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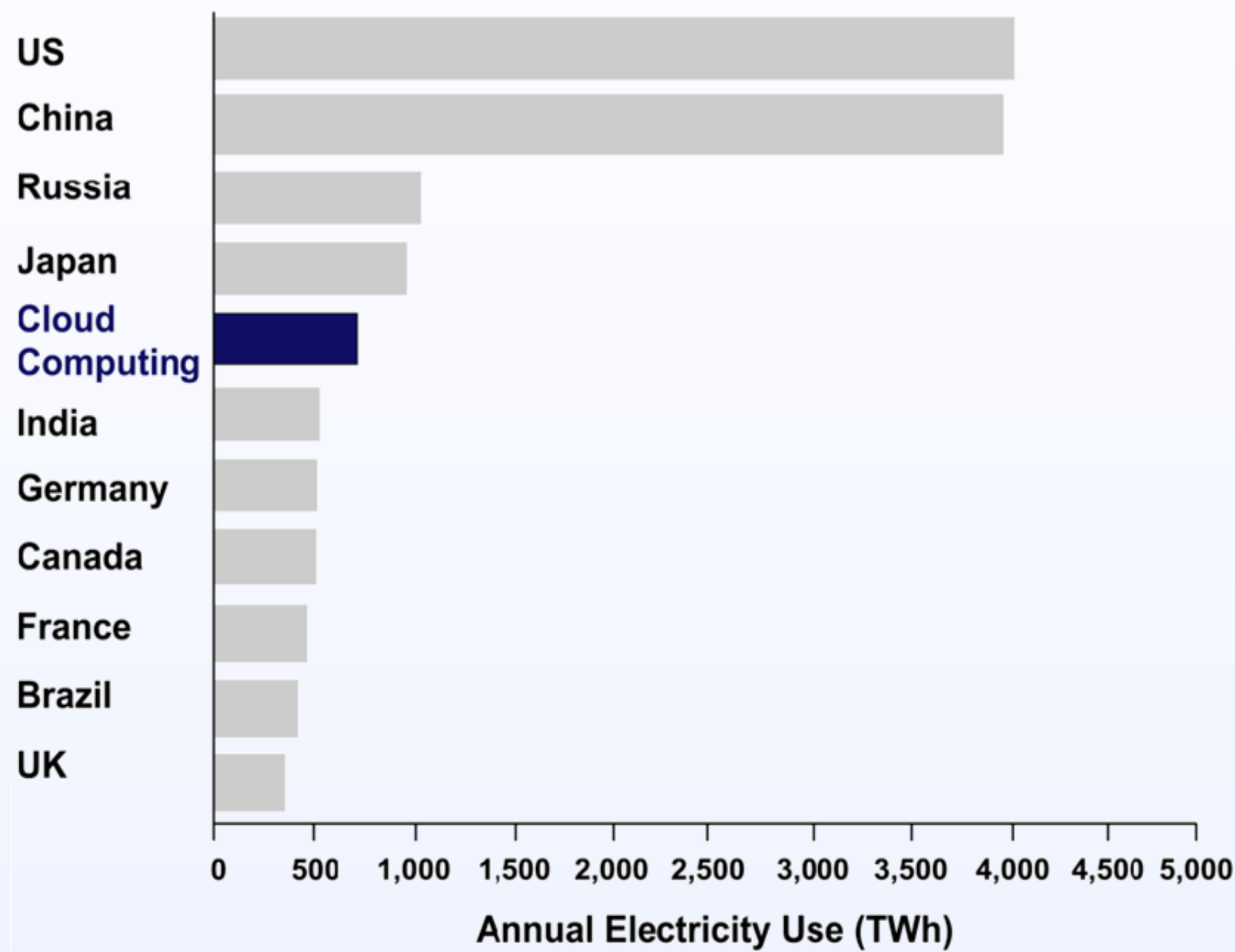
Energy Efficiency in Cloud Software Architectures



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Is Cloud Computing really energy-efficient?

Global Cloud Electricity Consumption



Source: Greenpeace International, How Clean is Your Cloud, April 2012

Motivation: Global ICT energy consumption constantly grows. Cloud computing is assumed to be energy-efficient, hence leading to a steady growth of cloud-based software services.

