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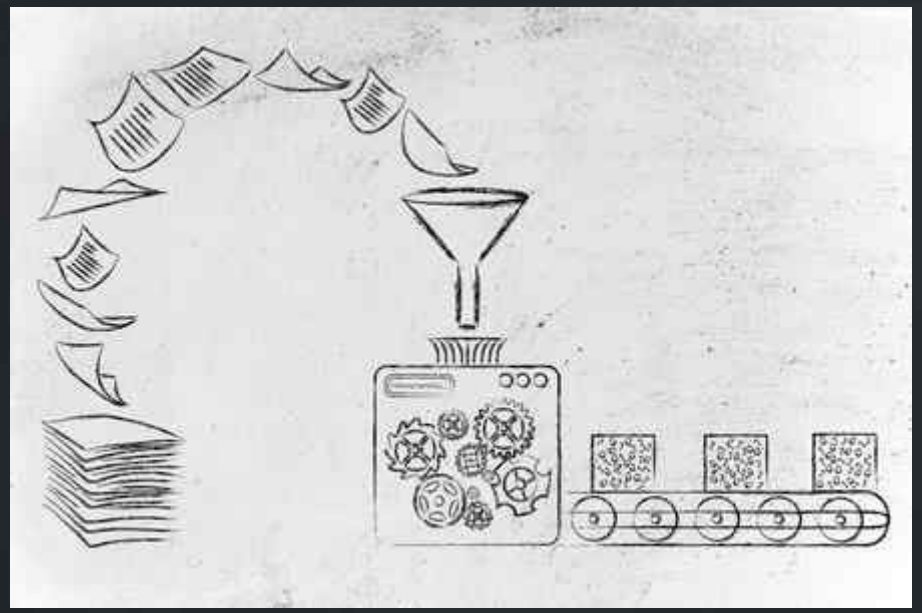
Improve SSIS Delivery with a Patterns-Based Approach

Meagan Longoria
July 19, 2017

What If I Told You

90% of your data integration development in SQL Server could be automated? In 5 years, you will be "old fashioned" if you are hand coding SSIS packages.



In This Session

I'll discuss:

- De-coupling design patterns from their package-specific implementation to increase consistency and quality
- Using existing metadata and light technical documentation to automate SSIS development
- Implementing a small change across multiple SSIS packages with minimal development effort

I will show you how we:

Load a dimensional model from scratch

About Me

Meagan Longoria

I am a Solution Architect with BlueGranite in Denver, CO.

I'm a Microsoft Data Platform MVP.

You can find me on Twitter at @mmarie or on my blog at DataSavvy.me.

Catch me at IT/Dev Connections in October!

I

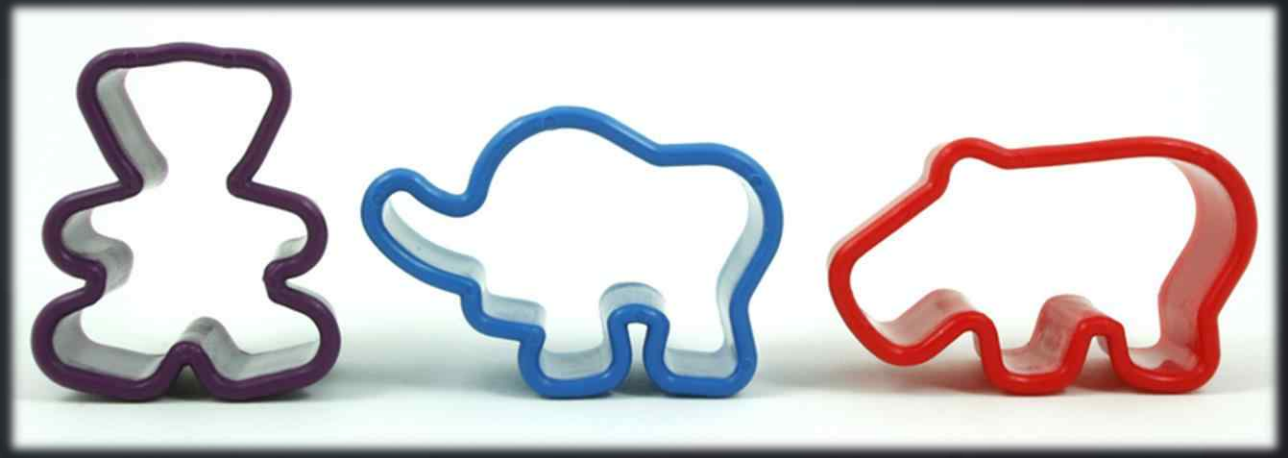
What Are SSIS Design Patterns?

Design Patterns

In General

Design Pattern: A general reusable solution to a commonly occurring problem within a given context.

It’s a description or template for how to solve a problem that can be used in many situations.

