

SPINNAKER
SUPPORT



PLANNING AND EXECUTING A SUCCESSFUL SQL SERVER DATABASE MIGRATION

Presented By: Carlos Colón | November 12, 2016

Presentation Topics

- ▶ Typical SQL Server Migration Plan
- ▶ Key Deliverables
- ▶ Database Migration Steps
- ▶ Brief Overview of SQL Server Migration Assistant Tool (SSMA)
- ▶ Common Problems in Database Migrations

What is NOT Covered

- ▶ Detailed SSMA Tutorial
- ▶ DBMS Specific Migration Information
- ▶ How to Build Target SQL Server System

Goals

By the end of the presentation you will:

- Understand at a high level how to migrate a database to SQL Server
- Know how to avoid surprises by better planning
- Leverage SSMA as both a planning and a migration tool

Presenter Info



- 20 years of experience in database development, administration, and project management
- B.S. in Management of Information Systems – USF
- Dobler Consulting lead of DBA Managed Services practice

SQL Server Migration Challenges

- All database migration projects are unique
 - Differences in DBMS, configurations, SQL code, front-end applications, third-party tools, etc.
- Not all database system components can be migrated
 - In most cases, logins cannot be migrated
 - Third-party applications may not be compatible with SQL Server
 - Embedded and dynamic SQL code has to be migrated manually
 - Applications may require new drivers/connectors
- Scope of database migration project can be quite large
 - Migration effort can include thousands of database objects and lines of code
 - Not enough time to perform full regression/performance testing

Steps for Overcoming Challenges

- Thoroughly analyze existing database system
 - Identify all components that must exist in target SQL Server environment
- Develop an approach for each component that will require manual migration
 - Consider grouping components by categories that will implement the same approach (i.e. replace current transactional replication and failover solutions with AlwaysOn).
 - Evaluate risks and contingency options
- Include adequate time for migration testing
 - Plan to execute your database migration as many times as possible in your test environment
 - Develop test approach to minimize risks
 - Practice makes perfect!

Typical SQL Server Migration Plan

- I. Analysis
- II. Planning
- III. Build
- IV. Migrate, Test, Fix, Repeat
- V. Deployment
- VI. Support

Analysis Deliverables

- System Architecture Diagrams
 - Map all components of AS-IS and TO-BE systems
- System Configurations
 - Operating System, DBMS, Applications and Third Party tool versions
 - For database, look for Collation, ANSI defaults, Quoted Identifier settings
- Hardware Specifications
 - Identify server and storage requirements for target system
 - Unless you are migrating to an existing SQL Server, you will need to order new hardware early in the project

Planning Deliverables

- Environment Plan
 - Outline of environments to be used in migration project
 - States what components from AS-IS and TO-BE systems will be included
 - Document who will use the environment and when

- Project Schedule
 - Leverage SSMA Migration Reports for estimating effort

Planning Deliverables

- Change/Source Code Version Management Plan
 - Change happens, and you better be ready for it
 - Develop a strategy to incorporate changes to source system without disrupting migration schedule
 - Create new source code repository for migrated database objects
- Production Contingency/Back out Plan
 - Get management buy-in early in the project
 - Agree on checkpoints and who makes GO/NO-GO decisions
 - Agree on criteria to implement contingency plan

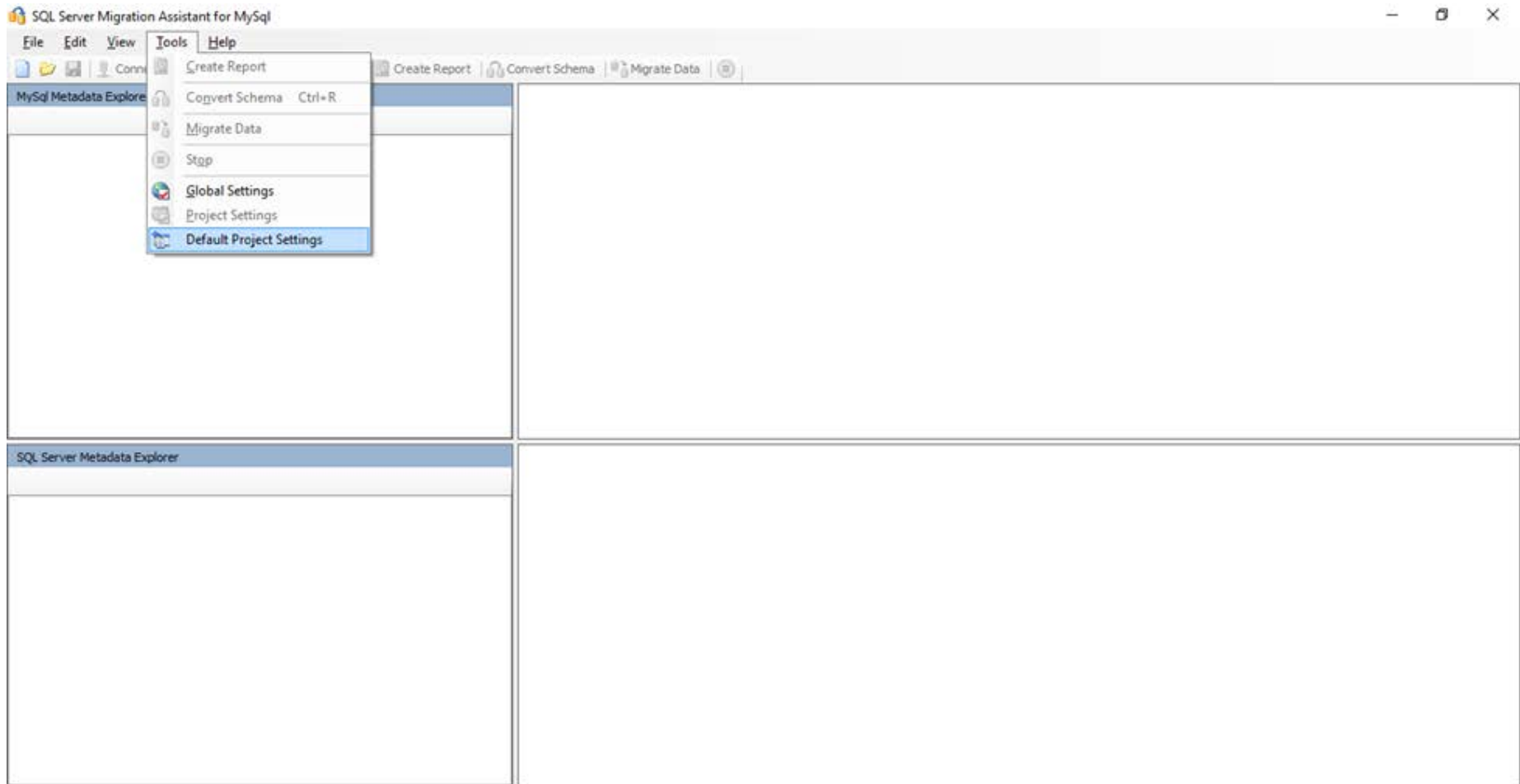


Intro to SSMA Tool

- SQL Server Migration Assistant Overview
 - Provides detailed migration assessment report with effort estimates
 - Automates schema and data migration
 - Available for five DBMS: Oracle, Sybase, MySQL, Access, and DB2
 - Capable of migrating source DBMS to SQL Server 2005 or higher and to SQL Azure



SSMA Configuration



SSMA Configuration

Default Project Settings

Migration Target Version : SQL Server 2014

- SQL Server 2014
- SQL Server 2012
- SQL Server 2005
- SQL Server 2008
- SQL Azure

Please select a migration project type in the 'Migration Target Version' drop down box.

