Invitation to tender

OGC-API-Features tooling adjustments to the Dutch API Design Rules and INSPIRE

Geonovum

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12th of October 2022	Second draft
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Chapter 1 - Introduction

This chapter gives the general background and specifies its goals and scope.

Invitation to tender

This document gives information about the invitation to tender regarding adjustments to open source tooling for publishing OGC-API-Features according to OGC-standards, Dutch API Design Rules and INSPIRE requirements.

The fixed budget is € 20.000 excluding 21% VAT per tool. When enough qualifying offers are received, Geonovum has the intention to reward at least 2 offers that must concern different open source tools (see chapter 4).

Background

The OGC standards for spatial services that are currently widely in use are complex for users outside the geospatial domain. Because of this, it requires significant expertise in geospatial information technology to be able to use these services. Seen from outside the geospatial domain, the data behind the OGC services is part of the "Deep Web", because the data is published behind specialized web services and not readily available for the majority of web developers [Taylor and Parsons 2015]. This group of users is increasingly using and creating geospatial data. It is therefore seen by Geonovum as an important new target group to disseminate geospatial data, in addition to our existing users of these services.

OGC-API-features is a relatively new OGC standard for a download service of spatial features by means of an API (Application Program Interface) and might solve the above mentioned problem. They are considered as follow up for the OGC Web Feature Service (WFS) standard. The main advantage is that this new kind of services is less complex for users outside the geospatial domain.

More and more governmental organizations offer REST APIs (henceforth abbreviated as APIs), in addition to existing interfaces like SOAP and WFS. These APIs aim to be developer-friendly and easy to implement. While this is a commendable aim, it does not shield a developer from a steep learning curve getting to know every new API, in particular when every individual API is designed using different patterns and conventions. To overcome this problem a Dutch API strategy was setup. Part of this strategy is a standard for designing APIs in the Dutch Public Sector. This standard describes a widely applicable set of design rules for the unambiguous provisioning of REST APIs. The primary goal of this standard is to offer guidance for organizations designing new APIs, with the purpose of increasing developer experience (DX) and interoperability between APIs for the Dutch public information infrastructure.

The INSPIRE Directive aims to create an European Union spatial data infrastructure for the purposes of EU environmental policies and policies or activities which may have an impact on the environment. This European Spatial Data Infrastructure will enable the sharing of environmental spatial information among public sector organizations, facilitate public access to spatial information across Europe and assist in policy-making across boundaries.
INSPIRE is based on the infrastructures for spatial information established and operated by the Member States of the European Union. The Directive addresses 34 spatial data themes needed for environmental applications. Once a dataset fits in the description of one of these 34 themes, INSPIRE enforces European public data providers to publish the following:

1) Metadata data
2) View services
3) Download services

Most currently implemented INSPIRE download services are based on the WFS standard and/or an ATOM feed service. But so far, no fully INSPIRE compliant download service uses the new OGC-API-Feature standard.

Geonovum wants Dutch geospatial data to be used, not only by geo-experts, but also outside the geospatial domain. Therefor Geonovum wants to stimulate the use of the new OGC-API-Feature standard. To do so, a

testbed has been set up and a guideline has been published in a draft version for the Dutch INSPIRE data providers how to use the new standard.
An important conclusion from the testbed is that none of the tools used in the testbed fulfil all Dutch API Design Rules nor do they fulfil the INSPIRE requirements and no tooling is known to do so at this moment (September 2022).

Some off the barriers are listed below:

- OGC-API Feature tools are based on the international OGC-standards, so it is not immediately logical to comply with national standards like the Dutch API design rules.
- They don't support other coordinate reference systems (CRS) than WG84. For instance, ETRS89 which is required by many INSPIRE themes is mostly not supported. Also the mostly used encoding GeoJSON does not officially supported another CRS than WGS84. New standards like OGC-API-Features - part 2 and an extension to GeoJSON: JSON FG will help to solve this CRS problem, once tooling has adjusted to them.
- INSPIRE download services also demand linkage to several items, which is not provided in all of the currently existing tools.
- Another barrier for implementing OAPIF services conform INSPIRE is the complexity of the INSPIRE data models. The data needs to be flattened and converted into simple encodings like GeoJSON.

The first three barriers could be solved by adjusting the existing tools.

Goal

The goal of this invitation to tender is to make existing open source tooling for serving OGC-API-Feature services more adjusted to the OGC standards, the Dutch API Design Rules and the INSPIRE requirements in order to help the European and Dutch geospatial data providers and users. This will strengthen the Dutch public geospatial infrastructure.

