

Preservation of digital geospatial records

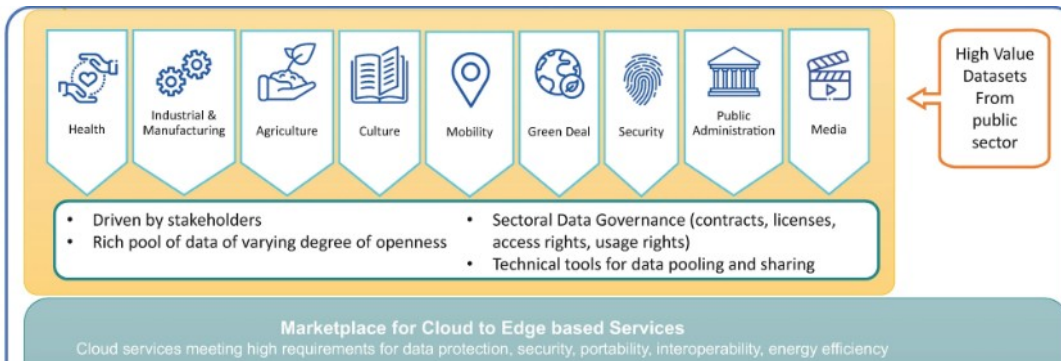
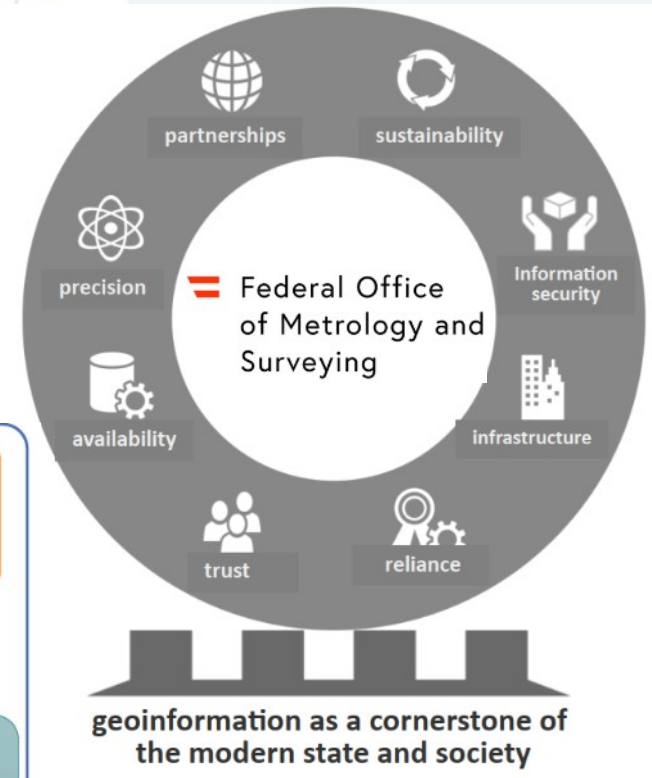
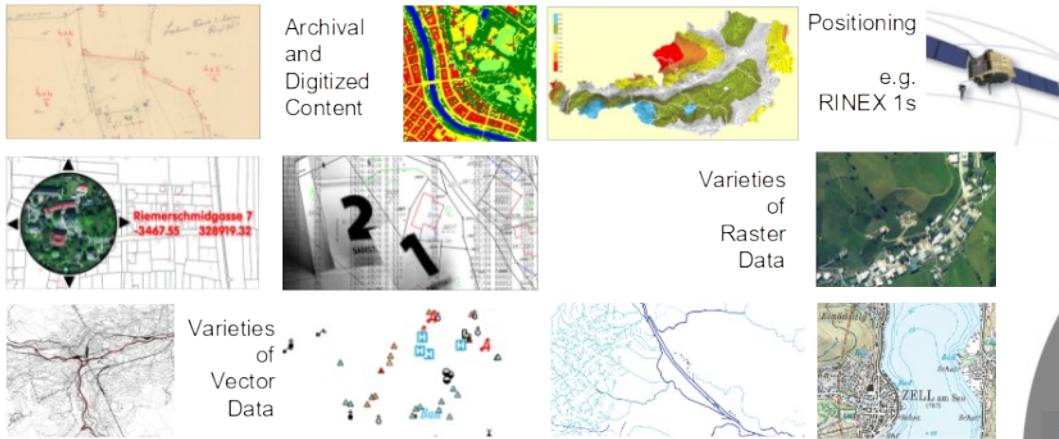
Perspectives on future requirements in terms of Service-Oriented Architectures and AI

Markus Jobst

Agenda

- Introduction
- Brief analysis of actual situation
- Appropriate considerations for long-term preservation
- Experiences and practices

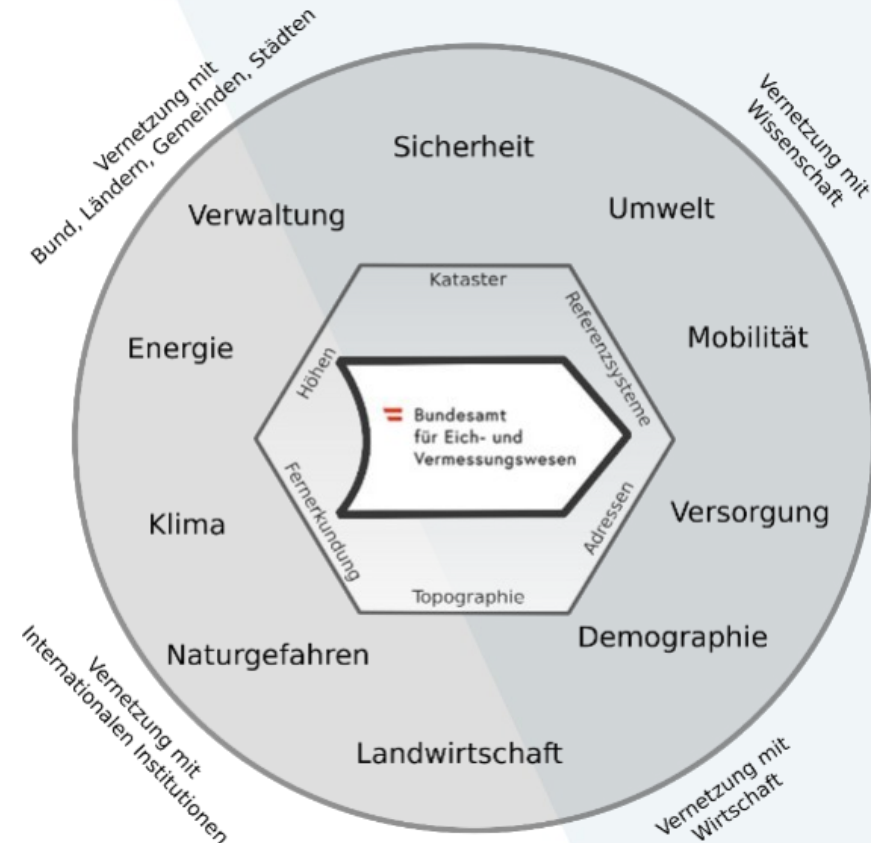
Introduction/The role of governmental products



