Tivoli Storage Manager for Virtual Environments

Referent: **Andreas Kindlbacher** – Tivoli Storage Sales Leader

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Opportunity Identification – TSM for VE

Questions to ask:

- Do you use VMware virtual machines as production servers?
  - By 2012, most x86 server workloads will be running in VMs
- Do you need to improve the protection of data in virtual servers?
  - Traditional in-guest backup solutions drag down the performance of virtual servers and may not provide adequate Recovery Point Objectives for more critical data
- Do you need to improve the recoverability of virtual server data?
  - Can you easily recover an individual file, a disk volume or an entire virtual machine?
  - Would you like to recover disk volumes within a couple of minutes?

Improve Service

Reduce Costs

Mitigate Risks

Pricing

- Priced by Process Value Units (PVUs) for the cores of the vSphere host running the protected guests
  - US Price = $35.00 per 10 PVU
  - TSM or TSM EE is a prerequisite product for TSM for VE; the price is in addition to the TSM or TSM EE b/a client license covering the vSphere server
- No licensing is required for the vStorage backup server, whether it is a physical or a virtual system
- Sub-capacity pricing is available
  - http://www.ibm.com/software/lotus/passportadvantage/subcaplicensing.html

Competition (see speaker notes for details, additional links)

	Competitors, as of Feb 2011:	IBM TSM for VE	Symantec NetBackup	EMC Networker + Avamar	Commvault Simpana	Quest vRanger Pro	Veeam
1	**Block Level Backup**	Yes	No, only file level	In-Guest and image-level backups	Granular File level recovery from a full image backup	No (Image based backup)	File level
2	**Flexible recovery options**	File, Volume, and VM image	File, Volume, and VM image	File, Volume, and VM image	File and full VM image	Instant file level recovery	File, Volume, and VM Image
3	**Near Instant Restore**	Yes	Instant restore available	Yes	Yes – only for VM	No	Yes
4	**Auto-Discovery of new VM's**	Yes	No	No	Yes	Yes	No
5	**Support for LAN-Free data transfer**	Yes	Needs an agent	WAN friendly	No	Yes	Yes
6	**Scalability**	Manages up to 2 billion objects	Need to add media server to grow capacity	Need to add media server to grow capacity	Limited	Yes	Yes
7	**Data deduplication**	Built in	Yes, extra $$$	Yes, Source Based, extra $$$	Integrated	No	Limited
8	**Unified Recovery Management**	Yes	Yes	Yes	Limited	No	No

Tivoli Storage Manager for Virtual Environments

Product Overview

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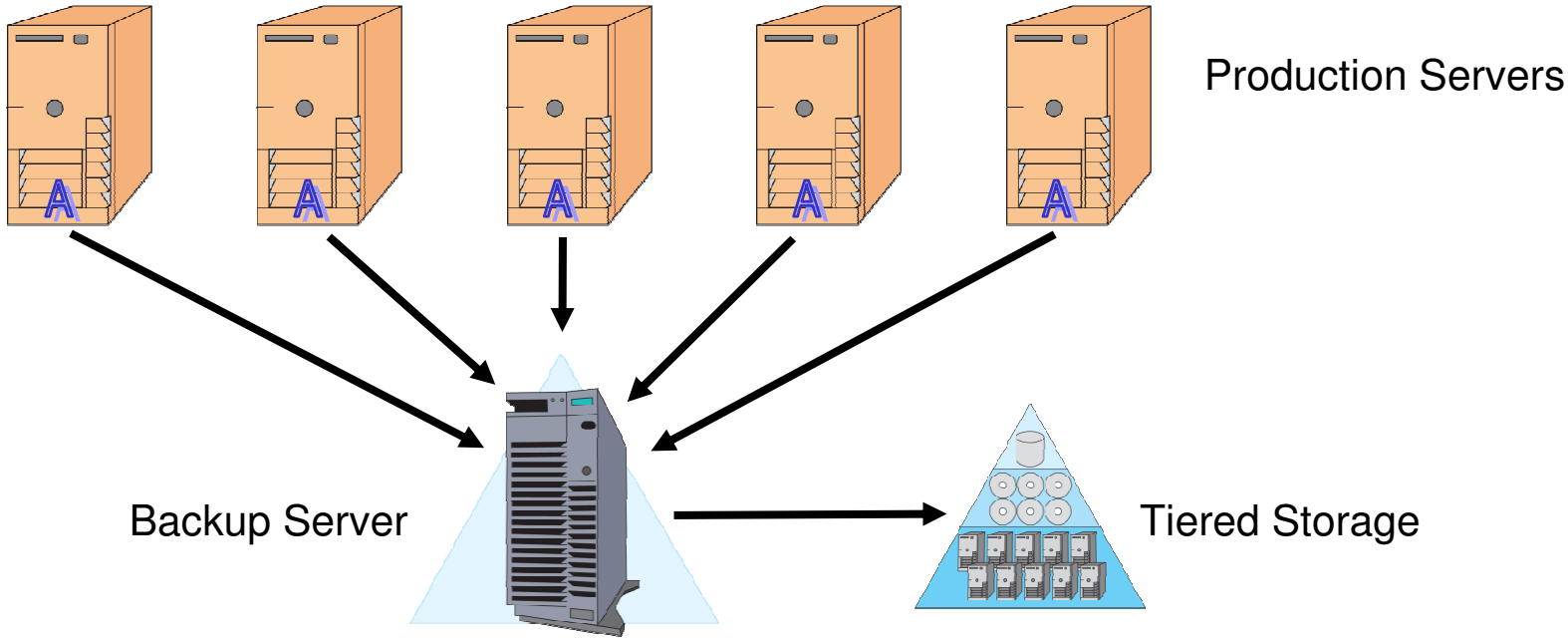
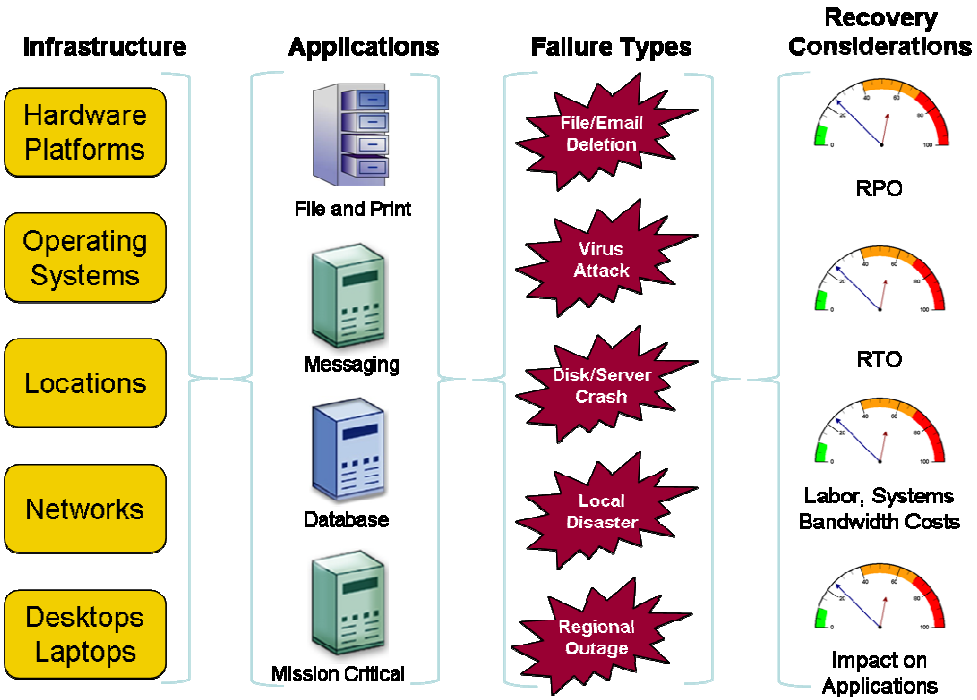
Backup used to be so easy



