

# Managing SQL Server Availability Groups

What happens AFTER the build!





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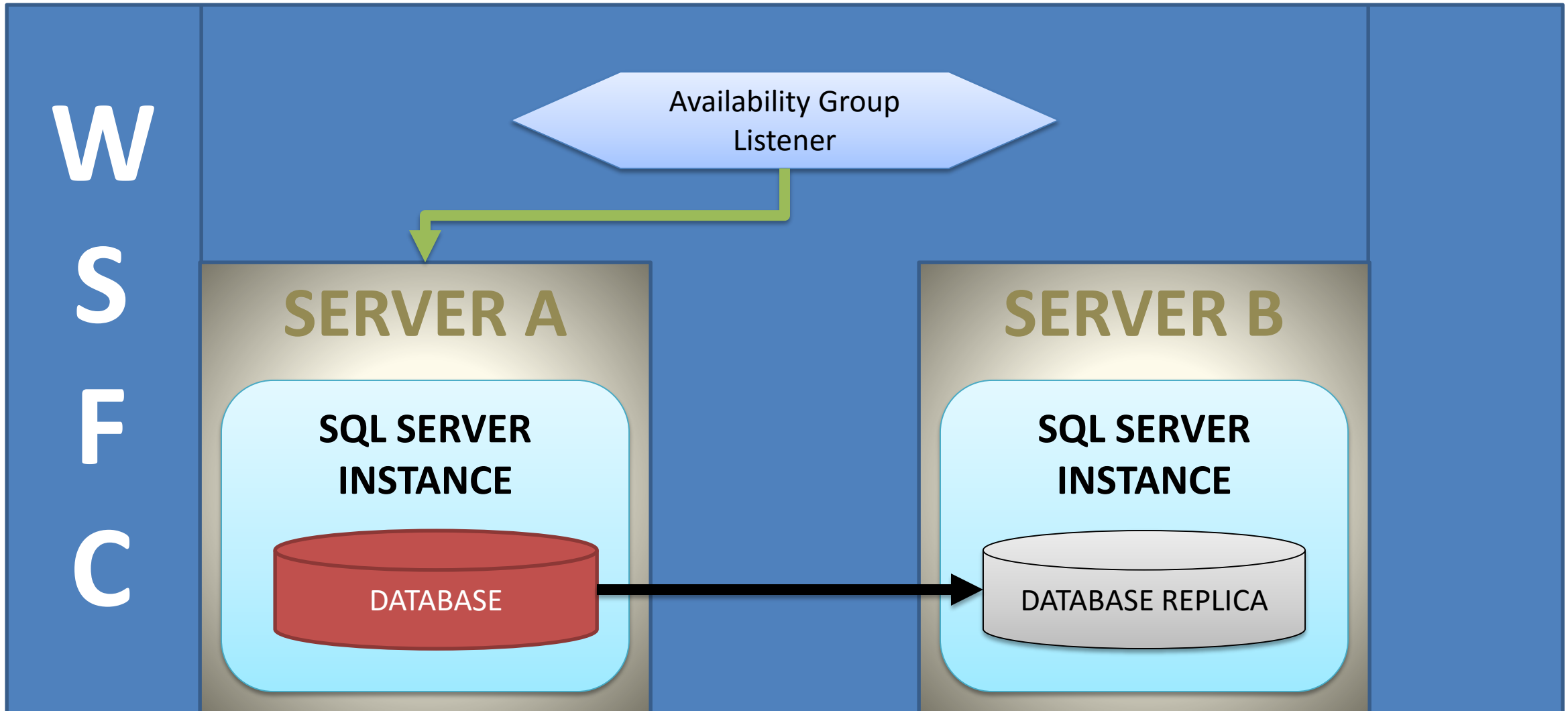
Data Platform







- Availability Group Architecture
- What doesn't get replicated
- Patching
- What to watch for








- High Availability/Disaster Recovery Solution (HADR)  
“Share Nothing”
- Read/Write – one node, others can be read replicas
- Synchronous and Asynchronous replication
- Enterprise only

