Meet your business objectives with small cells
Lead the game, connect the city
Small cells open new ways for operators to meet the coverage and capacity needs of their customers in urban and rural areas, indoors and outdoors.
Big trends. Macro networks alone cannot cope

Demand for mobile broadband continues to climb. Growing indoor use requires a major boost in coverage and capacity. Urbanization is soaring. City-living will be the norm for two-thirds of the world’s population by 2050. Regulatory and market needs are forcing the roll out of high-quality access to even the remotest rural areas. New technologies are coming on stream at an accelerating pace.

For CTOs and network planners working with constrained budgets, these trends make it more complex to blend new and old technologies to create a future-proof network; one that can satisfy demand and support innovative services.

The task is equally difficult for operators’ segment managers working to protect profitability, create new business and extract maximum value from customer demand. Generating business growth depends not just on identifying lucrative new opportunities, but being able to address them quickly.

Small cells are the most cost-effective way to achieve densification. Some 98 percent of mobile operators agree, saying small cells are essential to their future strategy.2

Densify to meet demand

Capacity is fundamental. Building greater capacity means networks need to be densified. Base stations will need to be positioned ever closer together. Densification brings massive capacity and high spectral efficiency that substantially improves the customer experience.

While many issues can be tackled by extending and upgrading existing networks, there are limits on macrocellular infrastructure. In urban areas, upgrading macro-based coverage and capacity is extremely challenging. Locations suitable for new base station sites are rare, dogged by regulatory bureaucracy and prohibitively costly to acquire and build.

Site acquisition is easier, while deployment is faster, leading to the lowest cost coverage. Small cells can be quickly dropped into locations where demand is greatest, both indoors and outdoors, enabling operators to adapt to the changing urban environment and new customer demand patterns. Operators can even use small cells to integrate Wi-Fi into networks and use it as simply another option in the portfolio of radio access technologies.

Meanwhile, small cells are an effective way to implement coverage in rural areas where demand cannot justify the high cost of macrocell deployments. Even in remote locations some sites, like tourist attractions, can deliver significant revenue that is easy to capture with small cells.

2 The Dell’Oro Group, Informa Telecoms & Media
A small cell for any occasion

Nokia has built the industry’s widest portfolio of small cells, helping meet operators’ business needs in all circumstances. Whether fulfilling consumer demand, providing huge capacity at public venues, densifying urban networks, delivering indoor coverage to win valuable enterprise revenue, or rolling out rural service, Nokia Small Cells are ready.

In fact, Nokia is seen as the leading provider of small cells by several analysts whose reports cite the largest portfolio of residential small cells; highest maximum power; innovative, future-proof and well-rounded solutions; and ease of deployment supported by services. These attributes have led Nokia Small Cells to be adopted by almost 250 service providers and enterprises across all continents.

The Nokia Small Cells offer includes a family of self-installed Femtocell access points to address the fast-growing revenue opportunity from small office and enterprise indoor demand.

These are complemented by the Nokia Flexi Zone portfolio for larger indoor spaces and outdoor. Flexi Zone introduces a novel “hot zone” architecture that simplifies the deployment and operation of multiple small cells. It boosts performance and significantly reduces the Total Cost of Ownership (TCO) by up to 50 percent compared to stand-alone small cells.

A compact guide to small cells

Femtocell
A small, low-power, wireless access point designed to improve mobile signals in residential and small business environments.
Indoor: 10-125mW
Coverage radius: 10s of meters

Picocell
The second-smallest wireless connection point offering mobile coverage and capacity in medium to large and public indoor spaces.
Indoor: 125-250mW
Coverage radius: 10s of meters

Microcell
With the largest coverage area for small cells, microcells are mostly used in city centers and other densely populated areas/venues.
Outdoor: 1-10W
Coverage radius: 100s of meters

Mini-macro BTS
A small cell sized base transceiver station (BTS) with the same coverage as a macrocell base station. Improves urban, outdoor-in, rural, suburban and tourist area capacity and coverage where a macrocell is impractical or intrusive.
Outdoor: >10W
Coverage radius: kilometer(s)

Macro BTS
High power radio cell providing mobile network coverage and capacity for the largest areas, conventionally mounted on towers.
Outdoor: >10W
Coverage radius: kilometer(s)
Indoor coverage for the home and for the business

Nokia Femtocells meet the demands of residential use and small office, home office (SOHO) applications by optimizing coverage and capacity. They offer a cost-effective and self-deployable way to deliver mobile signals inside small and medium-sized buildings.

