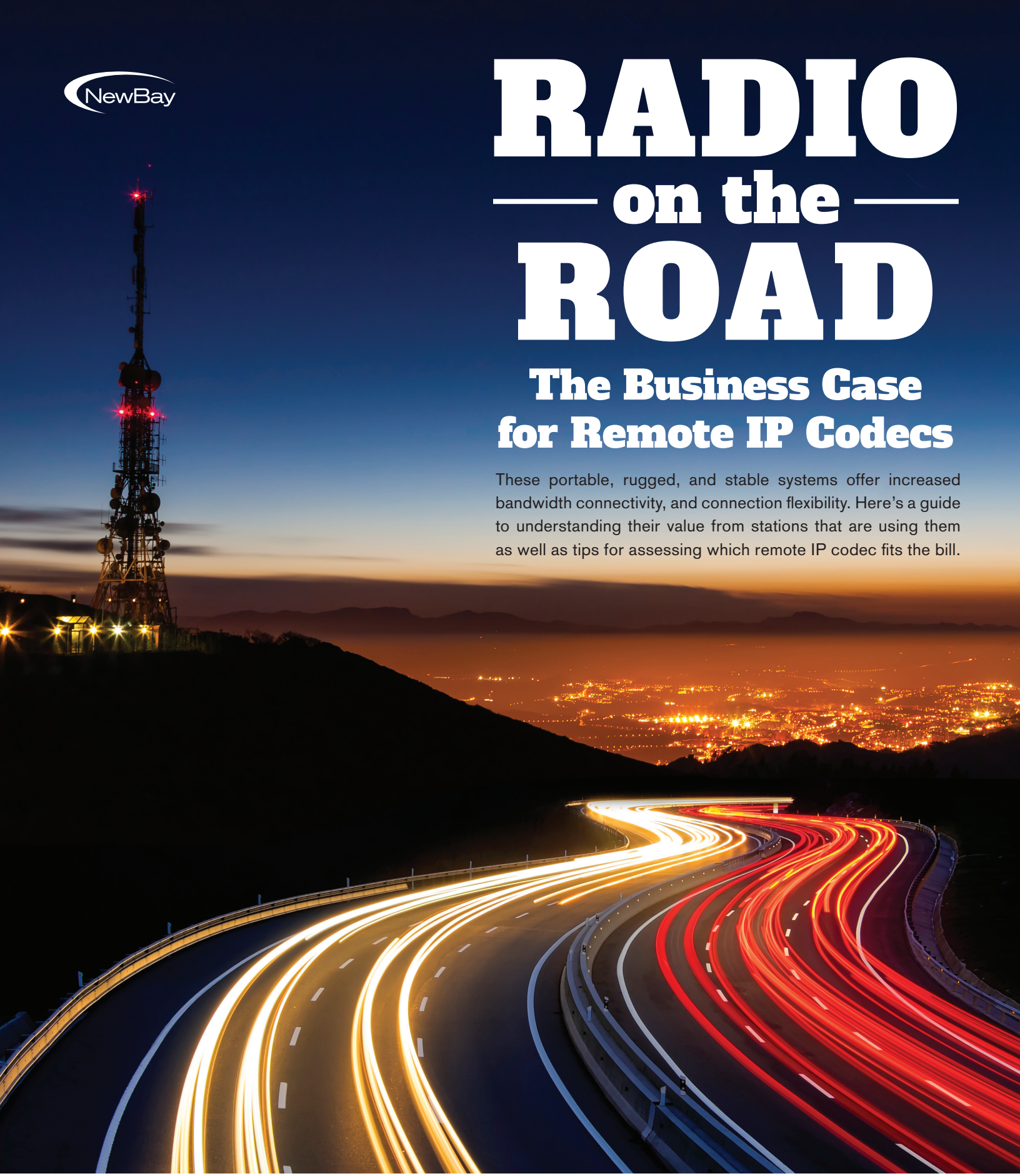
NewBay

RADIO on the ROAD

The Business Case for Remote IP Codecs

These portable, rugged, and stable systems offer increased bandwidth connectivity, and connection flexibility. Here's a guide to understanding their value from stations that are using them as well as tips for assessing which remote IP codec fits the bill.



