Software Improvement Group

Broncode Inspectie – Atlas Portaal
Findings Presentation

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Background and context for the assessment

Background

- Atlas Portaal is a system used to visualize geographic information to the general public through a map viewer. The underlying application that enables this is Geodan Maps.
- Geodan Maps was developed approximately five years ago and has been under the management of Geodan for the past four years. During this period, an average team of three people worked on Geodan Maps. After setting up the initial application, efforts were made to improve user-friendliness, add additional explanations, and provide functionality for submitting notifications.
- The maintenance contract is ending in October 2023, requiring a new tender for the management of the Atlas Portaal. As part of the tender process, an independent investigation into the maintainability and quality of the current code has been requested with SIG.

Scope

- The scope of this assessment is to provide a baseline of the code quality of Atlas Portaal. The code that is in scope is therefore limited to only the customizations made for the Ministry of I&W called Atlas Portaal.
- The underlying application Geodan Maps is out of scope for this investigation.
- Due to the timeline to have results of this assessment the parts of Atlas Portaal built with the “no-code” BettyBlocks technology are out of scope.

Goal and activities of this assessment

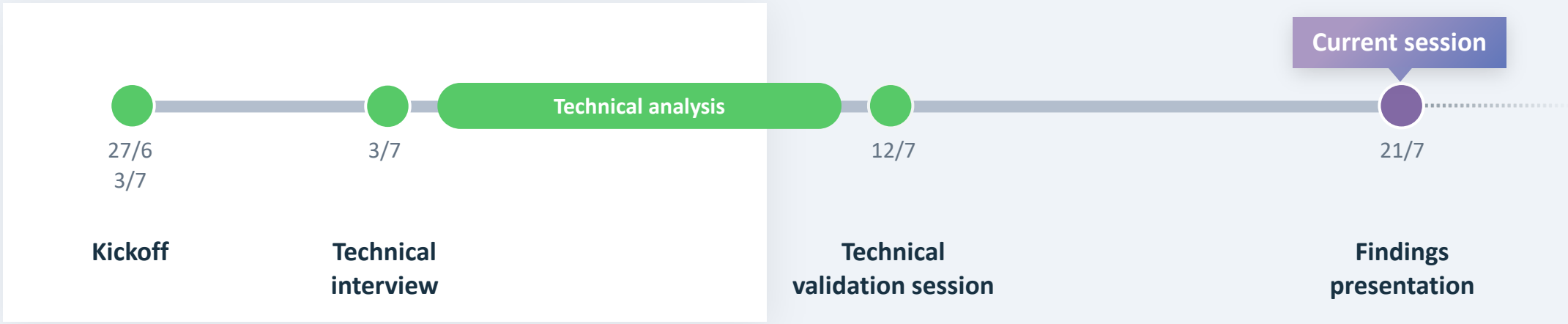
The goal of this assessment is to provide insights into the code quality of the Atlas Portaal using the Sigrid Platform. This will be achieved by answering the following research activities:

1. Inspection of the source code and benchmarking against the ISO25010 Maintainability standard and the SIG/TÜViT implementation in measurable norms.
2. Recommendations and improvements based on the findings in determining and benchmarking software quality.

Planning

Phase 1: **Initiation and Analysis**

Phase 2: **Advice**



LEGEND: **Finished** session Current session

Atlas Portaal has 4★ maintainability, but comprises of only a fraction of the total solution

Atlas Portaal is a small, customized layer built on top of Geodan Maps; an application built by Geodan. It has an above market-average quality rating of 4.3★. Currently the largest risk is that more maintenance might be required over the following years due to duplicated code, a fact that the development team is aware of.

- The implementation of the BettyBlocks parts in the application have not been investigated, however, the use of Betty Blocks is uncommon among developers.
- Important to note is that, without examining the underlying system Geodan Maps, there is an incomplete understanding regarding the foundation on which it relies. This makes the Atlas Portaal dependent on Geodan and its services.

