



Voice over Wireless LAN

Michael Frendo

Vice President, Voice System Engineering

Voice Technology Group

May 11, 2004

Voice over Wireless LAN

Cisco.com

The Next Killer Application?

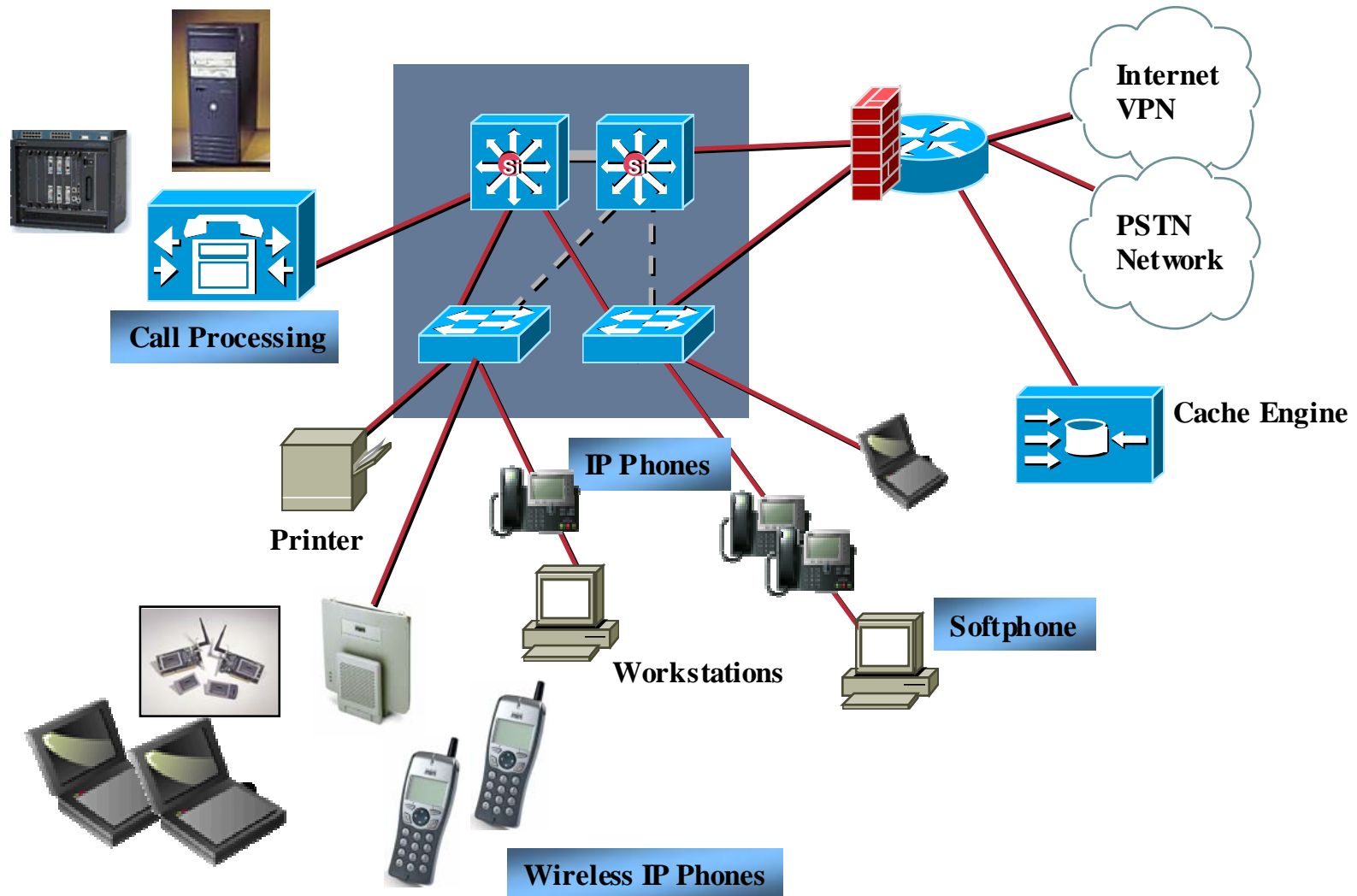