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Tieline® The Codec Company

Here's Why Radio is Turning to IP for Remote Broadcasts

Crocmedia Broadcasting knows all too well the pressures of radio broadcasting on the big stage.

As an Australian broadcaster flying 14,000 miles to cover the year's ultimate football game, concerns over connectivity, reliability, security and cost were paramount. There was no bigger test for George Biagioni, Crocmedia IT broadcast engineering director, than when he decided to road test a portable IP codec package on radio row in Houston in February 2017.

With two broadcasters in Texas and another announcer back in Melbourne, "we needed very low latency audio communications between Melbourne and Houston to make it work," Biagioni says.

The solution ensuring this success are new IP-based networking technologies crowned by remote IP audio codecs. Today, legacy networking technologies like POTS and ISDN are making way for IP, which is proving to be a predominant way to transport remote broadcast audio.

Just ask Crocmedia, whose show hinged on the chemistry the announcers have with one another. As the hosts bounced comments instinctively off one other, the remote codec in Houston connected faultlessly to the distribution codec back in Melbourne. "It never missed a beat," Biagioni says, "and delivered imperceptibly low latency audio over IP for several hours of broadcasting."

The IP-based systems used by Crocmedia and other radio broadcasters are helping stations to cover major league sporting events on the world's stage, to deliver play-by-play high-school basketball games, and to provide a lifeline to remote towns in the US and Australia.

This ebook from *Radio World* and Tieline will look at some of those real-world examples and explore both the challenges that radio broadcasters are facing and the benefits to transitioning to remote IP audio codec technology.

For broadcasters who have made the transition, the strengths of investing in an IP-based networking technology are clear. Crocmedia points, for example, to the technology's multiple connectivity options. "We can stream using USB modems, Wi-Fi, or Ethernet connections, so every option is covered," Biagioni says. The extended battery capability of the ViA codec that Crocmedia uses is also key.

"We are constantly doing live remote broadcasts, and [this technology] offers the flexibility we require to stream from dozens of locations," Biagioni says.

For radio broadcasters, IP remote codec technology has moved to the forefront. This ebook will offer guidance on:

- Why IP is the network of choice for broadcasters looking for reliable and high-quality audio connectivity
- Why radio stations are choosing to deploy IP audio codec technology in the field
- How new IP codec systems are helping stations cover both remote and major events

On page 3, the general manager of an AM station in Crookston, Minnesota, reveals how this technology has improved audio quality, cut costs, and provided the flexibility to connect via multiple networks as needed.

Likewise, on page 4, the Black Star network shares how indigenous radio programming is being broadcast to 15 remote communities in North Queensland, Australia—despite the regularly flooded cellular network on-site and concerns over battery life in the Australian Outback.

Entercom Communications shares on page 5 how IP audio codec technology came to the rescue during the World Series when the sports talk station KCSP(AM)—the flagship station of the Kansas City Royals—was unable to establish anything better than a POTS-quality connection out of state.

Finally, on page 6, in "Selecting the Right Remote IP Codec for Your Station," our partner Tieline presents its perspective on the remote IP codec opportunity in a sponsored white paper that details the key product capabilities that any radio station should consider as they evaluate this new technology. Read on to learn more.

Paul McLane
Editor in Chief/Editorial Director
Radio World

KROX Goes Live ViA Tieline

Ease of use and reliability keep the signal on the air.

By Chris Fee, President/General Manager, KROX(AM)

CROOKSTON, Minn. — I have always been passionate about sports; and radio has been in my blood since I graduated from Bemidji State University in 2000 after studying mass communications and coaching. I started my radio career at KROX(AM) with part-time announcing while in high school and college, and after graduating college, I came home to work full-time. I love doing play-by-play sports commentary for basketball, football, volleyball, hockey, wrestling, baseball and softball, which is my passion.

