Teoria

Protocolos de Aplicação para projetos IoT

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Disciplina
Sistemas Distribuídos

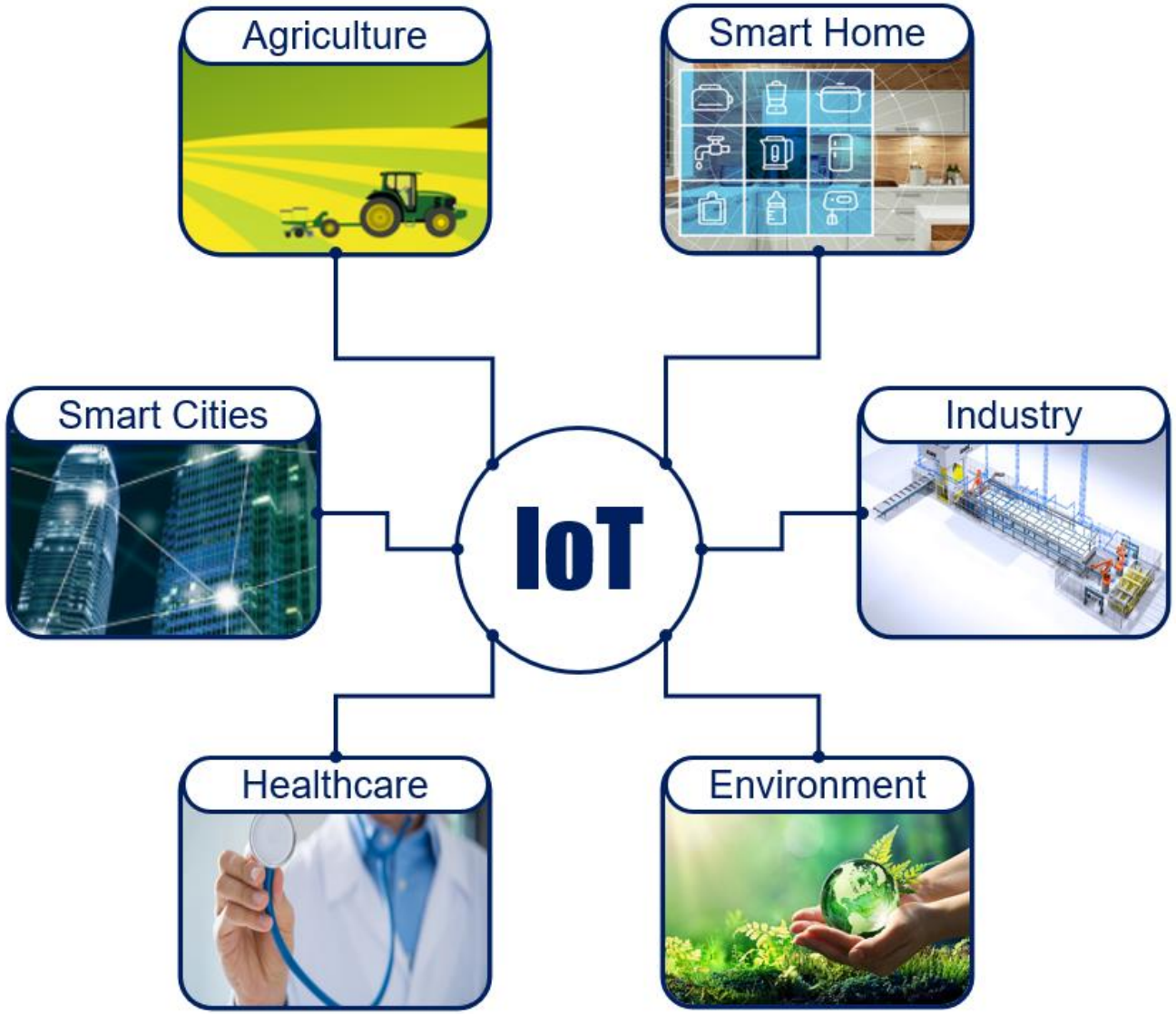
Versão:
2.0

Objetivos:

- Apresentar os conceitos de IoT
- Apresentar os principais protocolos de aplicação para projetos IoT:
  1. HTTP REST
  2. CoAP
  3. MQTT

IoT

Verticais IoT:



