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Part IV

ENGINEERING ADAPTIVE PRIVACY

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Adaptive Systems

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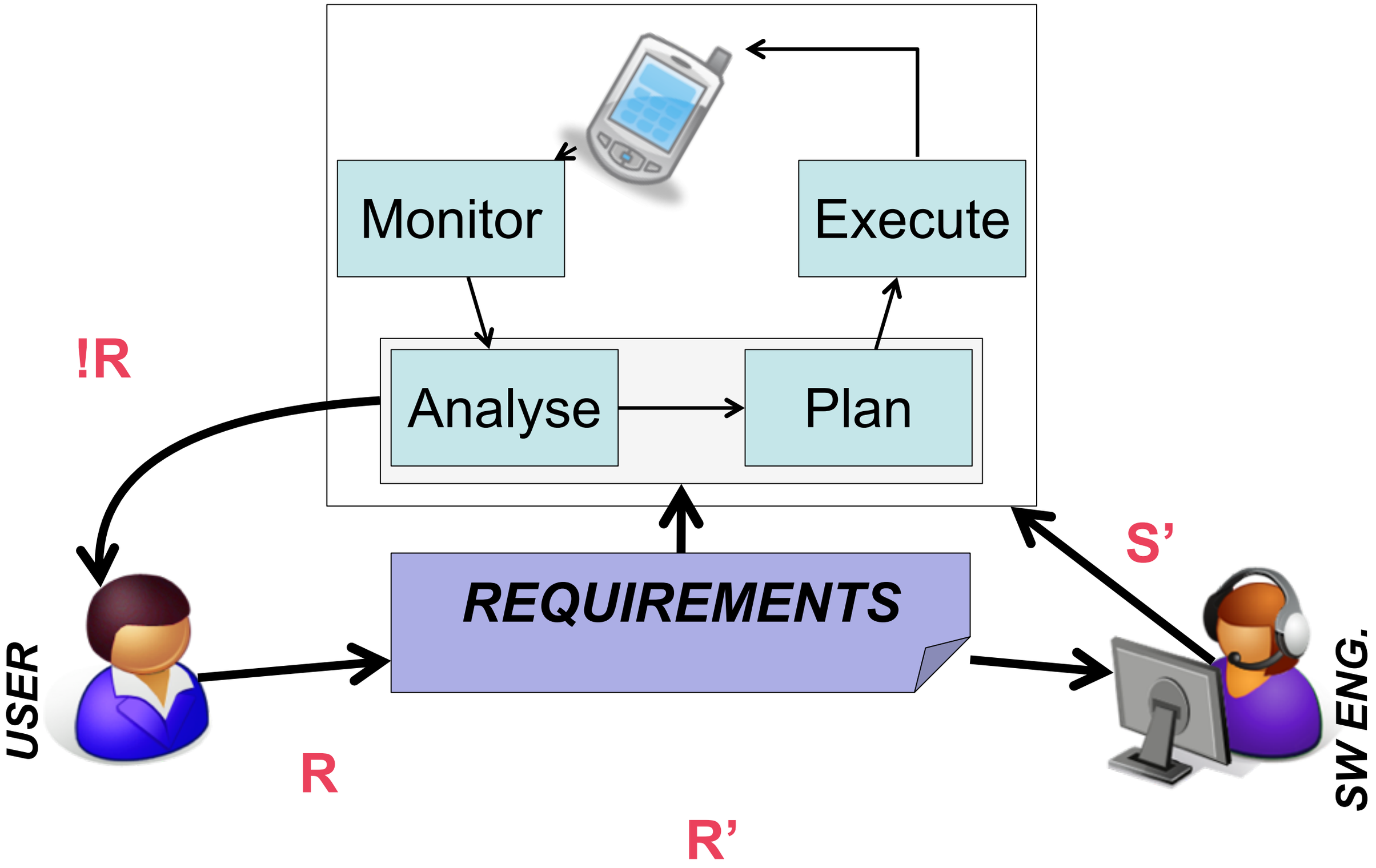


