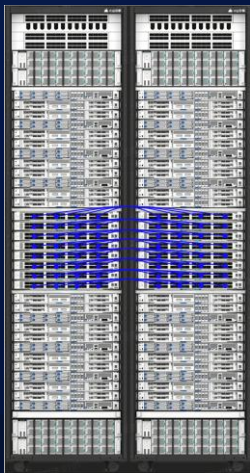


兆瓦级算力系统架构设计

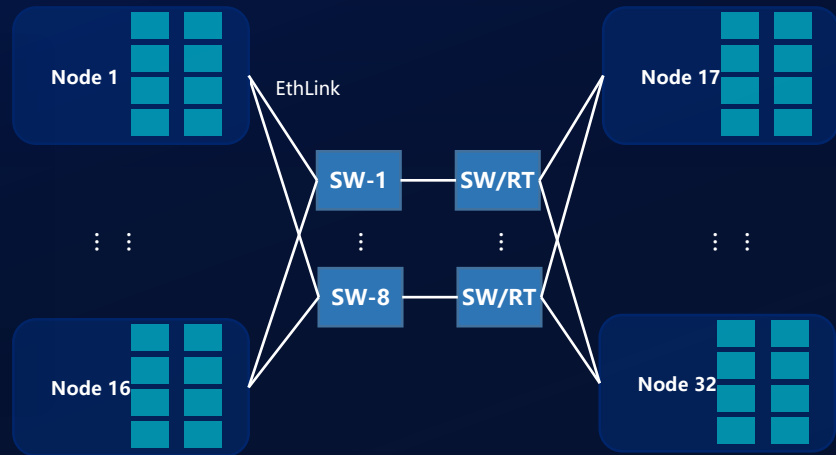
高晓军 字节跳动

AI Rack System 2.0: 使能多样性算力

- Scale Up Density: **256 XPU**
- **240kW**/Rack
- Modular, flexible Design
- Rack level delivery
- Open architecture , diverse computing

