



# View and Download Services for the Theme Buildings in the Czech Republic

**Petr Souček**

**Czech Office for Surveying, Mapping and Cadastre  
Prague, Czech Republic**



ČESKÝ ÚŘAD ZEMEMĚŘICKÝ A KATASTRÁLNÍ  
CZECH OFFICE FOR SURVEYING, MAPPING AND CADASTRE  
TSCHECHISCHES AMT FÜR LANDESVERMESSUNG UND KATASTER

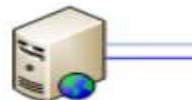


# Topics

- The infrastructure
- The experience with themes Parcels (CP), Addresses (AD) and Administrative Units (AU)
  - View and Download services (direct access – WFS, pre-defined datasets - GML)
- The theme Buildings (BU)
  - View services
  - Download services (direct access – WFS, pre-defined datasets - GML)
- Conclusions



# Infrastructure



Webový server



Souborový a tiskový server



Server Exchange



Server pro správu



Databázový server

- We use single infrastructure for INSPIRE harmonized and non-harmonized national data sets and services.
- Source data are stored in the Information System of the Cadastre of Real Estates (CP, BU) and in the Register of Territorial Identification, Addresses and Real Estates (AD, AU, BU).
- Data for publication are stored in the Publication Database.



# INSPIRE View Services #1

- View service
  - <http://services.cuzk.cz>
    - <http://services.cuzk.cz/wms/inspire-cp-wms.asp>
    - <http://services.cuzk.cz/wms/inspire-ad-wms.asp>
    - <http://services.cuzk.cz/wms/inspire-au-wms.asp>
  - Running since May 9, 2011 (CP), September, 2013 (AD, AU)
  - **Services are open**
    - Free of charge
    - Available for all users
    - No registration is required



# INSPIRE View Services #2

- Implementation by a map server Marushka®



**Marushka®**  
map server

- Follows Technical Guidelines and Specifications
- Data are updated ONLINE
- The source data are stored in the publication database

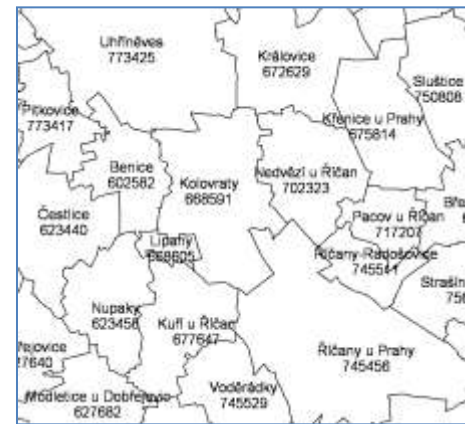


# INSPIRE View Services – examples #1



Cadastral parcels

- The Theme CP – providing layers:
  - CP.CadastralParcel (parcel polygons, labels of parcels) up to a scale of 1:20 000
  - CP.CadastralBoundary (parcel boundaries) up to a scale of 1:20 000
  - CP.CadastralZoning (boundaries and names of cadastral zoning) up to a scale of 1:100 000

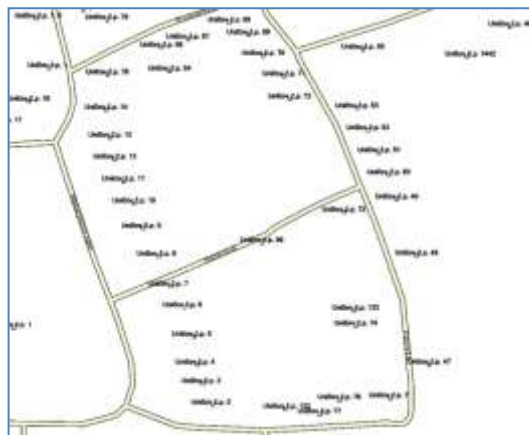


# INSPIRE View Services – examples #2



Addresses

- The Theme AD – providing layers:
  - AD.Addresses (addresses) up to a scale of 1:20 000
  - AD.AddressArea (reference point of part of municipality) up to a scale of 1:100 000
  - AD.Addresses.Text (number of the building, zip code, etc.) up to a scale of 1:5 000
  - AD.Thoroughfare (a street network) up to a scale of 1:50 000



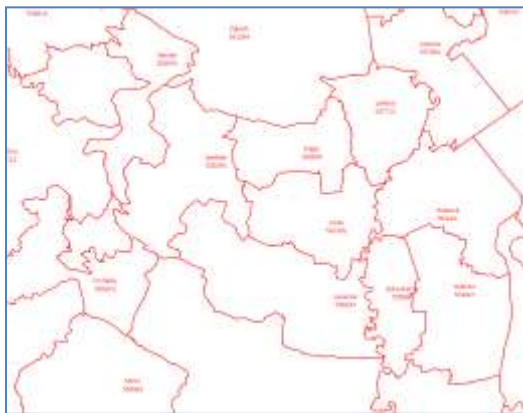
# INSPIRE View Services – examples #3

- **The Theme AU – providing layers:**

- AdministrativeUnit (polygon of units) up to a scale of 1:100 000 000
- AdministrativeUnitLabel (label of units) up to a scale of 1:100 000 000
- AdministrativeBoundary (boundary of units) up to a scale of 1:100 000 000