Scerri, S., Tuikka, T., de Vallejo, I.L., Curry, E. (2022). Common European Data Spaces: Challenges and Opportunities. https://doi.org/10.1007/978-3-030-98636-0_16

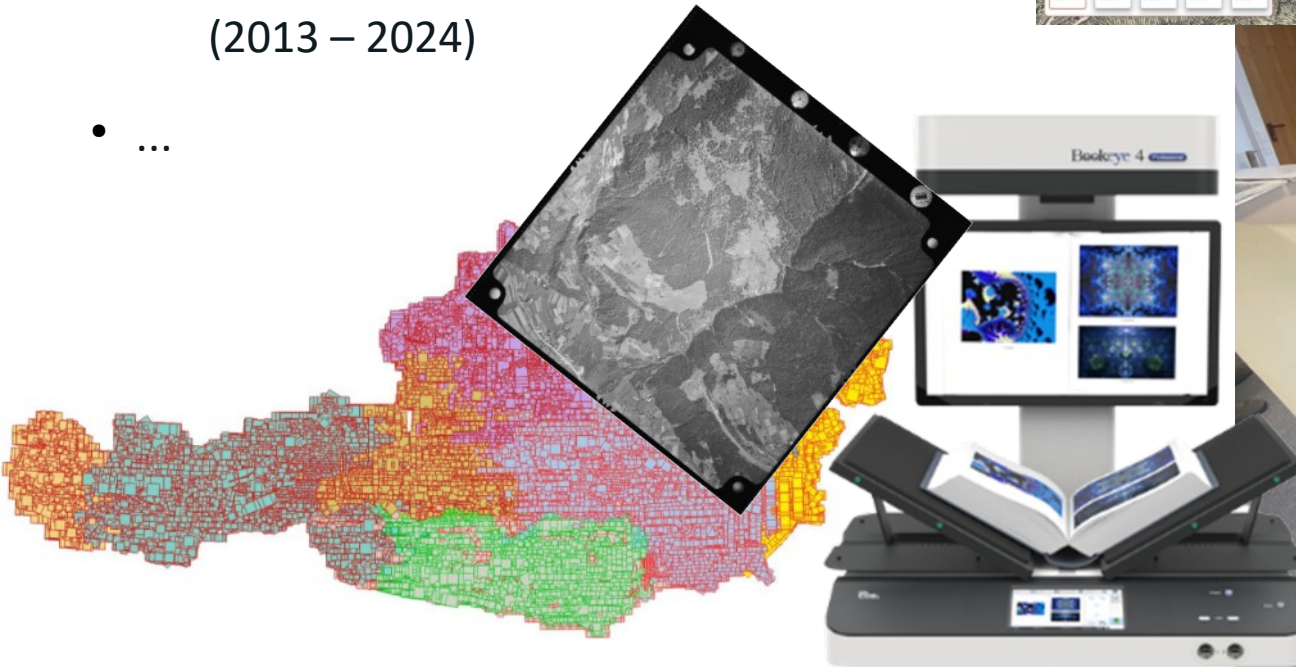
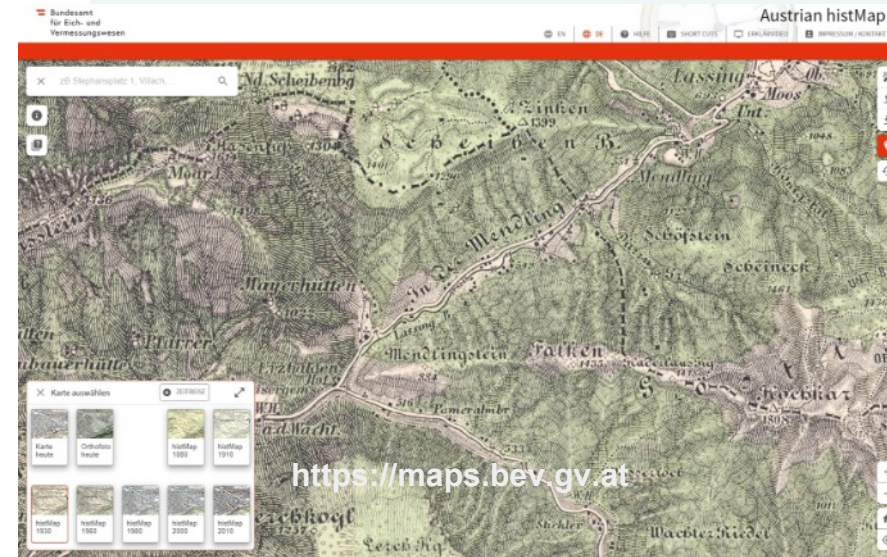
Governmental Products / Trust

- **Expand collections of data sources** and microservices with a network for the secure and self-determined exchange of continuously maintained information
- between **known or unknown** partners
- with an agreed **level of trust** between the parties involved
- to **bridge** a variety of use cases and thematic domains.
- Clear **data sovereignty** (sovereignty)
- (Core) competencies
- **Responsibilities**/Maintenance



Digital Archiving Experiences

- Digitalisation of Aerial Imagery
- Digitalisation and Presentation of Maps
- Digitalisation of cadastre archives in Austria (2013 – 2024)
- ...



