

WINDOWS SERVER 2008 – EXCHANGE SERVER 2007 CLUSTER



Inhalt

- Neuerungen in Windows Server 2008 im Vergleich zu Windows Server 2003
- Neuerungen in Exchange Server 2007 im Vergleich zu Exchange Server 2003
- Administration eines Exchange Server 2007 Clusters unter Windows Server 2008
- Spezielle Konfigurationen

Referentenvorstellung

- Marc Grote
- Baujahr 1972 – seit 1989 hauptberuflich ITler
seit 1995 Selbststaendig, vorher angestellt als IT-Administrator
- Schwerpunkte: Windows Server Clustering, PKI, Exchange Server seit 5.0, ISA Server als er noch Proxy Server hiess
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- Blog: <http://www.it-training-grote.de/blog>

Workshop Zeiten

- 09:00 – ca. 16:30 Uhr
- Gegen 10:30 Uhr 30 Minuten Pause
- Mittagspause gegen 12:30 – 13:30 Uhr
- Gegen 14:45 Uhr 30 Minuten Pause

Neuerungen in Windows Server 2008

- Einfuehrung in die neue Produktfamilie
- Aenderungen im Netzwerkbereich (NAP, IPv6, NPS)
- Aenderungen im Active Directory
- RODC, Server Core
- Terminal Server Services / -Gateway
- Sicherheitsverbesserungen / Erweiterungen
- Aenderungen im IIS
- Server Virtualisierung mit Hyper-V
- Hochverfuegbarkeit (Failover Cluster und NLB)
- Automatisierte Client- und Serverinstallation
- Migration von Windows 2003 zu Windows Server 2008

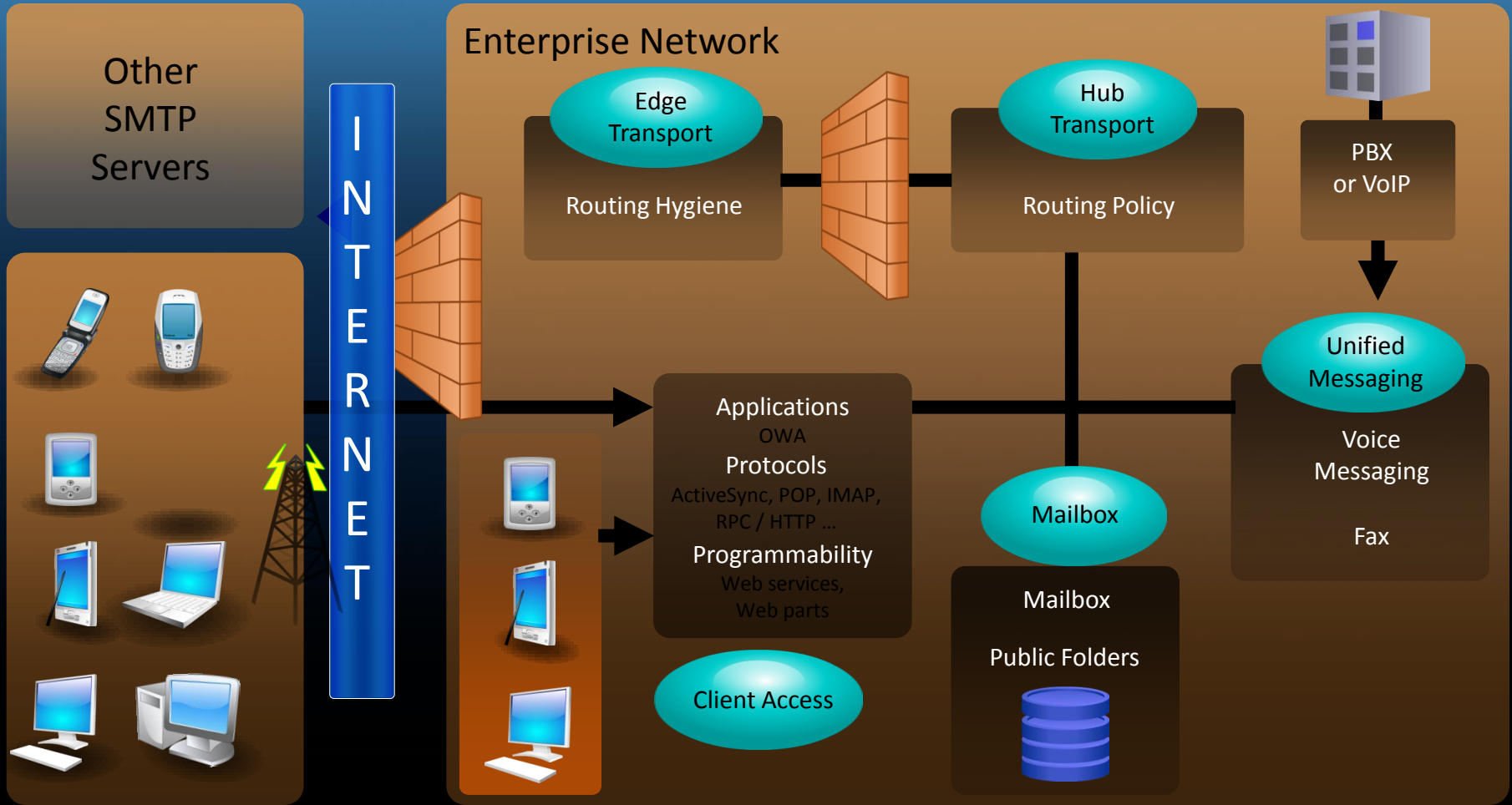
Neuerungen in Exchange Server 2007

- Neue Exchange Rollen
- Edge Server
- Clustering
- Empfängerverwaltung
- Konfiguration des Messaging
- AntiSpam und Antivirus
- Message Records Management
- Neue OWA / EAS / OA Funktionen
- Exchange Verwaltungskonsole
- Exchange Verwaltungsshell
- Datensicherung und Wiederherstellung
- Migration von Exchange 2003 zu Exchange 2007

Exchange Server 2007 Serverrollen

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

Serverrollen



Quelle: <http://www.microsoft.com/exchange>

Clustergrundlagen

- Ein Cluster, von engl. cluster = Traube, Bündel, Schwarm, genannt, bezeichnet eine Anzahl von vernetzten Computern, die zur parallelen Abarbeitung von zu einer Aufgabe gehörigen Teilaufgaben zur Verfügung stehen. Im Gegensatz zu Parallelrechnern findet die Lastverteilung auf der Ebene einzelner Prozesse statt, die auf einer oder verschiedenen Maschinen des Clusters gestartet werden. Man benötigt also keine parallelisierte Software oder spezielle Betriebssysteme. Alternativ werden Cluster auch zum Steigern der Verfügbarkeit von Systemen genutzt

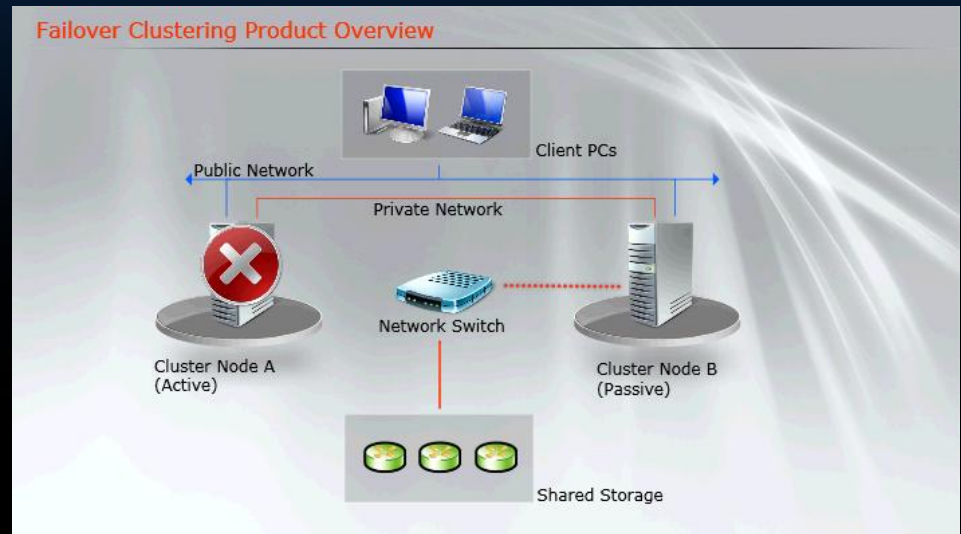
Quelle: <http://de.wikipedia.org/wiki/Computercluster>