Recommendations in context of a potential transfer of maintenance to another supplier:

- *While the current system is free from apparent risks, the view is currently limited to only the Atlas Portaal. To obtain the complete insight in the transferability of the Atlas Portaal, it is recommended to conduct a thorough review encompassing the entire solution, including the underlying system developed by Geodan, as well as the implementation of the BettyBlocks components within the source code.*

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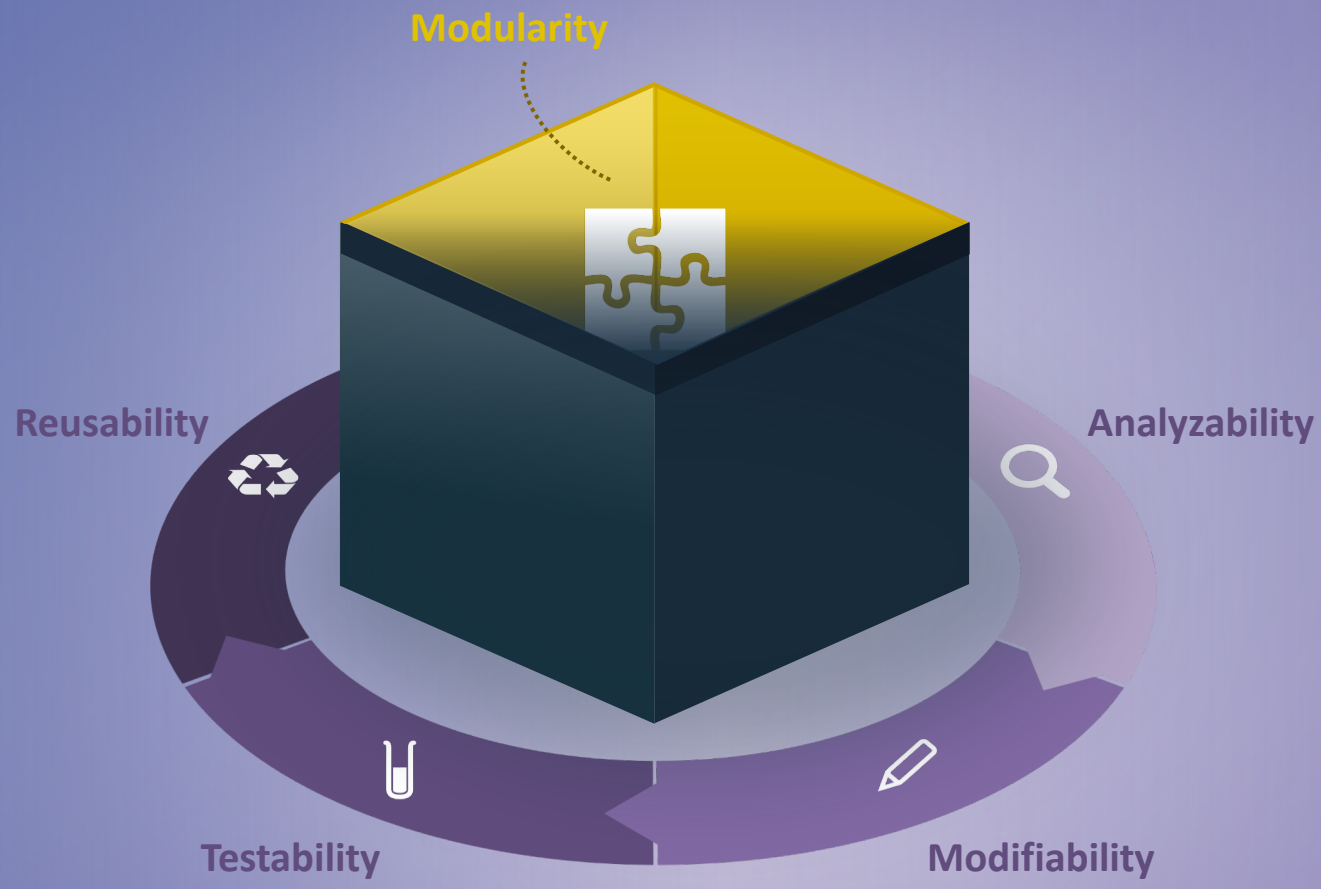
Explanation: The ISO 25010 standard for Maintainability has 5 sub-characteristics