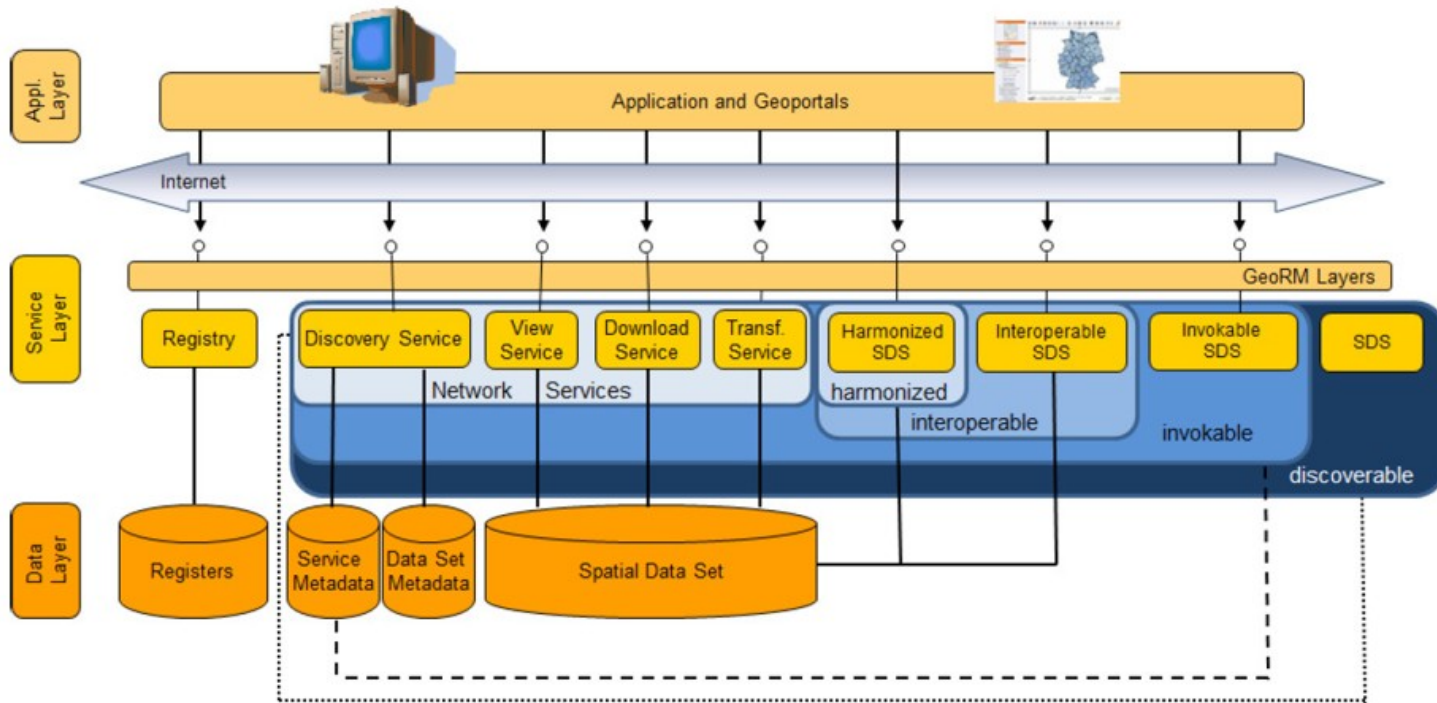
Not a topic for this presentation

- IT backup mechanisms
- Storage systems (tape libraries, HDD, ...)
- Physical Media preservation



Brief analysis of actual situation

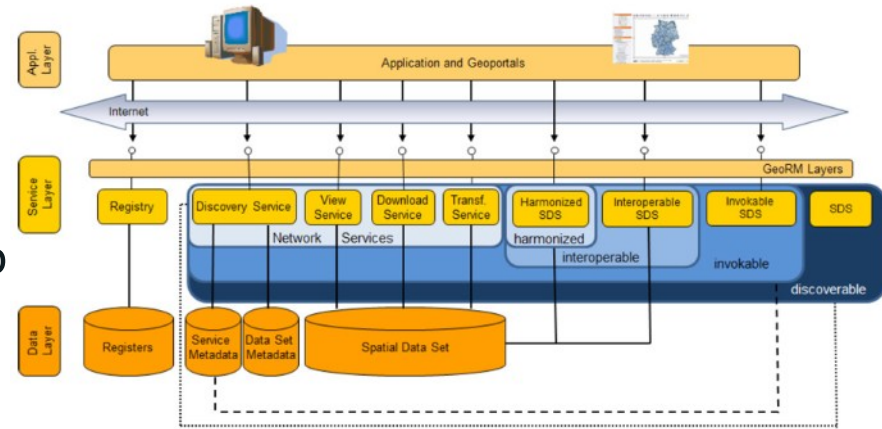
SDI frameworks, components and architectures



SDI frameworks, components and architectures

Critical interfaces and procedures

- (1) Spatial **Data** to
Spatial Data **Services**
- (2) Spatial Data/Spatial Data Services to
Spatial Data **Caches**
- (3) Spatial Data Services to
Applications
- (4) Spatial Data Caches to
Applications



Metadata and its standardization

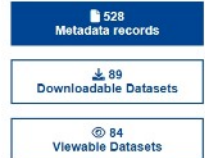
Semantic description (registries) and its
standardization

INSPIRE Datasets - EU & EFTA Country overview

Datasets by Theme: Geographical names



Geoportal Dataset Statistics



Spatial scope coverage:

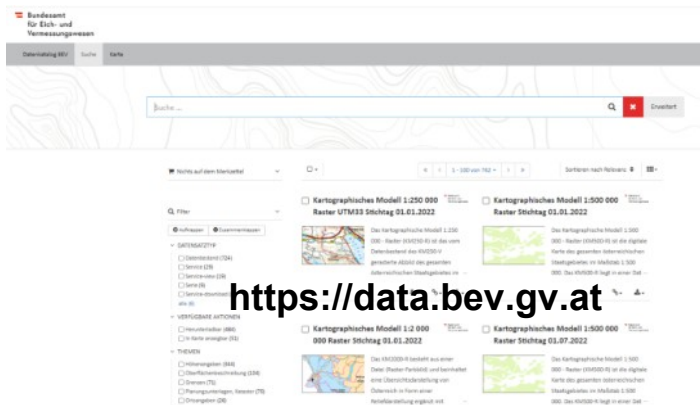
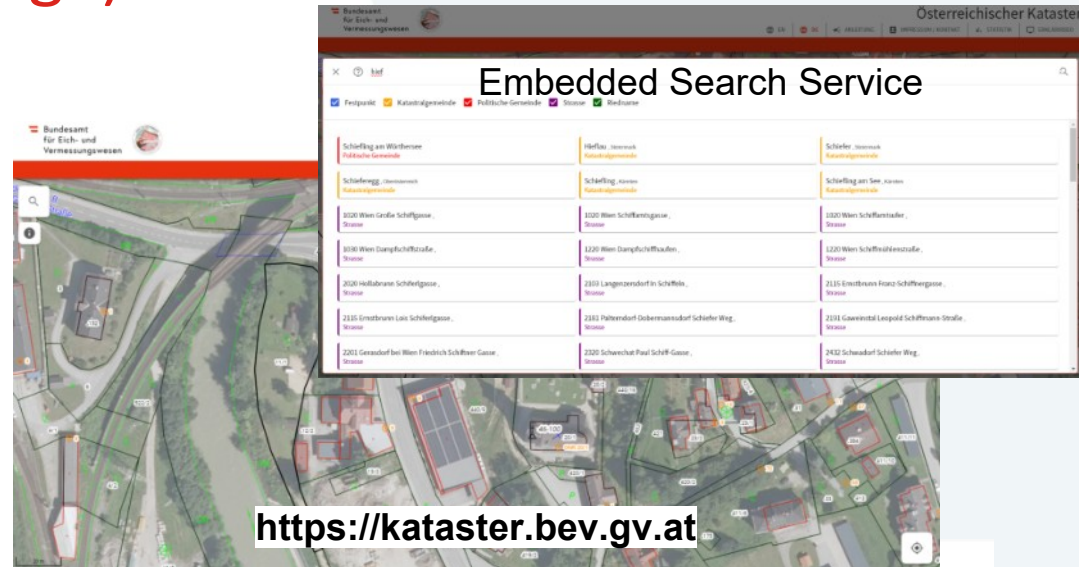
- National
- Regional

