Backup, Restore, High Availability, and Disaster Recovery for Microsoft® SharePoint® Technologies

Module Objectives And Takeaways

- **Module Objectives:**
  - Discuss and Demonstrate Content Recovery Features in Windows SharePoint Services 3.0 MOSS 2007
  - Provide Comprehensive Overview of Backup/Restore Options and Strategies
  - Describe the Options for High Availability and Disaster Recovery for MOSS 2007 Server Farms

Data Recovery Types

Content Recovery

- End user driven
- Accidental update or deletion
- Frequent and small-scale

Backup/Restore

- Farm or Database Restore
- Hardware Failure or Disaster
- Hardware Migration or Replacement

High Availability and Disaster Recovery

- Minimize Downtime
- Large Amounts of Data
- Redundancy
- Additional Hardware

Content Recovery
Solutions

- Recycle Bin
- Versioning
- Export and Import API (STSADM / SharePoint Designer)
- Web Delete Event & MSIT Site Delete Capture Feature
- SQL Server 2005 Content Database Snapshots

Typically end user driven and occasionally admin

Recycle Bin

“I just deleted my deck and my presentation is in an hour!”

- **End User Driven**
- **Supports Lists, Document Libraries, Folders, Documents, and List Items**
- **Security-Trimmed**
- **Two Stages**
  - End User
  - Site Collection Administrator
- **Site Collection Level**

Recycle Bin
Two Stages

- **1st Stage: End User Deletes File/Item**
  - Appears in End User & Site Collection Recycle Bin
  - End-user or Site Collection Administrator can restore
- **2nd Stage: End User Empties or Deletes from Recycle Bin**
  - Appears in Site Collection Recycle Bin
  - Site Collection Administrator can restore

Recycle Bin
Special Features

- **Quotas**

  1st stage counts against Site Collection Quota

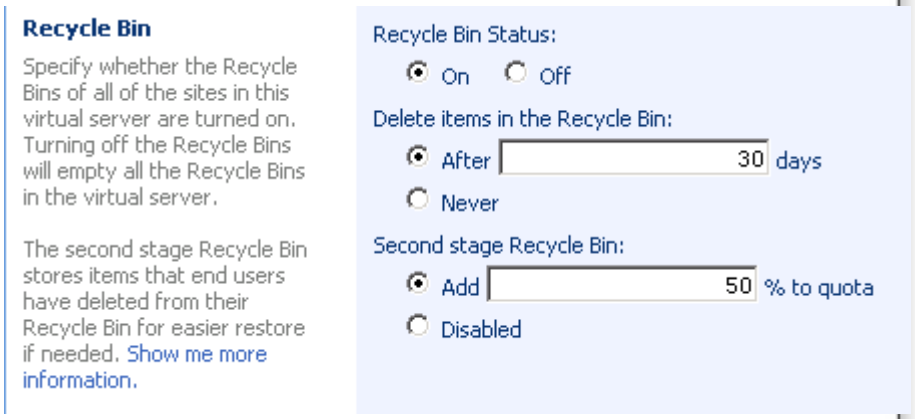
  2nd stage is included in “Recycle Bin Quota”

  - Adds 50% by default

- **Auto-Delete Service**

  Permanently deletes items (1st or 2nd stage) that have been deleted for more than X number of days

  30 days by default



Versioning

“I made some changes but now I want to go back to a previous version!”

- **Pros:**
  - Supports both List Item and Document versioning
  - End users can retrieve earlier versions
- **Cons:**
  - Versions count towards site quota
  - Functionality needs to be enabled per List/Document Library (Disabled by Default)
  - Does not support Folders, Webs and/or Sites

WebDeleting Method

"There's no recycle bin for sites!"
"I deleted my site, but now I want it back!"

- SharePoint Object Model allows developer to custom build backup solutions at the "web delete" event
- SPWebEventReceiver.WebDeleting Method (Microsoft.SharePoint): http://msdn2.microsoft.com/en-us/library/microsoft.sharepoint.spwebeventreceiver.webdeleting.aspx

WebDeleting Method

- **Pros:**

  Extensible

  MSIT's Custom Feature Available on CodePlex: "Microsoft IT Site Delete Capture 1.0"

  http://www.codeplex.com/governance/Release/ProjectReleases.aspx?ReleaseId=3830

- **Remember:**

  No out-of-box solution (download from CodePlex and Install)

  Will have to write custom code or download and install custom feature

  SPWebEventReceiver.WebDeleting Method (Microsoft.SharePoint): http://msdn2.microsoft.com/en-us/library/microsoft.sharepoint.spwebeventreceiver.webdeleting.aspx

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Microsoft IT Site Delete Capture Feature

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Backup/Restore Site, Document Library, Folder, Item

“I want to move my site/etc. to another farm!”
“What happened to Smigrate?”

- **Content Migration: replaces smigrate.exe**
  - STSADM –o export –url <url> -f mysite.cmp
  - STSADM –o import –url <url> -f mysite.cmp
- **STSADM or SharePoint Designer to Create a Backup File**
- **Additional options available via the Object Model and SPD**
  - Fine-grained scope selection (SPWeb → SPListItem)
  - Incremental migration (since given change token)
- **Limitations:**
  - Only migrates site level and below
  - Not full fidelity: Cannot migrate workflow, alerts, features, solutions, recycle bin state

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Backup/Restore/Migrate Site, Document Library, Folder, and/or Item Using STSADM or SharePoint Designer

