Flink 在字节跳动的实践

The Practice of Apache Flink at ByteDance

公司：字节跳动

职位：大数据工程师

演讲者：邹丹

概览
Outline

- 相关背景
  Related Background
- 流式作业管理平台
  Streaming Job Management Platform
- 生产实践
  Production Practices
- 展望
  Future Work

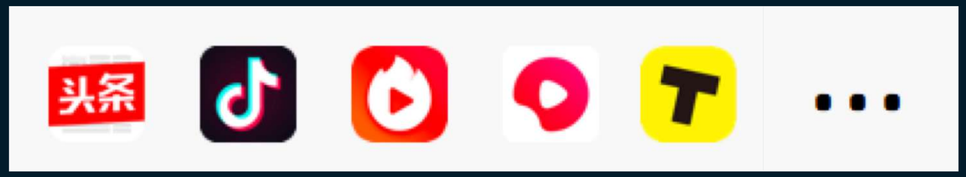
Yarn 集群 5+
5+ Yarn clusters

机器 1w+
10k+ machines

作业数 2000+
2k+ jobs

用户数 300+
300+ users

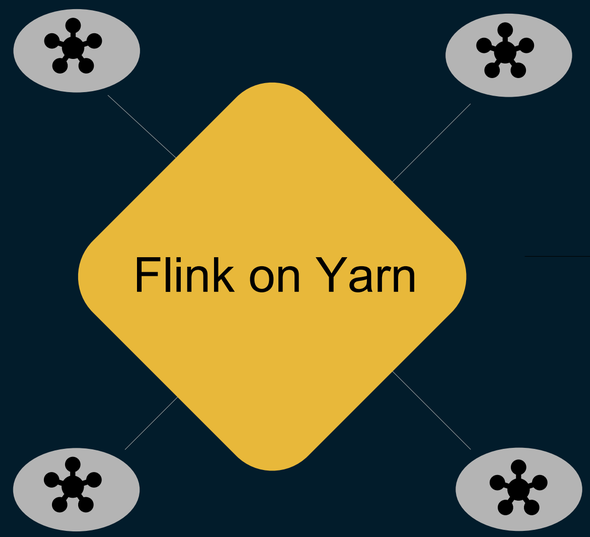
数十个产品
Dozens of products



Flink on Yarn

独立的 Yarn 集群
Independent Yarn clusters

内存和 CPU 隔离
Memory and CPU Isolation



按不同的业务划分队列
Queue divide by groups

重要作业跑在 Yarn 独立 label 的机器上
Business critical jobs on labeled machines of the cluster

流式作业管理平台

Streaming Job Management Platform

流式作业管理平台

Streaming Job Management Platform

1. 提供页面操作，一键启动，停止，重启

   Enable simple operations e.g. start , stop and restart.

2. 作业和用户(组) 绑定，方便作业管理

   Bind job and user (group) for ease of management.

3. 代码版本管理，升级/回滚简单

   Manage code versions for ease of upgrade / rollback.

4. 代码配置分离

   Separate code and configuration.

流式作业管理平台
Streaming Job Management Platform

5 监控作业状态，作业失败自动拉起。

Monitor job status, and restart the failed job automatically.

6 记录操作历史，方便追溯

Record operating history for easy tracing.