Arquiteturas propostas para IoT

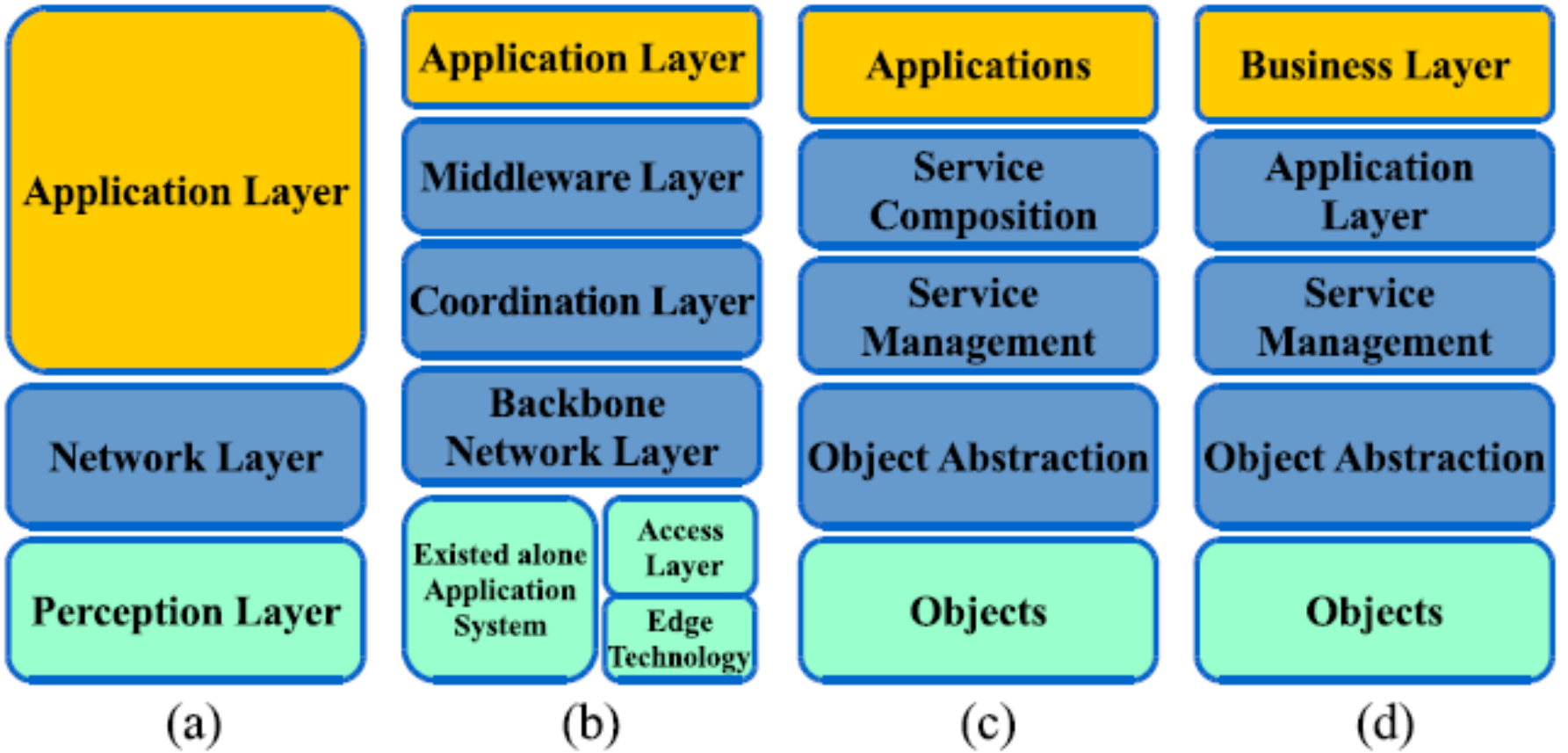