Maintainability
ISO 25010

- Analyzability
- Modifiability
- Testability
- Modularity
- Reusability

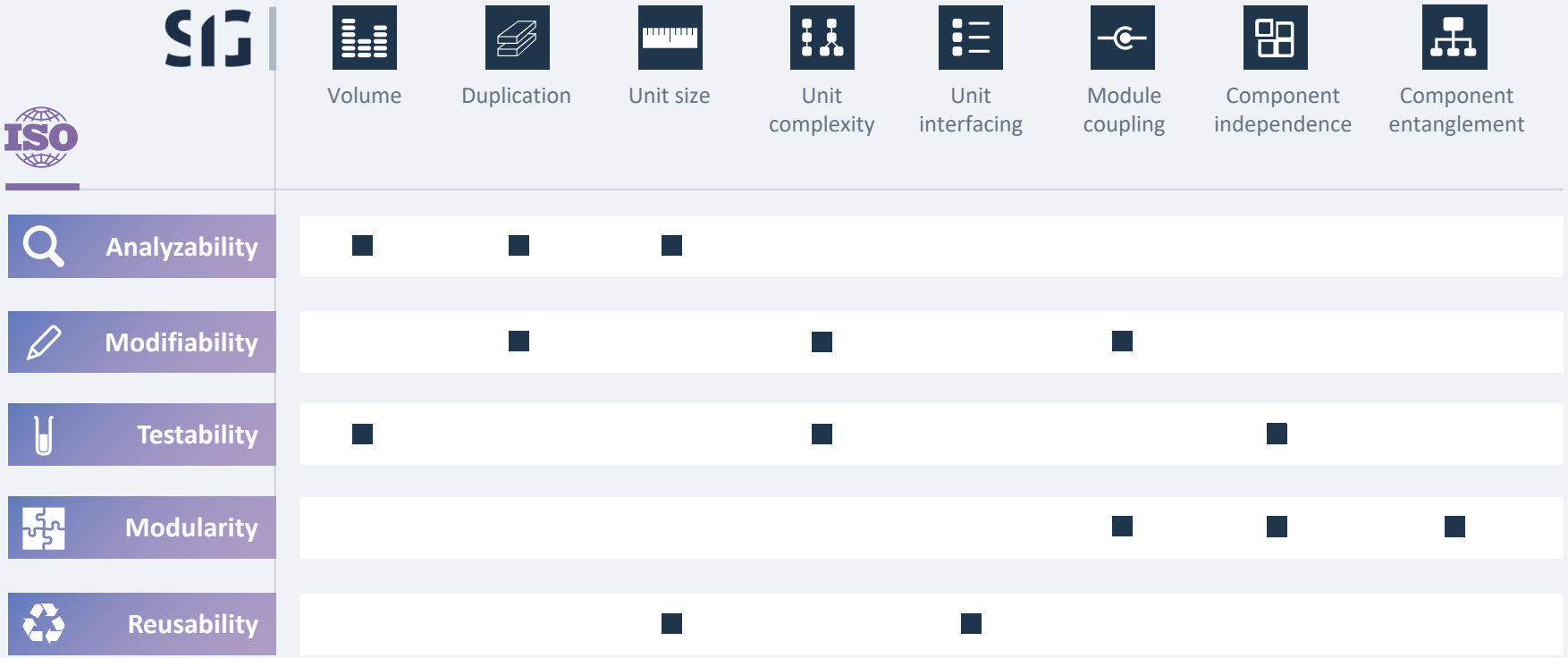


The ISO 25010 standard refers to **maintainability** as:

"The degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements."

Maintainability according to the ISO 25010 standard has five sub-characteristics. These sub-characteristics can be seen as a **representation of the phases** that are passed when performing maintenance work.

