效果展示 – 基于接口调用统计的后向流控

流控效果精准

通过流控增强对业务系统的把控

- 压测确定容量上限和消费速率
- 常态配置流控策略

设置某业务的调用上限为2100w/min

目录

- 背景
- 设计
- 实现
- 最佳实践
- 效果展示
- 总结

总结

- 引入Paxos能让事情变简单
  - 保证数据可靠性
  - 杜绝乱序、重复消费
- 良好设计解决其它核心问题
  - 高性能：Plog as queue、Group Commit
  - 高可用：Store接入均衡、轻量级租约维护、Consumer负载均衡
- 实现投产
  - 业务配合、热点处理、屏蔽策略、流控策略.....
- 展望：Paxos将会成为一种开发模式

PhxPaxos组件介绍

PhxPaxos是微信团队开源的Paxos类库

- 高性能
- 功能完善
- 接口方便易用

项目地址

- https://github.com/tencent-wechat/phxpaxos

腾讯云商用队列介绍

CKafka

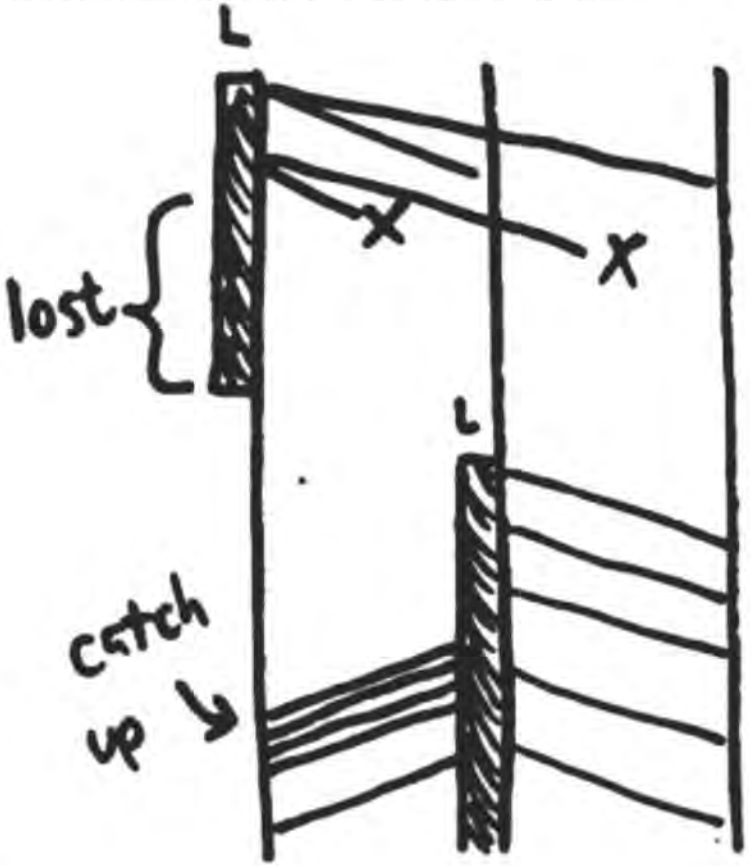
- 场景：大数据分析，日志采集
- 一致性协议：ISR

CMQ

- 场景：金融级高可靠强一致
- 一致性协议：Raft

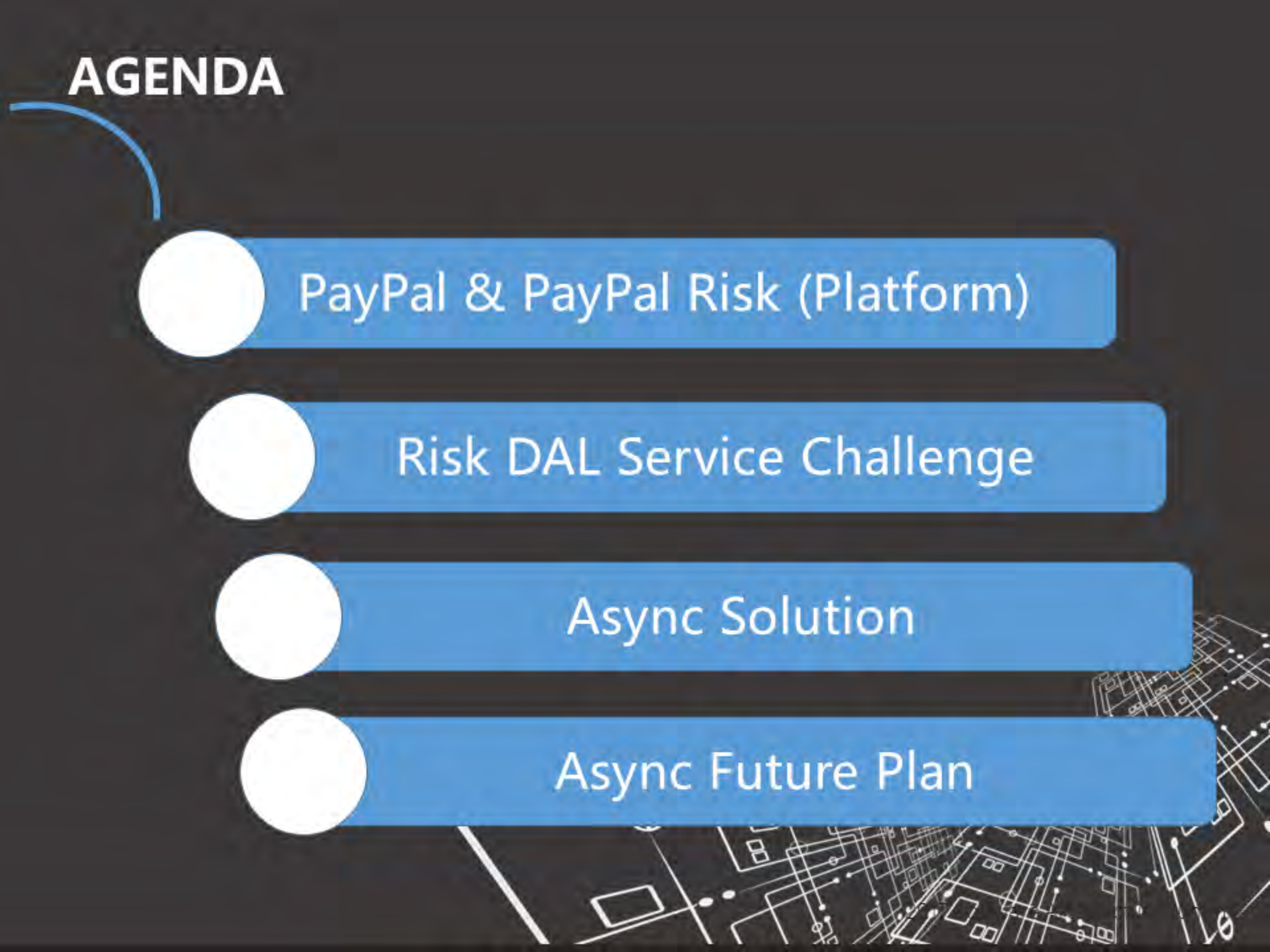
About Kafka tolerate f-1 failures with f nodes

- ISR为空可能导致数据丢失
  - https://aphyr.com/posts/293-jepsen-kafka
- 进一步说明经逻辑证明的一致性模型才是可靠的



AGENDA

- PayPal & PayPal Risk (Platform)
- Risk DAL Service Challenge
- Async Solution
- Async Future Plan



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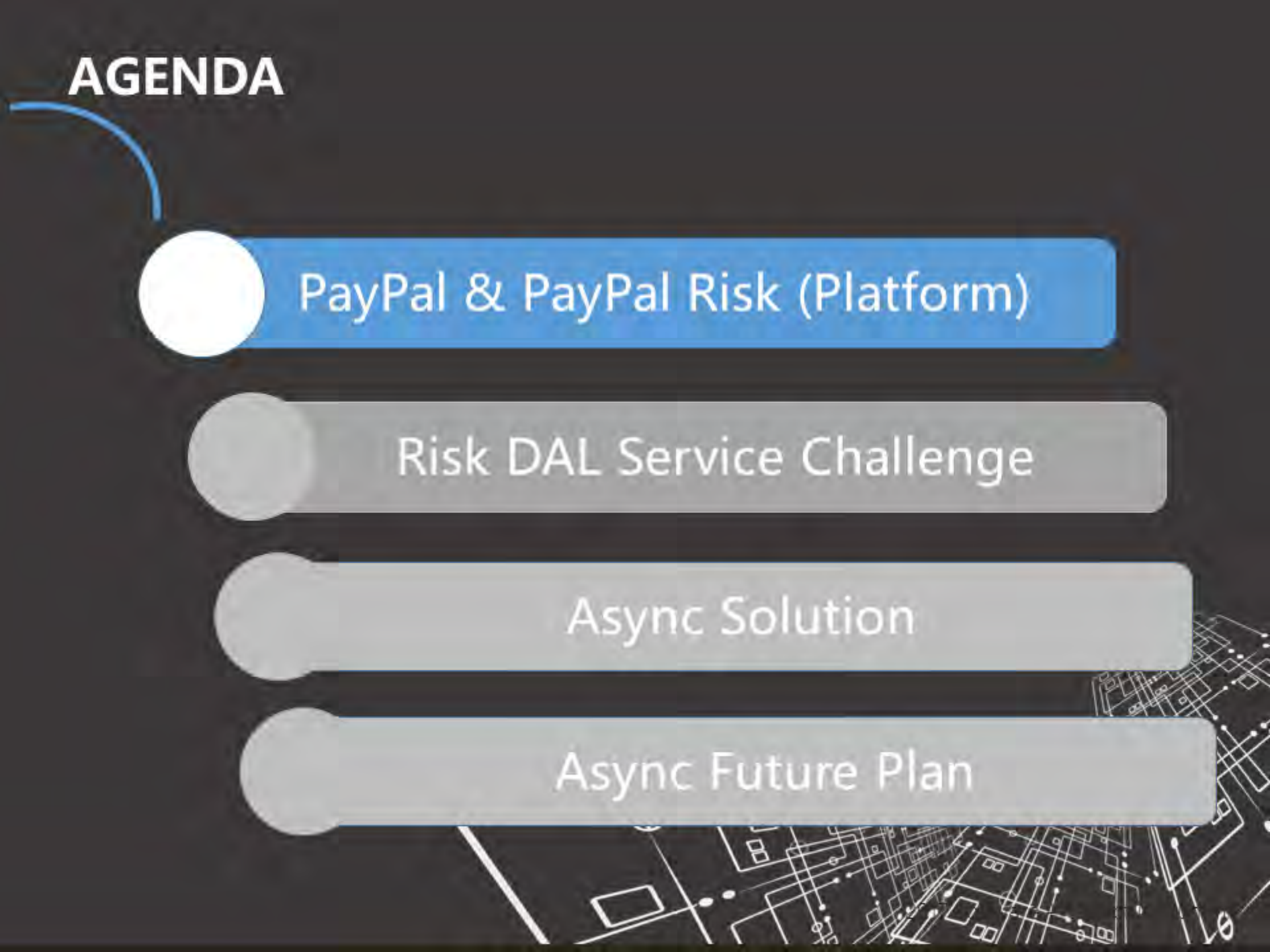

PayPal Overview

The power of
our platform

PayPal

Our technology transformation enables us to:

- Process payments at tremendous scale (**200**+ countries & **25** currencies supported)
- Accelerate the innovation of new products
- Engage world-class developers & technologists

