京东弹性数据库

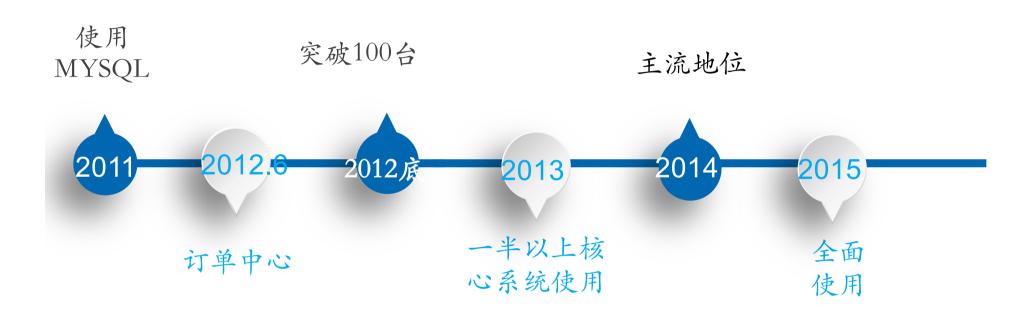
戴东东

数据库技术部





京东MySQL发展历程



JD.COM 京东

一站式MySQL BinLog日志实时采集、统一分发、消费订阅和监控服务



低成本高效率

- •节省硬件成本
- •节省研发成本
- •节省运维成本

BinLake日志订阅服务



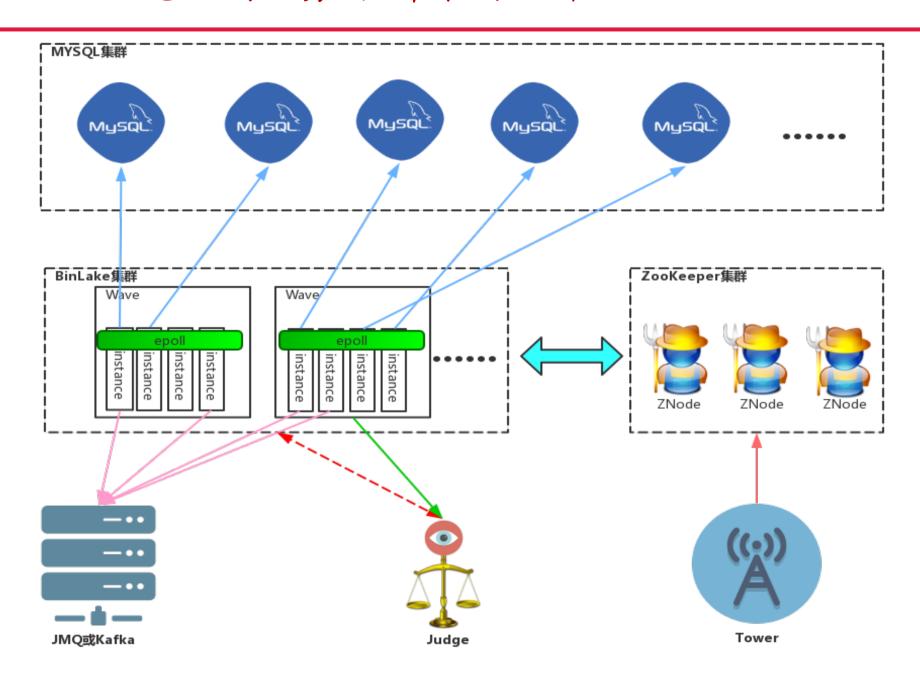
- •整体解决方案
- •统一运维管理一站式申请
- 7*24小时即时相应

高性能 高可用

- 所有节点无单点故障
- •集群部署、弹性扩容
- 集群自愈、自动负载均衡

