

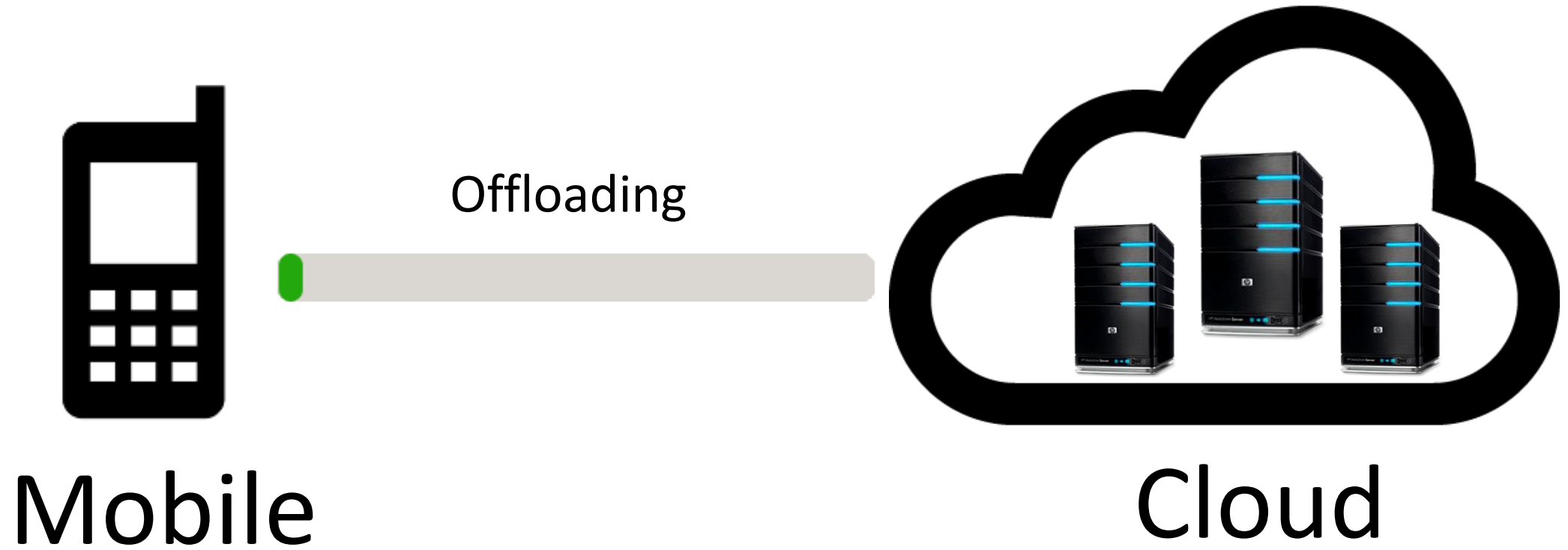


Performance and Energy Consumption Evaluation of Mobile Cloud Applications Supported by Stochastic Models

