

Femtocell Evolution: A Model of Market and Standards Cooperation

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***Femto Forum** - Chairman*



Overview

- About Femto Forum
- Femtocell motivations
- Early barriers to implementation
- Co-operation with 3GPP and other bodies on standards
- Co-operation with ETSI on plugfests
- A growing market with increasing use of open standards



The Femto Forum

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

Aims

Ecosystem Development

Market Education

Driving open standards



End-to-end system providers



Network Elements



Products



Components and Software



Other enablers



■ 60 operators covering 1.7 billion mobile subscribers – 33% of total

■ 74 providers of femtocell technology

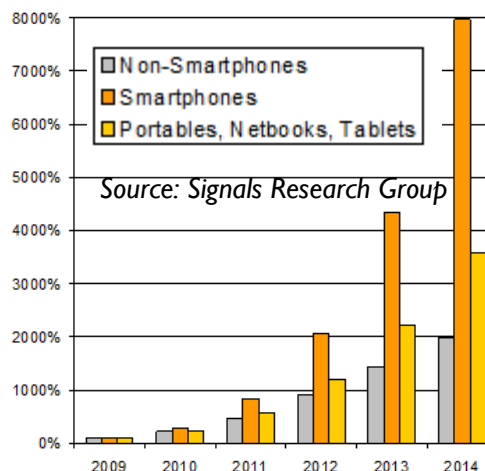
Why Femtocells?

- Dramatic growth in mobile broadband
- Consumers increasingly sensitive to coverage for both voice and data—especially at home and in the office
- Operators need to meet this demand – but quickly and at reduced cost-per-bit

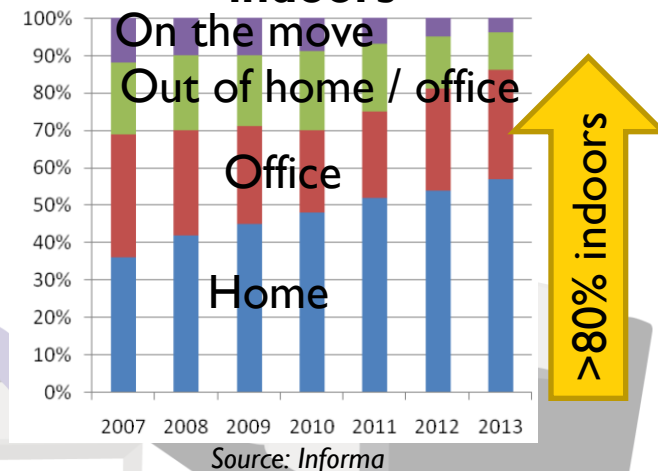
Explosion of internet connected devices



Exponential growth of mobile data traffic

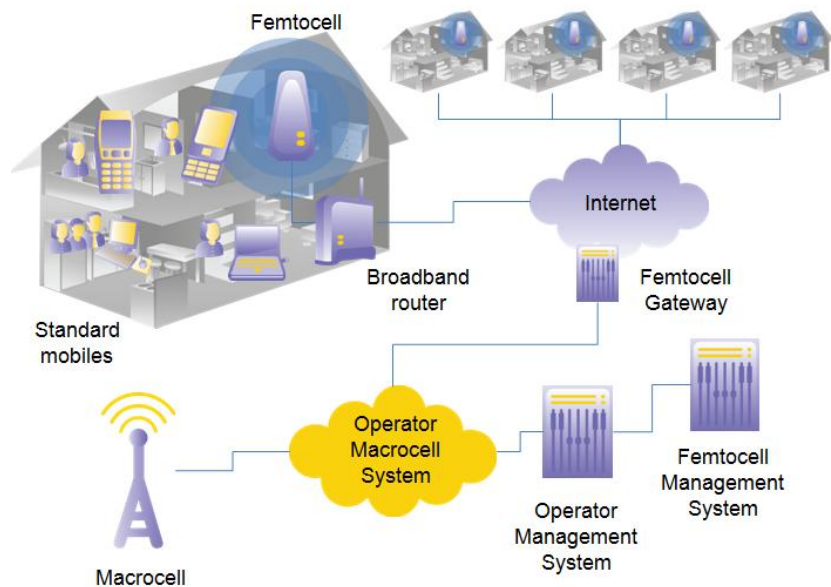


Traffic increasingly indoors



What are femtocells?

