



## Return of experiences on Blockchain projects

*From IoT securing to multi-actors messaging system for conflict areas*

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**Adrien CALVAYRAC**

Innovation Ecosystem Lead, France  
Managing Enterprise Architect  
[Adrien.calvayrac@capgemini.com](mailto:Adrien.calvayrac@capgemini.com)



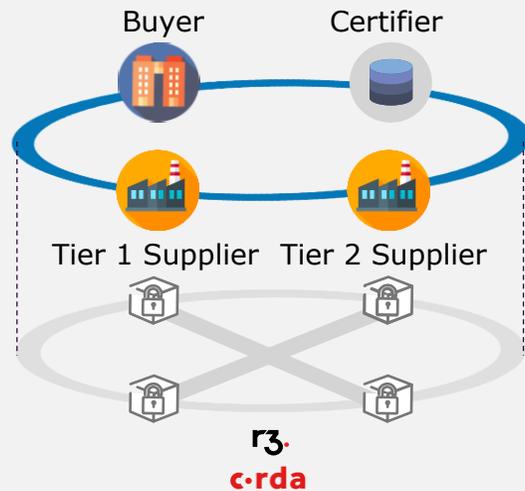
**Nafissatou DIARRA**

Project Leader - Research & Innovation  
[nafissatou.diarra@capgemini.com](mailto:nafissatou.diarra@capgemini.com)



# Overview of 3 different use cases for Blockchain systems

## Trusted Data Exchange



Connects different legal entities together to exchange data in a direct, traced and secure way

→ **Know Your Customer, Know Your Supplier, Procure-to-Pay...**

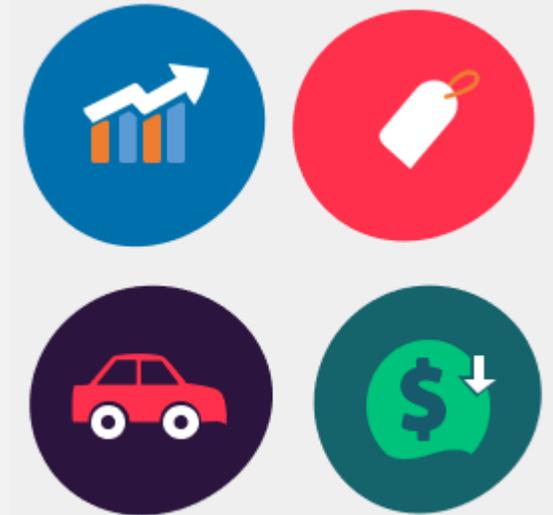
## Whiteflag



Secured messaging network for conflict and disaster areas

→ **Ceasefire, Mine fields, proof of life, emergency alerts...**

## DIAMS4IoT



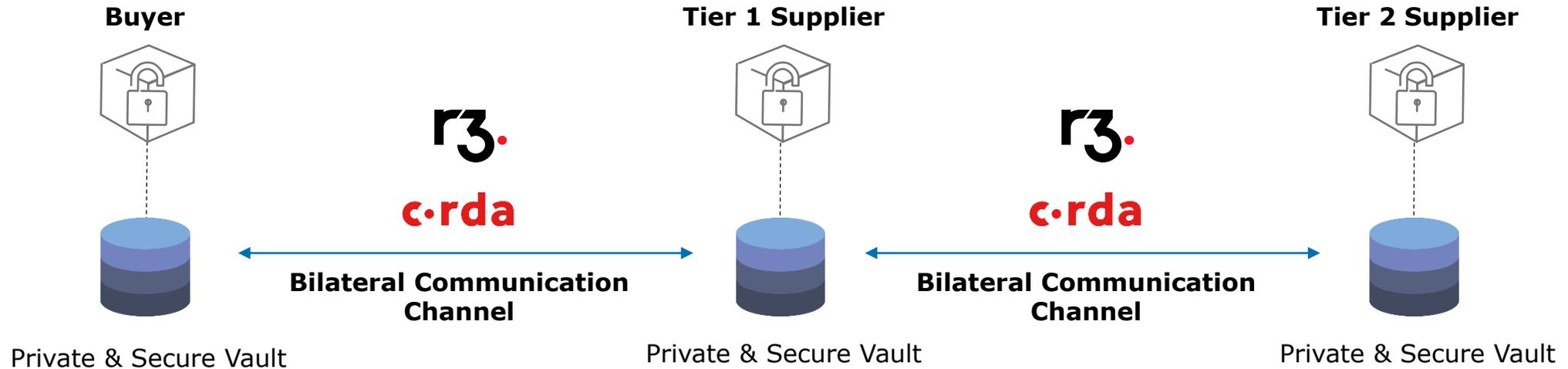
Blockchain-based IAM System for IoT devices

→ **Identity Management, Authentication, Data Integrity**

# TRUSTED DATA EXCHANGE PLATFORM



Connecting different legal entities together to exchange data in a direct, traced and secure way



## Key Product Considerations

- Ability to **send data**
- Ability to request specific information (**questionnaire**)
- Ability to answer to **specific requests**
- Ability to grant / revoke data sharing **consent**
- Ability to chain data exchanges to **design any process**
- Data exchange transactions are **signed by both parties**
- Data exchange transactions are **timestamped**
- Tamper-proof audit-trail for full persistent **traceability**
- Ability to **forward** data
- All features are available on HTML and API for **automation**

