

Upgrading to SQL Server 2014

Best practices how to perform successful upgrade.



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Few words about me

- Michał Sadowski
- Kraków, Poland
- Principal IT Specialist in ABB, responsible for Treasury Management System
- Taking active technical role in upgrade (to SQL Server 2014) project
- MCP since 2005, MCITP: SQL Server DBA 2005/2008
- Interests:
 - Disaster Recovery
 - Performance tuning
- Leader of **PLSSUG** Kraków group



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Polish SQL Server User Group

- Polish SQL Server User Group was born in 2008
- Join at
 - <http://plssug.org.pl/>
- Come to user group meeting
 - <http://www.meetup.com/PLSSUG/>
- Start using our social networks
 - <http://www.facebook.com/PLSSUG>
 - <http://www.youtube.com/user/PLSSUG>
 - https://www.linkedin.com/groups?home=&gid=21614&trk=anet_ug_hm
- Join SQL Day 2016 conference in Wrocław, Poland in May 2016



Overview

- Reasons for upgrade
- Benefits of upgrade
- Upgrade strategies
- Possible upgrade paths
- Tools
- Demo
- Best Practices
- Summary



Reasons for upgrade

- End of mainstream support
- New features:
 - In-memory OLTP
 - Updateable Clustered Columnstore index
 - Delayed durability
 - AlwaysOn
 - SQL Server 2014 on Windows Core
 - Better BI tools
 - *AlwaysEncrypted**, *Stretch Database**
- Hardware upgrade
- Consolidation



Mainstream and extended support

Version	Mainstream	Extended
SQL Server 2000 SP4	08-04-2008	09-04-2013
SQL Server 2005 SP4	12-04-2011	12-04-2016
SQL Server 2008 SP4	08-04-2014	09-07-2019
SQL Server 2008 R2 SP3	08-04-2014	09-07-2019
SQL Server 2012 SP2	11-07-2017	12-07-2022
SQL Server 2014 SP1	09-07-2019	09-07-2024
SQL Server 2016*	XX-07-2021	XX-07-2026

<https://support.microsoft.com/en-us/lifecycle>



Hotfix vs Patch vs Cumulative Update vs Service Pack

- Patch - Publicly released update to fix a known bug/issue
- Hotfix - update to fix a very specific issue, not always publicly released
- Cumulative Update - Incremental update between service packs or software versions to fix multiple outstanding issues
- Service Pack - A **tested**, cumulative set of all hotfixes, security updates, critical updates, and updates, sometimes features

Benefits of upgrade

- Upgrade should be opportunity to make SQL Server infrastructure more:
 - Resilient
 - Agile
 - Optimized
- Upgrade is also refactoring opportunity that can take advantage of to improve:
 - Performance
 - Manageability
 - Availability



New features in SQL Server editions

- SQL Server 2008 (R2)
 - Row, Page and Backup compression
 - Extended Events
 - Resource Governor
 - Filestream
 - New DATE and TIME data types
- SQL Server 2012
 - Availability Groups
 - Readable Secondary replica
 - Columnstore Index
- SQL Server 2014
 - In-Memory OLTP Tables
 - Delayed Durability



