MAPS for the WEB
SEPT–OCT 2020
#Maps4HTML

# From Points of Interest To Maps of Objects


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**Full-stack developer at Norkart AS**


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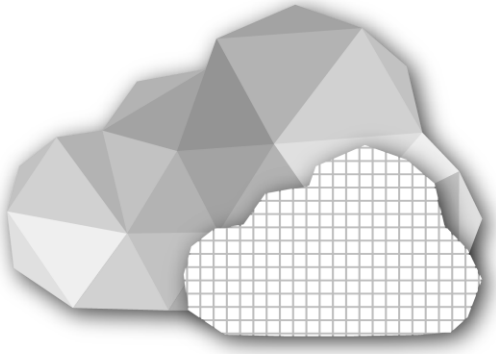
Making location count.

OPEN AR CLOUD

NORKART



# OPEN AR CLOUD

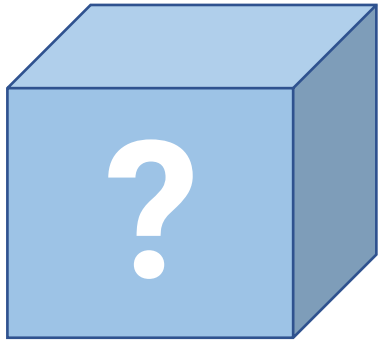
Open AR Cloud's mission is to drive the **development** of **open** and **interoperable** spatial computing **technology**, **data** and **standards** to connect the physical and digital worlds for the benefit of

**300 +**

**Individual members**

**55 +**

**Partner organizations**




# Point of Interest vs Interesting Object

# Comparison

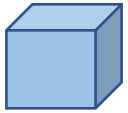
## Point Of Interest (PoI)

**Refers** to **“something”** by its **position**

Position normally limited to **2D geographical position**

Can represent **very different things**
- Point in area/place of any kind
- Location of stationary object
- Location of moving object

Typical attributes:
- Category
- Id
- Name
- **Visualized by generic categories of symbols**
- Metadata
  - Metadata comes in diverse strucures: EV Charger is a good example of complex and rich metadata



## Object in Map (OiM)

Has a real world geospatial pose (GeoPose):
- **3D geospatial position and rotation/orientation**
- **Six** degrees of freedom (6DoF)

Has a defined and limited 3D volume (bounds)
**Often has unique 3D geometries per object**

Allows visualizations to be **concrete and specific** to each object and **less abstract and generic**

Can represent any real or virtual object with a 3D volume and a real world pose.

OiM’s can **represent a subset of what PoI’s** can do but in a way that **is more spatially accurate** enabling **new ways to use maps** ( like immersive maps)

OiMs would **share many attributes of PoIs**, so if a standard was made for PoI’s a – An OiM standard could easily extend it.

# **Sidenote:** PoI's still have no standards ☹

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**github.com/opengeospatial/poi**

here

Google Maps

NORKART

GeoJSON

GeoJSON is a format for encoding a variety of geographic data structures.

```
{
  "type": "Feature",
  "geometry": {
    "type": "Point",
    "coordinates": [125.6, 10.1]
  },
  "properties": {
    "name": "Dinagat Islands"
  }
}
```

GeoJSON supports the following geometry types: `Point`, `LineString`, `Polygon`, `MultiPoint`, `MultiLineString`, and `MultiPolygon`. Geometric objects with additional properties are `Feature` objects. Sets of features are contained by `FeatureCollection` objects.

A journey back to the time of paper maps...


LE PLAN DE LA VILLE, CITE, VNIVERSITE ET FAVXBOVRGS DE PARIS AVEC LA DESCRIPTION DE SON ANTIQVITE
ET SINGVLARITEZ
Paris 1615
LA RIVIERE DE SEINE

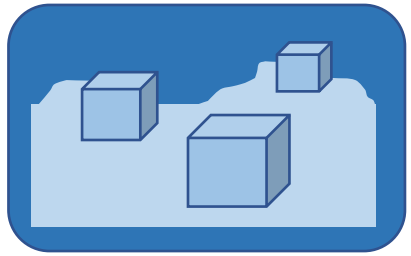

Star Wars: Galaxy's Edge
Mickey's Toontown
Fantasyland
Frontierland
Critter Country
RIVERS OF AMERICA
New Orleans Square
Adventureland
Tomorrowland
Main Street, U.S.A.
CITY HALL
DVC
N
S
E
W
FANTASMIC! Viewing Options*
Disney FASTPASS® Distribution
Available near Frontier Landing.
Blue Bayou and River Belle Terrace**
Dinner packages include access to reserved viewing.
Hungry Bear Restaurant**
On-the-Go meals include access to the viewing area.
*Attraction operating hours

