



(Meta-)Modeling of Process-Oriented Information Systems

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University of Applied Sciences St. Gallen**



Outline

1. HERA: Process-oriented, cross-organisational e-government



1.1 Motivation

1.2 Characteristics of an application scenario

1.3 Interaction patterns

1.4 Model-driven approach

1.5 Conclusions

2. Transfer to other application areas

2.1 Medical Workbench

2.2 Innovation Management

3. Overall conclusions & open issues

E-Government: Portals vs. End-to-End Processes (1)

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- Environment and construction
- Work
- Mobility
- Security
- State and law

SPECIAL

DIRECT LINK



[Portraits of the cantons](#)

[Portraits of the cantons:
Canton Appenzell Innerrhoden](#)

[Cantons online](#)

» Individuals

The administration accessible to all: young and old, students, employees and jobseekers...

FROM A TO Z

Public services are just one click away:

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[Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

CH.CH - TOP 3

Frequently sought information and popular links:

[Identity card - How to apply](#) 

[Museums and collections](#)

[Cantonal libraries - Consultation](#) 

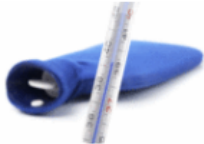
LATEST NEWS

Press releases from the Federal Administration:

14.11.2008
[Swiss Rescue on a simulated disaster exercise](#)
[Federal Department of Foreign Affairs]

14.11.2008
[Marked increase in the number of psychiatric patient admissions](#)
[Federal Statistical Office]

DOSSIER - MONTHLY



The 7th of November 2008 is National Influenza Vaccination Day. Here is some useful information and advice on this theme.

[Seasonal influenza](#)


PRACTICAL INFORMATION

Find a doctor, a job, a train timetable, work out your tax bill online and much more... Here's a selection of links to the most frequently used services.


[Practical information](#)


[Advanced search](#)


Personalise

[Select a commune / canton](#) 

Publicjobs 

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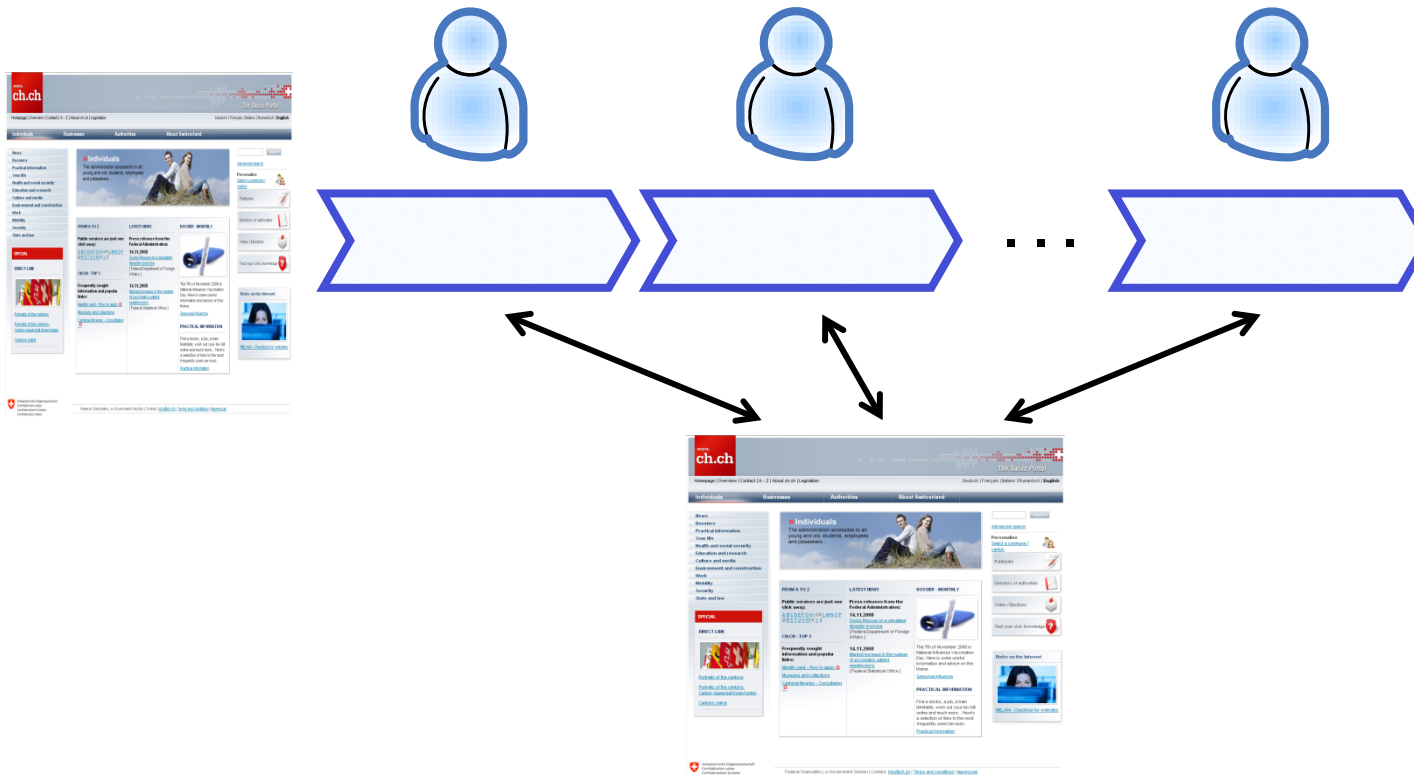
Test your civic knowledge 

Risks on the Internet

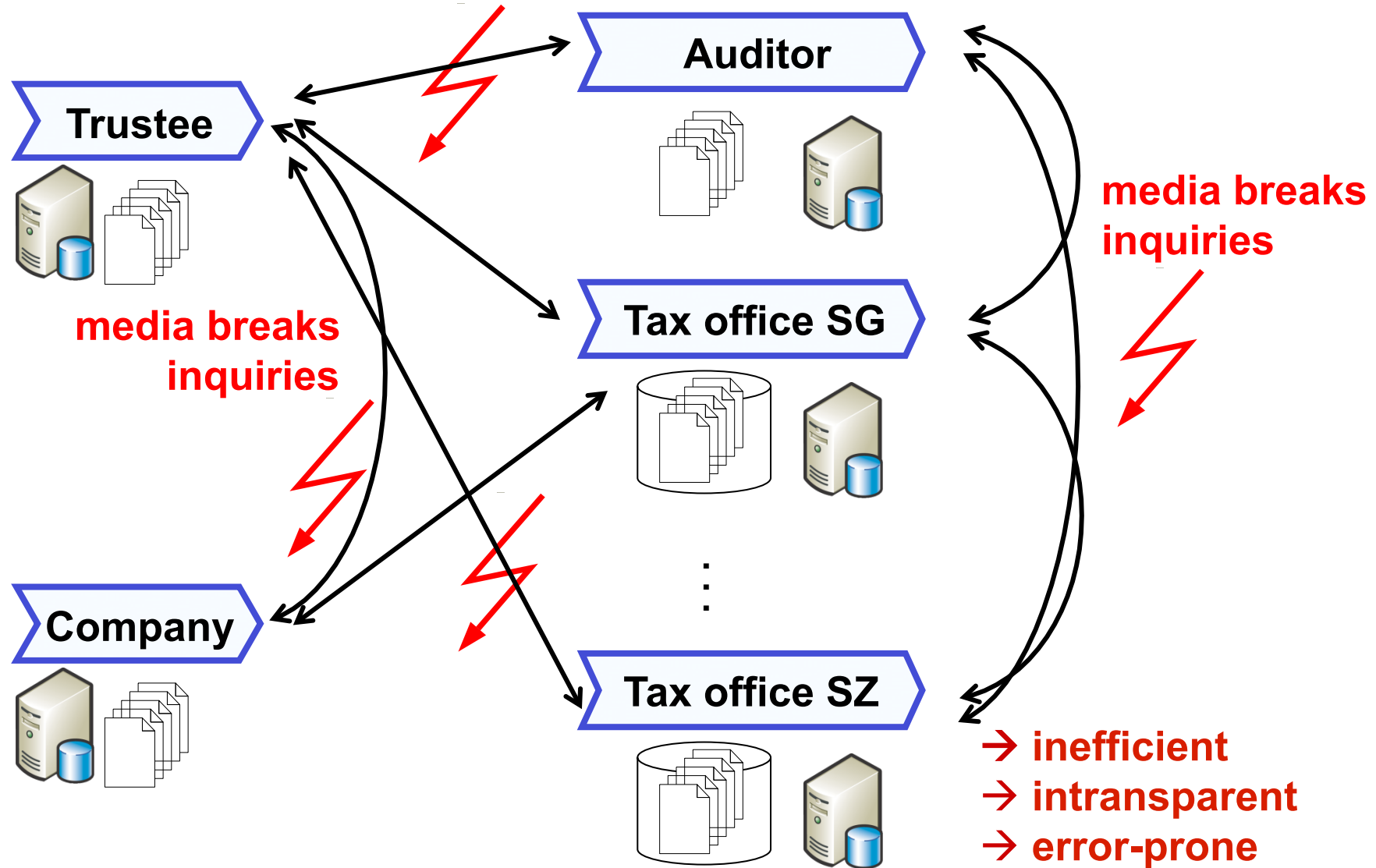


[MELANI - Checktool for websites](#)

E-Government: Portals vs. End-to-End Processes (2)

