CS315: Principles of Database Systems
NoSQL

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2nd semester, 2013-14

Tue, Fri 1530-1700 at CS101

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- It is not only SQL
- It does not aim to provide the ACID properties
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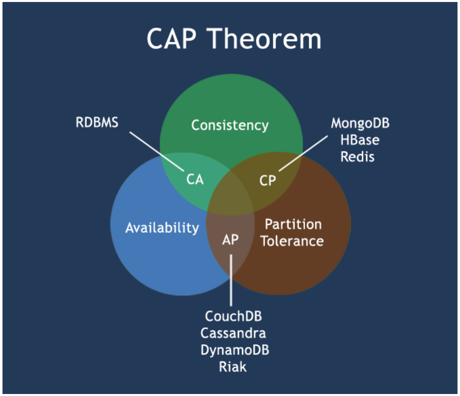
- Later changed since RDBMS is too powerful to always ignore
- Aims to provide
  - Scalability
  - Flexibility
  - Naturalness
  - Distribution
  - Performance

CAP theorem



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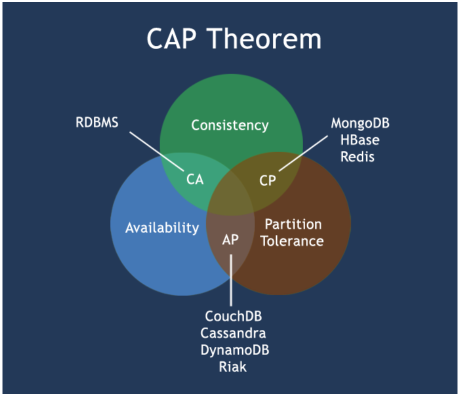

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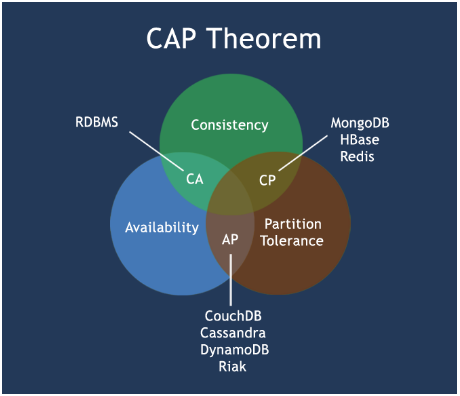

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- Not a theorem – just a hypothesis

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- Basically Available: System guarantees availability
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- To counter ACID

Types

- Four main types of NoSQL data stores:
    1. Columnar families
    2. Bigtable systems
    3. Document databases
    4. Graph databases

Columnar storage

- Instead of rows being stored togther, columns are stored consecutively
- A single disk block (or a set of consecutive blocks) stores a single column family
- A column family may consist of one or multiple columns
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- Two main types
  - Columnar relational models
  - Key-value stores and/or big tables

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- Example: MonetDB

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- Example: Cassandra, CouchDB, Tokyo Cabinet, Redis

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- Example: BigTable, HBase, Cassandra, HyperTable, SimpleDB

Document databases

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- Popular document formats are XML, JSON, BSON, YAML
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- Example: MongoDB, CouchDB

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- Example: Neo4J, HyperGraph, Infinite Graph, FlockDB

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- Not every good feature reported has been validated
- Most legacy systems still use RDBMS
- NoSQL horizon is shifting rapidly with almost no control or sense
- However, trend is for NoSQL as cloud computing and big data relies on it