

PL/SQL Application Frameworks

For Custom Systems

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THE CHURCH OF
JESUS CHRIST
OF LATTER-DAY SAINTS

How to get the most of this?

- Sit back and enjoy the first 20-30 minutes.
 - Presentation and whitepaper can be had from IOUG website.
- Make notes about existing frameworks you want to check out.
- Engage as we walk through the starter framework:
 - <http://sourceforge.net/projects/plsqlframestart>
 - <http://www.dbartisans.com/index.htm>

Software Architecture and Construction

- *Programming is a combination of art, science and engineering...*
- *...and for those inheriting legacy systems, methods and policies, it also includes skills in archaeology, psychopathology, waste management and forensics.*
- If your development environment and deliverables were seen as dwellings meant to be used by others, what would they resemble?

Software as Useful Structures



OR



Software as Useful Structures

- It's been said that if you don't know where you're going, any road will get you there.
- So I like to use metaphors to visualize the goal.
- This is how I like to envision the systems I design and build: clean, robust, functional, comfortable...



The Target

- My hope is to validate or renew the fire within you to produce clean, elegant, robust PL/SQL-based systems more rapidly and reliably than you could before...
- ...so that you can enjoy your work more, or spend less time getting it done.
- *Application infrastructure is crucial to aspects everyone cares about: speed, cost, quality, flexibility, scalability, etc.*

Agenda

- Define: Frameworks, libraries, components.
- Are frameworks needed?
- Examining your environment
- Framework contents
- Framework design, build and rollout
- Existing frameworks and libraries
- Case study: *PL/SQL Starter Framework*

Definitions

- Framework
 - Organized collection of libraries that implement common functionality used by developers to write software in a rapid, consistent manner.
- Library
 - Organized collection of related components.
- Component
 - Individual routine that does a single thing well.
- Caveats
 - Oracle libraries
 - Class libraries

Are frameworks needed?

A few analogs:

- Automobile design and construction
- Web site design & construction
- Home design and construction

Timber Framed

- Robust. Warm. Spacious. Inviting.
- Each one a work of art. Skilled carpenters.
- But slow-going and costly.



Conventional or Stick-Built

- The norm. Slower build exposes project to risk. Wasteful.
- Requires lots of specialists.
- Quality not always the best.



Panel-built Homes

- The frame's components are pre-built in a factory by specialized carpenters.
- Far less waste. Higher quality and exacting deliverables.
- Pieces are delivered in a bundle, and the home's frame can be erected in a day.



Are frameworks needed?

- What happens when a structure is built ad-hoc, without sufficient thought and effort invested in the foundation and frame?



Are frameworks needed?

YES!

...well, it depends.

Assessing the Need

- Timing
- Existing code base
- Existing frameworks
- Architectural direction
- Security and other policies
- Maintenance & enhancement demands
- Quality and performance

Framework Contents

- Early stage services
 - String, number, date and collection handling
 - Logging, debugging, messaging & email, exception handling, timing, assertions
 - Codes, configuration, environment
 - Locking, auditing, security
 - Testing
 - Standards, templates, code analyzers/advisers
- Late stage services
 - ETL-related, 3rd party integration, reporting, job management, DBA-centric utilities
- Industry/Project-specific services

Framework Design & Build

*Programs must be written for people to read,
and only incidentally for machines to execute. -
Donald Knuth*

*Simplicity is prerequisite for reliability. -
Edsger W. Dijkstra*

*Simplicity carried to the extreme becomes
elegance. - Jon Franklin*

*Simplicity is the ultimate sophistication. -
Leonardo da Vinci*

Framework Design & Build

- Use packages to bundle related components.
- Decentralize constants and literals.
- Overloading (pseudo-polymorphism)
- Precede code with high-quality comments, testing and pseudo-code.
- Model use of your assertions, exceptions, messaging, debugging and logging library.
- Set up and model use of your templates, versioning, formatting, and testing tools.
- Follow best practices, esp. DRY and KISS.
- Short, intuitive names for packages and routines.

Framework Design & Build

- Only catch expected exceptions.
- Document framework API well, at least in the package specs if nowhere else.
- Provide small, working, sample application if you can, demonstrating all the pieces.
- Use anonymous transactions to capture critical info before rollbacks.
- Independence and loose coupling (orthogonality).

