

**Western Digital<sup>®</sup>**

# **The Future of Data Infrastructure**

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# Forward-Looking Statements

## *Safe Harbor | Disclaimers*

This presentation contains forward-looking statements that involve risks and uncertainties, including, but not limited to, statements regarding our data center products and technologies, expectations regarding data usage and storage, our business strategy, growth opportunities, and demand and market trends. Forward-looking statements should not be read as a guarantee of future performance or results, and will not necessarily be accurate indications of the times at, or by, which such performance or results will be achieved, if at all. Forward-looking statements are subject to risks and uncertainties that could cause actual performance or results to differ materially from those expressed in or suggested by the forward-looking statements.

Key risks and uncertainties include volatility in global economic conditions, business conditions and growth in the storage ecosystem, impact of competitive products and pricing, market acceptance and cost of commodity materials and specialized product components, actions by competitors, unexpected advances in competing technologies, difficulties or delays in manufacturing, and other risks and uncertainties listed in the company's filings with the Securities and Exchange Commission (the "SEC") and available on the SEC's website at [www.sec.gov](http://www.sec.gov), including our most recently filed periodic report, to which your attention is directed. We do not undertake any obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future developments or otherwise, except as required by law.



# The Evolving Role of Data

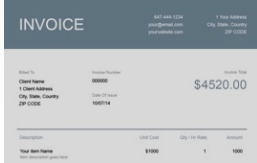
*Creating the data-driven economy*

Richness

## Data as a record



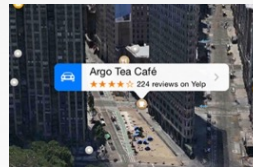
164	94	45	73	88	99
166	172	10	30	62	49
896	2,132	2,390	3,852	2,175	1,398
2,845	1,001	1,920	3,748	3,360	33
1,133	1,358	3,925	3,175	2,544	
4	2,897	1,710	1,287	1,272	2,358
12	1,844	1,725	2,110	3,929	3,100
99	1,903	1,442	3,282	3,265	
032	1,198	2,453	1,272	1,500	
	92	258		158	155



