The Local Oscillator

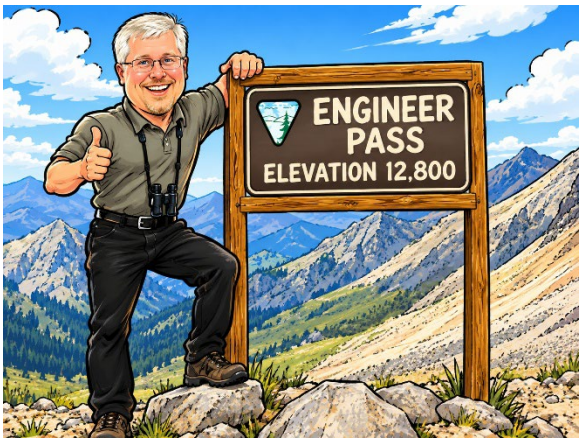
The Newsletter of Crawford Broadcasting Company Corporate Engineering

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68 Years!

Some 68 years ago this month, Crawford Broadcasting Company came into being.

Think about that for a bit. Can you think of any radio groups that were around in 1958 that are still around today? There may be a few, but you won't need more than a couple of fingers to count them. The network O&Os are, as far as I know, all gone. So many of the other great names have come and gone over the years, but Crawford Broadcasting Company is still here and still strong.



I haven't been around for the whole 68 years… that would be a neat trick if I had, but I have been around for most of those years. These past 42 years have been quite a ride.

When I came aboard in 1984, the company was 26 years old, and already it had an amazing history. At that time, we had six stations: WDCX in Buffalo, WDJC in Birmingham, WMUZ in Detroit, WYCA in Chicago, KPBC in Dallas and the newly acquired KBRT in Los Angeles. Strong stations, each of them, and strong markets.

In Dallas in 1989, we purchased and built out a CP for a new AM station on 770 kHz, 5 kW with four towers. Before we turned the first spades of dirt, I had a modification application in with the FCC to add one more tower and increase power to 10 kW. So we went on the air with 5 kW and four towers, and within a few months, built the fifth tower and increased power to 10 kW. In those days, there were ownership restrictions, so before we could sign the new station on, we had to divest ourselves of the one we already had. That messed with the timing a bit, but we got it done.

We rolled along with those six for a few years, but then in the early 1990s, the expansion began. Portland. Denver. The Bay Area. Rochester. Syracuse. Albany. St. Louis. And in addition to those new markets, we added to our station count in existing markets, purchasing additional stations in Portland, Denver, Chicago, Detroit, Birmingham and Buffalo. And in the expanded band rollout, we added yet another station in Portland. Then in 2000 we added two stations in Colorado Springs.

There were some divestitures along the way as well. We sold Dallas, Syracuse and Albany as well as the expanded band station in Portland. We sold one of our stations in Rochester. We sold St. Louis. And we turned in the license for our regular band parent station in Portland. Later, we sold Colorado Springs.

We did some upgrades along the way during those years, starting with… a downgrade in Detroit. I have chronicled in these pages the story of taking superpower class B WMUZ-FM from 115 kW ERP to 50 kW ERP along with a height increase and fixing just about all the many signal problems in the process. Those were some nervous days for me, but by God's grace it all worked out, and WMUZ-FM has been a strong performer ever since.

In Albany, we completely rebuilt the 50 kW facility, including transmitter, phasing and coupling system. About the only things we didn't touch were

the towers. In Detroit, we replaced the phasing and coupling systems for both WEXL (now WCHB) and WRDT. In Denver in the mid-1990s, we purchased and built out a new 50 kW AM on 670 kHz (KLTT). That station remains a strong performer and mainstay of our company.

In 2000 or 2001 (I can't remember), we did a power increase on our two Colorado Springs AM stations, taking them from 5 kW to 15 kW. They were great performers at that power level. We had an amazing diplexer, numerous large cabinets, and we had to jack the tower and replace the base insulator with a taller one that could handle 30 kW. That was a project, let me tell you. And I'll never forget seeing Ed Dulaney with one of the XL-30 transmitters on a forklift, figuring out that it absolutely would not fit through the door. "I measured it! It should have fit!" The solution involved a masonry saw and a bunch of plywood, and we eventually got a much wider back door for the building.

