White Paper

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Application Frameworks – Building Block for Business Applications

Harpreet Mittar
harpreet.mittar@polaris.co.in

Contents

Part 1 – Introduction

Objective

This White Paper glances over the need for application frameworks, their applicability and benefits.
It also covers core features that should be supported by well designed frameworks for robustness and scalability.
We also look at how **proprietary framework (SCORE) adds value** over generic frameworks in rapid application development.

Part 2 – Why Frameworks

Why?

Application Frameworks form the backbone of any software application. Well designed frameworks enable developers to rapidly develop applications with repeatable and superior quality. Frameworks enable developers to focus on core business and functional requirements rather than on infrastructure and other application logistical needs.

Some of the benefits of using frameworks are-

- ✓ Rapid Application development
- ✓ Standard coding practices
- ✓ Predictable programming model
- ✓ Repeatable and superior quality
- ✓ Adapters for 3rd party interfacing
- ✓ Fewer application defects and rework
- ✓ Consistency
- ✓ Maintainability
- ✓ Superior customer satisfaction

Part 3 – Must-Have Framework Features

Core Features

A framework should be robust, maintainable and scalable. Some of the core features that go into the making of a well designed framework are elaborated below.

- ✓ **UI/View management**
  - Framework supports rapid design and generation of UI screens. **Multiple delivery channels** viz. Web browser, thick desktop clients are supported. Automatic generation of HTML and Java Swing code from a single screen design.
  - Support for **Rich Internet Applications (RIA)** with **Ajax**, **jQuery and extJs**.
  - Definition vs. Creation model.

- ✓ **Data Validation/ Rule Engine**
  - Framework provides client and server side validation check points. Basic validations are easily extendable to allow applications to override and customize default routines.
  - In addition, dependency checks / business rules are definable and extendable.

- ✓ **Authorization and Access Control**
  - Framework supports implicit authorization checks of user actions based on roles and rights.

- ✓ **Navigation Control**
  - Framework provides navigational controls to navigate to another screen on a specific user action. **Conditional navigation** is a step further that allows multiple paths based on evaluation of data conditions at runtime.

- ✓ **Remote Access**
  - Framework seamlessly and transparently allows remote calls across distributed application tiers with appropriate serialization techniques.

- ✓ **Service oriented business functions**
  - Applications are able to associate service functions with user actions to execute required business logic. This is a **configuration** input along with navigation paths.

- ✓ **Data Access**
  - Framework's data access engine supports **automatic creation** and execution of database statements, Batch updates and **Concurrency checks**.

- ✓ **Transaction Management**
  - Framework has robust transaction demarcation, execution and rollback capabilities. It may be further extended to distributed/XA transactions.

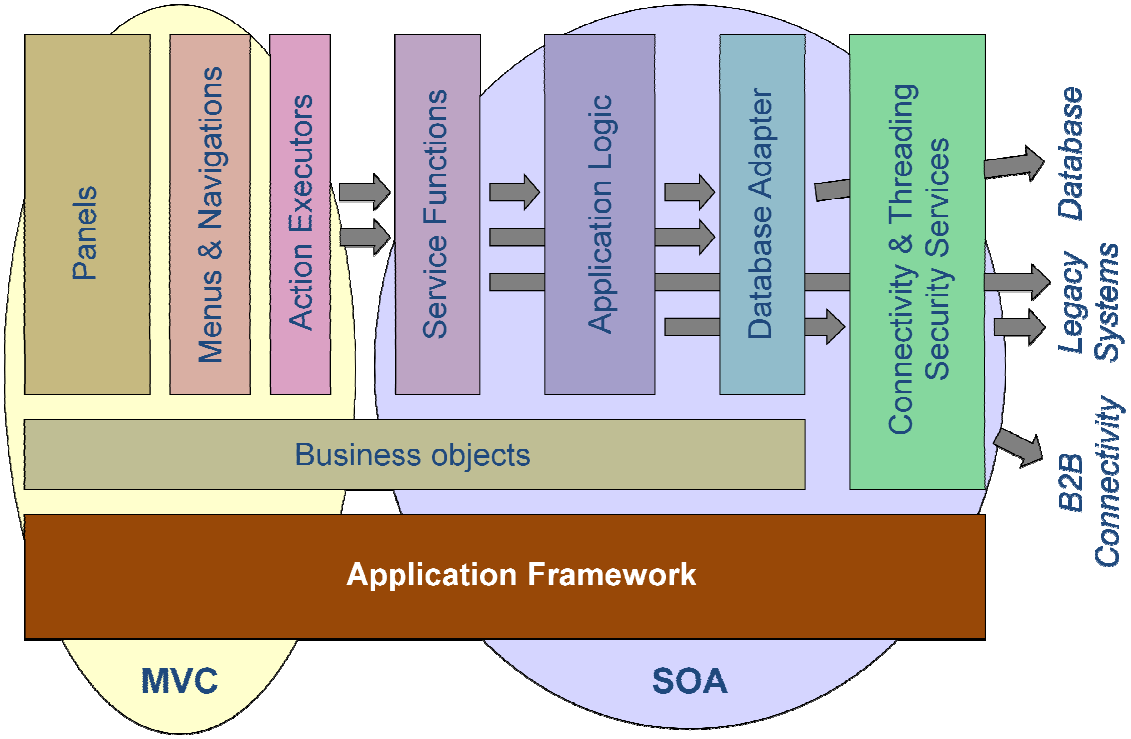
- ✓ **Resource Management**
  This includes but is not limited to the following:
  - Business Objects – creation and lifecycle management of serializable data objects that transfer data across multiple layers
  - Connection pooling – Database connections, External system connections
  - Session management – User session management and expiry
  - **Caching** – of frequently used objects for performance, cache updation and expiry.