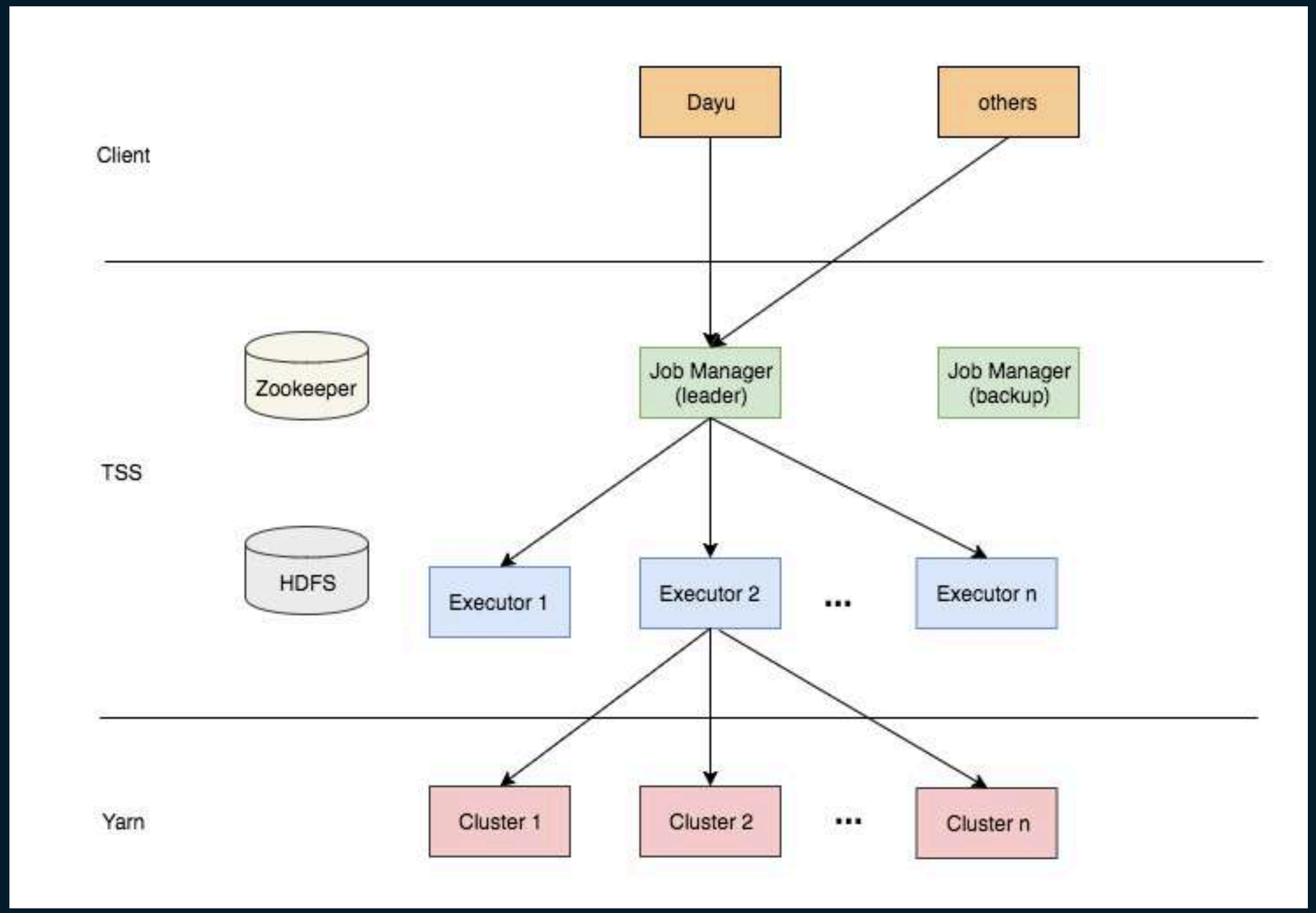
7 提供作业问题自动排查工具

Provide automatic troubleshooting tools.

