FIERCE INNOVATION AWARDS

TELECOM EDITION

2019

FierceTelecom FierceWireless

INNOVATION REPORT

CONTENTS

KEVIN GRAY
PUBLISHER, FIERCEWIRELESS
AND FIERCETELECOM

—

WELCOME
TO THE FIERCE INNOVATION AWARDS - TELECOM EDITION!

Innovation has never been more important in telecom and wireless. As providers race to meet the demand for data, leverage new revenue opportunities, and compete head-on with the cable companies, they need to approach service delivery in innovative ways in order to control costs and expand opportunities.

We think the companies profiled below exemplify the type of innovation that will be foundational to the changes coming to our industry. They're addressing requirements like network assurance and operational support systems, which must become more automated to enable operators to provision and monetize new services. They're migrating 5G radio access and the many technologies that support it to software. And they're using wireless technology to dramatically improve business outcomes for customers.

Our judges evaluated applicants based on the following criteria: ease of use/ROI, effectiveness, technical innovation, competitive advantage, and financial impact. In addition, they looked for true innovation: entries that were unique, solved a real problem and/or pioneered a new process.

Applicants were judged in the following categories:

Business Services / Solutions and gear for delivering or managing enterprise services. Includes SD-WAN, VoIP, contact centers, unified communications (video and voice conferencing, speech recognition, e-mail and messaging), ethernet on demand, as well as security monitoring, troubleshooting, system monitoring, and disaster recovery.

BSS/OSS / Billing and operations support systems, including network management, customer experience management, service assurance, revenue management and other forward-thinking support and enablement software.

Customer Engagement / Partner management, Big Data analytics, Customer service platforms, portal strategies, user-centric policy engines, self-provisioning, tools for leveraging and benchmarking social and companion apps, and more.

Cloud Services / Solutions supporting cloud storage and service delivery, including apps, backup and data syncing.

IoT / Solutions and technologies geared towards bringing connectivity to everyday devices and infrastructure. Includes Smart Cities, Vehicles, Homes, Wearables, Buildings, Healthcare, and Manufacturing.

Next-Gen Deployment Wireless / Equipment and solutions used to segue from past wireless network buildouts to newer market models, including Small Cells, HetNets, Wi-Fi, Backhaul, Spectrum Efficiencies, C-RAN, and 5G Development.

Next-Gen Deployment Wireline / Advances in broadband architectures for either core networking or the last mile, including fiber, Docsis 3.1, PON, Ethernet, Packet Optical, as well as network edge or access network solutions.

Network Test and Measurement / Handheld, portable and lab-based hardware, software or centralized solutions for testing, management and maintenance.

Public Safety Technology / Innovations that modernize public safety operations for police, fire and emergency medicine. Includes LTE network services with priority and preemption, infrastructure, DAS systems, deployable communication nodes, devices and applications.

Security / Solutions and Services geared towards securing networks, devices and content.

SDN/NFV / Network function virtualization and software-defined networking options that support the unique requirements of telcos and other network operators.
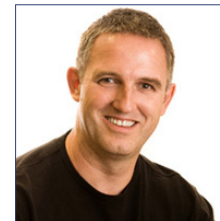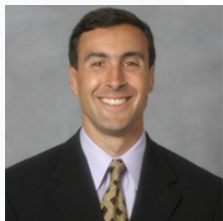
Enjoy the read!

JUDGES

ROGER ENTNER
ANALYST AND FOUNDER
RECON ANALYTICS, INC.

MATTIAS B. FRIDSTRÖM
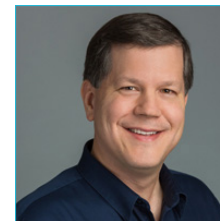VICE PRESIDENT AND CHIEF EVANGELIST
TELIA CARRIER AB

IAIN GILLOTT
PRESIDENT
IGR

MARK LOWENSTEIN
MANAGING DIRECTOR
MOBILE ECOSYSTEM

JOE MADDEN
FOUNDER
MOBILE EXPERTS, INC.

RON MARQUARDT
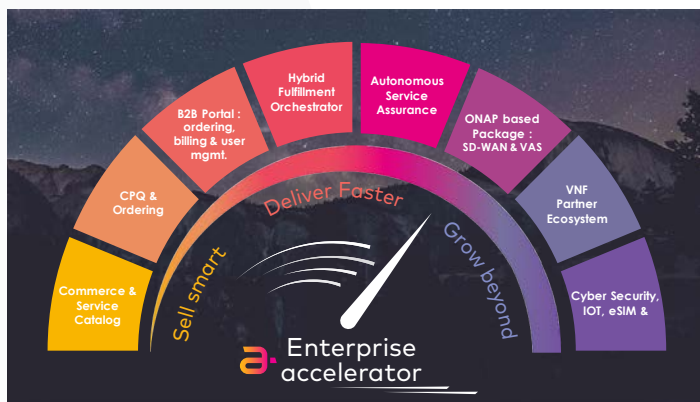VP OF TECHNOLOGY INNOVATION
AND ARCHITECTURE
SPRINT

DAN MURPHY
EXECUTIVE DIRECTOR TECHNOLOGY
VERIZON

MONICA PAOLINI
PRINCIPAL
SENZA FILI

WINNER: BUSINESS SERVICES
PRODUCT/SERVICE: CPQ — CONFIGURE-PRICE-QUOTE

WHY IT'S A WINNER: Time is money and Amdocs' automated CPQ wins this segment for its ability to slash the time it takes operators to convert leads into contracts. The telco-specific platform uses automation to help operators quickly evaluate a new opportunity by understanding network availability, P&L scenarios, partner service availability and opportunity cost. This simplifies even the most complex RFPs, and enables providers to deliver quotes and sign contracts faster.

A Tier 1 operator is using Amdocs' CPQ to generate contracts in minutes that used to take days. With the automated CPQ, internal stakeholders can more easily see how a new proposal will impact their bottom line using the platform's P&L analysis capability.

"It takes only 5 to 6 stakeholders to interact with the CPQ application to create a 5,000 sites quote," said Yogen Patel, Head of Product and Solutions Marketing at Amdocs.

Amdocs' CPQ, which integrates with operators' existing BSS and OSS platforms, enables a completely seamless data flow during the lead-to-cash process across multiple B2B product lines. Order time has been cut in half and the sales-to-finance cycle has been cut by 40%.

"CPQ enables CSPs to manage the sales

life cycle end-to-end, whether creating a new proposal, contract or amendment/renewal of an existing one," explained Patel. "Usually it is launched from the Salesforce SFA app, when a lead becomes a sales opportunity. To create the proper sales quote, the sales representative will be guided to select the right offerings, configure them to each site/group's needs, price and discount them, and send for needed internal approvals."