- or -

**Just Another Side Effect
of IP Communications
Convergence**

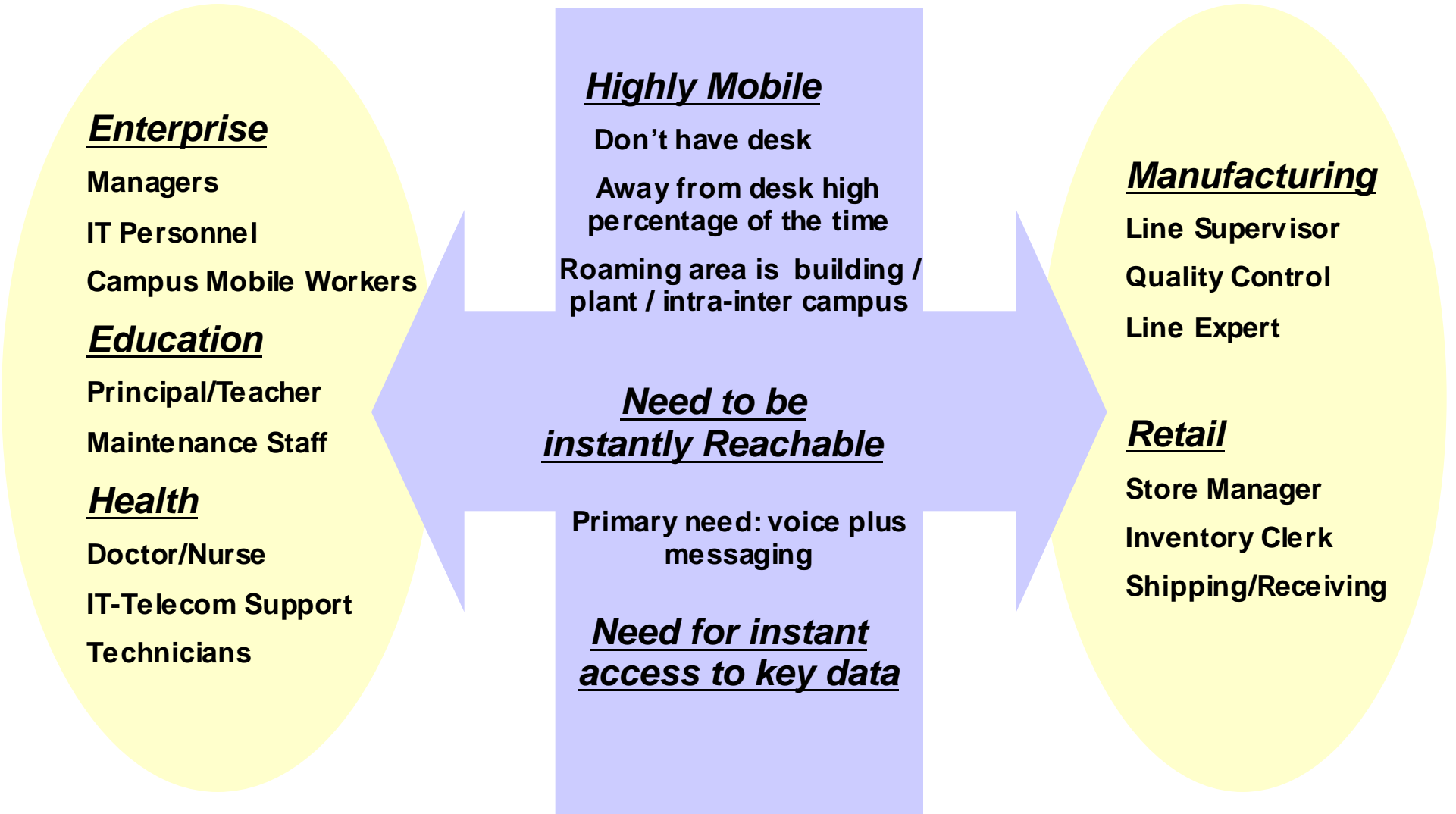


Adding VoWLAN to Emerging IP Communications: Add APs + Cisco Wireless IP Phone 7920