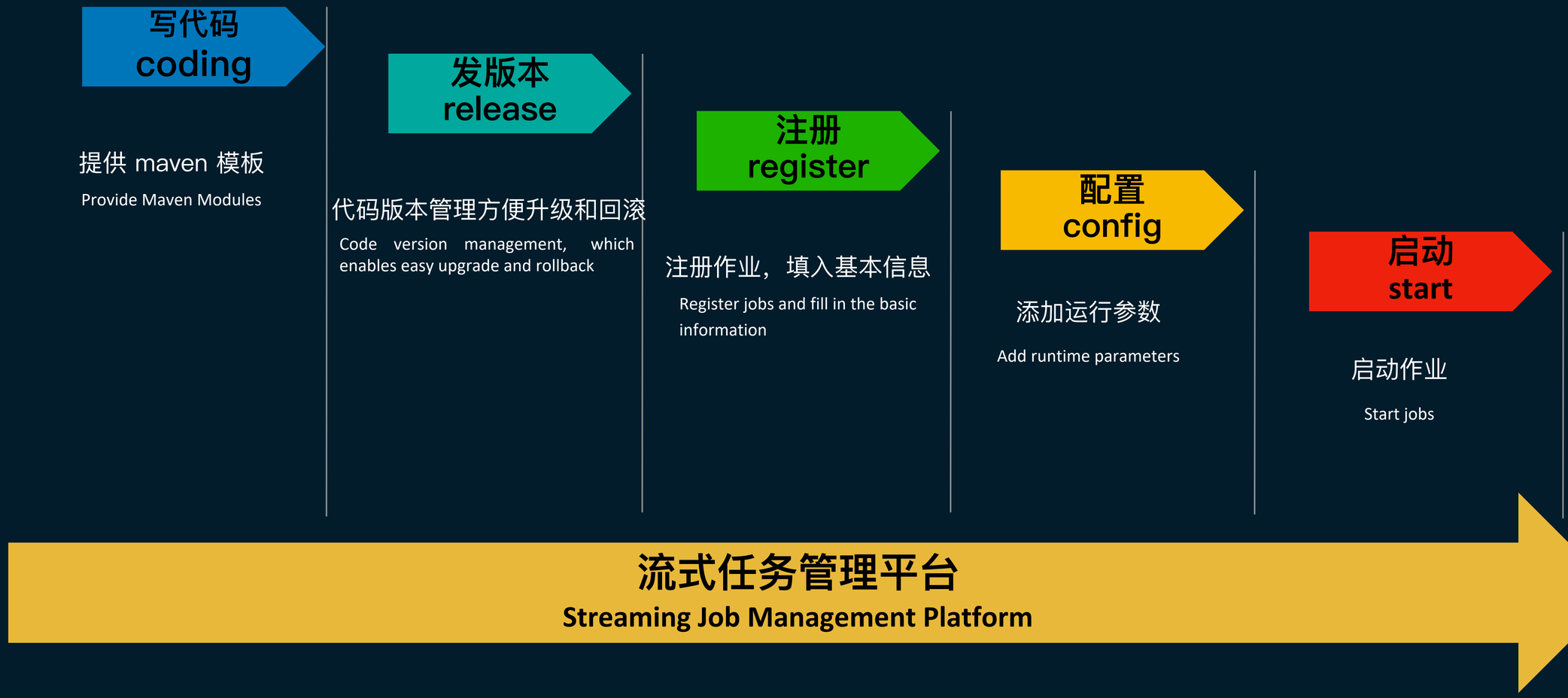
8 一站式管理

One stop management.

