

HOW TO GET SQL SERVER TO RUN BETTER ON CRAPPY HARDWARE

Monica Rathbun

Consultant

Denny Cherry & Associates Consulting



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Consultant

Denny Cherry & Associates Consulting



PASS Mid-Atlantic Regional Mentor

User Group Leader: Hampton Roads VA

SQL Saturday VA Beach Organizer



MRathbun@sqlespresso.com



sqlespresso.com

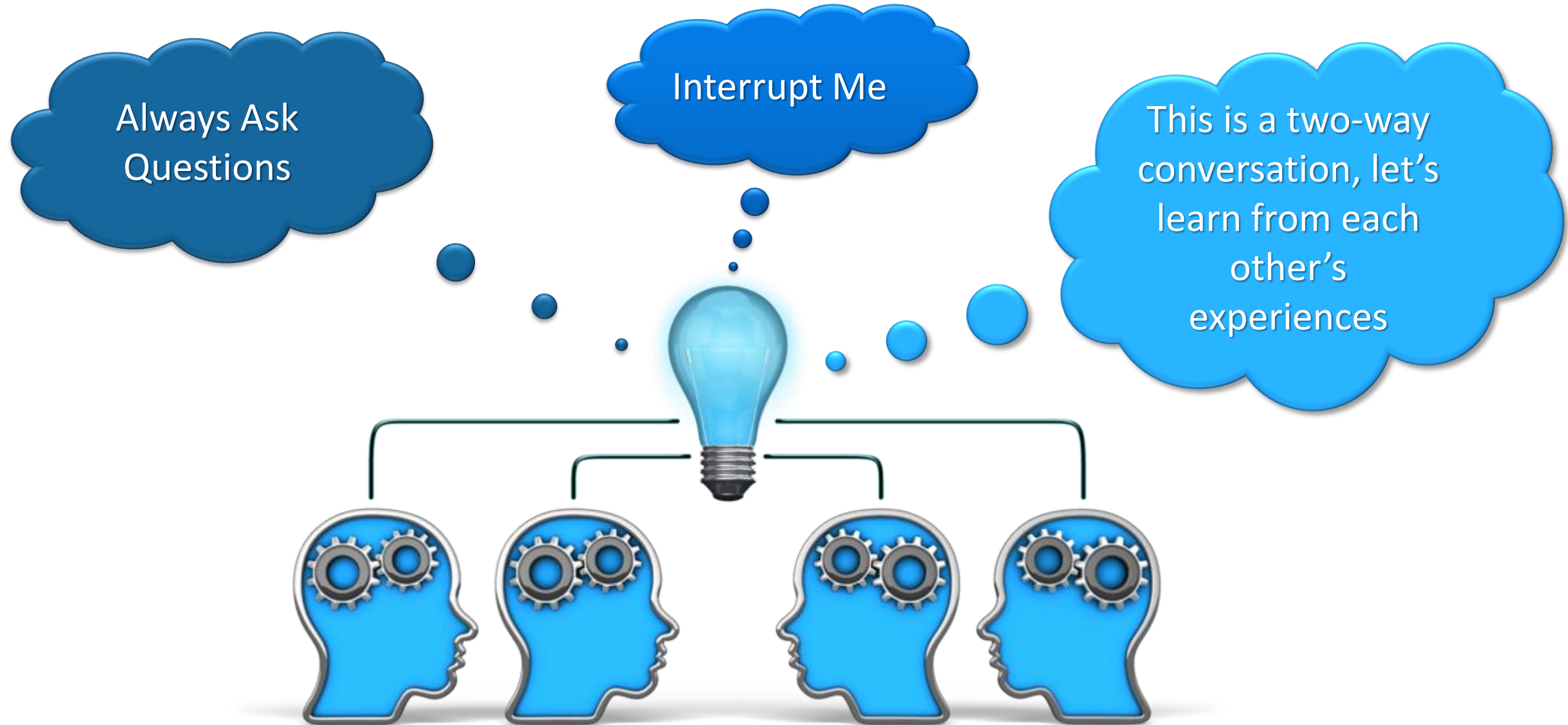


@SQLEspresso



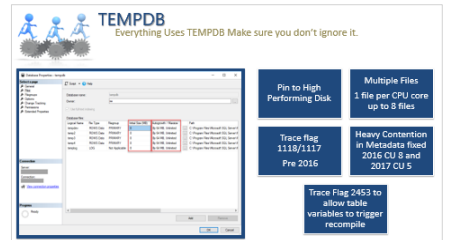
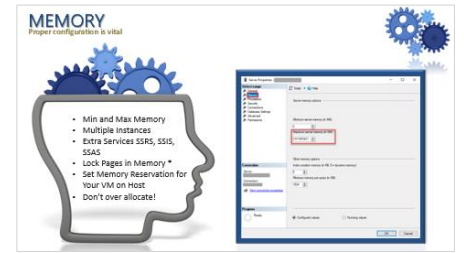
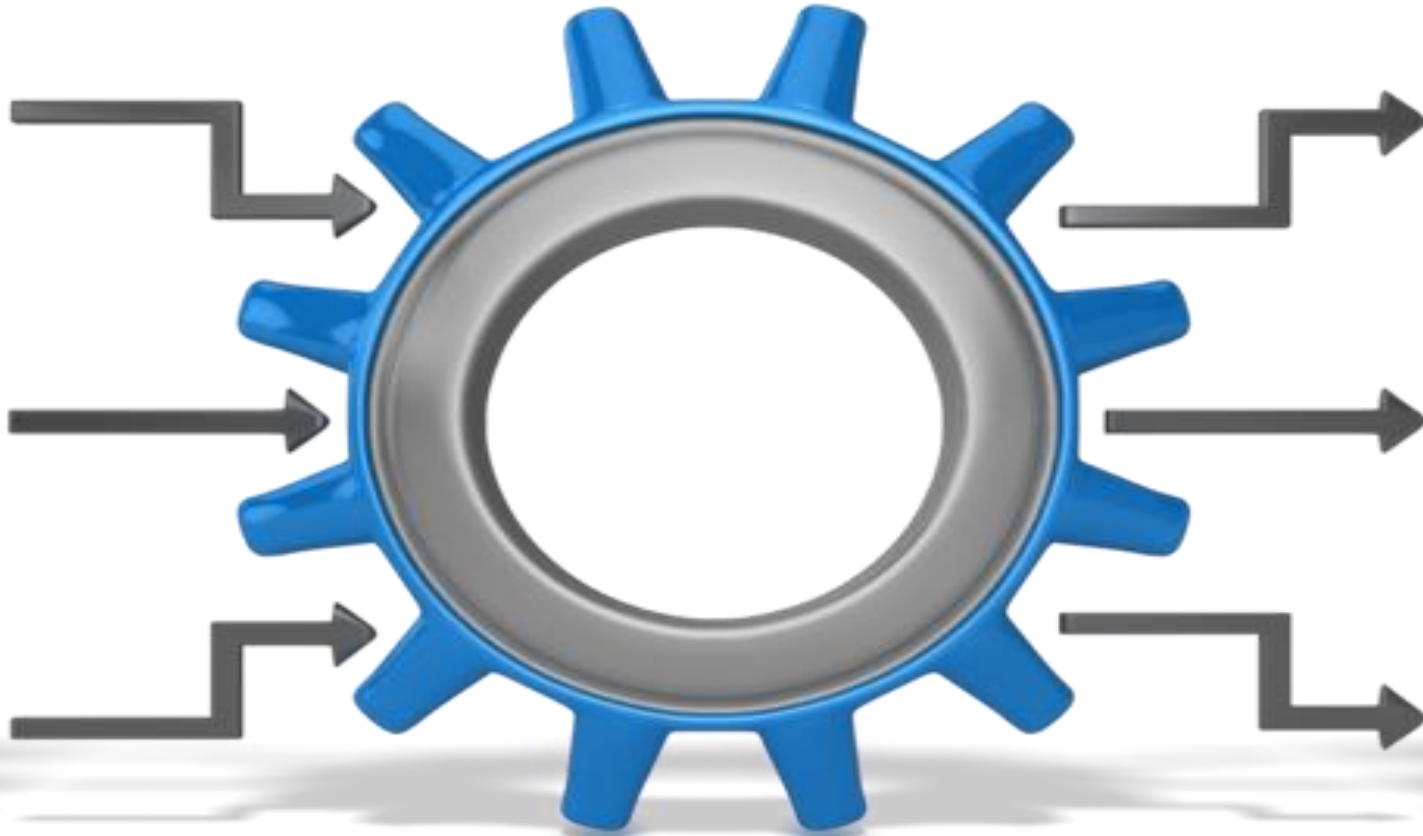
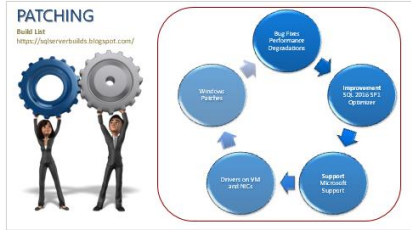
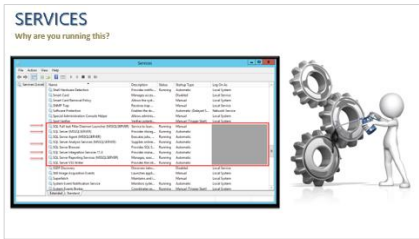
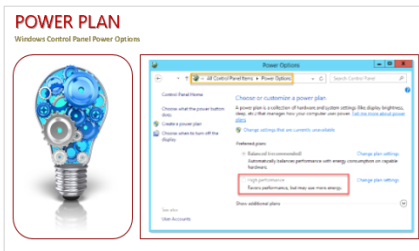
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PRESENTATION RULES



