



Modernizing SQL Server the Right Way

Strategies, Guides and Tools

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Experience

Over 13 years in IT, 9 on Database Administration.

Operated with Regional and International (USA) Operations.

Worked with SQL Server, Oracle, MySQL and MongoDB databases.

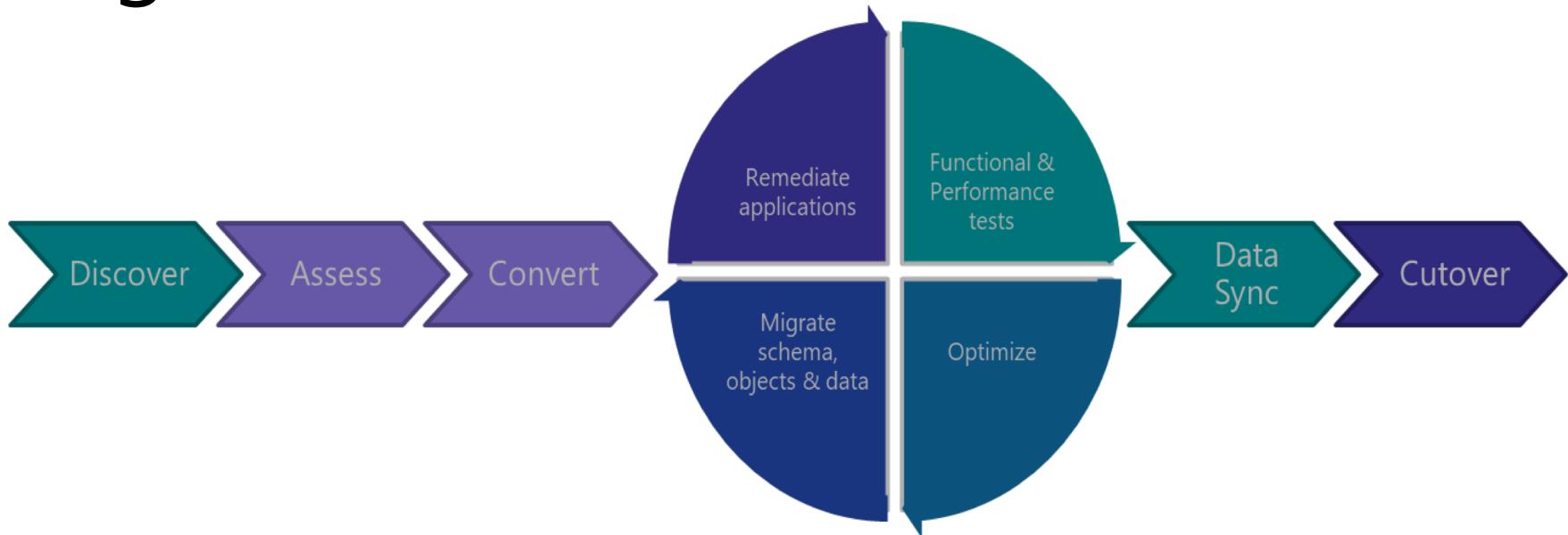
Community

Guatemala SQL Server User Group Staff Member

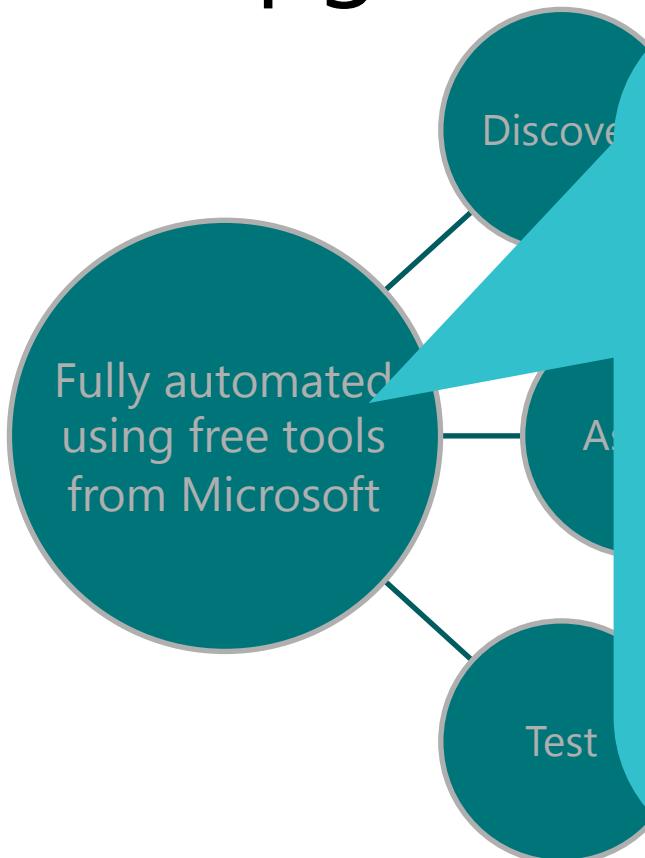


Upgrade Process

Minimize Risk with the Database Migration Guide



Reliable Upgrades

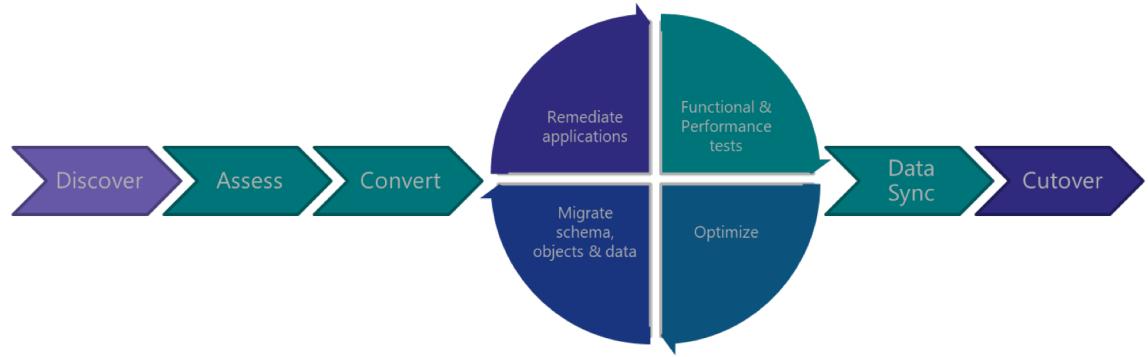


*"With tools like Database Migration Assistant and Database Experimentation Assistant, we were able to **reduce the time and effort** required for the upgrade, enable automated A/B testing capability to **minimize risk** and provide a **high confidence** upgrade plan for a mission critical, Tier-1 environment spanning over a 1000 instances of SQL Server within 3 months."*

