

UNIVERSITAS GUNADARMA

Jaringan Komputer

Medium Access Control

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Medium Access Control

Media Access Control adalah sebuah metode untuk mentransmisikan sinyal yang dimiliki oleh *node-node* yang terhubung ke jaringan tanpa terjadi konflik.

Ketika dua komputer meletakkan sinyal di atas media jaringan (sebagai contoh: kabel jaringan) secara simultan (berbarengan), maka kondisi yang disebut sebagai "*collision*" (tabrakan) akan terjadi yang akan mengakibatkan data yang ditransmisikan akan hilang atau rusak. Solusi untuk masalah ini adalah dengan menyediakan metode akses media jaringan, yang bertindak sebagai "lampu lalu lintas" yang mengizinkan aliran data dalam jaringan atau mencegah adanya aliran data untuk mencegah adanya kondisi *collision*.

Ada empat buah metode *media access control* yang digunakan dalam jaringan lokal, yakni:

- *Carrier Sense Multiple Access with Collision Detection* (CSMA/CD): metode ini digunakan di dalam jaringan Ethernet half-duplex (jaringan Ethernet full-duplex menggunakan switched media ketimbang menggunakan shared media sehingga tidak membutuhkan metode ini). CSMA/CD merupakan metode akses jaringan yang paling populer digunakan di dalam jaringan lokal, jika dibandingkan dengan teknologi metode akses jaringan lainnya. CSMA/CD didefinisikan dalam spesifikasi IEEE 802.3 yang dirilis oleh Institute of Electrical and Electronic Engineers (IEEE).
- *Carrier Sense Multiple Access with Collision Avoidance* (CSMA/CA): metode ini digunakan di dalam jaringan dengan teknologi AppleTalk dan beberapa bentuk jaringan nirkabel (wireless network), seperti halnya IEEE 802.11a, IEEE 802.11b, serta IEEE 802.11g. Untuk AppleTalk, CSMA/CA didefinisikan dalam spesifikasi IEEE 802.3, sementara untuk jaringan nirkabel didefinisikan dalam IEEE 802.11.
- *Token passing*: metode ini digunakan di dalam jaringan dengan teknologi Token Ring dan Fiber Distributed Data Interface (FDDI). Standar Token Ring didefinisikan di

dalam spesifikasi IEEE 802.5, sementara FDDI didefinisikan oleh American National Standards Institute (ANSI).

- *Demand priority*: digunakan di dalam jaringan dengan teknologi 100VG-AnyLAN dan didefinisikan dalam standar IEEE 802.12.

Medium access control (MAC) is a collection of mechanisms that regulates user access to a medium using SDM, TDM, FDM, or CDM. MAC belongs to the data link control layer of the OSI model.



Multiplexing

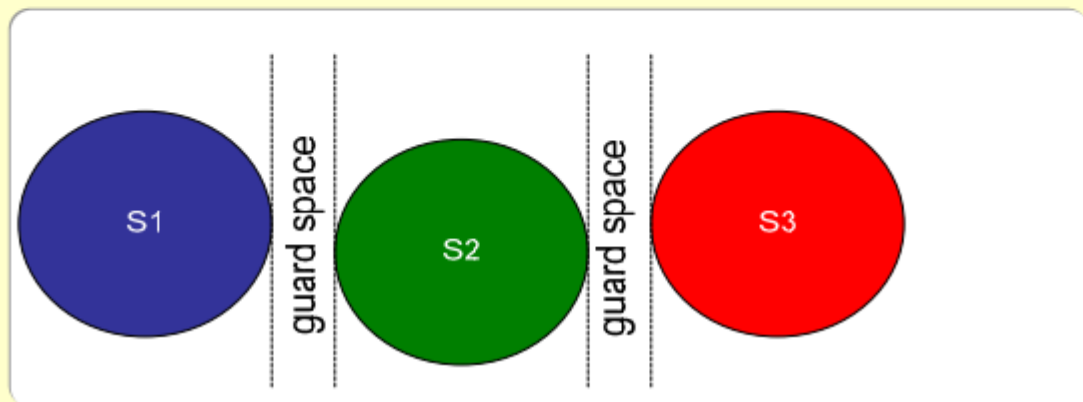
- It costs significant amounts to change a telephone system, not least the cost of the "construction"
- Hence the more calls you can pump down a cable the more profitable the cable becomes
- **Telco's** (Telephone companies) have developed elaborate multiplexing schemes
- The schemes can be divided into three categories
 - Frequency Division Multiplexing (**FDM**)
 - Time Division Multiplexing (**TDM**)
 - Code Division Multiplexing (**CDM**)

Sharing a medium

- Time division multiplexing brought digital technology to mobile communications
- Recall, "multiplexing describes how several users can share the same medium with minimum or no interference" [Schiller 2003]
- In mobile communications multiplexing can be applied in 4 dimensions
 - Space
 - Frequency
 - Time
 - Code

