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# SQL Server Overview

Presented by “Graeme Purves”

Building Skills to Enable Success

# Attendee Information

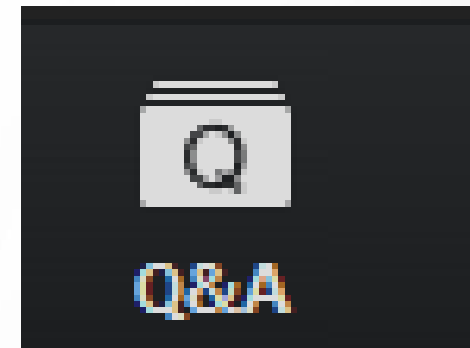
Open and hide your control panel with orange **arrow**

Join **audio**

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- Telephone and dial in using the info provided



**Note: Today's webinar is being recorded.**



# Presenter – include picture and BIO detail

Certifications	
MCSE	Windows Server NT4 – Windows Server 2016
MCT	Since 1997
MCDBA/MCSE	SQL Server 6.5 – SQL Server 2017
CNE/CNI	Netware 3.1 – Netware 6
CLE	Suse Linux Enterprise Server
Security Analyst	Linux & Windows Server Security



Graeme Purves

# Overview of Microsoft SQL Server and SQL High Availability Options



# SQL Server Versions

## SQL Server Versions

Version	Release Year	Mainstream Support End	Extended Support End
2019	2019	2025	2030
2017	2017	2022	2027
2016	2016	2021	2026
2014	2014	2019	2024
2012	2012	2017	2022
2008 R2	2010	2014	2019
2008	2008	2014	2019
2005	2005	2011	2016
2000	2000	2008	2013
7.0	1998	2005	2011
6.5	1996	2004	
6.0	1995	1999	
4.2	1992	1999	
1.0	1989		

# SQL Server Editions

## SQL Server Editions

Main Editions	Other Editions
Enterprise	Developer
Standard	Express
Business Intelligence	Compact
Azure SQL Database	

## SQL Server 2017/2019 Supported Linux Distributions

RHEL	SLES	Ubuntu Server
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Docker Container: Linux SQL images only supported

# SQL Server Components

## SQL Server Components

Database Engine

Integration Services

Master Data Services

StreamInsight

Replication

Power View

Machine Learning Services  
(R and Python)

Analysis Services

Reporting Services

Data Quality Services

Full-Text Search

PowerPivot

Polybase

# SQL Server Scalability

Instances per computer	50 instances on a stand-alone server.
Instances per Cluster	50 instances (SMB storage) 25 instances (SAN storage)
Databases per instance of SQL Server	32,767
Database size	524,272 terabytes
Maximum compute capacity used by a single instance - SQL Server Database Engine	Operating system maximum 64 sockets x Cores ? (64)
Maximum memory for buffer pool per instance of SQL Server Database Engine	Operating System Maximum 24 TB

# Client Tools

Client Tool	O/S Support
SSMS	Windows
SSDT	Windows Visual Studio
SQLCMD	Windows, Linux, macOS
PowerShell	Windows, Linux, macOS
Azure Data Studio	Windows, Linux, macOS
Visual Studio Code	Windows, Linux, macOS
Azure Data Factory (ADF)	Cloud
SQL Server Migration Assistant(s)	Windows

# New Features

Version	Feature
SQL Server 2014	In-Memory OLTP Buffer Pool Extension
SQL Server 2016	Temporal tables Always Encrypted Dynamic Data Masking Row Level Security Stretch Database
SQL Server 2017	Automatic database tuning Linux Support SQL Server Machine Learning Services, support for Python and R language
SQL Server 2019	Always Encrypted with secure enclaves Data Discovery & Classification labeling & protecting the sensitive data

# High Availability

Availability Option	Supported Editions
Always On Availability Groups	Enterprise (Standard Basic)
Always On Failover Cluster Instances	Enterprise, Standard
Database Replication	All (*)
Database Mirroring	Enterprise, Standard
Scale Out Server Federation	Enterprise, Standard
Scale out databases with Shard Map Manager	Azure
Log Shipping	Enterprise, Standard, Web
Host Clustering	All