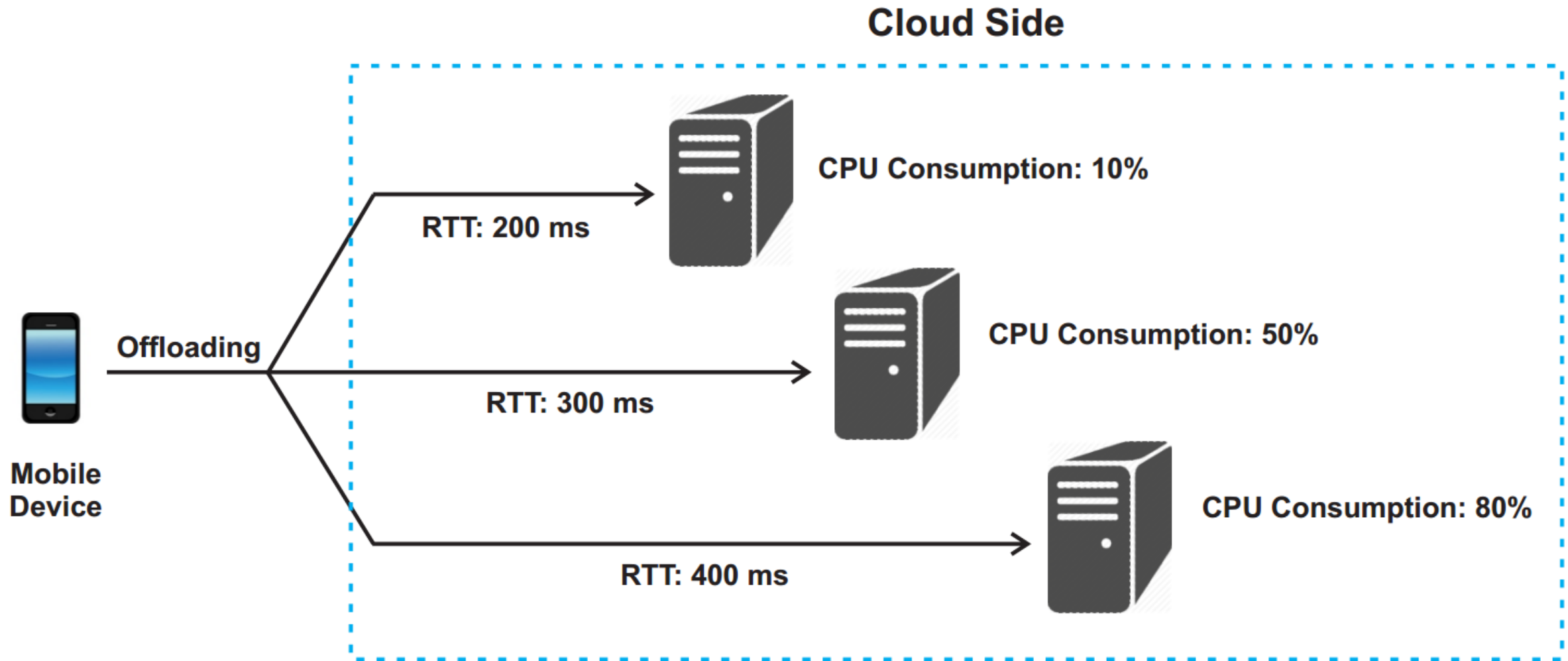
Francisco Airton Silva
Ph.D Candidate

Dr. Paulo Maciel
Advisor

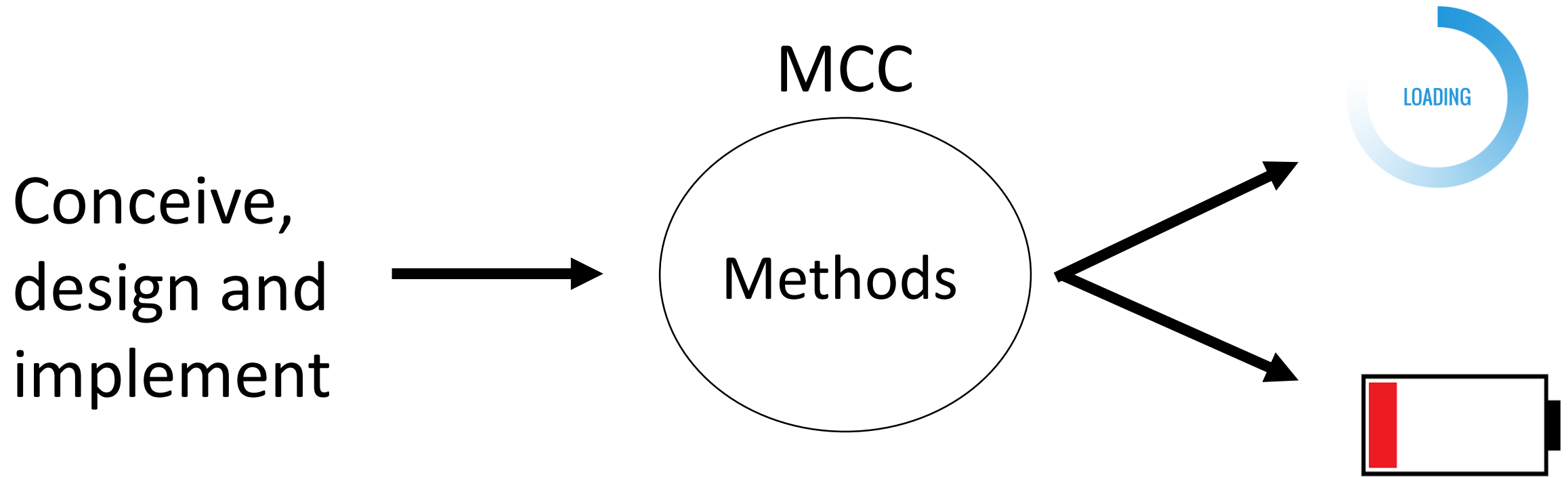
Mobile Cloud Computing (MCC)