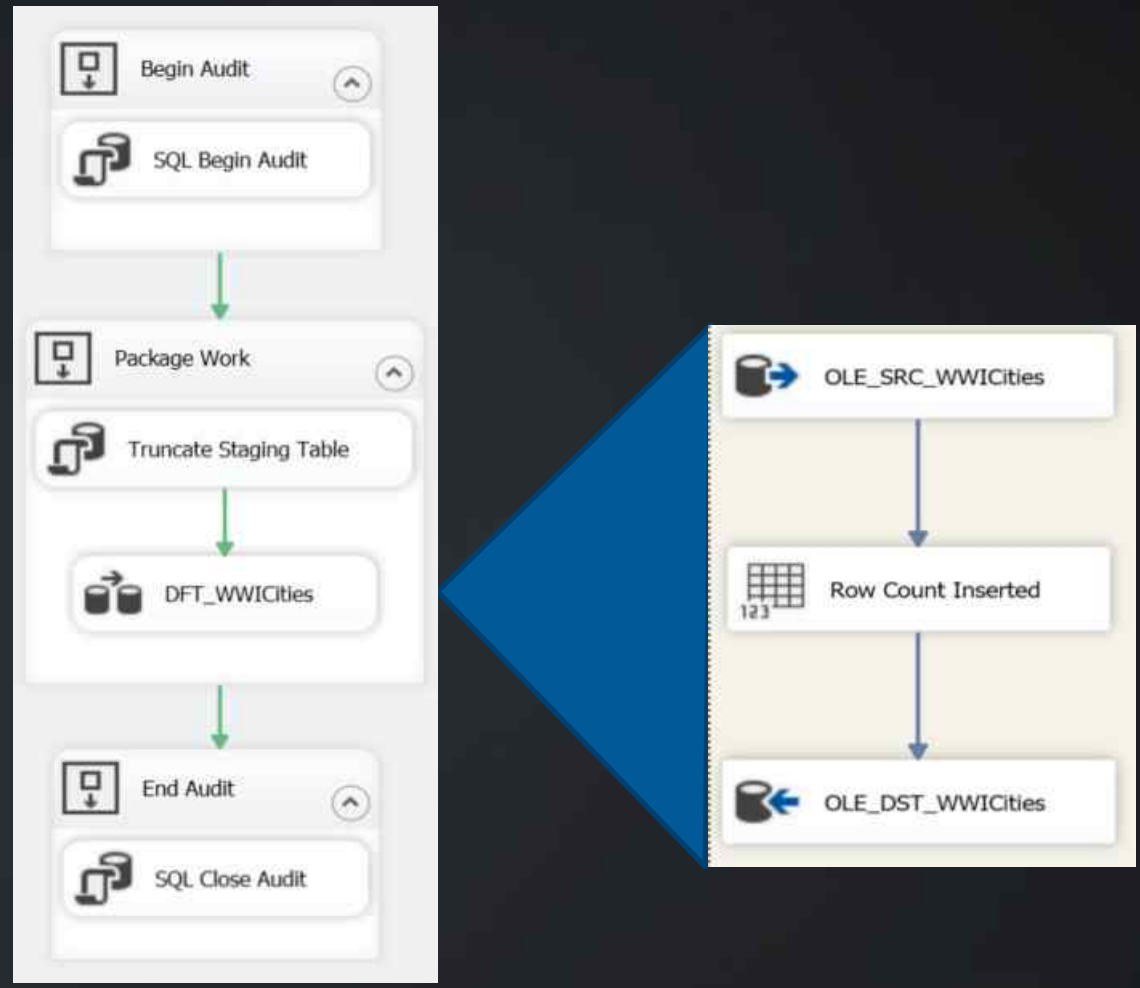


Design Patterns

SSIS Package

Stage_WWICities.dtsx

- Executes the [ETL].[PackageControlStart] stored procedure
- Truncates the Staging.WWICities table.
- Executes a Data Flow Task that:
  - Selects all columns and all rows from Application.Cities
  - Counts the rows
  - Inserts the data into the Staging.WWICities table.
- Executes the [ETL].[PackageControlStop] stored procedure