SQL 2012	1 primary, 4 replicas, 2 synchronous
SQL 2014	1 primary, 8 replicas, 2 synchronous
SQL 2016	1 primary, 8 replicas, 3 synchronous

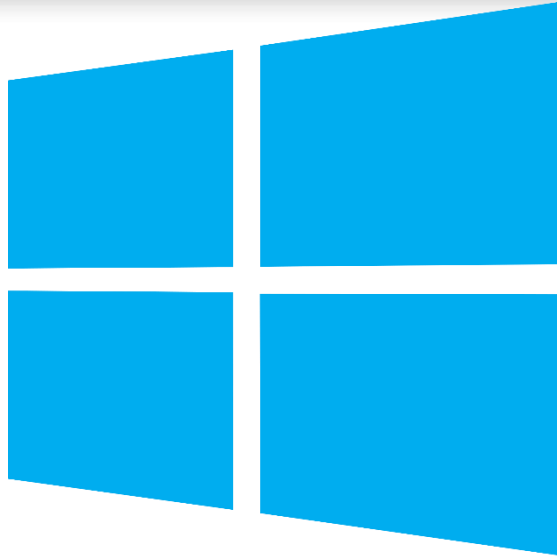


Component	Shared
Database	
Tables	
Indexes	
Users	
Stored Procedures	
Data	

Component	Shared
Server	
Logins	
SQL Agent Jobs	
Linked Servers	
Configurations	











- Hotfixes
- Security Updates

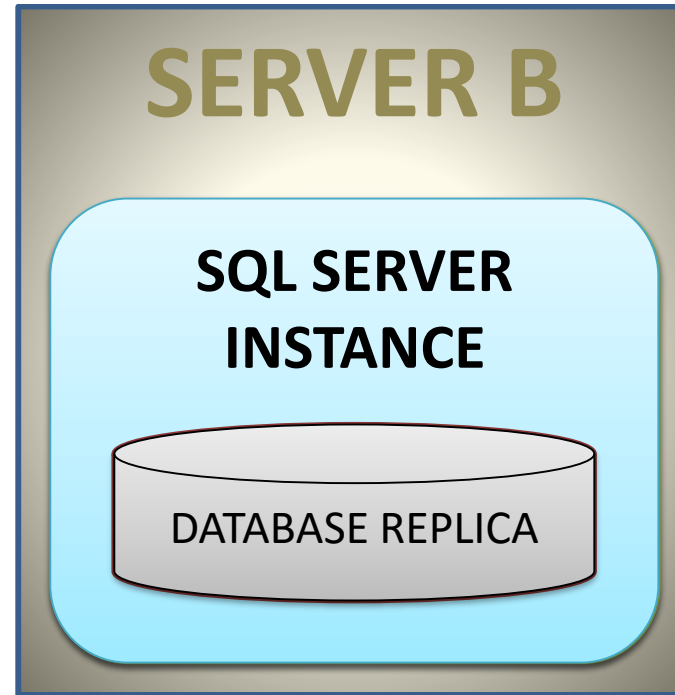
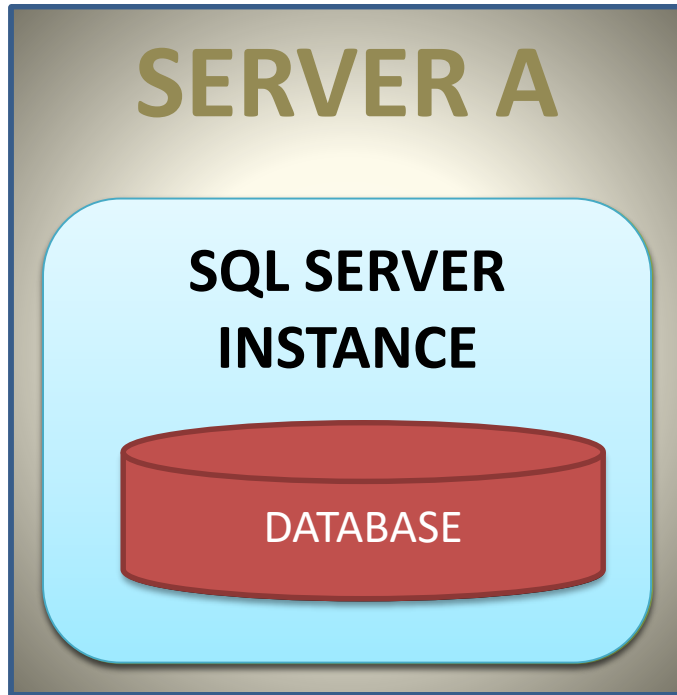


