Usability Study of Computer Support to Time-oriented, Skeletal Planning with the *Asgaard* Project

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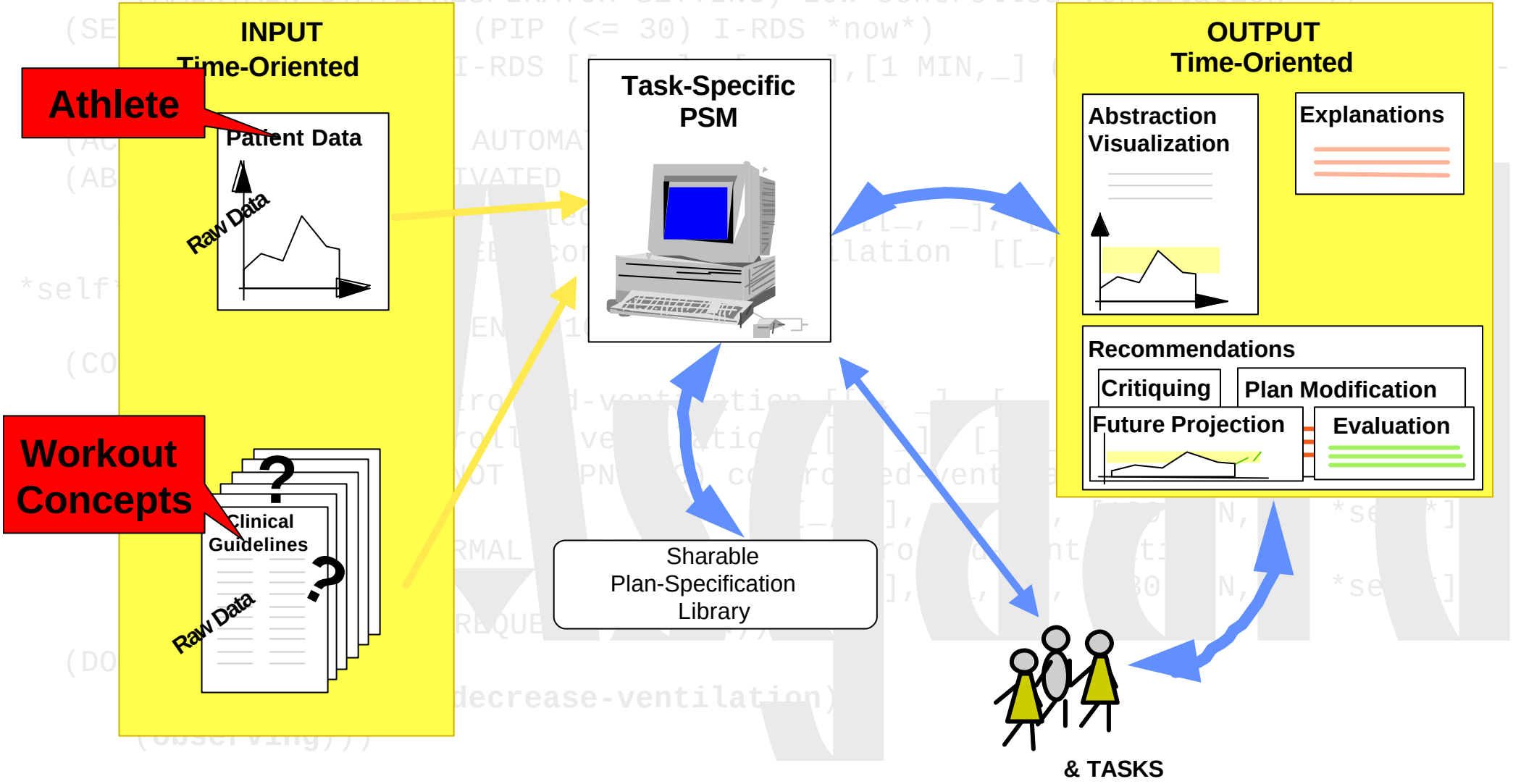
Knowledge Acquisition in cooperation with the Austrian Army Sport Center