Administration eines Exchange Server 2007 Clusters

- Was ist neu und anders in der Clusterverwaltung
- Neue Clusterarten
- Exchange 2007 im Windows 2008 Cluster
- Quorum Optionen
- Exchange 2007 Cluster Installation
- FSW Konfiguration
- Clusterverwaltung
- Failover / Failback
- Troubleshooting / Backup und Recovery

Cluster Neuerungen in Windows Server 2008

- Was ist neu im Windows Server 2008 Cluster
- Was ist neu und anders in der Clusterverwaltung
- Clusterarten
- Exchange 2007 im Windows 2008 Cluster
- Quorum Optionen
- Exchange 2007 Cluster Installation
- FSW Konfiguration
- Clusterverwaltung
- Failover / Failback



Was ist neu und anders im Windows 2008 Cluster

- Cluster Validation Tool
- Setup Improvements
- Migration Improvements (Kopieren der Cluster Konfiguration)
- Cluster Management mit WMI
- Neue Quorum Optionen
- IPv6 Support, DNS statt WINS/NetBIOS Namensauflösung
- Abhängigkeit Ressource IP-Adresse und Netzwerkname entfällt
- IPSEC zwischen Client+Server und Node zu Node

Was ist neu und anders im Windows 2008 Cluster

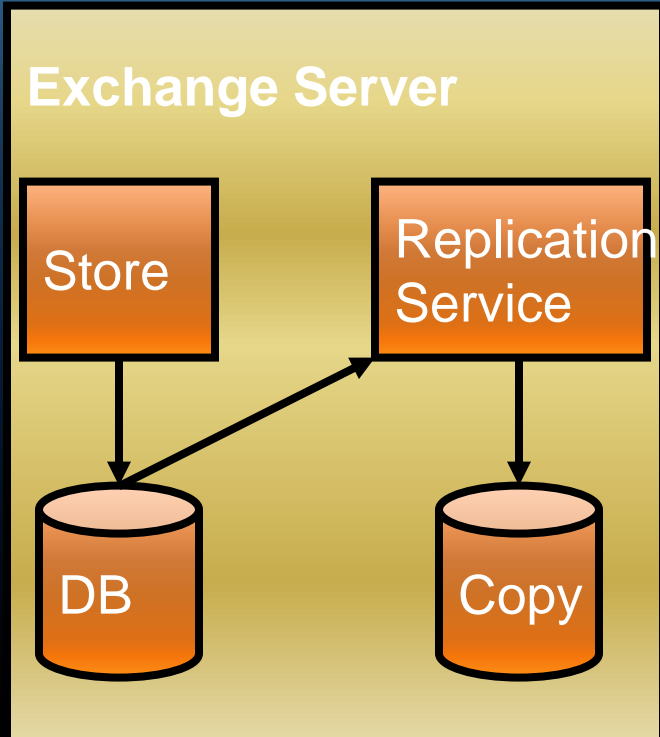
- Kerberos Authentifizierung zwischen Cluster Nodes
- Erweiterter Mechanismus fuer „Persistent Reservations“
- Kein SCSI Bus Reset mehr
- Cluster Account (CSA) im „LocalSystem“ Kontext
- SAS, iSCSI, SAN, kein SCSI mehr
- GPT Disk
- VDS Unterstuetzung (eigener VSS Writer)
- Cluster Heartbeat Unicast statt Broadcast
- Cluster Network Driver (CLUSNET.SYS) ersetzt durch NETFT.SYS)
- Statt Textfile Logging ETL (Event Trace Logging)
- Inter-Node Verschluesselung moeglich (Default = Off)
- Unterstuetzung fuer Server Core

Clusterarten

- LCR = Local Continuous Replication (eigentlich kein Cluster, aber in diesem Zusammenhang erwahnt)
- SCC = Single Copy Cluster – „Vanilla Cluster“
- CCR = Cluster Continuous Replication
- SCR = Standby Continuous Replication