Four years ago, I bought the station from my father.

CONNECTIONS

At KROX, we have been using the Tieline i-Mix G3 mixer/codec for about five years, and while sports mixers are good pieces of equipment and sound good, the i-Mix and now the ViA codec are on another level when it comes to quality. They make it sound like you are calling the game from the studio.

In reviewing Tieline's ViA, I'll start by saying it's nice and compact and easy to use. The touchscreen and menus are a step up from the i-Mix and are simple to navigate and intuitive. The input and headphone controls are also easy to access and adjust.

I don't have a technical background but ViA is so simple to configure I can do it on my own. We had our engineer do the initial setup with the i-Mix G3 and when we got the Tieline ViA we just dialed and it worked.

The ease of using the ViA is second to none, and the ability to use its built-in Wi-Fi, an IP LAN or a phone line at a venue covers all our options. A couple of seconds is all it takes to connect the codec to a Wi-Fi access point, and we have successfully streamed live from various schools and colleges. In places without phone lines, a LAN or Wi-Fi, I have even used the hotspot on my phone to broadcast the game and it is crystal clear, studio-sound quality. It is amazing.

Scott Kleven (left) and Frank Fee doing a high school hockey game using the VIA.

Although I wasn't familiar with the codec initially, I was able to make a connection to our Commander G3 studio codec quickly and easily. The touchscreen clearly displays send and return PPMs, and you can swipe to view connection info and IP statistics.

We connect in stereo over IP and send a mix-minus from the studio to our announcers at the remote site. We stream using Tieline Music with a bitrate of at least 64 kbps when we connect over wired IP and when the wireless network supports that bitrate.

Tieline's automatic jitter buffer settings allow us to talk to the studio in real time. The auto jitter adjustment measures network capability to reduce latency to the lowest level the network can reliably support. Total latency is never more than 100 ms.

I love broadcasting over IP. It is pretty much foolproof, and we have never had a drop or anything while using IP. It makes life a lot easier and is one less thing to worry about in the age of disappearing phone lines. Not having to deal with our telco as much has also been welcome. With IP, we are saving on telephone line costs and sound better on our remotes, which only helps sales.

The ViA codec is a tremendous upgrade to anything we have used. We added an FM translator over a year ago so people are really noticing the difference when we use the ViA and i-Mix compared to sport mixer games over a phone line or cellphone.

Since we started using the Tieline codecs many listeners have told us that our broadcasts have improved and now sound crystal-clear, and that's awesome. We also had an advertiser tell us our remotes sound great.

So far we have used ViA for play-by-play sports coverage, live remotes from stores, Christmas concerts and other live events throughout the year. It's trouble-free every time we take it out and we are talking about buying another one already.

For information, contact Dawn Shewmaker at Tieline USA in Indiana at (317) 845-8000 or visit www.tieline.com.

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Black Star Launches Cooktown Radio Station with ViA

By Gerry Pyne

Gerry Pyne is General Manager of Queensland Remote Aboriginal Media (QRAM), which runs the Black Star radio network and transmits indigenous radio programming to 15 remote communities in far North Queensland, Australia.

I started my career as a technical officer with the main telco in Australia in the late 1970s, before completing electronics and electrical engineering qualifications and moving into community radio in Victoria, and then commercial radio in north Queensland. About 20 years ago I oversaw the creation of the National Indigenous Radio Service in Brisbane and since 2010 I have been responsible for setting up and maintaining technical services for the Black Star radio network.

Black Star plays an important role in regional Queensland by distributing local content to 15 stations in the network across North Queensland. We syndicate radio programming and each market receives local news and weather reports, with up-to-date cyclone warnings and community service announcements. In most of these communities we are the only station delivering local content and as a result we are seen as a breath of fresh air.

We stream music updates and other program content from Cairns to a data centre in Sydney each day over a WAN. We then use local Zetta playout machines at each site to deliver locally branded content at each location.