The Problem



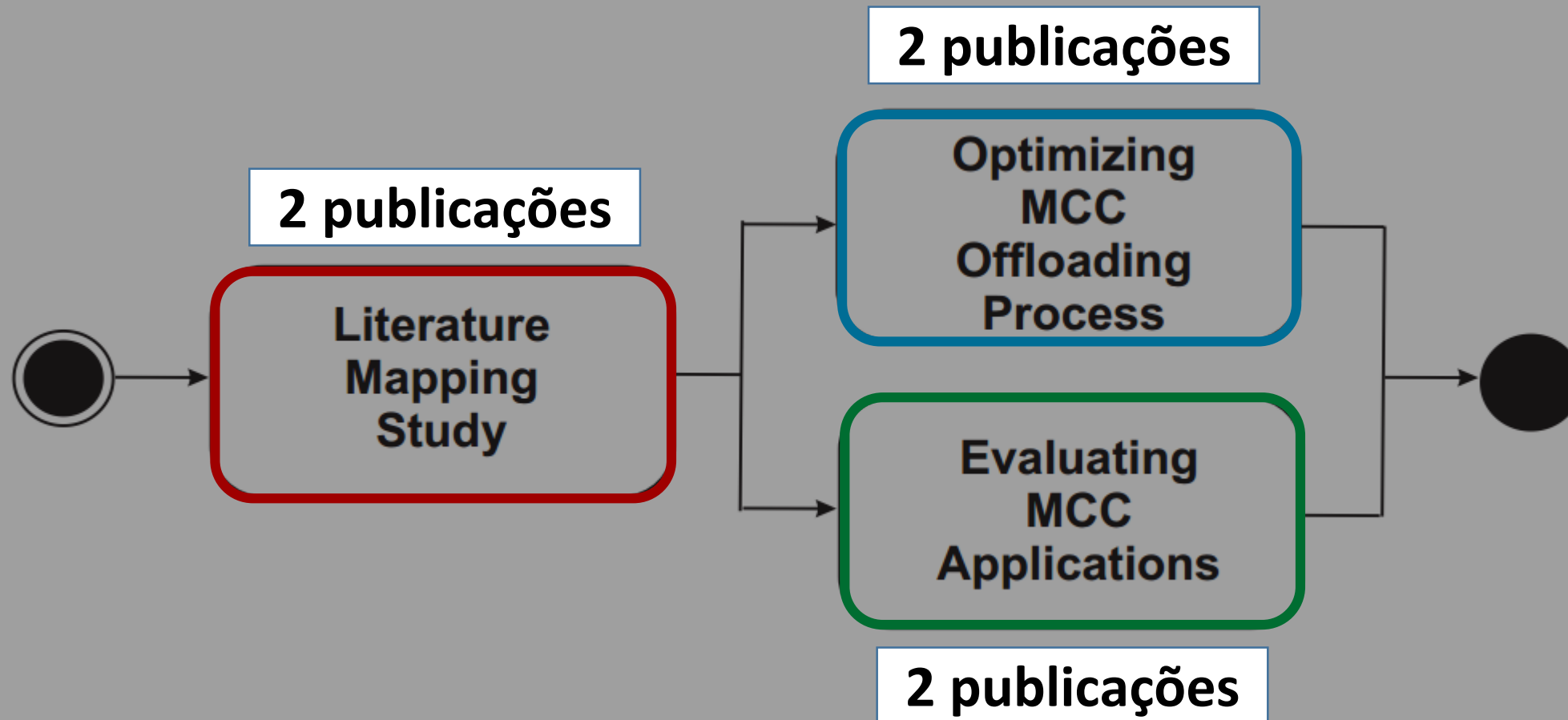
General Objective



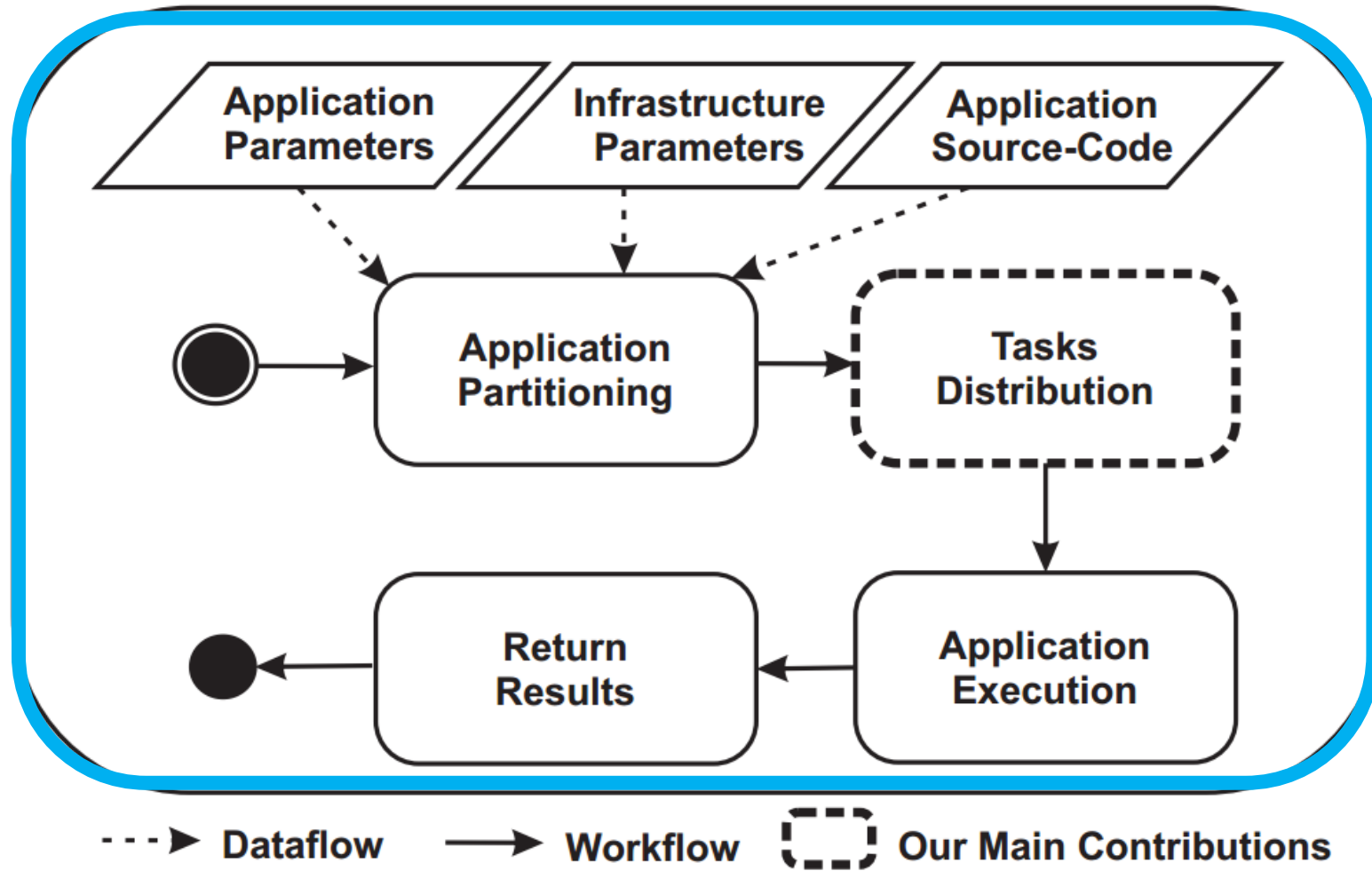
Specific Objectives

1. Conceive, design and implement **mobile application offloading techniques** aiming at **performance** and **autonomy** improvement.
2. Conceive strategies to support MCC application performance **evaluation**.
3. Propose MCC application **performance models**.
4. Design and implement **tools** to evaluate MCC applications.

