

Communication Based Rail Traffic Control with Cab Signaling

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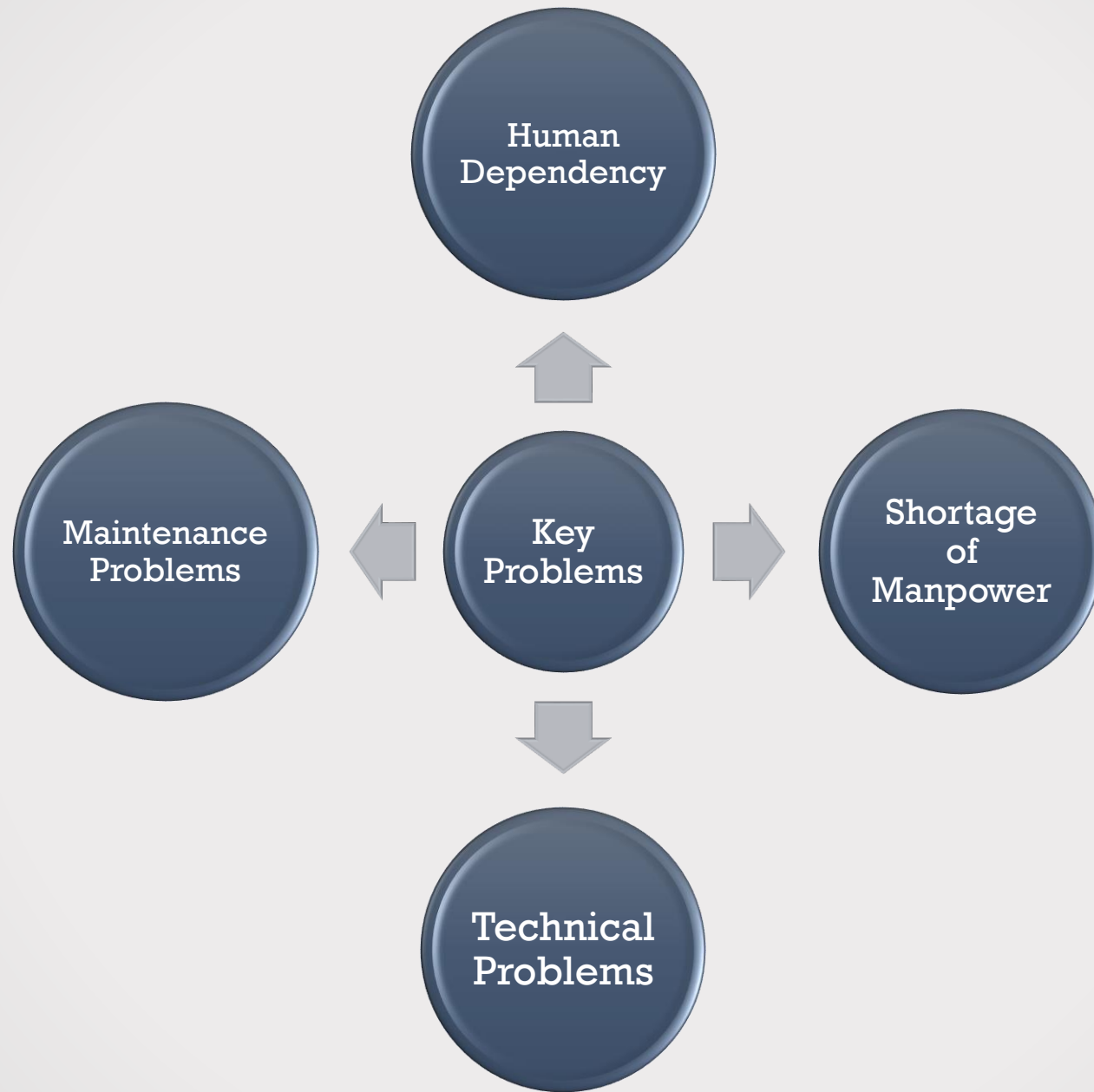
More or less 100 train accidents occur in Bangladesh each year



72% of these accidents are caused by human error



Technical failures also contribute to this problem



Our Solution

Microcontroller based system

Signalling using programmable RF module

Introducing IoT

Robotics based Emergency Braking System

Our solution is
comprised of 2
levels



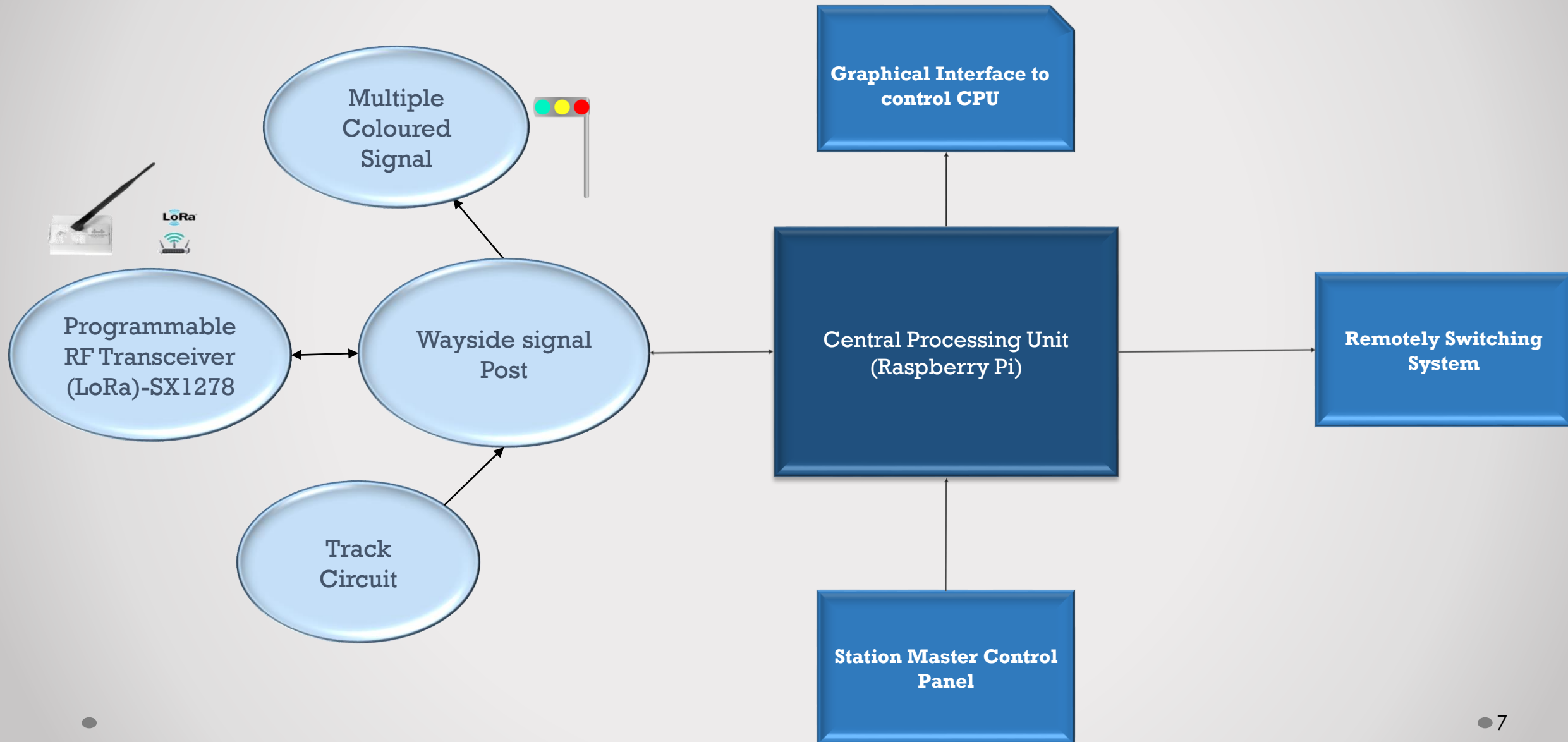
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graph TD; A[Our solution is comprised of 2 levels] --> B[Level 1: Basic cab signaling system]; B --> C[Level 2: Modified form of CBTC]
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Level 1: Basic cab
signaling system