架构
Architecture



流程
Work Flow

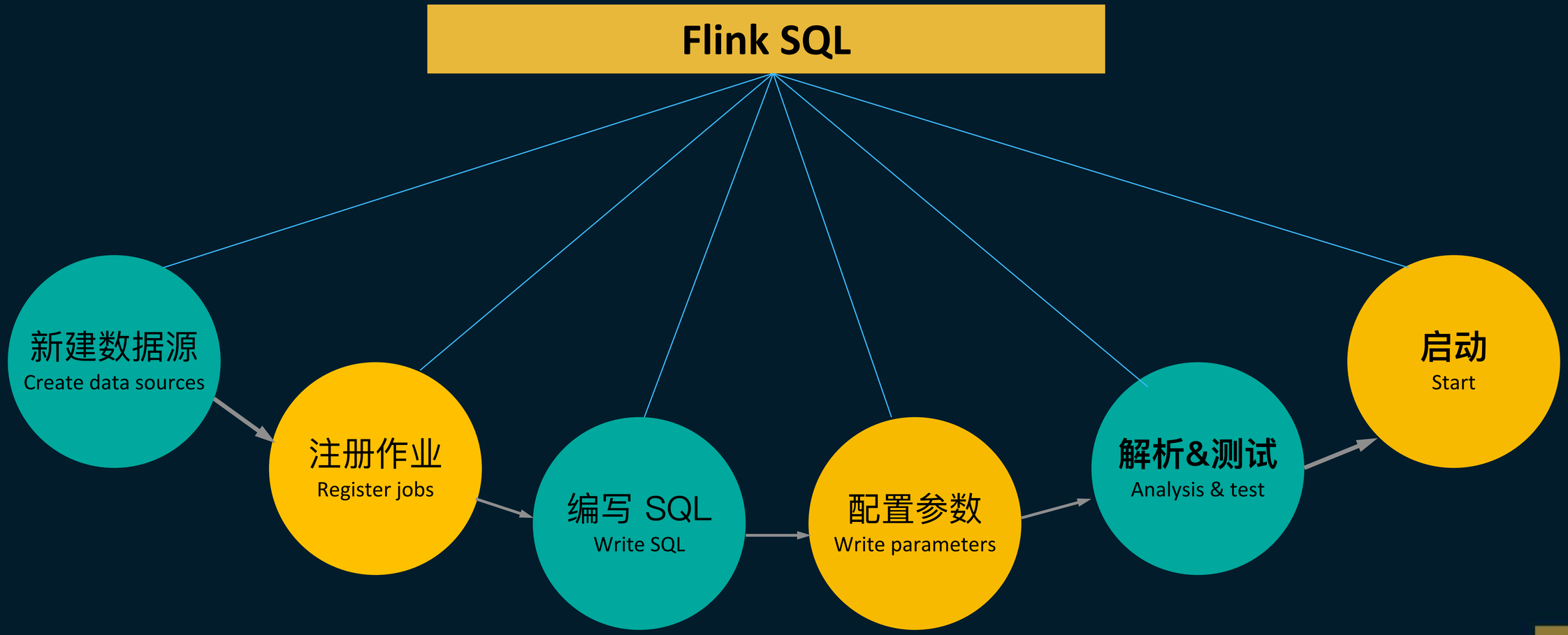

写代码
coding
提供 maven 模板
Provide Maven Modules
发版本
release
代码版本管理方便升级和回滚
Code version management, which enables easy upgrade and rollback
注册
register
注册作业，填入基本信息
Register jobs and fill in the basic information
配置
config
添加运行参数
Add runtime parameters
启动
start
启动作业
Start jobs
流式任务管理平台
Streaming Job Management Platform

Flink SQL

- 简单易懂，使用门槛低
  Easy to understand, lower entry bar
- API 较为稳定，版本升级时，用户无需修改代码
  Stable API, users do not need to modify the code after upgrade
- 优秀的优化框架，用户只需要专注于业务逻辑实现
  Great optimization frameworks, users only need to focus on the business logic