OK Apply Cancel

SSMA Configuration

Default Project Settings

Migration Target Version : SQL Server 2014

Mode: Default

Conversion
Migration
Collecting Data

Misc

@@ERROR global variable	Convert and mark with warning
Dynamic SQL	Convert and mark with warning
Equality check conversion	Simple conversion
Insert an explicit value into a timestamp column	Exclude column
Proxy table conversion	Mark with error
RAISERROR base message number	30001
Store temporary objects defined in procedures	Yes
System objects	Convert and mark with warning
Unresolved identifiers	Convert and mark with warning
String expressions	
Concatenation of NULL	Keep current syntax
Conversion of Empty Strings	Keep current syntax
Conversion of LIKE operator	Simple conversion
CONVERT and CAST binary string conversion	Convert and mark with warning
CONVERT or CAST empty strings to numeric types	Simple conversion
Format strings	Create new string
System functions	
CHARINDEX function	Keep current syntax
DATALength function	Keep current syntax
INDEX SQL	Mark with error

Misc

General
Synchronization
GUI
Type Mapping

OK Apply Cancel

SSMA Configuration

Default Project Settings

Migration Target Version : SQL Server 2014

Mode: Default

Conversion
Migration
Collecting Data

Misc

@@ERROR global variable	Convert and mark with warning
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Unresolved identifiers	Convert and mark with warning

String expressions

Concatenation of NULL	Keep current syntax
Conversion of Empty Strings	Keep current syntax
Conversion of LIKE operator	Simple conversion
CONVERT and CAST binary string conversion	Cast to fixed length
CONVERT or CAST empty strings to numeric types	Simple conversion
Format strings	Create new string

System functions

CHARINDEX function	Keep current syntax
DATALength function	Keep current syntax

Conversion of LIKE operator
Specifies whether to convert LIKE operands to match Sybase ASE behavior. If the option is "Cast to fixed length" and LIKE pattern is '%' with leading spaces, the left hand operand will be cast to the char or nchar data type.


General
Synchronization
GUI
Type Mapping

OK Apply Cancel

SSMA Configuration

Default Project Settings ✕

Migration Target Version : SQL Server 2014 ▼

Mode: Default ▼ 

- Conversion
- Migration**
- Collecting Data

<ul style="list-style-type: none"> ▼ Dates Correction Replace unsupported dates Do nothing ▼ Migration Engine Migration Engine Client Side Data Migration Engine ▼ ▼ Misc Batch size 10000 Check constraints False Data migration timeout 15 Extended data migration options Hide Fire triggers False Keep identity True Keep nulls True On Error Proceed to next batch Round fractional part of numbers No Sybase Unicode Endian Little-endian Table lock True Use cursors False ▼ Parallel Data Migration Parallel data migration mode Auto
--

General

Synchronization

GUI

Type Mapping

Migration Engine

Migration Engine used during data migration

OK Apply Cancel

18

SSMA Configuration

Default Project Settings

Migration Target Version : SQL Server 2014

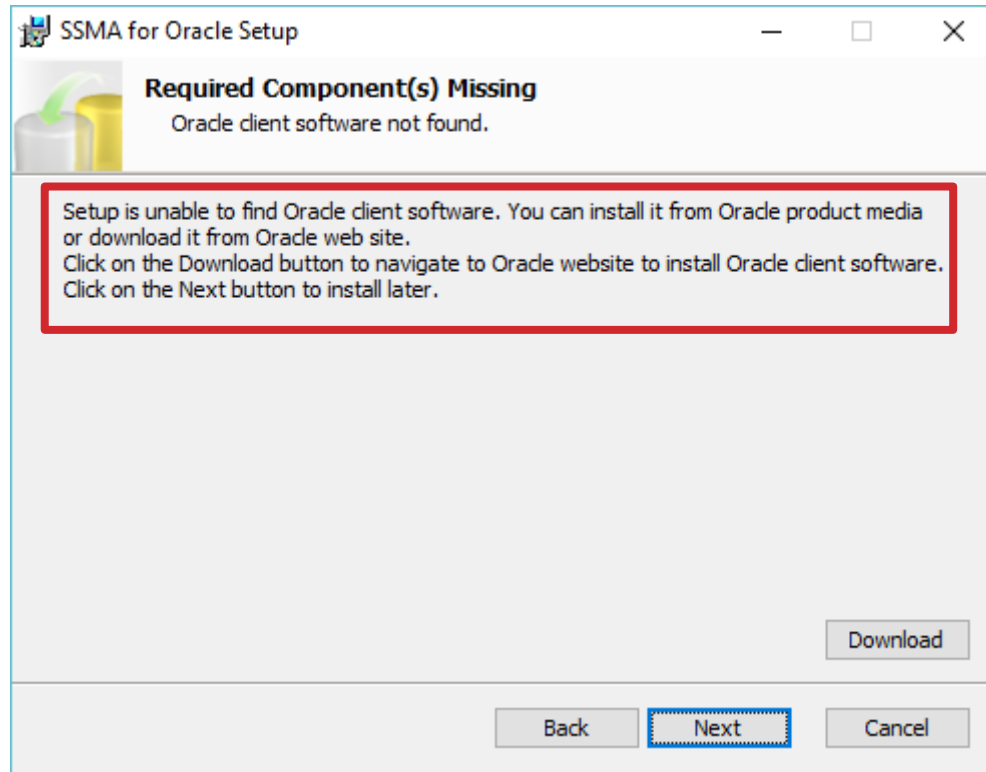
Type Mapping

Source Type	Target Type
float[16..*]	float[53]
image	image
int	int
integer	int
longsysname	nvarchar[255]
money	money
national char	nchar
national char varying	nvarchar
national char varying[*..4000]	nvarchar[*]
national char varying[4001..*]	nvarchar(max)
national char[*..4000]	nchar[*]
national char[4001..*]	nvarchar(max)
national character	nchar
national character varying	nvarchar
national character varying[*..4000]	nvarchar[*]
national character varying[4001..*]	nvarchar(max)
national character[*..4000]	nchar[*]
national character[4001..*]	nvarchar(max)

Deprecated datatype

OK Apply Cancel

Verify Drivers



Verify Drivers

MySQL-to-SQL Demo #1[SQL Server 2014] - SQL Server Migration Assistant for MySQL

File Edit View Tools Help

Connect to MySQL Connect to SQL Server Create Report Convert Schema Migrate Data

MySQL Metadata Explorer

Go Up Go Back Go Forward

SQL Server Metadata Explorer

Go Up Go Back Go Forward

Connect to MySQL

Specify parameters for new connections to the source.