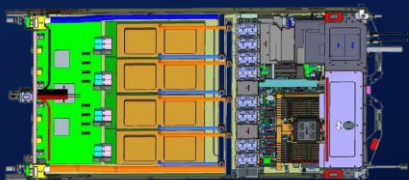


单柜部署&并柜集成部署



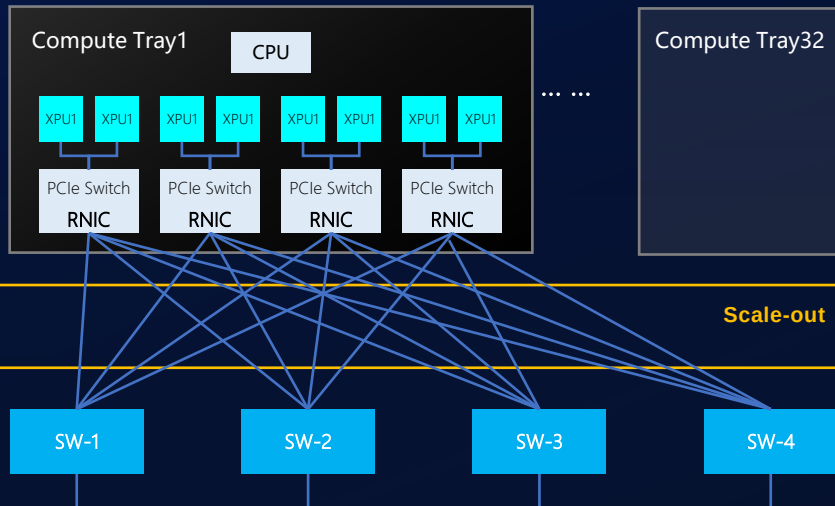
AI Rack 2.0: XPU Scale-out 实践

共享超节点基础设施技术规范
高密度、资源高效利用；原生液冷、释放算力潜能



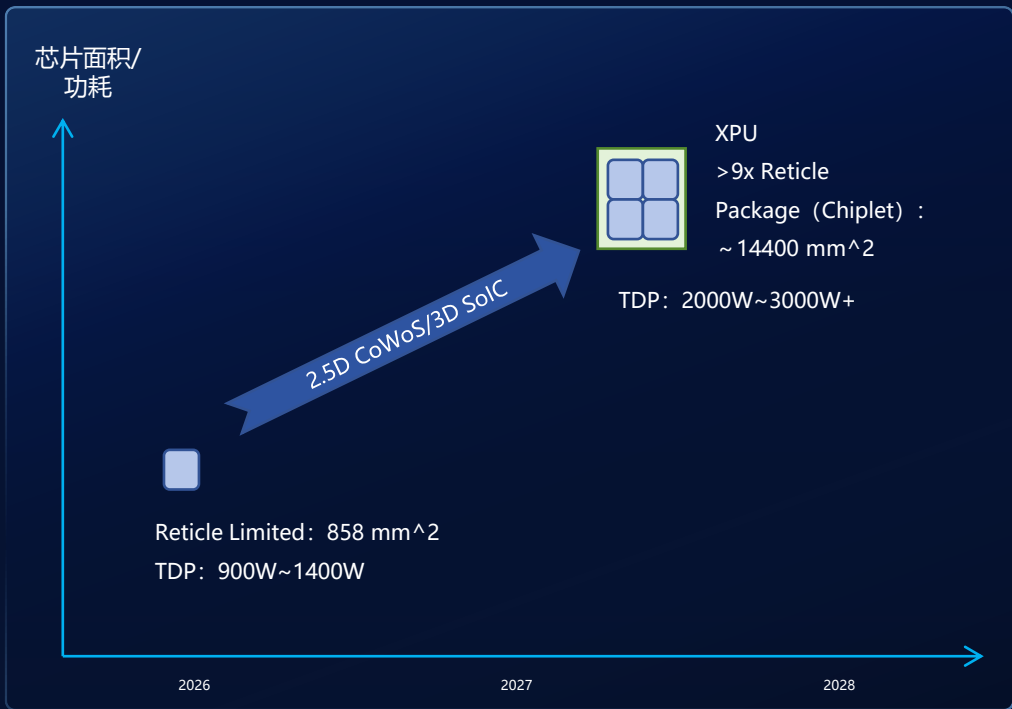
X32

Eth 256卡

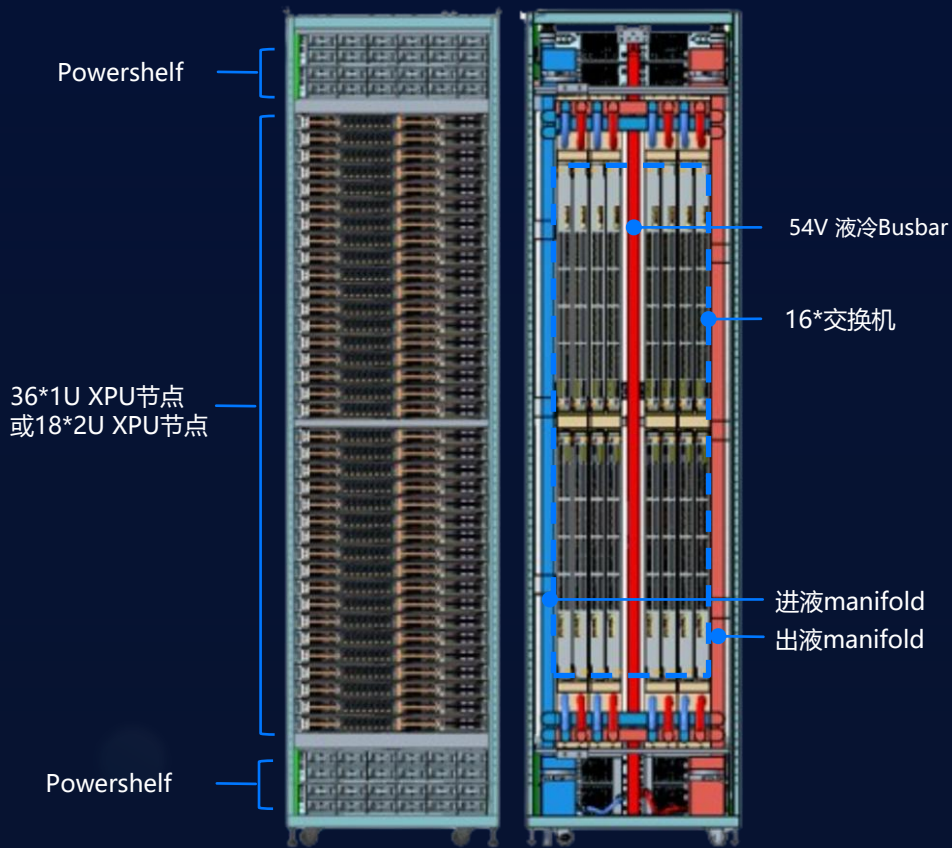


