Presto@Alibaba Group – How Alibaba AnalyticDB Supports Real-time PB Scale Online Analytics

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Presto Summit, March 12, 2019

Agenda

- About Us

- Our customers

- Improvements in Presto

- Future Plan

About Us – Alibaba Group

Digital Media & Entertainment

Core E-Commerce

Local Services

Financial Service

Logistics

Marketing

Cloud Computing

870 Million

Active Users of Alipay Around the Globe

Serving 15 million SMEs worldwide

100 Million

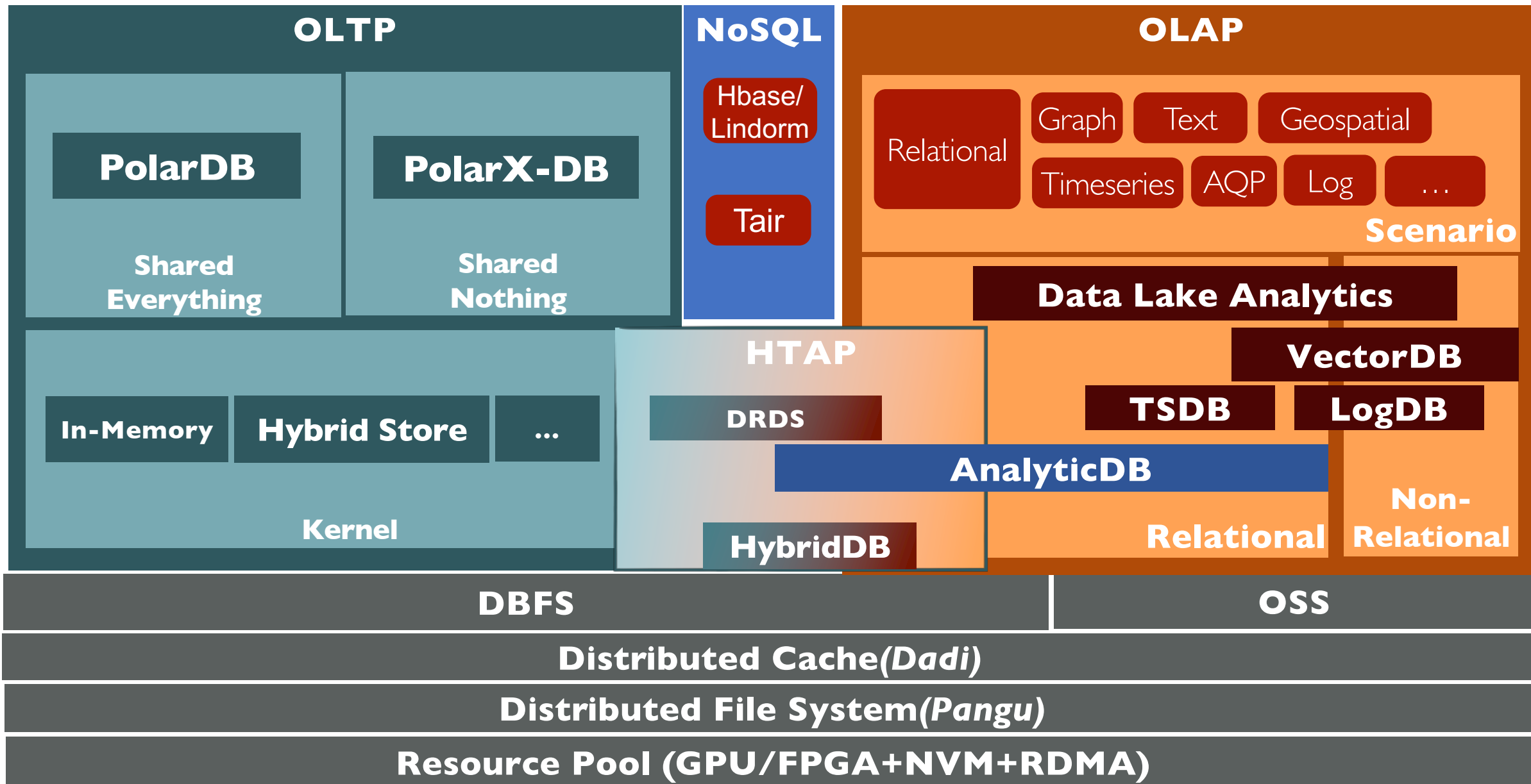**Packages Processed by Cai Niao Logistic Network Each Day**

