O2A specification for SDI Data Product Configuration

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Preface

All GeoServer-based data products consist of three parts: input (data exchange), output (GeoServer-based OGC Web Services) and VEF integration. This specification covers how output and VEF integration can be configured by the use of the O2A SDI Data Product Configuration GitLab repository. It will contain all GeoServer-hosted layers at AWI but externally hosted OGC web services can also added to have them properly integrated into VEF-based viewers.

After having an initial talk (see SOP), we'll set up your data product within our public Data Product Configuration repository and you'll get access to directly edit it.

Parts of the configuration should only be touched by O2A SDI admins – *usually* indicated by filenames beginning with `admin.` – but some parts are designed to be directly maintained by product owners (this could be you!) – *usually* indicated by filenames beginning with `owner.` – via Git merge requests (guide coming soon)**.**

Multiple filetypes will be used/mentioned here. You will use TOML to configure the metadata (e.g. title and abstract) of your layers and services, SLD for styling your data on the map, Markdown and JSON to configure filter behaviour and metadata presentation in VEF-based viewers.

- Configuration files:
    - TOML https://toml.io
- Layer Styling
    - OGC SLD specification https://www.ogc.org/standard/sld/
    - GeoServer SLD reference
        - https://docs.geoserver.org/2.21.x/en/user/styling/sld/index.html (release currently used by O2A SDI 01 Nov 2023)
        - https://docs.geoserver.org/main/en/user/styling/sld/index.html (current stable release)
- VEF Metadata Templates: Markdown-based https://spaces.awi.de/x/7QkQH
- VEF Mapping Files: JSON-based
    - Gallery Mapping https://spaces.awi.de/x/TQLeGw
    - Filter Mapping (documentation coming soon)

Version 0.1

Repository Schema

The repository consists of three "levels" of folders. The first level is the "label" level, holding one folder per public GeoServer instance/label of the O2A SDI (currently: `common`, `platforms`, `basemaps`) and one folder (`_other`) for OWS hosted differently (O2A SDI ArcGIS Server, external servers). One level down in the folder structure is "service" level, where each folder represents one OWS (e.g. `common/marehub`, `common/media`, `common/bathymetry`, `platforms/expedition`). One more level down is "layer" level, where each folder represents one OWS layer (e.g. `common/media/photos`, `platforms/expedition/events`). Additionaly, there are some fixed folders: `_styles` within each GeoServer instance/label folder and `_resources` which may be found on root, label, service and layer level.

`_styles` folders hold all SLD files for its associated GeoServer instance/label. SLD files are used to define how WMS layers look when rendered for `GetMap` requests.

`_resources` folders hold files configuring a layer's behaviour and metadata appearance in VEF-based viewers.

```
. <repo>
|-- admin.*
|
|-- <label>
|   |-- admin.*
|   |
|   |-- _styles/<SLD files>
|   |-- _resources/<resource files>
|   |
|   `-- <service>
|       |-- owner.service.toml
|       |-- admin.*
|       |
|       |-- _resources/<resource files>
|       |
|       `-- <layer>
|           |-- owner.resources.toml
|           |-- owner.layer.toml
|           |-- admin.*
|           |
|           `-- _resources
|               |-- popup.md
|               |-- sidebar.md
|               |-- gallery.mapping.json
|               `-- filter.mapping.json
|
|-- _resources/<resource files>
|
`-- _other
    |
    `-- <arbitrary-service-id>
        |-- owner.urls
        |
        |-- _resources/<resource files>
        |
        `-- <layer>/_resources/<resource files>
```

`_resources` folders (on all levels)

A `_recources` subfolder, independent of its location (root level, label level, service level, layer level), contains files to influence the presentation and behaviour in VEF-based viewers (like the Marine Data viewer). There will be no effect when loading the OWS in any other client (like ArcGIS, QGIS, other mapping apps).

There are three sorts of files supported. VEF Metadata Template take care of metadata presentation in VEF popups and the VEF sidebar. They are recommended for each and every layer. VEF Mapping files take care of frontend-side filter harmonization and media gallery behaviour. These files are only used in special cases. Specific documentation can be found here:

- VEF Metadata Template files (`*.md`), to configure presentation of your data in popups and sidebar https://spaces.awi.de/x/7QkQH
- VEF Filter Mapping files (`*.mapping.json`) (documentation coming soon)
- VEF Gallery Mapping files (`*.mapping.json`) see https://spaces.awi.de/x/TQLeGw

In general files with specific names inside resources folders will get used automatically. These names are:

- `popup.md` (VEF Metadata Template for popups)
- `sidebar.md` (VEF Metadata Template for the sidebar)
- `filter.mapping.json` (VEF Filter Mapping)
- `gallery.mapping.json` (VEF Gallery Mapping)

