



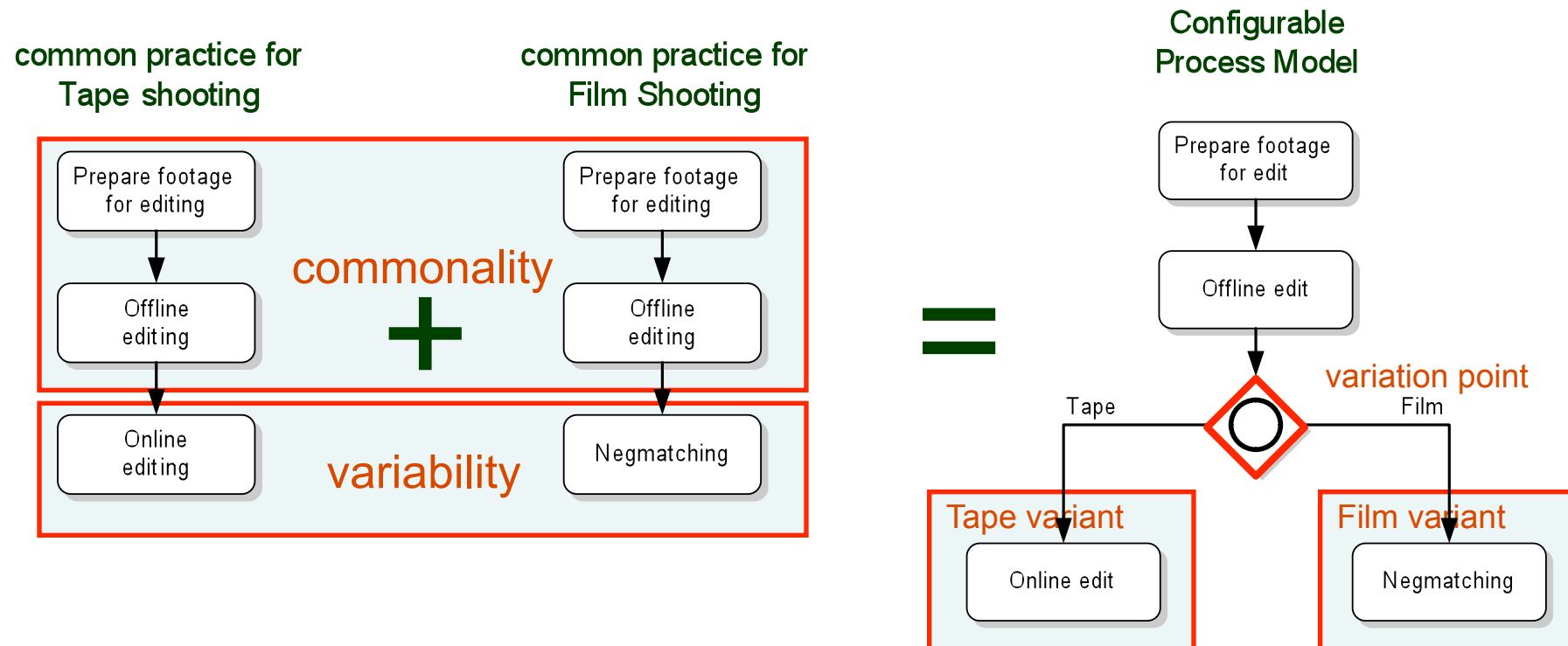
Configurable Process Modeling

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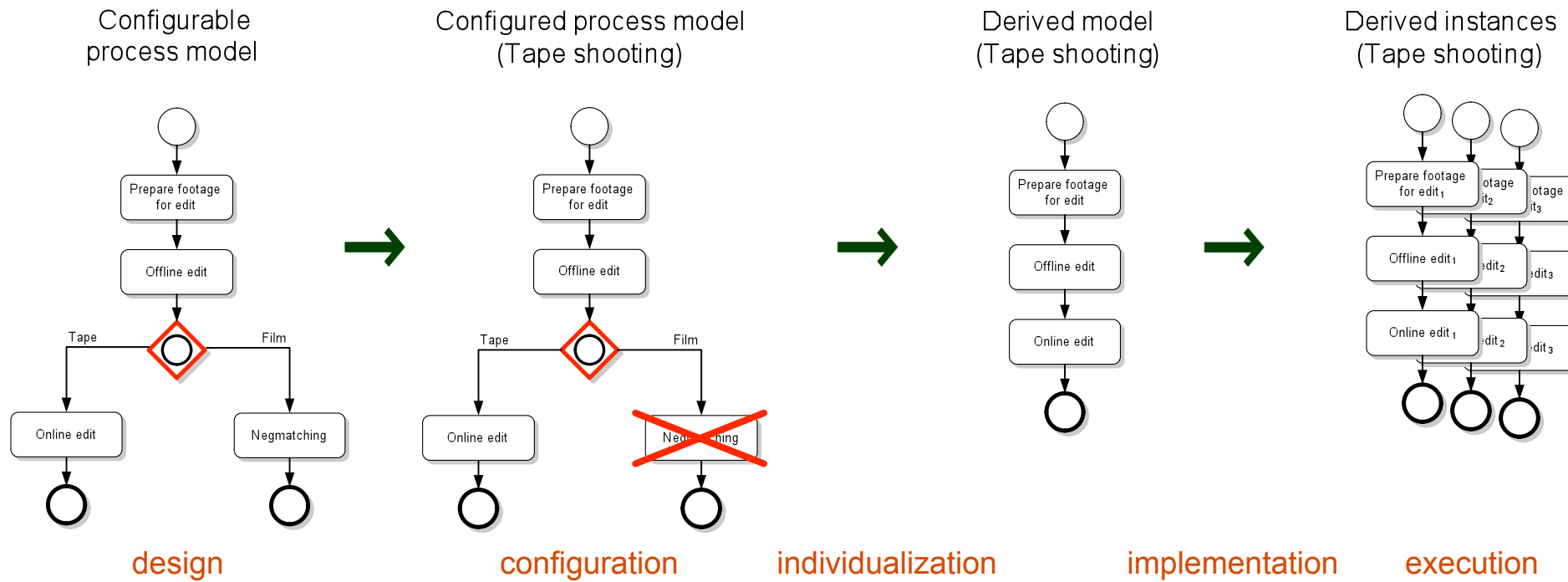
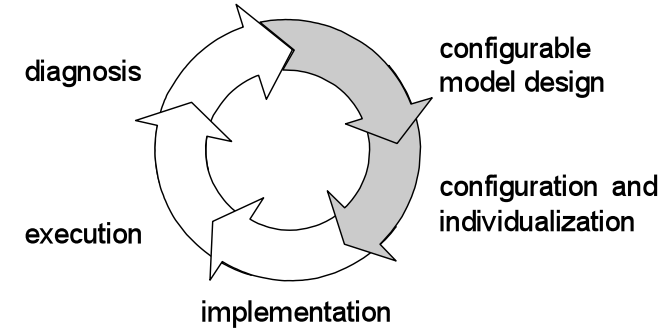
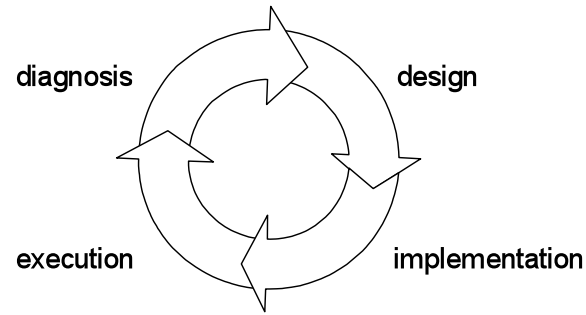
Configurable process model



