# SQLSat Kyiv Team



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# Session will begin very soon :)

Please complete the electronic **evaluation form** for this session and for the event. **Your feedback** will help us to improve future conferences and **speakers** will appreciate your feedback!

# Enjoy the **conference**!

Kamil Nowiński

@SQLPlayer

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**PASS**
**SQLSATURDAY**
KYIV | 18 MAY 2019

The databases in SSDT
A work with project and best practices

# Kamil Nowiński

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Speaker, blogger, data enthusiast

Senior Data Engineer at ASOS ([www.asos.com](www.asos.com))

15+ yrs experience as DEV/BI/(DBA)

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SQL Server Certificates:

MCITP, MCP, MCTS, MCSA, MCSE Data Platform,

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Moreover: Bicycle, Running, Digital photography

@NowinskiK, @SQLPlayer

# Blog & interviews



www.SQLPlayer.net

# PODCAST – interviews with…

# DevOps – definition (Wikipedia)

**DevOps** (a clipped compound of "**development**" and "**operations**") is a software engineering **culture and practice** that aims at unifying software development (Dev) and software operation (Ops).
The main characteristic of the DevOps movement is to strongly advocate **automation and monitoring** at <u>all steps</u> of software construction, from integration, testing, releasing to deployment and infrastructure management.

DevOps aims at shorter development cycles, increased deployment frequency, and more dependable releases, in close alignment with business objectives.

# DevOps approach across your project

- Already adopted across SOME projects

- Already adopted across ALL projects

- Plan to adopt in the next 2 years

- Not adopted and no plans in the next 2 years

# Redgate – State of database DevOps

**Has your organization already adopted, or do you plan to adopt, a DevOps approach across any of your IT projects?**

**Yes**

**43%** already adopted across some projects

**15%** already adopted across all projects

**No**

**27%** Plan to adopt across some or all projects in the next two years

**15%** Not adopted and no plans to adopt within the next two years

# AGENDA

- What is the SSDT?

- Do I need it?

- How to start with DACPAC's?

- (Well) known issues

- Deploy/Publish database to target server

- Circular dependencies!

# What is the SSDT?

- SQL Server Data Tools

- Now, it's a part of Visual Studio

- Free!

- Database project, including:
  - Schema, Stored Procedures, Functions,
  - Tables, Views, Security, CLR
  - … and much more!

# SSDT: How to install?



**Workloads**    Individual components    Language packs    Installation locations

Web & Cloud (7)

☑ **ASP.NET and web development**
Build web applications using ASP.NET, ASP.NET Core, HTML, JavaScript, and container development tools.

☑ **Azure development**
Azure SDK, tools, and projects for developing cloud apps and creating resources.

☐ **Python development**
Editing, debugging, interactive development and source control for Python.

☐ **Node.js development**
Build scalable network applications using Node.js, an asynchronous event-driven JavaScript runtime.

☑ **Data storage and processing**
Connect, develop and test data solutions using SQL Server, Azure Data Lake, Hadoop or Azure ML.

☐ **Data science and analytical applications**
Languages and tooling for creating data science applications, including Python, R and F#.

☑ **Office/SharePoint development**
Create Office and SharePoint add-ins, SharePoint solutions, and VSTO add-ins using C#, VB, and JavaScript.

## Summary

> Visual Studio core editor
> Universal Windows Platform development
> .NET desktop development
> Mobile development with .NET
> Office/SharePoint development *
> Azure development
> ASP.NET and web development
> Game development with Unity
∨ Data storage and processing
  Optional
  ☑ SQL Server Data Tools
  ☑ Azure Data Lake and Stream Analytics Tools
  ☑ .NET Framework 4 – 4.6 development tools
  ☑ Redgate ReadyRoll Core
  ☑ Redgate SQL Prompt Core
  ☑ Redgate SQL Search
  ☑ F# language support

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# SSDT: How to download, install?

