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Ensuring Business Continuity by Deploying a Highly Available Exchange 2007 Infrastructure

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Agenda

- Business Continuity
- Business Drivers for implementing High Availability
- Methods of achieving HA
- New technology solutions

Business Continuity

- Messaging services are mission-critical or business-critical
- If the messaging system is not available, productivity can be lowered, and business and revenue opportunities can be lost.
- Even if e-mail is neither mission-critical nor business-critical to your organization, chances are that the loss of messaging services would create a substantial disruption to your organization

High Availability – Focus of today's discussion

- Redundancy (Data and Service)
- Fault Tolerance
- Site Resilience
- Organizations must understand their requirements and then look at the operational issues to understand what solution is best for them

Disaster Recovery

- How to correctly back up Exchange 2007
- How to restore Exchange 2007
 - Mail, Mailbox, Database, Storage Group, Server, Services, Site
- How to repair corrupt databases when no backups are available

Typical criteria for selecting appropriate availability solution

- Time to recovery
- Data impact of recovery
- Associated hardware and software costs
- Associated resource costs
- Probability of event
- Implications on the business
- Complexity risks
- Third-party solutions
- Pros
- Cons

What is the plan for implementing an SLA around your messaging service?

- Already have one
- 0 to 3 months
- 3 to 6 months
- 6 to 12 months
- No plan for an SLA

Categories and elements in a typical enterprise-level SLA

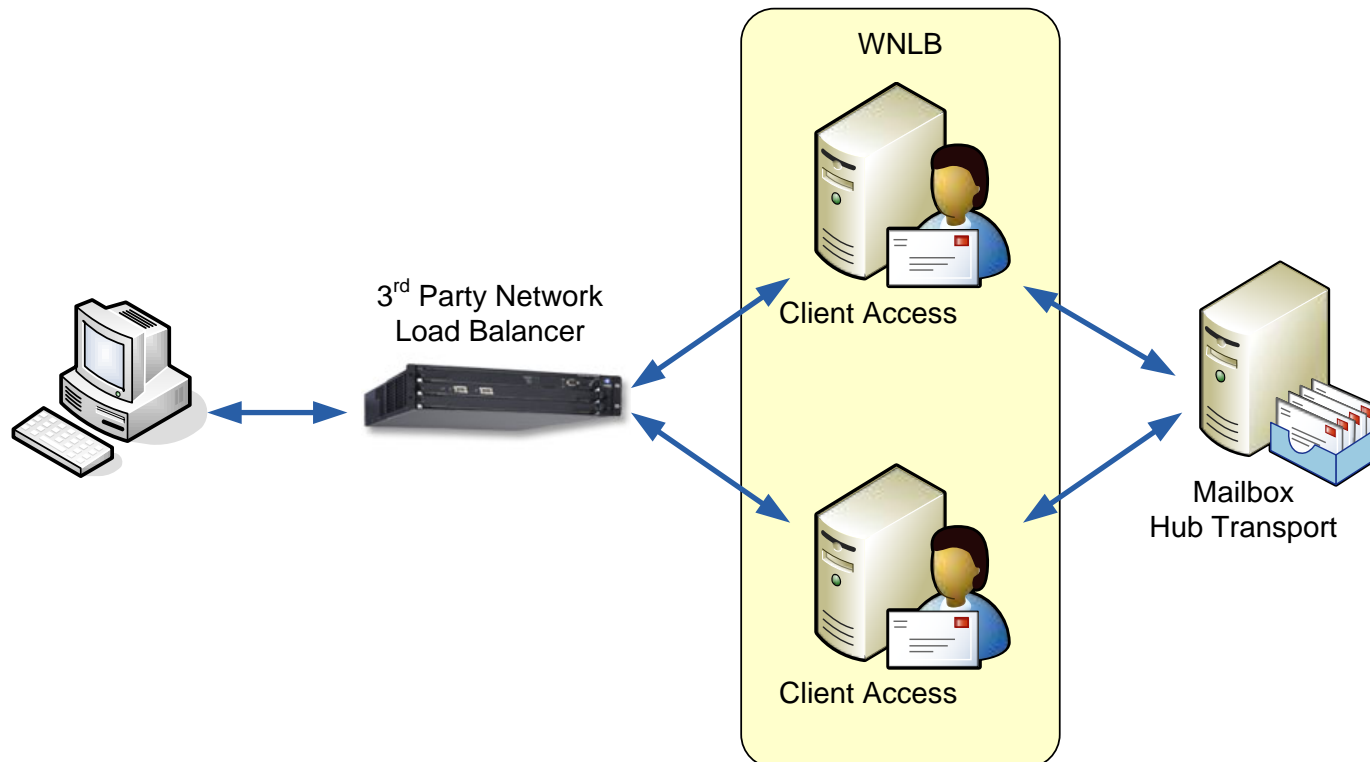
SLA categories	Examples of SLA elements
Hours of operation	<ul style="list-style-type: none"> •Hours that the messaging service is available to users •Hours reserved for planned downtime (maintenance) •Amount of advance notice for network changes or other changes that may affect users
Service availability	<ul style="list-style-type: none"> •Percentage of time Exchange services are running •Percentage of time mailbox stores are mounted •Percentage of time that domain controller services are running
System performance	<ul style="list-style-type: none"> •Number of internal users who the messaging system concurrently supports •Number of remotely connected users who the messaging system concurrently supports •Number of messaging transactions that are supported per unit of time •Acceptable level of performance, such as latency experienced by users
Disaster recovery	<ul style="list-style-type: none"> •Time allowed for recovery of each failure type, such as individual database failure, mailbox server failure, domain controller failure, and site failure •Time it takes to provide a backup mail system so that users can send and receive e-mail messages without accessing historical data (called Messaging Dial Tone) •Amount of time it takes to recover data to the point of failure
Help desk and support	<ul style="list-style-type: none"> •Specific methods that users can use to contact the Help desk •Help desk response time for various classes of problems •Help desk procedures regarding issue escalation procedures
Other	<ul style="list-style-type: none"> •Amount of storage required per user •Number of users who require special features, such as remote access to the messaging system

