Supporting energy-awareness for Cloud users

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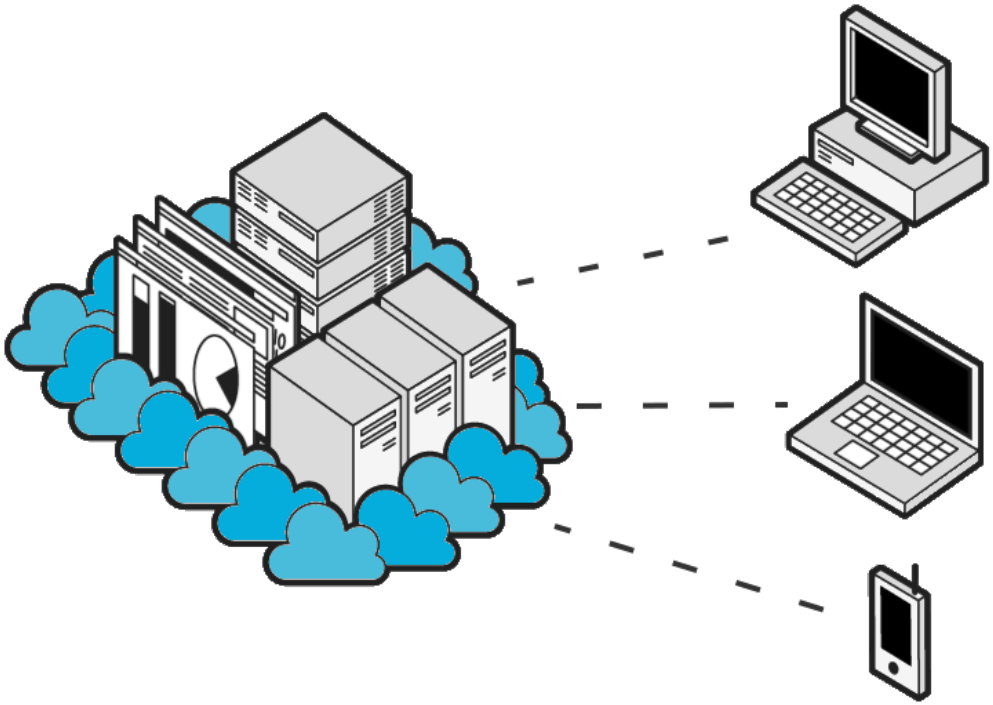
Summary

Summary – General Context and Motivation

General Context

Cloud Computing

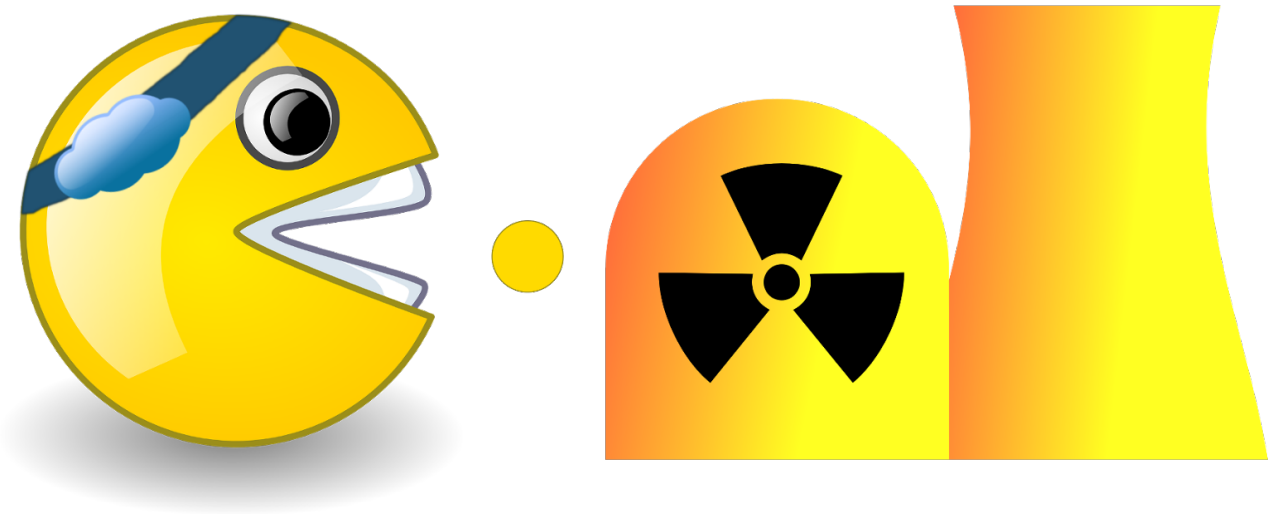


- Software-as-a-Service
- Platform-as-a-Service
- Infrastructure-as-a-Service

Motivation

The Cloud consumes an enormous amount of Energy

- The Cloud consumes around 2% of the worldwide total energy
- Quadruple by 2020 if the demand continues to go on

