Robert	BBC		robert.wadge@bbc.co.uk	studio engineer	want simple signal-flow based configuration and automatic deployment that makes decisions based on current system resource utilization/reservation	so that I can treat the system as a black box, the internals of which I don't need to understand		conf			
104	ak	6/13/2013 9:43:55	Wadge	Robert	BBC		robert.wadge@bbc.co.uk	system engineer	want to have access to diagnostic, monitoring and visualization of system in layers from user level signal routing/processing configuration down to the metal on which it's deployed	so that I can have confidence that it's working correctly and can diagnose problems quickly when they occur	Deployment of IP systems can be very opaque; intentionally so in the case of cloud-based services. It should "just work" but what about when it doesn't?	mon	conf		
105	ak	6/13/2013 9:47:36	Wadge	Robert	BBC		robert.wadge@bbc.co.uk	studio engineer	want network transport of streams to be agnostic to the internal format of the video, audio and metadata that is being carried	so that I can seamlessly transport different media on the same infrastructure and simultaneously provide media to downstream clients in different formats that are appropriate to them		streams	int		
106	ak	6/13/2013 9:49:28	Wadge	Robert	BBC		robert.wadge@bbc.co.uk	system engineer	want to be able to flexibly deploy software-based real-time signal processing and analysis modules in my IP-based flows	so that I can transcode, analyze and transform my media on the fly to meet the needs of downstream consumers of that media (be that downstream client in my facility or network subscribers)		interop	streams	file	
107	ak	6/13/2013 10:54:42	Chandana	Aljira	BBC		ajira@rd.bbc.co.uk	system designer	minimize the energy use of the network, particularly when idle	in order to save money and minimize greenhouse gas emissions (and carbon tax).		Accounting			
108	ak	6/13/2013 10:56:58	Chandana	Aljira	BBC		ajira@rd.bbc.co.uk	system designer	be sure that the equipment used can be easily repaired and maintained rather than having to be replaced	fewer material resources are used		conf	Accounting		
109	ak	6/13/2013 10:58:41	Chandana	Aljira	BBC		ajira@rd.bbc.co.uk	system designer	be able to easily disassemble the equipment	it can be remanufactured or recycled		Accounting			
110	ak	6/13/2013 12:48:51	Brightwell	Peter	BBC		peter.brightwell@bbc.co.uk	broadcast producer	have a consistent approach to real-time control/monitoring events that is decoupled from the mechanism used to ingest the video and audio	adding real-time information to our content across multiple delivery platforms is simplified.		time			
111	ak	6/13/2013 12:51:07	Brightwell	Peter	BBC		peter.brightwell@bbc.co.uk	system designer	support future coming UHD/TV resolutions using a compression that enable me to manage the production workflow in a smart way with scalable access to ease proxy creation for editing, monitoring and production, to enable fast transcoding or downscaling to HD, and without any visual loss in quality after multiple generation of compression.	changes to network and format technologies have minimal impact on my control/monitoring infrastructure		mon			
112	ak	6/26/2013 7:45:50	Lorent	Jean-Baptiste	intPOX		ju.lorent@intpox.com	broadcast engineer	want to keep the quality of uncompressed video with the benefits of a compression that is easy to implement on existing infrastructure, that offers a visually lossless quality with a low compression ratio, a low complexity, and a latency that does not affect my current infrastructure.	so that I can have efficient, high quality and economic delivery and content management of current HDTV and future UHD/TV resolutions.		int			
113	jm	6/26/2013 7:55:31	Lorent	Jean-Baptiste	intPOX		ju.lorent@intpox.com	broadcast engineer	have open and standardised interfaces	I can build and adapt systems consisting of different vendor's equipment easily.	(From Geneva meeting)	Interop	int	COTS	
114	jm	6/27/2013 5:23:41	Opfemann	Hartmut	Dimension Data Germany		hartmut.opfemann@dimensiondata.com	System integrator	want to look (and get) a reliable contribution circuit at reasonable costs from any - even remote - location	a journalist can feed his material to the studio	(From Geneva meeting)	Reach	Prov	Ref	
115	jm	6/27/2013 5:26:52	Amatucci	Gaetano	HR		gamatucci@hr-online.de	system engineer	use components that use open/standardized interfaces	I am not locked into a particular vendor's products	(From Geneva meeting)	Interop	int	COTS	
116	jm	6/27/2013 5:28:11	Brightwell	Peter	BBC		peter.brightwell@bbc.co.uk	system designer	design engineer, facility owner	Be able to keep pace with increased quality and platform requirements while meeting required sustainability regulations and reducing energy OPEX costs.	(From Geneva meeting)	Accounting			
117	jm	6/27/2013 5:29:08	Chambers	Chris	BBC	BBC RAD	chris.chambers@rd.bbc.co.uk	design engineer, facility owner	Use the same synchronization protocol to all of my video- and audio equipment	I don't have to spend time and money to implement different standards in my facility.	(From Geneva meeting)	Interop	Time		
118	jm	6/27/2013 5:29:23	Storaas	Tore	TV 2		tor@tv2.no	System designer	Assist or not hinder the creative process through use of technology	I have more programming ideas to choose from and fresher material coming from the ideas I've chosen	(From Geneva meeting)	Interop	Conf		
119	jm	6/27/2013 5:31:12	Gross	Kevin	AVA Networks		kevin.gross@avanw.com	Production supervisor	never make on-air mistakes	productions can be set up quickly	(From Geneva meeting)	Rel	Prov		
