Network Computing courses

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ENSIBS - UBS

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Figure: teaching.auzias.net

Course details

Objectives

- How do *computers* communicate?
- What are the mechanisms **under** an HTTP request or a telegram message?
- Networks are all around us, better study them!

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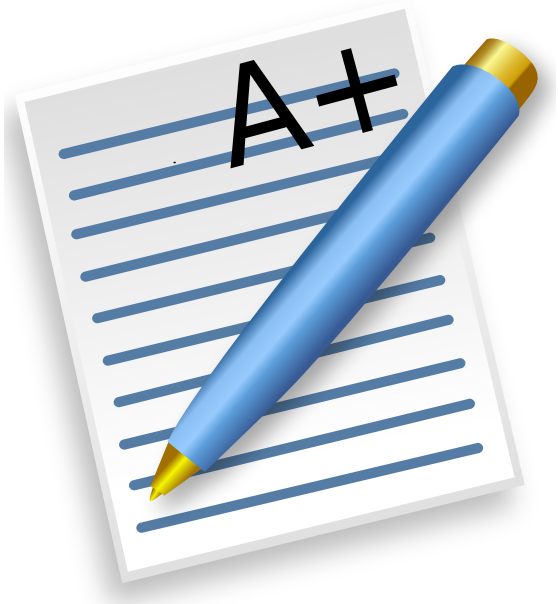

Evaluation

- Short test at the beginning of every lesson (5 min) ?
- Project
- Final exam (1 hour)
- All same weighting

Material

- Slides available at teaching.auzias.net (github too)

Presentation Outline

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- **IP:** Internet **Protocol** provides the functions necessary to deliver a package of bits from a source to a destination over a network
- **(world wide) Web: network** consisting of a collection of Internet websites using HTTP

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- **RFC:** Request For Comments (Internet Draft (ID), RFC, Internet Standard)

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- **NAT:** Network Address Translation, router modifying IP address into another IP address.

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- **Thin client: application** where most functions are carried out on a central server

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- **WAN:** Wide Area Networks cover a broad area (Internet)

