

BROWNFIELD SOFTWARE - INDUSTRIAL WASTE OR BUSINESS FERTILIZER?

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BROWNFIELD

Monday, November 22, 2010



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Queen Victoria Markets Building, George Street, Sydney c.1891

Romanesque
+ Art Deco c.1930



BROWNFIELD

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Queen Victoria Building c.2009

BUSINESS CONTEXT

- End-of-period SLAs not being met
- Mandatory legislative changes
- Lucrative new business model
- Number of accounts from 10K to 250K over a decade, projected to 10M in the next 2 years
- Four other business initiatives affecting the same system



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Picture a geek going on a project
A project not only of planning and architecture, but of code



SIA

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A journey in a dimension where SLAs aren't being met

COMPLIANCE

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where the spectre of Sarbanes–Oxley surrounds you,
and where mandatory legislative changes are looming

NEW BUSINESS MODEL

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where a lucrative new business model lurks between light and shadow

EXPONENTIAL GROWTH

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A dimension where scale is life

FIVE PROJECTS CHANGING THE CODE

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and it lies between the pit of your fears and the summit of your hopes.
You're entering...



**THE
LEGACY
ZONE**

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The Legacy Zone!

TECHNOLOGY CONTEXT

10+ years of data

Sybase (raw JDBC, no prepared statements)

ClearCASE

Expensive, inconsistent logging

A few tests – main()

TECHNOLOGY CONTEXT

Java code since 1997

3,500 classes

2,000 line methods

15,000 compiler warnings

20,000 line classes

TEAM CONTEXT

4 “agile” consultants (BA, IM, devs)

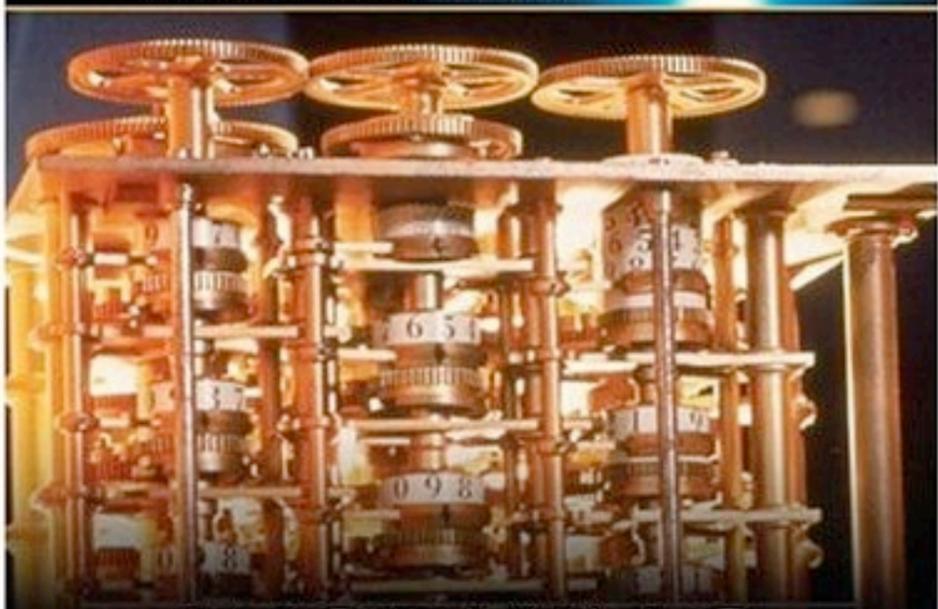
4 visiting off-shore consultants (QA, dev)

2 in-house (BA, dev)

Centralized QA, architecture, SCM, DBA, operations teams

IT'S IMPOSSIBLE!

