The bridge to possible

智能多雲 彈性靈活部署

思科全新混合雲平台，打造綠色節能數據中心
提升資訊維運韌性，邁向 ESG 永續經營大道

黃明杰 Mickey Huang
思科台灣 雲架構軟體事業群 產品經理
Mar.23 2023

The bridge to possible

思科全新混合雲平台

Cisco UCS X-Series

IT 面臨的持續挑戰

混合雲催生了
基礎設施運維孤島

可見性降低，成本
和風險增加

應用多樣性推動
基礎架構多樣性

專用系統增加了
維運複雜性

分散的技術阻礙了價
值實現的時間

寶貴的 IT 資源浪費在
平臺整合上

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

新的基礎架構和運營模式

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

思科全新混合雲平台

UCS X-Series powered by Cisco Intersight

跨雲操作

無與倫比的
靈活性

面向未來

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

從根本上簡化混合雲基礎架構

利用雲維運的基礎架構進行簡化

使用專為現代應用設計的系統進行簡化

通過面向未來的系統進行簡化

UCS X-Series

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

面向未來的設計
Engineered for the next decade

保護投資
並專注於創新

2030+

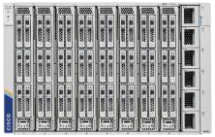
- Liquid-cooling
- Silicon photonics
- Next gen. fabrics
- Power and cooling capacity
- Future accelerators
- Intel roadmap

2022

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

2023 全新推出 UCS-X M7

為現代工作負載提供更高的靈活性和更高的性能



7th Gen UCS X-Series Compute Nodes

不折不扣的應用程式加速

intel. DATA CENTER GPU FLEX SERIES

New GPUs with UCS X-Fabric

Cisco Intersight

實現基礎架構和運營轉型

4th Gen Intel® Xeon® Scalable Processors

Intel 有史以來最具可持續性的數據中心處理器

Made with 80% renewable electricity*
for lower carbon footprint

Manufactured at Sites with State-of-the-art Water Reclamation
2.8 billion gallons of water recycled in 2021*

Built with circular economy strategies for waste
5% total waste to landfill*

Up to 20% CPU power saving at less than 5% performance impact
with Optimized Power Mode

Integrated AI for 14x perf / watt boost
for AI inference workloads with Intel AMX acceleration vs no acceleration

Built-in telemetry and power management tools
Dynamically reduce frequency and power down cores with P-state and C-state controls

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

CPU + Accelerators: 突破性的效率

Higher Performance per Watt

2.9x

average improvement of perf/watt with built-in accelerators*

Lower Power Bills

up to **70W**

power savings per CPU with Optimized Power Mode

Lower TCO More Sustainable

55%

lower TCO and power consumption while reducing 524K kg of CO_2 emissions*

AI Real Time Inferencing workload, ResNet50

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

See backup for workloads and configurations. Results may vary.
*for selected workloads.
*4th Gen Intel® Xeon® Scalable Processor vs. 3rd Gen Intel Xeon Scalable processors.

UCS X210c M7 Compute Node

Flexible server for all your workloads

- Two-socket modular server
  - 4th Gen Intel® Xeon® Scalable CPUs with **50% more cores** than M6
- Up to **8 TB** of capacity using 256 GB **DDR5** DIMMs
- Up to six SAS/SATA/NVMe drives (H/W NVMe RAID)
- Up to **200 Gbps** Unified Fabric

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

UCS X210c M6/M7 Compute Node – GPU

Run modern apps in less space

- High-density form factor supports a wide range of workloads
- Up to 2x Flex 140 Intel Data Center GPUs for VDI and video transcoding

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

UCS X410c M7 Compute Node

Designed for scale up applications

- **Four-socket** modular server
  - 4th Gen Intel® Xeon® Scalable CPUs
- Up to **16 TB** of capacity using 256 GB DDR5 DIMMs
- Up to six SAS/SATA/NVMe drives
- Up to **200 Gbps** Unified Fabric
- Connect up to 2x X440p PCIe nodes

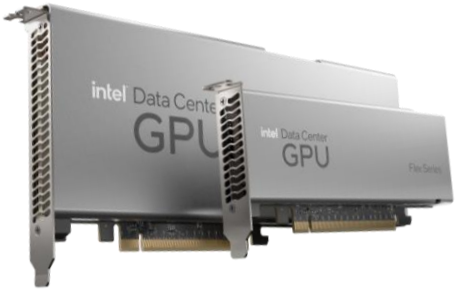
© 2021 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

New GPUs options with UCS X-Fabric

Modular design enables flexibility and choice

Intel Data Center GPU Flex Series 140 and 170

- Outstanding compute density and energy efficiency
- Main use cases: VDI and video transcode
- Secondary use cases: Rendering and AI/ML
- Up to 4x Intel Flex 140 or up to 2x Intel Flex 170



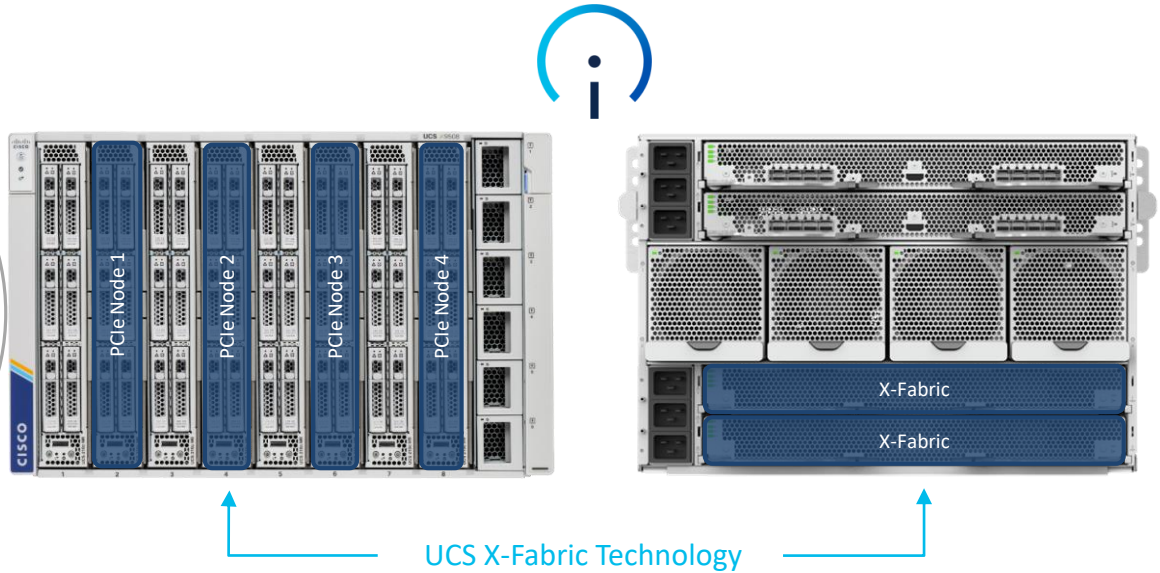
intel
Data Center
GPU

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

UCS X-Fabric Technology and PCIe Nodes with GPU

PCIe node supports up to

- ***4x Intel Data Center GPU Flex 140***
- ***2x Intel Data Center GPU Flex 170***



