Tækniskólinn
skóli atvinnulífsins

Implementing IPv4

Module Overview

- The TCP/IP Protocol Suite
- Protocols in the TCP/IP Suite
- TCP/IP Applications
- What Is a Socket?

Lesson 1:Overview of TCP/IP

- The TCP/IP Protocol Suite
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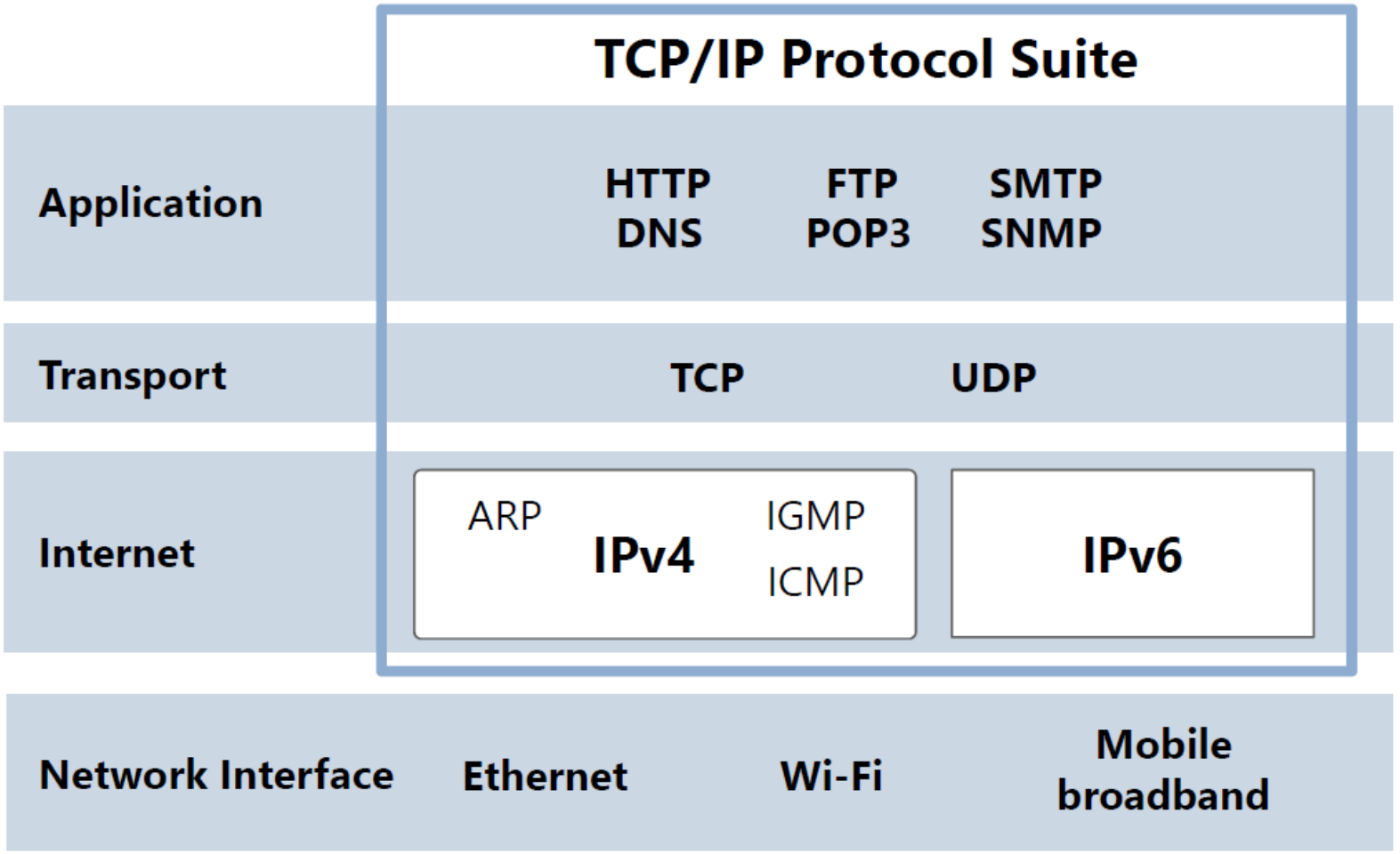
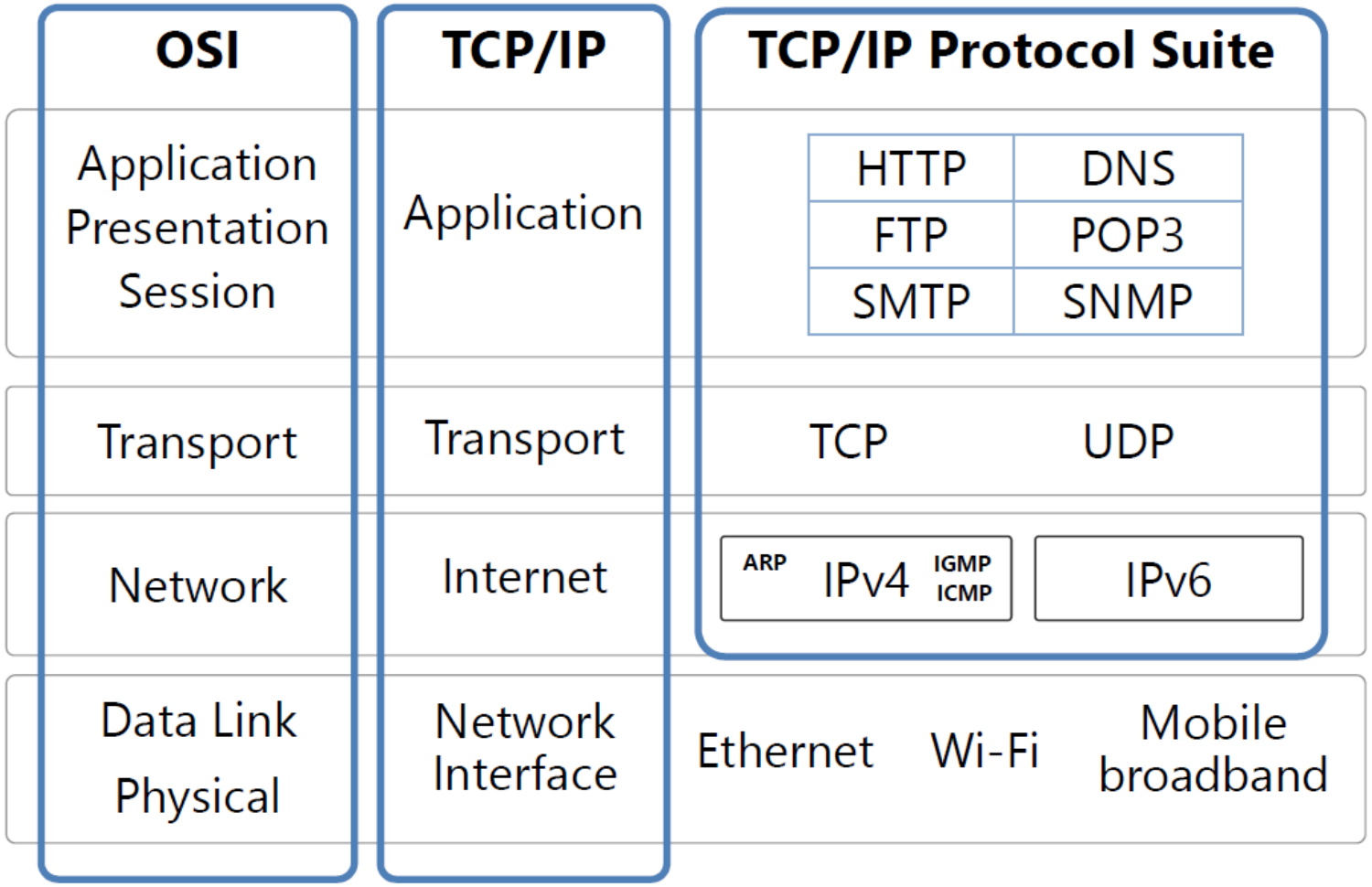
The TCP/IP Protocol Suite



