

Position Paper – Advanced Separation Of Concerns (ASOC) Workshop
**The Ubiquitous Overlapping, Dynamic Concerns
Project vs. Product**

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Abstract

This position briefly outlines the value of integrating project concerns and product concerns into ASOC goals. Specifically it outlines the dynamic, interrelated aspects of project concerns, and then postulates their use (dynamic risk modeling) in supporting ASOC use.

Position

Advance Separation Of Concerns (ASOC) has at its core a focus on the support for on-demand remodularization of software products integrating multiple, potentially arbitrary kinds of concerns [1]. Given this statement of purpose, in spite of numerous successful research endeavors, there remain many problems to resolve.

Project & Product (Meta) Concerns:

One such problem area, ubiquitous to software engineering is the distinctive and overlapping concerns of the software *project* and the associated software *product(s)*. The list below suggests some of the dimensions of the relationships between these two fundamental areas of concern (meta concerns). Although incomplete, the proposed list suggests the dynamic and inter-dependent nature of project and product concerns:

Economics [2]: Typically defined at the project definition, and subsequently distributed among the products produced. *E.g., What products to produce? When? For what value/expected benefit? At what cost?* Typically these are expressed as non-functional requirements[], goals[] or constraints on the software product[]. But in fact, these project-oriented concerns both influence and subsequently depend on the partitioning of the product (requirements, design, etc.) to measure. Furthermore, these concerns are dynamic, in that as the project/product(s) evolve, the distribution of economic measures also change – and can influence the decision to continue to invest in the software development.

Risk [3]: Risks are highly dynamic concerns that relate to both project and product, and are typically categorized as *Project Risks* (threats to the project plan) to *Technical Risks* (threats to the quality of the product) to *Business Risks* (threats to the economic value of the product). These risks themselves are

- Dynamic: They change with time as the project progresses
- Often interrelated: For example, a technical risk may have schedule and economic impacts.

Planning & Scheduling: These areas of concern relate product concerns to project concerns. This relationship is typically through the creation and tracking of the product concerns (e.g., work products) against their development progress (various metrics).

Quality [4]: can define several dynamic, highly interrelated concerns that link to other product concerns (e.g., requirements, design, code, test, etc.). Although addressed in ASOC literature, these concerns also relate to project goals such as risk and economics. More specifically, the tangible (typically lower-level), measurable quality attributes of the product can be linked back to less-tangible, higher-level product and project-level quality attributes.

Risk and Refactoring:

The fascinating aspect of these interrelated project and product concerns is the potential value of the effort of capturing and linking the concerns. Specifically, ASOC has as its aim the means of reducing/eliminating the effort associated with refactoring efforts, caused by numerous sources, (e.g., the “dominant decomposition” problem). At issue is the project-related issues of the *risk of refactoring* and the *expected cost of refactoring*. As both of these issues become larger, the associated cost (investment) in ASOC techniques bring the most value. Furthermore, these measures should be dynamic, and linked to the on-going changes in the various project and product concerns.

The suggestion made by this position is that in capturing project and product concerns (and specifically risk), should *ASOC incorporate not only the goal of on-demand remodularization, but also the goal of guiding its use.*

All remodularization (product) issues are tied directly to project-related issues that ASOC techniques have the potential to model. Similarly, if project concerns are modeled (especially risk), the value of the ASOC effort can be matched to the risks involved. Thus the value/cost of the effort can be communicated to software decision-makers.

These types of decision-related project metrics are modeled, and used for project decision making, occasionally referred to as *requirements triage*[5]. Requirements triage refers to the annotation of product features, and balancing them with against estimates of project-related issues (economics, risk, planning & scheduling, quality, etc.) for the correct scoping of product requirements. However, integrating dynamic project-related concerns into ASOC brings the ability not only to estimate these factors at the requirements stages, but also to track and use triage (scoping/ remodularization) techniques throughout the life cycle.

References (short list)

1. Ossher, Harold, and Tarr, Peri. “Multi-Dimensional Separation of Concerns and The Hyperspace Approach” in *Proceedings of the Symposium on Software Architectures and Component Technology: The State of the Art in Software Development*. Kluwer, 2000. (To appear.)
2. Tockey, Steve. “A Missing Link in Software Engineering” *IEEE Software* Nov-Dec 1997, pp. 31-36.
3. Pressman, Roger. “Risk Analysis & Management” (Chapter 6) in *Software Engineering, A Practitioners Approach*, 5th Ed., McGraw Hill, 2001.
4. Dromey, R. Geoff. “Cornering the Chimera” in *IEEE Software*, January 1996 pp. 33-43.
5. Davis, Al. “The Most Ignored Piece of Requirements Engineering: Requirements Triage” *ICRE 2000 Tutorial*. Omni-vista inc., Colorado Springs, CO.