PayPal Risk KPI

The power of
our platform

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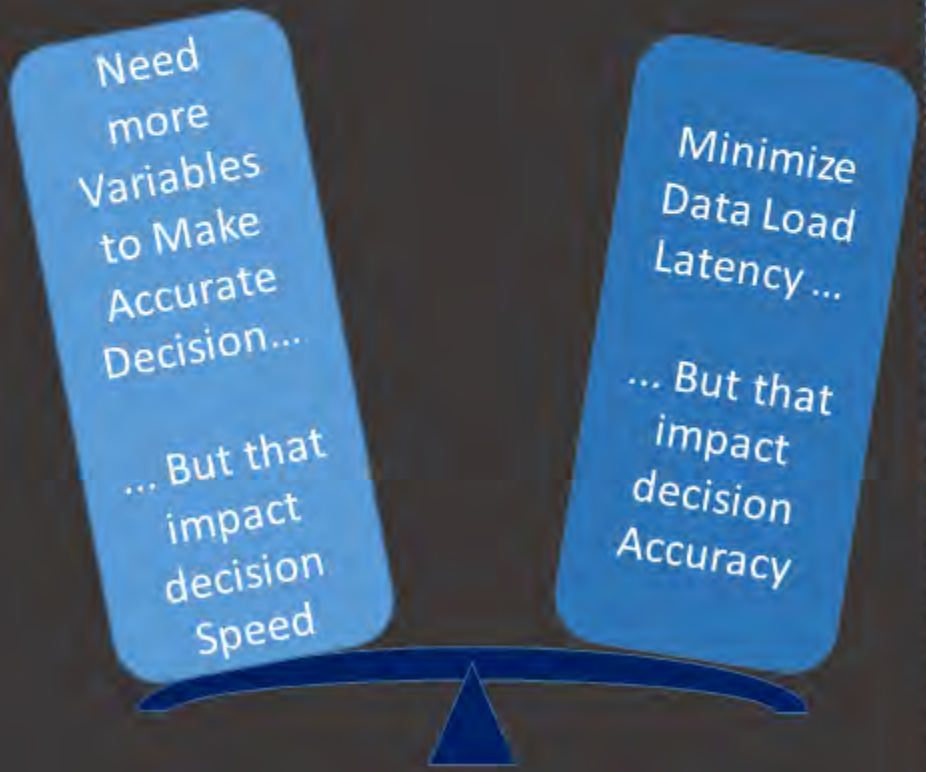
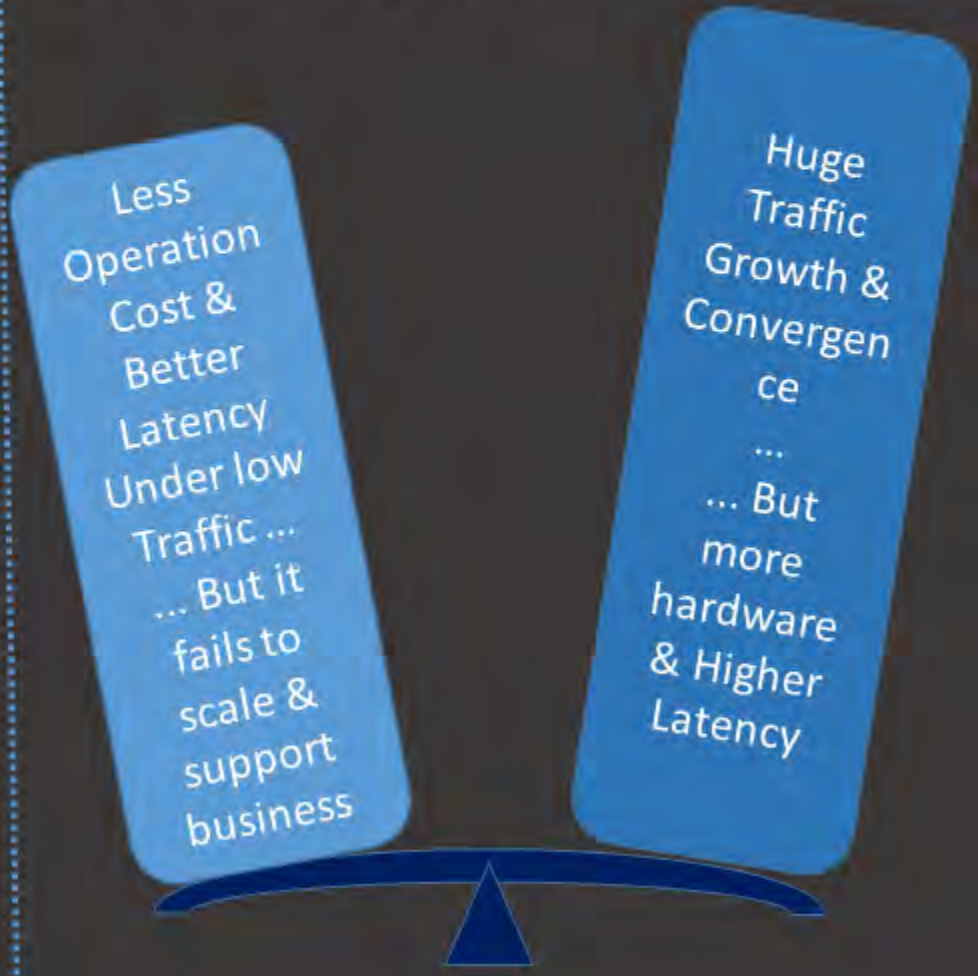
Requirement for Risk Platform

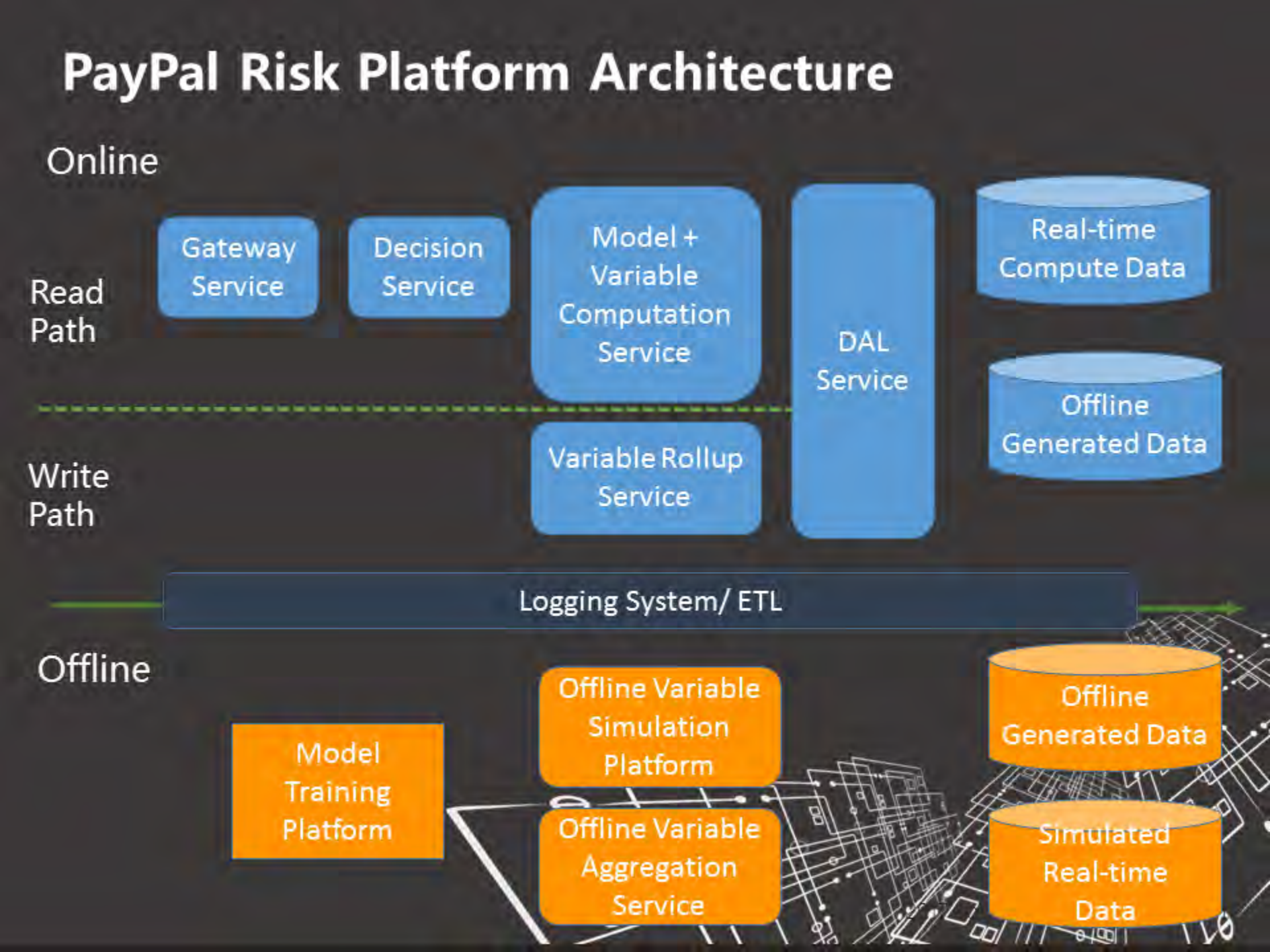
Accuracy vs Latency



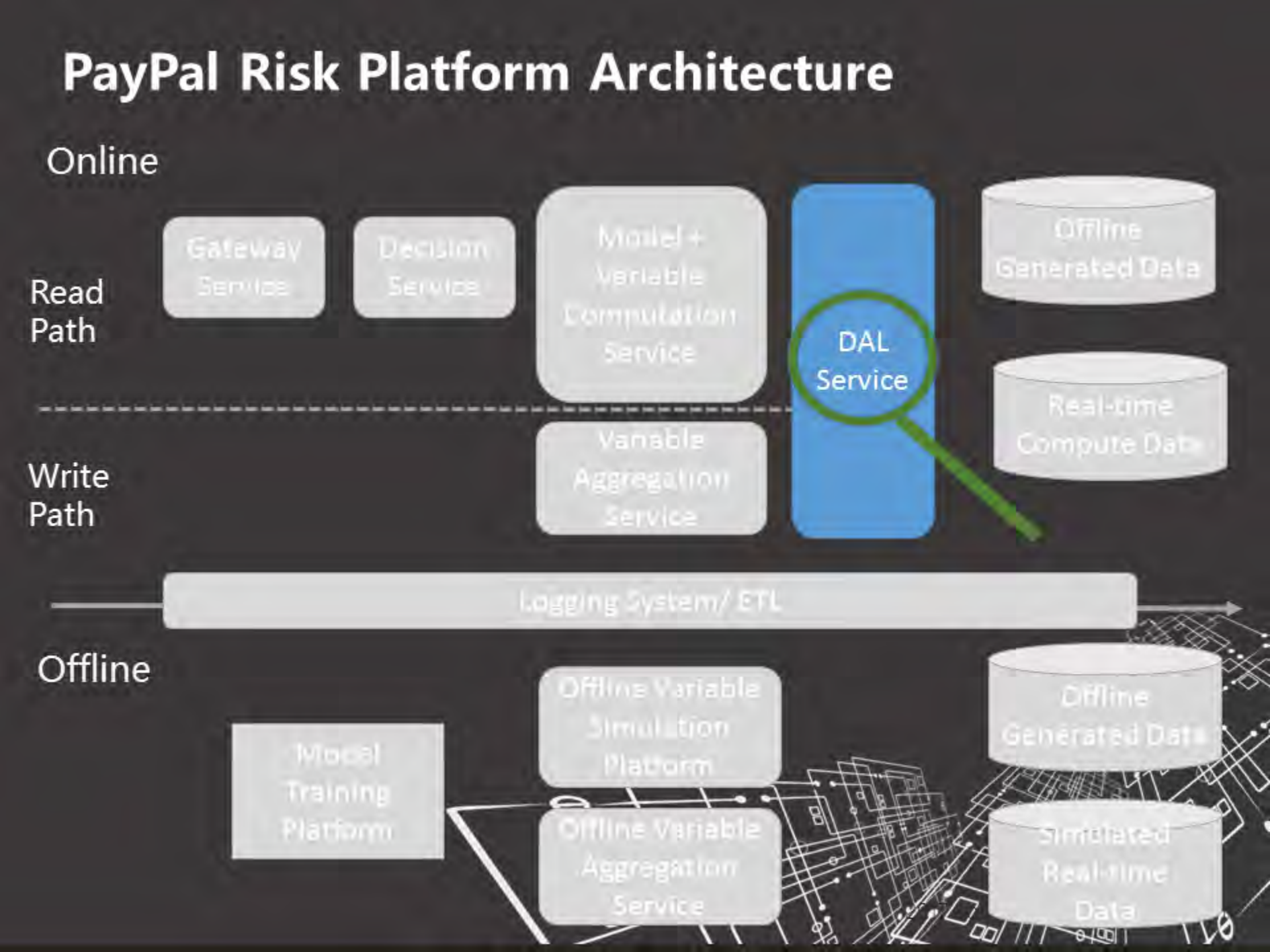
Low Latency + Hardware Investment Vs Large Throughput



