



# Food Waste Management

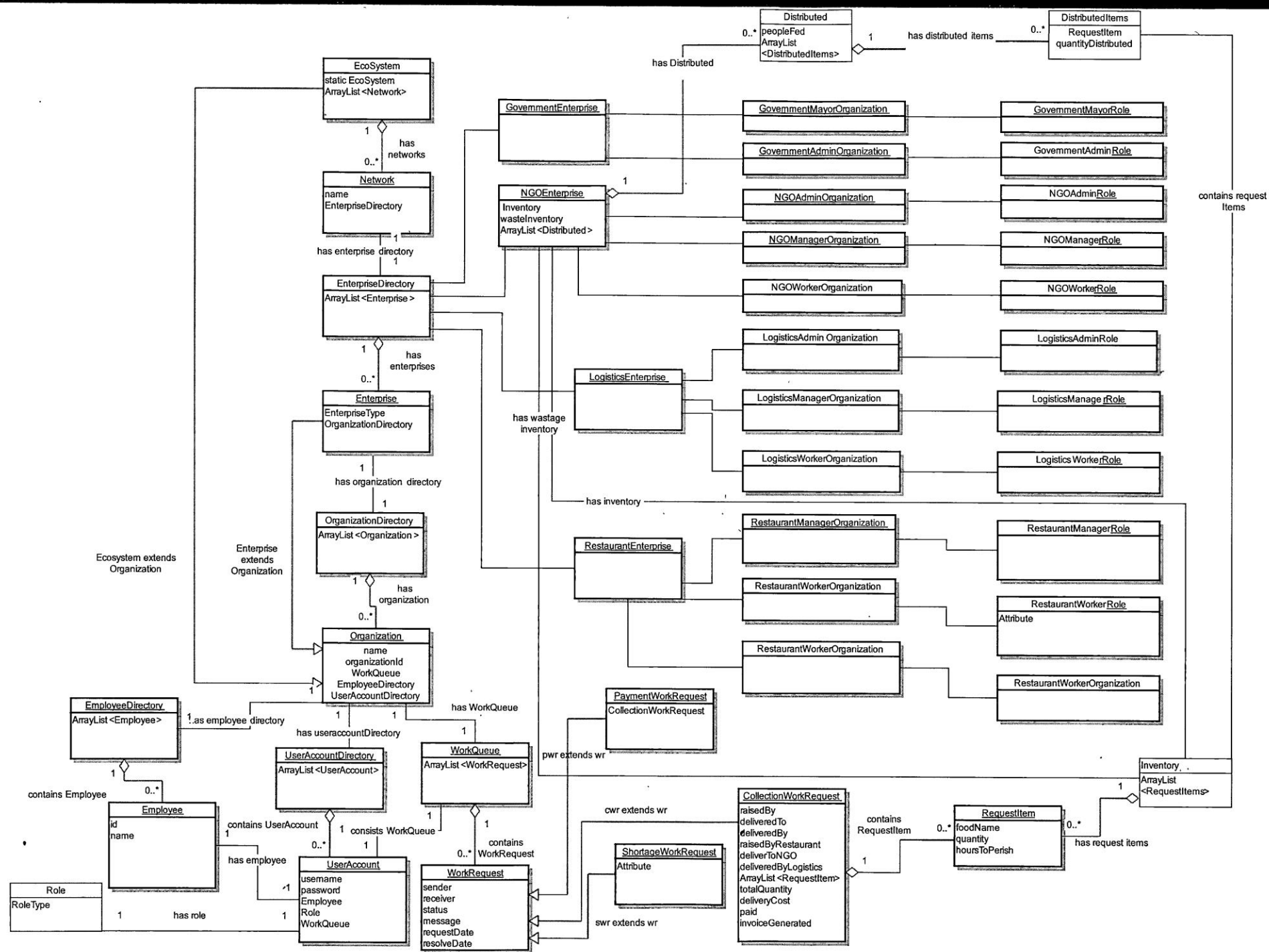
# Problem Statement

- Food wastage is a massive problem and one of the most overlooked thing in today's world
- One third of all food produced in the world goes to waste
- Some restaurants/cafés have a policy to not serve food from previous day, despite being perfectly edible. This is all thrown away as "waste", at the end of day.
- Roughly \$400B in food ends up in landfills every year resulting in 3.3 billion metric tons of greenhouse gases annually which has multiple effects on the world. (ref: <http://foodtechconnect.com/2015/10/09/10-startups-reducing-food-waste-one-byte-at-a-time/>)
- At the same time, worldwide nearly 800 million people do not have enough to eat. That means one in nine people are suffering from hunger. Hunger and malnutrition are the number one risk to health worldwide. (ref: <https://www.foodbanking.org/hunger-food-banking/about-hunger/global-hunger>)
- Our application provides a way to bridge the gap between the wastage and deficit, by letting restaurants donate this food to NGOs, who in turn can feed the needy