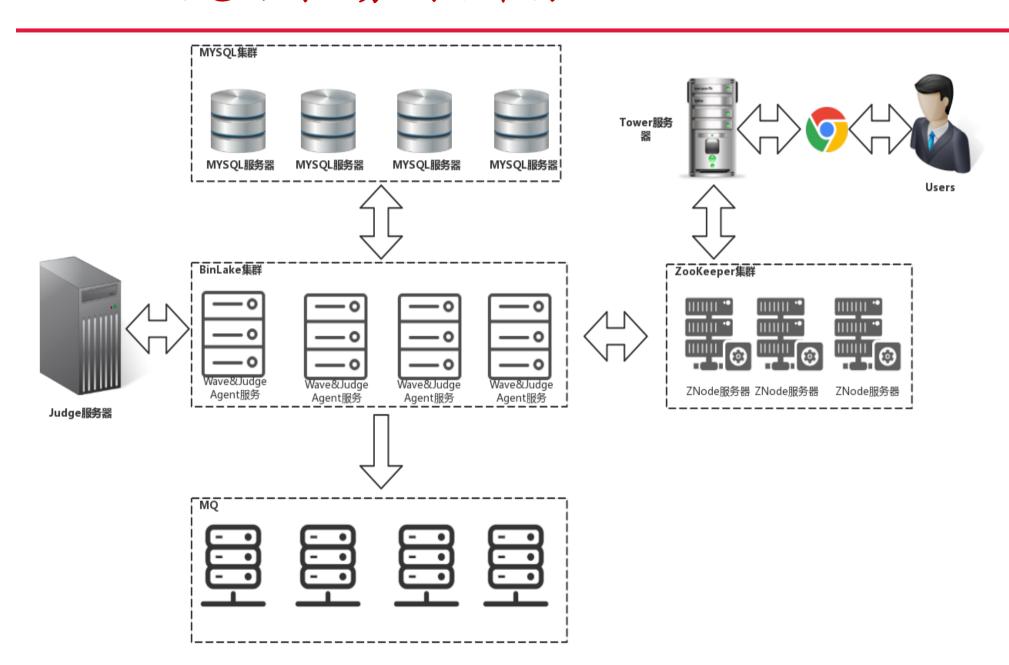
BinLake日志订阅服务-软件架构设计

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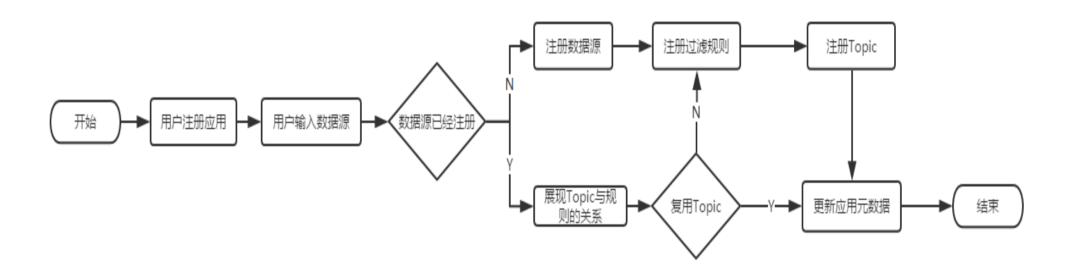


BinLake日志订阅服务-网络架构

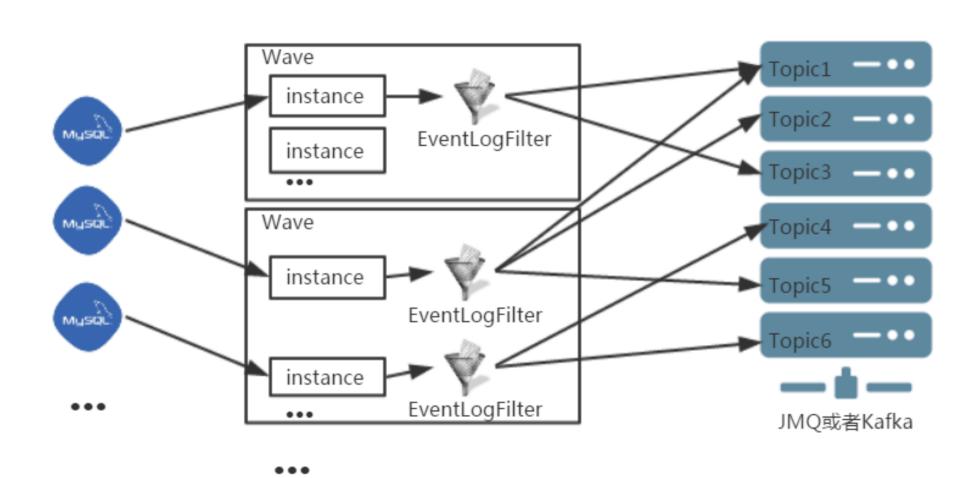
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BinLake日志订阅服务-instance复用与日志过滤JD.COM京东



