

## IMKL and INSPIRE

Liesbeth Rombouts  
Informatie Vlaanderen

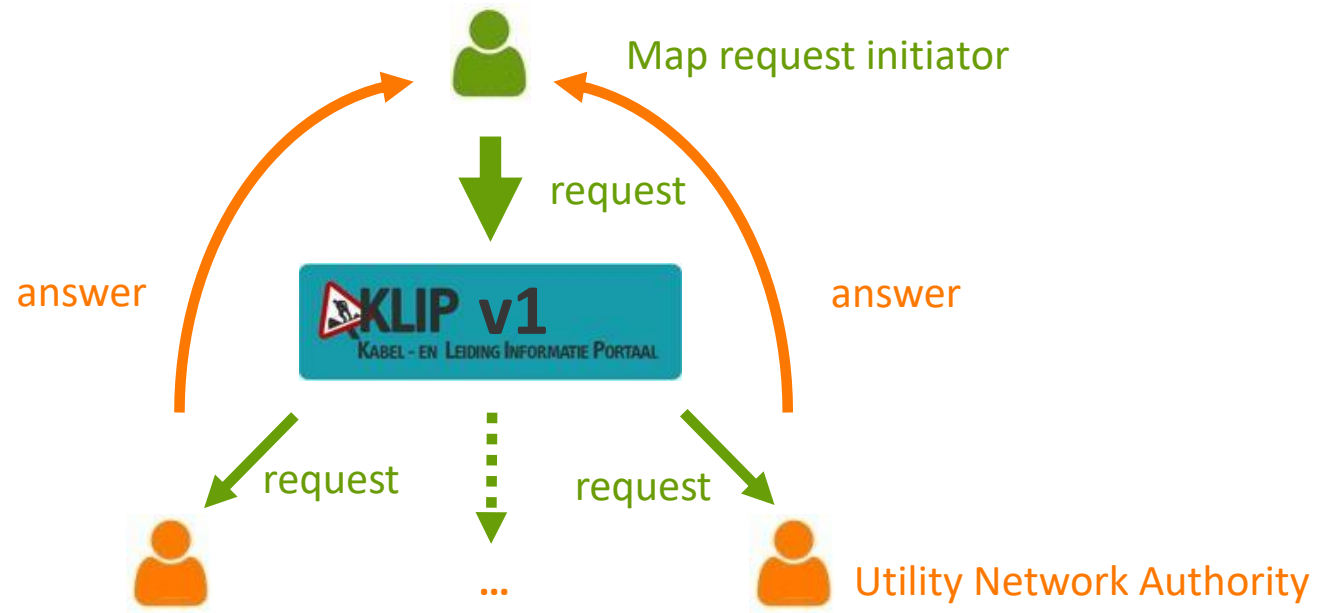
**INFORMATIE  
VLAANDEREN**

Luc Van Linden  
HL Consulting

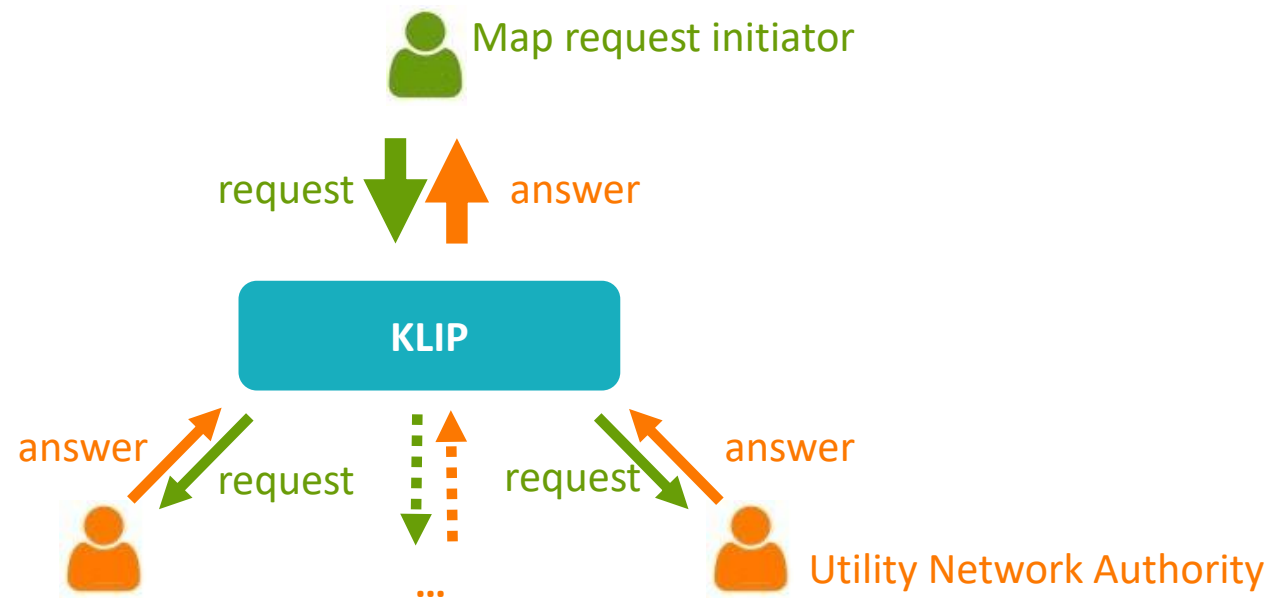


**HL**CONSULTING

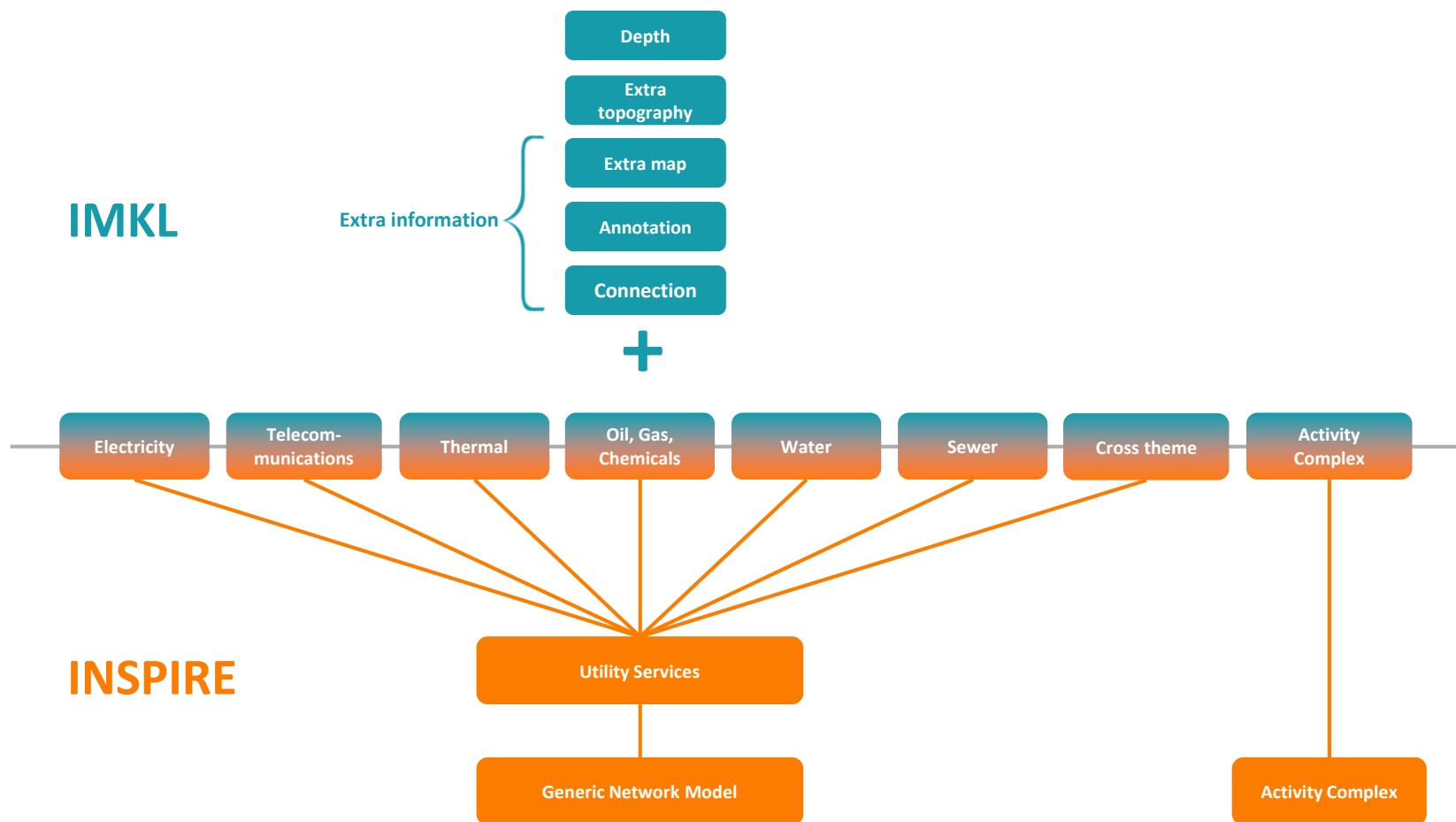
# KLIP – before 2016

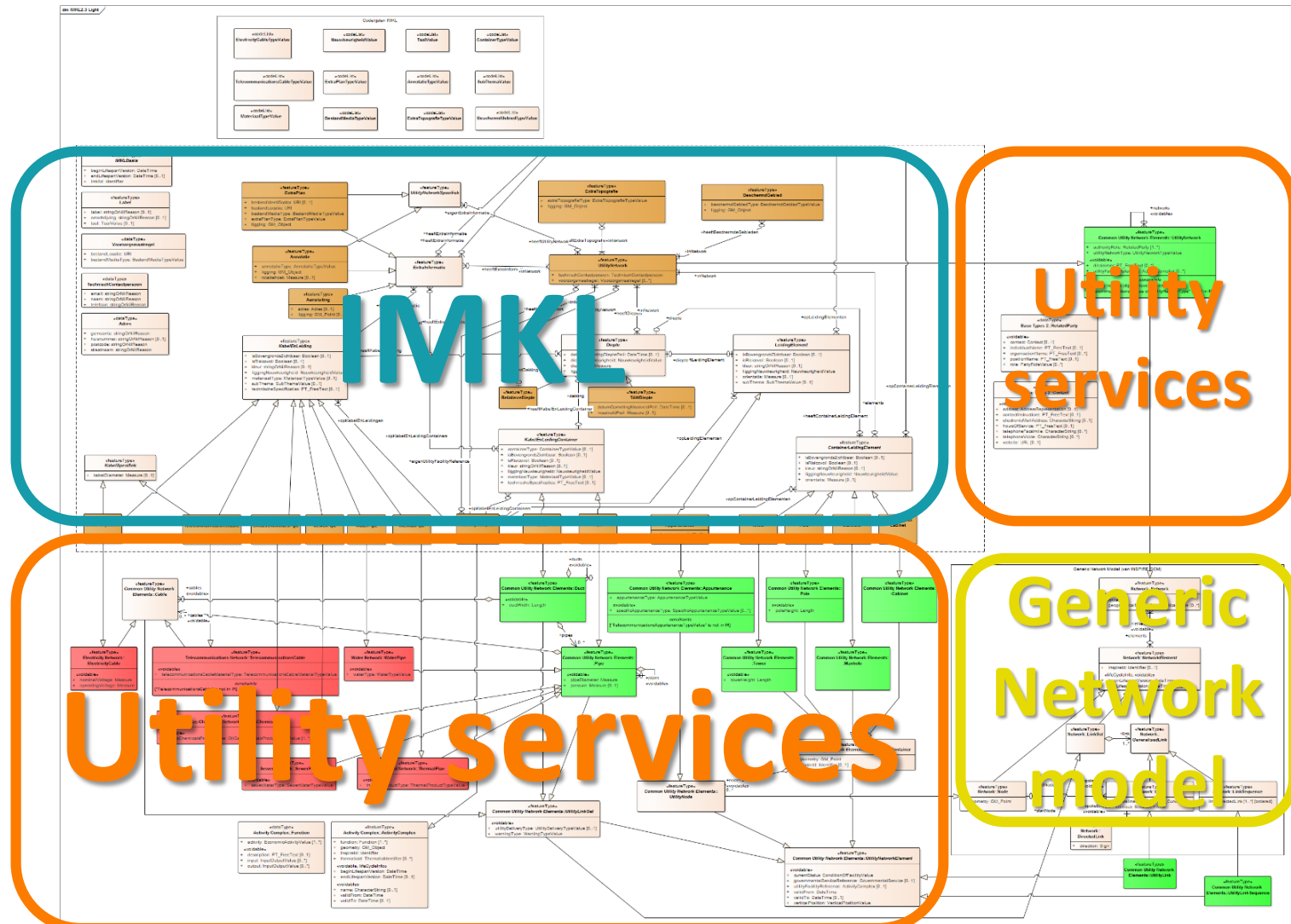


# KLIP – since 2016



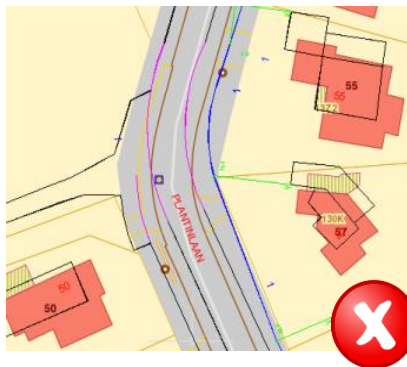
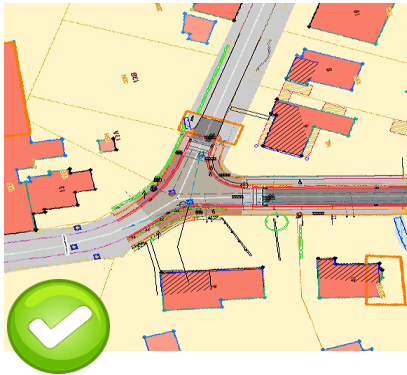
# “The Model”





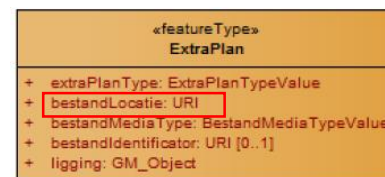
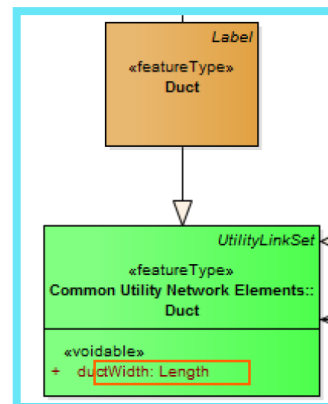
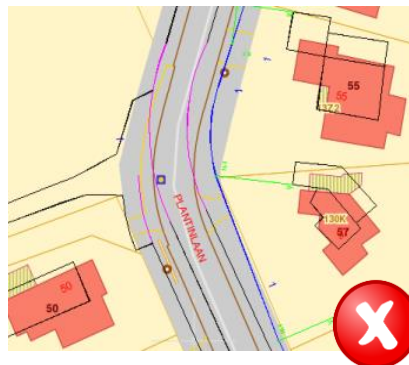
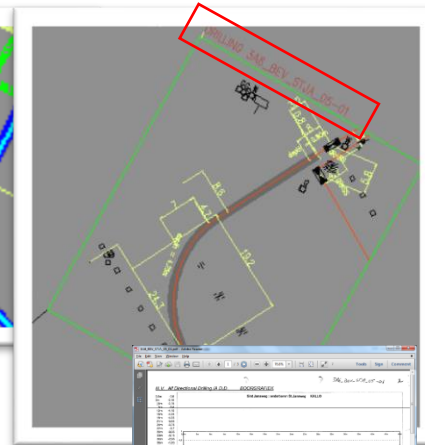
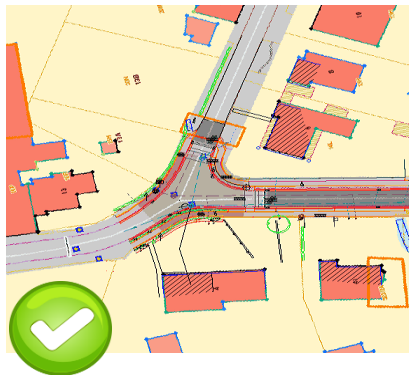
# Challenge (UNA): Validate the source data vs Model

1. Data geo-referenced wrt common reference large-scale basemap?



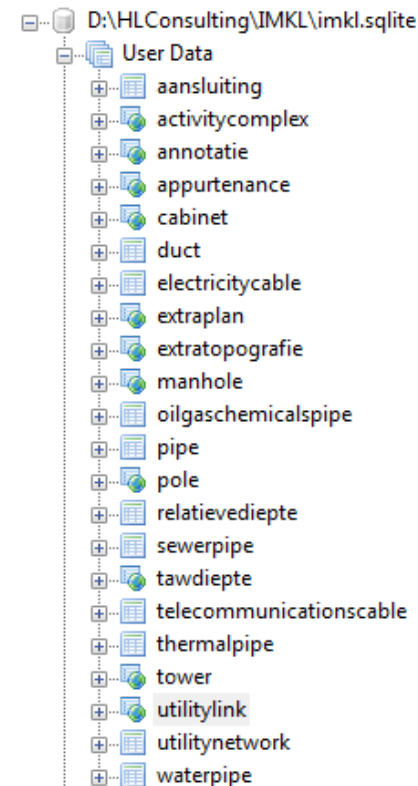
