Survey Results

TOWARD A NEXT-GENERATION CONTROL PROTOCOL SUITE

ESTA NEXT-GEN CONTROL PROTOCOLS STUDY GROUP

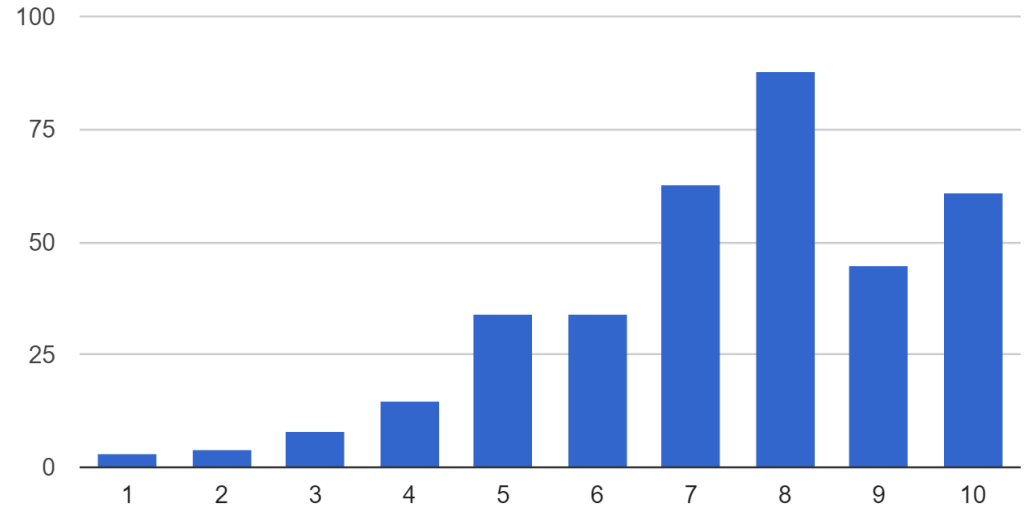
Survey Mission

ESTA's Technical Standards Program (TSP) will use these responses to help us improve the protocols we have, as well as guide us in the future.

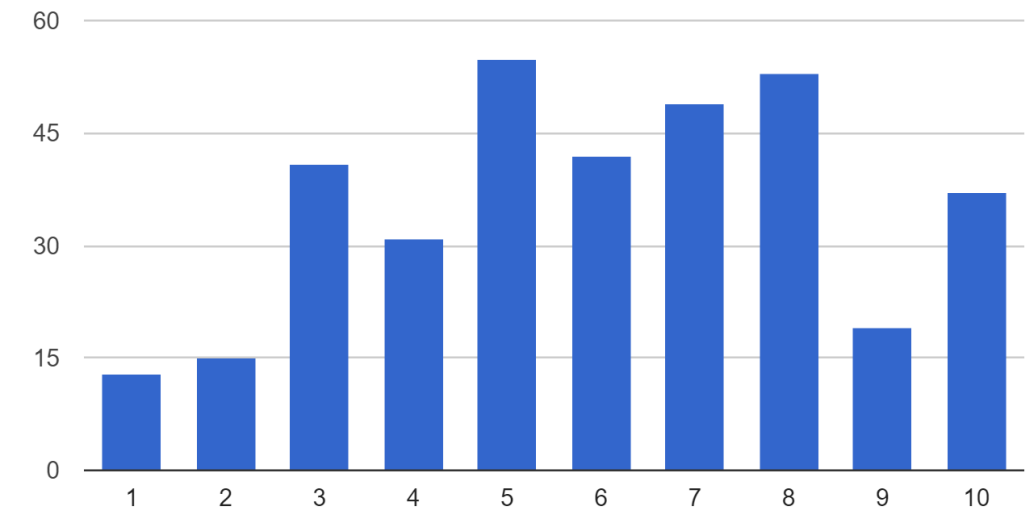
360 responses received.

DMX 512 Now and Future

How well does DMX512 serve your needs today? 7
Average: 7.41

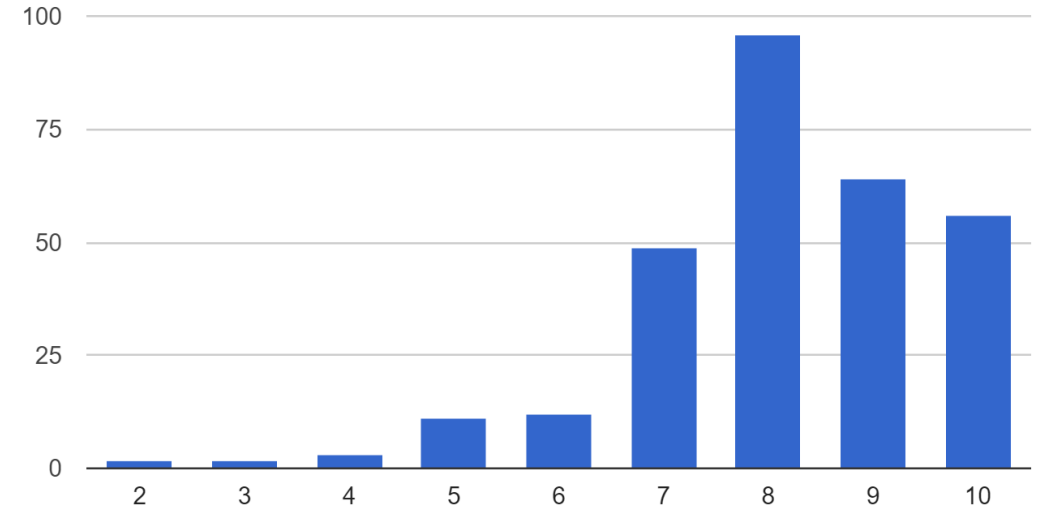


How well do you think DMX512 will serve your needs for the foreseeable future? 6
Average: 5.99

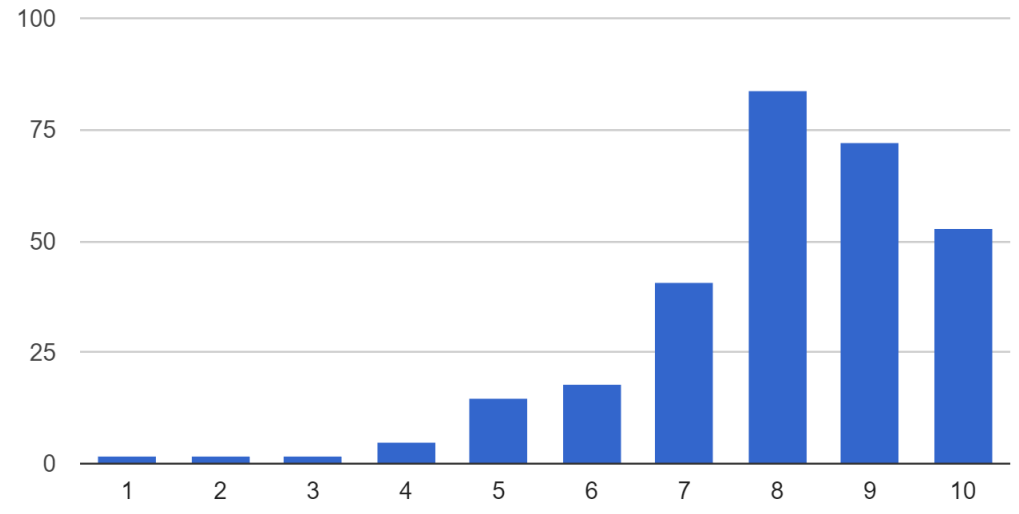


sACN Now and Future

How well does sACN serve your needs today? 7
Average: 8.12



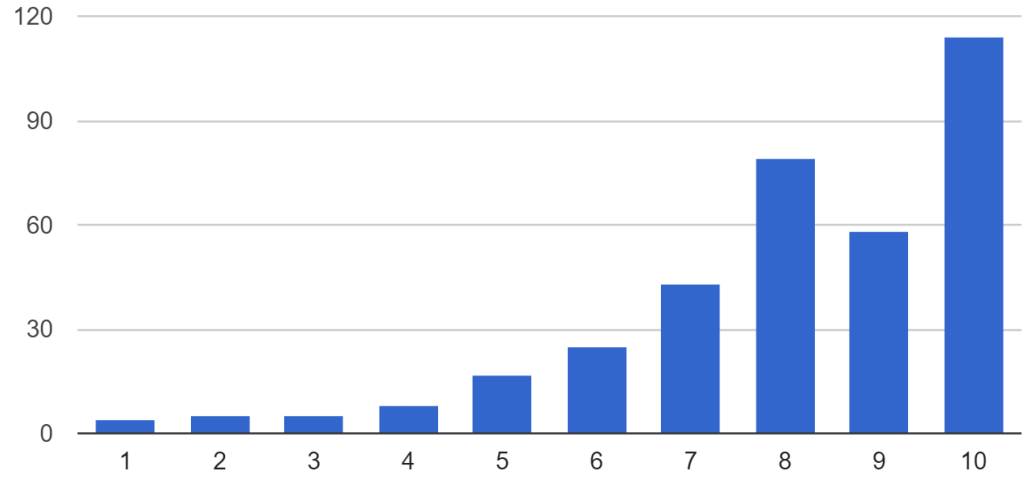
How well do you think sACN will serve your needs for the foreseeable future? 7
Average: 8.00



