NETWORKING   PROGRAMMING   DBMS   OPERATING SYSTEM   INTERNET
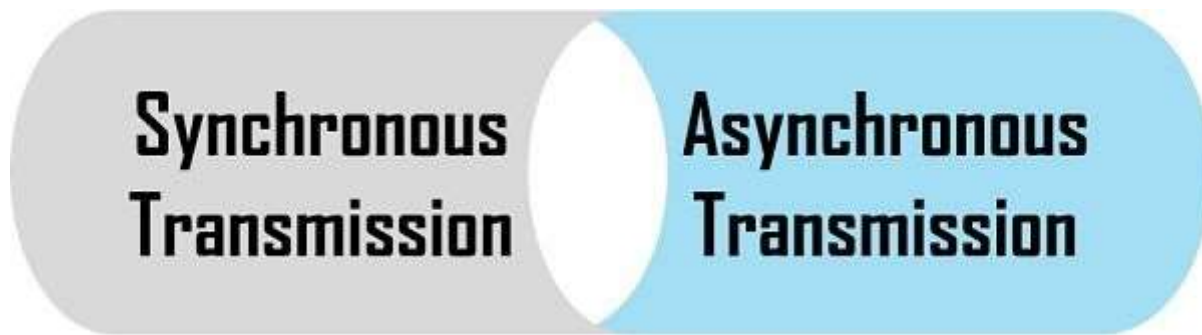
HARDWARE   SOFTWARE

Difference Between Synchronous and Asynchronous Transmission

In the previous article, we have discussed Serial and Parallel Transmission. As we know in Serial Transmission data is sent bit by bit, in such a way that each bit follows another. It is of two types namely, **Synchronous and Asynchronous Transmission**.

One of the major differences is that in Synchronous Transmission, the sender and receiver should have synchronized clocks before data transmission. Whereas Asynchronous Transmission does not require a clock, but it adds a parity bit to the data before transmission.

Furthermore, the synchronous transmission uses synchronization characters while asynchronous method employs start/stop bits, in order to alert the modem when data are being sent and when are these transmissions are completed are known as message characters.

Content: Synchronous Vs Asynchronous Transmission

Comparison Chart

BASIS FOR COMPARISON	SYNCHRONOUS TRANSMISSION	ASYNCHRONOUS TRANSMISSION
Meaning	Transmission starts with the block header which holds a sequence of bits.	It uses start bit and stop bit preceding and following a character respectively.
Transmission manner	Sends data in the form of blocks or frames	Sends 1 byte or character at a time
Synchronization	Present with the same clock pulse.	Absent
Transmission Speed	Fast	Slow
Gap between the data	Does not exist	Exist
Cost	Expensive	Economical
Time Interval	Constant	Random
Implemented by	Hardware and software	Hardware only

BASIS FOR COMPARISON	SYNCHRONOUS TRANSMISSION	ASYNCHRONOUS TRANSMISSION
Examples	Chat Rooms, Video Conferencing, Telephonic Conversations, etcetera.	Letters, emails, forums, etcetera.

Definition of Synchronous Transmission

In **Synchronous Transmission**, data flows in a full-duplex mode in the form of blocks or frames. Synchronization between the sender and receiver is necessary so that the sender knows where the new byte starts (since there is no gap between the data). Therefore, each block of characters is labelled with the synchronization characters and the receiving device acquires the data until a special ending character is identified.
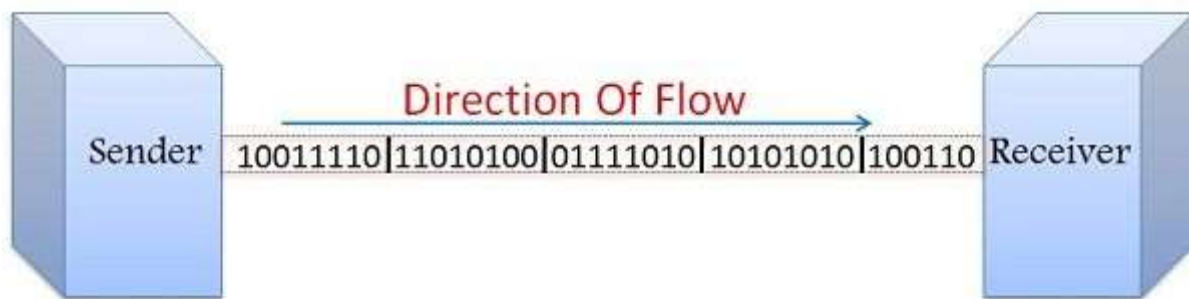

Synchronous Transmission is efficient, reliable and is used for transferring a large amount of data. It provides real-time communication between connected devices. Chat Rooms, Video Conferencing, telephonic conversations, as well as face to face interactions, are some of the examples of Synchronous Transmission.

The voice-band and broad-band channels are usually used in the synchronous transmission modes as it provides a faster speed up to 1200 bps and serves the purpose of high data transfer speed.

Definition of Asynchronous Transmission

In **Asynchronous Transmission** data flows in a half-duplex mode, 1 byte or a character at a time. It transmits the data in a continuous stream of bytes. In general, the size of a character sent is 8 bits to which a parity bit is added, i.e. a start and a stop bit that gives the total of 10 bits.