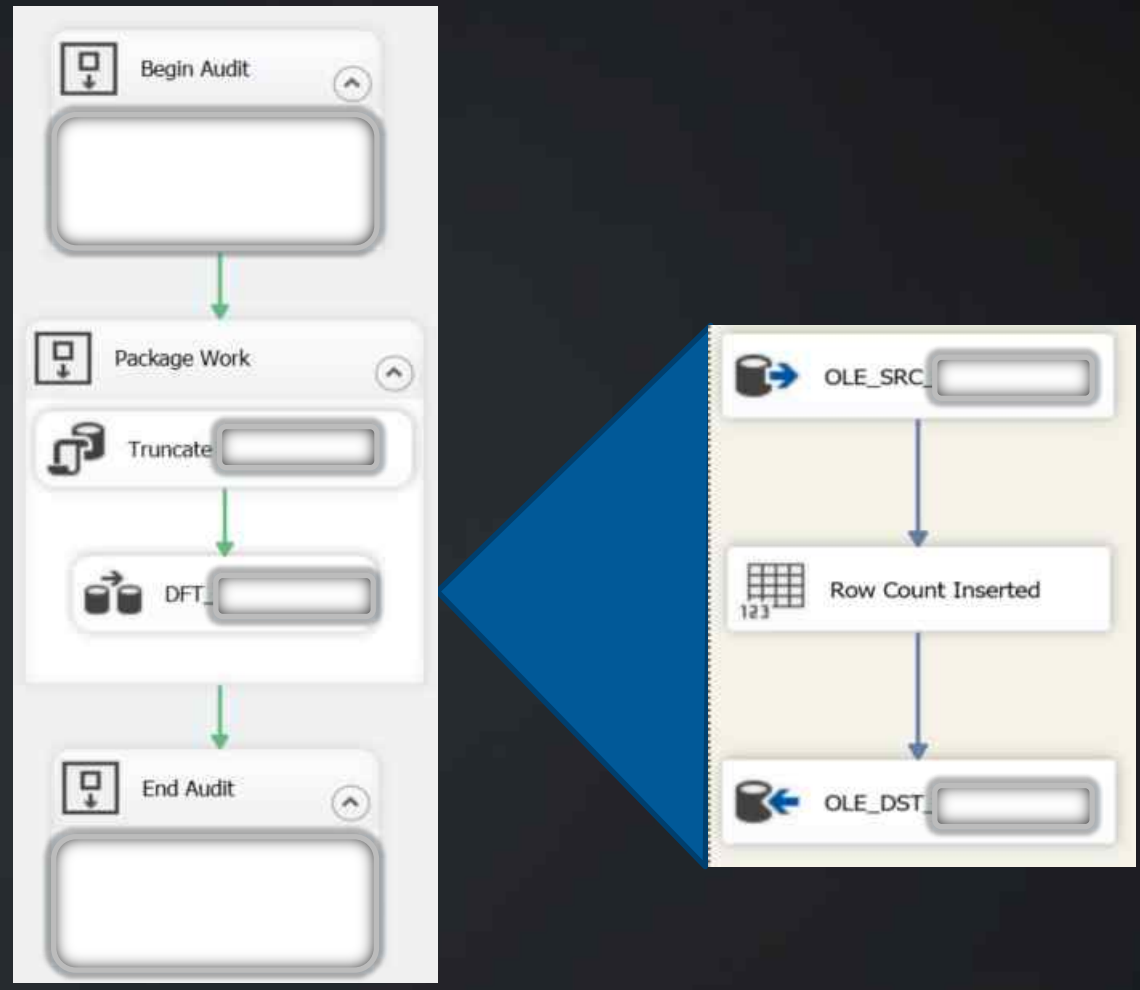


Design Patterns

In SSIS

Staging/Truncate and Reload Pattern

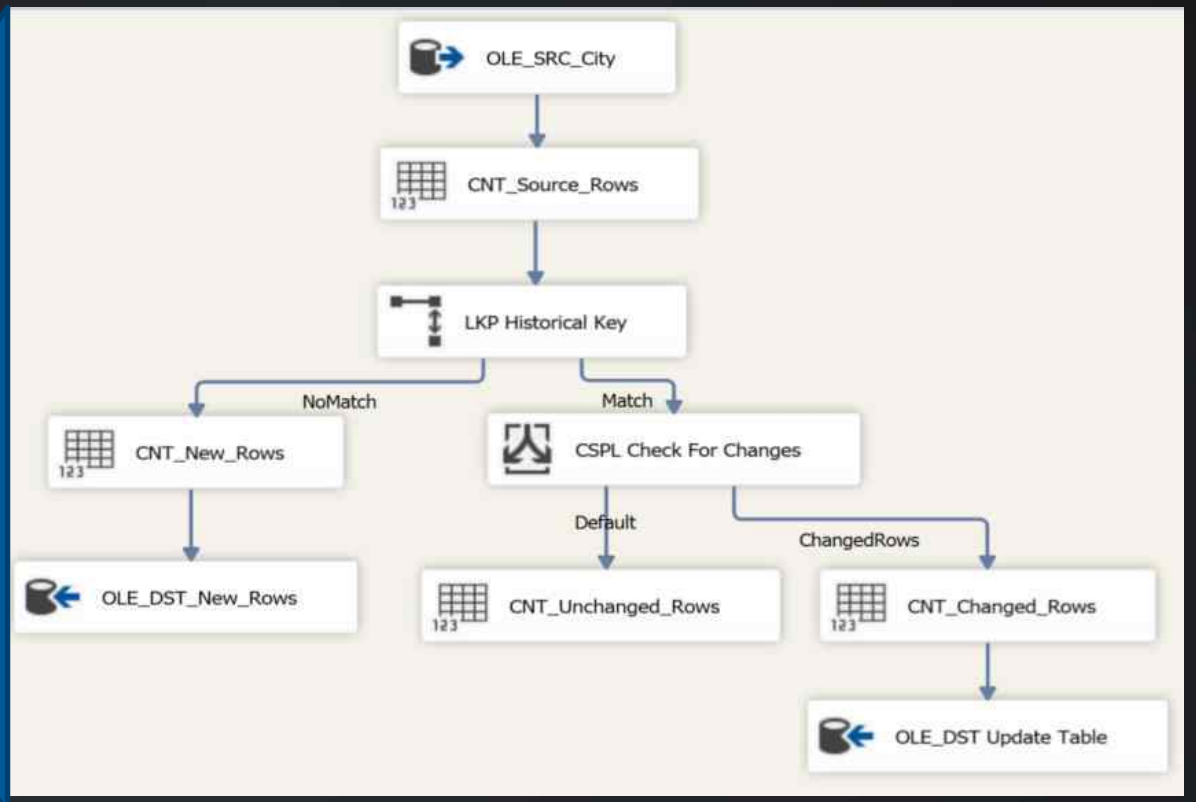
- Performs some kind of audit action to log the start of the package execution
- Truncates the staging table
- Imports data from an OLEDB source
- Performs some kind of audit action to log the end of the package execution



