# **PROJECT CHARTER**

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|  | 1. Informação geral | | | | | | | | | | | | |
|  | Nome do Projeto: | | | Nome da proposta | | | | | | | | | |
|  | Sponsor: | | | Isabel Azevedo | | | | | | | | | |
|  | Departamento | | | **Departamento de engenharia informática** | | | | | | | | | |
|  | 2. Equipa do Projeto | | | | | | | | | | | | |
|  | Cargo | **Nome** | | | **Departamento** | | | **Contact Tel** | | | **E-mail** | | |
|  | Researcher | **Miguel Ferreira** | | | **DEI** | | | **911053305** | | | [**1230199@isep.ipp.pt**](mailto:1230199@isep.ipp.pt) | | |
|  | Advisor | **Isabel Azevedo** | | | **DEI** | | |  | | | **ifp@isep.ipp.pt** | | |
|  |  |  | | |  | | |  | | |  | | |
|  | **3. Stakeholders** | | | | | | | | | | | | |
|  | Nome | | | | | | | | | Poder | | Interesse | |
|  | Developers | | | | | | | | | Baixo | | Alto | |
|  | Companies | | | | | | | | | Médio | | Alto | |
|  | Entidade reguladora da proteção de dados | | | | | | | | | Alto | | Alto | |
|  |  | | | | | | | | |  | |  | |
|  |  | | | | | | | | |  | |  | |
| 4. Âmbito | | | | | | | | | | | | | |
| **Problema / justificação** | | | | | | | | | | | | | |
| In the software industry, the demand for high performance and efficiency is ever-increasing [1] and often comes with significant trade-offs and a careful choice of technologies [2]. One key area where performance and efficiency are critical is the communication between clients and servers. Over the years, various technologies have emerged to address this, with one of the most prominent being Protocol Buffers—a language-neutral, platform-independent mechanism for serializing structured data [3].  There are numerous serialization formats available, each suited to different use cases. Common formats such as JSON and the more legacy XML format are widely used, yet studies have demonstrated significant differences in performance across these formats [4][5][6]. These differences often stem from how well each format integrates with specific API architectural styles, impacting speed, resource consumption, and scalability.  While much research has focused on comparing serialization formats, using Protocol Buffers with the REST is one particular combination that holds promise for both present and future demands. Despite the growing popularity of gRPC (which also uses Protocol Buffers), REST remains widely adopted, raising the question of whether Protocol Buffers can enhance its performance and efficiency.  **RQ1: How does the use of Protocol Buffers impact the performance of REST APIs compared to JSON and other serialization formats in terms of latency, throughput, and resource consumption**  **RQ2: To what extent can Protocol Buffers improve energy efficiency in REST API communications compared to JSON and other serialization formats?** | | | | | | | | | | | | | |
| **Objetivos do projeto** | | | | | | | | | | | | | |
| This thesis's objective is to comprehensively evaluate using Protocol Buffers with REST will be benchmarked against other serialization formats, such as JSON, focusing on several critical factors: performance, energy consumption, scalability, and ease of use. The analysis aims to provide concrete insights into how Protocol Buffers, when used with REST, compare in these dimensions, particularly in modern distributed systems. This will include assessing potential trade-offs and determining which approach offers the best balance for various use cases regarding efficiency, scalability, energy consumption, and long-term viability in different technical environments. | | | | | | | | | | | | | |
| **Benefícios** | | | | | | | | | | | | | |
| * Reduced Costs * Ease of Use/implementing * Better performance in systems | | | | | | | | | | | | | |
| **Entregáveis** | | | | | | | | | | | | | |
| * Project Charter * Project Plan * Dissertation document * Presentation * Proof of concept | | | | | | | | | | | | | |
| 5. Tempo | | | | | | | | | | | | | |
| **Milestones / Datas** | | | | | | | | | | | | | |
| * 03/11/2024 – Literature Review * 04/11/2024 – GQM Draft * 06/11/2024 – Definition of skills needed for the research * 11/11/2024 – Full Draft for the first delivery * 13/11/2024 – Improved Literature * 16/11/2024 – Hypothesis test planning * 16/11/2024 – Full GQM Plan * 20/11/2024 – Improved First Delivery * 24/11/2024 – Presentation Document * 06/12/2024 – Delivery date for the Advisor * 01/01/2025 – Delivered the documents * 04/01/2025 – Final Date for delivery | | | | | | | | | | | | | |
| 6. Custo | | | | | | | | | | | | | |
| **Fontes de custo** | | | | | | | | | | | | | |
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| 7. Pressupostos | | | | | | 8. Restrições | | | | | | | |
| No changes are going to happen to protocol buffers during research. | | | | | | Having to use a VPN for research | | | | | | | |
| 9. Riscos | | | | | | | | | | | | | |
| **Riscos identificados** | | | | | | | | | | | | | |
| Descrição | | | | | | | | | Causa | | | Efeito | |
| Lack of knowledge | | | | | | | | | Lack of proper research being made | | | Not being able to understand future analysis or how it works | |
| Increased Project scope | | | | | | | | | Necessity or intention of increasing the depth of the research | | | Probably not being able to finish the dissertation in time or losing focus on the real problem | |
| Lack of available projects | | | | | | | | | Not having available implementations on the internet to give to not have a bias on the values/implementation | | | Having to make my tools to do the comparisons | |
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| **10. Aprovação** | | | | | | | | | | | | | |
|  | | | Nome | | | | Assinatura | | | | | | Data (DD/MM/YYYY) |
| Sponsor | | | Isabel Azevedo | | | |  | | | | | |  |
| Cliente | | |  | | | |  | | | | | |  |
| Gestor do Projeto | | | Miguel Ferreira | | | | ***Miguel Alves Ferreira*** | | | | | | 31/10/2024 |
| Notas | | | | | | | | | | | | | |
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