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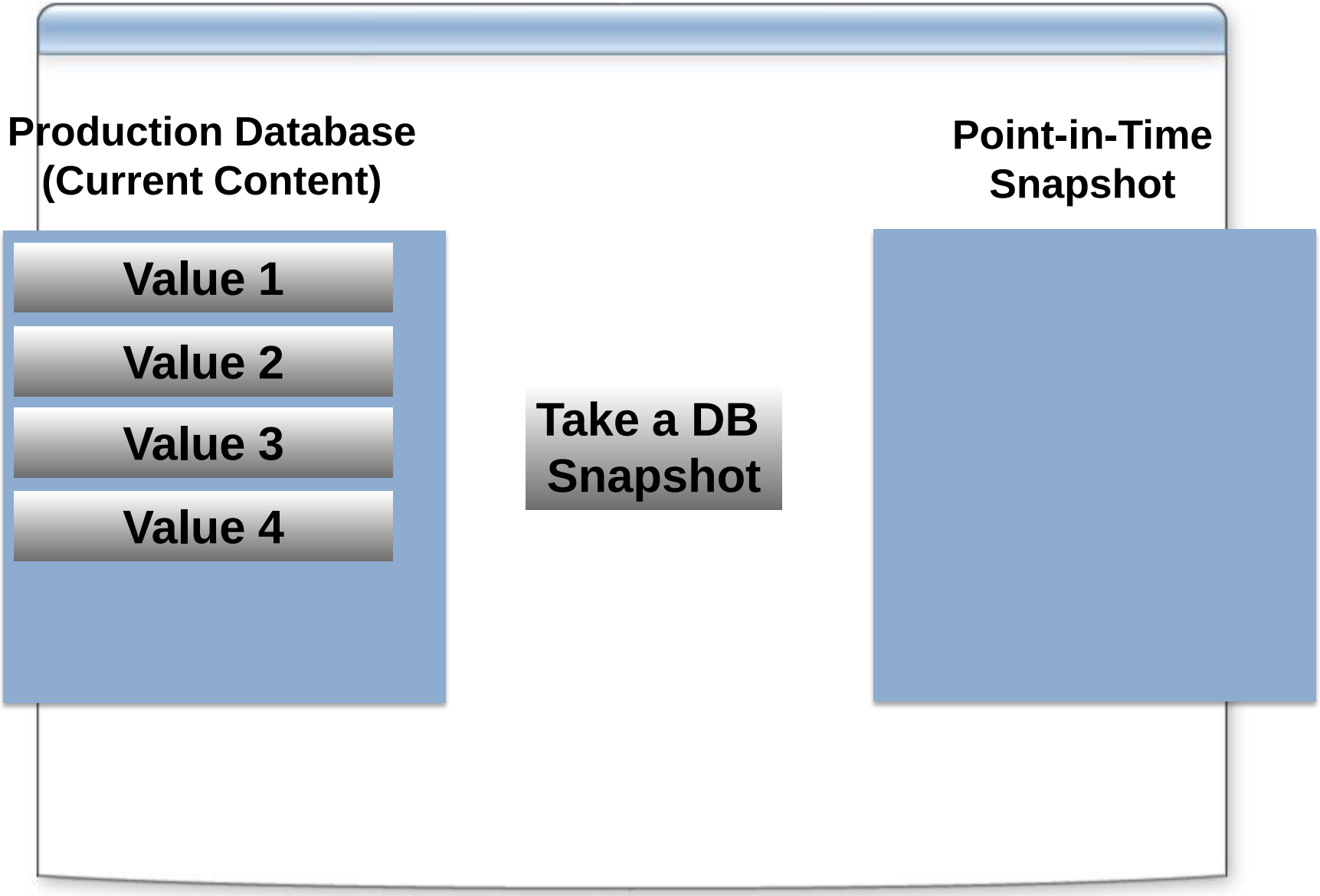
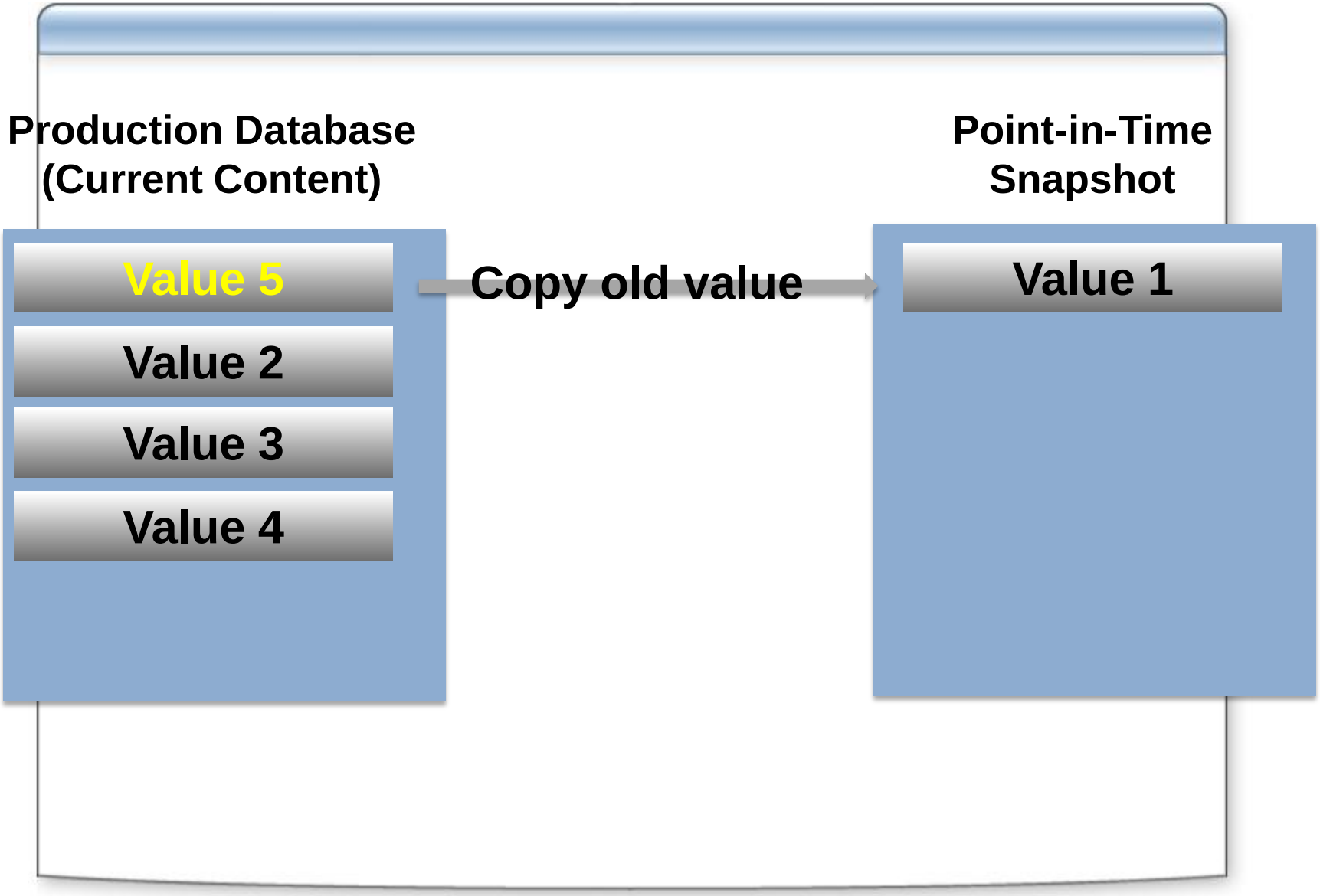
SQL Server 2005 Database Snapshots

- SQL Server 2005 feature
- Focused on versioning Content Databases
- Not a backup or high availability solution
- Record is changed in current database, original value for that record is copied
- Allows you to retrieve data from snapshot point in time
- Efficient space usage
- WSS Snapshot Article: http://support.microsoft.com/?id=929649

