



Solution Brief

Wireless Mesh Network

Outdoor Wi-Fi made simple

Pervasive Wi-Fi

Wi-Fi has forever changed the way business users and consumers access the network. With millions of Wi-Fi devices shipping annually, the technology is integrated with virtually all mainstream mobile devices including laptops, tablets, PDAs, and even cameras, cell phones, and MP3 players. Wired access is giving way to Wi-Fi, indoor/outdoor boundaries are being blurred, and the familiar Wi-Fi hotspot is evolving to user-friendly hotzones and ultimately full-scale city broadband wireless.

Moscow's Golden Telecom was looking for a way to expand its broadband access network with WiFi, and needed to get coverage to over 3.9 million people. And to further complicate matters, there was the harsh outdoor climate of Russia to factor into deployment. Golden Telecom chose Nortel, and now boasts the largest Mesh network in the world, with over 14,000 deployed access points. It is expected that 2008 will see the network expand even further, demonstrating the enhanced scalability of Nortel's solution. "Only Nortel was able to offer us a

robust, scalable wireless mesh solution capable of delivering reliable and secure services to over 3.9 million households" said Alexander Rozanov, Director, Business Development, Golden Telecom.

Wireless Mesh Network feature highlights

- > Interference mitigation dual radio design
- > Indoor/CPE mesh access point
- > Range maximization with smart antenna design
- > 4-radio Duo-mode configuration
- > Adaptive Mesh Management Protocol
- > VoIP support through QOS enforcement
- > WiMAX/4.9GHz backhaul options
- > Superior price/performance ratio
- > Aesthetically pleasing
- > Lowest power consumption in the industry
- > Lightest access point in the industry
- > Highest receive sensitivity for improved performance



Outdoor Wi-Fi

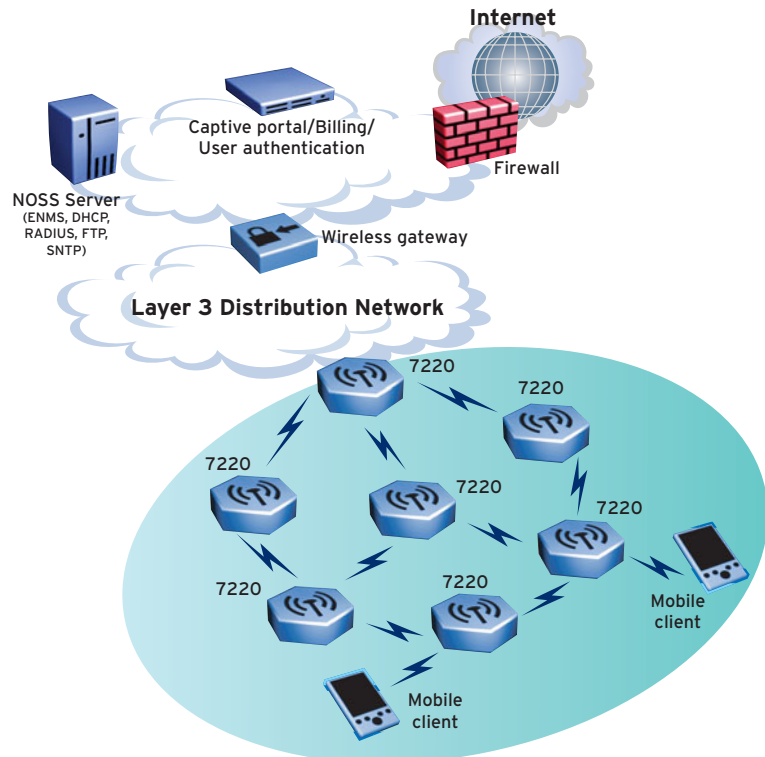
Outdoor Wi-Fi deployments create unique challenges. Mesh is ideally suited to outdoor deployments; only one AP needs to be physically connected to the network and provides connectivity to those around it. Additionally, Mesh requires only power, and is well-suited to handling line of sight issues due to its topology, allowing for much greater distances between APs. Mesh is weather-proof, easy to deploy, and is extremely scalable. The cost to cover an area with Mesh is relatively low when you take into account all factors associated with network deployment.

WLANs can be cost-prohibitive for massive scale outdoor projects with coverage requirements that dwarf even the largest indoor implementations. Nortel also provides scalable indoor Wi-Fi solutions to fit any need; these include our Wireless LAN 2300 series products for Enterprise deployments, as well as the Wireless Mesh Access Point 7215 for expansive indoor environments.

Wireless Mesh Network and Architecture Improvements

Nortel's Wireless Mesh Network (WMN) is a secure, and highly scalable Wi-Fi solution that delivers low cost wireless broadband for outdoor or expansive indoor areas. WMN makes outdoor Wi-Fi viable and is designed to enable a new revenue opportunity for service providers or municipalities to enable enterprises to extend their private WLANs to outdoor areas.