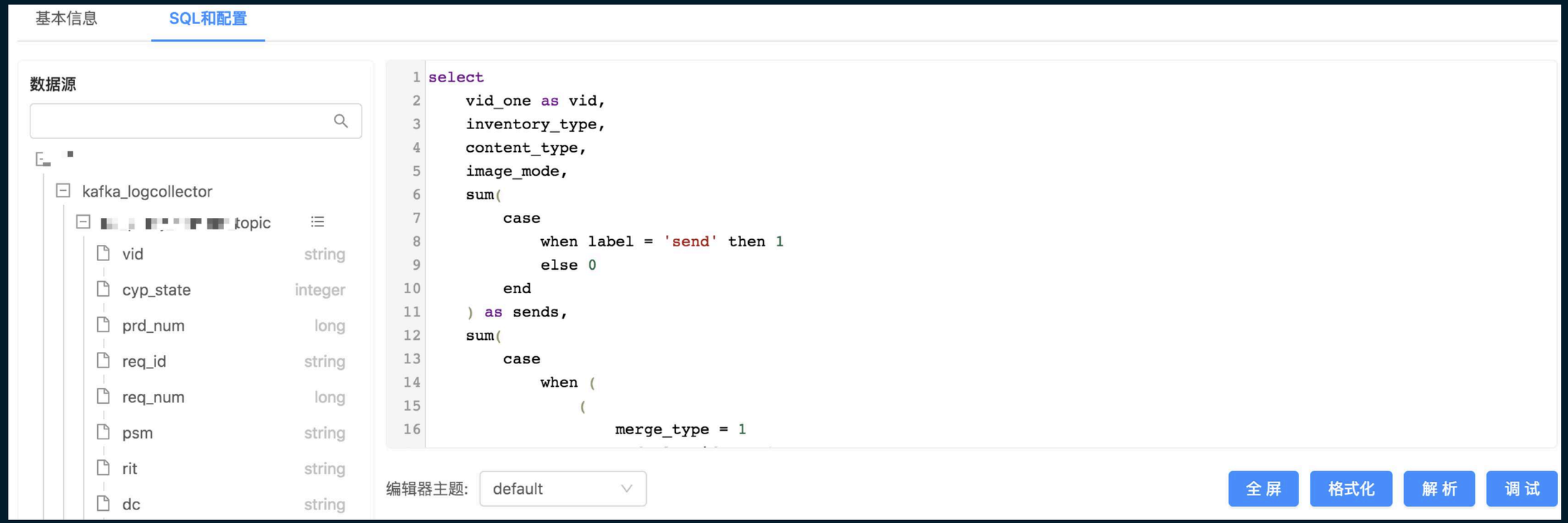
Flink SQL 流程

Flink SQL Work Flow



编写 SQL

Write SQL



测试
Test

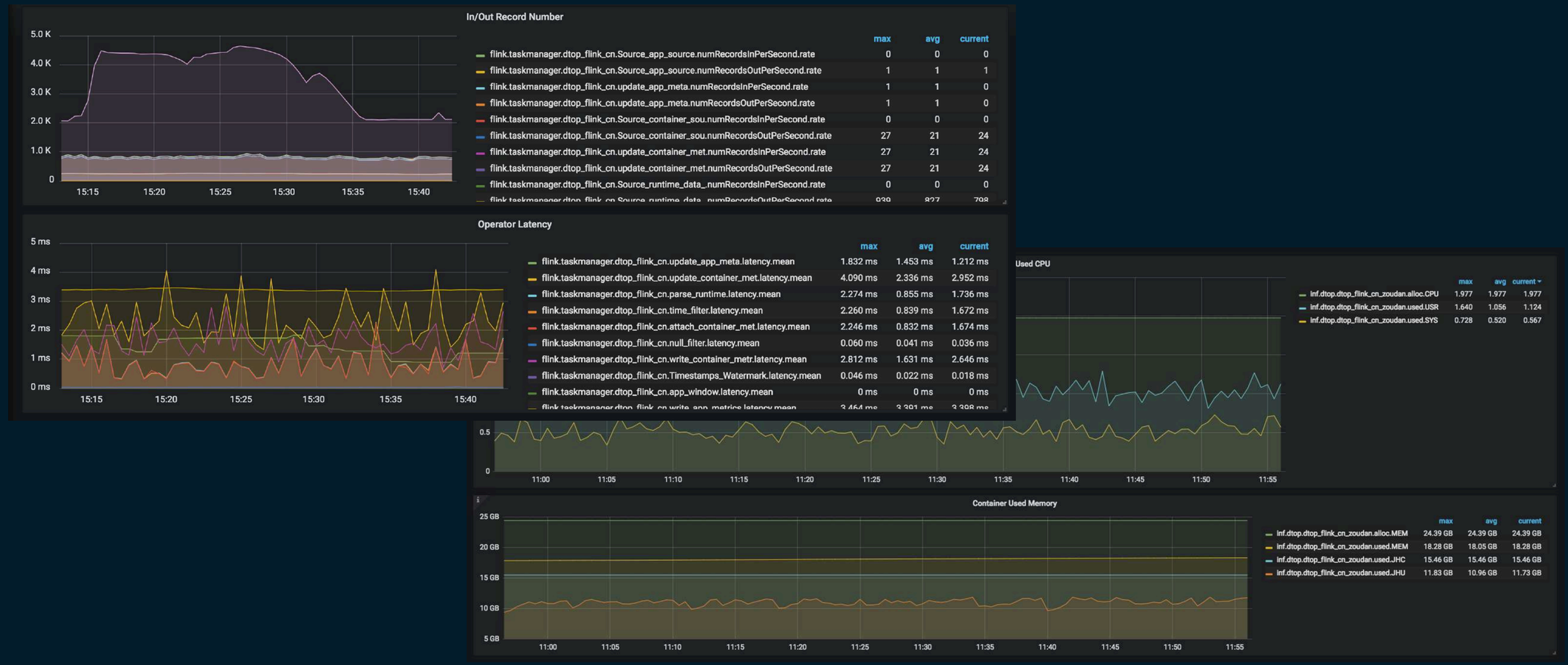
解析结果 | 测试日志 | 测试结果

下载测试结果

vid	inventory_type	content_type	image_mode	sends
415914	40002	4	0	2
413912	9	1	4	1
428338	9	1	4	1
423375	9	1	4	1
378450	9	1	4	1
420624	9	1	4	1
426616	9	1	4	1
392461	9	1	4	1
411842	9	1	4	1