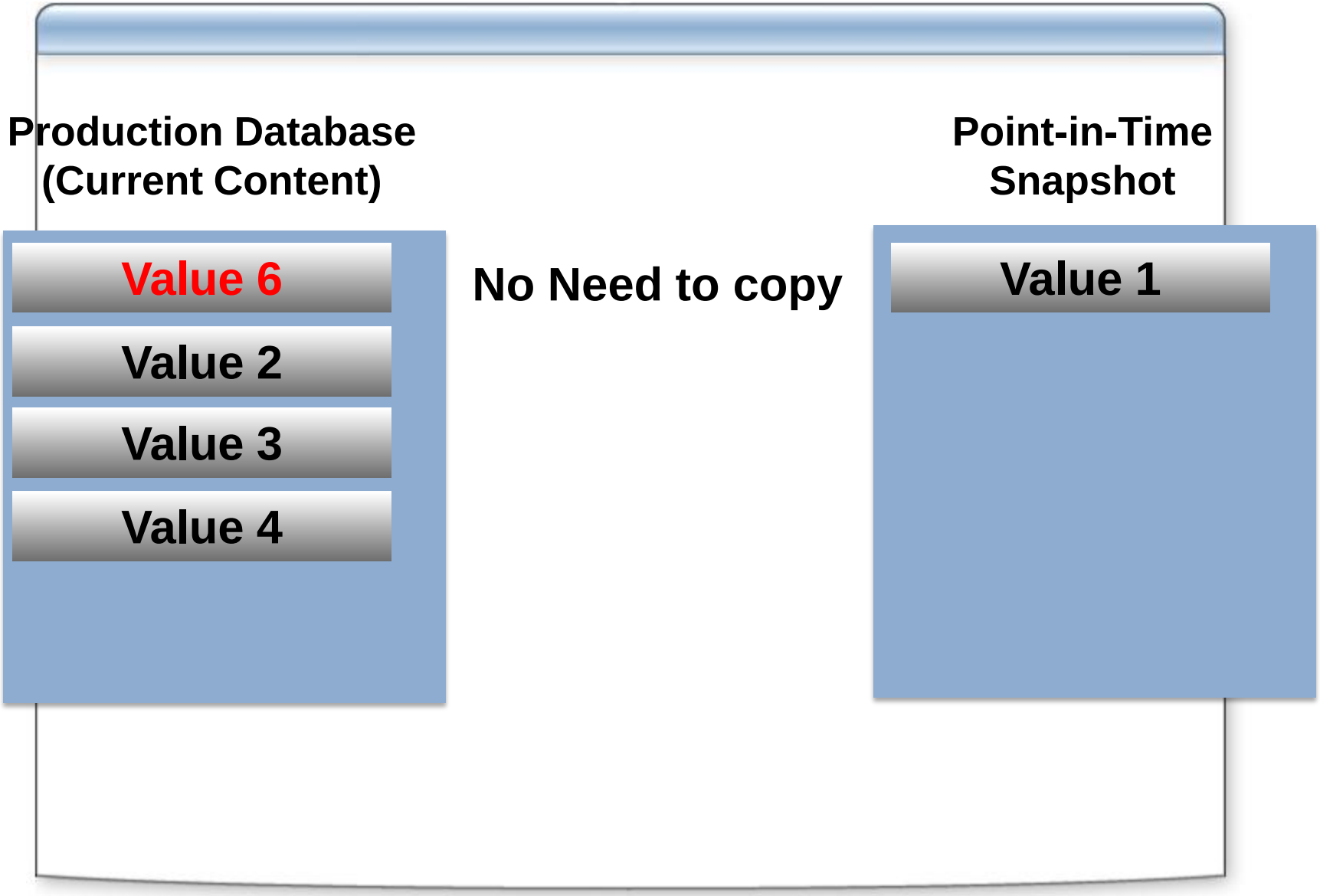
SQL DB Snapshots



SQL DB Snapshots



SQL DB Snapshots



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SQL Server 2005 Database Snapshots and SharePoint 2007

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Migrate and/or Backup/Restore an Entire Site Collection

"I want to backup my site collection and migrate it to a different Farm or Content Database!"

- **STSADM –o backup –url <url>**

  Pros: Large scale content and security backup at Site Collection level

  Remember:

  - Performance-sensitive operation
  - Not ideal for frequent large backups on busy Site Collections
  - Can cause errors when migrating a root Site Collection further down the tree

- **STSADM –o mergecontentdbs –url <url> -sourcedatabasename <srcdb> -destinationdatabasename <destdb>**

  Enables moving a site collection from one content database to another

  Included in SP1; Also available in the October 8th public update (KB934525)

Data Recovery Types

Content Recovery

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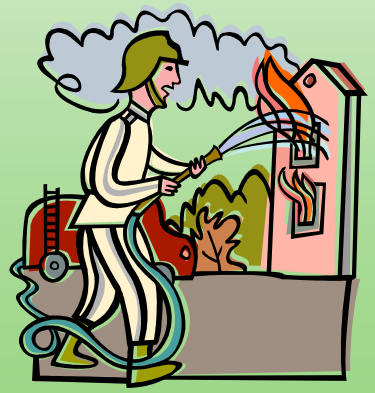
- Accidental update or deletion
- Frequent and small-scale

Backup/Restore

- Farm or Database Restore
- Hardware Failure or Disaster
- Hardware Migration or Replacement

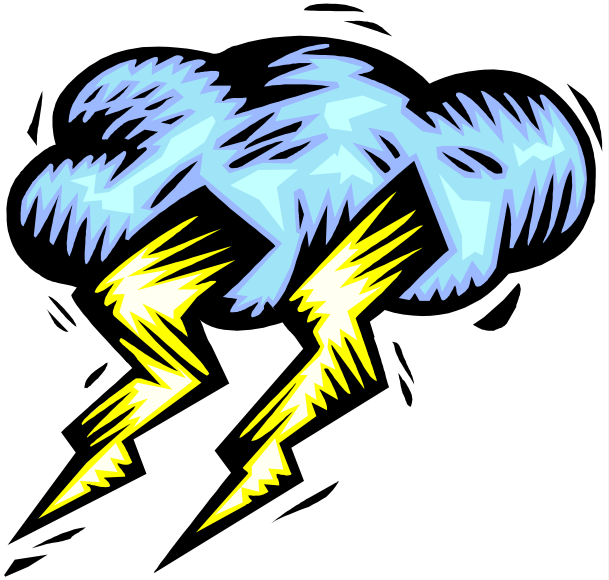


High Availability and Disaster Recovery

- Minimize Downtime
- Large Amounts of Data
- Redundancy
- Additional Hardware

Disaster Recovery
Backup & Restore Solutions

- SharePoint Backup/Restore
- SQL Server Backup and Restore
- Data Protection Manager 2007
- Third-Party Solutions



Proactive Planning for hardware/farm failure;
Typically last resort for service level agreement.