Redundancy – Promise vs Delivery

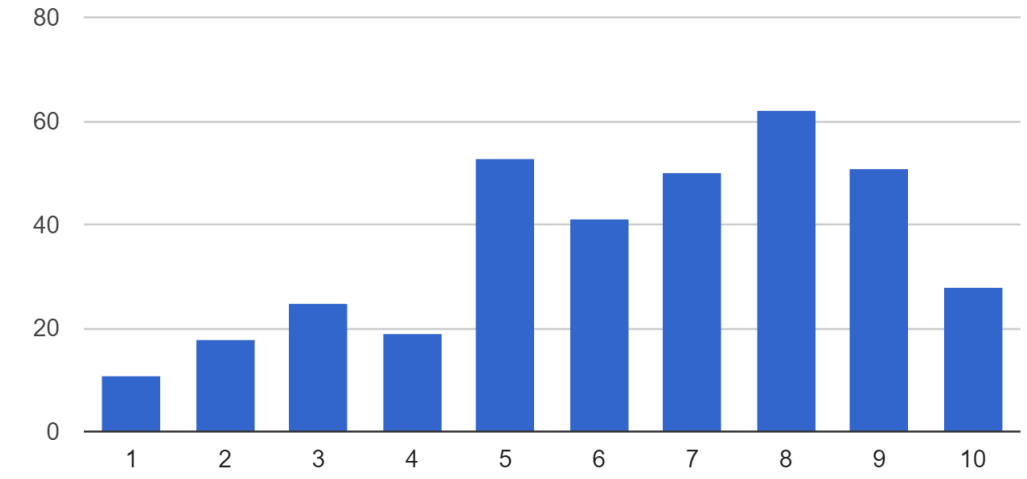
How concerned are you with designing redundancy into your entertainment system in case of equipment failure? 4

Average: 8.08

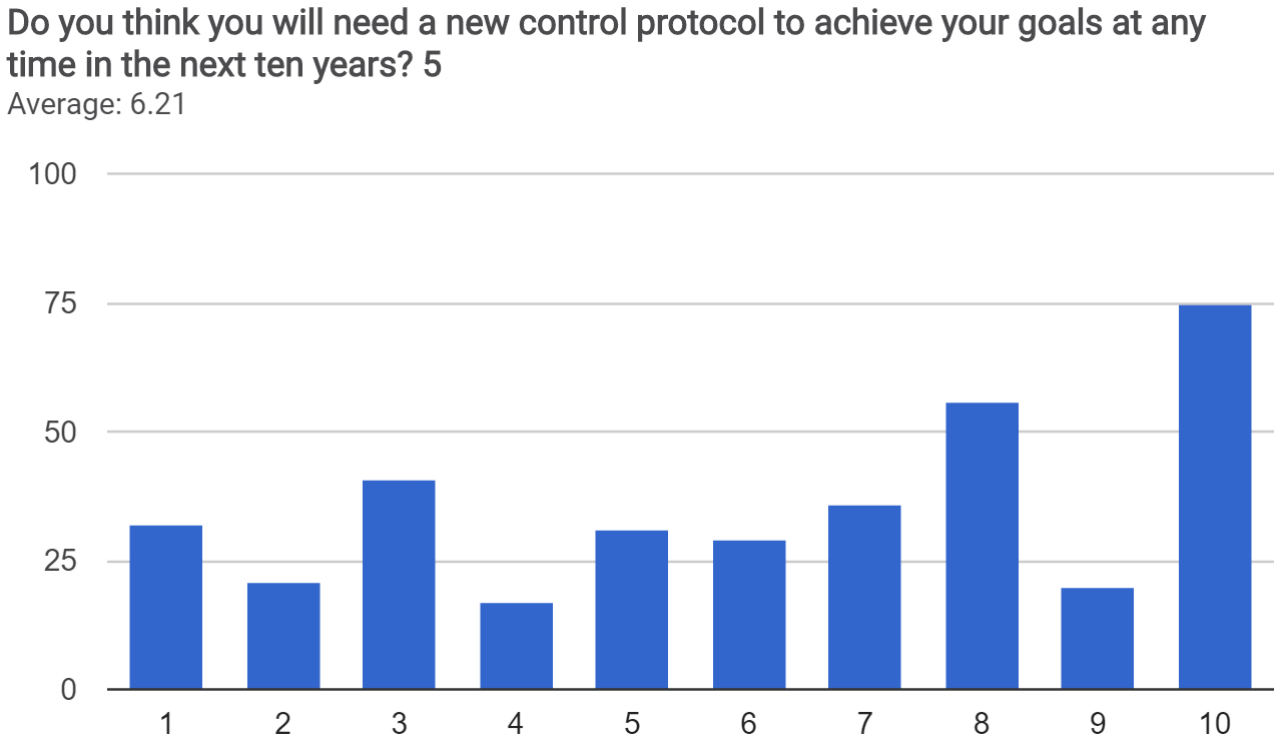


How often are you actually able to use redundancy features successfully in your entertainment systems? 4

Average: 6.41



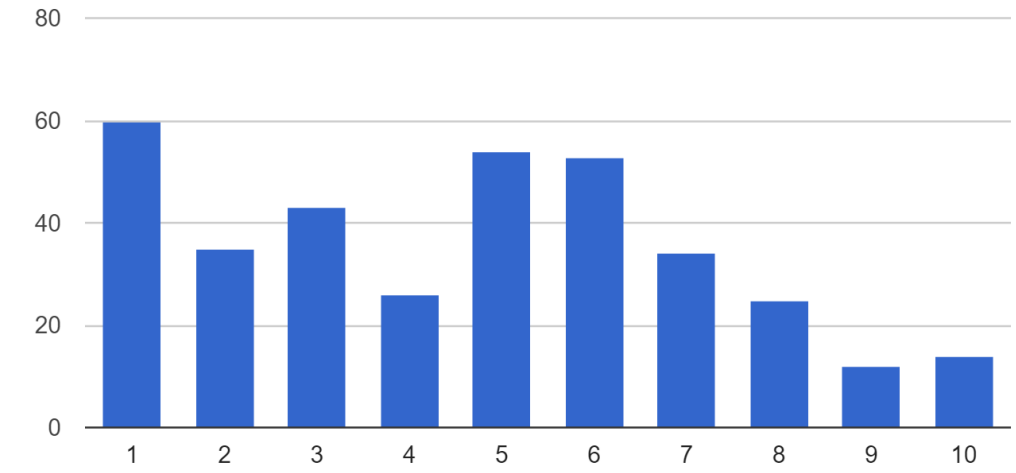
Do we need a new protocol?



If so, which physical layer?