Framework Adoption

- *There is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the old order, and only lukewarm defenders in all those who would profit by the new...*

- Niccolò Machiavelli

Framework Adoption

- Sponsors & champions
- Enterprise architecture, policies and standards
- Development methodology
- Management style and strategy
- Time, people and \$\$\$ constraints

Framework Adoption

- Legacy demands
- New project demands
- 3rd party considerations
- Appetite for risk
- Your role

Existing Frameworks

Collection Name	License	Purpose	Location & Notes
PLNet.org	Free	Repository of PL/SQL libraries and utilities	plnet.org
PL/SQL Starter Framework	Free	My starter framework. No code-gen utilities.	sourceforge.net/projects/plsqlframestart
Feuerstein's Work	Free	Repository of new and old code generation utilities by Steven Feuerstein	stevenfeuerstein.com/gcentral.html
Quest Pipelines Archive	Free	Repository of useful PL/SQL utilities	quest-pipelines.com/pipelines/plsql/archives.htm#misc04
QCGU (Quest CodeGen Utility)	Free	Framework, Standards, Scripts, Template Factory, Code Generation, + more	qcgu.net <i>Latest incarnation of Feuerstein's vast reservoir of experience. Preceded by QXNO, PL/Vision, and PL/Generator.</i>
PL/Vision	Free	Framework, API Generator, + more	quest-pipelines.com/pipelines/dba/PLVision/plvision.htm <i>Replaced by QXNO and then QCGU. Not supported.</i>
PL/Generator	Free	Table API Generator	stevenfeuerstein.com/plgen.zip <i>Replaced by QCGU. Not supported.</i>
PL/SQL Interface Generator	Free	Table API Generator	sourceforge.net/projects/plsqlintgen

Existing Libraries

Quest CodeTester	\$\$\$	Testing Framework and Software	quest.com/code-tester-for-oracle <i>What started as Steven Feuerstein's attempt to bring agile-esque "test-first" mentality to PL/SQL (utPLSQL), has been heavily reworked, solidified, and given a UI.</i>
utPLSQL	Free	Testing framework	sourceforge.net/projects/utplsql
utPLSQL_DWH	Free	Testing framework for Data Warehousing	sourceforge.net/projects/utplsqudwh
PL/SQL Unit Test Framework	Free	Testing framework	sourceforge.net/projects/plsqlunittest
Quest Error Manager	Free	Error Handling	tinyurl.com/27xkyr <i>Included in QCGU. But offered separately as well. Not supported.</i>
Log4PLSQL	Free	Logging	log4plsql.sourceforge.net sourceforge.net/projects/log4plsql
OraLog	Free	Logging	sourceforge.net/projects/oralog
Orate	Free	Logging	sourceforge.net/projects/orate
Hotsos Library	Free	Tuning	sourceforge.net/projects/hotsos-ilo
PLDoc	Free	Documentation	sourceforge.net/projects/pldoc
PL/FLOW	Free	Workflow	sourceforge.net/projects/plflow

Existing Libraries

FTP Interface	Free	FTP from PL/SQL	myoracleportal.net/blog1.php/2009/02/01/plsqlftp
UTL_FTP	Free	FTP from PL/SQL	sourceforge.net/projects/plsqlftp
UTL_FTP	Fair	FTP from PL/SQL	sourceforge.net/projects/utl-ftp
Mail Tools	Free	Mail from PL/SQL	myoracleportal.net/blog1.php/2009/02/01/plsqlemail
PL/PDF	\$\$\$	PDF Generation from PL/SQL	plpdf.com
PL/Suite	\$\$\$	PL/SQL software as job schedulers, file managers and cryptographers	plsuite.com PL/Run product is unique.
Tidycode PL/SQL Formatter	\$\$\$	Code Formatter	equinoxbase.com/tpsf/
ClearSQL	\$\$\$	Code Formatter, Analyzer and Diagrammer	clearsql.com/

Case Study: Starter Framework

- First built in 1997 for 8i. Completely rebuilt for 9i in 2001. Being rebuilt again for 10g, trying to follow some of my own advice ;-)
- Open source.
 - <http://www.dbartisans.com/code.htm>
 - <https://sourceforge.net/projects/plsqlframestart>
- Be sure to fully evaluate Quest/Feuerstein's free offerings as well.
 - <http://qcggu.net>

Recap

- Frameworks are a critical part of any application infrastructure.
- Infrastructure cannot be ignored without consequence.
- Many factors play in determining whether you build or adopt a framework and what it contains.
- Best practices must be followed in building a framework.
- Expect great improvements across the SDLC once the initial learning curve is crested.

Your Design Legacy



OR



Questions?

Thank You for Attending!

- Please fill out your evaluation form.
- This was
 - Session #465
 - “PL/SQL Frameworks for Custom Systems”
 - by Bill Coulam
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