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Accelerate with ATG: Advanced Sizing for Safeguarded Copy on FlashSystems

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- North America ATG Storage - Managing Copy Services on the DS8000 Using IBM Copy Services Manager Test Drive
- North America ATG Storage - IBM DS8900F Safeguarded Copy (SGC) Test Drive
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Meet the Speaker

Shu Mookerjee is a Level 2 Certified Technical Specialist with over twenty years at IBM, working in a variety of roles including sales, management and technology. For the last decade, he has focused exclusively on storage and has authored four (4) Redbooks. Currently, Shu is Senior Technical Specialist where he provides education, technical guidance, Proofs of Concept and Proofs of Technology to IBMers, business partners and clients.

Dominic Pruitt is a Level 2 Certified Technical Specialist with over thirty years at IBM, working for 16 years in IBM product development for PCs & storage. For the last 17 years he has worked in above market storage sales with a focus on various IBM storage products including FlashSystem and Storage Insights.

Agenda

- Goals and Assumptions
- A Review Safeguarded Copy
- Safeguarded Copy Sizing
- Demo - Differences between “SGC1” and “SGC2”
- Storage Insights - Use Cases and Demonstration

WARNING!!!

There WILL be math!

Goals and Assumptions

Assumptions:
The audience has at least some familiarity with Safeguarded Copy (though we'll review some core principles/mechanics as they relate to sizing)

Goals:

- Improve the understanding of sizing factors for a FlashSystem Safeguarded Copy implementation

- Demonstrate how to leverage Storage Insights to assist with Safeguarded Copy Capacity Sizing

What Is Safeguarded Copy?

What Safeguarded Copy IS:

- IS a virtual airgap/isolation solution that uses FlashCopy Snapshot functionality to provide additional protection against cyber attacks
- IS primarily used is for “Rapid Ransomware Recovery”
- IS a way to creates immutable, untouchable copies whose data remains invisible and inaccessible to host applications until such time as needed
- IS optimized for space through Thin-Provisioning
- IS policy-based and volumes will expire/ “age out” based on retention policy

What Safeguarded Copy IS NOT:

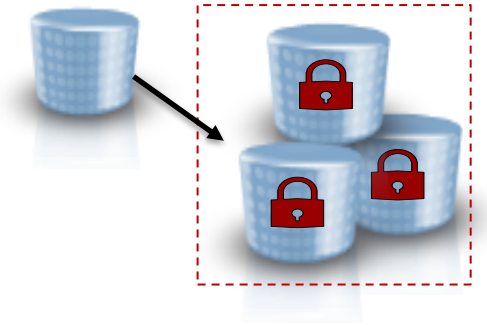
- IS NOT the same thing as Cyber Vault. Safeguard Copy is a ***capability***, Cyber Vault is a ***solution***
- IS NOT a separate product. It ***does*** require a FlashCopy license, though
- IS NOT a WORM solution. It’s more accurate to say it’s “WORN (”Write Once Read NEVER”)

What is Safeguarded Copy? – SGC1 “versus” SGC2

You can use TWO SGC methods on CURRENT SYSTEMS (but not on the same Volumes/Volume Group)

Legacy Safeguarded Copy (SGC1):

- Available as of Storage Virtualize 8.4.2
- Requires the creation of a Child Pool for the secure storage of the immutable snapshots (Safeguarded Copies)
- Requires and external scheduler (Copy Services Manager, Copy Data Management) *particularly in the recovery process*
- *Can* require extensive management of FlashCopy mappings



Volume Group Safeguarded Copy (SGC2):

- Available as of Storage Virtualize 8.5.2
- Does NOT require the creation of a Child Pool.
- Both scheduling and recovery are done internally without the need for an external scheduler
- Leverages Volume Group Snapshot technology so all snapshots are already immutable