WHY IT'S INNOVATIVE: The Amdocs CPQ doesn't just help operators respond to RFPs; it empowers them to create new business opportunities as well. Amdocs has patented its CPQ "business offer template," which documents tailored offerings that salespeople construct based on existing agreements with a given customer and then can be used to establish new services. The template also enables the update, via a single click, of large volumes of existing or ordered products associated with the offering/service. Salespeople are radically more efficient now that Amdocs has streamlined the order-entry process by drastically cutting the number of data fields a salesperson must populate. Instead of entering data into hundreds of fields, salespeople can quickly enter a relatively small amount of data and get back to selling.

Anthem is a proud recipient of the **2019 Fierce Innovations Award.**

When members receive a cancer diagnosis, **they'll have questions.**

With Anthem's Concierge Cancer Care Program, **they'll have confidence in our support.**

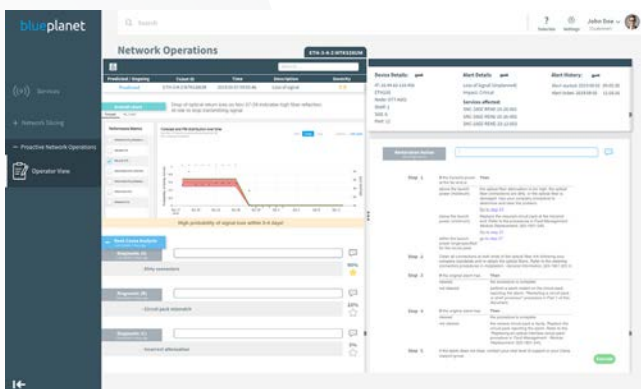The most advanced cancer care available, delivered in the most compassionate way possible.

Anthem ✚ ◆

WINNER: BSS/OSS
PRODUCT/SERVICE: BLUE PLANET PROACTIVE
NETWORK OPERATIONS (PNO) SOLUTION

blueplanet®
a division of Ciena

WHY IT'S A WINNER: Blue Planet's software can analyze billions of events happening across multiple layers of a network in order to predict problems before they occur. That's not all Blue Planet is predicting for its customers - the Ciena division has also developed a savings calculator to help operators forecast the impact PNO can have on costs. Kailem Anderson, VP of Portfolio Engineering at Blue Planet, explained how it works. "It uses information like mean time to resolve, business impact, closure and reporting efforts, loaded labor rates, truck roll costs, and SLA penalty changes to calculate a total cost of ownership in the present mode of operation versus the future," he said. On average, this tool demonstrates that providers using PNO will save 38% on "trouble-to-resolve" operating expenses, according to Blue Planet.

The vendor-agnostic solution uses machine learning to predict problems before they occur and can recommend action to prevent them from ever happening. **"By using a combination of telemetry, policy and orchestration, you can actually ensure that the failure doesn't happen and you can project and obviously mitigate that risk,"** said Anderson. PNO has been shown to successfully predict up to 95% of unplanned loss-of-service outages, and tier 1 service providers such as Colt have

tested the solution in their production networks.

WHY IT'S INNOVATIVE: PNO marries artificial intelligence with human intelligence to give operators the best of both worlds. The network operations center allows engineers to take control of the AI-assisted troubleshooting process. The result is a virtuous circle, as over time the input from human engineers enables the software to get better and better at predicting network problems and identifying the best response. Anderson said operators can choose to implement a partial closed-loop, in which the system identifies potential failures and allows engineers step in to prevent them, or a full closed loop, in which the network predicts problems and repairs itself before they happen.

Earlier this year, Ciena evolved Blue Planet as a separate division so that customers can buy Blue Planet's software even if they aren't using Ciena's network gear. Other Blue Planet solutions, including its multi-domain service orchestration software, can be integrated with PNO.

WINNER: CLOUD SERVICES
PRODUCT/SERVICE: M-CAS - AI BASED
5G+MEC COLLISION AVOIDANCE SYSTEM
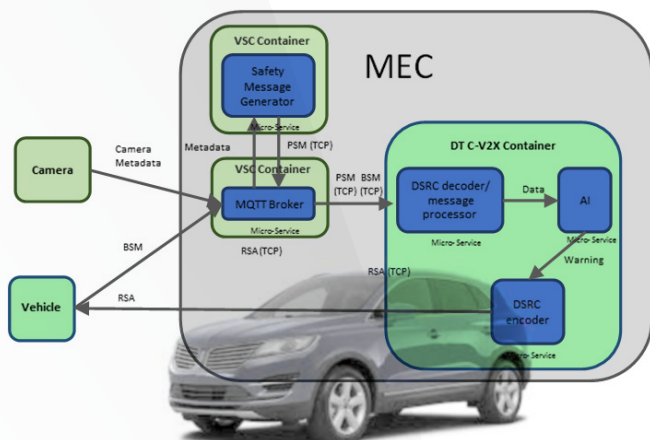
WHY IT'S A WINNER: Verizon's MCAS solution places the edge computer in close proximity to the base station, and the connected vehicles can be miles away using 5G to establish a secure transport layer security connection to the server. Each vehicle sends information to the server every 100 milliseconds. The vehicle information is encapsulated using UPER encoding as defined in SAE J2735 and sent to the mobile edge computer using Message Queuing Telemetry Transport (MQTT) protocol.

The system is trained to recognize vehicles and pedestrians. If it detects a potential collision, vehicles with on-board connectivity can respond to avoid the accident. The software uses an artificial intelligence/machine learning convolutional neural network developed by Verizon to monitor road users'positions, acceleration, speed and direction. It also relies on input from pole-mounted cameras and on detailed street maps. The streets at the Universityof Michigan's Mcity test facility were the first to be mapped; next up are 3 cities in the US.

WHY IT'S INNOVATIVE: Verizon said it has created the only collision-avoidance system that relies primarily on edge-based servers rather than on-vehiclemprocessing. "The cost of the hardware in the car is much cheaper because they don't have to have the computational power," explained Verizon's Mauricio Andrada. He added that server-based MCAS is also safer in some important scenarios. He said that when a potential collision is beyond a car's line of sight, the car is likely to get the message faster from a server than from other connected cars.**"The server has much better visibility of what's going on in the road than the sensors on board the car,"** Andrada said.

Along with leading global car manufacturers, Verizon is exploring the idea of building its MCAS into future vehicles. The company is also exploring non-carrier specific radios and other cross-carrier strategies to make sure its MCAS can benefit cars that aren't connected to the Verizon network.

5G.
We're already on it.

Today's cell site infrastructure is evolving to support emerging 5G architectures, including 5G-friendly radios requiring more power at the top of cell towers.

To protect against voltage drops from the tower's base and the radios at the top, Vertiv™ introduces the innovative eSure™ Power Extend Converter – a finalist in this year's Fierce Innovation Awards – Telecom Edition! This hand-held device plugs directly into an existing DC distribution panel, conserving valuable space while delivering over 98% efficiency.

Vertiv has the vision and expertise to help you rethink your energy use. Learn how to save cost with the arrival of 5G.

Visit **Vertiv.com/PowerExtendConverter**.