PayPal Risk Platform Architecture



PayPal Risk Platform Architecture



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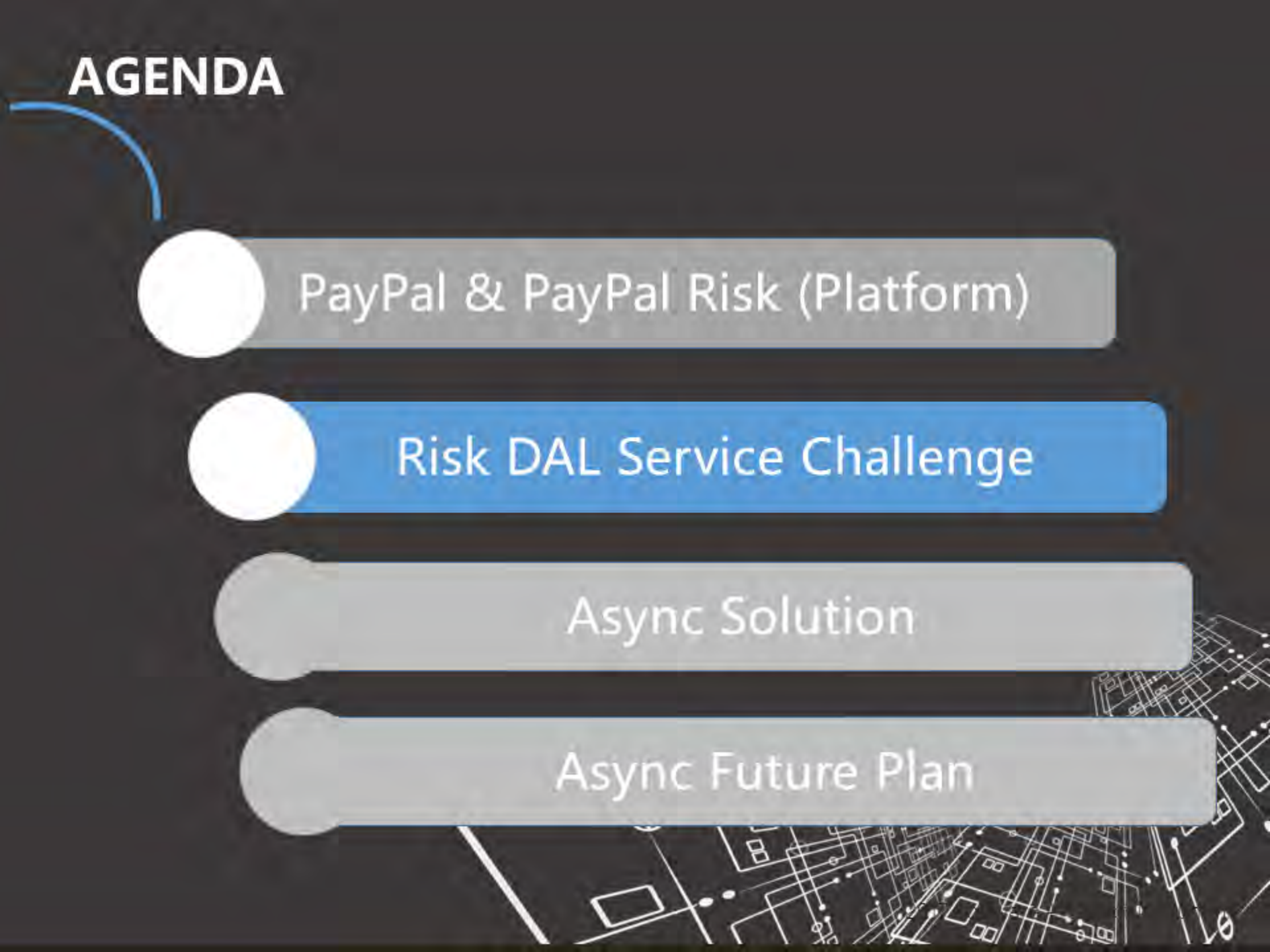


DAL Service Ultimate Questions

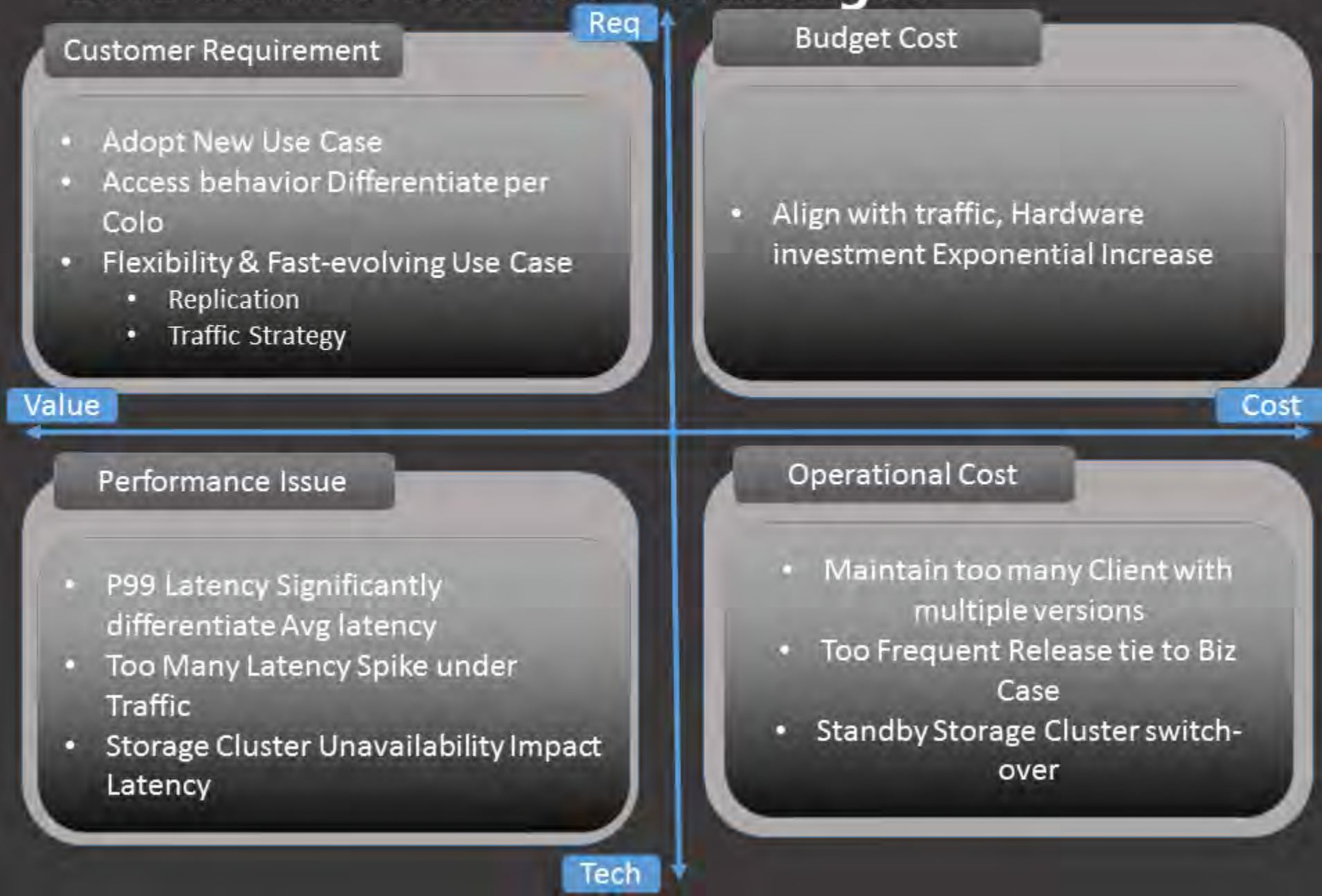
<100ms P99.99 Latency ??

For single instance, 20k-30k Peak TPS ??

99.99% Availability-To-Business??

