



OPEN
Compute Project



Regional
Community

OCP TAIWAN DAY

Road to 5G · AI · Edge Computing





OPEN
Compute Project



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing

Open Source Innovation to enable Intelligent Cloud



Danny Ting, CTO of Microsoft Taiwan



2 Mil

miles
intra-datacenter fiber

72+

Tb per second
backbone

54

Azure regions

100+

datacenters

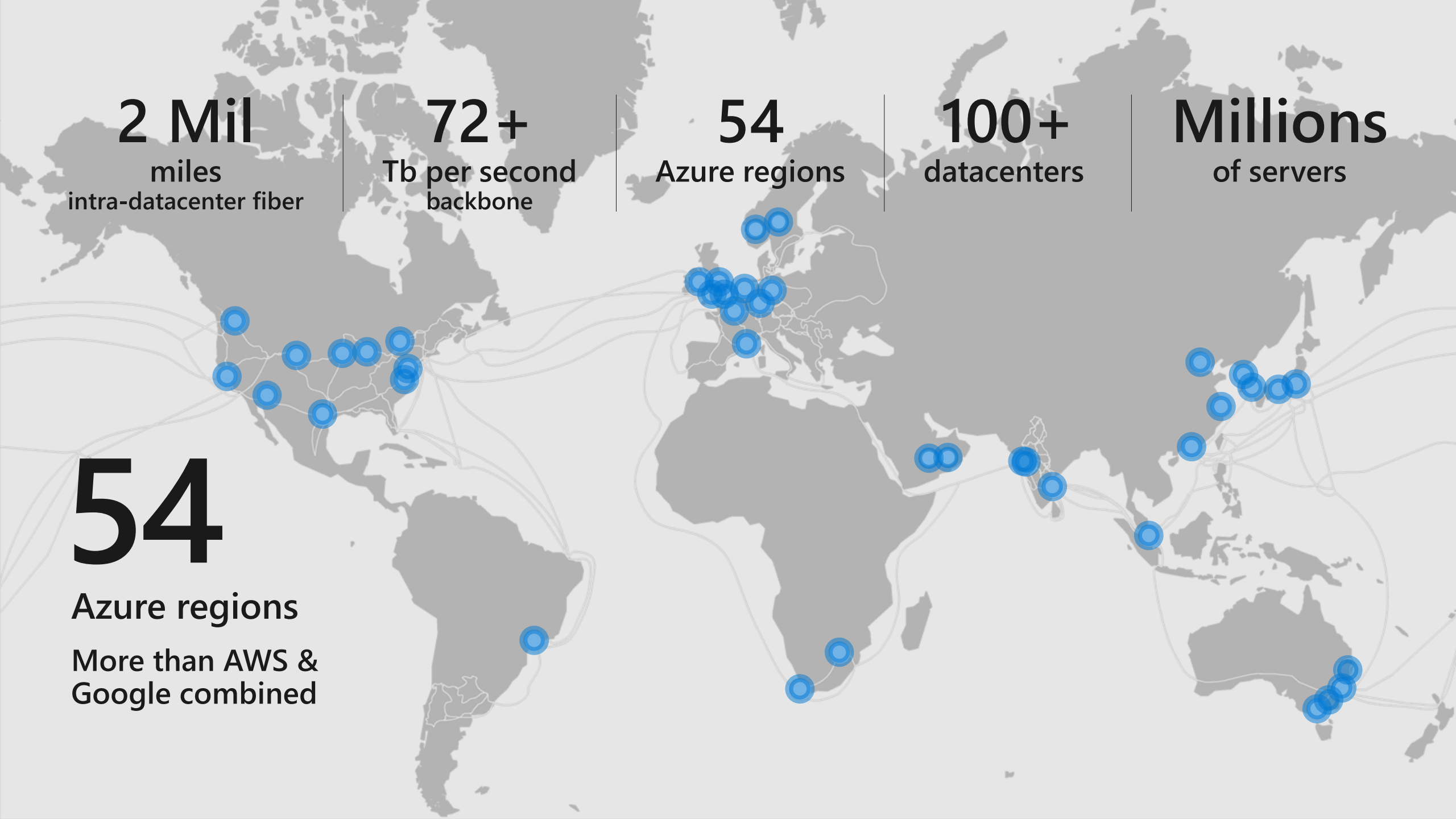
Millions

of servers

54

Azure regions

More than AWS &
Google combined

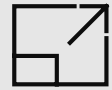




Innovation in hardware design

Project Olympus:

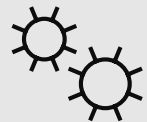
Next generation rack level hardware solution



