

# *UI8ISI5201 – Computer Networks*

## *Infrastructure Based vs Ad Hoc Network*

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*Topic : Infrastructure based vs adhoc network*

*Team : 28*

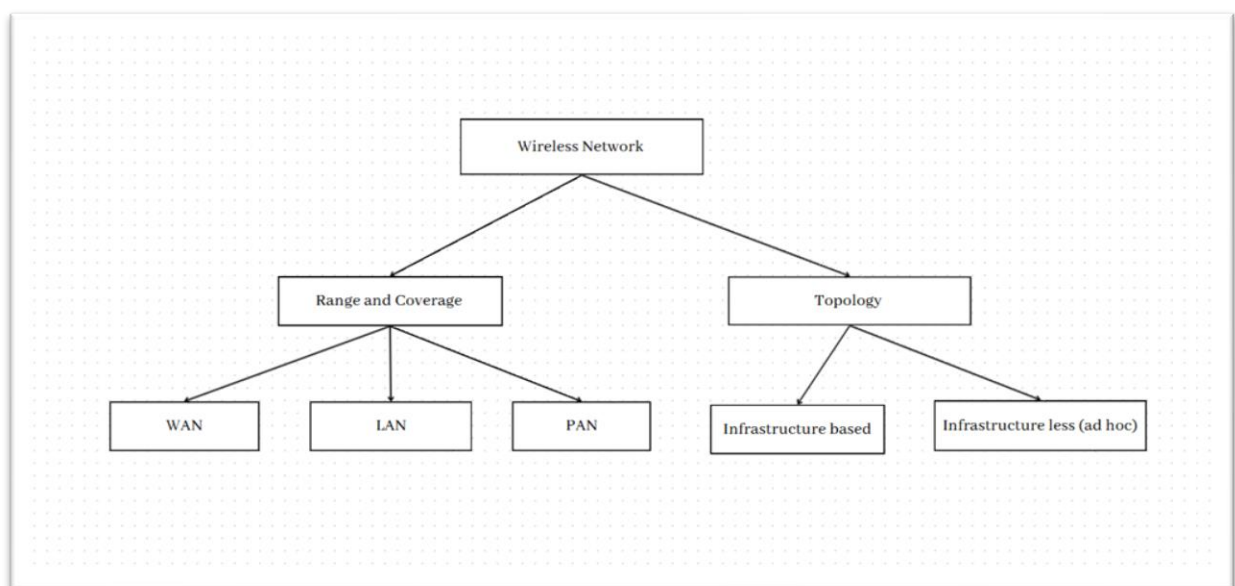
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### *Wireless network :*

*A wireless network allows devices to stay connected to the network but roam untethered to any wires. Access points amplify Wi-Fi signals, so a device can be far from a router but still be connected to the network.*

*Types :*



### *Infrastructure based network :*

*Infrastructure mode is when the wireless network requires a physical structure to support it. This essentially means there should be a medium handling the network functions, creating an infrastructure around which the network sustains. Infrastructure- based requires the use of infrastructure devices such as base stations (BSs) used in traditional cellular systems or access points (APs) used in wireless local area networks (WLANs) to facilitate communication between mobile devices.*

- *Fixed infrastructure available.*
- *Must have a base station or access point*
- *These base station or the access point are fixed and centralized*

*It performs these typical functions:*

- *Providing access to other networks*
- *Forwarding*
- *Medium access control*

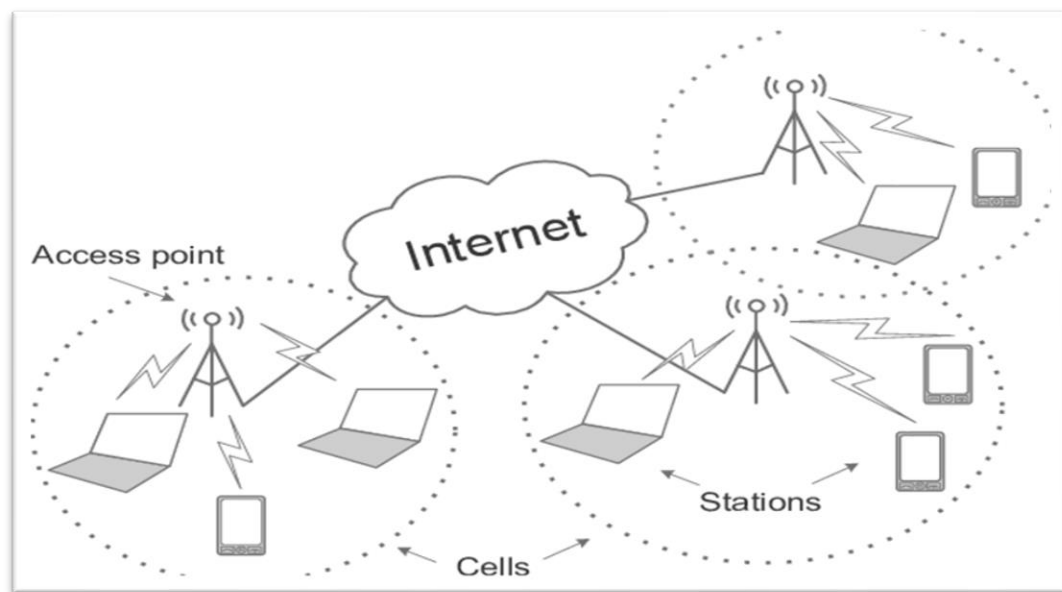
*In infrastructure-based wireless networks, the communication takes place between the wireless nodes (i.e., endpoints in the network such as your computer, your phone, etc.) and the access points (i.e., the router) only.*