Covering 15 hundred cities and counties in mainland China

$768 Billion

GMV of FY2018

552 million monthly active users

About Us - Database

About us – Database OLAP

AnalyticDB

High concurrency, low latency, real-time Analytics Database on Cloud

- **1000+ nodes, >10PB data**
- **100K** QPS、10M insert per second
- **GPU 10x acceleration**
- Millisecond response
- AI empowered optimization
- MySQL Compatible

Data Lake Analytics

Serverless Multi-model Query Service on Cloud

- **Server-less:** Low maintenance cost, Zero time to deployment
- **Built for Data Lake :** Various data source, various data format
- Interactive query on OSS OTS data
- Multi-tenancy, dynamic, elastic
- MySQL Compatible

Evolution @ Alibaba

~2008

Oracle RAC

Greenplum

2009

2011

HBase
MySQL

AnalyticDB
1.0

2012

More...

HTAP

Time
Series

Data Lake
Analytics

AnalyticDB
2.0

Graph

About Us – Database - OLAP

Forrester - Contenders

Gartner – Niche Player

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Online and Interactive Analytical Services

AnalyticDB (ADB): **online data analytics** to explore business value of data for Alibaba cloud customers and Alibaba Group

Report	**Interactive**	**Intelligence**

Delivers high performance through multi-dimensional query to support BI analysis

Real-time interactive query from millions labeled customers to find high value targets (E-commerce, CRM…)

Internet company to build data analytics platform to manage & explore data value (Marketing, AD, O2O…)

Our Customers

- Public Cloud & Private Cloud & Alibaba Group
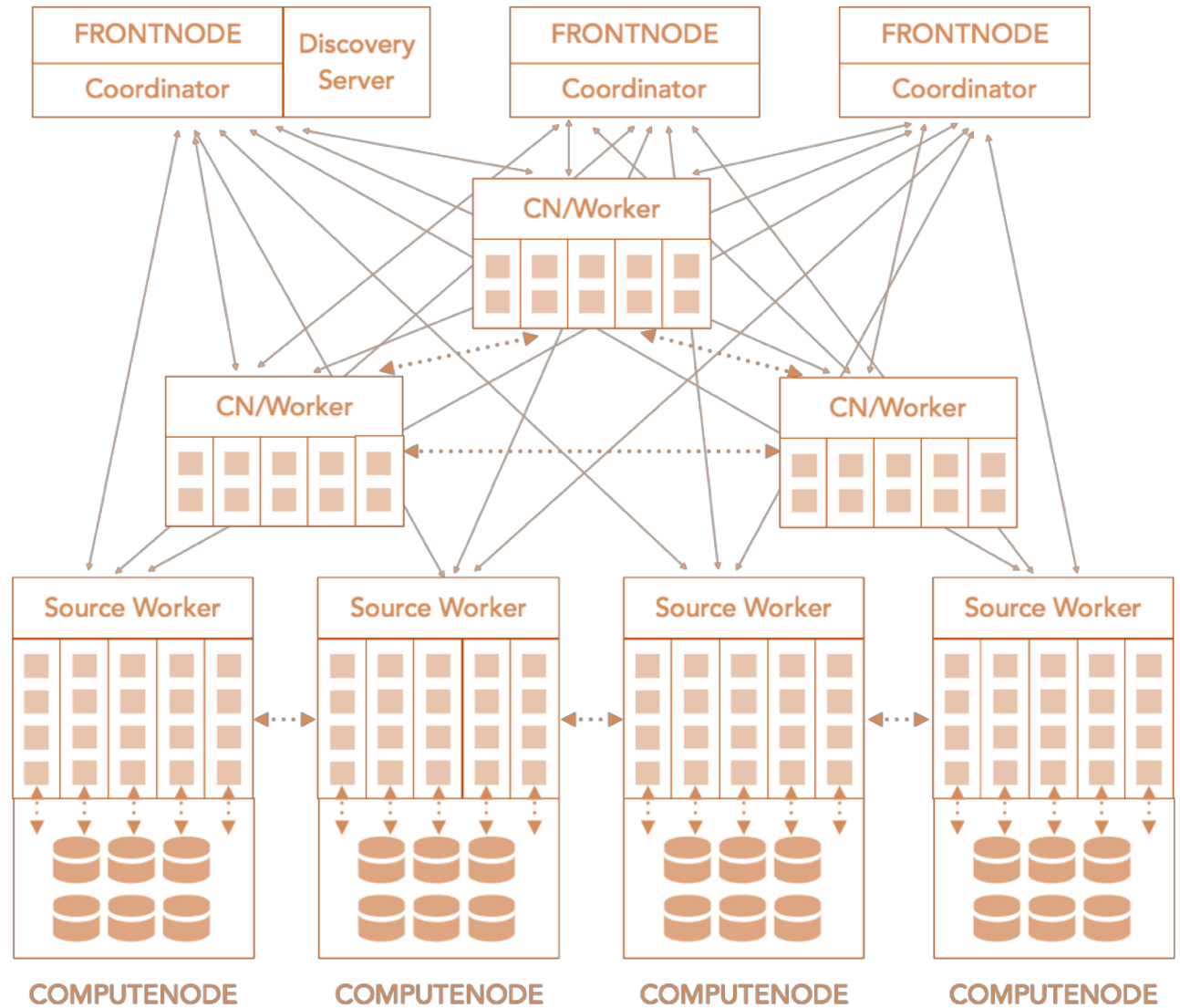 - Across 10+ industries