Privacy Theory

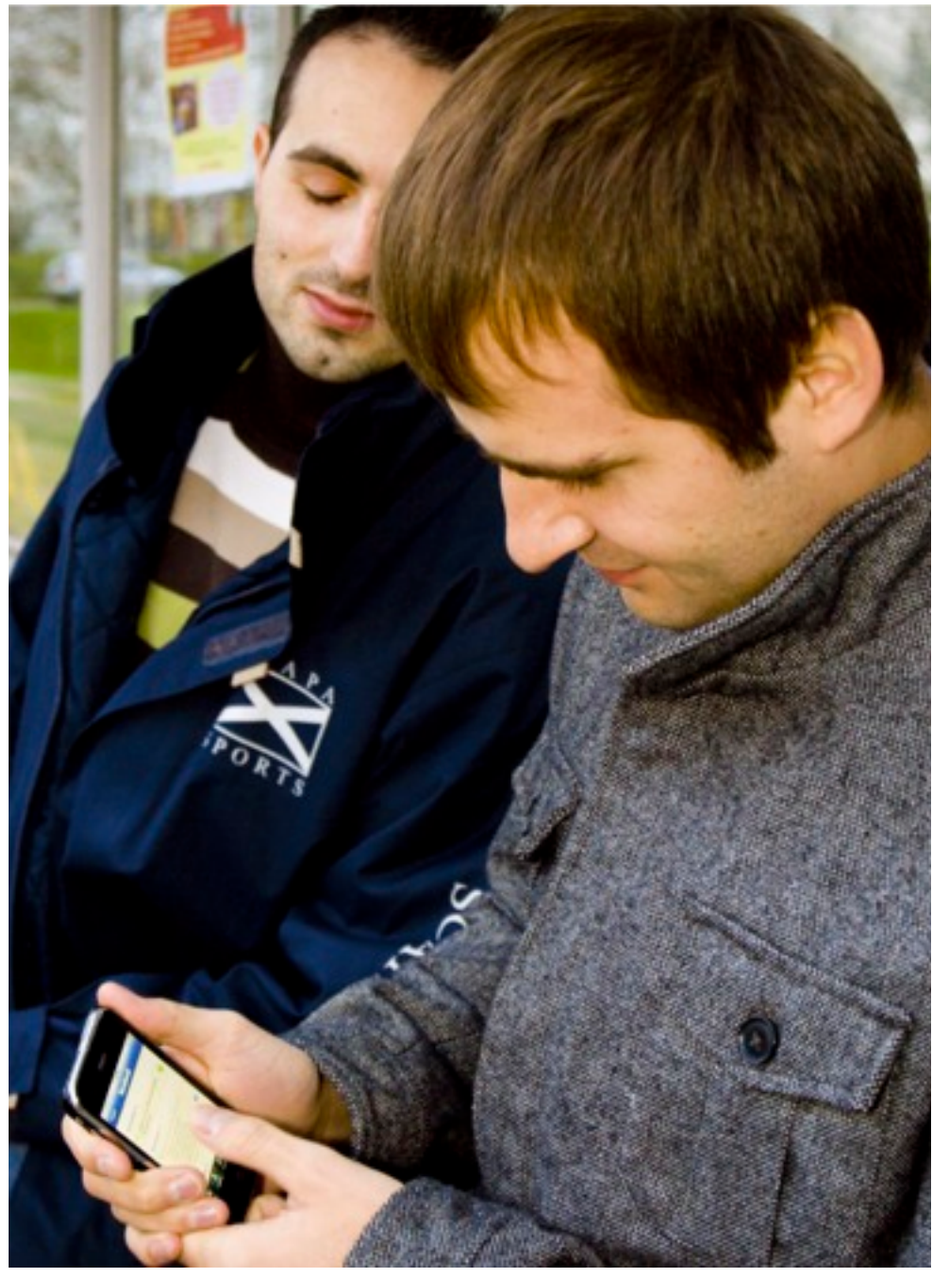
- ***Bi-directionality*** *(Altmann)*
  - ***Output:*** *sharing information with others*
  - ***Input:*** *sensing activity of others, previous experience, etc.*

Privacy Requirements

- Gathering mobile privacy requirements is difficult because …

  – privacy is sensitive and depends on socio-cultural context.

