x

802.11 Standard

- In 1997, the IEEE (Institute of Electrical and Electronics Engineers) created the first WLAN standard.
- Unfortunately, 802.11 only supported a maximum network bandwidth of 2 Mbps which is too slow for most applications.
- For this reason, ordinary 802.11 wireless products are no longer manufactured.
- 802.11 standard uses the same unregulated radio signaling frequency of 2.4 GHz.

802.11a Standard

- While 802.11b was in development, IEEE created a second extension to the original 802.11 standard called 802.11a.
- 802.11a was created at the same time. Due to its higher cost, 802.11a is usually found in business networks whereas 802.11b better serves the home network.
- 802.11a supports bandwidth up to 54 Mbps and signals in a regulated frequency spectrum of 5 GHz.
- Pros of 802.11a
  - Fast maximum speed
  - Regulated frequencies prevent signal interference from other devices
- Cons of 802.11a
  - Highest cost
  - Higher frequency compared to 802.11b shortens the range of 802.11a networks
  - The higher frequency also means 802.11a signals have more difficulty penetrating walls and other obstructions

802.11b Standard

- IEEE expanded on the original 802.11 standard in July 1999, creating the 802.11b specification.
- 802.11b supports bandwidth up to 11 Mbps, comparable to traditional Ethernet.
- 802.11b standard also used the same unregulated radio signaling frequency of 2.4 GHz.
- Pros of 802.11b
  - Vendors often prefer using these frequencies to lower their production costs.
  - Signal range is good
- Cons of 802.11b
  - Slowest maximum speed
  - Being unregulated, 802.11b gear can incur interference from microwave ovens, cordless phones and other appliances using the same 2.4 GHz range. However, by keeping 802.11b gear a reasonable distance from other appliances, interference can easily be avoided.

802.11g Standard

- In 2002 and 2003, WLAN products supporting a newer standard called 802.11g emerged on the market.
- 802.11g attempts to combine the best of both 802.11a and 802.11b.
- 802.11g supports bandwidth up to 54 Mbps and it uses the 2.4 GHz frequency for greater range.
- This standard gear is backward compatible with 802.11b.
- Pros of 802.11g
  - Fast maximum speed
  - Signal range is good and not easily obstructed
- Cons of 802.11g
  - Costs more than 802.11b
  - Appliances may interfere on the unregulated signal frequency

802.11n Standard

- 802.11n is a standard that improves upon the previous 802.11 standards by adding multiple-input-multiple-output antennas (MIMO).
- Here one more concept of wider channel width of 40 MHz added. Where as earlier standards uses channel width of 20 MHz
- Introduced more spatial streams up to 4 and higher-order modulation (64 QAM).
- This standard operates on both the 2.4 GHz and the 5 GHz bands and its net data rate ranges from 72.2 Mbps to 600 Mbps.
- The IEEE has approved the amendment and it was published in October 2009.
- Pros of 802.11n
  - Fastest maximum speed
  - Best signal range over earlier WiFi standards due to increased signal intensity
  - More resistant to signal interference from outside resources
  - Backward compatible with all 802.11 a/b/g equipment's

IEEE 802.11

↳ Family of WLANs.

→ It is a standard that specifies the Physical or MAC Layer adapted.

