Integration of Hazard Management Services

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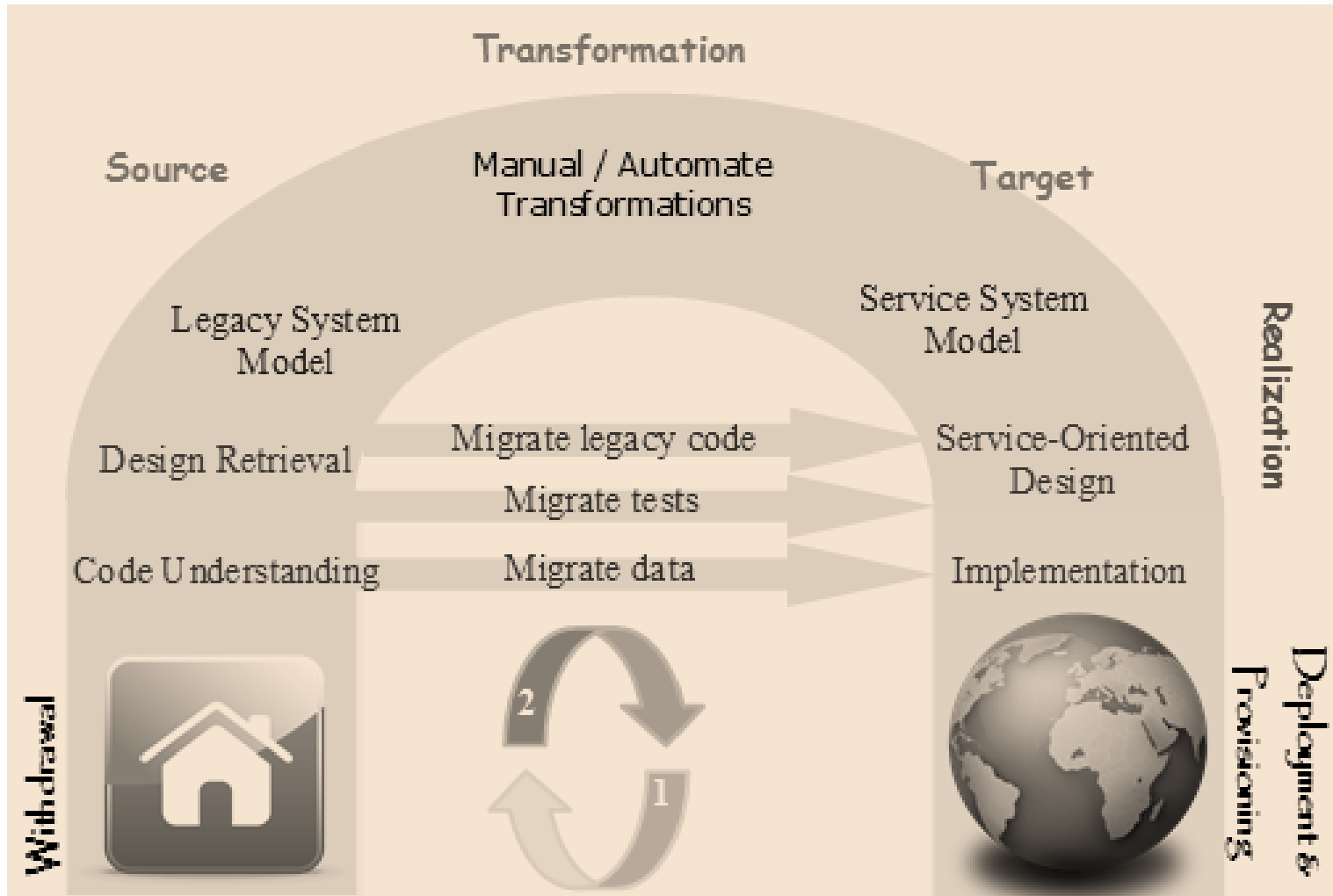Marin Litoiu, York University, Canada

