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KPC International

Requirements Specification

Timetracking

# Document History

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# Introduction

Welcome to our ambitious project: the design and development of a cutting-edge, cloud-based time-tracking and time-management system. Our primary goal is to create an application that not only collects and stores data, but also becomes the backbone for various applications and departments within your organization. From payroll and invoicing to benchmarking and proposal estimation, our all-encompassing platform will revolutionize your workflow.

This initial version of the application will focus on project compliance, particularly catering to the stringent auditing requirements of the pharmaceutical industry. Our solution aims to provide comprehensive insights into your business processes and, more importantly, offer a detailed breakdown of how time is allocated within each project. By doing so, we empower your team with invaluable information to drive productivity and efficiency to unprecedented levels.

But our ambitions don't stop there. Our ultimate objective is to deliver an unparalleled user experience, offering informative analyses of your overall business model. By leveraging advanced data analytics and visualization, we strive to be more than just a time-tracking tool; we aspire to be a strategic partner in your business growth.

In this document, we present the comprehensive requirements for the time tracking application, encompassing both functional and non-functional aspects. Moreover, we offer a tantalizing glimpse of the app's conceptual design, setting the stage for the remarkable user interface that will be fine-tuned during the development phase using an agile approach.

With unwavering dedication, cutting-edge technology, and a passion for excellence, we are committed to bringing your vision to life. Together, let's embark on a journey that will transform the way you manage time and elevate your organization to new heights of success.

## Product scope

In response to the evolving landscape of the pharmaceutical industry, digitization and paperless validation have emerged as essential pillars for progressive companies. Our cloud-based application comes as a strategic requirement for pharmaceutical companies, driven by the industry's growing reliance on technology and its pursuit of greater efficiency.

The pharmaceutical sector is known for its intricate and challenging projects, often leading to delays in project delivery. This is where our application becomes the ultimate solution. By providing unprecedented insights into time allocation and expenditure, the application empowers stakeholders with a level of accuracy and analysis previously unattainable.

Every aspect of the project, from commissioning to qualification and validation, will be meticulously recorded and described in great detail. This comprehensive approach will effectively highlight the contributing factors behind project delays. As a result, our application functions as a proactive agent, detecting the root causes of delays, enabling managers to swiftly rectify issues and realign projects with timelines.

Our application's impact will go beyond just identifying delays. By capturing and analysing data with unmatched precision, it will facilitate better decision-making at every level of the organization. Armed with this valuable knowledge, pharmaceutical companies will be empowered to optimize their operations, enhance productivity, and propel their growth in this ever-competitive industry.

In conclusion, our cloud-based time-tracking and management system will be the catalyst for the pharmaceutical industry's journey towards a more efficient, agile, and data-driven future. By embracing this transformative solution, companies can embrace a new era of streamlined processes, reduced project delays, and heightened success. Together, let us usher in a new age of innovation and progress in pharmaceutical project management.

## Product value

At the heart of our application lies an objective and meticulous measurement of time throughout the entire testing process. From writing and executing test documents to reviewing the tests themselves, every step will be precisely recorded and analysed. This fundamental feature serves as the bedrock for generating invaluable data that will be harnessed to create an essential benchmark for your organization.

By utilizing this benchmarking data, our application empowers you to make data-driven evaluations and informed decisions regarding time allocation. It goes beyond mere tracking, providing you with a comprehensive understanding of where time is optimally spent and where it might be wasted. This level of insight is invaluable for identifying areas of improvement and streamlining processes.

With pinpoint accuracy, our application acts as a powerful tool to identify the contributing factors behind inefficiencies and delays in the testing process. By shining a spotlight on these bottlenecks, it enables your team to address them proactively, leading to improved efficiency and timely project completion.

Moreover, the application's data-driven approach provides an objective foundation for performance evaluation. By objectively assessing the time taken for each task and test, it creates a fair and transparent assessment framework. This not only benefits project managers in their decision-making but also promotes a culture of accountability and continuous improvement within your organization.

In summary, our application's core functionality revolves around precise time measurement, benchmark creation, and data analysis. By leveraging this comprehensive data, you gain the power to optimize your testing processes, enhance productivity, and achieve remarkable results. Embrace this technology-driven solution to elevate your testing practices and set new standards of excellence in your industry.

## Intended Audience

Extensive market research has been conducted, consulting esteemed clients from renowned companies like J&J, Sanofi, and Lonza. The response received was overwhelmingly positive, with unanimous agreement that the application's concept holds immense potential. Clients recognized its crucial role as a powerful tool to empower project managers in successfully delivering projects on time.

Amidst the research phase, several challenges were brought to light, and addressing them becomes our top priority. One key challenge lies in identifying the most suitable software platform for the application's development. Our goal is to select a platform that not only provides the necessary resources but also offers robust technical tools to ensure a successful and seamless development process. This platform should be equipped to handle the complexity and demands of the pharmaceutical industry while ensuring ease of support and maintenance.

Moreover, we acknowledge the importance of seamless integration with existing applications used by our clients. The ability to integrate harmoniously with these established systems is critical to facilitate smooth data exchange and eliminate silos of information. By achieving this integration, our application will seamlessly fit into the clients' ecosystem, streamlining processes and enhancing overall efficiency.

Our commitment is to overcome these challenges through rigorous technological exploration and meticulous planning. By leveraging the right software platform and investing in the integration capabilities, we assure you a robust and user-friendly application that meets and exceeds your expectations.

With your valuable insights and our technical expertise, together, we will revolutionize the pharmaceutical project management landscape, setting new standards of efficiency and excellence for your industry. Embrace this journey with us, and let our application be the driving force behind your successful project deliveries.

## Intended use

The envisioned end product of our application is a robust and reliable cloud-based platform that seamlessly integrates with various systems. It will be specifically designed to handle large amounts of data efficiently, ensuring a smooth and streamlined user experience. By being adaptable and scalable, it will cater to the diverse needs of different users, providing tailored versions to suit their unique requirements.

The core functionality of the application will encompass comprehensive time management and tracking, acting as an automatic and accurate time-logging system throughout the project's lifecycle. This data will serve as the foundation for a detailed analysis of each project, shedding light on how time is allocated and spent, particularly across the different CQV phases (Commissioning, Qualification, and Validation).

Crucially, our application will go beyond retrospective analysis, as it aims to predict realistic timelines for new projects. By leveraging advanced data analytics and predictive modelling, it will provide project managers with invaluable insights to plan and execute projects with confidence and precision.

The development phase of the application can be categorized into four key stages:

1. **Basic Time Management and Time Tracking:**

Laying the foundation for time tracking functionality to accurately capture and log project time data.

1. **Data Collection:**

Implementing a robust system to collect and organize data from various sources to ensure comprehensive insights.

1. **Visualization Dashboard:**

Designing an intuitive and user-friendly dashboard that presents the collected data in a visually appealing and easily digestible format.

1. **Analysis and Prediction:**

Integrating advanced data analytics and predictive algorithms to generate meaningful project analysis and realistic timeline predictions.

This application is a dire requirement for the industry, as no existing system currently offers such comprehensive functionalities. It will fill a significant gap in the market, providing an all-in-one solution for pharmaceutical project management.

Once perfected, the application will be made available to companies beyond KPC, enabling them to benefit from its transformative capabilities. Technical details and licensing arrangements for external users will be determined in due course, ensuring a seamless and fair adoption process.

As we embark on this ambitious journey, our vision is to revolutionize the way projects are managed in the pharmaceutical industry. By harnessing technology and data-driven insights, we aim to elevate project efficiency, accelerate success, and usher in a new era of innovation and productivity.

# Business Requirements

The table below has an initial list of business requirements that the application needs to implement.

|  |  |  |
| --- | --- | --- |
| No. | Requirement | Priority |
| 1 | Include all items that consume time on a project – e.g. meetings |  |
|  |  |  |
| 2 | Evaluate time travelling from desk to factory as part of requirement. (Consider tracking separately). |  |
|  |  |  |
| 3 | Starting with a manual system (drop down menus) and moving to fully automated ( e.g. integrated with NuaVal, GPS) |  |
|  |  |  |
| 4 | Standalone app for use on client projects - licence based (SaaS) |  |
|  |  |  |
| 5 | The application will be able to support all types of KPC projects not depending upon whether the project is a NuaVal or a Non-NuaVal project. |  |
|  |  |  |
| 6 | Integrated with NuaVal |  |
|  |  |  |
| 7 | Accessed via mobile phones, laptops, tablet. |  |
|  |  |  |
| 8 | Integrated with KPC Business process e.g. payroll / finance etc. |  |
|  |  |  |
| 9 | Security with access e.g. dual factor authentication. |  |
|  |  |  |
| 10 | Support various levels of access – project manager, Admin, User, Supervisor User. |  |
|  |  |  |
| 11 | Exception Reporting – e.g. if someone hasn’t worked a full day |  |
|  |  |  |
| 12 | Well-designed User Interface. |  |
|  |  |  |
| 13 | Data should feed back into proposal (bids) process to help with better project estimation |  |
|  |  |  |
| 14 | There will be different levels of details in the different types of the projects and the details will be based on the needs of the user. |  |
|  |  |  |
| 15 | The application will have the ability for multiple number of different clients to access the time tracking system separately. |  |
|  |  |  |
| 16 | There will be a secure login system that will provide the required security and protect the data. |  |
|  |  |  |
| 17 | The data that the time tracking system will generate will be compatible with the other internal applications working in KPC |  |
|  |  |  |
| 18 | The application in the later version will be able to track the time automatically and will not require any form of manual input. |  |
|  |  |  |
| 19 | The application will have a dashboard section where all the analysis of the project will be present and the reports of a specific project could be downloaded or imported and shared with the user that do not have access to the system. |  |
|  |  |  |
| 20 | The later version of the application will have the option to audit all the transactions record that is being recorded. |  |
|  |  |  |
| 21 | The application will also be able to predict the timeline of a new project based on the older data. |  |
|  |  |  |
| 22 | The application will have different interface and different type of access for different types of user and each user will have specific type of jobs that they can perform. |  |
|  |  |  |
| 23 | The application will have an API that can be used to connect to external applications as well by the external users. |  |
|  |  |  |
| 24 | The initial version of the application will have a data collector that will be able to process both the NuaVal as well as the Non-NuaVal projects providing the flexibility to cover all the active as well as inactive projects in the company. |  |
|  |  |  |
| 25 | The application will have an API so as to provide the ability to connect to different systems seamlessly. |  |
|  |  |  |
| 26 | A later version of the application that will be able to provide a predictive analysis of the project based on the previous projects that have been completed successfully. |  |

# Functional Requirements

## Application Uses

The application's versatility will be realized through three distinct types of uses, each tailored to specific user groups. These different use cases will be introduced in a progressive timeline, with the initial version of the application catering to KPC NuaVal and KPC Internal (Non-NuaVal Project) uses. As the application evolves, it will eventually extend its capabilities to support External Projects from companies beyond KPC.

**1. KPC NuaVal:**

This version of the application will be designed explicitly for KPC's NuaVal projects, aligning perfectly with the unique requirements of these specialized endeavours. It will serve as a dedicated time-tracking and time-management system, precisely logging and analysing data related to NuaVal projects. By focusing on the specific needs of NuaVal, this version aims to enhance the efficiency and effectiveness of these projects.

**2. KPC Internal (Non-NuaVal Project):**

In this use case, the application will cater to internal projects undertaken by KPC that fall outside the scope of NuaVal. It will be a comprehensive time-tracking and management solution, providing valuable insights into project execution and resource allocation. By encompassing all KPC internal projects, this version aims to improve overall project management and decision-making processes.