120	jm	6/27/2013 5:33:20	Kevin	Gross	AVA Networks		kevin.gross@avanw.com	Operations manager	convert a camera or other source into a network port and start using it with minimal manual intervention	Greatly simplify Media Transfer operations.	(From Geneva meeting)	Conf	Prov	Interop	
121	jm	6/27/2013 5:35:03	Brightwell	Peter	BBC		peter.brightwell@bbc.co.uk	facility operator	reduce technical design and operations staff to the bare minimum	reduce overhead and improve operating margins	(From Geneva meeting)	Interop	Conf	COTS	
122	jm	6/27/2013 5:35:28	Rodgers	Roland	BBC NI		roland.rodgers@bbc.co.uk	Director	avoid vendor lock-in	use competition to reduce cost and increase innovation from vendors	(From Geneva meeting)	Interop	int	COTS	
123	jm	6/27/2013 5:35:44	Kevin	Gross	AVA Networks		kevin.gross@avanw.com	company owner	blind media IDs such as AD-ID and EIDR to media	reliably identify media elements, accurately fulfill distribution, and enhance audience measurement	(From Geneva meeting)	Streams	int		
124	jm	6/27/2013 5:37:43	Gross	Kevin	AVA Networks		kevin.gross@avanw.com	Facility designer	Where near-instant delivery of high-quality content is not possible (e.g. bandwidth restrictions), I want a low-quality version to be made available very quickly, with progressively higher-quality versions following on automatically.	This will allow adequate coverage of "breaking news" type events to be carried as quickly as possible, while still preserving the quality of the content held in the archive.	(From Geneva meeting)	Streams	Prov	Reach	
125	jm	6/27/2013 5:38:30	Edwards	Thomas	FOX		thomas.edwards@fox.com	Content distributor	restricted or sensitive material does not leak outside the authorized users.	For example materials where rights are not available in certain regions, obligatory elements, or material used for research into programs on sensitive topics (e.g. child porn). (From Geneva meeting)	(From Geneva meeting)	Security	Interop	Best	
126	jm	6/27/2013 5:39:42	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	Parallelism	Use IT and communication transport technologies at the lower layers for what they are good at. Convergence could and should occur at the policy, security and management levels.	(From Geneva meeting)	COTS	int	Prov	
127	jm	6/27/2013 5:43:50	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	Use commodity technologies as easily as I use the lingua franca SDI today	we can fully exploit the mass market cost controls and reduce unnecessary (lossy) processing stages	(From Geneva meeting)	COTS	Interop	int	
128	jm	6/27/2013 5:45:08	Chambers	Chris	BBC	BBC RAD	chris.chambers@rd.bbc.co.uk	Research, Design engineer	be able to start work on "post-production" on live content as it is being captured	our team can (re)view what will be programme will look like asap and shorten the production cycle	(From Geneva meeting)	Interop	File	Conf	
129	jm	6/27/2013 5:47:04	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	A solution which scales up massive routing solutions	The current limit of ~1100 square SDI video routers no longer hampers station design	(From Geneva meeting)	Conf	COTS	Streams	
130	jm	6/27/2013 5:50:37	Brightwell	Peter	BBC		peter.brightwell@bbc.co.uk	production user	The need to easily provision a media facility is network flows including AV streams, file transfers, real-time control, storage access, and intermittent non-media traffic. Each flow type should be characterized by one or more of: (1) guaranteed set bandwidth and other QoS params including lossless and best effort, (2) connection end point permissions, (3) point to multipoint configuration, (4) segmenting flows into virtual groups, and (5) security profiles per flow or group. Additionally, the entire system configuration should be adjustable on demand.	Flows must be managed in terms of provisioning and configuration. Without these functions, path QoS and security will be sacrificed. This ability is mandatory in a well-managed facility and should be part of the recommendations from the JTF.	(From Geneva meeting)	Conf	COTS	Streams	
131	jm	6/27/2013 6:13:06	Ellis	Mike	BBC		mike.ellis@bbc.co.uk	technical architect	real-time connection from event points to the broadcasting organization	that I can reduce the complexity and cost of OB vans on location	(From Geneva meeting)	Prov			
132	jm	6/27/2013 11:24:20	Kovalick	Al	Media Systems Consulting	Fox TV Network	kovalick@pacbell.net	Facility Owner	Remote control my cameras	I can save not sending cameramen on site	(From Geneva meeting)	Streams	Prov	Interop	
133	jm	6/28/2013 13:14:47	Poulin	Felix	EBU - European Broadcasting Union		poulin@ebu.ch	Media Producer	to get the visibility on the media signals (audio/video/time and fixed data/control)	I can troubleshoot and fix problems as quickly as in the SDI world	(From Geneva meeting)	Mon	int		
134	jm	6/28/2013 13:17:29	Poulin	Felix	EBU - European Broadcasting Union		poulin@ebu.ch	Media Producer	to be able to compose the audio/video, pull contextual data and interact with the content producer live	I can monetize (or add value) for personalized user experience	(From Geneva meeting)	Streams	Prov	Reach	
135	jm	6/28/2013 13:20:09	Poulin	Felix	EBU - European Broadcasting Union		poulin@ebu.ch	Operation technician	be able to send light and compact fly away kit that requires minimal installing staff and that is quick to setup and troubleshoot and that can be operated remotely from the production house	I save on transport cost, installation time and on location staff	(From Geneva meeting)	COTS	Conf	Accounting	