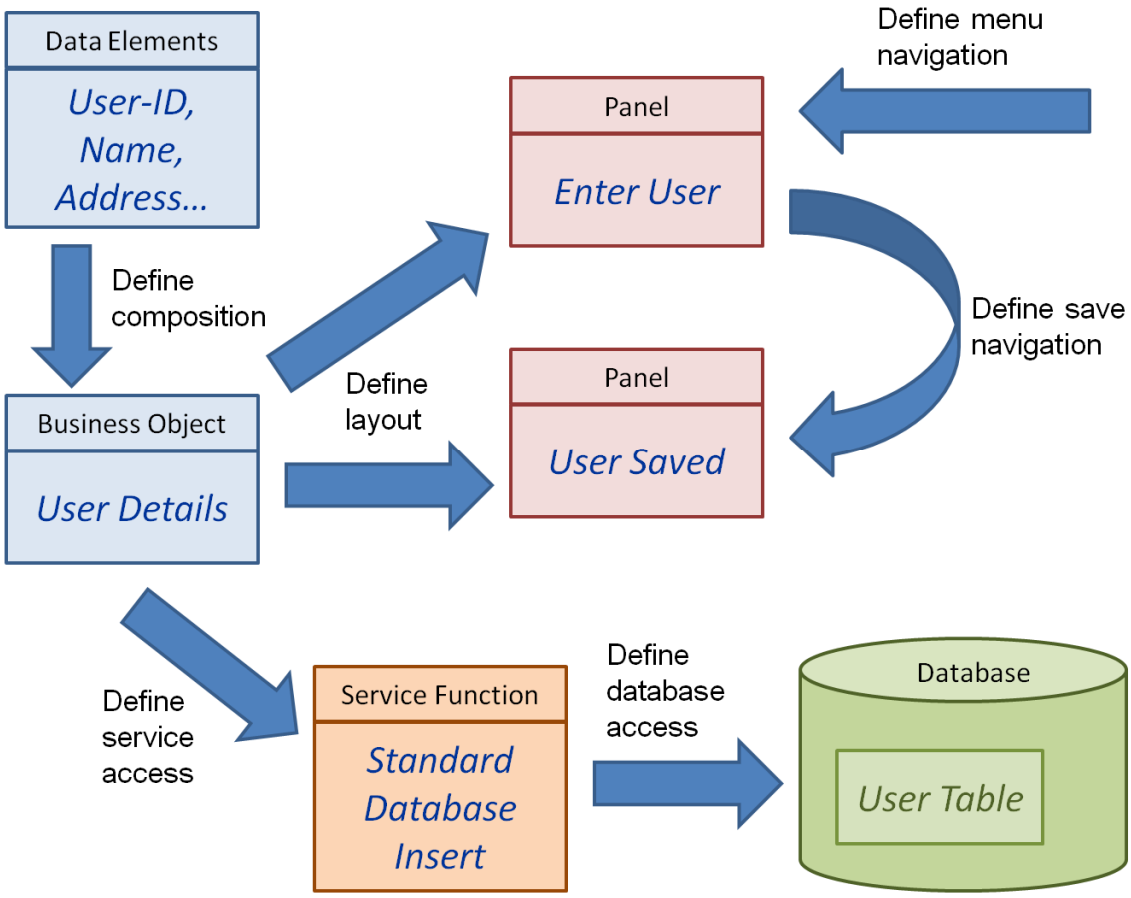
- ✓ **Application security**
  - Framework is designed keeping in mind basic application security threats including but not limited to – **Cross site scripting, SQL injection**, Password encryption, **File scans** etc.