- Low-power access points...
 - ...using mature mobile technology
 - ...in licensed spectrum
 - ...generating coverage and capacity
 - ...over internet-grade backhaul
 - ...at low prices
 - ...with full operator management
 - ...self-organising, self-managing



Generic Femto Network Architecture

- Applications include:

- Residential
- Enterprise
- Hot spot
- Metro

Standards in place for:

- UMTS
- LTE
- CDMA
- WiMAX

Femto Forum Vision

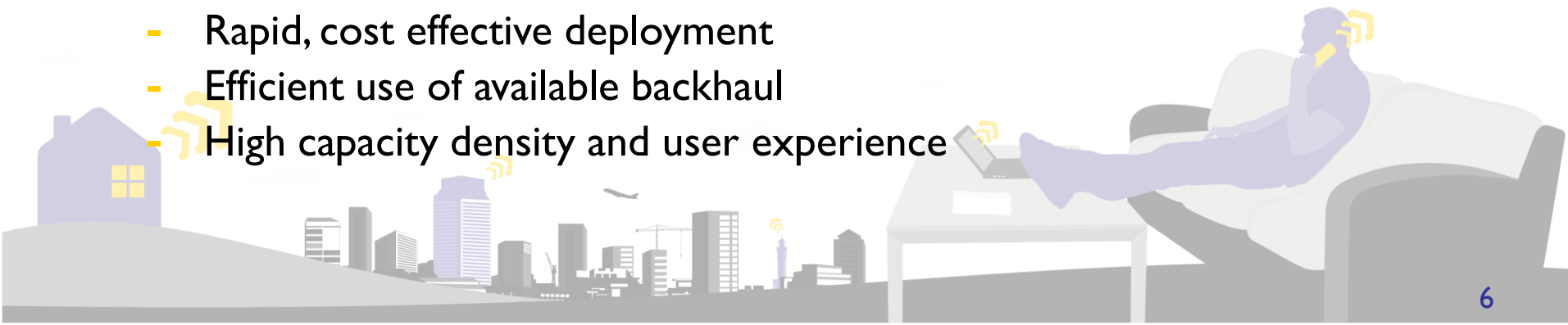
“Delivering a great mobile experience to one billion users via femto technology”

Femto Forum’s scope

We support the whole range of small cell applications enabled by femto technology. This technology has been enabled by the advent of femtocells, but is broader than femtocells, including office and outdoor environments.

Femto technology includes key attributes such as:

- Scalability
- Automated configuration and optimisation
- Rapid, cost effective deployment
- Efficient use of available backhaul
- High capacity density and user experience



Identified Barriers to Deployment

Business Case

Femto Forum publishes detailed findings from femtocell business case study

New results show femtocell business case is both positive and robust to varying operator situations, and can even work on cost savings alone for heavy data users.

Spectrum Efficiency

FEMTO FORUM STUDY CONCLUDES THAT CELL-TO-CELL INTERFERENCE BETWEEN FEMTOCELLS AND THE MACRO NETWORK IS NOT A BARRIER TO DEPLOYMENT

Femtocells can deliver a significant increase in mobile network capacity and play a key role in increasing mobile data speeds

Standards



World's first femtocell standard published by 3GPP

[News Archives](#)

Three-way cooperation between 3GPP, Femto Forum and Broadband Forum creates new standard in record time enabling operators to deploy standards-based femtocells

Ecosystem

End-to-end system producers



Products



Network Elements



Components & Software



Other enablers



Cooperation Roadmap

Build ecosystem



Express market needs



Build Consensus



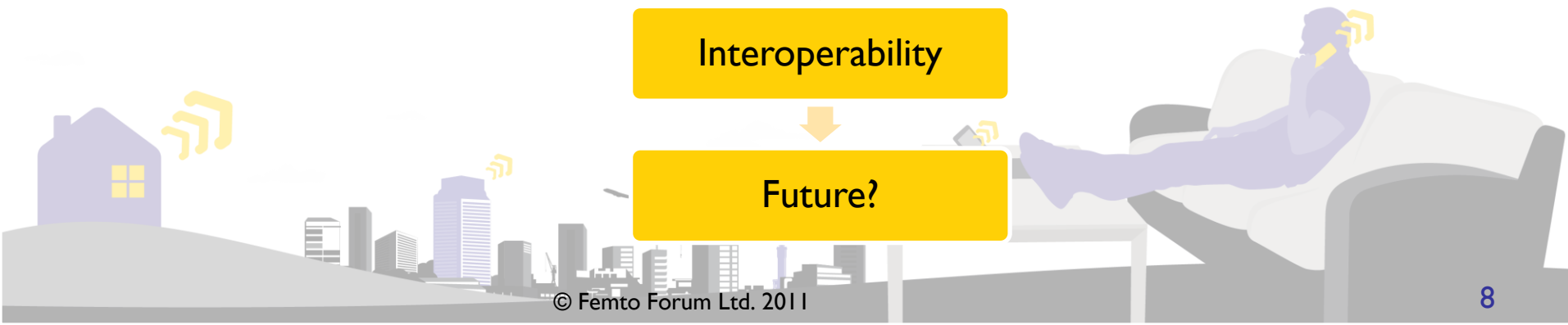
Create standards



Interoperability



Future?



