

Flipkart Infrastructure Journey

Flipkart's Infrastructure Evolution with Business Change and Growth

What's this talk about?

- Flipkart's Business Journey
- Flipkart Infrastructure
- Flipkart Network
- Flipkart Storage
- Flipkart's Interest in OCP
- Flipkart OCP adoption challenges





India has the fastest expanding internet user base



Flipkart 🔀

2016 vs 2021 projections India is tracking to be World's 2nd largest Internet user base.

*SOURCE: Euromonitor, IAMAI, China Internet Network Info, HBR, PEW | NOTE:Of 360 Mn, 220 Mm are Urban and rest Rural Consume. Collaborate. Contribute.











Flipkart's Shifting Workloads

- Initial e-commerce and e-books
 - Almost a traditional RDBMS application
 - Content delivery
- Flyte music store
 - Streaming content
 - Low latency





Flipkart 🙀

Flipkart's Shifting Workloads

- Retail Heavy
 - Select products and listings, few retailers
 - Data and batch analytics
- Marketplace and user growth
 - Exponential growth in sellers, products and listings
 - Heavier data and batch analytics, archival data





Flipkart's Shifting Workloads

- Tier-2 cities and many Indias
 - User generated content
 - Low latency personalization
 - Application (not just content) delivery from the edge
- Risk mitigation
 - Business continuity and disaster recovery
 - Content moderation

OPEN Corperse

Flipkart's Infrastructure

- Co-Managed Datacenters
- Multiple geographically separated regions
- x10k baremetals / region









Flipkart's Network

- Large Scale Deployments every 3 years
 - Overlaps with merchant silicon refresh
 - 40G 2015
 - 100G 2018
 - 200G ----
 - 400G 2022
- Disaggregate hardware & software
- Standardization of "Clos L3 Fabric"







Flipkart's Network

- Clos Fabric
 - Merchant silicon
 - Wide ecmp spray
 - Small blast radius
 - "Infrastructure as cattle"
 - Automation







Flipkart's Network

- Extensibility and Automation
 - Provisioning
 - Lifecycle management
 - Fault detection
 - Self healing









Flipkart's Network Services

- Egress peer engineering
- Elastic load balancing
- SR-IOV
- Overlay
- NVMeOF





Flipkart 🙀

Flipkart's Storage Evolution

- Past: Converged Direct Attached
- Present: Composable JBOD/Fs
- Future: Hyper-Composable NVMe-oF



Why composability matters?

- Need to improve utilization of all resources
- Data has to be available unless the media itself has failed
 - Hardware failures
 - Software failures
 - Software/Firmware upgrades
 - Hardware/Network maintenances
- Storage is sticky



Flipkart

Why composability matters?

- Storage is unavailable when server is down for maintenance
 - Recreate the VM and rebalance/restore data from replica/backup - slow and becomes worse with larger/more disks
 - A DC wide maintenance will rewrite the data twice
 - Or wait until the maintenance is completed risky



Flipkar





Flipkart 🔀

Logical View

1 JBOD 4-6 servers 2 TORs



Storage POD

4 Racks 2 TORs 8 JBOD/Fs 48 Servers



Flipkart 🔀

Flipkart's interest in OCP

- Disaggregation of Hardware & Software
- Standardised API's across classed of hardware
- Open firmware
- Community driven approach
- Drive change, than wait for vendors to incorporate
- Extensibility & manageability





Flipkart's interest in OCP

- Rich vendor ecosystem and options
- Tested by "Hyperscalers", could fulfil a large portion of Flipkart's feature requirements
- Open Rack : Driving space, power and cooling efficiencies
- Large scope to experiment, internal customers







Flipkart OCP adoption challenges

- Rate of physical infrastructure growth
- New vendor ecosystem, needs solve for :
 - Availability
 - Logistics
- Software feature parity
- Support
- Need to create engineering bandwidth





- Giridhar Yasa
 - <u>giridhar.yasa@flipkart.com</u>
- Jain Johny
 - jain.johny@flipkart.com
- Raghdipsingh Panesar
 - <u>raghdip.panesar@flipkart.com</u>



