

A high-angle, blurred photograph of a crowd of people walking on a light-colored pavement. The motion blur gives a sense of a busy, fast-paced environment.

SLA Assurance in Cloud Data Centers

Yearly Team Meeting 2016

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CSC

COMPUTER SCIENCE
AND COMMUNICATIONS
RESEARCH UNIT



UNIVERSITÉ DU
LUXEMBOURG

Agenda

- Who am I ?
 - Background & Education
 - Work Experience
- Master Thesis
- PhD: What I did ?
- PhD: What am I doing ?
- PhD: What would be the future ?
- Attended events

Who am I ?

- Abdallah Ali
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 - abdallah_zain@ci.suez.edu.eg
- Born in Suez, Egypt (The South entrance for the Canal de Suez)



BIO: Background & Education



- **BSc.(Sep. 2006- July 2010)**
 - Bachelor of Information & Computer Sciences - Suez Canal University (Ismailia, Egypt)
- **Pre-MSc.(Sep. 2011- July 2012)**
 - Pre-master of Computer Sciences(Master 1) – Suez Canal University (Ismailia, Egypt)
- **MSc.(Sep. 2013 – July 2015)(Erasmus Mundus)**
 - Master of Information & Computer Sciences – University of Luxembourg (Luxembourg)
 - Two profiles: Communications & Network Systems

BIO: Work Experience

- **Teaching Assistant (Oct. 2010 – Aug. 2013)**
 - Faculty of Computers & Informatics, Suez Canal University (Egypt)
- **Instructor (Jan. 2011 – Aug. 2013)**
 - CISCO Academy, Suez Canal University (Egypt)
- **Network Administrator (Feb. 2012 – Aug. 2013)**
 - IT Unit in Faculty of Computers & Informatics- Suez Canal University (Egypt)
- **Research Assistant (Jan. 2014 – Mar. 2015)**
 - SnT- Vehicular & Secan labs, University of Luxembourg (Luxembourg)



Master Thesis



Thesis:

Service Level Agreement Assurance in Cloud Computing Data Centers

Supervisor: Prof. Dr. Pascal Bouvry

Reviewer: Prof. Dr. Ulrich Sorger

Advisor: Dr. Dzmitry Kliazovich



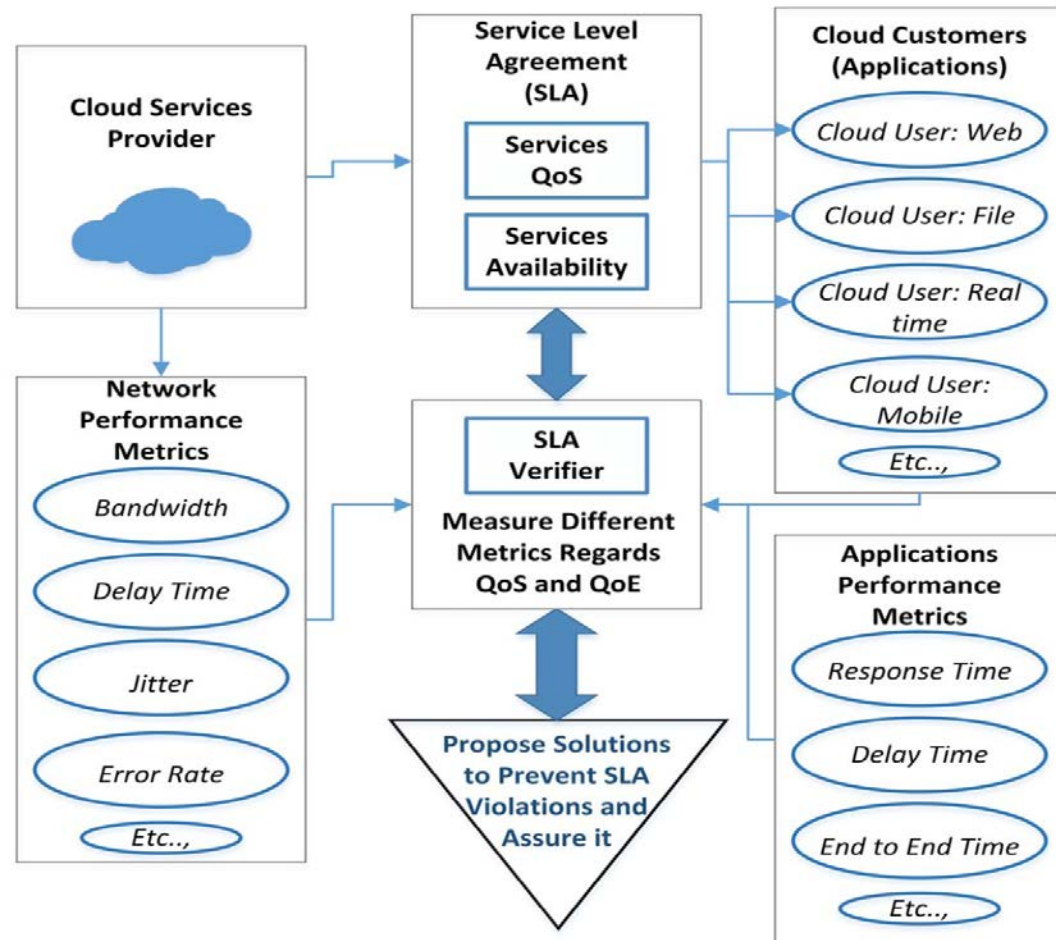
PhD: what I did?