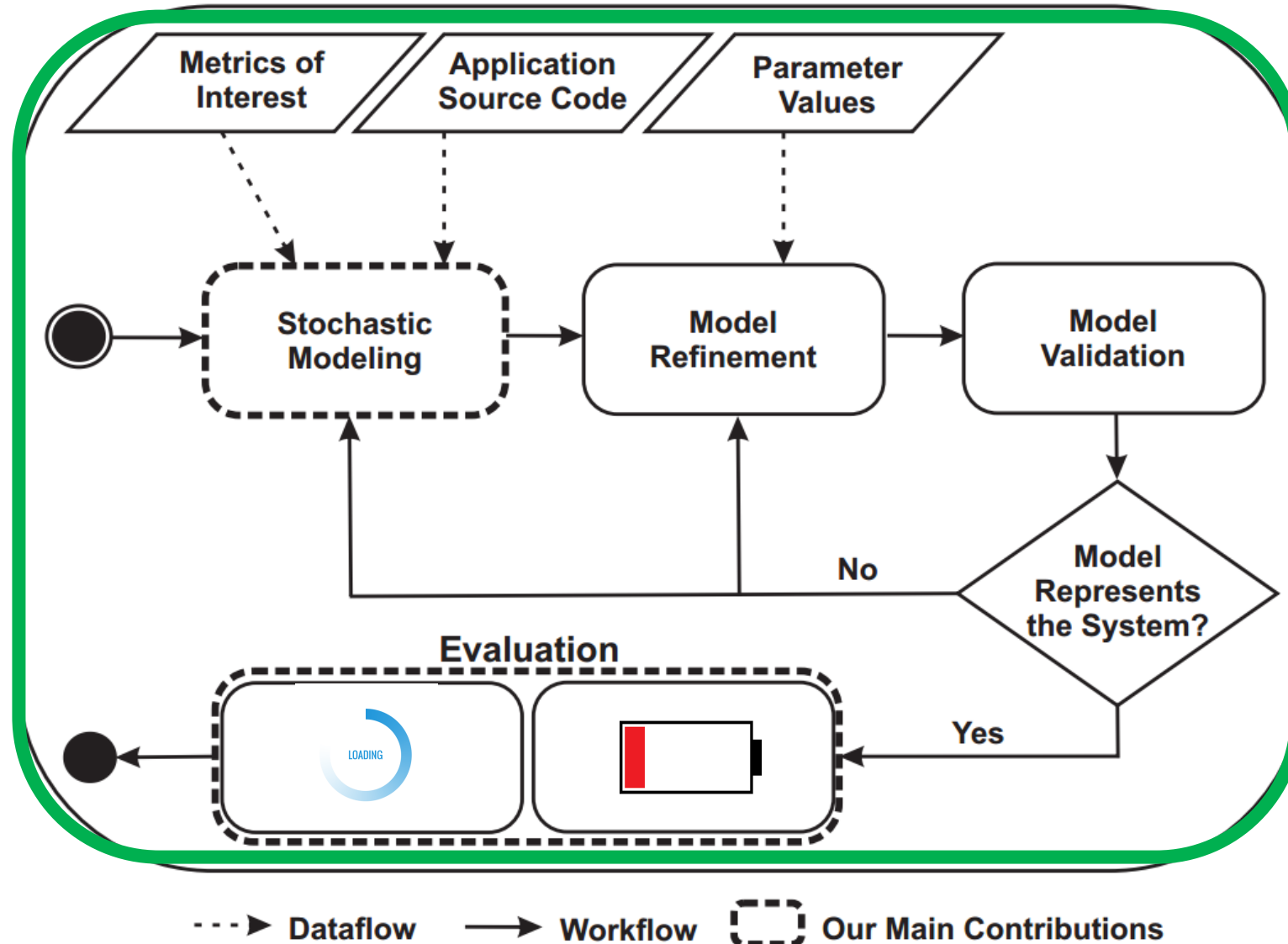
Research Methodology



Proposal Overview: Optimizing MCC Off. Process



Proposal Overview: Evaluating MCC Applications



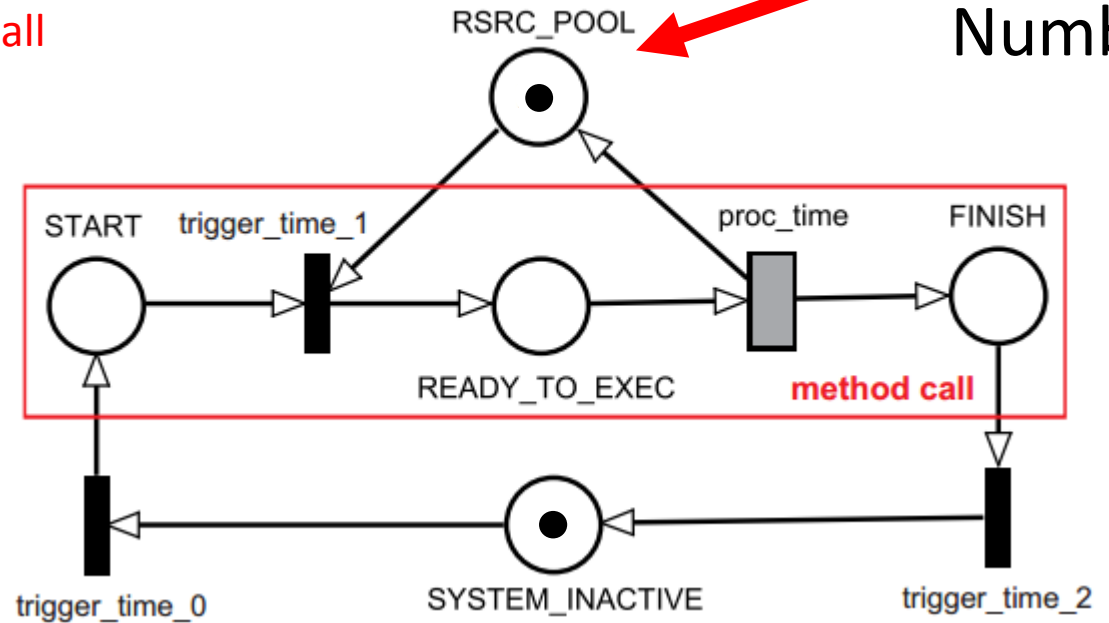
For Today...



