CUMULO
NIMBO

FP7-257993

CumuloNimbo Overview

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Project Consortium

- U. P. Madrid
- SAP
- FORTH
- Yahoo
- U. McGill
- U. Minho
- FlexiScale

SEVENTH FRAMEWORK PROGRAMME

SDCI 2012: Secure and Dependable Computing for Critical Infrastructures
Cortina d'Ampezzo, Italy, 19 Jan 2012

Goals

- CumuloNimbo aims at solving the lack of scalability of transactional applications that account for the majority of existing applications.
- CumuloNimbo aims at conceiving, architecting and developing a transactional, consistent, elastic and ultra scalable Platform as a Service.
- Goals:
  - Ultra scalable and dependable -- able to scale from a few users to many millions of users while at the same time providing continuous availability;
  - Support transparent migration of multi-tier applications to the cloud with automatic scalability and elasticity;
  - Avoid re-programming of applications and non-transparent scalability techniques such as sharding.

Challenges

- Main Challenges:
  - Update ultra-scalability (millions of updates per second)
  - Strong transactional consistency
  - Non-intrusive elasticity
  - Inexpensive high availability
  - Low latency
- CumuloNimbo will go beyond the State of the Art by scaling transparently transactional applications without sharding as it is current practice in today's cloud PaaS.

Promised Outcomes

- The **architecture and implementation** of an **ultra scalable PaaS** with a functionality equivalent to a multi-tier transactional service platform such as J2EE. The target users of the PaaS are **cloud application developers**.
- The **architecture and implementation** of a **high performance communication and storage** infrastructure. The target users of this infrastructure are **cloud providers**.
- **Use of industrial standard benchmarks** on top of the PaaS to evaluate the scalability and prove the transparent migration.
- Scalability also for two other families of applications based solely either on relational databases or no-SQL column-oriented data stores.