Requirement 2: Formats

As a participant in the television equipment food chain (vendor, integrator, architect, operator), I want the signal formats inside the packet-based media networks of the future television plant to:

1. be well documented in an interoperable-standards-actually-followed sense
2. be supportive of current media operations such as mixing, cross-fading, DVE, and voice-over;
3. be able to manage compression concatenations, and supporting arbitrarily good picture quality (up to lossless when conditions allow);
4. be based on well-understood and generally-available compression and networking technologies;
5. be able to address parts of signals (audio, video, metadata) in addition to whole signals;
6. be able to support the expected hegemony of current and future image formats, frame rates, and file types;
7. provide easy, fast, reliable connections;

So that high-functionality facilities can be constructed using equipment from multiple vendors with an expectation of excellent interoperability and a high-quality output signal.

Requirement 3: Streams

As a system designer or facility operator I want facility-wide media/data real-time streaming so I can stream:

1. real time audio+video+data muxed and synced streams (see Time story);
2. self-describing streams that identify: stream ID, contents, owners, other;
3. virtual bundles: separate streams and data paths logically grouped as one;
4. nearly equivalent SDI functionality (see QoS story);
5. legacy SDI payloads carried in a stream (backwards compatibility);
6. across an infrastructure enabled to carry future (4K+) payloads;
7. using multicast support (as with SDI today);
8. media switchable on video frame or audio frame boundary by COTS (Commercial Off-the-Shelf) switches (see Time story);
9. media switched in facility router using COTS products and components
10. packet-based network switches (see COTS story);
11. across an infrastructure that scales from small to large installations;
12. provisioned with ease (see Provisioning story);
13. configured with ease (see Configuration story);

14. in a payload agnostic manner; compressed or uncompressed support;
15. with easy access from any node connected to the packet-based network;

So that I can build agile, real time, lossless, low latency, workflows with the ability to trade off QoS, formats, and reach.