## Data as communication



## Data as efficiency



## Data as currency

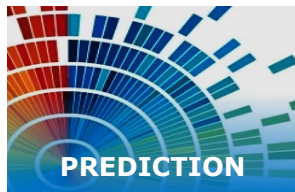


Value

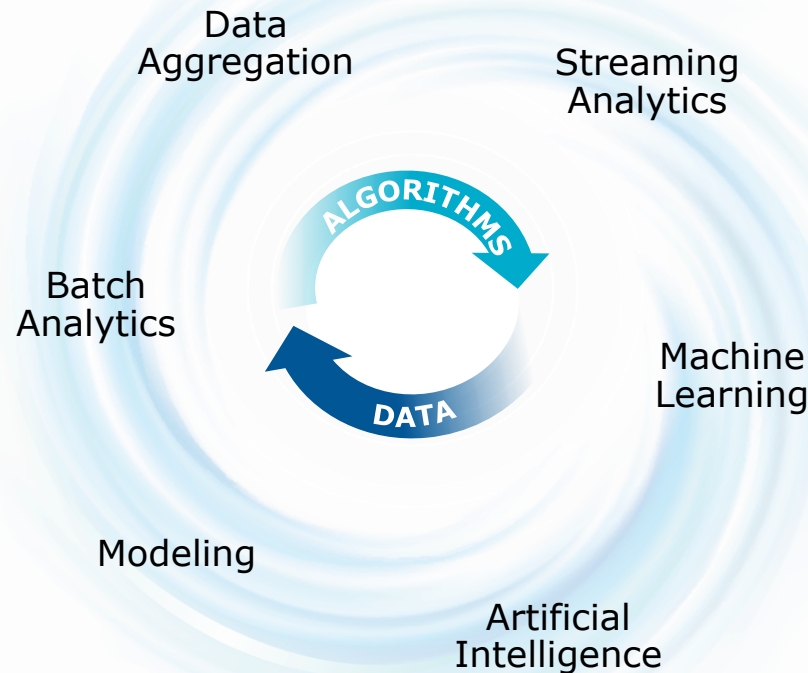
# Diverse and Connected Data Types

*Tight coupling between Big Data and Fast Data*

## Big Data



## Scale



## Fast Data

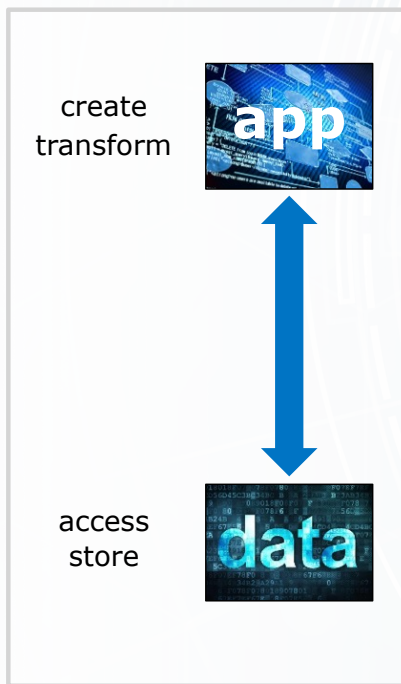