Goal: investigate Cloud-based software to understand how its software architectures deal with energy-efficiency.

Research methods: Systematic Literature Review

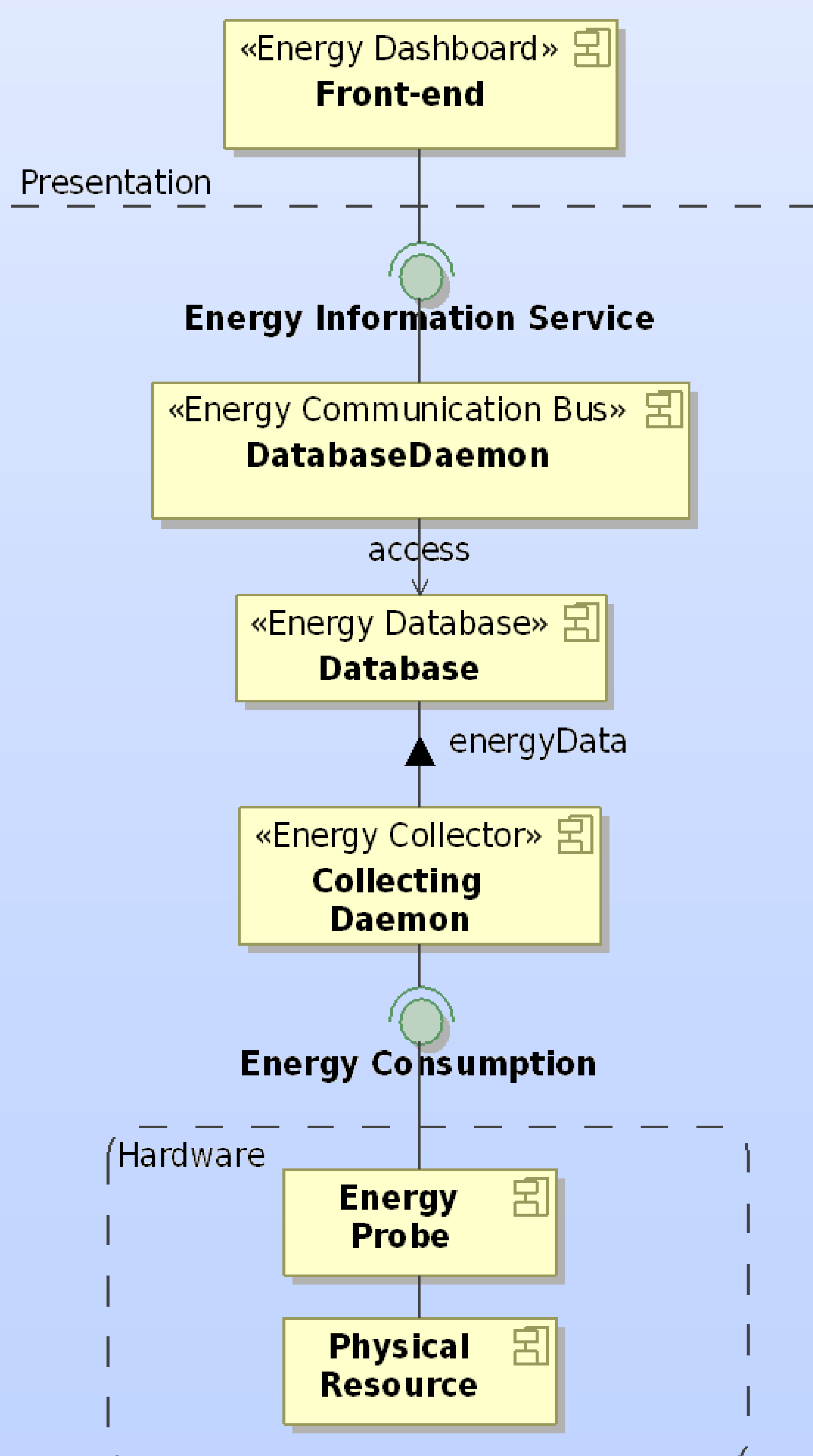
Results: software architectural strategies addressing energy efficiency aspects of Cloud-based software services.