Overview

- **Introduction to the Asqaard idea**
  - The Asqaard framework
  - Asbru - a language for time-oriented skeletal plans
- **Thesis**
  - Asbru is applicable in real-world environments
- **Evaluation Environment**
  - Fitness Seminar
  - Processing within the problem domain
  - Example in Asbru
- **Discussion and Conclusion**

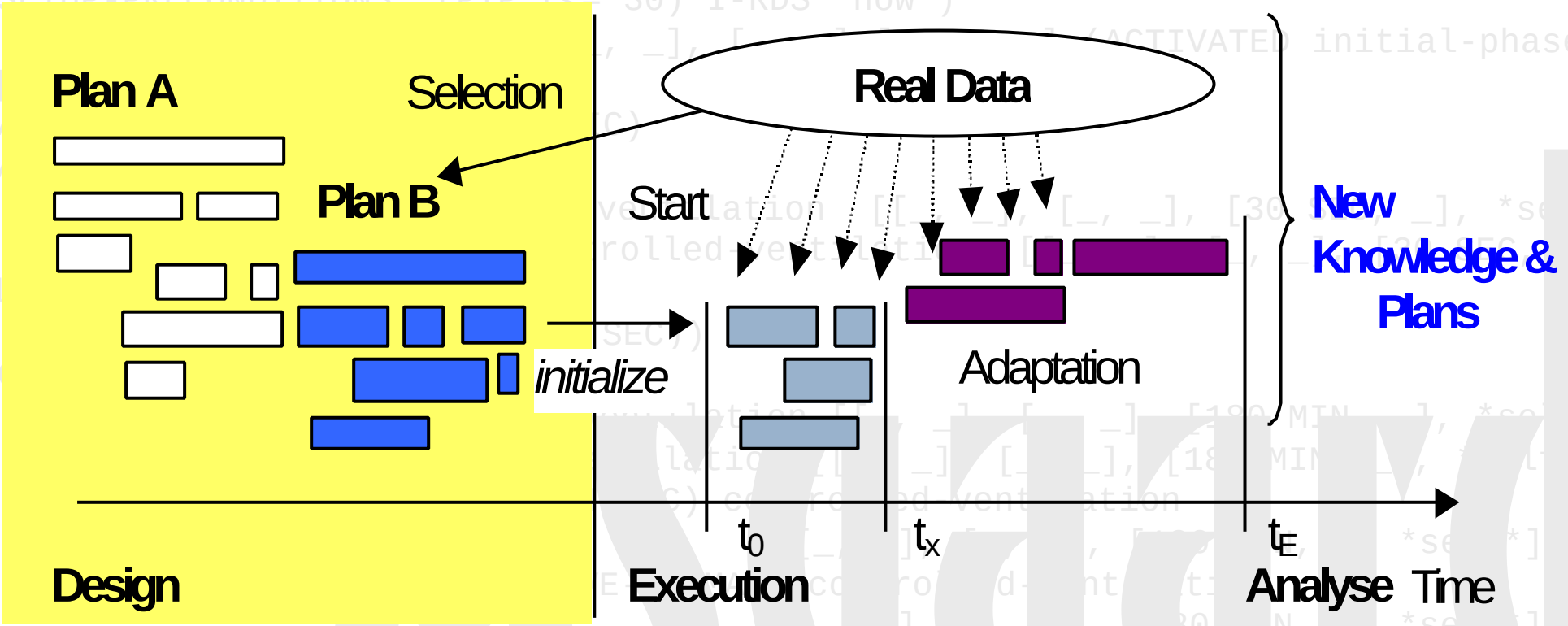
The Asgaard Idea



Asbru's Key Features

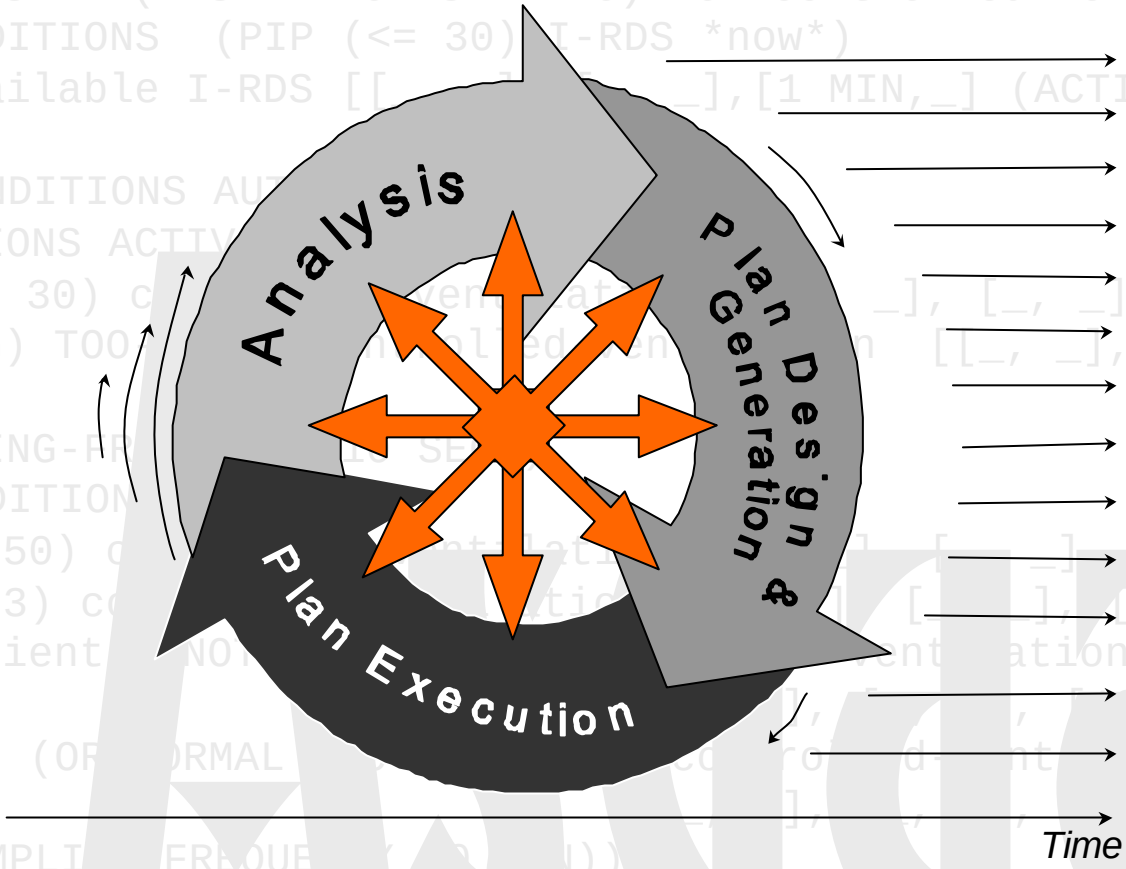
- **Hierarchical Decomposition of Plans**
- **Temporal Annotations**
- **Components**
  - Preferences
  - Intentions
  - Conditions
  - Effects
  - Plan Layouts

Time-Oriented, Skeletal Plans



- Representation & reuse of domain-specific procedural knowledge
- Reusable in different contexts

Which Plan Management is Needed ?



- Fully integrated and intertwined tasks

Thesis: Is Asbru applicable?

- **First hypothesis approach:**
  „Asbru is useful to support the task of time-oriented plan management“
- **Now more specific:**
  „Asbru is useful and applicable to support the task of time-oriented plan management in a sport‘s domain“