## Performance

# The Changing Nature of Data Interaction

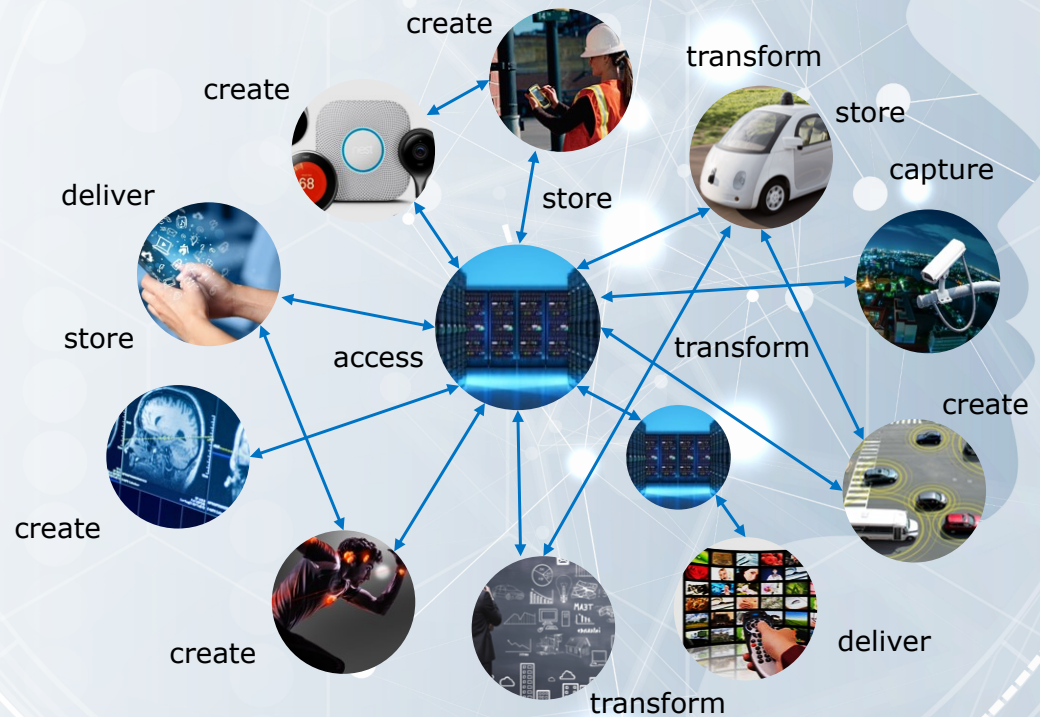
## Past

Data Held Captive by Single Application



## Current and Future

Data Pooled and Shared by Multiple Applications





# Increasingly Dynamic Workloads

A survey of mid-sized and large-enterprise IT users found...



