INVITED ARTICLE

Productivity Improvement Tool: Code Generator

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1. BRIEF DESCRIPTION:

Code Generator is window based tool for generating code for the .NET application following MVC kind of architecture i.e. application having Presentation layer, Business layer, Data layer where data layer is calling the stored procedure in the SQL Server.

2. CODE GENERATOR DEVELOPMENT ENVIRONMENT:

- . Net Framework 2.0, C#, ADO.Net
- MS SQL Server 2005

3. PRE-REQUISITE:

- Table designing is complete and tables are created in the SQL Server
- Database connection and folder where code will be generated is defined in code (Currently database and folder information is hard coded in code.)

4. INPUT:

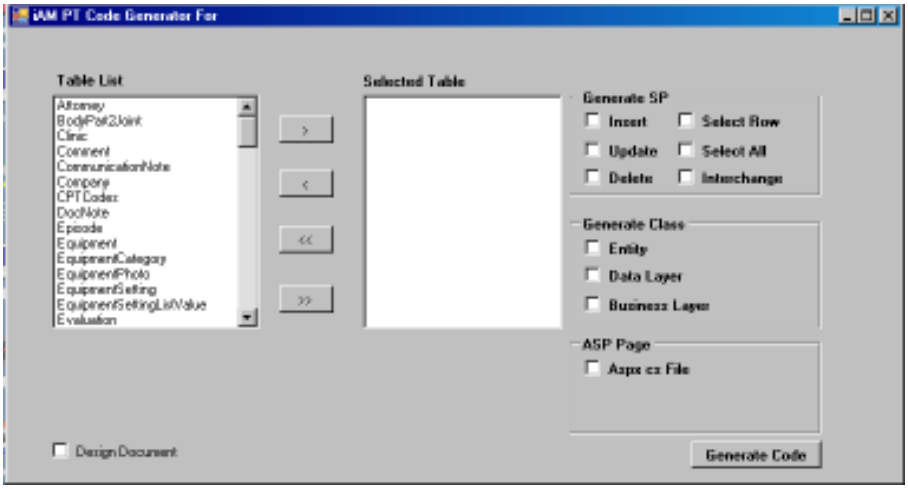
Currently database and folder information is hard coded in code.

- Database connection
- Folder where code will be generated

5. OUTPUT:

- iAMPT.sql (having stored procedure code for insert, update, delete, gets, getByID for each table)
- Entity classes (Generated in Entity folder)
- Business Layer classes (Generated in BL folder)
- Data Layer classes (Generated in DL folder)

6. SCREEN:



7. DETAILS:

On Form Load (At start up): Table names (from the database) are populated in the table list.

User Inputs:

- Select tables for which code needs to be generated
- Check the checkboxes for which portion (layer/ type of stored procedure) of code needs to be generated.
- Click "Generate Code" button to generate the code.

Logic:

For each Selected Table

i) Get the table information (column name, data type, length, primary key etc) from the SQL Server system tables

ii) For each selected check box (i.e. Generate SP - Insert, Update, Delete, Select Row, Select All, Generate Classes – Entity, Data Layer, Business Layer)

Generate code based on the information got from the system tables.

Note: The template for each piece of code is pre-defined (i.e. Currently hard coded). This template is filled with table information fetched from system table and written to the file.

8. BENEFITS TO PROJECT:

- Basic functionality like insert, updates, delete and get functionality achieved with minimum effort. Due to this more effort given in achieving the complex functionality and business process.
- Consistency in code
- Ease in implementation of coding standard.
- Chances of defects in code generated are very less. Defects will occur only if there are defects in template.
- 50 % of Code Generated
- Auto generated code LOC: 69351
- Total LOC: 136500
- % Code Generated = (69351/136500) * 100 = 50 %

9. EFFORTS FOR CREATION OF CODE GENERATOR:

15 to 20 PDs

10. FUTURE IMPROVEMENTS TO CODE GENERATOR:

- Code generator for Presentation layer
- Code generation based on Stored Procedure
- Provide option to select database in running mode
- Provide user to select the folder where code should be generated
- User defined coding standard.
- Generalization of hard coding in Code generator.

This tool has been already experimented on live product development project and it has been observed that, such tool can certainly be great help for both Software Development Company and End customer. **It will not only help to have shorter development schedule but improved quality at lower efforts and cost.**

Please refer following business case for detail:

11. BUSINESS CASE

A S/W Company wants to develop new product suite, which will be based on their existing system (client/patient management software for clinics). The new

product is being developed to overcome the current issues of multiple data entry of information in disparate systems, data loss, time required for data entry, lack of configurability and scalability.

A high-level summary of the major functions the application will perform or will let the user perform is as mentioned below.

