

Database Development with SQL Server

*Peter Ward, peter@wardyit.com,
WARDY IT Solutions*

About Peter Ward

- Chief Technical Architect WARDY IT Solutions
 - Blog: www.wardyit.com/blog
 - Email: peter@wardyit.com
 - Twitter: @wardy
- President QLD SQL Server User Group
 - www.qssug.org
- SQL Server MVP
- SQL Server Virtual Technology Solutions Professional (VTSP) for Microsoft

Agenda

- Data-Tier Applications in Microsoft Visual Studio 2010
- Demo: Data-Tier Application & the Sever Utility
- Demo: Creating Data-Tier Applications
- Demo: Data-Tier Application Deployment
- Managing Change in Data -Tier Applications
- Demo: Modifying a Data-Tier Application and Deploying the Changes

Deployment Challenges

- Difficult deployment
 - Need to package applications with databases
 - Need to record deployment intent
 - Handing off T-SQL scripts is error-prone
 - Upgrades are challenging

Management Challenges

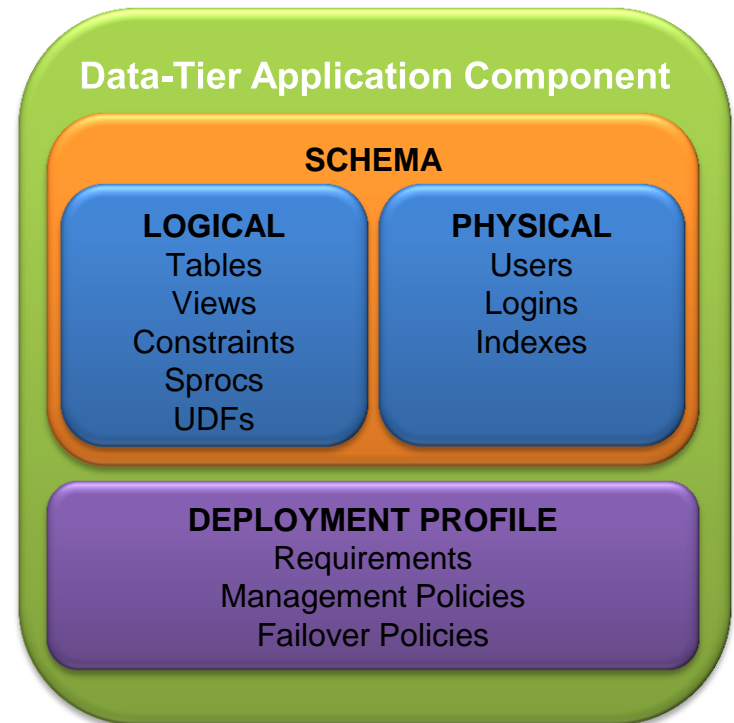
- Ever-increasing number of servers and applications
 - Lack of enterprise-wide view of SQL Server health
 - Server/instance
 - Application
- Difficult resource planning

Data Application Vision

- T-SQL development experience should be
 - First-class during development
 - Productive
 - Based on understanding of deployment intent
- Common tooling from Visual Studio 2010
 - Rich T-SQL editor
 - Intellisense
 - Debugger
 - Deep integration with project system

