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Presentation by Conxx CTO Jeff Blank

Public officials are being pulled in different directions for the funding of networks for many diverse constituent groups, including but not limited to:

Public Safety and Emergency Services
Public Broadband
Schools and Libraries
Health Care and
2 way radio networks for Municipal services.

Understand that in nearly every PA County there is a 911 network, a county data network, one or more telephone networks, school and library networks, health care networks, networks for public WiFi, networks for utility services and SCADA, and networks that backhaul security and traffic video.

All of these networks cover the same geographic areas, compete for limited funding and each drive their own maintenance costs.

In the past, single purpose networks were built one atop the other as each division of government adopted newer technology. These networks serviced a single need, each built by a parent agency trying to meet its own parochial need. As these parochial needs grew, more and more single purpose networks were built for services such as public safety, schools, libraries, broadband, municipal services, and even voice traffic. The result is redundant networks, significantly increased costs and operational inefficiencies.

Today's networking technologies have advanced to the point where single purpose networks are, or should be, a thing of the past and not a plan for the future.

Multiservice networks implementing such technologies as private MPLS (which is short for multiple protocol label switching) and SD-WAN (short for software defined wide area networks) have enabled the building of a

single network with very diverse purposes and varied priorities on one platform.

This combined network architecture maintains all the safety, security, and priorities of the single purpose built networks, but allows for the more efficient use of public and private funds. These multiservice networks solve the needs of many constituent groups and efficiently use public funds. In fact multi-service networks are more efficient, more reliable, have greater capacity and can be less costly to build and maintain. CONXX has built and can demonstrate these networks in NY, MD, DE, and here in PA

So why isn't this being done as a preferred practice?

In my opinion, public policy lags quite a bit behind the state of the telecommunications industry. In trying to set priorities and direct public investment, you are handicapped by dated yet lingering conceptions of the past that yield outdated funding mechanisms and regulation.

The two arguments most often encountered when building a multiservice network are based around funding and sovereignty misconceptions. Statements like "I can't pay for it with these funds if it's going to be partially used for that." "I can't have school Internet take down my public safety radio".

Let us look at the second statement, which cites concerns about security and sovereignty.

In a multiservice network – data traffic is 100% separate and secure. Just as 2 phone calls pass through the same telephone central office without conflict so does traffic flow through a multiservice network without conflict.

In the same way legal contracts are written to share resources, multiservice network configurations are written to keep traffic separate and secure. Remember that a school and the FBI can use circuits through the same phone system switch securely. These multiservice networks can have very silo-ed purposes and still share a combined infrastructure.

And telcos handle data the same way. There might be a cable to your building, and the next building and the next – but back at the central office for Verizon or Frontier or Comcast all of that proprietary data is routed over the same switches and processed via shared networks. Our multi-service networks use the same protocols, and the same equipment to keep data safe, secure and separated. There is no technology drawback to investing in multi-user networks.

Now for the first item -- funding.

Traditional funding mechanisms have frowned on or prohibited combined projects. For example a public safety radio upgrade was difficult to combine with a municipal services network, or a public broadband project.

Earlier this year we were advising a PA county that was attempting to improve broadband for its residents while also undertaking a 911 network upgrade. The county administration was interested in a multi-service platform that would handle public safety and community broadband – until advised that a shared use network didn't conform to current funding guidelines. Interesting to note that the multiservice network was actually less expensive to build, but PEMA didn't have the flexibility to fund a new technology project.