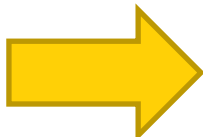
Femto Forum Steps Up Drive for Harmonised Network Integration

Femto Forum Press Release, 30 January 2008

- We had catalogued 15 different potential network architectures
- Crucial to drive towards a ‘best of breed’ approach which met operator requirements swiftly
- Announced: At the Femto Forum’s next plenary in March 2008, a variety of approaches to femtocell network integration will be put forward by members. Synergies between the approaches will be identified and the Femto Forum will provide a framework within which consensus can be built around similar approaches. “it is crucial that all the players in the market begin to plan together for the longer term. Operators have been vocal about their desire for a more unified approach to femtocell network integration as the scale of deployments increases.”

Femto Forum members see eye-to-eye on femtocell architecture

Femto Forum Press Release 21 May 2008

- At its plenary meeting in March, operator members agreed the principles for interoperability on the so-called Fa interface between Femtocell Access Points and Femto Gateways
 Eventually became the “Iuh” specification in 3GPP
- The forum has been accepted as a Market Representation Partner (MRP) with key industry standards bodies, 3GPP, 3GPP2 and established cooperation agreements with the DSL Forum and the GSMA




Femto Forum adopts field-proven management protocol to facilitate large-scale femtocell deployments

Femto Forum Press Release 16 July 2008

- Members have agreed to implement the Broadband Forum's TR-069 "CPE WAN Management Protocol", a worldwide standard for real-time management of customer premises equipment (CPE), as the basis for the management protocol for femtocells.



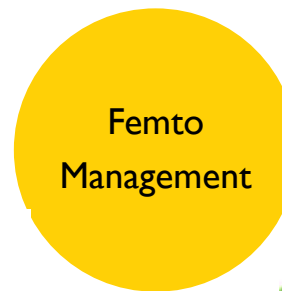
Worlds first femtocell standard published by 3GPP

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Three-way cooperation between 3GPP, Femto Forum and Broadband Forum creates new standard in record time enabling operators to deploy standards-based femtocells

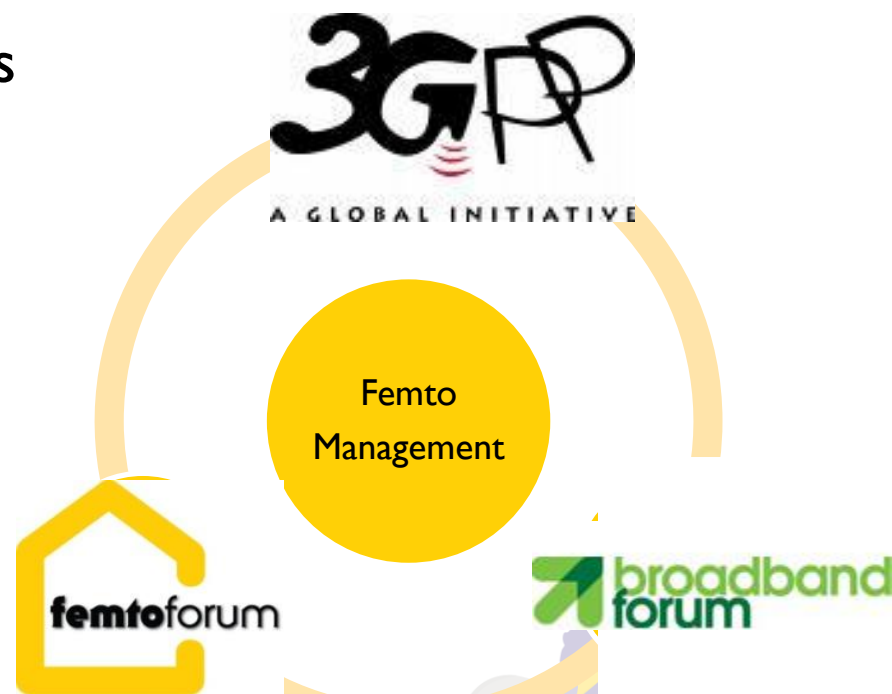


- Joint Femto Forum, 3GPP, Broadband Forum press release 7 April 2009
- Unique 3-way partnership
- Included full luh specification and TR-196 data model for femtocell access point management



Completed Management Standard

- Unique three-way partnership
- Set out operator requirements
- Achieved consensus on use of TR-069 management protocol
- Created femto-specific data model (TR-196) in very short time
- Published by Broadband Forum
- Incorporated in Release 8 3GPP standard



