Grid Scheduling and Multithreading

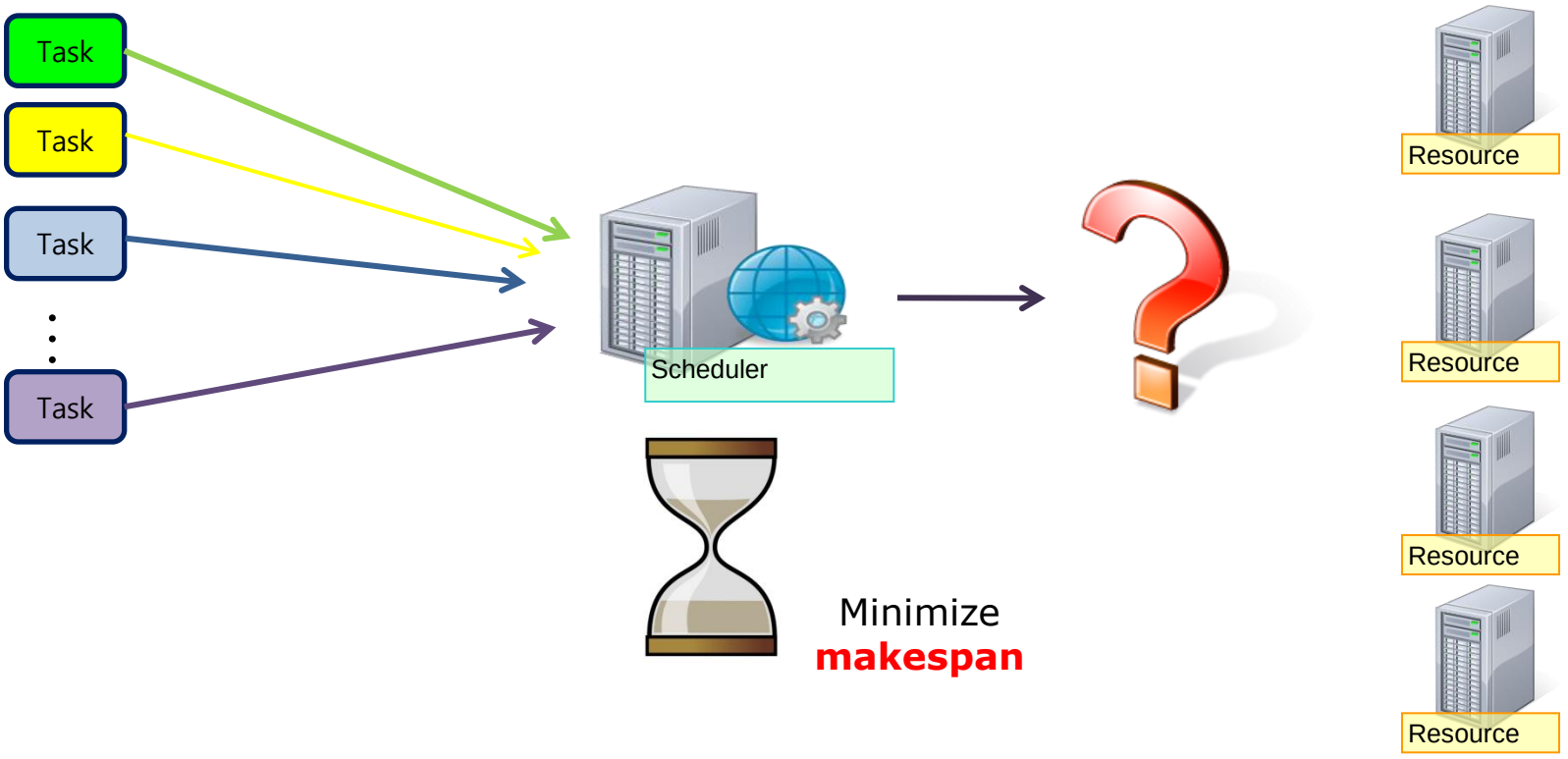
Jin Suk Kim

University of Seoul

서울시립대학교
UNIVERSITY OF SEOUL

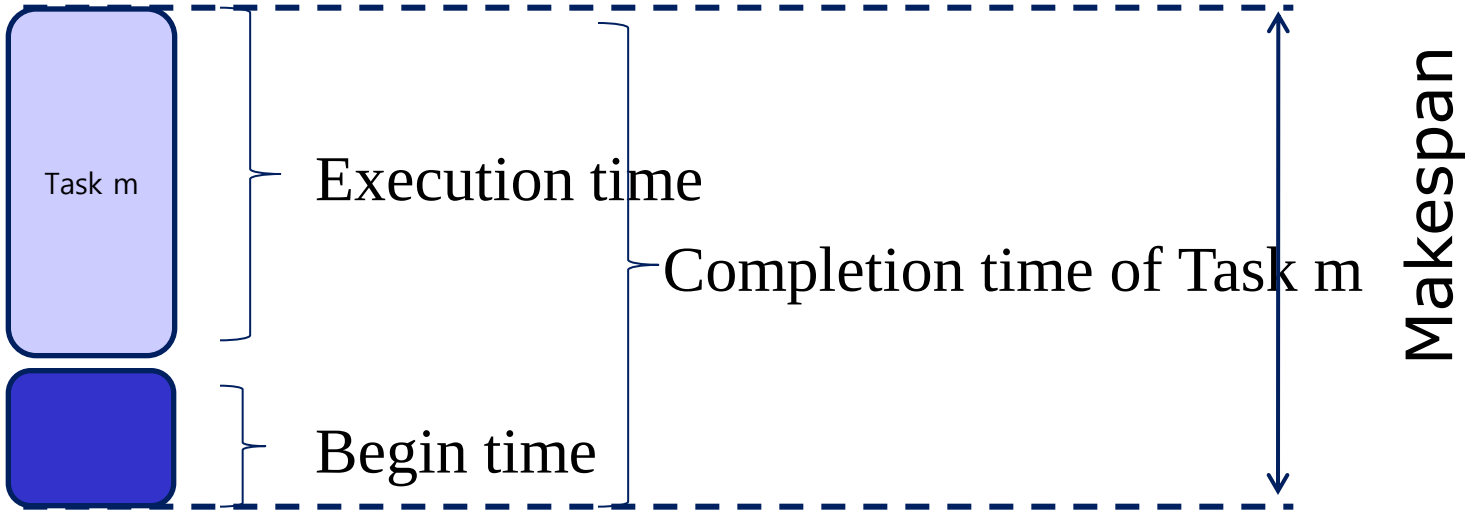
What is Scheduling Problem

- How to execute clients' task to resource immediately?
- How to schedule huge tasks to resources efficiently?