**45%**  
of compute hours  
and storage capacity  
are utilized



**70%**  
report inefficiencies  
in the time required to  
provision compute and  
storage resources



Source: IDC White Paper, sponsored by Hewlett Packard Enterprise, *Quantifying Datacenter Inefficiency: Making the Case for Composable Infrastructure*, Doc #US42318917, Mar 2017

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# Driving New Demands on Data Infrastructure

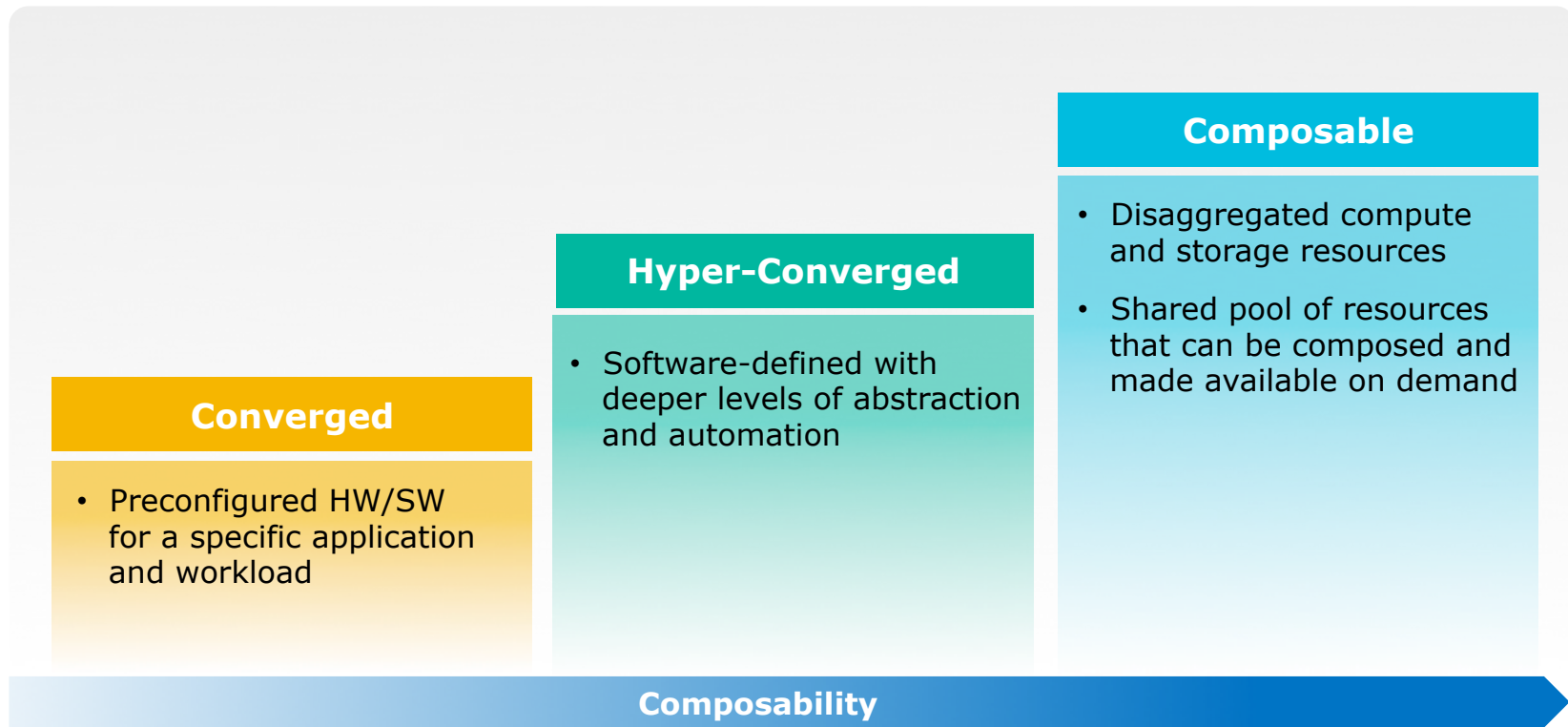
**Scalability**

**Efficiency**

**Agility**

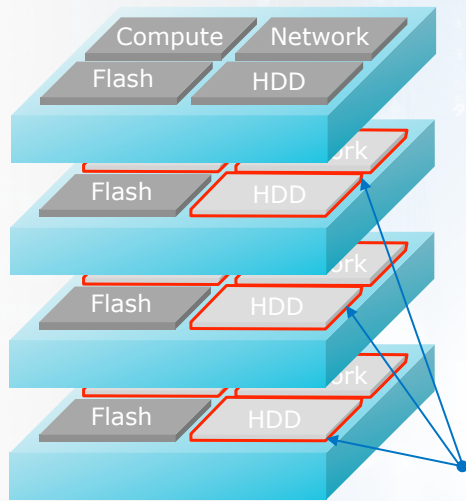
**Performance**

# The Data Infrastructure (R)evolution



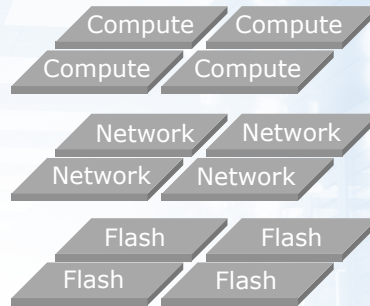
# Hyperconverged vs. Composable

## Flash Intensive Workload



**HCI**

**Vs.**



Underutilized resources

**SCI**

**Scalability**

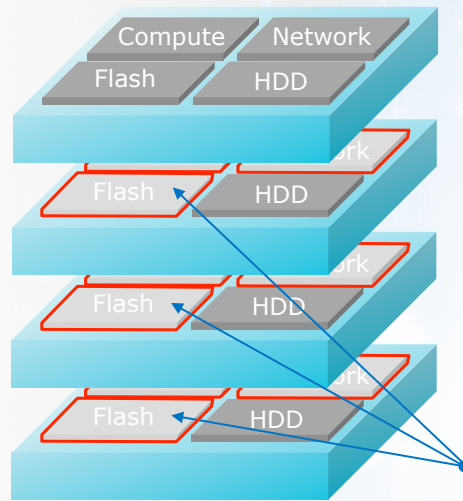