Provider: MySQL ODBC 5.1 Driver (v5.1.13) : 32 Bit; trusted

Please consider using driver version 5.1.6 or higher.
The selected provider is incompatible with the installed version of SSMA for MySQL. This warning may be a result of running SSMA as 64-bit application while having only 32-bit connectivity components installed or vice versa. You can run 32-bit SSMA application if you have 32-bit connectivity components or 64-bit SSMA application if you have 64-bit connectivity components, shortcut to both 32-bit and 64-bit SSMA can be found under the Programs menu.

Server port: 3306

SSL

Configure

User name: SqlMigration

Password:

Connect Cancel

Done.

Verify Drivers

Access-to-SQL Demo #1[SQL Server 2014] * - SQL Server Migration Assistant for Access

File Edit View Tools Help

Add Databases Find Databases Connect to SQL Server Convert, Load, and Migrate Create Report Convert Schema Migrate Data

Access Metadata Explorer

Go Up Go Back Go Forward

Access-metadata

Databases

MonthlySalesReports

Queries

Tables

SQL Server Metadata Explorer

Go Up Go Back Go Forward

Output

Access Object Collector error: Database

Retrieving the COM class factory for component with CLSID {CD7791B9-43FD-42C5-AE42-8DD2811F0419} failed due to the following error: 80040154 Class not registered (Exception from HRESULT: 0x80040154 (REGDB_E_CLASSNOTREG)). This error may be a result of running SSMA as 64-bit application while having only 32-bit connectivity components installed or vice versa. You can run 32-bit SSMA application if you have 32-bit connectivity components or 64-bit SSMA application if you have 64-bit connectivity components, shortcut to both 32-bit and 64-bit SSMA can be found under the Programs menu. You can also consider updating your connectivity components from <http://go.microsoft.com/fwlink/?LinkId=197502>.

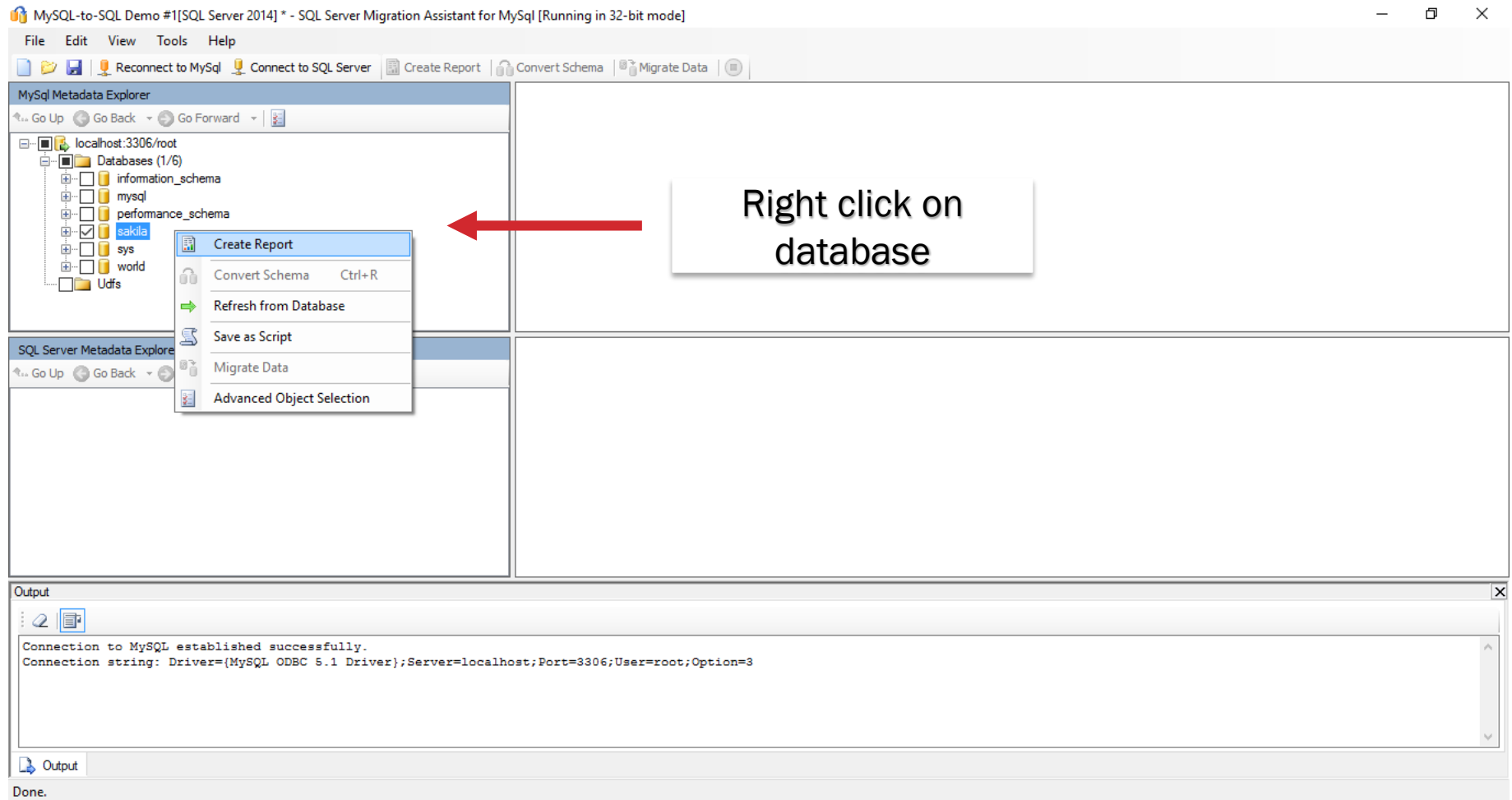
An error occurred while loading database content.

Output

SSMA as a Planning Tool

- SSMA features a Database Migration Assessment Report
 - The report lists all database objects that will require manual effort for conversion
 - Indicates the reason objects cannot be migrated automatically
 - Provides rough estimates on manual effort
- Perform a test conversion to uncover additional issues
 - SSMA may not catch all possible migration issues
 - Errors may appear when loading migrated objects to SQL Server (i.e. improper use of quoted identifiers, computed columns, etc.)
 - Do a test conversion to get a full picture of migration assessment

SSMA Migration Assessment Report



SSMA Migration Assessment Report

SQL Server Migration Assistant for MySQL: Assessment Report

Microsoft® SQL Server® Migration Assistant 6.0



Databases > sakila

Conversion statistics

Statement type	Total	Converted	Not converted
ALL	559	90.33%	54
argument	13	100%	0
auto-increment-column	13	100%	0
auto-increment-option	13	100%	0
block-statement	1	100%	0
column-declaration	91	98.9%	1
constraint-foreign-key-clause	22	63.63%	8
constraint-primary-key-clause	17	94.11%	1
constraint-unique-clause	2	100%	0
create-relation-table-statement	17	94.11%	1

Objects by categories

Object type	Total	With errors
databases	1	1
functions	3	0
procedures	3	3
tables	16	8
triggers	6	0
views	7	3

