MFG Digital Transformation 2.0

Race to Reinvent for Digital Success

Shirley Tsai

Research Manager

IDC Taiwan

Digital Transformation (DX) 2.0

Early DX adopters

DX 1.0 = Digital-led transformation

DBS → UOB 大華銀行

中国平安 PING AN 保险 · 银行 · 投资 → Allianz

 → 

 → Pizza Hut

Recent DX adopters

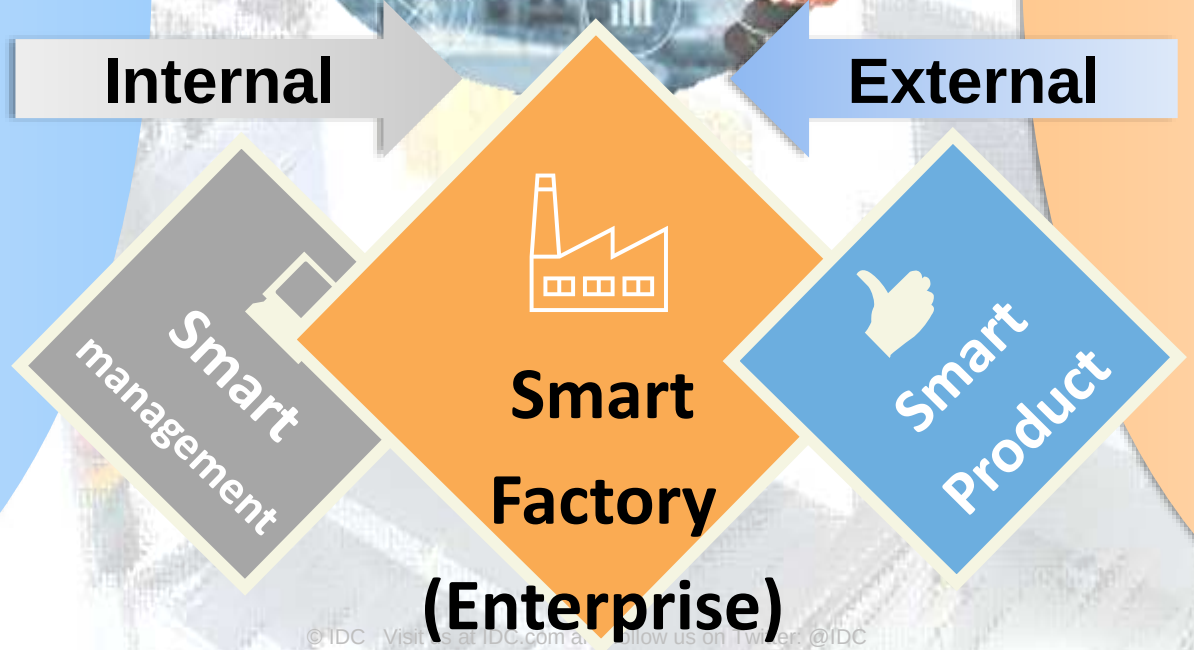
DX 2.0 = Data-driven transformation

Source: IDC CxO Conversations, 2019

The Challenges that Manufacturers Face

Internal Drivers for Digital Transformation

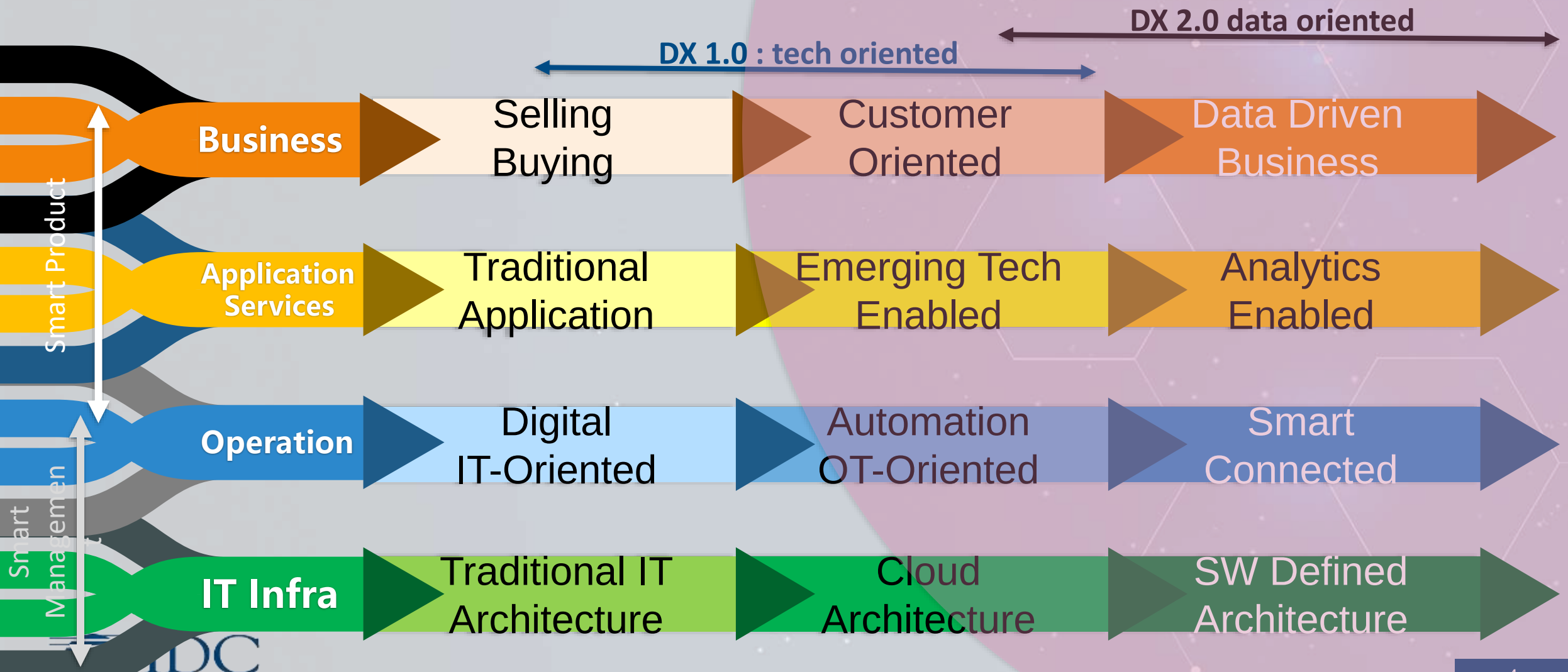
- Increasing internal costs
- Talent shortage
- The IT silos let decision making becomes hard
- Security concerns for IT and OT devices
- New product service to keep Competition



External Drivers for Digital Transformation

- Demand variability
- Lower and lower product price
- New technologies
- New competitors
- New ecosystem
- New Business / economy