SharePoint 2007 Native Backup/Restore

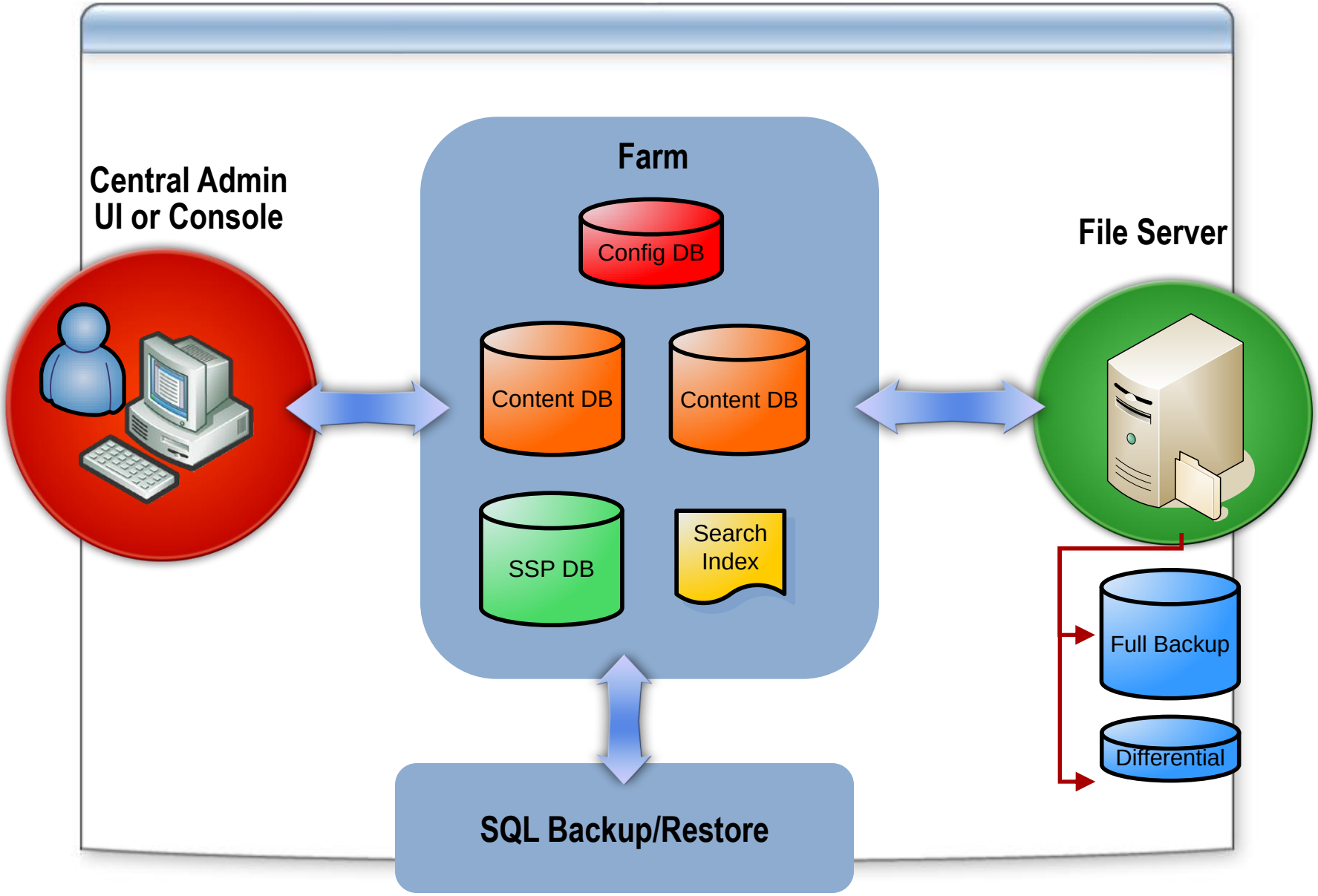
“I have a small to medium deployment.
Do you have anything for me out of the box?”

Out of the box Backup/Restore UI and Command Line for Central Administrators

Our recommended solution for small-medium deployments

SharePoint 2007 Native Backup/Restore

How it works



SharePoint 2007 Native Backup/Restore
Details

- **Out of the Box UI and command line access for Central Administrator**
- **'Hooks up' SharePoint databases and search index on Restore**
- **Supports Full and Differential backup**
- **Backs up the search index**
- **Extensible framework for 3rd party applications**

Considerations:

- **Use the command line with Windows Task Scheduler for scheduled backups**
- **Backs up content databases and search index**
  - You must manually backup front end files
  - We recommend you keep images of your web front ends
- **High restore time → Low availability**

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Scheduling SharePoint's Native Backup/Restore

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SQL-Only Backup/Restore

“My SQL servers are managed by a separate organization or data center from my SharePoint installations.”

- **Pros:**
  - Reuse existing technology and processes
  - Non-application specific
- **Remember:**
  - Post-restore reattachment and clean up
  - Manually Backup / Restore all customizations on WFE Servers (.Net Assemblies, Features, IIS Metabase, etc. – batch file can help automate this proces)
  - SSP must be backed up and restored separately via SharePoint Backup & Restore

System Center Data Protection Manager (DPM) 2007

- **Part of System Center**
- **Supports SQL and SharePoint**
- **Uses SharePoint VSS writer, Import/Export to backup and restore SharePoint**

  Can restore servers to individual items
- **Uses recovery DPM server to extract item level data from their VSS backups**
- **Has integrated UI experience for disk based and tape backups**
- **Product Overview:** http://www.microsoft.com/systemcenter/dpm/default.mspx
- **TechNet Webcast: Protecting Microsoft SharePoint with Data Protection Manager:** http://msevents.microsoft.com/cui/WebCastEventDetails.aspx?culture=en-US&EventID=1032356636&CountryCode=US

System Center Data Protection Manager (DPM) 2007

- Provides farm wide and item level protection
- Can restore farms, databases, sites, lists, and list items.
- Recover to original
- Recover to alternate
- Copy to Tape
- Has integrated UI experience for disk based and tape backups

  Uses SharePoint VSS writer, Import/Export to backup and restore SharePoint

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Data Protection Manager 2007 and SharePoint 2007

Jason Buffington
Sr. Technical Product Manager
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3rd Party Backup Tools

"I want to use a custom or 3rd party tool to backup/restore my farm! Does SharePoint support that?"

