JOURNAL OF APPLIED
COMPUTER SCIENCE
Vol. xx No. xx (xxxx), pp. xx–xx

Object-Oriented Internet - Azure interoperability

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Abstract. *Each paper should be followed by a compact abstract which points to the main scopes and the results obtained by the paper. The abstract should be written with the Times New Roman font, 10 pt, justified, and with the 1cm margin both left and right side with respect to the margin of the paper. The abstract should not contain any formulas or references, and should not exceed 200 words.*
Keywords: *Azure, Cloud Computing, Object-Oriented Internet, Industrial communication, Industry 4.0, Internet of Things, Machine to Machine Communication, OPC Unified Architecture*

1. Introduction

- **Subject** - A basic matter of thought, discussion, investigation, development, etc. Describe the problem and the motivation for undertaking the effort to solve the problem.

- **Goal** What we are going to achieve - the result or achievement toward which effort is directed.
- **Scope** - What we must do to prove the goal have been achieved. Extent or range of development, view, outlook, application, operation, effectiveness, etc.
- **Related work** - Any information about available reusable deliverables related to this work.

2. Azure Main Technology Features

- **Selection of the service**
- **Metadata** - must be discussed in context of the design/run time stages.
  - **Device Template (DT)**
  - **Device Capability Model**
  - **Interface**
  - **Digital Twin Definition Language (DTDL)**
- **Simple, complex and structural data processing**
- **Connectivity**
- **How to implement** All about available libraries and tools

3. OOI Main Technology Features

- Machinie To Machine communication based on the semantic data
- OOI PubSub Implementation Architecture
- Simple, complex and structural data processing

4. Azure to Sensors (A2S) connectivity deployment (field level connectivity)

The title must be revised

- **Architecture** - Domain model presenting relationship between the: Azure, PubSub Gateway, Device, Design and development tools
- **Connectivity** - Describe reactive nature of the Azure monitoring process data (telemetry) services.

- **Deployment phases**
  - Design
  - Gateway and devices registration
  - Authentication
  - Device/Service association
  - Device/Application association
  - Establishing session
    - Device/Device Template (Device Capability Model) association - establishing a semantic-context
    - Security management - establishing security-context
  - Interconnection - exchange of data
  - Maintenance

We have selected IoT Central because:

- provides process data visualization user interface
- allows to describe devices using metadata containing telemetry data types

5. Gateway implementation

- Architecture
- Protocol selection and mapping
- Configuration
- Testing

6. Conclusion

The OPC UA PubSub to Azure gateway (`AzureGateway`) implementation has been just published on GitHub as the open-source (MIT licensed) as a part of the more general concept of the Object-Oriented Internet reactive networking. It is proof of the concept that

1. OPC UA PubSub can be implemented as a powerful standalone package - no C/S dependency
2. Azure interoperability can be implemented as an out-of-band communication (MQTT, AMQP, HTTP) - no PubSub dependency
3. Process data functionality can be composable at run-time - no programming required

References