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Application development with relational and non-relational databases

Thursday, September 1, 2016 1:00 PM (5 hours)

In this workshop, the students will learn how to use relational and non-relational databases to build multi-threaded applications. The focus of the workshop is to teach efficient, safe, and fault-tolerant principles when dealing with high-volume and high-throughput database scenarios. This includes, but is not limited to, systems such as PostgreSQL, Redis or Elasticsearch.

A basic understanding of the following things is required:
- A programming language (preferably Python or any C-like)
- Basic SQL (CREATE, DROP, SELECT, UPDATE, DELETE)
- Linux shell scripting (bash or zsh)

The course will cover the following three topics:

- When to use relational databases, and when not
- Relational primer
- Non-relational primer
- How to design the data model
- Using SQL for fun and profit
- Query plans and performance analysis
- Transactional safety in multi-threaded environments
- How to deal with large amounts of sparse metadata
- Competetive locking and selection strategies
- Building a fault-tolerant database application
- Distributed transactions across relational and non-relational databases
- SQL injection and forceful breakage
- Application-level mitigation for unexpected database issues

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