Big Data Platform at **P**interest

Mao Ye

Data Architecture

Design Choices for Hadoop Platform

Pinball for Workflow Management

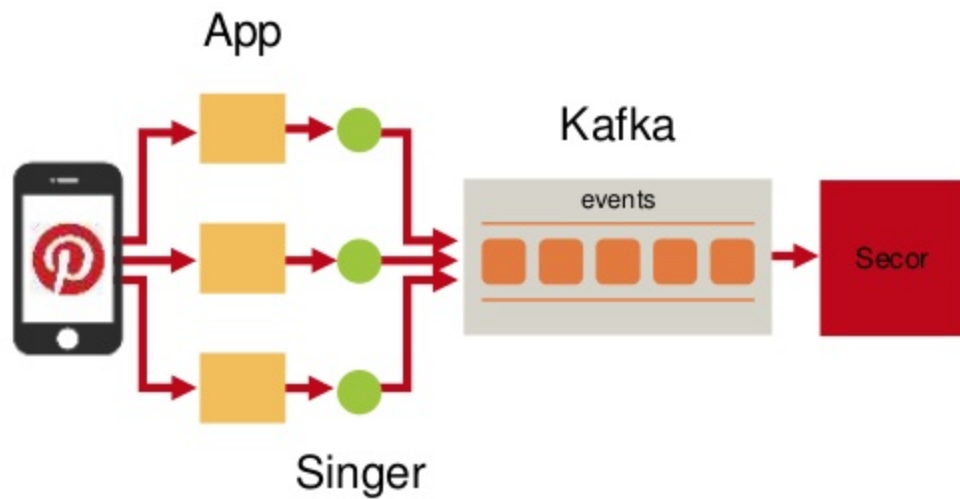# Data Architecture

Data at Pinterest

- 60 Billion Pins
- 1 Billion boards
- 100M MAU
- 60 PB of data on S3
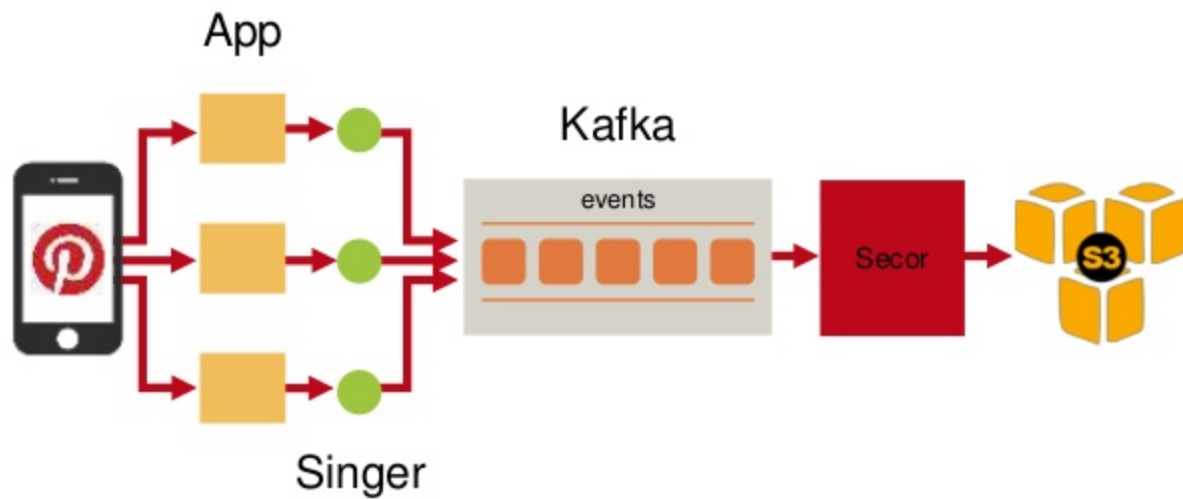- 3 PB processed every day
- 2000 node Hadoop cluster
- 250 engineers
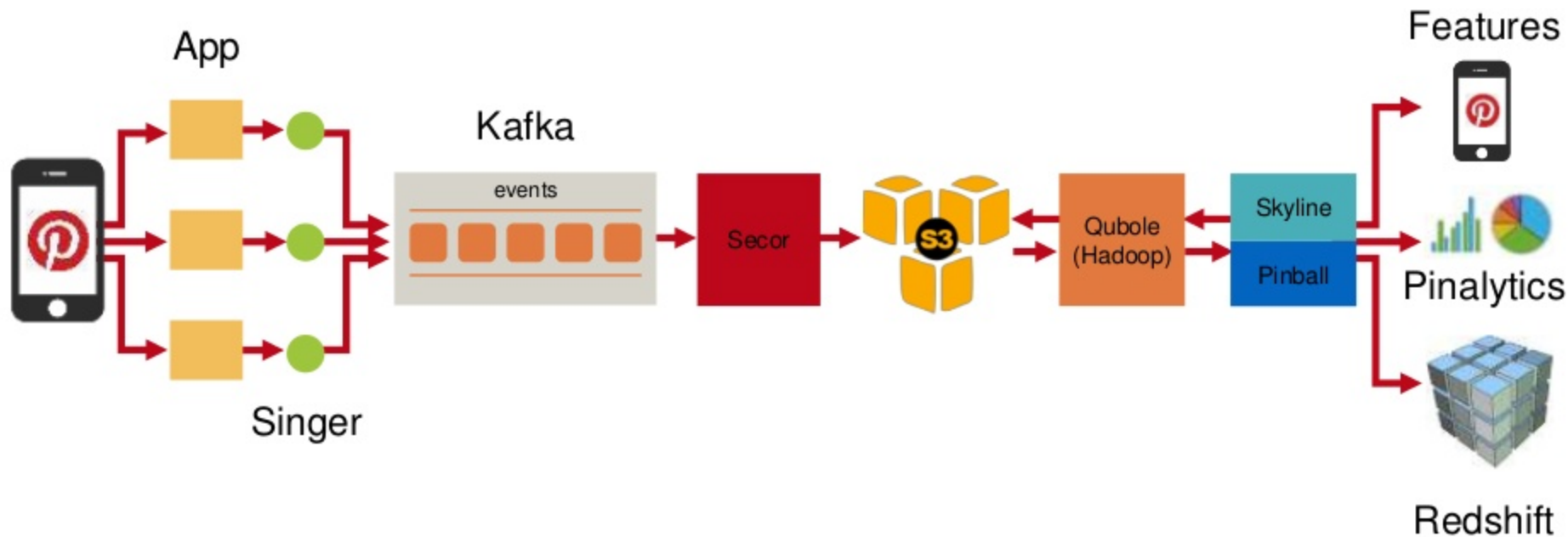
Pinterest Data Architecture

