PROPOSAL OF NEW INSPIRE GOOD PRACTICE

STAC AS AN INSPIRE PREDEFINED-ACCESS DOWNLOAD SERVICE

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INTRODUCTION

- This is a proposal of a technical approach for implementing the requirements set out in the INSPIRE Implementing Rules for Network Services based on the STAC specification and the STAC API.
- Although STAC, through specific formats such as Cloud Optimized GeoTiff (COG), can to some extent handle data dynamically, this proposal does not cover dynamic datasets, real-time data or direct access to individual data through query functionality.

CURRENT GOOD PRACTICES FOR DOWNLOAD

- Several by MIG endorsed solutions for implementing download services are already available. They cover implementations based on ATOM, WFS, WCS, SOS and also OGC API – Feature
- So this approach shows one of several ways of implementing INSPIRE Download services for predefined datasets.
- Is yet another option for a download service needed?

WHY STAC AS DOWNLOAD SERVICE?

Main advantage - better support for downloading predefined datasets (bulk download of datasets).

- OGC API - Features are designed for direct access, not designed for downloading complete predefined datasets
- STAC is designed to manage structured catalogs of downloadable files, which is an excellent fit for INSPIRE's requirements for predefined data sets
- STAC provides a more easy and user-friendly way to distribute and access such data
- STAC is already supported in GIS platforms such as QGIS and ArcGIS

SHORT ABOUT STAC

- Designed to organize and access large volumes of Earth observation data
- STAC has since gained traction as a more general standard for handling predefined datasets
- Provides a simple JSON-based interface
- Offers a simple solution for searching, finding and downloading datasets from a catalog
- The API is RESTful and based on the OGC API Feature standard
- Is a suitable, modern, alternative API solution for bulk downloading of INSPIRE datasets
- This proposal of good practice presents a general solution that works for both raster and vector data

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STAC SPECIFICATION & API

THE STAC SPECIFICATION

The STAC Specification consists of 4 semi-independent specifications. Each can be used alone, but they work best in concert with one another.

- STAC Item
- STAC Catalog
- STAC Collection
- STAC API

THE STAC ITEM

STAC Item is the **core atomic unit**, representing **a single spatiotemporal asset** as a GeoJSON feature and can be easily read by any modern GIS or geospatial library.

The STAC Item JSON specification includes **additional fields** for:

- the **time** the asset represents
- a **thumbnail** for quick browsing
- **asset links**, links to the described data
- **relationship links**, allowing users to traverse other related STAC Items


```
{
    "stac_version": "1.0.0",
    "type": "Feature",
    "id": "20201211_223832_CS2",
    "bbox": [],
    "geometry": {},
    "properties": {},
    "collection": "simple-collection",
    "links": [],
    "assets": {}
}
```

THE STAC CATALOG

The STAC Catalog provides a flexible structure to **link various STAC Items together** to be crawled or browsed. The spec is quite simple, just a JSON that:

- contains a **list of STAC Items**
- contains a **list of child STAC Catalogs** - allowing a hierarchical grouping of STAC Items

```
{
    "stac_version": "1.0.0",
    "type": "Catalog",
    "id": "20201211_223832_CS2",
    "description": "A simple catalog example",
    "links": []
}
```

THE STAC COLLECTION

STAC Collection is an **extension of the STAC Catalog** with additional information that **describe STAC Items** that fall within the Collection such as:

- the extents
- License
- Keywords
- Providers
- etc.


```
{
    "stac_version": "1.0.0",
    "type": "Collection",
    "license": "ISC",
    "id": "20201211_223832_CS2",
    "description": "A simple collection example",
    "links": [],
    "extent": {},
    "summaries": {}
}
```

