

Fixed Mobile Convergence- The Hows and Whys

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Our Panel...

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Motorola Inc.

- Dan Jacobson

Senior Portfolio Manager, Converged Voice Services
Sprint Nextel

- Pejman Roshan

VP of Marketing/Co-Founder, Agito Networks

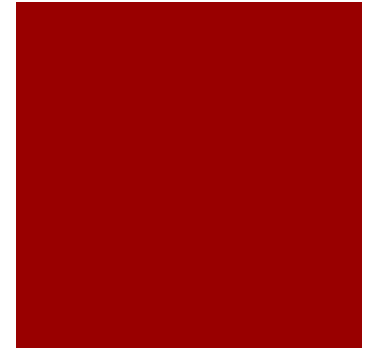
- Vivek Khuller

President and CEO, DiVitas Networks

Basic Premise

“Mobility will be the biggest driver for unified communications, and providing continuous access to key personnel will be the single most important thing we can do to improve productivity.”

Fixed Mobile Convergence



The ability to integrate private networks, wired and wireless, with public cellular services and pass calls between them

Customer Motivations for FMC



- **Cost Savings:** You can save money, but it might not be on your cellular bill (unless you can divert international cellular calls to the wired net).
- **Improved Accessibility:** Faster decision making as critical people can be accessible continuously via one number and one voicemail.
- **Mobile Unified Communications:** Greater productivity for the mobile users by integrating presence and other UC features on the mobile device
- **Business Ownership of Telephone Numbers:** Customers are calling the business number, not the user's cellular number.
- **Better Indoor Coverage:** With a voice-capable wireless LAN or a cellular distributed antenna system (if available)

FMC Solution Differentiators



- Control Point
 - Enterprise/PBX Controlled- eFMC
 - Carrier Controlled- cFMC
- Hand-off
 - None, Manual, or Automatic
- Functionality
 - Voice Calls
 - Mobile Unified Communications

eFMC Option Summary

Cellular Only/Simultaneous Ring

- Pro:
 - ◆ Covers the basics
One number/voicemail, access...
 - ◆ Works with any handset
 - ◆ Immediate set-up
 - ◆ Mobile UC client for feature integration
- Con:
 - ◆ Additional cellular charges?
 - ◆ Indoor coverage?
 - ◆ User compliance?

Dual Mode Wi-Fi/Cellular

- Pro:
 - ◆ Covers the basics
One number/voicemail, access...
 - ◆ May save on cellular charges
 - ◆ Automatic handoff ensures compliance
- Con:
 - ◆ Requires a voice-capable WLAN
 - ◆ Limited range of handsets
(no Blackberries!)
 - ◆ Prospects for presence federation?

Simultaneous Ring

Wired-Mobile Convergence

eFMC

Basic Operation

1. IP PBX with Simultaneous Ring/Extension-to-Cellular Feature
2. Once the cellular number is programmed in the IP PBX, calls ring on cellular and desk set
3. User can answer on either device (manual transfer capability optional)

Analysis:

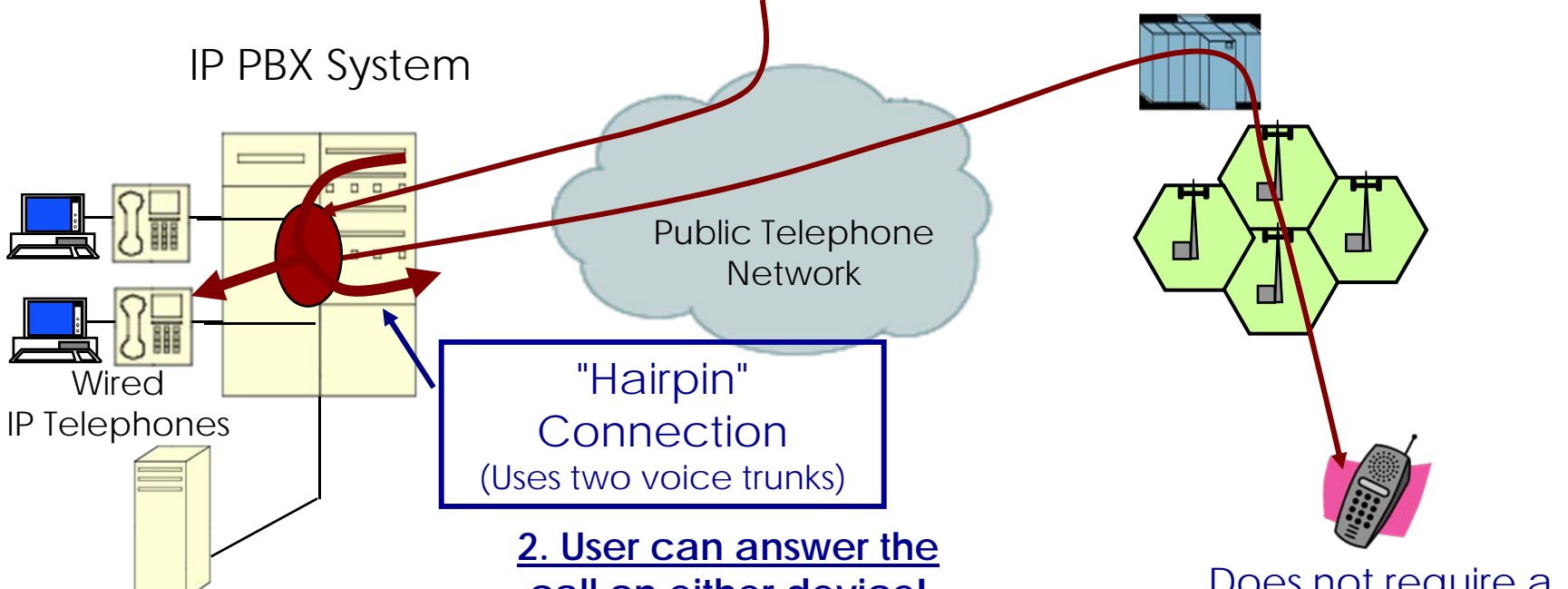
- ◆ **Delivers the Basics:** One number, one voicemail, anywhere access
- ◆ **Handset Selection:** Works with any cellular-only handset whose number is stored in the IP PBX
- ◆ **Works with Mobile UC:** Can be used in combination with cellular-based mobile UC solutions
- ◆ **Cost:** Possible increased cellular costs as all inbound/outbound cellular calls must pass through the PBX
- ◆ **Enforcement Problem:** How can we ensure the user selects the lower cost option when they are near a wired desk set?

Simultaneous Ring

Wired-Mobile Convergence



Incoming Call



1. Telephony Server
Rings incoming calls simultaneously to desk set and to the user's cell phone

"Hairpin" Connection
(Uses two voice trunks)

2. User can answer the call on either device!
Unanswered calls go to the PBX's voicemail system

Does not require a dual mode handset

Note: To protect the number, outgoing cellular calls must also be placed through the PBX

