

E2Clab: Reproducible Analysis of Complex Workflows on the Edge-to-Cloud Continuum

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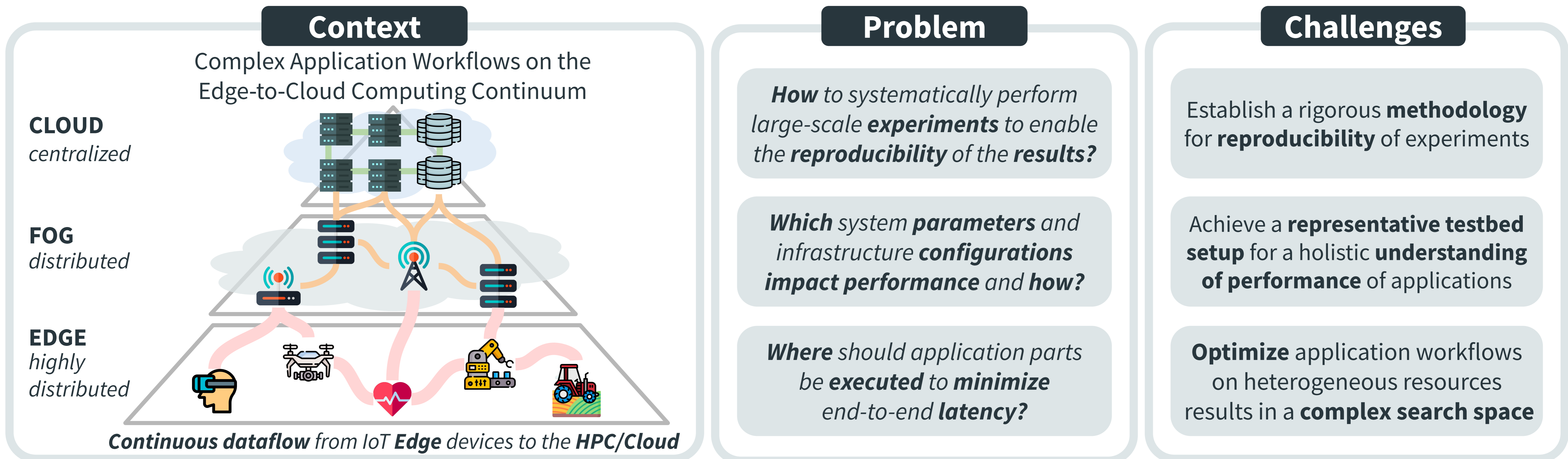