AGENDA



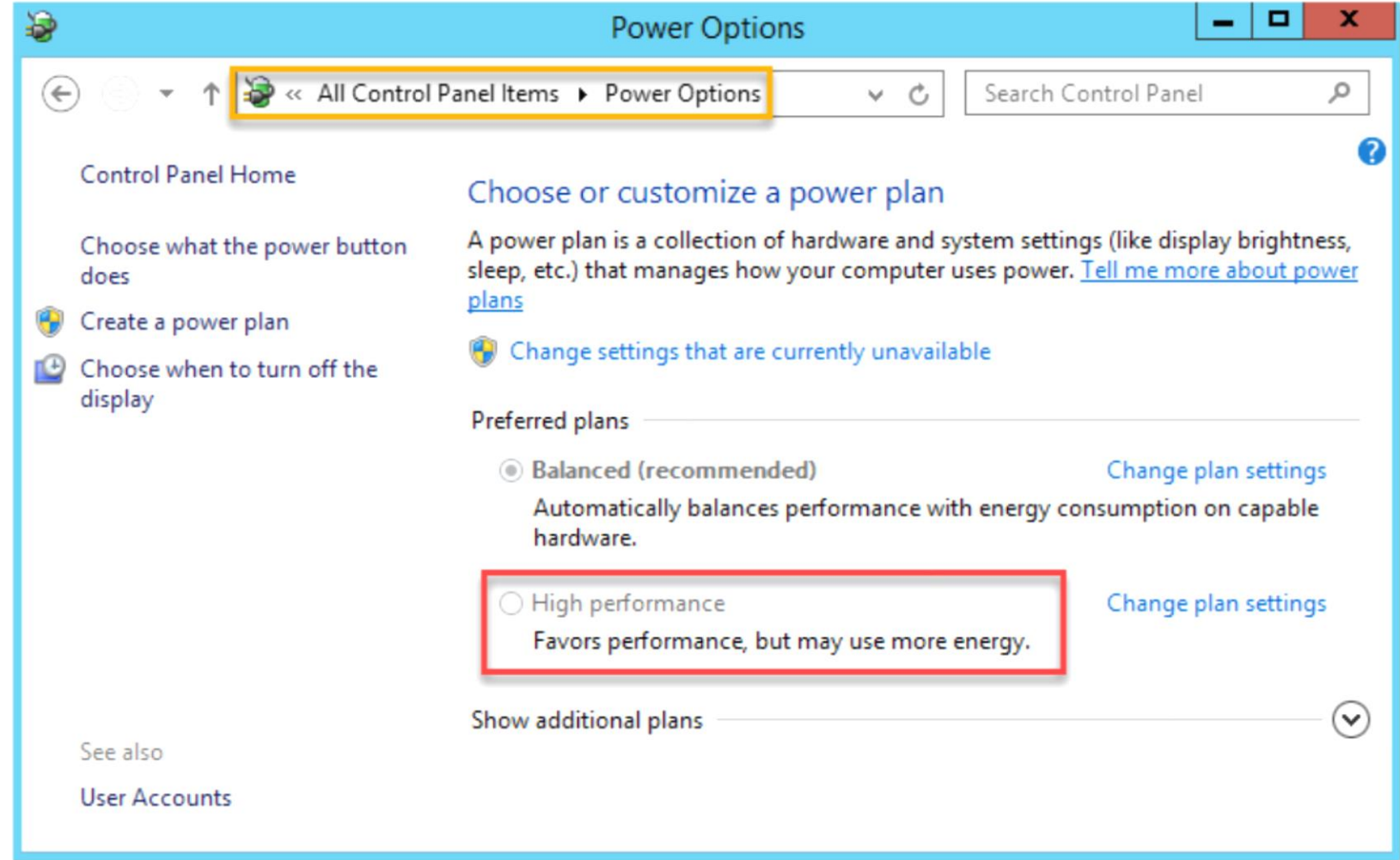


BEST PRACTICES

Start with the basics.