超低时延；节省光模块 + 布线，减少光链路故障点、降低运维复杂度

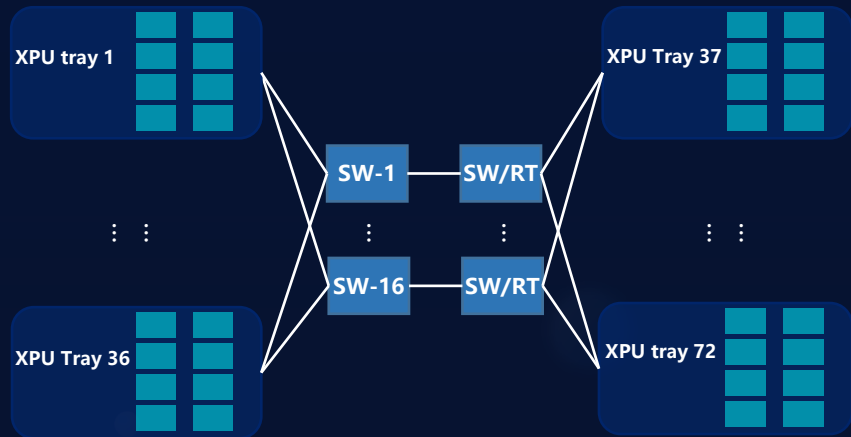
新一代智算系统迈向兆瓦级



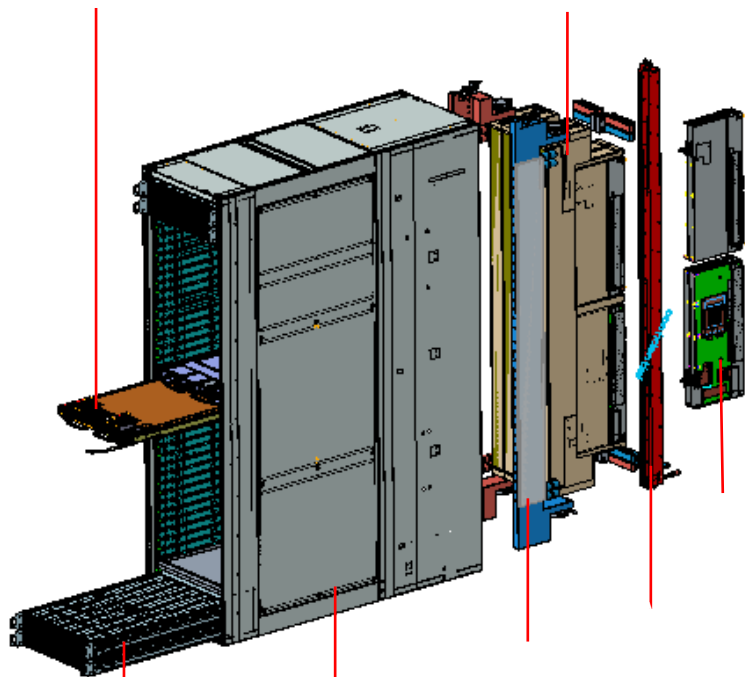
兆瓦级算力系统： AI Rack 3.0



- Scale-up Density: 576 XPU@2并柜, 提升2X
- Scale-up带宽: 460TB/s, 提升2X
- 500kW/Rack
- 800V HVDC
- 支持100%全液冷
- 整机柜交付全球部署