JVM-Based High Performance & ATB DAL Service

DAL Service Technical Challenges



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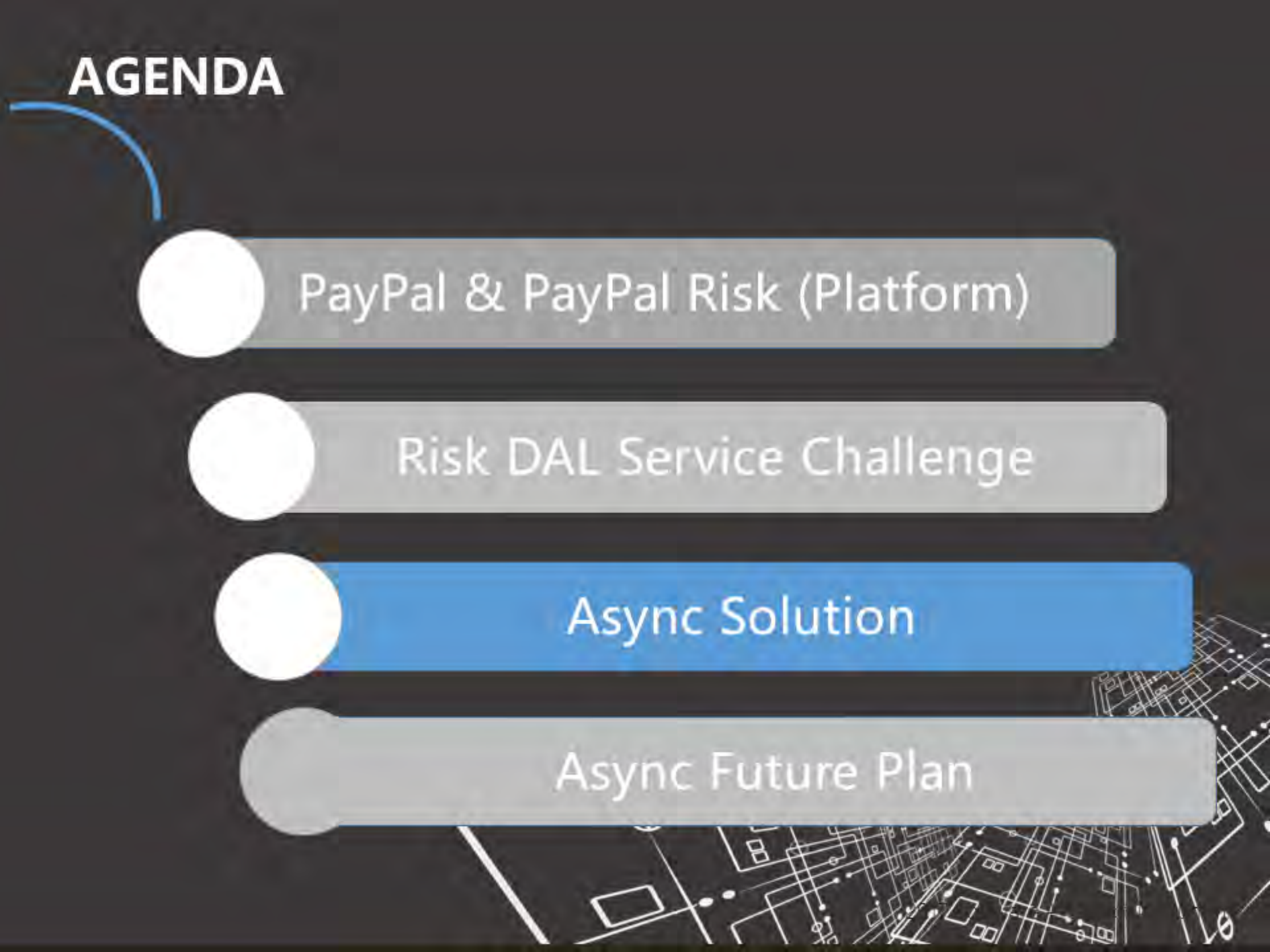
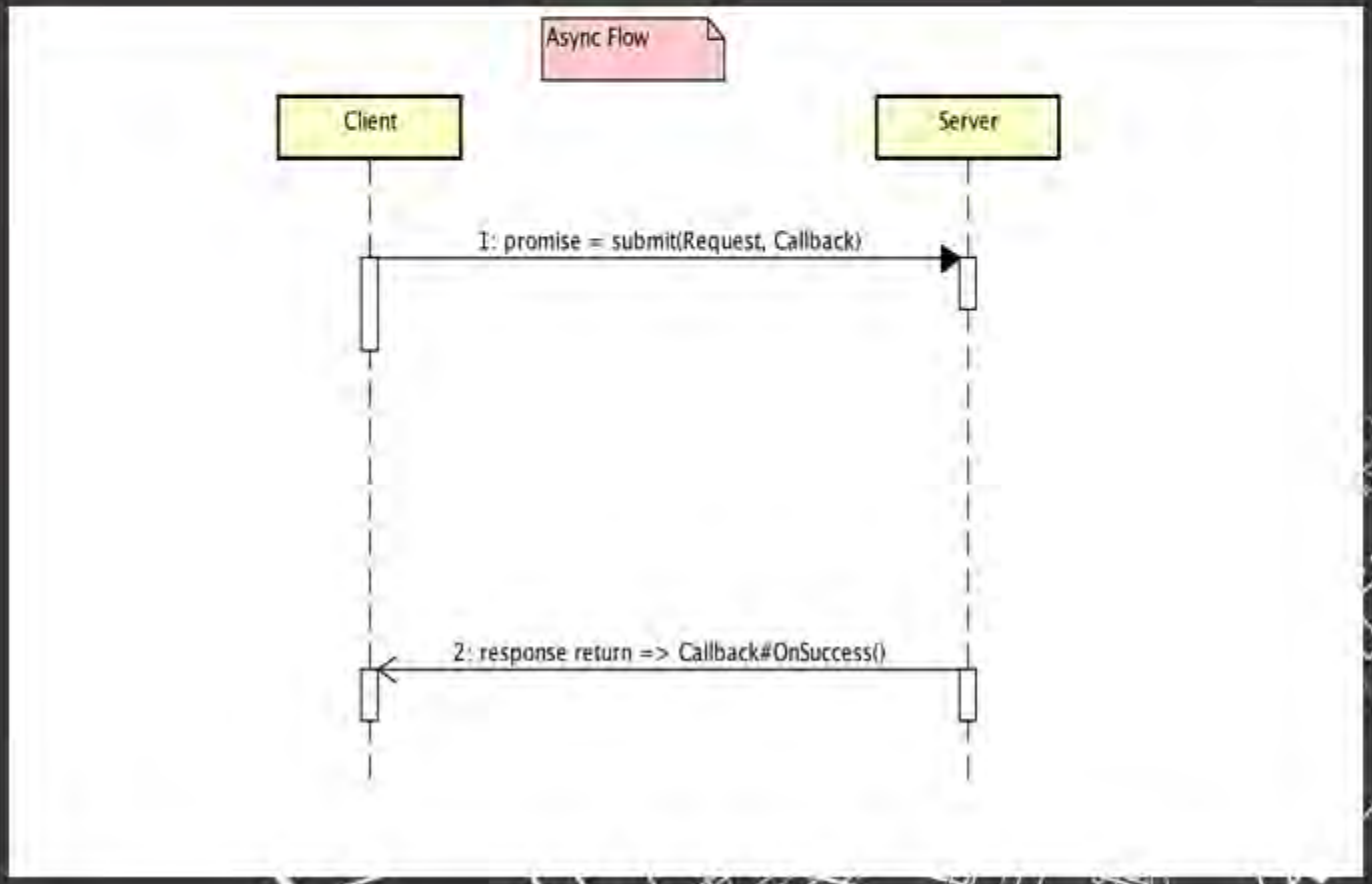
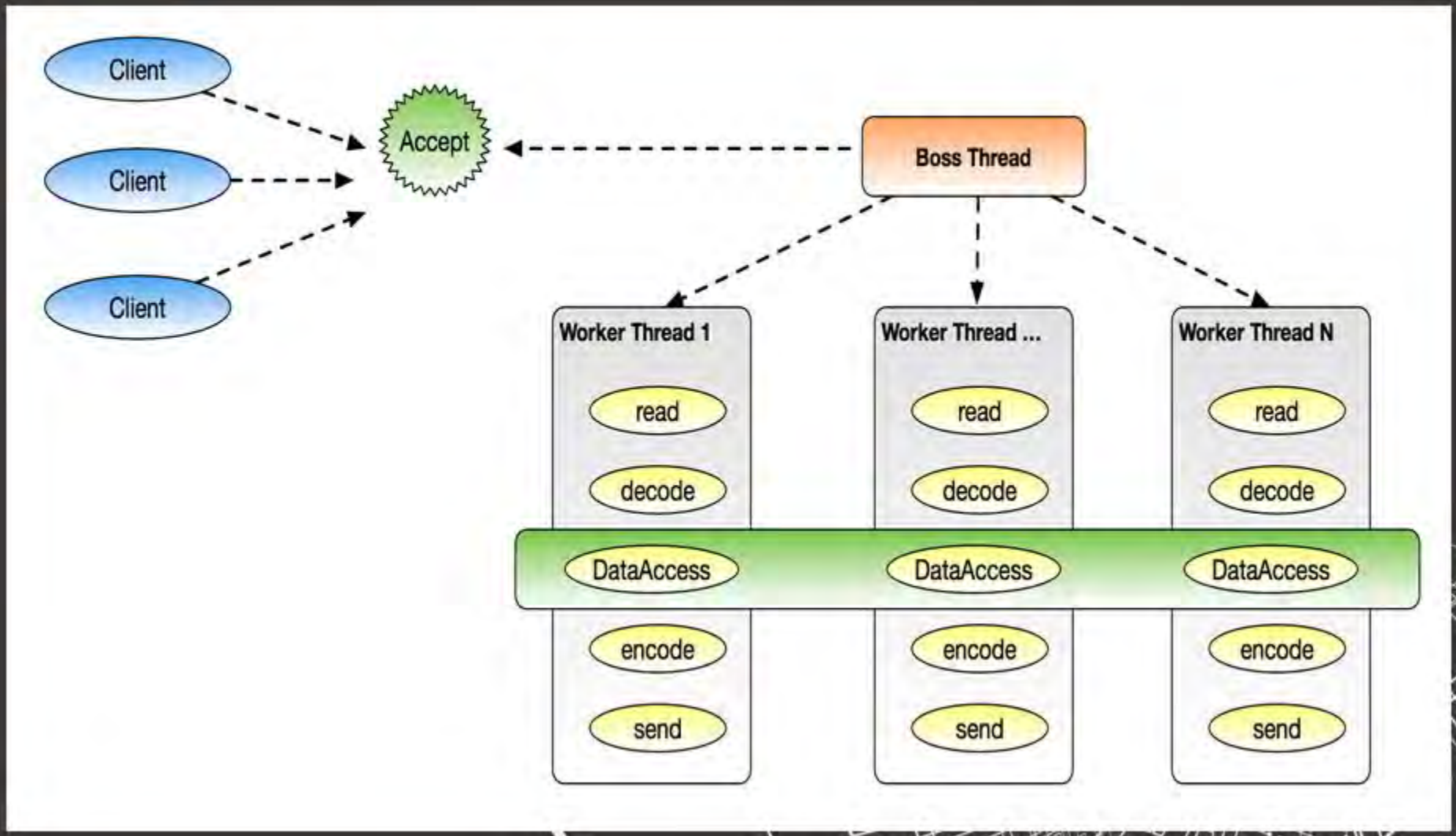


Async Original Benefit

- More Efficient Thread Scheduling
  - Non-blocking Call
  - Event-Driven Callback
- Less Context Switch
- Fault Isolation

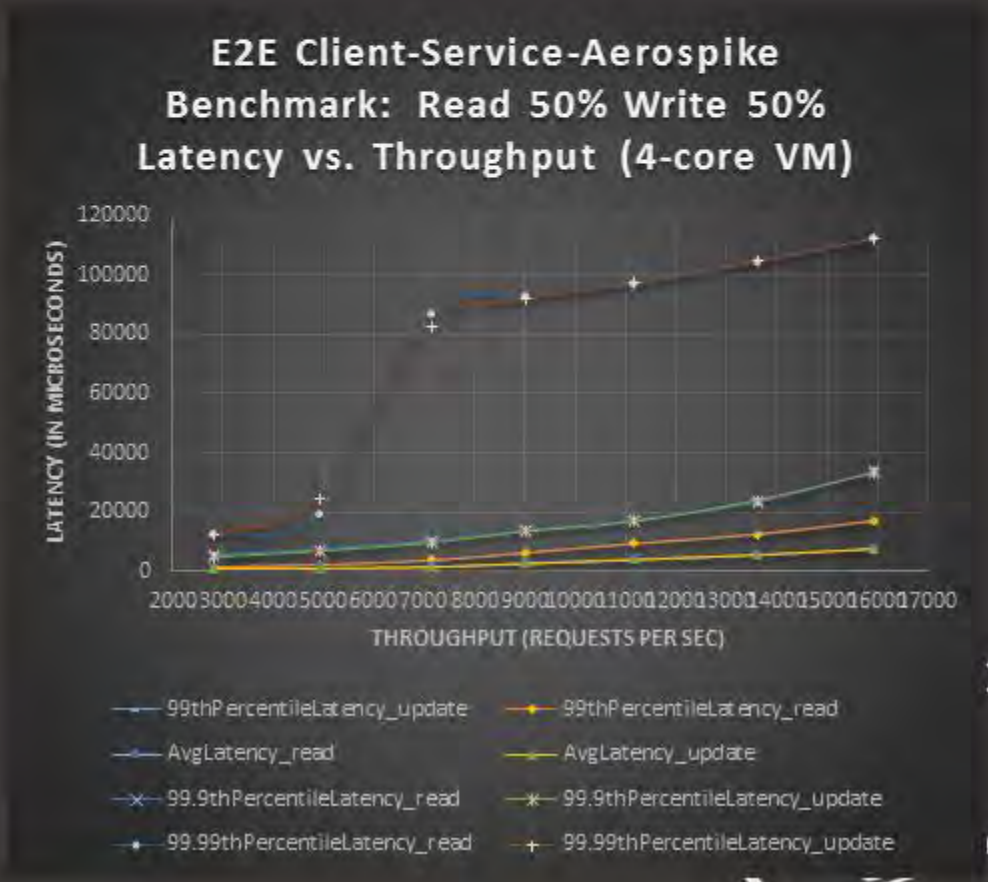


Reactor Pattern Threading Model



Async DAL Service KPI Comparison

- Low Latency
  - ~10-35% Reduction (Average/P99)