Administrative units

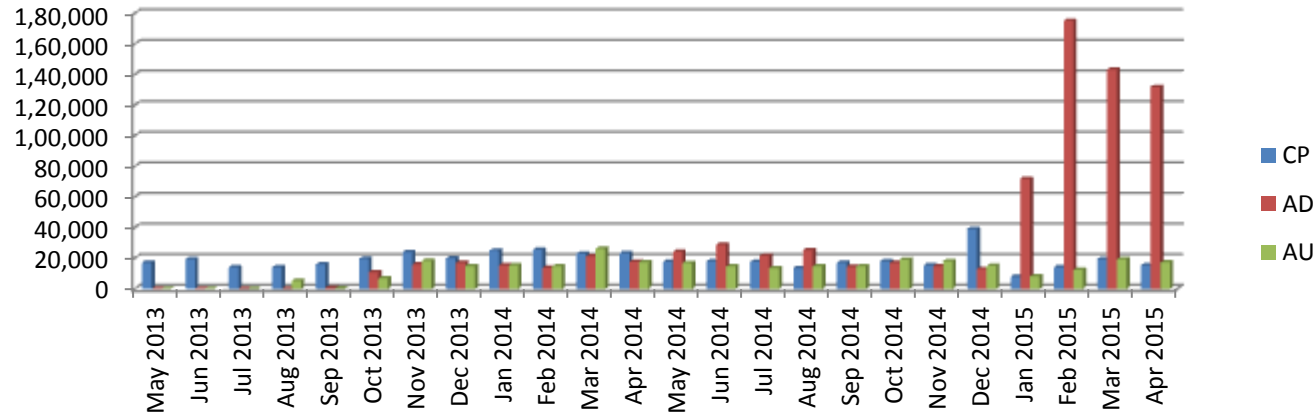




# INSPIRE View Services – statistics

- Statistics of using
- Approximately 20,000 visits per month for themes CP, AU and 150,000 visits per month for theme AD.

**View service (WMS) for themes CP, AD, AU - number of visits**



# INSPIRE Download services #1

- Download services in two versions:
  1. Download (direct access, WFS).
  2. Download (pre-defined datasets or pre-defined parts of datasets, GML).
- Running since June 28, 2012 (CP), September, 2013 (AD, AU)
- **Services are open**
  - Free of charge, available for all users and no registration is required
- Data are available in format GML 3.2.1
- Data follows INSPIRE Data Specification
- Implementation by a map server Marushka®

**Marushka®**  
map server

 **GEOVAP**



# INSPIRE Download services, var. I

- Direct access download services (WFS 2.0.0)
- <http://services.cuzk.cz/>
  - <http://services.cuzk.cz/wfs/inspire-cp-wfs.asp>
  - <http://services.cuzk.cz/wfs/inspire-ad-wfs.asp>
  - <http://services.cuzk.cz/wfs/inspire-au-wfs.asp>
- **Data are updated ONLINE**
- Supported requests GetCapabilities, DescribeFeatureType, ListStoredQueries, DescribeStoredQueries and GetFeature defined by OGC standard version 2.0.0



# INSPIRE Download services, var. I

- Direct access download services (WFS)
  - Supported many of coordinate systems (EPSG), on-the-fly transformation.
  - The National system - S-JTSK Krovak East North (EPSG 5514),
  - The European system - ETRS89 (EPSG 4258),
  - other systems commonly used in the Czech Republic.
- Limitations of WFS:
  - for layers – a single query is limited by the size of defined area and by number of return elements.

```
</gml:Polygon
</gml:surfaceMe
</gml:MultiSurface
</CP:geometry>
- <CP:inspireId>
  - <base:Identifier>
    <base:localId>C2
    <base:namespace
  </base:Identifier>
  </CP:inspireId>
  <CP:label>Dolni Adrš
  <CP:level>3</CP:leve
- <CP:levelName>
  <gmd:LocalisedCh:
  </CP:levelName>
- <CP:levelName>
  <gmd:LocalisedCh:
  </CP:levelName>
- <CP:name>
  - <GN:Geographical
    <GN:language>c
    <GN:nativeness>
    <GN:nameStatus
    <GN:sourceOfNa
    <GN:pronunciati
  - <GN:spelling>
    - <GN:SpellingC
      <GN:text>D
      <GN:script>
      </GN:SpellingC
    </GN:spelling>
  </GN:Geographical
</CP:name>
<CP:nationalCadastra
<CP:originalMapScal
- <CP:referencePoint>
  - <gml:Point gml:id=
```