App

Pinterest Data Architecture

Pinterest Data Architecture

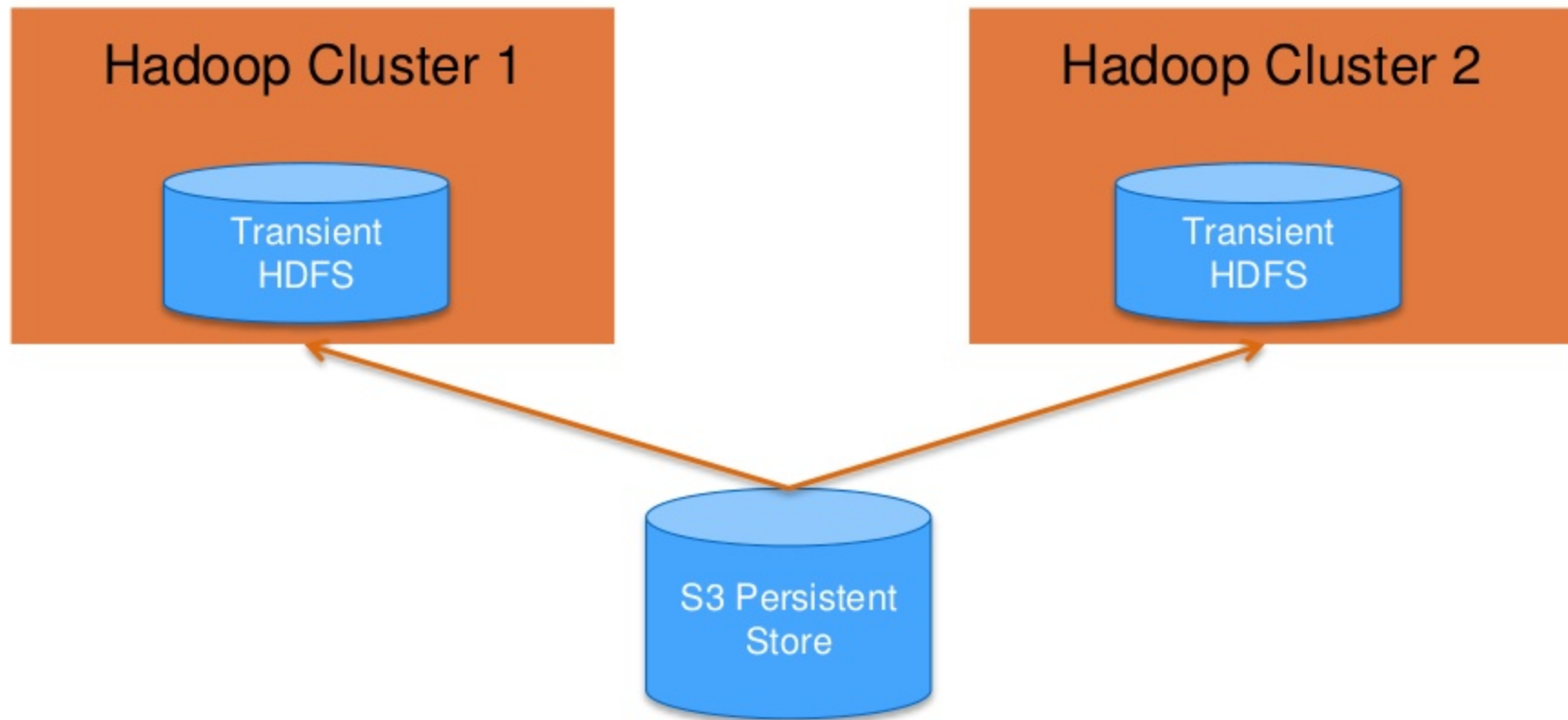# Pinterest Data Architecture

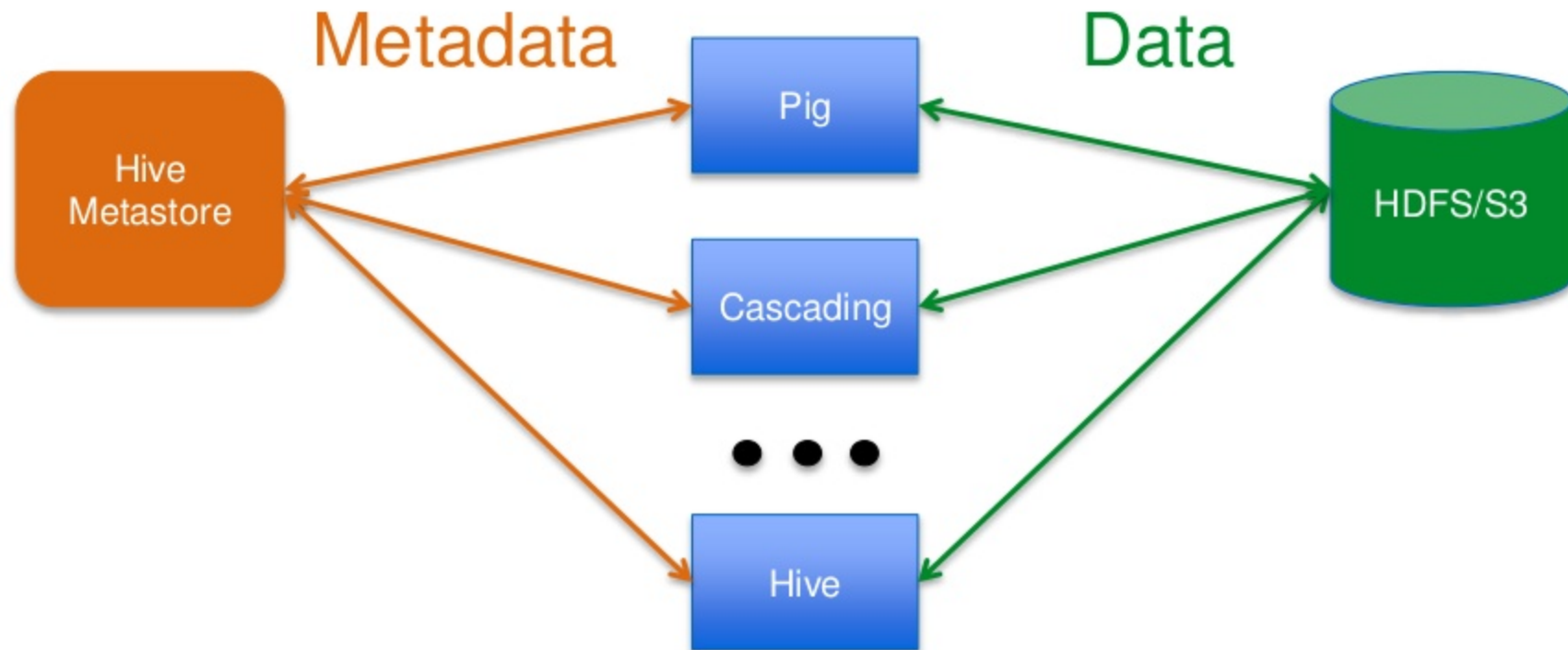# Design Choices for Hadoop Platform

Hadoop Platform Requirements

- Isolated multi-tenancy

- Elasticity

