Maintain, Modernize or Migrate?

An Iterative Model for Migrating Legacy Systems

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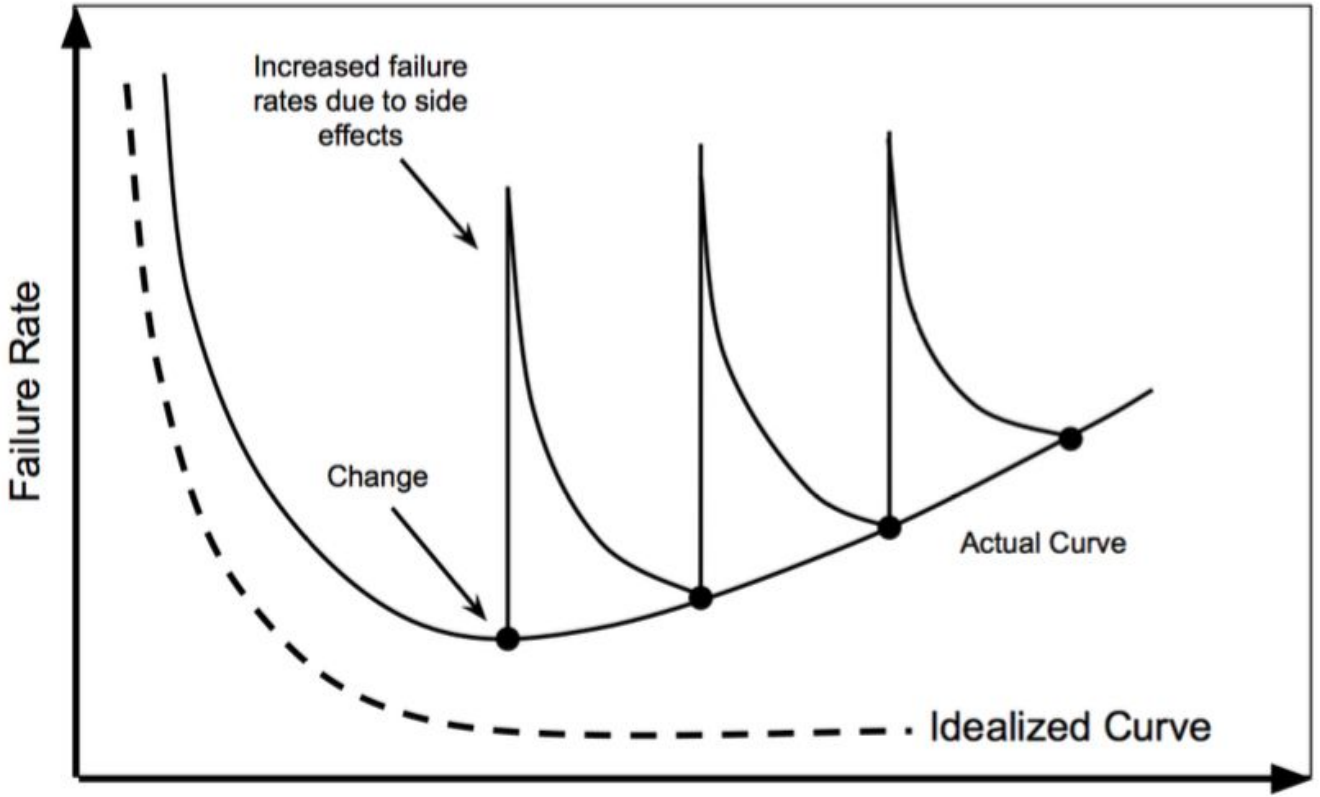
Overview

- Context of Software Maintenance
- Case Study System
- Iterative Model
- Application of the Model
- *Open Discussion*

Software failure rate over time



Pressman, R. (1994), *Software Engineering, a Practitioner's Approach (European Edition)* , McGraw Hill , New York .

