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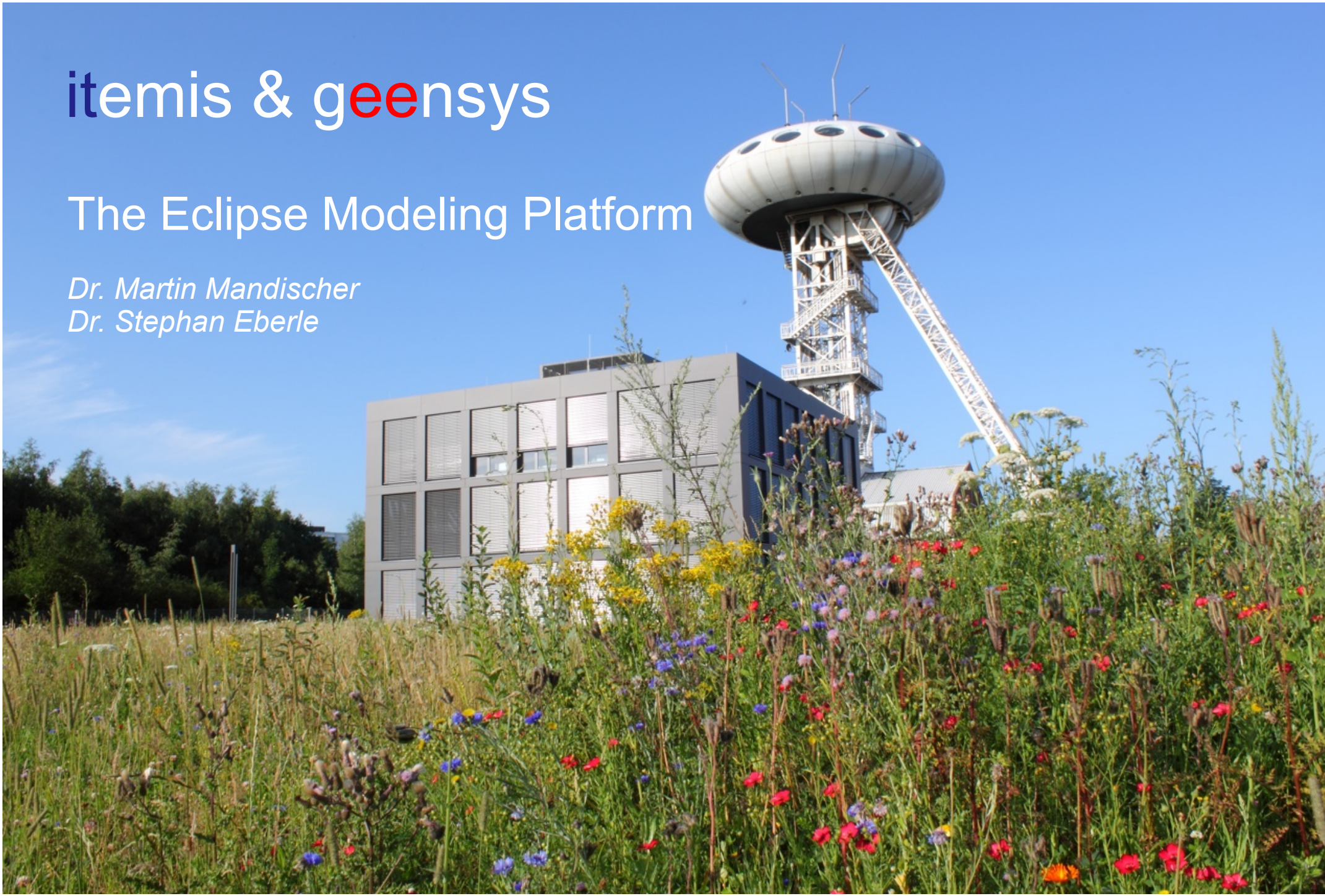
The Eclipse Modeling Platform

Dr. Martin Mandischer
Dr. Stephan Eberle



Agenda

- itemis & geensys
- Vision and Goals of The Eclipse Modeling Platform
- The Eclipse Modeling Platform Industry Working Group
- Key Requirements and Architecture of the MP
- Gaps and Eclipse Projects
- Next Steps

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Dr. Martin Mandischer
itemis
Head of Project Management
Prokurist, CSM, CSP, PMP®

Dr. Stephan Eberle
geensys
Development Manager
Lead of Artop Core and Validation
Sphinx project co-lead

itemis

- Specialist for model driven software development
- Founded in 2003
- Offices in Germany, France, Swiss and Canada
- 140 employees
- Strategic Member of Eclipse Foundation
- Close cooperation with research facilities

