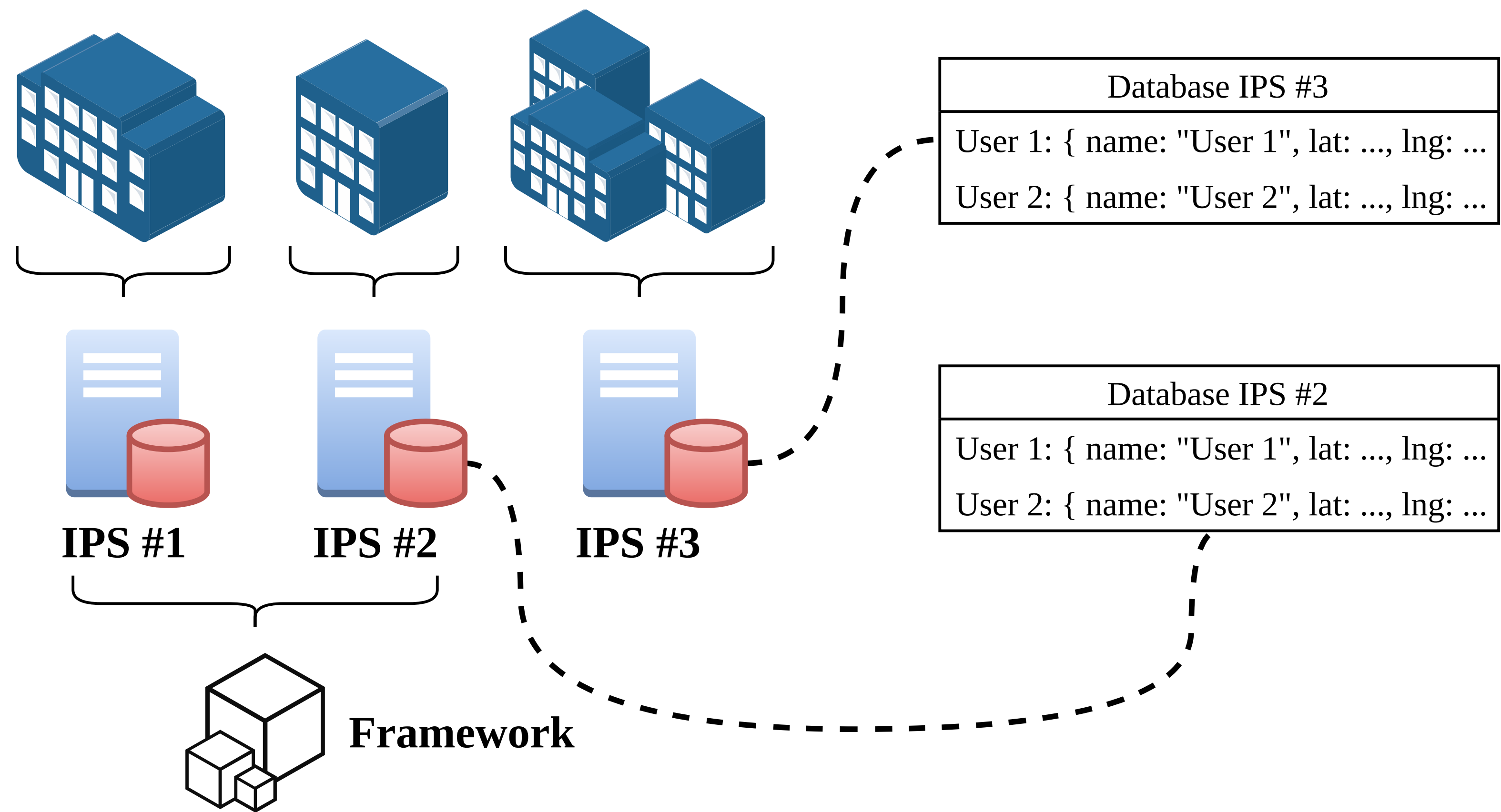


A Solid-based Architecture for Decentralised Interoperable Location Data

Maxim Van de Wynckel, Beat Signer

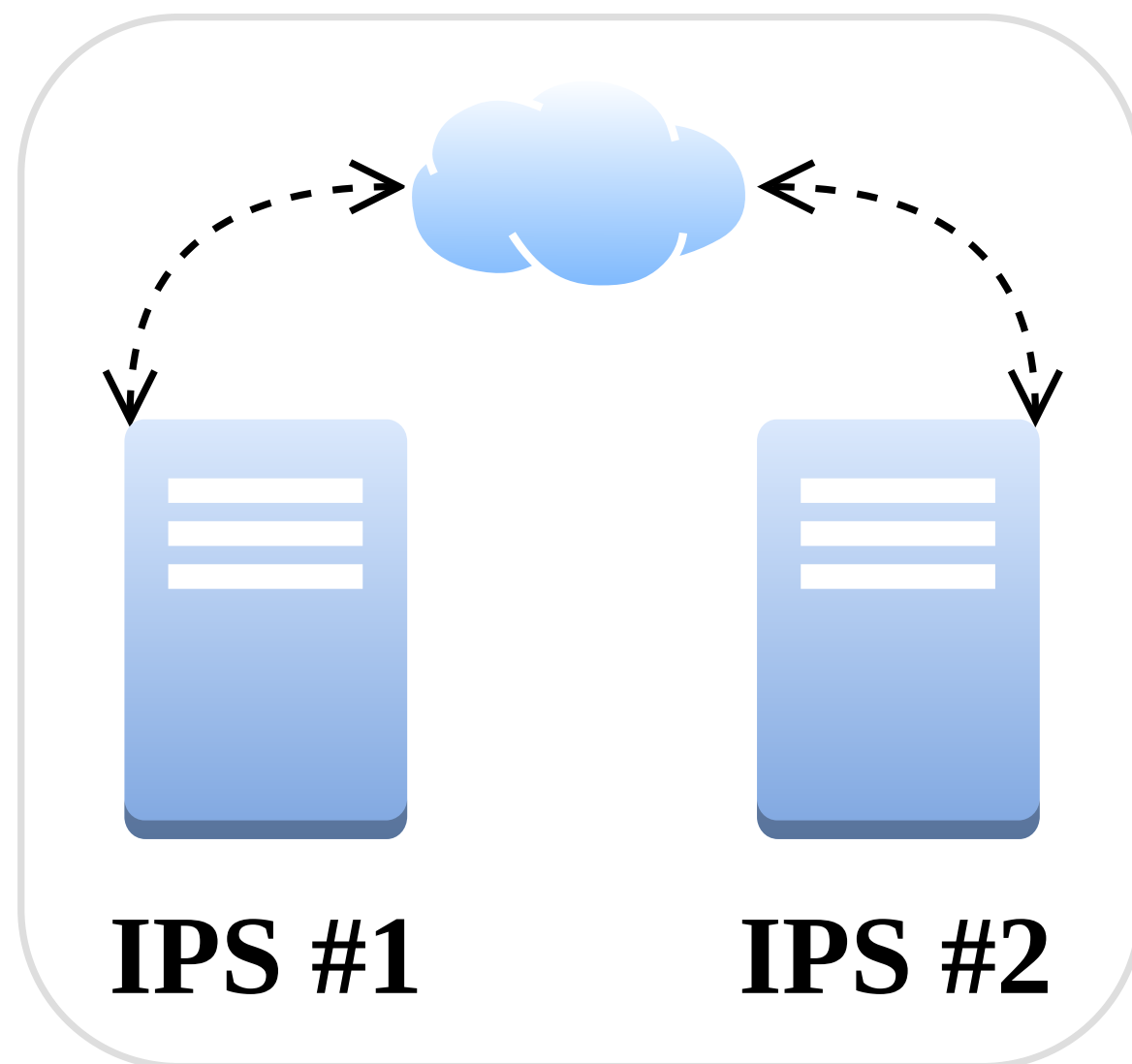
*Web & Information Systems Engineering Lab
Vrije Universiteit Brussel*

Current indoor positioning systems (IPS)



Problems with current IPS'

1. Users not in **control** of their **data**
2. No **interoperability** between positioning **systems**
3. No **interoperability** between (navigation) **applications**