Exchange 2007 Server Roles

- Client Access Server
- Hub Transport Server
- Edge Transport Server
- Unified Messaging Server
- Mailbox Server

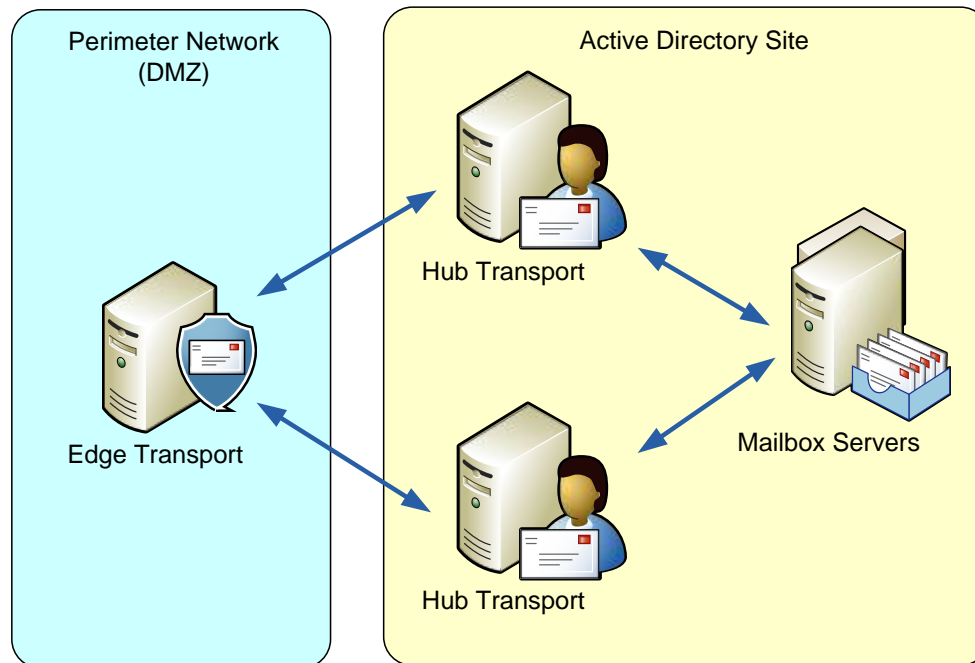
Client Access Server

- Redundant Server(s)
- Network Load Balancing
- Third-party hardware-based network load-balancing device