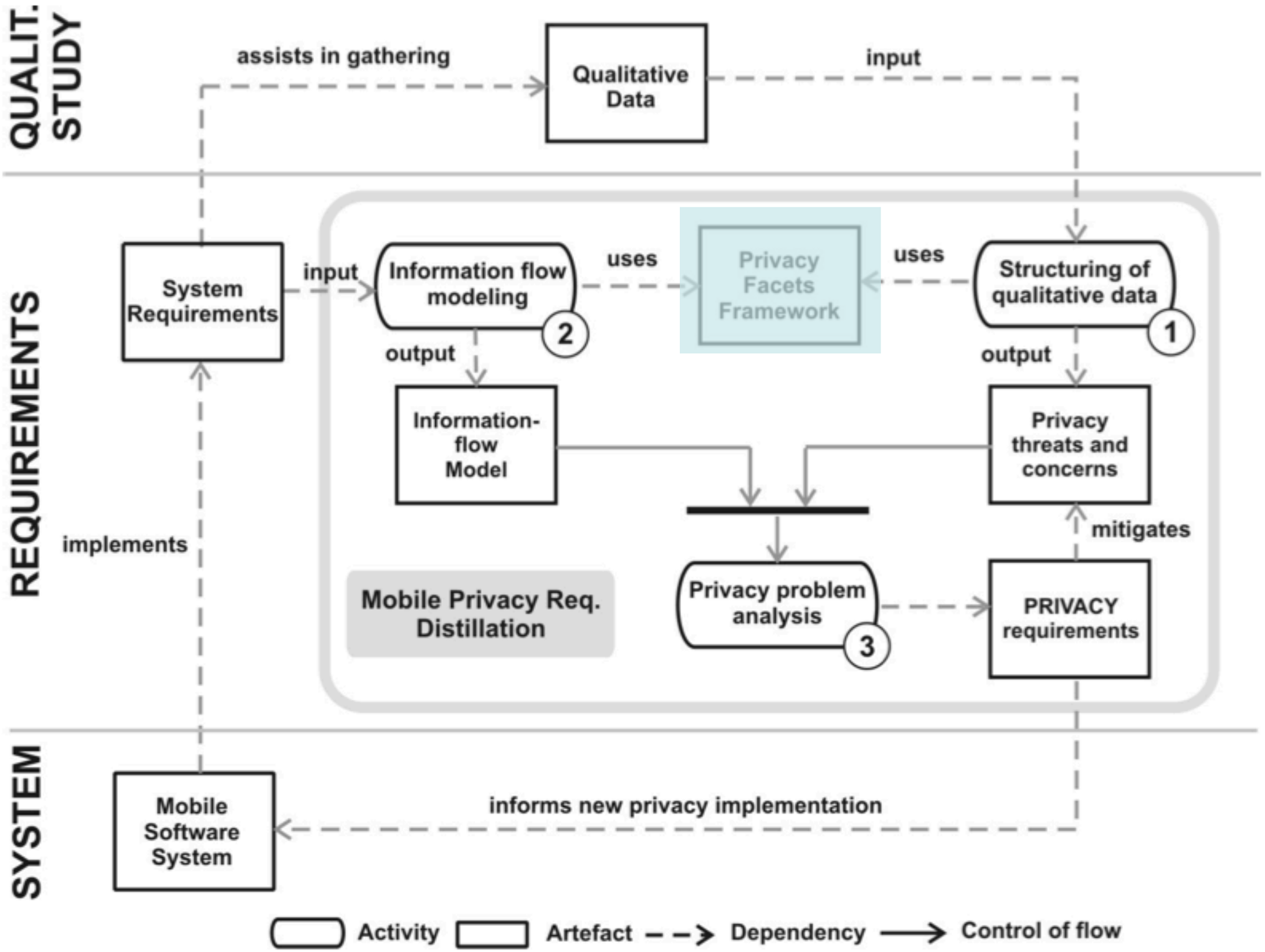
  – mobility introduces contextual shifts and logistical obstacles.