Salesforce – PASS Summit 2017

Review the [Database Migration Guide](#) for

Discover



Discover with MAP Toolkit

Database

Steps to complete
Collect inventory data 3,402 Machine(s), 0 % Success on 8/28/2015 1:07 PM Options Create/Select database

Scenarios

SQL Server Discovery 3 Total Count 0 SQL Server 2014 0 SQL Server 2012 1 SQL Server 2008 R2 2 SQL Server 2008 0 SQL Server 2005 0 SQL Server 2000	Azure VM Readiness 1 Machines with SQL Server 1 Ready 0 Ready after changes	Oracle Products 3 Total Count 2 Oracle 11 0 Oracle 10 1 Oracle 9
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Which SQL Server versions do I have?

Which Editions am I running?

Which SQL Server components are installed?

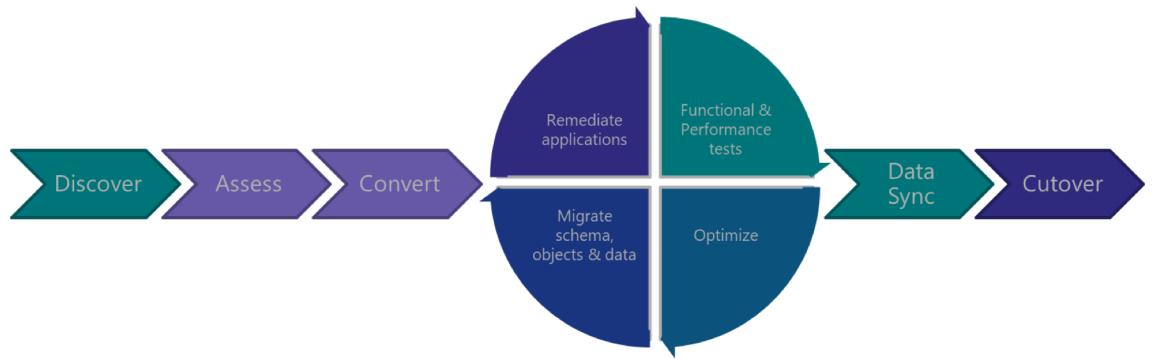
How many cores are on each server?

