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White Paper

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# An overview of Database availability group (DAG) in Exchange 2010

Bineesh Babukuttan

## Abstract

Database availability group (DAG) is the most significant feature that has been made available in Exchange 2010 which addresses many of the limitations of the high availability features that were available with previous versions of Exchange. This document provides an overview of DAG.



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# 1 What is Database availability Group In Exchange 2010?

Exchange 2007 used LCR, SCC, CCR and SCR for high availability and site resilience of the mailbox databases. In LCR, the database is replicated to another disk on the same server. If any hardware failure occurs, the mailboxes will not be available, as the replica of the mail databases are stored in the same hardware but different drives. SCC is a clustered mailbox server configuration in which the mail databases are stored in shared drives. Since SCC uses shared drives to store the mailbox database; the failure of the server will ensure that mailboxes are available as the other node of the cluster is still available. If any failure of the shared drive occurs, the mailbox availability will be affected.CCR is a clustered mailbox configuration which allows for hardware as well as storage redundancy. The limitation of CCR is that the cluster can contain only two members, one active and one passive node. Exchange 2007 SP1 introduced a new feature called SCR by which the databases from the primary site can be replicated to disaster recovery sites and achieve site resilience.

Database availability group (DAG) is the most significant feature that has made available in Exchange 2010 which addresses many of the limitations of the high availability features that were available with previous versions of Exchange. The CCR which is used for onsite replication and SCR used for offsite replication has been combined together to form DGA in Exchange 2010. All the high availability features which were available in the earlier versions has been replaced by DAG .Microsoft defines DAG as a group of up to 16 Mailbox servers that host a set of databases and provide automatic database-level recovery from failures that affect individual databases. Any server in this group can host mailbox databases from any other servers which are in the same database availability group. This ensures the availability of the mailbox database in case of hardware failure of a server or a storage failure.