Cisco.com



Common End-User Characteristics

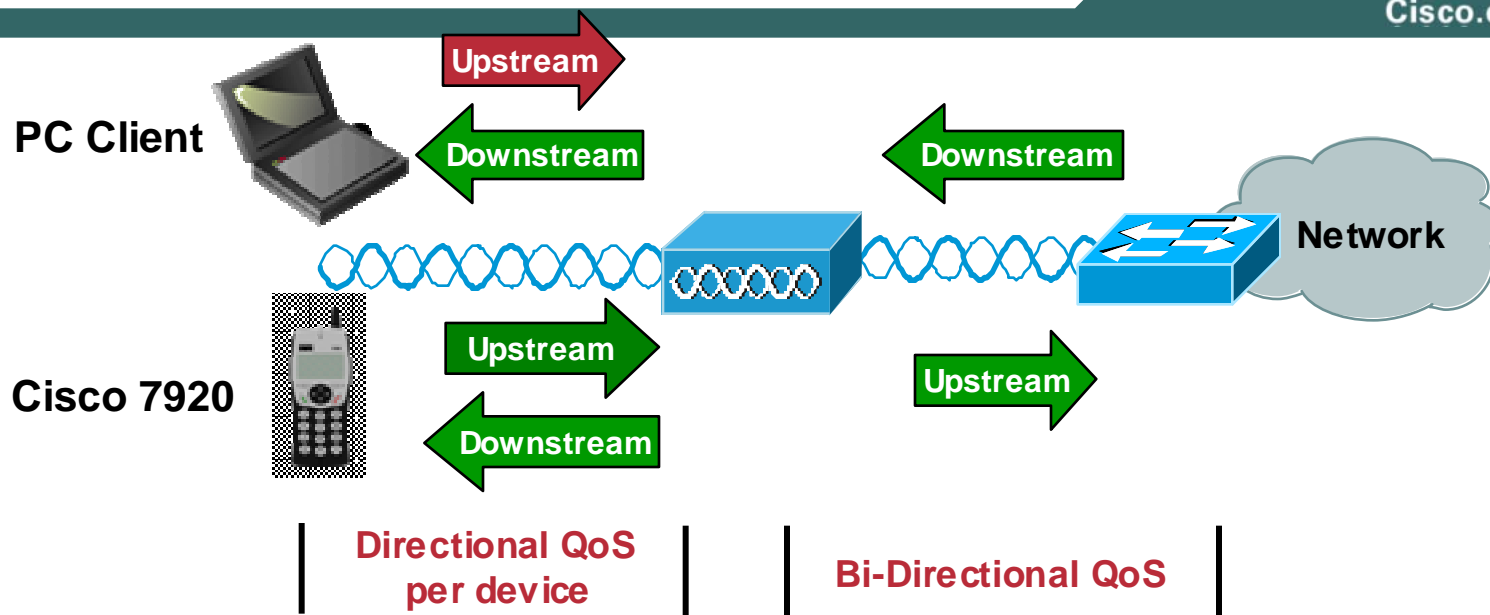


Solving the VoIP Issues and the WLAN issues



WLAN QoS Challenges

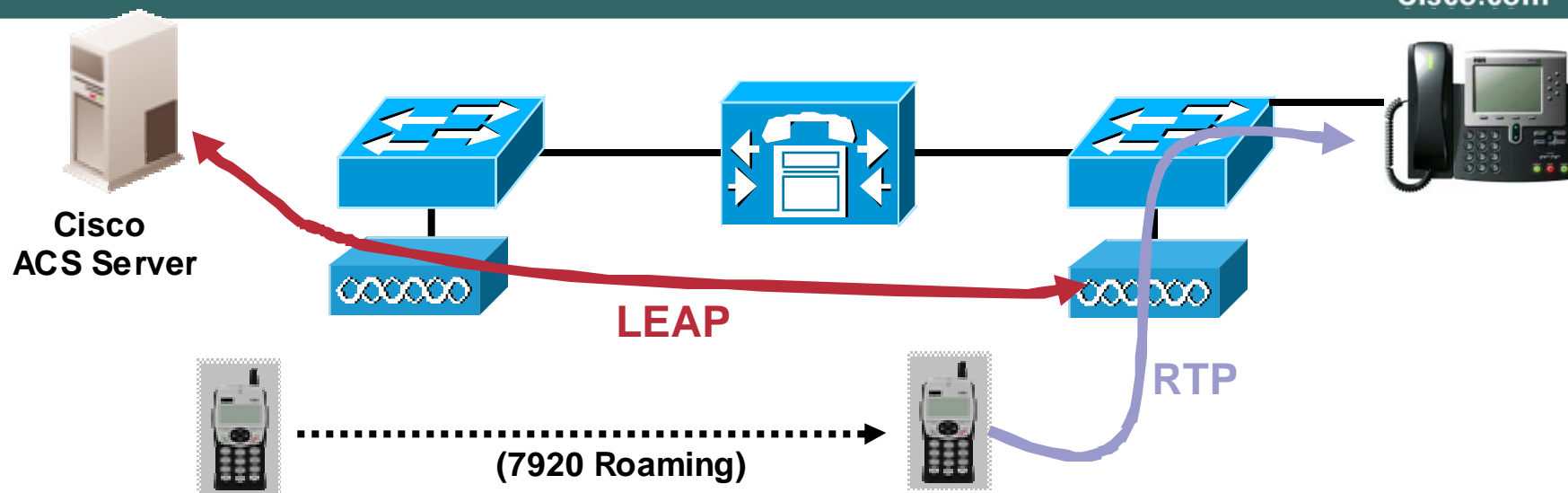
Cisco.com



- WLAN QoS is based on a model of preferred access to the RF medium
- QoS is statistical, not guaranteed
- Downstream traffic from AP receives “soft QoS” as VoIP receives preferred treatment, but not a strict priority queue
- Upstream traffic from Cisco 7920 uses enhanced access to RF medium, so it will also get “soft QoS”
- Multiple 7920s will all use enhanced access to RF medium, so 7920s will compete with other 7920s for access.

Cisco 7920 – Authentication Models

Cisco.com



- LEAP (Cisco-EAP) provides a dynamic WEP key.
- LEAP re-authentication will occur with each roam between APs.
- LEAP authentication requires a RADIUS server that supports LEAP.