Topologies

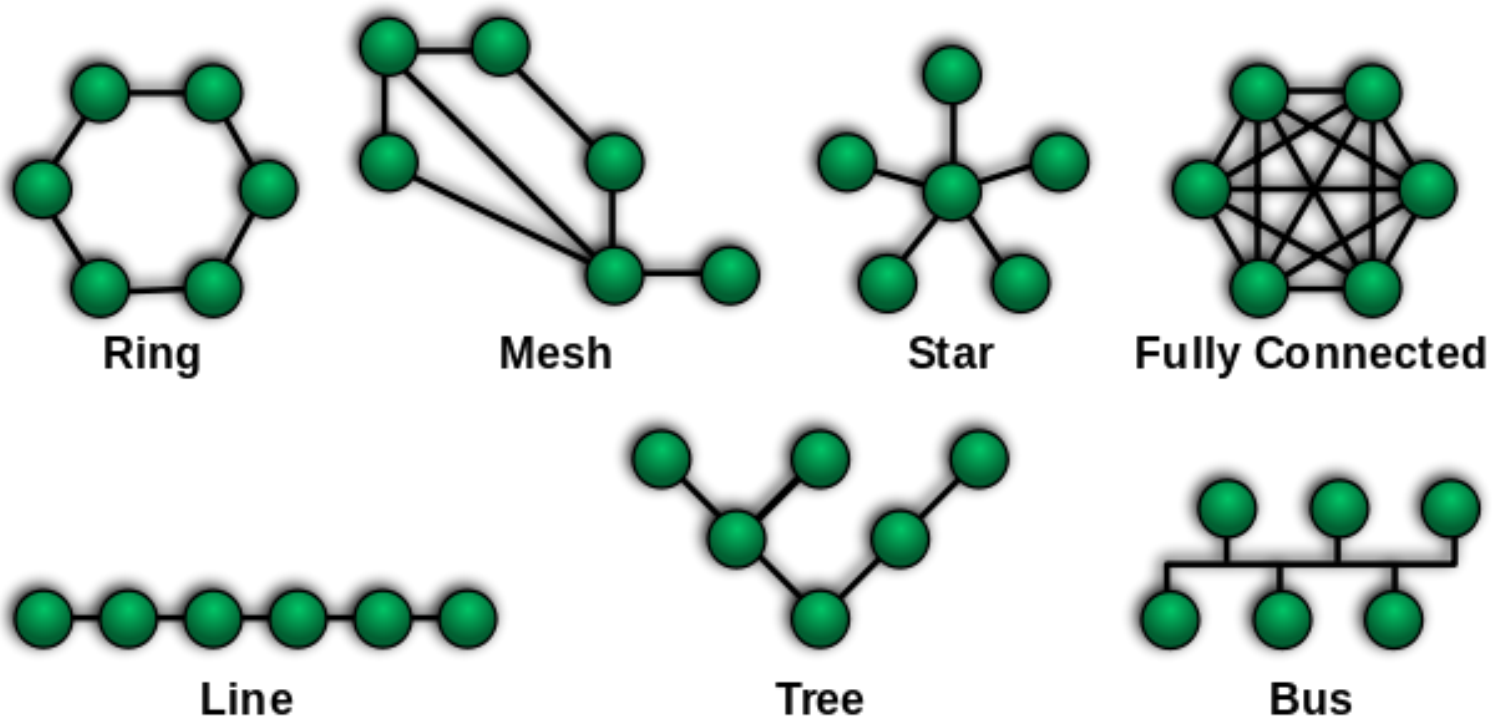

Figure: upload.wikimedia.org

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- **Tree:** hierarchical topology, such as a binary tree.

Bonus

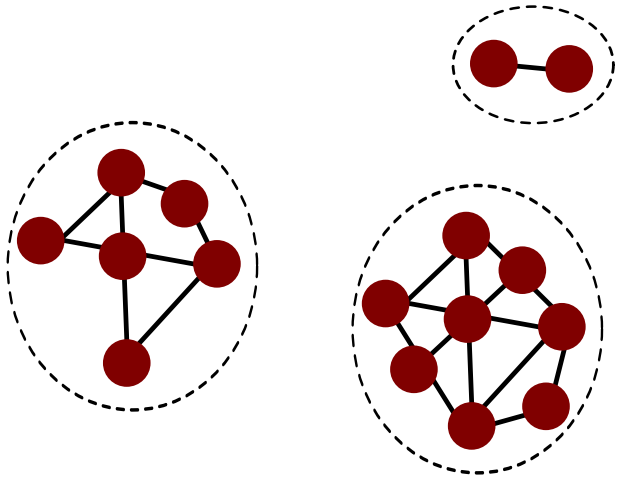

Figure: Disconnected MANET illustration [1]

Bonus

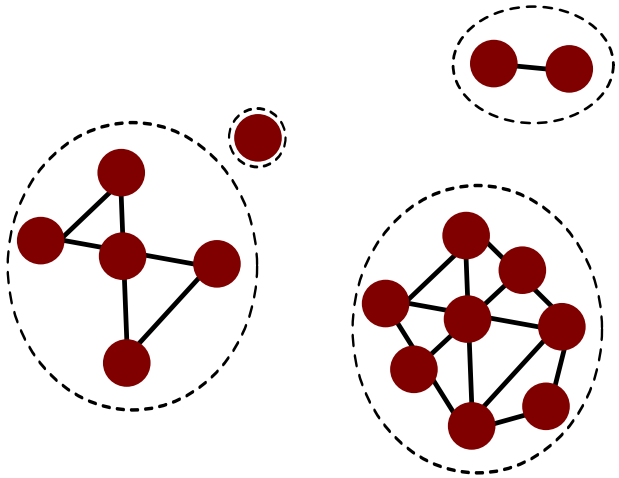

Figure: Store-carry-and-forward [1]

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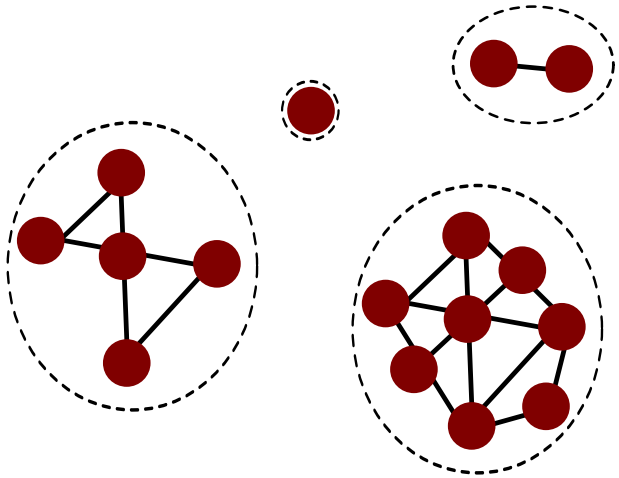