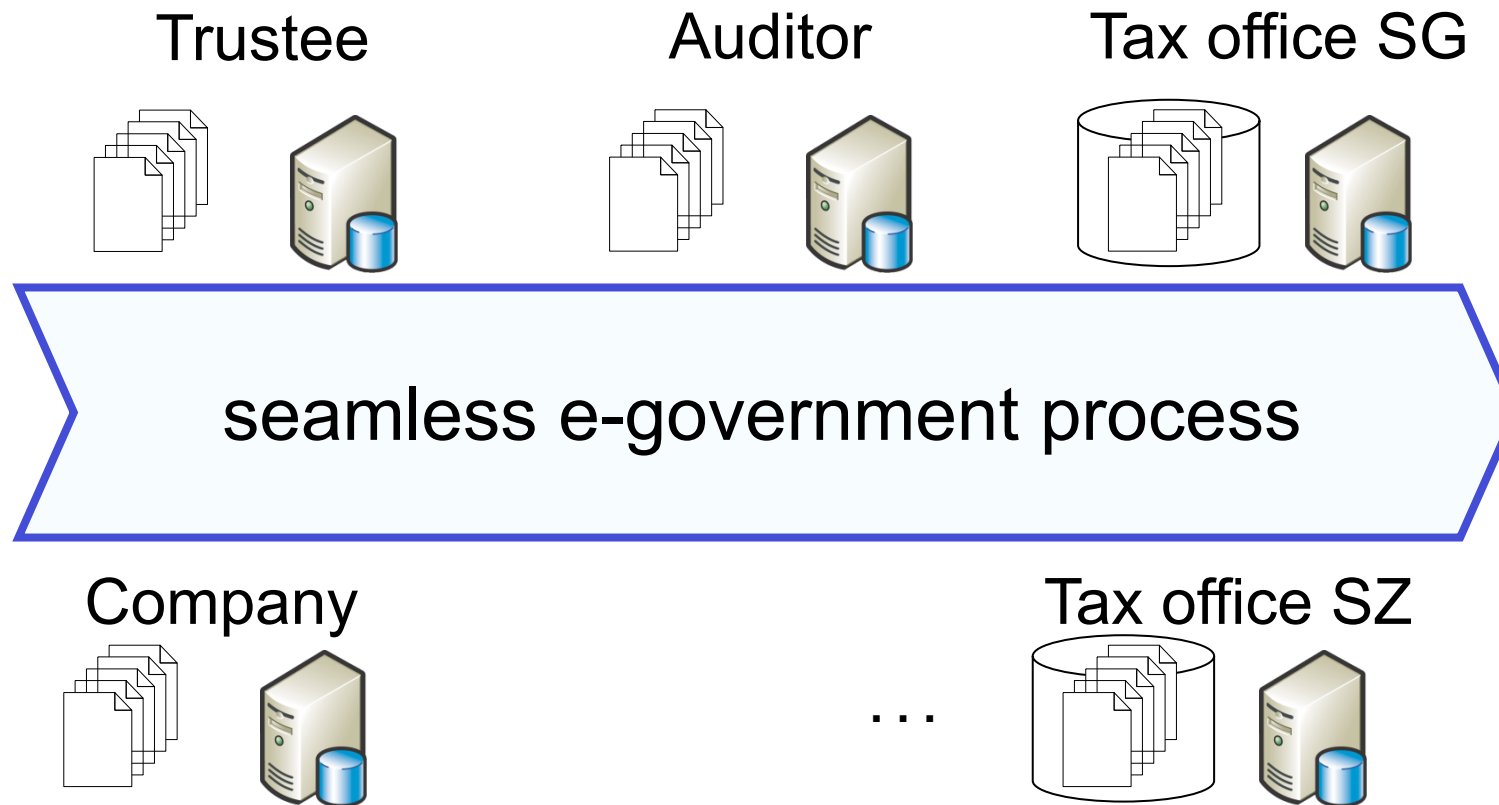


Example: Company Tax Declaration Process



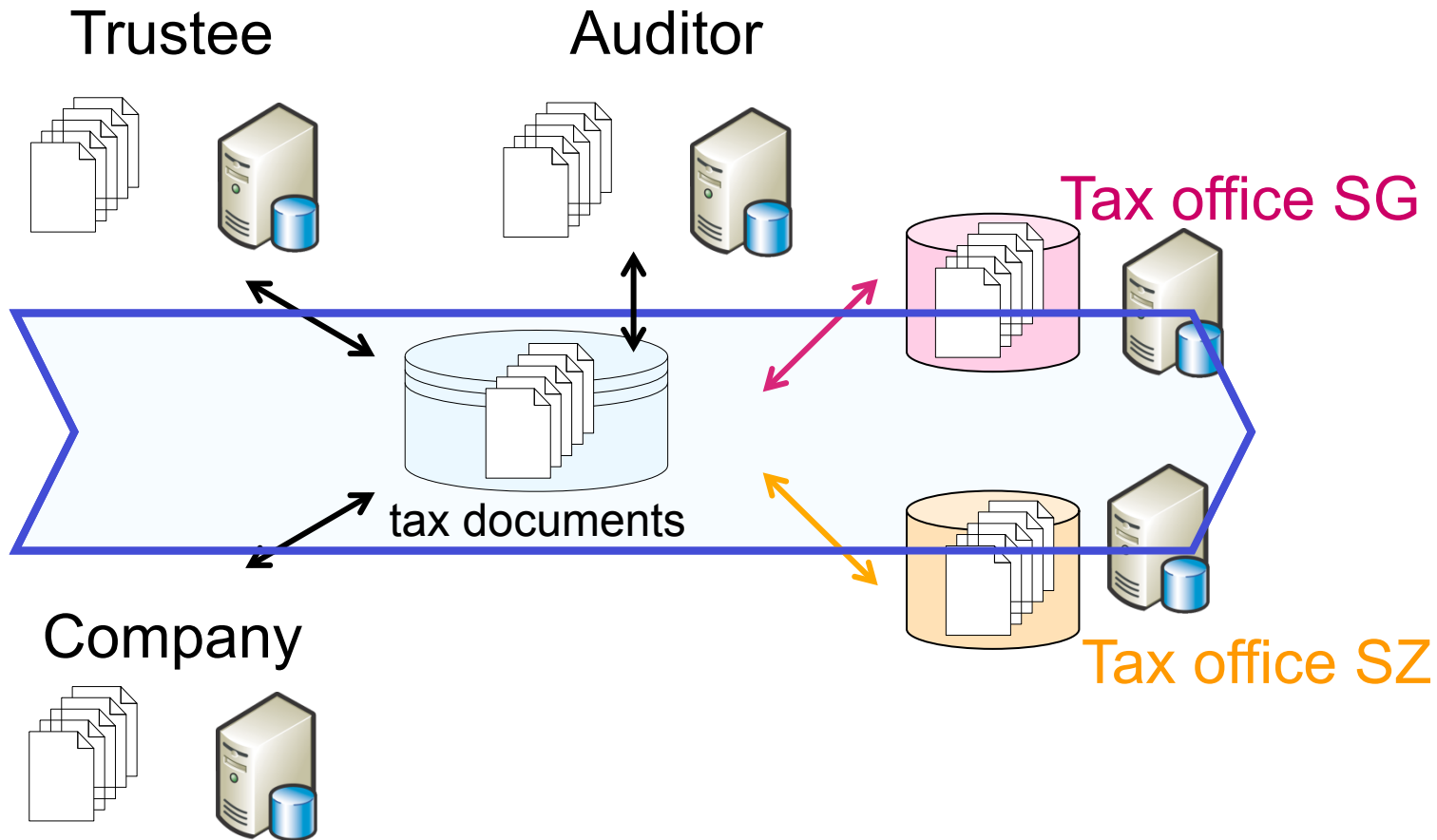


Goal: Cross-organisational process integration





Goal: Cross-organisational information integration





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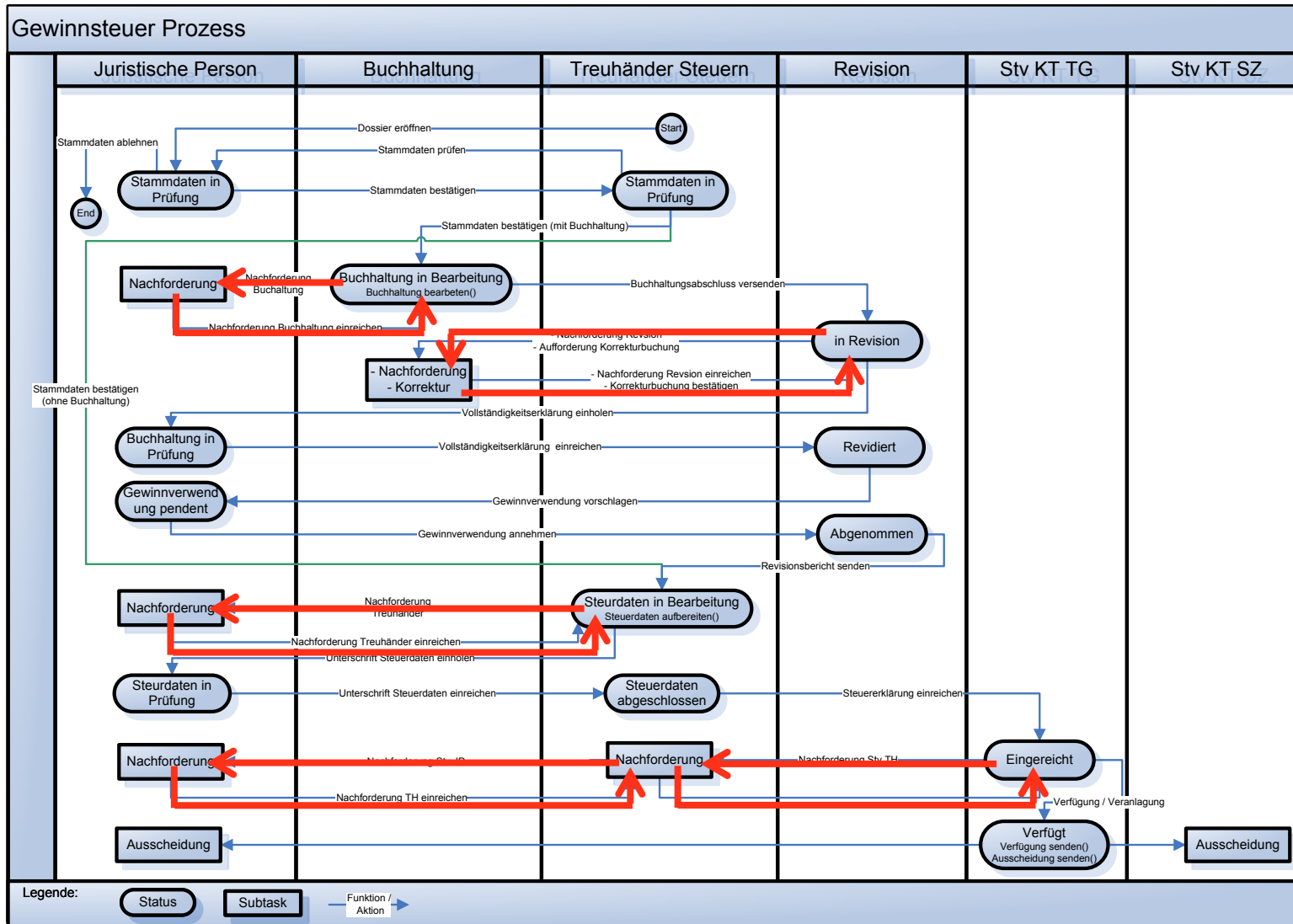
2. Transfer to other application areas

2.1 Innovation Management

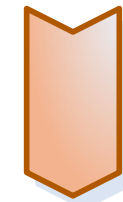
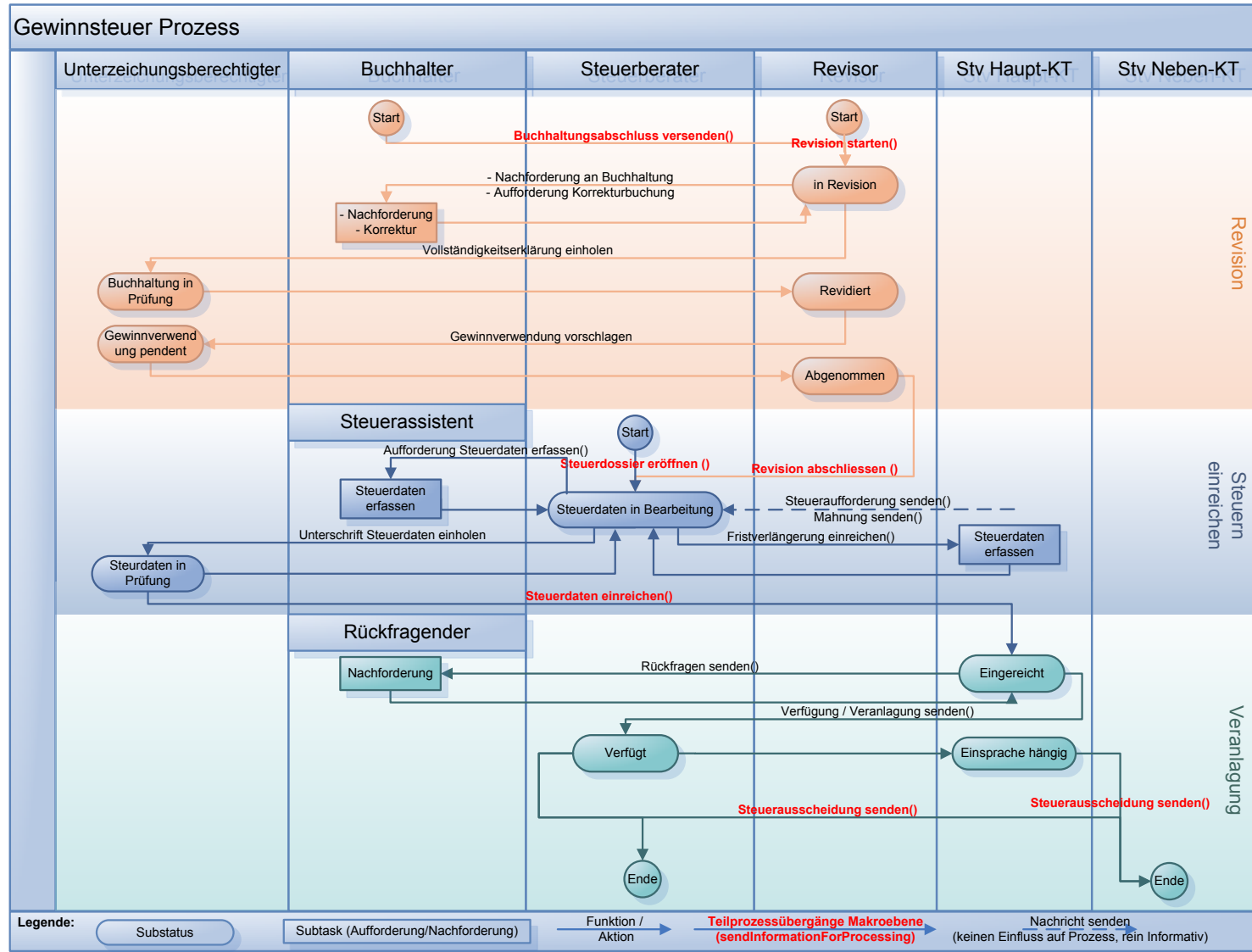
2.2 Medical Workbench