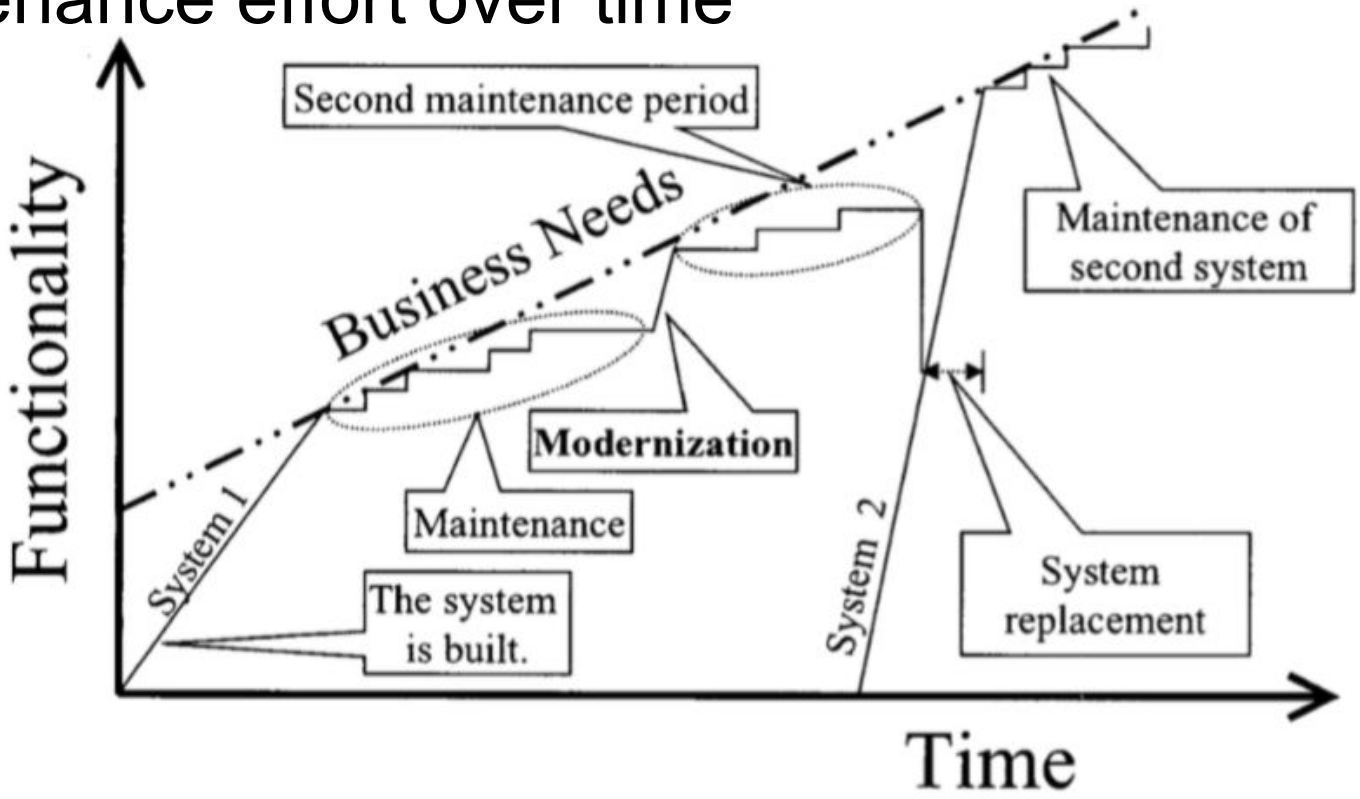
Maintenance

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

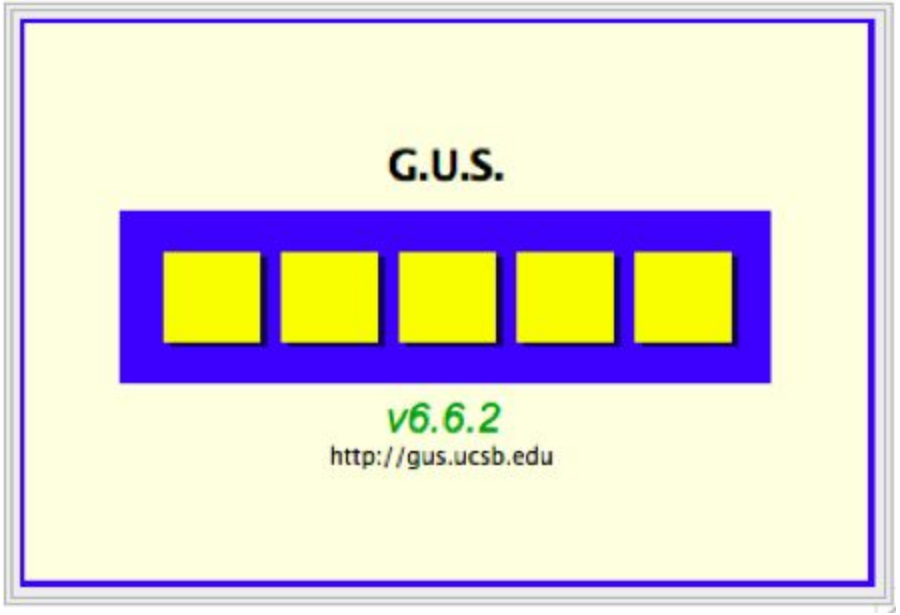
Development

The first attempt to capture the requirements as a software product.

Maintenance effort over time



Comella-Dorda, S.; Wallnau, K. C.; Seacord, R. C. & Robert, J. E. (2000), A Survey of Black-Box Modernization Approaches for Information Systems., in 'ICSM' , IEEE Computer Society, , pp. 173-183 .



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Denoting software or hardware that has been superseded but is difficult to replace because of its wide use.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

Brodie, M. L. & Stonebraker, M. (1995), *Migrating Legacy Systems. Gateways, Interfaces, and the Incremental Approach* , Morgan Kaufmann .

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

~Watts Humphrey

Users	**Software Engineers**	
Happy	Happy	Best situation, everyone is happy.
Happy	*Sad*	Most precarious, we must keep the users happy whilst enhancing a maintainable system
Sad	Happy	The worst situation. Avoid at all cost
Sad	*Sad*	2nd best. Anything is better than the current software.

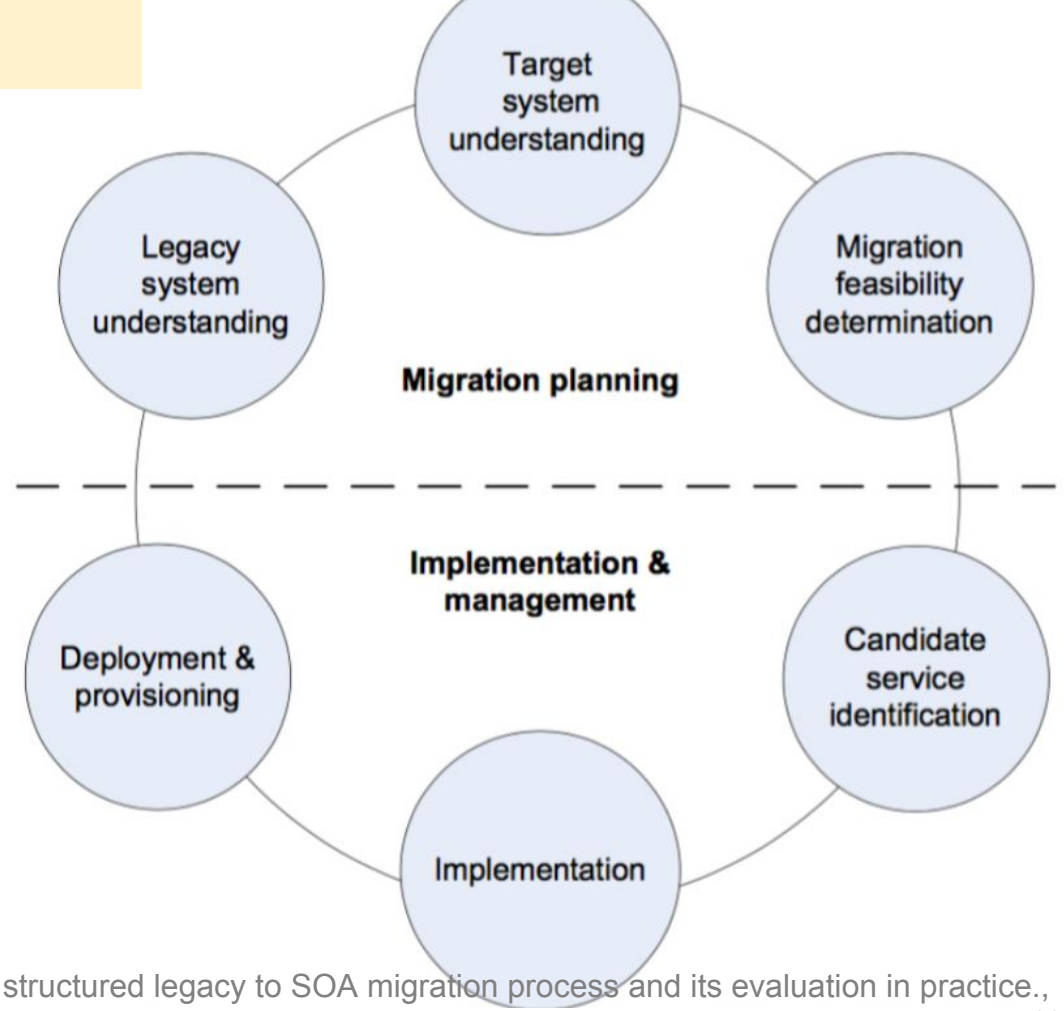
Simplified view of possible legacy situations

