

Femtocell Solutions Panel Session Wednesday 10:00-11:15

Panellist	Company	Position
David Chambers	ThinkFemtocell.com	Femtocell Expert
	Amdocs	OSS Mobile Solutions Manager
Dave Nowicki	Airvana	VP Marketing and Consumer Applications
Dan Troshynski	Acme Packet	Technical Director
Barlow Keener	Keener Law Group	President

What is a femtocell anyway?



- Complete mobile phone basestation shrunk to size
- Connects to mobile network via broadband internet (cable, DSL)
- Excellent coverage and capacity within the home/office
- Works with existing 2G or 3G phones

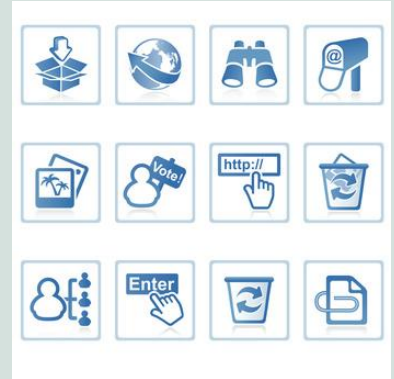
What problems do they address?



Coverage



Capacity



Applications

Current state of the market?

Volumes

2009: 200K units

2013: 12M units?

Standards

GSM 3G

CDMA 3G

LTE

Geography

North America

Europe

Japan

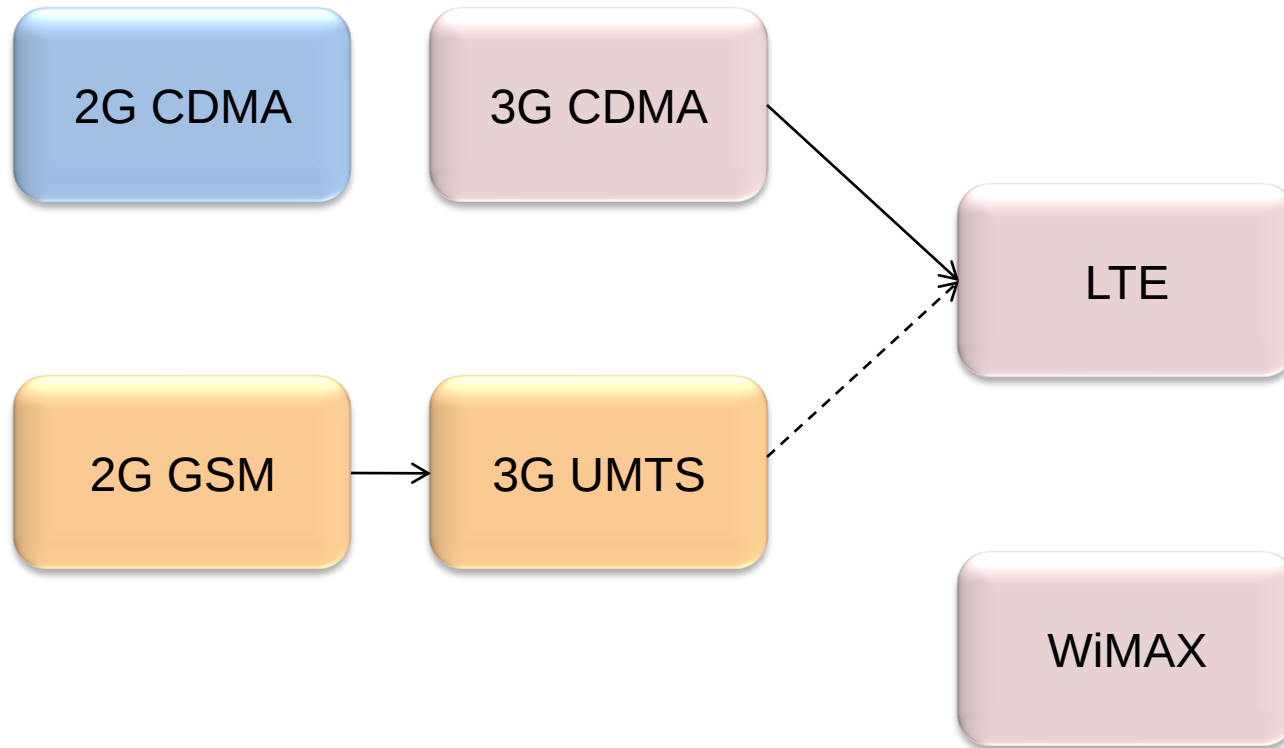
China

Rest of World



3G CDMA paves way for 4G femtocells

Enables IMS early



Key:

CDMA
Core Network

GSM
Core Network

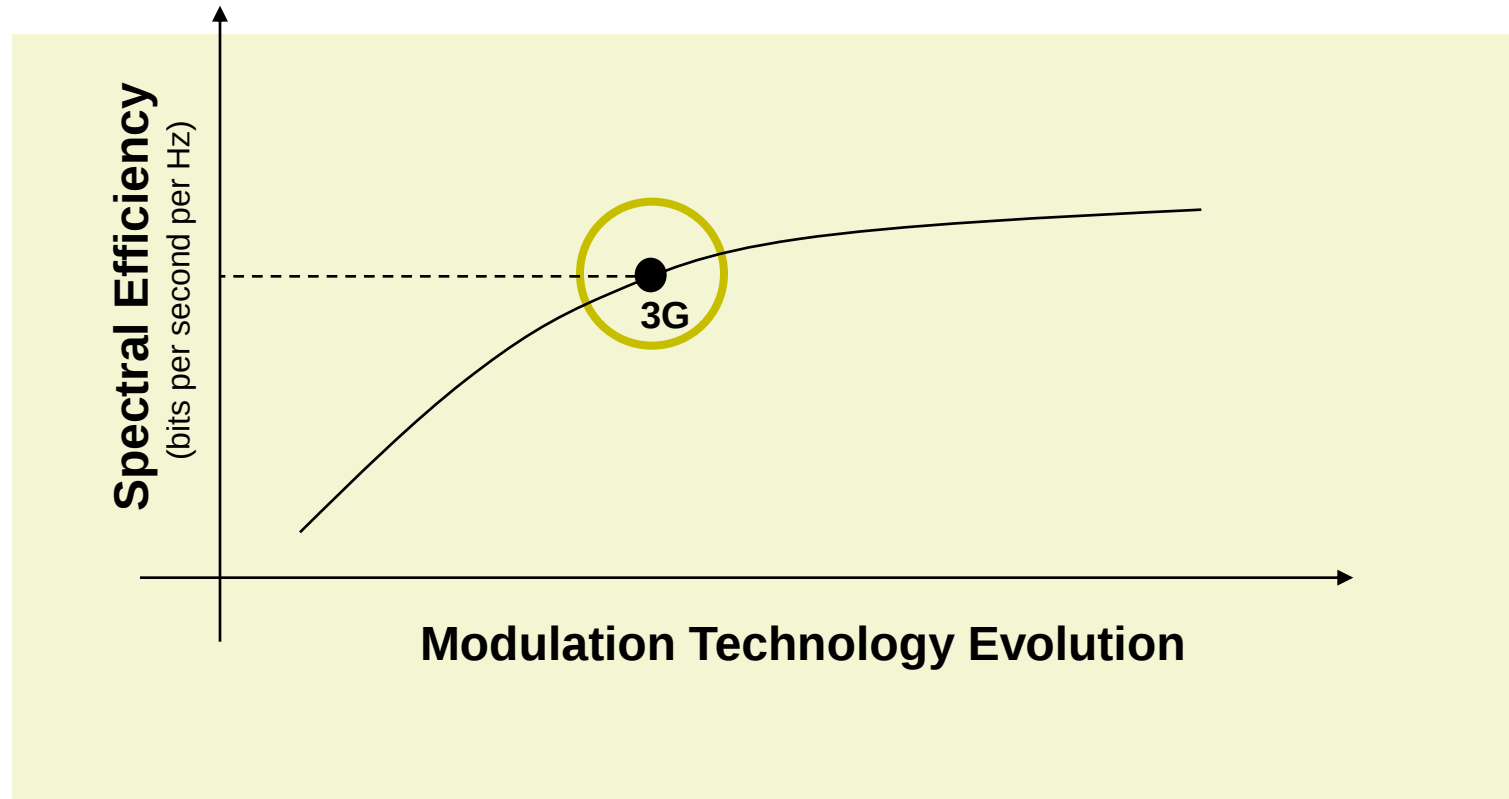
IMS
Core Network

David Nowicki

VP Marketing and Consumer Applications

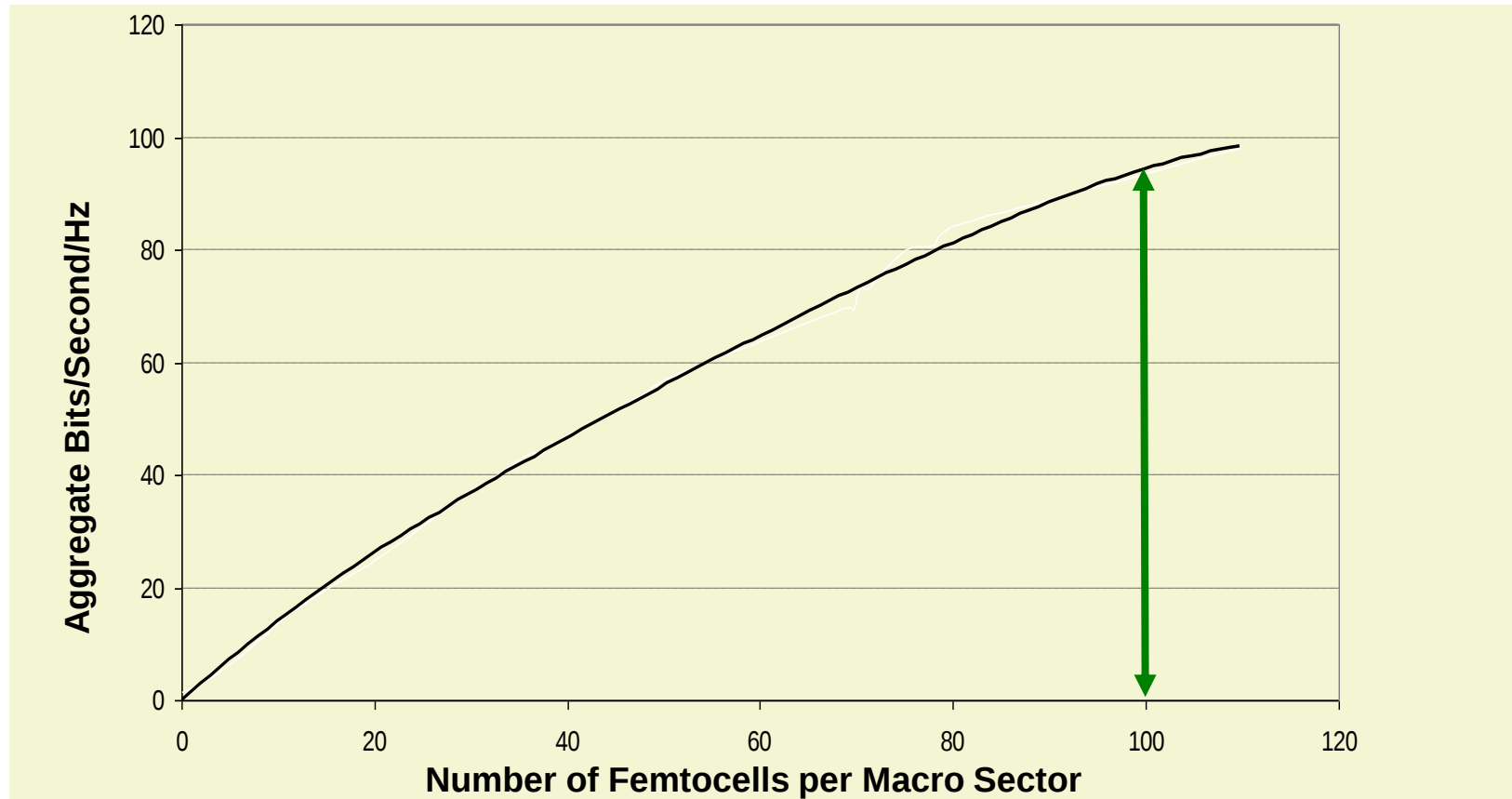
Airvana

Air Interface Evolution Delivers Incremental Gain



Next Generation of Air Interfaces (LTE/WiMax) Will Deliver Modest Gains in Spectral Efficiency

For Dramatic Gains, We Need to Look Elsewhere



Dramatic Gains in Spectral Efficiency Requires New Radio Network Architectures Such As Femtocells

The Femto Forum

- Promoting & enabling femtocells
- Not-for-profit, founded in 2007
- Independent, Inclusive, International