Select a country

Austria	5	Greece	1	Norway	5
Belgium	4	Hungary	1	Poland	1
Bulgaria	2	Iceland	1	Portugal	5
Cyprus	1	Ireland	1	Slovenia	5
Czechia	1	Latvia	1	Spain	1
Denmark	1	Lithuania	1	Sweden	1
France	1	Malta	1	Switzerland	1
Germany	1	Netherlands	1	Turkey	1
Gibraltar	1	Poland	1	Ukraine	1
Greece	1	Portugal	1	United Kingdom	1
Hungary	1	Spain	1		
Iceland	1	Sweden	1		
Ireland	1	Switzerland	1		
Latvia	1	Turkey	1		
Lithuania	1	Ukraine	1		
Malta	1	United Kingdom	1		
Netherlands	1				
Poland	1				
Portugal	1				
Slovenia	1				
Spain	1				
Sweden	1				
Switzerland	1				
Turkey	1				
Ukraine	1				
United Kingdom	1				

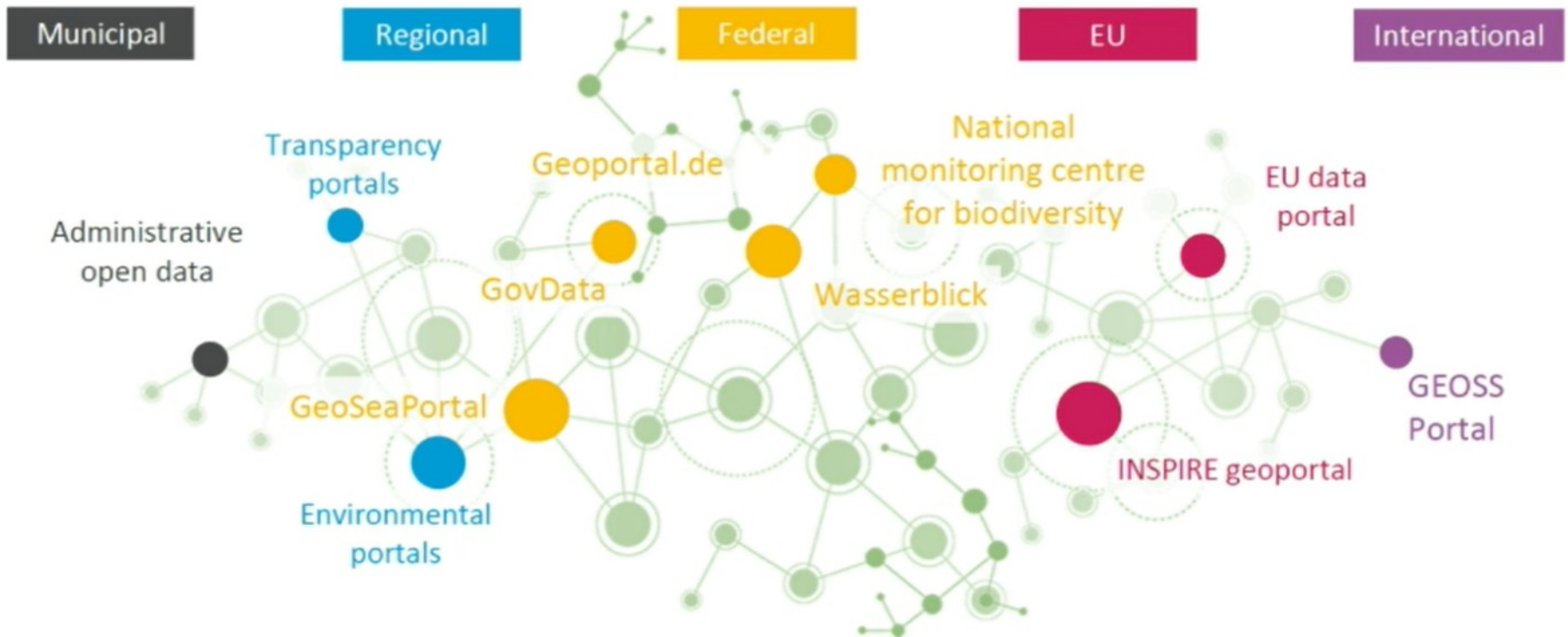
Critical interfaces (of usage) in SDI

- Principles of SOA
- Interfaces and formats
- Data / Services /
Caches / Applications
- Dataset availability vs.
Spatial Feature Access
- Embedded functionalities
- Semantic definitions