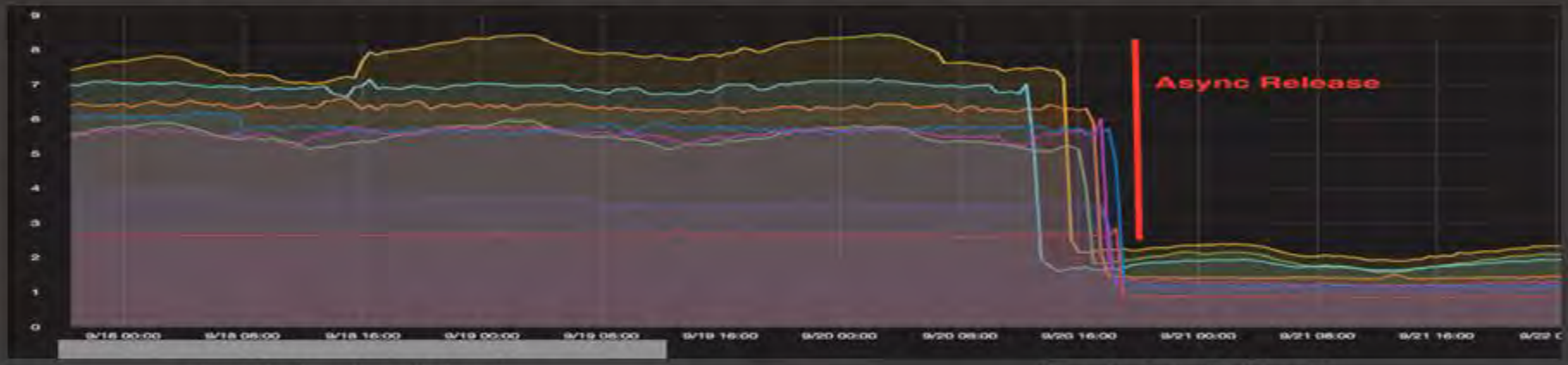


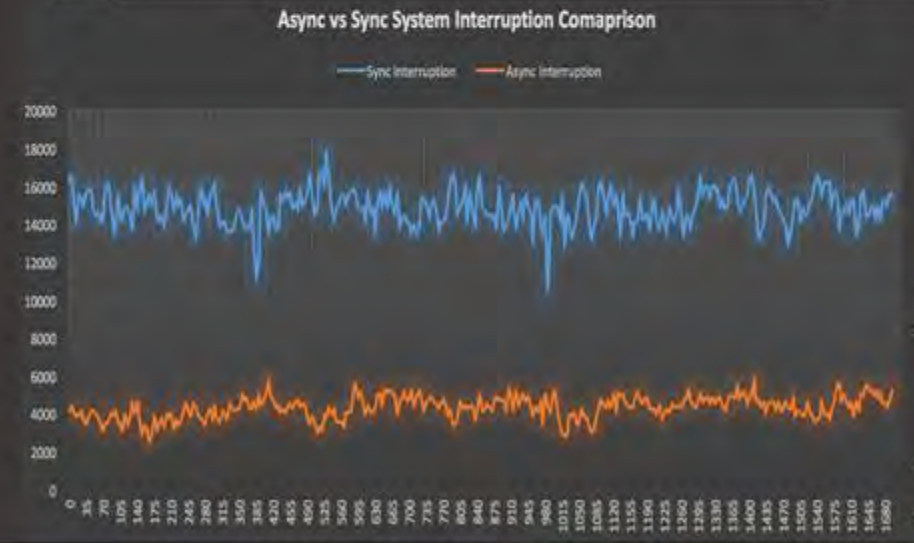
Async DAL Service KPI Comparison – Cont.

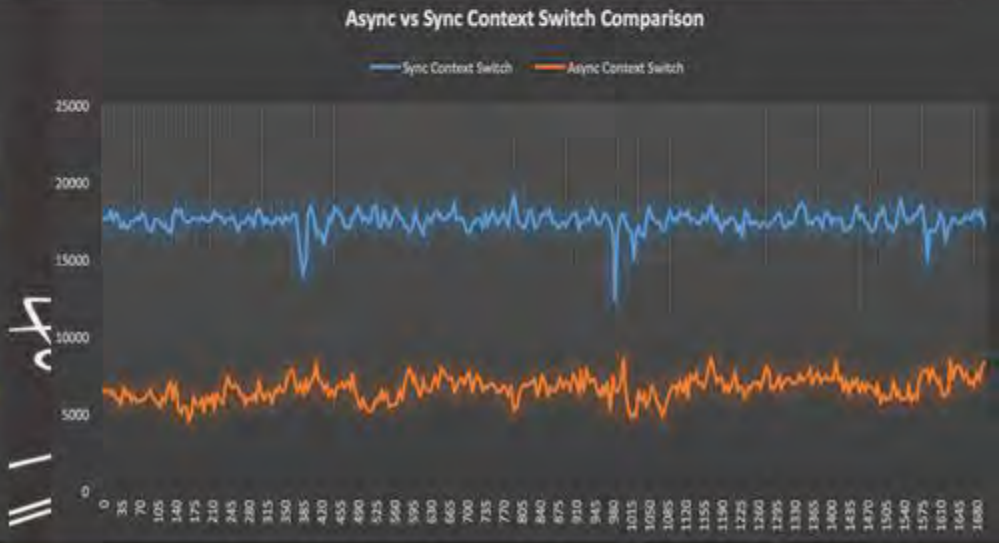
- High Throughput
  - 3-10X Increase (Single Instance Comparison)

Async DAL Service KPI Comparison – Cont.

- Less CPU Usage
  - 50% CPU Usage Reduction
  - 66%+ Reduction for Context Switch & System Interrupts

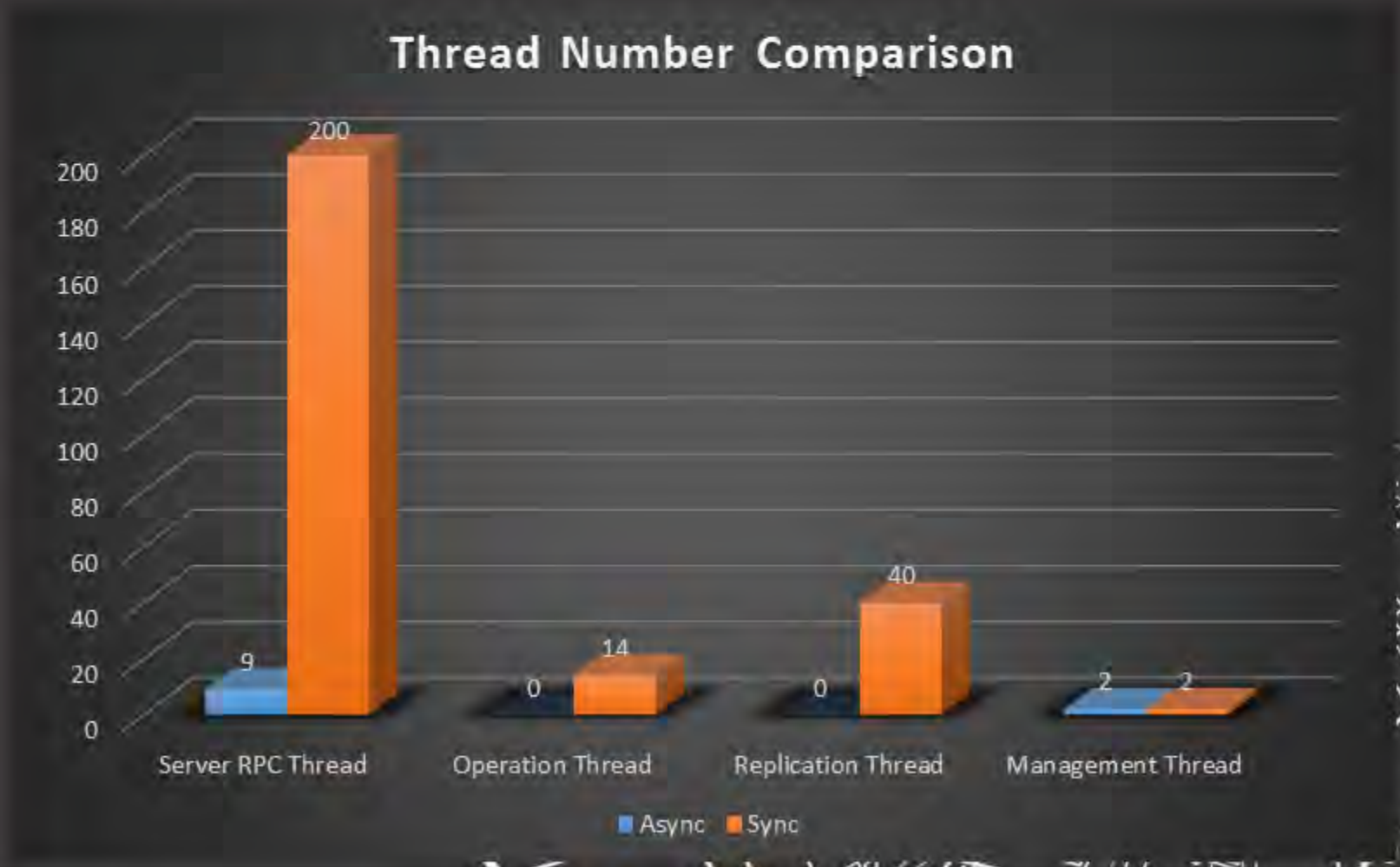






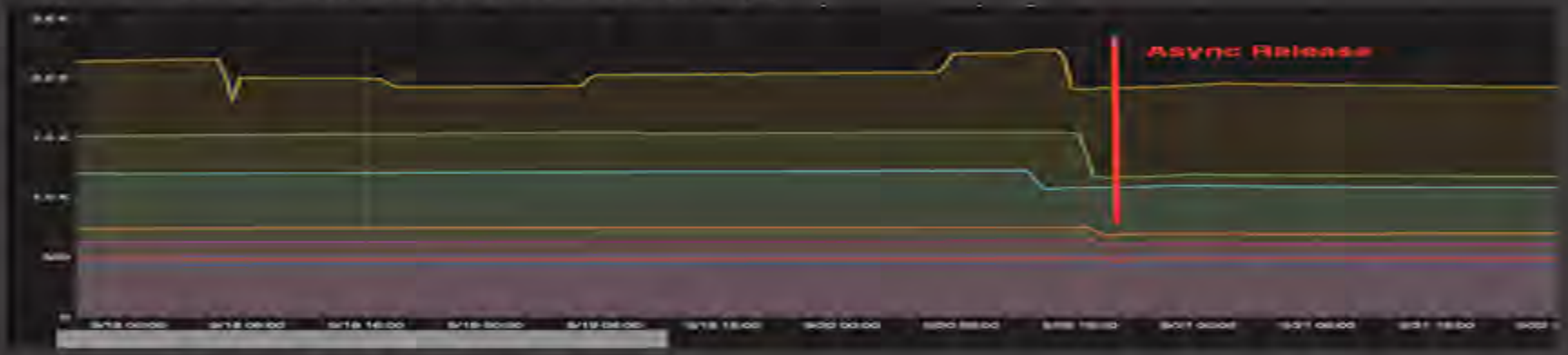
Async DAL Service KPI Comparison – Cont.