It does not require a clock for synchronization; rather it uses the parity bits to tell the receiver how to interpret the data. These parity bits are known as start and stop bits which control the transfer of data.
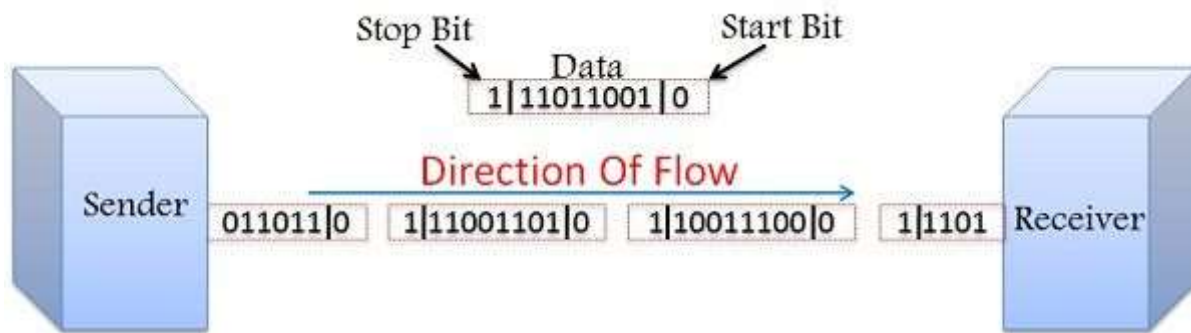
It uses character-based synchronization so that the receiving terminal could synchronize itself with the receipt of data on a character. It is simple, fast, economical and does not require a 2-way communication. Letters, emails, forums, televisions and radios are some of the examples of Asynchronous Transmission.

The voice-band channels that are of a narrow type and operates on a slower speed are utilized in the asynchronous transfer. Here, the transmitting device works manually or intermittently.

Key Differences Between Synchronous and Asynchronous Transmission

1. In Synchronous Transmission, data is transferred in the form of frames. On the other hand, in Asynchronous Transmission data is transmitted 1 byte at a time.

2. Synchronous Transmission requires a clock signal between the sender and receiver so as to inform the receiver about the new byte. In contrast, in Asynchronous Transmission sender and receiver does not require a clock signal as the data sent here has a parity bit attached to it which indicates the start of the new byte.

3. Data transfer rate of Asynchronous Transmission is slower than that of Synchronous Transmission.

4. Asynchronous Transmission is simple and economical, whereas Synchronous Transmission is complicated and expensive.

5. Synchronous Transmission is efficient and has lower overhead as compared to the Asynchronous Transmission.

6. In asynchronous data transfer, the line is kept at a stable value (logic 1) if no data is transmitted through the line. As against, in synchronous transfer, the end of the data is indicated by the sync character(s). Further than the sync characters, the line can be either high or low.

Conclusion

Both Synchronous and Asynchronous Transmission have their advantages and disadvantages. Asynchronous is simple, economical and used for transmitting a small amount of data.

Conversely, Synchronous Transmission is used for transferring the bulk of data as it is efficient and has less overhead. Hence, we conclude that both Synchronous and Asynchronous Transmission are necessary for data transmission.

Related Differences:

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2. Difference Between Flow Control and Error Control

3. Difference Between USART and UART

4. Difference Between Stack and Queue

5. Difference Between Array and Linked List

Comments

Tiras says

September 27, 2016 at 5:08 am

Clear and elaborate explanations! thumbs up......keep up.

Reply

Mahi says

November 25, 2016 at 1:53 pm

It's very esiar to learning ???

Reply

Mohammad Aarif Ansari says

December 1, 2016 at 7:58 am

Thankx its realy help full

Reply

shipra twarneel says

December 28, 2016 at 8:28 am

its really very helpful

Reply

Mick says

January 6, 2017 at 9:35 am

if I am the sender on a Synchronous transmission fiber line – must the receiver also have a clockspeed and same capabilities than me, to get most of the benefit on a Synchronous line?

Reply

Neha K says

January 6, 2017 at 11:37 am

The clocks of sender and recevier must be synchroinized.

Reply

junaid iqbal says

February 17, 2017 at 7:21 am

it is very help full thanx .....

Reply

Bharat says

April 29, 2017 at 6:26 am

Thanks, it is very helpful for me.

Reply

ramesh(mca,Mtech) says

August 18, 2017 at 11:06 am

thank you......easy and clean

Reply

Sonu Khan says

October 24, 2017 at 9:11 am

It is very useful for novices.

Reply

Paree says

November 14, 2017 at 9:49 am

Very useful website. Keep up the good work guys!

Reply

priyanga says

November 21, 2017 at 9:45 am

its really helpful thank you....

Reply

Harshvardhan patil says

June 24, 2018 at 4:06 am

It's very helpful to me

Reply

Hemalatha R says

August 14, 2018 at 4:14 am

neat and clear explanation, thank you

Reply

Bonface says

August 29, 2018 at 2:53 am

It's amazing! Thank you

Reply

Prashant says

October 4, 2018 at 6:47 pm

Nice 👌

Reply

Saloni krishnan says

November 22, 2018 at 6:14 pm

Every time when i come to this website. I find my answer not only answer
but also very satisfied by its easy language, words or terms used. I am very
thankful to you
Thanks Mam

Reply

Dipali says

December 21, 2018 at 1:17 am

This is the best website I know till now. Explanations are very easy to learn..and have satisfactory points. great😄

Reply

Usman Khalid says

February 9, 2019 at 4:51 am

very helpful :))

Reply

john says

April 23, 2019 at 10:51 am

High-Quality Info! Thanks!

Reply

Kishor says

June 14, 2019 at 2:57 pm

Excellent for the basic level candidates.

Reply

Dave Ibeh says

July 12, 2019 at 8:20 pm

NICE POST

Reply

Persie jae says

February 25, 2020 at 8:01 pm

Thanks…. it was very useful and well explained

Reply

Sonali Ramesh Jagtap says

May 20, 2020 at 8:09 am

very well explained

Reply

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