- **What to look for in a 3rd party solution**
  - Does it back up the Search Index?
  - Does it require post-restore manual work
- **SharePoint integration with VSS framework**
  - Easier for 3rd parties to write custom backup/restore tools
  - Entire server (search index is included)
  - Only supports catastrophic overwrite scenario (not migration)

Backup / Restore Solution for each scenario

- **To create a backup of a farm:**
  Use stsadm –o backup/restore
  Use SQL-Only Backup/Restore; WFE Backup
  Use Data Protection Manager 2007
- **To migrate a site collection to a different content db:**
  Use stsadm –o **mergecontentdbs** –url <url> -sourcedatabasename <srcdb> -destinationdatabasename <dest>
- **To migrate or backup/restore a site collection:**
  Use stsadm –o backup http://server/site
- **To migrate a site/list/library/item:**
  Use stsadm –o export/import
  Use SharePoint Designer 2007

Backup and Restore Types

Content Recovery

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Backup/Restore

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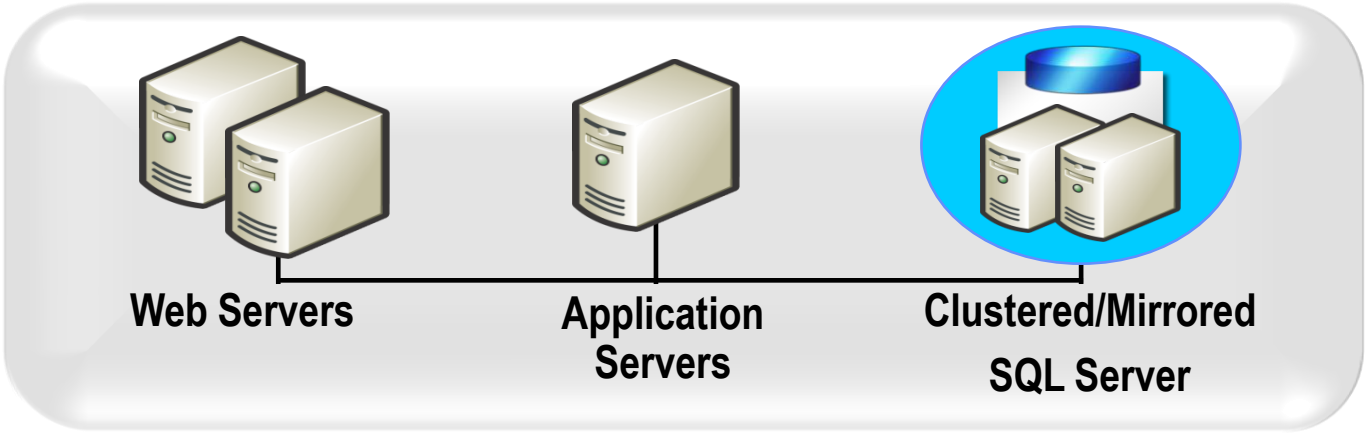
High Availability and Disaster Recovery

- Minimize Downtime
- Large Amounts of Data
- Redundancy
- Additional Hardware

High Availability & Disaster Recovery Solutions

- **Installation Scenarios**
  - Low Availability
  - High Availability (WFEs and DB Servers)
- **Database Availability**
  - SQL Clustering for High Availability in a Single Farm
  - Database Mirroring for High Availability in a Single Farm
  - Database Mirroring for High Availability to a Secondary, Standby Farm
  - Log Shipping for High Availability to a Secondary, Standby farm

High Availability (WFE, Database, & Application Servers)
Multi-Server Farm Scenario

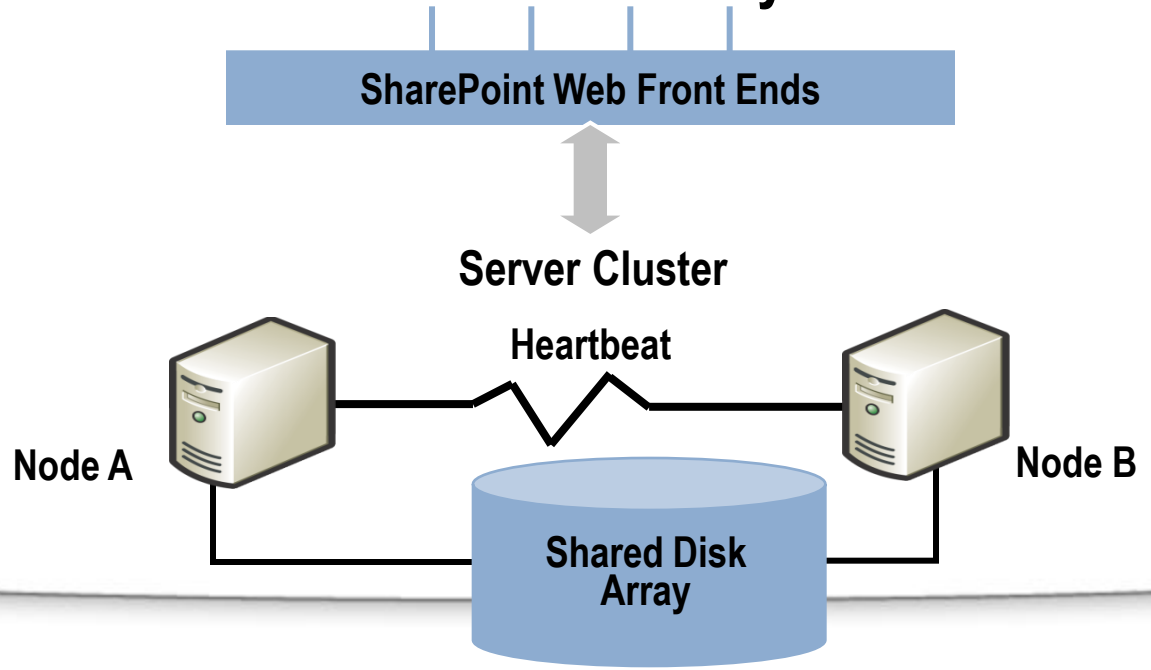


- Optimizes performance of web servers
- Increases redundancy and reduces points of failure
  - Redundancy at WFE and Database server roles
- Determine configuration based on your business needs and goals
  - Determine config of other Application roles (Excel Services, Index, Forms, etc)

SQL Server Failover Clustering for High Availability in a Single SharePoint Server Farm

"If my SQL server experiences a hardware failure, how do I keep my SharePoint farm running?"