## Key Use Cases

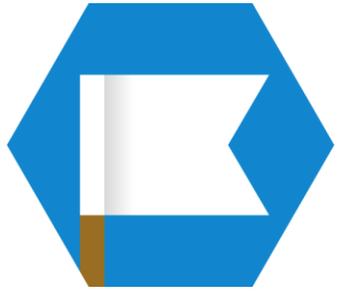
Supplier Onboarding

Supplier Assessment

Deep-tier Suppliers

Supplier Certification

Supplier Network Map



# Whiteflag

using blockchain to  
save lives

WhiteFlag Project



Ministerie van Defensie



Save the Children



ICRC



United Nations  
Educational, Scientific and  
Cultural Organization





# Why?

We believe we can prevent loss of lives in disaster & conflict areas around the globe, that may occur by lack of information

## Information sharing

Enable precise situational awareness

## Multiple Parties

Military forces, armed groups, peacekeeping forces, journalists, aid and non-governmental organizations, civilians, refugees etc.

## Geopolitical Tension

Neutral way of Information Exchange

## International Humanitarian Law

Create undeniable proof & Accountability





# How?

## Internet

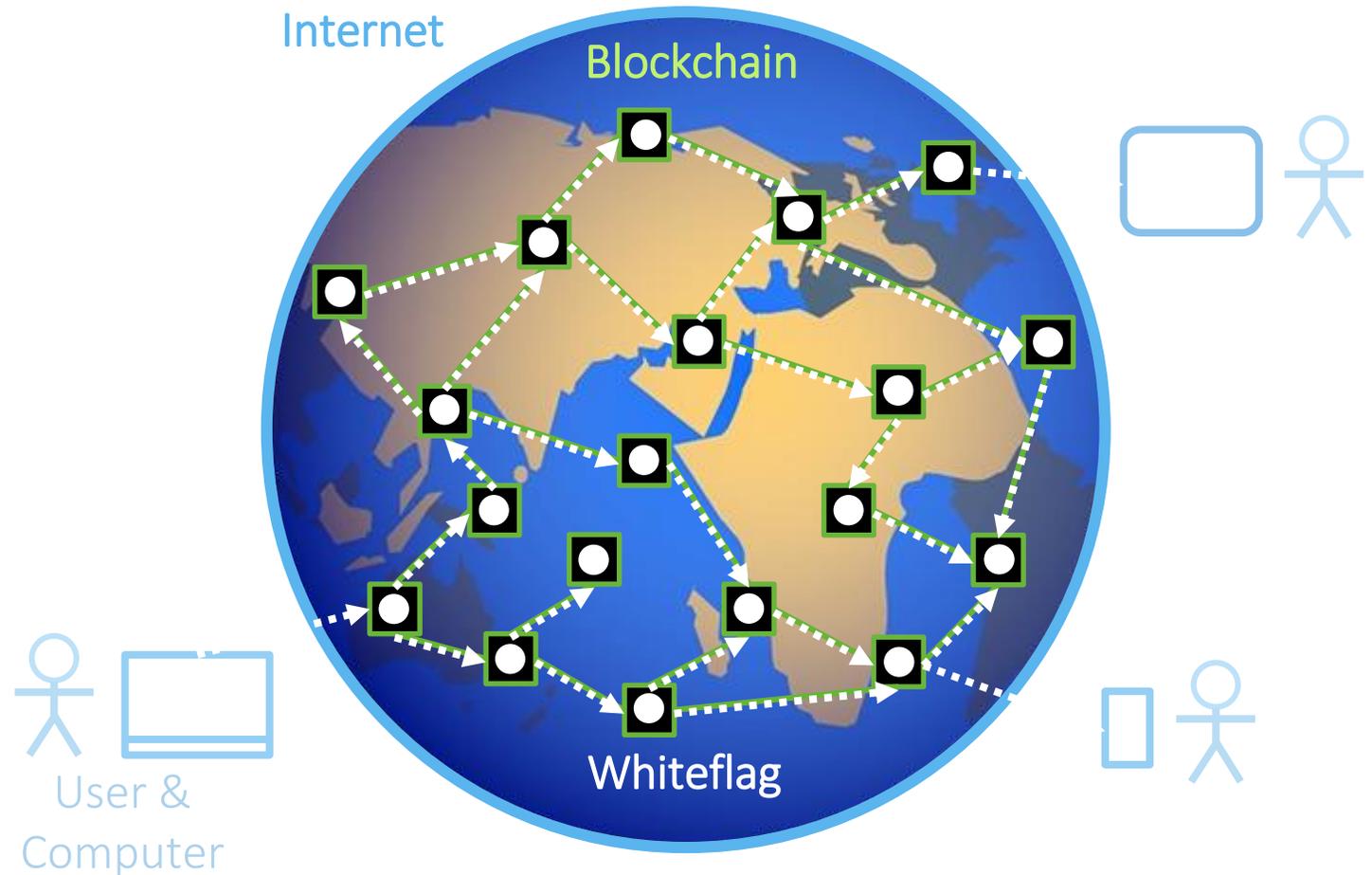
- Global connectivity

## Any Public Blockchain Network

- Neutral: not owned or controlled by an organization or individual
- Neutral: Open Access
- Data Integrity, Non-repudiation
- Persistent data

