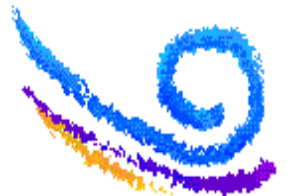


The Value of VM for the VSE Enterprise (*What Else Can I Do With VM?*) Session G42

2000 VM and VSE Technical Conference

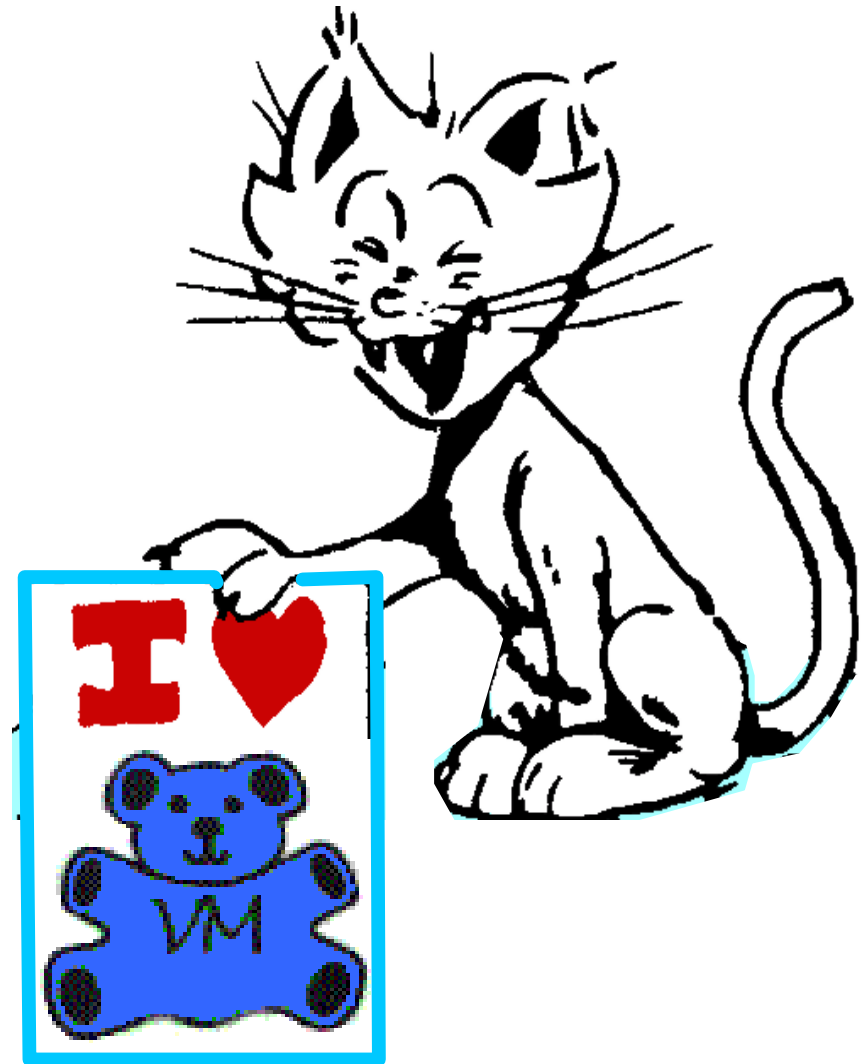
James M. Savoie
IBM Advanced Technical Support

[RETURN TO INDEX](#)



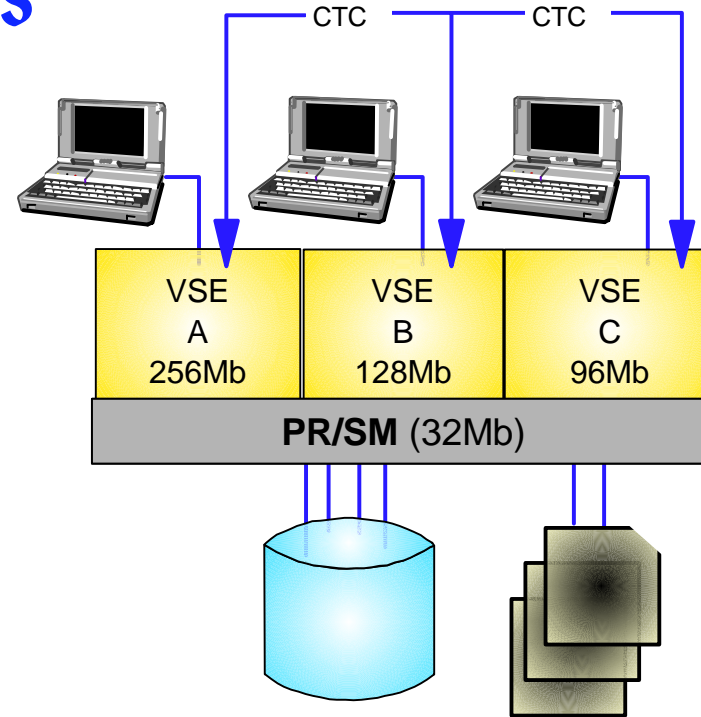
Benefits of VM for VSE Guests

- ▶ More Flexible than Logical Partitions
- ▶ Disk and Tape Services
- ▶ Database Services
- ▶ Network Services
- ▶ Web Services
- ▶ New Application Servers as VM guests

