

Implementing gRPC in the TuSoW project

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What is TuSoW?¹

It's a LINDA-like tuple spaces implementation.

It is:

- Lightweight
- Modular
- Flexible
- Highly interoperable

Specifically suited for coordinating software agents in Edge Computing settings.

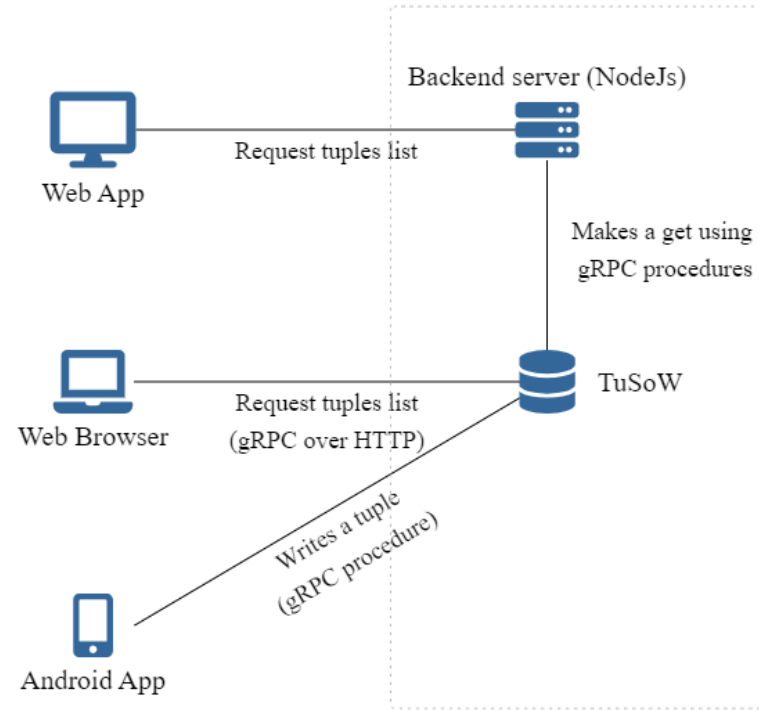
Abstract

This project aims to add a new way of remotely accessing tuple spaces by using Google Remote Procedure Call.

