


# 國家高速網路與計算中心

## 儲存虛擬化的應用



系統整合、資訊服務的第一選擇

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- 虛擬化的目的
- 儲存虛擬化的架構圖
  - ▶ NFS連線架構圖
  - ▶ ISCSI 連線架構圖
  - ▶ SAN連線架構圖
- 儲存虛擬化的應用
  - ▶ Snapshot
  - ▶ Flexclone
  - ▶ Snaprestore
  - ▶ deduplicate
  - ▶ RCU
- Q&A



- ✦ 減少電源使用 & cooling
  - ▶ 減少 physical server & reduce space
  - ▶ 減少 BTU/hr
- ✦ 簡化 infrastructure
  - ▶ 減少管理節點
- ✦ Reduce deployment
  - ▶ 使用 template 的方法可以快速佈署 virtual machine
  - ▶ 使用 clone 的方式可以快速佈署 testing 環境



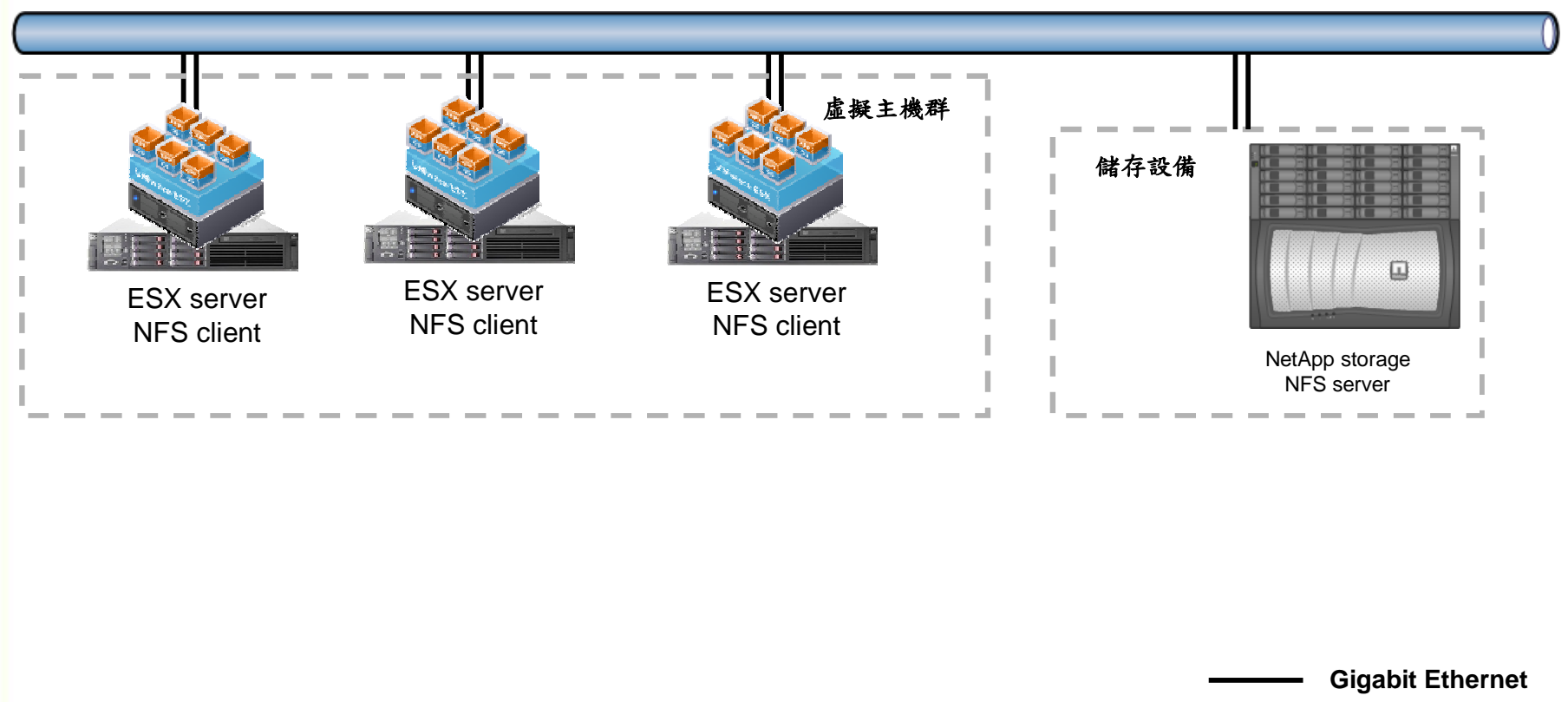


# NetApp Architecture

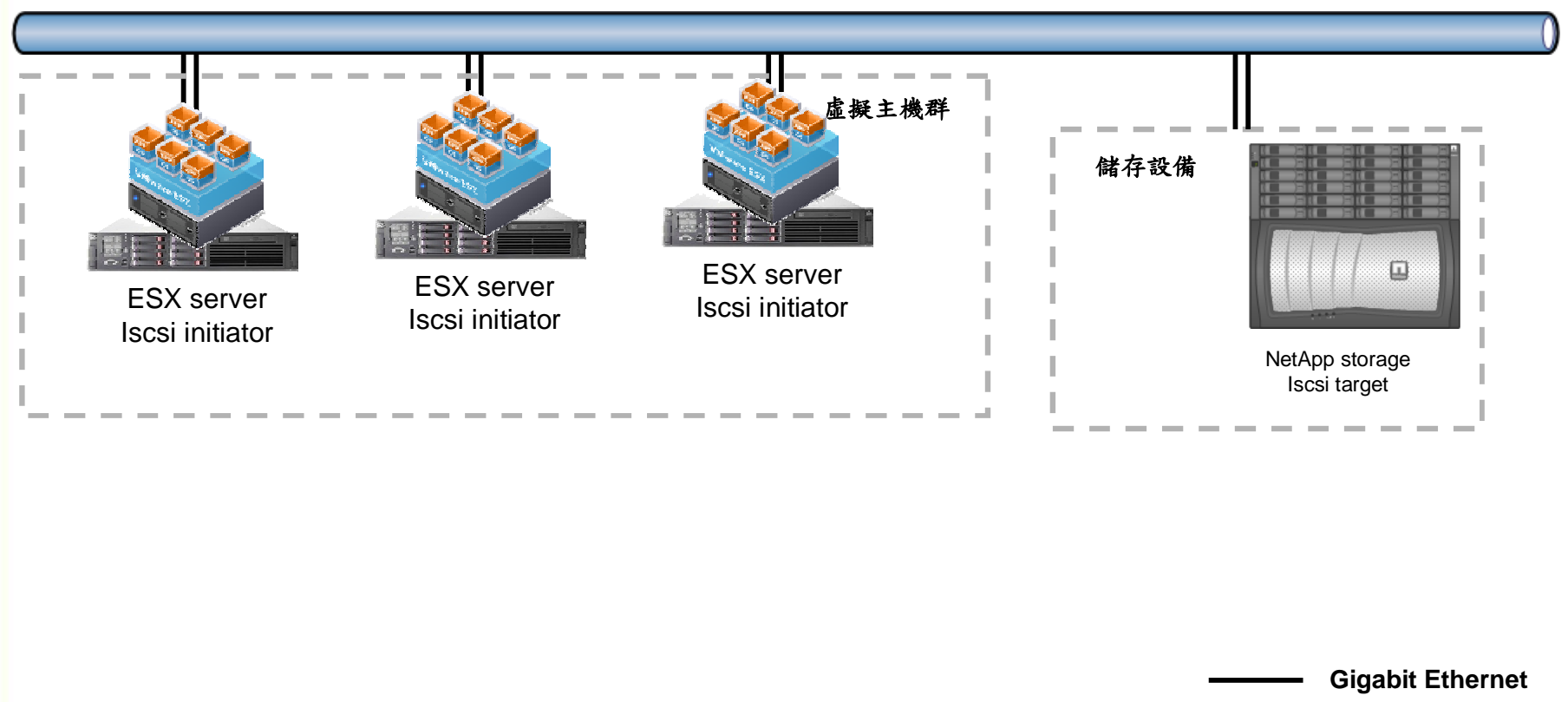
NetApp support  
protocol



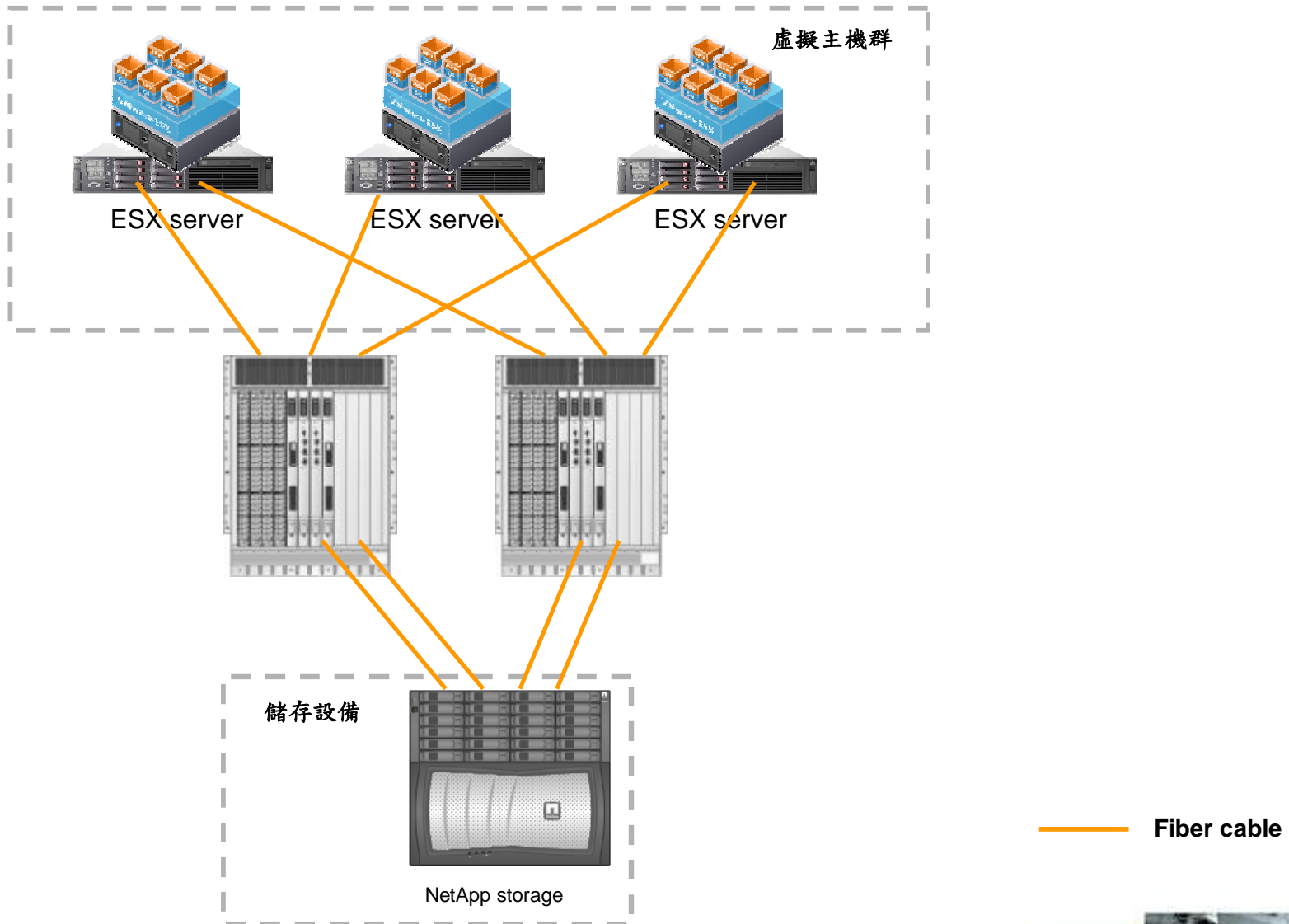
## NFS 連接架構圖



## I SCSI 連接架構圖



## SAN連接架構圖



## NetApp Snapshot<sup>TM</sup> Technology

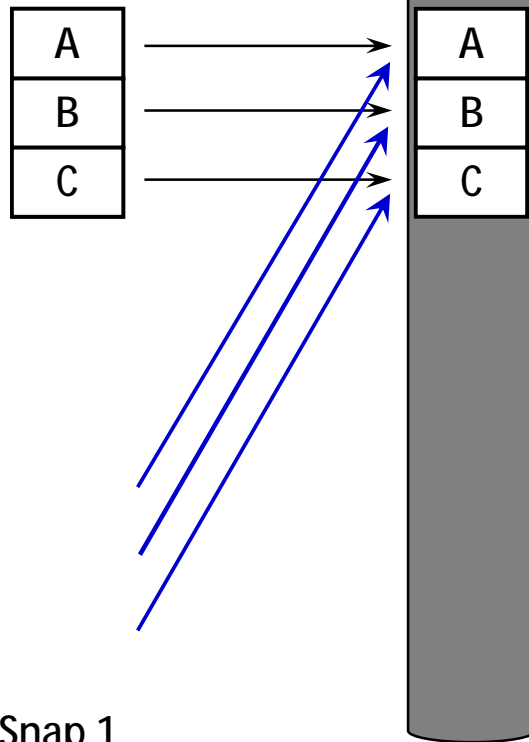