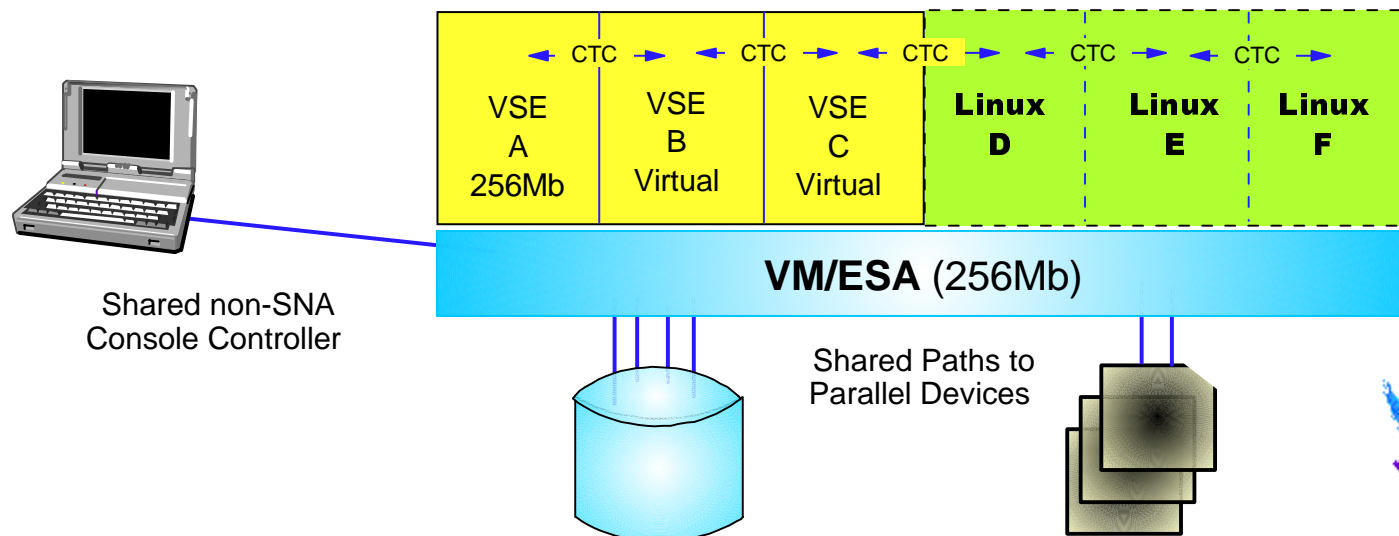


Partitioning Alternatives

Hardware Partitioning

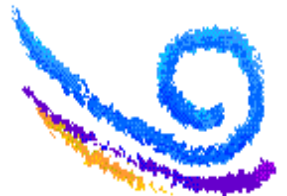


Partitioning with VM



A Hypervisor that does more than Partition

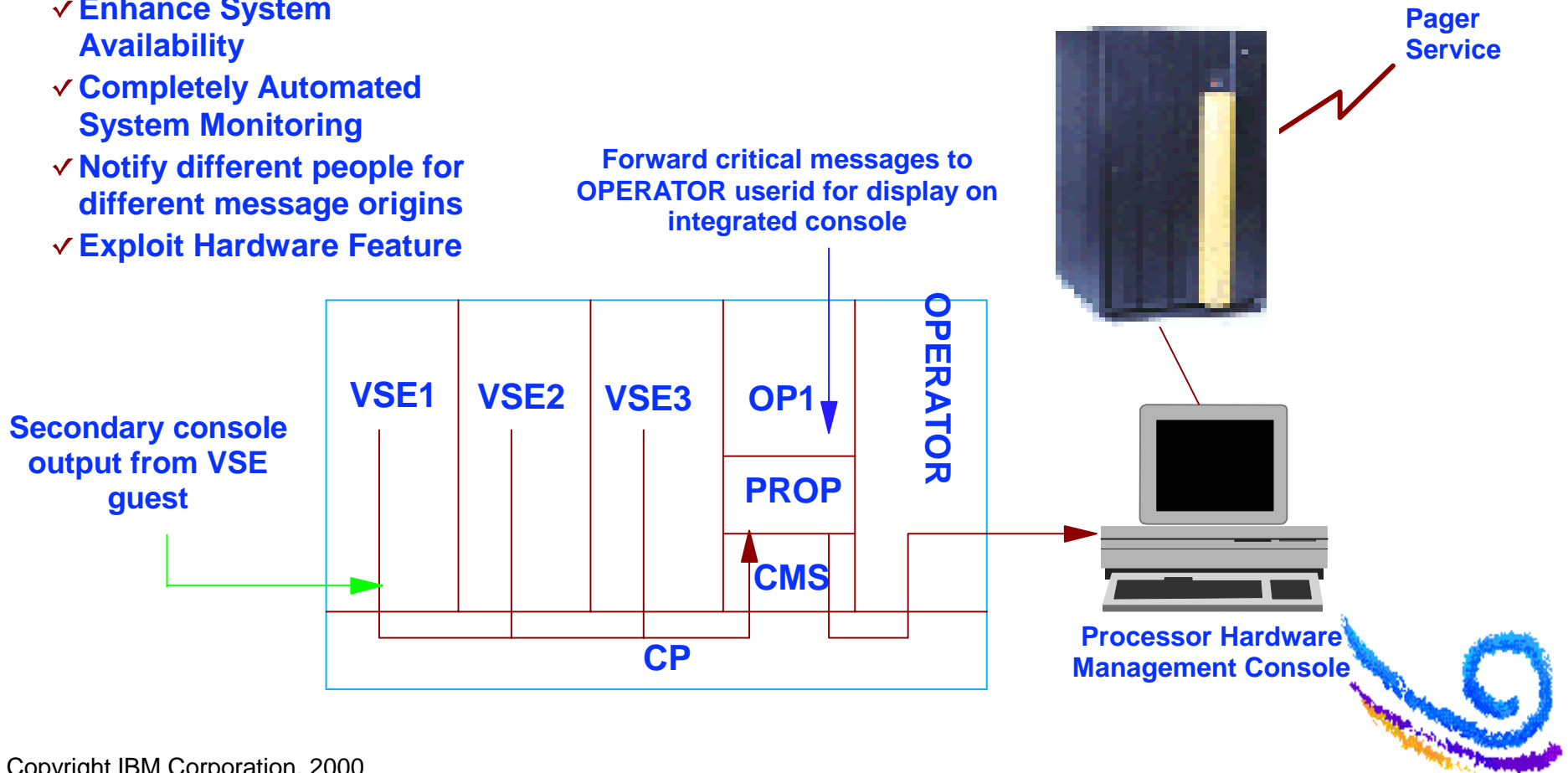
- ▶ Monitor and tune a multi-image VSE system
 - System wide monitoring tools (RMF-like capability)
 - Share capping
 - Accounting
- ▶ Minimal performance impacts
 - Preferred Guests with dedicated disk provides equivalent to LPAR performance
 - When volumes must be shared, VM Minidisks can be cached in processor storage to mitigate overhead
 - When Virtual Disks in Storage are controlled by VM, storage resources are pooled and available on demand
 - VM will use more than 2Gb real storage, deploying it to any VSE image at the appropriate time as Virtual Storage, cached minidisks, virtual disks in storage, etc.
 - Better n-way dispatching



The Hardware Pager Notification Facility

VM/ESA integrated console support enables use of a hardware paging system, delivering critical VM and VSE messages to the pager of the key operator or system programmer who needs to know!

- ✓ Enhance System Availability
- ✓ Completely Automated System Monitoring
- ✓ Notify different people for different message origins
- ✓ Exploit Hardware Feature



VM Serves Disk Files to VSE

▶ Mini-Disk (MDisk)

- Share VSE Volumes without dedicating physical paths, similar to ESCON Multiple Image Facility (EMIF)
- Performance impact mitigated by
 - MDisk Cache
 - CCW Fastpath
 - Economic 4-pathing for devices on parallel channels
- Manage VSE MDisks with DFSMS
 - Panel driven method to expand MDisks
 - Operates on Groups of MDisks
 - Migration to new disk geometry

▶ VM Virtual Disk (VDisk)

- Pool memory and paging resources across multiple VSE images
- Put Data in Memory that can be shared (linked) by multiple guests
- Ideal for VSE Lockfile

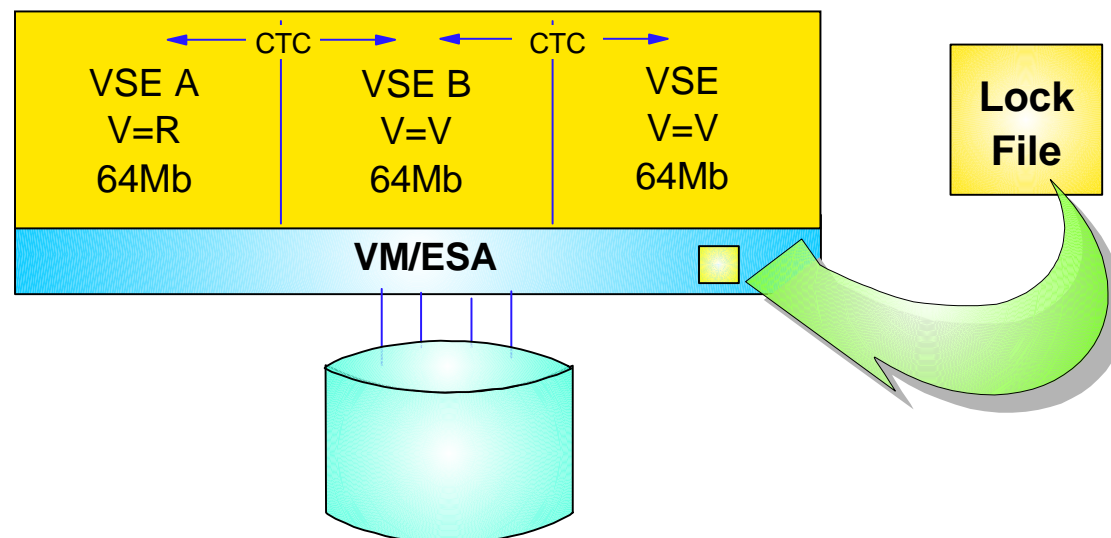
▶ Shared File System (SFS)

- Multi-user access with locking available at the file level
- Xedit
- A great place for VSE application source and JCL



VM Virtual Disks in Storage

- ▶ VM Virtual Disks can be used by VSE applications and end users to provide high speed, temporary disk in real storage.
 - Putting the VSE Lockfile into real storage alleviates a common bottleneck when multiple VSE images share DASD
 - Appears to the VSE guests as a real FBA DASD device
 - Can be shared between VSE guests, unlike native VSE Virtual Disks
 - Removes need for 3rd party software or solid state devices

