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Beyond Wi-Fi: Creating smart education
campuses with pervasive broadband

Private wireless networking for higher education

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Higher-education institutions play a key role in shaping our society and ensuring graduates are ready with the right skills for Industry 4.0. Up to now, these institutions have relied on Wi-Fi networks for campus connectivity and digitalization. But with Wi-Fi reaching its limits of mobility, security and total cost of ownership (TCO), new technologies are emerging.

A private wireless network supported by fixed wireless access (FWA) and optical LAN can meet institutions' connectivity needs — and support a wider set of mission-critical services and operational capabilities.

The connected education environment

Institutions need fast, secure, high-throughput campus networking to support a wide range of applications including:

Classroom technologies such as smart boards, smart podiums and smart lighting so instructors can enhance the learning experience.

Digital productivity tools that enable students and staff to get more done while attending classes and practicums and while on the go.

Well-equipped **Industry 4.0 labs** to power research into critical communications technologies and IoT applications.

Campus security technologies such as video monitoring, smoke sensors, emergency call buttons and fever detectors to help make campuses safer and ensure student health.

Augmented and virtual reality classrooms to support **remote learning**, enabling students and teachers to participate from anywhere.

High-quality, affordable **residential connectivity** that provides internet access, communications, automation and smart devices for students who live on campus.

Mobile e-commerce so students and staff can buy food, event tickets and other merchandise, further supported with autonomous vehicle-based delivery services.



To support these applications, campus networks need to be secure and reliable, with high performance, extensive coverage, high capacity and support for user mobility. Today, 4.9G/LTE private wireless networking is already meeting these needs — and 5G is even more powerful.

Future-ready performance

A 4.9G/LTE or 5G private wireless network gives higher education institutions everything they need to serve staff and students today and evolve over time.

Reliability

Cellular networks schedule loads more effectively than Wi-Fi, keeping performance stable and predictable no matter how many users are on the network at once.

Coverage

Wi-Fi signals have trouble getting around obstructions including buildings, trees, large vehicles and metal fences — making it difficult to achieve full coverage of a large complex like a university campus. With higher-power, lower-frequency radio signals that can travel farther, 4.9G and 5G generate broad coverage.

Capacity

4.9G/5G's advanced scheduling capabilities mean each small cell can handle hundreds of users actively communicating at once — while Wi-Fi access points often struggle to handle more than 50.

Mobility

Wi-Fi was never designed for mobility and doesn't manage it well, with slow handoffs between access points that make true mobility impossible. LTE/5G are built to ensure seamless coverage no matter how far or how fast users and their devices travel.

Performance

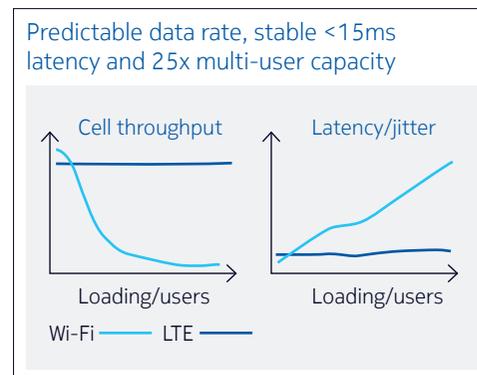
Unlike Wi-Fi, LTE/5G performance does not degrade with the number of connected users or devices. Combined with a decreased vulnerability to interference, this means private wireless produces much better, more reliable performance.

Security

Wi-Fi's vulnerability to hacking has made many institutions hesitant to adopt other kinds of wireless solutions, but private wireless offers end-to-end encryption and military-grade security to keep operations and sensitive data safe.

Lower TCO

A private wireless network has an overall lower long-term cost of ownership than Wi-Fi: the larger coverage area reduces the initial capex, and the network's much higher capacity eliminates many of the costs that would come with scaling up the access points.



The power of fiber

For situations that demand high-capacity wired connections, passive optical LAN (POL) uses optical fiber to deliver high-bandwidth connectivity where you need it — providing better service than traditional copper cabling at a much lower cost.

Going farther with FWA

Fixed wireless access (FWA) extends the reach of private wireless networks to remote buildings or student residences.



Having a single private wireless network to handle all loads and applications is easier to manage — with better performance, stronger security and greater flexibility.

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As a trusted partner for critical networks, we are committed to innovation and technology leadership across mobile, fixed and cloud networks. We create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Adhering to the highest standards of integrity and security, we help build the capabilities needed for a more productive, sustainable and inclusive world.

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