

Managing systems lifecycles: projects of systems and services re-design and upgrade

Throughout the systems lifecycle, designers have to deal with redesigning or upgrading existing systems in order to cope with new structural or functional requirements (integration of new technologies, rules or constraints such as environmental legislations for instance) or customers' needs and expectations. This means that the system performance had been below the acceptance levels. The re-design or upgrade design activities must therefore take account of the target performance.

The redesign and upgrade of systems can be studied from a management point of view. The total or partial redesign or upgrade of systems and services they offer need to follow rigorous approaches to minimize non-value modifications. This means that designers must be able to set performance targets on both the system and the project to lead efficiently redesign or upgrade of the system to minimize time-to-market. The redesign and upgrade project should also be controlled thoroughly during its run.

From a more technical perspective, the redesign or upgrading activities deal with existing system's sub-systems (i.e. modules or components) mapped to functions with measurable performances. This leads to the definition of hard and soft constraints that englobe the run of the frozen subsystems while allowing improvements of modifiable subsystems. The interfaces between frozen and modifiable parts should also be designed and implemented without alteration of performance of the global system. Nevertheless, even though various systems do have similarities, they have profound differences too. Improving or upgrading a train, an airplane or a workshop of a plant is different from computer or car redesign because it deals with every single operational instances in the first cases (with their own specificities) while in the second case, a new generation of systems is redesigned. Redesign and upgrading activities concern then on system's instance, family or versions.

This session would cover various aspects of system re-design and upgrade and papers dealing with following issues are very welcomed:

- theoretical studies of system and service re-design, retrofitting and upgrading,
- case studies of total or partial system or service re-design and upgrade,
- data and knowledge management throughout the lifecycles
- design for upgradability
- lifecycles management
- Redesign and upgrading decision support systems
- systems engineering and project management practices alignment
- etc.

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