Enables the latest cloud services



Designed to support cloud growth
& global scale



Efficient & cost effective



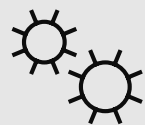
Innovation in datacenter operations



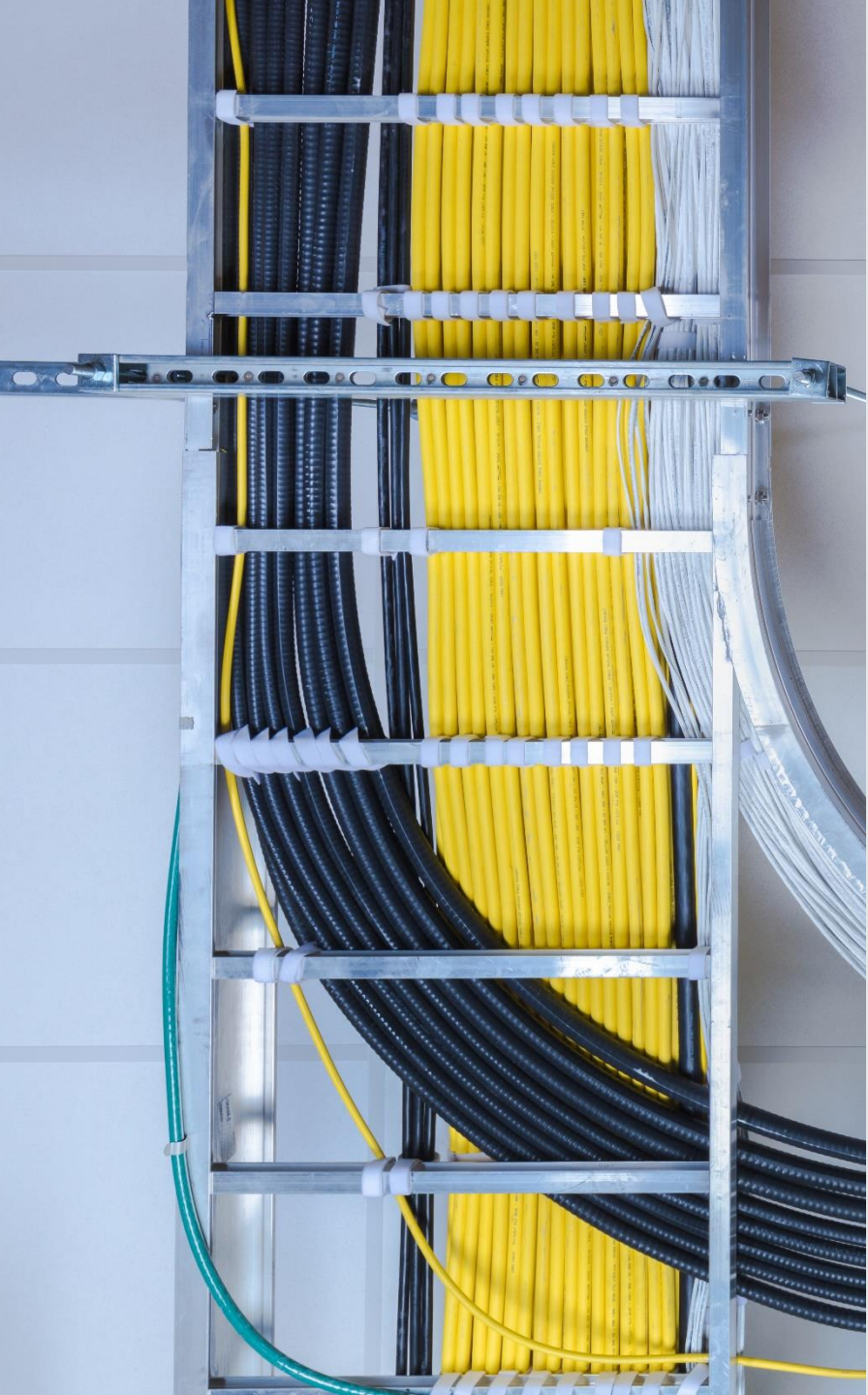
Deep telemetry and analytics
unlocked through Azure services



Reliability: Real-time health monitoring
through IOT, machine learning



Efficiency: Increased through AI-driven
controls and maintenance



One of the largest networks on the planet



Inter and intra regional connectivity



Terrestrial & subsea network



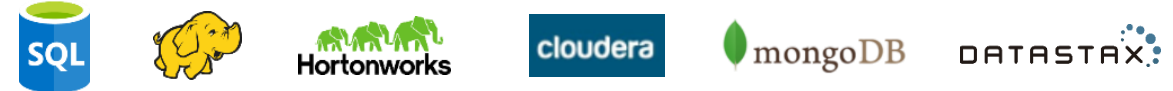
Interconnection

Works with popular tools and frameworks

Management



Databases & middleware



Applications



Infrastructure



App frameworks





>95%

of Fortune 500 use
Microsoft Azure

Azure provides best in class performance



Compute
performance

960
CPUs

Largest in public cloud



Memory

24
TB RAM

Largest in public cloud



Remote Storage
(single disk)