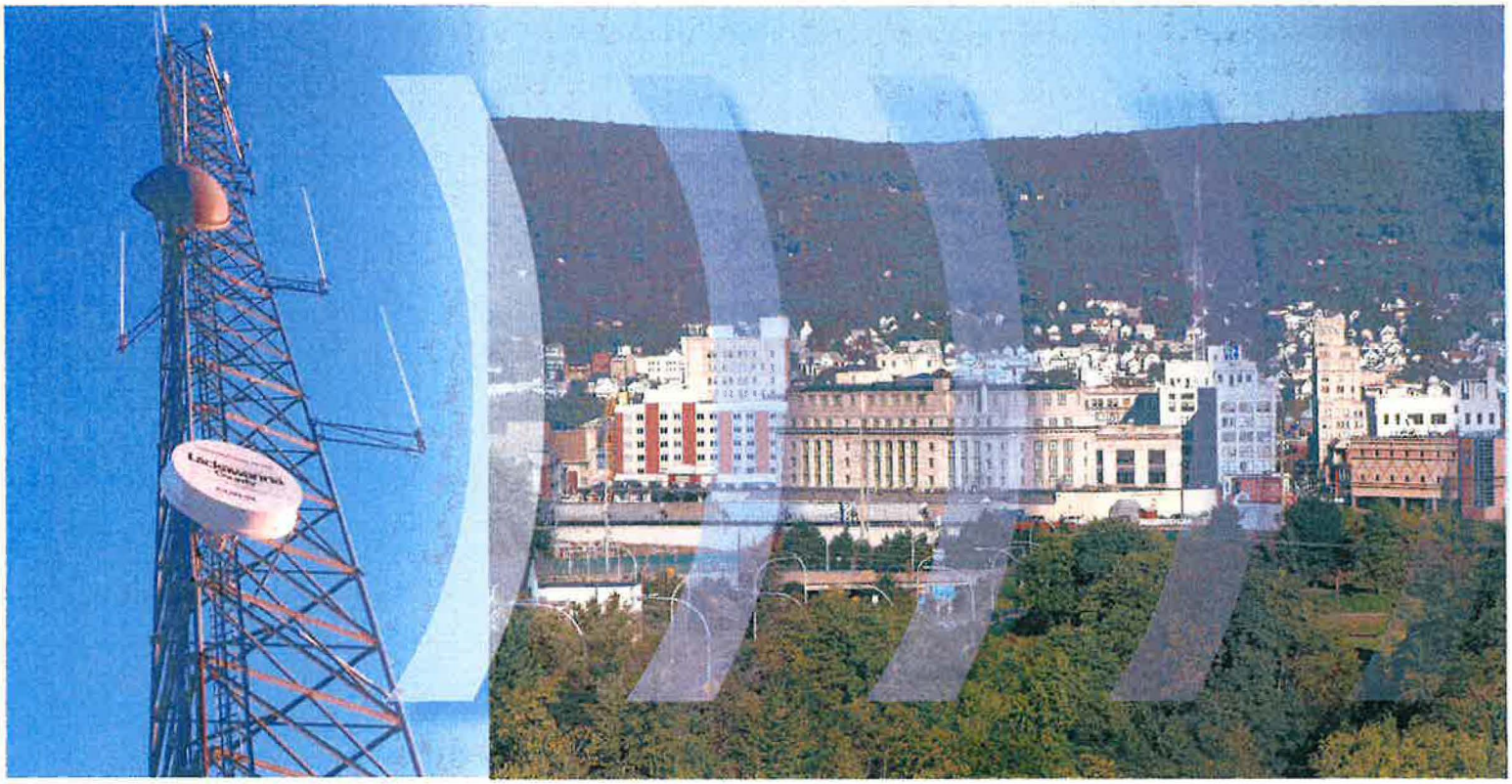
This is where the leadership of you as policy makers is needed to evaluate newer, but proven technology and set policy that secures a greater return on the investment of public funds.

With our comments we submit a White Paper written by FEMA describing our multiservice network platform as a SMART PRACTICE, a Case Study on the Lackawanna County multiservice network and correspondence regarding the aforementioned guidance disallowing multiservice networks.

Thank you for the opportunity to present today and I look forward to answering any questions you may have.

Lackawanna County Pennsylvania

SMART NETWORK INITIATIVE



'Budget neutral' project earns revenue that moves the cash flow to positive.

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HOW TO PAY FOR IT?

Even great ideas need to pay for gas in the tank, and here county officials used some innovative financing .

FUNDING FROM THIN AIR

County Commissioners Jim Wansacz and Corey O'Brien crafted a savings-based financing plan that yielded the upfront project funds without a bond issue or borrowing guarantee that would impact the county's debt limit.

Both Fidelity Deposit and Discount Bank and M&T Bank evaluated the concept and tendered offers to fund the project cost – leverage by non-appropriated lease payments that would come from the savings in the county telecom budget. The savings were greater than the payments, meaning immediate financial benefit to the county.