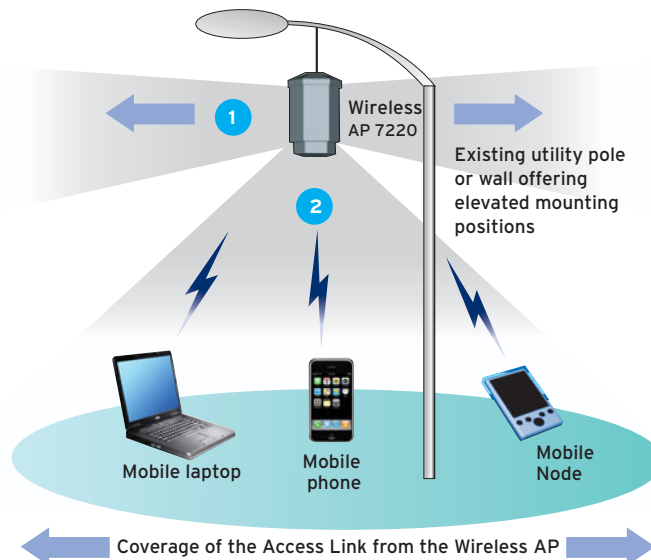
Figure 1. The Wireless Mesh Network architecture



Mesh architecture: Nortel's Wireless Mesh Network simplifies outdoor Wi-Fi. Wireless transit links between access points means they can be mounted virtually anywhere — without the complexity and cost of running Ethernet cables outdoors.

WLAN architecture: WLANs rely on access points that must be individually wired. This architecture is complex and costly to deploy outdoors. APs must also be within 100m of a network switch — further limiting mounting options and coverage.

Figure 2. Wireless Mesh Network radio architecture



1 Transit Link @ 5 GHz (802.11a)

- Reduces backhaul facilities and OPEX up to 70%
- Seamless mobility

2 Access Link @ 2.4 GHz (802.11b/g)

- Reduces deployment and operations cost up to 75%
- Just add power
- Auto configuring and recovery

The Wireless Mesh Network features three main elements — Access Points (APs), Wireless Gateways (WG) and the Wireless Mesh Management platform.

The **Access Points** perform client access and traffic distribution functions. The dual-radio APs feature a unique inter-AP wireless transit capability with adaptive wireless mesh routing. Client access is 802.11b/g in the 2.4 GHz spectrum and transit is carried over 802.11a in the 5GHz spectrum. Two models are available:

- The Access Point 7220 can be deployed indoors or outdoors and features a rugged, weather-proof housing with integrated smart antennas. A Duo-mode option allows two 7220s to be co-located and cross-connected for a 4-radio co-coordinated configuration that doubles radio resources for both transit and access links to improve throughput and latency.



Wireless Mesh Access Point 7220

- The Access Point 7215 is a cost-effective indoor access point that can be deployed for Mesh-based broadband wireless service, or as a seamless indoor extension for enterprise deployments. The AP 7215 can connect to the network via a wired Ethernet connection or wireless transit link with other Mesh APs.



Wireless Mesh Access Point 7215

The Wireless Mesh Network features three main elements — Access Points, Wireless Gateways and the Wireless Mesh Management platform.

- Enhancements to Wireless Mesh in release 3.1 include further ease of deployment, and features supporting lower latency and greater throughput.

Wireless Gateways logically connect the Mesh network IP Subnet(s) to the enterprise wired network, or service provider's distribution network, and are responsible for routing, mesh transit link security, stateful firewalling, user data path security, and wireless user mobility.

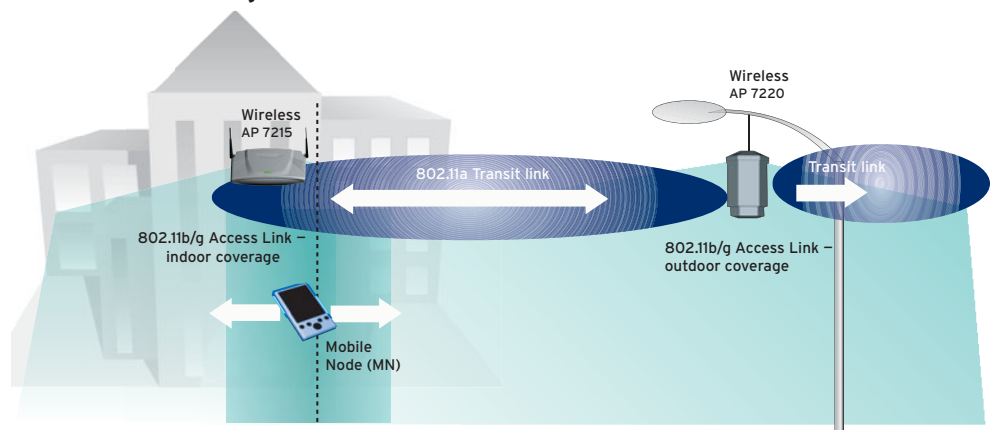
- The Wireless Gateway 7250 features security acceleration hardware, dual 10/100 Ethernet interfaces with expansion slots, and support for up to 90 Access points.

