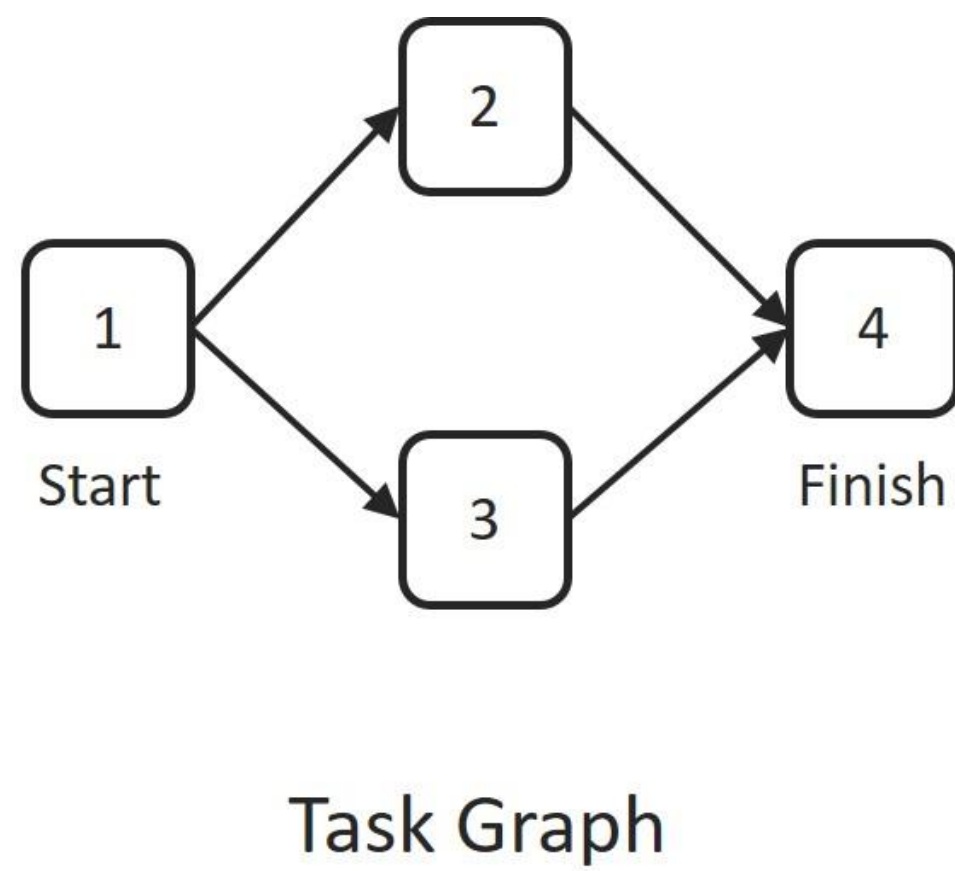


Online Learning for Wireless Distributed Computing

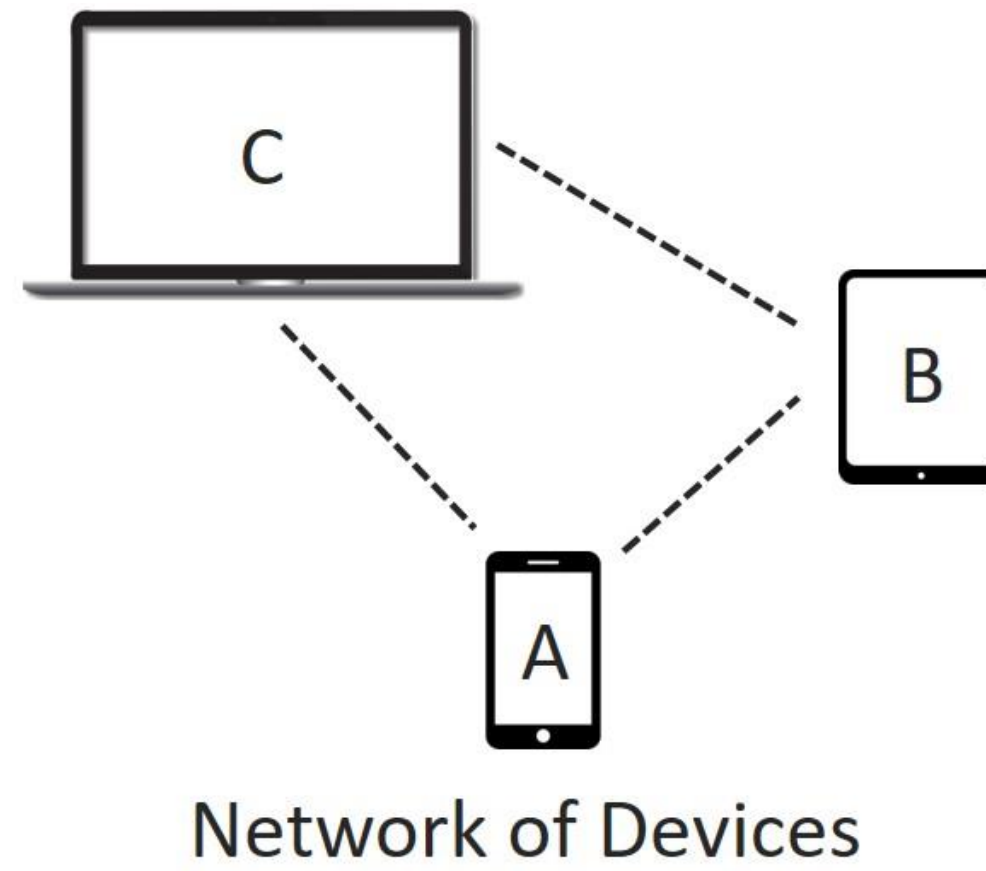
Pranav Krishna Sakulkar and Bhaskar Krishnamachari

