The Local Oscillator

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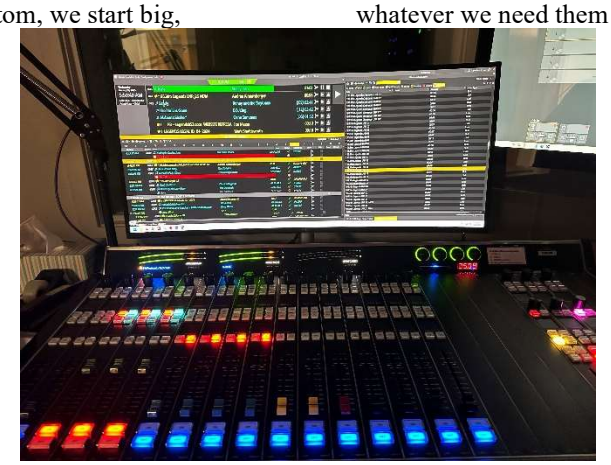
Zetta – The Adventure Begins

As I write this in late January, we are in the middle of our first Nexgen-to-Zetta conversion in the Denver market. As is our custom, we start big, company-wide projects in Denver first so that I can keep an eye on them, learn all I can, and hopefully head off most problems and issues downstream as we work our way through the markets. I can say with confidence that starting in Denver was a wise course of action in this case.



Zetta on the air on KLVZ

First, let me say that Zetta is a starship compared to the Nexgen space shuttle. And I don't mean the old NCC-1701 Captain Kirk starship. I mean the Captain Picard NG NCC-1701-D starship! It is a refreshing platform that makes sense for radio stations in the 2020s.

Unlike Nexgen, which had its roots in the old DOS Prophet Wizard platform, Zetta is a new product from the ground up, and it shows.

Conventional Windows/PC keystrokes and shortcuts work as you would expect them to. This is good for new users – if a person can use Word or Excel, he or she will find their way around Zetta without a lot of trouble. But for longtime Nexgen users, there is a bit of an un-learning curve. Still, it's not hard to find your way around in Zetta's modular architecture and get the desired results.

The thing that has made me glad that we started in Denver is the exports. When Amanda and I did the Zetta demo at last year's spring NAB convention, we specifically asked about metadata exports, which are very important in our RDS/PSD world, and we were assured that Zetta offered an "unlimited" number of exports that would do whatever we need them to. So it was with confidence that we jumped into this omnibus project.

When we put the first station on the air, however, we quickly found out a couple of things about Zetta's exports. Yes, you can have as many as you want, but they do not have anywhere near the base functionality of the exports that Nexgen offers.

For one thing, and this was a showstopper, Zetta will not do a direct Xperi export. You must have some kind of middleware that has that capability if you're an HD station and intend to update PSD metadata.

Another shortcoming is that there is no export delay feature. All exports are sent out in real time, and if you have a profanity delay and/or are transmitting in HD with its analog diversity delay, the metadata shown on analog FM receiver screens will be way ahead of what the listener is hearing.

And yet another issue is that there is no direct provision to transmit DPSTEXT= as the leading text in RDS exports, which makes it impossible to directly put title/artist information in the DP and RT fields as the recommended practice calls for.

RCS addresses the last two shortcomings with an outboard (and free) pseudo-middleware app called "Glue." XML processing code in that app can add DPSTEXT= and the desired delay to an export.

This is in my view a band-aid fix at best. All these should be native export functions of Zetta. If the 25-year-old Nexgen platform can do it, why can't the latest-greatest Zetta? Hopefully it will be fixed in a future update.

For the time being, we have had to install TREPlus and let it do the heavy lifting for PSD and RDS exports. We already have TREPlus in place in several markets, so it won't be a big deal there, but it is an unexpected added expense in other markets.

Getting TREPlus to work with Zetta was a daylong trial-and-error process. It's not the same as with Nexgen, where we export metadata to an XML file and TREPlus loads it. It's all TCP with Zetta, and we had to set up a TCP server for the exports. With everything set up exactly as it should be, it still didn't work. I even had BE support on the phone for over an hour, looking at everything, and they couldn't figure it out. Then I noticed that the start and end times were both set to the default, which is 12:00 AM. That apparently created a zero-minute window. I set the end time to 11:59 PM and voila! I noticed the next day that the default end time in the TREPlus dashboard had been changed to 11:59 PM.

So what does the conversion process look like? It's a lot less automated than I thought it would be. The RCS installation tech got into our system a week or so before his trip to Colorado and installed SQL Server and CALs on the existing Nexgen file server. He also installed Zetta on the server and started the database conversion process.

Once on site, he began building the system one station at a time, getting Zetta running alongside Nexgen and doing some training of the staff. Then the first station was put on the air with Zetta, and we started working the bugs out.

DRR clocks and record logs (called BGR for Background Recorder in Zetta-speak) were a challenge and required a lot of manual work by the installer and our people (Amanda). Program clocks and music log imports also required some work.