Filter by title

> Distributed Replay
> SQL Server Configuration Manager
> SQLCMD
> SSB Diagnose
⌄ SQL Server Data Tools (SSDT)
  **Download SSDT**
  Release notes for SSDT
  Previous releases of SSDT & SSDT-BI
  SQL Server Tools
  > Project-Oriented Offline Database Development
> SQL Server Management Studio (SSMS)
> SqlPackage.exe
> SQL Server Profiler
> Visual Studio native helpers
> Tutorials
> SQL Server on Linux
> SQL on Azure
> Resources
> Reference

## Changes in SSDT for Visual Studio 2019

With Visual Studio 2019, the required functionality to enable Analysis Services, Integration Services, and Reporting Services projects has moved into the respective Visual Studio extensions. The core SSDT functionality to create Database Projects has remained integral to Visual Studio (you need to select the Data storage and processing workload during install). There is no more standalone SSDT installation required.

If you already have a license to Visual Studio 2019:

- For SQL Database Projects, install the Data storage and Processing workload for Visual Studio
- For Analysis Services, Integration Services or Reporting Services projects, install the appropriate extension(s) from the marketplace

If you don't already have a license to Visual Studio 2019:

- Install Visual Studio 2019 Community
- Install the Analysis Services, Integration Services or Reporting Services as appropriate

## Changes in SSDT for Visual Studio 2017

Starting with Visual Studio 2017, the functionality of creating Database Projects has been integrated into the Visual Studio installation. There is no need to install the SSDT standalone installer for the core SSDT experience. To create Integration Services/Analysis Services/Reporting Services projects you still need the SSDT standalone installer.
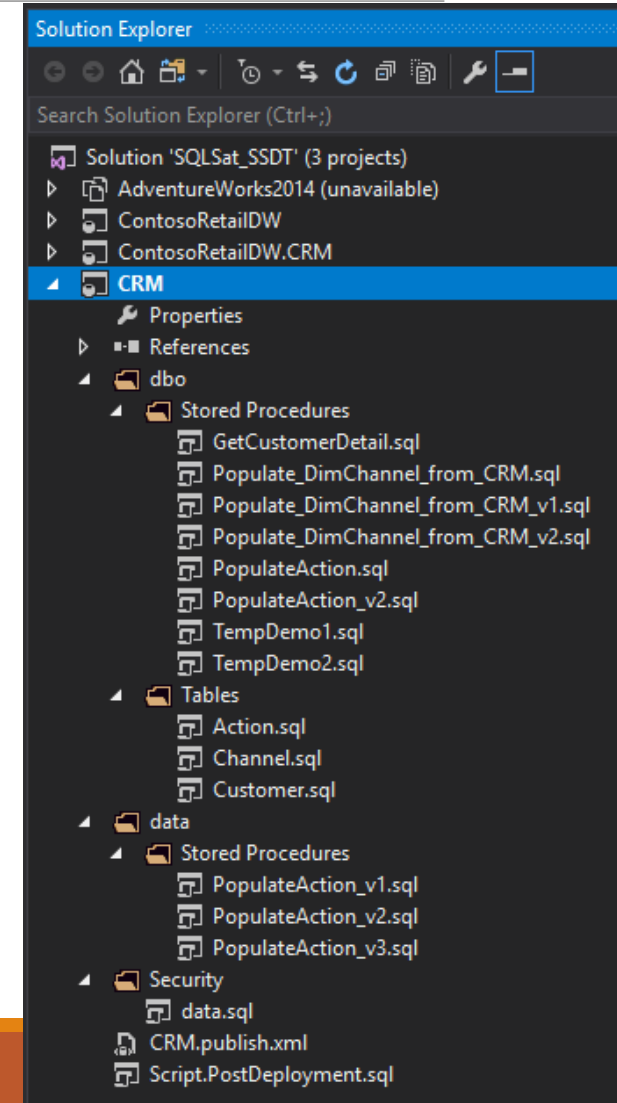
- For Database Projects, install the Data Storage and Processing workload for Visual Studio
- For Analysis Services, Integration Services or Reporting Services projects, download and install SQL Server Data Tools

