GURU NANAK INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

FEMTOCELL

CONTENTS

ABSTRACT

Femtocell is a small cellular base station, designed for use in residential or enterprise, Connects to the service provider's network via broadband. Femtocell is one type of Indoor network which provide the wireless access within the particular area. Femtocell ensure that they are, carefully planned cellular network. Mobile handsets can handle phone calls through the femtocell, with the broadband internet connection. Femtocell is a device that creates a small area of cellular signal in your home or office. It works through internet connection and convert your cell signal, then send it over the internet to a femto gateway which then sends the signal out from there.it provides excellent coverage and capacity.

INTRODUCTION

- Femtocell is one type of Indoor network which provide the wireless access within the particular area.
- Femtocells ensure that carefully planned cellular networks which may connects through the Internet .
- For mobile handsets , they can handle phone calls through the femtocell, with the broadband internet connection.
- Femtocell is a device that creates a small area of cellular signal in your home or office.it works through internet connection and convert your cell signal then send it over the internet to a femtogateway which then sends the signal out from there.
- it provides excellent coverage and capacity.

NEED OF FEMTOCELL

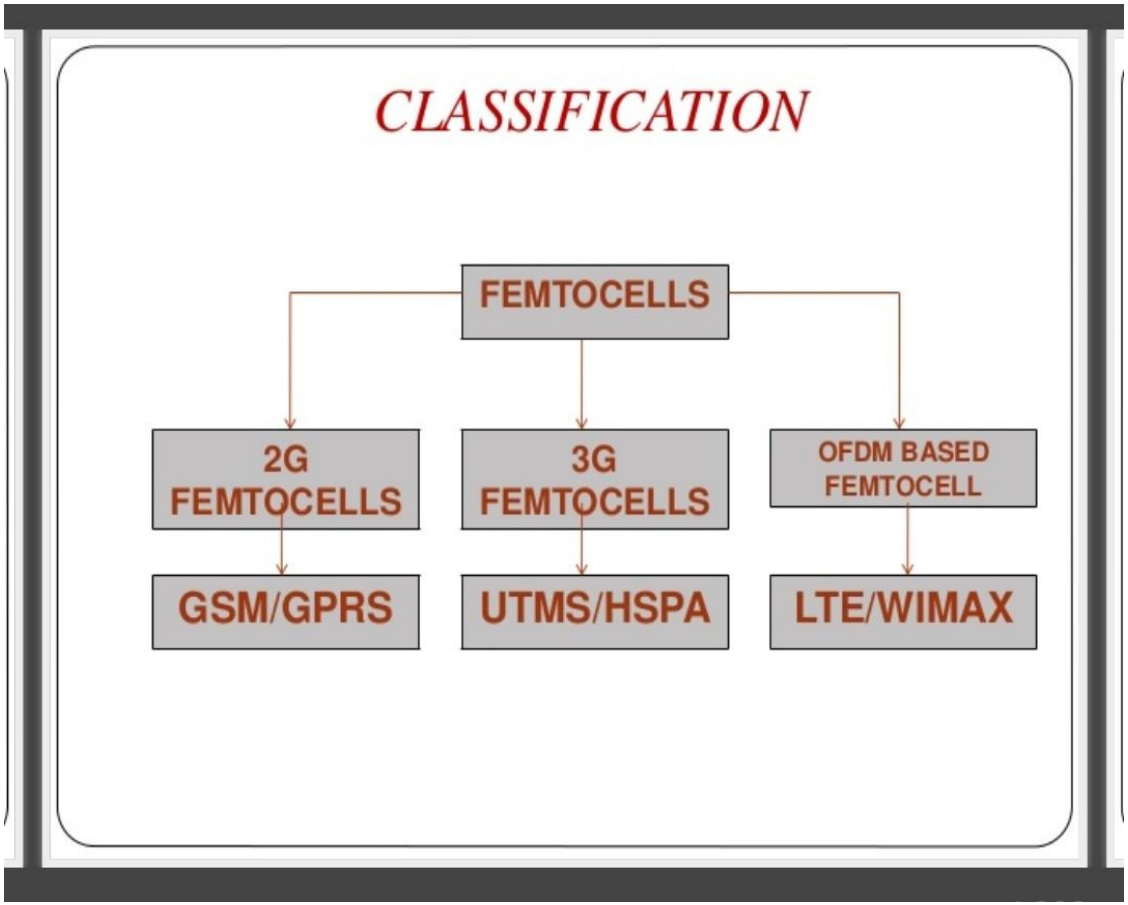
- Macro cell cannot provide good signal strength for indoor coverage.
- Femtocell can enable higher capacity.
- Femtocell is requried when mobile celluar networks normally suffers from poor pentration in cerrtain areas like indoors ,decreases the quality of voice and video communications, slow downs the high speed services.