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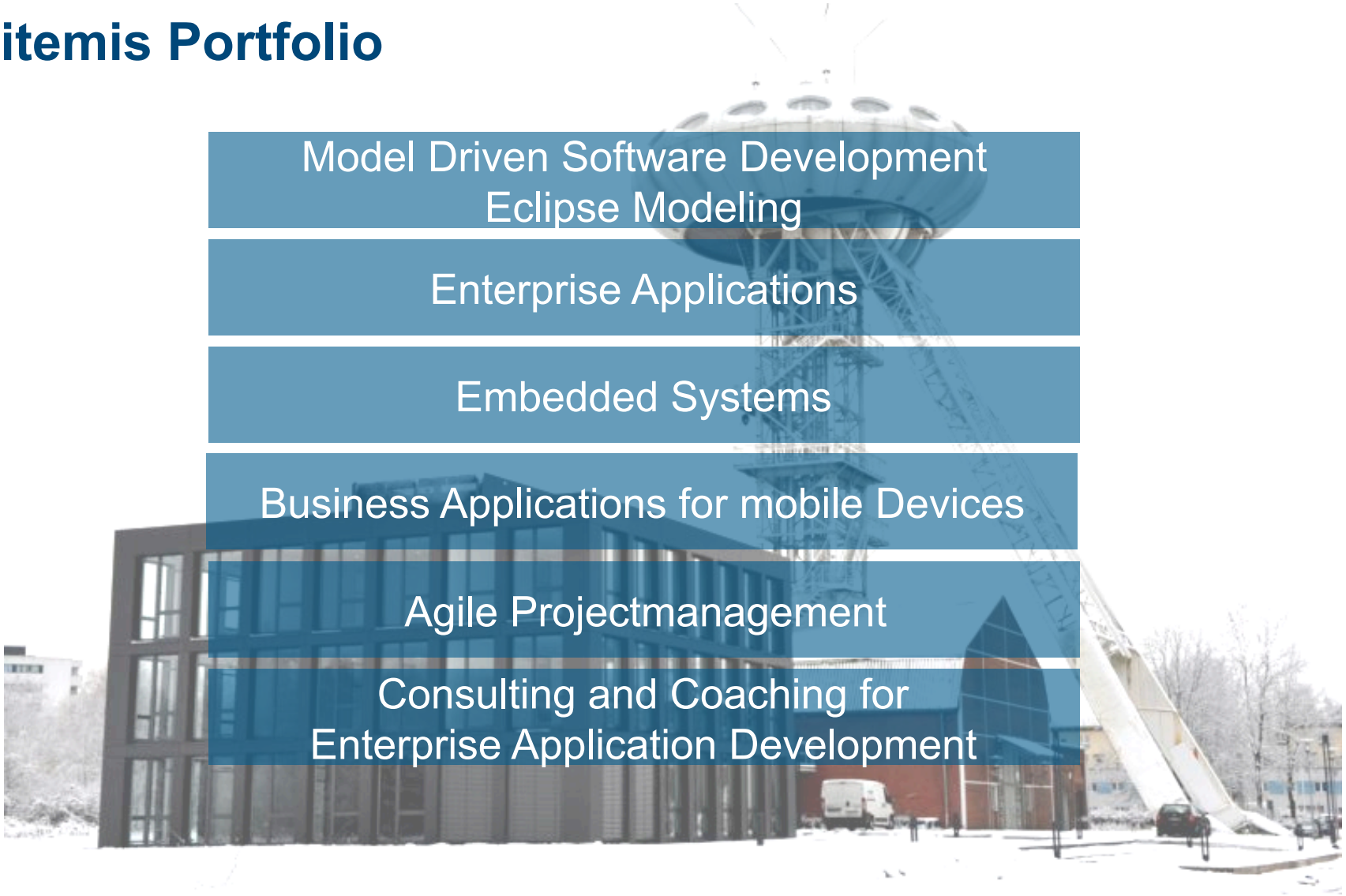
itemis Portfolio



- Model Driven Software Development
  Eclipse Modeling
- Enterprise Applications
- Embedded Systems
- Business Applications for mobile Devices
- Agile Projectmanagement
- Consulting and Coaching for
  Enterprise Application Development

