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- American Psychological Association 7th edition - Filip Leitner
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- Chicago Manual of Style 17th edition (author-date)
- Cite Them Right 10th edition - Harvard
- IEEE
- ISO-690 (author-date, Slovak)
- ISO-690 (author-date, Slovak) - Filip Leitner**
- Modern Humanities Research Association 3rd edition (note with bibliography)
- Modern Language Association 8th edition
- Nature
- More Styles...

ZOZNAM LITERATÚRY

DIACONO, M., RUBINO, P., MONTEMURRO, P. (2013): Pre of wheat. A review. *Agronomy for Sustainable Development*. roč. 11, č. 1, s. 1-10. doi:10.1007/s13593-012-0111-z

DONG, T., MENG, J., SHANG, J., LIU, J., WU, B. (2015): Evaluation of Chlorophyll-Related Vegetation Indices Using Simulated Sentinel-2 Data for Estimation of Crop Fraction of Absorbed Photosynthetically Active Radiation. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*. roč. 8, č. 8, s. 4049-4059. doi:10.1109/JSTARS.2015.2400134

DORIGO, W. A., ZURITA-MILLA, R., DE WIT, A. J.W., BRAZILE, J., SINGH, R., SCHAEPMAN, M. E. (2007): A review on reflective remote sensing and data assimilation techniques for enhanced agroecosystem modeling. *International Journal of Applied Earth Observation and Geoinformation*. roč. 9, č. 2, s. 165-193. doi:10.1016/j.jag.2006.05.003

FOUNTAS, S., CARLI, G., SØRENSEN, C. G., TSIROPOULOS, Z., CAVALARIS, C., VATSANIDOU, A., LIAKOS, A., CANAVARI, M., WIEBENSOHN, J., TISSERYE, B. (2015): Farm management information systems: Current situation and future perspectives. *Computers and Electronics in Agriculture*. roč. 115, s. 40-50. doi:10.1016/j.compag.2015.05.011

FOX, P., TYC, G., BECKETT, K. (2017): The UrtheCast SAR-XL multi-band, multi-aperture spaceborne SAR system. *2017 IEEE Radar Conference, RadarConf 2017*. s. 1761-1764. doi:10.1109/RADAR.2017.7944492

GARCIA, A., HANSEN, J., MARIANI, L., NAIN, A., RAMESH, K., RATHORE, L.S., VENKATARAMAN, R., CHALLINOR, A., STIGTER, K., SUBHAS, N. (2010): Chapter 4 Weather and Climate Forecasts for Agriculture This chapter was written by H. P. Das, Sections of this chapter were internally reviewed by facilitators Andrew Challinor, Luigi Mariani, Kees Stigter, Natraj Subhas and R. Venkataraman.

GEIPEL, J., JACKENKROLL, M., WEIS, M., CLAUPEIN, W. (2015): A sensor web-enabled infrastructure for precision farming. *ISPRS International Journal of Geo-Information*. roč. 4, č. 1, s. 385-399. doi:10.3390/ijgi4010385

GITELSON, A. A., VIÑA, A., CIGANDA, V., RUNDQUIST, D.C., ARKEBAUER, T.J. (2005): Remote estimation of canopy chlorophyll content in crops. *Geophysical Research Letters*. roč. 32, č. 8, s. 1-4. doi:10.1029/2005GL022688

GITELSON, A. A., VIÑA, A., VERMA, S.B., RUNDQUIST, D.C., ARKEBAUER, T.J., KEYDAN, G., LEAVITT, B., CIGANDA, V., BURBA, B.B., SUYKER, A.E. (2006): Relationship between gross primary production and chlorophyll content in crops: Implications for the synoptic monitoring of vegetation productivity. *Journal of Geophysical Research Atmospheres*. roč. 111, č. 8, s. 1-13. doi:10.1029/2005JD006017