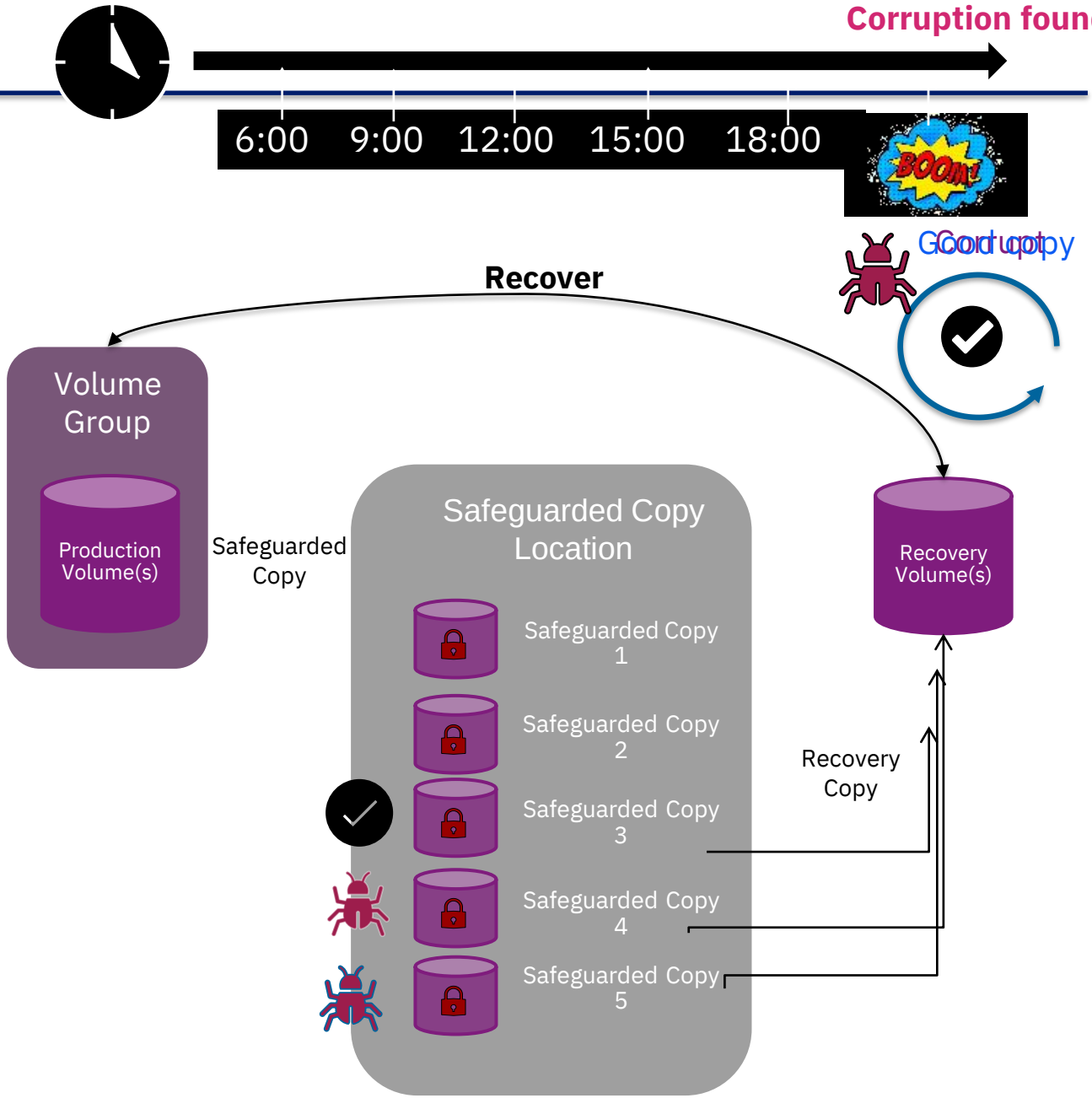
When to Use SGC1 vs SGC2?

- Leverage SGC1 when managing multiple FlashSystems where an External Scheduler provides a single management plane for all those systems
- Leverage SGC2 when managing a single FlashSystem (or one per site)

Shupinion!

What is Safeguarded Copy?