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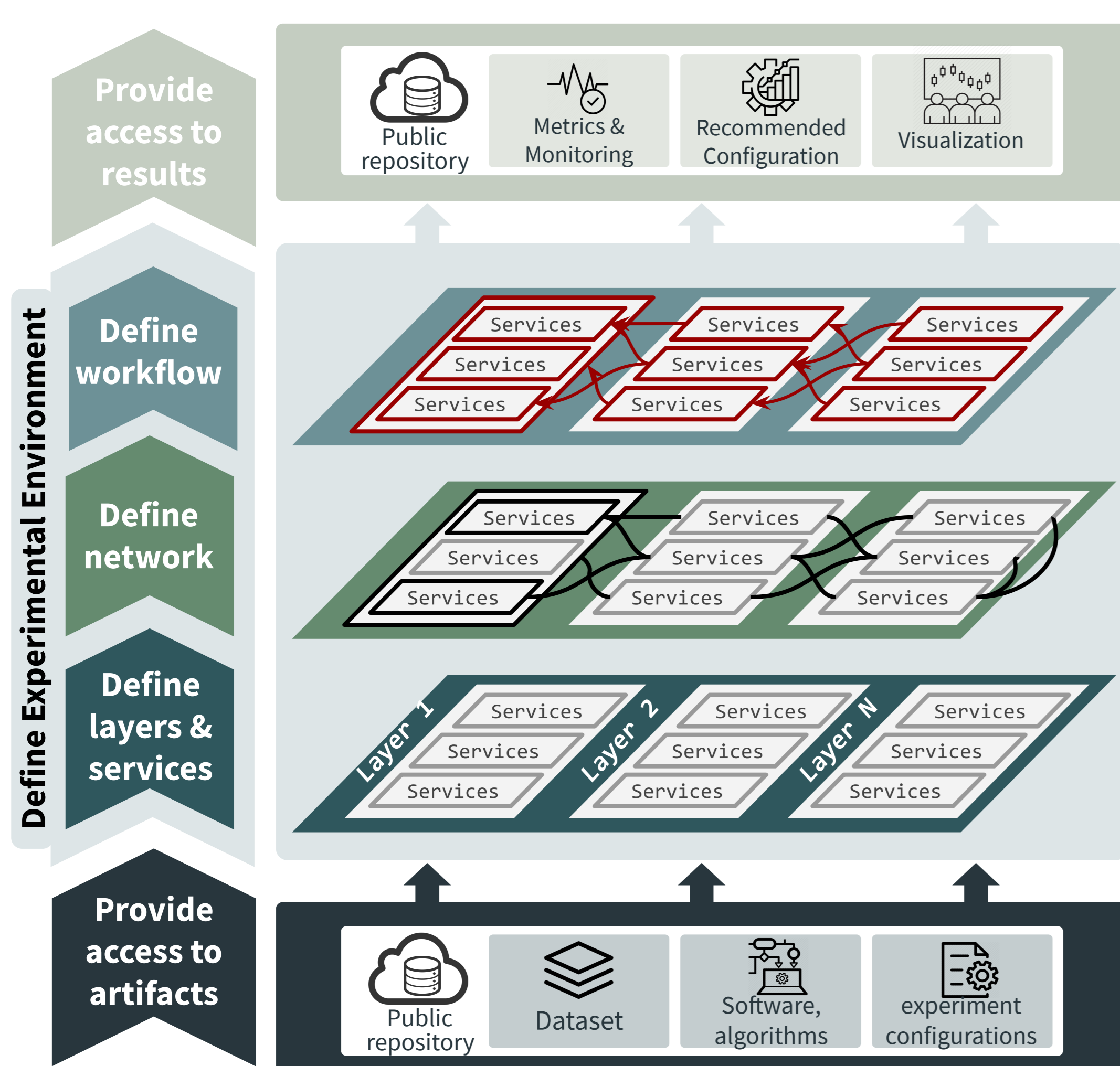
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Introduction