The **Enterprise Network Management System (EMMS)** is an enhanced version of Nortel's ubiquitous Enterprise Network Management System — a common management platform shared among a wide breadth of Nortel wireless and wired networking products. The system provides a centralized utility for monitoring and managing wireless mesh network operations including:

- Discovery and visualization of Access points, Wireless Gateways and Wireless Bridges
- Visualization of mesh routes
- AP status monitoring, event logging and alarms
- Fault management, including capturing and logging of traps and faults
- Real-time performance metrics logging including utilization, error rates, and
- Provides an intuitive user interface for monitoring and reporting.

No wireless mesh solution is complete without a comprehensive portfolio which supports and enhances its capabilities. To that end, Nortel offers multiple backhaul solutions to extend and complement the robust mesh network, a tested and verified voice solution that operates with a number of clients, call servers, and transport mechanisms, and a rich application portfolio that is available for demonstration in our Solutions Interoperability Lab.

Figure 3. An indoor Wireless Mesh Access Point 7215 enables seamless roaming between indoors and outdoors



Flexible Mesh Backhaul Options

A feature of the mesh network architecture is that each wired access point can share its Ethernet connection with multiple meshed access points. Additional wired APs can be added to provide resiliency, or to improve throughput by decreasing the number of transit link hops to the wired network.

The locations where wiring is possible are typically limited, and represent the most restrictive planning parameter for any installation. Nortel offers flexible mesh backhaul options that overcome this restriction and can greatly expand the deployment opportunities, reach and service potential of the mesh network.

The **Wireless Bridge 7230** is deployed in pairs to create a long-range wireless link that provides a wireless Network Access Point (NAP) for the mesh group. The bridge can be configured to operate in the 5GHz unlicensed spectrum, or the 4.9GHz licensed public safety band to create low-cost, high-capacity line-of-

site wireless links for rapid deployment of long-distance Ethernet links.

- With external antenna, the 7230 supports up to 17Mbps full duplex for link distances as far as 6 km, and up to 120 km at lower data rates
- Integrated flat panel antenna version supports up to 17Mbps full duplex as far as 2 km and up to 30 km at lower data rates
- 4.9, 5.3, 5.4, and 5.8 GHz band product variants available
- Near line-of-site transmission support
- Upcoming 50 Mbps throughput support in late 2008, and 100 Mbps in 2009

Another alternative is using Nortel's **Fixed WiMAX 1000** portfolio for backhaul. Its base transceiver stations (BTS)

and terminals are modular and support high-bandwidth, long range WiMAX backhaul links in both licensed and unlicensed spectrum without line-of-site restrictions.

Voice over Wireless Mesh

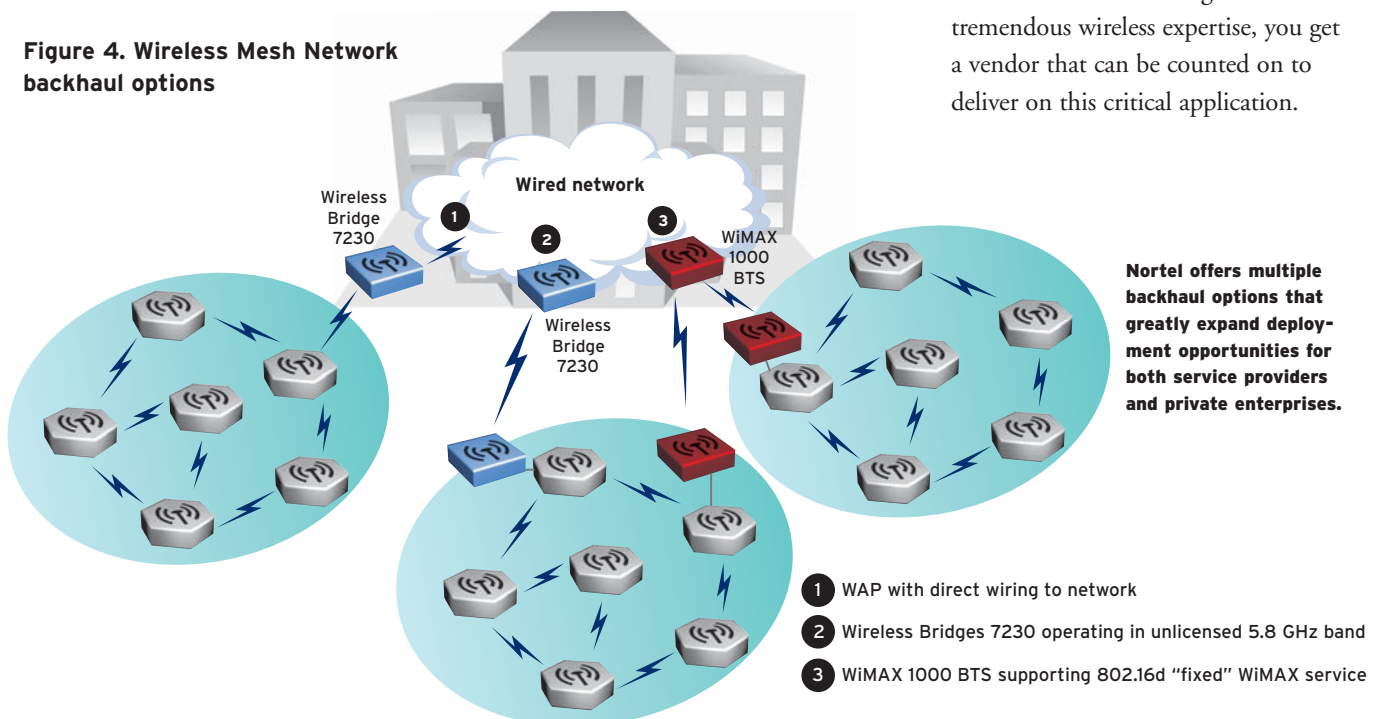
Wireless Mesh's versatility is further evidenced by its handling of voice protocols. Voice over Wireless Mesh is now very much a reality, giving way to a wide range of applications. There is significant opportunity for reduced voice costs, both from an infrastructure (provider) and usage perspective, and with the emergence of Wi-Fi based voice devices such as dual-mode cellular/Wi-Fi and pure Wi-Fi based handsets, laptop and PDA voice clients, etc.