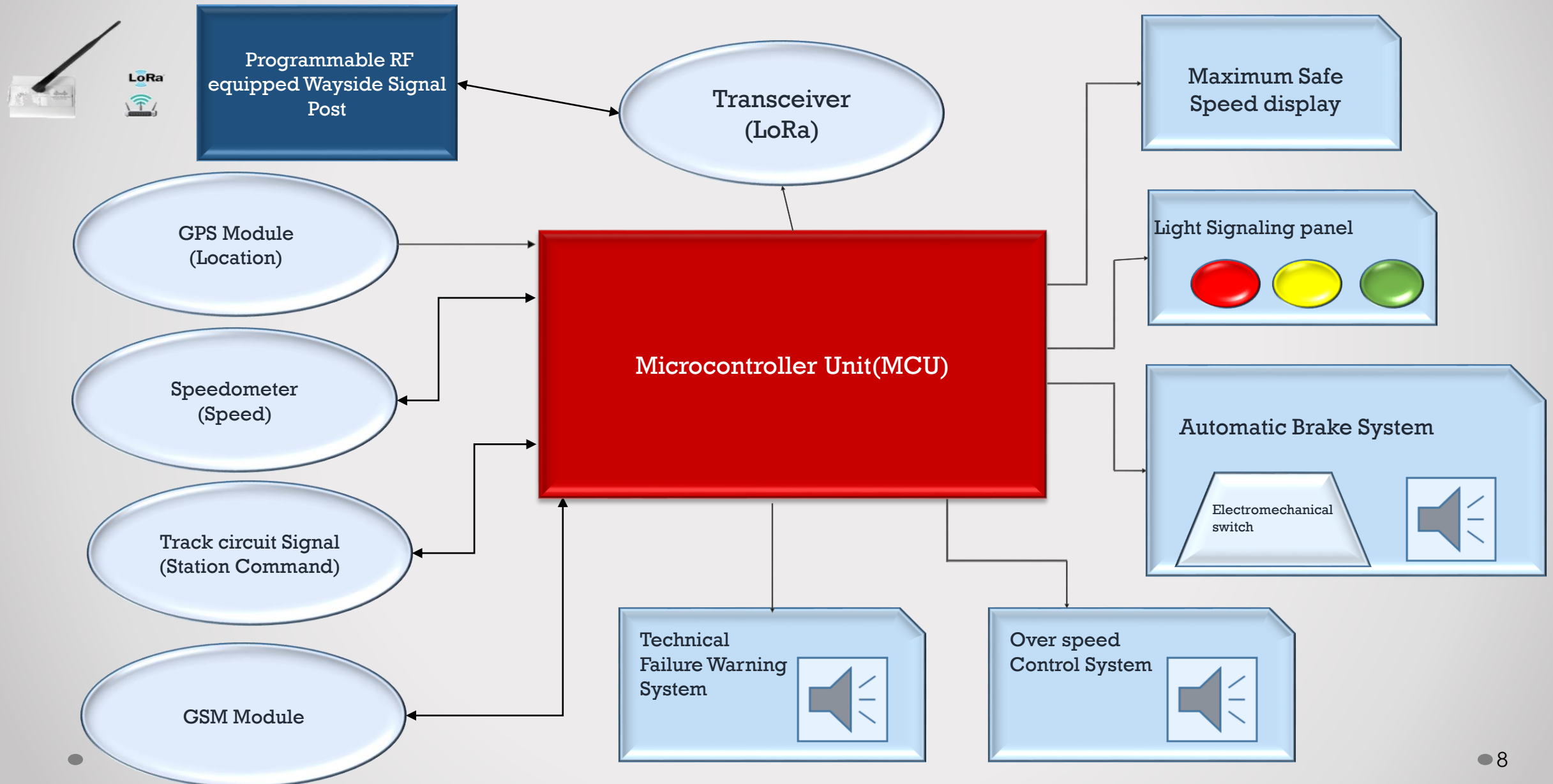
Level 2: Modified
form of CBTC

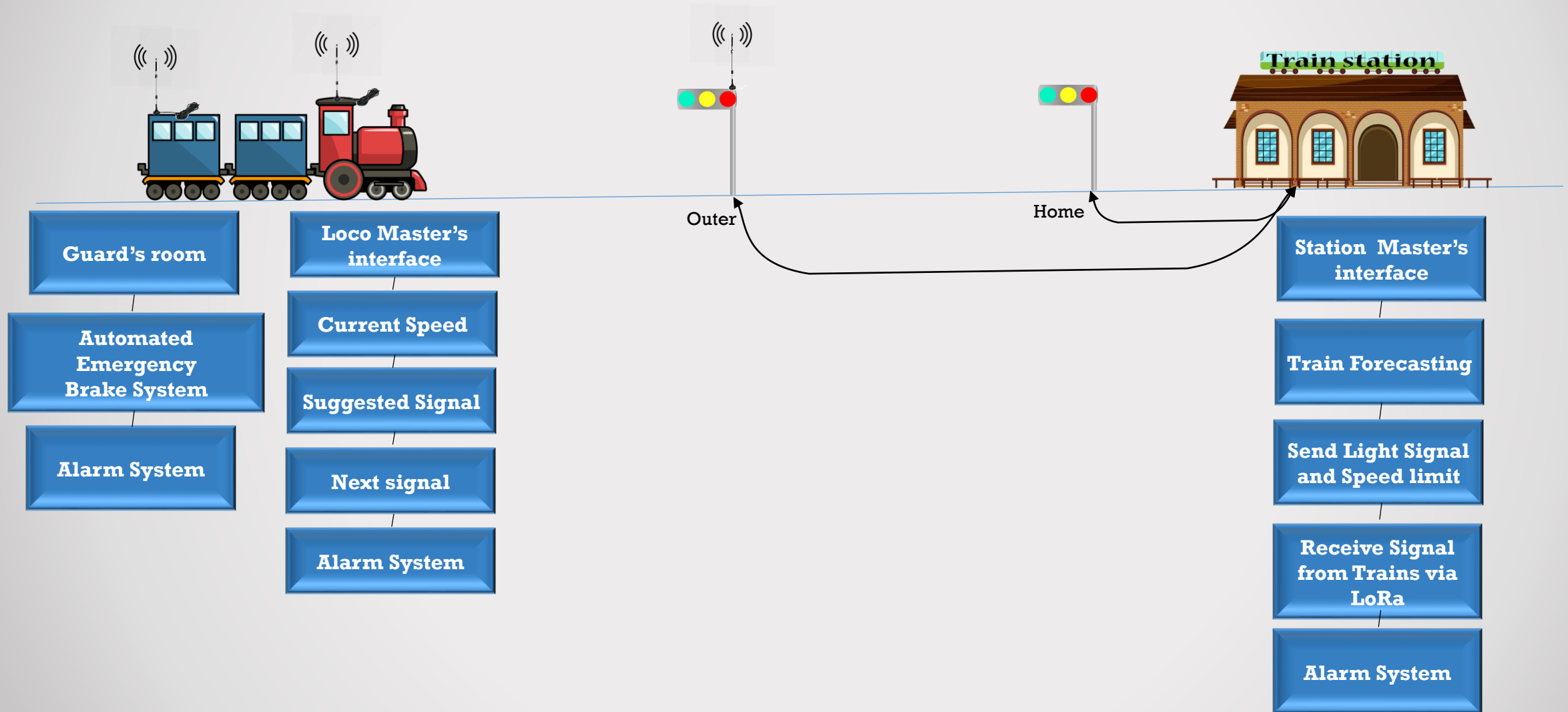


Station System Design(Level-1)



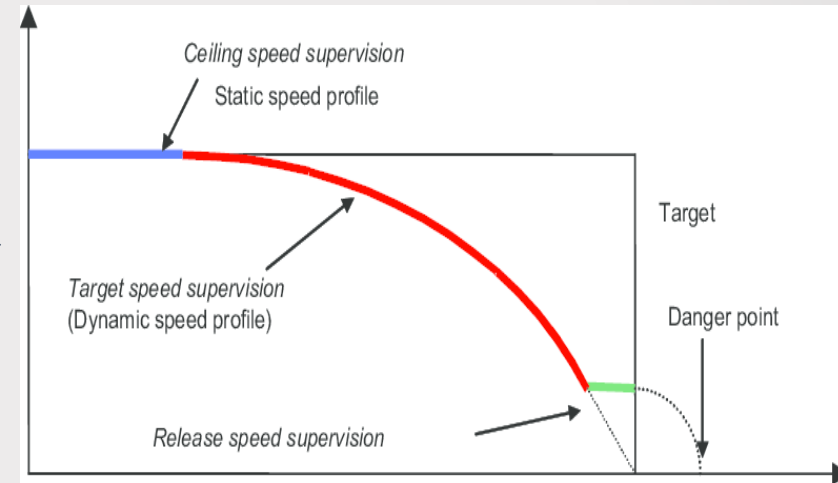
On board System Block Design for Loco Master(Level-1)





Error Check:

