

The SACC logo is rendered in a bold, white, sans-serif font with a blue glow effect. It is positioned in the upper right quadrant of the image. The background features a blue wireframe architectural structure with a perspective view, creating a sense of depth and modernity. A bright blue light source emanates from the left, casting a glow across the scene.

SACC

2021 中国系统架构师大会

SYSTEM ARCHITECT CONFERENCE CHINA 2021

数字转型 架构重塑

IT168.com

ChinaUnix

ITPUB

云上会议 网络直播 | 2021.5.20-2021.5.22

京东云分布式存储ZBS架构演进

京东科技-京东云架构师-张永锋

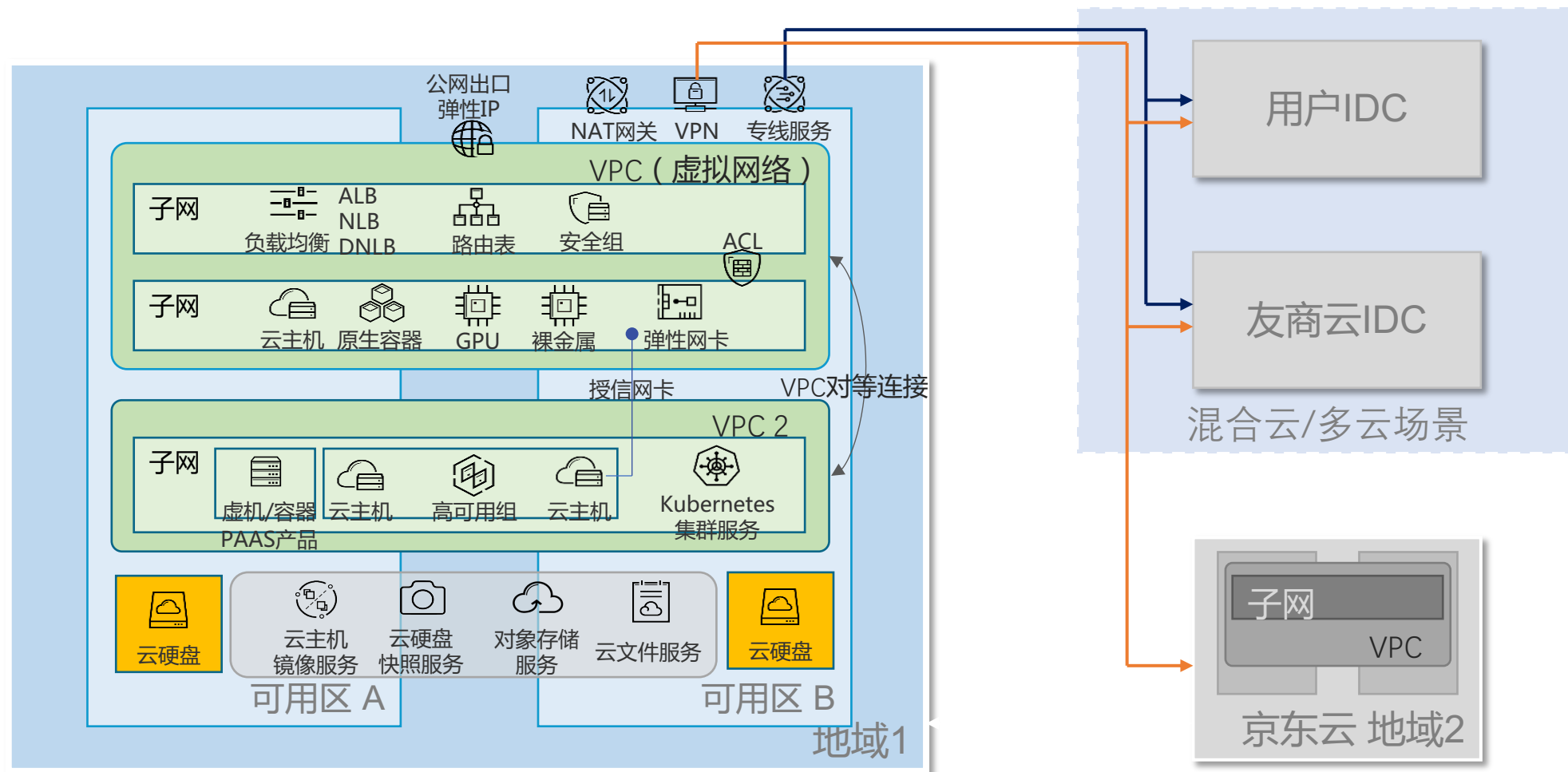
目录

- ZBS简介
- IAAS产品全景
- ZBS基础架构
- 基于RAFT的存储引擎
- 即时备份与恢复
- 云硬盘热迁
- 冷热数据分层
- NBD客户端
- SPDK客户端