Evaluating Applications using SPNs

```
public List<Image> reduceC(Image image){  
    Image image2 = reduceColor ( image );  
    Image image3 = reduceColor ( image2 );  
    Image image4 = reduceColor ( image3 );  
    results.add ( image4 );  
    return results;  
}
```

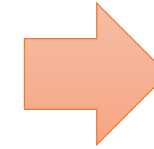
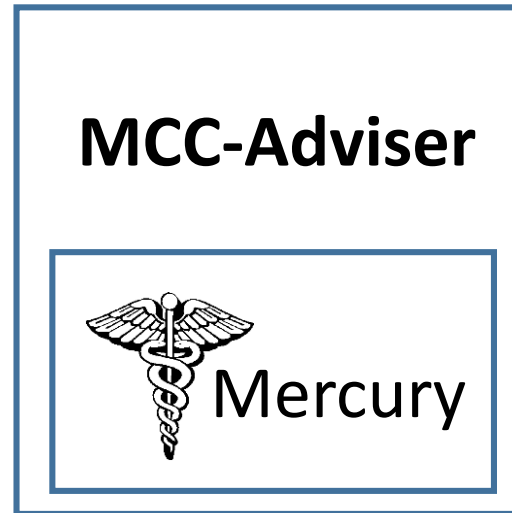
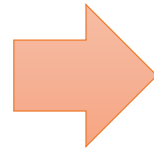
metho-call



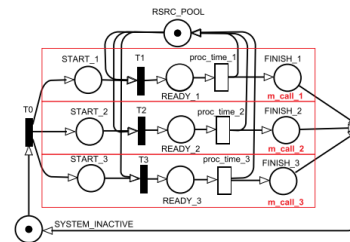
Available
Resources
Number

Evaluating Applications using SPNs

```
public List<Image> reduceC(  
    Image image1, Image image2, Image image3){  
  
    results.add (reduceColor (image1));  
    results.add (reduceColor (image2));  
    results.add (reduceColor (image3));  
  
    return results ;  
}
```

