The Local Oscillator

The Newsletter of Crawford Broadcasting Company Corporate Engineering

How I Learned to Stop Worrying and Love the VLAN

I often joke with Mike Cary that I fondly remember the days when I was a broadcast engineer. These days, most of my work is administrative, meaning that I "fly a desk" most of the time with very little time spent doing anything technical.

That by itself represents a paradigm shift, but there has been another shift that has deeply penetrated the technical ranks of our company. I'm talking, of course, about the transition of broadcast infrastructure to IT. Like the proverbial frog sitting happily in the slowly heating pot of water, this transition crept up on us over the past couple of decades. Some might say that it started with a shift to digital audio (AES), but in actuality it started before that, when the first computer was installed in a radio station. Since then, what has become known collectively as information technology or "IT" has become more and more pervasive, like some kind of invasive species taking over an ecosystem with roots and offshoots everywhere.

Don't get me wrong – this isn't a bad thing. It's anything but. That said, it has presented certain challenges, particularly for "senior" folks like me. We've had to learn an entirely new way of doing things and an entirely new (to us) technology with its own set of rules and standards, all while that technology along with its rules and standards continues to evolve. Talk about your moving targets!

Today, at this great company, all our studio infrastructures are AoIP. If there is an analog or even AES wire to be found, it's pretty short and in sparse company. Our "rack rooms" or engineering spaces are now "server rooms." Those big bundles of audio, AES and multi-conductor cables are gone, replaced with much smaller bundles of Ethernet cabling. In many of our facilities, fiber-optic cables are present,

usually carrying data to/from rooftop- or tower-mounted microwave data links.

Transmitter sites are fully bidirectionally connected to the studios. Transmitters and just about all other equipment have network interfaces and offer both direct GUI (web) interfaces and SNMP control/monitoring. Even our phone systems, office and on-air, are fully digital, with our on-air phone systems running in containers on file servers, completely virtualized. And more and more elements of broadcast infrastructure are becoming virtualized.

While I mostly fly a desk these days, I have long spent a good bit of time doing developmental work, not dreaming up new technologies but finding ways to employ existing technologies in new (to us) ways in our broadcast facilities, and I continue to do that both personally and through various "wizards" within our company with specialized knowledge in different areas.

Recently, we commissioned a new 11 GHz microwave data link from our Lansing, IL tower site on the southeast side of Chicago to the WYCA Beecher, IL transmitter site. This isn't a long path, around 18 miles, and it is the last of our local Chicago market sites to get such a link. We have an 18 GHz link from our studio in Hammond to Lansing, some four air miles plus or minus, and we have plenty of capacity on that link for both Lansing (WSRB main and WPWX offsite aux) and Beecher (WYCA).

The trouble is, Rick has for some time had that 18 GHz Hammond-Lansing link in exclusive use for Wheatnet, using a blade at the Lansing site for WSRB and WPWX audio. He has been using an unlicensed 802.11 5.7 GHz link for other Lansing site traffic, and that unlicensed link does not have the capacity or reliability to carry traffic for both Lansing and Beecher. We were seeing audio dropouts on the Beecher Tieline codec from the outset over the new

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11 GHz link. Rick correctly concluded that the trouble was upstream on the unlicensed link and not on the new licensed 11 GHz link.

My workbench VLAN setup of the two Zyxel switches and a Cambium link. Port 1 of the switches was Zetta, port 2 was Wheatnet, and port 10 was a trunk port between the Cambium radios.

My challenge, then, was to find a way to run both Wheatnet and other site traffic over the single 18 GHz link from Hammond to Lansing. I knew there was a way to do that while keeping the two networks and their traffic separate, and I suspected it would involve VLANs.

Many years ago, Art Reis told me that the mark of a true wizard was knowing who all the other wizards are. He was right, and I know a few wizards, several of whom work for this great company. One, however, is Steve Solton of Convergence Solutions, and I ran by him the gist of what I needed to do, and he immediately knew what was required and how to make it happen.

We purchased a pair of Zyxel managed switches, and with some experimentation, I was able to create two separate VLANs, one for Wheatnet and one for everything else. I was then able to trunk those through a Cambium link on the bench and separate them out on the other end. On the "studio" end, I connected the Wheatnet VLAN port to the Wheatstone switch, and I connected the other VLAN to the Zetta network. On the "transmitter" end, I connected a blade to the Wheatnet VLAN port and a computer to the Zetta VLAN port.

I could route to and pass audio through the blade with no issues, and I was able to simultaneously run traffic through the Zetta VLAN. I was also able on the native VLAN (VLAN1) connect to the Cambium GUI on each end with no issues. I could not see any of the Wheatstone multicast traffic

on the Zetta side nor any of the Zetta traffic on the Wheatstone side.

The KLTT transmitter site HVAC controller. Note the box to the far left with the two red buttons – the Pi is in there. The two big contactors switch 480V 3-phase power to the RTUs. The thermostat at the lower right sets the trip point for the automatic switchover.

After labeling everything up, I shipped the switches to Rick in Chicago. He got them installed on the 18 GHz link between the Hammond studio and the Lansing transmitter site, and everything worked like the proverbial hose! He had it running in just minutes.

