AI/ML Infrastructure

The Cisco Advantage

Eyal Dagan & Rakesh Chopra

Common Hardware Group (CHG)

9/11/2023

© 2021 Cisco and/or its affiliates. All rights reserved.

Forward-Looking Statements

This presentation contains projections and other forward-looking statements regarding future events or the future financial performance of Cisco, including future operating results. These projections and statements are only predictions. Actual events or results may differ materially from those in the projections or other forward-looking statements. Please see Cisco's filings with the SEC, including its most recent filings on Forms 10-K and 10-Q, for a discussion of important risk factors that could cause actual events or results to differ materially from those in the projections or other forward-looking statements.

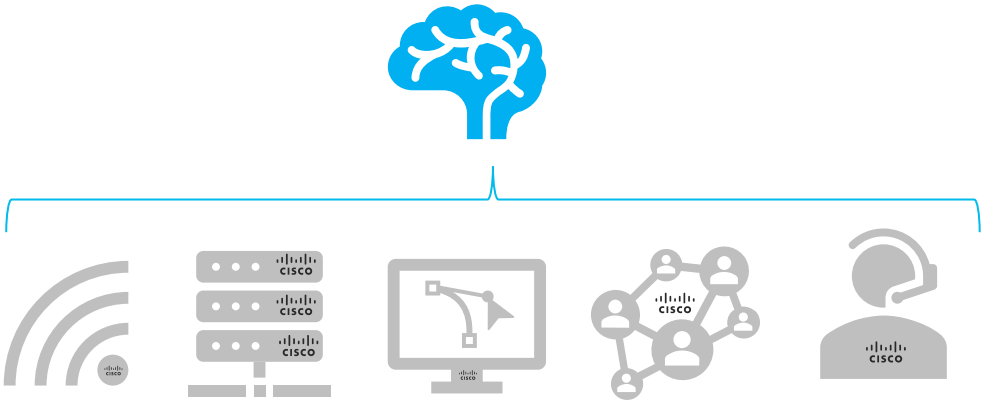
GAAP Reconciliation

During this presentation references to financial measures of Cisco will include references to non-GAAP financial measures. Cisco provides a reconciliation between GAAP and non-GAAP financial information on the Cisco Investor Relations website https://investor.cisco.com/financial-information/financial-results/default.aspx

© 2023 Cisco and/or its affiliates. All rights reserved.

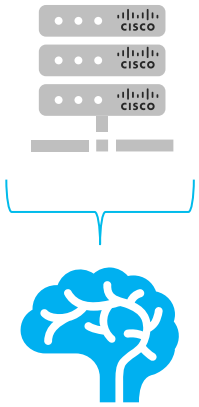
Artificial Intelligence & Cisco

Using AI to improve Cisco products & services



Cisco AI Enhanced Products

Selling Cisco products to enable AI networks

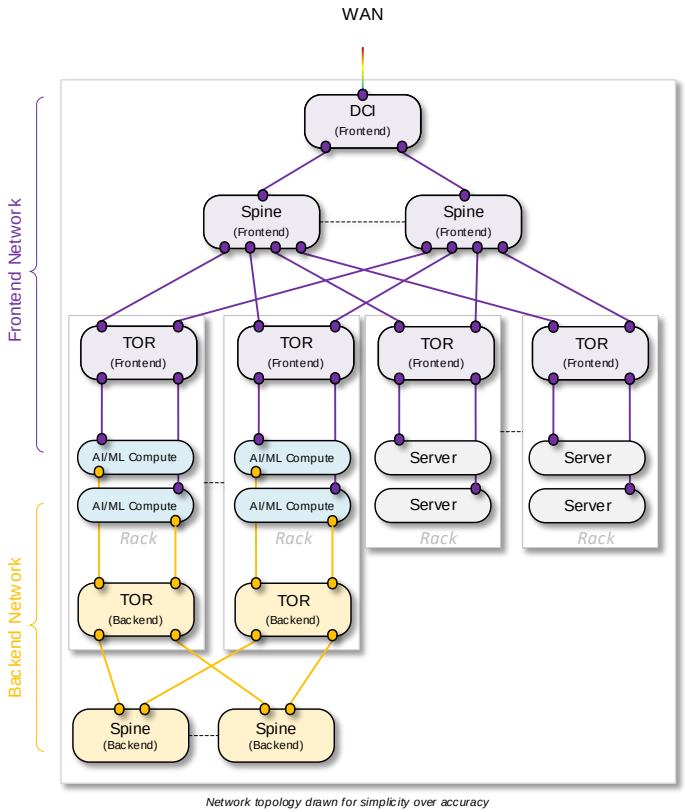


3rd party AI Networks
Focus Today

© 2023 Cisco and/or its affiliates. All rights reserved.

