SMART INDIA HACKATHON '17

Ministry of Road Transport and Highways

#RH24

Weight of Vehicle

Team – Optimistic Squad

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PROBLEM STATEMENT

- An app which will use RC number to view the vehicle details, weight of vehicle and how much weight is allowed to load on vehicle. And also through app we can search for Truck Weigh in motion System. Alert to be sent to competent authority if the load is higher than legal limits through this app.

Proposed Solution

- The weight of the truck is obtained from the WIM system and is compared with the legal limits of that truck.
- if it exceeds, an alert is sent to the authority and the penalty is auto debited from the owner's bank account.

Why WIM

- Instant check for road legal weight
- Fully unattended weighing operation
- Weighs hundreds of vehicle daily
- Automatic recording of weight and images of vehicle
- Gross weight,axle weights,numbers of axles can be recorded

Focused on

- The total weight of the vehicles
- Each individual axle weight
- Numbers of axle of the vehicle
- Data and time of vehicle passed on the weigh in motion scale
- Images of the vehicle by using higher resolution cameras
- The vehicle number plate can also be recorded along with the weight of data
- Number of vehicles passed on the weigh in motion scale Speed of the Vehicle

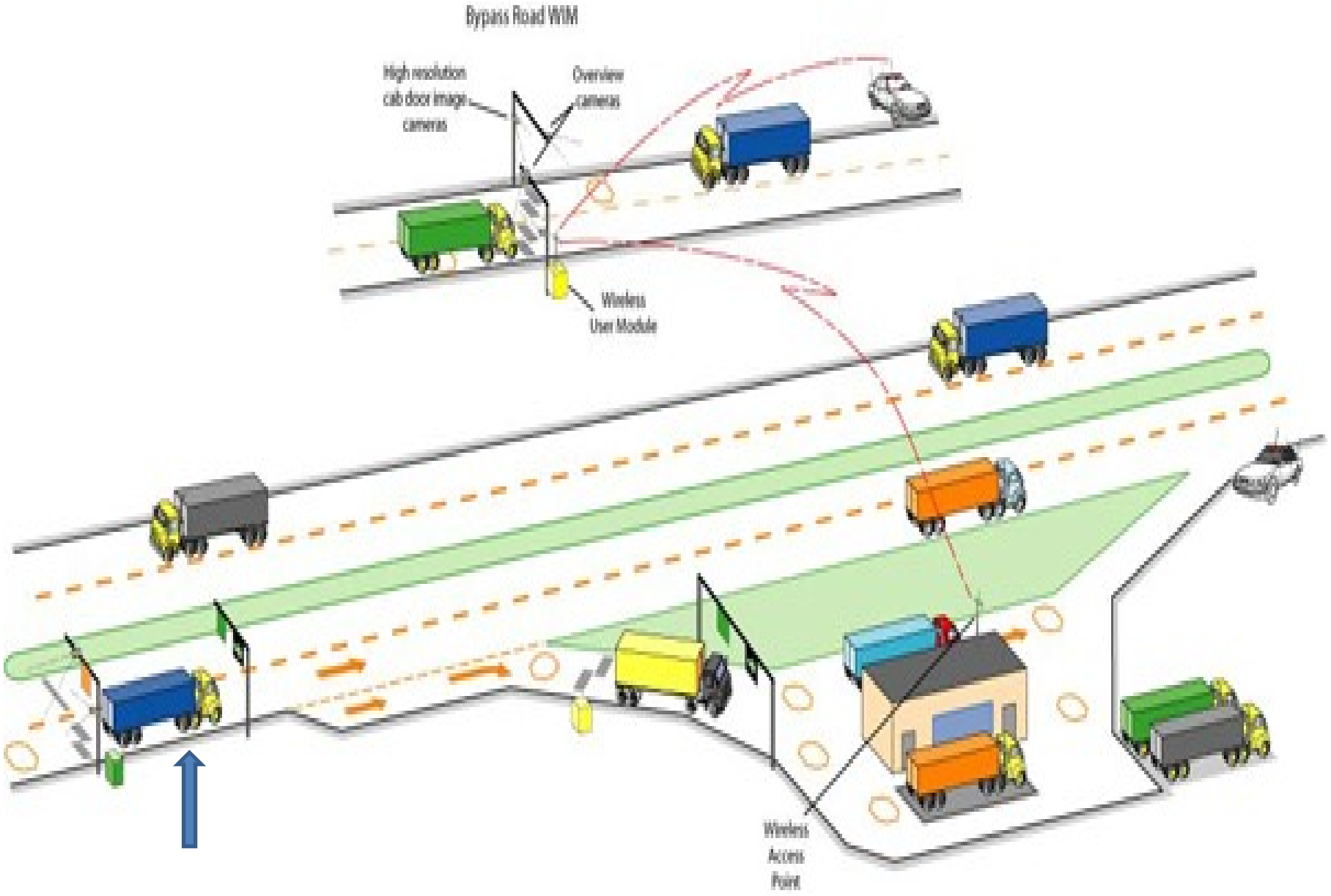
Features

- The Weight In Motion (WIM) system is to be installed in Toll gates.
- Integrating the WIM System with our proposed implementation
- Has
  1. Web Application at Toll Stations
  2. Official Mobile Application For RTO Authorities
  3. Hardware Detection System