Mobile UC Implementations

Definition: Extend UC features to cellular devices

Single Path Solutions

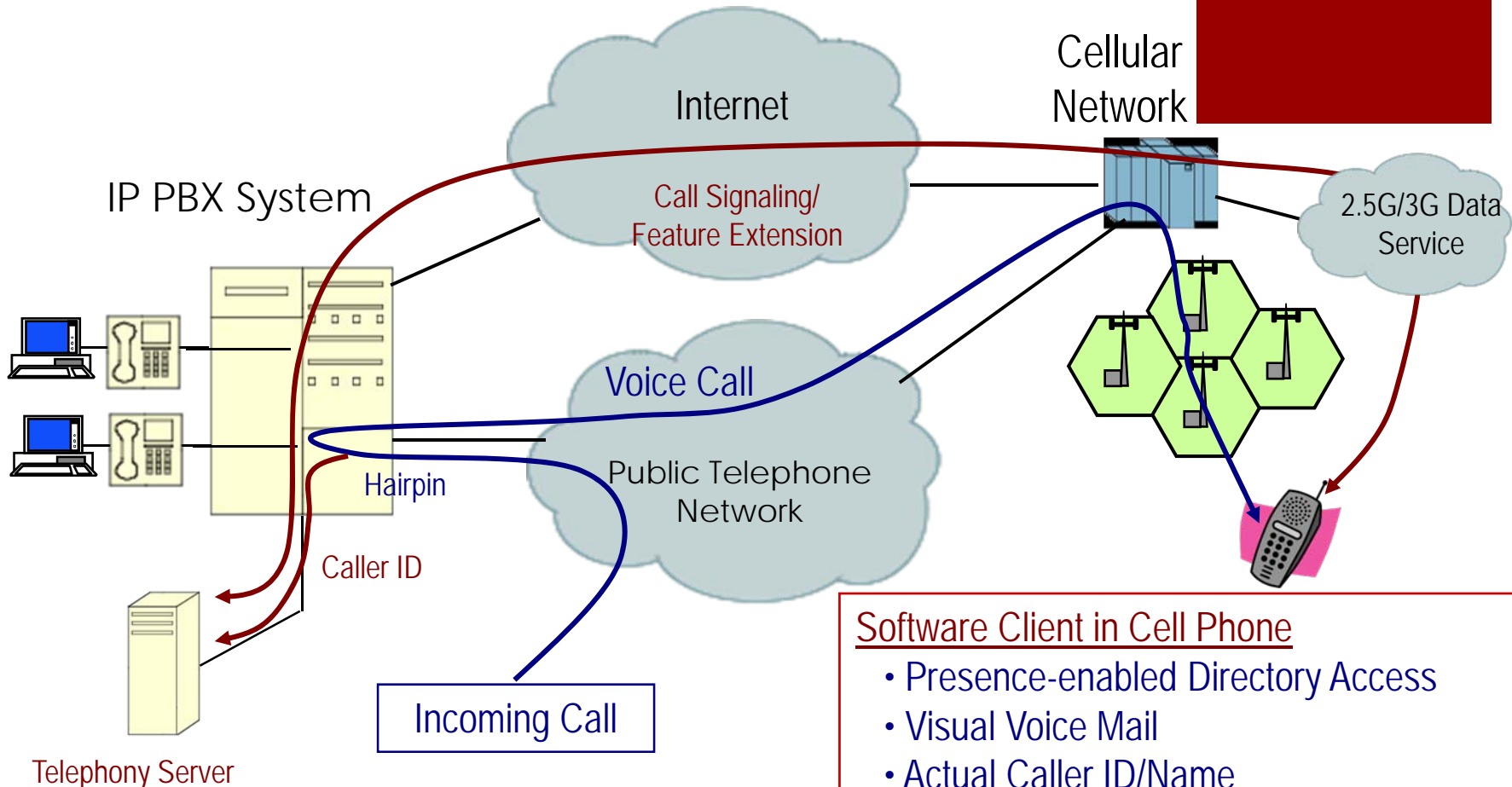
- ◆ Signaling sent via DTMF tones over the cellular voice connection
- ◆ Typical Features:
 - 4-digit Extension Dialing
 - In-call Features: Hold, Conference, Park, Transfer
 - Dual Persona

Dual Path Solutions

- ◆ Cellular voice connection plus a cellular data service for signaling (In-call features available only with 3G cellular data services)
- ◆ Typical Features:
 - 4-digit Extension Dialing
 - In-call Features: Hold, Conference, Park, Transfer
 - Dual Persona
 - Visual Voicemail
 - Actual Caller ID (Inbound and Outbound)
 - Corporate directory access
 - Presence-enabled directory (maybe)

Dual-Path Mobile UC

eFMC



Software Client in Cell Phone

- Presence-enabled Directory Access
- Visual Voice Mail
- Actual Caller ID/Name
- 4-digit extension dialing

Sample of Mobile UC Products

eFMC

■ UC Platform Vendors:

- ◆ IBM: Lotus Sametime Mobile/Blackberry Client for Sametime
- ◆ Microsoft: Office Communicator Mobile/Blackberry Client for for Microsoft OCS

■ IP PBX Vendors:

- ◆ Avaya: one-X Mobile Telephony, Mobile UC, or Dual Mode
- ◆ Cisco: Unified Mobile Communicator
- ◆ Siemens: OpenScape Mobile UC, HiPath MobileConnect

■ Others:

- ◆ Agito: RoamAnywhere Mobility Router
- ◆ DiVitas: DiVitas Server
- ◆ Nokia Intellisync Call Connect