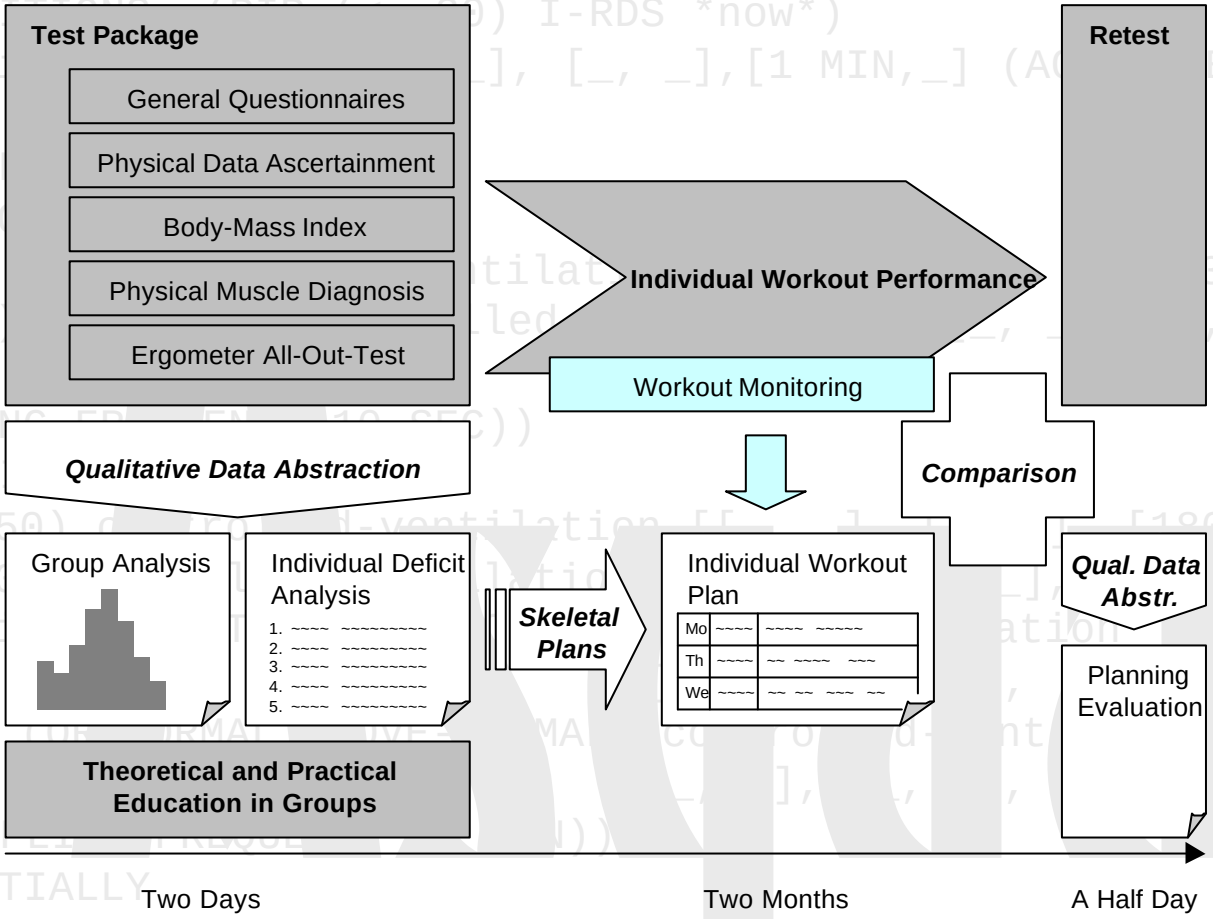
Idea: Evaluation of Asbru in a real-world environment

- **Knowledge Modelling**
  - How fit is Asbru? Does it meet our expectations?
  - Identifying design patterns in Asbru
- **Implementation**
  - Get a running prototype
  - Descibe a real-world confguration of a planlibrary
- **Social impacts**
  - How cost-effective is Asbru for workout plans?
  - How reliable are the suggestions?