GNIP, P., KAFKA, S., CHARVAT, K. (2008): PREFARM SOLUTION - MAPSERVER

HALLER, A., JANOWICZ, K., COX, S.J.D., LEFRANÇOIS, M., TAYLOR, K., LEONARDI, D., LIEBERMAN, J., GARCÍA-CASTRO, R., ATKINSON, R., STADLER, C. (2018): The Semantic Web for Sensor Ontology: A joint W3C and OGC standard specifying the semantics of sensors, observations, sampling, and actuation. *Semantic Web*. roč. 10, č. 1, s. 9-32. doi:10.3233/SW-180320

HATFIELD, J. L., PRUEGER, J.H. (2010): Value of using different vegetative indices to quantify agricultural crop characteristics at different growth stages under varying management practices. *Remote Sensing*. roč. 2, č. 2, s. 562-578. doi:10.3390/rs2020562

HEEGE, H. J. (2013): *Precision in Crop Farming*. ISBN 9789400767591. doi:10.1007/978-94-007-6760-7

HERRMANN, I., PIMSTEIN, A., KARNIELI, A., COHEN, Y., ALCHANATIS, V., BONFIL, D. J. (2011): LAI assessment of wheat and potato crops by VENµS and Sentinel-2 bands. *Remote Sensing of Environment*. roč. 115, č. 8, s. 2141-2151. doi:10.1016/j.rse.2011.04.018

HĽAVINKA, P., TRNKA, M., BALEK, J., SEMERÁDOVÁ, D., HAYES, M., SVOBODA, M., EITZINGER, J., MOŽNÝ, M., FISCHER, M., HUNT, E., ŽALUD, Z. (2011): Development and evaluation of the SoilClim model for water balance and soil climate estimates. *Agricultural Water Management*. roč. 98, č. 8, s. 1249-1261. doi:10.1016/j.agwat.2011.03.011

HUETE, A. R., (1988): A soil-adjusted vegetation index (SAVI). *Remote Sensing of Environment*. roč. 25, č. 3, s. 295-309. doi:10.1016/0034-4257(88)90106-X

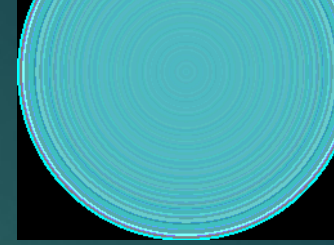
JAYNES, D. B., KASPAR, T. C., COLVIN, T. S., JAMES, D. E. (2003): Cluster analysis of spatiotemporal corn yield patterns in an Iowa field. *Agronomy Journal*. roč. 95, č. 3, s. 574-586. doi:10.2134/agronj2003.5740

JAZAYERI, M.A., LIANG, S.H.L., HUANG, C.H.J. (2015): Implementation and evaluation of four interoperable open standards for the internet of things. *Sensors (Switzerland)*. roč. 15, č. 9, s. 24343-24373. doi:10.3390/s150924343

JRC EUROPEAN COMMISSION, (2011): NDWI (Normalized Difference Water Index). *Product Fact Sheet*. roč. 5, č. July, s. 6-7. Dostupné na: http://edo.jrc.ec.europa.eu/documents/factsheets/factsheet_ndwi.pdf

KALOXYLOS, A., GROUMAS, A., SARRIS, V., KATSIKAS, L., MAGDALINOS, P., ANTONIOU, E., POLITOPOULOU, Z., WOLFERT, S., BREWSTER, Ch., EIGENMANN, R., TEROL, C.M. (2014): A cloud-based farm management system: Architecture and implementation. *Computers and Electronics in Agriculture*. roč. 100, s. 168-179. doi:10.1016/j.compag.2013.11.014

KEOH, S.L., KUMAR, S.S., TSCHOFENIG, H. (2014): Securing the internet of things: A standardization perspective. *IEEE Internet of Things Journal*. roč. 1, č. 3, s. 265-275. doi:10.1109/JIOT.2014.2323395



Webové služby



MAPOVÉ ZDROJE – CV. Č. 2

FILIP LEITNER



Webové služby

- ▶ Nástroje umožňujúce prístup k priestorovým dátam prostredníctvom štandardizovaného webového rozhrania

- ▶ Aktuálnosť
- ▶ Dostupnosť
- ▶ Dohľadateľnosť

- ▶ Rozhranie medzi klientom a serverom

- ▶ Komunikácia prebieha za pomoci predefinovaných operácií

▶ Pozor na:

- ▶ zlučovanie nezlučiteľných dát
- ▶ nesúlady mierok
- ▶ rozdielny časový rozsah mapových serverů

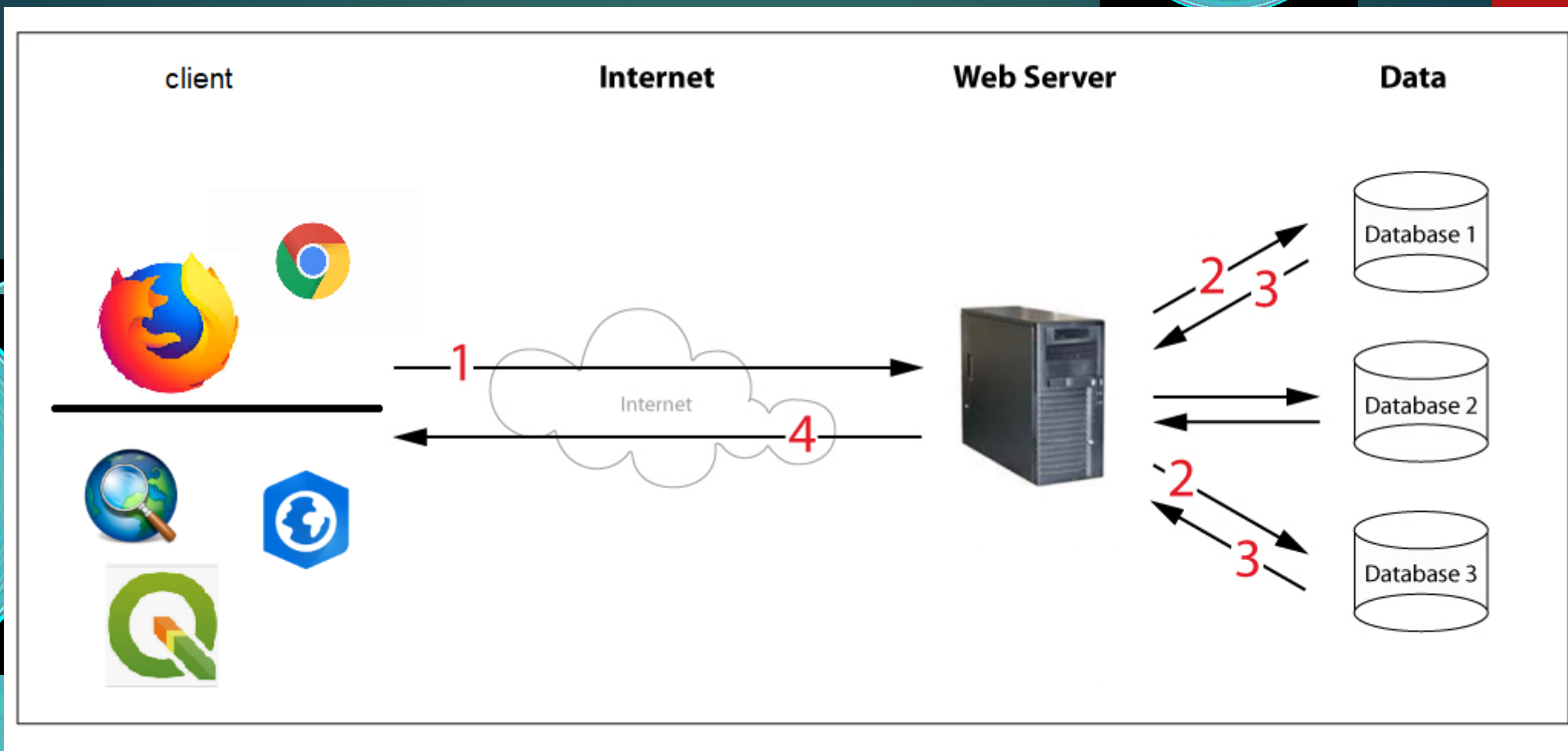
Nástroje umožňujúce prístup k priestorovým dátam prostredníctvom štandardizovaného webového rozhrania

▶ **Open Geospatial Consortium (OGC)** web service

- ▶ organisation focused on developing and defining open standards for the geospatial community to allow interoperability between various software, and data services

- ▶ Umožňuje využiteľnosť naprieč platformami, jednotu naprieč sektormi
- ▶ Výrazne zjednodušuje implementáciu
- ▶ The problem is not necessarily that the geographic information has not been captured, but accessing and combining geographic information from different sources in a timely manner.