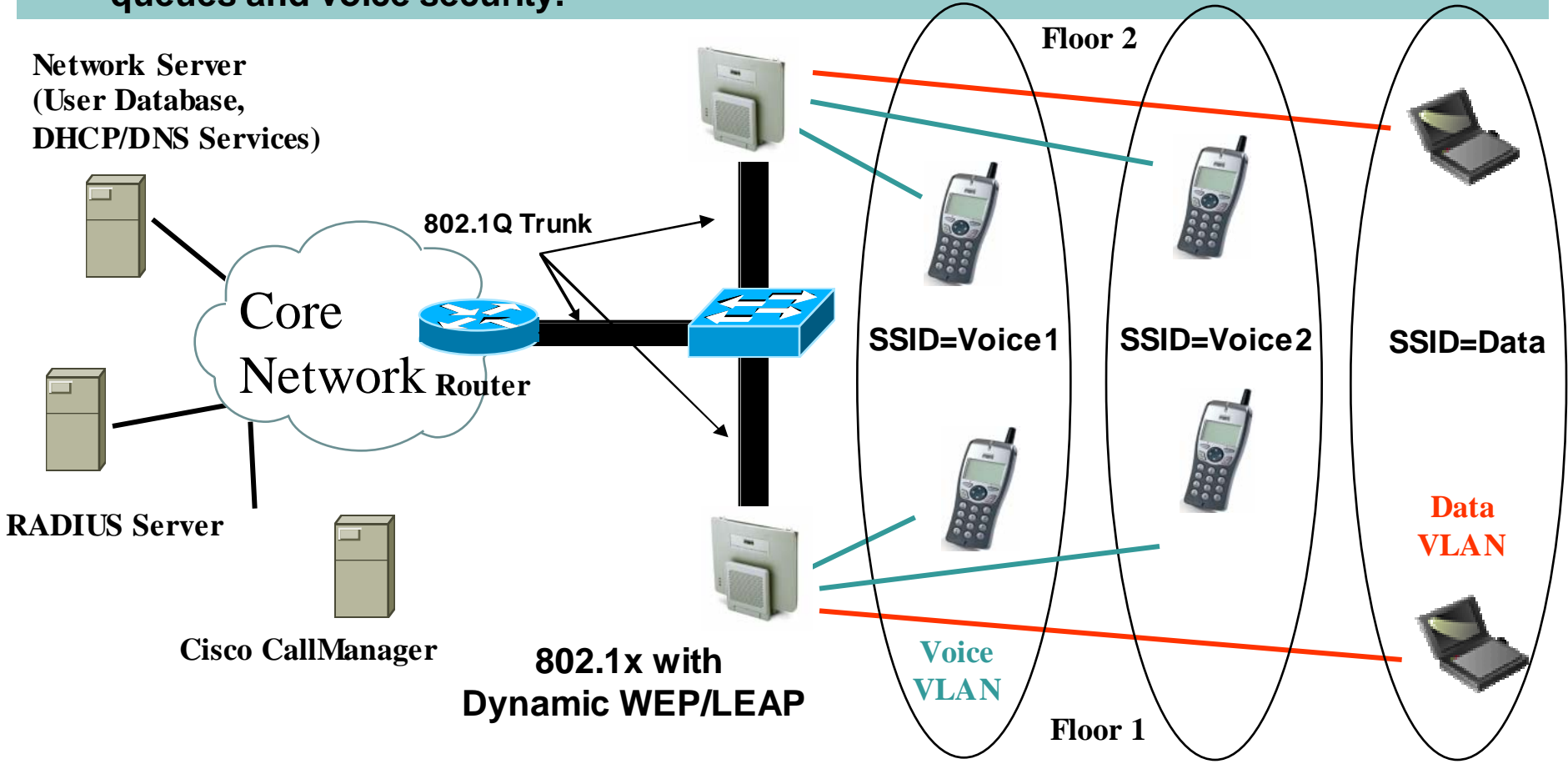
OR

- Static WEP provides a fixed WEP key. The key is manually configured on 7920s and APs.

Security and Priority: “Wireless” VLAN Deployment