# Approach

- We have designed a system to curb the wastage by managing the flow of food going waste by redirecting it from the restaurants to the needy people
- For this we have different organizations like Restaurants, NGOs, Logistics who working in unison to achieve this goal
- Restaurants raise requests for food collection, which are passed onto all NGOs within the network
- These requests must however contain food which are not going to be perished immediately(show be consumable at least 4 hours)
- Based upon the feasibility of the request, any NGO can pick-up the request and assign it to any logistics partner within the network
- These logistics organizations then complete the pick-up from the requested restaurant, and deliver it to the requested NGO
- NGOs can also raise a request with other NGOs within the network for an inventory shortage, and subsequently any NGO can then redirect restaurant requests to the particular NGO facing shortages
- Logistics charges the requesting NGO for the deliveries, sending them invoices which are then paid for by the NGO
- A Mayor can view all the activities within the different Enterprises in their network (Like amount of food wastage avoided by restaurants, people fed by NGO, expenses incurred by them in doing so, etc.)

# Object Model



aft saved at 17:40:07

# Use Case

## Use Case 1 : Collection Request

- A restaurant/café worker creates a collection request for excess food, which is then sent across to all the NGOs within the network
- An NGO manager can view all the request raised by restaurants for pick-up and assign it to an employee in their enterprise, who will then proceed with the collection of the delivery and updating the inventory
- If the NGO manager feels they have sufficient food in the inventory and sees a shortage request from other NGO, they can directly assign it to the NGO for further processing
- After either of the 2 cases, the request is then forwarded to logistics manager's queue
- Any logistics manager can pickup the request and assign it to one of their employee
- The said employee then picks up the package from the requested restaurant and delivers it to the NGO
- A delivery cost is assigned to the on delivery completion
- The NGO worker collecting this request then updates the enterprises' inventory with the food delivered



## Login Panel

User Name: dbw1

Password: \*\*\*\*

Login

Logout

## Restaurant Worker Work Area - Collection Request

### Add Food Items :

Food Type: Sandwich

Quantity: 1

Hours to perish\*: 4

\* Considering the logistics, we only accept food which would last for atleast 4 hours.

Add

Food Type	Quantity	Hours to perish
Eggs	4	10

Remove

Message: Eggs

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Raise Request

# Use Case

## **Use Case 2 : Invoice Request**

- After a successful delivery, a delivery cost is provided against it
- A Logistics manager can then generate an invoice for all successful deliveries made by their enterprise, to a particular NGO
- This request is then forwarded to the respective NGO's manager who would then be responsible for the payment of the same



## Login Panel

User Name:

Password:

Login

Logout

## Logistics Manager Work Area - Generate Invoices

NGO Name:

Job Completion ...	Request Status	Cost	Invoice Generated	Paid
Sun Dec 11 13:2...	Inventory Update...	\$10.23	Yes	Yes
Sat Dec 10 16:5...	Inventory Update...	\$13.0	Yes	Yes
Sun Dec 11 13:2...	Inventory Update...	\$2.0	Yes	Yes
Sun Dec 11 13:2...	Inventory Update...	\$18.0	Yes	Yes

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Generate All Invoices


Generate Invoice



# Use Case

## Use Case 3 : Shortage Request

- An NGO manager while viewing the enterprises' inventory can raise a shortage request
- The manager also mentions an employee who would then follow-up on the request
- This request is then forwarded to all other NGO managers within the network
- An NGO manager can then redirect a particular collection request to an NGO facing a shortage
- The logistics and collection then proceeds like a usual collection request
- This collection request is linked to the original shortage request

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## Login Panel

User Name:

Password:

## NGO Manager - Shortage Request

Message:

Select Employee: 

nuhw1

# Use Case

## **Use Case 4 : Food distribution**

- Any NGO employee(worker) can distribute food to people from the collection.
- The employee can view the inventory, as well as the time before which the particular food item would perish
- This way, maximum wastage can be avoided
- The number of people fed are then updated after a particular distribution



## NGO Worker - Distriubute Food

Password: \*\*\*\*\*

Logout

Food Type	Quantity	Hours to Perish
Salad	5	6.25
Pizza	3	6.25
Salad	5	6.25
Sandwich	1	0.25

Quantity: 1

Add

Remove

People fed:	1
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Wastage Avoided:

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Confirm

# Use Case

## **Use Case 5 : Perishable time update**

- Whenever the application runs, it browses through all the requests raised and updates the perishable time on a particular food item
- Whenever a food item in an NGO's inventory is perished(i.e., time to perish becomes 0), then item moves from the inventory to the wastage inventory
- The wastage inventory helps keep track of the wastage in a particular NGO
- This can help in redirecting some requests to other NGOs who generally would face shortage of food



## Login Panel

User Name:

Password:

Login

Logout

## NGO Manager - Wastage Records

**Total Quantity :** 40.75 pounds

Food	Quantity	Wastage Amount(In po...
Pizza	4	12.0
Meat	2	4.0
Pizza	4	12.0
Eggs	1	1.0
Eggs	5	5.0
Pizza	2	6.0
Sandwich	1	0.75

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# Use Case

## Use Case 6 : Mayor

- A Mayor can view the interactions between the various enterprises within their network
- This would help them understand restaurants which donate their leftovers and help avoid wastages
- In terms of NGO, help understand which NGO is helping feed people
- Mayor can also check the expenses incurred by the NGOs in helping avoid wastages. This might help the Mayor allocate some funds to the NGO(future scope)



## Login Panel

User Name:

bgm

Password:

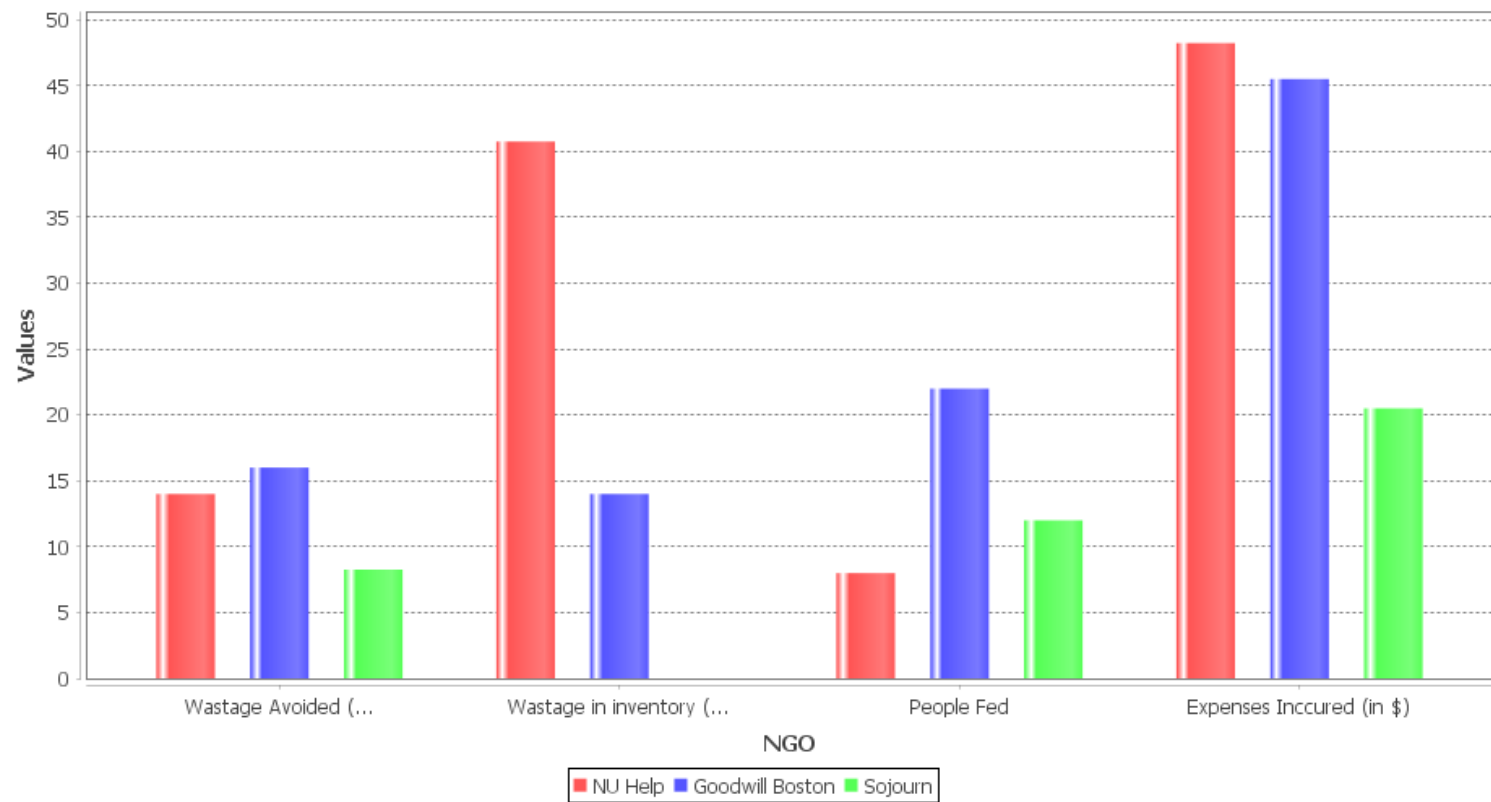
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Login