3. Overall conclusions & open issues

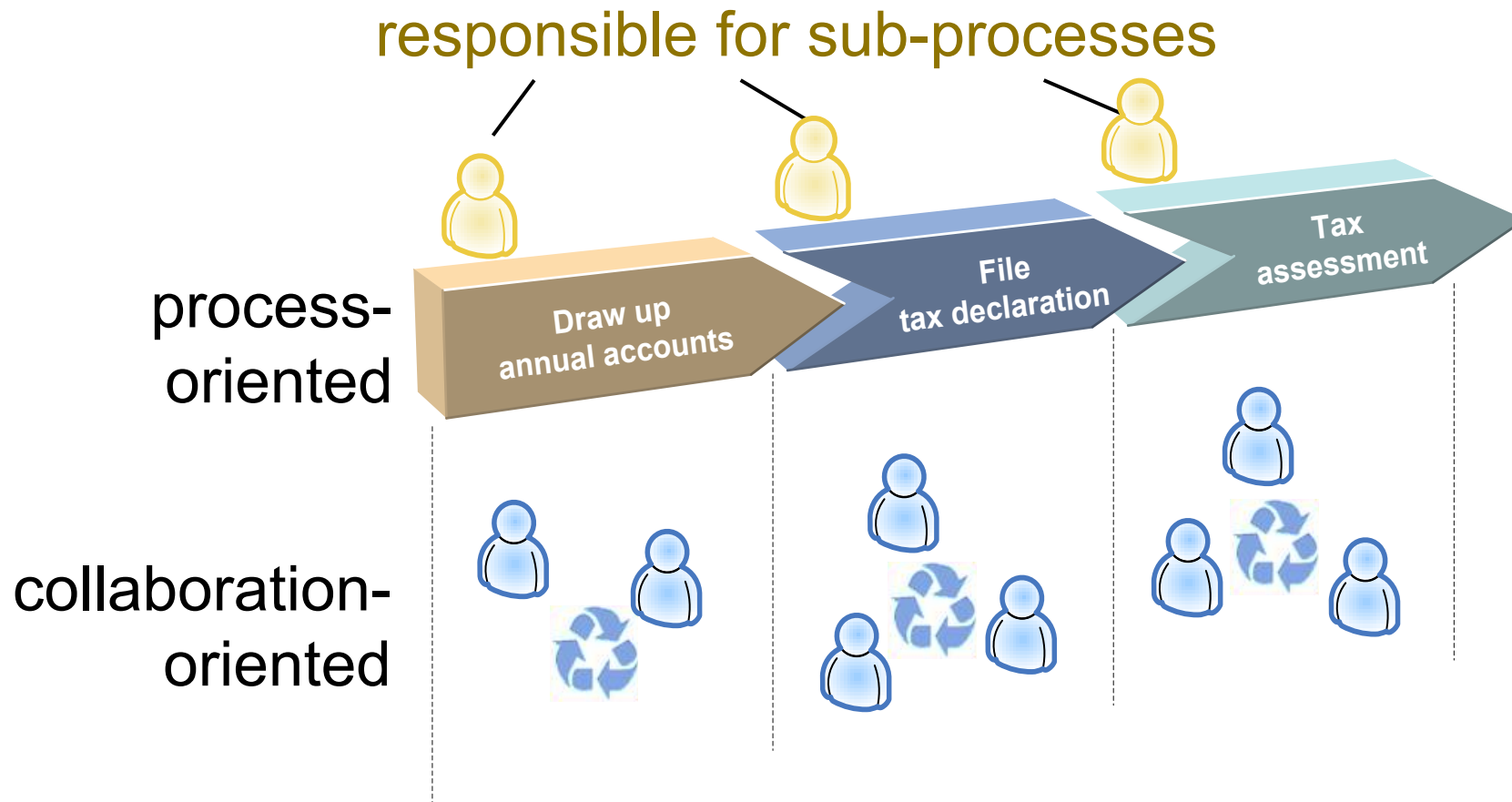
Process has many ad hoc parts



Process consists of 3 main parts



Sub-processes as collaboration contexts





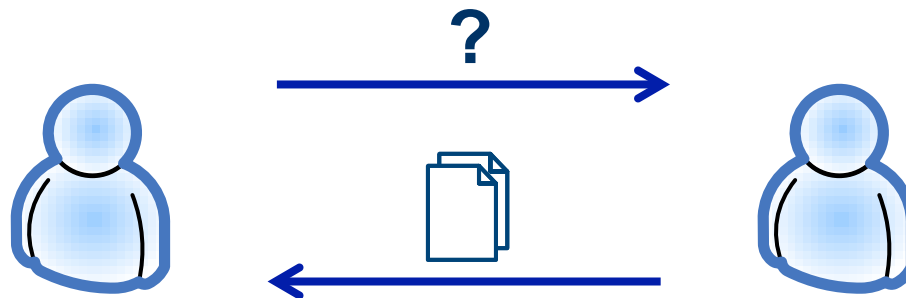
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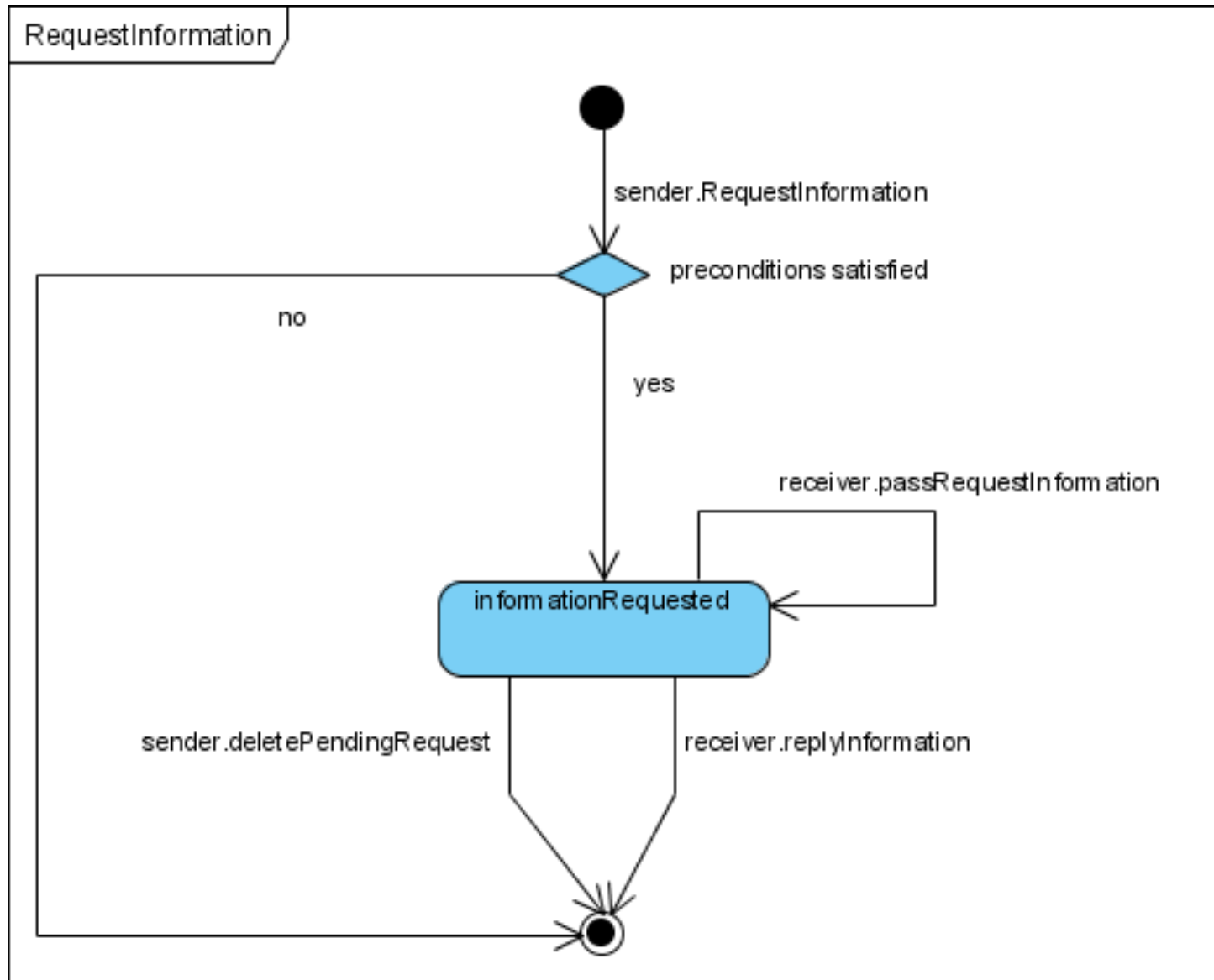


Generic interaction patterns (1)

request information:



- possibly with a time limit and escalation measures
- pending requests can be removed with the proper authorisation



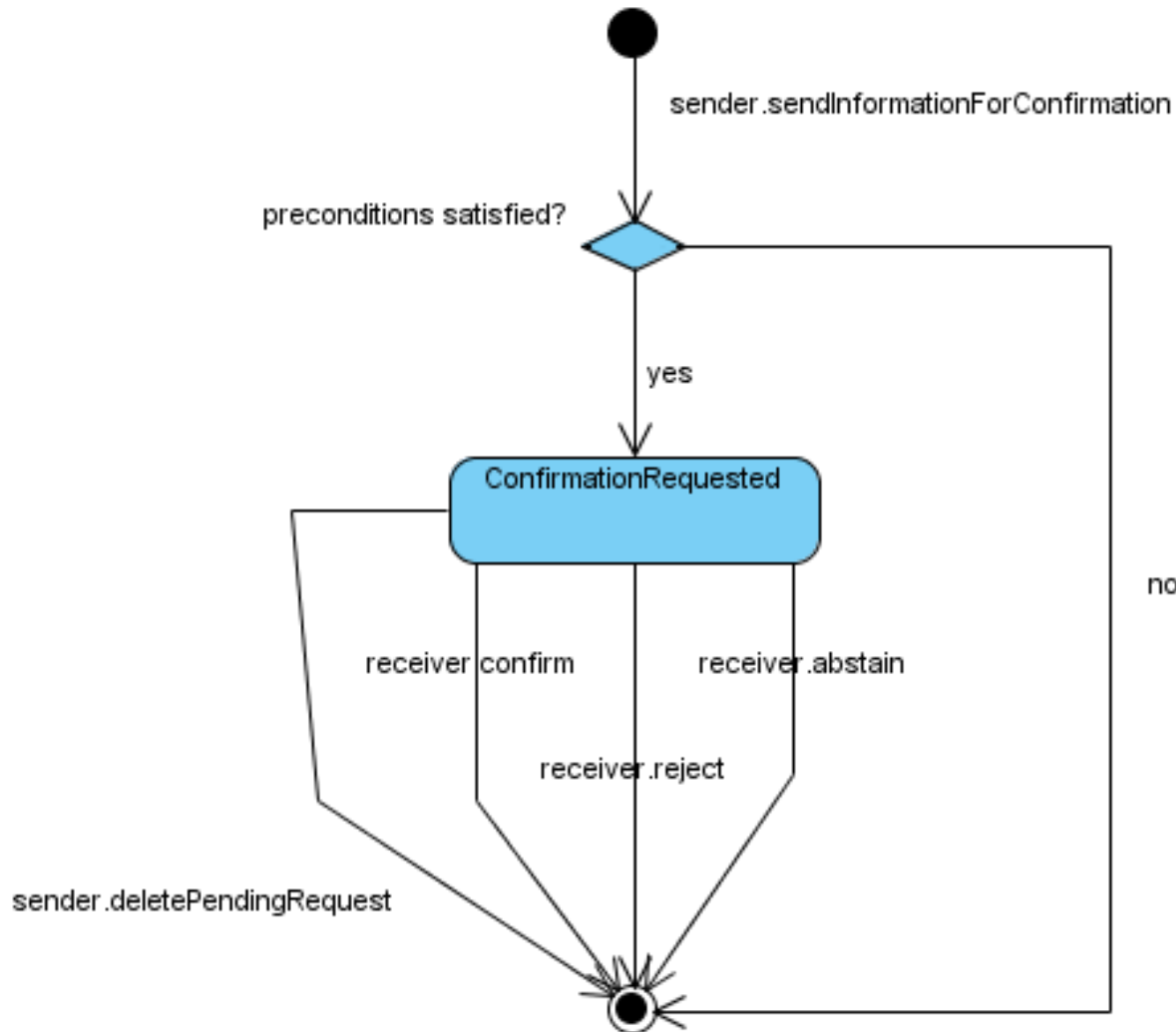


Generic interaction patterns (2)

confirm information:



- special case: confirm via (electronic) signature
- possibly with a time limit and escalation measures
- pending requests can be removed with the proper authorisation





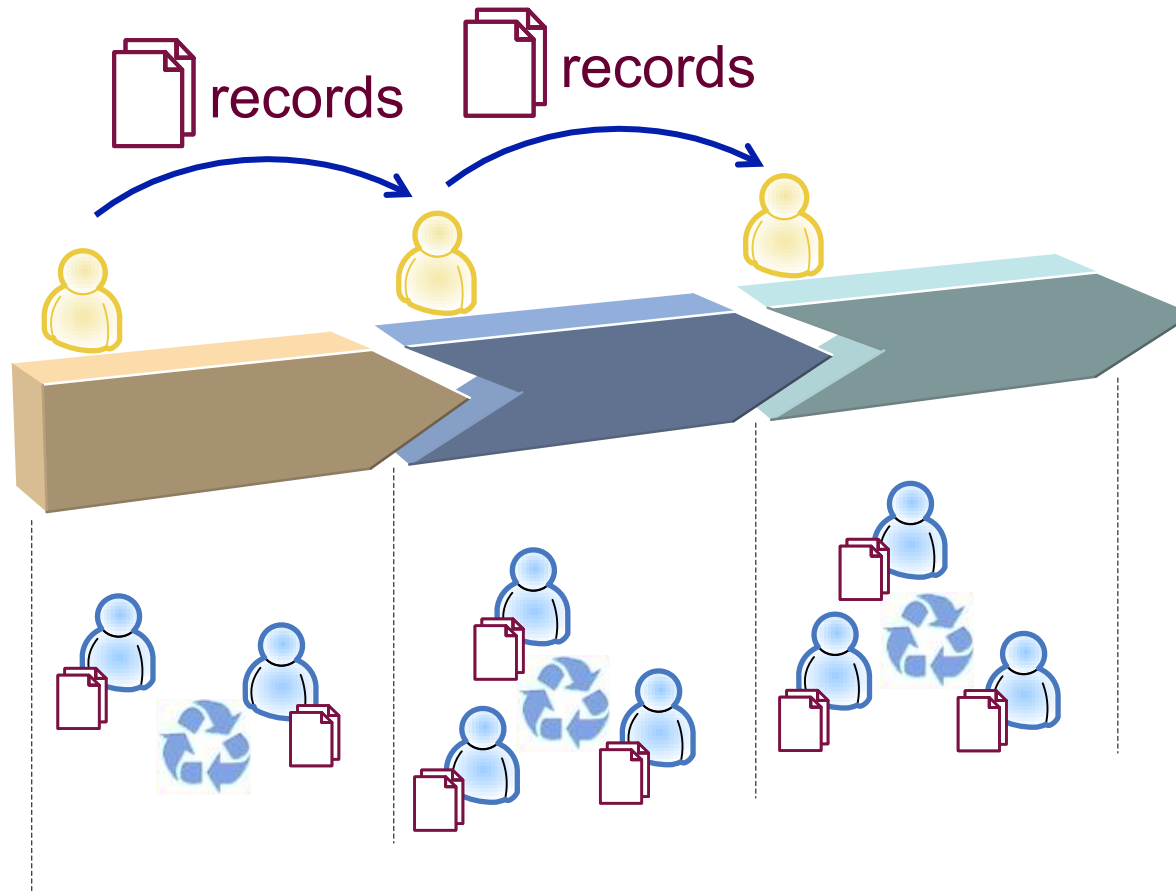
Generic interaction patterns (3)

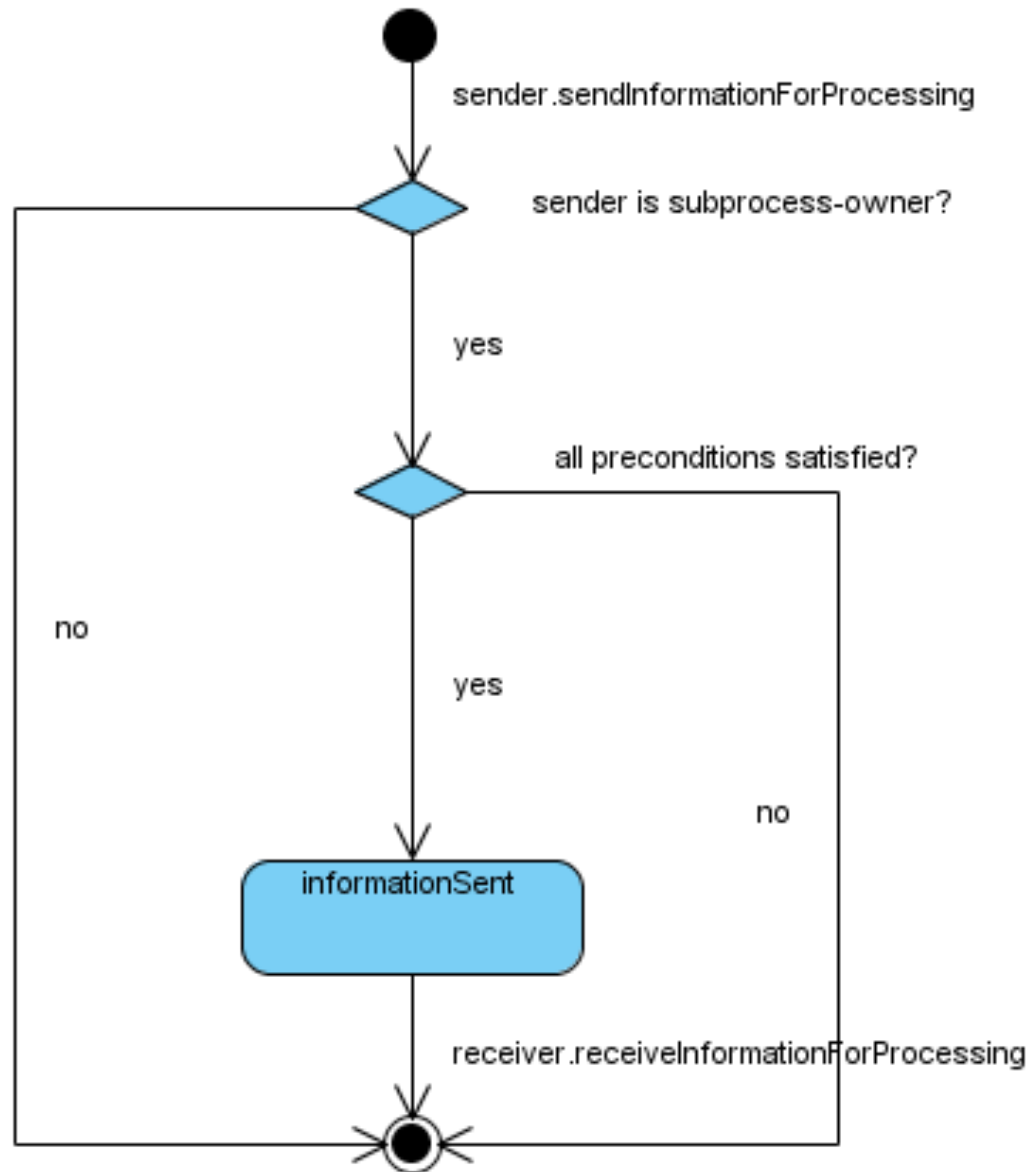
send information to take notice:



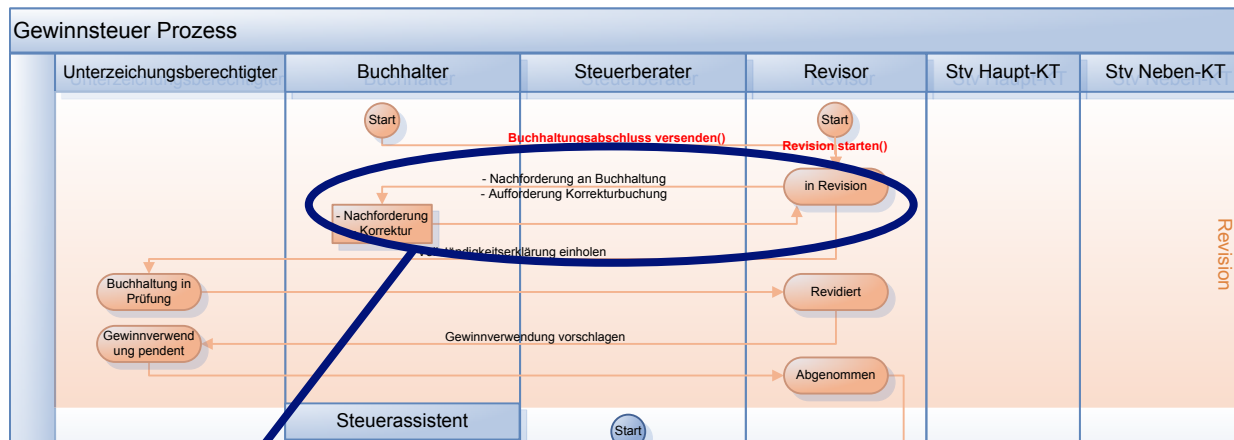
Generic interaction patterns (4)

send information for further processing /
sub-process transition:





Permitted activities depend on user role and context



auditor: supplementary information request to accounting

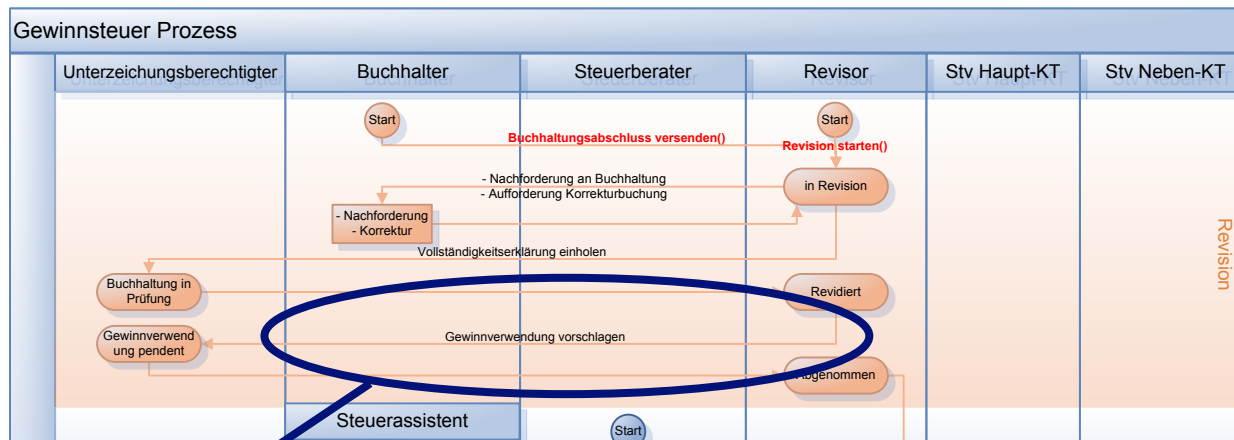
requestInfo(info: text, addressee: accounting): accountingExtract

auditor: send information for correction details to accounting

sendInfo(info: text, addressee: accounting)