Aims

Ecosystem
Development

Market Education

Driving open
standards

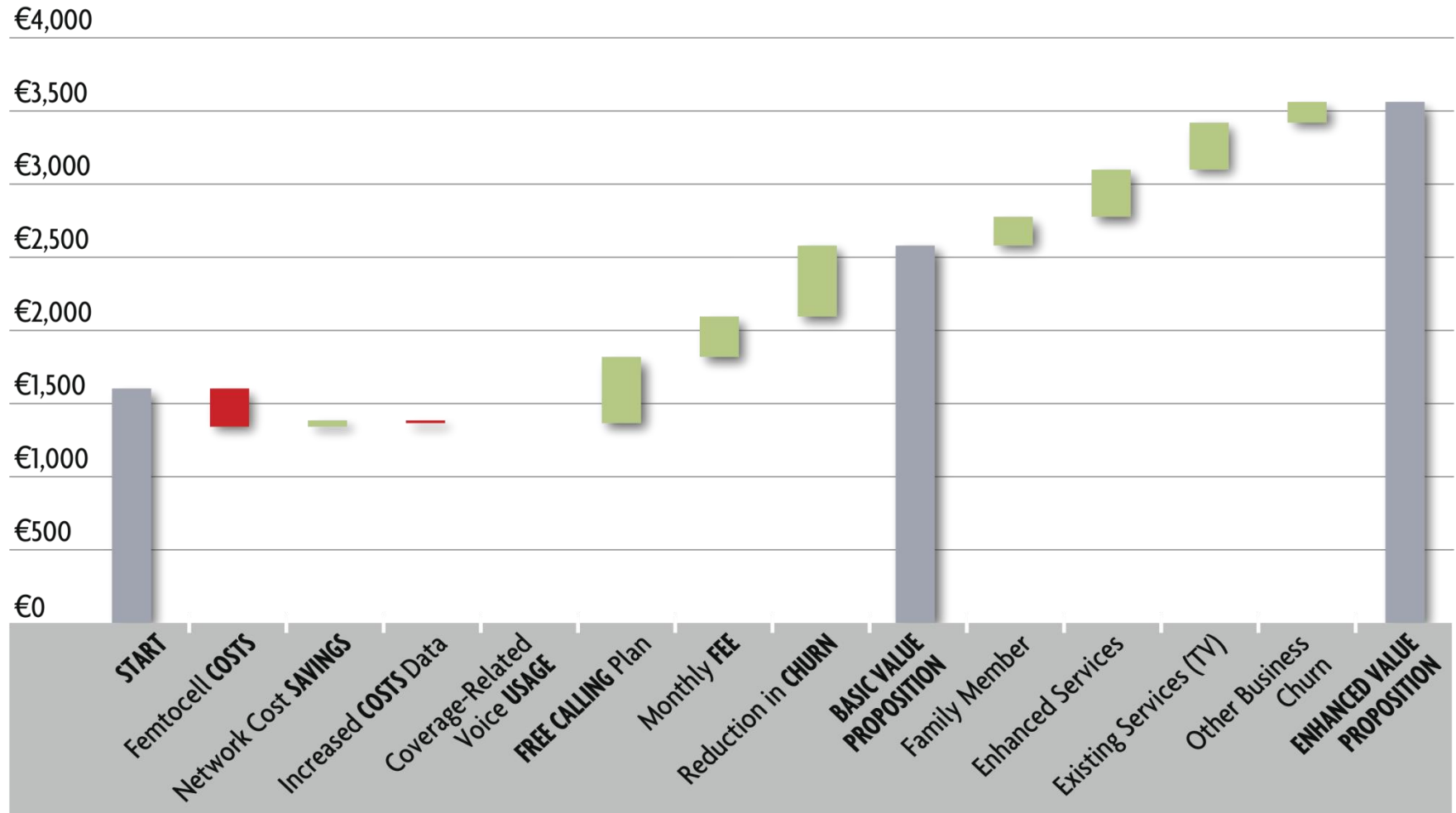
Members



- 43 operators covering 1.308 billion mobile subscribers
- 17 of the top 20 mobile operators
- 61 providers of femtocell technology and fixed line operators
- All of the top 5 mobile infrastructure vendors

Service concept: Family with teenagers (Europe)

Household Lifetime Value (€)



Service Concept: 5 GB Data Card User, Free Femtocell

Household Lifetime Value (€)

€1,000

€900

€800

€700

€600

€500

€400

€300

€200

€100

€0

This simplified scenario, stripped of all complex assumptions, shows how a “free” femtocell network can increase household lifetime value.

