

SQLintersection

Using Service Broker, Encryption, and
Replication with Availability Groups

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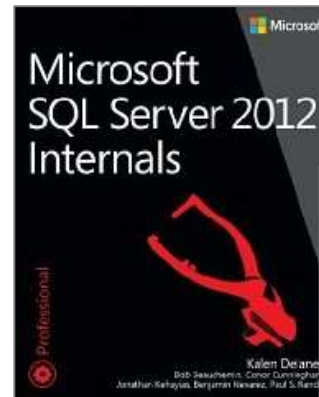


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Reminder: Intersect with Speakers and Attendees

- **Tweet tips and tricks that you learn and follow tweets posted by your peers!**
 - Follow: #SQLIntersection and/or #DEVIntersection
- **Join us – Wednesday Evening – for SQLafterDark**
 - Doors open at **7:00 pm**
 - Trivia game starts at **7:30 pm**
 - Winning team receives something fun!*
 - Raffle at the end of the night
 - Lots of great items to win including a seat in a SQLskills Immersion Event!*
 - The first round of drinks is sponsored by SentryOne and SQLskills



Overview

- **Service Broker Routing**
- **Replication on Availability Groups**
- **Encryption with Availability Groups**
- **Transparent Data Encryption**

Service Broker Routing

- **Availability Group must have a Listener configured**
- **Each replica server requires a Service Broker endpoint**
 - LISTENER_IP must be set to ALL
 - Same TCP/IP Port must be used on all servers
- **Grant CONNECT on the endpoints on each replica**
- **Create route using Listener Name or IP Address and TCP Port in msdb on each replica server**

Replication on Availability Groups

- **Does not support Peer-to-Peer Replication publishers or the distribution database**
- **Distribution database cannot be added to an Availability Group**
 - Plan for HA/DR requirements for the distribution database separately
- **Kerberos authentication is required for Windows authentication of replication agents running on servers other than the distributor**
 - Set SPN for AG Listener in Active Directory (<https://msdn.microsoft.com/en-us/library/hh213417.aspx>)

Configuring Publication with AG's

- **Configure distribution on remote distributor**
 - Add all AG replicas as publishers to distributor
- **Configure publisher on original primary replica**
- **Configure remote distribution on all possible publishers**
- **Configure replica hosts as replication publishers**
 - Add linked server to the distribution database server
- **Redirect publication to AG Listener name with `sys.sp_redirect_publisher` in the distribution database**
- **Validate configuration in the distribution database using `sys.sp_validate_replica_hosts_as_publishers`**

Replicated Database Consistency with AG's

- The log reader will not process log records that have not been hardened at all availability group secondary replicas by default to ensure that on failover, all rows replicated to a subscriber also are present at the new primary.
- Trace flag 1448 - enable the log reader to move forward when asynchronous replicas have not acknowledged receipt of log record

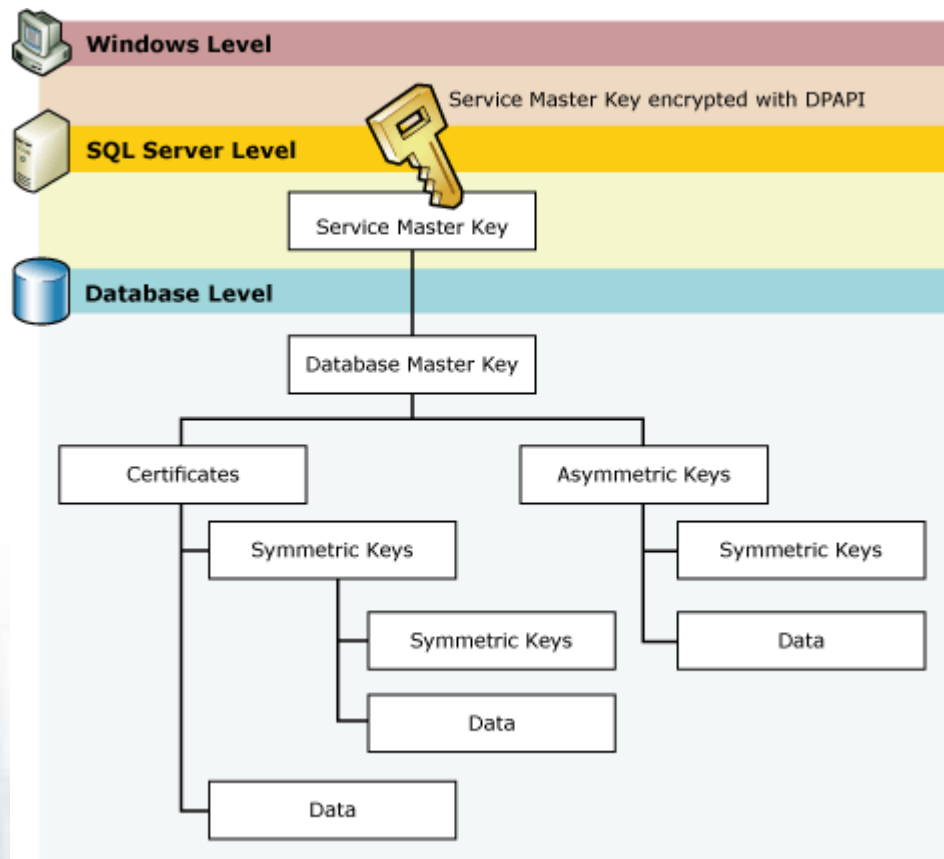
Replicated Database Consistency with AG's