VoIP Applications such as Skype are becoming increasingly prevalent, and are rapidly becoming the mobile communication application of choice. Quality of Service (QoS) is critical to ensuring solid voice capabilities, and you'll find it built into Nortel's Wireless Mesh. QoS classes supported by the mesh portfolio include voice, video, best effort, and background. When you factor in Nortel's rich voice heritage with its tremendous wireless expertise, you get a vendor that can be counted on to deliver on this critical application.



Wireless Bridge 7230 on pole mount

Figure 4. Wireless Mesh Network backhaul options



Consider the Nortel advantage where new voice installations are concerned:

- Wireless backhaul and outdoor packaging allows new environments to be addressed
- Cost effective deployment of broadband access
- Use of unlicensed spectrum, mass 802.11b/g devices
- A complete portfolio of Call Servers, user clients, and transport infrastructure
- Nortel has over 100 years of voice experience; hundreds of millions of people make billions of wireless calls on Nortel wireless networks

Voice possibilities in Wireless Mesh Network environments are varied, and can include:

- Complement/alternative to cellular in target areas — downtown hot zones and city-wide coverage
- Delivery of broadband voice and data services to unserved areas — rural areas/towns, underprivileged areas, and developing countries

- Reduced communications cost for campus environments — opportunities to leverage existing LAN networks, combined with data applications on the same infrastructure
- Higher Education, enterprises, factories and warehouses
- Temporary or specialized deployments — government/military deployments, emergency response scenarios

Simplifying Mesh Deployments

Flexible mesh management is an integral component of the Mesh AP operating system and has been solely developed to simplify the deployment and operation of Mesh networks and optimize its performance and availability. Key functions include:

- Auto-discovery of neighboring APs and available routing paths upon initial boot cycle
- Auto-configuration and system synchronization without manual intervention

- Radio resource management featuring auto-channel negotiation and assignment with neighboring APs to minimize the effects of interference
- Smart Antenna management to control the sophisticated 6-panel integrated directional antenna array for optimized transmission quality and data rates
- Lowest power consumption in the industry, making Nortel the ecologically-friendly choice
- Industry's lightest mesh access point
- Dynamic mesh routing to establish available mesh routing paths and monitor their performance
- Fast fault-recovery ensures service resiliency by dynamically re-routing in the event of AP failure
- Scalability with low cost Access Points that require only mounting and power; high AP density per each Wireless Gateway