LCR oder CCR

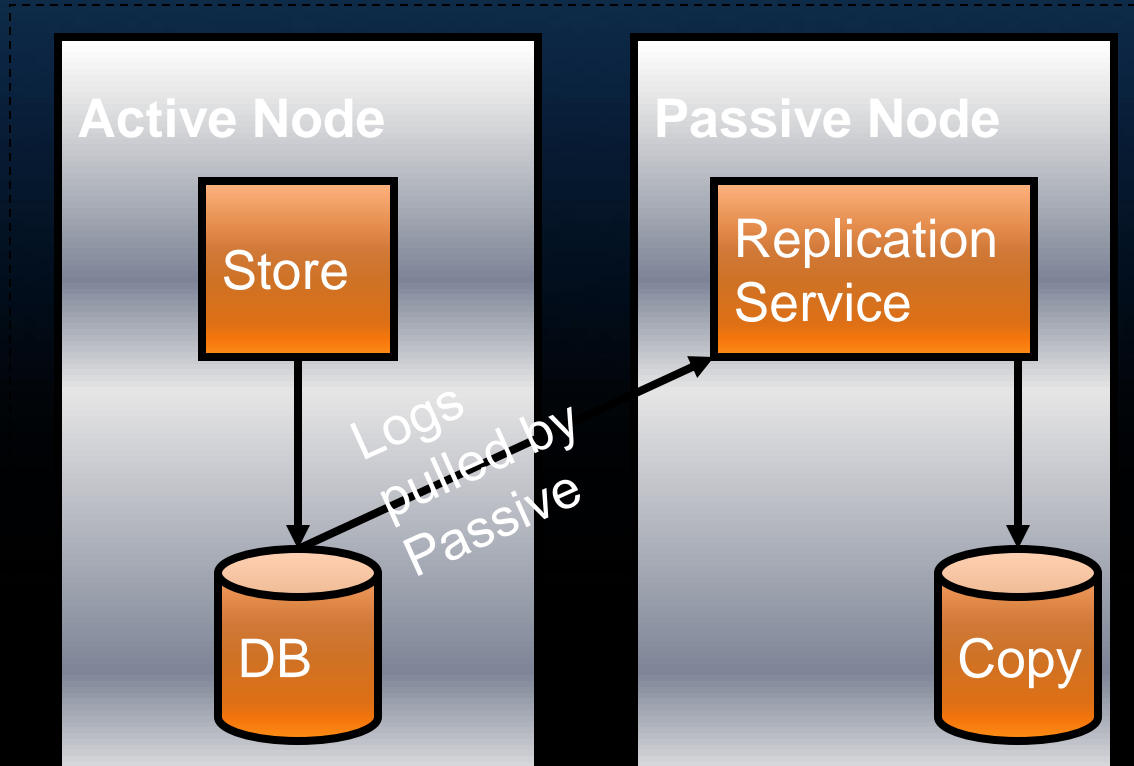
Standalone Server



LCR

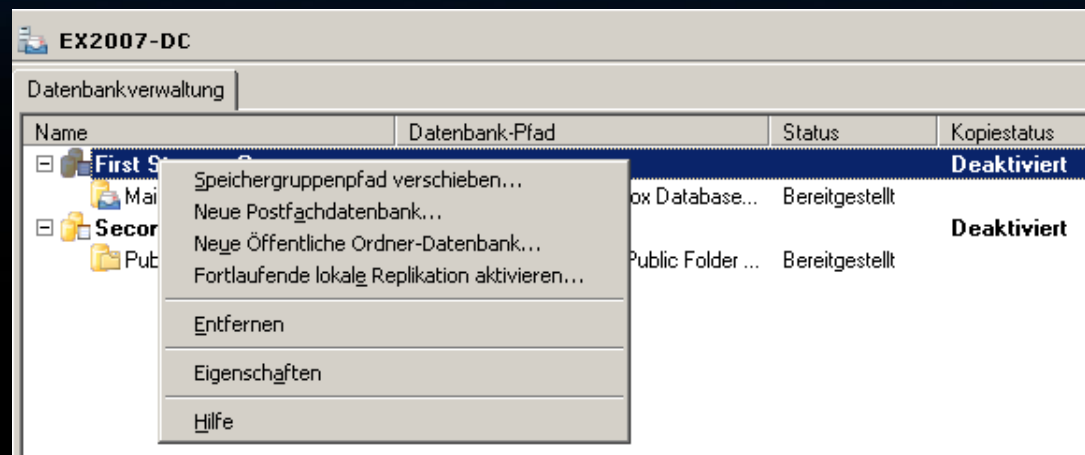
CCR

Cluster



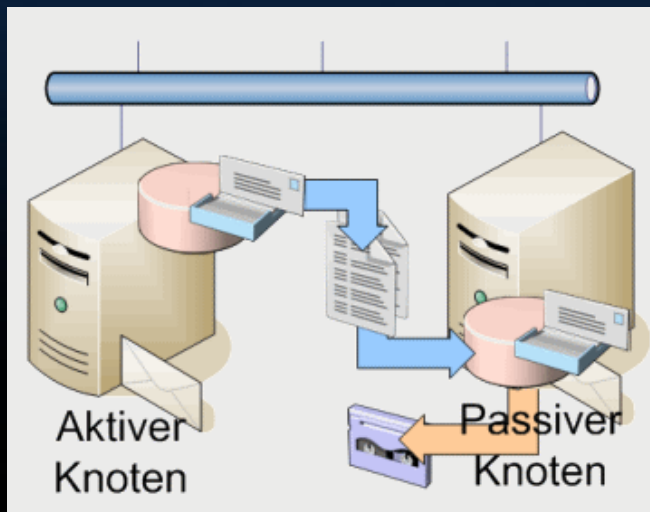
LCR

- Lokale Kopie einer Postfach-Datenbank mit Transaktionsreplikation
- Kein Ersatz für ein Backup
- iSCSI, SAN möglich
- Kein LCR für öffentliche Ordner
- Kein UNC Pfad



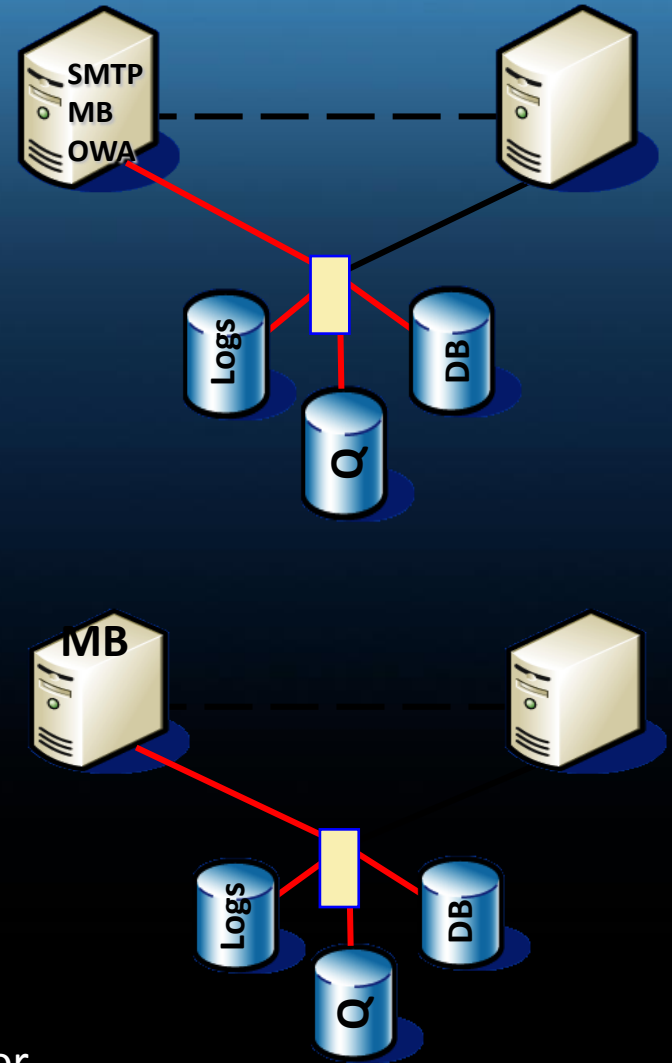
SCC

- Kein Active/Active Cluster (bei 2 Knoten) mehr
- Ausschliesslich Active/Passive
- Prinzip wie bei Exchange 2003



SCC

- Exchange Server 2003
 - Requires shared storage
 - SMTP, OWA, and Mailbox are cluster-aware
 - Single copy of mailbox data
 - Up to 8-node Active/Passive
 - 2-Node Active/Active
- Exchange Server 2007
 - Requires shared storage
 - Mailbox Only
 - Simple redundancy for other roles
 - Single copy of mailbox data
 - Up to 8-node Active/Passive
 - At least one passive required
 - Active/Active cut
 - Improvements in Install, Management, Behavior

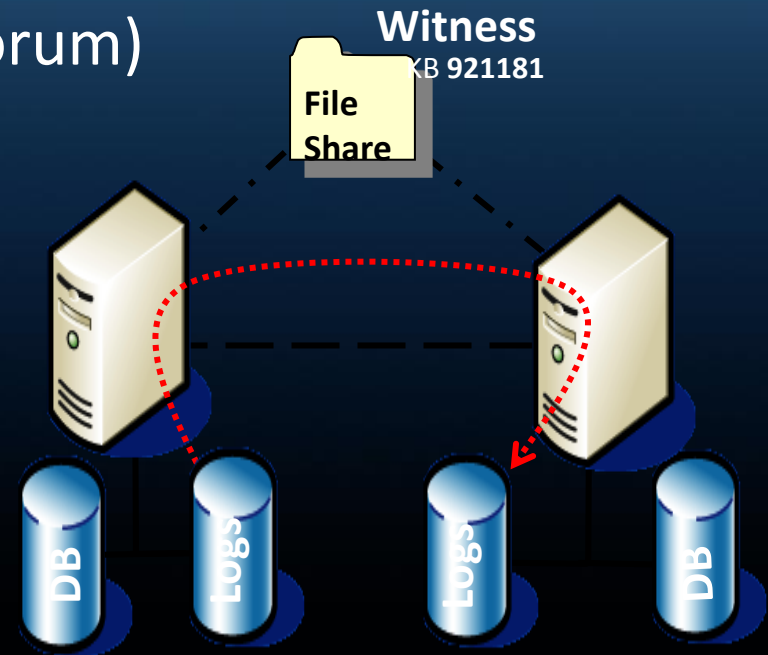


CCR

- Kopie einer Exchange Datenbank auf räumlich getrennten Clusterknoten
- Datenbank wird per Transaktionsreplikation repliziert
- Kein Shared Storage (Quorum) notwendig
- Voraussetzung MNS (Majority Node Set)
- Dritter Rechner als Witness (Zeuge) notwendig
- Im K-Fall minimaler Datenverlust möglich