# NetApp Snapshot™ Technology

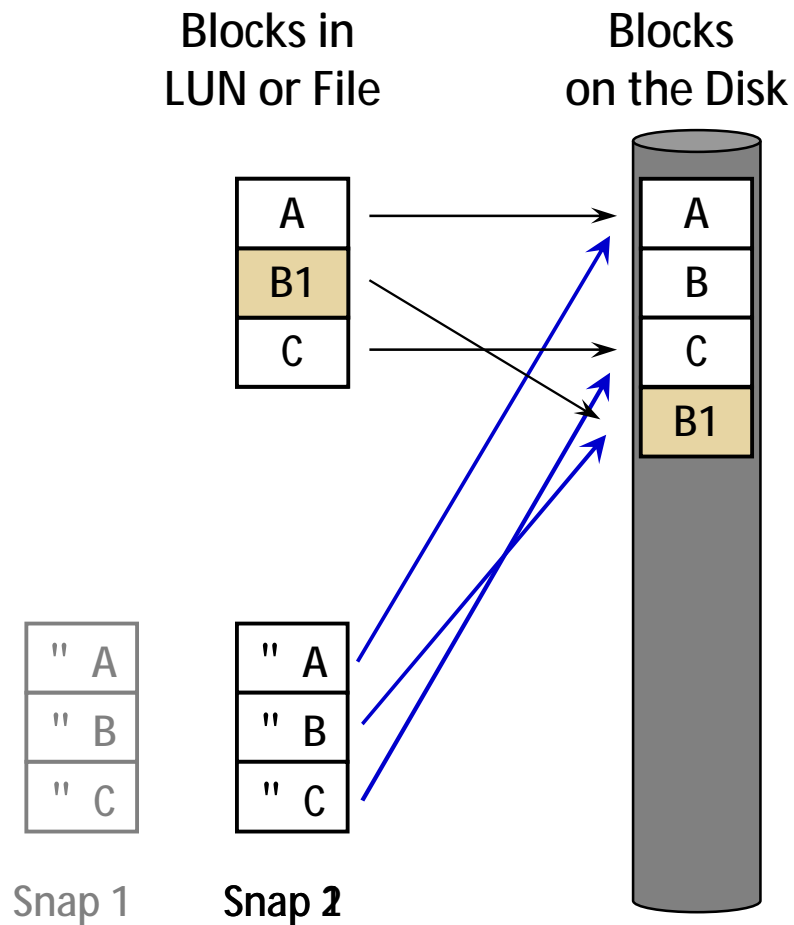
Blocks in  
LUN or File

Blocks  
on the Disk



- ✦ Take snapshot 1
  - ▶ Copy pointers only
  - ▶ No data movement

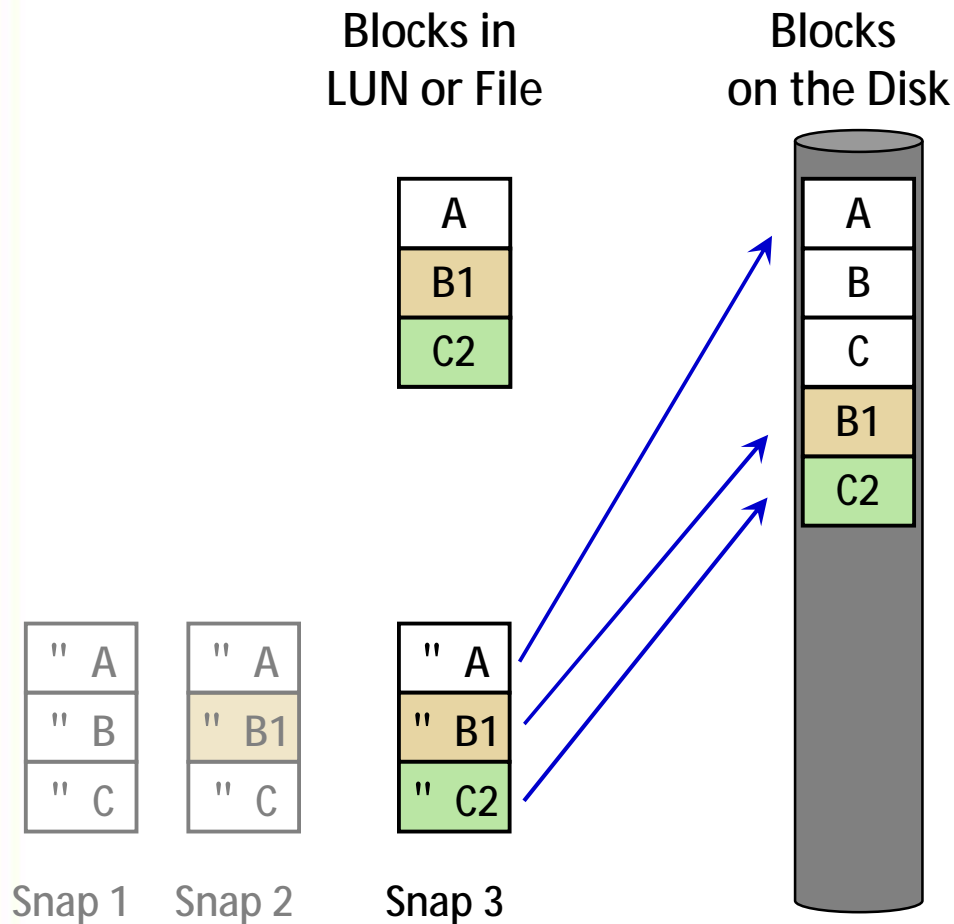




- ✦ Take snapshot 1
- ✦ Continue writing data
- ✦ Take snapshot 2
  - ▶ Copy pointers only
  - ▶ No data movement