Errors (23) Warnings (8) Info (58) Navigate by Warnings

Total estimated manual conversion time: 24 hr(s)

M2SS0016: SQL Server Migration Assistant for MySQL Error message: Unresolved identifier(4) Estimated manual conversion time: 2 hr(s)
rewards_report(4), Estimated manual conversion time: 2 hr(s)

M2SS0035: SQL Server Migration Assistant for MySQL Error message: SSMA for MySQL does not support FULLTEXT indexes(1) Estimated manual conversion time: 1 hr(s)

C:\Users\Carlos\Documents\SSMAProjects\MySQL-to-SQL Demo #1\report\report_2016_02_27T04_23_03\mainindex.html

Close

SSMA Migration Assessment Report

SQL Server Migration Assistant for MySQL: Assessment Report

Microsoft® SQL Server® Migration Assistant 6.0

Databases > sakila > Tables > film

Statistics:

Source	Target
<pre> 1 CREATE 2 TABLE `film` 3 (4 `film_id` smallint(5) UNSIGNED NOT NULL AUTO_INCREMENT, 5 `title` varchar(255) NOT NULL, 6 `description` text, 7 `release_year` year(4) DEFAULT NULL, 8 `language_id` tinyint(3) UNSIGNED NOT NULL, 9 `original_language_id` tinyint(3) UNSIGNED DEFAULT NULL, 10 `rental_duration` tinyint(3) UNSIGNED NOT NULL DEFAULT '3', 11 `rental_rate` decimal(4, 2) NOT NULL DEFAULT '4.99', 12 `length` smallint(5) UNSIGNED DEFAULT NULL, 13 `replacement_cost` decimal(5, 2) NOT NULL DEFAULT '19.99', 14 `rating` enum(15 'G', 16 'PG', 17 'PG-13', 18 'R' </pre>	<pre> 31 CONSTRAINT PK_film_film_id PRIMARY KEY (film_id), 32 /* 33 * SSMA error messages: 34 * M2SS0037: ON UPDATE CASCADE SET NULL SET DEFAULT action was cha 35 36 CONSTRAINT film\$fk_film_language FOREIGN KEY (language_id) REFERE 37 ON UPDATE NO ACTION */ 38 39 40 CONSTRAINT film\$fk_film_language_original FOREIGN KEY (original_l 41 ON UPDATE CASCADE, 42 /* 43 * SSMA informational messages: 44 * M2SS0149: The ssma\$rowid column has been added 45 */ 46 47 ssma\$rowid uniqueidentifier DEFAULT newid() NOT NULL UNIQUE 48 </pre>

Errors (23) Warnings (8) Info (58) Navigate by Warnings Total estimated manual conversion time: 24 hr(s)

M2SS0016: SQL Server Migration Assistant for MySQL Error message: Unresolved identifier(4) Estimated manual conversion time: 2 hr(s)

rewards_report(4), Estimated manual conversion time: 2 hr(s)

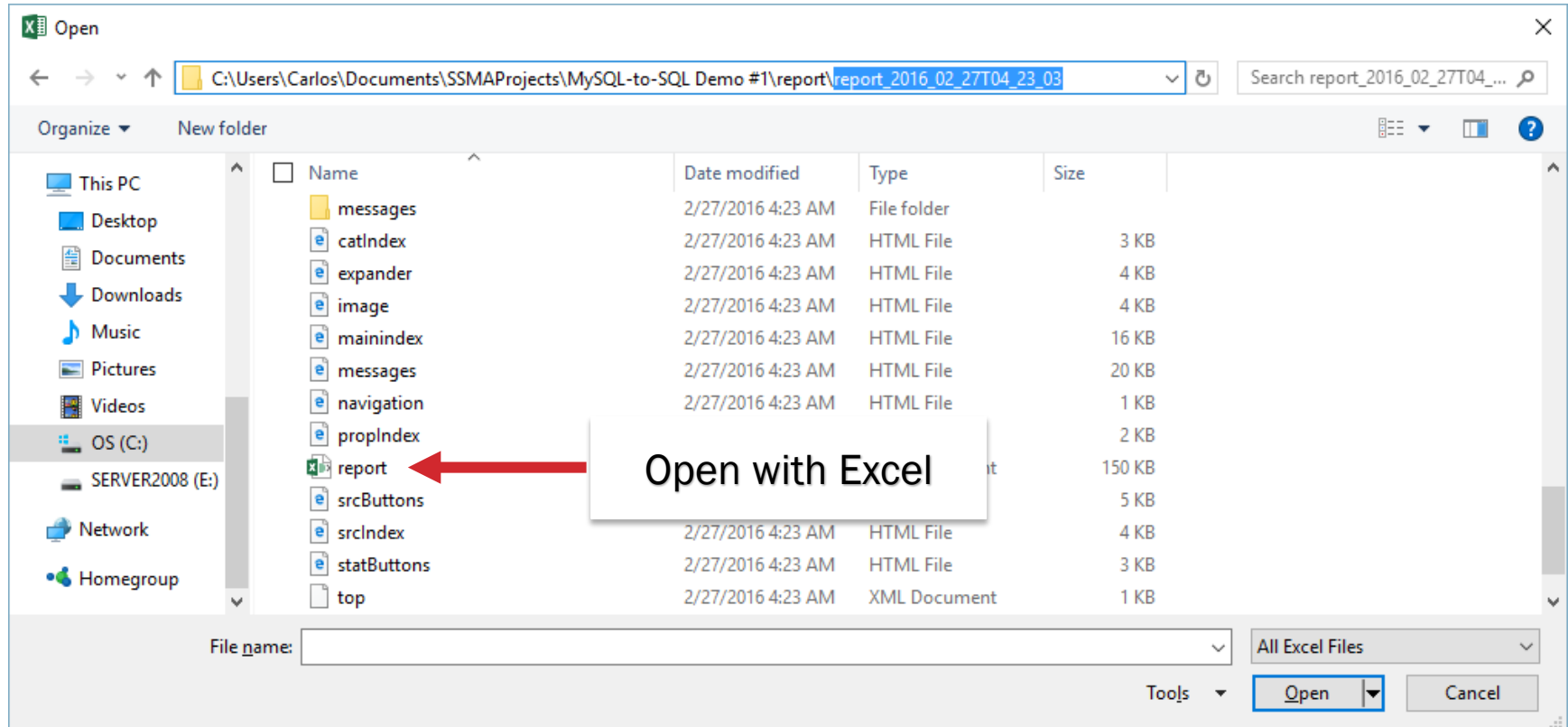
M2SS0035: SQL Server Migration Assistant for MySQL Error message: SSMA for MySQL does not support FULLTEXT indexes(1) Estimated manual conversion time: 1 hr(s)

C:\Users\Carlos\Documents\SSMAProjects\MySQL-to-SQL Demo #1\report\report_2016_02_27T04_23_03\mainindex.html