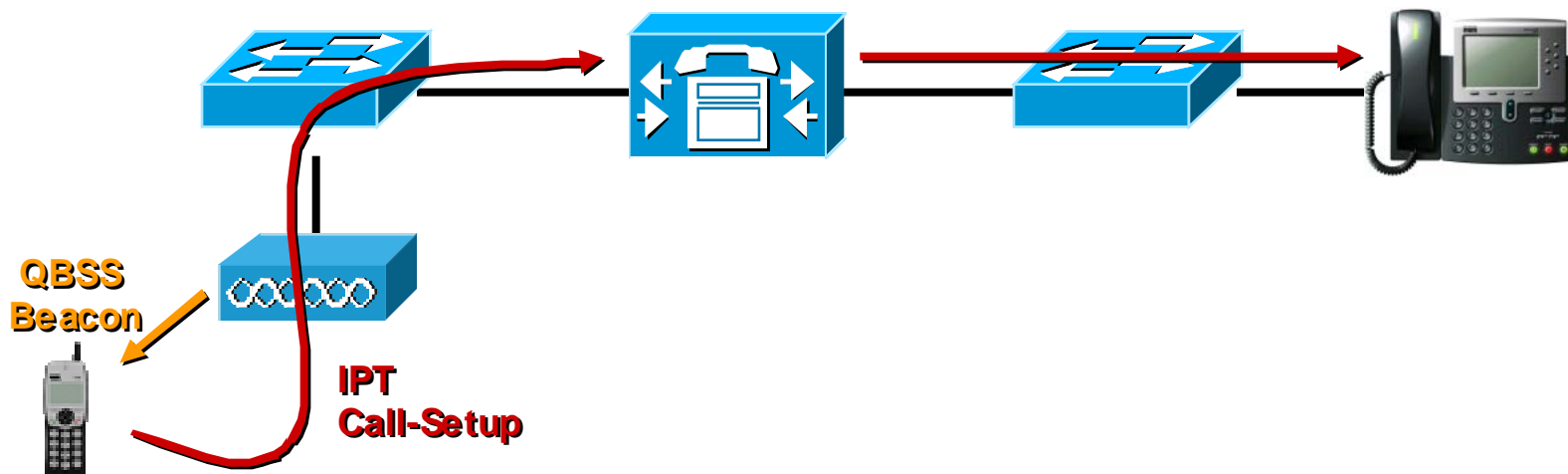
Need for device differentiation:

- VLANs enable the separating of voice & data traffic to achieve different priority queues and voice security.



