

Code Generation with T4 Text Templates

Oleg Sych
www.olegsych.com

Generating Multiple Outputs

Demo

```
<#@ template language="C#" hostspecific="True" debug="True" #>  
<#@ output extension="txt" #>  
<#@ include file="T4Toolbox.tt" #>  
<#  
TransformationContext.SaveOutputToFile("File1.txt", "First File");  
TransformationContext.SaveOutputToFile("File2.txt", "Second File");  
#>
```

Making Template Reusable

Demo

```
<#@ assembly name="Microsoft.SqlServer.Smo" #>
<#@ assembly name="Microsoft.SqlServer.ConnectionInfo" #>
<#@ import namespace="Microsoft.SqlServer.Management.Smo" #>
<#+
class DeleteProcedureTemplate: Template
{
    public Table table;

    protected override void RenderCore()
    {
#>
create procedure <#= table.Name #>_Delete
<#+
    // ...
    }
}
#>
```

Generating Multiple Outputs

Demo

```
<#@ template language="C#" debug="True" hostspecific="True" #>
<#@ include file="T4Toolbox.tt" #>
<#@ include file="DeleteProcedureTemplate.tt" #>
<#
    Server server = new Server();
    Database database = new Database(server, "Pubs");
    database.Refresh();
    DeleteProcedureTemplate deleteTemplate = new DeleteProcedureTemplate();
    foreach (Table table in database.Tables)
    {
        deleteTemplate.table = table;
        deleteTemplate.RenderToFile(table.Name + "_Delete.proc.sql");
    }
#>
```

Making Generator Reusable

Demo

```
<#+
public class CrudProcedureGenerator : Generator
{
    public string DatabaseName;

    protected override void RunCore()
    {
        Server server = new Server();
        Database database = new Database(server, this.DatabaseName);
        database.Refresh();
        DeleteProcedureTemplate deleteTemplate = new DeleteProcedureTemplate();
        foreach (Table table in database.Tables)
        {
            deleteTemplate.table = table;
            deleteTemplate.RenderToFile(table.Name + "_Delete.proc.sql");
        }
    }
}
#>
```

Using Code Generator

Demo

```
<#@ template language="C#" debug="True" hostspecific="True" #>  
<#@ include file="T4Toolbox.tt" #>  
<#@ include file="CrudProcedureGenerator.tt" #>  
<#@ include file="DeleteProcedureTemplate.tt" #>  
<#  
    CrudProcedureGenerator generator = new CrudProcedureGenerator();  
    generator.DatabaseName = "Pubs";  
    generator.Run();  
#>
```

T4 in Team Projects

Demo

- Store templates in source control
- Use relative paths for external files
 - `<#@ template hostspecific="True" #>`
 - `Host.ResolvePath()`
- Use relative for template files in Include directive
 - Relative paths in Include directive are limited to 1 level of nesting
 - Add path to team templates to
`HKLM\Software\Microsoft\VisualStudio\9.0\TextTemplating\IncludeFolders`

Making Code Generator Extensible

Demo

```
<#@ template language="C#" debug="True" hostspecific="True" #>
<#@ include file="T4Toolbox.tt" #>
<#@ include file="CrudProcedureGenerator.tt" #>
<#@ include file="DeleteProcedureTemplate.tt" #>
<#
    CrudProcedureGenerator generator = new CrudProcedureGenerator();
    generator.deleteTemplate = new MyDeleteProcedureTemplate();
    generator.DatabaseName = "Northwind";
    generator.Run();
#>
<#+
class MyDeleteProcedureTemplate: DeleteProcedureTemplate
{
    protected override void RenderCore()
    {
        this.WriteLine("-- this code was generated by a tool");
        base.RenderCore();
    }
}
#>
```

T4 Template Design

- Create one *Template* class for each output
 - Place template content in *RenderCore* method
- Create one *Generator* class for each input
 - Place code generation logic in *RunCore* method
- When necessary
 - Provide virtual methods in your *Templates* to allow user to customize code generation
 - Provide writeable properties in your *Generators* to allow user to replace templates

Resources

- [Visual Studio SDK](#)
 - [Domain-Specific Language Tools](#)
- [www.olegpsych.com](#)
 - [Presentations](#)
 - [Code Generation with T4 Text Templates](#)
 - [Articles](#)
 - [Text Template Transformation Toolkit](#)
 - [T4 Architecture](#)
 - [T4 Template Design](#)
- [www.t4editor.net](#)
- [http://www.codeplex.com/t4toolbox](#)