VERTIV™

WINNER: CUSTOMER ENGAGEMENT
PRODUCT/SERVICE: CONCIERGE CANCER CARE.

WHY IT'S A WINNER: Anthem is making technology accessible to cancer patients in order to increase the quality of care they receive. The company's Concierge Cancer Care is the brainchild of Dr. Manish Oza, who was covering an emergency room in Baltimore when he got the idea. A cancer patient whose immune system was compromised by chemotherapy had just spent hours waiting to be seen, exposing herself to everything in the ER. When Oza was finally able to see her he quickly diagnosed a simple case of shingles.

Oza works for Anthem, which delivers Blue Cross Blue Shield health insurance to more than 40 million people in 14 states. That day he decided that technology could save his company money while saving patients from needless hospital visits. His idea was implemented through a set of sensors in a remote monitoring kit that connects to Wi-Fi and monitors a patient's vital signs by using a stethoscope adapter, tongue depressor, otoscope adapter, and thermometer. Cancer patients insured through Anthem receive instructions on how to activate the kit immediately following diagnosis. They log into a website for telehealth consultations with remote doctors who receive information from the sensors. These doctors can assess a patient's status based on temperature, heart rate, vital organ sounds, and visual examination

of the mouth and ears. Oza says that with these tools in place, many complications that may occur during chemotherapy (like shingles) can be diagnosed and treated while the patient remains at home.

Anthem's comprehensive cancer program decreases ER visits by 12-17% and hospital admissions by 13-18%. Now Oza wants to extend the solution beyond cancer patients. **"After you're cured of your cancer, you can use remote monitoring devices for your son that has asthma, your daughter that has an earache,"** he said. "It will become like the new thermometer for our generation."

WHY IT'S INNOVATIVE: Anthem uses artificial intelligence and machine learning to analyze patient data and match cancer victims with appropriate specialists and clinical trials. The company is looking at new metrics to define success such as increase in lives saved or prolonged and an increase in the number of clinical trials filled at the cancer centers of excellence that partner with Anthem.

WINNER: IOT
PRODUCT/SERVICE: ZYTER

WHY IT'S A WINNER: Zyter is personalizing the internet of things for millions of users, and streamlining operations for its corporate customers. The winner in the IoT category didn't start out as an internet of things company – originally derived in 2017 as a brainchild of serial entrepreneur Sanjay Govil, Zyter is a cloud-based communications platform-as-a-service that leverages the power of the connected enterprise to deliver unique digital experiences. Today, the Maryland company has amassed 7 million active users.

"We conceptualize Zyter as a user experience platform," said Harish Pai, Zyter SVP and CTO. For example, New York's Penn Station worked with Zyter to create its FindYourWay app for commuters and travelers. The software uses beacon technology to recognize smartphones as they enter the station, and users receive personalized messages detailing train status and boarding gate information. Zyter also created the mobile event app for London's Hyde Park Winter Wonderland, which offers users navigation, interactive maps, registration, personalized itineraries, ticketing information, a mobile wallet, and integration with social media.

WHY IT'S INNOVATIVE: Through integration with customers' backend systems, Zyter offers users what Pai calls

"context aware collaboration." In the hospital setting, for example, Zyter can combine information from bedside devices with existing patient records, scans, and lab results to create a complete patient profile when one doctor consults another. **"The physician on the other end can pull up all information related to the patient within the chat window without having to rely on the other physician to provide that information,"** Pai said.

Healthcare is one of Zyter's biggest verticals, because hospitals can improve efficiency and outcomes using the platform. Zyter's IoT interface enables more than just wearables for patients; hospitals also use it to track assets, from wheelchairs to vaccines. Zyter also improves the patient experience. Customer Molina Healthcare used the platform for a mobile health solution that shows members healthcare benefits details, provider and pharmacy directories, medication lists, and treatment costs.

Pureport

On-Demand Cloud Connectivity Platform

Cloud networking is now easier, faster, and more affordable.

- Pureport's Multicloud Fabric platform seamlessly orchestrates private connectivity to the top public cloud providers.

- Deploy cloud connections in minutes, without the need for additional hardware.

- Distributed Multicloud Router supports Layer 3 networking, and automates BGP configurations.

- Cloud Grade NAT functionality automates the resolution of overlapping IP addresses.

- Self-Service Console offers an intuitive, visual tool to deploy and manage cloud networks.
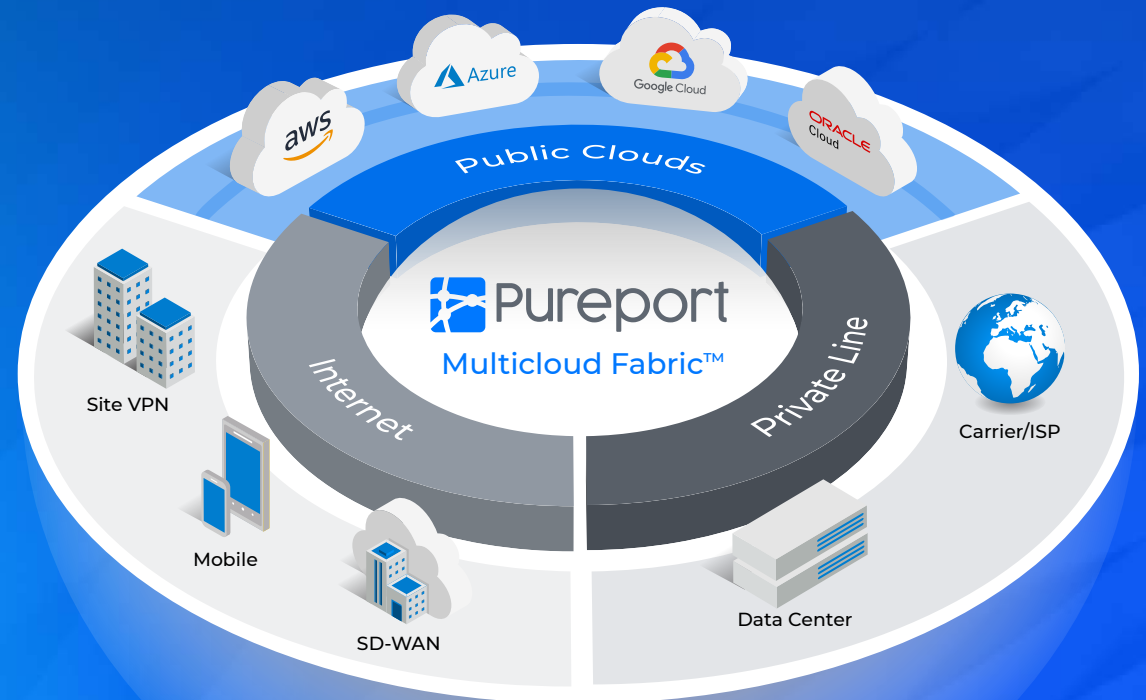
www.pureport.com | sales@pureport.com

HOT SDN OR COLD PIZZA?