Prior to this little exercise, I lived in fear of VLANs. I didn't understand them and saw little application in our infrastructure. I learned a great deal in the process of configuring the Zyxel switches, and now I'm a VLAN believer!

That's pretty much the way it's been with me and all technology since, oh, 1978 or so (when I graduated engineering school). Learn by doing, then embrace the technology.

Routers

Another project I have been involved in over the past couple of months is the installation of routers at some of our transmitter sites.

It started at KBRT, and the impetus was the Palisades and Eaton wildfires earlier this year. During those fires, local utilities preemptively shut off both electricity and gas to entire areas not in the burn area.

It occurred to me that if that happened at our studio, we would be dark – our generator runs on natural gas – so I ordered satellite internet at our transmitter site to provide site connectivity from anywhere. But it would require someone going to the

site to switch things over to the internet feed should that happen. What if we couldn't get in because of a wildfire? It's happened before.

Sixty feet of backfilled trench. I felt every inch. Note the old and damaged strap at the upper right.

So I bought a dual-WAN router and configured it up here in Denver before shipping it out to Todd Stickler at KBRT. It takes the feed from the studio network by microwave and fiber on one WAN input (the router has an SFP port) and the satellite internet (with static IP) on the other WAN input and routes to an isolated network at the site.

Todd and Mike were able to get this installed and working, and now we have options should the worst happen.

Taking that same concept forward, we purchased several more of those routers and installed them at our Denver sites (Lookout Mountain was already so equipped). The only thing we don't have working yet is the IP phones at the KLZ and KLTT sites, but we'll get those going shortly.

HVAC Controller

Another technology application I worked on over the winter was a Pi-4 based HVAC controller for the KLTT transmitter site. I got the unit built up over the winter, and Stephen Poole and I collaborated on the Python code to run it (Stephen did all the heavy lifting).

With warm weather coming on, in mid-April I knew I was running out of time to get the HVAC controller installed, so I took a full day out of the office and got it done.

I wish I had a photograph of the mess that was in that NEMA box before I started – I was like Chip Gaines on demo day cleaning it out. The photo above shows a much cleaner enclosure.

It's all done and tested now, and it also works like a hose, transferring between main and backup HVAC units with a push of a button with duct dampers moving and thermostats powering up/down as well. Soon we'll have the system working over SNMP so we can have the Burk remote control manage it.

While she had me at that transmitter site in work clothes, Amanda pointed out that we still had a place in the antenna field on the south side of the bisecting canal where the horses that live out there had unearthed and torn up some of the copper strap. We had intended to do that repair work last fall, but the ground froze before we could get to it. With the ground thawed on that day last month, I was running out of excuses.

Out came the shovel and I started digging, some sixty feet of trench a foot deep. We had our brazing supplies at the site (still from last fall), and we had a roll of new 4-inch strap on hand, so we were prepared to join the new strap to the old and complete the repair. It took some time, and man-oh-man was I tired and sore after all that digging, but the deed is done.

We still have some additional strap repair to do around the site, but that was the big section that needed to be replaced. We'll get to those others as time permits in the coming warm weather months.

Three Down

We now have three markets that have completed the Zetta transition, and as this issue goes to press, one more (Detroit) is in process. Before we finish Detroit, KBRT/KNSN will be underway as well, and both Amanda and I plan to be present for that one since KBRT does not have a studio engineer. On the heels of KBRT/KNSN will be KCBC, and Steve Minshall is all set and ready to go. Then, in early June, we'll get moving on Chicago, and Lord willing, before half the year is done, we'll be done with our Zetta conversion project.

The New York Minutes
By
Brian Cunningham, CBRE
Chief Engineer, CBC – Western New York

Hello to all from Western New York! Spring has finally arrived here, and we were beginning to think that winter would never end. Although it was not an exceptionally hard winter, snow-wise (we have certainly seen a lot worse), but the cold winds seemed to excessively blow non-stop, throughout the winter months. I don't know, maybe it's the old man complaining, but this year seemed to be a lot colder than normal. I am glad to finally see the sunshine and feel warmth again, and I am actually looking forward to beginning outdoor maintenance at all our transmitter sites!

As I am writing this, weather forecasters are predicting some very nasty weather for the Niagara region, including Buffalo and Rochester. Torrential rains accompanied by high winds, lightning and the possibility of tornadoes are forecast for the beginning of May. As this weather prediction is several days away, it gives me ample time to ensure that our standby generators are fueled up and ready to spring into action, if needed. Noco Fuel has topped off both our diesel generators in Boston and Hamburg, and the generators have been tested to ensure proper operation.

There was no problem with the Gillette 100 kW genset in Boston when I tested it. However, the 125 kW Cummings generator in Hamburg would only run for about 10 seconds and then shut down. I checked the fluid levels (oil/water) and found that the coolant level was low, which was probably what was shutting the generator down. I called our generator mechanic to stop by and give it a check out to see why the coolant level was low, as there was no indication of a leak or broken hose. He checked everything out, topped off the coolant level, and proclaimed it ready for service, as he found nothing wrong. The water pump, hoses, et al were good. He surmised that the block heater running all winter long in all probability caused some of the coolant to evaporate, therefore dropping the fluid level down to the point that the low fluid indicator would shut the engine down to protect it from running without ample anti-freeze levels.