# Returning to digital maps

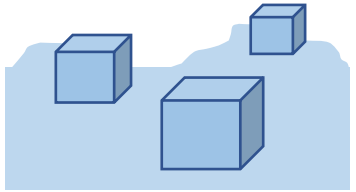
# Digital map data is breaking out of screens

PoI's on 2D maps

PoI's on flat 3D tilted maps



OiM's in a sceen based
3D geospatial maps



OiM's in the real world
Using AR cloud tech

2D geographical coordinates → 6DoF Geospatial Pose (GeoPose)

Leaflet

Flat 2D raster

mapbox

2D Vector

3D tilt
extruded 2D features

Google Earth

CESIUM

3D Globe maps

Allow 6DoF geospatial placement of 3D objects

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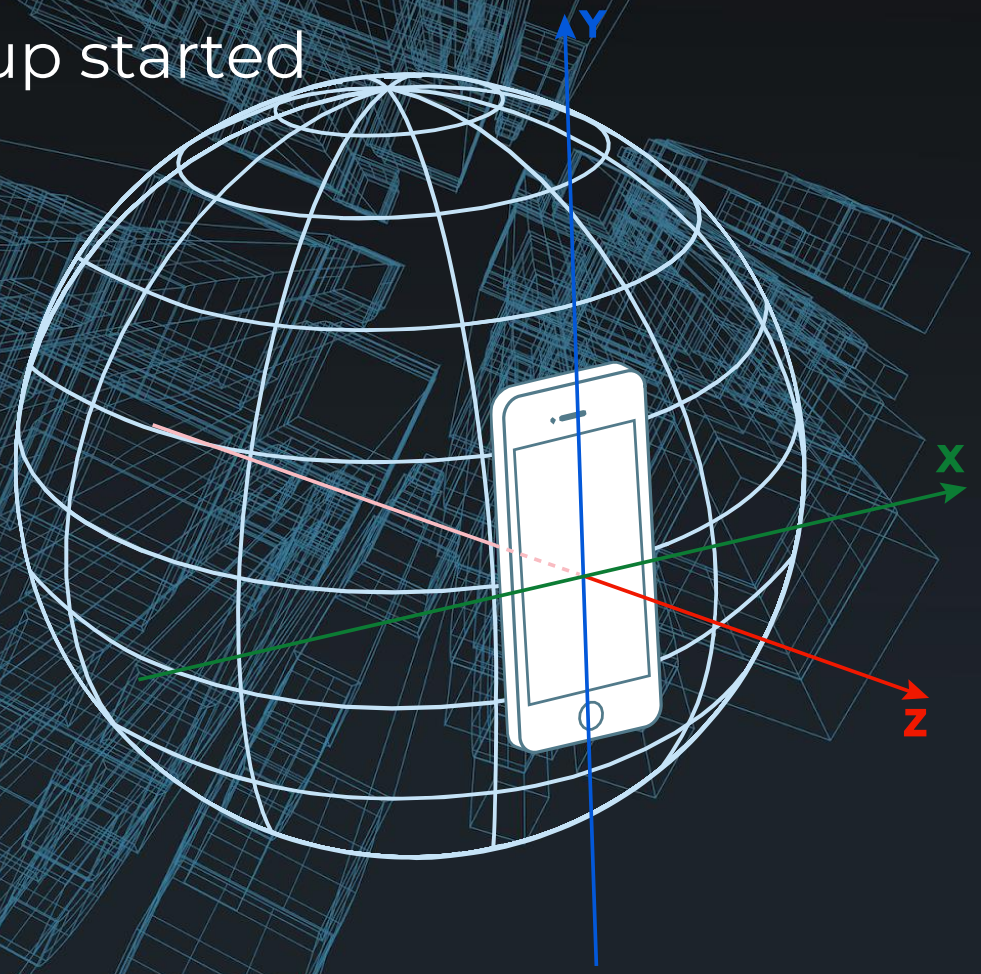
Real World Spatial Computing Infrastructure based on realtime updated 3Dmaps in the Cloud

# Geopose - geospatial 6DoF position and orientation

- Universal GeoPose Standard
- OGC GeoPose Standards Working Group started on January 24th 2020
- Hopefully a draft specification soon

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Ordnance Survey

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# OSCP

**A reference Open Spatial Computing Platform**

# «Open Spatial Web»

**1**

## Universal real-world pose

Highly accurate geospatial position and orientation with 6DoF «**GeoPose**».

**2**

## Make reality machine-readable

Geometry, semantics & relationships of the current reality near your location, is Made available in machine readable form.