- Install a backup agent on production server, schedule the backup, copy the data periodically to the backup server

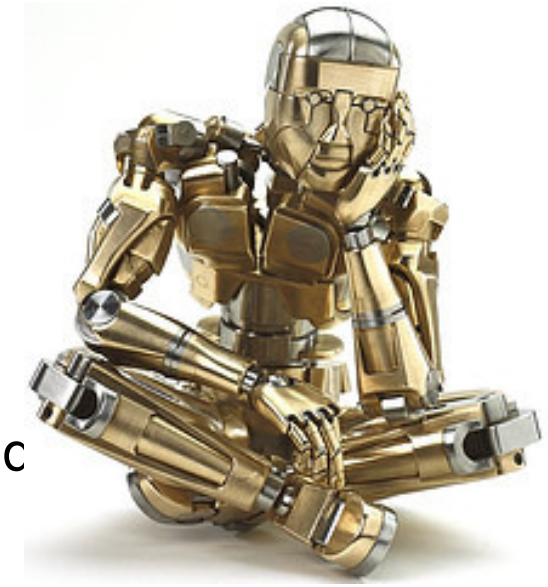
It's not so easy anymore



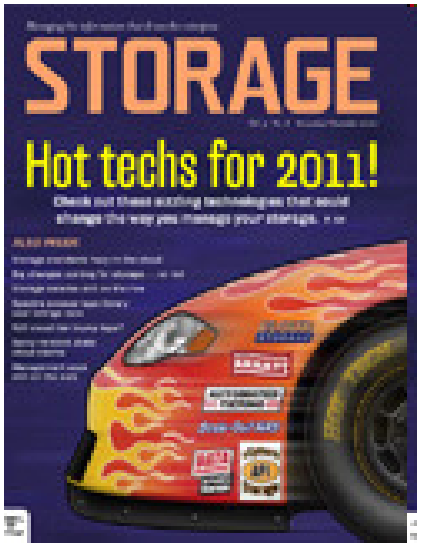
- Proliferation of different system platforms, applications, physical locations all with different service level requirements
- Lots of different things can go wrong, all requiring different recovery capabilities
- Need to balance the needs of the business (data availability, resiliency) against the needs of the business (costs, resources, system availability)

Virtual server environments have changed the game

- Virtual machines take advantage of the growth in processor power, memory and I/O
  - The computers get bigger, but the application workloads have remained flat
- Virtual machines can be created very quickly
  - Minutes to provision, rather than weeks to request, procure, install and test
- Tremendous savings in hardware, power/cooling, floor space and management costs
- VMs enable new levels of service management and new delivery models
  - Quickly create new servers for application development and testing, special projects, periodic workflows like financial reporting, or to expand capacity on demand
  - Virtual servers are a basic component of public and private cloud infrastructures



Changing the game, for better and for worse …



"Virtualized servers have been a boon to the systems side of the house, but a bane for storage managers."