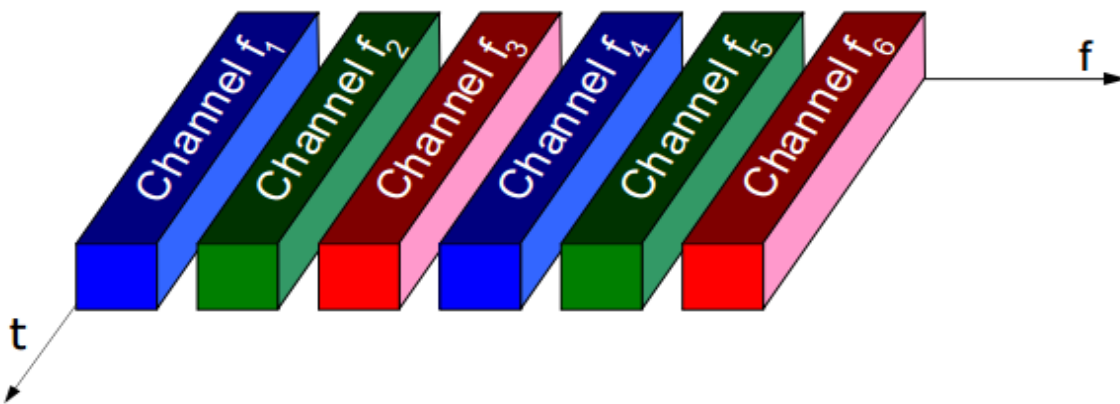
Space Division Multiplexing (SDM)

- Premise that if we have entities wishing to communicate using a single channel, then as long as we space them far enough apart interference will not occur
- To reduce further, the risk of interference place **guard space** between the frequency spaces



Frequency Division Multiplexing (FDM)

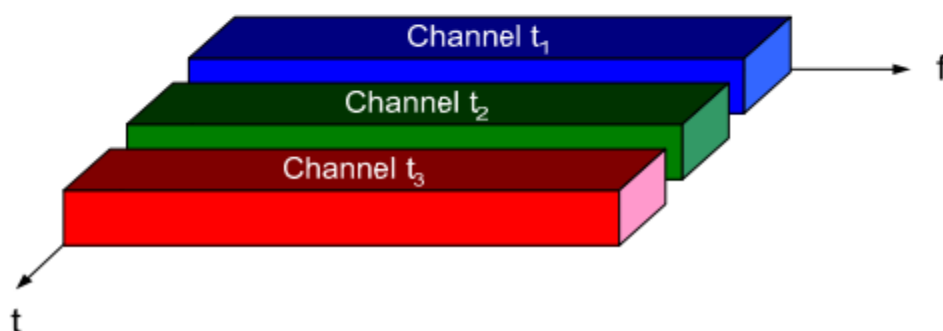
- Divides the available frequency into non-overlapping bands with guard spaces between to avoid overlapping (**adjacent channel interference**)
- Receiver only has to know the frequency to tune in to
- Used in analogue systems



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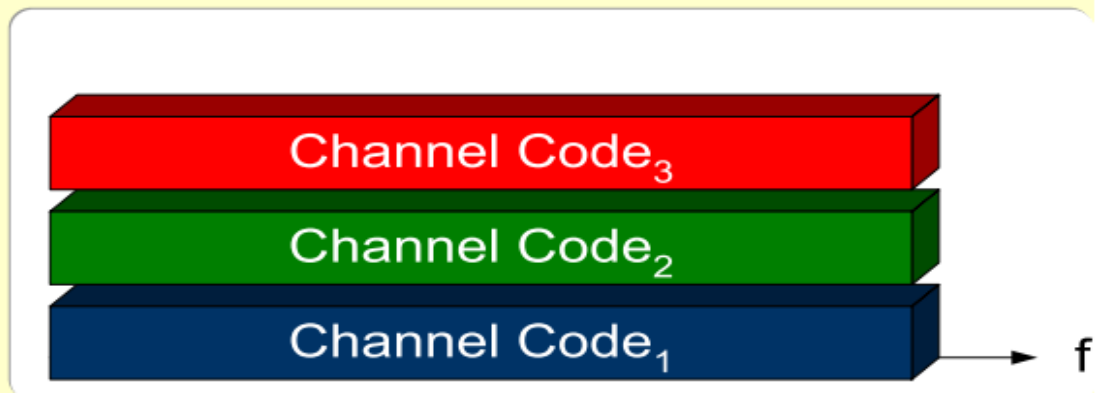
Time Division Multiplexing (TDM)

- Allows access to entire frequency bandwidth but for a limited amount of time
- All senders use same frequency in at different time
- If two transmissions overlap known as **co-channel interference**
- Precise clock synchronisation required



Code Division Multiplexing (CDM)

- All channels use the same frequency, however, each channel is given its own unique code
- Each code must be sufficiently **orthogonal** to allow appropriate guard spaces
- Large range of codes provides significant expansion, security, etc



Code Division Multiplexing (CDM)

- Highly complex scheme
- Receiver has to know the code & be able to separate out other traffic on different codes which appear as background noise
- Receiver & transmitter must be synchronised to provide correct decoding
- All signals must reach the receiver with relatively equal strength or the receiver will not be able to distinguish between them

Referensi

http://id.wikipedia.org/wiki/Media_Access_Control

<http://www.swiftutors.com/medium-access-control.html>

[http://www.fcet.staffs.ac.uk/alg1/2004_5/Semester_1/Communications,%20COMMS%20\(CE00038-2\)/10COMMS.pdf](http://www.fcet.staffs.ac.uk/alg1/2004_5/Semester_1/Communications,%20COMMS%20(CE00038-2)/10COMMS.pdf)