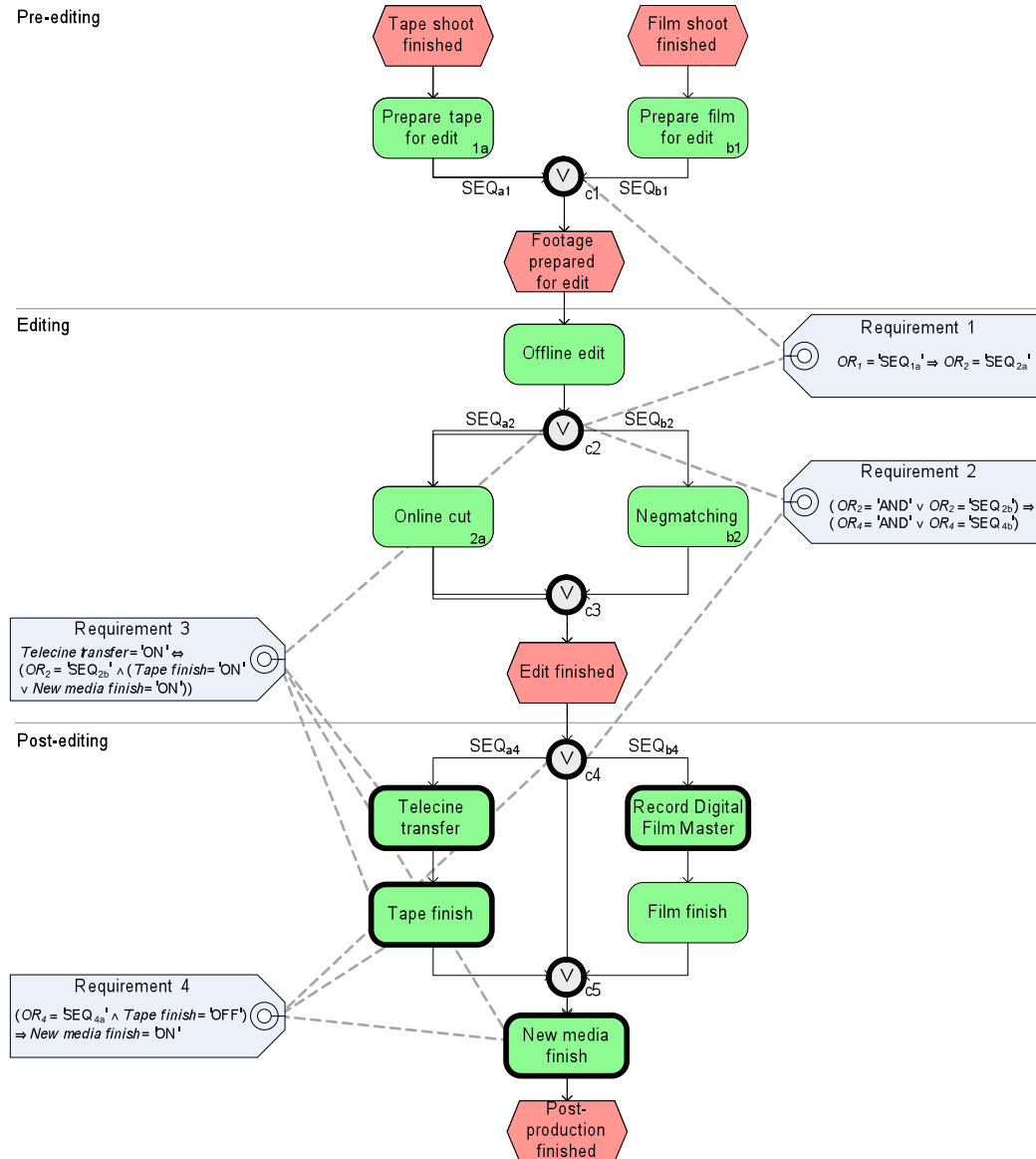
Integrated representation of multiple variants of a same process in a given domain, which can be configured for a specific setting, leading to an **individualized** process model.



Configurable process models in the process lifecycle



C-EPCs: a notation for configurable process models



- Variation points are highlighted in the model.

- Requirements reduce the configuration space.



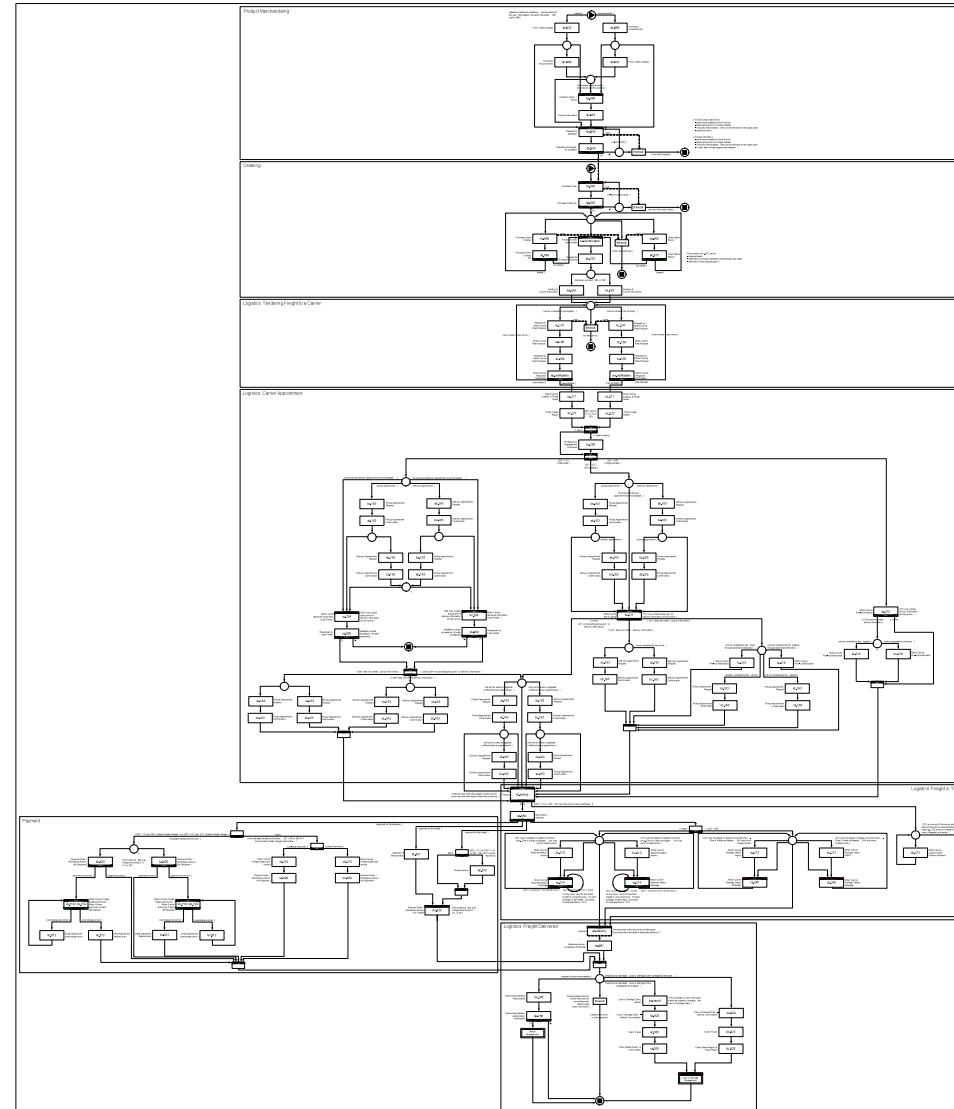
- **9** variation points
- over **1,200** possible configurations

A more complex example...



