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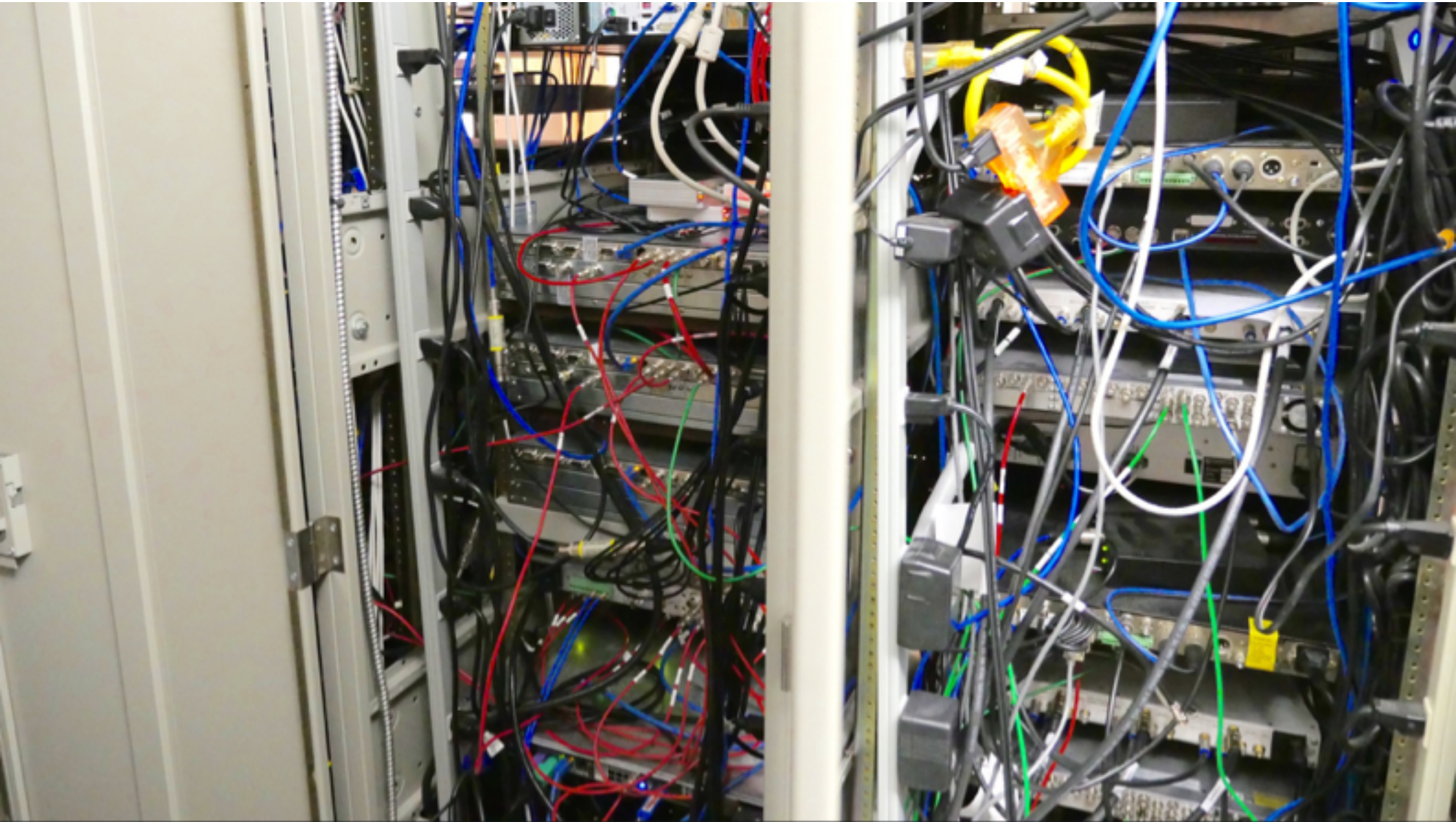
# Engineering

PROGRESS & PLANS

2016 has brought many challenges, and countless improvements.