Hot Technologies for 2011,

STORAGE Magazine, Dec 2010 (link)

VMs have made data and storage management more complex

- Data continues to grow at unprecedented rates, across all industries
- Sever virtualization does not reduce the data
- When a virtual server is de-commissioned or moved, what happens to its data, and the storage capacity that it consumed?
- How do you manage data management processes in virtual environments?
  - Backup / Restore
  - Disaster Recovery
  - Data Lifecycle Management

Analyst Predictions

More than 90% of users deploying virtual machines are doing so specifically to reduce x86 server space and energy costs.

VM densities are increasing on physical servers, 1:15 today

By 2012, most x86 server workloads will be running in a VM.

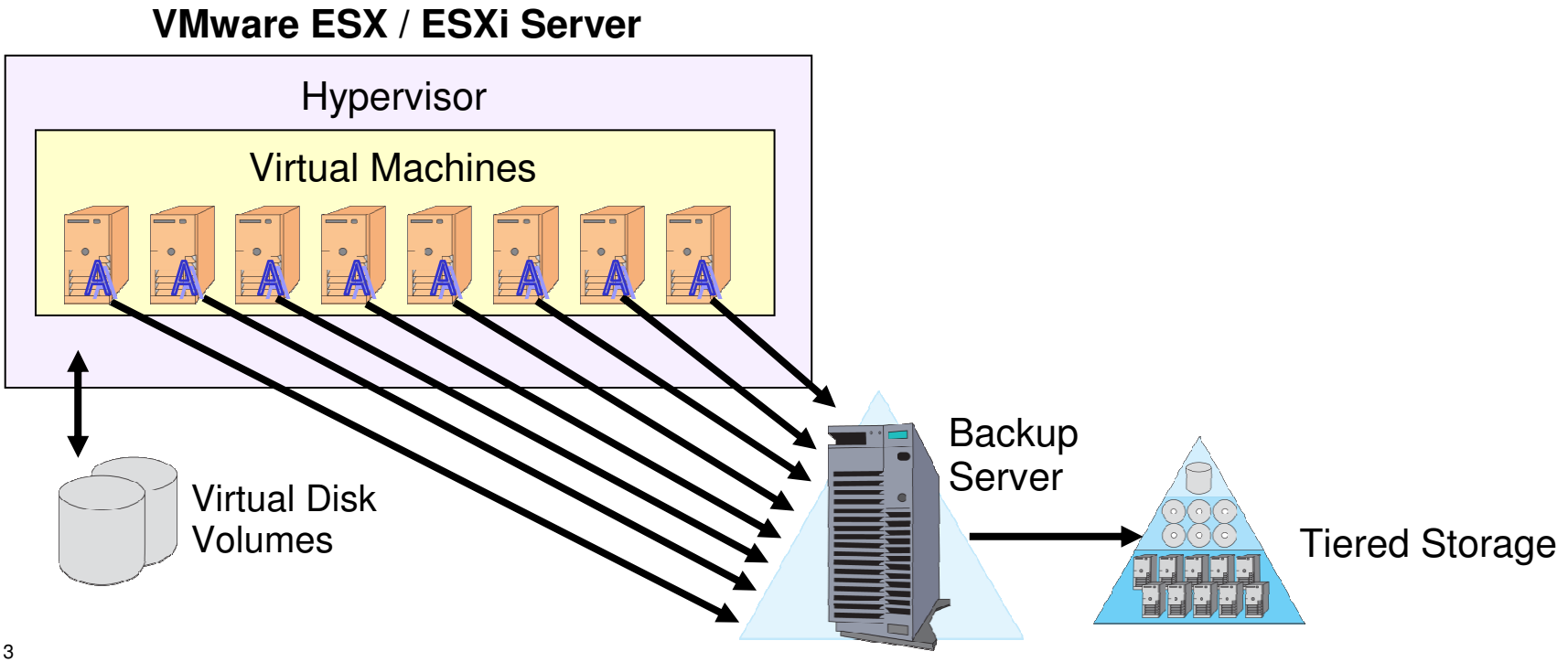
Roughly 80% of the virtual machines today are utilizing “traditional” in-guest backup or host backups.

How do you manage data protection and recovery in your virtual servers?

