

## Project Background and Objectives

In real-world workflows, tasks often involve multi-person collaboration, cross-resource coordination, and approval processes, leading to prolonged stagnation. Traditional task management tools typically provide only basic status labels, lacking automated analysis and actionable recommendations. As a result, managers struggle to identify bottlenecks, allocate resources, or expedite approvals in a timely manner.

The goal of this system is to automatically detect “stuck” tasks, provide an overall bottleneck overview, and generate actionable solutions to help teams restore workflow momentum.

## Core Features

1. **View – view\_bottleneck\_tasks:** Aggregates all tasks with a status of stuck, integrating data from the resources, collaborators, and task logs tables to output bottleneck types, inactivity duration, and sorted results. Managers can access a full bottleneck distribution without writing complex SQL, enabling quick prioritization.
2. **Trigger – trg\_update\_task\_log:** Automatically records the old status, new status, and change time whenever a task’s status changes, ensuring complete and traceable history logs.
3. **Stored Procedure – usp\_generate\_suggestions:** Generates suggestions based on three predefined rules:
  - **Unavailable resources:** is\_available = 0 and status = stuck → Suggest “Provide missing resources.”
  - **Long inactivity:** last\_updated over 7 days ago and status = stuck → Suggest “Reassess priority or assign additional help.”
  - **Pending approval:** description contains “approval” and status = stuck → Suggest “Follow up with the approver promptly.”

## Challenges and Solutions

- **Duplicate suggestions:** Used NOT EXISTS to prevent generating identical suggestions multiple times.
- **Null value matching:** Applied COALESCE to handle NULL values, ensuring keyword matching works correctly.
- **Foreign key insert order:** Controlled the insertion sequence of parent and child tables to avoid foreign key constraint errors.

## Impact and Future Improvements

This system enables managers to quickly pinpoint bottleneck tasks and receive targeted recommendations, significantly improving task progression efficiency. In the future, it can be expanded into a full-featured task management platform, centered on bottleneck analysis, with a web-based visualization interface and task dependency analysis to support larger and more complex team collaboration scenarios.