VICS Reference Model

- **50** variation points,
- **186,000** possible configurations.



Lack of decision support



- Configuring a process model can be difficult and time-consuming, due to:
 - size of the variability space,
 - complexity of the domain.
- Domain experts usually have little or no knowledge about modeling notations (e.g. in the screen business).

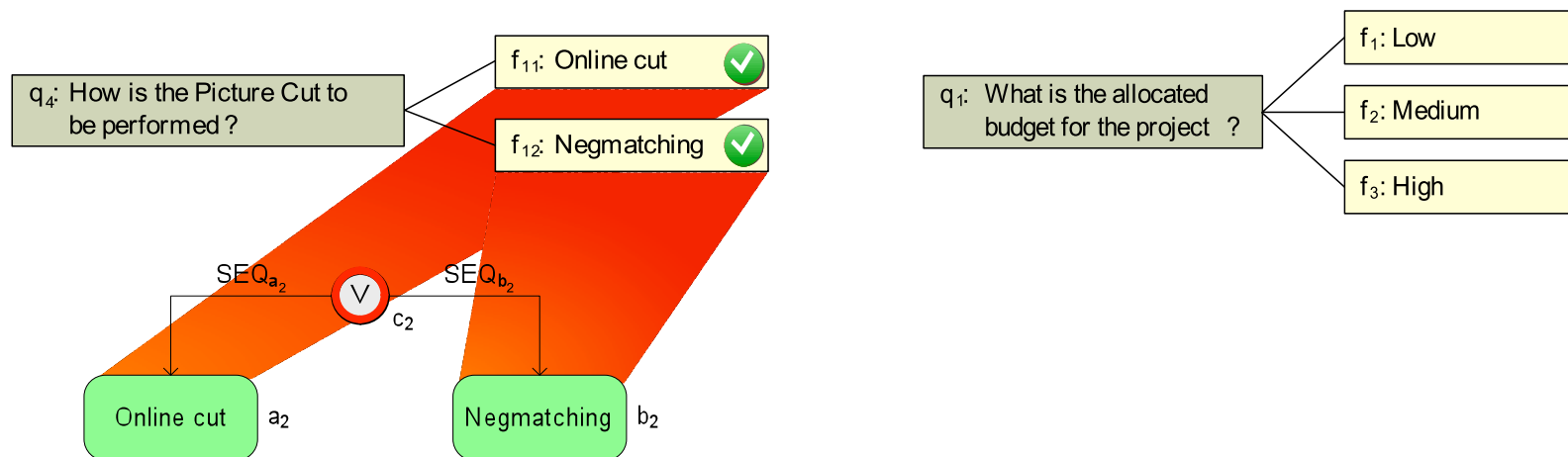


- Need to facilitate the configuration of process models by domain experts, without requiring process modeling knowledge.

Questionnaire-based approach



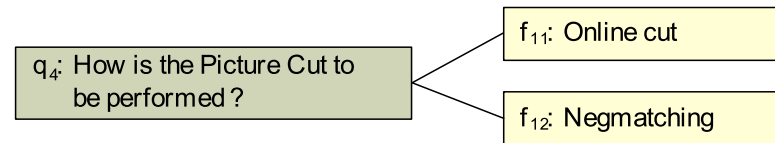
- Configuration can be simplified if carried out by answering a set of questions → *no need to be aware of modeling notations.*
- The basic concepts of the approach are questions and domain facts:
 - a **question** is composed of a set of domain facts;
 - a **domain fact** encodes a business choice and can be set to “true” or “false”.
- Variation points in the process model are mapped to boolean expressions over domain facts.
- Questions may affect one or multiple variation points:



Domain constraints

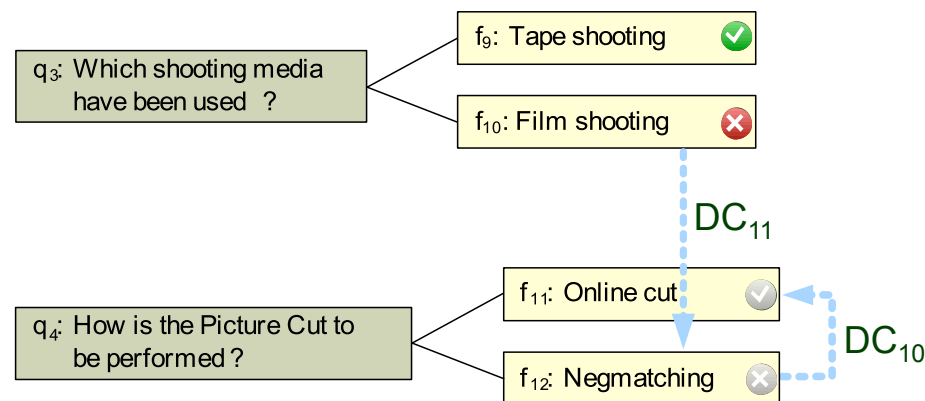


- The configuration space of the domain is restricted by a set of propositional logic **domain constraints** over the domain facts.