Sources – Gartner, IDC, ESG

Traditional in-guest backup and recovery model

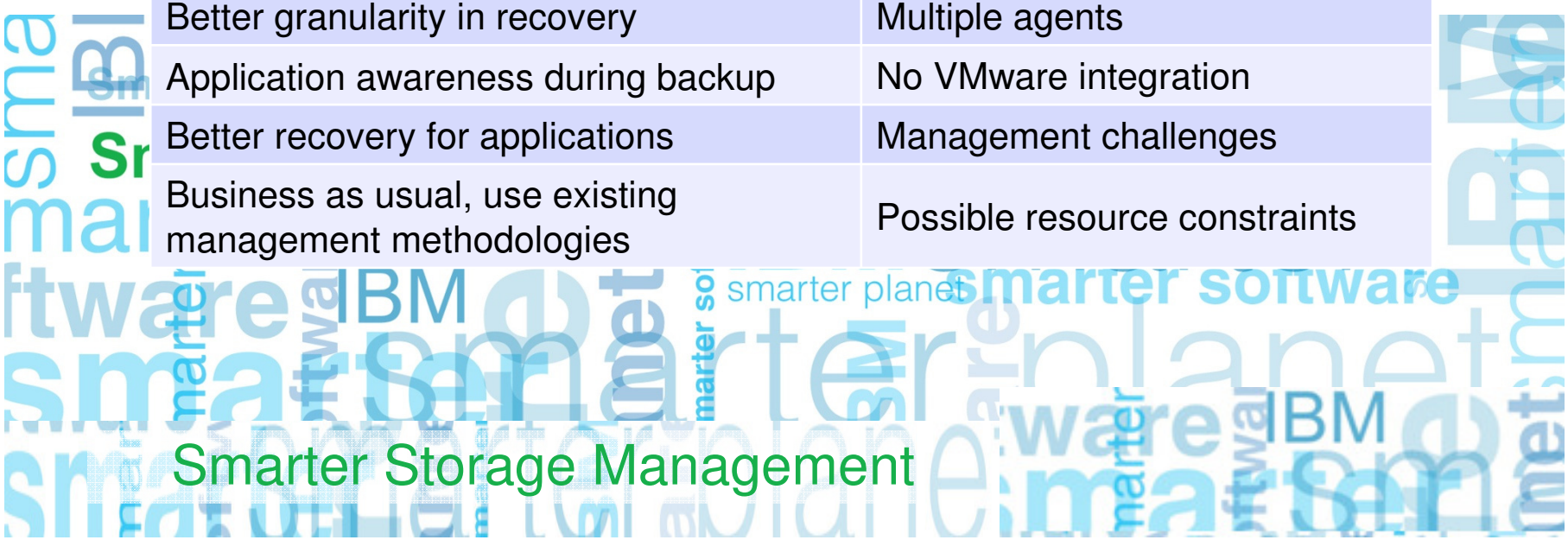
- Install a backup agent in the guest OS, just like a physical server
- Run and manage backups just like in a physical server environment
- Downside: deploying, managing, maintaining 'backup agent sprawl'
- Downside: can put a serious drain on processor, memory, I/O resources
  - From running multiple backups at once; file system scans during incremental backups; etc.



Traditional in-guest backup using TSM and TSM FastBack

- Still the predominant approach
- Heterogeneous support for …
  - Hypervisors: **KVM, Hyper-V, VMware, LPARs, Solaris Containers, HP nPartitions, etc.**
  - Guest Operating Systems: **Windows, Linux, z/Linux, z/OS, Solaris, more**
- TSM Fastback is a very good fit for this approach (on supported platforms)
  - Block-level incremental forever backup, in the background
  - V

Pros	Cons
Better granularity in recovery	Multiple agents
Application awareness during backup	No VMware integration
Better recovery for applications	Management challenges
Business as usual, use existing management methodologies	Possible resource constraints



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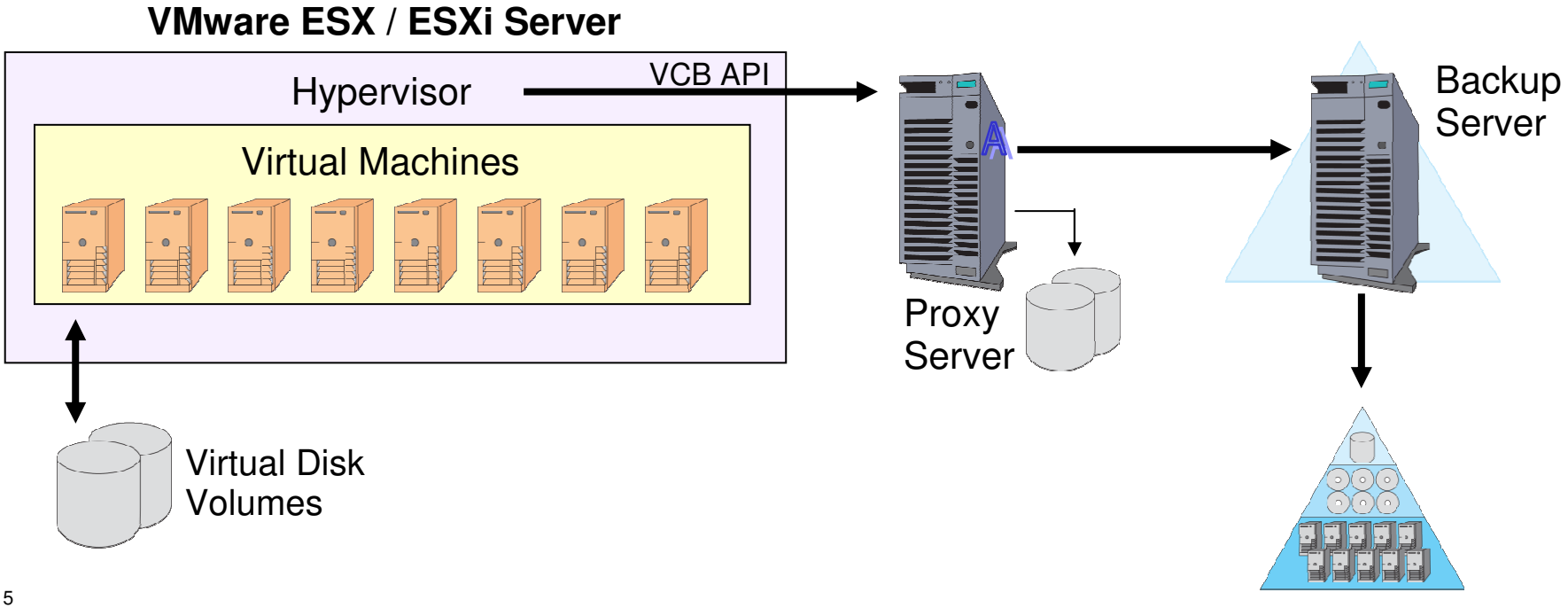
VMware Consolidated Backup (VCB)

