

IoT Workshop

Trygve Laugstøl <trygvis@trygvis.io>

What is IoT

What is IoT

- ▶ Not “a computer connected to the internet”
 - ▶ Then it is really just another computer connected to the internet
- ▶ Must be something else
 - ▶ It is simply devices that are resource constrained
 - ▶ Usually in more than one way
- ▶ Autonomous operation, the connection might not be permanent

IoT is just a concept

- ▶ *The Internet of Things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data.*¹

¹Wikipedia "Internet of Things"

What is an IoT Device?

- ▶ Constrained in (one or more of):
 - ▶ Memory
 - ▶ CPU
 - ▶ Network bandwidth and/or latency
 - ▶ Storage

Going back to basics

What is the internet again?

OSI model

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

▶ [Wikipedia: OSI model](#)

▶ [Wikipedia: OSI model#Examples](#)

Layer 1: Physical Layer

- ▶ 10BASE5, 10BASE2
- ▶ 10BASE-T / 100BASE-TX / 1000BASE-TX
- ▶ 802.11a/b/g/n PHY
- ▶ RS-232

Layer 2: Data Link Layer

- ▶ Ethernet
- ▶ WiFi
- ▶ Bluetooth
- ▶ Token Ring

Layer 3: Network Layer

- ▶ IP
- ▶ ICMP
- ▶ IPX

Layer 4: Transport Layer

- ▶ TCP
- ▶ UDP

Layer 5: Session Layer

- ▶ “sockets”
- ▶ NetBIOS

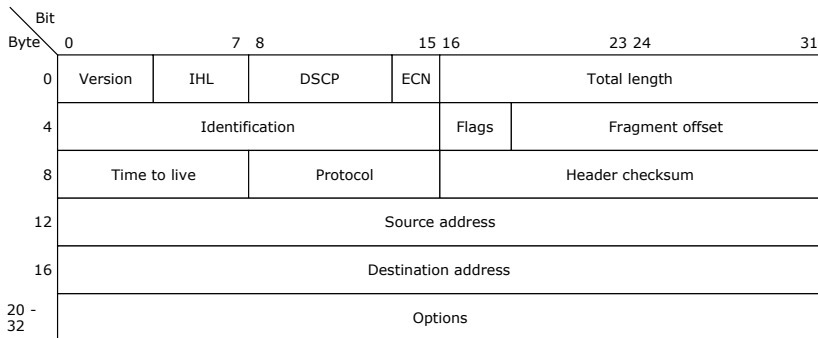
Layer 6: Presentation Layer

► SSL

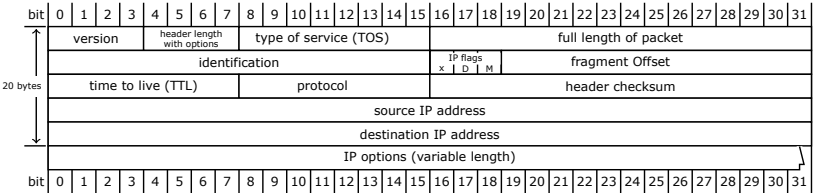
Layer 7: Application Layer

- ▶ HTTP
- ▶ MQTT
- ▶ DNS
- ▶ (everything else..)

Details: IP



Details: IP



Notes

Assignments

- ▶ Measure round trip time/latency. Measure UDP, TCP. Measure when the packet size is greater than the MTU