**3. External Projects (Companies outside KPC):**

The final version of the application will extend its reach beyond KPC, offering its transformative capabilities to external companies and their projects. Tailored to meet the distinct needs of these diverse organizations, this version will empower them with advanced time-tracking, data analysis, and predictive functionalities. By offering seamless integration and support for external projects, this version seeks to enhance collaboration and efficiency across the industry.

Throughout this progressive timeline, the application will continuously evolve, incorporating feedback from users and emerging technological advancements. Our vision is to create a comprehensive and inclusive platform that becomes the industry standard for cloud-based time-tracking and management, driving innovation and success across NuaVal, KPC Internal, and external projects alike.

#### KPC NuaVal User:

The seamless integration between the NuaVal system and the timesheet system will provide a smooth user experience for NuaVal users. Upon logging into the NuaVal system, the user will have direct access to the timesheet system without the need for a separate login process. This streamlined approach ensures convenience and efficiency for NuaVal users.

For NuaVal users, all the relevant data will be seamlessly transferred from the NuaVal system to the timesheet system through the API (Application Programming Interface). This API integration will facilitate the secure and real-time exchange of data between the two systems, eliminating manual data entry and reducing the risk of errors.

Once the data is transmitted to the timesheet system, it will be processed and analysed to showcase valuable insights on the dashboard. The dashboard will present the selected or provided data in a visually appealing format, making it easy for NuaVal users to access and interpret critical information.

Additionally, within the timesheet system, NuaVal users will have different levels of access, tailored to their specific roles and responsibilities. This hierarchical access control ensures that each user can only view and modify data that is relevant to their assigned tasks, maintaining data security and confidentiality.

With a robust API integration and an intuitive dashboard, NuaVal users will experience a seamless and efficient workflow, enabling them to focus on their core tasks and make data-driven decisions with confidence. The collaboration between the NuaVal system and the timesheet system will pave the way for enhanced project management and improved overall performance within the NuaVal projects.

#### KPC Internal (Non-NuaVal Project) User :

The KPC internal user, unlike the NuaVal user, will have a separate Data Collector Interface that functions independently from the NuaVal system. This interface will serve as the central hub responsible for collecting and processing all the data required by the timesheet system. Initially, for the first version of the application, the data collector will rely on manual data collection from all users involved in KPC internal projects.

To facilitate this manual data collection process and enhance user experience, a dedicated user interface will be created. This user-friendly interface will simplify the data submission and entry process, making it more efficient and less cumbersome for users. By providing an intuitive platform for data input, the application aims to streamline the collection process and minimize errors.

As the application evolves in subsequent versions, the focus will shift towards automation to further improve the user experience and efficiency. In these later versions, an automated data collector will be integrated into the system. This automated collector will be capable of gathering timesheet data automatically without any need for manual intervention, thereby eliminating the need for manual submissions by users.

To support the automated data collection process for non-NuaVal projects, the application will leverage the time tracking API. The API will serve as the conduit through which the timesheet system communicates with other relevant systems, seamlessly gathering data and ensuring accuracy and real-time updates.

By incorporating both manual data collection with a user-friendly interface in the initial version and automated data collection through API integration in later versions, the application aims to cater to the diverse needs of KPC internal users. This progressive approach will empower users with improved data collection processes, enhanced accuracy, and more efficient project management within their non-NuaVal projects.

## Application User Types

The application will cater to four main user types, each with distinct access levels and responsibilities:

**1. Administrator User Type:**

a. The administrator will have top-tier access to the system, with both read and write permissions for all information.

b. They can access project lists and user lists, viewing timesheets of any user linked to a project.

c. The admin can change the status of approved timesheets, edit or delete timesheets on behalf of users, and close timesheets for further processing.

d. An analytics dashboard will be available for the administrator, providing a comprehensive overview of data.

**2. Project Manager User Type:**

a. Project managers will have access to project lists they are linked with and detailed member lists for each project.

b. They hold the responsibility of approving submitted timesheets from regular users and can omit timesheets on behalf of users.

c. Project managers can add new regular users to the database and link them to projects.

d. The project manager will also have their own analytics dashboard to monitor project-related data.

**3. Regular User Type:**

a. Regular users will have limited access, mainly to their own details, which they can view and edit.

b. They can create and submit their timesheets, as well as edit unapproved timesheets they have submitted.

c. Regular users can access a list of all their submitted timesheets for reference.

d. The regular user's dashboard will display analytics data relevant to their own timesheets.

**4. Supervisor User Type:**

a. The supervisor user will have read-only access to all available information, without editing privileges.

b. They can create and submit their own timesheets through the user portal, with access to view and edit only their own timesheets.

c. The supervisor user can access lists of projects and users linked to those projects and view all submitted timesheets by users.

d. Their dashboard will provide a summarized view of analytics data.

With these distinct user types and access levels, the application ensures secure data management, appropriate delegation of responsibilities, and a user-friendly experience for all stakeholders involved in the time-tracking and project management processes.

## Administration Requirements

The table below outlines a list of requirements for the Administration user.

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Login | The admin will login through the Data Collector to gain access to the timesheet system. On successful login the user will be brought to the landing page. On error the user will be informed. |
| 2 | Get the list of projects | The admin must be able to access the directory of all the active and inactive projects that KPC currently has. From that list of projects the admin must be able to select the project for which the details are required. |
| 3 | Get the list of users | The admin must be able to access the directory or a list of the users that are linked with the projects that is selected in the previous stage. |
| 4 | Create / Enable users | The admin must have the ability to create a new user and add it to the directory of all the active or inactive users.  This functionality will depend on the technology used. |
| 5 | Create projects | The admin must have the ability to create a new project and add it to the directory of all the active or inactive projects. |
| 6 | Revoke access | The admin must have the ability to revoke the access of any of the user types if and when required.  This functionality will depend on the technology used. |
| 7 | Review deletion | The admin will review any request of deletion of records by the user after the approval of timesheet. |
| 8 | Assign users to projects | The admin will be the user type with the responsibility to assign users to different projects and provide support in the same. |
| 9 | Project manager | The admin makes sure that the assignment of a project manager for a project is done and that every project has a project manager with no exceptions of multiple project managers assigned to the same project. |
| 10 | Closing of timesheet | The admin is the user type who is able to close the timesheet after the approval to prevent from any form of changes after the approval and to ensure that the timesheet is processed and sent to the next phase so that further action can be taken by the different departments. |
| 11 | Admin reports | The admin will have his own dashboard that will contain all the data and access to all the information. Providing analysis on every aspect so that the admin has all the information required in the event when support is required. |

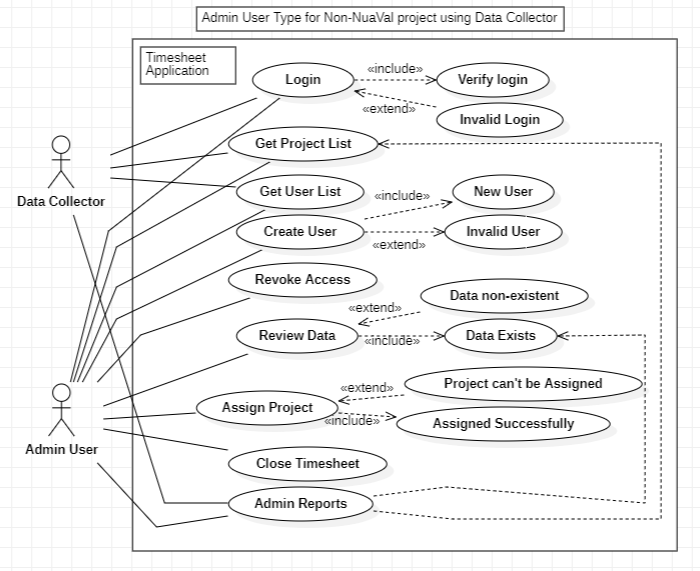


Figure Admin user

## Project Manager Requirements

The table below outlines a list of requirements for the Project Manager User.

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Login | The project manager will login through the Data Collector to gain access to the timesheet system. On successful login the user will be brought to the landing page. On error the user will be informed. |
| 2 | Get the list of projects | The project manager must be able to get a list of all the projects that they are linked with so as to select one project from the list to get detailed analysis. |
| 3 | Get a list of members | The project manager must be able to get a list of all the members that are linked to the project selected and the user must be able to select a member of the project from the list. |
| 4 | Approval of timesheet | The project manager must have the right to have access to all the submitted timesheets of which the user must be able to approve the ones that do not have any issues. |
| 5 | Edit or create record in timesheet | The project manager must have the right to change records in the timesheet submitted on behalf of the request made by the member of the project. Furthermore, the user must also be able to create new records in the timesheet as well on the behalf of the member of the project. |
| 6 | Delete a record | The project manager will have the access to delete any record from the timesheet submitted by the user for a selected user.  Should this be added to a audit log. |
| 7 | Add regular user | The project manager should be able to add new regular users in the project they can be pre-existing users from other projects or new users entirely. |
| 8 | Project manager level report | The project manager must have access to a dashboard that should allow the user to get detailed idea of what is going on in the selected project up to the granularity of the detailed work of any member of the project. |

Diagram

Description automatically generated

Figure Project Manager

## Regular User Requirements

The table below outlines a list of requirements for the Regular User.

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Login | The regular user will login through the Data Collector to gain access to the timesheet system. On successful login the user will be brought to the landing page. On error the user will be informed. |
| 2 | Get a list of project | The regular user must be able to get a list of all the active projects that he is linked with and must be able to select from the given list. |
| 3 | Create a timesheet record | The regular user must be able to create a timesheet record manually by manually entering all the details and all the values for the same |
| 4 | Get a list of all the timesheet records | The regular user must be able to get a list of all the submitted timesheet records. These records will be read on access if they are approved and read and write access if they haven’t been approved. |
| 5 | Edit timesheet records | The regular user must be able to edit timesheet records after submission. This access to editing the records remains till the time the timesheet record is approved. After the approval of the timesheet record the regular type user will not be able to perform any changes for the same he has to send a request either to the project manager or the admin to get the records changed. |
| 6 | Get a list of approved timesheets | The regular user must be able to get a list of all the timesheets that have been submitted and has been approved by the project manager and these records must only be read only records and the user must not have access to change the records at all. |
| 7 | Delete a timesheet record | The regular user must be able to delete a submitted timesheet record. This action can only be accessed till the time the timesheet submitted by the user isn’t approved. Also, after the approval of a timesheet that record can’t be deleted by the user as the access level converts to read only. |
| 8 | User level report | The regular user must have access to a dashboard where all the analytics and important data must be displayed on the basis of the project selected. |

Diagram

Description automatically generated

Figure Regular User

## Supervisor User Requirements

The table below outlines a list of requirements for the Supervisor User.