For the last two weeks in March, we had Samantha Johnson from RCS busy installing Zetta for our Buffalo facility. I must say that we were thoroughly impressed (and pleased) with how the entire installation went.

I recall back in early 2004 when we had Nexgen installed. Our installer, Diane Crawford (no relation), did not do a very good job of training on how to use the new automation software. We were transitioning from DOS-based Dalet to windows-based NexGen and were constantly phoning tech support to answer questions on how to do this and that.

Not this time. Samantha made sure through numerous training sessions that everyone knew how to navigate and use Zetta to the level of their responsibility. Additionally, going through the Zetta certification program was a HUGE benefit for me, as I was able to learn about Zetta and had a general understanding of how and why as I shadowed Samantha throughout the installation process.

It has been several weeks since the launch of Zetta, and I am happy to report that there have been minimal problems with the system. 99 percent of any issues noted have been operator errors or log template boo-boos that were not noticed before we went live.

I am consistently impressed with the power of Zetta, and with exception of the shortfalls of Zetta's export functions, I have found it to be well-thought out and easy to navigate through the menus.

Each month, while performing maintenance duties at all of our transmitter sites, one of my monthly checks is the operation of our back-up transmitters. I generally run them for about a half-hour to ensure that they will perform if and when the main goes down. There's nothing worse than having

The ND5 +15V power supply, fixed!

A new fence around the generator at our Boston transmitter site.

your main transmitter go down and switching to the auxiliary only to find it will not work, either!   I had this happen to me years ago and have always made it a point to exercise the aux monthly to ensure that it will work when needed.

During one such maintenance visit in April at the WDCX (AM) transmitter site in Rochester, the backup Nautel ND-5 transmitter would not come up. After troubleshooting the failure, I found that the +15vdc supply in the exciter had failed.

I pulled the supply out, which is mounted underneath the exciter drawer, to see what components were bad, and ordered the parts from Nautel. The following week, I returned to complete the repair. After replacing the bad transistor, voltage regulator and tantalum capacitor, I remounted the supply and checked it without a load. Everything was good, so I connected the output to the exciter and immediately noticed the +15 volt supply dropped to 0v… Hmmm… something was pulling the supply to ground. Now I know what caused the supply failure. On to find the additional problem.

After checking all the components, I found a shorted 6.8uF capacitor on the mod driver board in the exciter, replaced it and the transmitter came back to life!

Had I not routinely checked the operation of

the auxiliary transmitter, it would have put us in a bad situation if the main had failed, off the air with two non-working transmitters!

On Tuesday the 22nd, Active Fence Company removed a portion of the fencing around the WDCX-FM tower and generator. Last winter when we had the new 100 kW Gillette generator installed, a portion of the fence had to be removed in order for R.B. U'Ren to remove the old 50 kW genset and install the new 100 kW generator.

When the installation was completed, they attempted to reinstall the fence but found that it would not go back into its original place due to the size of the new generator's fuel tank. We secured the area the best we could and later obtained a quote for replacement and submitted it for the following years budget.

The weather forecast predicted Tuesday to be sunny and warm, so Mike Mangione and his crew got the job done in about a half-day's work. The tower and generator are once again secure from any unwanted intruders.

That about wraps up another month here in the great northeast, and until we meet again here in the pages of *The Local Oscillator*, be well, and happy engineering!

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The Motown Update
by
Mike Kernen, CSRE
Chief Engineer, CBC–Detroit

Boom boom, out goes the network!

A spring thunderboomer rolled through southeast Michigan with the usual wind, rain, and lightning. Yawn, good sleeping weather.

When I got to work the next morning, I was told that our AM gospel station had gotten a few calls from listeners wondering why they hadn't heard their favorite AM drive time host's usual banter. I hadn't gotten any alarms, nor was the station silent but as soon as I heard this, I knew that our audio processor was playing a preloaded playlist from the transmitter site, rather than audio coming from the studio – but why?

I quickly attempted to troubleshoot by popping into the transmitter site's network and interrogating the usual suspects – STLs, the remote-control system, the audio processor itself – but nothing responded. Not via the terrestrial internet provider nor the satellite ISP. I couldn't get anything to respond, so I jumped back in the truck and headed to the site.
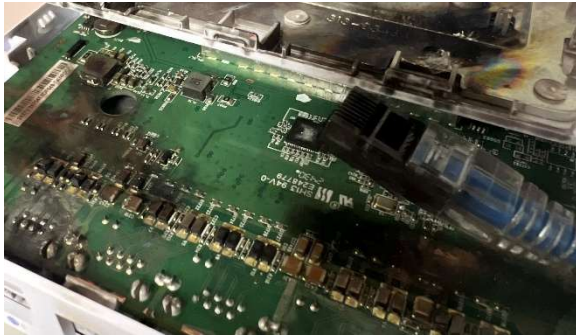
The fried router from WCHB showing the blackened RJ45 that had to be pulled from its jack with pliers because its contacts were welded to those in the RJ45 jack.

As soon as I walked in, I could see that the power was on, the transmitter was working normally, and nothing was out of place in the building. Why no audio, no ability to connect?

I started checking the STLs, and they were all disconnected – even the one for the translator that is collocated there. A quick glance at my brand-new router and I could see that it was off as was the network switch, the cable modem, and the satellite internet modem. Check the UPS – no, it's on. I even used an outlet tester I keep in my bag, yep, power is on.