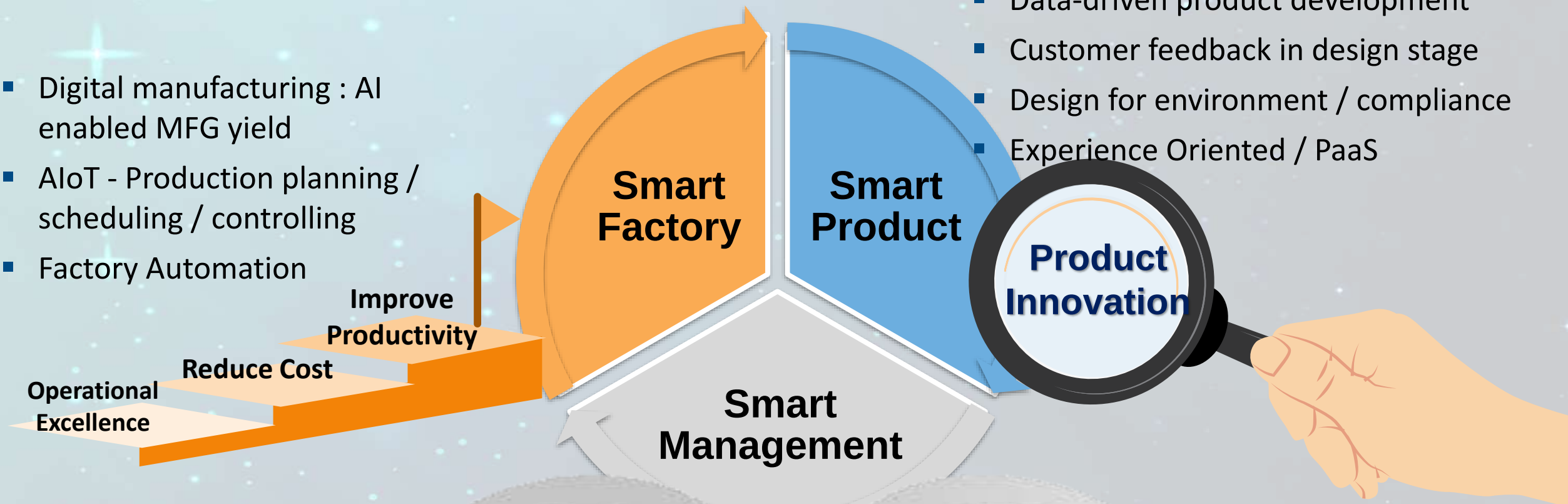
MFG's Journey from DX1.0 to DX2.0



Three Ways to Kick-off DX Journey

- Digital manufacturing : AI enabled MFG yield
- AIoT - Production planning / scheduling / controlling
- Factory Automation

- Data-driven product development
- Customer feedback in design stage
- Design for environment / compliance
- Experience Oriented / PaaS



- Supply chain visibility
- Suppliers management
- Talent Ready

- Demand / behavior analysis
- New interaction models
- OMO channels

IDC Analyze the Future

MFG : TOP5 Business Priorities

2017 2018 2019

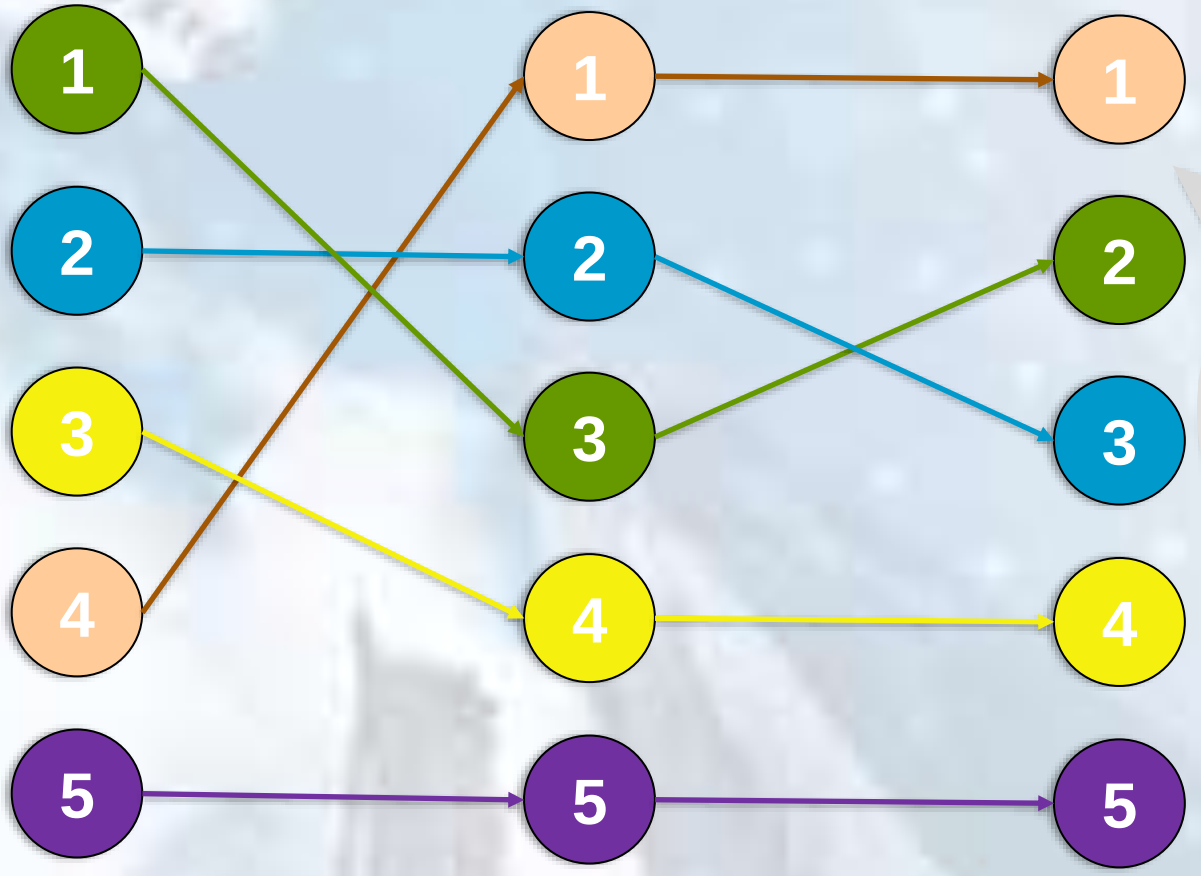
Smart Product : data driven product innovation

Smart Factory : AI enabled operational excellent

Smart Management : new market / customer segment

Smart Management : supply chain performance

Smart Product : product as a Service model or focus



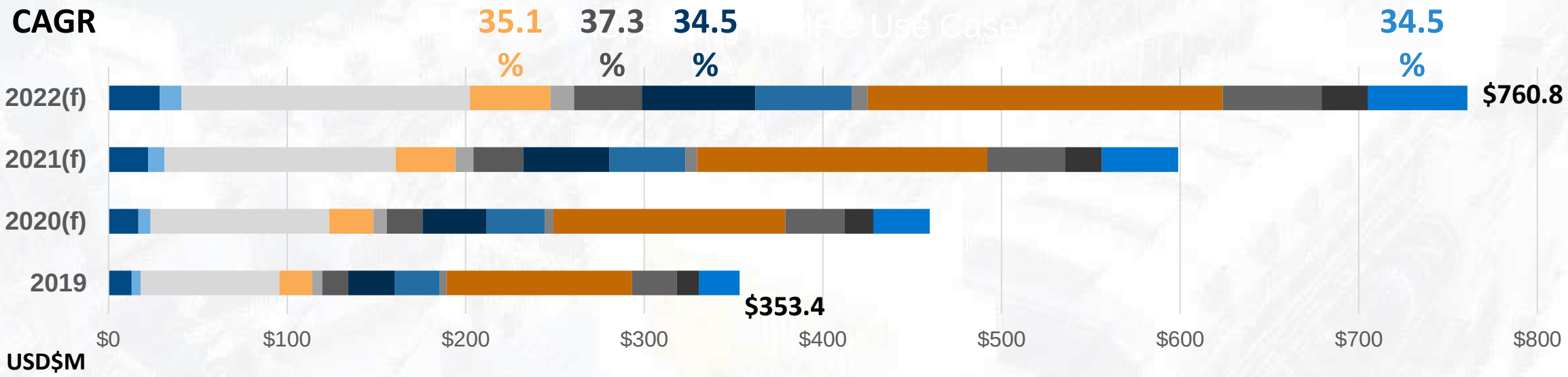
Data / AI Driven is the New Normal

IDC Analyze the Future

Source: AP Manufacturing Insights; n = 446 (2017); 677 (2018); 783 (2019)