In Birmingham, we acquired a 50 kW powerhouse that was a total wreck. We quite literally bulldozed the whole site except for the towers and built a new transmitter building, installed a new phasing and coupling system, new transmitters and equipment, new transmission and sample lines, new ground system – everything – and got it running the way it should be.

In Denver, we moved our "peanut-whistle" 800 kHz daytime station to 810 kHz, increased daytime power to 2.2 kW and added 430 watts of nighttime power using a four-tower directional array completely within the footprint of the KLZ two-tower directional array. That station, now KLVZ, remains a strong performer with its oldies format, serving the whole market with a great hybrid digital signal.

We did some FM upgrades, too. In Rochester, we took our class A FM from a tower on the east side of town and moved it to a tall tower on the west side, installed a big directional panel antenna and did a power increase to 6 kW. We eventually sold that station, but it had (and still has) a great signal serving the whole market.

North of Birmingham, we did a major structural upgrade to the 1,330-foot tower and replaced the 80-foot pole on top with a 24-inch face tower section that was much stiffer. We hung a 10-bay ERI SHPX on that, producing an amazing signal covering a huge area. We replaced the whole tower at WDJC in Birmingham, increasing the height and improving the already amazing signal.

In Chicago, we took our 30 kW/400 ft. FM to 50 kW and 492 feet, greatly improving its reach in the process. We later replaced the directional antenna with a better one from ERI. That signal does a great job of covering that market.

Then in 2017 or thereabouts, we added FM translators to most of our AM signals. Some of these translators were merely placeholders, but some were and continue to be real standouts, serving their entire markets with great FM signals.

Studio and infrastructure projects through the years are too many to count. Analog source equipment (vinyl records, carts and reel-to-reel magnetic tape) gave way to hybrid (digital "carts" using floppy disks, Instant Replays and DAT tapes) and then to full digital (Dalet, then Nexgen, then Zetta) playout systems. Analog consoles (Autogram R/TV-20s and Audioarts R60s) gave way to hybrid AES/analog consoles and then to full digital (Wheatstone TDM and then AOIP). Bundles of audio and AES cables became thin runs of orange CAT6 cable.

We were on the cutting edge with C-Quam AM Stereo for a good run of years. That sounded amazing! It's too bad we couldn't get the receiver manufacturers onboard.

And then in the early 2000s came HD Radio, which we still run on all our stations but two. Thankfully we have manufacturer support for that mode.

And what a great group of engineers I have had the privilege of leading through these years. None are better than the group we now have, most of whom have been with us for many years. Each one has brought special skills to the table and contributed in immeasurable ways to the success of their individual markets and the company as a whole. You are a blessing, every one of you.

It almost boggles the mind when I stop to think through this journey, where we started and where we are now, in every segment of our company. But we're not done yet, far from it. I am excited at what the future holds, both for our company and the industry as a whole. Changes are coming fast these days, and we are adapting as fast as the changes come. It is a challenge, but our people thrive on challenges.

I can't imagine what broadcast radio will look like in another 68 years, or even in another ten. But I know that as long as we're still here, we will stay on the cutting edge, keeping our great radio stations sounding as good as technology permits. There are and will be none better. Buckle up and hang on!

The New York Minutes
By
Bill Stachowiak
Chief Engineer, CBC – Western New York

Greetings from Buffalo!

A few weeks ago we had an indication on the WDCX-FM remote control of a tower light failure. Upon investigation, we discovered that the SSAC SCR9L tower light alarm monitors had both failed.

Since I wasn't the one who set up the monitoring, I had to learn how it was configured. Essentially what happens is that the beacon power is routed through the device so that a normal amount of current with all beacons working can be established. If the current drops off because of a beacon bulb failure, the device energizes a relay to signal an abnormal condition.



A 5-volt power supply was routed through these contacts and fed to an analog metering input on the remote control. This is great except if for some reason the photocell fails, the lights will never come on, and thus the relay will stay closed.

I decided to make a modification to the system so that I could tell if the lights have turned on. I plan to use a relay to turn on and off a status indication on the remote control. I will connect the coil of the relay to the output of the photocell so that when the lights come on, the relay will energize. I also plan to route the beacon power through the relay, as I don't like all the beacon current being drawn through the photocell.

We have set lower limits on the tower light channel so that if there is a failure, we will be informed immediately. We will also get emails when the lights turn on and off. Thankfully everything else here in Buffalo has been very stable.