160K
IOPs

Fastest in public cloud



Local
storage

3.7M
IOPs

Fastest in public cloud



File storage

100K
IOPs

Fastest in public cloud



VM-VM Networking

30
Gbps Ethernet

Fastest in public cloud

100
Gbps InfiniBand



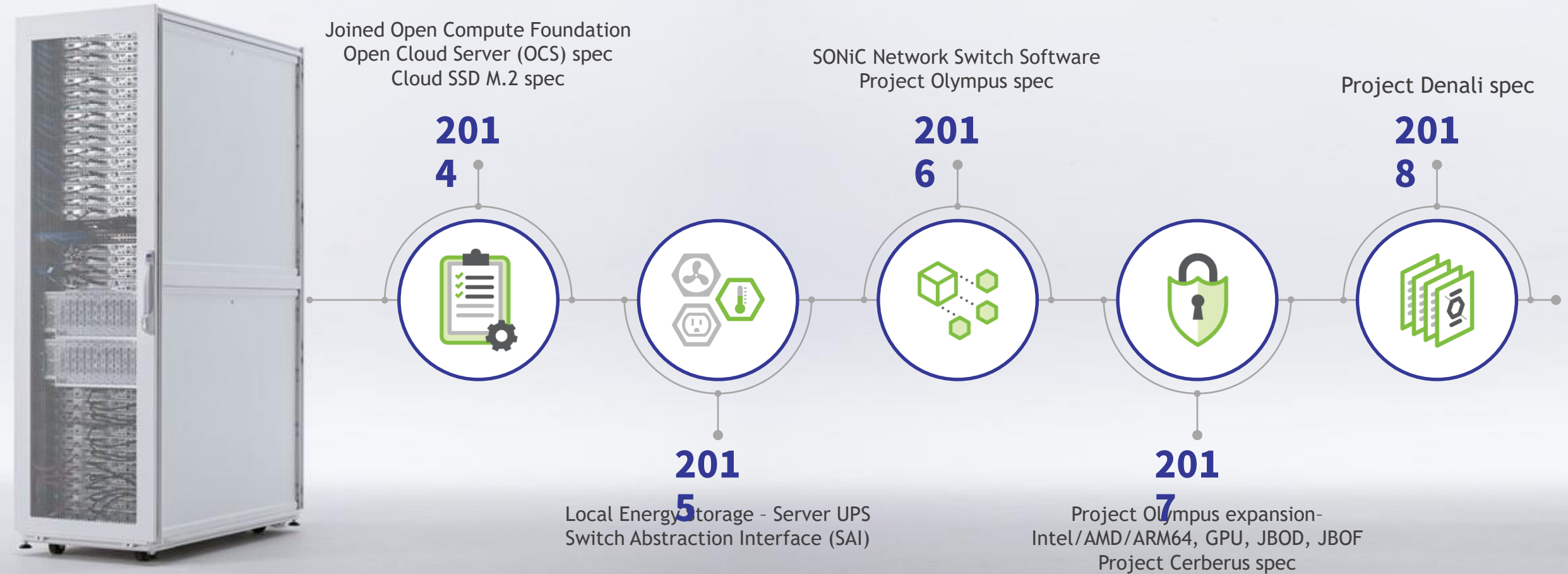
Hybrid Networking

100
Gbps Connectivity

Fastest in public cloud



Microsoft & OCP



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing



PROJECT OLYMPUS CONTRIBUTIONS ACCEPTED BY OCP



Rack Architecture

Chassis
Power & Management Distribution
Universal PDU
Airflow Blocker
Management

Motherboards

Intel® Xeon® Scalable Processor
Motherboard and BIOS



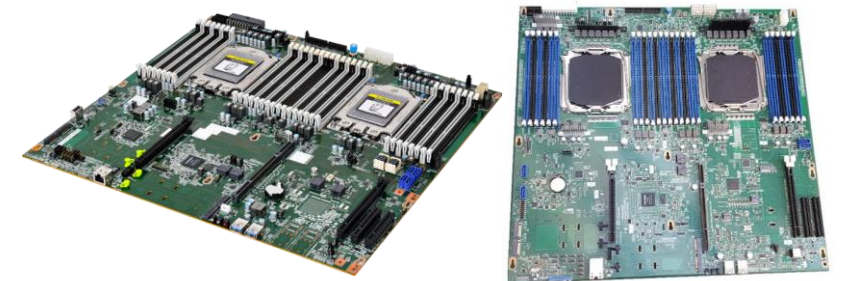
Server Chassis

1U & 2U
Power Supply I/F



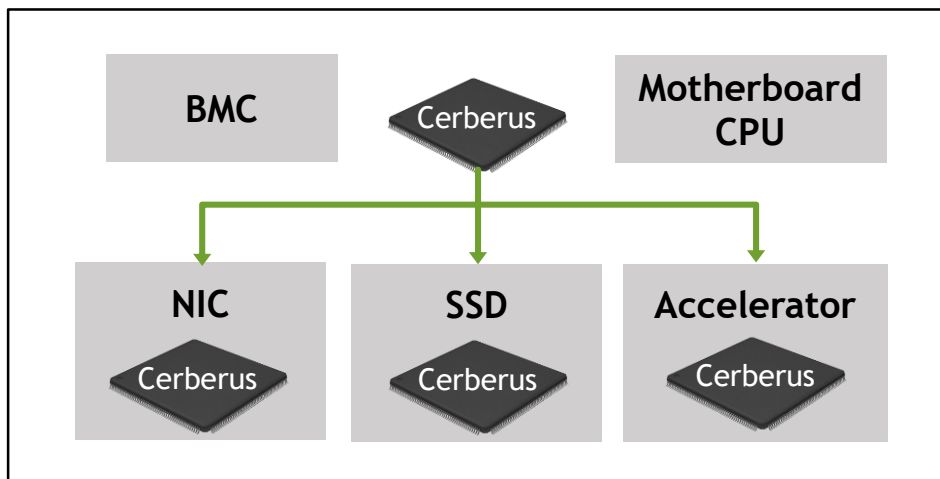
Motherboard Specifications

Universal Motherboard
AMD EPYC
Cavium ThunderX2 ARMx64



Project Cerberus updates

Cerberus Master/Slave architecture -
Specification augmented to extend Root of Trust domain to peripheral components



All Project Olympus motherboards now have Cerberus capability enabled for secure bringup

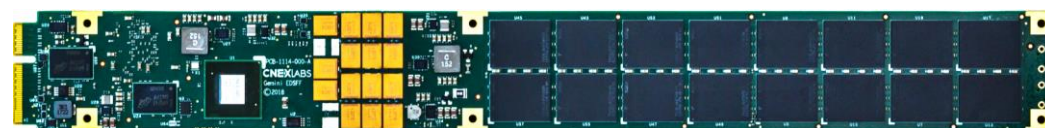
Project Denali updates

Version 1.0 specification approved by Denali JDF members in February 2019 (15 member companies collaborating over 12 months)

Specification scope expanded to include storage/media disaggregation beyond the Cloud

- Enterprise Arrays
- Computational Storage
- IoT Applications

**Microsoft Denali EDSFF Prototype –
Up to 70% savings on non-media SSD costs**



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing

Data cacophony

OCP TAIWAN DAY

Road to 5G · AI · Edge Computing



Where is the data coming from?