作业监控

Job Monitoring



生产实践
Production Practices

问题一: 运维压力大

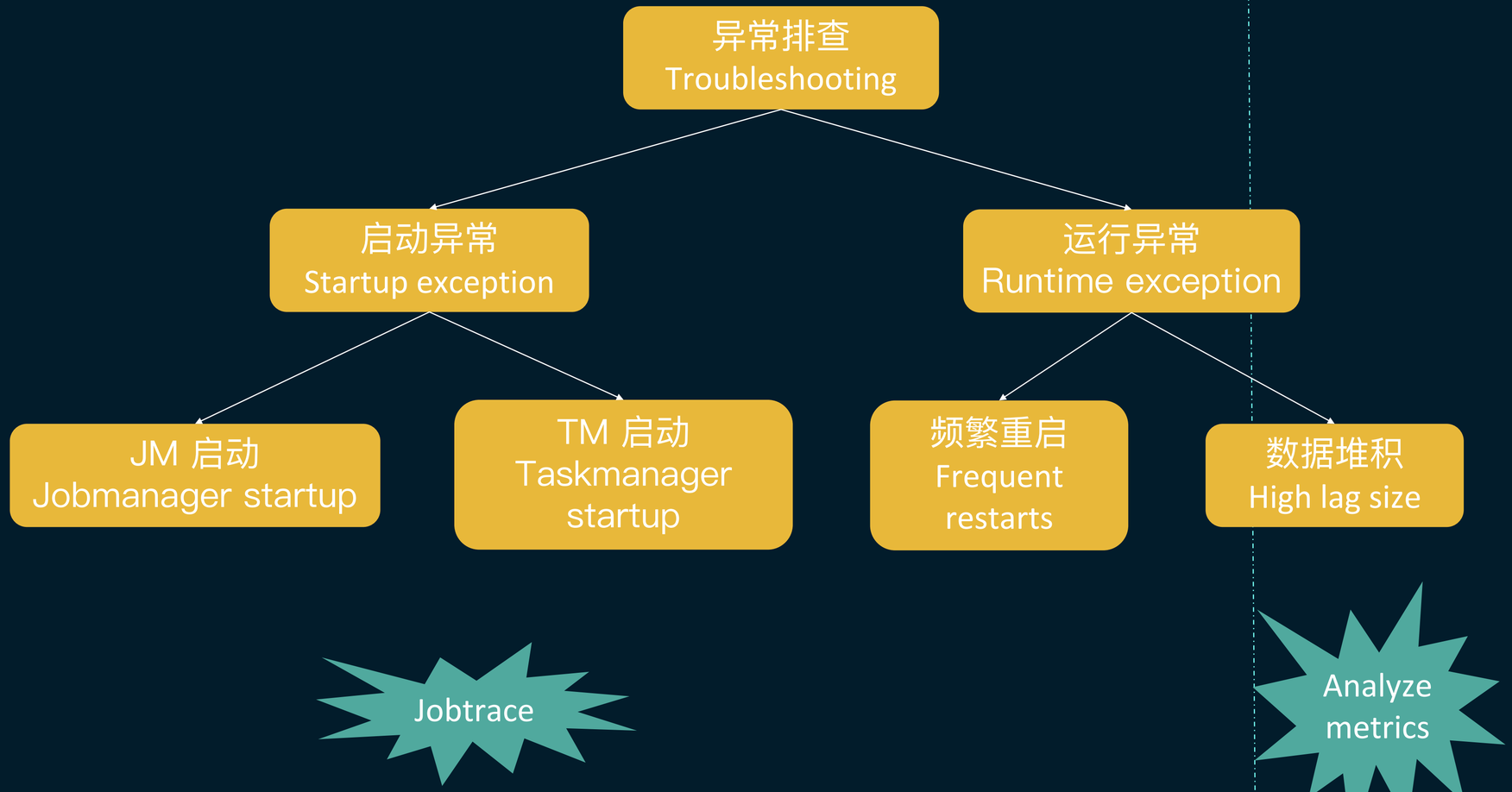
High Operation and Maintenance Pressure

- 2k+ 作业, 3+ 攻城狮
  2000+ jobs， 3+ engineers

- 实时性要求高
  Critical real-time requirement

解法: 自动排查工具

Automatic Troubleshooting Tools



错误日志
Error Log

数据延迟
Data Delay

问题二: 集群管理困难
Hard to Manage Clusters

- 缺少集群状态监控
  Insufficient cluster monitoring

- 缺少批量操作功能
  Lack of batch operation capacities

解法: 集群管理工具
Cluster Management Tools

集群运维开关

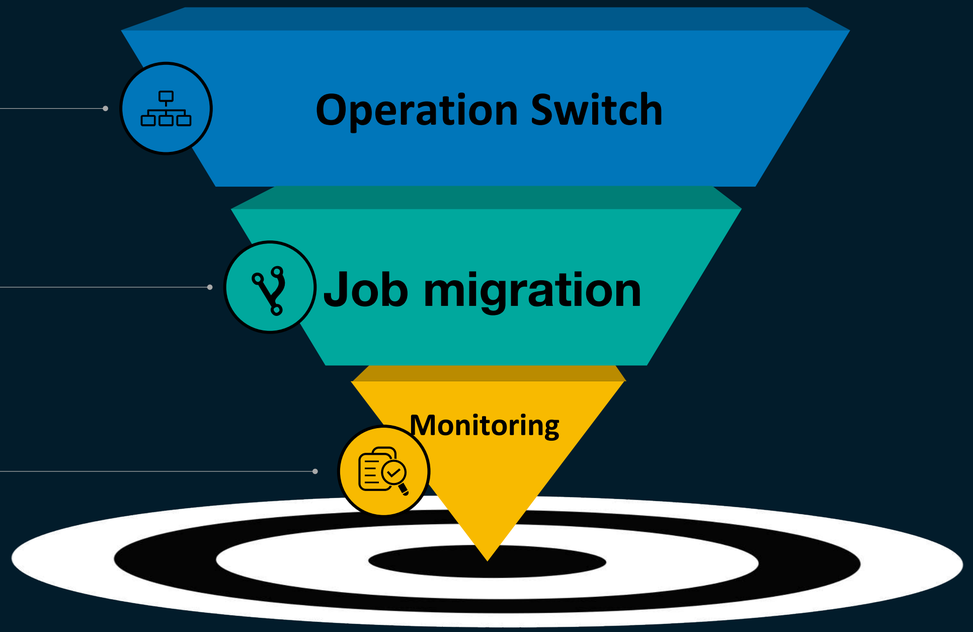
Cluster operation switch

作业批量迁移