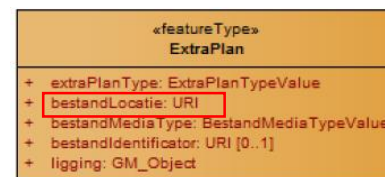
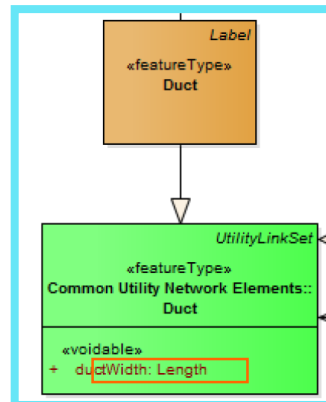
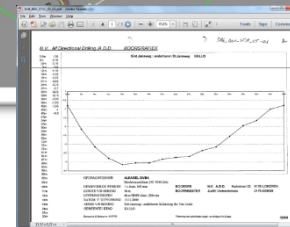
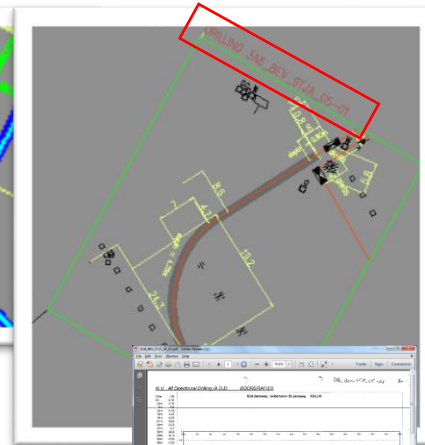
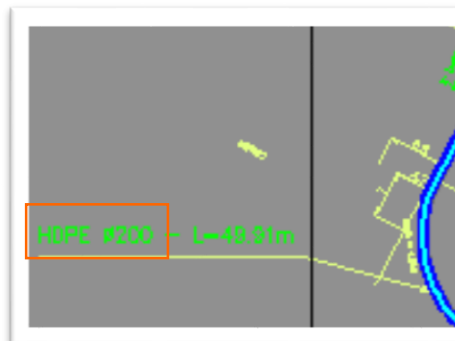
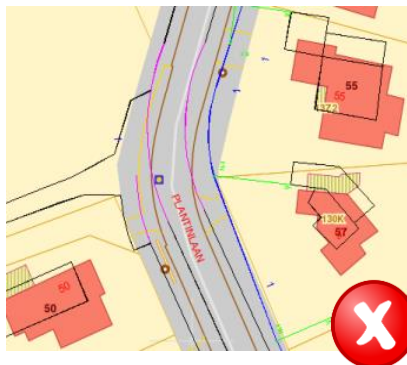
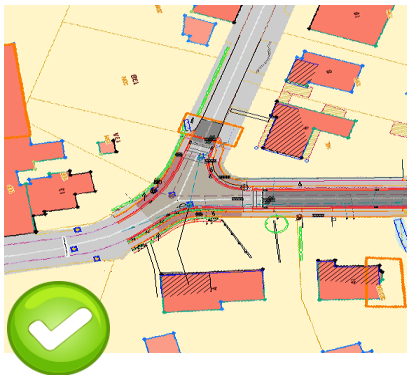
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1. Data geo-referenced wrt common reference large-scale basemap?
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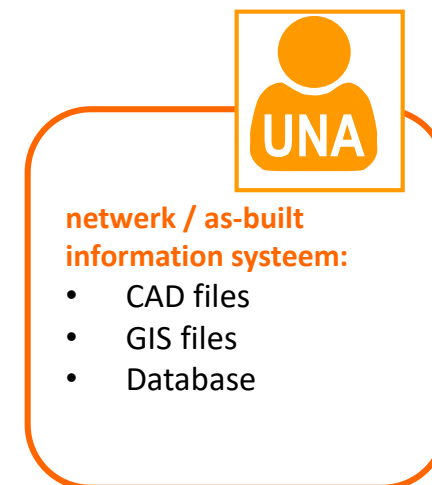
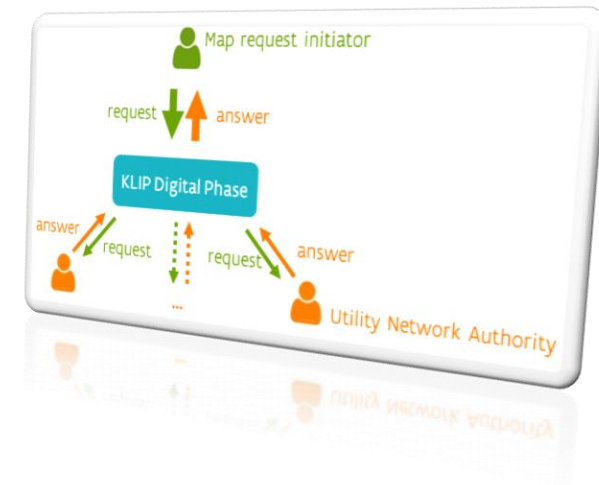
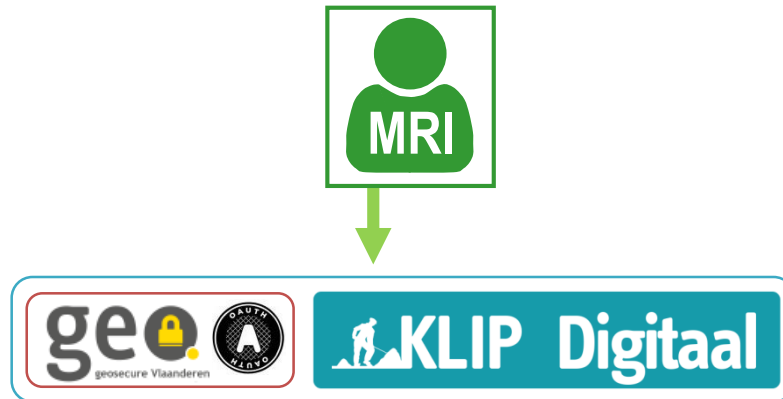
# Challenge (UNA): Validate the source data vs Model

1. Data geo-referenced wrt common reference large-scale basemap?
2. Required elements (features, properties and relationships) available in the source data?
3. Does an asset register exist?

