Compass4D lessons learned

Interoperability

5 October 2016

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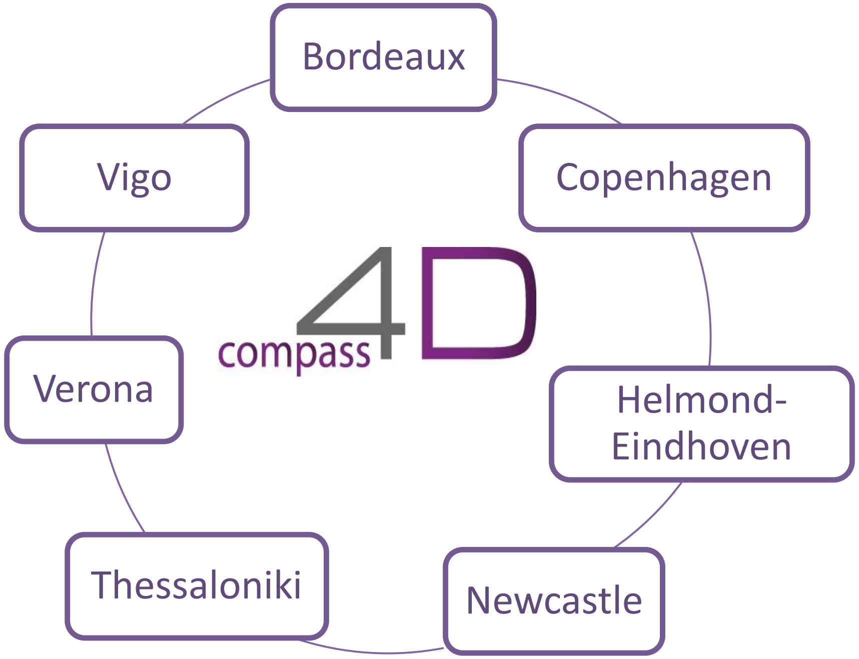
Pilot sites



