



Tecmic

30
ANOS



INTELLIGENCE AND INNOVATION

Assignment of Tasks/Services

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ISEL ESGi Challenge 2022

the World outside, inside your Window

Fleet management and scheduling challenge

- WELCOME
- TECMIC's activity video
- Challenge presentation

Fleet management and scheduling challenge - Stage 1

- **Objective:**

- Develop an algorithm that returns collaborator work schedules:
 - In a certain period of time;
 - Considering the skills of collaborators, service needs and availability during this period.

- **Criteria:**

- (25%) Minimize collaborator downtime and the number/time of interruptions between services;
- (20%) Minimize the number of collaborators needed to carry out all planned tasks;
- (40%) Maximize the distribution of services by collaborators;
- (15%) Minimize collaborator overtime (extrahours).

Fleet management and scheduling challenge - Stage 2

- Objective:

- Develop an algorithm that considers the characteristics of vehicles to the final working hours of collaborators:
 - Respecting the characteristics of the available vehicles and, on the other hand, the characteristics of the services.

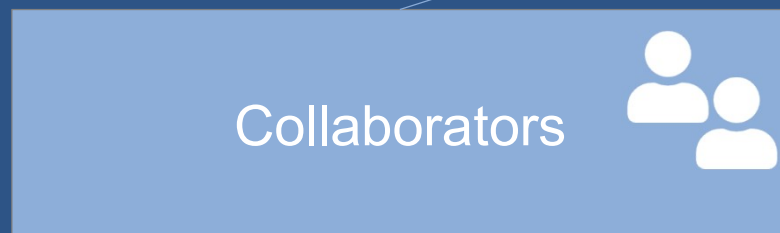
- Criteria:

- (40%) Minimize the number of daily vehicle changes per collaborator;
- (30%) Minimize downtime between services;
- (30%) Minimize the number of vehicles needed to fulfill the services.

- Constraint:

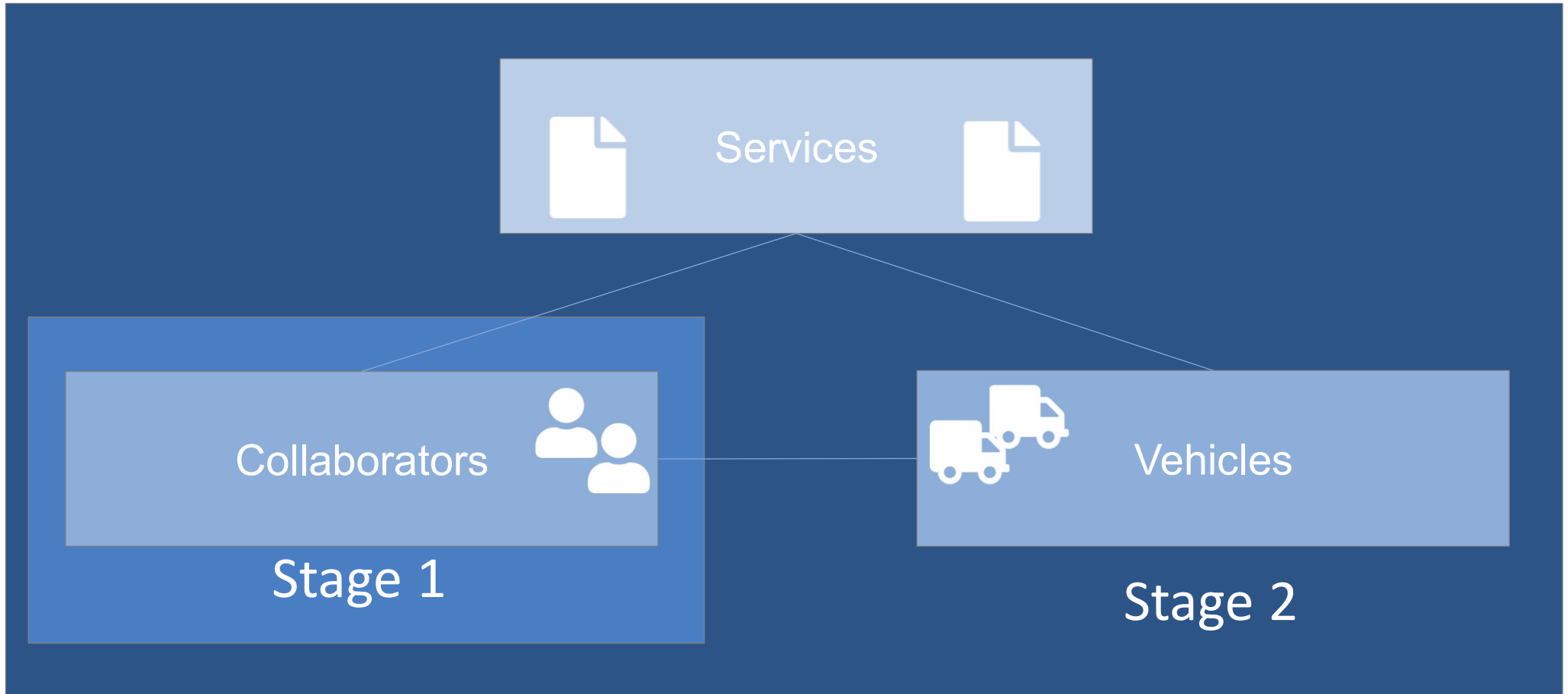
- The vehicle **cannot travel longer** than **14 hours** per day.