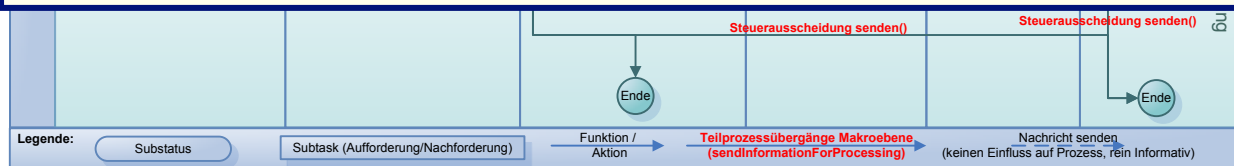
Permitted activities depend on user role and context



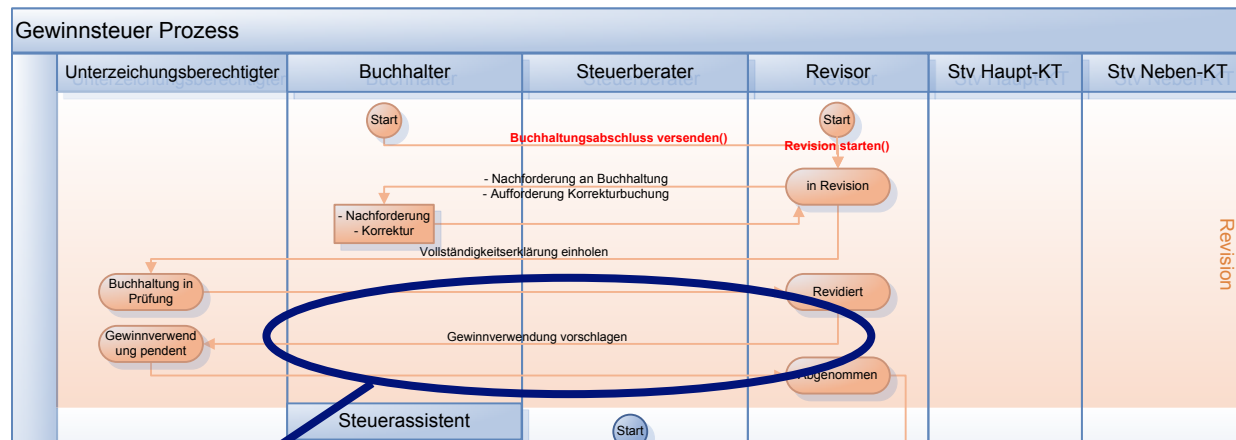
auditor: request confirmation that the records are complete

signDocument(info: confirmDoc, addressee: company): signedConfirmDoc

precondition: sub-process = "auditing"
& no pending supplementary requests or correction details



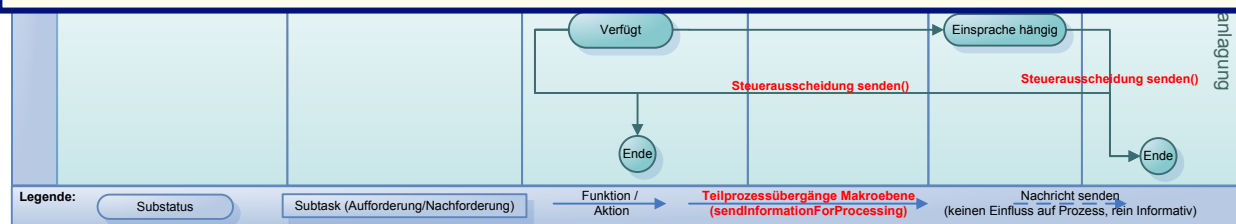
Permitted activities depend on user role and context



auditor: propose how to allocate profits

confirmInfo(info: text, addressee: accounting): confirmation

precondition: sub-process = "auditing" & $\exists x$: completenessDeclaration(x)

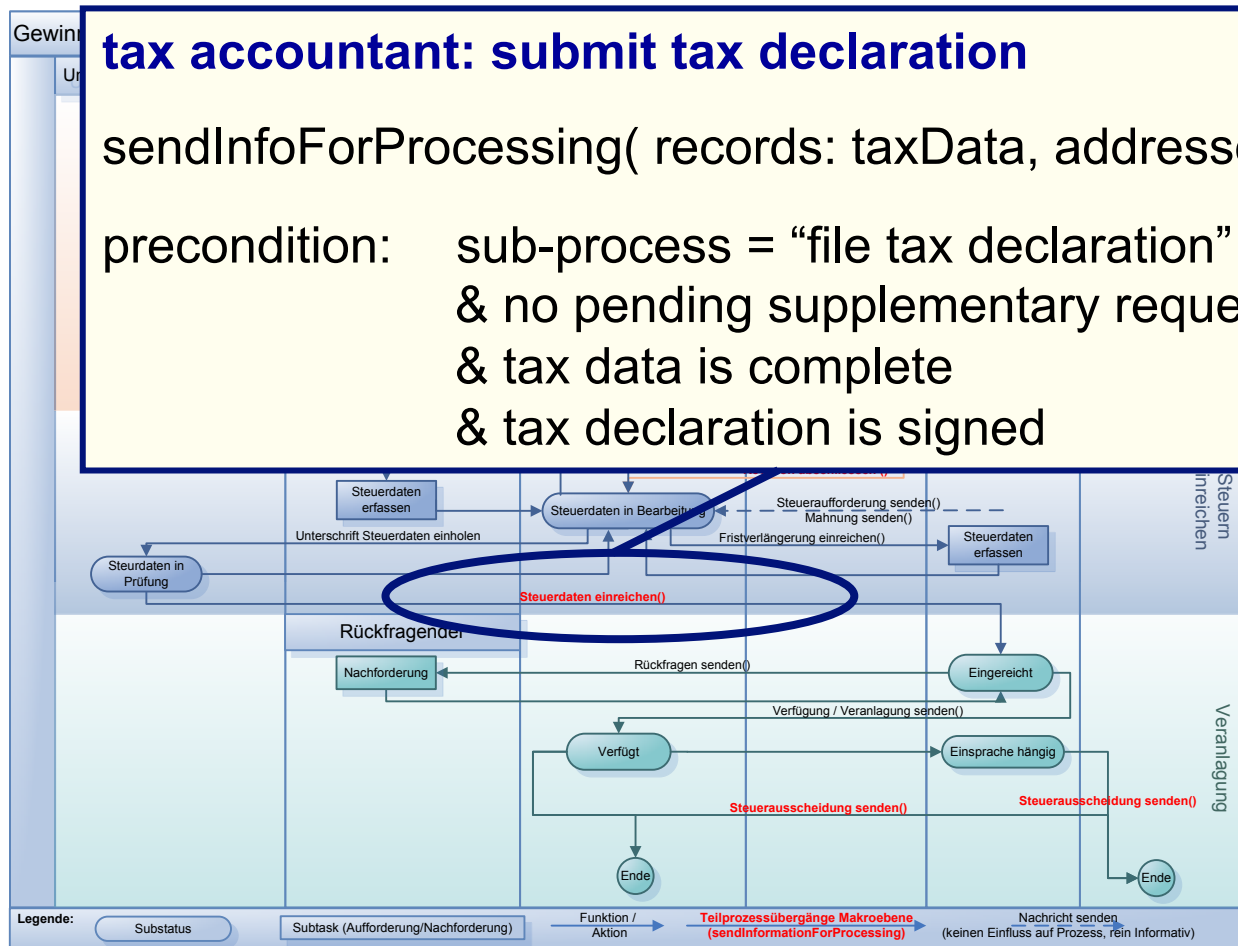


Permitted activities depend on user role and context

tax accountant: submit tax declaration

sendInfoForProcessing(records: taxData, addressee: taxOffice)

precondition: sub-process = "file tax declaration"
& no pending supplementary requests
& tax data is complete
& tax declaration is signed