Requirement 4: File

As a system architect, product designer, manufacturer, or system engineer, I want to:

1. be able to mix streaming-based and file-based content in the same unified packet-based system to published standardized specifications;
2. be able to define QoS levels for file transfer for local, remote and local/remote file transfers;
3. be able to have multiple levels of file transfer QoS;
4. be able to monitor QoS deliver-to-commit and make adjustments by level criteria;

So that I can use files and streams in a unified packet-based system and to ensure that files are consistently delivered when they are needed and am able to make the trade-offs of cost and complexity for reduced/extended transfer times.

As a facility or production company owner, a producer or content provider, or a system engineer, I want to:

5. be able to begin work on “post-production” on live content as it is being captured;
6. be able to (re)view what the program will look like in near real time;
7. be able to use software-based real-time signal processing and analysis modules in the packet-based file-based flows;
8. be able to transcode, analyze and transform content on-the-fly;

So that I can shorten the production cycle and meet the needs of the downstream consumers of media.

As a video editor, I want to:

9. be able to mix various qualities of signal;
10. be able to change dynamically between streaming and high-quality transfers;

So that I can get the best signal and content quality while editing on low-bandwidth connections.

Requirement 5: Reach

I want to exploit the near-ubiquitous reach and rapidly increasing bandwidth of the globally connected packet-based networks (including private leased links and also the public internet) in order to:

1. be able to easily, securely, effectively browse media and exchange files with peers at other organizations;
2. be able to quickly create ad-hoc live interconnections that are able to utilize the available network;
3. be able to combine the above to leverage geographically distributed content, staff, and equipment as if they were inside my four walls;

So that I can improve time-to-air and improve staff, equipment, and budget utilization.

Requirement 6: Interoperability

As a system architect, product designer or manufacturer, I want to:

1. be able to use readily available and accepted packet-based standards, technology (e.g., standardized compression), interfaces (e.g., APIs), components and products in a multi-vendor environment;
2. be able to use software-based real-time signal processing and analysis modules in the packet-based file-based flows;
3. be able to ensure that all network-attached devices are designed and tested to operate in likely real-world scenarios;
4. be able to ensure that all network-attached devices are able to manage through and deal with dropped packets and out-of-order delivery;
5. be able to have control surfaces that are conceptually decoupled from the software control APIs of the underlying infrastructure and equipment;
6. be able to use “format agnostic” technologies;
7. be able to send audio (e.g., RDD-6) and audio essence through the entire network;
8. be able to design and manufacture systems and test compliance to an industry-standard interoperability specification;
9. be able to ensure that network-attached devices transmitting / receiving video are fully interoperable with SMPTE 2022, existing synchronization protocols for video and audio, and other relevant specifications;
10. be able to use IPv6 for the packet-based network;
11. be able to store, retrieve and exchange media and information between media production systems using media production-oriented standards-based protocols;

So that my operations are optimized, I can have maximum vendor sourcing flexibility through “plug-and-play”, “future proof” my system designs, I can choose the appropriate human interfaces for the evolving workflows independently of core infrastructure, maintain quality and compliance with broadcast regulations (e.g., US FCC CALM), I can manage the large (and growing) number of network-attached device addresses, and I can meet the media format needs of my downstream customers.

As a facility or production company owner or producer or content provider, I want to:

12. be able to identify primary and backup paths for the content throughout the packet-based network in a “federated” manner;
13. be able to use “self-contained” / “self-defining” streams with software-defined connections and/or physical-only connections;
14. be able to have the equivalent of the broadcast “tally” system in the packet-based network that provides downstream/upstream “on-air” status;
15. be able to include communications (e.g., “intercom”) along with content streams,
16. be able to dynamically add and remove components (e.g., SCTE triggers, audio and/or other metadata) from the system;
17. be able to dynamically decide to deliver streaming media over the public Internet using a Content Delivery Network (CDN) through a standards-based ecosystem including the dynamic negotiation of SLAs;
18. be able to capture a specified number of discrete channels of HD live video and sound broadcast with a specified accuracy and sampling rate and bit depth;
19. be able have a standards-based packet-based network infrastructure capable of supporting any media format at greater-than or less-than real-time, “format agnostic”, including capability for timecode, control and metadata;

So that I can have the redundancy, resiliency, reliability, simplicity, scalability, serviceability in the IT environment but with the “mission critical” real-time nature of broadcast in a live or near-live production environment in a way that allows me to repurpose “boxes” and “functionality” as my needs change regardless of “real” versus “virtual” studios to accelerate time-to-market of my content.