Key AI / Automation Use Case in MFG

75% Manufacturers leverage analytics technologies to enhance the capabilities



- Automated Customer Service Agents
- Automated Preventative Maintenance
- Digital Twin/Advanced Digital Simulation
- **IT Automation**
- Pharmaceutical Research and Discovery
- Regulatory Intelligence
- **Supply and Logistics**
- Automated Human Resources
- **Digital Assistants for Enterprise Knowledge Workers**
- **Intelligent Process Automation**
- Others
- Quality Management Investigation and Recommendation Systems
- Sales Process Recommendation and Automation

n = 346
Note: Multiple dichotomous table - total will not sum to 100%.
Source: Analytics, AI and Intelligent Automation Services Survey 2019, IDC, May, 2019

IDC Analyze the Future

Data Driven Enterprise Drives New Generation Infrastructure

1 Security

2 Consolidation

3 Scalability

4 Reliability

5 Openness

6 Visualization

IDC Analyze the Future

Use Cases toward Data Driven Manufacturers

- **Challenges / Solution:**

Big data analytic solution to detect vulnerabilities in their new car prototypes

- **Result:**

(1) Ensure higher quality in early stage

(2) Boost brand reputation and save lives

(3) Reduce recalls of cars already in use / warranty cost

AMRC

- **Challenges / Solution:**

AI-enabled visual inspection system for quickly defect faulty parts with less waste

