Data Communication BLM3051

Furkan ÇAKMAK

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Lecture Information Form - Weekly Subjects

BLM3051 Data Communication

Week 2

Week	Date	Subjects
1	04.10.2022	Introduction to Data Communication Standards Used on Data Communication, Architectural models
2	11.10.2022	OSI Reference Model , Layers and Their Functions
3	18.10.2022	Signaling and Signal Encoding
4	25.10.2022	Parallel and Serial Transmission, Communication Media and Their Technical Specs., Multiplexing (TDM, FDM)
5	01.11.2022	Error Detection and Error Correction Techniques
6	08.11.2022	Data Link Control Techniques, Flow Control
7	15.11.2022	Asynchronous and Synchronous Data Link Protocols (BSC, HDLC)
8	22.11.2022	1. Vize Haftası
9	29.11.2022	LAN Technologies Continued, IEEE 802.4, 802.5, 802.11
10	06.12.2022	Connectionless and Connection Oriented Services, Switching
11	13.12.2022	Wide Area Networking Technologies (X.25, ISDN, FR, ATM, xDSL.)
12	20.12.2022	Communications Equipment's, TCP/IP Model, Security Issues
13	27.12.2022	Research Presentation 1
14	03.01.2022	Research Presentation 2

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OSI Reference Model

- ISO – 1984
- De Jure
- Features
  - Open
  - Flexible
  - Robust
  - Interoperable
  - Easy to explain
  - Easy to understand
- 7-layers
- Never applied / Ideal Model

7	Application Layer
6	Presentation Layer
5	Session Layer
4	Transport Layer
3	Network Layer
2	Data Link Layer
1	Physical Layer

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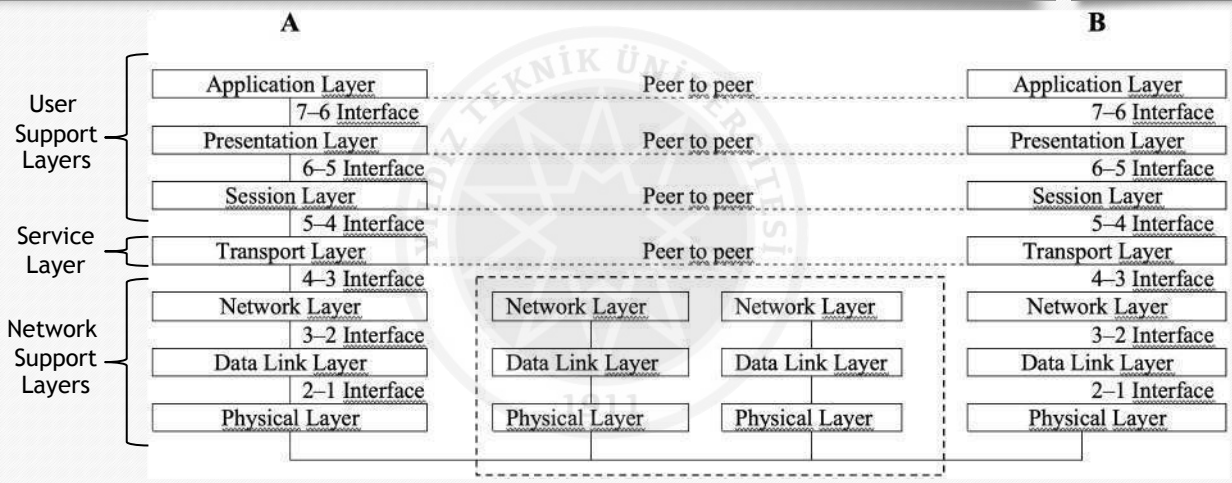
OSI Reference Model – Con't



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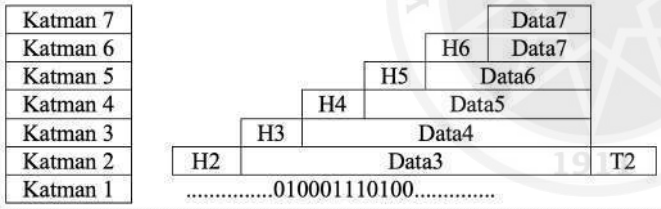
OSI Reference Model – Con't

- Each layers add a **header** package.
- Only second layer (Data link) add a **trailer** end of the package.
  - Error control
- Encapsulation



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OSI – Physical Layer

- Responsible for **trasmitting bit arrays** between peers.
- General functions of the Physical Layer;
  - Electromechanic
  - **Direction** of the package
  - Determining **magnitudes** of signals
    - Amplitude, Wavelength, Frequency
  - **Initiation** and **termination** of the physical connection.