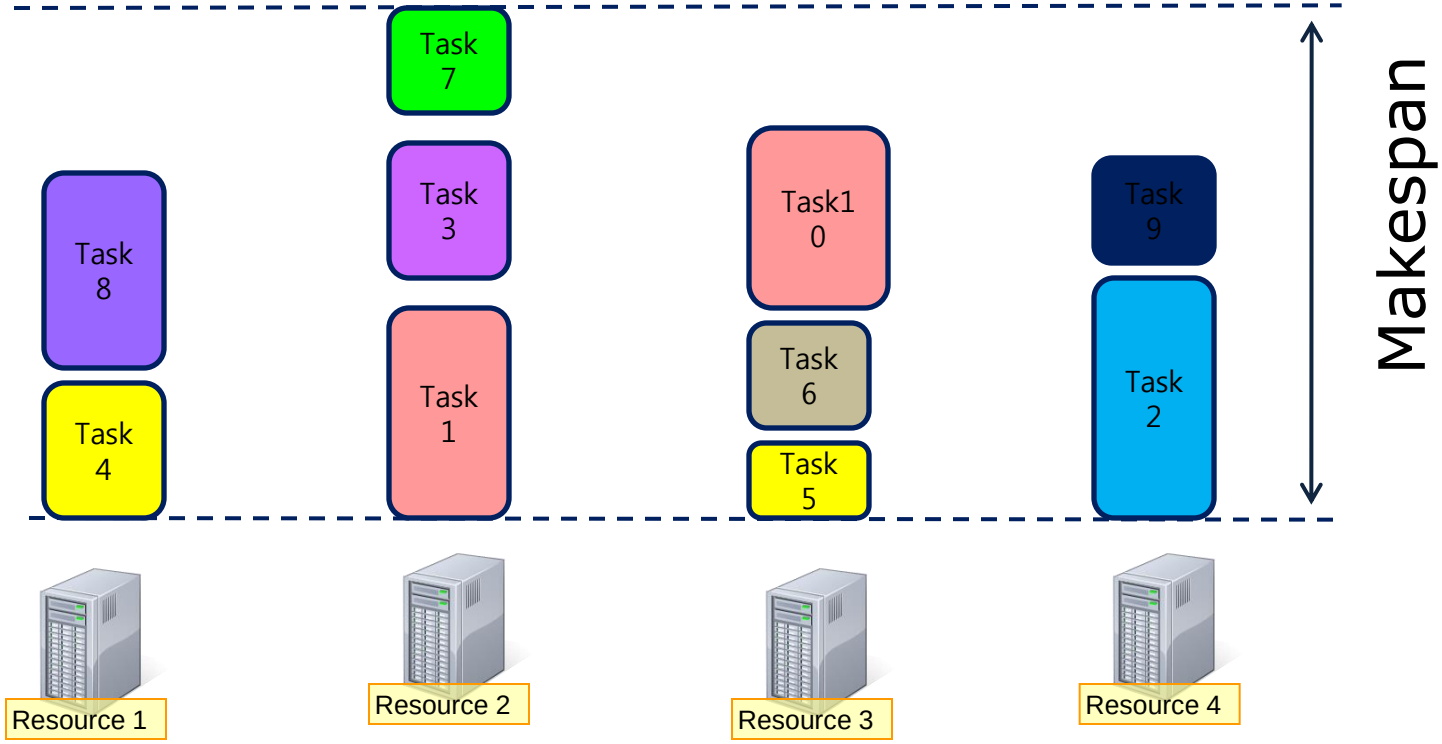
What is the makespan?

- Makespan (Performance metric)
  - Example for one processor



Performance metric

- Example for many processors



Scheduling algorithms

Static mode

- offline mode
- task execution times are known
- Genetic algorithm
- PSO algorithm, …

Dynamic mode

- online mode
- task execution times are unknown
- MET
- MCT
- MECT

An Example

- We have 3 smartphones for example.

- (모든 실험예는 단지 예일뿐, 실제적인 측정에 의한 데이터가 아님)

Example

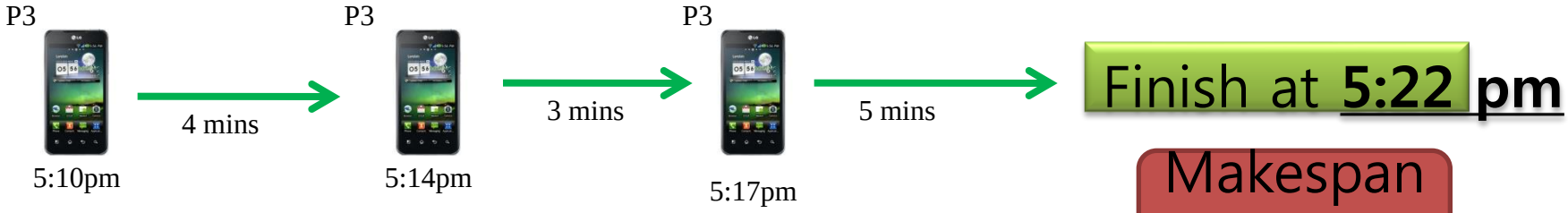
- We have several tasks.

Tasks/Jobs					
Resources		Install Skype	Upload video lesson	Send pictures	Begin time
	Phone1	7 mins	4 mins	6 mins	5:25 pm
	Phone2	5 mins	7 mins	8 mins	5:00 pm
	Phone3	4 mins	3 mins	5 mins	5:10 pm

MET (Minimum Execution Time) algorithm

- It assigns task to computing machine whose execution time is the minimum.