I occasionally help out a small 5 kW AM station when they are off the air and are in serious trouble. I recently got that call, so I went to their studio, which is collocated with their transmitter. They have a Harris Gates 5 transmitter. This transmitter is interesting in that it has an adjustable output network to match the transmitter to the load impedance. With proper tuning the directional coupler always sees a 50-ohm load.

The first thing I did was to connect a dummy load to the transmitter. With the load connected, the transmitter wouldn't stay on. I immediately got a VSWR trip. This told me that the directional coupler wasn't seeing a proper 50-ohm impedance, so the problem was somewhere in the output network.

Generally, when a problem like this occurs, you can identify the faulty component with a good visual inspection. Sure enough, we identified a blown-up capacitor. It was in the third harmonic trap. After replacement of the cap, the transmitter was returned to normal operation.

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

The 'ber' Months

Fall is beautiful here in Michigan. My wife can't stop marveling at the color – it's her favorite time of year.



I'd rather be staring down the pending summer months myself, but I can't deny that autumn in the mitten state is wonderful. We recently spent some time on Mackinac Island, Traverse City, and in Grand Rapids.

Around the radio stations, we find ourselves mowing and trimming and doing general maintenance on the tractors. We recently had the pleasure of changing filters and oil on one of them, which for some odd reason I rather enjoy.

Another thing happens, too, as the temperature falls; I start to nest. I organize, straiten-up, throw away junk.

The FCC rule forcing us to change to long passwords has had me thinking about security, too. I'm all for security, but too often, it locks me out, which is nearly as bad as letting in the bad guys.

Password lists are an absolute must now, and those, too, have to be secured. I've learned that password managers are not foolproof. Too often I'm presented with a log in challenge, and the password manager doesn't pop up, or offers an incorrect password. The method some use where a code gets sent to my cellphone is my favorite, but God forbid I leave it at home!

Nonetheless, I'm committed to security. For all its faults, it's not going away and it's forever evolving into an increasingly more difficult landscape to navigate.

Tieline Issue

For five plus years, I've been using our Tieline Genie Distribution codec to do just what it's designed for – distributing programming. Its reliability has been exceptional. Suddenly it decided to stop following one schedule, sitting like a house beside the road instead.

I've learned the hard way to try never to obfuscate evidence, so prior to doing anything more than reading the log files (which confirmed the connections were not being made for that schedule), I contacted technical wizard Bryan Harper at Tieline for support. He downloaded more logs, the hexadecimal ones I can't read, and confirmed what we already knew. Like me, he had no idea why this problem was happening.

A simple reboot resolved the problem, but the incident is noteworthy because the computerized system malfunctioned without failing completely. The GUI, other schedules, and audio encoding continued to operate normally. The issue was confined to just that one schedule item that had worked for years.

Belts and Suspenders

I like redundancy, which pretty much means I like solving problems that I don't yet have. I'm a risk-averse person which explains why I don't bet the ponies! I've looked for redundancy wherever I can, and I constantly feel like there's never enough of it. Trouble is, redundancy costs money, and there is a risk/reward equation that must be satisfied prior to its implementation.

In the case of the Tieline issue above, something that happened once in five years affecting an overnight program distribution isn't worthy of a dime to fortify. For things like these, we can employ situational awareness. Fortunately, Tieline supports SNMP, so every night shortly after the schedule makes the connection, I have our Burk remote control system run a Jet flowchart to verify the connections are made. If any of them aren't, it texts the Operations Manager and me in enough time for us to troubleshoot and hopefully make connections manually.

I recently lost some audio on our Zetta file server due to a full hard drive. We run a large number of long-form programs on each of the four stations in Detroit, and admittedly our housekeeping is, well, a work in progress. It's easy to pile up lots of already run programs that take hundreds of megabytes each.

During the purge panic, I deleted some music that I wanted to get back without having to resynchronize with the entire cloud store. I decided to create another local content store on our NAS where I'd have everything including the Zetta database should the fileserver someday choose to cash-it-in. While the cloud store is a fantastic option and necessary should there be a localized catastrophe, having a local copy of everything that can be

transferred at local network speed, rather than over the internet might just come in handy someday.

Something is Broadcasting on my Broadcasting Network

Earlier this month, we completed a project that replaced four point-to-point wireless network radios that make up the ends of an STL. Essentially, they take the data that's made the long haul via our microwave system and connect it to the studio on the one end and the transmitter site on the other.