Bulk migration

集群状态监控

Cluster status monitoring



问题三: 作业启动慢

Jobs Start Slow

- Yarn 分配 container 慢
  Container allocation by Yarn is slow

- Flink job 启动慢
  Starting flink jobs is slow

解法: 启动加速
Job Start Speedup

- Yarn 调度优化

  Yarn scheduling optimization

- 共享公共资源

  Share public resources

- Slot 达到最低要求就启动

  Start when slots meet minimum requirements

问题四: 机器资源短缺
Machine Resources Shortage

- 业务高速发展
  Fast business growth

- 机器资源有限
  Machine Resources are limited

解法: 自动资源调整

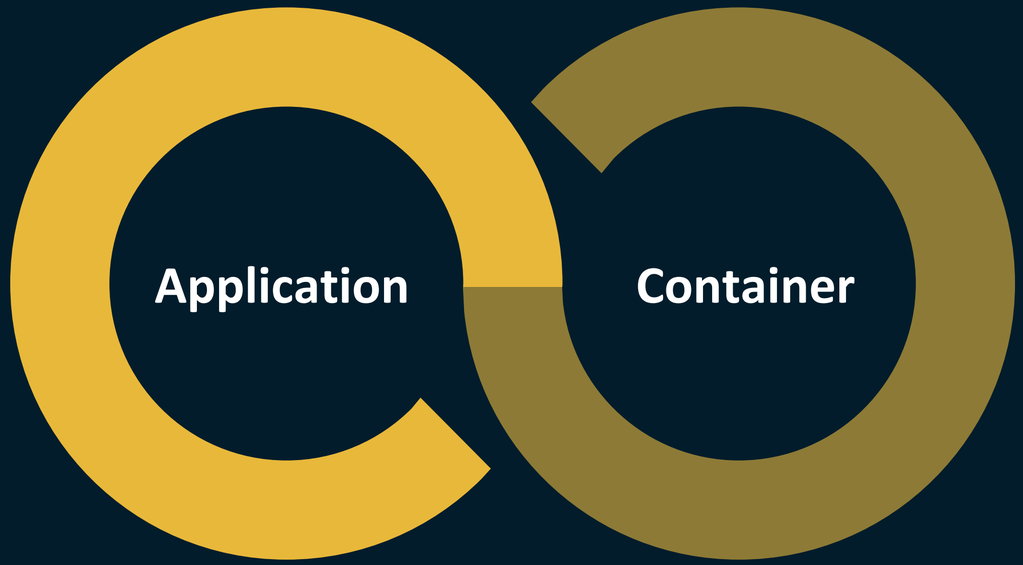
Automatic Resource Adjustment

重启

Restart