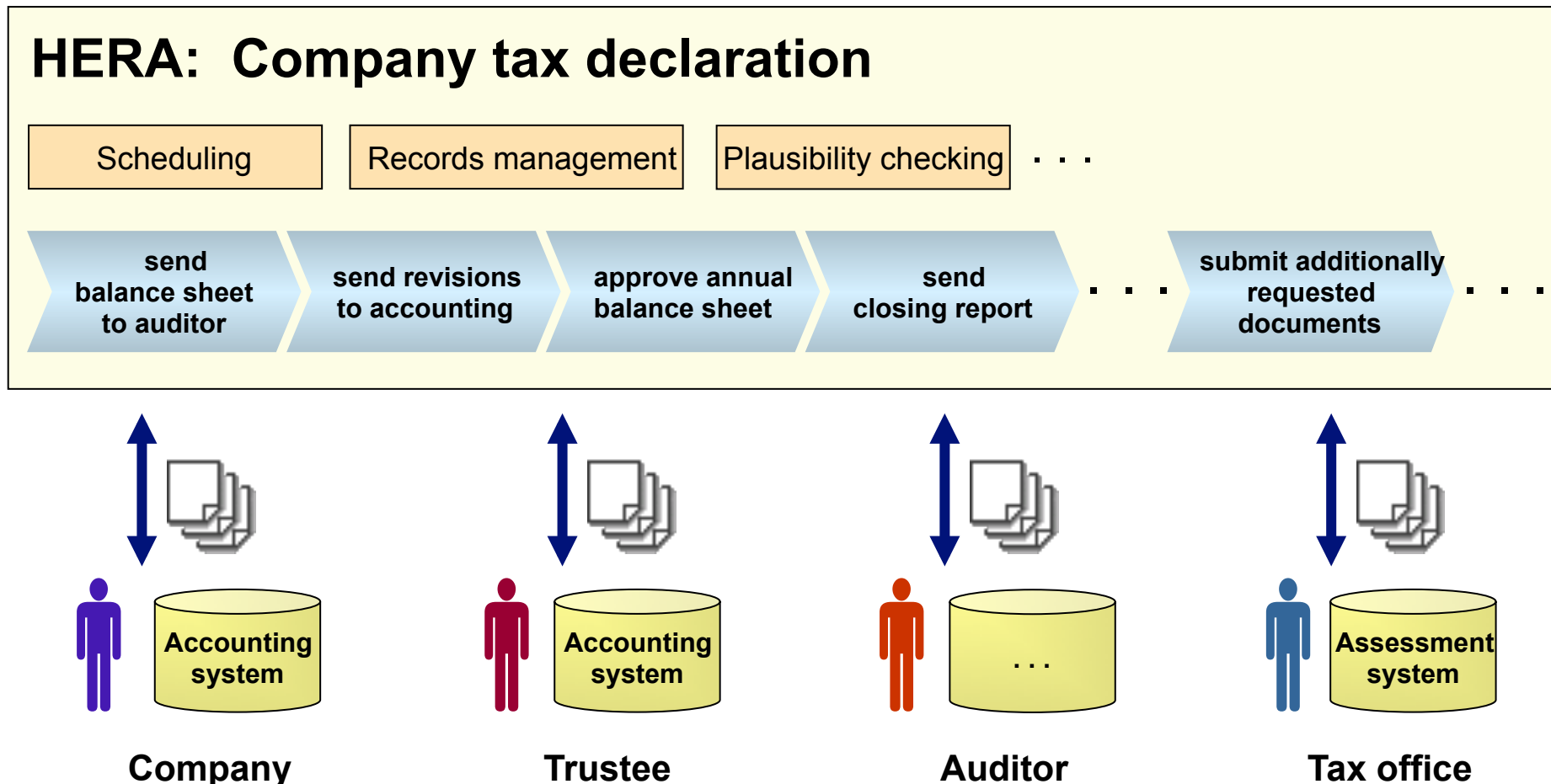




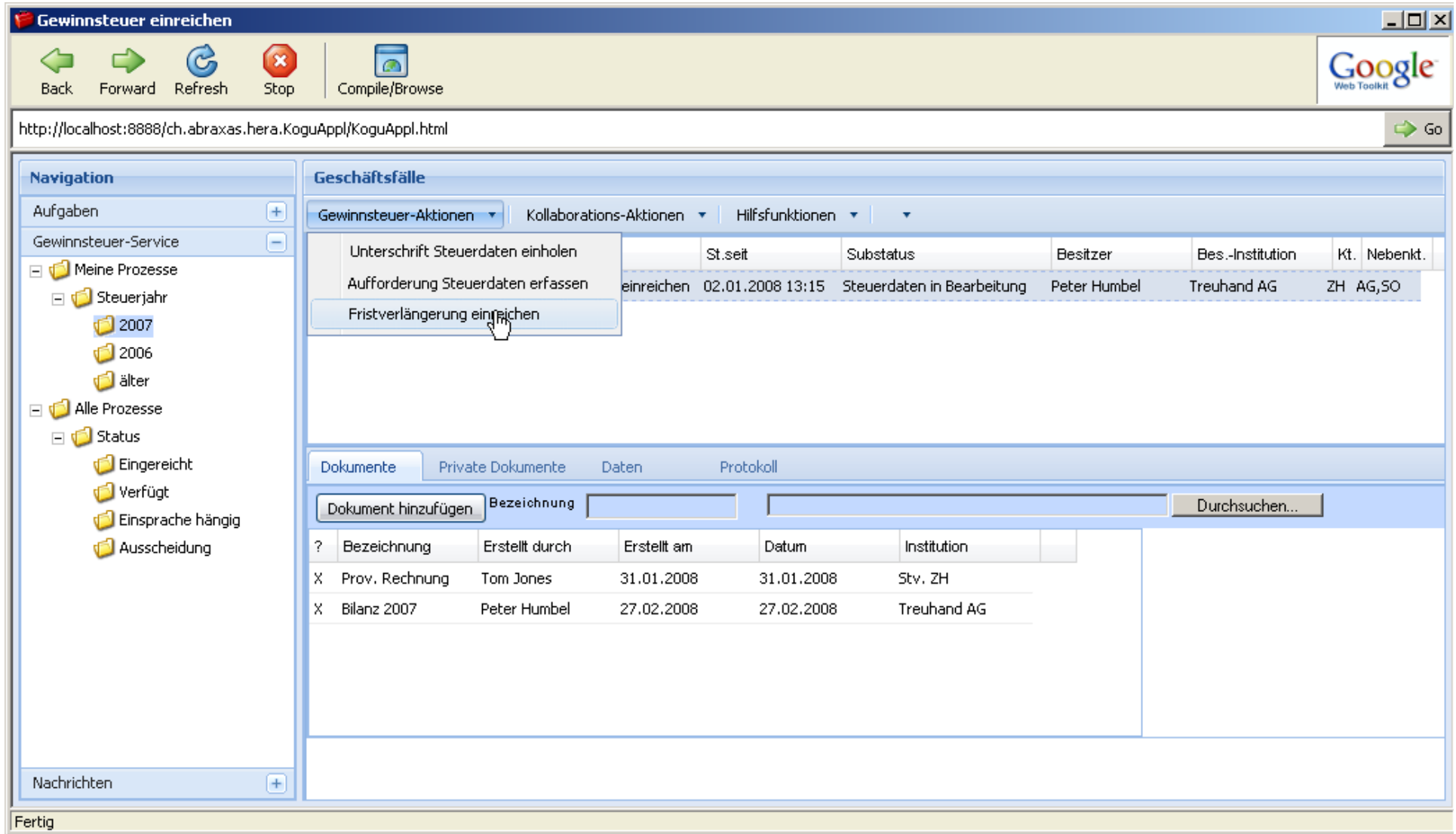
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- process & collaboration support
- data exchange



Screen shot of HERA user interface



Gewinnsteuer einreichen

Back Forward Refresh Stop Compile/Browse

Google Web Toolkit

http://localhost:8888/ch.abraxas.hera.KoguApp/KoguAppl.html Go

Navigation

Aufgaben +

Gewinnsteuer-Service -

- Meine Prozesse
 - Steuerjahr
 - 2007
 - 2006
 - älter
 - Alle Prozesse
 - Status
 - Eingereicht
 - Verfügt
 - Einsprache hängig
 - Ausscheidung

Nachrichten +

Geschäftsfälle

Gewinnsteuer-Aktionen Kollaborations-Aktionen Hilfsfunktionen

	St.seit	Substatus	Besitzer	Bes.-Institution	Kt.	Nebenkt.
einreichen	02.01.2008 13:15	Steuerdaten in Bearbeitung	Peter Humbel	Treuhand AG	ZH	AG,50

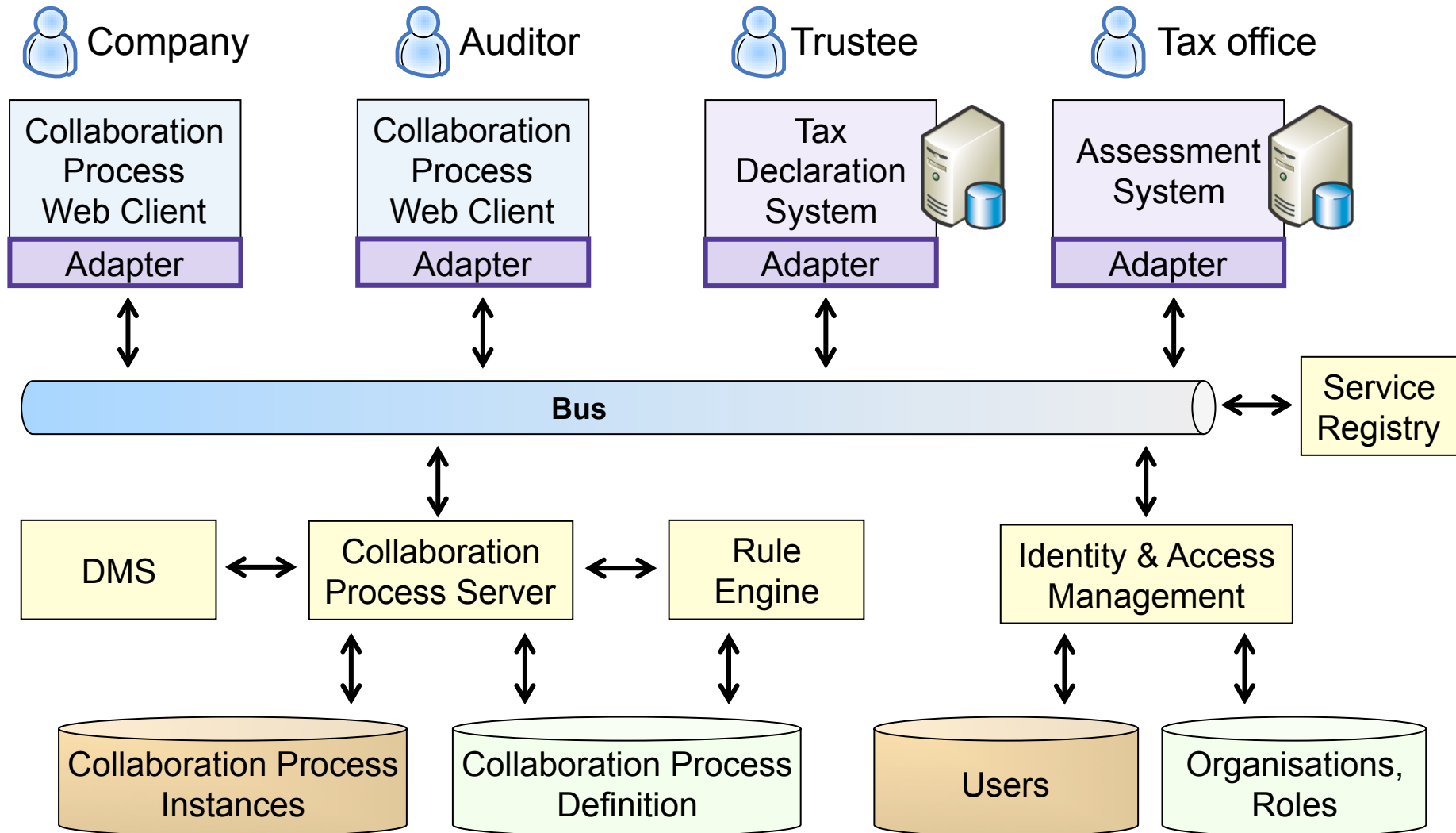
Unterschrift Steuerdaten einholen
 Aufforderung Steuerdaten erfassen
 Fristverlängerung einreichen

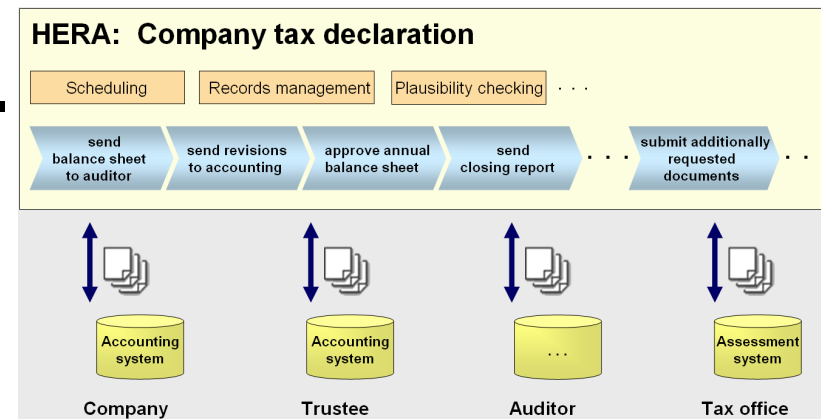
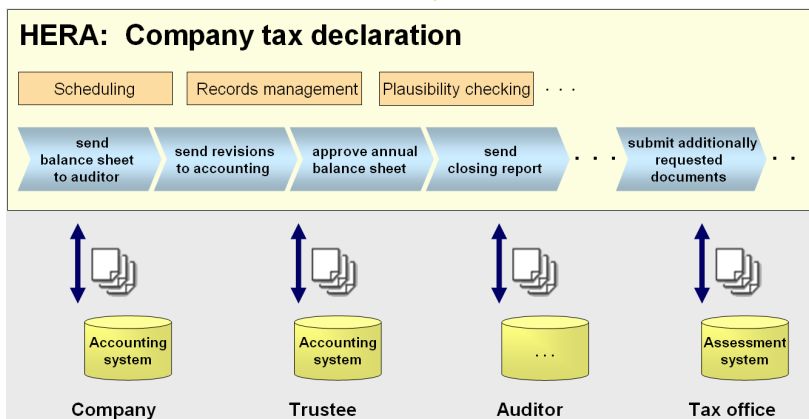
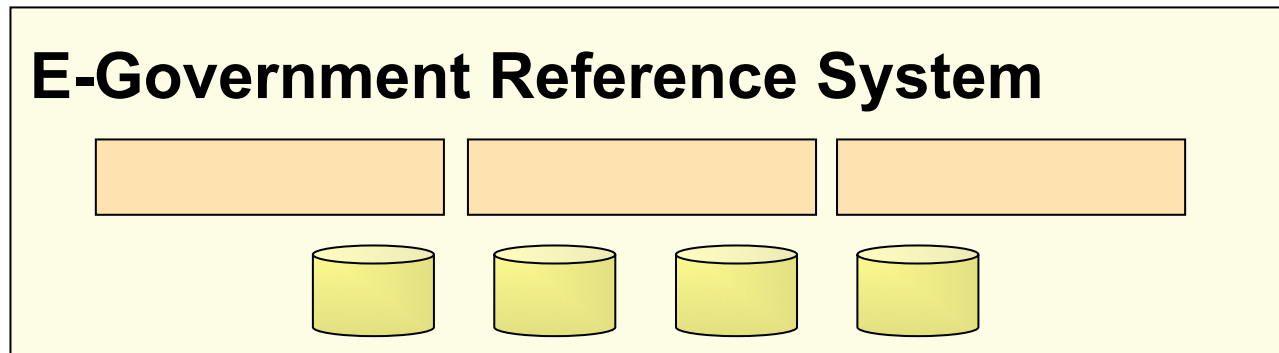
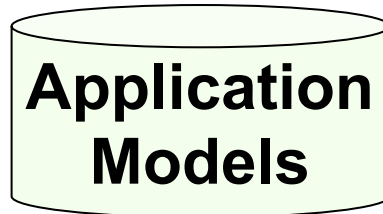
Dokumente Private Dokumente Daten Protokoll

Dokument hinzufügen Bezeichnung Durchsuchen...