Summary

- Software Migration

- Migration target model

- Example for hazard management services

Maintenance and Evolution

- Rapidly evolving external factors

- Well-established internal plans for long-term, progressive modernization

- Narrow line between initial development and maintenance

Software Migration

Migration Concerns

	State-of-the-art	Strategy	Methods	Tools	Standards	Practice	Business
Introduction to the Migration from Legacy Applications to Service Provisioning	Y	Y					Y
Research Challenges in the Maintenance and Evolution of Service-Oriented Systems	Y	Y					
Legacy to SOA Evolution: A Systematic Literature Review	Y		Y				
Reengineering and Wrapping Legacy Modules for Reuse as Web Services (Motivation, Method, Tools & Case Studies)		Y	Y	Y		Y	Y
Service Identification and Specification with SoaML			Y		Y		Y
The SOA Frontier. Experiences with 3 Migration Approaches	Y		Y	Y	Y	Y	
Model-Driven Software-Migration - Process Model, Tool Support, and Application	Y		Y	Y		Y	Y
Moving to SaaS: Building a migration strategy from concept to deployment	Y	Y				Y	Y
Migration of data between cloud and non-cloud datastore			Y			Y	
Migrating a legacy web-based document-analysis application to Hadoop and HBase:: An Experience Report	Y		Y	Y		Y	Y
Geographically Distributed Cloud Based Collaborative Application	Y		Y			Y	
Bridging the SOA and REST architectural styles	Y	Y					
Considerations of Adapting Service-offering Components to RESTful Architectures	Y	Y	Y		Y		Y
Model Driven Integration of Non-Homogeneous Software Artifacts in Service Oriented Computing			Y	Y		Y	

PREMIER REFERENCE SOURCE

Migrating Legacy Applications
Challenges in Service Oriented Architecture and Cloud Computing Environments

Migrating Legacy Applications: Challenges in Service Oriented Architecture and Cloud Computing Environments

Anca Daniela Ionita

www.igi-global.com/book/migrating-legacy-applications/68187

IGI

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IEEE International Symposium on the Maintenance and Evolution of Service-Oriented and Cloud-Based Systems (MESOCA)

- a co-located event of the IEEE International Conference on Software Maintenance and Evolution (ICSME)
- **MESOCA 2016: October 3, 2016** Raleigh, North Carolina, USA
- http://mesoca.etil.ca/

Migration Challenges

Source Challenges	Transformation Challenges
- complexity and scale - monolithic code - missing interfaces - too many dependencies - incompatible data types	- restructuring databases - building correct transformations - assessing if transformations maintain essential functions and data - performing time-consuming manual transformations
Decision Challenges	**Target Challenges**
- estimating the global cost of migration - estimating ROI - assessing transformation time - identifying new roles for managing services - changing business models - pricing for all parties involved - dealing with employee resistance to change	- versioning services - defining the appropriate granularity of services - avoiding vendor lock-in for Cloud services - maintaining the coherence of the target system in an incremental migration - determining the right thresholds for scaling up and down - predicting QoS failures - scaling out to public Cloud providers

Migration to services

- Suitable processes needed
- Integrated tool suites
- More automation
- Standards for interoperability
- Socio-legal challenges