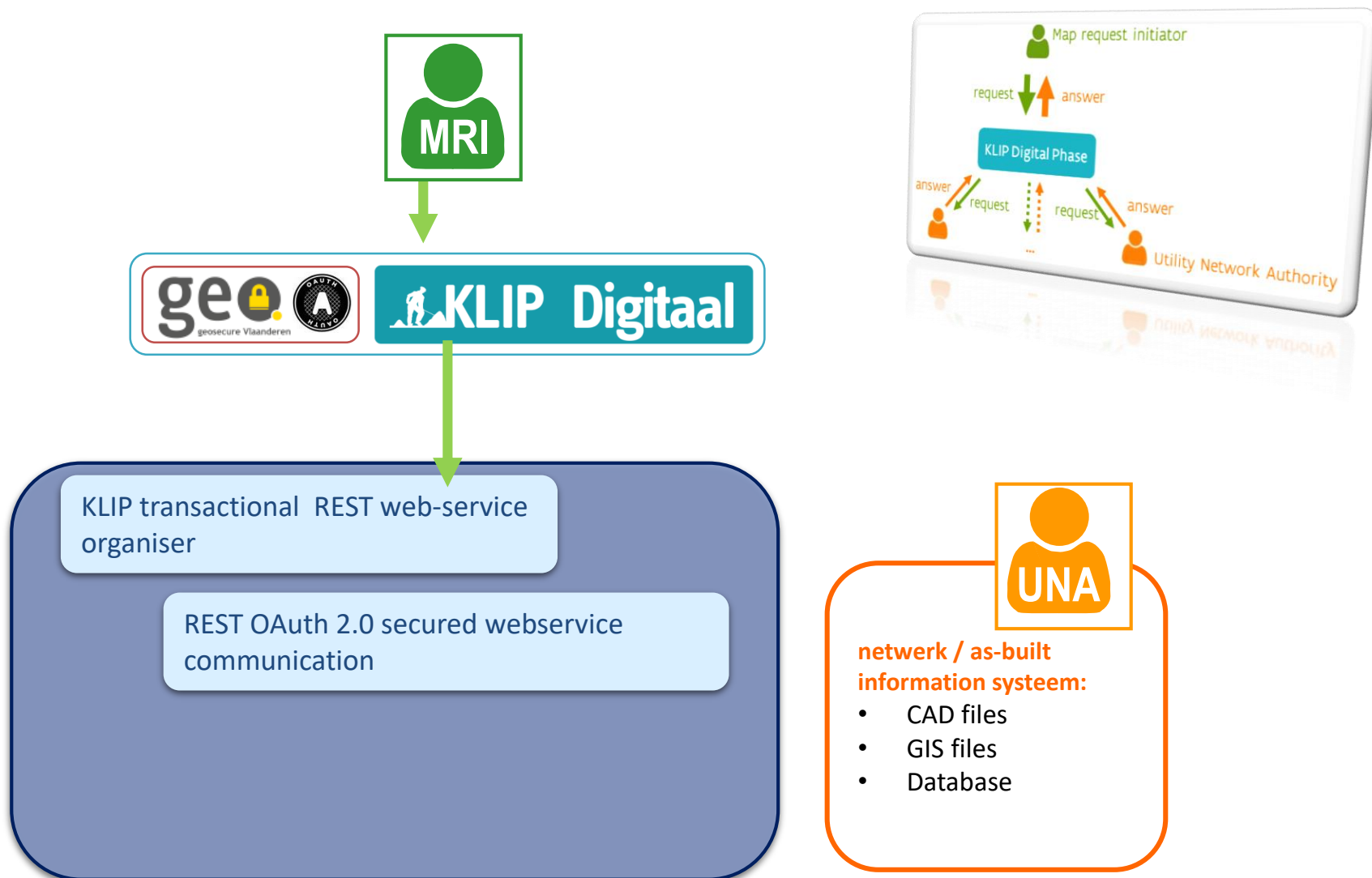




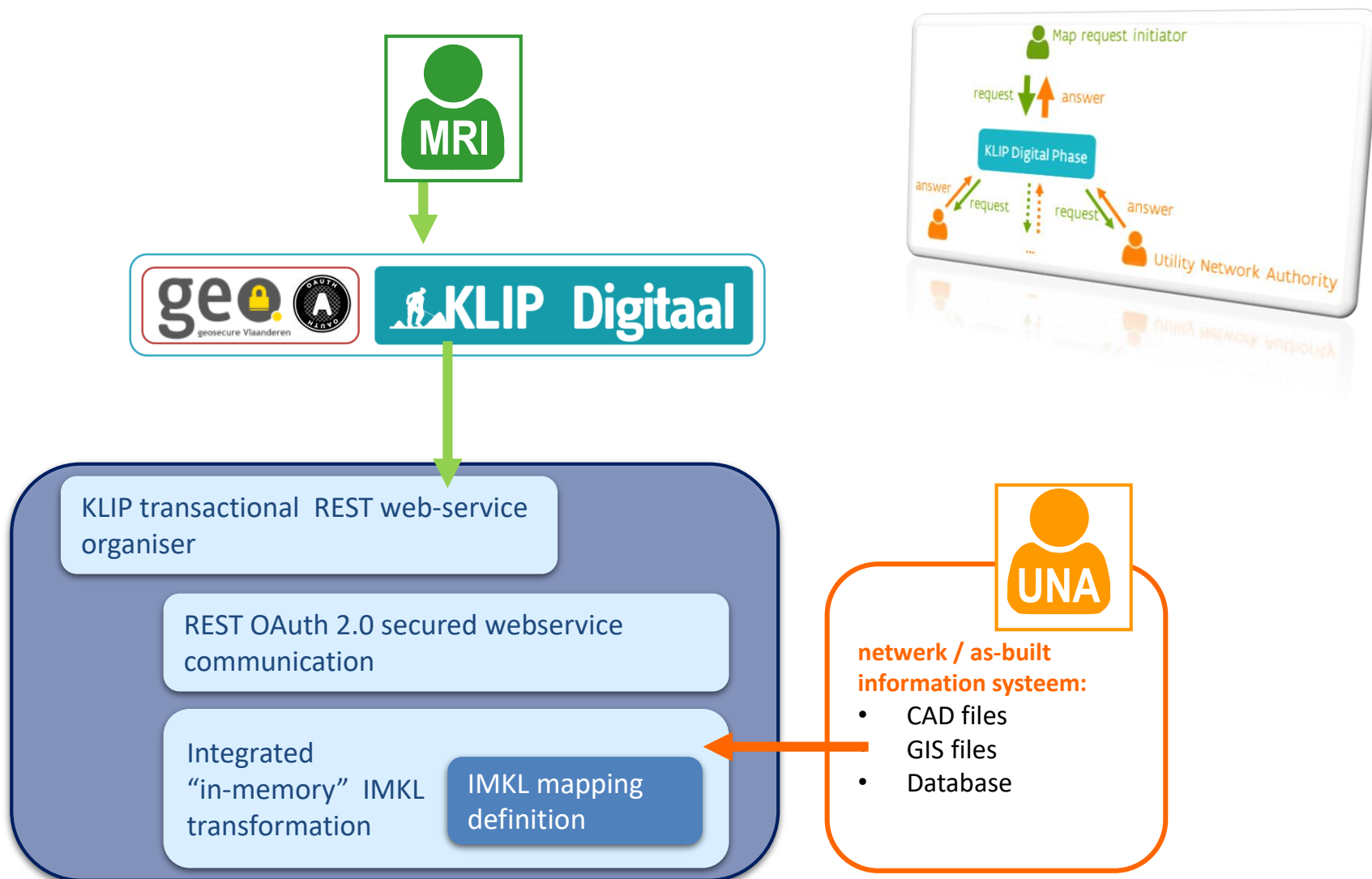
# Challenge (UNA): Automate the Responses (via REST)



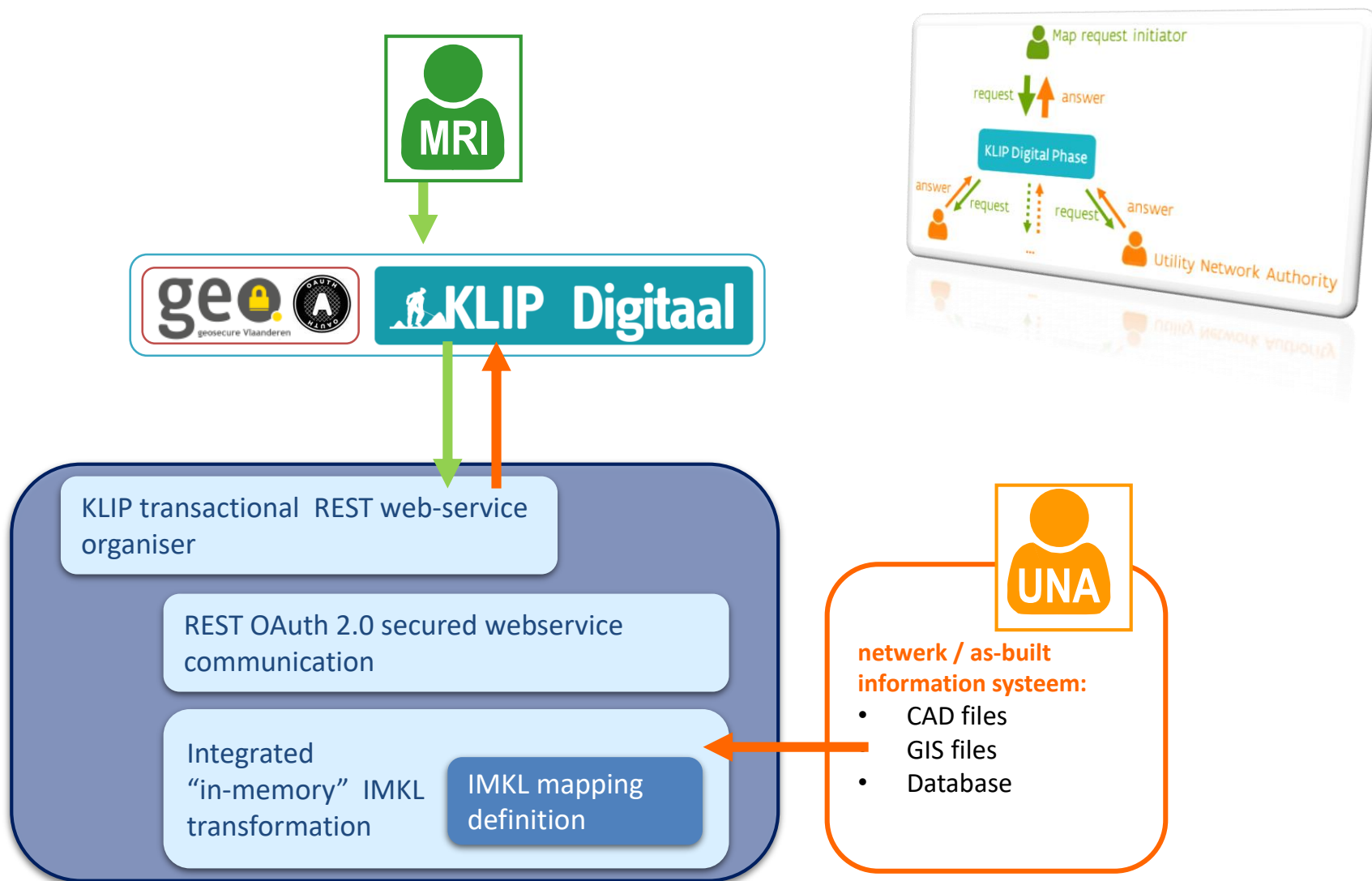
# Challenge (UNA): Automate the Responses (via REST)