In Denver, we had not been doing traffic log imports, and that changed with Zetta. This will result in a lot less work for our operations people going forward. No more manual loading of spots, etc. in the logs. The traffic person simply exports the finished logs (less headers) to a mapped drive and they are ingested by Zetta and show up in the Zetta logs.

At press time, we have two of our four Denver stations up and running on Zetta. We had hoped to have all four up and running by this time, but the issues with exports and the amount of time it has taken to recreate all the Nexgen clocks have really slowed us down. The plan, at this point, is to press on through the first weekend in February and get the other two stations moved over.

As the end of this process is slowly coming into sight, I can offer a few observations and opinions on Zetta. It is a starship, no doubt about that, and it is generally well thought out and intuitive to use.

Things I like about Zetta are the modular design, complete flexibility in screen layout and color. I like the way it works seamlessly with Wheatstone, both with Wheatnet audio drivers and with crosspoints and utility mixers. I like the ease and seamlessness of music and traffic log imports.

Zetta2Go is an out-of-the-park home run – our out-of-town voice trackers had no problems getting it to work and learning to use it. Voice tracks sound amazing!

And there are many more features that I like and I'm sure this list will grow with continued use.

All that said, there is one thing about which I am really disappointed with Zetta. You can guess what it is – exports. Zetta's metadata exports are not, in my opinion, ready for prime time. Even using a very capable middleware program like TREPlus downstream, there are still problems.

The installer and I spent several hours trying to get the pop-up metadata export, wherein you can ostensibly send a message out to the RDS and PSD, to work, but no joy. The tag that identifies the nature of the export is missing from the XML in that pop-up feature. This also applies to metadata exports in logs, what we called "Export Comment" in Nexgen. It just doesn't work. We were able to produce some XSLT code to get around this, a workaround for sure, but it did what we needed it to.

Another major gripe is that Zetta will not communicate with the Sage 3644 EAS unit like Nexgen would. That means that our engineers will have to hard wire a Wheatstone LIO to each Sage unit and then create the GPO function in Zetta. Again, why did RCS miss such a fundamental and global function that was present in its older product?

In my view, RCS needs to spend a good bit more time on the development of its GPIO integration and metadata exports. The potential for greatness is there, but it's going to take some work to give it the polish the rest of the platform has.

The only other thing I can think of is more an irritation than a dislike or disappointment. As in Nexgen, library elements are in categories: songs, spots, shows, fill, etc. The same is true in Zetta. However, "Shows" is not what it is in Nexgen. Instead, the category where long-form shows go is "Links." Huh? Apparently that is something that was brought into Zetta from GSelector. No doubt it's

going to cause some confusion for a while, but we'll get used to it.

Hopefully by next month's issue, I'll have some more insights and observations on Zetta. But for right now, overall and with the rather large exception of metadata exports, I'd say Zetta is a huge step up from Nexgen.

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

Hello to all from Western New York! For almost the entire month of January, I have been indoors due to the excessive amount of snowfall we have received. It started snowing right before Christmas, and it seems like it hasn't stopped since. To date, we have received nearly 10 feet of snow, with no immediate relief in sight.

Thankfully, we have not experienced any commercial power interruptions due to the heavy snow and winds as we have during past snowstorms. All our generators have been checked and rechecked to ensure operation should we lose power at any of our transmitter sites.

Forecasters are predicting more of the same for the month of February, but the only saving grace is that Lake Erie has finally frozen over (well, at least 80%), and that will significantly cut down the recurring lake effect snowstorms.

In mid-January, I noticed that the top beacon on tower #4 at our Hamburg transmitter site, was not blinking. I reported it to the FAA, with intentions of replacing the faulty flasher in the following days, but the weather has kept me from getting this work done. With wind chill temperatures near and sometimes below zero with snow accumulations in the tower field waist-deep in places, I called the Flight Services Center and extended the NOTAM until mid-February. Hopefully by then I can get to the tower and replace the faulty flasher.

In Rochester at DJR's WLGZ transmitter site, we use a Burk VRC-2500 for our remote control. At my last maintenance visit, I found the Dell Optiplex 780 computer that interfaces with the remote control had failed. This computer is essential to the operation of the remote control, as all calibration of readings and configuration of the remote are handled using the Lynx-5 software.

I brought the computer back to Buffalo to troubleshoot the cause of the failure. The computer would boot-up to the desktop, and seconds later would reboot on its own, over and over.

Thinking it was a switching power supply problem, I swapped out the power supply with a spare I had on hand, with the same results.

Next, I checked the cooling fan located on top of the processor heat sink. It seemed to have some drag when I would spin it with my finger, so I replaced it, thinking that the processor was shutting down due to overheating, but the computer still would not stay on.

I had saved an old Dell laptop and decided to install the Lynx-5 software on it and load the configuration files I had saved on my thumb-drive to replace the failed computer. This would have worked fine except for the fact that Burk is no longer supporting the Lynx-5 software. Therefore, they could not provide me with a license key to authorize the new install.