- Unattended application availability: automatic failover capability without administrator intervention
- Shared cluster name means application awareness or manual administration unnecessary



SQL Server 2005 Database Mirroring

- **Implemented on a per database level**
- **Transactions sent from Principle to Mirror**
- **Provides a "warm" standby in case of failure**
- **Principal and Mirror must be separate SQL 2005 SP1+ servers (Enterprise or Standard)**
- **Optional "Witness" server to monitor primary and mirror to ensure both are working**

  Automatic failover (SQL) - on failure the witness will turn the mirror into the principle (no automatic failover for SharePoint Farm Servers)

- **Using Database Mirroring with MOSS 2007:**
  http://technet2.microsoft.com/Office/en-us/library/80609398-b01d-4d0a-b429-040b74cae51c1033.mspx

SQL Server 2005 Database Mirroring

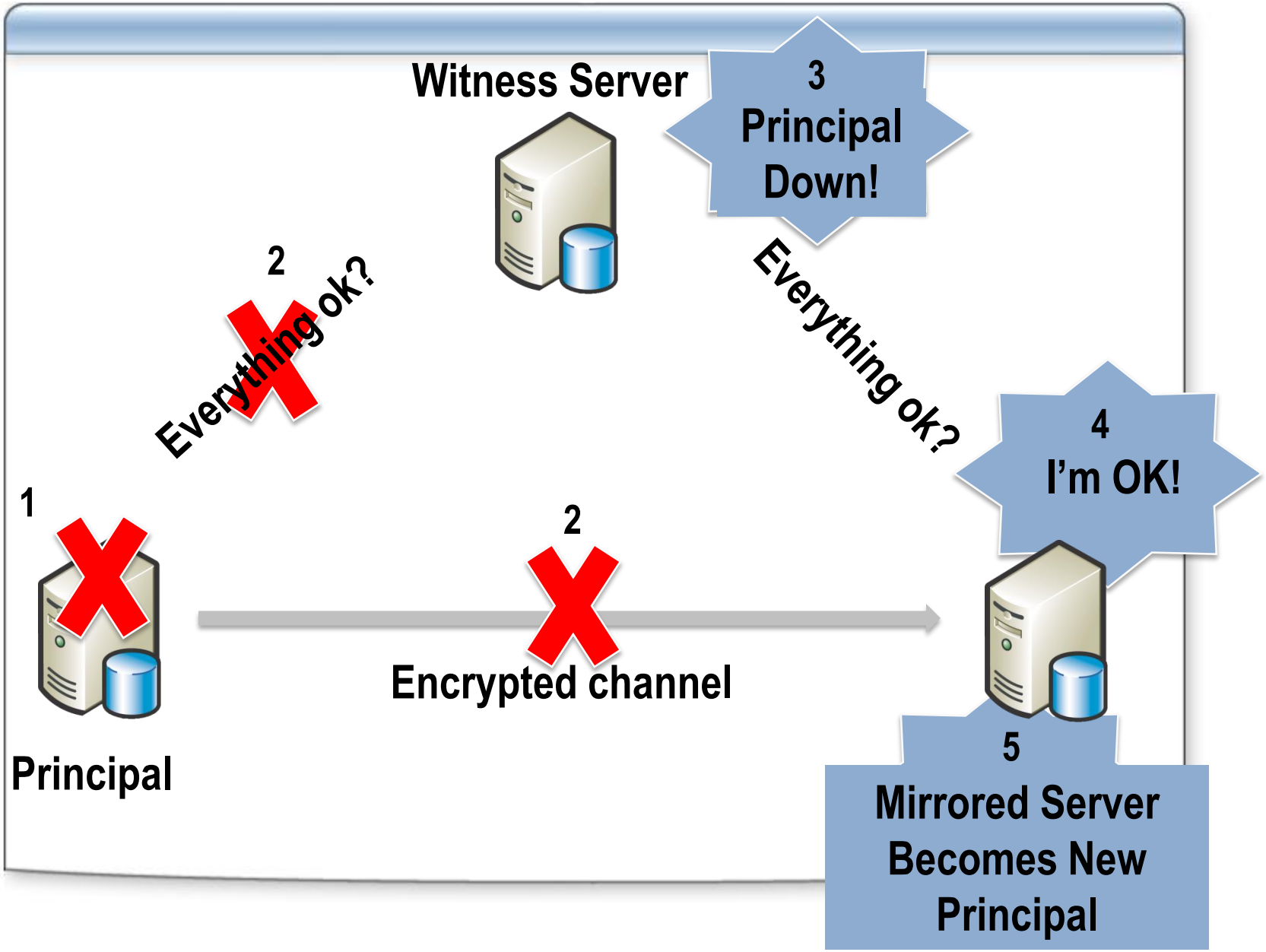
- **Three modes that can be used:**

  High Protection: Synchronizes transaction writes on both servers, manual failover. Intolerant to latency and performance problems. (Synchronous)

  High Availability: Same as High Protection mode but uses a Witness server to manage failover. (Synchronous)

  High Performance: Writes are not synchronized on both servers. Assumes everything will complete successfully on the mirror. Tolerant to latency and low bandwidth. (Asynchronous)

SQL Server 2005 Database Mirroring



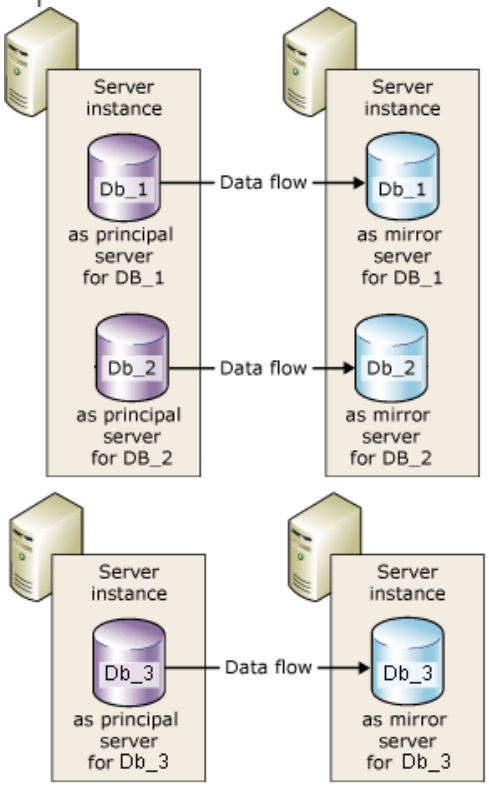
SharePoint and Mirroring for Local High Availability

- SharePoint is not mirroring aware. When failover occurs need to notify SharePoint Farm Servers
- Config DB and Central Administration content DB
- Attach Content Databases to SharePoint Web Applications

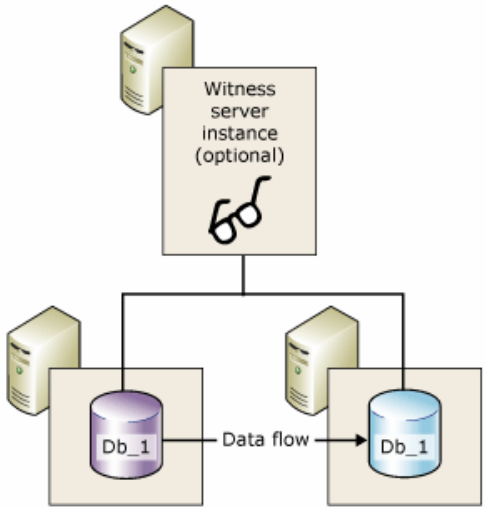
  http://technet2.microsoft.com/Office/en-us/library/80609398-b01d-4d0a-b429-040b74cae51c1033.mspx?mfr=true