Braking Curve is updated at specific intervals

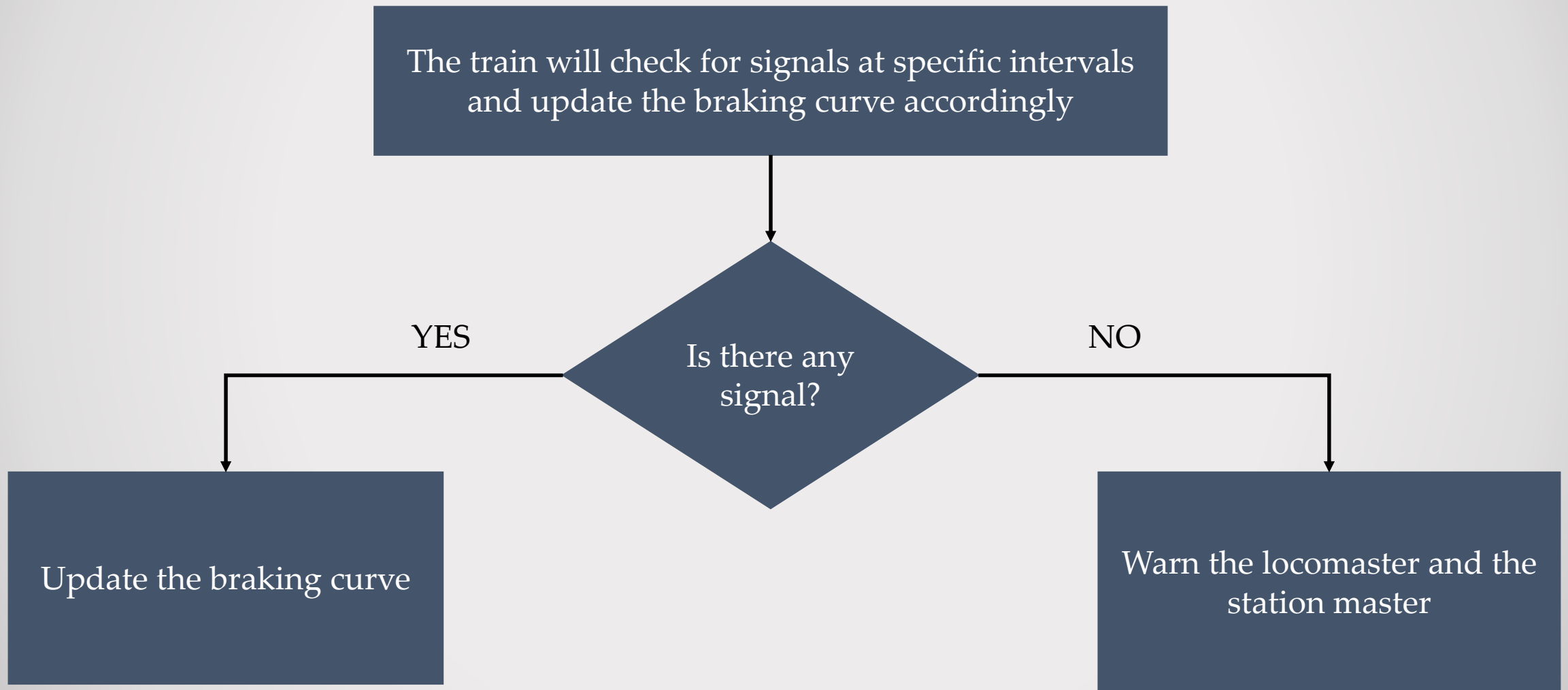


Detection of
connection failure

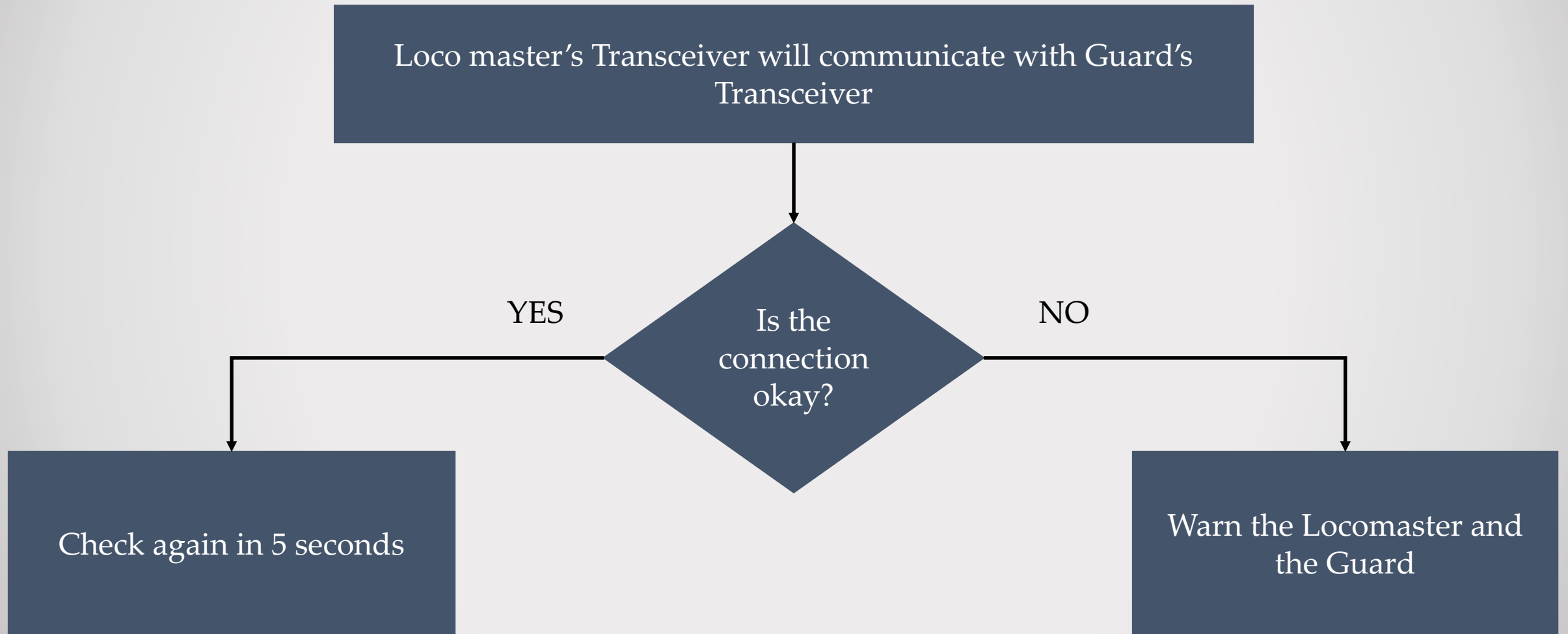
Alarming the Loco
Master, Guard and
Station Master