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Geensys


Automotive

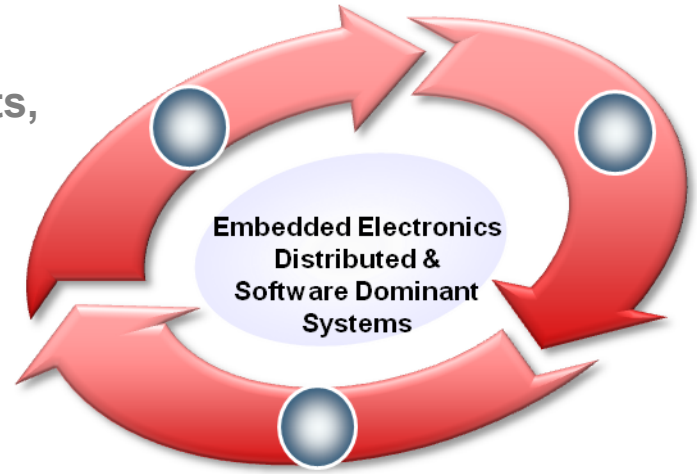

Aerospace


Transportation


Industrial


Communication

Engineering
E/E & mechatronics projects,
SW IP modules



Custom Tools
Model-based
solutions

Professional Services
Consulting services for E/E projects & processes

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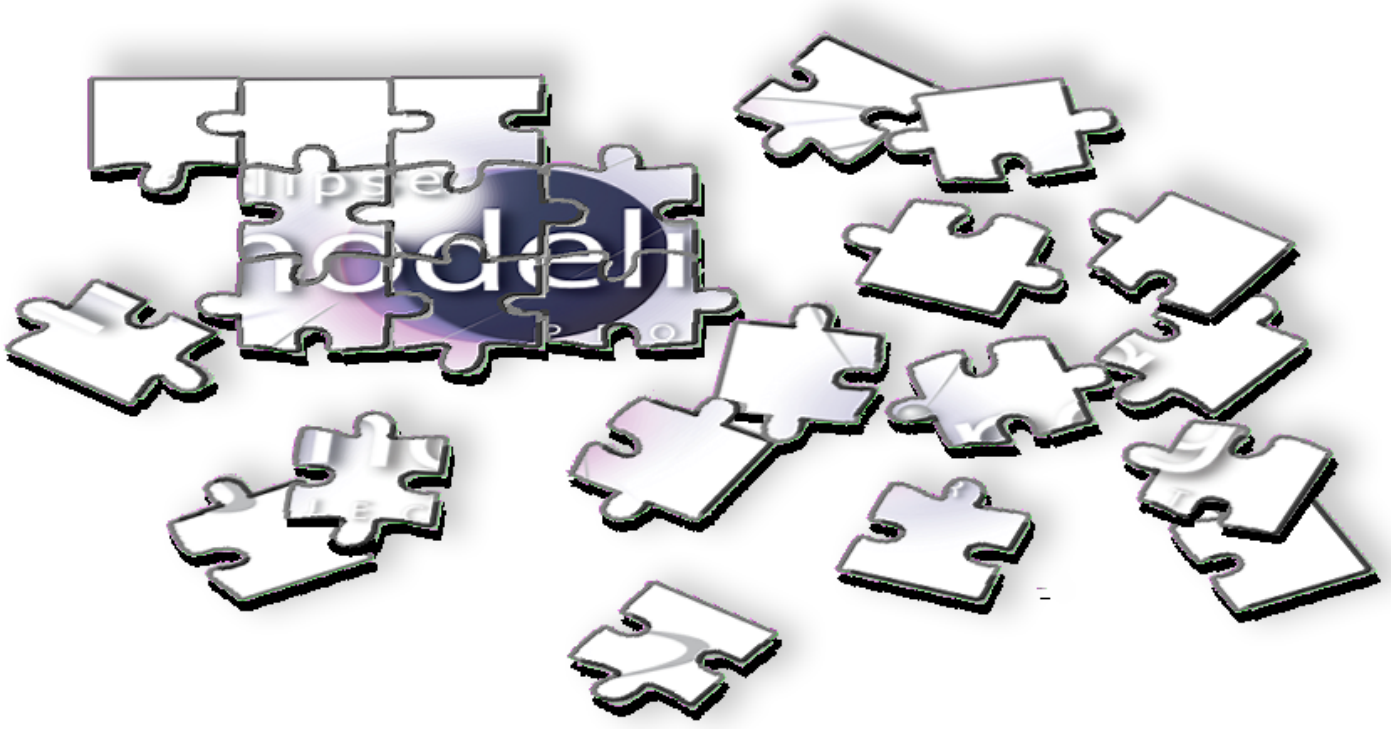
Eclipse Modeling Project as of Today

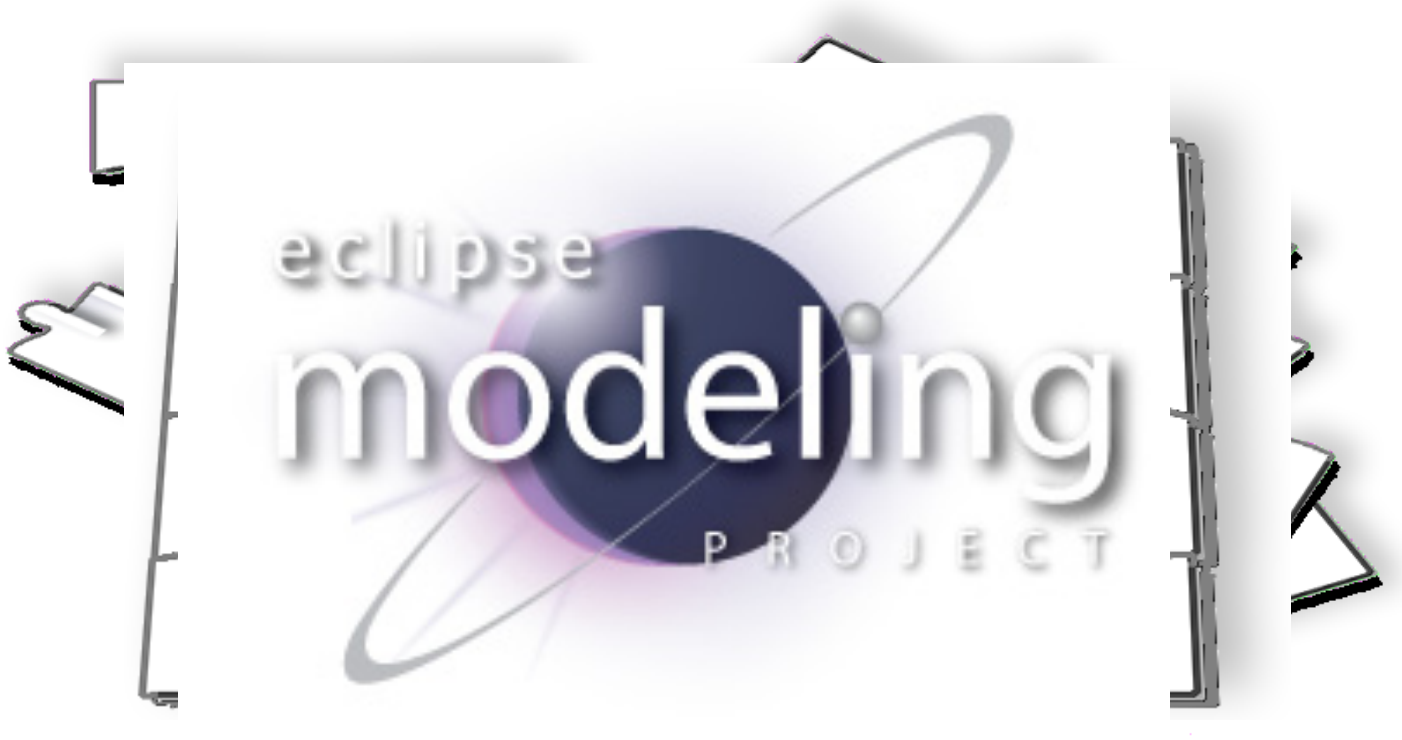


Vision

“The Eclipse Modeling Platform (EMP) is an industrial quality integrated software platform designed to enable a complete tool chain of model-centric tools.

