



Wireless Mesh Network

Technical Overview

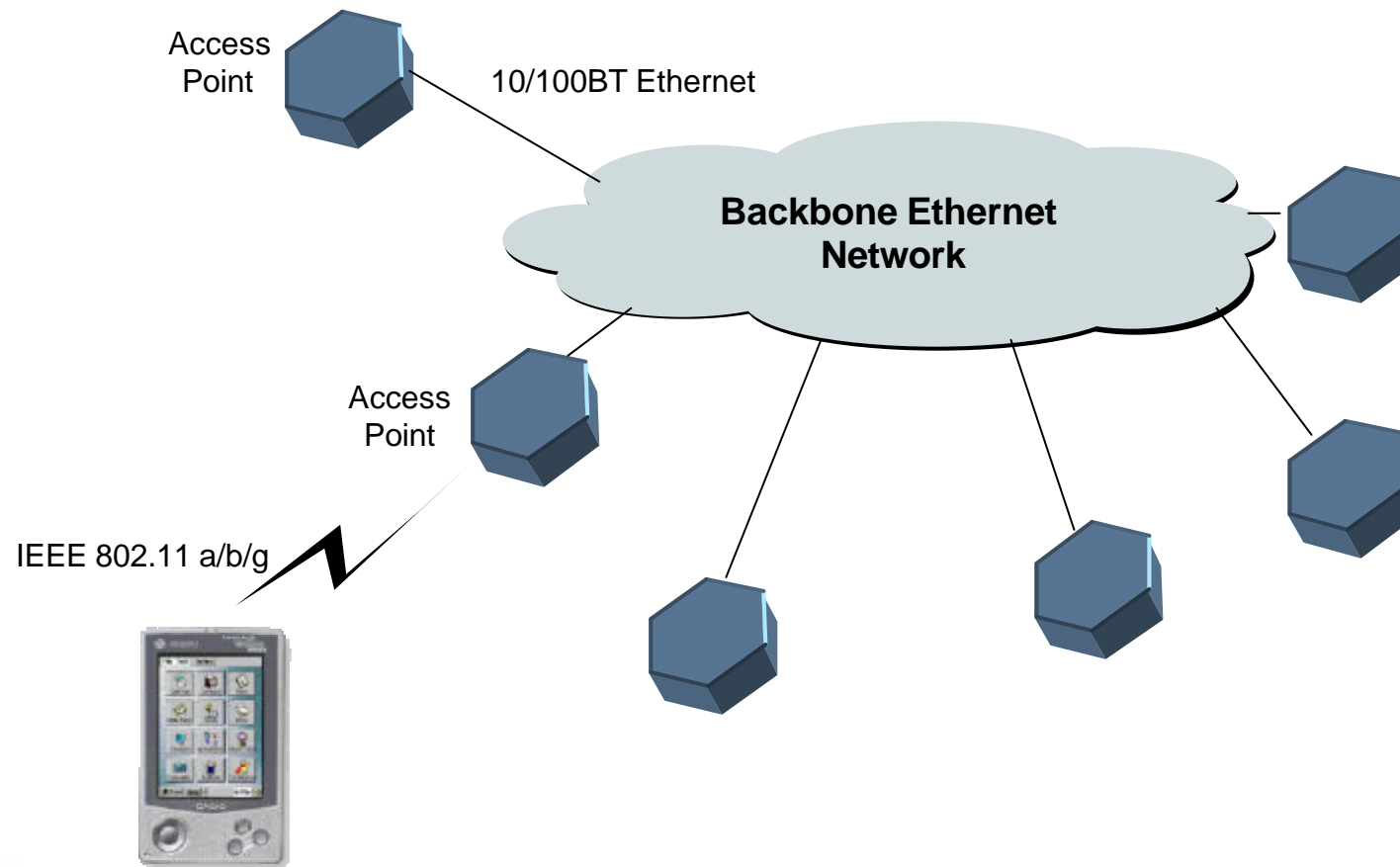
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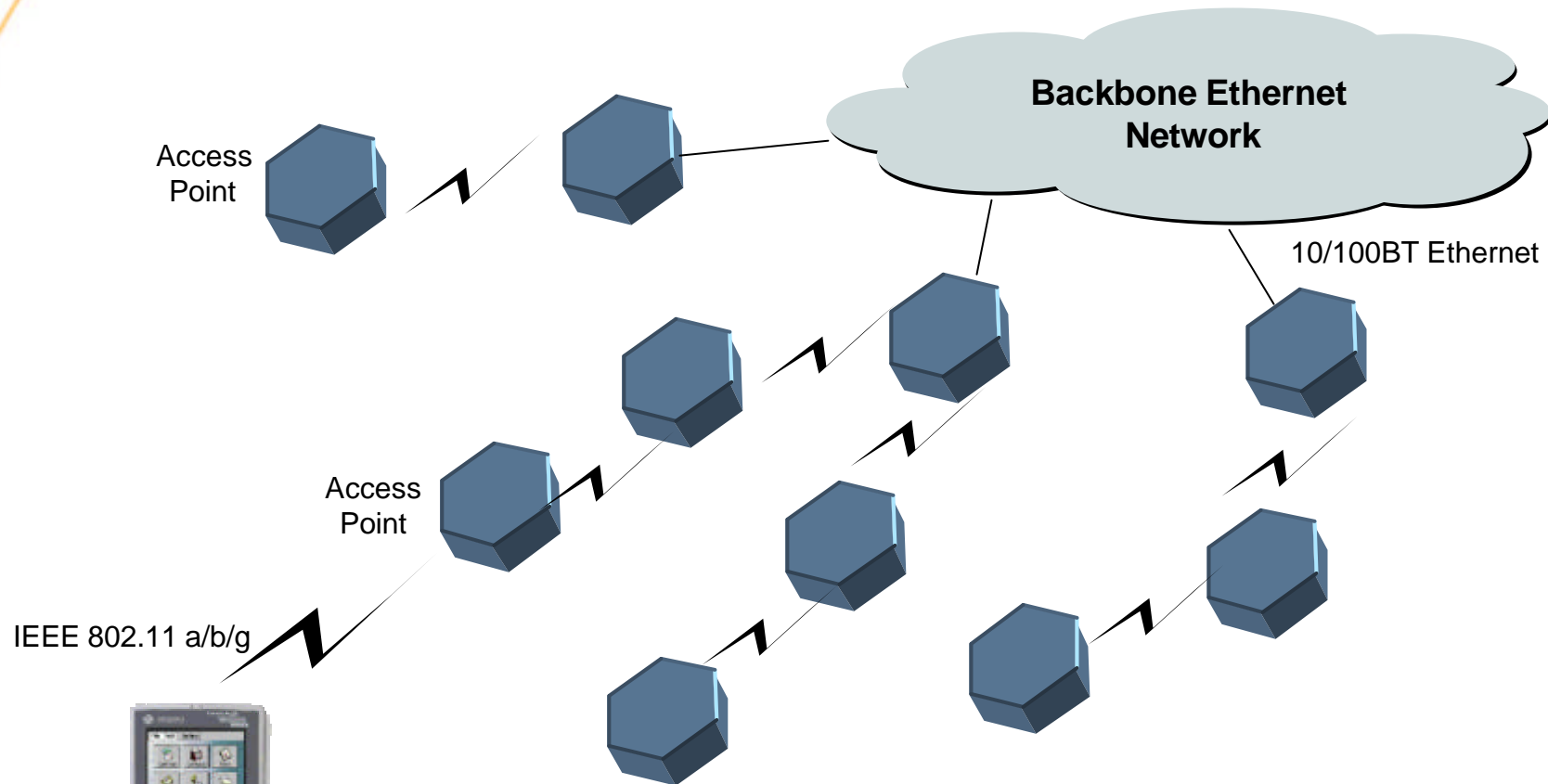
What is a Wireless Mesh Network ?