## Whiteflag Protocol

- Authentication
- Pre-defined Messages
- Optional Encryption



a reliable means for both combatant and neutral parties in conflict zones  
to digitally communicate pre-defined signs and signals

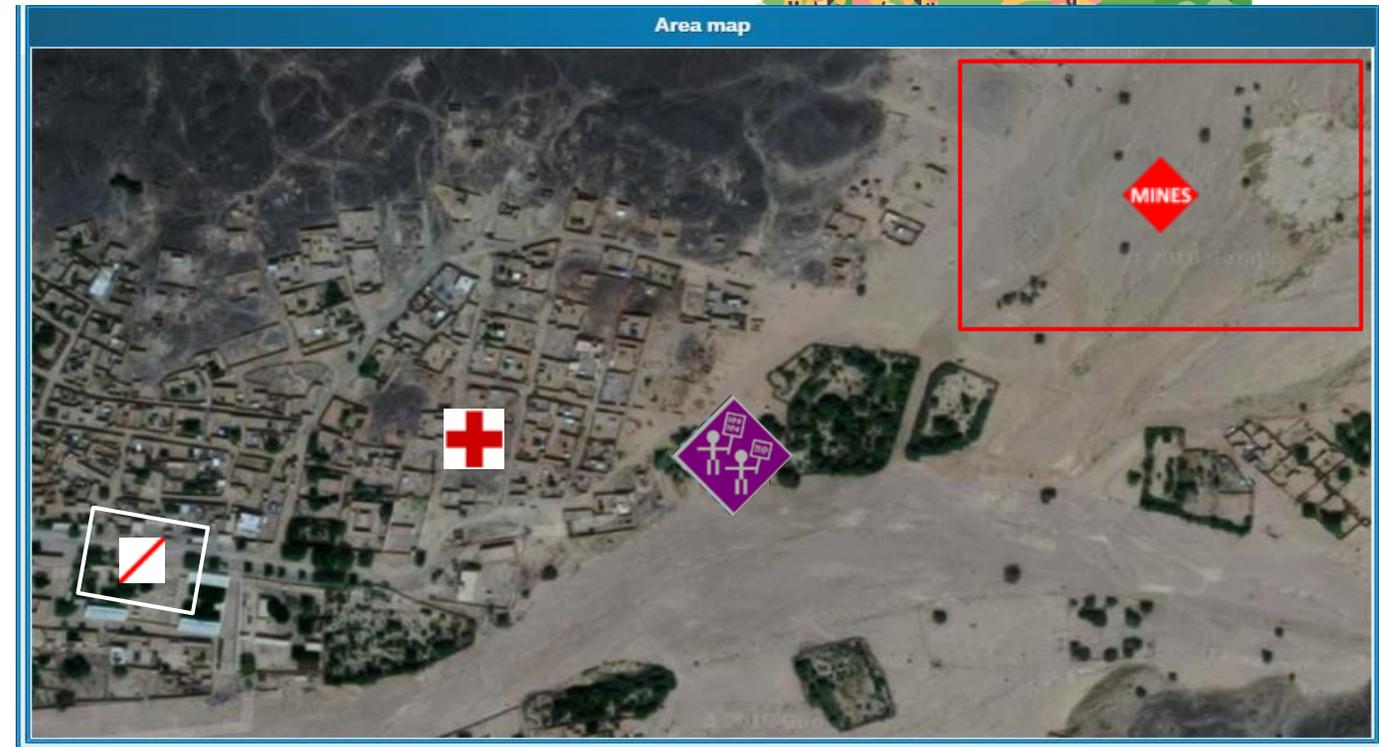


# What?

A decentralised protocol, the Whiteflag protocol, that describes a trusted messaging network for disaster & conflict areas



Code	Nom	Exemples
P	ProtectiveSign	P11  P31
E	EmergencySignal	E11: Medical emergency
D	DangerSign	D21  D52
S	StatusSignal	S10: proof of life
I	Infrastructure	I23: Oil pipeline
M	Mission	M25: Food distribution
Q	Request	Q20: Area access request
R	Resource	
F	FreeText	



Send short encoded messages in a blockchain transaction



# Which additions to existing communication means?

CHARACTERISTICS								
<b>Neutrality:</b> <i>is the platform, or access to it, not owned or controlled by any party?</i>	✓	✗	✗	✗	✗	✗	✗	✗
<b>Interoperability:</b> <i>is the meaning of shared information unambiguous?</i>	✓	✗	✗	✗	✗	*	✗	✗
<b>Availability:</b> <i>is it possible to make information available to everyone?</i>	✓	✗	✓	✓	✗	✓	✗	✗
<b>Authentication:</b> <i>is the source of the information identifiable</i>	✓	✓	*	✗	*	✗	✗	✗
<b>Data integrity:</b> <i>is it impossible to manipulate information?</i>	✓	✗	✗	✗	*	✗	✗	✗
<b>Confidentiality:</b> <i>does the platform support full end-to-end encryption?</i>	✓	✓	✗	✗	*	✗	✗	✗
<b>Transparency:</b> <i>are the inner workings of the platform fully transparent?</i>	✓	✗	✗	✗	✗	✗	✗	✗