Design Patterns

SSIS Package

Load_DimCity.dtsx

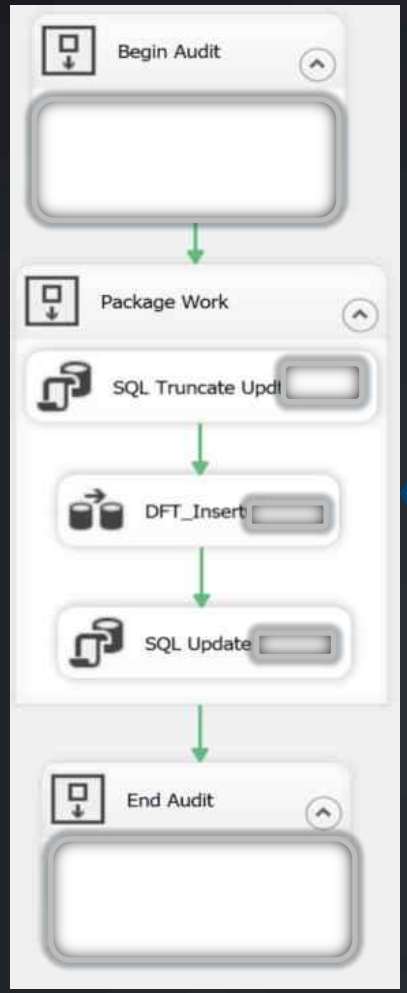


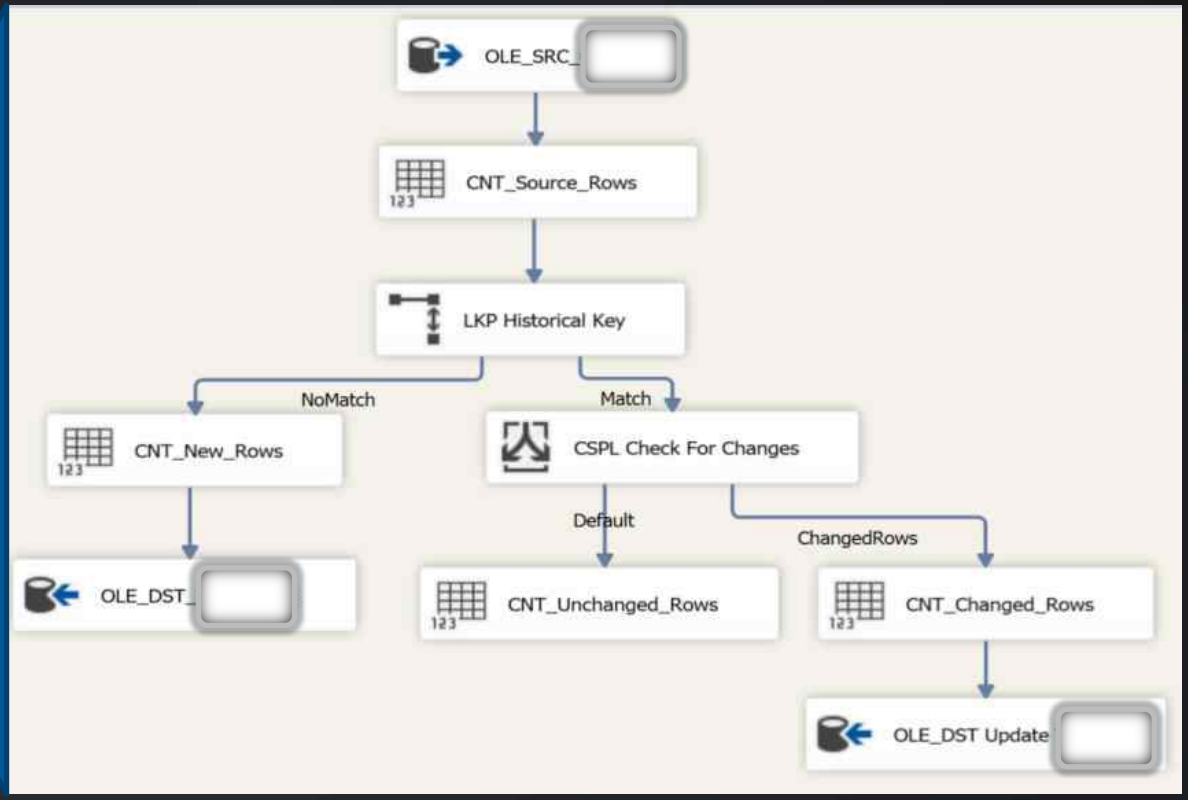
Design Patterns

SSIS Package

Load Type 1 Dimension

- Perform some audit start action
- Truncate the update table
- Execute a data flow:
  - Retrieve data from a view
  - Check to see if the row already exists
  - Insert new rows
  - Check existing rows for changes
  - Insert changed rows in the update table
- Execute the update statement
- Perform some audit closing action