SQL Server 2005 Database Mirroring

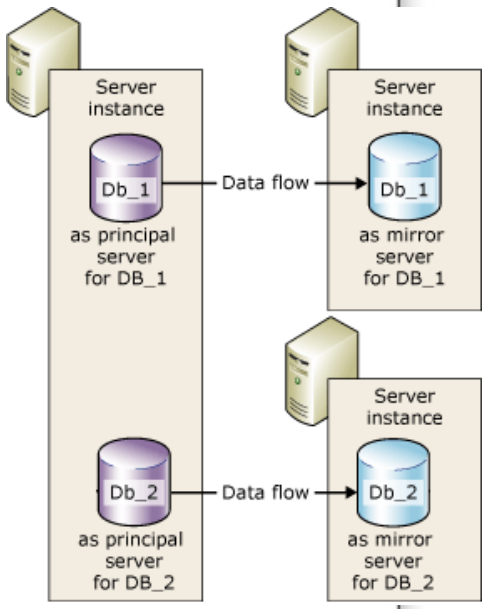
Supported Topology



Supported Topology



Unsupported Topology



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Database Mirroring Failover in a SharePoint 2007 Server Farm

Mike Watson
Technologist, MMS
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Clustering vs. Mirroring for Local High Availability

Failover Clustering	SQL Mirroring
The secondary node takes over immediately (hot)	Mirror takes over immediately upon failure (with witness) Else run a single SQL statement to failover.
Failure is automatically detected by database nodes; SharePoint references cluster, therefore failover from a SharePoint perspective is seamless and automatic	Failure detected automatically for SQL Server tier (if using a witness); however, failover of other SharePoint topology tiers is a manual process (not automatic)
Does not protect against failed storage as storage is shared between nodes in cluster	Protects against failed storage as both Principal and Mirrored DB Servers write to their local disks
All databases protected	Only mirrored DB's (Content DB's) are protected
Transactionally consistent	Transactionally consistent (synchronous mirroring) Potential for loss (asynchronous mirroring)
Transactionally concurrent	Transactionally concurrent (synchronous/High Protection/Availability) May not be concurrent if using (asynchronous/High Performance mode)
Limited distance (Win 2003)	Limited distance (synchronous/High Protection/Availability) Much greater distance (asynchronous/High Performance)
Shorter time to recovery (seconds/minutes)	Short time to recovery (seconds/minutes)

Log-Shipping or Mirroring to a “Warm” Standby Farm

“I want the minimal delay when my data center goes down!”

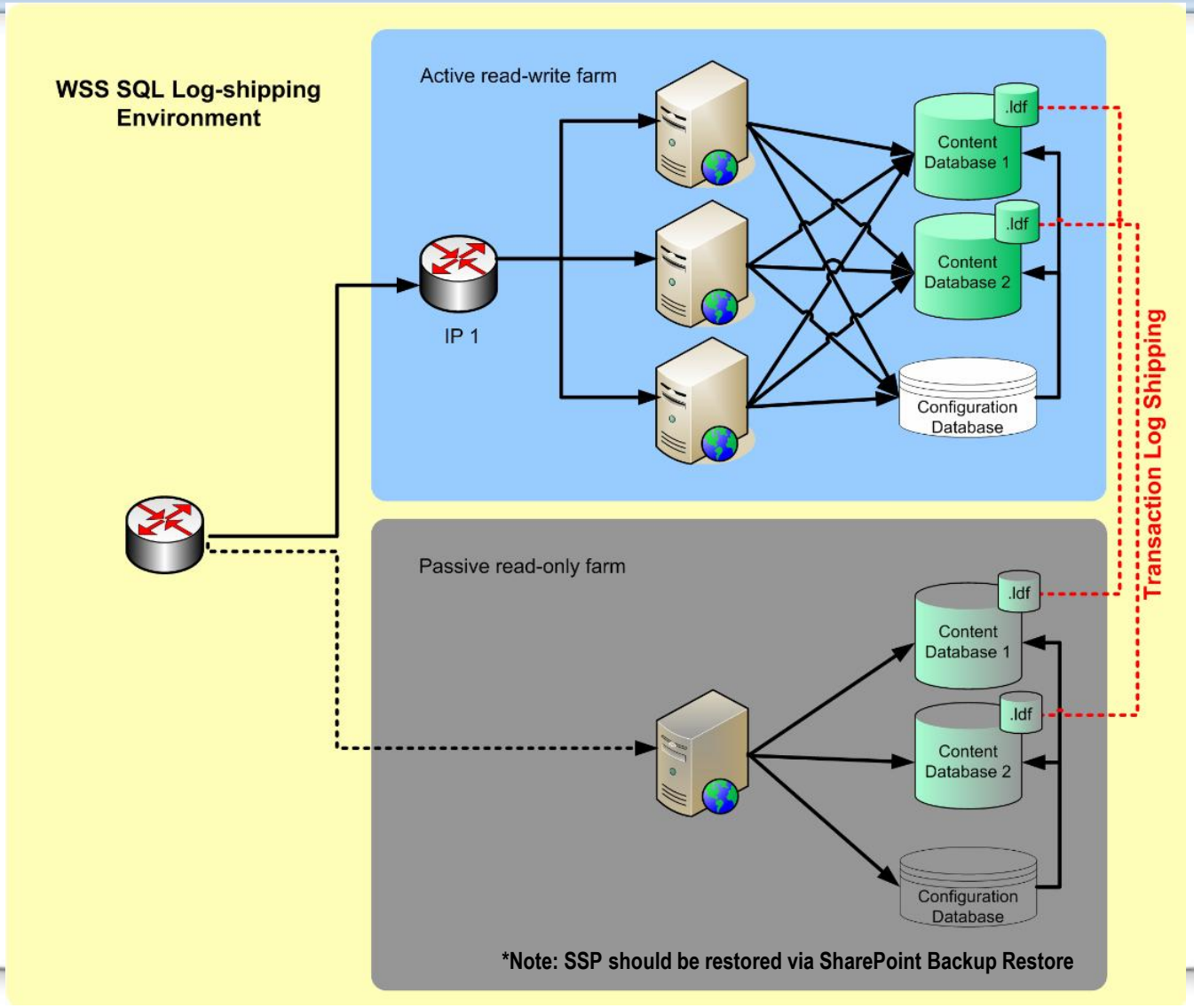
“I need another farm to test my solutions before I put them into production!”

