Praveen Madupu
Mb: +91 98661 30093
Sr. Database Administrator
praveensqldba12@gmail.com

Short notes on Distributed Availability Groups in SQL Server:

What They Are

- **Distributed Availability Groups** = An **Availability Group (AG)** that spans **two separate AGs**, usually in **different clusters** or **different data centers**.
- Introduced in **SQL Server 2016** for cross-cluster HA/DR.
- Think of it as **AG-of-AGs**.

Why Use Them

- **Disaster Recovery** across geographically separate sites.
- **No shared cluster** — each AG runs its own WSFC (Windows Server Failover Cluster).
- Allows **asynchronous replication** between sites without merging clusters.
- Great for **multi-site failover** and **cloud + on-prem hybrid**.

How It Works

- **Primary AG** in Site A (cluster 1)
- **Secondary AG** in Site B (cluster 2)
- They are linked via a **distributed AG**.

Data flow:

```
Primary Replica in AG1 → Secondary Replica in AG1
                       → Forwarded to Primary Replica in AG2
```

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- No direct cluster quorum between the two sites — just uses endpoints for communication.

Key Features

- Can be **asynchronous** (DR) or **synchronous** (low latency).
- **Automatic seeding** of replicas supported.

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- Can span **different domains** (cross-domain replication).
- Doesn't require the same number of replicas in both AGs.

Limitations

- No automatic failover between the two AGs (only within each local AG).
- More complex to set up than a normal AG.
- Requires **Enterprise Edition**.
- Higher latency across WAN can affect sync performance.

Common Use Case

- **On-Premises AG** for local HA
- **Cloud AG** for DR
- Distributed AG links them → Continuous replication without merging failover clusters.