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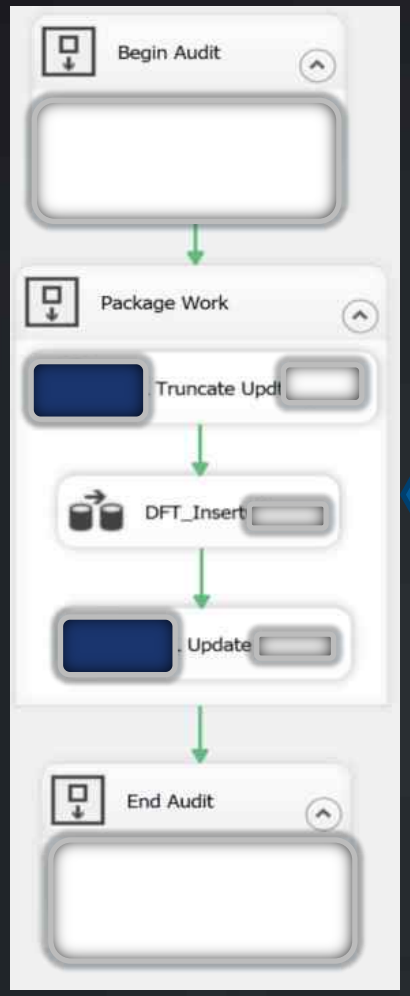
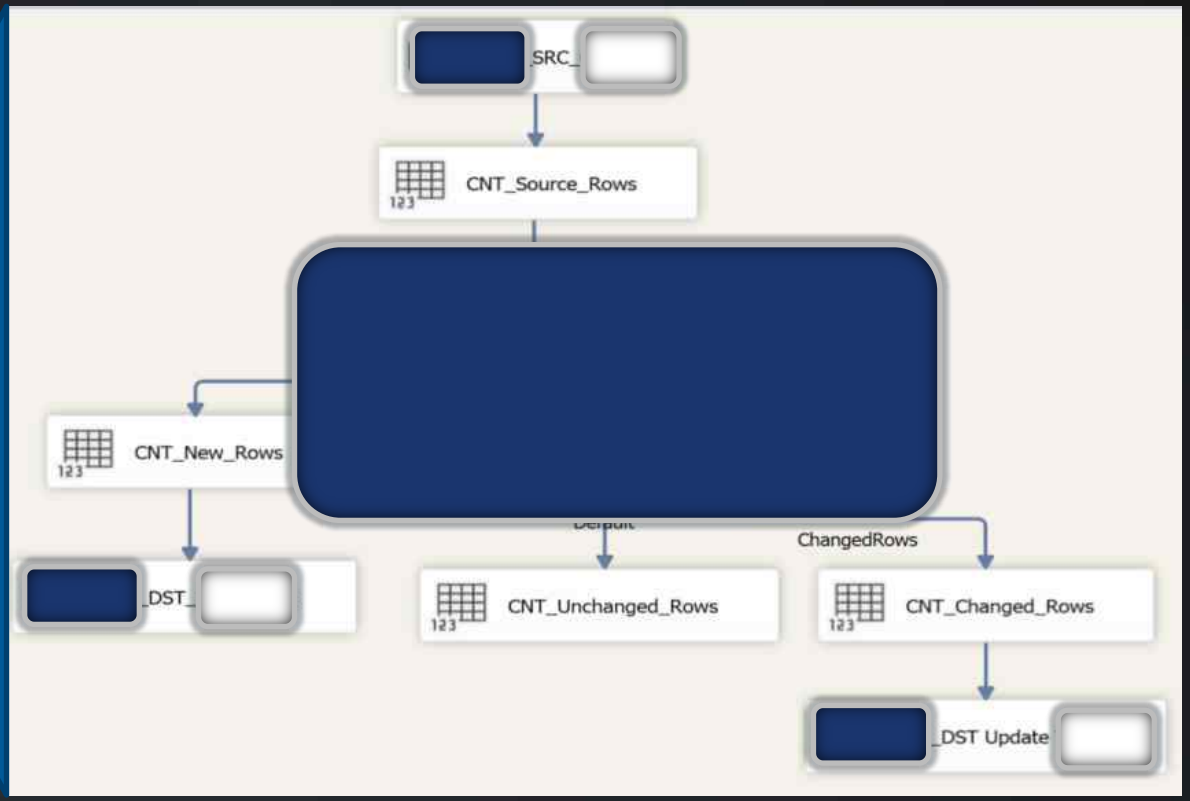
Design Patterns

Level of Detail

You define the context of the design pattern.

It may be different in different environments.





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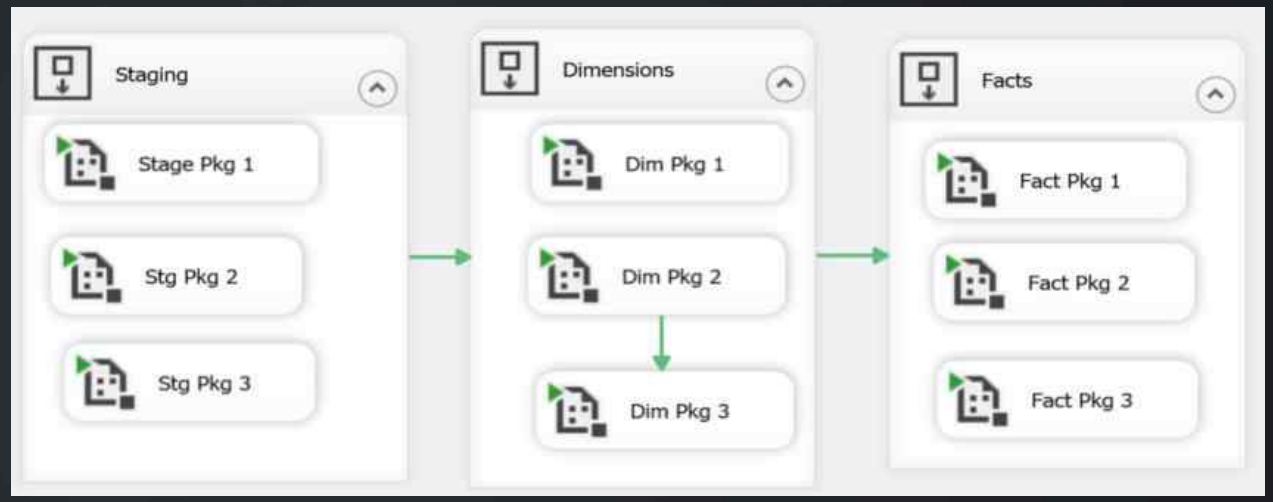
Design Patterns

Package Execution Framework

How do you execute the packages in a project?