It's easy to fall into the line of thinking that everything on an Ethernet network is point-to-point. You send something from one IP address, and it ends up at another. Ethernet has both multicast which is subscription-based streaming (in a nutshell) and broadcast capabilities. I don't often use broadcast for anything, save for one instance where I had one HDRadio exporter that I needed to feed two transmitters' exciters. It worked like a hose.

Our fine friends at Ubiquiti, the same folks who we chose to provide the aforementioned IP radios, use Ethernet broadcast messages for device discovery. I found this out using Wireshark.

Why did I even look? Well, my RDS encoder was not updating as it should. It worked well enough that I didn't really realize it was broken for a couple of weeks.

What was happening was that these radios use port 10002 for discovery and would send their 'I'm here' messages on 255.255.255.255 using that port. The Inovonics RDS unit would then get invalid and mixed messages on that port, which it would discard. This greatly degraded its update frequency.

Here is the Wireshark capture data I found that helped me figure this out.

Internet Protocol Version 4, Src: 169.254.248.0, Dst: 255.255.255.255

Ethernet II, Src: Ubiquiti_4a:f8:00 (70:a7:41:4a:f8:00), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

User Datagram Protocol, Src Port: 33374, Dst Port: 10002

The Ubiquiti PowerBeam 5AC (or likely any Ubiquiti radio) running AirOS8 has a software switch to disable discovery, which quiets these broadcast messages. After doing so, I watched Wireshark for a while and the traffic to port 10002 definitely ceased. For safety, I changed the UDP port on the RDS encoder to 10009.

Miscellaneous Ramblings and Goings On

Ah, the wonderful world of computing. AI is here and all of a sudden, it's everywhere you look. It's a sea change in the way we live, like it or not. I used to hear the words 'data center' and think wow, would I love to visit one and see how it's set up and managed. Now the term is taboo, and data centers are shunned by those in their proposed vicinity. Their construction is also causing shortages and attendant price increases on things we often need at the radio station and were used to being able to buy regularly and reasonably. Server memory and SSD hard drives are now crazy expensive. What happened?

As entertaining as endless AI cat videos and altered clips of porch pirates receiving their instant karma may be, I still haven't found a place for AI in my life. I don't need it polishing my amateur rants, bending spoons, or – least of all – driving cars! By the way, I had Copilot rewrite the previous sentence – for irony.

Ok, I'm an old guy who just isn't hip. I knew it would happen. I'm probably just being crotchety and rooted in my ways, but I still haven't seen how AI helps me.

Ok, ok, it does work well figuring out what I'm trying to tell my voice recognition system in my truck, but once I get the destination programmed, it does ridiculous things like telling me to get off at the next exit then to get right back on. How's it going to work in situations where predictive care is required, like passing children playing a sidewalk, or when you suspect another driver doesn't see you, or even more to the point, when another driver does something you just knew they would do so you gave them the room to do it?

The self-driving nannies on my vehicle work to a degree, but I'd never fully trust them. Lane-keep assist sometimes loses the lane markers, adaptive cruise control sometimes brakes when it doesn't need to, forward collision warning has slammed on the brake for some phantom obstruction, and my backup sensors let me back into a post (yeah, ok, that one was my fault).

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

Whirlwinds – and its Definitions

However you'd like to define the word, the month of October was a whirlwind.



Definition 1: Meteorological storm. We had one. Hurricane Isaias barreled right through the center of Alabama and brought our area a lot of rain and some high wind gusts. Of course, this is Alabama, so more people were concerned with the impact that the weather was going to have on the Alabama/Georgia game in Tuscaloosa with ESPN's Game Day crew in town or whether the Zach Bryan concert was still taking place in Auburn University's stadium that night. Everyone can rest easy – the storm effectively carved right through the state nearly dead even between the two events.

Definition 2: Anything resembling a whirlwind, as in violent act or destructive force. I don't know that a lot has been said on these pages about what we're doing down here in Birmingham, but we're in the process of "right-sizing" our operation here. This has included adjusting our station count and also looking at options for housing our studio space in a smaller area. With that in mind, here is brief run down of October.

This was hard one, but Crawford Broadcasting turned in our FCC broadcast license for WXJC-AM effective on September 30, 2026. With that action, a lot of things were set into motion that have truly been original experiences for me.