Robert C. Martin Series



WORKING EFFECTIVELY WITH LEGACY CODE

Michael C. Feathers

MICHAEL C. FEATHERS

LEGACY CODE

The Addison-Wesley Signature Series

REFACTORING DATABASES

EVOLUTIONARY
DATABASE DESIGN

SCOTT W. AMBLER

PRAMOD J. SADALAGE



*Forewords by Martin Fowler, John Graham,
Sachin Rekhi, and Dr. Paul Dorsey*

Sachin Rekhi and Dr. Paul Dorsey
Forewords by Martin Fowler, John Graham



THE WASTE

“Just a temporary solution”. 10 years ago.

IT-driven solution

THE CATALYST

Iterative and Incremental delivery

“QuickStart” inception

Agile Architecture

High-performance delivery team

THE FERTILIZER

It had been used to make money

It was still being used to make money

It was going to be used to make a fertilizer-load more money

WE DID...

“Whole team” from the beginning

Run locally

CI

Deploy regularly

Prioritize

Test

Code quality

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- Involve DBA and Ops from the get-go
- Continuous Integration server (our branch, plus trial merges with 2 to 4 other project branches)
- Deploy to test environment often (2-3 times/week, 50x more than previously)
- Deploy to production often (4 times in 6 months, 10x more than previously)
- Implement the highest risk, highest value feature first
- Write tests
 - Functional
 - Integration
 - Unit
 - Performance
- Qualitative analysis - pasta, crap4j

WE DIDN'T...

Upgrade 3rd-party libraries (at first)

Replace home-grown frameworks (at first)

Make other broad-based refactorings (at first)

“Rewrite” anything

Break more windows

THE MYTHS

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1) Working on brownfields code sux - greenfields is teh awesum

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Proven need
Active users
Influential in org and market
Ongoing strategic value
Game changing



2) An OO implementation is slower than a procedural one

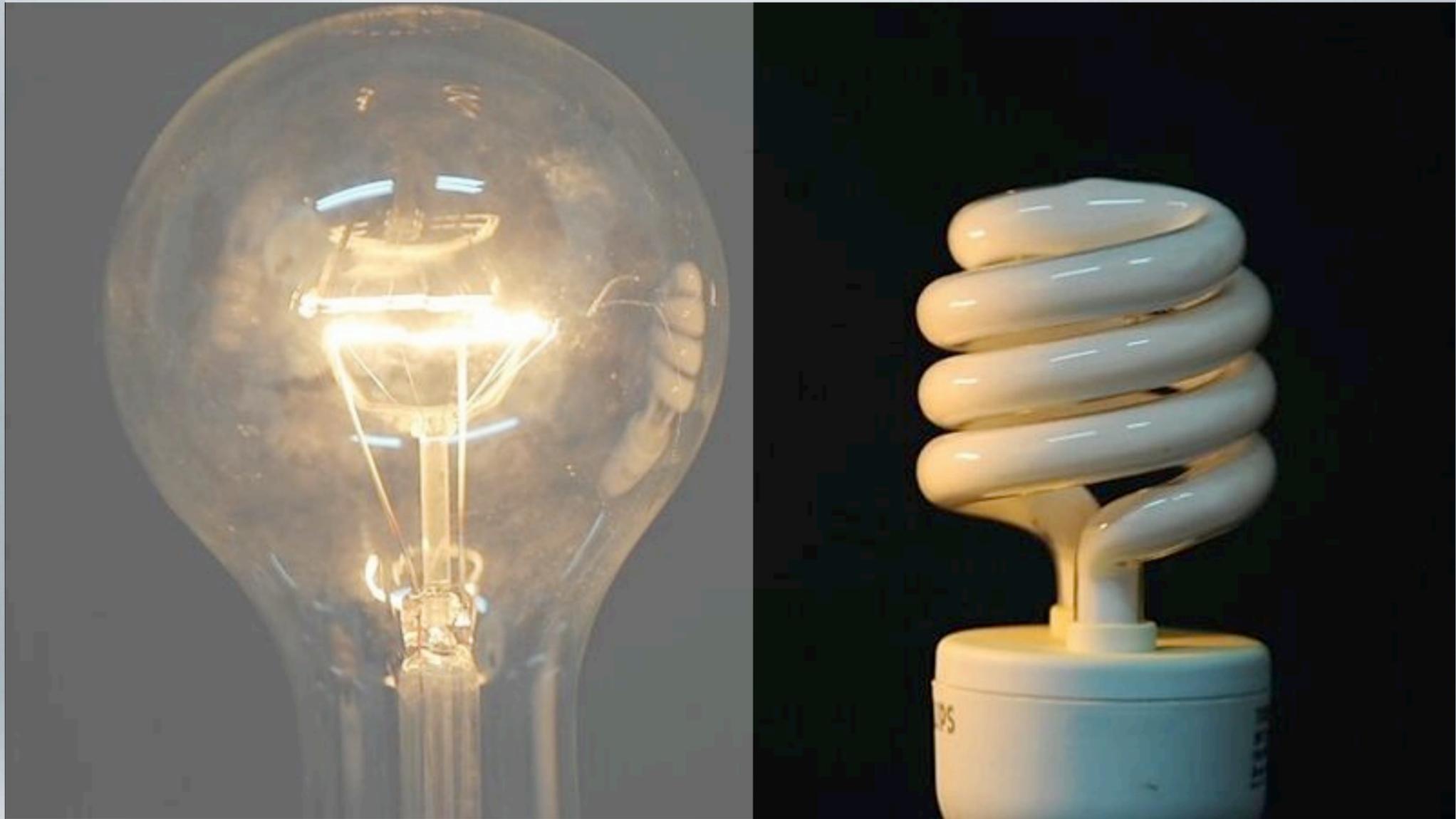
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Transaction scripts