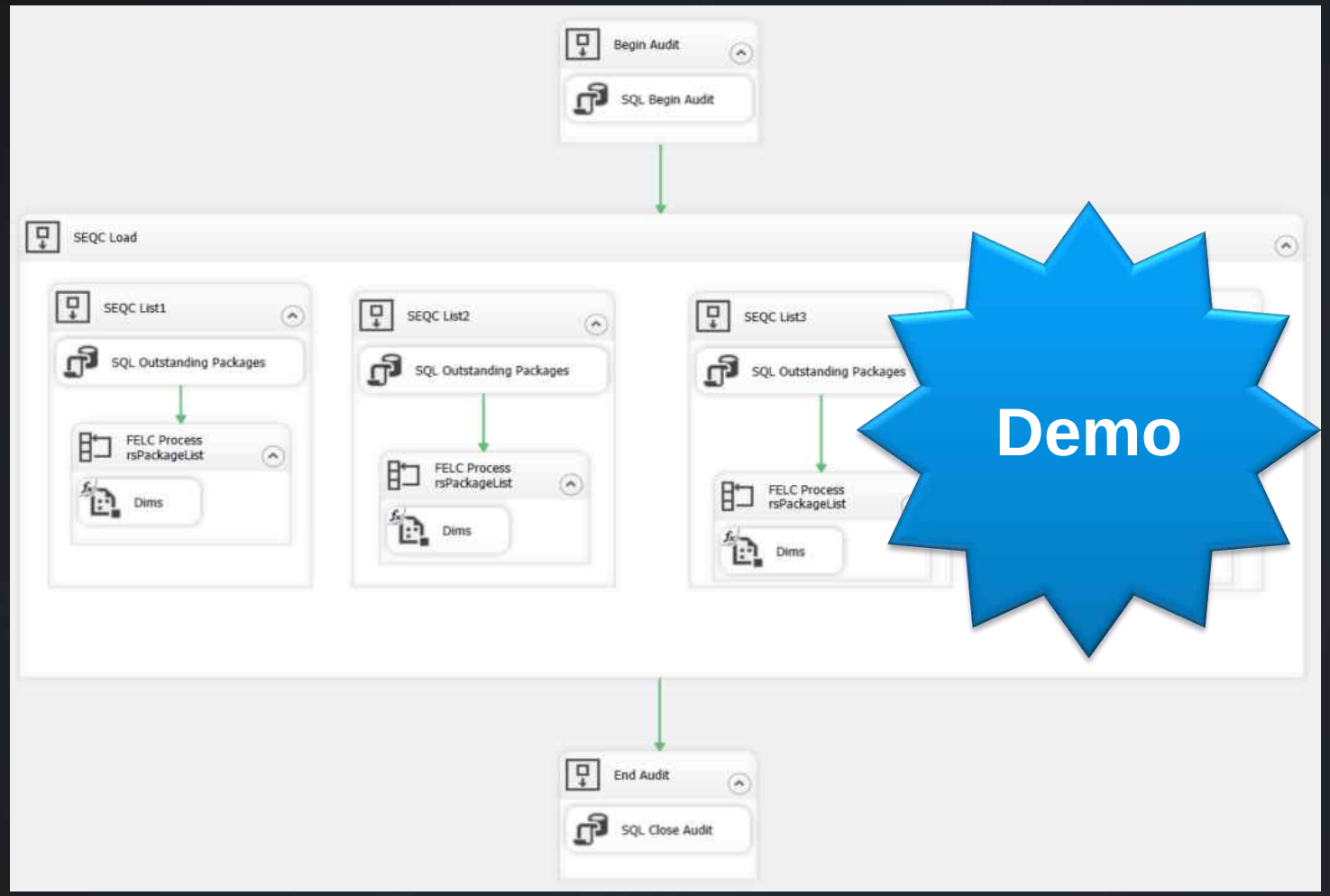
Free-For-All Master Package

Organized Free-For-All Master Package



Design Patterns

Our Package Execution Framework



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Why Don’t SSIS Devs Talk In Design Patterns?

Some Do, But…

- Traditionally SSIS is tightly coupled to the data we are moving and transforming
- You can’t just copy and paste your packages to make similar ones
- Many people stumble into ETL development and don’t have computer science/software development education.

Why Do Design Patterns Matter?

Consistency and Optimization

Reusable design patterns facilitate better SSIS testing and optimization

Common design patterns enable using less senior resources in development efforts while maintaining quality.

Common design patterns make life easier for DBAs and support teams

Why Do Design Patterns Matter?

The Human Element

Design patterns provide consistent value and expectations to consumers of the data, lowering the learning curve for data use.

Design patterns help junior devs understand why/how we need to solve problems rather than focusing on the mechanics of learning different frameworks/design patterns

Reusing design patterns keeps us from having to design the same solutions over and over. We don’t have to make decisions again if we’ve already made them.

II

Automate Your Design Patterns

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Biml™

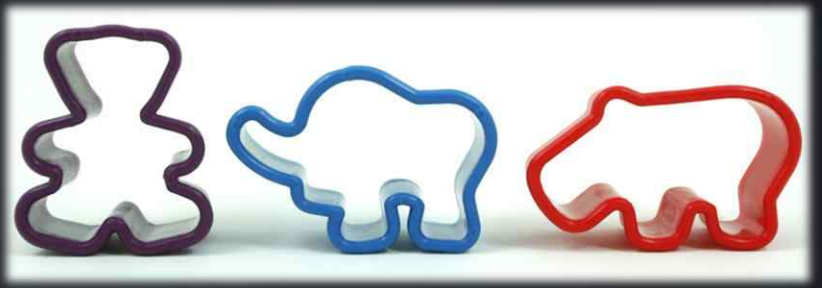
Business Intelligence Markup Language

Domain specific language for describing business intelligence objects

XML that you can write to:

- Build packages faster
- Ensure consistency

Defines Your Design Patterns



Biml describes

- SSIS packages, databases, schemas, tables
- SSAS cubes (Mist only)
- Coming soon: SSAS Tabular and Azure Data Factory Pipelines