Chosen Domain: Fitness Seminar

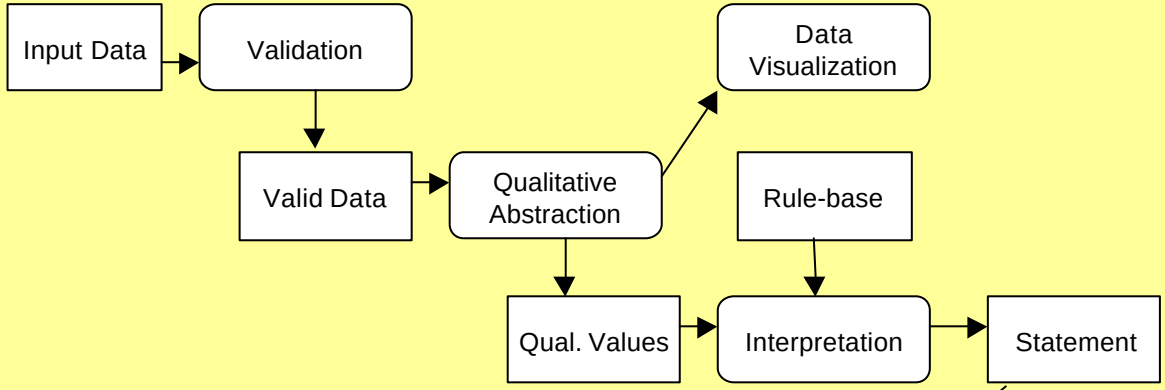
- **Outline of a seminar:**
  - 20 to 40 participants performing a standard test package
  - the participants get one day theoretical and practical education and suggestion for their individual workout
  - retest after two month of unsupervised workout
- **Challenge:**
  - Producing individual workout suggestions
- **Why Fitness?**
  - Easy to acquire knowledge (no doctors with beeper)
  - No critical consequences with wrong suggestions
  - Clear and well defined domain