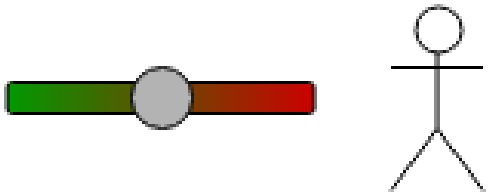


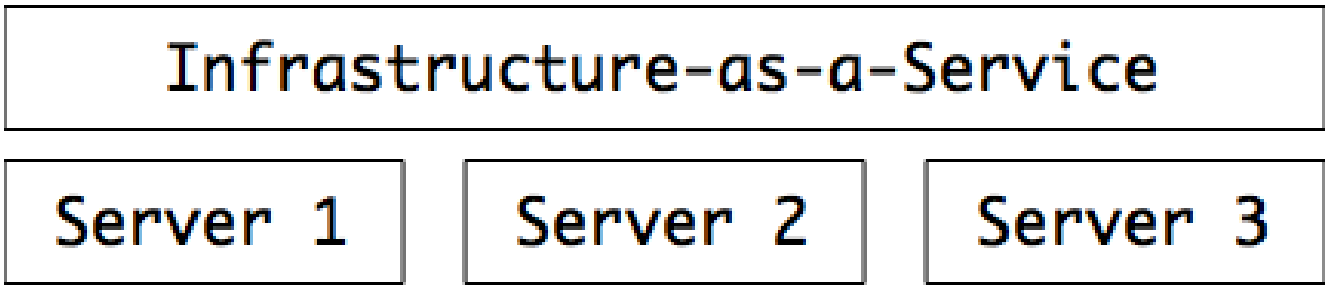
Summary – Thesis Subject

Supporting energy-awareness for Cloud users

Rendre les nuages plus verts grâce aux utilisateurs

Thesis Context





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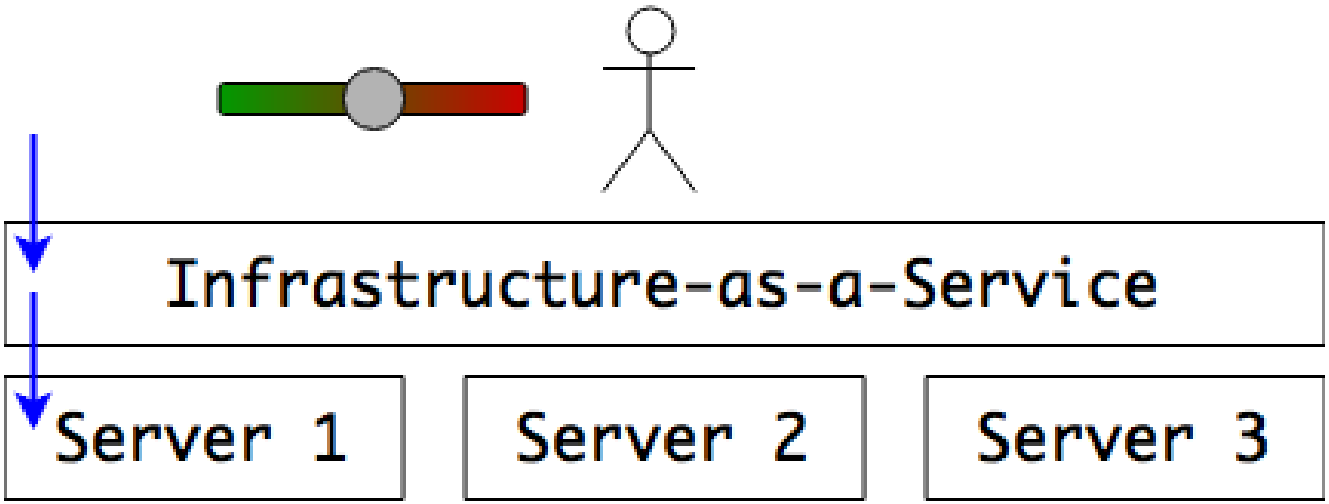

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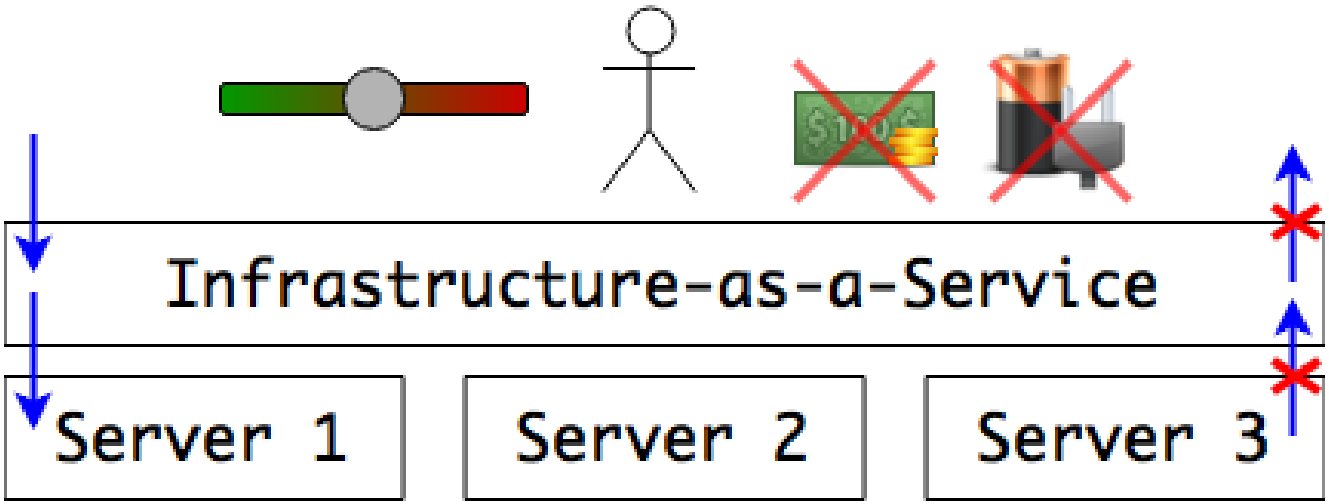