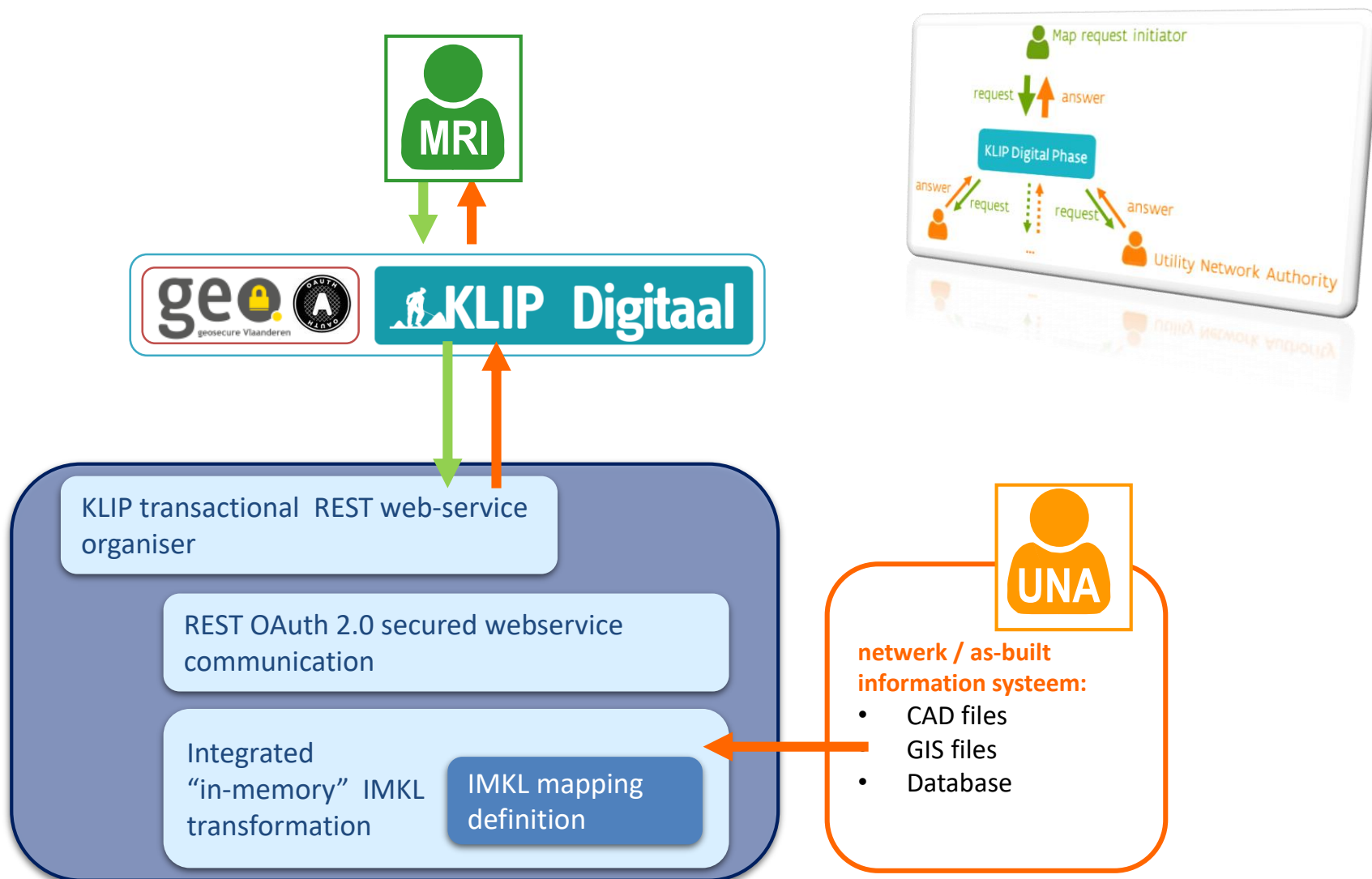
# Challenge (UNA): Automate the Responses (via REST)



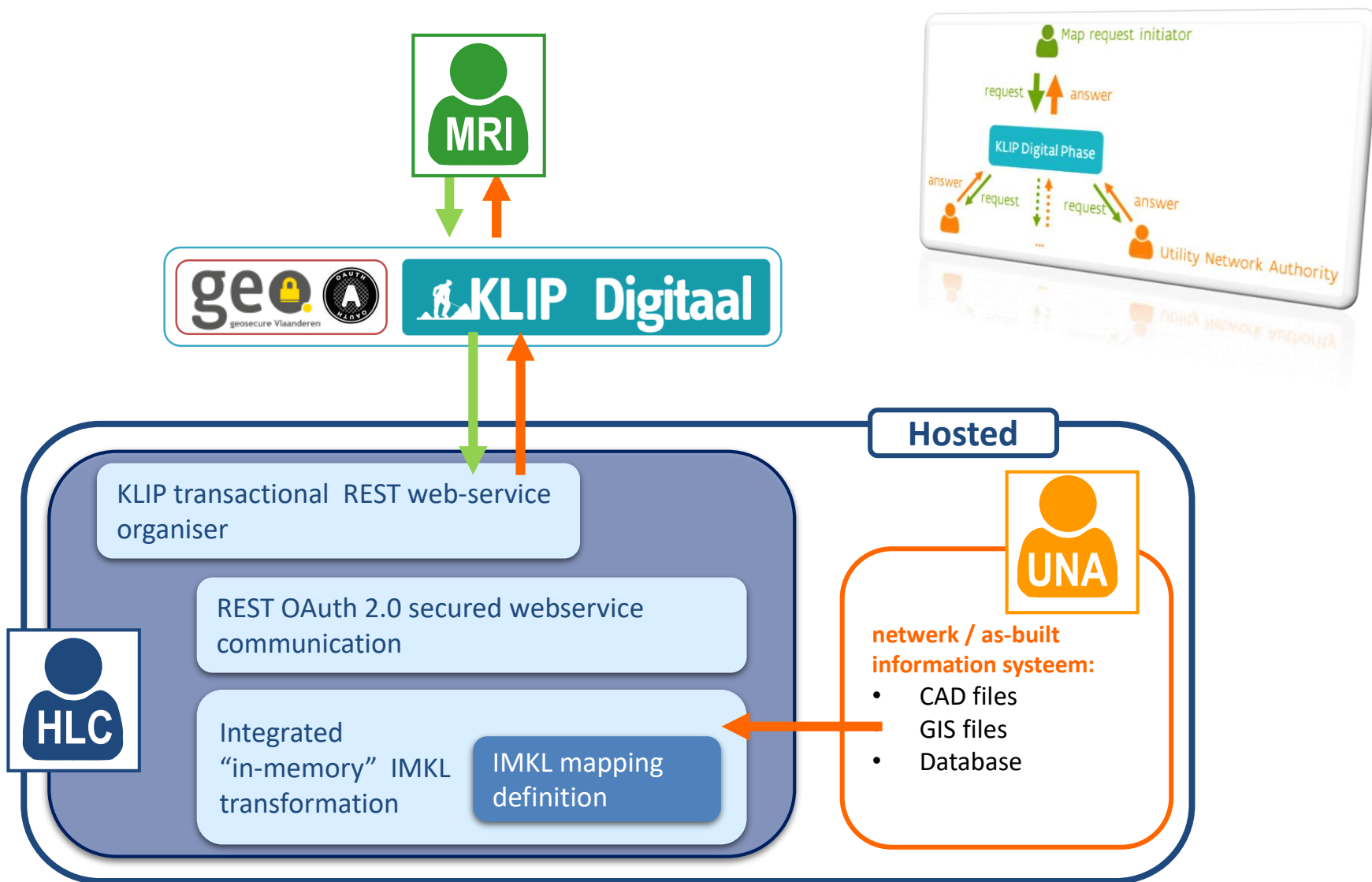
# Challenge (UNA): Automate the Responses (via REST)



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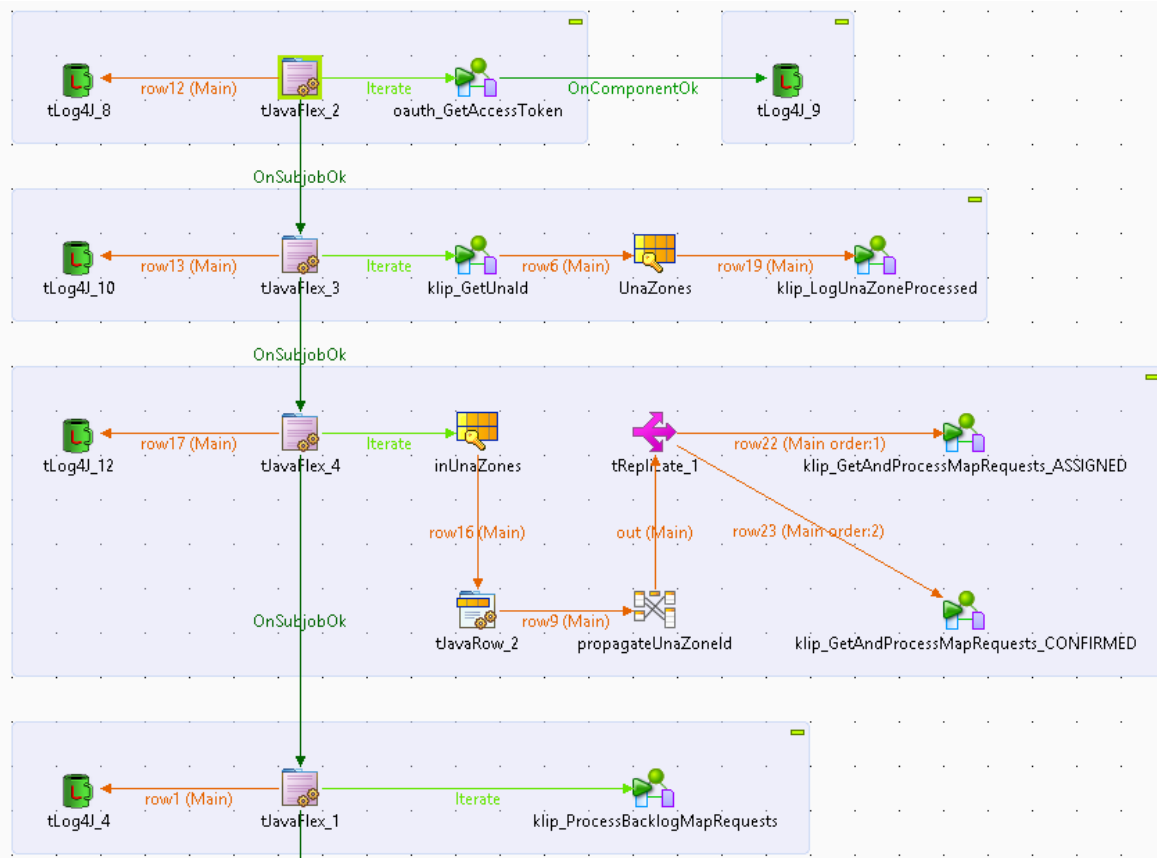
# Challenge (UNA): Automate the Responses (via REST)



# Technical implementation: use of Open Source underpinned by Open Standards



Mainstream IT   
Open source Data Integration &  
ESB platform  
TALEND Spatial Extension