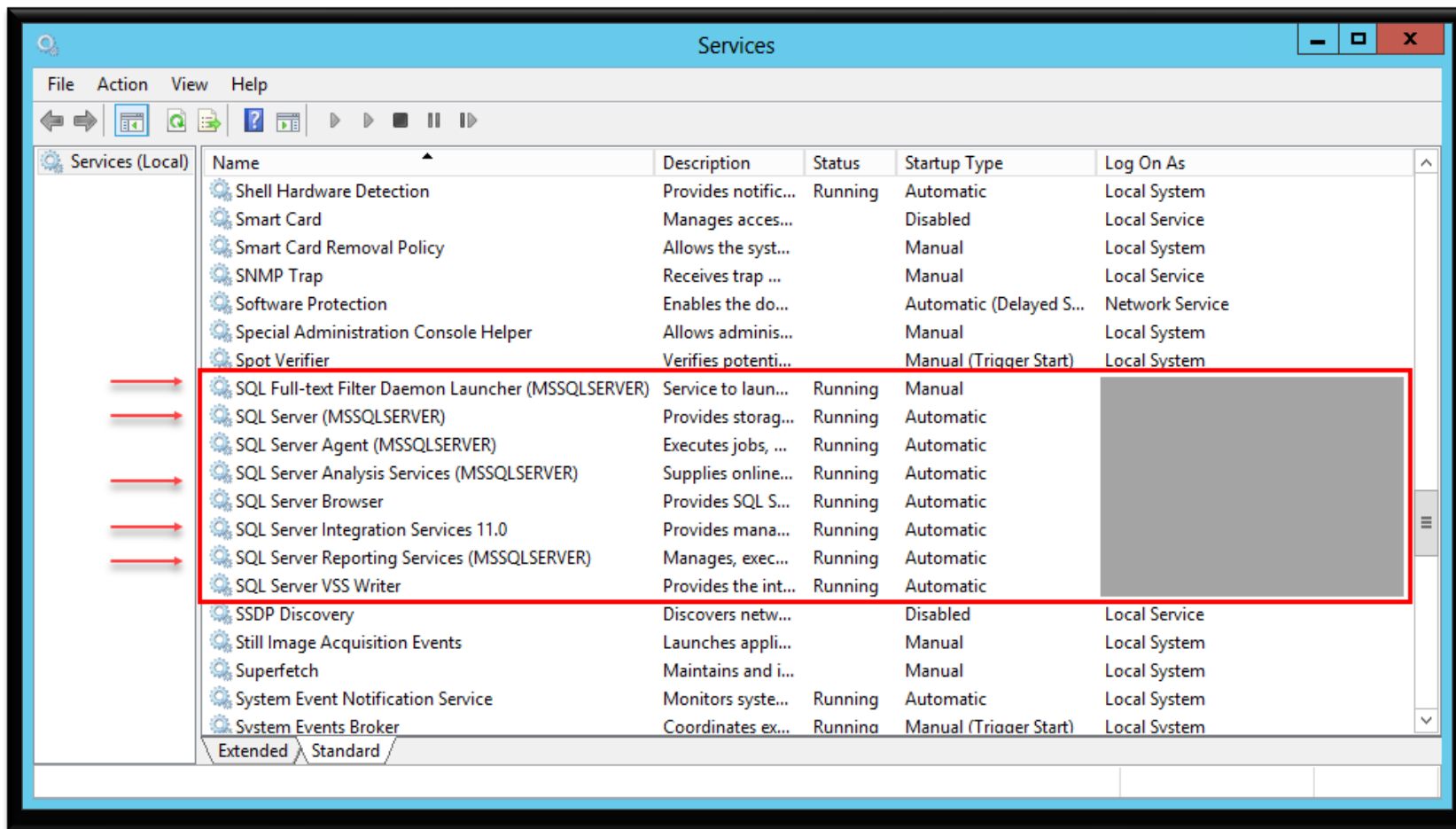
POWER PLAN

Windows Control Panel Power Options



SERVICES