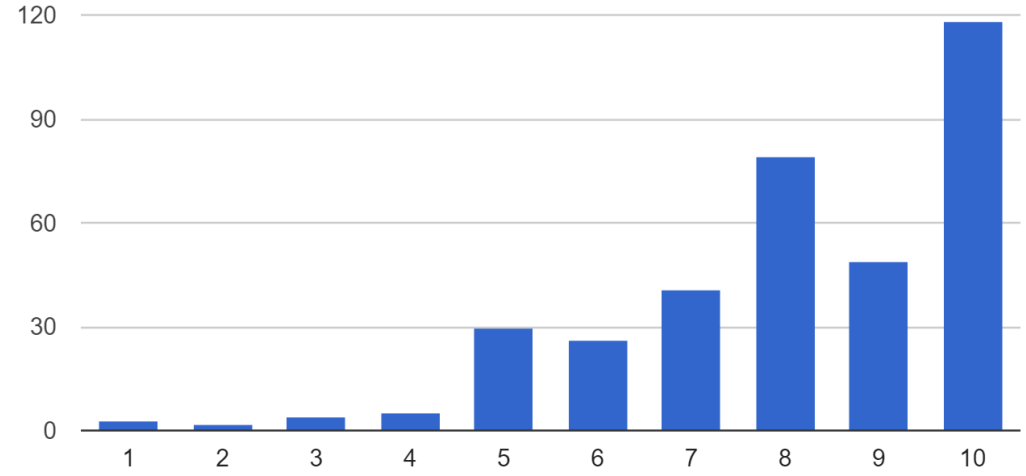
Do you think that RS-485 serial (as used in DMX512) is the correct technology to carry these protocols in the future? 7

Average: 4.60

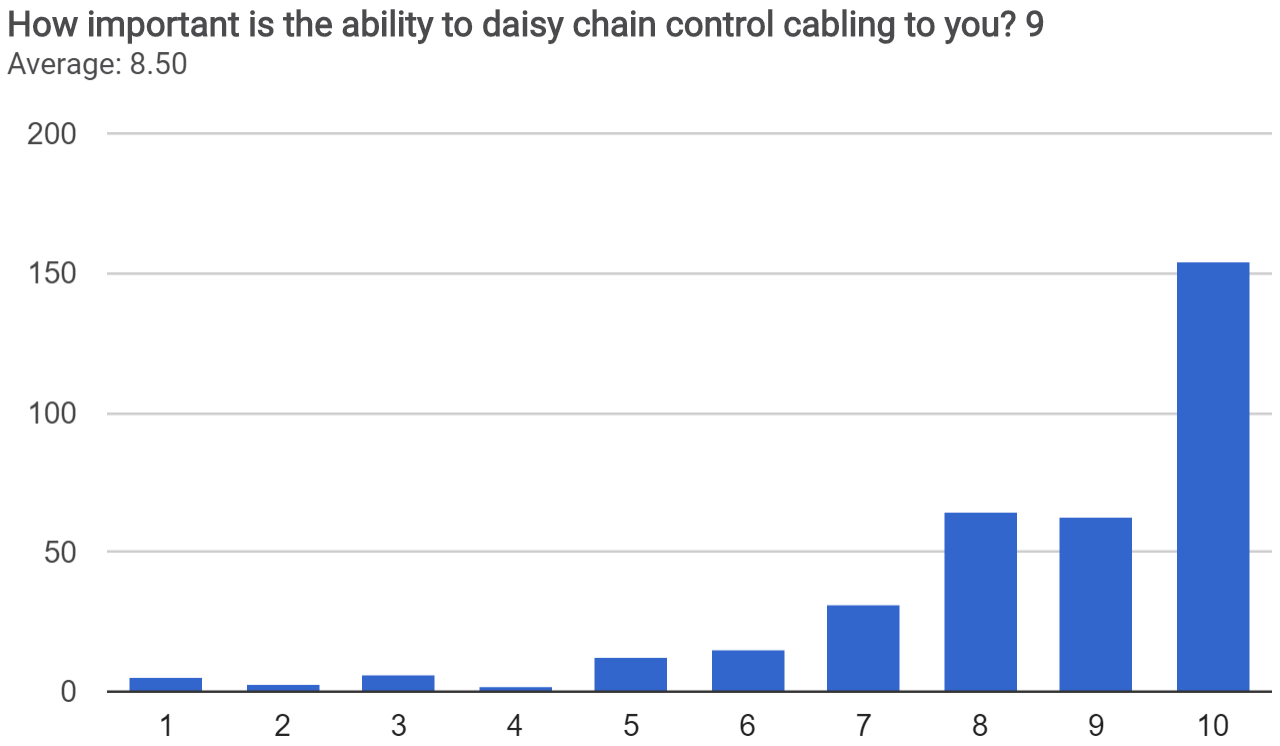


Do you think that Ethernet (Wired or Wireless) is the correct technology to carry these protocols in the future? 8

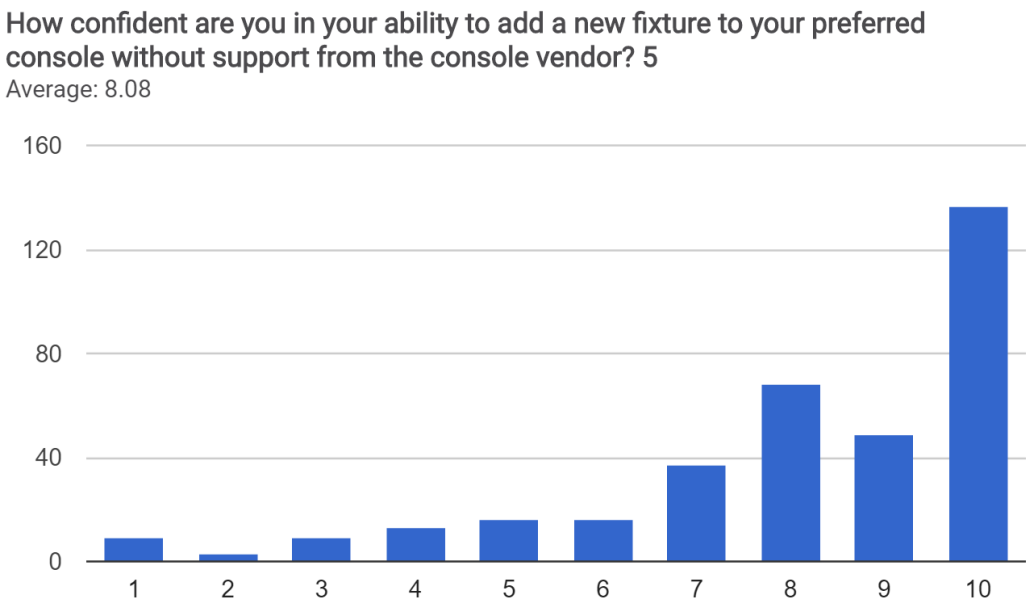
Average: 8.08

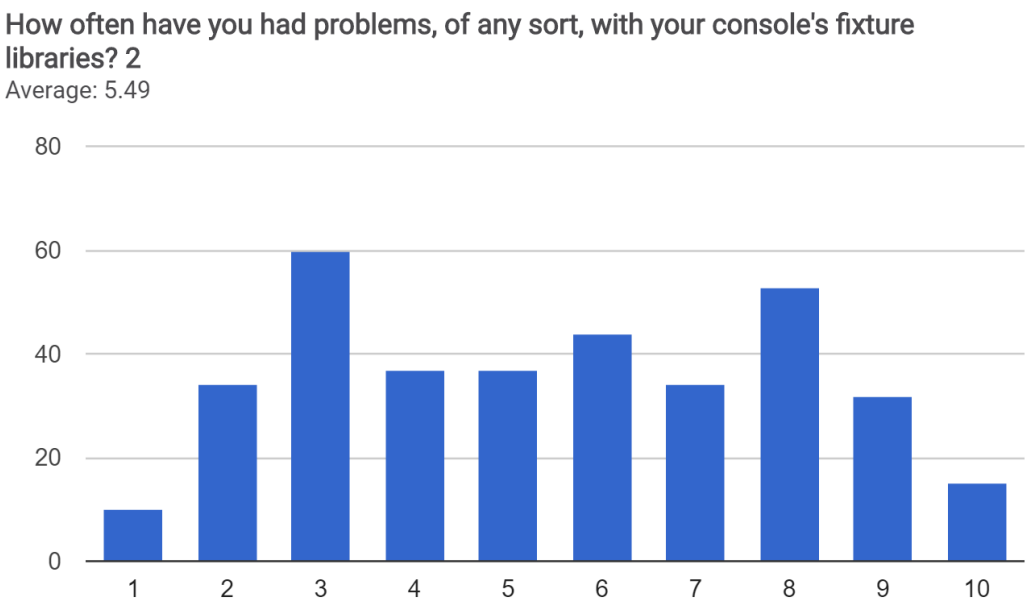


Cabling topology?