Close

Click error to show
code

How to Access Saved Report



How to Access Saved Report

report - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW

Clipboard Font Alignment Number Styles Cells Editing

A15

Object Name	Number o	Manual C	ALL	argument auto-incr	auto-incr	block-stat	column-d	constraint	constraint	constraint	create-rel	create-sta	create-tat	ddl-staten	default-co	delete-sta	drop-state	fulltext-sp
sakila	4	24	90.33%	100%	100%	100%	98.90%	63.63%	94.11%	100%	94.11%	88.88%	94.11%	84.21%	100%	100%	100%	0.00%
Functions	3	0	100%	100%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%	N/A	100%	N/A	N/A	N/A	N/A
Procedures	3	5	76.71%	100%	N/A	N/A	100%	0.00%	N/A	0.00%	N/A	0.00%	75.00%	0.00%	100%	N/A	100%	N/A
Tables	16	10.5	95.41%	N/A	100%	100%	N/A	100%	63.63%	100%	100%	100%	100%	100%	100%	100%	N/A	0.00%
category	1	0	100%	N/A	100%	100%	N/A	100%	N/A	100%	100%	100%	100%	N/A	100%	N/A	N/A	N/A
Triggers	6	0	100%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%	N/A	100%	N/A	100%	N/A	N/A
Views	7	8.5	55.81%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	57.14%	N/A	57.14%	N/A	N/A	N/A	N/A

Note: The manual conversion time is the estimated time to manually complete the database conversion after using SSMA.

Assessment Summary Detailed Assessment Objects by Categories Error Messages Warning Messages Informational Messages

READY

How to Access Saved Report

report - Excel					
FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW					
Clipboard Font Alignment Number Styles Cells Editing					
A1 Error Messages and Objects					
1	A	B	C	D	E
	Error Messages and Objects	Amount	Manual Conversion Time (in hours)		
2	M2SS0016: SQL Server Migration Assistant for MySql Error message: Unresolved identifier	4	2		
3	rewards_report	4	2		
4	M2SS0035: SQL Server Migration Assistant for MySql Error message: SSMA for MySQL does not support FULLTEXT indexes	1			
5	film_text	1			
6	M2SS0036: SQL Server Migration Assistant for MySql Error message: ON UPDATE action was changed to NO ACTION to avoid circular references of cascaded foreign keys.	2			
7	staff	1			
8	store	1	1		
9	M2SS0037: SQL Server Migration Assistant for MySql Error message: ON UPDATE action was changed to NO ACTION to avoid multiple paths in cascaded foreign keys.	6	6		
10	customer	1	1		
11	rental	2	2		
12	film	1	1		
13	payment	2	2		
14	M2SS0061: SQL Server Migration Assistant for MySql Error message: SSMA for MySQL does not support SPATIAL indexes	1	1		
15	address	1	1		
16	M2SS0188: SQL Server Migration Assistant for MySql Error message: SSMA for MySQL does not support creation of temporary tables in stored procedures, functions, and triggers	1	1		
17	rewards_report	1	1		
18	M2SS0195: SQL Server Migration Assistant for MySql Error message: DDL Statements are not valid in this context	1	0		
19	rewards_report	1	0		
20	M2SS0201: SQL Server Migration Assistant for MySql Error message: MySQL standard function is not supported	6	3		
21	nicer_but_slower_film_list	1	0.5		
22	film_not_in_stock	1	0.5		
23	film_list	1	0.5		
24	actor_info	1	0.5		
25	film_in_stock	1	0.5		
Assessment Summary Detailed Assessment Objects by Categories Error Messages Warning Messages Informational Messages					

Develop approach
for each error

Develop Migration Scripts

- Develop scripts to execute schema migration
 - Complete manual object migration in SQL Server
 - Generate full set of scripts after SQL code is complete

- Recommended scripts:
 - Create database scripts
 - Create tables, views, functions, stored procedures
 - Create triggers
 - Create clustered indexes, primary key constraints
 - Create non-clustered indexes
 - Create foreign key constraints
 - Create logins, roles, permissions
 - Post migration scripts (i.e. computed columns)

SSMA Schema Migration

MySQL-to-SQL Demo #1[SQL Server 2014] - SQL Server Migration Assistant for MySQL [Running in 32-bit mode]

File Edit View Tools Help

Reconnect to MySQL Reconnect to SQL Server Create Report Convert Schema Migrate Data

MySQL Metadata Explorer

Go Up Go Back Go Forward

localhost:3306/root [offline]

Databases (1/6)

- information_schema
- mysql
- performance_schema
- sakila**
 - Events
 - Functions
 - Procedures
 - Statements
 - Tables
 - Views
- sys
- world
- Udfs

Right click on database

Create Report

Convert Schema Ctrl+R

Refresh from Database

Save as Script

Migrate Data

Advanced Object Selection

Schema Mapping

Source Schema	Well-Known	Description	Target Schema
sakila	<input type="checkbox"/>		sakila.dbo

database : sakila

Modify

Reset to Default

SQL Server Metadata Explorer

Go Up Go Back Go Forward

localhost [offline]

Databases

- master
- model
- msdb
- tempdb

Properties

category : Databases

Category Information

Category	Databases
Subitems Count	4

Category

The name of the category.

Done.

SSMA Schema Migration

MySQL-to-SQL Demo #1[SQL Server 2014] * - SQL Server Migration Assistant for MySQL [Running in 32-bit mode]

File Edit View Tools Help

Reconnect to MySQL Reconnect to SQL Server Create Report Convert Schema Migrate Data

MySQL Metadata Explorer

- category
- city
- country
- customer
- film
- Indexes (4/4)
- Triggers (3/3)
- film_actor
- film_category
- film_text
- inventory

SQL Server Metadata Explorer

- localhost [offline]
 - Databases (1/5)
 - master
 - model
 - msdb
 - sakila
 - Schemas (1/1)
 - tempdb

Table SQL Type Mapping Data Settings Charset Ma. SQL Modes Properties Report

table: film

```

12 'rating' enum('G','PG','PG-13','R','NC-17') DEFAULT 'G',
13 'special_features' set('Trailers','Commentaries','Deleted Scenes','Behind the Scenes') DEFAULT NULL
14 'last_update' timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,
15 PRIMARY KEY ('film_id'),
16 KEY 'idx_title' ('title'),
17 KEY 'idx_fk_language_id' ('language_id'),
18 KEY 'idx_fk_original_language_id' ('original_language_id'),
19 CONSTRAINT 'fk_film_language' FOREIGN KEY ('language_id') REFERENCES 'language' ('language_id') ON
20 CONSTRAINT 'fk_film_language_original' FOREIGN KEY ('original_language_id') REFERENCES 'language' (
21 ) ENGINE=InnoDB AUTO_INCREMENT=1001 DEFAULT CHARSET=utf8
22 <
  
```

Table SQL Data

table: film

```

115
116 /*
117 * SSMA error messages:
118 * M2SS0037: ON UPDATE CASCADE|SET NULL|SET DEFAULT action was changed to NO ACTION to avoid multipl
119 */
120
121
122 ALTER TABLE [dbo].[film]
123 ADD CONSTRAINT [film$fk_film_language]
124 <
  
```

Output

Output Error List

Done.