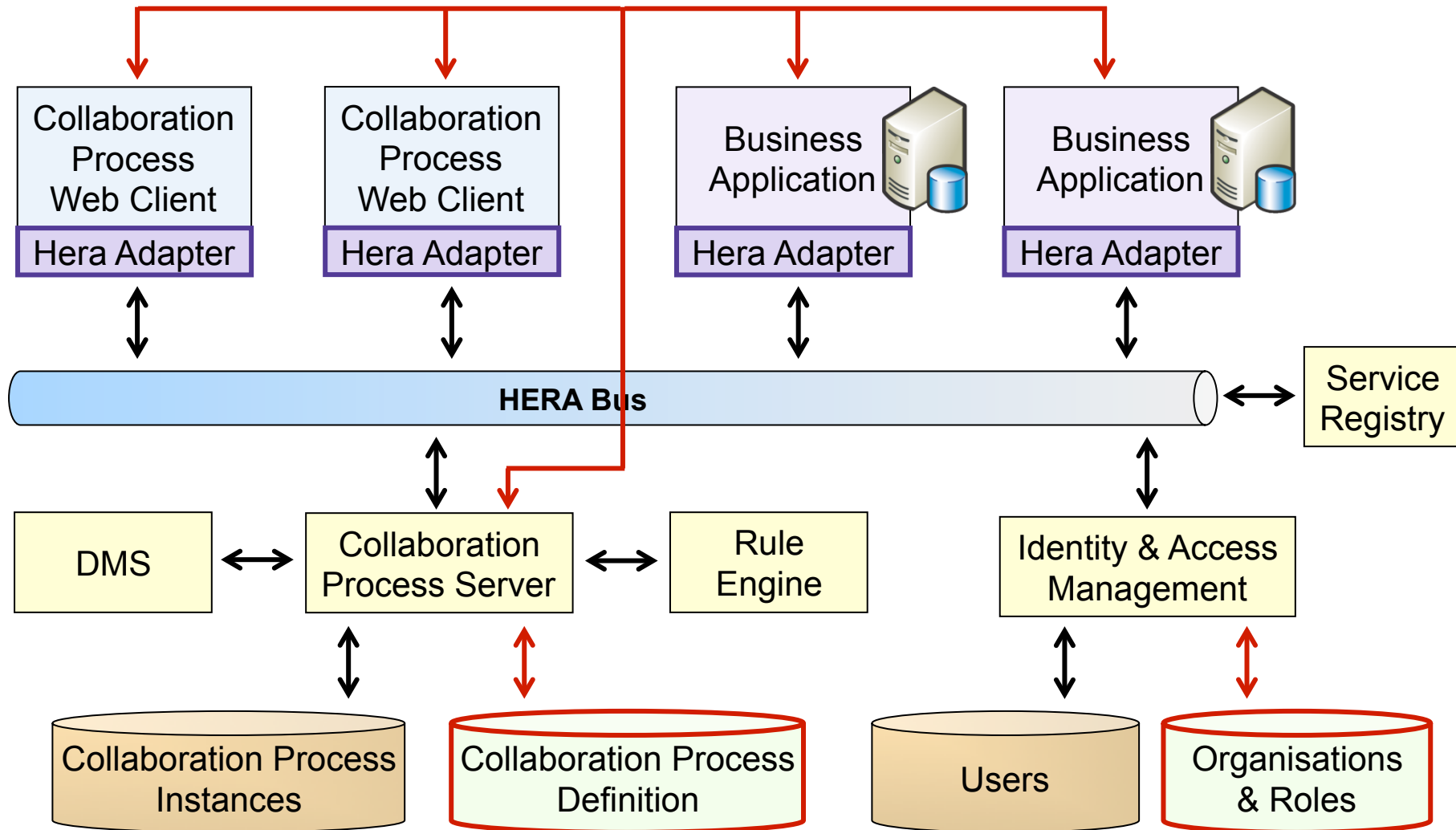
?	Bezeichnung	Erstellt durch	Erstellt am	Datum	Institution
X	Prov. Rechnung	Tom Jones	31.01.2008	31.01.2008	Stv. ZH
X	Bilanz 2007	Peter Humbel	27.02.2008	27.02.2008	Treuhand AG

Fertig

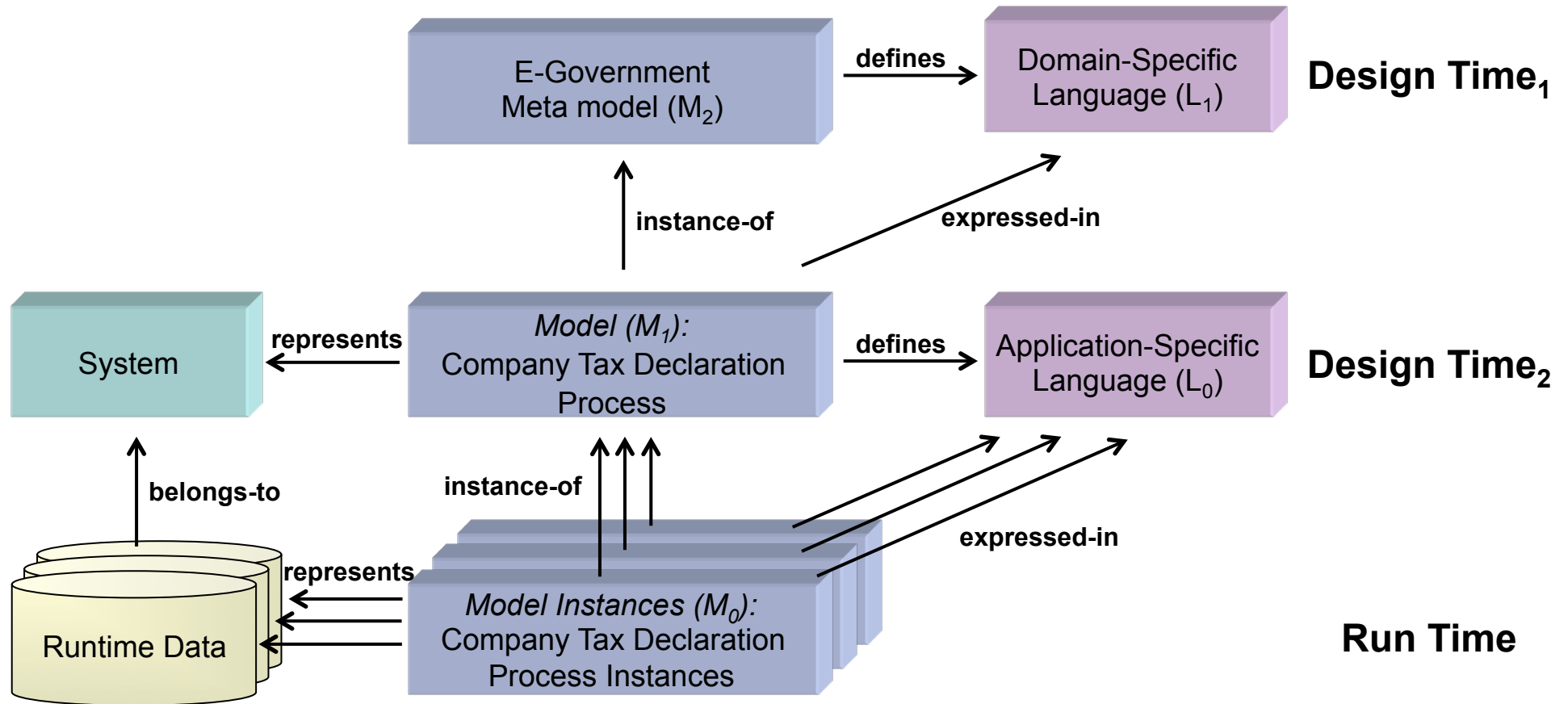




Driven by application-specific models



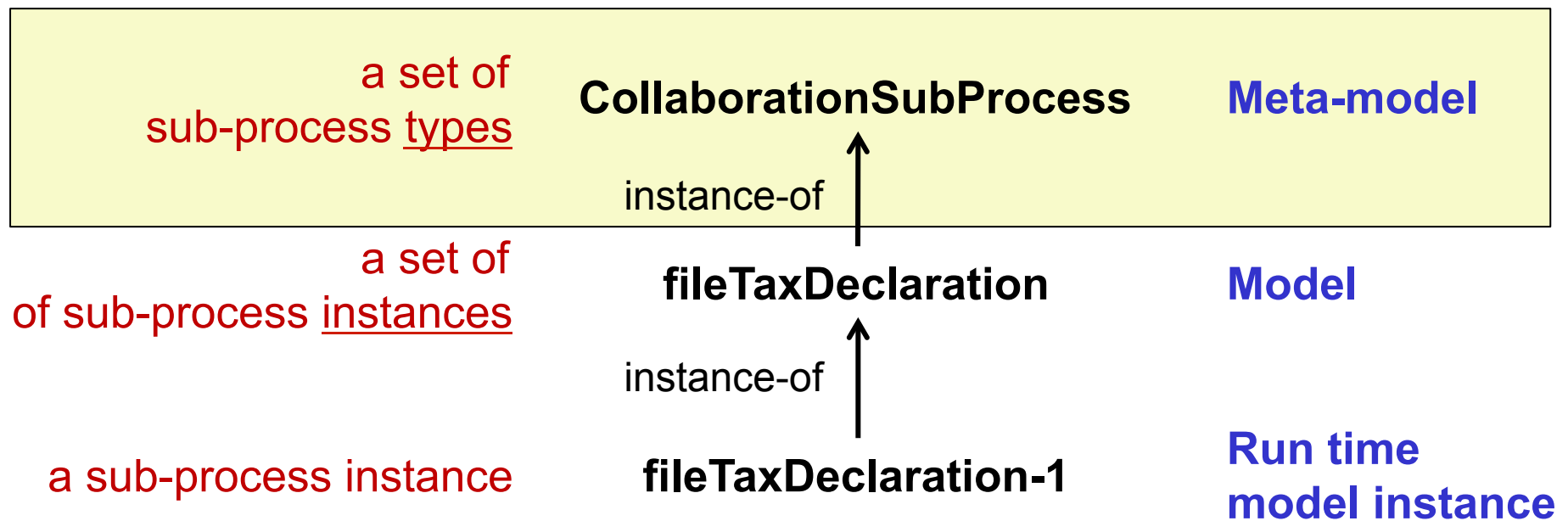
Meta-model hierarchy (1)