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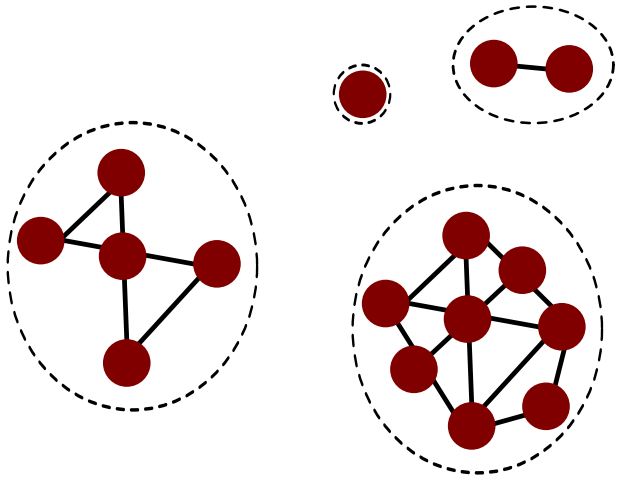

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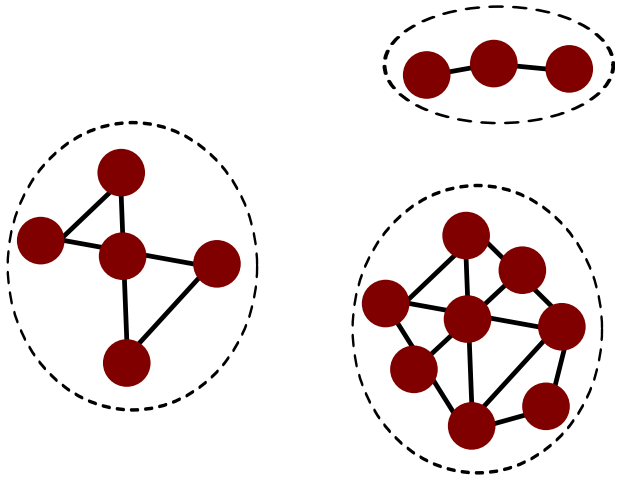

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192.168.0.48	208.67.222.222	DNS	76	Standard query 0x4797 A getbootstrap.com
208.67.222.222	192.168.0.48	DNS	108	Standard query response 0x4797 A 192.30.252.154 A 192.30.252.153