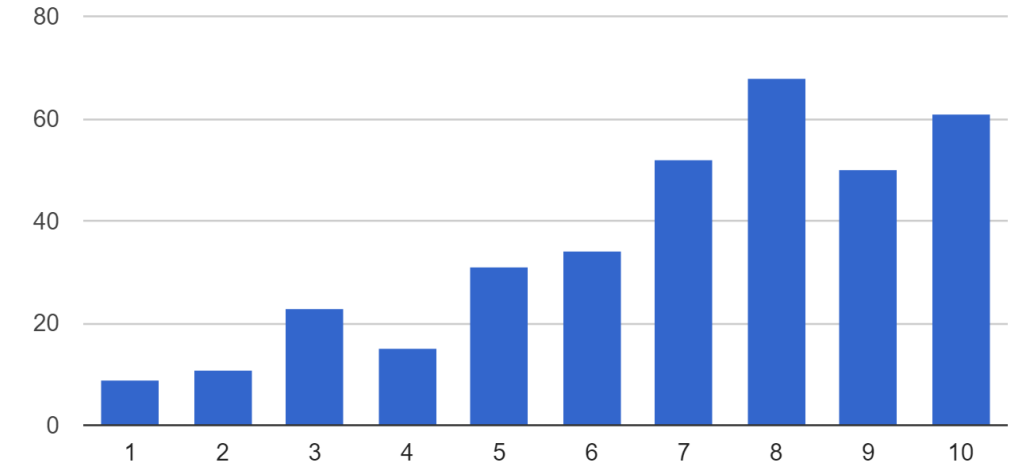
Fixture Library Challenges



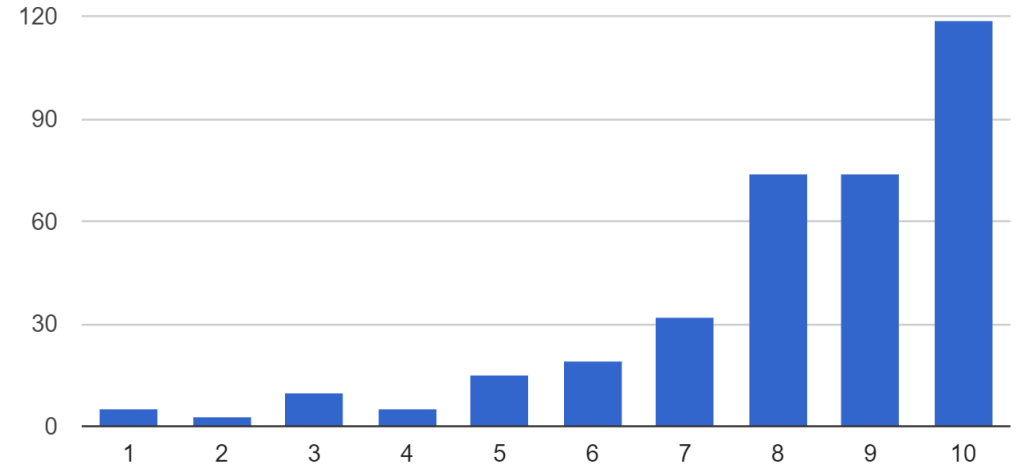


Fixture Library Features

How important are real-world units (pan/tilt in degrees of rotation, strobe rate in Hz, etc) to you when programming a lighting controller? 5
Average: 7.03

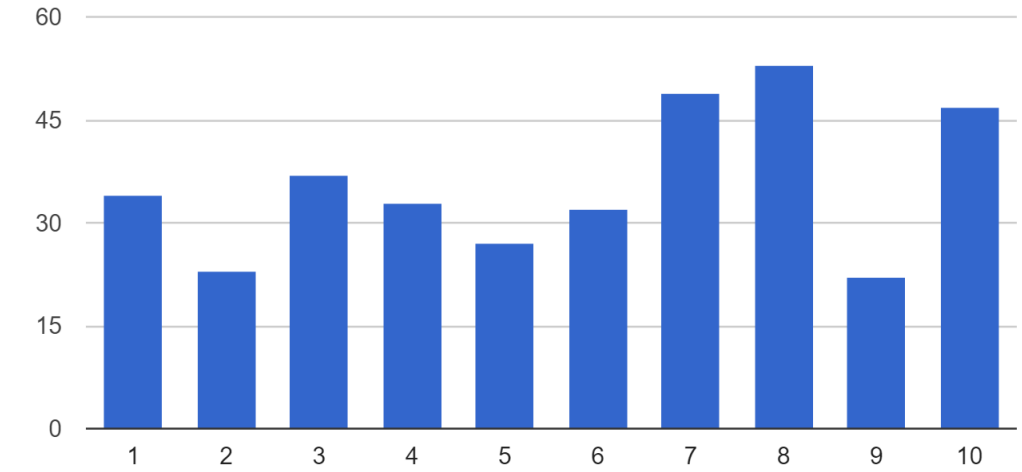


How important is color calibration between different makes, models, and types of fixtures to you when programming a lighting controller? 7
Average: 8.21

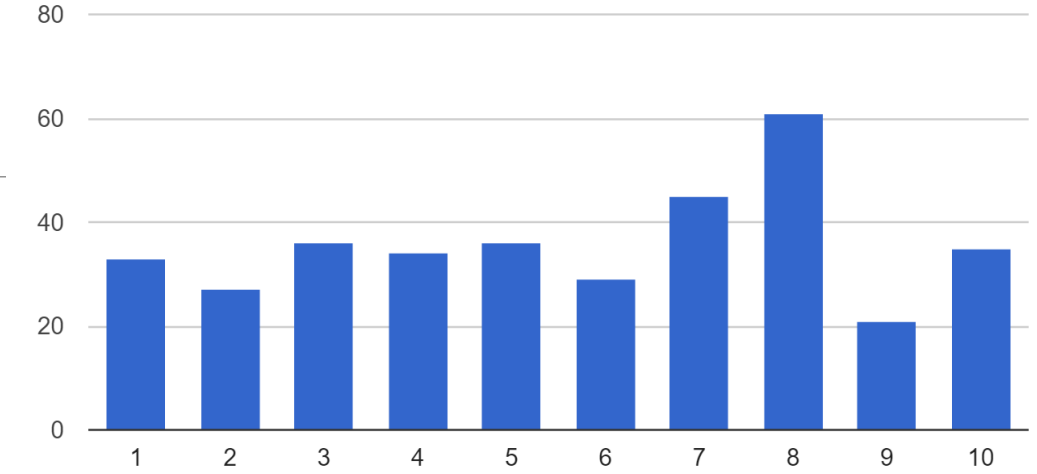


Security Features

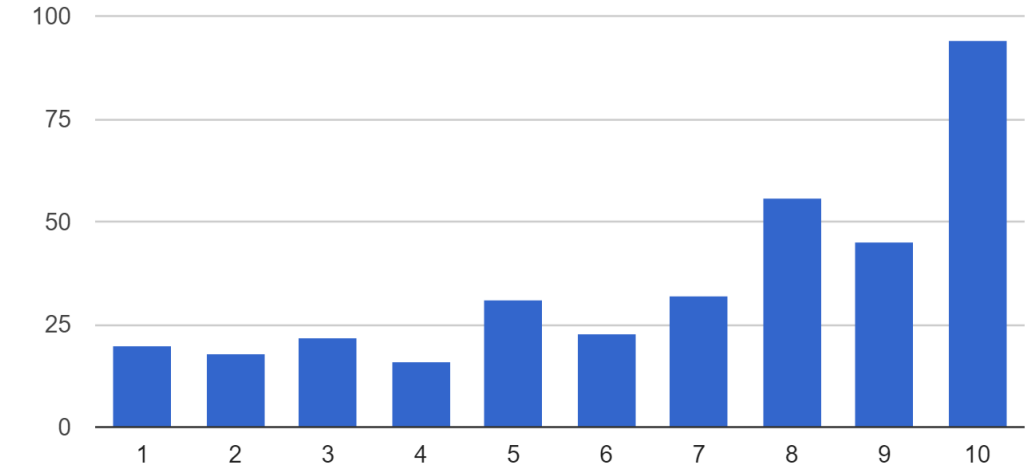
How concerned are you with network security in general on your entertainment system? 7
Average: 5.84



How concerned are you with limiting what abilities each authorized user has on your entertainment system? 3
Average: 5.68



How concerned are you with preventing unauthorized users from accessing your entertainment system? 5
Average: 6.99



Results Summary

Interactive Results Summary Available Here:

https://awesome-table.com/-Lk2-QqvfCaHw2wHVIH7/view

Not going to copy paste all results here as that causes filtering/slicing features to be lost.

However, summary only includes world cloud from free-form text responses, so the full responses are captured here for easy access.

Free Form Text Responses

Anything else you'd like to tell us about yourself?

15yrs in events, 10yrs in installs just starting up design and consulting company.