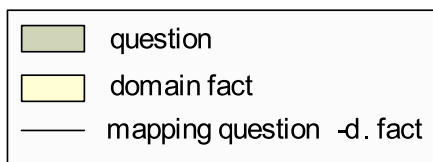
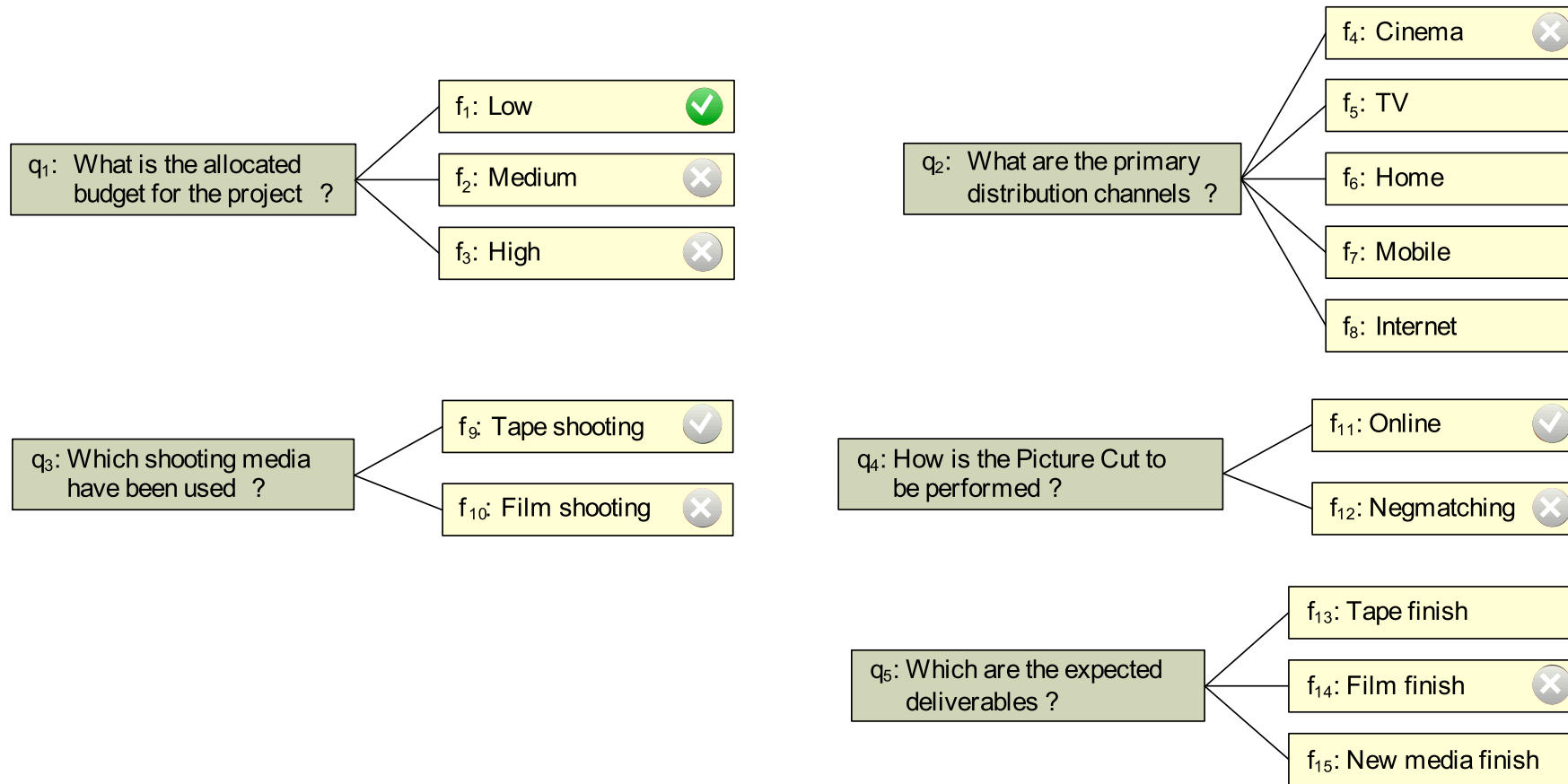
$$DC_{10}: f_{11} \vee f_{12}$$

- By means of domain constraints, answers to questions may be determined by previous answers.

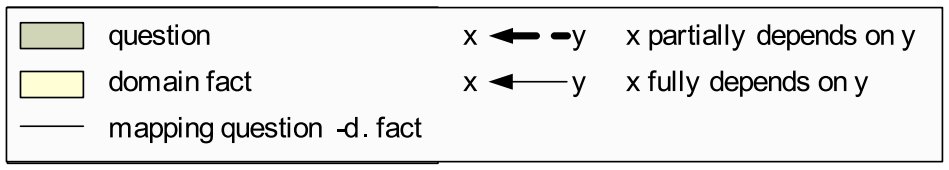
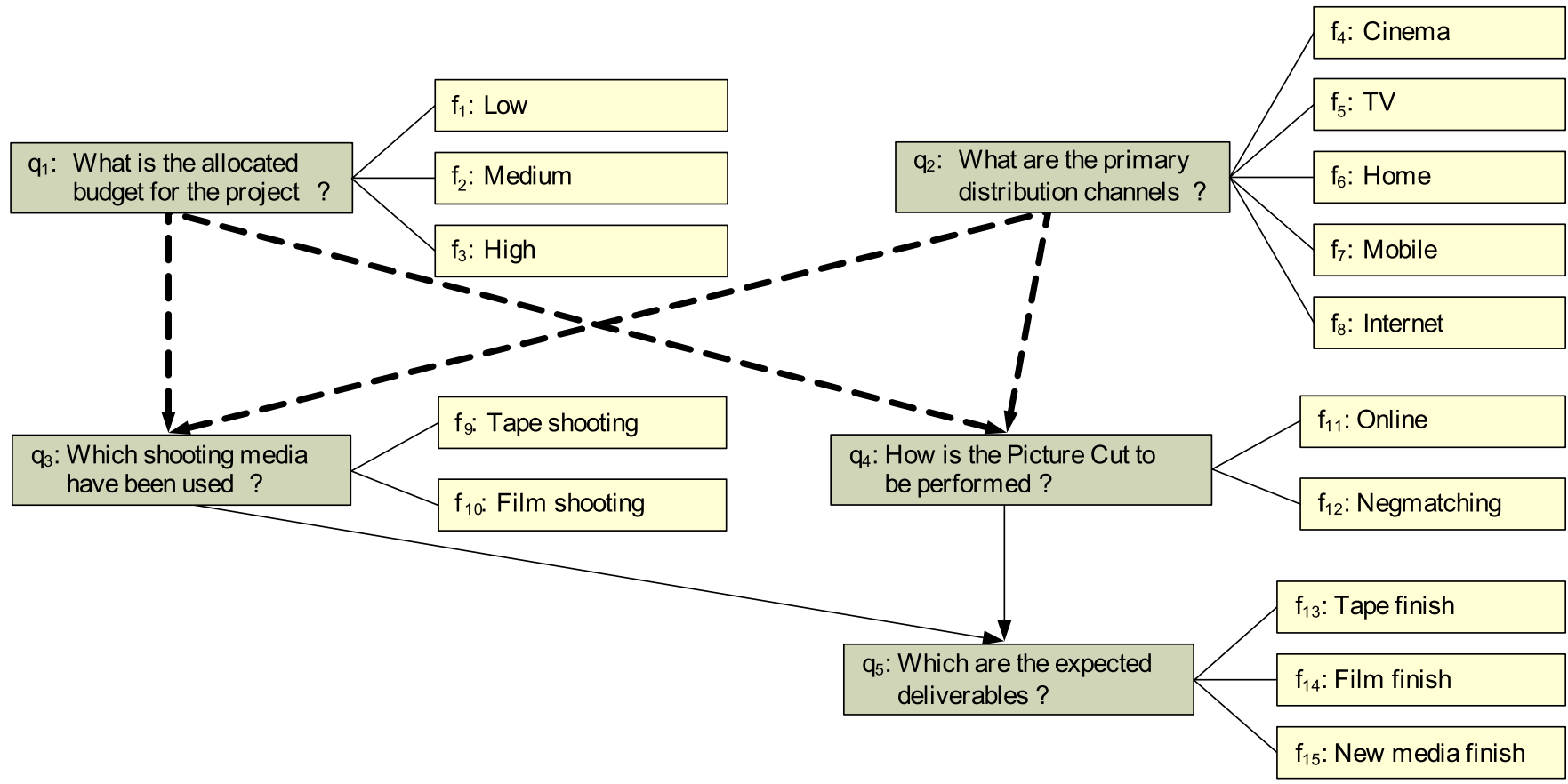