We secured Tower Maintenance Company to come and demo the 5-tower array. This included dropping each tower, all metal scrap cleanup, and cutting guy anchors below soil grade. Prior to that work, Jack and I also gutted all the ATUs of all of their associated capacitors, coils, lighting chokes, and any other valuable parts. Cris will be able to use these parts in other markets to lighten the expenses of other projects. It's eerie being out there now. The only remnants left on the 37-acre site are the five concrete piers and our transmitter building in the center of the field.

With that work done, we've begun the planning for shipping our Nautel NX50 to KBRT in our Los Angeles market so that they will have a full-power backup for their operation. We sent KBRT the Burk ARC Plus Touch setup we had at the site as well. We also have entertained a buyer for our auxiliary transmitter, a Nautel XL60, and they are going to proceed with the purchase and remove it from the site. We've also listed the 37 acres for sale with a commercial real estate firm.

The studio downsizing has so many options that it could make your head spin like a whirlwind. Without going into a lot of detail and once things get a little more settled in, I'm sure at some point Cris will likely tell most of our market chief engineers that the equipment store is open in Birmingham.

Definition 3: Something characterized by great energy or swiftness, often with an atmosphere of chaos. It feels like it, but there is a lot going on that looks like (and feels like) an alternate universe right now. This is my 25th year with Crawford Broadcasting Company. WXJC-AM and WYDE-AM were put on before my time here, and WYDE-FM was purchased and rebuilt while I was here. Our studio space was purchased in 2006, and the entire top floor of the building was gutted and rebuilt for our operations here. Simply put, there has been a lot of energy, sweat and tears put into this market and its engineering operations by Cris, Stephen, Jimmy Parker and Jack Bonds, and all of that is getting rearranged all around us. There is a lot of work in front of us to get things done and be prepared for what lies ahead of us, and I am looking forward to the challenge.

Reverse Engineer Anything

Some of you likely have heard of the latest rage in the AI sphere. It is called Reverse Engineer Anything. The Github project had about 10,000 stars three weeks ago and has ballooned in popularity to over 400,000 stars.

It will be hard to explain this without some degree of background, but at the heart of the project is a number of software tools that have been around for a long time. One is Ghidra, an NSA tool used for

decompiling code into pseudo code that has been around since 2019. Hopper is a Mac and Linux tool that breaks down binary files and inspects sting calls in software and it has been present in the industry since 2011. A third tool is called IDA, and it is a disassembler and decompiler that inspects assembly instructions. It has been an industry standard tool since 1990! I'll type it again in the event that you missed it, 1990.

So, what is so special about Reverse Engineer Anything? To answer that, we need to talk about what has been going on in AI for the better part of six months or so, and the term you need to familiarize yourself with is "agents." AI agents are designed to do computer-type, repetitive, software coding.

What the maintainers of REA have done is put all of these tools into one place. People who have installed the software then sick their agents on hardware, firmware or any form of software to begin to work on disassembling programs and seeing how they work, what software calls are made, what strings are presented when things are asked for, and the output that is presented to the user. From there, the agent can take all of that information and essentially say to itself, "How would I write software code to replicate that output?" and before you know it you have a program written that can somewhat look and feel like the one you have downloaded from any provider that you can think of.

Of course, the replicas are not perfect, and many report that some of their first runs are extremely buggy, but what about the second run where you ask the agent to clean up this part, or the 30th cycle where you actually have something that closer to 98% feature complete with the other two percent something that you never used in the first place. It could turn into the Wild West pretty quickly.

Source code carries a copyright, but is it source code any longer? While company lawyers are spending 12 months in court, the AI coding gets better and a million people have done something similar. I'm not for stealing anybody's intellectual property. Period.

But I can tell you where it be helpful. What about people that purchase products and a company simply abandons their software or hardware? A couple cases to consider-when COVID happened, Peloton and LuLuLemon created a mirror that could be used for workouts from home for a cool $1,500. When the need had passed, they simply stopped supporting the devices since they weren't profitable any longer. People have already used REA to bring those back to life.

What about your $800 Smart TV that is essentially an ad server for the manufacturers of said TV's. Users have let their agents go at the firmware on those TVs and remove the ads. Other products might come to your mind since we're a technical bunch, where you've thought to yourself, this would be such a better device if it did X, Y or possibly both. Planned obsolescence becomes a little less scary when I could possibly use a tool like this to overcome poorly written firmware.