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# DACPAC, BACPAC

- DACPAC = Data Tier AppliCation PACkage
  - Doesn't contain DATA
  - Contains SCHEMA Only
- BACPAC = BACkup PACage
  - Contains SCHEMA
  - Contains DATA (BCP native format)
- ZIP format

# How to start with database project?

- Install SSDT

- Create new db project and import:
    - From script
    - Directly from SQL server
    - Data-Tier Application (DACPAC)

# (Well) known issues

# (Well) known issues

- Same database references

- Circular references/dependencies

- Unvisible temp tables

- Disable/Enable trigger across databases
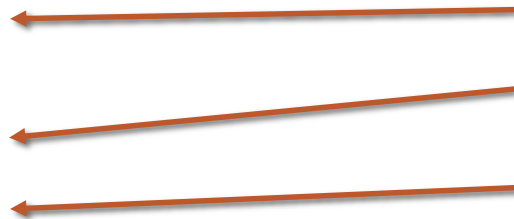
- How to manage of data?

- Can I deploy SQL Jobs?

# Database dependencies & references

**CRM_Audit**

**CRM**

**Tables:**
- Customer
- InvoiceHeader
- InvoiceLines
- CustomerAddress
- CustomerEmail

**Tables:**
- Customer_Audit
- CustomerAddress_Audit
- CustomerEmail_Audit
- TransactionLog

**Triggers:**
- Tr_Customer
- Tr_CustomerEmail

**Stored Procedures:**
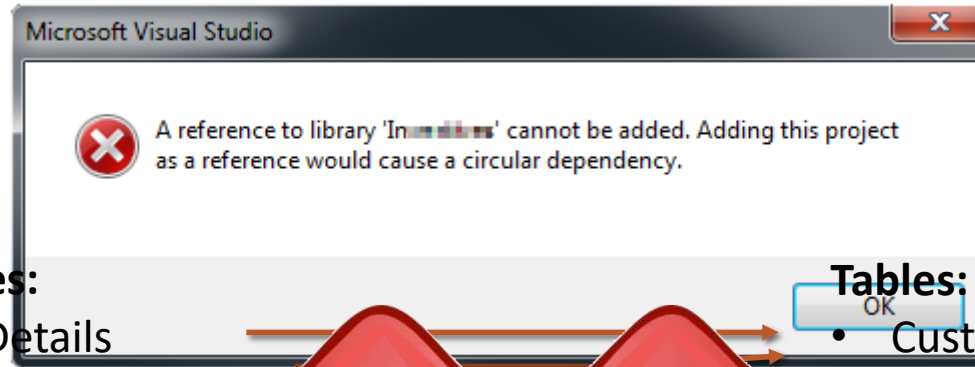- AddLogItem

# Circular dependencies

**CRM_Interface**

**CRM**

**Stored Procedures:**
- GetCustomerDetails
- MergeCustomers
- AddLogItem
- GetCustomerInvoice

**Tables:**
- Customer_Audit
- CustomerAddress_Audit
- CustomerEmail_Audit
- TransactionLog

**Tables:**
- Customer
- InvoiceHeader
- InvoiceLines
- CustomerAddress
- CustomerEmail

**Triggers:**
- Tr_Customer
- Tr_CustomerEmail

**Stored Procedures:**
- AddLogItem

Microsoft Visual Studio

A reference to library 'In▮▮▮▮▮▮' cannot be added. Adding this project as a reference would cause a circular dependency.