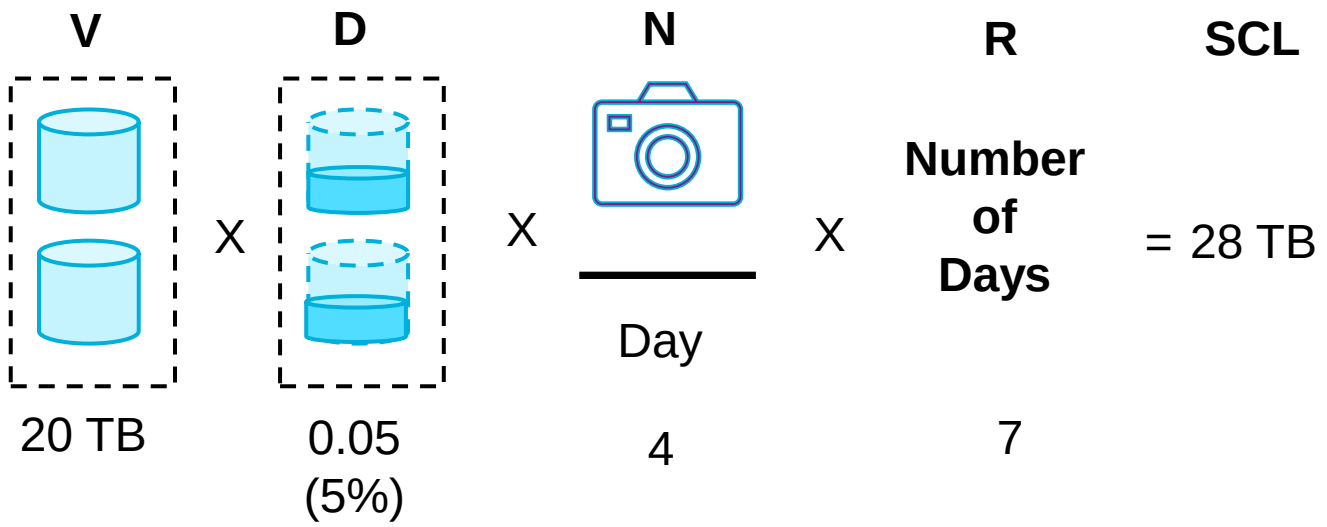
- Logical Corruption Protection to prevent sensitive point in time copies of data from being modified or deleted due to errors, destruction or ransomware
- Not directly accessible to any server or application
- Data is accessible *only* after a Safeguarded copy is recovered to a separate recovery volume.
- Recovery volumes are used for:
  - Data validation
  - Forensic analysis
  - Restoration of production data



Safeguarded Copy Sizing - Safeguarded Copy Location Capacity

- **Four (4) Key Parameters:**
  - Volume capacity (quantity and size of volumes)
  - Data change rate per Safeguarded Copy Snapshot
  - Frequency of Safeguarded Copy Snapshots
  - Retention of Safeguarded Copy Snapshots

- **Simple Sizing Calculation:**
  - SCL = V x D x N x R where:
    - V = Total volume capacity (TB)
    - D = Data change rate per copy (decimal)
    - N = Number of snapshots per day
    - R = Number of days the copies are retained
    - SCL = Safeguarded Copy Location Capacity



Don't Forget!!

- Potential loss of capacity savings due to encryption
- Assume that final SGC volume has a data change rate of 100%
- Will affect source volumes if they're thin provisioned

Safeguarded Copy Sizing –Data Change Rate

Data Change Rate

- Periodic write activity to the volume
- Best way to obtain is directly from system dashboards
  - Some storage dashboards and/or system monitoring tools can provide this data over time in graph or chart form
- Or take multiple snapshots at the same frequency per day and measure data change
- Or use a DAILY data change rate approximation
  - TLS (formerly known as “Lab Services”) uses 12 -15%
  - Plug that into the equation from previous slide in place of *D x N*
  - Equation becomes: “Volume capacity x DAILY data change rate x number of days”
  - For StorM input, divide the Daily Data Change Rate by the number of copies per day.