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Login | The Supervisor User must be able to login in the system and the system must be able to authenticate the credentials and show error if wrong credentials plugged. |
| 2 | Get a list of project | The Supervisor User must be able to get a list of active and inactive projects and the user must be able to select one of the project to get detailed information. |
| 3 | Get a list of users | The Supervisor User must be able to get a list of all the users linked with the project selected and should be able to view all the details. |
| 4 | Get a list of all the timesheet records | The Supervisor User must be able to get the record of all the timesheets submitted either approved or non-approved. |
| 5 | View Regular User Report | The Supervisor User must be able to view the dashboard of the Regular User type and view all the analytics data. |
| 6 | View Project Manager Report | The Supervisor User must be able to view the dashboard of the Project Manager User type and view all the analytics data. |
| 7 | View Admin Report | The Supervisor User must be able to view the dashboard of the Admin User type and view all the analytics data. |

Diagram

Description automatically generated

Figure 4 Supervisor User

## Use Cases

There are many use cases that can be designed for the application to showcase the different scenarios but the following mentioned are the ones that are the most relevant ones. The below mentioned use cases will be able to describe the main features and also the design of the application and also how it’s working.

|  |  |  |
| --- | --- | --- |
| **Index** | **User** | **User cases** |
| 1 | Admin | Revoking Access |
| 2 | Admin | Adding/Enabling New User |
| 3 | Admin | Closes the Timesheet |
| 4 | Admin | Changes Timesheet After Approval |
| 5 | Admin | Reviews Delete Request |
| 6 | Project Manager | Project Manager Extracts Timesheet Information of the Selected User |
| 7 | Project Manager | Project Manager Edits the Timesheet Record of the Selected User |
| 8 | Project Manager | Project Manager Approves the Timesheet of the Selected User |
| 9 | Project Manager | Project Manager Deletes the Timesheet for the Selected User |
| 10 | Project Manager | Project Manager Changes the Status of the Timesheet for Selected User |
| 11 | Regular User | User wants to Edit Timesheet |
| 12 | Regular User | User wants to input data |
| 13 | Supervisor User | Supervisor gets a list of all projects and selects one |
| 14 | Supervisor User | Supervisor gets a list of all projects and users linked to select one and get details |
| 15 | Supervisor User | Supervisor gets Timesheet information of Selected User |
| 16 | Supervisor User | Supervisor views the dashboard of all the different types of users |

## Use Case Diagrams with Description

### Use Case: Admin Revoking Access

1. The admin will login using the valid credentials and the system will check the validity of the credentials.
2. The admin when received a request to revoke access of the user will first validate that the user is a valid user this will be done by the system.
3. After selecting the user the admin can change the status of the access level and saves all the data to the main database.

Diagram

Description automatically generated

### Use Case: Admin Adding/Enabling New User

1. The admin will login using the valid credentials and the system will check the validity of the credentials.
2. The admin will first select a project from the project list and then the system will determine if the selected project is valid or not.
3. The admin will then selects the user and add the information to the project linking the user with the project.
4. The final step will be updating the main database which will be done by the system.

Diagram

Description automatically generated

### Use Case: Admin closes the Timesheet

1. The admin user will login using the valid credentials which will be checked by the system.
2. The admin will select a project from the dropdown list and its validity will be checked by the system then a user will be selected linked with the project and the validity of the selected user will also be verified.
3. Then the admin will get a list of all the timesheets of which he can select the approved timesheets and then he will be presented with the close timesheet button.
4. After closing the timesheet the data will be available to other departments for further processing.
5. The final step is updating the main database with the updated data.

Diagram

Description automatically generated

### Use Case: Admin Changes Timesheet After Approval

1. The admin user will login using the valid credentials which will be checked by the system.
2. The admin will select a project from the dropdown list and its validity will be checked by the system then a user will be selected linked with the project and the validity of the selected user will also be verified.
3. Then the admin will get a list of all the timesheets of which he can select the approved timesheet and then he will be presented with an edit button through which he can edit the timesheet according to the requirements.
4. The final step after the editing of the timesheet is completed is to update the main database.

Diagram

Description automatically generated

### Use Case: Admin Reviews Delete Request

1. The admin user will login using the valid credentials which will be checked by the system.
2. The admin will select a project from the dropdown list and its validity will be checked by the system then a user will be selected linked with the project and the validity of the selected user will also be verified.
3. Then the admin will get a list of all the timesheets of which he can select the approved timesheet and then he will be presented with a delete button and he can delete the selected timesheet record.
4. The final step is updating the main database with the updated information about the deleted record.

Diagram

Description automatically generated

### Use Case: Project Manager Extracts Timesheet Information of the Selected User

1. The project manager logs into the system with the provided credentials which will be verified by the system for the validity. If valid the user will be presented with the project manager portal.
2. From the project manager user portal the project list can be selected from the dropdown menu (only one project can be selected at once).
3. When project is selected from the list the system will check for the validity of the project selected whether there is any data present for the selected project or not. If present the user can proceed to the next step otherwise an error will ne shown.
4. The user will be presented with a list of all the users that are linked to the selected project from which the user can select one user at a time. Here, the system will select if the data for the selected user for the selected project exits or not. If the data does exist then the user can proceed to the next step.
5. After selecting the user the project manager will be presented with all the submitted timesheets for the selected user and he will be able to select one timesheet to perform different actions or even just view the timesheet.

Diagram

Description automatically generated

### Use Case: Project Manager Edits the Timesheet Record of the Selected User

1. The project manager logs into the system with the provided credentials which will be verified by the system for the validity. If valid the user will be presented with the project manager portal.
2. From the project manager user portal the project list can be selected from the dropdown menu (only one project can be selected at once).
3. When project is selected from the list the system will check for the validity of the project selected whether there is any data present for the selected project or not. If present the user can proceed to the next step otherwise an error will be shown.
4. The user will be presented with a list of all the users that are linked to the selected project from which the user can select one user at a time. Here, the system will select if the data for the selected user for the selected project exits or not. If the data does exist then the user can proceed to the next step.
5. After selecting the user the project manager will be presented with all the submitted timesheets for the selected user and he can then edit the timesheet accordingly.
6. When done editing the user can save the timesheet and an updated version of the timesheet will be saved in the database.

Diagram

Description automatically generated

### Use Case: Project Manager Approves the Timesheet of the Selected User

1. The project manager logs into the system with the provided credentials which will be verified by the system for the validity. If valid the user will be presented with the project manager portal.
2. From the project manager user portal the project list can be selected from the dropdown menu (only one project can be selected at once).
3. When project is selected from the list the system will check for the validity of the project selected whether there is any data present for the selected project or not. If present the user can proceed to the next step otherwise an error will be shown.
4. The user will be presented with a list of all the users that are linked to the selected project from which the user can select one user at a time. Here, the system will select if the data for the selected user for the selected project exits or not. If the data does exist then the user can proceed to the next step.
5. After selecting the user the project manager will be presented with all the submitted timesheets for the selected user and the user can select a timesheet. If the timesheet is already approved he will be displayed a message if the selected timesheet is not approved he can move to the next step and can approve the selected timesheet.
6. When the user is finished with the actions that he needed to perform he can save the timesheet and an updated version of the timesheet will be saved in the database.

Diagram

Description automatically generated

### Use Case: Project Manager Deletes the Timesheet for the Selected User

1. The project manager logs into the system with the provided credentials which will be verified by the system for the validity. If valid the user will be presented with the project manager portal.
2. From the project manager user portal the project list can be selected from the dropdown menu (only one project can be selected at once).
3. When project is selected from the list the system will check for the validity of the project selected whether there is any data present for the selected project or not. If present the user can proceed to the next step otherwise an error will be shown.
4. The user will be presented with a list of all the users that are linked to the selected project from which the user can select one user at a time. Here, the system will select if the data for the selected user for the selected project exits or not. If the data does exist then the user can proceed to the next step.
5. After selecting the user the project manager will be presented with all the submitted timesheets for the selected user and he can then delete any of the timesheet.
6. When the user is finished performing the relevant action he can save the timesheet and an updated version of the timesheet will be saved in the database.

Diagram

Description automatically generated

### Use Case: Project Manager Changes the Status of the Timesheet for Selected User

1. The project manager logs into the system with the provided credentials which will be verified by the system for the validity. If valid the user will be presented with the project manager portal.
2. From the project manager user portal the project list can be selected from the dropdown menu (only one project can be selected at once).
3. When project is selected from the list the system will check for the validity of the project selected whether there is any data present for the selected project or not. If present the user can proceed to the next step otherwise an error will be shown.
4. The user will be presented with a list of all the users that are linked to the selected project from which the user can select one user at a time. Here, the system will select if the data for the selected user for the selected project exits or not. If the data does exist then the user can proceed to the next step.
5. After selecting the user the project manager will be presented with all the submitted timesheets for the selected user and the user can select a timesheet. If the timesheet is already approved he will be displayed a message and he can proceed to change the status of the timesheet to not approved.
6. When the user is finished with the actions that he needed to perform he can save the timesheet and an updated version of the timesheet will be saved in the database.

Diagram

Description automatically generated

### Use case: Regular User wants to Edit Timesheet

1. The regular user will login using the valid credentials which will be checked by the system.
2. The user will then get a list of the submitted timesheets and from the list the user can select one.
3. The system will check if the timesheet is approved or not. If it is approved the user can’t change the timesheet but if it isn’t approved then the user will be presented with the edit timesheet option and can edit the timesheet.
4. If the timesheet is approved the admin will be able to either edit or delete the timesheet record.
5. After the required changes are done to the timesheet the system will then update the database with updated data.

Diagram

Description automatically generated

### Use Case: Regular User wants to input the timesheet data

1. The regular user logs into the system and these credentials will be validated by the system.
2. The user then will be presented with the list of all the linked projects and can select one of the projects.
3. After selecting the project the system will check if the access has been revoked or not.
4. When user is done adding the data for the timesheet then he can submit the timesheet for approval.
5. This timesheet is then updated in the main database.

A picture containing text

Description automatically generated

### Use Case: Supervisor gets a list of all projects and selects one

1. The Supervisor User logs in with the valid credentials which will be checked by the system.
2. The supervisor will then get a dropdown list of all the projects and can select from it.
3. The list will contain data of both active as well as inactive projects and the supervisor has to select one to get the detailed information.
4. Then after selecting the project the supervisor will be able to view the details of the project.

Diagram

Description automatically generated

### Use Case: Supervisor gets a list of all projects and users linked to select one and get details

1. The supervisor user logs in with the valid credentials which will be checked by the system.
2. The user will then get a dropdown list of all the projects and can select a project from it.
3. The user can then view all the users linked with the selected project and can select a user to view all detailed information.
4. After the user selection the user will have all the detailed information about the user with view only access.

Diagram

Description automatically generated

### Use Case: Supervisor gets Timesheet information of Selected User

1. The supervisor user logs in with the valid credentials which will be checked by the system.
2. The user will then get a dropdown list of all the projects and can select a project from it.
3. The user can then view all the users linked with the selected project and can select a user to view all detailed information.
4. After the user selection the user will have all the detailed information about the user with view only access.
5. Here the user can select a timesheet to view all the information.

Diagram

Description automatically generated

### Use Case: Supervisor views the dashboard of all the different types of users

1. The supervisor user logs in with the valid credentials which will be checked by the system.
2. The user will then get a dropdown list of all the projects and can select a project from it.
3. The user can then view all the users linked with the selected project and can select a user to view all detailed information.
4. After the user selection the user will have all the detailed information about the user with view only access.
5. Now the user can view the dashboard of the user in details with view access only.

Diagram

Description automatically generated

## Rules and examples

The application will boast a comprehensive set of rules that the system will diligently enforce. During the initial release, these rules will be uniformly applied to all users. However, in subsequent releases, the application will offer the flexibility to apply specific rules to different categories of users, enhancing customization and catering to diverse user needs.

By incorporating rules into the system, the application ensures consistent adherence to predefined guidelines, promoting standardization and best practices across the organization. These rules will act as checks and balances, enhancing data accuracy, project management efficiency, and overall user experience.

In the initial release, all users, regardless of their user type, will be subject to the same set of rules. These rules may cover various aspects, such as timesheet submission deadlines, mandatory data fields, validation of entries, and restrictions on data modification after approval.