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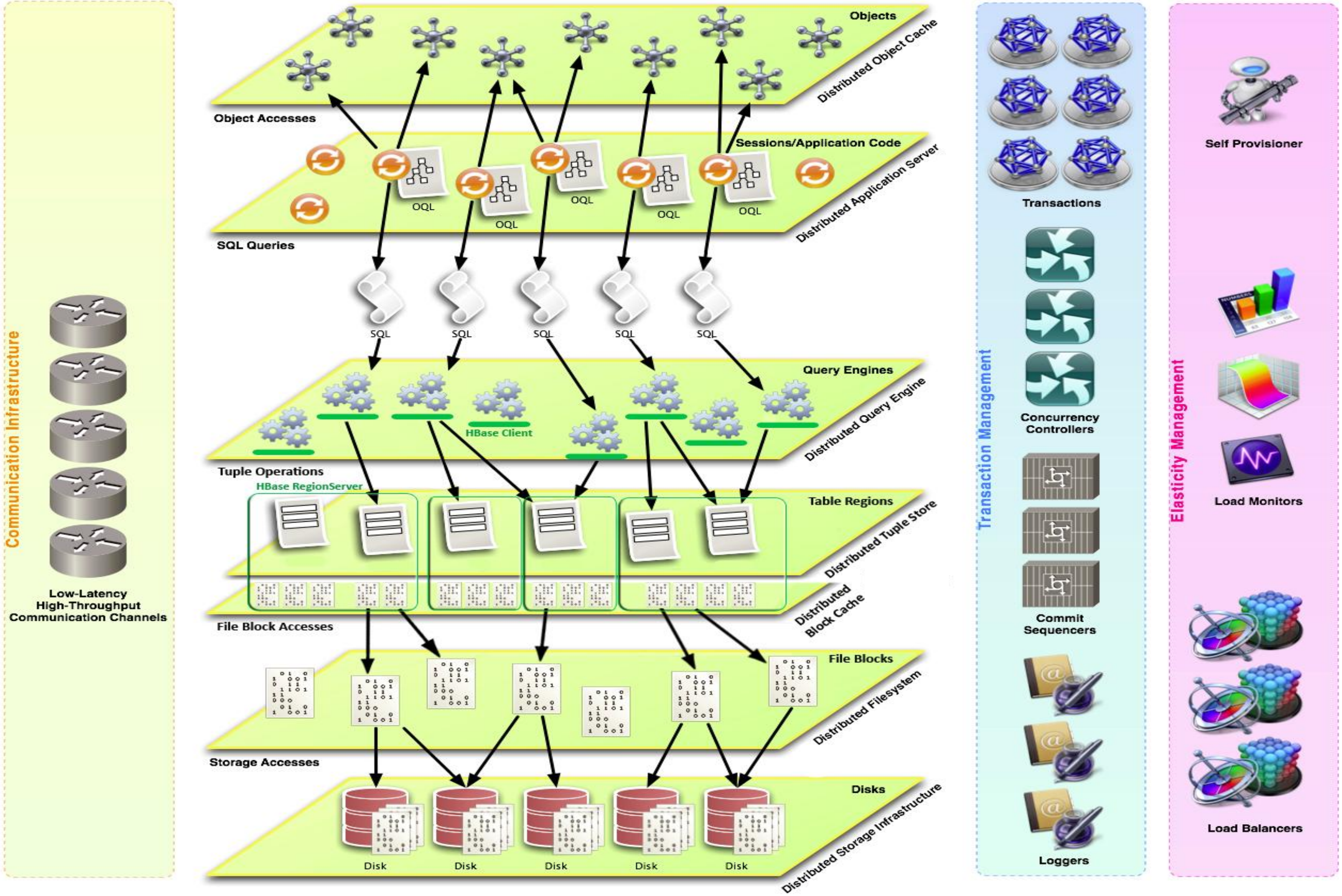
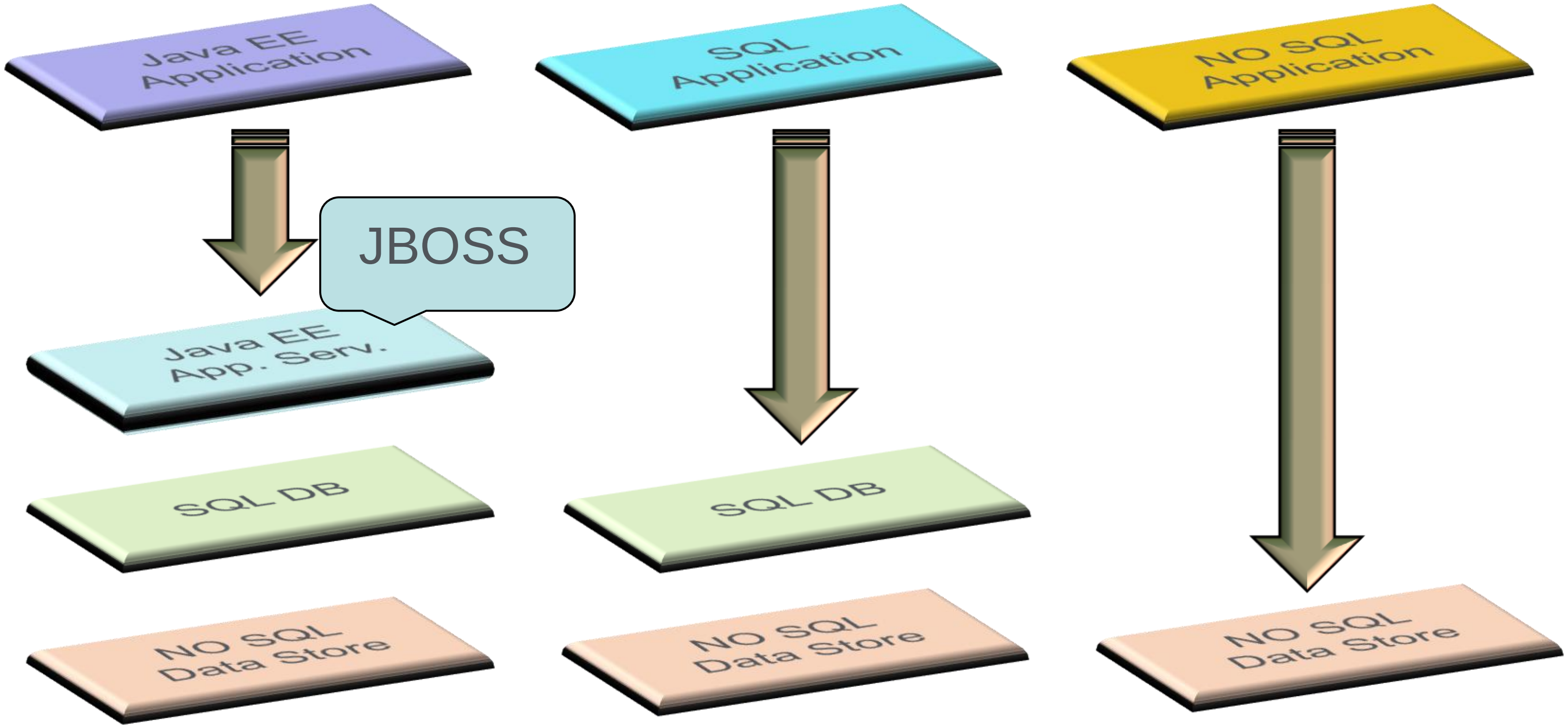
Progress and Achievements: Architecture