\* Only with additional features

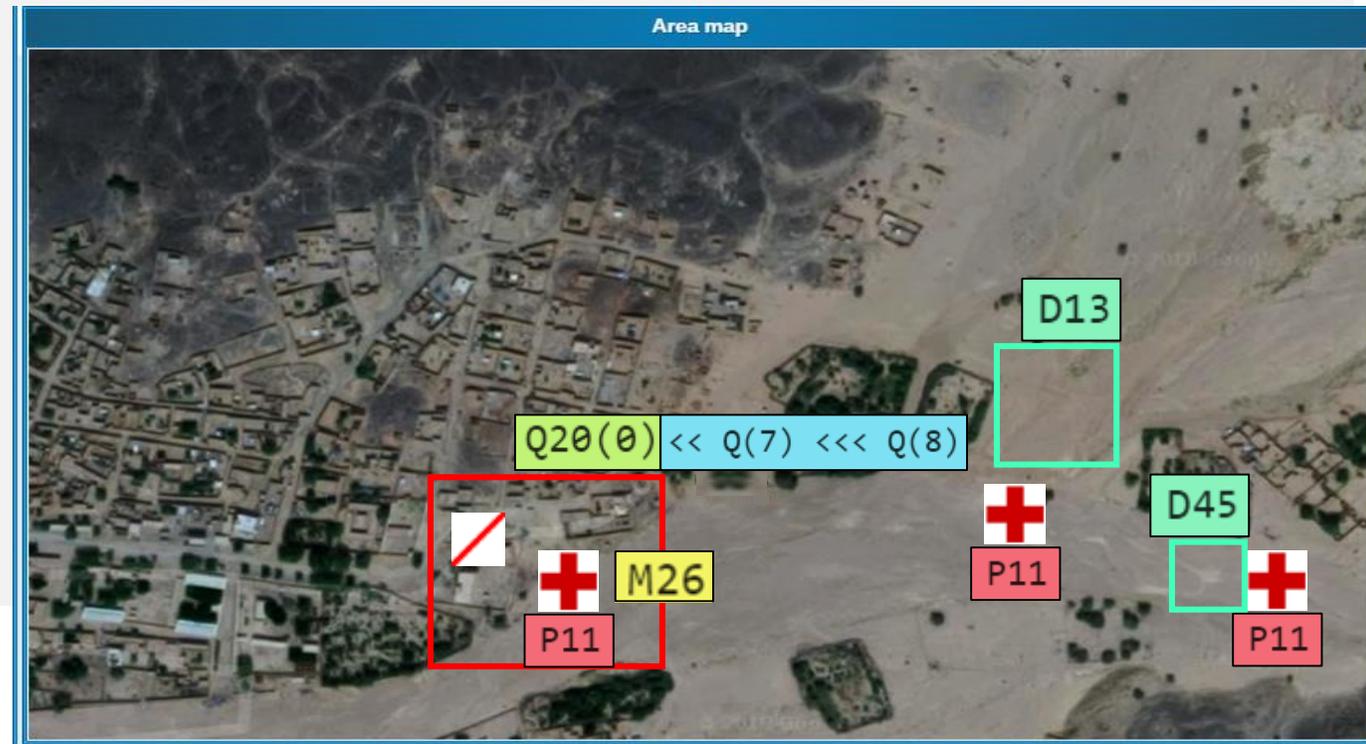
# Example of use case

→ *NGO access to a conflict area to provide help*



A humanitarian convoy is transporting emergency material for local population in a conflict zone:

1. **Verification of** NGO Blockchain account **authenticity** →  $A2(\theta)$
2. **Request to access the area** sent to the different parties involved in the conflict
3. Declaration of **reception/acceptation**
4. On its way to the zone, the convoy can **declare its position** and **inform** on the encountered **environment**
5. Within the area, we can communicate the **type of assistance provided** (*to coordinate the different NGOs*)



