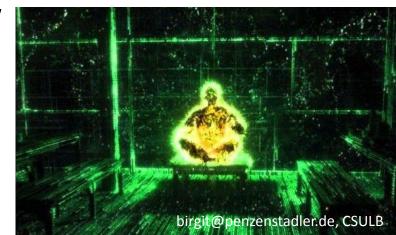
GRL for Representing the Sustainability Reference Model

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birgit@penzenstadler.de Twitter @twinkleflip California State University Long Beach 8th Intl. i* Workshop www.sustainabilitydesign.org Ottawa, Aug 25, 2015 <<Overall goal>> Achieve Sustainability <Dimension>> Achieve <<Dimension>> Achieve <<Dimension>> Achieve <<Dimension>> Achieve <<Dimension>> Achieve social sustainability environmental sustainability economic sustainability individual sustainability technical sustainability <<Value>> <<Value>> <<Value>> maintain conserve <<Value>> <<Value>> <<Value>> maintain biodiversity human capital maintain create long-<<Value>> use long-term maintain healthy community human health term profit make easy to environment maintain provide provide encourage <Value>> natural education encourage healthy maintain habitat apply good optimize nutrition use lasting exercise trust design hardware resource follow practices consumption long-term manage strategy knowledge provide a create ţ education dear value reserve lunch options program contribution sustainable recycle promote mentor lunch resources put up continuous Human walks Millenium stretching rights goals postures

In a nutshell:

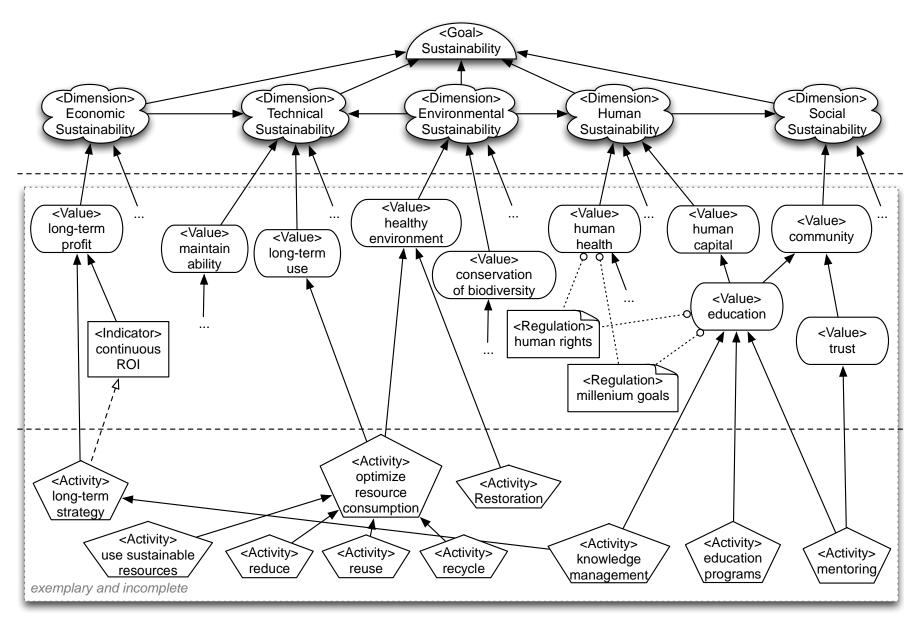
- [Context]
 - Sustainability: often fuzzy arguments
 - Previous work: reference model for sustainability
- [Problem] Reference goal model not standardized notation
- [Contribution] Use GRL to represent
- [Impact]
 - Broader understanding of how to decompose and handle
 - Formalized basis for reasoning
 - We hope to engage in community discussion



