

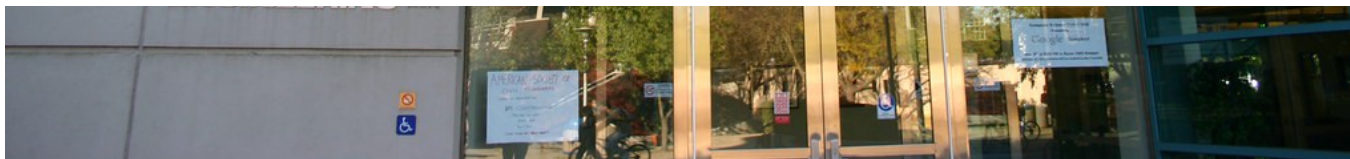
Radix partners with top US research lab to bring its new Cerberus Consensus to life



Radix DLT **Following**

Mar 25 · 8 min read





Radix is delighted to announce that it is partnering with ExpoLab to run a series of theoretical and live tests to analyse the scalability potential and security boundaries of the Cerberus consensus protocol.

ExpoLab, is a group out of UC Davis Computer Science Department, led by Prof. Mohammad Sadoghi, which has created the ExpoDB platform to analyse and test different DLT and consensus protocols. The ExpoDB platform allows for early real world simulated testing of Cerberus, as well as providing independent comparisons with other protocols on measures like scalability, liveness and safety.

Radix's Cerberus consensus protocol aims to solve one of blockchain and DLT's key challenges — scalability. Cerberus does this by creating a multi-lane superhighway, capable of processing massive numbers of transactions in parallel. Cerberus can process transactions in parallel due to its highly sharded data structure and unique application layer.

Together Radix and ExpoLab will be working to:

- Create a mathematical analysis and proof to support the whitepaper
- Identify potential attack vectors and how to overcome them
- Implement Cerberus on the ExpoDB platform to test for potential real-world deployment issues
- Run comparisons of Cerberus performance on ExpoDB to other consensus protocols

As part of Radix's commitment to open-source not just its code but also its research and challenges, all of the research, tests and results from the partnership will be made public through academic papers, blogs and code releases.

“We are still in the very early days of what is humanly possible to do with distributed computing and consensus systems, and we are excited to be working closely with some of the world's best researchers in this space. We look forward to treading new ground together; radically pushing up the limits of what performance can be achieved on public decentralised ledgers.” Piers Ridyard, CEO, Radix DLT

Alongside Prof. Mohammad Sadoghi, post-doctorate fellow Jelle Hellings, PhD student Suyash Gupta and PhD candidate Sajjad Rahnema will be

working on the Radix Cerberus project at ExpoLab. They will be working closely with Radix founder Dan Hughes as well as the other authors of the Cerberus whitepaper Florian Casar, Josh Primero and Stephen Thornton.

See full profiles and biographies for the ExpoDB team members along with the group's publication list below

Profiles

Mohammad Sadoghi is a Professor in the Computer Science Department at the University of California, Davis. Formerly, he was an Assistant Professor at Purdue University and Research Staff Member at IBM T.J. Watson Research Center.

Professor Sadoghi's research spans all facets of secure and massive-scale data management. He leads the ExpoLab research group with the aim to pioneer a new exploratory data platform — -referred to as ExpoDB- — a distributed ledger that unifies secure transactional and real-time analytical processing (L-Store), all centered around a democratic and decentralized

computational model (ResilientDB). He has co-founded a blockchain company called Moka Blox, a spin-off of our ResilientDB Fabric.

His research on blockchain has received press coverage extensively and covered by Advancements TV — CNBC, Yahoo! Finance, Market Insider, Crypto Media, Times Union, WBOC TV/Radio, Davis Enterprise, CoinDesk. He has over 80 publications in leading database conferences/journals (including SIGMOD, VLDB, ICDE, EDBT, TODS, and TKDE) and 34 filed U.S. patents. He has co-authored a book on “Transaction Processing on Modern Hardware” as part of Morgan & Claypool Synthesis Lectures on Data Management. Currently, he is co-authoring a book entitled “Fault-tolerant Distributed Transactions on Blockchain” also as part of Morgan & Claypool Synthesis Lectures on Data Management. He has offered several blockchain tutorials at Middleware Conference and graduate blockchain courses at UC Davis.

Jelle Hellings studied Computer Science and Engineering at the Eindhoven University of Technology, Netherlands. He finished his graduate studies in the summer of 2011, with a final research project focused on external memory algorithms for indexing trees and directed acyclic graphs. He then moved to Hasselt University, Belgium, where he did his doctoral research in the Databases and Theoretical Computer Science research group, in

combination with a teaching position. His doctoral research focused primarily on the expressive power of query languages, and he finished his doctoral research in the spring of 2018. Since the summer of 2018, Jelle is a Postdoc Fellow at UC Davis in the Exploratory Systems Lab (ExpoLab) led by Prof. Sadoghi. His current research focus is on the theoretical bounds of consensus protocols in malicious environments and, more generally, on exploring new directions for replicated systems in the malicious environment. His theoretical work on consensus blockchain protocols has appeared in top conferences/journals such as DISC, ICDT, PVLDB, to name a few.