CCR

- Two-node Active/Passive failover cluster
 - File Share Witness (MNS Quorum)
 - No shared storage
 - Witness on Hub Transport
 - Automatic recovery
- Log shipping and replay
- Full redundancy
- One or two datacenter solution
 - Subnets and Sites must be stretched in a two datacenter deployment



CCR

- Cluster service monitors the resources
 - Failure detection is not instantaneous
- IP Address or Network Name resource failures cause failover
 - A machine, or network access to it, has failed completely
- Exchange service failure or timeout doesn't cause failover
 - The service is restarted on the same node
- Database failure doesn't cause failover
 - Don't want to move 49 databases because 1 failed

Neue HA Funktionen in Exchange Server 2007 SP1

- Standby continuous replication (SCR)
- Support for the following features in Windows Server 2008:
 - Multiple subnet failover clusters
 - Dynamic Host Configuration Protocol (DHCP) Internet Protocol version 4 (IPv4)
 - IPv6
 - Exchange and failover cluster network configuration
- New quorum models (disk and file share witness)
- Continuous replication (log shipping and seeding) over a redundant cluster network in a cluster continuous replication (CCR) environment
- Reporting and monitoring improvements
- Performance improvements
- Transport dumpster improvements
- Exchange Management Console improvements

Quorum Optionen

- What Is Quorum?
- How Quorum Works
- Types of Quorum Modes
- What Is the Node Majority Mode?
- What Is the Node and Disk Majority Mode?
- What Is the Node and File Share Majority Mode?
- What Is the No Majority: Disk Only Mode?
- Choosing a Quorum Mode

Quorum Optionen

Failover cluster features supported by Exchange 2007 SP1

| Windows Server 2003 | Windows Server 2008 | Exchange 2007 support |
|--|---|---|
| Shared disk quorum | No Majority: Disk Only Quorum | Supported, but not recommended on Windows Server 2008. |
| Majority Node Set quorum | Node Majority Quorum | Supported. |
| Majority Node Set quorum with File Share Witness | Node and File Share Majority Quorum | Supported, and recommended for CCR. |
| Shared disk quorum or Majority Node Set quorum with file share witness | Node and Disk Majority Quorum | Supported, and recommended for single copy clusters (SCCs). |
| 8-node clusters | 16-node clusters | 8-node clusters only for SCCs. (CCR is a 2-node cluster.) |
| IPv4 address resources | IPv4 and IPv6 address resources | Supported; however, IPv6 tunneling over IPv4 is supported by Windows Server 2008, but not supported by Exchange 2007. |
| Static IPv4 addresses | DHCP-IPv4 addresses | Supported, but not recommended for production environments. |
| Single subnet required for each cluster network | Multiple subnets supported for cluster networks | Supported for SCC and CCR. |

Quelle: <http://www.microsoft.com/exchange>

Quorum Optionen

| Quorum Mode | Description |
|-------------------------------------|---|
| Node Majority | <ul style="list-style-type: none">• Only nodes in the cluster have a vote• Quorum is maintained when more than half the nodes are online |
| Node and Disk Majority | <ul style="list-style-type: none">• The nodes in the cluster and a witness disk have a vote• Quorum is maintained when more than half the votes are online |
| Node and File Share Majority | <ul style="list-style-type: none">• The nodes in the cluster and a witness file share have a vote• Quorum is maintained when more than half the votes are online |
| No Majority: Disk Only | <ul style="list-style-type: none">• Only the quorum-shared disk has a vote• Quorum is maintained when the shared disk is online |

Select Quorum Configuration

Configure Cluster Quorum Wizard

Select Quorum Configuration

Before You Begin

Select Quorum Configuration

Configure Storage Witness

Confirmation

Configure Cluster Quorum Settings

Summary

Read the descriptions and then select a quorum configuration for your cluster. The recommendations are based on providing the highest availability for your cluster.

- Node Majority (not recommended for your current number of nodes)
Can sustain failures of 0 node(s).
- Node and Disk Majority (recommended for your current number of nodes)
Can sustain failures of 1 node(s) with the witness disk online.
Can sustain failures of 0 node(s) if the witness disk goes offline or fails.
- Node and File Share Majority (for clusters with special configurations)
Can sustain failures of 1 node(s) if the witness file share remains available.
Can sustain failures of 0 node(s) if the witness file share becomes unavailable.
- No Majority: Disk Only (not recommended)
Can sustain failures of all nodes except 1. Cannot sustain a failure of the quorum disk. This configuration is not recommended because the disk is a single point of failure.

[More about quorum configurations](#)

< Previous Next > Cancel

Quorum Funktionsweise

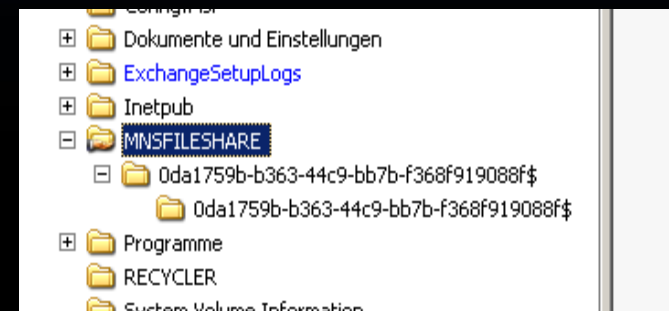
- A node that is starting must determine if there are other nodes it can communicate with
- All nodes must agree on the cluster configuration, and determine whether there are enough votes to come online
- If quorum is not reached, the nodes go into a dormant state until more votes arrive
- If there are enough votes, the Resource Control Manager (RCM) can bring resources and applications into service, and begin health monitoring
- After quorum is attained, the cluster is fully functional

FSW Konfiguration

- FSW fuer MNS
- Ersatz fuer 3 Knoten Notwendigkeit
- Installation auf HTS
- QFE 921181 bei W2K3, nicht bei W2K8
- Anlage mit Cluster.exe

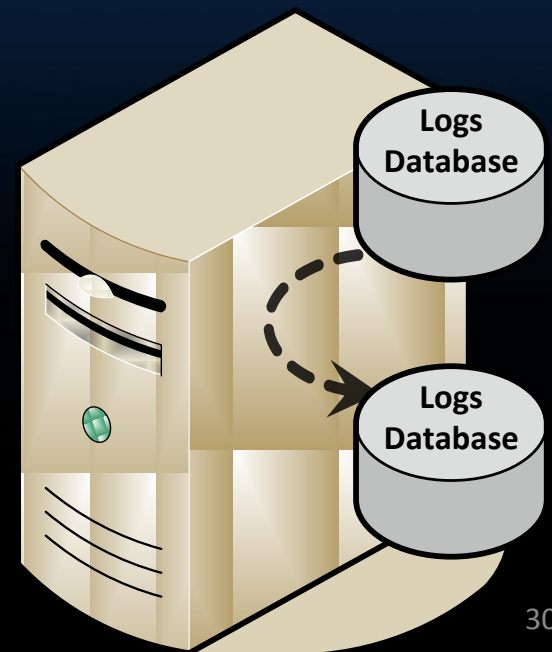
FSW

- Installation auf Hub Transport Server
- Hotfix auf Cluster Knoten erforderlich
<http://support.microsoft.com/kb/921181> (Reboot)
- Freigabe MNSFILESHARE (ist wählbar)
- Berechtigungen für Cluster Service Konto Vollzugriff
- Auf einem Clusterknoten:
cluster.exe res "Majority Node Set" /priv
MNSFileShare=\\HTSERVER\MNSFileShare
- Test:
cluster res "Majority Node Set" /priv