Web Scale Data Center Network

Addressable Market



Network topology drawn for simplicity over accuracy

Traditional Ethernet network

- Routing
  - Silicon
  - Systems
  - Optics
- Switching
  - Silicon
  - Systems
  - Optics

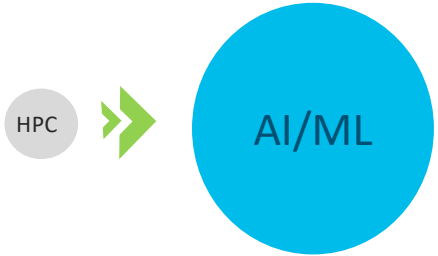
Migrating to Ethernet

New Market Opportunity

- Switching
  - Silicon
  - Systems
  - Optics

© 2023 Cisco and/or its affiliates. All rights reserved.

Why Ethernet?



Sole-source GPU	»	Multi-source GPU
Sole-source switch	»	Multi-source switches
InfiniBand	»	Ethernet

Ethernet is the inevitable answer

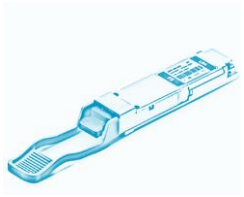
© 2023 Cisco and/or its affiliates. All rights reserved.

Why Cisco?

Key technology

Silicon

Systems



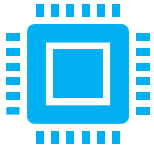
Optics

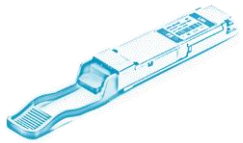
Only company with all the key technologies

© 2023 Cisco and/or its affiliates. All rights reserved.

Why Cisco?

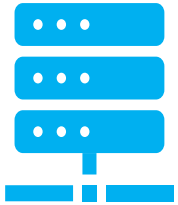
Multiple Business Models



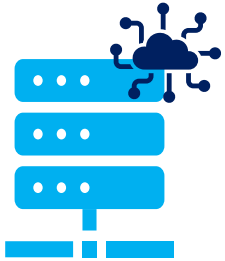


Components

Silicon
Gray Optics
Coherent Optics



White Box



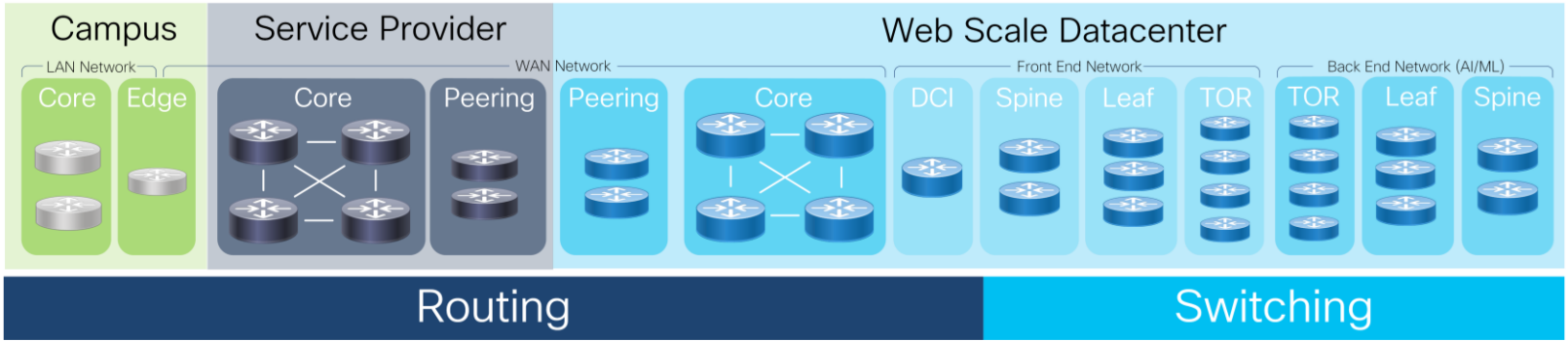
Full System

Only company with all the business models

© 2023 Cisco and/or its affiliates. All rights reserved.