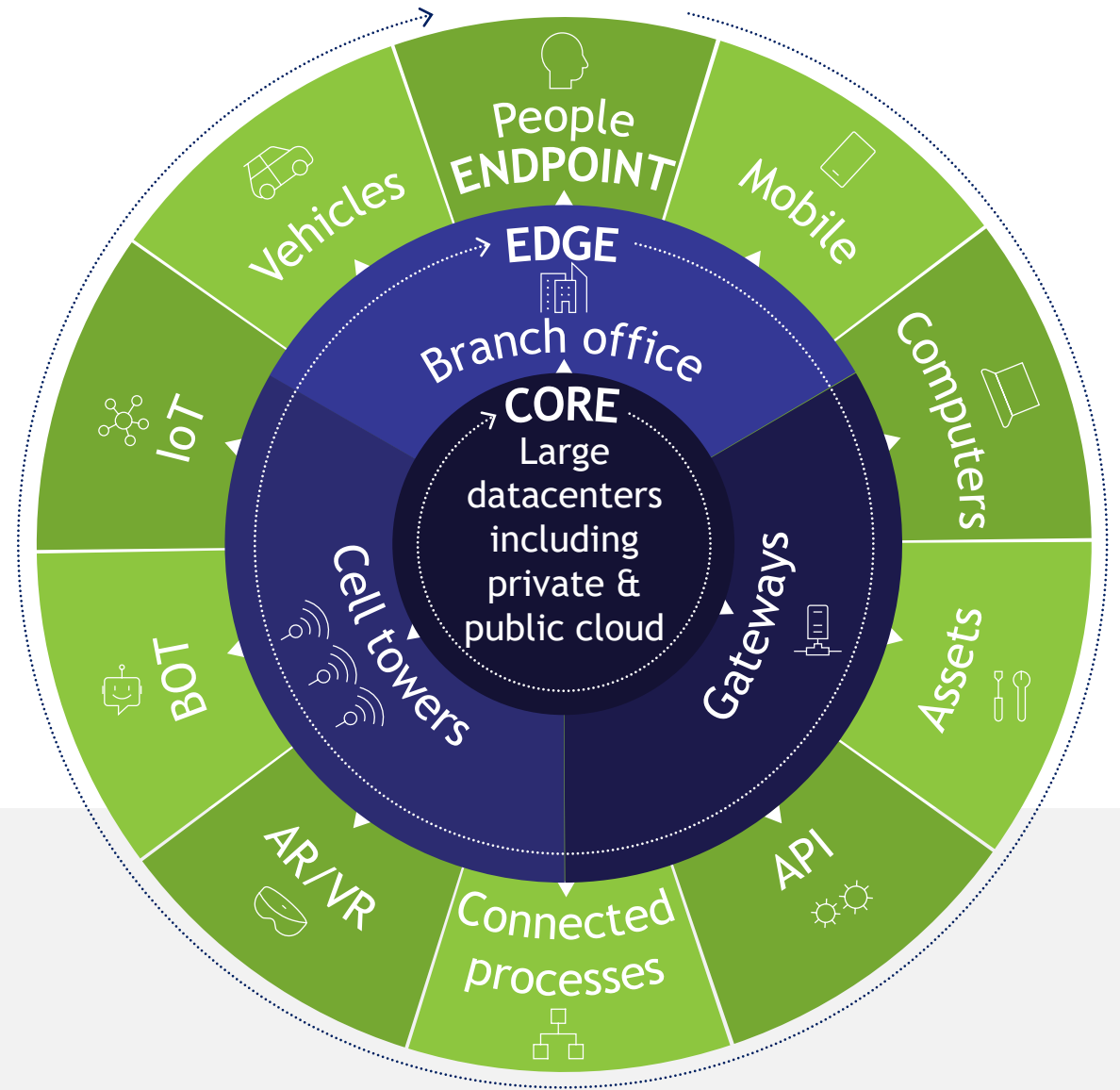
Generated at the **Endpoints**

Collected and pre-processed at the **Edge**

Analyzed, stored, archived at the **Core**

**Data propagates
from endpoints to core and back**

Source: IDC's Data Age 2025 study, sponsored by Seagate

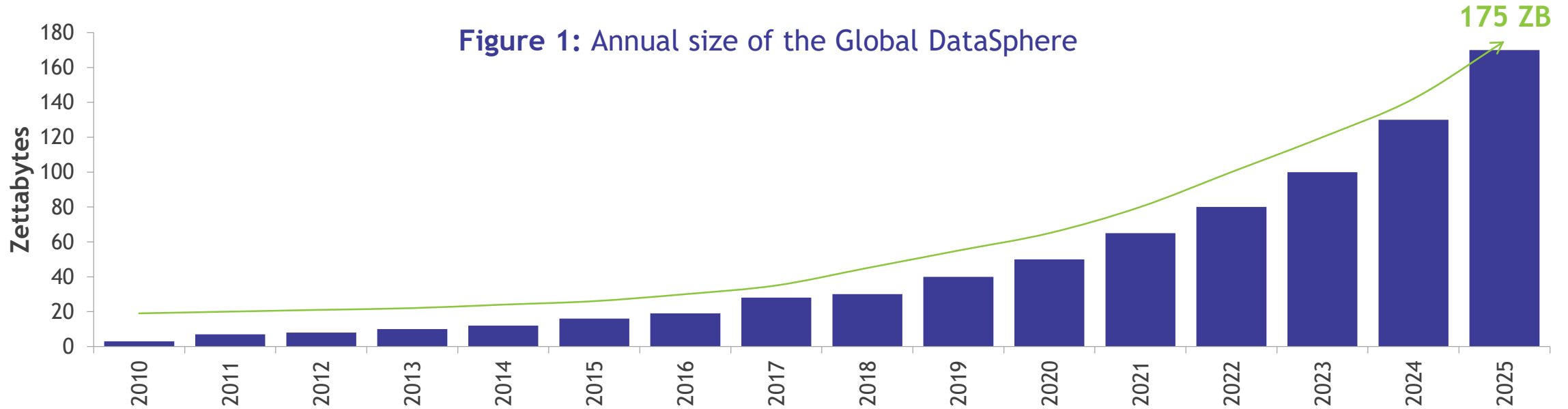


OCP TAIWAN DAY

Road to 5G · AI · Edge Computing

Data growth projections

IDC predicts Global DataSphere will grow from **33 Zettabytes (ZB)** in 2018 to **175 ZB** by 2025