**Efficiency**

**Agility**

**Performance**

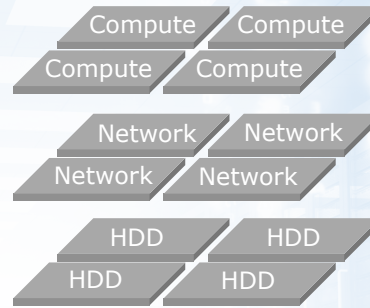
# Hyperconverged vs. Composable

## Capacity Intensive Workload



**HCI**

**Vs.**



**SCI**

Underutilized resources

**Scalability**

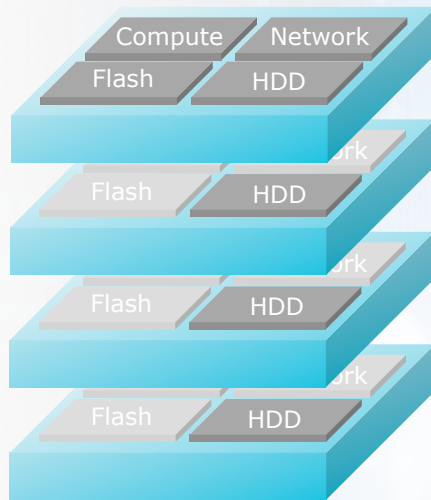
**Efficiency**

**Agility**

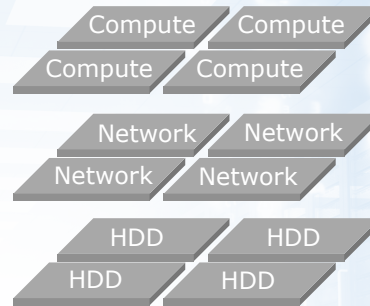
**Performance**



# The Benefits of Composability



**Vs.**



**Greater economics, agility, efficiency and simplicity at scale**

**Applicable to all environments – virtual, containers, bare metal – and applications**

**~40%** lower TCO than traditional HCI architectures<sup>1</sup>

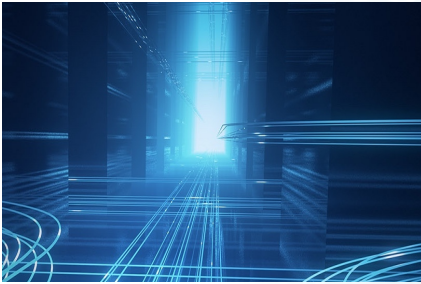
**~50%** savings in initial CapEx investment<sup>1</sup>

<sup>1</sup>TCO and CapEx estimates based on internal analysis, utilization estimates and component pricing as of July 2018.