- Single DB
  - thousands nodes
  - thousands QPS
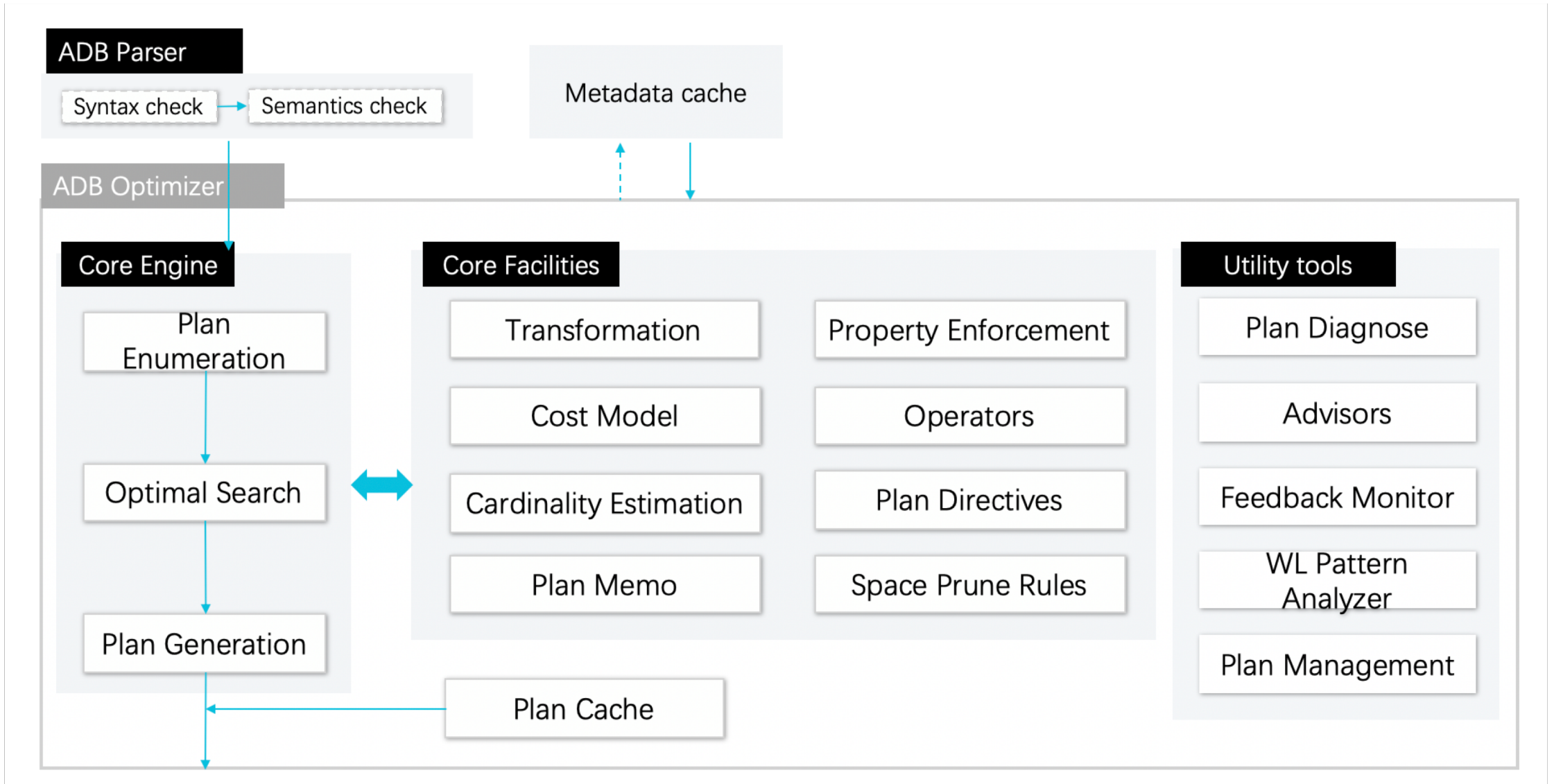 - hundreds Concurrent Queries

