Western Digital®

Open Composable Disaggregated Infrastructures for the Edge

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Agenda

1. What is CDI? What is Open CDI?
2. How does Open CDI map to Edge Data Center Characteristics?
3. Open Composable Ecosystem and Products from Western Digital
4. Open Composable API
5. Conclusions

What is CDI, What is Open CDI?

- IDC defines Composable Disaggregated Infrastructure:

  "The application-centric approach to IT — building environments that require new levels of scale, automation, and flexibility — can be effectively delivered via composable/disaggregated infrastructure (CDI) and could become a common approach to deal with this duality."[1]

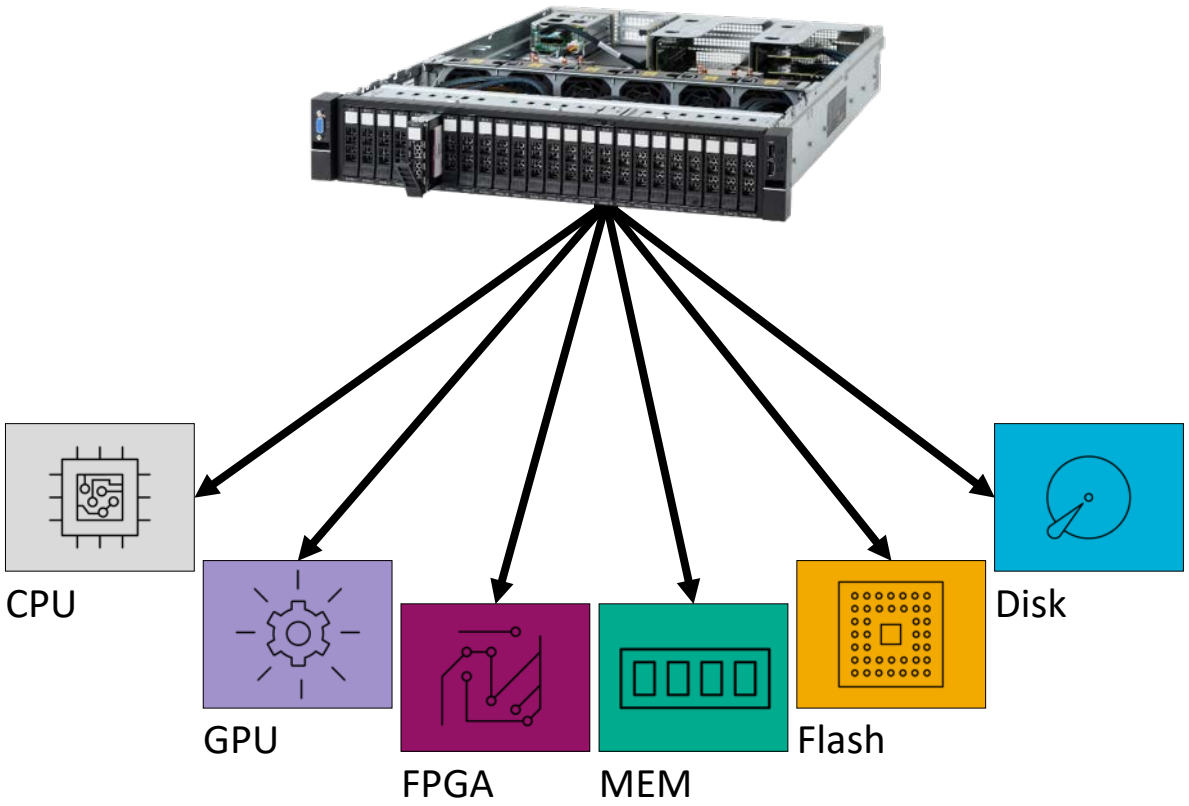
- Benefits over traditional Infrastructure
  - Improved flexibility
  - Reduced cost
  - Speed to provision virtual systems
  - Ease of scaling up and out
  - Application level control (Orchestration)
- Open CDI
  - Provides all the benefits of CDI
  - Eliminates vendor lock in as resources from multiple vendors are composed into virtual systems