I do a lot of pré-visualization

I was trained as a theatre technician and now work for a distributor of lighting products as a product specialist.

Cruise industry

Besides my dayjob as lead technician in a dutch theatre, i'm a small developer or Artnet capable hardware and iOS app's.

I'm a media server programmer and software developer and previously worked for Green Hippo in special projects. I designed and wrote large parts of the show control integration systems for the Hippotizer product including the DMX control system.

ETC Technical Support, but also theatrical work on the side.

I split my time as a lighting designer, programmer and tutor

I'm a video designer, engineer, and media server programmer.

laser projector manufacturer

working in education, i take on the role of technician, electrician, designer, programmer, and operator.

Educator

Head Electrician For A Large 1st National Broadway Tour

Extensive experience with controls and control protocols over the past 20+ years

Technical Dirctor at an independent boys high school.

It's hard to pick one category professionally, as I'm also a designer and many other things.

In addition to lighting design I often design and program the lighting controls systems

Background is in automation and show control system deployment

I also do Museum and Art installs (maybe thats considered Architectual

Full-time event staff at PRG

I'm still pretty inexperienced, so take everything I say with a healthy grain of salt.

I design systems for private individuals in either marine (superyachts) or residential settings.

Head Electrician at LORT Theatre

I tech & program.

Free Form Text Responses

Anything else you'd like to say about DMX512?

Your termination question should have included the option ‘only when I have a problem’ which is when I use them.

Needs replacing with a higher bandwidth rs-485 based standard

Biggest issue with DMX fixtures these days seems to be the lack of reading & filtering packets based on start code.

It works and has served the industry well. But it is time to move on.

Terminator answer would be I use them when needed

In my opinion the applications have outgrown the conventional application of DMX512. I think in the future fixtures will take sACN or Artnet directly.

It needs to go away

Serial DMX is impractical for media server control as even the simplest shows require multiple universes.

The daisy-chain-ability of RS485 is I think of vital importance in consideration of alternatives. Star-formation networking including Ethernet just won’t catch on in the industry due to this limitation. Even fixtures with inbuilt Ethernet switches for “thru”, are regarded as not reliable or trustworthy due to the likelihood of the switch failing if the fixture fails. At the same time, it seems unlikely that simply increasing the baud rate to transfer larger universes would make significant enough improvements to be worthwhile, without likewise significant caveats in its reliability and/or availability due to price of implementation. IP based distribution protocols have largely removed a lot of the pressure to develop such improved standards, but given the proliferation of highly pixel-mapped fixtures that can consume half a universe each with ease, it seems like there is definitely demand for an improved last-step synchronous protocol.

I've met resistance from production electricians to the use of terminators.

DMX has served us for a long time. It's time for a retirement party.

industry uptake of RDM would keep DMX alive, otherwise its outdated.

Fairly new to it, just started working with it 2 years ago when we developed a DMX based laser controller

It's solid, and it tends to be dodgy connections or fixtures that cause failures rather than anything related to the protocol IME. Easy to understand and difficult to get wrong!

It's robust and it works. I foresee it continuing to be the "final mile" of control wiring for the foreseeable future.

i think i will keep using it in the forseeable future for "the last mile", i.e. to get the signal to the fixtures, but not to send it from the console to the stage

We use a large fiber ring for our backbone but so many lights still require 5pin DMX at some point

Its a dinosaur that is so limiting and expensive that i no longer really have any need for it.

DMX512 is a perfectly suitable protocol for controlling dimmers, but is lacking when it comes to complex (motorized) devices.

Can't believe how well it's held up over time, and how adaptable it's proven

Always a reliable connextion

Free Form Text Responses

Anything else you'd like to say about DMX512? (Cont.)

Please write a book explaining how it works in detail

Networking is the way forward...

Single universe DMX is something i've not used for several years now. Its just not big enough to control the things i need to control

Fills most of my needs but feels limiting with today's use of LED's. Most products only implement 8bit dimming which is never smooth with LED's. If each address was a 16bit value instead of having to use 2 addresses, it would be far more prevalent, and easier to implement.

The only times I have needed to use terminators is in situations where I might have a light close to the desk and then its output is sent a far way to thaw last few lights and in cases like this the reflection caused my no terninamtion can become an issue

Best protocol, but need a really better implementation in architectural market (stop DALI!!!)

While I typically use a network backbone of some sort, DMX512 is still the best "last mile" solution I see right now.

Typically I use DMX512 for power control (dimmers, relays, etc) and other protocols for fixture control I often need more than (2) universes for fixture control and the physical infrastructure for DMX512 above (2) universes becomes cumbersome.

I wish that DMX 512 (RS-485) would be abolished in this industry. Not only would it immediately aid those who are being counterfeited in China, but I have seen questionable products in action (that should have never been approved for any use in this industry), all with a 5-pin DMX for easy control from a lighting console. When other analog protocols were abandoned in favor of DMX everyone used converters for a few years and then they forgot about analog. While DMX-512 served our business well for many years, I'm hoping we can soon forget this no-parity protocol.

DMX just works. But when it doesn't, it's usually a new manufacturer's crappy implementation that everyone else has to suck it up and fix.

Dmx would be fine if the ch count wasn't limited to 512

A DMX1024 with double frequency or DMX2048 with 4x frequency would be nice.

Rock solid and brilliant - so easy to use and set up. Plug and play. Let's hope it is around in some form for a long time to come. I use sACN and similar protocols all the time but there's something easy and simply about using DMX for individual units and straight out the back of consoles etc.

Its very robust and forgiving but it is a poor choice for pixel mapping high channel count fixtures

Your question about cabling technologies omits permanently installed building wire AKA DMX compliant Belden or similar wiring.

Works well

Considering it's age, still pretty awesome

It is a very robust and stable protocol, I like it

DMX as a control protocol is great RDM stinks.

Free Form Text Responses

Anything else you'd like to say about DMX512? (Cont.)

Works well

Considering it’s age, still pretty awesome

It is a very robust and stable protocol, I like it

DMX as a control protocol is great RDM stinks.

It's time to move on.

I feel as though DMX512 meets current needs fine; but as shows move out of 50-100 universes, I feel as though limitations in run distance, universes available, and parameters consumed by luminaries may make DMX512 strained.

Make DMX a requirement for all future consoles so venues aren't forced to switch to sACN

Was great in its day, but just can't handle the amount of data (# of universes) we use these days, even for basic stuff.

perfect "last-mile"

Considering it's age, It's done very well!

The topology is great, but almost everything else is... not. In particular: - The "Break" is a really nasty misfeature. Almost every modern microcontroller or CPU UART has hardware errata such that that break detect/break send either doesn't work at all or is broken. A lot don't even try to support it. It's long past time the Break was retired and one of the many other ways of indicating packet boundaries used instead. - No checksum or even sequencing, so receivers can't reject bad packets or warn about poor cabling. - Users need to know exactly how many bytes of data each fixture needs, as otherwise fixtures use parts each others data and misbehave in surprising ways. The protocol ought to deal with that! - Have to update all fixtures at the same rate, even if most of them aren't changing.

Better education necessary for engineers in architectural applications.

I'd like to see more RDM adoption

It would be helpful to narrow the variability of MBB, Break, MAB

Ireally appreciate as an end user that it's robustness is so good when people use cabling which is not to specification, make connection errors and generally abuse it!

I find terminators are more needed based on the controller sending signal

Free Form Text Responses

sACN - Do you use a cabling technology not mentioned? Tell us about it.

WiFi. When I’m being cheap.

I am often at the mercy of whomever specified it. I may not even know how I'm getting from here to there.

5 GHz Wireless

WiFi

Sometimes Wireless Network for special requirements that do not require a fixed installation. For example for artists on stage who should be able to move freely.

Opticon Fiber and Nemo Fiber

TMB ProShell on RJ45 Ethernet Copper Patch Cables

Free Form Text Responses

Anything else you'd like to say about sACN?

the description of fibre patch cables is not in keeping with common naming convention ... I am presuming you are talking about single mode and multimode cables.. I suspect this will confuse a lot of people taking the survey

Also use per-channel-priority quite a lot, aka DD packets. Unfortunately not all receiving devices support it and it's hard to find documentation which products do support it. Per-channel-priorities are mainly used to take/give control of LEDs or moving lights between the houselight controller and lighting console. There is quite often the need or reservation done in the system to have more than two transmitting sACN sources for a given universe (houselight controller, lighting console, backup, guest console, mediaserver).

Love it. If I can get the networking side working that is.