Why the SDN delivery man has finally arrived for hungry carriers

Centralized SDN

Distributed SDN

When the Internet was new, I remember trying to explain to my friends how they'd be able to order a pizza from their computer. Of course, we all know it takes longer than expected before a new technology is universally adopted, but in just a couple of years that Internet pizza had arrived in everyone's kitchen. Soon no-one thought it was cutting edge at all, not even the man slicing the mozzarella.

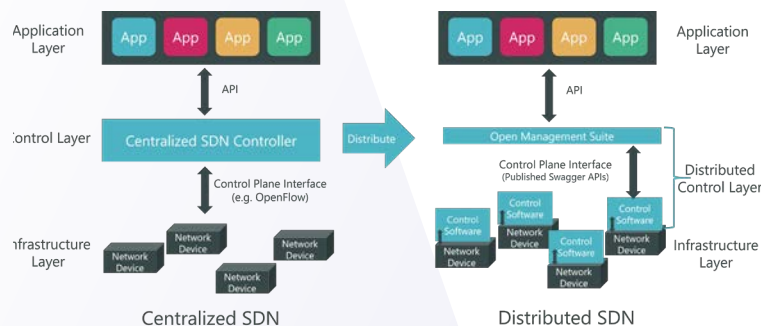So, what about those hot networking technologies — SDN and NFV? They promised to make networks agile, programmable, automated — not to mention cheaper. And to be fair, SDN has arrived in the data center. But for those of us in the telecoms world, building and running the biggest networks, it sometimes seems like the delivery man is still 'just around the corner', while our pizza has gone stone cold.

So why? It turns out that SDN, or at least SDN as it was originally conceived, is simply not well suited to carrier networks. It's hard to scale a single point of control to manage millions of forwarding states. It's hard to limit the 'blast radius' if something catastrophic happens with your controller. And it's hard to migrate from here to there — what does a national carrier's network look like when half of it is centrally controlled, and the other half isn't?

So, is it time to give up on SDN? Not at all. SDN for carriers is a bit like a perfectly good pizza that someone decided to add pineapple to. (Presumably they thought the pineapple was a good idea, but no one quite remembers why.) Well, it turns out

there was a secret sauce for carrier SDN and it was over in the next aisle all along – being enjoyed by the cloud-natives.

These IT giants have figured out how one engineer can operate ten thousand servers, how to add a new microservice like Facebook Chat for 2 Billion users, and how to use Web2.0 tools to automate everything.

At RtBrick, we thought they might be onto something. It turns out the first trick is to distribute the control plane. Rather than try and control everything centrally, carrier routing software can be deployed in a software container on each bare-metal-switch.

Another key ingredient is replacing the hundreds or thousands of customized databases in traditional routers with a single state database on each switch. This has brought a huge gain in simplicity, with a thousand times fewer database interactions to manage, and the ability to scale using hundreds of processor cores - which is how the Internet-natives scale (Amazon uses 128 cores in a server).

And, like the cloud-natives, code can be compiled from discrete building blocks, with the required microservices selected for each use-case.

The result? An agile, programmable, low cost Software Defined Network for telcos — already being tested in some of the world's largest access networks.

So, it seems SDN finally has been delivered to carriers — and it's arrived with extra pepperoni!

WINNER: NEXT-GEN DEPLOYMENT WIRELESS
PRODUCT/SERVICE: THE REIMAGINED 5G NETWORK

WHY IT'S A WINNER: Cisco is leading the charge to truly virtualize the entire mobile network. Japan's Rakuten Mobile chose Cisco to help it design, implement and operate a greenfield, software-defined 5G network.

"First we had to build a foundational platform," explained Masum Mir, VP of Products at Cisco. "It's a horizontally scaled cloud infrastructure. So it goes closer to your radios, it goes deep into your data centers, and everything in between. So that is the very first layer and it's all software."

That first layer supports the virtual packet core, a combination of software built by Cisco and other partners. Mir said Cisco pioneered packet core virtualization and cloudification. He said Cisco's virtual packet core is in the process of becoming cloud native, and that the next step will be containerization.

Software-defined radios are the next step in network function virtualization. Cisco did not build Rakuten's radio controllers, but that software does run on Cisco's horizontally scaled cloud infrastructure.

Cisco is often categorized as an IT vendor rather than a telco vendor, but the company has a long history with service providers, data centers, and enterprise telecom. "In North America today the majority of mobile data traffic goes through our packet core," Mir said. Clearly, the company plans to maintain that leadership position as packet core functionality moves to software. Mir noted that Cisco has been virtualizing network functions for years in data center and enterprise environments.

WHY IT'S INNOVATIVE: Cisco's 5G network is different from the 5G networks North American operators are building. Cisco's software-defined architecture starts with virtual network functions instead of adding NFV piecemeal and integrating it with legacy hardware. Cisco's solution represents a radical departure for U.S. operators, but that doesn't mean they aren't interested.

"The trigger point for Tier 1 operators is the decision point on how they build the 5G standalone core and how they operate it," said Mir. "We are working hand-in-hand with all the major Tier 1 providers on that journey … We are getting our hands dirty, working with our customers side-by-side to build these best practices with the goal to get to automated operations."

WINNER: NEXT-GEN DEPLOYMENT WIRELINE
PRODUCT/SERVICE: DRIVENETS NETWORK CLOUD

WHY IT'S A WINNER: DriveNets Network Cloud is changing the operational model for service providers by licensing cloud-native core and edge networking software running over industry-standard white boxes to replace the traditional core and provider edge routers. The solution can scale from a single router of 4Tb/s in one white box up to 768 Tb/s (7680 ports of 100G) running over a cluster of white boxes as one router entity. Founder and CEO Ido Susan says most of the company's customers are Tier 1 service providers, because they have a lot to gain from the economies of scale DriveNets offers.

ACG Research compared the total cost of ownership for DriveNets Network Cloud solution to the total cost of ownership that traditional network hardware vendors project after their planned convergence of mobile, broadband and enterprise networks. The research team found that on average, providers could cut routing expenses by 61% with DriveNets, and could cut overall operating expenses by 36%.

WHY IT'S INNOVATIVE: In addition to programming the router data plane, DriveNets programmed the control plane as a cloud-native software independent of the hardware on which it runs. It also developed a service orchestration

platform to orchestrate the disaggregated architecture of white boxes and cloud-native services. That's a sharp departure from legacy routing systems that bundle proprietary hardware and software for data, control and orchestration. It means that when a service provider needs to add more density to the network core, compact "pizza box" sized servers can be added to the network infrastructure without adding more hardware for the control function.

Susan's previous startup Intucell was acquired by Cisco for $475 million, and Susan worked at Cisco for two years following the acquisition. He says he has great respect for the networking giant which taught him so much, but he's sure he has found a new way to help service providers scale their networks.