Manual Overwrite

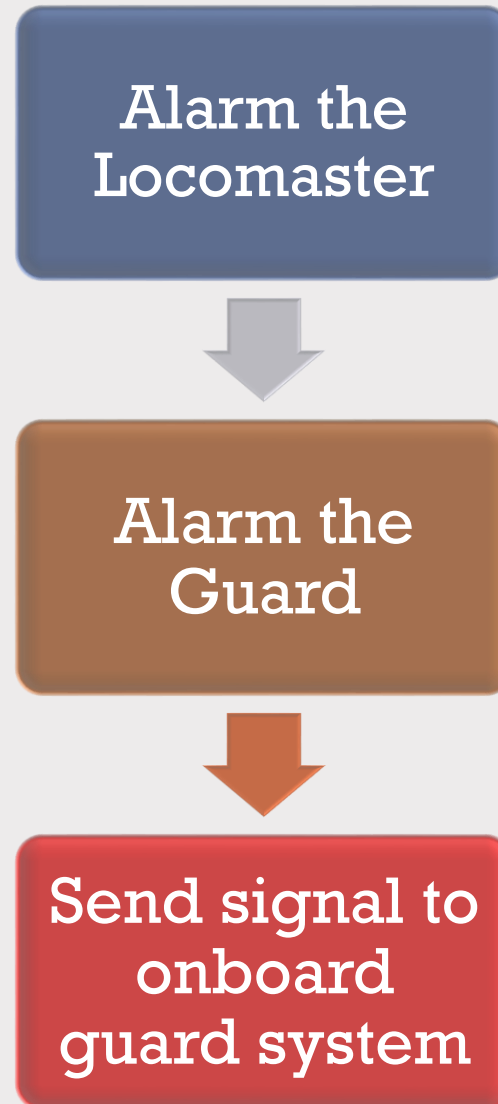
Detection of Connection failure



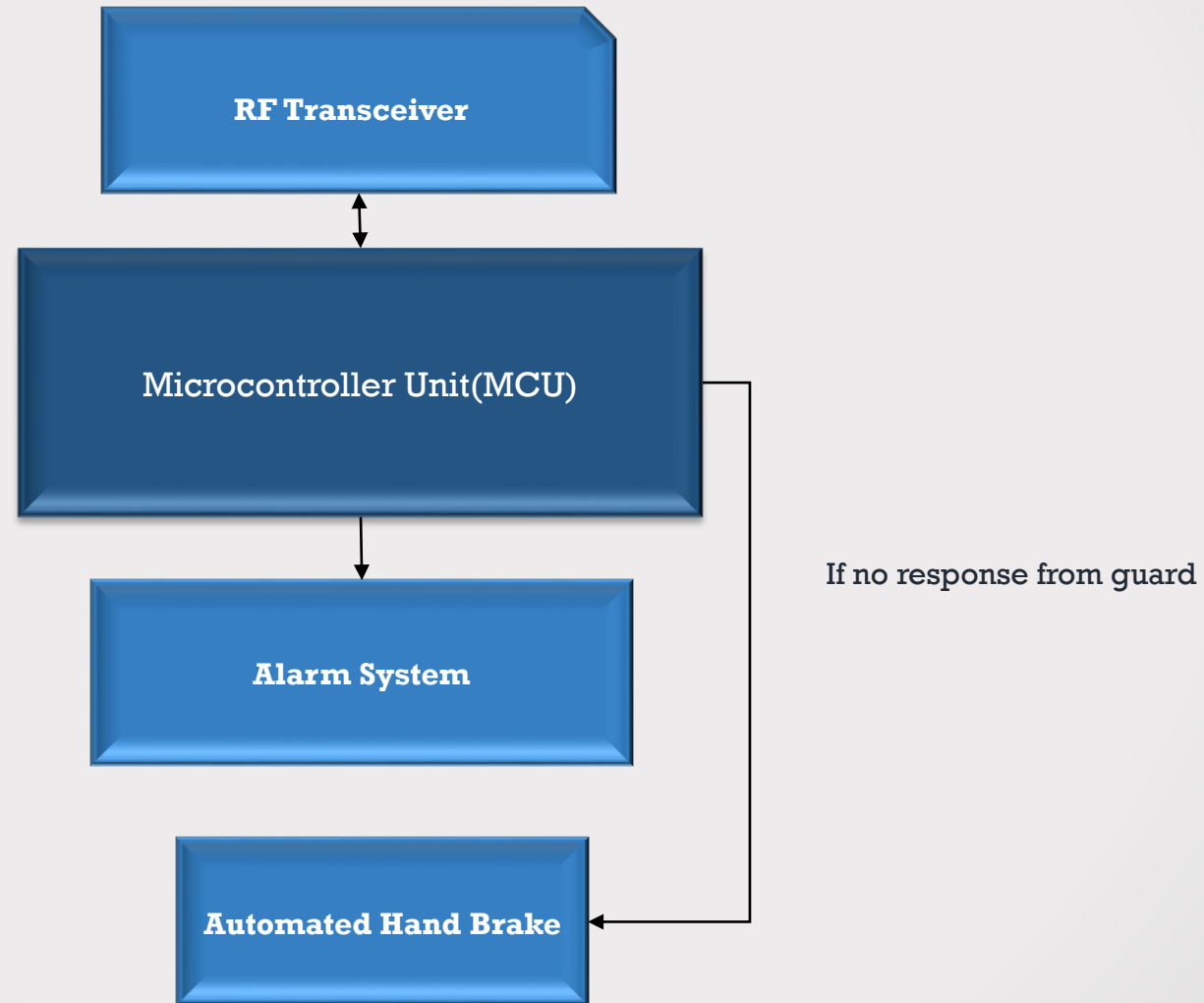
Detection of Connection Failure



What if the signal is overlooked?