On 16th September we launched Cooktown 96.9FM on the Cape York Peninsula. To celebrate we went on the road to broadcast live from Cooktown at two locations using our new Tieline ViA portable codec.

We were the first Australian broadcaster to receive the new ViA codec and I was very excited to road test the new unit. The first thing I noticed was how easy it is to setup. The touch screen menus are so simple to use that you don't even have to open a manual to get up and running. I tested ViA thoroughly using a Telstra supplied Huawei E8372h-608 USB modem and it was very solid streaming over IP.

Announcer Greg Reid (left) interviews local residents in Cooktown.

Our first broadcast with ViA was from outside a local business sponsor, "The Lure Shop", to promote the new Black Star radio service in Cooktown. Our announcer Greg Reid is well known on the Cape and he interviewed local identities throughout the 3 hour broadcast.

Cooktown is a small town and on most days the cellular network was flooded and can be very unreliable. We decided to use an ADSL IP link which was also pretty slow, but we used Tieline's low bit-rate Music algorithm with automatic jitter buffering and connected very reliably with no packet loss. I was super impressed by the codec's performance.

We were overwhelmed by the response to the broadcast and it was one of the best I have been involved in. The take-up of radio is amazing in Cooktown and everyone seemed to be listening to the show. We had packed school buses stop to greet us, and we had visits from the ranger's office, council workers and the general public.

With ViA you can literally arrive minutes before a broadcast, set up the headset mics, check the connection and go live. There's no need for a truck with loads of equipment any more. ViA has an internal battery which lasts for several hours and if you are using the 12 volt power supply it's also a great backup if external power is lost. We connected in seconds to a Commander G3 at our hub studio at Black Star Central in Cairns and used a laptop with Teamviewer to monitor and control our RCS Zetta playout system.

Overall the ViA codec performed perfectly to ensure the broadcasts were a huge success. In the bush you don't have much choice when it comes to technologies, so the fact that ViA can use cellular, Wi-Fi, and LAN connections delivers the flexibility we require. Black Star looks forward to taking this technology to other communities and adding a new dimension to local broadcasting throughout the network.

For information, contact Charlie Gawley at +61-8-9249 6688 or visit www.tieline.com.

Tieline Hits Home Run for Entercom KC

By John Morris, Assistant Chief Engineer, Entercom Communications

KANSAS CITY, Mo. — Our Entercom stations own Tieline Merlin and Commander G3 rack-mount and remote codecs, as well as some older Commander G1 POTS codecs and multiple Report-IT Enterprise user accounts.

Tieline codecs are an integral part of our setup, and we use them for a variety of broadcasts, including remote location news, sports events and talk shows. We also use Tieline gear for commercial client drop-in remotes, and we have used a pair of Tieline Commanders in IP mode as a backup STL.


Entercom's John Morris with the Tieline Merlin codec

Our Tielines are used frequently for sports play-by-play, and we still connect over POTS; however, lately, we have been using IP more often.

RESCUE

In fact we had a situation recently where Tieline came to the rescue during the World Series between the Kansas City Royals and the New York Mets at Citi Field in New York. We were about to use some non-Tieline ISDN codecs to broadcast the game on KCSP(AM), our sports talk station and the flagship station of the Royals in Kansas City, but were unable to establish anything better than a POTS-quality connection out of state.

We called Don Free, who is the engineer for the Kansas City Royals Radio Network and he had a Tieline Commander G3 unit that we asked him to try instead over IP. He connected it to the stadium LAN and dialled into our Kansas City Merlin codec and it hooked up immediately, so it was used as the primary link for the game. We routed studio communications and a mix-minus feed back to the stadium by assigning a channel in our studio's Wheatstone console to the Merlin codec's input. The broadcast sounded great and was definitely comparable to ISDN-quality.