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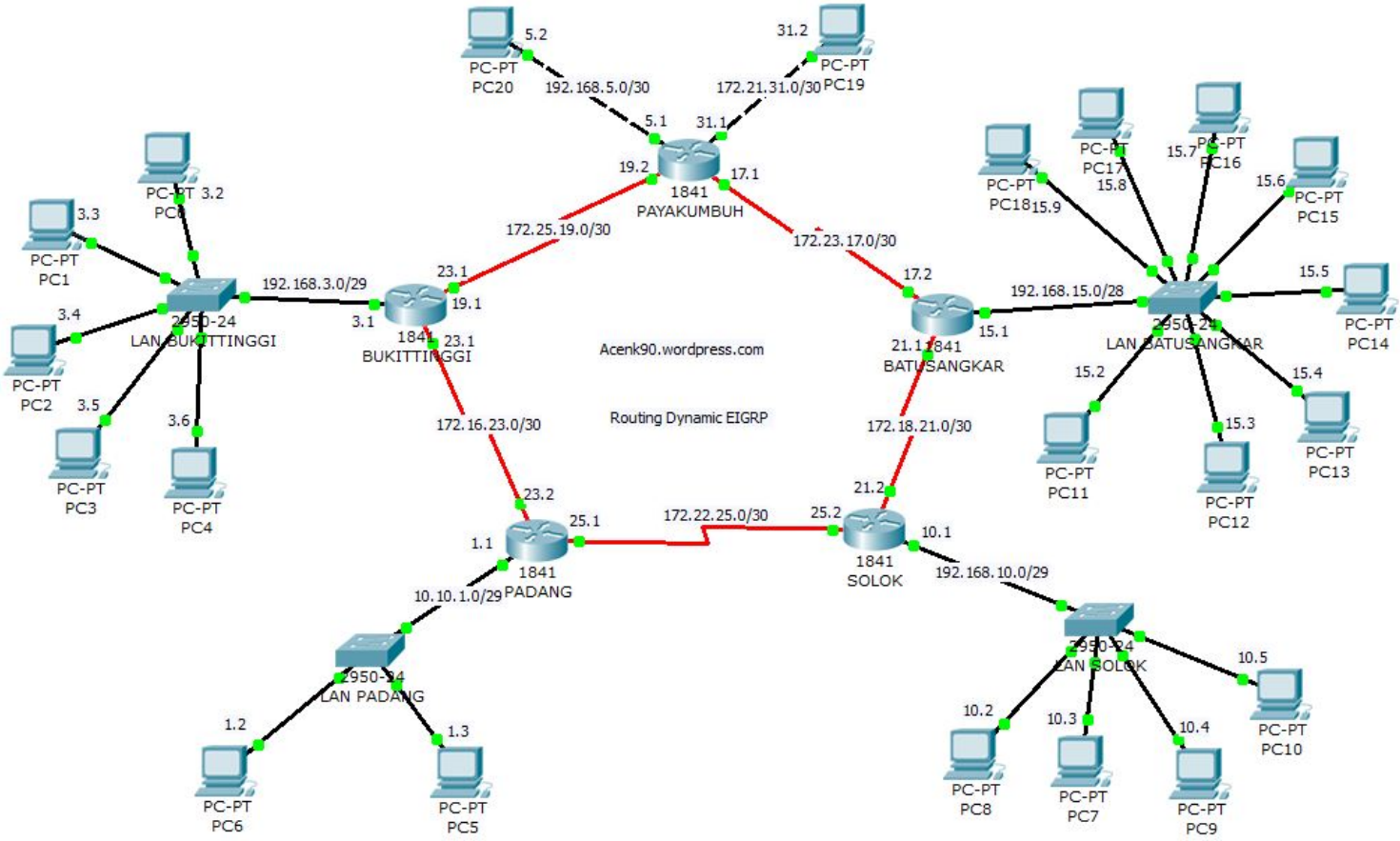
127.0.0.1	127.0.0.13	TCP	74	36159 > http [SYN] Seq=0 Win=43690 Len=0 MSS=65495 SACK_PERM=1 TSval=12
127.0.0.13	127.0.0.1	TCP	74	http > 36159 [SYN, ACK] Seq=0 Ack=1 Win=43690 Len=0 MSS=65495 SACK_PERM
127.0.0.1	127.0.0.13	TCP	66	36159 > http [ACK] Seq=1 Ack=1 Win=43776 Len=0 TSval=122257 TSecr=12225
127.0.0.1	127.0.0.13	HTTP	356	GET /index.html HTTP/1.1
127.0.0.13	127.0.0.1	TCP	66	http > 36159 [ACK] Seq=1 Ack=291 Win=44800 Len=0 TSval=122259 TSecr=122
127.0.0.13	127.0.0.1	HTTP	354	HTTP/1.1 200 OK (text/html)
127.0.0.1	127.0.0.13	TCP	66	36159 > http [ACK] Seq=291 Ack=289 Win=44800 Len=0 TSval=122259 TSecr=1
127.0.0.1	127.0.0.13	HTTP	357	GET /favicon.ico HTTP/1.1
127.0.0.13	127.0.0.1	HTTP	565	HTTP/1.1 404 Not Found (text/html)
127.0.0.1	127.0.0.13	TCP	66	36159 > http [ACK] Seq=582 Ack=788 Win=45952 Len=0 TSval=122269 TSecr=1