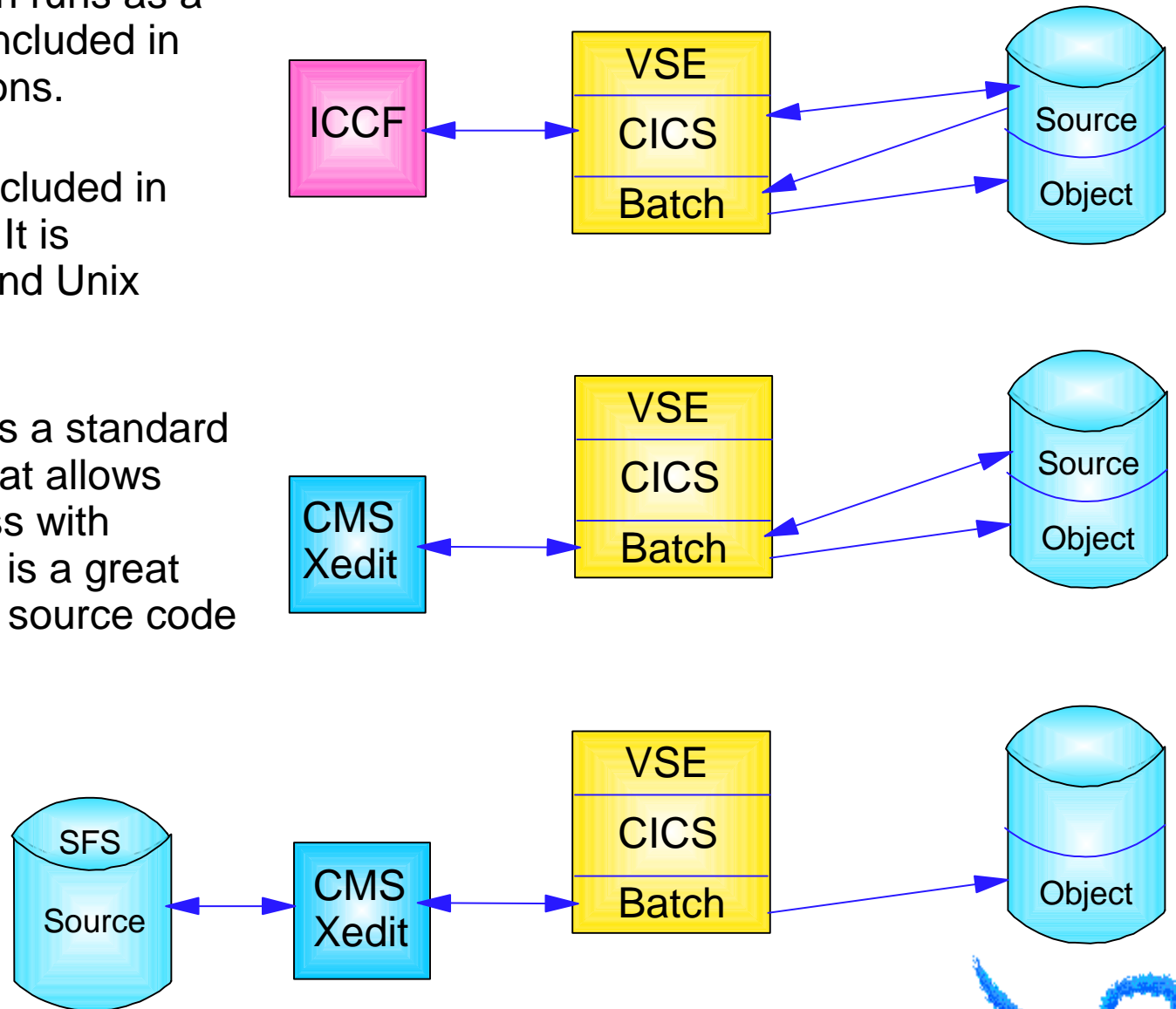


Application Development

- ▶ ICCF is 3270 editor which runs as a CICS transaction and is included in VSE/ESA V2 base functions.
- ▶ Xedit is the CMS editor included in VM/ESA base functions. It is preferred by MVS, VSE and Unix programmers alike.
- ▶ The Shared File System is a standard component of VM/ESA that allows multiple concurrent access with systems management. It is a great place for VSE application source code and JCL.

Terminal Options:

- Dial/Undial
- TCP/IP for VM
- PVM
- VM Feature for VSE/VTAM



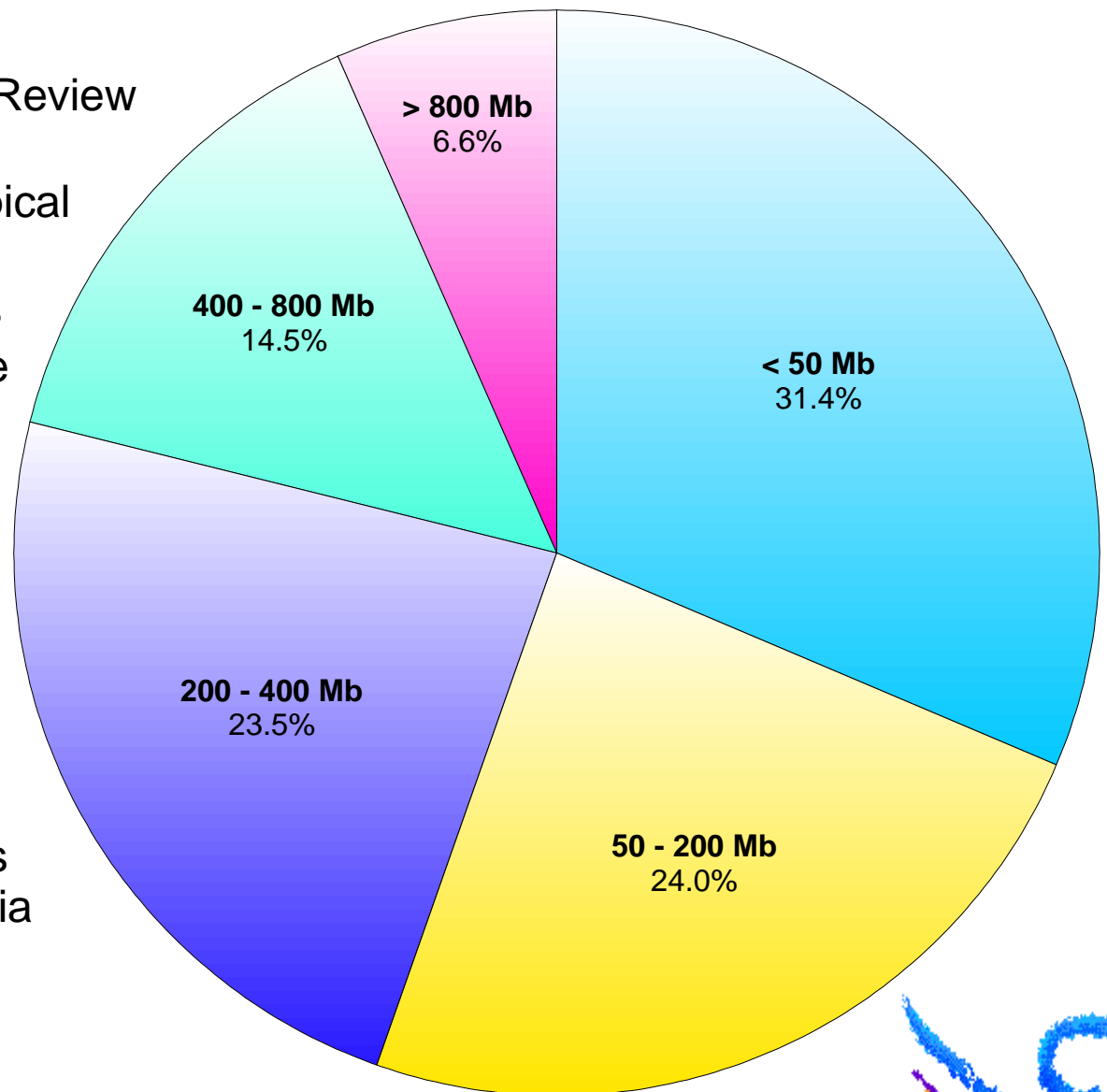
Tape Capacity Utilization

▶ Source: Computer Technology Review
December 1996

- All tape technologies and typical tape applications analyzed
- Several million tape volumes
- 255 MB average volume size
- 79% under 400MB
- 52% below 250KB/sec

▶ New tape media technology offers 100 fold improvement in reliability, capacity and performance