First Femto Forum UMTS Femtocell Plugfest



- Plugfest took place in March 2010
- Interoperability tests between femtocell network gateways, security gateways, femtocell access points and chipsets
- Verifying the Release 8 Iuh interface and associated security protocols
- Over **20** participants, including access point, gateway, chipset and software vendors of all sizes

Ablaze Wireless, Acme Packet, Airvana, Alcatel-Lucent Telecom, Alpha Networks, Askey Computer Corporation, C&S Microwave, Cisco Systems Inc, Contela, Continuous Computing, Genband, Huawei, IntelliNet Technologies, ip.access, Kineto Wireless, NEC, Node-H, Nokia Siemens Networks, picoChip, Technicolor, TRaC Global and Ubiquisys

- **11 months from standard to plugfest!**

Second Femto Forum UMTS Femtocell Plugfest



- Plugfest took place in February 2010
- Focused on Broadband Forum TR-196 femtocell management standard
- Interoperability tests were conducted between femtocell access points, management systems, security gateways and femtocell network gateways
- The plugfest also tested the IPsec/IKEv2 security protocols which allow femtocells to communicate over the public Internet to operators' core networks in a highly secure manner
- 13 participants:

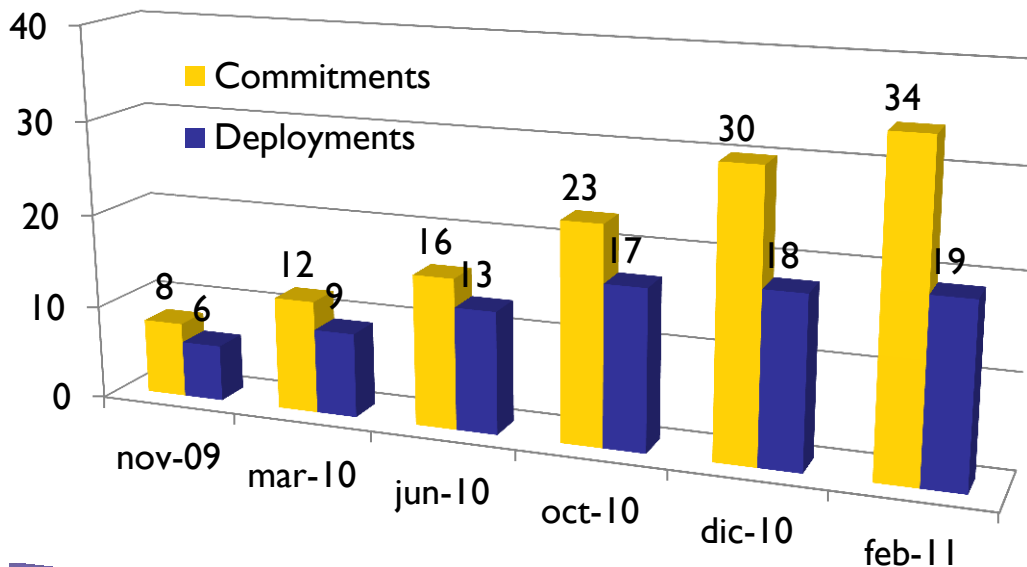
Ablaze Wireless, Acme Packet, Alcatel-Lucent Telecom, Alpha Networks, Argela, Askey Computer Corporation, Huawei, Institute for Information Industry, NEC Corporation, Node-H, Nokia Siemens Networks, PicoChip and Ubiquisys

3GPP Release 9 Specification

- Included full end-to-end LTE femtocell (HeNB) architectures
- Also provided enhanced functionality for UMTS/HSPA femtocells (HNB)
- Demonstrates that femtocells are now firmly embedded in the standards roadmap



Strong Growth in Deployments and Commitments



Six new commitments in the last quarter alone

Next Steps

- 3rd Femto Forum plugfest with ETSI
 - Combining aspects of both operation and management
 - Release 9 luh interface and TR-196 Management combined
- Future items under discussion
 - Definition of minimum set of functional requirements?
 - Is certification needed?
 - Further increase of functionality in plugfests?



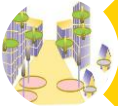
Femto Forum Priorities for 2011



Encourage operator deployments (identifying motivations, overcoming obstacles, spreading best practice)



Consumer attitudes and value proposition



Metro/outdoor cells



Integrated Femtocell / Wi-Fi Networks



LTE femtocells



Enterprise Femtocells



Service enablement



Open interoperability

Conclusions

- Great progress can be made in a short time with close alignment between industry bodies
- Need to ensure that standards closely reflect market need
- Need also to ensure full consensus regarding the details of the standards
- Based on the full cooperation between operators, vendors and industry bodies the femtocell market is off to a flying start!