It will be based on existing Eclipse modeling technologies but focus on better integration, quality, scalability and usability for use in the enterprise“

Eclipse Modeling Project ➡ Eclipse Modeling Platform



Goals

- Identification, refinement and prioritization of key requirements
- Architecture
- Gap analysis and roadmap definition
- Planning and organization of an IWG
- Funding of development in selected Eclipse Modeling projects
- Project management and integration of platform

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The Modeling Platform IWG

- Started: Q4, 2009
- Current phase: Proposal
- User Companies
  - Alcatel-Lucent
  - Ericsson
  - Swift
  - UBS
- Solution Companies
  - itemis, Geensys,
  - Zeligsoft, Obeo

Current status

- MPIWG goals are clear 
- High level requirements are understood 
- Architecture draft exists 
- Gaps in Eclipse Modeling projects analyzed 
- Roadmap for requirements to be implemented in 2011 

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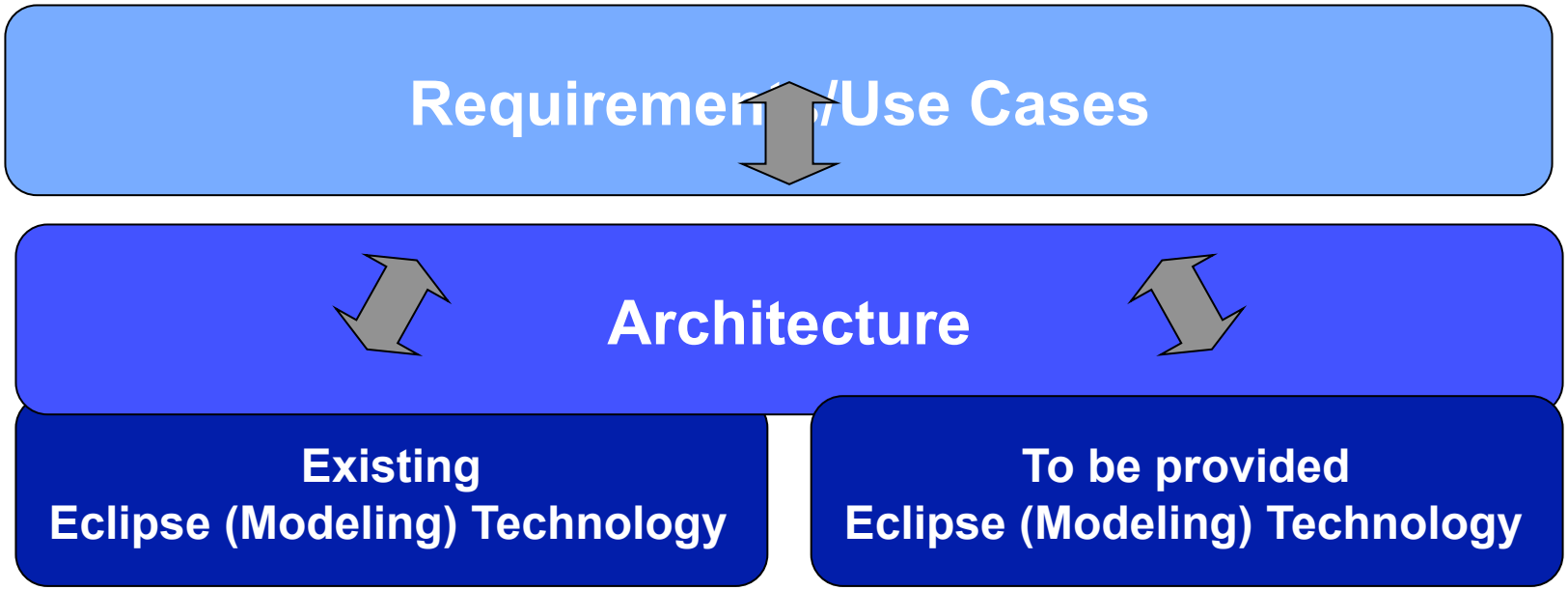
Key Requirements (functional)

- Model Version Management (Life-cycle Support)
  - Versioning of metamodels and instances
  - Support of muli-user and distributed development teams
- Model Migration
  - Support for automatic application of metamodel changes to model instances
- Model-level Compare and Merge
  - Comparison/merge of model elements or fragments instead of entire resources/files
  - Model repository support
- Traceability
- Model Auditing
  - Support for review cycles and approvals

Key Requirements (non-functional)

- Scalability
  - Support for models containing 500 000+ model objects
  - 300 000 model objects in 7000 resources
- Multi Modeling Language Support
  - Support for different types of models during different steps of the software development lifecycle
  - Support for different versions of a metamodel in the same environment
  - Out of the box support of industry standards UML, BPMN and SysML
  - All MP services must be applicable to user-defined domain specific modeling languages