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弹性数据库-系统优势

数据库在线动态扩容技术 提高了系统可用性、稳定性

数据库 动态扩容

整体解 决方案 提供了数据库日志消费、 中间件处理、自动运维管理 等一站式技术方案

完全兼容 MySQL协议

兼容原有应用系统, 利于系统升级、迁移 六大 优势

高性能 高可用

所有节点无单点故障集群部署、集群自愈

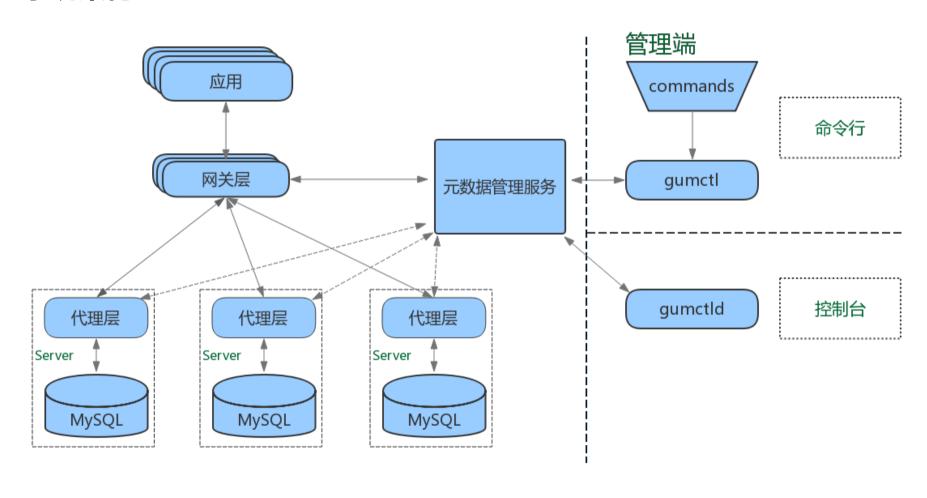
可以容器 化部署

与现有容器技术无缝 集成,提高了运维效率 支持OLTP\OLAP 二种计算模式

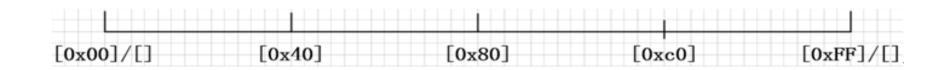
> 解决了在分库分表的情况下, 对大量数据进行数据分析计 算的问题,性能高,成本低

弹性数据库-系统架构

系统架构



弹性数据库-Resharding-KeyRange



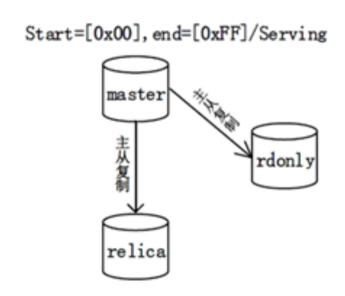
Start=[0x00], End=[0xFF]: 整个Key Range, 也可以用空值表示, 比如Start=[], End=[]

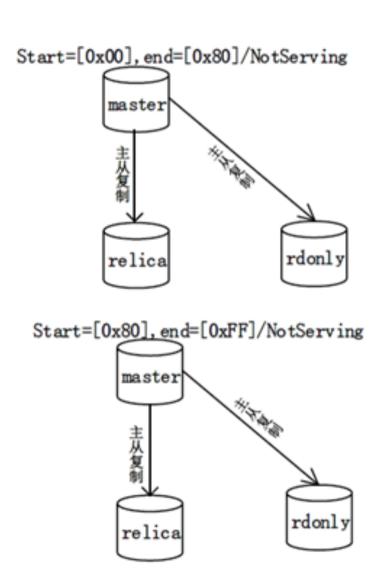
Start=[0x00], End=[0x80]:小于0x80的 Key Range, 整个Range的前1/2