- 80% of data traffic is generated in indoor urban areas
- 87% think it is imperative to have inbuilding cellular coverage
- 84% of operators receive customer complaints about poor inbuilding coverage
- 30-40% cheaper to deploy femtocells than macrocells

Nokia Home Cell V3 and Femtocell Multi-band Residential

These low-power, high-capacity femtocells provide 3G or 3G/4G coverage and capacity to the home, delivering fast, responsive data service and crystal-clear voice. Featuring plug-and-play self-installation, the cell uses an existing broadband internet connection accessed through Ethernet, supporting from eight to 16 simultaneous users.
Nokia Enterprise Cell V2.2 and Femtocell Multi-band SOHO

Providing scalable 3G or 3G/4G capacity for small to medium enterprises, these self-deployable small cells target small public indoor and enterprise office spaces. The access points can support from 32 to 64 simultaneous users and multiple cells can autonomously self-organize, providing coverage for an enterprise up to 5000m². Enterprise femtocells provide seamless mobility and simultaneous voice and data service continuity with the macro network.
Expand coverage and capacity, when and where it’s needed, outdoors and indoors

Nokia Flexi Zone is an innovative small cell cluster solution with two key elements – Flexi Zone access points and the Cloud Flexi Zone Controller. Flexi Zone access points combine low power LTE, 3G and Wi-Fi into self-configuring units to provide coverage and capacity underlay networks, both indoors and outdoors. These access points can operate as stand-alone small cell base stations and then be expanded by adding a Cloud Flexi Zone Controller, enabling very large deployments with minimal impact.

The solution allows an operator to build almost unlimited capacity and coverage, offering up to 50 percent lower overall costs than conventional small cell or DAS deployments. This scalability allows Flexi Zone solutions to tackle very large indoor spaces such as airports, stations or whole urban centers.

**Nokia Flexi Zone Access Points – compact and powerful**

Flexi Zone small cells are not only the smallest in the industry, they are also the industry’s only base stations to offer the same features and capacity as macro cells. This simplifies the integration and operation of small cells with the macro network to offer 30 percent lower overall costs than conventional units.

Flexi Zone Multi-band base stations’ modular design supports multiple carriers across various frequency bands (including 3GPP and 5 GHz bands) offering high performance with a combined data rate of more than 1 Gbps. To serve the most demanding hot spot/ hot zones, operators can also deploy this platform by using Licensed Assisted Access (LAA) and Carrier Aggregation (CA) across licensed and unlicensed spectrum.

Flexi Zone can be also used to overlay LTE on top of older DAS systems or to provide a competitive alternative to DAS and hybrid DAS in very large buildings. In effect, Flexi Zone offers the lowest upfront costs and simple deployment through its ability to piggyback on existing Ethernet and offers the possibility of network sharing from day one.
Finding new sites for traditional macro cells is increasingly complex and expensive. Small cells will play a critical role in providing operators with a solution that can be easily and quickly deployed in strategic locations to add capacity. These smaller radius sites will be characterized by “light” deployment principles involving low-cost, easily available locations such as light poles, traffic lights, building walls and street-level shelters. The critical enablers for these deployments are base station size, low power consumption and “all in one box” solutions.