1. Service Level Agreement Assurance between Cloud Services Providers and Cloud Customers

2. Virtual Desktop Infrastructure (VDI)

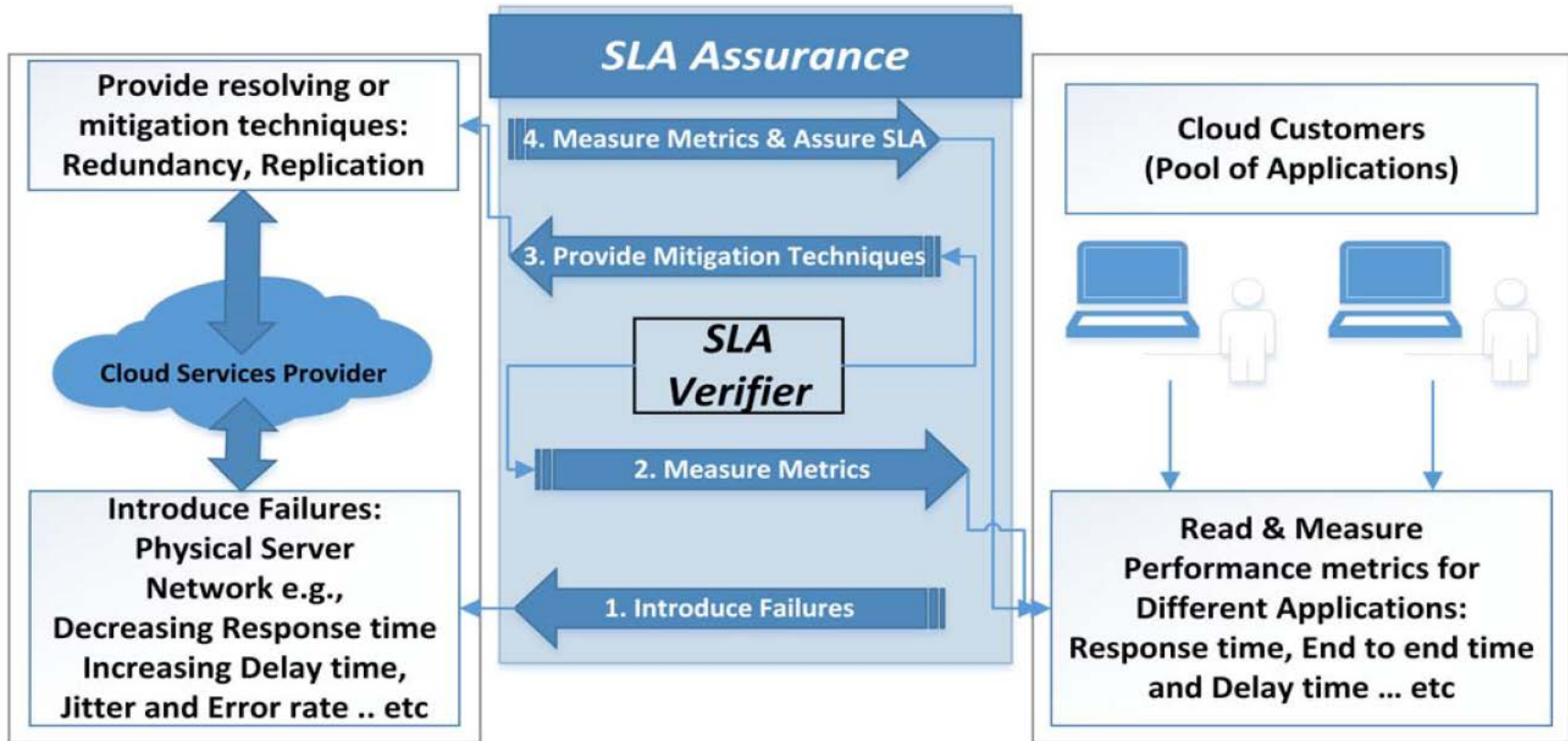
1. SLA Assurance

- After Classifying cloud applications and identify their performance metrics
- Assuring SLA Response time metric by:
 - SLA Verifier [1]



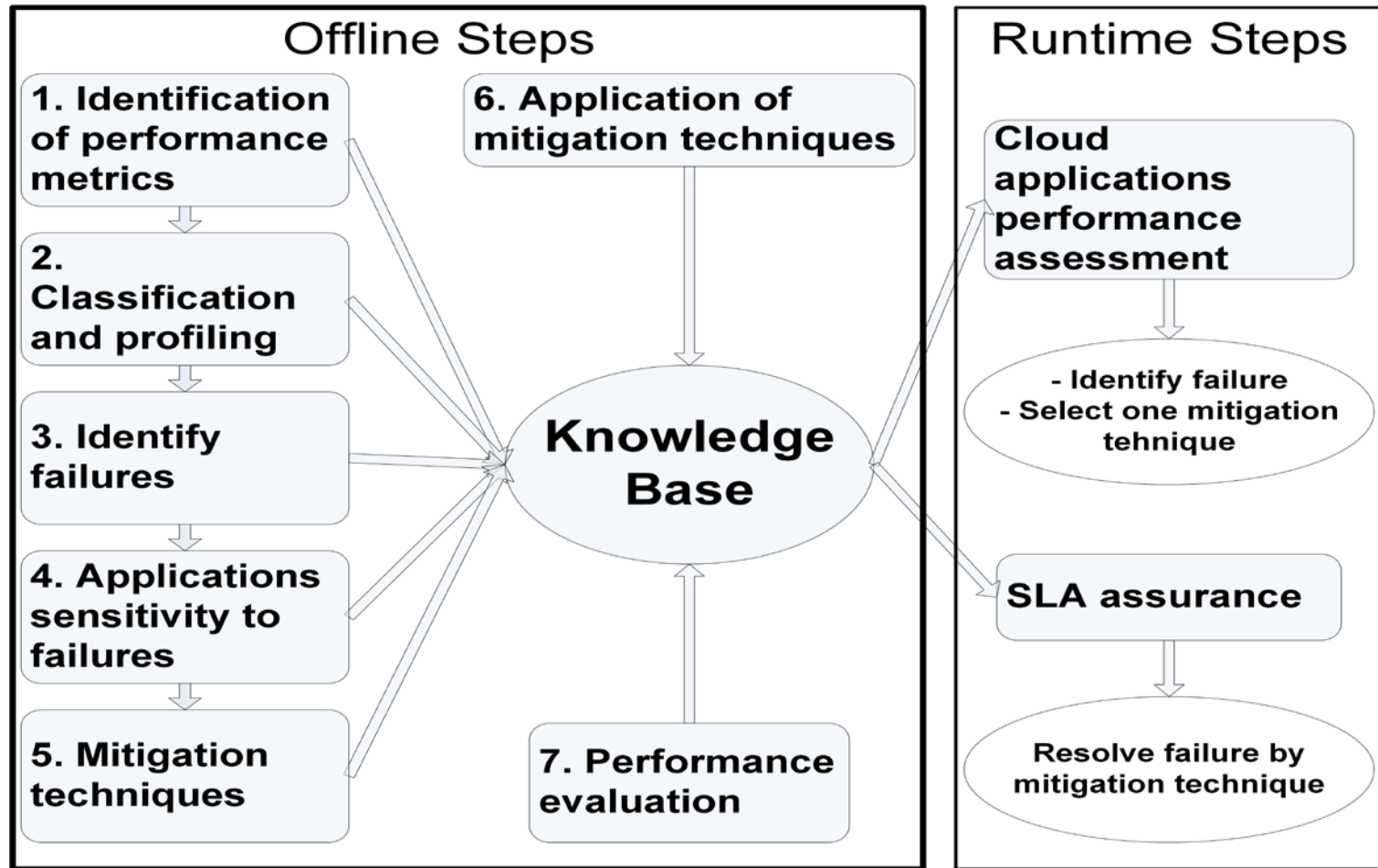
[1] A. Ibrahim, D. Kliazovich, and P. Bouvry "Service Level Agreement Assurance between Cloud Services Providers and Cloud Customers," **16th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing(CCGrid), 2016**