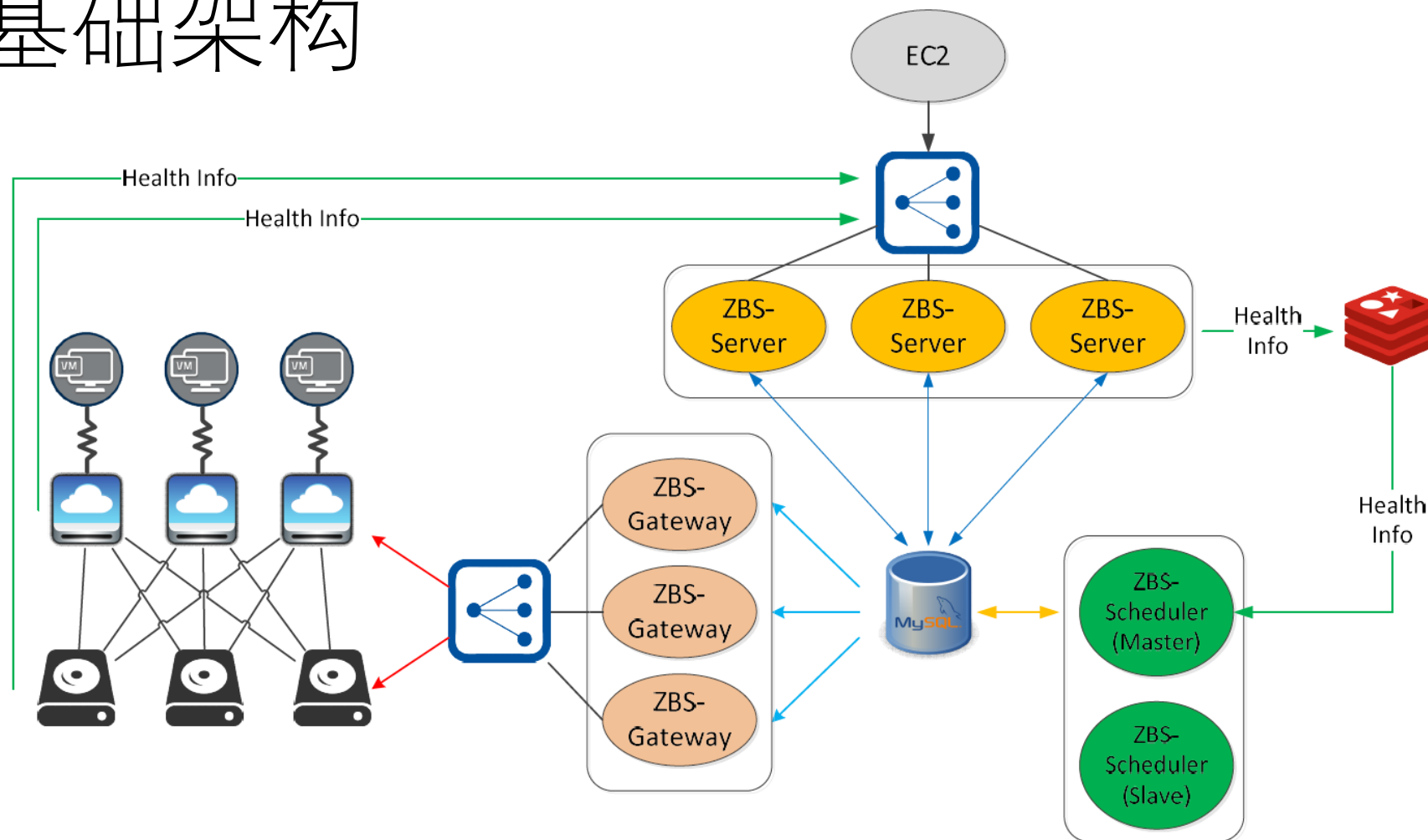
ZBS简介

- 低时延，高性能，高可靠的分布式块存储
- 存储计算分离，云硬盘数据独立于云主机状态
- 支持弹性在线扩容，性能升级、降级
- 支持私有化部署
- 数据面支持RDMA
- 存储引擎基于RAFT协议研发
- 基于快照技术实现指定时间点的数据备份
- 基于LAZY READ的技术恢复指定时间点的数据
- 冷热数据分层/分布式缓存大幅降低成本
- NBD客户端支持通用的块设备
- SPDK客户端提供高性能存储