# Always On Availability Groups

## Replicas

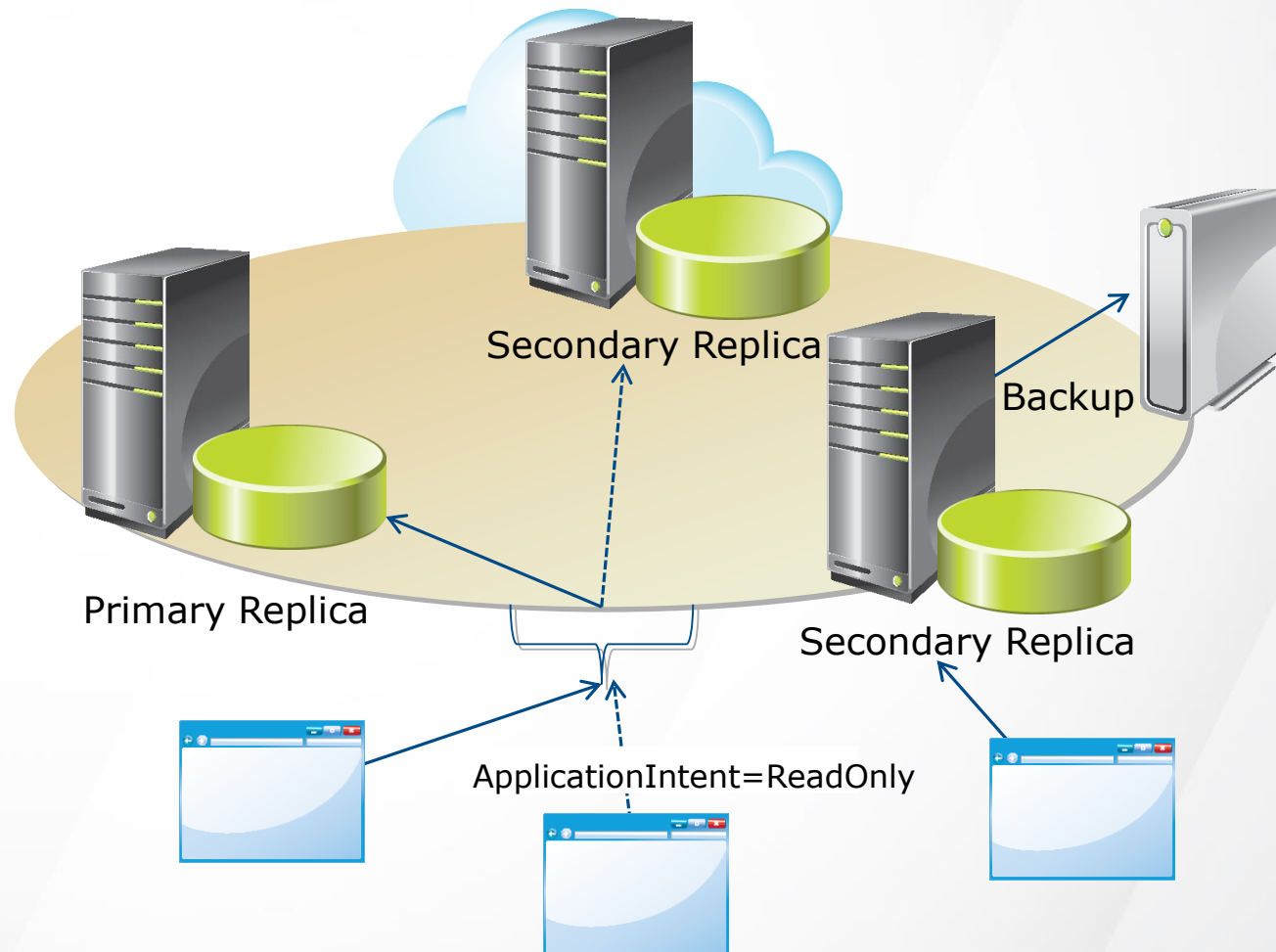
Primary Replica (read-write)  
1 Per Cluster