Wireless Distributed Computing: Introduction



| Task | Device |
|------|--------|
| 1 | A |
| 2 | A |
| 3 | B |
| 4 | C |

Assignment



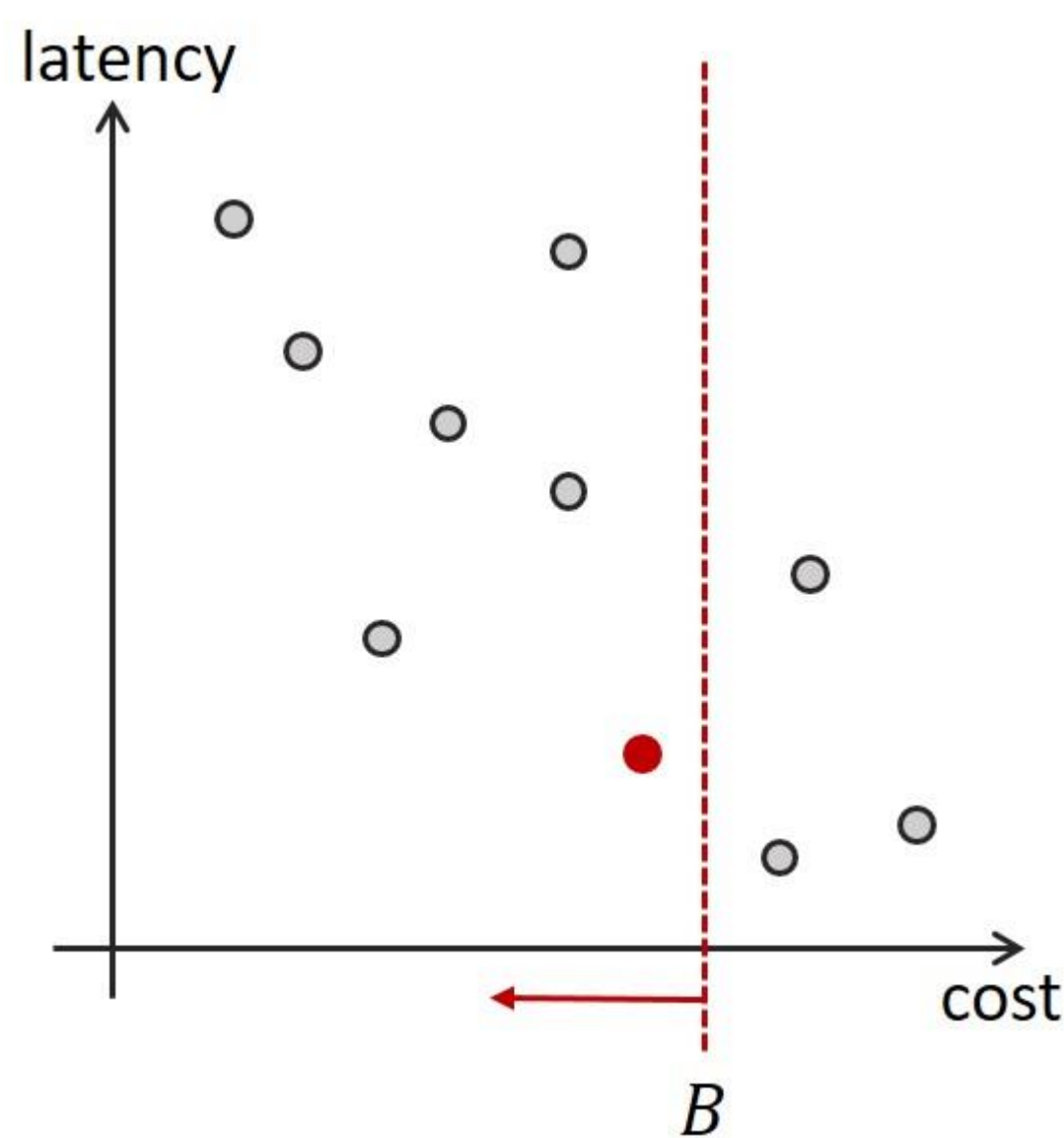
- Dynamic Device Behavior
- Time-Varying Channels