- ✓ Based on native PCIe Gen. 4
- ✓ Provides GPU acceleration to enterprise application
- ✓ No backplane or cables = Easily upgrades

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

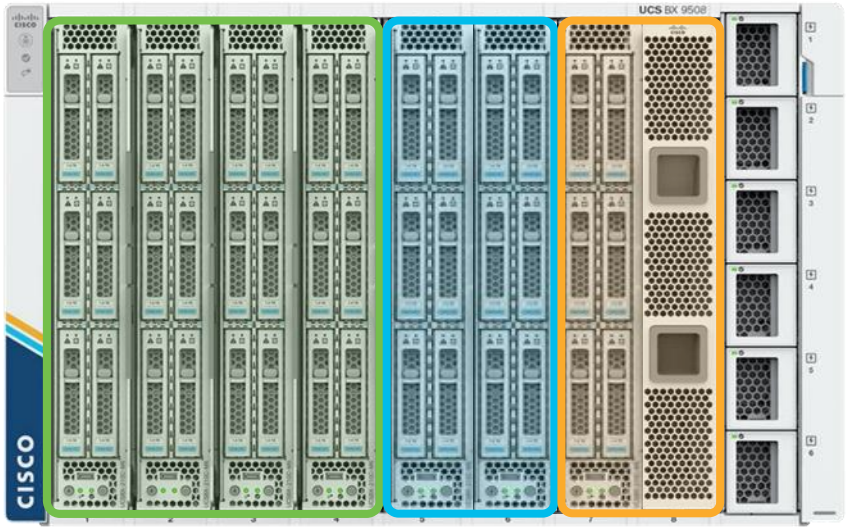
UCS X-Series with X-Fabric

整合機架工作負載

- AI/ML
- Accelerated VDI
- Big Data, SDS, Containers

+

傳統刀片工作負載



Up to 960
Cores
per Chassis
(M6 or M7)

24
GPUs
per Chassis

intel

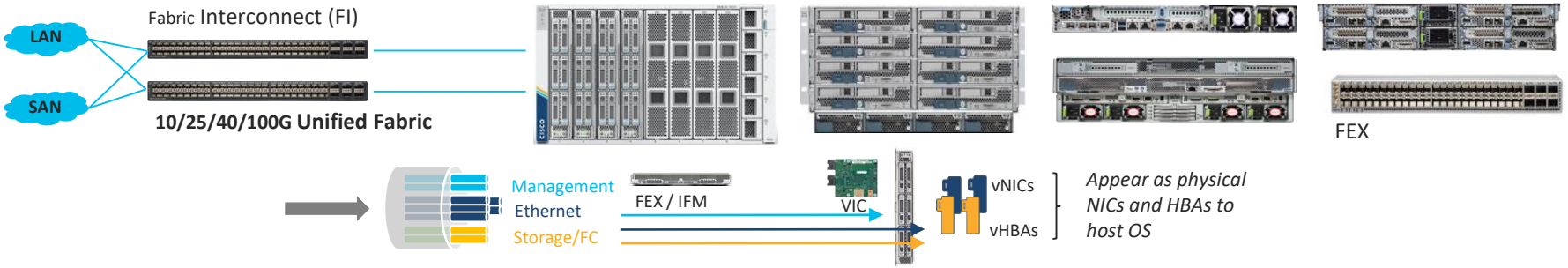
200G
Bandwidth to
compute node

1 PB
of storage

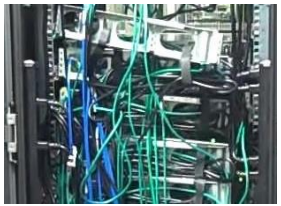
© 2021 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

UCS Fabric 帶來機房管理的簡化

單純　　彈性　　TCO 減少



傳統機架



臨時雜亂且不一致

傳統刀鋒伺服器

結構化，但孤立且複雜

CISCO UCS

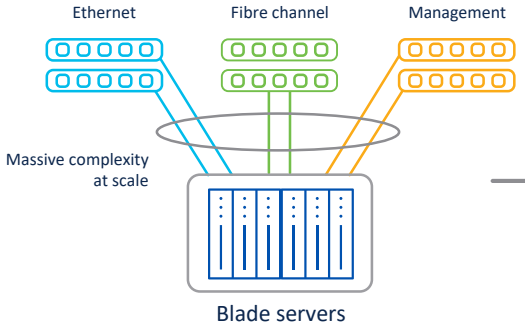
簡化、優化和自動化

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

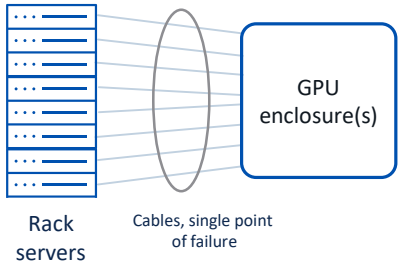
業界領先的簡易優化架構

傳統方法

1 | Silos of multiple ethernet and SAN fabrics and adapters



2 | Complex PCIe connectivity to external accelerators



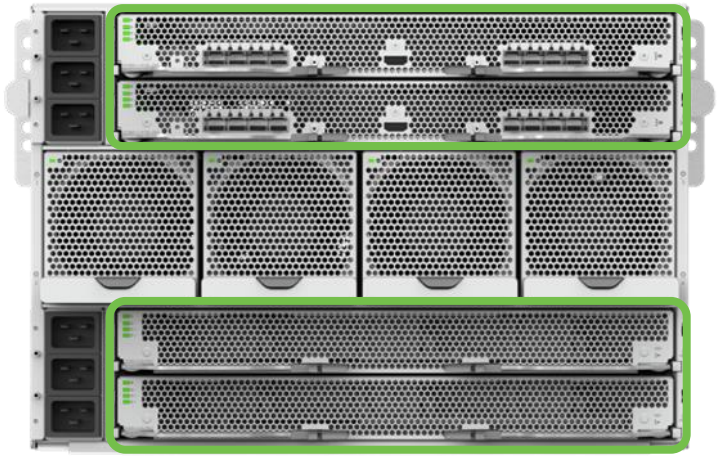
思科解決方案

UCS X-Series

Cisco Intersight

Unified fabric

X-Fabric + PCIe nodes



©2022 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

企業在追求 ESG 的路上, 比機架式伺服器更好的選擇

X-Series 與機架式伺服器相比的優勢

模組化
Produces roughly 50% lower consumption of raw materials over three generations than rack servers

節能
Reduces the number of necessary inverters, power conversions, and by design runs more efficiently lowering total energy consumption

使用感知
Uses constant monitoring and cooling algorithms to dynamically adjust power usage for optimal efficiency

通過設計實現可持續性

可持續包裝
Offers multipack options to reduce packaging for high-volume orders

回收材料
Plastic parts use post-consumer recycled resin

高效元件
Utilizes efficient components like high-efficiency, Titanium-rated power supplies

將可持續性嵌入整個產品生命週期

供應鏈可持續性
Cisco works to uphold human rights, promote worker well-being and minimize negative environmental impacts in our supply chain.