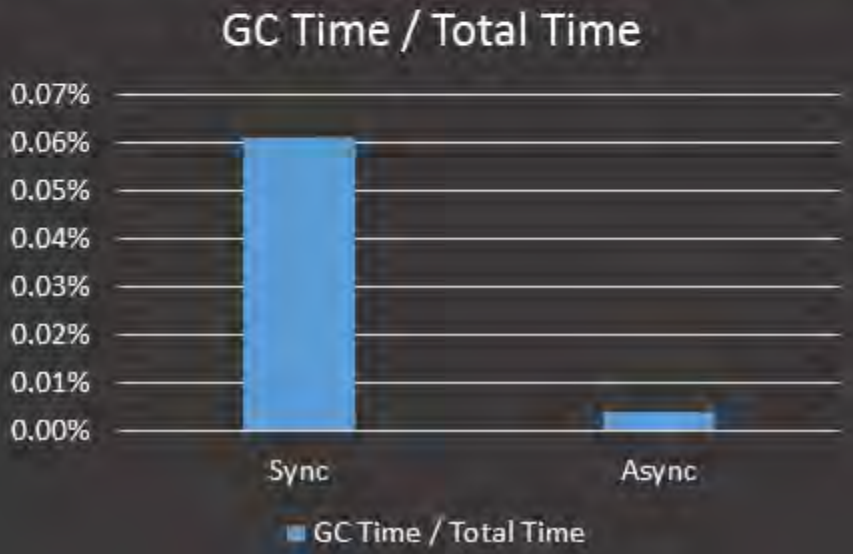
- Less Thread Pool
  - 90% Reduction for Thread pool number

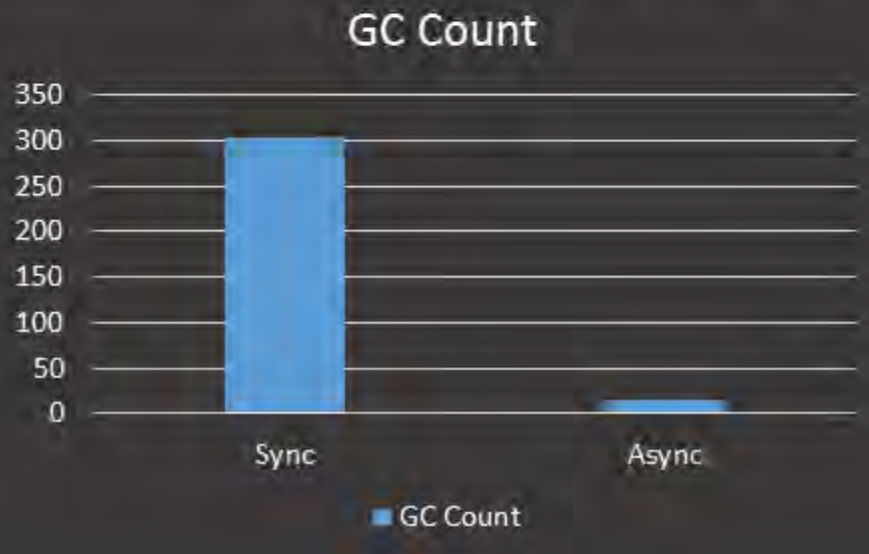


Async DAL Service KPI Comparison – Cont.

- Memory Friendly
  - 20% Reduction for Memory Allocation
  - 100+MB Young Generation after Young GC
  - 130+MB Pooled Off-heap







We Have ONE Async Dream

- Reform Application Charter from CPU-bound Charter to IO-bound
- Traffic Throughput (non-)linear growth with CPU Usage
- By guarantee Low Latency, Taking 20-30K TPS with 500MB JVM Heap (After young GC)
- Cloud Friendly Application
  - Less Hardware Investment
  - Low Operational Cost
  - Easy Capacity Estimation

High Performance Design

E2E Async

- Non-blocking Pipeline: Async RPC + Async DataAccess

Less is More

- **Shared** ThreadPool OVER Separate ThreadPool
- **Inline** Execution over Execution cross Multiple Thread Pool

---

Autonomous Memory Management

- Use Off-Heap as much as possible
  （inbound/outbound & [de]serialization）
- Release Inbound Memory At earlier stage (submitRequest)

High Performance Good Practice

Inbound/Outbound Management

- Batch Consolidation
- Order Management
- Timeout Management
- Retry Only Happen in Client Side

Programming Habit

- Fast Fail over Exception Thrown Cascading
- Logging & Monitoring Matters
- Thread-safe Write Operation In Control Plan while Exception-safe Read Operation In Data Plane

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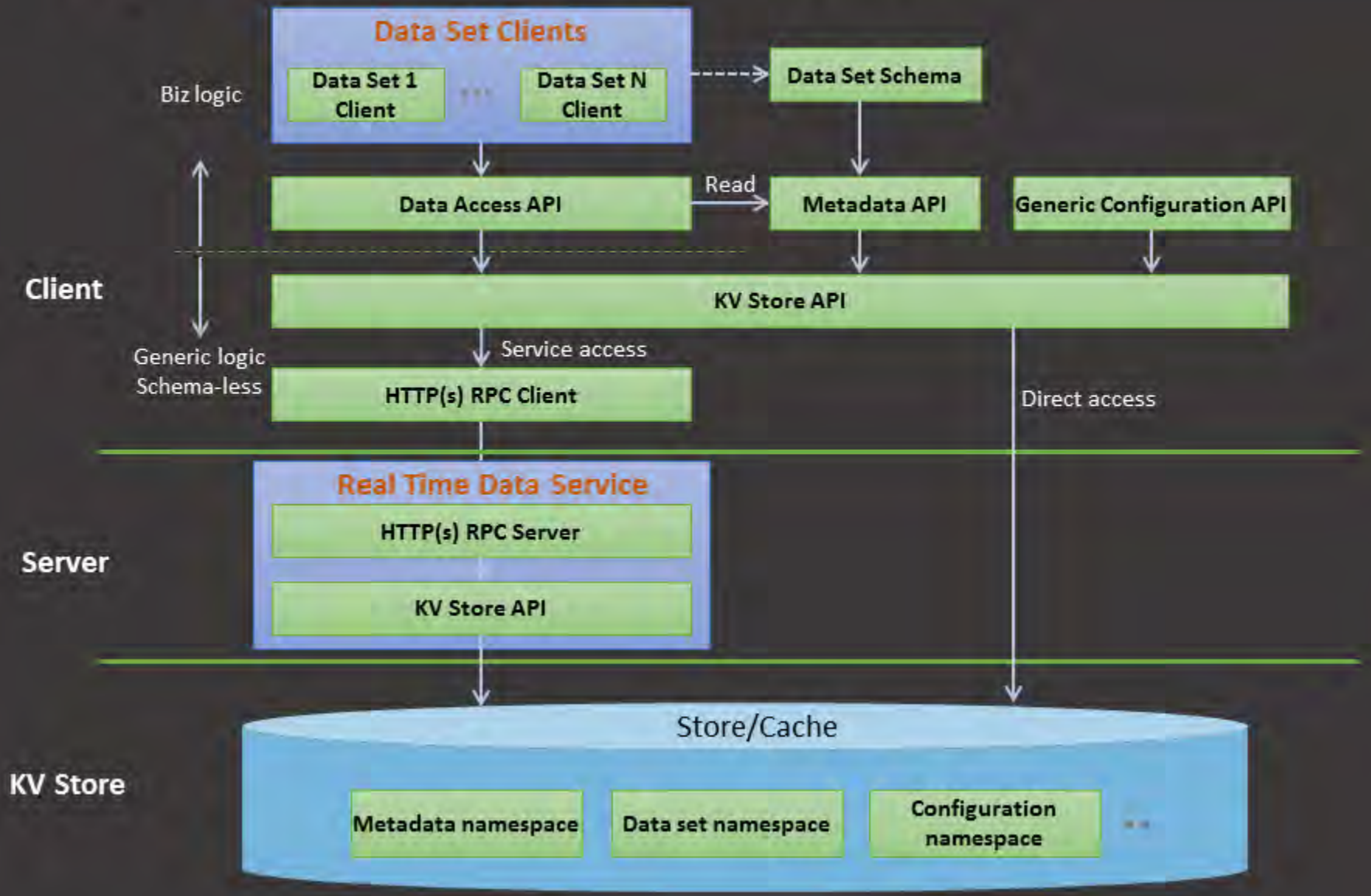
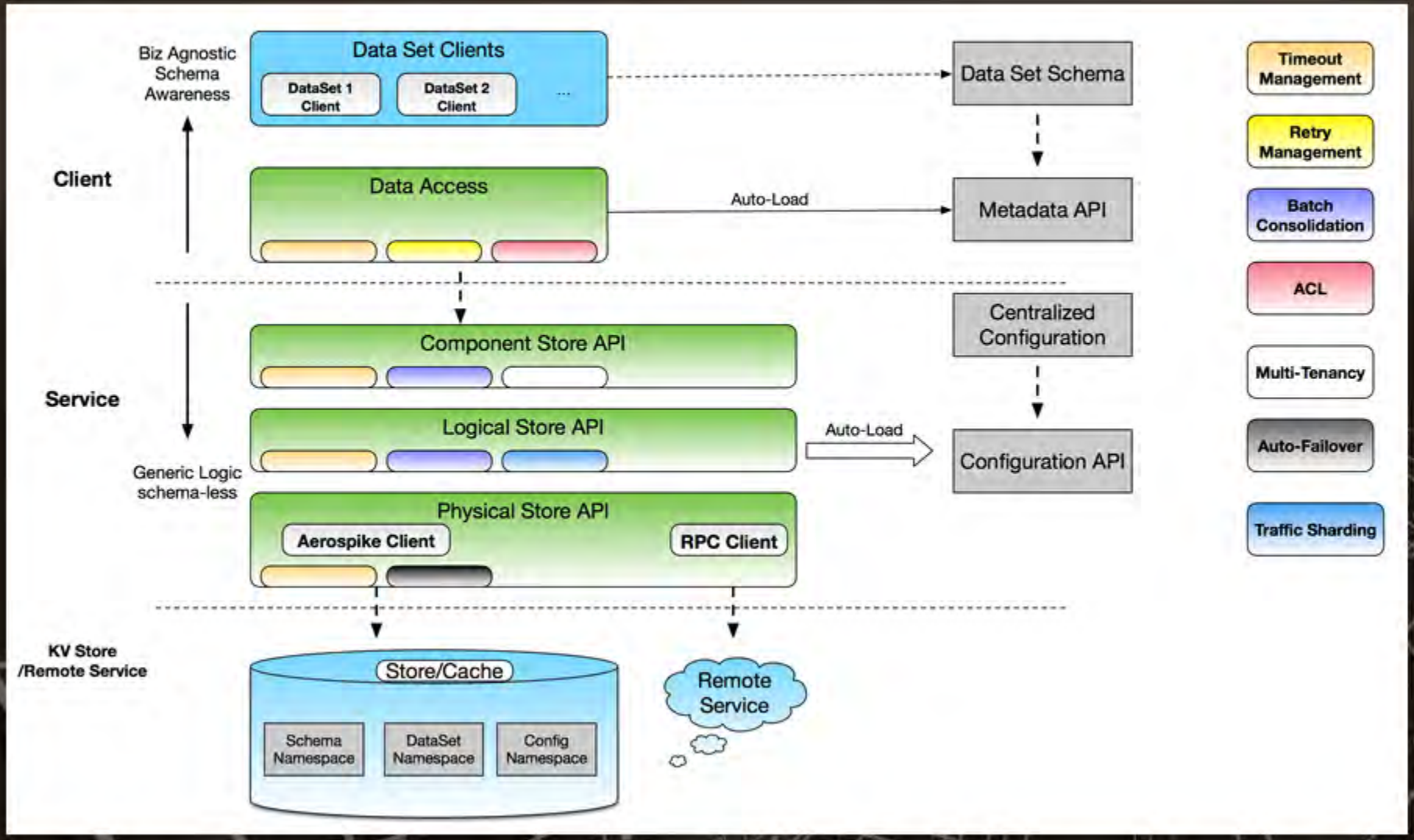
KPI Sign-Off

- Performance Test as Critical Path for Each Commit
- [Mandatory] Continuous Performance Test for Each Commit

Async High Level Architecture



Async DAL Service Hierarchy



Async Data Access Maturity

DAL Service Feature

- Client& Server RoR Identification
  - biz-schema aware on Client Side
  - Schema-less on Sever Side
- Traffic Sharding & Routing
  - Active-Active/Active-Standby
- Auto-Failover
- Multi-Tenancy
  - ACL
- Direct/Service-To-Service Replication

… ….