IAAS产品全景

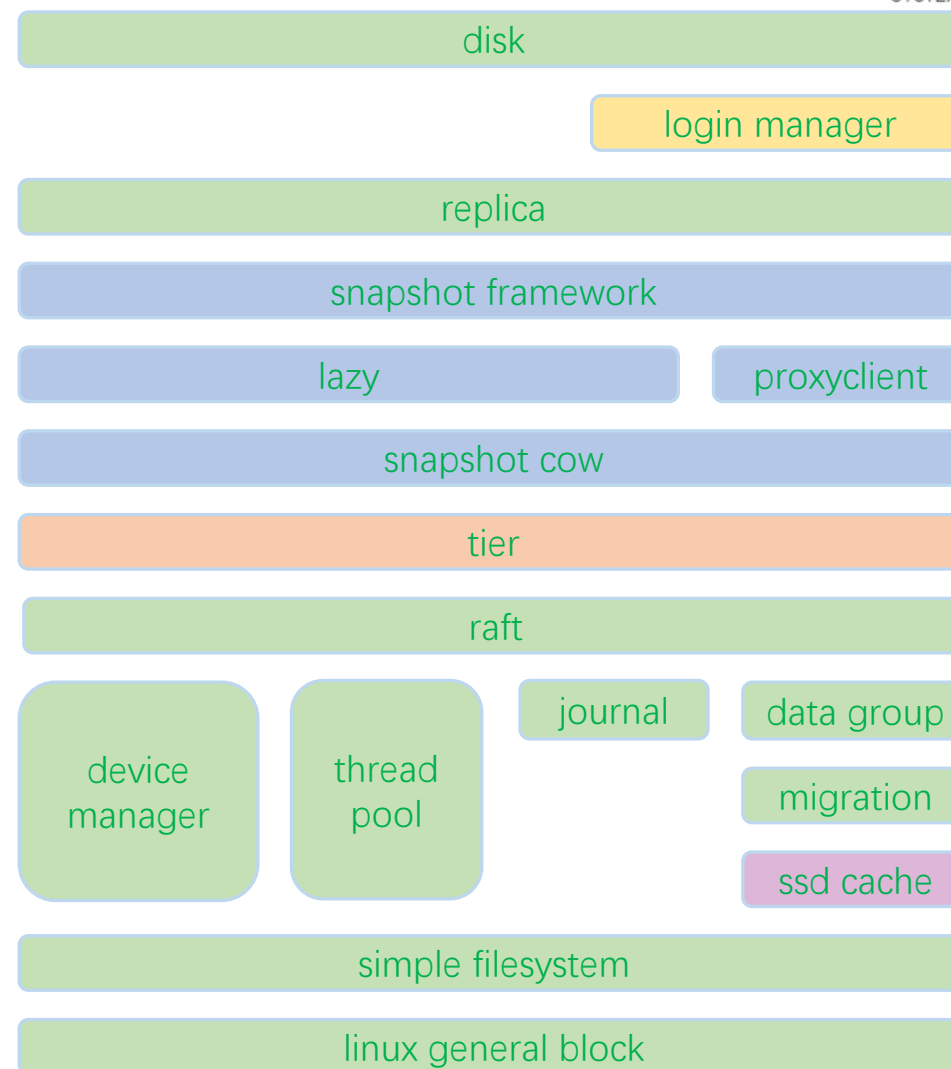


ZBS基础架构

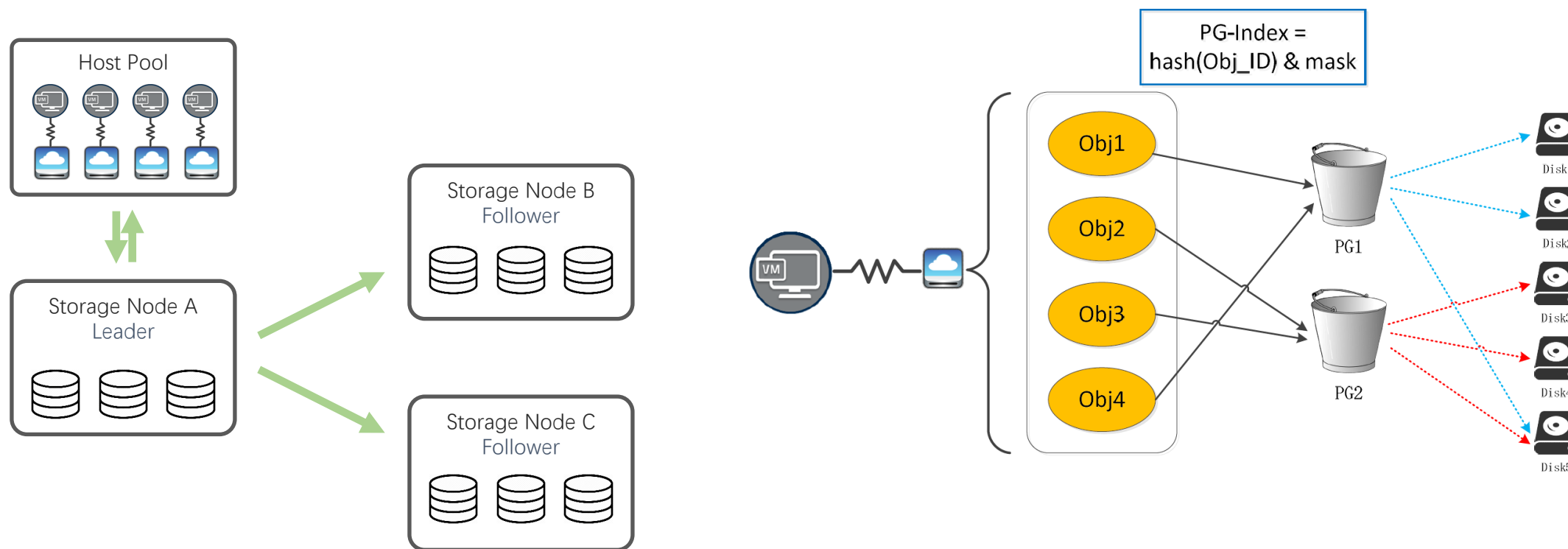


演进路线

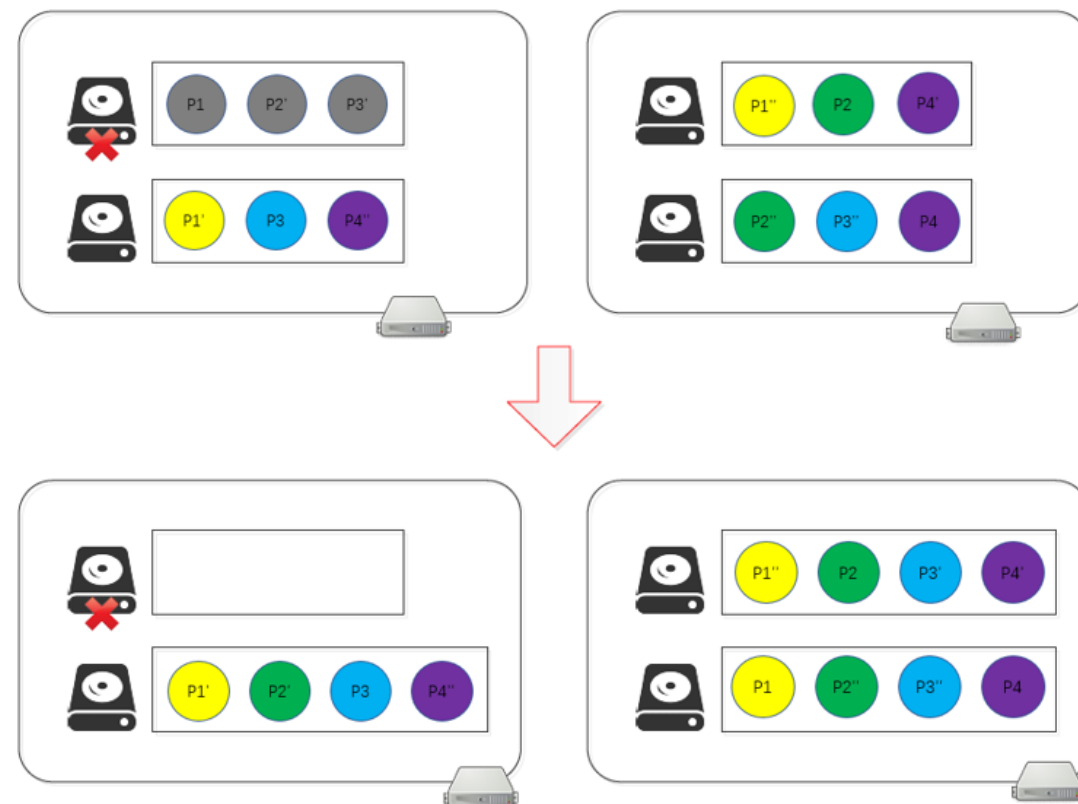
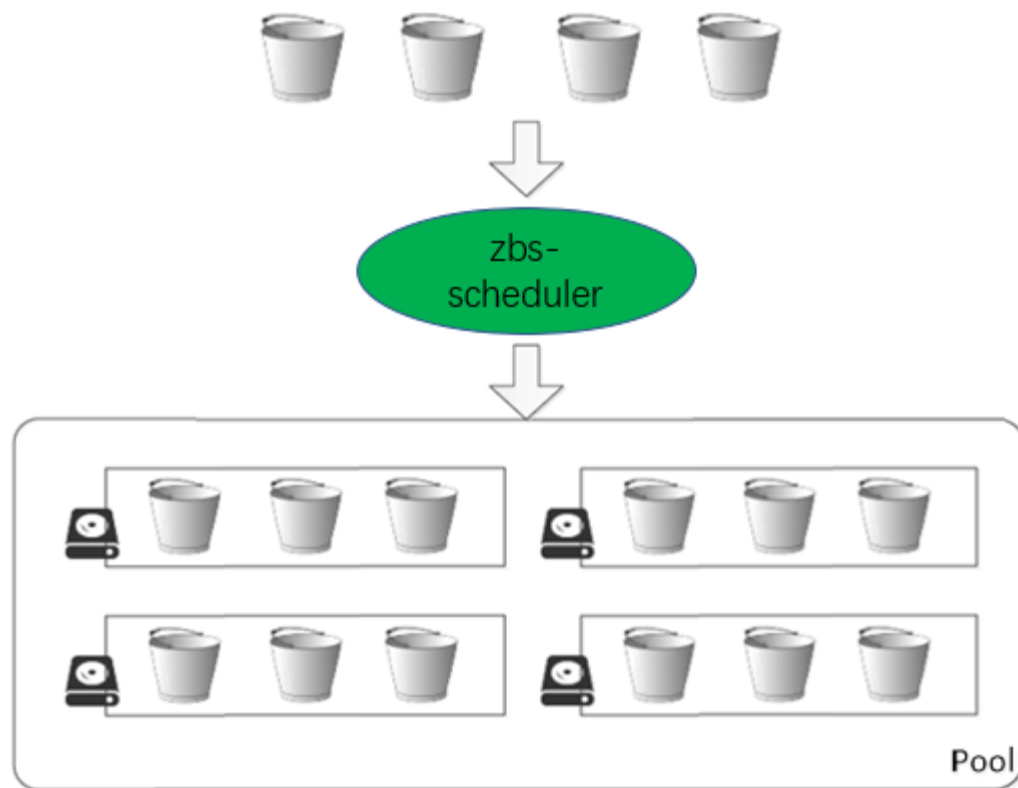
- 基于RAFT的分布式块存储
- 增量镜像 及 Lazy Read
- Fence机制
- 卷热迁
- 冷热分层（分布式缓存）
- 单机ssdcache
- 调度组热迁