As you may know, we've been working hard to get everything around here working properly.



It hasn't been easy...



...but we're getting there, a little at a time.



We've made smart choices, saved money wherever possible, and have made a positive impact on everything we've touched.



We do this...



...so they can do this.



We keep building more of these...



...so they can create more for our viewers, our clients, and our community.



We're working to deliver FOX in HD, and to improve all our video and audio output, wherever viewers see and hear it. (We're also upgrading the electrical capacity of our rack room to support all these improvements!)



We've become a part of CBS All Access...



...invested considerable effort into improving our closed captioning (it's now more accurate and in-sync than all other newscasts in the local area)...



Property  
of VCC  
(Feeds DirecTV  
via Charter fiber)

...and worked with all our cable and satellite providers to improve their connections...



...by creating a proper co-location space and “clean feeds” for each provider.



It's taken a lot of days, nights, weekends - sometimes all of the above - but we're making it happen!



While many of our projects are about fixing what's broken, others are more creative in nature. For example, we've been combining various pieces of open-source software to create a video playout system and CG that will soon act as a backup to our on-air systems.



We built an inexpensive video logger system, which captures everything that goes out over our airwaves and saves it to disk. It's available from any computer in our facility, and will be able to save video for a year or more.

Default -- TSReader Professional 2.8.48

File Export View Record Playback Forward Plugins Settings Help

PAT PID 0  
 PMT PID 48 - Progr. 3  
 PMT PID 64 - Progr. 4  
 STT PID 8187  
 2016/09/27 00:57:27  
 TVCT PID 8187  
 MGT PID 8187  
 EIT/ETT

Active PIDs: Disabled Sort Decending Sort by Rate Sort by PID

- 0 (0.10% - 18.69 Kbps)
- 40 (0.03% - 5.16 Kbps)
- 48 (0.99% - 17.78 Mbps)**
- 52 (2.18% - 422.93 Kbps)
- 63 (0.73% - 141.12 Kbps)
- 64 (0.03% - 4.94 Kbps)
- 65 (19.25% - 3.72 Mbps)**
- 68 (2.28% - 460.73 Kbps)
- 69 (0.68% - 131.67 Kbps)
- 7404 (0.03% - 6.01 Kbps)
- 7425 (0.02% - 3.87 Kbps)
- 7426 (0.01% - 1.29 Kbps)
- 7427 (0.01% - 1.72 Kbps)
- 7428 (0.01% - 1.87 Kbps)
- 7429 (0.00% - 859 bps)
- 7430 (0.00% - 859 bps)
- 7431 (0.00% - 859 bps)

General Information

Source: Linear Systems DVB-ASI cards  
 Tuner: n/a  
 Signal: n/a  
 Null BER: 0.000000E+000  
 Profile: Default  
 Network Type: ATSC  
 Run Time: 000:00:07

MPEG-2 Statistics

	PAT	PMT	CAT	ETT	PSIP	EIT
Sections	80	39	0	40	84	47
CRC Errors	0	0	0	0	0	0
Continuity Errors:	0			Max. bitrate:	19392844 bps	
TEI Errors:	0			Last sec.:	19.661 Mbit	
Sync losses:	0			In buffer:		
				Out buffer:		

Video Decode

5 - KEYC-HD  
 Kevin Cas Watt

3 - KEYC-HD

3 - KEYC-HD

4 - FOX12HD

Parsing MPEG-2 video stream from program 4 on PID 65 (FOX12HD)