- **Result:**

(1) Deliver image-transfer speed of 5GB/s

(2) Streamlines model training and data management

(3) 5 days to deliver a proof of concept solution

tsmc

- **Challenges / Solution:**

AI-enabled trade Secret Registration and Management System

- **Result:**

(1) AI chatbot that provides quick replies to frequently asked questions

(2) Build up the date analysis function for data visualization

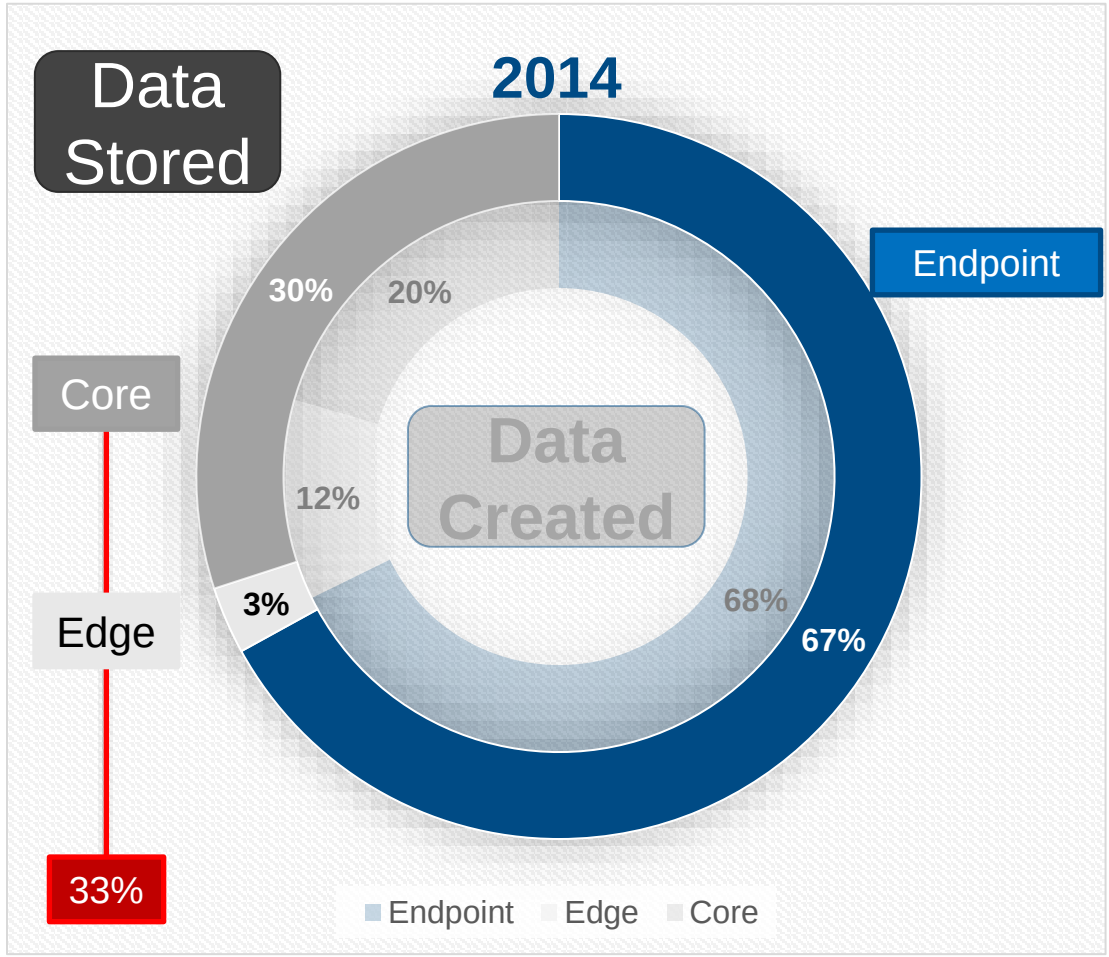
(3) Higher competitiveness

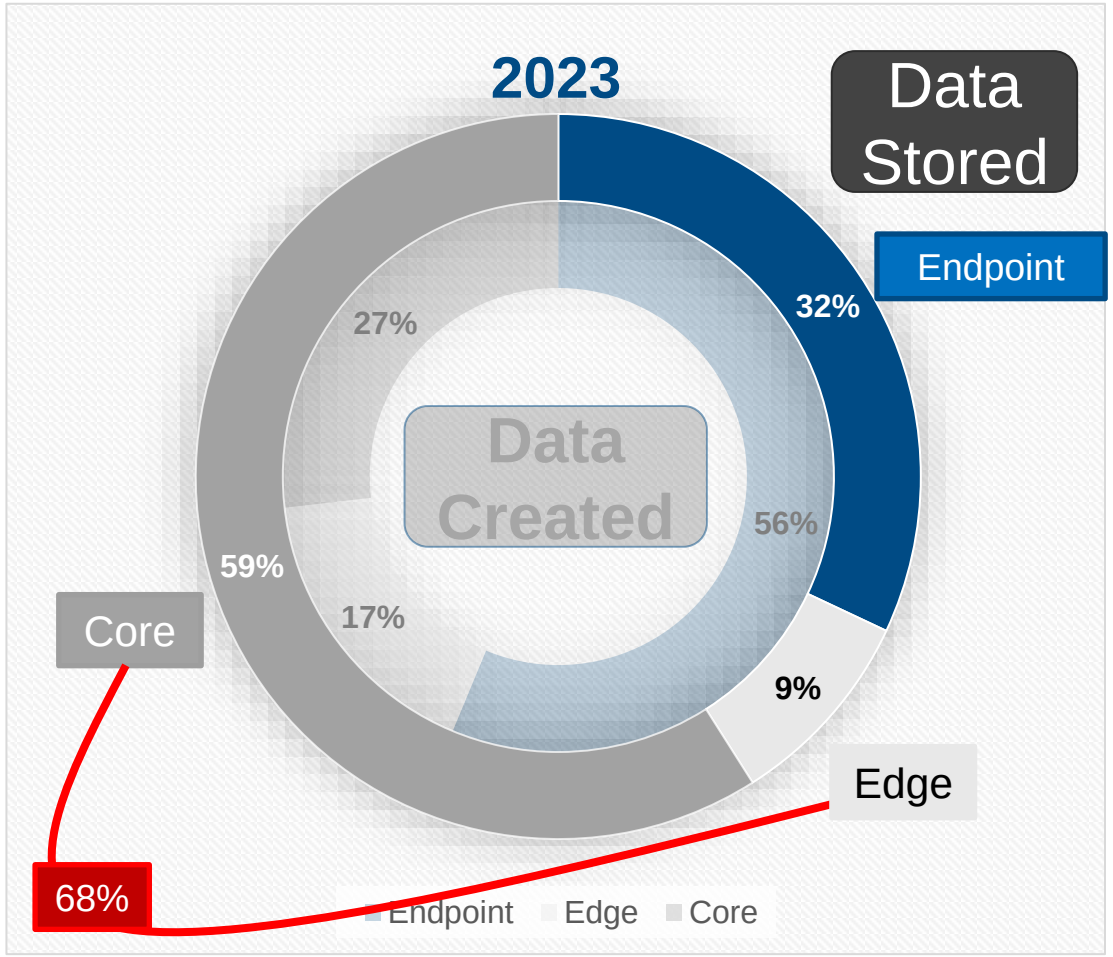
IDC Analyze the Future

The Growing Importance of Edge

Enterprise

Creating Versus Storing Data





You Can’t Do It All – Learn to Partner

- Focus on doing what you know best
- Focused elements of the solution
- You don’t have to control everything or lead from the front for successful projects
- Prepare to source business IP partners to complement your technology and services
- Leverage others’ technology
- Specialize to leverage your advantages
- Look to monetize services and data
- Focus allows repeatable elements and scale

IDC Analyze the Future

IDC
Analyze the Future

IDC x IBM 數位轉型2.0
企業決勝點：資料儲存策略

台灣製造業案例分享

Jim Lin
台灣IBM 硬體系統部 資深業務經理

製造業要求下的儲存需求與功能挑戰？

IBM Spectrum Virtualize

IBM Spectrum Control

要求7x24，兩廠互為備援，不中斷的服務

預算有限，又面臨數據，不斷增長

不想被特定供應商所束縛，
又不希望造成，存儲孤島，功能孤島，服務孤島等。

如何更有彈性？
可以滿足業務用戶需求，和資料安全和保護？

製造業客戶實際案例架構分享

採用 IBM 軟體定義解決方案，應用Stretched Cluster技術，將每一對虛擬化引擎分別部署於兩地機房之間，實現跨機房間的虛擬化集群。

可整合並最佳化新舊、不同來源之儲存空間，並提供重複刪除與資料壓縮等機制。

Spectrum Virtualize是核心的軟件引擎，可以虛擬整合500多種不同的儲存系統。快照，異備，資料加密。

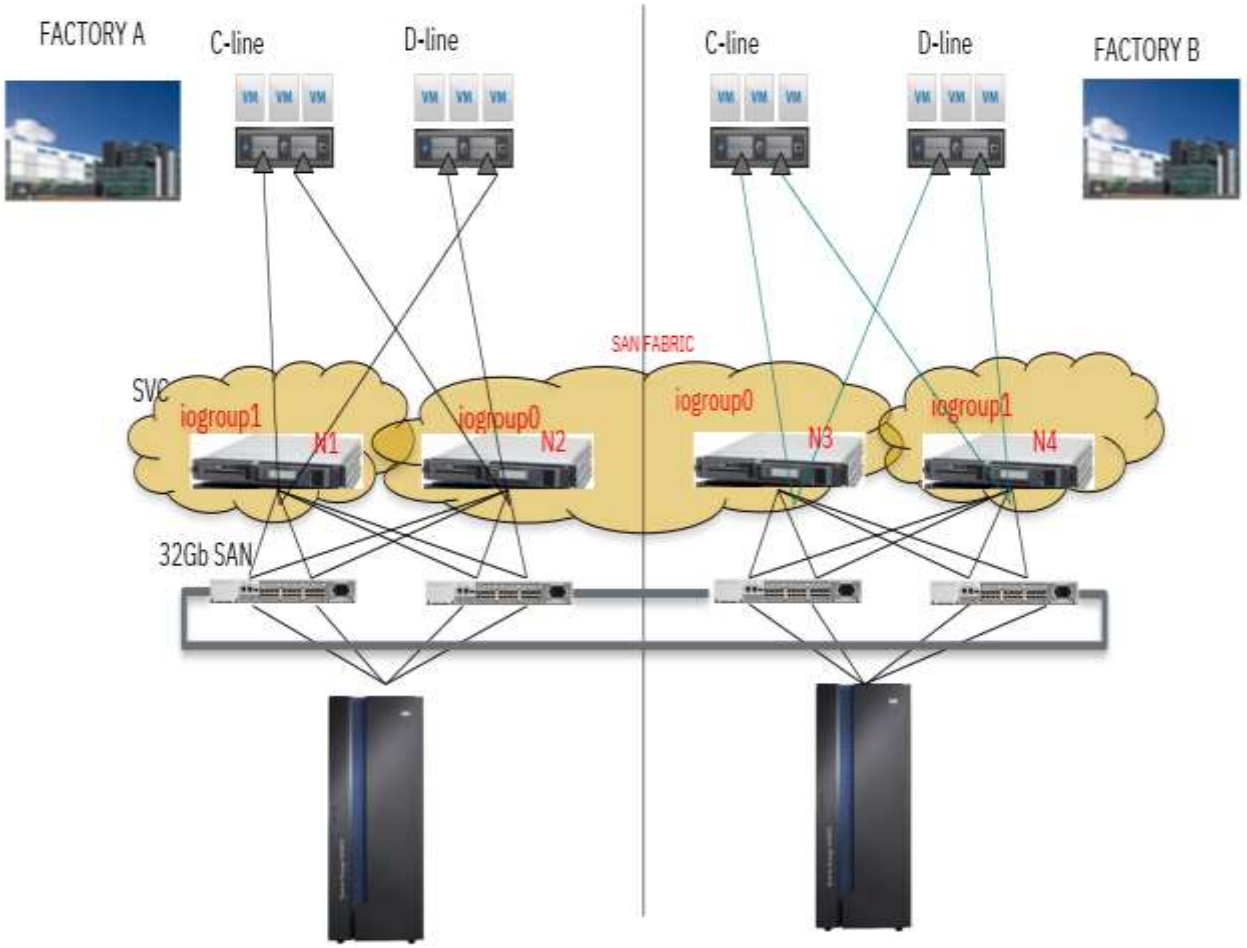
可彈性擴展，資料分級分層，可線上資料遷移，並可開源服務支持及雲端服務整合等機制。

具備支援開源應用和雲端服務能力

IBM Spectrum Virtualize

IBM Spectrum Control

Unique Uptime Solves Real Client Pain Points



Thank you

IBM 全閃存虛擬技術解決方案

陳瑞基 (AKIRA CHEN)

台灣IBM硬體系統部 資深技術顧問

針對資料儲存需求，客戶所面臨的要求與挑戰？

Old and New

65%

cut infrastructure costs

59%

avoid vendor lock-in and avoid data stored with different vendors' technologies in silos across the enterprise.

