Generic Workflow Management, Monitoring and Reporting Application

Project Summary

Every business needs workflow management, monitoring and reporting. A workflow can be defined as a defined list of processes. It is a challenge for businesses of all sizes, but small businesses in particular who lack a dedicated team to oversee departmental communications or maintain a record of internal business procedures often struggle. They rely on either manual communication or a third-party softwares that must be tailored to their use case, which may be expensive. A user without technical understanding is unable to alter the program because customization is often handled by the application developers. We propose a solution that targets to solve all the above mentioned problems: “Generic Workflow Management, Monitoring and Reporting Application”.

Description

Every business has a set of business processes which have to be coordinated in order to meet the business goal. These processes together form a workflow. Businesses need to monitor their workflows to track the progress of a work item, notify the concerned departments (different processes are managed by different departments usually), and improve on the existing processes (through reporting).

Large scale businesses usually employ in-house software teams/third party companies to develop a process management system for their complex use cases. However, this is expensive. It may cost a large scale organization millions of dollars to get this job done. Small scale businesses, however, can’t afford to invest a lot of money on this, and that’s where our solution comes into picture. We are developing a generic workflow management, monitoring and reporting software which can be customized to the needs of ANY small scale business having relatively simple workflows. By generic, we mean that the business owner, who isn’t expected to know anything about software development can customize the software to suit their business needs.

For example, one possible use case for our solution can be at a restaurant with multiple departments (Waiters, Chefs, Cashiers). Here, each workflow is an order which will go through different processes (Order Taken -> Order Being Prepared -> Order Prepared -> Order Sent To Table -> Payment). Using our solution, the restaurant owner can utilize the “Generic” capability and customize it to their needs by defining these workflows and the parameters they are expected to take using a simple spreadsheet interface. For example, the parameters of an order could be the items which are being ordered, and the parameters for taking a payment from the customer

could be the total bill amount. As the workflow status will be updated by different departments, the owner can track the status of different orders, and understand the bottlenecks using the reporting features. Additionally, each department will be notified as the previous process is completed, so this will ensure the lead time reduction increasing efficiency.

Another use case for the same software (without any changes to the software code) can be in a library. For example, consider the library workflow of a student requesting for a book and the book being picked up and then eventually dropped off by the student. Here, the stages of the workflow can be 'Book Requested', 'Book Acquired', 'Book on Hold', 'Book Picked Up', 'Book Returned', 'Book Placed', etc.

Usefulness

Our application is a boon for small businesses who have to do some kind of process management, but can't afford to pay a software company to develop a process management solution customized to their use case.

There are several applications that exist which provide workflow management tools, however these are heavily focused on workflow management in small teams. This entails that individual users manage their tasks and update them on the portal to indicate progress. Our application would be focussed on managing department workflows. The generic nature ensures the wide applicability of the project in a number of domains, as opposed to existing applications that focus only on a particular use case.

Realness

Our application consists of several different kinds of data. These can be described as follows:

1. Workflow and Process Schema - Each business will have different workflows and different processes within each of them. The business owner will use a user-friendly (like a spreadsheet) to define the workflows, processes and their parameters to customize the application to their business needs. This data will be stored in our system. We will be picking 1-2 example businesses and generating this data manually.
2. Workflow-process Data - This is the actual data that will be produced as the businesses start using our application for process management. This will include information on the process stage at which each workflow instance is and the parameter values associated with the processes that the user had defined at the start. We will be generating this data through scripts for now.
3. User data - Different types of users will be interacting with our application and we will be generating user records.

Functionality

Application Data

Our application consists of different kinds of data - workflow and process schema, the actual data of workflow and process instances, and user data which will be required for access control.

1. The schema of the workflows and processes which will be provided by the business owners. We will have to save this information as this contains the order of execution of the workflows.
2. The actual data of the workflow and process instances which will have process specific data. The attributes for each business process that will be stored will differ according to the use case. For example, for a library this could mean the date on which the book was borrowed.
3. The user data which will be used for access control and authentication. This will contain attributes like username, password, user role, project (the business which they are associated with), etc.