Hub Transport Server

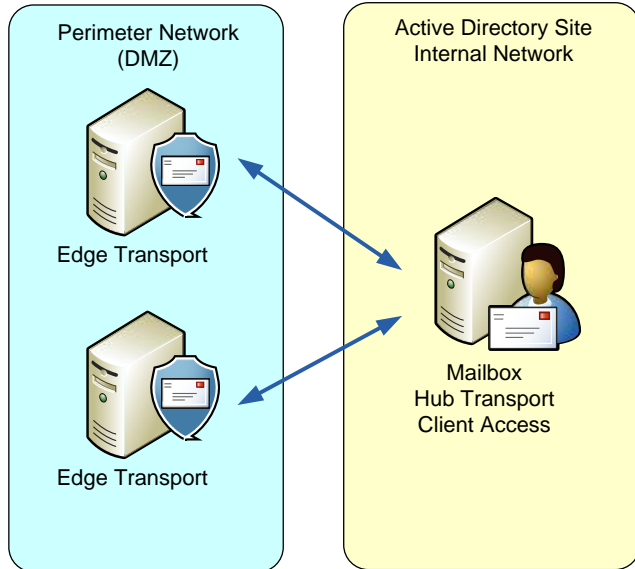
- Redundant Server(s)
- Built-in resiliency for intra-site message transport
- NLB for the inbound non-authenticated Exchange communication



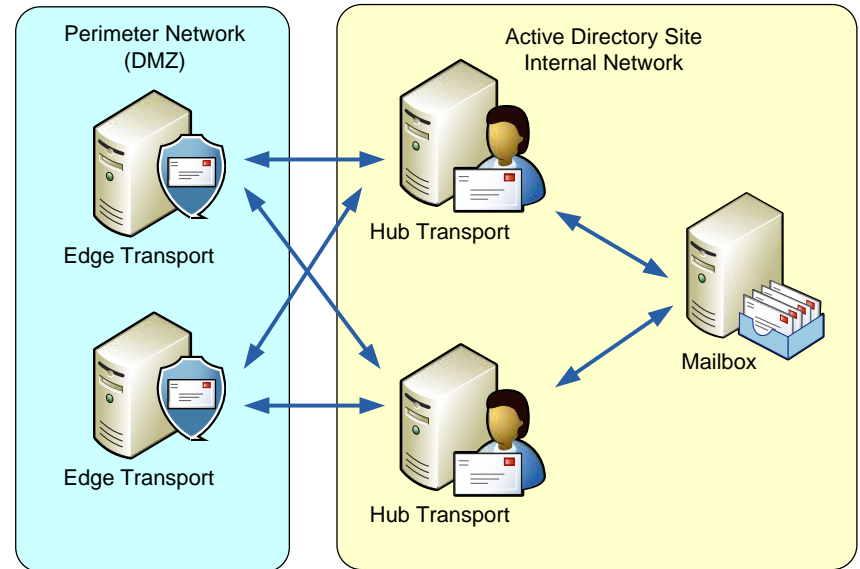
Edge Transport Server

- Redundant Server(s)
- Use multiple DNS Mail Exchanger (MX) records to load balance activity across those servers
- Hardware load balancer is supported

