

# 儲存架構優化－最佳配置提升效能&可用性

*IBM Spectrum Storage Family*

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Senior Storage Consultant



# What are you looking for?

## Speed

change only what you need to change to get value faster

## Flexibility

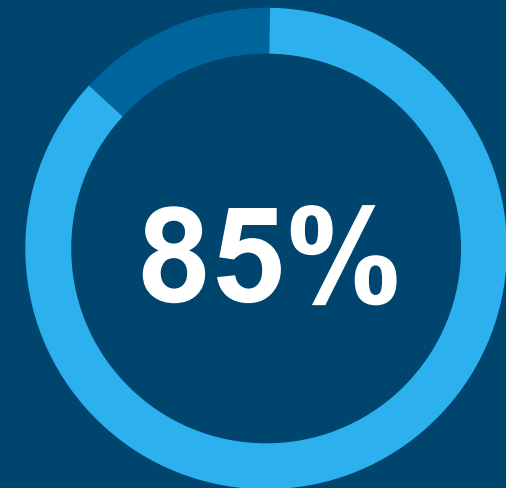
positioning workloads to best deliver on business objectives

## Innovation

integrate cloud services, open communities and emerging technologies (cognitive, blockchain, IoT, etc.) to maximize opportunity

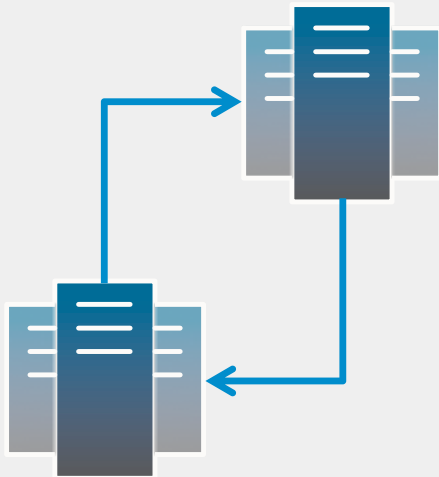
## Insight

combine your data and processes with new sources of information to get to the best outcomes

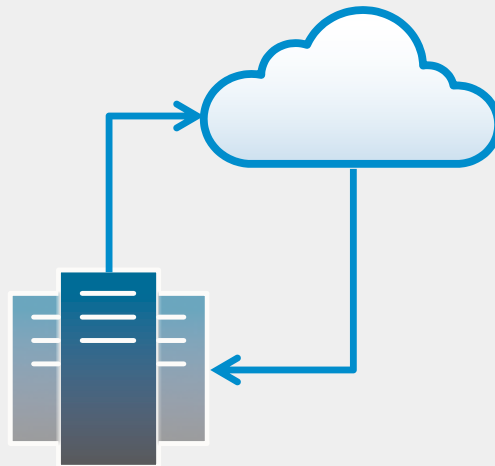


of leaders implementing hybrid cloud say it is accelerating digital transformation in their organizations\*

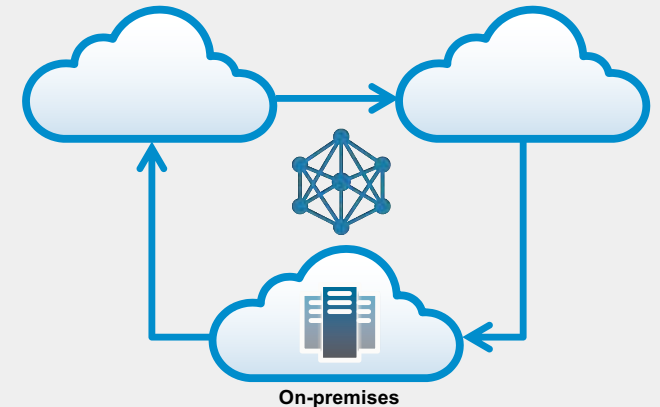
# Hybrid cloud is the bridge to your future



**Traditional IT**  
**[Dedicated systems]**  
*Data center driven*



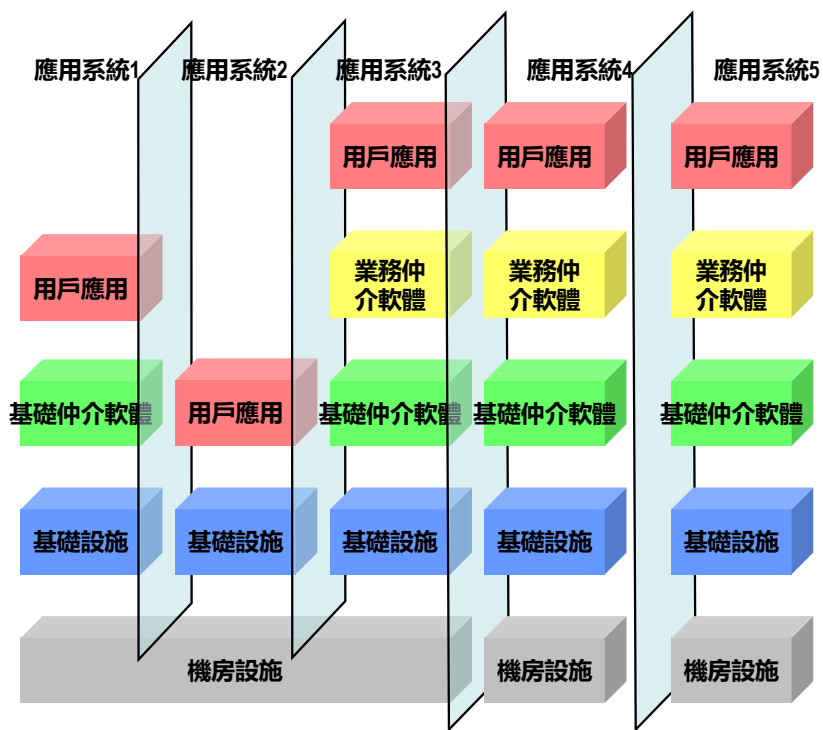
**Hybrid Cloud Storage**  
*Use case driven*



**Inter-operational Clouds**  
*IT in the service of business*

**Future-proof your data**

## 絕大多數客戶的現狀 → 傳統孤島式 IT 架構的包袱



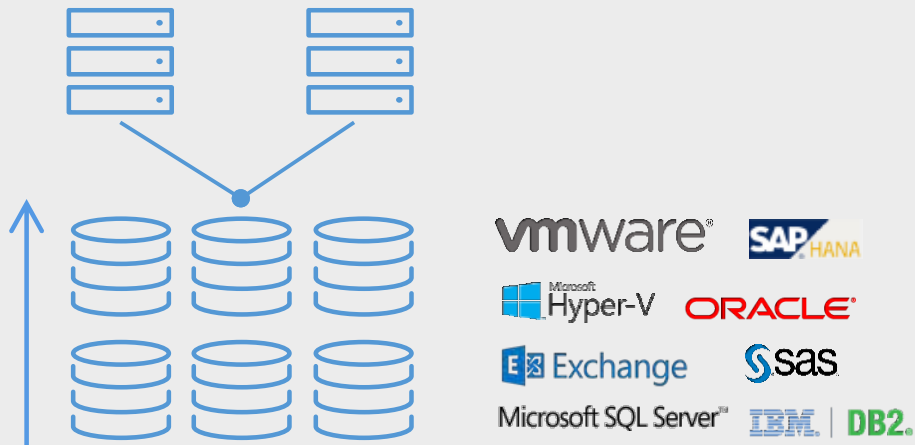
資源利用率低

回應業務慢

採購/管理/運營成本高

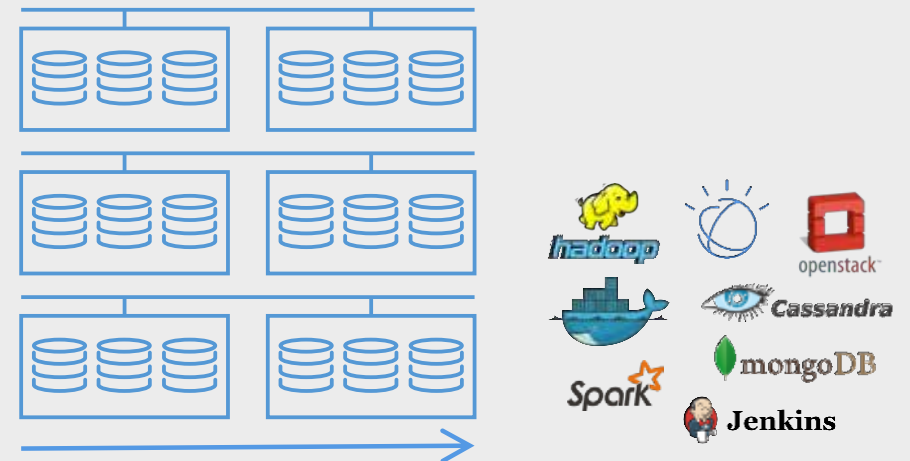
# 未來IT 基礎架構的需求及趨勢

## Traditional application workloads



Optimize traditional application infrastructure to free up money and resources.

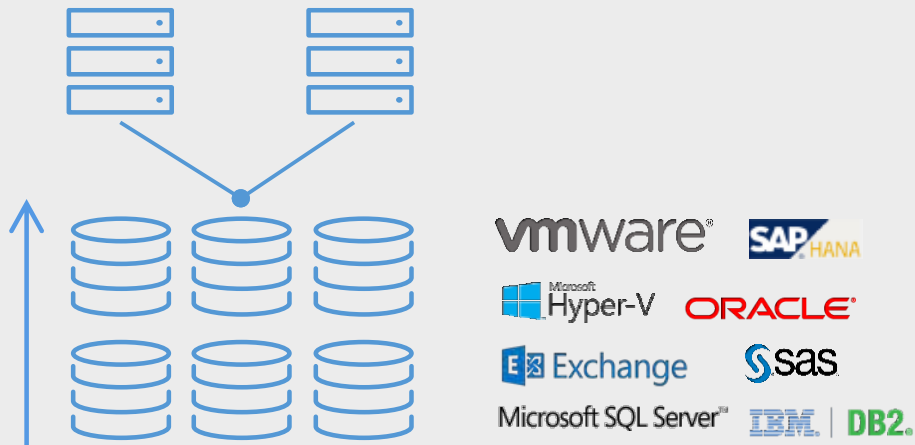
## New generation application workloads



Invest in, deliver and operate new application infrastructure to run IOT, analytics, blockchain and other new workloads.