In desperation, I pulled the hard drive from the failed computer and installed it in another Optiplex computer I kept for a spare (hoping that the hard drive was good) and was able to get the replacement computer to boot up and run the software.

We certainly have dodged a bullet for now, but we will eventually have to replace this aging remote control system at some point in the future with a new Burk ARC Plus Touch.

In Buffalo, I have been busy getting our Nexgen computers ready for the Zetta installation sometime in the early spring. All Nexgen computers have been upgraded to Windows 11, and we have

been going through the file server, moving and saving audio files that are not essential to our operation to a backup drive. By purging these old files, it will save time (and drive space) when we get ready to convert the files to a newer system.

I have seen Zetta in action. Several years ago at one of our SBE meetings, Chris Onan did a thorough demonstration of Zetta, so I am not totally unfamiliar with the capabilities of what Zetta provides us, but I am looking forward to learning all about it before the installation begins. I'm sure that Amanda will be well versed on Zetta by the time we install it, so I will rely on her expertise and advice for any issues/questions we may have.

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!

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

Unsolved Mysteries

The usual dull gray month of January was anything but dull. Yes, we still have a few days to go as I write this, but I welcome the relative calm even if we do have snow and deep freeze to deal with.

What I'm happy about is this: our network is once again working normally! Unfortunately, it does not mean the mystery is solved. Was it Steve in the TOC with wire cutters, or was it Olivia in her apartment cutting and pasting code?

Over the years since I joined Crawford here in Detroit, I've been rebuilding and analyzing the networks at each location. I've left no stone unturned, and I'm quite pleased with the results. It's better, faster, multitudes more robust and – pardon the hyperbole – infinitely more organized.

The network's backbone, apart from the isolated Wheatnet network, is one hundred percent Ubiquiti Unifi, and I'm absolutely thrilled with their stuff. Their support, however, is a different story but not unfamiliar to anyone working within an IT environment. Suffice it to say, unless you breach their paywall with a wheelbarrow full of cash, you're condemned to chat and email support, which is free, slow and an awkward undertaking of sending files and screenshots.

Like any computer network, whether it be in your house, your business, even your car, it's all interconnected – that's the point. The problem is that when interconnected devices misbehave, they can cause myriad problems, sometimes in an instant and at a distance. Here's the story:

Unifi's integrated management platform allows the administrator to see all their Unifi devices in one place. Managing switches, routers, Wi-Fi access points, VLANs, WANs, LANs, LUNs, all managed together and all visible in a simple graphical user interface. My experience with Ubiquiti and Unifi was without complaint until... well, until I was showing my assistant Steve how I set up a VLAN.

I chose an unused port on a switch in our phone room, changed its VLAN assignment, and poof, bad things started to happen everywhere. An evil data packet traveled to several switches, unleashing gremlins all over the building. The stations' audio servers lost their connections to the database server, and we scrambled to figure out what had happened and get audio back on the air.

Once we finished restarting the audio servers and got things going again, I was left with our mystery. What happened, why, and how can I ensure that it doesn't happen again. Like any good mystery, proving who wielded the pearl handled dagger at midnight in the parlor wasn't enough. And to make matters worse, discovering a motive wouldn't help me.

I started checking everywhere to see what else could be affected and found several things. HDRadio was down, the remote-control system (we use Burk) was having trouble seeing its outboard gear and SNMP connections, and Wi-Fi was so slow that it was entirely unusable. I measured Wi-Fi speeds at well less than 1Mbps. Looking at the Unifi dashboard I instantly saw that many of the network nodes were unreachable. In the course of resetting switches I surpassed the number of DHCP addresses our router was set up to allocate so the switches all came back

up with the Ubiquiti default of 192.168.1.20 which is not even on a network we have defined.

With 290 nodes on our network, it's safe to say we rely heavily on it. After getting our studio automation system back online, I remained puzzled by the lack of Wi-Fi speed. Also bothering me was the fact that our VLAN for HDRadio which is rather delicate, was not passing data adequately. Cameras were up, internet access was up, STLs were up, streaming was up.

Reaching out for support on our Burk devices led me to a dead end, through no fault of Burk's nor their equipment. Experiments we tried yielded odd results, like the unit working fine after a factory reset and connected to the switch on the bench but failing once it was returned to the TOC.

Trying to get the Wi-Fi working again was equally frustrating. I pulled every access point down and factory reset them, to no avail.

Pinging these devices turned out to be the most telling test. Replies were either very long or intermittently timing out. Though I can't say definitively, I think there was a node somewhere on the LAN that was erroneously sending a storm of broadcast packets, meaning every other node on the LAN would have to inspect each packet and reject it, denying capacity for the devices' intended traffic. In the case of the Burk and HDRadio equipment, they have only 10 Mbps network interfaces which would easily be overwhelmed.