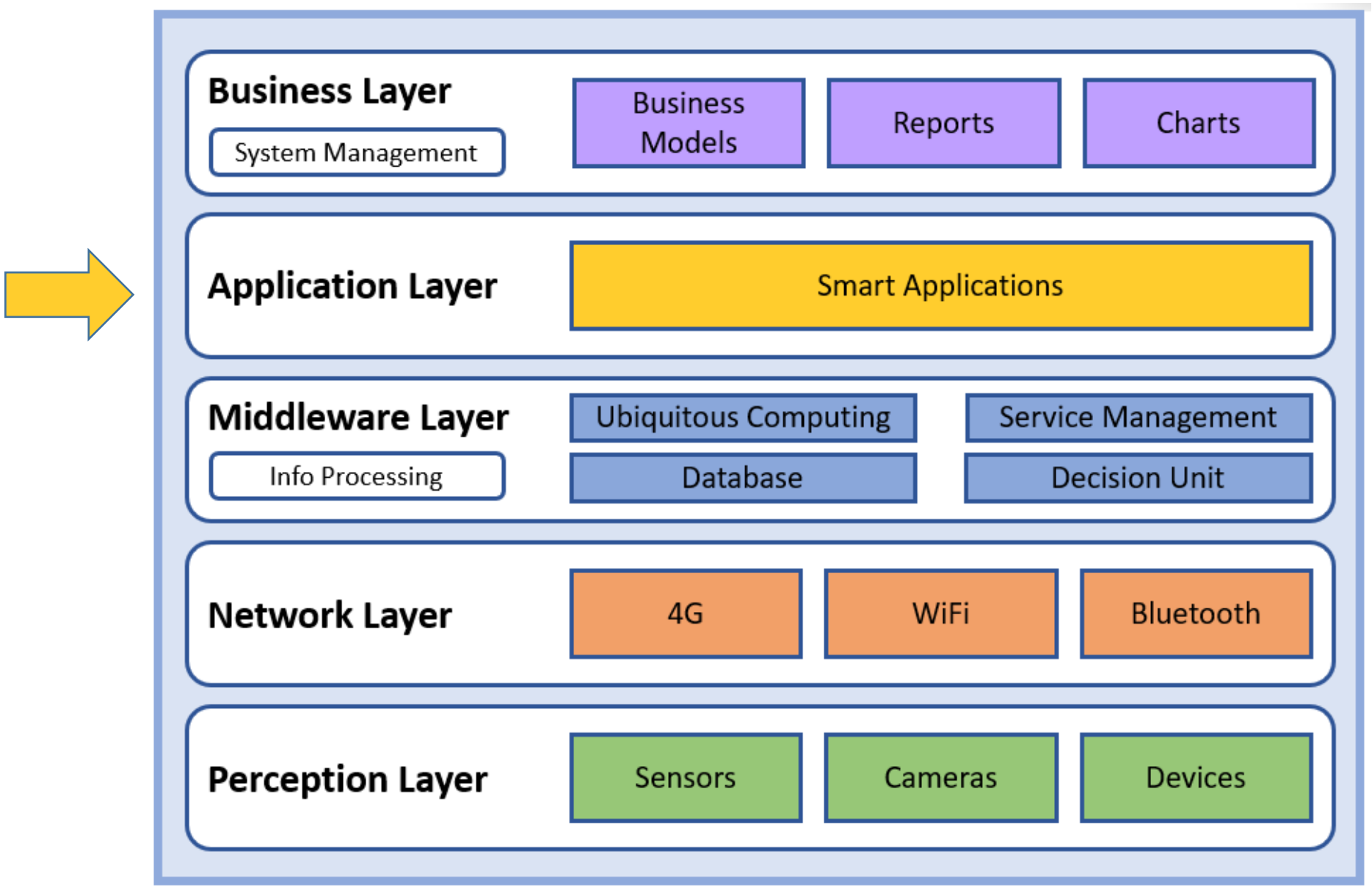