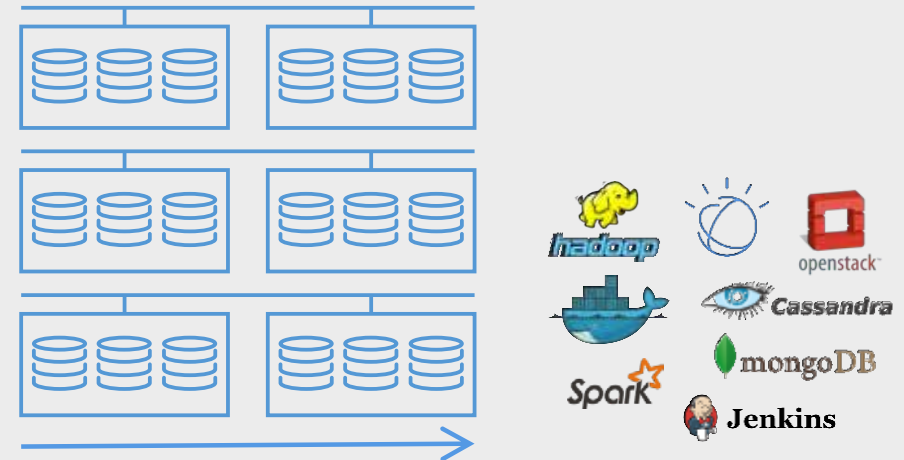
# How to move forward?

## Traditional application workloads



Optimize traditional application infrastructure to free up money and resources.

## New generation application workloads

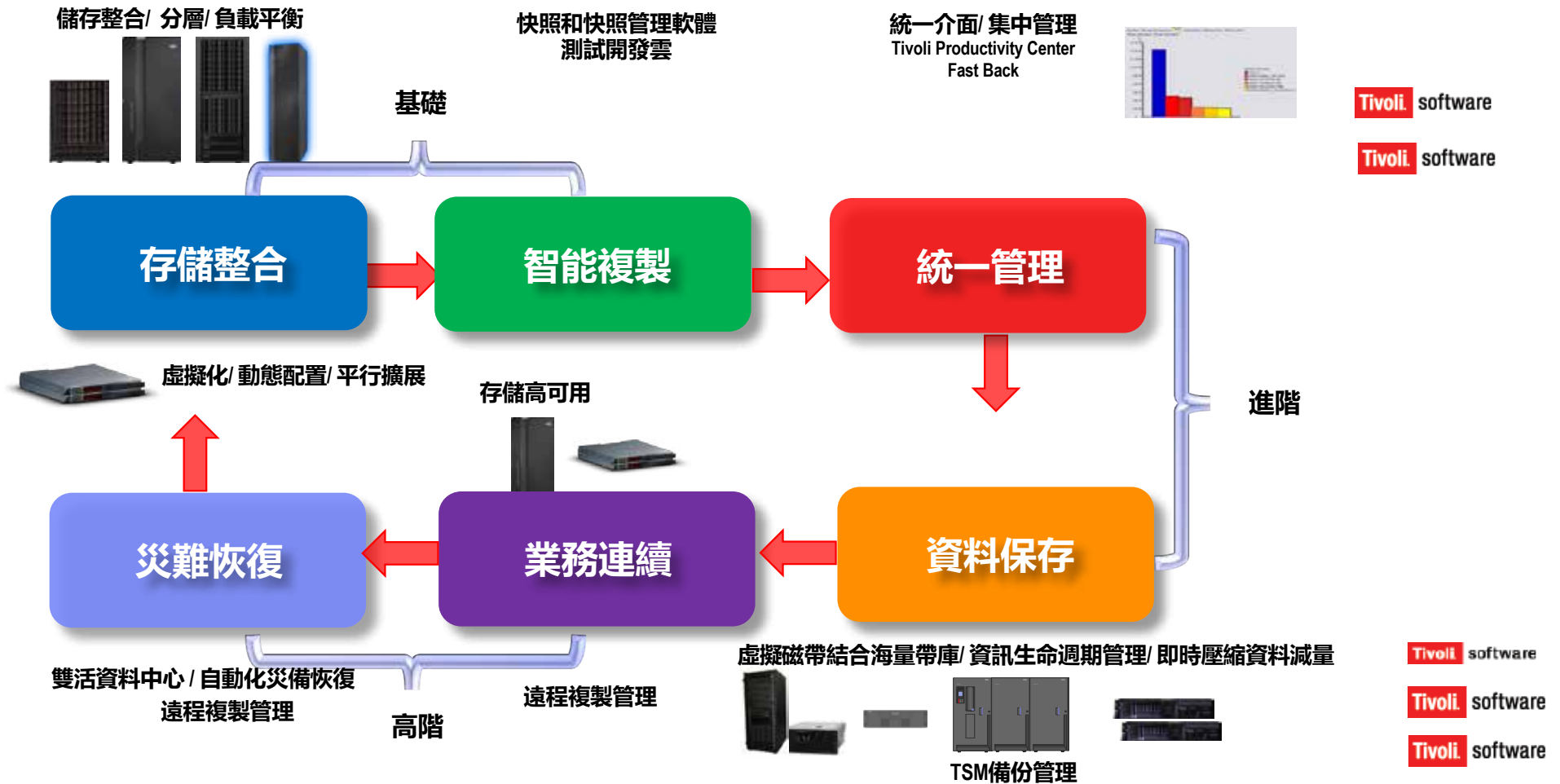


Invest in, deliver and operate new application infrastructure to run IOT, analytics, blockchain and other new workloads.

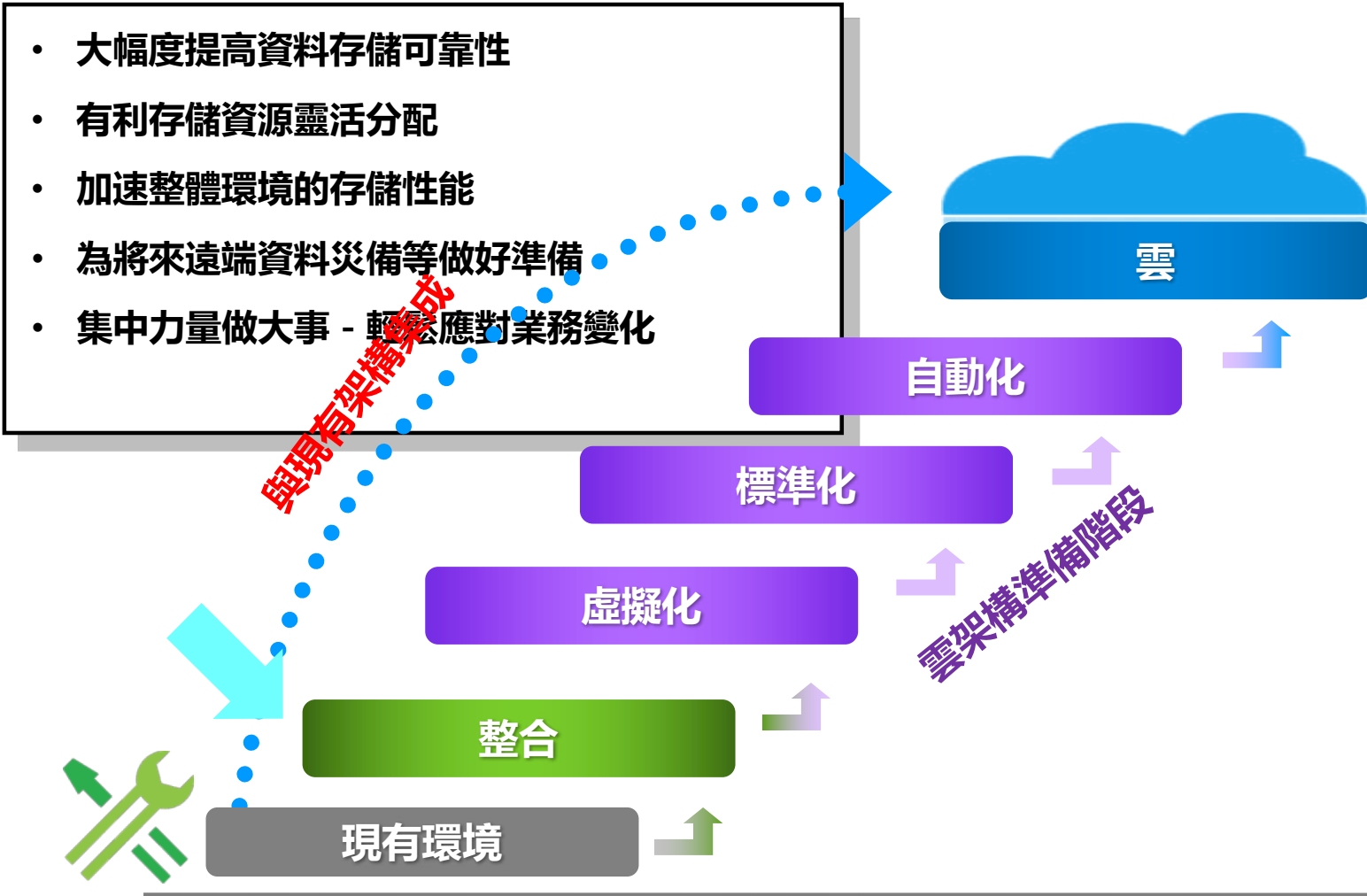
Use **software-defined storage**, driving **all-Flash**, **converged**, and **cloud**, to do so