Hazard Management

N-WATCHDOG

- Early Warning and Decision Support Soft System for the Anticipative Assessment of the Fast Dynamics of Territorial Vulnerabilities Induced by Nuclear Facilities
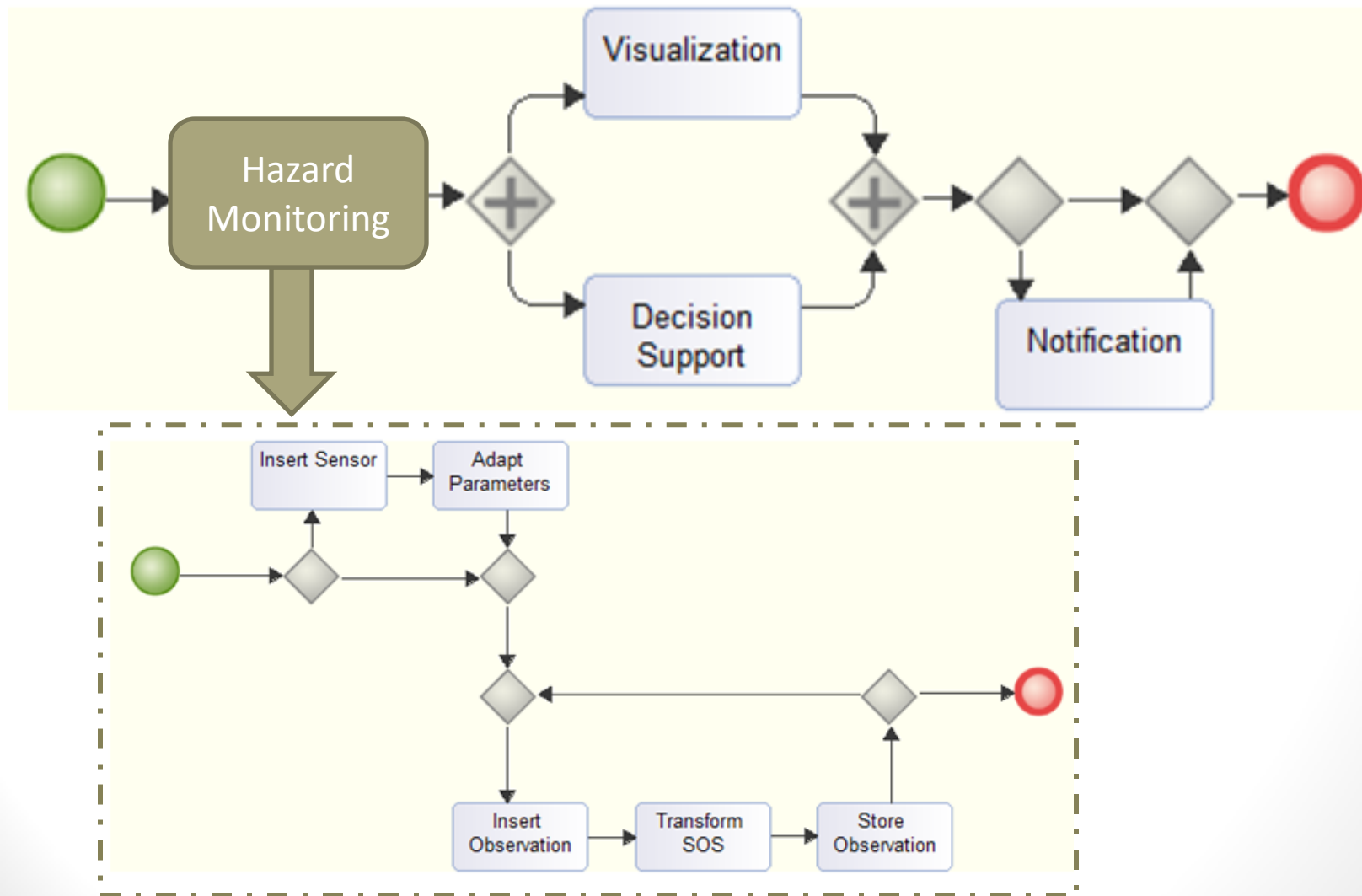
CyberWater

- Prototype Cyberinfrastructure-based System for Decision-Making Support in Water Resources Management

Process template for migration

Example of Integrated Services

Process template

Oracle database

Web services

- ***Water pollution services***
  - Quality attributes:
    - pH
    - Turbidity
    - Conductivity
    - Color
    - Nitrites
    - Bacteria

- ***Air pollution services***
  - Quality attributes :
    - sulfur dioxide
    - nitrogen dioxide
    - ozone,
    - carbon monoxide,
    - suspension powders with diameter less than 2.5 μm
    - suspension powders with diameter less than 10 μm.

Hazard monitoring

- REST client

  - querying sensor properties in *SensorML*

- Open-source implementation of the *Sensor Observation Service*

  - Sensor Web Infrastructure

  - 52°North

Decision

- business rules

Visualization

- Maps API

Notification

- Alerts for pollution warning

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Conclusion

- Process template capable of orchestrating services for multiple types of hazards

- Model the software transformation target of existing early warning and alert systems

- Future work
  - migrating more complex algorithms for decision support
  - late binding of services, based on location, risk probability and impact

Thank you!

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