Suyash Gupta is pursuing doctoral research at the Computer Science Department at the University of California, Davis. At UC Davis, he is a senior member of Exploratory Systems Lab and works under the supervision of Prof. Sadoghi. He also works as the Lead System Architect at ResilientDB. Prior to joining UC Davis, he started his doctoral research at the Department of Computer Science at Purdue University. He earned a Master of Science degree from Purdue University in 2017 and transferred to UC Davis to complete his research. He also received a Master of Science (Research) degree from Indian Institute of Technology Madras in 2015. His current research focuses on attaining safe and efficient, fault-tolerant consensus meta-protocols in distributed and blockchain applications. He

also has published works that present efficient optimizations and design for parallel and distributed algorithms.

Sajjad Rahnama is a PhD student at the Computer Science Department of the University of California Davis supervised by Prof. Mohammad Sadoghi. He is also a member of Exploratory Systems Lab. His current research focuses on the distributed systems, fault-tolerant consensus protocols, and their applications in blockchain and secure transaction processing. He is one of the lead author of “ResilientDB: Global Scale Resilient Blockchain Fabric” to be presented at VLDB 2020 in Tokyo.

Publications

- **ResilientDB: Global Scale Resilient Blockchain Fabric.**
S. Gupta, S. Rahnama, J. Hellings, *Mohammad Sadoghi. PVLDB 2020.*
- **Coordination-free Byzantine Replication with Minimal Communication Costs.**
J. Hellings, *Mohammad Sadoghi. International Conference on Database Theory (ICDT 2020).*
- **Q-Store: Distributed, Multi-partition Transactions via Queue-oriented Execution and Communication.**

T. Qadah, S. Gupta, *Mohammad Sadoghi*. *International Conference on Extending Database Technology (EDBT 2020)*.

- **Brief Announcement: The Fault-Tolerant Cluster-sending Problem.**

[Preprint, Technical Report]

J. Hellings, *Mohammad Sadoghi*. *International Symposium on Distributed Computing (DISC 2019)*.

- **Brief Announcement: Revisiting consensus protocols through wait-free parallelization. [Preprint, Technical Report]**

S. Gupta, J. Hellings, *Mohammad Sadoghi*. *International Symposium on Distributed Computing (DISC 2019)*.

- **Transaction Processing on Modern Hardware. [Flyer, Abstract, eBook]**

Mohammad Sadoghi, S. Blanas. Morgan & Claypool Synthesis Lectures on Data Management. 2019.

- **Blockplane: A Global-Scale Byzantizing Middleware.**

F. Nawab, *Mohammad Sadoghi*. *ICDE 2019*. [Preprint]

- **BlockLite: A Lightweight Emulator for Public Blockchains. [Preprint]**

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S. Gupta, Mohammad Sadoghi. *Distributed and Parallel Databases (DAPD 2019)*.
- **In-memory Blockchain: Toward Efficient and Trustworthy Data Provenance for HPC Systems. [Preprint]**
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- **Scalable Multiway Stream Joins in Hardware.**
M. Najafi, Mohammad Sadoghi, H.-A. Jacobsen. *Transactions on Knowledge and Data Engineering (TKDE 2019)*.
- **QueCC: A Queue-oriented, Control-free Concurrency Architecture.**
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H.-A. Jacobsen, Mohammad Sadoghi, M. Tabatabaei, R. Vitenberg, and K. Zhang. *Middleware 2018*. [Part 1, Part 2]
- **In-memory Blockchain: Toward Efficient and Trustworthy Data Provenance for HPC Systems.**
A. Al-Mamun, T. Li, Mohammad Sadoghi, D. Zhao. *Big Data 2018*.
[Paper]

- **Blockchain Transaction Processing.**
S. Gupta, *Mohammad Sadoghi*. Encyclopedia of Big Data Technologies. Springer 2018. [[Preprint](#)]
- **L-Store: A Real-time OLTP and OLAP System.** [[Paper](#), [Slides](#) with an alternative abstraction reformulation]
Mohammad Sadoghi, S. Bhattacharjee, B. Bhattacharjee, M. Canim. EDBT 2018.
- **EasyCommit: A Non-blocking Two-phase Commit Protocol.** [[Paper](#), [Slides](#)]
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- **Extending In-Memory Relational Database Engines with Native Graph Support.** [[Paper](#), [Slides](#), [Poster](#)]
M. Hassan, T. Kuznetsova, H.-C. Jeong, W. Aref, *Mohammad Sadoghi*. EDBT 2018.
- **EmbedS: Scalable, Ontology-aware Graph Embeddings.** [[Paper](#), [Slides](#)]
G. Diaz, A. Fokoue, *Mohammad Sadoghi*. EDBT 2018.
- **Hybrid OLTP and OLAP.**
J. Giceva, *Mohammad Sadoghi*. Encyclopedia of Big Data Technologies. Springer 2018. [[Preprint](#)]

- **A Scalable Circular Pipeline Design for Multi-Way Stream Joins in Hardware.**
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