Progress and Achievements: Three Software Stacks in an Integrated PaaS



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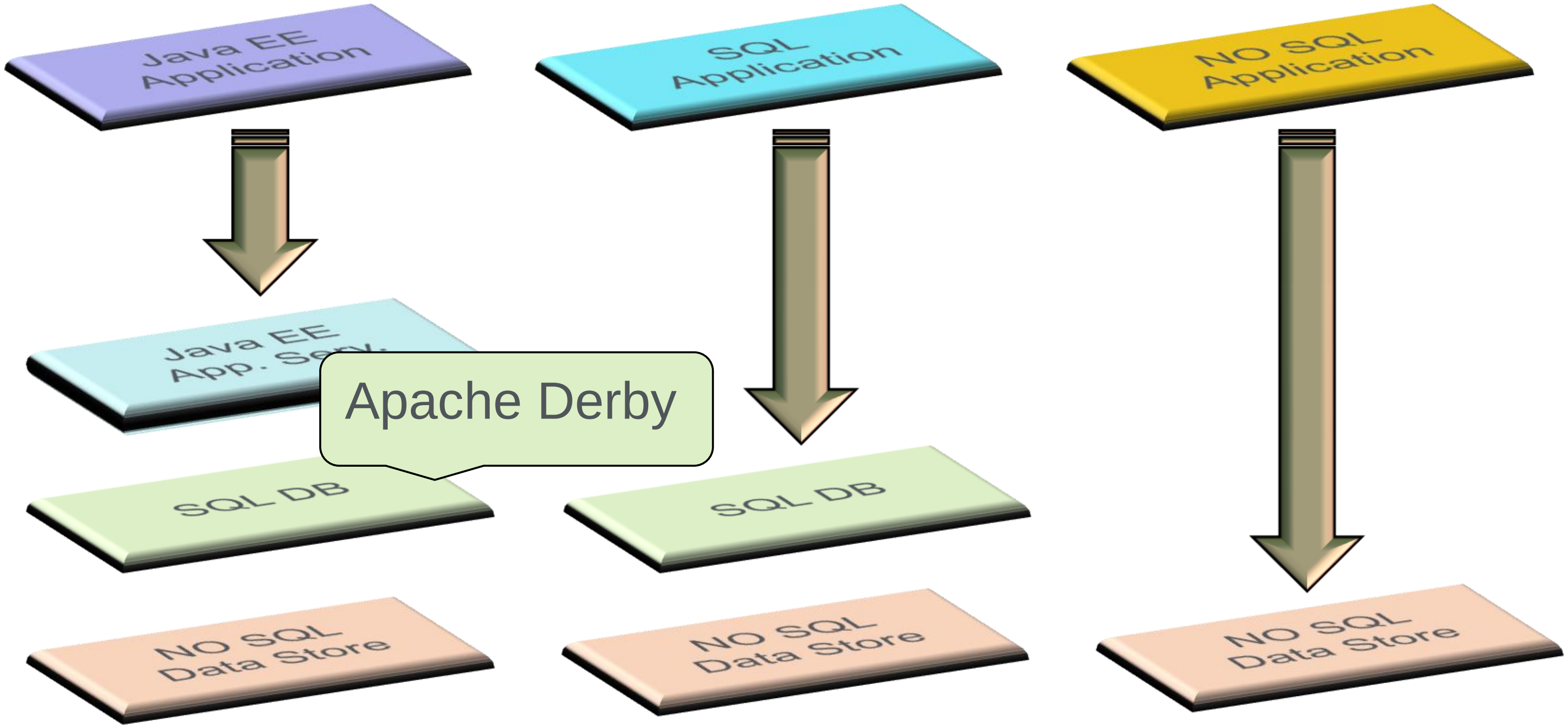
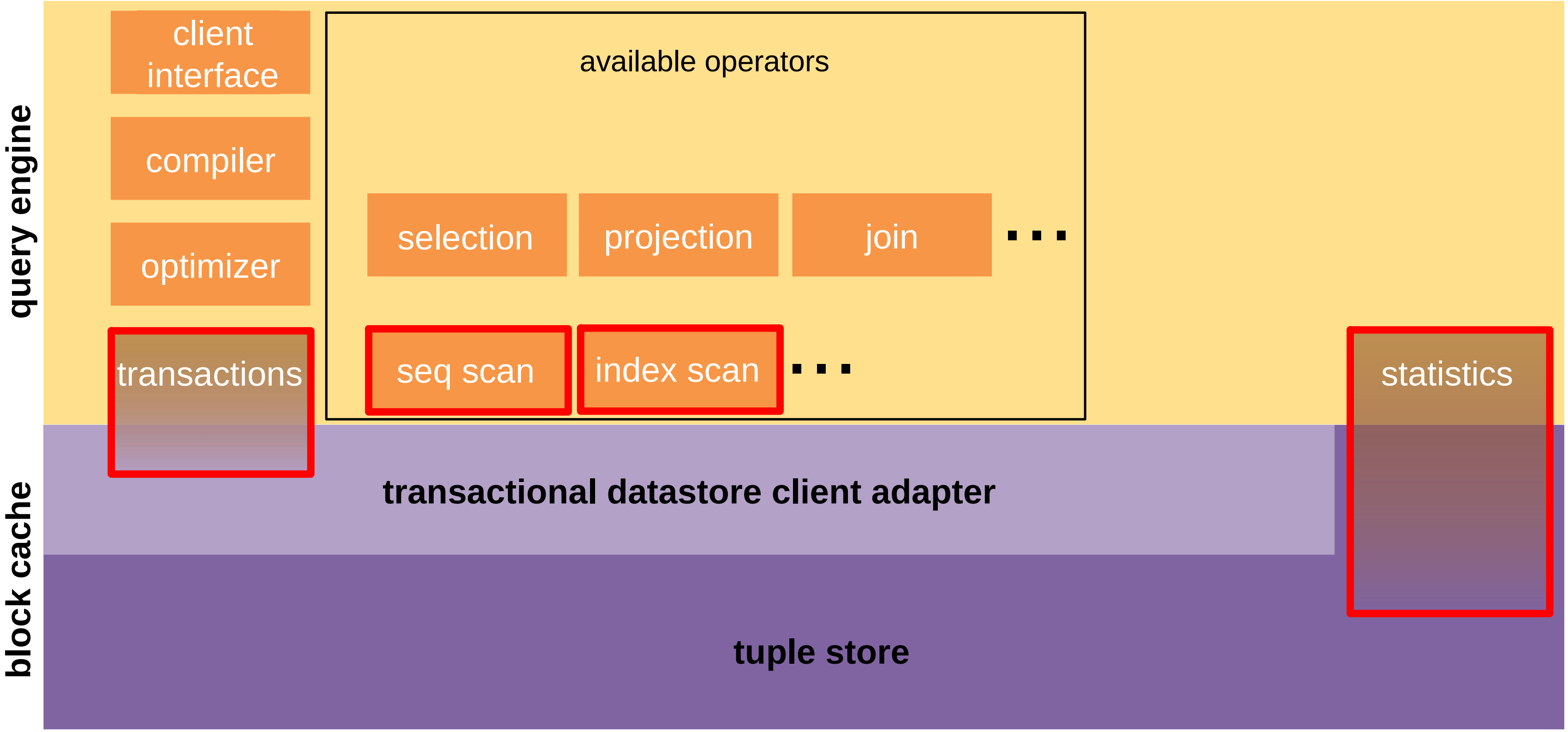
Progress and Achievements: Three Software Stacks in an Integrated PaaS