- ◆ RIM/Ascendent Systems

Dual Mode/Automatic Handoff

Mobile-Mobile Convergence

eFMC

Dual Mode Wi-Fi/Cellular with Automatic Handoff

1. Mobility Controller
 - Recognizes the availability of users over the WLAN
2. Dual Mode WLAN/Cellular Handsets
 - Require client software to interface with the WLAN Voice Controller
3. Assumes a voice-capable WLAN Infrastructure is available

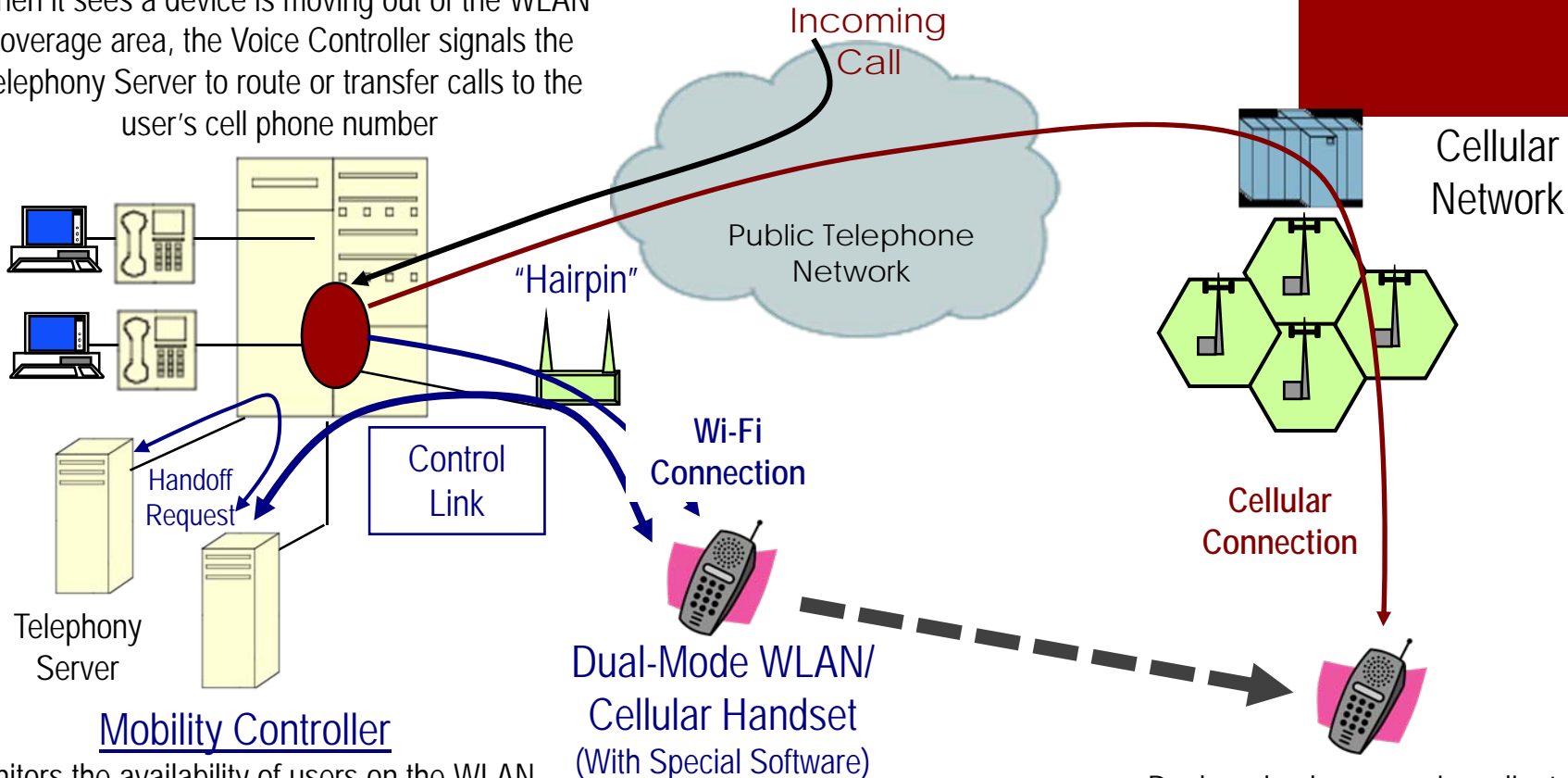
Analysis:

- ◆ **Delivers the Basics:** One number, one voicemail, anywhere access
- ◆ **Cost:** All inbound/outbound cellular calls must pass through the PBX, however calls made/received over the WLAN involve no cellular charges
- ◆ **Assured Compliance:** Calls are automatically routed over the WLAN when available
- ◆ **Mobile UC:** Typically include some mobile UC features (presence ?)
- ◆ **Convenience:** No need to manually transfer calls
- ◆ **Limited Handset Selection:** Client requirement limits the range of handsets

Dual-Mode/Automatic Handoff Mobile-Mobile Convergence



When it sees a device is moving out of the WLAN coverage area, the Voice Controller signals the Telephony Server to route or transfer calls to the user's cell phone number



Mobility Controller
Monitors the availability of users on the WLAN and insures user compliance
If the user is in the coverage area, the call is automatically routed onto the WLAN

Dual-mode phone requires client software and typically provides mobile unified communications features

Automated Handoff Options

■ IP PBX Vendors:

- Avaya one-X Mobile Dual Mode
- Siemens Mobile Connect
- Cisco/Agito Networks

■ Independent:

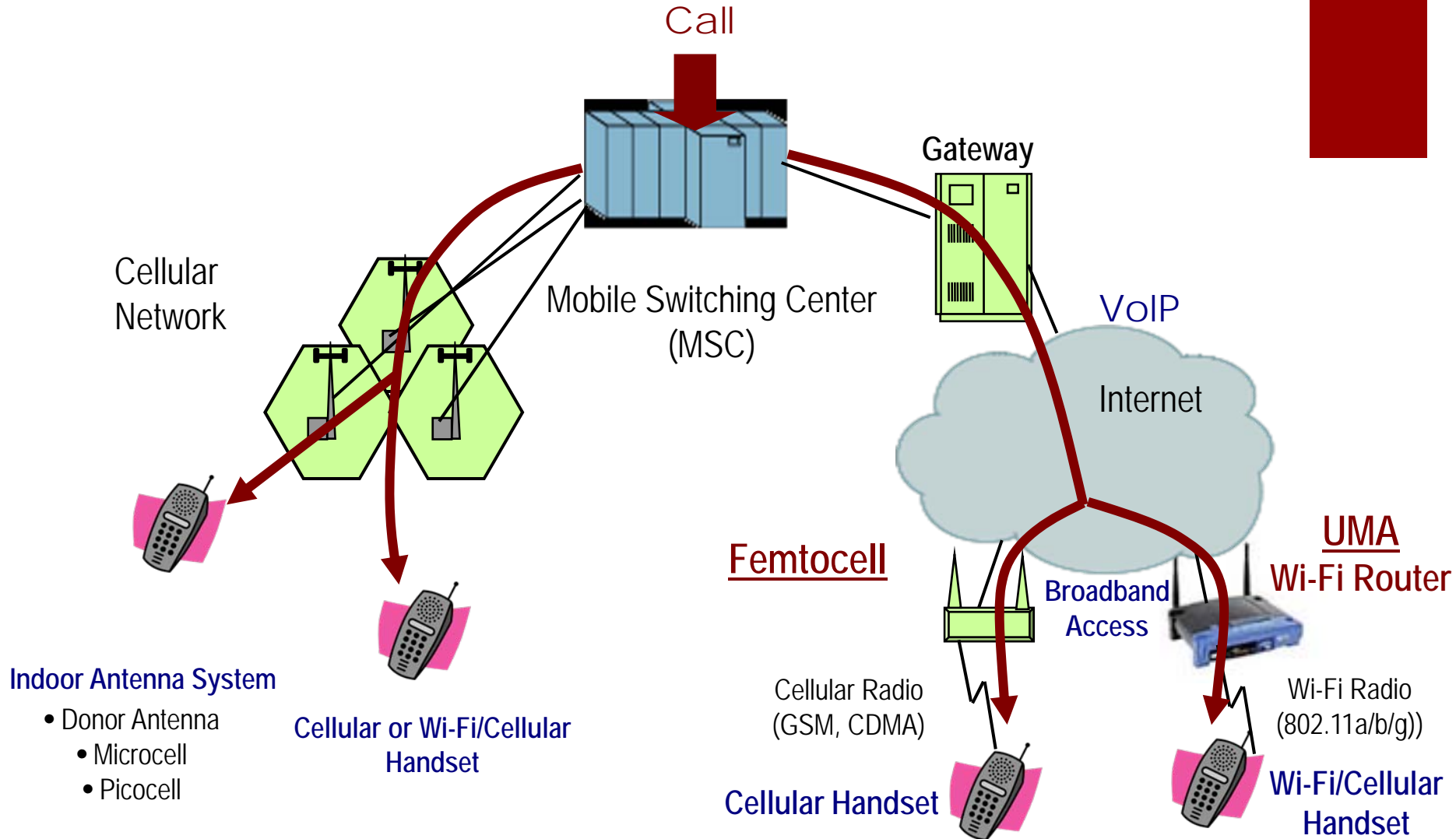
- Agito: RoamAnywhere Mobility Router
- DiVitas: DiVitas Server
- CounterPath/FirstHand Technologies (Coming)