Nástroje umožňujúce prístup k priestorovým dátam prostredníctvom štandardizovaného webového rozhrania



https://geoportal.cuzk.cz/WMTS_ORTOFOTO_900913/WMTService.aspx?layer=orto&style=default&tilematrixset=googlemapscompatibleext2%3Aepsg%3A3857&Service=WMTS&Request=GetTile&Version=1.0.0&Format=image%2Fpng&TileMatrix=17&TileCol=71578&TileRow=44899

WMS getMap

- ▶ url + parametre
- ▶ [https://geoportal.cuzk.cz/WMS_ZM25_PUB/service.svc/get?](https://geoportal.cuzk.cz/WMS_ZM25_PUB/service.svc/get?SERVICE=WMS&VERSION=1.3.0&REQUEST=GetMap&FORMAT=image%2Fpng&TRANSPARENT=true&LAYERS=GR_ZM25&STYLES=default&WIDTH=256&HEIGHT=256&CRS=EPSG%3A3857&BBOX=1721973.373208452%2C6261721.357121639%2C1878516.407136493%2C6418264.39104968)
- ▶ SERVICE=WMS&
- ▶ VERSION=1.3.0&
- ▶ REQUEST=GetMap&
- ▶ FORMAT=image%2Fpng&
- ▶ TRANSPARENT=true&
- ▶ LAYERS=GR_ZM25&STYLES=default&
- ▶ WIDTH=256&HEIGHT=256&
- ▶ CRS=EPSG%3A3857&
- ▶ BBOX=1721973.373208452%2C6261721.357121639%2C1878516.407136493%2C6418264.39104968

https://geoportal.cuzk.cz/WMS_ZM25_PUB/service.svc/get?SERVICE=WMS&VERSION=1.3.0&REQUEST=GetMap&FORMAT=image%2Fpng&TRANSPARENT=true&LAYERS=GR_ZM25&STYLES=default&WIDTH=256&HEIGHT=256&CRS=EPSG%3A3857&BBOX=1721973.373208452%2C6261721.357121639%2C1878516.407136493%2C6418264.39104968

Parameter	Required?	Description
<code>service</code>	Yes	Service name. Value is <code>WMS</code> .
<code>version</code>	Yes	Service version. Value is one of <code>1.0.0</code> , <code>1.1.0</code> , <code>1.1.1</code> , <code>1.3.0</code> .
<code>request</code>	Yes	Operation name. Value is <code>GetMap</code> .
<code>layers</code>	Yes	Layers to display on map. Value is a comma-separated list of layer names.
<code>styles</code>	Yes	Styles in which layers are to be rendered. Value is a comma-separated list of style names, or empty if default styling is required. Style names may be empty in the list, to use default layer styling.
<code>srs</code> or <code>crs</code>	Yes	Spatial Reference System for map output. Value is in form <code>EPSG:nnn</code> . <code>crs</code> is the parameter key used in WMS 1.3.0.
<code>bbox</code>	Yes	Bounding box for map extent. Value is <code>minx,miny,maxx,maxy</code> in units of the SRS.
<code>width</code>	Yes	Width of map output, in pixels.
<code>height</code>	Yes	Height of map output, in pixels.
<code>format</code>	Yes	Format for the map output. See WMS output formats for supported values.
<code>transparent</code>	No	Whether the map background should be transparent. Values are <code>true</code> or <code>false</code> . Default is <code>false</code> .
<code>bgcolor</code>	No	Background color for the map image. Value is in the form <code>RRGGBB</code> . Default is <code>FFFFFF</code> (white).
<code>exceptions</code>	No	Format in which to report exceptions. Default value is <code>application/vnd.ogc.se_xml</code> .
<code>time</code>	No	Time value or range for map data. See Time Support in GeoServer WMS for more information.