"It's really about taking the networking model that service providers have today, based on multi-vendors, multi-platforms, multi-hardware and multi-networks, and substantially simplifying it," Susan said. He said companies like Facebook and Google have already accomplished this in the compute and storage arenas, and DriveNets is doing the same in service provider networking.

PERSONAL PHONES FOR BUSINESS USE.
Risk or Opportunity?

It's no surprise the explosion of smartphones in the hands of employees has presented several challenges for business. A recent report by Frost and Sullivan states that up to 80 percent of employees use their personal phones for work. Therefore, it's not a question of whether or not your employees are using their personal phones for business purposes, it's how often.

So what is driving the desire to use personal phones for business? First, employees are no longer tethered to their desks. Businesses have embraced the changing workplace by offering flexible "work from anywhere" environments including home offices, remote locations, and even co-working spaces. Second, employees hate the idea of carrying two phones, one for personal and one for work. Form the employee's standpoint, using their own smartphone is just plain easier.

Letting employees use their personal phones for work, a.k.a. "Bring-Your-Own-Device (BYOD) has some definite advantages for both the employee and the company. Employees like using the phone

they are comfortable with and businesses can save time and money by not having to buy an additional device to support and maintain.

On the other hand, BYOD doesn't come without risks. Keeping business and personal information separate is difficult. If you have already adopted a BYOD model or are contemplating this approach, we recommend evaluating your risks of BYOD relative to the 4 C's. Control, Compliance, Customer Experience and Cost.

CONTROL
The person who owns the phone number controls the relationship. Imagine a current customer calling the personal phone of an ex-employee and getting no response, or worse yet, getting ahold of the ex-employee and being told they are no longer with the company and are now working for your competitor.

COMPLIANCE
We live in a world of instant communication, especially as it relates to texting. In fact, texting is one of the most effective methods of communications with 90 percent of texts opened within minutes. However, texting can expose compliance risks, especially for highly regulated industries.

CUSTOMER EXPERIENCE
Customers increasingly expect professional responses, but when relying on an employee's personal phone for business

communication, that professionalism could be compromised with personal voice mails and calls answered at the wrong time and in the wrong place.

COST
Gathering reliable reimbursement costs for BOYD programs can also be difficult. Businesses risk overpaying employees either through direct reimbursements or stipends without an effective method to monitor personal verses business phone usage.

Now imagine if you could easily add a second number, a dedicated business number, on your employee's smartphone. Sprint MultiLine from Sprint Business helps ensure corporate BOYD policies remain compliant while addressing the risks of the 4 C's. It works on any smartphone, regardless of carrier, making sure business communications stay in compliance and in line with the company's standards. Employees will continue to use personal phones for business, and knowing that, Sprint MultiLine is a powerful solution to help manage any BYOD program.

Two lines,
one phone.

The easy way to manage business comms on employee devices

Your people prefer using their personal devices for work-related communications—it's just easier.

But it's also riskier, making mobility management, security and compliance nearly impossible.

Sprint MultiLine is an app that lets you add a business line to your employees' devices. They control their personal calls and you manage and secure their business comms—no matter what smartphone or operator they use.

Your people keep the devices they're comfortable with, switching between personal and business lines as needed; while you ensure all business communications are secure and compliant, without spending money on business devices.

We call it MultiLine. Our customers call it win-win.
Visit **sprint.com/multiline** to find out more.

Works for Business®

Sprint®
Business

WINNER: NETWORK TEST AND MEASUREMENT
PRODUCT/SERVICE: INTELLIGENT FACTORY-BUILT NETWORK IFBN

WHY IT'S A WINNER: LightRiver's adaptive approach to data-driven assurance has already been deployed at scale within multiple Tier 1 operator networks, putting the company ahead of its competition in this space. LightRiver wins the Network Test and Measurement category even though it isn't primarily a test and measurement equipment vendor. The company deploys packet optical networks at scale for data center interconnect, metro and long-haul applications. VP, Greg Byrne, describes the company's approach as a "factory-built network model," meaning LightRiver pre-builds, with the goal of turnkey implementation for the operator.

Byrne conceived the Intelligent Factory-Built Network as he realized that LightRiver was seeing long lag times between delivery of a network and implementation. He knew his company was performing all industry standard circuit tests, including Bit Error Rate and ITU-T Y.1564, once during the build and again during the installation. But those tests weren't giving customers enough confidence to flip the switch. "We needed a more comprehensive test," Byrne says. He and his colleagues developed the intelligent Factory Built Network as the integration of two LightRiver products, Factory Built Network and netFLEX software.

WHY IT'S INNOVATIVE: "Unlike a simple circuit test that gives you information on performance simply end-to-end, through the intelligent factory testing we're able to give the customer a complete network topology," Byrne said. "That's generated essentially through the test methodology. Then from that topology they can actually see the path that a circuit takes through the network. In a traditional one you know that a circuit got from point A to point Z but you don't actually know how it got through the network. And similar to that you don't understand its health and its performance at each segment of the network. ... This allows for an analysis or baseline of each hop along that path."

LightRiver's software is typically on the customer's server in a virtual environment, and continues to monitor the network for 60 days after launch. Customers can keep it longer as a subscription. The software monitors all circuits at all times, producing much more meaningful data than test systems that analyze each circuit at a discrete point in time. **"It's a multi-vendor, multi-technology, multi-layer system,"** said Byrne. "It's a far more holistic approach to testing."

WINNER: PUBLIC SAFETY TECHNOLOGY
PRODUCT/SERVICE: PUBLIC SAFETY NETWORK
TESTING SOLUTION

WHY IT'S A WINNER: PCTEL's IBflex® scanning receiver hardware, paired with the company's SeeHawk® Touch software on Android tablets, is making buildings safer and cutting costs for service providers, construction contractors, and building owners. The solution is used to measure coverage and signal quality on public safety frequencies and produce reports that conform to NFPA and IFC standards and local building or fire codes.

Building owners use it to meet code requirements and service providers use it to optimize public safety coverage, which is critical to first responders in an emergency. After a service provider upgrades a building's public safety system, the PCTEL solution demonstrates the improvement quickly and efficiently.

"We did the coverage testing in about 25% of the time planned. It really has changed the way we do business," said Jason Chambers, Area Service Manager for Day Wireless.

The PCTEL solution can reduce testing time by 75% because it tests all public safety frequencies at the same time using an automated procedure that records data in real-time and generates detailed, printable reports showing pass/fail results for all channels, bands and technologies at the building and floor level. Separate reports using different criteria can be

generated from the same test.

The solution can also be used to conduct walk testing and drive testing for design, verification, benchmarking, and optimization of cellular, public safety, and private radio networks. It measures all channels and technologies simultaneously at each grid location, including signal quality for P25, DMR, and LTE/FirstNet, and power for any LMR technology, such as TETRA, EDACS, and analog radio.