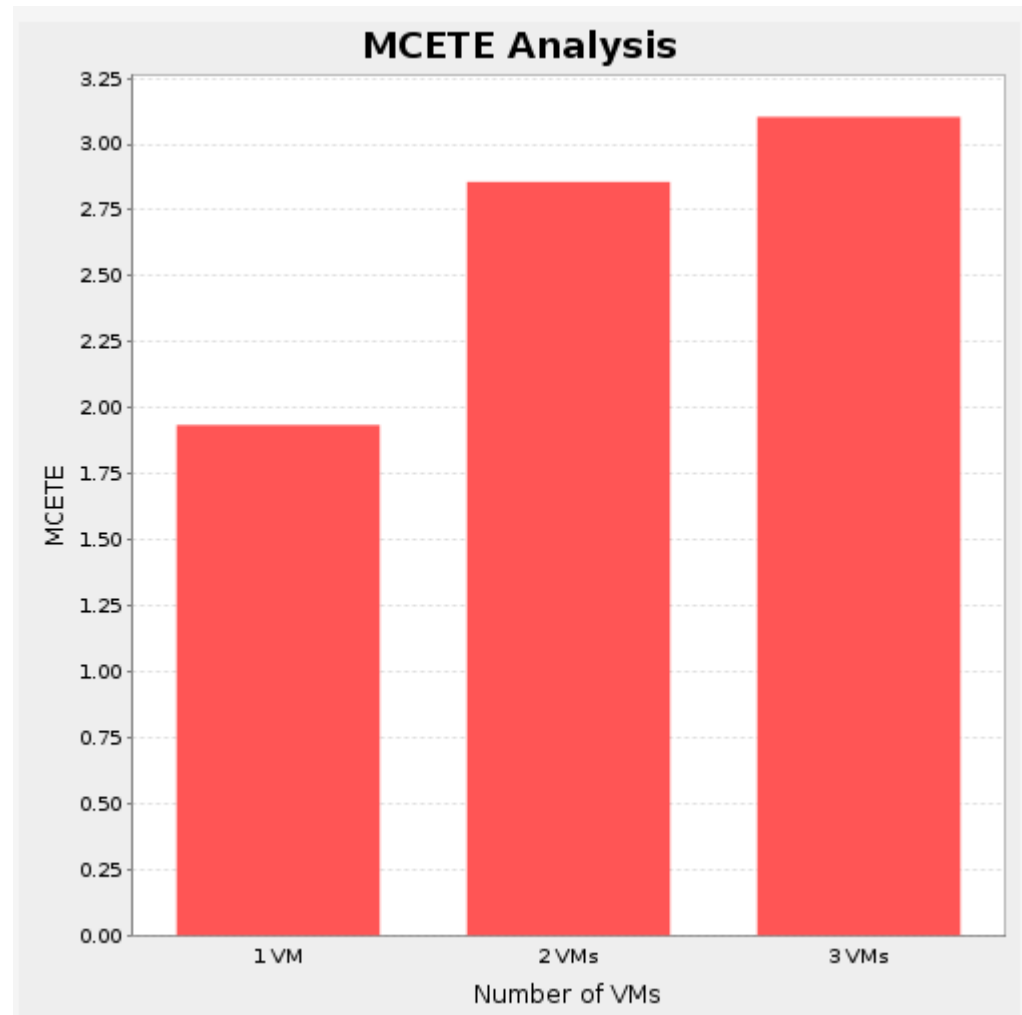


MCETE



MCC-Adviser

Mean
Consumption
Energy to
Execute



Calculating MCETE

$$\text{MCETE} = TTime \times \sum_{n=1}^K Performance_n$$

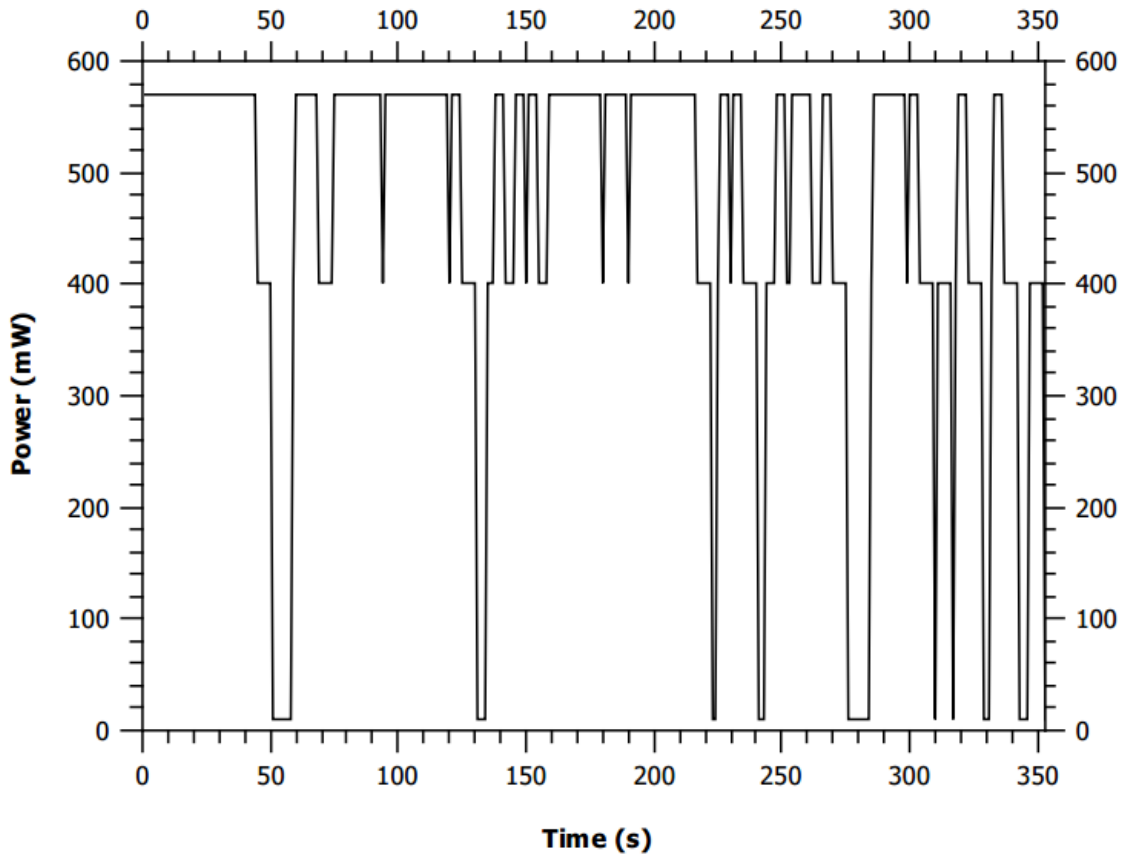
$$Performance_n = Tp_n \times Energy_n$$

$$Tp_n = Prob(Place_n > 0) \times \frac{1}{Time_n}$$

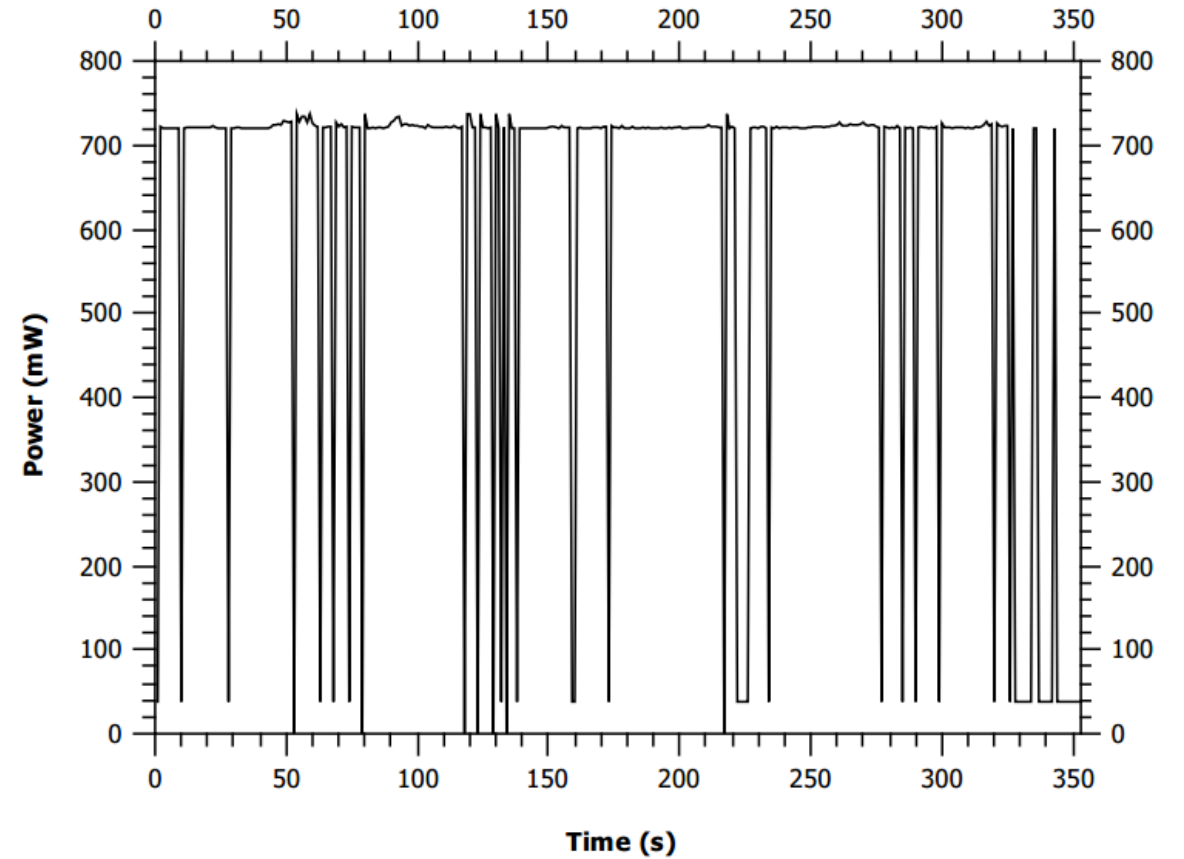
$$Energy_n = POWER \times Bytes_n \times Time_n$$

