

SAMMClouds:
Secure and **A**daptive **M**anagement
of **M**ulti-**C**louds

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People

UNIMORE

UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA



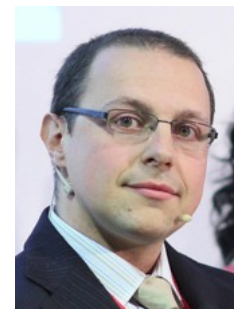
Claudia Canali (PI)
RU



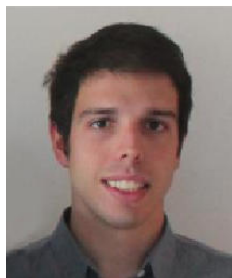
Riccardo Lancellotti
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Mohammad Shojaifar
Post-Doc grant
(now @CNIT)



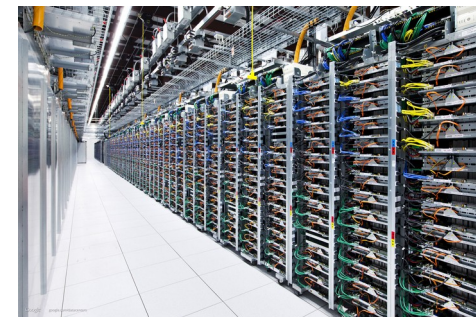
Mirco Marchetti
Post-Doc grant
(now RTD-B)



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Ph. D. Student
(now Post-Doc grant)

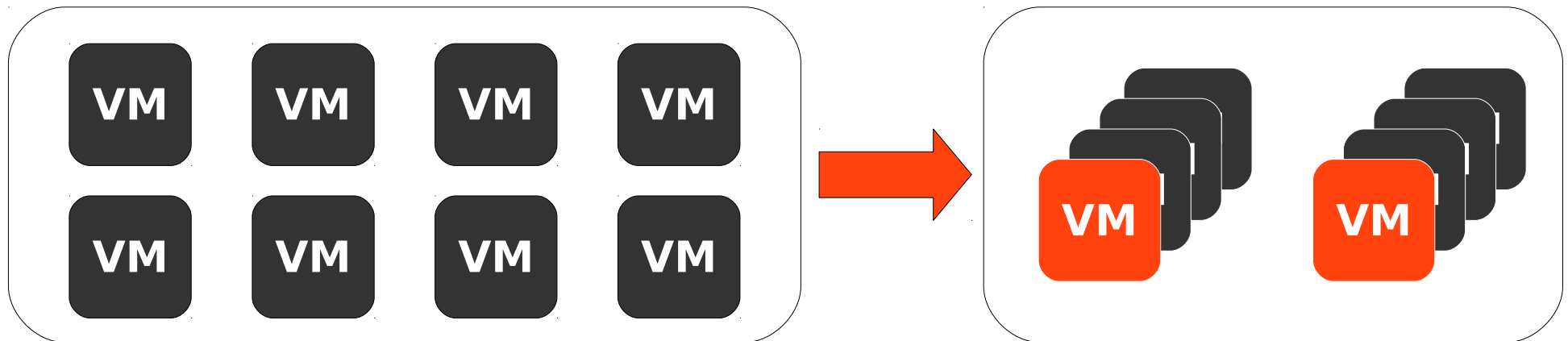
Motivations

- The Cloud Computing vision
 - Many customers → few providers
 - Elasticity: scale-up, pay-per-use
 - Virtualization (IaaS)
- Large Data Centers (> 10⁵ VMs, PB of data)
- Challenges:
 - **Monitoring** (collect & extract info about DC)
 - **Management** (reduce energy consumption)
 - Guarantee security