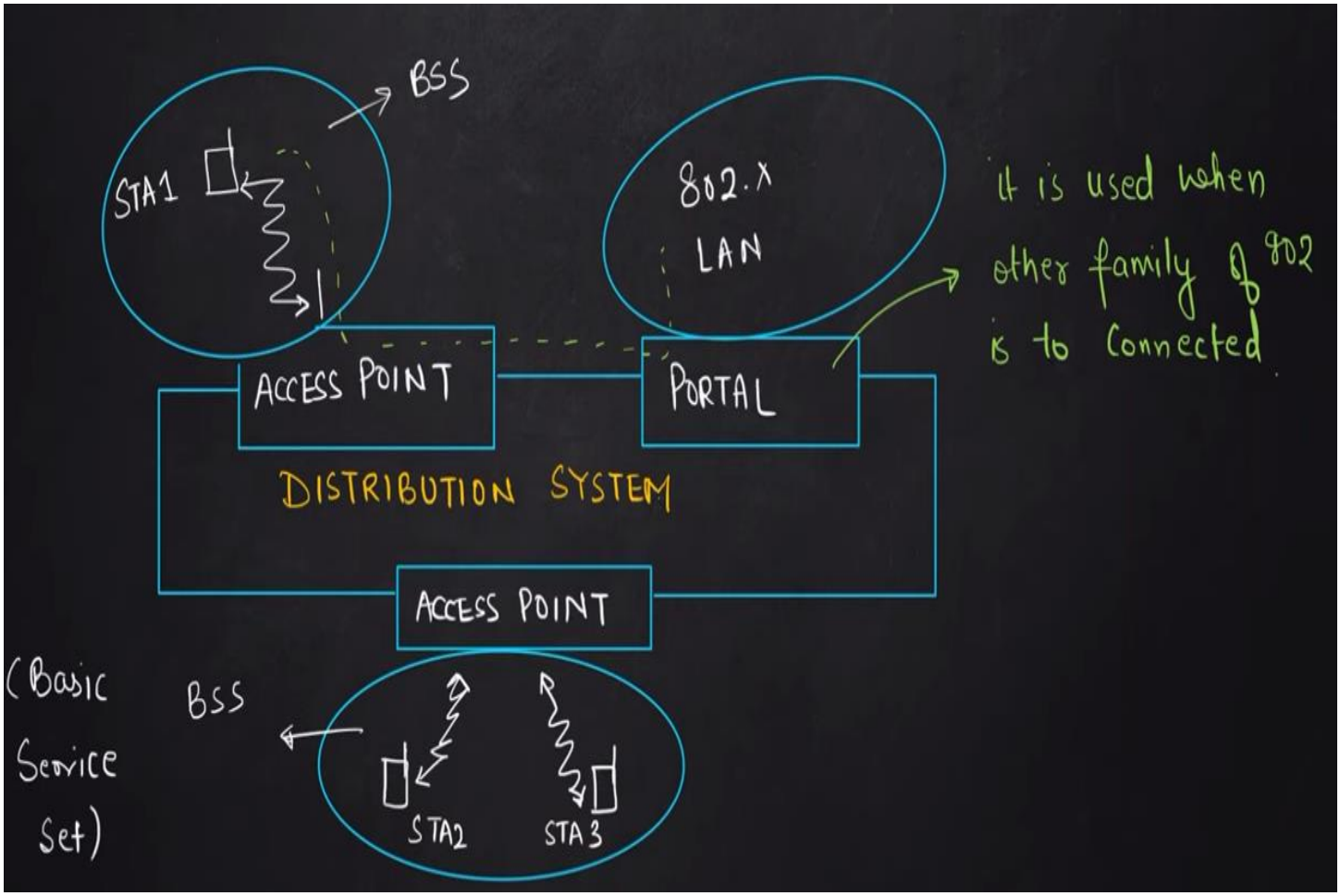
→ Defines separate standard for infrastructure based and adhoc N/w.