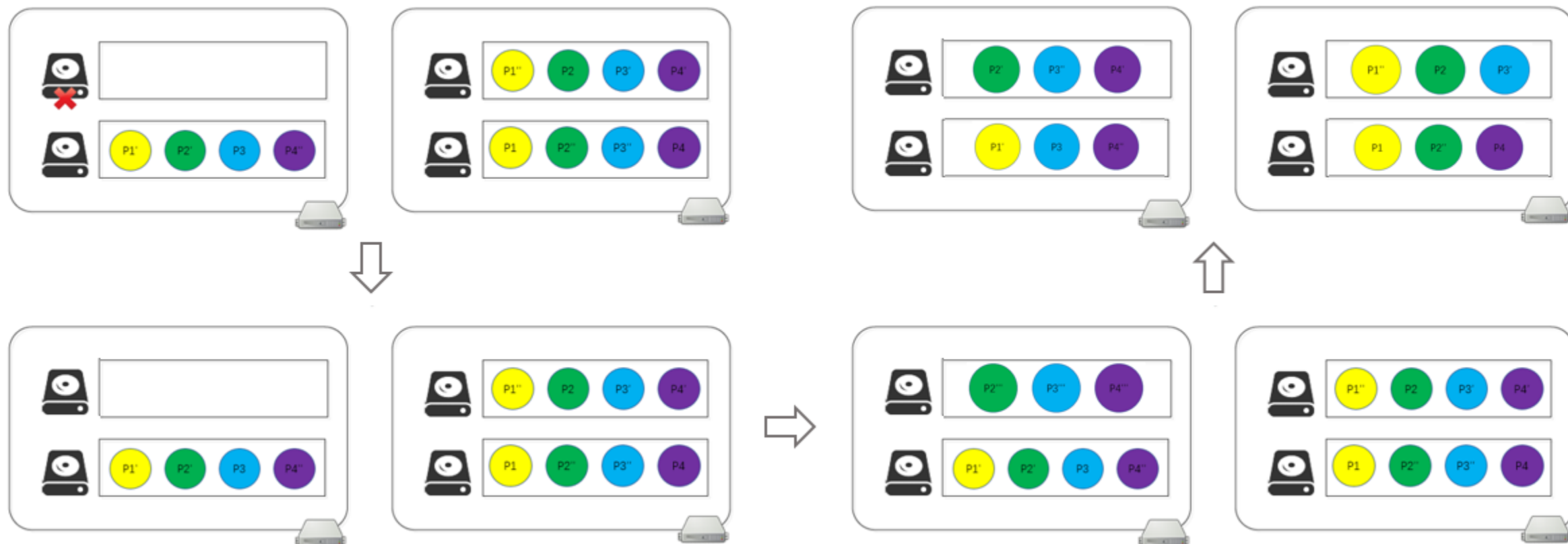
基于RAFT的存储引擎



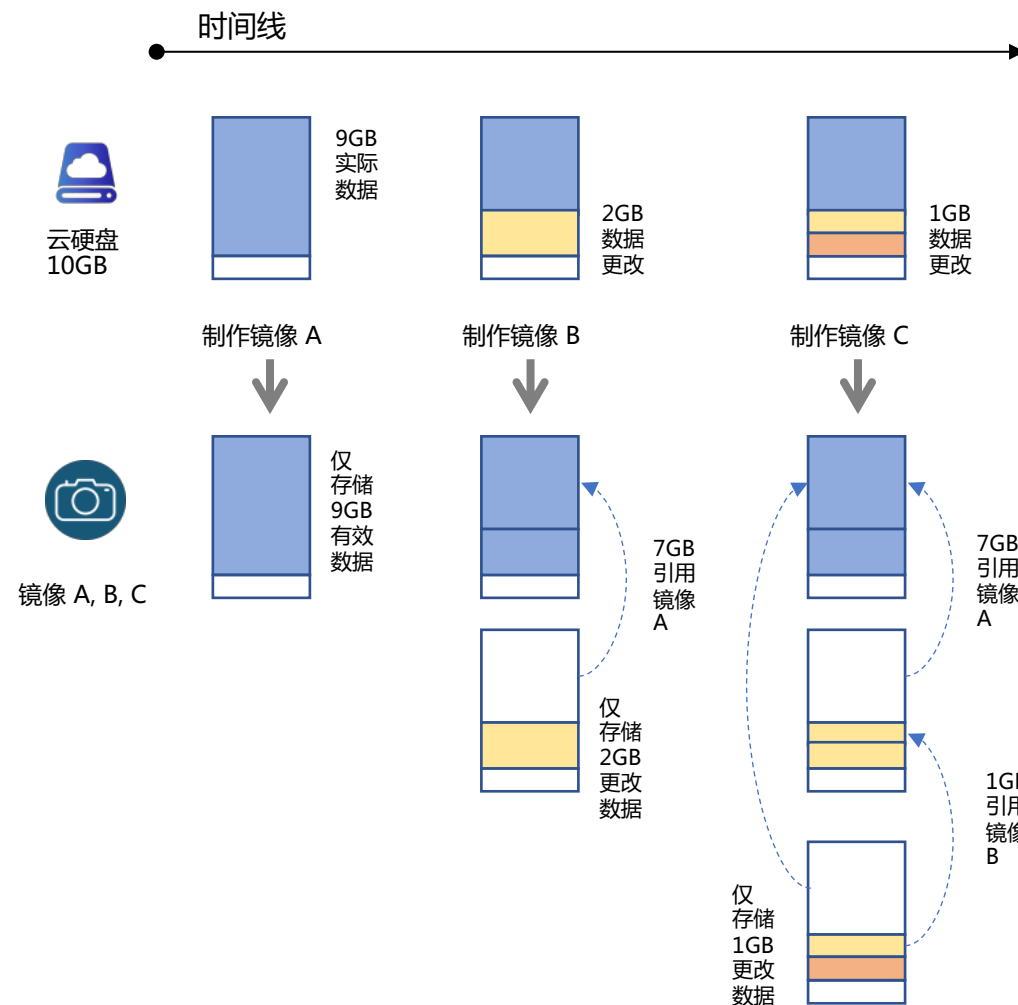
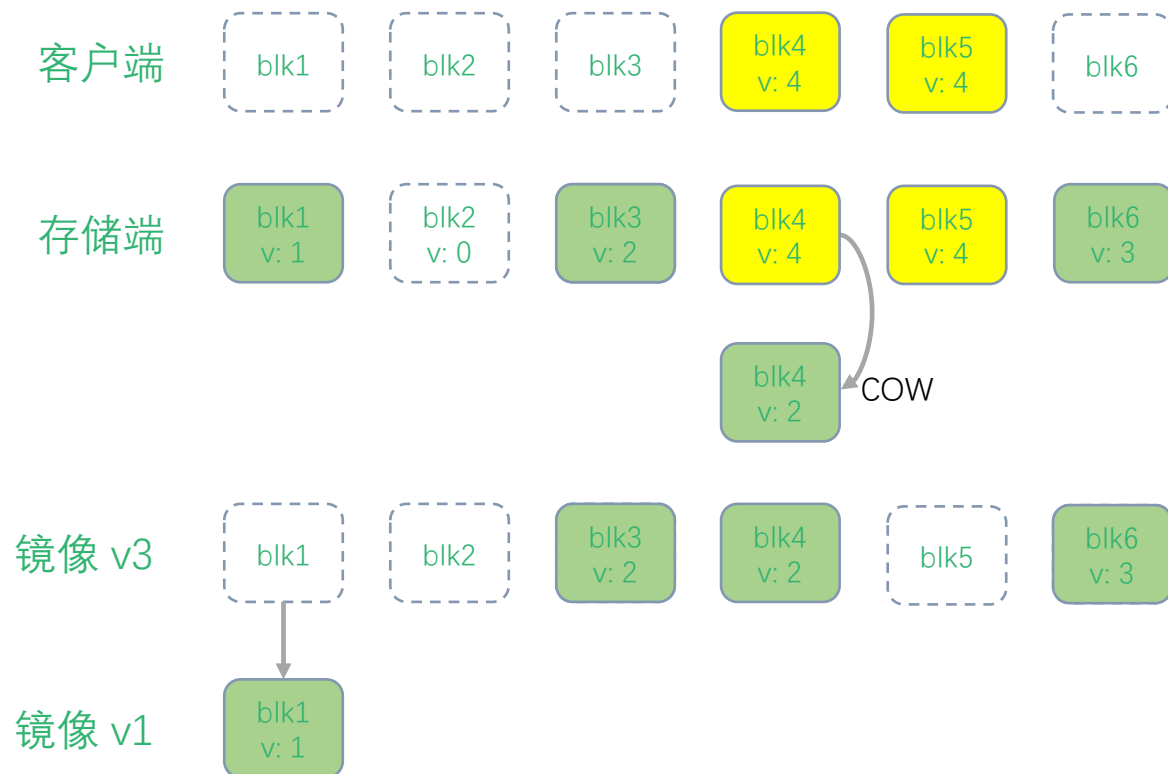
调度组初始化及故障迁移