Functions

1. Add/update/delete users: New business owners will sign up on our application and provide us with a list of employees (as part of the process schema). We will need to create user accounts for all these employees with the desired privileges. Users may need to update their data, like a user may shift from one department to another. Or the user account may have to be deleted if the user leaves the company.
2. Add/update/delete workflows and processes:
    a. Business admin will provide our system with the schema for the workflows and processes. That information will have to be added in our DB.
    b. These workflows may be updated, for example, a new business process is being introduced. We will need to update the workflow data in this case.
    c. Workflows may be removed, for example, when a company is discontinuing a service.
3. To enable process owners to update process status: Business process statuses will be updated by the concerned people in the departments. This update will have to be made in the database, and the status of the workflow will be updated for all users in the corresponding department.
4. To notify users of the next process that the current process is completed: As a business process owner updates its status, the subsequent process in the workflow will have to be notified about the same.
5. To enable overall and detailed monitoring of the workflows: The business owner will be able to view real time status of the different ongoing workflows. This will enable them to keep track of the workflows which are stuck for long, and therefore diagnose ongoing

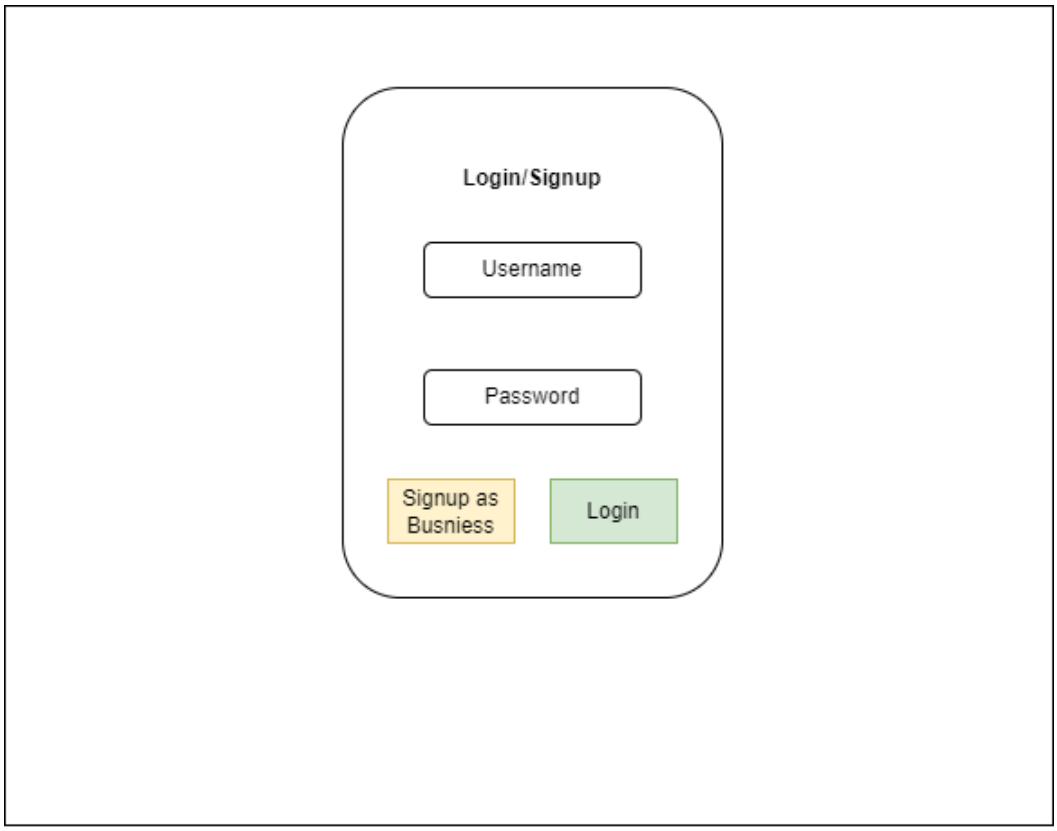
issues. For example, the restaurant owner can track the number of ongoing orders at an instance of time.

6. To generate reports for various workflows: The business owners can view daily/monthly/annual reports to find the various business metrics. This can help them improve on their business processes and probably find the departments which may need more workforce. We will be using SQL aggregation functions to come up with these metrics.

We are a cool project! We plan to create the application in a way such that it can be customized by workflow owners. We support the small business and family business owners by giving them the liberty to edit/enhance their workflows anytime they want. The database will be optimized to handle various types of workflows and be designed in a generic way to normalize the data stored. The challenging part of development would be to come up with a generic schema which can be customized for different kinds of data. Ultimately, we are enabling any business user to store custom data, and use it to analyze and improve their business processes.