Problem Formulation

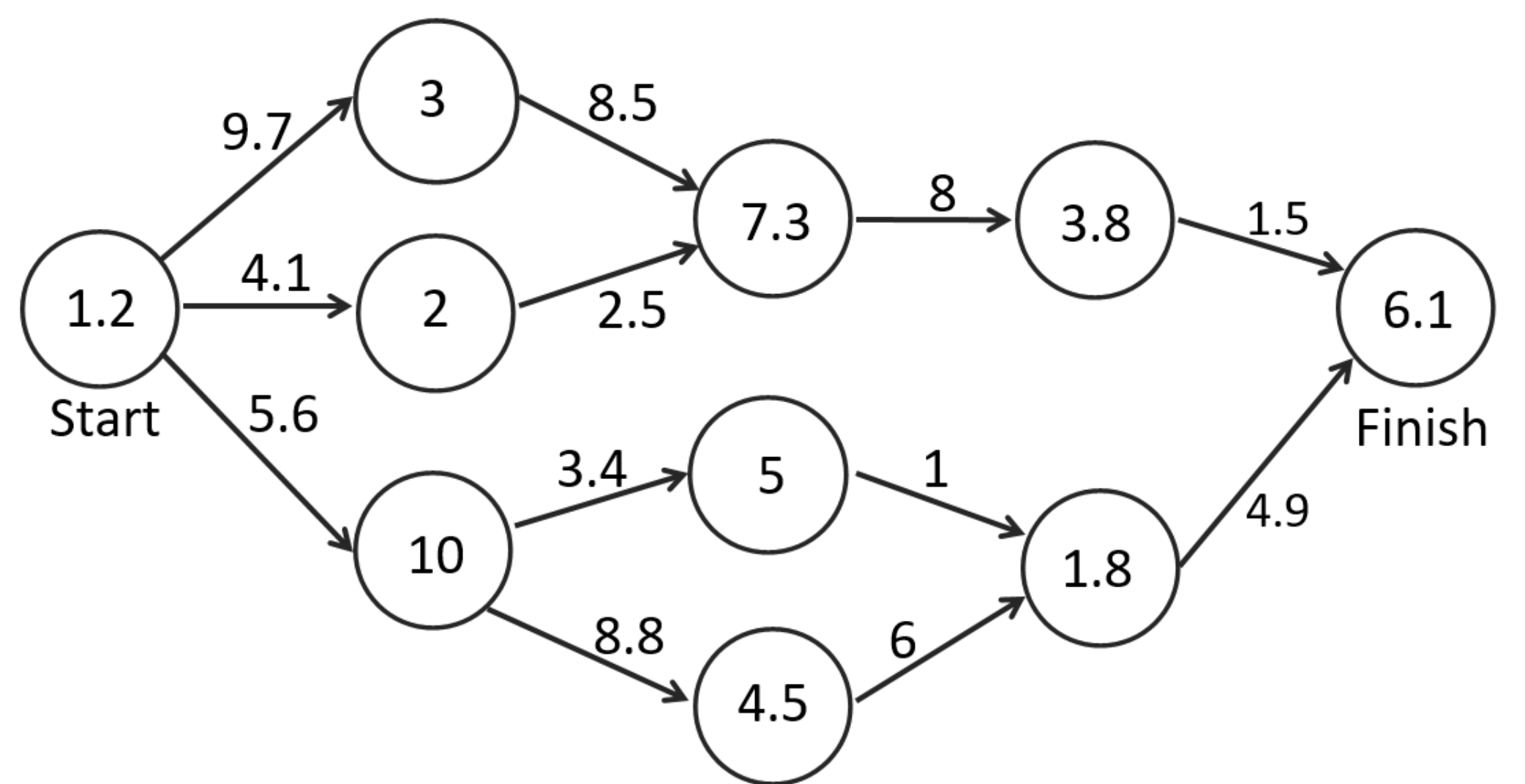
Device assignment decisions based on:

- Overall Latency (Delay)
 - Task Execution Latency
 - Data Transmission Latency
- Overall Cost
 - Task Execution Cost
 - Data Transmission Cost

Optimization Problem
Minimize: *delay*
Subject to: $cost \leq B$



Contextual Combinatorial Bandit



Context: Data-frame features
Combinatorial choices: Job-Device mappings

Assumption:

- Random delays
- Deterministic costs

Idea:

- Learn the PMFs for all channel specific and device specific RVs.
- Use the upper confidence bounds of the PMFs at each step to solve the optimization problem.

Discussion of Results

- We proved a logarithmic regret bound for general non-linear Lipschitz reward functions.
- The idea is to reduce the coefficient of the regret from being exponential in the number of devices to being linear in them.