Progress and Achievements: Elastic Query Engine Layer



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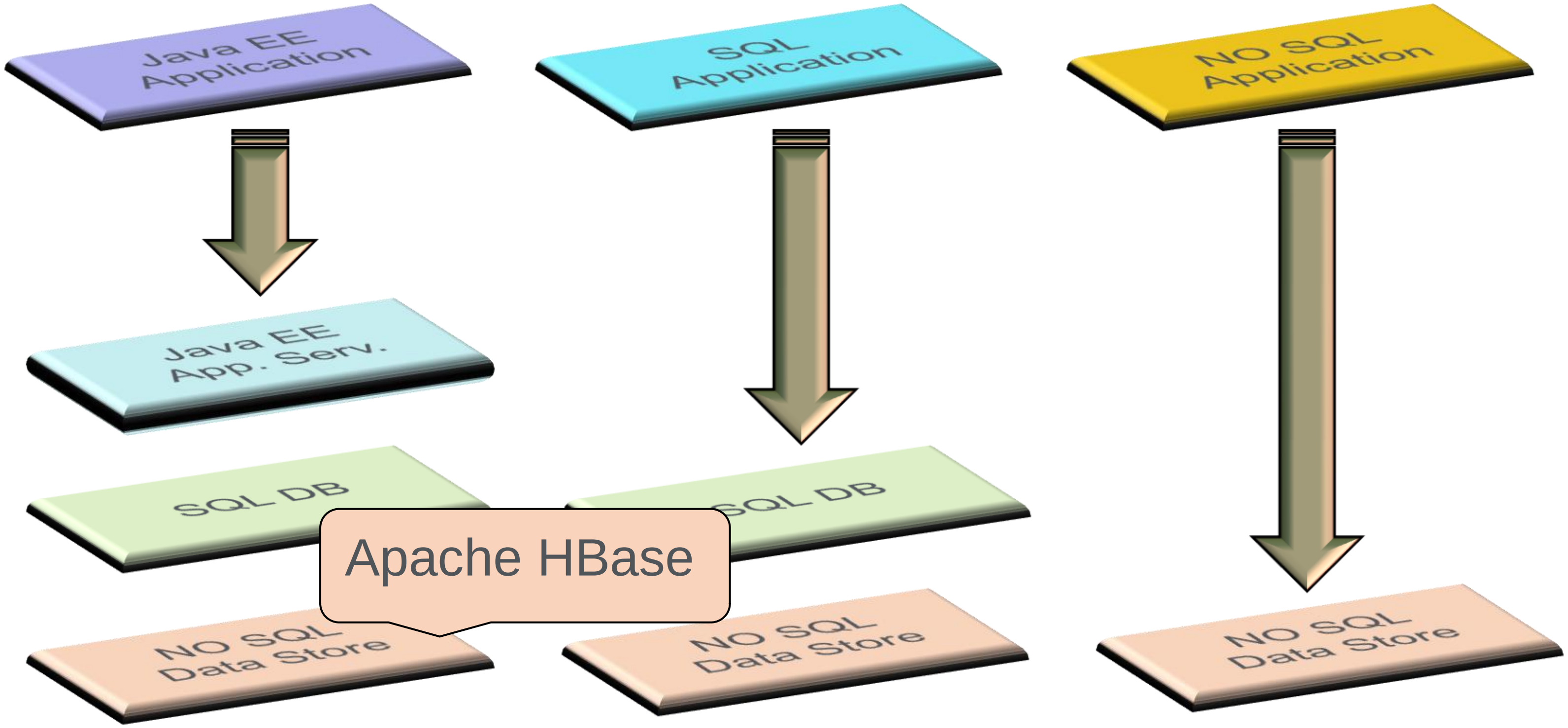