Start [Taskbar icons] 7:56 PM 9/26/2016

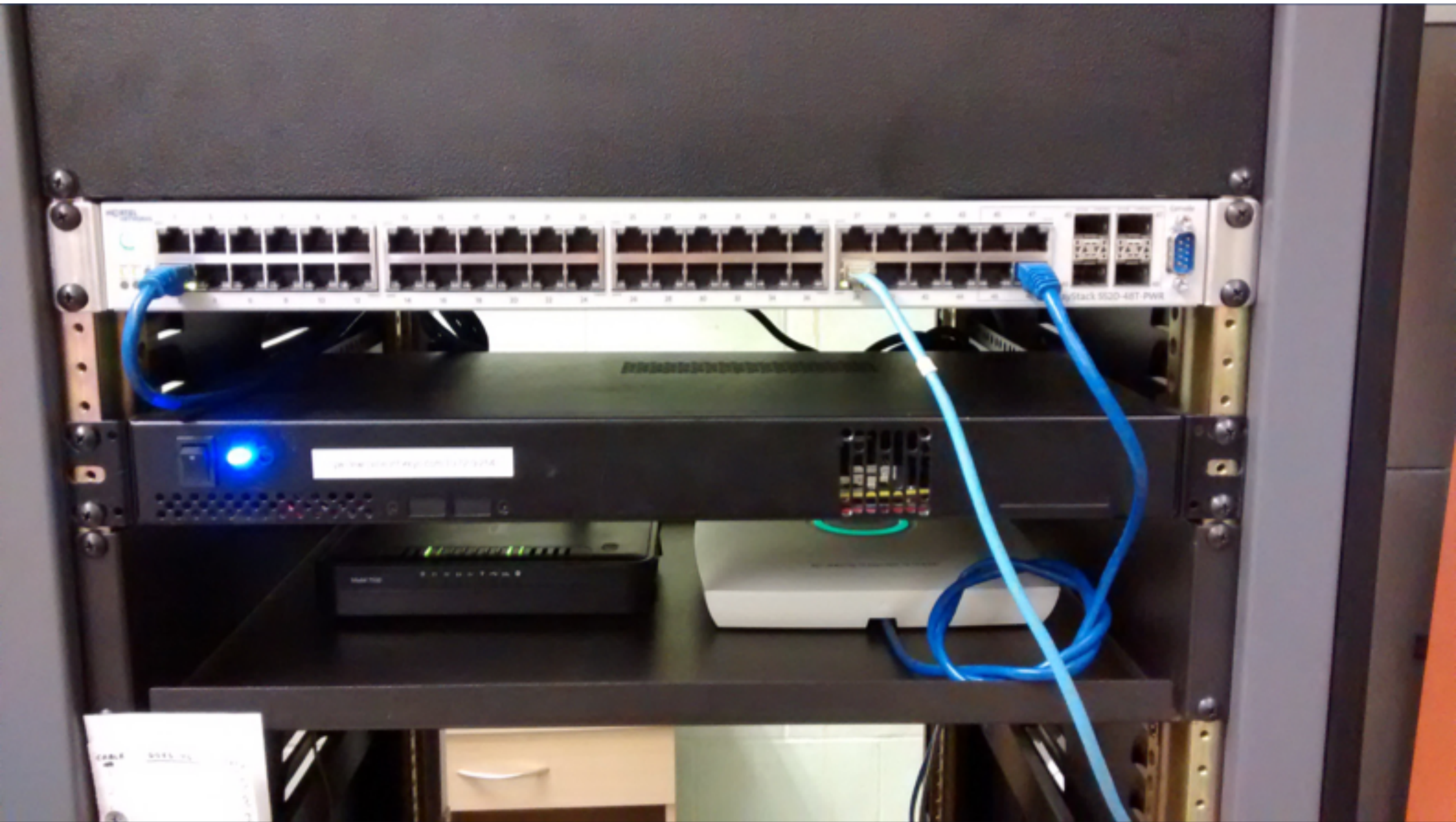
It also combines with our new transport stream analysis system, allowing us to “go back in time” to diagnose digital video issues.



That allows us to keep a sharp eye on our output, and ensure everything is running right.