Accessibility



Readability

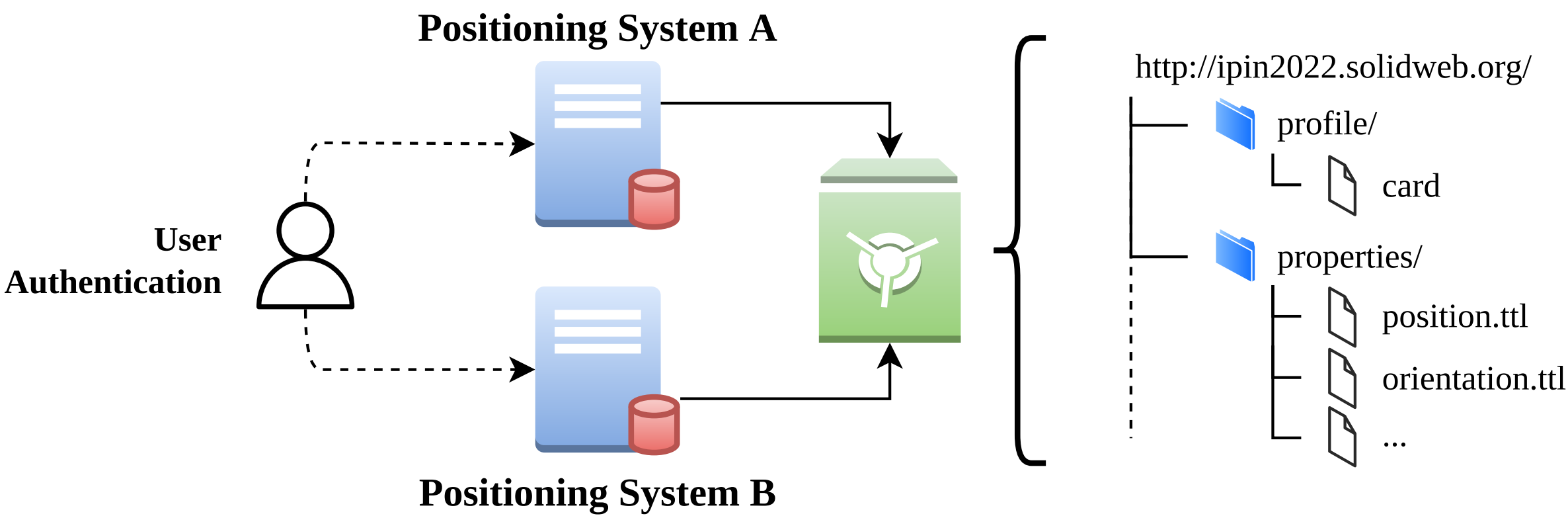


Understandability

What is Solid?

- ▶ Decentralised data vaults called *Pods**
- ▶ Semantic linked data

What is Solid?



```
position.ttl
<> a sosa:ObservableProperty ;
  rdfs:label "My Position"@en .

:1648831850 a sosa:Observation ;
  sosa:observedProperty <> ;
  sosa:resultTime "...";
  sosa:hasResult: [ ... ] .

:1648831900 a sosa:Observation ;
  sosa:observedProperty <> ;
```

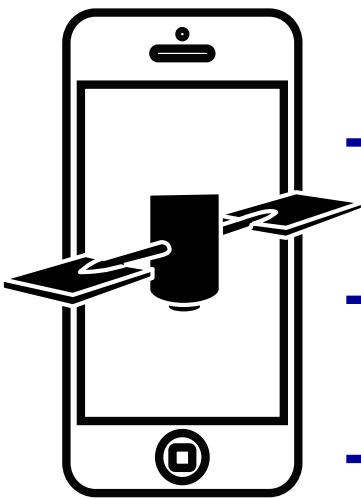
RDF: Properties and Observations



PoC Demonstrator



Geolocation API (a)