SLA Verifier [1] / SLA Assurance



[1] A. Ibrahim, D. Kliazovich, and P. Bouvry "Service Level Agreement Assurance between Cloud Services Providers and Cloud Customers," *16th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid)*, 2016

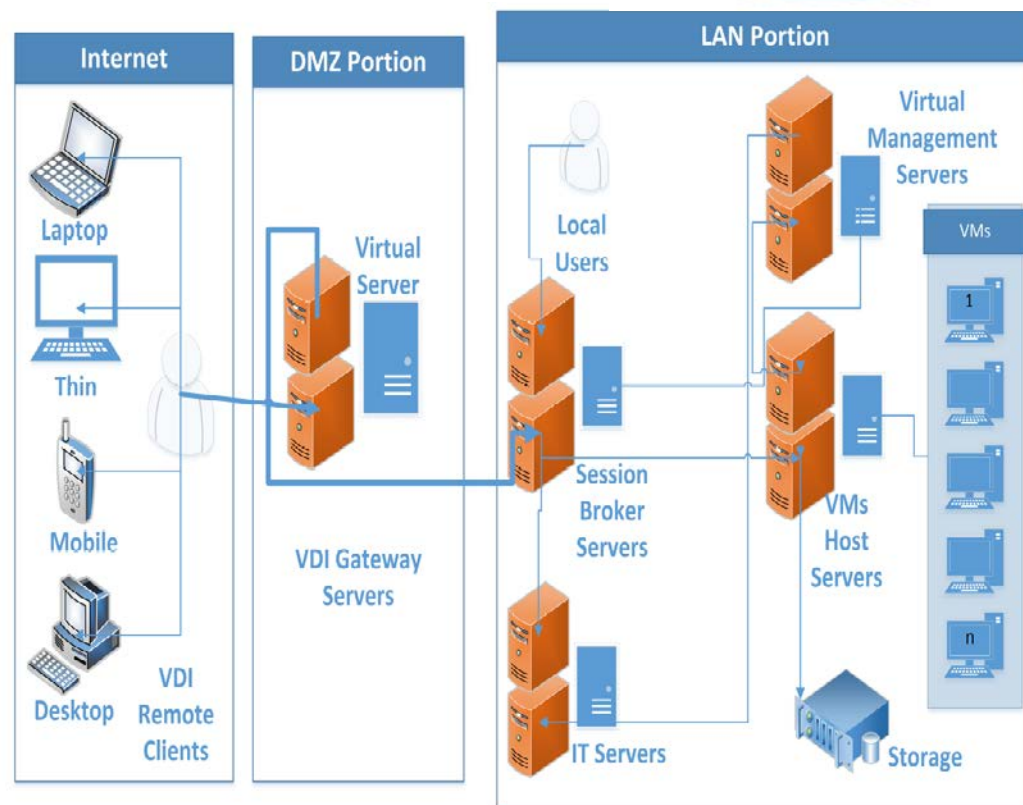
SLA Assurance Framework^[2]