BimlScript

Automate Your Biml

Allows you to extend Biml with C# or VB.NET

Classic ASP:HTML :: BimlScript:Biml

Automates your design patterns

Instantiates Your Design Patterns

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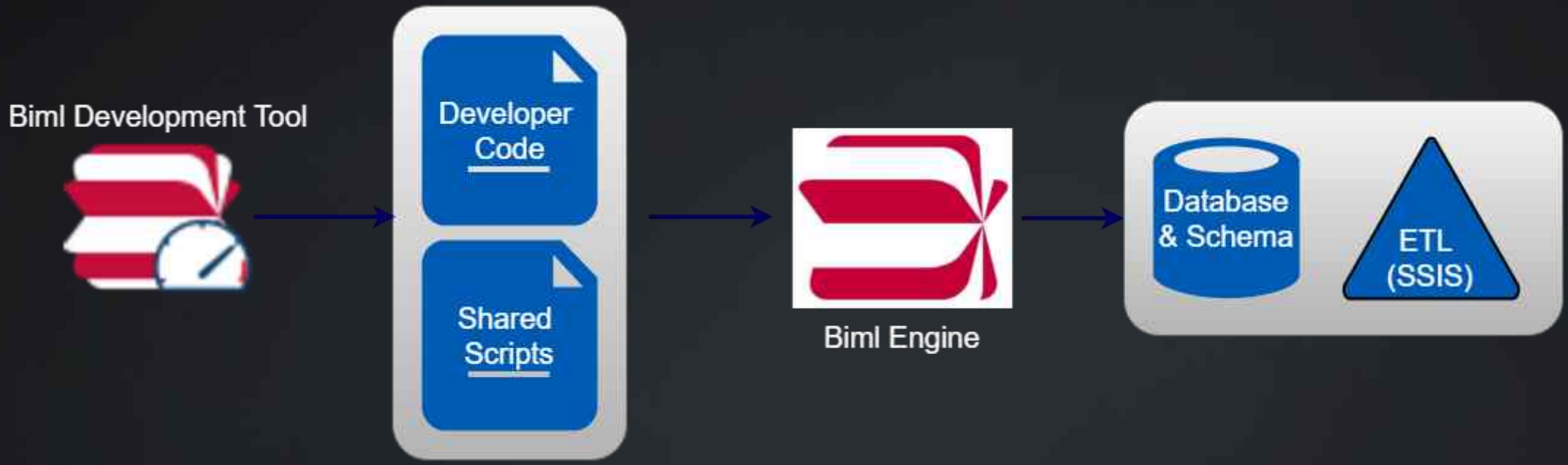
Biml Tools

Tool	Free?	Description
BimlExpress	Free	VS add-in for 2010-2015, SQL Server 2005-2016, faster release cycle than BIDS Helper
BimlStudio	Paid	Separate application, more features (SSAS, reverse engineer, transformers, metadata modeling)
BimlOnline	Free	Limited functionality but can reverse engineer
BIDS Helper	Free	VS add-in, not available for SQL 2016/VS 2015

**Pricing model may change in the future

How Does Biml Work?

Development Flow



Biml Demo

Look at BimlScript for the Staging/Truncate & Reload Pattern

Generate a package from Biml

Benefits of Biml

Free Magic

All generated artifacts appear to be hand built.

Packages can be deployed and run on unmodified SQL Server (no need to install anything on the server running the packages).

Biml is version agnostic.

Biml is free with BIDS Helper, BimlExpress, or BimlOnline.