VMware's first approach to offload backups from VMs

- Snapshots of the VMs are taken by the Hypervisor and sent to a Proxy Server, which is then backed up by the Backup Server
- Downside: requires more hardware (server and storage)
- Downside: multi-step recovery through the Proxy Server



Using VCB with Tivoli Storage Manager

- Supported only on VMware
- This approach tries to combine the benefits of the traditional and host based approaches
- Provides an API to talk to the console and move the data through the proxy server

Pros	Cons
“LAN Free” backup	Questionable application integration (VMware triggers VSS for Windows guests)
Backup is off-loaded to the proxy server	VCB requires an additional data hop
Flexibility – supports both file level and image level backup.	Recovery might be challenging (depending on the type of backup used)
Utilizes VMware API	

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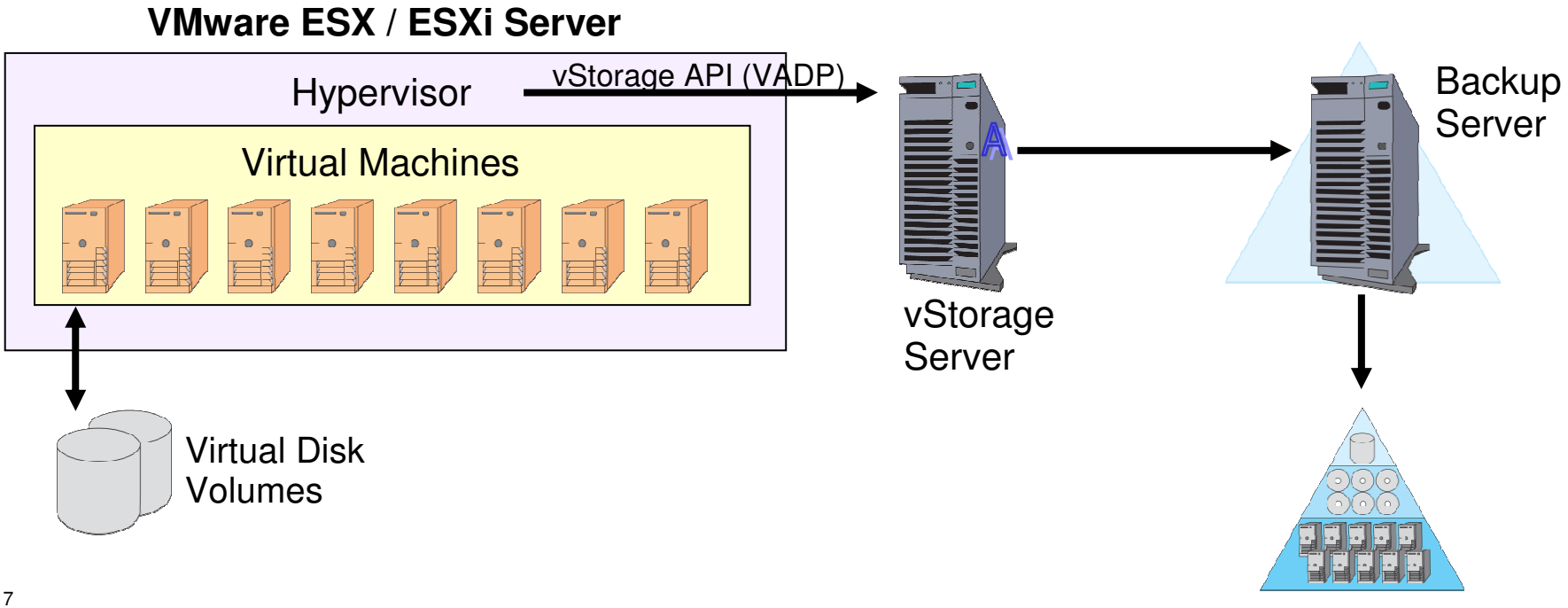
The new approach: VMware vStorage APIs for Data Protection

- Data is accessed directly from the VM storage and passed directly to the backup server (single hop, data is not stored on the vStorage Server)
- Changed Block Tracking allows incremental backups (with periodic fulls) without forcing a scan of the guest OS file system