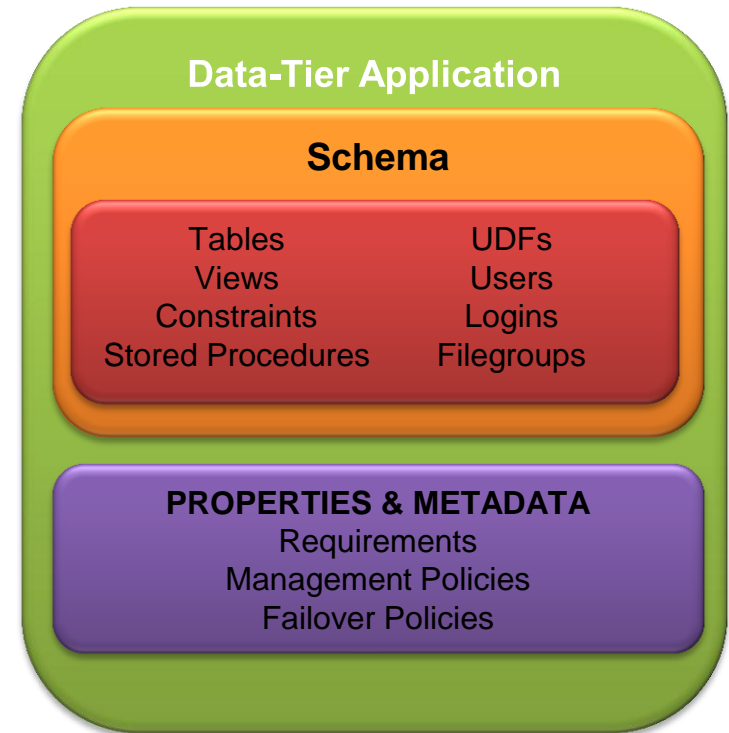
Data-Tier Application Component

- Unit of deployment for T-SQL applications
- Defines contents of the application
- Wraps deployment intent as policies
- Simplifies deployment and administration
 - Install
 - Uninstall
 - Upgrade
 - Repair (not in V1)



Data-Tier Application

- Deployed instance of a Data-Tier application component
- Maps to a database
- Has direct and strict relationship with .dacpac file definition



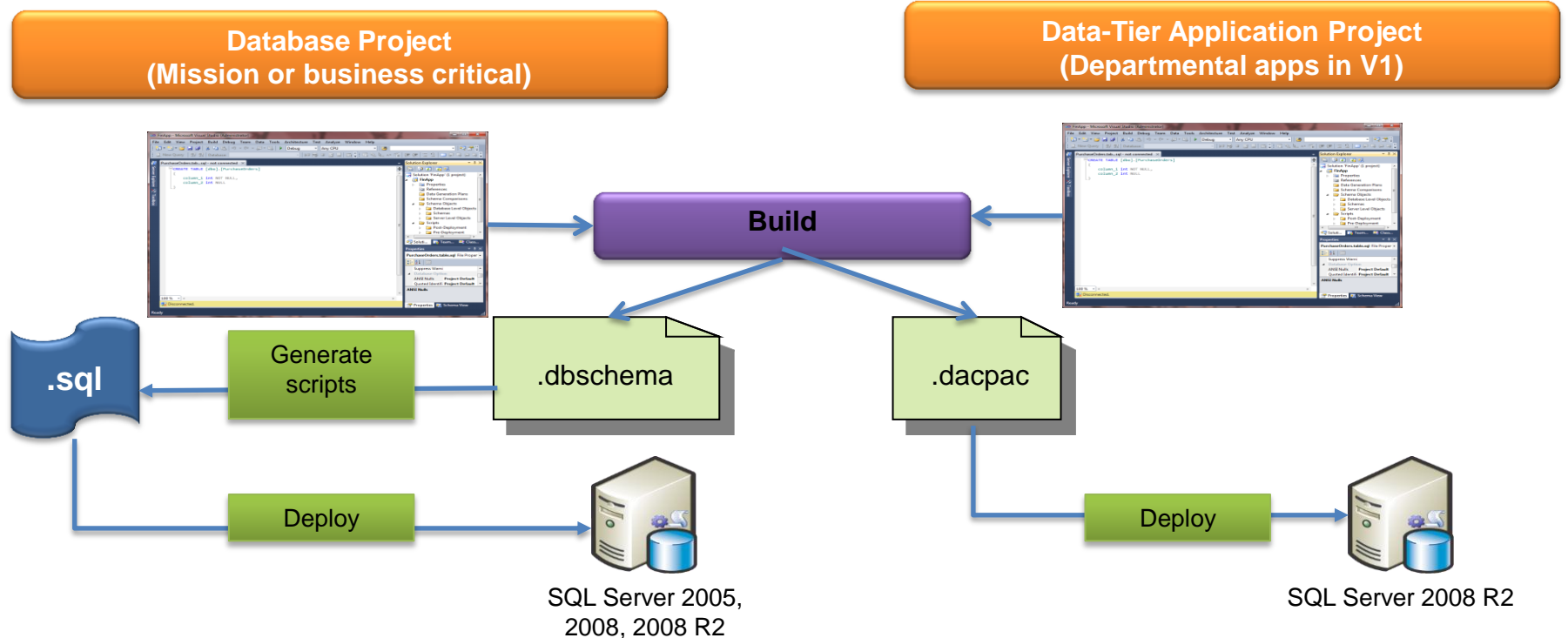
Data-Tier Applications in 2010

- Business goals and vision
 - First-class T-SQL/DAC development experience in VS
 - “Develop, Deploy, Manage”
 - Common tools and experiences in SSMS and VS
 - Editor, IntelliSense, debugging, ...
- Key scenarios
 - Deep integration with project system
 - Highly productive T-SQL editor (IntelliSense, debugger, ...)
 - DAC Projects in Pro+ SKUs
 - Application Lifecycle Management scenarios in Premium & Ultimate SKUs

