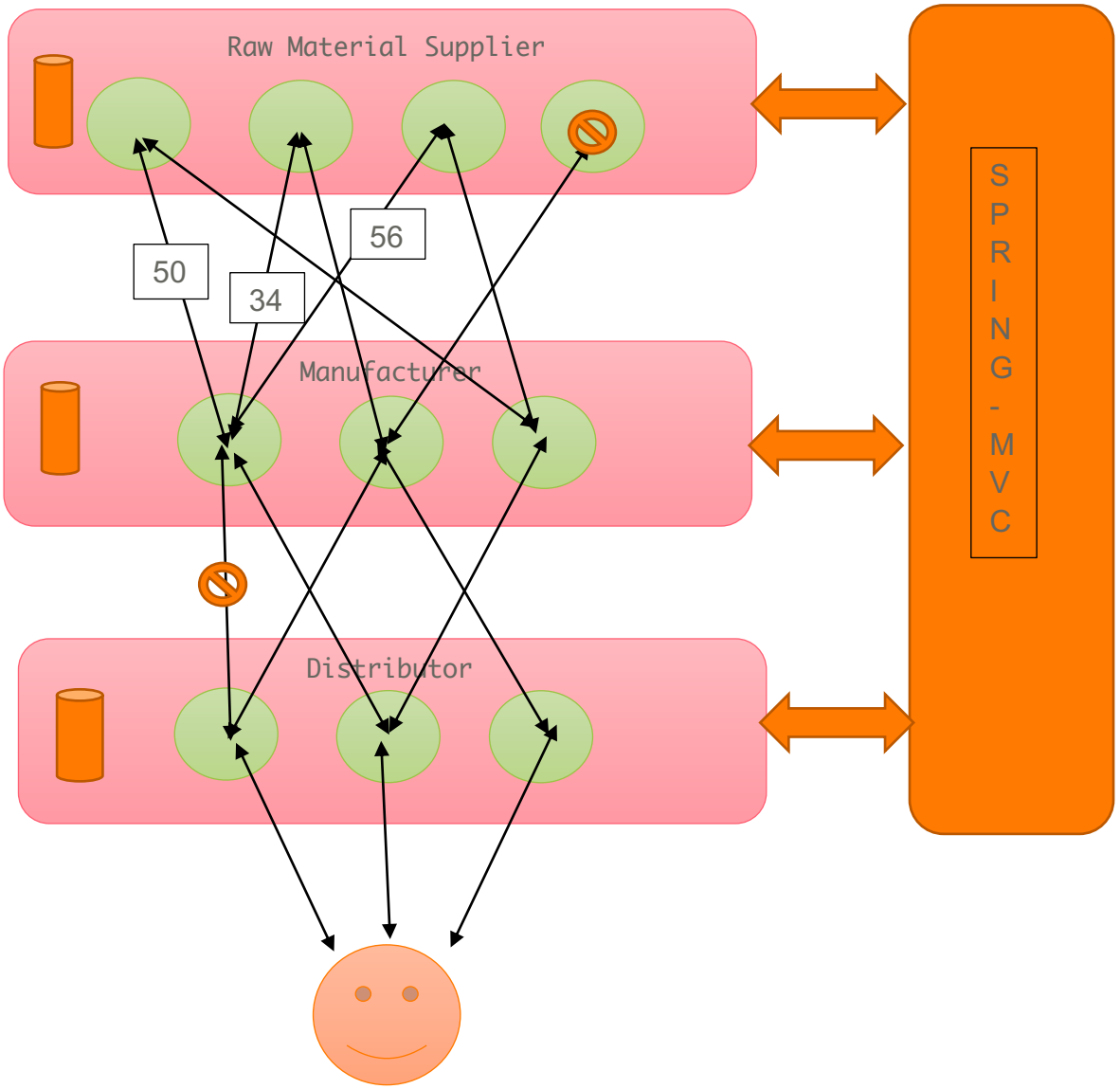
INFO 6250 – Web Tools Tech.