- Patient Module
    - Manage Patient
    - Capture the Out Patient Intake Information
- Schedule Module
    - Manage Appointments of patient for different clinics
    - Reports
        - Detail Schedule Report
        - No Show Report
        - Re-Evaluate Schedule
- Documentation Module
    - Initial Evaluation
        - Examination (Outpatient Information, Questionnaire, Test and Measures)
        - Evaluation (Treatment Plan, 1st Daily Progress Note, Override Progress Note, Problems & Goals, Prognosis/Diagnosis, Preferred Practice Pattern)
        - Plan of Care (Duration & Frequency, Next Evaluation)
    - Daily Progress Note
    - Re – Evaluation
    - Communication Note
    - Doc Notes
    - Exit Note
        - Discharge Note
        - Discontinuation Note

- Reports

- Administration Module
  - Management of master data

12. KEY CHALLENGES

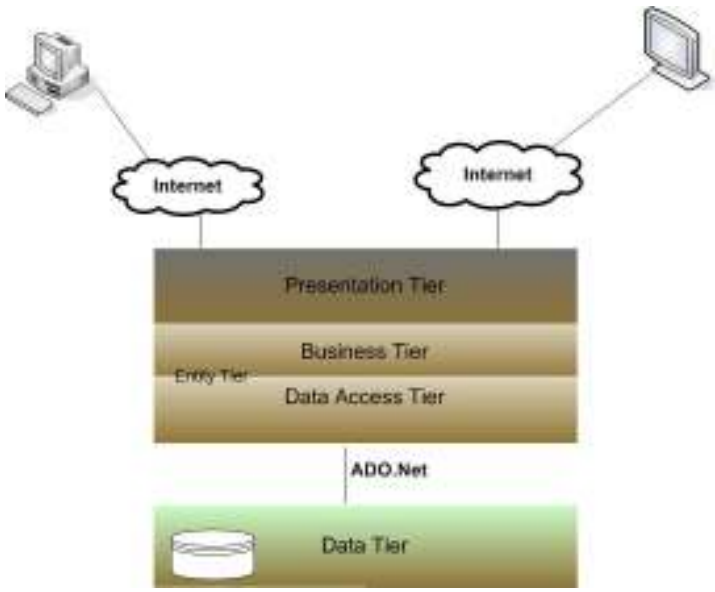
- Interfacing Web Camera/Signature Pad with the Web application
- Flash integration with .Net
- Generalized Questionnaire
- Domain understanding
- Performance Testing

13. PROJECT SIZE

The size of Project is around 1200+ FP.

14. TECHNICAL ARCHITECTURE

Application Architecture:



3-tier application is a program, which is organized into three major disjunctive tiers. These tiers are:

- Presentation tier (Front end)
- Business tier (Middleware)
- Data tier (Backend)

Data tier

This tier is responsible for retrieving, storing and updating information. Therefore this tier can be ideally represented by a commercial database. Stored procedures will be part of the Data tier. Usage of stored procedures increases the performance and code transparency of an application.

Entity tier

This is the core of the system, the linking pin between the other two tiers. In most applications, programmers often have a single tier between the presentation logic and the actual back-end database. They tend to lump both the business logic and the data access into the same entity tier. It's better to separate the code that enforces business rules and performs multi-step business processes from the database access code.

Business tier

This sub tier contains classes, which handle the logic processing of the application, and handles information exchange between presentation and data access tier/layer. This tier doesn't know anything about the GUI controls and how to access databases.

Data Access tier

This tier acts as an interface to the Data tier. This tier knows, how to (from which database) retrieve and store information.

Presentation tier

This tier is responsible for communication with the users and web service consumers and it uses objects from the business layer to respond to the GUI raised events.

15. OPERATING ENVIRONMENT

- **Development Environment**
  - . Net Framework 2.0, C#, ASP.Net 2.0, JavaScript
  - MS SQL Server 2005, ADO.Net

- IIS 6.0 Web Server
- IE 6.0 & 7.0

- **Deployment Environment**
  - Windows 2003 server
  - IIS Web Server 6.0
  - . Net Framework 2.0
  - SQL Server 2005
- **End User Environment**
  - Windows XP.
  - Windows 2000 if reasonably simple to support else not support windows 2000.
  - If possible test for the windows Vista compatibility.
  - IE 6.0 & 7.0

AUTHOR'S PROFILE

Mr. Nikunj Patel is a dynamic professional comprising mix of IT and Non-IT background. Having more than 22 years of experience in Information Technology, Manufacturing, Production Planning control (PPC), Procurement and Inventory Management has worked with different reputed organizations at various capacities.

Currently he is working as Sr. Manager / Delivery Manager with one of the top 10 IT companies having total delivery responsibilities for multiple global accounts. He is shouldering responsibilities of PES Business Unit Head for the locations. Presently he manages business of more than $ 10 Million having multiple accounts and team of 300+ IT Professional as various levels. As a Delivery Manager he is responsible for delivery of all projects to the multiple clients, with high-quality and low-cost. Delivery Manager is expected to play a significant role in managing client expectations, team performance, and supporting business development through proposals.