# Other examples of use cases



**Mark protected sites / critical infrastructures**



**Signal a Mines field**



**Send a Proof of life**



**Negotiate a Ceasefire**



**Declare a Surrender**



# Timeline



Koninklijke Luchtmacht



Ministerie van Defensie



Save the Children



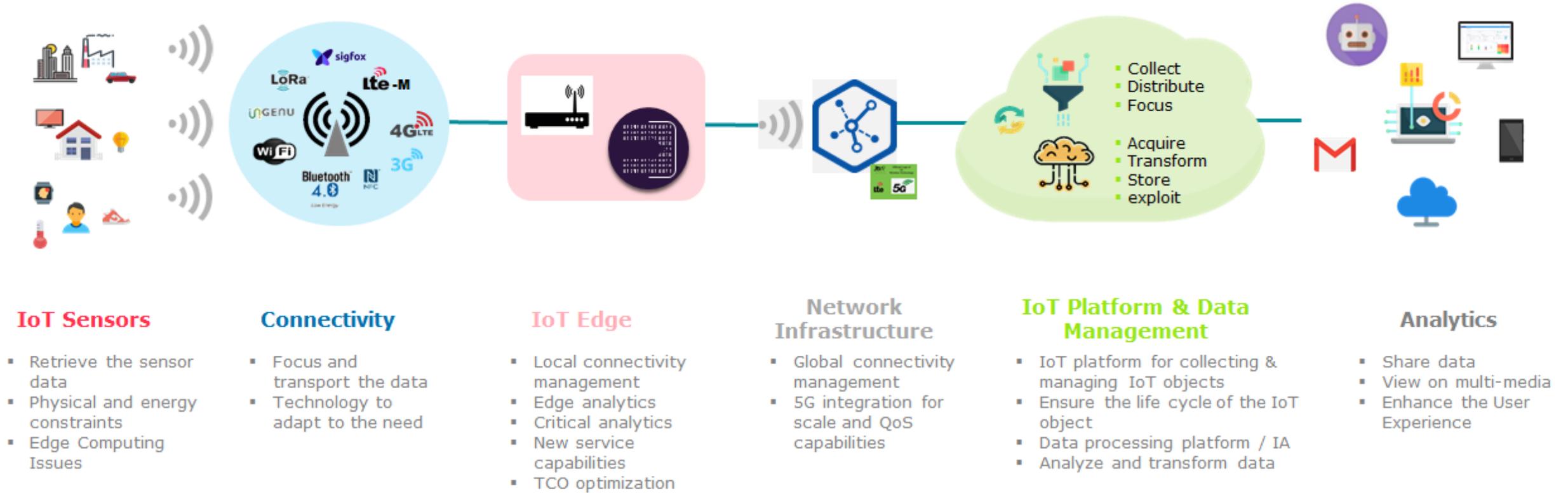


DEMS - Research and Innovation

# DIAMS4IoT Project



# The IoT Value Chain



**Security & Privacy by design**

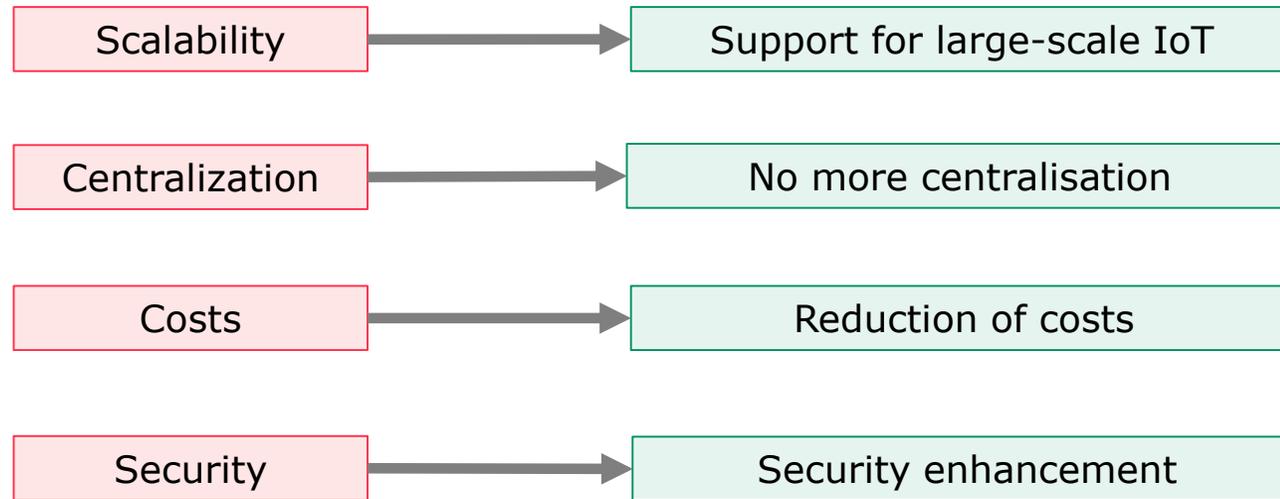
Sources: Capgemini Research



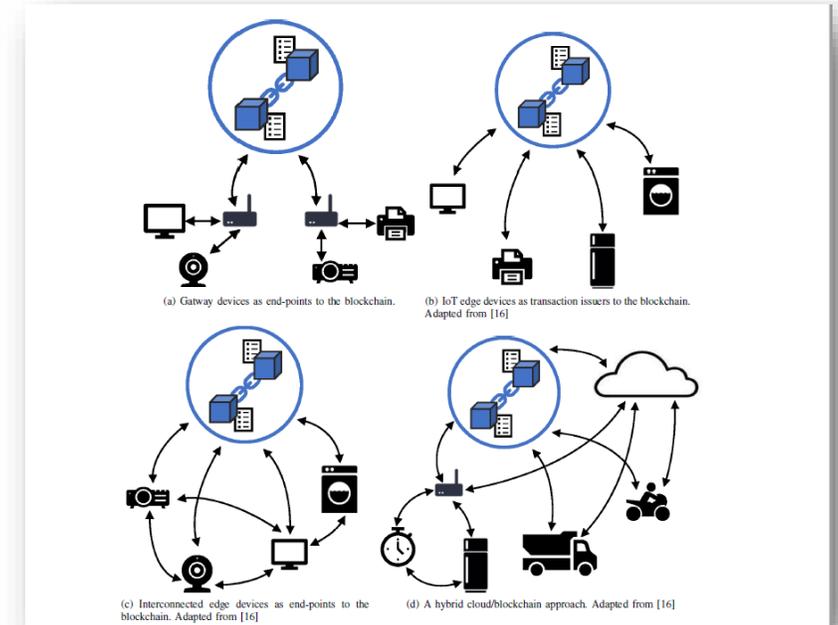
# Can Blockchain be an answer to IoT issues?