**3**

## Seamless spatial discovery

Local content, experiences, services, communication-channels, and spatial applications

# Layers of the **Spatial Web**

A layer can contain experiences, static content, live datastreams, services, applications/solutions etc. There needs to be a shared way of registering all such things to one or more layers.

**THEMATIC LAYERS** (Examples)

**IoT**

**Art**

**Entertainment**

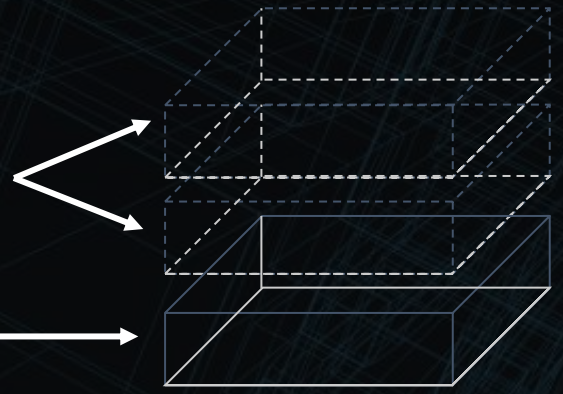
**Commerce**

**Construction/Infrastructure**

**Mobility**

**BITS:** Digital representations of the real world

**ATOMS:** Real world



**REALITY CAPTURE LAYERS**

Real-time reality layer

Transient dynamic state - restricted to only be shared locally at the edge to protect privacy, except emergency)

Static reality layer

Static persistant reality -may be shared globally

Physical reality

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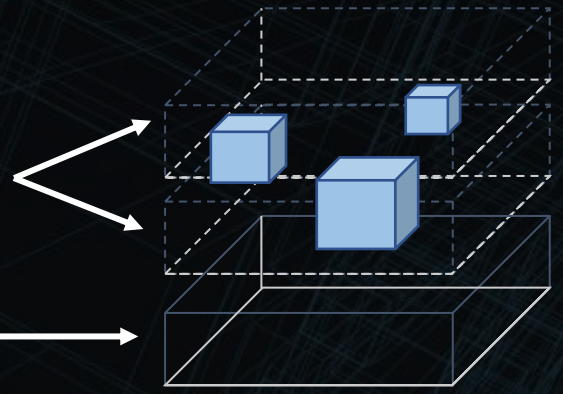

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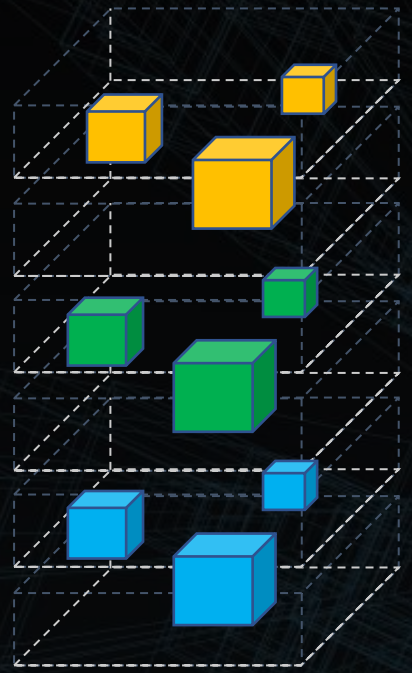

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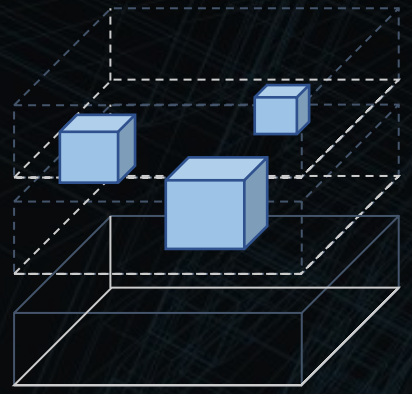

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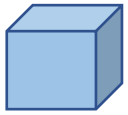
# Thoughts on webstandards..

**Point Of Interest (PoI)**



**Object in Map (OiM)**

1. Browser support for Objects In Map (OiM's) with OGC GeoPose and automatic transform from geospatial to cartesian.
   - In native Maps API
   - In native <map> element
     - Globe Mode (on screen like Cesium and Google Earth
     - Immersive mode leveraging WebXR for 1:1 scale

```
<map zoom="11" lat="48.85591" lon="2.3469543" width="640"
height="300"> <layer label="OpenStreetMap"
src="https://example.com/mapml/osm/" checked
crossorigin></layer> </map>
```

2. Root level browser support for GeoPose services.
   - Could become a protocol compliant way to use AR-Cloud positioning services to enable OiMs (and much more) to be rendred in Immersive Mode in the browser at their real world location – «Painting the world with data» – And objects…