As the application evolves, future releases will enable the assignment of specific rules to different categories of users. This dynamic rule allocation will allow administrators and project managers to tailor rule sets according to the unique requirements and responsibilities of each user type. For example, rules related to project-specific guidelines may be applied only to project managers, while rules governing data validation might apply to all regular users.

With this progressive approach, the application ensures a more personalized and efficient user experience, fostering compliance with industry standards and organizational policies. The flexibility to adjust rules based on user categories empowers organizations to adapt to evolving needs and optimize their time-tracking and management processes effectively.

Below is a list of initial rules that will be operated in the system.

|  |  |  |
| --- | --- | --- |
| No. | Rule / Exceptions | Priority |
| 1 | Each user has to have a minimum of 40 hours submitted per week. This can be a combination of project work, sick leave and annual leave |  |
|  |  |  |
| 2 | The total of sick leave and annual leave cannot exceed 40 hours per week. |  |
|  |  |  |
| 3 | If annual leave in total for the year exceeds X days project manager and admin notified |  |
|  |  |  |

## Block diagram architecture

The application's crucial requirement is its ability to cater to both internal and external processes, ensuring its versatility and wide-ranging utility. The application will seamlessly accommodate the time-tracking needs of applications and business processes within KPC International, serving as an indispensable tool for recording time spent on various activities within the organization.

For internal processes, the application will integrate effortlessly with existing systems and workflows, providing an intuitive and efficient platform for time tracking. Whether it's project management, resource allocation, or performance evaluation, the application will offer valuable insights and data to streamline internal processes and enhance overall productivity.

Additionally, the application will extend its services to external customers who may require time tracking for their specific purposes. In this scenario, the application can be deployed either within the KPC Internal environment, allowing external customers to access and utilize the system as part of the organization's offerings, or externally, granting customers the flexibility to use the application as a standalone solution.

For external deployments, the application will be designed with security and scalability in mind, ensuring data privacy and optimal performance. It will be adaptable to different customer needs and requirements, allowing them to leverage its time-tracking capabilities effectively.

By catering to both internal and external processes, the application positions itself as a comprehensive and inclusive solution. It empowers KPC International to better manage its internal operations while offering a valuable tool to external customers for their time tracking needs. With this dual approach, the application contributes significantly to fostering productivity, efficiency, and collaboration across the organization and beyond.A screenshot of a computer

Description automatically generated with low confidence

This diagram above shows the outline of a scalable decoupled architecture that would provide for both an internal and external facing application.

|  |  |
| --- | --- |
| Architecture Layer | Description |
| Data Tier | Main data persistence that stores the transaction data need to run the application |
|  |  |
| Replication Process | A process (maybe ETL - Extract, transform and Load) that pulls data from the transactional runtime database into a date warehouse storage for off line processing. |
|  |  |
| Data Analytics Tier | Data persistence that will store current and historical data for other processes to interrogate and process. |
|  |  |
| Auth Process | Process to allow authentication of users. |
|  |  |
| Data Science Processes | Runtime environment (e.g. Python and associative libraries/ and/or Azure ML platform) to allow insights/predictions to be generated. |
|  |  |
| Data Extraction Processes | Process(s) that outputs data in compatible format for other applications such as payroll, invoicing etc. |
|  |  |
| Report Generation Processes | Business report generation |
|  |  |
| Business Tier | Main business logic tier with API access |
|  |  |
| Web Tier | User interface |
|  |  |
| NuaVal | External application that accesses time tracking features through a API |
|  |  |
| Other Applications | Any other application that may need to consume or provide data to time tracking application |

# External Interface Requirements

Detailed Summary of Wireframes:

**a. Admin Type User:**

I. Login Page:

The Login Page serves as the entry point for Admin users, providing a secure gateway to access the application. Admins can enter their credentials to log in and gain access to their dedicated portal.

II. Admin Portal:

The Admin Portal is the central hub for Admin users, offering top-tier access to all information and functionalities. It provides an overview of key data and allows admins to manage projects, users, and timesheets efficiently.

III. Admin Tools Portal:

Within the Admin Tools Portal, Admin users have access to a set of powerful tools and features to oversee and optimize the application's operations. They can manage system settings, configure rules, and handle user permissions, ensuring smooth administration.

IV. Admin Timesheet Portal:

The Admin Timesheet Portal allows admins to view and manage all submitted timesheets across projects and users. They can approve or reject timesheets, edit or delete entries as necessary, and generate detailed reports for analysis.

V. Admin User Timesheet:

This wireframe presents the view of an individual user's timesheet from the Admin perspective. Admin users can access and analyse timesheets for specific users, making it easier to understand their time allocation and performance.

**b. Regular Type User:**

I. Login Page:

The common Login Page provides Regular users with secure access to the application, enabling them to enter their credentials and access their dedicated portal.

II. Regular User Portal:

The Regular User Portal serves as the primary interface for Regular users, offering access to essential features like timesheet creation, submission, and data management.

III. Regular User Tools Portal:

Within the Regular User Tools Portal, Regular users can access various tools and options to enhance their time-tracking experience. This may include editing settings, managing preferences, and reviewing their timesheets.

IV. Regular User Timesheet:

The Regular User Timesheet wireframe showcases the user's timesheet view. Regular users can create, submit, and edit their timesheets through this portal, providing a seamless and efficient time-tracking process.

**c. Project Manager Type User:**

I. Login Page:

Project Managers access the application through the common Login Page, which grants them secure entry to their dedicated portal.

II. Project Manager User Portal:

The Project Manager User Portal offers Project Managers an overview of their assigned projects and linked users. They can access relevant data and manage project-related tasks.

III. Project Manager Tools Portal:

Within the Project Manager Tools Portal, Project Managers have access to a range of tools for project management and time tracking. This may include timesheet approval, user assignment, and project settings.

IV. Project Manager Timesheet:

The Project Manager Timesheet wireframe showcases the timesheet management view from the Project Manager perspective. They can review and approve timesheets submitted by regular users, streamlining the approval process.

**d. Supervisor Type User:**

I. Supervisor User Portal:

The Supervisor User Portal provides Supervisors with read-only access to relevant information. They can view users, projects, and timesheets, gaining valuable insights without editing capabilities.

II. Supervisor Tools Portal:

Within the Supervisor Tools Portal, Supervisors can access various tools to facilitate their role, such as viewing and managing their own timesheets, tracking project progress, and generating summarized analytics.

III. Supervisor User Timesheet:

The Supervisor User Timesheet wireframe depicts the timesheet view from the Supervisor perspective, allowing them to create and submit their own timesheets for tracking purposes.

*Please note that while the Login Page is mentioned separately for each user type, it may later be consolidated or replaced with Active Directory integration for a more streamlined login process. The wireframes encompass a comprehensive user experience, catering to the unique needs and responsibilities of each user type within the application.*

## Data Collection for Non-NuaVal Project

In the initial version of the application, data collection for Non-NuaVal projects will be carried out manually using a form-based user interface. This workflow will enable users to input detailed information related to their timesheets, which will then be organized into an excel-like data format. The generated data can be exported into various data forms, facilitating further utilization within the application.

The data collection process will involve capturing multiple levels of detailed information, allowing for comprehensive timesheet records. Users will input the following information manually:

1. **Project ID:**

Identifies the specific project to which the timesheet is related.

1. **Area ID:**

Identifies the area or department within the project.

1. **Activity:**

Specifies the particular task or activity performed.

1. **Document Status:**

Indicates the status of the document (e.g., draft, submitted, approved).

1. **Standard Hours Worked:**

Automatically filled for the day but editable if necessary (e.g., if fewer hours were worked).

1. **Overtime:**

Details related to overtime during development workshops (method of entry to be decided).

1. **Annual Leave:**

Records the duration of annual leave taken.

1. **Sick Leave:**

Records the duration of sick leave taken.

Once all the relevant data is collected through the form-based user interface, it can be exported into various data formats. Depending on the preferred method, the data will either be stored in a separate database or directly transferred to the time-tracking application for further processing.

This initial version of the timesheet system allows for detailed and accurate data entry, enabling users to record their activities and leave durations effectively. As the application evolves in future releases, the data collection process may be enhanced through automated data entry, integrations with other systems, and improved reporting functionalities. This progressive approach ensures that the application remains flexible and adaptable to the changing needs and demands of users and stakeholders.Diagram

Description automatically generated

## User Interface Concepts

The concept user interface models presented below are intended to provide a glimpse of the application's potential design and layout. These wireframes are not the final user interface, as the actual user interface will be meticulously designed and developed during the development phase. The final user interface will be the result of collaborative efforts, incorporating user feedback, usability studies, and best design practices.

**1. Login Page Wireframe:**

This wireframe will showcase a simple and secure login page where users can enter their credentials to access the application. It will present a clean and intuitive interface, allowing users to log in effortlessly.

**2. Dashboard Wireframe:**

The dashboard wireframe will offer an overview of essential information at a glance. It will be designed to display project statistics, timesheet statuses, and important analytics in an organized and visually appealing manner.

**3. Timesheet Entry Form Wireframe:**

The timesheet entry form wireframe will illustrate a user-friendly interface for manual data entry. It will provide fields for Project ID, Area ID, Activity, Document Status, Standard Hours Worked, Overtime, Annual Leave, and Sick Leave. Users can efficiently input and edit the required information.

**4. Timesheet Approval Wireframe:**

The timesheet approval wireframe will depict a dedicated area for project managers to review and approve submitted timesheets. It will provide options to accept or reject timesheets and allow project managers to add comments or feedback.

**5. Analytics Dashboard Wireframe:**

The analytics dashboard wireframe will showcase comprehensive data visualization tools. It will present insightful graphs, charts, and statistics to help users gain valuable insights into their project and time-related data.

**6. Admin Portal Wireframe:**

The admin portal wireframe will illustrate an all-inclusive interface for administrators. It will provide access to user management, project management, timesheet analytics, and system settings, allowing administrators to efficiently oversee and manage the application.

**7. Regular User Portal Wireframe:**

The regular user portal wireframe will showcase a streamlined interface for regular users. It will facilitate easy timesheet creation, submission, and data management, providing an efficient user experience.

**8. Project Manager Portal Wireframe:**

The project manager portal wireframe will offer a comprehensive interface for project managers. It will allow them to manage projects, assign users, review timesheets, and access project-related analytics.

These concept wireframes serve as a starting point for the actual design and development of the user interface. The final user interface will undergo iterations and improvements to ensure it meets the application's goals and provides users with a seamless and satisfying experience. Feedback from stakeholders and real-world testing will guide the user interface's finalization, resulting in an intuitive, user-friendly, and visually appealing application interface.

### Login Page

The login page will serve as the primary entry point for all user types accessing the application. It will be a common interface shared among all users. On this page, users will be prompted to provide two mandatory inputs: "username" and "password."

Upon submitting the credentials, the system will initiate a verification process. It will check the provided details against the database to determine whether the credentials are valid and correspond to an authorized user. Additionally, the system will identify the user's type (Admin, Regular User, Project Manager, or Supervisor) based on the logged-in credentials.

This differentiation based on user credentials is crucial, as it will directly impact the level of access the user is granted within the application. Each user type will have specific permissions and functionalities tailored to their roles and responsibilities. By identifying the user type during login, the system can efficiently allocate the appropriate level of access and present the user with a personalized dashboard and features relevant to their user type.

The login verification process ensures a secure environment for the application, allowing only authorized users to access the designated areas and functionalities. By accurately determining user types and access levels, the application maintains data integrity, security, and privacy while delivering a customized and optimized user experience for each user type.

