The Wireless Toolkit Has More Options Than Ever.

(And That's a Really Good Thing!)

The wireless toolkit is undergoing a transformation that is both evolutionary and revolutionary in response to the requirement for intelligent connectivity to achieve smart building and campus outcomes which include improved occupant experience, greater operational efficiency and meaningful data insights. As a result, IT Leaders can no longer rely solely upon Wi-Fi to connect the tens of thousands of sensors and the many devices and services inside buildings. Nor is it pragmatic to continue siloed wireless technology planning. Instead, a heterogenous approach is needed.

That's great news, because next-generation wireless technologies and solutions including 5G, Wi-Fi 6 and CBRS (Citizens Broadband Radio Service) among others are poised to not only enable myriad PropTech trends but, more importantly, spawn new applications thanks to new capabilities.

However, more options often leads to a maze of complexity, especially when multiple tools may offer seemingly similar benefits such as "performance." Therefore, it's tempting to fall into the "or" trap when it comes to network planning instead of embracing an "and" strategic outlook. Which is akin to the longstanding Beatles and Stones debate: why choose just one? Read on for guidance on the wireless toolkit.

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5G

None of the emerging wireless technologies combine as much hype, skepticism and game-changing potential as 5G, which is the fifth-generation cellular protocol defined by 3GPP, the de-facto standards organization for mobile telephony. Unlike previous generations (including the current 4G network) which were characterized exclusively by incremental performance, 5G is multi-dimensional. Not only does 5G provide an enormous pipe for enhanced mobile broadband, it also delivers ultra-reliable low latency for instant response action and supports massive multiple machine-type communication to enable an enormous number of simultaneous connections to the network.

5G capabilities will be leveraged for enhanced fan experience at sports and entertainment venues. It will connect sensors, monitors and meters throughout buildings, campuses and cities. It will elevate healthcare through remote robotic surgery and patient monitoring. Engineering firms will apply 5G for virtual reality and tactile internet capabilities, while immersive learning will improve education. Lastly, 5G will play a key role in Industry 4.0 smart factories.

Although mobile operators are aggressively rolling out the 5G macro network, the indoor environment historically trails the outdoor build-out by several years. Similarly, available spectrum and other regulatory concerns inform certain network capabilities and application use cases will emerge sooner than others. As building owners and operators await a more widespread deployment of 5G, they should not put on hold current cellular enhancement initiatives during which additional infrastructure such as fiber can be readied to support future 5G components or overlays.

Enhanced Mobile Broadband	Massive Machine-Type Communication	Ultra-Reliable Low Latency Communication
Capacity	*IoT*	*Instant Action*
Devices	Smart Buildings	Industrial Automation

Wi-Fi 6

Wireless used to be pretty simple for buildings: you deployed Wi-Fi. As a result, IT Leaders have nearly 20 years of familiarity with Wi-Fi. Marketed as Wi-Fi 6 as opposed to the IEEE standard, 802.11ax, the newest generation is focused on high efficiency wireless which exhibits certain advancements not unlike 5G including higher data rates, increased capacity, and improved performance in environments where there are many connected devices. In addition, it provides better power efficiency and interoperability. Significantly, Wi-Fi 6 seeks to address a well-understood vulnerability – security – through the addition of government-grade WPA3 security.

Wi-Fi will continue to be a workhorse throughout the built world, supporting a multitude of user devices such as laptops and smartphones, appliances including printers and video monitors, and IoT sensors. In addition, Wi-Fi 6 will enable specialty applications within sectors like – say – healthcare where patient monitoring, asset tracking and staff communications are wireless.

Wi-Fi 6 routers are already available, and devices such as laptops and smartphones are increasingly hitting the market. Given familiarity with deploying and supporting the technology, the take-rate will likely be high and fast because of low risk thanks to backward compatibility. Wi-Fi is clearly a staple of wireless connectivity, however, IT Leaders should nevertheless consider a heterogenous toolkit approach to ensure performance and integrity for business-critical applications and services.

Wi-Fi 6 TECHNICAL CHARACTERISTICS

✓ Higher Data Rates ✓ Increased Capacity ✓ Power Efficiency

✓ Interoperability ✓ WPA3™ Security ✓ Ease of Use

✓ Performance in Environments with Many Connected Devices

cbrs

Developed by the federal government, CBRS is not a technology standard but, rather, spectrum – specifically, 150 MHz of spectrum which constitutes a massive block that far exceeds that which is owned by mobile operators. What's similarly notable is CBRS is the first attempt by the Federal Communications Commission (FCC) to share spectrum for federal and non-federal use. It cannot be overstated how revolutionary this is because it democratizes access to cellular spectrum which, until now, was off-limits to most stakeholders including building owners. Now, nearly any building can deploy a CBRS network. That's why the block of spectrum is often referred to as the "Innovation Band."

In what has become a recurring theme among the next-generation wireless toolkit, CBRS delivers technology benefits of performance, reliability and security. In addition, it provides compelling business-oriented value propositions including CAPEX and OPEX ownership models.

CBRS will be used to support mission- and business-critical services that exceed the capabilities of Wi-Fi. Because reach and capacity extends beyond that of Wi-Fi, CBRS is ideal for supporting applications such as high-definition security cameras, and for providing connectivity where fiber runs are physically or financially unfeasible. CBRS capabilities inform it will play a key role in industrial sectors including factories, warehouses and logistics centers as well as mining and oil and gas. Lastly, CBRS may eventually emerge as a solution to provide multi-operator cellular connectivity inside buildings to support BYOD initiatives by removing the necessity of a carrier-initiated signal source.

CBRS-ENABLED APPLICATIONS

Access Control	Environment Sensors	Video Display
Asset Tracking	Fire & Outage Detection	Video Surveillance
Building Control	Location-Based Services	Voice Communication
Data Connectivity	Patient Monitoring	Wayfinding

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THE WAY OF A WIRELESS CONNECTIVITY HERO

Because every IT Leader has unique goals and requirements and, of course, because every building or campus is different, there is no "silver bullet" solution or cookie-cutter approach for wireless network planning. Nonetheless, there exist best practices:

- ➢ Be proactive, not reactive.

- ➢ Consider short-term (12-24 months), mid-term (3-5 years) and long-term (7-10 years) scenarios.

- ➢ Establish SMART Goals (where S = specific; M = measurable; A = attainable; R = relevant; and T = time-based).

- ➢ Capture business and technical requirements across functional area stakeholders.

- ➢ Identify financial monetization and federal / state / municipal compliance guidelines.

- ➢ Embrace a heterogenous network approach and adopt the best tools for the job.

- ➢ Plan for the unexpected by designing for capacity and infrastructure upgrade contingencies.

- ➢ Don't go it alone: engage trusted resources early and often.

SMART WIRELESS SOLUTIONS

RF Connect delivers forward-leaning wireless broadband solutions that connect people, devices and buildings to make them more productive, happier and safer. We do this by designing, deploying, managing and operating wireless networks that enable user and public-safety communications and support critical applications and services. As a trusted advisor, we employ a heterogeneous approach that aligns the best technology solutions (including Wi-Fi, 4G, 5G, CBRS, FirstNet and network infrastructure), capital funding and financing, and turnkey managed network services to support the current requirements unique to each client and to anticipate new ones.

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