產品回收和再利用
Return end-of-use gear for free in a simple, secure, and sustainable way. Certified remanufactured products and available through Cisco Refresh.

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

UCS X-Series 在全球各行業快速建立成功案例

Large finance company invested in X-Series for the long-term compelling TCO numbers

Regional telco adopted X-Series modular system to future-proof their environment

Top 20 healthcare system embraced X-Series to flawlessly run Epic, SQL, VDI, & other enterprise apps

Top-tier race car manufacturer accelerated their business with a future-ready X-Series environment for their VSI/VDI aps

Leading travel provider implemented X-Series to seamlessly integrate with an existing storage solution and Intersight

Entertainment and e-commerce giant supports customers with X-Series for AI/ML and video streaming apps

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

“思科 UCS X 與 Intersight 將我們的 IT 維運簡化提升到一個新的水準”

Solving your operation’s most complex electrical, automation, and operational technology challenges.

“Aging compute infrastructure that is not conducive to easy upgrades or scaling can paralyze operations and innovation. With the flexibility provided by Cisco’s UCS X-Series and simplicity of Cisco Intersight cloud operations platform, we will reduce our data center footprint, contribute to our sustainability efforts, and power our virtualized desktop infrastructure (VDI) environment and specialized 3D modeling applications. Not only do our employees benefit, but there is a major impact on our business as our customers can review projects from construction job sites in real time, giving us a real competitive advantage.”

–Nathan Bullock, IT Operations Manager, Interstates

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

X-Series是虛擬化的理想選擇

智能結構

- 2.5x bandwidth increase over B-Series means…
- Higher VM density
- Better traffic segmentation for VM / Apps / backup channels

存儲性能

- Local NVMe drives with performance caching means…
- Higher application performance

機架密度

- Rack density and local storage means…
- More VMs in a given footprint

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

採用 X-Series 建構資料庫系統的優勢

整合更多伺服器，同時節省資金

16TB drives x 6 = 96TB storage/compute node.
Fewer licenses, less infrastructure, data closer to CPUs.

啟用本地資料庫支援、內部機箱故障切換

Failover does not require special vendor licenses,
no investment in external storage and related switches,
cables, etc.

在系統機架中需要更少的空間

Utilizing internal storage enables all-Cisco solution
without an external storage array to find space
and powering/cooling.

Intersight 管理優勢

Enforce global policies, proactive system monitoring
to avoid performance issues and problematic vendor support
challenges.

NVMe 可實現卓越的性能

Superior I/O performance for OLTP workloads.

為未來增長做好準備

Ability to support larger CPU wattage with proper cooling
help ensure meeting future performance requirements.

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

Intersight 簡化可持續性維運 範例 - 電源政策

Power policies

- Global setting for Chassis Power behavior
- Redundancy, Power Save modes

Power profiling policy

- Node, Blade and Rack server
- Tests and determines actual min and max power draw

Power capping policy

- Node, Blade and Rack server
- Individual and group power capping
- Group level or individual manual

Dynamic power rebalancing

- Competitive advantage
- Chassis and Rack group level redistribution of available power

Power group policy

- Set of chassis that draw power from the same PDU and maintain under the advisable limit

Fan speed control policy

- Global or individual non disruptive server setting
- Controls power usage and airflow noise levels

Power allocation policy

- Global setting to specify policy-based power capping or manual node power cap is used

Server power control policy

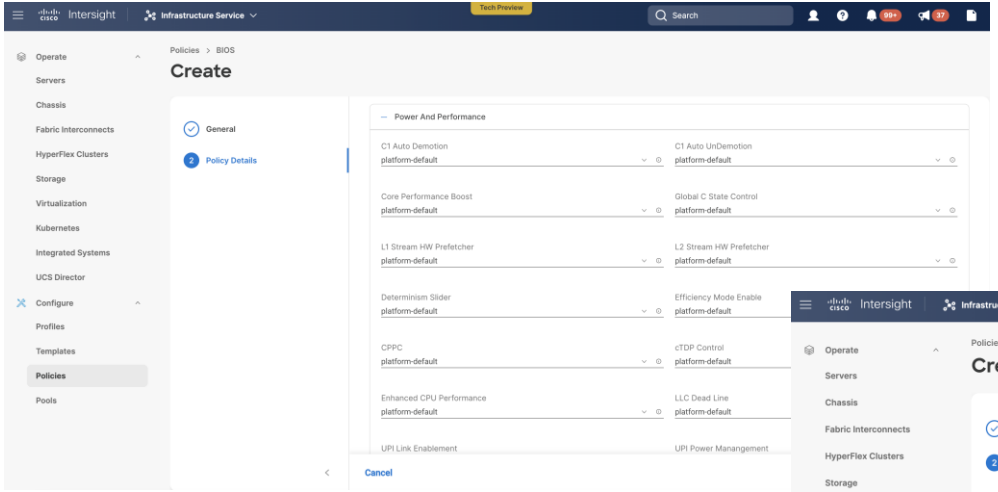
- Chassis and Rack level
- Priority set to calculate initial power allocation and discretionary use

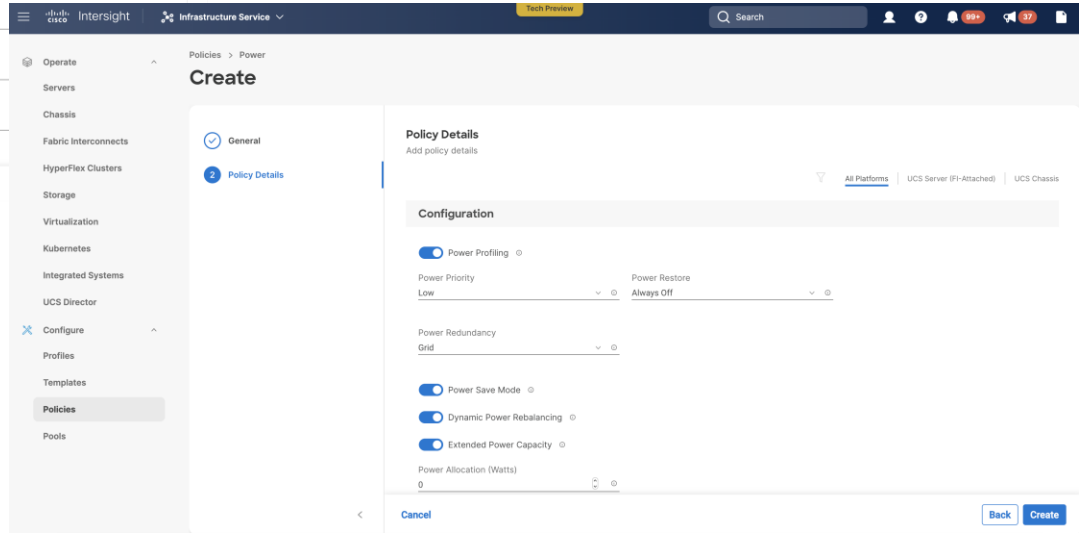
BIOS and OS power policy

- Use BIOS tokens to adjust power based on app needs
- OS level power recommendations

