

# Introduction to ElaSQL

DB/AI Bootcamp

2018 Summer

DataLab, CS, NTHU

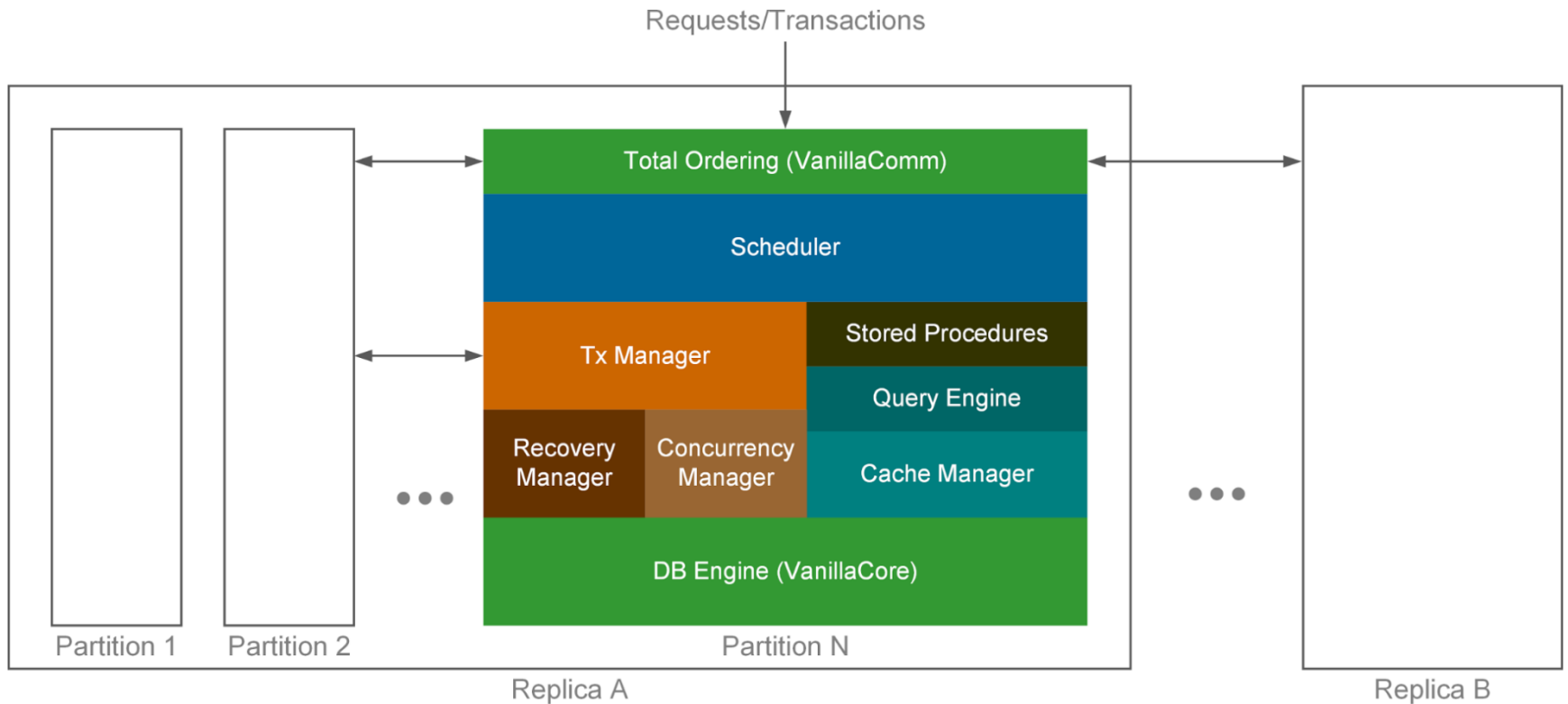
# ElaSQL

<https://github.com/elasql/elasql>

# ElaSQL

- ElaSQL is a relational distributed DBMS.
  - Research prototype
  - Written in Java
- Features
  - High scalability
  - High availability
  - Elasticity (coming soon)

# Architecture



# Current Implementation

- ElaSQL provides several types of distributed execution engine:
  - Fully replicated DBMS
  - Calvin [SIGMOD'12]
  - T-Part [SIGMOD'16]

# Getting Started

- Since ElaSQL does not allow ad-hoc queries, we will use a benchmark software to test it.
- ElaSQL-Bench
  - A benchmark framework particularly designed for ElaSQL.
  - Provides famous standard benchmarks, such as YCSB, TPC-C... etc.