59%

improve latency

Storage connectivity

in the Hybrid Multicloud era matters. Storage must have a way to connect to the cloud.

Storage location

in Hybrid Multicloud matters depending on data security, regulatory environments, performance, and availability requirements.

Speed of adoption

in the Hybrid Multicloud era matters. NVMe, Storage Class Memory (SCM), and Software-Defined Storage (SDS)

如何幫助
製造業解決
處理資料
所遇到的
困難與挑戰？

架構簡化
資料安全

-高可用性

-異備需求

IBM:

儲存虛擬解決方案

軟體定義儲存方案

資源整合
方便管理

-異質儲存整合

-空間效能效率化

-單一管理界面

IBM:

儲存虛擬解決方案

全閃存解決方案

軟體定義儲存方案

因應未來
雲端支援

-強化傳統架構

-新型服務導入

-混合雲平台建置

IBM:

儲存虛擬解決方案

軟體定義儲存方案

雲端作業系統

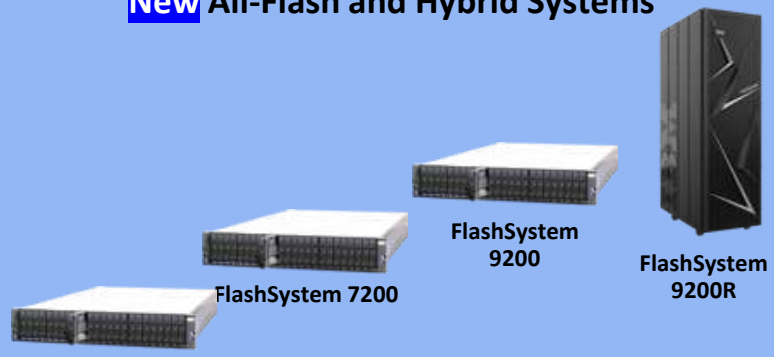
IBM 全儲存產品：企業數位轉型最佳利器

Storage for Hybrid Multicloud (混合雲)

IBM Storage Insights

IBM Spectrum Virtualize

New All-Flash and Hybrid Systems



SVC

SAN Volume Controller

Storage for Z

Networking

Storage for AI & Big Data (人工智慧與大數據)

IBM Spectrum Discover

IBM Spectrum Scale

IBM Cloud Object Storage

Elastic Storage System

Cloud Object Storage

Cyber Resiliency & Modern Data Protection (網絡安全和現代化數據保護)