“Pre-Call” Admission Control

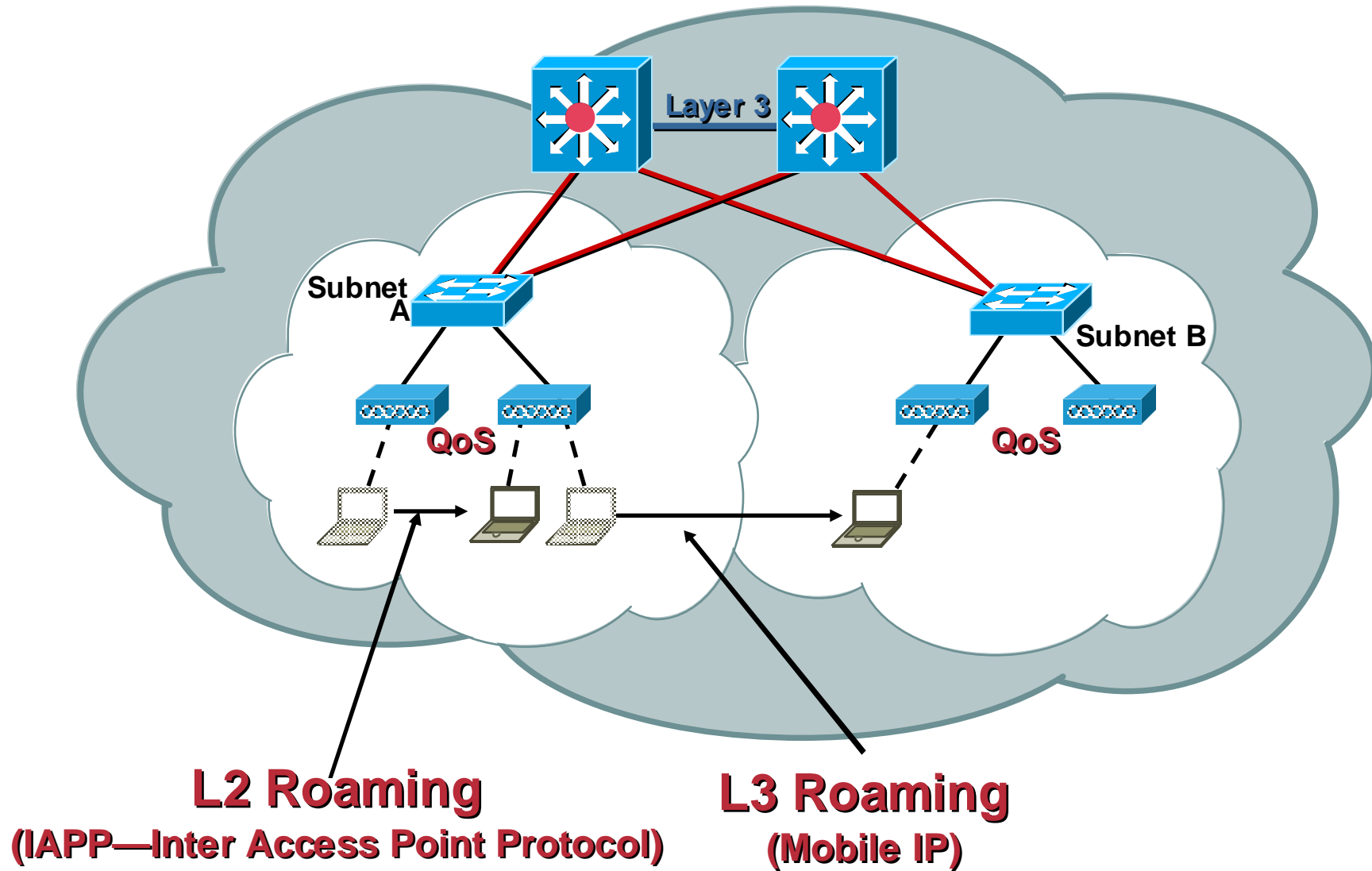
Cisco.com



- Prior to call setup, the 7920 will compare the QoS Basic Service Set (QBSS) value from the AP with the QBSS threshold configured on the phone
- If the threshold is NOT exceeded, the 7920 will attempt to place the call; If the threshold is exceeded, the call will fail with “network unavailable”;
- CallManager Admission Control (via Locations or Gatekeeper) will be applied if the call-setup is attempted by the 7920