MCC-Adv Testbed

Calculating the POWER



3G Channel

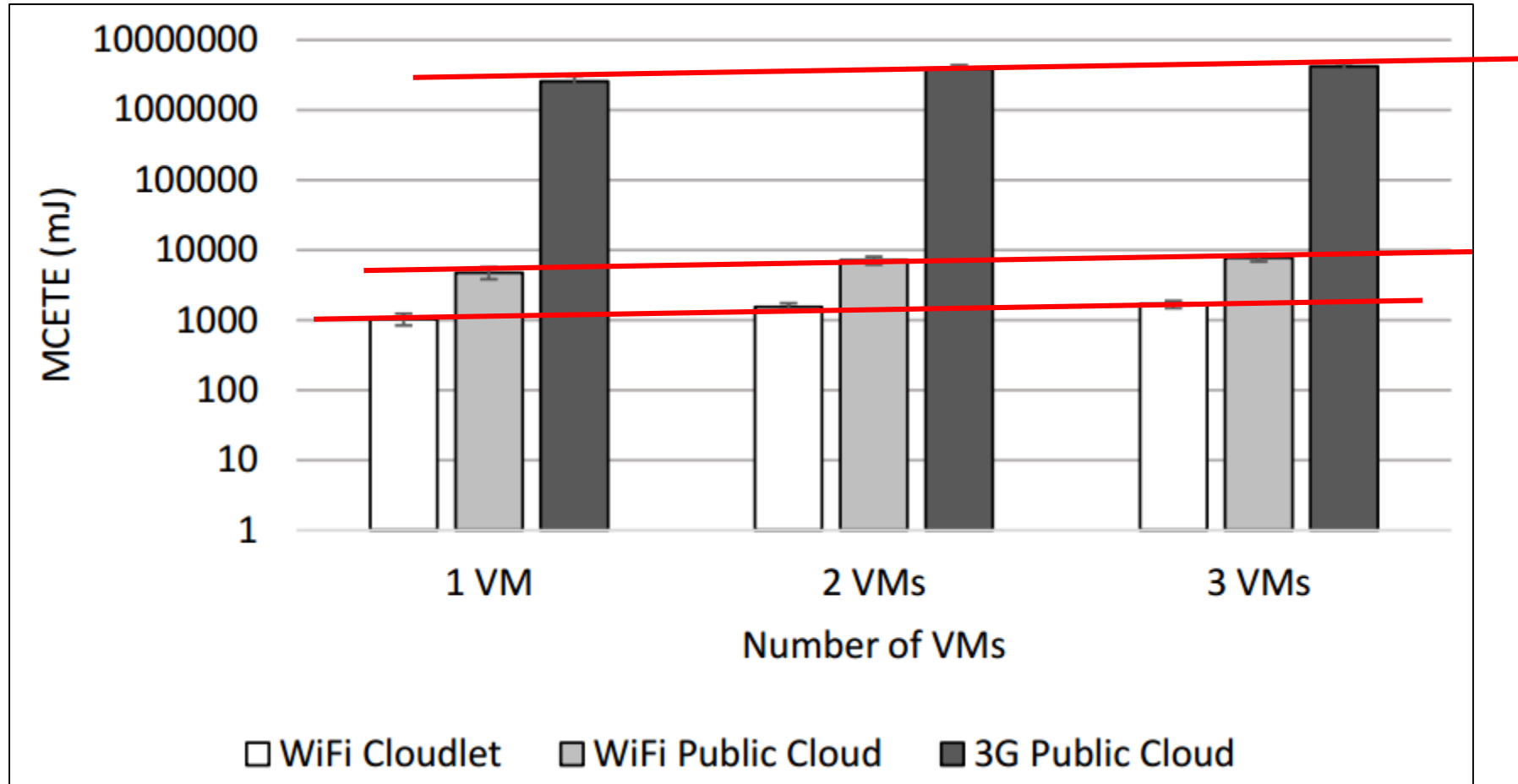


WiFi Channel

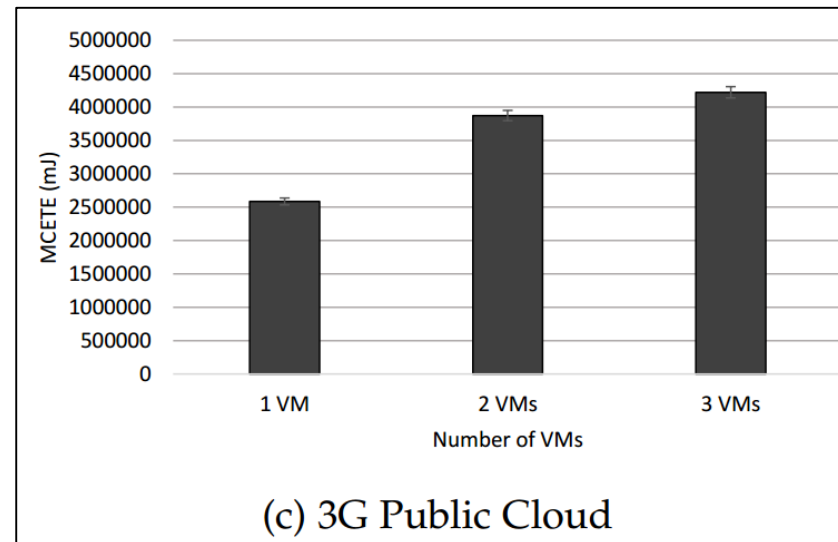
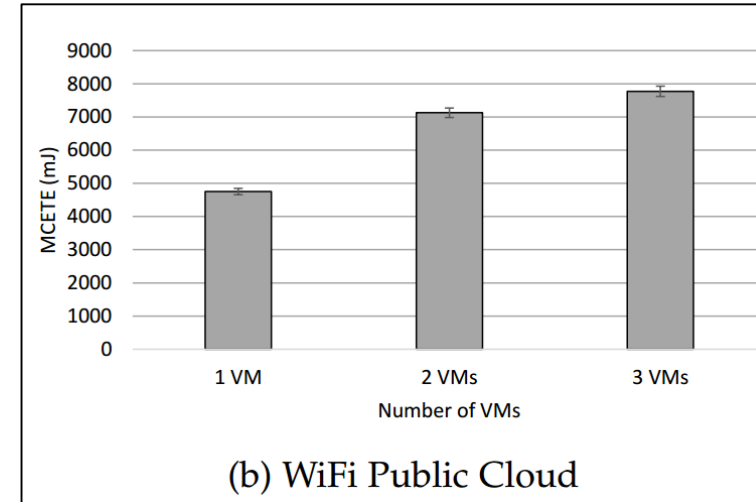
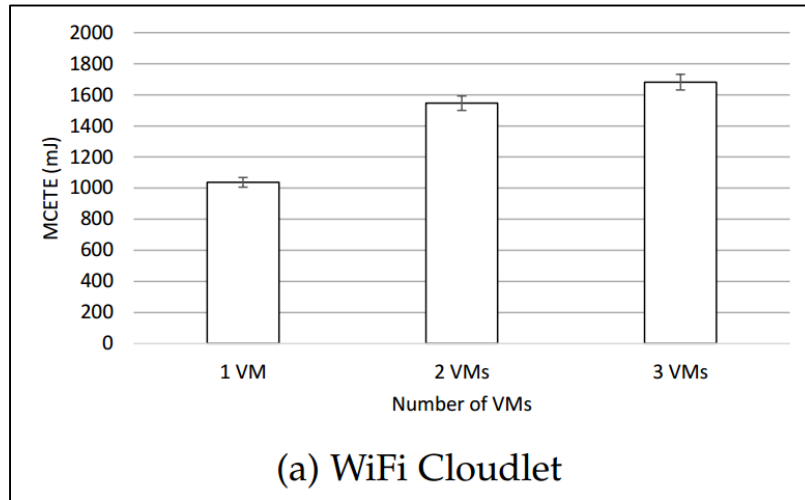
Calculating the POWER

