

Wireless Deployment with IPv6

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IPv6 is the Evolution, and the only Solution

Discussion

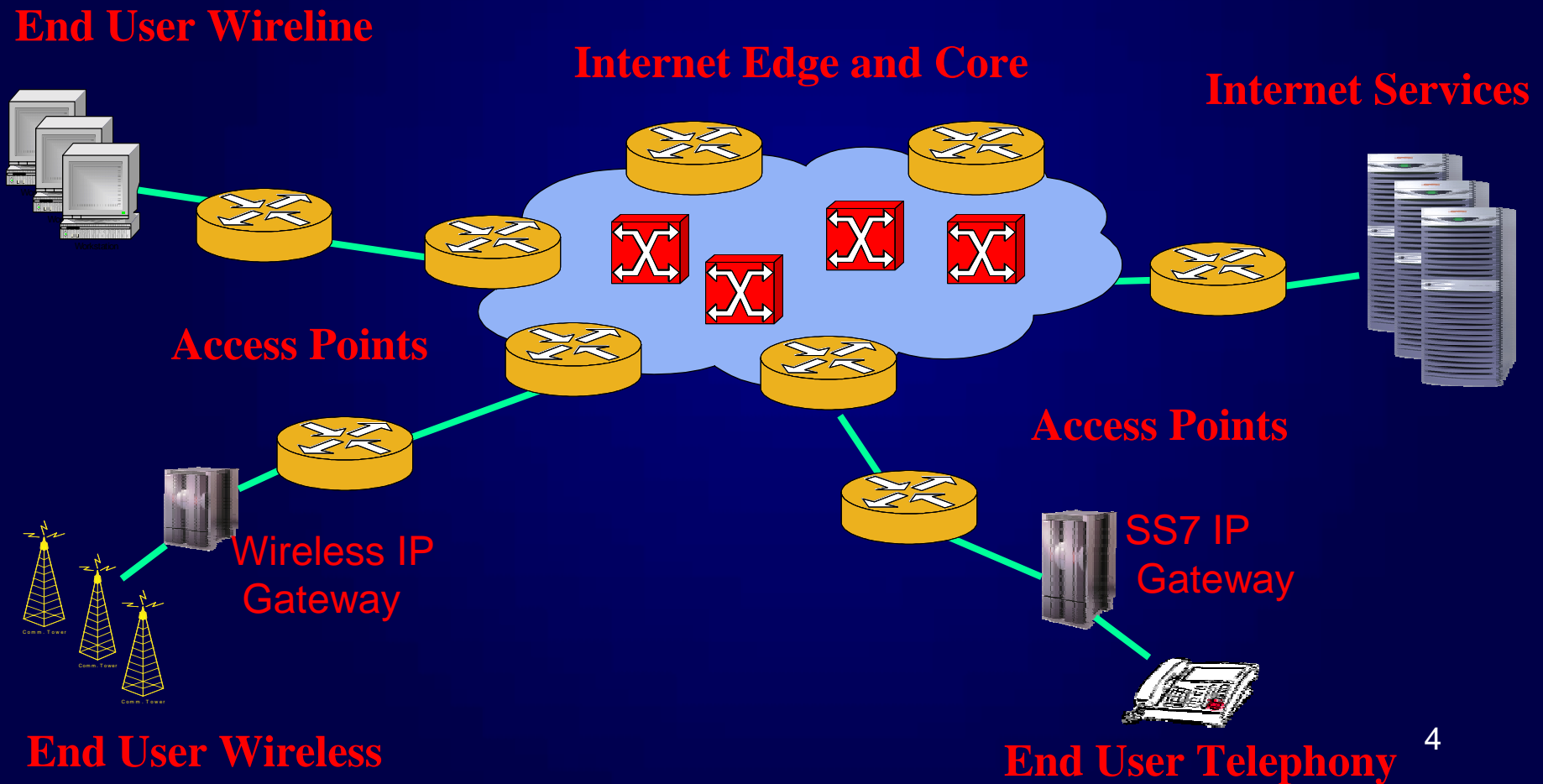
- Mobile Communications Industry Objectives
- Internet and Current Wireline IP Evolution
- Wireless Evolution
- Mobile IPv6 Evolution
- The Future: Wireless and Wireline Integrated
- Impact on the Mobile Communications Industry