Nortel Leadership in Mesh Networking

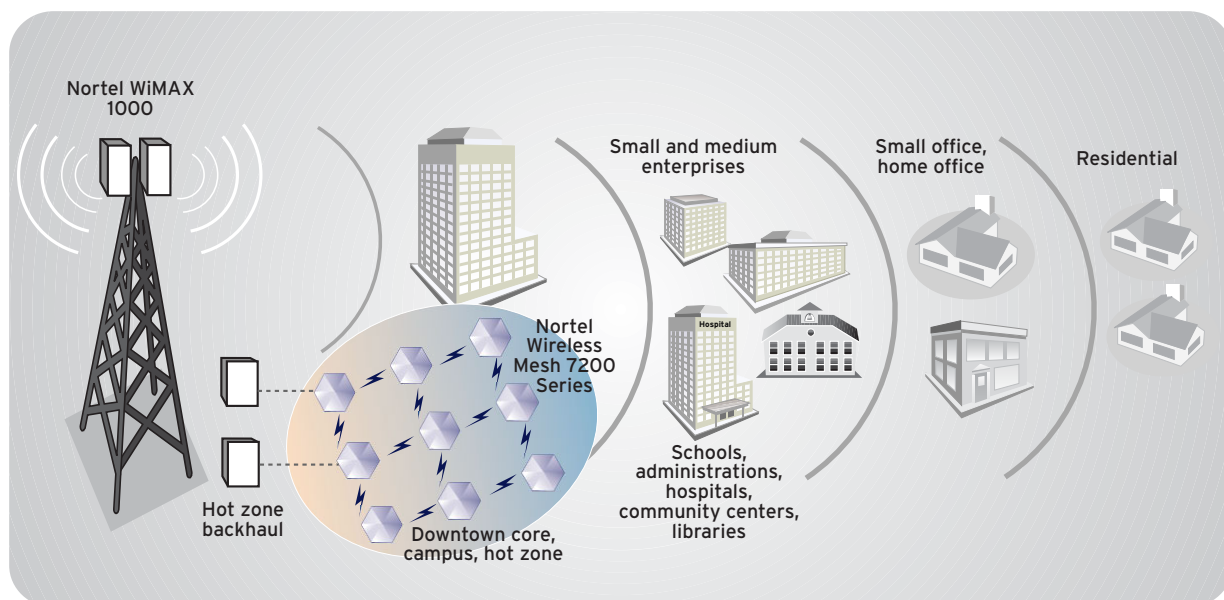
Interference mitigation — The most destructive phenomenon for wireless networks is interference. Nortel's dual-radio design uses different spectrums for transit and access to enable high-density deployments without the self-interfering limitations of single-radio designs. Flexible mesh management allows APs to survey RF characteristics, share information with neighbors and negotiate the transit link channel configuration that delivers the best signal and data rates. Nortel's exclusive Smart Antenna technology intelligently controls multiple integrated directional antennas and establishes transit link beams that don't interfere with non-targeted neighbors.

Stronger security — Expansive mesh networks rely on transit and backhaul links that traverse public spaces creating an opportunity for hackers to intercept

Unique features

- Duo-mode enables up to 4-radios at a single installation location
- Backhaul options include 7230 Wireless Bridge/WiMAX 1000/4.9 GHz
- Seamless roaming among all Mesh APs
- QoS enforcement for voice and multi-media
- Access links secured with WPA/WPA2
- Transit links secured with IPSec encryption
- Virtual service groups with discrete service profiles for up to 8 SSIDs
- Smart Antenna with integrated switched-beam 6-panel directional antenna array
- Access point 7215 enables seamless indoor/outdoor roaming
- Smart Antenna technology optimizes backhaul data rates
- Multiple priority queue and WRR queuing for priority forwarding maintains QoS during peak loads
- Distributed routing intelligence
- Radio Resource Management with auto-channel negotiation limits interference

Figure 5. Wireless Mesh Network solution for low-cost outdoor Wi-Fi coverage



transmissions. Nortel goes beyond the standards based WPA/WPA2 access link security and addresses the transit link threat. Nortel delivers proven IPSec security for the transit links — a method derived from Nortel’s trusted VPN technology that already secures hundreds of millions of business users. When the secure tunnel terminates on the wireless gateway, a stateful firewall filters authorized traffic to the wired network and ensures that control systems are not accessible by mobile users.

Greater scalability — Flexible mesh management also allows operators to add capacity by simply adding another Mesh AP into the targeted coverage zone. New access points auto-discover their neighbors, negotiate the cleanest channels, and establish and maintain optimized routes. If performance impacting transit bottlenecks are identified, they can be relieved by Nortel’s 7220 Duo-mode configuration that effectively doubles available radio resources to support extended multi-hop paths, with reduced latency and greater throughput. An “Inter-Wireless Gateway roaming” feature can expand the roaming domain from campus size to

citywide network without using extra software on mobile client side.

Simplicity — Nortel’s exclusive Smart Antenna technology lets operators take advantage of the range, throughput and spectral efficiency benefits of high gain directional antenna without the operational burden of manual installation, alignment and maintenance of typical external antenna designs. The auto-discovery and auto-configuration and self-healing capabilities simplify installation and ongoing management. In addition, the low Access Point weight makes for vastly easier installation by electricians.

Service resiliency — Nortel’s Smart Antenna technology combined with separation of access and transit spectrums, means that overlapping cells can be deployed to provide service resiliency at the client access level. Should an AP fail, the system will recognize the failure and dynamically re-route to the best alternative path. For the most resilient installations, the 7220 Duo-mode configuration provides the access and transit radio resiliency of a chassis-based system but removes the risk of shared components to provide full redundancy

for antennas and power supplies as well. The innovative design of the Access point 7220 provides resistance to the elements – minimal external wiring removes an inviting vulnerability and the integrated Smart Antennas will auto-recover should the AP be knocked out of alignment under severe conditions.