Game-changing technology and budget-neutral funds fueled a design-build engagement with Conxx that guaranteed project completion, performance and cost.

ON BUDGET

Conxx, INC. agreed to a guaranteed maximum cost contract to build a 10-tower, 1 Gbps, high reliability, low latency, MPLS core network, and install Last Mile connections for 50 county offices and service locations across a 465 sq mi landscape. Conxx added two tower locations for improved network design but the project cost stayed right at $2.8M. Numerous local businesses were integrated into the project supply chain and local labor was hired to assist.

PERFORMANCE EXCEEDS EXPECTATION

The expectation for high reliability is fulfilled with five-nines engineering riding on a multipath ring, self-healing licensed microwave backbone – built with Ceragon IP20 licensed microwave radios.

The key to the technology, which is also the key to the business plan, was the implementation of Conxx MPLS over wireless. This technology enables diverse and even mission-critical users -- public safety, government, corporate, education and Internet Service Providers to use the same network without interference -- reducing every user's cost while providing superior service.
This is a very Smart Network.

This technology also features prioritization, encryption, QoS, VLAN, TDM, SCADA, VOIP, WiFi and VPLS designed to enable Carrier Ethernet transformation data across the service access network via Alcatel Lucent 7210 SAS network switches. In short, the Conxx network delivers fiber quality performance far below the cost and far beyond the physical limits of fiber cable.

Last Mile connections utilize Radwin point-to-point and point-to-multipoint radios in licensed and non-licensed spectrum and provide service in as little as the same day it is ordered for VLAN or business class broadband.

The Radwin system made channel management efficientas the software based radio gear can be tuned to available spectrum between 4.9-6.0 GHz.

A two-man crew implemented 50 off-site last mile connections that included County Courts, District Attorney and Sherriff, all District Justices, county authorities and utilities, remote offices and parks in about 40 work days.

A CLOSER LOOK AT THE SAVINGS

The actual savings calculations that Lackawanna County used to secure budget neutral system financing ae shown. In addition the county IT department has begun to generate significant revenue from network users.

Circuit Type	Number	Annual Savings
T1	13	$114,190.00
T3	2	$139,080.00
Cable Internet	9	$ 8,010.00
10mbps DIA	1	$ 27,965.00
VON	1	$157,248.00
DSL	1	$ 960.00
Total Annual Conxx Network Savings		$447,453.00

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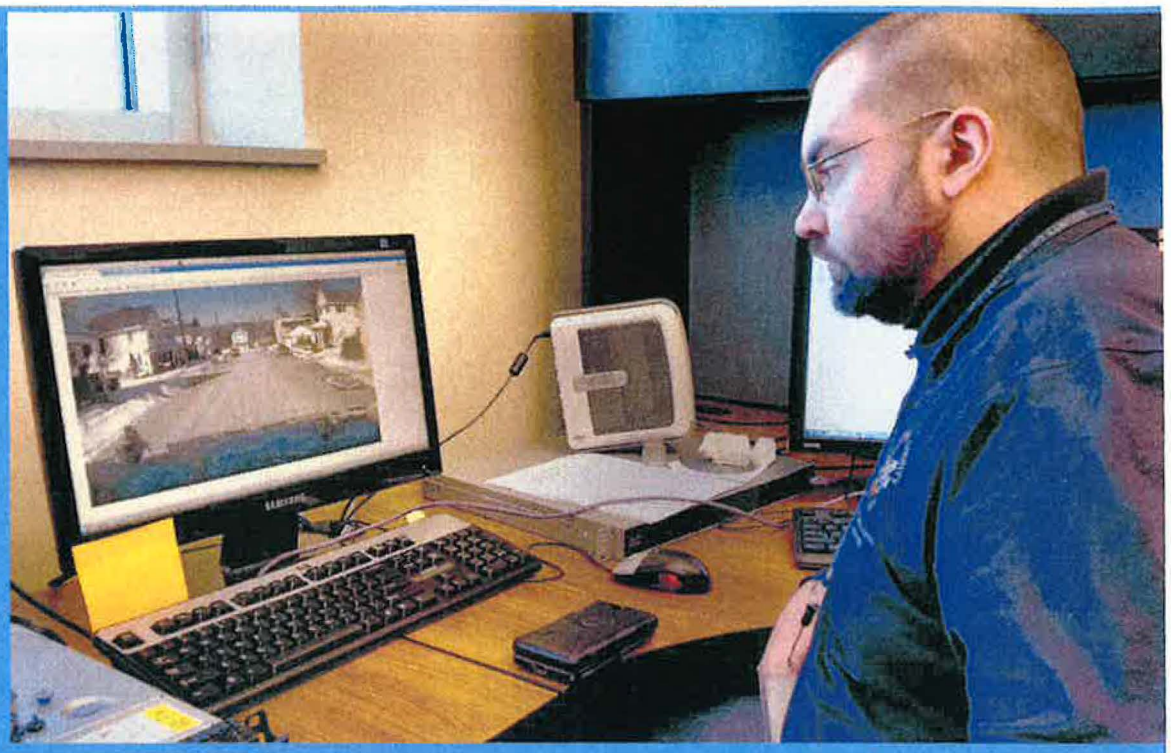
County Commissioners Jim Wansacz and Corey O'Brien, Esq. flank CIO Jeff Mando