Traditional WLAN Architecture



What is a Wireless Mesh Network ?

WLAN with Wireless Transit

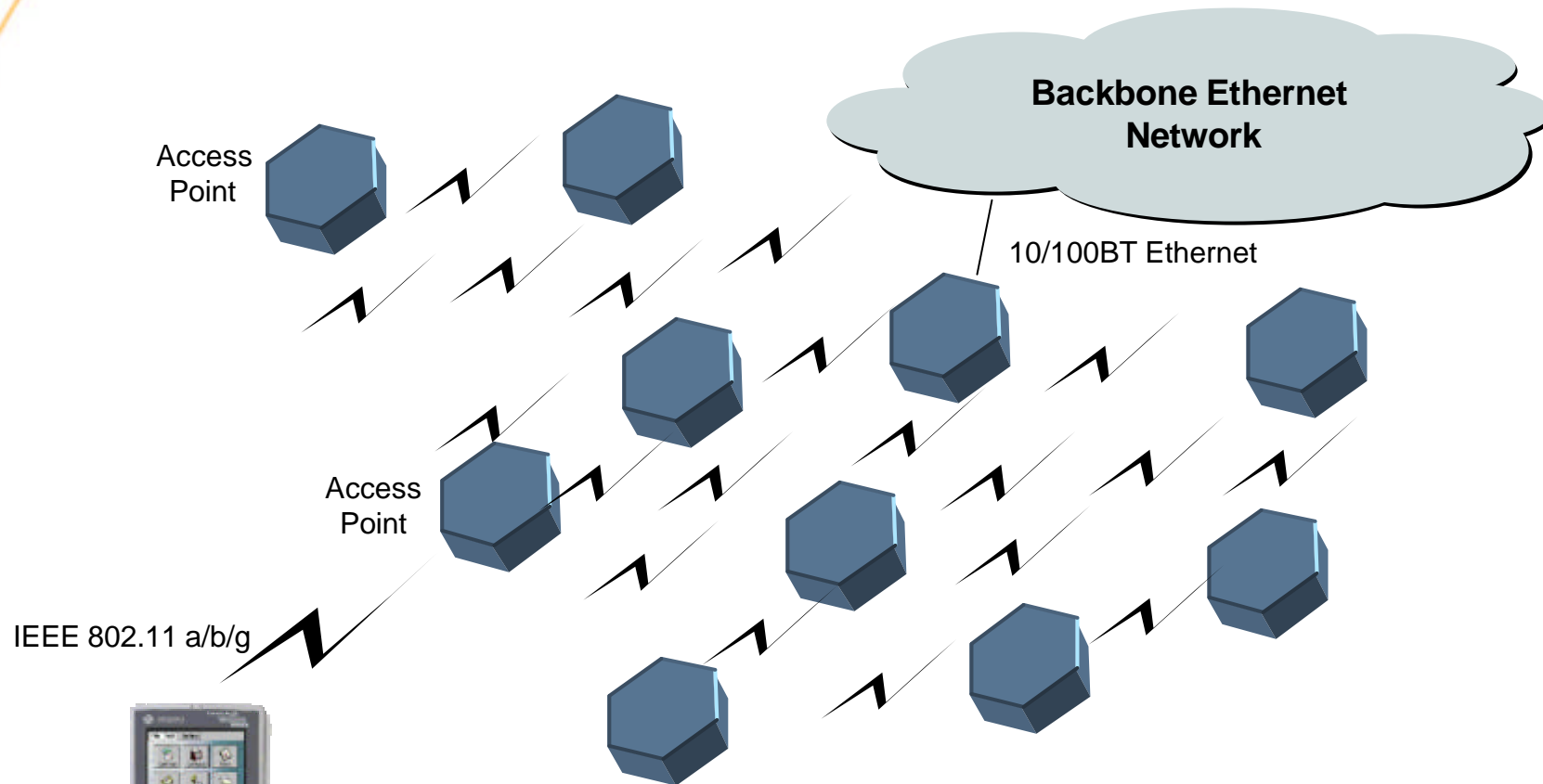


Wide variety of Wireless Transit technology



What is a Wireless Mesh Network ?