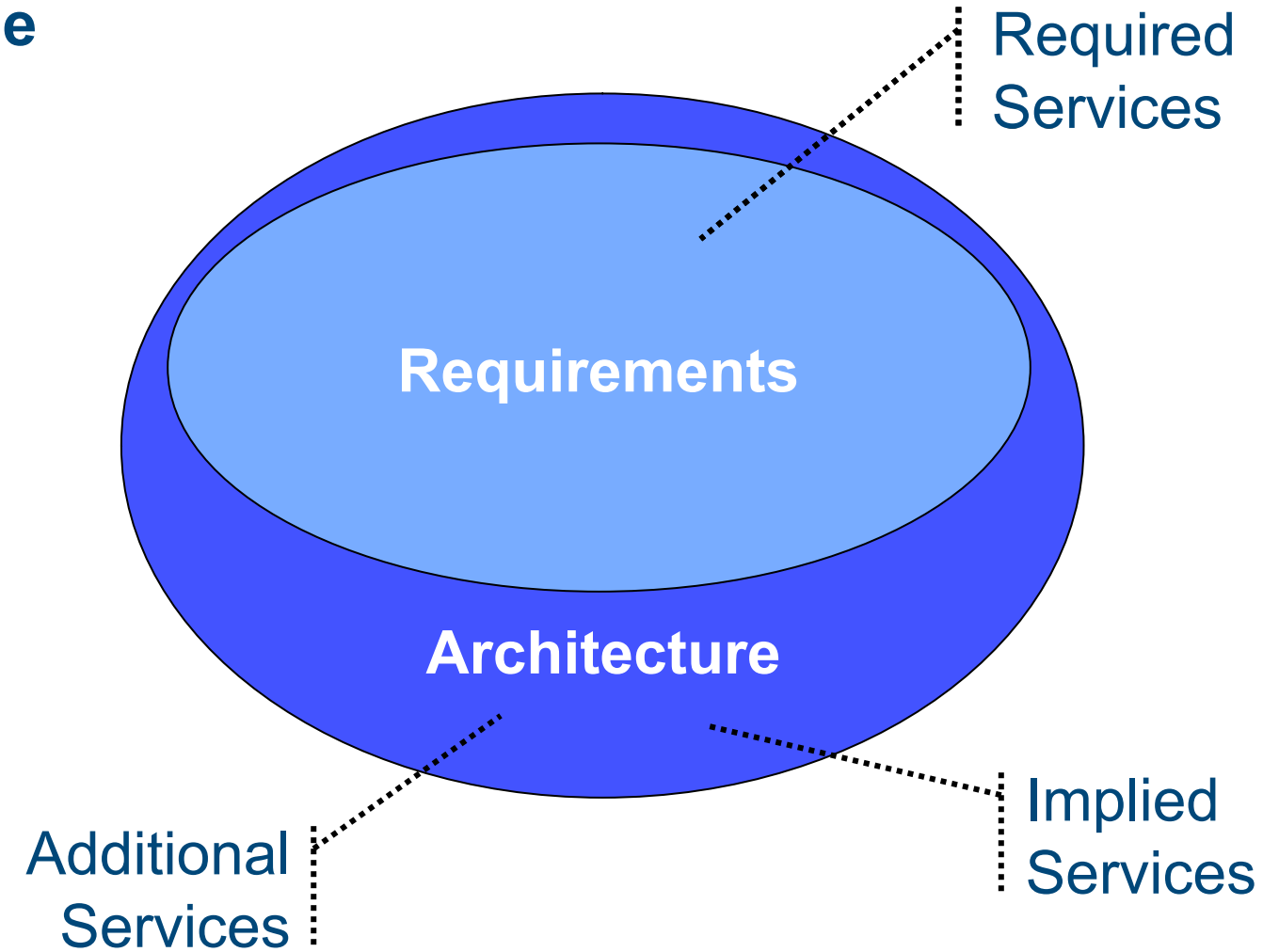
Feature vs. Architecture-driven Approach



Architecture Objectives

- To **overcome fragmentation and duplication** of the Eclipse Modeling projects
  - Not driven by existing Eclipse Modeling technologies and their decomposition
- To **identify the services** the MP should provide ("20 Modeling Things")
  - Features and scope of each service
  - Dependencies between services
  - Layers regrouping services in meaningful subsets
- To provide a common **frame for alternative implementations**

Coverage


Required Services
Requirements
Architecture
Additional Services
Implied Services

Required Services

- Persistence (partially)
- Metamodel Management
- Version Management
- Access Control
- Compare & Merge
- Traceability
- …

