

Problem Statement

- Spectral Crisis
 - Not sufficient to serve 1.2 Billion Population
 - M2M yet not huge
- On top congested areas are further difficult
 - All network facing congestion leading to quality issues in all major metros
- Growth will be difficult with new spectrum
 - 3G we know only few slots
 - 2G is not available
- Increasing cell sites have huge CAPEX burden

2 Facts

- 60% of the phone calls originates in building
 - TRAI report
 - Opportunity to divert these calls to alternatives
 - WiFi
 - Multi-radio expensive phones will only support this
 - Need carrier server changes for supporting in-building incoming calls
 - Femto
 - Works with all phones as well as incoming/outgoing calls seamlessly
- Femto is matured and sold by some of the carriers already

But

- Femto-cell adoption remains negligible
 - Why?
 - Current offerings are based on a model where user pays for the hardware
 - Why should user pay for helping carrier?
 - Carrier will save spectrum, not user
 - Only user who do not have mobile service at their home/building will buy
 - Very few such customers
 - Why should not carrier install Femto?
 - Millions of Subscribers needing billions of dollars of CAPEX
 - So Femto-cell remains a hype technology
 - Many companies have invested in Femto technology and waiting to die
 - Any alternative?

An Alternative Business Model

- Carrier hates CAPEX needing solutions
 - Instead they are little better in OPEX-based offerings
- So our proposal is to create a 3rd party Owned Femto Network installed in buildings
 - Carrier just share revenue with this new 3rd party for all the in building calls
- If the saving of the carrier from this saving of spectrum and better call quality to user compensates for the loss of revenue due to sharing with 3rd party carrier will love it
- If the revenue share is good enough for the 3rd party, they will like expand their foot print to everywhere

Active Network Sharing?

- Active sharing of this 3rd party femto network among multiple carriers will make a win-win situation
 - 3rd Party provider revenue goes up
 - Each carrier payout to the femto provider goes down

Technology Ready?

- Need minor changes
 - Femto Cell
 - Should transfer calls from a carrier to its respective Femto Gateway
 - That means Femto-cell should support configuration to handle many Gateways
 - Billing
 - Carriers must recognize calls originated from Femto network and share revenue to Femto providers
 - Femto provider may need additional billing support to keep its own billing data
 - Clearing House should recognize Femto provider to enable revenue sharing

Business Model

- It is apparent that crowded place is best place for a Femtocell to add value
 - Spectrum is over crowded so call diversion will be more beneficial to Carriers
 - Femto providers will be happy as more calls will pass through it resulting more revenue
- Example Places
 - Malls
 - Call drop is a major problem today in many of the Indian Malls in Metros
 - Railway Stations/Airport
 - Difficult to make call today in these places
 - Large Office Buildings/Hospitals etc.
 - Software Companies looking to save some money
 - Sporting Arena
 - However not a everyday crowd
- Can these Building Owners/Managers can be Femto providers
 - In particular many of the technology companies whose buildings are fully networked and connected to Internet may like to host their own network as this will effectively reduce their telecom cost

Business Model - Numbers

- Accenture Building in Bannerghata Raod, Bengalore
 - Host 6000 Employees
 - Similar number of mobile phones
 - Assuming each make and receive 3 calls a day from their mobile
 - $6000 * 3 \sim 18000$ Calls per day
 - $\sim 18000 * 2 = 36000$ minutes of mobile calls per day
 - $\sim 20 * 36000 * 12 = 8640000$ minutes per year
 - $\sim 8640000 * 1/2$ (rupees) = 4320000 Rupees per year
 - Assuming a revenue share of
 - 30% ~ 1296000 Rupees per year
 - 20% ~ 864000 Rupees per year
 - 10% ~ 432000 Rupees per year

6000 Employee \sim 600000 Sqft Area
of FemtoCell $\sim 600000/10000$
 ~ 60

Cost $\sim 60 * 4000$ Rupees ~ 240000
Cabling cost ~ 100000 (incremental
on top of IP network)
Total ~ 240000

RoI in 6 month!

(Just at 10% Revenue Sharing!)

Scope of Standardization

- Femtocell Capacity Augmentation:
 - Support for requisite number simultaneous calls are important requirement for success of the model. Given coverage radius of 40 m, it certainly need to support only fewer simultaneous calls which though simple will need finite chages in the femtocells

Scope of Standardization... cont.

- Seamless Access to all subscribers:
 - Currently Femtocell subscribers are allowed to control access to the Femto service in house through some configuration interface. This access control has to be made redundant for our model.

Scope of Standardization... cont.

- Support for Multiple Carriers:
 - Currently a given Femtocell is configured to work with a single operator which is configured by the operator. This however needs to change such that call from subscribers of a given carrier is send to the respective carriers.

Scope of Standardization... cont.

- Support for Charging:
 - In order that Femto Network Providers get appropriate revenue share, additional charging information are needed to be passed on the respective carrier's charging process.

Scope of Standardization... cont.

- Support QoS and SLA:
 - Additional QoS management responsibility has to be developed because of the shared environment with well defined roles for each party.

Scope of Standardization... cont.

- Support for Security: Additional security burden arises out of possibility of rouge Femtocell being hosted by attackers to divert traffic to their choice of network for malicious purposes. We will work together with the security SIG proposed in this meeting.

Scope of Standardization... cont.

- Support of Location Services:
 - For network where location is being generated by Cell Triangulation or AGPS i.e. with help from carrier, we need to find alternative mechanism such that carrier can continue to provide location service even if the user is served by a FNP. For GPS only solution, FNP do not need to do any additional steps though.

Scope of Standardization... cont.

- Support Emergency Calling:
 - Emergency calling service should seamlessly be supported. Location information accuracy should be per E911 needs.
- Support Legal Interception:
 - Legal Interception based on government regulation is must and system should support the same.

Regulatory Aspects

- There are various regulatory requirements that might need to be fulfilled or created. Details regulatory aspects will be expanded on during the course of this activity. Some of the points where regulatory enhancements might be required are:
 - Decision on who takes responsibility of communication quality
 - Decision on who be responsible for charging
 - Party to be responsible for guaranteeing security and legal intercept
 - How to make harmonize radio resources usages between Femto and macro-cells

Other Standards

- Standardization work done in other SDOs will be considered for this activity. Some of these include the 3GPP activity in .TS 23.251 and TR 22.951. Where needed, GISFI will provide input to other SDOs.