$$DC_{11}: \neg f_{10} \Rightarrow \neg f_{12}$$

Questionnaire model



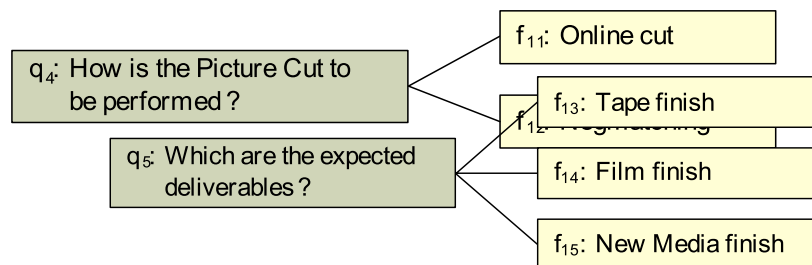
Order dependencies



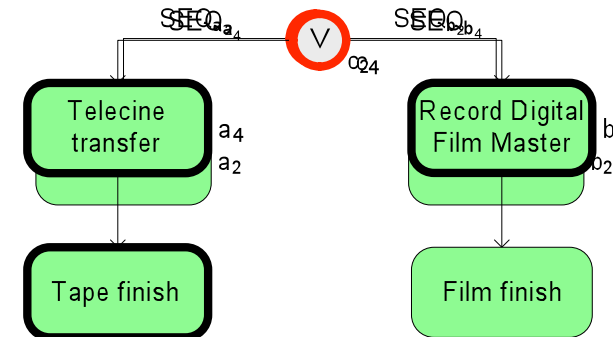
Mapping process models to questionnaire models



Questionnaire Model



Process Model



Mapping

$$MC_6: p_{SEQ_{a_2}}^{c_2} \Leftrightarrow \neg f_{12}$$

$$MC_7: p_{SEQ_{b_2}}^{c_2} \Leftrightarrow \neg f_{11}$$

$$MC_8: p_{AND}^{c_2} \Leftrightarrow f_{11} \wedge f_{12}$$

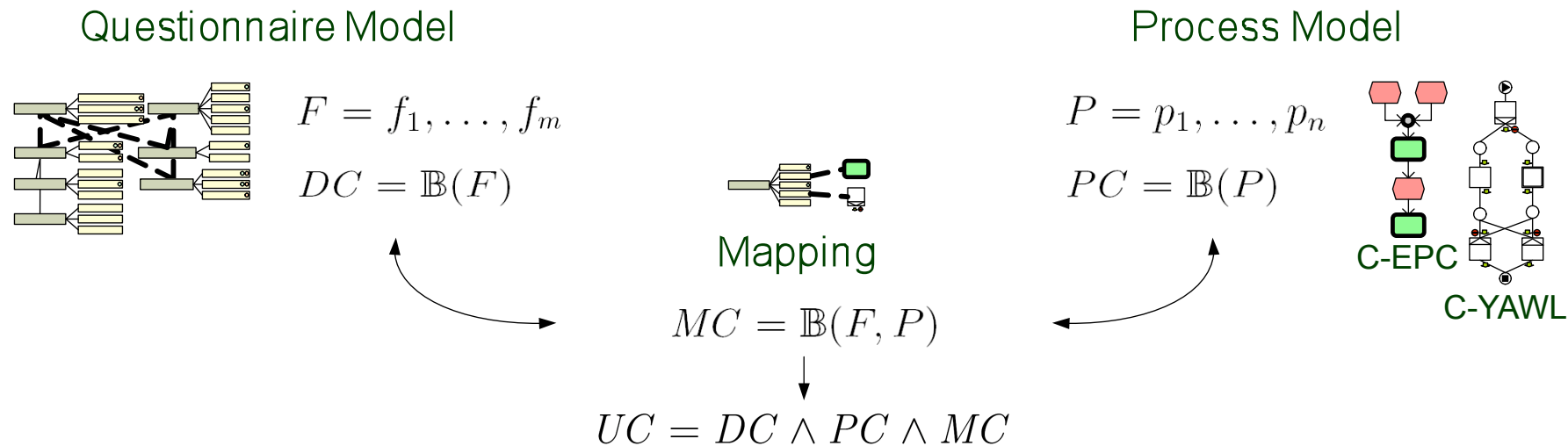
$$MC_9: p_{OR}^{c_2} \Leftrightarrow \text{false}$$

$$MC_{10}: p_{XOR}^{c_2} \Leftrightarrow \text{false}$$

Mapping process models to questionnaire models

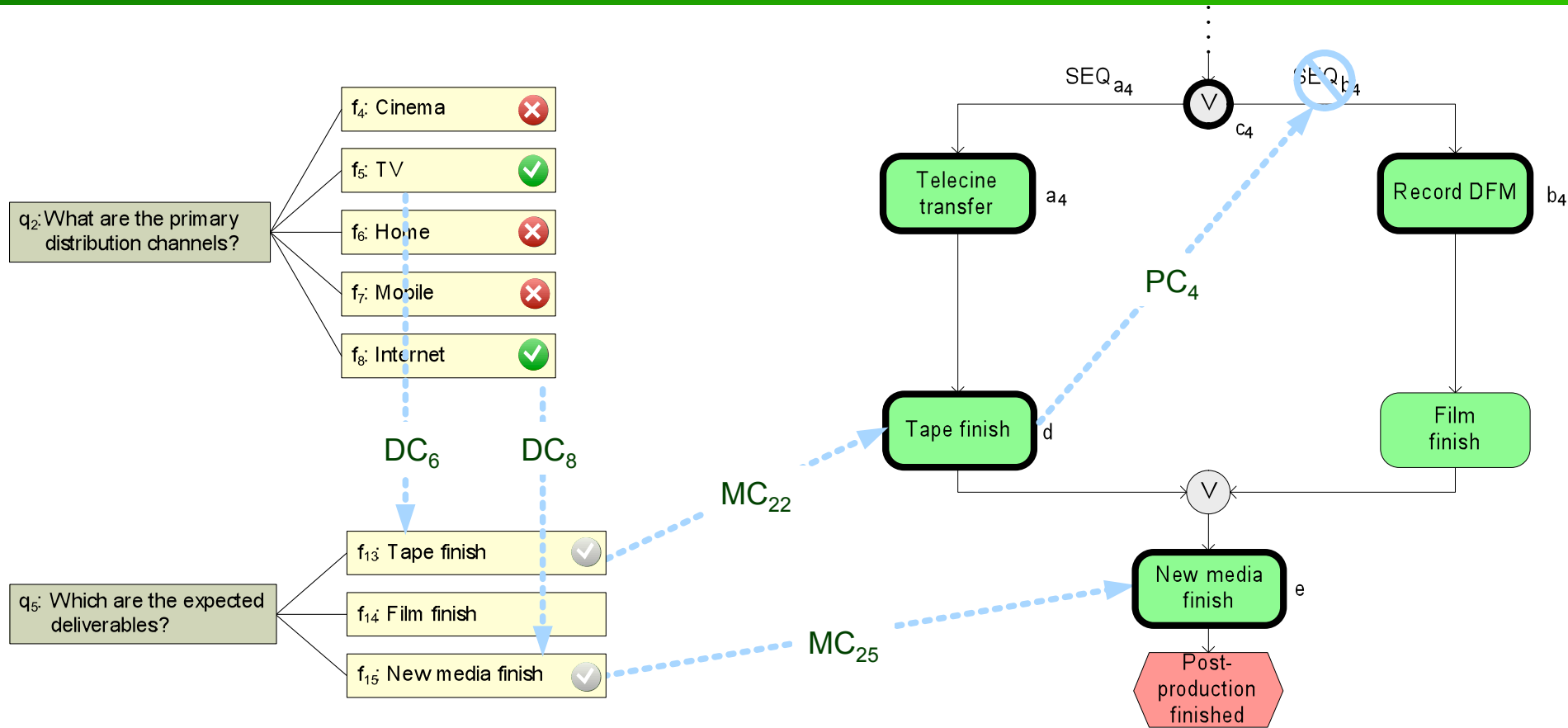


A *mapping* links process facts to domain facts:



The mapping ensures domain compliance and process model correctness.