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

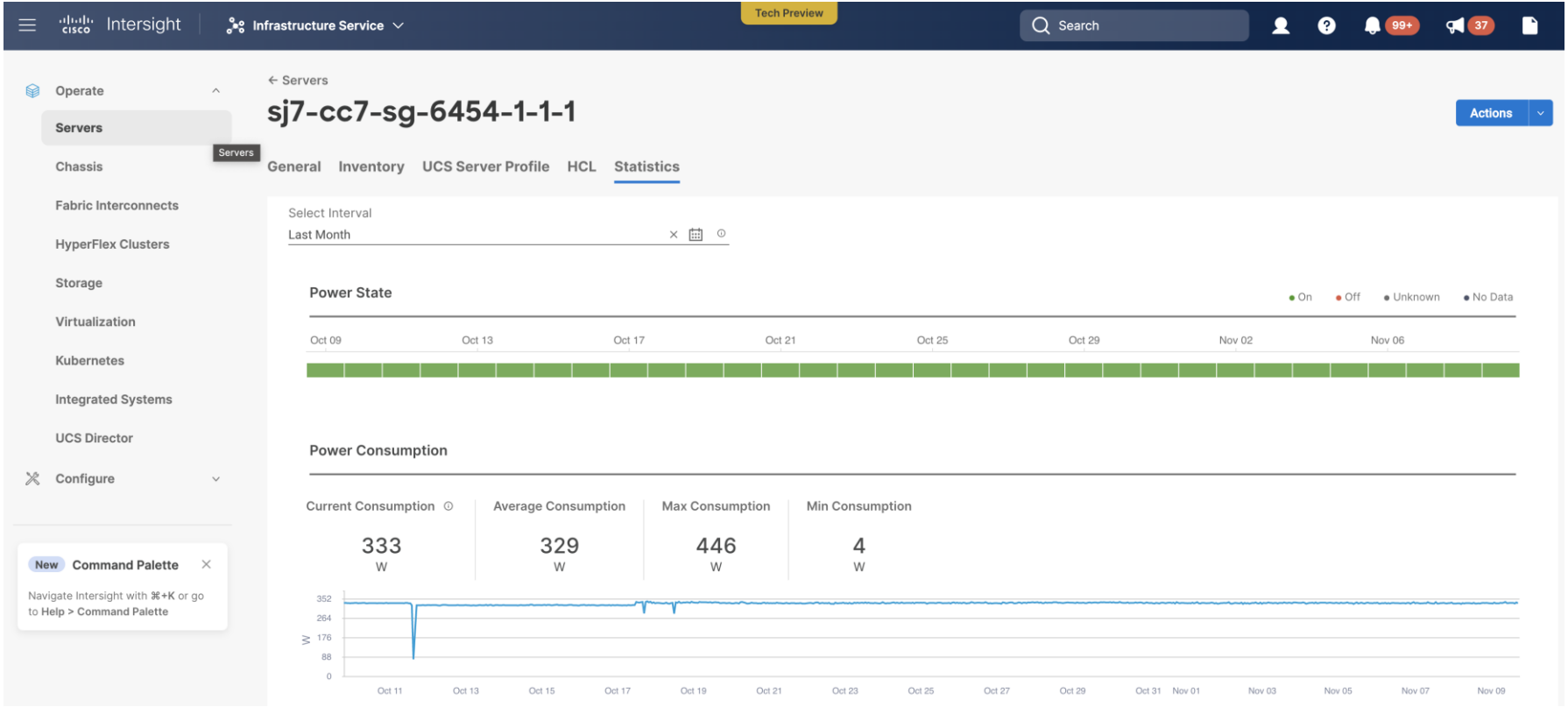
Intersight 簡化可持續性維運 範例 - 電源政策





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

UCS-X 電源利用率的趨勢和可視性



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

從根本上簡化的混合雲基礎架構

跨雲維運 – 雲地整合

無與倫比的靈活性

面向未來

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

UCS X-Series 對企業帶來的好處

簡單
跨雲託管，沒有嚴格的硬體配置規則

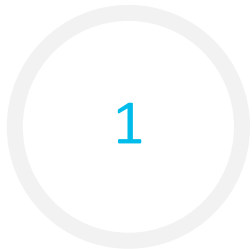
靈活
結合了刀片式伺服器和機架式伺服器的優點

面向未來
專為輕鬆採用下一代技術而打造

功耗更低

更具可持續性

更好的性能



控制點在雲中

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

企業在追求 ESG 的路上, 比機架式伺服器更好的選擇

X-Series 與機架式伺服器相比的優勢

模組化
Produces roughly 50% lower consumption of raw materials over three generations than rack servers

節能
Reduces the number of necessary inverters, power conversions, and by design runs more efficiently lowering total energy consumption

使用感知
Uses constant monitoring and cooling algorithms to dynamically adjust power usage for optimal efficiency

通過設計實現可持續性

可持續包裝
Offers multipack options to reduce packaging for high-volume orders

回收材料
Plastic parts use post-consumer recycled resin

高效元件
Utilizes efficient components like high-efficiency, Titanium-rated power supplies