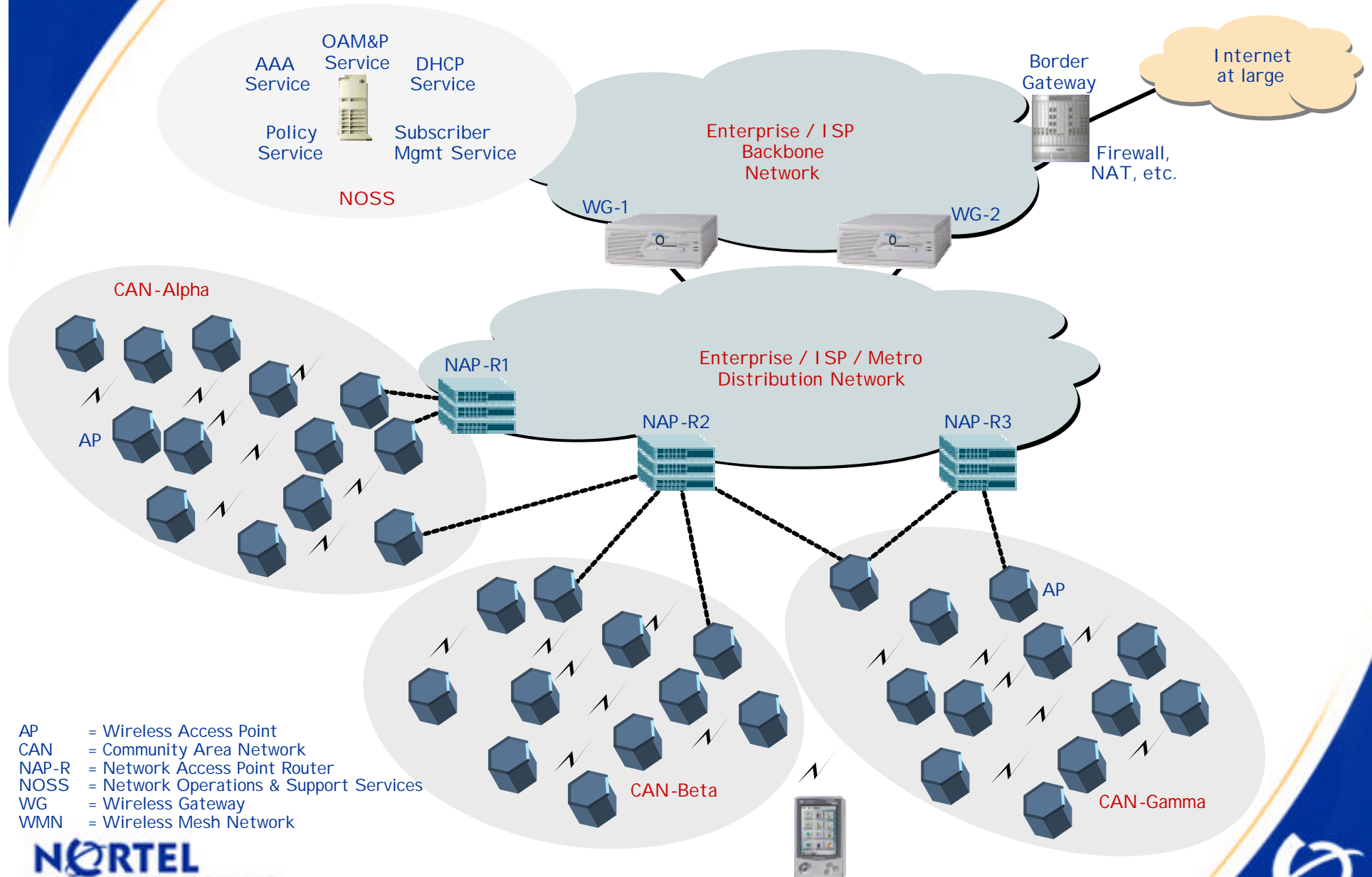
Wireless Mesh



Wireless transit with
Inter-AP 'Meshing' protocol



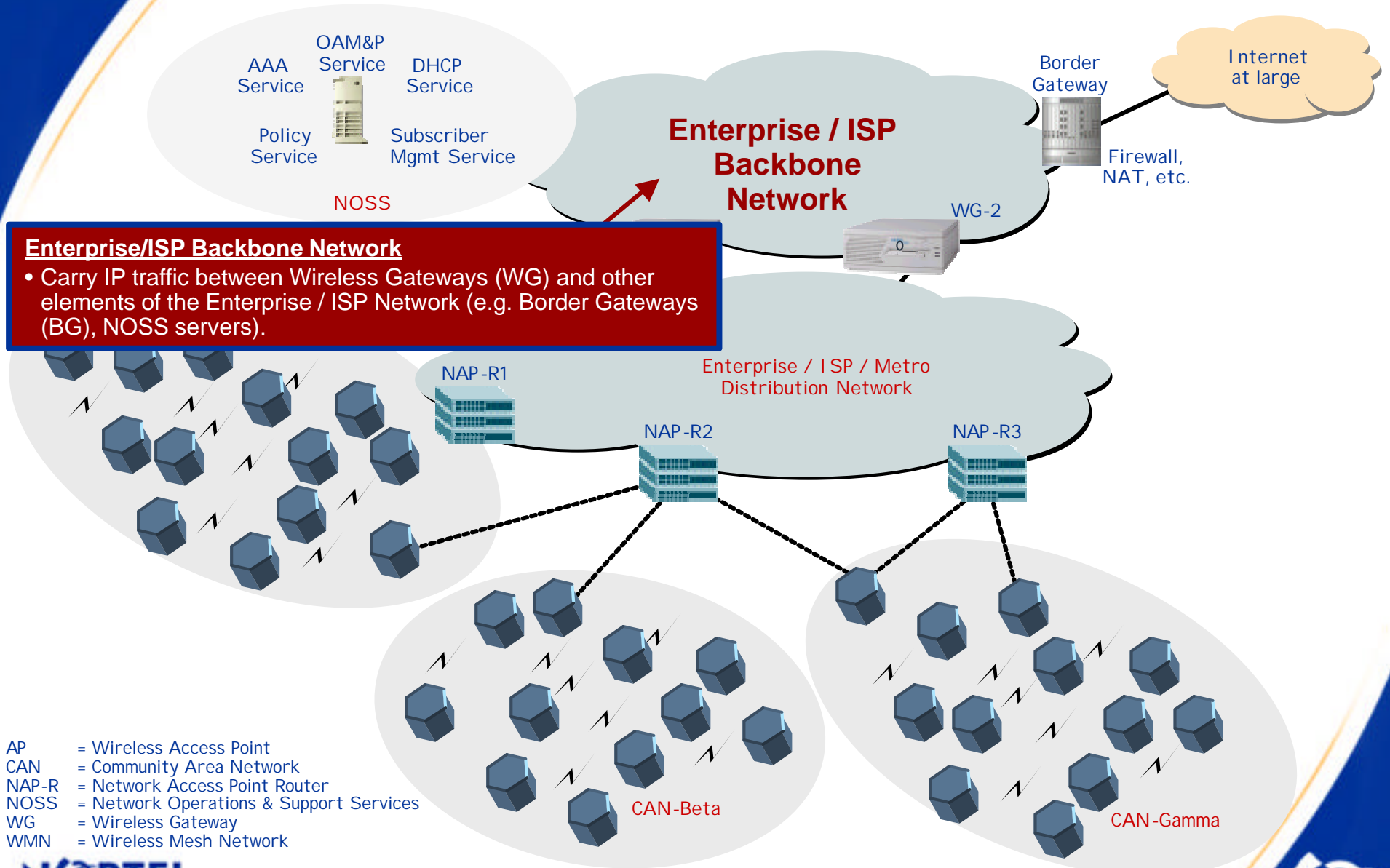
Prototype Network Architecture



- AP = Wireless Access Point
- CAN = Community Area Network
- NAP-R = Network Access Point Router
- NOSS = Network Operations & Support Services
- WG = Wireless Gateway
- WMN = Wireless Mesh Network