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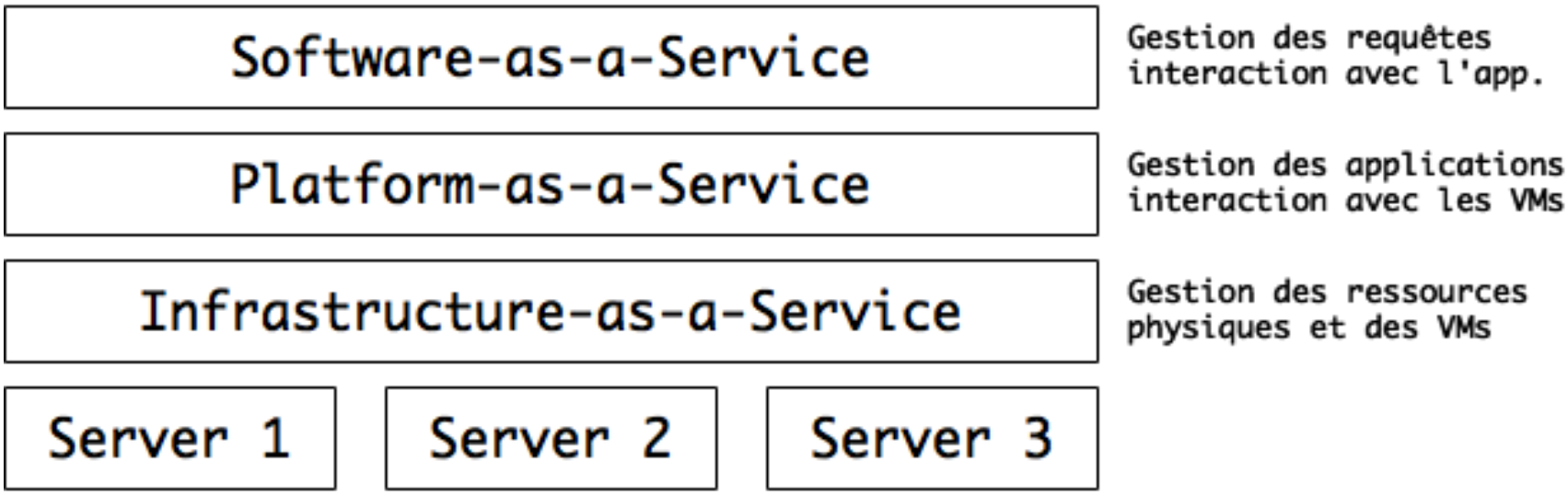
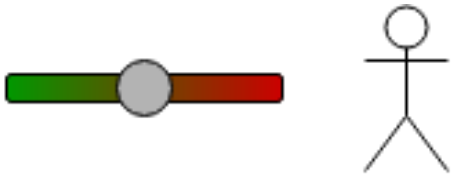
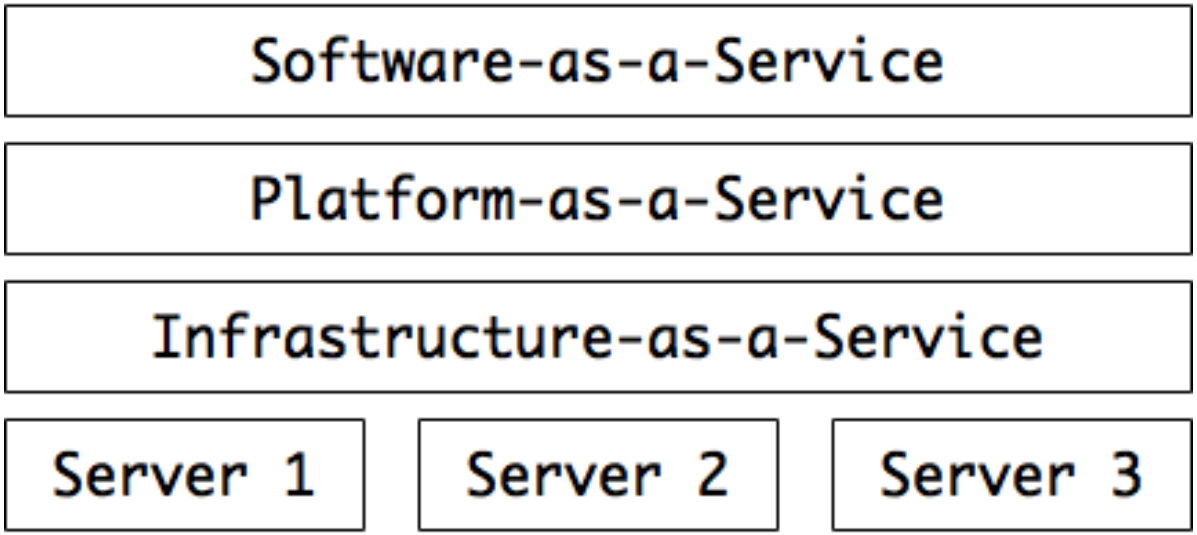


Thesis Objective





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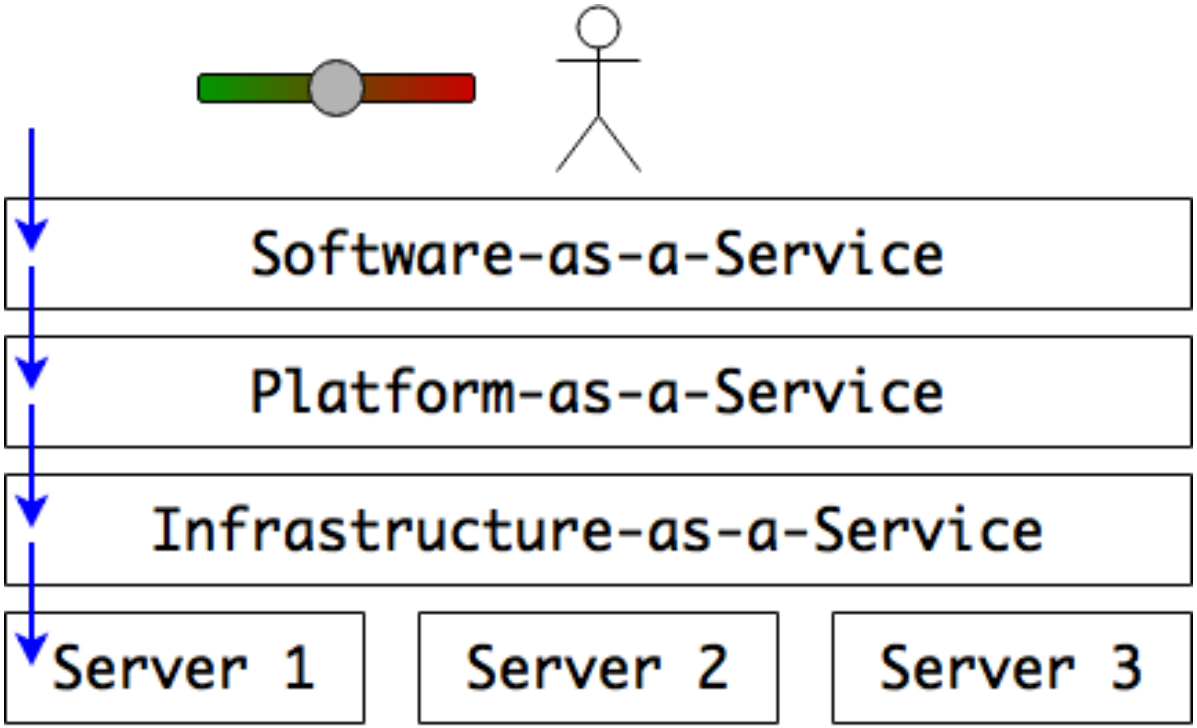