Prepare for change

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

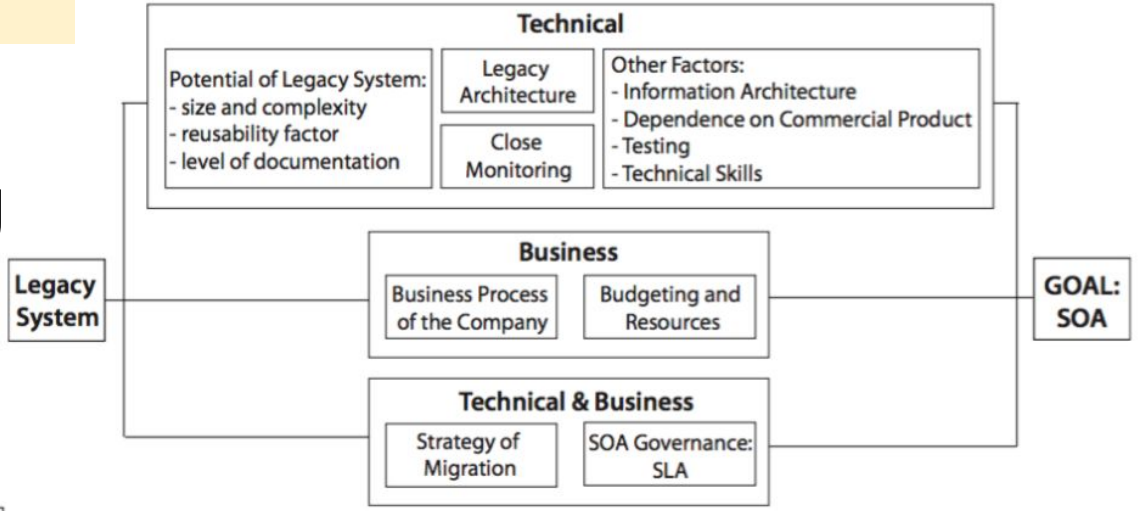
I had better learn what legacy system migration is all about!

A structured legacy to SOA migration process and its evaluation in practice



Khadka, R.; Saeidi, A.; Jansen, S. & Hage, J. (2013), A structured legacy to SOA migration process and its evaluation in practice., in Anca Daniela Ionita; Grace A. Lewis & Marin Litoiu, ed., 'MESOCA' , IEEE, , pp. 2-11 .

Success Factors model for migrating legacy systems



Propositions - Factors in Literature:

Potential of Legacy System
Strategy of Migration
SOA Governance: SLA
Business Process of the Company
Budgeting and Resources

Findings - Factors in Case Studies:

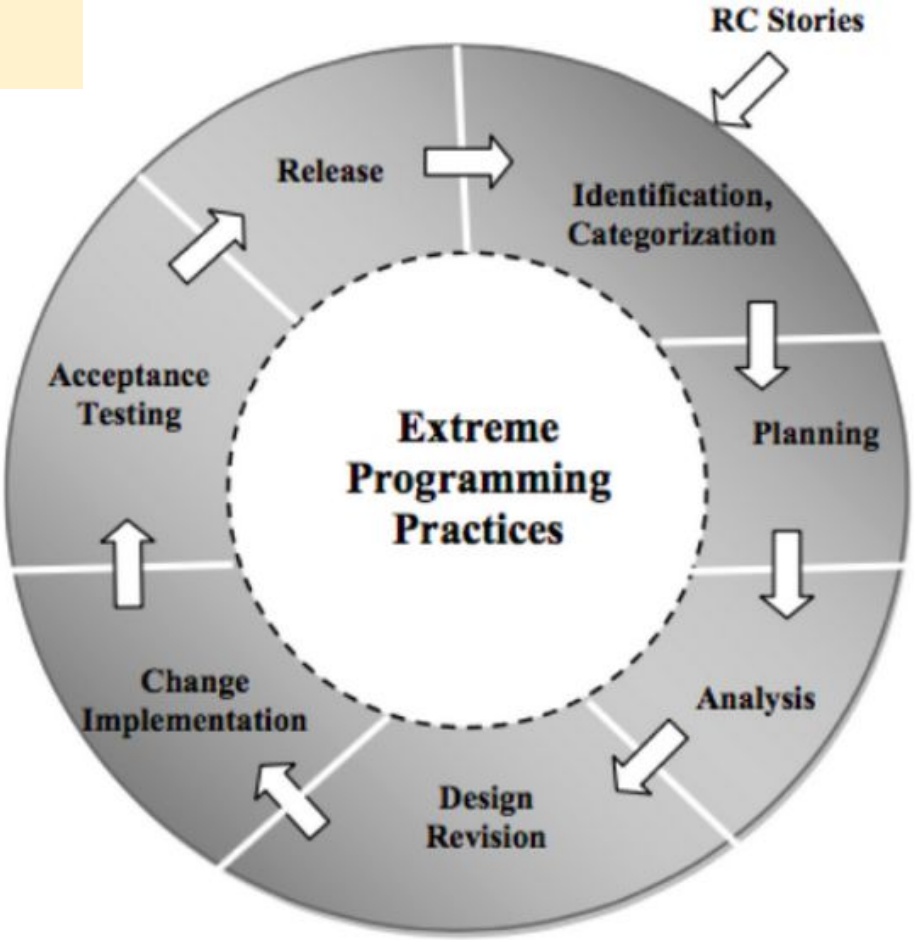
Potential of Legacy System
Strategy of Migration
SOA Governance: SLA
Business Process of the Company
Budgeting and Resources
Legacy Architecture
Close Monitoring
Other Factors:
- Information Architecture
- Dependence on Commercial Product
- Testing
- Technical Skills