START

**Add Femtocell
COSTS**

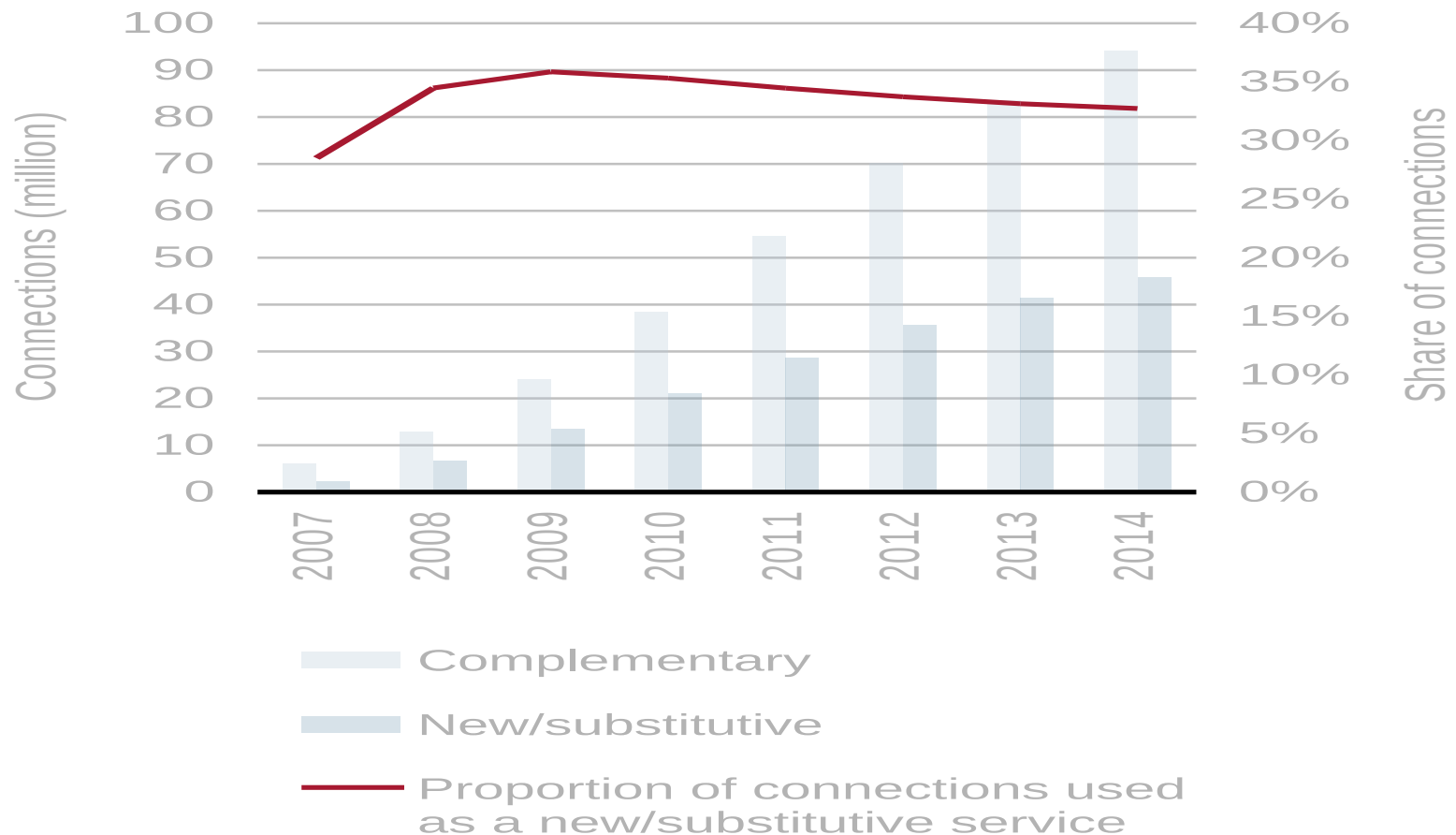
**Network Cost
SAVINGS**

**Add Reduction
in CHURN**

**BASIC VALUE
PROPOSITION**

Most users will employ mobile broadband services as a complement to fixed services

Figure 14: Mobile broadband connections in Europe by service usage type, 2007–2014
[Source: Analysys Mason, 2009]



Deployment Topic Summary

Topics	Status
Cost/Business Case	Business case puts this in perspective
Compatibility	FF collaboration leading to standards-based products in 2010