Scenario A

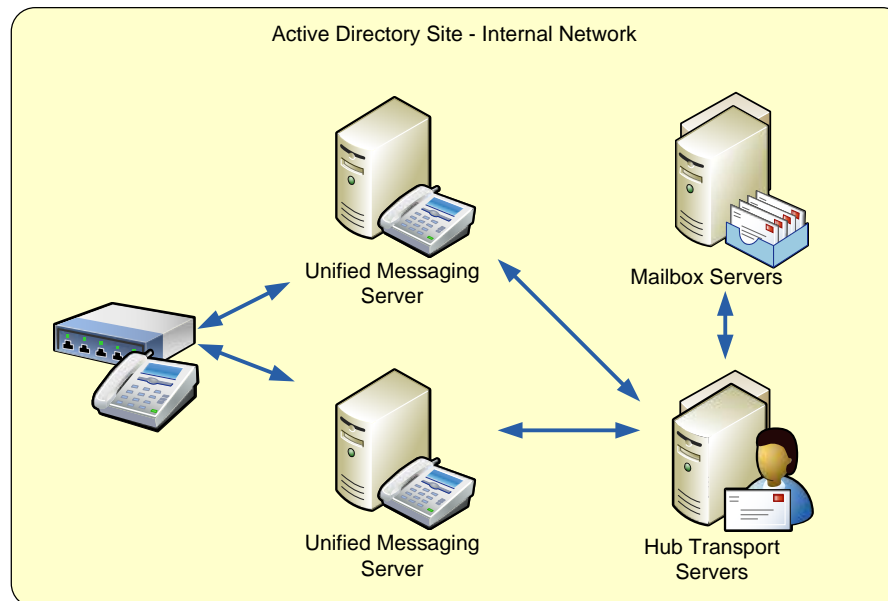


Scenario B



Unified Messaging Server

- Redundant Server(s)
- Two or more are in a single dial plan
- Configure VoIP gateways to route calls to Unified Messaging servers in a round-robin fashion
- Gateways can also retrieve the list of servers for a dial plan from DNS



Mailbox Server

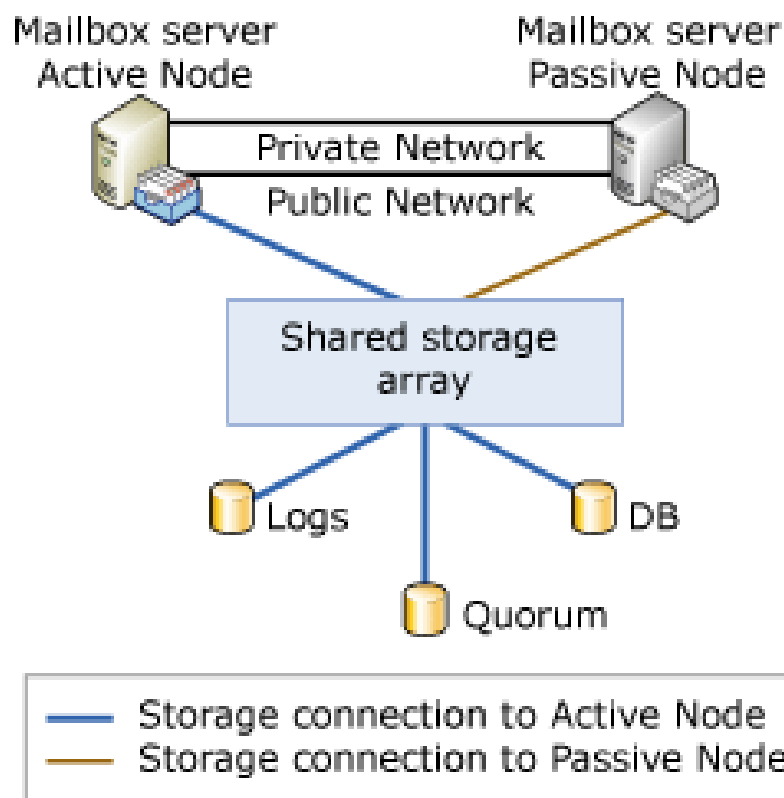
- Redundant Servers and/or Storage
- HA Options
 - Single Copy Cluster
 - Local Continuous Replication
 - Cluster Continuous Replication
 - Standby Continuous Replication (SP1)
- Considerations
 - *Single Datacenter Deployment* - redundancy that can automatically recover from some failures after a short outage. In the event of a site failure, a single datacenter solution relies on disaster recovery procedures to return to operating status
 - *Multiple Datacenter Deployments* - redundancy that can automatically recover from most individual failures. A multiple datacenter solution allows an organization to survive a datacenter failure without resorting to disaster recovery procedures. Failures that are not recoverable, such as a total site failure, require manual intervention for recovery.

How long was the longest unplanned mail system outage your company has experienced?