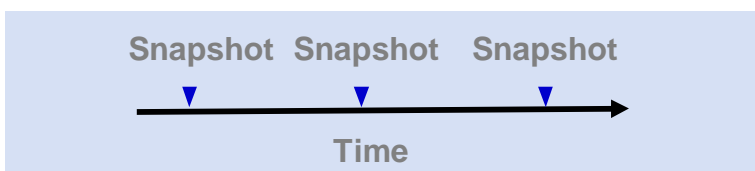
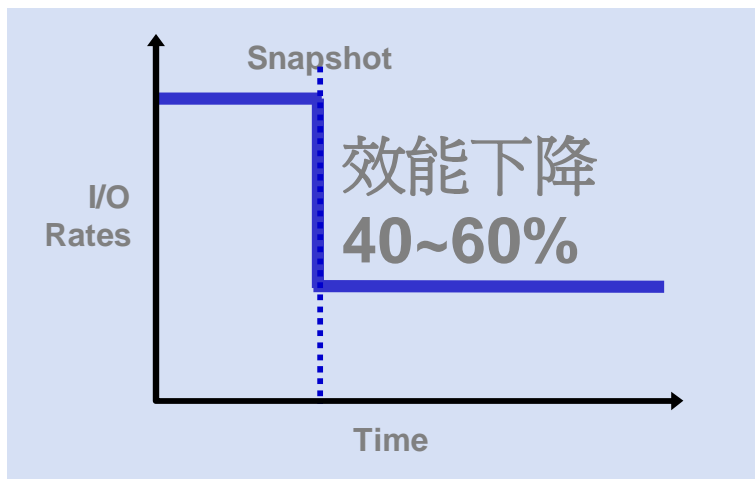
# NetApp Snapshot™ Technology



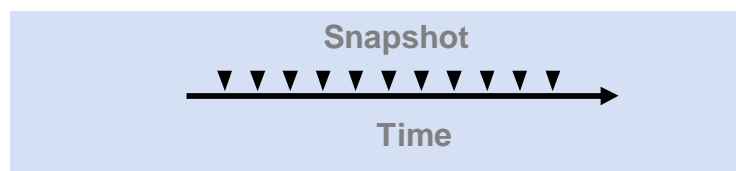
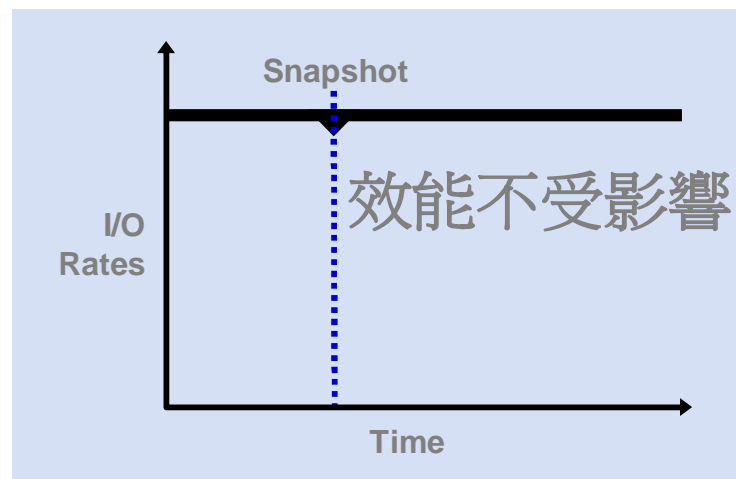
- ✦ Take snapshot 1
- ✦ Continue writing data
- ✦ Take snapshot 2
- ✦ Continue writing data
- ✦ Take snapshot 3
- ✦ Simplicity of model =
  - ▶ Best disk utilization
  - ▶ Fastest performance
  - ▶ Unlimited snapshots