CRS=EPSG%3A3857&BBOX=1721973.373208452%2C6261721.357121639%2C1878516.407136493%2C6418264.39104968

Základní webové služby v oblasti geoinformatiky

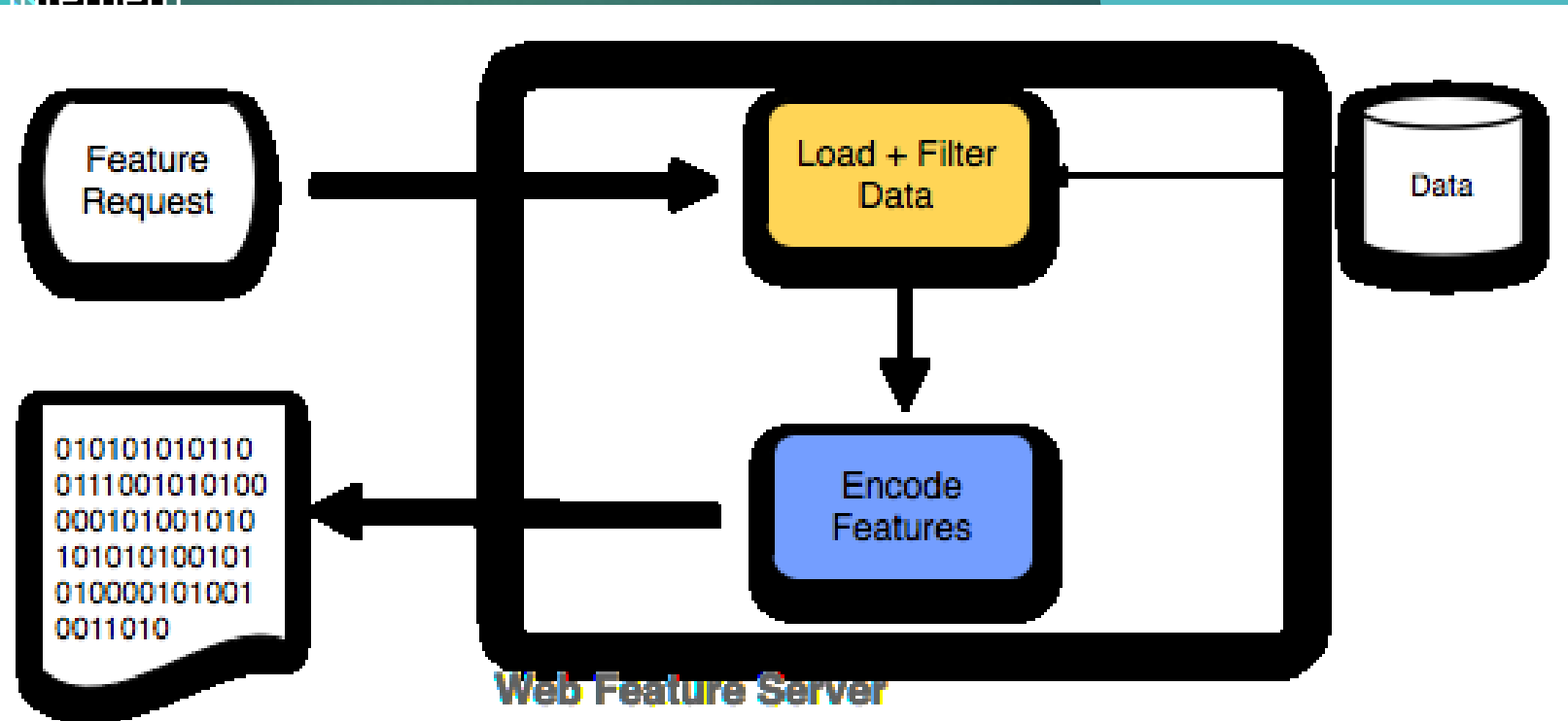
- vyhledávání (prostorových) dat a služeb (CSW)
- zobrazení náhledu na prostorová data (WMS)
- přístup k datům (WFS, WCS, SOS)
- procesní služby včetně transformačních (WCTS, WPS)
- ...