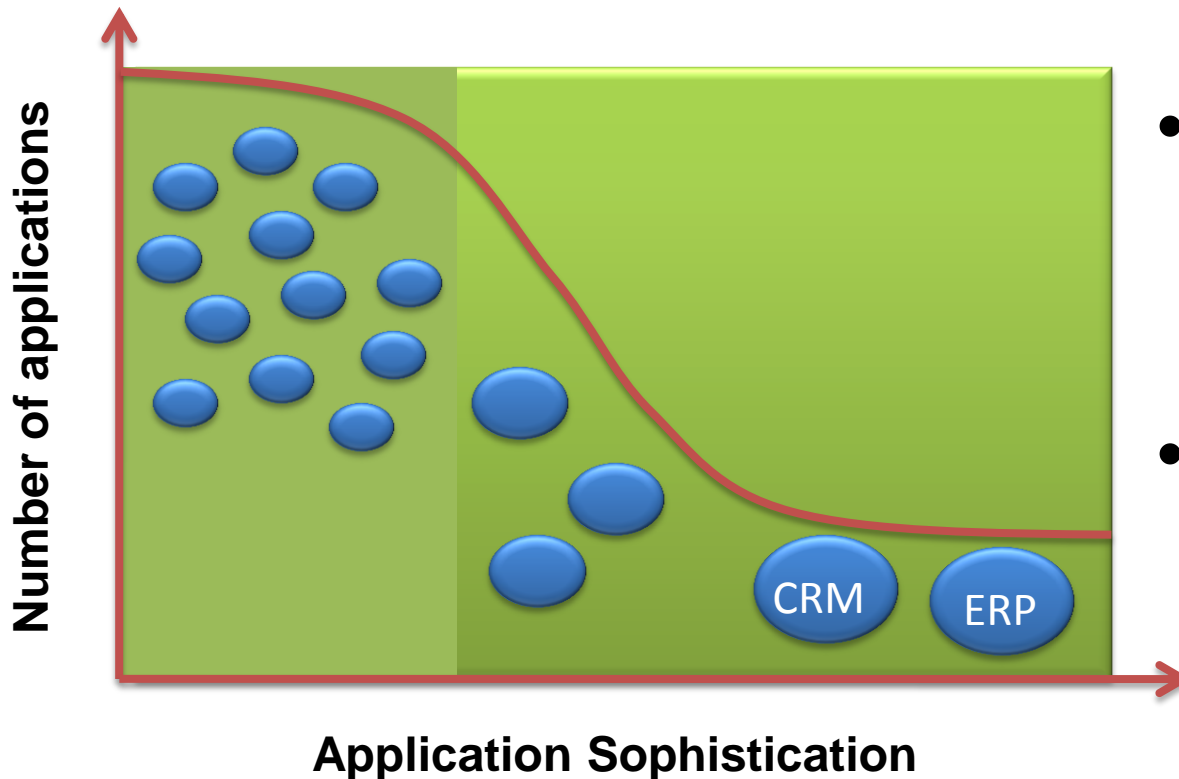
Do DAC Projects Replace Database Projects?

	Database Projects	Data-Tier Application Projects
Target applications	Mission or business critical	Departmental (for V1)
Database support	SQL Server 2005, 2008 & 2008 R2 and third-party databases	SQL Server 2008 R2 (with plans to support SQL Server 2008)
Deployment intent	N/A	Application & deployment intent
Schema complexity	Mission or business critical	Departmental (optimized for up to 1000 objects per project in V1)
Upgrade (schema + data)	Deploy generates SQL scripts; data stays in place	Upgrade is automated; data is migrated
SQL Server object types	All SQL Server 2008 objects	Most common SQL Server objects
T-SQL editing experience	Identical	