Goals / Requirements

- Implementing the abstract
- Modularity
- Unit testing

Possible scenarios

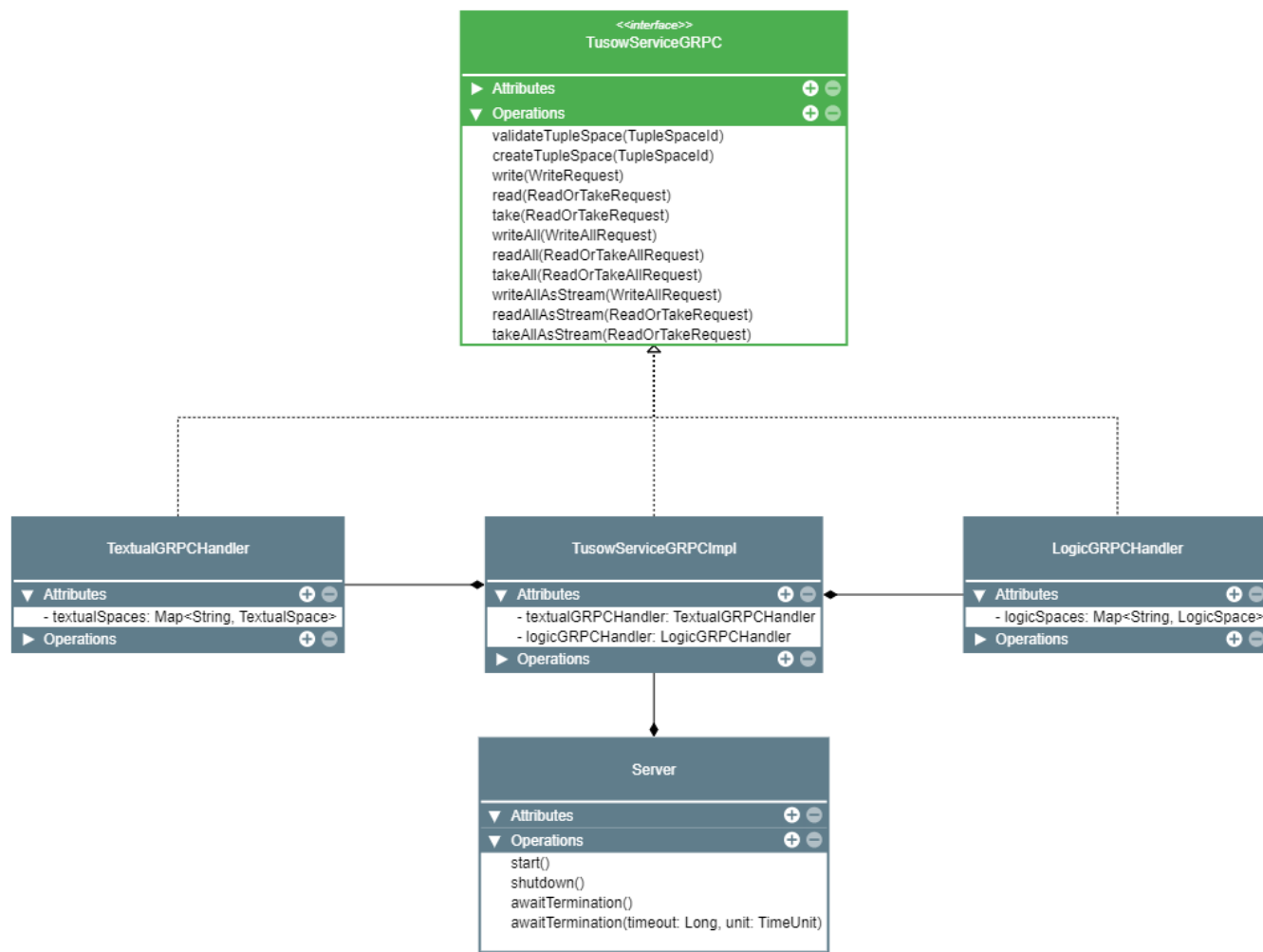


Requirements analysis

- Not altering the modular structure
- Unit testing for pull request creation
- gRPC service working must work with both logic and textual spaces
- Implement the following procedures:
 - Tuple space validation
 - Tuple space creation
 - Read
 - Take
 - Write
 - Read/write/take all
 - Read/write/take all as steam