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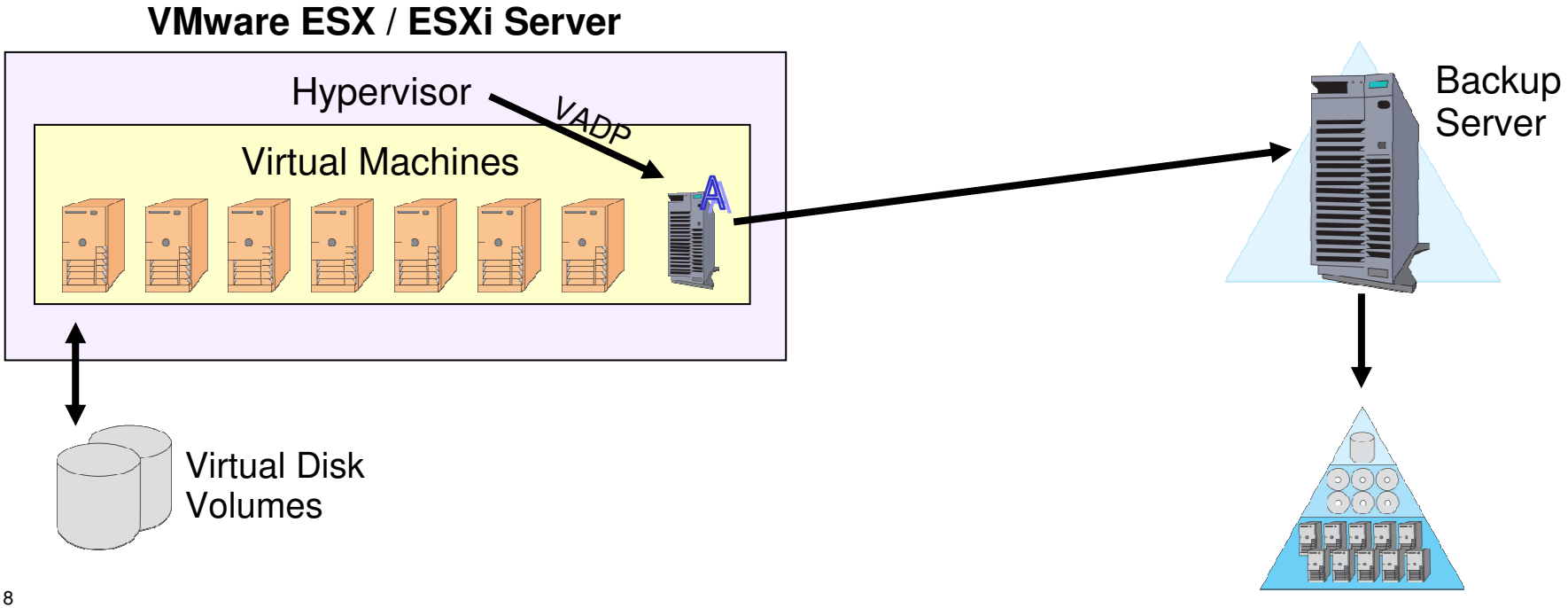
- Changed Block Tracking allows incremental backups (with periodic fulls) without forcing a scan of the guest OS file system
- The vStorage Server can be a virtual machine – no additional HW needed



Introducing Tivoli Storage Manager for Virtual Environments v6.2

- Announce – 22 Feb 2011; eGA – 13 Mar 2011
- Utilizes VMware's vStorage APIs for Data Protection, including block-level incremental backups based on VMware's Change Block Tracking
- Offloads the backup workload from virtual machines and production ESX hosts to vStorage backup servers
- Provides flexible recovery options – file, volume or image – from a single-pass backup
- Near-instant restore of Windows and Linux disk volumes
  - Data is made available immediately while it is copied in the background
- Simplifies day-to-day administration with the centralized Tivoli Storage Manager console
  - TSM for VE is supported on TSM Server v5.5 and above
- Automated discovery of new VMs; automatically applies backup policies

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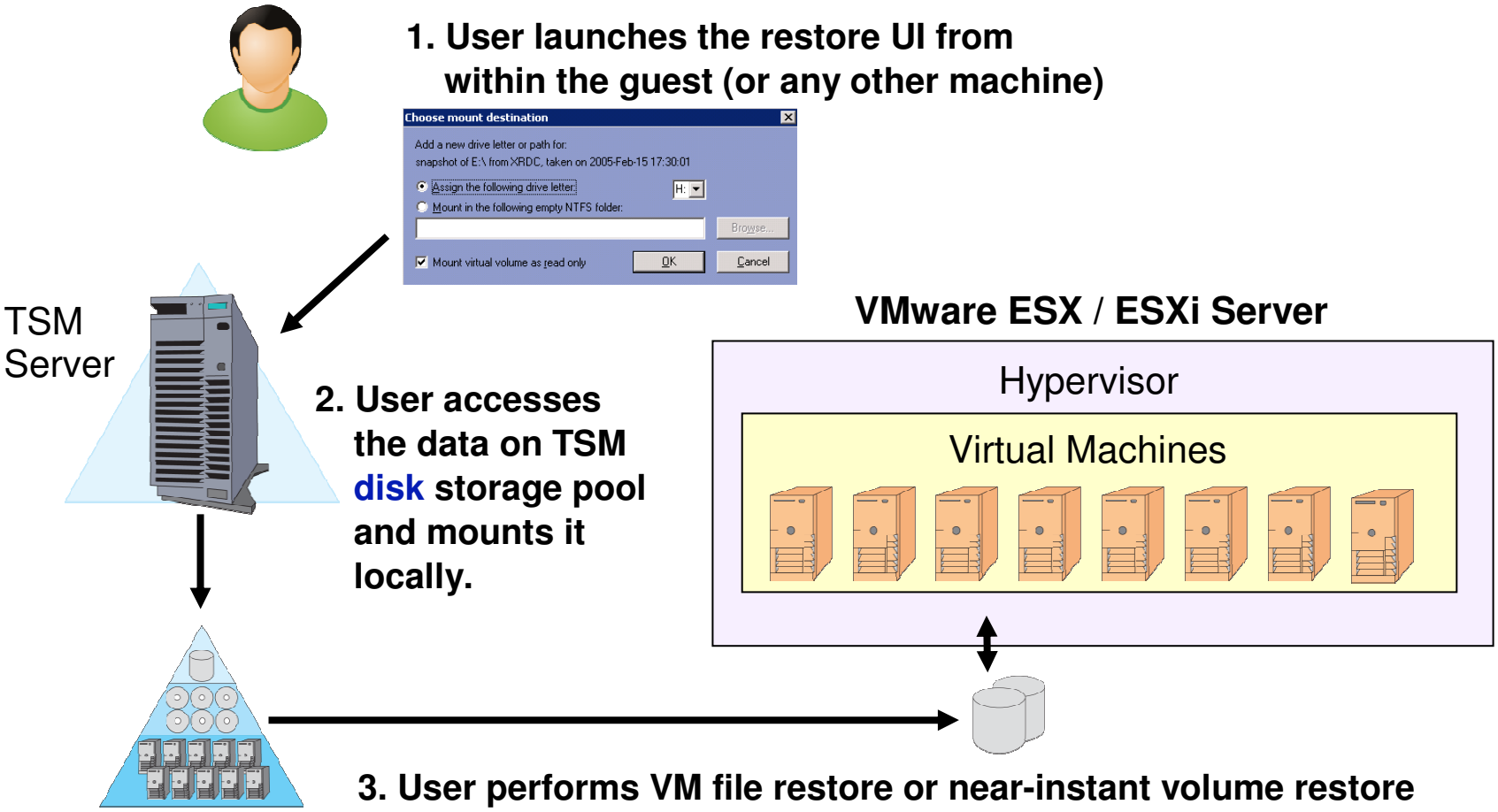
Advanced capabilities, flexible recovery options