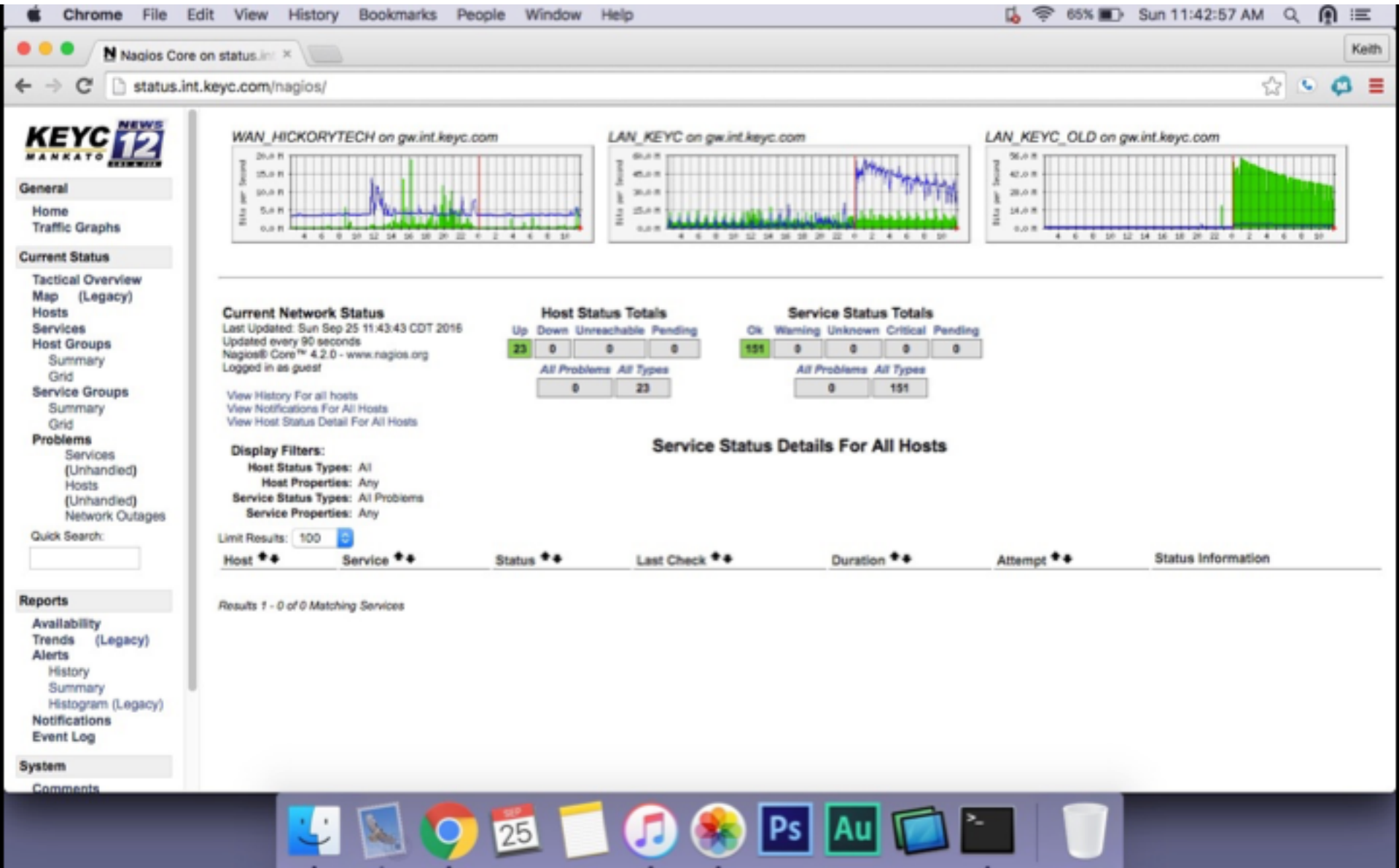
Upgrades at the transmitter site have also been a high priority for us.



Our site now has IP connectivity, and will soon have two diverse, redundant paths to the studio.



We're also expanding our remote control to add capacity for the newly-assembled backup transmitter, so that we can run both units automatically, and keep track of what they're doing from wherever we are.