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AnalyticDB Overview

- Distributed processing system

- High availability, no single point of failure

- Capable of scaling to thousands of nodes

- Extremely low latency, ~ms level response for table with ~100 billion rows

- Multi-tenancy support with isolated resource management

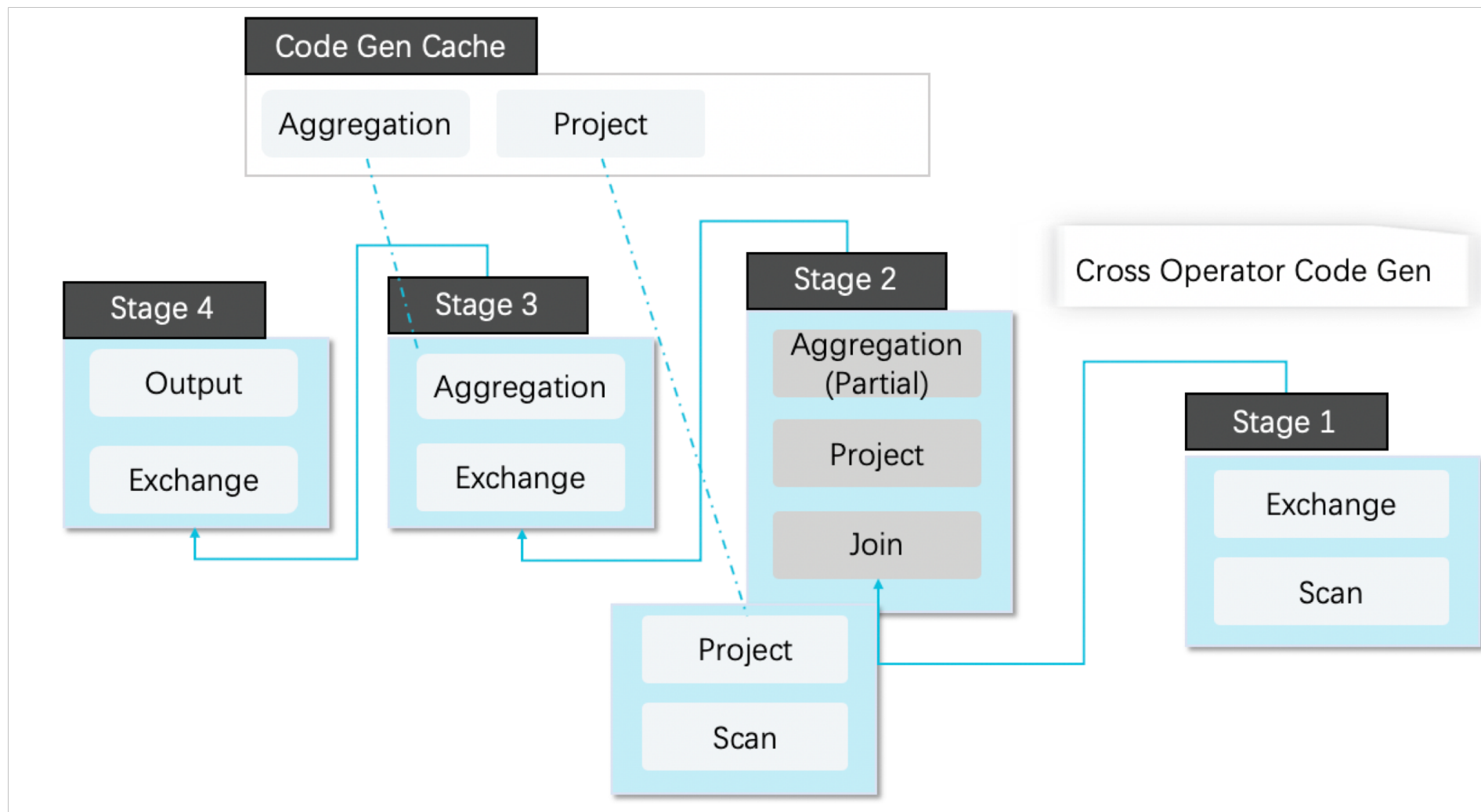# Improvement - Optimizer

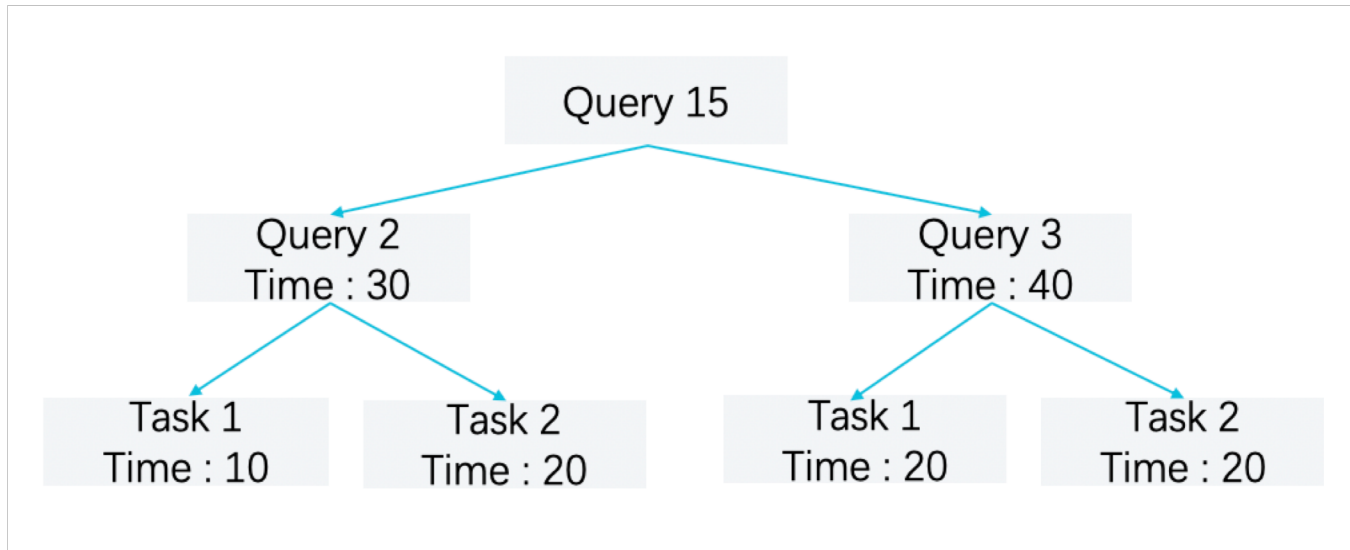# Improvement - Optimizer

- Statistics Collection

    - Table cardinality, Column NDV, Histogram etc.