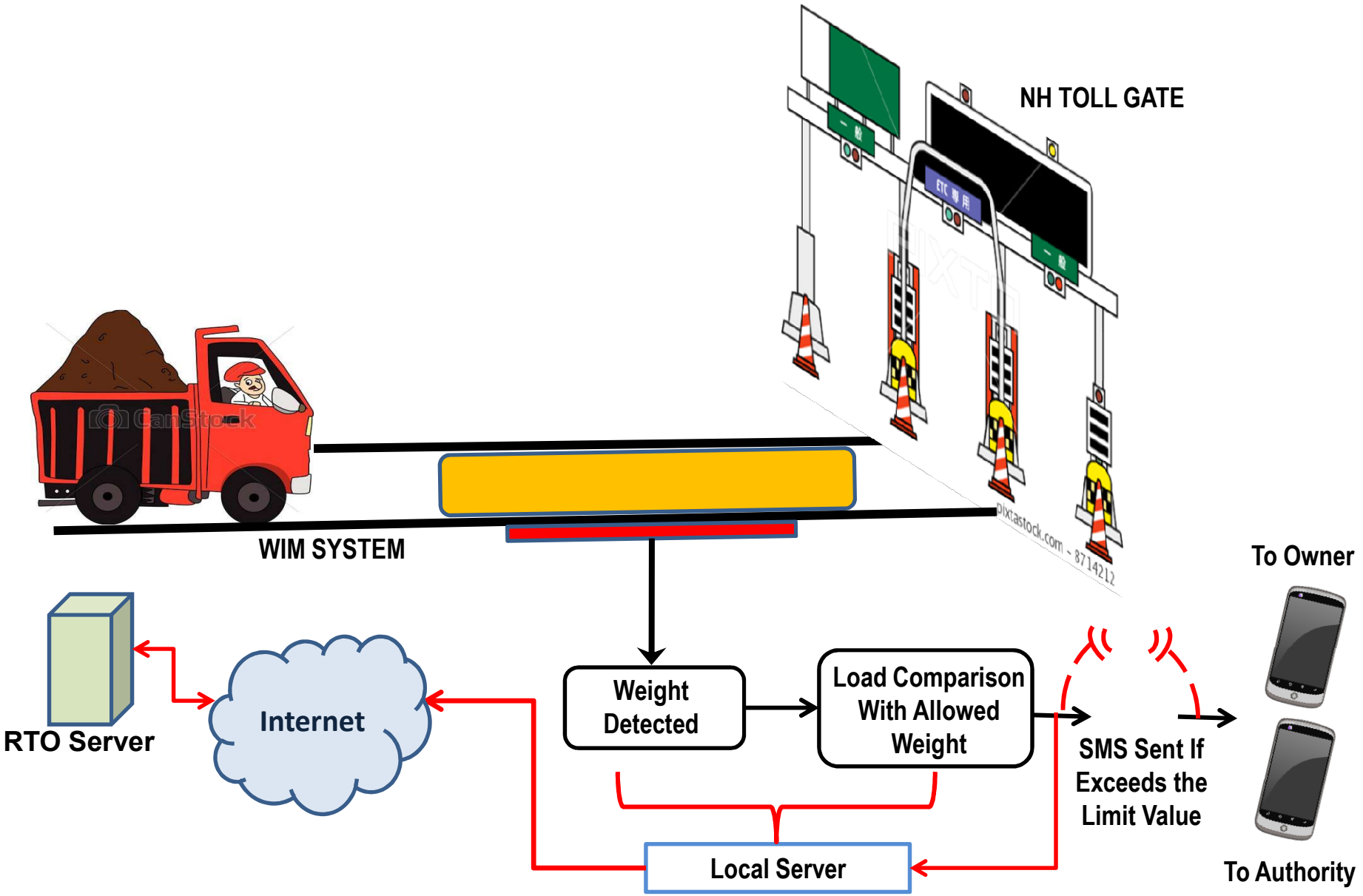
Innovative Solution

- Usage of RFID tags for all commercial vehicle.
  - The truck's Registration No.,
  - Vehicle Class,
  - Permit Type & Status,
  - Permit type of material,
  - Permited Location & Load
  - Made into a RFID tag, which is made visible on scanning it in the toll gates.
- In case of violation of permissible load or permit or material, then the SMS is pushed to the respective RTO authority as well the owner of the vehicle.
- In addition, the penalty is auto debited from owner's bank account.