How many databases are in each instance?

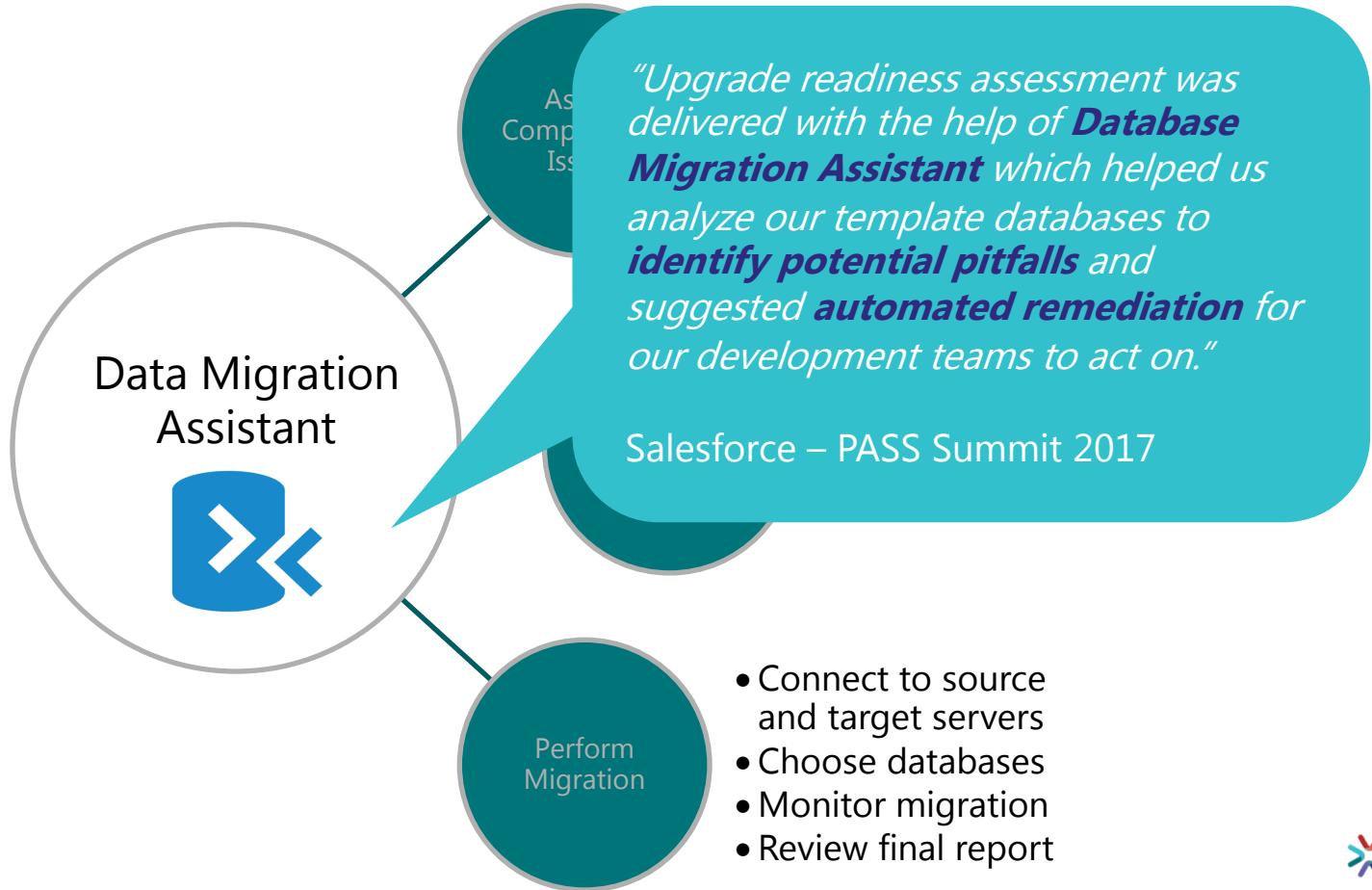
What are the sizes of all my databases?

What are the settings for each instance and database?