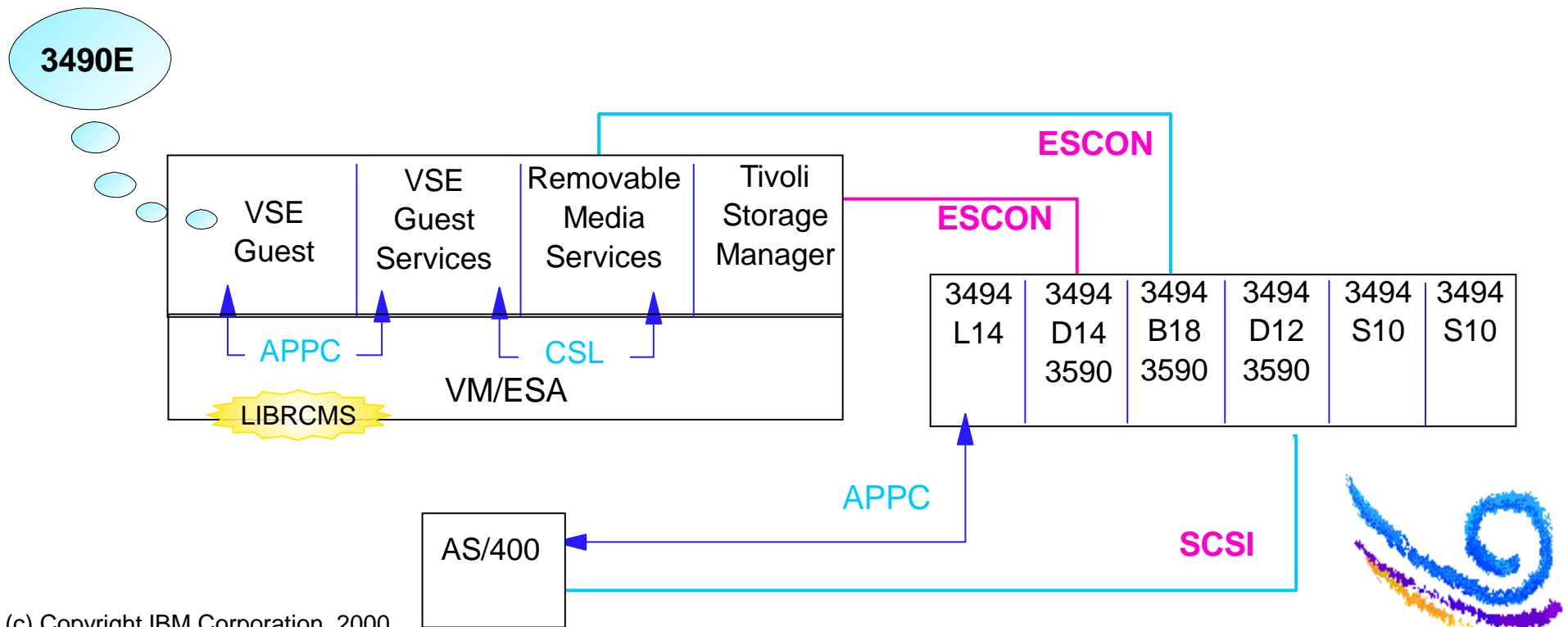
▶ *Virtual Tape* technology enables applications to exploit new media



Virtual Tape Serving with VM

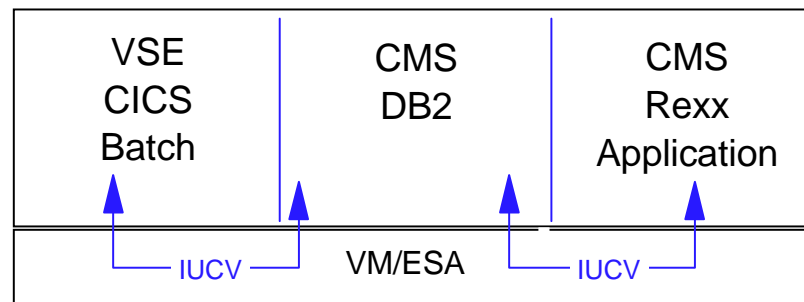
► Magstar Virtual Tape Library Server

- The 3494-B18 can use the entire 60Gb capacity of the 3590 cartridge. Most VSE data sets are smaller than 600 Mb, leaving unused space even on the 3490E media (2.4Gb)
- The VTS takes advantage of the density of the 3590 cartridge while emulating 3490E, improving media utilization with no changes required to VSE or its applications
- Front end RAID Disk drives ensure fast access to data with no operator interaction
- Controlled by DFSMS/VM Removable Media Services
- VTS snaps onto existing 3494 tape library, which can be shared with other platforms, e.g. Tivoli Storage Manager, AS/400, AIX, Windows and Solaris.
- New capability: Peer-to-Peer VTS for remote mirror image



VM Accelerates DB2

- ▶ VM optimizes resources, balancing memory, CPU, and paging subsystems between DB2 and multiple VSE images.
- ▶ VM Data Space Support (VMDSS)
 - Performs better than large page and directory buffers
 - Striping, unmapped internal DB spaces, and database directory in storage
 - Additional tuning parameters: targetws, saveint, etc.
 - VMDSS is included in the base of DB2 V5&6 for VM & VSE
- ▶ RXSQL for interpreted and compiled REXX access
- ▶ DB2 World Wide Web Connection
- ▶ For shops with multiple VSE images
 - Inter-User Communication Vehicle (IUCV) out performs SNA Cross Domain function shipping
 - VM can run multiple DB2 data bases
 - CICS partitions can connect to multiple VM/DB2 databases



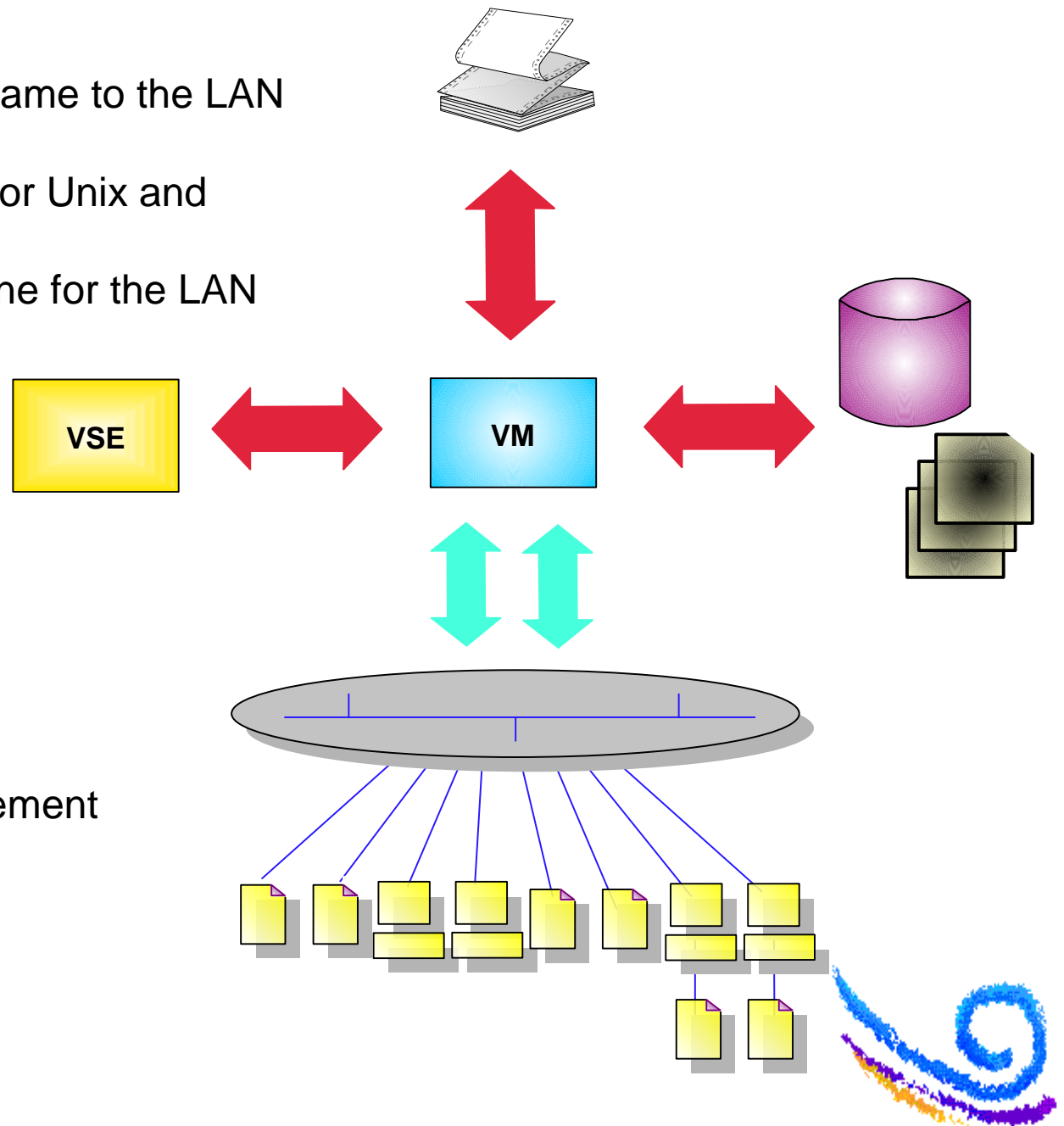
A Super Server for the LAN

- ▶ Bring the strength of the mainframe to the LAN environment

- Utilize mainframe capacity for Unix and Windows Applications
- Exploit Data Center Discipline for the LAN
- Reliable tape media
- Operators and automation
- Security
- Easy capacity upgrades