Nortel Wireless Mesh Network Architecture



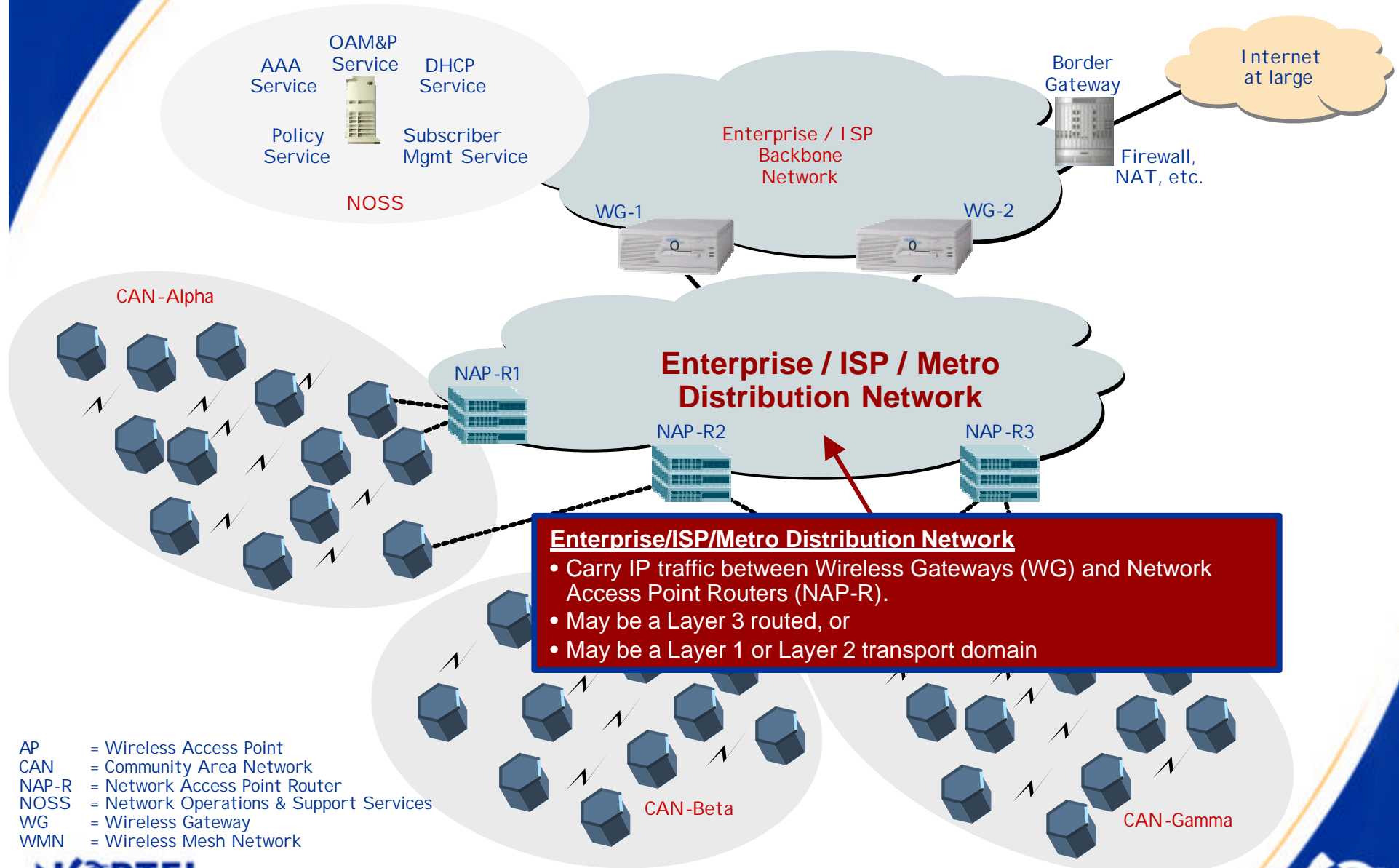
Enterprise/ISP Backbone Network

- Carry IP traffic between Wireless Gateways (WG) and other elements of the Enterprise / ISP Network (e.g. Border Gateways (BG), NOSS servers).

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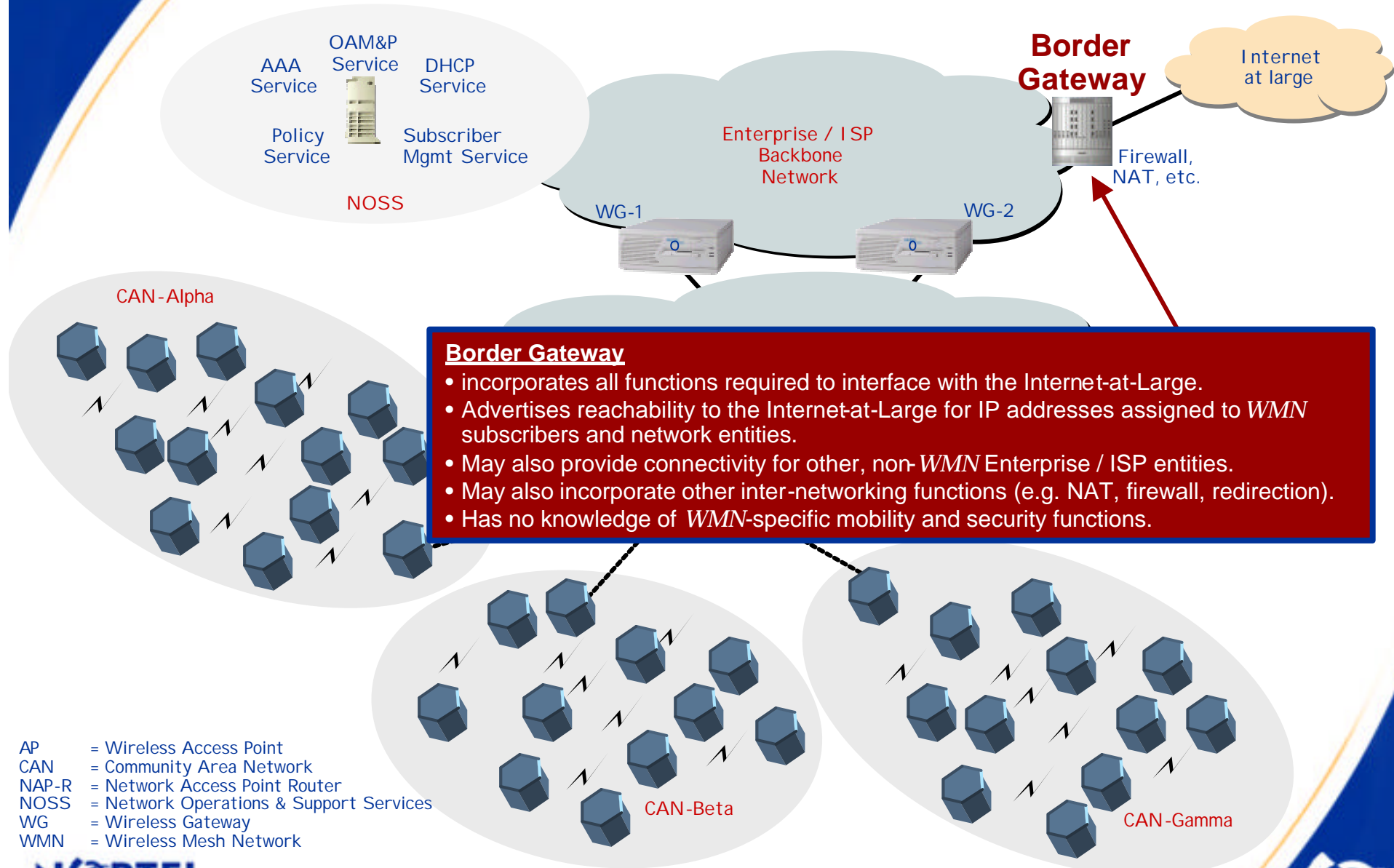
Enterprise/ISP/Metro Distribution Network

- Carry IP traffic between Wireless Gateways (WG) and Network Access Point Routers (NAP-R).
- May be a Layer 3 routed, or
- May be a Layer 1 or Layer 2 transport domain

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Nortel Wireless Mesh Network Architecture