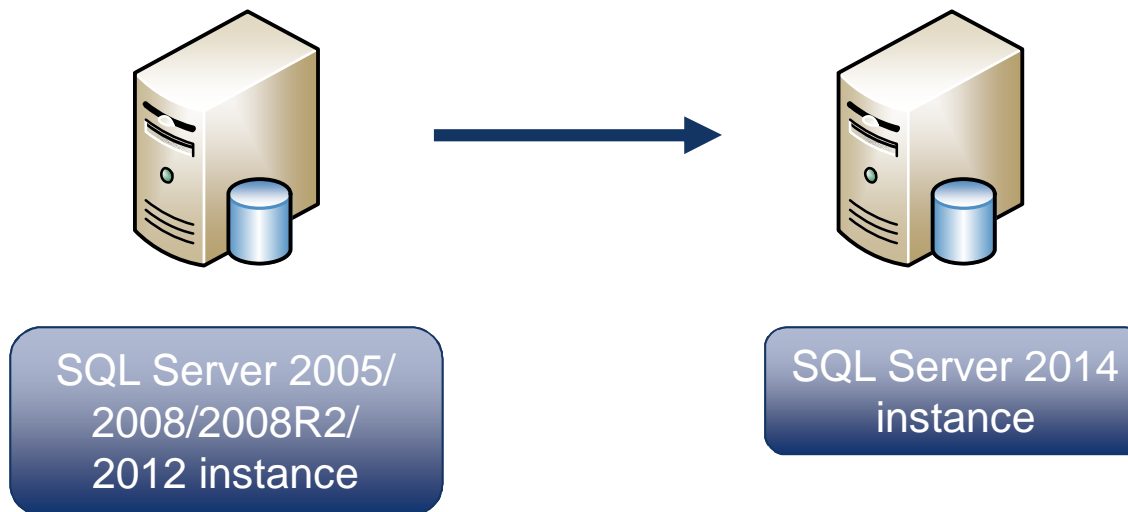
Technical debt

- Start paying your „technical debt”
- Windows Failover Clustering vs AlwaysOn
- Data types deprecated
- Better programming patterns
 - SET XACT_ABORT
- Need to develop strategy to mitigate future risks:
 - Documentation
 - Release Management
 - Change Management
- „Cloud readiness”
 - Contained databases

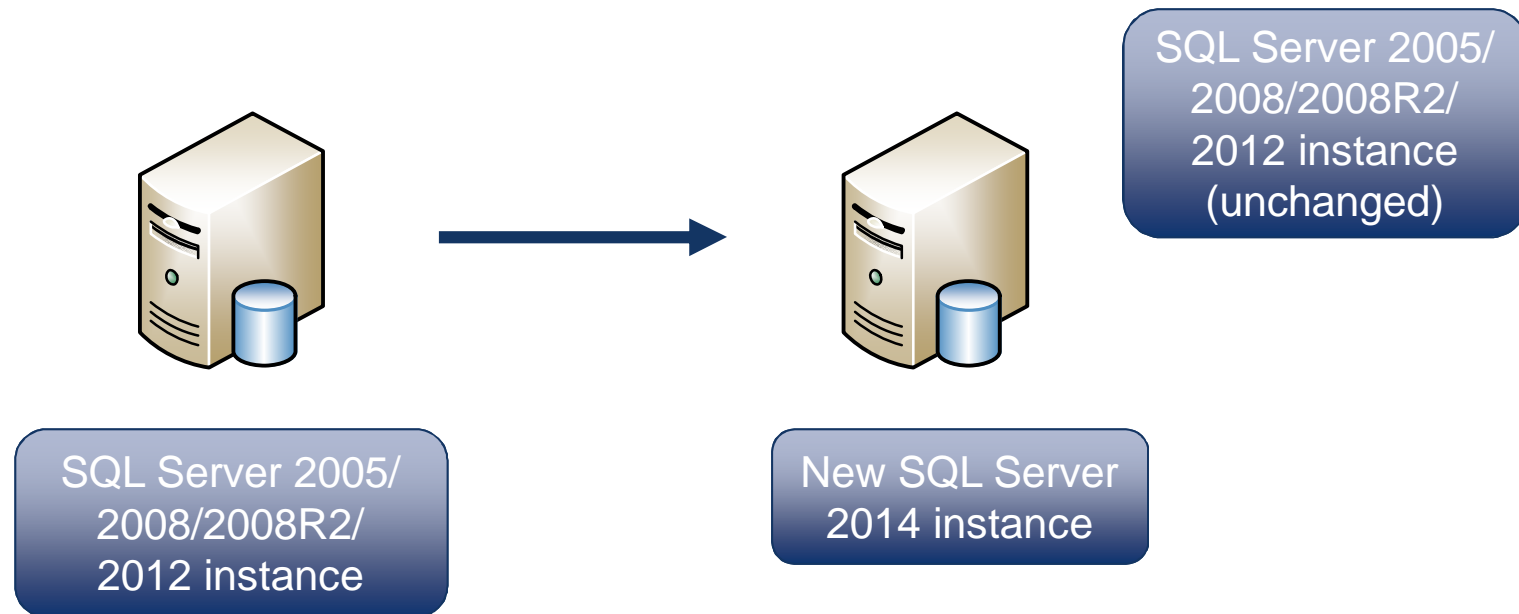
Upgrade strategies

- In-place upgrade – use setup program to directly upgrade an instance of SQL Server 2005, 2008, 2008 R2 or 2012. Older instance is replaced
- Side-by-side upgrade:
 - One server – The new instance exists on the same server as the target instance
 - Two servers - The new instance exists on a different server than the target instance