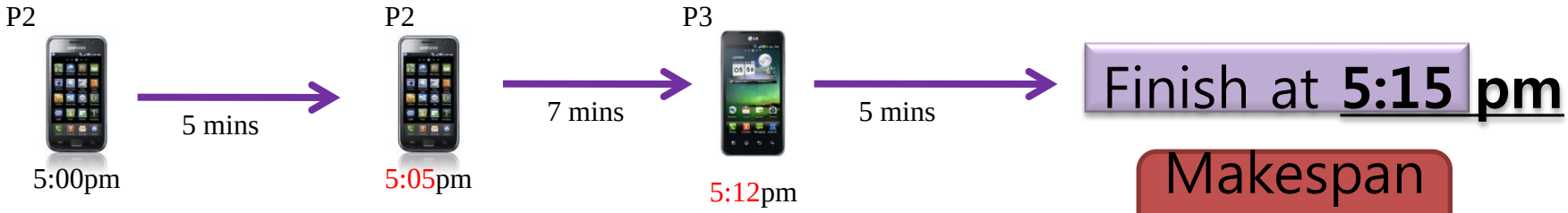
Tasks/Jobs					
Resources		Install S kype	Upload video lesson	Send pictures	Begin time
	Phone1	7 mins	4 mins	6 mins	5:25 pm
	Phone2	5 mins	7 mins	8 mins	5:00 pm
	Phone3	4 mins	3 mins	5 mins	5:10 pm



MCT(Minimum Completion Time) algorithm

- Task will assign to computing machine which gives minimum completion time. .

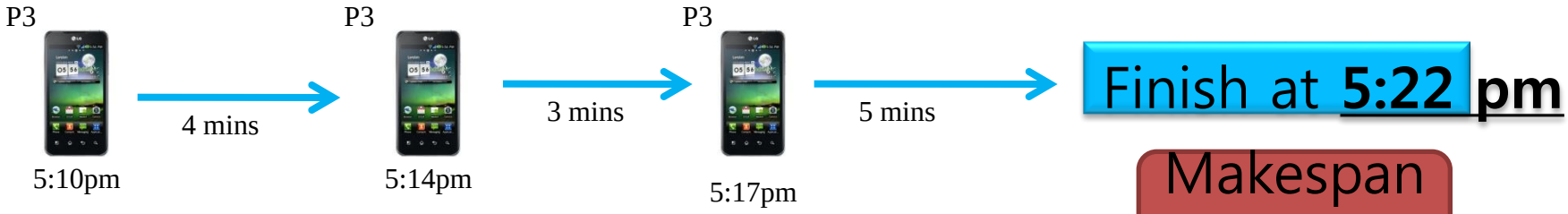
Tasks/Jobs					
Resources		Install Skype	Upload video lesson	Send pictures	Begin time
	P1	7 mins	4 mins	6 mins	5:25 pm
	P2	5 mins	7 mins	8 mins	5:00 pm
	P3	4 mins	3 mins	5 mins	5:10 pm



MECT (Minimum Execution & Completion Time) algorithm

- It assigns task into the machine which gives the least amount of execution time for the task and its completion time is smaller than maximum begin time.

	Tasks/Jobs				
Resources		Install Skype	Upload video lesson	Send pictures	Begin time
	P1	7 mins	4 mins	6 mins	5:25 pm
	P2	5 mins	7 mins	8 mins	5:00 pm
	P3	4 mins	3 mins	5 mins	5:10 pm



Simulation results

- Simulation results for makespan

	HighHigh	HighLow	LowHigh	LowLow
MCT	249585	26382	9512	1900
MECT	221841	21454	7798	1969
MEBT	207079	20906	8128	1838
MTM	215301	20322	8263	1836

HighHigh- High task heterogeneity and High machine heterogeneity
HighLow- High task heterogeneity and Low machine heterogeneity
LowHigh- Low task heterogeneity and High machine heterogeneity
LowLow-Low task heterogeneity and Low machine heterogeneity

Summary

- We surveys 3 grid scheduling algorithms.
- Deadline and Tardiness issue
- Co-allocation issue