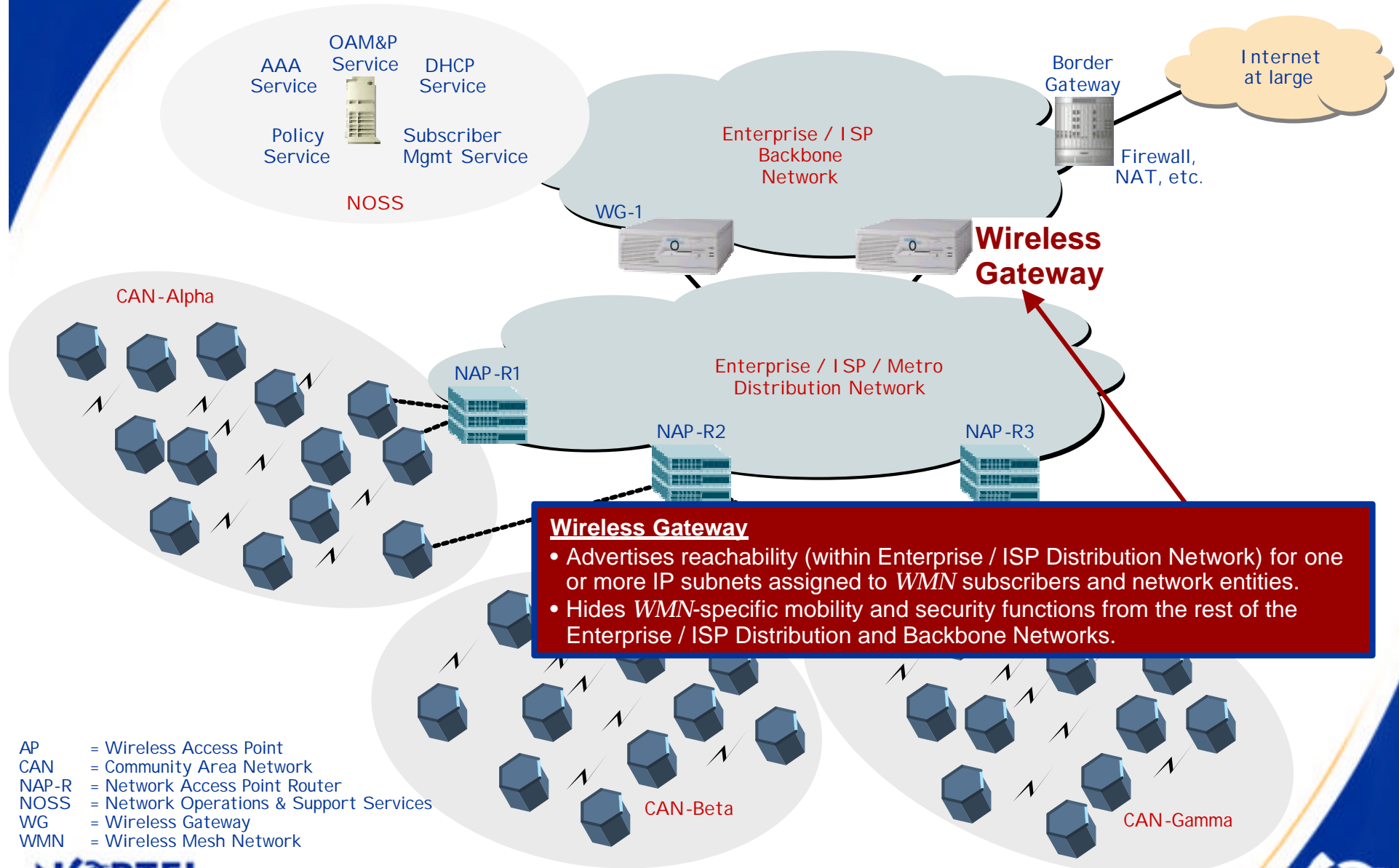
Border Gateway

- incorporates all functions required to interface with the Internet-at-Large.
- Advertises reachability to the Internet-at-Large for IP addresses assigned to *WMN* subscribers and network entities.
- May also provide connectivity for other, non-*WMN* Enterprise / ISP entities.
- May also incorporate other inter-networking functions (e.g. NAT, firewall, redirection).
- Has no knowledge of *WMN*-specific mobility and security functions.

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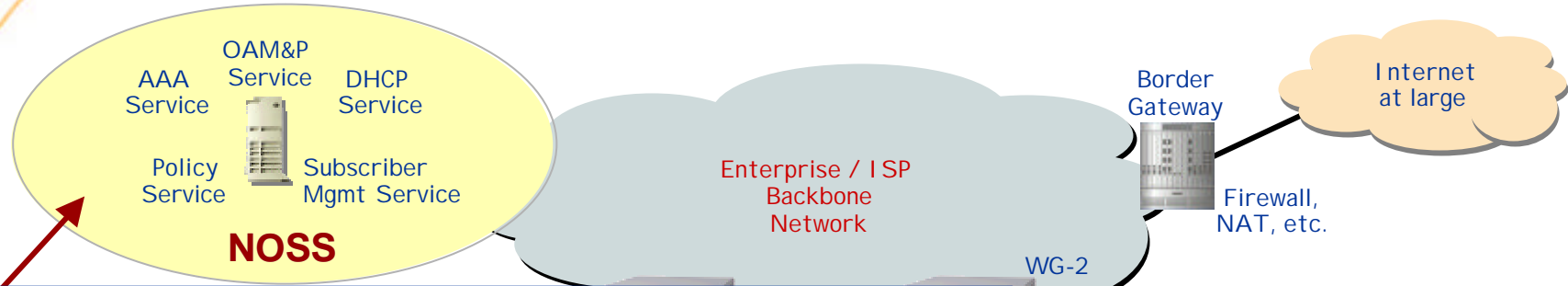
Wireless Gateway

- Advertises reachability (within Enterprise / ISP Distribution Network) for one or more IP subnets assigned to WMN subscribers and network entities.
- Hides WMN-specific mobility and security functions from the rest of the Enterprise / ISP Distribution and Backbone Networks.