No MVC

Row data mapper (generous)

- Classes were RDBMS DTOs
- Dereferencing usually re-queried the database
- State controlled by collaborators, behavior external to the class
- Processing for a client with 150,000 customers queried the client record 450,000 times



2) An OO implementation is slower than a procedural one

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Redesigned to instantiate an object graph

Unit tests, integration tests

SQL traces (helped DBA apply efficiencies too!)

Immutable objects

Tell, don't ask (even equals())

Processing for a client with 150,000 customers queried the client record once



3) It needs a complete rewrite to scale 100-fold

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Lazily instantiated object graph used 90% less memory
Data partitioning allowed for parallel execution
Process per CPU
Scale-out
Historical data archiving



4) It needs a complete rewrite to perform 99% faster

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Apply OO

Performance tests

Business-activity profiling (AOP)

Reduce log output

- Was 2GB/hour
- Sensible severity use in log statements and filters
- Remove %F and %L formats
- Briefer, more descriptive messages
- Reduce "log and throw". Use cause parameter
- Asynchronous appender



5) An XP team can't work concomitantly on the code with Waterfallers

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5 projects. 4 waterfall. 1 XP.

Temporary branches created to perform weekly merge and test

Merge conflicts managed and cleared by tech leads (~1/2 day)

Painful. So we did it more.

“UAT merge” took 2 days. Usually 2 – 3 weeks



6) You can't complete in 10 months with a team of 10
what a team of 20 can't complete in 20 months

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Bake a turkey at twice the heat, half the time = death

Half the size, half the time

Less ceremony

Fewer "hops"

Fewer "code collisions"

Less rework



7) This 10 year old pile of JaBOL won't be winning any awards

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Winning industry awards for 3 years
> \$8M in savings rebated to clients in 3 years
Keeping clients and attracting large new ones



8) Those outsourced developers will never get 'the Agile'

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Offshore Waterfall developers
500 page requirements docs
2 to 20 page Use Cases
Manual QA
Bug-Driven Development

8) Those outsourced developers will never get 'the Agile'