WHY IT'S INNOVATIVE: The PCTEL solution reduces the time technicians spend before, during and after they test public safety signal inside a building. The software makes it easy to import floor plans and set up grids and test criteria. The hardware tests the signal and the software automatically populates the grids with the necessary data, grades each floor and building, and generates printable reports for submission to local jurisdictions and building owners.

"It's a great piece of equipment that gives you the readings you need," said Joseph Rohlic, Director of Construction Services at Radio One. "I'm able to do my on-site pre-walks in half or even one-third of the time as before."

STREAMLINING IN-BUILDING CRITICAL COMMUNICATIONS NETWORK TESTING: A CASE STUDY

By David Adams, Director of Business Development, PCTEL, Inc.

When an emergency occurs indoors, first responders shouldn't have to wonder whether they will be able to communicate. That's why many local government jurisdictions require that building owners verify public safety network coverage. PCTEL developed a Public Safety Network Testing Solution to streamline the grid-based testing and reporting process that is used to ensure coverage. We quickly found that our solution was also being used to ensure in-building coverage for private critical communications networks.

In one instance, Day Wireless Systems, a wireless integration company serving California, Idaho, Oregon, Washington, and Wyoming, received the contract to build out a new BDA/DAS for a Fortune 100 company with a 2.3 million-square-foot manufacturing and data center facility. The system needed to serve both the operation-critical, on-site 900 MHz 'Life Safety' security and manufacturing communication system, and the local jurisdiction's P25 700 MHz public safety system for external fire and police emergency response.

EFFICIENT TESTING AND OPTIMIZATION

Day Wireless was given two days to bring the new DAS system online. Testing coverage across two different frequencies on a system of this size using a manual process can often take 20 man hours. With the PCTEL equipment, it took 1 tech 5 hours, reducing the man hours by 75%.

TIMELY, ACCURATE INFORMATION

PCTEL's SeeHawk® Touch software provides instant on-screen results, and printable reports are available within minutes of testing. "With the PCTEL equipment, there is no room for error in transcription," explained Jason Chambers, Day Wireless Area Service Manager. "This greatly improves confidence in the accuracy of results over the traditional process, where you have a floor plan with a bunch of grids on it and then a spreadsheet of hand recorded signal levels for each of the grids."

FAST DELIVERY OF CERTIFICATION REPORTS

When using a manual coverage test process, it usually takes 3 days to complete each report for a project of this size. Using PCTEL equipment, Day Wireless delivered both the life safety and public safety certification acceptance reports the next day. "The AHJ (Authority Having Jurisdiction) loved that he was seeing a direct extract from the PCTEL test equipment," said Chambers. "It is mapped right there on the grid and included in one report." The facility met requirements for occupancy related to public safety radio coverage 17 days ahead of schedule.

GAME CHANGER – A TRUSTED SOLUTION

"[PCTEL's testing solution] really has changed the way we do business, and not only just how long it takes to do things, or generate reports, but the confidence we have when we sit down with an AHJ or customer," stated Chambers. "We've started to use it more and more, not just for system coverage tests, but to help determine if a system's needed. It helps our engineering department to do pretesting on a retrofit or a remodel of a building. We can give our customers 'no kidding' data on what you should anticipate getting: the areas that need coverage, and the areas that are doing fine with coverage."

ENSURE CRITICAL COMMUNICATIONS COVERAGE

PUBLIC SAFETY NETWORK TESTING SOLUTION

Grid-Based Testing and Reporting for In-Building First Responder, Business Critical and Cellular Networks

- Simultaneously test multiple LMR and cellular networks
- Measure P25, DMR, UMTS and LTE/FirstNet signal quality, plus channel power for any technology
- Automatically generate real-time pass/fail results and printable reports
- Comply with NFPA 1221, IFC 510, and local code requirements
- Streamline the building approval process

> www.pctel.com/fierce

PCTEL

WINNER: SECURITY
PRODUCT/SERVICE: NETWORK SECURITY AND
FRAUD MANAGEMENT SUITE

WHY IT'S A WINNER: Mavenir's Network Security and Fraud Management Suite protects network operator revenues by addressing both security breaches and fraud. Network security is paramount as operators migrate to 5G, but service providers know it doesn't take a security breach to lose millions. Fraudulent use of the mobile network can occur even when security per se is not compromised.

"Fraud and security are often thought of as one category, but in reality, fraud teams and security teams are often split across different departments with no common systems. Mavenir has introduced to CSPs the opportunity to change that," said Mavenir Fraud Specialist, Marie Casey. Powered by machine learning, Mavenir's cloud-based solution gives operators one system and one data feed that can be used in multiple ways for multiple purposes.

Fraud costs network operators an estimated $29 billion per year, according to the Communications Fraud Control Association, and Mavenir says a single customer can save up to $24 million a year using its Network Security and Fraud Management Suite. A big part of this is revenue assurance: making sure all devices on the network are actually recognized and billed and locking SIM cards to devices. Another part is network protection; The Mavenir Signaling Firewall

(SIF) is meant to protect Mobile Network Operators' SS7, Diameter, SIP, and GTP signaling streams. Mavenir says it's unique in its ability to address complete telecom network security and fraud detection in a single solution.

WHY IT'S INNOVATIVE: Real-time machine learning means the Mavenir solution can detect and block security or fraud issues as they're developing, instead of collecting data, processing it, and then reporting the problem. "We use machine learning beyond anti-fraud, and it's very useful for network security scenarios as well," said Ilia Abramov, Mavenir VP and GM of the company's security business.

"This approach enables machine learning technology to complement our firewall offering by providing insight into the signaling elements and helping to prevent signaling attacks or fraud attempts." This means security breaches can potentially be stopped before they happen, and operators can save millions by intercepting scams sooner.

WINNER: SDN/NFV
PRODUCT/SERVICE: WIND RIVER LINUX

WIND RIVER LINUX

WHY IT'S A WINNER: Wind River Linux is at the forefront of the move to virtualize the 5G radio access network. To date, most 5G deployments have been focused on the RAN, and Wind River says its technology is powering the majority of 5G RAN deployments.

Wind River Linux is based on the Yocto Project, an open source collaboration that helps developers create custom Linux-based systems regardless of hardware architecture. Using Wind River Linux, network operators can use white box servers in a central office to control hundreds of cell sites,

WHY IT'S INNOVATIVE: Wind River Linux delivers technology to ease the adoption of containers in embedded systems. Containers are a way to package software so that applications can be separated from the hardware that runs them.

