Maintain, Modernize or Migrate?
An Iterative Model for Migrating Legacy Systems

Noah Spahn UCSB
Overview

- Context of Software Maintenance
- Case Study System
- Iterative Model
- Application of the Model
- *Open Discussion*
Software failure rate over time

Maintenance

Enhancing or correcting an existing software system to meet the current requirements.

Development

The first attempt to capture the requirements as a software product.
Maintenance effort over time
● When the Chief architect retires...

● UCSB homegrown system
● Developed on a commercial framework

● Growing user community
● Actively maintained and modernized
● Successfully adapted to environmental changes
● Oversight committee
Legacy

(Noun)
A thing handed down by a predecessor

Legacy

(Adjective)
Denoting software or hardware that has been superseded but is difficult to replace because of its wide use.

“Any systems that cannot be modified to adapt to constantly changing business requirements and their failure can have a serious impact on business”

~Brodie & Stonebraker

"If you don't know where you are, a map won't help."

~Watts Humphrey
<table>
<thead>
<tr>
<th>Users</th>
<th>Software Engineers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>Happy</td>
<td>Best situation, everyone is happy.</td>
</tr>
<tr>
<td>Happy</td>
<td>Sad</td>
<td>Most precarious, we must keep the users happy whilst enhancing a maintainable system</td>
</tr>
<tr>
<td>Sad</td>
<td>Happy</td>
<td>The worst situation. Avoid at all cost</td>
</tr>
<tr>
<td>Sad</td>
<td>Sad</td>
<td>2nd best. Anything is better than the current software.</td>
</tr>
</tbody>
</table>

Simplified view of possible legacy situations
Prepare for change

If new levels of upper management have a desire to retire the current system and migrate to a new one...

I had better learn what legacy system migration is all about!
A structured legacy to SOA migration process and its evaluation in practice.
Success Factors model for migrating legacy systems

Extended Iterative Maintenance Lifecycle Using eXtreme Programming


Maintenance includes Migration

ISO 14764-2006 and other IEEE standards (like ISO/IEC 12207) place migration as a departure from the maintenance cycle…

But in my experience, it should be part of the maintenance cycle.
The Iterative Model

For Migrating Legacy Systems

(in three views)
Maintenance as RC stories

Looking at the iterative model closely: request for change stories are:

- Prioritized
- Effort-estimated
- Completed in a time-boxed sprint
Migration as a Structured Process

The iterative model looks like a way to categorize maintenance activities into phases of migration.
Migration as Maintenance

Looking at the big picture, we see the incorporation of migration planning into the cycling of maintenance process.
3 Key features of the iterative migration model

1. Melding migration into the maintenance cycle
2. Plan for success by incorporating success factors at every phase
3. Scrum practice for maintenance
Applying the Iterative Model
Applying the Iterative Model

Legacy System Understanding

Welcome to GUS

GUS is a custom database system for managing and maintaining funding sources, purchasing, lien, and other essential financial information for many departments and research organizations across the UCSB campus.

Managing intramural as well as extramural funding, expense tracking and reconciliation can be very tedious and time consuming. The primary goal of the GUS development team is to simplify these complex and detailed operations while minimizing errors and reducing the frustrations normally associated with these essential tasks.

Since its inception in 1998, the system’s user base has grown from a single research organization to over 50 various units campus-wide.

The five major modules within GUS are:

- **Budget** - provide insight into the core of how GUS helps with financial management (based on the idea of management by Projects)
- **Contracts and Grants** is the starting point for many of the funds that are managed by organizational research units
- **Personnel** - payroll and payroll projections
- **Recharges** - tracks and manages departmental recharge and generates the Financial Journal
- **Purchasing** - on the web or using the equipment module from the 40 client

GUS is intended to improve data access, ease data entry, reduce duplicated data entry and data entry errors and provide automated assistance for common functions:

- monthly reports
- monthly reconciliations with the campus ledger
- communication with clients
- report production
- carry forward
- annual reports
- statistics collection

Thinking about GUS?

The GUS Executive Committee receives inquiries from departments/units that are interested in adopting GUS.

There are many things to think about as you contemplate switching to GUS. As a manager, you need to do considerable advanced planning to determine whether GUS is right for your unit. For example, GUS is project-code driven. If you do not currently track your finances this way, this is a major change. Is your unit research-intensive? Do you have a staff member who used GUS in a previous position that you consider a "power" user?
Applying the Iterative Model

Target System Understanding
Applying the Iterative Model

Migration Feasibility Determination

Sprint 24

Issues

- Documentation 1.0 1 issue
- Defect 2 issues
- v15 1 issue
- Gua Central 2 issues
- Issue without epic 5 issues

- GUS-266
  - Get 404 error on a nested page to link to existing resources
  - Move
documentation 1.0

- GUS-108
  - Track down 'direct to printer' issues
  - Done
  - Find any PRINT SELECTION command that s

- GUS-287
  - Backup reports don't support the display of volunteer time
  - Change
  - There is a need to give department a report th

- GUS-276
  - Baseline requirements
  - Gua Central
  - What are the minimum requirements to replicate

- GUS-275
  - document system
  - Gua Central
  - In order to understand the current system, we n

- GUS-246
  - newly added PTA's in Projects should default to get standard reports
  - Requested by Lynne Pritchard

- GUS-286
  - text resource folder without the use of RSR
  - No RSR file, just a Resource folder within the

- GUS-290
  - Integrate Geology into our managed stacks
  - Set up key-sharing on the

- GUS-272
  - Note employee DCRS field
  - DCRS is PII data and GUS isn't currently complete

- GUS-276
  - Follow up with Jackie Spier about bug she reported
  - There were 2 options discussed:
Applying the Iterative Model

Component System Integration
The end.

Thank you.