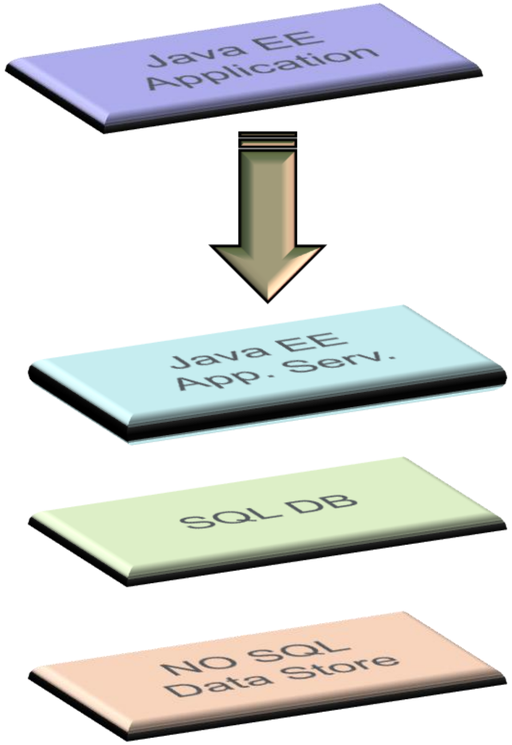
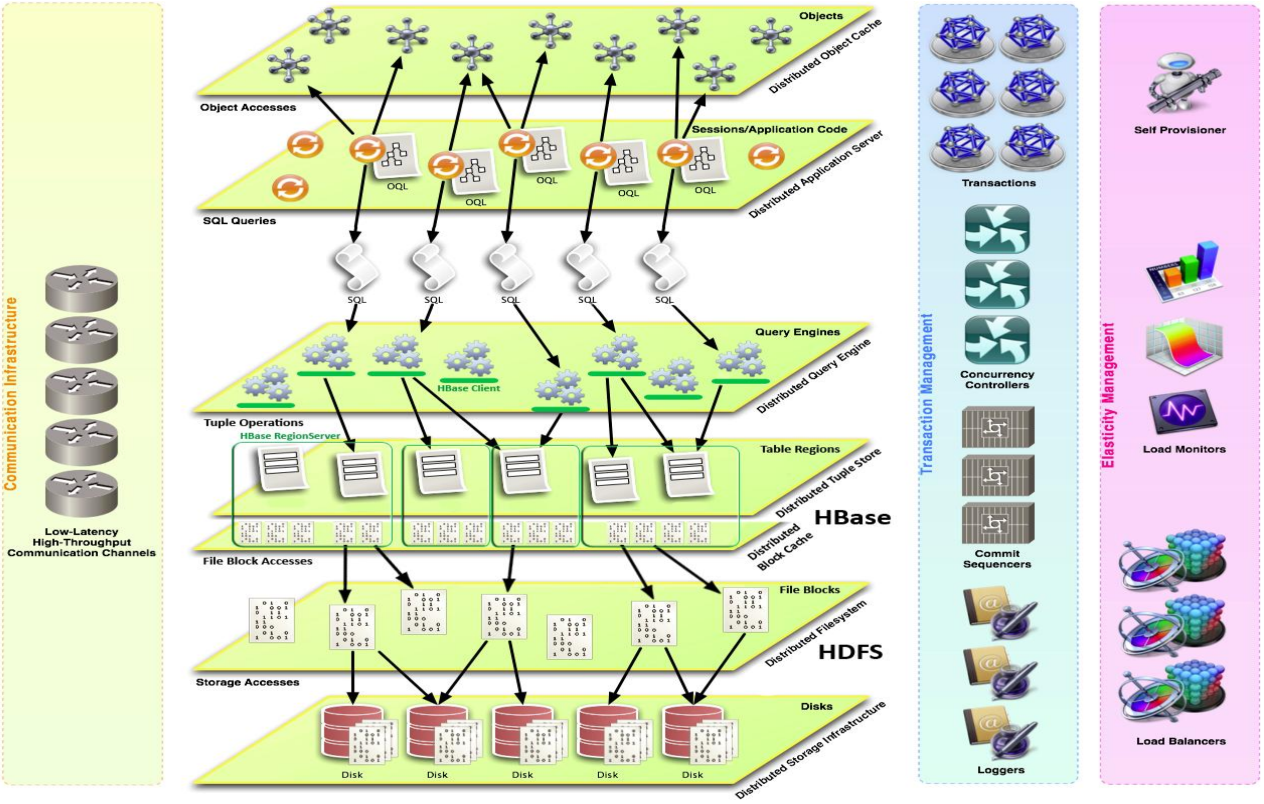
Progress and Achievements: Three Software Stacks in an Integrated PaaS