IBM Spectrum Protect Suite

Hybrid Cloud

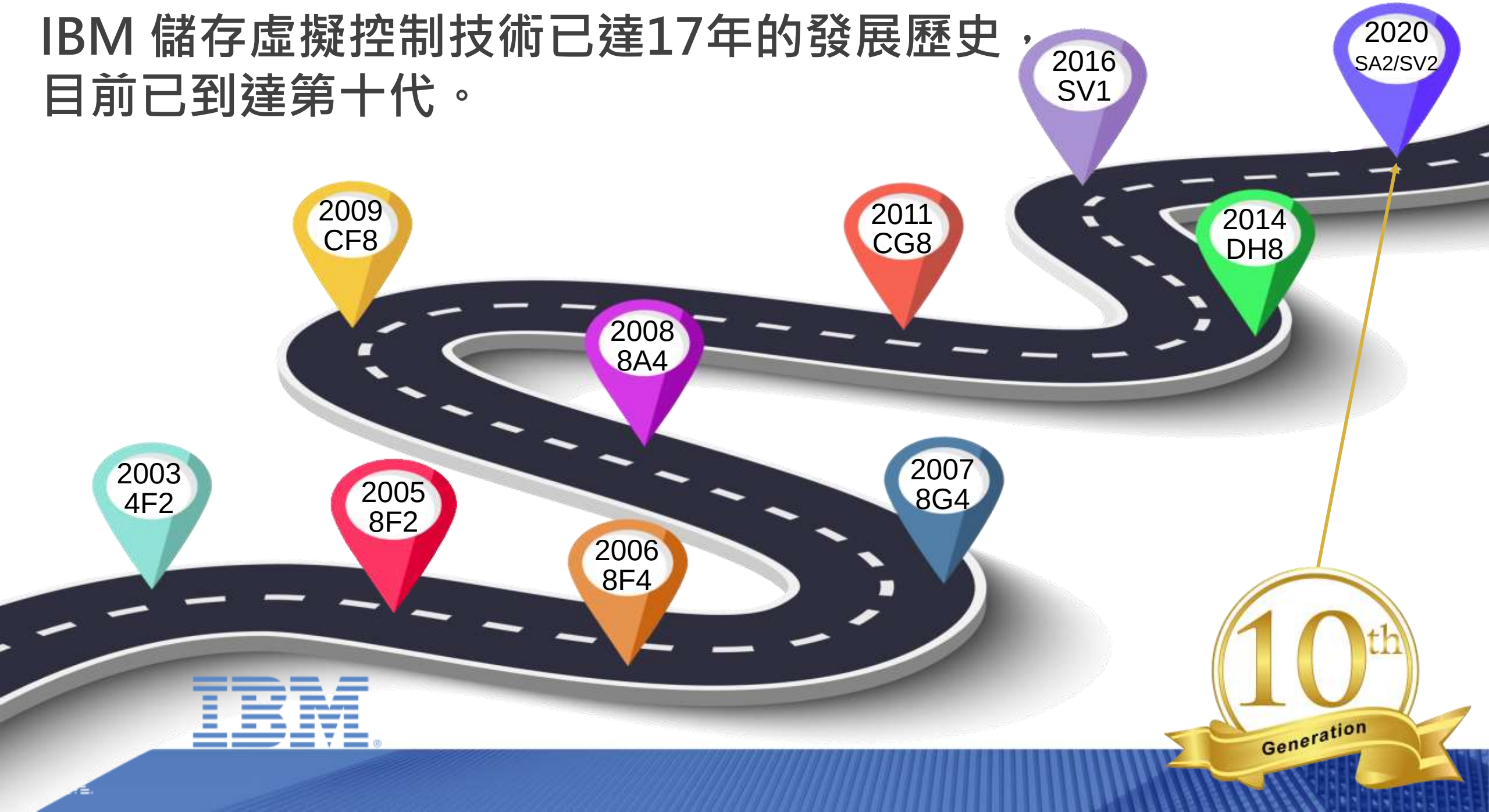
Snapshots

Tape

VMs

Containers

IBM 儲存虛擬控制技術已達17年的發展歷史，目前已到達第十代。



IBM支援叢集使用不同代的儲存控制器
以求最大限度保障客戶既有投資

SVC SV1

+

SVC SV2

+

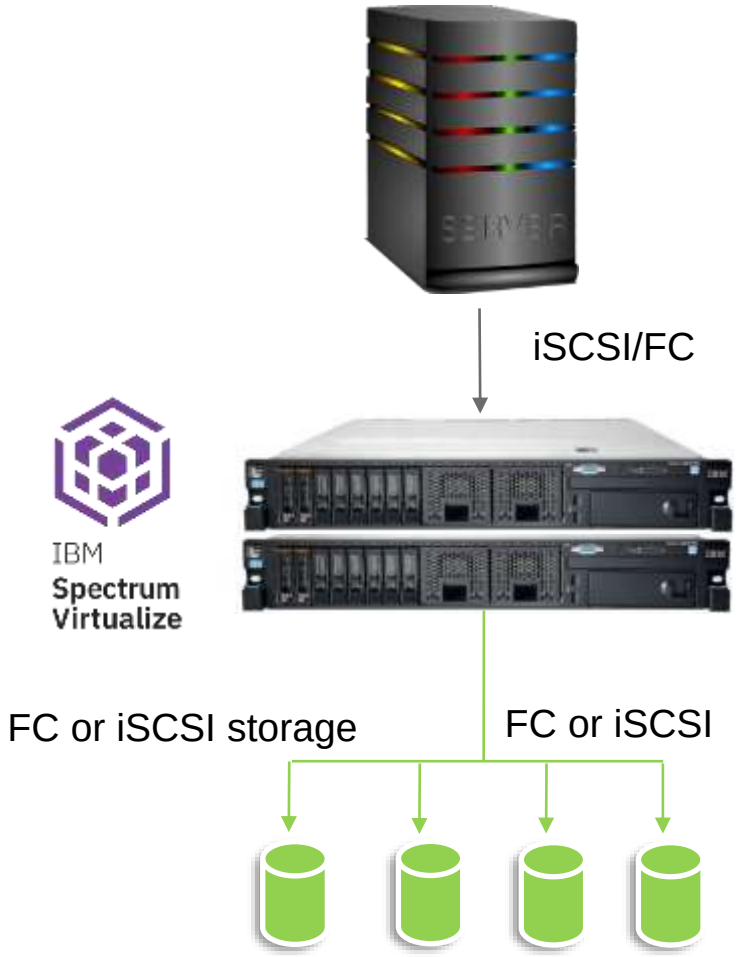
+

SVC DH8

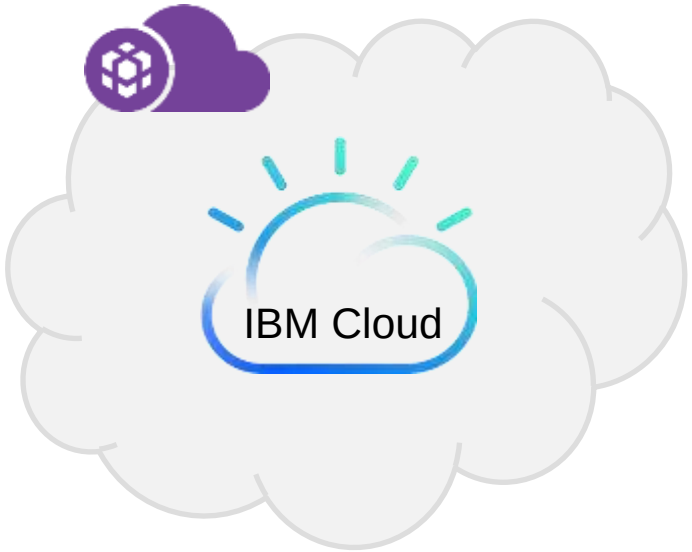
+

SVC SA2

IBM Spectrum Virtualize-本地和雲端均可佈署與整合



On IBM Cloud, IBM Spectrum Virtualize for Public Cloud is built on bare metal servers, with Endurance or Performance storage.



On AWS, IBM Spectrum Virtualize for Public Cloud is built on Elastic Compute Cloud (EC2) instances, with EBS storage.

On-premises

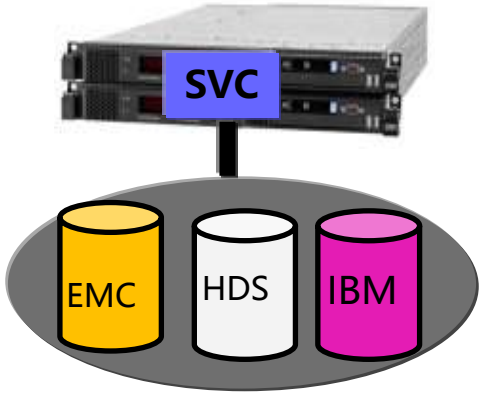
IBM Cloud

Full Spectrum Virtualize for Public Cloud Deck

AWS

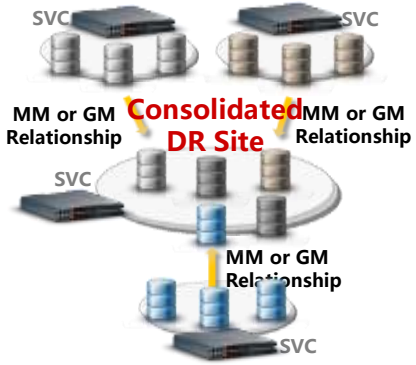
IBM儲存虛擬化技術應用場景
SVC儲存控制器具備可讀寫快取記憶體，可以增進儲存效能