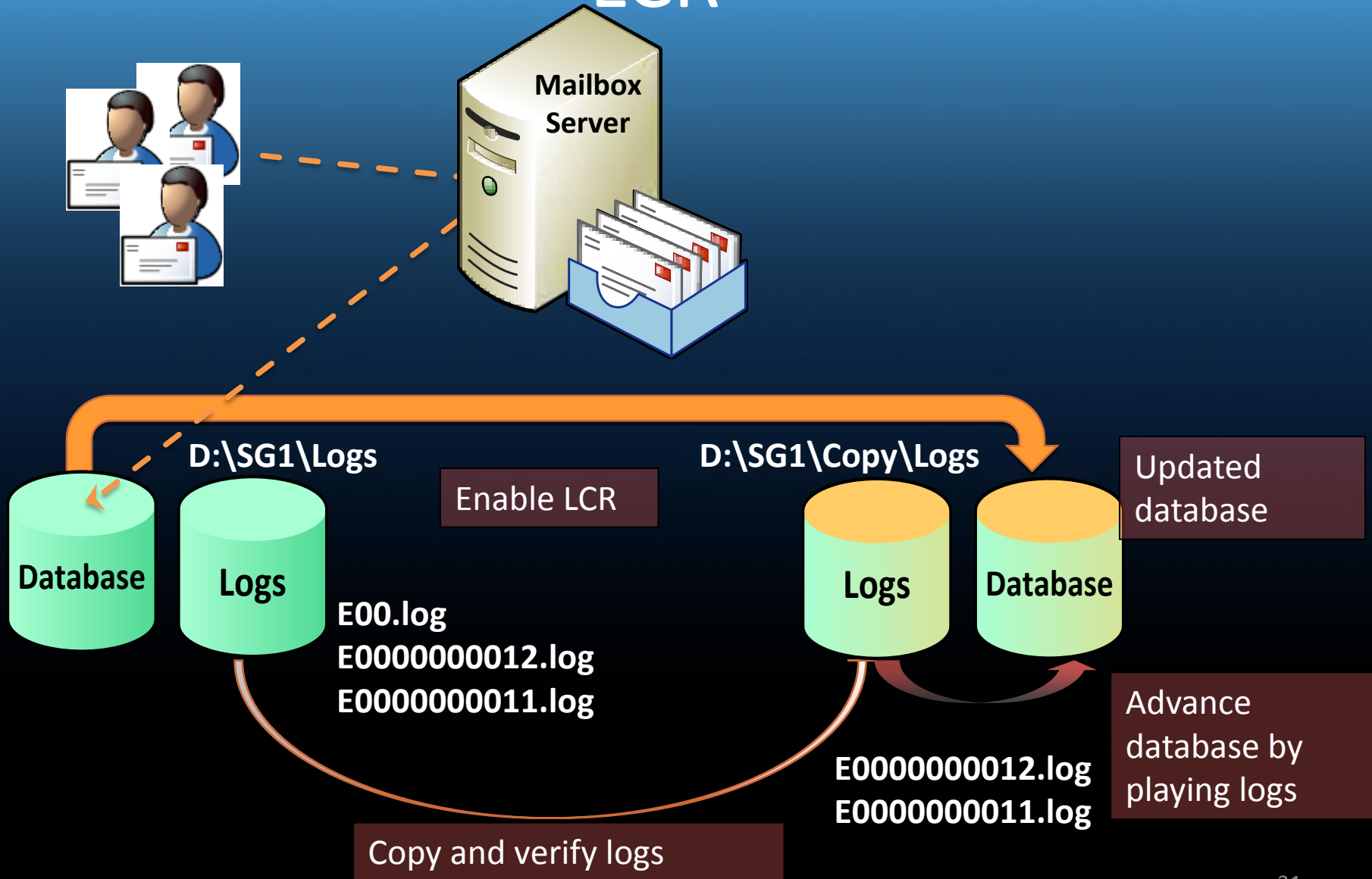


LCR – Local Continuous Replication

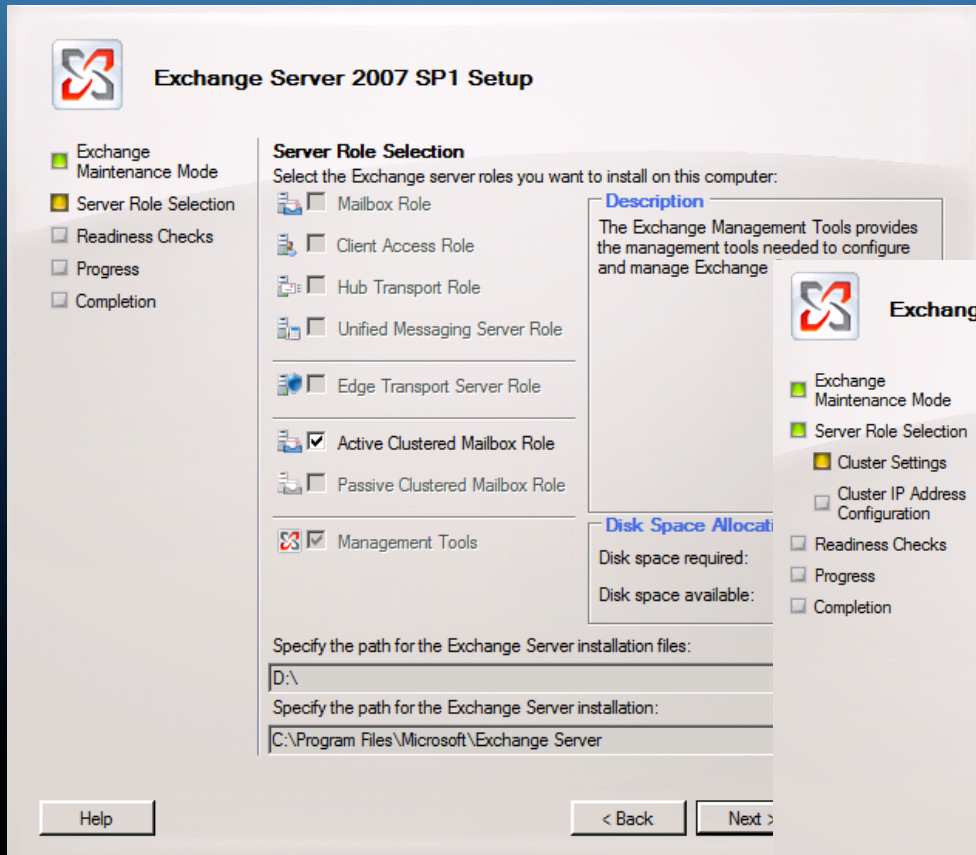
- Standalone server data availability
 - Data outages expensive to recover
 - Significant data loss (hours?)
 - Previous versions of Exchange required partner products for replication
- What is LCR?
 - Log shipping on a single server in a single datacenter
 - Enabled per storage group
 - Easy to configure



LCR



Exchange Cluster Setup



Exchange Server 2007 SP1 Setup

Exchange Maintenance Mode
 Server Role Selection
 Readiness Checks
 Progress
 Completion

Server Role Selection
Select the Exchange server roles you want to install on this computer:

- Mailbox Role
- Client Access Role
- Hub Transport Role
- Unified Messaging Server Role
- Edge Transport Server Role
- Active Clustered Mailbox Role**
- Passive Clustered Mailbox Role
- Management Tools**