1. IDC Worldwide Composable/Disaggregated Infrastructure Forecast, 2018–2023

Open Composability

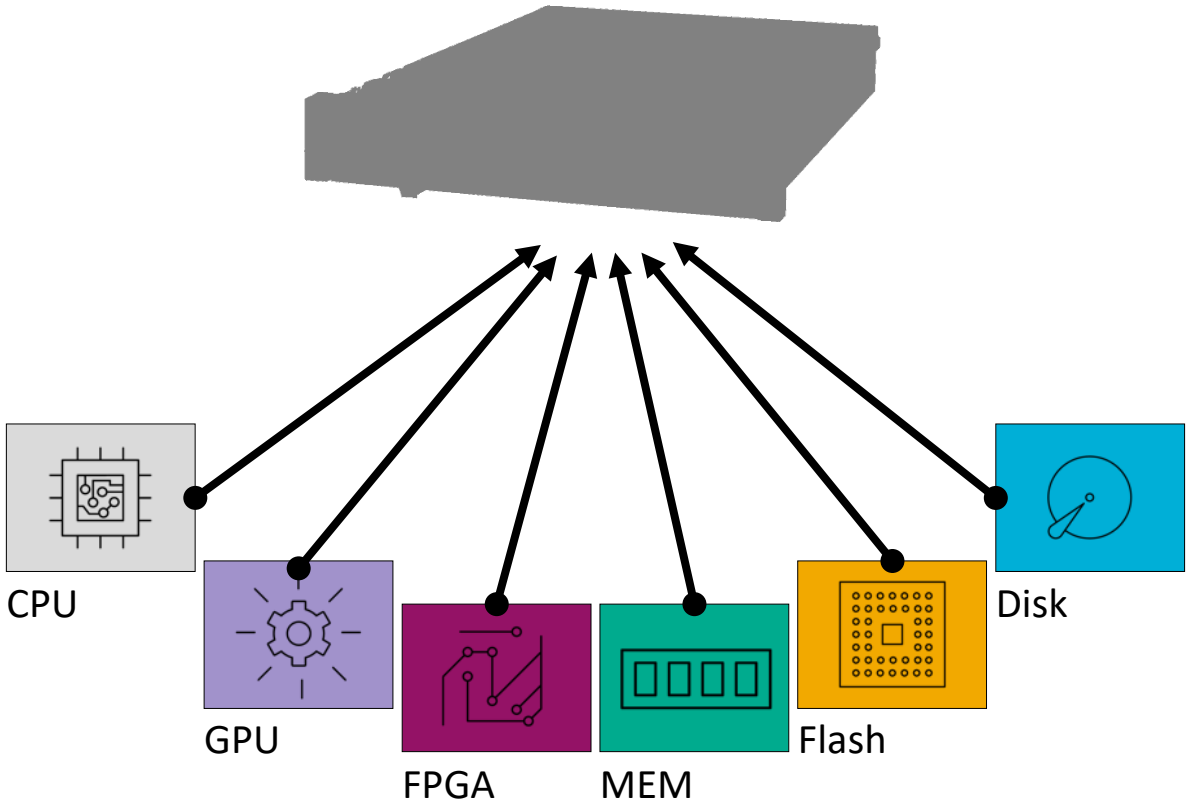
Provides the advantages of Hardware Composed Infrastructure with no vendor lock-in

Hardware Disaggregation



Disaggregate hardware components from the server so they can be efficiently pooled

Composability



Orchestrate virtual systems that can be optimally sized to the task

Edge Data Center Characteristics well serviced by Open CDI

Open CDI is great for the edge

Edge Data Center Characteristics

- Extension of the cloud
- Distributed locations
- Sparsely staffed / not staffed
- Low Latency compared to centralized cloud
- Changing workloads / new problems to solve
- Provide cloud like services, but with reduced latency
- Interconnected to cloud and to other edge datacenters

Open CDI Applicability

- Architected for hyper-scale & high availability
- Limited only by the scale of the fabric
- OC API intended for remote access & control
- Latency is a function of the fabric, not Architecture
- Key attribute driving Open CDI
- Enabled by OC API, but is a feature of orchestration
- Ethernet fabric is ubiquitous

Open Composable Ecosystem

Western Digital and partners making Open CDI reality

kaminario.