The SIG/TÜViT model maps the sub-characteristics to the system properties

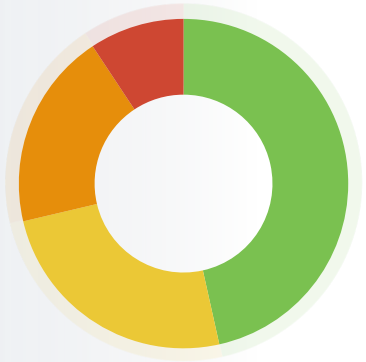


Evaluation of the ISO 25010 maintainability characteristic is based on the SIG benchmark

Maintainability is determined through automated source code analysis.

- SIG measures a set of properties of source code, as defined by the SIG/TÜViT Evaluation Criteria for Trusted Product Maintainability.
- The outcomes are compared to the SIG Benchmark, which is recalibrated yearly from thousands of systems in the SIG dataset. This results in a star rating.

The system properties are evaluated by source code measurement and benchmarking



Perform measurements on the code base

Aggregate measurements to **quality profiles**

Translate quality profiles to **system characteristic scores**

Translate to **ISO 25010 sub characteristic scores**

Translate to **overall rating** of technical quality

1 - **Measurements**

2 - **Quality profiles**

3 - **System characteristics**

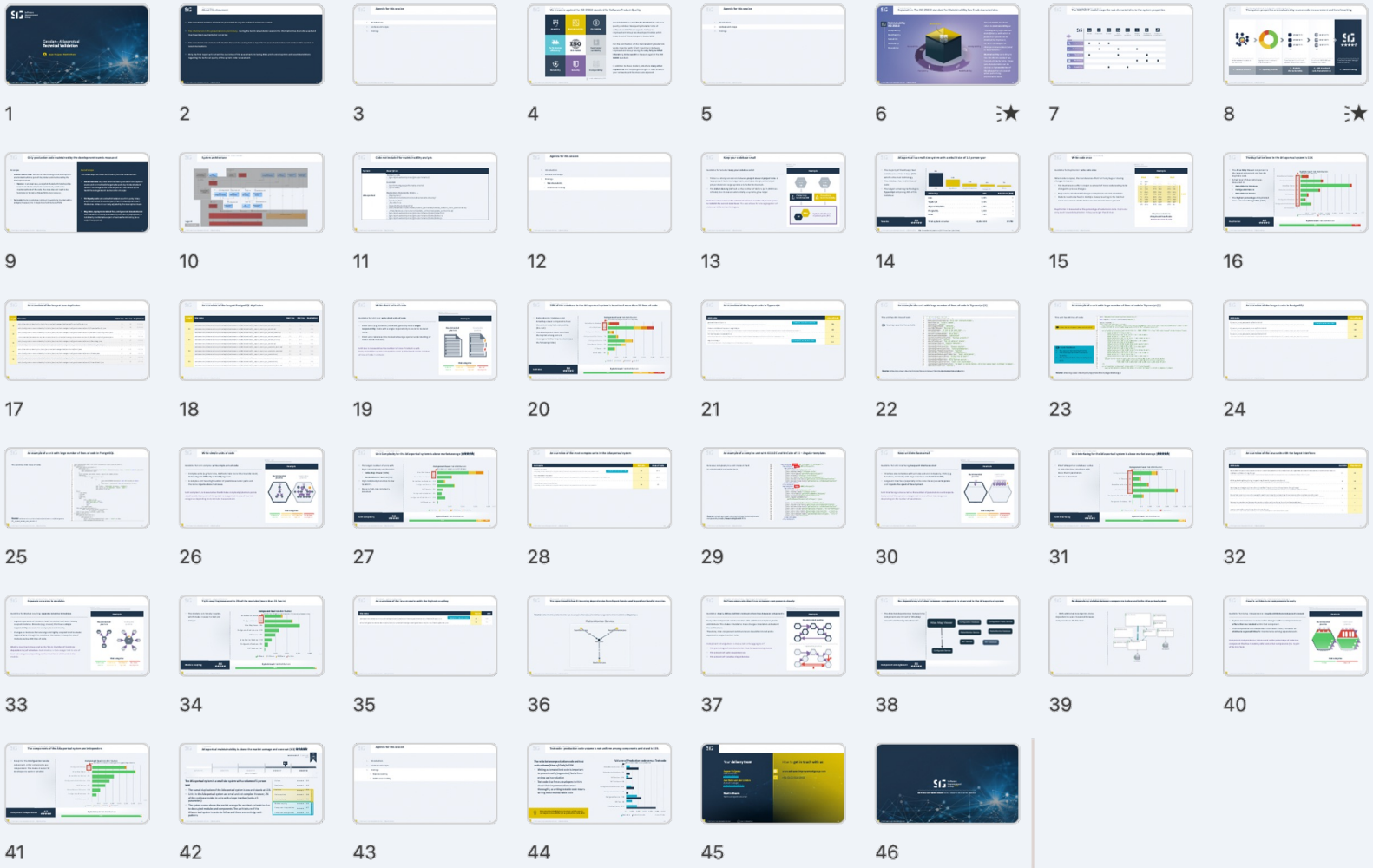
4 - **ISO standard sub-characteristics**