A screenshot of a login screen

Description automatically generated

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Login Page | The Login system will take allow all types of users to login and also distinguish between them. |
| 2 | Username | The user has to provide a valid username in the field. This is a mandatory field for the login system to work. |
| 3 | Password | The user has to provide a valid password linked with the username entered above. This is a mandatory field for the login system to work. |
| 4 | Login Button | When clicked the system will check the credentials and let the user in to the appropriate destination based on the user type else gives error. |
| 5 | Forgot Credentials | When clicked If the user don’t remember either of the above mentioned mandatory fields then the link will take to a portal to further authenticate and reset the credentials. |

### Admin Portal

The admin portal page is designed to equip the logged-in administrator with all the necessary tools to perform administrative duties efficiently. This user type has both read and write access to all the data and information in the database, enabling them to manage the application effectively. The admin portal will also provide a dashboard with valuable insights, displaying the number of currently active and inactive projects for quick reference.

Key features of the admin portal page include:

**1. Project and User Selection:**

- The admin can select a project from a dropdown list, containing all the projects available in the directory.

- After selecting a project, they can then choose a user from another dropdown list, displaying all users linked to the selected project.

**2. Admin Tools Portal Access:**

- By clicking on the "User Data" button, the admin will be directed to the admin tools portal. This portal will offer a range of actions and management capabilities for the selected user and project.

**3. Create New User and Project:**

- The admin will have the option to create a new user by clicking the "Create New User" button. This allows them to add new users to the system and link them to relevant projects.

- Similarly, they can create a new project by clicking the "Create New Project" button, streamlining project setup and management.

**4. Contact Information:**

- The admin portal will provide contact information for assistance or raising requests. Users can use an email client to get in touch, ensuring prompt communication.

The admin portal aims to centralize administrative tasks, making it easier for administrators to manage projects, users, and various settings. With read and write access, administrators have full control over data and can access different versions of dashboards tailored to different user types. This comprehensive portal empowers administrators to efficiently oversee and optimize the application, ensuring a smooth and effective time-tracking and management experience for all users.

A screenshot of a computer

Description automatically generated

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Admin Portal Page | The interface system with administrator level access. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Select Project | This is a dropdown list providing a list of all the projects from the active directory from which the user can select one at a time. |
| 6 | Select User | This is a dropdown list providing a list of all the users that are linked to the project selected. |
| 7 | User Data | When clicked on this button it will redirect to the dashboard page with the above details as input for the detailed information about the timesheets. |
| 8 | Create New User | When clicked on this button it will redirect to the forms page where the user will be able to put in the details of the new user as per the requirements stated. |
| 9 | Create New Project | When clicked on this button it will redirect to the forms page where the user will be able to put in the details of the new project as per the requirements stated. |
| 10 | Projects | The link take the user to a page with view access only showcasing all the active as well as inactive projects currently in the active directory. |

### Admin Tools Portal

The admin tools portal serves as a comprehensive interface with all the necessary tools to efficiently perform administrative tasks. Once the admin selects a project and user from the dropdown list and clicks on "User Data," they are directed to this portal, where they can access various management functionalities.

Key features of the admin tools portal include:

**1. Project Details of the User:**

- This section displays all the projects linked to the selected user, along with unique project numbers to establish the link between timesheet data and associated projects.

**2. Detailed User Information:**

- Detailed information about the selected user is provided, giving the admin insights into their profile and responsibilities.

- The admin has the option to edit this information if requested by the user or revoke the user's access if necessary.

**3. Project Assignment:**

- The admin can assign additional projects to the selected user from the portal, facilitating efficient project allocation and management.

**4. Timesheets Management:**

- The admin can view all timesheets submitted by the selected user.

- Action buttons are provided next to each timesheet entry:

- "View" (Eye icon): Allows the admin to view the timesheet in detail with read-only access.

- "Delete": Enables the admin to delete the timesheet record if requested by the user.

- "Close Timesheet" (Arrow with disk): Allows the admin to mark the timesheet as closed and ready for further processing by other departments.

- If additional actions are required on a timesheet, the admin can select the timesheet and click on the "Select Timesheet" button, directing them to a new page with more tools and actions available.

The admin tools portal offers a centralized platform for comprehensive user and project management. With access to project details, user information, and timesheets, the admin can efficiently oversee user activities and timesheet submissions. The interface streamlines administrative tasks, ensuring effective time-tracking, project management, and user coordination within the application.

A screenshot of a computer

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A screenshot of a computer

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Description automatically generated

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Admin Tools Portal Page | The interactive page with the administrator level access and all the admin tools available. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Select Timesheet | The user will be able to select a timesheet from the list above. By clicking it will take the user to a page with more detailed information about the selected timesheet. |
| 6 | Edit User | By clicking this the user will be able to change the details of the selected user. |
| 7 | Revoke | By clicking this the user will be able to revoke edit access for the selected user and the selected user will not be able to submit any timesheet record or edit them. |
| 8 | Assign Project | By clicking this the user will be able to assign a project to the selected user and also will be able to see all the projects that are linked to the selected user. |

### Admin Timesheet Portal

The admin timesheet portal is equipped with a range of actions and tools designed to efficiently manage the selected timesheet and perform various administrative tasks. This portal allows the admin to view the detailed timesheet information, including project details, hours worked, and various time-off records on a weekly basis.

Key features of the admin timesheet portal include:

**1. Detailed Timesheet View:**

- The admin can access the selected timesheet in detail, displaying the projects on which the user has worked and the hours dedicated to each project.

- The timesheet will showcase daily and weekly total hours, providing a comprehensive overview of the user's time allocation.

**2. Time-Off Details:**

- A section will contain comprehensive details about standard hours, overtime, time off in lieu, and sick leave, all organized on a weekly basis.

- This data allows the admin to monitor and manage time-off records efficiently.

**3. User and Project Details:**

- The admin will have access to the user's information, including personal details and project links.

- This section provides valuable context for better understanding the timesheet and user's activities.

**4. Timesheet Editing and Deletion:**

- The admin can edit the timesheet as required, incorporating any changes requested by the user or correcting discrepancies found during review.

- If necessary, the admin also has the option to delete the timesheet from the system.

**5. Timesheet Status Management:**

- The admin can change the status of the timesheet from approved to not approved if further adjustments are required.

- Once everything aligns with the requirements, the admin can close the timesheet, making it accessible to other departments for further processing.

The admin timesheet portal offers a comprehensive set of tools to ensure accurate time tracking and efficient timesheet management. With access to detailed timesheet data, the admin can effectively review, edit, and approve timesheets, promoting accuracy and compliance within the application. This user-friendly interface empowers administrators to streamline timesheet-related tasks, contributing to a smoother time-tracking and management process for the entire organization.

Table

Description automatically generated

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Admin Tools Portal Page | The interactive page with the administrator level access and all the admin tools available. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Select Timesheet | The user will be able to select a timesheet from the list above. By clicking it will take the user to a page with more detailed information about the selected timesheet. |
| 6 | Edit User | By clicking this the user will be able to change the details of the selected user. |
| 7 | Revoke | By clicking this the user will be able to revoke edit access for the selected user and the selected user will not be able to submit any timesheet record or edit them. |
| 8 | Assign Project | By clicking this the user will be able to assign a project to the selected user and also will be able to see all the projects that are linked to the selected user. |
| 9 | Edit Timesheet | By clicking this the user will be able to edit the timesheet selected above on behalf of the selected user. |
| 10 | Delete Timesheet | By clicking this the user will be able to delete the timesheet selected above on behalf of the selected user. |
| 11 | Change Status | By clicking this the user will be able to change the status of the timesheet from approved to not approved so the selected user can change the details. |
| 12 | Close Timesheet | By clicking this the user will be able to close the selected timesheet for further processing for the selected user. |

### Project Manager User Portal

The project manager user portal provides a basic overview of the timesheets submitted by the project manager. The interface offers convenient actions for viewing, editing, and submitting timesheets for efficient time management.

Key features of the project manager user portal include:

**1. Timesheet Overview:**

- The portal displays a concise overview of the timesheets submitted by the project manager.

- Each entry has two action buttons: "View" and "Edit" (pen icon).

- Clicking the "View" button opens a popup window displaying the detailed timesheet entry.

- Clicking the "Edit" button allows the project manager to make necessary changes to the timesheet entry.

**2. Submitting Timesheets:**

- The project manager can submit a new timesheet entry by clicking the "Submit Timesheet" button.

- Upon clicking, a form will appear, enabling the project manager to fill in the necessary details for the new timesheet entry.

**3. Project and User Selection:**

- The project manager can select a project from a dropdown list, containing all projects linked to them.

- After selecting a project, they can then choose a user from another dropdown list, displaying all users linked to the selected project.

**4. User Data:**

- By clicking the "User Data" button, the project manager can access detailed information about the selected user.

- This section allows the project manager to perform further actions related to the user and their timesheets.

The project manager user portal streamlines timesheet management for the project manager, enabling them to access, review, and edit timesheets effortlessly. The interface empowers the project manager to efficiently submit new timesheet entries and collaborate with specific users linked to projects. With user-friendly actions and dropdown selections, the portal simplifies the user's interaction with the application, enhancing overall productivity and time-tracking effectiveness.

A screenshot of a project manager

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A screenshot of a project manager

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|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Project Manager Portal Page | The interactive page with the project manager level access and all the project manager tools available. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Select Timesheet | The user will be able to select a timesheet from the list above. By clicking it will take the user to a page with more detailed information about the selected timesheet. |
| 6 | Submit Timesheet | By clicking this the user will be able to submit a timesheet record for the approval. |
| 7 | Select Project | This will provide the user with a dropdown list of the projects that the user linked with and will allow to select one project at a time. |
| 8 | Select User | This will provide the user with a dropdown list of the user that are linked with the project selected |
| 9 | User Data | By clicking this the user will be redirected to a page with the details of all the records for the selected user. |
| 10 | My Timesheets | In this interactive box the user will be able to see an overview of all the timesheets that he has uploaded and their status as well. |

### Project Manager Tools Portal

Upon clicking the "User Data" button, the project manager will be directed to the tools portal, where all the relevant tools for performing various tasks and actions will be available. This portal empowers the project manager with the necessary functionalities to efficiently manage timesheets and user-related activities.

Key features of the tools portal for the project manager include:

**1. Detailed Timesheet View:**

- The portal provides a comprehensive view of the selected timesheet for the chosen user, offering a detailed breakdown of project-related hours and activities.

- The project manager can review the timesheet in depth, ensuring accuracy and compliance.

**2. User Details and Linked Projects:**

- A section showcases detailed information about the selected user, including their personal details and a reference to all projects linked to the user.

- This section helps the project manager gain valuable context and insights into the user's responsibilities and project involvements.

**3. Timesheet Editing and Deletion:**

- The project manager has the option to edit the selected timesheet, making necessary adjustments based on requirements or user requests.

- Additionally, if required or requested, the project manager can delete the timesheet.

**4. Timesheet Approval:**

- If the project manager deems the timesheet to be accurate and compliant, they can click on the "Approve Timesheet" button.