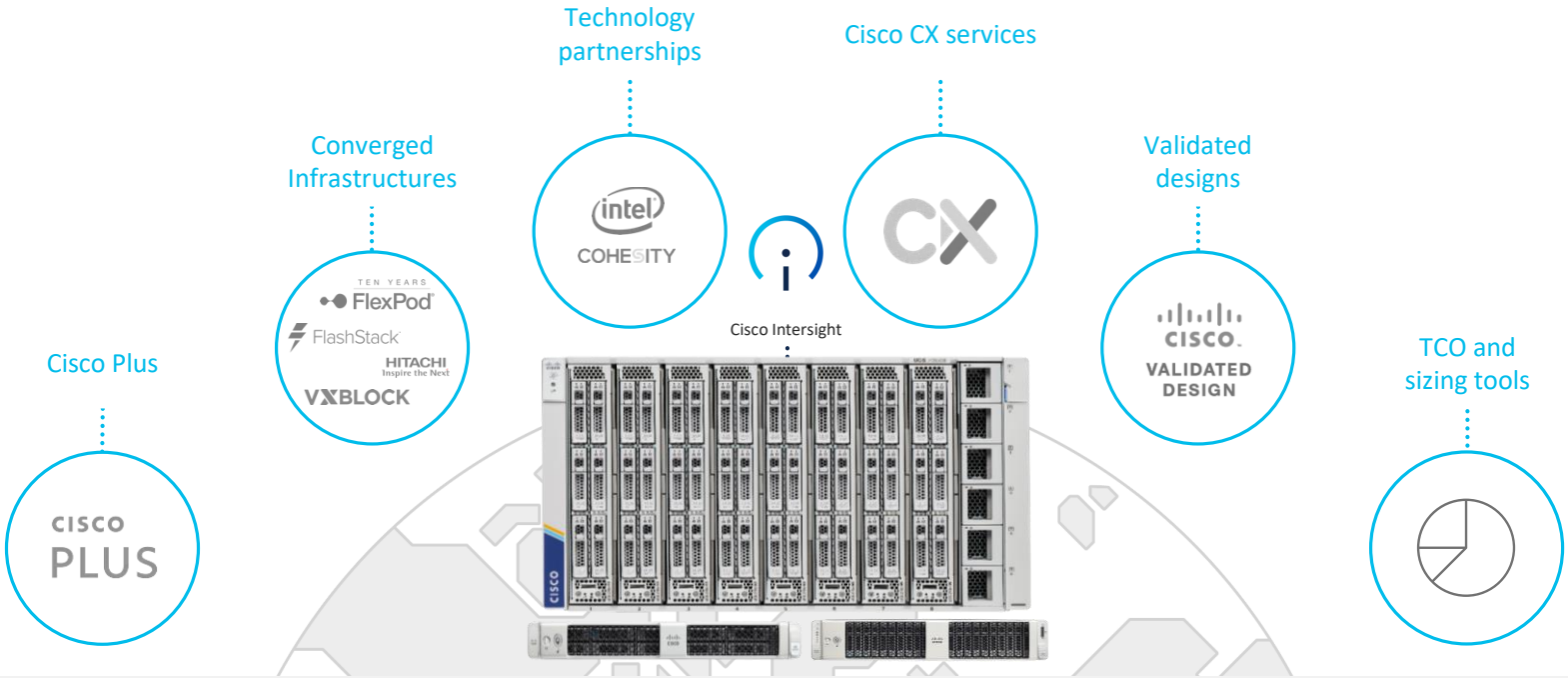
將可持續性嵌入整個產品生命週期

供應鏈可持續性
Cisco works to uphold human rights, promote worker well-being and minimize negative environmental impacts in our supply chain.

產品回收和再利用
Return end-of-use gear for free in a simple, secure, and sustainable way. Certified remanufactured products and available through Cisco Refresh.

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

迎向未來十年的混合雲平台

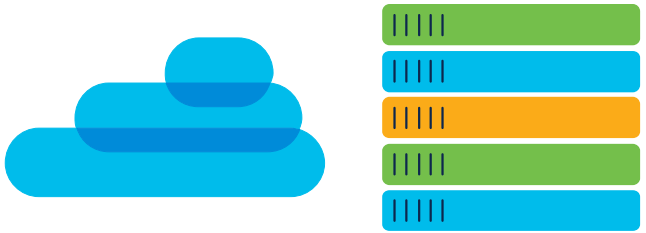


Virtual infrastructures | Hybrid cloud | Enterprise applications | AI/ML | Containers | SAP HANA | Desktop virtualization | Data protection

Cisco Solution portfolio

如何構建
可持續數據中心

每一瓦都很重要



.. ICT貢獻了近乎 3.9% 的冰山融化
...數據中心約佔其中的 33%

cisco Engage

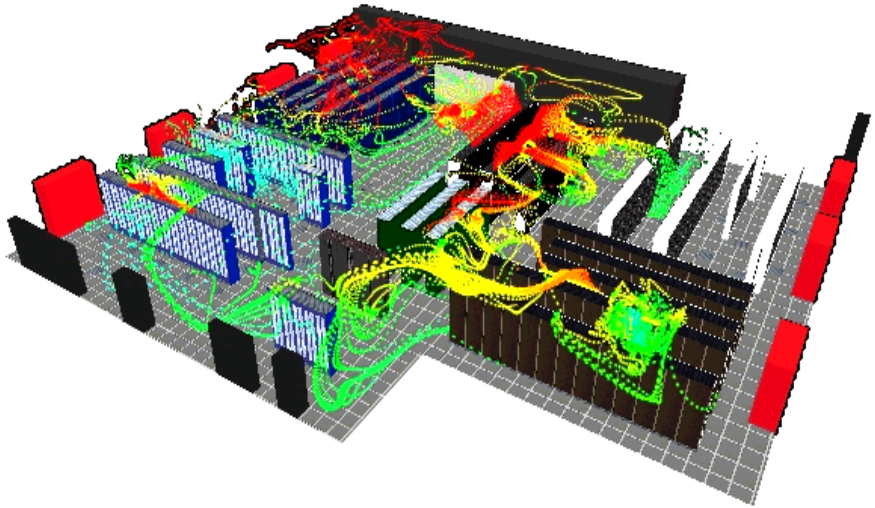
©2022 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

電力去哪兒了？

Losses in power generate heat

Power Supplied in DC	
Cooling	50%
Server / Storage	26%
Conversion	11%
Network	10%
Lighting	3%

Heat Generated at a Data Center



Each watt consumed by IT infrastructure carries a “burden factor” of 1.8 to 2.5 for power consumption associated with cooling, conversion/distribution and lighting

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

構建可持續數據中心的步驟

1. 應該如何構建？
2. 應該能看到什麼？
3. 應該如何反應？

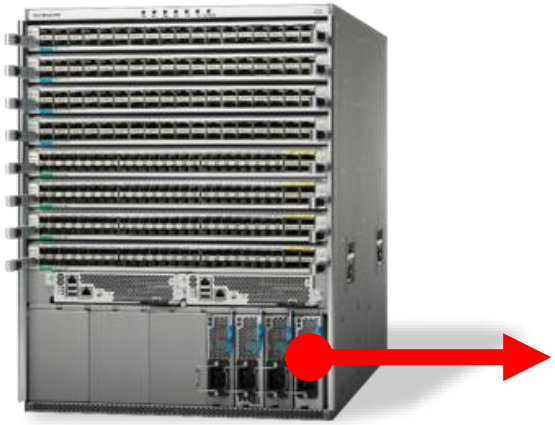
© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