[2] A. Ibrahim, D. Kliazovich, and P. Bouvry "On Service Level Agreement Assurance in Cloud Computing Data Centers," *IEEE 9th International Conference on Cloud Computing(CLOUD)*, 2016

2. Virtual Desktop Infrastructure (VDI)

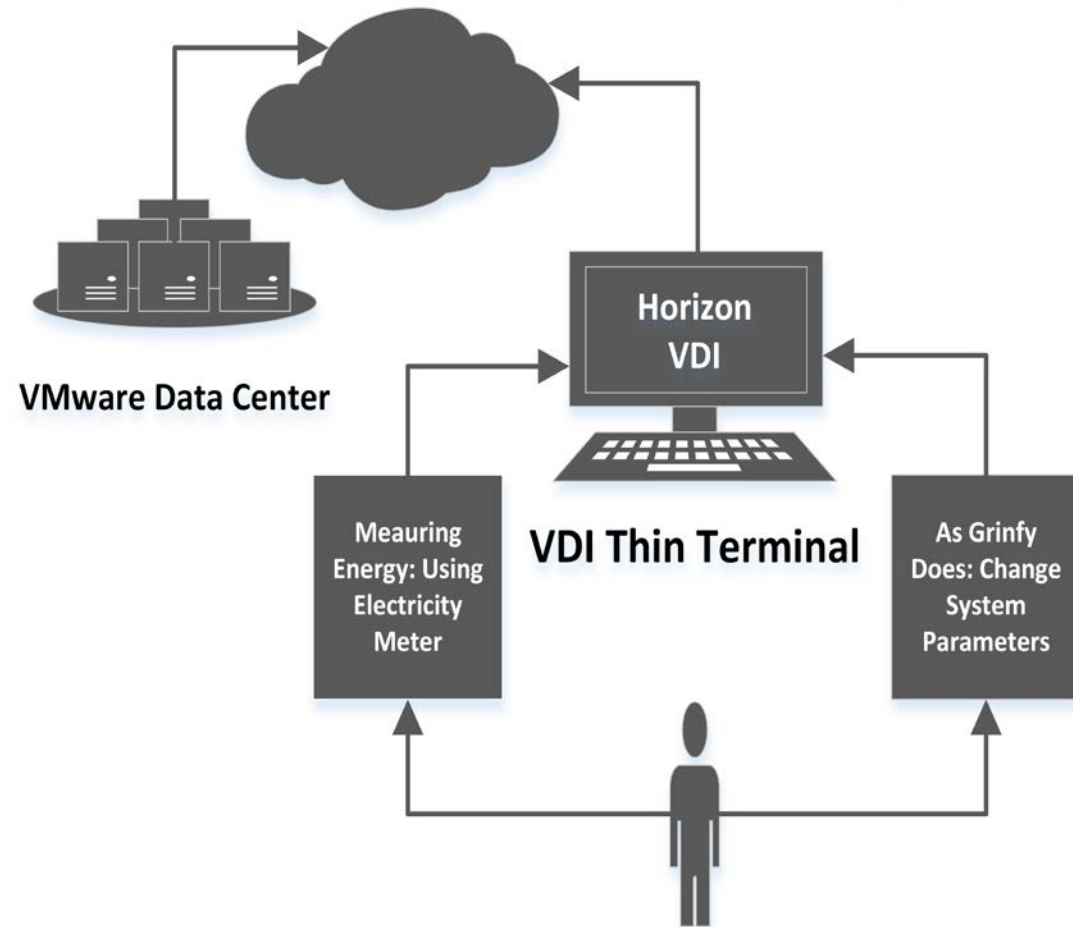
- Survey [3]:
 - VDI Architecture
 - VDI Clients
 - VDI Solutions
- RDP protocols
- VDI Benefits
 - IT and business
 - Green benefits



