

Key Features

Snooze: an open-source management system for Infrastructure-as-a-Service Clouds with:

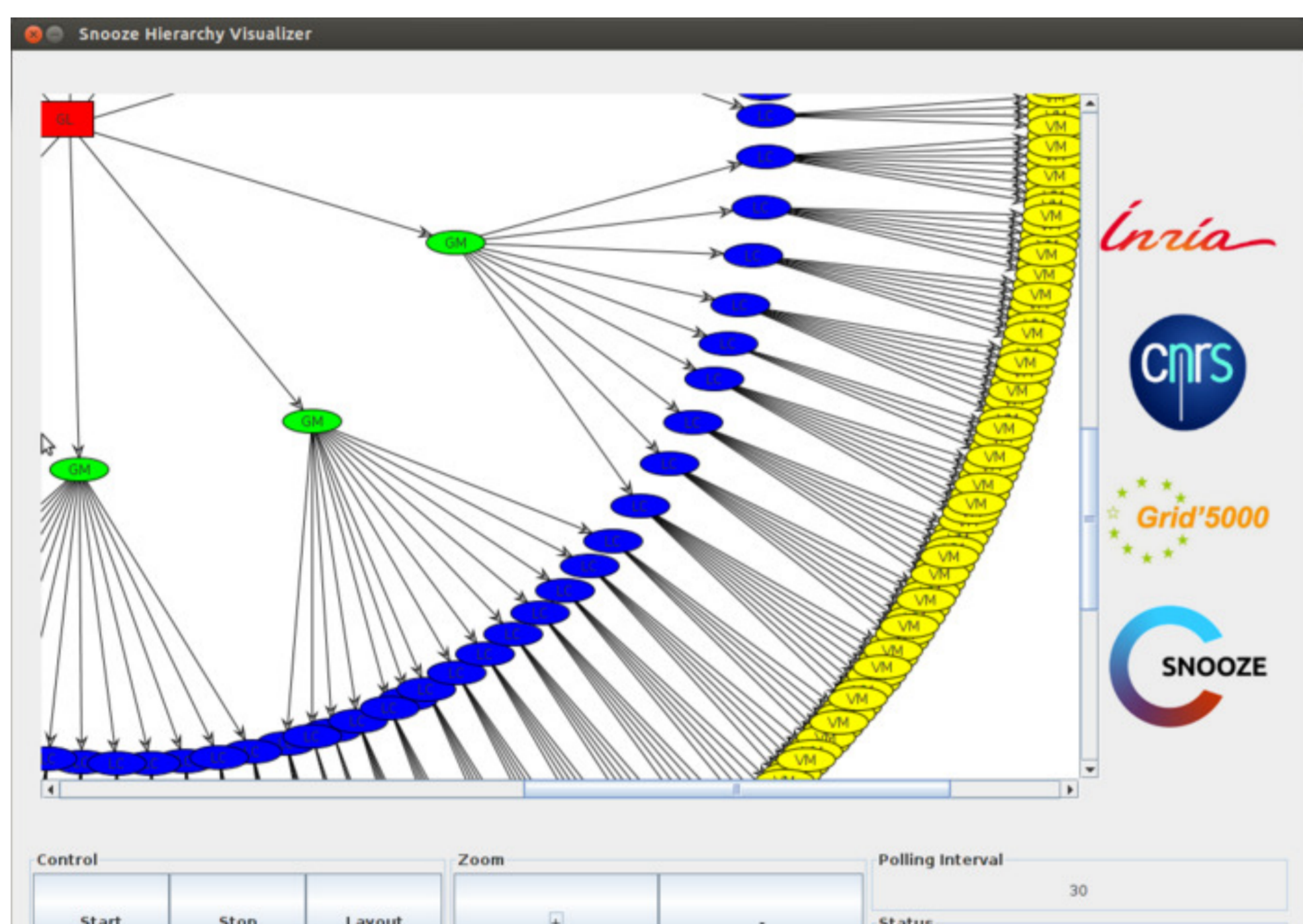
- ▶ self-organizing and healing architecture
- ▶ dynamic VM consolidation and live migration
- ▶ overload and underload detection
- ▶ power management