THE STAC API

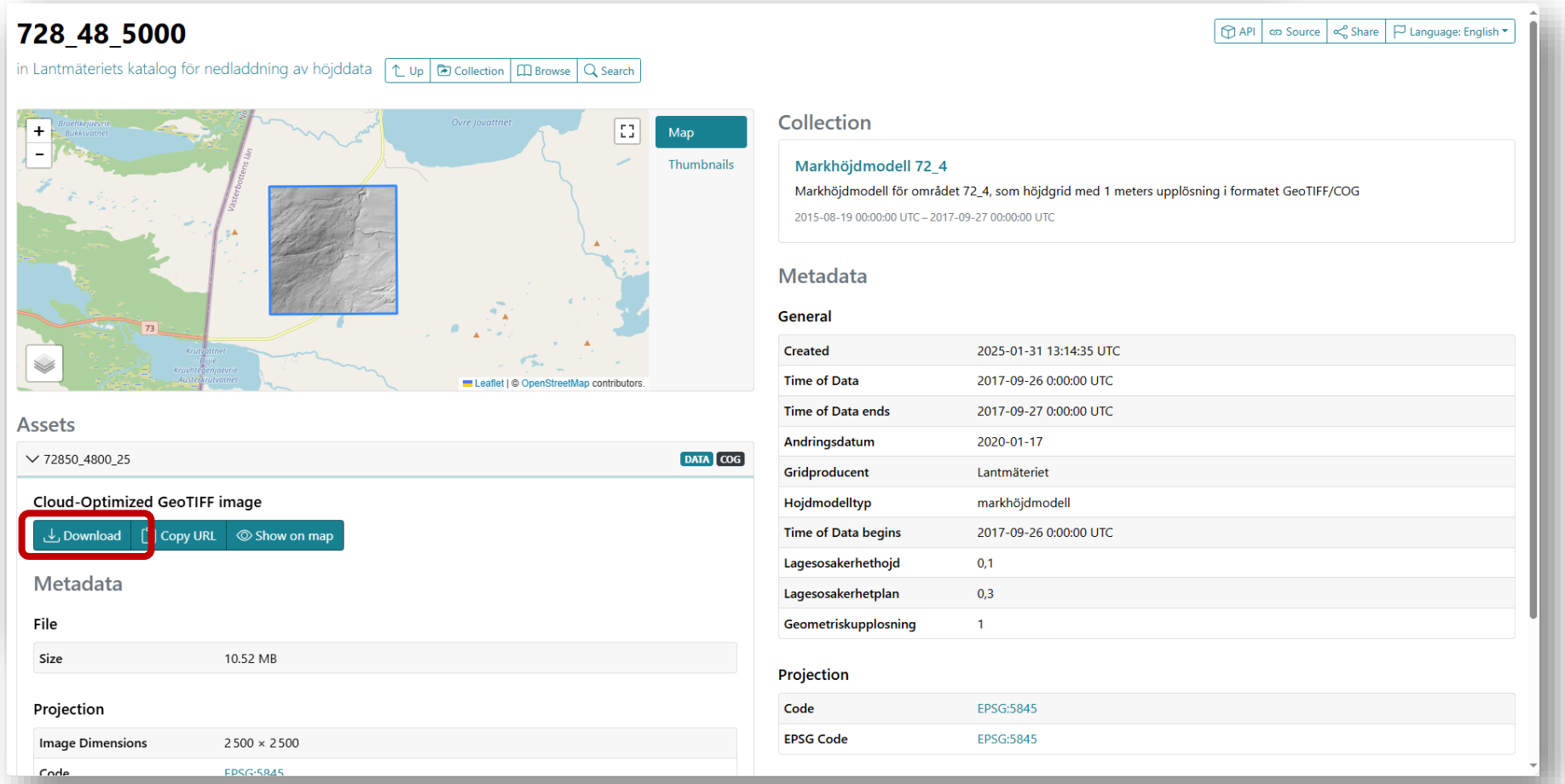
- STAC API provides a **RESTful endpoint** that enables search of STAC Items
- It is specified in OpenAPI and **based on the OGC API – Feature standard**
- It dynamically generates a GeoJSON FeatureCollection of STAC Items in response to a user query

```
/stac/search
```