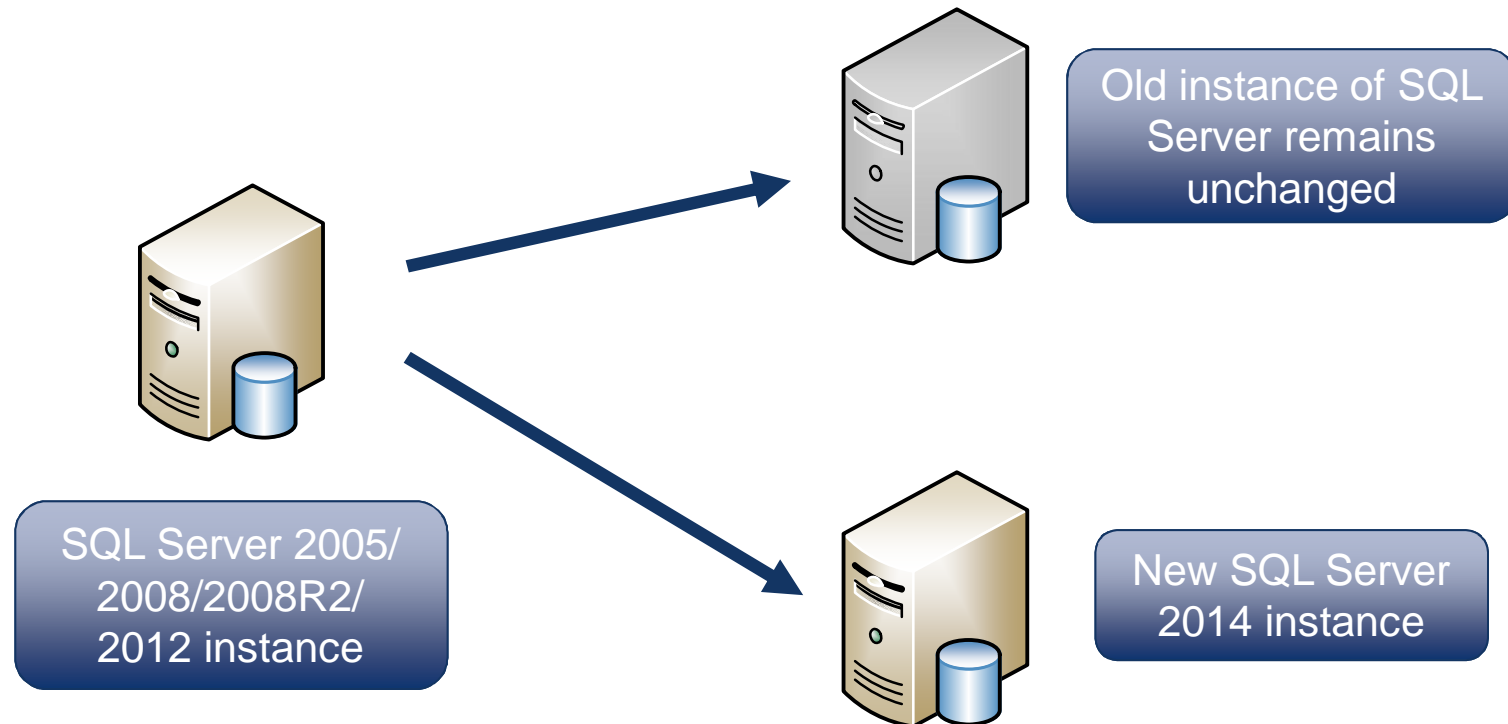
In-place upgrade



Side-by-side upgrade on the same server



Side-by-side upgrade



Considerations for choosing an upgrade strategy

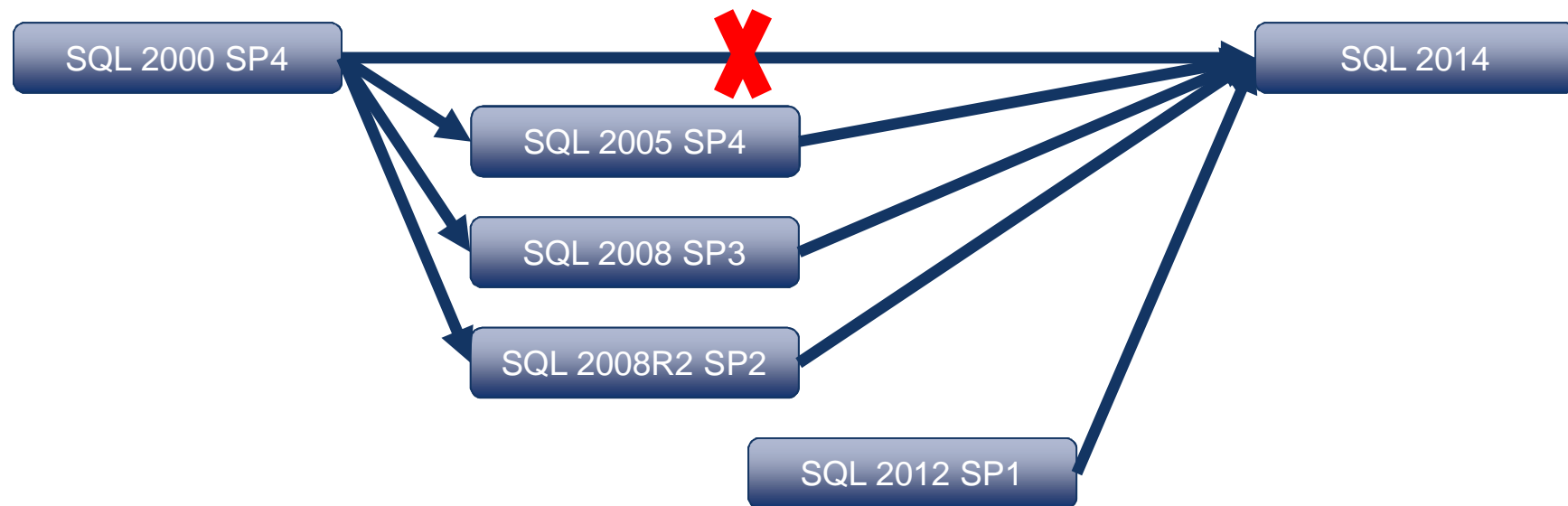
- Components
- Editions
- Partial upgrade
- Upgrading over time
- Effect on application
- Availability
- Rollback

Planning for an upgrade

- Backward compatibility
- Deprecated Features
- Discontinued Features
- Breaking Changes