Constraints in action



Domain constraints

$$DC_6: f_5 \Rightarrow f_{13}$$

$$DC_8: f_8 \Rightarrow f_{15}$$

Mapping

$$MC_{22}: p_{ON}^d \Leftrightarrow f_{13}$$

$$MC_{25}: p_{ON}^e \Leftrightarrow f_{15}$$

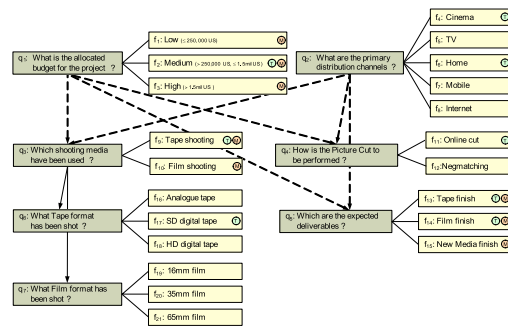
Process constraints

$$PC_4: p_{ON}^d \Rightarrow \neg p_{SEQ_{b_4}}^c$$

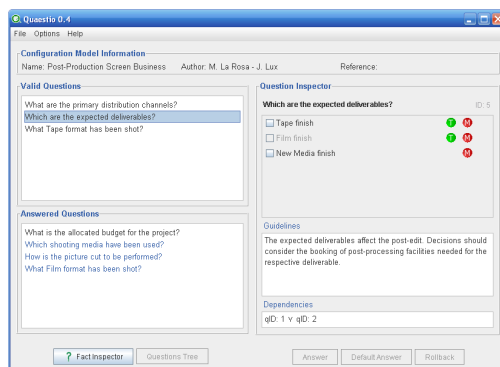
Application of the approach



Questionnaire model



input to



Interactive Questionnaire

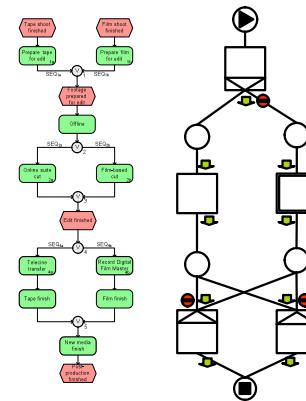
Mapping

Configurable process	Configuration $P'(cm)$	Boolean function $map(Q, P'(cm))$
OB_1	AND	$f_1 \wedge f_2$
	SRAND	$f_1 \vee f_2$
	SRQ ₁₂	$\neg f_1 \wedge f_2$
	OR	false
OB_2	XOR	false
	SRAND	$f_1 \wedge f_2$
	SRQ ₁₂	$f_1 \wedge \neg f_2$
	OR	false
OB_3	XOR	false
	same as OB_1	same as OB_1
	AND	$(f_1 \wedge f_2) \vee (f_1 \wedge \neg f_2) \vee (\neg f_1 \wedge f_2)$
	SRAND	$(f_1 \wedge f_2) \vee (\neg f_1 \wedge \neg f_2) \vee (f_1 \wedge \neg f_2)$
OB_4	SRQ ₁₂	$(f_1 \wedge f_2) \vee (\neg f_1 \wedge \neg f_2) \vee (f_1 \wedge \neg f_2)$
	SRQ ₁₂	$(f_1 \wedge f_2) \vee (\neg f_1 \wedge \neg f_2) \vee (\neg f_1 \wedge f_2)$
	OR	false
	XOR	false
OB_5	same as OB_1	same as OB_1
	AND	$(f_1 \wedge f_2) \vee (f_1 \wedge \neg f_2) \vee (\neg f_1 \wedge f_2)$
	SRAND	$(f_1 \wedge f_2) \vee (\neg f_1 \wedge \neg f_2) \vee (f_1 \wedge \neg f_2)$
	SRQ ₁₂	$(f_1 \wedge f_2) \vee (\neg f_1 \wedge \neg f_2) \vee (\neg f_1 \wedge f_2)$
Television transfer	ON	$(f_1 \vee f_2) \wedge (f_1 \wedge f_2)$
	OFF	$(\neg f_1 \wedge \neg f_2) \vee (f_1 \wedge f_2)$
	OR	false
	OFF	false
Record Digital Film Master	ON	$f_1 \wedge f_2$
	OFF	$\neg(f_1 \wedge f_2)$
	OR	false
	OFF	false
Tape finish	ON	f_1
	OFF	$\neg f_1$
	OR	false
	OFF	false
New media finish	ON	f_1
	OFF	$\neg f_1$
	OR	false
	OFF	false

answers

+

=



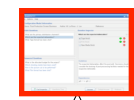
Individualized Model

Configurable Process Model

The Synergia toolset



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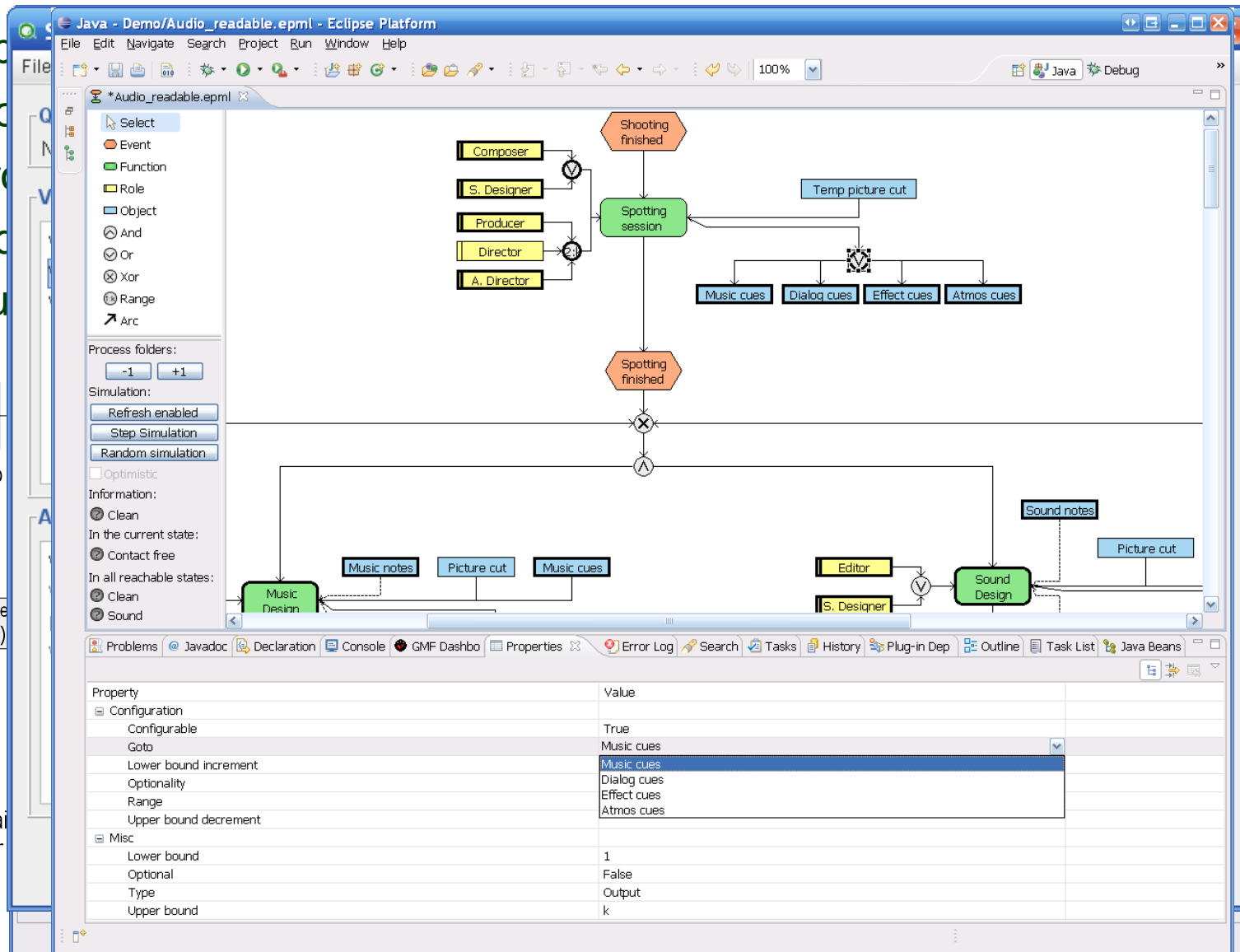