# To Download ElaSQL-Bench

- Method 1: using Git

```
> git clone https://github.com/elasql/elasqlbench.git
```

- Method 2: download from the website
  - <https://github.com/elasql/elasqlbench>

# VanillaComm

- You will also need VanillaComm.
- Git:

```
> git clone https://github.com/vanilladb/vanillacomm.git
```

- Github:
  - <https://github.com/vanilladb/vanillacomm>



# To Run ElaSQL-Bench

1. Import the projects to your Eclipse workspace.
  - Choose “Maven” > “Existing Maven Projects”
2. Wait for Maven to download necessary dependencies.
3. Setup Run Configurations
  - We will need 3 programs:
    - Server 0, Server 1
    - Client 0

# Run Configuration for Server 0

- Project: elasqlbench
- Main Class: org.elasql.bench.server.Startup
- Program Arguments: [DB Name] [Server ID]
  - E.g. elasql-0 0
- VM Arguments:

```
-Djava.util.logging.config.file=target/classes/java/util/logging/logging.properties  
-Dorg.vanilladb.bench.config.file=target/classes/org/elasql/elasqlbench.properties  
-Dorg.vanilladb.core.config.file=target/classes/org/vanilladb/core/vanilladb.properties  
-Dorg.vanilladb.comm.config.file=target/classes/org/vanilladb/comm/vanilladbcomm.properties  
-Dorg.elasql.bench.config.file=target/classes/org/elasql/elasqlbench.properties  
-Dorg.elasql.config.file=target/classes/org/elasql/elasql.properties
```

# Run Configuration for Server 1

- Project: elasqlbench
- Main Class: org.elasql.bench.server.Startup
- Program Arguments: [DB Name] [Server ID]
  - E.g. elasql-1 1
- VM Arguments:

```
-Djava.util.logging.config.file=target/classes/java/util/logging/logging.properties  
-Dorg.vanilladb.bench.config.file=target/classes/org/elasql/elasqlbench.properties  
-Dorg.vanilladb.core.config.file=target/classes/org/vanilladb/core/vanilladb.properties  
-Dorg.vanilladb.comm.config.file=target/classes/org/vanilladb/comm/vanilladbcomm.properties  
-Dorg.elasql.bench.config.file=target/classes/org/elasql/elasqlbench.properties  
-Dorg.elasql.config.file=target/classes/org/elasql/elasql.properties
```

# Run Configuration for Client 0

- Project: elasqlbench
- Main Class: **org.elasql.bench.App**
- Program Arguments: [Client ID] [Action (1/2)]
  - Load Testbed: 0 1
  - Benchmarking: 0 2
- VM Arguments:

```
-Djava.util.logging.config.file=target/classes/java/util/logging/logging.properties  
-Dorg.vanilladb.bench.config.file=target/classes/org/elasql/elasqlbench.properties  
-Dorg.vanilladb.core.config.file=target/classes/org/vanilladb/core/vanilladb.properties  
-Dorg.vanilladb.comm.config.file=target/classes/org/vanilladb/comm/vanilladbcomm.properties  
-Dorg.elasql.bench.config.file=target/classes/org/elasql/elasqlbench.properties  
-Dorg.elasql.config.file=target/classes/org/elasql/elasql.properties
```

# To Load Testing Data

1. Start server 0 and server 1
2. Wait for “ElaSQL server ready”
3. Start client 0 with “loading mode”
4. Wait for “loading procedure finished”
5. Terminate all programs

# To Benchmark

1. Start server 0 and server 1
2. Wait for “ElaSQL server ready”
3. Start client 0 with “benchmark mode”
4. Wait for “benchmark process finished”
5. Terminate all programs

# Check Out Reports

- ElaSQL-Bench generates two reports after it finishes benchmarking procedure.
- It puts the reports at “benchmark\_results” under your home directory.
  - If can configure the output directory in `elasqlbench.properties`.

# Configurations

- `vanilladb.properties`
  - Settings for VanillaCore (storage engine)
- `vanilladbcomm.properties`
  - The IP address of servers and clients
- `elasql.properties`
  - Settings for ElaSQL (distributed engine)
- `elasqlbench.properties`
  - Settings for benchmarking.



# A Few Tasks You Can Try

1. Try to change the workloads
  - For example, increasing the rate of read-write transactions, distributed transactions... etc.
2. Try to put two servers on different machines
3. Try to add more servers