Safeguarded Copy Sizing - TOTAL Capacity

Three Key Elements to Overall Sizing:

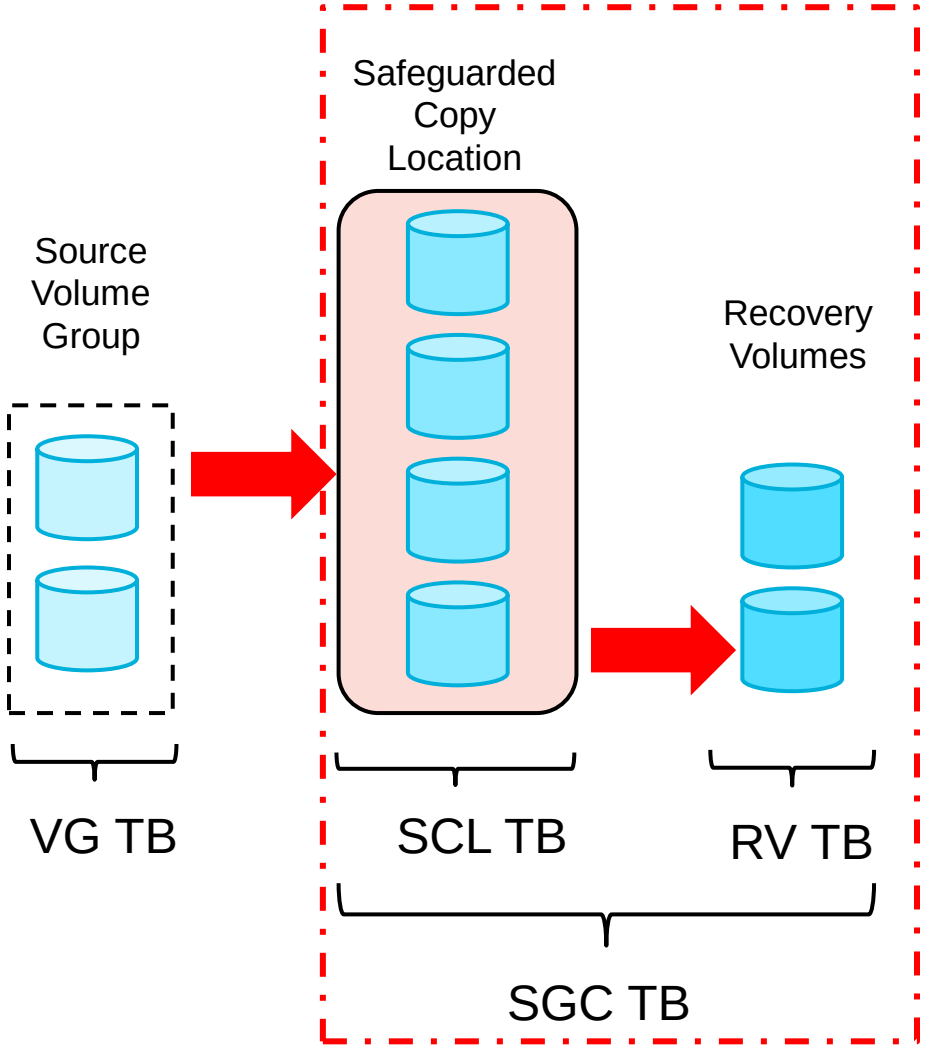
1. **Safeguarded Copy Location (Child Pool in SGC1)**
   - Isolated repository for all Safeguarded Copies
   - Safeguarded Copy Volumes are thin provisioned

2. **Recovery Volume Space**
   - Recovery Volumes are typically the same size & structure as the Source Volumes
   - Volumes can be recovered individually (SGC1). *However…*
   - **In SGC2 ALL the volumes in the Volume Group will be recovered**

3. **Loss of Compression from Ransomware**
   - Most common form of attack is encryption
   - Encryption will neutralize compression and eliminate capacity savings at both source and target volumes
   - Can impact Recovery Volumes. WILL impact Source Copies

Remember:

- VG = RV
- SGC = SCL + RV
  - VG = Source Volume Group Capacity
  - SCL = Safeguarded Copy Location Capacity (Child Pool in SGC1)
  - RV = Recovery Volume Capacity
  - SGC = Safeguarded Copy Capacity