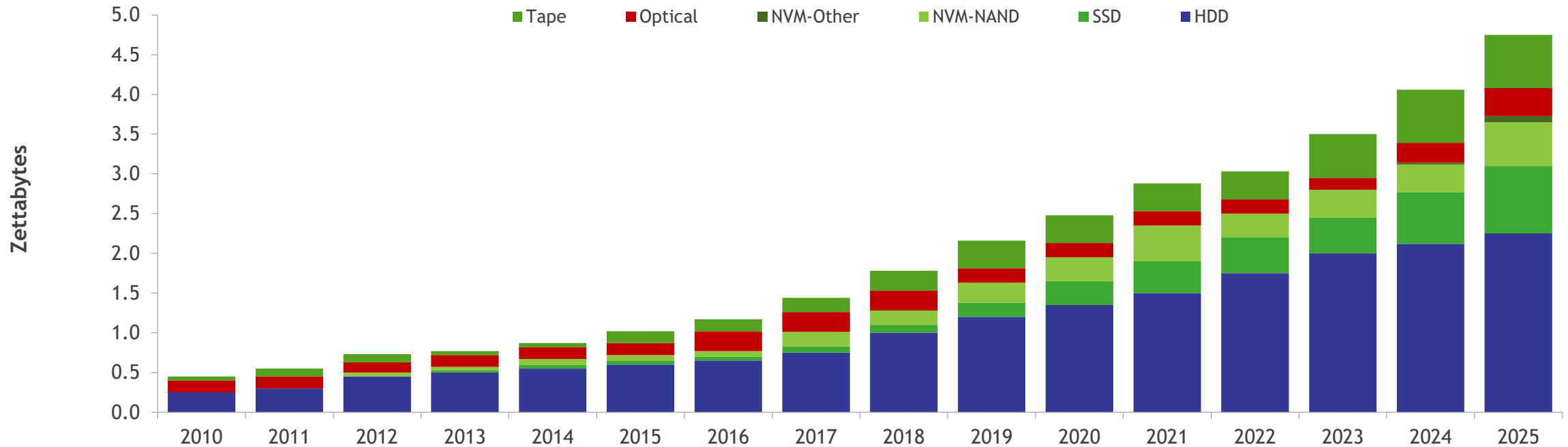
00000000000000000000

Zeitungsbe

Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

Storage capacity growth projections

Worldwide byte shipments by Storage Media Type



Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

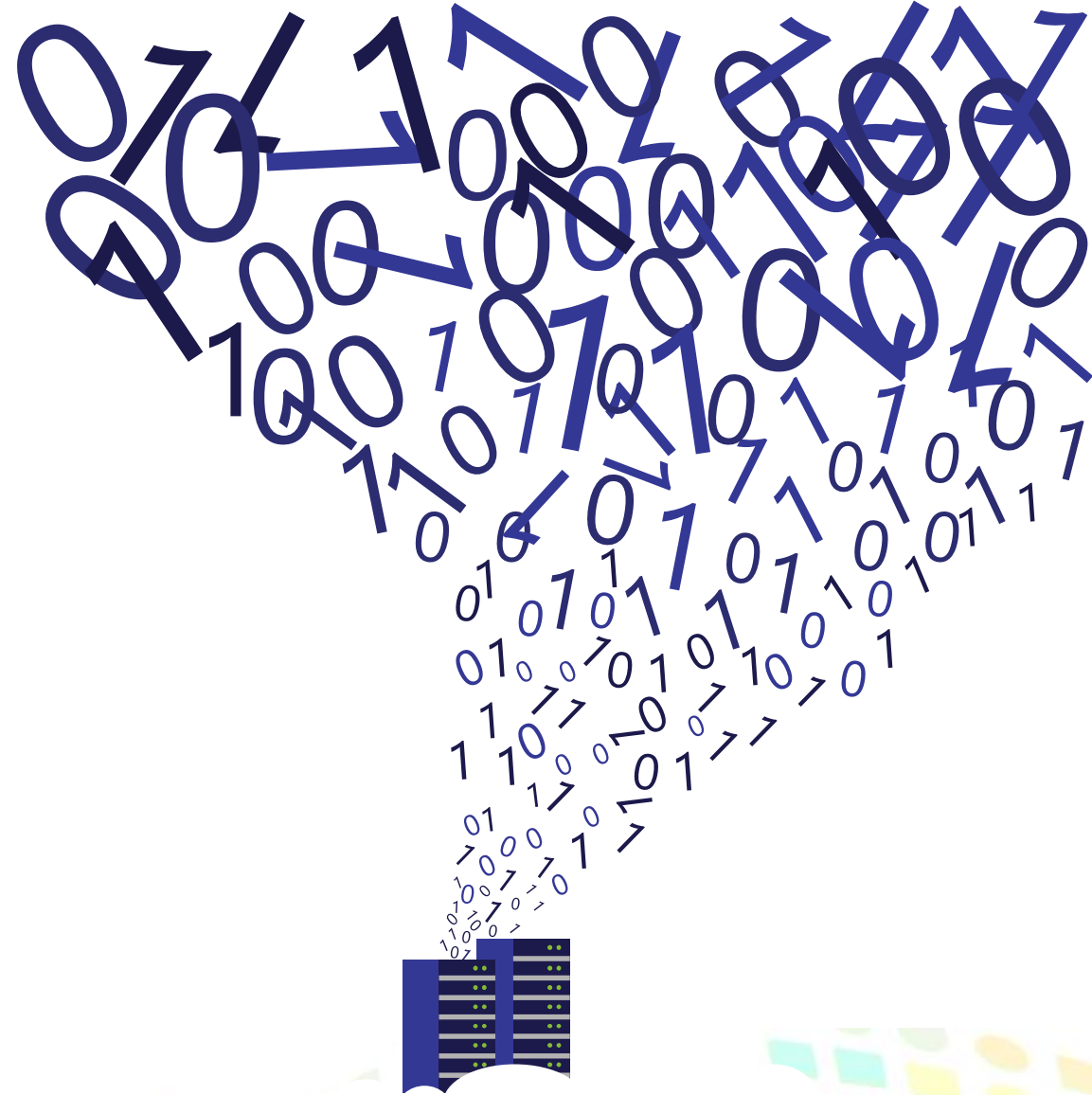
- Supply capacity not sufficient to keep up with 6x projected growth in storage demand
- Need new radical solutions for data processing improvements to address this supply/demand gap

OCP TAIWAN DAY

Road to 5G · AI · Edge Computing



Announcing Project Zipline



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing



Project Zipline



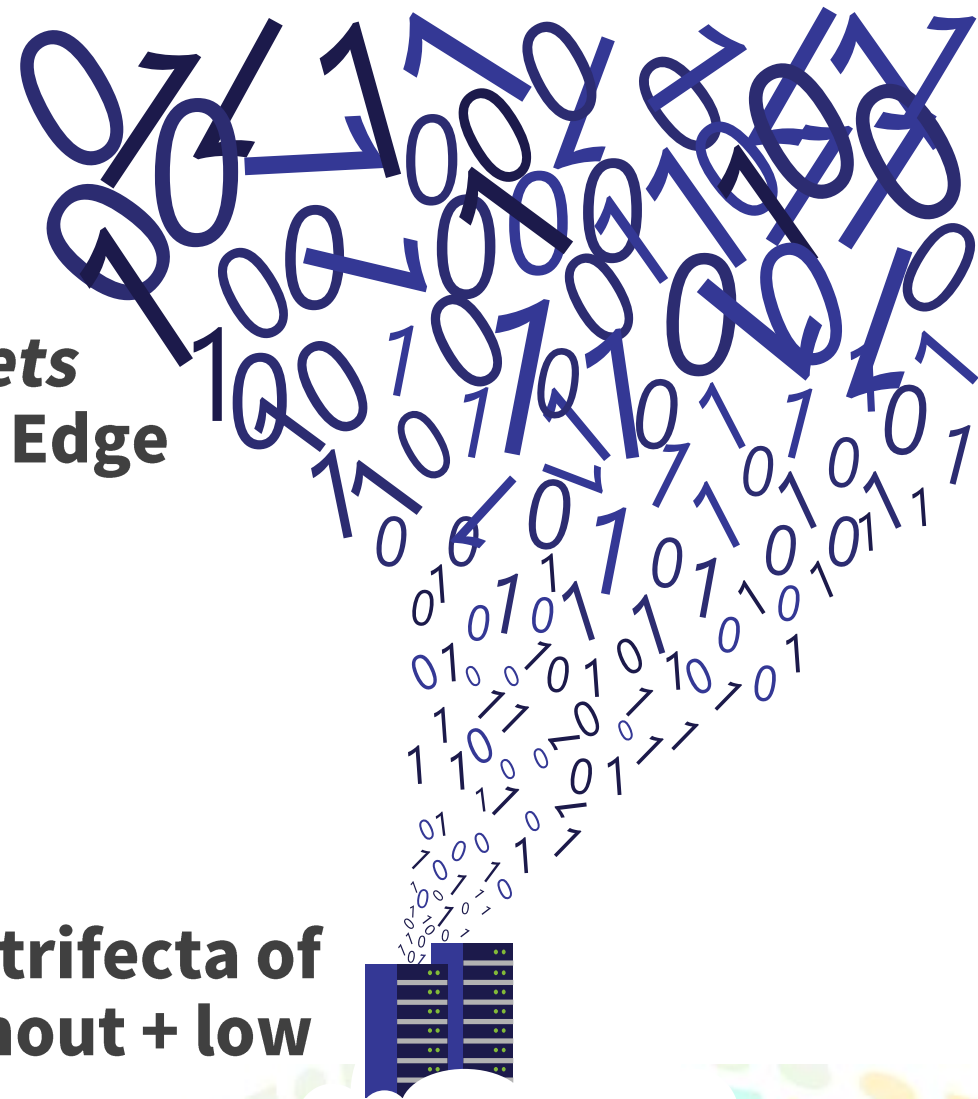
Targeted for legacy and modern datasets
Covering various usage scenarios from Edge to Cloud