Considerations for SDI long-term preservation

Structured data is (widely) available but not (easily) accessible



Michael Lutz, Datenlabor DE, INSPIRE Conference 2023

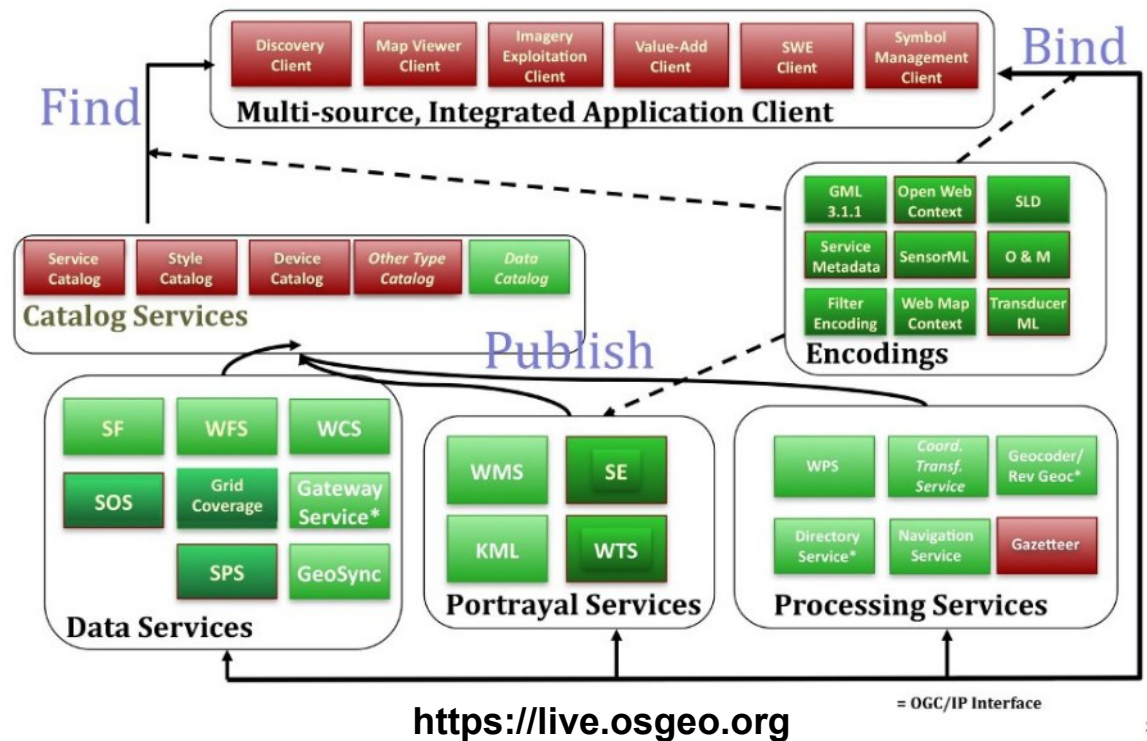
Quelle Grafik: tmit-solutions.com

Considerations

Variety of geospatial data service interfaces

- (Common/standardized) geospatial service interfaces
- Openly accessible e.g. like OGC
- Reproducible

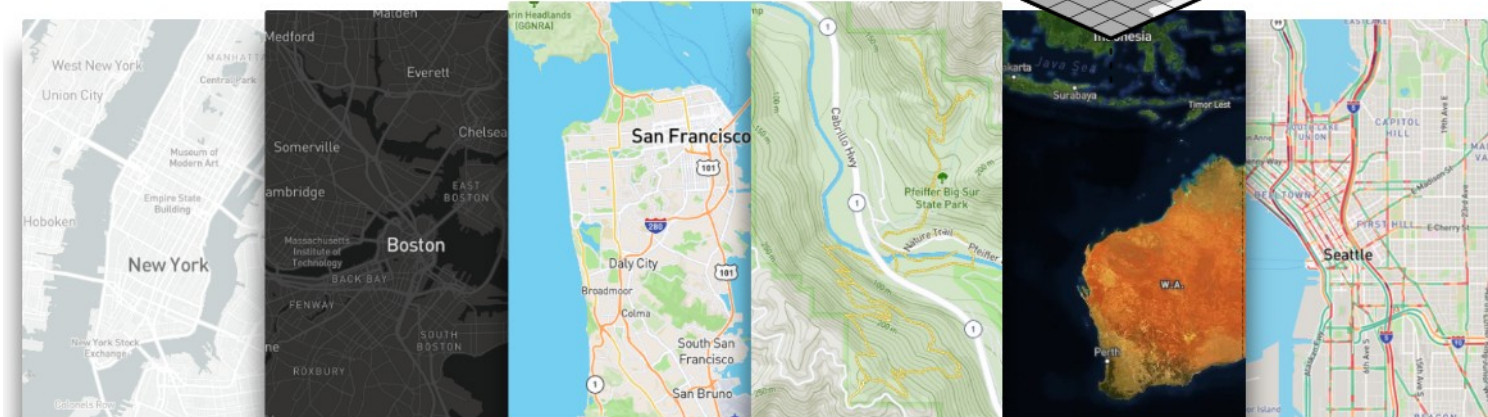
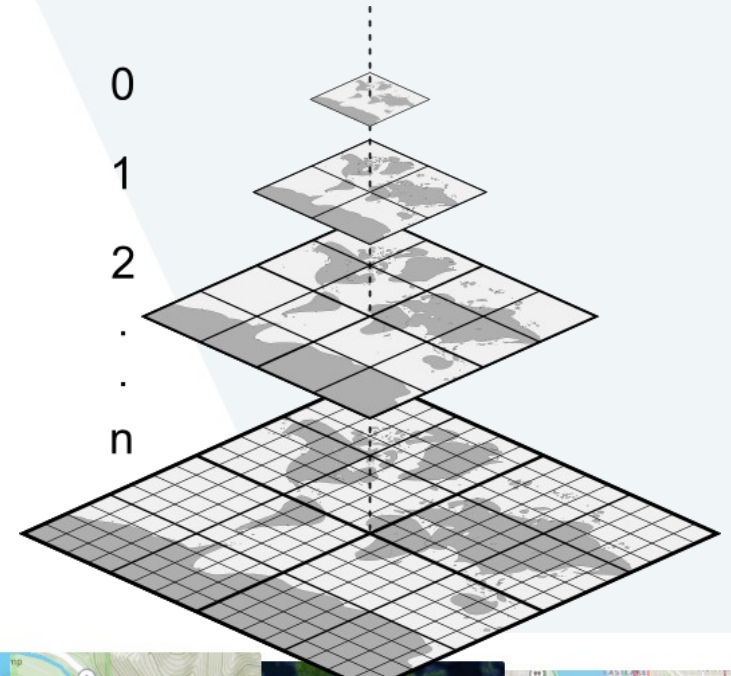
Web Services Framework Of OGC Geoprocessing Standards



Considerations

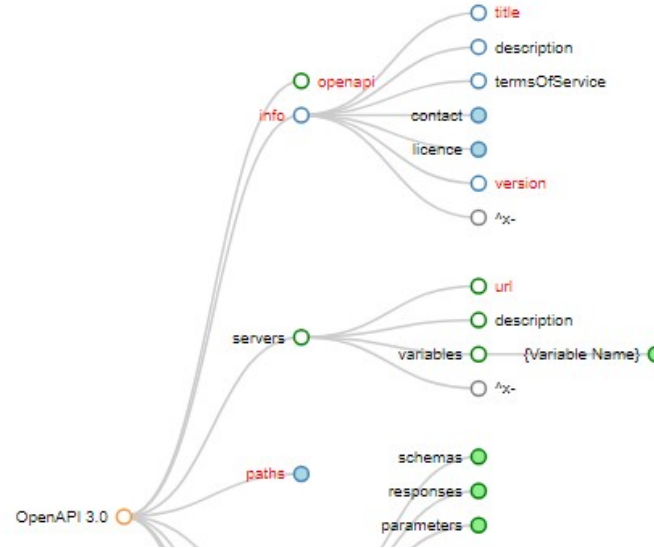
Variety and specification of spatial data caches