Protocols in the TCP/IP Suite



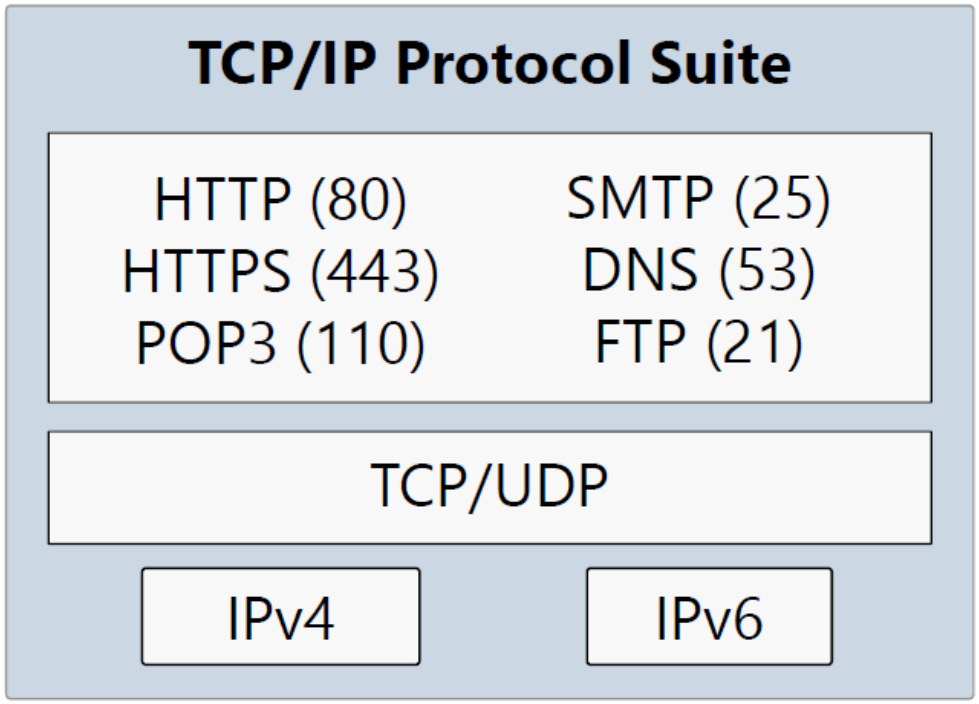
TCP/IP Applications

Some common application layer protocols:

- HTTP
- HTTPS
- FTP
- RDP
- SMB
- SMTP
- POP3

What Is a Socket?

A socket is a combination of an IP address, a transport protocol, and a port



Lesson 2: Understanding IPv4 Addressing

- IPv4 Addressing
- Public and Private IPv4 Addresses
- How Dotted Decimal Notation Relates to Binary Numbers
- Simple IPv4 Implementations
- More Complex IPv4 Implementations