- Behavior Changes



Possible version upgrade paths

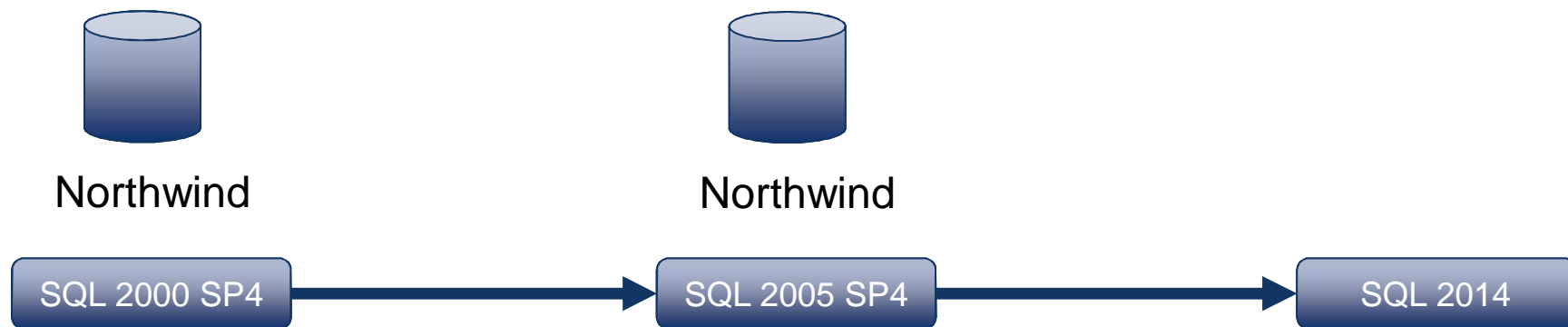


Tools

- SQL Server 2014 Upgrade Advisor
- Best Practices Analyzer for SQL Server
- SQL Server 2014 Setup: System Configuration Checker
- Upgrade Assistant for SQL Server 2012 (UAFS) plays together with Distributed Replay
- RMLUtils
- SQL Server Profiler/Extended Events
- System Monitor – SQL Server: Deprecated Features Object
- Custom scripts*