# Technical implementation: Transform & Encode underpinned by Open Standards



## 1. Source & Target schemas

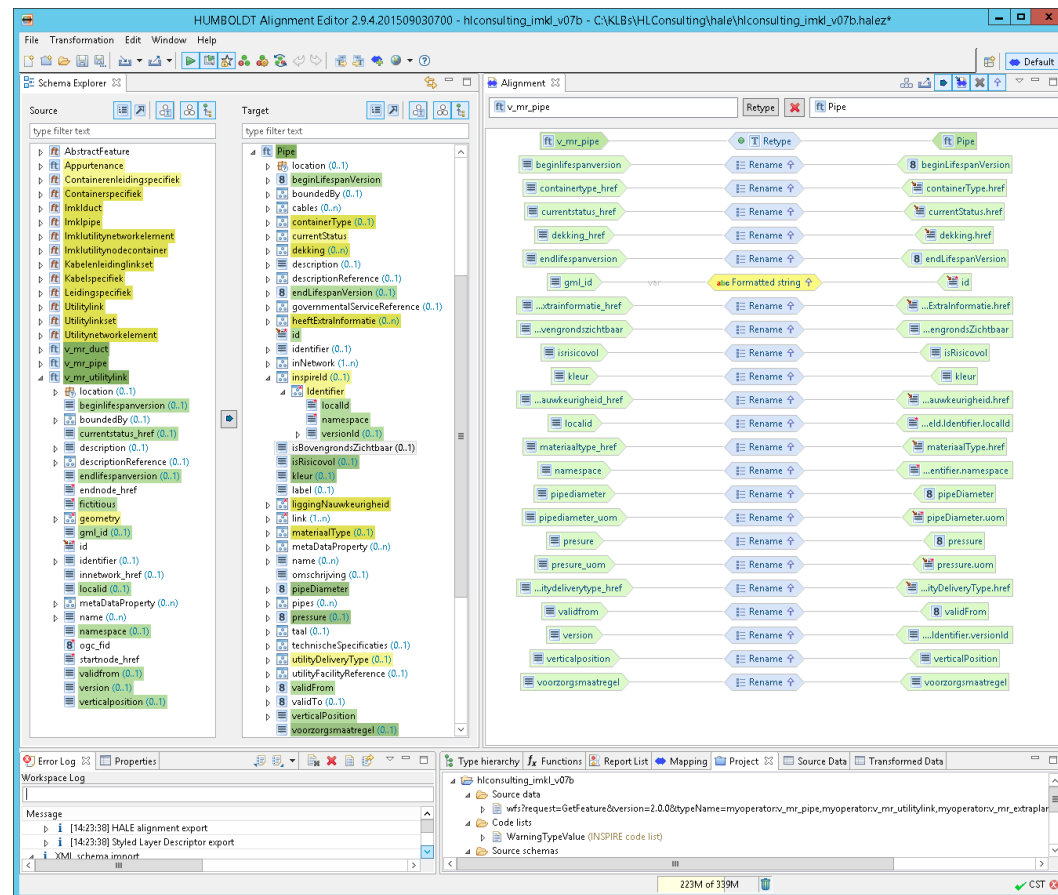
- > Read from data-sources
- > Or XSD GML Application schemas
  - Extremely efficient

## 2. Creating schema mappings

- > domain experts
- > Easily maintained external to the processing
- > Rich transformations

## 3. Transforms & encode IMKL GML 3.2.1 file

- > From GUI
- > From command line using mapping definition config file

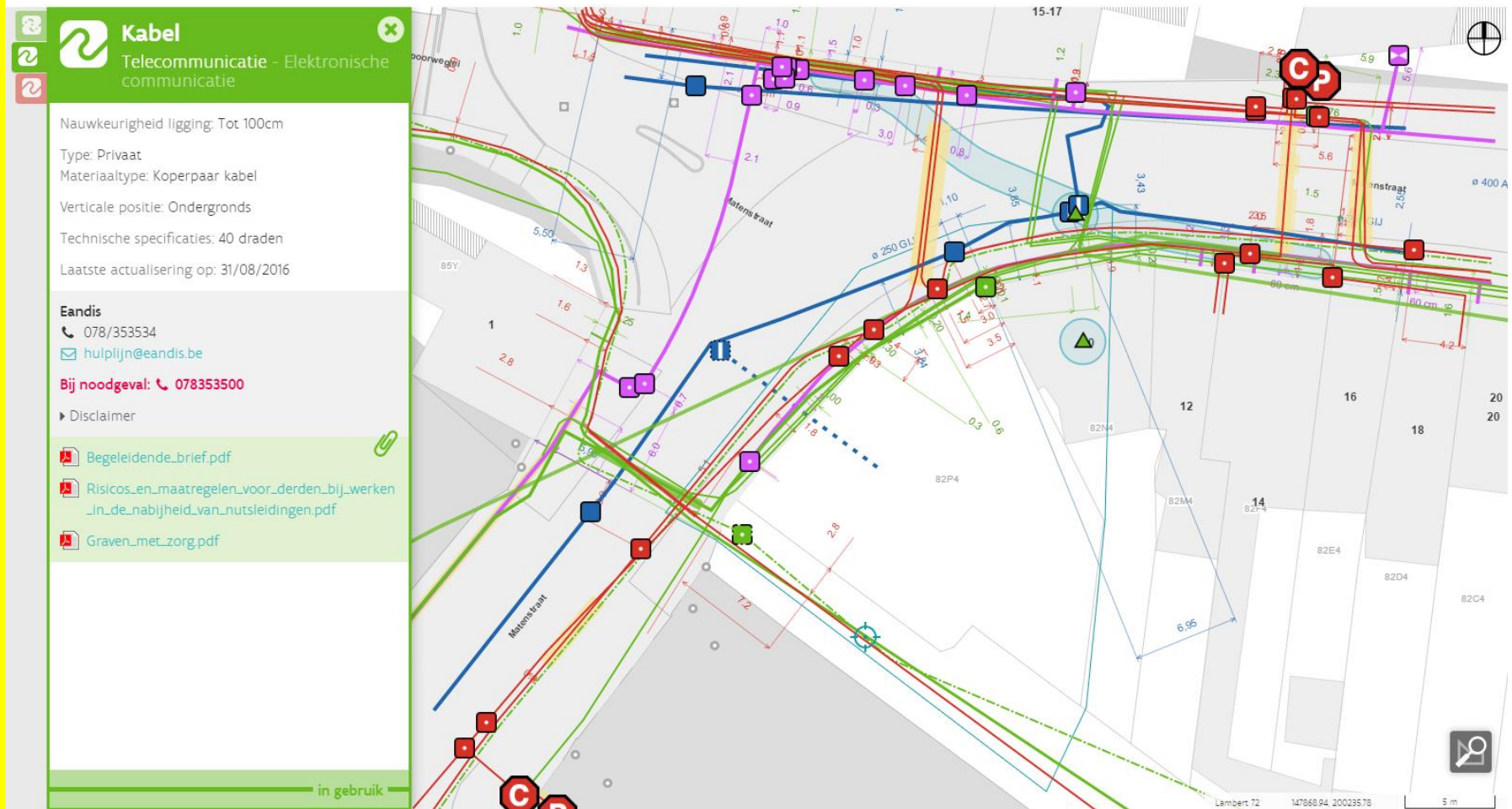




# IMKL → Viewer

- > IMKL → blob
- > Data validation
  - .NET
  - xsd validation: standard library
  - Extra validation rules: custom written
- > Data in the viewer
  - xml → json
  - harvest background layer

# Viewer



# Any Questions?

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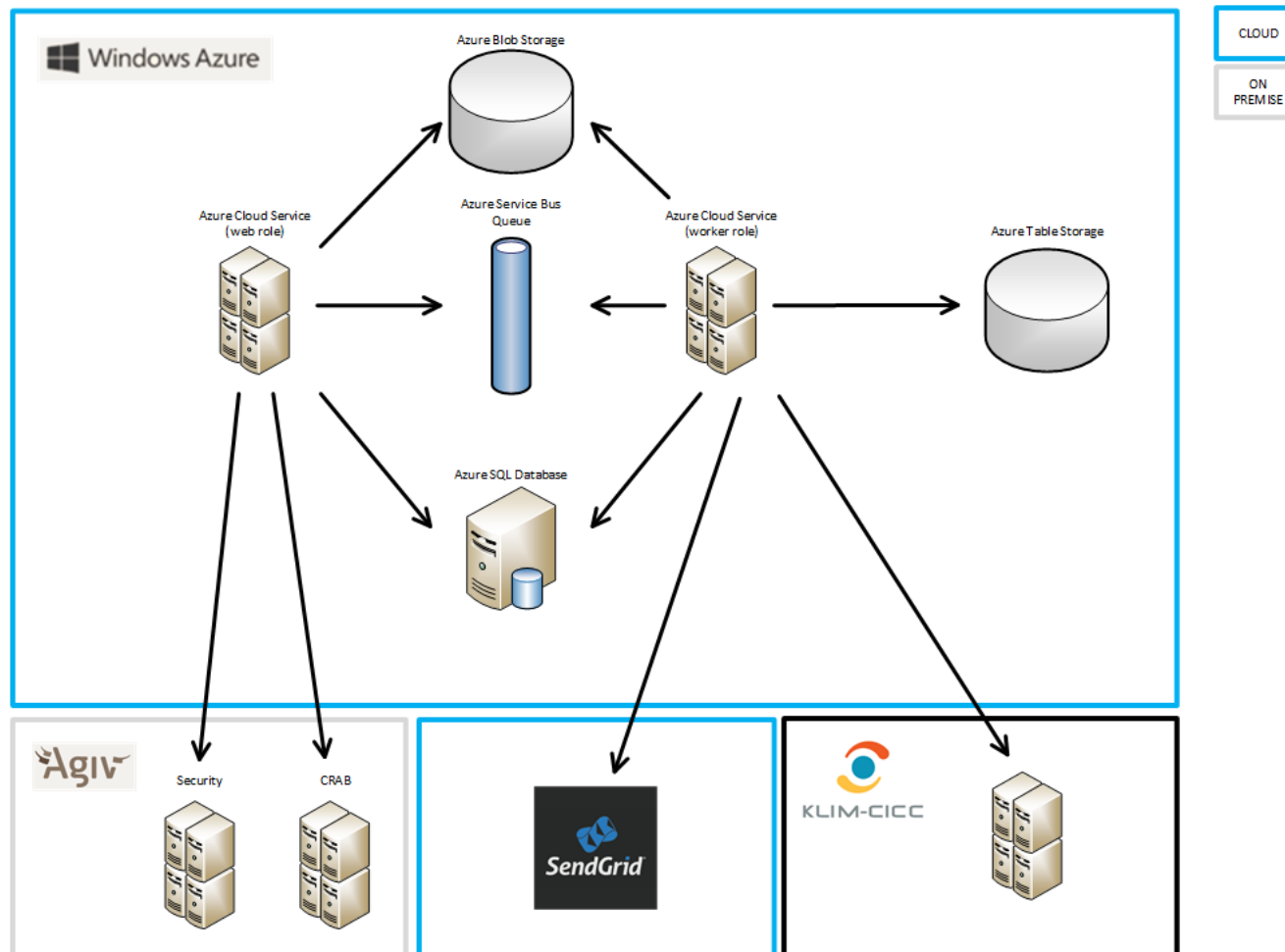


More information...