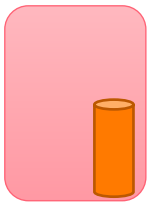
Supply Chain Issues:

AIM: Create a system which interacts with multiple entities (Raw Material Supplier / Manufacturer / Distributor / Consumer) and choose the best solutions to send goods/services to the end customer based on various supply chain issues.

Suggested Architecture:



Terminology:



- Entity (Raw Material Supplier / Manufacturer / Distributor)
- Spring BOOT + Spring REST + Spring JPA + Database

- Sub-Entity (Single)

Question to ask yourself? How will you configure multiple sub-entity within the main entity?

1. Database Column
   OR
2. Database Tables
   OR
3. Create each sub-entity as Spring Boot Application

Topics: Multi-Tenant Architecture, Spring Microservices

- Supply Chain Connection (Distance , Mode of Transporation, Time [Can be calculated based on Distance and Mode], Supply Chain Issues …etc)

- Weight Average

- Sub-Entity is not available or Connection is not available

- Front End Technology communicating with Spring Boot Application via REST API

- Front End Technology – Spring MVC

Use Cases for B+:

Raw Material Supplier (Minimum 3 Sub-Entity):

1) Manger for each Sub-Entity Level
    a. Creates
        i. Availability Units
        ii. Cost
    b. Confirms Order to be sent to Manufacture

2) Plant Manager - Configuring Supply Chain Issues
    a. Can be done at sub-entity, entity level

3) Admin
    a. Register Manger and Plant Manager
        i. Username, Password, Email Address, Phone Number, Full Address (Address Line1, City , State , Country)

Manufacture (Minimum 3 Sub-Entity)

1) Procurement Manager at each Sub-Entity Level
    a. Views available Raw Material and places orders bases on system recommendation. (which is best sub-entity to order from based on your supply chain configuration from manufacture-to-raw-material-supplier)

2) Production Manger at each Sub-Entity Level
    a. Create Product from Raw Material Available and set cost and availability
    Eg: 50 Computer Chips manufactures 50 Laptops or
    100 Kgs Steel + 200 chips manufacture 50 Cars
    [Do not over complicate this creation process]

3) Supply Manager
    a. Confirms order to Distributor

4) Admin
    a. Registers above roles (Reuse code and fields from above)

Distributor (Minimum 2 Sub-Entity)

a) Distributor Manager
    a. View available product and places orders based on system recommendation
       Note: System should automatically manage total number of product available based
    b. View Current inventory
    c. Confirms order to Customer

b) Admin
    a. Registers above roles (Reuse code and fields from above)

Customer

a) Searches for product availability
    a. If product is available in-store(distributor), display cost and time to ship
    b. If product is out of stock, display cost and time to ship (based on best route)

Notes:

a) In project submission document and final explain what all issues are you trying to solve and how your system solves these issues.

b) Supply Chain Issue: Snow Storm/Hurricane, Labor Shortage, Production Issue due to Energy Shortage or Equipment Failure, Geo Political Issues.
   Hint: Your system should simulate this via Flag (Boolean) or Percentage or … this will help you calculate the weight of your arrows.

c) How to solve production issues, order from multiple sub-entity.
d) Additional Reading Material

https://www.researchgate.net/publication/327739568_A_graph_theory-based_algorithm_for_a_multi-echelon_multi-period_responsive_supply_chain_network_design_with_lateral-transshipments#:~:text=Graph%20theory%20is%20used%20to,commercial%20solver%20on%20test%20problems.

Use Cases for A- and A:

Technology

- Using React JS
- Using Spring Security (Self Learning)
- Using Dockers

Business Issues

- How will your system behave if sub-standard material is detected or if there is a recall issued?
- Can you add a sub-entity programmatically?
- Any trends visible or reports about your system
- Connect to a 3rd party API provider to help you predict best routes
- Any other idea you would like to showcase.

Note: Solving of Business Issue should be higher priority vs technology.