Mobile Communications Industry Objectives

- Make a Profit
- Provide as many pervasive services as possible to as many users as possible
- Reduce operational costs when it will not disrupt services to users.
- Use the Internet as a multimedia highway to provide services and reach as many users as possible.
- Develop/Design a plan to move the current Wireline, Wireless, and Telephony systems to the *Next Generation Networking* capabilities (e.g. IPv6, Mobile IPv6)

Lets take a look at the Current Internet first

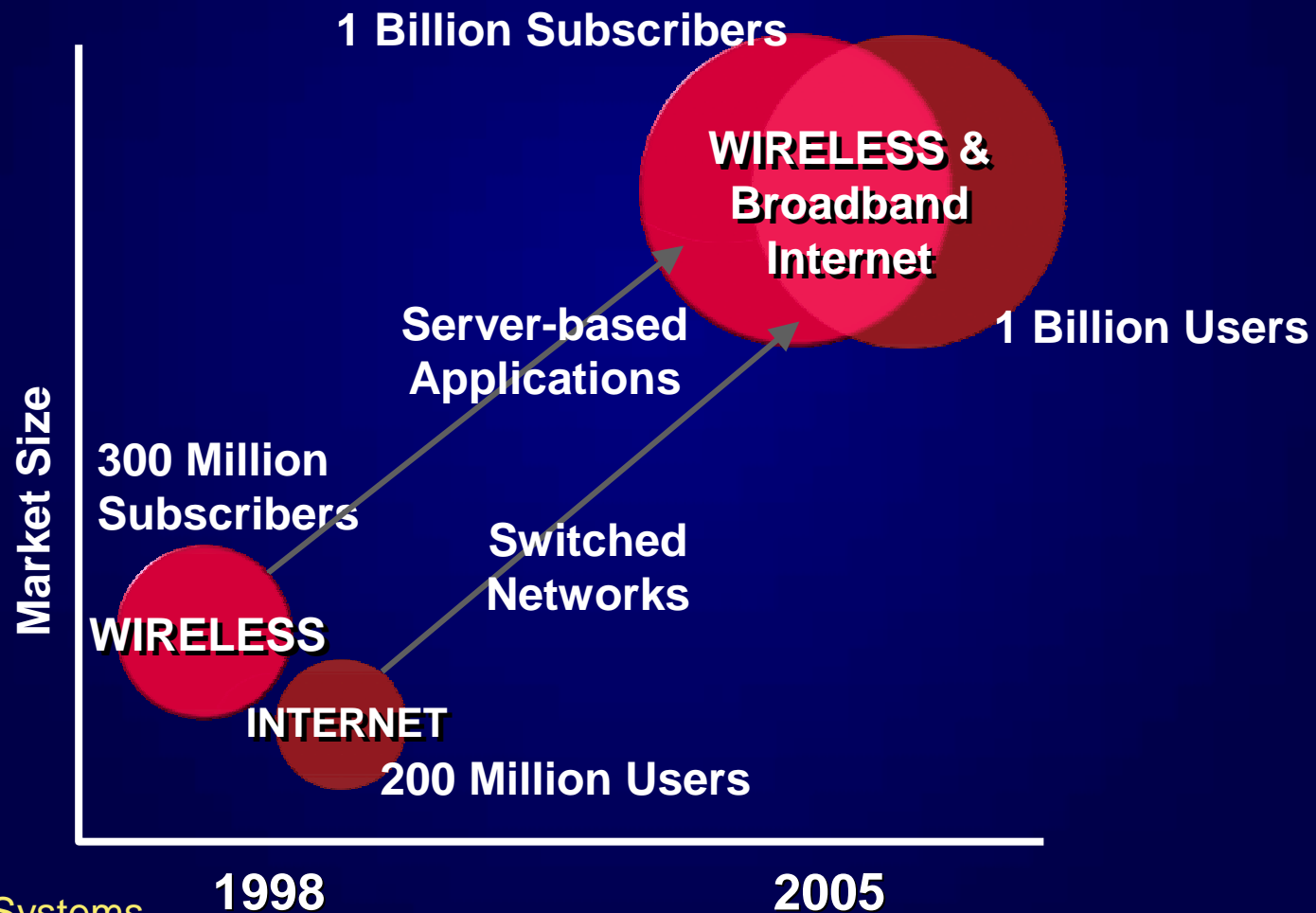