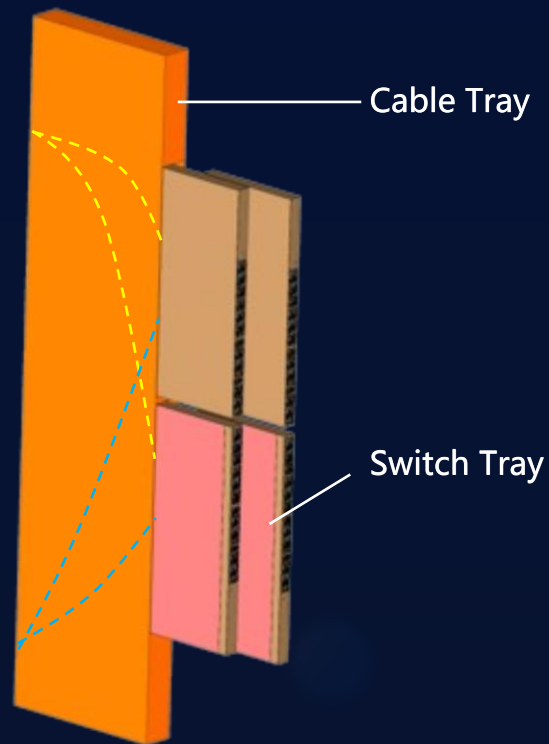
机柜设计



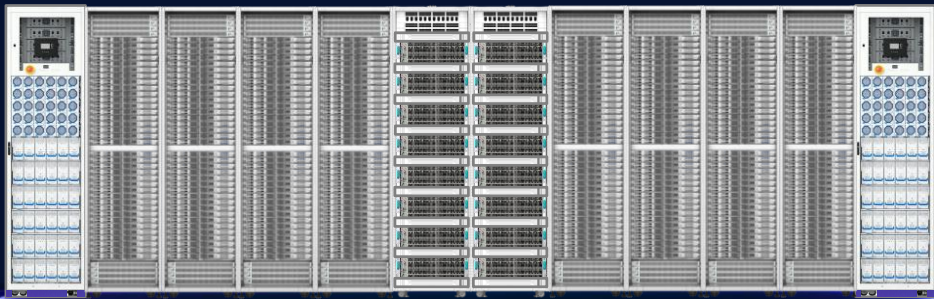
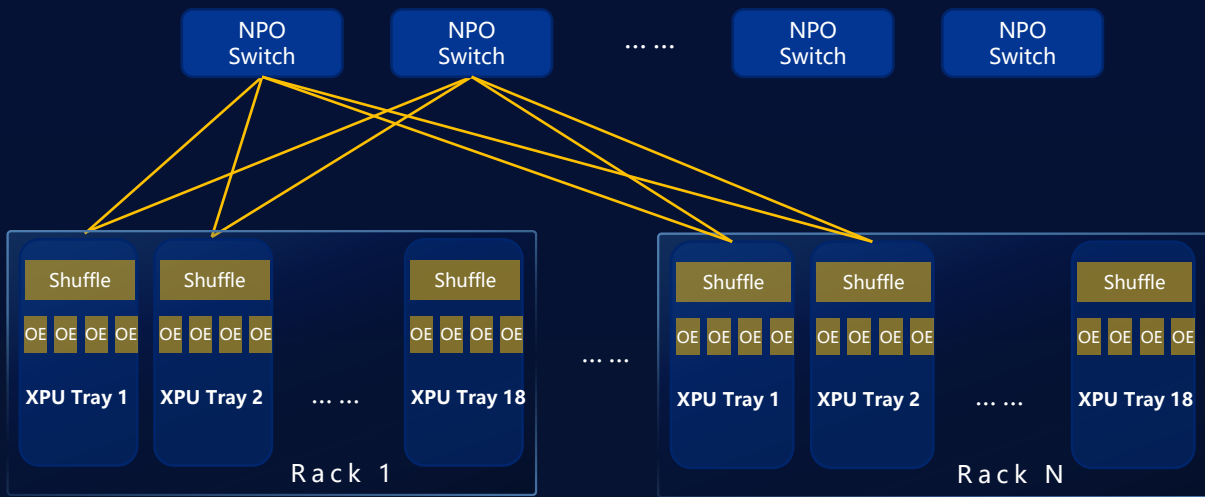
600mm 机柜