Secondary Replicas (read-only)  
8 Secondaries  
4 Synchronous (2019)  
3 (2017) 2 (2016)

## Availability Modes

Synchronous-commit mode  
Automatic Failover  
Manual Failover

Asynchronous-commit mode  
Forced Manual Failover



# Always On Failover Cluster Instances

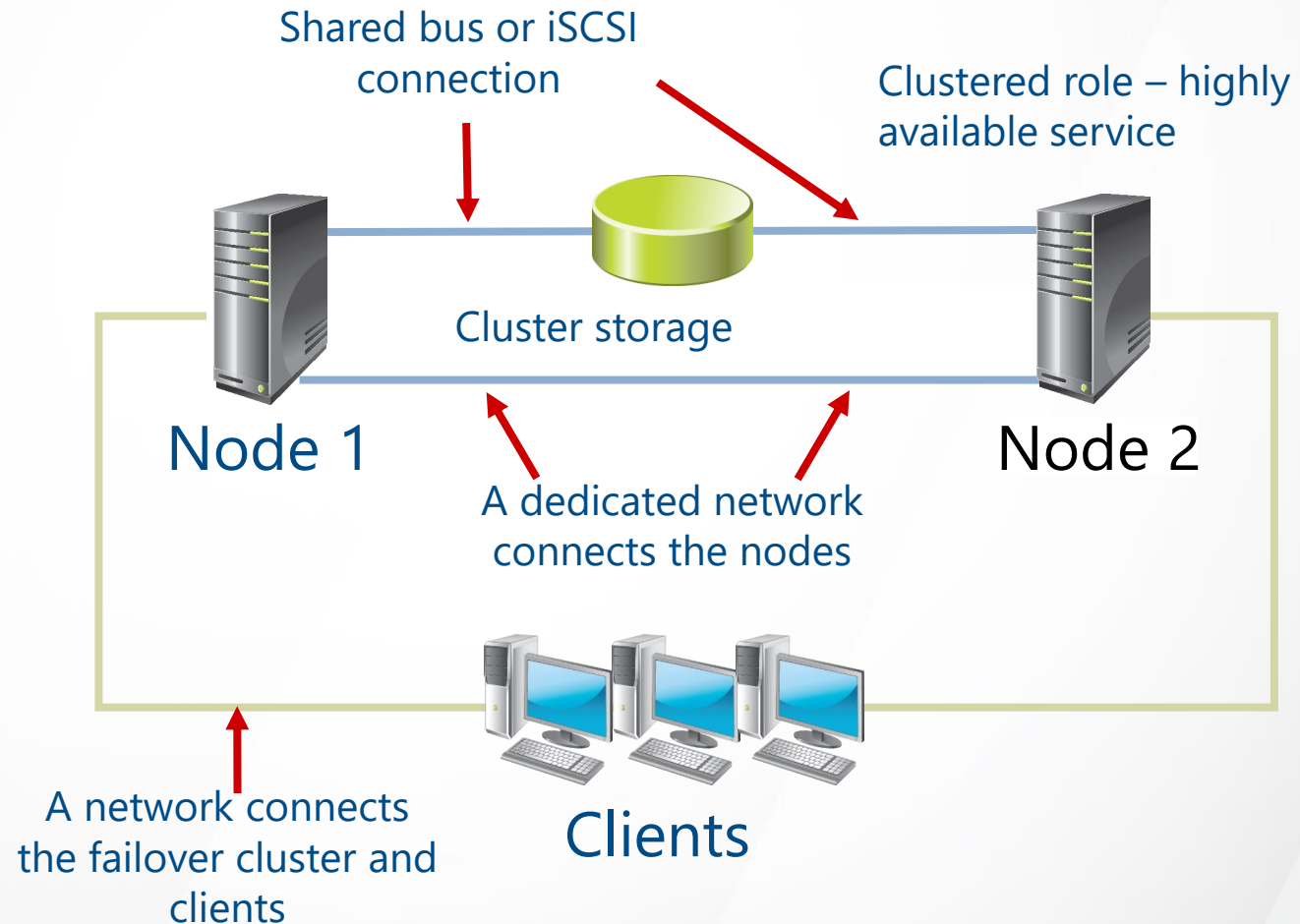
## Fail Over Cluster

Windows Server 64 Nodes

SQL Instances 50 (SMB)

SQL Instances 25 (SAN)