Then I looked at the router again and noticed black around the bottom of its case. It was blown open like a clamshell! The bottom cover was open in the front, with black soot all around it. I picked it up and tried to disconnect it, but the ethernet RJ45 plug had welded itself into the jack!

During the storm, lightning energy had traveled in via the cable from our internet service provider. Not only did it obliterate the router, it ruined three network switches, the cable and satellite modems, the WIFI access point, and the telephone VOIP modem.

Fortunately, I had grabbed our Tieline Via and our cellular JetPack hotspot, and within a few minutes, I had the site live on the air again.

It took a few days to get both of the ISPs back in operation, but the TieLine and JetPack covered us until repairs were made, which included replacement of the aforementioned router, switches, and modems.

TRE+ and Artist Experience

Prior to a trip to the Florida Keys, I'd been busy installing the Broadcast Electronics TRE+ product for HDRadio, which I wrote about last time. I went down there to celebrate a milestone birthday with my wife and several friends, and while I was there, I noticed something of interest while being driven around Greater Miami in UBER rideshare cars. Every car, save not one, had an HDRadio, and they all displayed the Artist Experience (AE) art that we've been working to implement here in Detroit. This was very surprising to see – even a Mercedes van had it.

Unfortunately, I've not personally had a vehicle that supports AE in some time since my current truck was built during the chip shortage and doesn't even sport an HDRadio. It's also notable that it does not display the RDS PS data, only the RT or radio text, which is much better anyhow.

HD Radio is out in front of our audience and it's very easy, especially for us engineers minted before FM Stereo, that it's not just an also-ran technology. I monitor everything we do on HDRadio and have plans to implement more monitoring via our Inovonics 551 for things like the art image not changing regularly or the PSD data becoming stagnant.

In the last two months, we have built campaigns for every one of our advertisers to showcase their logo or a custom graphic and text that displays synchronous with their audio ad. It's very impressive and gives each client a bit more value and a dashboard visual recognition factor that otherwise could not be achieved.

Zetta Preppers

As reported last month, I've been plowing through the RCS Academy in pursuit of my certification on Zetta. I'm happy to say that I passed the course and am now an RCS Zetta certified engineer. The course was relatively tough, I must say, but enjoyable and extremely informative.

Today as I write this, an RCS installation specialist is working on our conversion which should be completed in about three weeks. We are using the same hardware that we had been using for NexGen, or should I say ARE using.

You could say that this project is a bit like replacing the engine on a vehicle while it's being driven down the road. This does give one pause, but it is not unheard of – RCS has done it many times before, including in several CBC markets.

Some careful planning and we should be fine. Fortunately, the hardware we have is relatively new and up to the task, there just may be some shuffling to do as we convert and bring things online.

News from the South
by
Todd Dixon, CBRE
Chief Engineer, CBC–Alabama

Don't speak it into existence…

I hate to even mention it, but in the interest of talking about Zetta and its differences from Nexgen I will – we haven't had a Sequencer drop off our network in over five weeks. There, I said it. In Southern speak, I've put the mouth on it.

That's not to say that we haven't had to restart a machine or figure out little nuggets in Zetta that are new to us when we troubleshoot, but I haven't had to restart a machine because it was creating dead air for us yet, and that, my friends, is called a win.

You might ask what sort of things we've had to troubleshoot with Zetta. Several of the issues we've had are simply things that I would call user intervention. Our creative writers and traffic folks have had to get used to a few changes in their workflow – particularly regarding how they place and name spots.

Zetta doesn't handle rotations the way that Nexgen did and creating spot rotations now falls on our Visual Traffic software and the automation simply doesn't auto-generate rotations. The problem for Zetta is twofold.

The first issue is that in Zetta cart numbers are basically only used for spots and songs as they are the only two categories that need what they call "flat files," the text files that are generated by music scheduling (in our case Music Master) and spot scheduling (Visual Traffic). All other audio is simply handled in the database by the other metadata that is associated with each file. The venerable cart number is now called the "external ID" in Zetta and really not that prevalent in the overall use in the system.

The second issue regarding our spot and traffic is that Zetta (whether via programming or SQL database) wants the external ID for said spots to be a fixed number of positions. In our case, this was six digits. In Nexgen, we'd have a spot in a rotation that was named 0001325 with multiple cuts (i.e. -001, -002, -003 and so on). So, the solution is to simply have our Visual Traffic software create rotations with multiple numbers given out to a single client. This took some getting used to for our creative writers, long-time employee Terry Patilla and relatively new Ericka Woode, not to mention Brandon Woods doing

our traffic from Detroit, but they've all negotiated the changes well and are now handling the change in workflow really well.

The other thing that takes a moment to get used to is the Zetta Startup manager. While the Zetta login screen is proudly displayed in the center of the desktop, the real power player on each workstation is the Zetta Startup Manager.

