

# Strategies for Generating Code from Microsoft DSL Tools Using T4 Text Templates

```
1  
2
```



```
3 // (auto-generated)
```

Brooke Hamilton

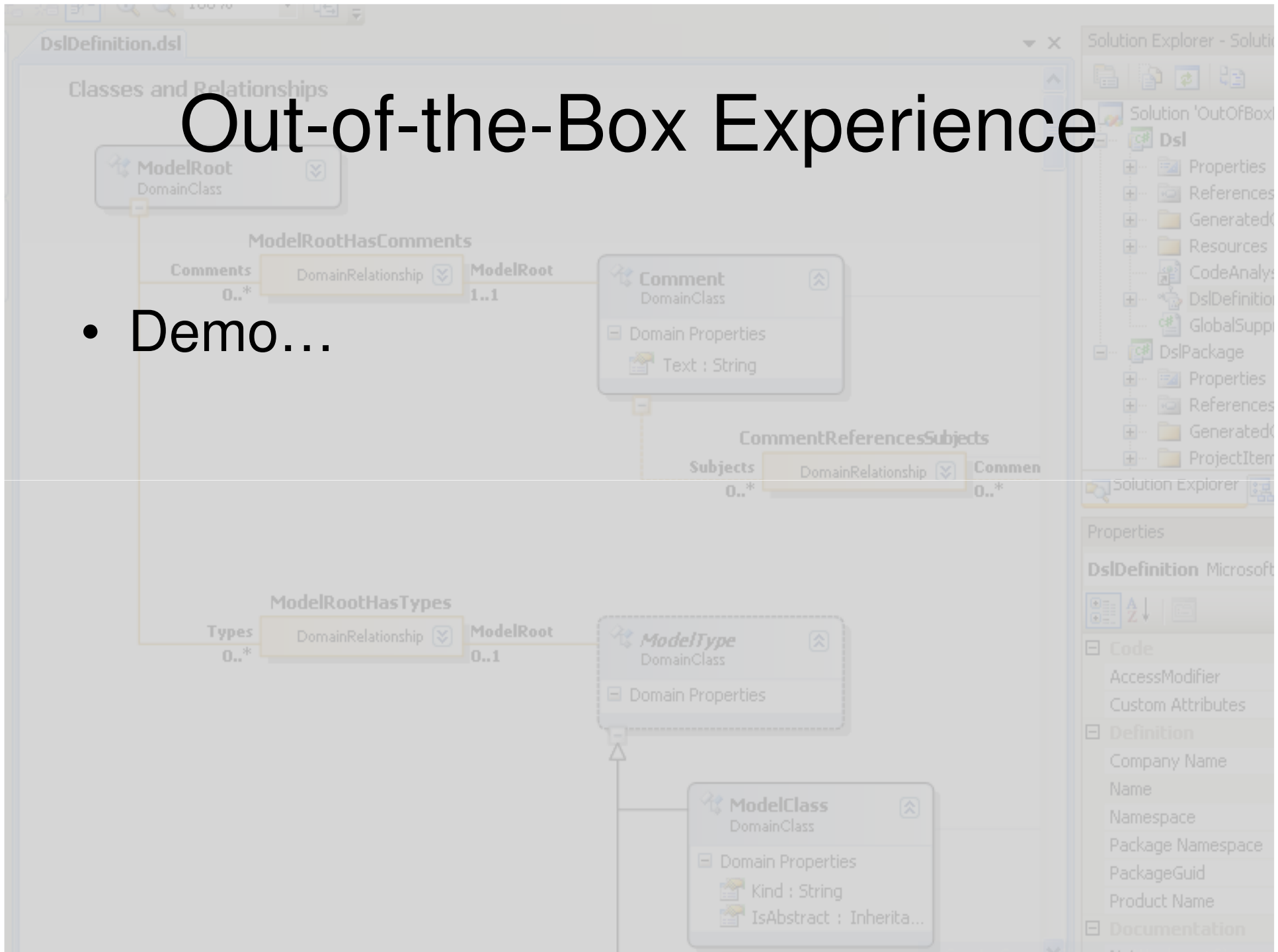
```
4 // This code was generated by a tool.
```

# Disclaimer

The experiences and viewpoints expressed in this presentation are my own, and are not necessarily the views of my employer.