For each layer used in VEF-based viewers, the file within its own `_recources` folder is prioritised over that in its sevice-level _resources folder and so on. This boils down to this priority list:

1. `<label>/<service>/<layer>/_resources/<file-by-convention>`
2. `<label>/<service>/_resources/<file-by-convention>`
3. `<label>/_resources/<file-by-convention>`
4. `_resources/<file-by-convention>`

However, the resources section of the `owner.layer.toml` (see subsection) file can be used to overwrite this convention with specific filenames (not filepaths) overwriting the convention, resulting in this final priority list:

1. `<label>/<service>/<layer>/_resources/<file-from-layer-configuration-if-existing>`
2. `<label>/<service>/_resources/<file-from-layer-configuration-if-existing>`

3. `<label>/_resources/<file-from-layer-configuration-if-existing>`
4. `_resources/<file-from-layer-configuration-if-existing>`
5. `<label>/<service>/<layer>/_resources/<file-by-convention>`
6. `<label>/<service>/_resources/<file-by-convention>`
7. `<label>/_resources/<file-by-convention>`
8. `_resources/<file-by-convention>`

File Specs

Admin vs. Owner Files

On any level there might be files prefixed with `admin.` or `owner.`, like `common/media/photos/admin.layer.toml` or `common/media/owner.service.toml`

`admin.` files are only to be created and edited by SDI admins. `owner.` files are to be created by admins and can be edited by data product owners to change some parts of the configuration themselves.

SLD files in `_styles` folders and files in `_recources` folders can be created and edited by data product owners.

Label Level

A label is a GeoServer instance within the O2A SDI. Currently there are three labels: `common`, `platforms`, `basemaps`. There's also a `<label>/_styles` subfolder – used to store all SLD files used for all layers of all services within thin GeoServer label/instance – and a `<label>/_resources` subfolder which can be used to provide resources for representation in VEF-based viewers which should be shared among multiple services and layers of this label /instance to avoid placing copies in each layer's subfolders.

`_styles/*.sld`

Put your SLD files here. Take care, that the filename matches the actual name of the XML-defined style.

`owner.service.toml`

A service folder refers to a workspace within a GeoServer instance/label and results in an OWS of the same name. Additionally an OWS has a human-readable title, an abstract and optional keywords – just like a scientific paper. These metadata can be specified in `<label>/<service>/owner.service.toml`. There's also a `<service>/_resources` subfolder which can be used to provide resources which should be shared among multiple layers of this service (see section on resource handling).

section	key	value type	required /optional /default	value description
	`title`	string	yes	human-readable title of the workspace (used as title for all contained OWS: WMS, WFS, WCS)
	`abstract`	string	yes	abstract, describing the service's content. VEF (Marine Data Viewer) supports Markdown URL representation (`<http://www.marine-data.de>`, `[Marine Data](http://www.marine-data.de>)`) and HTML (like `  `, `<a></a>`)
	`keywords`	string list	no	

`owner.layer.toml`

A layer folder results in a layer of the same name withing the OWS representet by its parent service-layer folder. A layer has a human-readable title, an abstract and optional keywords – just like a scientific paper. These metadata can be specified in `<label>/<service>/<layer>/owner.layer.toml`. Additionally default and alternative styles (referencing SLD files in `<label>/_styles/`) and VEF resources can be specified. If desired the default mechanism of auto-deploying changes to the GeoServer (styles, metadata) and/or VEF (recoures) can be deactivated.

section	key	value type	required /optional /default	value description
	`title`	string	yes	human-readable title of the layer
	`abstract`	string	yes	abstract, describing the layer's content. VEF (Marine Data Viewer) supports Markdown URL representation (`<http://www.marine-data.de>`, `[Marine Data](http://www.marine-data.de>)`) and HTML (like `  `, `<a></a>`)
	`keywords`	string list	no	
`SETTINGS`	`style_default`	string	yes	name of the SLD file (including file extension) to use as default style. The filename needs to match the actual style name. SLD files need to go here: `<label>/_styles/*.sld`
	`style_alternatives`	string list	no	names of SLD files (including file extension) to use as alternative styles. The filenames need to match the actual style name. SLD files need to go here: `<label>/_styles/*.sld.`