## 傳統 Snapshot



## NetApp Snapshot



1. 沒有停機時間
2. 在主機端及用戶端沒有任何CPU負載
3. 沒有網路流量
4. 瞬間完成
5. 在用戶端不需備份程式



## NetApp Flexclone<sup>TM</sup> Technology



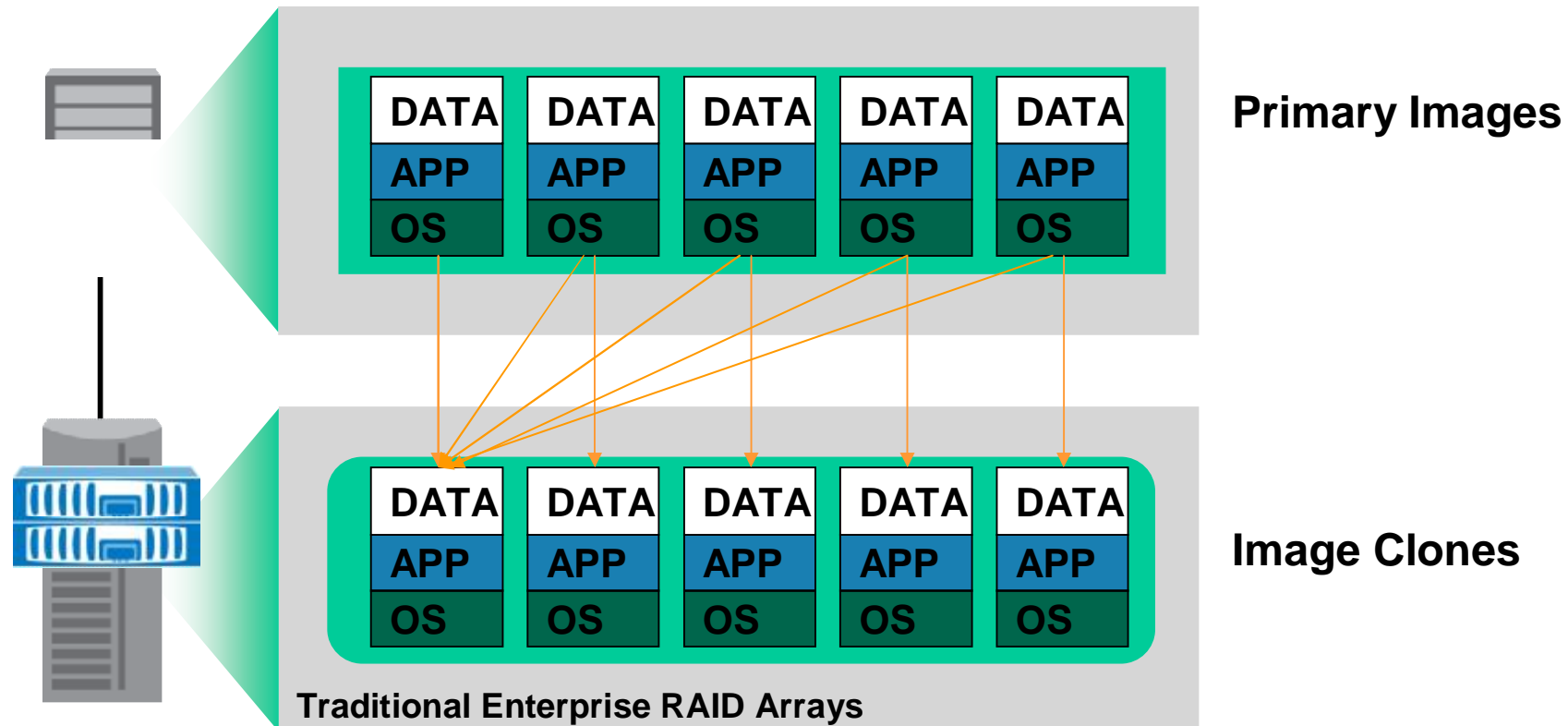
# NetApp Flexclone™ Defined

- FlexClone volumes are a point-in-time, writable copy of the parent volume. Changes made to the parent volume after the FlexClone volume is created are not reflected in the FlexClone volume.
- FlexClone volumes and their parent volumes share the same disk space for any common data. This means that creating a FlexClone volume is instantaneous and requires no additional disk space (until changes are made to the clone or parent).



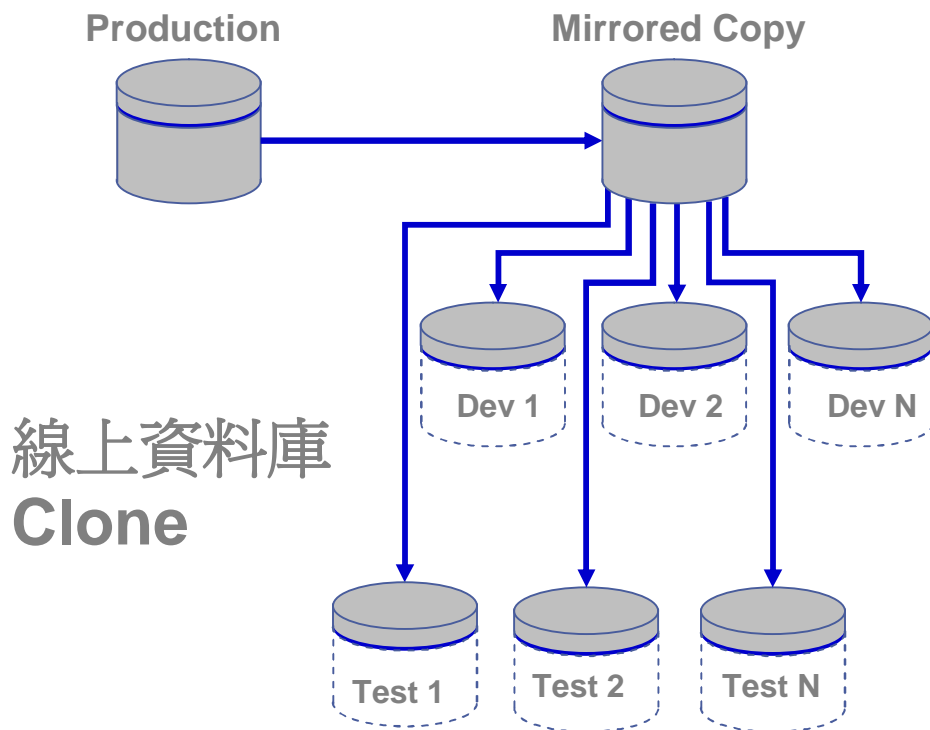
# 傳統虛擬機器複製

- ✦ 虛擬機器複製需要資料copy
- ✦ 虛擬機器複製storage 必須提供與範本機器相同大小的磁碟空間

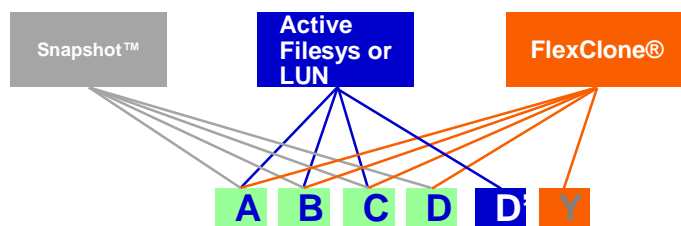


# FlexClone

建立測試複本，不重複佔用磁碟空間



- n 瞬間拷貝
- n 低資源損耗
- n 低成本
- n 容易且相對低廉的方法來複製產生資料庫，而不會影響資料庫
- n 適用於修復錯誤，升級和補丁
- n 輕鬆地重新分配儲存資料庫和交易日誌文件