OPEN COMPOSABLE API

DriveScale

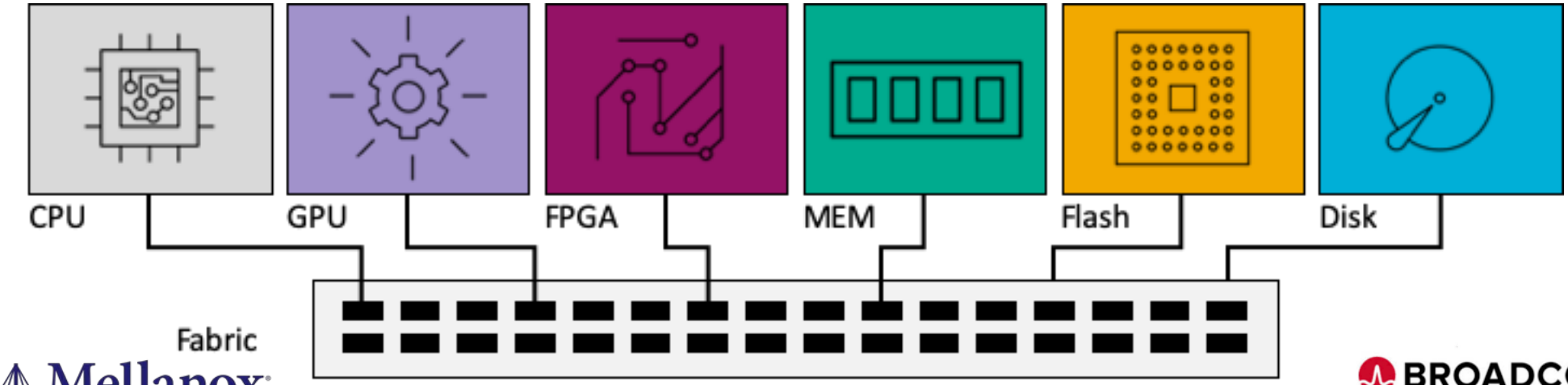
EIDETICOM

Western Digital.

XILINX.

Western Digital.

Western Digital.



Mellanox TECHNOLOGIES

BROADCOM

OpenFlex™ Fabric Attached Devices

All-Flash Fabric Device and Enclosure

High-Capacity Fabric & High-Performance Compute Device Concepts

OpenFlex F3100 — High performance, low latency for fast data

OpenFlex D4000 — High capacity for big data

OpenFlex C2000 — High performance compute

OpenFlex **NVMe™-over-Fabric | Infrastructure Disaggregation | Software Composable**

Standards Activities In Support of Open CDI

Utilizing Existing Standards Organizations to Enable Open CDI

SNIA / SFF

- SFF-TA-1013 Fabric Device Mechanical
- SFF-TA-1014 Fabric Device Connector
- SFF-TA-1015 Fabric Device Pinout