Pairing

Story cards

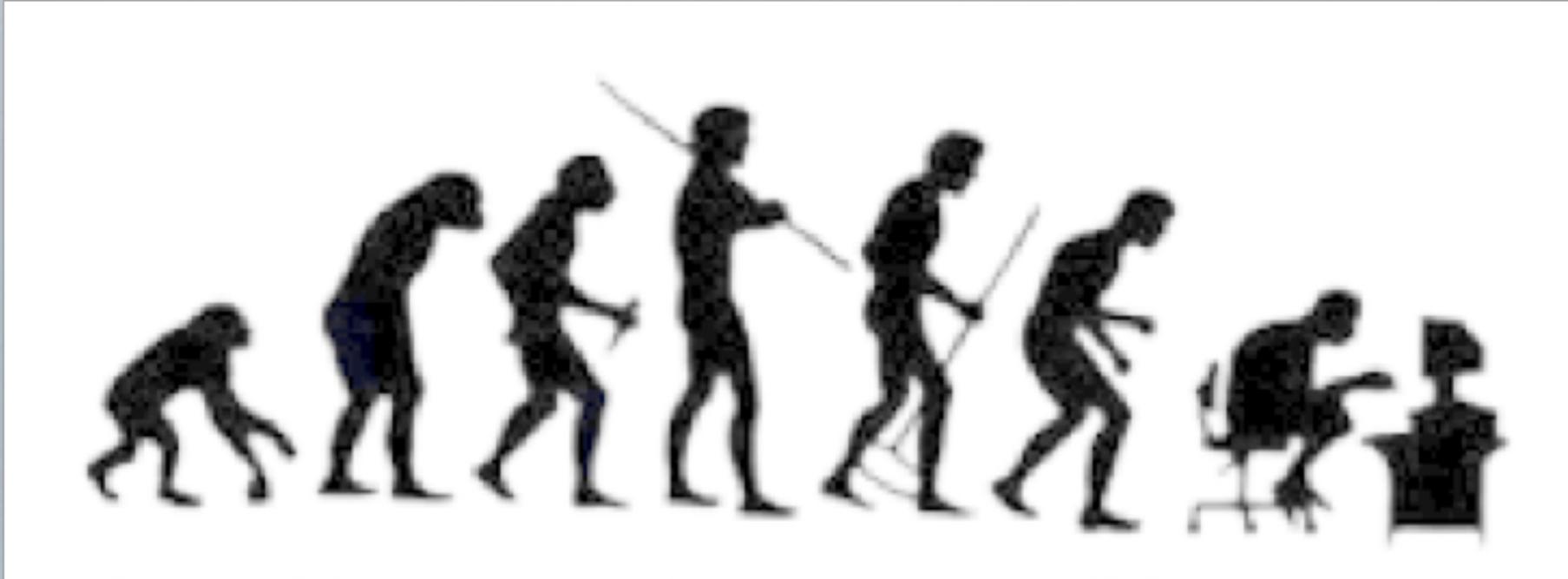
TDD

Selenium

EPIPHANY!

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Offshore Waterfall developers
500 page requirements docs
2 to 20 page Use Cases
Manual QA
Bug-Driven Development