# INSPIRE Download services, var. I

- Ways of calling getFeature requests

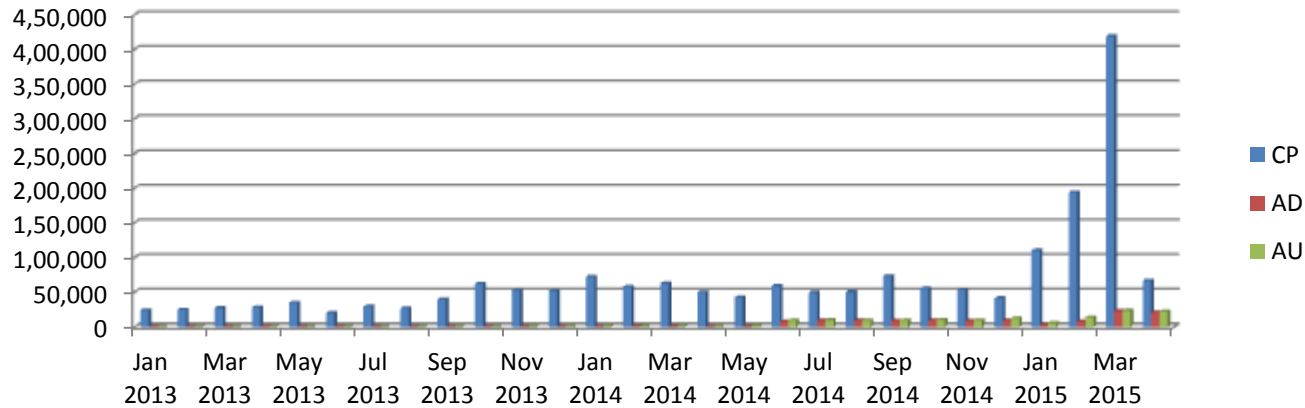
1. by BBOX (specific rectangle),
2. by ID (parcel, cadastral unit, addresses, etc.),
3. by StoredQuery (GetParcel, GetNeighbourParcels , GetZoning, GetUnit, etc.)



# INSPIRE Download services, var. I

- Statistics of using
  - approximately 50,000 visits per month

**Direct access download service (WFS) for themes CP, AD, AU  
- number of visits**



```
</gml:Polygon
</gml:surfaceMe
</gml:MultiSurface
</CP:geometry>
- <CP:inspireId>
- <base:Identifier>
  <base:localId>C2
  <base:namespace
</base:Identifier>
</CP:inspireId>
<CP:label>Dolni Adrš
<CP:level>3</CP:leve
- <CP:levelName>
  <gmd:LocalisedCh:
</CP:levelName>
- <CP:levelName>
  <gmd:LocalisedCh:
</CP:levelName>
- <CP:name>
- <GN:Geographical
  <GN:language>c
  <GN:nativeness>
  <GN:nameStatus
  <GN:sourceOfNa
  <GN:pronunciati
- <GN:spelling>
- <GN:SpellingC
  <GN:text>D
  <GN:script>
</GN:SpellingI
</GN:spelling>
</GN:Geographical
</CP:name>
<CP:nationalCadastra
<CP:originalMapScal
- <CP:referencePoint>
- <gml:Point gml:id=
```

# INSPIRE Download services, var. II

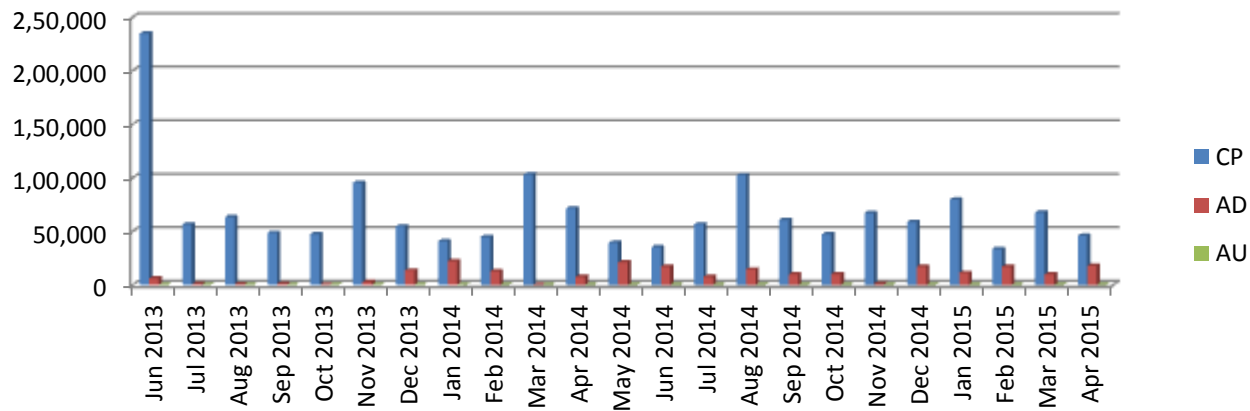
- Download pre-defined datasets or pre-defined parts of datasets
  - Generated GML files **updated daily**.
  - For each unit (cadastral zoning [CP], municipality [AD], country [AU]) is generated one GML file in ETRS89 and one GML file in S-JTSK Krovak East North.
  - Supported coordinate systems for generated files:
    - The National system - S-JTSK Krovak East North (EPSG 5514),
      - <http://services.cuzk.cz/gml/inspire/cp/epsg-5514/>
      - <http://services.cuzk.cz/gml/inspire/ad/epsg-5514/>
      - <http://services.cuzk.cz/gml/inspire/au/epsg-5514/>
    - The European system - ETRS89 (EPSG 4258),
      - <http://services.cuzk.cz/gml/inspire/cp/epsg-4258/>
      - <http://services.cuzk.cz/gml/inspire/ad/epsg-4258/>
      - <http://services.cuzk.cz/gml/inspire/au/epsg-4258/>