Conclusions- Generalized Factors mentioned by all Case Studies:

Potential of Legacy System
Strategy of Migration
SOA Governance: SLA

M. Galinium and N. Shahbaz, “Success factors model: Case studies in the migration of legacy systems to service oriented architecture,” in Computer Science and Software Engineering (JCSSE), 2012 International Joint Conference on, pp. 236 – 241, IEEE, 2012.

Extended Iterative Maintenance Lifecycle Using eXtreme Programming

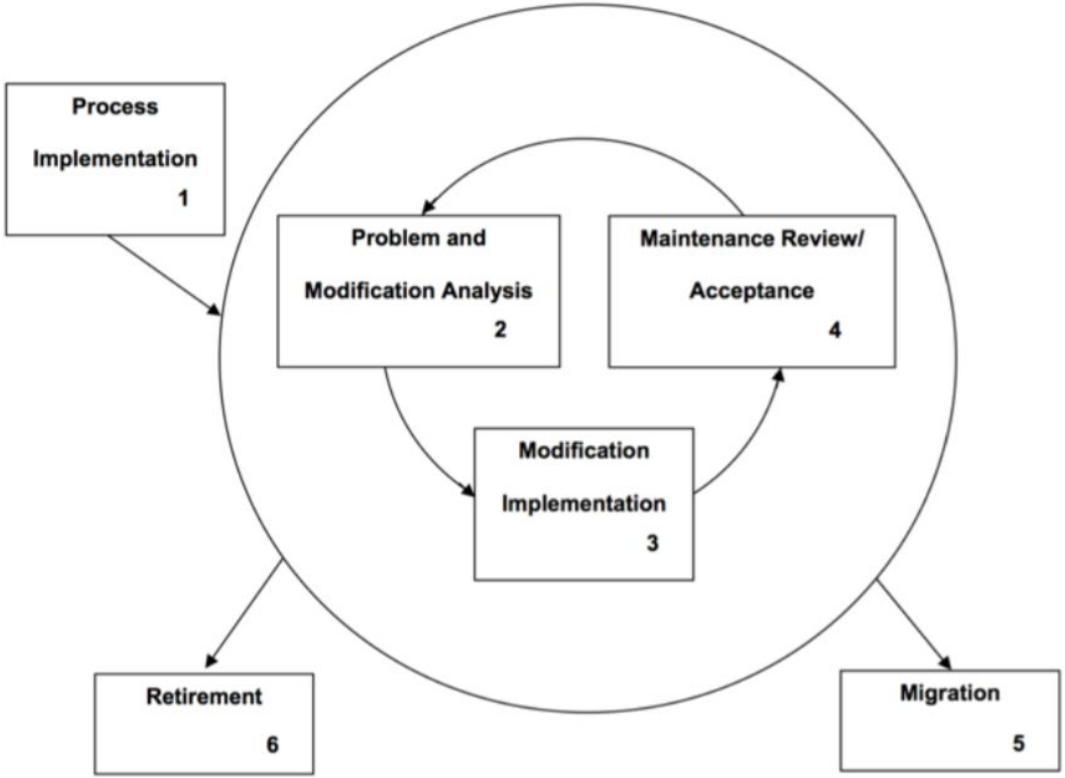


Choudhari, J. & Suman, U. (2014), 'Extended iterative maintenance life cycle using eXtreme programming.', ACM SIGSOFT Software Engineering Notes 39 (1), 1-12.
nce and Software Engineering (JCSSE), 2012 International Joint Conference on, pp. 236 – 241, IEEE, 2012.

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.



International Standards Organisation (ISO) (2006), *Standard 14764 on Software Engineering - Software Maintenance* , ISO/IEC .