Interference	FF collaboration resulting in white paper defining techniques to mitigate interference
Health	FF document addressing key concerns
Consumer Proposition	Coverage, Performance, Discounted Services, Femtozone Services, HD voice/cutting the cord, etc.
Product Readiness	FF membership shows well-established ecosystem

Security considerations for femtocells



Don Troshynski

Technical Director

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Why SIP-based femtocells?

Better service

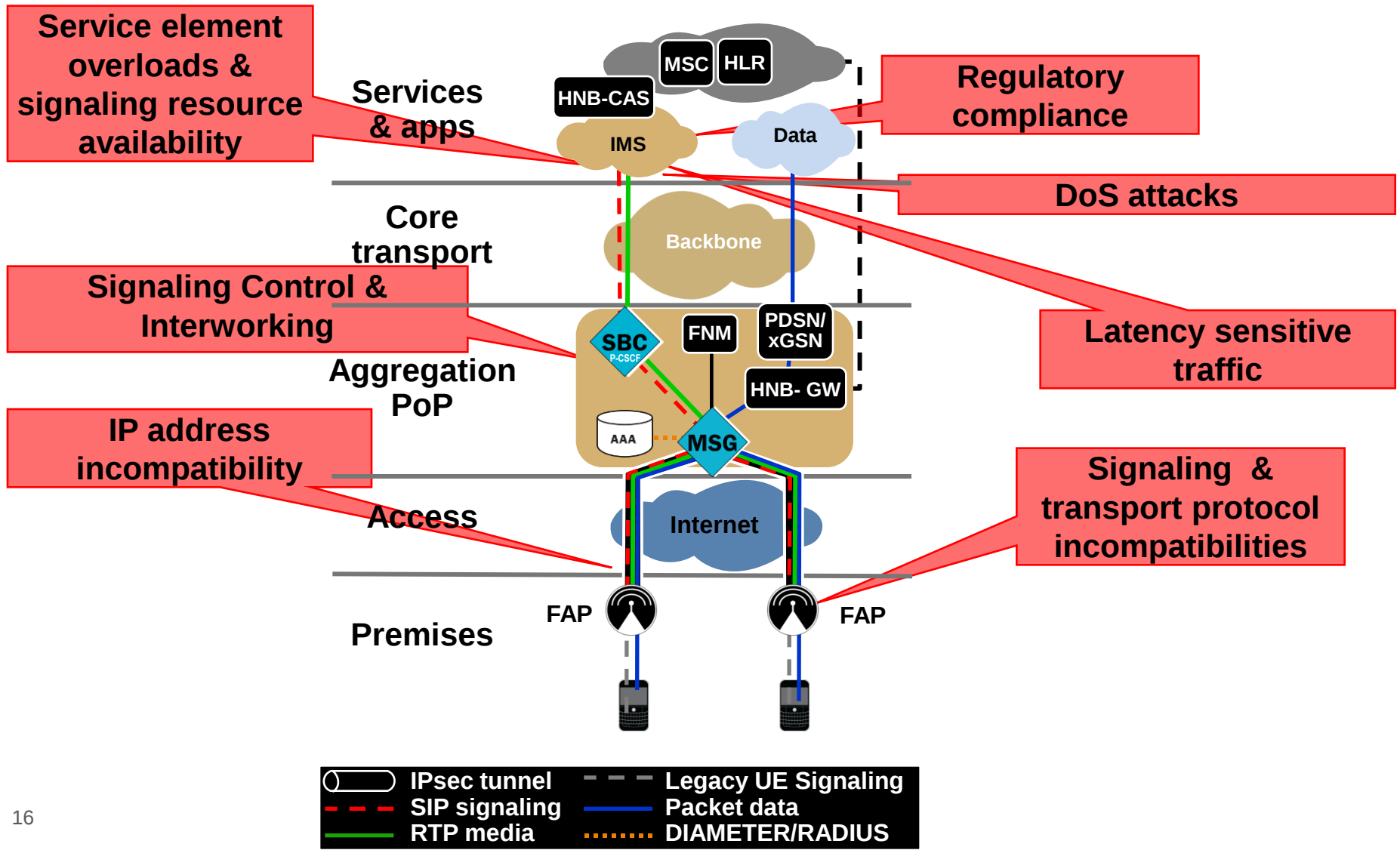
- > Going beyond the R99 phone
- > New and innovative services
- > Higher quality