It is something to think about. I'm a little more on the other side of the fence about hardware that I have purchased and the ability to continue to use it or upgrade it since I would be in sole control of whether it becomes a brick or not.

Until next time, keep your head up, and may God bless the work of your hands.

Tales From Cousin IT
by
Stephen Poole
CBC Corporate IT Specialist

Let's start with a local specialty: "rolling" a neighbor's yard with toilet tissue if their football team loses. I've seen some pretty epic rolls around Chapel Hill back home in NC, but the Alabama haters are in a class above the rest. When the Tide lost to Georgia and then Tennessee, the Charmin and Angel Soft started flying off the shelves. Figure 1 is a Bama fan's driveway just up the road from me.



That picture was taken after the loss to Tennessee, and the homeowner had already cleaned up some of the stuff. The folks here don't play around; the rolls are thrown through high branches and around shrubs. Top-line rolling.

Of course, the real question is how much longer Alabama's head coach will keep his job. If he loses to Auburn in the so-called "Iron Bowl," he's toast. The Crimson Tide changes coaches almost as frequently as toothbrushes. To me, it's insanity, because each firing has a multi-million dollar buyout clause, but that doesn't stop Tuscaloosa from gitten'er done. They're SERIOUS about their football.



Figure 1 - Bama loses, you get rolled!

PHP2Shell

You may have seen the recent headlines about the PHP2Shell vulnerability. As the name implies, a specially-crafted attack could gain shell (the equivalent of command line execution) access. This one was so serious that a bunch of websites around the world were abruptly taken off line until the patch was available. An attacker could simply craft a bogus HTML request that would sail right into the server, ignoring firewalls and other protection.

I've discussed PHP here in the past. Our own websites use it to build pages on the fly; it's a handy, powerful tool. WordPress, Joomla and other content managers use it. Other toolkits are available and are starting to eat into its share of servers, but PHP is still widely used worldwide (70% of current websites according to one source).

The standard Cybersecurity and Infrastructure Security Agency ("CISA") approach is to (1) identify the vulnerability with a proof of concept for an attack, (2) then notify the vendor. Once a patch is created you tell everyone to install it ASAP. In this case, someone leaked the details early (!!), so the dark web jumped on it (no doubt cackling all the while). PHP2Shell was being exploited before the patch was available. Thus, the CISA rated PHP2Shell as a 9.8 out of 10 for severity.

This affected every version of PHP from 5.4 to the current 8.5 release. The fix was originally scheduled for release on October 20, but Rocky Linux (which we use) delayed their patch until the next day. I went in to our web server and changed some configuration settings to make an attack more difficult. The patch was finally released, I installed it and reset the configuration for Elementor, a key plugin that we use with WordPress.

October has been a wild month in the World of IT. AI keeps finding what the geeks call "critical vulnerabilities" that must be patched. A typical session on a single server is shown in Figure 2. It's a good thing I shave my head, or I'd be pulling out my hair. Thus far, I've installed 14 full updates to all of our corporate servers in October alone (a total of 21 since September 2, including one tonight as I was writing this). After each one, I need to check everything on each server to ensure that nothing was broken.

All I can say at this point is to WATCH FOR UPDATES AND INSTALL THEM. Your number one enemy is complacency. "We've never been hit before, it can wait over the weekend." NO. It can't. You may have to do some of this after hours to prevent downtime during the workday, but hey, that's part of the job!

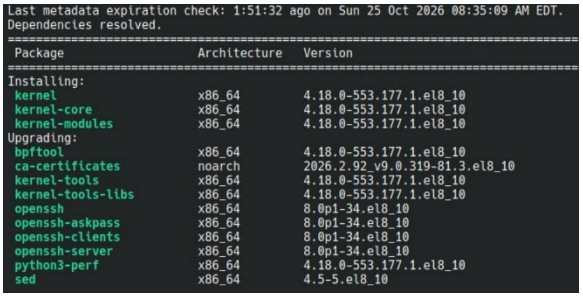


Figure 2 - A typical update including both kernel and SSH fixes.

Why These Bugs?

AI is finding bugs in old code, some of which are in function calls that are no longer being maintained and which have long since been forgotten. Additional hilarity: the Bad Guys are using AI to find the bugs as well, so it's a critical race. For those of you who have programmed in C, the ancient "gets()" function is a good example. It simply reads input without limiting the number of bytes received. It can easily be used to overflow memory and write code that can then be executed.