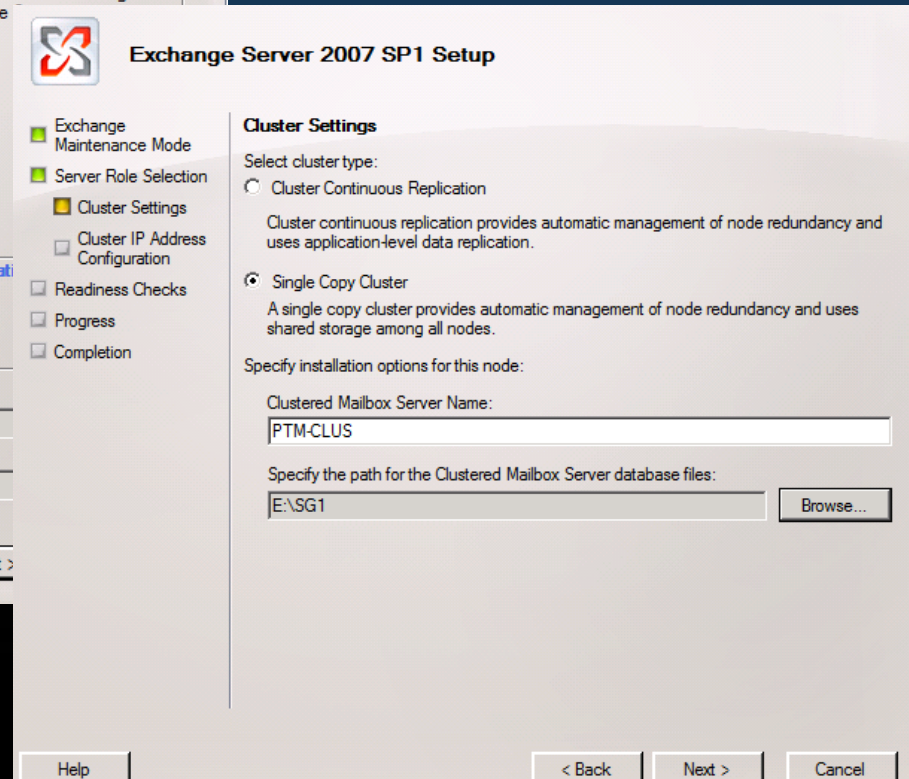
Description
The Exchange Management Tools provides the management tools needed to configure and manage Exchange

Disk Space Allocation
Disk space required:
Disk space available:

Specify the path for the Exchange Server installation files:
D:\

Specify the path for the Exchange Server installation:
C:\Program Files\Microsoft\Exchange Server

Help < Back Next >



Exchange Server 2007 SP1 Setup

Exchange Maintenance Mode
 Server Role Selection
 Cluster Settings
 Cluster IP Address Configuration
 Readiness Checks
 Progress
 Completion

Cluster Settings
Select cluster type:

- Cluster Continuous Replication
Cluster continuous replication provides automatic management of node redundancy and uses application-level data replication.
- Single Copy Cluster**
A single copy cluster provides automatic management of node redundancy and uses shared storage among all nodes.

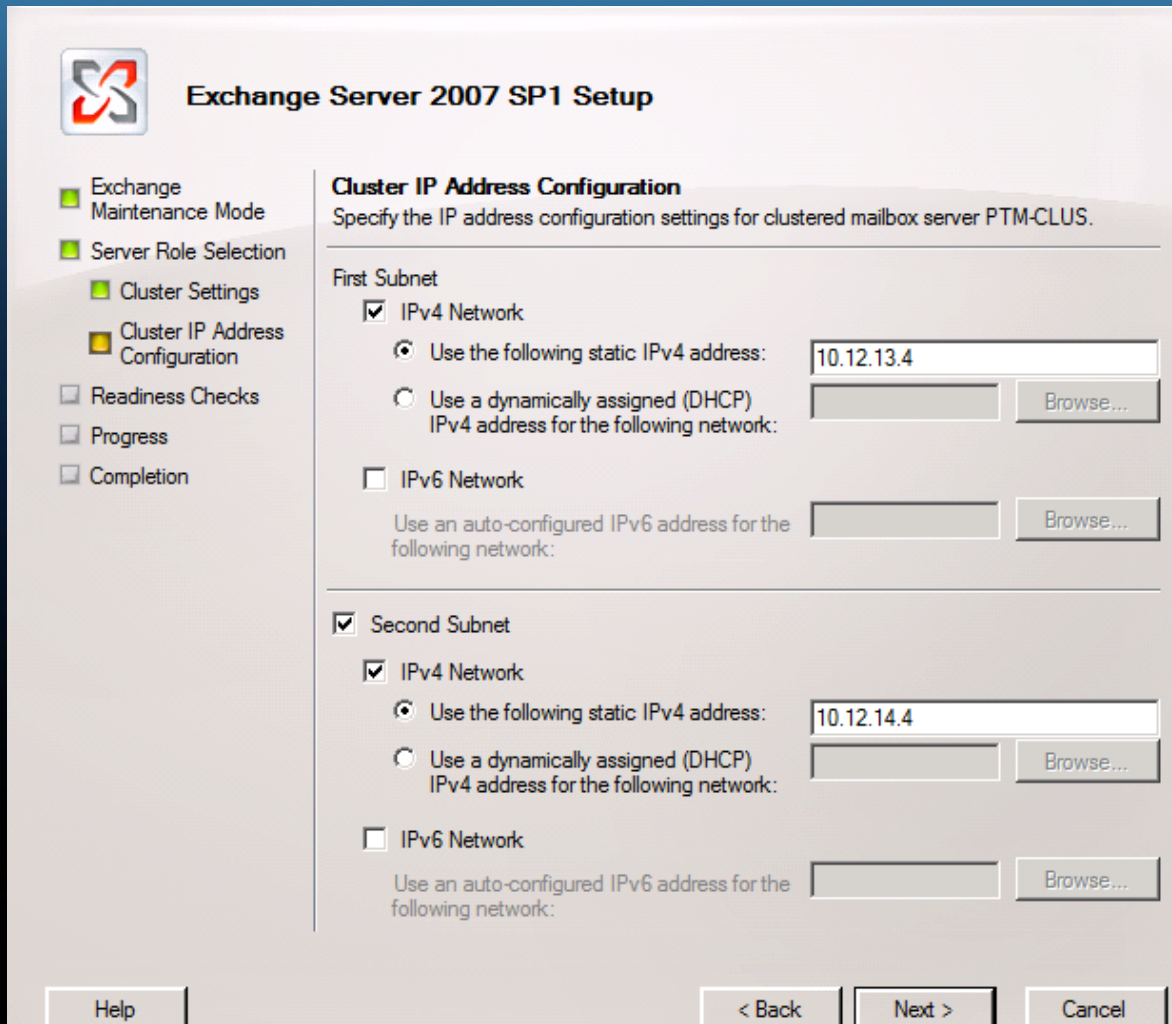
Specify installation options for this node:

Clustered Mailbox Server Name:
PTM-CLUS

Specify the path for the Clustered Mailbox Server database files:
E:\SG1

Help < Back Next > Cancel

Multiple Cluster Subnetze



Exchange Server 2007 SP1 Setup

Exchange Maintenance Mode
Server Role Selection
Cluster Settings
Cluster IP Address Configuration
Readiness Checks
Progress
Completion

Cluster IP Address Configuration
Specify the IP address configuration settings for clustered mailbox server PTM-CLUS.

First Subnet

IPv4 Network

Use the following static IPv4 address: 10.12.13.4

Use a dynamically assigned (DHCP) IPv4 address for the following network: [] Browse...

IPv6 Network

Use an auto-configured IPv6 address for the following network: [] Browse...

Second Subnet

IPv4 Network

Use the following static IPv4 address: 10.12.14.4

Use a dynamically assigned (DHCP) IPv4 address for the following network: [] Browse...