# IBM 存儲系統優化 – 6階段具體解決方案












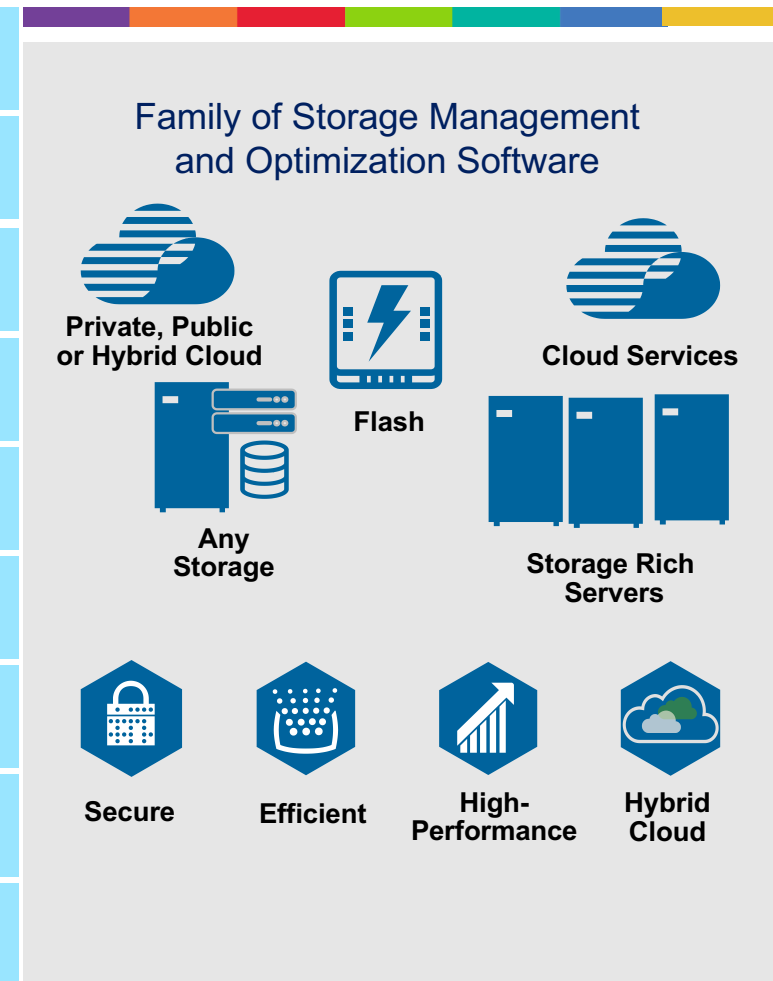
# 存儲整合的重要性





# IBM Software-Defined Storage Portfolio

 <b>IBM Spectrum Control</b>	Hybrid cloud storage and data management that helps optimize applications and reduce costs by up to 73%
 <b>IBM Spectrum Protect</b>	Optimized hybrid cloud data protection that can simplify restores and reduce backup costs by up to 53 percent
 <b>IBM Spectrum Protect Plus</b>	Complete VM protection and availability that's easy to set up and manage yet scalable for the enterprise
 <b>IBM Spectrum Virtualize</b>	Optimization of hybrid cloud block environments that helps improve flexibility and stores up to 5x more data
 <b>IBM Spectrum Archive</b>	Long term retention for active archive data that lowers costs up to 90% by delivering a fast tape file system
 <b>IBM Spectrum Accelerate</b>	Highly flexible, scale-out enterprise block storage for hybrid clouds that deploys in minutes
 <b>IBM Spectrum Scale</b>	High-performance, highly scalable hybrid cloud storage for unstructured data
 <b>IBM Cloud Object Storage</b>	Flexible and economical scalable hybrid cloud object storage with geo-dispersed enterprise availability and security
 <b>IBM Spectrum CDM</b>	Simplified copy data management that can increase business velocity and efficiency

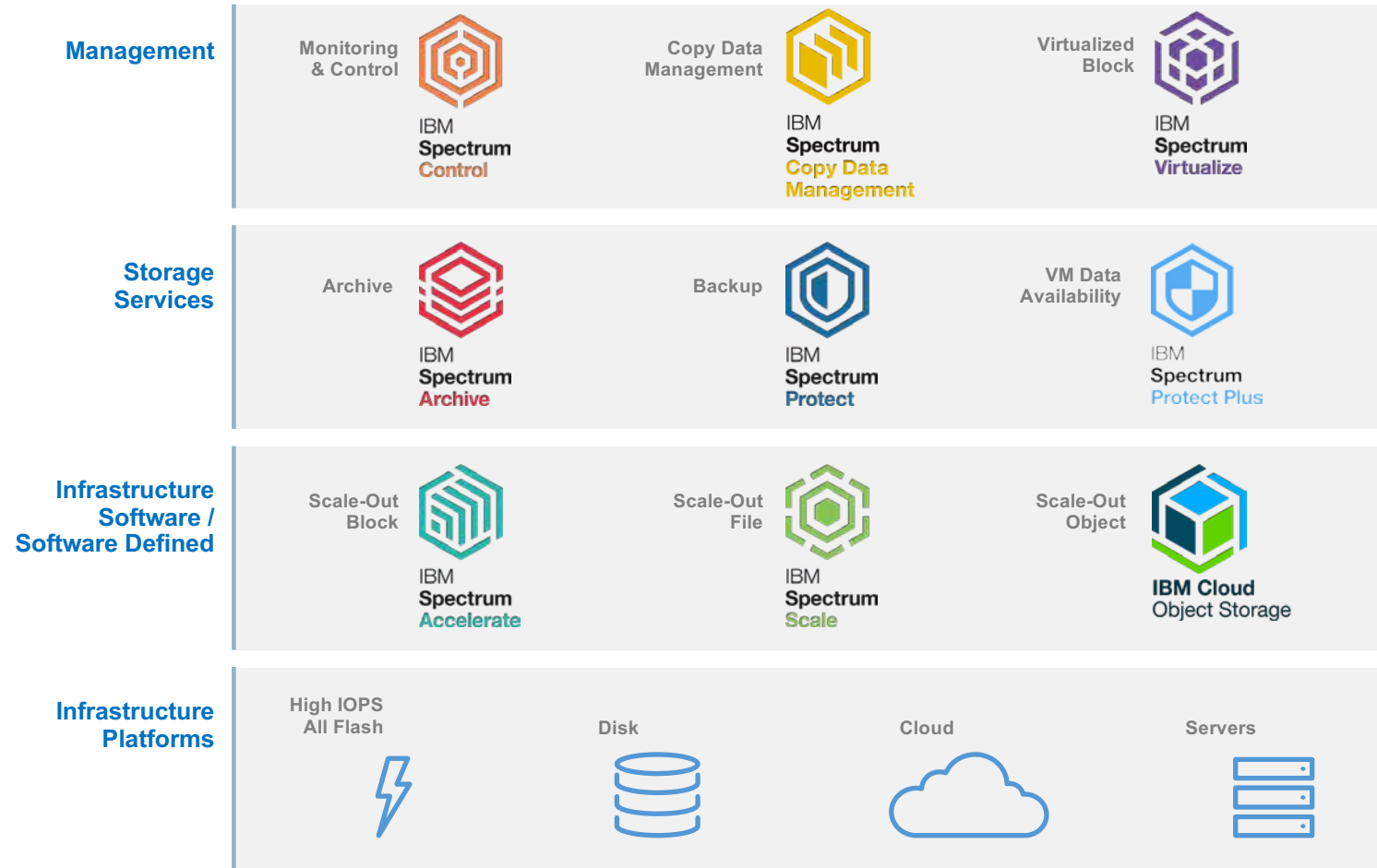


# IBM Spectrum Storage: Consumed as you like it



IBM  
**Spectrum  
Storage**

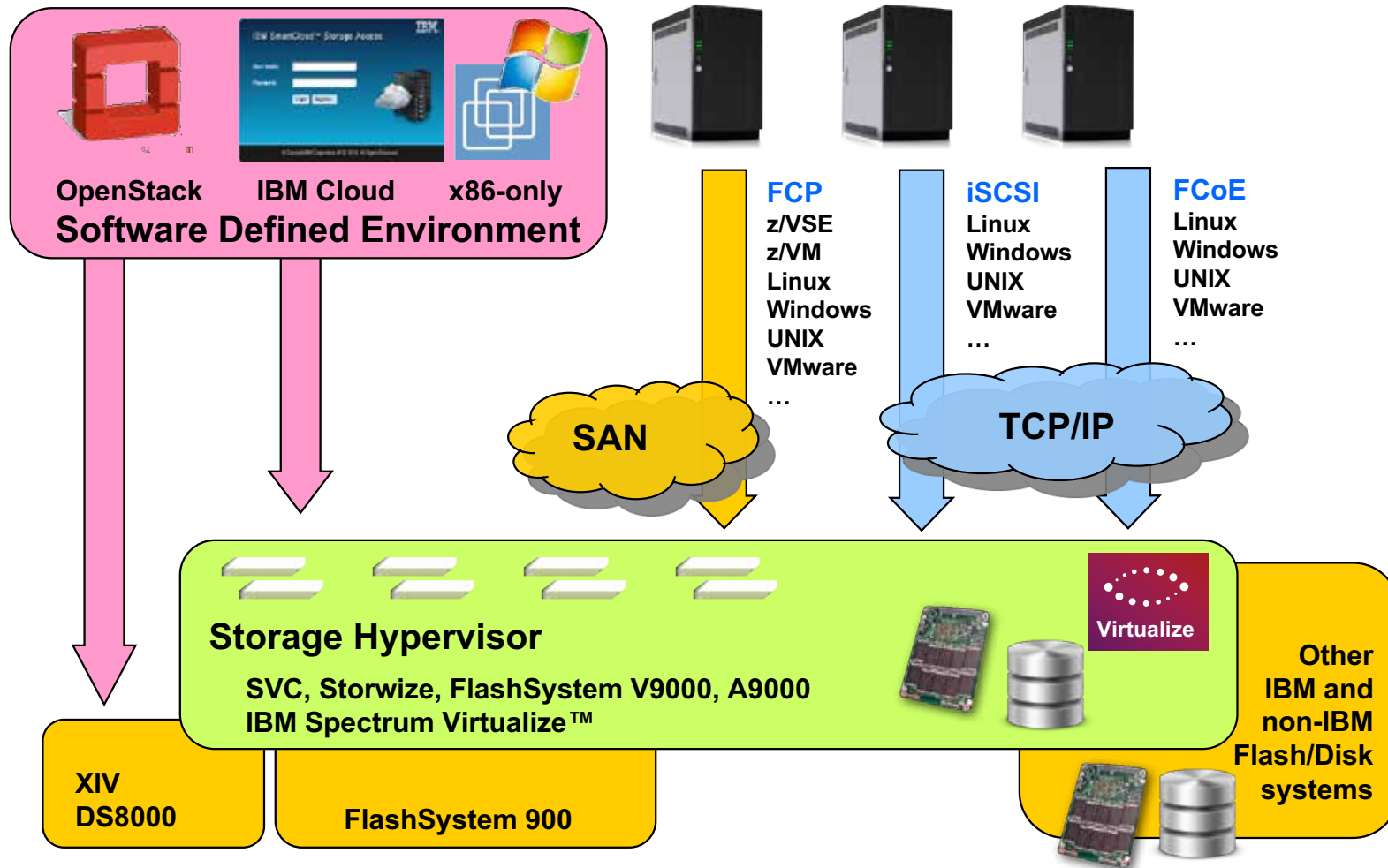
IBM's comprehensive set of software-defined storage tools delivered across appliance, converged and cloud.