At the end of the day, computers store and move information as numbers and early designs were called "calculators" for a reason. For example, the number 49 (00011001 in binary) could represent the ASCII letter "A," a byte from an image file or an instruction for the processor such as "add" or "branch to a different address." It all depends on the context, location in memory and how it's interpreted. (If you want to see hilarity in action, watch what happens if the instruction pointer jumps off the rails and starts executing a text file. Ask me how I know.)

Even though it's considered bad practice nowadays, some older programs allowed data to overlap the executable instructions in memory. With modern protected processes, this should cause a fault (ex., classic Windows' Blue Screen of Death). But by cleverly placing the bogus instructions in memory, the Bad Guys can sometimes find ways around that.

Memory Notes

As microprocessors became faster and faster, routinely clocking at 1 GHz and higher, other optimizations became necessary. My fellow engineers might get a good chuckle out of fact that the traces that carry the signals on a modern motherboard have to be treated as RF transmission lines with proper termination. In many cases, serial data, rather than parallel (example, 16 or 32 bits on separate traces), is better because there's less concern about a bit from trace 1 arriving before the one from trace 2, or crosstalk between traces.

Caching is another good example. RAM is faster than hard drives, local caches (such as the Level 1, 2 and 3 caches in a modern processor) are much faster than RAM, and the latest processors even try to guess what's happening next. They'll pre-load an entire string of instructions into uber-fast cache memory. Some processors can execute more than one instruction at a time now, too. Last time, I suggested that you learn to think like a Bad Guy; can you image what a hacker might do if he/she can access a cache buffer?

Beware Of Malicious Apps

A final warning about finance, budget and banking apps. Make sure you only use apps provided by your financial institution. There are all-in-one apps now that want to tie all of your accounts together for convenience. Not surprisingly, this makes the banks very nervous. Even if the app is legit, what could happen if someone compromises your phone? And remember, in addition to protecting yourself, you're protecting our company. If you do work on your smartphone or laptop and get hacked, that might be a Very Bad Thing.

One of these "all-in-one" apps that advertises locally brags that it can move money from one account to another, or even obtain a loan for you. If that doesn't raise red flags, I don't know what will. Again: even if the app is completely legitimate, other apps may not be. Anytime you install a new app, carefully look at what it wants to do. If it asks for permission to look at your contacts, email and text messages, that should concern you.

Ends And Odds

SNMP continues to be a focus for us. Cris tells me that Burk no longer offers an SNMP function enabling software key for their ARC Plus Touch units; now there's a separate Plus-X device that communicates with the remote control to handle SNMP requests.

Among other things, we're also still working on a retrofit for older transmitters. I recently purchased an 8-channel A/D board for the Raspberry Pi for testing. Is there anything these little computer boards can't do? If you're not frightened yet, I've even learned how the Management Information Base (MIB) files are crafted.

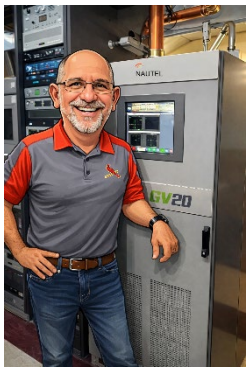
January is right around the corner, and I'm also working on a replacement for the Barracuda Spam Firewall that we've used for many years on our email system. Barracuda Networks has declared it

end of life, so we'll need a different solution. Given that it has been letting a lot of obvious spam through lately, replacing it will probably give better results, anyway.

The trademarks used here are the properties of their respective owners. The ever-vigilant lawyers made me say that. All images used in this article were done by me. Until next time, keep praying for this nation, and don't forget to vote!

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

I just returned from an 11-day trip to Africa where I was part of a mission trip to bring wheelchairs to individuals, mostly children, that have no device for mobility. It was great to be part of such a work of the Lord.



However, 11-days is the longest I have been away from the station operations and really couldn't participate in getting alarms and such due to lack of cell coverage. It was a time to see how the systems performed that we put in place to quickly diagnose and fix problems work without my intervention.

By systems, I mean equipment that sends alarms and the people that respond to them. For the most part, I have strong confidence in both those parts of the equation. This confidence was well placed during my absence.

However, it wasn't totally a smooth road, and that has caused me to pause and examine what went wrong, why it wasn't caught quicker and now how do I make the system even better? It was a good test, and we will take a very good system and strive for excellence.