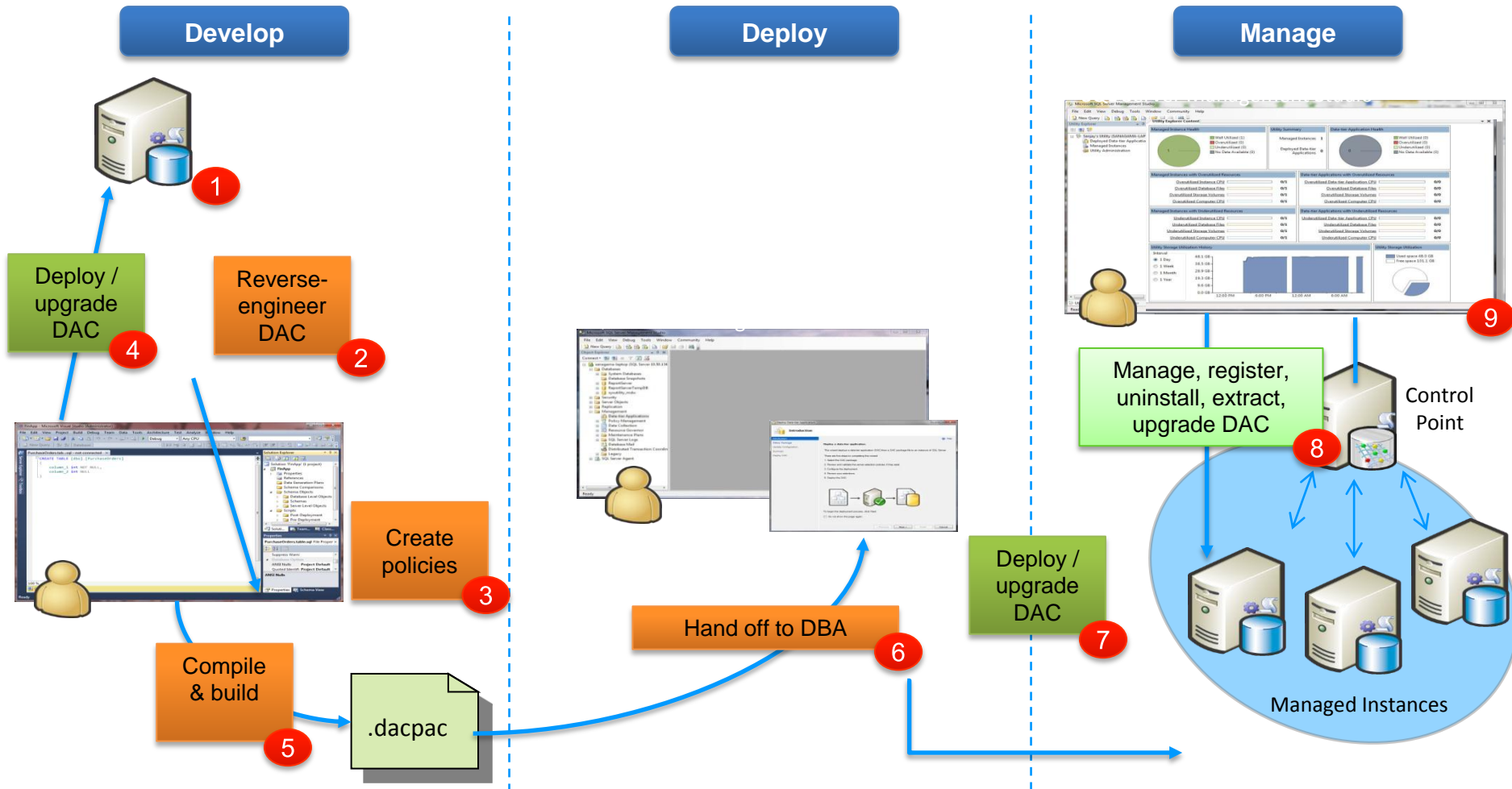
Database vs. Data-Tier Application



Target Databases for DAC V1



- Targeting most common app sizes
- Not LOB applications



Data-Tier Application Elements

- Application properties (appname, version)
- Database object definitions
- Instance-level object definitions (logins, collations, compatibility level)
- Server-selection policy
- Files & scripts (pre/post-deployment scripts)
- .dacpac is a .zip file
 - Contains multiple XML files
 - Does not contain any user data

Supported Objects

- Only the most common objects supported for author/edit
- Applications with unsupported objects are not supported