Demo



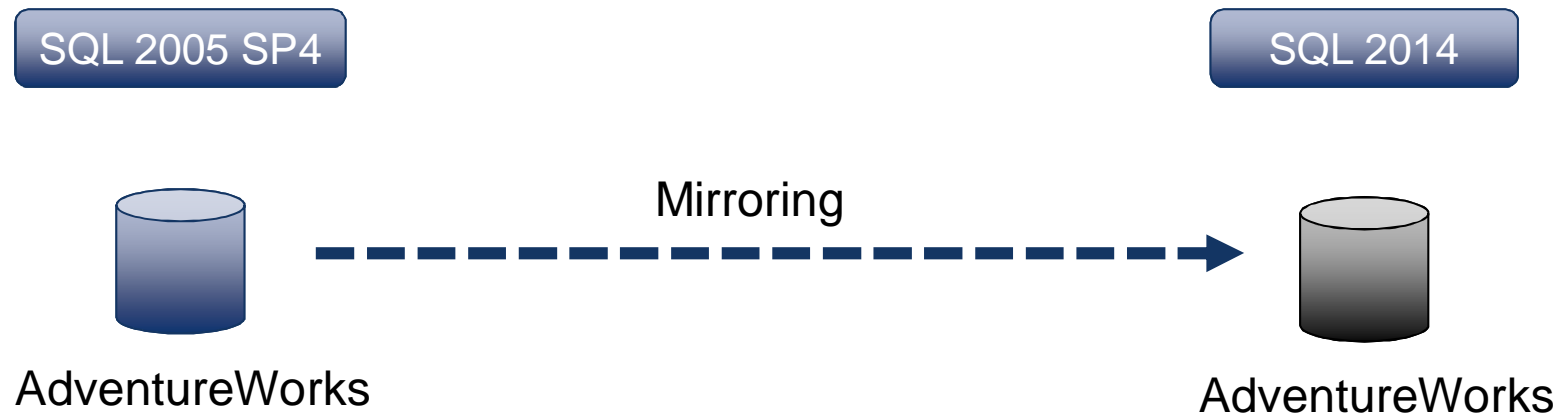
DEMO

UPGRADE FROM SQL SERVER 2000
TO SQL SERVER 2014



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Demo #2



DEMO #2

USING MIRRORING FOR UPGRADE



Best Practises

- Take side-by-side (new installation) option if possible
- Prepare new instance in advance:
 - Evaluate usage of trace flags
 - SQL logins and jobs
 - Extended Events with deprecated features
 - Prepare step-by-step migration plan (document) with rough time estimation and rollback description
 - Prepare test cases for baselining new instance
 - Use SQL Server Agent jobs whenever possible to automate all tasks
 - Rebuild all indexes after upgrade



Document all steps

PREPARING FOR SIDE-BY-SIDE UPGRADE

	Step description	Estimated time to complete	Time once completed
<input type="checkbox"/>	Inform stakeholder about the upgrade		
<input type="checkbox"/>	Install SQL Server on new server		
<input type="checkbox"/>	Install SQL Server 2014 Upgrade Advisor		
<input type="checkbox"/>	Configure Alerts		
<input type="checkbox"/>	Install Maintenance scripts		
<input type="checkbox"/>	Install <u>sp_WholsActive</u>		
<input type="checkbox"/>	Migrate logins		
<input type="checkbox"/>	Run Upgrade Advisor and review report		
<input type="checkbox"/>	Run DBCC CHECKDB		
<input type="checkbox"/>			

Summary

Pay your „technical debt”

Start preparation early and plan well

Be ready for rollback

Check the timing

Don't forget about backups after each major step

Practice, practice and practice



To learn more, go here:

- SQL Server 2014 Upgrade technical guide
- Microsoft SQL Server 2014 Upgrade Advisor
- SQL Server 2012 Best Practices Analyzer
- Discontinued Database Engine Functionality
- Breaking Changes to SQL Server Features
- Microsoft Virtual Academy
- Channel 9 – recordings from Ignite conference



FOR HELP, CONTACT ME:
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THANK YOU!



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