- Service Packs
- Cumulative Updates

SERVER A

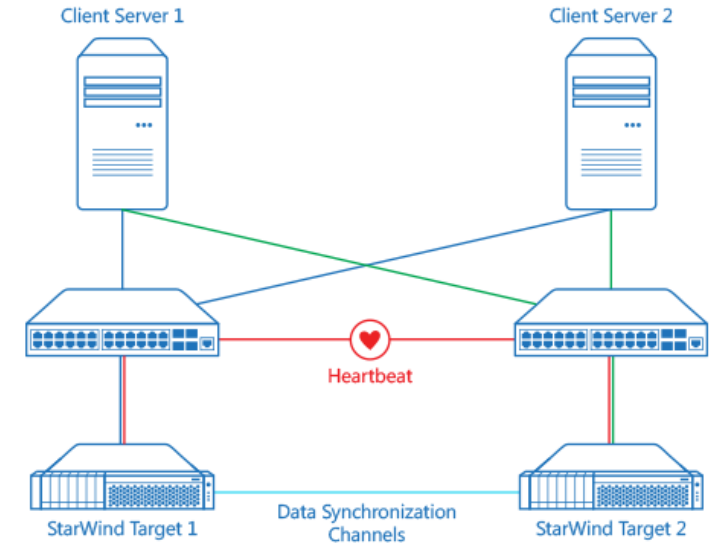
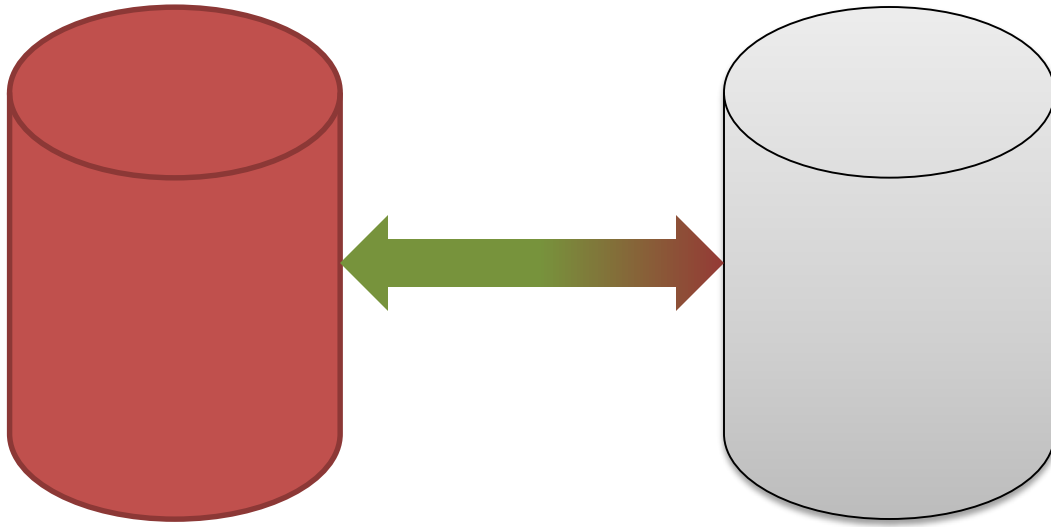
SERVER B

Component	Matching?
Windows Server Version	
Hotfixes and Security Updates	
SQL Server Version	
SQL Server Service Pack and Cumulative Update Level	



1. Patch Server B
2. Failover
3. Patch Server A





Oh, and the usual stuff...