# Technology stack

- > Website
  - Knockout, Durandal, OpenLayers
- > Wrapper
  - Electron
- > Backend
  - Azure SDK
- > Web API
  - ASP.NET Web API

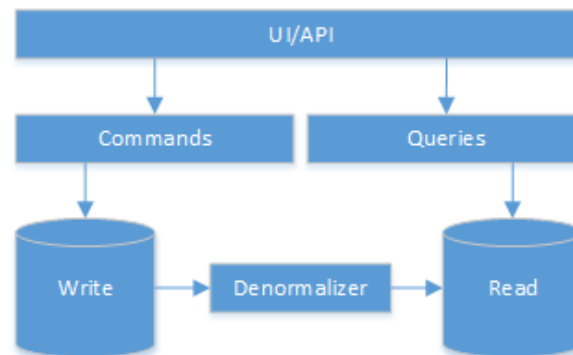
# Infrastructure



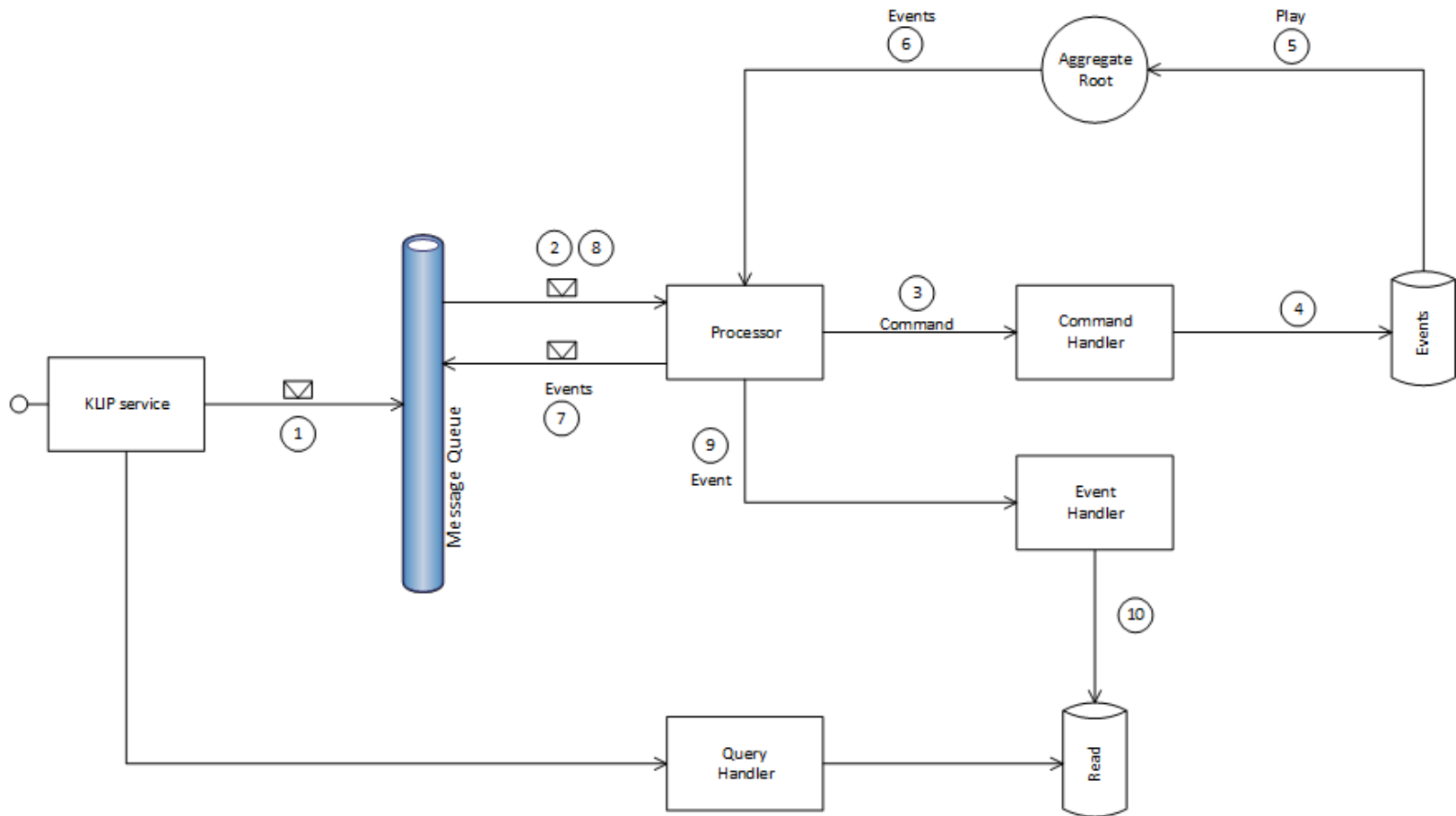
# Application architecture

## > CQRS with Event Sourcing

- commands (writes) separated from queries (reads)
- natural audit log



# Application architecture



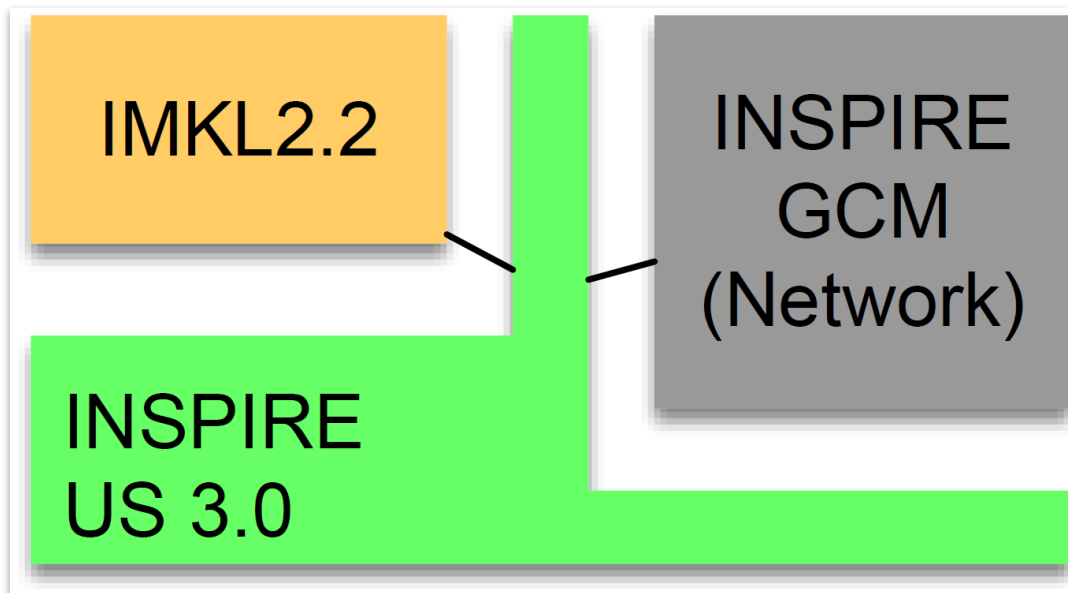


# API

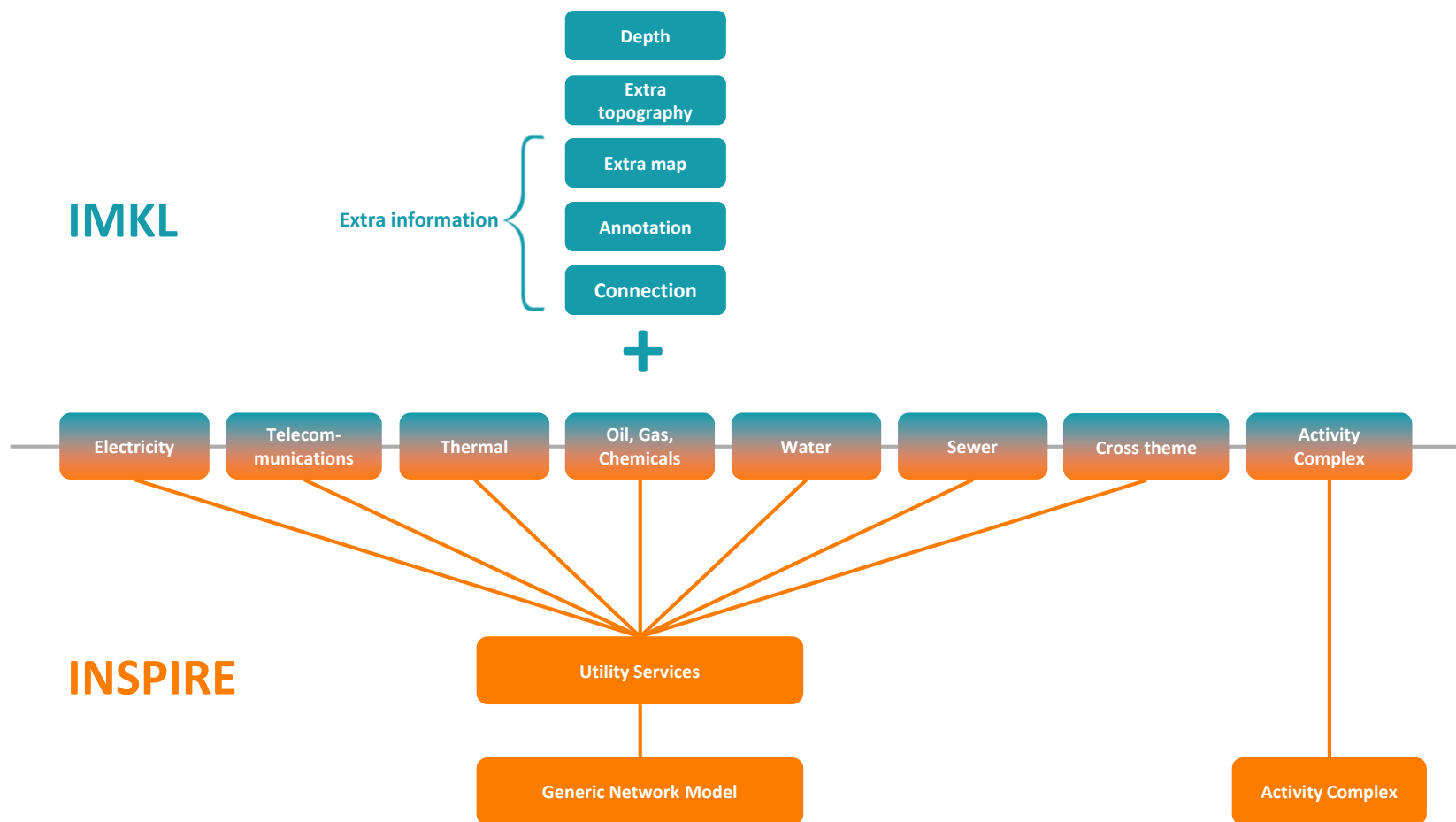
- > REST API over HTTPS
- > Secured by the OAuth 2.0 protocol
- > Supports JSON and XML
- > POST instructions asynchronous
- > GET instructions synchronous
- > Functionally broken down into methods for the Map Request Initiator and the Utility Network Authority