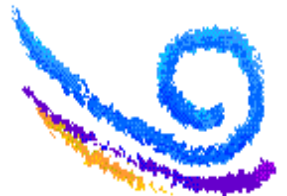
- ▶ Server Consolidation

- Network Services
- File Serving
- Print Serving
- Distributed Storage Management
- Webserving



Why VM/VTAM?

- ▶ VSE/VTAM by design restricts certain I/O buffers and I/O blocks below the 24 bit line.
 - VM/VTAM can be implemented as a cross domain resource to alleviate virtual storage constraints due to
 - Very large VTAM networks
 - Replacing 37x5 SDLC lines with a router and OSA-2
- ▶ VSE/VTAM does not have back-to-back SNA Network Interconnection (SNI) capability
 - VM/VTAM can provide the gateway allowing VSE to participate as an end node
- ▶ If you don't need the full function of VM/VTAM, there are cheaper alternatives
 - Passthrough/VM (PVM)
 - Access to CMS from VSE/VTAM terminals
 - Access to VSE guests from CMS logon
 - Programmability gives VM Webserver gateway to CICS
 - TCP/IP for VM
 - Telnet exit can dial a guest automatically
 - TN3270E drives PC attached printer
 - Function level 320



TCP/IP for VM , for VSE or for both?

Telnet, TN3270(E)

FTP

LPR/LPD

Webserver

Sockets API

NFS

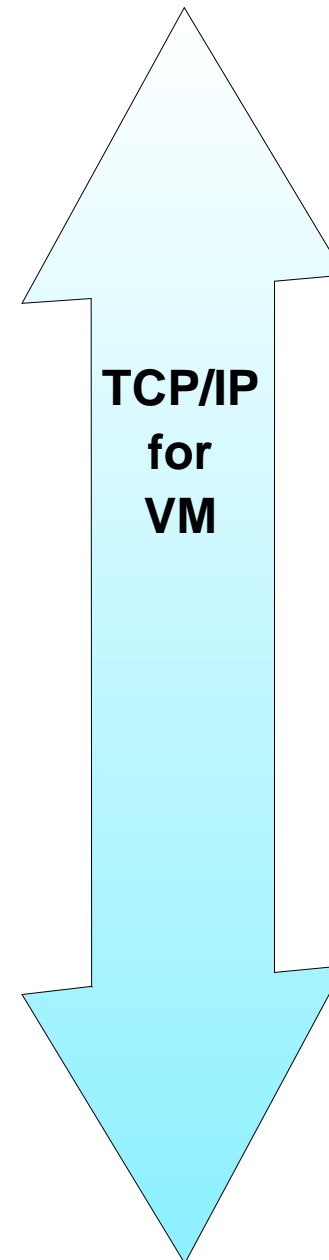
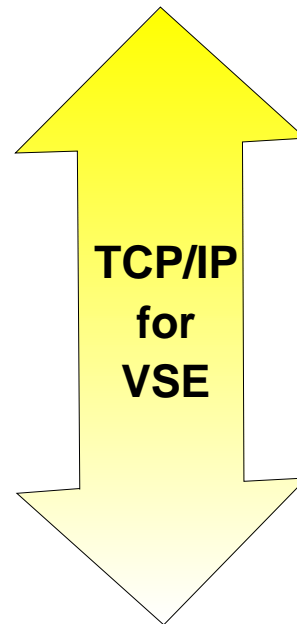
SMTP

SSL

Multiple Stacks

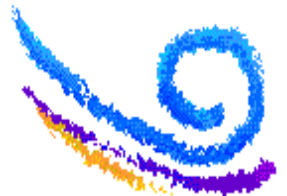
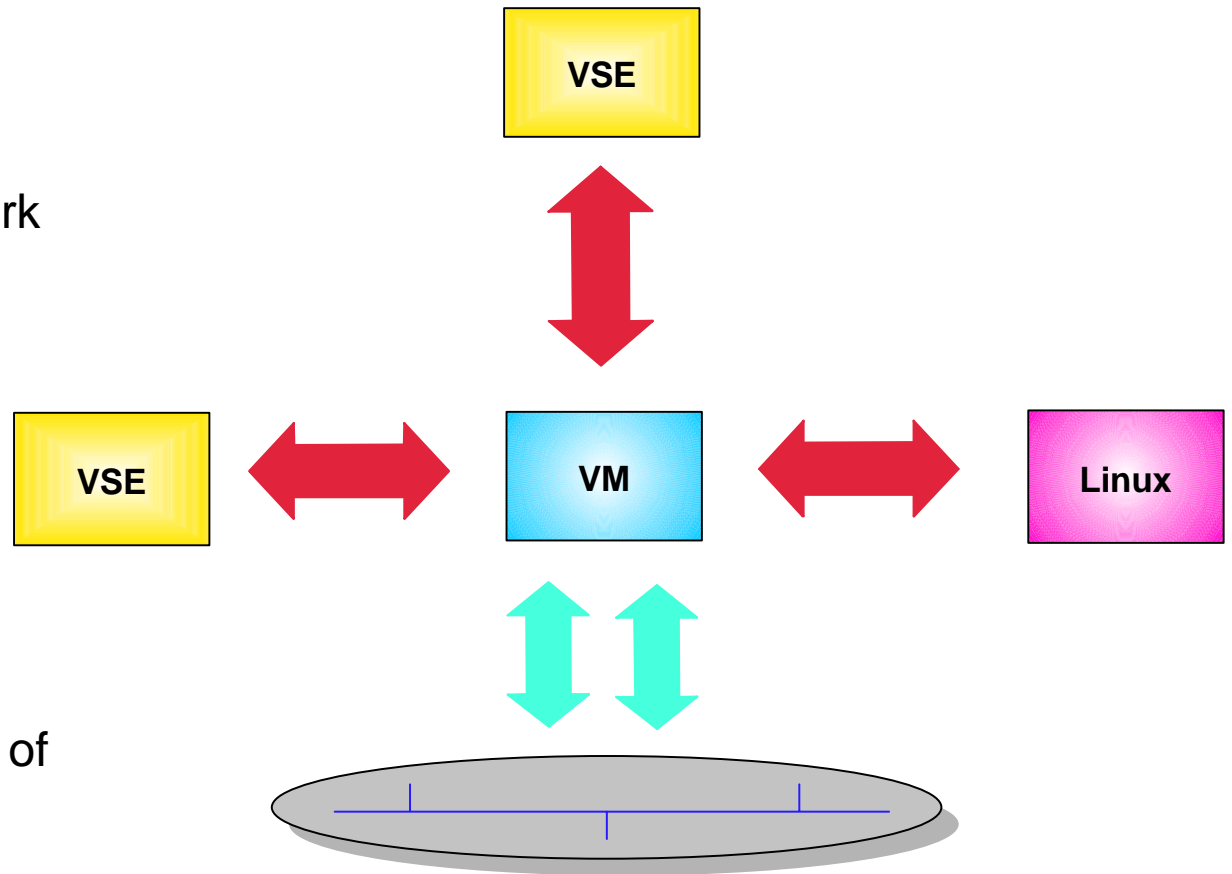
Dynamic Routing

Instrumentation



TCP/IP for VM, for VSE

- ▶ Dynamic Routing for S/390
 - Better problem determination
 - Less administration for network maintenance
 - More reliable network
- ▶ Enterprise Print Serving
 - Uses RSCS line drivers
 - High performance
 - Guaranteed delivery
 - PNET to RSCS
 - IP to IP, exploiting RSCS free of charge
- ▶ Webserving with Integrity and Security
 - Webgateway handshake with VSE IPServer
 - Apache on Linux for S/390