Near-Instant File and Volume Recovery (Windows and Linux Guest OS)



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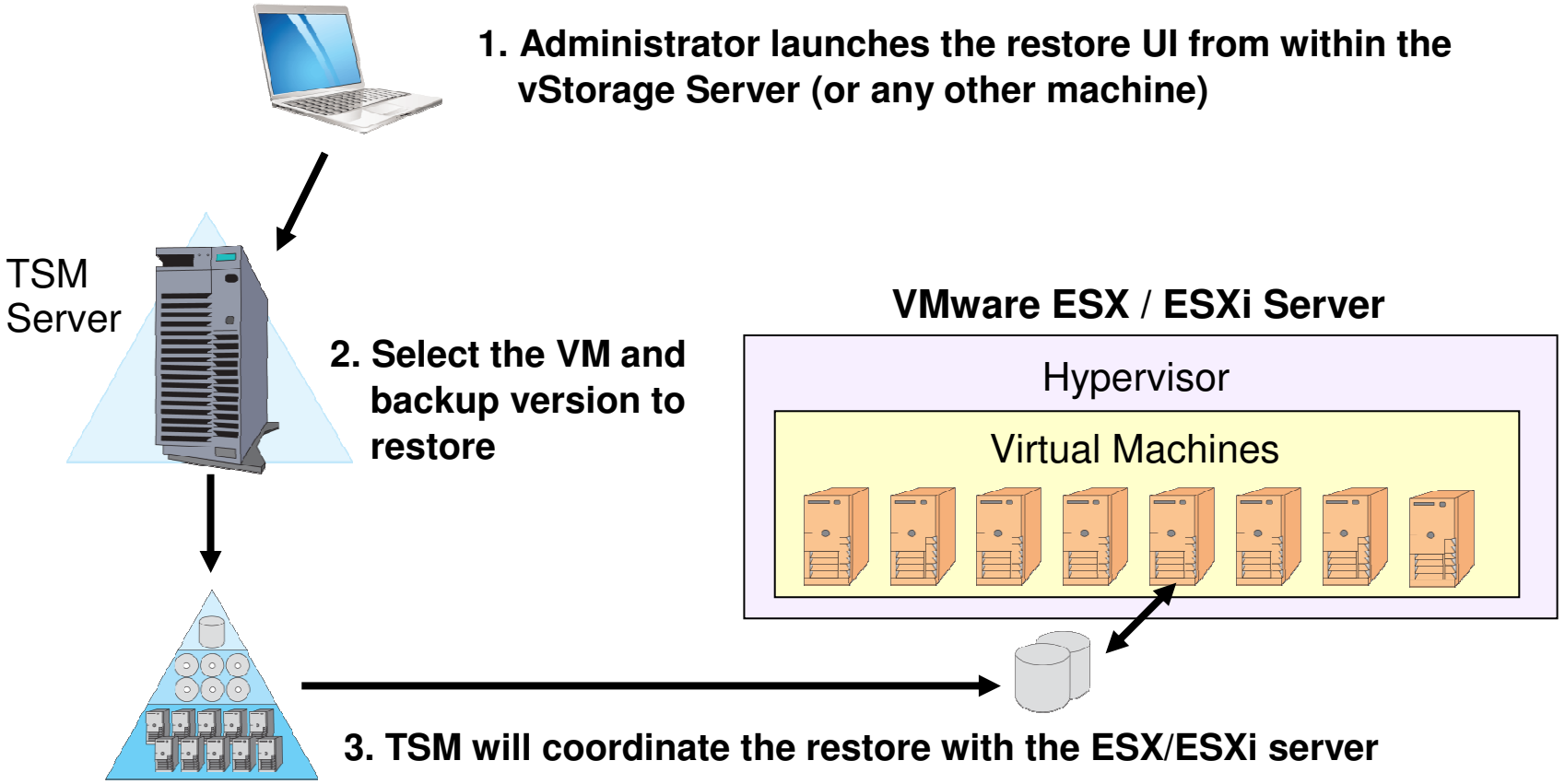
Advanced capabilities, flexible recovery options

