**Change Request Analysis Internal Document**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Title | Change Request Analysis Internal Document |
| Version | 1.0 |
| Author | José Raúl Castañeda Rosas |
| Date | 02/03/2023 |
| Comments | This is the first change report for SMMA. |

**INTRODUCTION**

This document is a tool to describe the changes requested to the SMMA monitoring platform by the main customer. The monitoring system has several IoT nodes whose function is to obtain information from the environment and upload it to the DB. Having a large number of IoT nodes that perform a large number of data insertions to the only DB, concern has been generated that the system can hardly be scaled to monitor a large number of geographical areas. The main interested parties have expressed their concern that the traditional database model is not sufficient to be able to handle all the requests from the different IoT nodes, which could generate a drop in service, which is why on-demand customers that the system changes to the distributed database model in order to divide the load among several nodes. On the other hand, some clients have asked us to create a section in the system to register sensors specifically in the system, thus avoiding registering each sensor every time a new Iotnode is registered.

Clients have stated that due to a new reform in Mexico, it is necessary to send weekly statistical reports to government institutions in order to study the evolution of pollutants and harmful elements, for which reason the already existing reporting module must be restructured and a way found. to store them or create a technique to be able to create them without storing them directly.

As a change in terms of compatibility, we have been asked for the system to be compatible with most commercial browsers such as Chronium, Edge, Firefox and Opera.

Throughout this document we will approach the change request from several important perspectives for the development of the system, broadly analyzing the implications of the change.

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**CONFIGURATION ITEMS**

To analyze the implementation of a new configuration it is important to consider the configuration items related to a change. For this document we will define configuration elements as "An element which intervenes in the business, development, organizational and service infrastructure which is susceptible to changes depending on the context and the needs of the company."

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| --- | --- | --- |
| ID-CR | Name | Descripción |
| CR1 | DISTRIBUTED DB | Implementation of multiple DB nodes |
| CR2 | Report Modules | Save or generate weekly reports |
| CR3 | Multi Browser Compatibility | Multiple Browser Compatibility |
| CR4 | Implementation of the sensor module | Create a section to register sensors |

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**TECHNICAL ANALYSIS**

**CR1**

From a technical point of view, it is possible to see that focusing the project on a distributed database leads to greater complexity. In general, this type of infrastructure is applied when there is a previous study of the data traffic, being applied in a geographically at strategic points, that is, they have a service locally in the areas where there are the greatest number of requests. Applying this type of technique in the initial stages can present a challenge due to the little information on data traffic that we have. On the other hand, printing a system that makes use of a distributed database would facilitate and solve the problems that could arise in a system that seeks to become a robust system with a broad geographical scope, so that it could scale more easily. It would also solve storage, data query and service availability problems.

The implementation of a distributed database will imply a greater workload and a greater complexity in the development of the system. As a solution, the software team together with the mechatronics team have proposed to analyze the feasibility of using the nodeIoT devices also as database nodes, since these have a Raspberry pi integrated and should be able to have a database integrated data, seeking in this way to use the equipment that you already have and avoid the high costs of paying for extra servers, but this does not take away the fact that it will require more development and implementation time as well as greater complexity in the configuration of the system built into the Raspberry pi.

**CR2**

Contemplating saving multiple reports could mean a great weight in the database, initially it was planned that it would be a generated report, but not saved, that is to say, that it would take the data that was in the monitoring table and based on the filters and The data could generate a report which could be downloaded by the user. Due to the new regulations in Mexico, the solution could be reached through different means, one of which would be that by means of a script which would use an email to generate the report and this would be sent to the dependencies that require it, on the other On the other hand, we could use the reports module that is already available so that any research, social, governmental and educational institution can generate reports depending on their needs, including those required by the new norm in Mexico. Doing it this way would allow cost and workload to increase significantly.

**CR3**

Due to the fact that the system is through a non-compiled language, this new configuration does not present any difficulties at a technical level, there are a few characteristics in terms of design which can change between browsers, but the development team will ensure that there is adequate compatibility with these elements using the tags and structures already present in HTML5 to solve these problems. On the other hand, since this is a web system, there should be no compatibility problems between operating systems and only the adaptability of the window to different monitor resignations will be taken care of.

**CR4**

Due to customer requests, it has been considered important to add an independent module that allows the administrator to add sensors independently of the IoT node, so that when registering a new IoT node it is not necessary to write each sensor it contains, allowing the administrator to select them from a list the sensor you want to associate with the new IoT node. Previously, the administrator must add the sensor model to be associated for it to be listed. This feature will make registration of IoT nodes easier, occupy less memory space in the database, and allow administrators to more easily query sensors that have been previously used for building IoT node devices. Although this implies a longer development time, it was concluded that it would not affect the metrics previously established in the project as much, but a group of new requirements should be added for the creation of the sensor module.

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FINANCIAL ANALYSIS

Initially, the project and its costs were designed to use a single server with a single database, which would contain all the data from the multiple IoT nodes, think about the idea of ​​using multiple servers for the hosting of distributed databases, it is ruled out due to the high cost of renting the equipment necessary to create this infrastructure, for this reason a way to use the equipment that they already have is sought to fulfill this function, managing to have this infrastructure without having to resort to external services. On the other hand, the other requests such as compatibility with different browsers and operating systems, the creation of the independent sensor module and the generation of reports to comply with government demands do not imply a cost in the acquisition of new equipment or equipment rental, but they do generate a slight repercussion in terms of the time spent on the system for its development, which would increase the time spent on its development.

The finance department recommends establishing metrics and a detailed analysis regarding the time required for the implementation of the new features to consider if their benefit is superior or equitable to the cost of the implementation, in search of maintaining the project at a sustainable cost.

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PUBLIC RELATIONS ANALYSIS

As it is an important issue for research, government, study and social institutions, it is considered important to have good communication with this type of institution because they could provide financing and be a means of dissemination to publicize the system in a way that the public that makes use of the platform is intensified and that it can be monetized through visits and donations, in addition to other means.

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Metrics: criteria and scales

**ANÁLISIS TÉCNICO**

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| Metric name | low | Médium | High |
| Code coverage risk |  |  |  |
| Technical Debt |  |  |  |

**FINANCIAL ANALYSIS**

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| --- | --- | --- | --- |
| Metric name | low | Médium | High |
| Net revenue risk |  |  |  |
| Return time risk |  |  |  |
| Return of investment |  |  |  |

**ANÁLISIS DE RELACIONES PÚBLICAS**

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| --- | --- | --- | --- |
| Metric name | low | Médium | High |
| Referral rate (with  respect to current  number of clients) |  |  |  |
| Probability of repeat |  |  |  |