File Serving with VM

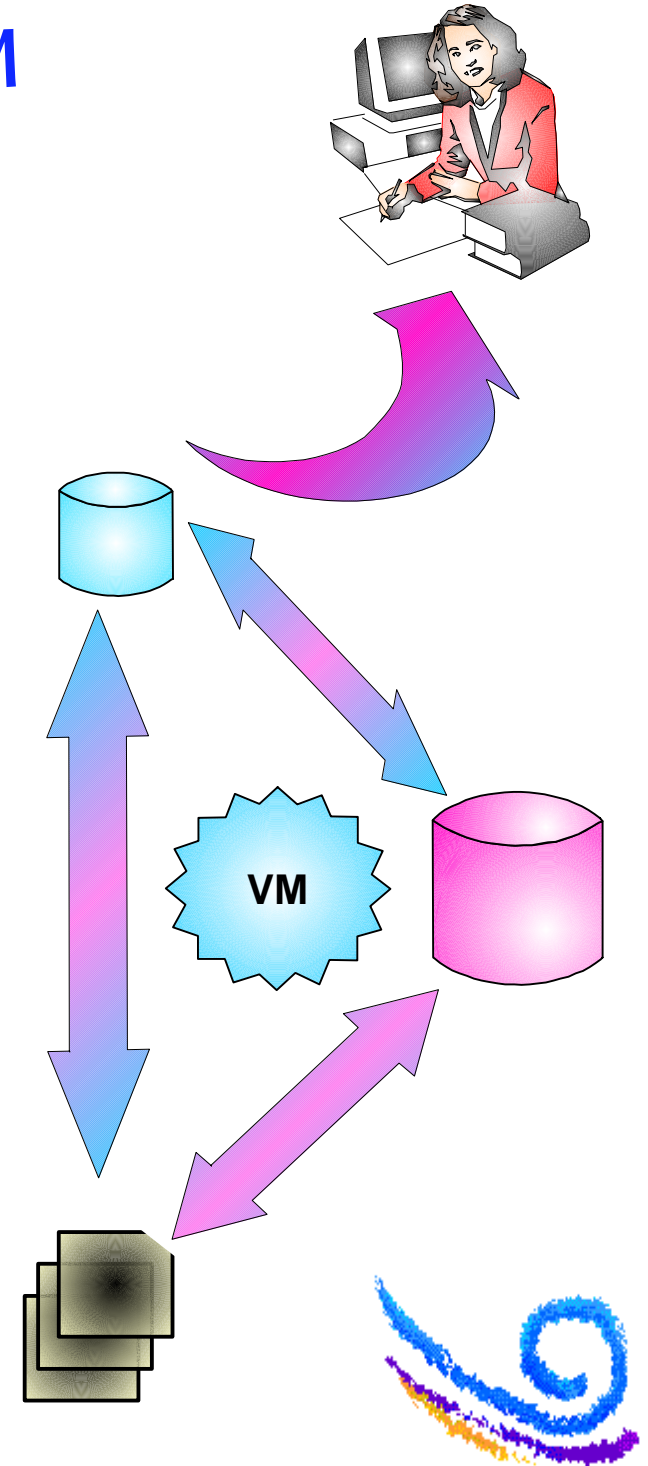
► Byte File System (BFS)

- A Unix style file system optimized for S/390
- Centralized Management
 - Automated Storage Management with DFSMS
 - Secure Host Access Control (e.g. RACF)
 - Centralized Administration of logical and physical capacities
- Enables Server Consolidation
 - Over 700 Posix interfaces in VM/ESA 2.3 & 2.4
 - Java Virtual Machine, JDK 1.1.6 and NetRexx
 - Network Station Manager and Boot Server
- Easy access from/to Unix and Windows
 - FTP send without pre-allocation
 - NFS access with Unix naming conventions
 - Automatic EBCDIC/ASCII Translation



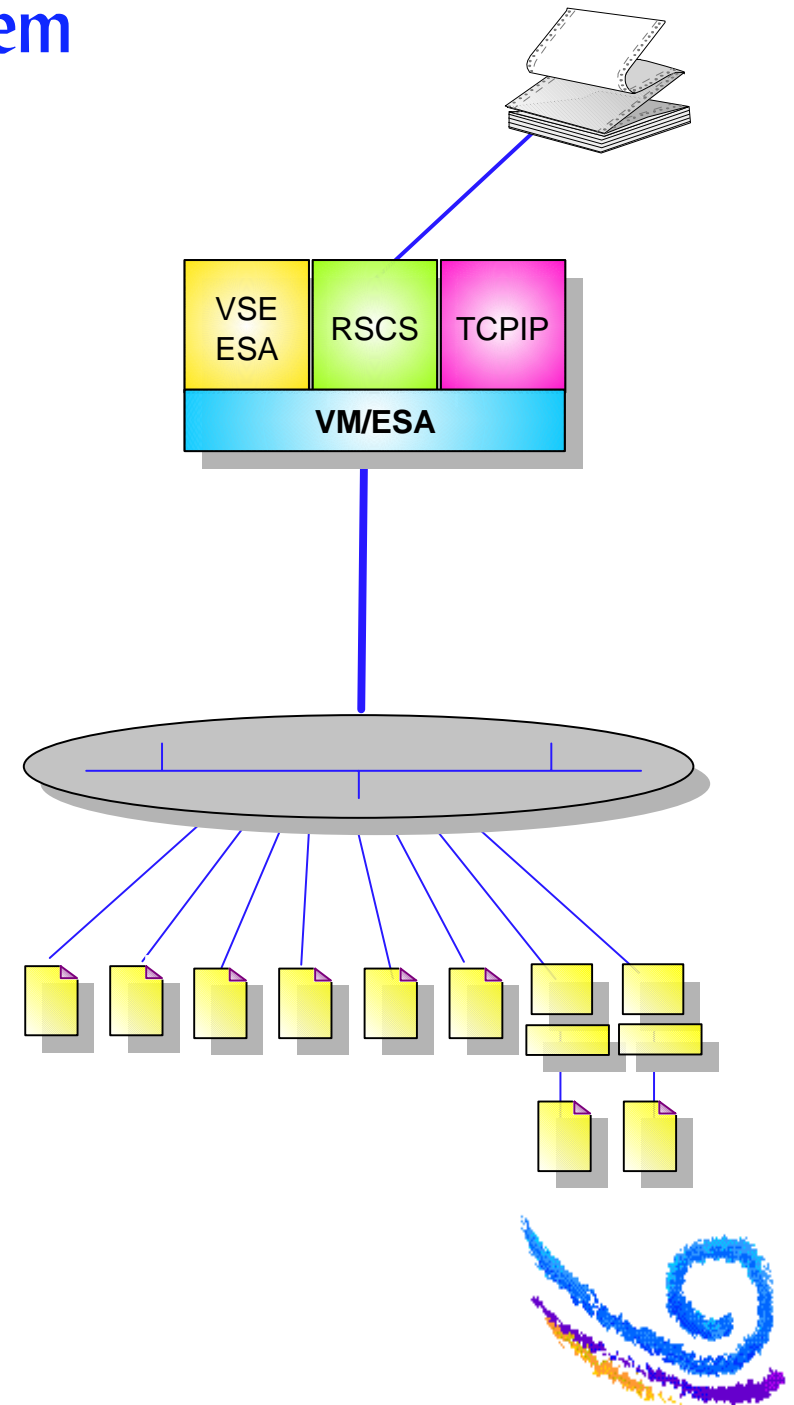
Systems Managed Storage with DFSMS/VM

- ▶ SFS and BFS
- ▶ Define classes of data and policies for management
 - By user directory
 - By Size
 - By Date of last reference
- ▶ Define types of media to manage
 - Primary, high speed disk
 - Slower, cheaper devices
 - Data automatically compacted and uncompactd
 - Secondary disk
 - Requires its own TSM instance
 - DFSMS provides CMS client code
- ▶ VM Makes a Great Place for
 - Cyclical and historical data
 - VSE application source and JCL
 - Unix and Windows application source and shell scripts
 - Documents and spread sheets