- **Mirror / failover farm**
  - **Warm backup** for quick content recovery
  - Reproduce primary farm on a secondary system
  - SQL Log Shipping or Mirroring transfer Content DB data
  - On disaster, router/DNS switches traffic to standby farm
- **Limitations:**
  - Must manually duplicate configuration changes
  - Errors will be log shipped/mirrored to mirror farm
  - Requires additional hardware
  - Search indexer must run separately on mirror farm
  - Secondary farm must be read-only

SQL Server Log-Shipping to a “Warm” Standby Farm

- Backup/Restore based technology that relies on transaction log files
- Need to have a shared folder that contains the log file backups
- Configure the frequency of backups and shipping
- No automatic failover
- Allows you to replicate data to several databases (one to many)

Standby Farm; Log-Shipping Example



Mirroring vs. Log Shipping for Warm Standby Farms

Mirroring	Log Shipping
Requires manual steps for failover of SharePoint Farm (reattach Content DB's to Web applications; ensure SSP is restored to mirrored farm; update DNS/router entries, etc.)	Requires manual steps for failover of SharePoint Farm Databases must me restored via logs; reattach Content DB's to Web applications; ensure SSP is restored to mirrored farm; update DNS/router entries, etc.
SQL Failover takes place immediately	No failure detection
Protects against failed storage	Protects against failed storage
Only mirrored Content DB's are protected	Only log shipped Content DB's are protected
Transactionally consistent (Synchronous/High Protection/Availability mode) Potential for loss (Asynchronous/High Performance mode)	Greater potential for data loss depending on frequency of log shipping interval and transaction occurrence
Transactionally concurrent (Synchronous/High Protection/Availability mode) May not be concurrent (Asynchronous/High Performance)	At least 1 minute behind
Limited distance (Synchronous/High Protection/Availability) Greater distance (Asynchronous/High Performance)	Greater distance
Short time to recovery (seconds/minutes)	Longer time to recover due to steps involved.
Can only mirror to one site (1:1 relationship)	Can Log Ship to multiple sites (1:Many relationship)

Determining and Creating a Redundancy Strategy

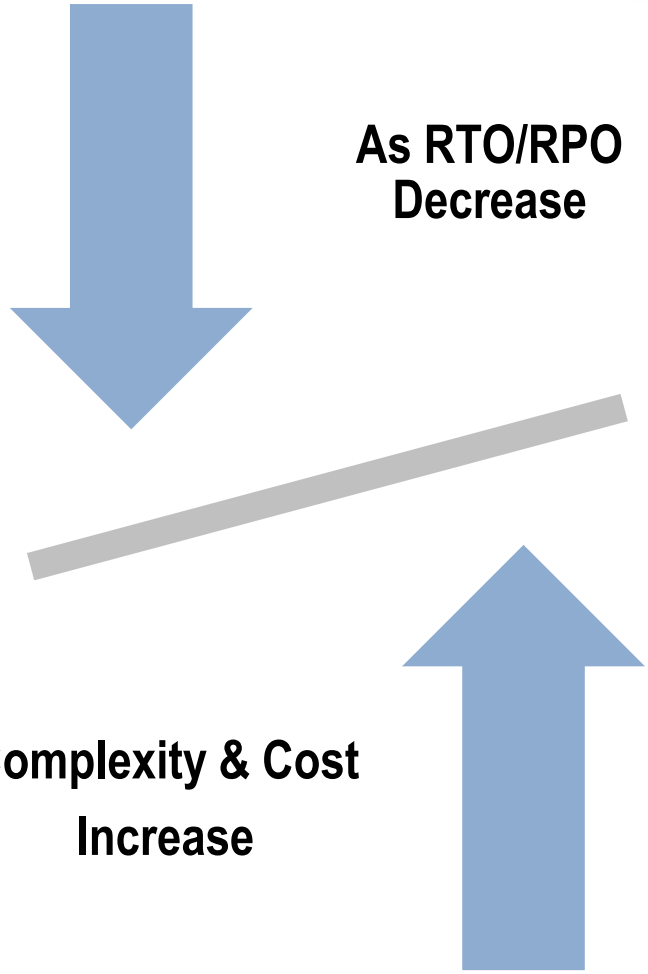
- Determine your required Recovery Time Objective (RTO) and Recovery Point Objective(RPO)
- Understanding the configuration and design of your specific SharePoint environment
- Which scenarios are most important to you

What are your RTO/RPO Requirements?

- RTO (Recovery Time Objective) = Maximum acceptable duration of time of system inoperability (Downtime)
- RPO (Recovery Point Objective) = Maximum amount of acceptable data loss (delta between last backup and system failure) (Freshness of Backup)
- RTO and RPO are the most important factors to your overall DR strategy

RTO and RPO affect:

- The technologies you choose
- The strategies you deploy
- The simplicity/complexity of your solution
- The location of your backups and environments



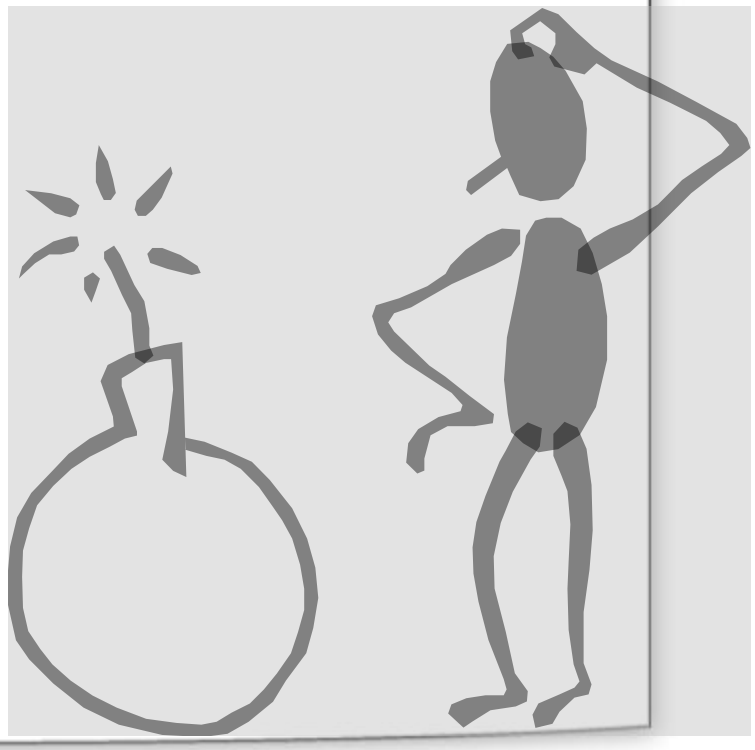
What Does Your SharePoint Environment Look Like?

- **Multiple farms in different regions?**
- **Do you need to protect all of your farms/services/content?**
- **How much does your environment change daily?**

  SUM(all Trans Logs/day)

What Scenarios Concern You?

- Hardware Failures?
- Infrastructure Problems?
- Application Problems?
- Facilities/Power Failures?
- Local or Regional Disasters?



Summary

Content Recovery

- Recycle Bin
- Versioning
- DB Snap Shots
- Web Delete Event

Backup/Restore

- SharePoint Backup/Restore
- SQL-Only
- Data Protection Manager 2007
- 3rd Party Tools

High Availability and Disaster Recovery

- SQL Clustering
- Database Mirroring
- Log-Shipping