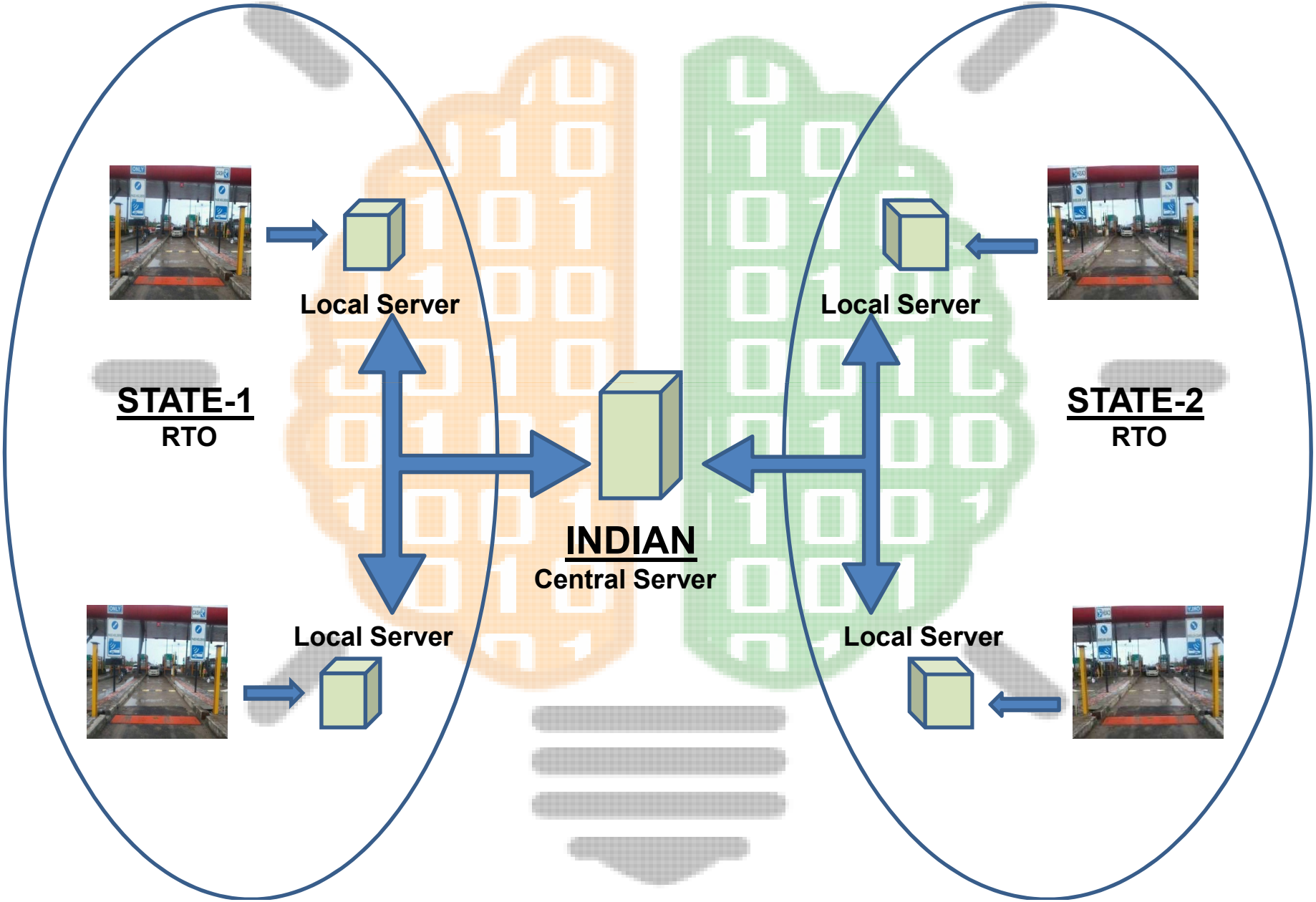
Idea behind


Bypass Road WIM
High resolution cab door image cameras
Overview cameras
Wireless User Module
Wireless Access Point