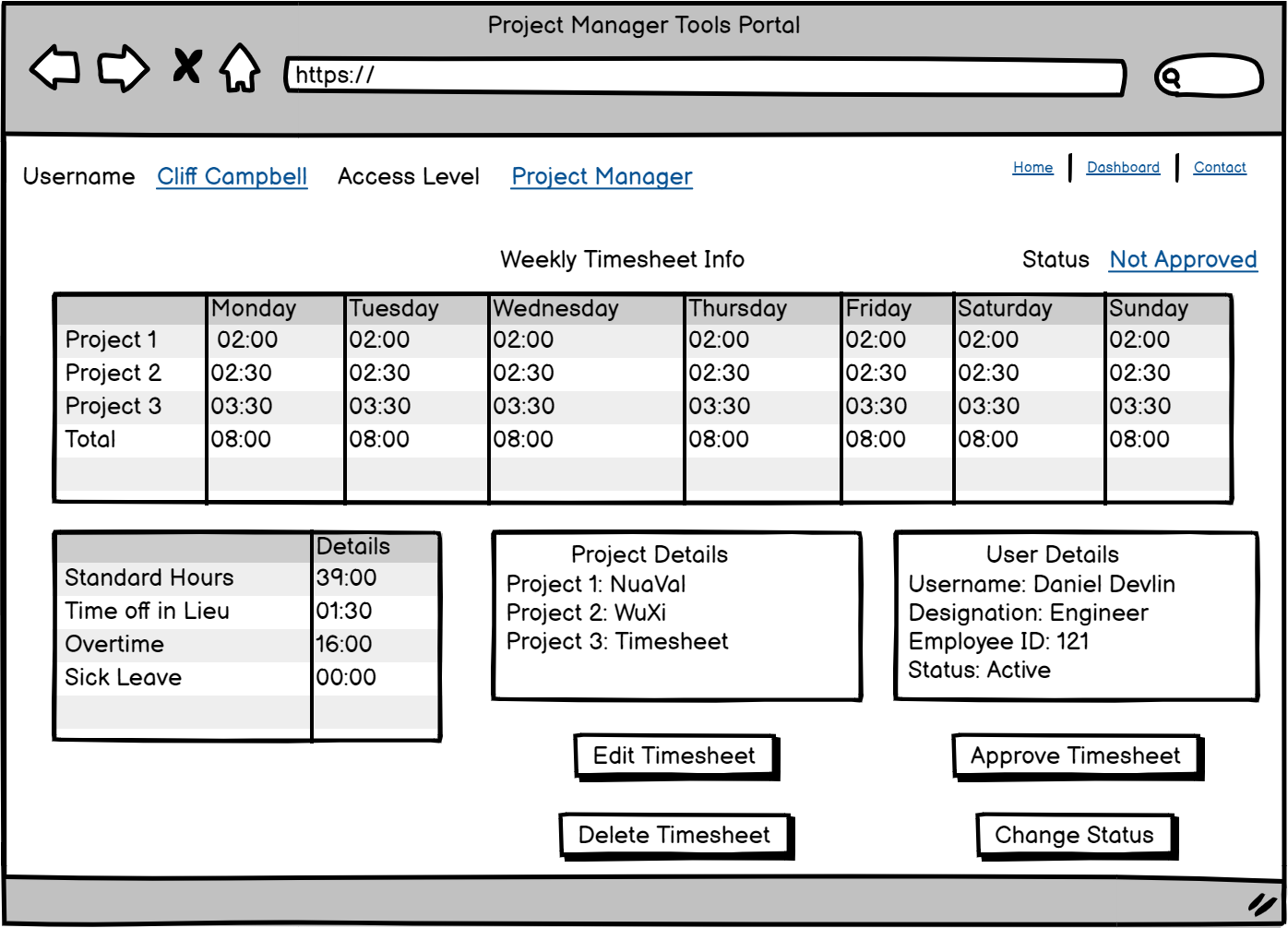
- This action instantly approves the timesheet and updates its status.

**5. Timesheet Status Management:**

- The project manager also has the flexibility to change the status of the timesheet from approved to not approved based on specific requests from the user.

- This capability enables the project manager to accommodate unique situations and maintain data accuracy.

The tools portal streamlines timesheet management for the project manager, allowing them to efficiently review, edit, and approve timesheets for their team members. With a user-friendly interface and access to relevant information, the portal empowers the project manager to ensure adherence to project timelines and resource allocation, contributing to successful project management within the application.



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| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Project Manager Tools Portal Page | This is an interactive page with all the tools necessary for the functioning of a project manager. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Edit Timesheet | By clicking this the user will be able to edit the timesheet information for the selected user on behalf of the selected user |
| 6 | Delete Timesheet | By clicking this the user will be able to delete the timesheet record for the selected record on behalf of the selected user. |
| 7 | Approve Timesheet | By clicking this the user will be able to approve one or more timesheets selected above for the selected user. |
| 8 | Edit User | By clicking this the user will be able to edit the details of the selected user on behalf of the user. |
| 9 | Assign Project | By clicking this the user will be able to assign a project to the selected user. |

### Regular User Portal

When a regular user successfully logs in from the login page with valid credentials and no access revoked by the admin, the user will be directed to the regular user portal page. This page will provide the user with a brief overview of the hours they have worked, displayed in a graph format. The graph will depend on the timesheets submitted and approved by the project manager.

Key features of the regular user portal page include:

**1. Overview of Worked Hours:**

- The page will showcase a graph representing the hours worked by the user.

- The graph will be based on the data from submitted timesheets that have been approved by the project manager, providing a visual summary of the user's work hours.

**2. List of Linked Projects:**

- The regular user will have access to a section listing all the projects they are linked with.

- The user can select any project from the list to obtain more detailed information.

**3. Project Data View:**

- To access detailed project information, the regular user will select a project from the list.

- After selecting the project, the user will click on the "My Data" button to be directed to a different page with project-specific data.

The regular user portal page offers a user-friendly interface with a quick overview of worked hours and project links. The graph visualization aids the user in understanding their time allocation and project involvement. By providing access to project-specific data, the portal enhances the regular user's understanding of their contributions and supports effective time management within the application.

A screenshot of a login form

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|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Regular User Portal Page | This is an interactive page with the basic insights about the hours worked in real-time. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Select Project | This will provide a dropdown list of all the projects the selected user is linked with. |
| 6 | My Data | By clicking this the user will be able to view all the timesheets submitted for the selected project. |
| 7 | Hours Worked | This graph shows an overview of all the hours worked on different projects in a week in real-time. |

### Regular User Tools Portal

When the regular user logs in and provides their credentials for validation, the system will verify the information and grant access to the regular user portal. From the user portal, when the user clicks on the "My Data" button, they will be directed to the user tools portal. This portal will offer various functionalities to facilitate timesheet management.

Key features of the user tools portal for the regular user include:

**1. Recently Submitted Timesheets:**

- The user can view all recently submitted timesheets in this section.

- Two actions are available for each timesheet entry:

- "View" (Eye icon): Allows the user to view the timesheet as a popup window, providing a detailed overview of the entry.

- "Edit" (Pen icon): If the timesheet has not been approved yet, the user can edit the timesheet using this option.

**2. Archive:**

- The user can access archived timesheet information, providing a historical record of past timesheets.

**3. Create Timesheet:**

- The user has the option to create a new timesheet by clicking on the "Create Timesheet" button.

- Clicking this button will direct the user to a new page where they can input the necessary data for the new timesheet entry.

**4. User and Project Details:**

- A section will showcase detailed information about the regular user, including personal details and project links.

- This section provides the user with valuable context, displaying all projects they are linked with.

The user tools portal offers a user-friendly interface with quick access to recently submitted timesheets and timesheet creation functionality. With the ability to view and edit timesheets, the portal ensures users have control over their timesheet data. The portal also provides a comprehensive view of user and project details, supporting the regular user's understanding of their contributions and facilitating effective time management within the application.

A screenshot of a computer

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|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Regular User Portal Page | This is an interactive page with all the tools necessary for the functioning of a regular user. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Select Timesheet | By clicking this the user will be able to select the timesheet and view details of the selected timesheet. |
| 6 | Submit Timesheet | By clicking this the user will be able to view all the timesheets submitted for the selected project. |
| 7 | Edit Unapproved Timesheet | By clicking this if the user has selected an unapproved timesheet then he can edit the timesheet data and re-submit. |

### Regular User Timesheet

When the regular user clicks on the "Create Timesheet" button on the regular user tools portal, they will be directed to the timesheet portal. In this portal, the user can input and edit their timesheet records. The same page can be used for editing any unapproved timesheets as well. Once the user has filled in all the necessary information or completed the edits, they can click on the "Submit" button to forward the timesheet to the project manager for approval.

Key features of the timesheet portal include:

**1. Timesheet Input and Editing:**

- The user can input their timesheet data in this portal and also make edits to any unapproved timesheets.

- The portal offers a user-friendly interface for easy data entry and modification.

**2. User and Project Details:**

- The user will be able to see their personal details and project links as a reference.

- This section provides context for the timesheet data and helps the user understand their work allocation.

**3. Categories of Worked and Non-Worked Hours:**

- The timesheet portal displays different categories under which the user's worked or non-worked hours are organized.

- This feature allows the user to track their hours based on specific project activities or time-off records.

**4. Annual Leave and Sick Leave Input:**

- The user can input their annual leave or sick leave information directly into the timesheet during submission.

- This functionality streamlines the process of tracking and managing time-off records.

The timesheet portal streamlines the process of timesheet creation and editing for the regular user. By providing an organized view of worked hours and time-off records, the portal enhances the user's understanding of their time allocation. With a convenient submit button, the user can easily forward the timesheet for project manager approval, promoting effective timesheet management within the application.

A screenshot of a computer

Description automatically generated

|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Regular User Timesheet | This is the page where the user will input the timesheet data and will be able to submit the timesheet |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Submit Timesheet | By clicking this the user will be able to submit a timesheet record for approval. |

### Regular User Timesheet (Non-NuaVal Project)

Table

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|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Regular User Timesheet | This is the page where the user will input the timesheet data and will be able to submit the timesheet |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Submit Timesheet | By clicking this the user will be able to submit a timesheet record for approval. |

### Supervisor User Portal

When the supervisor user logs into the system, their credentials will be validated to ensure their correctness. Upon successful validation, the user will be directed to the supervisor user portal. In this portal, the supervisor can view their recently submitted timesheets and take actions accordingly.

Key features of the supervisor user portal include:

**1. Recently Submitted Timesheets:**

- The portal displays the recently submitted timesheets by the supervisor user.

- For unapproved timesheets, the supervisor has the option to view or edit the timesheet directly from this page.

**2. Project and User Selection:**

- The supervisor user can select a project from a dropdown list containing all projects.

- After selecting a project, the user can then choose a specific user linked to the selected project.

**3. User Data and Timesheets:**

- Clicking on the "User Data" button will present the supervisor with detailed information about the selected user, including all the timesheets submitted by the user.

- This section provides comprehensive insights into the user's activities and timesheet history.

**4. Archive:**

- The supervisor user can access the archive button to view all previously submitted timesheets.

- This feature offers a historical record of past timesheets for reference.

**5. Submit New Timesheet:**

- From the supervisor user portal, the user has the option to submit a new timesheet.

- The user can input all the necessary data for the new timesheet and submit it for approval.

The supervisor user portal streamlines timesheet management for the supervisor, providing quick access to recent and archived timesheets. With the ability to view, edit, and submit timesheets, the portal facilitates effective oversight and ensures efficient time-tracking within the application.

Table

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| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Supervisor User Portal Page | This is an interactive page with a basic overview of the user details and only have view access and would not be able to edit anything. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | Select Project | This is a dropdown list containing a list of all the projects from which the user can select a project. |
| 6 | Select User | This is a dropdown list containing a list of all the users linked with the selected project and the user will be able to select a user. |
| 7 | User Data | By clicking this the user will be redirected to another page with all the details of the selected user. |
| 8 | My Submitted Timesheets | This interactive box will showcase the timesheet data submitted by the user on a weekly basis and also will be able to see the status of the timesheet. |
| 9 | View Timesheet | By clicking this the user will be able to view the detailed view of the selected timesheet. |
| 10 | Submit Timesheet | By clicking this the user will be able to submit a timesheet record for approval. |

### Supervisor Tools Portal

When the supervisor user selects one of the timesheets from the list for the selected user and clicks on "User Data," they will be directed to the supervisor tools portal. In this portal, the supervisor user will have read-only access, allowing them to view the selected timesheet in detail for verification purposes, without the ability to alter the data.

