High Availability

For isolated server failures:

Windows crash, RAID controller failure, SQL or Windows patch fails, C drive full, bad memory chip, wrong box unplugged

RPO: Max acceptable data loss:

Biz Goal	IT Goal	Current	
			Zero
			1 minute
			1 hour
			1 day

RTO: Max acceptable downtime:

Biz Goal	IT Goal	Current	
			Zero
			1 minute
			1 hour
			1 day

Disaster Recovery

For widespread outages:

Data center power or network outage, domain controller failure, SAN failure, fire, quake, zombies in the data center

RPO: Max acceptable data loss:

Biz Goal	IT Goal	Current	
			Zero
			1 minute
			1 hour
			1 day

RTO: Max acceptable downtime:

Biz Goal	IT Goal	Current	
			Zero
			1 minute
			1 hour
			1 day

"Oops" Deletions

For human T-SQL error:

DELETE without a where clause, bug in stored procedure for updates, end user needing a restore due to human error

RPO: Max acceptable data loss:

Biz Goal	IT Goal	Current	
			Zero
			1 minute
			1 hour
			1 day

RTO: Max acceptable downtime:

Biz Goal	IT Goal	Current	
			Zero
			1 minute
			1 hour
			1 day

Recovery Time Objective (RTO) - Downtime

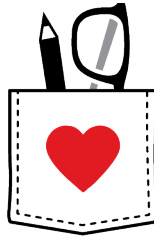|	Zero-1 Sec	1 Minute	1 Hour	1 Day
Zero-1 Sec	>$1,000,000 Multiple active servers with bidirectional replication (usually requires code change)	$100k-$500k Clustering w/SAN, synch AlwaysOn Availability Groups (EE), synch database mirroring	$100k-$250k Synch SAN replication, synch VM replication	
1 Minute			$50k-$250k Async AlwaysOn Avail Groups (EE), async DB mirroring (EE)	$5k-$100k Log shipping, async SAN replication, async VM replication
1 Hour			$5k-$100k Log shipping, async SAN replication, async VM	
1 Day				

(Left axis label: Recovery Point Objective (RPO) - Data Loss)

BRENT OZAR UNLIMITED

Comparison of SQL Server Availability Features

	>$1mm	$100k-$500k			$100k-$250k		$50k-$250k		$5k-$100k		
	Replication	Failover Clustered Instances (FCI)	AlwaysOn Availability Groups - Synch	Database Mirroring - Synch	SAN Replication - Synch	VM Replication - Synch	AlwaysOn Availability Groups - Asynch	Database Mirroring - Asynch	Log Shipping	SAN Replication - Asynch	VM Replication - Asynch
Recovery Point Objective (Data Loss)											
Data loss possible	Yes	No*	No*	No*	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Typical RPO goal	Zero	Zero	Zero	Zero	Zero	Zero	1 Minute	1 Minute	1 Hour	1 Hour	1 Hour
Recovery Time Objective (Downtime)											
Failover automatic or manual	Automatic	Automatic	Automatic	Automatic	Optional	Optional	Manual	Manual	Manual	Manual	Manual
Can be failed over by the DBA alone	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No
Easy to fail back and forth for patching	Some	Yes	Yes	Yes	No	No	Yes	Yes	Some	No	No
Multiple live writeable servers	Optional	No	No	No	No	No	No	No	No	No	No
Fails over Agent jobs, SQL logins	No	Yes	No	No	Optional	Yes	No	No	No	Optional	Yes
3rd party apps fail over easily	No	Yes	Yes	Some	Yes	Yes	Yes	Some	No	Yes	Yes
Typical RTO goal	Zero	1 Minute	1 Minute	1 Minute	1 Hour	1 Hour	1 Hour	1 Hour	1 Day	1 Day	1 Day
Groups of Databases											
Are the same point in time	No	Yes	No*	No	Yes	Yes	No	No	No	No	No
Fail over together	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hardware & Software Requirements											
SQL Server minimum version supported	Apps vary	Any	2012	2005	Any	Any	2012	2005	Any	Any	Any
SQL Server minimum edition required	Apps vary	Any	Enterprise	Standard	Any	Any	Enterprise	Enterprise	Any	Any	Any
May require application changes	Yes	No	No	No	No	No	No	No	No	No	No
Req storage for multiple copies of DBs	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Requires shared storage (SAN)	No	Yes	No	No	Yes	Yes	No	No	No	Yes	Yes
Requires virtualization	No	No	No	No	No	Yes	No	No	No	No	Yes
Can use local solid state storage	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No
Performance											
Has noticeable performance impact	Maybe	No	Yes	Yes	Maybe	Maybe	Minimal	Minimal	No	Maybe	Maybe
Can offload backups, DBCCs, reports	Yes	No	Yes	No	No	No	Yes	No	Some	No	No

BRENT OZAR UNLIMITED

BRENT OZAR
UNLIMITED

We are a boutique consulting firm focused on understanding your environment and strategy.

We partner with you to identify pain points and develop solutions that align to your business goals.

Your experience comes first; we share our knowledge and expertise to help you.

SQL Server Backup and Recovery Class

It's the most critical job duty for a database administrator – but how much do you really know about it? In this 115-minute video course, Jes Borland covers the different recovery models, backup methods, restore options, and best practices.

$29 - http://BrentOzar.com/go/jobsecurity
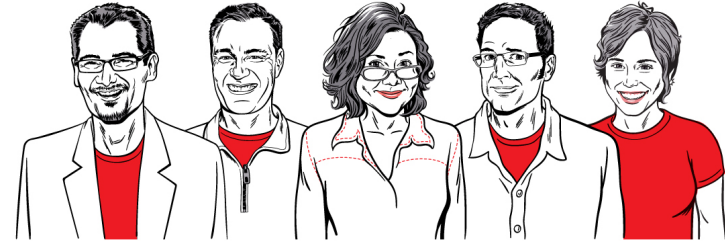
Here's some of our favorite free resources:

sp_Blitz® - free SQL Server health check script.

sp_BlitzIndex® - diagnose your index disorders.

sp_AskBrent® - why is the SQL Server slow?

Tuesday Tech Triage: every Tuesday we host a free 30-minute webcast to help you learn SQL Server.

Go get 'em now: http://BrentOzar.com/first-aid/

Virtualization, SAN, and Hardware for Microsoft SQL Server

When you're the one who has to plan, buy, set up, and troubleshoot production SQL Server, you need to know hardware, shared storage, and VMware. Brent Ozar goes in depth in this six-hour video course.

$299 - http://BrentOzar.com/go/hardware