Whereas Nexgen simply had a program running with its different pieces being hidden, Zetta runs in a more modern, modular framework that has a number of services running. Is your workstation running as a sequencer, an audio
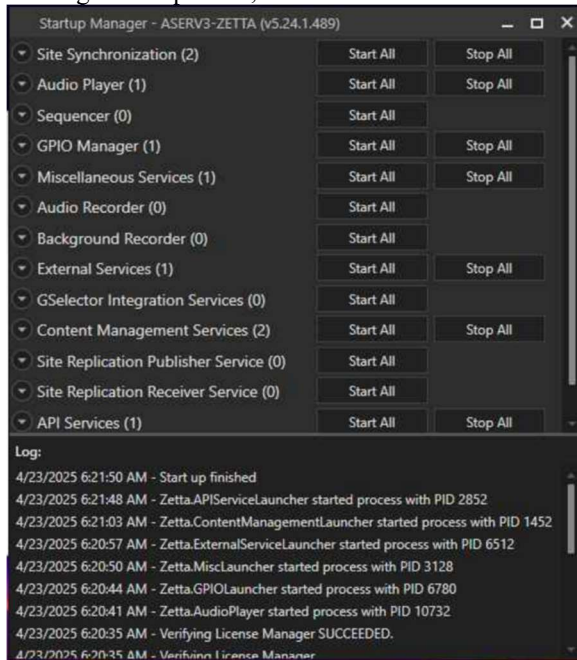

Figure 1 - The Zetta Startup manager allows you to pick and choose what aspects of the program need to be stopped and restarted.

player, or possibly serving out metadata? All of those things are running as services in Zetta and can simply be stopped and restarted without having to shut down the entire program.

The main place where this has come into play is that several times we have had metadata that needed a restart. Instead of shutting down the entire program, the metadata is found under the "external services" tab, and we were able to stop and restart that metadata generation without affecting on-air playout. What a beautiful thing!

I can say that after having been on the system for a little over a month, I am finding that I like it a lot better than Nexgen. Even though it is a completely new system to me, I feel it is laid out in a more intuitive way so that it is easier to find settings and configurations. It isn't that I didn't know my way around Nexgen, but there were times that I had to really think, "Where is that setting again?" and so far, that hasn't been an impediment to me getting around Zetta.

Why, yes, it is still Windows…

The only other real issue for us this past month was that our Visual Traffic server that runs on Windows 11 decided to not remember its local user account and simply flush it into the ether. For the most part, our Visual Traffic software and machines simply run without issue. The occasional restart was required and once every five weeks, I would go in and update the licenses on the server.

You might think that an issue like not being able to login would be relatively simple to resolve, but after spending the better part of a day trying to take the "easy" route, I ended up having to put a new install of Windows 11 on the machine and then allow the Marketron gurus to remote in and set up the system again.

There are so many nuances to how these machines work, ones that had been added over the course of several years that needed to be added back in with a single install. We have both a server that runs VT and a client workstation and both are utilized by folks from outside of our market in Detroit and Buffalo. This all required adding all of that necessary software (VT and otherwise) back onto the system.

The firewall ended up being the main culprit in the client machine not being able to connect, and also for some real inherent slowness in how the system was working. After a few rounds with Marketron tech support, it all has gotten ironed out.

I will give Marketron some kudos with regard to their tech support staff. They really know their stuff and were pretty timely in their responses to the issues we were having with the server.

That is about it from Birmingham this month. It has been a good, long month... So until the next time we meet on these pages, may God bless the work of your hands.

Tales From Cousin IT
by
Stephen Poole, CBRE, AMD
CBC Corporate IT Specialist

As I mentioned in a previous issue, these giant datacenters with zillions of PCs want gobs of juice, and the power utilities are warning that they won't be able to meet the demand. Being a Certified Jeenyuss™, I may have a solution. The utilities should talk to the people who make canned orange juice. Those folks smash the fruit so vigorously that it approaches nuclear fusion. (Probably why it tastes so nasty; they're even squeezing the bitter oils from the peel.) Surely they could add a bit more squeeze to create a self-sustaining reaction. Endless energy, and they'd get even more gnarly-tasting juice for the kids! Win, win.

It IS nice that I no longer have to worry as much about severe weather here, now that Todd is in my former position as Chief Knob Twirler. This most recent April hasn't been as bad as some, but not fearing a call at 2AM (or being awakened by a tornado coming through my neighborhood, as happened in 2011) is a beautiful thing. Todd had a blown motor in his Jeep and needed to take a few days off to fix it, so I told Jack I'd be glad to pitch in if things went south. But it was nice and quiet.

Now on to less-important stuff, starting with ...

My Personal Website: He Dead

For many years (15 years), my personal website was located at Dreamhost. In mid-March, they suffered some kind of meltdown. My site, along with countless others, suddenly disappeared. Their status page said, "We're working on it! It'll be back soon!" This went on for weeks: "Soon," in this case, was over a month.

Adding to the joy was that, due to a mix-up with my account, I lost my domain name. It has been re-registered by a Chinese group. Ergo, my former website now features a page filled with oriental gibberish. You can't make this stuff up.

Keep this in mind: If you go with a standard plan from a hosting provider, you'll be sharing that server with a bunch of other folks. You'd have to pay a premium for a dedicated server (i.e, you're the only one on it), or set up a server on your own premises, using your own Internet access.

Bottom line: The usual "$15 a month" plans are on a shared server. That's true at GoDaddy, AWS, and most other providers. Now, to be fair, these heavily-shared servers are high-powered. They've been optimized to handle zillions of connections per second and have lots of fast storage space and CPU muscle. But there's still the problem of backups ... and restoring everything after a failure.