Start=[0x80], End=[0xFF]: 大于0x80的 Key Range, 整个Range的后1/2

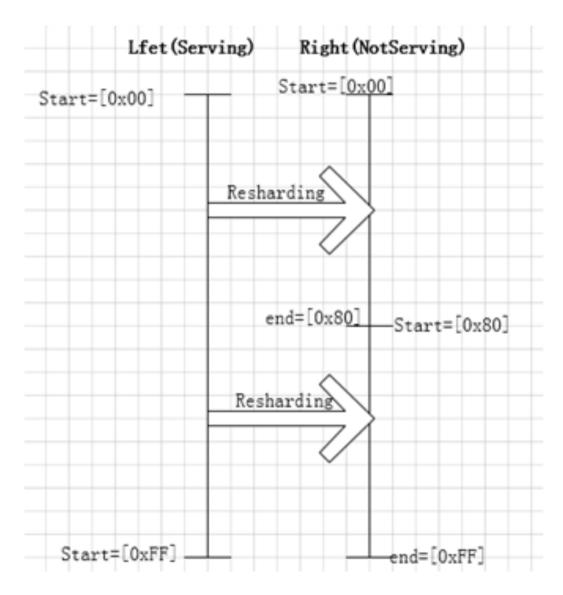
Start=[0x40], End=[0x80]: 第二个1/4 Key Range., 整个Range的1/4

启动新的Shard并初始化master





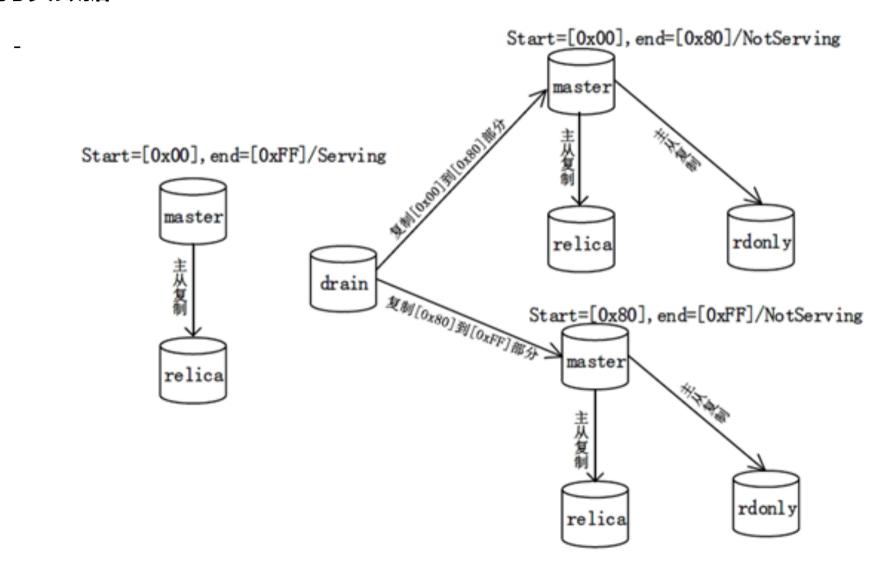
KeyRange检查



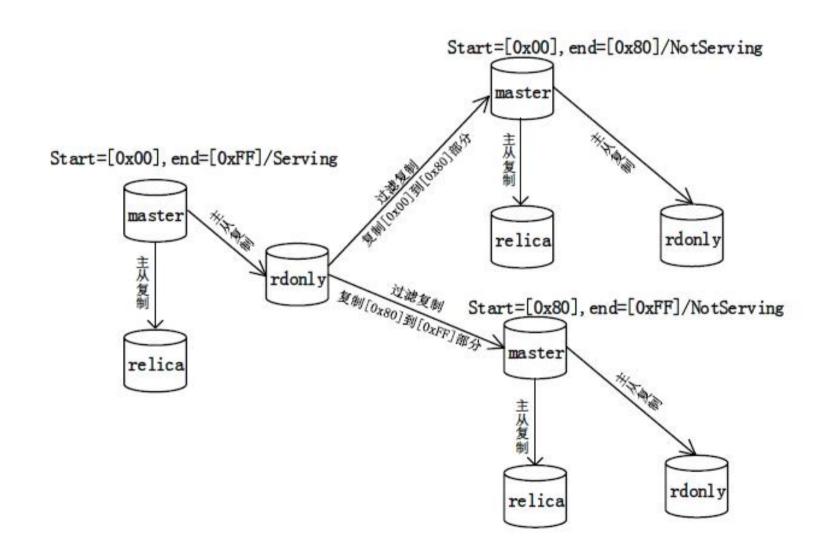
KeyRange检查

Lfet (Serving) Right (NotServing) Start=[0x00] Start=[0x00]Start=[0x40] Resharding至哪个分片? end=[0x60] Start=[0xFF] end=[0xFF]