# Our Composable Infrastructure Vision

1

**Open**



2

**Scalable**



3

**Disaggregated**

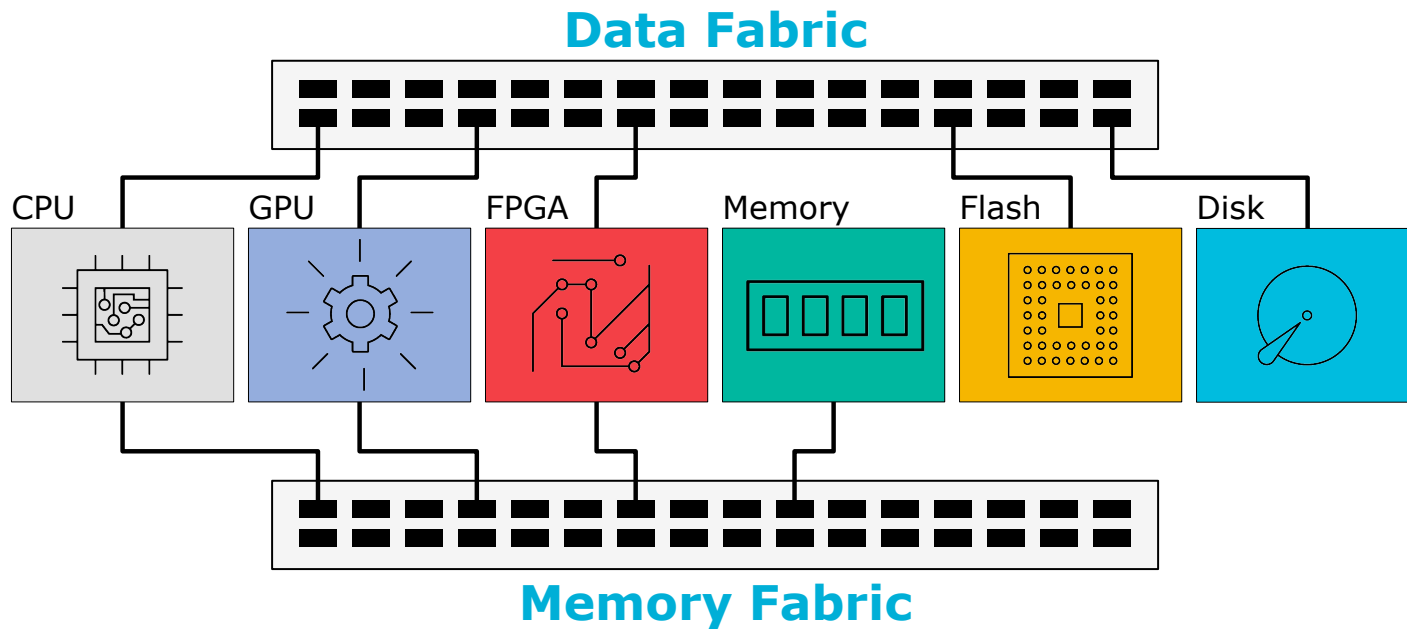


4

**Extensible**



# Enabling Composable Infrastructure



- No physical systems – only composed systems
- No established hierarchy – CPU doesn't 'own' the GPU or the Memory
- All elements are peers on the network and they communicate with each other

# NVMf Fabric Devices

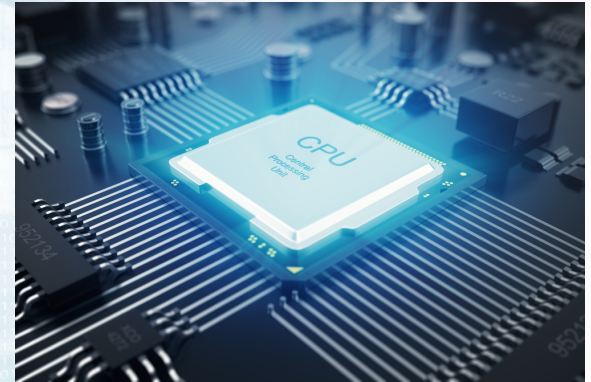
Flash



Disk



Compute



## The New World of NVMf Fabric Devices

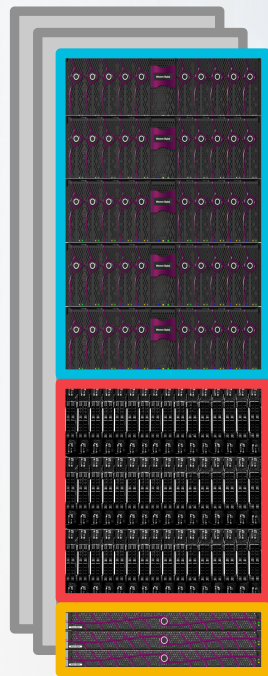
Simpler building blocks  
Maintains multiple paths to the device

