



Wimax Technology and its applications



Outline

- Introduction
 - Digital Divide
 - WiMax
- WiMax Mesh Networks
 - Terms of WMN
 - Scheduling
 - Operation
- Advantages of WMN



Introduction

- Digital Divide: (World Summit on Info Society)
- It's unequal access to info and communication Technologies - (ICTs).
- ISPs play role of “**Middleman**”: Buy network access rights from operators.
- Sell these to subscribers with more profit – increasing technology price – **PROBLEM !** –



Introduction

- This paper shows:
- How the **WiMax** will solve the problems of costs
- Applications Used: **WiMax** Mesh Technology
- What is **WiMax** ?



WiMax

- ***Worldwide Interoperability for Microwave Access***
- Telecommunication technology providing wireless data over long distances
- Point 2 Point Links and Mobility.
- Advantages:
 - **Mobility**
 - **Security**
 - **Quality of Services (QoS)**



Contd

- **Scalability**
- **Portability**
- **Use: Adaptive Antenna Systems (AAS)**
- **Higher Throughput:**
 - is the average rate of successful message delivery over a communication channel.
- **Last Mile Connectivity:**
 - is the final leg of delivering connectivity from a communications provider to a customer – ([fig1](#))
- **Provide Mesh Technology**



WiMax Mesh Networks

- Wireless Mesh Network – (WMN)
 - nodes connecting to neighbouring nodes, forming a web of nodes, creating a structure that models the Internet – ([fig 2](#))
- WiMax mesh network:
 - Allows traffic to be routed through and between subscribers stations (SS) also called Mesh SS, bypassing BS.
 - What is Mesh BS and SS?



WiMax Mesh Networks

- Mesh BS: nodes connecting network to backhaul
- Mesh SS: nodes have direct links called neighbors
 - also called “one-hop” and altogether they form a neighborhood (Mesh).
 - Extended neighborhood (called “two-hop”)
 - **includes all the neighbors of the neighborhood.**
- Traffic direction -Mesh BS = **uplink**
- while the traffic away from the Mesh BS = **downlink.**
- WMN uses omnidirectional (360) antennas.



Terms of WMN

Scheduling

Operation



Scheduling

- Types: **Centralized & Distributed**
- Defined: Both are algorithms used by Mesh **WiMAX**
- **In Centralized:** *Mesh BS gathers a resource request from all the Mesh SS within a certain range.*
- Mesh Centralized Scheduling (**MSH-CSCH**) Methodology:
 - Messages Created by mesh BS
 - broadcasted to all the neighbors
 - Neighbors - do the same until all participating nodes receive a message
 - The mesh BS decide the amount of resources in both **uplink** and **downlink**.
 - Give the decision with the requesting mesh SS.



Scheduling

- **In Distributed:** all nodes + Mesh BS co-ordinate their transmission and
- Broadcasting schedule that includes available resources, requests.
- **Mesh Mode Schedule with Distributed Scheduling (MSH-DSCH):**
 - Used Between two communicating nodes.
 - One link is used.
 - The QoS parameters established on per message basis **NOT** per link.
 - only the time division duplexing (**TDD**) supported in Mesh mode.



Operation

- Mesh nodes **48-bit** MAC address - *used in the network entry process.*
 - Node will receive a **16-bit** Node Identifier (Node ID)
 - After being authorized by Mesh BS.
 - Then, node assigns an **8-bit** link identifier (Link ID)
 - **for each link established for communication**
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- WiMAX Mesh theoretical deployment model:
 - is a regular **hexagonal** shape with nodes at each corner of the hexagon ([fig 3](#)).

Advantages of WiMax Mesh

- A mesh system has the ability selfreconfiguration as any source goes down or has a problem.
- Establishing new links, avoiding jams & overload.
- Avoid obstacles using **Non Line of Sight (NLOS)**. (Fig4)
- Remember “ *Wimax works in both LOS and NOLS*”



A hand is shown using a laptop mouse. The background is a blurred image of a laptop keyboard and mouse, overlaid with a semi-transparent grid of binary code (0s and 1s) in a light blue/purple color. The overall tone is professional and tech-oriented.