Fig. 3. The IoT architecture. (a) Three-layer. (b) Middle-ware based. (c) SOA based. (d) Five-layer.

Arquiteturas de 5 camadas

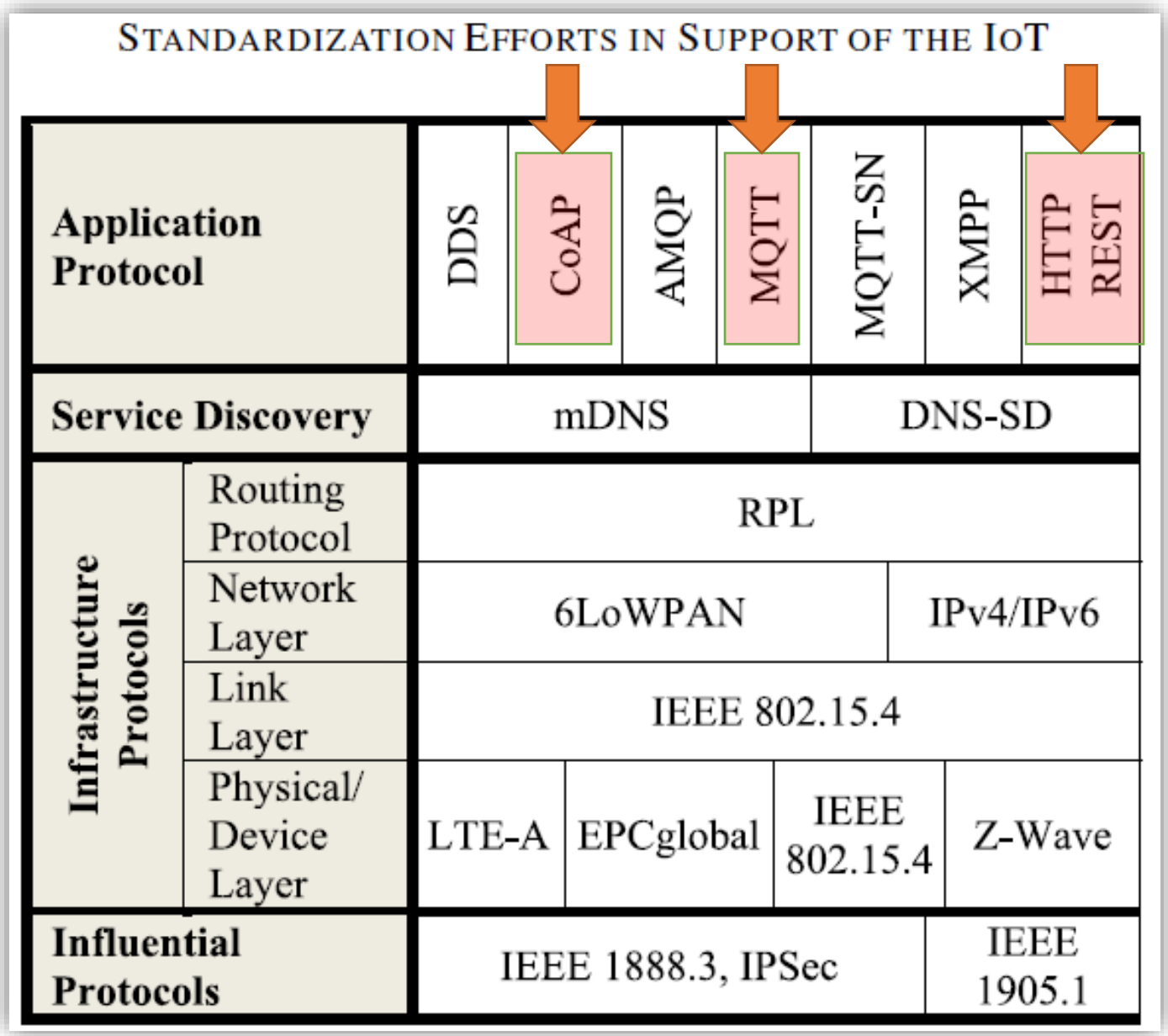


Protocolos de Infra e Protocolos de Aplicação:

STANDARDIZATION EFFORTS IN SUPPORT OF THE IOT

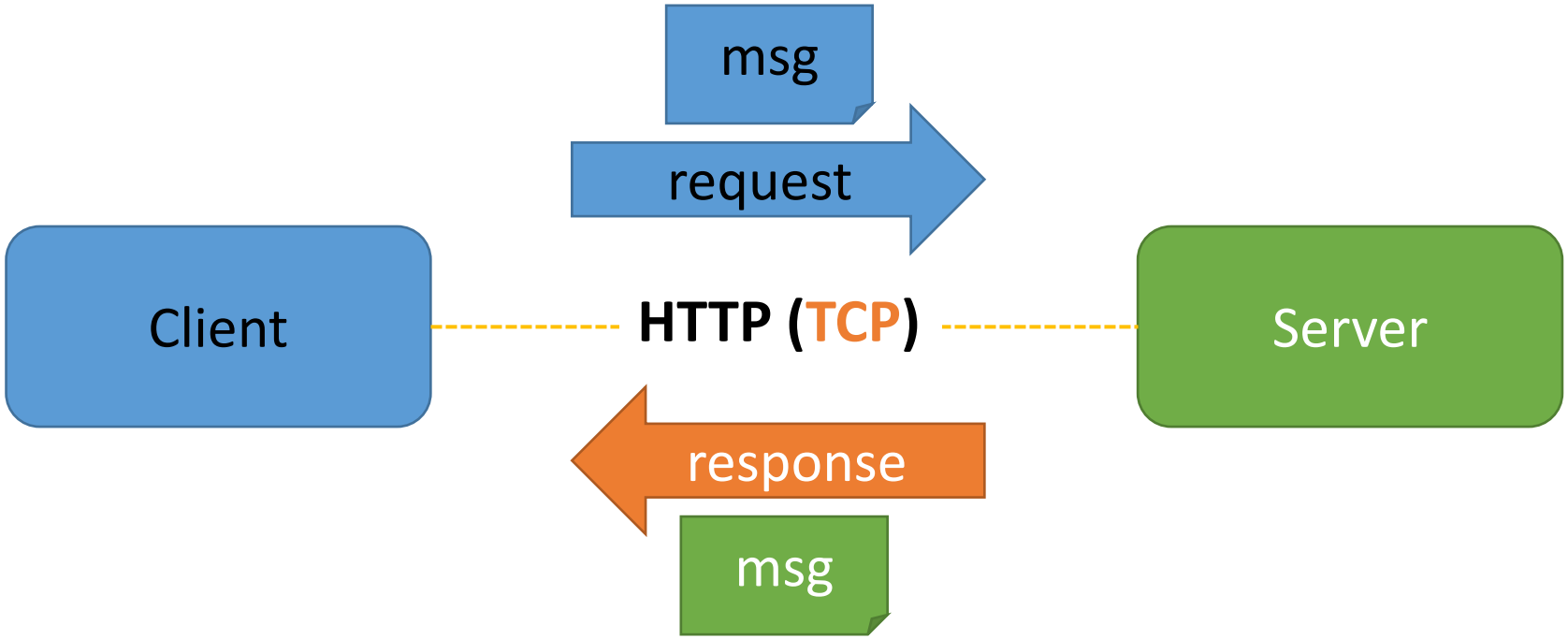
Application Protocol		DDS	CoAP	AMQP	MQTT	MQTT-SN	XMPP	HTTP REST
Service Discovery		mDNS				DNS-SD		
Infrastructure Protocols	Routing Protocol	RPL						
	Network Layer	6LoWPAN				IPv4/IPv6		
	Link Layer	IEEE 802.15.4						
	Physical/ Device Layer	LTE-A	EPCglobal	IEEE 802.15.4		Z-Wave		
Influential Protocols		IEEE 1888.3, IPSec				IEEE 1905.1		

Protocolos de Infra e Protocolos de Aplicação:



1
Http REST

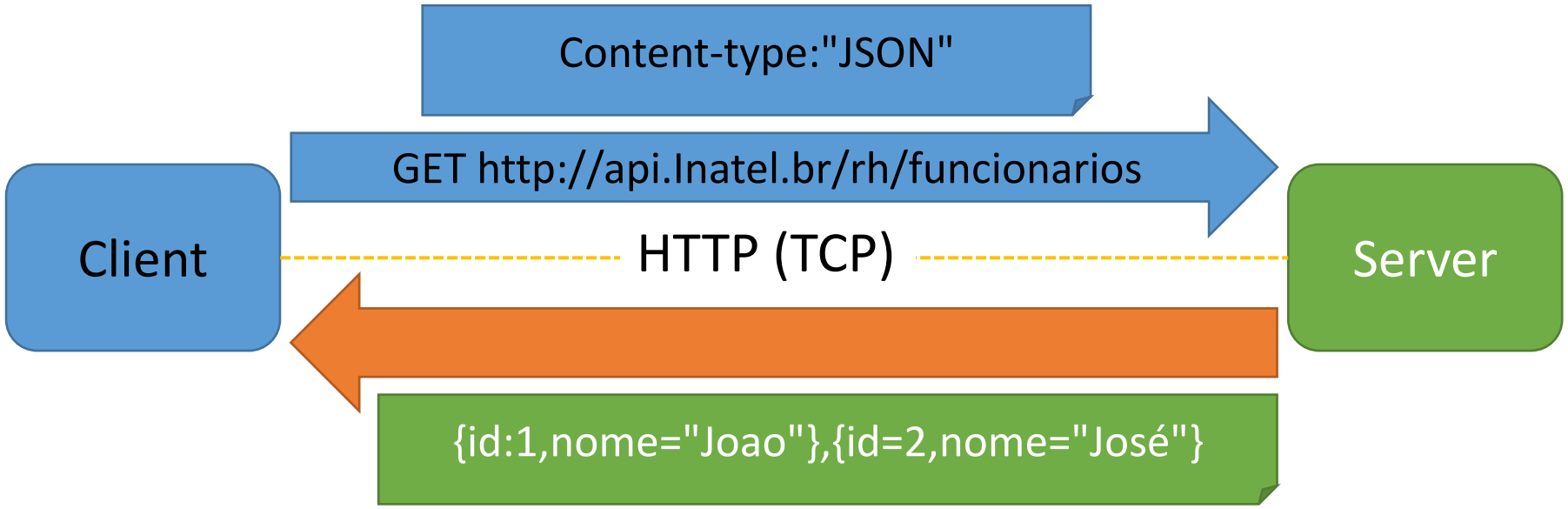
1) HTTP REST



1) HTTP REST

Representational State Transfer:

1) URL: http://api.inatel.br/erp/rh/funcionario
2) Operation: GET, PUT, POST, DELETE
3) Hypermedia: JSON, XML



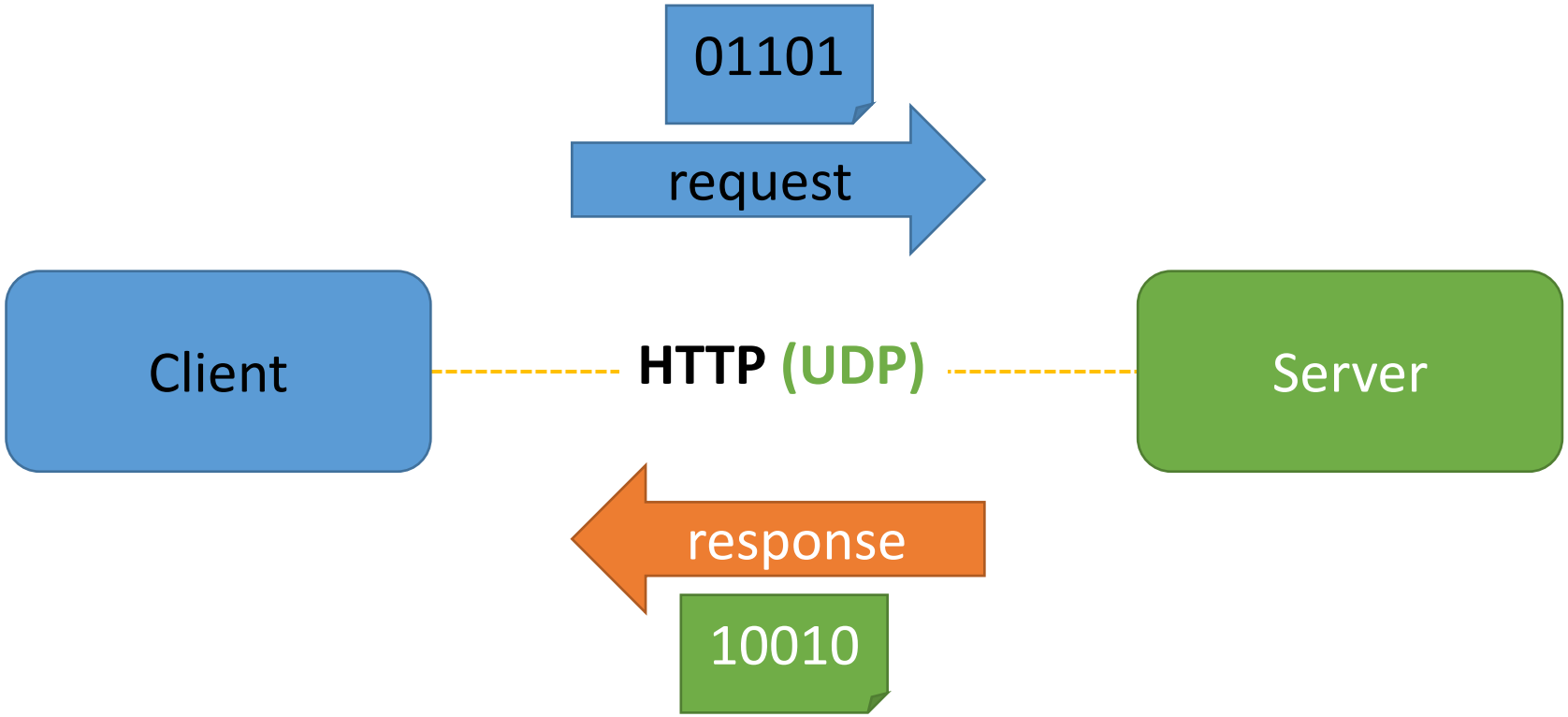
2) HTTP REST

- Features:
  - Syncronouns
  - Stateless