Full solution stack implementation -
Algorithms + Software + Hardware



Compression without compromises
Always-on data processing enabled by trifecta of
high compression ratios + high throughput + low latency



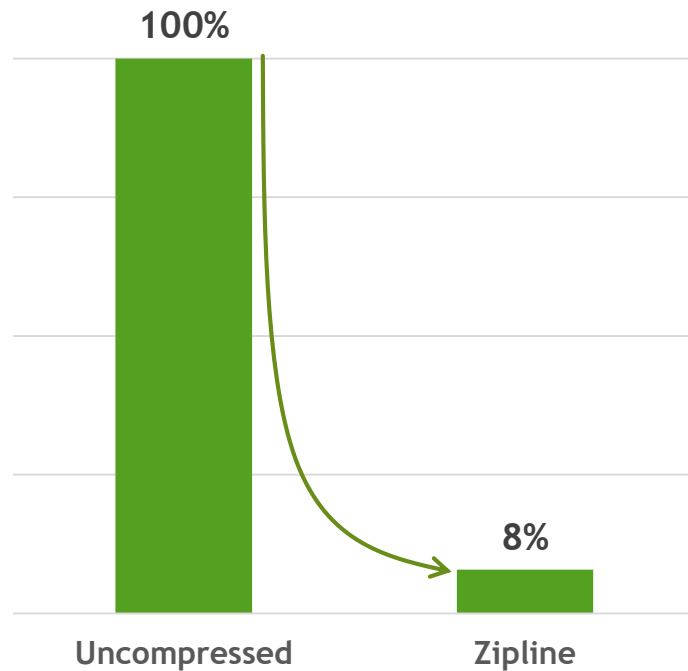
OCP TAIWAN DAY

Road to 5G · AI · Edge Computing

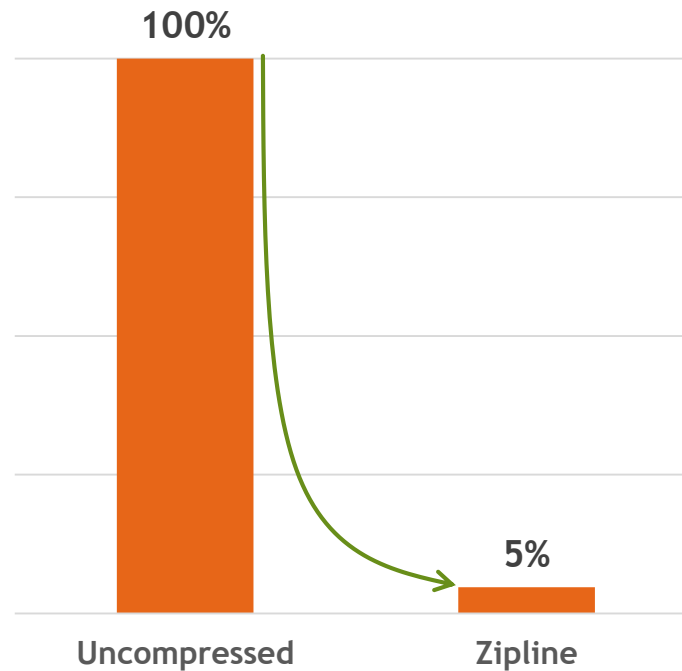


Project Zipline compression gains

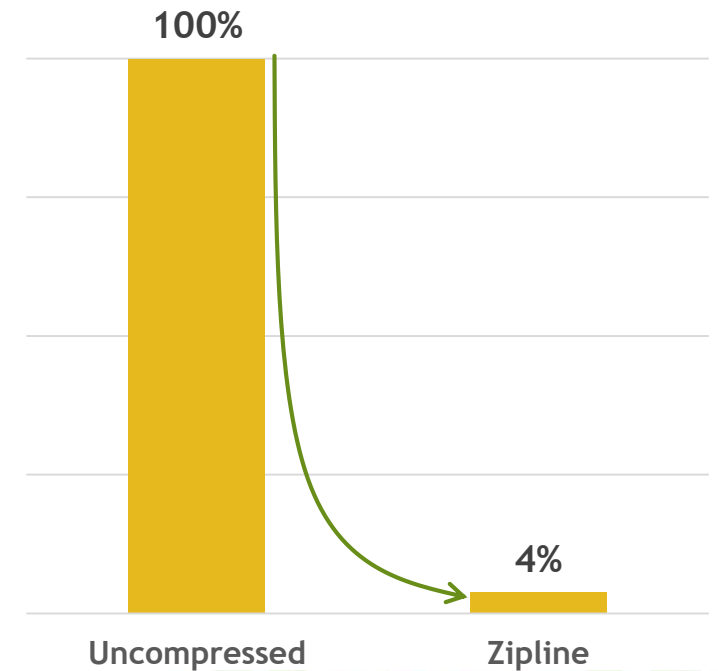
Cloud Data Set #1



Cloud Data Set #2



Cloud Data Set #3



Data sets: Application Services logs, IoT Text Files, System Logs

OCP TAIWAN DAY

Road to 5G · AI · Edge Computing

Open sourcing *Project Zipline*

Compression algorithm and specifications

Interoperability across endpoints (edge to cloud)

