



Week of march 9th

# Mapping Cases

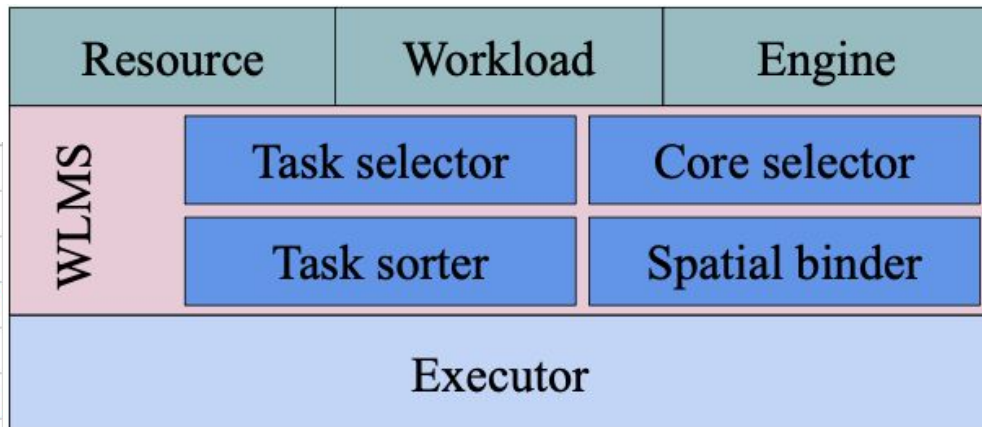
$N_C$  : Number of cores available

$N_T$  : Number of Tasks available

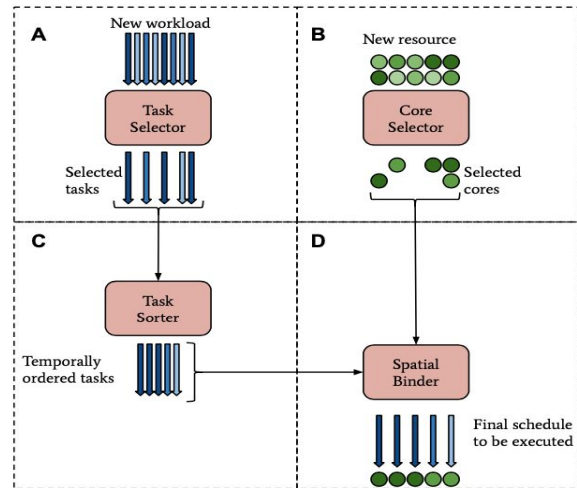
1.  $N_T \leq N_C$  : Easy distribution if the number of cores is more than the number of tasks.
2.  $N_T > N_C$  : If the number of tasks is greater than the number of cores, then the execution can take more than one generation. Currently, I am working on this. I know what vivek's emulator is doing for execution of multiple generations.

# Vivek's Emulator

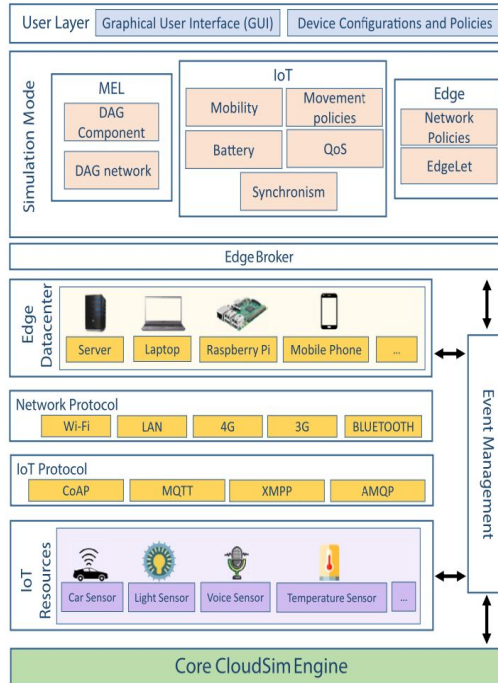
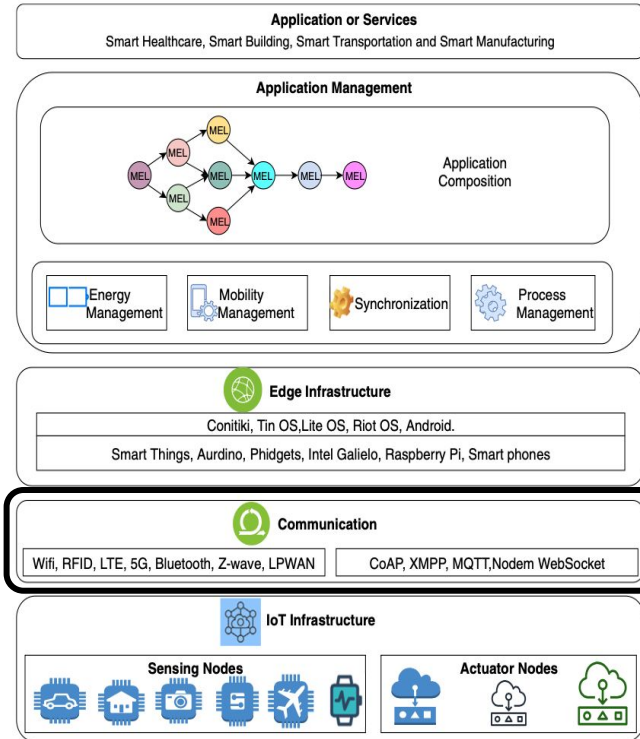
Baseline (random)	ops per task	Execution time	
1	1026.427692	31.09916683	
2	1024.641687	31.24511859	
3	1026.341718	32.20272548	
4	1026.400217	30.59070303	
5	1022.200646	31.97277931	
	1025.202392	31.42209865	
Baseline (l2f)			
1	1027.920653	31.07045886	
2	1024.919197	31.03858136	
3	1023.031644	31.18779537	
4	1020.878482	31.35398596	
5	1020.671986	32.1969615	
	1023.484392	31.36955661	