OK

# Circular dependencies

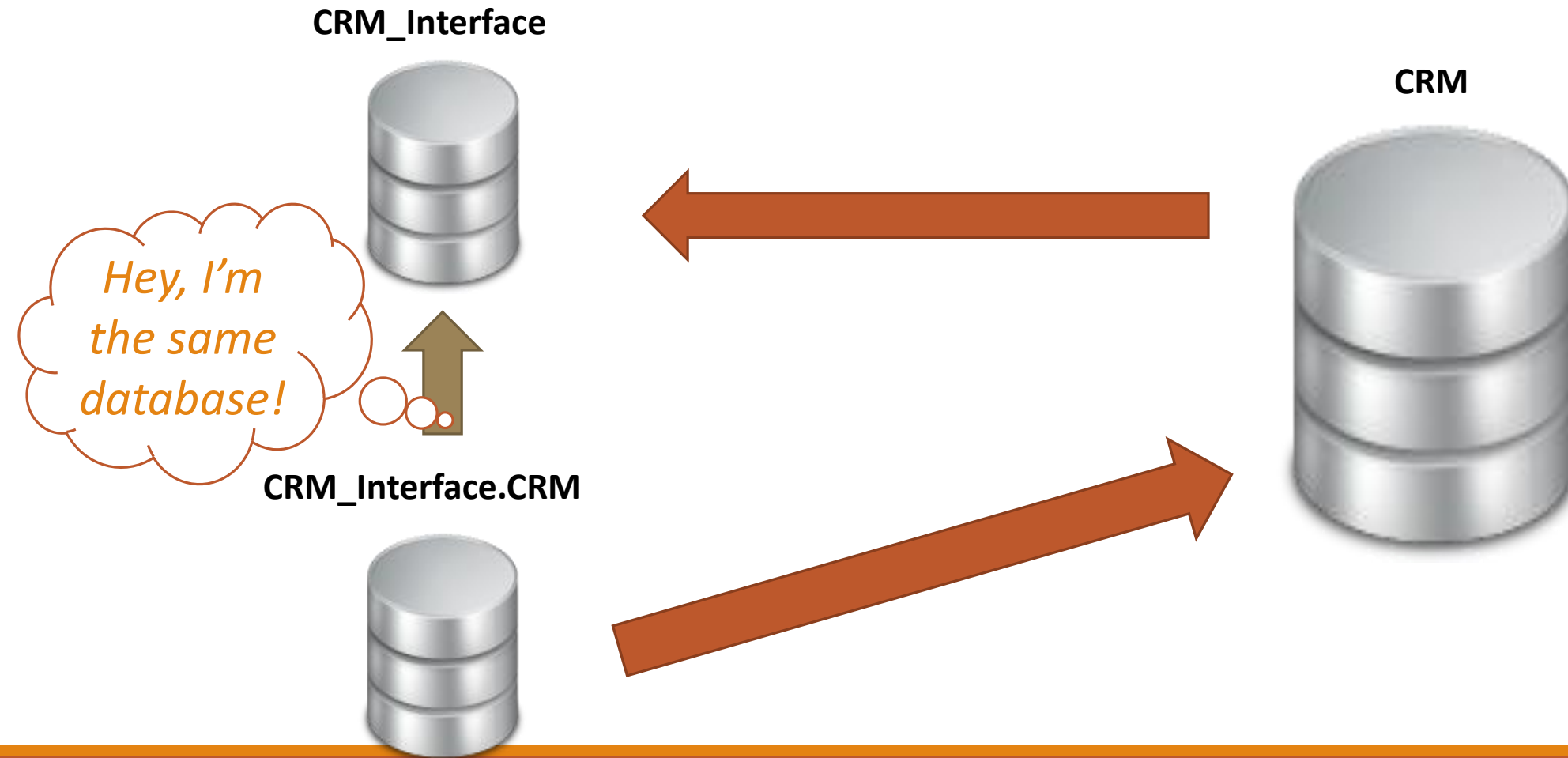**CRM_Interface**                                                           **CRM**
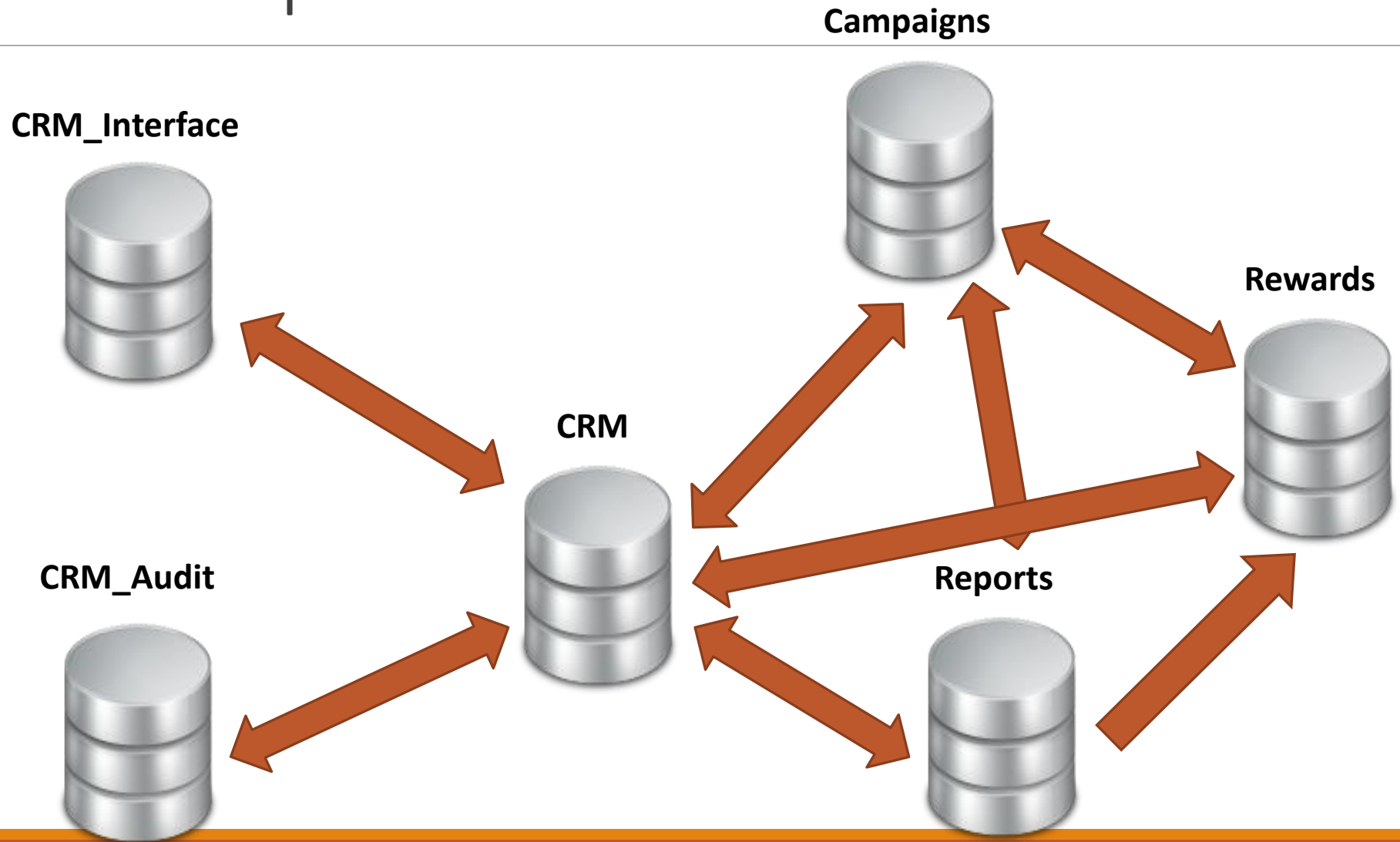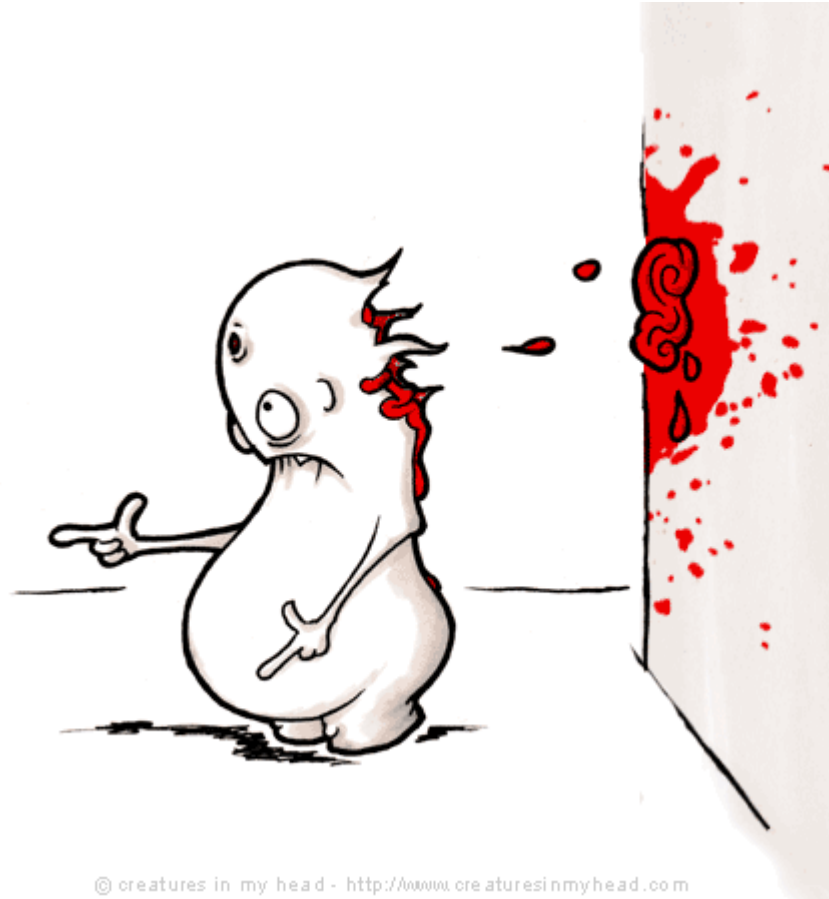
# Circular dependencies