"As an example, containers can be used for virtual distributed unit (vDU) and virtual central unit (vCU) functions," said Michel Genard, VP of Products at Wind River. "Containerized applications performing these vRAN 5G network edge roles have been proven to be significantly more performant (latency, for example) than alternative approaches. Thus, vDU and vCU devices deployed at the edge, often

based on disaggregated approaches, are emerging as containerized technology solutions. **In these emerging disaggregated scenarios, it will be important to use a well-architected container-based infrastructure to manage a distributed edge cloud network."**

Containerization will also be important for 5G IoT applications. Mission-critical industries such as automotive systems, medical equipment, or factory automation typically use devices with long lifecycles, and as they adopt 5G connectivity they will need reliable software with similarly extended lifecycles. Existing container technologies and platforms, like those in enterprise Linux, often require updates too frequently to run effectively on these embedded systems. Wind River Linux makes it easier for embedded developers to successfully use containers by providing a lightweight solution. It is compatible with Docker under Open Container Initiative specifications, which allows applications to use the same Linux kernel as the system they're running on. But Wind River Linux has a smaller footprint than Docker, which is key to embedded developers.

CEL-FI: CHANGING THE FACE OF PUBLIC SAFETY COMMUNICATIONS

According to the First Responder Network Authority, communication is essential in an emergency. Public safety personnel out in the field need a strong wireless connection that is guaranteed through network priority and pre-emption, to protect and save lives.

Existing Public Safety communication was not uniform nationally; and because it was limited to push-to-talk, it did not support cellular technology that could deliver video and data. The FirstNet Authority was created in partnership with AT&T to provide a dedicated cellular public safety network for emergency personnel to use for critical voice and data communication. FirstNet is a high speed, nationwide wireless broadband network with dedicated band 14 for public safety agencies and first responders, as well as pre-emption support for all AT&T bands as backup frequencies.

While FirstNet is essential for the public safety market, its effectiveness could be significantly hampered because of the cellular coverage holes and poor signal areas that still exist inside many buildings and remote areas. Nextivity created the Cel-Fi GO RED FirstNet Booster to solve FirstNet cellular coverage challenges when communication is a matter of life and death.

Cel-Fi GO RED makes it easier and safer for first responders to do their jobs properly while minimizing risks to themselves and those they are tasked with helping. Operational in just minutes, Cel-Fi GO RED provides 100dB coverage for up to 15,000 sq. ft. per unit, powering a strong and reliable cellular connection on FirstNet-compatible devices inside buildings for emergency communication by police, fire, and medical personnel.

Cel-Fi GO RED is designed to withstand the elements, making it a robust solution for use in harsh conditions typical of emergency situations. There are a number of Cel-Fi GO RED and antenna configurations based on the size of the building, building materials, and wall arrangements, providing numerous options for installers. Cost-effective and straightforward to install, installers also appreciate how quickly it can be deployed.

Cel-Fi GO RED was the first in a trio of public safety offerings announced by Nextivity over the last year. Cel-Fi GO RED Portable Partner Solution Kits provide support for multiple carriers for mobile and emergency scenarios, while the Cel-Fi QUATRA RED in-building public safety ERRCS solution offers seamless public safety communications for SMB to enterprise size buildings.

These solutions represent a new approach to in-building public safety equipment, as well as portability to emergency situations in remote locations, by enabling reliable communication when and where it's needed most. By leveraging award-winning technology and incorporating feedback from integrators and public safety professionals, Cel-Fi solutions were designed specifically with the needs of the public safety market in mind, and are backed by a 100% performance assurance that has proven to be popular with customers, partners, and integrators around the world.

For first responders in emergency situations – and those they're tasked to help – Cel-Fi can mean the difference between life and death.

Learn more about the Cel-Fi RED Public Safety Line at cel-fi.com/red.

BUSINESS SERVICES

ADVA
ADVA ENSEMBLE
NFV SOLUTION - 18.4.1
RELEASE

AMDOCS
CPQ – CONFIGURE-PRICE-QUOTE, A LEAD-TO-CONTRACT AUTOMATION SYSTEM FOR NEXT-GENERATION VALUE-ADDED CONNECTIVITY AND ENTERPRISE SERVICES BUNDLES

SPRINT BUSINESS
SPRINT MULTILINE

BSS/OOS

BLUE PLANET, A DIVISION OF CIENA
BLUE PLANET PROACTIVE NETWORK SOLUTION (PNO)

MATRIXX SOFTWARE
MATRIXX DIGITAL COMMERCE

VERYZON WIRELESS
MATIOS (5G REAL-TIME DEVICE MONITORING ANALYSIS TOOL)

CLOUD SERVICES

CLOUDGENIX ™
SCLOUDGENIX
CLOUDBLADES PLATFORM

PUREPORT
PUREPORT'S MULTICLOUD FABRIC™
PUT BEFORE VERIZON

VERYZON WIRELESS
M-CAS - AI BASED 5G+MEC
COLLISION AVOIDANCE SYSTEM

CUSTOMER ENGAGEMENT

ANTHEM, INC.
CONCIERGE CANCER CARE

NUANCE COMMUNICATIONS, INC.
VODAFONE DEPLOYMENT OF NUANCE
INTELLIGENT ENGAGEMENT PLATFORM

RADISYS
ENGAGE@WORK

IOT

APTILO NETWORKS
APTILO ZERO-TOUCH WI-FI
IOT CONNECTIVITY™

IDEMIA
SMART CONNECT ENTITLEMENT

ZYTER
ZYTER'S DIGITAL EXPERIENCE PLATFORM

NEXT-GEN DEPLOYMENT WIRELESS

CISCO SYSTEMS
THE REIMAGINED 5G NETWORK

COLLINEAR NETWORKS
HYBRIDCNX-520

VERTIV GROUP CORP.
ESURE C48/58-1000 POWER
EXTEND CONVERTER

NEXT-GEN DEPLOYMENT WIRELINE

DRIVENETS
DRIVENETS NETWORK CLOUD

INFINERA
INFINERA XR OPTICS

TEJAS NETWORKS
TJ1400 ULTRA-CONVERGED BROADBAND ACCESS/EDGE (UCB) PRODUCT FAMILY

NETWORK TEST AND MEASUREMENT

ANRITSU COMPANY
RADIO COMMUNICATION TEST STATION MT8000A

LIGHTRIVER
INTELLIGENT FACTORY BUILT NETWORK (IFBN)