Outline: Fitness-Seminar

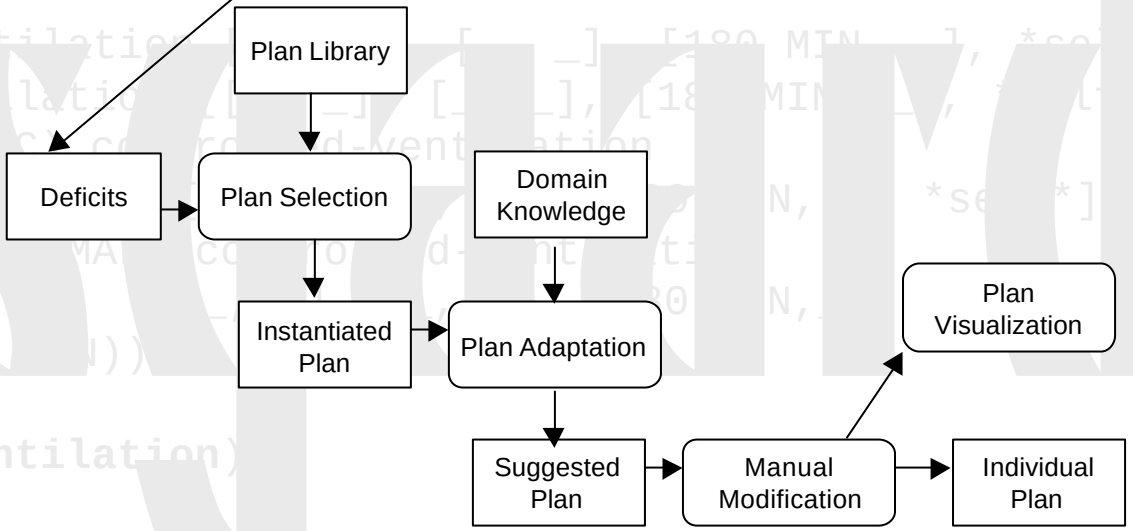


Plan and Data Processing

Data Processing

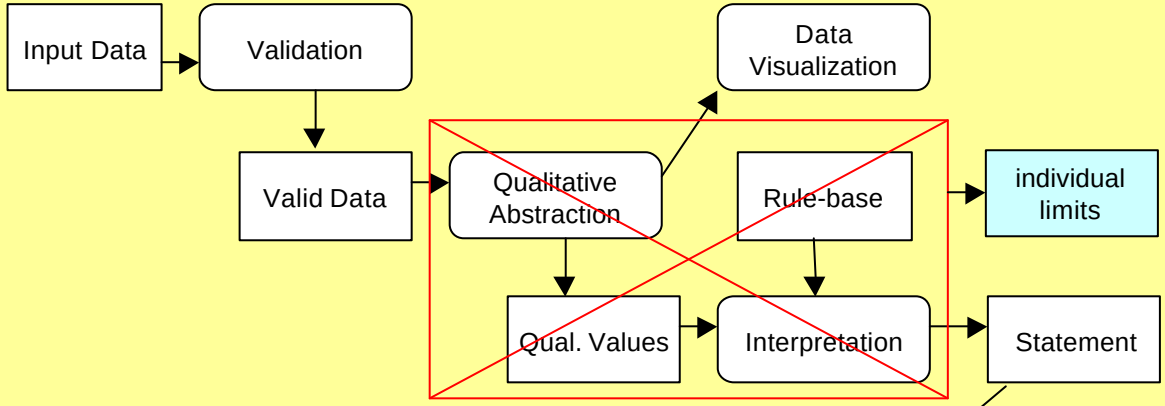


Plan processing



Some Changes...