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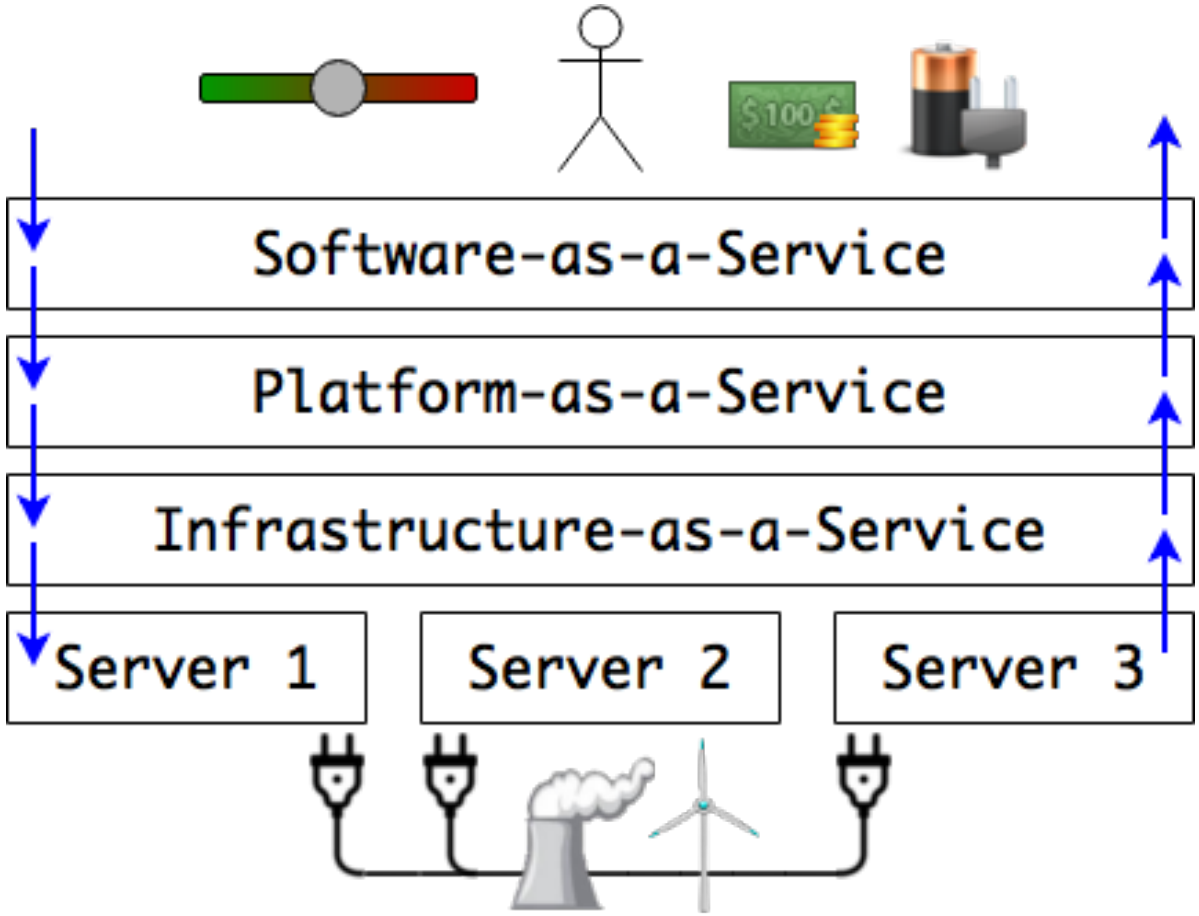
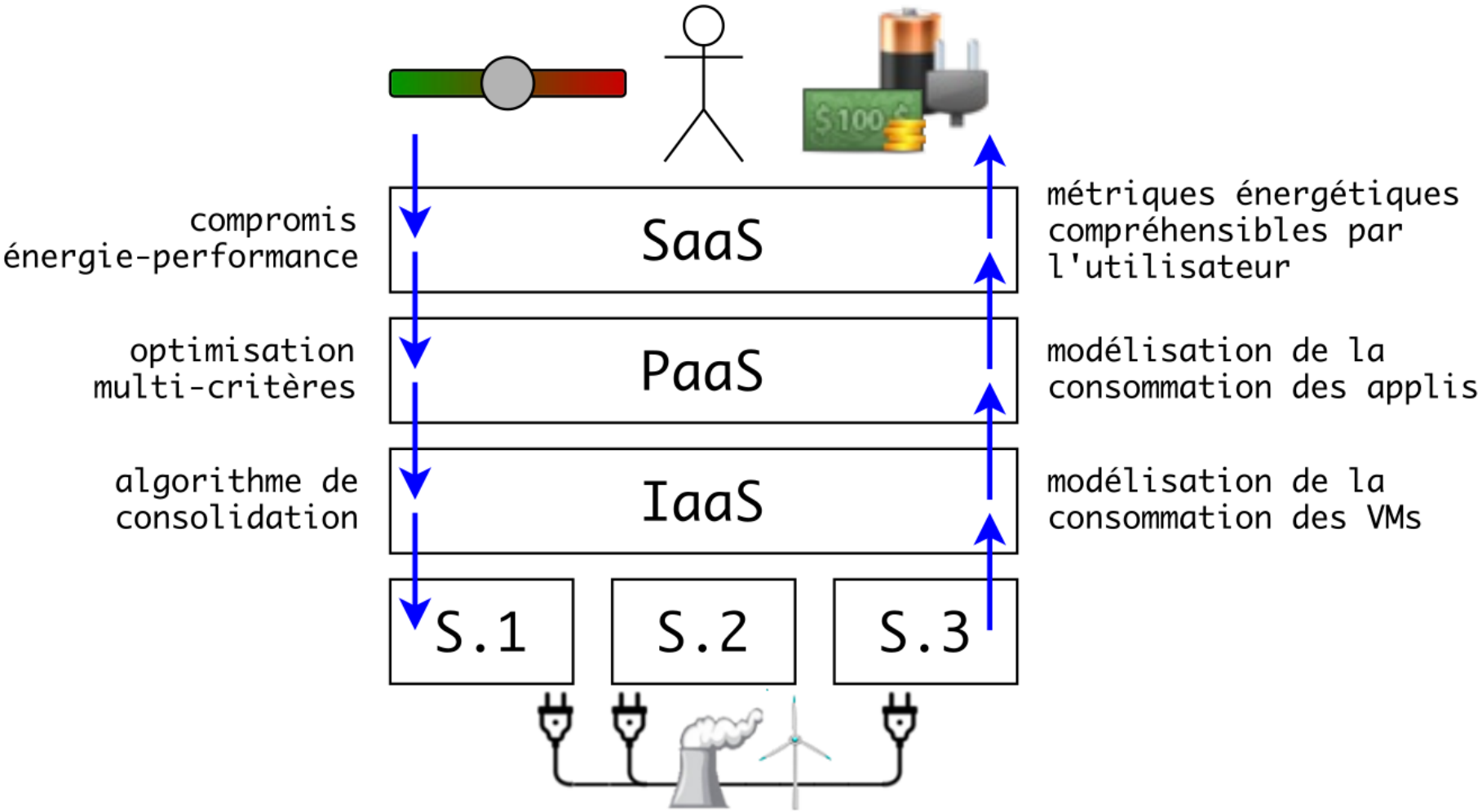