異質儲存整合

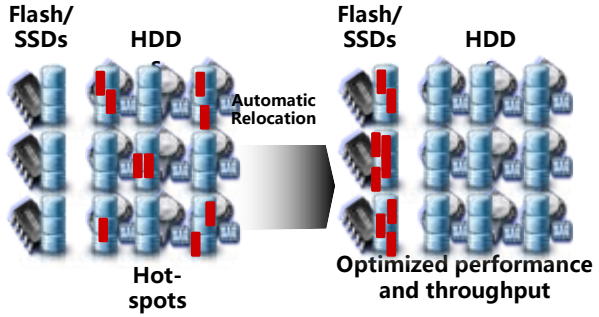


本地高可用

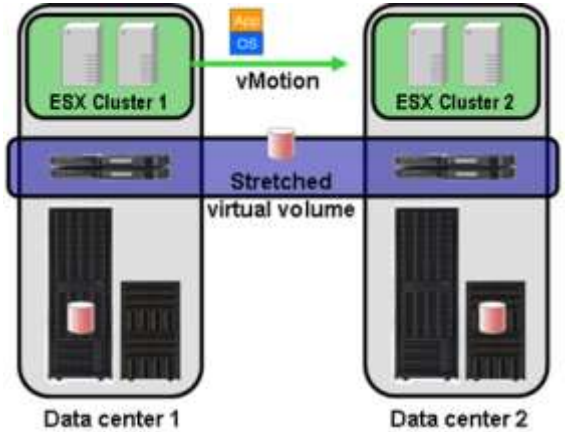
線上資料移轉



異質儲存災備

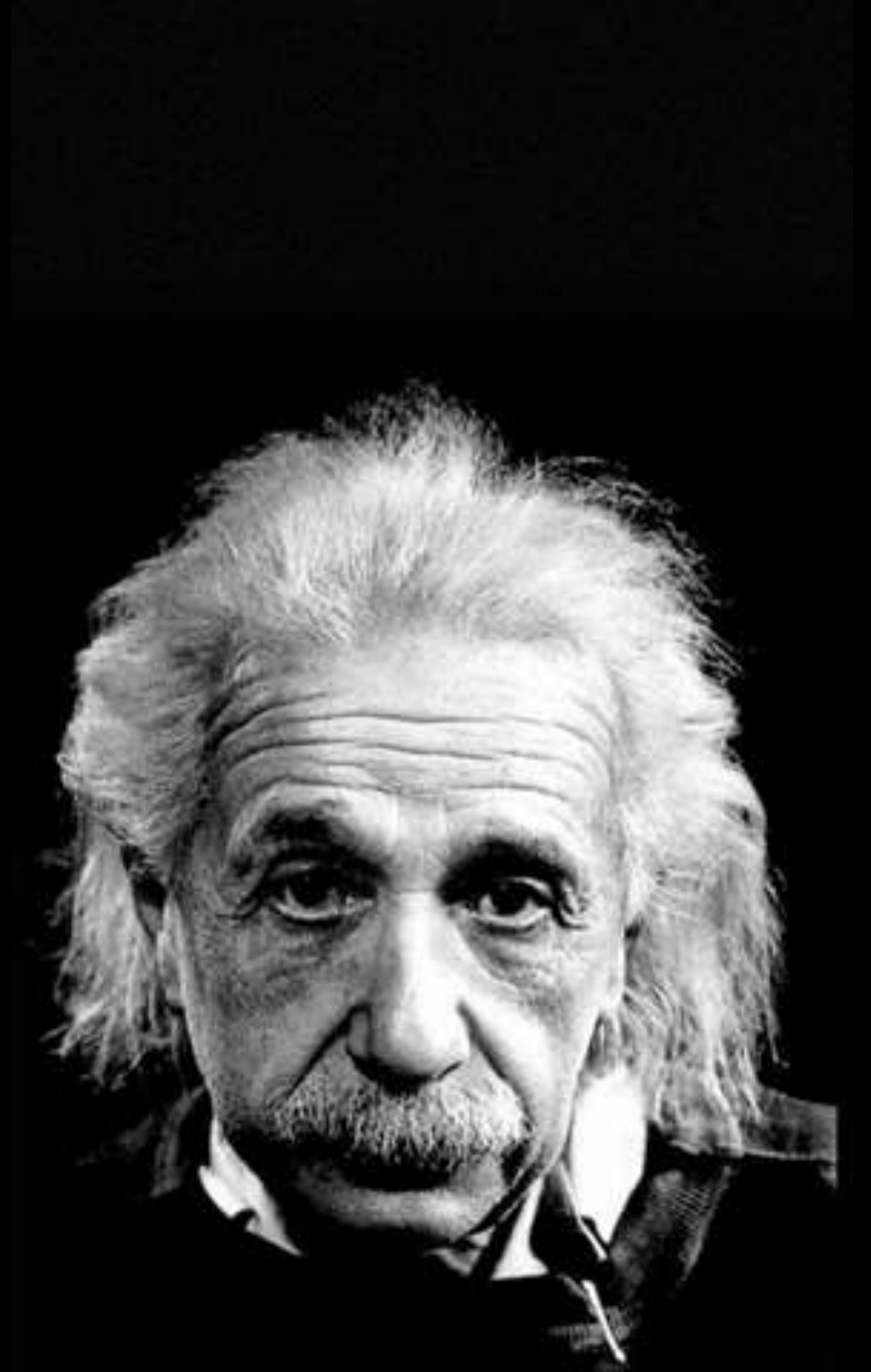


自動分級儲存



儲存雙活中心

“Everything should be made as Simple as possible…
but not Simpler”
Albert Einstein



IBM
全閃儲存系列

滿足現代高效能

應用程式的需求而設計

獲得保證的

業界先進技術

全快閃記憶體儲存設備虛擬化

管理混合式環境並合併工作負載

優化您的效能

滿足您全公司最重要應用程式的需求

IBM全閃存系列產品
-具備儲存虛擬化核心技術
-具備可結合雲端之儲存管理技術

*Illustrative performance comparison, will vary based on workloads and configurations