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

Wow, is November really here? That means the start of the holiday season. October brought Colorado some cooler weather. It brought southwest Colorado a ton of rain and with it, flooding. Here in Aurora, we have had some rain. We are still a long way from recovering from this year's drought.



We have begun preparing the tower sites for winter. This usually means a good cleanup inside each building, end of season mowing to knock down the remaining growth, and a good cleaning of the ATUs.

Quick Recap

I can't say enough how grateful I am for Daniel Gattis to be on board with us. Without his help this year, there is no doubt in my mind our sites would be in bad shape. He has been keeping up with the cleanup and has taken some projects upon himself that I didn't even think of.

One of those things is the canopy on our Kubota tractor. A few years ago, I got a little too close to one of our big dishes at KLZ. It cracked the corner pretty bad. I think Daniel did the same thing earlier this year as well. He was able to work some magic and repair it. While I haven't seen it in person, the pictures make it look like nothing ever happened.

An Engineer Wears Many Hats

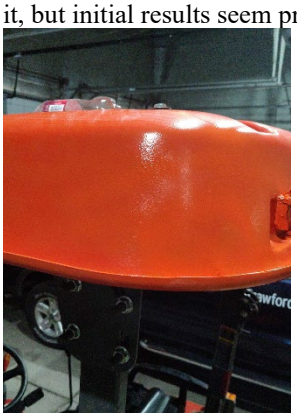
Most people think being an engineer is this glamorous job. I get to go to the transmitter sites and fix equipment and for the most part, that is true. But more and more, it entails working on computers. For me, it meant cleaning carpet. We had someone bring in an unopened glass bottle of olive oil, and it was dropped in an office and shattered. All the oil went straight into the carpet. And if you don't remember,

that carpet isn't that old.

I went to work cleaning it up the next day when I found out about it. We have a little "Spot Bot" that I used to clean it. I used carpet solution, along with Formula 409 and Dawn dish soap to try and get it out. Initially it looked good, but after a month or so, the spot began to reappear.

After working on it a couple times with very little change, I made the decision to rent a carpet cleaner from Lowe's. My husband was kind enough to come to the office on a Saturday to work on it with me.

We used carpet solution along with a brush and a small tub of soapy water. After going over it with the machine, we used that soapy water with a brush to scrub it. Then we went over it again with the machine. It's only been a few days since we cleaned it, but initial results seem promising.



The repaired Kubota Canopy.

Translator Swap

Many of you may have seen in the trade press that we did a translator swap with iHeart Media. Here in Denver, we gave them 100.7 which was paired with KLZ. In return they gave us 103.3 out in San Diego. I'm sure you'll get some details on this swap in these pages at some point.

100.7, along with 95.3, is located up on Lookout Mountain just west of Denver. While it's a bit sad to lose that one FM here in Denver, I must say, having the equipment out of our rack at the transmitter site makes me happy. I was able to install a rack shelf to keep our laptop on. We have also purchased a locking rackmount drawer that we will install. It will allow us to store a few things, like tools, and keep them secure.

Capacitor Trial

Kintronic Laboratories is working on an economical replacement for mica capacitors, which of late have gotten to be stupid expensive. They asked us if we would be willing to test one of the prototypes here in Denver, and we were glad to help out.

On a foggy morning in late October, we took the prototype cap out to the KLTT site and installed it in the place of a 1,000 pF mica capacitor at tower #1. The day pattern came up with no problem, and we didn't have to touch the phasor controls.

Over the coming months, we'll be watching the performance of this cap, checking operating temperature and watching for parameter drift in the antenna system.



The prototype capacitor is the one on the left. It has the same value and function as the 1,000 pF 294 next to it.

Coming Up

There is plenty of work to do around the various sites here in Denver. It is my hope that we get the end of season cleaning done. At the office, I need to replace some of the small LCD screens on the LXE consoles. It's probably a good time to do a good cleanup of the consoles as well and a good dusting of the equipment in the studios. Besides that, I really have nothing scheduled. Only time will tell what comes up this month.

I am praying for snow, lots of snow. We normally don't get a ton of snow in November, but with the winter we had last year, we are in desperate need. I am praying for a lot of blizzards, feet of snow, to hit us this year.

I think 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-FM • Cullman - Birmingham, AL
101.1 MHz, 100 kW/410m AAT

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