Also, keep in mind that a network's capacity is based on layer 1 and 2 of the OSI model and that broadcast traffic is analyzed in the 4th abstraction layer, which requires some amount of processing to actively accept or reject. On a network with certain links having capacities of 10 Gig, we can see how a broadcast storm can overwhelm lower performing network tenants.

What did I do to fix this? Well, I'm not 100% sure. I power cycled every core switch and some edge switches that seemed affected. I wiped out all my Wi-Fi networks' configurations and reset all access points to factory defaults. After rebuilding the SSID's returning the access points to service, the Unifi Wi-Fi controller which lives in the abstract of the network may have stopped erroneously repeating broadcast traffic.

Another factor was restarting and factory defaulting some of the network's switching gear. Unfortunately, Unifi doesn't let you know who has been nominated to be the Wi-Fi controller, nor does it offer a method to reset it. Also unfortunately is that the Unifi management console does not identify broadcast traffic loads or provide a detailed Spanning Tree Protocol (STP) log at the debug level I was running. Throughout this process, I did notice several ports flashing STP warnings, even though they were connected to devices that had no physical way to cause traffic loops. This might have been a clue I failed to decode early on.

The mystery may remain, but I did benefit from the harrowing experience. I learned a lot about navigating the Ubiquiti support system, for one. I also learned how to read and interpret much of the information provided on the Unifi console, and lastly, I was able to clear up some issues identified in the process.

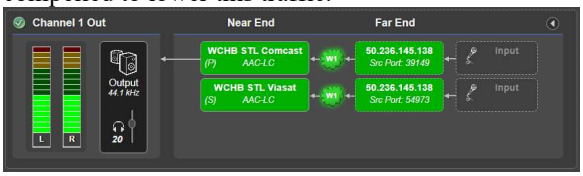
Security Camera Networking

We are all facing an inevitable eventuality: Digital video over IP. I've been transitioning all of our security cameras to IP cameras, which have a much better picture, are easier and more completely manageable, can be powered by their data cables via Power Over Ethernet or PoE, and are fast becoming the standard of the industry. The first few I installed were not a concern for our network, but as we keep changing out our analog units for IP, we are beginning to find that they generate network traffic like no other node on the network.

IP security cameras allow the recorder to commit the camera's bitstream to hard drive without an analog to digital capture means. Some recorders can handle up to 128 cameras and 288 Terabytes of storage, wow! If you think that's impressive, think about the amount of network capacity required to stream the video from all these cameras back to the network video recorder known as the NVR – massive! Add to that the fact that most cameras generate two and sometimes three different video streams for different purposes. To mitigate traffic somewhat, some cameras can be configured to use multicasting. This method allows for a given camera to be recorded by more than one recorder or sent to observer's monitors without having to generate unique data streams for each receiving node – but that's a bit beyond the scope of this article.

While endeavoring to solve the network issues talked about above, I noticed that roughly 60 Gbps was being trafficked on one network span and I was able to see that the bulk of it was security camera data. I'm really not sure if this traffic could be causing issues or if perhaps the network could handle this and more, but it seemed like a place to look. Since I have a hybrid NVR which also supports traditional coaxial cameras, I only have seven using the newer IP connection method. It seems like this

would be a cakewalk for a modern network, but I felt compelled to lower this traffic.



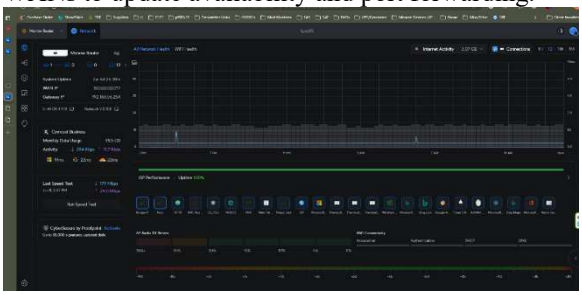
Both streams arriving via different ISPs.

Adjusting the cameras was straightforward. Several places to adjust are the method of video compression, the picture quality (4K, 2K, 1080, 720, etc.) and the especially the frames-per-second (FPS) settings. 30 FPS is way too much for a security camera, I suggest 7-10 FPS. Since most cameras support at least two different video streams, you can set up the NVR to monitor the low frame rate video and switch to a higher resolution higher frame rate stream when motion is detected. Also advisable is to segregate cameras to a VLAN so that their traffic is isolated and on a different broadcast domain. I may attempt this and report on it next month.

STL Rejiggering

As part of my network work, I decided to ditch the varied network routers living at the transmitter sites in favor of Ubiquiti Unifi UCG Ultra cloud gateways. These are dual WAN capable and are managed via the Unifi Portal which is where I also manage the network at the studio building.

Now each network has a common management platform where I can see multitudes of information. Everything from ISP status on my WANs to update availability and port forwarding.