- Never had an outage
- 1 hour
- 2 to 4 hours
- 4 to 12 hours
- 12 to 24 hours
- More than 1 day

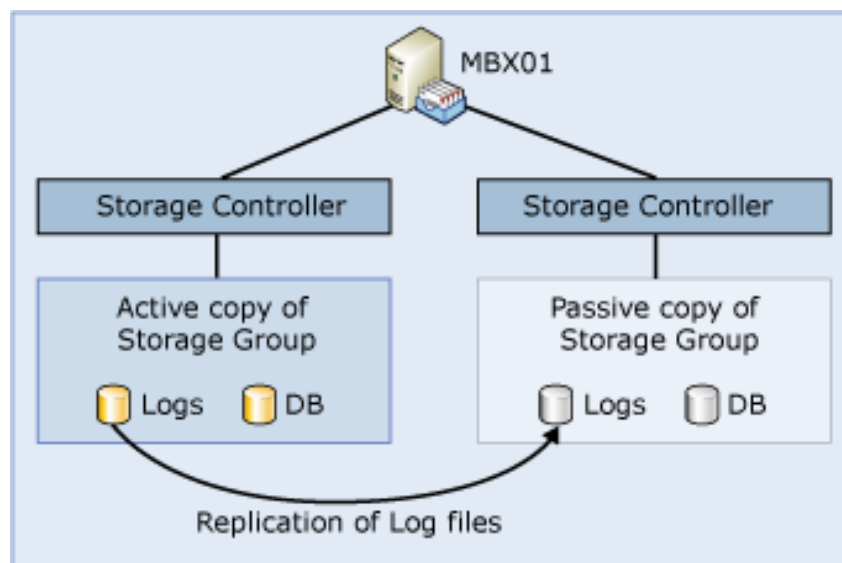
Mailbox Server – Single Copy Cluster

- Redundant Servers
- Shared Storage
- Installation integrated into Setup



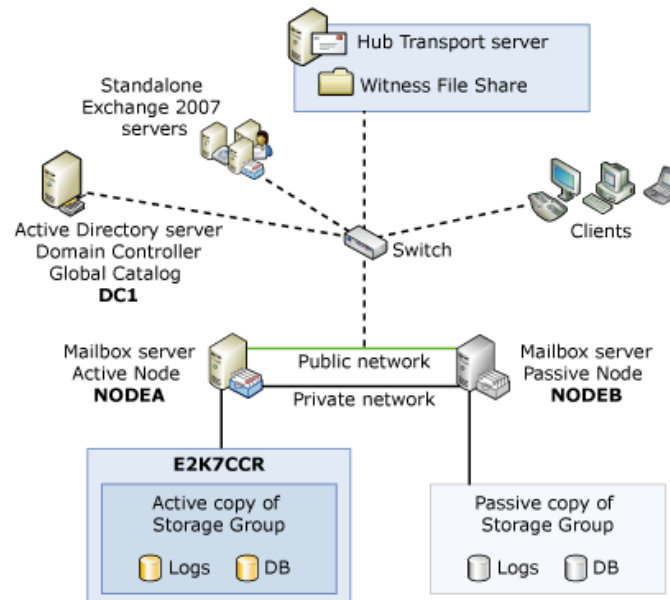
Mailbox Server – Local Continuous Replication

- Redundant Storage
- Built-in asynchronous log shipping
- Installation integrated into Setup
- LCR-enabled storage groups cannot contain more than one database



Mailbox Server – Cluster Continuous Replication

- Redundant Servers and Storage
- Built-in asynchronous log shipping
- Majority Node Set cluster
 - <http://support.microsoft.com/?kbid=921181>
- CCR cluster nodes must be deployed in the same Active Directory site
 - Recommendation to be the same physical location
- CCR-enabled storage groups cannot contain more than one database