APPEND
.../position.ttl

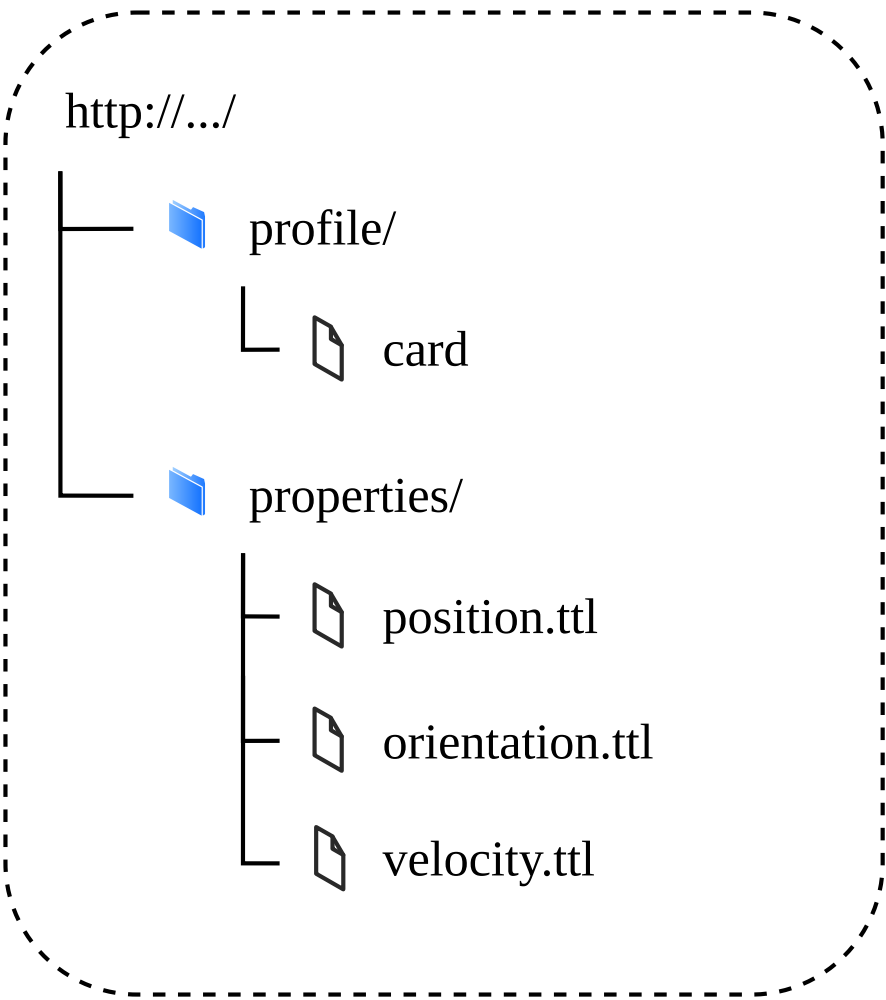
APPEND
.../orientation.ttl

APPEND
.../velocity.ttl

READ
.../position.ttl

APPEND
.../position.ttl

User Pod (c)



READ
.../position.ttl

READ
.../orientation.ttl

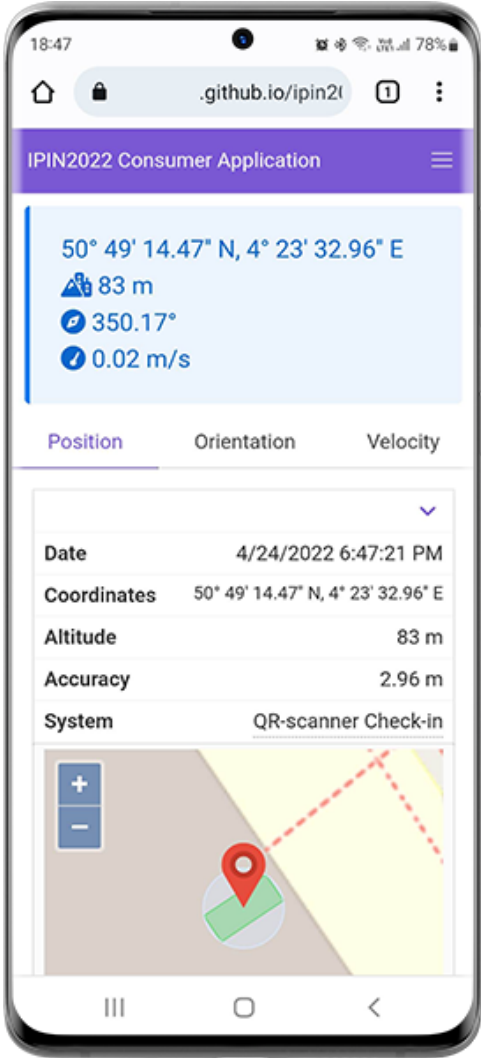
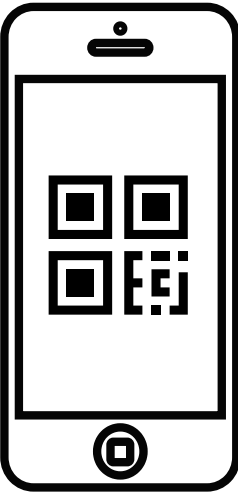
READ
.../velocity.ttl