Flexi Zone Micro Small Cells are suitable for deployment outdoors and in harsh indoor environments. They support all the most commonly used frequency bands for 3G, FDD LTE and TD-LTE. The range includes optional Wi-Fi, enabling operators to take advantage of unlicensed spectrum to further increase site capacity and improve the customer experience at busy locations.
Nokia Flexi Zone Indoor Pico and Multi-band Indoor Pico Base Station

As operators continue to deploy 3G and LTE networks, the need to provide better coverage and capacity is becoming more urgent, especially within buildings where most data is consumed. Nokia indoor small cells allow mobile operators to deliver on both needs using a compact and discrete 3GPP compliant solution that provides a low TCO indoor solution that takes advantage of existing LAN infrastructure, making it as easy to deploy as Wi-Fi access points.

Flexi Zone Picocells feature a compact single enclosure, designed for ‘light’ installations, whether ceiling or wall mounted. The advanced modular design enables a faster time to market for the many variations of technology and bands expected for indoor small cell deployments.
Nokia Flexi Zone Mini-Macro LTE Base Station

Flexi Zone Mini-Macro Base Station’s “macro like” RF power (2 x 20W) allows operators to provide macro-sized coverage in locations unsuitable for macro base station deployment. As well as being an easy way to provide rural coverage, the base station opens new use cases such as low cost indoor coverage for high rise buildings from an outdoor deployment on an adjacent building (‘outside-in’), deeper outside-in coverage from street level deployment and for discreet deployments in sensitive residential or tourist areas.
Nokia Cloud Flexi Zone Controller

Flexi Zone’s innovative zone architecture uses multiple low power indoor or outdoor access points (APs), coordinated by a localized zone controller. The Cloud Flexi Zone controller - a virtual function running on a server platform - allows operators to coordinate small cell clusters and limit the transport, Evolved Packet Core and Operation and Management impact of large deployments, while ensuring trouble-free integration with existing network infrastructure.

This compact controller platform can be deployed either locally in enterprise IT networks or centrally in an operator’s own telco sites. Each zone can contain up to 1,000 Flexi Zone access points, bringing flexibility to expand as needed and acts as a single eNodeB to simplify large small cell deployments.
Expert support for building and running dense networks

The Nokia Small Cells portfolio is supported by expert Services for HetNets. Nokia provides a complete set of services to help operators achieve the best and most cost-effective network to meet their business objectives.

- **20%** lower TCO can be achieved with the help of SCORE methodology compared with traditional methods.
- **30%** faster deployment is possible with the Nokia Site Certification partner program and SCORE methodology.
- **21%** higher data rate.

4 Nokia SCORE (Site Certified for Overall Relative Efficiency) provides a rating of qualified small cell sites.
5 Based on Nokia field studies.
Nokia experts look at how small cells can best be planned to support the coverage and capacity of the macro network layer. When sharing the same frequency band, small cells need to be located carefully to avoid interference from macro base stations. Precise radio planning and thorough backhaul planning ensure that extra capacity is placed close to subscribers. This gives better quality and steers traffic efficiently from the macro layer onto the small cells.

Nokia helps minimize risks and get new sites up and running as quickly as possible. Small cell Implementation is based on a clustered approach to site activities in which multiple small cells are deployed at the same time. Standardized processes and installation accessories matched to the site location further improve efficiency, reducing deployment time from days to hours. Alternatively, an operator can ask Nokia to take responsibility for providing complete, ready-to-go network sites, handling all negotiations with local authorities and site owners. This turnkey approach further speeds up small cell deployment and minimizes risks.

Once the small cells are deployed, Nokia ensures that all network layers work well together. This includes improving data speeds and ensuring successful handovers between calls and connections as subscribers move around. Traffic balancing shares voice calls and data volumes efficiently between the macro and small cell network layers, making the best use of the available resources and boosting the customer experience.
Small cells – today’s answer for future growth

With its complete portfolio of small cells products and services, Nokia aims to help operators deliver compelling services and customer experiences that can increase revenues from consumers and business users. Small cell networks enhance network quality and create more loyal customers.

Differentiating their services by providing a totally reliable and always accessible high speed, high throughput network will help operators to meet the needs of demanding subscribers and prevent them churning to a rival provider.

Find out more about Nokia Small Cells at:
https://networks.nokia.com/products/small-cells