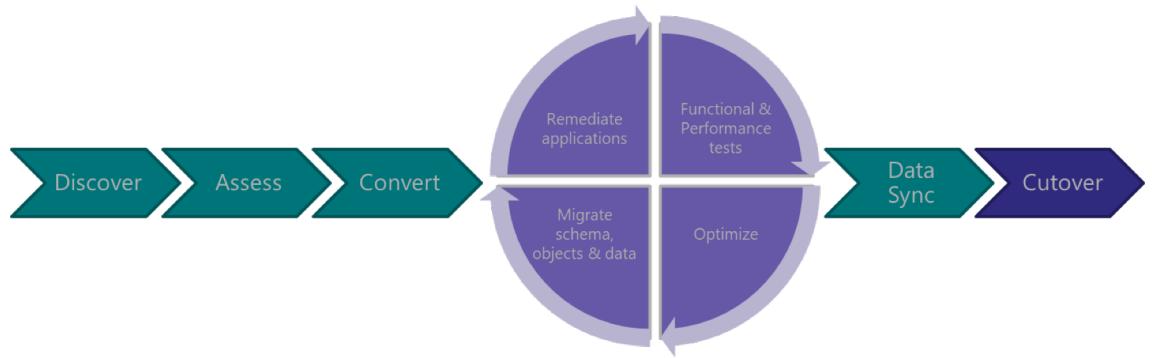
Assess & Convert



Assess & Convert with DMA



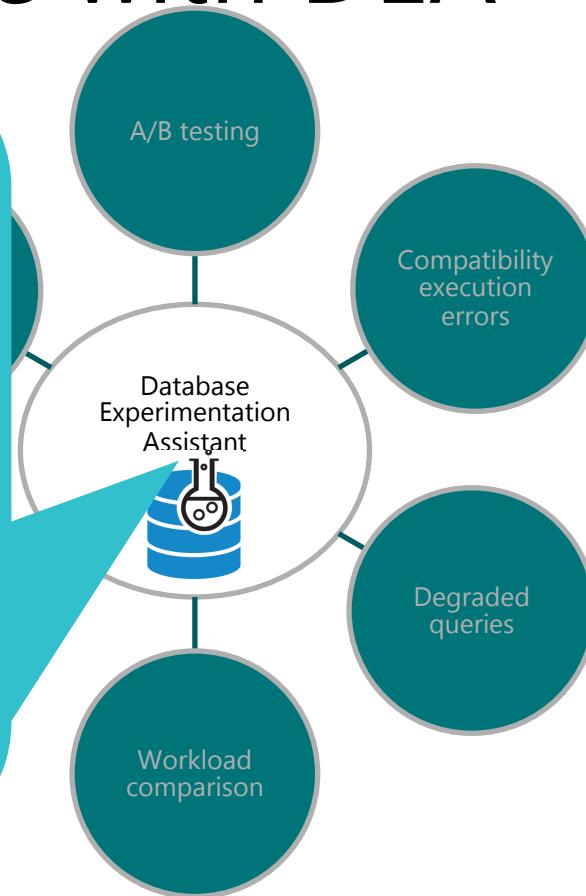
Test & Optimize



Test & Optimize with DEA

"Database Experimentation Assistant helped us perform comparison tests between our current environment and a test SQL Server 2016 environment to identify regressions, breaking changes and performance characteristics."

Because of the automation, we were able to repeat such an exercise with multiple iterations using different configuration settings."



Salesforce – PASS Summit 2017



Walkthrough

Microsoft Assessment and Planning Toolkit

Overview

Cloud

Desktop

Server

Desktop Virtualization

Server Virtualization

Database

Usage Tracking

Environment

 Overview

Environment Summary

50 % Inventory Success

2 Machines Found

1 Machines Inventoried

100 % Performance Collection Success

0:1:0 Duration (Days:Hrs:Mins)

1 Machines

Additional Resources

Learn More

- [MAP Toolkit Homepage](#)
- [MAP Training Wiki](#)
- [MAP Toolkit on TechNet](#)

Community

- [MAP Toolkit Team Blog](#)
- [TechNet User Forums](#)

Reference Material

- [MAP Toolkit Application Download](#)
- [MAP Toolkit Sample Reports](#)

Scenarios Available

Server Virtualization

Database

Usage Tracking

Environ...



Cloud

All scenarios relevant to the migration to and use of cloud services and products offered by Microsoft.