    - AQP, Parallel Collection, Dynamic Sampling

- Optimization Rewrite

- Plan Cache

- Advanced Plan Explain

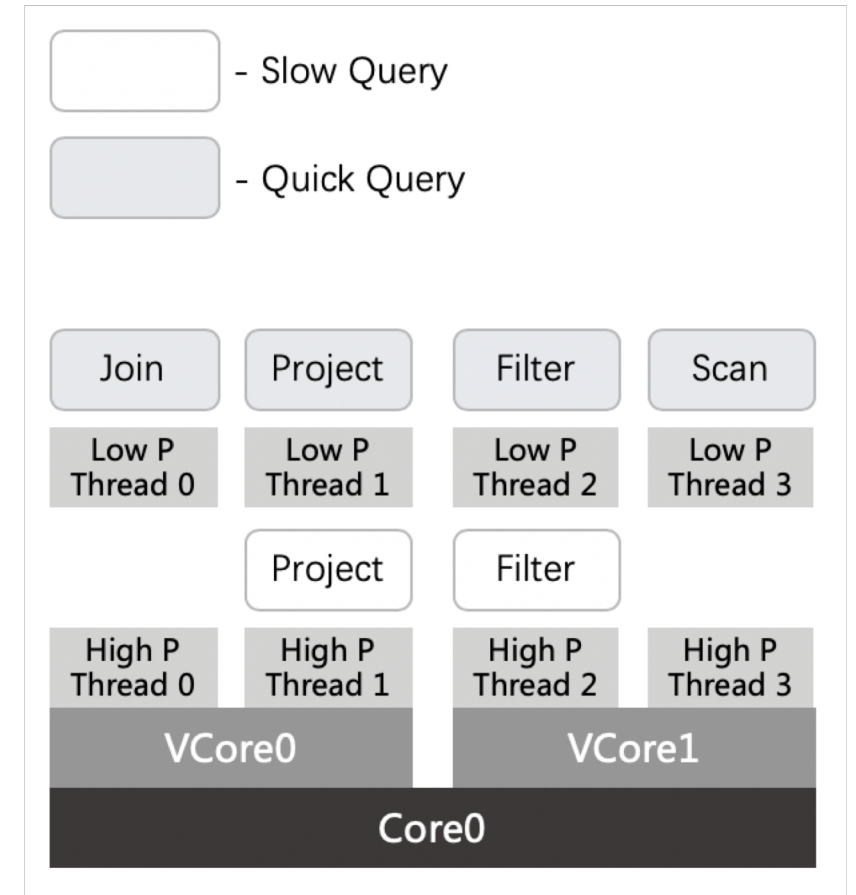- CBO (Cost Model, Join, Aggregation etc.)