The wireless gateway redundancy feature provides mesh core resiliency, protecting the mesh operation in the event of a gateway failure.

Quality of Service (QoS) — Nortel’s Wireless Mesh network supports differentiated services including voice and multi-media by dynamically reserving transit link bandwidth and enforcing packet prioritization. QoS support removes the utility and service constraints of data-only solutions. WMM-based QoS is also supported.

Flexible Deployment Options — Each outdoor deployment is unique. Nortel’s dual-radio architecture and 5GHz transit opens up deployment possibilities by removing the proximity and density constraints of single-radio designs. The unique integrated 6-panel directional antenna array delivers high

quality transit. And because wired network access points are hard to come by and costly to deploy, Nortel gives planners the freedom of deploying Mesh networks many miles from the wired network access point using the 7230 Wireless Bridge or WiMAX 1000 backhaul options using either licensed or unlicensed bands.

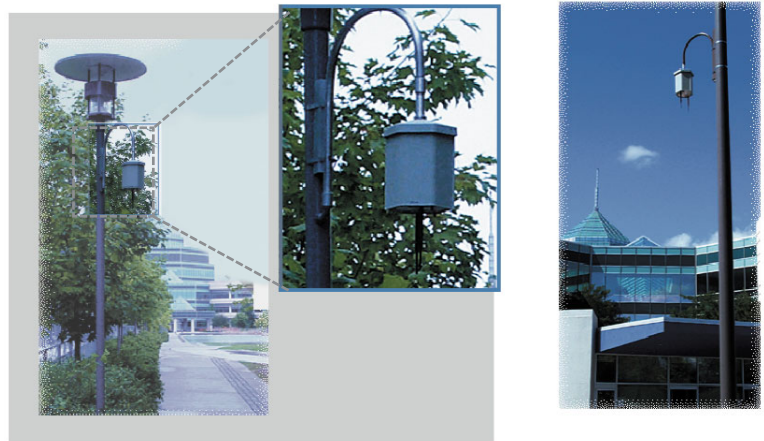
Lower cost — Nortel's Wireless Mesh Network is optimized to deliver low cost wireless broadband services over expansive areas. The innovative wireless transit architecture and flexible backhaul options keep wiring requirements and costs at a minimum. Very low power consumption provides an ecologically-friendly choice, and mounting Access Points can be done by any licensed electrician — just add power and a mounting kit of your choice.

Why Nortel?

What makes Nortel stand apart?
For starters:

- Nortel has pioneered successful Wireless Mesh deployments in tech savvy and early-adopter markets like Taiwan, where we have developed expertise around value driven applications, workable business models and options for wireless broadband technology. This spans wireless networking

Figure 6. Real-life deployment of Nortel Wireless Mesh Network solution



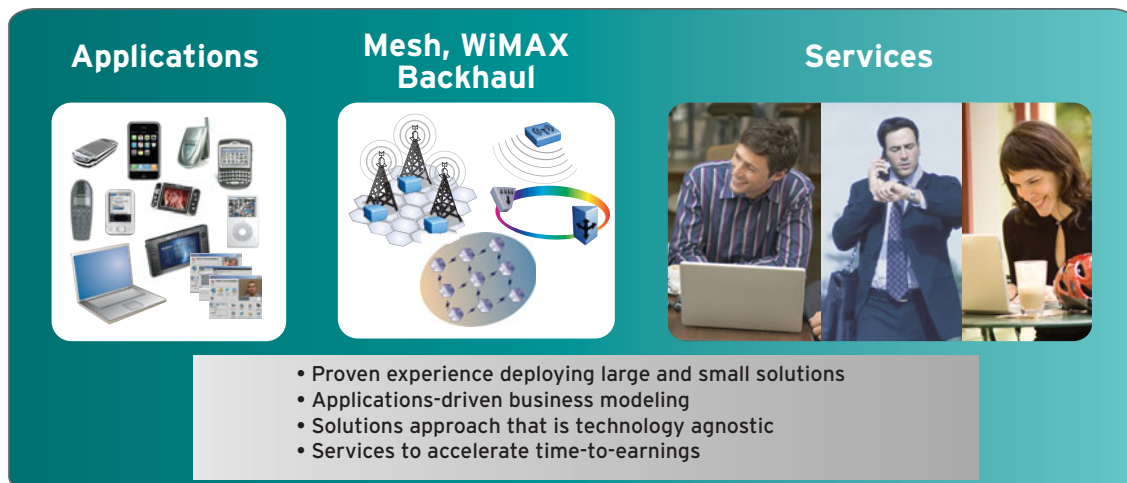
(Mesh, WiMAX, cellular), network security, communication applications, complemented by world class solution partners and Nortel service provider partners. We enable the entire solution (Figure 7) — not just the infrastructure.