Lower cost Infrastructure

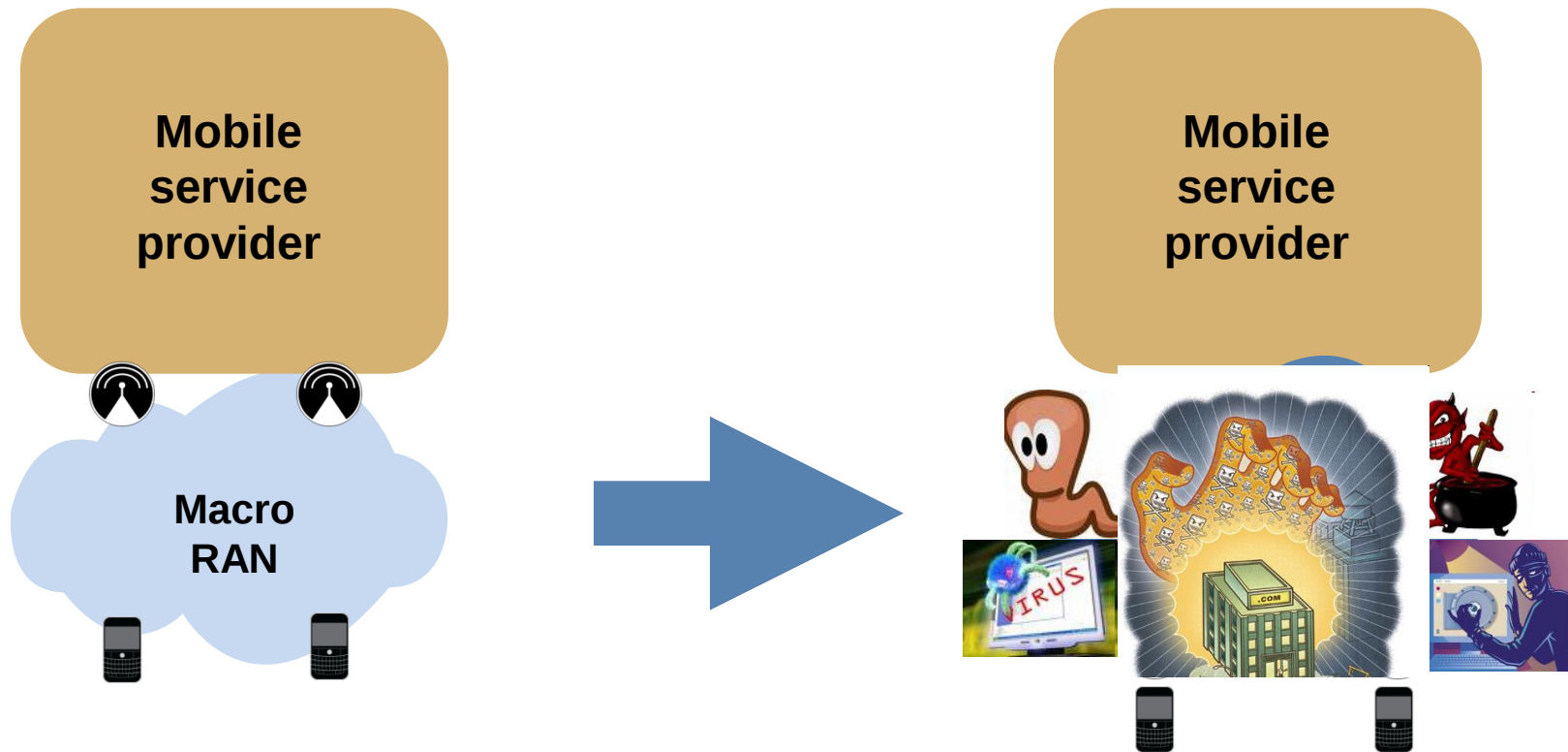
- > Reduce load on MSCs
- > Reduce dependence on application-specific gateways
- > Leverage existing or emerging IMS network architecture