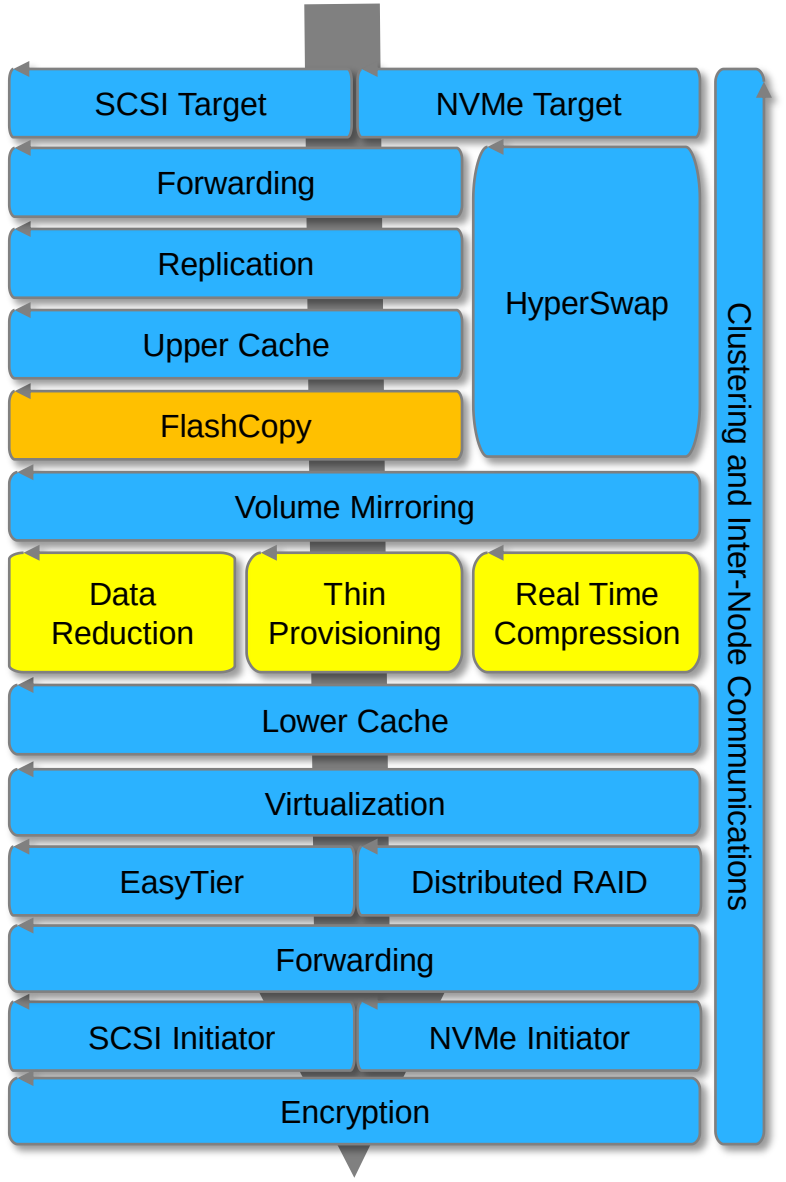
Note: Regardless of SGC version, you still ***must*** accommodate for the capacity consumed by the actual Safeguarded Copies

Safeguarded Copy Sizing – SGC and DRP

- Remember…Safeguarded Copy is just a FlashCopy Snapshot
- Data reduction happens below FlashCopy
  - Data is “uncompressed”, “rehydrated” or “re-duped” before SGC starts
  - Volume is then copied as a thin provisioned immutable snapshot in SGC pool
  - After which, volume is like any other SGC volume

- When sizing SGC for DRP volumes, use the fully allocated virtual volume size.
  - Easier math
  - Accounts for space-saving loss if volumes fall victim to a ransomware attack

Shupinion!



Alright...

Demo Time!

Thank you!