# DEMO

- Create empty database project

- Import database from server

- Create references & variables

- Resolve first issues

- Resolve circular references

# Circular dependencies

# Circular dependencies



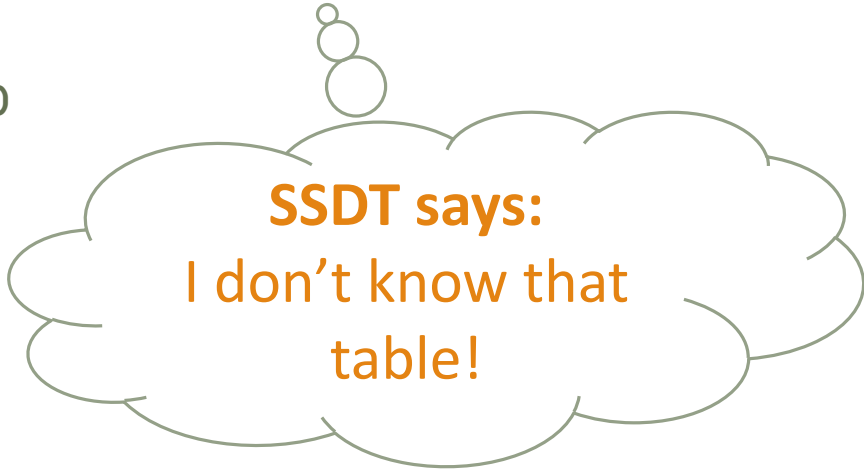© creatures in my head - http://www.creaturesinmyhead.com