- **When the publisher is configured with two replicas (one primary and one secondary) and a failure happens, if the original primary replica remains down, the logreader does not move forward until all secondary databases are brought back online or until the failed replica is removed from the availability group.**
 - To allow the logreader to proceed, remove the original primary replica using `ALTER AVAILABILITY GROUP <group_name> REMOVE REPLICA`, then add a new secondary replica to return high availability or disaster recovery

Configuring Subscriptions with AGs

- **Add the subscriber AG Listener as a linked server on all replicas**
 - Ensures that all of the failover partners can connect to the listener
- **Script the transactional replication push subscription and manually change @subscriber to use the AG listener name for the subscription**
 - Subscriptions must be created by script and not directly through the UI in SSMS
- **Pull subscriptions must set –Subscriber parameter of the Run Agent job step to the AG listener name**

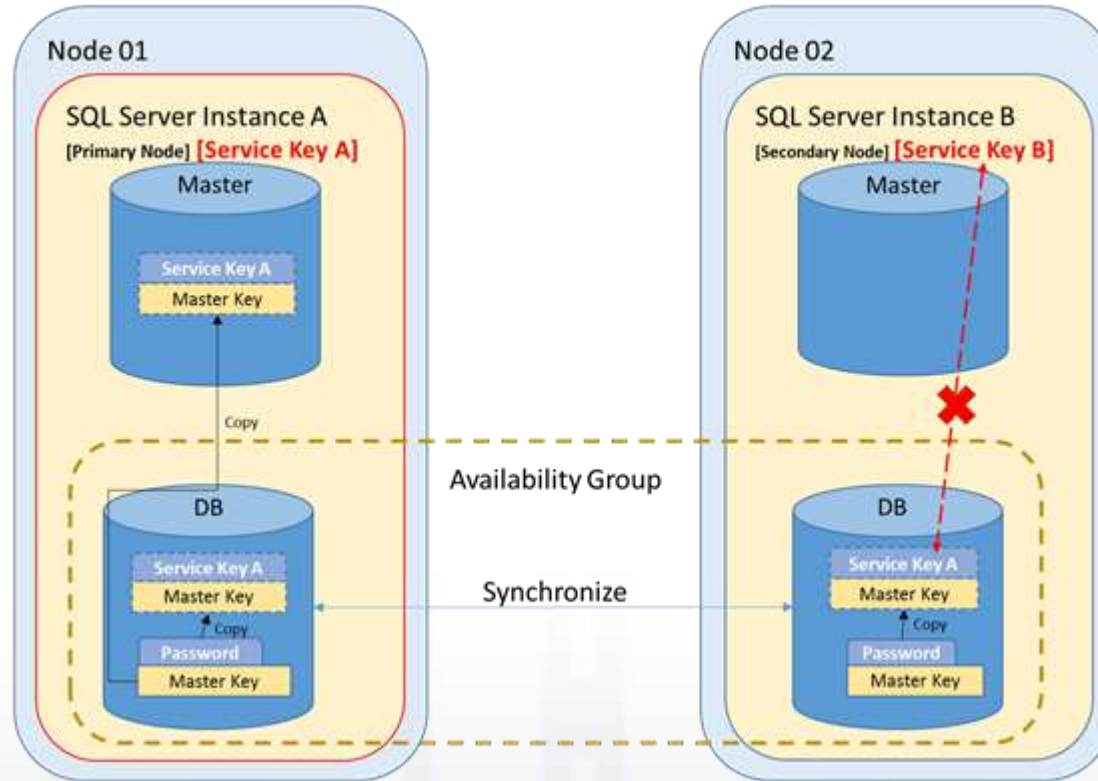
SQL Server Encryption Hierarchy



Encryption with AGs

- By default each replica server has a different Service Master Key protected by the Windows DPAPI through the service account
- Failing over to a different replica breaks the encryption hierarchy unless credentials for the Database Master Key are created with `sp_control_dbmasterkey_password`
- AG Wizard in Management Studio 2016 now supports encrypted databases
 - Does not support TDE or databases with a DEK created in them
- **Alternative is to restore Service Master Key across all AG replicas from the primary replica**

