Difference Between Guided and Unguided Media

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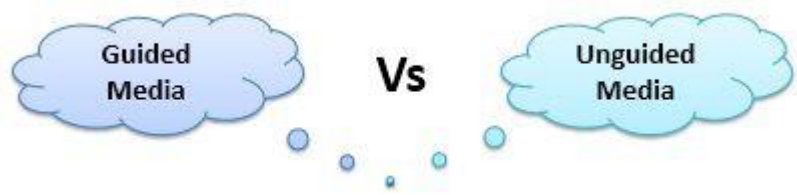

The computer and other communicating devices represent data in the form of signals. The signals transmit between communicating devices in the form of electromagnetic energy, and hence the signals are called **electromagnetic signals**. Electromagnetic signals are the combination of electric and magnetic fields that vibrates in relation to each other. The electromagnetic signals can travel through various transmission media. The transmission media is broadly classified into two categories that are **guided** and **unguided media**.

The basic difference between guided and unguided media is that in the **guided media**, the signal travels through a physical medium whereas, in **unguided media,** the signal travel through the air. There are some more differences between guided and unguided media which I have discussed with the help of comparison chart shown below.

Content: Guided Vs Unguided Media

Comparison Chart

BASIS FOR COMPARISON	GUIDED MEDIA	UNGUIDED MEDIA
Basic	The signal requires a physical path for transmission.	The signal is broadcasted through air or sometimes water.
Alternative name	It is called wired communication or bounded transmission media.	It is called wireless communication or unbounded transmission media.
Direction	It provides direction to signal for travelling.	It does not provide any direction.
Types	Twisted pair cable, coaxial cable and fibre optic cable.	Radio wave, microwave and infrared.

Definition of Guided Media

Guided transmission media are more commonly known as the **wired communication** or **bounded transmission media.** The electromagnetic signals travel between the communicating devices through a physical medium/conductor. As the medium for transmission is a physical conductor, it also provides **direction** to the signal. But there are physical limitations of the conductor in the guided media. Like the length of the conductor, its installation cost, its maintenance, etc.

The guided media is categorized further into three categories that are **twisted-pair cable, coaxial cable** and **fiber-optic cable**. The twisted pair cable has

two conductors wires wounded around each other and each surrounded by an insulating material. The twisted pair cable is flexible and easy to install. But it has *low bandwidth* and provide *less protection* from *interference*. Twisted pair cable are also of two types **shielded and unshielded twisted pair cable**.

The **coaxial cable** has a central core conductor (usually copper) enclosed in an insulating sheath, which is further encased in an outer metallic braid, it serves as both protection against noise and as a second conductor which completes the circuit. Now, the outer metallic covering is also covered by an insulating sheath. The coaxial cable carries signals of *higher frequency* than the twisted pair cable.

The third category is the **optical fibre** which is made of glass or plastic, and it transmits signals in the form of light. The optical fibre is *noise resistance, has less signal attenuation and has a higher bandwidth* in comparison to twisted pair cable and coaxial cable. But it also has some drawbacks like; it is *very expensive, i*t requires a lot of *installation and maintenance charge* as any defect in the cable can diffuse light and alter the signals. As the optical fibre is made of glass, it is very *fragile*.

So, we have discussed the major categories of guided media lets move on to unguided media.

Definition of Unguided Media

The **unguided media** is also called **wireless communication**. It does not require any physical medium to transmit electromagnetic signals. In unguided media, the electromagnetic signals are broadcasted through air to everyone. These signals are available to one who has the device capable of receiving those signal.

The unguided media is also called unbounded media as it does not have any border limitation. The unguided media allows the user to connect all the time, as the communication is wireless the user can connect himself from anywhere to the network.

The unguided media is categorized into **radio waves, microwaves and infrared waves**. The **radio waves** are generated easily; they are *low-frequency signals* and can travel a *long distance*. The radio waves can penetrate through the buildings.

The **microwaves** are transmitted in a straight line and hence require the **line-of-sight transmission**. The distance covered by the microwave signal depend on the height of the two antenna. More the taller are antennas longer is the

distance covered by the signal. The microwave has a *frequency higher* than the radio waves. Microwave are used for telephone communication mobile phones, television distribution, etc.

Infrared waves are used for short range communication. Like, the remote control for televisions, VCRs, etc. uses infrared waves. It can not penetrate through obstacles. The government licence is not required, to operate an infrared system as it is more secure against eavesdropping.

Key Differences Between Guided and Unguided Media

1. The key difference between guided and unguided media is that guided media uses a **physical path or conductor** to transmit the signals whereas, the unguided media **broadcast the signal** through the air.
2. The guided media is also called **wired communication** or **bounded transmission media**. However, the unguided media is also called **wireless communication** or **unbounded transmission media**.
3. The guided media provide **direction** to the signal whereas, the unguided media **does not direct** the signal.
4. Categories of guided media are **twisted pair cable, coaxial cable** and **optical fibre**. On the other hands, the categories of unguided media are **radio wave, microwave,** and **infrared signal**.

Conclusion:

Guided media is a wired communication it transmits data either using twisted pair cable, coaxial cable or fibre optics; it requires maintenance charge. The unguided media is a wireless communication it transmits signal by broadcasting it through the air.

Related Differences:

1. **Difference Between Optical Fibre and Coaxial Cable**
2. **Difference Between UTP and STP Cables**
3. **Difference Between ADSL and Cable Modem**
4. **Difference Between Analog and Digital Signal**
5. **Difference Between Star and Mesh Topology**