- Scalability — Nortel has deployed the two largest mesh networks in the world: the city of Moscow with over 14,000 access points, and the City of Taipei with over 5,000 access points, covering 272 square km, and serving 2.65 million residents. Conversely, we have also deployed much smaller networks with equally impressive results.
- A dedicated Solutions Interoperability Lab in Research Triangle Park, NC to ensure full application compatibility testing and integration. We currently run over thirteen different applications

in the lab, ensuring that your network will work “right” the first time. These applications can provide additional value for a mesh deployment for municipal cost recovery and sources of revenue.

- Automated meter reading
- Workflow automation
- RFID asset/fleet tracking
- Unified communication services
- Portals
- Advertising
- Mobile TV
- Transit hotspots
- Mobile VPN
- Digital video surveillance
- Rapid first responder capability
- New technologies and applications are continually added.

Figure 7. Real-life deployment of Nortel Wireless Mesh Network solution



Wireless Access Point 7220 — Technical specifications

Wireless AP 7220 Access Link 802.11b/g (2.4 GHz) Radio System

Center frequency

- 2417 MHz to 2457 MHz (i.e., North America)

Data rate: 54 Mbps max

- Supports 1, 2, 5.5, 11 Mbps (IEEE 802.11b)
- Supports 6, 9, 12, 18, 24, 36, 48 and 54 Mbps (IEEE 802.11g)
- IEEE 802.11b/g standard rates

Access antenna options

- Co-linear whip, 5 dBi nominal antenna, SMA connectors

Radiated EIRP

- +26 dBm typical

Receive sensitivity 802.11b (11 Mbps)

- -95 dBm typical @ 11 Mbps
- -96 dBm typical @ 5.5 Mbps
- -98 dBm typical @ 2 Mbps
- -101 dBm typical @ 1 Mbps

Receive sensitivity 802.11g (54 Mbps)

- -80 dBm typical @ 54 Mbps
- -82 dBm typical @ 48 Mbps
- -86 dBm typical @ 36 Mbps
- -90 dBm typical @ 24 Mbps
- -92 dBm typical @ 18 Mbps
- -95 dBm typical @ 12 Mbps
- -95 dBm typical @ 9 Mbps
- -96 dBm typical @ 6 Mbps

Wireless AP 7220 Transit Link 802.11a (5 GHz) radio system

Center frequency

- 5740 MHz to 5840 MHz
- 4.9 GHz to 5.850 GHz (Optional external antenna only)

Data rate: 54 Mbps max

- Supports 6, 9, 12, 18, 24, 36, 48 and 54 Mbps
- IEEE 802.11a standard rates

Antenna system gain from radio module card inside the unit

- 10.7 dBi nominal

Radiated EIRP

- +28 dBm typical @ 54 Mbps
- +30 dBm typical @ 48 Mbps
- +32 dBm typical @ 6-36 Mbps

Radiated EIRP (802.11a)

- +28 dBm typical @ 54 Mbps
- +30 dBm typical @ 48 Mbps
- +32 dBm typical @ 6-36 Mbps

Receive sensitivity (<1% packet error rate)

- -82 dBm typical @ 54 Mbps
- -85 dBm typical @ 48 Mbps
- -90 dBm typical @ 36 Mbps
- -93 dBm typical @ 24 Mbps
- -98 dBm typical @ 18 Mbps
- -100 dBm typical @ 12 Mbps
- -101 dBm typical @ 9 Mbps
- -101 dBm typical @ 6 Mbps

Environmental specifications

- Operating temperature range: - 40°C min, 50°C max

Regulatory

- Weather rating: NEMA 4, IP56/Category 2 testing
- Safety: UL, CSA
- Emissions/radio: ETSI v1.3.1, FCC Class B, Part 15, RSS 210
- RoHS compliant

Hardware specifications

- Wired network interface: Auto sensing 10/100BaseT Ethernet, 1.5kV surge protection per IEC60950
- Power input nominal: 100V - 240V AC (45Hz – 65Hz)
- Power consumption
 - Operating: Indoor or outdoor > 0°C = 8W typical
 - Outdoor < 0°C = 8W – 14W (- 40°C)
 - Startup: Indoor or outdoor > 0°C = 8W typical
 - Outdoor < 0°C = 24W (short duration) 8W – 14W (- 40°C)
- Dimensions (without mounting brackets or antennas)
 - 265mm (10.5 inches) tall x 200mm (8 inches) diameter
- Weight: 2.3 kg (5 lbs)
- Color: Gray

Optional accessories

- Mounting brackets (right-angle or straight horizontal attachment)
- 5m, CAT5 Ethernet indoor/outdoor rated cable for network access point (ap@NAP) operation
- 13dBi, 18dBi and 23dBi TL external antennae

Indoor Wireless Access Point 7215 — Technical specifications

Wireless AP 7215 Access Link 802.11b/g (2.4 GHz) Radio System

Center frequency

- 2412 to 2484 MHz (i.e., North America)