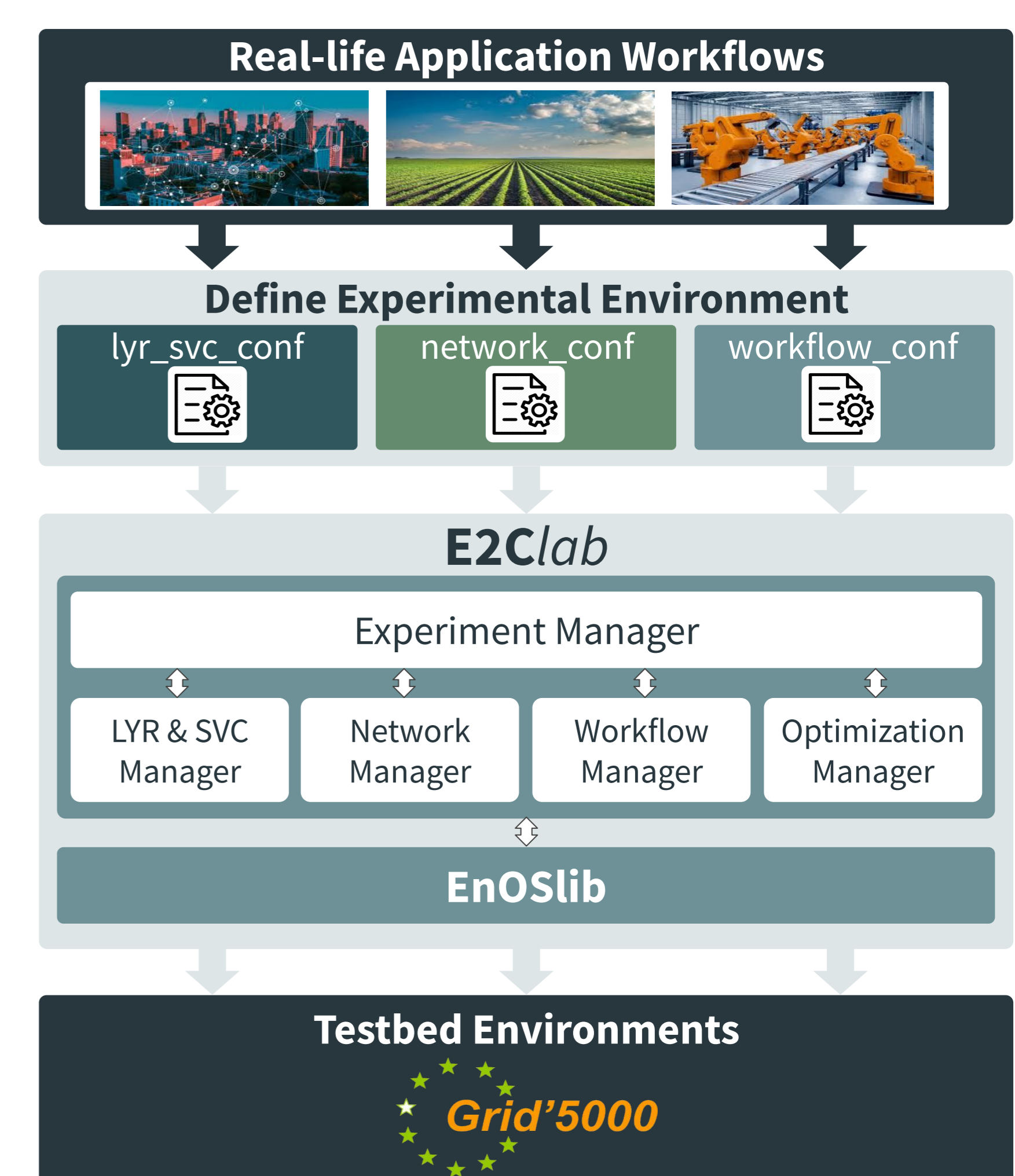


Our Contribution

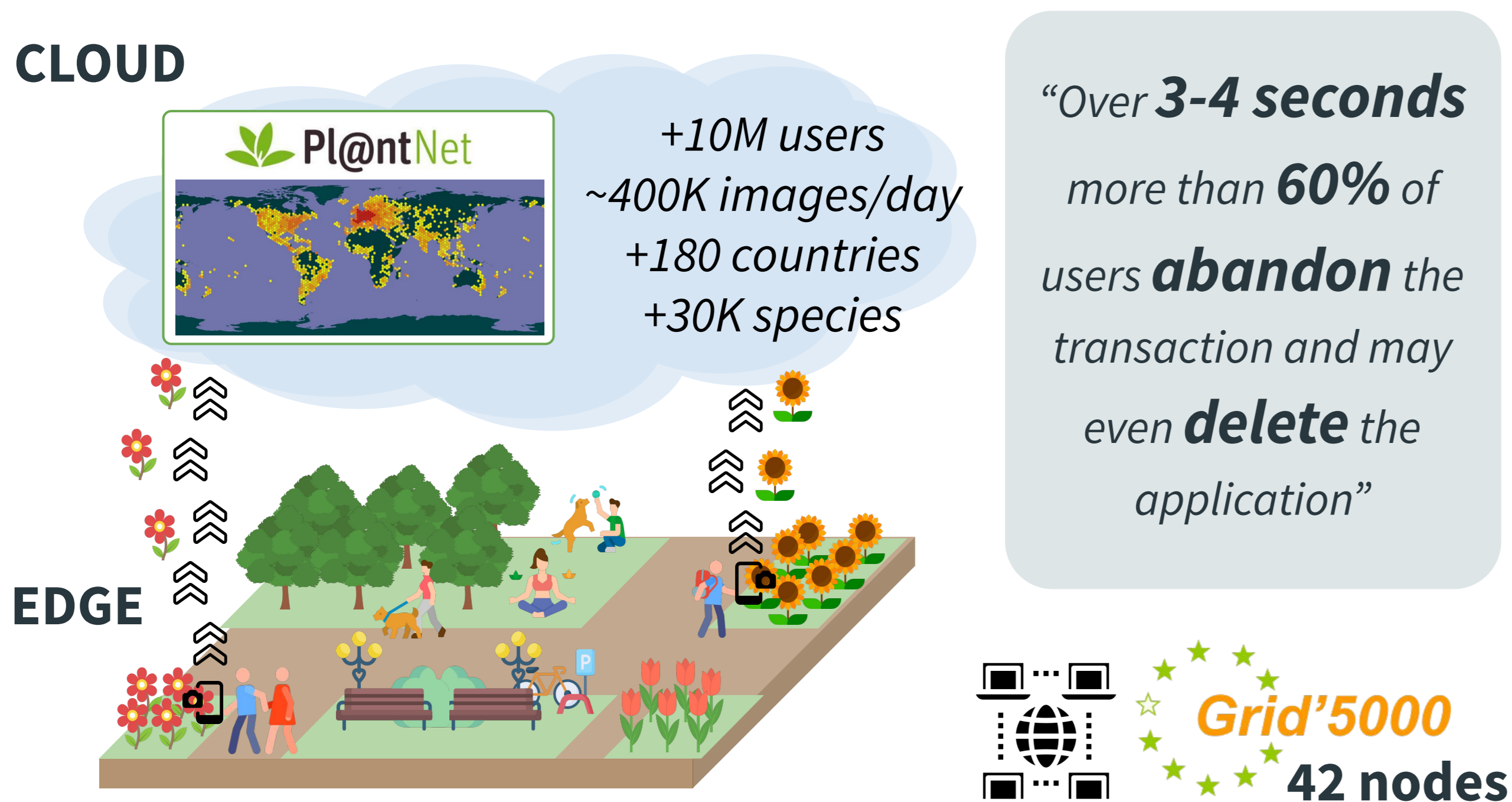


Methodology

- ★ **Reproducible Experiments**
Repeatability, Replicability & Reproducibility
- ★ **Mapping**
Application parts & physical testbed
- ★ **Variation & Scaling**
Experiment variation and transparent scaling
- ★ **Network Emulation**
Edge-to-Cloud communication constraints
- ★ **Application Optimization**
Parameter search of application and infrastructure configurations