# INSPIRE Download services, var. II

- Statistics of using
  - approximately 30,000 visits per month

**Non-direct access download service (GML) for themes CP, AD, AU - number of visits**



28 May 2015

Geospatial World Forum (The 9th INSPIRE Conference), 25-29 May 2015, Lisbon, Portugal





# The INSPIRE theme BUILDINGS (BU)



Buildings

**Information**

Legal Acts - Technical Guidance

## Definition

Geographical location of buildings.

## Description

A building is a covered facility, usable for the protection of humans, animals, things or the production of economic goods. A building refers to any structure permanently constructed or erected on its site. Information on location of buildings may be supplied as points or with the actual basic form of the building. Usually buildings are part of cadastre. On the local level buildings are available within the large scale cadastral maps or cadastral data sets and are geometrically represented as surfaces.

Most buildings can be identified (geocoded) by address (separate theme in INSPIRE).



Buildings



# The INSPIRE theme BUILDINGS (BU)

- Source data are stored in The Register of Territorial Identification, Addresses and Real Estates:
- The implementation through the Publication database
  - Data are replicated from the source databases.
  - Data transformation is done using PL/SQL scripts.
  - Updated every 2 hours.
- View and download services
  - Implemented by a map server Marushka®
  - in process, **launching in July 2015**



# The INSPIRE theme BUILDINGS (BU) #1

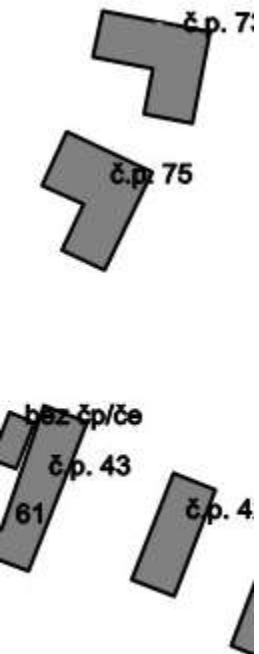
- Process of implementation
  - Problem with missing extended application scheme (XSD) for building
  - On website <http://inspire.ec.europa.eu/schemas/> are available only files for base scheme
    - BuildingsBase.xsd
    - BuildingsCore2D.xsd
    - BuildingsCore3D.xsd
  - Conversely, missing files for extended scheme
    - BuildingsExtendedBase.xsd
    - BuildingsExtended2D.xsd
    - BuildingsExtended3D.xsd



# The INSPIRE theme BUILDINGS (BU) #2

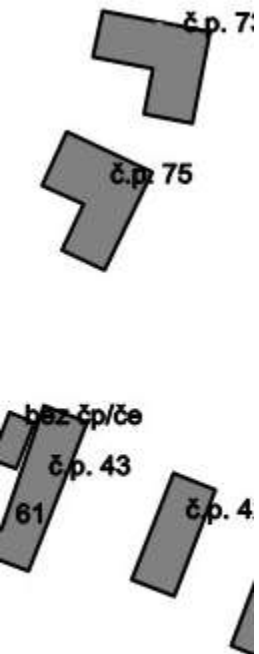
- Process of implementation

- We waited for the official extended application scheme (XSD) for building, because base scheme is insufficient for us:
  - missing reference to address,
  - missing reference to cadastral parcel,
  - missing additional thematic attributes (material of construction, official area or value, connection to utility networks...).



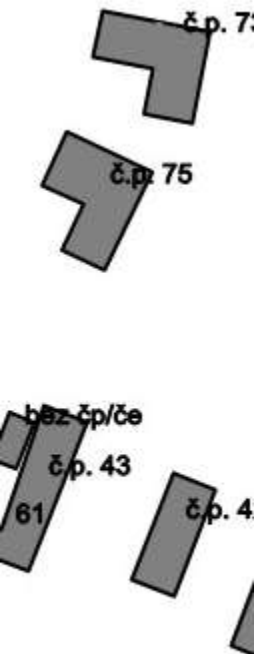
# The INSPIRE theme BUILDINGS (BU) #2

- Process of implementation
  - We created own XSD files for extended application scheme (only 2D version, because Czech Republic has no 3D data)
  - Author: Ing. Michal Med, [michal.med@cuzk.cz](mailto:michal.med@cuzk.cz)
  - Scheme is available on own website
    - <http://services.cuzk.cz/xsd/inspire/bu-ext/3.0/BuildingsExtendedBase.xsd>
    - <http://services.cuzk.cz/xsd/inspire/bu-ext2d/3.0/BuildingsExtended2D.xsd>



# The INSPIRE theme BUILDINGS (BU) #2

- Problems in creating extended application schema
  - Heredity – XSD class cannot have two parents,
  - Instantiation – has been solved before in other XSD schemas (copied),
  - Extensions – replacing BuildingsExtended2D with local version with additional information.
  - Universality – in other countries can be possibly solved another way.