- Microsoft Azure VM Readiness
- Microsoft Azure Virtual Machine Capacity
- Office 365 Readiness
- Microsoft Private Cloud Fast Track
- Hardware Library

Overview

Cloud

Desktop

Server

Desktop Virtualization

Server Virtualization

Database

Usage Tracking

Environment

Database

Steps to complete

Collect inventory data

2 Machine(s), 50 % Success on 6/17/2019 3:55 PM

Options

Create>Select database

Scenarios



SQL Server Discovery

Total Count

- 1 SQL Server 2017
- 0 SQL Server 2016
- 0 SQL Server 2014
- 0 SQL Server 2012
- 1 SQL Server 2008 R2
- 0 SQL Server 2008
- 0 SQL Server 2005



Azure VM Readiness

Machines with SQL Server

- 0 Ready
- 1 Ready after changes



Oracle Products

Total Count

- 0 Oracle 18
- 0 Oracle 12
- 0 Oracle 11
- 0 Oracle 10
- 0 Oracle 9

Additional Resources

Desktop

Server

Desktop Virtualization

Server Virtualization

Database

Usage Tracking

Environment

0 SQL Server 2000

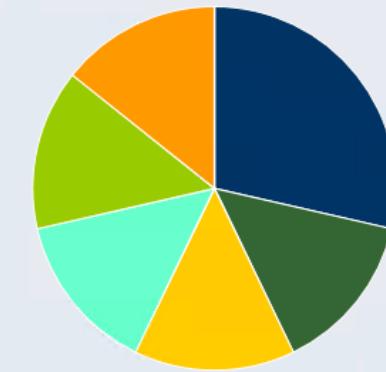
7 Total Count

- 2 Database Engine Services
- 1 Integration Services
- 1 Analysis Services
- 0 Reporting Services
- 1 Master Data Services
- 1 Data Quality Services
- 1 SQL Server R Services

0 Licensed Editions

- 0 Enterprise
- 0 Enterprise Core
- 0 Data Center
- 0 Standard
- 0 Web
- 0 Business Intelligence

SQL Server Components



Licensed Editions



Demo





Walkthrough

Database Experimentation Assistant



Welcome to Database Experimentation Assistant

To get started, click on the left side navigation bar.



Capture a workload on the source server.



Replay the captured workload on target 1 and target 2.



Analyze replayed traces collected from target 1 and target 2.