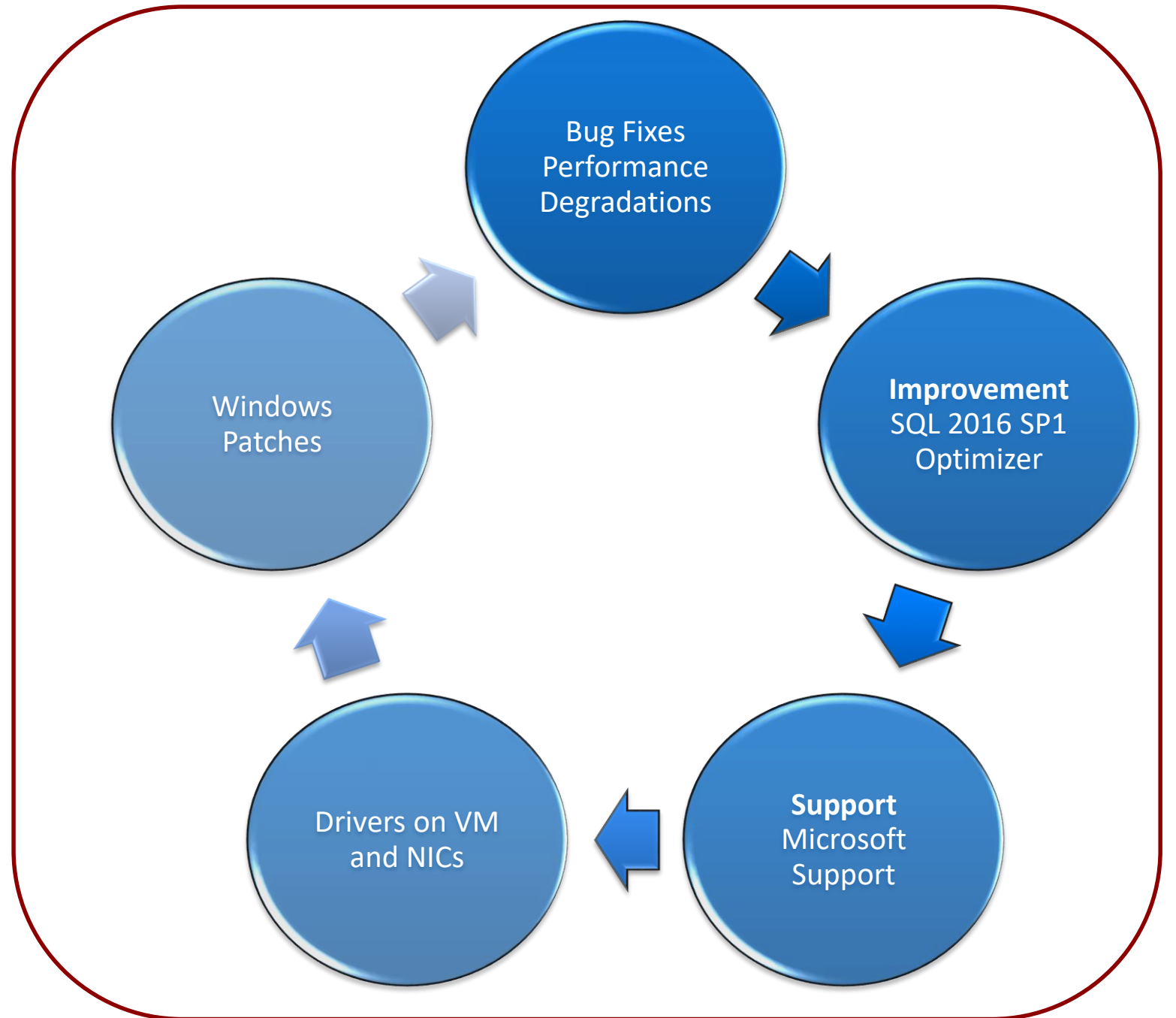
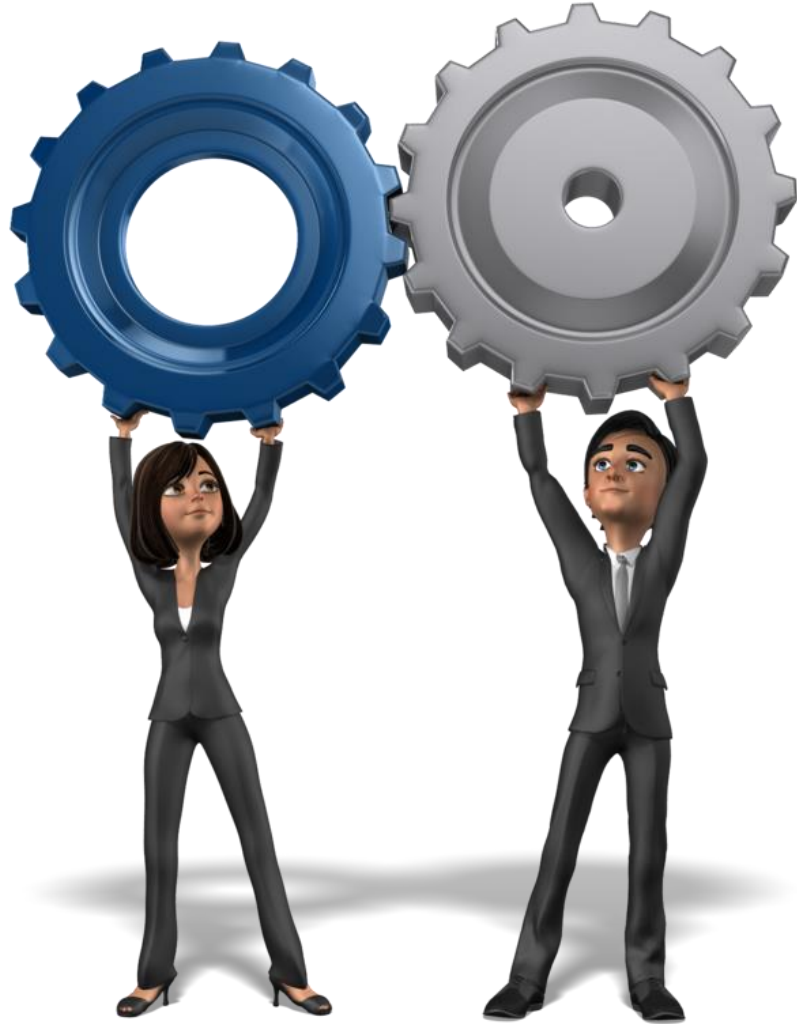
Why are you running this?



