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*Project*

ECAD-Topologie-Editor

**Business Case**

TINF22F, Software Engineering I

project 2023/24

Business Case

*Customer*

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# Description and Goals

In this project we will enhance the frontend visualization of an asset administration shell for digital twins, by adding a topology editor. Nowadays asset administration shells are the standard of industry to digitally visualize various products. The product will enable users to drag & drop assets on to an empty canvas and connect them with specific cables the compatibility of the connectors will automatically be verified. To achieve this, we will analyse the structure of the previous AAS Webclient project and reuse the components we need before we start with the design. A variety of tests and a detailed user documentation adds on to a great user experience.

# Return on Investment

The project focuses on a user-friendly frontend visualization of an ECAD Topology Editor. Until now there are no websites available for this use case. The lack of editors of this type leads to users that are unable to easily create combinations of AAS-Components. Also inexperienced users who want to create topology can’t do so with the current tools available. Summarized, a user-friendly editor accelerates the work of users thus reduces the costs of work processes. In the long term the reduction of time and costs is the return on Investment in this project. Additionally, a well-organized and user-friendly tool enhances the motivation of a user to work with this tool. So, this can help to support the own employees on one hand, but also provides an advantage to other Webclients if one is planning to offer the editor to other users for money (subscription model) or to completely sell the editor.

# Time scope

The introduction to the project took place on 8th September 2023. On this day, the customers selected this team for this project. The final presentation and delivery of the project will be on 17th May 2024. Given this information our time frame corresponds to 36 weeks. However, between the 27th November 2023 and the 1th March 2024 the team members are already working on other projects. This slowdown of production is considered in the time scope.

The remaining 22 weeks are divided into two parts:

1. Until the 27th November the team is focused on the analysis of the project tasks and the design of the webpage. This includes the design of usability concepts for essential use cases as well as a first prototype for a user-friendly frontend of an topology editor, which also contains the ability to drag & drop ASS-components. Additionally, the time will be used for documentation, communication, and organization within the team members. The results of the first half of this project will then be presented to the customer.
2. The second half includes the finalization of the project as well as the tests of the application and the creation of the technical documentation. Also here, some time will be needed for the documentation and communication across the team. The ECAD topology editor will then be delivered to our customers together with a presentation.

## Working hours per work package

The whole project is divided into different work packages, while every team member focuses on different tasks. Hereby every member has a maximum time budget of 180 hours for the whole project. The following table shows how the working time of every team member is planned to be distributed across the working packages.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Ralf Kunath | Alexander Regemann | Simon Braun | Sven Sendke | Nikolas Bodenmüller | Aziz Carducci | Nico Anders |
| Documentation | 70 | 30 | 30 | 30 | 30 | 30 | 30 |
| Customer dialogue | 5 | 5 | 5 | 5 | 5 | 20 | 5 |
| Meetings | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| Analysis | 10 | 10 | 10 | 10 | 20 | 20 | 10 |
| Design | 0 | 10 | 20 | 10 | 20 | 0 | 0 |
| Coding | 25 | 80 | 70 | 10 | 45 | 25 | 5 |
| Testing | 25 | 0 | 0 | 65 | 5 | 35 | 5 |
| GitHub Organization | 5 | 5 | 5 | 5 | 15 | 5 | 20 |
| Project Management | 0 | 0 | 0 | 0 | 0 | 0 | 60 |
| Presentation | 10 | 10 | 10 | 15 | 10 | 15 | 15 |
| Total | 180 | 180 | 180 | 180 | 180 | 180 | 180 |

# Expenses

Since all team members work from home and with their own devices, we do not have any fixed costs. However, we pay every team member an hourly bonus of 10€ to cover electricity, heating, and device-usage costs. Altogether the expenses of this project will be 114.300€.

The wages for every team member are based on the companies point of few, which means, that all taxes etc. are already included.

|  |  |
| --- | --- |
| **Wages** | Salary (project-sight, per hour) |
| System architect (Nikolas Bodenmüller) | 100€ + 10€ bonus |
| Project Leader (Nico Anders) | 95€ + 10€ bonus |
| Product Manager (Aziz Carducci) | 90€ + 10€ bonus |
| Test-Manager (Sven Sendke) | 90€ + 10€ bonus |
| Developer (Alexander Regemann) | 70€ + 10€ bonus |
| Developer (Simon Braun) | 70€ + 10€ bonus |
| Technical Documentation (Ralf Kunath) | 50€ + 10€ bonus |

Calculating the wages on the work packages, we come to the following costs per work package. The work package “Internal and external organisation” hereby summarizes of all the smaller work packages that ensures the project progress like project management or customer dialogue.

|  |  |
| --- | --- |
| **Work package** | Costs |
| Internal + external organisation | 43.750€ |
| Analysis | 8.450€ |
| Design | 5.600€ |
| Coding | 22.475€ |
| Tests | 12.575€ |
| Documentation | 21.450€ |
| Total | 114.300€ |

|  |  |
| --- | --- |
| **Additional costs** | Costs |
| Microsoft 365 Business Standard, six user for nine months | 661,50€ |
| JetBrain license, three users for one year | 2.337€ |
| Hosting server, nine months | 1.800€ |
| Total | 4798,50€ |

# Offer

|  |  |
| --- | --- |
| Expenses | 119.098,50€ |
| + Profit (25%) | 29.799,63€ |
| Total | 148.898,13€ |

The calculated expenses and a profit margin of 25% result in our offer of 148.898,13€.

# Economic risks

* Financial risk

During the last weeks one could observe an immense rise in costs in all different areas. We can expect that the prices will continue to rise, which is why we can expect significantly higher project costs than we would have had in the past. This rise in prices is already considered in the expense calculation and the resulting offer.

* Returning risk

If our customers are not satisfied with the products or recognize errors while usage, which were not discovered in the development and testing process, we will have to readjust the product. Since the project will have ended by then, we would have to lay other projects aside to work again on this project. We try to avoid this risk by planning enough time for clean development and detailed testing.

# Conclusion

Since AAS is a vital part of industry 4.0, a tool to easily create AAS topologies with drag & drop holds immense potential for the future of the industrial sector. Therefore, it is a strategic decision to invest in the development of this website today, granting our client a competitive advantage in the market tomorrow. By prioritizing human-oriented websites, we can enhance efficiency and motivation in the workplace. The resulting advantages outweigh the costs and risks associated with the project, leading us to initiate the project in close consultation with our client.