IBM FlashSystem Product Family

Performance

Scalability

IBM install, ECS service
Technical Advisor, 24x7, 30 min response

SAS AFA and Hybrid

NVMe AFA and Hybrid

NVMe AFA

FlashSystem 5010

FlashSystem 5030

FlashSystem 5100

FlashSystem 7200

FlashSystem 9200

FlashSystem 9200R

End-to-End NVMe with FCMs

Entry Enterprise

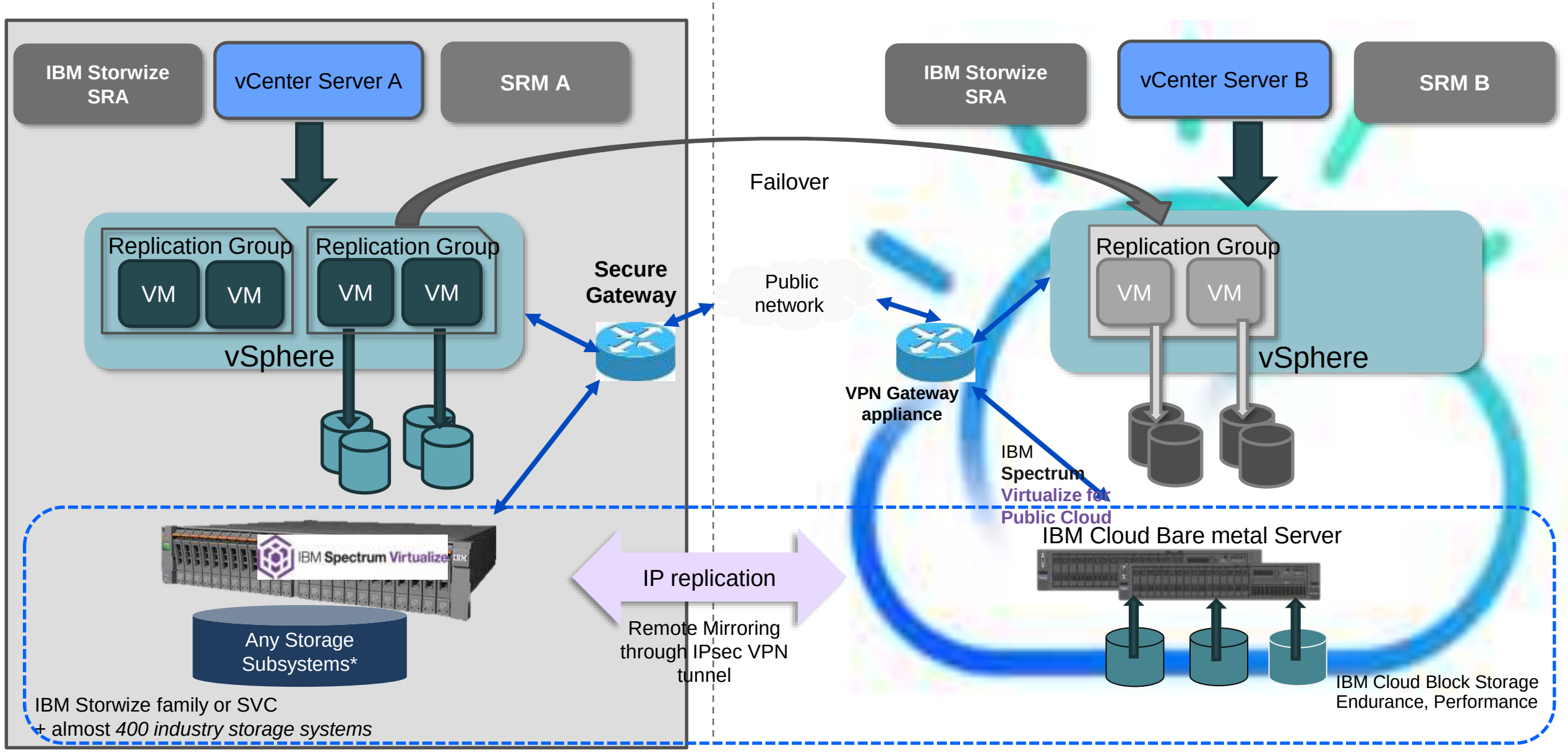
Midrange Enterprise

High-End Enterprise

IBM Spectrum Virtualize

IBM Storage Insights

Spectrum Virtualize 可整合Vmware實現業務高可用性的混合雲解決方案



IBM FlashSystem 使用的快閃儲存體

Think **EASY TIER**

	SAS SSD	NVMe SSD	FlashCore Module	SCM SSD
Type of Flash	3D NAND	3D NAND	3D NAND	Optane, zSSD
Protocol	Serial Attached SCSI	NVMe	NVMe	NVMe
Physical Size	2.5”	2.5”	2.5”	2.5”
Capacities	1.92TB – 30TB	800GB – 15.36TB	4.8TB – 38.4TB	350GB – 1.6TB
Differentiator	None	None	Hardware Comp and Encryption	Ultra low Latency
	5010/5030 – Control Enc. All models – Exp. Enc.	FlashSystem 5100 FlashSystem 7200 FlashSystem 9200/R	FlashSystem 5100 FlashSystem 7200 FlashSystem 9200/R	FlashSystem 5100 FlashSystem 7200 FlashSystem 9200/R

IBM FlashCore 擁有的特異性能

Valuable and Eliminates Pain

Special access to the Flash cells

Continually assesses health

Hotter data placed in healthier blocks increases endurance by up to 57%

Write amplification reduced up to 45%

Variable Voltage extends flash life

High-performance, high reliability flash

Hardware compression and encryption with no performance penalty. This delivers the industry's highest capacity flash modules.

Results:

- Flash lifespan is extended
- Latency does not degrade
- Errors and downtime reduced
- Compression without penalty
- Clients become focused on real world workloads rather than warranty issues

Spectrum 軟體套件

This diagram shows which product is included in which „package”

IBM Spectrum Control Base Edition *)

IBM Spectrum Storage Suite

Virtual Storage Center

Spectrum Control Advanced Edition

IBM Spectrum Control Standard

IBM Copy Services Manager

+

Analytics & Optimization & Provisioning

+

IBM Spectrum Protect Snapshot

+

IBM Spectrum Virtualize

Base Virtualization &
FlashCopy &
Metro & Global Mirror

+

Protect

Archive

Accelerate

Scale

IBM Cloud Object Storage

Spectrum Virtualize

Compression

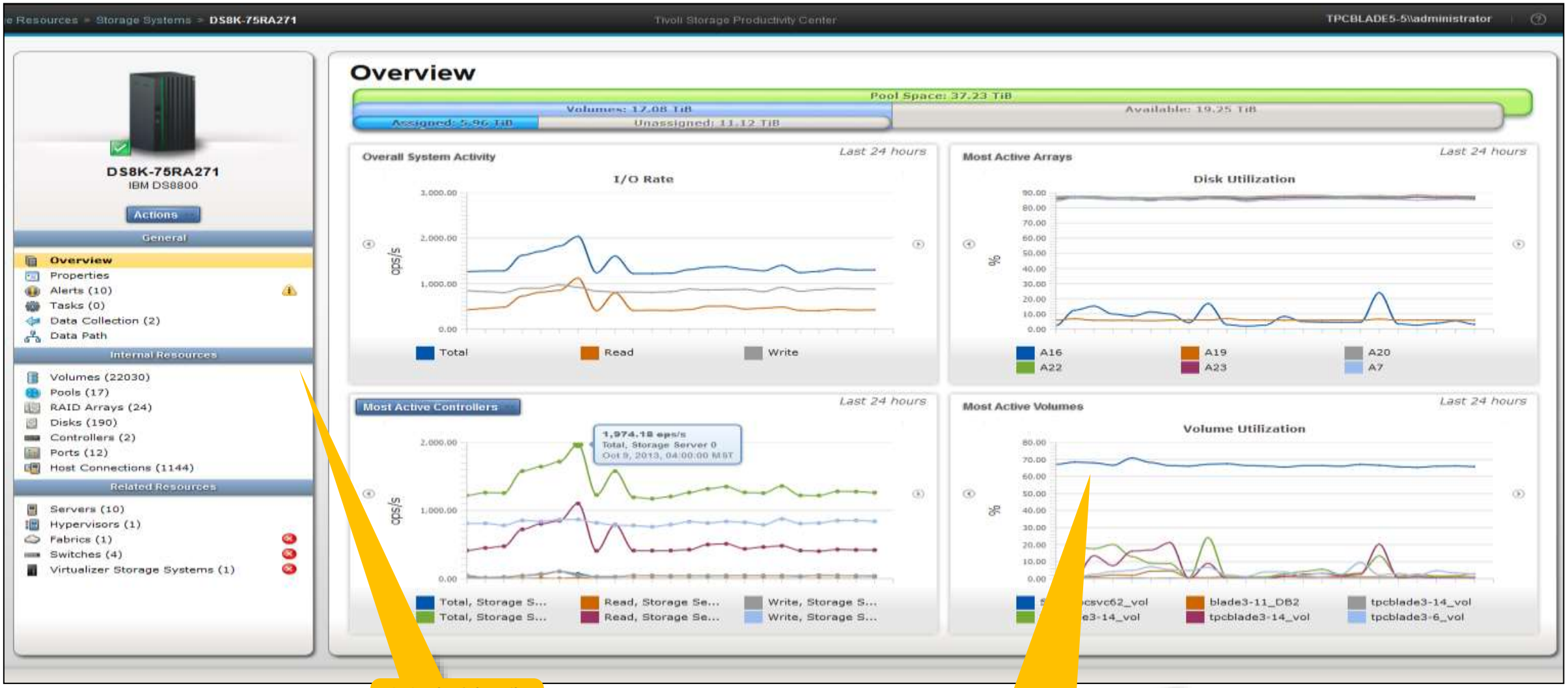
Spectrum Virtualize

Encryption

IBM Spectrum Control 單一整合化介面管理環境中各個SAN元件

IBM Spectrum Control 全域一目瞭然的性能監控與分析

- 接近實時 (real-time) 的效能動態
- 各個 SAN 元件 End to End的效能
- 儲存事件與故障監控管理
- 縮短錯誤診斷、隔離與排除的時間



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