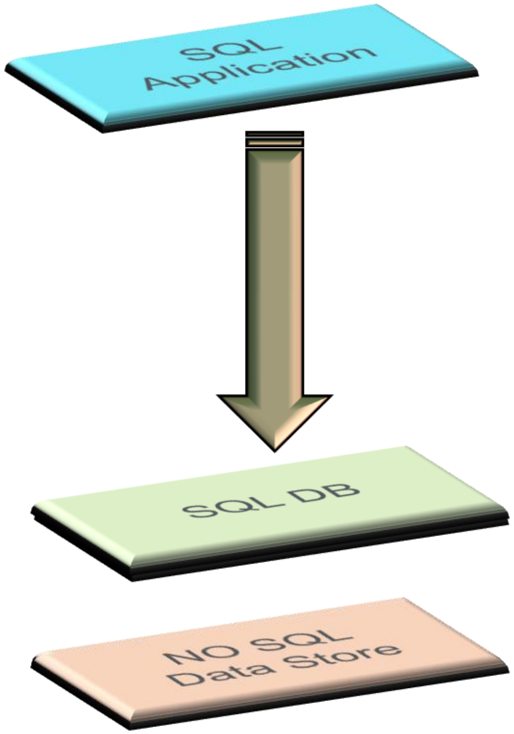


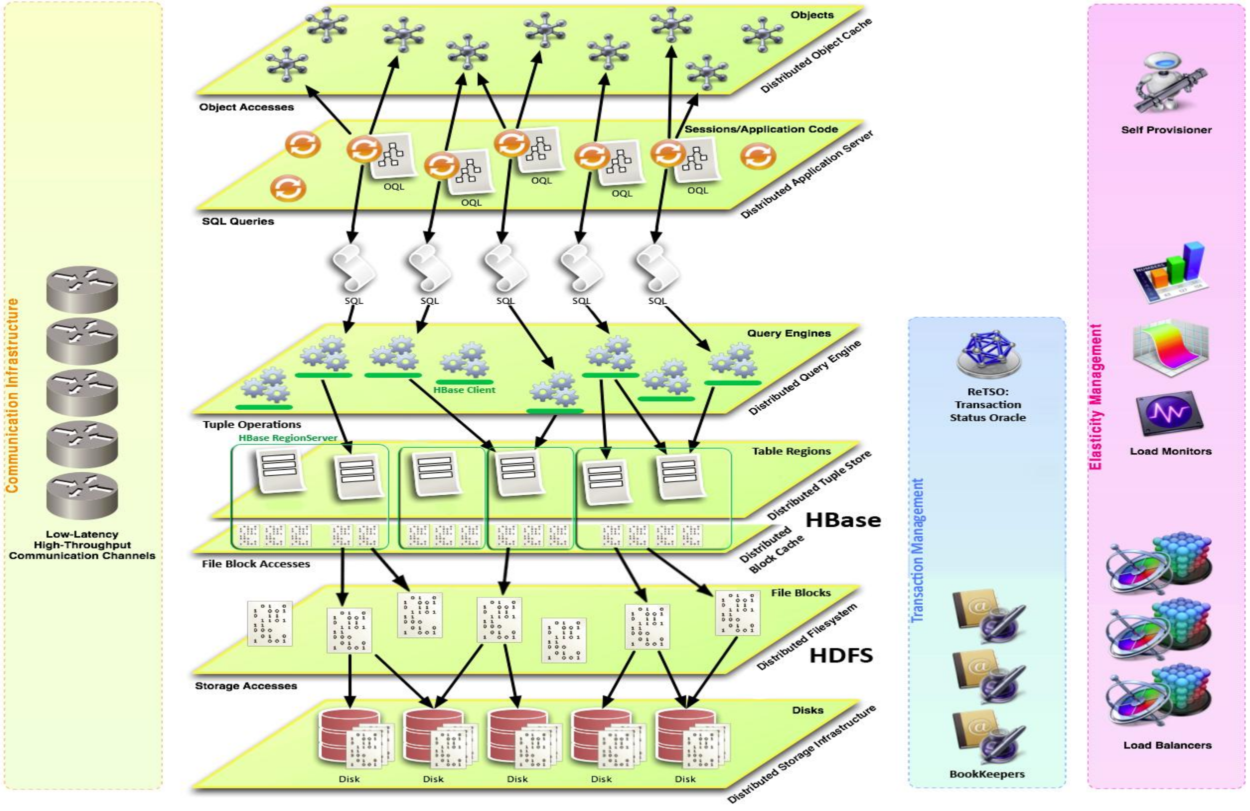
Progress and Achievements: Holistic Transaction Management





Progress and Achievements: HBase Transaction Management





Progress and Achievements: Developed and Integrated Prototypes

- One year of project.
- Prototype implementations available of the main components:
  - transactional managers
  - application server and object cache layers
  - SQL engine layer
  - No-SQL data store layer
- A running integration of all above components.