

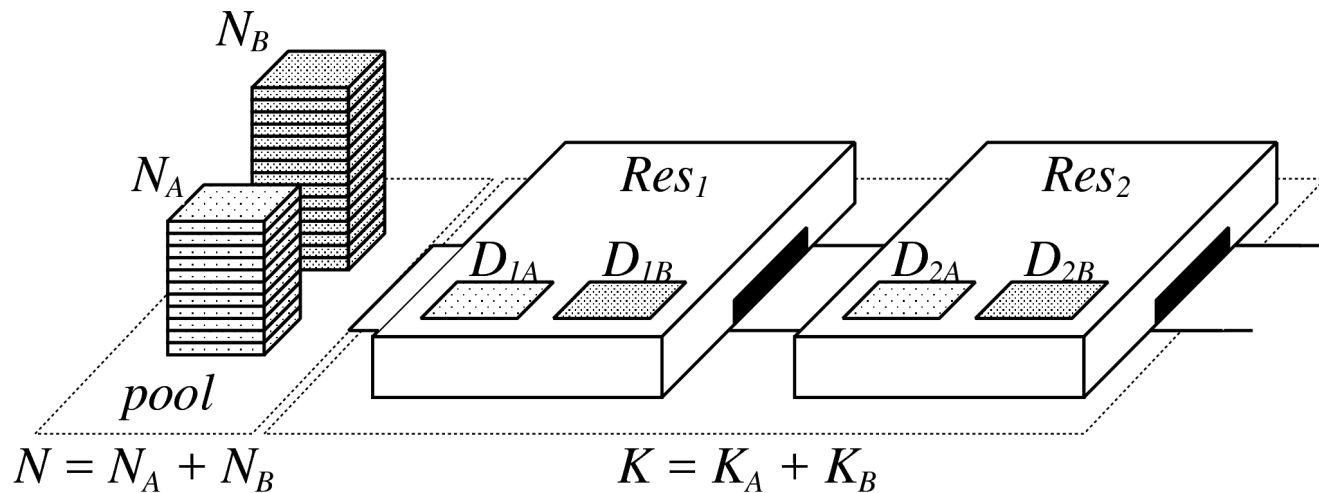
Analytical solutions for Pool Depletion Systems

PoliCloud for parallel execution

Davide Cerotti
Marco Gribaudo
Riccardo Pincioli
Giuseppe Serazzi

Pool Depletion System

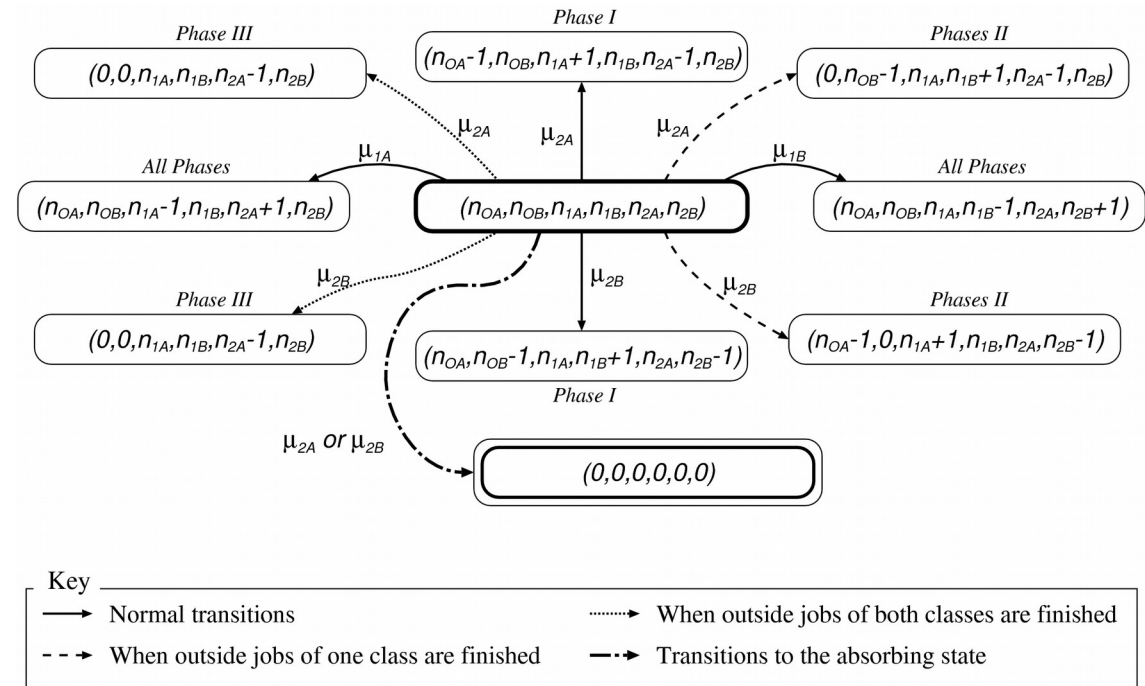
- A **pool**, with a huge and fixed number N of heterogeneous task
- A **system**, with finite capacity K