It's not the first time this has happened to us and is occurring with increasing frequency. It appears ISDN problems are more numerous when calling out of state. Recently, I set up a remote broadcast for a guest on a network show on the West Coast. The remote engineer could not connect over ISDN if he called from there, but I could call him successfully. He told me that this had been a problem at his end for a while. Like us, he could get a local connection at full bandwidth but could not get the carriers to talk above POTS-quality out of state.

Due to the phasing out of ISDN, it's becoming a pain to get ISDN lines installed, and it's getting prohibitively expensive. Our in-house carrier changed hands recently and subsequently our bandwidth issues started increasing. After several weeks we still don't have ISDN long distance-capability through this company. I've had assurances their techs would get back to us and so far, nada. Nice "on hold" music, I'll give 'em that!

When I started with Entercom, we were doing Marti shoots with vans and UHF antennas on deployable masts. POTS codecs were a revelation and definitely safer. These days with POTS there are numerous issues, such as difficulty obtaining a dedicated line at the venue, the cost of line installation and bandwidth issues. Plus it's often tough to get a phone jack handy at a remote venue, which often necessitates a 200-foot run down a hall to the "D mark" using all your JK line and in the process creating a trip hazard!

As for IP:

- IP is pretty ubiquitous and it's now at most locations with a jack handy.
- IP bandwidth is usually no problem and it's more stable.
- IP is cheaper and the boss certainly likes that!

The Tieline codecs saved the day for our World Series broadcast and in my opinion IP is now starting to lead the way. The connection was rock-solid and sounded great. All of our engineers find Tieline codecs easy to operate and configure and overall there's less of a learning curve with the Tieline product — which is a big win!

For information, contact Dawn Shewmaker at Tieline USA in Indiana at (317) 845-8000 or visit www.tieline.com.

SELECTING THE RIGHT REMOTE IP CODEC FOR YOUR STATION

There's a reason why radio broadcasters are heading into the field with the next generation of IP remote codecs at their side. These portable, rugged, and stable systems offer increased bandwidth connectivity, network options, and connection flexibility. Here's a guide to understanding their value and assessing which remote IP codec fits the bill.

Introduction

Both inside the studio and out in the field, IP is driving a new revolution in radio. While ISDN and POTS technologies have proven reliable in the past, new IP-based technologies are offering connection flexibility, increased bandwidth connectivity, functionality in remote locations, and network options.

Where is this revolution taking place? Out on the road, as more broadcasters are making the IP transition with IP remote codecs for live remote broadcasts. The newest solutions—a combination mixer, router, and IP codec—are lightweight, portable devices that have been compared to a full remote truck in a box, with their flexible connection options and myriad audio processing solutions.

Major broadcasters like Entercom Communications and The Dan Patrick Show have already adopted IP remote codec technology. They point to the cost savings and efficiencies that come from operating on a flexible and reliable IP-based infrastructure while in the field.

Any broadcasters considering the adoption of IP radio codecs should consider the technology's capabilities and ask potential suppliers frank questions about security, network options, and redundant streaming operations.

What follows is a business case primer for making the decision to migrate your remote radio broadcast to IP.

Issues and Challenges Experienced by Remote Broadcasters

In days of yore, a radio station looking to differentiate itself with a live remote radio pickup had one option: regular old dial-up. Then ISDN entered the fray with considerable improvements over POTS and its traditional bandwidth limitations. ISDN offered dedicated bandwidth capability that ensured that audio was generally delivered without compromise.

But issues have arisen with circuit-switched networks like ISDN as well, including rising costs and lack of availability as fewer new venues invest in ISDN lines.