WFS – Web feature service

- ▶ zdieľanie vektorových geografických dát
- ▶ Na rozdiel od WMS,WMTS poskytuje priamo dáta – najčastejšie v formáte GML ...geoJSON v závislosti od serveru

▶ relatívne pomalá – závisí na type výstupného formátu, priestorovom rozsahu, počte prvkov, rýchlosti internetu

▶ Zobrazenie je v



WFS – Web feature service

- ▶ Dostupnosť operácií v závislosti na type služby
 - ▶ Simple
 - ▶ GetCapabilities – informácie o službe a jej obsahu, možnostiach
 - ▶ GetFeature - dáta
 - ▶ DescribeFeatureType – popis dát (atribúty a pod.)

GetFeature request parameters

Parameter	Remarks
REQUEST (M)	Name of WFS request type; must be GetFeature for a WFS GetFeature operation
SERVICE (M)	Service type; must be WFS for all WFS operations
TYPENAME (M)	A list of feature type names to query
BBOX (O)	Used to limit the returned features in only those that are not disjoint with a bounding box defined by BBOX; mutually exclusive with FILTER and FEATUREID. TYPENAME is a prerequisite.
FEATUREID (O)	A list of feature instances to be fetched by a WFS identified by the feature instances feature identifiers; mutually exclusive with FILTER and BBOX. >TYPENAME is a prerequisite
FILTER (O)	A filter specification describes a set of features to operate upon. The filter is defined as specified in the OGC Filter Encoding Specification. If the FILTER parameter is used, one filter must be specified for each feature type listed in the TYPENAME parameter. Individual filters encoded in the FILTER parameter are enclosed in parentheses "(" and ")". TYPENAME is a prerequisite.
MAXFEATURES (O)	A positive integer indicating the maximum number of features that should be returned by a WFS to a request.
OUTPUTFORMAT (O)	The output format used to describe feature data returned by WFS; the default value is GML2.
PROPERTYNAME (O)	A list of properties may be specified for each feature type that is being queried. (Refer to the OGC WFS Specification Section 13.2.2 on how to form lists of parameters). A 1:1 relationship exists between each element in a FEATUREID or TYPENAME list and the PROPERTYNAME list. The absence of a value indicates that all properties should be fetched.
VERSION (O)	Request version number; the WFS Connector supports only WFS version 1.0.0

- ▶ ListStoredQueries, DescribeStoredQueries, GetPropertyValue, GetFeatureWithLock, LockFeature, Transaction, CreateStoredQuery, DropStoredQuery

Filtrování

Filter Encoding

► Prostorové

```
<ogc:Filter>
  <ogc:Within>
    <ogc:PropertyName>SHAPE</ogc:PropertyName>
    <gml:Envelope>
      <gml:lowerCorner>48.4744444 12.7083628</gml:lowerCorner>
      <gml:upperCorner>49.4017450 14.8397106</gml:upperCorner>
    </gml:Envelope>
  </ogc:Within>
</ogc:Filter>
```