Speaking of “keeping track of things”, we’ve also deployed open-source monitoring software, so we can stay on top of all our hardware and software.

The screenshot displays the Nagios Core monitoring interface. The browser address bar shows the URL `status.int.keyc.com/nagios/`. The main content area is a table listing monitored hosts and services.

Host	Service	Status	Last Check	Duration	Attempt	Status Information
cbs-sync01	ping	OK	09-25-2016 11:42:35	31d 2h 48m 44s	1/3	PING OK - Packet loss = 0%, RTA = 0.29 ms
cbs-sync02	ping	OK	09-25-2016 11:42:47	31d 2h 49m 6s	1/3	PING OK - Packet loss = 0%, RTA = 0.28 ms
fledrop	/	OK	09-25-2016 11:42:40	31d 8h 41m 24s	1/3	DISK OK - free space: / 12601 MB (88% inode=92%);
	/home	OK	09-25-2016 11:42:35	34d 12h 8m 24s	1/3	DISK OK - free space: /home 157971 MB (82% inode=99%);
	ftp	OK	09-25-2016 11:38:21	34d 12h 16m 21s	1/3	FTP OK - 0.005 second response time on fledrop port 21 [220 Welcome to KEYC News 12]
	http	OK	09-25-2016 11:42:36	34d 12h 14m 8s	1/3	HTTP OK: HTTP/1.1 200 OK - 2131 bytes in 0.004 second response time
	load	OK	09-25-2016 11:42:35	31d 8h 42m 39s	1/3	OK - load average: 0.00, 0.01, 0.05
	ping	OK	09-25-2016 11:42:47	31d 8h 40m 59s	1/3	PING OK - Packet loss = 0%, RTA = 0.45 ms
	processes	OK	09-25-2016 11:42:38	17d 22h 14m 7s	1/3	PROCS OK: 157 processes
	smb	OK	09-25-2016 11:42:34	34d 12h 16m 21s	1/3	OK SMB Sharename: sales Disk Home directories
	ssh	OK	09-25-2016 11:42:40	34d 12h 14m 0s	1/3	SSH OK - OpenSSH_6.6.1p1 Ubuntu-2ubuntu2.3 (protocol 2.0)
gw	swap	OK	09-25-2016 11:42:40	34d 12h 12m 8s	1/3	SWAP OK - 99% free (1004 MB out of 1021 MB)
	uptime	OK	09-25-2016 11:42:39	31d 8h 42m 34s	1/3	System Uptime - up 31 days, 8 Hours, 42 Minutes
	users	OK	09-25-2016 11:39:02	31d 8h 40m 54s	1/3	USERS OK - 0 users currently logged in
	/	OK	09-25-2016 11:42:38	34d 12h 18m 11s	1/3	DISK OK - free space: / 22236 MB (96% inode=99%);
	/var	OK	09-25-2016 11:42:38	34d 12h 19m 28s	1/3	DISK OK - free space: /var/run 3 MB (96% inode=96%);
	http	OK	09-25-2016 11:42:40	34d 12h 13m 57s	1/3	HTTP OK: HTTP/1.1 200 OK - 1545 bytes in 0.006 second response time
	load	OK	09-25-2016 11:42:35	31d 8h 45m 38s	1/3	OK - load average: 0.02, 0.03, 0.02
	ping	OK	09-25-2016 11:42:36	34d 12h 21m 55s	1/3	PING OK - Packet loss = 0%, RTA = 0.21 ms
	processes	OK	09-25-2016 11:42:37	34d 12h 17m 59s	1/3	PROCS OK: 64 processes
int	swap	OK	09-25-2016 11:42:35	34d 12h 15m 29s	1/3	SWAP OK - 100% free (4095 MB out of 4095 MB)
	uptime	OK	09-25-2016 11:38:31	34d 12h 14m 39s	1/3	System Uptime - up 31 days, 8 Hours, 52 Minutes
	users	OK	09-25-2016 11:42:36	34d 12h 13m 40s	1/3	USERS OK - 1 users currently logged in
	/	OK	09-25-2016 11:42:43	34d 12h 22m 1s	1/3	DISK OK - free space: / 10407 MB (73% inode=91%);
	dhcp	OK	09-25-2016 11:42:43	34d 12h 21m 52s	1/3	OK: Received 1 DHCP OFFER(s), max lease time = 600 sec.
	dns	OK	09-25-2016 11:42:34	34d 12h 18m 3s	1/3	DNS OK: 0.015 seconds response time. int.keyc.com returns 10.12.1.1
	http	OK	09-25-2016 11:42:49	13d 19h 44m 31s	1/3	HTTP OK: HTTP/1.1 302 Found - 207 bytes in 0.004 second response time
	load	OK	09-25-2016 11:42:43	34d 12h 13m 47s	1/3	OK - load average: 0.01, 0.10, 0.12
	ping	OK	09-25-2016 11:42:41	34d 12h 21m 42s	1/3	PING OK - Packet loss = 0%, RTA = 0.39 ms
int	processes	OK	09-25-2016 11:42:41	31d 8h 44m 57s	1/3	PROCS OK: 161 processes
	ssh	OK	09-25-2016 11:42:41	34d 12h 17m 48s	1/3	SSH OK - OpenSSH_6.6.1p1 Ubuntu-2ubuntu2.6 (protocol 2.0)
	swap	OK	09-25-2016 11:42:42	34d 12h 13m 39s	1/3	SWAP OK - 80% free (812 MB out of 1021 MB)
	uptime	OK	09-25-2016 11:43:10	34d 12h 21m 41s	1/3	System Uptime - up 31 days, 8 Hours, 47 Minutes