Check error list

SSMA Schema Migration

MySQL-to-SQL Demo #1[SQL Server 2014] * - SQL Server Migration Assistant for MySQL [Running in 32-bit mode]

File Edit View Tools Help

Reconnect to MySQL Reconnect to SQL Server Create Report Convert Schema Migrate Data

MySQL Metadata Explorer

- category
- city
- country
- customer
- film
- Indexes (4/4)
- Triggers (3/3)
- film_actor
- film_category
- film_text
- inventory

SQL Server Metadata Explorer

- localhost [offline]
 - Databases (1/5)
 - master
 - model
 - msdb
 - saikila
 - Schemas
 - tempdb

Create Report
Convert Schema
Synchronize with Database
Save as Script
Advanced Object Selection

Table SQL Type Mapping Data Settings Charset Ma SQL Modes Properties Report

table: film

```

12 'rating' enum('G','PG','PG-13','R','NC-17') DEFAULT 'G',
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14 'last_update' timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP,
15 PRIMARY KEY ('film_id'),
16 KEY 'idx_title' ('title'),
17 KEY 'idx_fk_language_id' ('language_id'),
18 KEY 'idx_fk_original_language_id' ('original_language_id'),
19 CONSTRAINT 'fk_film_language' FOREIGN KEY ('language_id') REFERENCES 'language' ('language_id') ON
20 CONSTRAINT 'fk_film_language_original' FOREIGN KEY ('original_language_id') REFERENCES 'language' (
21 ) ENGINE=InnoDB AUTO_INCREMENT=1001 DEFAULT CHARSET=utf8
22 <
  
```

Table SQL Data

table: film

```

115
116 /*
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120
121 ALTER TABLE [dbo].[film]
122 ADD CONSTRAINT [film$fk_film_language]
123
124 <
  
```

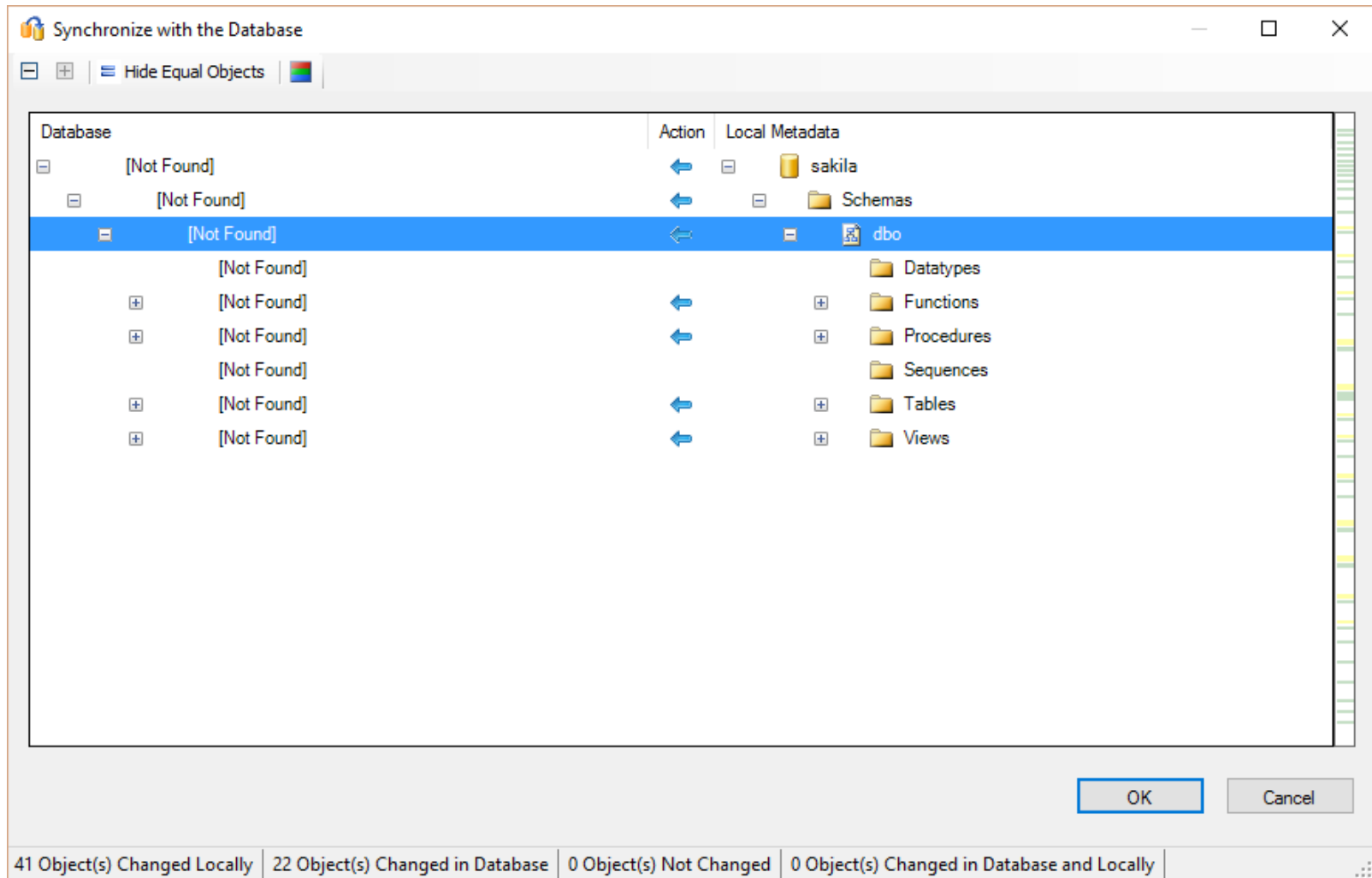
Output

Output Error List

Done.

Apply changes to SQL Server

SSMA Schema Migration



SSMA Schema Migration

MySQL-to-SQL Demo #1[SQL Server 2014] * - SQL Server Migration Assistant for MySQL [Running in 32-bit mode]

File Edit View Tools Help

Reconnect to MySQL Reconnect to SQL Server Create Report Convert Schema Migrate Data

MySQL Metadata Explorer

- category
- city
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- Triggers (3/3)
- film_actor
- film_category
- film_text
- inventory

SQL Server Metadata Explorer

- localhost
 - Databases (1/5)
 - master
 - model
 - msdb
 - sakila
 - Schemas (1/1)
 - tempdb

Table SQL Type Mapping Data Settings Charset Ma SQL Modes Properties Report

SQL table: film

```

1 CREATE TABLE `film` (
2   `film_id` smallint(5) unsigned NOT NULL AUTO_INCREMENT,
3   `title` varchar(255) NOT NULL,
4   `description` text,
5   `release_year` year(4) DEFAULT NULL,
6   `language_id` tinyint(3) unsigned NOT NULL,
7   `original_language_id` tinyint(3) unsigned DEFAULT NULL,
8   `rental_duration` tinyint(3) unsigned NOT NULL DEFAULT '3',
9   `rental_rate` decimal(4,2) NOT NULL DEFAULT '4.99',
10  `length` smallint(5) unsigned DEFAULT NULL.
11