Cisco Silicon One

Convergence without compromise



Silicon One

One architecture
One SDK
One form factor
One design

Unmatched programmability
Unmatched performance
Unmatched efficiency
Unmatched flexibility

Multiple devices
Multiple markets
Multiple business models

One network
One experience

One experience, across the network, without compromise

© 2023 Cisco and/or its affiliates. All rights reserved.

Cisco Silicon One

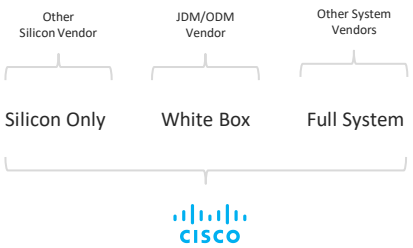
Innovation Strategy

Win Customers

Meet customers where they are

Engaging Web Scale optimizes all products

Maximize Revenue

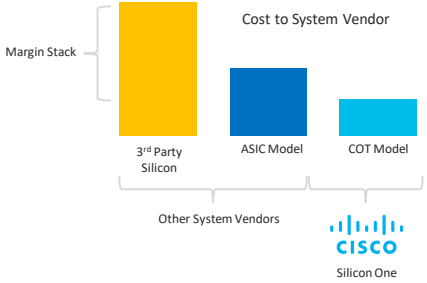


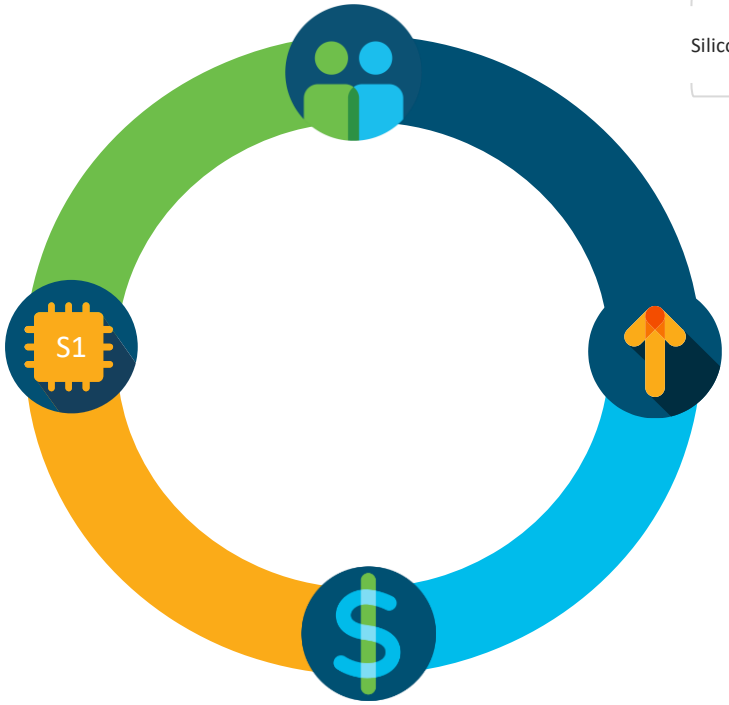
Drive Innovation

Differentiated products adds value

Convergence enables leverage

Development model drives down costs





Maximize Volume

Scale drives cost down

Re-invest

Accelerate differentiation

© 2023 Cisco and/or its affiliates. All rights reserved.

Cisco Silicon One G200

Uniquely efficient and capable / Optimized enhanced Ethernet for AI/ML

One architecture
A simpler easier to maintain network

High Performance
2x higher performance than G100

Sustainability via technology
2x more power efficient than G100

Ultra low latency
2x Lower Latency than G100

Optimal network design
512-wide radix enables
flatter, more efficient networks

Fully shared packet buffer
Optimal fairness, burst performance, JCT

51.2 Tbps



Advanced 112 Gbps SerDes
Cisco designed next-generation ADC SerDes
Support for Optics, 4-meter DAC, LDO and CPO

Advanced load balancing
Non-correlated WECMP avoids hash polarization
Congestion-aware stateful load balancing
Congestion-aware packet spraying

Link failure avoidance
HW based traffic link failure redistribution optimizes
real-world large-scale deployments

Programmable processor
Deterministic ultra-low latency processor
with run to completion for ultimate flexibility