Tools and Techniques

Several techniques:

- Analytical equations
- **Stochastic model**
- Simulation (JMT, ...)

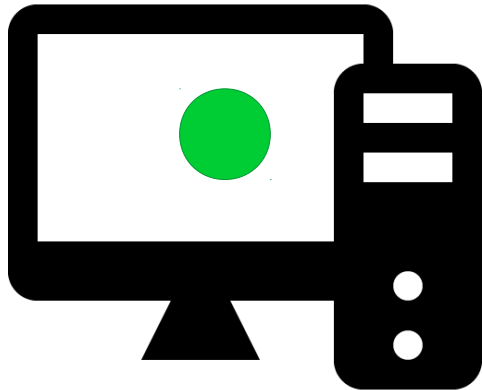


State space size:

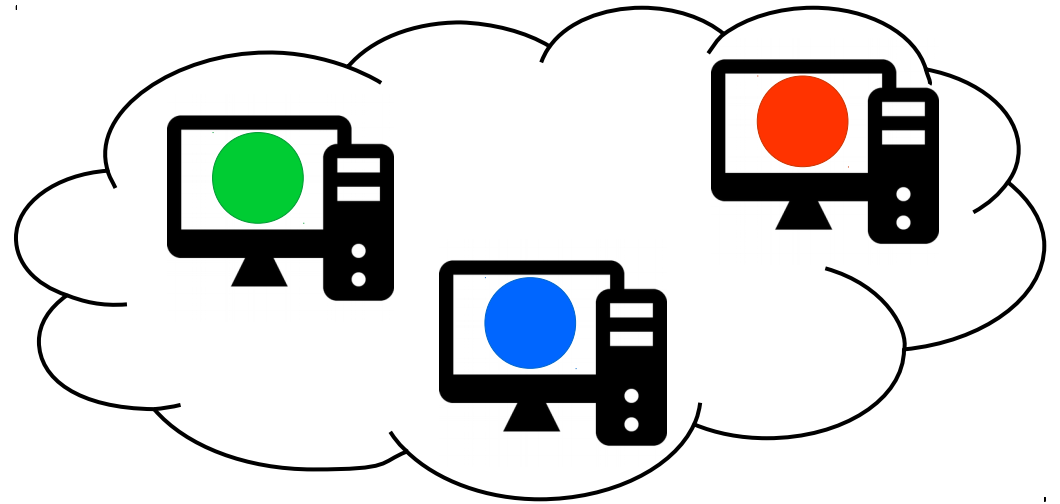
- single-class workload, $N = 100$ and $K = 1 \rightarrow 201 \text{ states}$
- multi-class workload, $N = 80$ and $K = 40 \rightarrow 470771 \text{ states}$
- **State space explosion**

Exploiting PoliCloud

Single machine



PoliCloud



10 configurations to analyze:

- ~26 hours → $N=200$, $K=16$ and multi-class workload

Conclusions

- We are using PoliCloud for parallel executing different configurations of a pool depletion system
 - A lot of time has been saved:
 - Single machine
 - $26 \text{ hours} * 10 \text{ configs} = 260 \text{ hours} \sim 11 \text{ days}$
 - PoliCloud → 26 hours
- Future work:
 - Simulations on PoliCloud

References

- Cerotti, D., Gribaudo, M., Pincioli, R., & Serazzi, G. (2016). Stochastic analysis of energy consumption in pool depletion systems. In *Measurement, Modelling, and Evaluation of Computing Systems and Dependability and Fault Tolerance 2016*.
- Cerotti, D., Gribaudo, M., Pincioli, R., & Serazzi, G. (2016, October). Optimal population mix in pool depletion systems with two-class workload. In *VALUETOOLS 2016, Taormina (IT), 2016*.

Thanks for your attention