*There can be more than one access point on the same network handling different wireless nodes.*

*When to use an infrastructure network:*

- *If you can easily add more access points to boost the range*
- *If you want to set up a more permanent network*
- *If you will need to bridge to other types of networks (e.g., you can connect to a wired network if required)*

*Example : WLAN, cellular network, paging system*



### *Infrastructure less network :*

*Infrastructure- less network is a wireless network that doesn't requires the use of infrastructure devices such as base stations (BSs) used in traditional cellular systems or access points (APs) used in wireless local area networks (WLANs) to facilitate communication between mobile devices.*

- *So doesn't have any base station or an access point*
- *No existing infrastructure required*

*Example: Ad-hoc network*

### *Ad Hoc network or Infrastructure less network :*

*Ad-hoc wireless networks, on the other hand, do not require a set infrastructure to work. In ad-hoc networks, each node can communicate with other nodes, so no access point that provides access control is required.*

*Whereas the routing in infrastructure networks is taken care of by the access point, in ad-hoc networks the nodes in the network take care of routing.*

*Routing is to find the best possible path between the source and destination nodes to transfer data.*

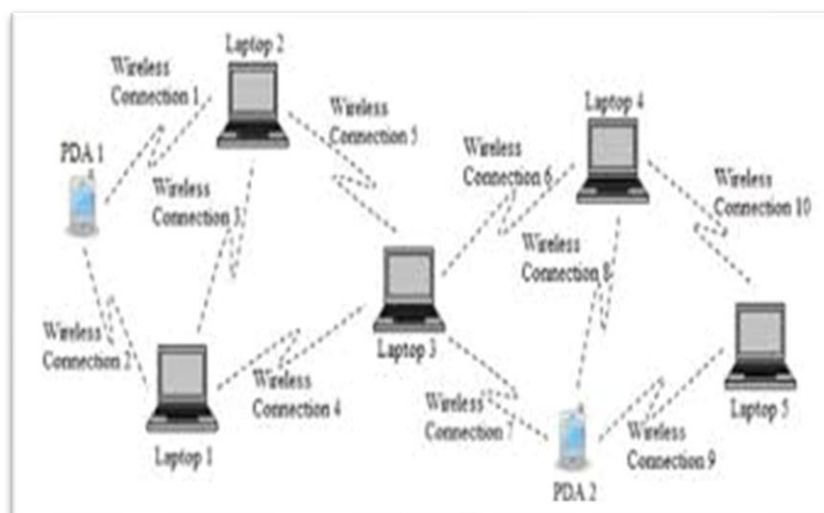
*All the individual nodes in an ad-hoc network maintain a routing table, which contains the information about the other nodes. As the nature of the ad-hoc network is dynamic, this results in ever-changing router tables. One important thing to note is that an ad-hoc network is asymmetric by nature, meaning the path of data upload and download between two nodes in the network may be different.*

*A typical example of an ad-hoc network is connecting a speaker and the computer through Bluetooth. Another example would be connecting 2 or many computers through mobile hotspot.*

*Example : Mobile Ad hoc network*

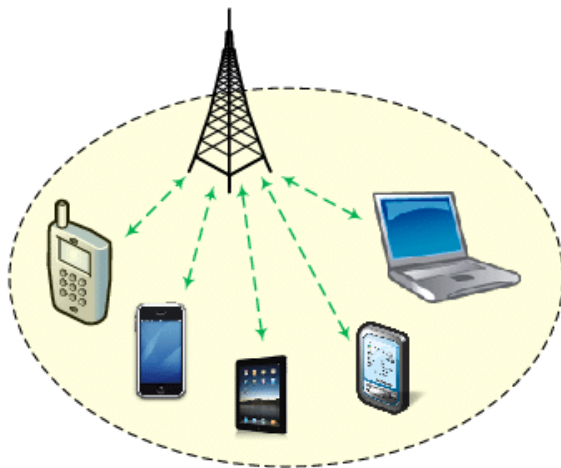
*When to use an ad-hoc network:*

- If you want to quickly set up a peer-to-peer (P2P) network between two devices*
- When creating a quick temporary network*
- If there is no network infrastructure set up in the area (ad-hoc is the only network mode that can be used in areas like this)*