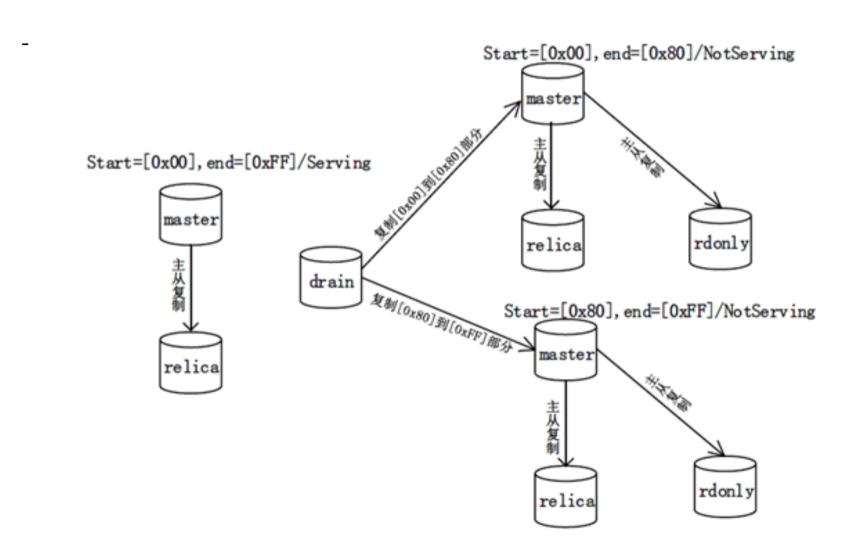
拷贝数据



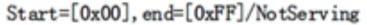
开启过滤复制

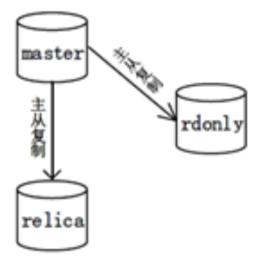


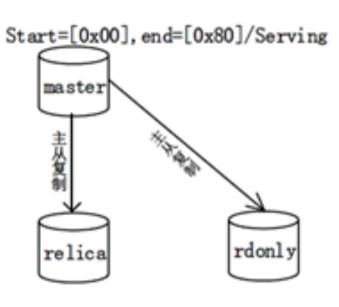
校验数据一致性

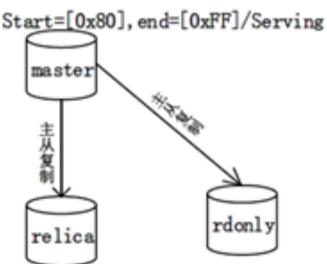


切换到新的Shard、停止过滤复制

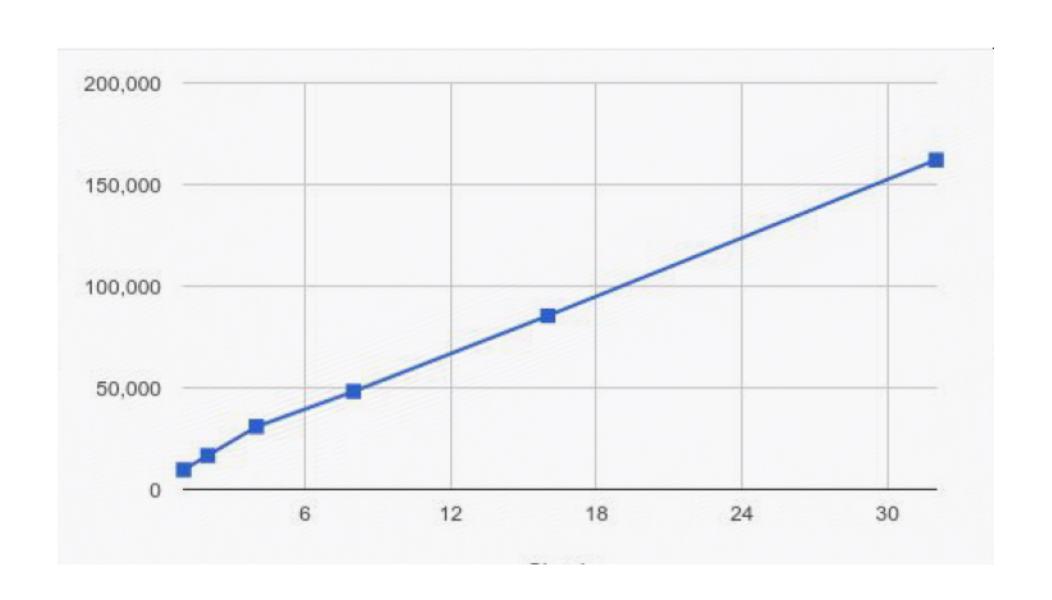








弹性数据库-线性扩展对性能的影响



弹性数据库-聚合查询

支持 SUM、COUNT、 AVG、 MIN、MAX聚合函数 支持ORDER BY、GROUP BY、单字段、多字段支持 支持LIMIT语法

例子:

SELECT DEPT, AVG(SALARY) FROM USER GROUP BY DEPT;

SELECT * FROM USER ORDER BY SALARY DESC LIMIT 10, 10;

SELECT * FROM USER ORDER BY SALARY DESC, AGE ASC LIMIT 10, 10;

SELECT MAX(SALARY), MIN(SALARY), AVG(SALARY) FROM USER GROUP

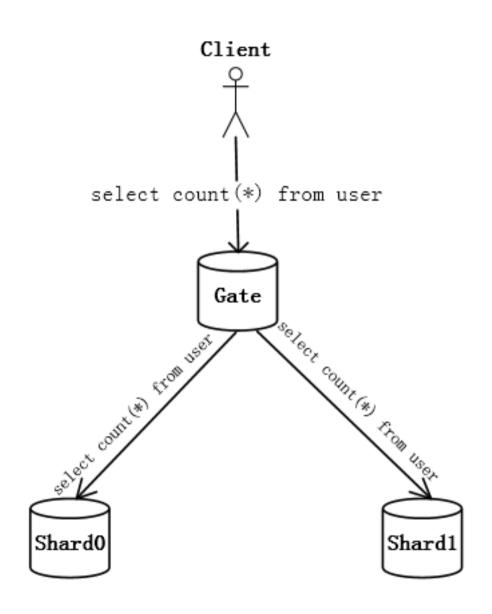
BY DEPT LIMIT 10, 10;

SELECT MAX(SALARY), MIN(SALARY), AVG(SALARY) FROM USER GROUP

BY DEPT, SEX LIMIT 10, 10;

SELECT COUNT(*) FROM USER;

弹性数据库-聚合查询



弹性数据库-流式处理

支持流式查询操作, 避免占用过多内存

流式的聚合查询OrderBy 、 GroupBy select * from t order by age;

```
[ ] shard0: [1, 3, 7, 9, 11, .....] shard1: [2, 4, 6, 8, 10, .....]
```

```
[1,2,3,4] \leftarrow shard0: [7, 9, 11, 13,15,...] shard1: [6, 8, 10,12, 14,...]
```

```
[3,4,6,7] shard0: [9,11,13,15,EOF] shard1: [8,10,12,14,16...]
```

弹性数据库-支持跨Shard Join查询

- select emp.name, depart.dpname from emp left join depart on emp.depart = depart.dpno;
- select emp.name, depart.dpname from emp right join depart on emp.depart = depart.dpno;
- select emp.name, depart.dpname from emp inner join depart on emp.depart = depart.dpno;
- select emp.name, depart.dpname, emp.depart, depart.dpno from emp.left join depart on emp.depart = depart.dpno where emp.depart > 10;

备份恢复



管理平台



谢谢!

戴东东

电子邮箱:daidongdong@jd.com