The Iterative Model

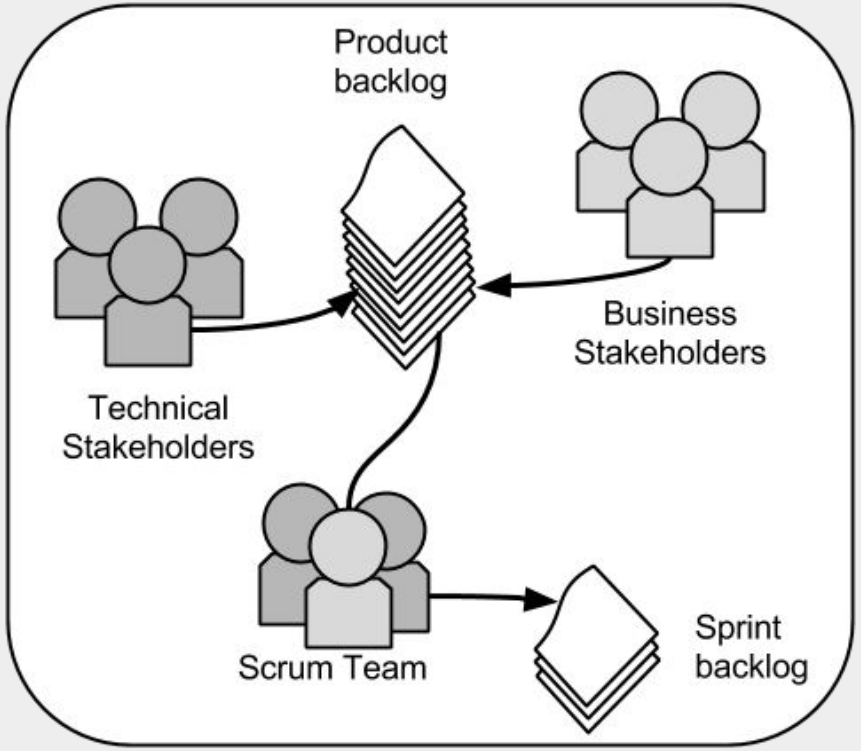
For Migrating Legacy Systems

(in three views)

Maintenance as RC stories

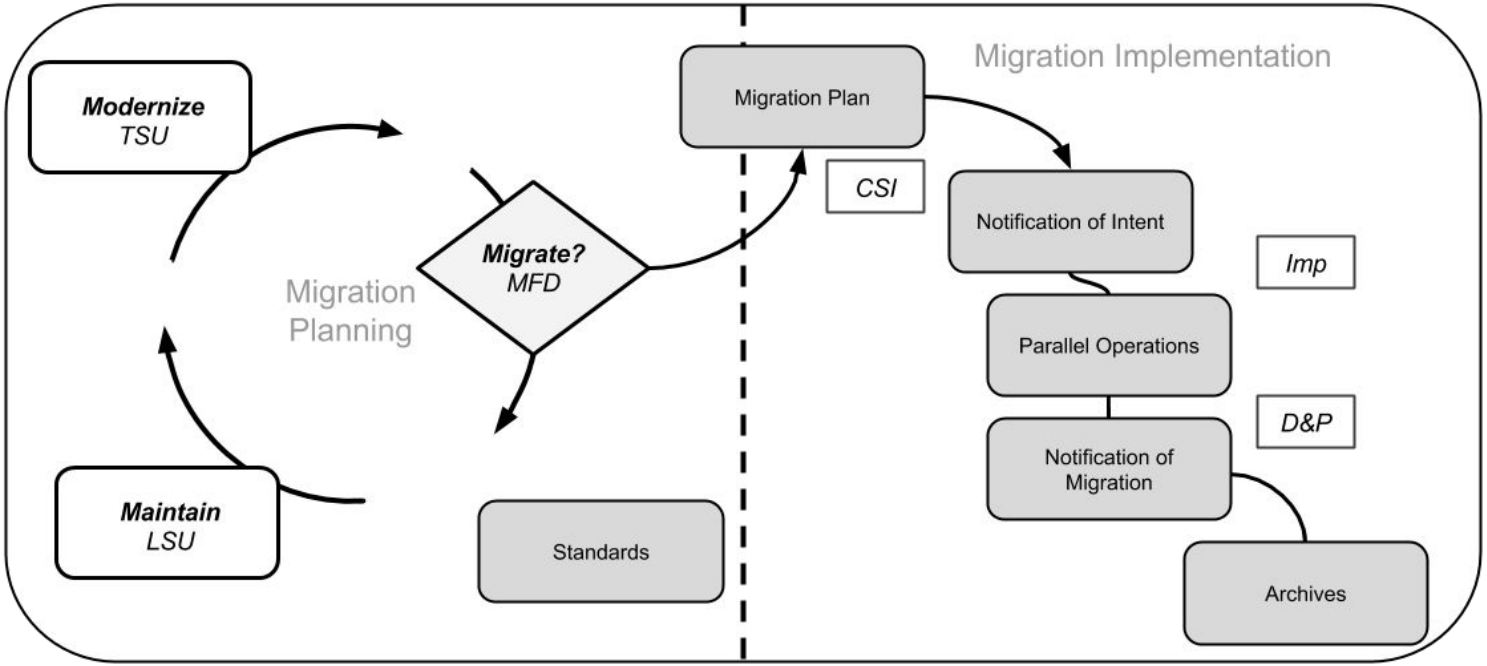
Looking at the iterative model closely: request for change stories are:

- Prioritized
- Effort-estimated
- Completed in a time-boxed sprint



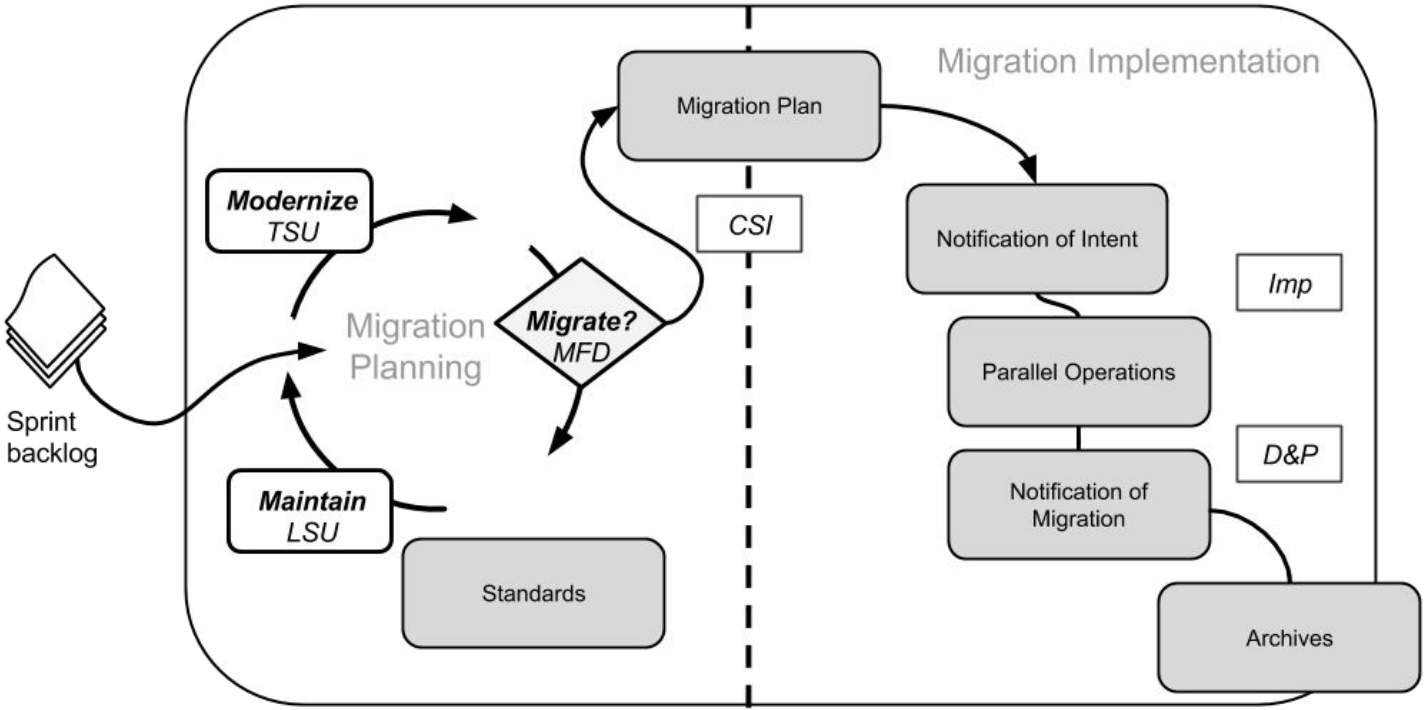
Migration as a Structured Process

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