Mailbox Server – Standby Continuous Replication

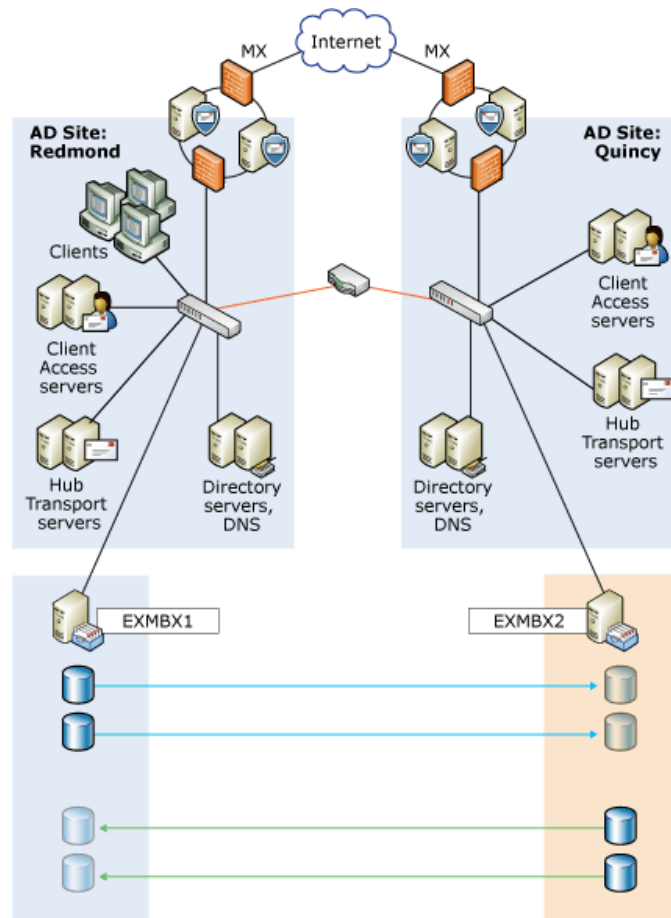
- Redundant Servers and Storage
- Built-in asynchronous log shipping
- Options available for Multiple Source / Target
- SCR source and target systems can be in separate AD Sites
- Recommended solution for Site Resilience
- Available in Exchange Server 2007 Service Pack 1

You have not deployed Exchange 2007 yet because?

- Waiting for SP1
- Not enough internal resources
- Not yet realized investment in hardware
- No view of the ROI it provides over Exchange 2003
- Already deployed Exchange 2007

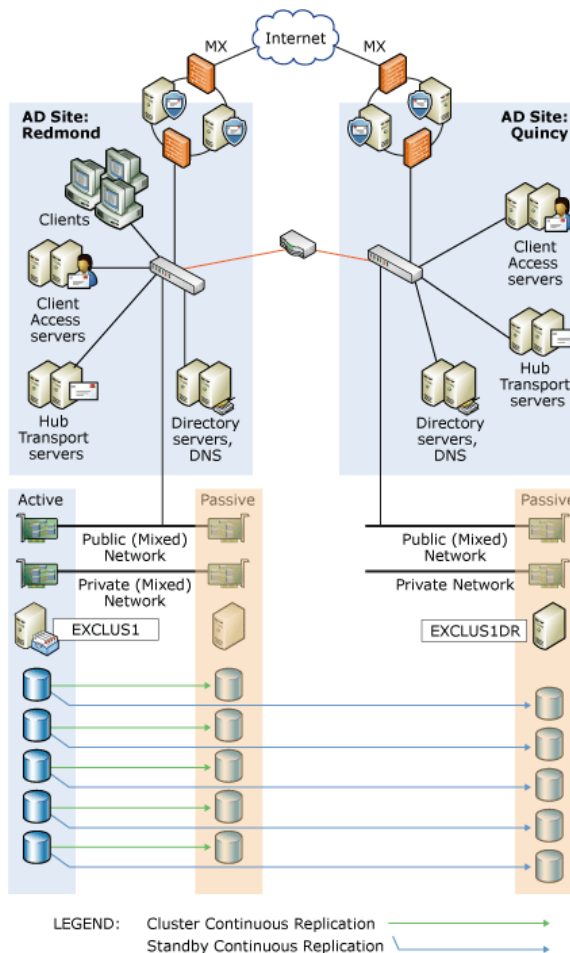
SCR – Scenario 1

- Using SCR to replicate a storage group from one stand-alone Mailbox server to another Mailbox server