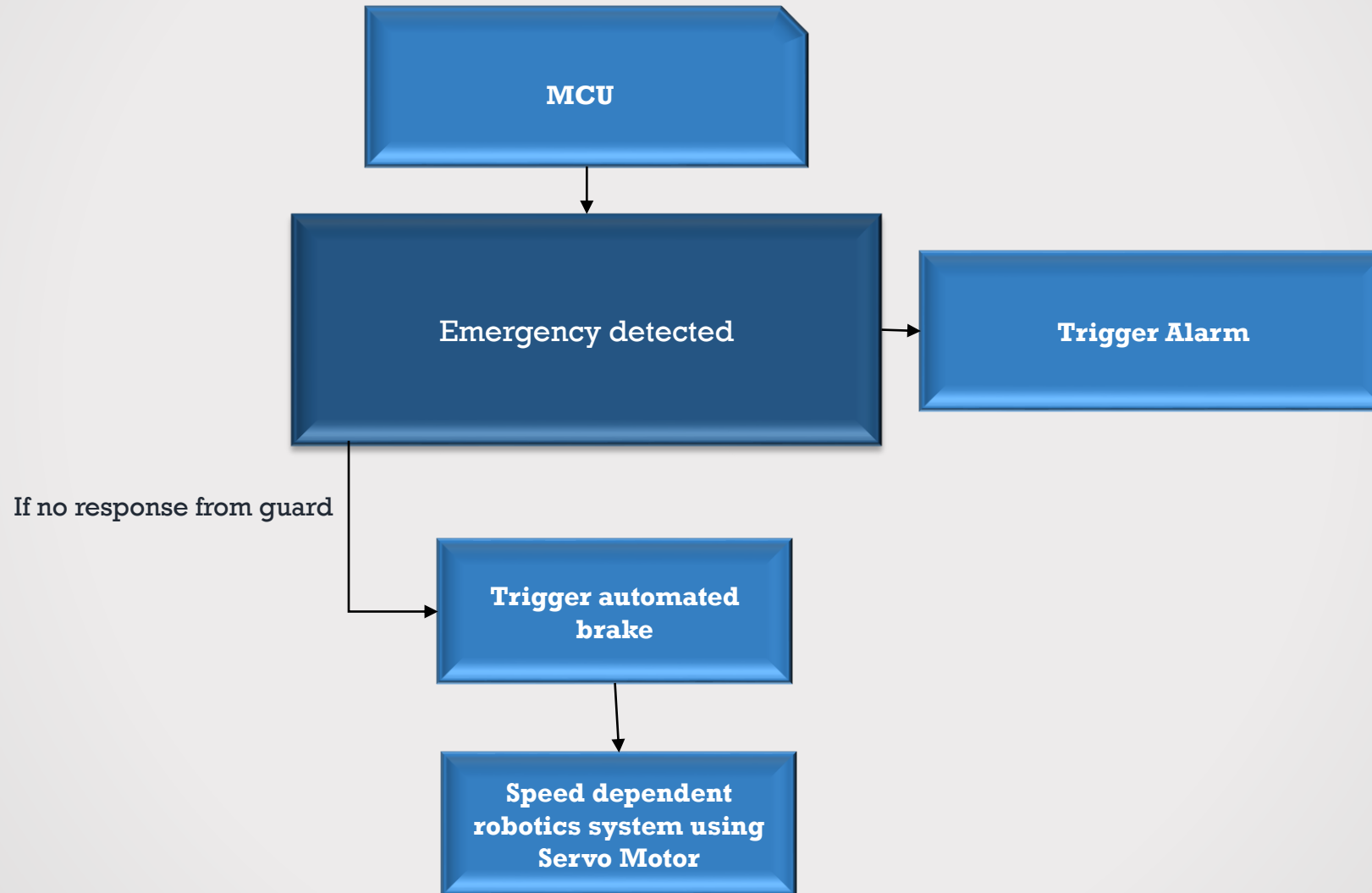


On board System Block Design for Guard(Level-1)



