Model Driven Legacy Migration

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Information System Layers

**Application Software**
- Business process services
- Components and programs for business logic

**Platform Infrastructure**
- Component execution environment
- Offers Frameworks, Standards, Life Cycle Services

**System Software**
- Operating systems and Network protocols
## Legacy Information Systems Characteristics

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<td>Home-grown applications with millions of lines of code (undocumented)</td>
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<td>Functionality overlaps lead to redundant code-base (requires reuse initiative)</td>
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<td>Technology evolution and standards compliance is low</td>
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<td>Proprietary runtime infrastructure with limited APIs for external connectivity</td>
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<td>Interoperability with modern distributed architectures is complex</td>
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<td>Availability of skilled programmers in legacy languages is reducing</td>
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<td>Dependency on legacy systems is high for business continuity</td>
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<td>Legacy environment is robust and handles large volumes of data</td>
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Legacy Migration Methods

**Manual Redevelopment (Past)**

Discard existing system and start fresh development

**Tools Based Modernization (Present)**

Quick fix modernization such as web enabling

Extract logic segments and wrap them as components

**Model Driven Migration (Future)**

Capture legacy system assets through models

Migration through transformation methods for model elements
Migration Models

Application Aspects Model
This model defines application as a container for source code, domain processes and entities, and architectural services

Data Layer Model
Persistence layer is more than schema and data – this model defines them all

Platform Model
Captures application environment in the view of multiple stakeholders including administrators and developers

Migration Map
A blue print for migration. It defines migration as transformation of model elements through activities, methods, frameworks, and tools.
Application Aspects Model

Concept

Business application is an aggregation of the following
- Source Code Elements
- Domain Elements
- Architecture Elements
- Life Cycle Elements

Benefits

- Enables effective profile analysis of the application
- Guides in selecting modernization options
- Broad focus on application assets than source code alone
Application Aspects Model Based Profile Analysis

Method for analyzing legacy applications and deciding on modernization road map

**Business Quotient**
Application alignment and fitness to current business processes
Domain Elements in the model reveal this

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**Architecture Quotient**
Compliance with evolving technology standards is the measure
Architecture elements directly measure this

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**Operations Quotient**
Ease of enhancement and support
Source code elements and life cycle parameters contribute to this measure
Data Layer Model

Concept
Persistence layer in applications have following constituents
- Storage Access Methods
- Data and History
- Schema
- Connectivity Options
- Data Server Features

Benefits
Data layer model captures finer level elements of persistence

Ensures migration methods are identified for all the elements
Platform Model

Concept
Application platform is a cohesive and collaborative set of services

Benefits
Captures overall environment – from hardware details to user interface
Gathers details from the perspective of business users, administrators, development community, vendors.
Captures dependency information and co-existence of applications in the platform
Migration Map

Fine grain road map with activities and methods for executing migration project

Concept
Migration transforms source elements into target elements through activities of migration framework

Benefits
Facilitates upfront blue print for migration
Ensures every element is considered in migration initiative
Guides in selecting tools for migration activities

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Migration Map Format
Model Driven Migration Approach

Concept
Equate legacy and target environment on model elements and define methods of migration

It is a process with following steps

Build Source & Target Models
Build Transformation Map
Choose methods for migration
Estimate and Execute
Capture Learning
Benefits of Migration Models

Migration coverage beyond source code and data is the core value of these models

- Provides the big picture and defines scope of migration
- Migration map is an excellent tool to blue print the transformation
- Ensures that migration is planned for every source element
- Highlight training needs for effective operations at target environment
- Knowledge base captures migration expertise for future migrations
- Models serve as valuable documents about enterprise platforms
- Estimation and execution effectiveness are assured
Future Work on Migration Models

Current models are primitive. We acknowledge the need for more work in this direction

- Define meta-models of these models using UML
- Detailed models for elements such as Business Rules
- Models to represent knowledge assets of legacy applications
- Automatic profile analysis and Migration map generation methods
- Models for migration knowledge base
- Integration and interoperability with internal models of leading tools
- A migration workbench that leverages these models
Thank you