- Support multiple clusters

- Ephemeral clusters

- Access control layer

- Shared data store

- Easy deployment

Decoupling compute & storage

Hadoop Cluster 1

Transient HDFS

Hadoop Cluster 2

Transient HDFS

S3 Persistent Store

Centralized Hive Metastore

Multi-layered Packaging

Runtime Staging

(on S3)

Automated
Configuration
(Masterless Puppet)

Baked AMI

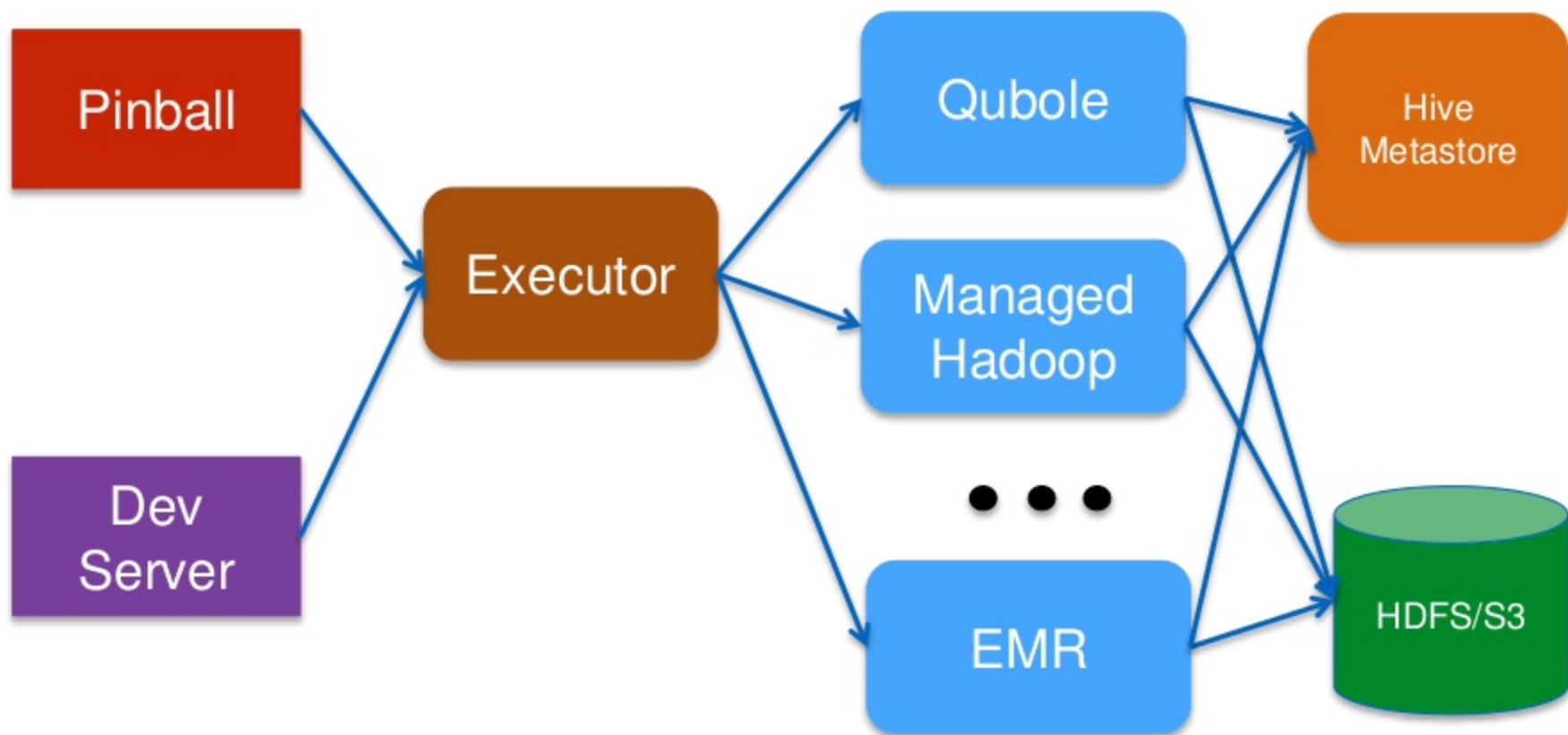| Mapreduce Jobs
Hadoop Jars/Libs
Job/User level Configs |
| --- |
| Software Packages/Libs
Configs (OS/Hadoop)
Misc Sys Admin |
| OS
Bootstrap Script
Core SW |