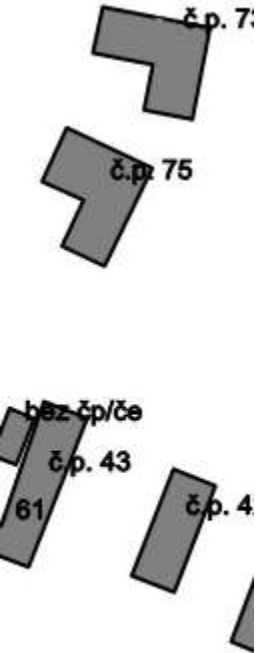
# BUILDINGS – View Services

- View service
  - <http://services.cuzk.cz/wms/inspire-bu-wms.asp>
  - In process, **Launching in July 2015**
  - **Services are open** (Free of charge, Available for all users, No registration is required)
  - Implementation by a map server Marushka®
- Data are updated ONLINE
- The source data are stored in the publication database



# BUILDINGS – View Services

- Providing layers:
  - BU.Building (buildings) up to a scale of 1:25 000
  - BU.BuildingPart up to a scale of 1:10 000
  - BU.BuildingText (number of the building) up to a scale of 1:5 000
  - BU.BuildingByType (visualized by type of buildings) up to a scale of 1:20 000



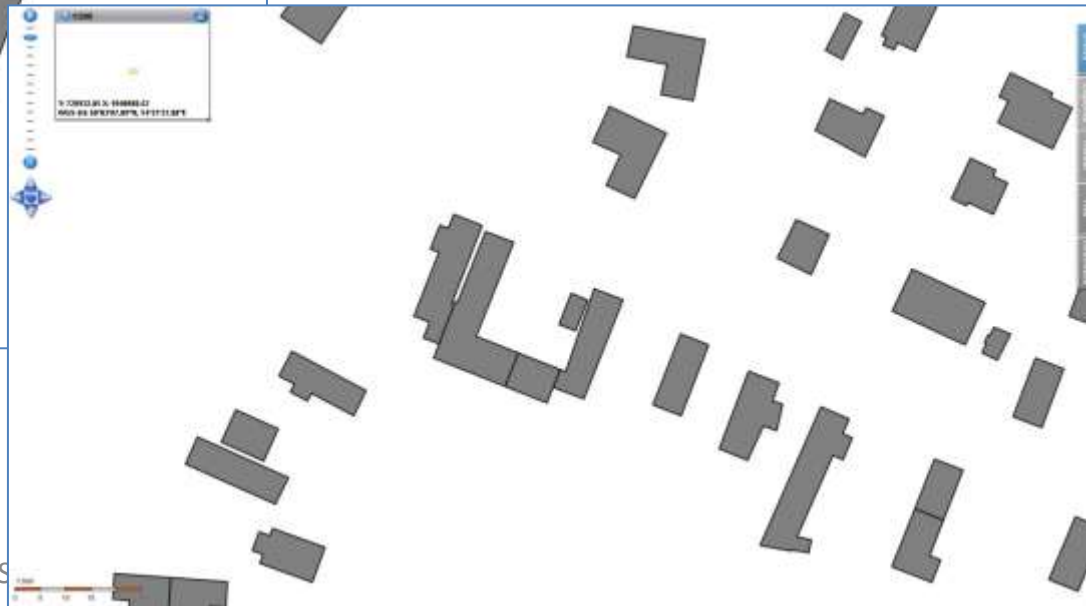
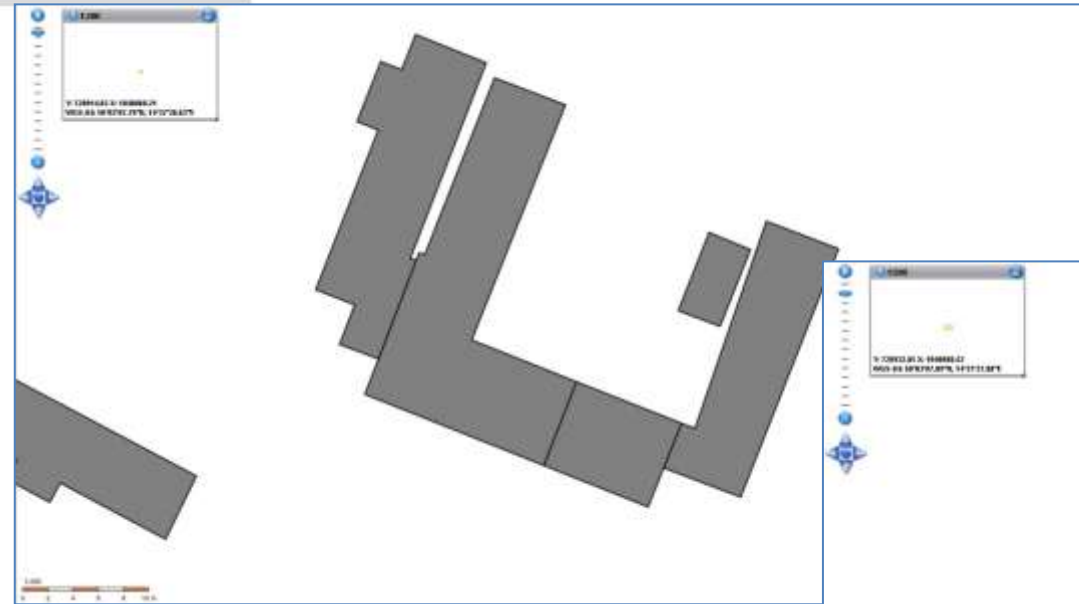