Grid'5000: Experimental Validation Platform

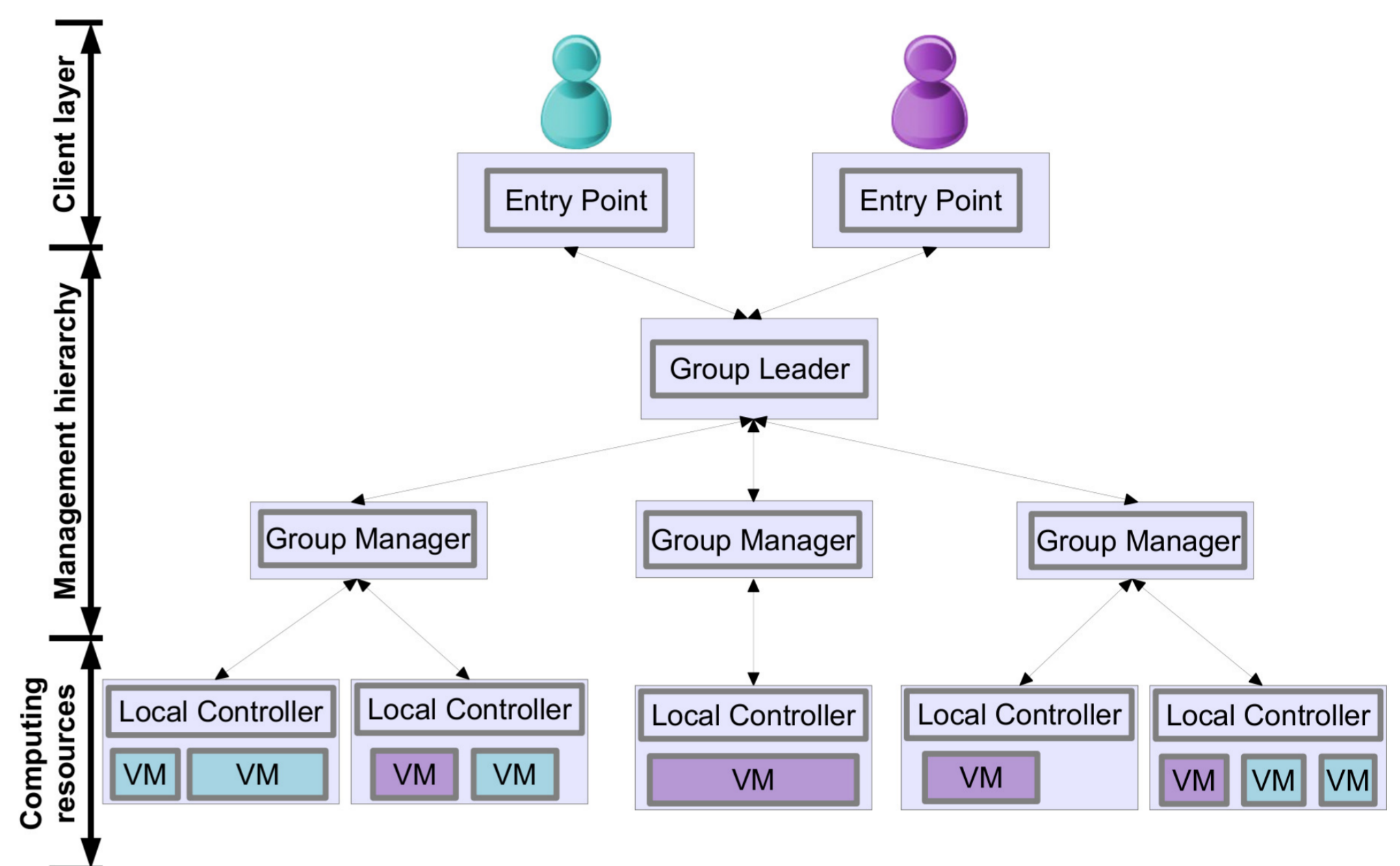


- ▶ French experimental testbed to support experiment-driven research on large-scale parallel and distributed systems
- ▶ 10 sites linked by a dedicated Gigabit network
- ▶ more than 8,000 cores