Executor Abstraction Layer

Why Qubole?

- Hadoop & Spark as managed services

- Tight integration with Hive

- Graceful cluster scaling

- API for simplified executor abstraction

- Advanced support for spot instances

- Baked AMI customization
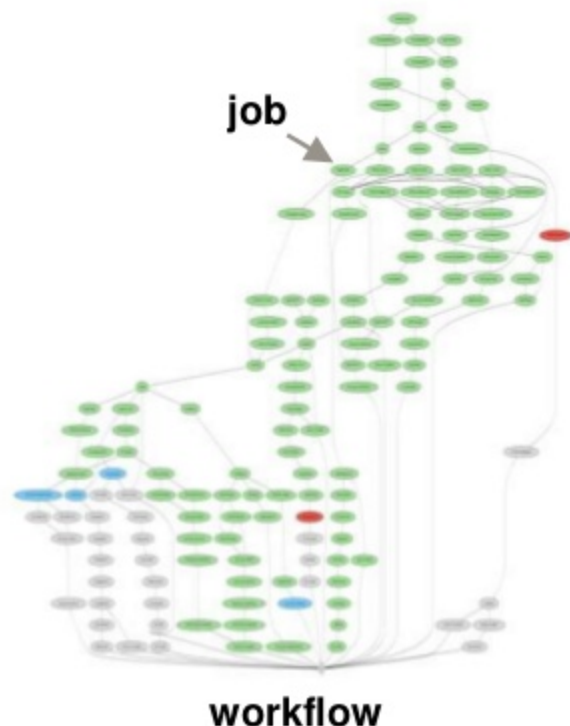
Pinball for Workflow Management

Scale of Processing

- **Scale:**
  - 60 Billion Pins
  - Hundreds of workflows
  - Thousands of jobs
  - 500+ jobs in a workflow
  - 3 petabytes processed daily