Internet Access Points Architecture



Internet Characterization Today

- Virtual Private Networks
 - Tunnels
 - Private Addresses
 - Secure at Edge or Access Only
- Network Address Translation (NAT) Required
- End-2-End Model is Lost
- Try getting a Globally Routable IPv4 Address in Europe or Asia; or a set of them for your business !!!
- These are not optimal conditions for the evolution of the Internet

Growth of wireless and broadband Internet

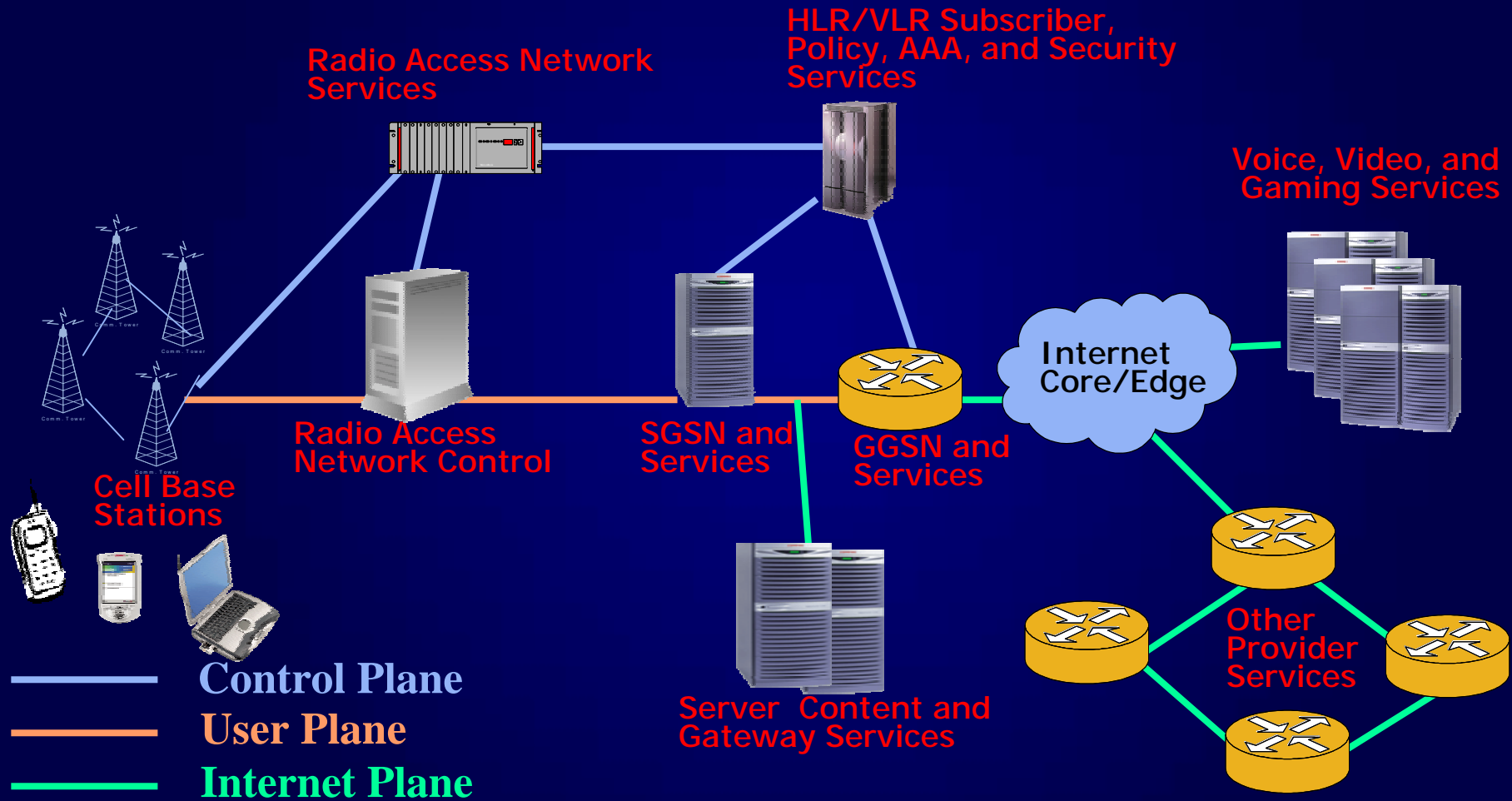


Internet engineers are working on it !!!

