WSDARWIN: A Decision-Support Tool for Web-Service Evolution

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Software evolution is a socio-technical problem.

However, web services pose extensive social and technical constraints of special interest.
Motivation

We need to change our service to offer more features.

Evolution effort and cost

Price, Adaptation Costs

The contradictions, constraints and externalities due to interaction may be modeled as a game.
Web-Service Evolution Game

Provider can:
1. Retain the status quo of the service (SQ)
2. Evolve the service (E)
3. Evolve the service and support the client (S)

Client can:
1. Adapt to the new version of the service (A)
2. Leave the provider (L)
Service Evolution Decision Tree

\[ aC_{ai} < p^S_{ei} - p^E_{ei} \]

\[ p^S_{ei} > C_e - aC_{ai} \]

\[ V^C_{ei} - V^C_{ej} > p^E_{ei} - p_{ej} + bC_{ai} - C_{aj} \]
Simply by evaluating these conditions the provider can be lead to the most appropriate action.
Conclusions

- Service evolution is a technical problem with socio-economic extensions.
- A decision cannot be made solely based on code, costs and prices.
  - Interactions and externalities have to be taken into account.
- Game theory succeeds into capturing the reaction of all participants to the various decisions.
- The decision tree is a practical tool for providers that includes the preference analysis and goes straight into aiding the decision-making process.
- The details of the mathematical model (what needs to be calculated and how) is being formulated as we speak!
1. To what degree, do decision-makers take into account socio-economic parameters in software evolution?

2. Should we switch from a techno-economic approach to a more socio-economic one in service evolution?