Software Architectural Strategies for Energy Efficiency

We identified the following software architectural strategies to guide the design of energy-efficient software.

Energy Monitoring

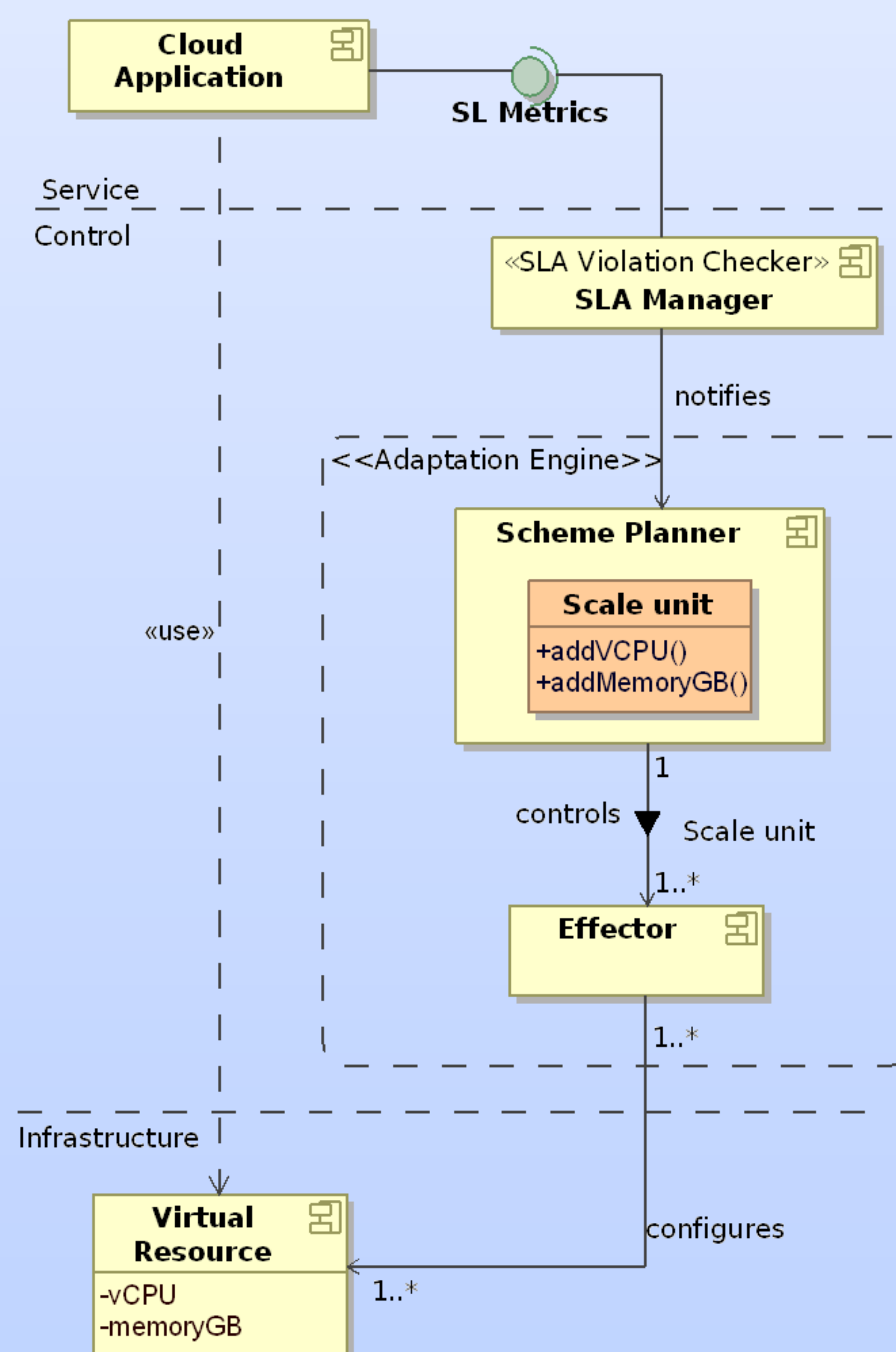
Monitor the energy consumption of the cloud infrastructure.