ADVANTAGES

- Increases both coverage and capacity.
- Reduce cost.
- Improve reliability
- Femtocell units can help related cellular services by offering a better speed and data rate when inside buildings,where the coverage and data rate is generally lesser than outside.

CLASSIFICATION

- Types of femtocells
- 2G Femtocells
- 3G femtocells
- OFDM femtocells



2G FEMTOCELL

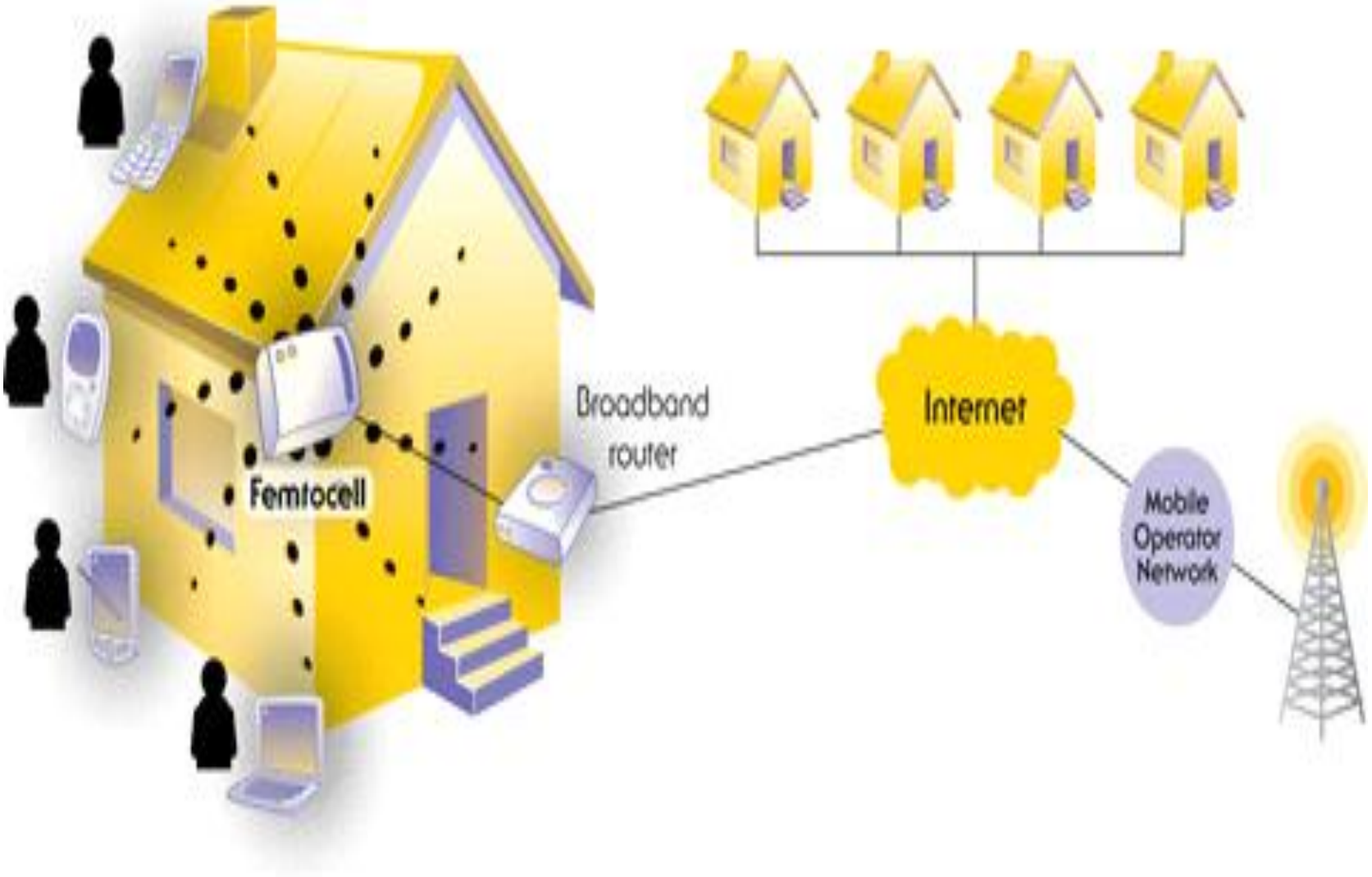
- Low cost.
- Good quality voice service.
- Does not provide high data rates.
- Gsm/Gprs