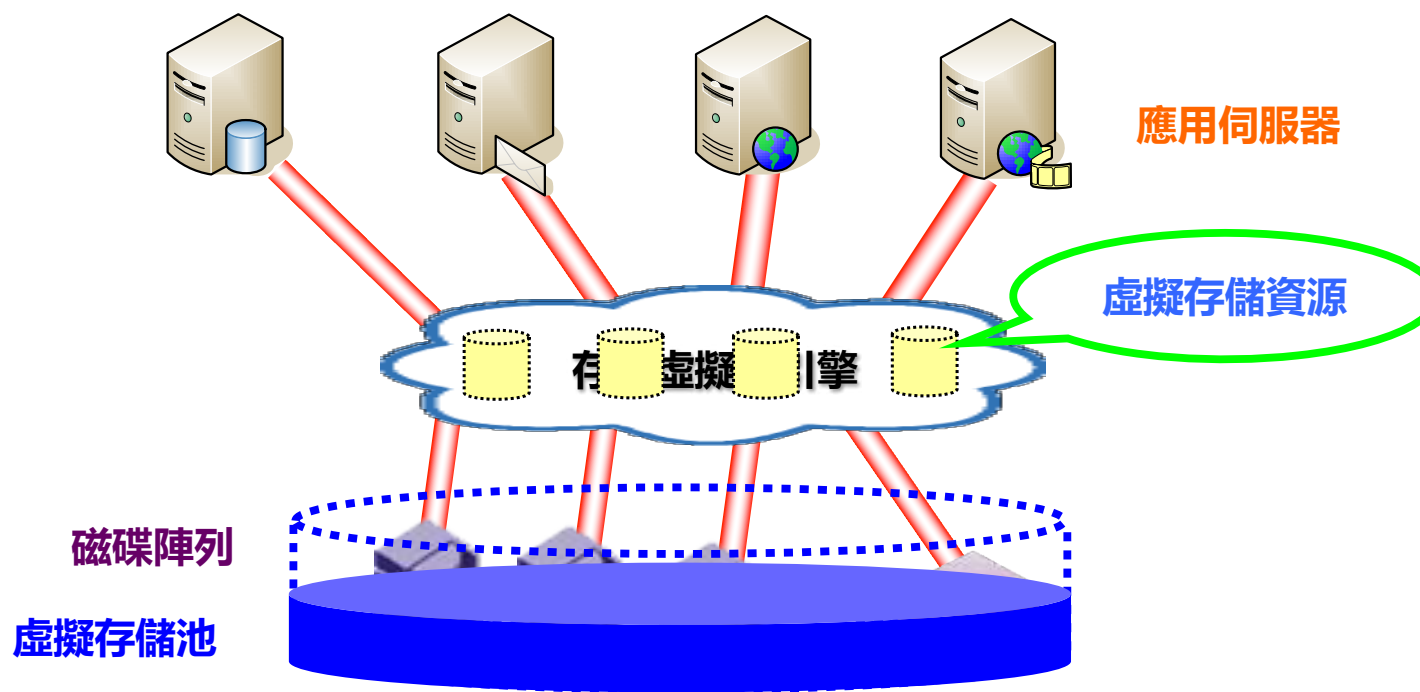
# IBM 軟體定義儲存 建議架構



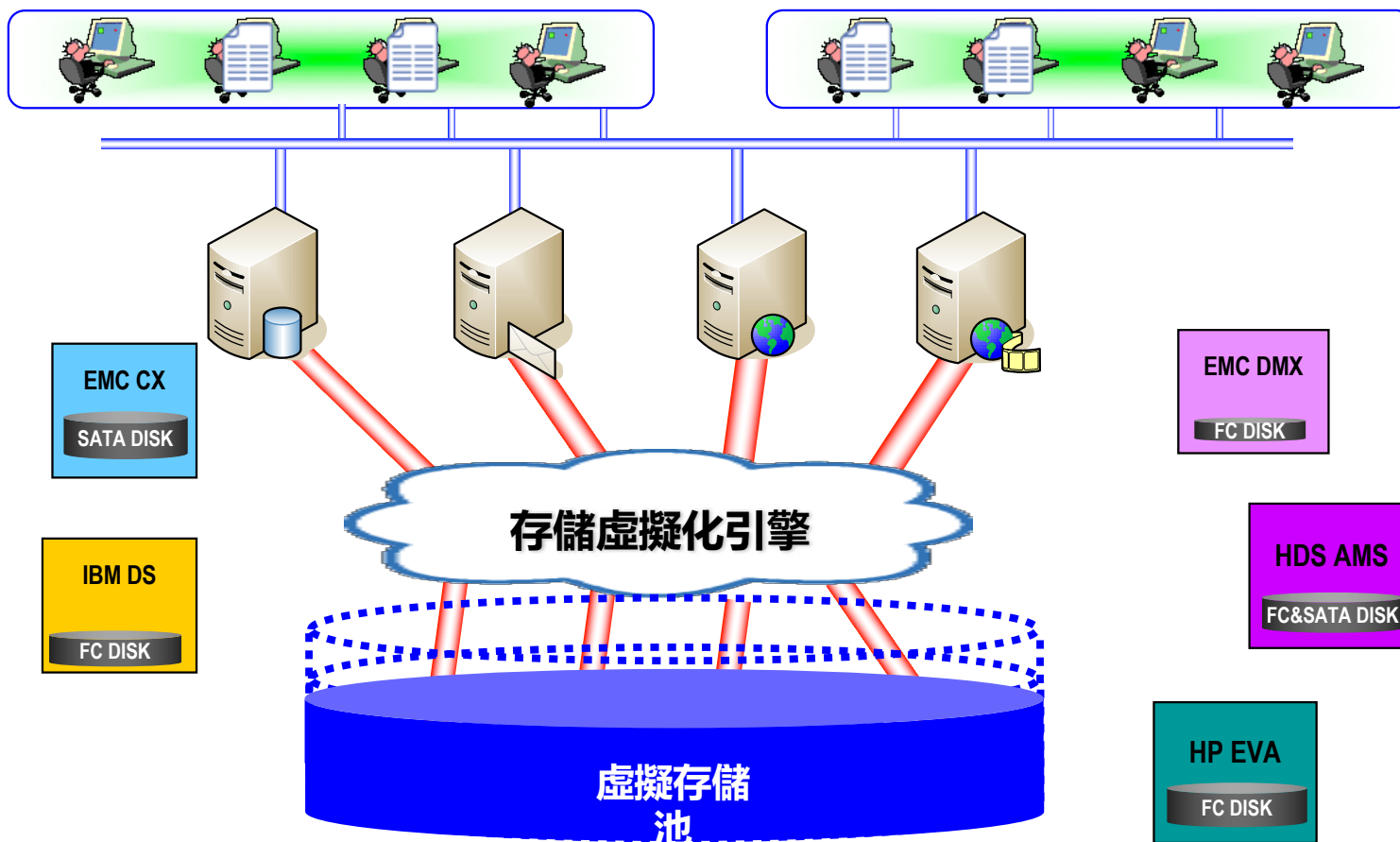
# IBM Vision: Software Defined Storage - Virtualization



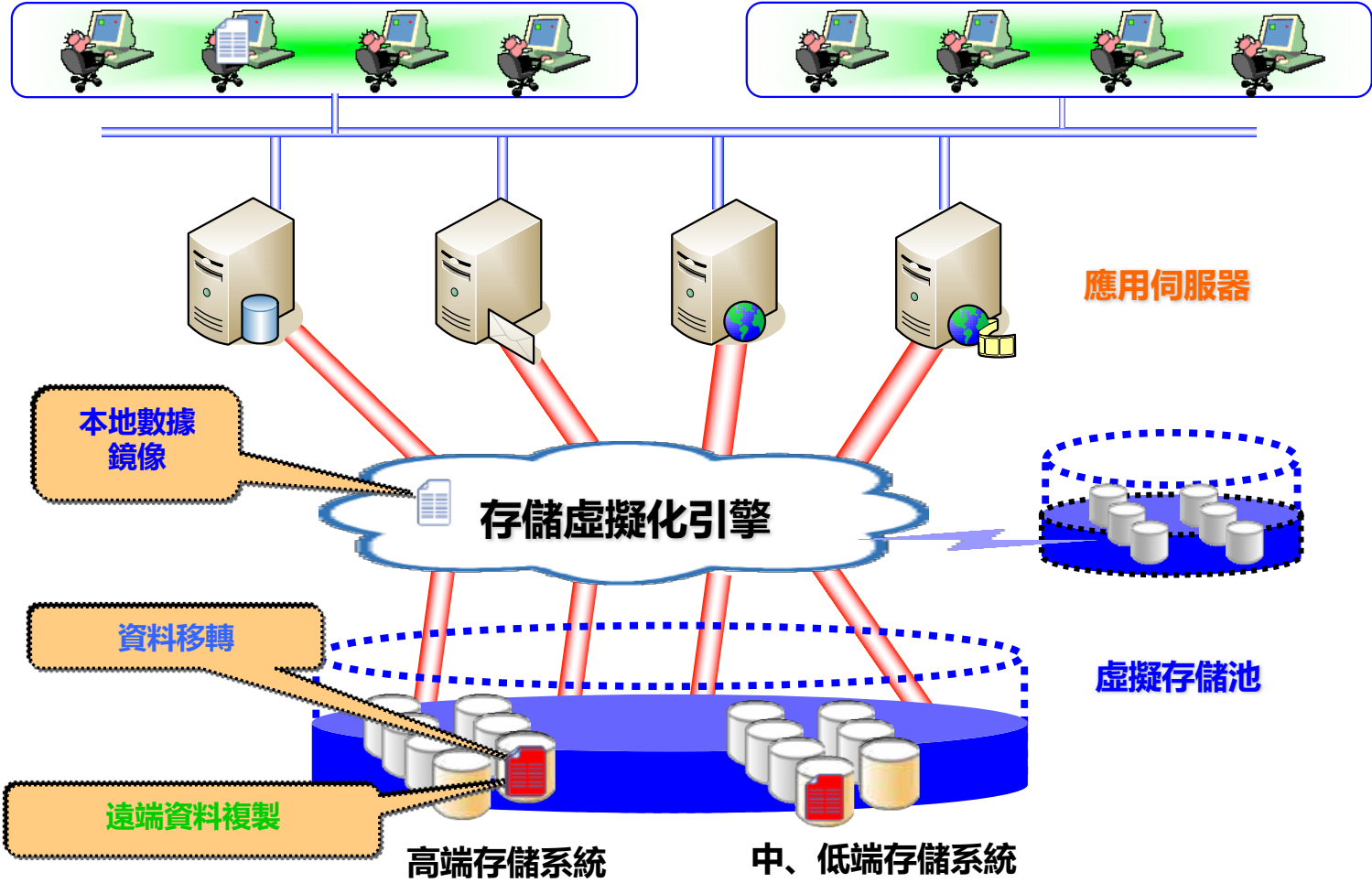
## 儲存虛擬化: 跨設備 (儲存資源池化!!)