Femtocells represent early ROI for IMS evolution

With SIP comes needs for controls



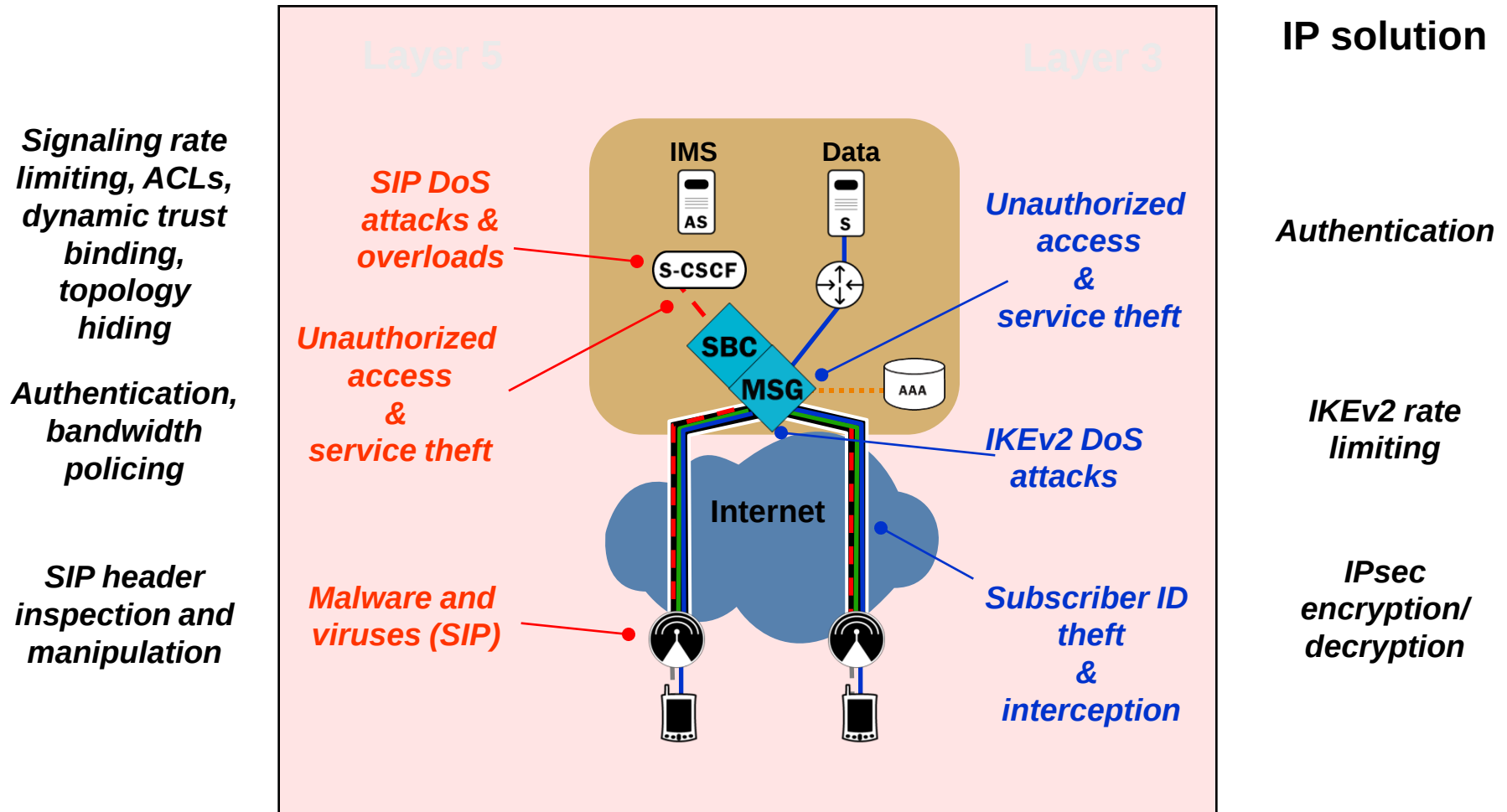
Change in access = change in security challenges



Security impacts to MNOs
Service interruption
Operator reputation / trust
Subscriber churn
Lost revenue