3G FEMTOCELL

- Based on the UMTS terrestrial radio access(UTRA)
- Better than gsm
- Large capacity

OFDM FEMTOCELLS

- The categories are WIMAX and LTE
- LTE--> long term evolution
- WIMAX ->worldwide interoperability for microwave access



Femtocell network

ELEMENTS OF THE FEMTOCELL NETWORK ARCHITECTURE

- Femtocell Access Point (FAP)
- Security Gateway (SeGW)
- Femtocell Device Management System (FMS)

FEMTOCELL ACCESS POINT (FAP)

- Femtocell Access Point is the primary node in a femtocell network that resides in the user premises (e.g., home or office). The FAP implements the functions of the base station and base station controller and connects to the operator network over a secure tunnel via the Internet.

SECURITY GATEWAY (SEGW)

- The security gateway is a network node that secures the Internet connection between femtocell users and the mobile operator core network. It uses standard Internet security protocols such as IPSec to authenticate and authorize femtocells and provide encryption support for all signaling and user traffic.
- The security gateway supports a large number of femtocells connecting to the operator's network.

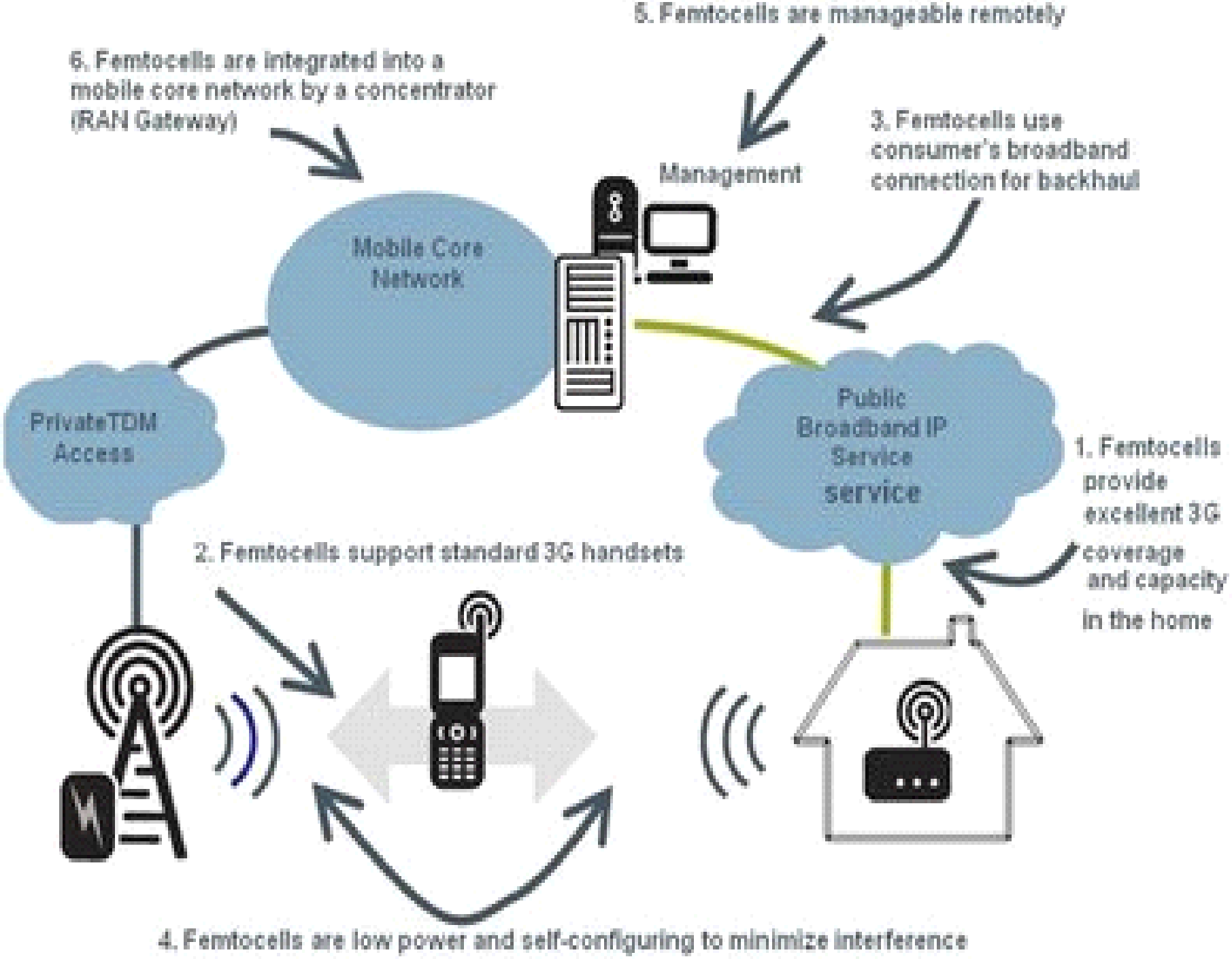
FEMTOCELL DEVICE MANAGEMENT SYSTEM (FMS)