構建可持續數據中心的步驟

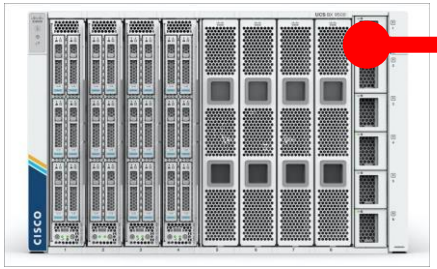
1. 應該如何構建？
2. 應該能看到什麼？
3. 應該如何反應？

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

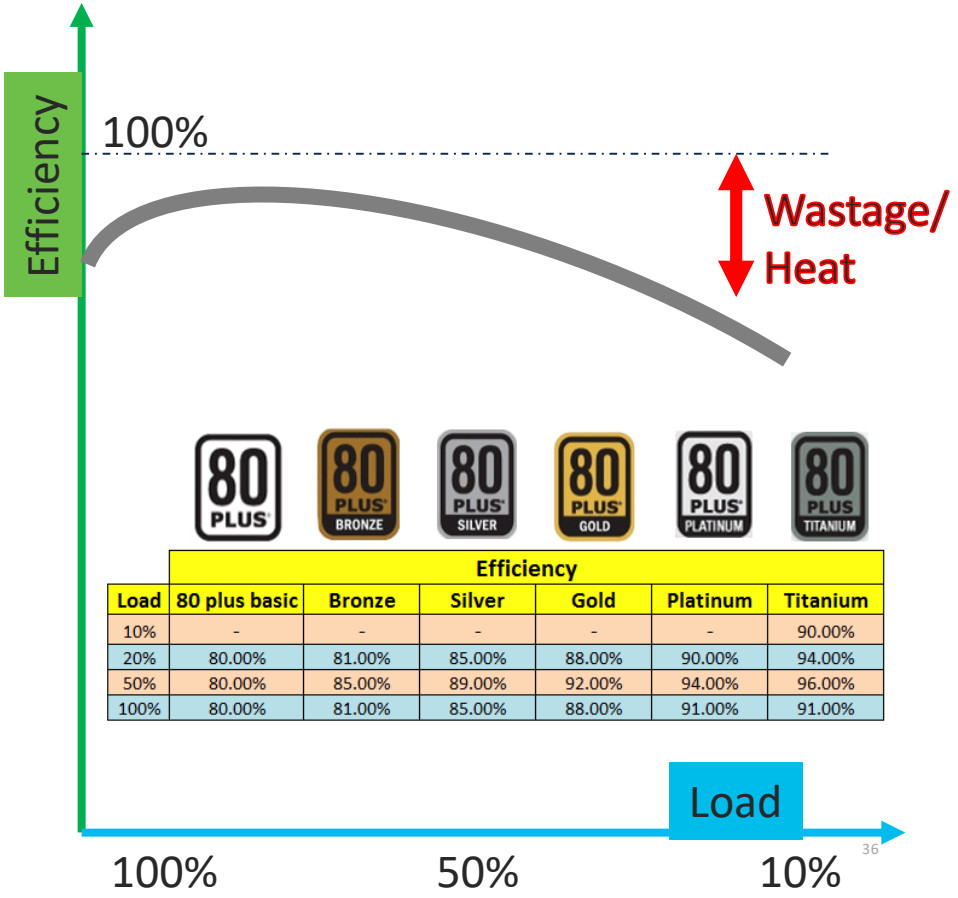
電源效率



Titanium



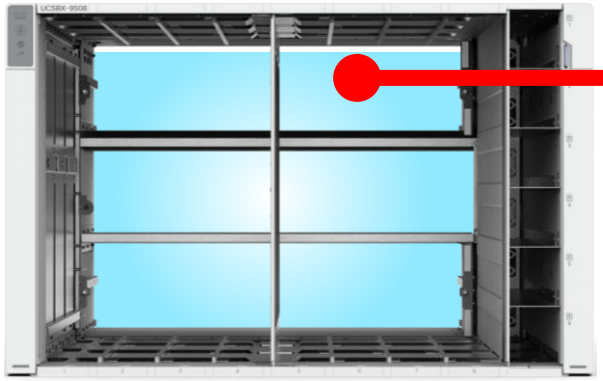
Platinum



	Efficiency					
Load	80 plus basic	Bronze	Silver	Gold	Platinum	Titanium
10%	-	-	-	-	-	90.00%
20%	80.00%	81.00%	85.00%	88.00%	90.00%	94.00%
50%	80.00%	85.00%	89.00%	92.00%	94.00%	96.00%
100%	80.00%	81.00%	85.00%	88.00%	91.00%	91.00%

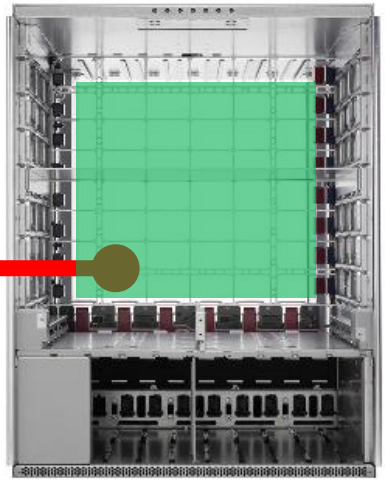
© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

開放式機箱無背板設計



UCS X-Series
UCS B-Series

Nexus 9500
Nexus 7000



防止技術鎖定

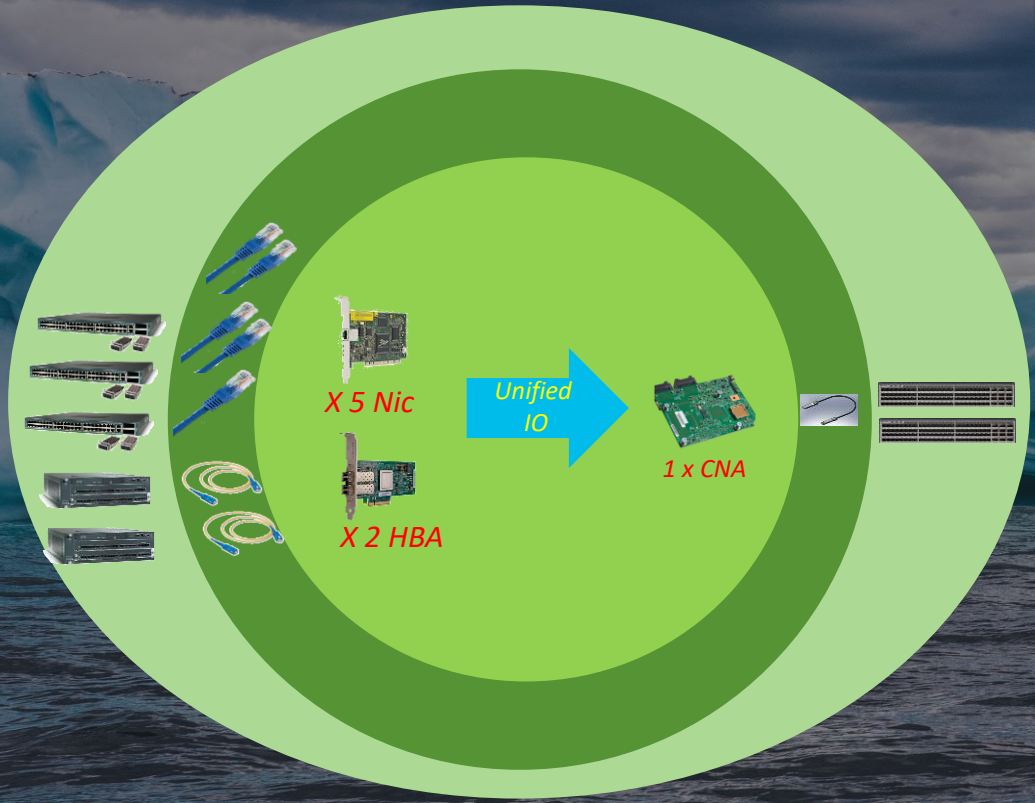
減少氣流限制

最大化電源效率

根據需要配置工作負載

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

Unified IO, Fabric Innovations, Cisco ASIC



Unified I/O powered DC :

- Reduce 7 adapters/cables to 2 adapters/cables
- Reduce power consumption of 50 W per server
- Consolidate 5 switches to 2
- Simplify connectivity