# BUILDINGS – examples #1

Layer BU.Building

1:500

1:200



# BUILDINGS – examples #2

Layer BU.Building

1:2 000

1:1 000

# BUILDINGS – examples #3

Layer BU.Building

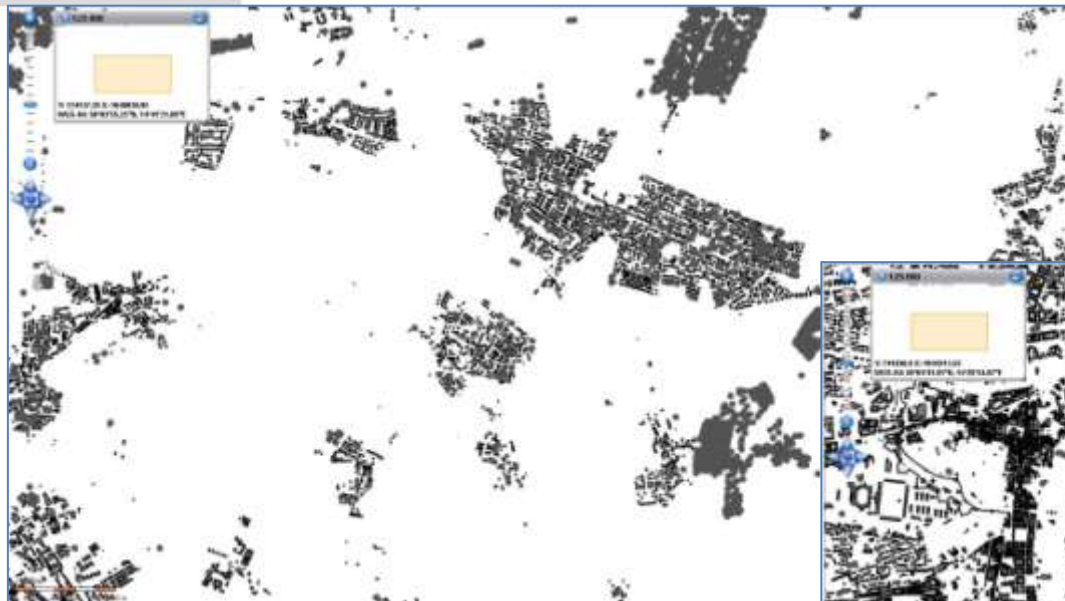
1:10 000

1:5 000

# BUILDINGS – examples #4

Layer BU.Building

1:25 000 (city Prague)