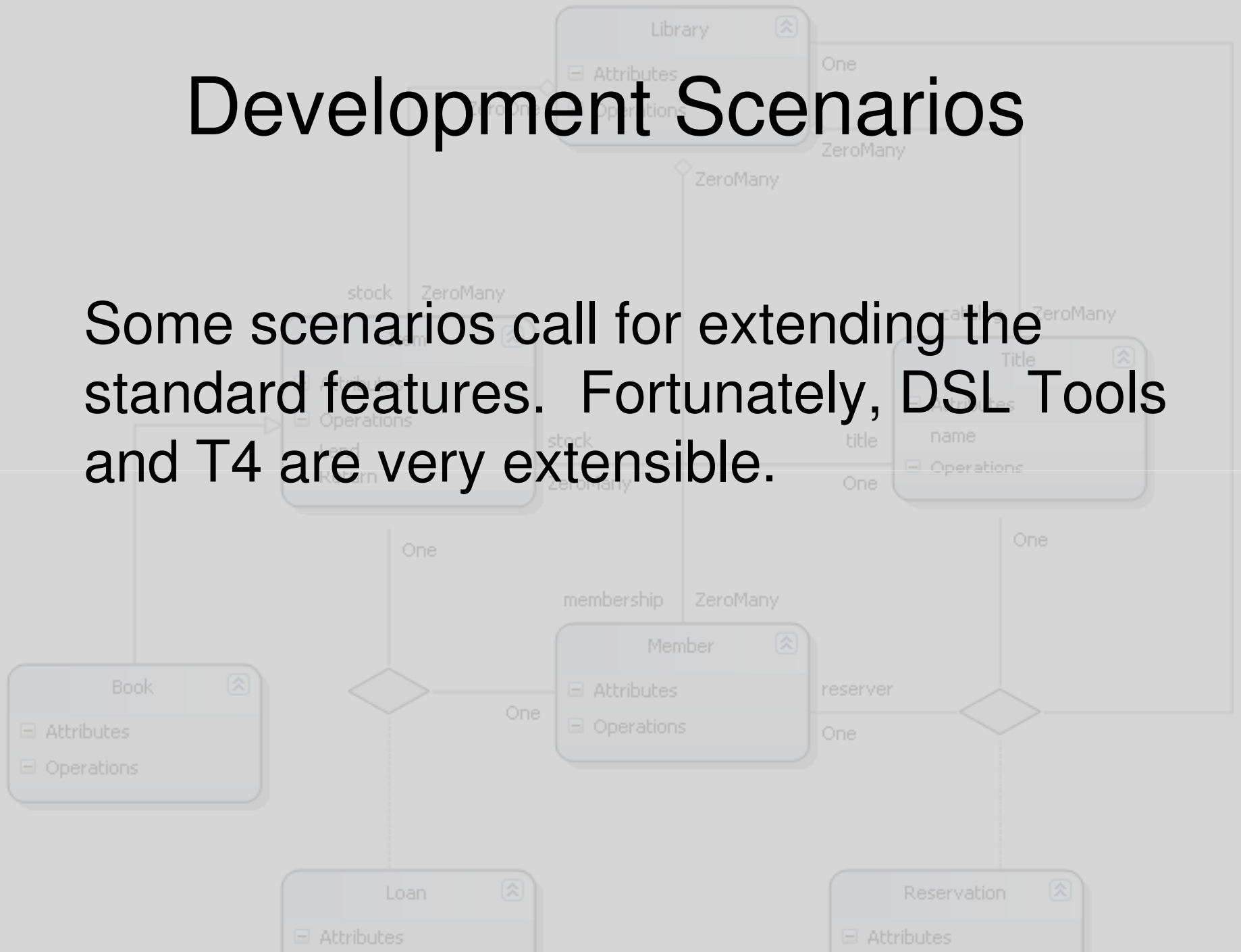
# Out-of-the-Box Experience

- Demo...