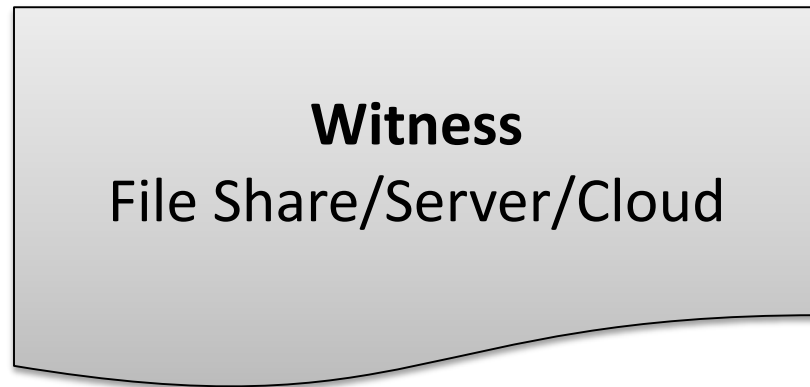
## HADR DMVs

- `sys.dm_hadr_database_replica_states`
- Run on Primary Node
- Where `is_primary_replica = 0`
- `log_send_queue_size` and `redo_send_queue_size`
- `log_send_rate` and `redo_rate`

## CAUTION: USE YOUR BRAIN

- Know your activity
- Focus on time to replicate!

```
select ar.replica_server_name
      ,db_name(database_id)
      ,log_send_queue_size
      ,log_send_rate
      ,case
        when ISNULL(log_send_rate,0)=0
          then 0 else
            log_send_queue_size/log_send_rate
        end as SecToSend
      ,redo_queue_size
      ,redo_rate
      ,case
        when ISNULL(redo_rate,0)=0
          then 0 else
            redo_queue_size/redo_rate
        end as SecToSend
from
  sys.dm_hadr_database_replica_states
rep
  join sys.availability_replicas AR
    on rep.replica_id = ar.replica_id
where is_primary_replica = 0
```



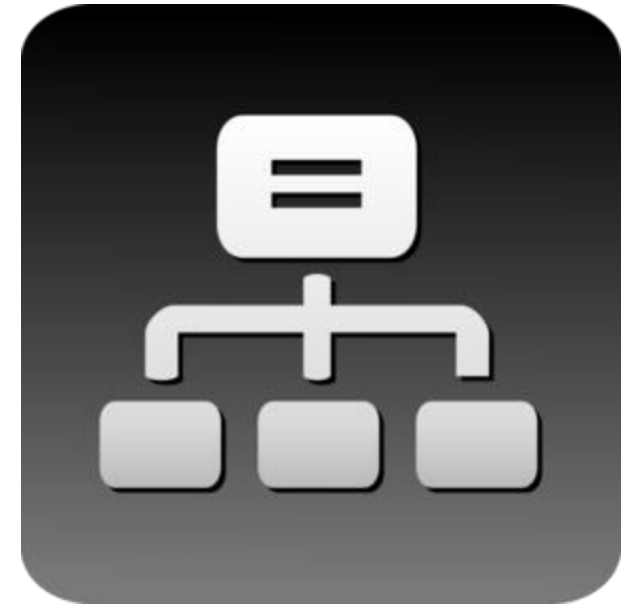
### Cluster Quorum

- Needs more than half
- What gets a vote?

### Best Practices

- Have an odd number
- Voting majority in primary location

- Understand your Resources
  - Cluster Name
  - Availability Group Listener
- Cluster Logs
  - Failover Cluster Manager





Occurs when Errors 823, 824, or 829 occur.

### Repair Process:

1. Corrupted page is accessed, error occurs. Primary broadcasts to Secondaries for a clean page.
2. Secondary with clean page completes redo on Log.
3. Secondary copies page to Primary
4. Any deferred transactions are resolved on Primary

```
msdb.dbo.suspect_pages  
sys.dm_hadr_auto_page_repair
```

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