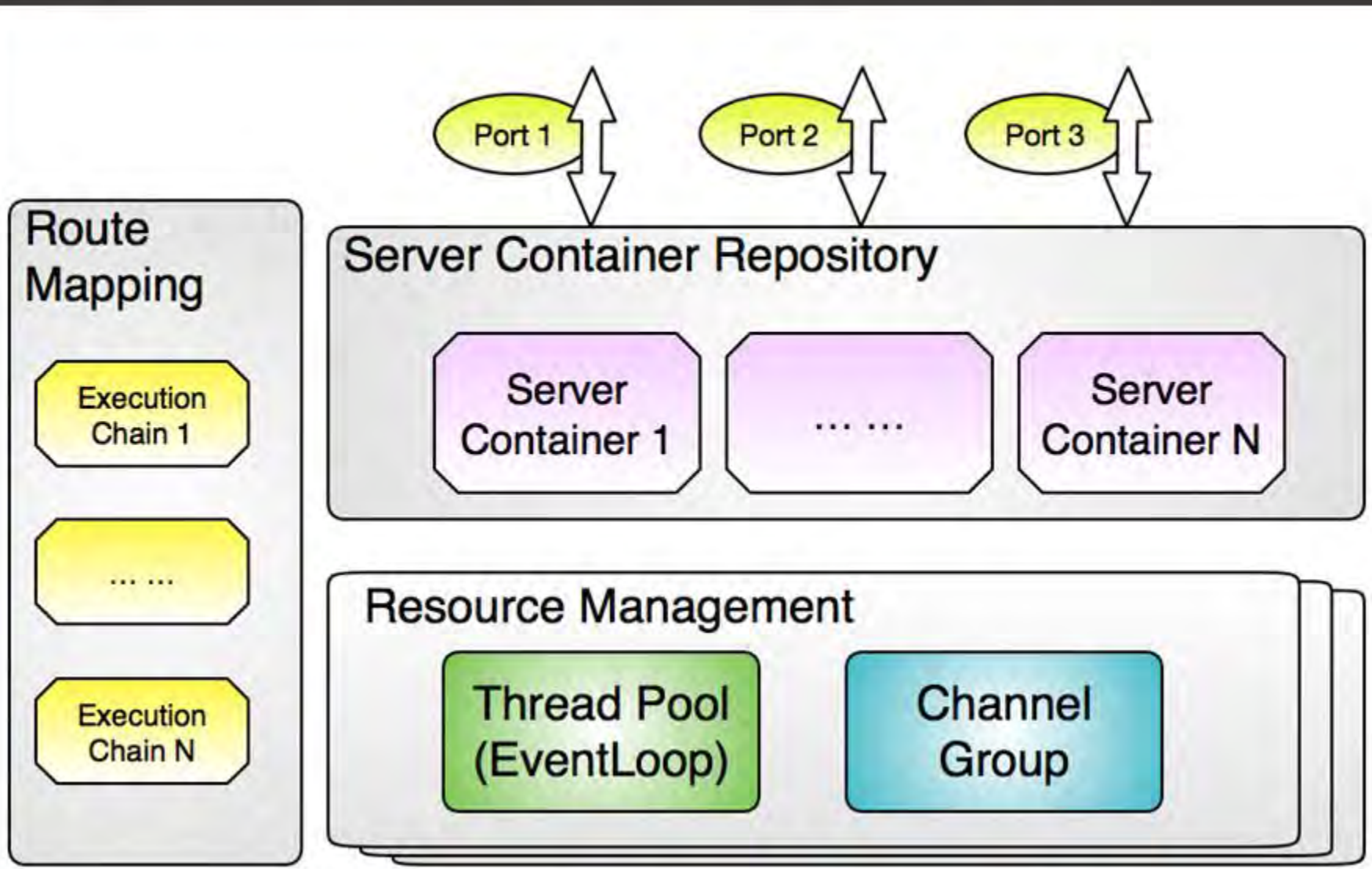
Data Access Mapping

DataSet => KV Mapping
Logical => Physical DataSet Mapping

Metadata Driven

- Source-of-Truth for Online Guideline & Offline Inventory
- Centralized Configuration
- Zero Restart/Auto-Fresh

Async RPC Control Plane Abstraction



Async RPC Maturity

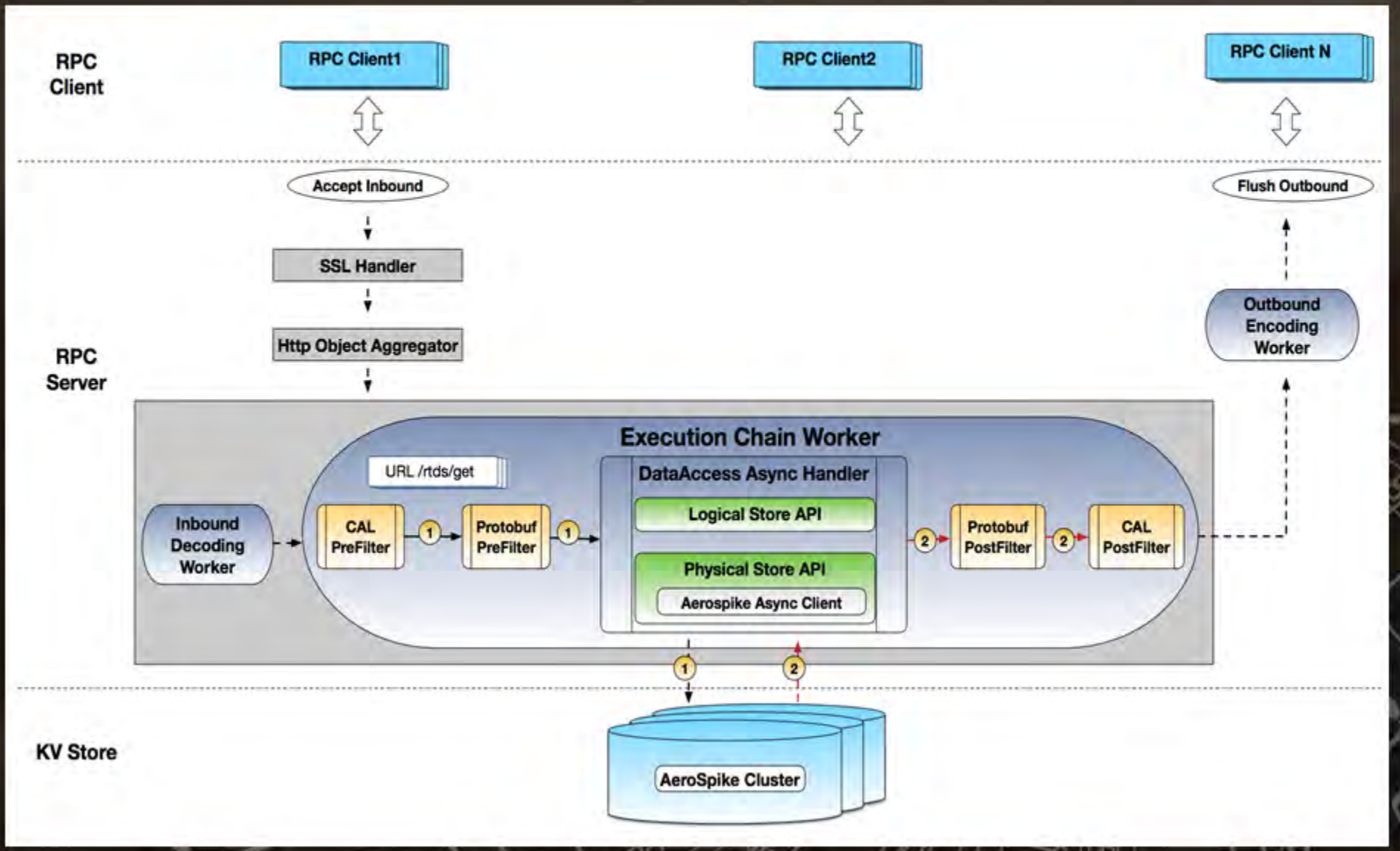
High Flexibility Configuration

- Configurable Execution Chain per URL
  - Customize protobuf / json encoder
  - Inject Monitoring Module
- Execution Resource Configuration
  - Threadpool size / netty option (tcp_nodelay)
  - Sharable or not
- Service Listener Registry

RPC Resource Management

- Server Container Life Cycle Management
  - Graceful Shutdown
  - Partial Shutdown Given Container
- Auto Rebuild RPC Client Channel