Roaming Types

(Layer 2, and Layer 3)

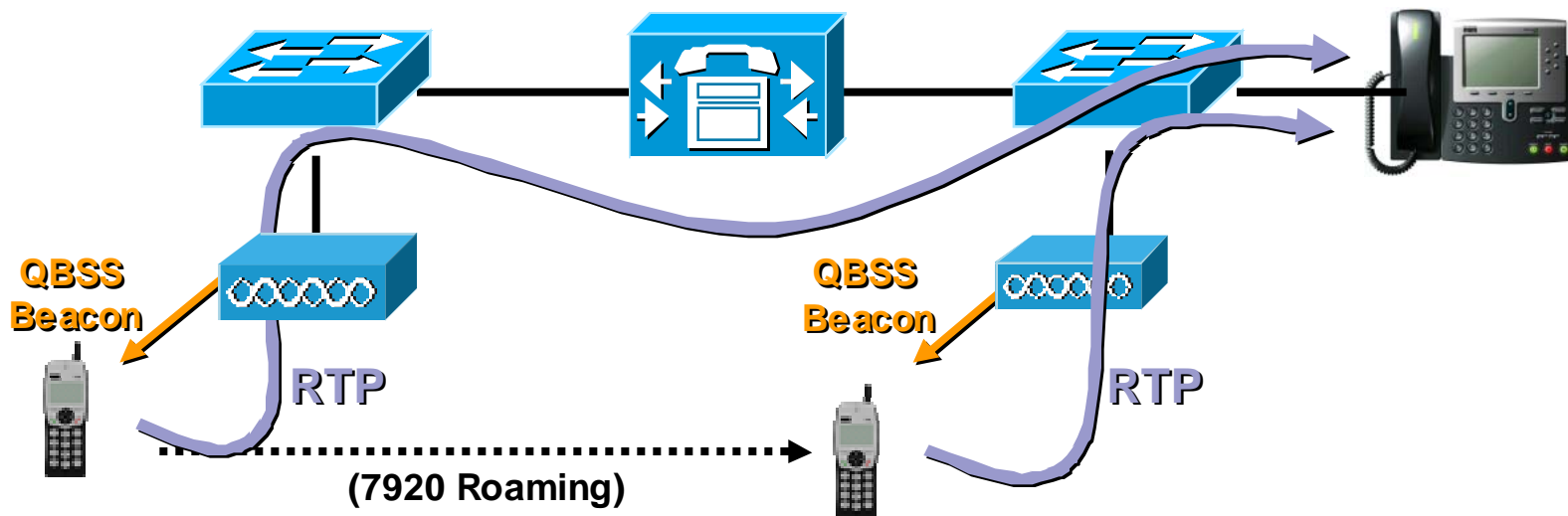


Roaming and the Cisco Wireless IP Phone 7920

- **The Cisco Wireless IP Phone 7920 supports a phone based seamless and secure roaming scheme**
- **Phone scans all RF channels at power-up and develops a table of available RF channels and RSSI; the table is updated periodically to keep the information current**
- **When a AP1-AP2 differential threshold is reached – the phone switches from AP1 to the target AP2**
- **Roaming Performance**
 - 40/128 bit WEP: Roam time of <100ms**
 - LEAP: 200-300ms with a local ACS server**
 - Note: Roaming time can increase if the ACS server is not local.**