PATCHING

Build List

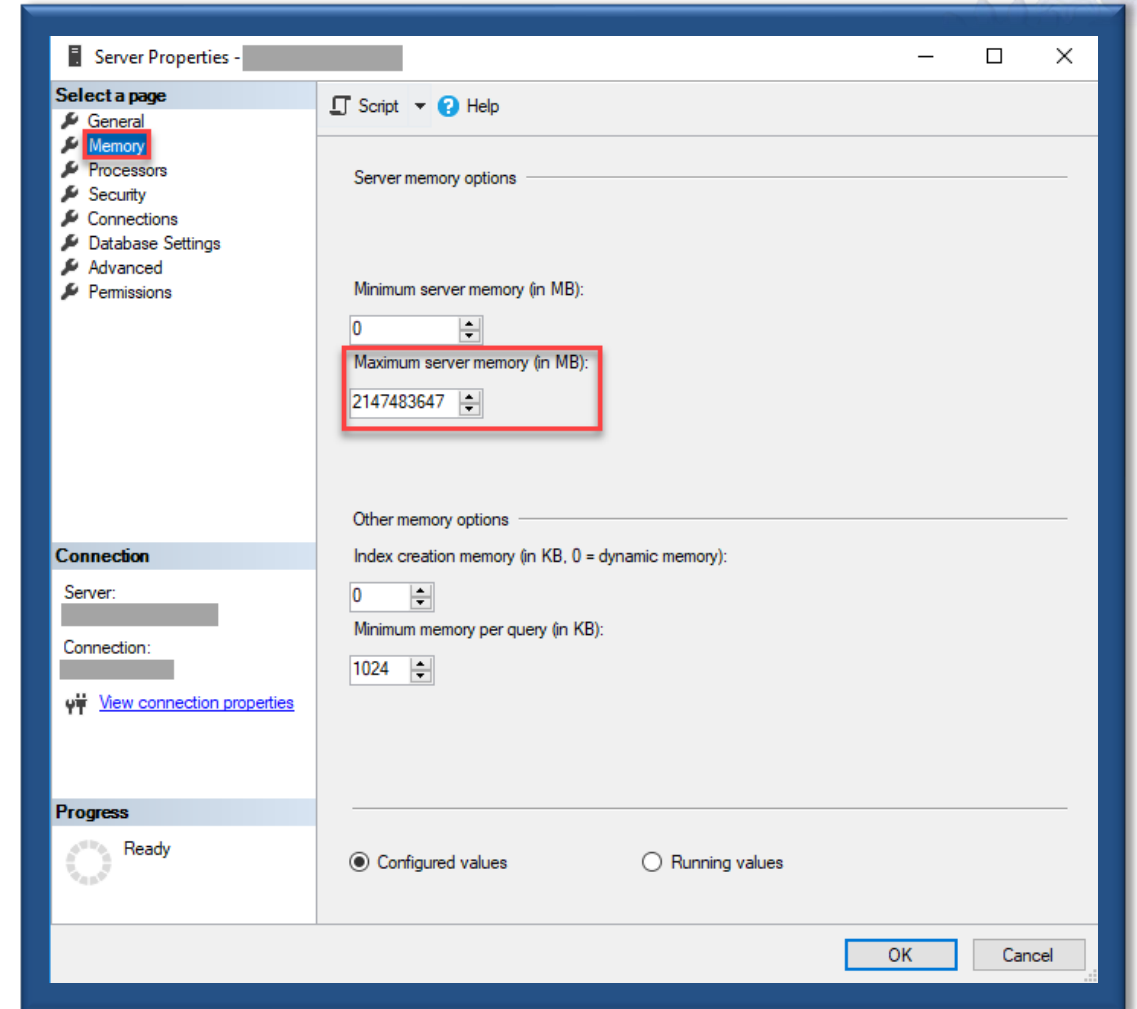
<https://sqlserverbuilds.blogspot.com/>

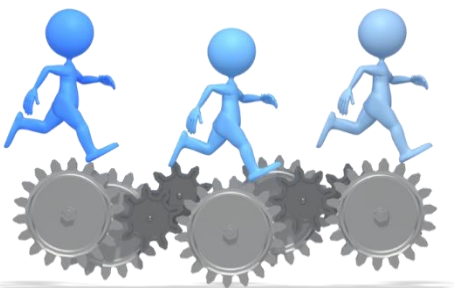


MEMORY

Proper configuration is vital

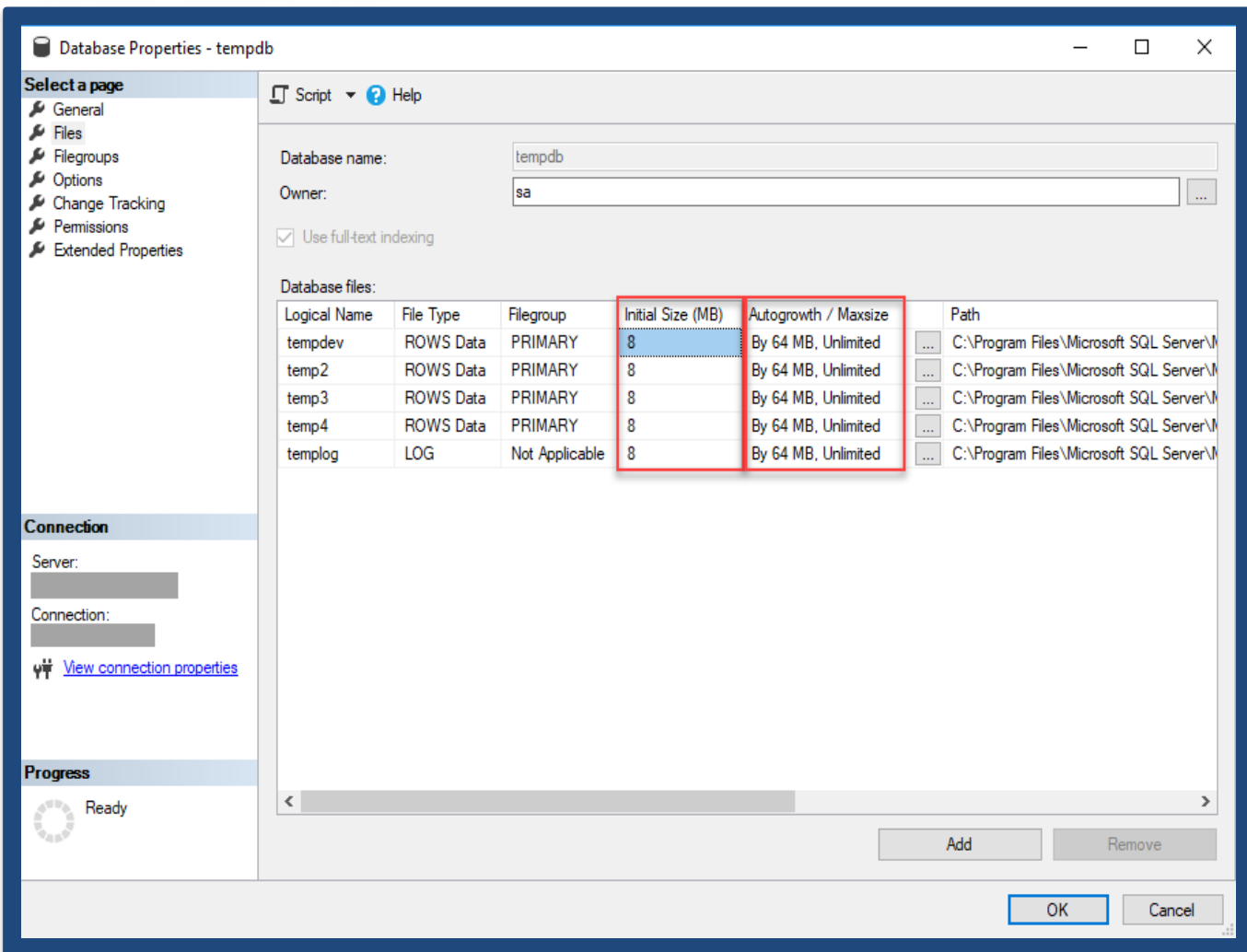
- Min and Max Memory
- Multiple Instances
- Extra Services SSRS, SSIS, SSAS
- Lock Pages in Memory *
- Set Memory Reservation for Your VM on Host
- Don't over allocate!





TEMPDB

Everything Uses TEMPDB Make sure you don't ignore it.



Pin to High
Performing Disk

Multiple Files
1 file per CPU core
up to 8 files

Trace flag
1118/1117
Pre 2016

Heavy Contention
in Metadata fixed
2016 CU 8 and
2017 CU 5

Trace Flag 2453 to
allow table
variables to trigger
recompile

MAKE FRIENDS WITH NETWORK & STORAGE ADMINS

Their baby might be ugly



IDENTIFYING BOTTLENECKS

Perfmon Counters



Latency\Queue

- Avg. Disk sec/Read counter
- Avg. Disk sec/Write counter
- Avg. Disk Queue Length



Memory

- Database Pages
- Page Life Expectancy
- Available MBYTES



CPU

- Processor\% Processor Time
- Processor\% User Time
- Processor\% Interrupt Time



Third Party Tools

- SentryOne
- Idera
- SolarWinds
- Red Gate

YEP YOU HAVE PROBLEMS

Challenges Ahead



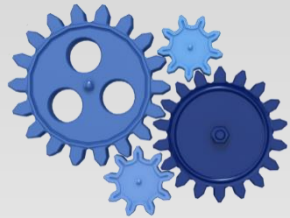
Bad\Old Hardware	Older Disks	Just Not Fast Enough
	Limited Physical Server	No Memory Slots
		Slow CPU
Budget	No New Hardware	
	No New Licenses	
Team Just Doesn't Get SQL	RAID 5 for ALL	
	Clones	