Contd.

- competitive end user throughput and high QoS for multimedia traffic.
- WMN offers a low cost advantage
 - **by minimizing infrastructural cost.**
- Scaling itself to accommodate more members.
- Additionally, WMNs are robust (strength) because they are not dependent on a single source



Conclusion

- **Digital Divide**
- **WiMax**
- **WiMax Mesh Networks**
 - **Terms of WMN**
 - Scheduling
 - Operation
- **Advantages of WMN**



Fig.1. A usage scenario, WiMAX will reach every part of our lives

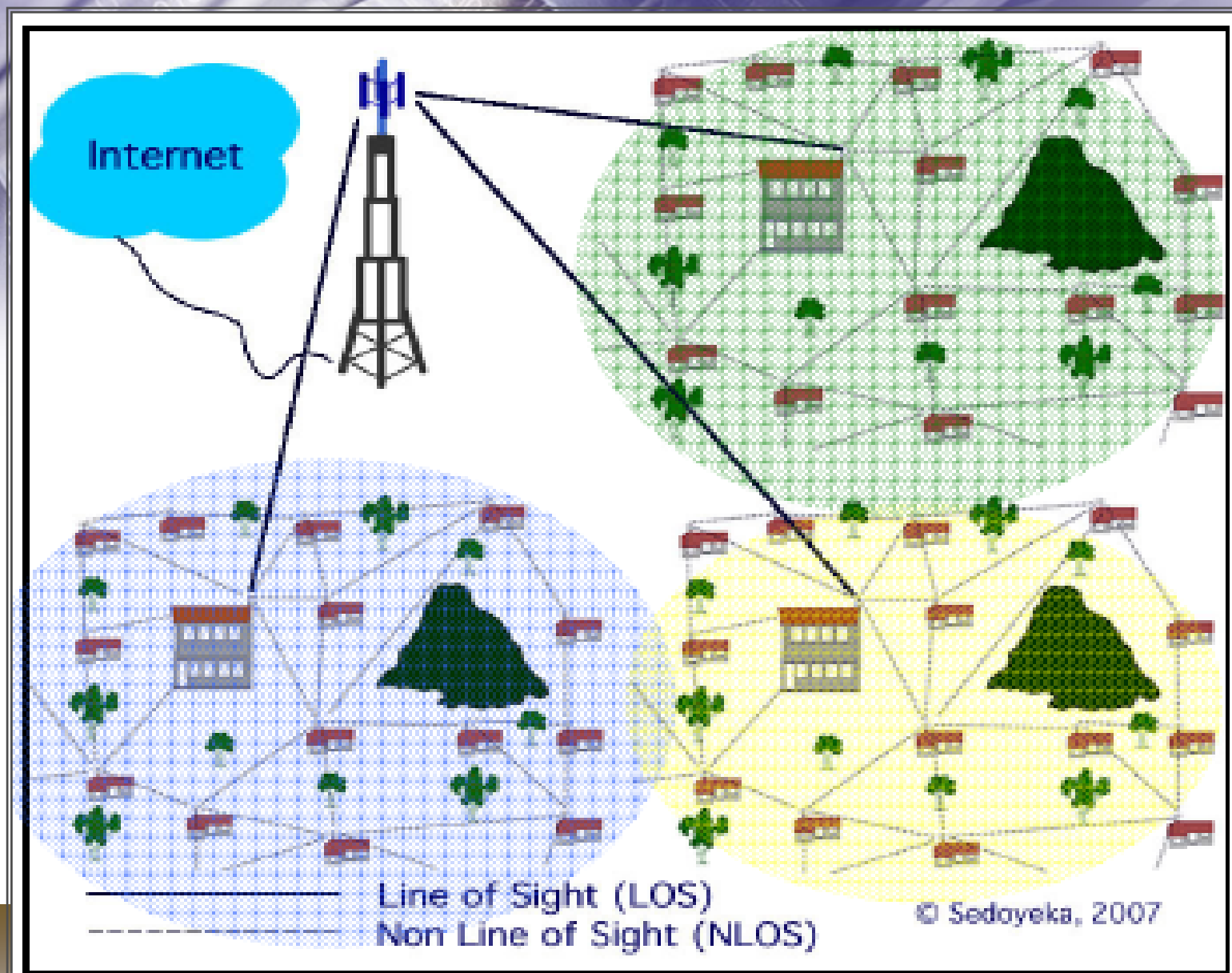
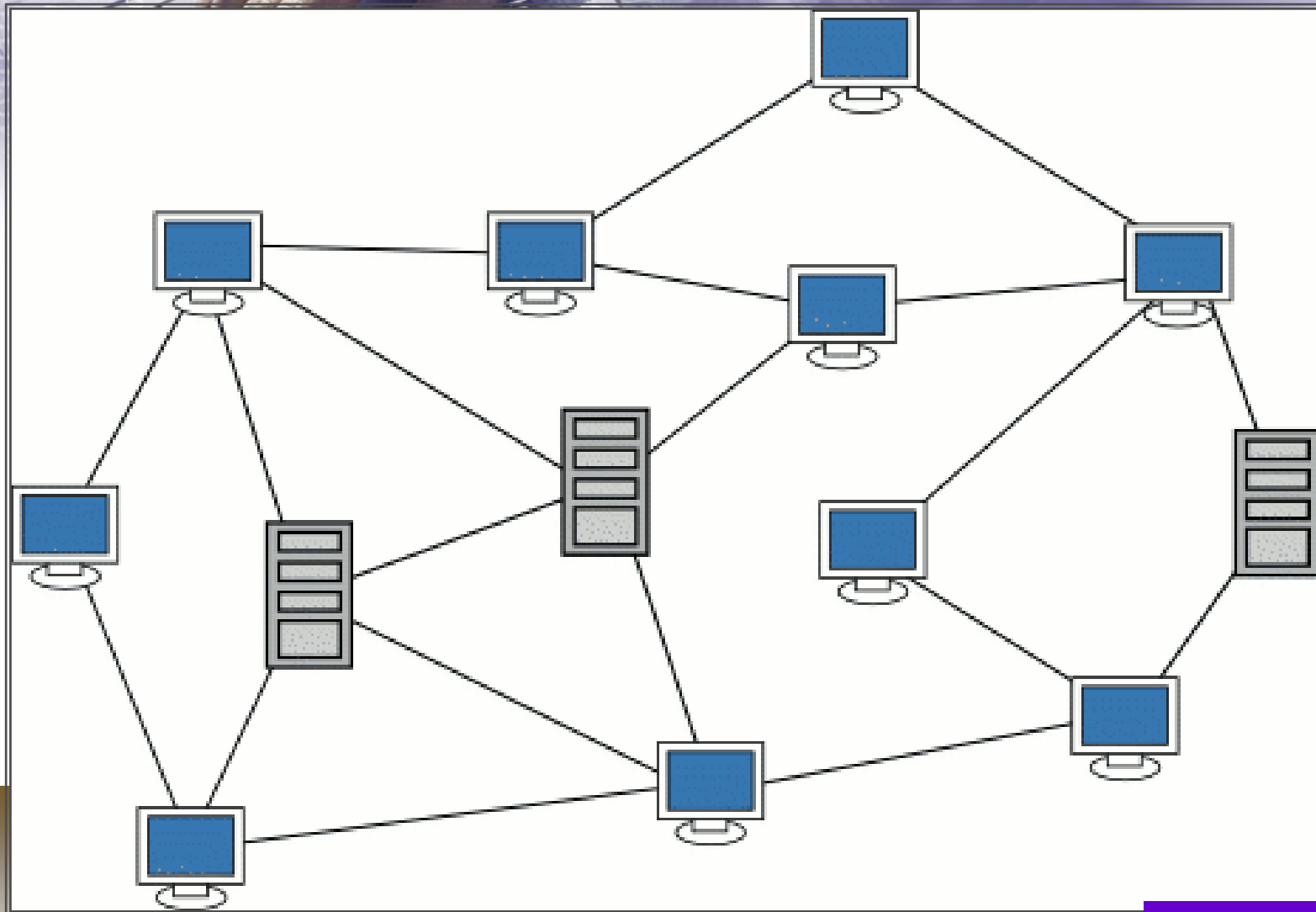