- The femtocell management system, also located in the operator network, plays a critical role in the provisioning, activation and operational management of femtocells using industry standards. The management system is perhaps the most critical node in ensuring the scalability of a femtocell network to millions of devices.
- To ensure low-cost and easy setup for subscribers, the activation and provisioning of the femtocell must be plug-and-play.

WORKING OF FEMTOCELL

- A femtocell is installed at home and connected to mains power and a standard broadband IP connection to the mobile operator's core network. Voice calls, text messages and data services are provided by the same systems.
- Femtocells are sold by a (MNO) to its residential end-users or enterprise customers. A femtocell is typically the size of a or smaller, and connects into the end-user's line.
- Once plugged in, the femtocell connects to the MNO's mobile network, and provides extra coverage in a range of typically 30 to 50 meters for residential femtocells (depending on the existing coverage and output power — usually 20 mW which is five times less than a router). From an end-users' perspective it is , there is no specific installation or technical knowledge required — anyone can install a femtocell at home.

- The end-user must then declare which mobile phone numbers are allowed to connect to his/her femtocell, usually via a web interface provided by the MNO. This only needs to be done once. When these mobile phones arrive under coverage of the femtocell, they switch over from the (outdoor) to the femtocell automatically.
- Once installed in a specific location, most femtocells have protection mechanisms so that a location change will be reported to the MNO. Whether the MNO allows femtocells to operate in a different location depends on the MNO's policy. International location change of a femtocell is not permitted because the femtocell transmits licensed frequencies which belong to different network operators in different countries.


5. Femtocells are manageable remotely
6. Femtocells are integrated into a mobile core network by a concentrator (RAN Gateway)
Management
3. Femtocells use consumer's broadband connection for backhaul
Mobile Core Network
PrivateTDM Access
Public Broadband IP Service
service
1. Femtocells provide excellent 3G coverage and capacity in the home
2. Femtocells support standard 3G handsets
4. Femtocells are low power and self-configuring to minimize interference

CHARACTERISTICS

- Low impact
- Capacity
- Lowcost
- Easy enduser installation
- Security
- Support for existing handsets
- Service assurance

FUTURE SCOPE

- Research is being done on femto cells that work on 4G network for business enterprises that can handle more calls simultaneously.

CONCLUSION

- Femtocell have the potential to provide high quality network access to indoor users at low cost which improves coverage and capacity.
- Femtocells are considered to be the solution to meet the future need for high data rates and capacity in wireless celluar networks.

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THANKYOU