Virtual Storage Manager
Storage Technology Corporation

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Problems

→ **Inefficient use of tape media**

- **average data set size on tape is 255 MB**

- **media capacities range from 12 to 150 GB**

→ **Inefficient use of tape transports**

- **mount/dismount activity a large portion of transport usage**

- **extra transports used to handle peak allocation demands**

Solution

Virtual Storage Manager by StorageTek

- **Provides virtual tape transports**

- **Provides virtual tape cartridges**

- **Efficiently uses real tape transports**

- **Efficiently uses real tape cartridges**

- **Transparent to the host system and to applications**

Acronyms

→ **VSM - Virtual Storage Manager**

→ **VTCS - Virtual Tape Control System**

→ **VTSS - Virtual Tape Storage Subsystem**

→ **VTV - Virtual Tape Volume**

→ **VTD - Virtual Tape Drive**

→ **RTD - Real Tape Drive**

→ **MVC - Multi-Volume Cartridge**

→ **GUI - Graphical User Interface**

VSM Components

HSC

VTCS

GUI

Control Path

CDS

VSM Control & Data Path

VTSS

Migrate/ Recall

Virtual Tape Control System (VTCS)

→ **VTCS is an extension to HSC**

→ **Major responsibilities**

- **Influences allocation to virtual tape drives**
- **Issues "robotic" commands to the VTSS**
- **Manages the Migration/Recall of Virtual Tape Volumes**
- **Controls the Use of the VSM-managed Real Tape Drives and Multi-Volume Cartridges**
- **Keeps track of Virtual Volume location in CDS**

Graphical User Interface (GUI)

➔ **The GUI is the management interface to the system**

- **Windows (95 or NT)**

- **Runs on User-provided PC**

- **TCP/IP link to VTCS**

➔ **Major responsibilities**

- **RTD Configuration**

- **Installation Verification**

- **AUDIT**

- **Policy Definitions**
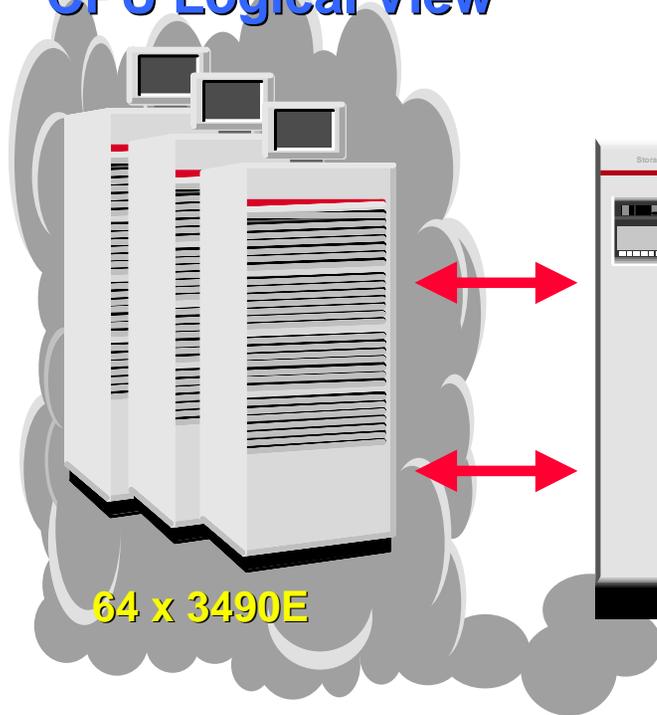
- **Reporting**

Virtual Tape Storage Subsystem (VTSS)

➡ **VTSS is a modified StorageTek Iceberg**

- **Based on the latest model manufactured for IBM**

➡ **Major responsibilities**

- **Interfaces with the host based software (VTCS)**

- **Emulates a virtualized robot**

- **Provides Virtualized Tape Drives**

  – **Emulates the complete 3490-E command set**

- **Provides space for resident Virtual Tape Volumes (VTVs)**

  – **Transport mechanical actions occur at electronic speeds**

- **Contains the migrate / recall engine**
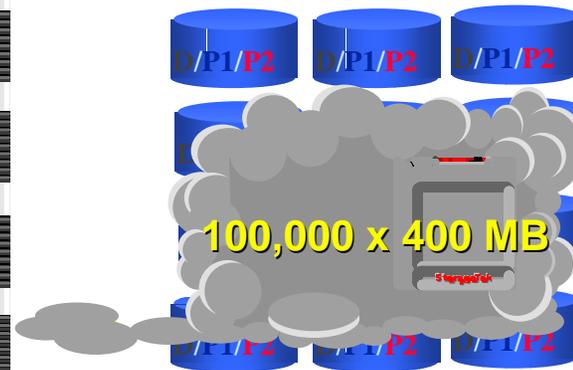
Virtual Tape Storage Subsystem (VTSS)

CPU Logical View

Physical Real Storage

Array

D/P1/P2   D/P1/P2   D/P1/P2

100,000 x 400 MB

D/P1/P2   D/P1/P2   D/P1/P2

64 x 3490E

StorageTek   Disk Array Controller
ICEBERG

Note: Up to 100,000 Virtual Tape Volumes can reside within each Iceberg machine. The limit for the combination of resident /migrated virtual volumes is a significantly higher number