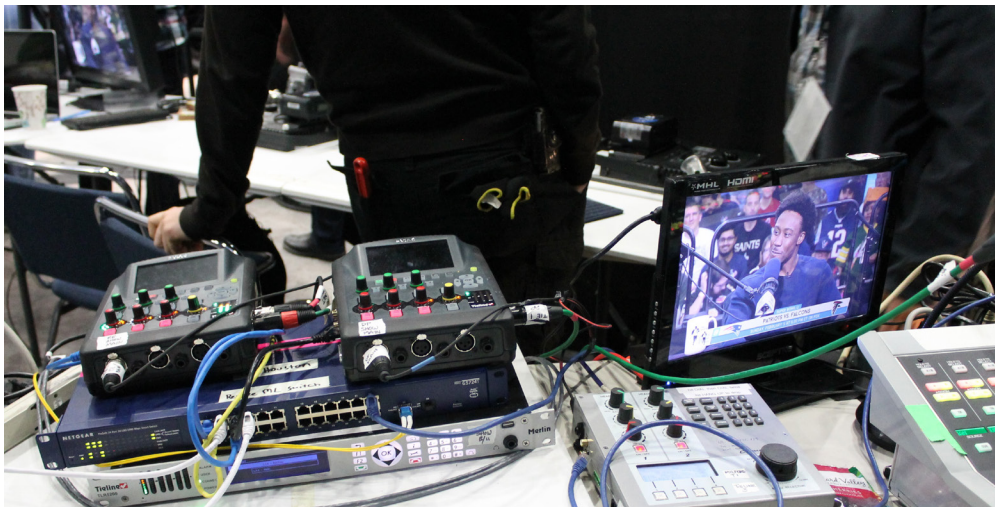
Yet despite IP's benefits, IP codec technology has not been uniformly adopted. When it comes to adopting a new networking infrastructure, broadcasters have raised legitimate questions—about IP-over-network availability, about whether IP can truly safeguard remote delivery on an everyday basis, and about functionality.

Today, however, forward-thinking radio stations are looking at IP-based technology for remote operations for several reasons, including:

- Reliability
- Clarity
- Cost savings
- Connection flexibility
- Ease of use
- Functionality in remote locations
- Increased bandwidth connectivity
- Network interoperability and backup

How IP Technology Improves Broadcasts and the Bottom Line

For one broadcaster, adoption of IP technology was vital to competing on one of the biggest stages in the sporting world.



Tieline ViA, Merlin and Commander codecs used to broadcast the Dan Patrick and Rich Eisen Shows

The Dan Patrick Show had a challenge. For more than 18 years, the syndicated radio and television sports program has been hosted by former ESPN personality Dan Patrick. The program has covered the biggest sporting events in the nation with a roster of guests that include NFL players, commentators, and team owners. In February 2017, the show was tasked with setting up a full seven-day remote before the crowning of the nation's football champion.

From Left to Right: Ryan Quarles, Kentucky Commissioner of Agriculture and Mike Adams, host of AgriTalk broadcasting with the ViA.

Even in the simplest scenarios, radio remotes in new locations are challenging. And this show is as technical as a technical gets, with Dan and four co-hosts talking via individual mic on/off/cough panels with a talkback to Dan and the remote board op (all through a 12-channel IP console) with a complement of transmitters, receivers, and preamps to control. Add to that a small speaker on set for guests to hear phone calls, bumper music, and truck playback.

Yet the transmission went off without a hitch, because the show had turned to a series of IP-enabled audio codecs. These codecs improved the broadcast and enabled the show to differentiate itself with a series of on-the-road remote broadcasts with multiple hosts.

A week later, during a second remote event halfway across the country, the technology performed admirably again at a major golf tournament—even though the weather doused wires and equipment in mud and water.

Hitting the Marks: Flexibility, Reliability, and User-Centric Design

Farm Journal Radio, a network tasked with covering a vast, remote stretch of the US to broadcast a syndicated talk radio program that airs on 98 affiliate stations, has very different requirements. Much of that programming comes from on-the-scene reporters traversing a massive area of the American Midwest.

An in-depth look at the ViA remote codec from Tieline. Watch the video.

As might be expected, IP connectivity can be difficult across such an expansive agricultural region, so flexibility is paramount.