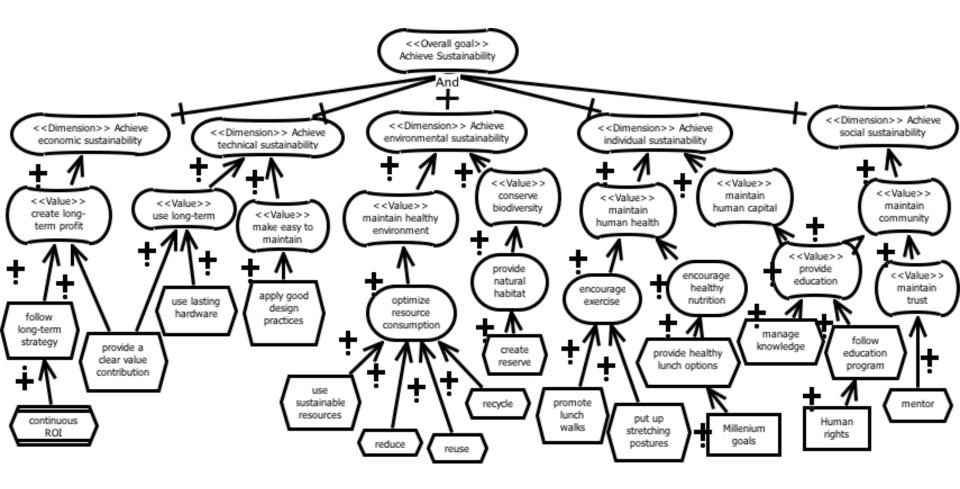
Software Engineering for Sustainability

- Sustainability: All forms of life flourish forever. [Ehrenfeld], includes different dimensions – environmental, but also social.
- For software systems
 - Domain-dependent sustainability
 - Domain-independent sustainability
- Software Engineering for Sustainability (SE4S):
 Translation and refinement from domain- dependent sustainability requirements to domain-independent requirements and then further development.

Old sustainability reference model



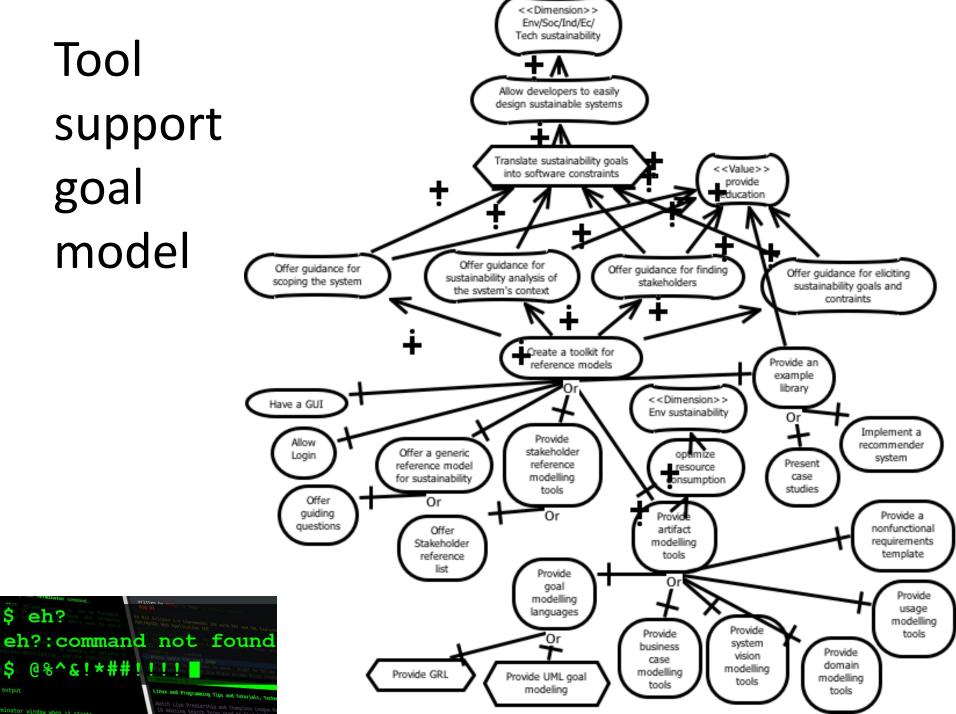
New sustainability reference model



Tool support goal model

\$ eh?

@%^&!*##!!!!**!**



Discussion

- Choice of GRL Notation: GRL because of direct support for indicators
- Expressiveness of New Model: Initial loss of information resolved by using metadata.
- Analysis and Reasoning: Qualitative and quantitative, weighting of goals, assessments.
- Future Work: Actors and Tooling.



Conclusion and Future Work

- Take-away Message.
 - Sustainability goal reference model in GRL allows for reasoning with qualitative and quantitative data.
 - Intended to serve as guidance and checklist for software engineers who want to include the goal of sustainability into their development.
- Future work includes:
 - Adding actors
 - Online tool support inspired by jUCMNav
- Special thanks to: Jennifer Horkoff, Gunter Mussbacher, Daniel Méndez, Leticia Duboc, and Reviewer 1