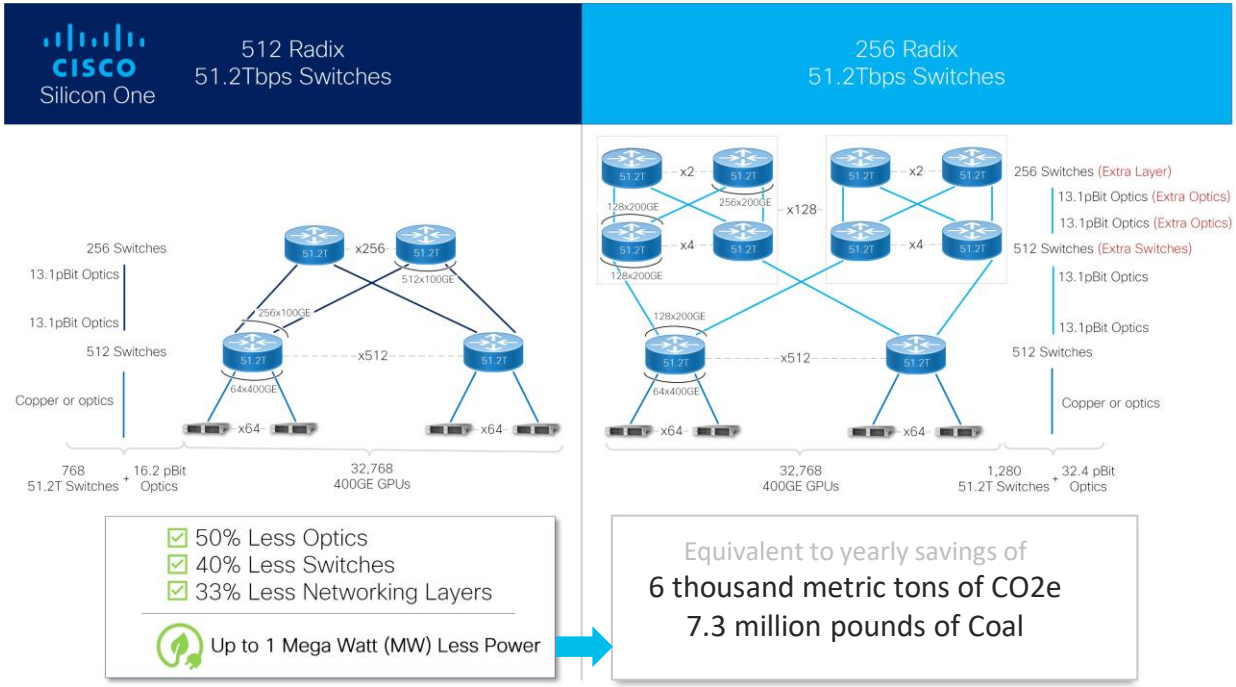
435B+ Lookups per second
Enables advanced features like SRv6 uSID

Deep visibility & Analytics
In-band telemetry including emerging protocols
Hardware analyzers enable post event debuggability

© 2023 Cisco and/or its affiliates. All rights reserved.

Optimal Network Design

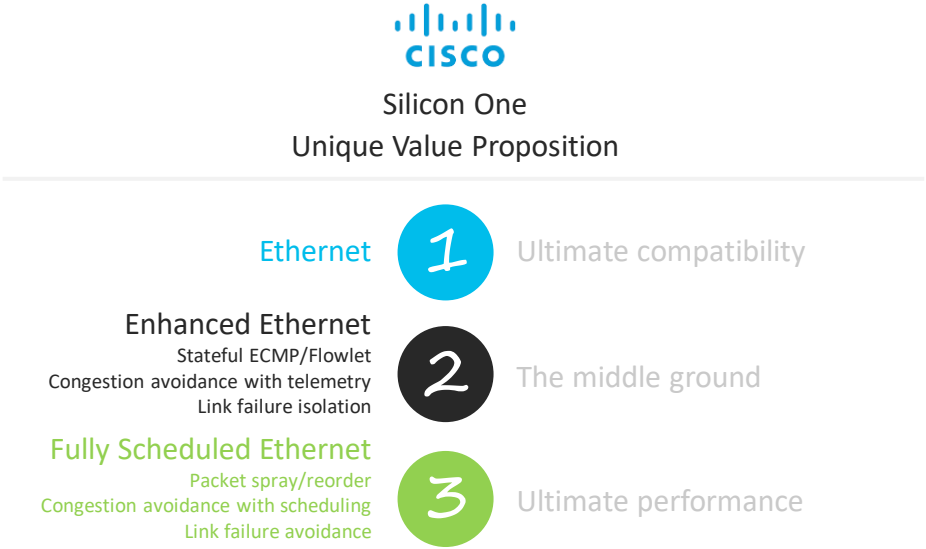
The advantage of a higher radix chip



© 2023 Cisco and/or its affiliates. All rights reserved.