Dozens of machines, and hundreds of services, are checked constantly. If one goes down, we'll know right away - no waiting for the staff to complain.



This is especially important as our systems continue to grow. We recently deployed four 48TB storage units, and two 72TB storage units - each with new drives, used enclosures (since enclosures don't wear out), and controllers we built in-house.



We built them this way not just for the savings - although we did save a bundle - but also for the performance. Here we see a speed test on Production's existing storage...



...and here's the same test on their new storage, which was one of those built right here at the station.



With this super-big, super-fast storage, and the new Macs and software we helped them select, Production will be producing like never before.



Rather than just keep buying Mac Pros as in the past, we performed a series of tests on a number of Apple models, and found that the i7 Retina iMac offered comparable performance at 40% of the price.



This allowed us to upgrade all of their machines this year, rather than just two (as was initially planned).



Of course, there's lots of other projects underway - such as the HD skycam upgrade and expansion project.



We're working on adding cameras in exciting new locations, like this downtown rooftop.  
And with the research and testing complete...



...and even custom parts made (at our chief engineer's home shop, in this case)...



...such as this heavy-duty leg clamp (on right - "standard duty" factory piece on left)...



...all that remains is to put them on the towers...



...which - with any luck - will be happening in the next few weeks.



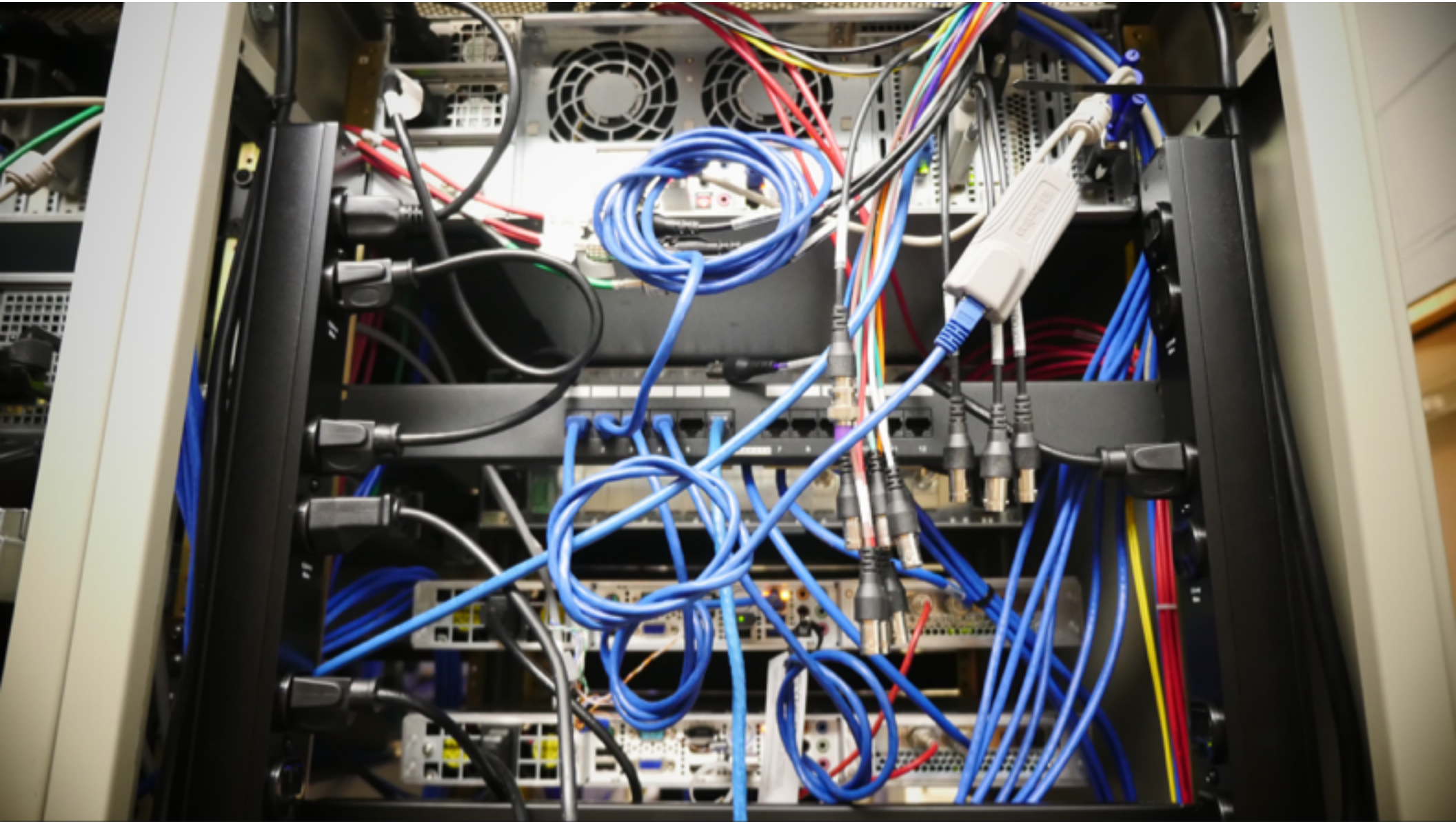
There's been countless other improvements too small to mention - such as the upgrades performed on our LiveShot equipment yesterday, which will make it perform better in challenging signal situations...



...and the new PCs going into master control tonight, improving on-air stability and relieving our operators from worry.



But we're far from done. We have enormous hopes and expectations for this facility, and realizing them is a process that moves one step at a time.



There's still a lot of this left to deal with...



...but we keep working, upgrading, and improving.



The foundation we started building last year, is what has enabled this year's projects, and what in turn will enable next year's projects. Everything here is interconnected, and all our efforts are designed to move this station ever closer to its potential.

# Engineering

Technical Precision

*is the foundation for*

Better Results

*in all that we do, and*

Less Worries

*as we do so!*

*So we can remain...*

**Stable.**

**Reliable.**

**The Leader.**



There are many challenges to come, but we remain optimistic about 2017 and beyond. We appreciate your support of our endeavors, and look forward to advancing KEYC News 12 and FOX 12 Mankato to become rock-solid, top-notch technical performers.