## 通過儲存虛擬化技術整合異質儲存資源

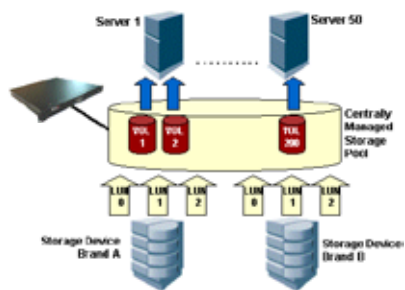


# 儲存虛擬化後的應用...

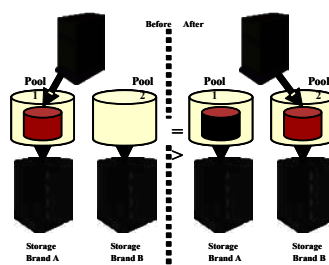


# 在業務集中整合下運用虛擬化技術

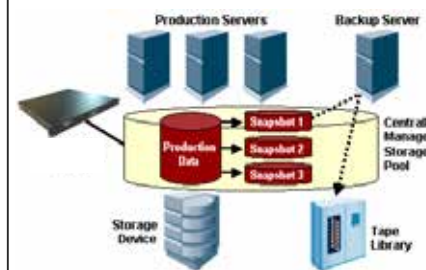
存儲整合



無中斷資料移轉



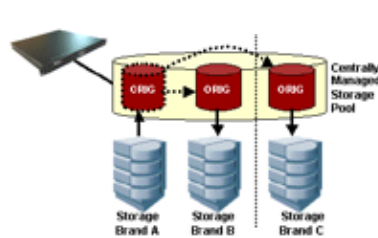
快速應用恢復



應用測試與開發



分層存儲基礎設施

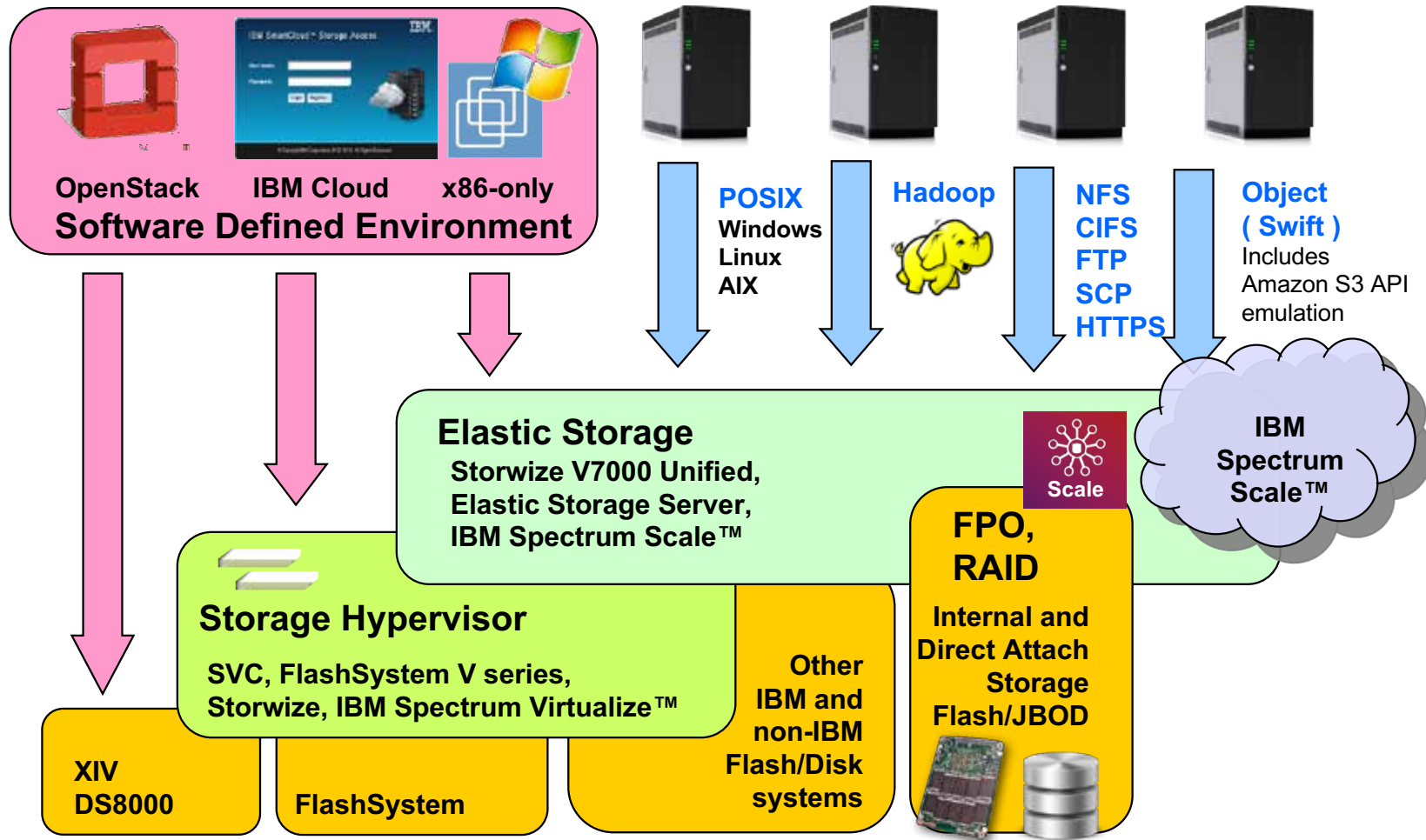


經濟高效的災難恢復





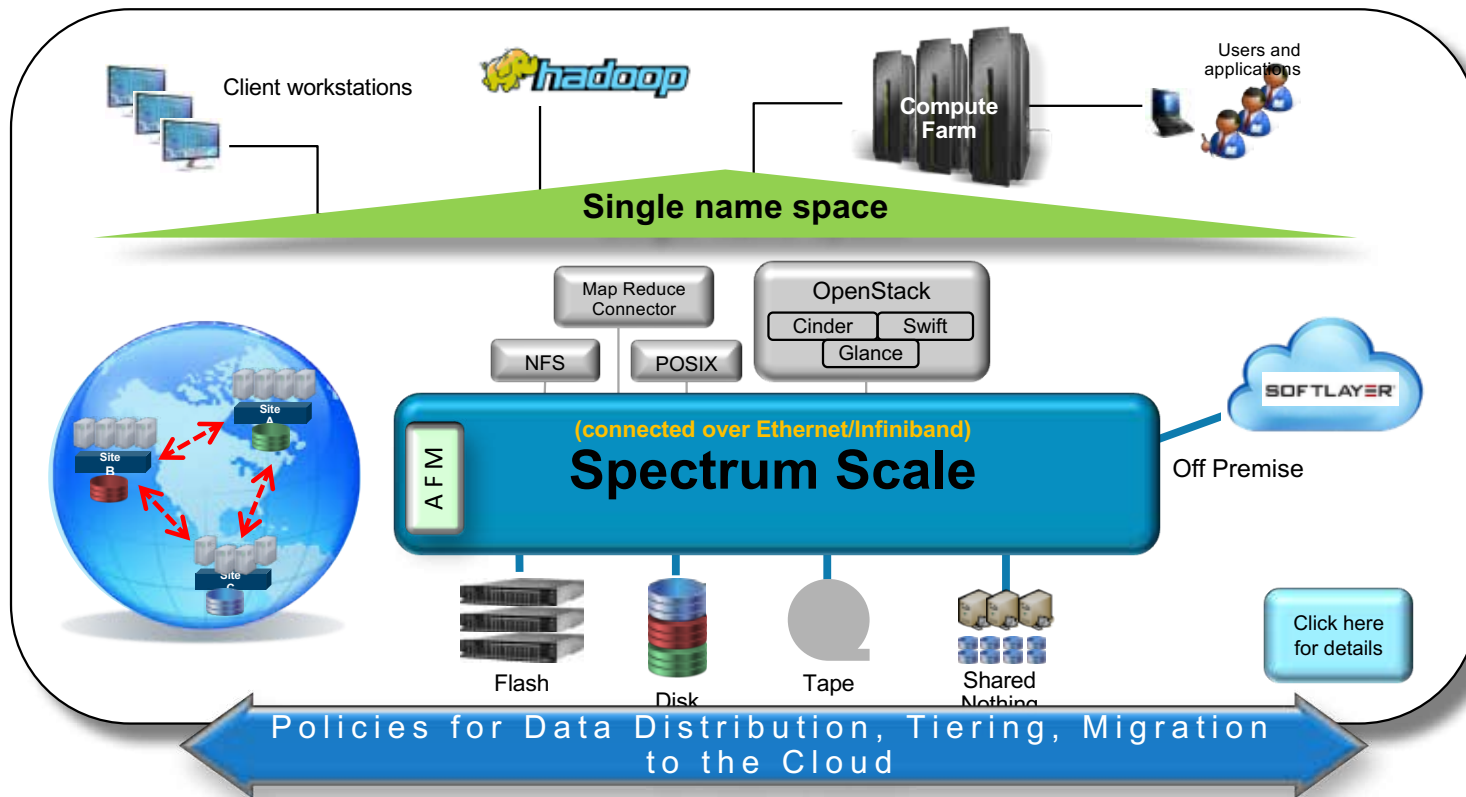
# IBM Vision: Software Defined Storage for Files and Objects