Below is a pictorial representation of DAG

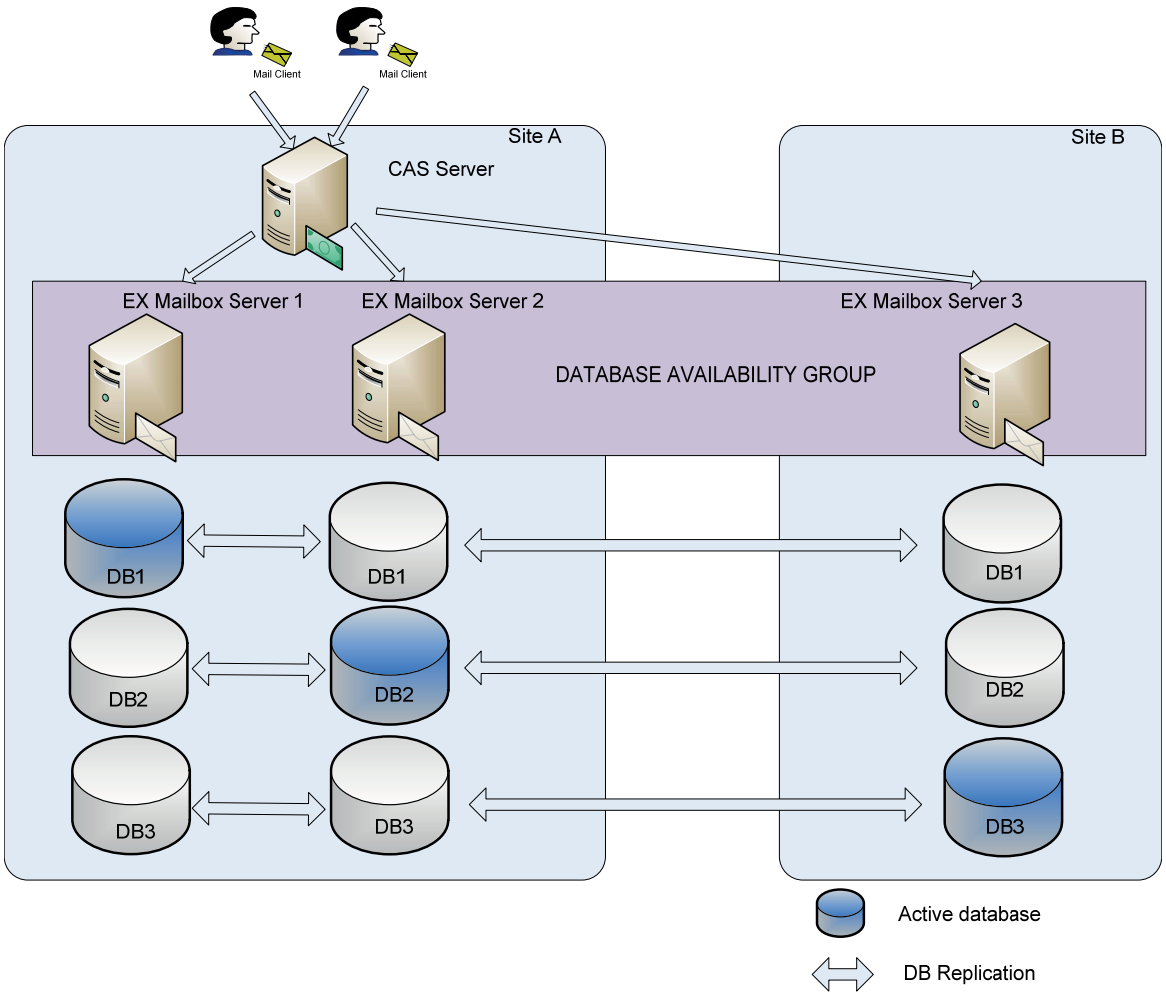


*Figure 1 - Pictorial Representation of DAG*

## 2 Creating DAG

A database availability group can be created by using either exchange 2010 management console or by using command let and the mailbox servers can be added to the group. The active database are replicated to the other servers who are members of DAG. Network compression and encryption are enabled for log file copying as well as seeding the database to other servers in DAG. Creating a separate network for the database replication and log file shipping is advised as this can utilize considerable network bandwidth even with the compression enabled and can lead to the clogging of the network.

When a DAG is created, a DAG object is created in Active directory and an IP address is assigned to it. As the server is added to the DAG, the server's name is added to the DAG object in Active directory.

## 3 High Availability and Site Resilience with DAG

Unlike Exchange 2007, where windows failover clustering has to be created for setting up CCRs or SCCs, the failover cluster is created when the first server is added to DAG.DAG uses subset of windows failover cluster namely cluster heartbeat ,cluster network and cluster database. The fail over between the members servers of DAG is managed by a process called "Active manager" which runs on every member server in DAG.

The servers from different subnets can also be added to the DAG .This enables the servers from datacenters of different sites being members of the DAG. The site resilience which was achieved by using SCRs in Exchange 2007 Sp1 can easily be accomplished by using this feature.

The public folder databases cannot use the DAG.

## 4 Client connections

All MAPI clients connecting to Exchange 2010 mailbox server connects through the CAS Server. A new service called Exchange RPC service in CAS servers handles all MAPI connections .The Client Access role determines which server currently hosts the active copy of a mailbox by reference to the DAG information, which is held in Active Directory, and redirect clients when a database has been switched.

## 5 Key changes in Exchange 2010

To realize the architectural need of DAG in Exchange 2010, the mailbox databases have been associated to the organizational level from the server level. Also, the storage groups have been removed and database names have to be unique across the organization. The failover occurs at the database level and not the server level as previous version .This helps in reducing the failover time considerably. Unlike Exchange 2007 clusters, multiple roles can be installed on the servers who are member of DAG.

## 6 Acronyms Used in the document

LCC – Local continuous replication

CCR – Cluster continuous replication

SCC – Single copy cluster

DAG – Database availability group

AD – Active directory

## 7 About the Author

Bineesh Babukuttan is an Associate Consultant with Infosys .He has over seven years of IT industry experience with expertise in area of design, implementation and support of messaging and collaboration systems, migrations of messaging systems, desktop deployment solutions and enterprise mobility solutions.

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For more information, contact askus@infosys.com

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