SNIA™
SFF TWG
Technology Affiliate

Proposed Open Compute Storage Projects

- Open Composable API Specification
- F3000 Mechanical Design

OPEN
Compute Project®

Open Composable API

REST based commands for orchestration

OPEN COMPOSABLE API™

Device Discovery

GET /Query

System Discovery

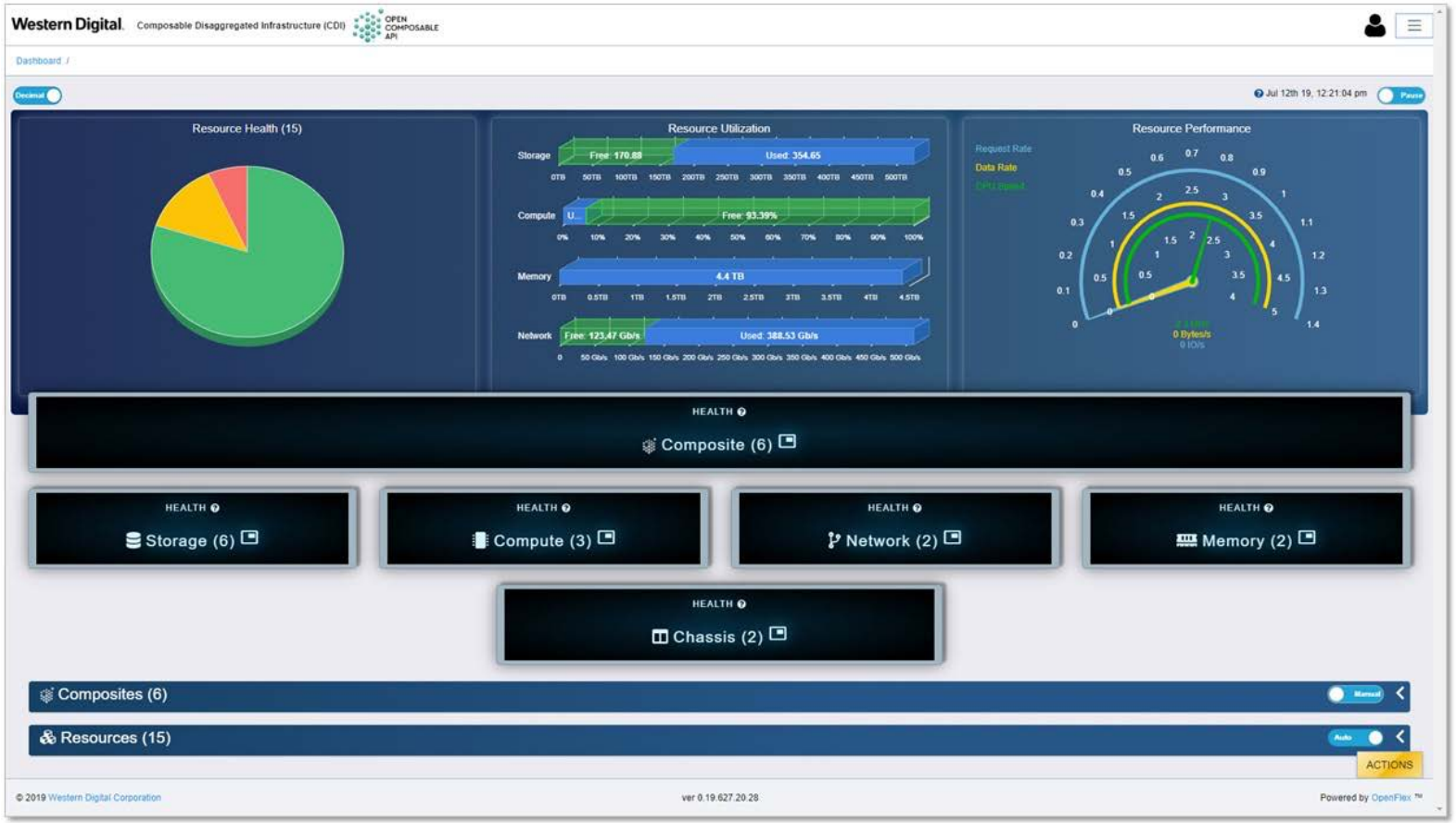
GET /System/Query

Compose Systems

POST /System/Composites

Create Storage Volumes

POST /Storage/Devices/{id}/Volumes/{id}



Compose your virtual systems with one API

Email inquiries to OpenComposableAPI@wdc.com

Conclusion

Open Composable Disaggregated Infrastructure Advantages for Edge

- Western Digital is investing to bring the benefits of Composable Disaggregated Infrastructure together with Open standards free of vendor lock-in
- Open Composable Disaggregated Infrastructure can solve many of the challenges facing designers of Edge data centers. Open CDI is well suited for
  - Distributed data centers
  - Remote control
  - Easy configuration for rapid deployment
  - Low latency path to storage
  - Interconnected to cloud and peer data centers
- A growing ecosystem of partners are creating end-to-end solutions