For Farm Journal Radio, the only solution was an IP remote codec. The network had connected primarily over POTS, but now Farm Journal Radio uses a remote codec to broadcast the programs “AgriTalk” and “Market Rally” exclusively over IP. “One day we may be at a convention center, and the next broadcasting directly from a farm in the Corn Belt,” says John Herath, director of operations. For this network, IP remote codec technology has evolved into the predominant means of transporting remote broadcast audio.

Merlin Plus, the Studio Connection Unit with ViA Watch the video.

The challenges for WJHI(LP) were a little different: conjuring a studio where none had existed before. Basketball is religion in the state of Indiana, and when Tim Dench was given the opportunity to set up a new state-of-the-art studio for educational broadcaster WJHI in Jefferson, Indiana, there were two priorities: building a professional radio program that could compete in Indiana’s highly competitive broadcast radio market, and tackling remotes in far-flung corners of the Hoosier state. “I wanted to put WJHI on the map and be capable of something different,” says station manager Dench.

One key consideration in selecting remote radio equipment is its ability to handle live sports remotes successfully. In Indiana, listeners were paying attention. “Our sports gym seats 5,000 spectators, and listeners are keen to follow our team,” Dench says.

As he was road testing audio codecs, Dench found that reliability was a problem. During his research, he found an IP remote codec that hit several key markers: flexibility, user-centric design, and reliability. On top of the studio’s Wheatstone LX-24 consoles, the station installed a Tieline Merlin PLUS with WheatNet-IP codec that interfaces into Wheatstone IP88 BLADE. This rack-mounted codec receives incoming IP streams from a Tieline ViA codec and allows Dench to seamlessly route them using WheatNet-IP NAVIGATOR software.

The benefit is that the Merlin PLUS accepts up to six concurrent connections—an important consideration for a station that wants to integrate multiple simultaneous remotes and cross between each one. Even students can get in on the broadcast via the Tieline Report-IT Enterprise app that allows students to file live reports directly from their smartphones.

For remote broadcasts, three announcers handle play-by-play, color commentary, and stats coverage through the ViA codec, and a USB and line in inputs on the codec are used for digital playback of prerecorded interviews, announcements, and sponsorship messages. The station typically connects via a LAN or through a built-in Wi-Fi feature to connect to local access points, and it can use a mobile phone to broadcast using Wi-Fi hotspots.

ViA used for sports play-by-play at WJHI

The broadcasts have been super reliable, Dench says. “It simply has to work and not fail.” A state-of-the-art facility like this would not be possible without IP remote codec technology, he says. “The flexibility provided by the latest technology lets us dream up a new broadcast idea and then just go out and do it.”

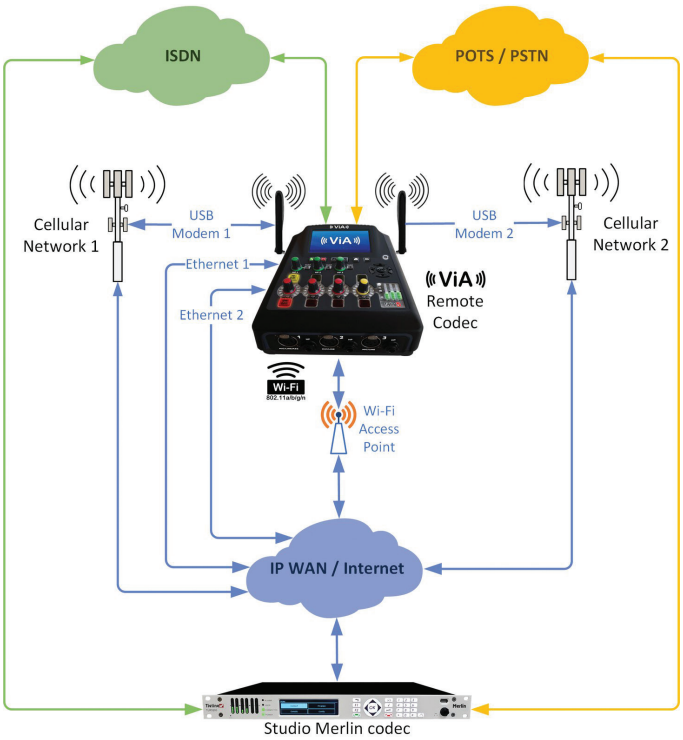
Selecting an IP Remote Codec Technology

Gone are the days when a remote was a mic and a Marti in the back of a van. As one broadcaster notes, talent expects the same level of quality and convenience they have at their home studios, and listeners expect broadcast-quality audio regardless of where the audio is originating.