7	Application Layer
6	Presentation Layer
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OSI – Data Link Layer

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- Extract/divide **frames** from the messages.
- Send frames to receiver side **in an order.**
- Using acknowledgment (ACK) info;
  - In case of an **error,**
  - In case of **not receive** the package,
  - **Re-transmission**
- Add **header** and **trailer** data to frames.
  - To determine the **starting and ending points** of the frame.
- Header includes;
  - Sender address,
  - Receiver address,
  - Order info
- Trailer includes;
  - A code (to check errors)

7	Application Layer
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OSI – Data Link Layer – Con't

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- General functions of the Data Link Layer;
  - Node to node **error free** delivery
  - Addressing (in header part)
    - MAC Address
  - Access Control
  - Flow Control
  - Error Handling
  - Synchronization
- In Local Area Network (LAN)
  - DLL divides into 2 different layers;
    - LLC (Logical Link Control)
    - MAC (Media Access Control)
- Communication at the data link layer is in the **same network.**

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OSI – Network Layer

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- Network layer is responsible for;
  - **Efficiently** and **accurately** forwarding the packet
  - From source to destination **over different network links**.
- Communication at the network layer is in the **different network**
  - **Router (3rd level devices)**
- **Switching**
  - Connection oriented
    - like telephone infrastructure system
- **Routing**
  - **Determining the path between sender and receiver**
  - **Connectionless**
    - **Delivering packages**
  - **In DLL, data transfer occurs between nodes**

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OSI – Network Layer – Con't

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- Address must be different from DLL's addresses.
  - Logical Address
- **Data transfer occurs between the source and the destination.**
- General functions of the Network Layer;
  - **Source to Destination packet delivery**
  - **Logical addressing**
  - **Routing**
  - **Address transformation**
    - Between logical and physical addresses
  - **Multiplexing**
    - Multiple physical connections on a single newtwork connection at the same time

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OSI – Transport Layer

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- Responsible for the **transmission of data**
  - from source to destination
- Network layer responsible for delivering data
- Transport layer responsible for delivering packages
  - data = package[]
- Data transmission is between applications, not computers.
- An additional addressing mechanism is required
  - to **distinguish the applications from each other**.
  - **Service Access Point – SAP**
    - Ports, Sockets
- Transport layer **divides the incoming information into pieces (*segment*)** in sizes **supported by the infrastructure**.
  - Segmentation
    - Sequence number
    - Re-assembly

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OSI – Transport Layer – Con't

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- There are **two types** of services.
  - **Connectionless**
    - Like post services
  - **Connection oriented**
    - Like phone services
      - Establish connection
      - Data transmission
      - Terminate connection
    - **More control over the data to be transferred**
- General functions of the Transport Layer;
  - Data transmission between source and destionation nodes
  - To **provide data flow** between applications with **the help of service points**
  - **Segmentation & Re-assembling**
  - Ensuring connection control
    - Connectionless | Connection oriented

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OSI – Session Layer

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- This layer is responsible for **ensuring continuity**.
  - Synchronization
- Choosing connection type
  - Half-duplex
  - Duplex
- Session data transfering
  - Password
  - Logon verification
- **Sessions** can **be split into sub-sessions** to ensure the **reliability of the connection**
- Sub-sessions are provided with **checkpoint** information.

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OSI – Session Layer – Con't

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- General functions of the Session Layer;
  - **Managing the session**
  - **Communication control**
    - if it is half-duplex
  - **Ensuring synchronization**
  - **Gracefull close**

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OSI – Presentation Layer

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- General functions of the Presentation Layer;
  - **Provides interoperability** by **eliminating possible differences** in **information representation** between devices during data communication
    - Abstract data syntax
  - **Encryption & Decryption**
  - **Compression & Decompression**

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OSI – Application Layer

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- User Interfaces
  - Electronical mail (e-mail)
  - File transfering
  - Remote desktop control
  - Internet explorer
  - vb.

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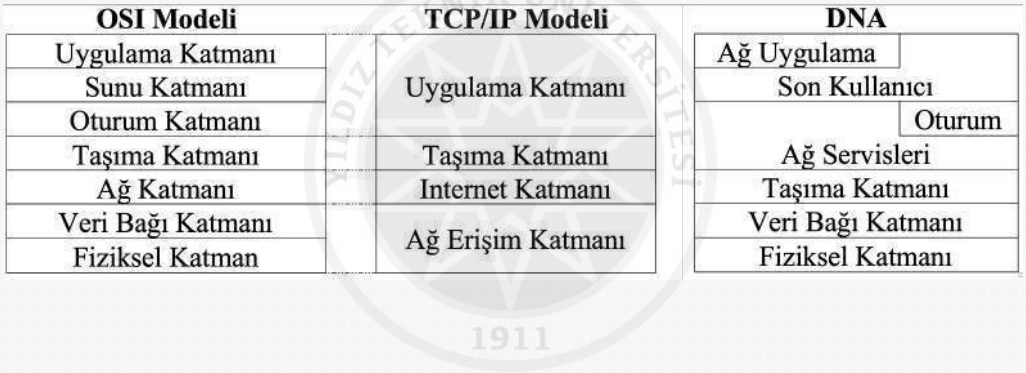
Other Network Models



OSI Modeli	TCP/IP Modeli	DNA
Uygulama Katmanı	Uygulama Katmanı	Ağ Uygulama
Sunu Katmanı		Son Kullanıcı
Oturum Katmanı		Oturum
Taşıma Katmanı	Taşıma Katmanı	Ağ Servisleri
Ağ Katmanı	Internet Katmanı	Taşıma Katmanı
Veri Bağı Katmanı	Ağ Erişim Katmanı	Veri Bağı Katmanı
Fiziksel Katman		Fiziksel Katmanı

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Thank you for your listening.

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