1:25 000



# BUILDINGS – examples #5

Layer BU.BuildingText

1:1 000

Layer BU.Building

Layer BU.BuildingPart

1:1 000

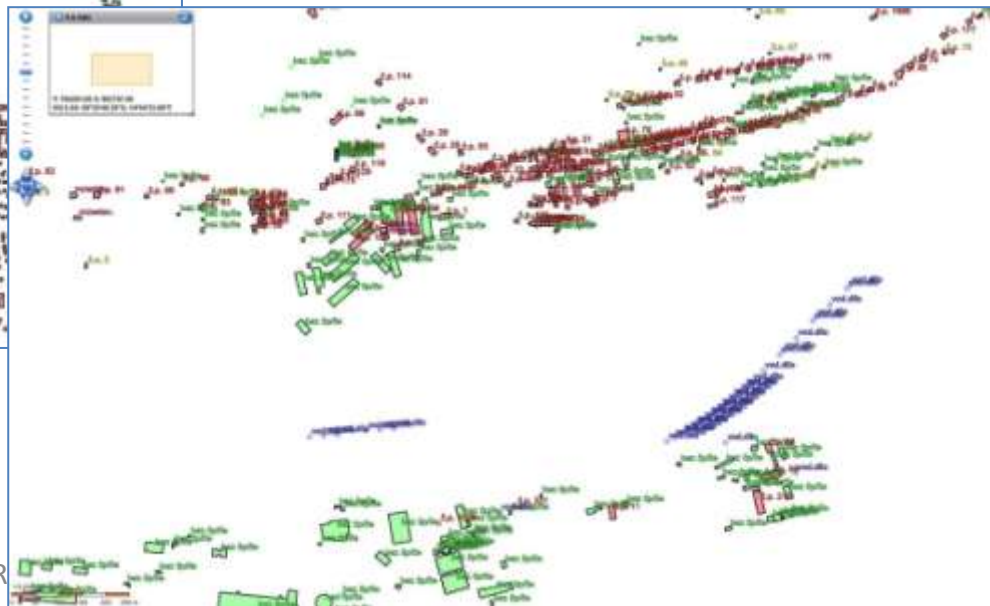


# BUILDINGS – examples #6

Layer BU.BuildingByType



1:10 000



1:10 000

# BUILDINGS - Download services

- Download services in two versions:
  1. Download (direct access, WFS).
  2. Download (pre-defined datasets or pre-defined parts of datasets, GML).
- In process, Launching in July 2015
- **Services are open**
  - Free of charge, available for all users and no registration is required
- Data are available in format GML 3.2.1
- Data follows INSPIRE Data Specification
- Implementation by a map server Marushka®

**Marushka®**  
map server

 **GEOVAP**



# BUILDINGS - Download services, var I.

```
</gml:Polygon
</gml:surfaceMe
</gml:MultiSurface
</CP:geometry>
- <CP:inspireId>
  - <base:Identifier>
    <base:localId>C2
    <base:namespace
  </base:Identifier>
</CP:inspireId>
<CP:label>Dolni Adrš
<CP:level>3</CP:leve
- <CP:levelName>
  <gmd:LocalisedCh
</CP:levelName>
- <CP:levelName>
  <gmd:LocalisedCh
</CP:levelName>
- <CP:name>
  - <GN:Geographical
    <GN:language>c
    <GN:nativeness>
    <GN:nameStatus>
    <GN:sourceOfNa
    <GN:pronunciati
  - <GN:spelling>
    - <GN:SpellingC
      <GN:text>D
      <GN:script>
    </GN:SpellingC
    </GN:spelling>
  </GN:Geographical
</CP:name>
<CP:nationalCadastra
<CP:originalMapScal
- <CP:referencePoint>
  - <gml:Point gml:id=
```

- Direct access download services (WFS 2.0.0)
- <http://services.cuzk.cz/wfs/inspire-bu-wfs.asp>
- Data are updated ONLINE
- Supported many of coordinate systems (EPSG), on-the-fly transformation.
  - The National system - S-JTSK Krovak East North (EPSG 5514),
  - The European system - ETRS89 (EPSG 4258),
  - Other systems commonly used in the Czech Republic.
- Ways of calling GetFeature requests
  - by BBOX (specific rectangle), by ID (building), by *StoredQuery [in future]*