Remote Spooling and Control Subsystem

- S/390 Reliability and Scalability make possible a single point of management for any and all printers
 - Mainframe line printers
 - High capacity quality printers
 - Disperse LAN printers
 - Workstation attached printers
- Flexible Store & Forward Printing
 - Postscript
 - Binary graphics
 - Many Delivery options including *Guaranteed Delivery*
 - No RSCS license charge for LPR/LPD support!
- NJE to/from Power queue to distribute VSE listings to printers on the LAN
- Transport over IP to other VSE systems



Manage Distributed Storage with VM and

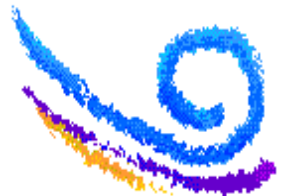
▶ **Tivoli Storage Manager, S/390 Edition (5697-TSO)**

- Centrally managed back-up, recovery & archive solution for distributed servers
- Takes advantage of existing S/390 infrastructure: Hardware, Software, Security, Skills, Data Center Discipline
- Browser Interface
- ADSM V3.1 Pre-installed on VM/ESA 2.4 (5697-VM3)

▶ **Tivoli Space Manager, S/390 Edition (5697-SPO)**

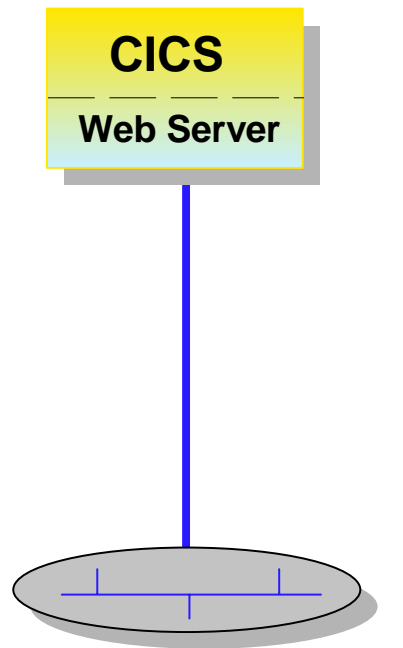
- Optimize disk space on SUN and AIX Servers
- Automates Policies
 - Moves infrequently used files to tape
 - Recalls files upon user request
- Previously a feature of ADSM V3.1

▶ IBM Announcement 299-282



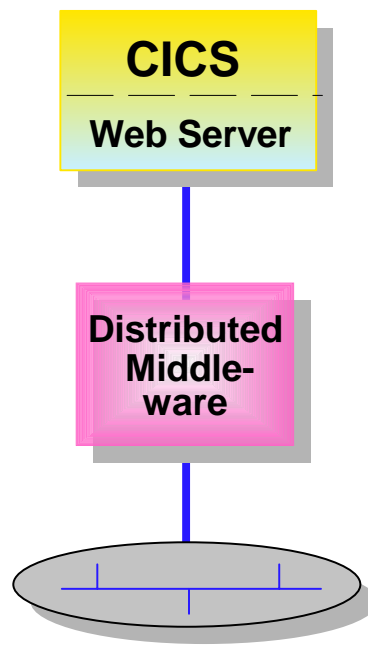
Web Serving Models with VSE

Two Tier



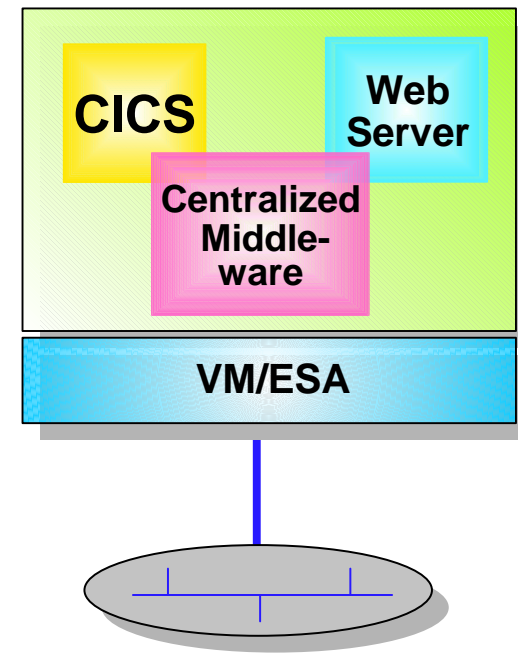
- ▶ Simple, cost effective

Three Tier



- ▶ Security for legacy applications

Middleware on S/390



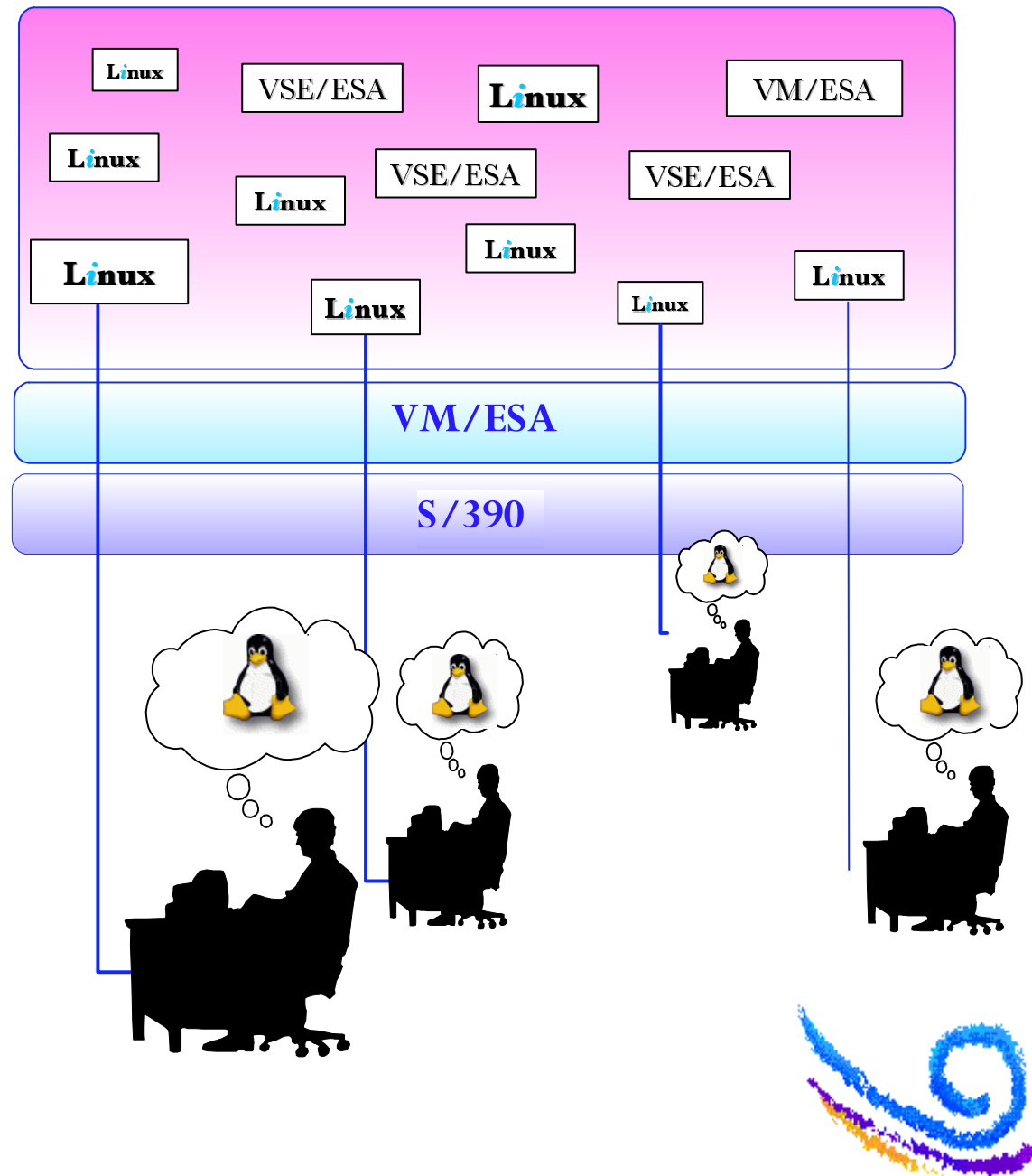
- ▶ Simple, cost effective
- ▶ Security for legacy applications
- ▶ Scalable, grows with your business

VM puts the Middleware back into the Mainframe!