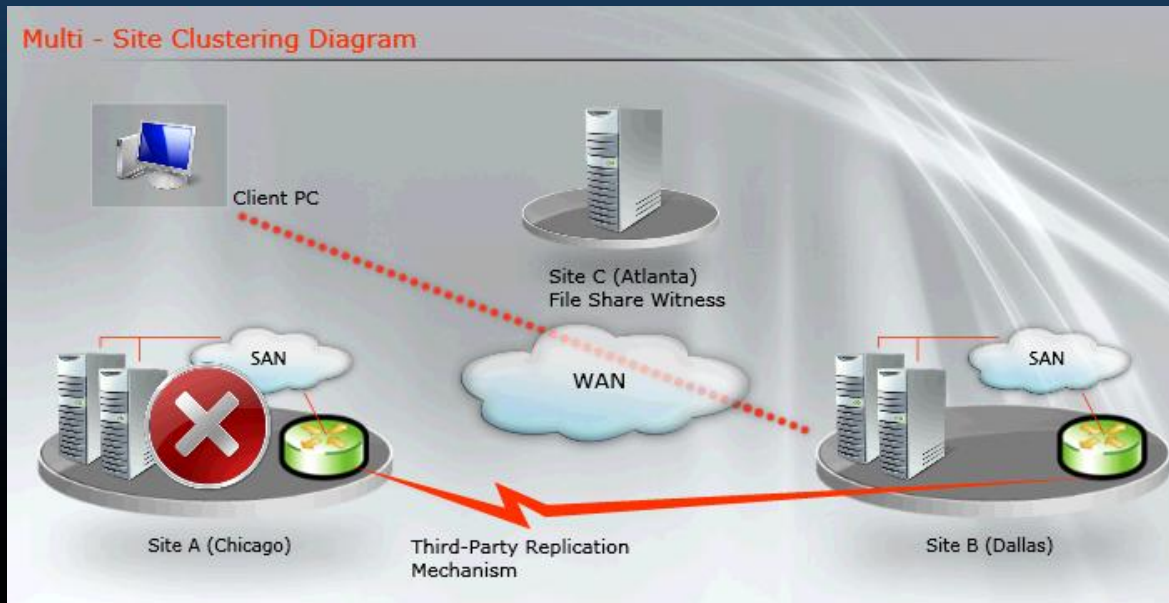
IPv6 Network

Use an auto-configured IPv6 address for the following network: [] Browse...

Help < Back Next > Cancel

Multisite Clustering

- Multisite Clustering



Quelle: <http://www.microsoft.com/exchange>

Multisite Clustering

| Quorum Mode | Choose when: |
|-------------------------------------|---|
| Node and Disk Majority | <ul style="list-style-type: none">• Directed by vendor only |
| No Majority: Disk Only | <ul style="list-style-type: none">• Directed by vendor only |
| Node Majority | <ul style="list-style-type: none">• Limited to two sites |
| Node and File Share Majority | <ul style="list-style-type: none">• Three sites are available |

Quelle: <http://www.microsoft.com>

Cluster Monitoring

- Tools for Monitoring Failover Clusters
- Using Event Viewer to Monitor Failover Clusters
- Viewing Events for the Entire Cluster
- Using Event Tracing
- Using Tracerpt.exe to View the Event Trace Log
- Using Cluster.exe to Export the Cluster Log
- Using the Reliability and Performance Monitor Snap-in

Cluster.exe

```
Administrator: Command Prompt
<format> =
  BINARY !DWORD !STRING !EXPANDSTRING !MULTISTRING !SECURITY !ULARGE !LARGE !LONG

CLUSTER NODE /?
CLUSTER NODE /HELP

C:\Users\administrator.DOMAIN>cluster node w2k8-clu1 /pause

Pausing node 'w2k8-clu1' ...

Node           Node ID Status
-----
w2k8-clu1      1 Paused

C:\Users\administrator.DOMAIN>
```

```
Administrator: Command Prompt

C:\Users\administrator.DOMAIN>cluster /quorum

Node           Node ID Status
-----
w2k8-clu1      1 Up

C:\Users\administrator.DOMAIN>

C:\Users\administrator.DOMAIN>cluster /quorum

Witness Resource Name Path                                     Type
-----
Quorum                Q:\Cluster\                                     Majority

C:\Users\administrator.DOMAIN>
```

Tracerpt

```
Administrator: Command Prompt
C:\>cd Windows
C:\Windows>cd System32
C:\Windows\System32>cd winevt
C:\Windows\System32\winevt>cd Logs
C:\Windows\System32\winevt\Logs>tracerpt ClusterLog.etl.001 -o -report

Input
-----
File(s):
  ClusterLog.etl.001
100.00%

Output
-----
DumpFile:          dumpfile.xml
Report:            workload.xml

The command completed successfully.
C:\Windows\System32\winevt\Logs>
```

Report Statistics

Computer Information

| | |
|------------------|----------|
| Computer: | Client |
| Windows Build: | 6001 |
| Processors: | 1 |
| Processor Speed: | 2527 MHz |
| Platform: | 64 Bit |

Collection Information

| | |
|--------------------|---------------------------------|
| Start Time: | Mittwoch, 13. Mai 2009 07:27:54 |
| End Time: | Mittwoch, 13. Mai 2009 21:50:44 |
| Duration: | 51769 Seconds |
| Buffers: | 107 |
| Processed Events: | 3935 |
| Lost Events: | 0 |
| Use Timing Window: | No |

Files

| | |
|----------------|--|
| File: | C:\Windows\System32\winevt\Logs\ClusterLog.etl.001 |
| Logger Name: | FailoverClustering |
| Start Time: | Mittwoch, 13. Mai 2009 07:27:54 |
| End Time: | Mittwoch, 13. Mai 2009 21:50:44 |
| File Duration: | 51769 Seconds |

Processed Events Top: 3 of 15

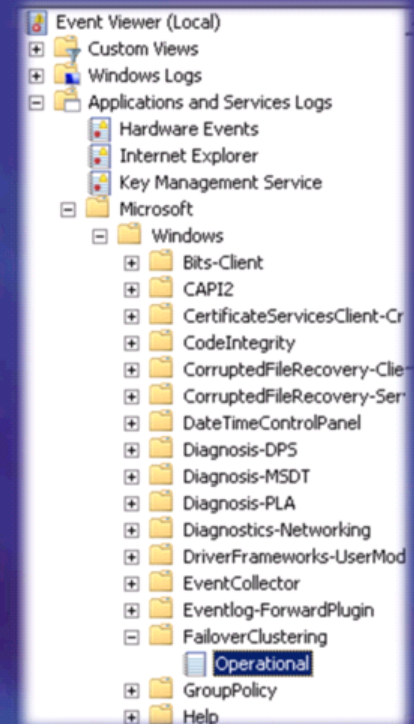
| Event | Opcode | Task | Payload Guid | Payload ID | Version | Count |
|--------------------------------------|---------|------|--|------------|---------|-------|
| Microsoft-Windows-FailoverClustering | Default | 0 | {baf908ea-3421-4ca9-9b84-6689b8c6f85f} | 2049 | 0 | 3371 |
| Microsoft-Windows-FailoverClustering | Default | 0 | {baf908ea-3421-4ca9-9b84-6689b8c6f85f} | 2051 | 0 | 166 |
| Microsoft-Windows-FailoverClustering | Default | 0 | {baf908ea-3421-4ca9-9b84-6689b8c6f85f} | 2050 | 0 | 162 |
| | | | | | | 3935 |

-O
-OF XML, CSV,

Cluster Logging

- Where to find Cluster events in Event Viewer

| Cluster Events | | |
|----------------|----------------|---------------------|
| Level | System Channel | Operational Channel |
| Critical | ✓ | |
| Error | ✓ | |
| Warning | ✓ | |
| Informational | | ✓ |



- Operational channel found under:
 - Applications and Services Logs \ Microsoft \ Windows \ FailoverClustering

Protokollierung

- Setup Logs
- Message Tracking (alle HTS - GetMessageTrackingLogE2EwithTime.ps1)
- Connectivity Logging
- Test Connectivity (www.testexchangeconnectivity.com)
- SMTP Send und Receive Logging
- Logging Level Application Log
- Routing Table Logs
- Certificate Logs
- IMAP4 / POP3 Logs
- Pipeline Tracing

Protokollierung

EXCHANGE SERVER 2007 LOGS

Exchange Server 2007 logs provide detailed information for troubleshooting & operations