- ✓ **Exception Handling**
  - A good error handling framework allows applications to categorize exceptions into info messages, confirmation messages, warnings and errors. This is supported by the UI/View layer in the form of displaying appropriate screens, color, font schemes.

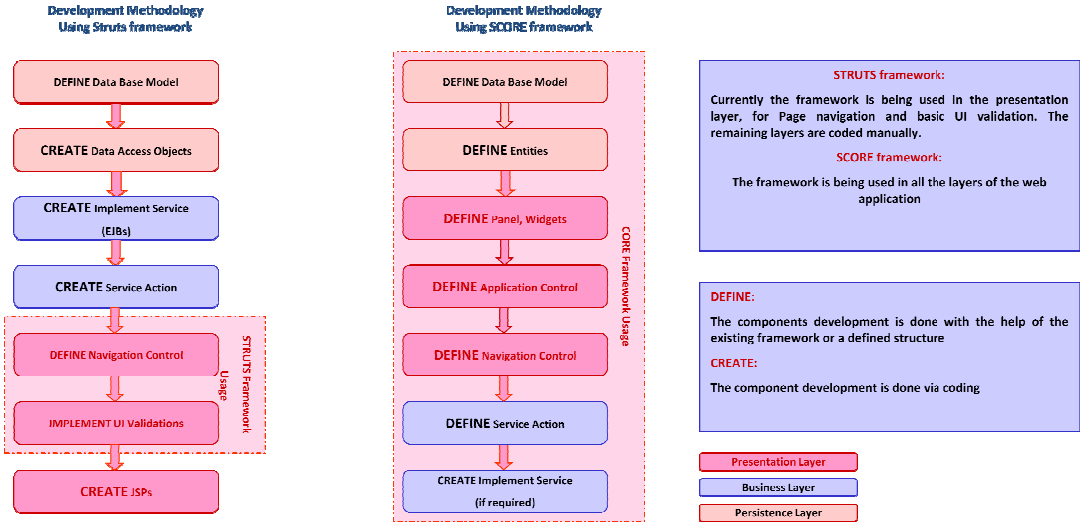
- ✓ **Logging**
  - A good logging mechanism allows different levels of logging that can be switched on or off as per needs for debugging and tracing.

Part 4 – Example of SCORE based development




Data Elements
User-ID, Name, Address...
Define composition
Business Object
User Details
Define layout
Panel
Enter User
Define menu navigation
Define save navigation
Panel
User Saved
Define service access
Service Function
Standard Database Insert
Define database access
Database
User Table

Struts Vs SCORE



- **SCORE covers all the J2EE architectural "stack" elements i.e. Presentation, Application and Data services**
- **SCORE already has much of the cleint specific interface and data rules which can be reused across all other applications**
- **SCORE can be further enhanced to add the needed functionality.**

Part 5 – Comparison with popular frameworks

Value-Adds	SCORE	Spring	Struts	Hibernate
Support for MVC, SOA and O-R mapping	✓	Partial	Partial	Partial
Automatic generation of HTML and Java Swing code	✓	○	○	NA
Built-in support for Ajax, jQuery for Rich Internet Applications (RIA)	✓	○	○	NA
Support for dynamic screen adjustments and layout	✓	○	○	NA
Validation Engine	✓	✓	✓	NA
Built-in Authorization checks	✓	○	○	NA
Built-in Concurrency checks	✓	NA	NA	
Panel caching – for base refresh and hidden fields	✓	○	○	NA
Built-in Security features – SQL Injection, Cross-site,	✓	Partial	Partial	Partial

File scans etc				
Built-in Swift Engine	✓	○	○	○
Built-in XML formatter/deformatter for object serialization	✓	○	○	○
Support for client-specific programming, quality , security and UI guidelines	✓	○	○	○
Learning curve and availability of Skilled resources	○	✓	✓	✓

Part 6 – Concluding Remarks

Frameworks provide long term benefits with rapid application development, superior quality, low maintenance costs and higher customer satisfaction.

Proprietary frameworks go further in adding value by fulfilling client specific needs and business requirements.