Power (mW)		Bytes		POWER (for one Byte)	
3G	WiFi	3G	WiFi	3G	WiFi
164029	218355	600363	90819921	0.273	0.0024

Case Study

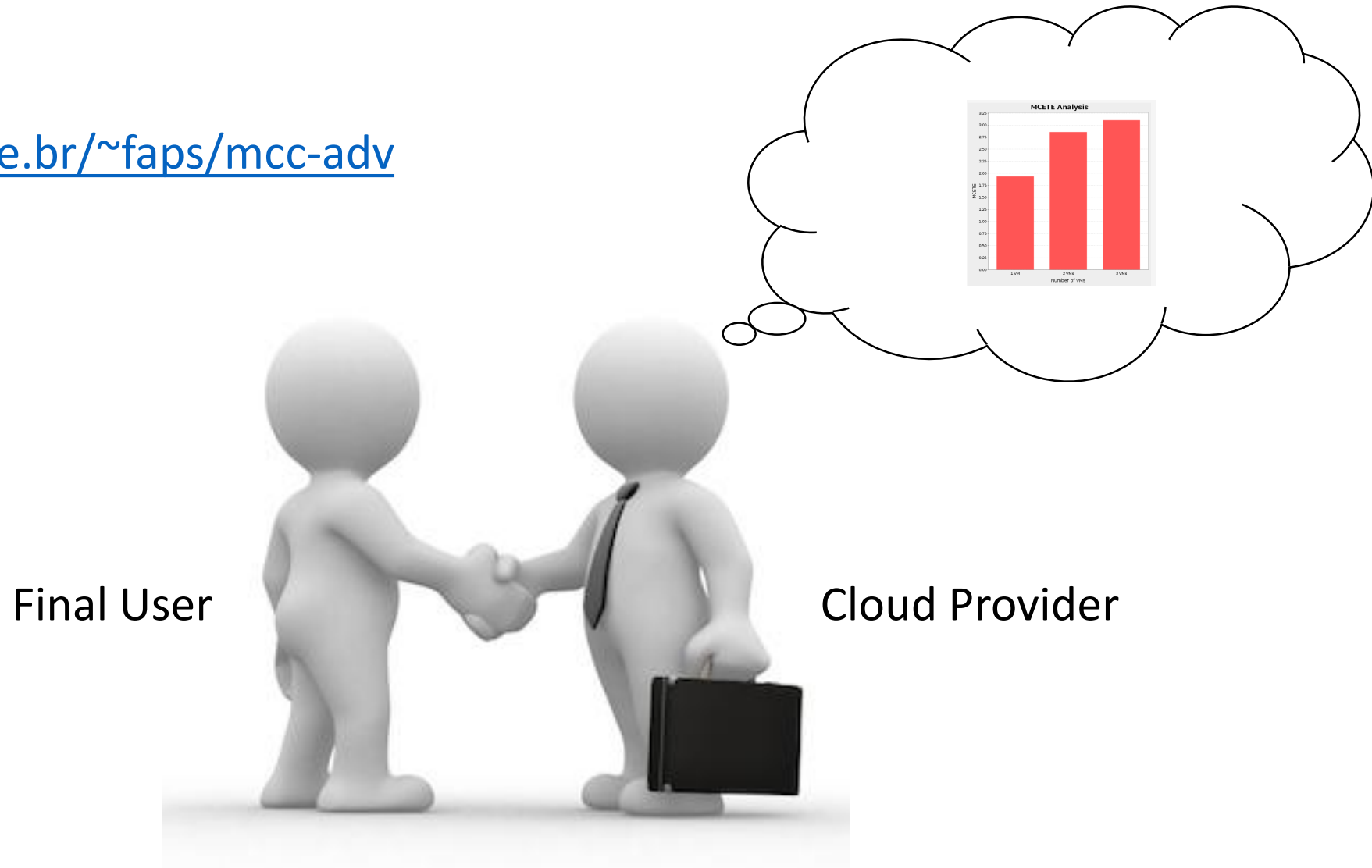


Case Study



MCC-Adviser

<http://cin.ufpe.br/~faps/mcc-adv>



What's next?

Thank You

<http://cin.ufpe.br/~faps>