## NetApp Snaprestore<sup>TM</sup> Technology



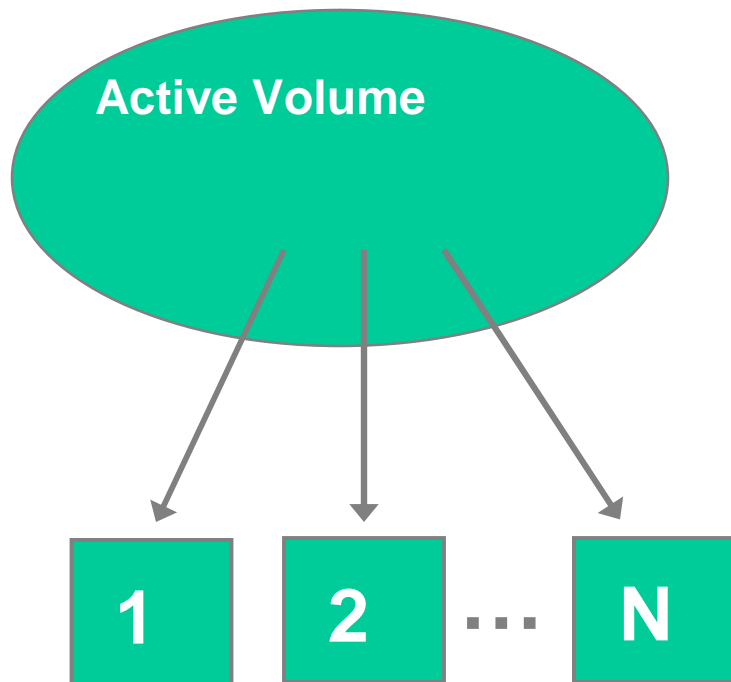
# NetApp SnapRestore™ Defined

- SnapRestore reverts an entire dataset to any previous online Snapshot, where the dataset can be
  - ▶ virtual disk(s) within a NetApp volume (SAN scenario)
  - ▶ the entire volume (NAS scenario)
- Instant recovery with no reboot (except root volume)
- Particularly compelling for software testing situations or database contents