Problematic



Summary – Contributions

First Contribution Objective

- Existing solutions use consolidation
- Turning off as many hosts as possible
  - Do not take the user into consideration
  - Complex to configure

To reduce the electrical consumption of the Cloud by including the user in the optimization system

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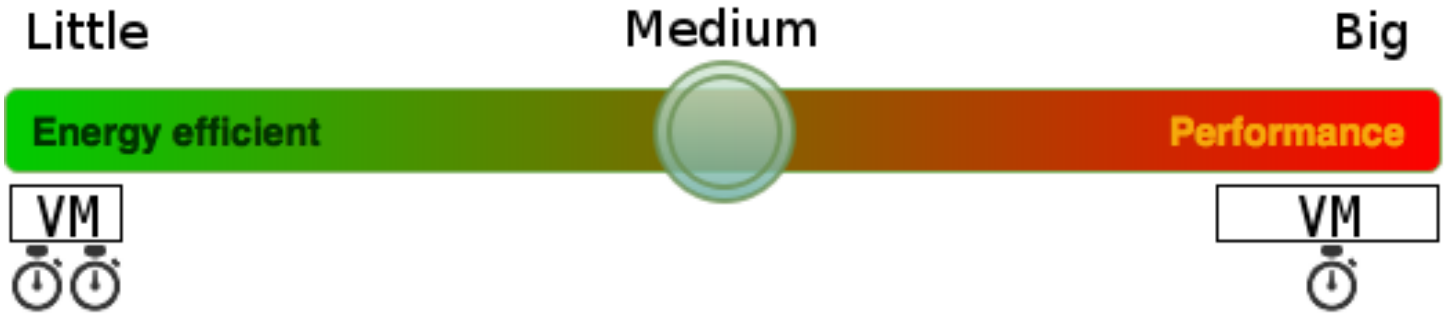
Our Research Contribution

Give the user an easy-to-use parameter



1. Easy-to-use interface to involve the user
   - Choice between *energy efficiency* and *performance*
   - Less performance → fewer resources → better consolidation
2. Algo to select VM size depending on chosen execution mode
3. Algo for the VMs placement on the servers
4. Prototype for the evaluation of the benefits of our approach

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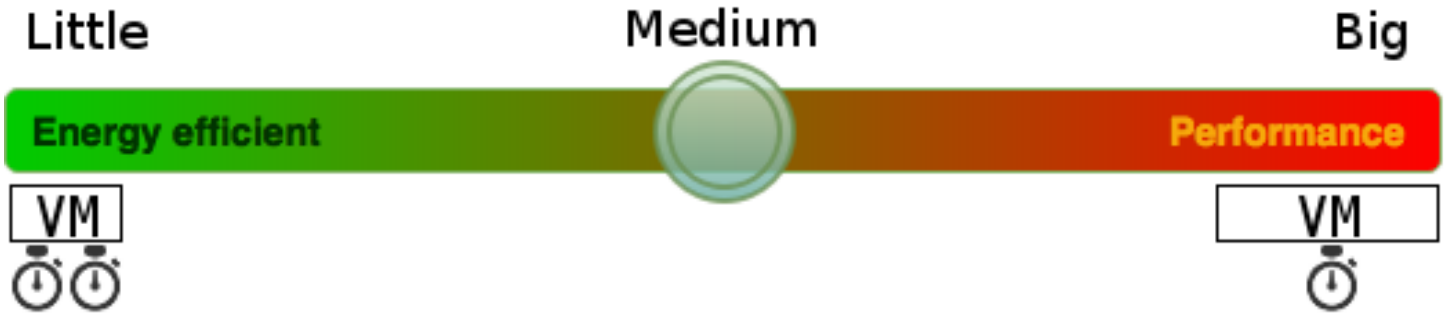