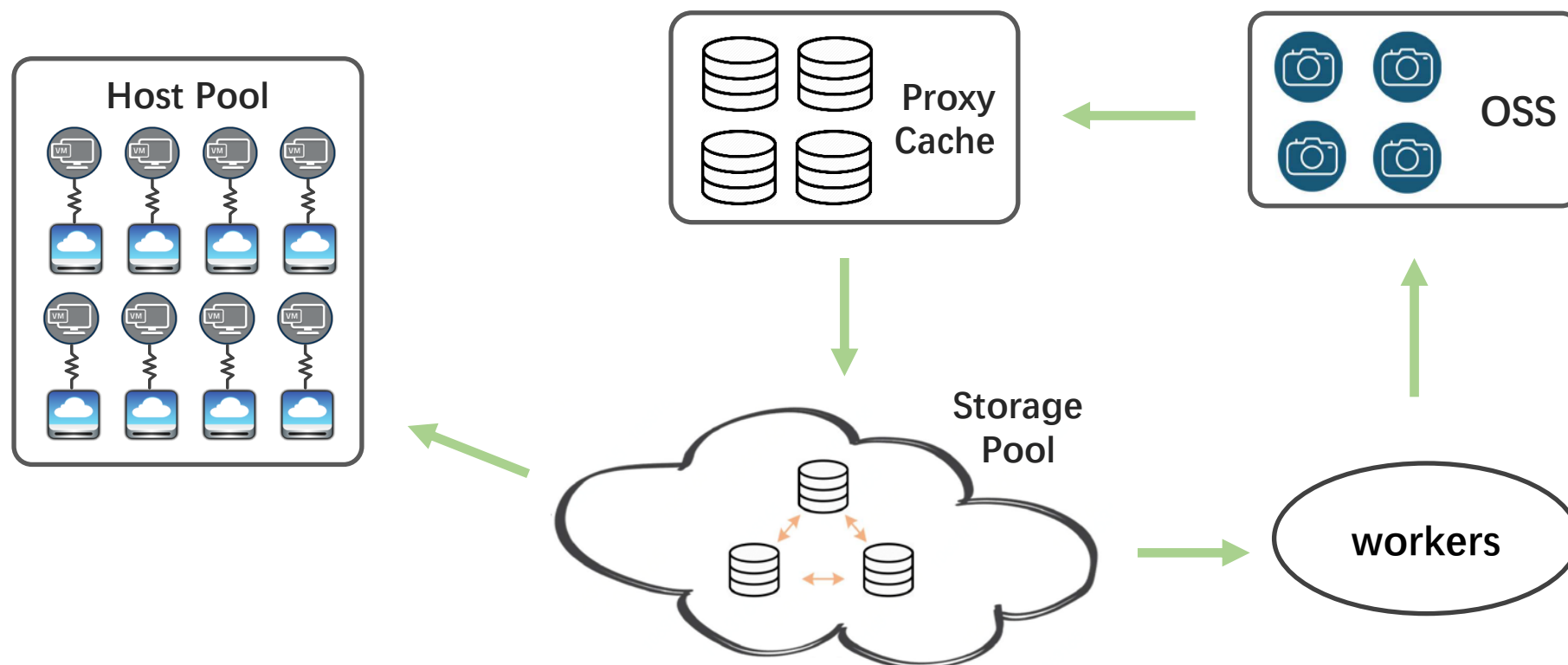
调度组热迁



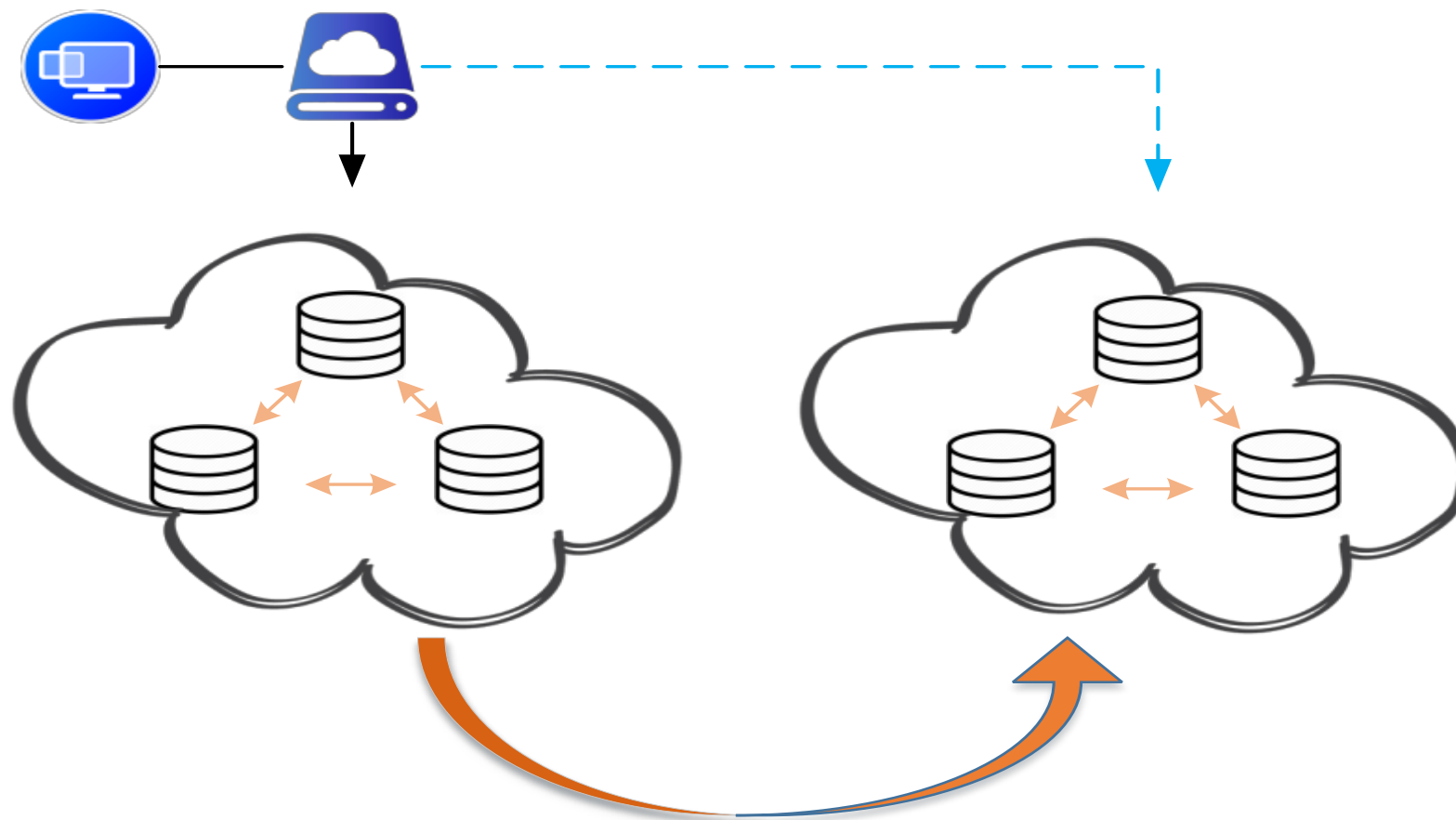
写时拷贝/增量镜像



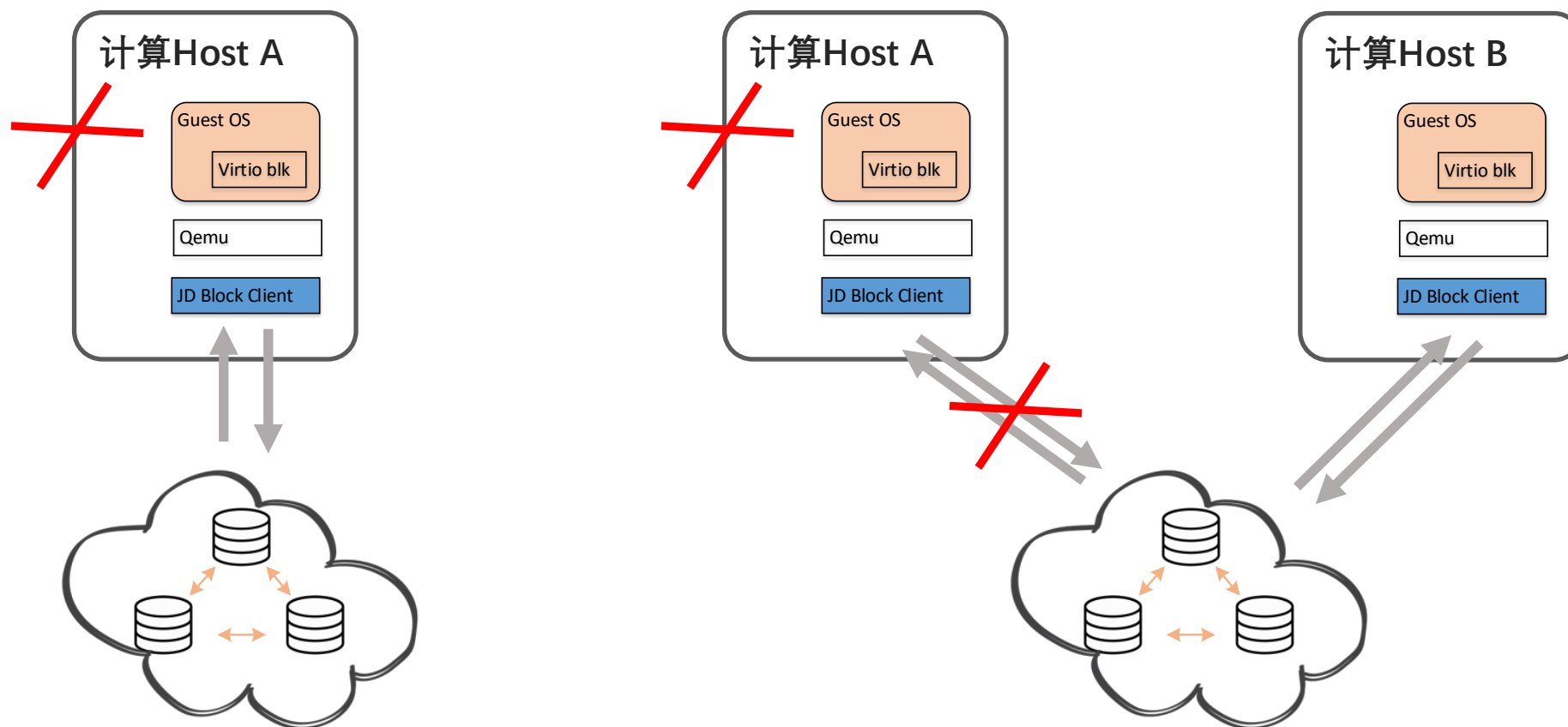