Privacy Requirements

- It is also difficult …
  - –for people to articulate subtle concerns and preferences.
  - –for analysts to observe emergent, contextualised behaviour.

Distillation Process



Privacy Facets Framework

- Used to structure qualitative data and produce information flow models:

Qualitative Data:

anything I feel is private to myself I keep it to myself. I have a lot of good friends so if I want to share it I am happy to share it with all my friends. If there was something private, that is more close to me, like a girl that I liked and I wanted to share it with a friend I would do that in person rather than on Facebook

Behaviour Patterns
Emotional Indicators

Privacy Facet Questions:
Threats & Determinants

- Information
- Actor
- Place
- Information Flow

Information
Problem Patterns

Privacy Facets Framework

- Used to structure qualitative data and produce information flow models:

Behaviour Patterns Emotional Indicators	Privacy Facet Questions: Threats & Determinants	Information Problem Patterns

Qualitative Data:

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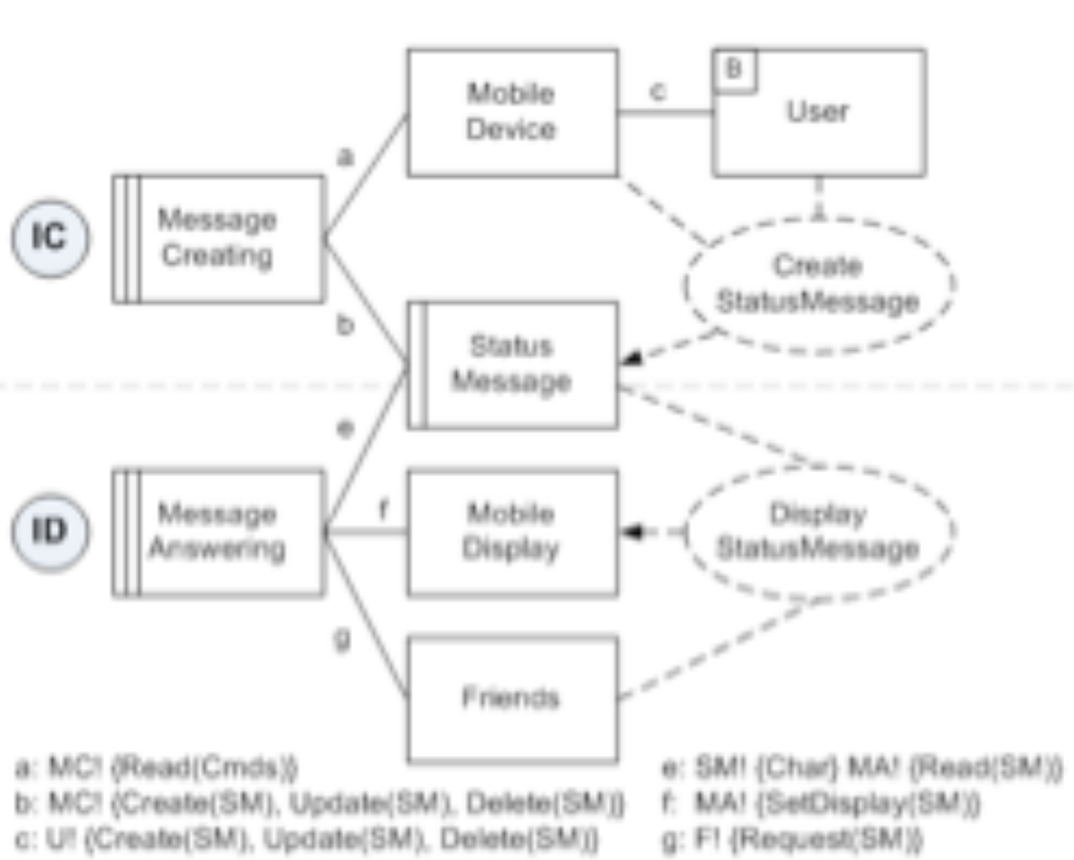

