



## INCANT: Integrate indoor positioning infrastructure in the Vicinity ecosystem

Grant agreement: 688467

Open virtual neighbourhood network to connect intelligent buildings and smart objects

# Thinkinside mission

*Thinkinside provides ICT solutions that transform INDOOR LOCATION data into actionable analytics.*

*Thinkinside helps companies understand how individuals and assets behave in physical spaces and how to optimize their operations through a hyper-accurate localization infrastructure.*



## Real-time

Real-time monitoring and control of processes based on **indoor location data**.



## Big Data

Cloud-based data processing pipeline able to handle vast amounts of data.



## Pluggable

Integration with existing enterprise platforms and business intelligence frameworks.

# Thinkinside: How it Works



ThinkIN platform integrates with **data from a large variety of Internet Connected Devices**, such as:

- tags,
  - wearables,
  - smartphones,
- with a hyper-accurate indoor localisation infrastructure

ThinkIn processes these data through its proprietary scalable data processing technology and provides:

- **Visual analytics and KPIs**
- **Real-time services**

Based on actual position, ThinkIN platform also provides:

- **Push-notifications**
- **Delivery of contents**
- **Real-time alerts**



RETAIL

retailerin



INDUSTRY

thinkin  
for Industry 4.0



HEALTHCARE

thinkin  
for Healthcare



FAIRS  
&EVENTS

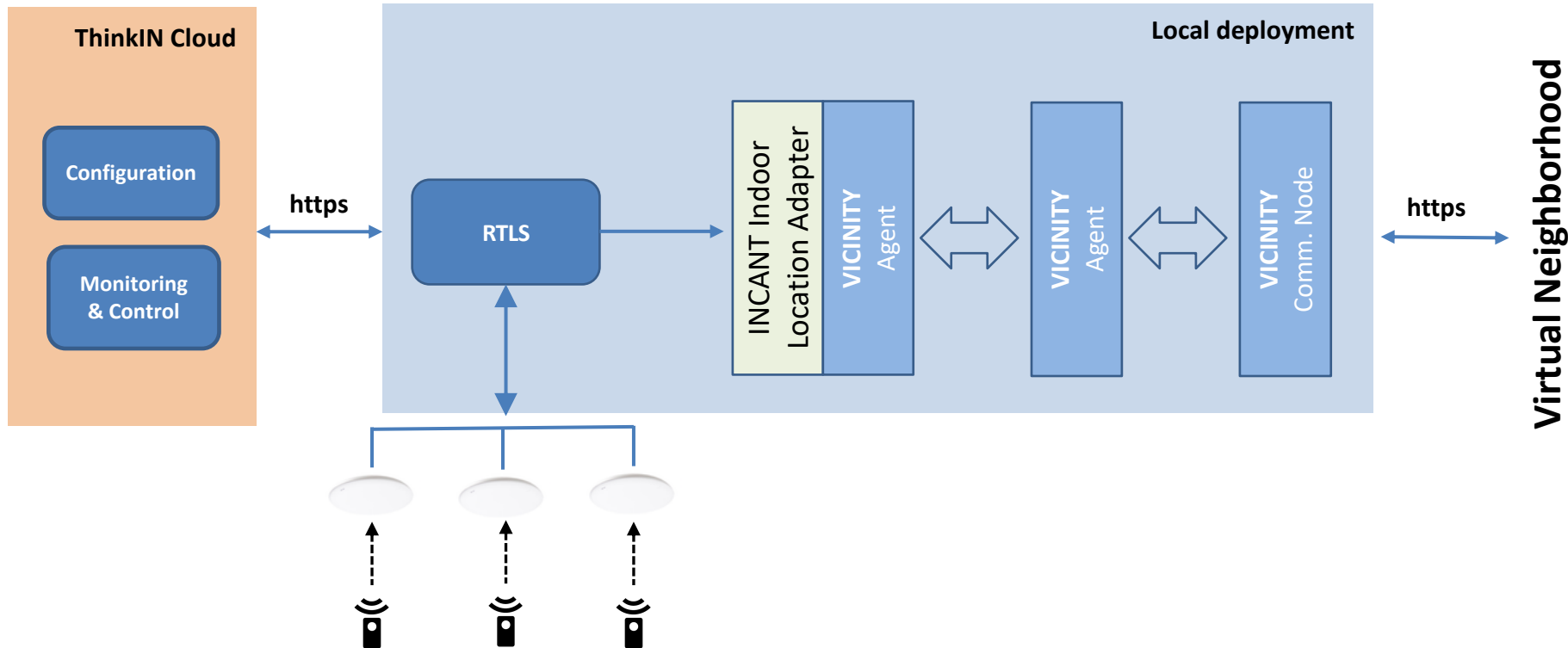
thinkin

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## OBJECTIVES:

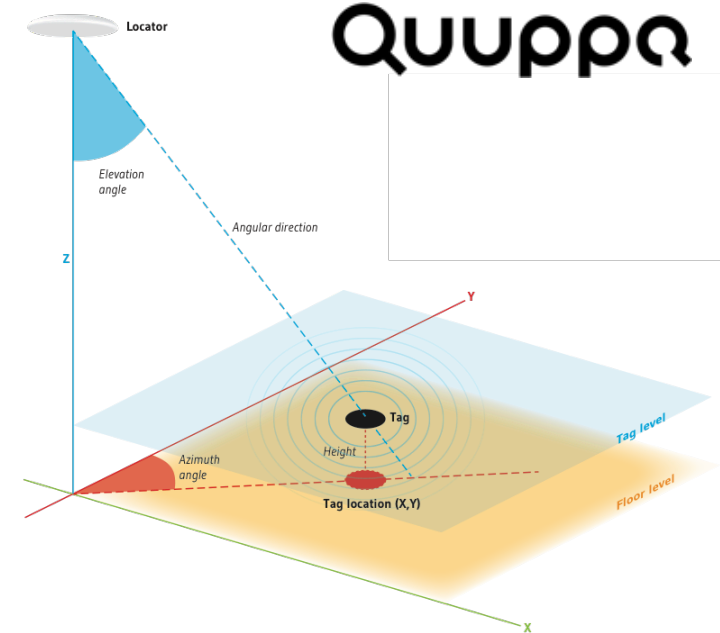
- To provide a VICINITY adapter for indoor location data
  - Supporting various localization technologies (e.g., BLE, WiFi)
  - Providing the enabling services for managing location-based support
  - Integrating with the VICINITY Neighborhood Manager
- To demonstrate the INCANT location-enablers in realistic scenarios (e.g., retail and warehouse)

# INCANT Architecture



We support any RTLS system providing high accuracy indoor location

- E.g., UWB, Bluetooth, LiFi
- Quuppa
  - Bluetooth Low Energy (BLE)
  - Track TAGs and Mobile devices
  - Based on the angle of arrival
  - Continuous tracking over large areas
  - Sub-meter accuracy



# Quuppa: antennas and TAGs



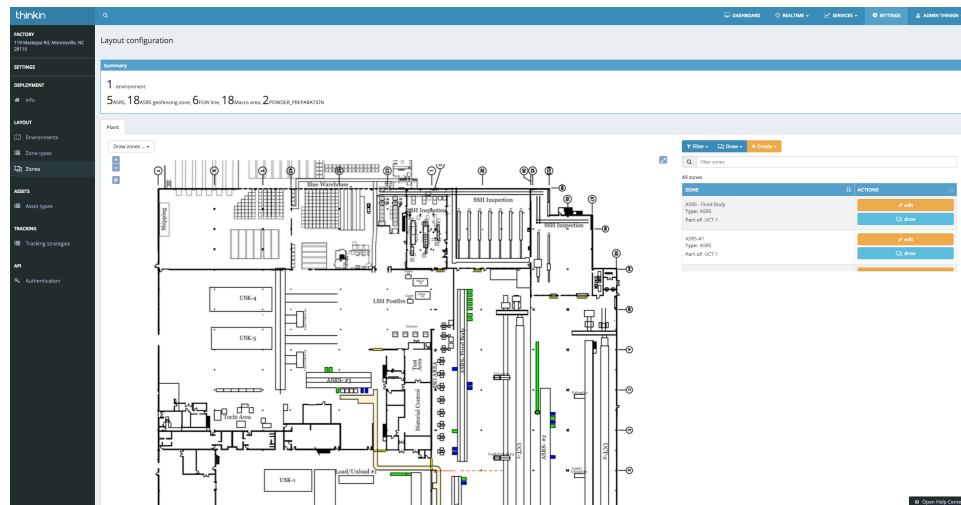
**Antenna**



**TAG**



- Configuration
  - Mapping and zoning
  - Objects registration and annotation
  - Objects grouping
- Monitoring and control
  - RTLS health monitoring and control
  - TAGs battery monitoring
- Geo-fencing events management
  - Geo-fence creation
  - Business rules creation



```
{
  "oid": "incant-thing-1",
  "name": "Trackable object in INCANT",
  "type": "adapters:TrackableObject",
  "properties": [
    {
      "pid": "location",
      "monitors": "adapters:TrackableObject ",
      "read_link": {
        "href": "/objects/{oid}/properties/{pid}",
        "output": {
          "type": "object",
          "field": [
            {
              "name": "position",
              "schema": {
                "lat": "float",
                "long": "float",
                "precision": "float",
                "altitude": "float",
                "EnvironmentID": long,
                "timestamp": "long",
              }
            }
          ]
        }
      }
    }
  ],
  "actions": [],
  "events": []
},
```

## Properties:

- Timestamp: timestamp of the last registered position
- Environment ID: environment from which the coordinate was generated
- X: x coordinate of the Object
- Y: y coordinate of the Object

Depending on the specific scenario, coordinates can be expressed according to:

- A relative coordinate system. This will depend on the specific RTLS technology being used and configuration
- Latitude / longitude coordinates

```
{
  "pid": "battery",
  "monitors": "adapters:ObjectBattery",
  "read_link": {
    "href": "/objects/{oid}/properties/{pid}",
    "output": {
      "type": "TrackableObjectBattery",
      "field": [
        {
          "name": "acceleration",
          "schema": {
            "percentage": "float",
            "timestamp": "long"
          }
        }
      ]
    }
  },
  "actions": [],
  "events": []
}
```

## Properties:

- Timestamp: timestamp of the last registered position
- Voltage: voltage of the TAG being used to track the object

```
{
  "pid": "accelerometer",
  "monitors": "adapters:ObjectAcceleration",
  "read_link": {
    "href": "/objects/{oid}/properties/{pid}",
    "output": {
      "type": "TrackableObjectAcceleration",
      "field": [
        {
          "name": "acceleration",
          "schema": {
            "Xacc": "float",
            "Yacc": "float",
            "Zacc": "float",
            "timestamp": "long"
          }
        }
      ]
    }
  },
  "actions": [],
  "events": []
}
```

## Properties:

- Timestamp: timestamp of the last registered position
- Xacc: acceleration over the x axis
- Yacc: acceleration over the y axis
- Zacc: acceleration over the z axis