Validation with a Large-scale Real-life Application: Pl@ntNet

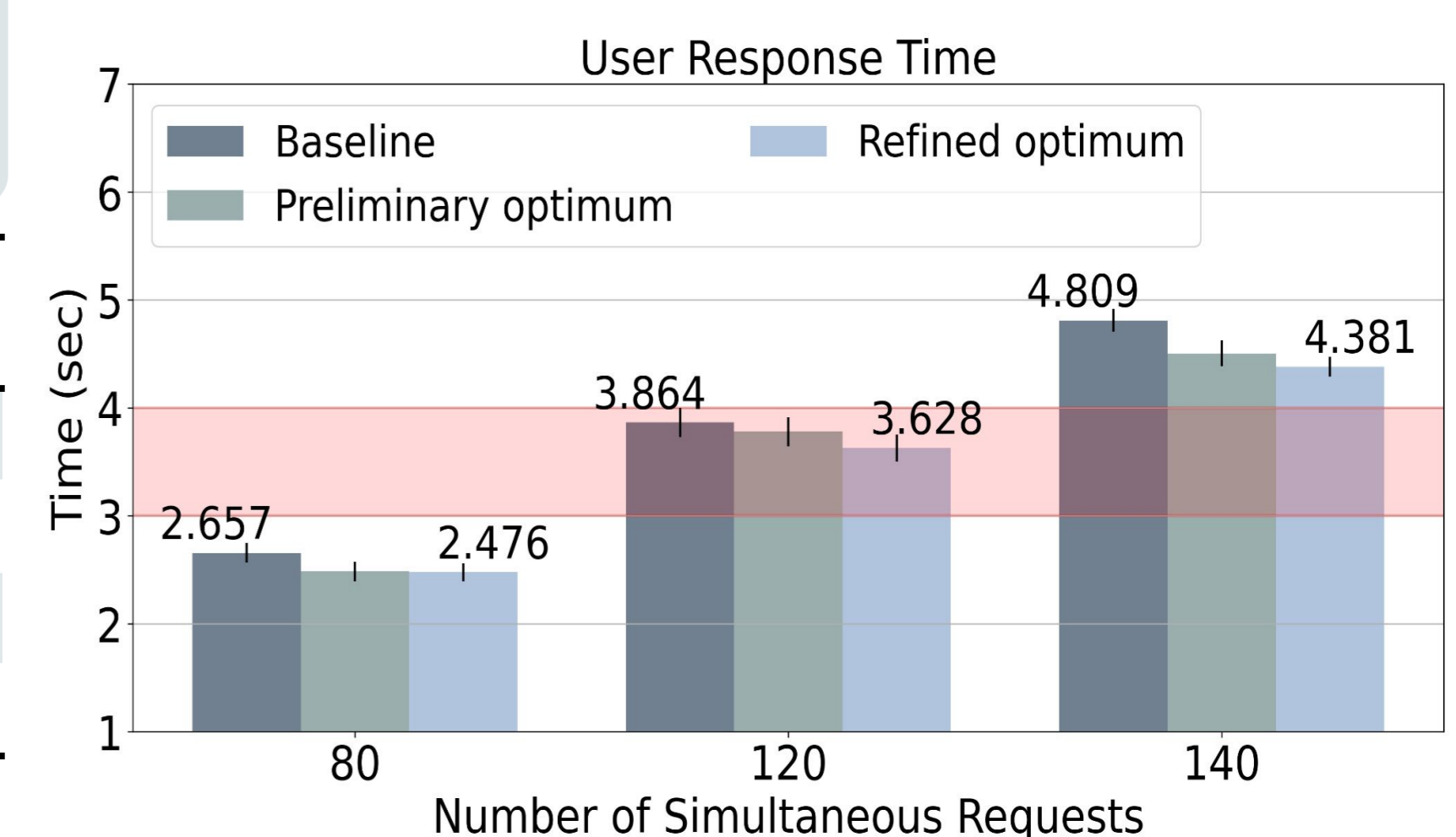


What is the software configuration that minimizes the user response time?

Find (http, download, simsearch, extract), in order to Minimize UserResponseTime
Subject to $20 \leq (\text{http, download, simsearch}) \leq 60$, Pool Size. $3 \leq (\text{extract}) \leq 9$, Pool Size.

Thread pool	baseline	preliminary optimum	refined optimum
HTTP	40	54	54
Download	40	54	54
Extract	7	7	6
Simsearch	40	53	53
User resp. time (sec)	2.65	2.48	2.47

How does the number of simultaneous users accessing the application impact on the user response time?



Takeaways

- Our methodology has proved useful for **understanding** and **improving** the **performance** of a real life application used at very large-scale.
- The configuration found by E2Clab can **process 35% more** requests and presents a **smaller user response time** compared to the baseline.

Perspectives

- E2Clab enables the Computing Continuum vision by allowing **reproducible** experimental **research** on **large-scale testbeds**.
- E2Clab supports the complete experimental cycle across the Computing Continuum: **deployment, analysis, optimization**.