Scalable Monitoring

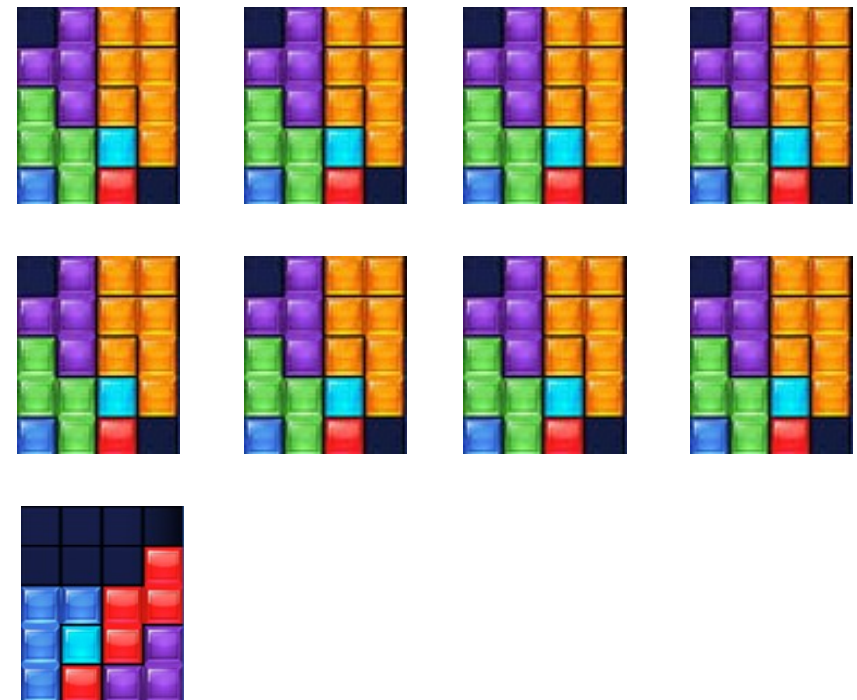
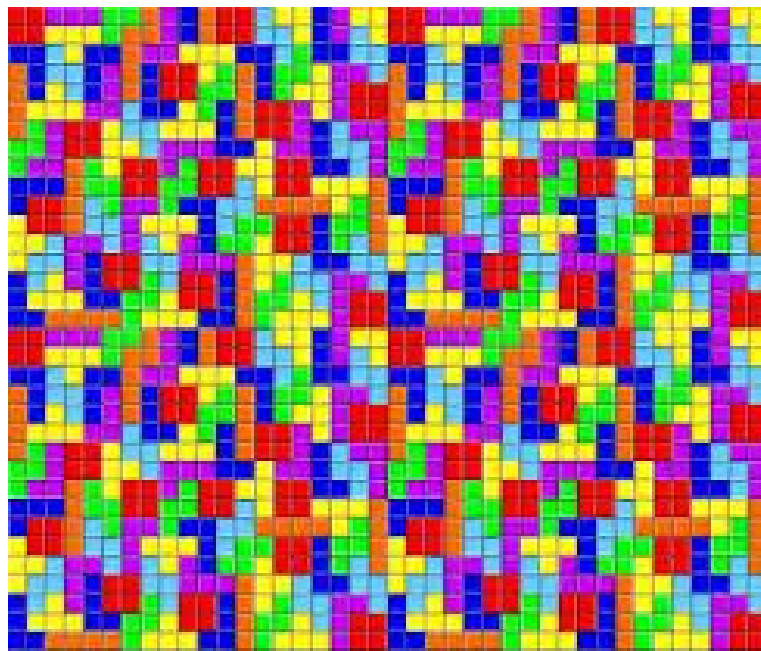
- IaaS Cloud: VMs as black boxes → ~~Scalable Monitoring~~
- Leverage information on VM with *similar behavior*



- Statistical description of VM behavior:
 - Correlation-based, Histograms, Mixture of Gaussian, ...
 - Comparison of multiple similarity metrics

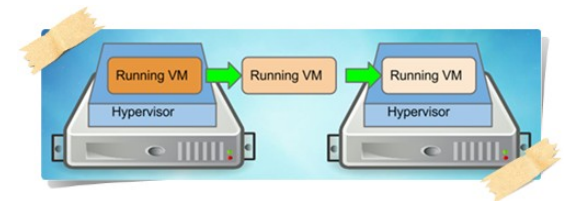
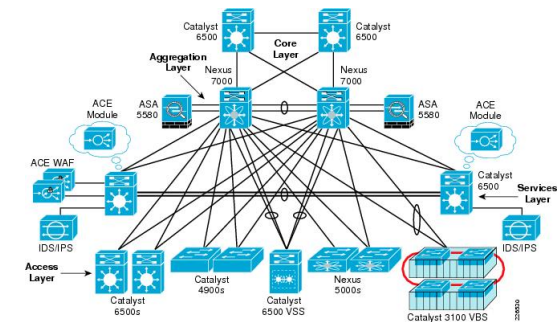
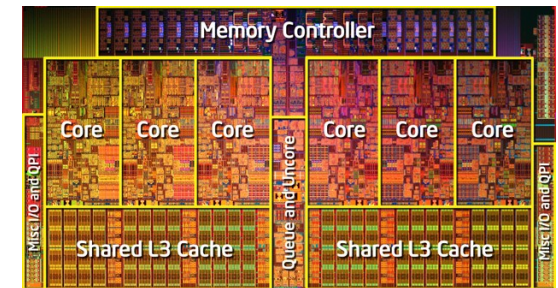
Green Management

- Fit VMs on Physical servers (match requirements for CPU, memory, ...; multiple time slots)
- Multi-dimensional bin-packing → Scalable Placement



Green Management

- Detailed energy models for VMs placement
- Details on servers
 - DVFS-based models for CPU
- Details on Data Center
 - Software-defined network (SDDC)
 - Network-related energy
 - Migration of VMs



Research Results

- Scalable Monitoring
 - 3 papers (2 Journals)
 - *IEEE Trans. Cloud Comp*
- Green Management
 - 8 papers (4 Journals)
 - *IEEE Trans. Cloud Comp*
- Security
 - 1 paper
- Overview:
 - 12 papers (6 Journals)
 - 1 post-doc grant
- Collaborations:
 - 2 International:
J. Abawajy, S. Abolfazli
 - 2 National:
Sapienza, Tor Vergata

Further Development

- Follow-up project:
 - S²C: **S**ecure and **S**oftware-Defined **C**loud
FAR 2016 – DIEF
- Ongoing collaborations:
 - L. Chiaraviglio (Univ. of Rome “Tor Vergata”)
 - M. Shojafar (CNIT)
 - D. Ardagna (Politecnico Milano)



SAMMClouds: Secure and Adaptive Management of Multi-Clouds

More info:

<http://web.ing.unimo.it/sammclouds/sammclouds.html>

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