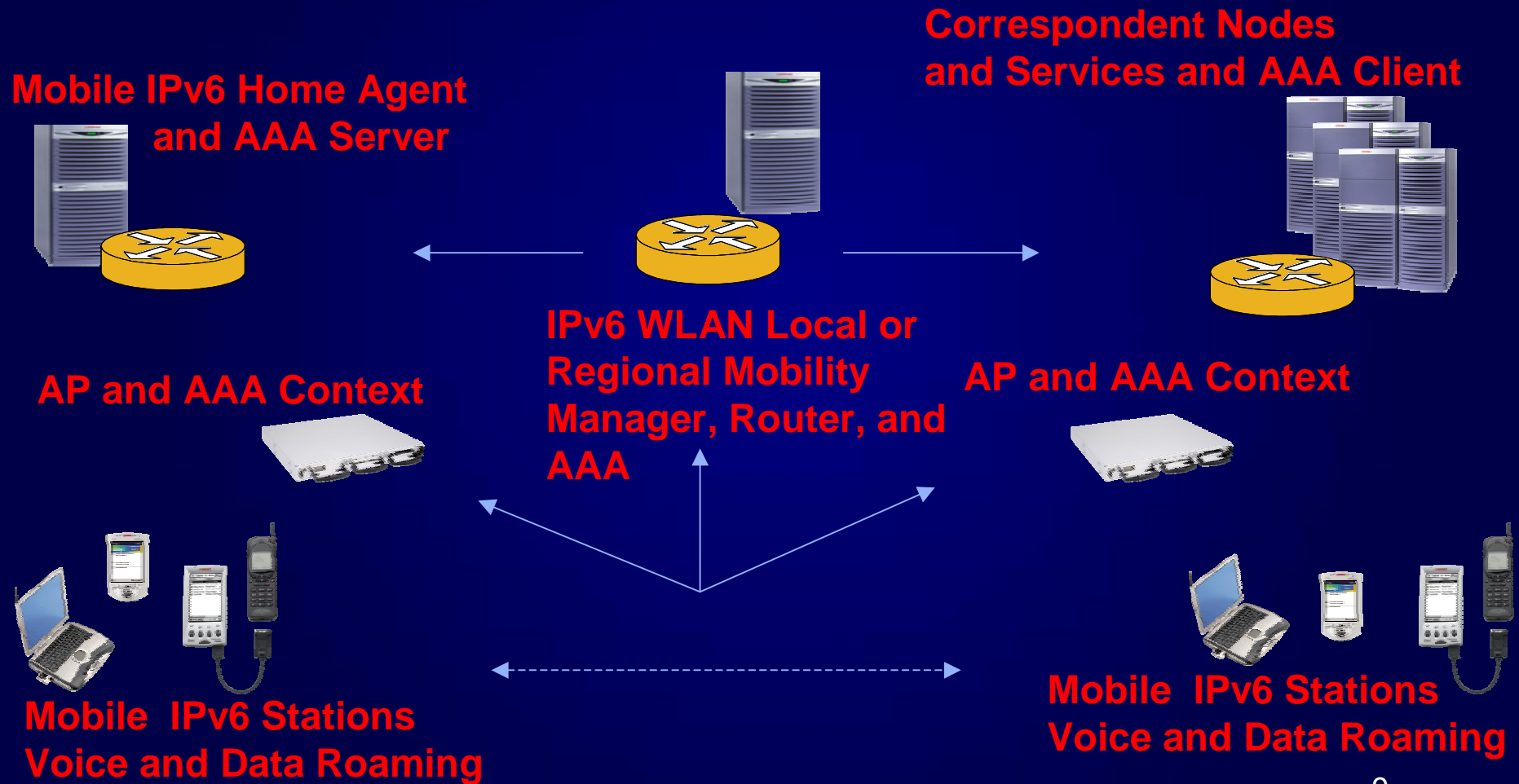
- The Next Generation Internet Protocol is IPv6 and will restore the End-2-End model of the Internet
- 2.5G and 3G Wireless requires the End-2-End model as it moves its use model to the Internet.
- Mobile IPv6 computing will revolutionize the Internet as the WEB did in the 90's.
- So lets discuss how this will happen!!!