Hyper-V  
Host Cluster  
+  
Guest Cluster



# Replication

## Types of Replication

Transactional replication

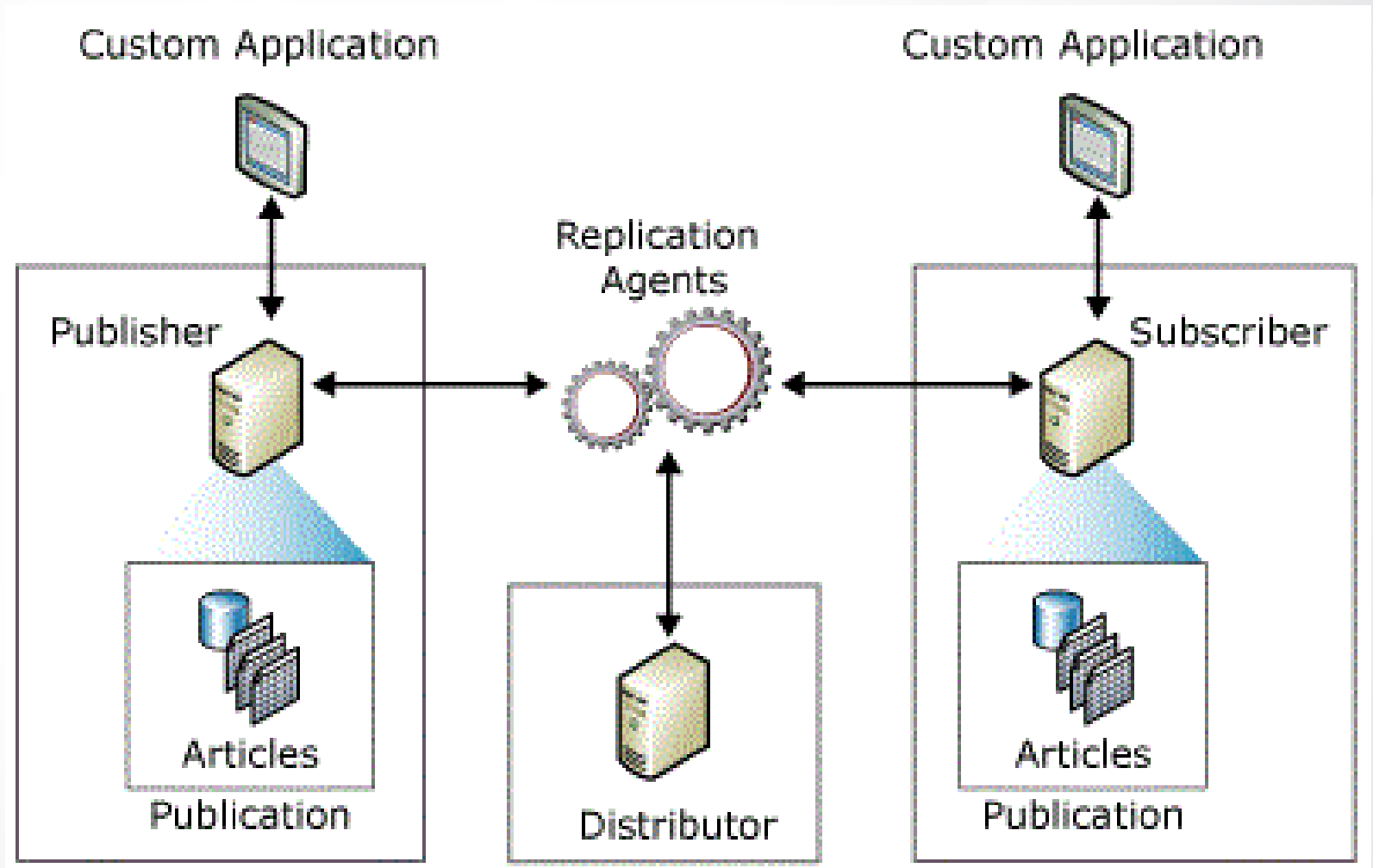
Merge replication

Snapshot replication

Peer-to-peer

Bidirectional

Updatable Subscriptions



# SQL Server Security

Encryption	Version Support
Transport Layer Security (TLS)	All
IPSEC	O/S Dependent
Transparent database encryption (TDE)	Enterprise, Standard
Column Encryption	All
Always Encrypted	All
Encrypted backup	Enterprise, Standard

Server Audit	All
Data classification and auditing	All
Dynamic Data Masking	All
Row-level security	All

# Azure Database Offerings

Azure SQL Database

SQL Server on Azure Virtual Machines

Azure Synapse Analytics (SSAS)

Azure HDInsight (Hadoop)

Azure Cosmos DB (MongoDB)