Network matched to media performance  
Faster Time-to-Market of innovation



# Purpose-Built Disaggregated Infrastructure

**Rack Option A:  
More Flash**



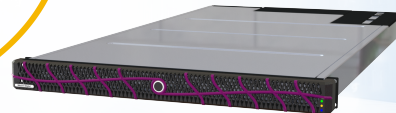
**Flash Enclosure**



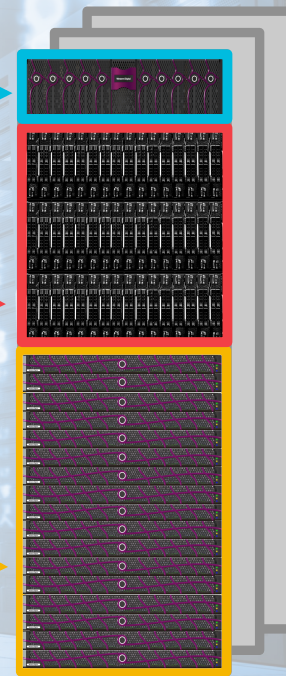
**Compute Enclosure**



**Disk Enclosure**



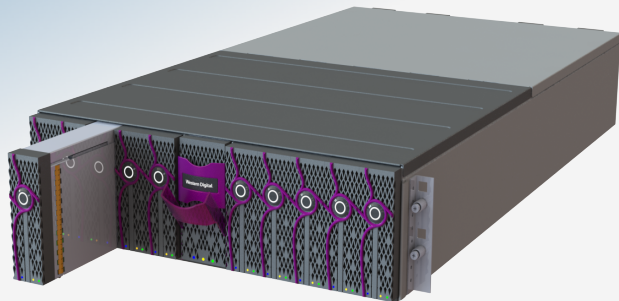
**Rack Option B:  
More Disk**



# Introducing OpenFlex™

*Open standards enable vendor-neutral solutions*

OpenFlex™ F3000 Fabric Device and E3000 Fabric Enclosure



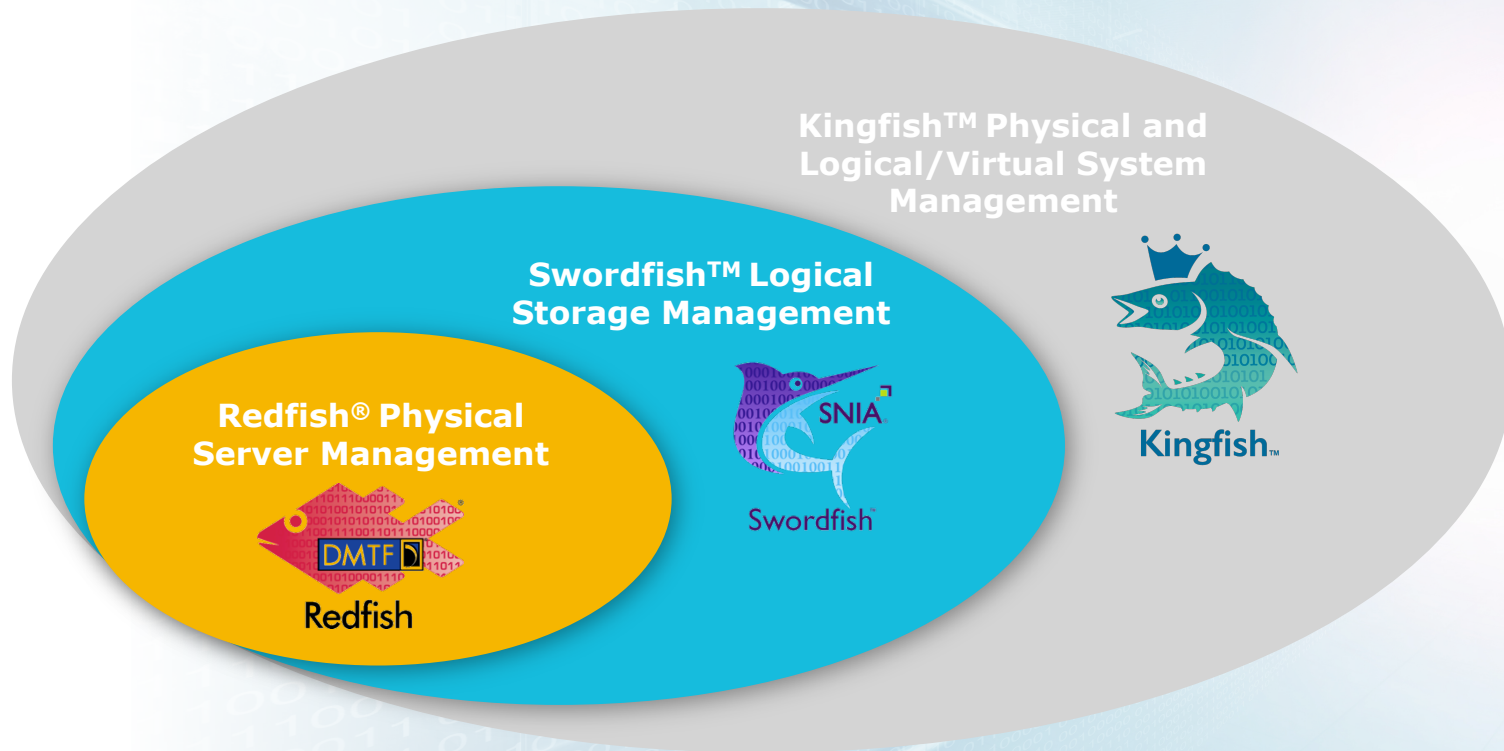
High-performance, low-latency fabric device for Fast Data: AI, real-time analytics, IoT