# IMKL Model

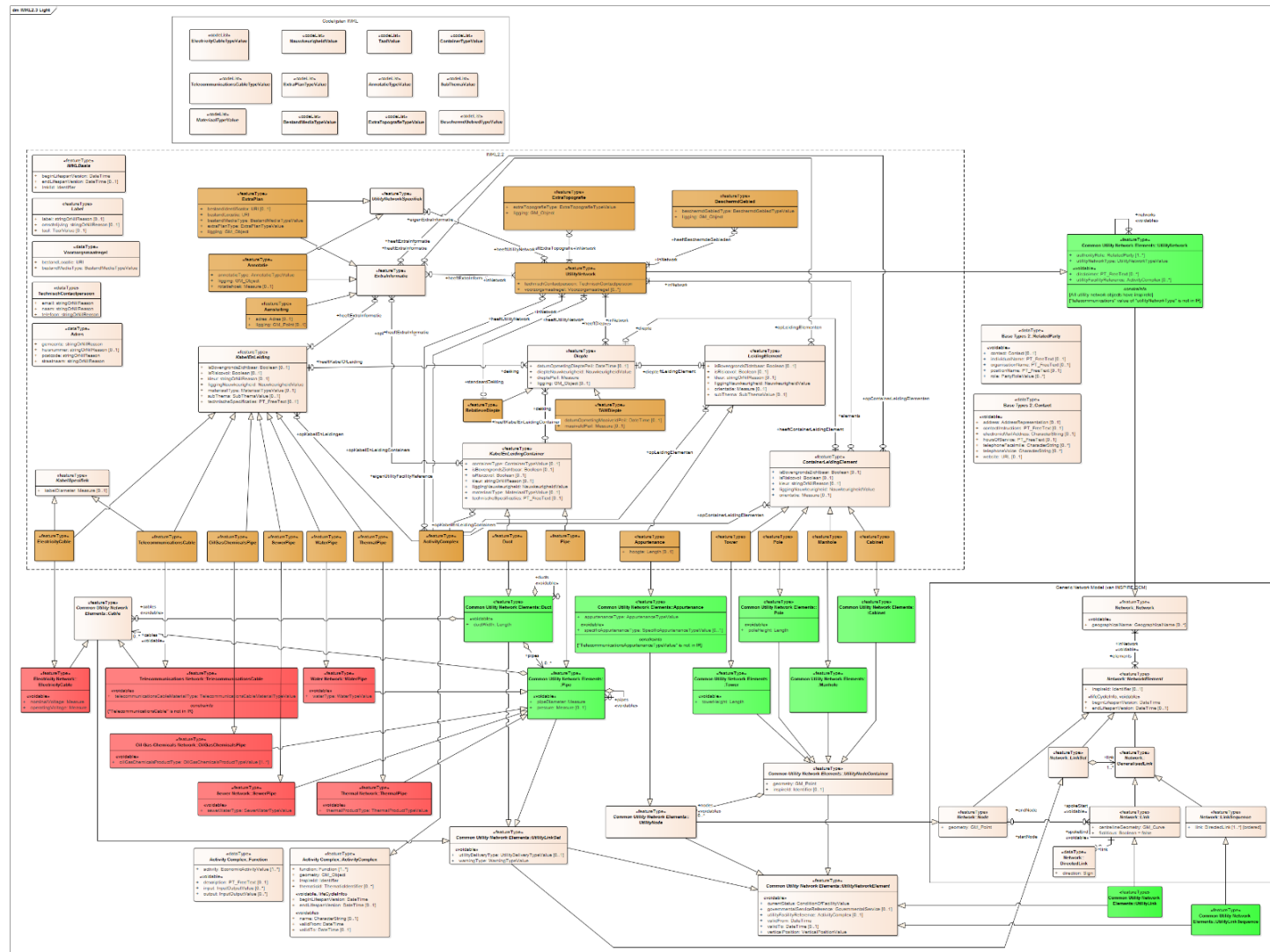
- > Information model Cables & Pipes (IMKL)
- > Extension to INSPIRE Utility Theme (INSPIRE US 3.0)
  - Additional classes, properties and relationships



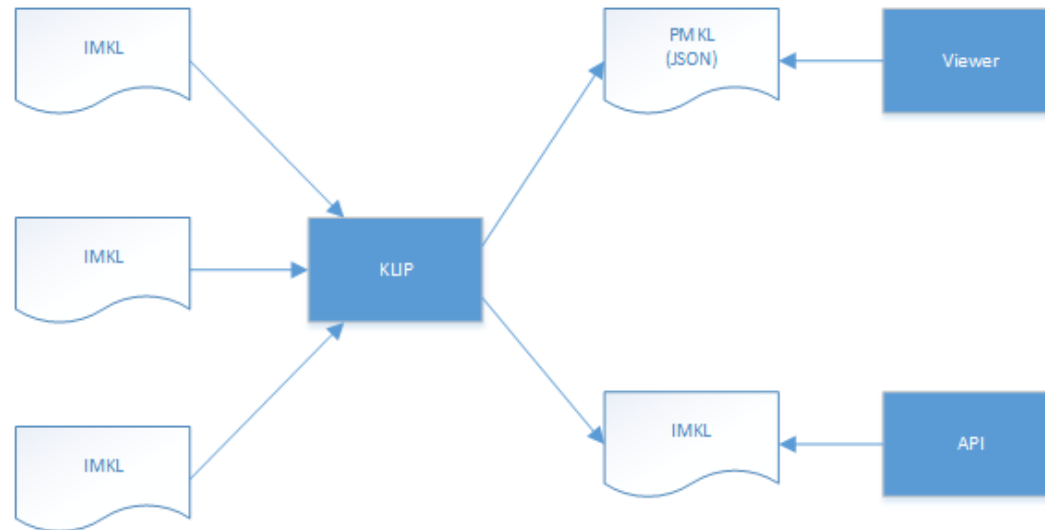
# IMKL Model



# IMKL Model



# Viewer



# Info and Documentation

- > Our answer to the RFI
- > Everything about KLIP (most of it in Dutch)
  - [www.klip.be](http://www.klip.be)
- > Test
  - <https://klip.beta.agiv.be>
    - > application
  - <https://klip.agiv.be/api>
    - > API documentation





## KLIP



### Cable and Pipe Information Portal (KLIP)

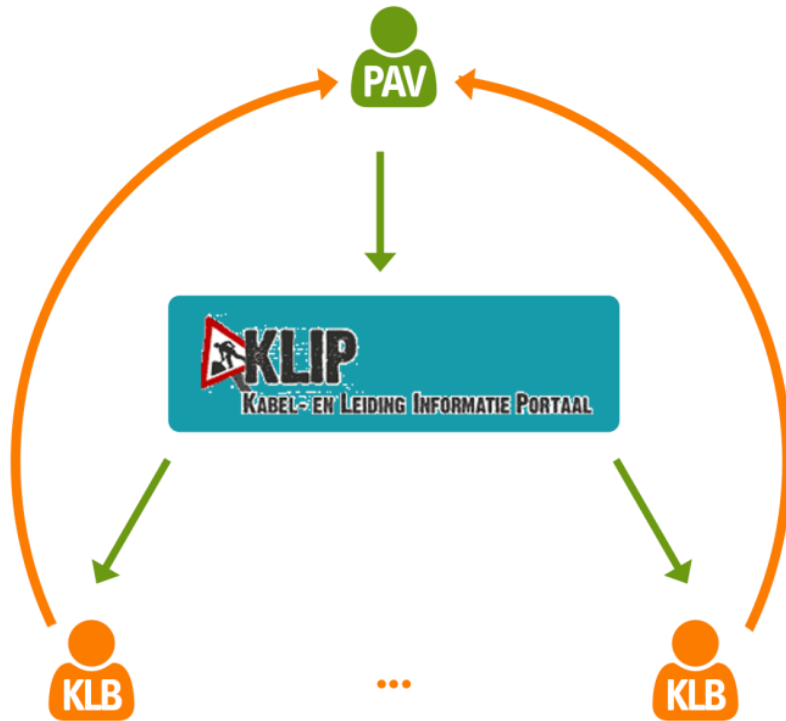
- Purpose precaution and avoiding accidents or damages to underground infrastructures.
- Contractor is legally obliged since 2009 to request upfront as-built information via a central portal (KLIP) hosted by the Flemish government.
- All infrastructure owners or maintainers need to register and supply plans for every request.

### New KLIP 1<sup>st</sup> of January 2016

- Shortening maximum term from 15 to 7 working days
- Exchange only network elements
- Usage of 1 single data model (IMKL)
- Offer the requestor 1 single view of the underground infrastructure

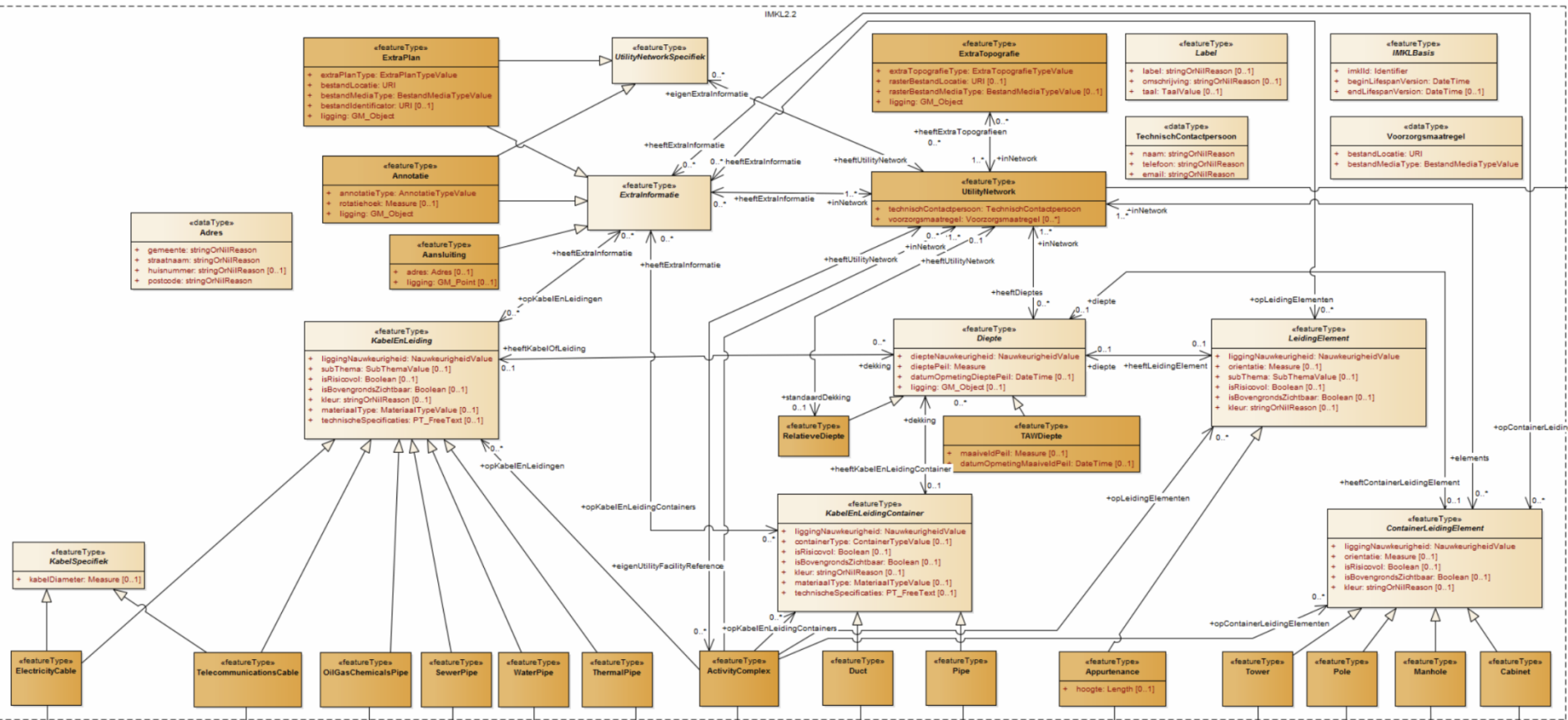


## KLIP IN THE PAST



## KLIP DIGITAL SINCE JAN '16



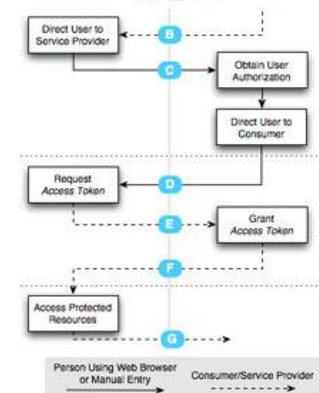
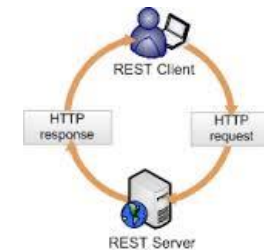