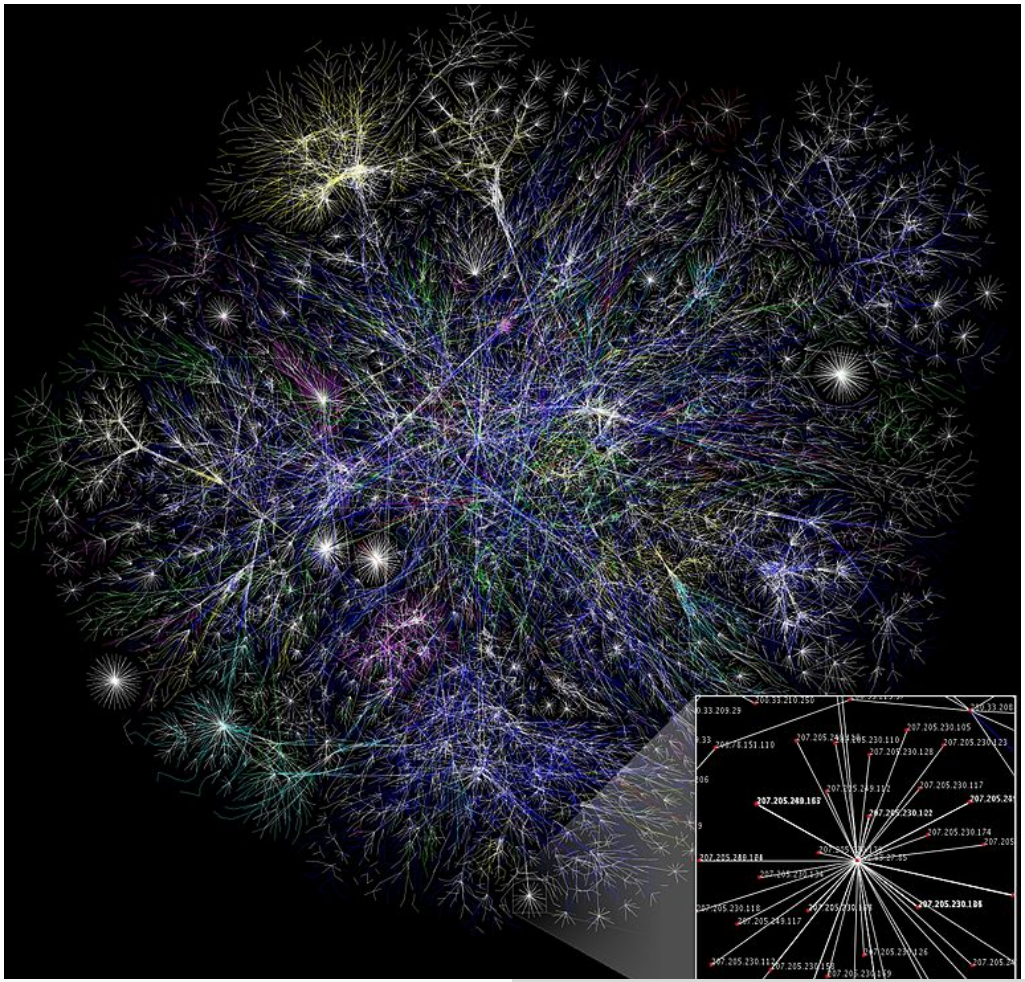
Figure: HTTP request/response

How do messages reach their destination?