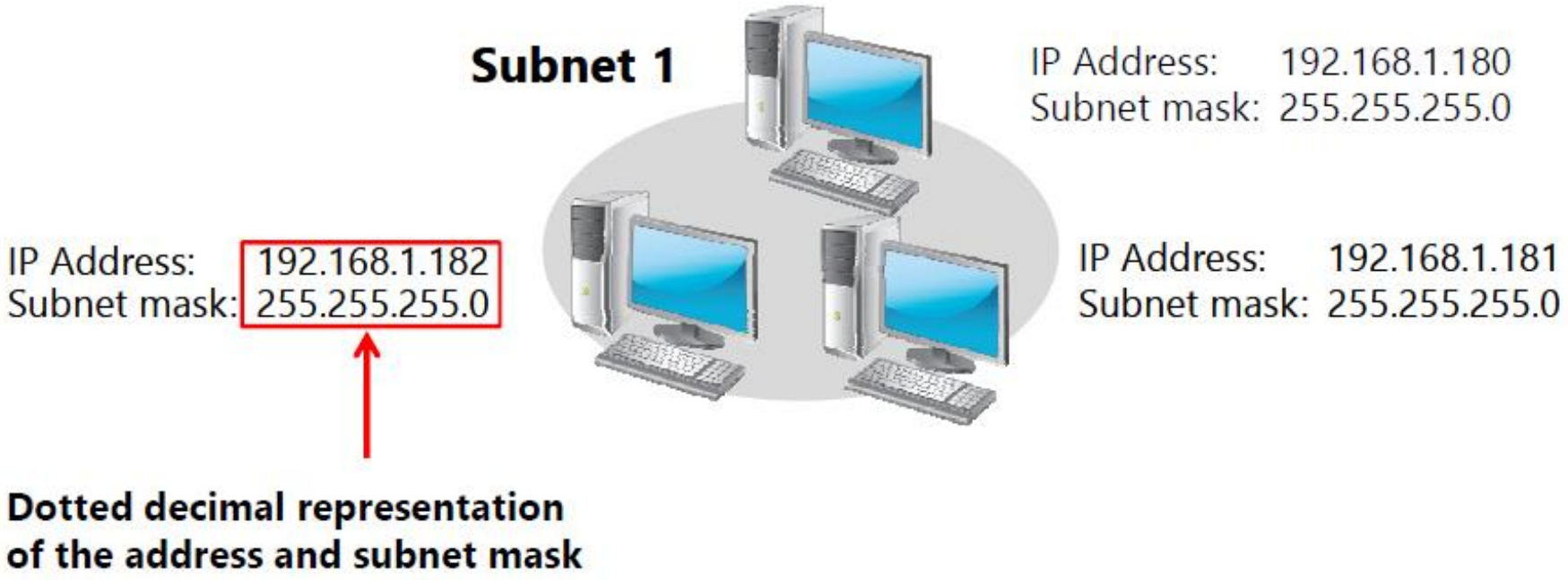
IPv4 Addressing

- Each networked computer must be assigned a unique IPv4 address
- Network communication for a computer is directed to the IPv4 address of the computer
- Each IPv4 address contains: Network ID, identifying the network Host ID, identifying the computer
- The subnet mask identifies which part of the IPv4 address is the network ID (255) and the host ID (0)

IP address	**172**	**16**	**0**	**10**
Subnet mask	255	255	0	0
Network ID	**172**	**16**	0	0
Host ID	0	0	**0**	**10**