The USG Ultra Dashboard

Also, the UCG Ultra supports WireGuard VPNs, so every site now has a VPN. The VPN allows me to jump on the network at any site just as if I were sitting there, which is a huge advantage especially since one of our sites is 80 miles from my home.

The UCG Ultra also gives me real-time status of our networks and considering that each of our transmitter sites relies on audio delivered via the public internet, I need to know if something goes down. Nothing worse than needing your backup only to find that it too has gone down.

The inexpensive UCG Ultra can switch traffic between ISPs, allows port forwarding based on one or both WANs and has rules-based security. The dashboard shows you at a glance how your network is performing, configured, and who or what is using it. The USG Ultra allowed me to send two streams from one of our CODECs, one via each ISP, and with this, should one ISP fail, audio should remain uninterrupted.

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

I know a number of you will get a chuckle from this, but The South™ is not built to handle ice or snow conditions. If the white stuff starts to fall, people around here lose their ever-loving minds. The TV news will always have the obligatory picture of the grocery store with no bread on the shelves and the milk supply emptied from their coolers.

If we ever had something that rivaled what happens in Buffalo, Denver, Detroit or Chicago, we would be in a world of hurt here. There is simply no reason to stockpile the resources to fight an event that occurs once every three to five years.

Oddly enough, this year, we have seen two separate weather fronts that produced snow in January. One dropped some snow on northern Alabama into Birmingham that I had to watch our transmitters closely over.

The other front brought snow to south Alabama and the northern panhandle of Florida, and the northern part of Alabama was bypassed completely. I've got family in Panama City and the last time it snowed there was 1989 – they got about three inches of snow this year!

The classic Job 38 verse, "Have you entered the storehouses of snow or observed the storehouses of hail, which I reserve for times of trouble?" comes to mind.

Thanks to all of you that deal with it on a regular, seasonal basis for allowing me to brighten your day with troubling stories about when we get three inches of snow here in Birmingham.

Updating for RCS Zetta

One of the many things that need to be done before Zetta comes rolling in the door in March is that we have to update all of our Nexgen workstations from Windows 10 to Windows 11. Call it what you will, but I've always had "trust" issues with upgrading to the next new Windows version, especially when there don't appear to be many feature upgrades between the two operating systems.

Also, engineering-wise, when things are running as they are supposed to, you generally back away slowly unless you have a need to upgrade to a new firmware or software package. All of our workstations were all running Windows 10, but with Zetta coming, all of them have to be upgraded to Windows 11.

Jack and I spent a couple days last week getting the studio and production machines upgraded. As I'm writing this in the last week of January, we're going to focus on the machines in our TOC.

So far, the upgrades have gone without incident. Most of the machines were able to simply go through the Windows update channel to get the latest version of Windows 11 (24H2) on them. Only one machine would not update, and I eventually forced the update with the latest Windows 11 ISO from the Microsoft download site.

Of course, Nexgen and any other settings that were needed for the machine were placed back on the system, but the choice for me became, "How much time should this really take versus should I just get the sledge hammer out?" We were upgrading all the others within an hour, so the time frame was set. Once I got beyond that window, the brute force method became the way to do it.

After each was upgraded correctly, I also went into each and made sure to get rid of apps that were installed that we'll never need. Things like Xbox, any Microsoft extras and even things that are paid for by third party vendors like Linked In needed to go. The only thing that those extras accomplish is slowing down the primary function of the machines and that is to run Nexgen/Zetta and I'll take every performance enhancement I can get.

Backing Up

Maybe you have never had to try and recover important information from a computer hard drive like documents or audio-visual media because the drive failed or windows simply "misplaced" it. To be honest, I'm surprised that it doesn't happen more than it does. That fact is likely a testament to how good the magnetic storage technology on hard drives has gotten over the years. Between hard drive failures, OS foibles, or the possibility of ransomware

attacks, it is imperative that you have a backup plan for any data that you have charge over.

In information technology circles, the hard and fast rule for backing up any important data is called the 3, 2, 1 rule – three copies of your data, stored on two separate types of media, with one copy being off site.

One of the things I hear over and over as I watch some channels about computer technology I follow on YouTube and read about data backup is that "Hardware or Software RAID (Redundant Array of Independent Disks) is not a backup." While it is great for redundancy on a single system and certainly protects data by copying among multiple drives, it is not a true backup.

Here in Birmingham, we have a primary and a secondary file server of our Nexgen system, with two mirrored disks each (a RAID 0), and once a week, we make a backup to an external USB drive. We have two separate drives so that we alternate the backups between the two devices. Those external drives also allow us to take the backups off-site.

Once Zetta is in place, Cris has contracted with RCS to put all our systems on Zetta Cloud – a true off-site backup of our file server data. Once the service is in place, we'll be pushing incremental changes that happen on our servers to their backup servers.

In the event of catastrophic failure of a studio database, we could place an internet connected Zetta workstation at our tower sites and their Zetta cloud service would push the data to that machine. This would allow us to keep on generating audio while we get our studio situations back in order.