Distillation Process

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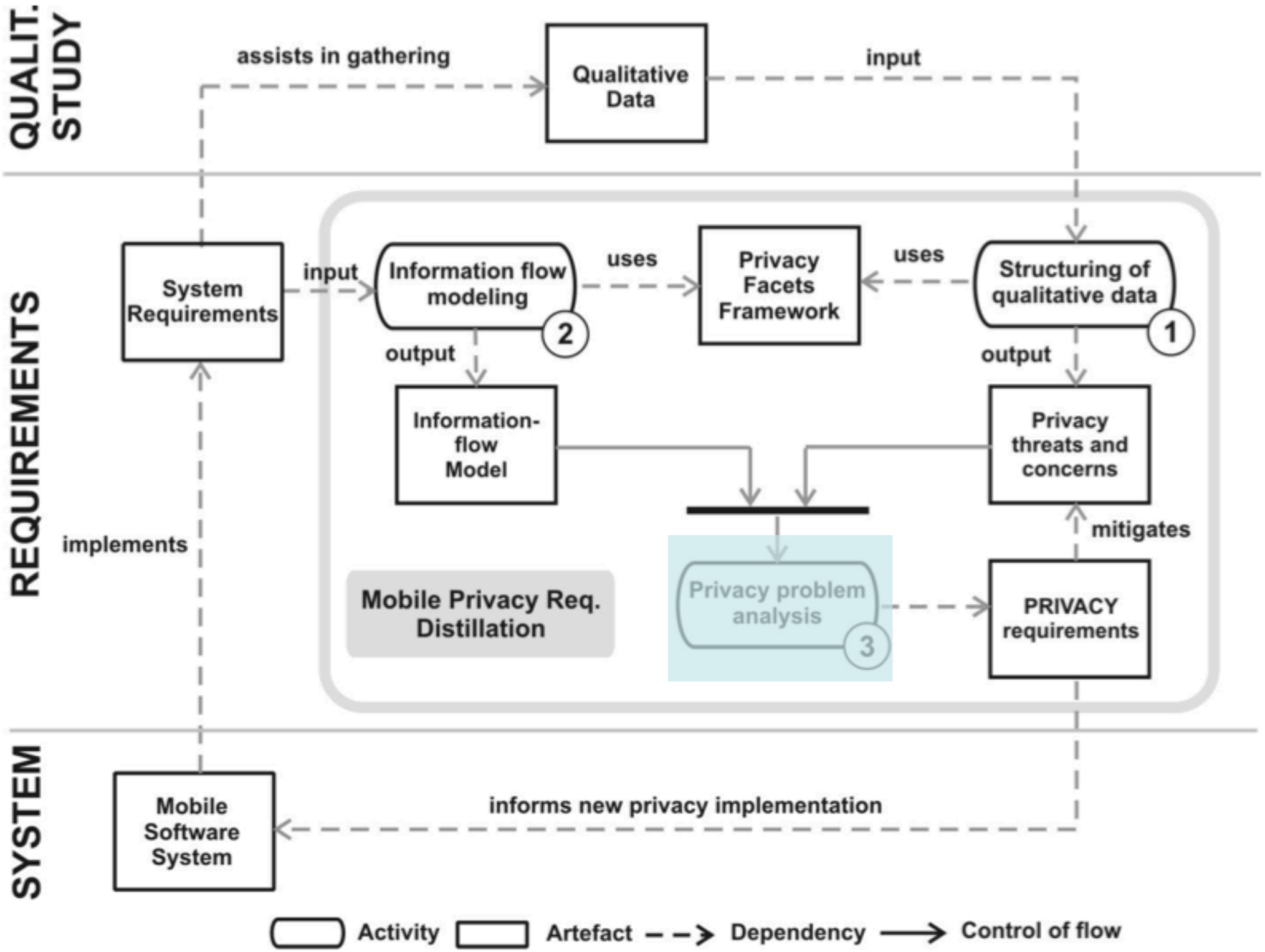