As a video editor or camera operator, I want to:

20. be able to transform my media material and content through error-resilient processes without needing to use intermediate files between each processing step;
21. be able to connect my camera to a packet-based network and have it operational “immediately”;

So that I can work with large quantities of material in a wide variety of formats simultaneously and effectively and I am able to capture material in a timely manner even when repositioning the camera(s).

Requirement 7: Configuration

As a Facility Operator, I want to have flexible error-free configuration to:

1. be able to quickly add and configure new equipment and elements;
2. be able to have the additions be intelligent and highly automated;
3. be able to have an excellent management/monitoring view of the system;
4. be able to deal with the variety of formats, stream-types, and file types likely to come in the future in a “format agnostic” manner;

So that I can be on-air quickly, avoid the human mistakes and errors associated with high-complexity repetitive engineering tasks, to understand faults in a timely manner and to be “future proofed.”

Requirement 8: Testing

As a facility owner, a media system reseller, or a network operator or administrator I want to:

1. be able to simply identify streams;
2. be able to see streams visually;
3. be able to quality test streams including pass/fail non-destructively in a straight-forward manner;
4. be able to test encrypted and non-encrypted streams;
5. be able to test streams for standard broadcast-style quality measures and standards and for packet-based quality measures and standards;
6. be able to verify compliance of the end-to-end packet-based network infrastructure to installation, function, performance, reliability and interoperability specifications;
7. be able to monitor media network traffic;

So that I can ensure that these complex systems are operating as required, diagnose, support and manage to QoS agreements, and minimize overall costs and downtime.

Requirement 9: Provisioning

As the systems engineer of a professional media facility I want to:

1. be able to use state-of-the-art tools to deploy professional media connectivity whenever and wherever I need it;
2. be able to send professional content over the Internet, meeting our quality needs, but taking advantage of the self-routing and self-provisioning capabilities of the Internet;
3. be able to set up a feed from a remote camera (which can be robotically controlled) within 10 seconds from the time it is first connected to the network;
4. be able to have my infrastructure scale automatically with load balancing capabilities that take advantage of various links available;
5. be able to have my workflow automatically adjust to incorporate the correct transcoding so that when I provision a circuit to a destination the format type is correct;
6. be able to quickly set up efficient distribution networks that deliver the same content to multiple places;
7. be able to provision a link at a low quality initially, if that is all that is available, but then allow the quality to improve as resources become available;

So that I can rapidly meet the business-driven operational needs of my company and make economical decisions about the links I use for transport of professional media.

Requirement 10: Security

As a broadcast media organization, I want to:

1. protect content and infrastructure from unauthorized access

So that restricted or sensitive material does not leak to unauthorized users, I can prevent my operation from being disturbed by malicious actions and no one can conduct unauthorized activities under the name of my organization.

Requirement 11: Reliability

As a professional media organization, I want to:

1. implement redundant paths in my network to ensure that the facility does not contain single points of failure which can impact the work in multiple studios simultaneously;

2. identify primary and backup paths of the same stream; switching among those paths should be seamless;
3. ensure that a failure of one system in a studio is contained within that system and cannot affect other systems in that studio, or other studios in that facility;
4. eliminate making on-air mistakes;
5. include an equivalent function of the broadcast “tally” system in the packet-based network so that devices downstream or, in a routing infrastructure, can understand a bidirectional (upstream/downstream and vice-versa) status of “on-air” so that inadvertent system changes could be locked-out (or prioritized to administrative / override) status;
6. know the key system reliability specifications that constitute an "enterprise-class" network switch/router that will be able to transport high-bitrate video signals in a live television production environment;

So that broadcasting can continue without interruption even in the event of failures (including configuration errors) of shared systems and I can recover from a link failure without having time gaps in the media. And, so that I can effectively communicate with suppliers to explain my requirements and appropriately evaluate products for use in my facility.

