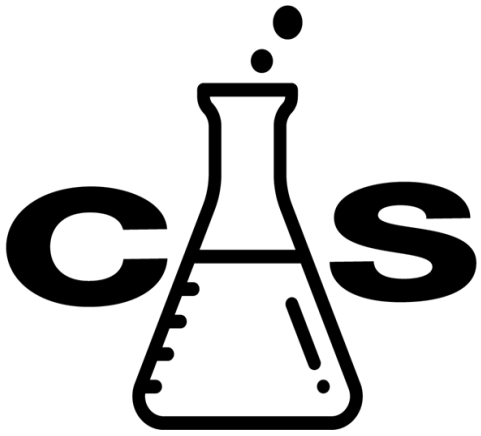
CSLabs Project Extension, Team 1 – 2021–2022

Software Requirements Specification Report



Project Team:

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Key Personnel Information and Contribution Breakdown

Zaid Hussain – Project Leader, contributes to the analysis reports, the frontend and backend by implementing additional, essential functionalities

Justin Hurst – Full Stack Developer, contributes to the frontend and backend by implementing additional, essential functionalities

Jason Henry – Full Stack Developer, contributes to the frontend and backend by implementing additional, essential functionalities

1. Are the open-source license terms compatible with my business requirements?

.NET: The .NET project is open-source and free to use under the MIT license. Since our project only utilizes .NET without making any modifications, the licensing meets our requirements without needing to include the license into our project.

Entity Framework Core: EF Core is released under the MIT license as well and it is free to use without needing to include the license or citations.

ReactJS: React is released under the MIT license, and it is free to use. Since our project only utilizes it without making any modifications, the licensing meets our requirements without needing to include the license.

Typescript: Typescript is release under Apache 2.0 license, which also allows the commercial use without needing to include the license.

MariaDB: MariaDB is released under GPL license, version 2. It allows internal usage free of any cost, for commercial purposes as well.

2. What is the strength of the community?

.NET: It is a widely used framework, with more than 100,000 contributors, including from different organizations. Microsoft invests in .NET greatly, and it provides great flexibility to users across developing on any OS. .NET has gained huge following among developers and has great community support as well.

Entity Framework Core: EF Core is also a widely used framework that is utilized to communicate with database using .NET objects. It has a strong community with great support.

ReactJS: React has gained a great amount of popularity recently, and it is being adopted by many organizations and projects due to its state management and light weight.

Typescript: TS was originally developed by Microsoft and contains a large number of developers; an increasingly great number of developers are making the switch to Typescript.

MariaDB: MariaDB is widely used in the community, including MySQL users as it is based on it, and MySQL is one of the most popular DBMS tools.

3. How well is the product adopted by users?

NET: It is used by millions of developers across the globe, including several large companies. It also providing extensive community support, with wide collection of great answers on Stack Overflow platform.

Entity Framework Core: EF Core is widely adapted when .NET is used to serve as ORM (object-relational mapper) for a more efficient development process.

ReactJS: React, as one of the fastest growing libraires, has resulted in a large community and users, providing great support for it. It has been adopted for large-scale use as well by large companies such as Netflix, Instagram, and Airbnb, Dropbox, and others.

Typescript: Typescript is well adopted by developers in the web development community, and it is growing greatly. Developers prefer TS instead of JavaScript for type safety of the programs. Many companies use TS including Slack, Airbnb, Google, etc. Angular and Vue is also written in TS, which is widely used.

MariaDB: MariaDB is a very popular RDBMS tool, it is used by many projects including commercial ones. It is also used and sponsored by large companies such as IBM and Microsoft.

4. Can I get a warranty or commercial support if I need it?

NET: are LTS versions released and supported every 3 years. There are commercial support solutions provided my Microsoft which covers .NET, although, this is not needed for our use. Any issues can also be reported to the GitHub repository.

Entity Framework Core: There is support provided in the form of GitHub issues, and due to the large development community, these issues tend to be resolved in a reasonable amount of time.

ReactJS: React does not provide a commercial license, but there is huge community support provided online.

Typescript: Using Microsoft's commercial support solutions, one can get support for Typescript.

MariaDB: There is commercial support provided through MariaDB platform that provides enterprise features.

5. What quality assurance processes exist?

NET: It uses Azure pipeline to run tests and automated regression tests. This provides good quality releases.

Entity Framework Core: The project runs through an automated testing pipeline provided by Azure pipelines. If the tests fail, the newer version will not be released. This includes regressions tests. Any breaking changes are detailed in major version changes.

ReactJS: React uses CircleCI for their automated testing. These tests are run before every release to make sure features are not broken. There are enough tests in the system that React was able to do a complete rebuild off of the current set of tests and had a working product at the end of it.

Typescript: The language runs through an automated testing pipeline provided by Azure pipelines. If the tests fail, the newer version will not be released. This includes regressions tests. Any breaking changes are detailed in major version changes.