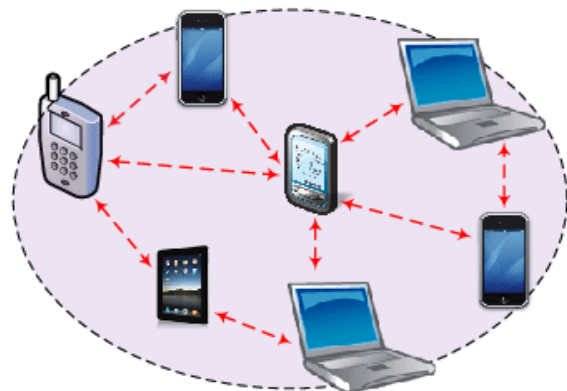


## Infrastructure based vs Ad Hoc Network :

	Infrastructure	Ad hoc
<b>Characteristics</b>		
Communication	Through an access point	Directly between devices
Security	More security options	WEP or no security
Range	Determined by the range and number of access points	Restricted to the range of individual devices on the network
Speed	Usually faster	Usually slower
<b>Requirements for all devices</b>		
Unique IP address for each device	Yes	Yes
Mode set to	Infrastructure mode	Ad hoc mode
Same SSID	Yes, including the access point	Yes
Same channel	Yes, including the access point	Yes



Infrastructure-based wireless networks



Wireless ad hoc networks

## MANET:

*A MANET is the network that can be installed when needed, without any assist from the present infrastructure or any other type of fixed stations. It is completely a wireless connectively, consisting of mobile hosts. The host may be laptops, PDAs, digital camera, mobile phones, MP3 players, and so on*

*The nodes' movement is frequent and free in all directions. So, they must be able to dynamically arrange their own network. A MANET usually has an arbitrary topology which changes in an unpredictable manner.*

*This is in contrast to the cellular network in which wireless nodes are communicating with each other using fixed infrastructure.*

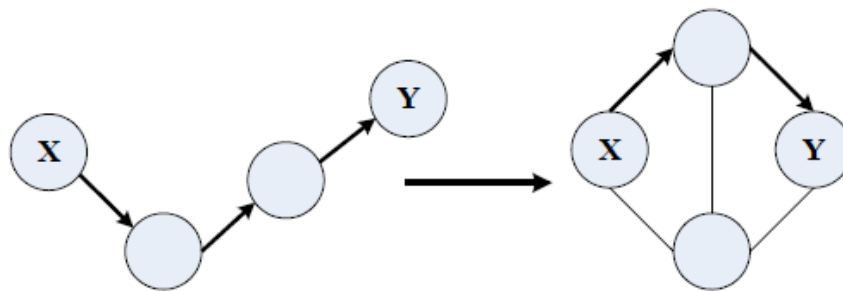
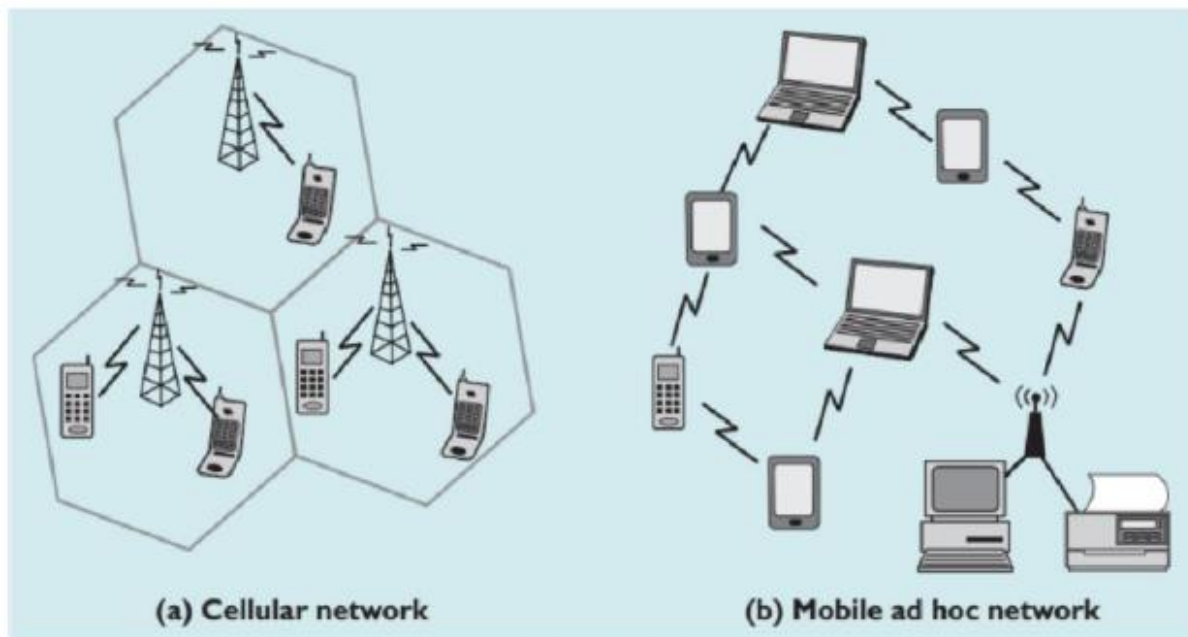