9) DBAs won't work with the developers to evolve the database

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DML tracing in the app

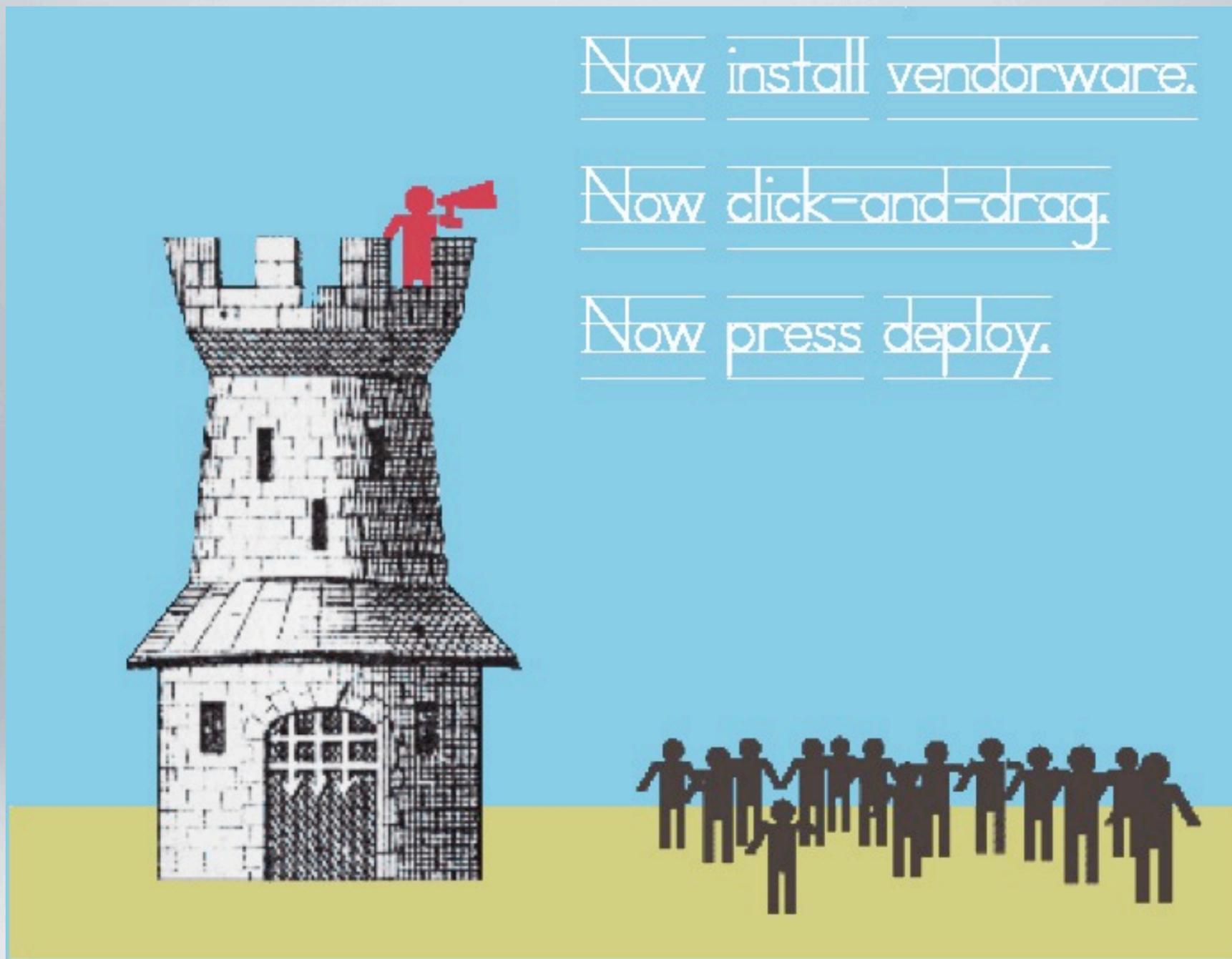
- Shows what code was generating the SQL
- Better determine optimizations in query, tables, joins, indexes

Database refactoring

DDL and migration scripts packaged with application

OO drastically altered the caching profile of the RDBMS

“BCV splits”, “Falconstor” for quicker database provisioning in QA environments



10) Architects don't code

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Implementation matched architecture

Feedback

Informed by own technology experience – not industry analyst golf experience

Compliance documentation accurate

- Past-tense
- Not speculative
- Referenced stories
- No fluff

THE HARVEST

- Wildly successful for client
- Great sense of accomplishment for team
- Agile worked
- Innovations



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IMAGE SOURCES

<http://www.essexfieldclub.org.uk/cache/b2755d96.jpg>

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