- (Common/standardized) cache specifications
- Openly accessible
- Standardized and exchange-able **style** descriptions (SLD, Carto-CSS, JSON, ...)
- Reproducible production methods



Considerations (Open) API for spatial data

- Variety of API
- Applicable IT architecture levels for API
- Standardized and exchangeable API definitions



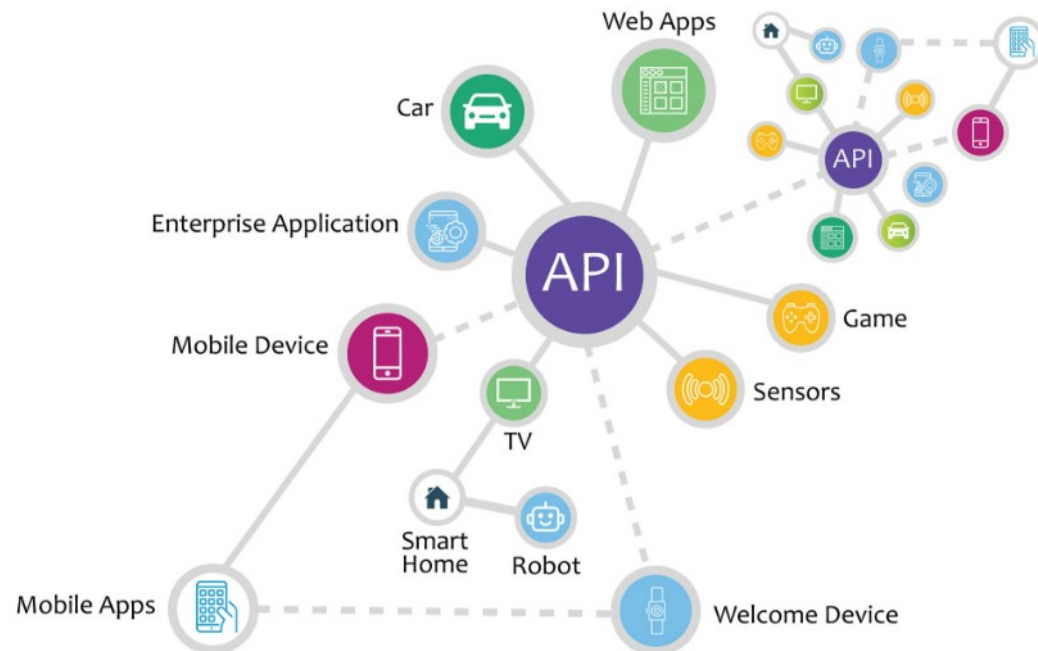
openapi property

New property!
Replace the `swagger` property

* Required

string

This string MUST be the semantic version of the document uses. The `openapi` field SHOULD be the semantic version of the OpenAPI document. This is *not* related to the version of the API.



Consideration: Discovery Mechanisms

Landing page and its references

- Plain HTML
- Sufficient meta and link information
- Well formed content (e.g. title and description)
- Compilation of all the needed information (for usage)

The screenshot shows a web page with a search bar at the top. The main content area includes a title, a description of the data, a list of features, a table of dates, contact information, keywords, GEMET-INSPIRE themes, and a map. The page is well-structured and contains all the information listed in the adjacent text.

```
<html ng-app="gn_search_minimal" lang="" id="ng-app">
<head>
<title>Digitales Landschaftsmodell - Gewässer Stichtag 08.04.2022</title>
<base href="https://data.bev.gv.at/geonetwork/srv/eng/catalog_search" />
<meta charset="utf-8" />
<meta name="viewport" content="initial-scale=1.0" />
<meta name="apple-mobile-web-app-capable" content="yes" />
<meta name="description" content="Der Objektbereich DLM - Gewässer umf" />
<meta name="keywords" content="" />
<meta property="og:title" content="Digitales Landschaftsmodell - Gewässer" />
<meta property="og:description" content="Der Objektbereich DLM - Gewässer" />
<meta property="og:site_name" content="Datenkatalog BEV" />
<meta property="og:image" content="https://data.bev.gv.at/geonetwork/srv/eng/catalog_search" />
<meta name="twitter:image" content="https://data.bev.gv.at/geonetwork/srv/eng/catalog_search" />
<meta name="twitter:title" content="Digitales Landschaftsmodell - Gewässer" />
<meta name="twitter:description" content="Der Objektbereich DLM - Gewässer" />
<meta name="twitter:site" content="Datenkatalog BEV" />
<link rel="canonical" href="https://data.bev.gv.at/geonetwork/srv/eng/catalog_search" />
<link rel="icon" sizes="16x16 32x32 48x48" type="image/png" href="https://data.bev.gv.at/geonetwork/srv/eng/catalog_search" />
<link href="https://data.bev.gv.at/geonetwork/srv/eng/portal.opensearch" />
<link href="https://data.bev.gv.at/geonetwork/srv/ger/.../static/gn-search" />
</head>
<body class="gn-nojs">
<div class="gn-full">
<div class="navbar navbar-default gn-top-bar" role="navigation">
<div class="container">
<div class="navbar-header">
<button type="button" class="navbar-toggle collapsed" data-toggle="collapse" data-target="#gn-top-bar" data-ks="collapse">
<span class="sr-only" />
<span class="icon-bar" />
<span class="icon-bar" />
<span class="icon-bar" />
</button>
</div>
<div id="gn-top-bar" class="navbar-collapse collapse">
<ul class="nav navbar-nav" id="topbar-left">
<li>
<a href="https://data.bev.gv.at/geonetwork/srv/ger/catalog_search#/home">Datenkatalog
</li>
<li>
<a title="Suchen" href="https://data.bev.gv.at/geonetwork/srv/ger/catalog_search#/search">
<i class="fa fa-fw fa-search hidden-sm"> />
<span>Suchen</span>
</a>
</li>
<li>
<div id="map-menu" class="hidden-nojs">
<a title="Karte" href="https://data.bev.gv.at/geonetwork/srv/ger/catalog_search#/map">
<i class="fa fa-fw fa-globe hidden-sm"> />
<span>Karte</span>
</a>
</li>
</ul>
</div>
</div>
</div>
<div class="container" role="main">
<div class="container-fluid gn-metadata-view gn-schema-isol19139">
<article id="ba4534b1-22c5-443d-a000-10af2a898d77" class="gn-md">
<div class="row">
<div class="col-md-8">
<header>
<h1>
<i class="fa gn-icon-dataset">

```

Considerations: Discovery Mechanisms

DOI: extending the distribution and persistence

DataCite Fabrica

Bundesamt für Eich- und Vermessungswesen / DOIs

10.48677/6854e2a0-166e-4679-9426-98c9d7a0a41d

Update DOI (Form)