Graphical User Interface



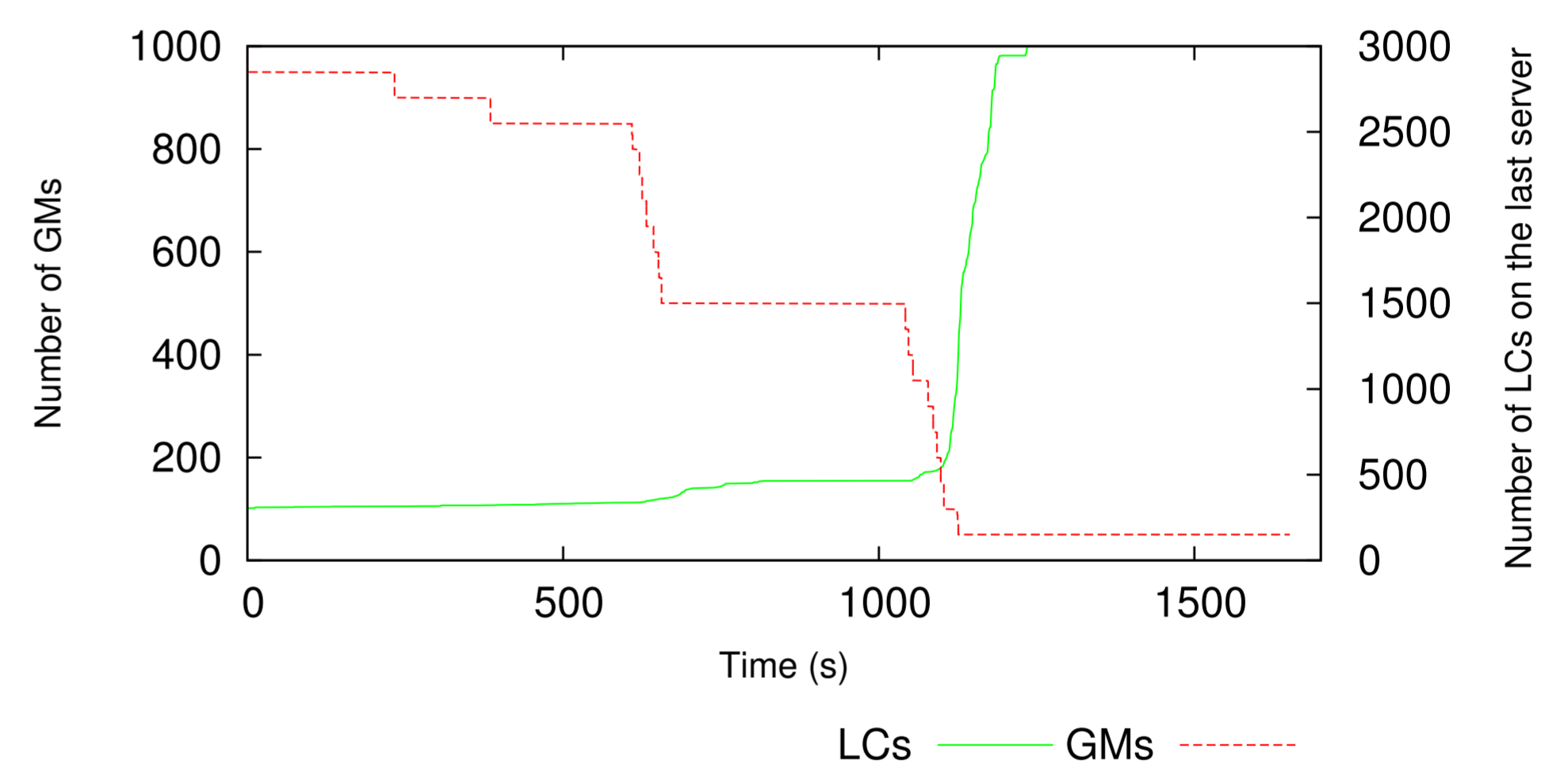
Architecture



Validation of the Fault-Tolerance

Experimental conditions:

- ▶ Initially: 1,000 GMs and 3,000 LCs, round-robin assignment.
- ▶ GMs are killed by groups of 50 at arbitrary times.
- ▶ **Self-healing mechanisms:** LCs of dead GM rejoin the hierarchy.
- ▶ **Finally: all LCs rejoin a living GM.**



Validation of the Scalability

System services join time for different topologies

Topology	1 GL	1 GL - 1 GM	1 GL	1 GL
Time since start up	5000 GMs	5000 LCs	1000 GMs - 3000 LCs	1000 GMs - 10000 LCs
30 seconds	1485 GMs	509 LCs	980 GMs - 474 LCs	-
1 minutes	3861 GMs	1043 LCs	1000 GMs - 767 LCs	979 GMs - 482 LCs
3 minutes	4656 GMs	2520 LCs	1000 GMs - 2134 LCs	983 GMs - 1492 LCs
10 minutes	4689 GMs	2633 LCs	1000 GMs - 2657 LCs	1000 GMs - 7436 LCs
15 minutes	4645 GMs	4283 LCs	1000 GMs - 3000 LCs	1000 GMs - 9593 LCs
20 minutes	4629 GMs	4300 LCs	1000 GMs - 3000 LCs	1000 GMs - 10000 LCs

<http://snooze.inria.fr>

References

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CCGrid: IEEE/ACM International Symposium on Cluster, Cloud, and Grid Computing, 2012.

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Energy Management in IaaS Clouds: A Holistic Approach.
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