ESSENSE – A Kernel of Essentials for Software Engineering

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Method Engineering – ME’11
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Outline

• Request for Proposal (RFP)
  – Problem statement
  – Desired solution
  – Objectives of the RFP
  – RFP development history and team
  – Method architecture and the Kernel approach
  – Requirements: The Kernel
  – Requirements: The Language
  – Proposed RFP schedule

• Questions
Problem statement

• Traditional software engineering and process engineering approaches are
  – viewed by development teams as being
  – too heavyweight and inflexible.

• Software processes defined by separate process engineers typically
  – do not leave enough flexibility for a development team to customize and tailor the process they use,
  – not just at the beginning, but continuously as necessary over the course of a development effort.

• As a result, the use of many good practices and processes
  – is often missing or ad hoc in many development efforts,
  – limiting the ability of development teams to be effective and scalable
  – while remaining flexible and agile.
Desired solution

- Agile software development is often effectively supported by the use of significant software frameworks that provide:
  - a toolkit of components (libraries and templates)
  - an easy-to-use scripting language for flexibly composing the components.
- A similar kind of framework is desired for the flexible creation of software development methods.
  - a set of practices out of which methods can be composed
- To allow the broadest possible applicability, what needs to be standardized are not the practices themselves, but the common ground of underlying concepts and principles used to define various practices.
  - an easy-to-use practitioner-oriented modeling language (DSL) is needed to define practices based on the common ground and composing them into methods.
- The goal is to support a development team, i.e. the practitioners
  - in defining, refining and customizing themselves the process they are actually using during the course of a software development effort.
ESSENSE RFP Objectives

• Solicits submissions for ESSENSE
  – a Domain-Specific Language and
  – a Kernel of Essentials for Software Engineering
    (aka. the Common Ground)

• Goal: a language and a kernel that are
  – scalable, extensible, and easy to use,
  – allowing people to describe the essentials of
    their current and future methods and practices.

• Tool support: enable methods and practices to be
  – composed, compared, evaluated,
  – tailored, used, adapted, simulated and measured
  – by practitioners as well as taught and researched by academic and
    research communities.
RFP development history & team

• Version 0:
  – December 2010, Issue list, OMG technical meeting, Santa Clara, USA

• Version 1a:
  – February 2011, Draft RFP

• Version 1b:
  – March 2011, Updated RFP, AB review, OMG technical meeting, Washington DC, USA

• Version 2a/b:
  – May/June 2011, Revised RFP, OMG technical meeting, Salt Lake City, USA

• Core team
  – Arne-Jørgen Berre (SINTEF)
  – Dave Cuningham (Fujitsu UK)
  – Brian Elvesæter (SINTEF)
  – Shihong Huang (FAU)
  – Ivar Jacobson (IJI)
  – Paul McMahon (PEM Systems)
  – Ed Seidewitz (Model Driven Solutions)
  – Ed Seymour (Fujitsu UK)

• Other contributors
  – SEMAT
  – Adaptive Systems
  – Cordys
  – SOFTEAM
  – ESI-Tecnalia
  – ...

A method is a composition of practices. Methods are enactable.

A practice is a repeatable approach to doing something with a specific purpose in mind. A practice provides a systematic and verifiable way of addressing a particular aspect of the work at hand.

The Kernel includes essential elements of software engineering.

The Language is the domain-specific language to define methods, practices and the essential elements of the Kernel.

Methods

Practices

The Kernel

The Language

Is defined in terms of
A key idea is the existence of a Kernel

- The Kernel is very small, extracted from a large number of methods
- It contains a starting point (slots) for the things that every process has, e.g.
  - work, team, requirement, software system, opportunity and stakeholder
- The Kernel is practice and method agnostic.
**Kernel: Straw man** (illustrative conceptual model)

**Alphas (Abstract-Level Progress Health Attributes)**
represent things to work with that subsume and encapsulate work products at a higher level of abstraction.