过去24小时

Last 24 hours



运行中

Runtime

过去1小时

Last 1 hour

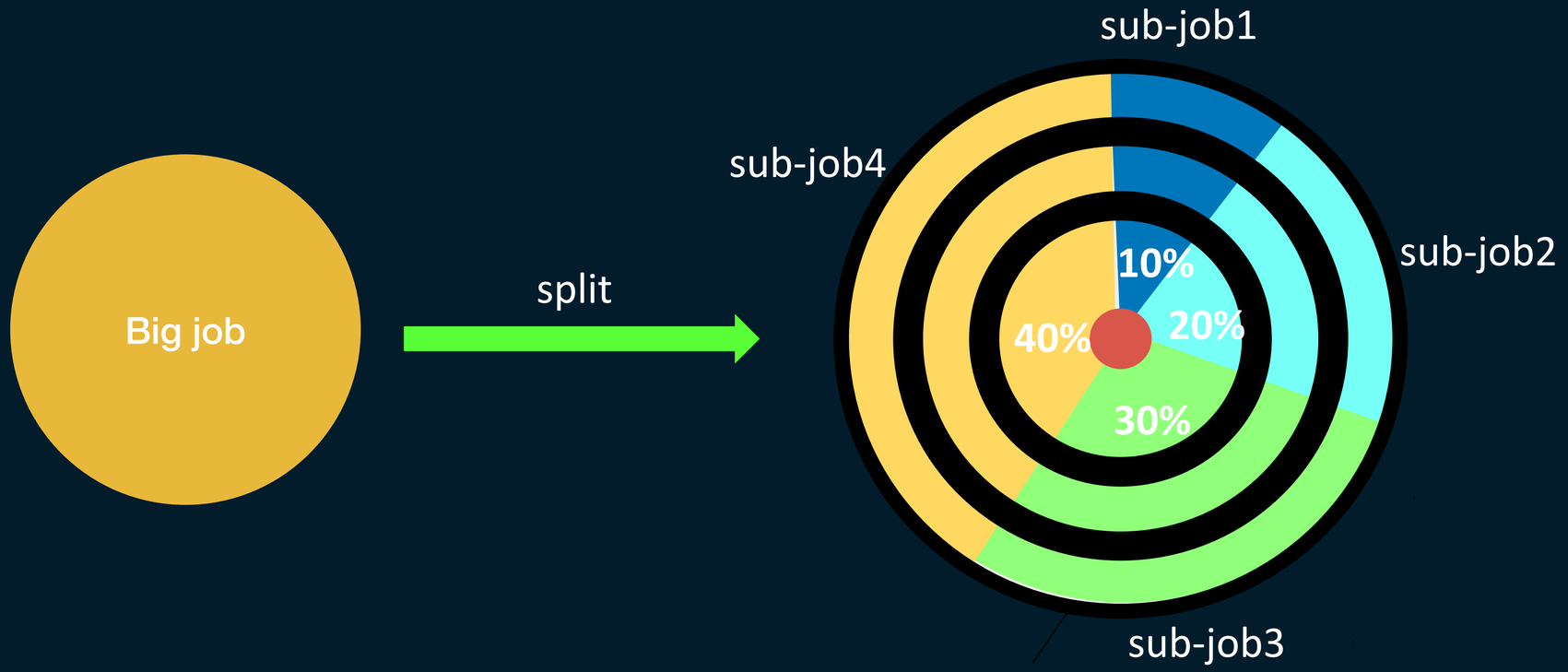
问题五: 稳定性不足
Instability

- 大作业稳定性差
  Big jobs are not stable enough

- 升级不平滑
  Job upgrade is not smooth

解法: 作业切分
Job Segmentation

- ✓ **稳定运行**
  Stably running
- ✓ **平滑升级**
  Smoothly upgrading



展望
Future Work

- 推广 Flink SQL
  Promote Flink SQL
- 更多的业务场景
  Enable more business scenarios
- 提高稳定性
  Improve stability
- 回馈社区
  Contribute back to the community

Q&A

致谢

感谢我们团队的小伙伴们，以上的内容是我们一起努力的成果。

Thanks to my colleagues for the great work we have done.


THANKS