```

Table SQL Data

SQL table: film

```

1 IF EXISTS (SELECT * FROM sys.objects so JOIN sys.schemas sc ON so.schema_id = sc.schema_id WHERE so. ^
2 BEGIN
3
4 DECLARE @drop_statement nvarchar(500)
5
6 DECLARE drop_cursor CURSOR FOR
7   SELECT 'alter table '+quotename(schema_name(ob.schema_id))+
8     '.'+quotename(object_name(ob.object_id))+ ' drop constraint ' + quotename(fk.name)
9   FROM sys.objects ob INNER JOIN sys.foreign_keys fk ON fk.parent_object_id = ob.object_id
10

```

Error List

0 Errors 0 Warnings 0 Information

ID	Message	Description

Output Error List

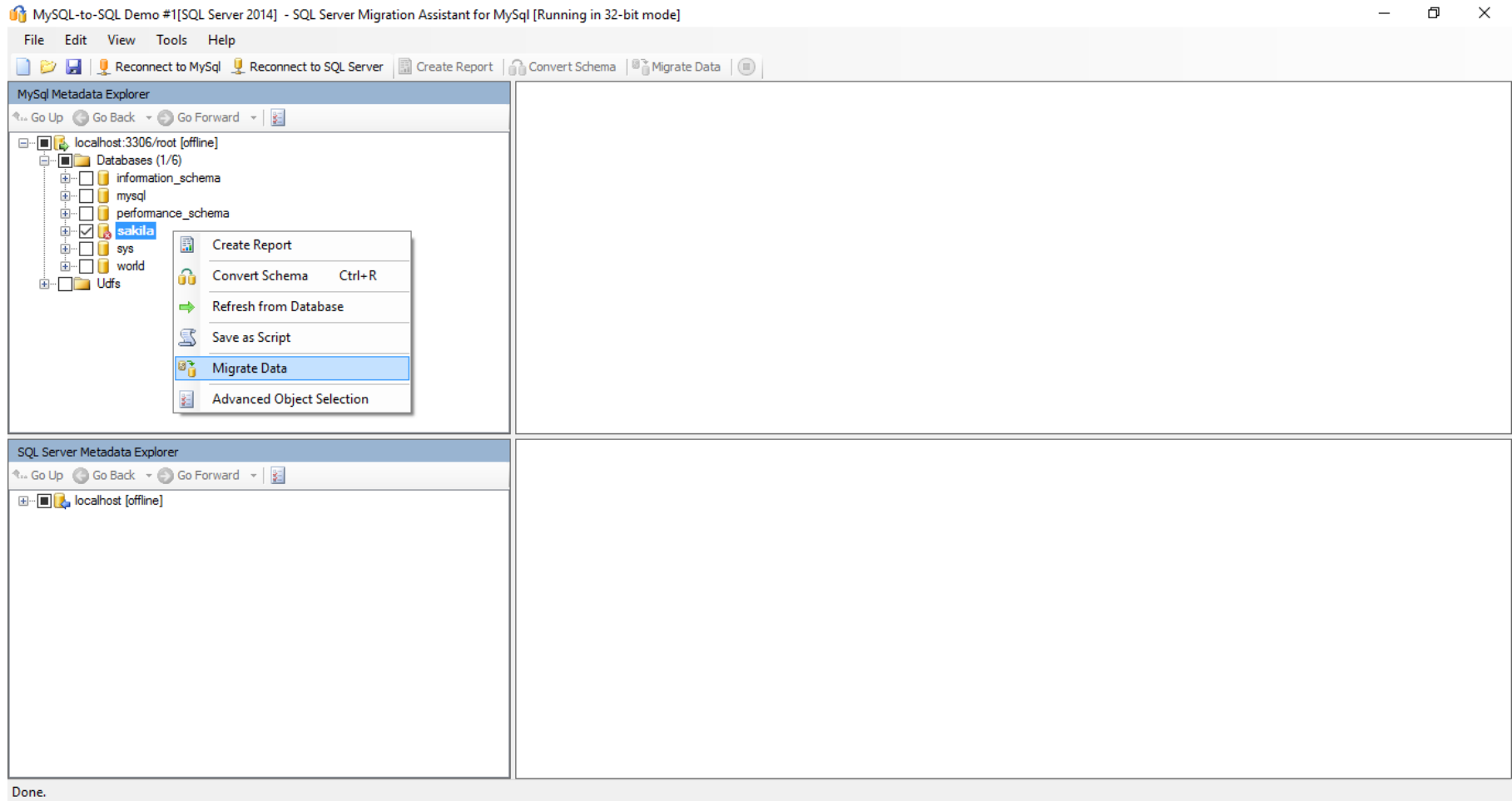
Done.

Check error list

Data Migration Options

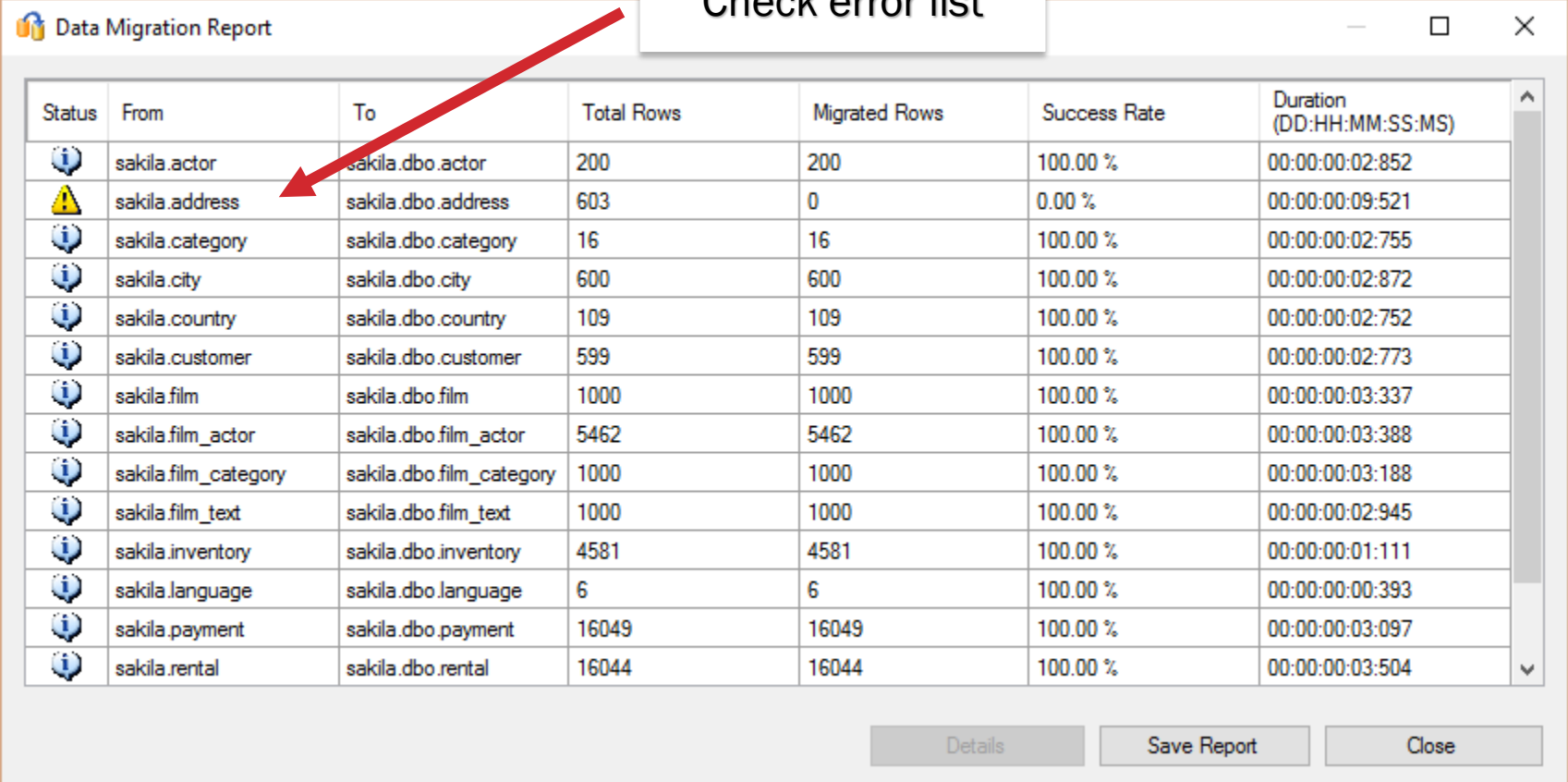
- Easiest option is to use SSMA to perform data migration
 - Test performance to determine best drivers to use
- For some DBMS source systems, SSMA offers Client-Side or Server-Side migration
 - Client-Side migration typically offers more driver options, data migration occurs on computer running SSMA
 - Client-Side migration not recommended if running SSMA remotely
 - Server-Side migration runs data migration on target database server, but typically is more restrictive on driver options
 - Test data migration the same way you would run it on Production!