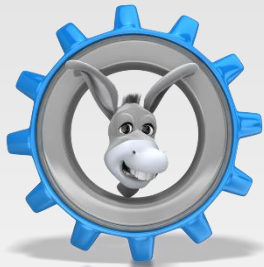
Too Many VMs on One Host



What Happens on One VM Now Effects Another



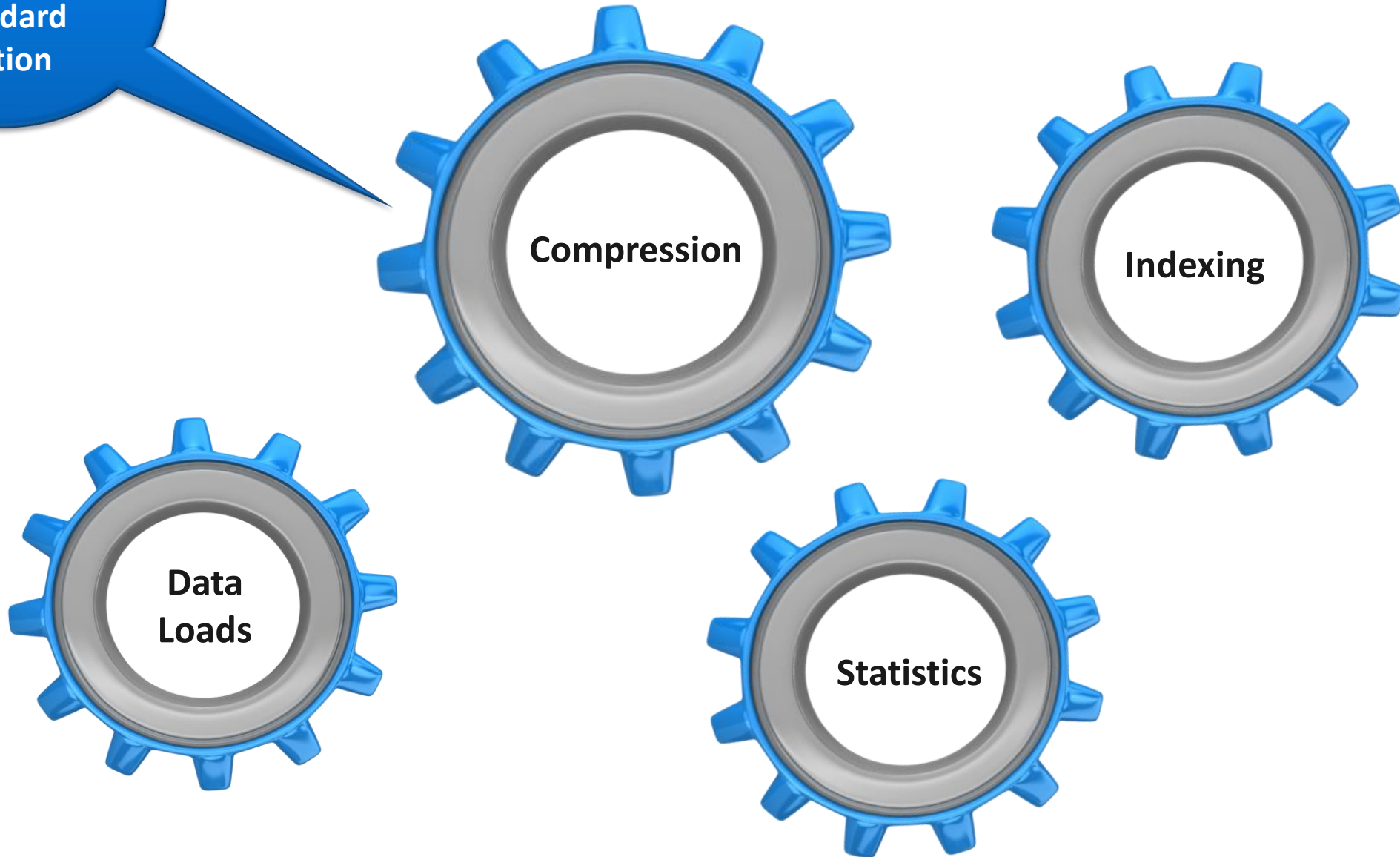
VM Over/Under CPU Allocation



Thin Provisioning

REDUCE DISK IO READS & WRITES

Now
Available in
Standard
Edition





COMPRESSION

More data in memory – It's the GOLDEN EGG!

Row/Page Compression
- More Data In
MEMORY

Saves Space on **Disk**

Backup Compression:
Less Data in **STORAGE**

Costs **CPU** speed,
but worth it

INDEXES

These are not set it and forget it.

**Remove Un-Used
Indexes**



Wasted Write Disk IO
Disable then Delete

Find Missing Indexes



Wasted Read IO
Avoid Duplicates

Covering Indexes



Consolidate Indexes
Specific Query Tuning – Key
Lookups



STATISTICS

This is the magic sauce that helps the optimizer.

Maintain

Keep These Up To Date!

Updates

Sync vs Async

Defaulted in
SQL 2016

Large Table

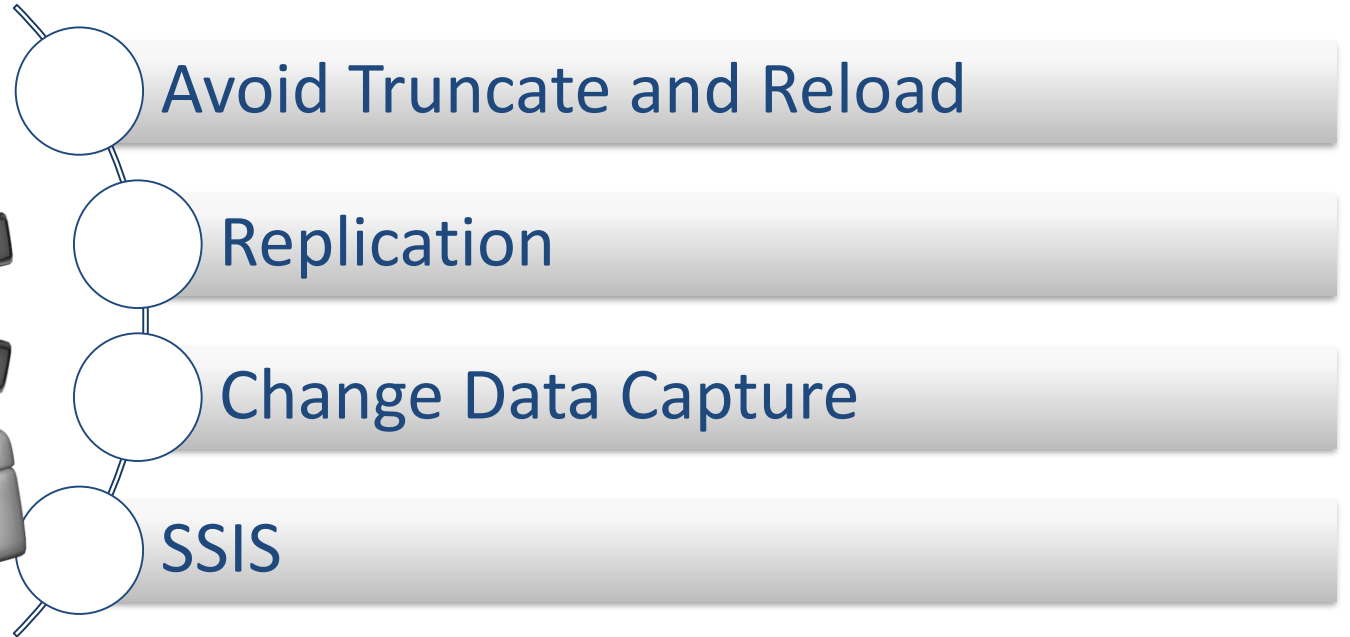
Trace Flag 2371

Missing Stats

Did You Know You Can Make Your Own?