Update DOI (File Upload)

Findable

Metadata Export

DataCite XML

DataCite JSON

Schema.org JSON-LD

BibTeX

DOI created

December 17, 2021, 14:34:16 UTC

DOI registered

December 17, 2021, 14:34:18 UTC

DOI last updated

December 17, 2021, 14:34:18 UTC

Schema

DataCite Metadata Schema 4

URL

<https://data.bev.gv.at/geonetwork/srv/metadata/6854e2a0-166e-4679-9426-98c9d7a0a41d>

Metadata

Verwaltungsgrenzen (VGD) - Stichtag 01.10.2021 BEV Dataset

Vermessungsämter,

Dataset Dataset published 2021 via Bundesamt für Eich- und Vermessungswesen

Die Verwaltungsgrenzen Stichtag BEV beinhalten die Grenzen der Verwaltungseinheiten Österreichs im Schnitt

Die Daten sind für folgende Grenzen vorhanden: 1) Katastralgemeindengrenze 2) Gemeindengrenze 3) Bezirksgr

Gerichtsbezirksgrenze 5) Vermessungssprengelgrenze 6) Finanzamtsbereichsgrenze 7) Bundesländergrenze 8



<https://doi.org/10.48677/6854e2a0-166e-4679-9426-98c9d7a0a41d>

Citation

Vermessungsämter. (2021). *Verwaltungsgrenzen (VGD) - Stichtag 01.10.2021 BEV* [Data set]. Bundesamt für Eich- und Vermessungswesen. <https://doi.org/10.48677/6854E2A0-166E-4679-9426-98C9D7A0A41D>

About Support PTNC.BEV4DATA -

Summary



About DataCite

What we do

Members

Services

Assign DOIs

Event data

Resources

Metadata schema

Fee Model

Contact us

Imprint

Feedback

<https://doi.datacite.org/dois/10.48677%2Fd54d7c29-4afe-44f7-9e6c-c036323b2dc8>

Preserving Semantics

Pragmatic Observations

- Controlled,
- stable and
- sustainable vocabularies
- Preserving semantics with its network of stable and reliable thessaurii
- Embedding mechanisms

Schema.org Docs Schemas Validate About

hasMap

A Schema.org Property

Thing > Property :: hasMap

A URL to a map of the place.

Values expected to be one of these types

- Map
- URL

Used on these types

- Place

Supersedes

- map_s
- map

Examples

Getting started: <https://schema.org/>

Vocabs Vocabularies About Editor API Help | W

In many areas of scholarly work, controlled vocabularies (gazetteers, thesauri, etc.) play a crucial role for resources and for ensuring interoperability between disparate projects and their data. The ACDH-C Vocabularies services that allow for collaborative creation, maintenance and publication of vocabularies and

kind

Skosmos Vocabulary Categories

GENERAL CONCEPTS	ISO 639-1 Language Codes ISO 639-3 Language Codes OFOS 2012: Austrian Fields of Science and Technology Classification 2012
META THESAURUS	labcbone Thesaurus IatIRRAIT: Taxonomy of Digital Research Activities in the Humanities
BACKBONE THESAURUS	Backbone Thesaurus OYAS Humanities Thesaurus GEMET IDU.world Thesaurus PARthenos Vocabularies
HUMANITIES	OHA Taxonomy OYAS Humanities Thesaurus OHA Thesaurus Vocabularies
ART HISTORY	lcondass
CULTURAL HISTORY	INDIGO Graffiti Thesaurus legalizus Taxonomia travelDigital Thesaurus
ARCHAEOLOGY	DEFC Thesaurus Iron Age Danube Thesaurus OeN Thesaurus - Cultural Time Periods

<https://vocabs.acdh.oew.ac.at/en/>

Map Legends

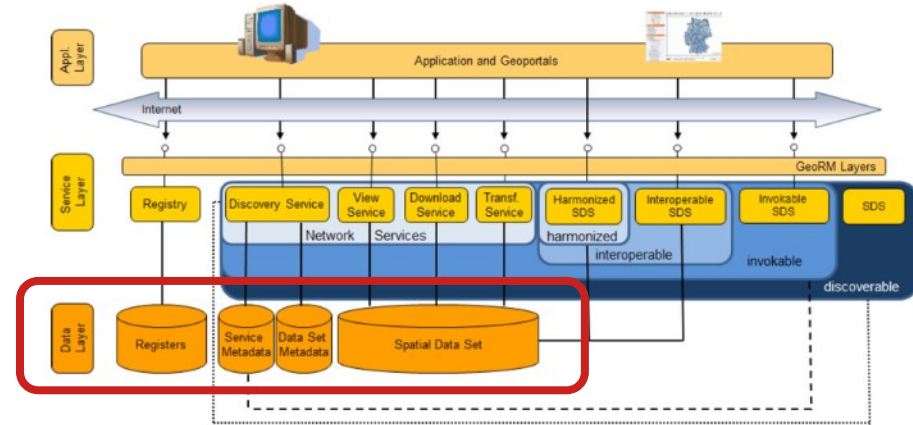
- stream, canal <5m wide
- occasionally water-bearing
- above ground water conduit
- underground water conduit
- spring
- well
- cistern
- Bad outdoor swimming pool
- reservoir
- water tower
- direction of flow
- kilometre marker
- torrent control
- waterfall
- sluice, weir
- groyne
- water level
- ferry
- pier
- hydroelectric power plant with lock

Experiences and practiced approaches

Experiences and approaches

Data tier

- Focus on data tier
- Evaluated product, metadata and semantic formats
- Production data versus distributed products
- Geospatial ... extending digital documents and records
- Cloud approaches
- Economic considerations