Hardware architecture specifications

High bandwidth, low latency implementation

Verilog RTL source and test suite

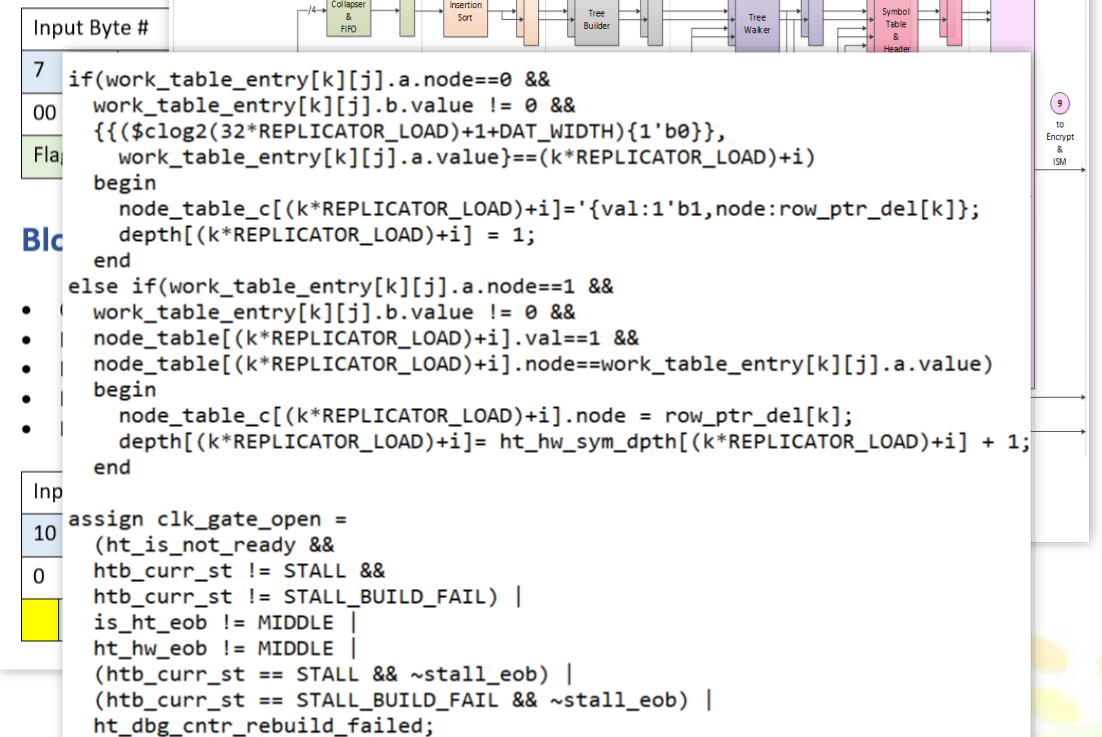
Open sourced IP - Industry first for OCP

contributions

Enabling faster adoption in the silicon ecosystem

Frame Header

- Window size: 64 KB
- Minimum n
- Mode: norm
- CRC: CRC32



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing



Project Zipline - Usage model examples



Network data processing



Smart SSDs



Edge computing



Analytics



Industrial IoT



Storage Archival Systems



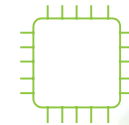
Database accelerators



Productivity Applications



Cloud migration appliances



General purpose Microprocessors



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing



Project Zipline - Ecosystem partners

CPU



Networking



Storage



EDA



OCP TAIWAN DAY

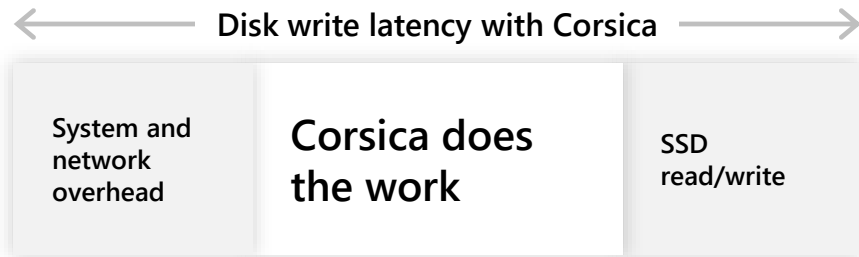
Road to 5G · AI · Edge Computing



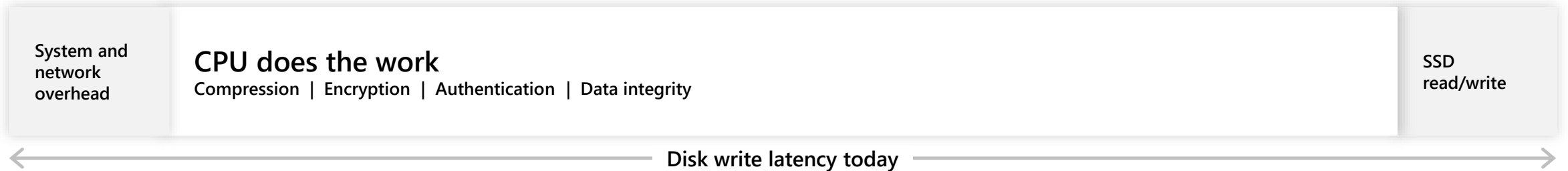
Corsica: A Project Zipline ASIC

Compression without compromise:

- High compression ratio
- Low latency
- Inline encryption, authentication
- High total throughput of 100Gbps



Corsica is 15-25 times faster than the CPU





Running cloud scale is challenging

54 Azure
regions

100k+ miles of fiber and
subsea cable

150+ edge
sites  Microsoft

Road to 5G · AI · Edge Computing

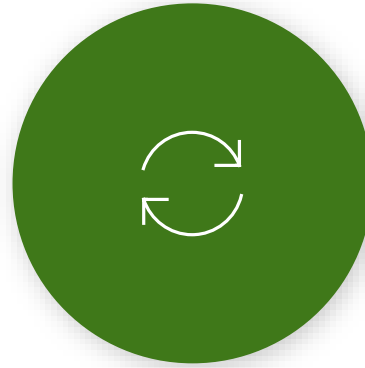
SONiC facilitates innovation



Control



Extensibility



Agility



Collaboration



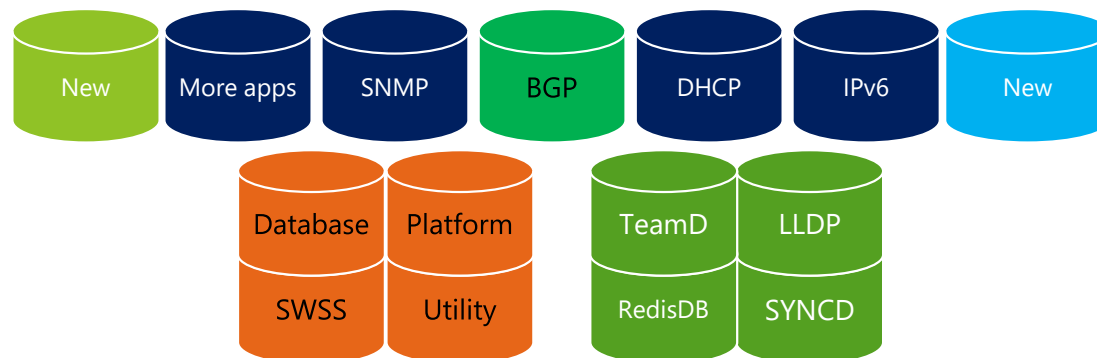
OCP TAIWAN DAY

Road to 5G · AI · Edge Computing



SONiC Software for Open Networking in the Cloud

configuration and management tools



Switch Abstraction Interface (SAI)