Lackawanna County PA was a high cost and limited access marketplace with respect to broadband and telecom services. Downtown corridors had fiber service, but building out to rural or remote service locations was costly. A careful look at the composite annual communications expense showed that yearly county spend was about to break $500,000 – while the service didn't fully meet the growing county demand!

The PA County Commissioners Annual Conference

shared information about a unique wireless network in Cumberland, Maryland and the firm, Conxx, Inc. that had built additional wireless government networks. Lackawanna County officials discovered a cost effective, multi-user and carrier-grade wireless network that earned a federal 'best practice' designation. The network delivered fiber quality technology without the fiber's cost and was shared among users whose data connection was secure and prioritized, allowing for public safety, government, institutional and public access on a single, secure, multiservice data network..



GAME CHANGING FOR PUBLIC SAFETY

As the network build came online, the 911 Department secured a Department of Justice Grant to replace its police radio system, called LMR or land mobile radio. Director Dave Hahn wanted the new P25 compliant, IP-based Motorola GTR8000 Base Station.

Initially, the project would not fit within the grant budget – the project was saved by using the new county wireless network, which was designed to snap on public safety backhaul for next generation 911 LMR communications and First Net requirements.

County 911 trimmed the budget by integrating base stations onto a top-priority VLAN on the wireless network – and saw performance that exceeded the Motorola specifications for jitter, latency, capacity and reliability. In addition, minimal funds were needed to easily add 'spur', or off-core LMR repeaters that resolved long standing gaps in 911 radio coverage. 911 is now switching fire and EMS radio from leased circuits to the wireless network and anticipates annual savings of $100,000.

IMMEDIATE BENEFITS TO BUSINESS

When an office park developer ordered a 20mpbs internet connection for the just-opened TekRidge Center in suburban Jessup PA, the cost of the short fiber build from the traditional telecom carrier exceeded $35,000.

For a build out fee *95% less costly*, the county installed a higher speed, lower latency connection and provides carrier grade broadband at less than half the 'going' monthly cost. Quick and cost-effective connectivity is now readily available as an advantage for business and economic development all across Lackawanna County.

IMMEDIATE BENEFIT TO EDUCATION

The county added a 1 Gbps link to the new Pennsylvania Research and Education Network, or PennREN, the 1,600-mile broadband network connecting PA's community anchor institutions and major universities. The network delivers low cost broadband, private network services and programs targeted to education, medical and non-profit organizations.

Lakeland School District in rural Scott Township is already linked via the county wireless network to PennREN, and all 14 public libraries are scheduled for connection in 2015. Additional school districts are evaluating a move to the network as current broadband contracts expire. Regional colleges and technical schools now have an affordable path to connect to PennREN.

IMMEDIATE BENEFIT TO RECREATION

All county parks and a growing number of municipal parks now feature free public WiFi, networked offices and security video backhaul, even from remote, difficult to reach locations across the county. A growing number of towns are also lighting up parts of their retail shopping areas with popular public Wi-Fi hotspots .

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