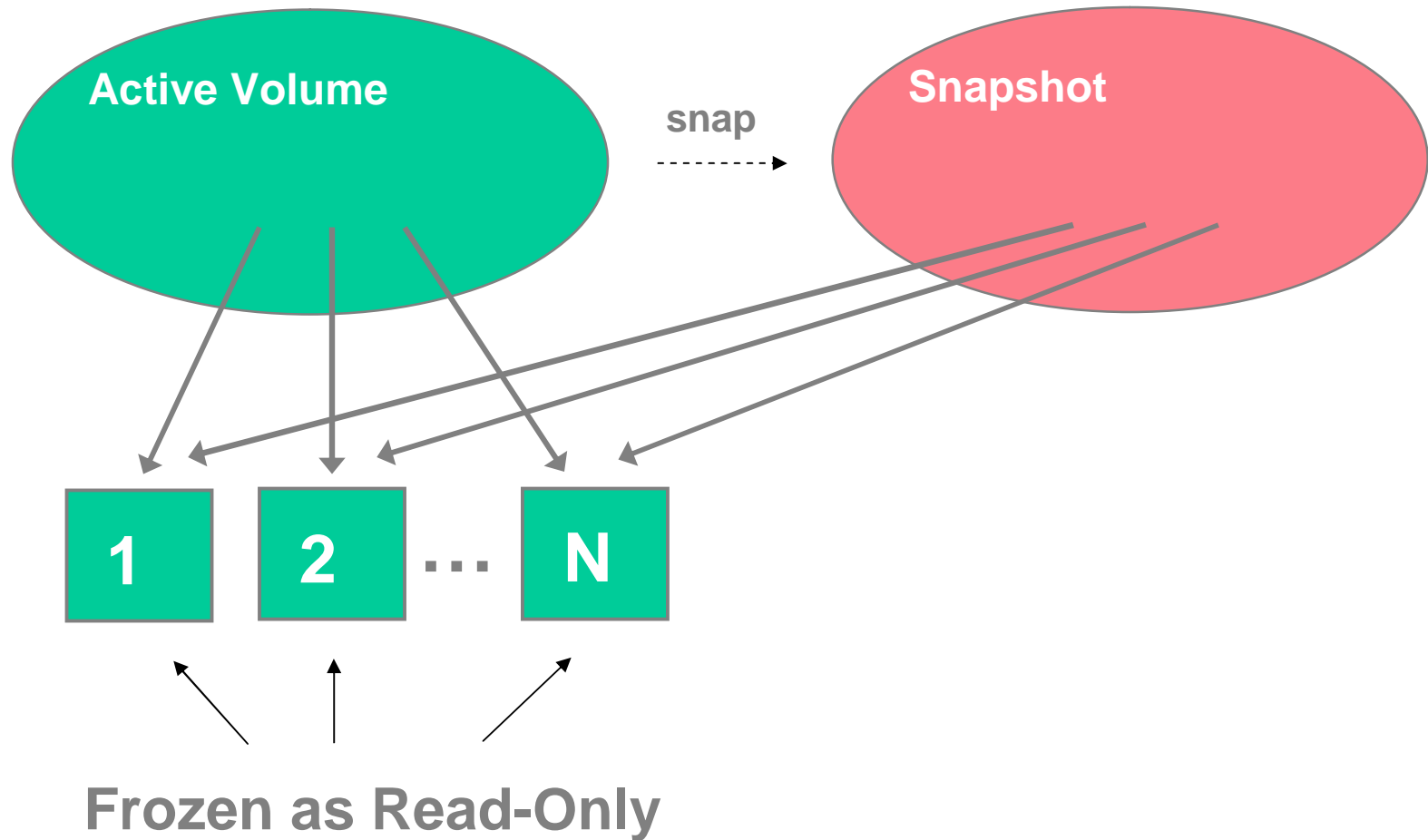
# SnapRestore Internals

*Normal operation before fault*



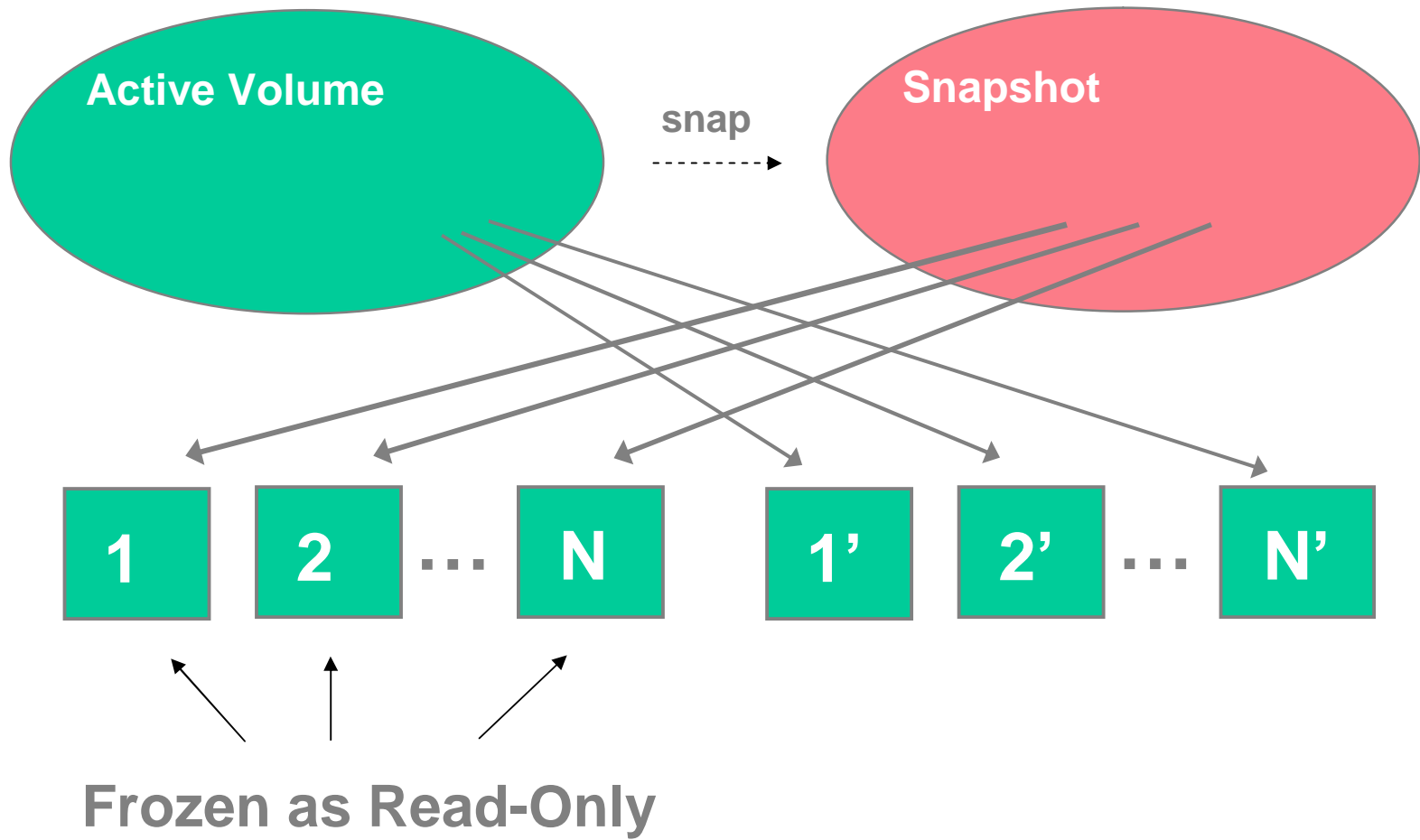
# SnapRestore Internals

*Take a Snap*



# SnapRestore Internals

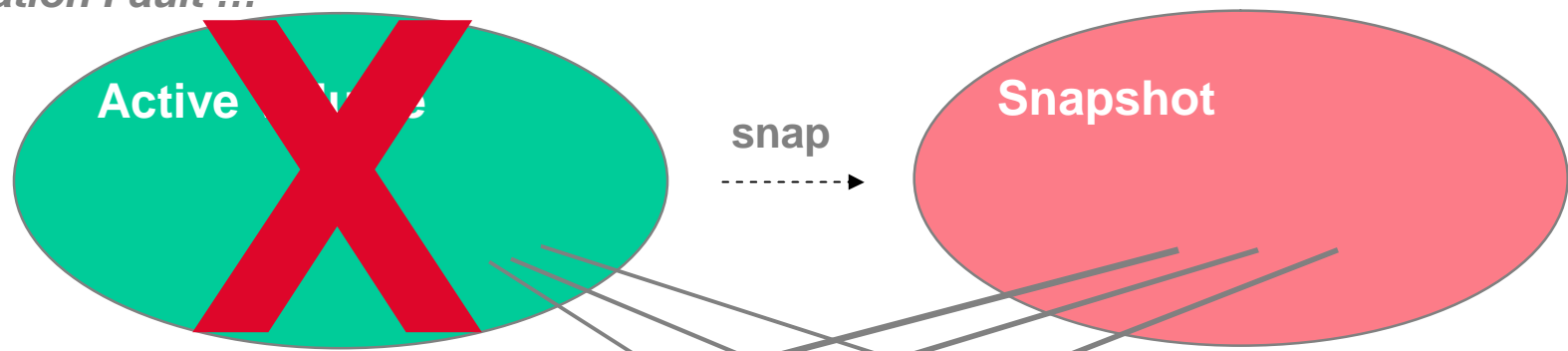
*Changed blocks are written over time*



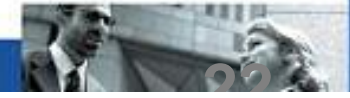
# SnapRestore Internals

*Fault occurs, active volume is rendered unusable*