Data Processing

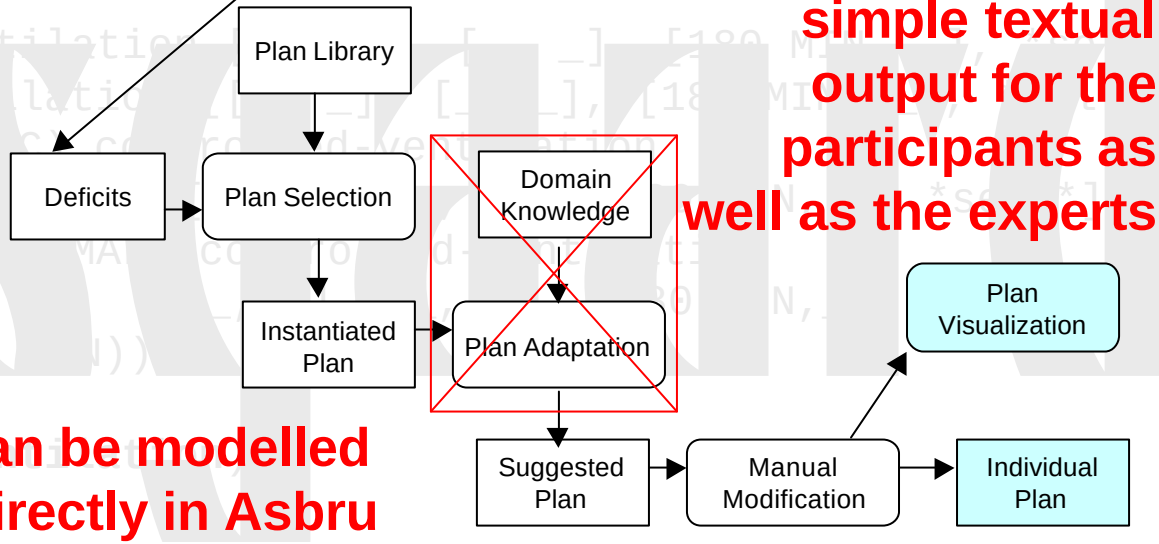


new output: individual limits

e.g.: heart rate „high“

Definitional Abstraction

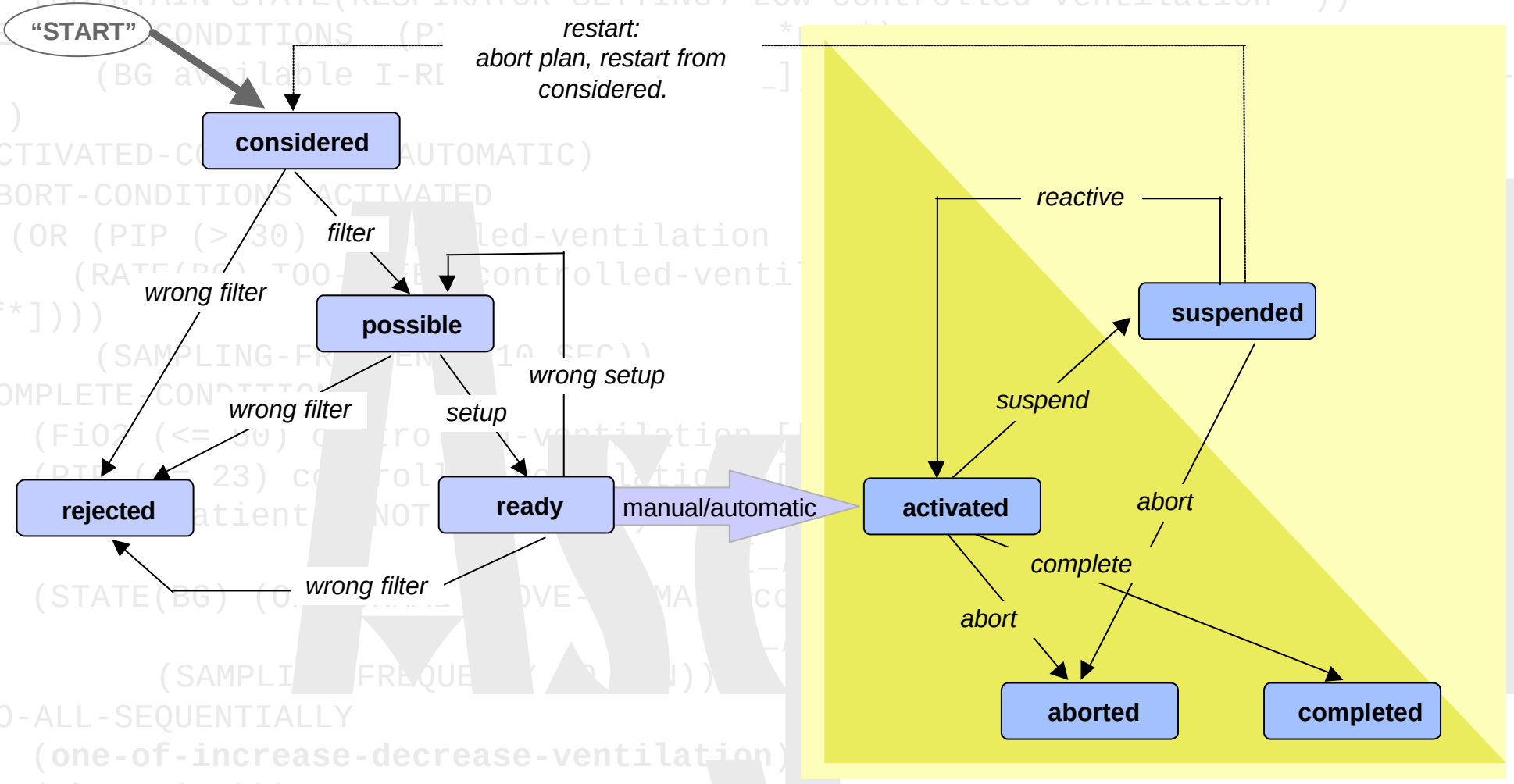
need for a simple textual output for the participants as well as the experts