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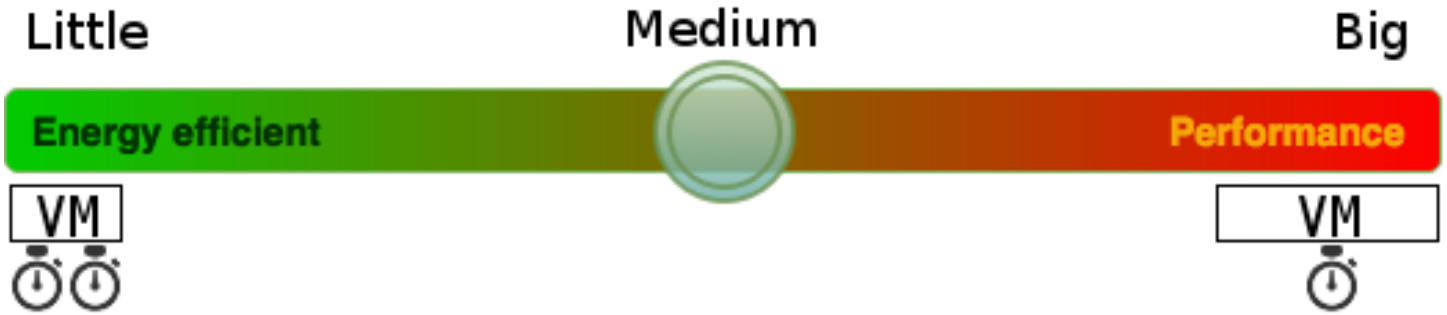

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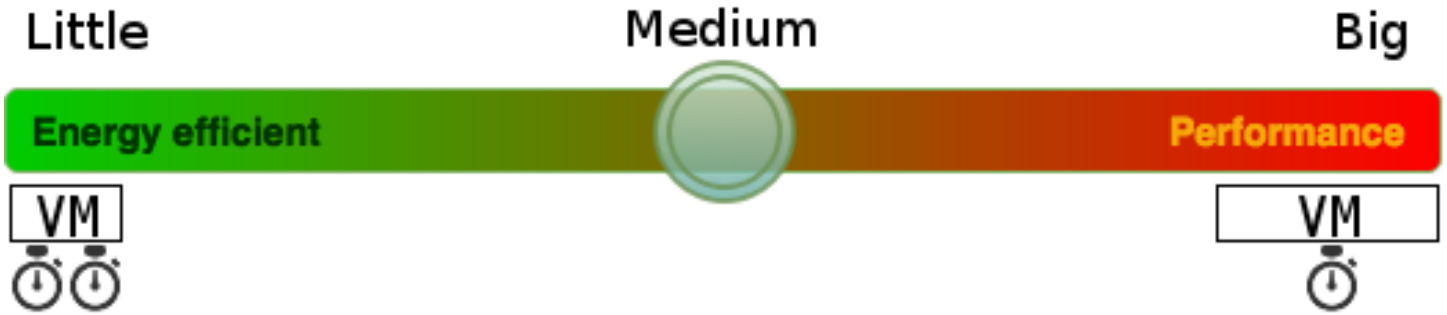

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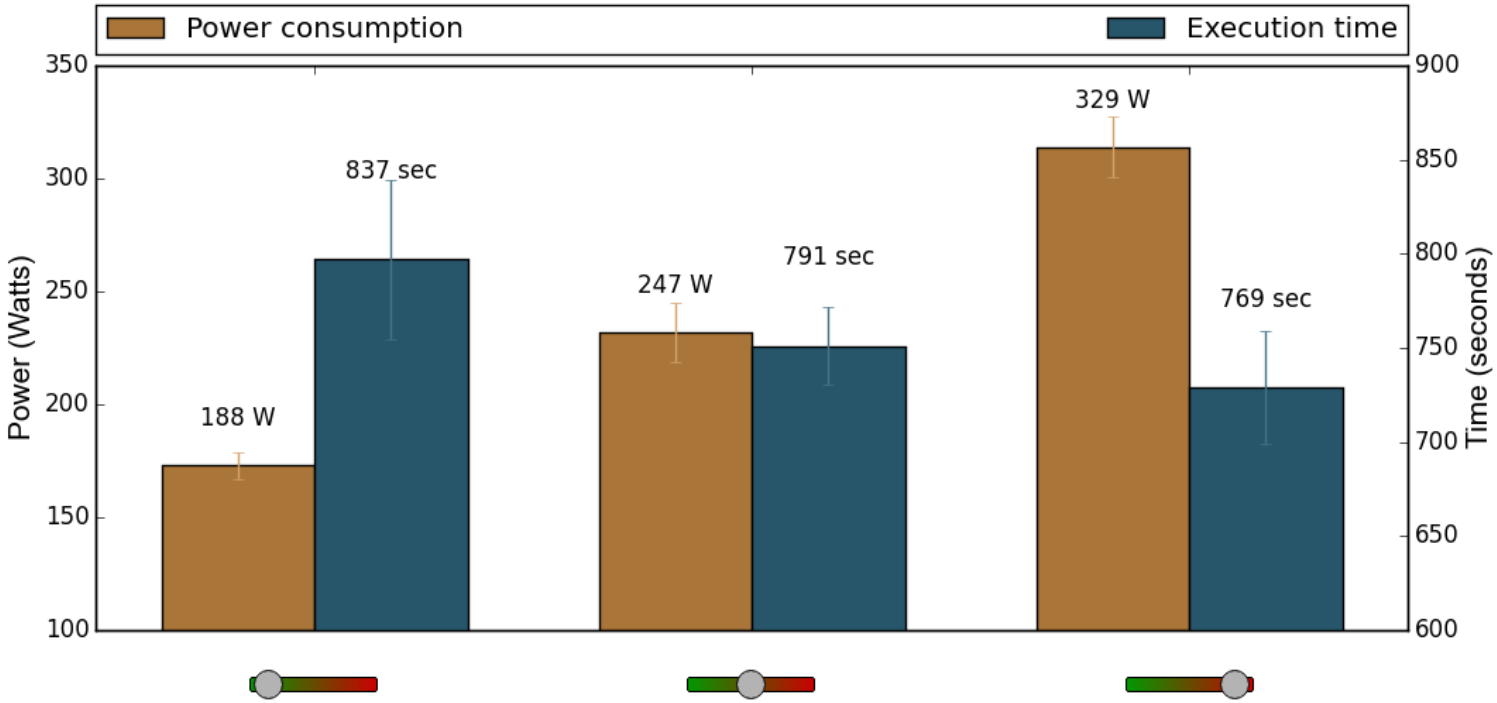
Experimentation Results