When considering IP remote codec technology, look for solutions that meet the following four requirements:

1. Does the technology offer connectivity over multiple networks?

Traditional technologies like POTS and ISDN have been long-term solutions for most broadcasters and are often still available. Some broadcasters may want to consider continued support for these networks alongside IP. Ask whether a technology takes a modular approach via ISDN/POTS network interface modules. The AM station KROX, for example, uses a Tieline i-Mix G3 IP/ISDN/POTS mixer/codec and ViA for play-by-play sports coverage and remotes from concerts and other live events. The ability of their codecs to access multiple network interfaces has proven foolproof for the station.



Broadcasters should consider IP solutions that take into account existing POTS and ISDN technologies

2. Can it safeguard remotes?

Sometimes, the imperfect nature of the public Internet sets up roadblocks. Therefore, any remote codec should offer different IP strategies to guarantee reliable transport of broadcast audio over the open Internet. Look for technology that is engineered to perform

George Biagioni, IT Broadcast Engineering Director, Crocmedia

over all IP networks, both managed and unmanaged.

Remote broadcasts require redundant streaming functionality. Look for a solution with dual redundant streaming and network bonding functionality that can increase connection bandwidth and aggregate data from multiple IP transports (such as LANs, cellular modems, or Wi-Fi). "Tieline's SmartStream PLUS redundant streaming delivers seamless redundancy for IP remotes and STLs alike. It's the gold standard for IP audio over the Internet," says Crocmedia's Biagioni.

For IP audio to be sent reliably over unmanaged IP networks, it's crucial that a codec employ IP network management strategies with correction strategies such as automated jitter-buffer techniques, Forward Error Correction (FEC), and error concealment. For the assistant chief engineer at Entercom Communications, a reliable IP remote codec connection was a lifesaver during a key broadcast. "The Tieline codecs saved the day for our World Series broadcast," says John Morris, assistant chief engineer for Entercom Communications.

3. How does the technology address flexibility?
Broadcasters require flexible ways of connecting when setting up remotes from different venues. Look for technology that offers multiple IP interfaces with features like dual LAN ports, dual USB ports for USB air cards, built-in Wi-Fi, and an internal LTE module option. Low-power station WJHI connects over a LAN, uses a built-in Wi-Fi feature to connect to local access points, and can tap into a cell phone to broadcast using Wi-Fi hotspots. "With all of the backup network interfaces, the ViA portable codec transformed our radio remotes with The Rich Eisen Show," says Jim Hibbard from Pacific Mobile Recorders.

4. Does it have IP bonding capabilities?
IP coverage can be iffy from time to time, particularly over cellular networks at major events like a ball game. Look for an IP codec that offers an IP bonding solution to aggregate data from multiple IP air cards and Wi-Fi or the like. This will allow you to create more stable connections with higher overall data bandwidth. In turn, this will provide more encoding algorithms from which to choose, plus you will have a level of redundancy should one connection be lost.

Tieline, the Codec Company that stays connected

Summary

"We are only just scratching the surface as to the variety of broadcasts [these] systems will let us do in the future," says Tim Dench, station manager for WJHI. For WJHI, the priorities are flexibility and ease of use. For Farm Journal Radio, the priority is establishing a rock-solid connection every time. As POTS and ISDN technologies continue to be phased out, radio broadcasters are looking at IP-based technology for its cost, stability, flexibility, and ubiquitous nature. "In my opinion, IP is now starting to lead the way," says Entercom's Morris.

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