“Mid-Call” Admission Control

Cisco.com

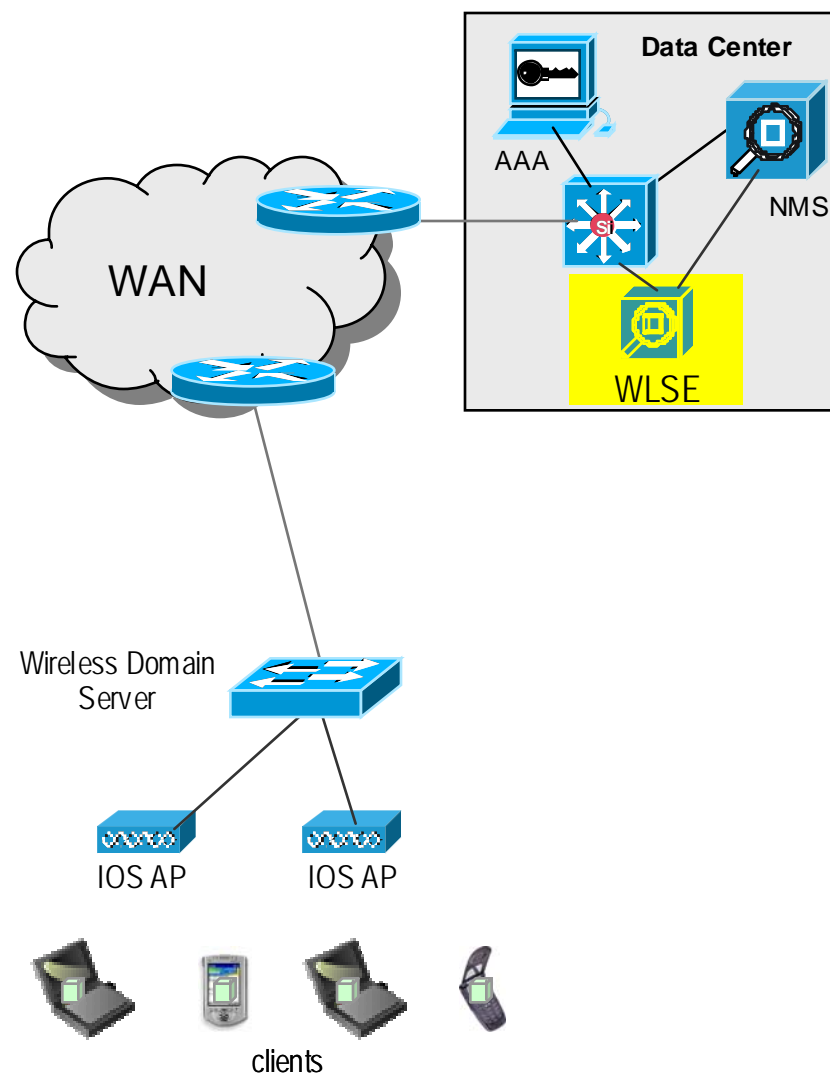


- During a call, 7920 will look at Received Signal Strength Indicator (RSSI) and QoS Basic Service Set (QBSS) values to determine the best available AP (QoS, Signal Strength) when roaming
- If QBSS and RSSI threshold are exceeded, roaming will not occur
- If QBSS and RSSI thresholds are NOT exceeded, roaming will occur to the best available AP

Cisco's Approach: The Structured Wireless-Aware Network (SWAN)

Cisco.com

- **Wireless LAN Solution Engine (WLSE)** provides AP management
 - Unattended en mass upgrades and configuration changes
 - RF management like rogue AP detection, site survey assistance
- **Wireless Domain Server (WDS)** aggregates, localizes data
 - WDS functionality currently available on IOS APs, on IOS switches and access routers
 - One WDS with redundant backup per subnet
- **IOS APs provide wireless edge services** e.g. client connectivity, RF scans, 802.1x port blocking and QoS packet prioritization
 - Cisco and Cisco Compatible clients optionally contribute RF scanning data



Cisco's VoWLAN Solution Summary

Cisco.com

- **Current features:**

- QoS between AP and switch (802.1p/Q prioritization over wired link)

- Transmit power sync (reduce interference; improve battery life)

- VLAN (create dedicated voice VLAN)

- Cisco LEAP (802.1X authentication/security)

- Fast AP-to-AP roaming (low-latency handoffs)

- CCKM (fast secure roaming using LEAP)

- WPA (industry standard encryption)

- **Future:**

- Power Savings

- QoS on the wireless link

- Fast Secure Layer 3 Mobility

- Support for multiple device types



802.11 Phone



Dual-Mode
802.11/Cellular
Phone



PDA with Softphone

CISCO SYSTEMS