IPv4 Addressing

An IPv4 configuration identifies a computer to other computers on a network



IPv4 Addressing

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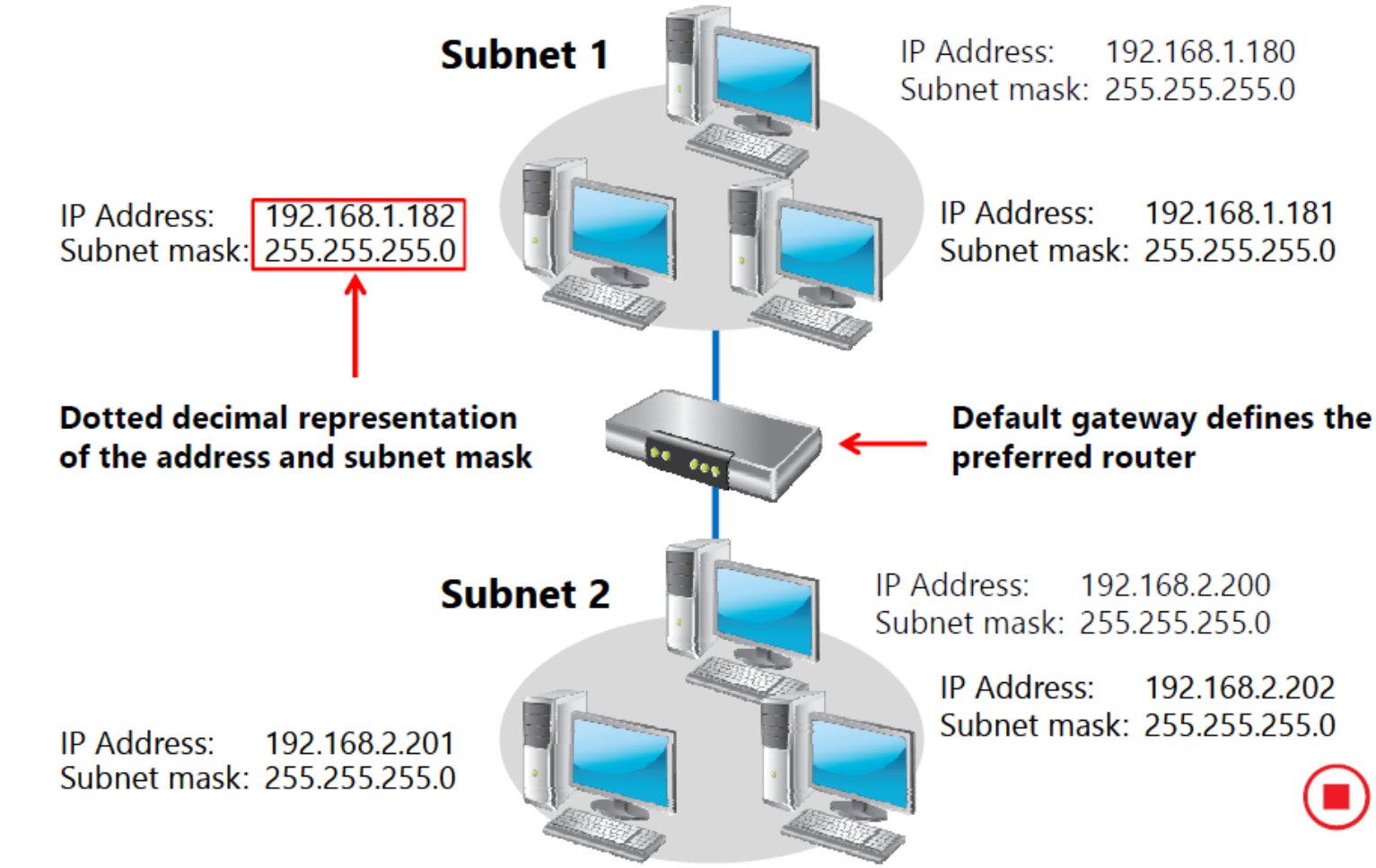


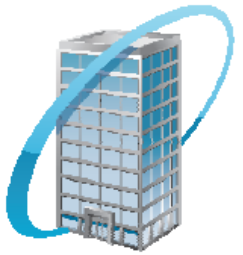
Public and Private IPv4 Addresses

Public

- Required by devices and hosts that connect directly to the Internet
- Must be globally unique
- Routable on the Internet
- Must be assigned by IANA/RIR

Private

- Not routable on the Internet
  - 10.0.0.0/8
  - 172.16.0.0/12
  - 192.168.0.0./16
- Can be assigned locally by organization
- Must be translated to access the Internet



How Dotted Decimal Notation Relates to Binary Numbers

Dotted decimal notation is based on the decimal number system, but computers use IP addresses in binary

- Within an 8-bit octet, each bit position has a decimal value
  - A bit that is set to 0 always has a zero value
  - A bit that is set to 1 can be converted to a decimal value
  - The low-order bit represents a decimal value of 1
  - The high-order bit represents a decimal value of 128

- If all bits in an octet are set to 1, then the octet's decimal value is 255, the highest possible value of an octet:
- 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1

How Dotted Decimal Notation Relates to Binary Numbers