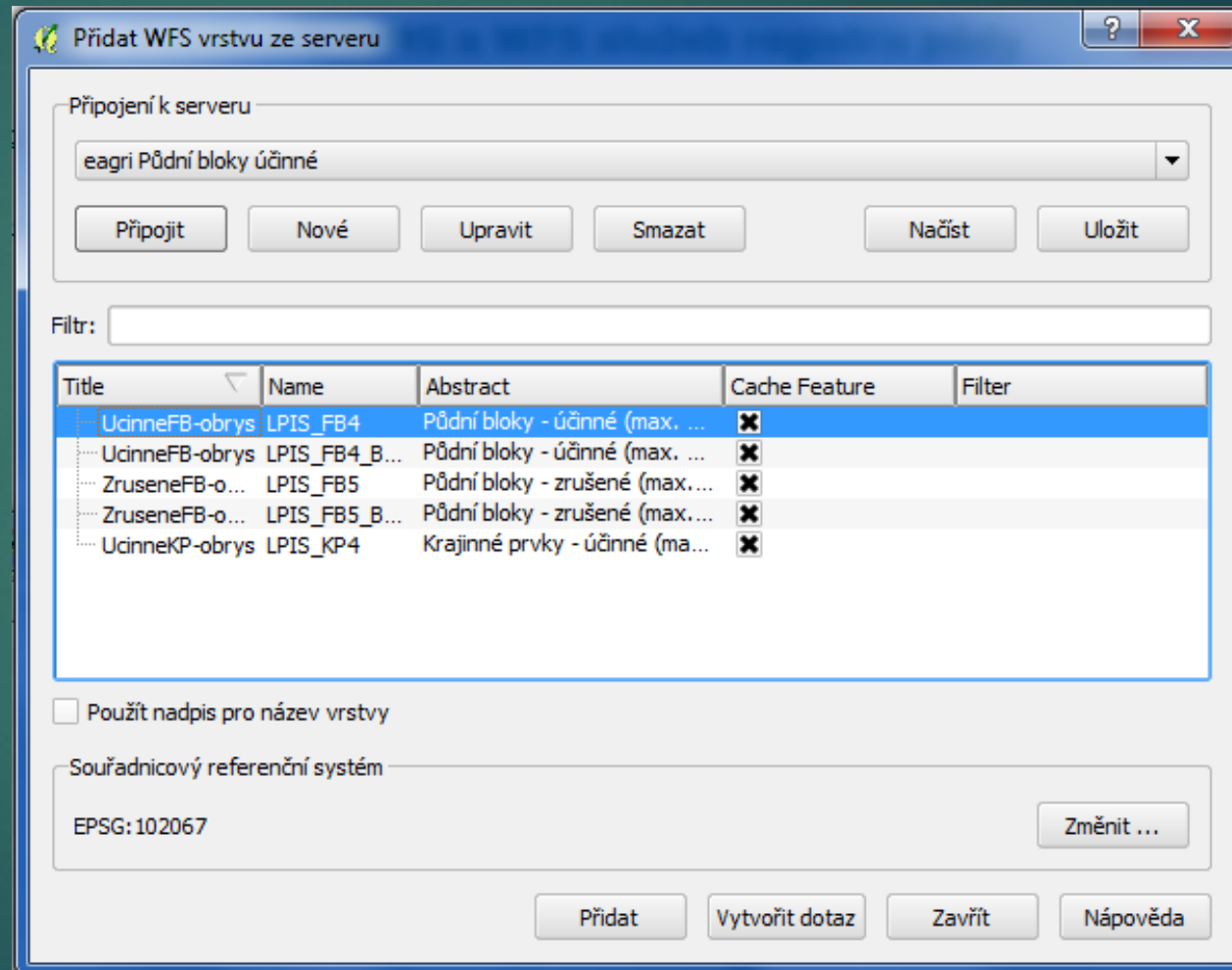
► Atributové

```
<ogc:Filter>
  <ogc:PropertyIsLike wildCard="%" singleChar="?" escapeChar="!">
    <ogc:PropertyName>NAZEV</ogc:PropertyName>
    <ogc:Literal>Český kras</ogc:Literal>
  </ogc:PropertyIsLike>
</ogc:Filter>
```

Feature Set	Feature
Spatial Capabilities	
	Equals
	Disjoint
	Touches
	Within
	Overlaps
	Crosses
	Intersects
	Contains
	DWithin
	BBOX
Scalar Capabilities	
Logical Operators	
	And
	Or
	Not
Comparison Operators	
	PropertyIsEqualTo (=)
	PropertyIsNotEqualTo (<>)
	PropertyIsLessThan (<)
	PropertyIsGreaterThan (>)
	PropertyIsLessThanOrEqualTo (<=)
	PropertyIsGreaterThanOrEqualTo (>=)
	PropertyIsLike
	PropertyIsBetween (range)

WFS – Web feature service

► GetCapabilities



WFS – Web feature service

► GetFeature

The screenshot displays the QGIS 2.0.1-Dufour interface. The main map window shows a pink polygonal feature. The 'Vrstvy' (Layers) panel on the left lists several layers, with 'LPIS_FB4' selected. The 'Identifikovat výsledky' (Identify Results) window on the right shows the attribute table for the selected feature.