I don't know the details (and Dreamhost ain't sayin'), but one wonders if their server did a full-blown come-apart and they found themselves struggling to rebuild hundreds of websites from backup. As we've all experienced and as I've said here many times, it's one thing to have a backup. It's another to have a plan to rapidly get that backup up and running when disaster strikes.

Because I had an account credit with Dreamhost, I made the mistake of registering another domain name with them. They supposedly sent an email to verify my ownership ... and it never arrived. I finally found it in a spam folder at Hiwaay. After a bit more research, a light dawned: The email that they had sent about my domain registration expiring (which should never have happened; I used auto-renew!) went into the spam can as well.

My friends; my partners; all y'all (some Southern lingo for you) ... of course you should still do backups, AND test each backup, AND have a detailed plan to restore after a meltdown. (Incidentally: yes, I have a full backup of my own website.) Don't assume that your hosting provider or "cloud" service will take care of things for you.

I wish I could repeat that a few dozen times. (Well, I could, but Cris might get annoyed, and you'd stop reading.)

More Ransomware

It's no longer possible to go more than a day or two without reading about some big organization being hammered by ransomware. Healthcare providers are a very popular target, because they have

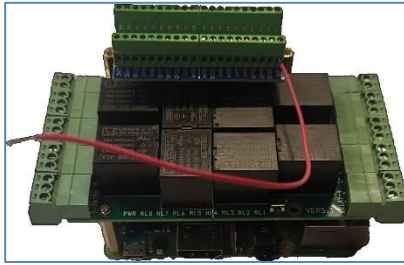all your info in one neat place, from your address and SS number to your payment information. (Yikes!)

Figure 1 - A sample for testing: Pi, relay HAT and breakout board for inputs.

I mentioned last time that I'm signed up with more than one credit monitoring service. Some time back, I also froze my credit report to prevent anyone from trying to get a loan in my name. I still keep an eye on it.

And hah! AI enters the picture. The ransomware groups – who operate under such charming names as "CIOp" and "Moonstone Sleet" – are using "ransomware as a service" (yes, that's a thing now) and Artificial Intelligence to find new ways to sneak into computer systems. Their phishing emails are so polished-looking that it's hard to tell that they've been artificially generated.

Figure 2 - The web browser in the Pi will let you tweak things.

What's really scary is that they're reportedly figuring out ways to do a "man-in-the-middle" thing on two-factor authentication (2FA). I'm not sure how that works, and it would take a lot of effort on the part of the Bad Guys, but if you're a juicy target, you may not even be able to trust a "click here to prove that you own this device" email!

The best thing you can do to protect yourself, as I've said before, is to avoid clicking a link in an email. Not even if it looks so legitimate you think, "This can't possibly be bogus – it's from my old friend Alfred!" Timing matters: if you've just changed your password, you have no choice but to trust a "Click here to confirm" email. But if you get one out of the blue asking you to "confirm your account," beware.

Don't download attachments, either. Go to the website mentioned in the email the usual way, or tell whomsoever wants to send a file to use a recognized, legitimate file-sharing service like Dropbox.

Speaking of AI ...

The Hot New Thing™, and as always, capitalized with reverence, is so-called "Vibe Coding." This is where you don't write your own program; you let an AI do it for you. I have mixed feelings about this, not because I'm afraid it would put me out of a job (I do more than simply write programs for our company), but because you really need to know what and why your code is doing what it does.

A bunch of different experts are warning that using code that isn't documented, vetted and well-understood is begging for problems. This part I agree with. As I've said in previous issues, AI is fine for short little examples. When I do a web search on something, Google's AI typically produces sample code. Nowadays, it even seems to work more often than not. But asking AI to create a mission-critical application is a bad idea – nay, a horrible idea.

SNMP On The Pi: Almost There

We've been sidetracked by Zetta installations and a few other issues, but I've tested this thing pretty thoroughly now. My test rig is shown in Figure 1; my fellow engineers will appreciate the official dangly piece of wire that I use
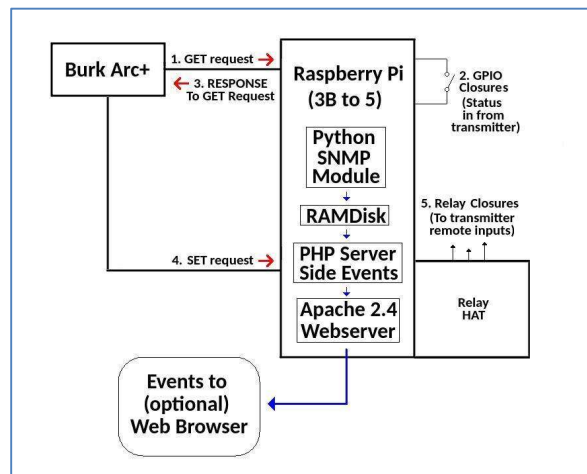

Figure 3 - A block diagram of the components used in the Pi.

to temporarily ground different inputs. I'd love to include a video with the relays going "clickity-clack," but I can't. You'll just have to take my word for it.