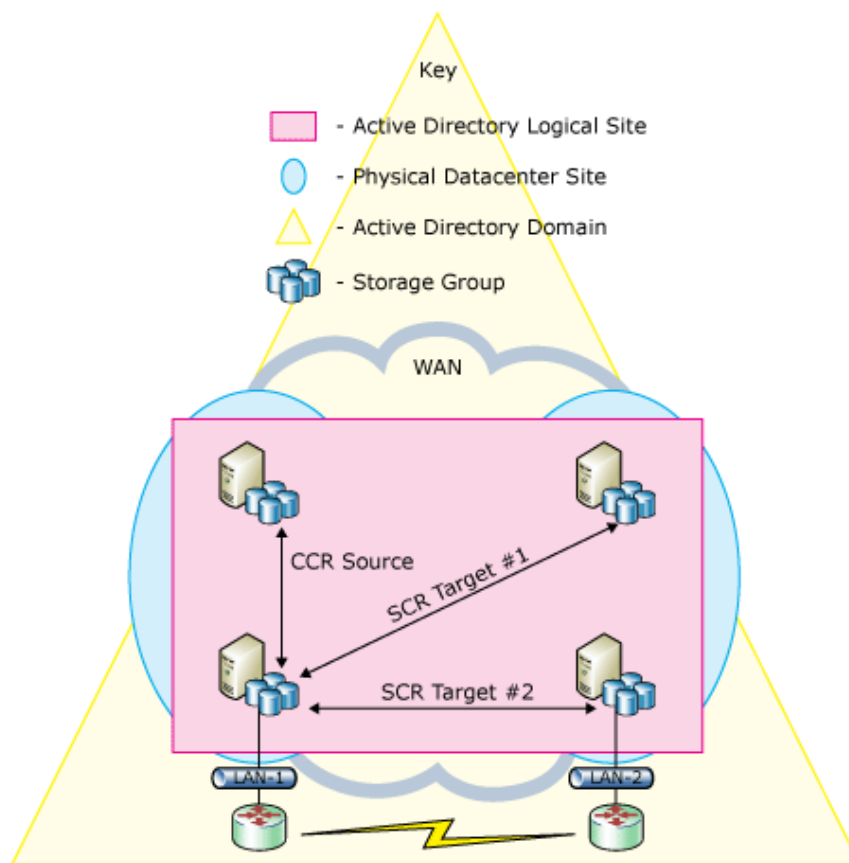
SCR – Scenario 2

- Using CCR to replicate storage groups locally and SCR to replicate one storage group to a remote location