Bordeaux

Copenhagen

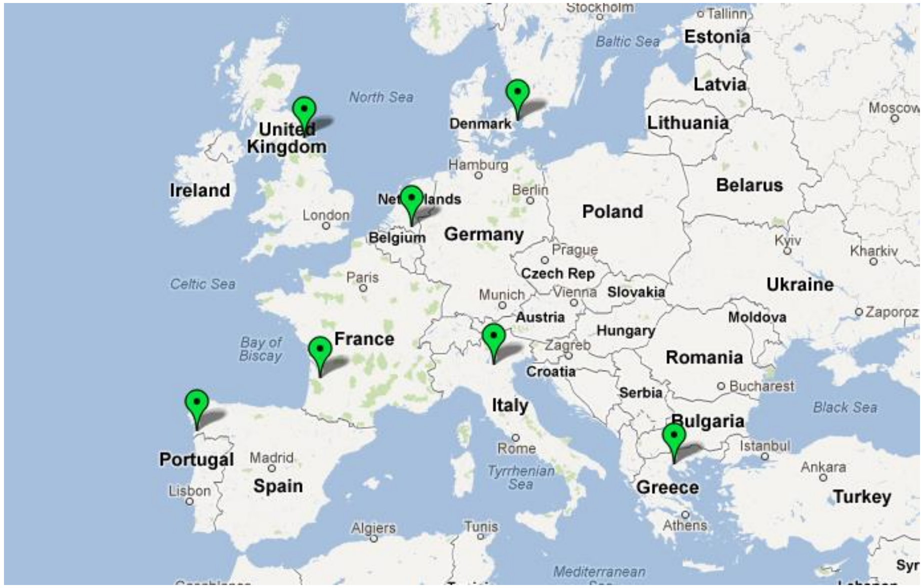
Helmond-Eindhoven

Newcastle

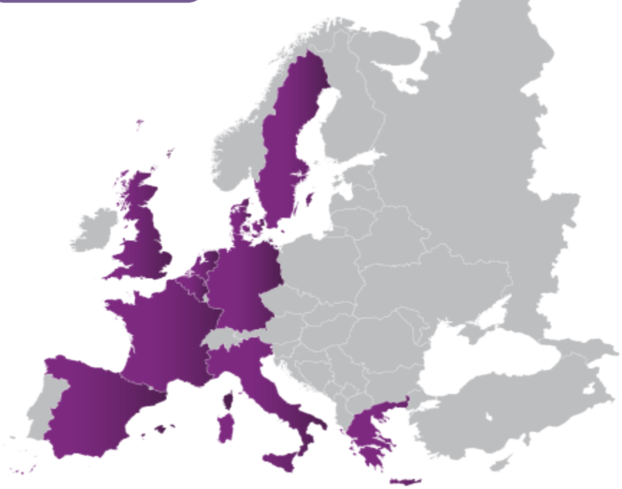
Thessaloniki

Verona

Vigo



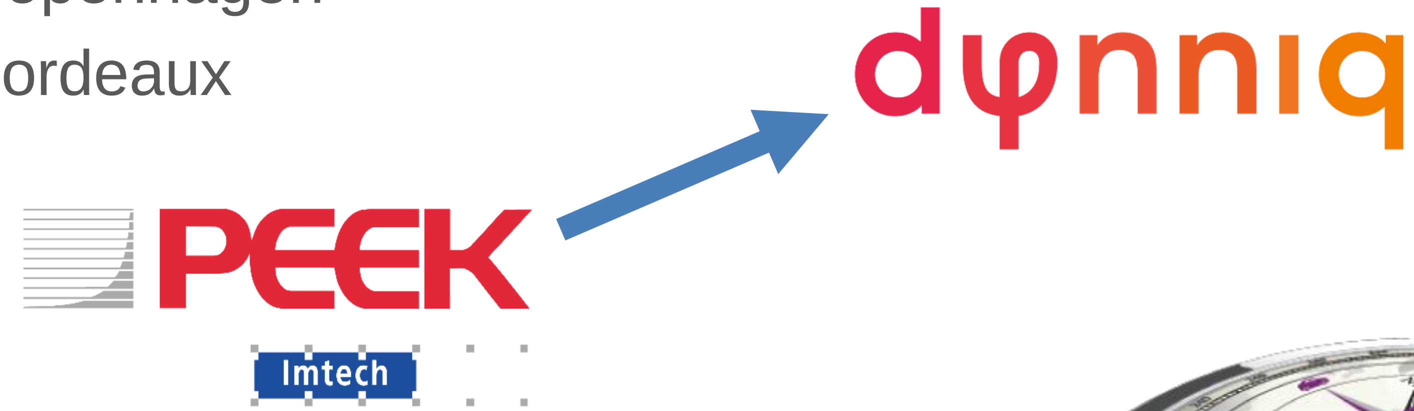
Compass4D pilot sites



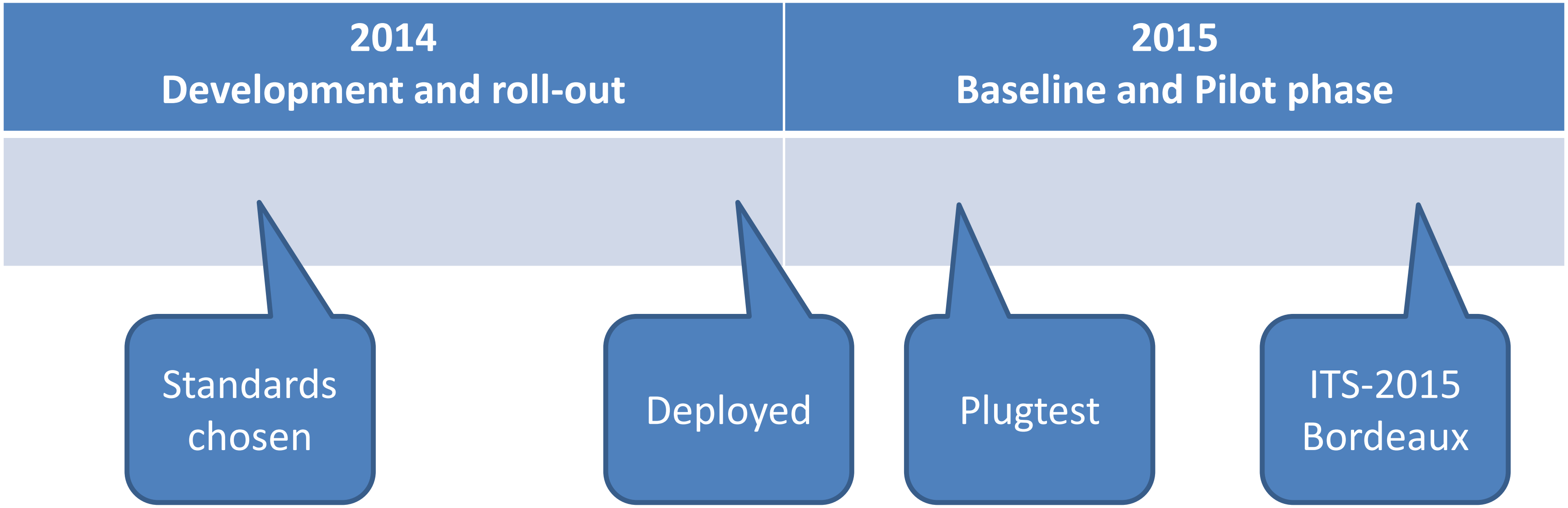
Geographical distribution of Compass4D partners