ASS



Connect to server to view existing reports or generate new reports

Server name ⓘ

Report Server e.g. localhost

Authentication Type ⓘ

Windows

Encrypt connection Trust server certificate

Connect

Analysis Reports



Connected Report Server: DEAGAWSVR2016

Switch Server

+ NEW REPORT

Threshold 5%



2016Migration

STATUS NAME DATE

Test08To14Sms 2018/07/18

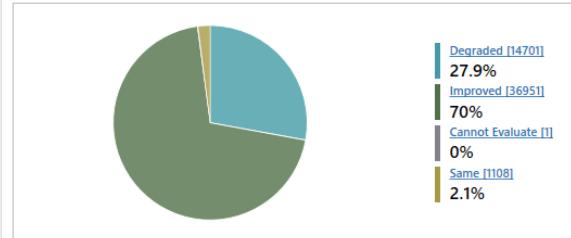
ADWTPS100 2018/07/18

2016Migration 2018/03/13

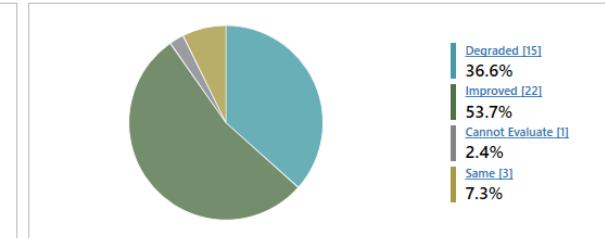


QUERY DISTRIBUTION

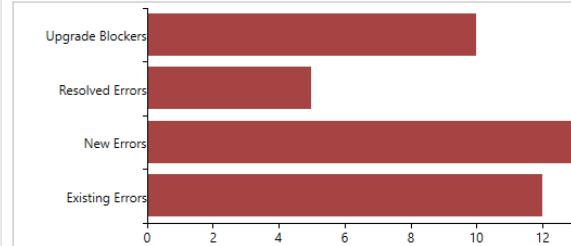
By execution count



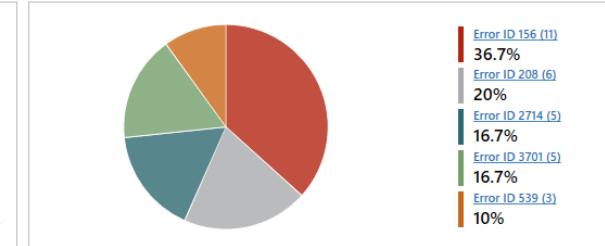
By distinct queries



Distinct error queries count by type



Error ID count



Top queries in workload

Top Improved Queries | Top Degraded Queries

Hash Id	Query Text	Mean Duration on Target 1 (μs)	Mean Duration on Target 2 (μs)	Duration Difference (μs)
-161615527833986948	IF OBJECT_ID (STR1, STR2) IS NOT NULL DROP TABLE DBO.EMPLOYEEONE;	102353	9105	-93248
-1704013646769530258	SELECT DISTINCT PP.LASTNAME, PP.FIRSTNAME FROM PERSON.PERSON PP JOIN	181508	127802	-53706

Analysis Reports



Connected Report Server: DEAGAWSVR2016

Switch Server

+ NEW REPORT

2016Migration

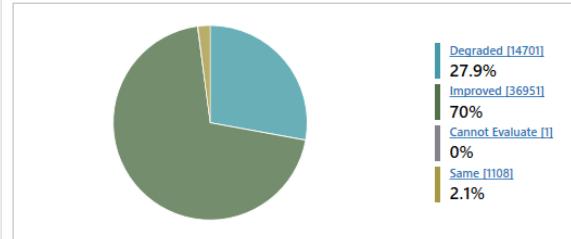
Threshold 5%



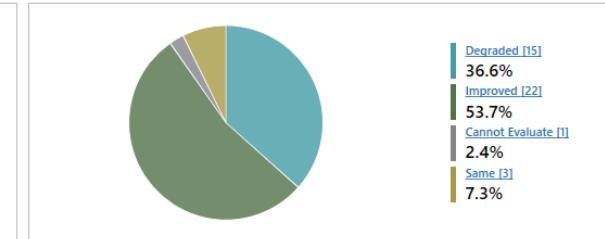
STATUS	NAME	DATE
✓	Test08To14Sms	2018/07/18
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✓	2016Migration	2018/03/13

QUERY DISTRIBUTION

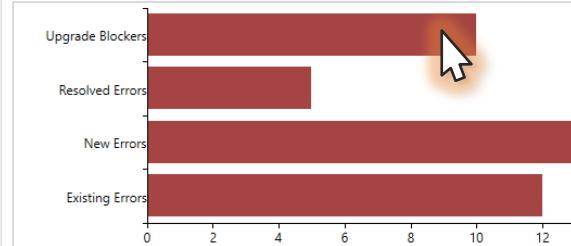
By execution count



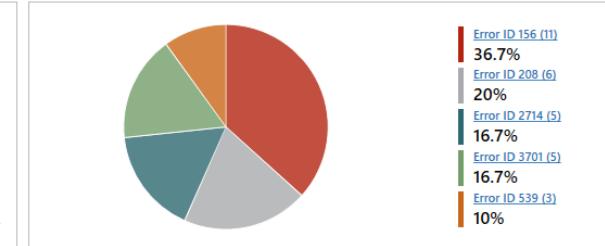
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Analysis Reports



Connected Report Server: DEAGAWSVR2016

Switch Server

+ NEW REPORT

2016Migration > Error

Threshold 5%



STATUS	NAME	DATE
✓	Test08To14Sms	2018/07/18
✓	ADWTPS100	2018/07/18
✓	2016Migration	2018/03/13

ERROR QUERIES

Error Type	Query Count	Execution Count
Existing Errors (Errors on target 1 server that continue to exist on the target 2 server.)	12	1128
New Errors (Errors which are new on the target 2 server.)	13	3552
Resolved Errors (Errors which existed on target 1 server but resolved in target 2 server.)	5	14
Upgrade Blockers (Errors that will block upgrade to target server.)	10	3519