## IoT CHALLENGES

## BLOCKCHAIN VALUE



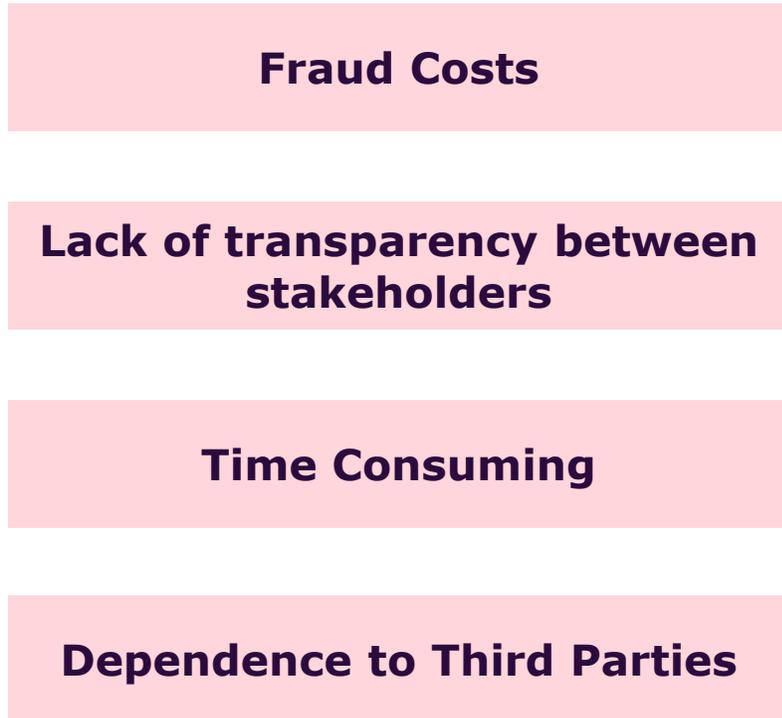
*-Data provenance + Integrity  
-Identity Management for real-world devices  
-Device Authentication and Monitoring*



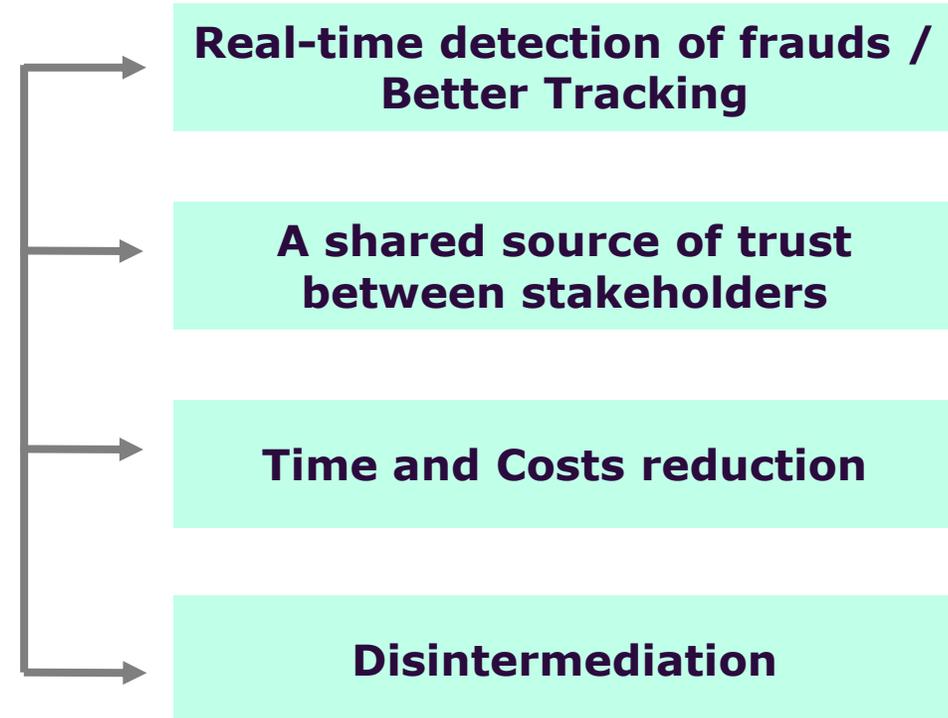


# The Supply Chain case

## TRADITIONAL SUPPLY CHAIN



## IOT-ENABLED SUPPLY CHAIN WITH BLOCKCHAIN



Companies like *Modum*, *Ambrosus* and *Slock.it* are building platforms to connect devices to Blockchains for use in Supply Chain...