Azure Database for MySQL

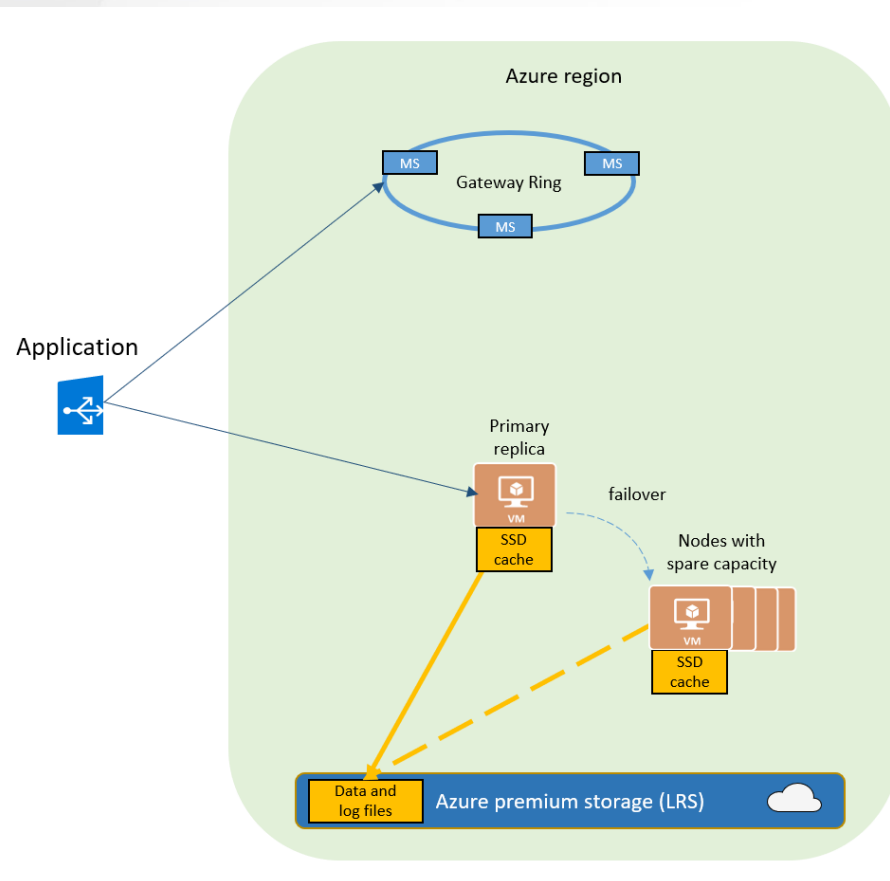
Azure Database for PostgreSQL

Azure Database for MariaDB

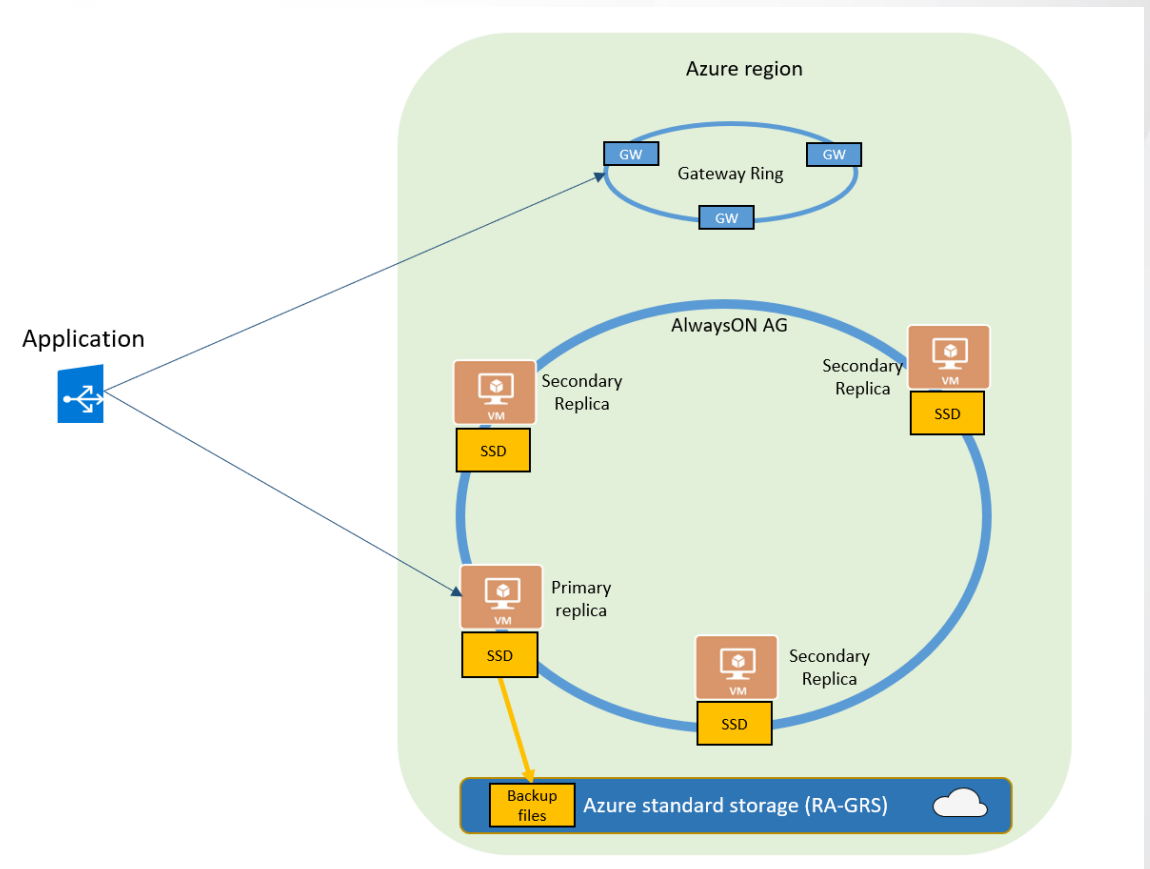
Azure Data Lake Analytics

# Azure SQL High Availability options

## Basic, Standard, and General Purpose service tier



## Premium and Business Critical service tiers



# Questions



# Courses

**Querying Data  
with Transact-  
SQL 20761**

**Developing SQL  
Databases  
20762**

**Administering a  
SQL Database  
Infrastructure  
20764**

**Provisioning SQL  
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