Example: Energy metering

Self-Adaptation

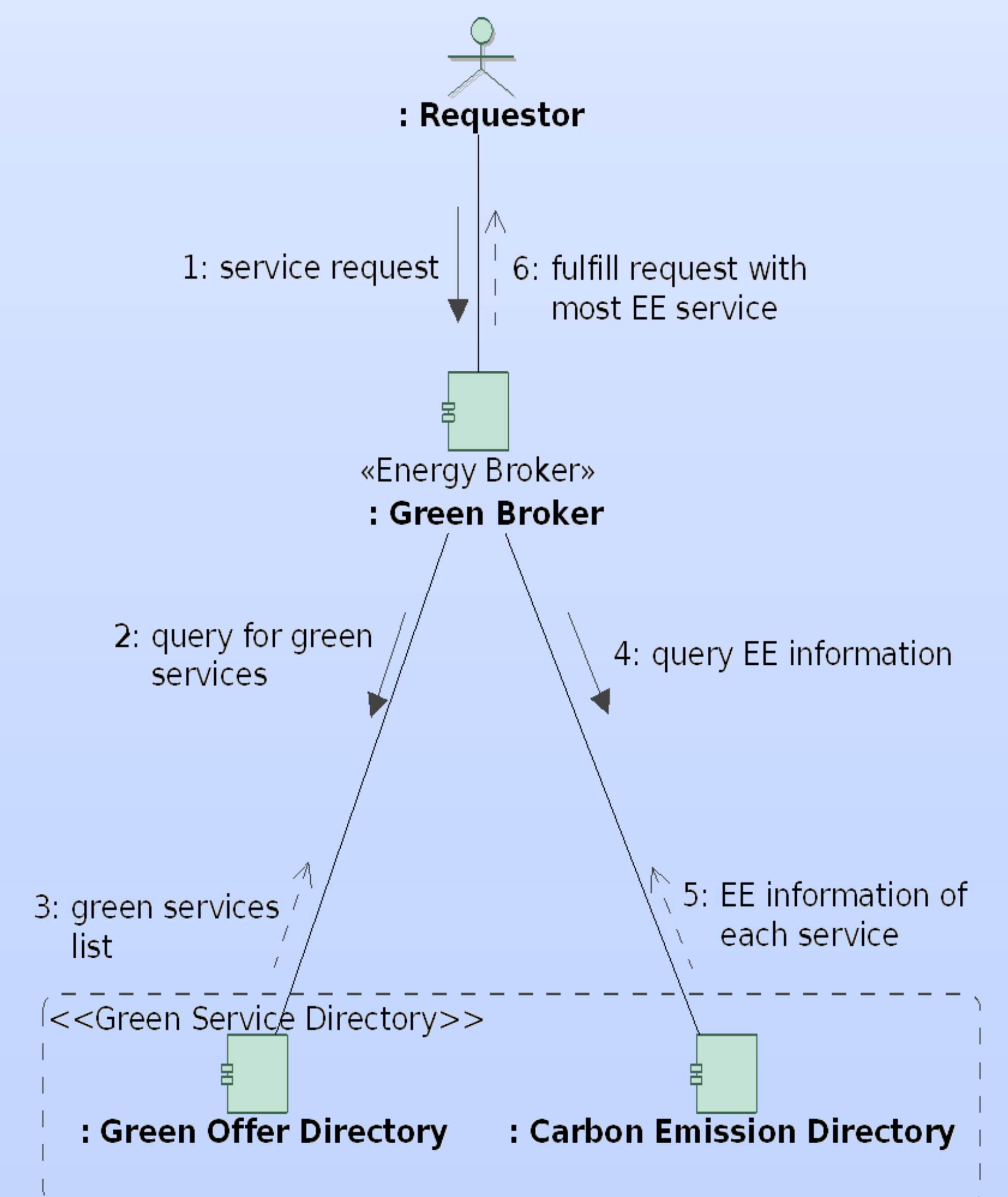
Reconfigure software at runtime to lower energy consumption.



Example: VM Scaling

Cloud Federation

Negotiate cloud services from multiple providers by using energy consumption information.



Example: Energy Broker

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Giuseppe Procaccianti is a double-degree PhD candidate of the VU University Amsterdam and Politecnico di Torino. He works in the Software & Services research group. His main research interest is energy-efficient software.