There is so much to unpack regarding information backups that it is hard to put into a couple of paragraphs. There are certainly some Network Attached Storage (NAS) systems that you can purchase where you simply supply the blank hard drives, and with a little bit of directed setup from their embedded firmware, their software simply does the work of backing up data from any data source on the network. There are a lot of these type of systems from makers like Synology, QNAP, AsusStor, TerraMaster, Buffalo, and others. Each have multiple drive setups that would allow you to "hot-swap" a drive if one goes bad.

These systems can get expensive, especially when you begin to add bigger capacity hard drives, but the nice thing is that they are almost set-and-forget appliances, and you can easily tell the device to backup shared folders in multiple places on your network at prescribed intervals and it will do it.

There are also open-source solutions that will do the same thing. Do you have a computer lying around that you aren't using anymore? They are perfect candidates for NAS software. In fact, laptops are perfect candidates for something like this. Think about it, everything, including a battery backup, is built in already. This is one instance where an older computer with really modest resources is perfect for the task at hand.

A couple of names to look for if you're interested in a solution like this are TrueNAS and OpenMediaVault. TrueNAS has two variants, one called Core that is based on BSD and one called Scale that is based on Linux. OpenMediaVault is strictly Linux based. Both have some software add-ons (Syncthing comes to mind) that allow them to do exactly what the purchased ones do above-schedule and manage backups without having to think about it.

I 3D printed a case, but you can use a regular case (or laptop) to achieve the same result.

Recently, I made a purchase on an eBay auction that included a motherboard, 8th gen Intel processor and cooler, 16 Gb of RAM, a 240 Gb SSD hard drive, a 1 Gb video card and 300 Watt power supply for total of $90. All the hardware (and the price!!) was perfect for my NAS project. The only thing I needed was a case, and I 3D printed a free model that I found online that will hold an additional four drives for an ideal NAS.

I'm planning on dropping TrueNAS on the SSD hard drive and having four additional drives in a RAID that will give me about six terabytes of storage overall. You may have the same kind of hardware laying around and there is plenty of information available that will help you get it configured exactly as you need it for your very own NAS solution.

Until we visit again next month, may God bless the work of your hands.

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

January was notable for several events. First, I turned 69 years old, solidly anchoring myself in the "Get Off My Lawn!" generation. Another year around the Son!

Second, we had snow and ice (Figure 1) twice. The first time was only a few inches, but the second storm was unusual in that the worst icing curved up through the South. My brother lives on the Crystal Coast of NC, and he received four inches, which is unheard of out there.

Third, President Trump was inaugurated and immediately began addressing his campaign promises. Those who don't like the man can't understand why some of us are so delighted with him, but there you go. No "studies," no Congressional inquiries; just gitterdid. Trump has even mused about sending those 90,000 new IRS workers down to help secure the southern border. I laughed out loud on that one.

Figure 1 - More snow in Alabama (and elsewhere)!

Fourth and finally, companies large and small continue to be hammered by ransomware. I've lost track and I've lost count. I am now enrolled in more than one credit monitoring/protection service, the most recent a freebie from Ascension Health. Folks, if you aren't doing off-site backups, using good anti-malware and taking other steps to protect yourself, you need to git jiggy wid'it (to use a popular phrase from a few years ago).

Choices

When it comes to computing in general, all of the available options make me feel like a midget in one of those "big and tall" men's stores. Do I go "Cloud" or stay local? Which OS do I use? Which device: PC with Windows, or an iMac? Which office suite, which database? Which programming language?

AI is the current darling, and I admit that it seems to be getting better. But it still has a ways to go. Recent studies have shown that AI-generated program code can have significant errors about half of the time. I've run across that myself. No, the biggest problems facing the Cloud, AI and online search in general, involve the huge datacenters that are needed. The average user has no idea of what is required to satisfy a simple search query. See Figure 2, a view inside a portion of a Bing Maps datacenter.

A typical system is based on distributed computing: many individual computers that are networked together to share tasks. All so-called "supercomputers" use this approach now. Specially-written management software that knows how to distribute jobs to different units can greatly increase the speed of computation. (My neckbeard tried to grow out when I typed that last sentence, by the way.)

Worldwide, at this writing, there are over 10,000 such datacenters (over 5,300 in the US alone), with more being built daily. However it's done, though, there are some real problems to be overcome, and things that, to be honest, I hadn't stopped to ponder until recently.

Cooling

I'm rebuilding an older computer with the latest Core i5 processor, faster RAM and solid-state drive. I already know about cooling; fans, heat sinks —- you can't build a PC without the stuff needed to keep the other stuff from getting hot. But glance again at Figure 2 (and remember, that's just a portion of one datacenter!). Can you imagine the cooling

Figure 2 - We just need to find that one bad connection ...

requirements for hundreds or thousands of individual computers? Fans alone won't do it. All they do is move the heat from inside the box into the building, where it has to be removed by something else. In your home, this would be your heat pump.