5 - **Overall rating**

Full technical details are available in the technical validation report

Full technical details of the findings are available in the technical validation report for this assessment:

- Maintainability: **38 pages**



Part of the technical validation report

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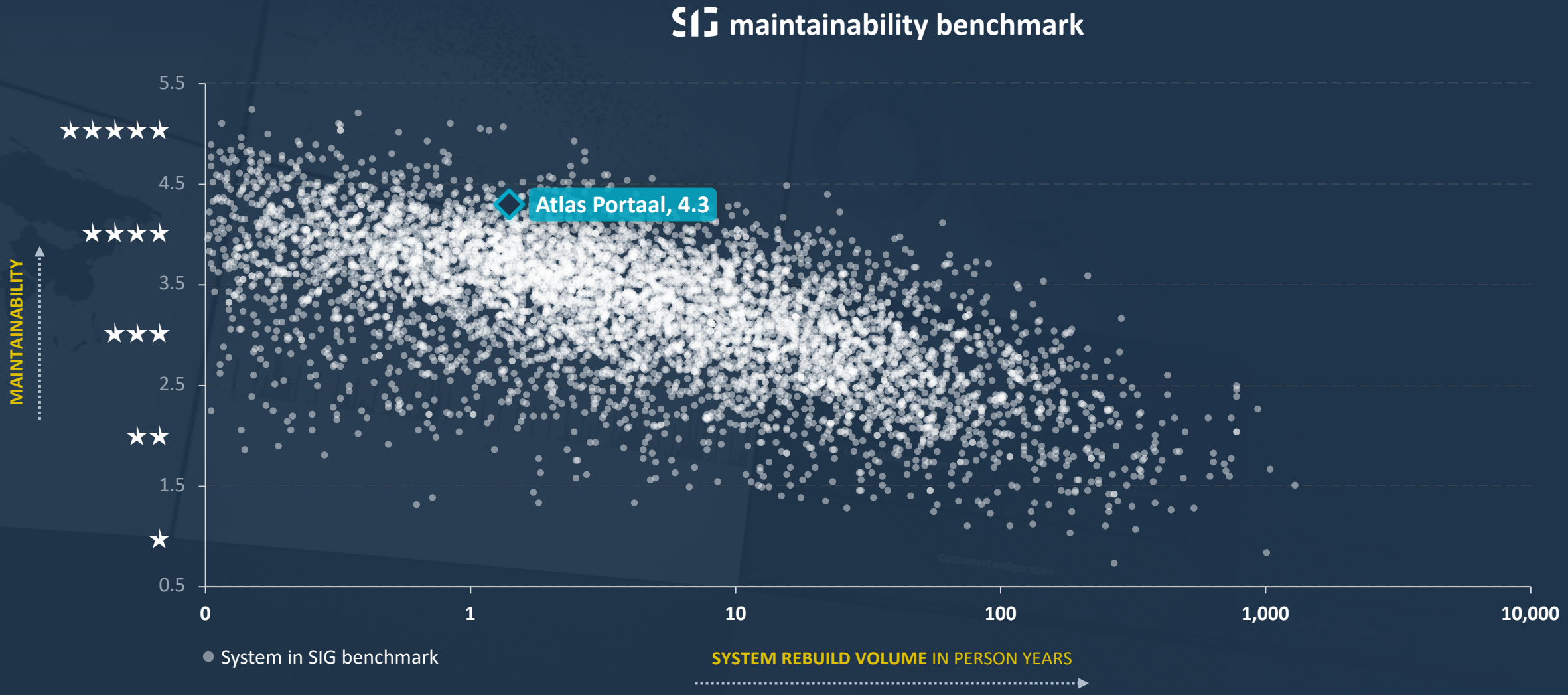
Atlas Portaal compared to the SIG maintainability benchmark