Carrier FMC (cFMC) Solutions

cFMC

- Carrier FMC (cFMC)
 - The carrier automatically hands off calls to/from a private network.
 - No US carriers have introduced cFMC services for the enterprise
- Consumer cFMC Services
 - The carriers have introduced consumer FMC services
 - ✦ UMA-based: Wi-Fi/Cellular handsets (T-Mobile, Cincinnati Bell)
 - ✦ Femtocell-based: Short-haul cellular (Sprint's AirRave)
 - Both use VoIP over the customer's broadband Internet connection as the alternative to cellular
- Cellular is the only wide area wireless service
 - Cellular will be part of your solution
 - Indoor coverage has been problematic
 - Simultaneous ring and Mobile UC products can greatly enhance the basic cellular service

cFMC: Carrier Controlled Options



Cellular Carrier Issues

cFMC

- **Quality Control:** Will they be held responsible for poor call quality or disconnects caused by WLAN screw-ups?
- **Revenue Impact:** How will they be compensated?
- **Customer Control:** Cellular carriers have enjoyed a unique franchise in mobile voice service
- **Consumer Tunnel Vision:** Cellular carriers are focused primarily on consumer markets
- **Parochial View of Wireless Technologies:** Don't trust anything but the cellular technology they know

Unlicensed Mobile Access (UMA) cFMC

■ Solution Elements:

1. Carrier-provided service (T-Mobile *HotSpot@Home*, Cinn Bell *Home Run*)
2. Broadband Internet service and Wi-Fi Router
3. UMA-capable Wi-Fi/cellular handset
(Nokia 6086, Samsung T409, BlackBerry Curve- 8320)

■ Capabilities Provided:

- ◆ Single number, anywhere accessibility, single voicemail
- ◆ Automated handoff between cellular and Wi-Fi for calls in progress
- ◆ Free Wi-Fi/VoIP calls when in range of home network