Experiences and approaches

- Raster data examples

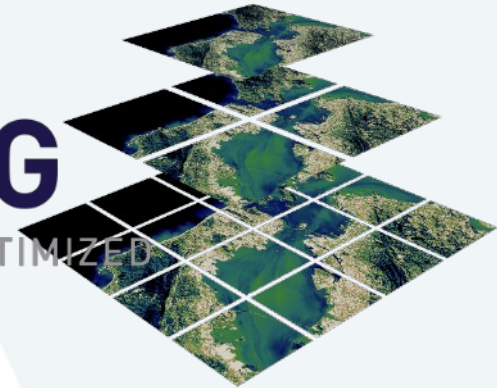
GeoTIF

JPEG2000



COG

CLOUD OPTIMIZED
GEOTIFF



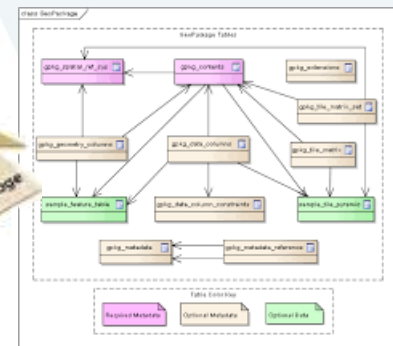
- Vector data examples

Geopackage

SHP

CSV

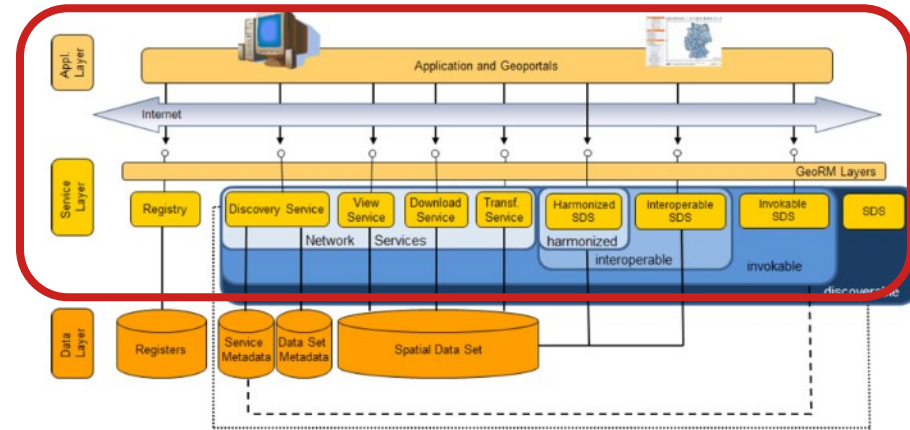
DXF



Experiences and approaches

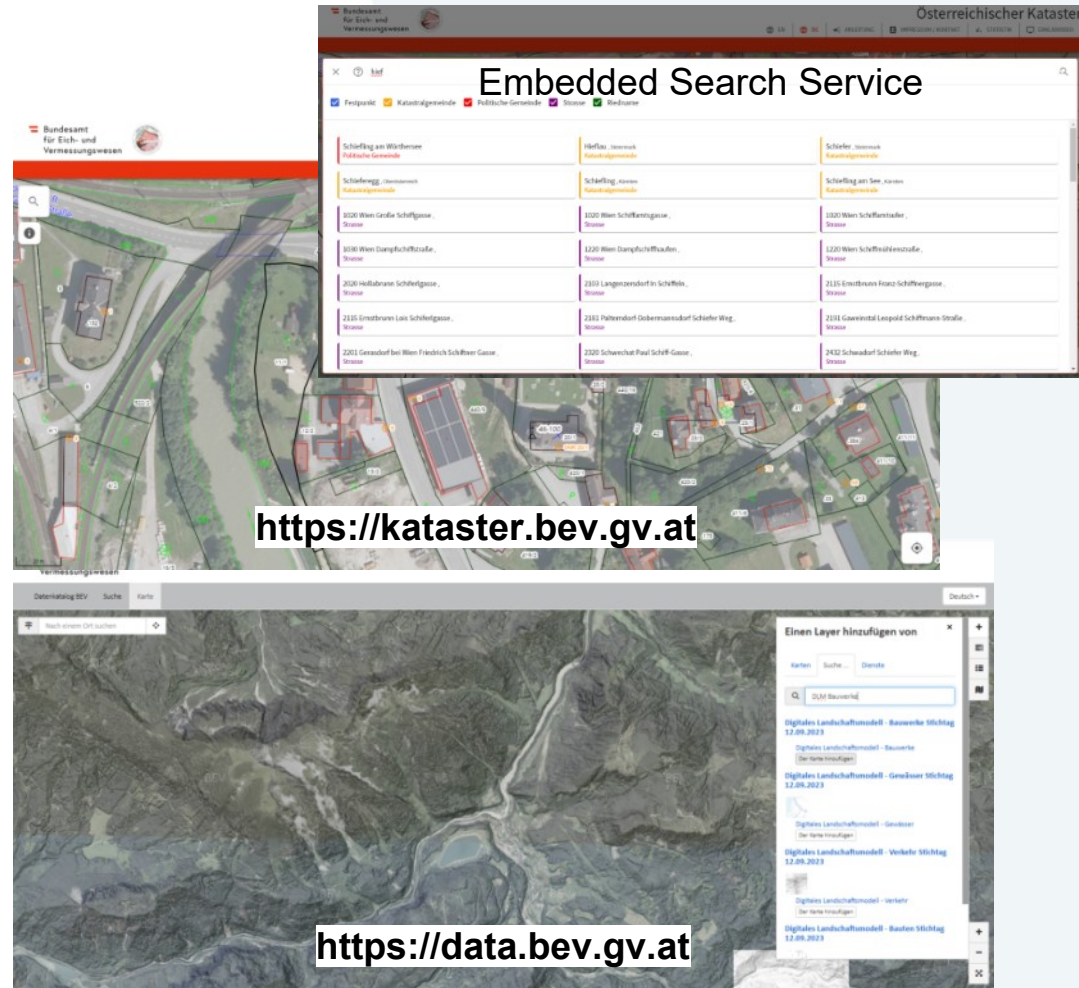
Service tier

- SOA system emulation requirements
- System virtualization (Server, DB)
- Dockerization of applications
- PoC for interface standardization
- Loss/elimination of digital rights management leads to new **archival access conditions** according to the General Data Protection Regulation (GDPR)



Conclusion

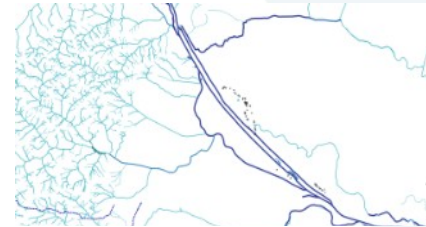
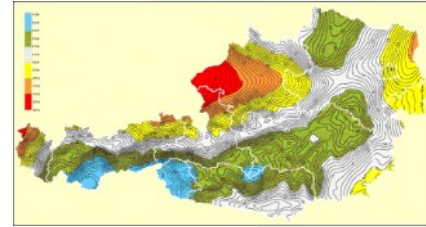
- Much more effort and development for long-term strategies are needed
- Complete SOA are not covered by actual preservation strategies
- Geospatial Knowledge Infrastructures are not covered by actual preservation strategies
- Importance of Archiving responsibilities



Contact

Agenda

- Brief analysis of actual situation
- Appropriate considerations for long-term preservation
- Experiences and practices



Dr.techn. Markus Jobst

CIO - Chief Information Officer

Email: markus.jobst (at) bev.gv.at

Schiffamtsgasse 1-3, 1020 Wien, Österreich