To help with your configuration, I crafted a built-in web server on the Pi that will let you enter the particulars of your installation (Figure 2). At present, we support two different HATs for the relays: an 8-unit device from Sequent Systems and a 4-unit card from DockerPi. Both are available from Mouser and Digikey. You should also get a breakout card (as seen at the top of Figure 1) to make it easier to connect your status inputs.

For those who care, a block diagram of the logic flow is shown in Figure 3, and that's enough for this issue. Until next time, keep praying for this nation!

The Chicago Chronicles
by
Rick Sewell, CSRE, CBNT, AMD
Engineering Manager, CBC–Chicago

VLAN Switches

Several years ago, after we installed an 18 GHz licensed Cambium Ethernet radio system between our Hammond studios and our Lansing transmitter site, we were so pleased with the performance that we decided to see if we could use it to extend our Wheatnet network to the site and use a blade for audio to the site.

It worked so well, and it sounded so good, with uncompressed 44.1k digital stereo audio that we decided to make a permanent connection. The only issue with doing that was that we lost the Cambium for usage with other traffic, audio codecs, remote control, HD data, etc.

The solution was to put that other traffic on our backup data connection, a 5.8 GHz unlicensed Ubiquiti system. This worked well for the most part, but being unlicensed, it was subject to dropouts from time to time, which was acceptable because the main audio was coming through the Wheatnet blade on the Cambium.

Essentially, we had two different LANs through two different paths. So they were differentiated physically. I knew it was possible to do this through Virtual LANs, but I didn't really have the network experience to make it work. I wanted to do it, but it wasn't until need drove us to explore how to get VLANs working on the more reliable Cambium system.

The need was driven by the installation of a new licensed Cambium Ethernet radio 11 GHz system between the Lansing Transmitter site and the Beecher transmitter site. With this change, the Beecher site was now getting data back forth between the Hammond studios via the Lansing site.

The system is performing well enough to get what we wanted from it with one audio codec, a Tieline Bridge-IT XTRA and the remote control as well as HD data. However, under that arrangement, the data was continuing the journey through the unlicensed Ubiquiti network. We were definitely experiencing dropouts at certain times of the day when the band was busier.

After discussing the possibility of splitting up the Lansing to Hammond Cambium path into virtual LANs with our Director of Engineering, Cris Alexander, he was inspired to make it happen.

He purchased two Zyxel GS2220, eight-port switches and configured them for two VLANs, one for the Wheatnet and the other for general data from Hammond to Lansing and subsequently to Beecher.

After configuring them he sent them to us in Chicago. The next day we hopped on getting them installed. Thankfully, it was plug and play and we were instantly in the virtual LAN business.

So far, we have not seen a glitch on any of the data going to either site. The catch phrase, "They work like a hose" has certainly applied in this situation.

Rocky Mountain Ramblings
The Denver Report
by
Amanda Hopp, CBRE
Chief Engineer, CBC - Denver

April was a busy month. A month full of networking and more Zetta.

We purchased several dual WAN routers like we did at KLZ and were able to get all our AM sites set up. Each site had its own issues.

One common one between KLZ and KLTT has been the Avaya IP phones. We can get the phone to register with our system, but audio will not pass in either direction. We have been actively working with our phone guy and have also opened a ticket with TP-Link to see if they can help us get this figured out. These phones are very handy as they connect us to the office.

AFCL

I was finally able to get the majority of Denver's program autoloads taken care of for Zetta. KLTT has the most that must be downloaded daily, so it was good to knock that out. I am sure I have more to work on with our other three stations, but this was a good start.

I am still learning so much about what Zetta can do. One thing, we have a show we must download daily but they upload a show that needs the beginning and end. I found out, if it is a consistent thing, timing wise, we can lock in some cue points, so we don't have to edit it every day too.

It is crazy all that Zetta can do. I went through the courses for both user and engineering and yet I'm still learning. I am grateful to Samantha Johnson from RCS who has spent countless hours with me working on AFC Launcher and other things Zetta teaching me.

KLTT HVAC Controller

We were able to get KLTT's HVAC controller installed. Stephen had created a program that would do what we needed, which is when it gets to a certain temperature, switch the AC to the backup unit and leave it there until a button is pressed to put it back on the main.

The old unit was complicated. It was created by a company that is no longer around, and when the temperature drops back below a certain point, the dampers would move back to the main unit, but the system remained on the backup, which meant it wouldn't cool.

My hope is that one day soon we can get this unit set up with SNMP so that I can also have control of it through Burk. Stephen is already working to figure it out.

Day/Night Switch KLTT

The Saturday before Easter I received an alarm from KLTT that the power was at 0.7%, meaning it was off air. I logged on and found that the transmitter interlock was open. I put it on the backup transmitter, and it came up fine. I looked at the main transmitter AUI and it also looked fine, so I switched it back with no further issue that day.

Then came Monday. At pattern change time, I received the same alarm and found I could not get the site back to the day pattern. I kept it on the night pattern and immediately headed to the site.

We started investigating in the building first, looking at relays in the building. All seemed fine. We went to the tower that was giving us the issue and found it didn't have 24V on the microswitch for the day pattern. We went back to the building, and we had 24V there on the wire feeding that microswitch.