# BUILDINGS - Download services, var II.

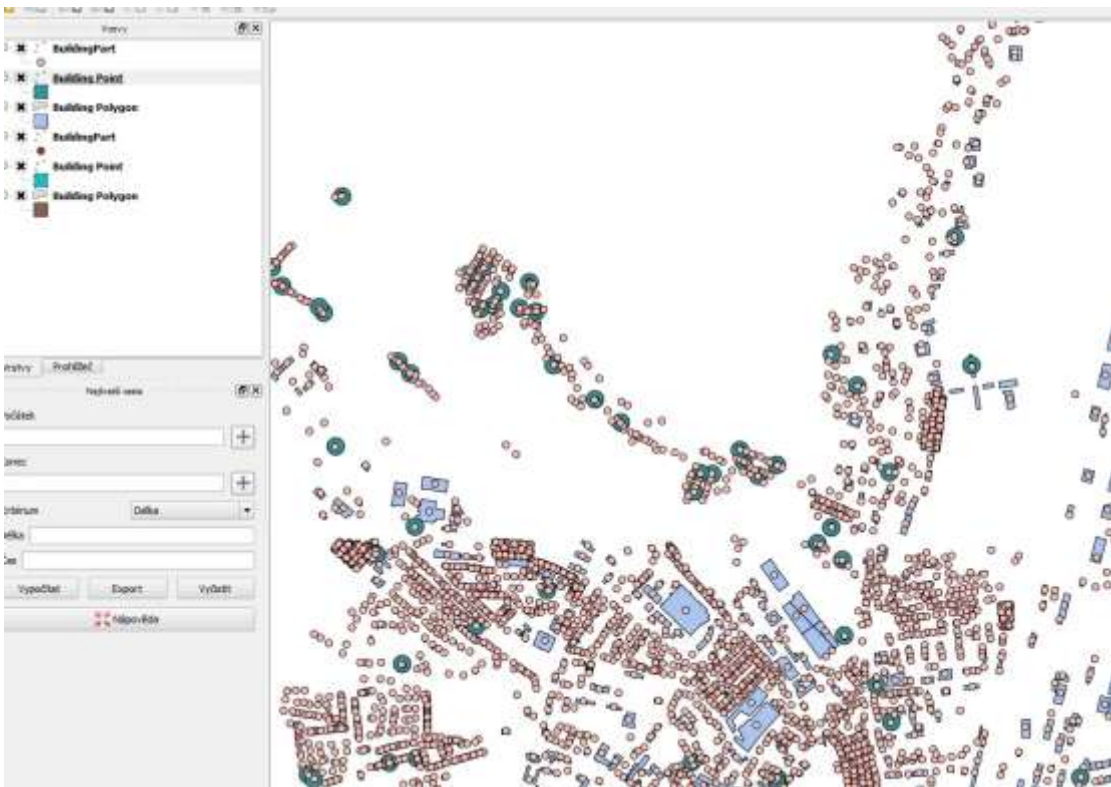


- Download pre-defined datasets or pre-defined parts of datasets
  - Generated GML files updated daily.
  - For each municipality (6 253) is generated one GML file in ETRS89 and one GML file in S-JTSK Krovak East North.
- Supported coordinate systems for generated files:
  - The National system - S-JTSK Krovak East North (EPSG 5514), <http://services.cuzk.cz/gml/inspire/bu/epsg-5514/>
  - The European system - ETRS89 (EPSG 4258), <http://services.cuzk.cz/gml/inspire/bu/epsg-4258/>

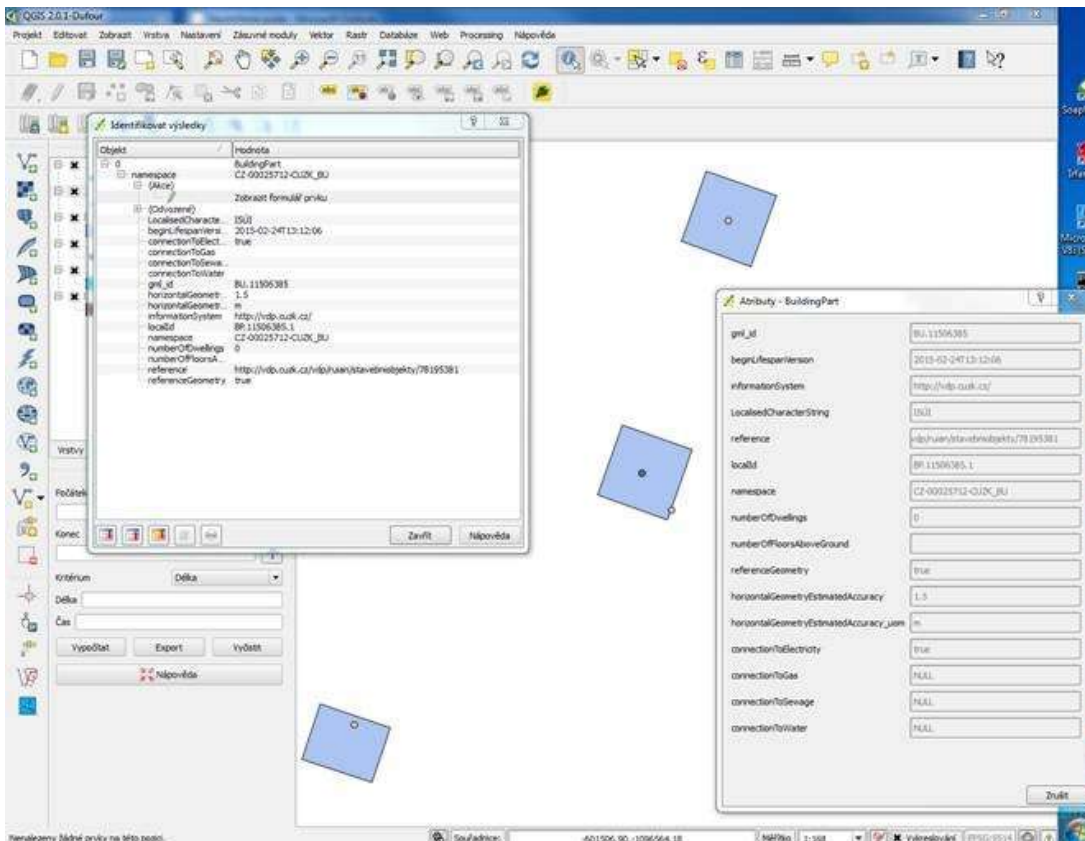


# BUILDINGS – examples #1

Visualization of GML in QGIS



# BUILDINGS – examples #1



Visualization of GML in QGIS

Attributes of feature Building and BuildingPart



# INSPIRE – conclusion

- **All services** for themes CP, AD, AU, BU **are open**. All services provided are free of charge for all users and no registration is required.
- Data and services are available on our geoportal <http://geoportal.cuzk.cz/>
- **Buildings** – we offer our extended application scheme for use in other countries => Thematic Working Groups





# Thank you for your attention

Ing. Petr Souček, Ph.D.

[petr.soucek@cuzk.cz](mailto:petr.soucek@cuzk.cz)



ČESKÝ ÚŘAD ZEMEMĚŘICKÝ A KATASTRÁLNÍ  
CZECH OFFICE FOR SURVEYING, MAPPING AND CADASTRE  
TSCHECHISCHES AMT FÜR LANDESVERMESSUNG UND KATASTER

