

ULRR

A product derivation process framework. Analysis of product derivation methods for software-intensive automotive product lines

Item Type	Meetings and Proceedings
Authors	O'Leary, Pádraig
Download date	2026-05-20 14:24:39
Item License	https://creativecommons.org/licenses/by-nc-sa/1.0/
Link to Item	https://hdl.handle.net/10344/192



Pádraig O'Leary

Supervised by	Ita Richardson Steffen Thiel
Research Area	GSD SPL
Project Title	A Product Derivation Process Framework

Problem Statement:

- ❑ An effective Product Derivation process can help to ensure that the effort required to develop the core assets is less than the benefits delivered through using these shared assets across the products within a product line however:
- ❑ Hotz et al. (Hotz, Gunter et al. 2003) describe product derivation as “slow and error prone even if no new development is involved”
- ❑ Deelstra (Deelstra, Sinnema et al. 2005) – Says there “is a lack of methodological support for application engineering and, consequently, organizations fail to exploit the full benefits of software product families.”
- ❑ Rabiser et al. (Rabiser, Grunbacher et al. 2007) – claims that “Guidance and support are needed to increase efficiency and to deal with complexity of product derivation”

Problem: Lack of methodological support for the Product Derivation Process

- ❑ “What are the basic activities in the product derivation process and to what extent can the development of a product derivation process framework guide organisations towards a “best-practice” approach to product derivation?”

State of the Art

- ❑ Current approaches to product derivation can roughly be categorised according to derivation technique used: configuration and transformation

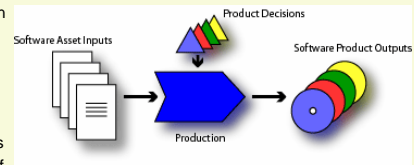


Figure 1. Product Derivation

- ❑ The configuration approach is based on the idea that product derivation activities should be based on the parameterisation of platform assets rather than on how individual products are obtained

- ❑ The transformation approach use model driven engineering techniques, by providing models as abstractions of platform assets and using model transformations as a technique for product generation

- ❑ Deelstra et al. present a product derivation framework. The framework presents a high level overview of product derivation activities. The framework consists of two phases: an initial phase and an iteration phase

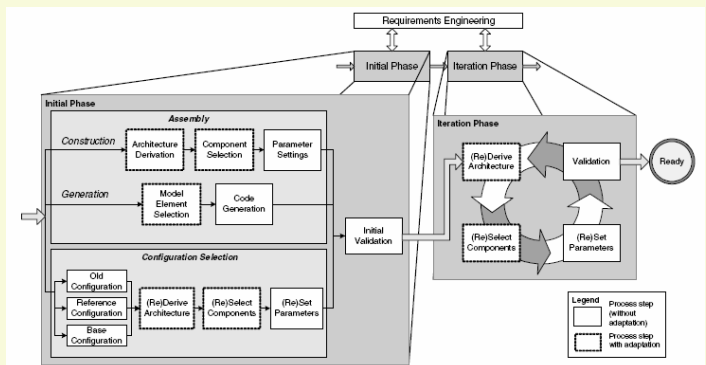


Figure 2. Deelstra et al. Product Derivation Framework (Deelstra, Sinnema et al. 2005)

A Product Derivation Process Framework:

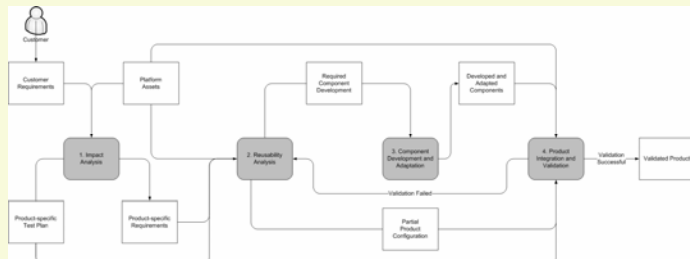


Figure 3. Proposed Product Derivation Framework

- ❑ Using the Eclipse Process Framework as a support tool for the development, maintenance and deployment of process content

- ❑ Development of a repository of product derivation ‘best’ practices

- ❑ Use of process patterns for the development of situational/company specific product derivation processes

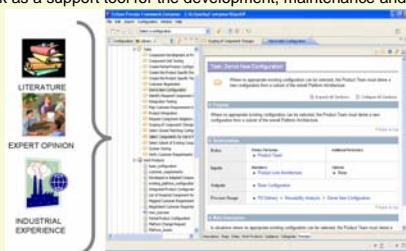


Figure 4. Building the Product Derivation Process Framework

References

- Deelstra, S., M. Sinnema, et al. (2005). Product Derivation in Software Product Families: A Case Study. *J. Syst. Softw.* New York, NY, USA, Elsevier Science Inc. **74**: 173-194.
- Hotz, L., A. Gunter, et al. (2003). A Knowledge-based Product Derivation Process and some Ideas how to Integrate Product Development. *Proc. of Software Variability Management Workshop*. Groningen, The Netherlands.
- Rabiser, R., P. Grunbacher, et al. (2007). Supporting Product Derivation by Adapting and Augmenting Variability Models. *Software Product Line Conference, SPLC 2007. 11th International*. Kyoto, Japan.

Solution Approach:



Work to Date:

- Performed literature review of PD practices and approaches within SPL
- ❑ Extrapolate from the literature an initial process framework for product derivation
- ❑ Iterative workshop series to further refine and assess framework
- ❑ Conduct Bosch Case Study on Product Derivation Process within Bosch Business Units
- ❑ Evaluate efficiency of Bosch Product Derivation Process and recommend further improvements
- ❑ Revised framework based on case study experiences

Future Work:

- ❑ Perform second case study on industrial product derivation practices
- ❑ Revise framework based on case study experiences
- ❑ Perform expert opinion analysis
- ❑ Revise and Validate Product Derivation Framework

Results to Date:

- O'Leary, P., I. Richardson, S. Thiel, (2008). Developing a Product Derivation Process Framework for Software Product Line Organisations. *EuroSPI 2008 Doctoral Symposium*. Dublin, Ireland.
- O'Leary, P., S. Thiel, G. Botterweck, M. Ali Babar, I. Richardson, (2008). Bosch AB10 Technical Report, LERO - The Irish Software Engineering Research Centre: 26.
- O'Leary, P., M. Ali Babar, S. Thiel, I. Richardson (2007). *Towards Agile Product Derivation in Software Product Line Engineering*. RISE 2007, 4th International Workshop on Rapid Integration of Software Engineering techniques, Luxembourg, LUXEMBOURG.
- O'Leary, P., M. Ali Babar, S. Thiel, I. Richardson (2007). *Product Derivation Process and Agile Approaches: Exploring the Integration Potential*. Proceedings of 2nd IFIP Central and East European Conference on Software Engineering Techniques, Poznań, Poland, Wydawnictwo NAKOM.