# Development Scenarios

Some scenarios call for extending the standard features. Fortunately, DSL Tools and T4 are very extensible.



# Scenario 1: Solo Developer

The out-of-the-box experience works well.

- MSI deployments work locally, or you can use the experimental hive (if you have only one DSL.)
- It's OK to not have a custom tool for every DSL.
- Rapid iteration is easy because everything is local.
- Versioning is not much of a constraint.

# Scenario 2: Enterprise Team Development

Most difficult to support with T4 and DSL Tools because you need:

- Quick deployments (MSIs are not quick)
- A custom tool associated with each DSL. Simple to do but the documentation is on MSDN forum posts.
- Rapid development and iteration on the T4 templates without turning them into a mess.
- Versioning for the DSL and T4 Templates

# Scenario 3: Enterprise Team with Centralized Control

Easier to support than the previous model, but...I've never seen it work.

- MSI-based deployments work well.
- Rapid iteration is not an issue.
- Versioning is less frequent.
- Still need a custom tool.

# Scenario 4: Product Development

Very similar to the centralized control scenario:

- MSI-based deployments work well.
- Rapid iteration is not an issue.
- Versioning is less frequent.
- Still need a custom tool.

# Custom Tool Creation Demo

- Transform All Templates button
- Custom tool creation
- Packaging and deploying custom tools

Changes to this file may cause incorrect behavior and will be lost if the code is regenerated.

# Deployment Demo

- DSL Tools supports MSI-based deployments. (Demo...)
- Deployments can also be scripted without MSIs (Demo...)
- Treat text templates as if they were a compiled dependency.
- Text templates can be deployed to a well-known location. Add a registry key to have T4 search for includes. Or add them to the DSL assembly as a resource.
- DSL and DSL package assemblies can also be deployed to a well-known location and installed from there.

# Versioning

- DSL Versioning
- Template Versioning
- Versioning is related to deployments

# Making T4 Templates More Maintainable

- Put some of the code into the DSL (Demo...)
- Use the Transaction Script pattern and name each function very well. (Demo...)
- Use includes for common functions (but this is still problematic)
- Use a different language from the one you are generating.
- Generate code using the double derived pattern

# Making T4 Templates More Maintainable, continued

- Use the RPA pattern (from Ron Kersic and Jan Ypma.)

Separate template code into three concerns:

- Rendering
- Pattern Matching
- Annotating

- Other Patterns

# Looking Ahead

- I recommend a different scenario: centralized DSL development and local template creation.
  - Language design requires forethought, and is less prone to change. It is a strategic element.
  - Code gen template development has to rapidly respond to changing needs. It is tactical. It has to be close to the construction teams.

# Looking Ahead, continued

- Features we need in T4 and DSL Tools:
  - Add reference to DSL
  - Add reference to text template
  - Call template (no more includes)
  - Generate code directly from Xml languages.
  - Allow choosing the template from the DSL instead of choosing the DSL from the template.
  - Create a custom tool that will search the project for templates that target the selected DSL instance.

# Looking Ahead, continued

- Raise the abstraction level of code generation, like using object orientation and visual tools. A DSL for code generation?

# Resources

- Contact: [hamiltonbrooke@yahoo.com](mailto:hamiltonbrooke@yahoo.com)
- T4 Documentation on MSDN:  
<http://msdn2.microsoft.com/en-us/library/bb126445.aspx>
- MSDN Visual Studio Extensibility Forum:  
<http://forums.msdn.microsoft.com/en-US/vsx/threads/>
- DSL Tools Book:  
<http://www.domainspecificdevelopment.com/>
- T4 Editor: <http://www.t4editor.net>
- More resources in the slide notes!