800VDC 输入 powershell

x4

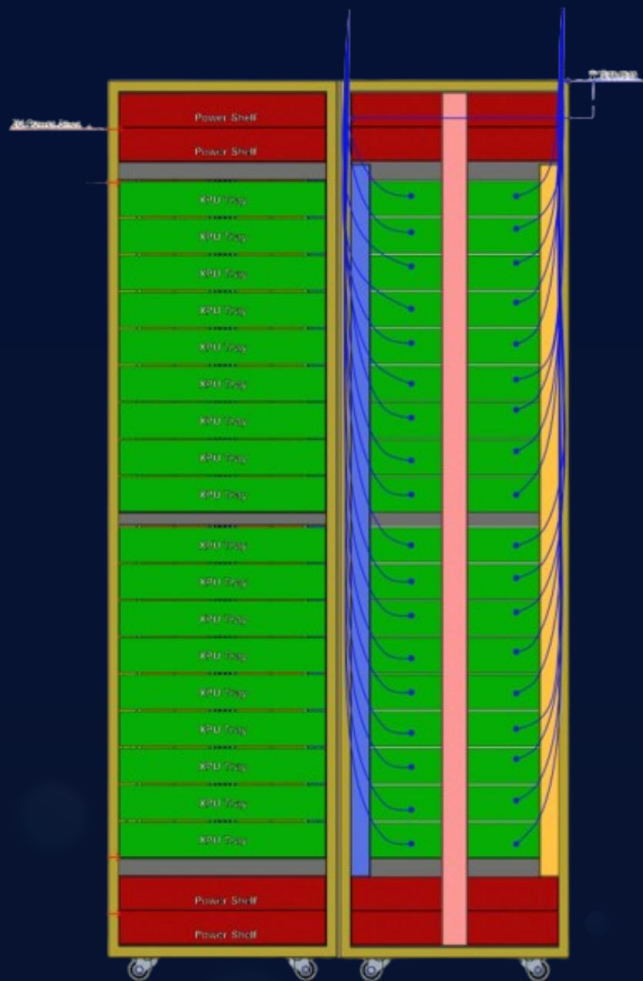


NPO光互连超节点



- Scale-up Domain: up to 1024 XPU
- 光互连NPO(Near-Package Optics)应用: 突破铜互连物理极限

机柜和节点——NPO



- 机柜、供电、液冷设计与铜互连Rack一致
- 500kW/Rack
- 支持800VDC输入
- 2U XPU Tray, 内置Shuffle
- Scale-up互连光纤后出

与社区伙伴协同，加速兆瓦级系统技术成熟和产品应用



算力及部件演进

- 新一代**XPU Form Factor**
- 推进**原生液冷部件**标准化和生态成熟 (SSD、NIC、光模、Memory)



系统互连扩展

- 扩展HBD规模
- 铜缆224G高速传输
- Scale-up光互连: **NPO**突破铜互连物理极限, 高密、高带宽



MW级供配电提升

系统: **800V** HVDC
板级电源: 垂直供电, 小型化、高性能



大功率高效散热

- 支持AI Rack免风扇, **100%液冷占比**
- 超高功率XPU: 3000W+
- 多chip流量匹配和低阻系统; 离散型功率器件高效散热
- 液冷系统在线检测

开放共创AI Infra未来!