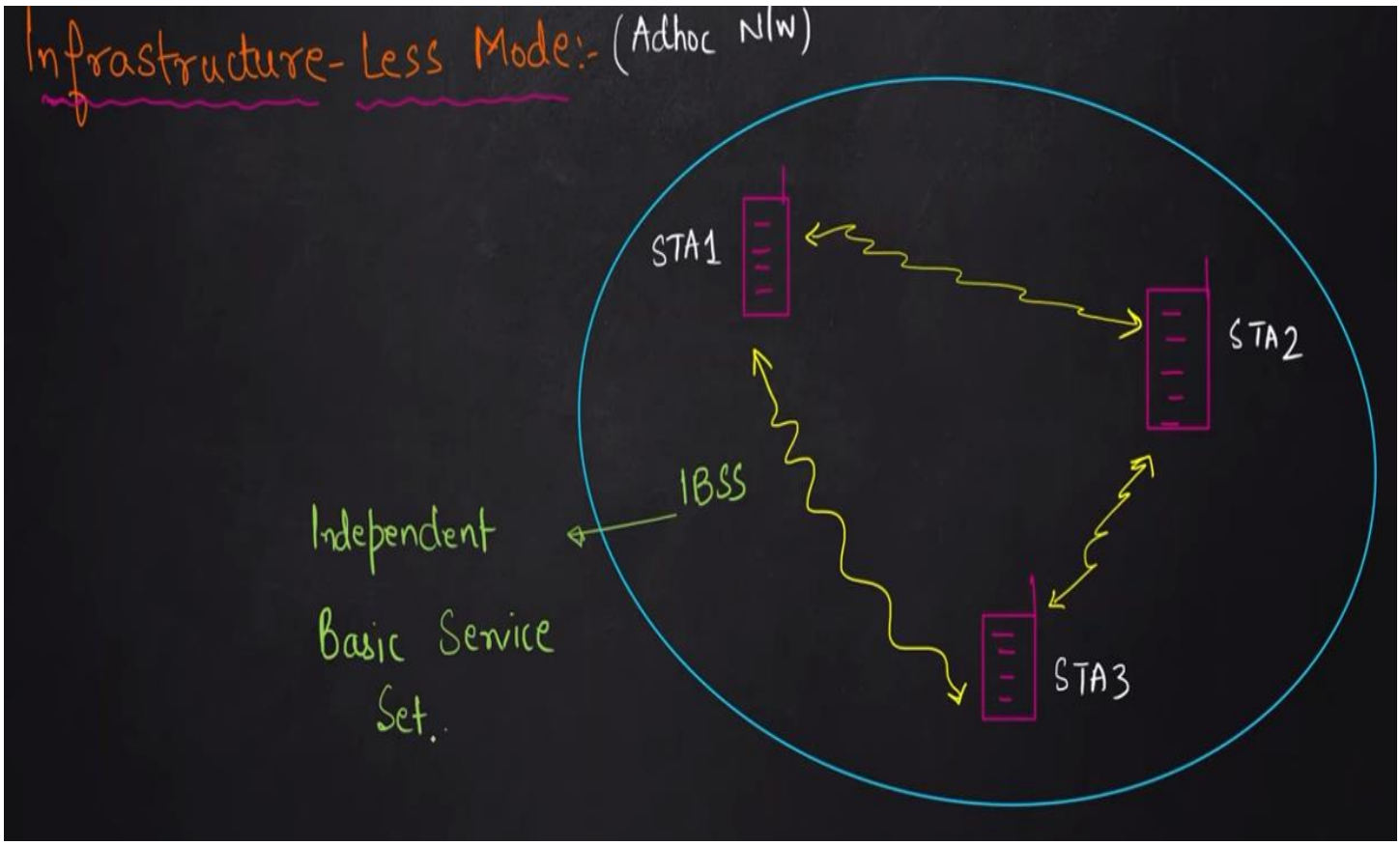
Infrastructure based Mode:-

↳ Helps in providing Wi-Fi Hot spots for internet access.

→ Based on CSMA/CA.

→ Multiple access point are Connected to form a distribution N/w.


BSS
STA1
802.x
LAN
It is used when other family of 802 is to Connected
ACCESS POINT
PORTAL
DISTRIBUTION SYSTEM
ACCESS POINT
(Basic Service Set)
Bss
STA2
STA3


Infrastructure-Less Mode:- (Adhoc N/w)
STA1
STA2
STA3
IBSS
Independent Basic Service Set.

IEEE 802.15:-

↳ Short distance wireless NIW used for networking of portable devices such as cellphones, PDA etc.

→ Similar to (BLUETOOTH)

REQUIREMENT:-

↳ Power Mgmt → Low Current Consumption

Range → 0 to 10m

Speed → 19.2 to Kbps

Size → 0.5 Cubic inches w/o antenna

Cost → Cheaper.

VARIANTS:-

	FEATURES
IEEE 802.15.1	Lower Layer of Bluetooth
IEEE 802.15.2	WPAN + WLAN
IEEE 802.15.3	High Rate, Low Power
IEEE 802.15.4	Low P