Waleed Reda

Curriculum Vitae

My research focuses on achieving latency reductions in distributed storage systems.

Education

2014–Current **PhD in Computer Science (Dual Degree)**,
Royal Institute of Technology (KTH)
Université Catholique de Louvain (UCLouvain).

- Thesis: *Accelerating Distributed Storage in Heterogeneous Settings*

2012–2014 **M.Sc. in Software Engineering**, *Nile University*.

- Class Valedictorian (Ranked 1st out of 31)

2006–2011 **Bachelor of Computer Engineering**, *Cairo University*.

Research Experience

2014–Present **Research Assistant**, *Royal Institute of Technology (KTH), Stockholm, Sweden*.

» *RedN*: Developed a framework that unlocks the Turing power of commodity RDMA NICs, allowing them to run arbitrary offloads—including common tasks such as hash lookups. We showed that this significantly reduces latencies for real applications like memcached. RedN will appear at NSDI'22.

» *Rambler*: Performed a measurements study on latency unpredictability in cloud provider networks. The findings were published at SIGCOMM CCR 2020.

» *Rein*: Developed a scheduling framework for distributed key-value stores to tame tail latency for multi-query scatter-gather requests. The proposed scheduling policies were prototyped inside Cassandra — a widely-used key-value store. The resulting work was published in EuroSys'17.

2018 **Research Intern**, *The University of Texas at Austin (UT Austin), TX, USA*.

» *Assise*: Designed and developed a distributed filesystem that leverages Non-Volatile Memory (NVM) and RDMA to provide low latency and high availability. The resulting work was published at OSDI'20. A follow-up project (called LineFS) focused on offloading Assise to SmartNICs and was published at SOSP'21.

Awards

2021 Best paper award at SOSP'21.

2021 JouleSort world record in energy-efficient sorting.

2014 Erasmus Mundus Joint PhD Fellowship in Distributed Computing.

Publications

[1] **Waleed Reda**, Marco Canini, Dejan Kostić, and Simon Peter. "RDMA is Turing complete, we just did not know it yet!" In: *19th USENIX Symposium on Networked Systems Design and Implementation (NSDI)*. 2022.

[2] Jongyul Kim, Insu Jang, **Waleed Reda**, Jaeseong Im, Marco Canini, Dejan Kostić, Youngjin Kwon, Simon Peter, and Emmett Witchel. "LineFS: Efficient SmartNIC Offload of a Distributed File System with Pipeline Parallelism". In: *Proceedings of the ACM SIGOPS 28th Symposium on Operating Systems Principles (SOSP)*. ACM. 2021.

[3] Thomas E Anderson, Marco Canini, Jongyul Kim, Dejan Kostić, Youngjin Kwon, Simon Peter, **Waleed Reda***, Henry N Schuh, and Emmett Witchel. "Assise: Performance and Availability via Client-local NVM in a Distributed File System". In: *14th USENIX Symposium on Operating Systems Design and Implementation (OSDI)*. 2020. ***Lead student author**.

[4] **Waleed Reda**, Kirill Bogdanov, Alexandros Milolidakis, Hamid Ghasemirahni, Marco Chiesa, Gerald Q Maguire Jr, and Dejan Kostić. "Path Persistence in the Cloud: A Study of the Effects of Inter-Region Traffic Engineering in a Large Cloud Provider's Network". In: *ACM SIGCOMM Computer Communication Review* (2020).

[5] Kirill L Bogdanov, **Waleed Reda**, Gerald Q Maguire Jr, Dejan Kostić, and Marco Canini. "Fast and accurate load balancing for geo-distributed storage systems". In: *Proceedings of the ACM Symposium on Cloud Computing*. 2018.

[6] **Waleed Reda**, Marco Canini, Lalith Suresh, Dejan Kostić, and Sean Braithwaite. "Rein: Taming Tail Latency in Key-Value Stores via Multiget Scheduling". In: *Twelfth European Conference on Computer Systems*. ACM. 2017.

Teaching Experience

2017-2019	**Communication System Design, KTH**.
	- Project-based course that focuses on building communication applications, services, and networks that tackle real-world problems.
Fall 2015	**Languages and Algorithms for Distributed Applications, UCLouvain**.
	- Theoretical basis of distributed systems, algorithms, and programming languages.
	- Fault tolerance, security, interoperability, and openness.
Fall 2014	**Cloud Computing, UCLouvain**.
	- Cloud service scalability. Apache Hadoop MapReduce & Apache Spark.

Technical Skills

Programming	C/C++, JAVA, Python, C#, VHDL
Miscellaneous	Matlab, OPNET, RapidMiner, LaTeX

References

Furnished upon request.