l've Got A SQL Server Database. Now What?

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About Me

- Denny Cherry & Associates Consulting
- 6 books
- Dozens of articles
- Microsoft MVP
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Agenda

- Files, File Groups, Disks
- Backups
- Recovery Model
- Database Maintenance
- Compression
- Corruption
- Compatibility Level
- Indexes

Files, File Groups, Disks

File Groups are made up of files

- Files hold the data
- Disks Hold Files



Hard Disk Drives (1)





92.2 GB free of 238 GB

Devices with Removable Storage (1)



DVD RW Drive (D:)

Files, File Groups, Disks

- Each database is made up of at least two files
- One file is data
- One file is transaction log



http://www.flickr.com/photos/photomequickbooth/4011249096/

Backups

► 3 Different Kinds of Backups

- Full Backups
- Differential Backups
- Transaction Log Backups
- Advanced Backup Options
 - ► File Group Backups
- Backups Saved On Another Machine



Full Backups

- Makes a point in time copy of the database
- Database is in the state the database was at the end of the backup
- Should be done daily or weekly



Recovery Models

Three Recovery Models Available

- Snapshot
- Bulk-Logged
- ► Full
- Used to control amount of logging



Snapshot Recovery Model

Minimal Logging
No Point In Time Recovery
Does Not Disable Logging



Bulk Logged Recovery Model

Some commands are bulk logged
Most commands are fully logged
Point In Time Recovery Supported



Full Recovery

- Almost nothing is bulk logged
- Point in time recovery is supported
- Full Data Protection



Restoring Data

- ► Full Restore
- Differential Restore
- Transaction Log Restore
- Page Level Restore
- ► File Group Restore



Database Maintenance

- Databases need TLC
- Index Rebuilding
- Index Defragmenting
- Update Statistics



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Database Maintenance

Index Rebuild

- Can be online or offline depending on version, edition and column data types
- Creates new indexes then drops old index
- Updates Statistics on index

Index Defrag

- Always Online
- Moves data around pages row by row
- Only moves rows that need to be moved

Statistics?

- How SQL Server figures out how to access data
- Statistics are used to create an execution plan
- Statistics are a sampling of the values within a table or index
- Statistics contain up to 200 samples of the values within the table
- Statistics track the number of values between sampled values





	Name	1	Updated	Rows	Rows Sampled	Steps	Density	Average key length	String Index	Filter Expression	Unfiltered Rows
1	IX_SalesOrderDetail_ProductID		Mar 14 2012 1:14PM	121317	121317	200	0.0078125	12	NO	NULL	121317
	All density	Average Length	Columns								
1	0.003759399	4	ProductID								
2	8.242868E-06	8	ProductID, SalesOrde	ProductID, SalesOrderID							
3	8.242868E-06	12	ProductID, SalesOrderID, SalesOrderDetailID								

	RANGE_HI_KEY	RANGE_ROWS	EQ_ROWS	DISTINCT_RANGE_ROWS	AVG_RANGE_ROWS
9	715	0	1635	0	1
10	716	0	1076	0	1
11	718	218	219	1	218
12	719	0	44	0	1
13	722	0	392	0	1
14	723	0	52	0	1
15	725	0	374	0	1
16	726	0	288	0	1
17	727	0	48	0	1

Compression

- Saves space within:
 - The database
 - Memory
 - Backups
- Costs CPU speed, but usually worth it
- Data Compression is Page or Row
- Backup Compression is an on or off



Corruption

- All databases can become corrupt
- Corruption is usually a hardware problem
- Corruption should be checked for regularly
- Depending on what is corrupt it may be repaired without data loss
- Corruption is checked for and repaired using DBCC CHECKDB
- Corruption will happen, how you prepare for it will determine how easily you can survive it
- Some corruption can't be repaired and must be restored from a backup



Compatibility Level

- Compatibility levels tell SQL Server which language syntax to support
- Does not effect the version of the SQL Server the database can be restored to
- SQL Supports several down level compatibility levels.
 - SQL 2012 supports SQL 2005 and up
 - ▶ SQL 2008 R2 and below support SQL 6.5 and up



Indexes

- Used to speed up queries
- Sorted based on the columns within the index
- Causes duplicate data to be stored
- Trades space for speed
- Indexes are $\frac{1}{2}$ art and $\frac{1}{2}$ science



Indexes

- Clustered
- Nonclustered
- ► Full Text
- Spatial



- ColumnStore
- ► XML



Semantic Search







CREATE INDEX IX_LastName on Employee (LastName) INCLUDE (FirstName)

Indexes



CREATE INDEX IX_LastName on Employee (LastName) INCLUDE (FirstName) WHERE Active = 1

Indexes

Indexes aren't free

- Every index added slows down INSERT/UPDATE/DELETE operations
- Only create indexes where the cost of having the index is worth it
- Unused indexes can be removed from the database

Additional Reading...

http://dcac.co/res/ive-got-a-database



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