Scope

The tooling must be open source and must have a solid community that will embrace the adjustments in their base code. So maintenance is secured.

It only concerns functionality for tooling that serve OGC-API-Feature services. So other type of services within the OGC-API service standards are out of scope.

Since OGC-API-Feature services are spatial services, attention is also asked for the geospatial module of the Dutch API Design Rules, although it is not yet official, because it is still in a consultation faze. So it is out of scope in this tender. Also the other modules are out of scope. Only the core is relevant to this tender.

This document

After this introduction, chapter 2 explains the tender procedure. Chapter 3 provides a detailed description of the assignment. Chapter 4 explains the organization of the testbed in more detail. Appendix A gives the metrics by which proposals will be judged.

This document has been updated, based on questions and comments that have been answered in the information session of November the 7th and the question period after this session. These updates have been marked Yellow.

Chapter 2 - How to tender

This chapter gives the information about the procedure of tender response.

Rules and procedure

The submission period for the tender starts on October the 18th, 2022 with the publication of the Invitation to Tender on the Geonovum website, https://www.geonovum.nl/themas/aanbesteding-toolaanpassingen-ogc-api-features.

The tender is open to private and public parties, and to combinations of parties (consortia). In the case of a consortium, there is one party who acts as the contact point and contractor on behalf of the consortium for the tender with Geonovum.

Geonovum has organized an informational meeting on Monday, November the 7th at 10:00h. The recording of this session and the presentation held during this session, can be downloaded from: https://www.geonovum.nl/themas/invitation-to-tender.

Your tender must be submitted by sending an e-mail to info@geonovum.nl, addressed to Rob van de Velde, director of Geonovum.

The tender is preferably written in English[1] and must at least contain:

- Motivation for the tool you are applying for to adjust;
- The adjustments you are intending to make with a reference to the requirements;
- Plan of approach;
- Time plan;
- References (including e.g. publications, projects, blogs, code on GitHub) and curriculum vitae for performers of the adjustments, showing enough relevant knowledge, experience and connection with the open source community of the tool to be adjusted, The OGC standards, the Dutch API Design Rules and the INSPIRE community;
- Statement of agreement with the publication of the adjusted code and deliverables under a CC/by license.
- Description of how the contractor is going to convince Geonovum that the community has adopted the adjustments into their base code in a way that it will be taken into maintenance by the community.

All outcome, not being source code, will be available under http://creativecommons.org/licenses/by/4.0/.

All source code is preferably available under a "popular and widely used or with strong communities" open source license as identified by the open source initiative.

The deadline for submitting a tender is Friday, December 9th, 2022.

Geonovum will judge the received tenders in the second and third week of December, according to the criteria stated in appendix A.

Parties are allowed to tender for more than one tool. However, Geonovum has the freedom to only award one tool.
Geonovum will announce which party is selected for which tool to adjust on Thursday, December the 22nd at the latest. All parties who have submitted a tender will be informed about the result via e-mail.
Note that reviewers of this document and Geonovum staff[2] are exempt from bidding.

[1] The alternative is Dutch
[2] Employees and Secondments

Chapter 3 - Deliverables

This chapter describes the deliverables and the requirement.

Deliverables

The deliverables are:

1) Adjustments to the base code supported by the tool community
2) Adjustments to the technical documentation supported by the tool community
3) Adjustments to the user guide supported by the tool community
4) Proof that the adjustments are accepted by the open source community of the tool and that it has become part of the base code and will be maintained in the future updates by this community as explained by the contractor in the offer.
5) Test results that proof the conformance of the tool after the adjustments. This can be substantiated by the OGC validator (validates against Part 1 and 2 of the OGC standard for OGC-API-Features), the Dutch ADR validator and the EU validator for INSPIRE. Validators can be wrong too, so if a requirement fails to be validated because of an error in the validator, the contractor should substantiate this.
6) A running service based on a test dataset equal to one of the datasets used in https://geonovum.github.io/OAPIF-PDOK-INSPIRE/ so we can compare and see the differences made by the adjustments. This service should stay online for at least 2 years.
7) A presentation and demo at a final public event showing the adjustments made.
8) A report explaining the adjustments made and the lessons learned (max. 2 A4 pages)

Requirements for code adjustments

Adjustments to the code should result in the possibility for users to publish OGC-API-Feature services that comply with all the requirements as stated in the following documents:

1. OGC-API-Features Part 1:Core. OGC. V1.0. URL: https://docs.opengeospatial.org/is/17-069r4/17-069r4.html
2. OGC-API-Features Part 2: Coordinate Reference Systems by Reference. OGC. V1.0. URL: https://docs.opengeospatial.org/is/18-058r1/18-058r1.html
3. Dutch API design rules 9 JULI 2020. URL: https://publicatie.centrumvoorstandaarden.nl/api/adr/ The API strategy consists of a core — a generic set of rules for all government APIs — and various modules that only pertain to a specific application. Only the core is relevant to this tender and the modules are out of scope.
4. Setting up an INSPIRE Download service based on the OGC-API-Features standard. INSPIRE-MIF. V1.0. URL: https://github.com/INSPIRE-MIF/gp-ogc-api-features/blob/master/spec/oapif-inspire-download.md.