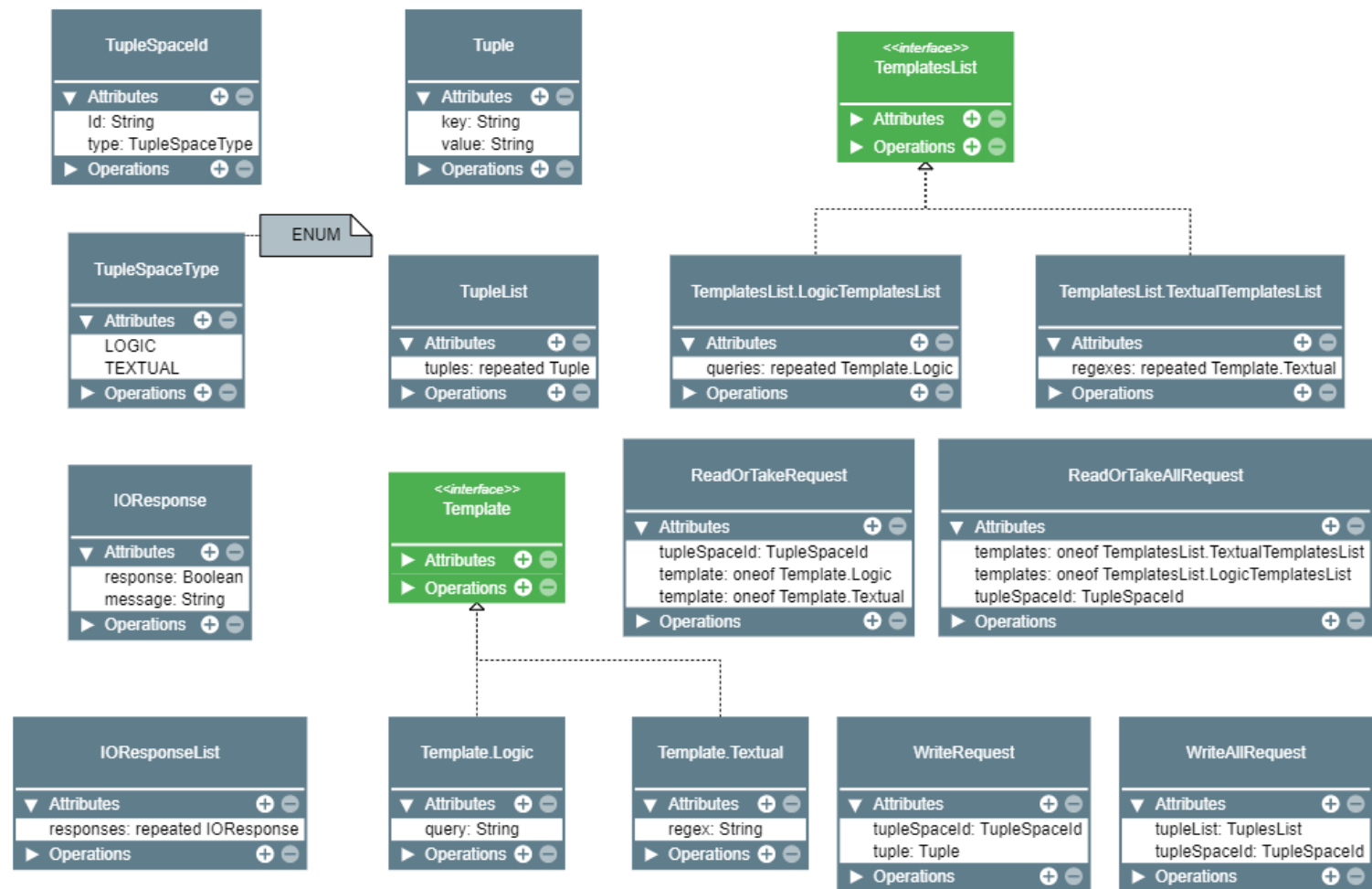
Design

Entities structure



Design

Messages structure



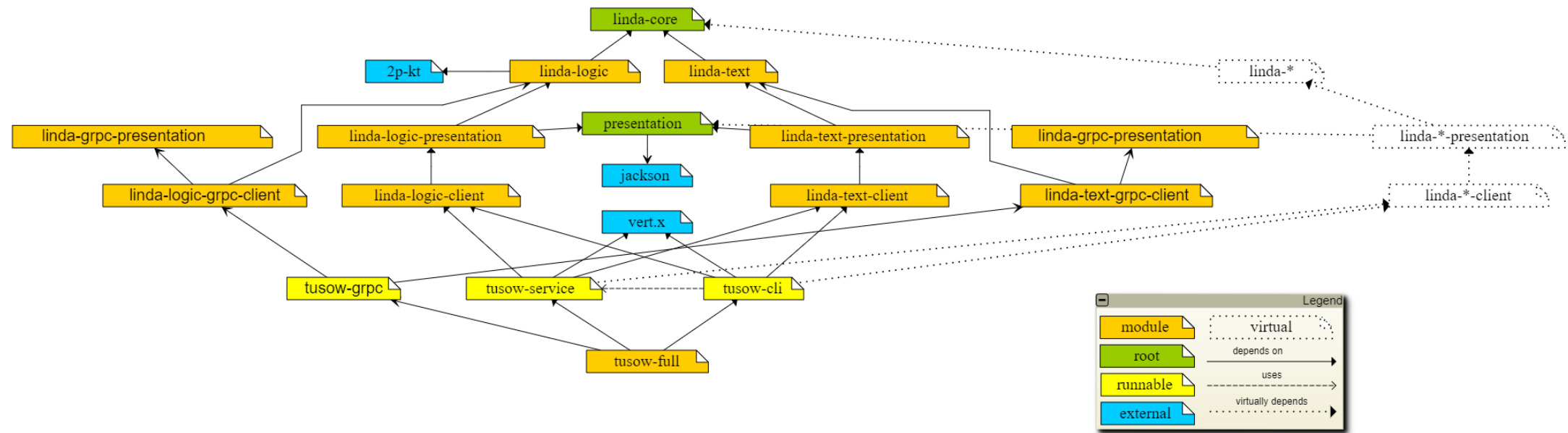
Design

Service structure

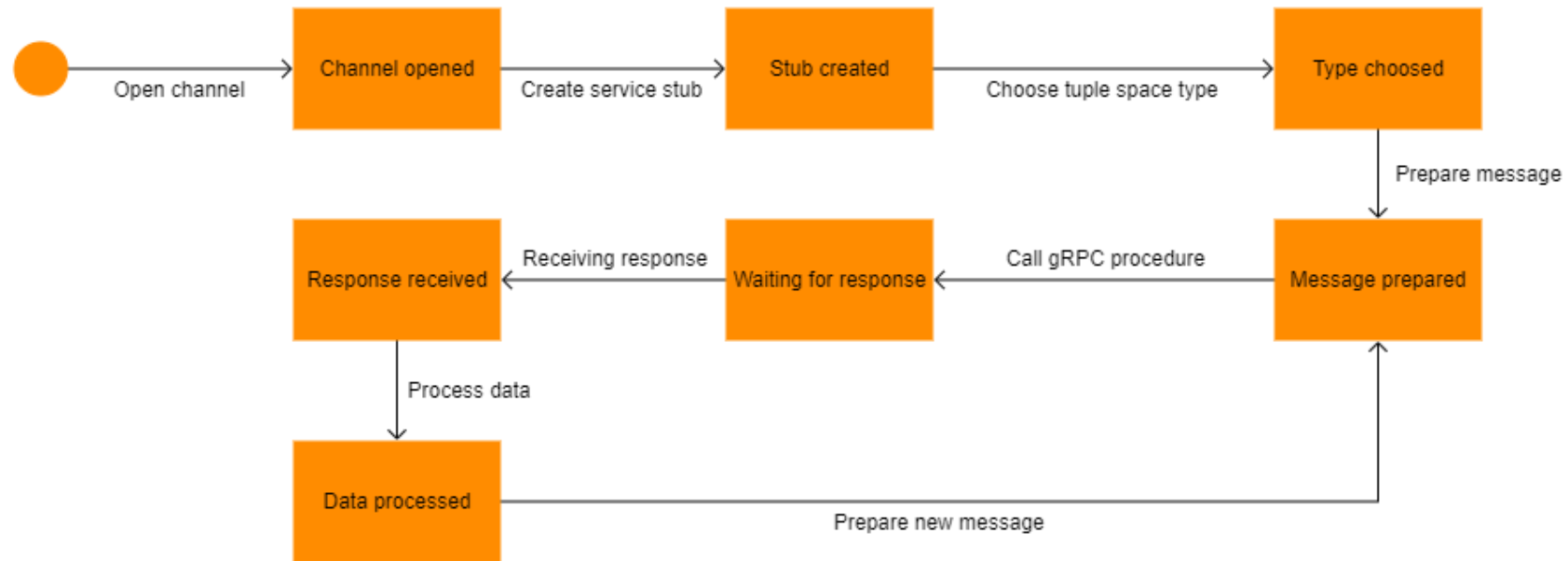
<<abstract>> TusowService	
► Attributes	⊕ ⊖
▼ Operations	⊕ ⊖
validateTupleSpace(TupleSpaceId): IOResponse	
createTupleSpace(TupleSpaceId): IOResponse	
write(WriteRequest): IOResponse	
read(ReadOrTakeRequest): Tuple	
take(ReadOrTakeRequest): Tuple	
writeAll(WriteAllRequest): IOResponseList	
readAll(ReadOrTakeAllRequest): TuplesList	
takeAll(ReadOrTakeAllRequest): TuplesList	
writeAllAsStream(WriteAllRequest): stream IOResponse	
readAllAsStream(ReadOrTakeAllRequest): stream Tuple	
takeAllAsStream(ReadOrTakeAllRequest): stream Tuple	

