

# Urban Traffic-light Control in IoT (IoT-UTLC) Project

Aghiles DJOUDI

LIGM/ESIEE Paris

April 19, 2019

# Outline

1. Introduction

2. IoT-UTLC Project

3. Conclusion

# Context

## Introduction

### IoT Applications

- ➡ Health care
- ➡ Transportation
- ➡ Industry
- ➡ Market
- ➡ School
- ➡ Vehicles
- ➡ Smart Home
- ➡ Agriculture



Figure 1: IoT Applications

# Context

## Introduction

### IoT Applications

- ➡ Health care
- ➡ **Transportation**
- ➡ Industry
- ➡ Market
- ➡ School
- ➡ Vehicles
- ➡ Smart Home
- ➡ Agriculture



Figure 1: IoT Applications

# Outline

1. Introduction

2. IoT-UTLC Project

3. Conclusion

# Outline

1. Introduction

2. IoT-UTLC Project

3. Conclusion

1. Conception

2. Implementation

3. Results

# Outline

1. Introduction

2. IoT-UTLC Project

3. Conclusion

1. Conception

2. Implementation

3. Results

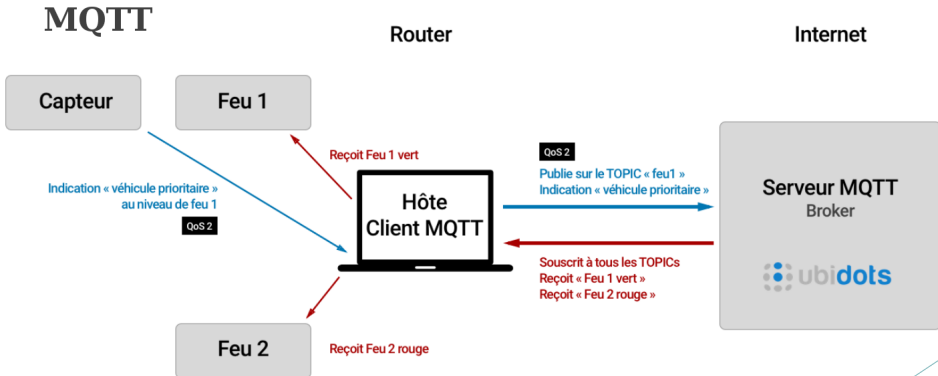


Figure 2: Plateforme UTLC



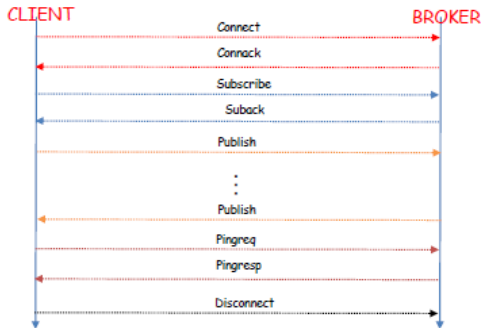


Figure 3: Publish and Subscribe

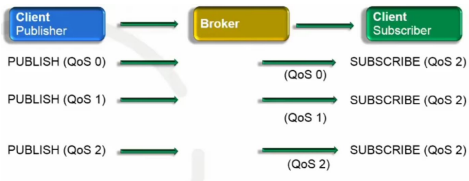


Figure 4: Publish and Subscribe

# Outline

1. Introduction

2. IoT-UTLC Project

3. Conclusion

1. Conception

2. Implementation

3. Results

# Technical choice

## Implementation

### ➡ ZOLERTIA RE-MOTE

- ➡ Low consumption component
- ➡ ADC port for placing sensors on it

### ➡ CONTIKI OS

- ➡ Operating system for wireless and low power development
- ➡ Support for newer standards (6LowPAN, RPL, CoAP, MQTT)

### ➡ 6LowPAN

- ➡ Based on IPv6 and IEEE 802.15.4
- ➡ IPv6-based network with low power consumption
- ➡ Ability to create a mesh network

### ➡ Sending packages

- ➡ UDP in the 6LowPAN network
- ➡ MQTT between the cloud platform and the router