The role of Dynniq

- Pilot site leader for Helmond
- WP2 leader
- Technology delivered to
  - Helmond
  - Copenhagen
  - Bordeaux



Time frame



2014
Development and roll-out

2015
Baseline and Pilot phase

Standards chosen

Deployed

Plugtest

ITS-2015 Bordeaux

Compass4D deployment issues

- In 2014 the MAP and SPaT standards were still being developed
- The public transport data definition in CAM was defined as 20 generic bytes
- In May 2014 a Compass4D working group decided on a version of the standards to use within the project

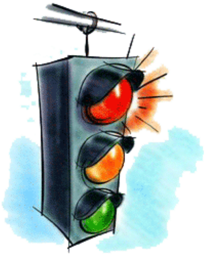
2015 ETSI Plugtest

- Compass4D vendors participated in the Plugtest
- Ideal environment to guarantee interoperability
- New versions of the standards
- Supporting standardisation was one of the goals of Compass4D

Compass4D Interoperability issues

- Incompatible changes in SPaT required a ‘big bang’ update of the pilot sites
- Most sites did not update immediately:
  - too much effort
  - disturbing the pilot site operation
- Only Bordeaux was updated in 2015 to support the ITS Conference demos

SPaT incompatible change



MovementPhaseState	Before	After
Unavailable	0	0
Dark	Not present	1
Stop-Then-Proceed	1	2
Stop-And-Remain	2	3
Pre-Movement	3	4
Permissive-Movement-Allowed	4	5
Protected-Movement-Allowed	5	6
Permissive-clearance	6	7
Protected-clearance	7	8
Caution-Conflicting-Traffic	8	9

Lessons learned

- Incompatible changes in SPaT have cost a lot of effort
- DENM standard not prepared for centrally generated (DATEX based) events
- Public transport data in the standard leans on local (German) standards
- Feedback sent to standardisation institutes

RECOMMENDATIONS

#1 backwards compatibility

- When changes are made to the standards these should be backwards compatible
- If this is not possible, co-existence must be ensured, e.g. by using different version numbers

#2 Version numbering

- Different versions of a standard should be recognisable by a unique version number in the message
- Version numbers for early deployment should be reserved from the start

#3 Scope

- Make sure a standard can be used in a broader scope

Examples:

- DENMs generated by a central system
- Digital signatures are directly linked to Geonetworking; how to use them in a mobile data network?

#4 Robustness

- Interpretation of the data in messages should be robust against errors

Example:

The time information in SPaT depends on the accuracy of the local clock time.

The message should be robust against this, or at least support detection of a difference in the clock time.

#5 Avoid region specific data

- Do not encode the same data in a region specific way; modern computers can easily convert these

Europe

```
TimeMark ::= INTEGER (0..36001)
```

Japan

```
TimeMark ::= SEQUENCE {
  year        Year,   -- BCD coding of A.D.    2 octets
  month       Month,  -- BCD coding of Month,  1 octet
  day         Day,    -- BCD coding of Day,    1 octet
  summerTime  SummerTime,
  holiday     Holiday,
  dayofWeek   DayOfWeek,
  hour        Hour,   -- BCD coding of Hour,   1 octet
  minute      Minute, -- BCD coding of Minute, 1 octet
  second      Second, -- BCD coding of Second, 1 octet
  tenthSecond TenthSecond   -- units of 100
millisecond, 1 octet
}
```

#6 No binary escapes

- Do not use region specific ‘BLOBs’, make sure the standard is complete in itself

TS 102 637-2, 2010

```
PTLineDescription ::= SEQUENCE {
  courseOfJourney CourseOfJourney,
  lineRef         LineRef,
  routeRef        RouteRef
}
```

TS 102 894-2, 2014

```
PtActivation ::= SEQUENCE {
  ptActivationType PtActivationType,
  ptActivationData PtActivationData
}
PtActivationType ::= INTEGER
{undefinedCodingType(0), r09-16CodingType(1),
vdv-50149CodingType(2)} (0..255)

PtActivationData ::= OCTET STRING (SIZE(1..20))
```

Thank you for your attention

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