Design

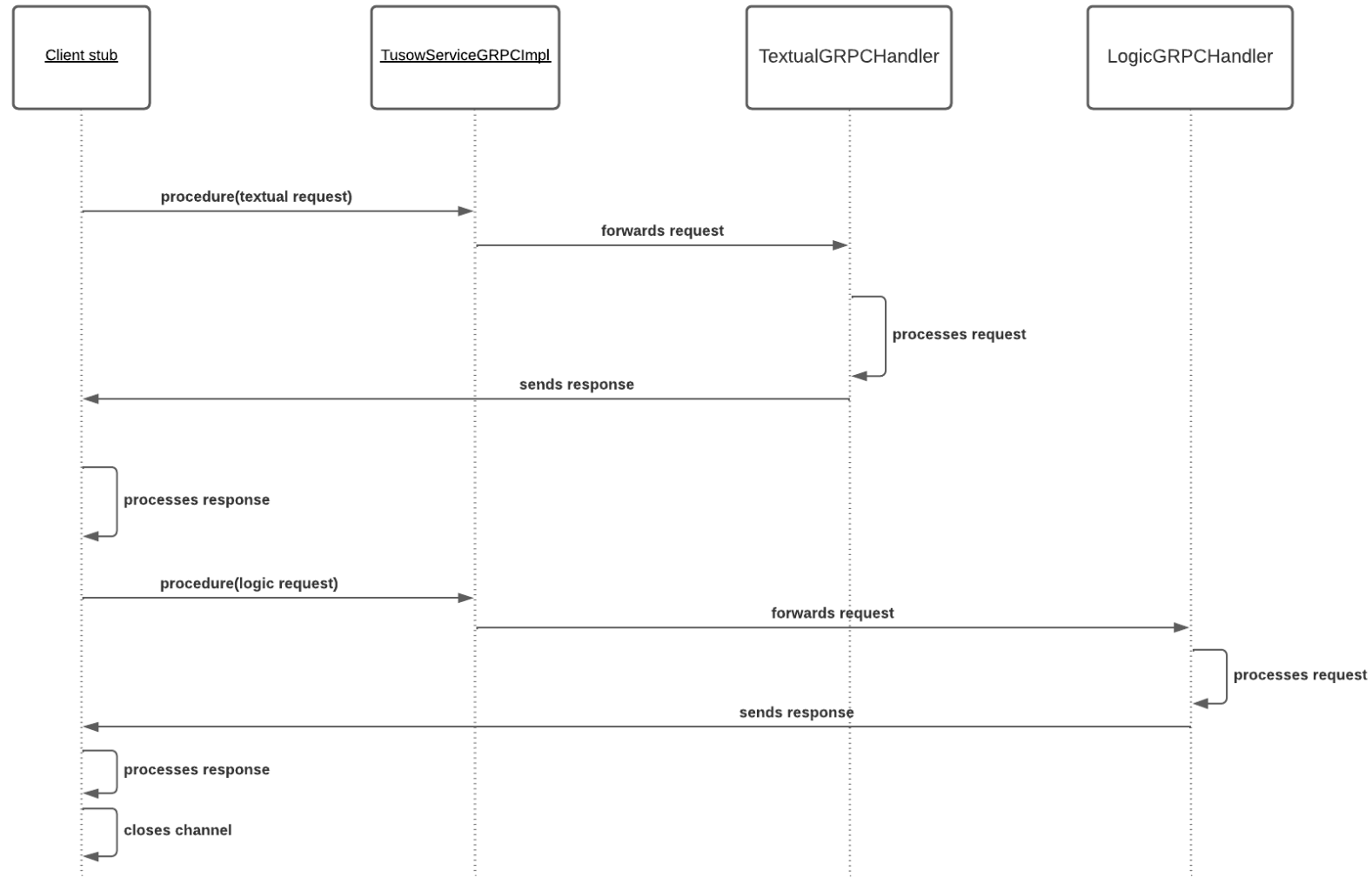
Modules structure



Behaviour



Interaction



What did I learn

I got a deeper understanding on:

- Tuple spaces
- gRPC
- Protobuf
- Approaching large projects created by other people

Bibliography

1. G. Ciatto, L. Rizzato, A. Omicini, S. Mariani, *TuSoW: Tuple Spaces for Edge Computing*, IEEE, 2019