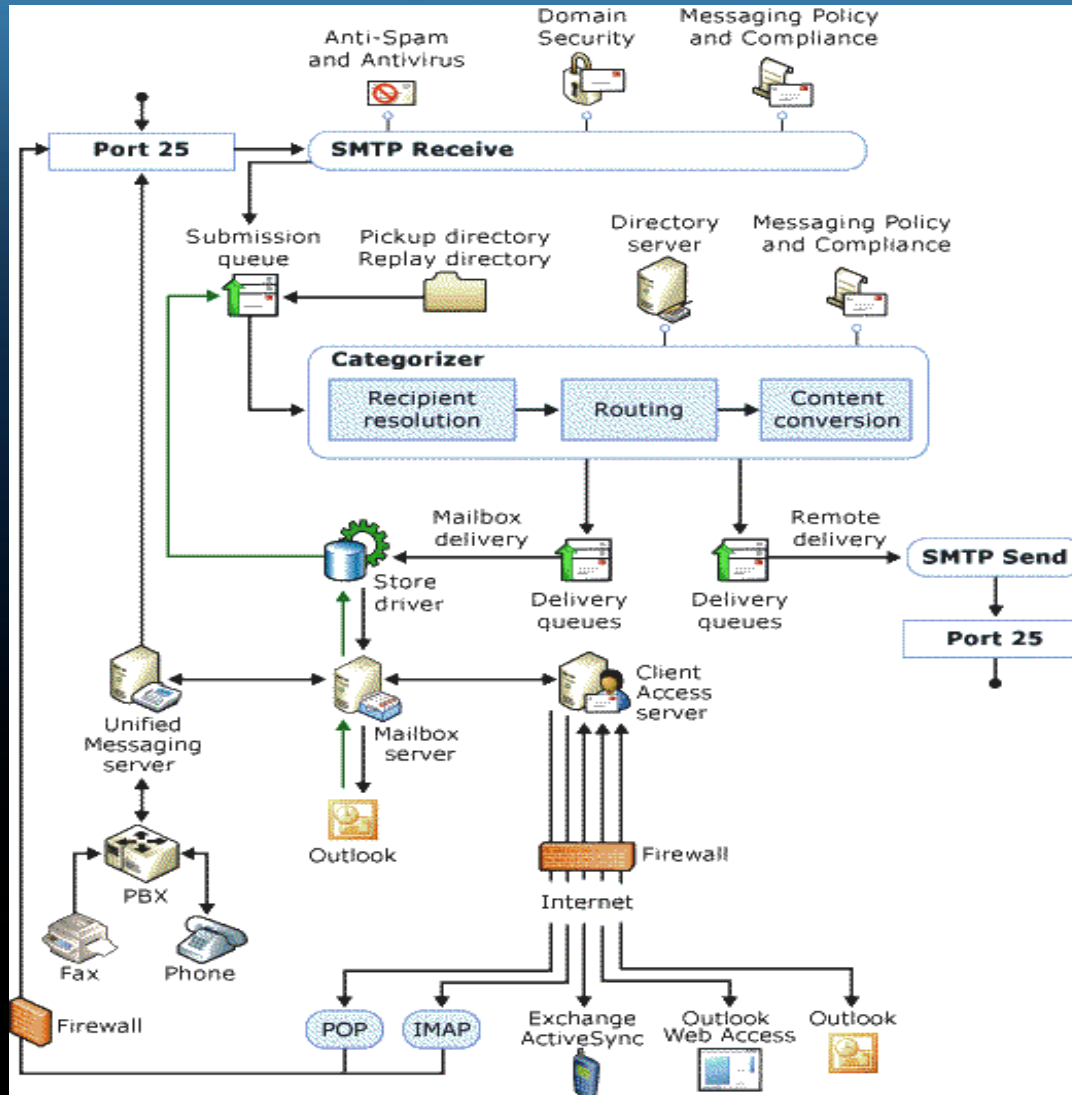
| LOG | ENABLED | DEFAULT LOCATION |
|------------------------|---------|---|
| SETUP | ✓ | <systemdrive>\ExchangeSetupLogs |
| TRANSACTION | ✓ | Exchange Server\Mailbox\First Storage Group |
| MESSAGE TRACKING | ✓ | Exchange Server\TransportRoles\Logs\MessageTracking |
| SMTP (PROTOCOL) | ✗ | Exchange Server\TransportRoles\Logs\ProtocolLog |
| AGENT | ✓ | Exchange Server\TransportRoles\Logs\AgentLog |
| CONNECTIVITY | ✗ | Exchange Server\TransportRoles\Logs\Connectivity |
| ROUTING TABLE | ✓ | Exchange Server\TransportRoles\Logs\Routing |
| MRM | ✗ | Exchange Server\Logging\Managed Folder Assistant |
| IIS* | ✓ | <systemroot>\System32\LogFiles\W3Svc1 |
| POP3 & IMAP4 | ✗ | Exchange Server\Client Access\PopImap |
| CERTIFICATE | ✗ | N.A. (Configurable) |
| CLUSTER* | ✓ | <systemroot>\Cluster |
| PIPELINE TRACING | ✗ | Exchange Server\TransportRoles\Logs\PipelineTracing |
| APPLICATION EVENT LOG* | ✓ | N.A. |

**Log maintained by Windows OS, Exchange components may log information to these logs*

Queues in Exchange

- **Submissions:** Used by the categorizer to gather all messages that have to be resolved, routed, and processed by Transport agents.
- **Poison Message:** The poison message queue is a special queue that is used to isolate messages that are detected to be potentially harmful to the Exchange 2007 system after a server failure.
- **Remote Delivery:** Remote delivery queues hold messages that are being delivered to a remote server by using SMTP.
- **Mailbox Delivery:** The mailbox delivery queues hold messages that are being delivered to a mailbox server by using encrypted Exchange RPC.
- **Unreachable Destination:** Each transport server can have only one Unreachable queue. The Unreachable queue contains messages that cannot be routed to their destinations

Mail Delivery



NLB in Windows Server 2008

- Next Generation TCP/IP
- IPv6 und IPv4 Support
- Multiple IP Address Support (Each node in an NLB cluster can now have multiple dedicated IP addresses)
- Microsoft ISA Server Integration (multiple IP Addresses per NLB, IPv6 Datenpakete werden ignoriert)

Exchange Server 2010 Ueberblick

Exchange 2010

The cornerstone of Microsoft's unified communications solution delivers the widest range of deployment options, the richest user experience, and unprecedented information protection and control capabilities.

Exchange...Online

All the messaging functionality you need, hosted elsewhere. Your workload should feel lighter already.

Voice Mail

Users get a single inbox for voice mail and e-mail. You manage both from a single platform.

Archiving and Retention

Take control of the information flowing into and around your network.

Neuerungen in Exchange Server 2010

- Hosted Service mit Exchange Online
- Keine Speichergruppen mehr
- DAG (Database Availability Group) = neue Clusterfunktionen (CCR, SCR, SCC gone)
- MAPI Mailflow durch CAS Server
- „Shadow Redundancy“ fuer HTS
- Moderated Transport
- Edge Server Erweiterungen (Antivirus, AD-DS, inc. Edge Subscription Updates)
- Max. 100 DB pro Server

Neuerungen in Exchange Server 2010

- Journaling Changes (Transport Journaling)
- Log Shipping per custom TCP Port (kein SMB)
- Rollenbaisertes Zugriffsmodell
- OWA Erweiterungen (Support fuer „Safari“ und FF)
- Erweiterter Mobile Client Support
- Free+Busy zwischen Exchange Orgs
- AD-RMS Integration
- Uvm.

Fragen?

A large, stylized question mark graphic composed of three overlapping, semi-transparent blue shapes. The word 'Fragen?' is written in a bold, orange, sans-serif font, with the question mark character overlapping the first question mark of the graphic.

Das Ende

Vielen Dank fuer Ihre Aufmerksamkeit