New Errors Existing Errors Resolved Errors Upgrade Blockers

Query Text	Error ID	Error Count	Error Text
SELECT PRODUCTID, LINETOTAL FROM SALES.SALESORDERDETAIL WHERE UNITPRICE < {##},{##} ORDER BY PRODUCTID, LINETOTAL COMPUTE SUM(LINETOTAL) BY PRODUCTID;	156	372	Incorrect syntax near the keyword 'COMPUTE'.
SELECT PRODUCTID, ORDERQTY, SUM(LINETOTAL) AS TOTAL FROM SALES.SALESORDERDETAIL WHERE UNITPRICE < {##},{##} GROUP BY PRODUCTID, ORDERQTY ORDER BY PRODUCTID, ORDERQTY COMPUTE SUM(SUM(LINETOTAL)) BY PRODUCTID, ORDERQTY COMPUTE SUM(SUM(LINETOTAL));	156	397	Incorrect syntax near the keyword 'COMPUTE'.
SELECT SALESPERSONID, CUSTOMERID, ORDERDATE, SUBTOTAL, TOTALDUE FROM SALES.SALESAORDERHEADER ORDER BY SALESPERSONID, ORDERDATE COMPUTE SUM(SUBTOTAL), SUM(TOTALDUE) BY SALESPERSONID;	156	342	Incorrect syntax near the keyword 'COMPUTE'.
SELECT PRODUCTID, ORDERQTY, LINETOTAL FROM SALES.SALESORDERDETAIL COMPUTE SUM(ORDERQTY), SUM(LINETOTAL);	156	365	Incorrect syntax near the keyword 'COMPUTE'.
SELECT PRODUCTID, ORDERQTY, UNITPRICE, LINETOTAL FROM SALES.SALESORDERDETAIL WHERE UNITPRICE < {##},{##} COMPUTE SUM(ORDERQTY), SUM(LINETOTAL);	156	327	Incorrect syntax near the keyword 'COMPUTE'.
SELECT PRODUCTID, ORDERQTY, UNITPRICE, LINETOTAL FROM SALES.SALESORDERDETAIL WHERE UNITPRICE < {##},{##} ORDER BY PRODUCTID, ORDERQTY, LINETOTAL COMPUTE SUM(LINETOTAL) BY PRODUCTID, ORDERQTY COMPUTE SUM(LINETOTAL) BY PRODUCTID;	156	354	Incorrect syntax near the keyword 'COMPUTE'.
SELECT PRODUCTID, LINETOTAL FROM SALES.SALESORDERDETAIL WHERE UNITPRICE < {##},{##} ORDER BY PRODUCTID, LINETOTAL COMPUTE SUM(LINETOTAL), MAX(LINETOTAL) BY PRODUCTID;	156	375	Incorrect syntax near the keyword 'COMPUTE'.
SELECT PRODUCTID, ORDERQTY, UNITPRICE, LINETOTAL FROM SALES.SALESORDERDETAIL WHERE UNITPRICE < {##},{##} ORDER BY PRODUCTID COMPUTE SUM(ORDERQTY), SUM(LINETOTAL) BY PRODUCTID COMPUTE SUM(ORDERQTY), SUM(LINETOTAL);	156	323	Incorrect syntax near the keyword 'COMPUTE'.
SELECT CUSTOMERID, ORDERDATE, SUBTOTAL, TOTALDUE FROM SALES.SALESAORDERHEADER WHERE	156	331	Incorrect syntax near the keyword 'COMPUTE'.

Modernization Tools Breakdown

DMA

Readiness assessment: blocking issues breaking changes, behavior changes

Moves schema, data and uncontained objects (like logins) To Azure SQL Database

Backup / Restore to another SQL Server (Keeps source DB Compatibility Level)

New feature recommendation

DEA

A/B Testing

Capture and Replay workload for performance testing and reporting

Also reports on migration blockers because of failed T-SQL syntax

QTA

Upgrade Database Compatibility Model to desired state

Detects workload regressions, and tests CE model variations (subsets)

Provides tangible recommendations for tuning queries without reverting DB compat

SQL Server Migration Assistant

Supports compete migration from Oracle, MySQL, SAP ASE, DB2, and Access to SQL Server 2008, 2008 R2, 2012, 2014, 2016, 2017, Azure SQL Database, and Azure SQL Data Warehouse (supported only by SSMA for Oracle).

Allows users to convert a database schema to a Microsoft SQL Server schema, upload the schema, and then migrate data to the target SQL Server.

Session takeaways

- Review the database migration guide
- Familiarize yourself with the DMA, DEA.

Downloads

MAP:

<https://www.microsoft.com/en-us/download/details.aspx?id=7826>

DMA:

<https://www.microsoft.com/en-us/download/details.aspx?id=53595>

DEA:

<https://www.microsoft.com/en-us/download/details.aspx?id=54090>

Questions?



Thank You