# Outline

1. Introduction

2. IoT-UTLC Project

3. Conclusion

1. Conception

2. Implementation

**3. Results**

# Results

## Comparison

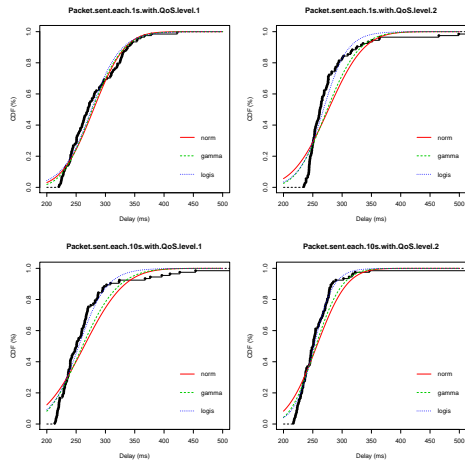


Figure 5: Distributions

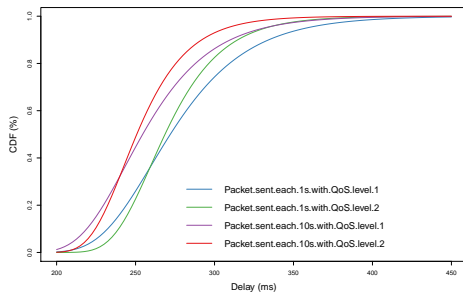


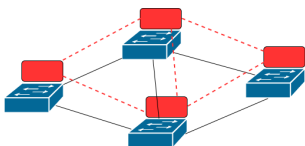
Figure 6: CDF comparison

# Outline

1. Introduction
2. IoT-UTLC Project
- 3. Conclusion**

# Conclusion

Traditional Network Architecture



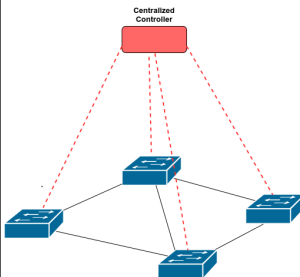
Physically  
Coupled in  
the Same  
Hardware



**Control Plane:** Complex Distributed Algorithm for Establishing Route

**Data Plane:** Simple Packet Forwarding

SDN Network Architecture



**Data Plane:** Fast, Dump, Flow Based Switches

**Control Plane:** Physically separated, programmable, smart and centralized controller

Figure 7: Traditional vs SDN Network

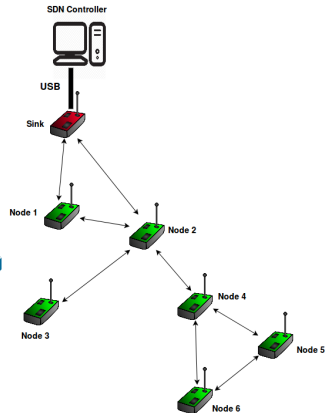


Figure 8: SDN-Controller



# Conclusion

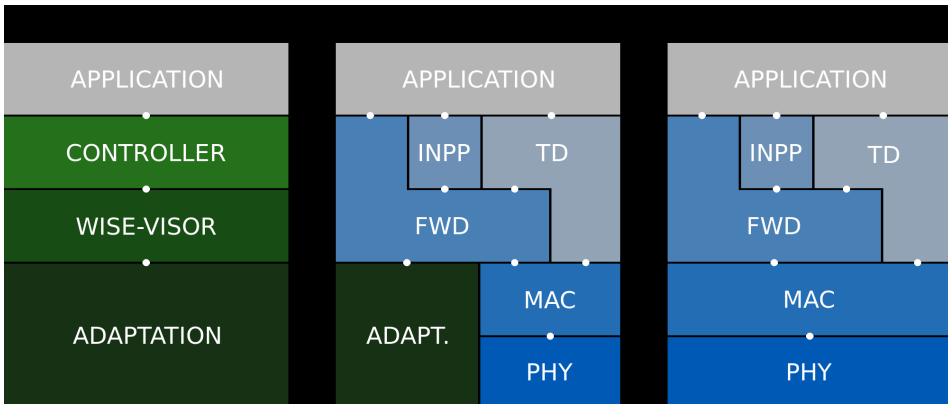


Figure 9: SDN-WISE

# Conclusion

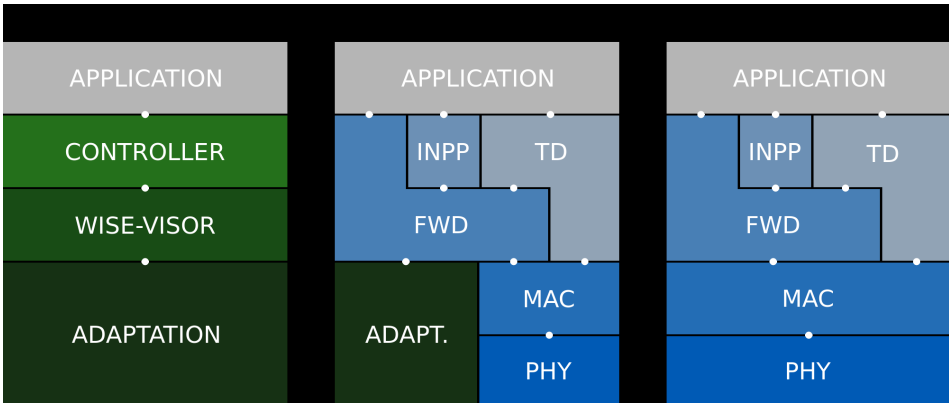


Figure 9: SDN-WISE

Thank you !

# Outline

- 1. Introduction
- 2. IoT-UTLC Project
  - 1. Conception

- 2. Implementation
- 3. Results
- 3. Conclusion

## References