# What is it?

## Shortcomings of existing **Blockchain-IoT-IAM** solutions

- Centralized/proprietary solutions
- Poor scalability
- Not adapted to any kind of devices
- Costs

- **Device Identity and Access Management System for IoT**
- A **Capgemini DEMS** Research and Innovation Project

## What's new with **DIAMS4IoT**?



**SCALABLE**



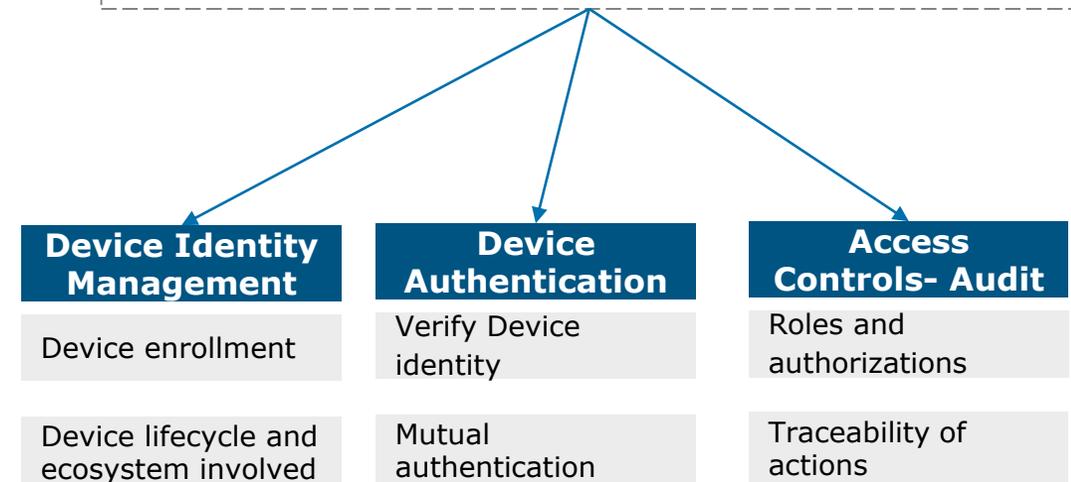
**LOW COST**



**DECENTRALIZED IAM**

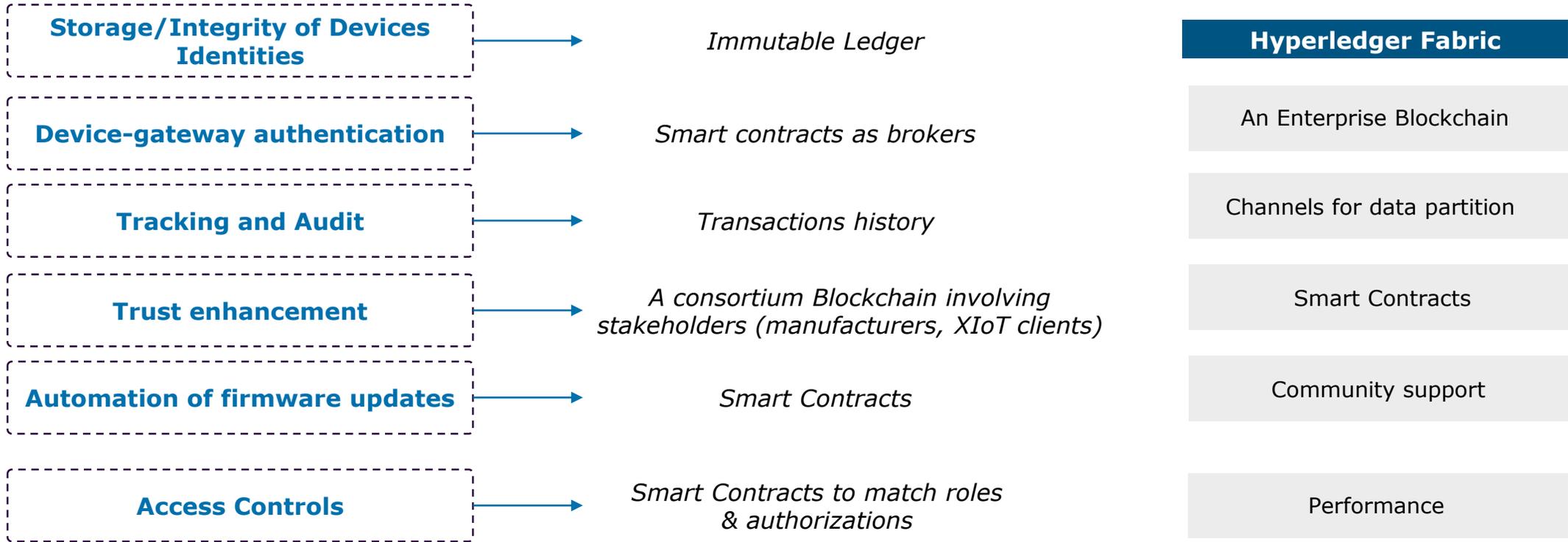


**AGNOSTIC - MODULAR**





# The Blockchain Value



# The DIAMS4IoT Project

## How?



### Device Identification

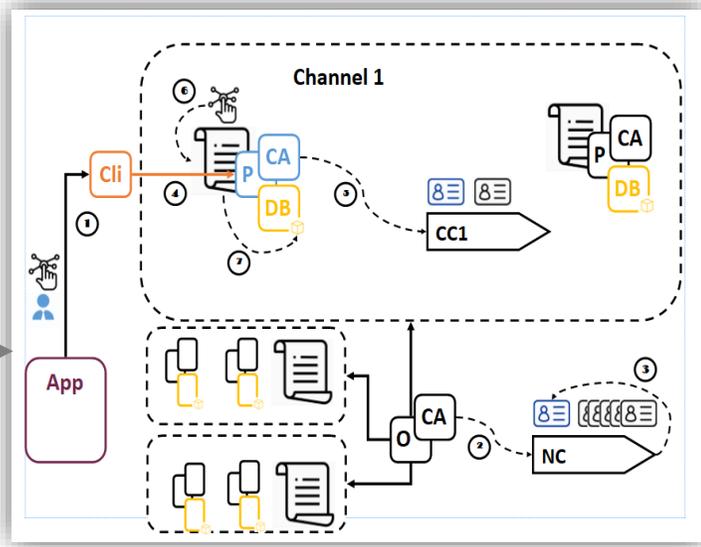


### Device Authentication

- Identity based on **device characteristics**
- Dynamic identity related to **device lifecycle**
- Based on an **embedded secret** on the device
- Actors of **device's ecosystem** are involved
- Identity stored on the Blockchain via a **Smart Contract**