Objekt	Hodnota
0	LPIS_FB4
idPudnihoBloku	8835201
(Akce)	
(Odvozené)	
CTVEREC	700-1050
ICO	44675488
idPudnihoBloku	8835201
idUzivatele	39831
kodCile	1
mapovyList	13-31-04
mapovyList_1_5000	Cesky Brod 3-7
natura2000ptaciLokalita	0,00
natura2000souhrn	0,00
natura2000vyznamneLokalita	0,00
ochrannaPasmaVodnihoZdroje...	0,00
platnyDo	
platnyOd	27.03.12
prumernaNadmorskaVyska	298,77
prumernaSvazitost	3,20
rezimEZ_PO	Konvenční hospodaření
stav	Účinný
STAV_KOD	4
stavajiciKulturaOd	11.10.03
ucinnostOdDleAktualizaceEP	27.03.12
uzemniPrislusnost	AZV Kolín
uzivatel	KAREL DIVÍŠEK
vymera	10,59
vymeraVBilychKarpatech	0,00
vymeraVMCHU	0,00
vymeraVMoravskemKrasu	0,00
vymeraVZCHU	0,00
ZAUDITO	0
zkracenyKod	9501/2

Poskytovatelé WFS

▶ Česko:

- ▶ eAGRI - účinné krajinné a půdní bloky

- ▶ http://eagri.cz/public/web/file/523757/Uzivatelcka_prirucka__Pouziti_WMS_WFS_v1_24_20200311.pdf

- ▶ ČÚZK - správní a katastrální hranice, INSPIRE parcely, adresy a územní správní jednotky

- ▶ [https://geoportal.cuzk.cz/\(S\(fv1imxuk1wqno4qx4r4gw1lz\)\)/Default.aspx?mode=TextMeta&side=wfs.INSPIRE&text=wfs.INSPIRE&head_tab=sekce-03-gp&menu=334](https://geoportal.cuzk.cz/(S(fv1imxuk1wqno4qx4r4gw1lz))/Default.aspx?mode=TextMeta&side=wfs.INSPIRE&text=wfs.INSPIRE&head_tab=sekce-03-gp&menu=334)

- ▶ AOPK ČR

- ▶ https://aopk.mze.cz/publik_syst/ctihtmlpage.php?what=6103&X=X

- ▶ ČGS

- ▶ <http://www.geodata.gov.cz/ranet/mapy/mapy-online/stahovaci-sluzby>

- ▶ Corine Land cover

- ▶ <http://micka.cenia.cz/record/basic/550aab71-c794-4ae1-99bc-15e1c0a80153>

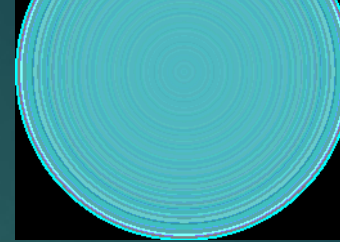
▶ Svět:

- ▶ US Geological Survey - nerostné zdroje USA
- ▶ USDA Forest Service – mapování požárů (USA + Kanada)
- ▶ Sinergise Sentinel Hub – data družic Sentinel (Slovinsko+EU)

Prezentácie

- ▶ <https://docs.google.com/spreadsheets/d/12PXekpRaTTZNNqBe1QN0ivbtu6XHvXv1dY5v-SdosV0/edit?usp=sharing>
- ▶ Po dvojacich
- ▶ Cca 10-15 minút
- ▶ Sfručne, ale pútavo
- ▶ Na záver zhrnutie
 - ▶ O čo ide
 - ▶ Produkty
 - ▶ Výhody, nevýhody
 - ▶ Prínos
 - ▶ Aj.

Každý týždeň 2-3? prezentácie (+1 záložná)
Odovzdať do ISu – stačí aj po odprezentovaní
Použiteľné ako študijný materiál pred skúškou



Ďakujem za pozornosť