RESOURCES	gallery_mapping	string	no (defaults to gallery.mapping.json)	name of gallery mapping file. Only required if deviating from gallery.mapping.json.
	filter_mapping	string	no (defaults to filter.mapping.json)	name of gallery mapping file. Only required if deviating from filter.mapping.json.
	popup	string	no (defaults to popup.md)	name of popup metadata template file. Only required if deviating from popup.md.
	sidebar	string	no (defaults to sidebar.md)	name of sidebar metadata template file. Only required if deviating from sidebar.md.
AUTODEPLOY	resources	boolean	no (defaults to true)	whether to autodeploy (accepted merge requests will trigger instant updates in AWI-hosted VEF-based viewers, applying changes in resource files) changes for this layer to production. If set to false, triggering updates otherwise is encouraged. Talk to your SDI admins!
	geoserver	boolean	no (defaults to true)	whether to autodeploy (accepted merge requests will trigger instant updates in O2A GeoServers, applying changes in styles, service/layer metadata) changes for this layer in production. If set to false, triggering updates otherwise is encouraged. Talk to your SDI admins!

`_other` Folder

The `_other` subfolder is the place to store resources for services/layers which are not hosted in the GeoServer part of the O2A SDI to be used within VEF-based viewers. This subtree only contains resource files (see above for specs), `owner.urls` files but neither SLD nor any other configuration files.

Within the `_other` subfolder each folder refers to one OWS endpoint (which could contain multiple services like WMS/WFS/WCS). The name of the subfolder (`_other/<arbitrary-service-id>`) can be choosen arbitrarily but should be kind-of human-readable. Inside, there needs to be one file named `owner.urls` (`_other/<arbitrary-service-id>/owner.urls`), specifying service URLs – one per line – to which this folder's resources are dedicated. There can be subfolders like on `<label>/<service>/` folders and the same resolve priorities apply.

Examples

`common/media/photos`

Taken from here: https://gitlab.awi.de/software-engineering/sdi/de.awi.sdi.o2a_spatial.dataproducts/-/tree/main/common/media/photos

Folder Structrure

```
. https://gitlab.awi.de/software-engineering/sdi/de.awi.sdi.o2a_spatial.dataproducts
|
`-- common
    |
    |-- _styles
    |   |-- marehubPhotos.sld
    |   `-- marehubPhotosPreview.sld
    |
    `-- media
        |-- owner.service.toml
        |-- admin.service.toml
        |
        `-- photos
            |-- owner.layer.toml
            |-- admin.layer.toml
            |-- admin.store.toml
            |
            `-- _resources
                |-- popup.md
                |-- sidebar.md
                |-- gallery.mapping.json
                `-- filter.mapping.json
```

common/media/owner.service.toml

```
title = "Media OWS"
abstract = '''
Media service with photo and video data provided by AWI, Geomar and Hereon. Curated metadata is extracted from
image FAIR Digital Objects (iFDOs) (<https://marine-imaging.com/fair/>) or automatically harvested from data
products in Pangaea (<https://pangaea.de/>).
'''
keywords = [ "WMS", "WFS", "MareHUB", "videos", "photos", "image", "iFDO", "PANGAEA" ]
```

common/media/photos/owner.layer.toml

```
title = "Photos"
abstract = "Layer with data provided by the three marine research centers AWI, Geomar and Hereon. It includes
data collected during marine research projects as well as data enriched for this layer, i.e., technical
metadata taken directly from the file, such as EXIF data. Depending on the data set, the provided metadata
varies for each data product. Preview photos that are provided via urls are lossy processed to make them
accessible for the web. This results in a loss of data information, even if not visible."
keywords = [ "MareHUB", "photos", "image", "PANGAEA" ]


[SETTINGS]

style_default = "marehubPhotos.sld"
style_alternatives = [ "marehubPhotosPreview.sld" ]


[AUTODEPLOY]

resources = false
```

`_other/hcdc-hereon-marehub/`

This is how resources – here: metadata templates (`*.md`) – for an externally hosted WMS could be added. There are no layer subfolders (hence no `<layer>/_resources/*.md` files) so that all layers of this service would use the the metadata templates provided in `_other/hcdc-hereon-marehub/_resources/`.

Taken from here: https://gitlab.awi.de/software-engineering/sdi/de.awi.sdi.o2a_spatial.dataproducts/-/tree/main/OTHER/hcdc-hereon-marehub

Folder Structrure

```
. https://gitlab.awi.de/software-engineering/sdi/de.awi.sdi.o2a_spatial.dataproducts
|
`-- _other
    |
    `-- hcdc-hereon-marehub
        |-- owner.urls
        `-- _resources
            |-- popup.md
            `-- sidebar.md
```

_other/hcdc-hereon-marehub/owner.urls

```
https://hcdc.hereon.de/geoserver/MareHub/ows
https://hcdc.hereon.de/geoserver/MareHub/wms
https://hcdc.hereon.de/geoserver/MareHub/wfs
```