Atlas Portaal maintainability is above the market average and scores at (4.3) ★★★★☆

The Atlas Portaal system is a small size system with a volume of 1.4 person-year

- The overall duplication of the Atlas Portaal system is low and stands at 11%
- Units in the Atlas Portaal system are small and not complex. However, 2% of the codebase resides in units with a large interface (units ≥ 5 parameters)
- The system scores above the market average for architectural metrics due to decoupled modules and components. The architecture of the Atlas Portaal system is easier to follow and there are no design anti-patterns

Volume	★★★★★	5.3	
Duplication	★★★★☆	4.0	
Unit size	★★★★☆	3.6	Unit
Unit complexity	★★★★☆	3.8	Unit
Unit interfacing	★★★★☆	3.6	Unit
Module coupling	★★★★★	4.6	Architecture
Component independence	★★★★★	4.7	Architecture
Component entanglement	★★★★★	5.5	Architecture

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Risks resulting from the findings

Maintainability

- With an above market maintainability, the system is currently future proof. It has 11% duplication in the code base, but no extra complexity is found.

Risks

- Duplication is a large amount especially for such a small system, this is not explained due to its micro-service architecture. However, the technical team is aware of the redundant code and looking into this. The risk is that this will increase the maintenance effort for Atlas Portaal.

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Further investigation with an expanded scope is necessary for a complete view on the solution

Recommendation

- Plan refactoring sprints to remove redundant code in the code base.

Optional for a possible transfer to another supplier

- Reserve time to allow for an analysis of the “no-code” BettyBlocks parts of the source code.
- Perform an assessment of the underlying system on which Atlas Portaal is built for a more complete view on the risks of the system.

Your **delivery team**

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Details of contact moments

Date	Session	Attendees
27/06/2023	Kick-off and Issue Interview	Ellen Post Uiterweer, Menno van Leeuwerden, Jasper Kuijpers (SIG), Rick Klompé (SIG)
03/07/2023	Technical Kick-off and Interview	Michiel Dekker, Onno Bleyenga, Joop Rosier, Jasper Kuijpers (SIG), Martin Khazra (SIG)
12/07/2023	Technical Validation	Michiel Dekker, Onno Bleyenga, Joop Rosier, Jasper Kuijpers (SIG), Martin Khazra (SIG)
21/07/2023	Findings Presentation	Ellen Post Uiterweer, Menno van Leeuwerden, Jasper Kuijpers (SIG), Jan Hein van der Linden (SIG)

Colophon and disclaimer

Colophon

As requested by the Ministry of I&W, SIG has performed a Software Risk Assessment on Atlas Portaal between 27 June and 21 July, 2023. Formal signee of the agreement is Christian van der Waart en Rene van Bever. During the assessment process, Ellen Post Uiterweer represented I&W as client towards SIG.

Document status

Only the Final (presentation) Report is a formal deliverable of this assessment that describes conclusions and recommendations. All other products represent the intermediate status of the assessment.

Disclaimer

SIG has compiled this report with information made available to SIG by I&W and its supplier Geodan. This information was considered by SIG as suited to the purpose, scope and depth of this assignment. Although SIG has validated this information on a best-effort basis, SIG cannot guarantee its accurateness, completeness, currency or lawfulness.

Amsterdam, 21 July 2023


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