Architecture



Stage 1

Architecture



Services

- **Id:**
 - Identifier.
- **Date:**
 - Service date.
- **Start:**
 - Service start time.
- **End:**
 - Service end time.
- **CollaboratorSkills:**
 - Collaborator skill (to be assigned a service, the collaborator's and service's skill must be the same).
- **VehicleSkills:**
 - Vehicle skill (to be assigned a service, the skill of the vehicle and the service must be the same).
- **Quantity:**
 - Minimum required capacity (to be assigned a service, capacity must be less than or equal to the vehicle's capacity).

Collaborators

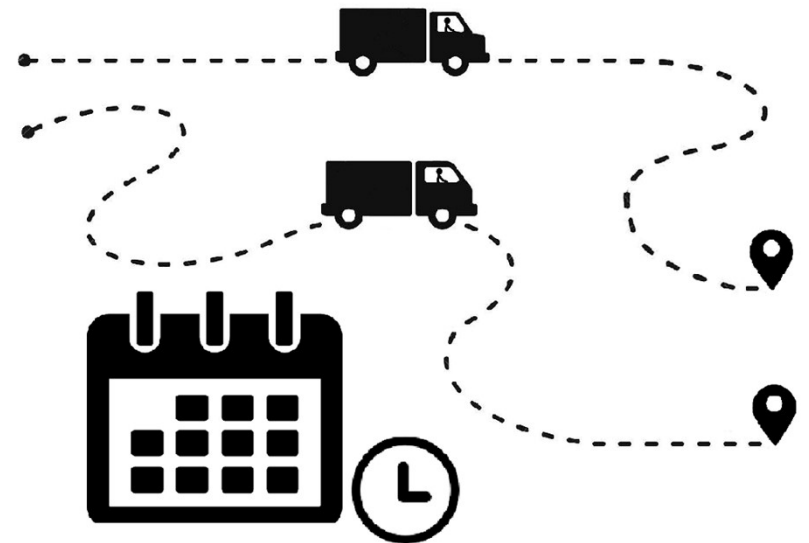
- **Id:**
 - Identifier.
- **Skills:**
 - Collaborator skill (to be assigned a service, the service and collaborator skill must be the same).
- **CollaboratorSchedules:**
 - Collaborator schedule (to be assigned a collaborator schedule).
- **ExtraHours :**
 - Extra Hours (to be assigned a collaborator schedule).

Vehicles

- **Id:**
 - Identifier.
- **Skills:**
 - Vehicle skill (to be assigned a service, the service and vehicle skill must be the same).
- **Capacity:**
 - Vehicle capacity.
- **MaximumWorkingHours:**
 - Maximum working hours per day.

Output

- Working Hours per Employee:
 - IdCollaborator
 - List:
 - IdService
 - IdVehicle



Ready for the ESGI challenge?

- Link to get the file with the data:
 - <https://tinyurl.com/yc8a6xpv>
- Any questions and File submission?
 - Send email to:
 - tiago.rodriques@tecmic.pt
 - joao.domingos@tecmic.pt

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Thank you

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