▶ **Mandatory,**
i.e., must be considered in effort estimation/planning

Implied Services

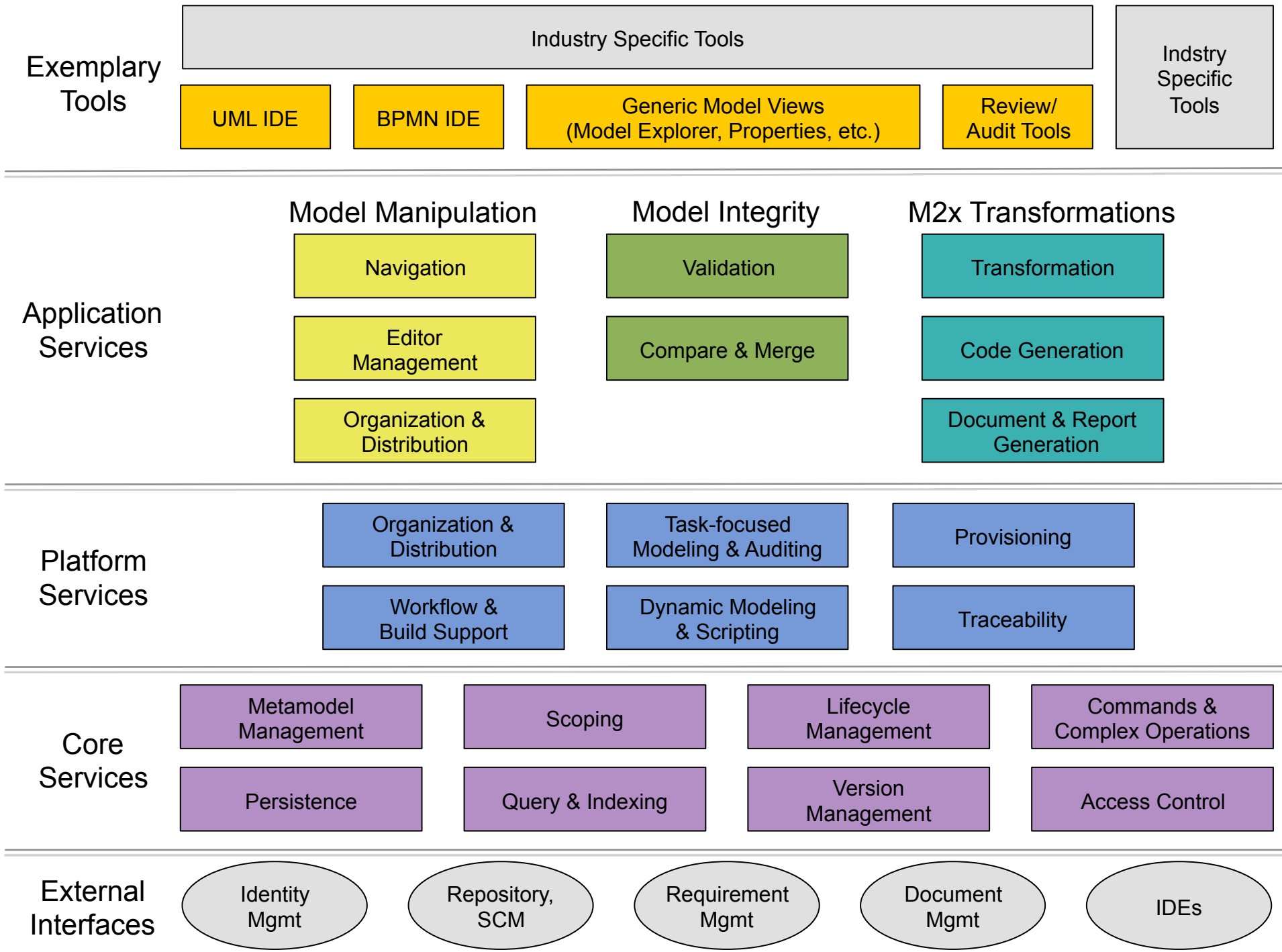
- Persistence (partially)
- Scoping
- Workspace Management
- Commands & Complex Operations (partially)
- Query & Indexing

▶ **Mandatory,**
i.e., must be considered in effort estimation/planning

Additional Services

- Navigation
- Editor Management
- Validation
- Workflow & Build Support
- Dynamic Modeling & Scripting
- Search & Replace
- Provisioning

▶ **Optional,**
i.e., can be omitted in effort estimation/planning


Exemplary Tools
Industry Specific Tools
Indstry Specific Tools
UML IDE
BPMN IDE
Generic Model Views (Model Explorer, Properties, etc.)
Review/ Audit Tools
Application Services
Model Manipulation
Model Integrity
M2x Transformations
Navigation
Validation
Transformation
Editor Management
Compare & Merge
Code Generation
Organization & Distribution
Document & Report Generation
Platform Services
Organization & Distribution
Task-focused Modeling & Auditing
Provisioning
Workflow & Build Support
Dynamic Modeling & Scripting
Traceability
Core Services
Metamodel Management
Scoping
Lifecycle Management
Commands & Complex Operations
Persistence
Query & Indexing
Version Management
Access Control
External Interfaces
Identity Mgmt
Repository, SCM
Requirement Mgmt
Document Mgmt
IDEs

Tentative Architecture Layers

- Core Services
  - Essential services (i.e., hardly possible to create any modeling applications without these)
  - Cross-cutting nature (i.e., impact all aspects of modeling applications)
  - Applicable to any kind of modeling application (i.e., modeling tools and non-tool applications)
- Platform Services
  - Extended services (i.e., provide support for important additional aspects but possible to create modeling applications without these)
  - Cross-cutting nature (i.e., impact multiple aspects of modeling applications)
  - Primarily used in for modeling tools (but not so much in non-tool applications)

Tentative Architecture Layers (cont'd)

- Application Services
  - Services supporting individual aspects of modeling applications (i.e., not all of them are necessarily required by any modeling application)
  - Applicable to any kind of modeling application (i.e., modeling tools and non-tool applications)

"Instantiation" of Modeling Platform Architecture: Sphinx

New Eclipse MDT project providing an integrated modeling tool platform

Main use case:

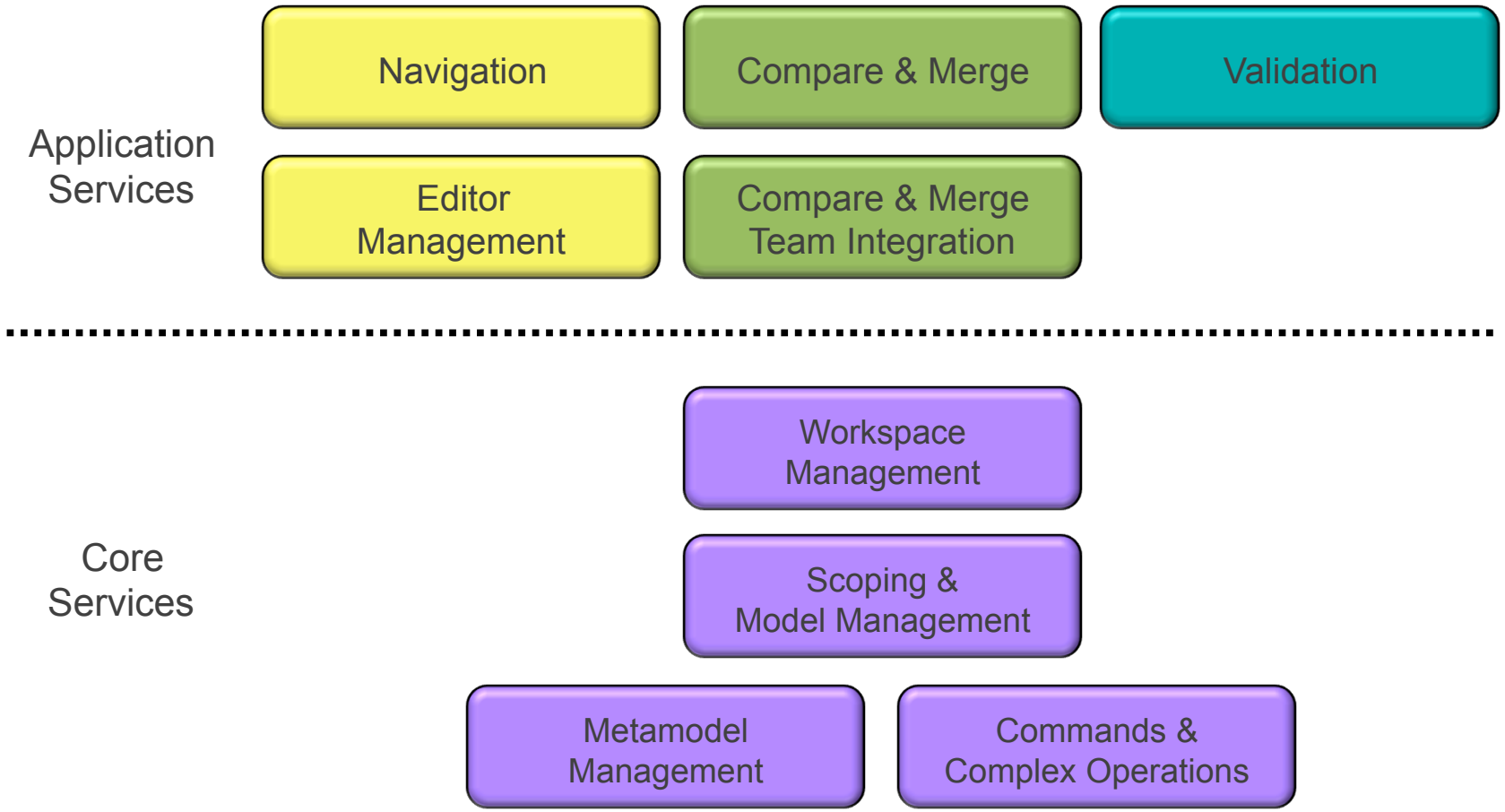
Modeling language(s) + Sphinx

⇨ **Industrial strength integrated modeling tool environment**

Origins

- AUTOSAR-independent layer (ECL) of **Artop**
- Backbone of **Papyrus**

Current Sphinx Architecture



Out-of-the-box UML Support: Papyrus

Project lead:
sebastien.gerard@cea.fr

For standards:

- Papyrus is a graphical modeling tool for UML2 and SysML.
- Papyrus targets to implement 100% of the OMG specification!

For DSL:

- Papyrus provides a very advanced support for UML profiles enabling support for "pure" DSL.
- Papyrus support may be fully customized: model explorer, diagram editors, property editors, etc.

Main contributors:

(Credit to Sébastien Gérard)

Papyrus is not a toy!

Papyrus and Airbus 

- Airbus supports Papyrus by a concrete involvement in specification and validation activities and by funding developments.