## Spectrum Scale - Today

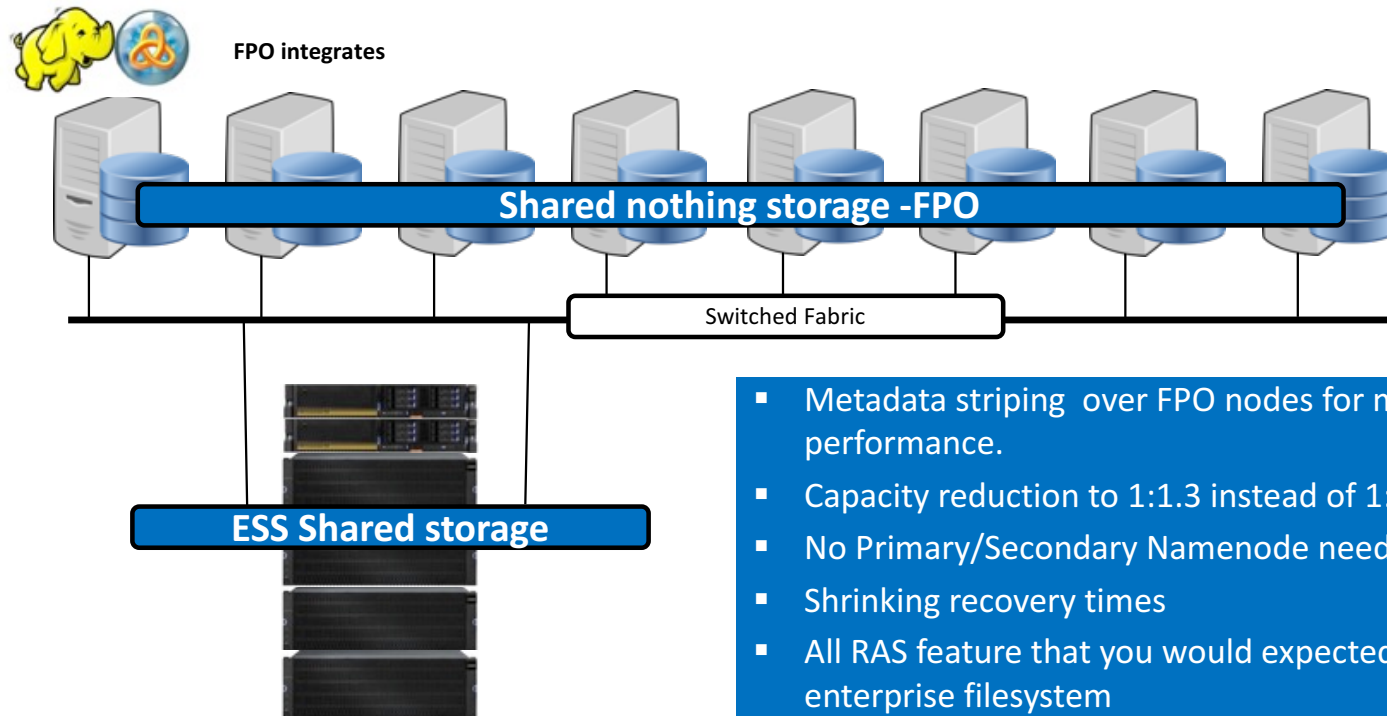
*A scalable, high-performance data and file management solution, based on GPFS Technology*

- 效能及空間幾乎無上限
  - 儲存動態優化(FPO)及生命週期自動管理(ILM)
  - 單一存儲點
- 整合既有設備
  - [Top500 proven GPFS reliability and performance](#)
  - Leapfrog the competition by combining ESS and LTFS together



## ESS for BigData and Analytics

Flexible storage configuration: not only for Hadoop!

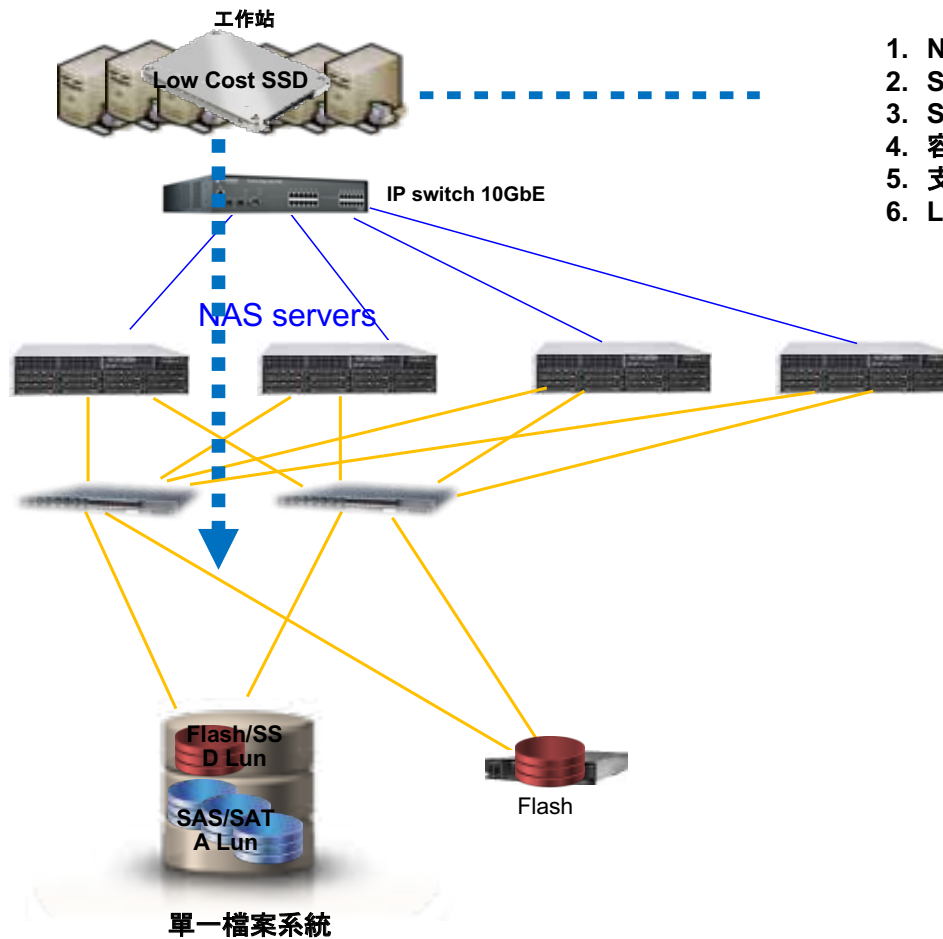


- Metadata striping over FPO nodes for max. performance.
- Capacity reduction to 1:1.3 instead of 1:3 (...1:8!)
- No Primary/Secondary Namenode needed
- Shrinking recovery times
- All RAS feature that you would expected from an enterprise filesystem

Back to Presentation



## Scale out Performance design



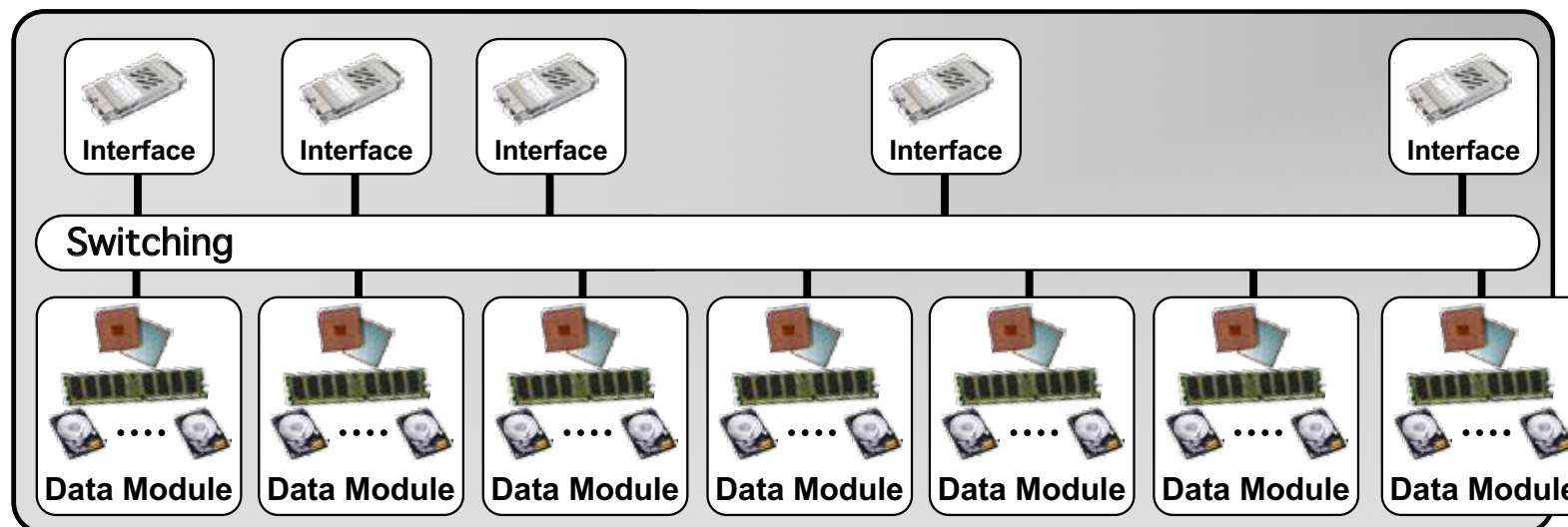
1. NAS Server 逐步擴充
2. SSD/Flash for Metadata only
3. SSD/Flash for Metadata and Data
4. 容量逐步擴充
5. 支援任何 SAN Storage
6. Low cost SSD 工作站加速

## IBM Grid Storage : 設計原則

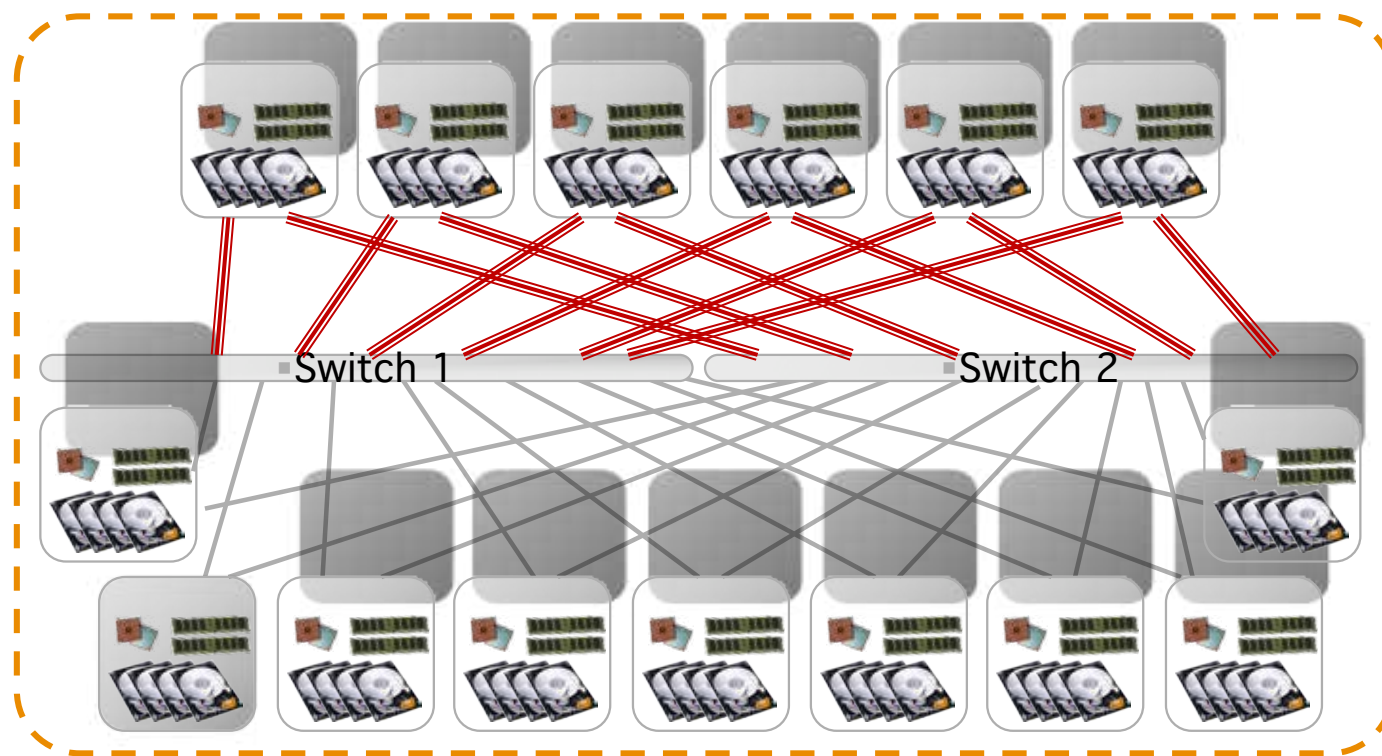
### 設計原則:

- 大規模並行
- 細粒度資料分佈
- 業界標準元件 – 緊耦合disk, RAM and CPU
- 虛擬化架構 – 零管理

Scale Out



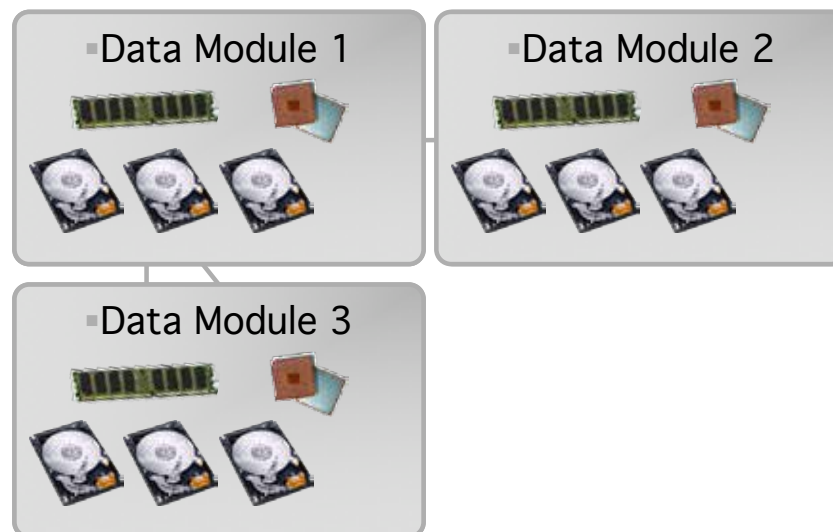
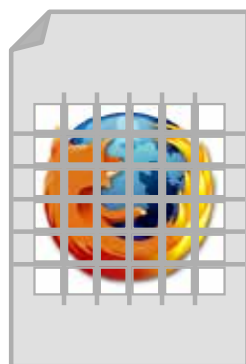
## IBM 網格式塊儲存架構



## 資料跨模組容錯機制

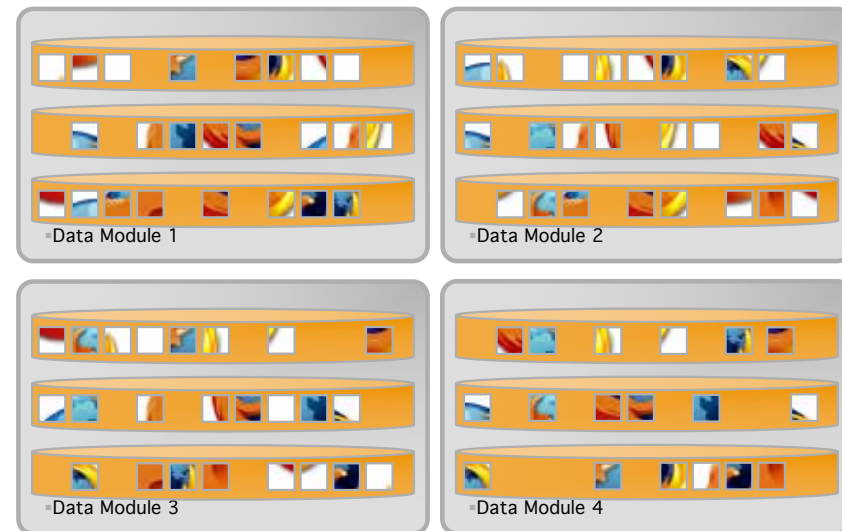
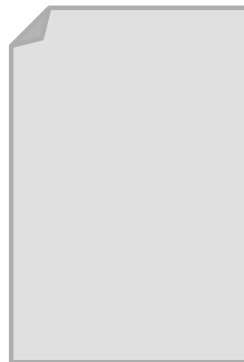
- 每個卷會分佈到所有的磁碟機上/ 所有資料鏡像
- 資料被分成1MB“分區” 存儲在磁碟上
- XIV 演算法以偽隨機的方式自動地將”分區” 分佈到系統所有的磁碟上

▪ NO RAID



## 網格架構下輕鬆實現 – 線性擴展

- 資料的分佈只有在系統變更時才發生改變
  - 當新硬體添加時硬體物理資源線性擴展
  - 資料分佈自適應動態擴展至新模組
  - 資料均衡分佈仍然得以保持



■ [ hardware upgrade ]

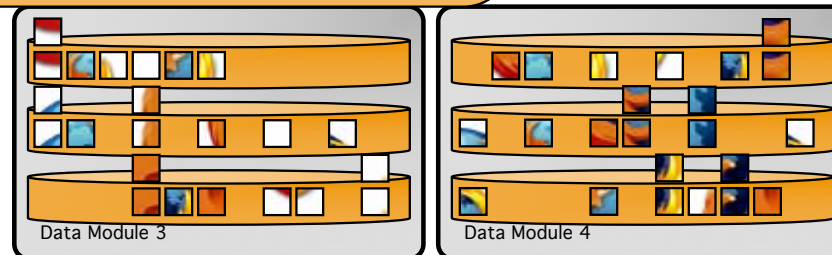


## RAID 2.0 資料容錯機制 --- 並行資料恢復

- 資料的分佈只有在系統變更時才發生改變
  - 當舊硬體移除時均衡仍然得以保持
  - 當硬體

資料分佈的完整化和自動化確保當配置變更時所有的磁碟機都會加入到資料重新分佈的任務中。

因此而帶來的是恢復/優化期間巨大的性能回報



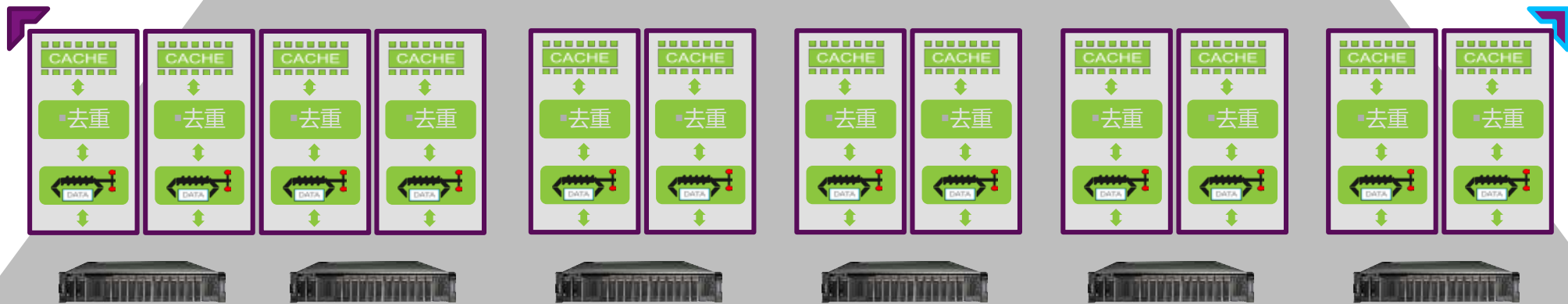
# IBM FlashSystem A9000R 利用網格儲存架構提供更高可用性 動態性能



■ 冗餘的 InfiniBand 底板

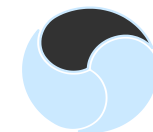
■ 初始配置包括 2 個網格元素

■ 擴展網格元素



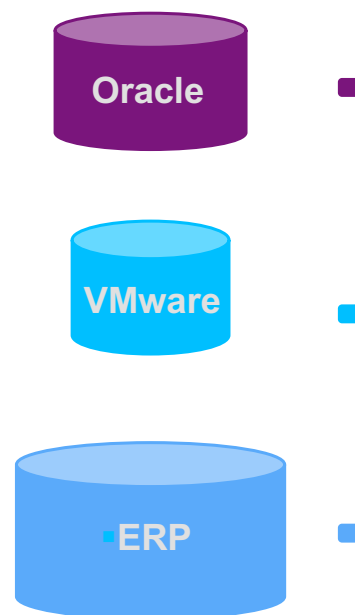
■ IBM Hyper-Scale Manager

■ 在 FlashSystem A9000R 中，模式刪除、去重和壓縮分佈於 1 個網格中。  
在 6 網格元素系統中，240 個 CPU 核心並行處理 I/O。