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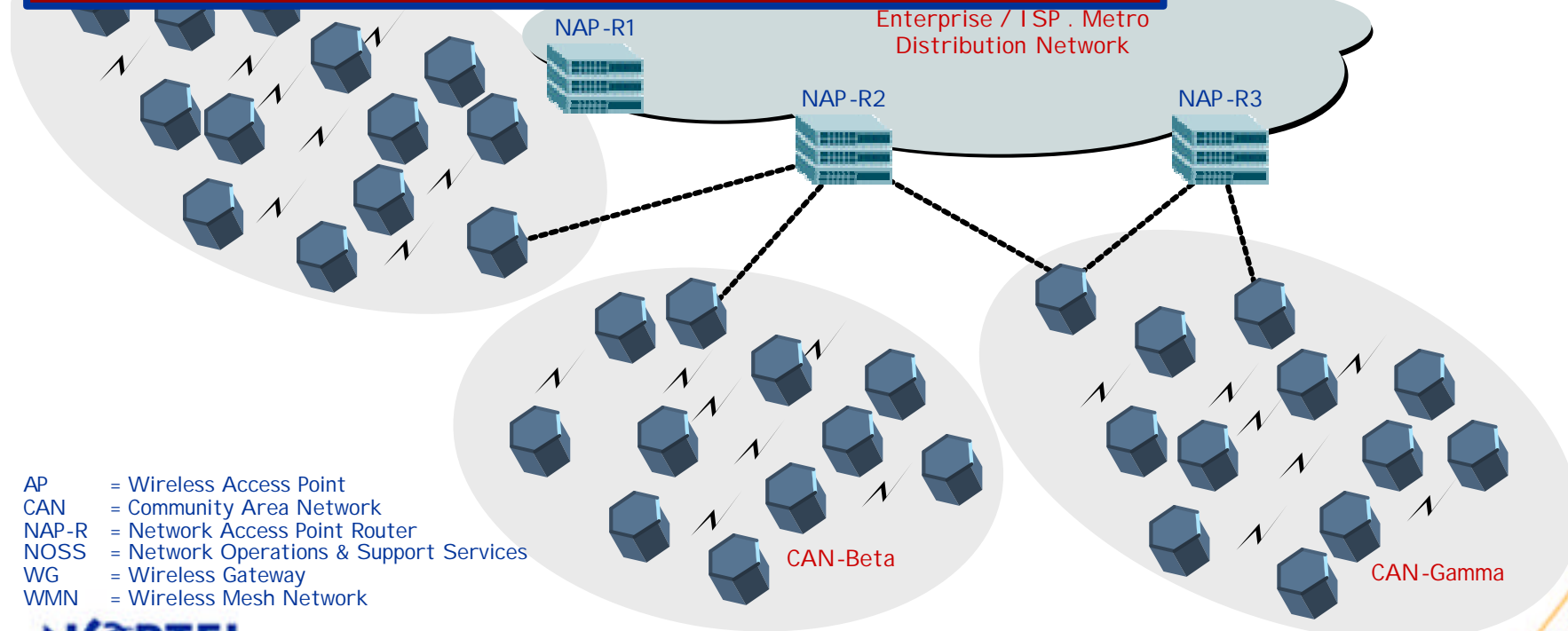


Nortel Wireless Mesh Network Architecture



Network Operations and Support Services

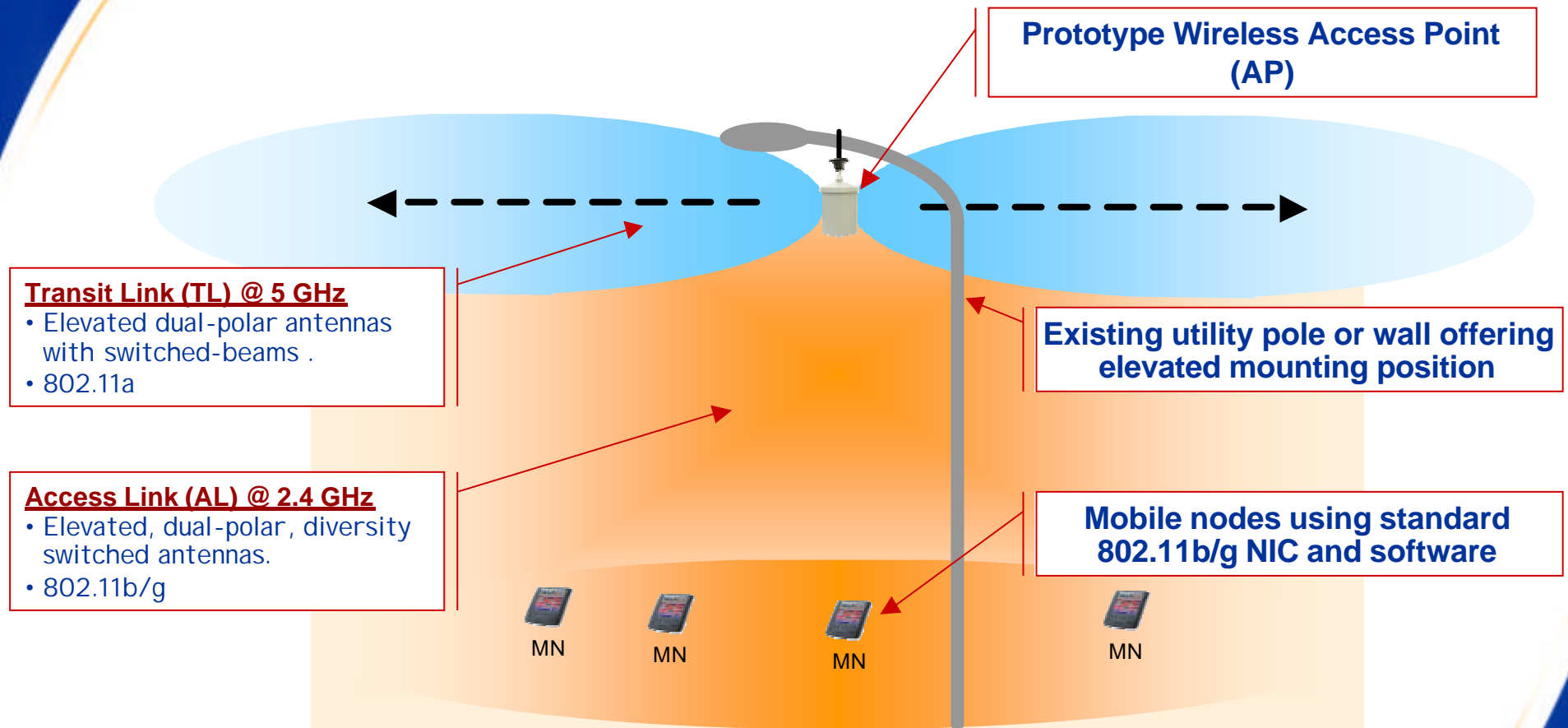
- Centralised monitoring and managing network operations.
- Interface to distributed elements of the *WMN* network through standard protocols I.e. DHCP, SNMP, RADIUS.