Cisco Silicon One

The Ideal AI/ML Infrastructure



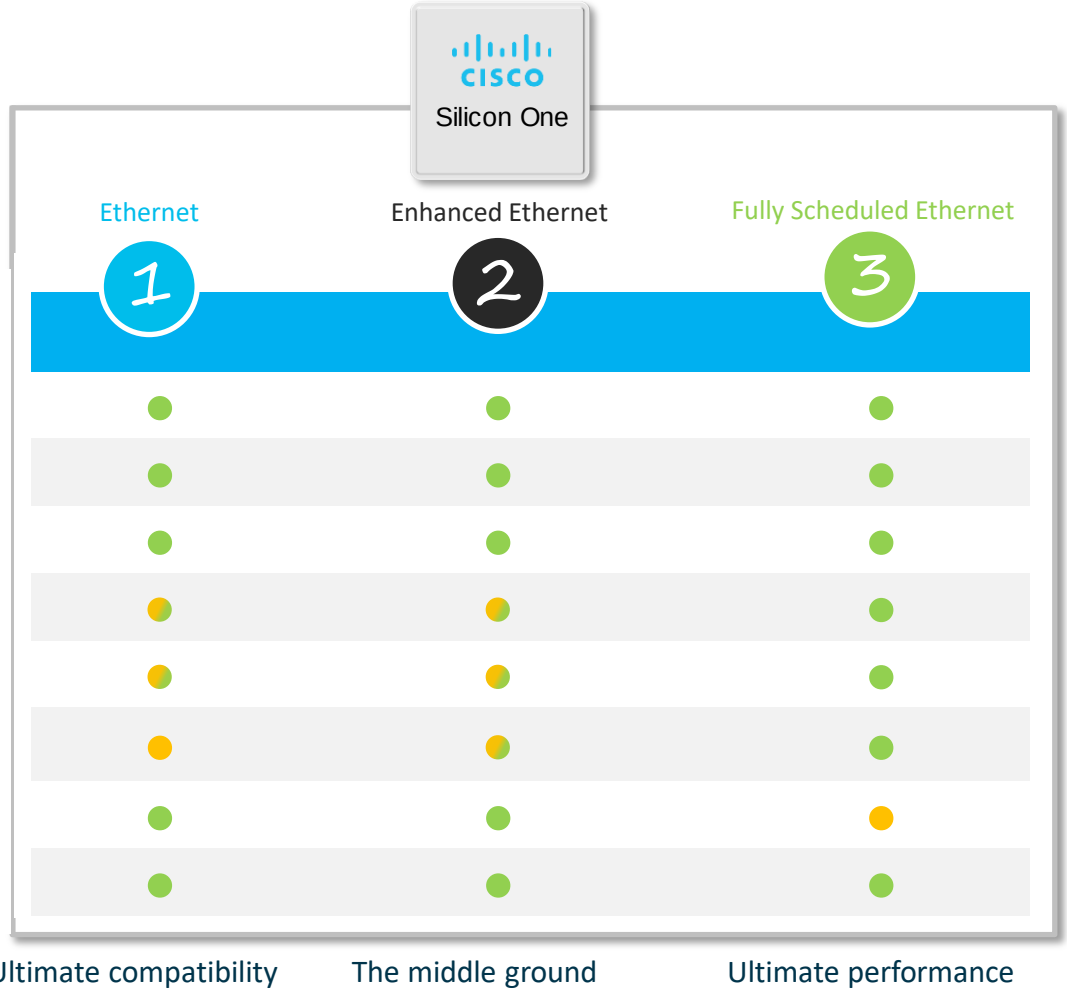
Cisco Silicon One convergence directly impacts AI/ML

One architecture, across 3 deployment models

© 2023 Cisco and/or its affiliates. All rights reserved.