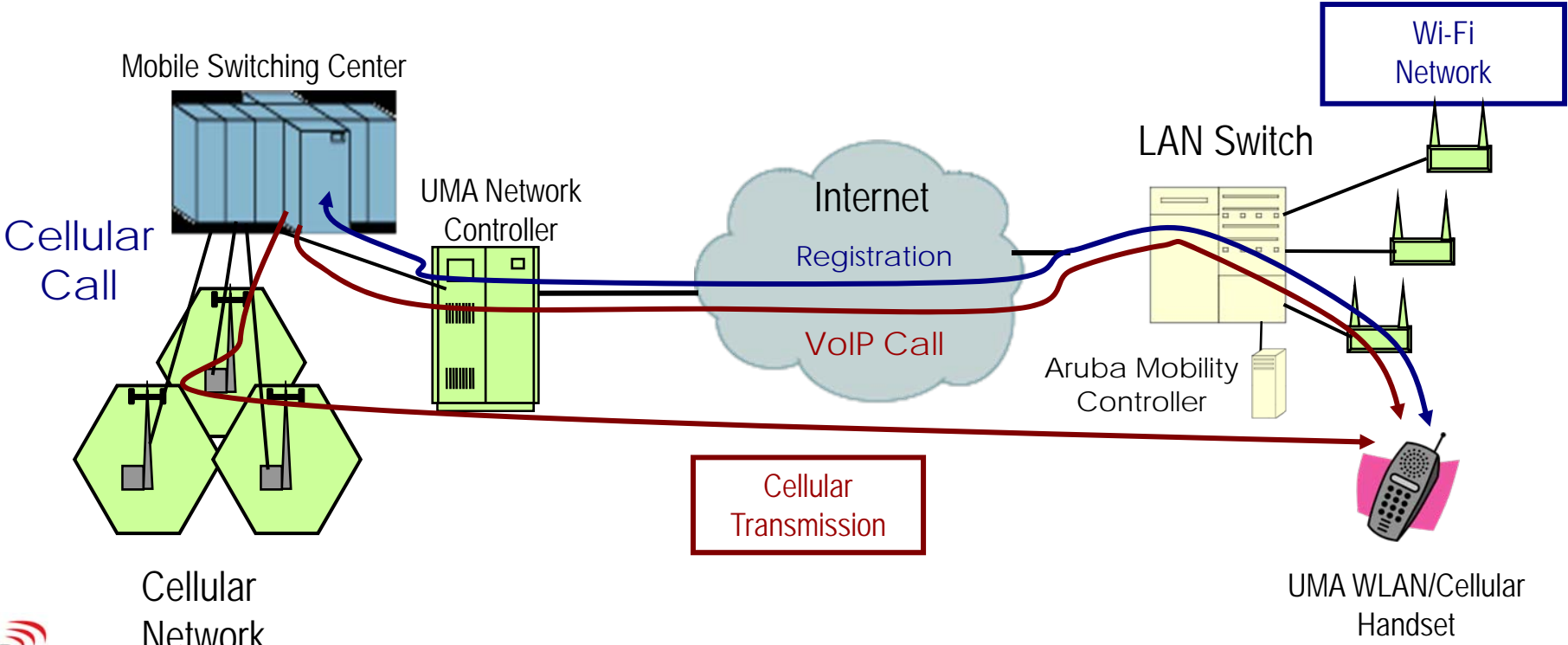
■ Enterprise Problem

- ◆ This is a consumer solution with no effective way to interface to a PBX system