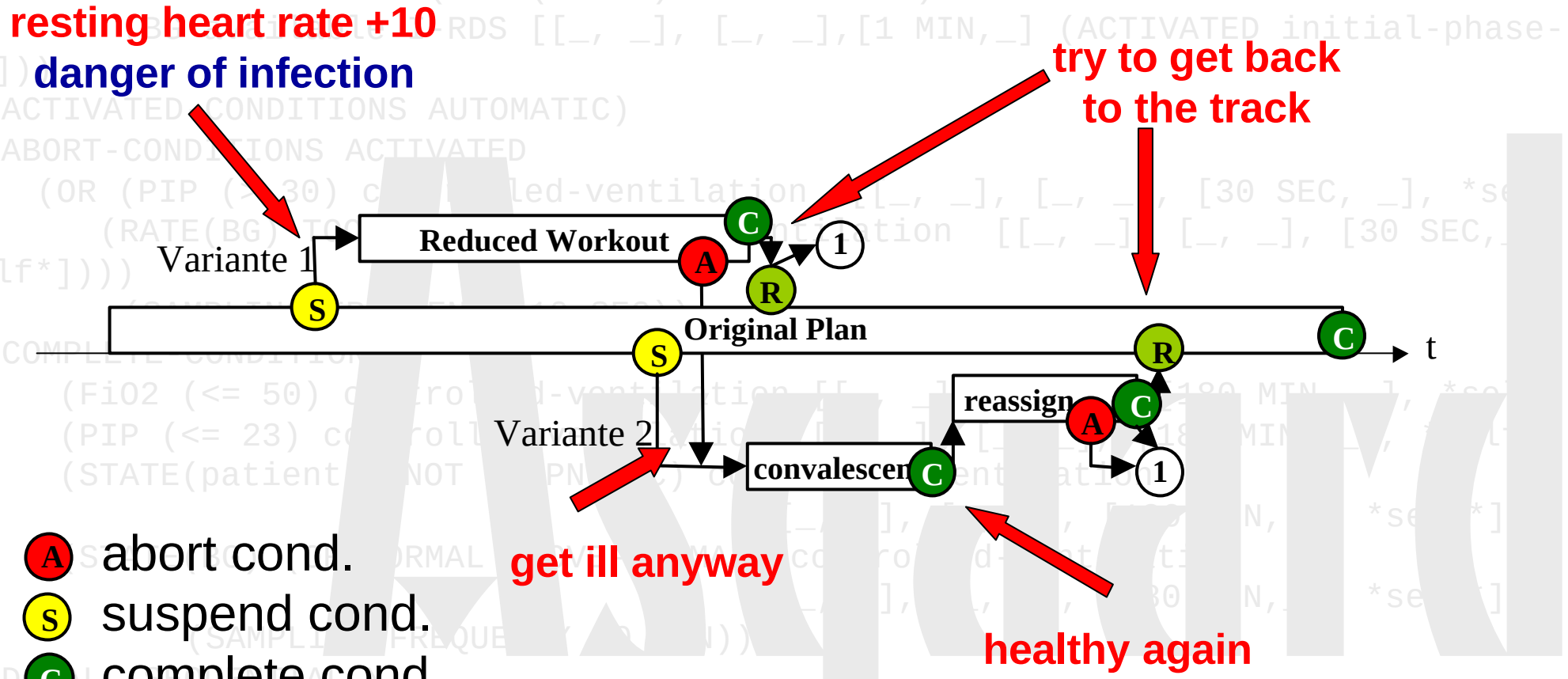
Plan processing

can be modelled directly in Asbru

Asbru: Plan States



Condition Example



- A abort cond.
- S suspend cond.
- C complete cond.
- R reactivate cond.

<xml>:

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<execution-condition label="POSSIBLE_ILLNESS" type="suspend-condition">
  <constraint-combination type="and">
    <parameter-proposition parameter="RESTING_HEARTRATE">
      <value-description type="equal">
        <qualitative-constant value="HIGH" />
      </value-description>
      <context>
        <context-ref name="HEALTHY" />
      </context>
    </parameter-proposition>
    <parameter-proposition parameter="SLEEP_QUALITY">
      <value-description type="equal">
        <qualitative-constant value="GOOD" />
      </value-description>
      <context>
        <context-ref name="HEALTHY" />
      </context>
      <time-annotation>
        <time-range>
          <mindu defined="yes">
            <numerical-constant value="3" unit="days" />
          </mindu>
        </time-range>
        <self />
      </time-annotation>
    </parameter-proposition>
  </constraint-combination>
</execution-condition>
```

Discussion: State of the Thesis

- **Did only raw research on related work**
  Missing detailed analysis for this specific problem domain for task decomposition
+ **Improved semantics and power of Asbru**
  Investigating new aspects by modelling knowledge
+ **Specify thesis and implementation more precicely**
  As the Asgaard-framework is still evolving in functionality and power is becoming more clearer

Conclusion

- We are on the way to give useful support to a real-world, not „toy-problem“ domain
- We are testing the capabilities of Asbru modelling knowledge descriptively
- Implementing a reusable prototype for different application domains
- Studying the social impacts of planning support to not technically driven task

http://www.ifs.tuwien.ac.at/asgaard