NOTIFICATION
.../position.ttl

NOTIFICATION
.../orientation.ttl

NOTIFICATION
.../velocity.ttl

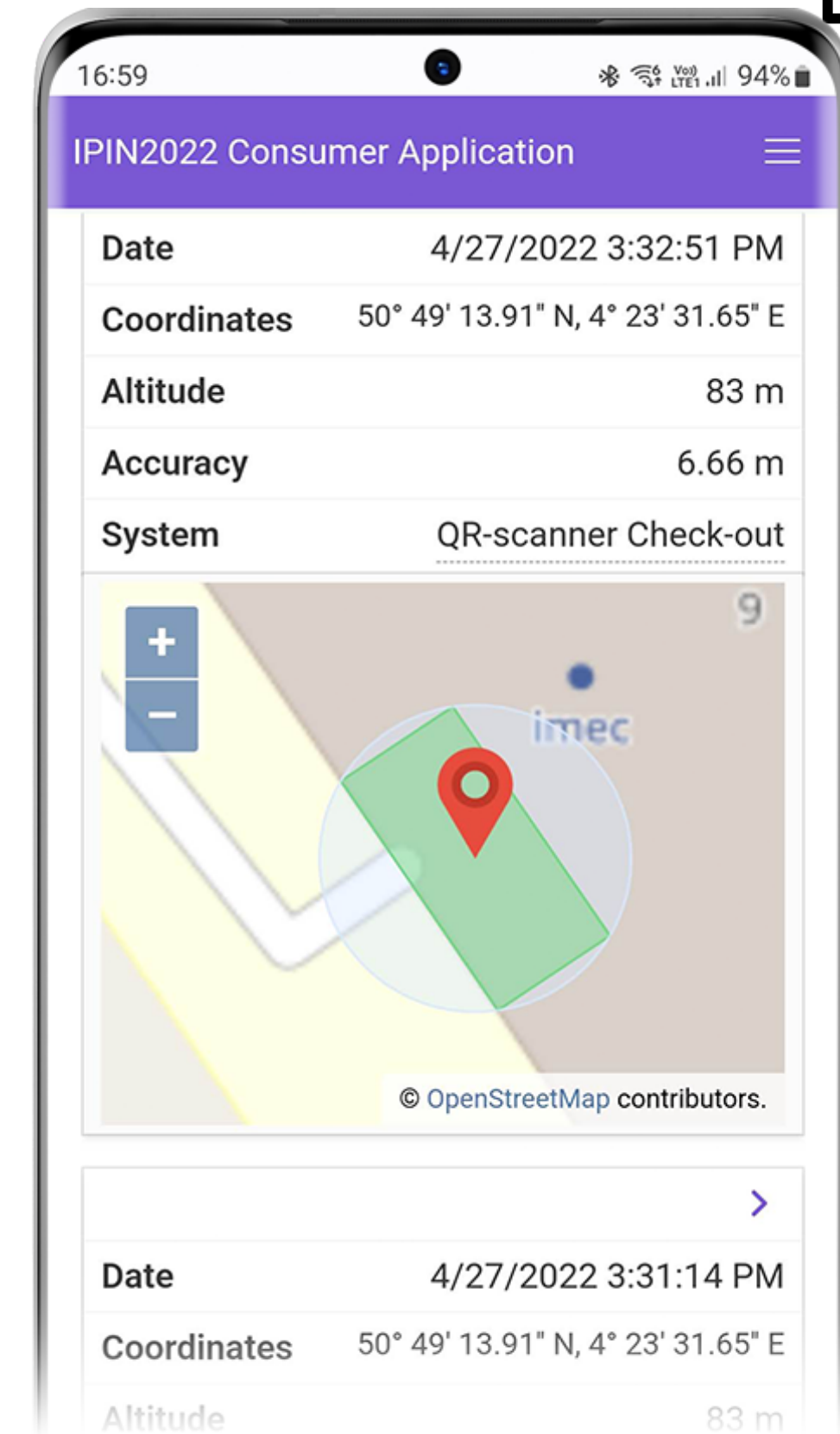
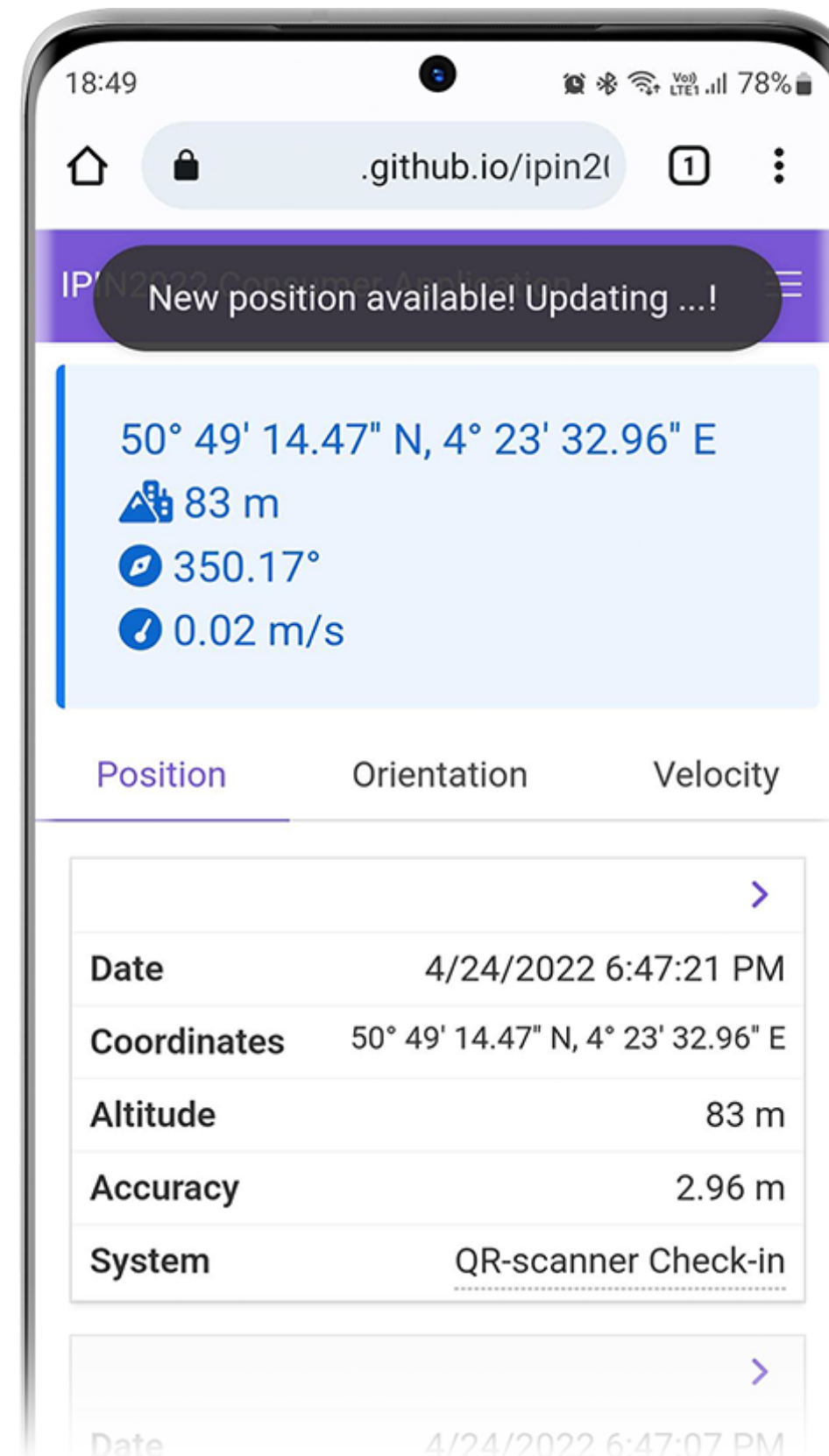
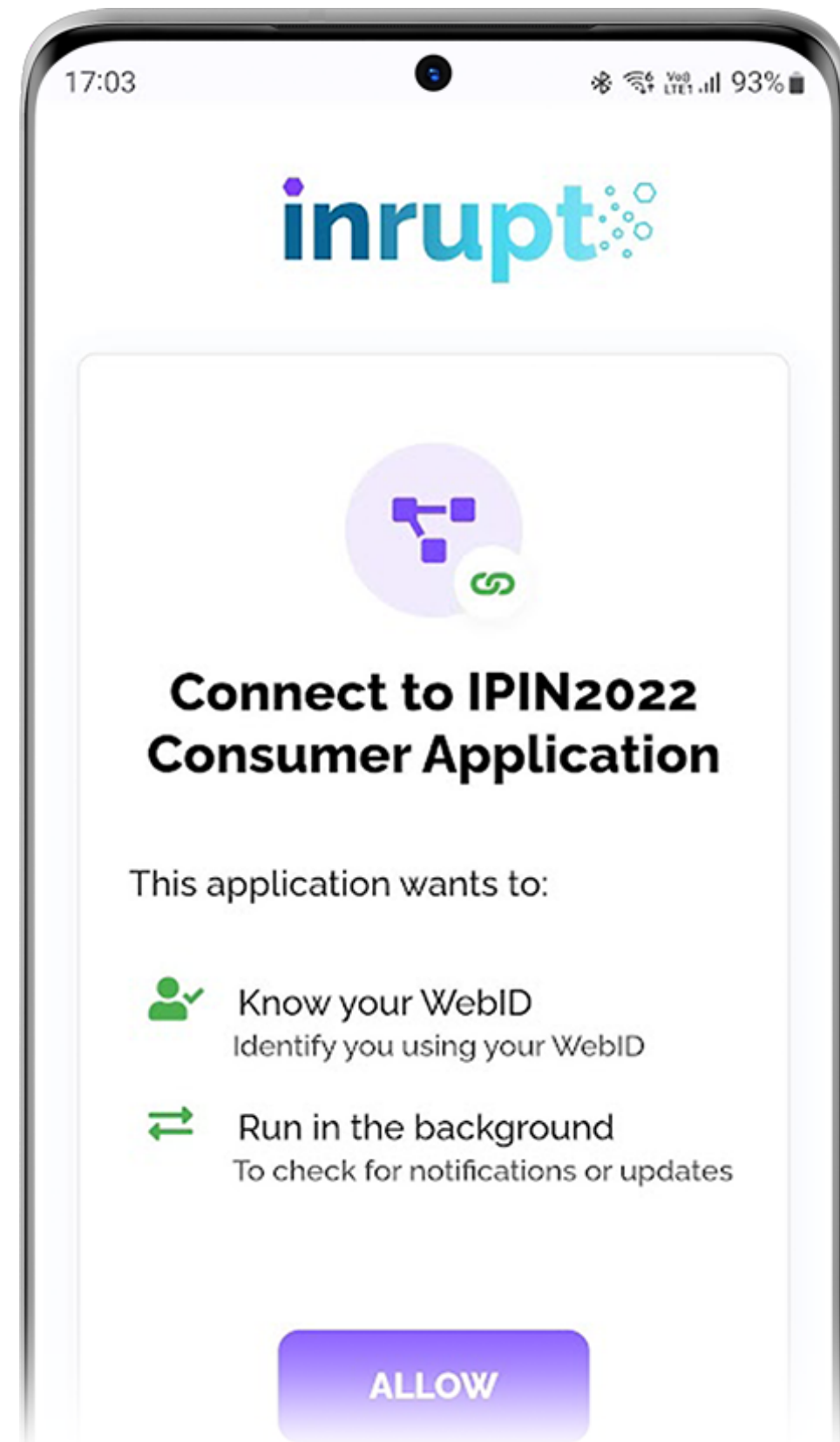
QR-scanner IPS (b)



Consumer Application (d)

Developed using  OpenHPS

PoC Demonstrator ...



PoC Demonstrator ...



```
SELECT ?posGeoJSON ?datetime ?accuracy {  
  ?profile a sosa:FeatureOfInterest ;  
           ssn:hasProperty ?property .  
  ?observation sosa:hasResult ?result ;  
              sosa:observedProperty ?property ;  
              sosa:resultTime ?datetime .  
  ?result geosparql:hasSpatialAccuracy ?spatialAccuracy ;  
          geosparql:asWKT ?posWKT .  
  BIND(geof:asGeoJSON(?posWKT) AS ?posGeoJSON)  
  ?spatialAccuracy qudt:numericValue ?value ;  
                  qudt:unit ?unit .  
  OPTIONAL { ?unit qudt:conversionMultiplier ?multiplier }  
  OPTIONAL { ?unit qudt:conversionOffset ?offset }  
  BIND(COALESCE(?multiplier, 1) as ?multiplier) # Default 1  
  BIND(COALESCE(?offset, 0) as ?offset) # Default 0  
  BIND(((?value * ?multiplier) + ?offset) AS ?accuracy)  
} ORDER BY DESC(?datetime) LIMIT 20
```