Full Virtual Machine Recovery (any supported Guest OS)



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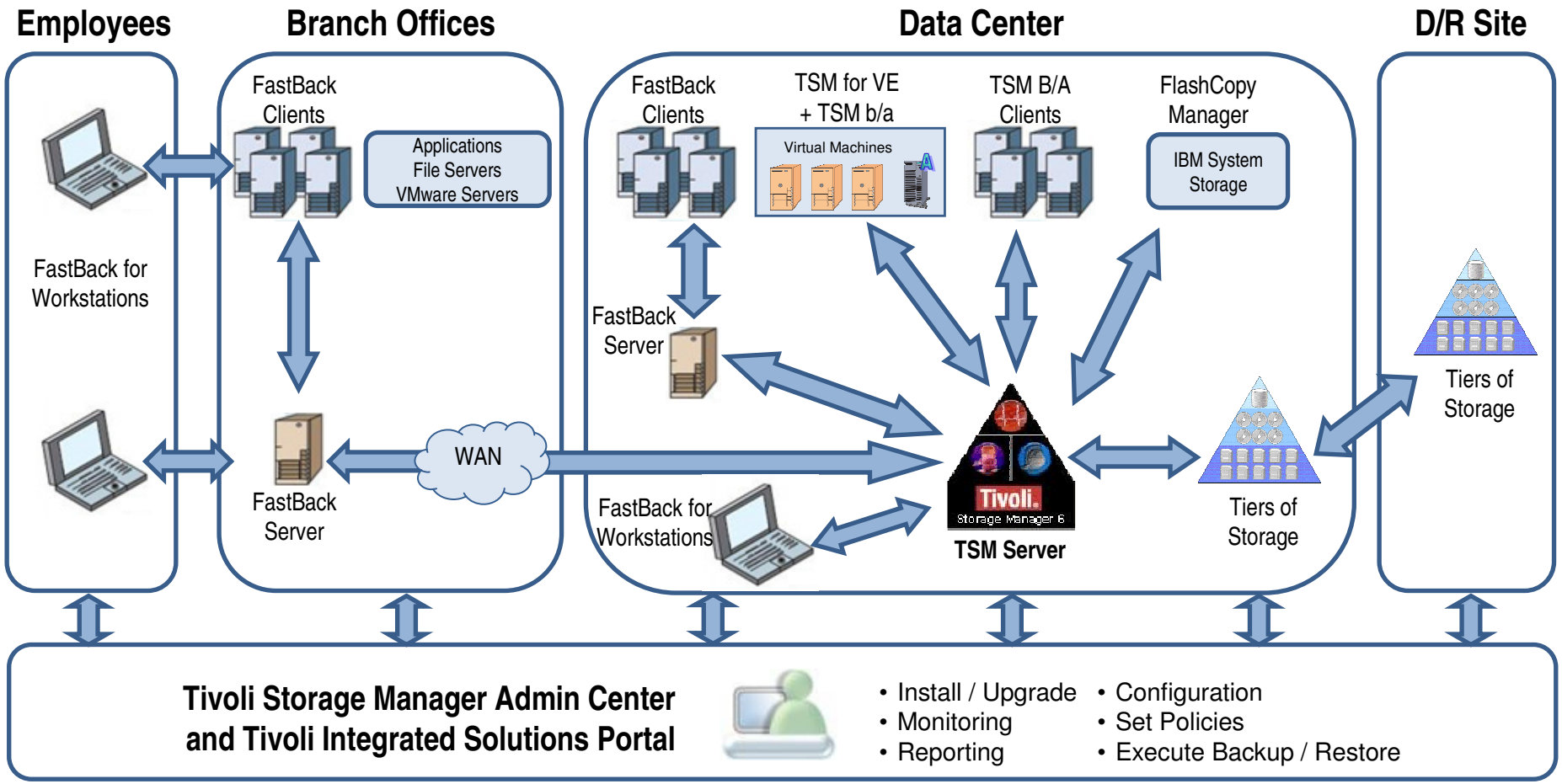
Continuing to Deliver Unified Recovery Management



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Tivoli Storage Manager for Virtual Environments - Summary

- Advanced data protection for VMware ESX and ESXi servers
- Leverages vStorage APIs for Data Protection (VADP)
- Non-disruptive, single-pass, block-level backup
- Flexible recovery options: file, volume, VM image
- Near-instant restore of files and disk volumes (Windows and Linux)
- No additional hardware required
- Simplified agent management – one agent supports multiple VMs
- Automated discovery of new VMs
- Support for LAN-free data transfer from the VMware server's storage to the backup server —preserving bandwidth for other uses
- Integrated with Tivoli Storage Manager for:
  - Unmatched scalability – manage up to 2 billion objects in a single TSM Server
  - Unified Recovery Management
  - Built-in data reduction / data deduplication
  - Policy-based tiered storage / data lifecycle management

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For more information
Links active in slideshow mode

- Storage Management Solutions
- Unified Recovery Management
- Backup and Recovery Solutions
- Remote Office Data Protection
- Data Reduction Solutions
- Storage Management in Cloud
- IBM Storage Blog
- Information Protection Services
- Tivoli Storage Manager for Virtual Environments
- Tivoli Storage Manager
- Tivoli Storage Manager FastBack
- Tivoli Storage FlashCopy Manager
- Tivoli Storage Productivity Center
- IBM Information Archive
- SAN Volume Controller

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