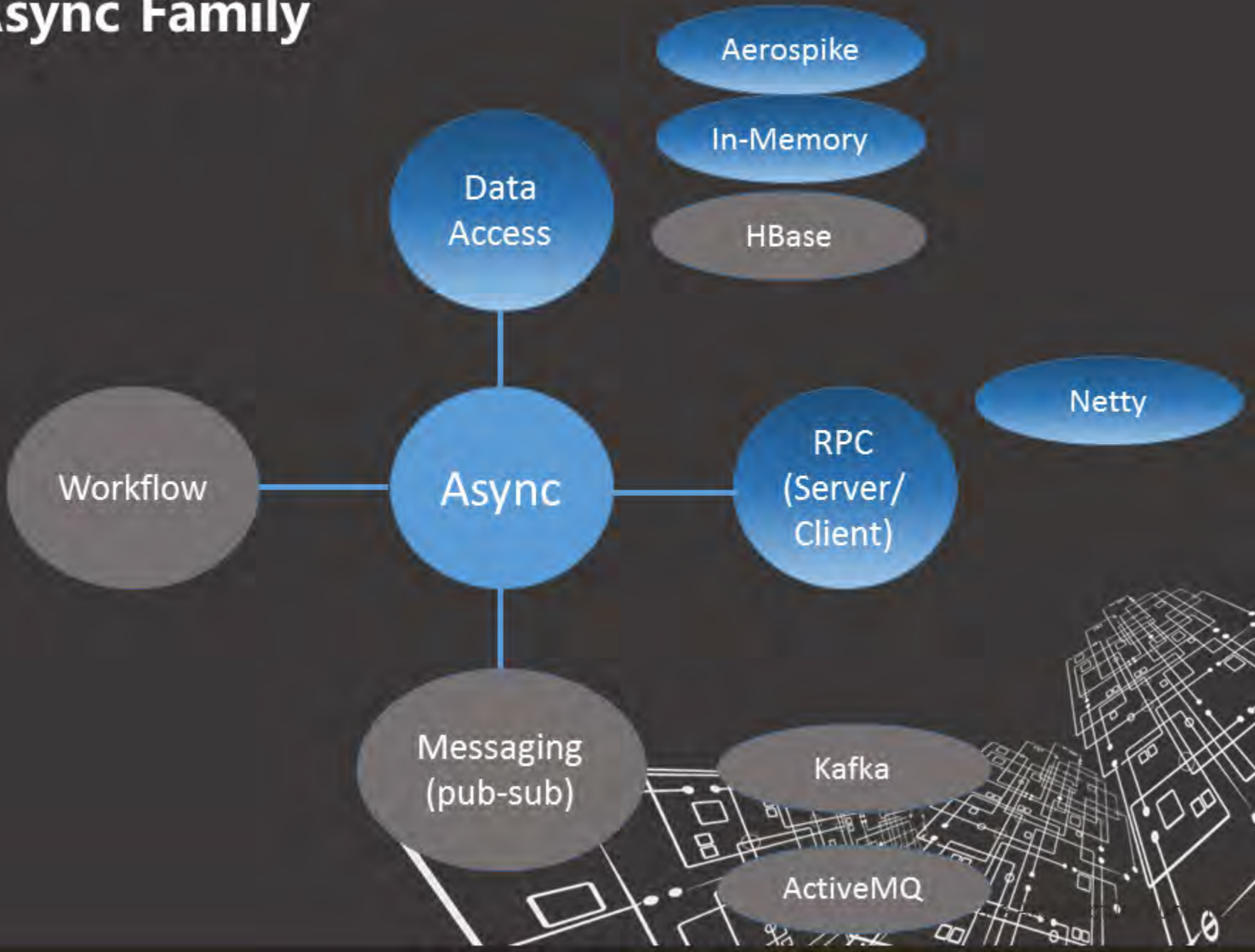
Async RPC Embrace Async DataAccess



Async Core Value

High Performance	• Low Latency + High Throughput • Low System Load • SLA Isolation • Understand Performance Contribution More
Cost Saving	• Less Hardware Investment • Loose Constraint for Hardware/VM SKU
Easy Adoption	• Zero Code Change + Zero Release (new case on-board) • Minimize new DB Storage Integration Effort • Lego-Style Customization • Highly Reusable Functionality
High Flexibility Configuration	• Execution Chain per URL (RPC) • DataAccess Storage & Option [consistency & ttl] • Traffic Routing Strategy • Replication Strategy

Async Family



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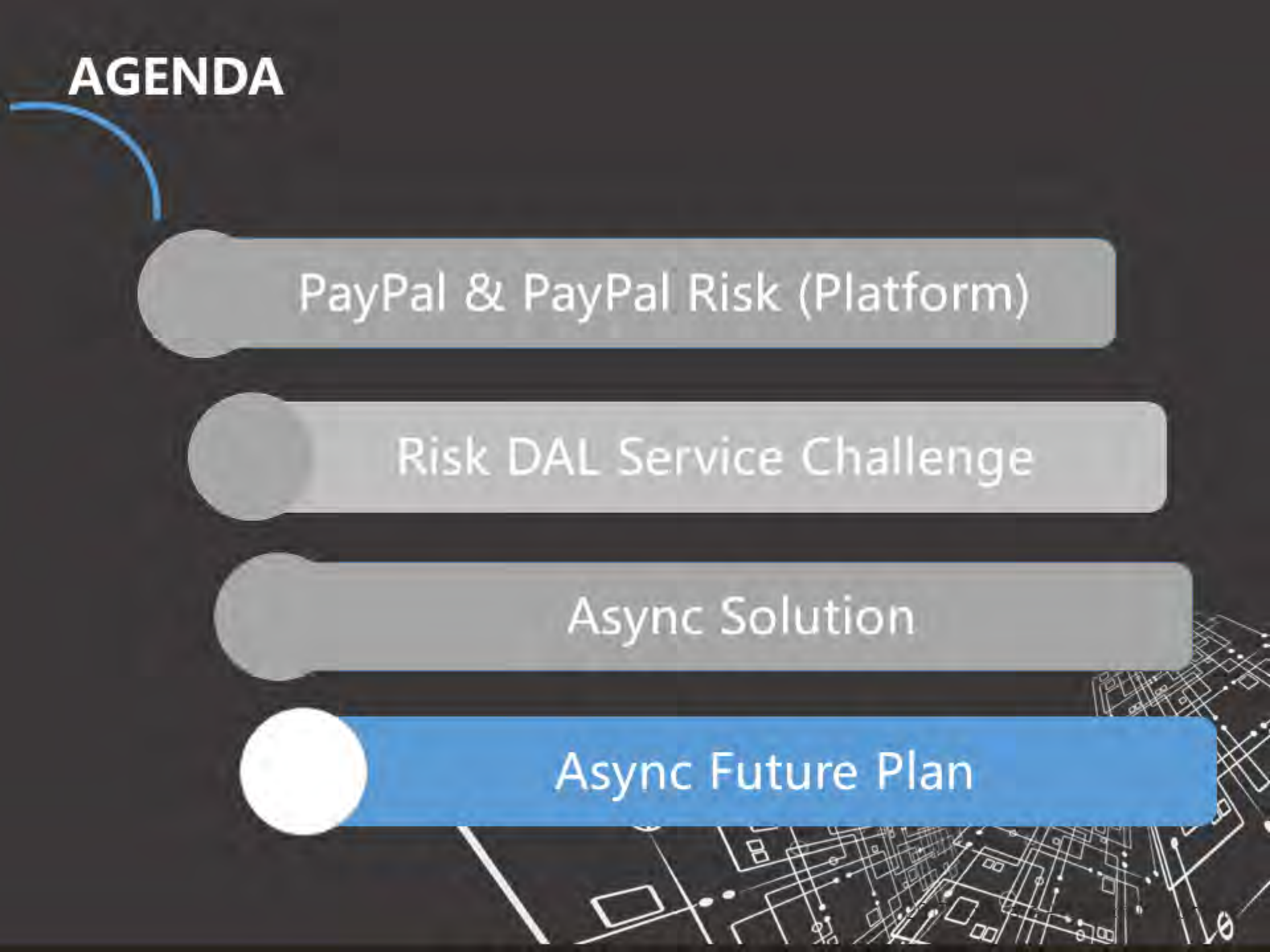

Future Plan

Open Source in Year 2019

Async+Sync Hybrid Workflow Execution

Async DataAccess	• Compute Operation Support • DB Server-side UDF Adoption • Smart Client for Direct & Service Access • Async HBase Integration
Async RPC	• Finer Granularity Monitoring & Throttling • Error Handling Injection • Client Side Multiplexing • Server Push Partial Response + RPC Client Consolidate Response
Continuous Performance Tuning Deep Dive	• Shared Eventloop • Netty Option (IO Ratio) • NIO vs Epoll SocketChannel • JDK SSL vs OpenSSL • Protobuf vs Msgpack • Sync Client vs Async Client • W/- Monitoring/Replication features


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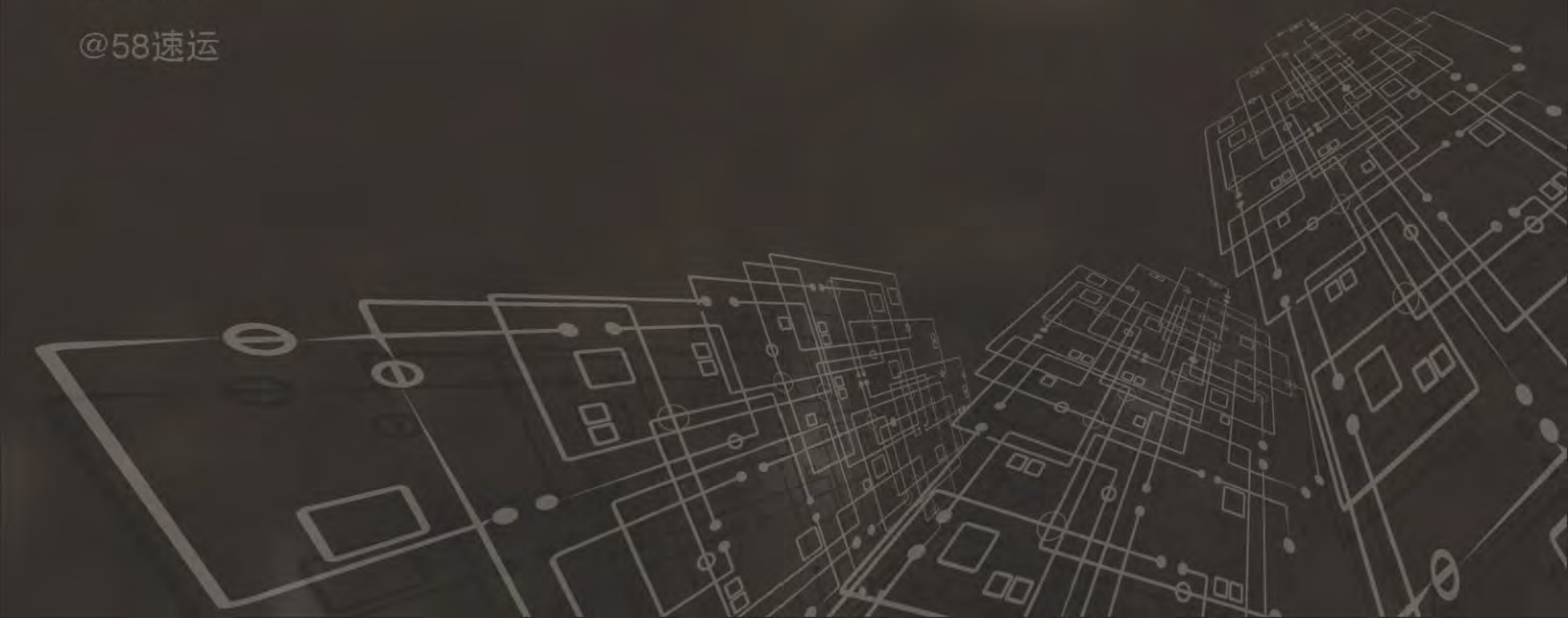
2017 Software Architecture Summit

打造58速运 高性能、高可用、实时消息平台

任桃术

@58速运



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- 业务背景
- 早期架构
- 58速运消息平台实践

  高性能、高可用、实时、高到达率、高扩展性
- 核心业务流程
- 总结

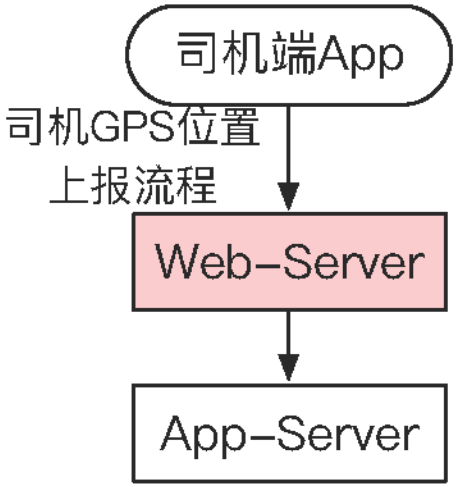
业务背景

- 58速运司机GPS位置实时上报

- 用户订单实时推送给司机

早期架构

- Web-Server性能问题



- 单点问题
- 三方推送
  及时性、限速、可达性