Ad 4:
The describing of encoding requirement means for the tooling, that it should be able to set the link to this description of the encoding once another encoding is used for output than GML. The description of the encoding itself, is of course the responsibility of the data provider.
Also the requirements for Predefined download, Bulk download and Metadata links mean that the tooling should enable the user to add the relevant links for their OGC-API-Feature services.
The filtering and the multilinguality are also mentioned in this document, but they are kept out of scope in this tender. This is because the filtering standard is not yet officially approved and the multilinguality requirement is not very relevant in the Netherlands.

Tool requirement

To find out which tooling needs which adjustment one can use the examples as shown in chapter 3 of the draft guideline. The tool from GISspecialisten.nl can be left out of scope, because it was never intended as a full compliant operational tool, but just to show how to comply with the requirement for more than one CRS. The other examples concern GOAF, Pygeoapi and Geoserver. If the applicant wants to tender for

another open source tool than these 3 tools, it should proof how this tool complies with all the requirements, like it has been done with the examples in the draft guideline.

The tool for which the adjustments are proposed should comply with the following tool requirements:

1) It must be existing software
2) It must be open source
3) It must be well maintained
4) It must have a mature and solid community
5) The software should have many (expected) users in the Netherlands and/or Europe

The software developers must preferably be familiar with OGC API's, the Dutch API Design Rules and with INSPIRE.

Chapter 4 - Organization

This chapter describes the coordination, publication, planning, finance and acceptance.

Coordination

The coordinator on Geonovum side is Pieter Bresters.
There will be a bi-weekly meeting between Geonovum and the chosen contractor(s), either at the Geonovum office in Amersfoort or online. The agenda items of these meetings are the progress and any issues or technical questions concerning the details of the assignment.

Publication

The results will be communicated with the community of the chosen tool by the contractor.
Geonovum will add the result of the adjusted tool to the guideline.
Geonovum will all also communicate the results within the INSPIRE community.
After completing the assignment(s), there will be a final online session in which the contractor(s) can present their adjustments.

Planning

Geonovum will announce which contractor(s) are selected in the third week of December 2022 at the latest (see chapter 2). The contractors start after a kick-off meeting with Geonovum at a mutual agreed moment. After this, the bi-weekly meeting between Geonovum and the contractor (s) will start.

The deadline for the first delivery of the assignment is Friday, March the 17th, 2023. Five weeks later, a presentation will be held by the contractors during the final online session. Meanwhile, the contractors can change their deliveries on the basis of the reaction from Geonovum.

Finance

The fixed budget is € 20.000 excluding 21% VAT per tool. When enough qualifying offers are received, Geonovum has the intention to reward at least 2 offers that must concern different open source tools.
Geonovum has the right to reward less when the received offers don't fulfil the minimum requirements.

The contractor should clearly specify which adjustments are made to the tooling within this budget, including all specified deliverables.

Acceptance

The adjustments to the tooling will be accepted by Geonovum, based on the test result that proof the conformance of the tool after the adjustments.
Proof of acceptance by the community will be as suggested by the contractor in the offer.
The other deliverables will be accepted by Geonovum based on the digital versions of the mentioned documents where the contractor has clearly marked the differences with previous versions of these documents.

Chapter 5 – Questions asked

This chapter describes the questions asked during the information session and the period after this session. The answers are given behind each question.