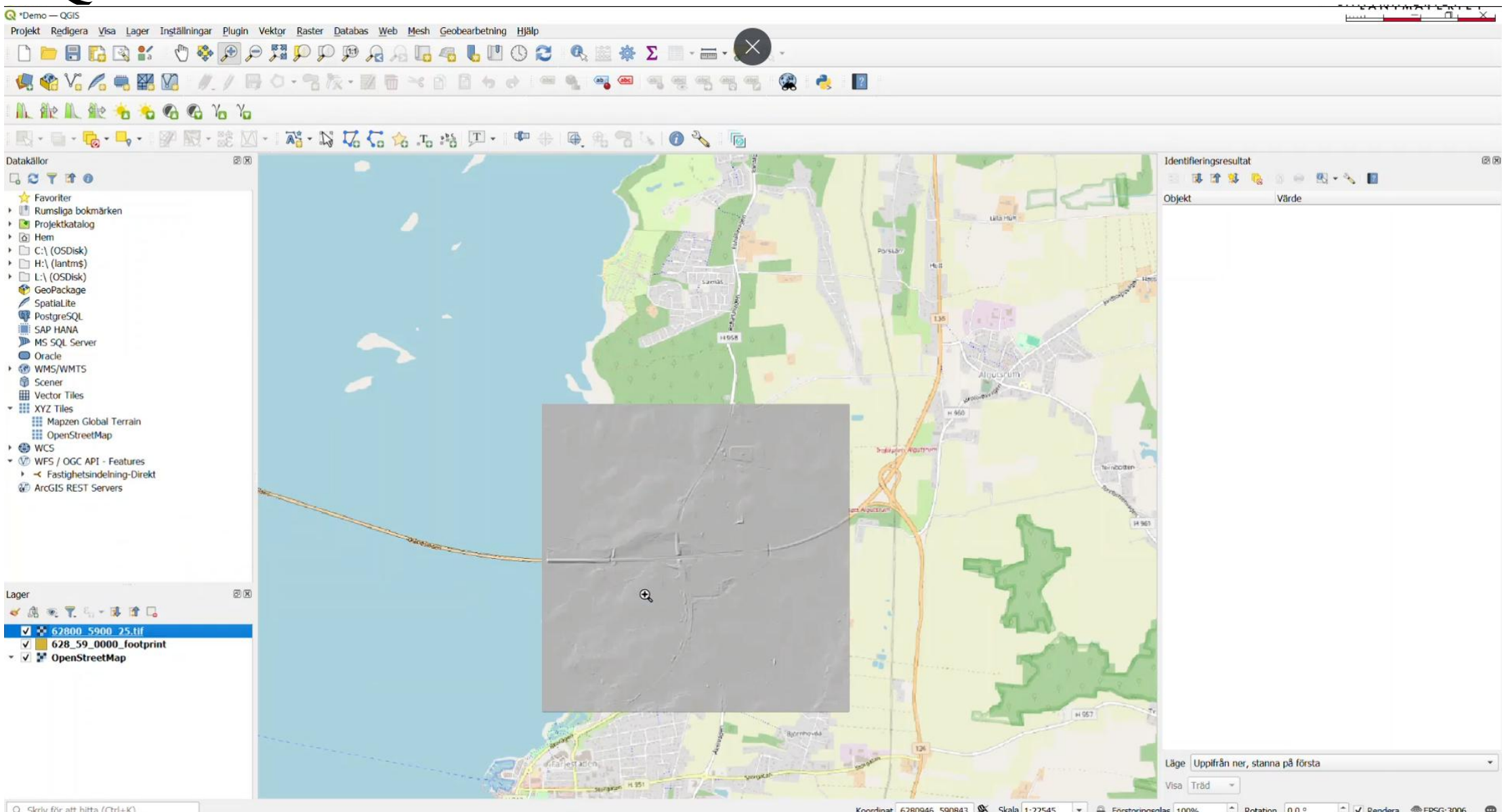
EXAMPLES

RADIANT EARTH STAC BROWSER

https://radiantearth.github.io/stac-browser/#/?.language=en



QGIS – STAC PLUGIN



OTHER OPEN SOURCE TOOLS

Other tools available, both open-source and proprietary, making it easy to get started

- STAC FastAPI – a robust Python-based server with built-in support for filtering and API standards
- PySTAC **&** PySTAC Client– developer tools for creating, validating, and managing STAC metadata
- **Planetary Computer STAC tools** – maintained by Microsoft, widely adopted for scalable deployments.

Commercial platforms

- Used by **Esri, AWS, Microsoft, Radiant Earth**
- **FME** will soon support STAC

THANK YOU! YOU CAN FIND US ON…

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