Privacy Argument


```
argument: MFb_CloseFriends_Norm
PN1 "<<User>> can only share Status Messages with close friends" {
  supported by
    F1 "<<User>> has close friends"
    F2 "<<User>> creates sensitive msg"
    F32 "<<User>> wants sensitive msg to be seen by close friends only"
    F4 "Close friends want to see sensitive message"
  warranted by
    R1 "<<User>> inputs sensitive message into status message field"
    R2 "When a close-friend taps the Fb icon on his mobile device, the
        application opens with sensitive status message displayed”}

argument:  MFb_Exposure_Concern
PC2 “Status messages are considered as non-sensitive by the system” rebuts
PN1 {
  supported by
    F6 “User is unable to classify a status message as being sensitivity
        or non-sensitive”
    F7 “The system is unable to differentiate between sensitive and non-
        sensitive status message”}
```

Engineering Adaptive Privacy

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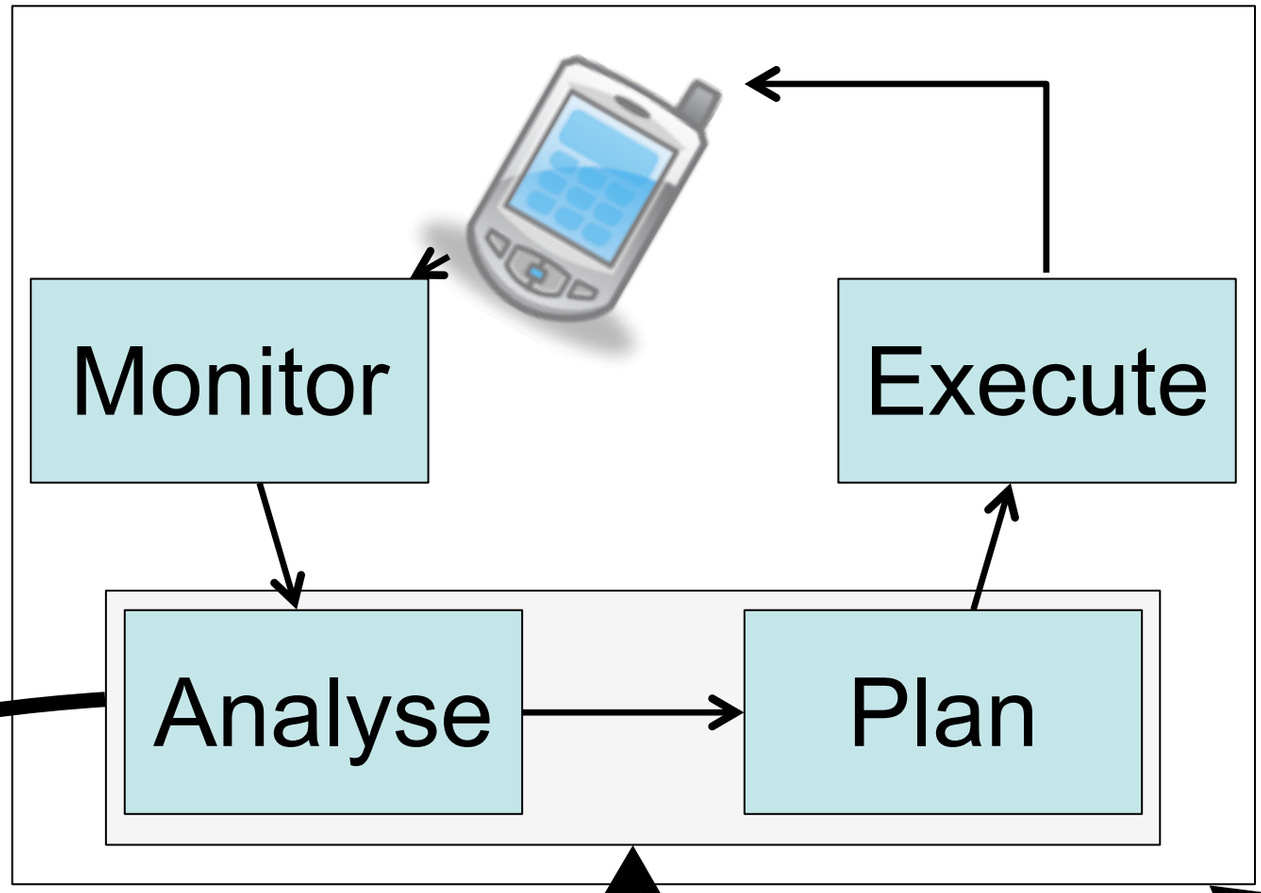