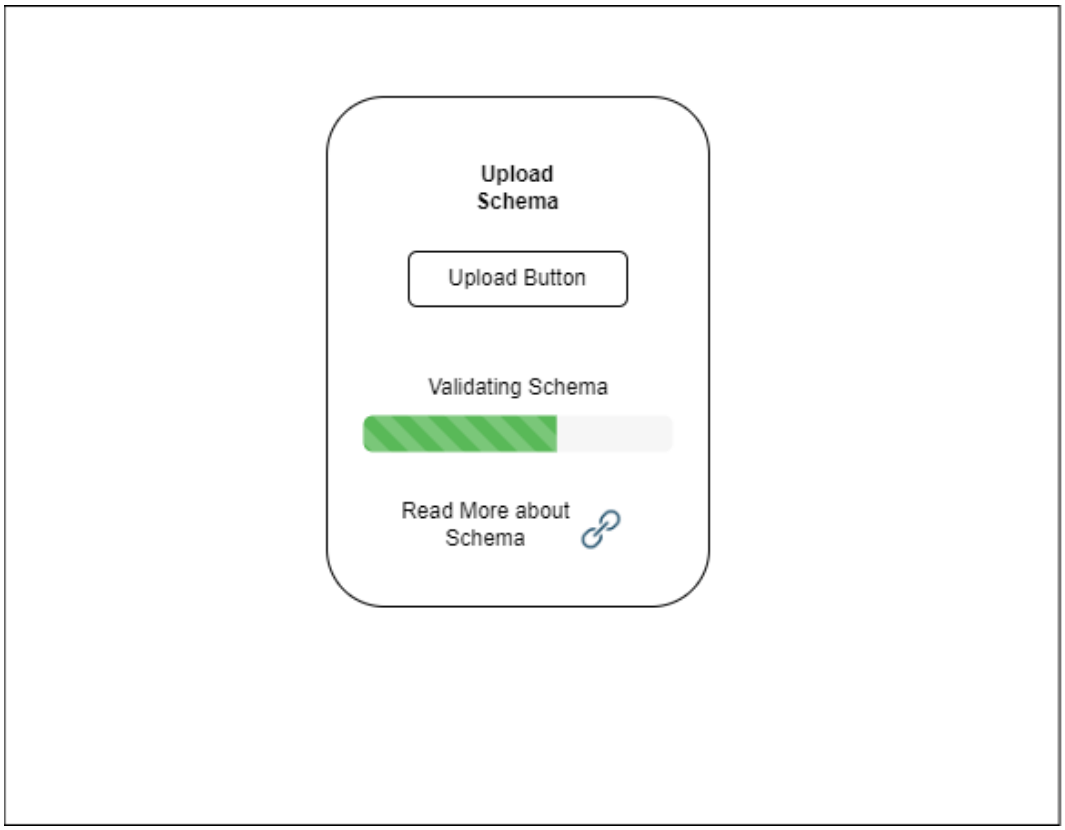
Low Fidelity UI Mockups

1. User login screen - this will be used by the employees to login to the system to see their pending tasks and update status on those.