Requirement 12: Monitoring

As a maintenance person or as a facility operator of a professional media facility I want to:

1. be able to see decoded video and audio at any point in my facility;
2. be able to determine correctness of MPEG or other compression bit streams at any point in my facility;
3. be able to monitor and analyze packet-based network or Ethernet errors at any point in my facility;
4. be able to simply identify and test signals at any point in my facility (e.g. see a thumbnail view of the video, verify presence of audio - simple pass/fail);
5. be able to monitor systems for compliance with QoS agreements or for system commissioning and acceptance;
6. be able to observe packet-based network statistics and trends;
7. be able to decouple monitoring from mechanism used to transport content;
8. be able to deploy automated monitoring and alarm systems;
9. be able to allow multiple users to simultaneously monitor the same point in a system;
10. be able to see a ‘dashboard-view’ roll-up of important routes and flows in my facility;
11. be able to remotely monitor video, audio, metadata and network performance parameters in real time;

12. count on a constant amount of delay between the time a signal is present at the source and the time it appears at a monitoring point (zero delay would be preferable);

So that I can provide the Quality of Experience (QoE) that my business management expects me to maintain for consumers of our media products, so that I can quickly determine the location of errors or outages and take appropriate remedial action, and so that I can quickly and simply verify the presence or absence of critical systems to be able to troubleshoot and restore media services.

Requirement 13: Quality of Service (QoS) for Streams

As a system designer or facility operator I want to transport synchronized, end-to-end, real-time, muxed or individual, audio/video/metadata streams over the packet-based network with:

1. video-frame/audio-sample time accuracy;
2. very low latency;
3. lossless transport;
4. rate-sufficient to meet the needs of current and future format payloads;
5. transport over local and campus networks;
6. each stream or group of streams having selectable QoS profile that is defined by the system configuration;
7. the ability to support a high profile with SDI-like (or AES3-like) performance and lower level profiles that sacrifice SDI-like (or AES3-like) performance in one or more degrees;

So that I can configure agile media workflows and transport real-time AV streams using the packet-based network in my facility and be able to select QoS profiles and tradeoff costs and performance depending on business needs.

Requirement 14: Quality of Service (QoS) for File Transport

As a system designer or facility operator I want to transport media files between endpoints in non-real-time using a packet-based network with:

1. adjustable and deterministic transfer time;
2. bounded loss;
3. rate-sufficient to meet the needs of current and future format payloads;
4. with transport over local, campus networks and Internet;

So that I can configure agile file-based media workflows and transport media files using the packet-based network in my facility and be able to select between QoS profiles and tradeoff costs and performance depending on business needs.

Requirement 15: Time

As a system designer I want facility-wide timing methods such that I can accomplish the following:

1. keep multiple A+V streams in the same transport in sync (lip sync);
2. keep multiple, separate A+V stream transports, synced together (link sync);
3. keep streams and end points synced to a house reference (nodal sync);
4. enable frame (or audio sample) accurate switching of real time AV synced streams (synced switching);

So that I can coordinate facility streams in lock step for sourcing, sinking, mixing, displaying and grooming to create agile real time workflows.

Requirement 16: Accounting / Monetization and Revenues

As a professional media content producer, I want to:

1. distribute content to end users and to content aggregators over public packet-based networks, with clear traceability and rights management;
2. be able to adapt content and advertisements to end user in real-time based on their feedback and information;
3. allow the viewer to compose the audio/video, pull contextual data and interact with me lively;
4. monitor media resources (network/processing/storage) usage;

So that I can gain more revenue from each of my content sources, through larger numbers of subscribers, maximize benefits for us getting better advertiser's satisfaction and personalized user experience and I can bill to service usage.

Requirement 17: Accounting / Expense Control and Sustainability

As a professional media organization, I want to:

1. be able to separate the physical locations of control surfaces, capture, routing and processing resources;
2. replace O/B van functionality by light and compact fly away kit that requires minimal installation staff and that is quick to setup and troubleshoot and that can be operated remotely from the production house;
3. monitor resources (network/processing/storage) usage;
4. minimize the energy consumption of storing, streaming and moving media around the network, particularly when idle;
5. be able to easily repair, upgrade, maintain and disassemble the equipment when decommissioned;
6. ensure the longevity of my design by using future proof technologies;

So that I have the freedom to deploy people and technology in the most cost and process-efficient way, save on transport cost, installation time and travelling of operating staff, and pay only for the resources that I use. I can also meet “carbon consumption” regulations, reduce OpEx on energy spend and carbon tax and protect myself against possible future resource shortages. And so that the system being built will remain valid when the requirements gets stricter (e.g., when I am required to support a higher resolution picture, I will have enough bandwidth to do so).

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