Average values after 5 experiments on each execution mode



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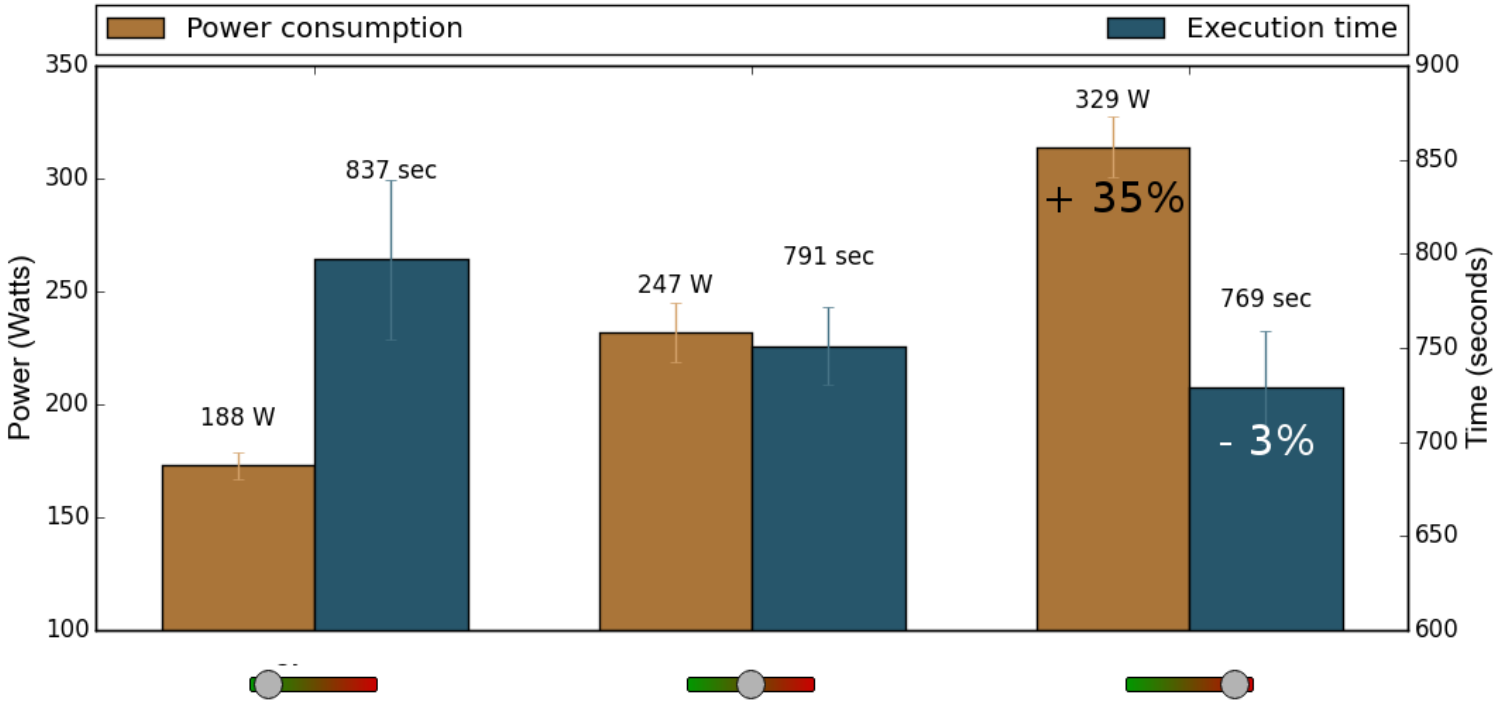