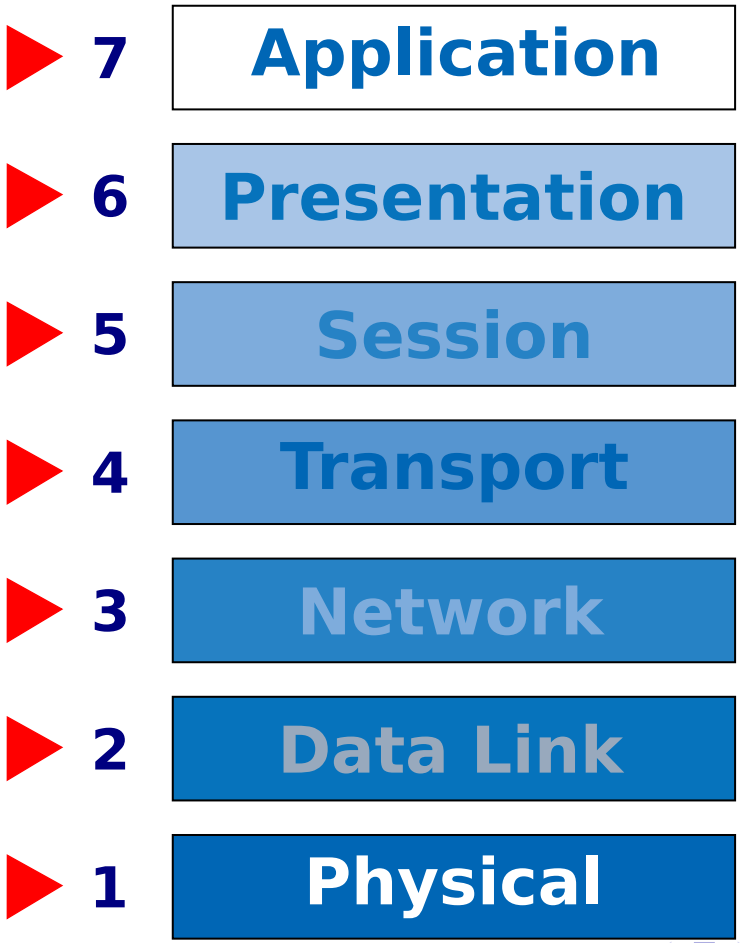


Topology Jaringan Menggunakan Routing Dynamic EIGRP Pada Cisco Router

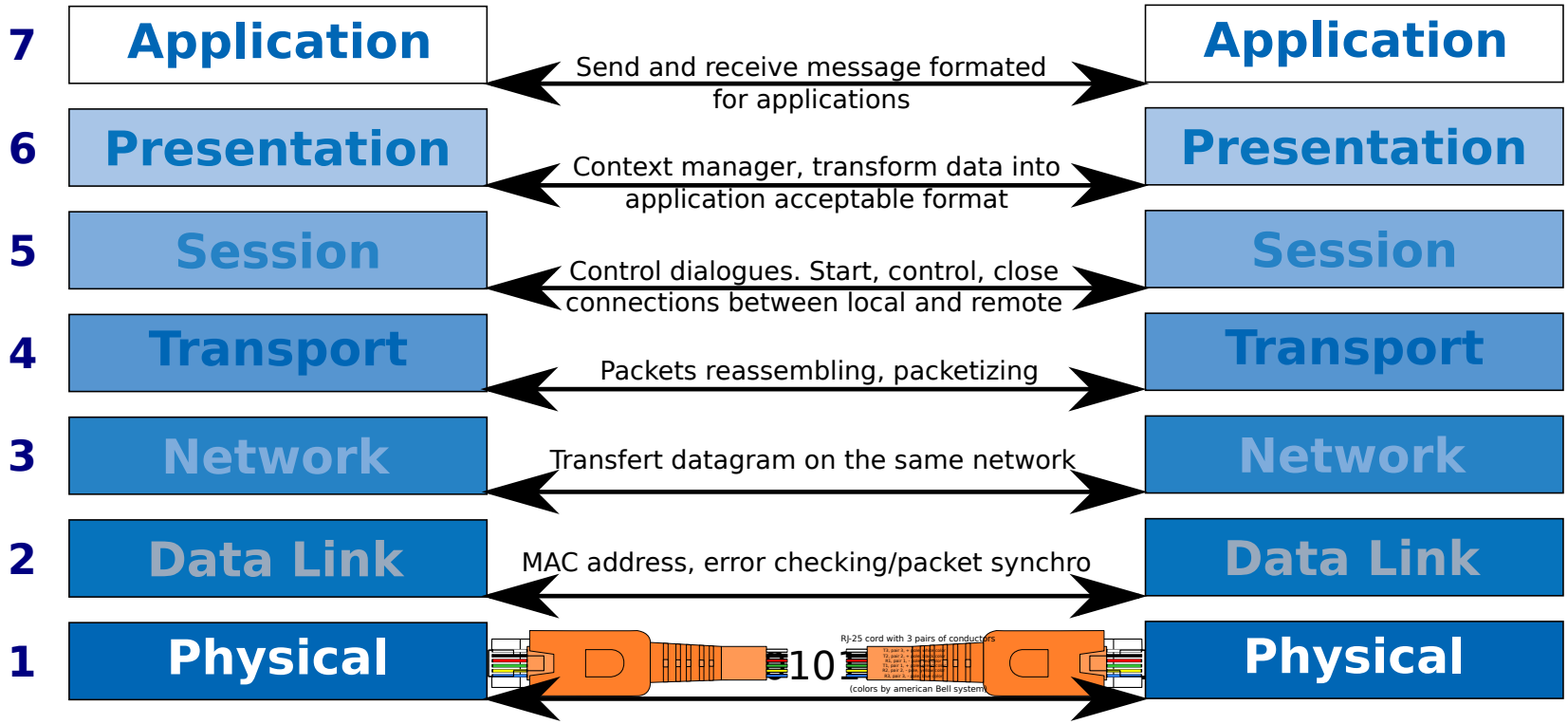
More like this...