MariaDB: The project has automated tests ran through appveyor. These tests provide regression testing preventing from working features breaking in the future. MariaDB has a dedicated time each week where they answer new contributor questions, and anyone can get answers from the official developers on the MariaDB Team.

6. How good is the documentation?

NET: Microsoft provides a nice documentation with necessary details which is also beginner friendly. The documentation is also continuously updated and improved.

Entity Framework Core: EF Core also follows a similar documentation format to .NET. Considering Microsoft's documentation history, this appears to be a great success.

ReactJS: React provides a comprehensive documentation providing necessary details that is essential to understanding React. React itself, is not a large library with complex components, hence in many cases it is complemented by third party libraries.

Typescript: It provides an excellent documentation and is tailored for specific developers as well.

MariaDB: There is documentation detailing all the features of the database server. It includes examples with a comments section where users can elaborate on concepts.

7. How easily can the system be customized to my exact requirements?

NET: .NET uses a dependency injection system that allows you to customize many aspects of request handling. Many features like Middleware, JSON encoding, and dependency injection are configurable. Although, most developers choose to use the provided features.

Framework Core: EF Core can be run on any operating system. EF Core works with a variety of database providers, giving us flexibility to choose an option that works best for us.

ReactJS: ReactJS provides a way for your UI to react to your variables. It is very small and portable allowing you to bootstrap it into many existing applications. This will not be needed for our use.

Typescript: Typescript has tens of compiler options that include setting actions are allowed and how to load types. This can be used to change our preference of types.

MariaDB: MariaDB contains a my.ini file that contains hundreds of configurations allowing us to customize the database.

8. How is this project governed and how easily can I influence the road map?

NET: Microsoft governs the roadmap of this project in correspondence with the .NET releases. Ifyou submit a feature request that many other people find is needed, it will be considered for the road map.

Entity Framework Core: Microsoft governs this product and accepts changes in PR's from the public. Large corporations could possibly influence the roadmap, but Microsoft is controlling its roadmap in tandem with .NET. The new changes can be seen at https://docs.microsoft.com/en-us/ef/core/what-is-new/index. Weekly status updates can be seen at https://github.com/dotnet/efcore/issues/23884.

ReactJS: Facebook and contributors with edit access governs React. Public users can report issues to the GitHub repository for any additional features or changes. Depending on public demand, they can be added/implemented to React.

Typescript: The language is governed by the contributors with edit access, primarily Microsoft developers. Public users can start issues in GitHub and depending on public demand, additional features can be added/implemented to TS.

MariaDB: MariaDB was originally developed by creators of MySQL, it is a community-developed fork of the MySQL server. The source code is hosted on GitHub, although one cannot open issues, but contributions from users is possible.

9. Will the product scale to my enterprise's requirements?

NET: It has been tested in large scale enterprise environments, and many large projects depend on it. With the .NET Ecosystem and safe typing, the project can scale to a very large size without causing breaking changes in improper refactoring.

Entity Framework Core: EF Core is widely used with .NET, hence it is tested to follow similar requirements for functionality and scalability as .NET.

ReactJS: ReactJS supports chunking to allow for massive scale. Pages and other sections of code can be loaded incrementally to provide a smaller bundle to the user. ReactJS is has been proven to be efficient even in large enterprises fulfilling their requirements.

Typescript: Typescript is built for enterprises. The type checking allows type-errors to be detected at development time, causing the project to grow to a massive scale and prevent refactoring from breaking the project.

MariaDB: MariaDB is used globally in enterprises. The DBMS tool can handle millions of records, but this application does not generate a large amount of data because rows are only inserted when users start a new lab, a user is registered, or a new module is created.

10. Are there regular security patches?

NET: .NET releases security fixes which also includes non-security bugs every second Tuesday of almost every month. The latest fixes are also provided on the GitHub releases page.

Entity Framework Core: There are regular security fixes that are tracked on the releases page on the GitHub repo https://github.com/aspnet/EntityFrameworkCore/releases. Microsoft takes security issues seriously and patches them as soon as possible.

ReactJS: React protects against XSS and is only used on the frontend. It cannot be used to compromise your backend. But ReactJS does not give any specific word for security as XSS is the main security issue on front end projects and it has been covered.

Typescript: Typescript releases a new minor version few months. Typescript is really a type layer on top of JS with no runtime usage, hence it has very few security-related concerns.

MariaDB: MariaDB tries to fix critical bugs immediately, usually within hours, and release fixed MariaDB binaries as soon as possible, usually the next day. Medium security bugs will be released in the next planned release per the release schedule https://mariadb.org/about/security-policy/

References

1. Gallavin, Jason et al. " CS Labs – Web Software Requirements Specification." 1 Oct. 2019, https://github.com/ius-csg/CSLabs-Capstone-Documentation/tree/master/cslabs-web-2019-2020/DesignDocs. 27 Sept. 2021