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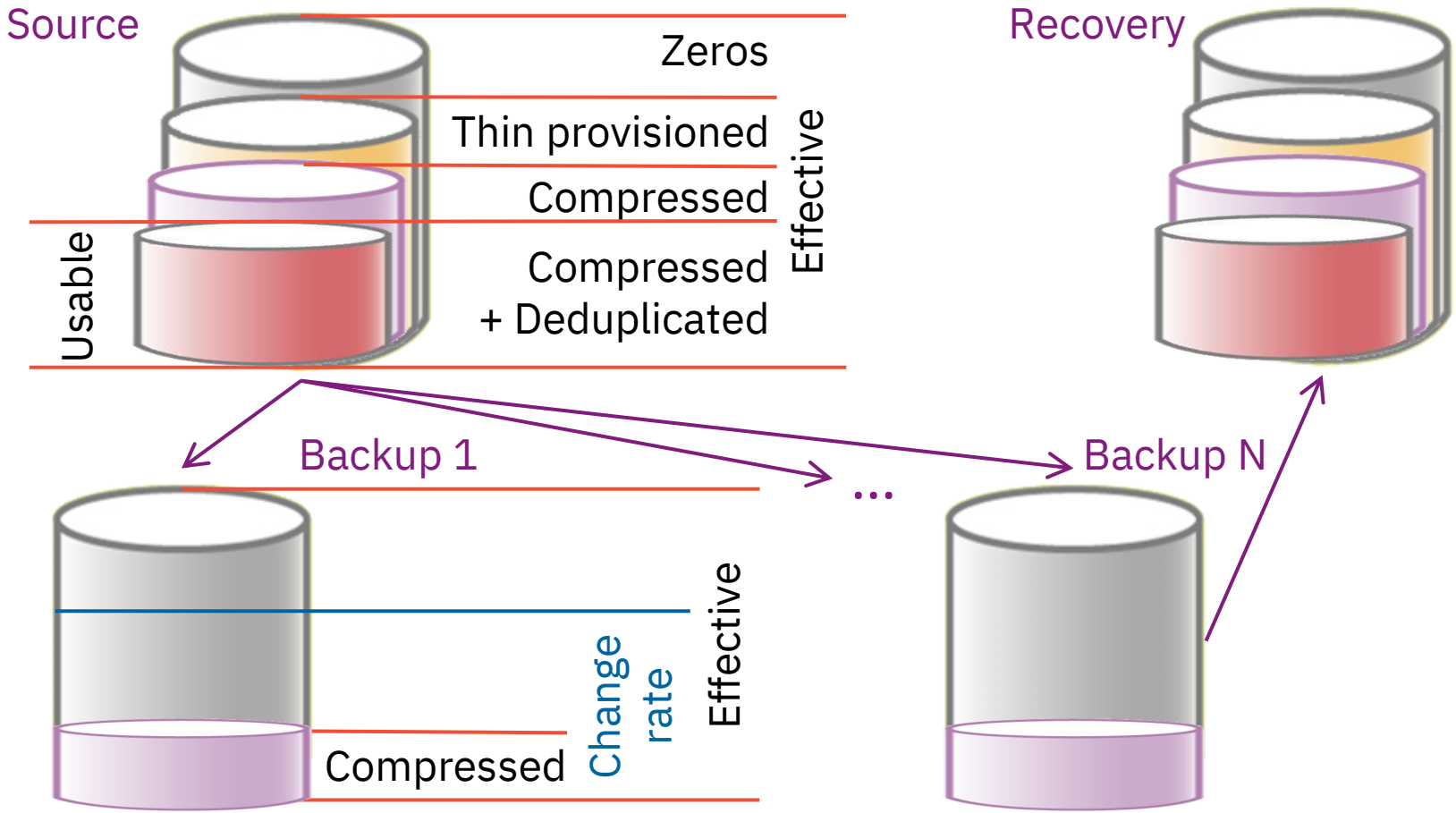
Appendix

Estimation of capacity for normal backups and recovery

- Cost of N backups:
- Effective capacity
  = (N+1) × Effective capacity of source
- Usable capacity
  = N × Compressed changes
  + Usable capacity of source
- Backups without savings from thin provisioning or deduplication!



Appendix

Estimation of capacity loss due to malware

- Malware encrypts the source volumes →
- Source loses capacity savings; used usable capacity ≈ effective capacity
- Last backup reaches ≈ 100% (but with savings like source)
- The lost usable capacity reduces also the pool's total effective capacity.