We figured that the age of the cable, a wire broke or that there was a bad crimp somewhere. We had some spare wires in the multicable to the tower, so we quickly moved the microswitch to an unused wire at both ends and that fixed the issue. We could have just cut the connector off and redone it and had it start working again, but we were short on time.

Car Radio

My car radio has been a problem for years. The radio is an aftermarket Pioneer HD Radio and was great when I first got it. In fact, my husband had the same one in his vehicle before we sold it. In

recent years, it just wasn't performing as well.

I thought it was an antenna issue, which could still be part of the issue. My car antenna is built into the back windows and is very directional. Earlier this year I purchased an aftermarket whip antenna and mount and got it installed, and that made reception better.

Then one day, out of nowhere, I had no AM band. I could hear the powerhouses 850 KOA and our own 670 KLTT, but nothing else. The FM band wasn't much better. I could easily hear the power houses, but anything else was in the noise.

When I got home that day I grabbed the factory radio, took apart my car and plugged it in. I could hear stations much better. This told me the issue was the radio itself.

Knowing I need a good radio to monitor our analog and HD signals as well as our PSD on all stations and RDS on the FMs, I went to Crutchfield.com and began looking. I found several radios that were nice that would work. I wanted to stick with Pioneer because I do like the brand. Plus, they have the features I want in a radio on a personal level.

I settled on the Pioneer DMH2000-NEX. I didn't need any of the aftermarket stuff to make it work with my sound system since I already had it from the previous radio. Crutchfield's price was a bit high, so I shopped around. I found it $100 cheaper on Amazon. I ordered it and the car mounting adapter I would need as well as a few other items like a backup camera that I could use with it.

I stayed home from work on a Friday, working on AFCL stuff all morning and then spent the rest of the day, a good eight hours or more, getting this all installed.

It works great, and Pioneer seems to love HD radio. Rather than just having AM/FM radio, you press a button on screen that says HD Radio, so the logo is always there when listening to any station,

The screen of my new Pioneer radio.

HD or not. Seeing it lock in Digital is easy, and if you need to force it to analog only, that is also easy. The backup camera looks great too. It is great having a reliable radio again with great display!

Coming Up

May is gearing up to be another busy month, starting with a trip out to KBRT to help with their Zetta transition. I always look forward to going to KBRT. My plan while there is to help get their autoloads done. Much like in Denver, all across the company, we are finding ways to be more efficient and one way is auto loading stuff into Zetta.

I think we will try to sneak away one afternoon to the tower site to check on things and that's always a fun trip for me. Todd does a great job taking care of the place. I wish it were in Denver so I could call it mine.

Things are greening up in the Denver area, which means I will be mowing soon. I am not looking forward to that. I have been so busy, I don't know when I will have the time to spend days on end mowing and spraying for weeds. I also sense more autoload work in Denver as I have three other stations to finish up with downloaded shows.

That about covers it for this edition. I pray you all stay safe and well.

KBRT • Costa Mesa - Los Angeles, CA
740 kHz/100.7 MHz, 50 kW-D/0.2 kW-N, DA-1
KNSN • San Diego, CA
1240 kHz/103.3 MHz, 550W-U
KCBC • Manteca - San Francisco, CA
770 kHz/94.7 MHz, 50 kW-D/4.3 kW-N, DA-2
KLZ • Denver, CO
560 kHz/100.7 MHz, 5 kW-U, DA-1
KLDC • Denver, CO
1220 kHz, 1 kW-D/11 W-N, ND
KLTT • Commerce City - Denver, CO
670 kHz/95.1 MHz, 50 kW-D/1.4 kW-N, DA-2
KLVZ • Brighton-Denver, CO
810 kHz/94.3 MHz/95.3 MHz, 2.2 kW-D/430 W-N, DA-2
WDCX • Rochester, NY
990 kHz/107.1 MHz, 5 kW-D/2.5 kW-N, DA-2
WDCX-FM • Buffalo, NY
99.5 MHz, 110 kW/195m AAT
WDCZ • Buffalo, NY
950 kHz/94.1 MHz, 5 kW-U, DA-1
WDJC-FM • Birmingham, AL
93.7 MHz, 100 kW/307m AAT

WCHB • Royal Oak - Detroit, MI
1340 kHz/96.7 MHz, 1 kW-U, DA-D
WRDT • Monroe - Detroit, MI
560 kHz/107.1 MHz, 500 W-D/14 W-N, DA-D
WMUZ-FM • Detroit, MI
103.5 MHz, 50 kW/150m AAT
WMUZ • Taylor - Detroit, MI
1200 kHz, 50 kW-D/15 kW-N, DA-2
WPWX • Hammond - Chicago, IL
92.3 MHz, 50 kW/150m AAT
WSRB • Lansing - Chicago, IL
106.3 MHz, 4.1 kW/120m AAT
WYRB • Genoa - Rockford, IL
106.3 MHz, 3.8 kW/126m AAT
WYCA • Crete - Chicago, IL
102.3 MHz, 1.05 kW/150m AAT
WYDE • Birmingham, AL
1260 kHz/95.3 MHz, 5 kW-D/41W-N, ND
WYDE-FM • Cordova-Birmingham, AL
92.5 MHz, 2.2 kW/167m AAT
WXJC • Birmingham, AL
850 kHz/96.9 MHz, 50 kW-D/1 kW-N, DA-2
WXJC-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT

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