SSMA Data Migration



SSMA Data Migration

Check error list



Data Migration Report

Status	From	To	Total Rows	Migrated Rows	Success Rate	Duration (DD:HH:MM:SS:MS)
	sakila.actor	sakila.dbo.actor	200	200	100.00 %	00:00:00:02:852
	sakila.address	sakila.dbo.address	603	0	0.00 %	00:00:00:09:521
	sakila.category	sakila.dbo.category	16	16	100.00 %	00:00:00:02:755
	sakila.city	sakila.dbo.city	600	600	100.00 %	00:00:00:02:872
	sakila.country	sakila.dbo.country	109	109	100.00 %	00:00:00:02:752
	sakila.customer	sakila.dbo.customer	599	599	100.00 %	00:00:00:02:773
	sakila.film	sakila.dbo.film	1000	1000	100.00 %	00:00:00:03:337
	sakila.film_actor	sakila.dbo.film_actor	5462	5462	100.00 %	00:00:00:03:388
	sakila.film_category	sakila.dbo.film_category	1000	1000	100.00 %	00:00:00:03:188
	sakila.film_text	sakila.dbo.film_text	1000	1000	100.00 %	00:00:00:02:945
	sakila.inventory	sakila.dbo.inventory	4581	4581	100.00 %	00:00:00:01:111
	sakila.language	sakila.dbo.language	6	6	100.00 %	00:00:00:00:393
	sakila.payment	sakila.dbo.payment	16049	16049	100.00 %	00:00:00:03:097
	sakila.rental	sakila.dbo.rental	16044	16044	100.00 %	00:00:00:03:504

Details
Save Report
Close

SSMA Data Migration

MySQL-to-SQL Demo #1[SQL Server 2014] * - SQL Server Migration Assistant for MySQL [Running in 32-bit mode]

File Edit View Tools Help

Reconnect to MySQL Reconnect to SQL Server Create Report Convert Schema Migrate Data

MySQL Metadata Explorer

Go Up Go Back Go Forward

Tables (16/16)

- actor
- address
- category
- city
- country
- customer
- film
- film_actor
- film_category
- film_text

SQL Server Metadata Explorer

Go Up Go Back Go Forward

localhost

Table SQL Type Mapping Data Settings Charset Mapping SQL Modes Properties Report

Table

Column Name	Data Type	Default	Identity	Nullable
ADDRESS_ID	SMALLINT(5) UNSIGNED		<input checked="" type="checkbox"/>	<input type="checkbox"/>
ADDRESS	VARCHAR(50)		<input type="checkbox"/>	<input type="checkbox"/>
ADDRESS2	VARCHAR(50)	NULL	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DISTRICT	VARCHAR(20)		<input type="checkbox"/>	<input type="checkbox"/>
CITY_ID	SMALLINT(5) UNSIGNED		<input type="checkbox"/>	<input type="checkbox"/>
POSTAL_CODE	VARCHAR(10)	NULL	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PHONE	VARCHAR(20)		<input type="checkbox"/>	<input type="checkbox"/>

Error List

1 Errors 0 Warnings 0 Information

ID	Message	Description
	DataMigration Error. From : sakila.address	Migration of Spatial Data requires SQL Server component (Microsoft.SqlServer.Types). Please perform this task on a machine with SQL Server 2008 (and above) or use server side data migration mode.

Output Error List

Done.

Check error list

Testing Converted Database Objects

- Develop a test approach focused on minimizing risk
 - Full regression testing may be impractical on large systems
 - Recommended approach is to unit test each database object
 - Run each object on source and target system and compare output
 - For objects where output does not match, perform additional testing and fix as needed
 - Consider production parallel testing if possible
- Schedule UAT and Performance testing on target Production hardware
 - Baseline performance of source system for critical functions and compare timings to target system
 - Before final deployment, perform user acceptance on target Production hardware

Test Database Migration Cycles

- Schedule time to run database migration steps multiple time
 - At a minimum, run through the database migration steps when setting up the test, QA test, and UAT environments
 - Additional test migrations can be scheduled when refreshing test environments and when doing code drops
 - Executing the migration steps multiple times provides more opportunities to uncover issues and to fine tune the process

Final Deployment

- Schedule a change moratorium prior to the final deployment
 - Allows for migration scripts to be in a stable state prior to deployment
 - Schedule one final test migration with the finalized scripts
 - Any emergency fixes to source system can be applied to target system after final deployment
 - All enhancements and non-critical fixes should be worked on new system
- Develop deployment plan
 - Include contact information and hours when people need to be available
 - Migration steps can take a long time, so schedule checkpoint meetings where people can get status information
 - Consider having a dedicated person to coordinate communications

Contingency Plans

- Have a detailed plan ready to enable source system
 - Preserve the state of source system to ensure back out plan is successful
 - Do not make changes on SQL Server that will make back out plan harder
 - Determine in advance the criteria for back out and who is responsible for making the decision
 - Plan your final deployment with a back out plan in mind (do not make changes that will make backing out more difficult)
- Plan for an extended post-production support
 - Some issues may arise days after the final deployment
 - Plan to set aside time for support team to address any emergency fixes

Decommission Source System

- Before decommissioning source system consider:
 - Script all database objects and archive in source code repository
 - Create backups and determine retention plan
 - Consider having a system available where source system can be restored if needed