Consider the entire security solution

Security threats



Legal and Regulatory Hurdles to be Addressed for Mass Market Deployment of Femtocells

**Barlow Keener
Keener Law Group
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Femtocell: Regulatory Framework



FCC – Staffers taking notice but no rulemaking or decisions

- > **1st Mention of “femtocell” by FCC: Feb 2008**
 - > “2007 Annual Report of Competitive Market Conditions for Commercial Mobile Services”
 - > Discussion of Sprint’s Airave product
 - > Prior mention of picocells for trials in airplanes

- > **FCC Definition VoIP: Does it apply to Femtocell Use?**

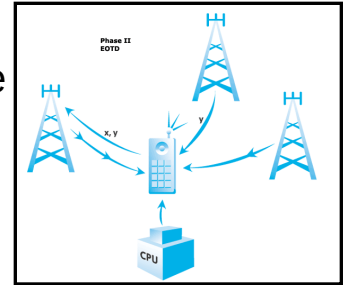
“Interconnected VoIP services” are services that

 - (1) enable real-time, two-way voice communications;
 - (2) **require a broadband connection from the user’s location;**
 - (3) require IP-compatible customer premises equipment; and
 - (4) permit users to receive calls from and terminate calls to the public switched telephone network.

- > **Femtocell looks like VoIP but CRMS providers are fully regulated**

Femtocells - 911 Issues

- > **More than 140,000 911 calls made each day from wireless phones**
 - > FCC: Any phone near a carrier tower must have 911 access
 - > Applies to femtocells that now have subscriber limitations – users at the home
 - > Applies to all phones that can use the spectrum – not just customers
 - > If femtocell powered up out of the “approved” location or licensed territory area, should 911 calls be required to be made? Yes.



- > **FCC 911 Antenna location regulation**
 - > Phase I FCC's Order (94-102) require that carriers to deliver location of cell site
 - > Phase II mandates that carriers must pinpoint a customer's actual location
 - > 2007 FCC 911 NPRM – proposed the idea of a hybrid location requirement using GPS location and tower location in the network
 - > Problem with GPS Femtocell location inside buildings
- > **FCC Requirement for carriers to provide 911 even in areas with weak signals**
 - > Automatic A/B Roaming-Intelligent Retry (with some modifications), Adequate/Strongest Signal, and Selective Retry.

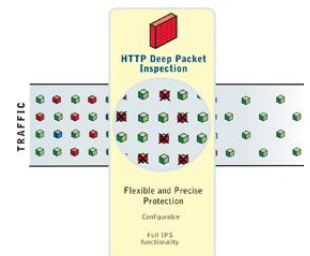
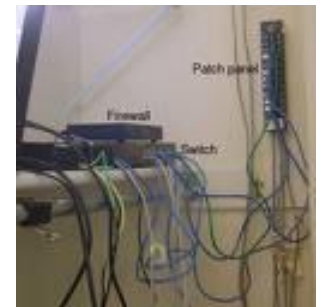
Femtocells: Roaming charge issues

- > Customers get excited about femtocells for 3 reasons
 1. Poor cell phone service at home 10-15% of the homes
 2. Taking advantage of the bundle package of “free” calls
 3. Taking the femtocell to the vacation home without cell service
- > There are 90 smaller cell phone companies in the US
 - > Femtocells can be created without GPS or user restrictions
 - > Customers can move their femtocell to another carriers
 - > U.S. customer could be charged by a foreign carrier where US customer locks on to foreign Femtocell – Mexico example
- > Roaming Issues are created
 - > Carrier A customer moves femtocell to Carrier B's licensed territory
 - > Femtocell is used by customers of Carrier B in the new territory
 - > Call through femtocell shows up as delivered by Carrier A
 - > Carrier A bills for roaming charges for call originated Carrier B's territory
 - > Difficult to monitor and detect



Parasitic Use Problems

- > Carriers will be transmitting calls through a customer's internet
 - > VoIP carriers like Vonage have regularly been called “parasitic”
 - > The voice call is carried on unrelated 3rd party's service
 - > New opportunities for listening and interfering with calls
- > “Wiretapping” by customers at home?
 - > Assumption is that femtocell will have encryption
 - > Assumption that femtocell will restrict non-family from use
 - > But if not, potential for “sniffing” and listening to other cell callers
 - > Sniffing is not limited to enterprise internet systems
- > Blocking: Internet providers have blocked VoIP, P2P
- > Sniffing Deep Packet Inspection: Allows ISPs to see/listen to all traffic
 - > IPSec tunnel provides limited security



Q&A Session



Useful Links

- > ThinkFemtocell.com
 - > News, views and analysis of femtocells worldwide
 - > Signup for free monthly newsletter
- > [Femto Forum](#)
 - > Industry body promoting femtocells
 - > Many useful white papers available for download
- > Panellists
 - > Dave Nowicki – [Airvana](#)
 - > Don Troshynski – [AcmePacket](#)
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