# Know issue: temp table

```
CREATE PROCEDURE [dbo].[TempDemo1]

AS



CREATE TABLE #TempTable (Id INT);

EXEC TempDemo2;
```

```
CREATE PROCEDURE [dbo].[TempDemo2]
AS

SELECT * FROM #TempTable;

RETURN 0
```

**SSDT says:**
I don't know that table!

# Know issue: temp table

```
CREATE PROCEDURE [dbo].[TempDemo1]

AS



CREATE TABLE #TempTable (Id INT);

EXEC TempDemo2;
```

```
CREATE PROCEDURE [dbo].[TempDemo2]
AS

IF 0=1
   CREATE TABLE #TempTable (ID int);

SELECT * FROM #TempTable;

RETURN 0
```

# Know issue: Disable/Enable trigger #1

- Disable/Enable trigger from other database

```
ALTER TABLE [$(ContosoRetailDW)].dbo.DimChannel
    DISABLE TRIGGER [Trigger_DimChannel];
```

| | Code | Description |
|---|---|---|
| ❌ | | SQL71502: Procedure: [dbo].[Populate_DimChannel_from_CRM] has an unresolved reference to object [dbo].[Trigger_DimChannel]. |

# Know issue: Disable/Enable trigger #2

- Alternative #1:
    - Use dynamic SQL (not recommended)

```
--Alternative solution in SSDT:
EXEC sp_executeSQL N'ALTER TABLE [$(ContosoRetailDW)].dbo.DimChannel
        DISABLE TRIGGER [Trigger_DimChannel];
        '
```

# Know issue: Disable/Enable trigger #3

- Alternative #2:
  - Create SP in the second database (locally for the trigger)
  - Call that SP from 'Remote' database

```
CREATE PROCEDURE [dbo].[Toggle_Trigger_DimChannel]
    @enable BIT
AS

    IF @enable = 1
        ENABLE TRIGGER dbo.[Trigger_DimChannel] ON dbo.DimChannel;
    ELSE
        DISABLE TRIGGER dbo.[Trigger_DimChannel] ON dbo.DimChannel;


RETURN 0
```

# How to include **data** in a database project?

- SSDT has no built-in solution for including data

- Use Post-Deployment script to populate table

- Wrap the scripts into stored procedures

- Make sure the order of referenced tables

# How to include **data** in a database project?

- Scenario #1: initial values only
    - For the very first time (run) only
    - Target table is empty
    - INSERT
    - Example script

# How to include **data** in a database project?

- Scenario #2: User has NO access to data
  - Full MERGE statement
  - Include DELETE clause
  - Example script

# How to include **data** in a database project?

- Scenario #3: users CAN add values from app
    - MERGE statement
    - Exclude DELETE clause
    - Example script

# DEMO

- Create publish profile

- Deploy manually

- Data script in Stored Procedure

- Post-Deployment script

- How to change data & deploy it

# SQL Jobs in database project

- Facts:
  - DACPAC is a database level project
  - SQLJobs are on server-level

- How to cope with:
  - Add separate database project
  - Only T-SQL scripts
  - Pre/Post deployment script to include above
  - Use PowerShell and SALT module from Sabin.io

# Resources

- [SQL Server Data Tools (MSDN)](#)

- [SQLPackage.exe (MSDN)](#)

- [Data-tier Application Framework (DACFx)](#)

- [Microsoft SQL Server Data Tools Team Blog](#)

- [GIT – branch organization](#)

- [Continuous Delivery and the Database (Redgate)](#)

- [Alex Yates - model vs mig](#)

- [Version Control tools for SQL Server](#)

- [SQLPlayer.net](#) blog

# Questions?

# Thank you!

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🔗 SQLPlayer.net

⭕ https://github.com/NowinskiK/CommunityEvents

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