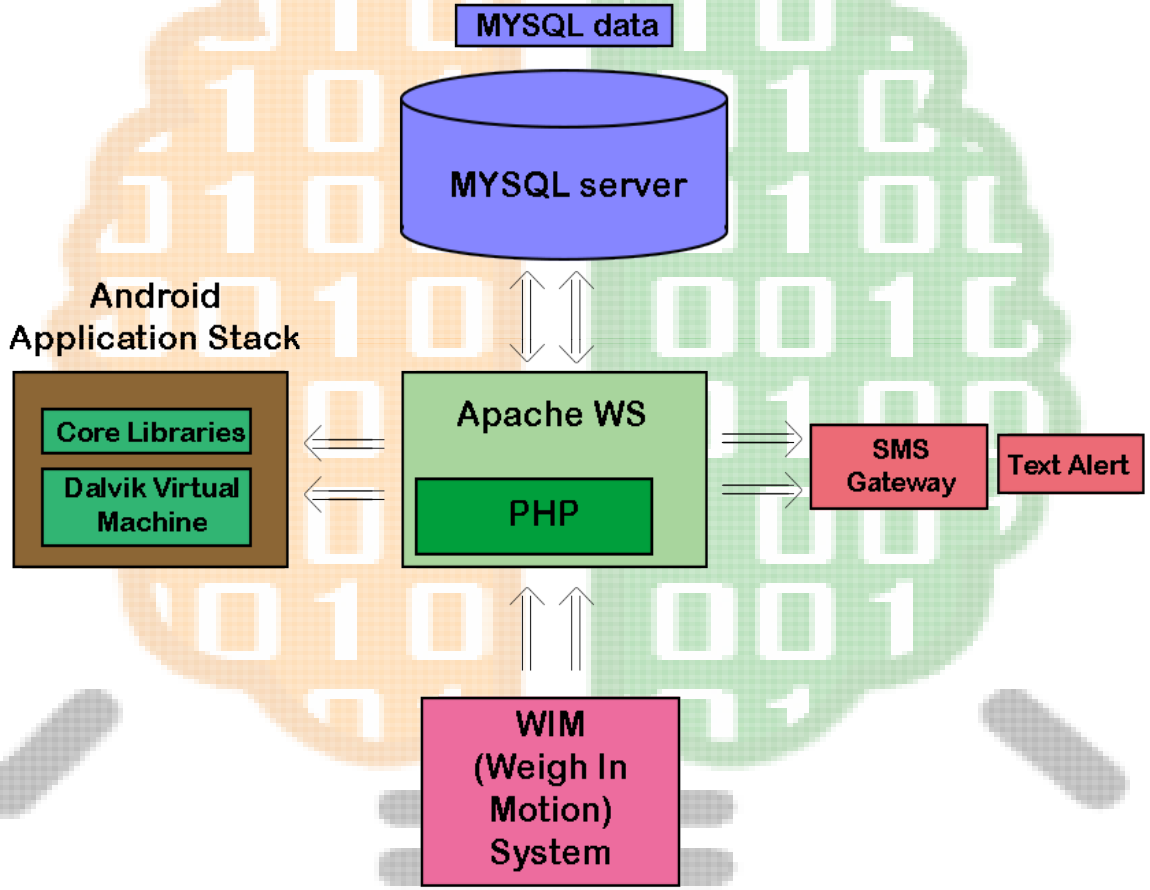
TRUCK ALERT WORKING PRINCIPLE



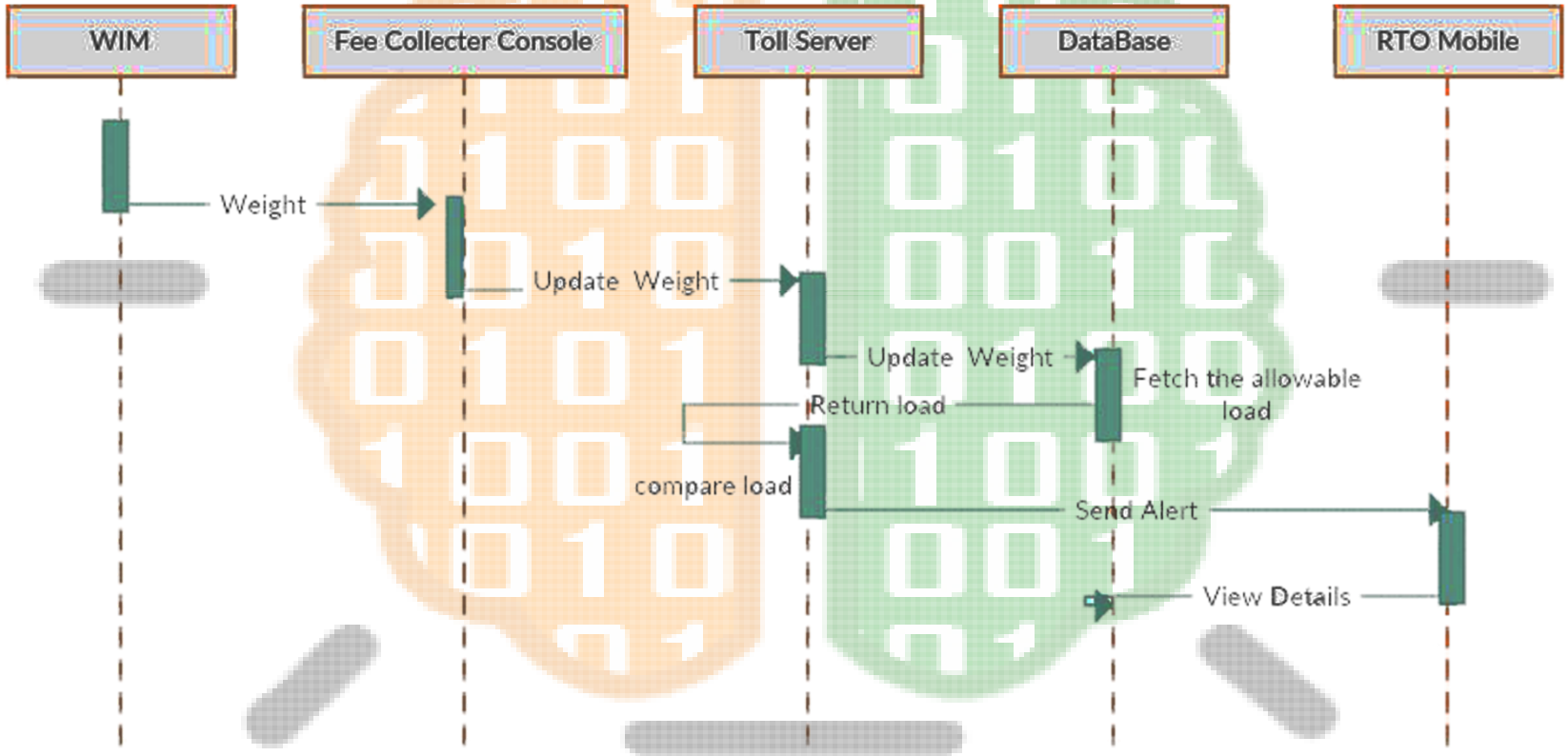
Deployment Model



TECHNOLOGY STACK



Detailed Design



Modules

- Weigh In Motion System(Prototype)
- Data Fetching Module from RTO Server
- Load, permit and permissible material carried related validations
- Updating the violation in the Central DB
- Push SMS to the RTO & Owner Mobile Unit
- Android APP for Ubiquitous Environment

Weigh In Motion System(Prototype)

- Arduino Uno Board and USB
- HX711-Load Cell Amplifier
- Load Cell (10KG)

DATA DICTIONARY

RTO

#	Name
1	reg_no
2	chasis
3	vehicle_class
4	owner_name
5	reg_date
6	capacity_seating
7	wt_unladen
8	laden
9	engine_number
10	body_type
11	manufacture_year
12	manufacture_month
13	phone
14	city
15	pincode
16	pan
17	purchase_date

