

# ProMoCF –

A lightweight process model and development methodology for component frameworks

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# Motivation

- **Component frameworks today**

- Quality is dependent on the experience and skills of the framework developers
- Proper process model is still missing (unlike object-oriented frameworks)

- **Requirements and Constraints**

- Systematic development of component frameworks
- Methodology for identifying and specifying the framework's components
- Agile models and heavyweight models are not applicable

- **Our approach: ProMoCF**

- A lightweight process model and methodology for component frameworks
- Modification of Pree's hot-spot-driven approach
- Successfully applied to the development of our component framework MM4U

- **Definition of a specific object model**

## Main cycle

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- **Identification of hot-spots & writing hot-spot-cards**
- **Grouping of hot-spot-cards into logical groups**
  - Compare the flexibility requirements described on each hot-spot-card
  - Cards with flexibility requirements for a common task form a logical group
  - For each logical group: write a *group-hot-spot-card*
- **Identification of components**
  - Each group-hotspot-card forms a distinct framework component
  - The group-hot-spot-cards define the flexibility requirements of the framework components
  - Case Study MM4U: Each group-hot-spot-card identifies one component



Definition of a

Identification

Grouping c

- Comparison
- Cards
- For e

Identifi

- Each
- Th
- Case s

Handwritten notes on sticky notes:

- GRUPPE (A-P) ZUGRIFF AUF BEITREPROF GRUPPEN
- GRUPPE (A-M) ZUGRIFF AUF MEDIEN + METADATEN
- GRUPPE (R) UNTERSTÜTZUNG DER KOMPOSITION
- GRUPPE (T) TRANSFORMATION DER INTERNEN MODI
- GRUPPE (P) UNTERSCHIEDLICHE FEHLERQUALITÄTEN
- GRUPPE (P) DARSTELLUNG DES PRÄSENTATIONSERGEBNISSES MIT GEEIGNETEM MULTIMEDIA-PLAYER
- Hotspots: → für jedes Ua → komplexe Operationen auf der hierunter arbeitet... werden (wie in FW)
- Hot-Spots:
  - play()
  - stop()
  - pause()
  - ~~reset()~~
  - play (TargetMedium content)
  - Eplay (String content)
- Factory- Spots:
  - get Factory (int format)
  - get Factory (String format)
  - get Factory (String content)

main cycle

not-card  
logical group

onent  
of the  
component

## ProMoCF (2/2)

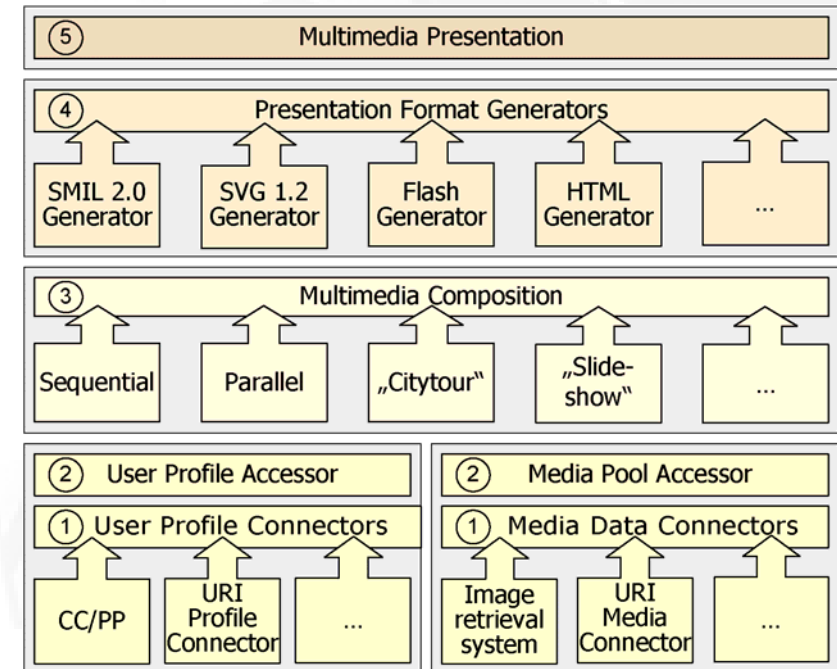
**For each component**

- **Framework (re)design and implementation**
  - Further hot-spots of the component's group-hot-spot-cards are identified
  - Specification of the component's interfaces (by the group-hot-spot-cards)
    - This includes "usage contracts" as well as "realization contracts"
  - Implement at least one concrete instance of the framework component
  - Test of the component instance in a test environment
  
- **Usage & test of the framework**
  - Develop concrete applications that use the component framework
  - Composition of component instances that meet the application's requirements
  - Instances can be, e.g., newly developed, but also modified existing ones or reused in different configurations
  
- **Repeat with main cycle, until hot-spots are OK!**

# Case Study MM4U

## ■ MM4U: component framework for personalized multimedia applications

- Identified five group hot-spot-cards and components
- Each addresses a particular task for creating personalized multimedia content
- Implemented flexible component instances (object-oriented frameworks)
- Developing concrete applications with MM4U primarily means composing and reusing the already implemented component instances



## ■ By identifying the group-hot-spot-cards, we could be sure that

- All necessary framework components have been identified
- The identified components are the right ones

**Further evaluation studies are needed to foster our approach!**