Migrate/Recall Engine

➜ **A mechanism to move data to and from the VTSS and the real tape drives**

➜ **Major responsibilities**

- **Emulate an ESCON channel**
- **Execute the 3490-E command set**
- **Perform error recovery as needed**

Migration and Recall Process

➡ **Virtual Tape Volumes are migrated and stacked on real tape cartridges**

  ● **The VTV retains it's original VOLSER**

    – **No catalog changes**

    – **No TMS changes**

➡ **Stacked real tape cartridges are called Multi Volume Cartridges (MVCs)**

➡ **Migration events occur in response to customer defined criteria and disk buffer utilization considerations**

Migration and Recall Process (cont)

➡️ **Requests for migrated virtual volumes are first moved from the multi volume cartridge to the disk cache**

➡️ **Access to the recalled volume occurs through a virtual tape drive**

➡️ **It looks like a longer mount**
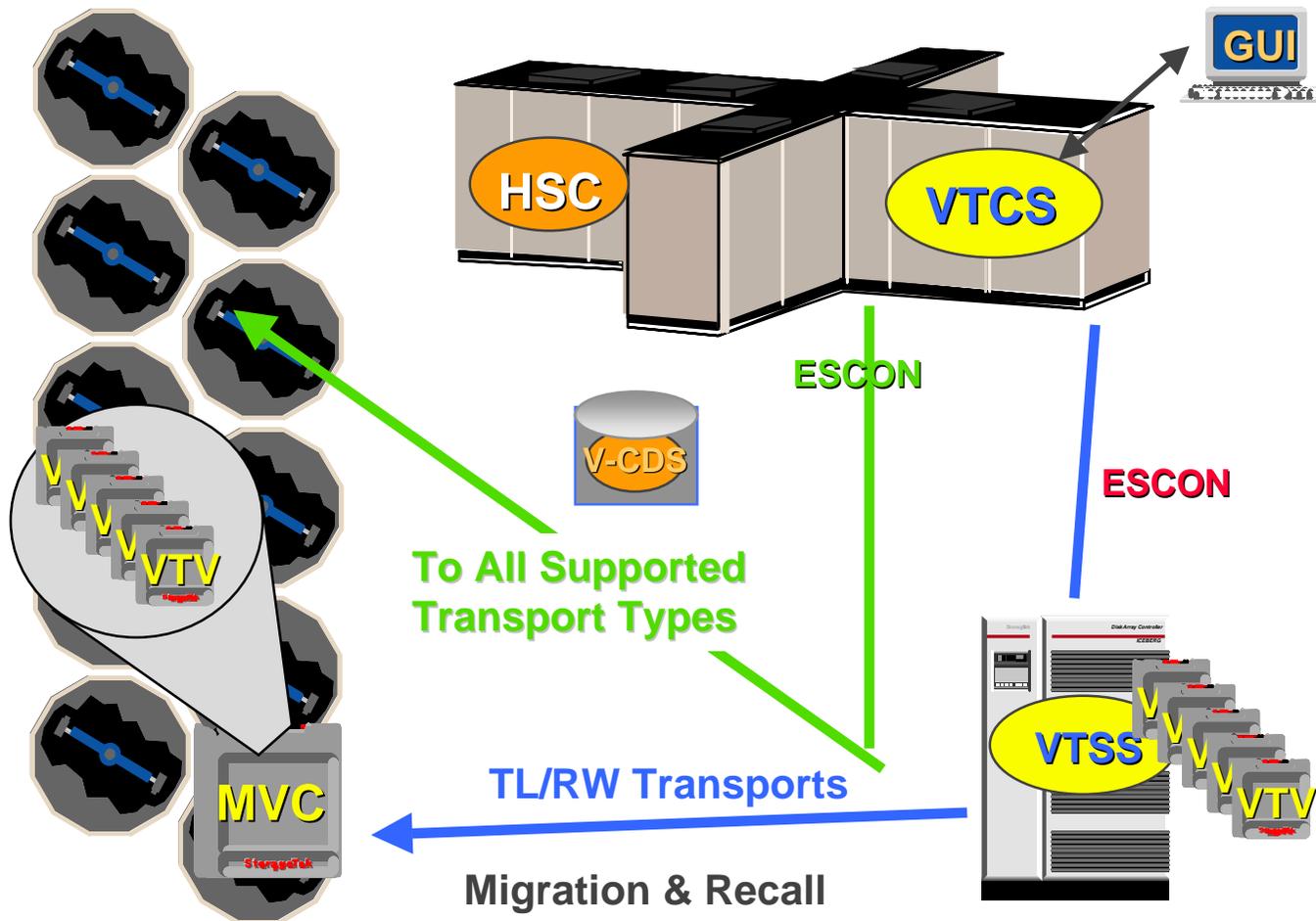
Automated Libraries

➜ **All StorageTek libraries supported
    by HSC 2.0.1**

➜ **No hardware or microcode changes**

Real Tape Drives

➡️ **All StorageTek Timberline transports**

➡️ **All StorageTek RedWood transports**

➡️ **No hardware or microcode changes**

VSM Architecture - Complete

GUI

HSC

VTCS

ESCON

V-CDS

ESCON

To All Supported Transport Types

TL/RW Transports

VTSS

VTV

VTV

MVC

Migration & Recall

Questions

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