For 1 MW DC

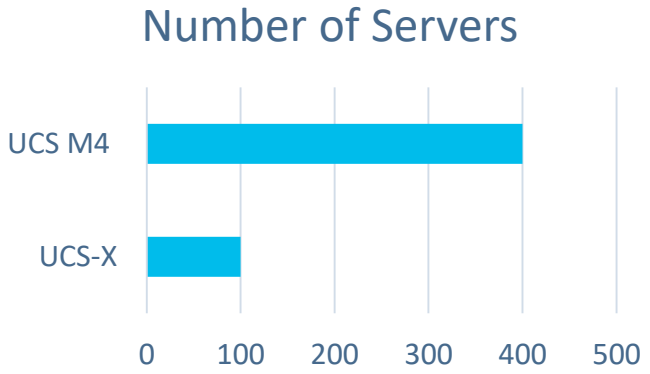
- Reduce 7,300 MWh per year
- Reduce 108,000M of Copper wire
- Reduce 165,000M of Fibre Optics
- 1,700 Tonnes of Co2 per year
- Avoided melting of 5100 M^3 of Arctic Ice per year
- Savings of USD 1.6 M per year on energy bill
- Savings of USD 170K carbon tax**

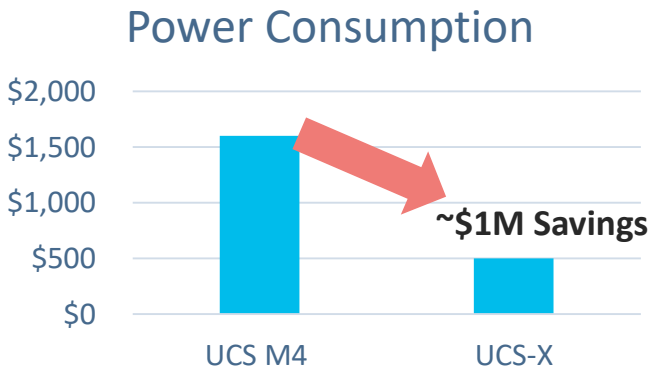
中型企業
(以 400 台伺服器為例)

- UCS X-Series Innovations
  - ASIC Innovation reduces energy consumption, eliminates overheads
  - Zone Based Cooling optimizes cooling efficiency, leading to power saving
  - Innovative architecture to optimize compute, memory and IO

- Environment Contribution
  - Saves 6185 MWH per year
  - Reduces 1442 Tonnes of Co2 emission
  - Equivalent to 43,113 tree seedlings grown for 10 year
  - Reduces energy cost by ~ USD 1M

Eg. PUE > 2, high power cost





©2022 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

全新 Cisco Nexus 9800 Series

性能、靈活性和效率

High Performance | High Port Density | Scalable | Low Power

14.4 Tbps per Slot | 36 400G Ports per Slot

8-slot and 4-slot Modular Switches

Cisco ACI Spine & NXOS Capable

Line Rate MACsec

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

Impacts of Powering Data Centers with Cloud Scale ASICs

Modernized Cloud Scale ASICs result in :

- Lower wattage per Gbps of throughput
- More functionalities, eliminates the need of external appliances for accelerates and protect workload
- Unprecedented visibility to reduce outage, isolate performance hotspots

Nexus 7700 Platform
3W per Gbps

Nexus 9000 Platform
0.3W per Gbps (Gen1, EX, 16 nm)
0.11W per Gbps (Gen3, GX, 7 nm)

Nexus 9800 Platform
0.08 W per Gbps
(Silicon One, 7nm)

For MSDC with 10,000s of 10 Gbps ports

- Saving of 1200 – 1500 Million Watt Hours per year
- Reduce 280 ~ 350 Tones of Co2 per year
- Avoided melting of 840 ~ 1050 M^3 of Arctic Ice per year
- Savings of USD 258 K ~ 323K per year on energy bill
- Savings of USD 28-35K carbon tax**

EPA United States Environmental Protection Agency
Greenhouse Gas Equivalencies CALCULATOR

構建可持續數據中心的步驟

1 應該如何構建？

2 應該能看到什麼？

3 應該如何反應？

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

在這個複雜的世界中，您如何確保應用程式性能並減少碳足跡？

僅用最少的資源，卻不影響性能

Know the Dependency, Know the Resource Hotspots!

Application Resource Management

Intersight Workload Optimizer

Visualize application resource dependencies (Infrastructure)

Automate application resourcing decisions (Infrastructure)

持續優化應用程式
按需資源

Application Performance Management

AppDynamics

Visualize application component dependencies

Automates anomaly detection down to line of code

持續推動業務和應用程式性能

藉由全棧可視簡化的工具 將應用/開發和基礎設施運營團隊聚集在一起

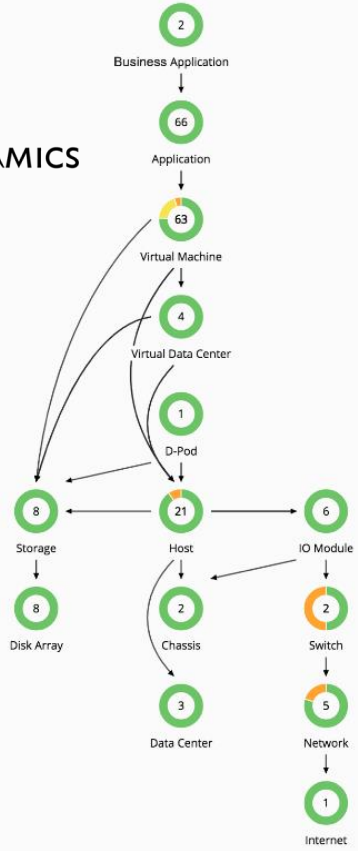
確保應用程式性能

With Cisco AppDynamics & Cisco Intersight Workload Optimizer (IWO)

Results

- Assure application performance
- On-premises re-sizing automation: **up to 30% utilization increase**
- Cloud compute resizing automation: **up to 30%+ cost savings**

With AppDynamics & IWO, application performance metrics drive better decisions through the infrastructure automatically.



© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

為可持續性而設計

可視性
Gain visibility into network energy consumption and cost

碳足跡
Understand greenhouse gases (GHG) of managed devices

關鍵可持續性指標
Total Power Utilization Effectiveness (PUE)*—future release

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

構建可持續數據中心的步驟

1 應該如何構建？

2 應該能看到什麼？

3 應該如何反應？

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

基礎設施即代碼

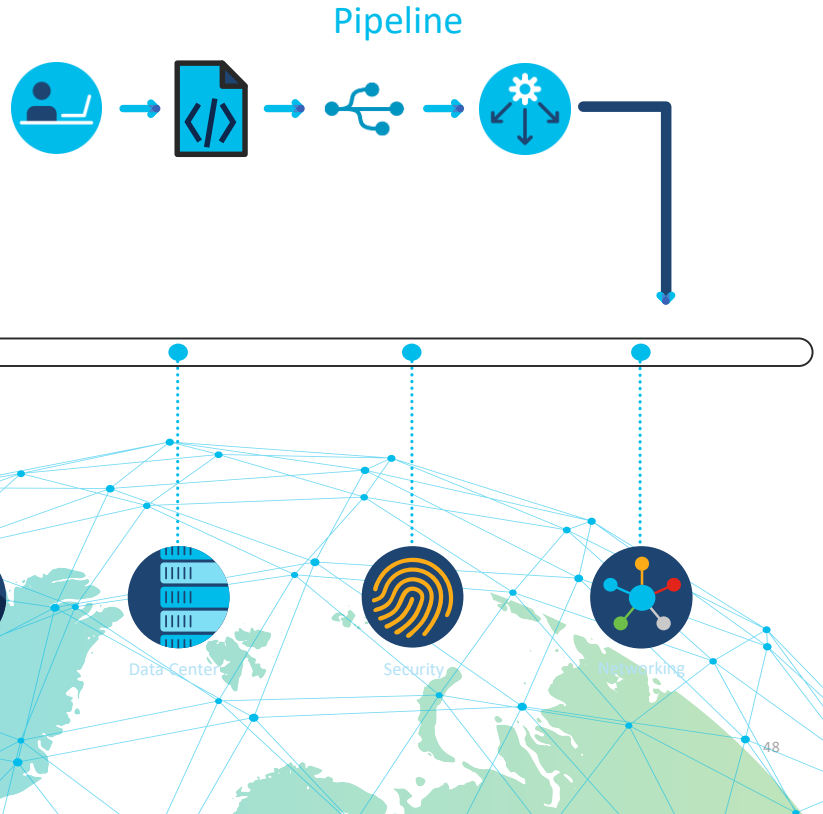
支援網路、計算和存儲的可程式設計性，以優化能耗

90%

Of enterprises will have an automation architect by 2025

(up from less than 20% in 2020)[1]

可程式設計基礎設施是綠色推動者。企業可以對網路、計算、存儲資源進行程式設計，以優化能源使用。

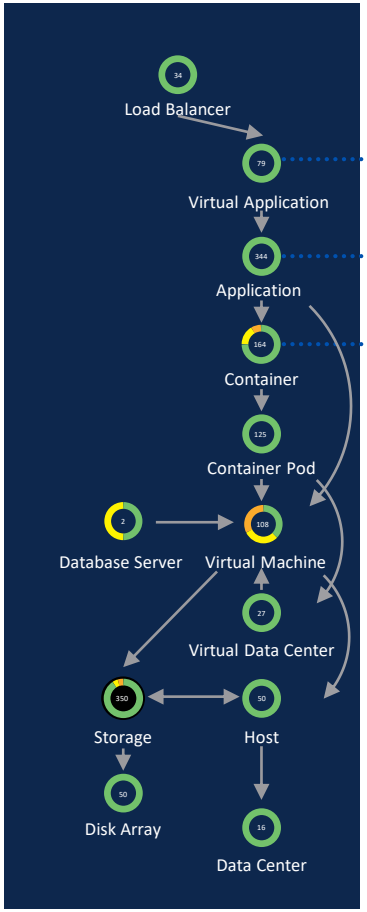


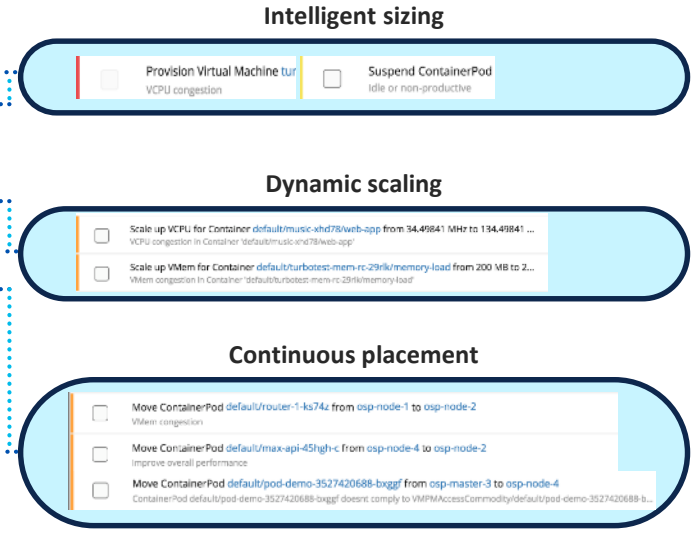
1 Gartner - *Top 10 Trends Impacting Infrastructure and Operations for 2020*

© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

動態資源分配以維護應用程式 SLA

Leverage AI to optimize resources





Optimize the management of Kubernetes clusters' resources

Continuous integration

Continuous deployment

kubernetes

- Install
- Deploy
- Harden

Monitoring & alerts

Workload Optimizer

How should you size containers from Day 1?

Dynamic placement & scaling to assure application performance

沒有閾值，沒有手動設置，沒有猜測，只有可執行方案

©2022 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

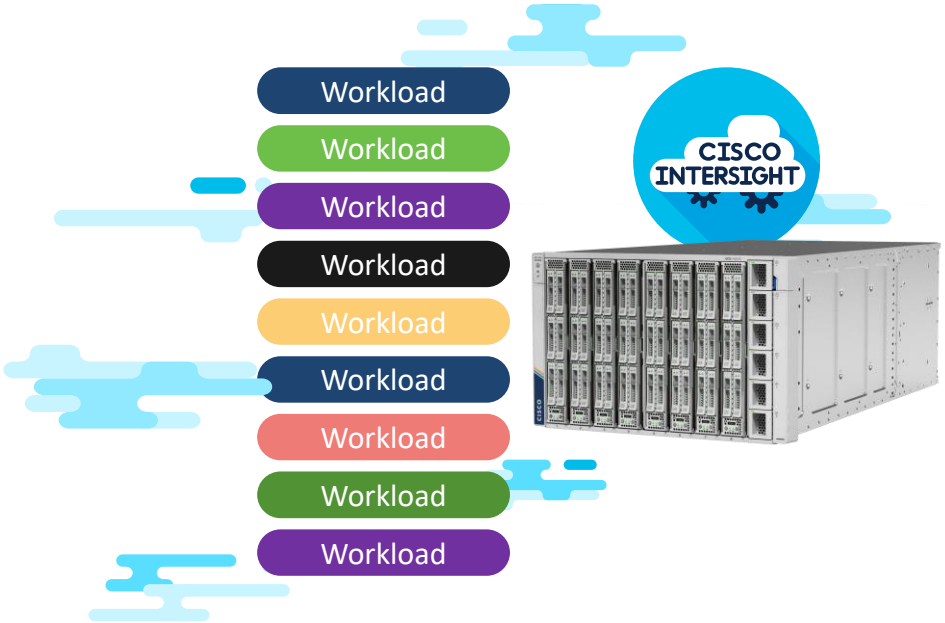
藉由人工智能分配計算資源
以最低的能耗滿足應用需求

全新思科混合雲平台 UCS-X Series

模組化創新 打破歷史系統限制

基礎設施即代碼 將元件組裝到系統中

支援多樣工作負載 在單一架構中



© 2020 Cisco and/or its affiliates. All rights reserved. Cisco Confidential

思科雲架構及軟體解決方案

為您橋接所有雲，建立綠能永續混合雲

The bridge to possible