- Subquery De-correlation

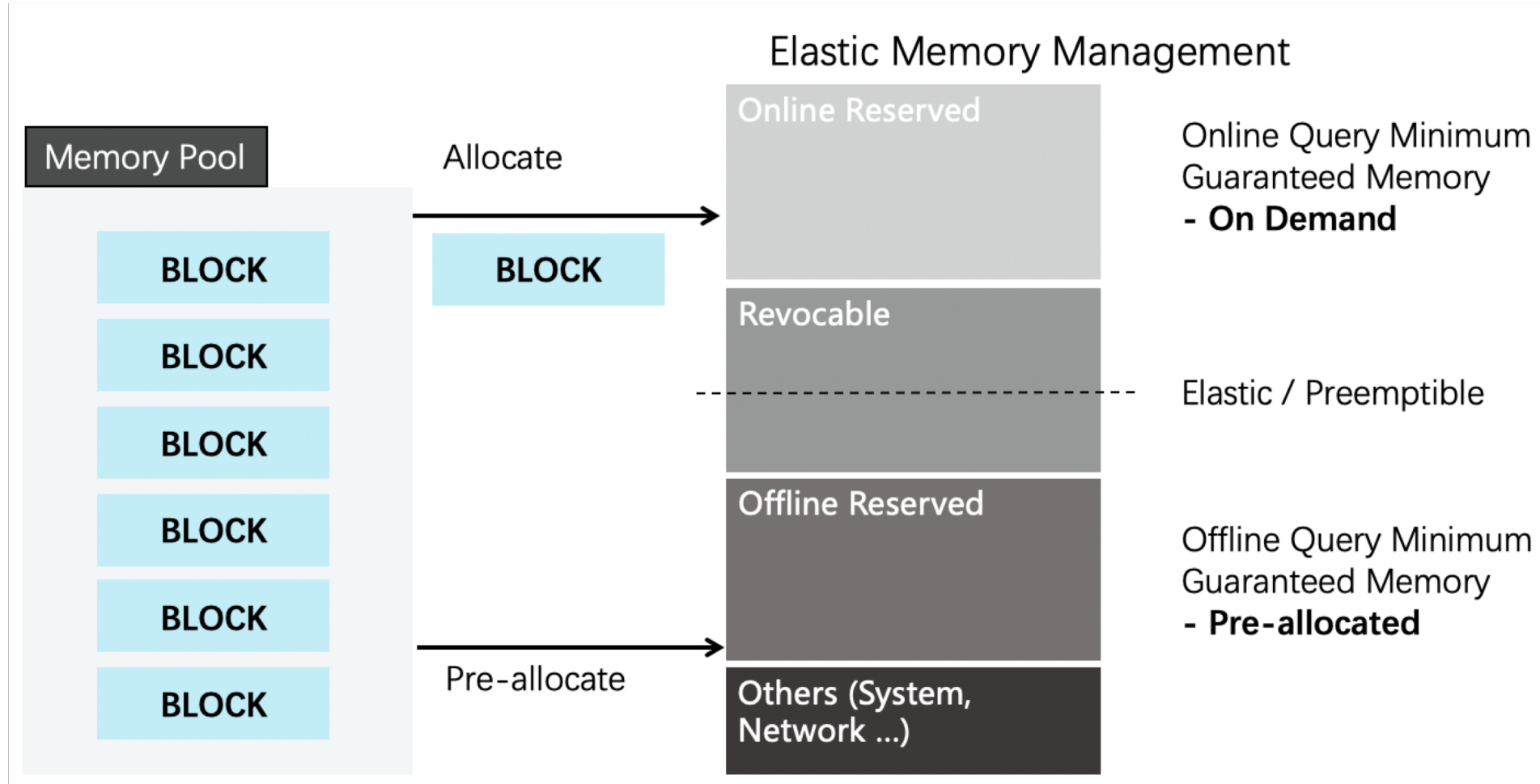# Improvement – Compute Engine – Code Gen

Improvement – Compute Engine - CPU

Query Fair Scheduling

Improvement – Compute Engine - Memory

Improvement – Compute Engine - Others

- MySQL Compatibility

- Binary Processing

- Vectorized Computation

- Disk Spill

- Serialization: Json → Kyro

- Network: Jetty → Netty

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Future Plan – Compute Engine

- Performance
  - Cache-aware Computation
  - GPU acceleration

- Scale
  - Support thousand-machines DB

- Features
  - Serverless (Workload / Security / Authentication etc.)
  - Apache Beam integration

Future Plan – Optimizer

- CBO optimization
  - Search space pruning
  - MEMO optimization
  - Parallel optimization

- Cost model improvement

- Compound & derived cardinality

- Adaptive Query Processing

- Tools / Advisors

Thanks

Alibaba Group