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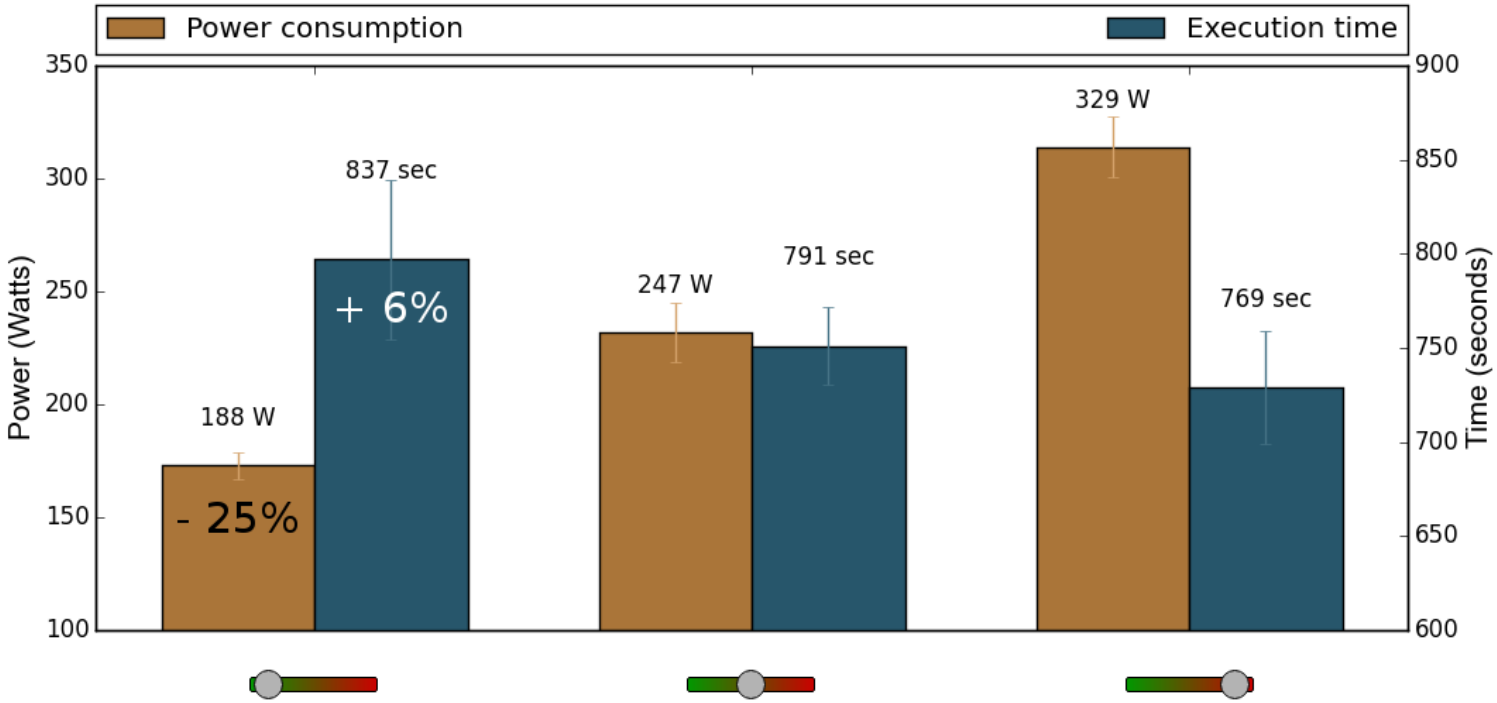


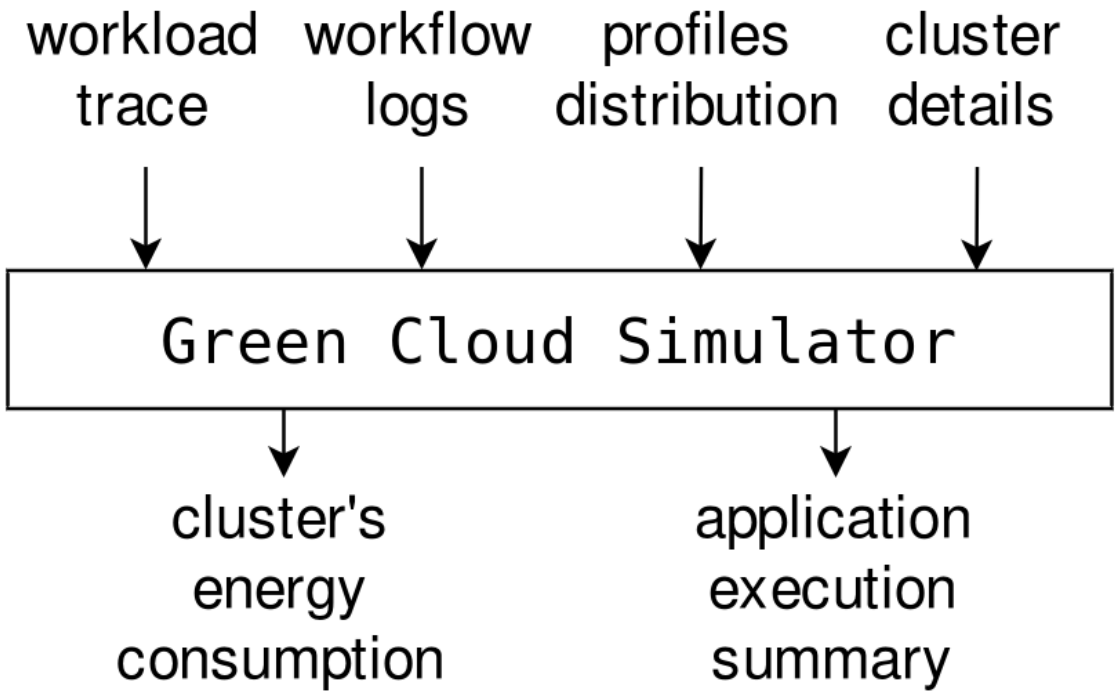
Publication

Objective of the 2nd Contribution

To know at which percent of *green* users
energy-aware Cloud systems start to save in energy

Experimental Setup

Cloud simulator architecture



Experimentation Results

Average of 10 simulations of an infrastructure with 330 hosts used during 24h

Big	Medium	Little	Energy (KWh)	Hosts used	Percent
100	0	0	632.489	282	100.000
100	0	0	292.941	292	46.316
0	100	0	234.122	168	37.016
0	0	100	231.921	143	36.668
80	0	20	273.205	236	43.195
60	0	40	269.969	208	42.684
40	0	60	258.138	190	40.813
20	20	60	246.590	167	38.987
20	60	20	242.464	171	38.335

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- Second contribution ready to be sent to the IGSC conference
- Ongoing work on an incentive system to motivate users to turn green

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