Policy-based Software Evolution

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Abstract

A software system is increasingly more difficult to evolve over time unless appropriate measures are taken. The table below shows the technological support for developing a new release as well as that for analyzing across releases and across products.
Technological Support for Software Evolution

<table>
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<tr>
<th>Function</th>
<th>Tool name or Type</th>
<th>Comments</th>
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<tr>
<td><strong>Technologies for New Release Development</strong></td>
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| Elicitation of product and process models     | • V-elicit, E³ elicitation tools  
• process modelling tools  
• software design tools | • Elicitation tools are currently research prototypes.  
• Commercially available modelling and design tools do not have adequate *elicitation* capabilities and thus require significant human involvement. |
| Measurement                                   | • Metric tools, such as: Slim, Anova, SPC, TychoMetrics, Minitab, Metric ONE, McCabe, etc. | • Commercially available.                                                |
| Develop & change process model                | • process modelling and simulation and analysis tools  
• product modelling and software design tools | • Process modelling and design tools are commercially available.  
• Basic process simulation and analysis tools are commercially available.  
• Advanced process simulation and analysis tools are research prototypes. |
| Verify model against policies                 | • Policy – V.  
• Law governed process enactment engines and environments | • Currently research prototypes.                                         |
| Analyse verification results                  | • Intelligent systems.                                                           | • Basically a human interpretation and judgement activity.              |
| Develop & Change policies                     | • Policy – M.  
• Law governed process enactment engines and environments | • Policy elicitation, modelling, specification and analysis tools are currently rudimentary research prototypes. |
| Gather knowledge                              | • Document processing tools and repository management tools                      | • Commercially available.                                                |
| **Technologies for Across Releases and Across Products analysis** |                                                                                 |                                                                          |
| Across-releases analysis                      | • Metric tools, such as: Slim, Anova, SPC, TychoMetrics, Minitab, Metric ONE, McCabe, Methodologist's Toolchest , etc.  
• Program understanding, Analysis, and Reverse-engineering tools | • Metric tools and for empirical studies are commercially available.  
• Reverse engineering tools are increasingly available commercially.  
• Advanced program understanding tools are research prototypes. |
| Store & Package                               | • Document processing tools and repository management tools                      | • Commercially available.                                                |
| Across-products analysis                      | • Metric tools  
• Architecture description and analysis tools  
• Product-line approaches and tools | • Metric tools are commercially available.  
• Architecture description and analysis tools, and product-line approaches and tools are rudimentary research prototypes |