SOLUTELIA LLC
WIND® EDGEREPORT™

PUBLIC SAFETY TECHNOLOGY

NEXTIVITY
CEL-FI GO RED

PCTEL
PUBLIC SAFETY NETWORK TESTING SOLUTION

VERIZON WIRELESS
M-CAS - AI BASED 5G+MEC COLLISION AVOIDANCE SYSTEM

SECURITY

ALLOT
ALLOT SECURE

FRIEND MTS
FRIEND MTS ASID WATERMARKING

MAVENIR
MAVENIR'S NETWORK SECURITY AND FRAUD MANAGEMENT SUITE

SDN/NFV

AMDOCS
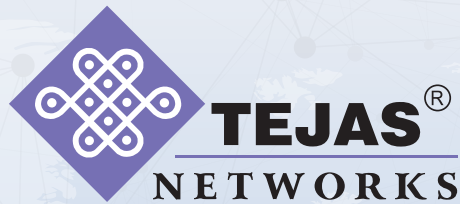AMDOCS NFV SD-WAN
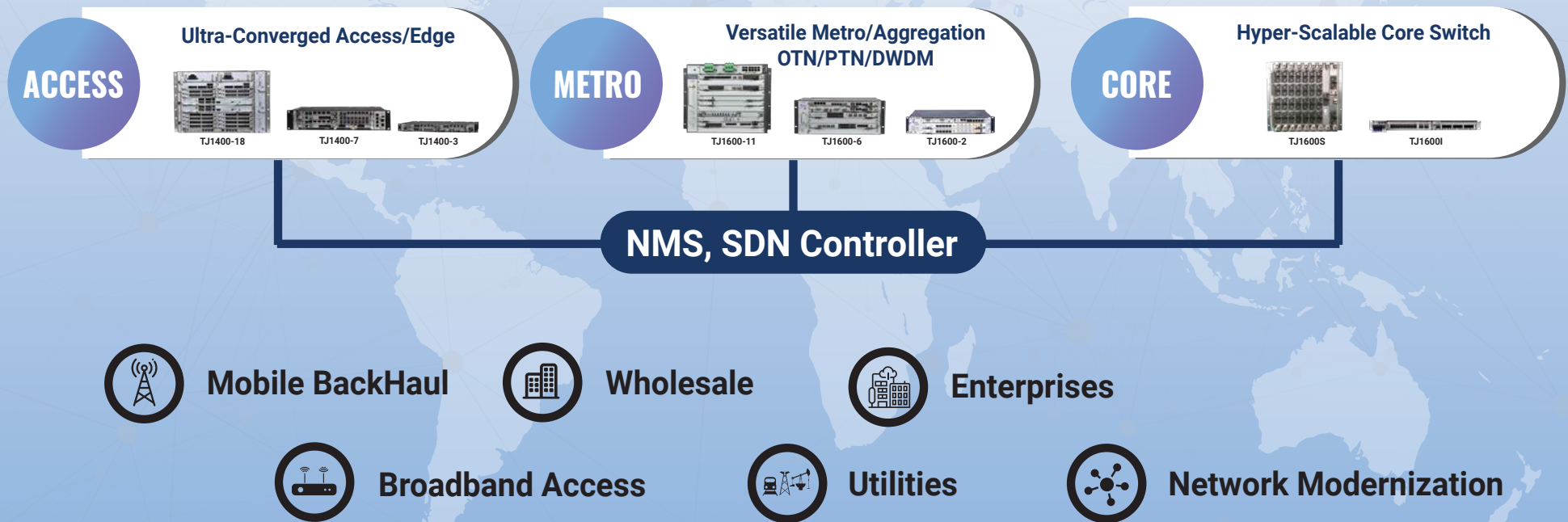PACKAGE ON AZURE

RTBRICK
RTBRICK FULL STACK
ROUTING SOFTWARE

WIND RIVER
WIND RIVER LINUX

COLLINEAR NETWORKS

Collinear Networks, Inc. provides wireless transport and edge solutions.

Addressing the need for ultra-high capacity wireless transport for 5G services, Collinear Networks provides a modular system called the CNX SystemTM. The CNX System includes:
• Free-Space Optical (FSO) and Radio Frequency (RF) wireless links
• Hybrid FSO and RF wireless inks
• Edge platform that provides switching and implements intelligent traffic handling.

Our free-space optical solution is the most advanced in the market, delivering up to 10Gbps over distances from 2km to 5km with high reliability and easy installation. Our mmWave links also provide up to 10Gbps.

And, our hybrid links (which tightly integrate mmWave and free-space optical) provide up to 20Gbps of capacity. Our solutions can also integrate with existing microwave to form dual-band or multi-technology links for the ultimate in wireless transport capacity and reliability.

We are headquartered in Santa Clara, CA, USA.

Learn more about Collinear Networks at www.collinear.com.

NEXTIVITY

The Cel-Fi GO RED FirstNet Booster amplifies FirstNet service inside buildings, ensuring that first responders have strong and reliable signals when using their cellular devices in emergency situations. The latest addition to the award-winning Cel-Fi product line, Cel-Fi GO RED delivers the same proven, strong, and reliable signal amplification of FirstNet band 14 and AT&T band 12 for a backup frequency. Cel-Fi GO RED can be deployed in just minutes at any emergency site with an Instant Coverage Kit that includes the required antennas, antenna mounting tripods, and power connectors. Cel-Fi GO RED is also indoor/outdoor NEMA4 rated to withstand the harsh conditions typical of emergency situations, and can be monitored remotely with the Cel-Fi WAVE platform.

Learn more about the Cel-Fi RED Public Safety Line at https://cel-fi.com/red/.

PCTEL

PCTEL is a leading global provider of wireless technology, including purpose-built Industrial IoT devices, antenna systems, and test and measurement solutions. Trusted by our customers for over 25 years, we solve complex wireless challenges to help organizations stay connected, transform, and grow.

For more information, please visit our website at https://www.pctel.com/.

PUREPORT

Pureport is committed to simplifying how enterprises connect their networks to the cloud, including eliminating complexities, high cost, long-term contracts, and recurring maintenance involved in connecting to the cloud. Pureport's Multicloud Fabric™ seamlessly orchestrates private connectivity to public cloud providers including Amazon Web Services, Microsoft Azure, Google Cloud, and Oracle Cloud. With Pureport's platform, enterprises can interconnect multicloud, hybrid cloud, or multi-site networks in minutes—with no need for additional physical infrastructure. Pureport's Distributed Multicloud Router supports thousands of virtual cloud connections per network and automatically scales with every new connection. Pureport's self-service Console makes management easy, and the API offers a DevOps-friendly solution.

For more information, visit www.pureport. com or connect with Pureport on Twitter and LinkedIn .

SPRINT

Sprint Business is changing the way SMBs, enterprises and government entities connect, manage and secure its people, places and things – orchestrating an array of next generation technologies, artificial intelligence and the power of Sprint's converged wireless, wireline and Curiosity™ IoT capabilities to create unparalleled products and solutions.

**https://business.sprint.com/
Twitter: @sprintbusiness
https://www.facebook.com/
SprintBusiness/**

VERTIV

Vertiv brings together hardware, software, analytics and ongoing services to ensure its customers' vital applications run continuously, perform optimally and grow with their business needs. Vertiv solves the most important challenges facing today's data centers, communication networks and commercial and industrial facilities with a portfolio of power, cooling and IT infrastructure solutions and services that extends from the cloud to the edge of the network.

Headquartered in Columbus, Ohio, USA, Vertiv employs around 20,000 people and does business in more than 130 countries.

Vertiv is proud to introduce the Vertiv™ eSure™ C48/58-1000 Power Extend Converter, a compact device that economically boosts voltage up to -58 VDC to support increasing power needs of remote radio heads on cell towers.

Learn more about the Vertiv Esure C48/58-1000 at vertiv.com/ powerextendconverter