Lets use Wireless to depict the evolution

3G Wireless Architecture Currently



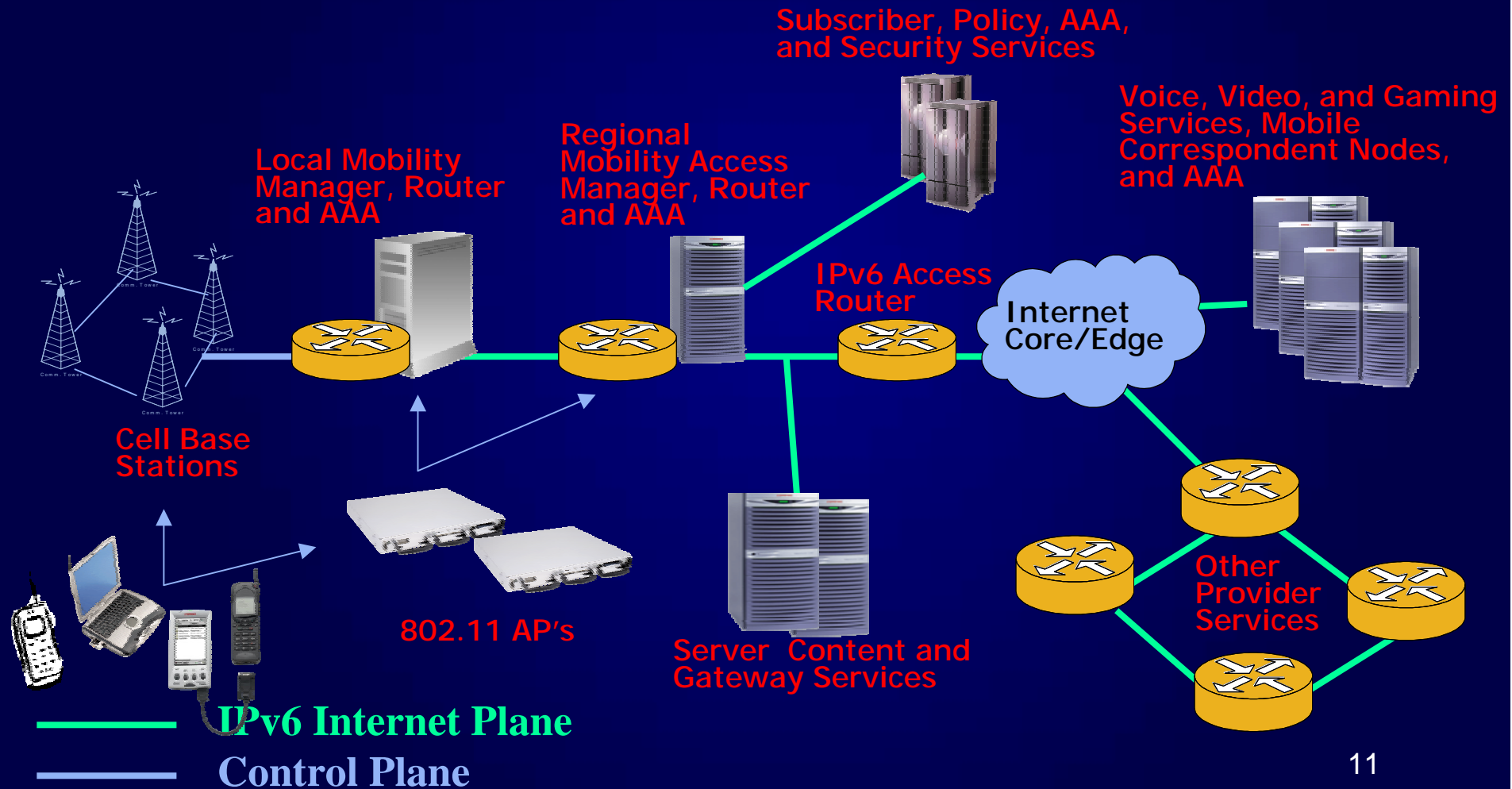
WLAN Internet Mobile IPv6 Network



Benefits of IPv6 WLAN Internet

- Creates competition and integration point to 3G methods
- Why not do voice over 802.11b or add multihoming capability to Mobile Stations (e.g. 802.11 & GSM/GPRS)
- Less stuff to manage WLAN is simple
- New market for Providers (e.g. Internet Café, Gaming Rooms, Student Library Search)
- WLAN can be secured more easily
- No license games and frills just the Internet *please!!!*

End-2-End IPv6 Mobile Wireless Services



Mobile IPv6 Taxonomy

- **Home Agent**
 - Acts as proxy for Mobile Node while away from Home
 - Tunnels packets from Correspondent Nodes to Mobile Node
 - Keeps location of Mobile Node as it moves
 - Forwards Home Network configuration to the Mobile Node
- **Correspondent Node**
 - Point of Services for the Mobile Node
 - Understands how to communicate to the Mobile Node
 - Directly through Route Optimizations
 - Indirectly through the Mobile Nodes' Home Agent
- **Mobile Node**
 - Usually a client that moves between Wireless Cells or Access Points
 - Maintain knowledge of Home Agent and Correspondent Nodes

Macro and Localized Mobility Management

- **Macro Mobility**
 - **Communications from the Mobile Node to the Home Agent Node**
 - **Communications from the Mobile Node to the Correspondent Node**
 - **Communications from the Correspondent Node to Home Agent**
 - **Communications update for Mobile, Home, and Correspondent**
- **Localized Mobility Management**
 - **Communications to address Mobile Terminal Movement**
 - **Fast Handoff (reduce packet delay)**
 - **Smooth Handoff (reduce packet loss)**
 - **Seamless Handoff == Fast+Smooth**
 - **Communications to handle Context Transfer**
 - **Buffer packets during movement detection**
 - **Forwarding packets after movement completed**

Mobile IPv6 Advantages

- **Large Address Space**