Where is the full ACN?

It is great and works more often for me than artnet

Missing discovery functionallity

The ethernet transport mechanism makes this protocol more appropriate for media server control, however it's still missing many features which a modern control protocol needs.

Streaming ACN is an excellently written protocol I think. The ability to use RDM over sACN would be absolutely an improvement but I understand that ability is coming. I am surprised that there aren't other subprotocols of sACN created for other niche requirements in this industry, for example for metadata transfer, control synchronisation, or even specialised variants for pixel-mapping and similar projects where the "512 agnostic 8-bit values" nature of DMX isn't helpful.

The biggest thing that is lacking is security.

it's movement in the right direction, which is badly needed

I could see great utility in custom packet header data. Many manufacturers (*cough* ETC) already abuse standard packets to provide additional information (such as per address priority). While this additional functionality is useful, I literally had to call ETC to figure out what was going on in these packets, where simple custom metadata probably would have answered the question for me/would make it easier to filter these packets out

I didn't realize there was a finished (?) standard for synchronous sACN data

I wish there were better test software options for viewing universes, data, and devices. Much like the luminex luminet monitor but for sACN

The 1:1 mapping of universes to Multicast Groups is insane and massively limiting to the protocol once you pass a point where ethernet switches can't handle the number of multicast groups.

Not enough experience to give a good answer at this one

It has been a game changer, it just works and I love it

the Ipv6 revision needs to be fixed to allow single stack (ipv4 OR ipv6)

Normally use it for Media Servers outputting sACN with or without a console.

Free Form Text Responses

Anything else you'd like to say about sACN? (Cont.)

sACN /ACN /Artnet /Kinet... a lot of dmx over ethernet... may be enough...

I find sACN most useful for fixture control especially large color changing LED or moving light installations. I don't trust it for power control because I find the switches to be too risky a point of failure. I do find it harder to design control systems utilizing sACN as the technology is a little more complex and I haven't taken the time to properly learn what's involved.

Incredibly simple standard that's become indispensable. But please incorporate per channel priority and add a receiver element to universe discovery on the next revision.

Fibre cables im aware of but ive never installed one.

I need a real discovery (like in ArtNet or KiNet) to detect the device and watch if it failed. The current disvovery from E1.31/2018 is useless for me.

Great protocol - just a shame that so many sACN nodes and units can be a pain to set up - often only one button on the facepanel to set every setting. Or a convoluted and tricky web interface that requires extra cables and a laptop etc... perhaps we need manufacturers to support putting a few more buttons on the front..!

sACN is the way forward but we need better diagnostic tools for trouble shooting. Also would like to have the Universes sync fully implemented

I’m a complete beginner with sACN, so please don’t take my responses too rigidly.

Would like to actually start using the universe synchronization.

Again, it has the same limitation as DMX that the user has to know how many bytes each fixture needs, and that whole universes have to be sent. The ETC per-channel priority helps a lot with the latter as it is at least possible to "unpatch" unused bytes. Per-Universe priority is basically useless, it's far too large a block.

Need RDM or similar device management....

I'm eagerly awaiting the adoption of RDMnet for sACN.

It's good but the robustness of the cabling is always a risk in touring, film and TV situations.

Free Form Text Responses
Anything else you'd like to say about Art-Net?

Max 2 transmitting sources is often too little. Unicast dislike is because that makes troubleshooting the system much more difficult. User rarely knows which version of artnet their controller uses. Artnet is used if sACN is not an option. Artnet implementation in receiving devices varies a lot.

I prefer sACN but quite a few fixture out there only take in Art-Net.

From a network topology and data distribution perspective the application of multicasting would be better, and probably faster is larger projects.

The ethernet transport mechanism makes this protocol more appropriate for media server control, however it's still missing many features which a modern control protocol needs. In situations using large numbers of universe the unicast combined with the universe addressing system is cumbersome, hence I prefer sACN where the universe address can be directly related to the multicast group.

Artnet is fundamentally unsuitable to the future of IP distribution of lighting control. The lack of multicast support, enforcement of specific IP address schemes, and providing packet broadcast functionality that is more often detrimental to network conditions than helpful, makes me think unlikely to use Art-Net on projects in the future. The subscriber model of sACN is simply so much better suited to the way lighting control networks are used.

It's often not clear which version, & which parts, of Art-Net a product supports.

It was great that it was created, but it should now be fired.

Networking in theory is resilient but there's more potential points of failure - switches, nodes etc. We tend to use it to go from console to 'stage'/primary distribution then use DMX 5 pin for local distribution on trusses/bars/whatever, even to fixtures that also have art-net in, so it's easy to rig and consistent to troubleshoot.

Eos only sends ArtNet 1 as far as i know, so i haven't used any other version. i never use ArtNet as primary protocol. i just add it and send it for specific channels, always for devices that can't handle sACN. it it was up to me i would never use ArtNet

I understand while the universes are the way they are, but I wish manufacturers of consoles/nodes would hide the network/subnet/universe and give me a simple interface that just says the actual number

Legacy, and not using it unless i have to for backwards compatiboility

Do not like at all

I feel like it hates me. Personally.

I do not like Art-Net. Most implementations use legacy standards which tend to clog up networks. The technology feels antiquated and I am turned off by products to only support Art-Net

Generally the networking side of my shows is taken care by a dedicated network tech or systems engineer

Art-Net is painful. Humans don't think in 0 based systems. And there's just no point in having a manufacturer's proprietary "open protocol" when you can use an industry standard (e1.31).

Artnet over WIFI usable for small events for ease of setup, delay of 80-120ms end to end over small system

Free Form Text Responses

Anything else you'd like to say about Art-Net? (Cont.)

The ArtNet ArtPoll&PollReply to find is very nice. Only the administration of the universes in PollReply is very difficult that dise always have to be in the range 1...16 and only provide 4 universes of information per PollReply. And the BindIndex of the ArtNet PollReply only reaches 256. Better would be in the PollReply Pro universe in the connected 16 or more bits. ArtNet 1 was simply there were 8 bits for the universe. ArtNet 3 became more accurate but also more difficult to configure also for the customer. In ArtNet 3 you have NetSwitch(7bit) SubSwitch(4Bit) Universe(4Bit, but the other 4bits must match SubSwitch). What's new in ArtNet4, I haven't found out yet, it's identical to ArtNet 4, but there's a new number on it and you can win a prize for that? My wishes would be: 1.) An ArtPollReply with independent universe entries. At least 32 universes better more into a PollReply without BindIndex, without SubSwitch, without NetSwitch, without Status2-Bit3 2.) If the protocol is called 1...4, then enter it in PollReply->ProtVerHi 1...4 and other packets as well. 3.) A common header for all ArtNet packages would be nice ID[8] OpCode[2] Version[2] and not like in ArtPollReply quite different 4.) The ArtNet OEM-ID in the ArtPollReply is a hindrance. This list has to be updated MANUALLY all the time. Unfortunately there is no easy format from Artistic Lizense to read it only from the Homepge, and the offered header file is always outdated. Better would be aktulles xml file or in ArtPoll a field in which the manufacturer enters his name and website.

I have found that different types of controllers output different "flavors" of Artnet which causes compatibility issues when you have a mix of gear from different manufactures. Broadcast works well as far as workflow on show site but can cause issues with high universes counts on large systems. Unicast is difficult to deal with on show site when equipment fails and have to repatch replacement equipment.

Artnet is amazing, I just don't like how some products start at 0 and some at 1, can make things harder.

Latency matters

Ditto off sACN. I know a little more about ArtNet, but nowhere near enough to be an expert.

Only use it when venue has done away with DMX. Great when it works, but consider it less reliable than DMX.

Great catch-all, but sACN is almost always better.

For us it provides a useful interface between something like a media server and a device(s) used to split Art-NET into multiple DMX outputs (eg: Artistic License Data-Lynx)

The people of Nantes demand that it stop spamming them! Art-Net 1 does work, if the system is very small. Art-Net 2 onwards only really works at all if everything is from the same manufacturer. Even then, most receivers and a lot of switches fall over once the system becomes medium-sized as they can't handle the Art-Poll reply storm.

Can it please just go away? :-p

Has the feature of bringing down an corporate network in seconds....

The hexadecimal universe numbering is very confusing

It's confusing because it starts at Universe 0

Obviously Art-Net has some good features but sACN has some advantages. Once again it all relies on 1s and 0s in the right order on a fragile cable which is always a risk on a multimillion show.