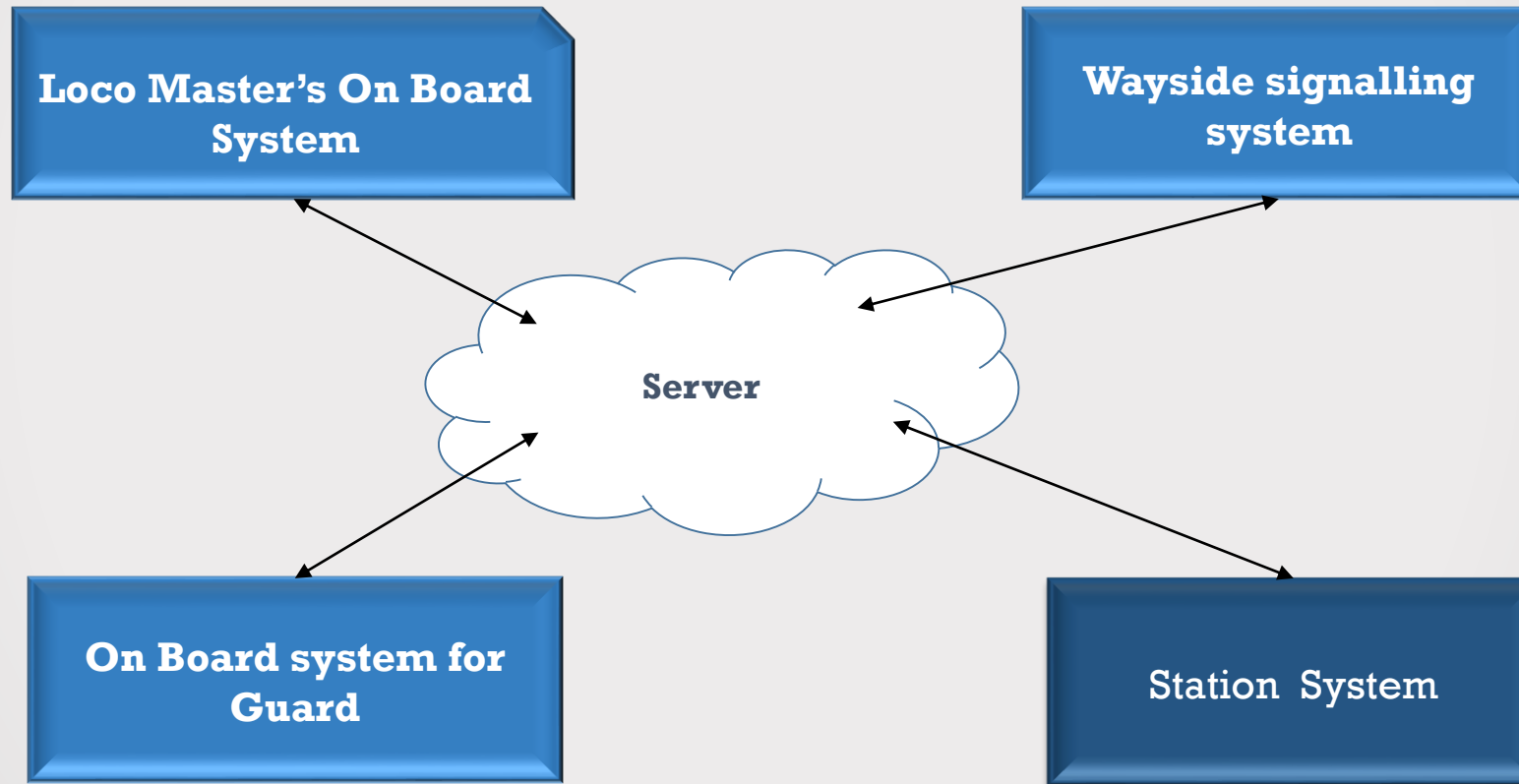
Automatic Braking System

Introducing robotics

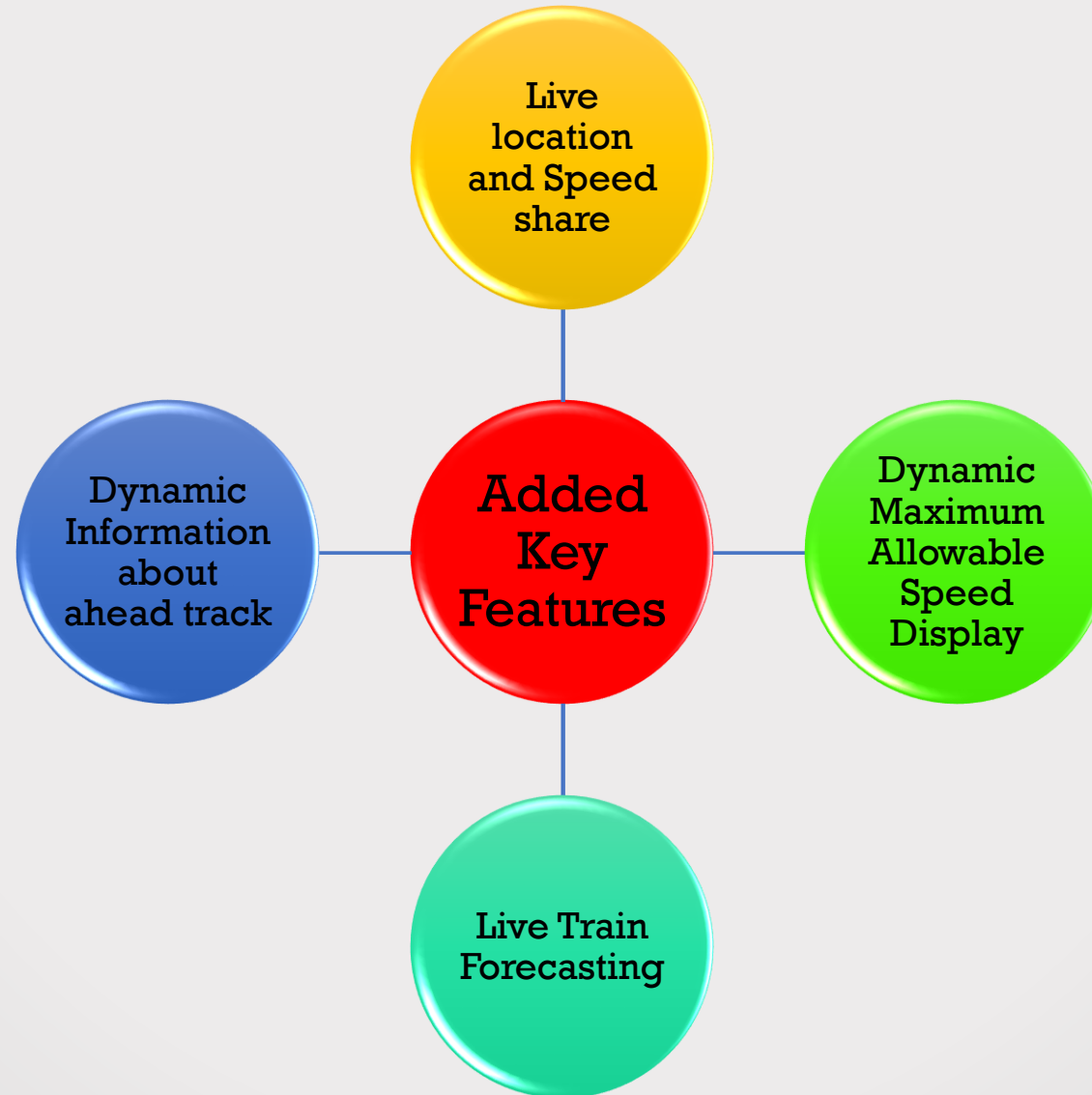


Upgrade from Level-1 to Level-2

Introducing IoT

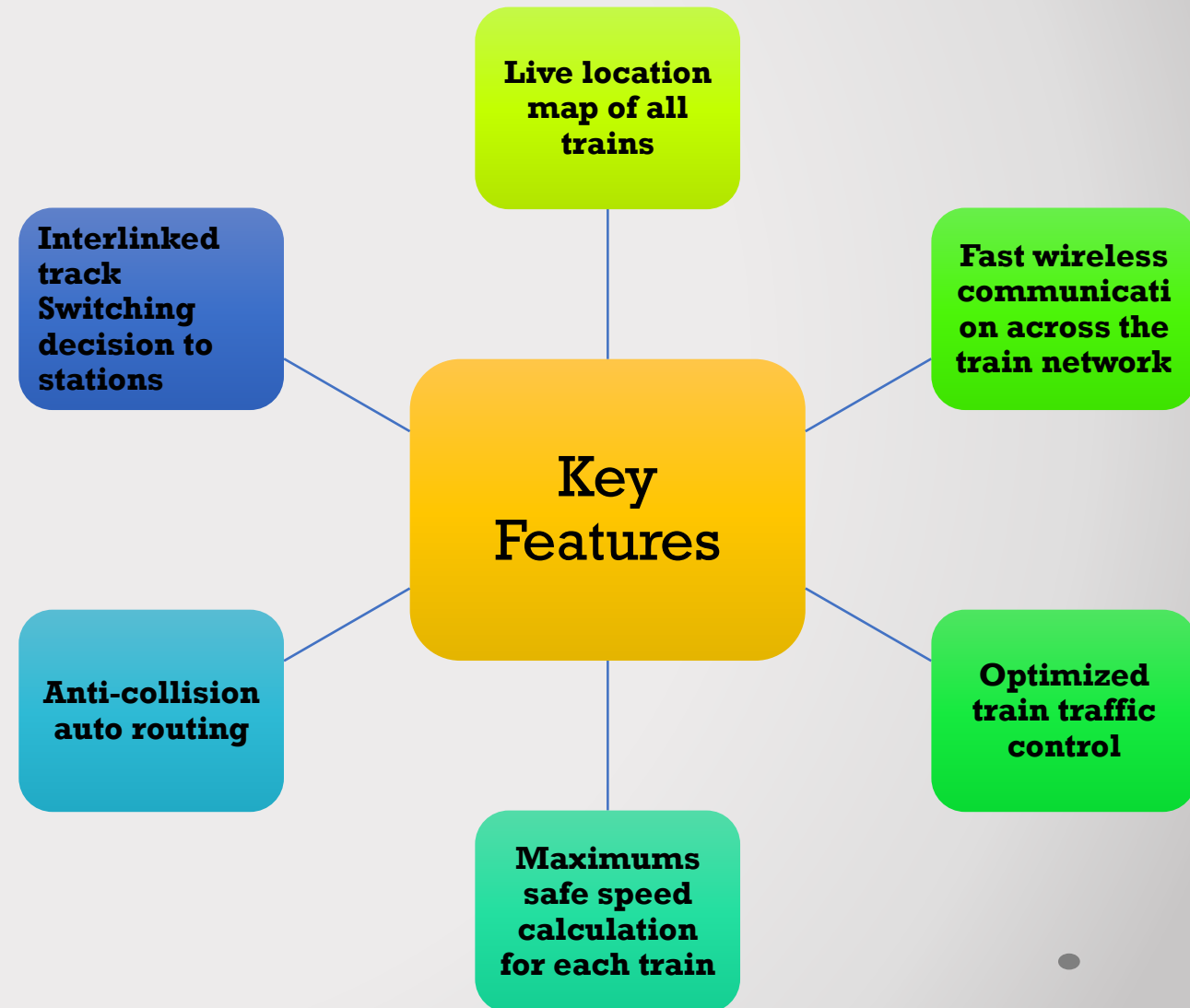


Smart On-board System



The Central Control System

- Wireless communication between train and control system reducing setup cost and difficulties
- Dividing rail network into regions to reduce server complexity and increasing speed
- Safe maximum speed for each train increasing overall efficiency of rail system
- Optimized decision to stations and safety check of rail switches