Data rate: 54 Mbps max

- Supports 1, 2, 5.5, 11 Mbps (IEEE 802.11b)
- Supports 6, 9, 12, 18, 24, 36, 48 and 54 Mbps (IEEE 802.11g)
- IEEE 802.11b/g standard rates

Antenna options

- 14dBi TL external antenna

Radiated EIRP Internal Dual Input Antennas

- 11b: +22 dBm typical
- 11g: +20 dBm typical

Receive sensitivity 802.11b (11 Mbps)

- -82 dBm typical @ 11 Mbps
- -92 dBm typical @ 1 Mbps

Receive sensitivity 802.11g (54 Mbps) Internal Dual Input Antennas

- -68 dBm typical @ 54 Mbps
- -85 dBm typical @ 6 Mbps

Wireless AP 7215 Transit Link 802.11a (5 GHz) radio system

Center frequency

- 5180 to 5840 MHz
- 4.9 GHz to 5.850 GHz

Data rate: 54 Mbps max

- Supports 6, 9, 12, 18, 24, 36, 48 and 54 Mbps
- IEEE 802.11a standard rates

Radiated EIRP (Internal Antennas)

- +17 dBm typical @ 54 Mbps
- +20 dBm typical @ 48 Mbps
- +21 dBm typical @ 6-36 Mbps

Radiated EIRP (802.11a) (External Antennas)

- +17 dBm typical @ 54 Mbps
- +20 dBm typical @ 48 Mbps
- +21 dBm typical @ 6-36 Mbps

Receive sensitivity (Internal Antennas)

- -67 dBm typical @ 54 Mbps
- -68 dBm typical @ 48 Mbps
- -73 dBm typical @ 36 Mbps
- -75 dBm typical @ 24 Mbps
- -79 dBm typical @ 18 Mbps
- -81 dBm typical @ 12 Mbps
- -83 dBm typical @ 9 Mbps
- -85 dBm typical @ 6 Mbps

Receive sensitivity (External Antennas)

- -66 dBm typical @ 54 Mbps
- -67 dBm typical @ 48 Mbps
- -72 dBm typical @ 36 Mbps
- -74 dBm typical @ 24 Mbps
- -78 dBm typical @ 18 Mbps
- -80 dBm typical @ 12 Mbps
- -82 dBm typical @ 9 Mbps
- -84 dBm typical @ 6 Mbps

Environmental specifications

- Operating temperature range: - 0°C min, 50°C max

Regulatory

- Safety: UL, CSA
- Emissions/radio: ETSI v1.3.1, FCC Class B, Part 15, RSS 210

Hardware specifications

- RoHS compliant
- Wired network interface: Auto sensing 10/100BaseT Ethernet, 1.5kV surge protection per IEC60950
- Power input nominal: 90V - 264V AC (47Hz – 63Hz)
- Power output
 - 10v minimum – 13v maximum, 2.0A
- +17 dBm typical @ 54 Mbps
- Dimensions: 24 x 15.5 x 5cm
- Weight: < 1.0 kg
- Country-specific power cords available
- Color: Dolphin Light Gray
- Optional accessories
 - 14dBi TL external antenna
 - 5m, CAT5 Ethernet indoor/outdoor operation

Wireless Bridge 7230 — Technical specifications

Air Interface

Technology

- OFDM

Duplexing Method

- Time Division Duplex (TDD)

Capacity

- Configurable up to 48 Mbps

Modulation

- OFDM - BPSK, QPSK, 16QAM, 64QAM

Channel Resolution

- 5 MHz

Transmitter Power

- 17 dBm max
- 12.8 dBm max for 4.9 GHz version

Range

- Up to 41 km (25.5 miles)
- Up to 80 km (50 miles) with an external antenna.

Frequency Band [GHz]

| | | | |
|--------|--------|--------|-------|
| 4.940– | 5.250– | 5.470– | 5.725 |
| 4.990 | 5.350 | 5.725 | 5.850 |

Standard

| | | | |
|-----|-----|------|-----|
| FCC | FCC | ETSI | FCC |
|-----|-----|------|-----|

LAN Interface

Framing/Coding PHY

- Up to 2 x 10/100BaseT, auto-sensing

Bridging

- IEEE 802.3/UT

Line Impedance

- Self-learning, up to 2048 MAC addresses

VLAN Support

- 100 V

Connector

- Transparent

Source

- RJ-45

Power

OOU Powered by

- PoE injector

Power Required by the OOU

- 100–240 VAC via external AC/DC converter

Power Consumption

- -48 VDC

Connector

- 20W max (OOU and PoE)

Outdoor Unit (ODU) with integrated antenna

- 2-pin

Physical

- Height: 305 mm/12 in
- Width: 305 mm/12 in

- Depth: 58 mm/2.3 in

- Weight: 3.3 kg/7.2 lb

Environment

- Enclosure: All-weather case

- Temperature: -35 to 60°C/-31 to 140°F

- Humidity: Up to 90%, non-condensing

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