 - Can support billions of Mobile Devices
 - Distributed hierarchy with NAT won't work and not deployed
- **Automatic Link Configuration**
 - Neighbor Discovery on home and visited networks
 - Stateless and Statefull Address Configuration
- **Destination Options removes need for signal and user plane**
 - Binding Updates to identify location
 - Registration Updates to identify movement
- **Routing is Optimized because of Binding Updates**

Mobile IPv6 continued Evolution

- Seamless Handoffs
- Header Compression
- Authentication, Accounting, and Authorization (AAA)
- Enhancements to Transport Layer Protocols
- Quality of Service (QOS)
- Local Mobility Management
- Mobile Ad-Hoc Networking

Full Seamless IP Wireless to the Internet

- IPv6 will be Mandatory for full Evolution to the Internet
- Radio Access Network parts will become IP Access Routers and Gateways
- Mobile IPv6 will be the architecture for Handoffs and to access Location Based Services
- Local Mobility Agents will distribute the processing of Wireless Handoffs and Integration of Wireless to Wireline access
- AAA will become the prime security, billing, and subscriber database infrastructure

Impact on the Mobile Communications Industry

- Internet End-2-End Model is restored
 - NAT is not required
 - Tunnels are not required
 - ****New**** End-2-End Applications can now evolve again
 - Internet Access will be pervasive and cheaper for underdeveloped nations and enabler for the have-nots in the world
- Internet End-2-End Security is restored
 - Security is between you and your ISP and your peer on the network
- Complexity is reduced by limiting the signal planes from existing Wireless and Telephone network protocols
- Seamless mobile computing on the Internet is achieved because of IPv6 and Mobile IPv6 Routing
- Wireline, Wireless, and Telephone System is integrated and manageable as a single network domain

Internet e2e + Pervasive Services + New Applications + Reduced Cost = Profit

Thank You
Questions??