Large datacenters require a huge outlay of money, and not just for the real estate. The computers themselves are a modest expense. As I've mentioned here before, many of these datacenters are built using commodity, off-the-shelf components.

But to handle the heat, some of the largest have turned to water cooling, built near lakes and rivers, with giant cooling towers. I've read of anywhere from 500,000 gallons to 5 millions gallons of water per day being used for cooling a datacenter!

My irony-poor blood is nourished by the thought that many of the same high-tech crowd that holler about climate change and global warming will publish their concerns onto the Internet through these huge, sprawling, heat-generating, water-cooled data farms. You can't make up this stuff.

Energy

This is the next bugaboo. Your typical desktop PC will draw a few hundred watts of power, depending on the task load. Gamers can easily use many times more, especially with overclocked processors and the latest Graphics Processing Units (GPUs), some of which are now eating more than 1 kilowatt by themselves. (That's not a misprint.) Even if you take the lowest numbers, multiply that by the hundreds or thousands of PCs in a typical datacenter and you'll see the problem.

Forget electric vehicles. They're yesterday's news. Figure 3 shows part of the utility supply for one of Google's datacenters, by no means their largest. The power companies warn that they're going to be overwhelmed if these huge clusters keep coming online. Georgia Power, a sister company to my own Alabama Power, just said that they may raise rates to meet the growing demand. Google "datacenter cooling" and "datacenter power usage" for all the information that you could want.

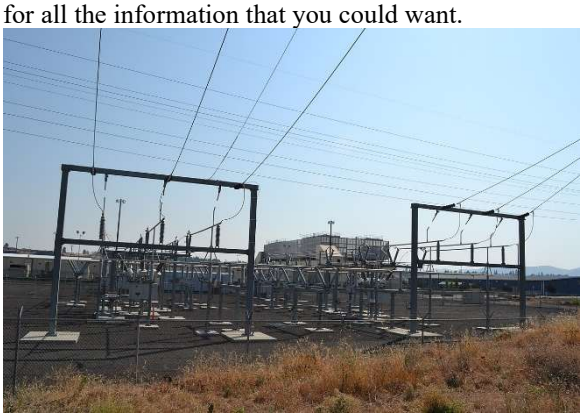


Figure 3 - Power for a Google datacenter in Oregon.

Other Issues ...

The Zetta upgrade in Denver has caused us to delay our mail server switchover. I'm still working on it, of course, and I monitor the thing constantly. I also do regular backups of the entire mail "store" (i.e., all email, user names, and so on). But I'm still anxious to get this done.

On the SNMP front: for simple SET commands, it's a no-brainer. We can simply tell the Burk to send a particular OID string. GET, is more work. The data being transferred is in a Basic Encoding Rules (BER) format, which has to be parsed and some values recalculated. But soon, Lord willing, all of our older Nautels, among other things, can have an embedded Raspberry Pi handling SNMP communications. (My neckbeard just grew again.)

As I said last month, anytime you see that "S" for Simple in an acronym, you should put on your helmet because it'll be anything but "simple." SNMP has actually been around for decades and the Management Information Base (MIB) is based on some older specifications, including SMIv2 (Structure of Management Information, version 2), which is a subset of ASN.1, which stands for "Abstract Syntax Notation, version 1." (I feel like I need to shave now.)

Y'all have a good 'un and stay blessed. Most importantly, until next time, keep praying for this nation.

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

A few weeks ago, I woke up to around 50 email alarms. Not exactly the way you want to start your day. All the alarms came from the Nielsen PPM Multi-Channel Encoding Monitor that monitors our internet streams.

The first thing I did was to confirm if the streams were actually down. After figuring out that the streams were actually on, I eventually diagnosed that the problem was that Nielsen PPM Multi-Channel Encoding Monitor or MCEM, was not getting audio.

The MCEM is fed audio for each station from Inovonics 610 Internet Radio Monitors. The issue seemed to lie with these units. It was strange that all four of these went down at the same time. It had to be something external to them.

Since I could bring up their Web GUI, the network was not an issue. I began to wonder if the firewall we installed at the end of the year might have stopped the data traffic from getting to the units. It had already been in place for a couple of months, so it didn't seem likely. Still, it was worth a check.

When I logged into the PfSense firewall, I did see that there was traffic being stopped to the Inovonics 610 units. I tried using the "Easy Rule" feature in PfSense, which essentially tells the firewall to stop blocking the traffic it is blocking to that IP address. This didn't fix the issue. I then turned to Todd Dixon, the guru of PfSense in the Crawford Broadcasting Company.

He saw the same things I was seeing, but we couldn't really see why it was stopping the URLs from getting through. Earlier, I had tried the URLs on my desktop computer on the exact same subnet and the link would bring up the streams on my computer just fine.