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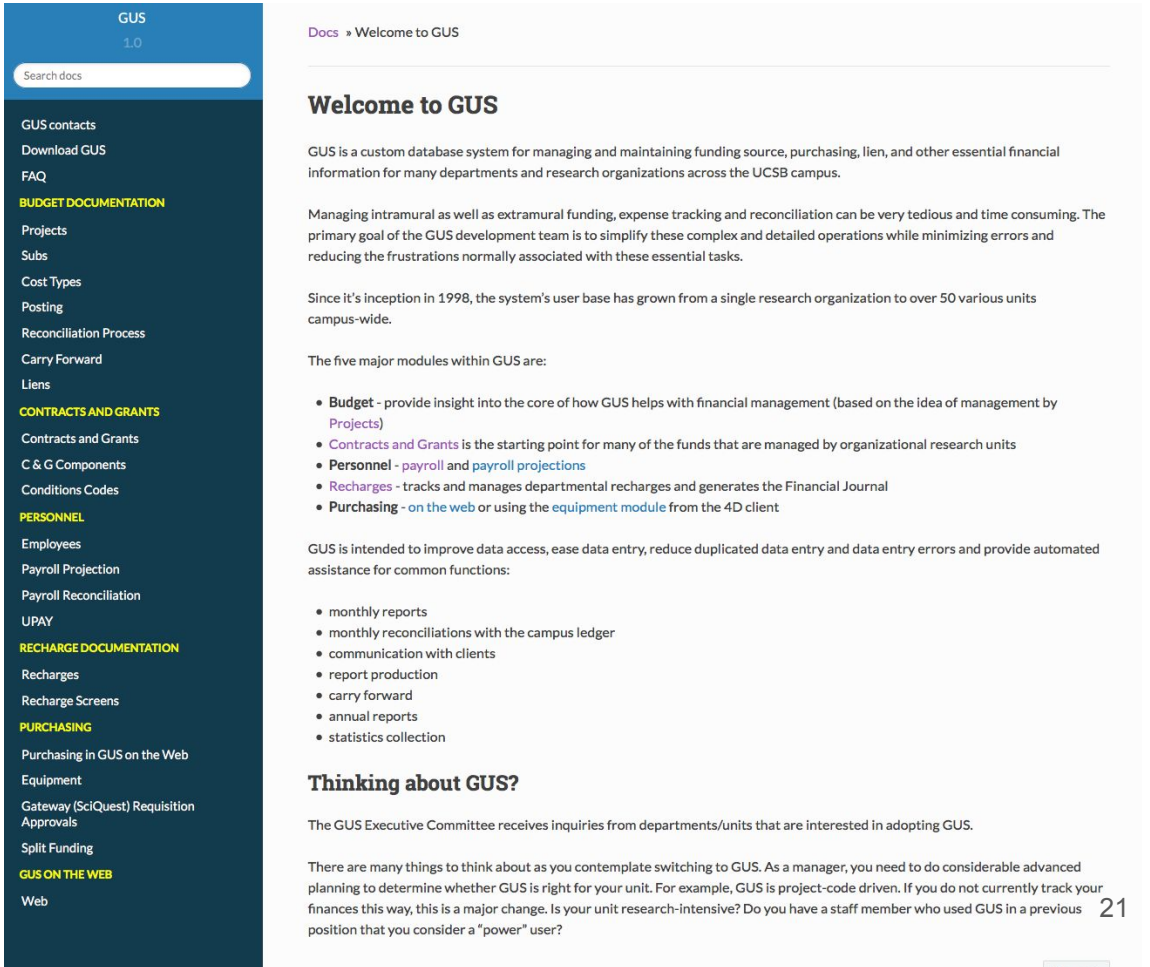
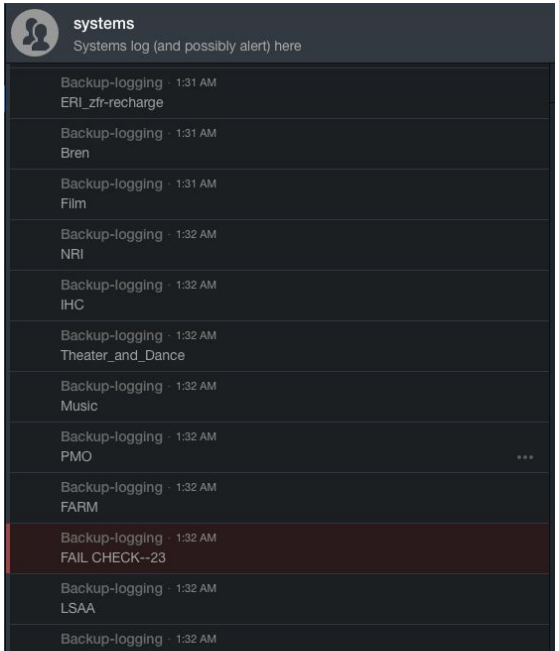
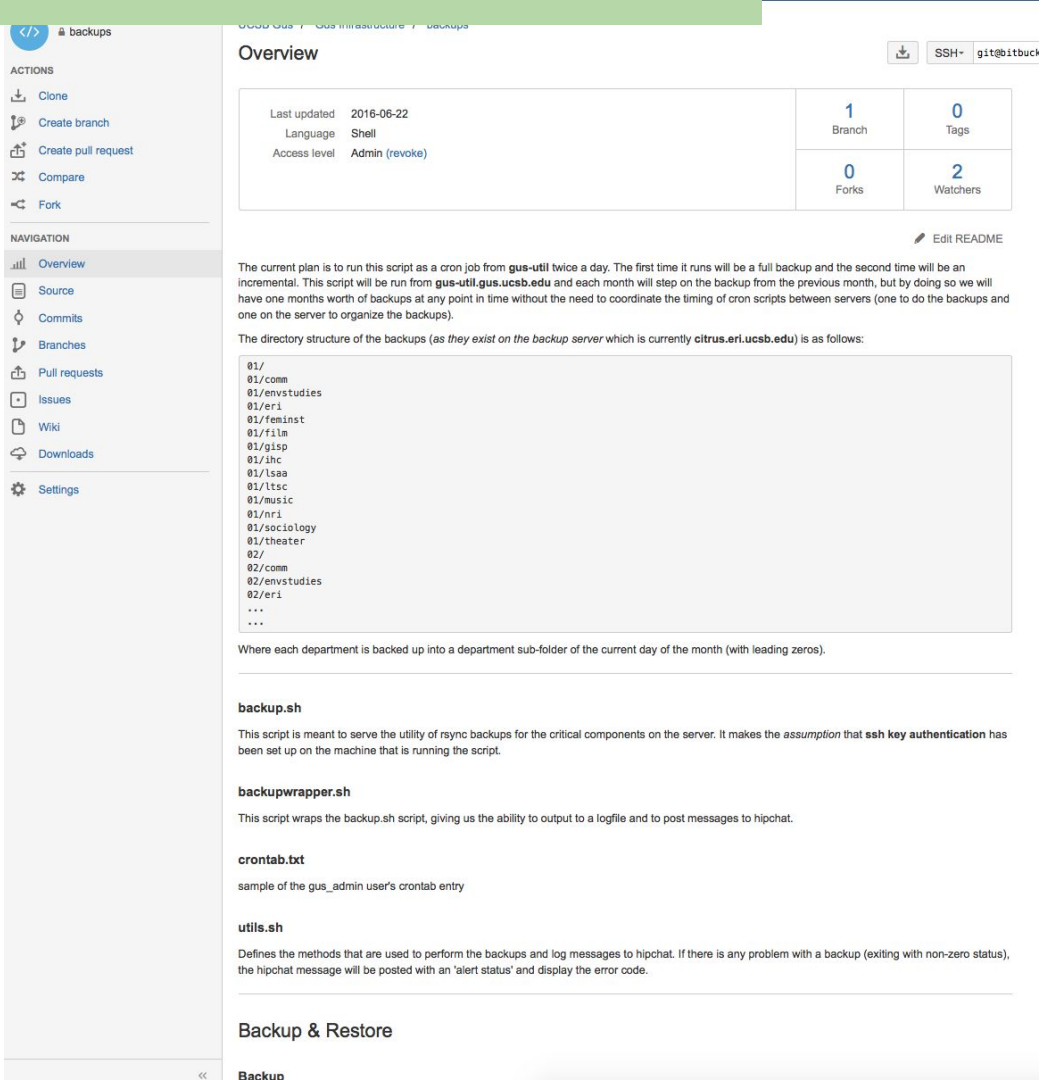
Legacy System Understanding