- 

Papyrus will be the UML/SysML modeler of Topcased in Q3 2011: http://www.topcased.org

Papyrus and Esterel 

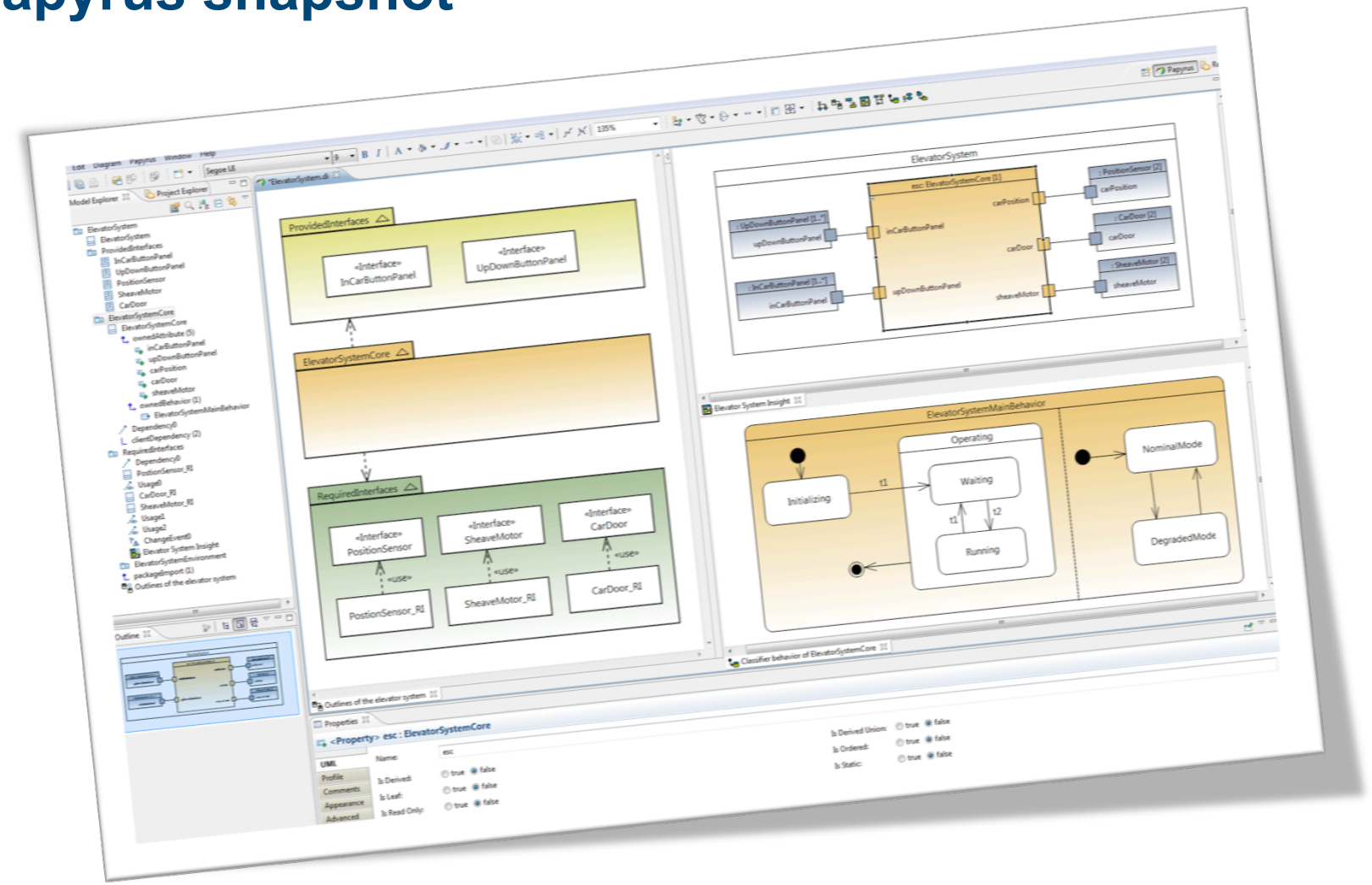
- Joint labs between CEA and Esterel Technologies to collaborate and commercialize critical systems and software development tools and processes (http://www.listerel.org).

- 

Based on a Papyrus customization, Scade System Designer provides the system view on top of SCADE.

(Credit to Sébastien Gérard)

Papyrus snapshot



(Credit to Sébastien Gérard)

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Requirements and Gaps

High Level Requirement Themes
A. Model Version Management (Life-cycle Support)
B. Model Audit Support
C. Core Platform Features for Enterprise Use
D. Flexible Content Support
E. Governance
F. Host and Target Debugging

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GAP Analysis

Result of gap analysis

Modeling Platform Requirement		Requirement effort for 2011 [PM]	Total requirement effort [PM]
Total overall effort		446	1211
Management	25 %	72	195
Platform Integration	5 %	14	39
Integration Testing	25 %	72	195
Overall efforts		288	781
A. Model Version Management (Life-cycle Support)		125	287
B. Model Audit Support		12	27
D. Flexible Content Support		151	352
E. Governance		0	42
F. Host and Target Debugging		0	73

Potential Eclipse projects

Evaluation Criteria
- Functionality
- Customizability
- Extensibility
- Scalability
- Usability
- Interoperability
- Documentation

Acceleo	MTF
ATL	MWE
BIRT	MXF
BPMN	Mylyn
CDO	OCL
EAdapt	Papyrus
EMF Compare	QVTo
EMF Core	Sphinx
EMF Transaction	UML 2
EMF Validation	Xpand
Yakindu	Xtend

Next Steps

- Roadmap ☑
- Process ☑
- Funding ☐
- Formal approval of IWG at Eclipse Foundation ☐
- Development & **Integration** ☐

Information

Links: www.eclipse.org

wiki.eclipse.org/ModelingPlatform

wiki.eclipse.org/Eclipse_MDD_Day

"20 Modeling Things"

Mail: mpwg@eclipse.org

itemis: www.itemis.de

geensys: www.geensys.com

Questions & Discussion