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Prototype Wireless Access Point Radio Networking Technology



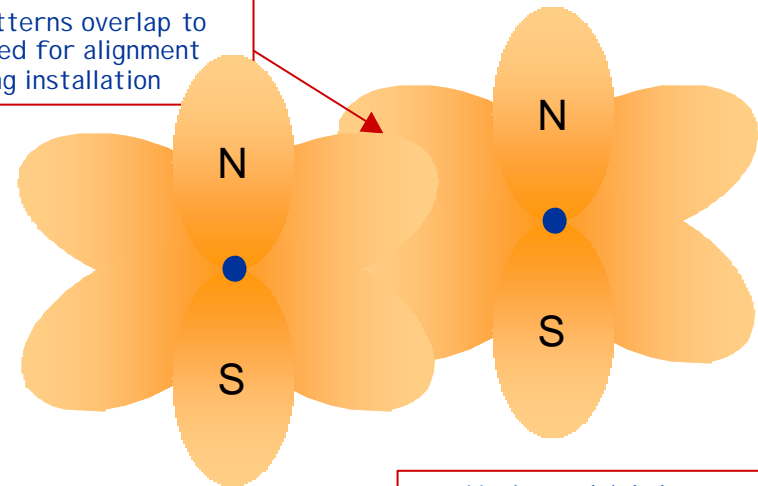
Access and Transit links separated in space and frequency



Prototype Wireless Access Point Switched Beam Antenna for Transit Links

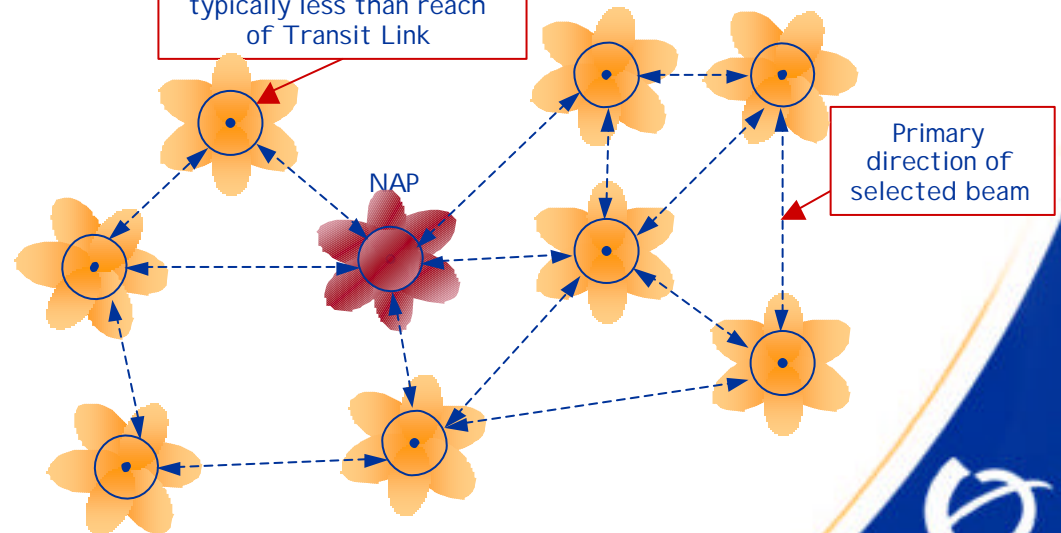
- **Antenna structure integrated into AP**
 - A beam is selected for communicating with each of the neighbouring APs.
- **Multiple degrees of freedom for each transit link**
 - Beam
 - Frequency
 - Polarisation
 - Burst time

Beam patterns overlap to avoid need for alignment during installation



Having multiple beams alleviates deployment difficulties, even if only a few are ever used in practice

Access Link coverage is typically less than reach of Transit Link



Prototype Wireless Access Point Transit Link Radio System

- **802.11a standard physical layer**
- **‘Meshing’ protocol above the MAC layer for transit link discovery, establishment, monitoring, maintenance, re-establishment**
- **Automatic assignment of channels according to local conditions and AP neighbourhood**
- **Consideration - Availability of 5GHz band in different countries**



Prototype Access Point



Wireless Mesh Applications

- Ad Hoc Networks
- Access Networks with minimal cable infrastructure
- Out door and in door campus
- Public Metro Wireless Networks





Thank You