Free Form Text Responses

Anything else you'd like to tell us about your experience with show control?

A lot of my software development activities is in show control, integrating protocols into 3rd-party software and writing show-specific software to solve show control problems.

ETC's efforts to increase support of OSC over TCP is I think important but has a long way to go. This is still a weak point in show control networking (IP-based flexible control protocol with guaranteed delivery).

Lots of devices only support OSC over UDP, which can be problematic. Often I would prefer the reliability of TCP, even with the possible delays that might introduce. I'd rather the cue happened late than not at all.

SMPTE and MIDI notes have made up over 80% of all show control for me

In film, the contact closure is used often believe it or not. Motion control camera rigs seem to only be able to use this

Mostly use qlab to control lighting console cues via timelines in a group cue

i want OSC classes. Tons of them. How to create hardware and software combos.

I wish all products supported UDP commands. People always say that there is no guarantee it will get there, but if it doesn't get there on time, then it missed the cue timing anyway. TCP does guarantee delivery, but it's no good if it's a few seconds late. Besides, if it's that late then there is some serious network problems. MSC works ok but seems like a kludge. It has limited use and takes a bunch of thumbing through manuals and trial and error to get right. OSC is headed the right direction but has it's share of trial and error and is seldom implemented. TCP is prevalent on projectors and other video gear but there is a serious lack of support for show control solutions.

I absolutely hate that the most immersive, timecoded shows are depending on a dumb audio signal to keep everything synchronized (SMPTE Timecode) and MTC is clunky and non-standard. We need a standard that can speak to all of these devices in a network protocol, not an audio protocol. It may still need to be time/timeline based. To me it is ridiculous to depend on an audio department to get high-quality signals or a lighting vendor to make sure the signal is piped right (if they even want to touch it). It is so out of touch with the direction control technology has gone in the last 10 years and where it will go in the next 10.

Also utilize PosiStageNet (PSN) on many applications.

Would love to see an batter way than RDM to get fixture info back into a showcontrol system/console. ie. Lamp status, errors etc.

Generally syncing with qlab, used open contact more regularly 10 years but not any more

A timecode over streaming ACN would be helpful, then you don't need any additional protocol (ArtTimecode) or cable (SMPTE) for a streaming ACN installation.

OSC is great! - definitely feels like the way forward

Most of my SMPTE/MIDI time code sync is provided internally for shows via Reaper, so I don't take external triggers on a regular basis.

Don't use it much

OSC is great, except it's way too open. There's no actual interoperability, even for trivial applications like running a cuestack.

Free Form Text Responses

Anything else you'd like to tell us about your experience with show control? (Cont.)

I design controls, how these are used varies greatly

It still appears we haven't got a show control protocol which works for everybody - may be a good thing in some ways though!!!

Problems and Concerns

Redundancy

Free Form Text Responses

If you provided feedback for "Other Entertainment Protocols", which other protocols were they? If you know why they needed reconfiguration, please let us know here as well.

Dante

MaNet 2

AE67 with ptpv2 transparent clocking requirements

Media server native protocols (HippoNet, d3Net), automation protocols.

MA NET

OSC

Kinet

Only had to do sACN because I've done more complex networks with that.

Dante, Q-LAN

ACN, OSC

Jumbo packets for disguise omnical and some KVMs.

Osc.

Dante and AVB

Dante to turn off power management

Dante and technically Shownet (not a fan of shownet)

OSC. Eos only recently started supporting sending (UDP) OSC to multiple locations, so it is/was common to use a broadcast IP as target. had to allow broadcast.

MA2-Net, ports limited to 100MB. 1GB required on large systems.

ETC wireless connectivity, DHCP services,

MA-Net, Hog-Net

MA Net, HogNet

LACP link aggregation, VLANs with IGMP snooping, QoS

Dante requires specific conditions to be happy.

IP Based Audio Protocols etc...

due to V-Lan Configuration

DANTE

MAnet - incompatibilities with corporate network at the outset

BlackTrax rttpl / rttpm

Dante, ndi, teamviewer

Free Form Text Responses

If you provided feedback for "Other Entertainment Protocols", which other protocols were they? If you know why they needed reconfiguration, please let us know here as well. (Cont.)

PSN / UDP / KiNet

ETCNet, Mosaic

ETCNet2 devices didn't support IGMP Snooping

Dante, Manufacturer specific protocols

Hog-Net

OSC standard networking trouble (IP and Subnet)

Ma-net

MA2 Net

Other protcol is kinet and http to config network device via website. Configuration. Some CISCO switches block multicast so streaming ACN by default

MA-Net, Hog Net, V676 Net, Dante, Internet

Sound Consoles, Meyer gear.

Just a general answer. Most of the time we're using dumb switches that need no configuration, or using entertainment-grade switches that need little or no configuration unless you want to get fancy. We avoid other enterprise switches on purpose. Other protocols - CITP/MSEX, OSC, other TCP/UDP comms for serial-over-ethernet control.

ShowNet - turning of broadcast storm protection. Also need to configure (for all switches) RSTP and ERPS and DHCP and VLAN

MA--Net2

OSC: colleague had misconfigured the switch during initial setup.

NDI and other live streams, reconfiguration for bandwith

Dante audio

CITP

MA Net, HogNet - to keep them separate from Art-Net, etc. and similar or to allow proper transmission of the appropriate protocol.

MA-net

Free Form Text Responses

If you provided feedback for "Other Protocols", which other protocols were they? If you know why they needed reconfiguration, please let us know here as well.

Telnet / MAnet / Dante

Stp/ rstp

MaNetx, copperlan

STP

Media server native protocols (HippoNet, d3Net), automation protocols.

OSPF, MP-BGP (for creating LSP's and tunneled ethernet)

UDP strings

spanning tree

External Public facing ports/protocols to the WWW

Energy Efficiency Settings

Again, I let others take care of the nitty gritty networking issues

BlackTrax rttpl / rttpm

Energy efficient ethernet, snmp, lags

KiNet Filtering

rSTP, needed to disable it to connect to external networks

Ma Net, HogNet - Separation of protocols on VLANs, etc.

Free Form Text Responses

Anything we didn't cover that you'd like to tell us?

We tend to create completely closed, wired networks hence the lack of concern

Most entertainment venues are a lost show waiting to happen in terms of security.

I often have to disable firewalls for show control protocols but I do not always have the option to keep those machines off the internet.

Why the heck does art-net default to a publicly assigned IP range? That's caused most of our problems with things, to be honest, even when the control network is completely independent of the internet; routers and machines presume that it should be a routed subnet by default... It'd be useful for the 'next generation' art-net (or equivalent) to use IPv6.

Any node or switch that has a front panel menu system needs a panel lockout function so people can't just change things, because they think they can but really they can not

16 bits of Universe addressing is insufficent

I would love real color calibration between fixtures, but don't expect that it's realistic without some kind of industry-wide agreement on how to report every fixture's performance in the IES color space. Also, real-world values in lighting controller programming are great, but are far worse than simple raw data when not 100% correct.

prevent unauthorized devices from accessing system(ie. sACN gateway send all 00 at priority 200)

RDM is about useless as MOST devices do not support it, and MOST of the ones that do only kinda support it. RDM usually causes problems and is almost always disabled. I know it's the fault of the end devices, but it's still sad it can't be used most of the time.

RDM Needs to work. The First troubleshooting method shouldn't be "Turn off RDM". RDM also needs to become interoperable over network. And Faster.

Working at a large entertainment company (Disney) where all entertainment networks are moving onto the corporate network... QoS, Vlan configurations and multicast routing is becoming incredibly important to us. Getting the IT departments up to speed with entertainment needs has been a challenge.

Network Security and Access Control are a top priority.

Needed to change subnet masks on routers most regularly when working with existing systems

Topic fixtures. I think the initiative gdtf-share.com is a good idea. It would be a dream if all consoles could use the same fixture libraries Many manufacturers want to support this. Unfortunately none has kept the promise

I think you need to have a section about DMX merging, mDMX combines, as well as splitting up multiple ethernet protocols to ease troubleshooting.

log-in/tracking of users important on large systems

I see why sACN is appealing, but see it implemented into a venue's existing LAN which makes the show dependent on that LAN and all its components which is risky. Also using that LAN opens the door to hackers.

The complete lack of any secure protocols in lighting control is a nasty problem waiting to bite (esp.) architectural systems very hard in the near future. It doesn't matter too much in theatre/tv/film as they are temporary by nature, but a building is relatively permanent!