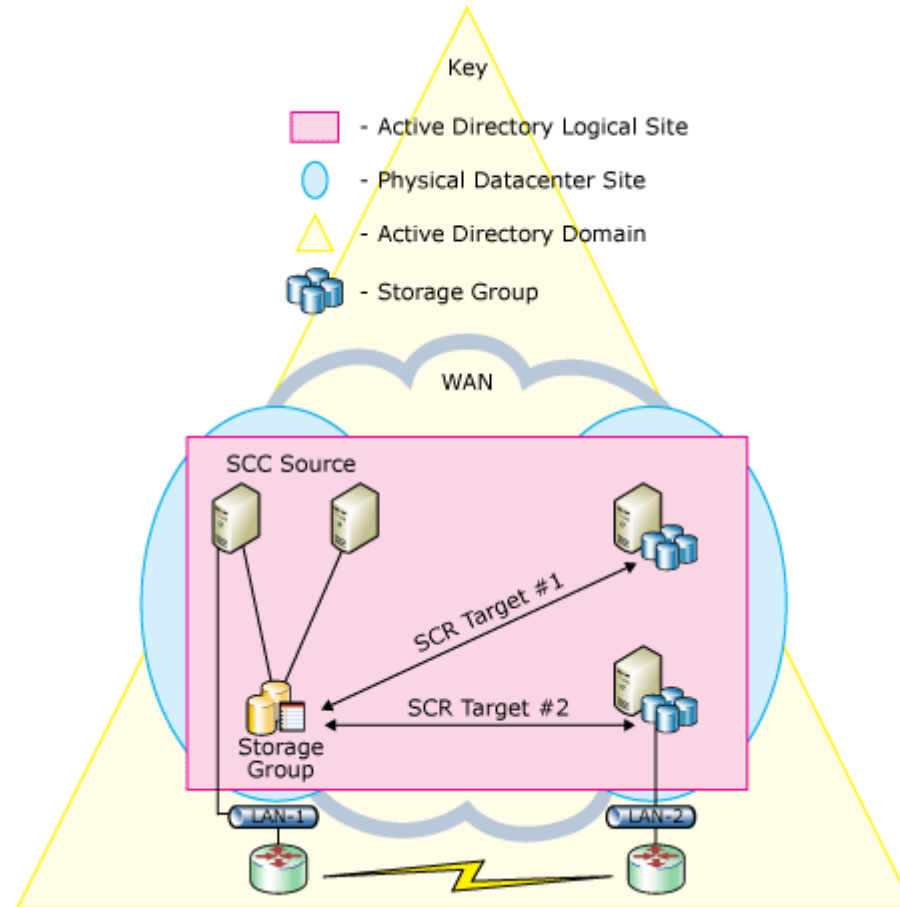
SCR – Scenario 3

- Using CCR to replicate storage groups locally and SCR to replicate storage groups to multiple remote locations



SCR – Scenario 4

- Multiple remote SCR targets for an SCC



Standby Continuous Replication Requirements

- The SCR source and the SCR target system:
 - must be running Exchange 2007 SP1
 - must have the Exchange 2007 SP1 Mailbox server role installed
 - must be in the same Active Directory service domain
 - can be located in the same or in different Active Directory sites.
- SCR-enabled storage groups cannot contain more than one database
- SCR source can be a storage group on any of the following:
 - stand-alone Mailbox server
 - clustered mailbox server in a single copy cluster (SCC)
 - clustered mailbox server in a CCR environment
- Each SCR target:
 - can have multiple source servers
 - can be a stand-alone Mailbox server that does not have LCR enabled for any storage group
 - can be a passive node in a failover cluster where the Mailbox role is installed, but no clustered mailbox server has been installed in the cluster
 - supports a maximum of 50 instances (50 replicated storage groups) when using the Enterprise Edition of Exchange 2007
 - supports a maximum of 5 instances when using the Standard Edition of Exchange 2007

Key Benefits of LCR, CCR, and SCR

- Rapid recovery from failure of server, storage, site, or active database (depending on the HA solution).
- Administrator selectivity, which protects the users that need it most.
- Minimal impact to the active database and log Input / Output loads.
- Ability to offload backup I/O from the active database and log volumes.
- Ability to reduce total data moved to backup media, while extending the backup window.
- Administration abstraction at the Exchange level through the use of the Exchange Management Console or the Exchange Management Shell.
- All solutions use Log Shipping as the data replication method, which is subject to data loss in a dirty shutdown scenario.

Comparing SCR with LCR and CCR

- SCR supports multiple replication targets per storage group. LCR and CCR support only one replication target per storage group (the passive copy).
- SCR includes a built-in delay for replay activity, and it enables an administrator to specify an additional delay. This is useful in a variety of scenarios. For example, in the event of logical corruption of an active database, the built-in and additional administrator-configured delay could be used to prevent logical corruption of an SCR target database. LCR and CCR have no such delays.
- SCR is completely managed using the Exchange Management Shell. The Exchange Management Console can be used to manage many aspects of LCR and CCR, but it cannot be used to enable or manage any aspects of SCR.

Useful Links

- Exchange Server 2007 High Availability: <http://technet.microsoft.com/en-us/library/bb124721.aspx>
- Exchange Server 2007 High Availability Storage Considerations: <http://msexchangeteam.com/archive/2006/10/05/429103.aspx>
- Exchange Team Video Blog on Exchange 2007 DR and High Availability: <http://msexchangeteam.com/videos/9/drandha/default.aspx>
- Exchange Server 2007 Disaster Recovery Decision Flowcharts (download): <http://msexchangeteam.com/files/12/attachments/entry447215.aspx>
- Exchange Team Blog on CCR, Site Resilience, and sample decision making process: <http://msexchangeteam.com/archive/2007/10/08/447211.aspx>
- Exchange Server 2007 Technical Library: <http://technet.microsoft.com/en-us/library/bb124558.aspx>
- PointBridge Blogs: <https://blogs.pointbridge.com>