  - Widely supported

- Limitation:
  - Unsecure
    - HTTPS
    - Message Criptography

2
CoAP

2) CoAP – Contrained Application Protocol



2) CoAP

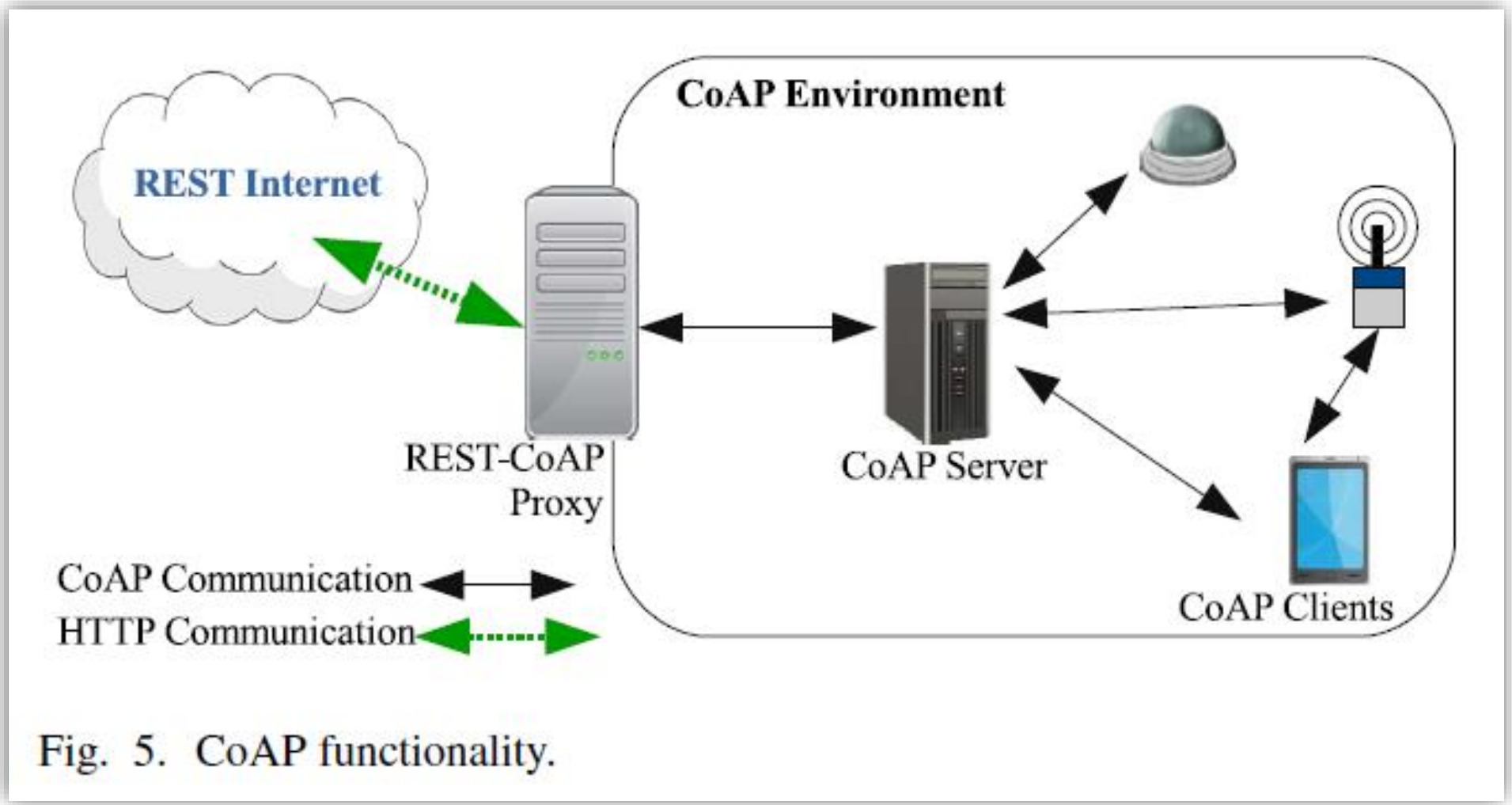


Fig. 5. CoAP functionality.