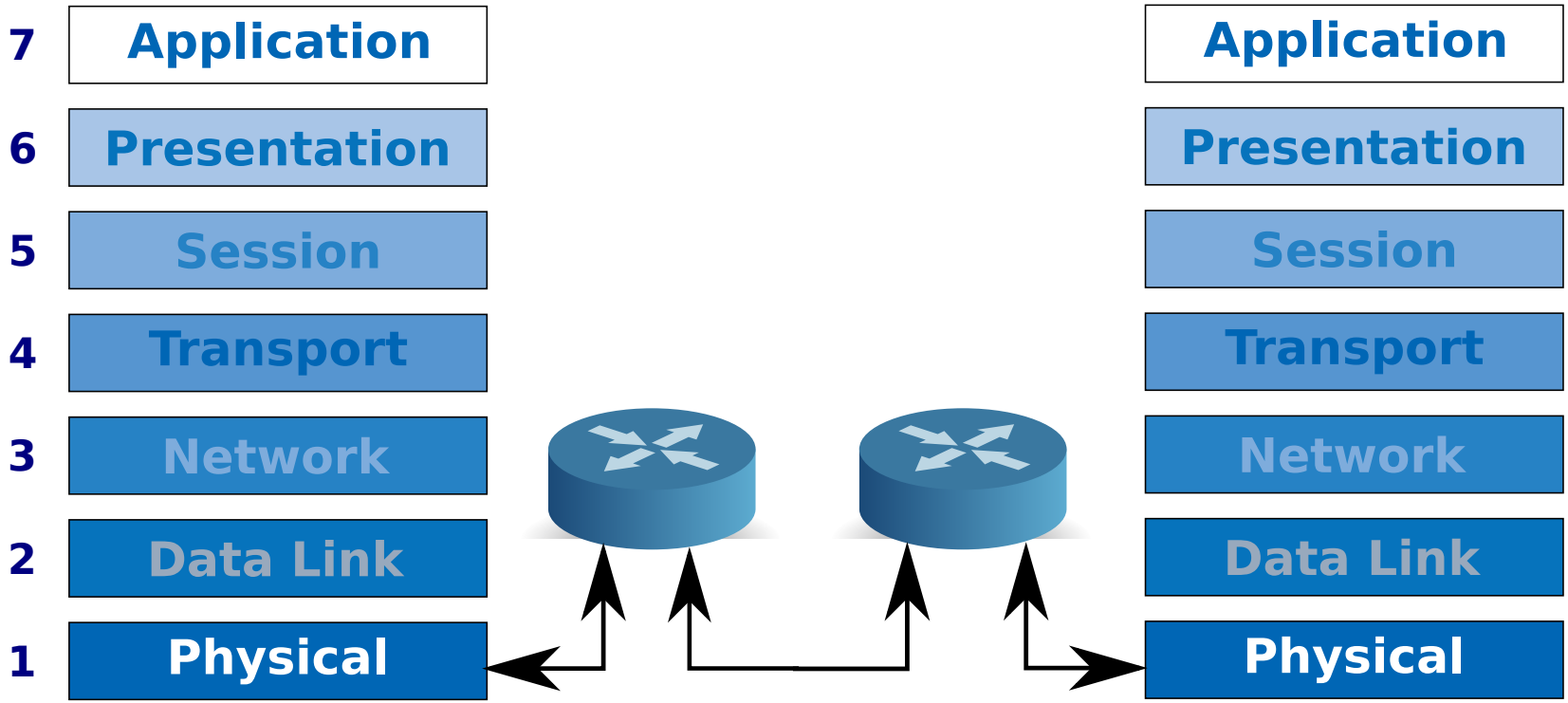
How does it work? From signal to application...



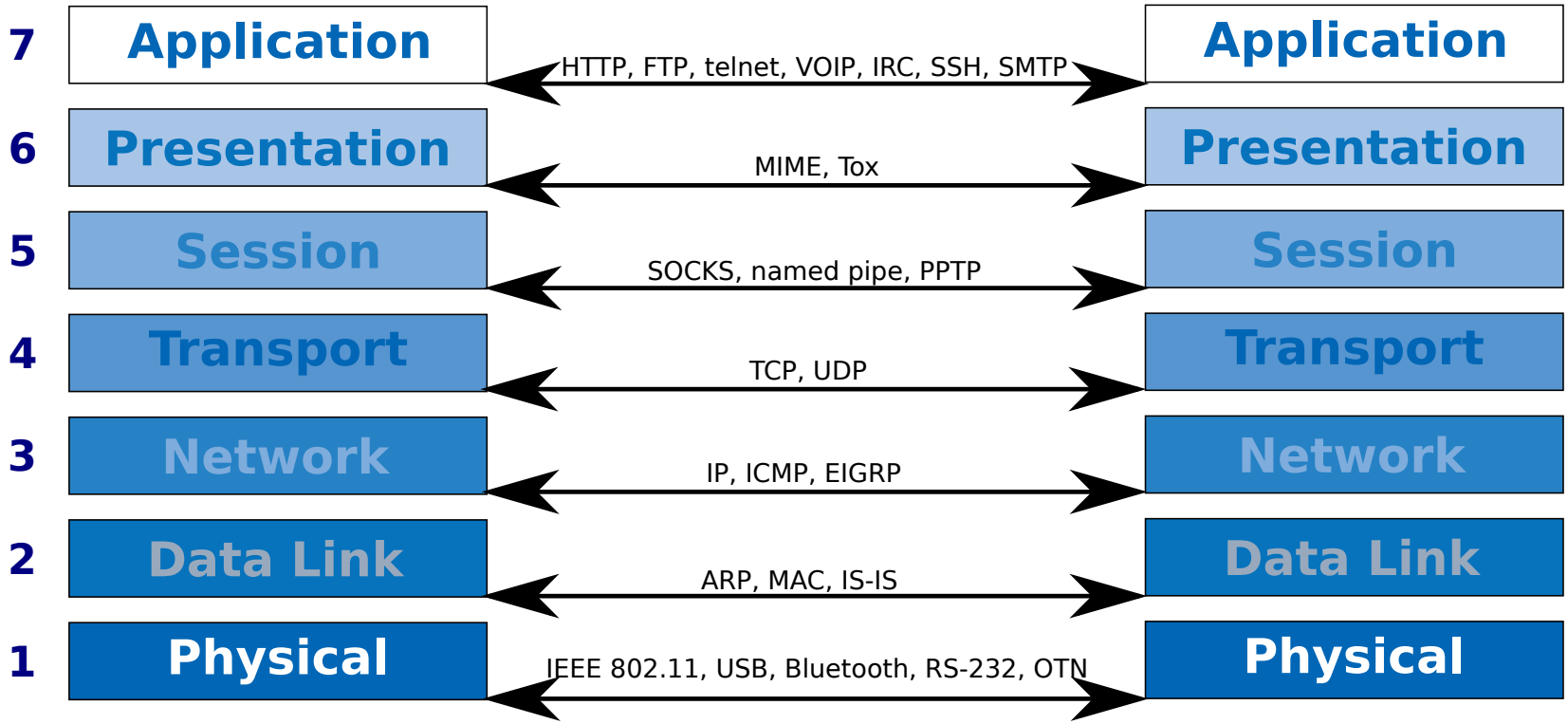
N^{th} layer communicate with N^{th} layer..