Figures taken from Vivek's Thesis\*\*



# IoT-SIM- Simulator for Edge environment



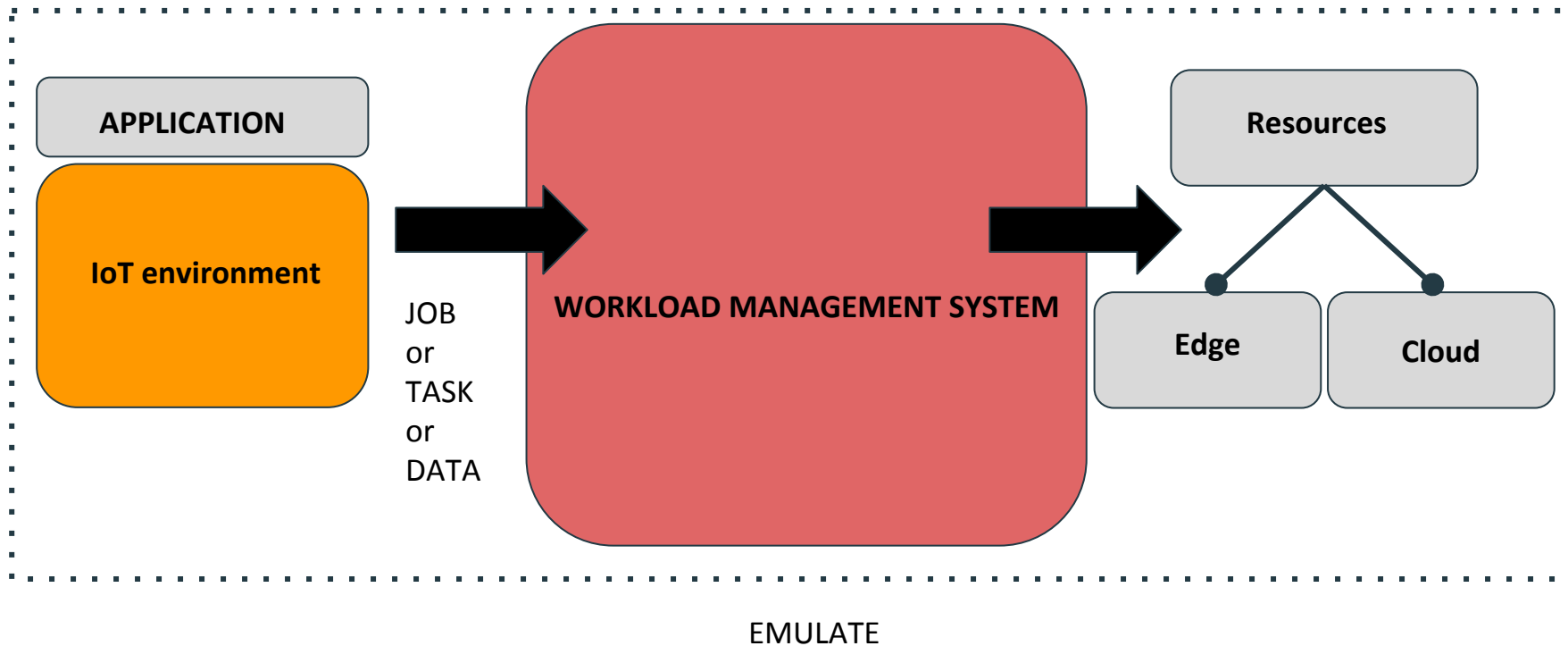
$$MI = f(DS),$$

$$Time_{proc} = \frac{MI}{CPU\ Capacity\ (MIPS)},$$

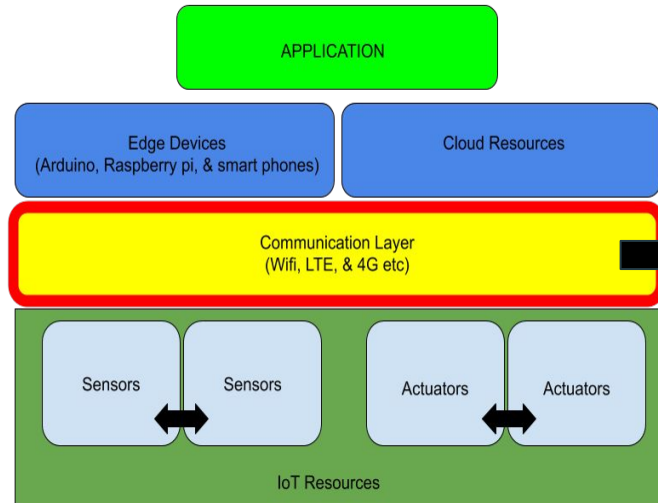
$$Total\_Proc\_Time_{MEL} = \max(Time_{shrink}, Time_{proc}).$$

$$Time_{trans} = \frac{N_{packet}}{data\ rate_P},$$

# Architecture



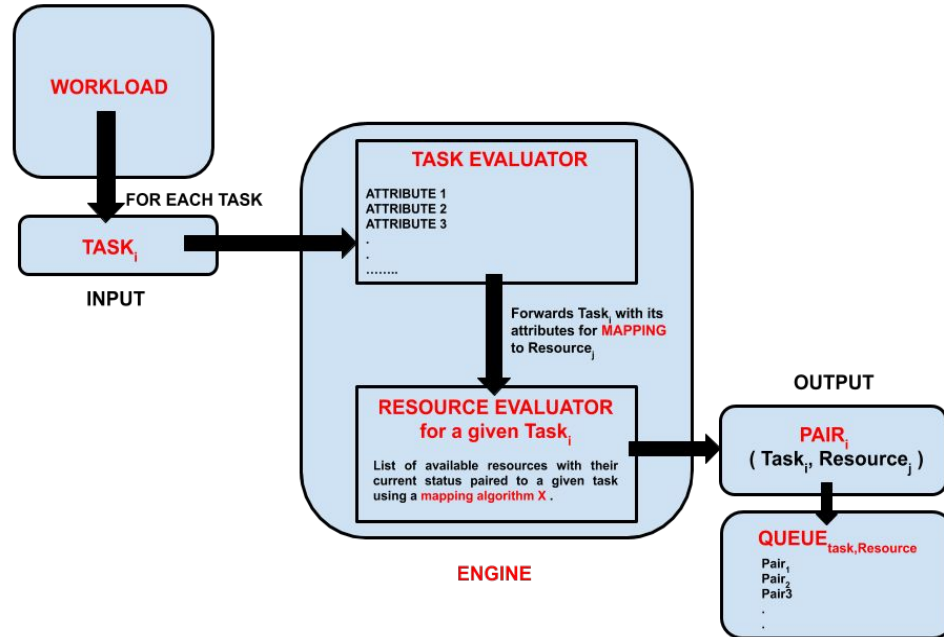
# Setup for Edge Environment



## NETWORK PROTOCOL

Technology	Frequency	Data Rate	Range	Power Usage	Cost
2G/3G	Cellular Bands	10 Mbps	Several Miles	High	High
Bluetooth/BLE	2.4Ghz	1, 2, 3 Mbps	~300 feet	Low	Low
802.15.4	subGhz, 2.4GHz	40, 250 kbps	> 100 square miles	Low	Low
LoRa	subGhz	< 50 kbps	1-3 miles	Low	Medium
LTE Cat 0/1	Cellular Bands	1-10 Mbps	Several Miles	Medium	High
NB-IoT	Cellular Bands	0.1-1 Mbps	Several Miles	Medium	High
SigFox	subGhz	< 1 kbps	Several Miles	Low	Medium
Weightless	subGhz	0.1-24 Mbps	Several Miles	Low	Low
Wi-Fi	subGhz, 2.4Ghz, 5Ghz	0.1-54 Mbps	< 300 feet	Medium	Low
WirelessHART	2.4Ghz	250 kbps	~300 feet	Medium	Medium
ZigBee	2.4Ghz	250 kbps	~300 feet	Low	Medium
Z-Wave	subGhz	40 kbps	~100 feet	Low	Medium

# Reference Architecture



**TASK EVALUATOR:** Identifies the characteristics associated with a task that are presented by the user such as minimum execution time required, minimum memory required, or/and latency range for completion.

**RESOURCE EVALUATOR:** For instance, evaluates the processing speed, memory capacity, filesystem type at a given time and pairs a resource with the given task for execution of the task.