Key features of the supervisor tools portal include:

**1. Detailed Timesheet View:**

- The selected timesheet is available in detail, showcasing all the hours the user has worked on different projects throughout the week.

- The portal provides a comprehensive overview of the user's work hours and activities, including leave and other categories of working hours.

**2. Read-Only Access:**

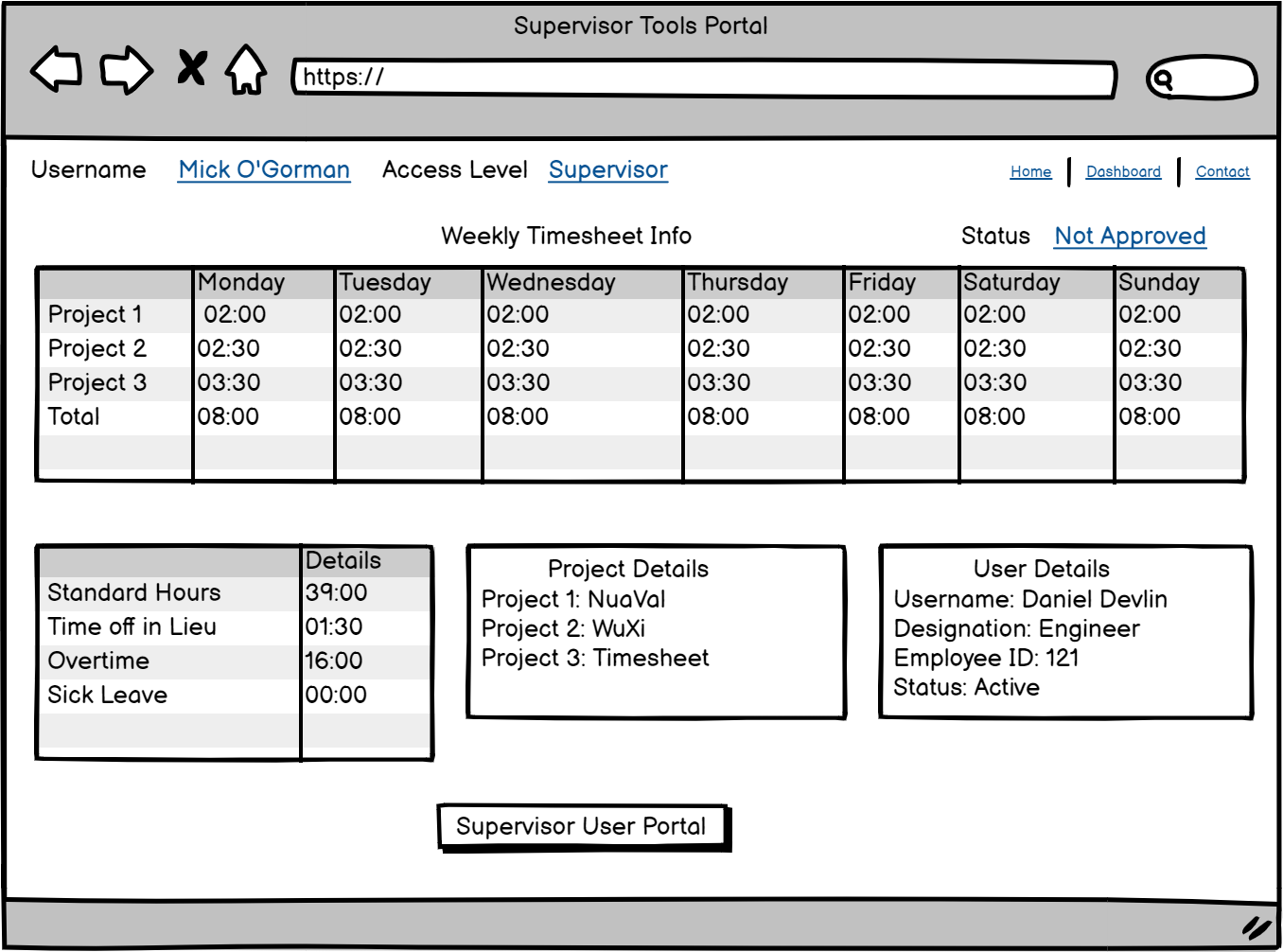
- As a supervisor user, access to the timesheet is read-only, ensuring data integrity and preventing any accidental modifications.

**3. User Details and Project List:**

- The portal displays the selected user's details, providing context and information about the user's role and responsibilities.

- Additionally, the supervisor user can access a list containing all the projects linked to the selected user.

The supervisor tools portal offers a detailed view of the selected timesheet for verification purposes, empowering the supervisor user to oversee and track the user's work hours accurately. With read-only access, the supervisor can review the data with confidence, supporting effective time management and accurate reporting within the application.



|  |  |  |
| --- | --- | --- |
| **No.** | **Requirement** | **Description** |
| 1 | Supervisor Tools Portal Page | This is an interactive page with a basic overview of the user details and will have the tools necessary for the functioning of the supervisor. |
| 2 | Home | The link will take the user to the main user portal where he can get the basic insights. |
| 3 | Dashboard | The link will take the user to the dashboard section where he can see the timesheets and other analytics. |
| 4 | Contact | The link will take the user to the contact section where the contact details for support will be present. |
| 5 | View My Timesheet | By clicking this the user will be able to go to the page where he can view all his submitted timesheets. |
| 6 | Detailed Timesheet Info | In this interactive box the user will be able to only view the selected timesheet for the selected user in details. |

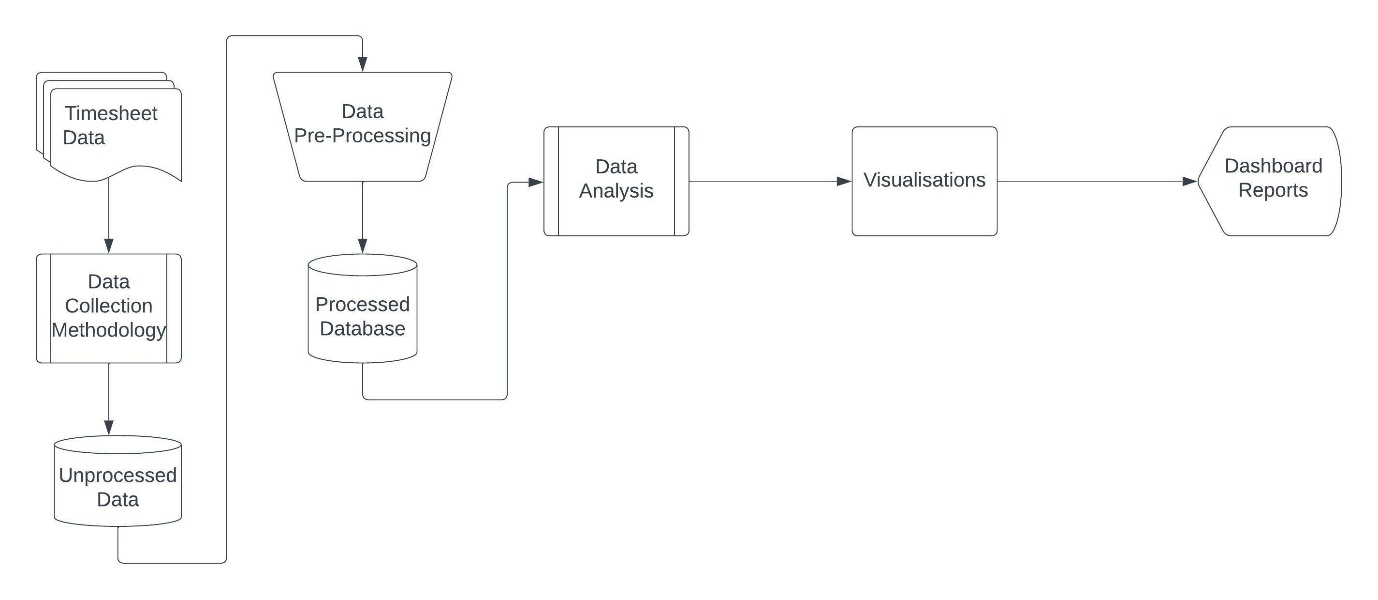
# Software interface requirements

Data analysis environment (what is it, the output and where will it go)

Diagram

Description automatically generated

Using the NuaVal Data



Using Non-NuaVal Data

# Non-functional requirements

## Security

Ensuring data protection and adhering to security regulations is crucial for the application's success and user trust. To achieve this, the following measures will be implemented:

**1. Role-Based Access Control:**

- The application will implement different layers of access based on user types (e.g., Admin, Project Manager, Regular User, Supervisor User).

- Each user will have access only to the functionalities and data relevant to their role, minimizing unauthorized access to sensitive information.

**2. Secure Login System:**

- A robust and secure login system will be implemented, incorporating strong authentication methods, such as multi-factor authentication (MFA).

- It will prevent unauthorized access and protect user accounts from potential breaches.

**3. Data Encryption and Safe Storage:**

- All collected data will be stored securely in a database.

- Sensitive data, such as user credentials and personal information, will be encrypted to protect it from unauthorized access.

**4. Transparent Data Collection:**

- Users will be informed about the data being collected during the onboarding process.

- A clear and concise privacy policy will be provided, outlining the types of data collected, the purpose of data collection, and how the data will be used.

**5. User Agreement and Consent:**

- Users will be presented with a user agreement document during the registration process.

- The agreement will explain the terms and conditions of using the application, including data usage and privacy policies.

- Users will be required to provide their consent before using the application.

**6. Compliance with Data Protection Regulations:**

- The application will comply with relevant data protection regulations, such as GDPR (General Data Protection Regulation) or HIPAA (Health Insurance Portability and Accountability Act), depending on the industry and user data being handled.

**7. Regular Security Audits:**

- Regular security audits and assessments will be conducted to identify and address potential vulnerabilities.

- Updates and patches will be applied promptly to maintain the application's security.

By implementing these security measures, the application will create a safe and trustworthy environment for users, fostering user confidence and compliance with data protection regulations.

## Data Integrity

The authentication layer implemented through the login page will play a crucial role in ensuring secure access to the software. This layer will be responsible for determining the user's identity and granting appropriate access levels based on their credentials. Unauthorized users will be prevented from accessing the system, enhancing security and protecting sensitive data.

Key features of the authentication layer and data protection measures include:

**1. Login Page and User Authentication**:

- The login page will require users to provide valid credentials (username and password) for authentication.

- Only authenticated users with proper access credentials will be allowed to log into the system.

- This authentication process will prevent unauthorized access to the application.

**2. Access Levels and Hierarchy:**

- Different user types (Admin, Project Manager, Regular User, Supervisor User) will have different access levels and roles.

- Each user type will have access only to the functionalities and data relevant to their role, based on a predefined hierarchy.

- This ensures that users are granted access to only the information and tools necessary for their responsibilities.

**3. Data Backup and Recovery:**

- Regular data backups will be created to safeguard against data loss or corruption in the main database.

- In case of any data issues in the main database, the backups will be used to restore the lost or corrupted information.