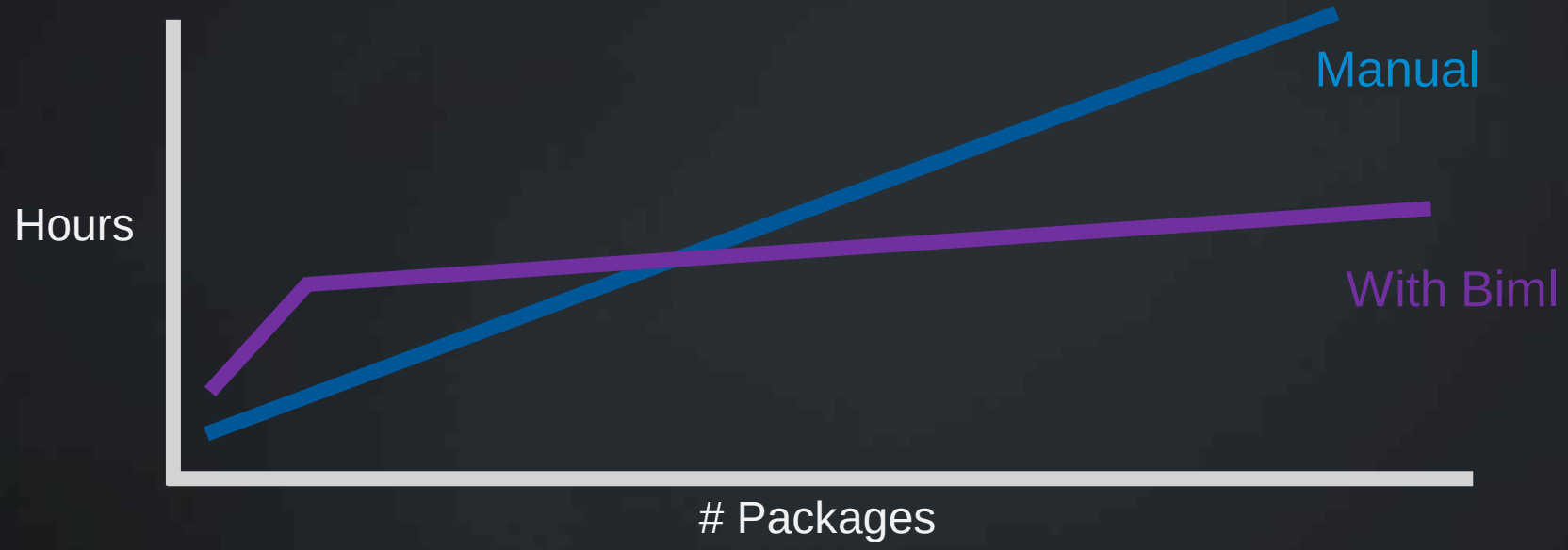
Benefits of Biml

All the Benefits of Design Patterns, Plus…

Reduces amount of time it takes to develop an SSIS project

Helps you recover from drag-and-drop-itis

Quickly implements design patterns and execution frameworks



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Biml Vs Control Flow Templates

A Clear Winner

Control Flow Templates:

- Only work with SQL Server 2016+
- Can’t be reverse engineered from a package that they created
- That contain data flow tasks that are subject to same limitations of the copy/paste of a package, and then some. E.g., they are bound to specified connection/table.

Do It With Metadata

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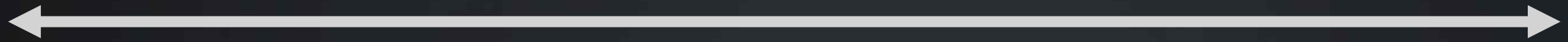
What Is Metadata?

As It Relates To SSIS

Natural Metadata	Hybrid Metadata	Synthetic Metadata
Metadata that exists as an artifact of pre-existing processes and is machine readable and relatively correct.	Metadata that enhances natu metadata, usually through key/ pairs or other simple relations	A largely standalone, often complex metadata store that captures business logic and pattern selection
Examples: Database schemas Data dictionaries Self-describing web services (OData)	Examples: Biml Annotations Database extended properties Data Dictionaries with added co	Examples: Excel workbooks Database tables Web Services



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Metadata Driven Development

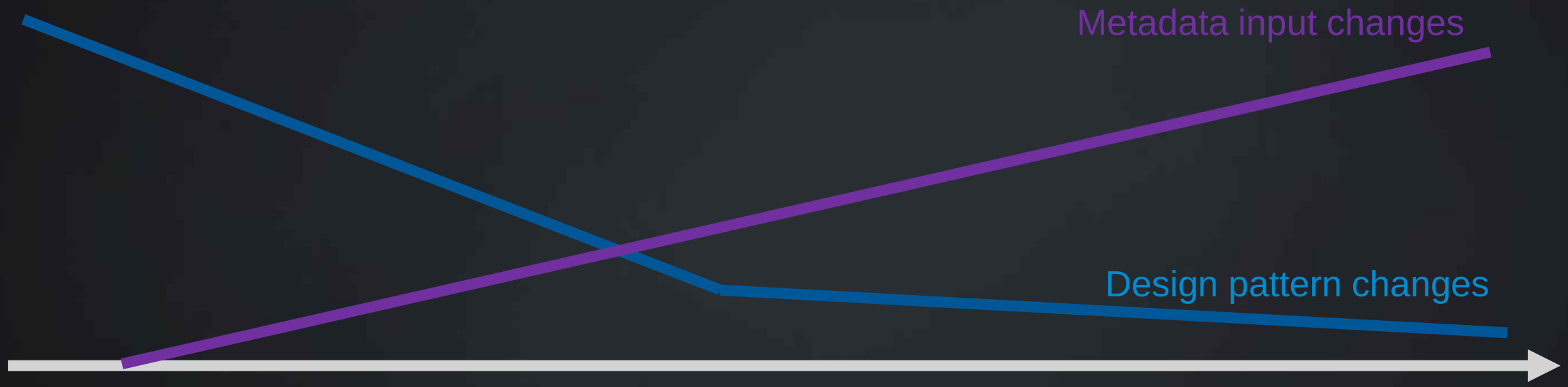
Use Your Metadata for SSIS Package Creation

- Your documentation is your metadata and BIML, which drives development. No need to write detailed documentation after the fact.
- Metadata keeps a good record of the inputs used to create the packages.
- Metadata can and should be source controlled.
- Mature implementations can involve data stewards filling in metadata rather than the ETL development team.

Metadata Driven Development

Changes the Way You Develop

As time goes on, you rarely change your pattern and more frequently change your data.



Capture Metadata

In Excel

Excel is the user interface. Data is captured in database tables.

Most people have Excel (or can export to Excel).

Excel makes it easy to add data validation.

Metadata Driven Demo

Start with an Empty Database

- Start with database objects deployed but not populated
- Upload metadata from Excel
- Generate the required packages

IV

Mass Changes: Freedom from Technical Debt

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Simple Reusability is Freedom

Composite reuse principle

At the project level:

- Design patterns

At the package level:

- Each package has only one task and variables are abstracted away
- Orchestration performed by master package, as a step or overall

Within the package:

Common variables, package audit (logging)

Continuous Improvement Without Tedium

Fewer Changes and Less Time to Update Code

Show Biml code and reuse of audit tasks

Add error handling in fact package

V

Final Thoughts

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Final Thoughts

Don’t make decisions you’ve already made before

Don’t leave it to chance that a developer has manually changed all settings or mapped all fields

Biml is “free” and there is no vendor lock-in

You don’t have to automate everything (80/20 rule)

Spend your extra time actually testing your SSIS packages

Focus on delivering value for business users

Questions

Or Comments

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