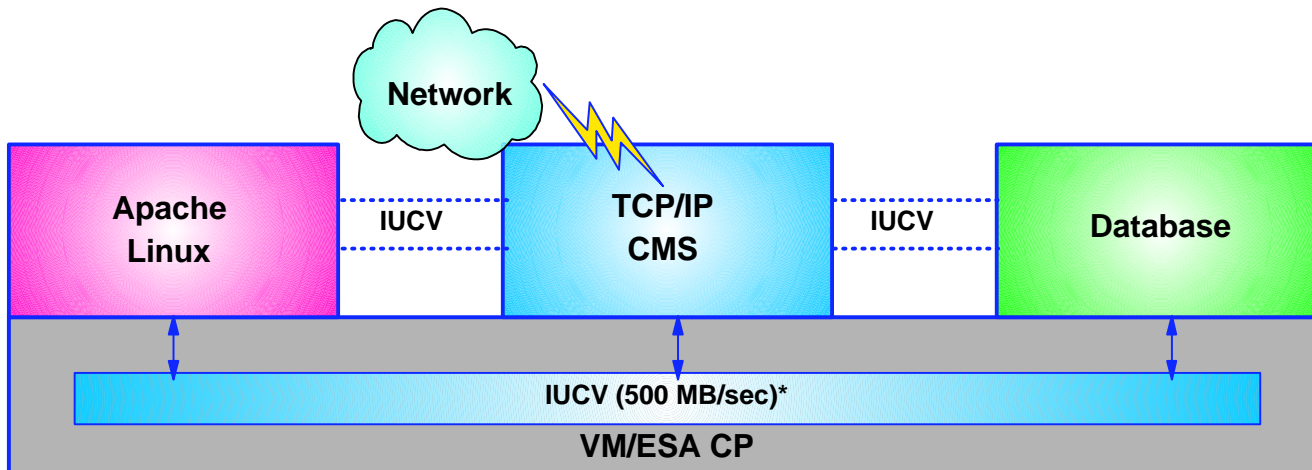
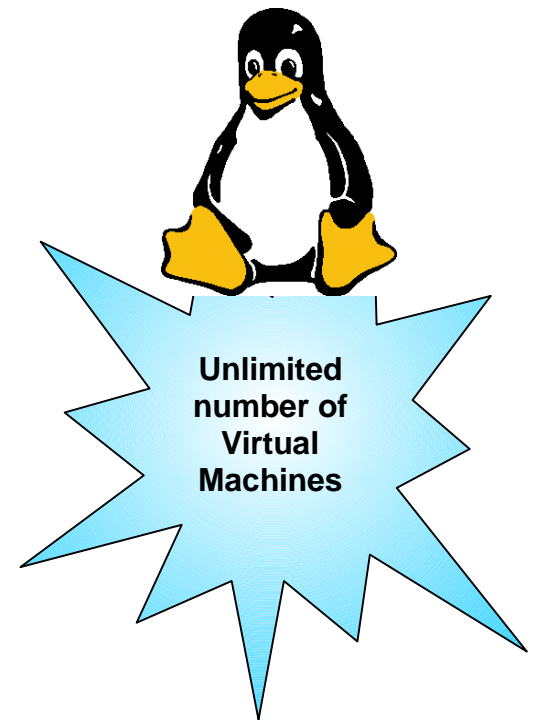
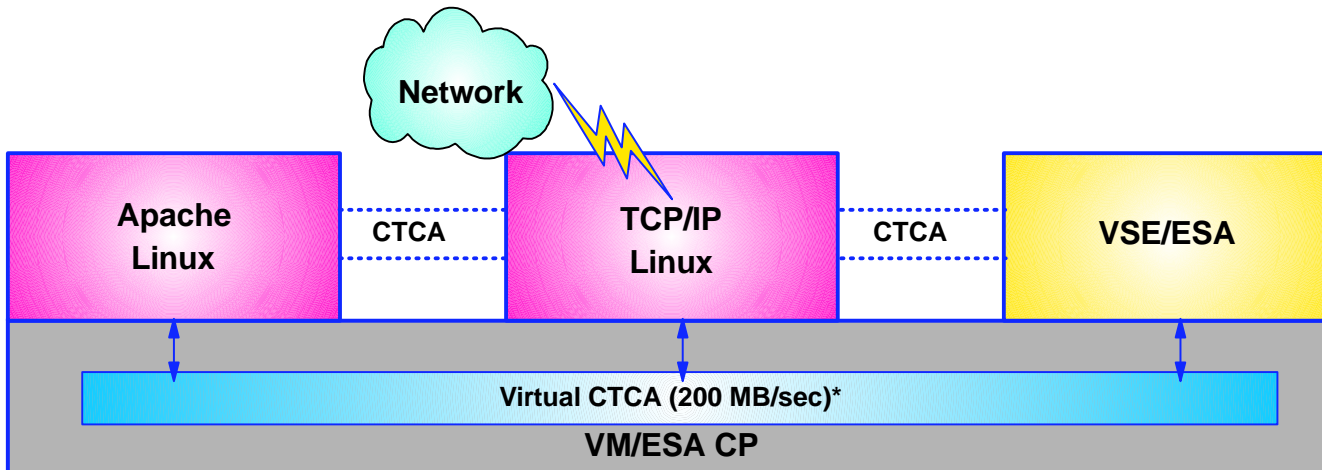
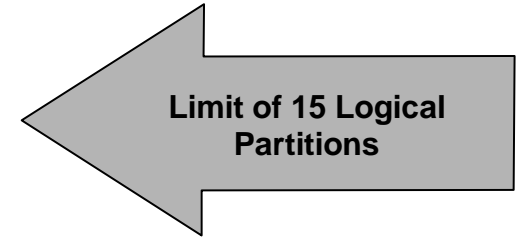
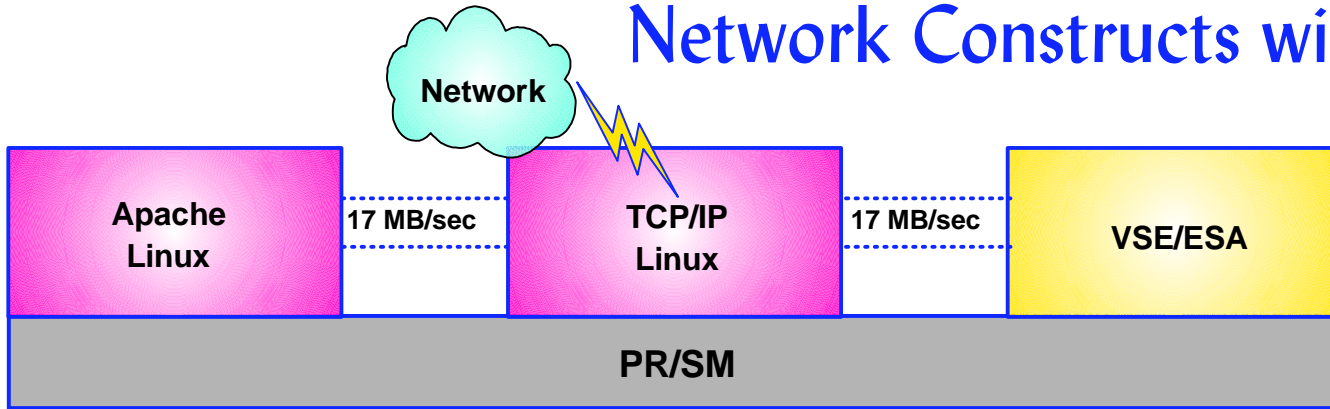


New Application Servers as VM guests

- ▶ Create virtual Linux servers on demand
- ▶ Virtually unlimited, independent Linux images
- ▶ Central administration
- ▶ Shared hardware resources
- ▶ High-speed inter-Linux connectivity
- ▶ Access to legacy VSE/ESA applications and data bases
- ▶ Build high-speed networks of virtual servers on a single hardware platform



Network Constructs with Linux for S/390



*Turbo G6 projected
 (c) Copyright IBM Corporation, 2000



Summary

- ▶ VM increases flexibility and control while conserving hardware resources
 - Processor and memory management
 - VSE Disks
 - Productivity tools
 - Automated Tape Operations
 - Database
- ▶ VM as a Super Server
 - Provides Wide Area Network Services
 - Provides File and Print Services
 - Storage Management with Tivoli
- ▶ VM brings middleware back to the mainframe
 - Web enablement with VM tools and ISV products
 - Web enablement and new application servers with Linux guests