OpenFlex™ D3000 Series Fabric Device



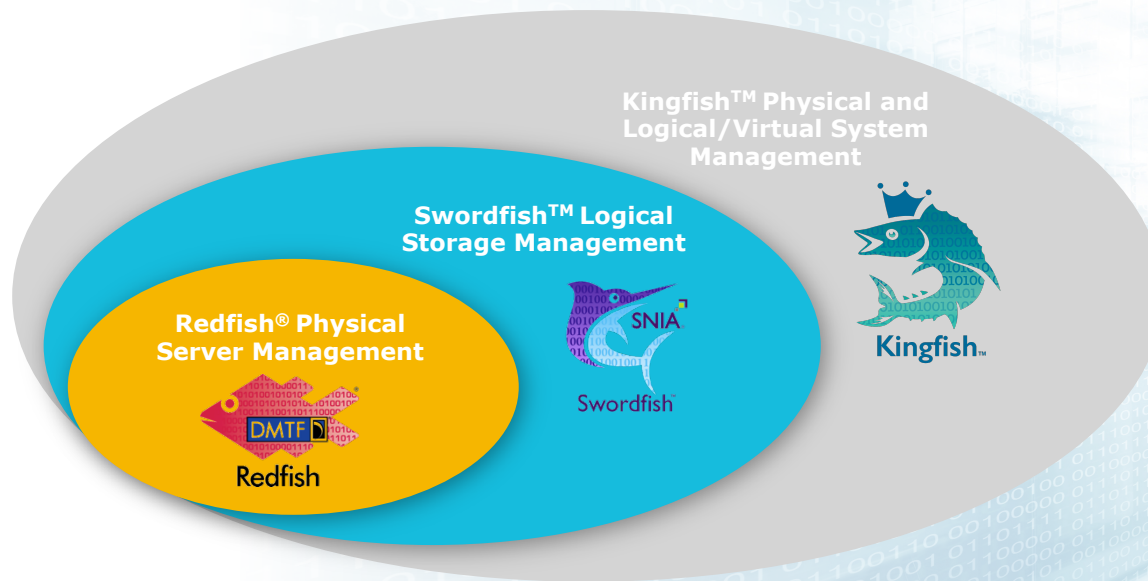
High-capacity fabric device for Big Data: batch analytics, machine learning, predictive modeling

# OpenFlex Management API





# OpenFlex Management API



- Kingfish Open API builds on existing open standards
- Unified across entire data infrastructure for delivering simplicity at scale
- Providing APIs to the public to accelerate innovation and market adoption

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# Software Orchestration

Rapid composability

New instances in seconds

Optimize to the unique needs of an application or workload



# Broad Ecosystem Support

*Focused on software composability tools and interoperable hardware*



Microsoft  
SQL Server



kaminario.



inspur 浪潮



# Western Digital OpenFlex

*Positioned to Accelerate Market Adoption*

## Open

1

Firm commitment to an open standards-based approach

## Ecosystem

2

Strategic position in the ecosystem to help accelerate market adoption

## Trust

3

Trusted leader in data center products, technologies and infrastructure



# Innovating for a Data-Centric World

Visit  
**Western Digital**®  
at booth #207 for an OpenFlex demo

[wdc.com/opencomposable](http://wdc.com/opencomposable) to learn more

The image features the Western Digital logo in white, bold, sans-serif font, centered on a black background. To the left of the text, there are abstract, flowing lines in shades of red, orange, and blue, resembling a stylized flame or a digital signal. The lines are composed of many thin, overlapping strands that create a sense of movement and depth.

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