- Identification Smart Contract**
- Authentication Smart Contract**

- An Authentication Protocol involving:
- **Pre-shared secret**
  - **OTP and challenges**
  - A **Smart Contract** to communicate with the Blockchain and access the device identity



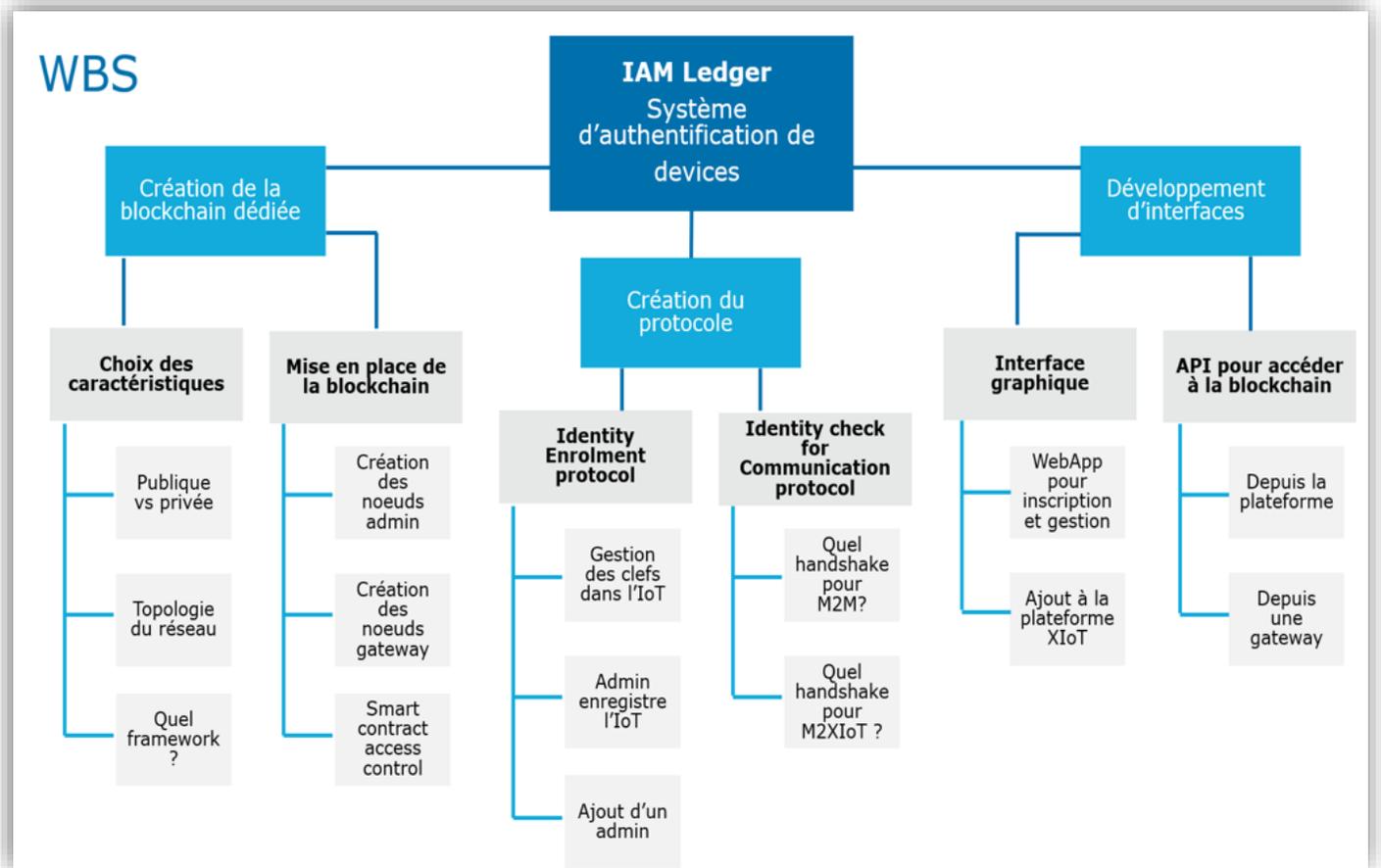
DIAMS4IoT Fabric Blockchain

# The DIAMS4IoT Project

## Status



- A Multi-channel Fabric Network
- Identification and Authentication Smart Contracts deployed
- Web Interface to communicate with the Blockchain (register devices identities and query the Ledger)
- (X)IoT gateways configured as Blockchain clients
- Simulation of authentication





**Thank you !**



People matter, results count.

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