Free Form Text Responses

Anything we didn't cover that you'd like to tell us?

Also concerned with accidental interference, wrong port, wireless, etc

I'm concerned with security and maintenance of the link on the system because I really don't want to risk losing a show/take e.g. on account of someone uploading box office data or printing documents - I had a theatre try to get me to use their super new building wide network but declined when they admitted everything including the box office was on it and no one had tested it during a show whilst other departments were passing data! Many people are very careless over ensuring the network is OK and don't think of the potential costs associated with a simple network/control failure.

Free Form Text Responses

Is there another technology (besides Ethernet or RS-485) that we should consider for future protocols? If so, why?

Would love to see something based on wireless mesh technologies with an auto layout function

Not sure. Many or most of the protocols used in other fileds of industry are fairly simple serial protocols of some kind (modbus, devicenet, protocols for machinery, HVAC). Would however be nice to have a protocol to talk more natively to moving lights and LEDs, instead of 0-255 on DMX. DMX needs a conversion in the controller of real world values to 0-255 and in the fixture that is converted to something that makes sense for the various motors and LED drivers and such. If there was a way for the controller to directly tell the fixture to rotate gobo at 5 RPM or Pan CCW 50 degrees, that might be pretty cool.

Bluetooth and Bluetooth Mesh

Thinnet 10BASE2 has a great topology to carry Ethernet along a lighting position. Just sayin'.

If things are to be wireless, I've often thought the mesh network style (eg zigbee) would be good for distributed lighting systems.

EtherCAT

More interested in having a robust connector standard, the 8P8C is not getting the job done, sometimes even in the EtherCON shell

No, I’m strongly in favor of TCP/IP

most reasonably scalable systems utilize both above topologies for a balance of cost/ease of use/reliability. I don't think the industry as a whole is ready to lose that.

Could consider something like Zigbee or other RF for mesh P2P networks if accurate timing could be solved.

Wireless

NOTHING wireless. at. all. ever. RF is too fungible.

Wireless mesh

Wireless mesh networks - for zero-cabling installations. Also protocols should not be restricted to lighting - technologies will continue to merge, which means control protocols need to be able to control lighting, sound, video, motion etc. The days of separate 'departments' will disappear in the future - so we need to stop considering control technologies separately

SPI LED chains are becoming increasingly important. For example WS2801 and WS2811

self healing mesh wireless networks

Bridging Systems, MA net, Medialon, etc.

no questions on RDM? Nothing on E1.17?

Ethercat, deterministic & a standard

There are a variety of industrial control protocols, however they tend to be expensive to implement. That would kill them.

Free Form Text Responses

Is there another technology (besides Ethernet or RS-485) that we should consider for future protocols? If so, why? (Cont.)

dedicated wireless of DMX/level info, not wifi/ethernet like Showbaby, RC4 etc

Whilst it has it's niche uses, wireless is never going to generally be a good idea with growing numbers of devices clogging the airwaves and no instant resolution solution in event situations. As more information gets passed between devices bandwidth will need to increase thereby meaning existing protocols are unlikely to be able to cope. Looking at the development of computer networking over the last few years it is highly likely that a new connection type and speed will arrive soon and so fibre or new technology would be the logical direction to be looking at present.

SDI

I can see Visible Light Communication or one of the low-power, low-bandwidth protocols (LORA, Zigbee) finding a use in what we do

Free Form Text Responses

Anything else you want to tell us?

Would be great to define a common OSC or similar standard - like MSC which works out of the box

It will be a good day when I no longer have to use DMX over RS485, in any cable form factor. I wish LED dimmer manufacturers would commonly support sACN and ArtNet natively. I'd love to stop worrying about Ethernet --> DMX converters.

Rdm via sACN needs ratification

Speaking as a media server programmer, DMX data (distributed via either DMX-512, sACN or Art-Net) is a terrible fit for media server control. Media servers have hundreds of parameters, requiring far more resolution than 8-bit. the personalities are incredibly complex and usually customised on a per-show basis. DMX also lacks the ability to natively transport parameter metadata (such as media/effect names, possibly thumbnails etc.) without another 3rd party protocol (CITP). What I want is a protocol which is smart enough for me to be able to turn on the console, interrogate any servers connected via ethernet, discover their personalities (without reference to any pre-built data, to actually use the data from the server to build the personality) and to then allow me control using native values which make sense and to display all relevant metadata.

RDM Over sACN is the big hurdle right now in my mind, and making sure people are getting in with the standard so we can mix systems more easily.

The length of time RDMnet has taken has been a real impediment - we had a need over ten years ago. The quality of fixture profile information available over RDM varies wildly from perfect to almost useless.

I don't believe that we will ever be able to get rid of fixture libraries (drivers) - but we should make fixture manufacturers responsible for creating and updating them. It is untenable for consoles to each have to keep up with thousands and thousands of lights which are in constant flux.

Thank you for doing this, it's important work

Thank you for putting this out there!

Wish there was a better adaptation of rdm over artnet and sACN inside the consoles

Industry-standard color response reporting, perhaps involving TM-30 scores as a metric, has to come before any kind of console color calibration is ever really going to work. Slot-by-slot or fixture-by-fixture data merging is important, but as a rule it needs to be easier to control than it is now. Building in a device ID, with the ability to define which ID to listen to along with fade time from one to the other, would solve a multitude of problems along these lines – from handing control from one console to another, to fading in data coming from a media server and restoring back.

I'm surprised RDM was not part of the survey as it has the potential to be useful for fixture configuration and operating feedback but is still highly flawed. RDM standardization would be extremely helpful. At present the protocol(s) seem to be proprietary to each manufacturer. Some are moderately useful but seem like the tools could be developed farther while others are nearly unusable. The process is frequently slow and bug ridden.

RDM needs to improve drastically.

Fix RDM.

Free Form Text Responses

Anything else you want to tell us?

Would love to see an sACN tool for auto universe/controller discovery. Understanding that there are thousands of universes to scan... On our corporate networks we sometimes have many controllers on the same sACN vlan and I would like to see an accurate state of the which universes are have active data and from which controller. I have reached out to the developer of sACN view and the request was closed as it would be very process intensive to scan all sACN universes for sources.

I think sACN is the way forward however DMX512 will never go away due to the amount of legacy equipment that only takes XLR 5pin that already exists and will continued to be used for the foreseeable future. Additionally some of the questions in this survey talk about redundancy. Although it's important we have found that no matter how much redundancy we may have in an ethernet system there are still choke points like the 5pin run up to the truss. Lastly, I think there needs to be more questions on what network topology are implementing as well as things like DMX merging and why they are using it to have a better understanding why people doing what they are doing.

Reliable daisy chain is the right topology, but discovery, configuration error reporting need to be fixed. Active 2 port switch at each device creating a defacto daisychain is not the answer. First fixture failure takes out the entire run.

To piggyback off of my answer above regarding Removing the Need for Console Fixture Libraries: I feel as though, traditionally speaking, all console ops/board ops are comfortable navigating fixture libraries or developing their own fixture profiles. Removing this feature through clever coding doesn’t seem necessary to me. It would be a better use of time to work on the other features instead.

RS485 is almost certainly the right physical technology for the "last mile", because it's very cheap, reasonably high bandwidth and daisychains. The rest should be IP based so all other physical technologies can be used, including those not yet invented.

better adoption / promotion of existing standards to manufacturers (particularly architectural)would be helpful

I still find RDM to be a "clunky" technology. It doesn't refresh quickly (I program on an ETC EOS Classic) and it's hard to identify units in the rig while sitting at a console. I don't know if this is a problem with the console software or with the protocol. I wish in the future that there was a way to communicate the location of a fixture over the network. (i.e. I wish I could just hang a lighting rig without pre-addressing/personality selecting any lights and then load my show file and have the network upload/correct the settings on every fixture.) So I would like to expand the capabilities and usefulness of RDM.

Rdm over sacn....

Let's work on a protocol standard that removes addressing (no universes or start addresses anymore, just fixture IDs or something clever)

One of the biggest current fixture library issues is manufacturers - incorrect information being supplied for fixture personalities and lack of certainty with colour mixing in reality in relation to H, S & I shown on console software. Having a plug and play protocol like DMX512 started out would be nice - it's getting to the point that soon we will need a network engineer every time we need to control a light! As a designer, programmer and operator I want to concentrate on the picture I'm producing not loads of setup protocols and networking data so any help with this is appreciated. My thanks to all doing the development work.

Fin.

Questions?

jpotterf@cisco.com