Fig. 3: Example of mobile Ad Hoc network topology movement.

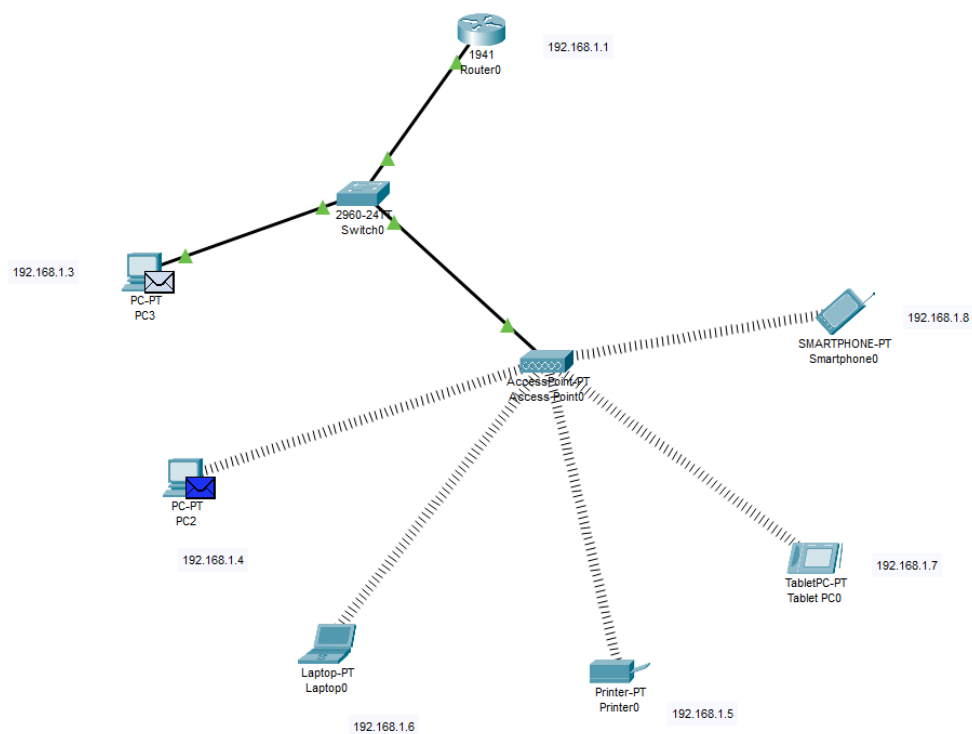
### *MANET Vs CELLULAR NETWORKS :*

Mobile Ad Hoc Network	Cellular network
No fixed base stations, very rapid deployment	Fixed, pre-located cell sites and base stations
Highly dynamic network topologies with multi-hop	Static backbone network topology
Hostile environment (losses, noise) and sporadic connectivity	Relatively benign environment and stable connectivity
Automatic adaptation to changes	Detailed planning before base stations can be installed
Infrastructure-less networks	Infrastructure networks
Cost-effective	High setup costs
Less setup time	Large setup time

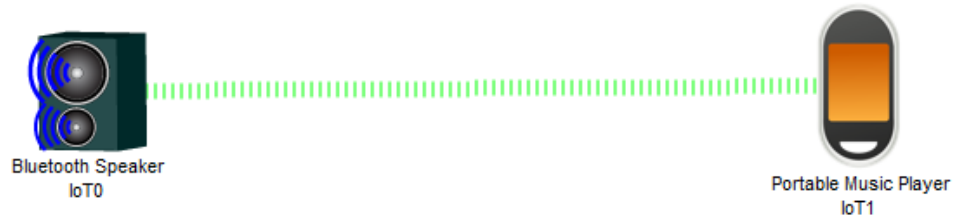


*Infrastructure and Ad hoc network created using Cisco packet tracker :*

*Infrastructure based :*



*Ad hoc :*



*References :*

[References 1](#)

[References 2](#)

[References 3](#)