SSD Impact on Data Recovery For Enterprise Storage

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Introduction

In a recent study, it was estimated that:

- Data loss within the enterprise has increased 400% since 2012
- 71% of enterprises are still not fully confident in their ability to recover after a disruption
- Companies are increasingly worried that traditional data recovery techniques will no longer suffice…

Study source: EMC Corporation

Discussion Topics

- Enterprise vs consumer SSD failure
- Data recovery process overview
- Unique methodologies
  - RAID
  - Physical
  - Logical
- Essentials to perform data recovery in an enterprise SSD environment

Enterprise vs. Consumer Data Loss

- ## Enterprise SSD
  - User error common
  - Drive health scans ID failing drives before total loss
  - Controlled environment
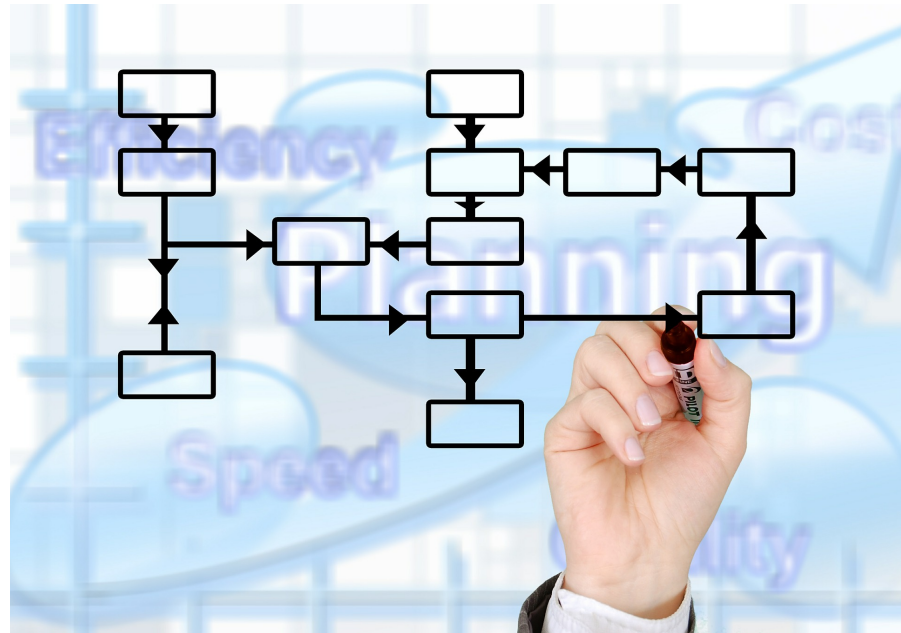 - If one SSD has failed, the data can often be rebuilt from other areas

- ## Consumer SSD
  - Corruption is most common
  - Drives can simply fail "without warning"
  - Can require system level repair
  - Most likely the only drive in the system

Enterprise Data Recovery Process

- ■ **When an SSD fails:**
  - – Restore
  - – Repair
  - – Extract
  - – Reassemble
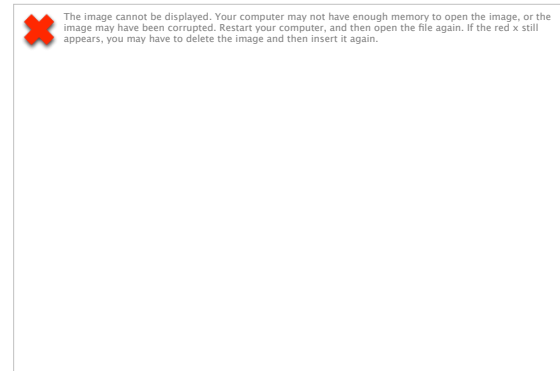
RAID Methodologies

- **Flash array data arrangement**
  - Drive
  - NAND
  - Page
- **Newer technology**
- **Far more SSD manufacturers than HDD**

Physical Methodologies (chip-off)

- Physical properties which can affect recovery efforts:
  - Use of extra BGA pads undefined by standards such as ONFI or JEDEC
  - Voltage adjustments
  - Encryption

The image cannot be displayed. Your computer may not have enough memory to open the image, or the image may have been corrupted. Restart your computer, and then open the file again. If the red x still appears, you may have to delete the image and then insert it again.

Logical Methodologies (chip-off)

- Logical properties which can challenge recovery efforts:

  - Vendor unique commands
  - Undefined addressing schemes
  - Software encryption
  - Advanced feature enablement
    - i.e. read-retry

The image cannot be displayed. Your computer may not have enough memory to open the image, or the image may have been corrupted. Restart your computer, and then open the file again. If the red x still appears, you may have to delete the image and then insert it again.

Essentials for Enterprise Recovery

- Customizable hardware/software
- Thorough competency in physical and logical NAND and RAID characteristics
- OEM relationships

Conclusion

- Challenges certainly exist in enterprise SSD recovery
- Data recovery in the enterprise SSD market is very possible with fluency in SSD/file system functionality and diligent R&D efforts

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