Questionnaire

Questionnaire Model (.qml)



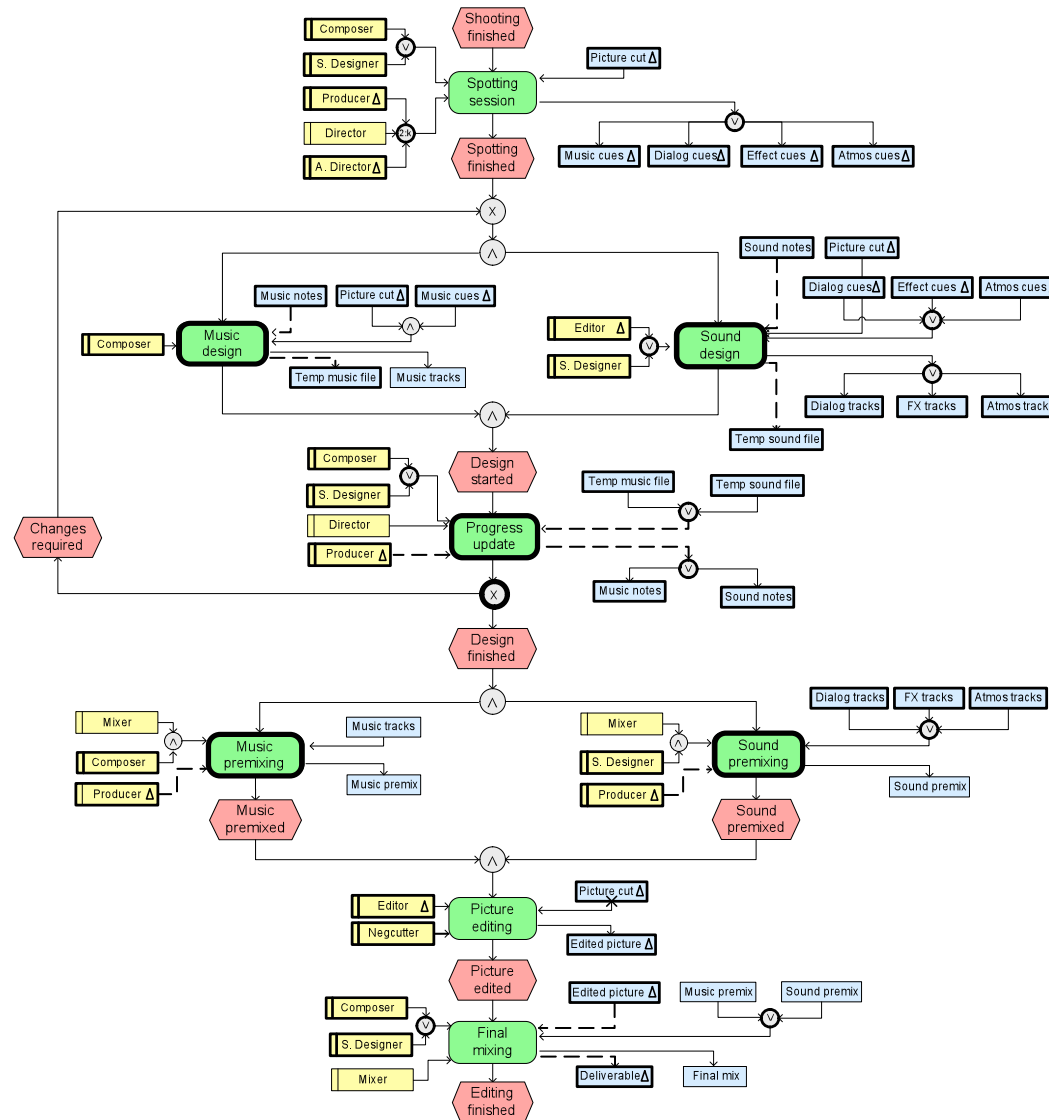
Questionnaire Designer



AWL Engine spec. (.yaw)

EPC (.epml)

A configurable 'reference' model for Post-production



- Construction and validation of the model with domain experts from the AFTRS
- **792** process elements
- **183** variation points (23%)
- over **310,000** process configurations
- **3** sub-questionnaires
- **1** introductory questionnaire
- **53** questions
- **162** domain facts

What from now?



i.e., how to achieve large scale adoption?

1. Improve toolset usability

- build upon initial results obtained through experiments conducted at AFTRS and Dutch municipalities

2. Generate content

- translate industry reference models into configurable models
- automate the creation of configurable models via merge techniques

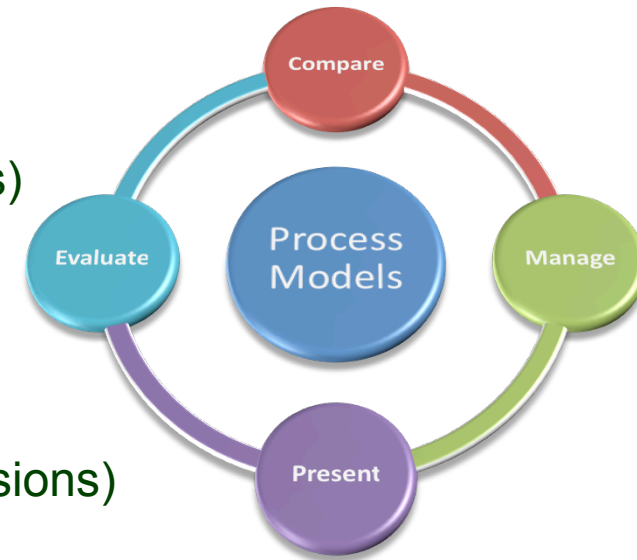
3. Investigate relation with large process collections