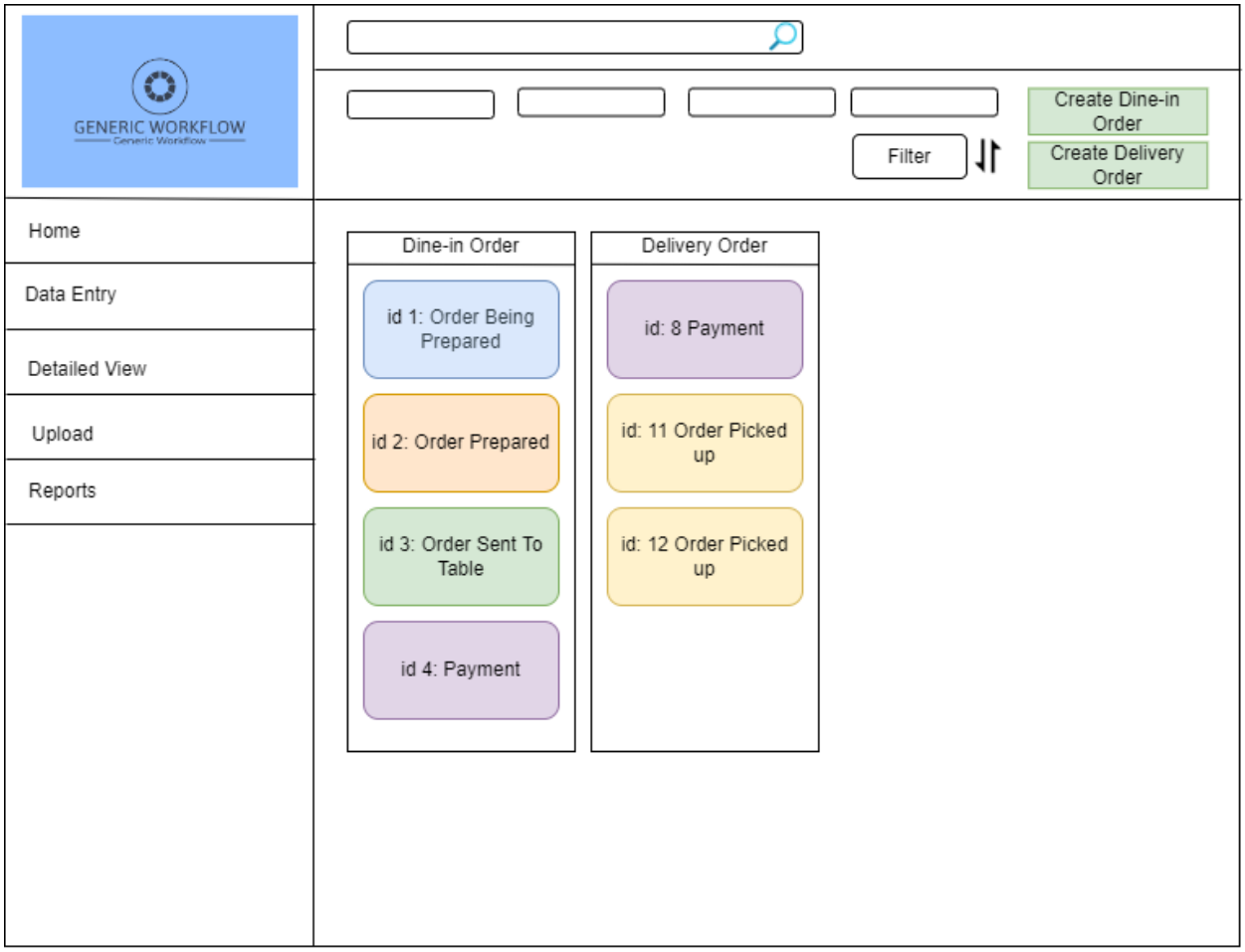


2. Business account creation - the business owner will first have to create an account for their business.

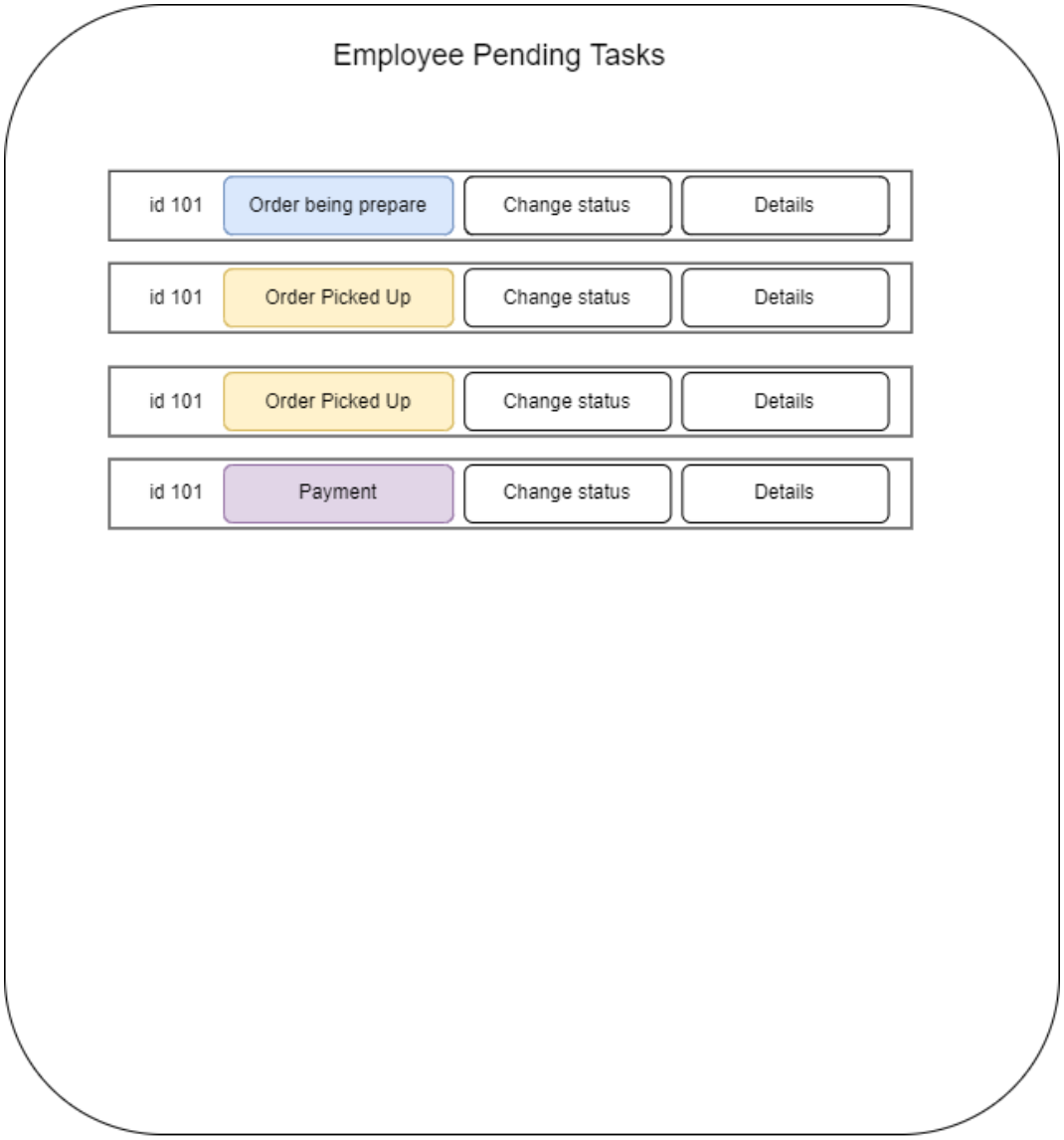
3. Business workflow registration screen - the business will provide our system with their workflow, process schemas as well as user data here. We will also perform schema validation on the same.



4. Business owner screen - the business owner is able monitor the state of all workflows and processes here.



5. Employee screen - each employee will be associated with a particular department (process in our case). Whenever a job is allocated to this department, the employee will see it on this screen. They will be able to make updates to the status of the workflow once they are done with the process. They can also view the details of the process that has to be done here.



Project work distribution

We are planning to distribute the project work workload vertically. These are the modules that we have identified as of now:

- User Data module - kumbhar2 will be responsible for the mock data creation of various users of the application. A user can be workflow owner/process owner/higher Management/DB Administrator. Each user will have certain permissions and constraints. The user module needs to handle addition/deletion/update of user records. This data will be used for user authentication and other user activity data.
- Workflow and Process Data Module - bk28 will handle the workflow and process definition, creation of mock data as well as the schema creation. Each process will have a predecessor and a successor. This information along with some other parameters will be stored in the process table. The challenge in this module is to model the data in a generic way so as to store data of different businesses having different use cases in the same tables.
- Actual Instance Data module - sg73 is responsible for storing the data for the workflow instances. A Workflow instance is the actual execution run of a workflow. This will contain data relevant to the workflow and the different processes within it. The challenge in this module is to model the data in a generic way so as to store data of different businesses having different use cases in the same tables.
- Metadata, Activity and Aggregate data for reports - ikarna2 is responsible for metadata (customer input for defining business specific workflows) schema and parsing. Activity data is the data generated when any process status is updated and a workflow instance goes from a stage to the next. The data to be used for generating reports will be sourced from workflows and be aggregated over a certain time period to analyze the work done/ work remaining/ straggler processes. The aggregated data will be used for analyzing trends over a long period of time to highlight the efficiencies of various processes and reduce any bottlenecks observed.