即时备份/恢复/系统盘



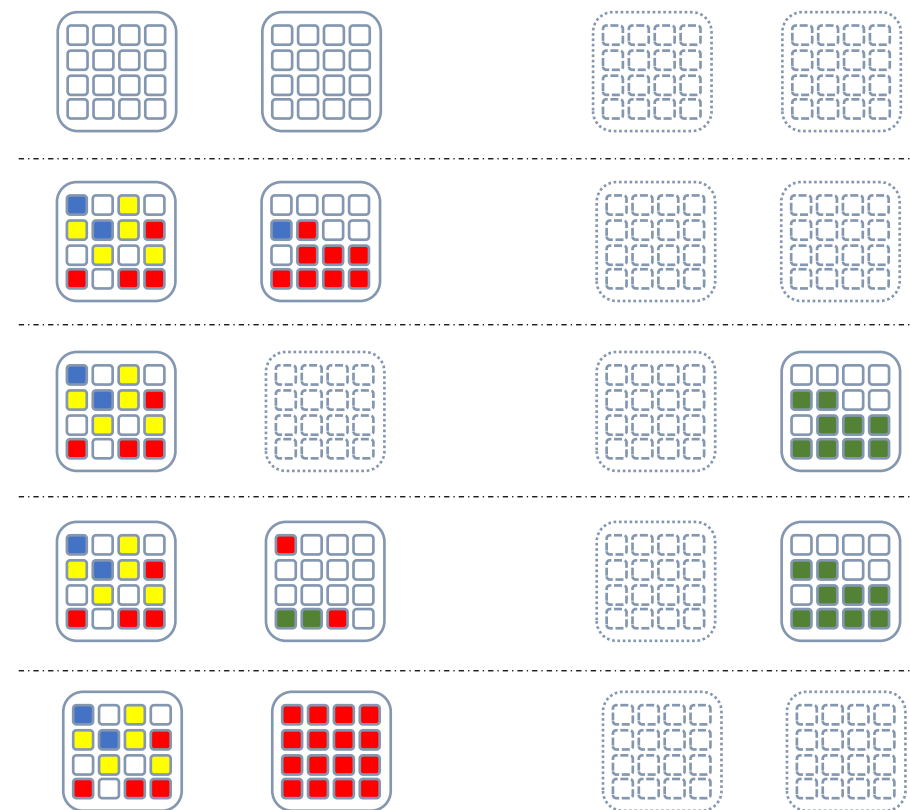
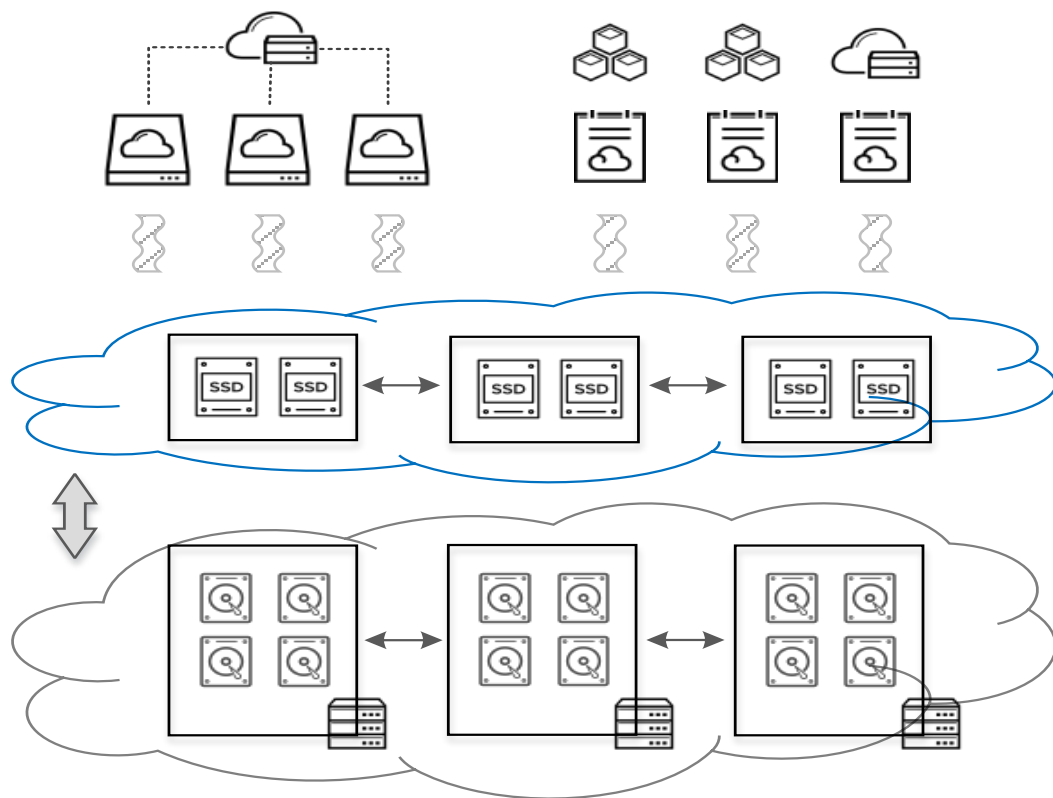
云硬盘热迁