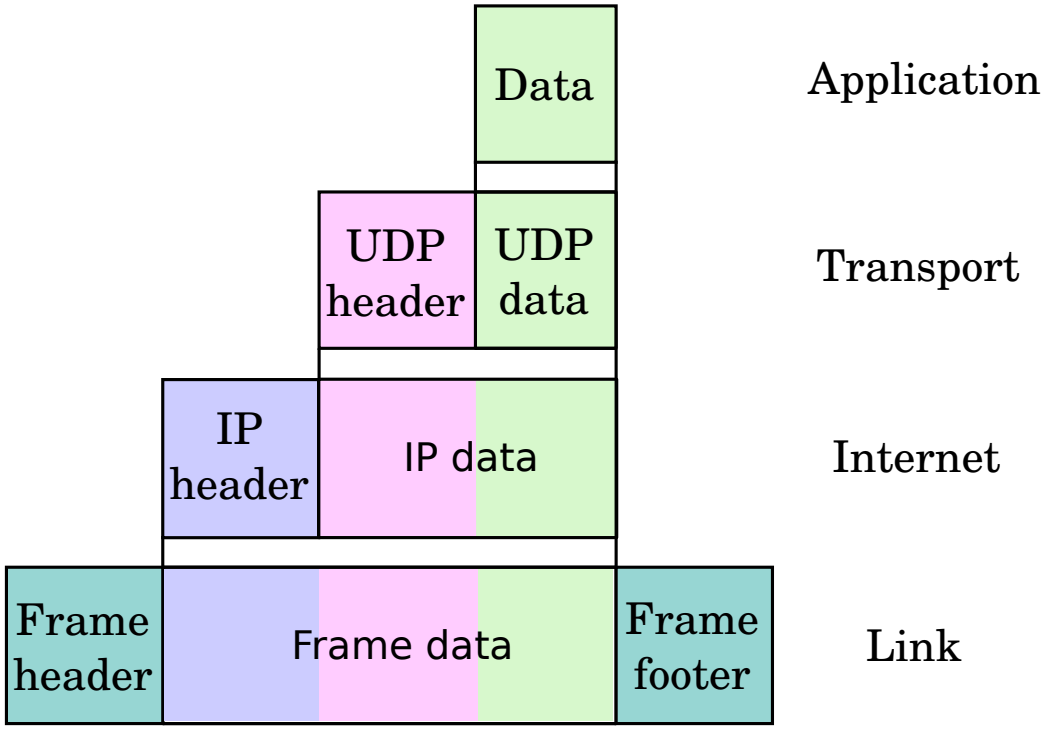
.. thanks to 3-th layers



One single protocol, one single layer



Encapsulation



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Presentation Outline

Aims

- Interface data link layer,

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- (De)Encode,

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- Transmit: 1 after 0 (after 0 or 1, after 0... or 1)

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- IEEE 802.16 (a.k.a. Wi-Max): ¡40 Mbit/s
- IEEE 1394 (a.k.a. Firewire): ¡3200 Mbit/s

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Maurice J. Khabbaz, Assi Chadi M., and Fawaz Wissam F.
Disruption-Tolerant Networking: A Comprehensive Survey on Recent Developments and Persisting Challenges.
IEEE communications surveys and tutorials, 2012.