- design and develop an advanced process model repository

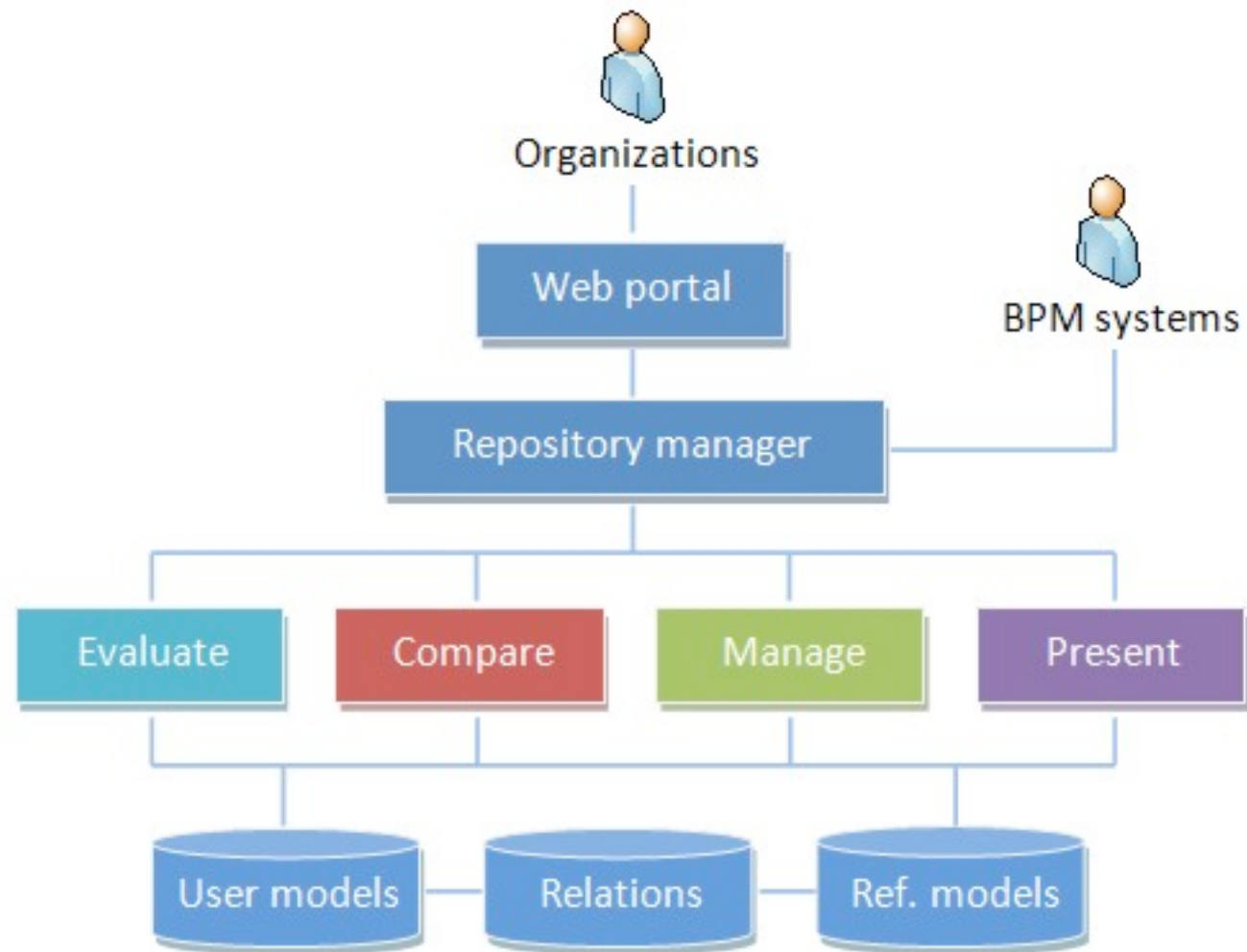
AProMoRe: Advanced Process Model Repository



- **Evaluation**
establish adherence to various quality notions
(e.g. correctness criteria, benchmarking frameworks)
- **Comparison**
search for similarities
(e.g. conformance to reference models, track extensions)
- **Management**
control the creation and evolution of process models
(e.g. via configuration, merging, improvement)
- **Presentation**
improve the understanding of process models
(e.g. contextualization via abstraction and colouring mechanisms)



AProMoRe - Architecture



Canonical format: the power of losing



Common process representation as **directed attributed graph**:

1. *Standardization*: cross-language operations can be performed directly and concatenated
2. *Efficiency*: no language conversions -> faster operations, e.g. Searches and comparisons
3. *Interchangeability*: non structural aspects captured by meta-data -> swap notations or semantics at (almost) no cost
4. *Flexibility*: inheritance mechanism -> different algorithms can work at different abstraction levels

For more information...



...visit www.processconfiguration.com

Process Configuration.com

- Overview
- Tools
- Download
- Documentation
- About
- Links

Overview

This site is dedicated to documenting research and experiences in the area of business process configuration. This study has been conducted by QUT's Business Process Management (BPM) Research Group - Brisbane, Australia, in collaboration with TU/e's BPM Research Group - Eindhoven, The Netherlands, and supported by the Australian Research Council (ARC) Discovery Grant "Next Generation Reference Process Models". Some of the case studies have been elaborated with the Australian Film Television & Radio School (AFTRS), as part of the ARC Centre of Excellence "BPM for the Creative Industries".

This research project has led to the development of a number of tools for process configuration, which can be found in the Tools section. The Documentation section provides an updated list of the academic contributions related to this project, while the Links section lists the contributors to the project, among providing some interesting links to the process configuration topic.

Business process configuration - an introduction

Business process configuration relates to the life cycle of *configurable reference process models*, from the design of languages to capture process variability, to the support of process configuration and execution.

A reference process model is an integrated representation of multiple variants of a business process, which is designed to be individualized to meet specific requirements. As such, reference process models promote systematic reuse of proven or common practices.

Reference process models are therefore general solutions in a given domain (e.g. logistics, human resources management), which need to get aligned to the business rules of a specific setting, i.e. an enterprise or a new project.

The best way to understand the concept of configurable reference process model, is by means of an example. Let's consider two common practices for the Post-production process in a screen business project: i) Tape shooting, and ii) Film shooting. As shown by the following picture, both the practices share some commonalities. In fact, whether we are interested in shooting on Tape or on Film, we always need to Prepare the footage for edit and carry out an Offline edit: these two activities are mandatory. However, shooting on Tape implies to perform an Online edit after the first two activities, while shooting on Film implies to perform a Negmatching. The possibility to choose between Online edit and Negmatching, according to certain conditions (in this case the shooting medium), represent a variability in the Post-production process.

```
graph TD
    subgraph "common practice for Tape Shooting"
        T1[Prepare footage for edit] --> T2[Offline edit]
        T2 --> T3[Online edit]
    end
    subgraph "common practice for Film Shooting"
        F1[Prepare footage for edit] --> F2[Offline edit]
        F2 --> F3[Negmatching]
    end
    T1 --- C1[commonality] --- F1
    T2 --- C2[commonality] --- F2
    T3 --- V1[variability] --- F3
    C1 + C2 = CRM[Combined Reference Model]
    CRM --> CRM1[Prepare footage for edit]
    CRM1 --> CRM2[Offline edit]
    CRM2 --> CRM3[variation point]
    CRM3 --> CRM4[Online edit]
    CRM3 --> CRM5[Negmatching]
```

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