Logout

## Mayor Work Area - Poeple Fed By NGO Chart

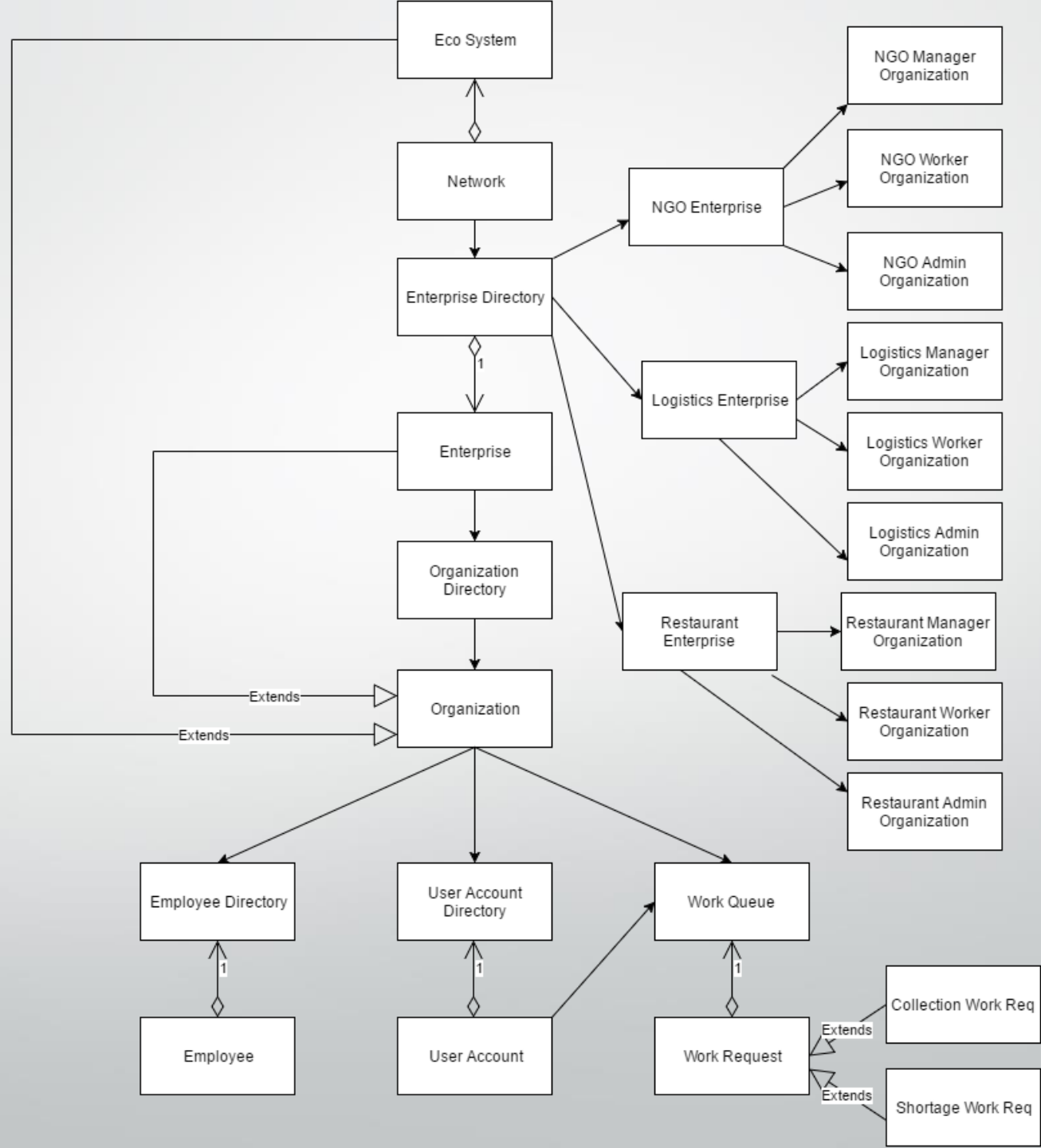
### Analysis report for NGO



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# Architecture Diagram



# Future Scope

- Instead of just restaurants/cafés we can also have people register themselves in the application to donate leftovers from parties/weddings
- Mayor can allocate funds to NGOs
- Ability to add non-perishable food. This can then be sent across to other network in case of any disasters resulting in shortage of food
- An ability of 1-1 tie-up between restaurant, NGO, and Logistics for pickups everyday