DATA LOADS

Know Your Environment



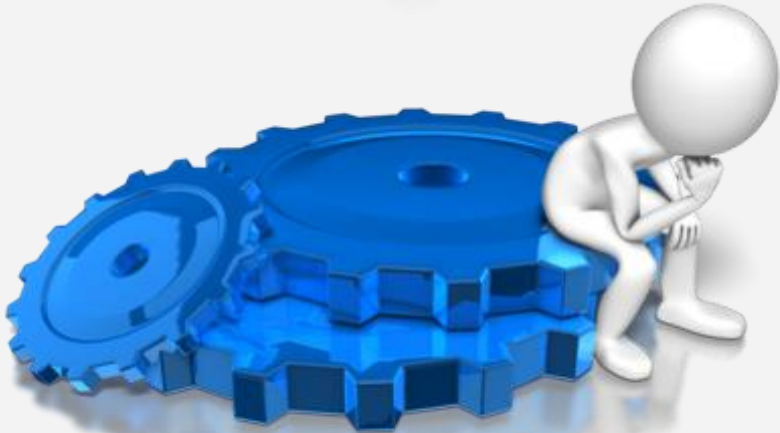
ALLOW SNAPSHOT ISOLATION & READ COMMITTED SNAPSHOT ISOLATION (RCSI)



Ta-dah!

READERS CANT BLOCK WRITERS
AND
WRITERS CANT BLOCK READERS

ions for each
ntained in tempdb.
**Default Isolation Level
in Azure SQL DB**



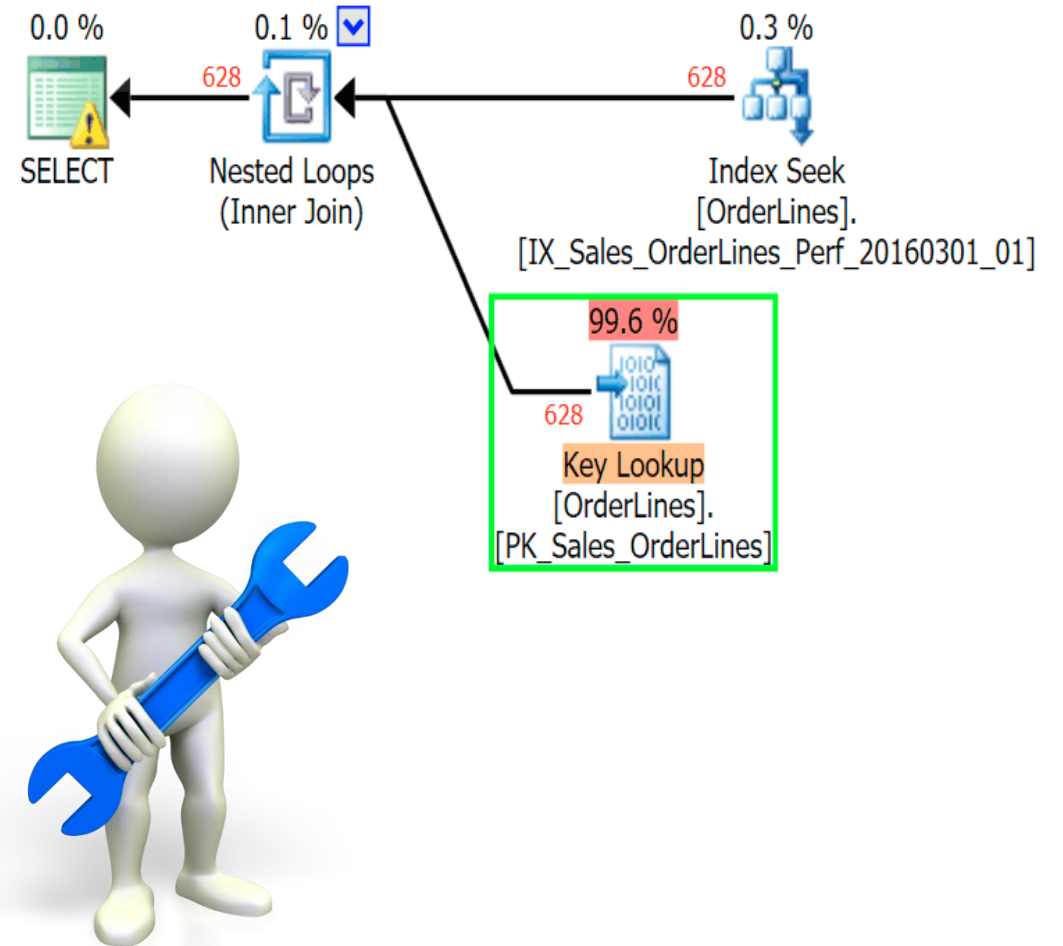
RCSI option

Allows access to versioned rows under the default READ COMMITTED isolation level.
If set to OFF, you must explicitly set the level for each session in order to access versioned rows

EXECUTION PLANS

Easy things to look at

Index Needs	More Granular Review
	Missing Includes
	Scans
Sorts	Does the data need to be sorted?
	Can it be done elsewhere?
Key Lookups	Extra Reads
	Easily Avoided in Most Cases
Spills	Spills to TempDB
	Forced to go to Disk



Contact Information



MRathbun@sqlespresso.com



sqlespresso.com



@SQLEspresso



linkedin.com/in/sqlespresso



Denny Cherry
& Associates Consulting

Your Data, Our Expertise
www.dcac.co

sales@dcac.co
323-686-1478

Accelerate your platform.

Optimize licensing.

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Pay off technical debt.

Unburden your environment.