Cisco Silicon One

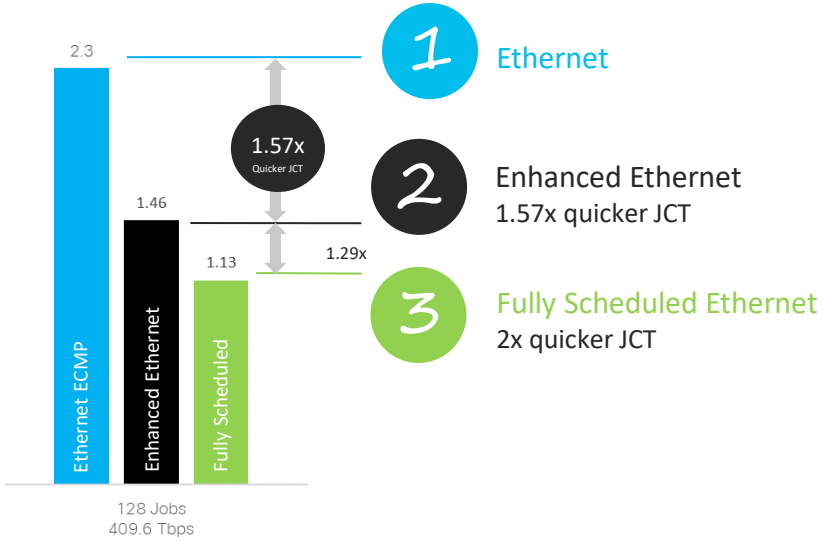
One Architecture for AI/ML



© 2023 Cisco and/or its affiliates. All rights reserved.

Cisco Silicon One

Ethernet, Enhanced Ethernet, Fully Scheduled Ethernet



AI/ML Workload characteristics

High performance GPUs
Admissible traffic pattern
High bandwidth flows
Long lived flows
Job wide synchronization with barrier operation
Multiple jobs running concurrently on same infrastructure

Network performance is critical

One bad load balancing decision effects all GPUs in the job

© 2023 Cisco and/or its affiliates. All rights reserved.