TOLL GATE

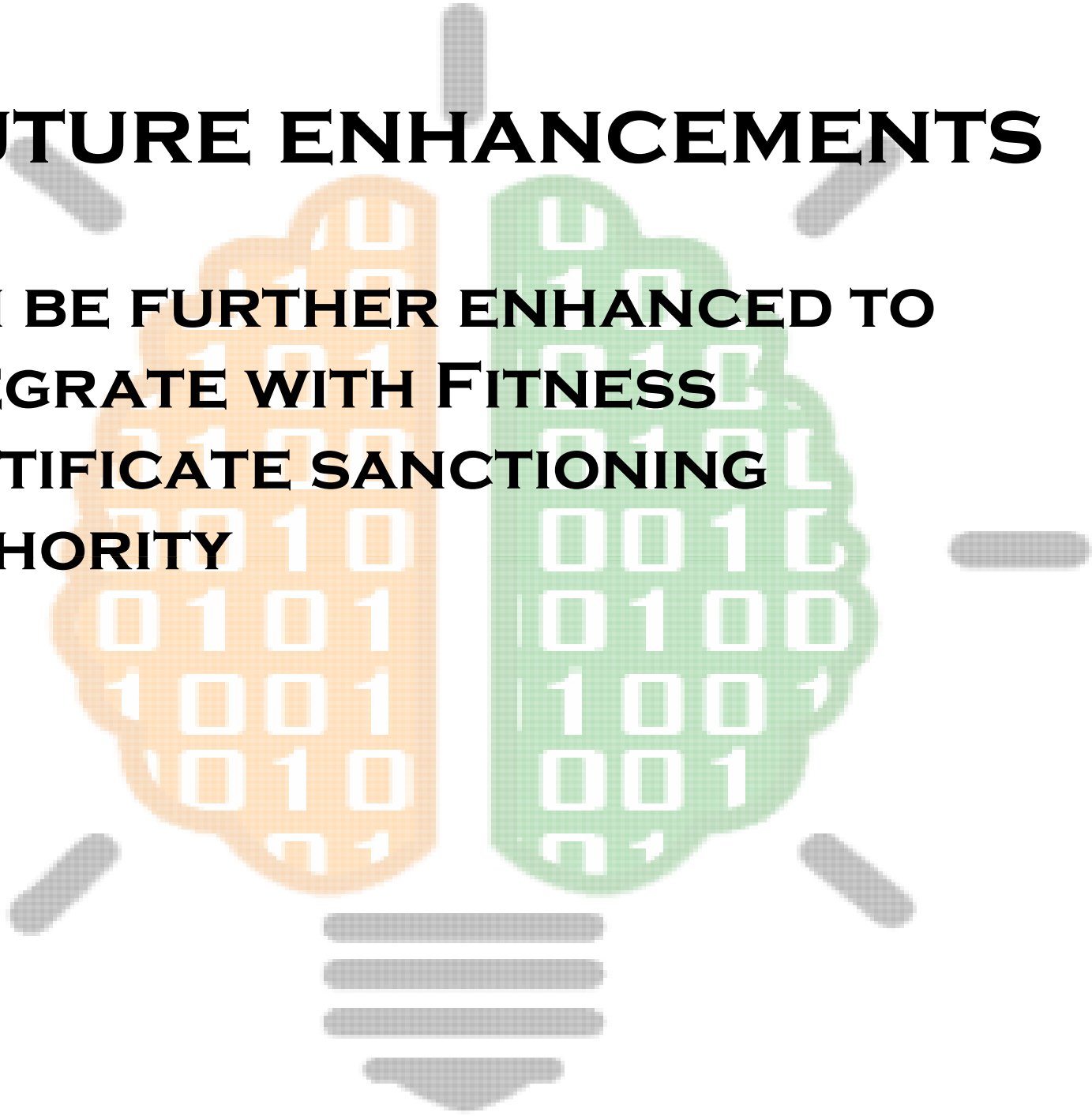
#	Name	Type	Collation	A
1	id	int(20)		
2	city	varchar(20)	latin1_swedish_ci	
3	vehicle_type	varchar(20)	latin1_swedish_ci	
4	reg_no	varchar(20)	latin1_swedish_ci	
5	lane_id	int(5)		
6	gross_wt	float		
7	max_wt	float		
8	axle	varchar(20)	latin1_swedish_ci	
9	veh_exceed	varchar(10)	latin1_swedish_ci	

TOOLS USED

- APACHE SERVER-3.2.2
- PHP & MYSQL
- Arduino IDE -1.8.1
- ANDROID STUDIO-2.
- WEB HOSTER- HOSTINGER.IN

Future enhancements

- Can be further enhanced to integrate with Fitness Certificate sanctioning Authority



Revenue Model

- Long Range RFID sensor can be used to cover per toll

  or

- Short range RFID sensor can be used per lane
- Revenue generated due to violation of rules is multifold compared to the deployment cost of the WIM System integrated with RFID.

Advantages of using WIM

- 95% accuracy is achieved using Piezo Electric sensors.
- Processing Rate is high.
- Safety of Roads.
- Continuous data processing.
- Increased coverage and lower cost.
- WIM can monitor truck traffic without alerting truck drivers - more truthful data.
- Dynamic loading data

Conclusion

- On integrating this innovation at all tolls
  - The road safety is increased
  - Damages caused by overloaded vehicles can be avoided
  - Revenue to the Road Highway department is increased