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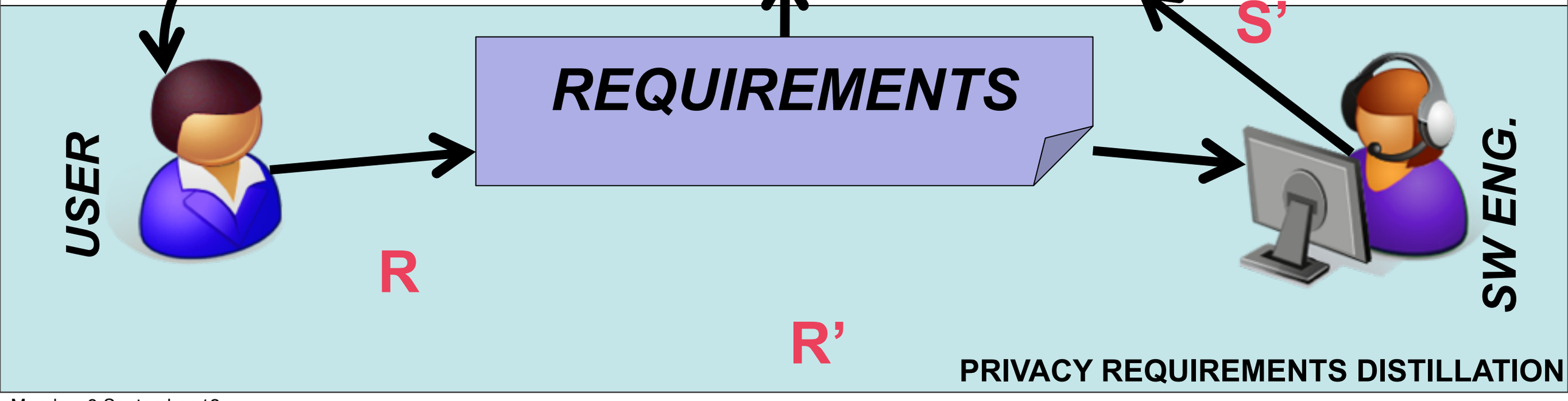

Summary

- Adaptive software systems must be capable of including end-users and software engineers in adaptation loop:
  - To handle end-user requirements that are highly individual, contextual and emergent, e.g., privacy
  - To allow evolution of the software when automated adaptation is not able to meet users' requirements.
- ***Privacy Requirements Distillation*** process offers systematic approach to analysing qualitative user experience data to extract requirements.