Cisco Silicon One

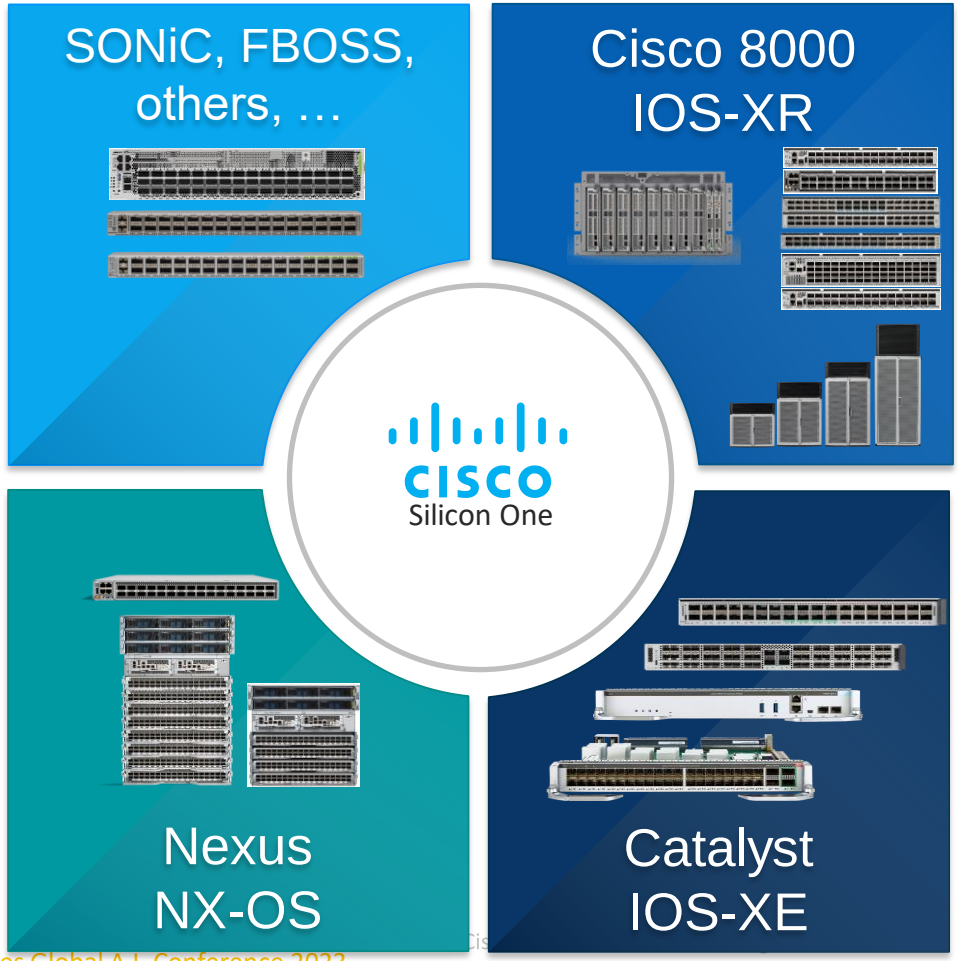
Impact

83%

5 out of 6 Tier1 Web Scale
Silicon Only & White Box

92%

Power Reduction
Deutsche Telekom



Cisco Silicon One

One Architecture, Many Devices



© 2023 Cisco and/or its affiliates. All rights reserved.

Cisco Silicon One

Why we win

Right technology

Right investments

Right scale

Right cost points

Right business models

Only company with all the technology

Silicon, Hardware, Optics, Software

Innovate across technology boundaries

Only company with all the business model

Silicon Only, White Box, Full System

Choice & Flexibility

© 2023 Cisco and/or its affiliates. All rights reserved.

FORWARD-LOOKING STATEMENTS

These presentation slides and the related conference call contain forward-looking statements, which are subject to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These forward-looking statements include, among other things, statements regarding future events (such as the success of our ongoing business transformation and operational discipline, the growth of our recurring revenue base and RPO, our healthy backlog, steps taken to improve the supply situation, strength of our cash flow generation, and commitment to shareholder returns) and the future financial performance of Cisco that involve risks and uncertainties. Readers are cautioned that these forward-looking statements are only predictions and may differ materially from actual future events or results due to a variety of factors, including: the impact of the COVID-19 pandemic and related public health measures; business and economic conditions and growth trends in the networking industry, our customer markets and various geographic regions; global economic conditions and uncertainties in the geopolitical environment; overall information technology spending; the growth and evolution of the Internet and levels of capital spending on Internet-based systems; variations in customer demand for products and services, including sales to the service provider market and other customer markets; the return on our investments in certain priorities, key growth areas, and in certain geographical locations, as well as maintaining leadership in Secure, Agile Networks and services; the timing of orders and manufacturing and customer lead times; significant supply constraints; changes in customer order patterns or customer mix; insufficient, excess or obsolete inventory; variability of component costs; variations in sales channels, product costs or mix of products sold; our ability to successfully acquire businesses and technologies and to successfully integrate and operate these acquired businesses and technologies; our ability to achieve expected benefits of our partnerships; increased competition in our product and service markets, including the data center market; dependence on the introduction and market acceptance of new product offerings and standards; rapid technological and market change; manufacturing and sourcing risks; product defects and returns; litigation involving patents, other intellectual property, antitrust, stockholder and other matters, and governmental investigations; our ability to achieve the benefits of restructurings and possible changes in the size and timing of related charges; cyber-attacks, data breaches or malware; vulnerabilities and critical security defects; terrorism; natural catastrophic events (including as a result of global climate change); any other pandemic or epidemic; our ability to achieve the benefits anticipated from our investments in sales, engineering, service, marketing and manufacturing activities; our ability to recruit and retain key personnel; our ability to manage financial risk, and to manage expenses during economic downturns; risks related to the global nature of our operations, including our operations in emerging markets; currency fluctuations and other international factors; changes in provision for income taxes, including changes in tax laws and regulations or adverse outcomes resulting from examinations of our income tax returns; potential volatility in operating results; and other factors listed in Cisco's most recent reports on Forms 10-Q and 10-K filed on May 24, 2023 and September 7, 2023, respectively. The financial information contained in these presentation slides and the related conference call should be read in conjunction with the consolidated financial statements and notes thereto included in Cisco's most recent reports on Forms 10-Q and 10-K as each may be amended from time to time. Cisco's results of operations for the three and six months ended July 29, 2023 are not necessarily indicative of Cisco's operating results for any future periods. Any projections in these presentation slides and the related conference call are based on limited information currently available to Cisco, which is subject to change. Although any such projections and the factors influencing them will likely change, Cisco will not necessarily update the information, since Cisco will only provide guidance at certain points during the year. Such information speaks only as of the date of these presentation slides and the related conference call.

© 2023 Cisco and/or its affiliates. All rights reserved.



© 2019 Cisco and/or its affiliates. All rights reserved.