Views	Database roles
Clustered indexes	Schemas
Non-clustered indexes	Logins
T-SQL stored procedures	Users
Check constraints	Computed columns
Primary key constraints	Triggers (DML)
Foreign key constraints	Alias types
Unique constraints	Table types
Table-valued functions	Scalar functions

Initial Deployment

- Supply name of instance for deployment
- Server selection policy is checked
- Database and objects are created
 - One data file (3MB and 1MB unlimited growth)
 - One log file (1MB and 10% growth limited to 2TB)
 - Recovery model taken from instance defaults

Demonstration

- Demo: Data-Tier Application & the Sever Utility
- Demo: Creating Data-Tier Applications
- Demo: Data-Tier Application Deployment

Viewing .dacpac Files

- Important to view .dacpac files before deployment
 - Extra important for externally produced files
 - Do not deploy files from unknown or untrusted sources
 - Test unknown files on separate, isolated instance
- View a .dacpac file by one of
 - Creating a data-tier application project in VS and importing
 - Unpacking the .dacpac file into a folder if VS unavailable
 - Deploying the .dacpac file to an isolated test instance

Unpacking .dacpac Files

- Unpack Data-Tier Application dialog
 - Right-click .dacpac file and select Unpack option
 - Scripts and files placed into a folder
- When unpacked, contains
 - T-SQL script (ObjectName.sql) (for all objects)
 - XML files
 - Server selection policy (can be viewed in SSMS)
 - Extra files section (pre/post-deployment files)

Comparing .dacpac Files

- Schema compare tool in VS can compare two DACs
 - Tool has been repurposed from Database project
 - Available in Premium and Ultimate editions
- If VS is unavailable:
 - Unpack both .dacpac files into separate folder structures
 - Use a differencing tool (e.g., WinDiff) to compare

Upgrading Data-Tier Applications

- Upgrade Data-Tier Application Wizard
 - Changes schema and properties of deployed applications
 - New database created with new schema
 - Application name must match currently deployed file
 - SQL authentication logins stored without password and logins are created disabled
 - Windows authentication logins OK as they are
- Data is migrated
 - Original database set to read-only
 - Must consider space usage
 - Both databases then renamed
- Can provide further tailoring via PowerShell

Database Drift

- Important to avoid direct modifications to deployed databases
- Objects in current database and not in .dacpac file are not transferred
- Data in new tables added after deployment is not transferred
- Original database is retained but renamed

Table Drift

Situation	Table Present	Data Transferred
DAC definition in msdb, new DAC, and current database identical	Yes	Yes
New table in DAC but not in definition in msdb or current database	Yes	No
Table in current database and new DAC but not in definition in msdb	Yes	No
Table in definition in msdb and current database but not in new DAC	No	No
Table in all three, but different structure in new DAC	Yes, with new structure	If table/column names don't match, no transfer. If they match, will attempt transfer, but could roll back upgrade.

Version and Environment Migrations

- Data-tier applications simplify upgrades
 - Eliminate the need for two versions of scripts (install vs. upgrade)
 - Declarative (allow focus on the required target schema, not on the code required to achieve the change)
- Delete Data-Tier Application Wizard removes applications prior to redeployment elsewhere

Registering Data-Tier Applications

- Registering a DAC requires
 - ALTER ANY LOGIN
 - VIEW DEFINITION on database
 - SELECT on sys.sql_expression_dependencies
 - dbcreator fixed server role membership
- Optimized for applications with fewer than 1000 objects

Managing Data-Tier Applications

- Entries made in msdb for installed DACs
- Must back up
 - Database for DAC
 - msdb
- Modifying database name will destroy association with msdb entries
 - No further upgrade via DAC
 - No utilization reports in SQL Server Utility

Demonstration

- Demo: Modifying a Data-Tier Application and Deploying the Changes

BPD: Data Tools Focus

Visual Tools for SQL Server

- Developer Focus
- Pro SQL DB Project & Tools
- AS, RS, IS (Formerly BIDS)
- New SQL Server DB proj type
- Standalone and VS experience

SQL Server Management Studio

- Management Focus
- Operations & Administration

Data Tools Roadmap

- SQL Azure support
- Visual Designers
- Single deployment engine
- Expanded app support
- Expanded support for SQL objects
- Project system enhancements
- ALM feature enhancements

vNext Vision

Combine the best of Data-Tier
Application and Database projects

Questions