Questions

1. Does it make sense to tender with an architecture of multiple microservices (e.g. tools)?
   Answer: This is allowed, as long as the output services can comply with all the requirements.
2. Can you be more specific about the scoring criterium "Overall proposal"?
   Answer: For this criterium, the evaluators of the offers will look at:
   - overall clarity
   - how realistic is the planning
   - plan of approach
   - completeness (list of chapter 2)
   - is it well cared for
3. Is the tender also about the frontend applications like GUI, or is it more about the backend software?
   Answer: The focus is about functionality and being able to comply with the requirements. This mostly means that the backend software needs to be adjusted, but in the end, a user should be able to comply with the requirements. If this means that something has to be changed in the GUI, this is also part of the adjustments to be made.
4. Is JSON FG a hard requirement?
   Answer: No, since INSPIRE does not require a certain encoding. But it does require a link to the description of the mapping from the encoding to the INSPIRE data model of the theme, when another encoding is used than GML. It would be nice though if JSON FG is supported as output encoding, since it is better equipped for multiple CRSs.
5. Is offering adjustments in other branches than the core application also accepted?
   Answer: When the contractor is for some reason not able to the get the adjustments into the core application within the boundaries of this tender, also a branch is accepted. This would of course influence the criterium "Quality of open source community behind the tool and trust in adoption by the community". To avoid a low score on this criterium, the contractor could describe in the offer how it will convince Geonovum that the branch will be maintained and how big the change is that it will eventually end up in the core application.
6. How strict are the Dutch API Design rules?
   Answer: The Dutch API Design rules can be divided in those that are testable by the given validator and those that have to validated by a human. The validator is currently integrated in the site developer.overheid.nl. At the beginning of January we will have an improved validator available as a stand-alone docker image. It will test for:
   API-03: Only apply standard HTTP methods
   API-16: Use Open API Specification for documentation
   API-20: Include the major version number in the URI
   API-48: Leave off trailing slashes from URIs
   API-51: Publish OAS document at a standard location in JSON-format
   API-56: Adhere to the Semantic Versioning model when releasing API changes
   API-57: Return the full version number in a response header
   The other design rules have to be evaluated by a human.
   Of course, Geonovum does not want to restrict the non-Dutch users to the Dutch rules. So only a configuration option to be able to comply with the rules is asked for.
7. Are you aware of newer versions of OGC part 1 and 2?
   Answer: The links of the OGC standards have been changed to the newer versions:
   - https://docs.opengeospatial.org/is/17-069r4/17-069r4.html
   - https://docs.opengeospatial.org/is/18-058r1/18-058r1.html
8. What is your definition of open source?
   Answer: We follow the definition as stated in the Open Source Initiative:
   https://opensource.org/docs/osd
9. Would fixing the problems shown in the examples of the guideline be enough to comply with all the requirements as set out in this document.
   Answer: No, these examples are an indication of what Geonovum has encountered with the used datasets and tools. The applicants are requested to adjust the tools in a way they comply with all

the requirements as set out in chapter 3 of this document. This should be substantiated by the validation result which is one of the asked deliverables.

10. Could you clarify the INSPIRE requirement for GML?
    Answer: GML as INPUT encoding is not a requirement in the mentioned standards. GML as input would help INSPIRE data providers when the data model is not complex, because in that case no transformation would be needed for harmonized INSPIRE data which is mostly encoded in GML. In many cases though, it is complex and then, a flattening to a simple encoding has to be performed any way.
    GML as output is also not a requirement, but it is a requirement to use simple features level 0 or 2 when GML encoding is being served by the API. If another encoding is used than GML, the data provider is responsible for a description how to map this back to the INSPIRE data model. The tool should give the user the option to link to this description with an URL.
11. In which OAPI-F document are the for INSPIRE required links needed for describing of encoding, bulk download, metadata links and license?
    Answer: Links should be presented in the collection element. see also: https://github.com/INSPIRE-MIF/gp-ogc-api-features/blob/master/spec/oapif-inspire-download.md#metadata-elements-of-the-data-set
12. The validation tools "OGC Validator" and "EU Validator" are presently skipping the tests required to verify functionality. Are unit tests covering the adjustments made to the open source tooling sufficient to demonstrate requirements are met?
    Answer: When the validators don't test on functionality, and the required example service don't proof the new build functionality, the contractor should proof in another way that the new functionality has been build. For instance by giving a demo or showing the results of a unit tests covering the adjustments made.
13. In ad4 of chapter 3 is written that filtering is out of scope for the INSPIRE requirements. Does that also mean the filtering as required in the OGC part 1: core and part 2: CRS specification?
    Answer: No, requirements about filtering as written in OGC-API-Features Part 1:Core and OGC-API-Features Part 2: CRS are within the scope of this tender. Only "OGC API - Features - Part 3: Filtering and the Common Query Language (CQL)" is out of scope.

Appendix A: Metrics

All proposals will be scored according to the following metrics:

Criterium	**Weight**
Overall proposal	30%
Portfolio, References and CV	20%
Quality of open source community behind the tool and trust in adoption by the community	20%
Expected impact of adjusted tool	
Expected use in NL	15%
Expected use in EU	15%