**4. Supervisor Clearance:**

- Access to data will be restricted to authorized users only.

- Any external entity or unauthorized user seeking access to the data will require clearance from the supervisor.

- This ensures that data is only accessed by authorized personnel.

By incorporating these measures, the software will establish a robust authentication layer and data protection framework. This approach will enhance the security of the application, maintain data integrity, and protect sensitive information from unauthorized access.

## Capacity

In the initial version of the software, as the data volume is relatively low, the data storage requirements will be minimal. The storage capacity can be tailored to accommodate the initial data load and usage. This approach will help in optimizing costs and resource utilization during the initial phase of the application.

However, as the software evolves and more features are implemented in subsequent versions, the data storage requirements are expected to increase. This growth in data volume may result from additional users, timesheets, project information, and analytics data. To ensure the system's scalability and performance, it will be necessary to expand the storage capacity accordingly.

Potential strategies for managing data storage in later versions of the software include:

**1. Scalable Architecture:**

- Adopting a scalable architecture that allows easy expansion of storage capacity based on demand.

- Implementing cloud-based storage solutions that can be scaled up or down as needed.

**2. Database Management:**

- Utilizing databases with built-in scaling capabilities, such as NoSQL databases or cloud-based database services.

- Optimizing data structure and indexing to improve database performance.

**3. Data Archiving:**

- Implementing data archiving strategies to store historical data separately, freeing up active storage space.

- Moving older or less frequently accessed data to long-term storage.

**4. Data Purging and Cleaning:**

- Regularly purging unnecessary data and cleaning up redundant or obsolete records to optimize storage space.

**5. Data Compression and Deduplication:**

- Implementing data compression techniques to reduce the storage footprint of stored data.

- Utilizing deduplication methods to identify and eliminate duplicate data, reducing storage redundancy.

**6. Monitoring and Capacity Planning:**

- Continuously monitoring data storage usage and performance to identify potential bottlenecks or issues.

- Conducting capacity planning to estimate future storage requirements and ensure sufficient resources are available.

By considering these strategies and planning for future data growth, the software can efficiently manage data storage requirements in later versions while ensuring optimal performance and scalability.

## 

## Scalability

To ensure the application can scale effectively when the demand on system resources increases, it's essential to implement a scalable architecture and adopt suitable strategies for both responsiveness and data storage. Here are some key considerations:

**1. Responsive Scaling:**

- Load Balancing: Implement load balancing to distribute incoming requests evenly across multiple servers. This ensures that no single server is overloaded, improving response times and overall system performance.

- Horizontal Scaling: Adopt a horizontally scalable architecture, where multiple instances of the application can be deployed across multiple servers. This allows the system to handle increased traffic by adding more servers as needed.

**2. Caching Mechanisms:**

- Implement caching mechanisms to store frequently accessed data in memory. This reduces the need to query the database repeatedly, improving response times for users.

**3. Asynchronous Processing:**

- Use asynchronous processing for time-consuming tasks or data processing. This approach allows the system to handle other user requests promptly, enhancing overall responsiveness.

**4. Content Delivery Networks (CDNs):**

- Utilize CDNs to distribute static content (e.g., images, CSS, JS) across multiple servers located in various geographic locations. This reduces server load and improves response times for users worldwide.

**5. Elastic Infrastructure:**

- Leverage cloud-based infrastructure services (e.g., AWS, Azure, Google Cloud) that offer auto-scaling capabilities. This allows the application to dynamically add or remove resources based on demand, optimizing resource utilization.

**6. Data Storage Scaling:**

- Choose Scalable Databases: Opt for databases that support horizontal scaling, such as NoSQL databases or distributed SQL databases. These databases can distribute data across multiple nodes to handle increased data storage requirements.

- Sharding: Implement database sharding, which involves partitioning data across multiple databases or servers. This enables efficient data retrieval and storage as the dataset grows.

**7. Data Replication and Backups:**

- Utilize data replication to ensure data redundancy and fault tolerance. Replicating data across multiple servers or data centres improves data availability and mitigates the risk of data loss.

- Implement automated data backups to safeguard against data loss. Regular backups ensure that critical data can be recovered in case of any unforeseen incidents.

By adopting these strategies, the application will be able to scale seamlessly to meet increasing demand on both responsiveness and data storage, ensuring a smooth user experience and optimal performance.

## Maintainability

To ensure the system is easily maintainable and cost-effective over its expected lifetime, several approaches will be adopted:

**1. Modular and Component-Based Architecture:**

- The system will be designed using a modular and component-based architecture, allowing for easier maintenance and updates.

- Individual components can be modified or replaced without impacting the entire system, enhancing modifiability.

**2. Power Apps for Modifiability:**

- Utilizing Power Apps, which allows for low-code development, to incorporate additional requirements and design features iteratively.

- Power Apps enable rapid development and customization, reducing development time and cost.

**3. Flexible Architecture for Extensibility:**

- Implementing a flexible architecture that can accommodate future changes and additions to the application.

- Well-defined APIs and interfaces will enable seamless integration of new functionalities.

**4. Endurance and Cost-Efficiency:**

- By avoiding the procurement of large inflexible applications, the system will prevent expensive processes and vendor lock-ins.

- The application's agility and adaptability will save costs in the long run, as it can evolve to meet changing requirements.

**5. User-Centric Design and Adaptability:**

- Taking user inputs and feedback into consideration to continually improve the application's usability and user experience.

- Regularly updating the application based on user needs and preferences to enhance adaptability.

**6. Documentation and Knowledge Sharing:**

- Maintaining thorough documentation of the system's architecture, design, and functionalities to facilitate future maintenance and updates.

- Knowledge sharing among the development team ensures collective understanding of the application, supporting maintainability.

**7. Automated Testing and Quality Assurance:**

- Implementing automated testing processes to identify and fix issues quickly, improving system stability and reducing maintenance efforts.

By adopting these practices, the system will be able to evolve with changing requirements, stay cost-effective, and provide a seamless user experience. A user-centric and adaptable approach ensures that the application can continually meet the needs of users and the organization, making it a valuable long-term solution.

## Usability

Ensuring ease of use and a straightforward user experience is crucial for the success of the application. To achieve this, the following measures will be implemented:

1. **Intuitive User Interface:**

The user interface will be designed with a focus on simplicity and clarity. The layout, navigation, and visual elements will be organized in a user-friendly manner to reduce cognitive load and promote ease of understanding.

1. **Role-Based Access:**

Each user type will have specific access privileges tailored to their roles and responsibilities. This ensures that users only see and interact with the features relevant to their tasks, minimizing confusion and clutter.

1. **Clear User Guidance:**

The application will provide clear and concise instructions or tooltips at appropriate places to guide users through different tasks and processes.

1. **Consistency in Design:**

Consistent design patterns, colour schemes, and terminology will be used throughout the application to create a familiar and predictable user experience.

1. **User Testing and Feedback:**

User testing will be conducted during the development process to gather feedback from real users. This feedback will be incorporated into the design to address any usability issues and improve the overall user experience.

1. **Responsive Design:**

The application will be designed with responsiveness in mind, ensuring that it is accessible and functional on various devices and screen sizes.

1. **Minimal Learning Curve:**

The application will aim to have a minimal learning curve, enabling users to quickly become proficient in using its features without extensive training.

1. **Error Handling and Validation:**

Effective error messages and input validation will be implemented to help users understand and correct any mistakes, reducing frustration and errors.

1. **User-Focused Documentation:**

Comprehensive and user-friendly documentation will be provided to assist users in understanding the application's features and functionalities.

1. **User-Centric Design Iteration:**

The application will be continually refined based on user feedback and behaviour to enhance usability and address any pain points.

By prioritizing user experience and simplicity, the application will foster user satisfaction and productivity, leading to higher user adoption and engagement.

# Development Process

The adoption of an agile approach for the development process will allow for flexibility, iterative improvements, and collaboration between the development team and stakeholders. The sprint planning sessions will play a crucial role in defining the objectives for each sprint and breaking down the tasks to be implemented.

During these planning sessions, the following questions and discussions will help in refining the concept wireframes and business flow:

**1. Approval Process for Project Manager-Submitted Timesheets:**

- Identify the relevant authority or role responsible for approving timesheets submitted by project managers. Define the workflow for approval and any additional checks or validations required.

**2. Approval Process for Supervisor-Submitted Timesheets:**

- Determine who will be responsible for approving timesheets submitted by supervisor users. Establish the necessary steps for approval and any specific rules or criteria to consider.

**3. Source and Maintenance of Project IDs:**

- Discuss the source of the list of Project IDs used in the application. Determine who will be responsible for maintaining this data, ensuring its accuracy and consistency.

**4. Time Off in Lieu (TOIL) Business Flow:**

- Detail the entire process and rules for Time Off in Lieu (TOIL). Clarify how users will apply for TOIL, how it will be approved, and how the TOIL balance will be updated.

**5. Iterative Rules and Regulations:**

- Understand that the rules and regulations for the application will be an iterative process. During each sprint, the development team can work with stakeholders to incorporate new rules and regulations into the application.

**6. User Input and Feedback:**

- Encourage stakeholders to provide their input and feedback during the sprint planning sessions. User feedback will help refine and improve the wireframes, use-cases, and business flow.

**7. Scope and Prioritization:**

- Determine the scope of each sprint by selecting a subset of tasks from the backlog that align with the sprint's objective. Prioritize tasks based on their importance and potential impact on the application's functionality and usability.

**8. Refining Concept Wireframes:**

- Use the sprint duration to flesh out the concept wireframes into detailed and functional wireframes. Discuss any modifications or improvements needed to align the wireframes with the application's requirements.

By addressing these questions and conducting collaborative planning sessions, the development team can ensure that the application meets the needs of stakeholders, adheres to the agile principles, and evolves effectively to deliver a successful and user-friendly cloud-based time tracking and management system.

# Appendix 1 – Commissioning process

A diagram of a flowchart

Description automatically generated with low confidence

The workflow diagram provides a clear overview of the business process implemented in the new application. It outlines the various steps involved in the project lifecycle and how they will be managed through the application. The main technologies used, Python Flask for the Back End and Microsoft Power Apps for the Front End, indicate a well-integrated and efficient system.

The workflow can be summarized as follows:

1. **Requirements Gathering:**

The process starts with the commissioning group gathering and discussing project specifications in detail. This step ensures a clear understanding of the project's requirements.

1. **Verification of Processes:**

After gathering requirements, the commissioning group verifies the processes required for the project, ensuring alignment with the project's objectives.

1. **Training and Review:**

The project manager schedules training and reviews for the engineers who will be involved in the project, ensuring they are well-prepared to handle the tasks.

1. **Designing and Implementing Functional Tests:**

The next phase involves designing functional tests, and teams are created to implement these tests. The teams oversee the tests, document the results, and ensure their proper execution.

1. **Verification and Iteration:**

The documented tests are verified, and if any tests fail, the necessary iterations are performed until all tests pass successfully. This iterative approach ensures the quality and completeness of the tests.

1. **Completion and Validation:**

Once all tests pass without the need for re-iteration, the process is considered completed. The successful completion signifies the validation of the project's functionality and readiness for further phases or implementation.

The utilization of Python Flask and Microsoft Power Apps brings versatility and efficiency to the application, enabling seamless communication between the Back End and Front End components. This combination empowers the application to streamline the business process, enhancing project management, time tracking, and data analysis within the pharmaceutical industry.

Overall, the workflow diagram and the chosen technologies demonstrate a well-structured and scalable approach to the application's development, ensuring a reliable cloud-based time tracking and management system for the pharmaceutical industry.