2) CoAP

- **Features**:
  - Syncronouns
  - Stateless
  - Lightweight (in relation to REST)

- **Limitation**:
  - Restrited support
  - Unsecure
  - Complexity

3
MQTT

3) MQTT: Message Queue Telemetry Transport

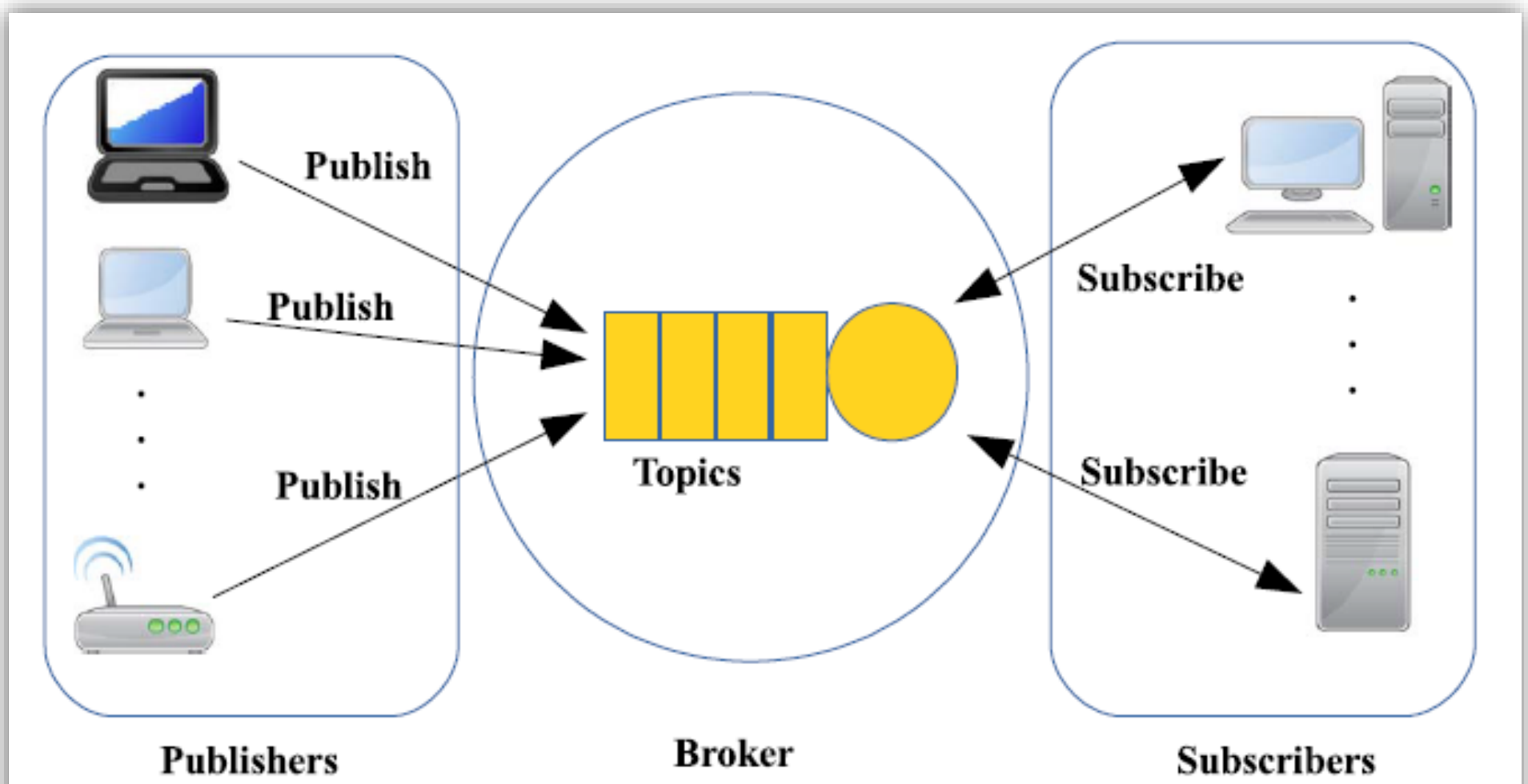


Fig. 8. The architecture of MQTT.

3) MQTT

- Features:
  - Assyncronouns
  - Lightweight (200 x 1)
  - Topic Hierarquical
    - Publish to **inatel/smartcampus/poste1**
    - Subscribe from **inatel/smartcampus/poste1**
    - Subscribe from **inatel/smartcampus/***
  - Open Source Supported:
    - Client API: **Eclipse Paho** (Java, Python, C, ...)
    - Message Broker: **Mosquito**, **RabbitMQ**

3) MQTT

- **Limitation**:
  - Unsecure
    - SSL
    - Message Criptography

Próximos Laboratórios

Comunicação Assíncrona

Configurar um servidor **MQTT**

Desenvolver cliente MQTT com **Eclipse Paho**

Configurar ambiente **Apache Kafka**

Desenvolver clientes Apache Kafka


THANK YOU