Fig.2. A typical WMN in operation

[NEXT](#)



[BACK>>](#)

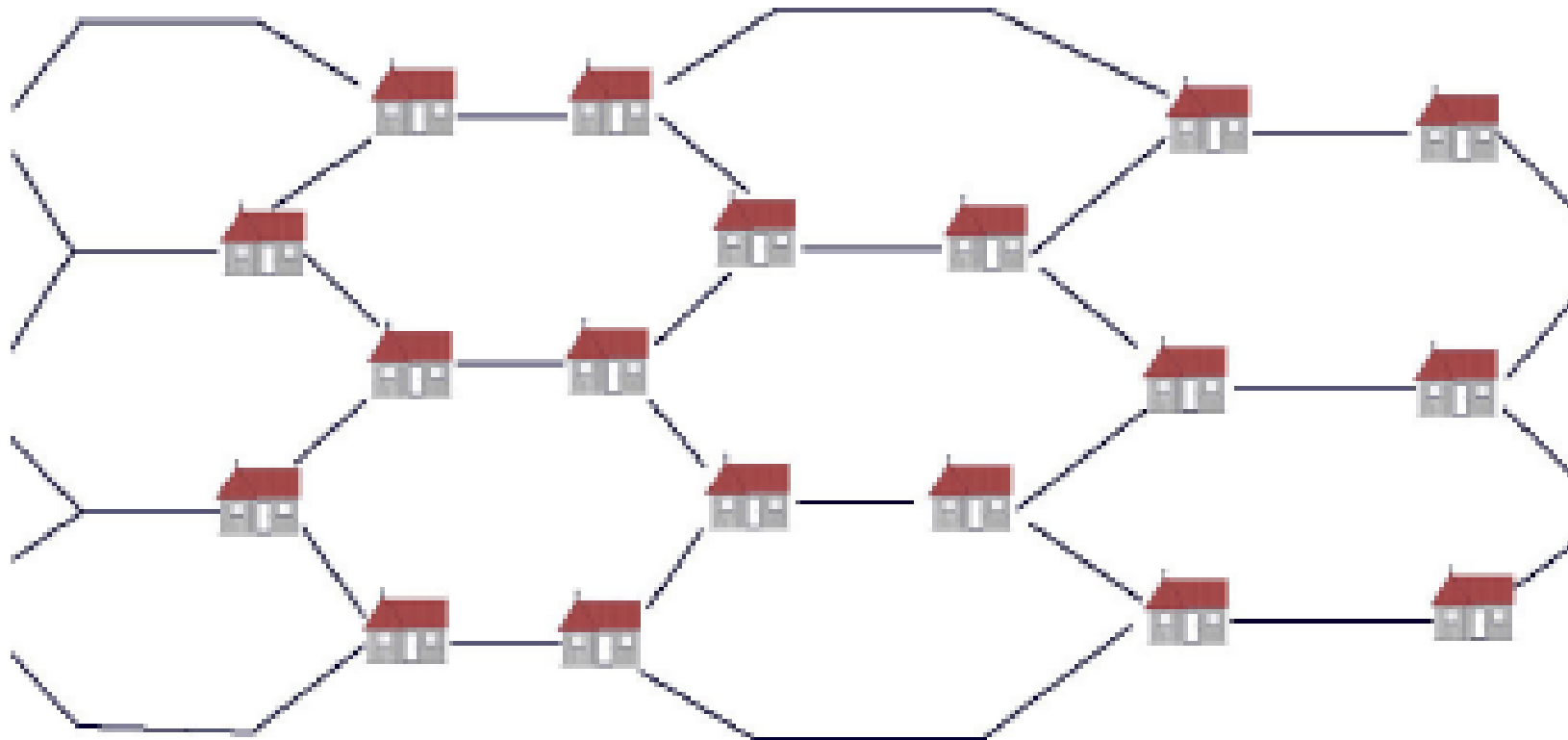


Fig.3. WiMAX Mesh theoretical deployment model [5]