1. relevant to an assessment of the project’s progress (stated objectives such as deadlines, costs, quality)

2. can be determined (directly or indirectly) in terms of the current state of the project’s work products
Requirements: The Kernel

- **Definition**
  - Expressed in the **Language**.
  - Encompass the **fundamental concepts** in the Software Engineering domain, including definitions of elements and their significant relationships.

- **Conciseness**
  - Only include a **small set of elements** that **are truly essential**.
  - The number of essential elements is expected to be closer to 10 than to 100.

- **Scope**
  - Cover from the **smallest projects** to large systems and systems-of-systems.

- **Broad practice coverage**
  - Support **many different practices** used by significant segments of the industry.

- **Broad lifecycle coverage**
  - Accommodate **various lifecycle models** used by significant segments of the industry.

- **Broad technology coverage**
  - Adaptable to a **wide range of software technologies** (programming languages, specification languages, graphical notations, software tools) used by significant segments of the industry.

- **Comparison**
  - Provide a basis for the **comparison of methods and practices** to see which are suitable for a given situation.

- **Measurement**
  - Provide a basis for the **measurement of methods and practices**, both to enable performance evaluation and to guide evaluation and validation in research.

- **Extension**
  - Ability to add practices, levels of detail and lifecycle models.
Requirements: The Language

• **Definition**
  - Abstract syntax model defined in MOF (Meta-Object Facility).
  - Formal static and operational semantics defined in terms of the abstract syntax.
  - Graphical concrete syntax that formally maps to the abstract syntax.
  - Textual concrete syntax that formally maps to the abstract syntax.

• **Description**
  - Support the description of practices and methods in terms of the essential elements of the Kernel.

• **Composition**
  - Support the composition of practices to describe existing and new methods.

• **Work Progress**
  - Allow the representation of work progress.
  - (For example, describing a practice that involves iterative development requires describing the starting and ending states of every iteration.)

• **Enactment**
  - Support the enactment of methods, both as used to help plan endeavors and as applied (or executed) as part of the day-to-day activities in real projects.
## Proposed RFP schedule

<table>
<thead>
<tr>
<th>Event or Activity</th>
<th>Actual Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of RFP by TF</td>
<td>ADTF – December 8, 2010</td>
</tr>
<tr>
<td>RFP placed on OMG document server</td>
<td>February 21, 2011</td>
</tr>
<tr>
<td>Discussion of RFP by Architecture Board Review by TC</td>
<td>March 23, 2011</td>
</tr>
<tr>
<td>Discussion in ADTF on the RFP</td>
<td>March 24, 2011</td>
</tr>
<tr>
<td>Approval of RFP by Architecture Board Review by TC</td>
<td>June, 2011</td>
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<tr>
<td>TC votes to issue RFP</td>
<td>June, 2011</td>
</tr>
<tr>
<td>LOI to submit to RFP due</td>
<td>September, 2011</td>
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<tr>
<td>Initial Submissions due and placed on OMG document server (“Four week rule”)</td>
<td>November, 2011</td>
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<tr>
<td>Voter registration closes</td>
<td>November, 2011</td>
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<tr>
<td>Initial Submission presentations</td>
<td>December, 2011</td>
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<tr>
<td>Preliminary evaluation by TF</td>
<td>December, 2011</td>
</tr>
<tr>
<td>Revised Submissions due and placed on OMG document server (“Four week rule”)</td>
<td>May, 2012</td>
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<tr>
<td>Revised Submission presentations</td>
<td>June, 2012</td>
</tr>
<tr>
<td>Final evaluation and selection by TF</td>
<td>September, 2012</td>
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<tr>
<td>Recommendation to AB and TC</td>
<td>September, 2012</td>
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<tr>
<td>Approval by Architecture Board Review by TC</td>
<td>September, 2012</td>
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<tr>
<td>TC votes to recommend specification</td>
<td>September 2012</td>
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<tr>
<td>BoD votes to adopt specification</td>
<td>September, 2012</td>
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Questions

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• OMG website:
  – http://www.omg.org

• SEMAT website:
  – http://www.semat.org