Applying the Iterative Model

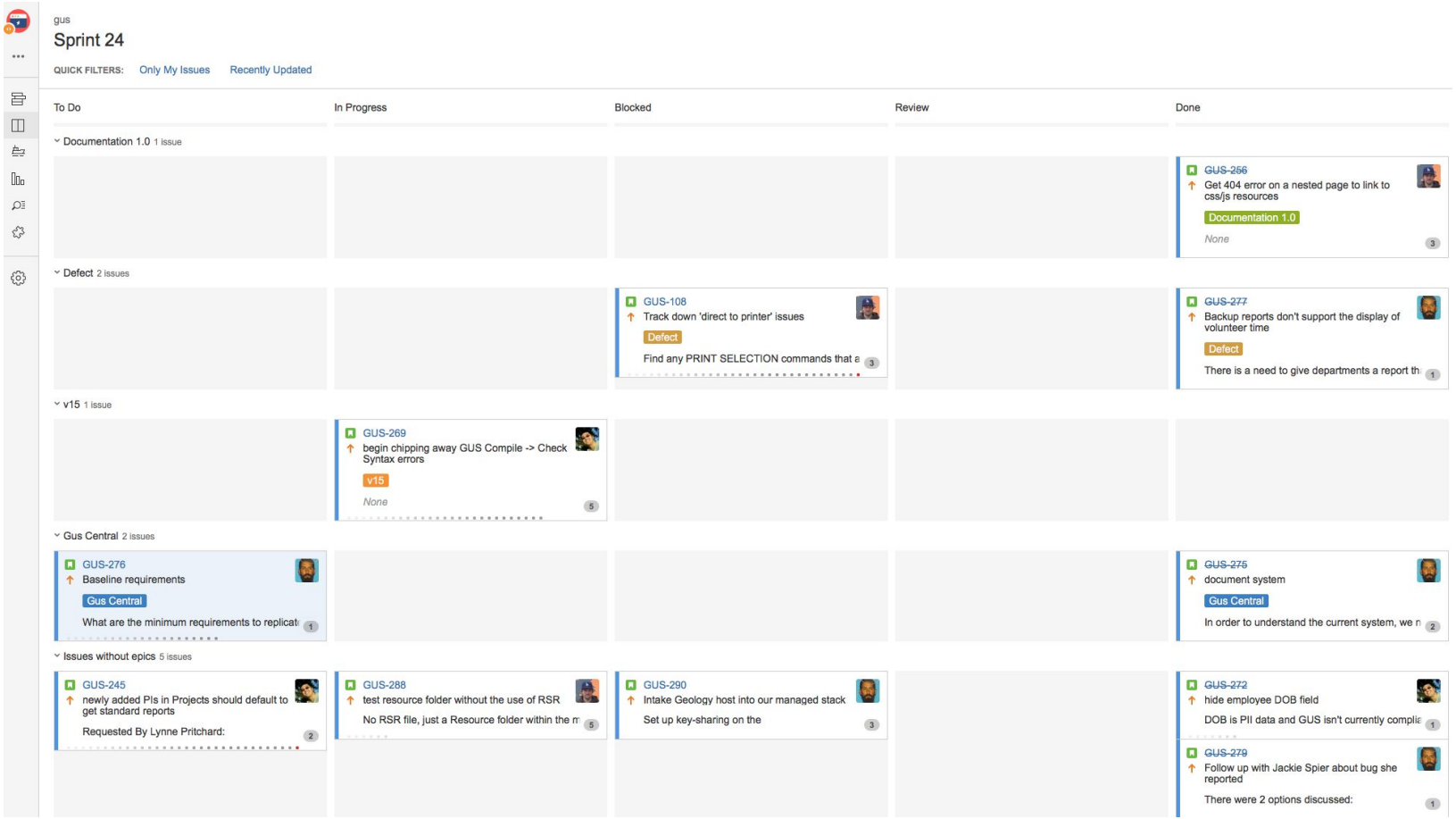
Target System Understanding





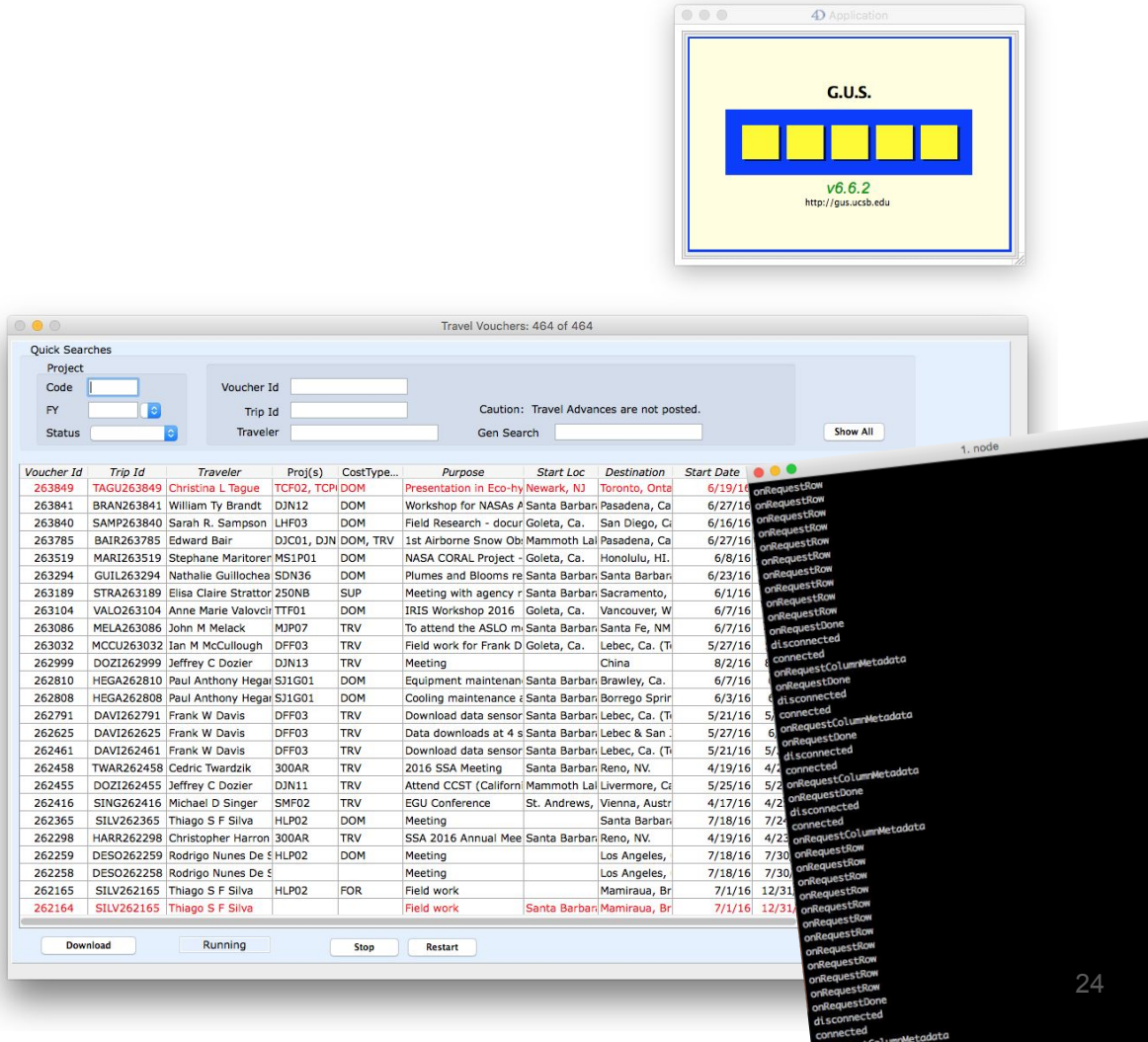
Applying the Iterative Model

Migration Feasibility Determination



Applying the Iterative Model

Component System Integration



The end.

Thank you.