Proceedings of the First Workshop on the Principles and Practice of Eventual Consistency

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Preface

The choice of consistency model is central to the design of any distributed system, but it subtle, complex, and has far-reaching consequences. Strong consistency is intuitive, but is expensive and prone to unavailability. Eventual consistency (EC), based on unsynchronized concurrent updates that are propagated in the background, improves responsiveness and availability, updates propagate more quickly, and enables less coordination-intensive and often less complex protocols.

EC is crucial for scalability but represents an unfamiliar design space. Conflicts and divergence are possible, making them hard to program against, while metadata growth and maintaining system-wide invariants can also become problematic. As more developers interact with and program against distributed storage systems, understanding and managing these trade-offs becomes increasingly important.

Despite a long history, EC remains poorly understood: how can we reason about the system state? How to ensure convergence? How to maintain structural invariants? How to compose a correct EC system from smaller parts? What are the requirements from the underlying communication layer? How can a single system support a mix of strong and eventual consistency, while maintaining the correctness of both?

This workshop aims to investigate the principles and practice of Eventual Consistency, by bringing together theoreticians and practitioners from different horizons, in order to make EC computing easier and more accessible.

The concept of this workshop sprang from several sources, including the 2013 Dagstuhl workshop on “Consistency in Distributed Systems”, the ANR Project ConcoRDanT http://concordant.lip6.fr/, and the EU FP7 project SyncFree https://syncfree.lip6.fr/.

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April 2014

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Table of Contents – PaPEC 2014

Replicated Objects and Composition

1. **Riak DT Map: A Composable, Convergent Replicated Dictionary**
   Russell Brown, Sean Cribbs, Sam Elliott and Christopher Meiklejohn
2. **An open implementation of Cloud Types for the Web**
   Tim Coppieters, Laure Philips, Tom Van Cutsem and Wolfgang De Meuter
3. **Efficient State-based CRDTs by Decomposition**
   Paulo Sérgio Almeida, Ali Shoker and Carlos Baquero
4. **Triton: a Peer-Assisted Cloud Storage System**
   Antonio Davoli and Alessandro Mei
5. **Beyond Replicated Storage: Eventually-Consistent Distributed Data Structures**
   Konrad Iwanicki

Operations and Logging

- **Closing The Performance Gap between Causal Consistency and Eventual Consistency**
  Jiaqing Du, Calin Iorgulescu, Amitabha Roy and Willy Zwaenepoel **

6. **Simizer: evaluating consistency trade offs through simulation**
   Sylvain Lefebvre, Sathiya Prabhu Kumar and Raja Chiky
7. **Making operation based CRDTs operation based**
   Carlos Baquero, Paulo Sérgio Almeida and Ali Shoker
8. **Citrea and Swarm: partially ordered op logs in the browser**
   Victor Grishchenko
9. **Merging OT and CRDT Algorithms**
   Ahmed-Nacer Mehdi, Pascal Urso, Nuno Preguica and Valter Balegas

Consistency Trade-offs

10. **Having Your Cake and Eating it Too: Combining Strong and Eventual Consistency**
    Paweł T. Wojciechowski and Konrad Siek

- **The Case for Fast and Invariant-Preserving Geo-Replication**
  Valter Balegas and Mahsa Najafzadeh **
- **Bridging the Gap: Opportunities in Coordination-Avoiding Database Research**
  Peter Bailis, Alan Fekete, Michael J. Franklin, Ali Ghodsi, Joseph M. Hellerstein and Ion Stoica **

Correctness

11. **Towards Verifying Eventually Consistent Applications**
    Burcu Külahçıoğlu Özkan, Erdal Mutlu and Serdar Tasiran
12. **A Generic Model of Consistency Guarantees for Replicated Services**
    Szymon Francuzik, Cezary Sobaniec and Dariusz Wawrzyniak
13. **On The Composability of Riak DT: Expanding From Nested To Multi-Key Structures**
    Christopher Meiklejohn

***: The authors did not opt to include their paper in the PaPEC’14 proceedings.*