Windows Server Failover Clustering (WSFC) Cluster



Transparent Data Encryption with AGs

- Verify each secondary replica instance has a Database Master Key (DMK) in the master DB (create a new one if missing)
- On the primary replica instance, create a backup of the certificate used to TDE encrypt the database
- On each secondary replica instance, create the TDE Certificate from the certificate backed up on the primary
- On the primary replica instance, create a full database backup of the TDE encrypted database
- On the primary replica instance, create a transaction log backup of the TDE encrypted database

Transparent Data Encryption with AGs (2)

- On the primary replica instance, add the TDE encrypted database to the Availability Group
- On each secondary replica instance, restore the full backup (with no recovery)
- On each secondary replica instance, restore the transaction log backup (with no recovery)
- On each secondary replica instance, join the database to the availability group

Review

- **Service Broker Routing**
- **Replication on Availability Groups**
- **Encryption with Availability Groups**
- **Transparent Data Encryption**

Questions?

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Don't forget to complete an online evaluation!

**Using Service Broker, Encryption, and
Replication with Availability Groups**

Your evaluation helps organizers build better conferences
and helps speakers improve their sessions.

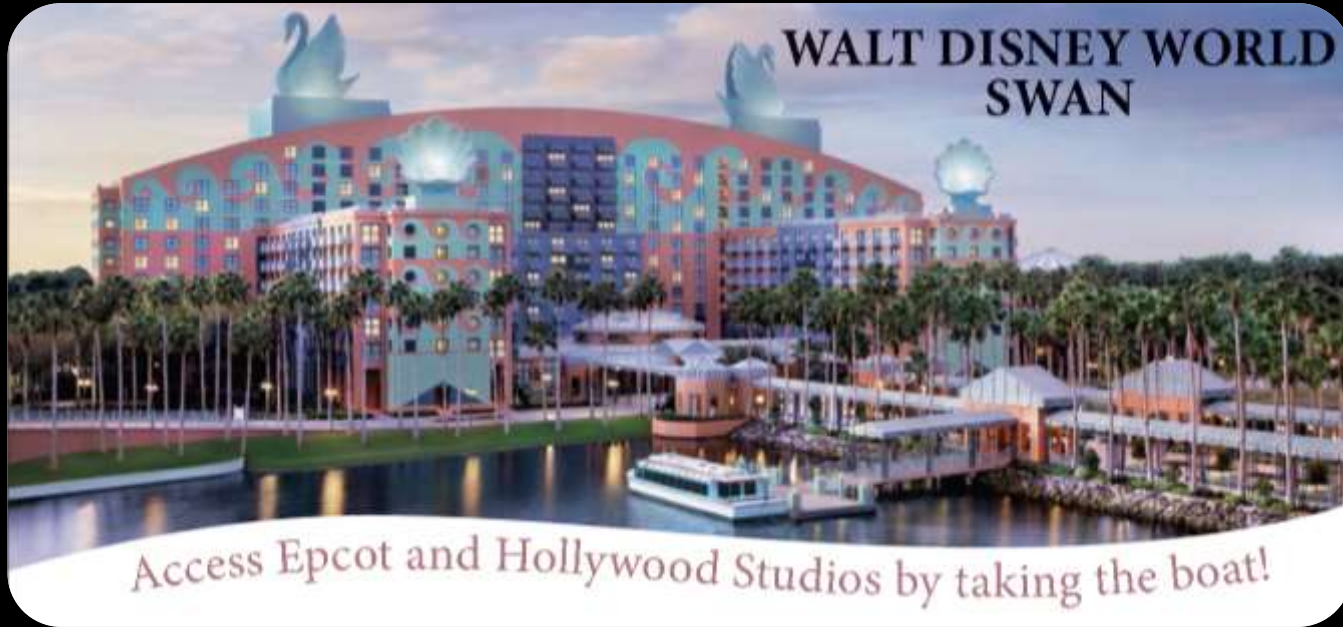


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Thank you!

Save the Date!

www.SQLintersection.com



2018

Mar 25-28

We're back in Orlando!



Leave the every day behind and enter a world of wonder and enchantment at the Walt Disney World® Resort. Located in the heart of the most magical place on earth, the Walt Disney World Swan and Dolphin Resort provides a truly extraordinary backdrop for our event! Beautiful tropical landscaping, tranquil waterways, and classic art and architecture work together to create a stunning landmark!