[3] A. Ibrahim, D. Kliazovich, P. Bouvry and A. Oleksaik “Virtual Desktop Infrastructures: architecture, survey and green aspects proof of concept,” *7th INTERNATIONAL GREEN and SUSTAINABLE COMPUTING CONFERENCE (IGSC'16) – (First RE-HPC workshop)- 2016*

Energy Efficiency in VDI [4]

- Measure the energy consumed by VDI solution,
- Measure traditional desktop energy consumption, and
- Compare between them.



[4] A. Ibrahim, D. Kliazovich, P. Bouvry and A. Oleksaik "Using Virtual Desktop Infrastructure to Improve Power Efficiency in Grinfy System," *8th IEEE International Conference on Cloud Computing Technology and Science (CloudCom) - 2016*

Energy Efficiency in VDI

- Applying Grinfy [5] monitoring and controlling on the systems which use VDI solutions
- Increase the energy saved by Grinfy [4, 5]

Power Analysis	Power Consumption (One Machine)			
	Fully Desktop	Fully Desktop with Grinfy	VDI Terminal	Grinfy with VDI
Energy Consumed (Watts)	45	31	26	5
Energy Saved (Watts)	0	14	19	40
Energy Saved (%)	0 %	30 %	40 %	90 %

[4] **A. Ibrahim**, D. Kliazovich, P. Bouvry and A. Oleksaik “Using Virtual Desktop Infrastructure to Improve Power Efficiency in Grinfy System,” *8th IEEE International Conference on Cloud Computing Technology and Science (CloudCom) – 2016*

[5] *Grinfinity comes from “green infinity” expression* : <http://grinfy.com>

PhD: what am I doing ?

- Performance Evaluation of SaaS Web Services across Multi-Cloud Providers
- Define Common metrics for measuring the behavior of cloud applications (generally) on top of the given cloud providers.
- Metrics will reflect scalability and performance in the representative cloud environment.

PhD: what am I doing ? (contd.)

- We select 4 references benchmarks to quantify this behavior:
 - Iperf
 - Twitter RPC-perf
 - Yahoo Streaming Benchmark
 - Apache HTTP server benchmarking tool

PhD: What would be the future ?

- Get the correlations between the metrics
 - Classify the cloud services providers
- Measuring the behavior of the specific classes of the applications

Attended Events, Conferences and Schools

Event / Conference / School	Where ?	When ?
Research Visit PSNC	Poznan, Poland	March, 2016
16 th IEEE CCGrid	Cartagena, Columbia	May, 2016
2 nd IEEE ComSoc Summer School	Trento, Italy	June, 2016
9 th IEEE CLOUD	San Francisco, USA	July, 2016
1 st Smart Cities and Urban Mentalities Summer school	Vienna, Austria	August, 2016
7 th IGSC International Green Computing Conference	Hangzhou, China	November 2016
UL HPC School	Belval, Luxembourg	November 2016
8 th IEEE CloudCom	Luxembourg, Luxembourg	December, 2016
Teaching: Distributed Systems and middle ware	Kirchberg Campus	Winter Semester 2016

Thank you for your attention



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