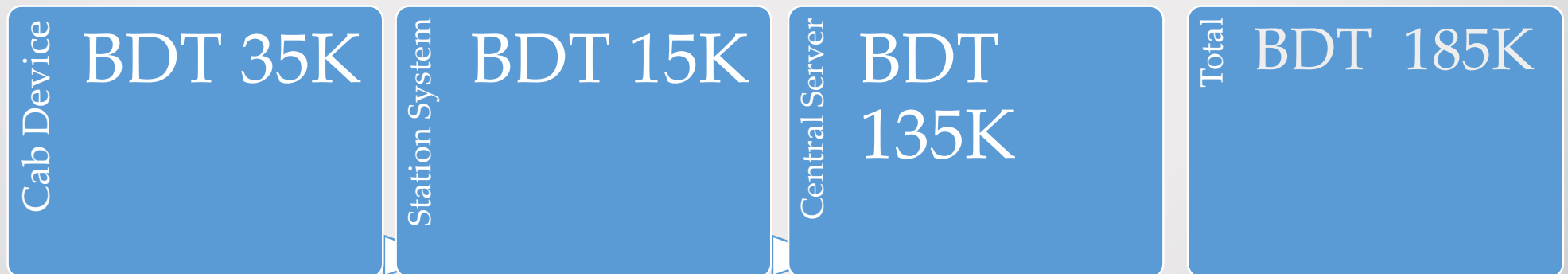


Budget

Estimated Cost up to Level-1 per Station and Locomotive



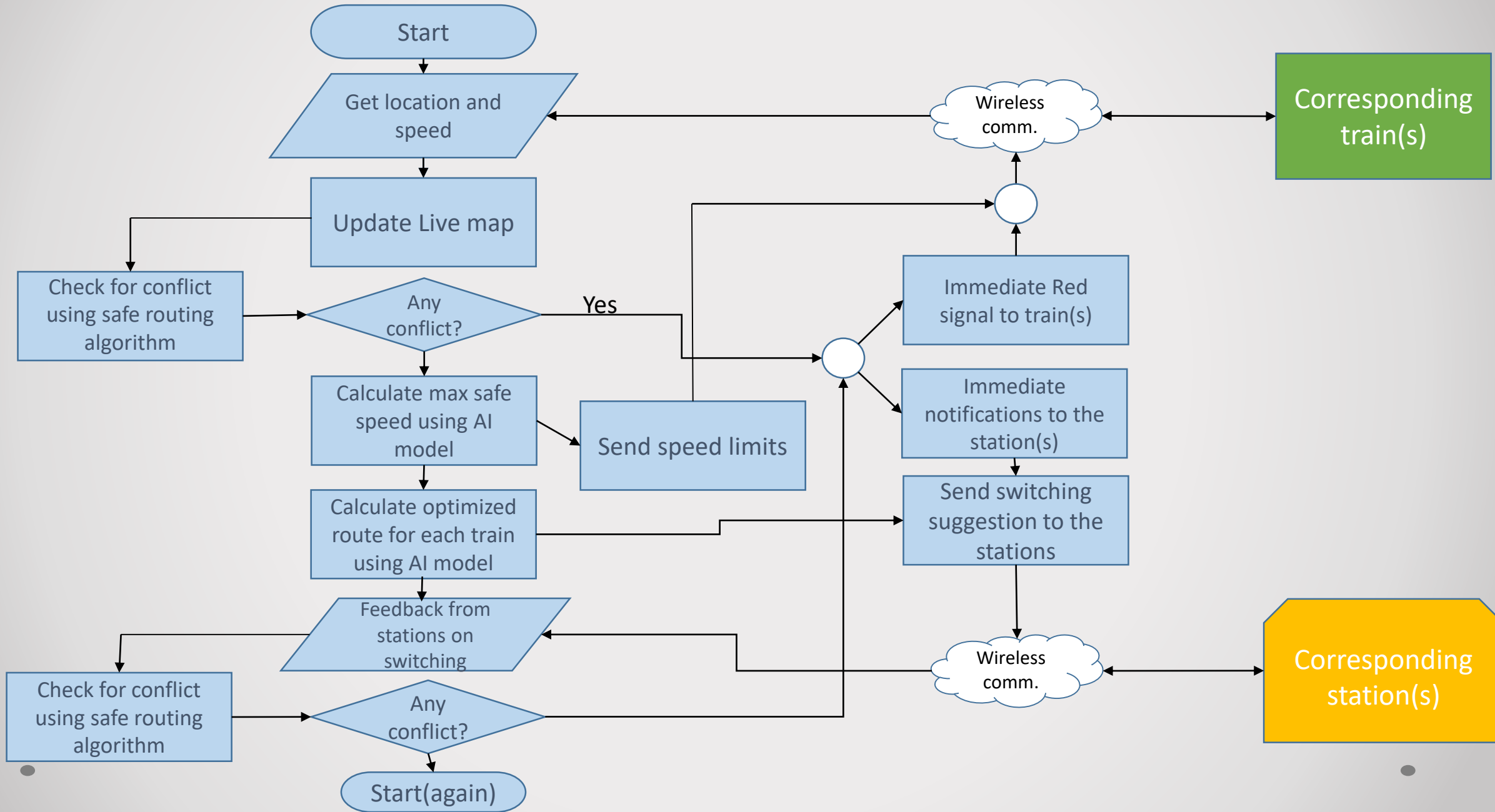
Estimated for Level-2



Thank You

Appendix

Central Control System flowchart



Budget defined

Name	Specs	Cost
Server PC	Intel Xeon 4114 Deca-core (10 Core) 2.20 GHz Processor (\$1,084.34) 2x 500GB SSD (130\$) 64GB RAM (\$213)	(1427\$) 121104.02 BDT
Rail Road modifications(per 10km)) Optional	Inductive proximity sensor x4 , Solar panel(100W 12V)x 4, Railroad insulation, Power	83200 BDT
Control room in station	pi, Network module(2G/3G), Switching connection, signalling connection,Track circuit connection	150000 BDT
Device on Locomotive	GPS, Network module, MCU, Servo motor LCD screen, LED panel, buzzer,	10000 BDT