JULY 2022

Bridging the Digital Divide and Paving the Way for Smart Cities

Celona's solution architecture for private mobile networks provides an unmatched opportunity for smart cities and their managed services partners:

A software-centric approach that makes it possible to enable private wireless connectiv1ty across communties and smart cities at rapid pace - delivering strong return on investment with non-metered cost structure.

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Introduction

Across cities in the United States, we've seen what technology can do to drive better decisions, support community initiatives, and power projects across education, emergency services and public safety. But our journey to connected communities is just starting.

According to a 2021 Federal Communication Commission (FCC) report on broadband deployments throughout the United States, millions of Americans continue to lack access to low-cost and reliable internet broadband services. This is an issue that has created what's being referred to as a "digital divide" – a gap between those that have access to internet and digital communications services and those that don't.

In addition, local governments in smaller communities are seeking ways to extend "smart city" technologies throughout their towns and counties with the purpose of enhancing the lives of residents. This could include projects such as community-wide surveillance and computer vision to improve public safety, intelligent air/water quality monitoring and various smart parking, traffic and street lighting systems.

As the need to access internet-connected services continues to grow, the digital divide could potentially leave many smaller communities behind. To solve this problem, local governments are now tasked with finding a solution that provides far-reaching and reliable broadband coverage to all residents in a cost-effective, easy-to-manage package.

We're now at a new crossroads. As our cities and people living in it demand improved service levels, existing wireless network infrastructures are struggling.

With the public mobile networks supporting high density of mobile users, a private mobile network presents the opportunity to enable remote learning for student homes that have the urgent need for reliable internet connectivity, with the eventual expansion into public safety and smart community services to further extend quality of life for all residents.

The Opportunity

Because residents in smaller communities are more geographically dispersed compared to urbanites, it's usually not economically feasible to build and operate a community-wide wired network for last-mile broadband connectivity. Instead, wireless technologies are a more realistic solution. Until recently, wireless deployments such as satellite, point-to-point or point-to-multipoint Wi-Fi and microwave have been the only readily available options.

While these types of wireless technology platforms can work in some use-case scenarios, they often fall short when it comes to providing wide-ranging coverage and reliable connectivity with predictable throughput and latency numbers that are required by modern applications.

Fortunately, counties, cities and school districts in the United States now have access to the Citizens Broadband Radio Service (CBRS) spectrum that is available for commercial broadband use within the United States. This gives school districts and/or local governments the ability to deploy a private LTE or 5G wireless network that delivers carrier-grade wireless connectivity for any number of educational and public health/ safety purposes.

A private mobile network delivers a growing list of benefits:

- Low cost to design, acquire and operate enabling deployments at scale
- Full control over the network configuration and devices that connect
- Guaranteed quality of service (QoS) on a per application basis
- Higher degrees of privacy and security for critical infrastructure connectivity
- Faster return on investment by supporting multiple use cases with a single network.

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The Solution

Several communities across the United States chose to bridge the digital divide with technical assistance and expertise from Celona. The proposed solution was to use Celona's portfolio of outdoor access points, private SIM cards and its cloud-native software platform to serve as the foundation for their county-wide wireless network.

The top priority use-case for all is to deliver broadband internet services for K-12 student households for educational purposes. Once the Celona private wireless network was strategically deployed to provide the best mix of coverage and performance within the CBRS spectrum, student households were outfitted with either indoor or outdoor LTE routers that serve as the on-ramp for student connectivity to virtual classroom content and technology. The private mobile network will be invaluable -- especially in the wake of the COVID-19 pandemic that forced many schools to begin offering online educational services as an alternative to in-person learning.

Celona's solution delivers on the promise for a non-metered cost structure with no cost per SIM per month: significantly reducing time to value. All software and hardware components required for the Celona private mobile network are provided as a single subscription SKU. Simplified ordering and pricing model that resembles enterprise network solution, easing consumption. The simple subscription pricing covers everything from the hardware (including part replacement), SIM cards, all software components that are delivered as SaaS, future software updates, maintenance and 24x7 support - in one 3- or 5-year price.

Deployed as overlay to any IT infrastructure across enterprise, government offices, school networks, Celona infrastructure does not require separate fiber/coax backhaul. Overlay architecture assumes no dedicated cabling and allows the service to be expanded wherever there is private network connectivity to smart city infrastructure.

The Future

The same Celona network would be used in other ways that serve the community, e.g., to leverage the wireless network as a reliable form of private voice communication for public safety and governmental purposes.

For each use case, Celona uses its patent pending MicroSlicing™ technology to appropriately secure and assign specific service levels for latency and throughput. For applications such as student remote learning, critical IoT infrastructure connectivity, public safety voice communications or video surveillance applications, network administrators can easily apply strict QoS guarantees to each of these traffic types – ensuring that the same infrastructure can be re-used for growing list of digital initiatives for many years to come.

As the requirements to enable new use cases emerge, Celona's innovation cycle can easily be mapped to support the IT leaders in the public sector. Celona accelerates technology delivery to its customers with a single support/warranty contract, single support/engineering team, unified roadmap across all components of its solution and rapid 4-week platform software release cycle for the entire solution. With an open ecosystem approach to fuel innovation, Celona partners with industry leaders like HPE Aruba, Qualcomm, Microsoft, Apple, Google, Cradlepoint, Sierra Wireless, Inseego, Zebra, NTT and others to enable new and innovative solutions for Smart Cities.

In addition, Celona's end to end solution from radio to core to cloud management architected work together rather than components that need integration. Entire solution developed in house for private networks rather than licensing products from multiple companies, allowing for better support and agility.

The Timing is Right

Thanks to the recent availability of the CBRS spectrum and Celona's technological advancements for private LTE/5G wireless, smaller communities finally have a last-mile wireless broadband solution.

One that rivals wired broadband alternatives from a performance and reliability standpoint at a fraction of the deployment and maintenance cost - and full privacy to the local government organizations that take advantage of it.

With the help of Celona, enabling a smart community in your town, city or county can be accomplished in 5 easy steps:

1. Work with Celona engineering team the Celona outdoor access point deployment on towers/rooftops,

2. Choose customer premise equipment (CPE) and end user devices required to connect users and devices to the private mobile network,

3. Create security and performance MicroSlicing policies to prioritize and secure important data flows,

4. Test against coverage and capacity requirements with automated site survey tools provided by Celona and its partners, and

5. Develop an educational and public service technology ecosystem that can utilize the private mobile network.

Conclusion

Instead of integrating different technology components from multiple product companies, Celona's solution and its go-to-market model has been designed from the ground up with private mobile networks in mind. Value to our customers across cities in the United States is clear: enable new digital services for all members of the community at a rapid pace and accelerate return of investment for wireless broadband initiatives.

SEE THE CELONA TECHNOLOGY IN ACTION

Request a free trial and custom product demonstrations by visiting us at celona.io/journey.

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