- **Support:**
  - Hadoop, Cascading, Hive, Spark …

job

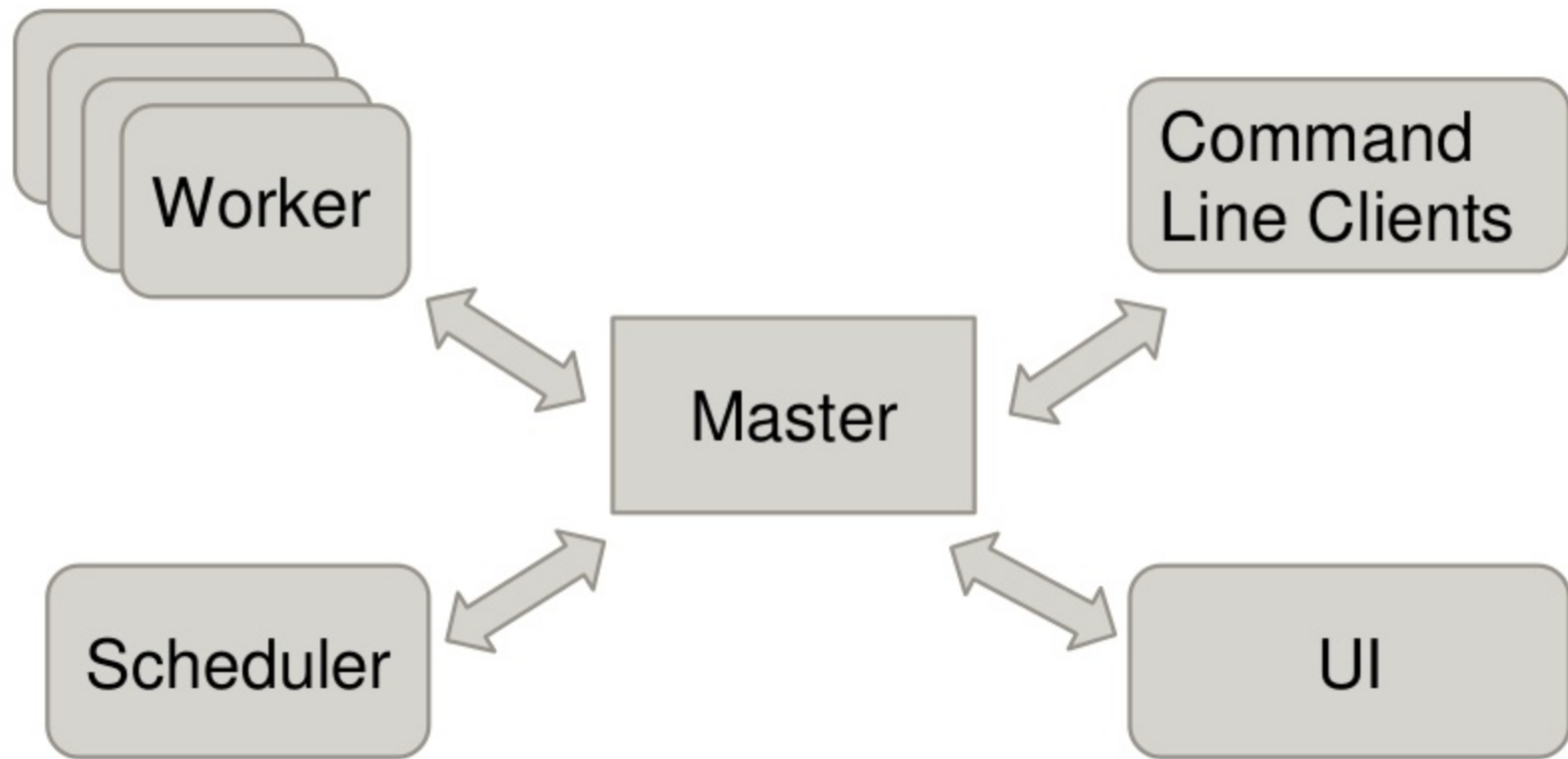workflow

Why Pinball?

- **Requirements**
  - Simple abstractions
  - Extensible in future
  - Reliable stateless computing
  - Easy to debug
  - Scales horizontally
  - Can be upgraded w/o aborting workflows
  - Rich features like auto-retries, per-job emails, overrun policies…
- **Options**
  - Apache Oozie, Azkaban, Luigi

Pinball Design

Workflow Model

- **Workflow**
  - A directed graph of nodes called jobs
- **Edge**
  - Run after dependence
- **Node**
  - Job is a node