*Application Fault ...*

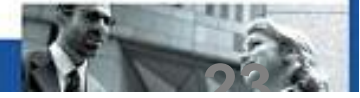
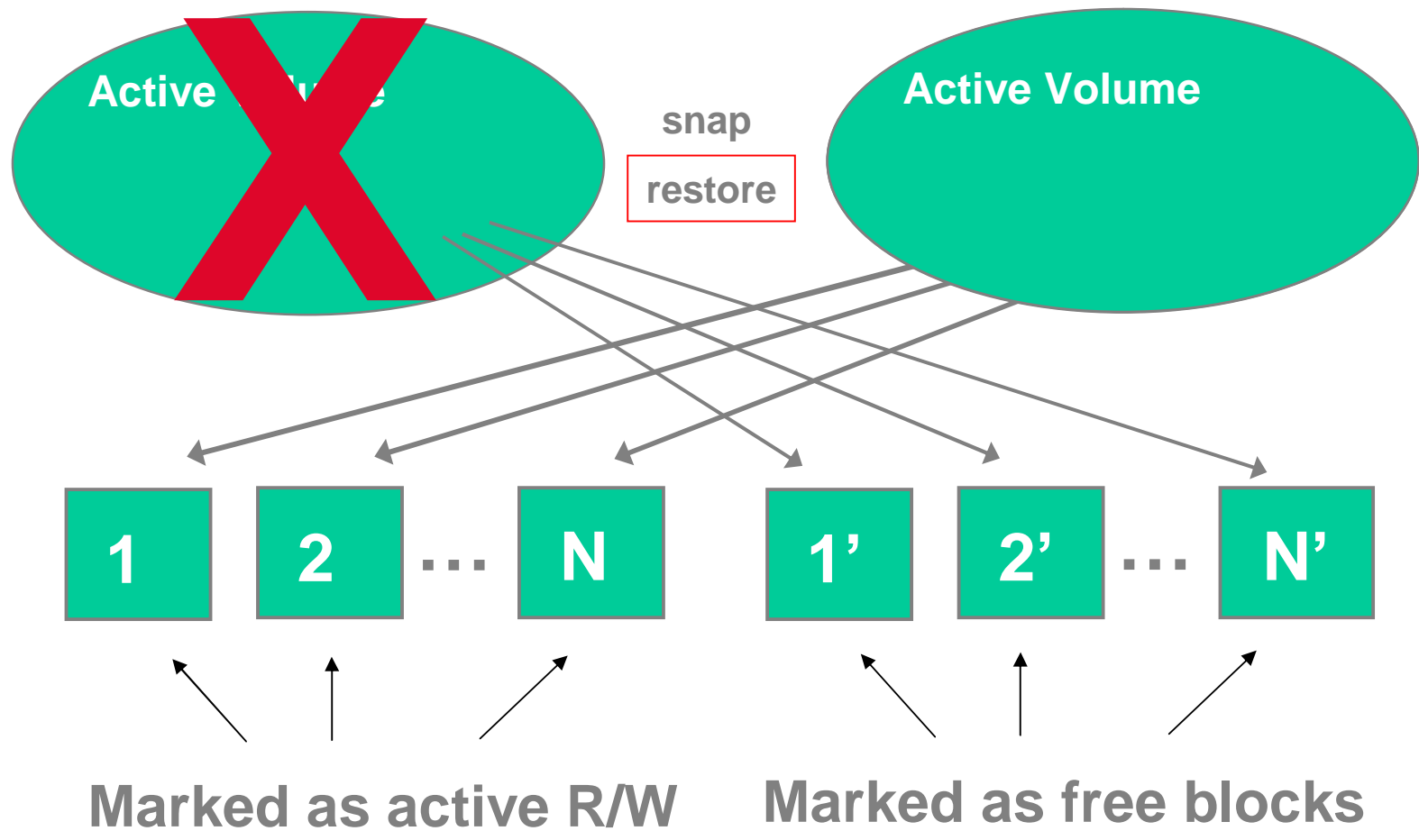


**Frozen as Read-Only**



# SnapRestore Internals

*SnapRestore to the rescue!*



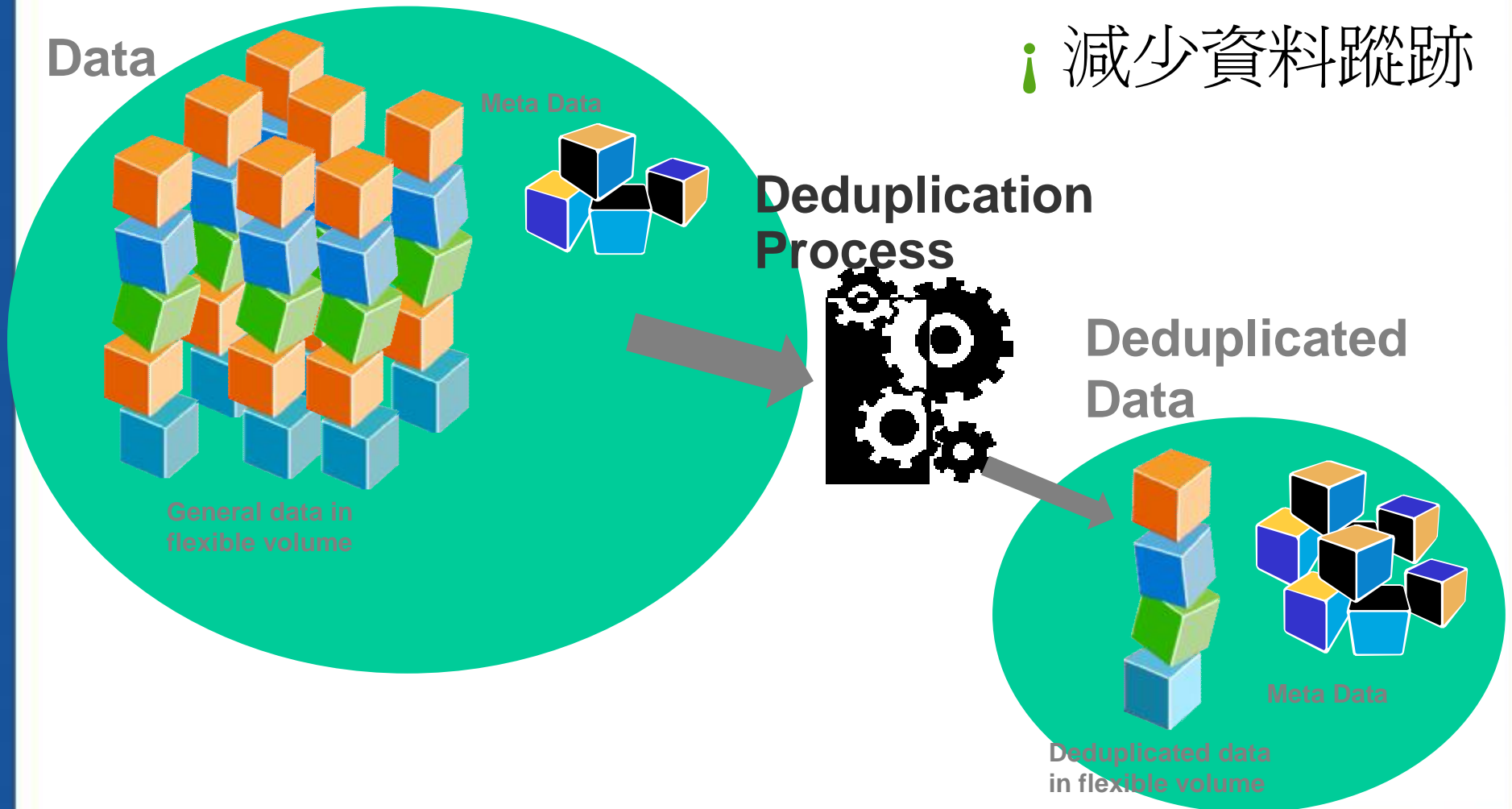
## NetApp Deduplication<sup>TM</sup> Technology





# De- duplication è 重複資料刪除

- 消除重複區塊
- 減少資料蹤跡





# Q & A