While Todd and I were looking at the issue, I went into one of the Inovonics 610's network configuration and I noted that the Internet Radio Monitor only allowed one entry for a DNS Server. In this instance, we were using the main Comcast DNS static IP address. We have been using this address for DNS for more than ten years and on lots of computers and equipment where we used static IP addresses, and we really had never had any issues. We often used a combination of the Comcast and Google DNS servers when it was possible to enter two or more servers.

It was a bit of a lark, but I decided to change the DNS server from Comcast to Google. Within 30 seconds, the stream was once again connected to the Inovonics Internet Radio Monitor. I felt bad that I wasted Todd's time, but I was glad to see it working again.

As you might imagine, we might have other issues show up. One of the first things we noticed was that our NexGen timekeeping computer was off on time. The time sync software was displaying a message that it was unable to connect to the time servers. I checked the DNS entry in the network setting and sure enough, it was only the Comcast DNS Server. Once changed to Google's DNS, the time sync started working again.

We also had a Burk ARC Plus Touch not sending us a notification of a generator exercising as expected, and it was also the same problem. One DNS entry was allowed and it was pointing to Comcast.

So, we are going to have to check a lot of equipment to see what is still pointing to the Comcast DNS server. It would be nice if Comcast had let us know that they were making a change or having issues.

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

As I write this, January is coming to a close. Last night I was eating dinner with my husband, and it dawned on me, it's already the end of the month. By the time many of you read this, it will be over. I feel like I was just on vacation between Christmas and New Year.

January has been a somewhat busy month. The move to Zetta is upon us. NexGen is what I started on in 2002 when I was inputting all the weekend infomercials on 670 KLTT. I know it like the back of my hand. It's bittersweet to know that it is going away. Don't get me wrong – it needs to go away. Zetta is a much better product, but it is a new product and the idea of having to learn something new is almost overwhelming.

Zetta

As I just mentioned, Zetta is here. RCS started the conversion on Monday, January 13th. They worked remotely that week and got all our audio converted over and imported into Zetta on the file server.

Scott Wells came into town the next Monday to begin the hard work. The hope was to get two stations done and then the final two done the next week. It has been a very slow process to say the least.

We got KLVZ switched over to Zetta on Wednesday the 22nd. Then issues began happening. First was the metadata export. We got the stream working, which was the most important thing for reporting purposes. But we wanted the HD PSD and the RDS to work. Scott spent a full day trying to get things done. He was able to get the RDS working after a fashion, but for PSD, we found that Zetta cannot do that export. We purchased a TREPlus license.

Some other odd issues… The first really isn't a Zetta issue, although it may be. I forgot, when I installed three new control room computers, to do all the stuff Wheatstone says in their Optimizing Windows for AoIP guide. How could I possibly forget that? One of the machines has been giving us grief since it was installed. Losing its way to the Wheatnet side of things. I wouldn't get an error saying it couldn't find the license server, but that is exactly what it acted like.

I think this may have been a firewall issue. Had I done what the guide said, I would've already forced both NIC's in the computer over to a private network instead of the public one it kept defaulting to. It is my hope that this will prevent ESET from seeing it as a public network and blocking it, despite all the rules I've added.

Another issue we had on that control room workstation was that with Zetta completely shut down, we could play website, YouTube or other audio from the machine through Wheatnet. But once Zetta would start, all the audio would go away. Scott did something and got it working again. Hopefully we won't have to deal with the problem in any other rooms. We obviously don't want to be dealing with a bunch of issues from different stations, so we need to get one room fully operational, then move on to the next.

With all the issues, at this writing, 2-1/2 weeks into the process, we still have just one station on Zetta with the other three having half a week to get changed over. It is a bit overwhelming since we have the other three stations, three production rooms, and more training that we need to get done in about three days.

Cambium Woes

We continue to have sporadic connection issues with our Cambium link to the KLDC transmitter site. The ethernet will quit working randomly. Thankfully I still have an RF link, but no data throughput to/from the site. We went out and replaced the Ethernet jack on the isocoil on the tower. This is the one that, due to condensation, got fried back in November. After we replaced it, we had a few more disconnects but it's been solid for about a

week now. Thankfully, our backup internet has also become stable again. I've made it a habit to check it every day or so just to be sure. I'm sure at some point I won't feel the need to constantly check it.

Coming Up

We must get this Zetta install completed still. I am still very nervous about the whole thing but I'm sure that by the next *Local Oscillator*, I will be either singing its praises or complaining about it a lot. Once the transition is complete, I might finally have time to sit down and get our FTP stuff automated more so that it is less work for our people in Denver. I have messed around a little bit here and there, but it is a bit complicated. I'm hoping with Zetta that it will be much easier.

I also need to spend some time at the various transmitter sites. We've had some severe cold weather as well as snow and that will typically mess with the tower parameters. This week is supposed to be warmer so I'm hoping things will come back to normal. Otherwise, I'll be going to the sites to clean up and get it all right on point for the parameters.

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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