Business UMA- Aruba Networks

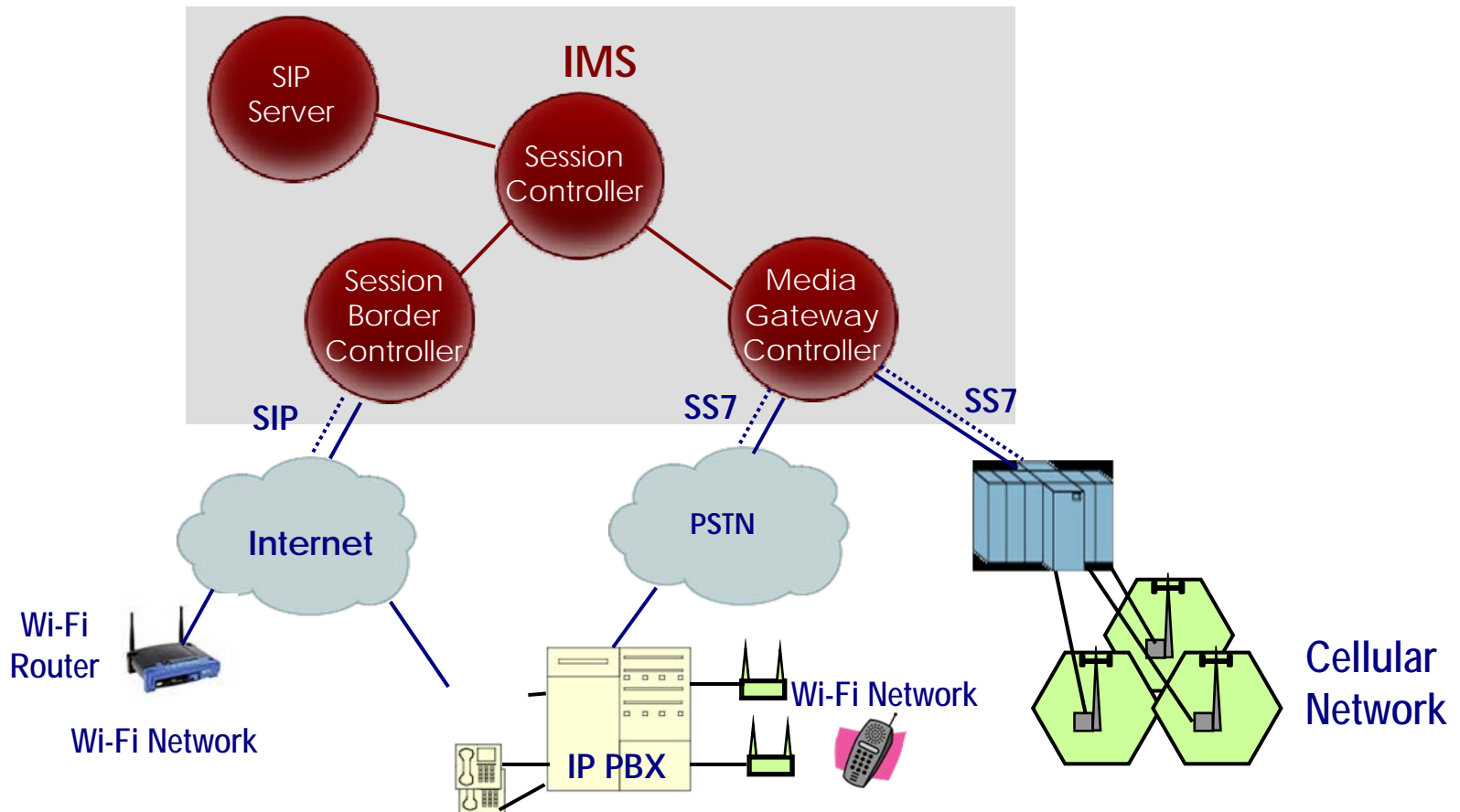


- ◆ UMA handsets can be set to recognize the corporate WLAN
- ◆ User can roam anywhere in the WLAN coverage area
- ◆ Handsets have the required enterprise WLAN features (802.11e QoS, 802.11i Security, APSD)
- ◆ Calls are handed-off transparently between the cellular and the enterprise WLAN network
- ◆ UMA mobile devices can be associated with the PBX through simultaneous ring



IMS Vision: Network Agnostic, All-IP

Vision: One number, device, voicemail, and feature set on one bill



Potential Strategic Developments

cFMC

- Significant change in cellular carriers' competitive posture
 - ◆ Actually offering enterprise FMC capabilities
 - ◆ Embracing/incorporating other wireless technologies
 - ◆ Finally selling dual-number handsets
 - ◆ "Cellular Centrex" with enterprise features
 - ◆ Actively promoting user provided handsets with real cost breaks
- Competition in the wide area wireless space (WiMAX?)
- Open handset initiatives (Android, iPhone, LiMO, RIM, Symbian)
- Open network initiatives (Verizon's "Any Device, Any App")
- Regulatory initiatives to force change

Conclusion



- Lots of options available, considerable interest from the user population
- Two sets of solutions: eFMC and cFMC
 - ◆ eFMC is available but the functionality suffers due to the lack of support from the cellular carriers
 - ◆ cFMC with real handoffs and feature integration would be preferable, but the cellular carriers are taking a close-minded approach to FMC
- FMC will probably not pay for itself
- Accessibility and productivity are the benefits

KEY QUESTIONS



- To what extent is FMC really ready for prime time?
- What vertical markets or applications are the most likely targets for FMC?
- Will an FMC solution really allow me to reduce my cellular costs?
- What are the advantages of rooting an FMC solution in an IP PBX, a WLAN Switch, or an adjunct appliance?
- Which of the solutions require dual mode cellular handsets, and will those handsets require special software to operate?
- How will the picture change when (and if) the cellular carriers finally embrace FMC?

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