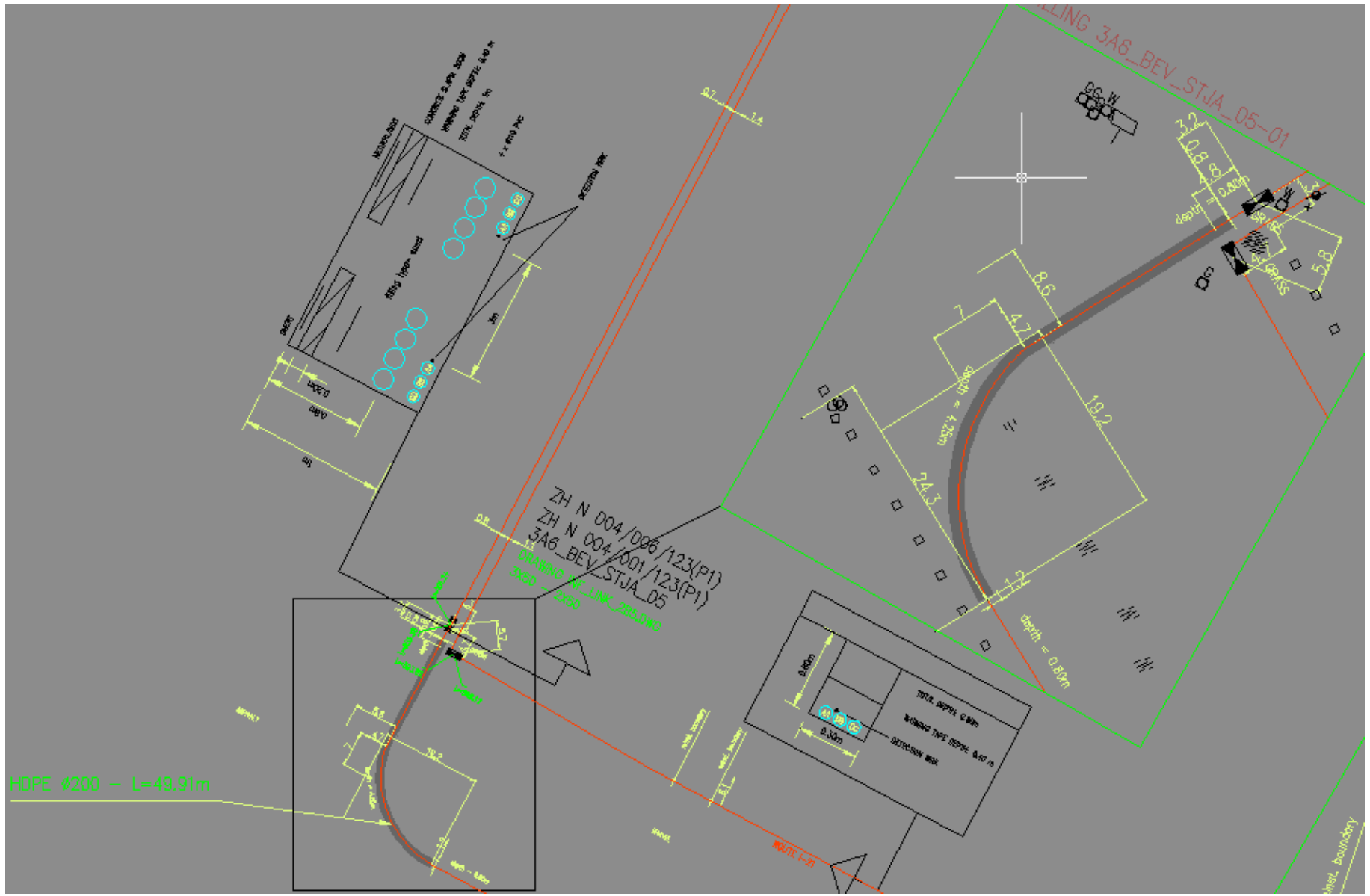
## KLIP: COMMUNICATION

### IMKL - PROTOCOL & API

- Exchange of network elements ONLY:
  - XML/GML 3.2.1 IMKL
  - Form & content compliant with IMKL model
  - No topography
- Communication with the KLIP platform only
- Portal
- Automated via REST web services
  - machine – machine
  - Transactional (per plan request)
- Security OAuth 2.0



## KLIP: TRANSFORM SOURCE



# KLIP: INTO A RESPONSE

## IMKL XML:

- Geographical Markup Language
- Version 3.2.1
- Open International Standard of Open Geospatial Consortium



```
<?xml version="1.0" encoding="UTF-8"?>
<gml:FeatureCollection xmlns:schemaLocation="http://mir.agiv.be/cl/AGIV/v1/xmlns/IMKL2.2 IMKL2.2_rc_12062014.xsd" xmlns:us-net-wa="http://inspire.ec.europa.eu/schemas/us-net-wa/3.0" xmlns:us-net-th="http://inspire.ec.europa.eu/schemas/us-net-th/3.0" xmlns:us-net-tc="http://inspire.ec.europa.eu/schemas/us-net-tc/3.0" xmlns:us-net-sw="http://inspire.ec.europa.eu/schemas/us-net-sw/3.0" xmlns:us-net-ogc="http://inspire.ec.europa.eu/schemas/us-net-ogc/3.0" xmlns:us-net-el="http://inspire.ec.europa.eu/schemas/us-net-el/3.0" xmlns:us-net-common="http://inspire.ec.europa.eu/schemas/us-net-common/3.0"
xmlns:imkl="http://mir.agiv.be/cl/AGIV/v1/xmlns/IMKL2.2" xmlns:gml:exr="http://www.opengis.net/gml/3.3/exr" xmlns:gmd="http://www.isotc211.org/2005/gmd"
xmlns:base2="http://inspire.ec.europa.eu/schemas/base2/1.0" xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3"
xmlns:base_net="urn:x-inspire:specification:gmlas:BaseTypes:3.2" xmlns:net="urn:x-inspire:specification:gmlas:Network:3.2" xmlns:act-core="http://inspire.ec.europa.eu/schemas/act-core/3.0" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:gml="http://www.opengis.net/gml/3.2" gml:id="HLC_1">
  <gml:featureMember>
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      <net:inspireId>
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          <base_net:localId>pi_D4C</base_net:localId>
          <base_net:namespace>be_HLC_klipDF_ZoneA</base_net:namespace>
        </base_net:Identifier>
      </net:inspireId>
      <net:inNetwork xlink:href="http://mir.agiv.be/data/IMKL/v2.2/UtilityNetwork/be_HLC_klipDF_ZoneA:HLCO_OP1"/>
      <net:link xlink:href="http://mir.agiv.be/data/INSPIRE-US/v3/UtilityLink/be_HLC_klipDF_ZoneA:ul_D4C"/>
      <us-net-common:currentStatus xlink:href="http://inspire.ec.europa.eu/codelist/ConditionOfFacilityValue/functional"/>
      <us-net-common:validFrom nilReason="Not applicable" xsi:nil="true"/>
      <us-net-common:verticalPosition nilReason="missing" xsi:nil="true"/>
      <us-net-common:warningType xlink:href="#null" nilReason="none" xsi:nil="true"/>
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    </imkl:Pipe>
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        </base_net:Identifier>
      </net:inspireId>
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      <net:centreLineGeometry>
        <gml:LineString gml:id="geom.ul_D4C" srsName="http://www.opengis.net/def/crs/EP5G/0/31370" srsDimension="2">
          <gml:posList>95936.6129398246 171027.06365957 96233.7154131277 170338.824203957 96473.7332741136 170570.829520421</gml:posList>
        </gml:LineString>
      </net:centreLineGeometry>
      <net:fictitious>false</net:fictitious>
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      <us-net-common:validFrom nilReason="Not applicable" xsi:nil="true"/>
      <us-net-common:verticalPosition nilReason="missing" xsi:nil="true"/>
      <us-net-common:UtilityLink>
      </us-net-common:UtilityLink>
    </gml:featureMember>
  </gml:FeatureCollection>
```

😊 Bedankt! Je IMKL werd goed verwerkt.  
Je plannaanvraag is succesvol beantwoord!  
Toch foutieve of onvolledige info doorgestuurd? Contacteer dan rechts



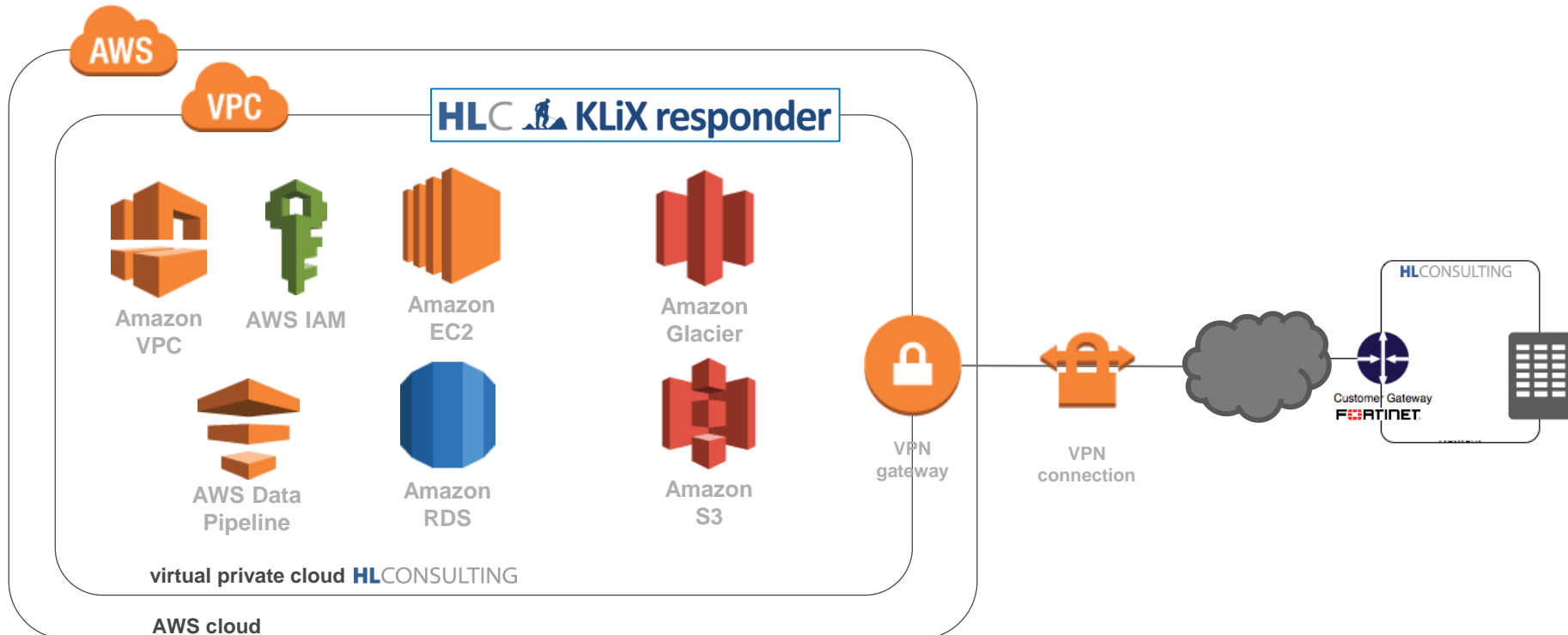
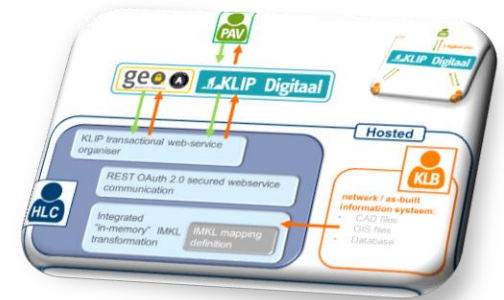
## HOSTED SERVICE

### Cloud hosted @Amazon AWS



- Secure & Reliable
- Scalable and high-performance
- Industry leader

HLC  KLiX responder





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