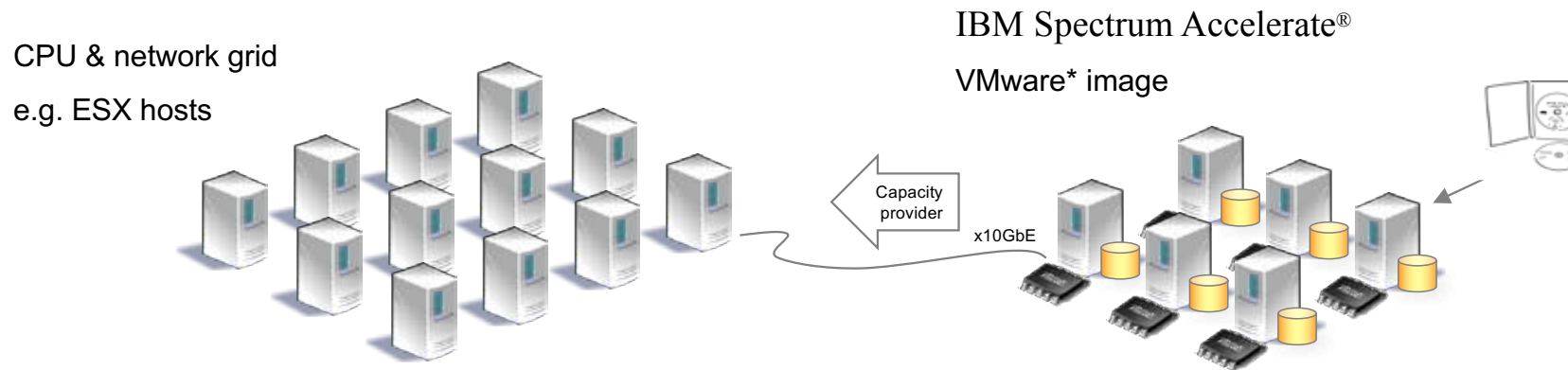


## 網格級別確保可靠性和一致性

- 借助初始配置：
  - 資料散佈於所有網格控制器和快閃記憶體主機殼
  - 數據在快閃記憶體主機殼上獲得保護
- 擴展時，自動將工作負載重新分配于所有可用資源：
  - 無需手動干預
  - 無需調節
  - 無需預先規劃
  - 線性可擴展性



# IBM Spectrum Accelerate, based on IBM grid storage architecture

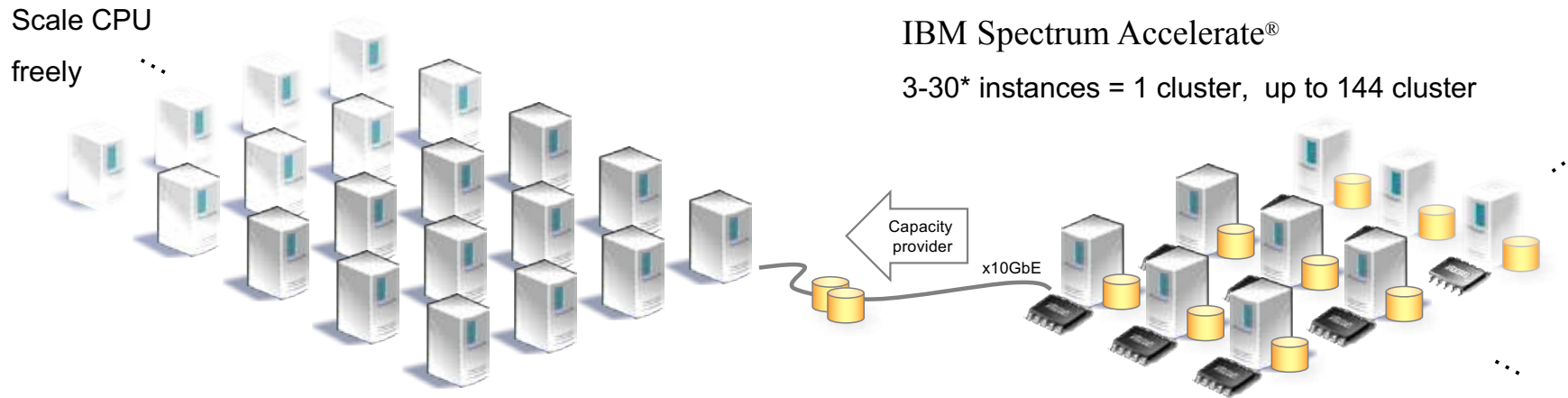


A VMware deployable image\* that turns **internal HDD JBODs** and **Flash cards** into an 'Enterprise-DNA' storage cluster.

Storage capacity is made available in **any** VM host via VMware vSphere workflows or via OpenStack *Cinder* if running VM-agnostic.

\* more hypervisors to come

# IBM Spectrum Accelerate = Enterprise scalability



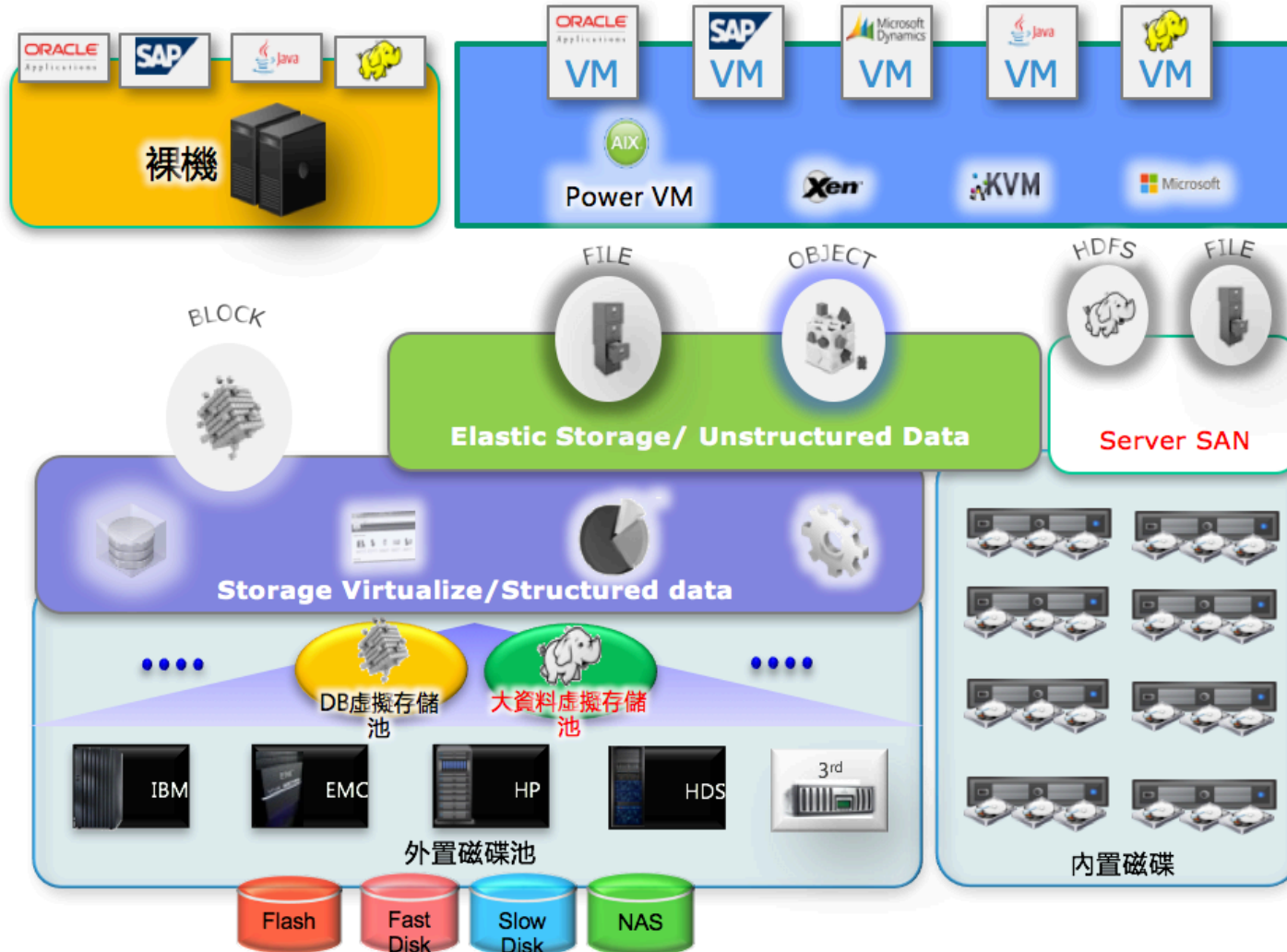
Grow capacity, throughput, cpu and network without dependencies, with fast access and **confined redundancy metadata traffic**.

Many uncommon software-defined features, like **zero tuning**, QoS, self-healing, **global consistent snapshots**, multi-tenancy, WAN-mirroring, cool 3D GUI...

\* limited to 15 in Rel.1 ("Cluster" handles redundancy, "metacluster" has single point mgmt).

# IBM Spectrum 軟體定義儲存解決方案 – 重新定義新IT架構

SDS as a Bridge between Traditional & New IT Infra.



# IBM Spectrum Storage Adoption



**87 of the Fortune Global 100 use IBM Spectrum Storage**

49 of the top 50 banks

14 of the top 15 telecommunications companies

18 of the top 20 energy companies

9 of the top 10 global healthcare companies

8 of the top 10 automobile manufacturers

**80 clients pick IBM Spectrum Storage every week**

# Introducing IBM Spectrum Storage Suite



## A new licensing model for IBM Spectrum Storage

Provides unlimited access to IBM's comprehensive set of software-defined storage offerings with convenient per-TB pricing



# IBM Spectrum Family Cloud Strategy

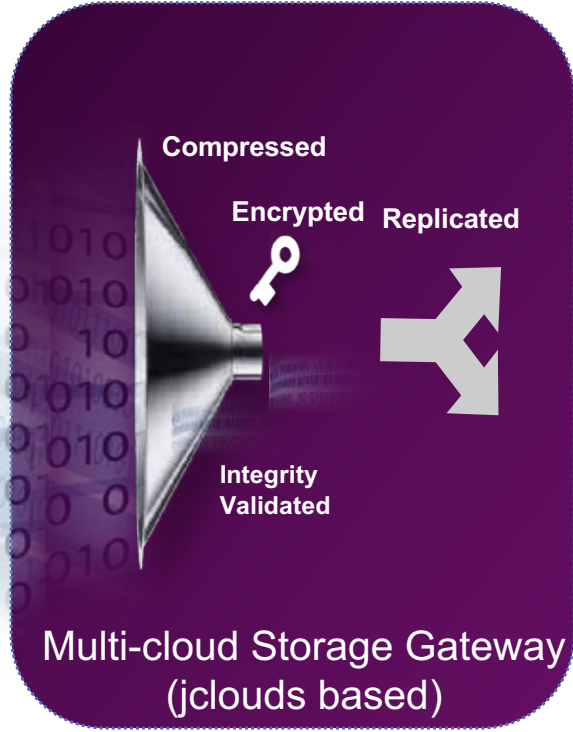
**Spectrum Virtualize**

**Spectrum Scale**

**Spectrum Accelerate**

**Spectrum Protect**

**Backup**  
**DR**  
**Tiering**  
**Archive**  
**Data sharing**



Note: The Multi-cloud Storage Gateway is a planned future enhancement

**Thank You.**  
**IBM Storage & SDI**