Fence机制



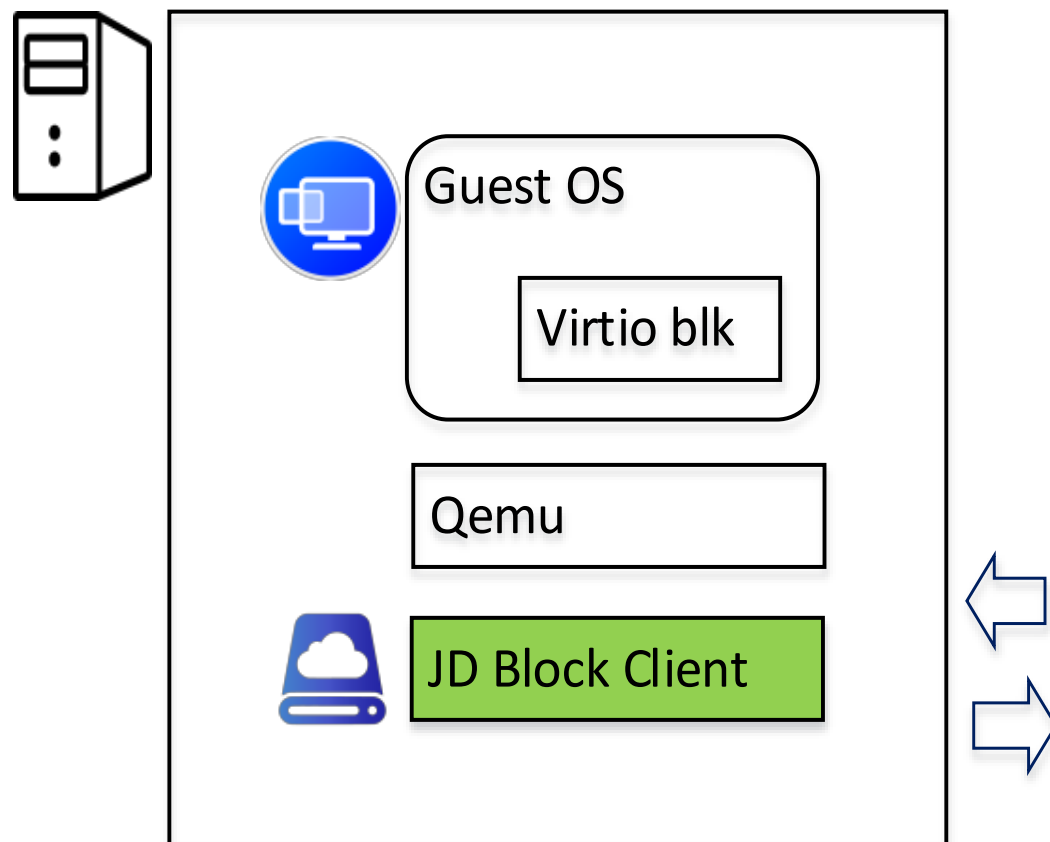
冷热数据分层



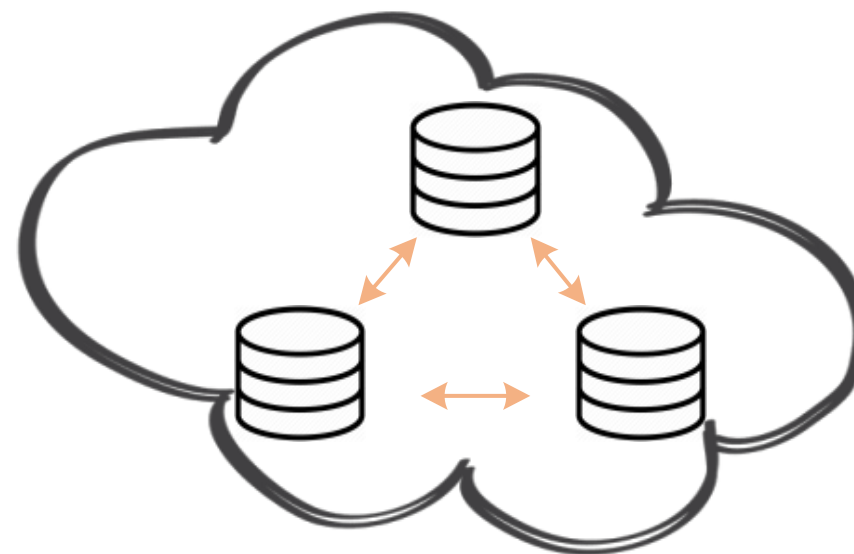
SSD Pool

HDD Pool

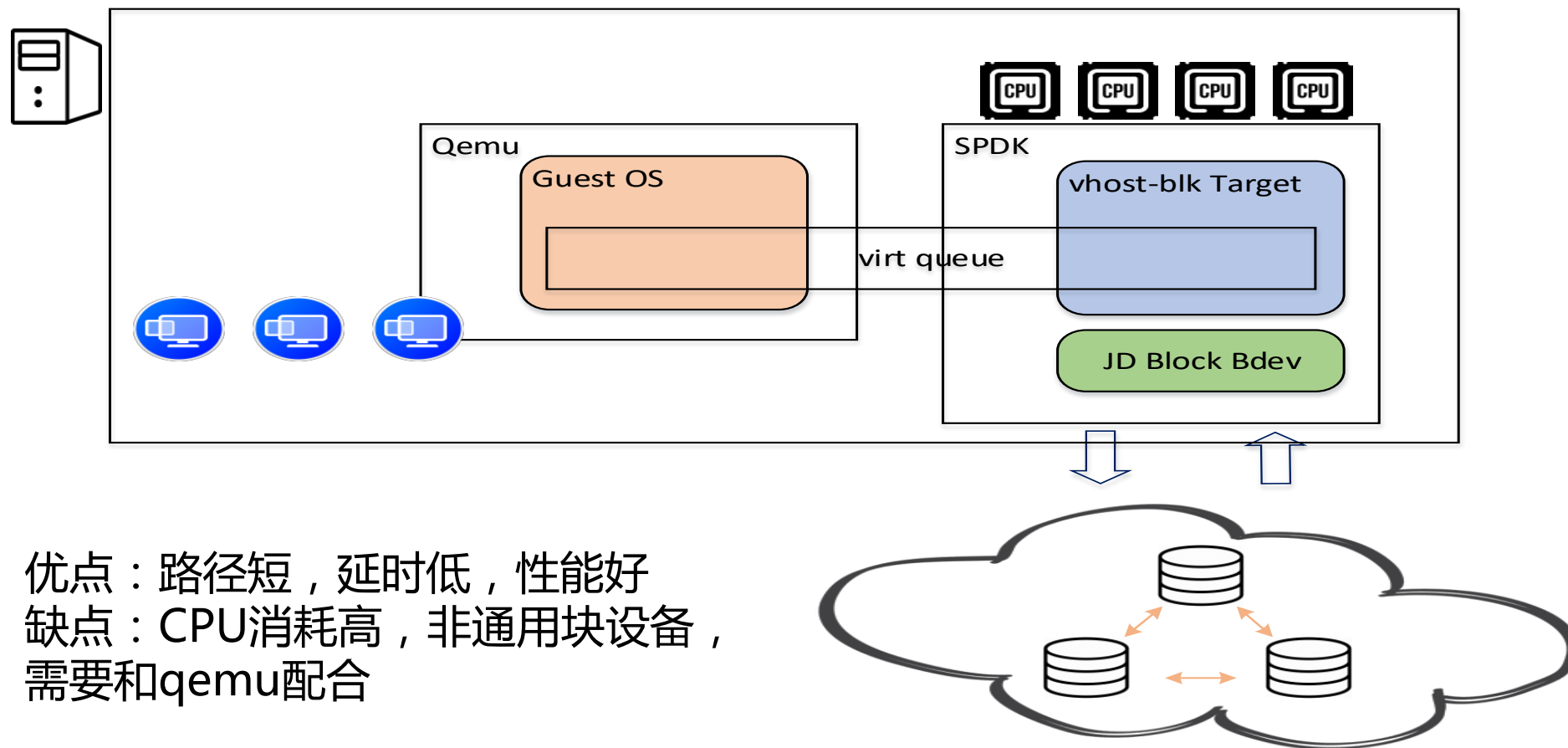
NBD客户端



优点：通用块设备，兼容性好
缺点：路径长，延时大，性能低
优化：客户端条带化，性能大幅提升



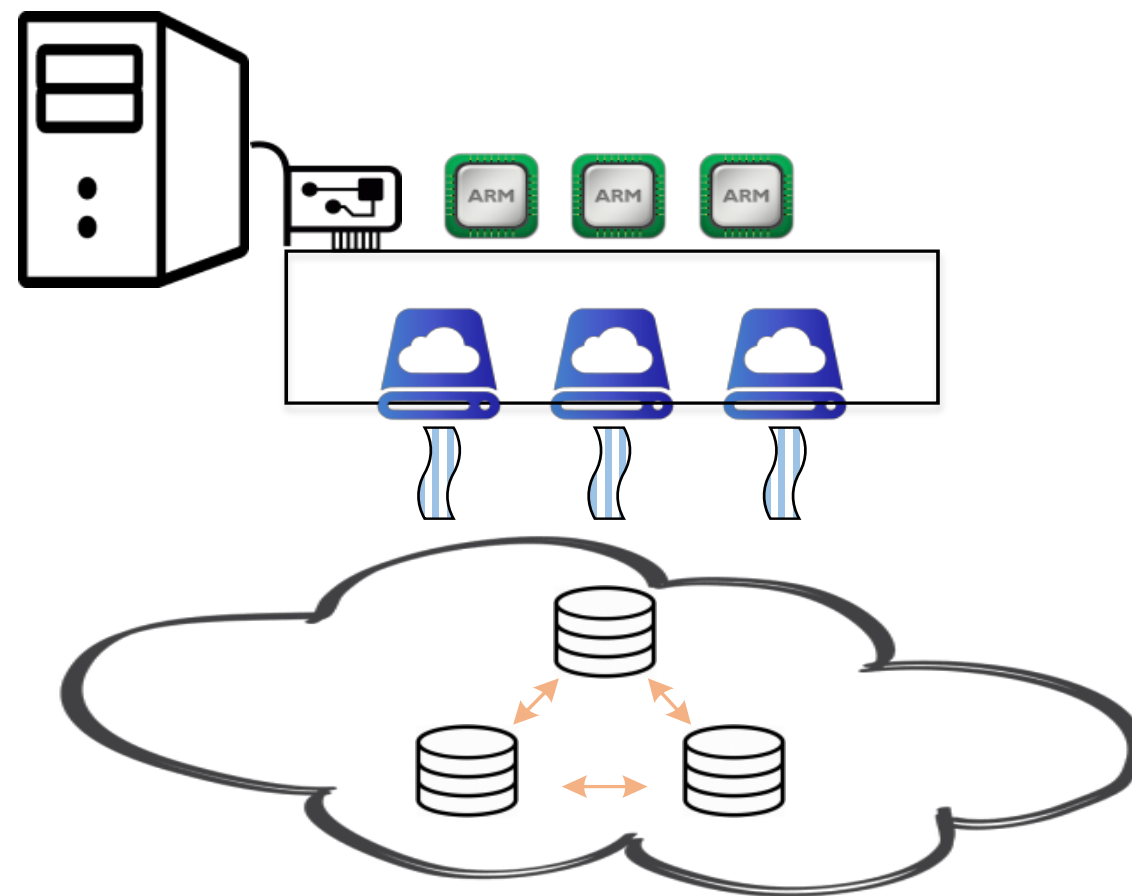
SPDK客户端-vhost模式



优点：路径短，延时低，性能好
缺点：CPU消耗高，非通用块设备，
需要和qemu配合

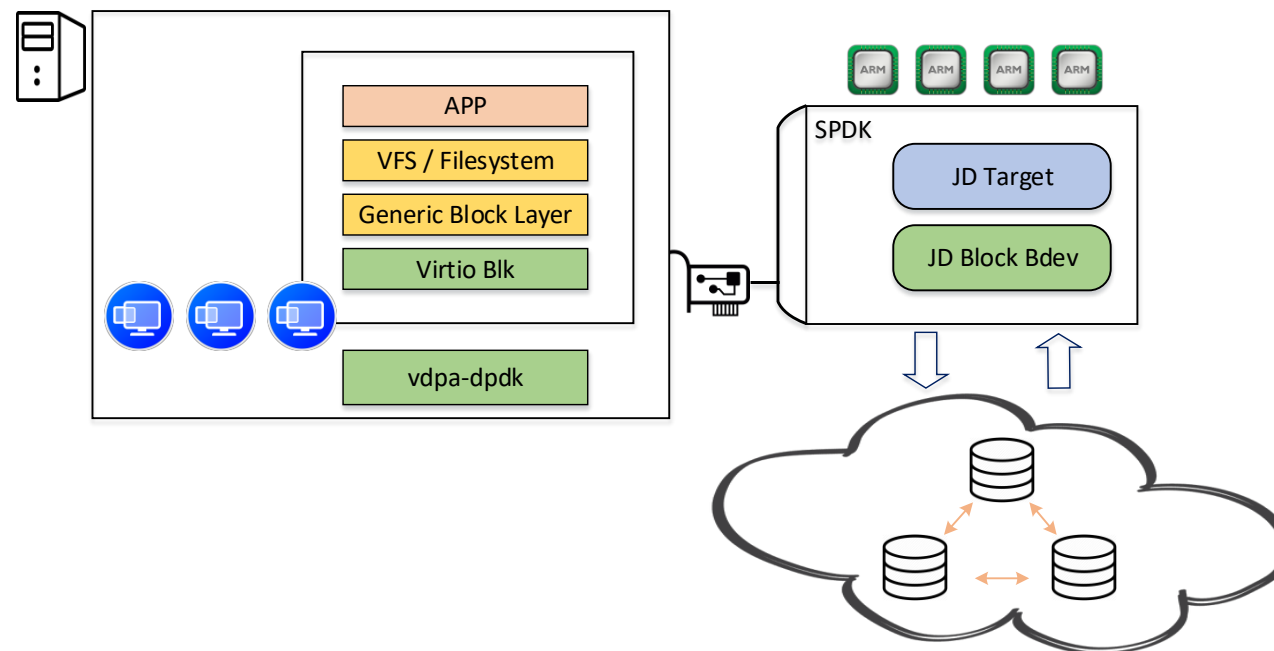
SPDK客户端-裸金属模式

- 利用智能网卡提供的网络和存储的硬件加速能力，将原有虚拟化网络和存储协议栈的负载从物理宿主机上卸载至智能网卡
- 使主机具备与物理机无差别的极致性能，且具备云主机弹性部署、故障快速恢复等特性
- 支持云盘快照、扩容等所有云盘功能



SPDK客户端-智能网卡虚拟化模式

- vDPA(vhost Data Path Acceleration)
让virtio数据面不需宿主机干预，云主机和智能网卡直通
- 延时大幅降低
- 支持云盘快照、扩容等所有云盘功能
- 硬件设备数量有限，可挂载的云硬盘数量受限
- 受限于智能网卡性能，云硬盘性能上限不如NBD和vhost模式



The background is a deep blue with a complex wireframe pattern of rectangular shapes, resembling a stylized city skyline or a data visualization. A bright cyan diagonal line runs from the top left towards the center. In the upper left, there is a logo consisting of three horizontal bars of increasing length, with the letters 'SACC' written in a stylized font below them. The word 'THANKS' is centered in a large, white, sans-serif font, with a bright cyan horizontal line passing through its middle, creating a lens flare effect.

THANKS