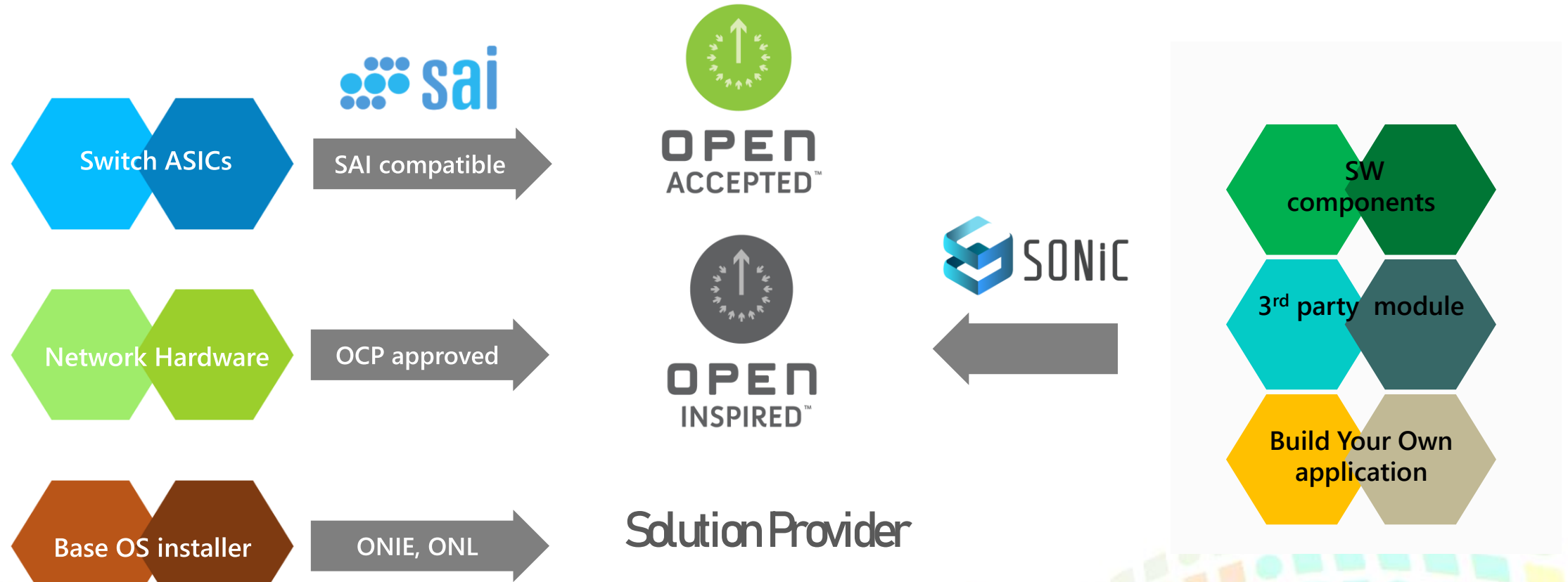


OCP TAIWAN DAY

Road to 5G · AI · Edge Computing



OCP ecosystem enriched by SONiC



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing

ODCC(Open Data Center Committee) - China

Phoenix Project (凤凰项目)

- SONiC Phoenix release for white box switch
- Interoperability test certification
- Build open source management tooling on top of SONiC Phoenix release
- Founding members: Alibaba group, Tencent, Baidu, China Mobile, China Unicom, and JD.com



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing





Building block for fast evolution, high reliability, operation cost reduction

- Deployed to 44 regions
- Firmware upgrade up to thousands of switches per day
- High fidelity emulation tool—ONE for configuration validation
- Feature release reduced from months to weeks

Looking forward

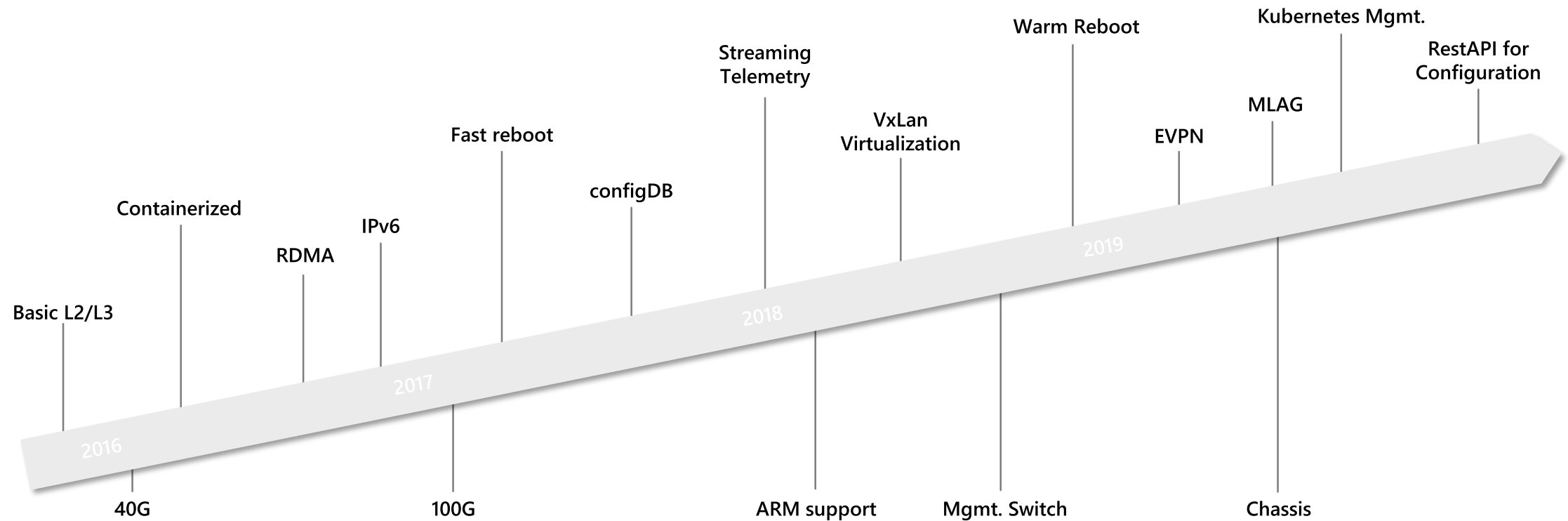
- Inside data center all on SONiC
- Extending to management network, WAN, and other roles



OCP TAIWAN DAY

Road to 5G · AI · Edge Computing





OCP TAIWAN DAY

Road to 5G · AI · Edge Computing





OPEN
Compute Project

OCP TAIWAN DAY

Road to 5G · AI · Edge Computing

THANK YOU