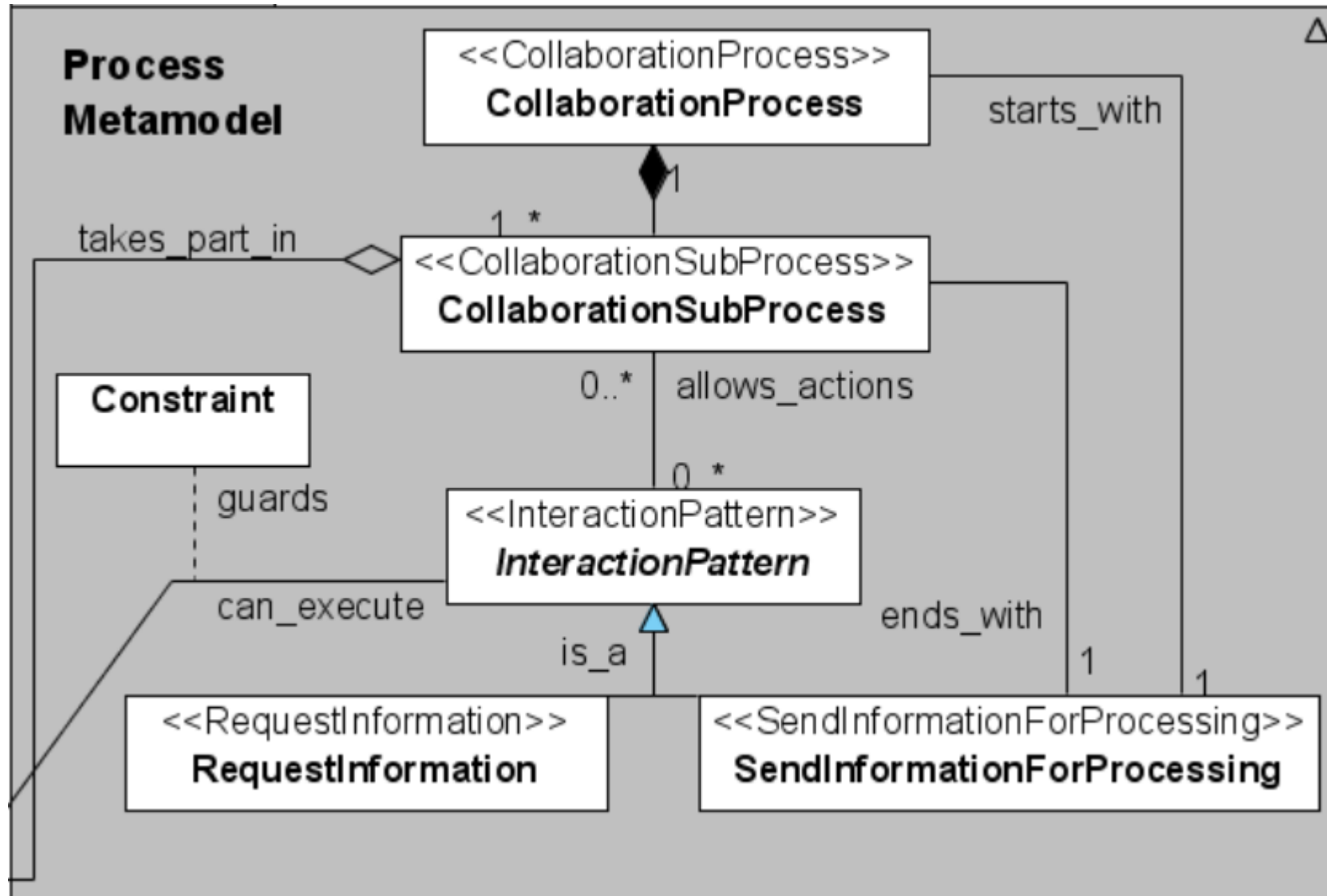


What is a meta-model?

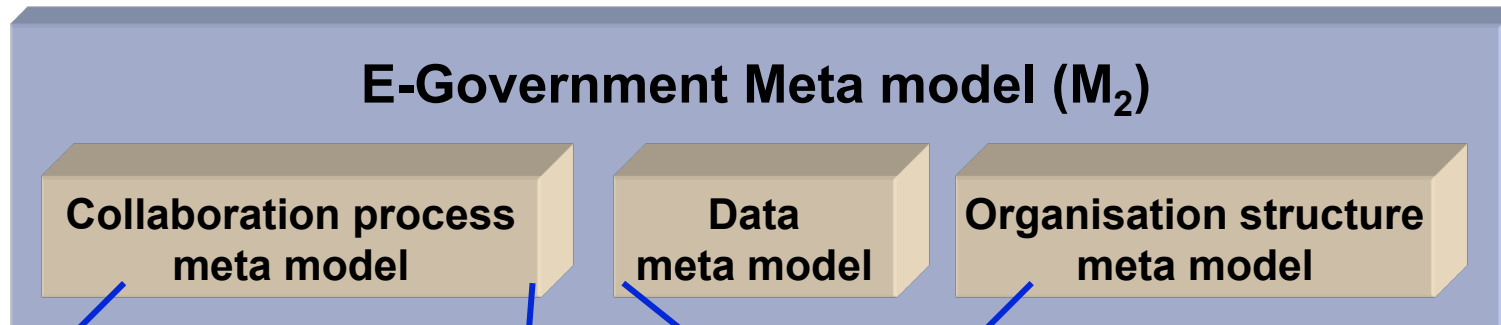
A meta-model defines the language from which to form a model.

A model is an instance of the associated meta-model.





Model elements



Finite state machines:

- interaction patterns

Description logics:

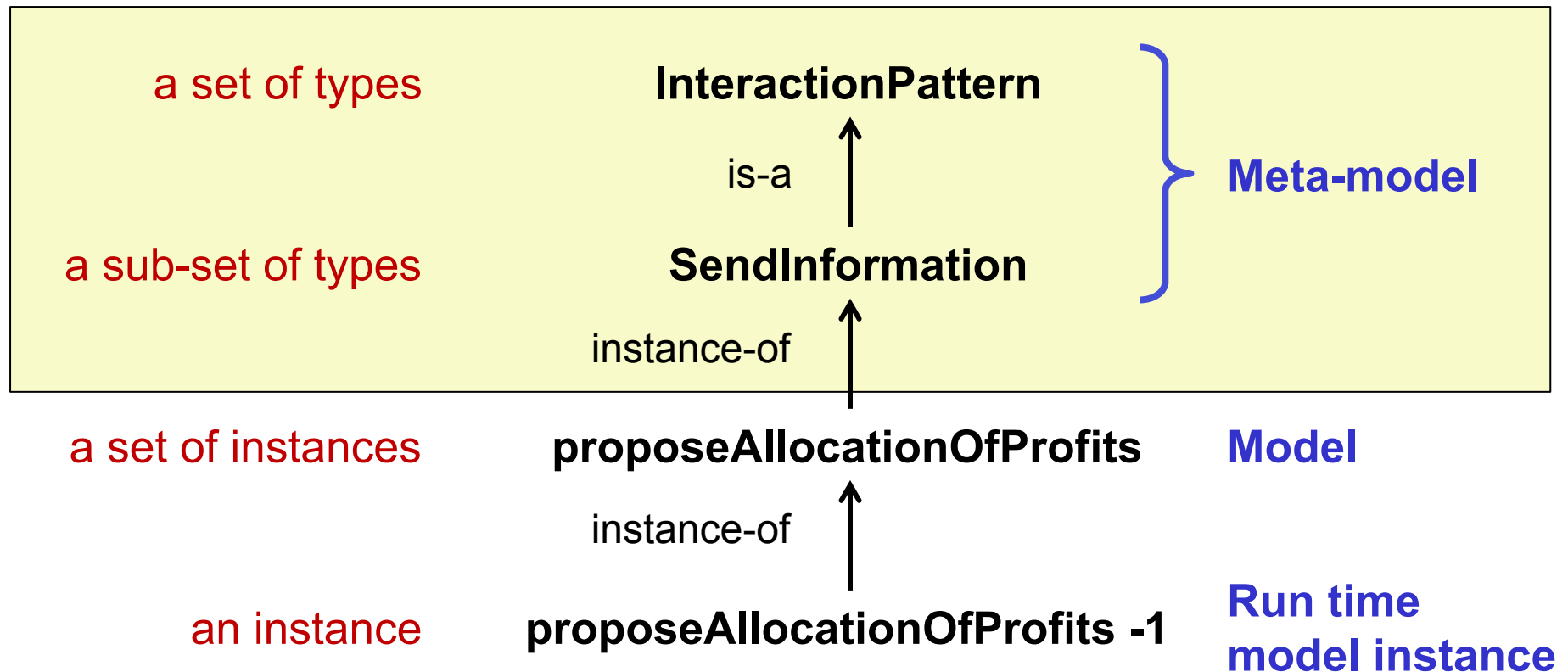
- object types
- meta data terminology

Rule schemata:

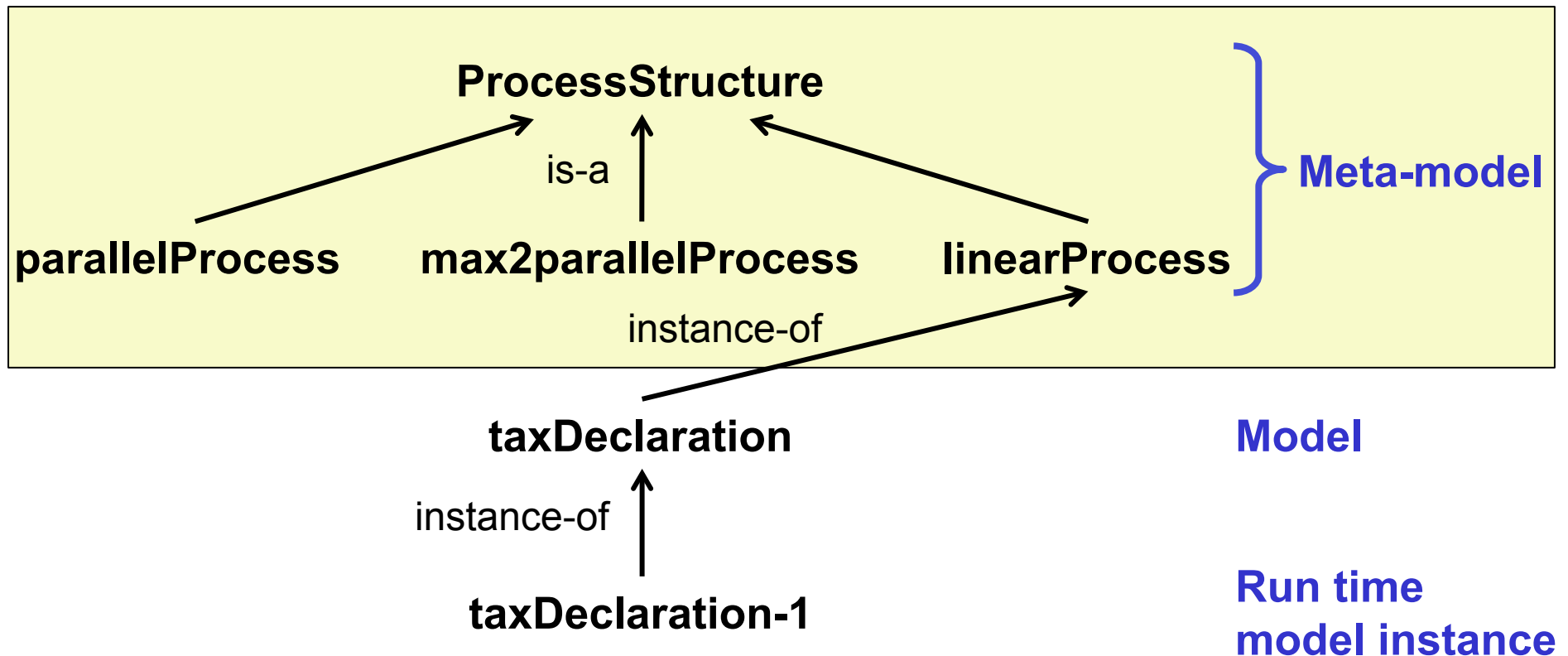
- process structure
- preconditions for interaction pattern instances
- visibility of interaction pattern instances



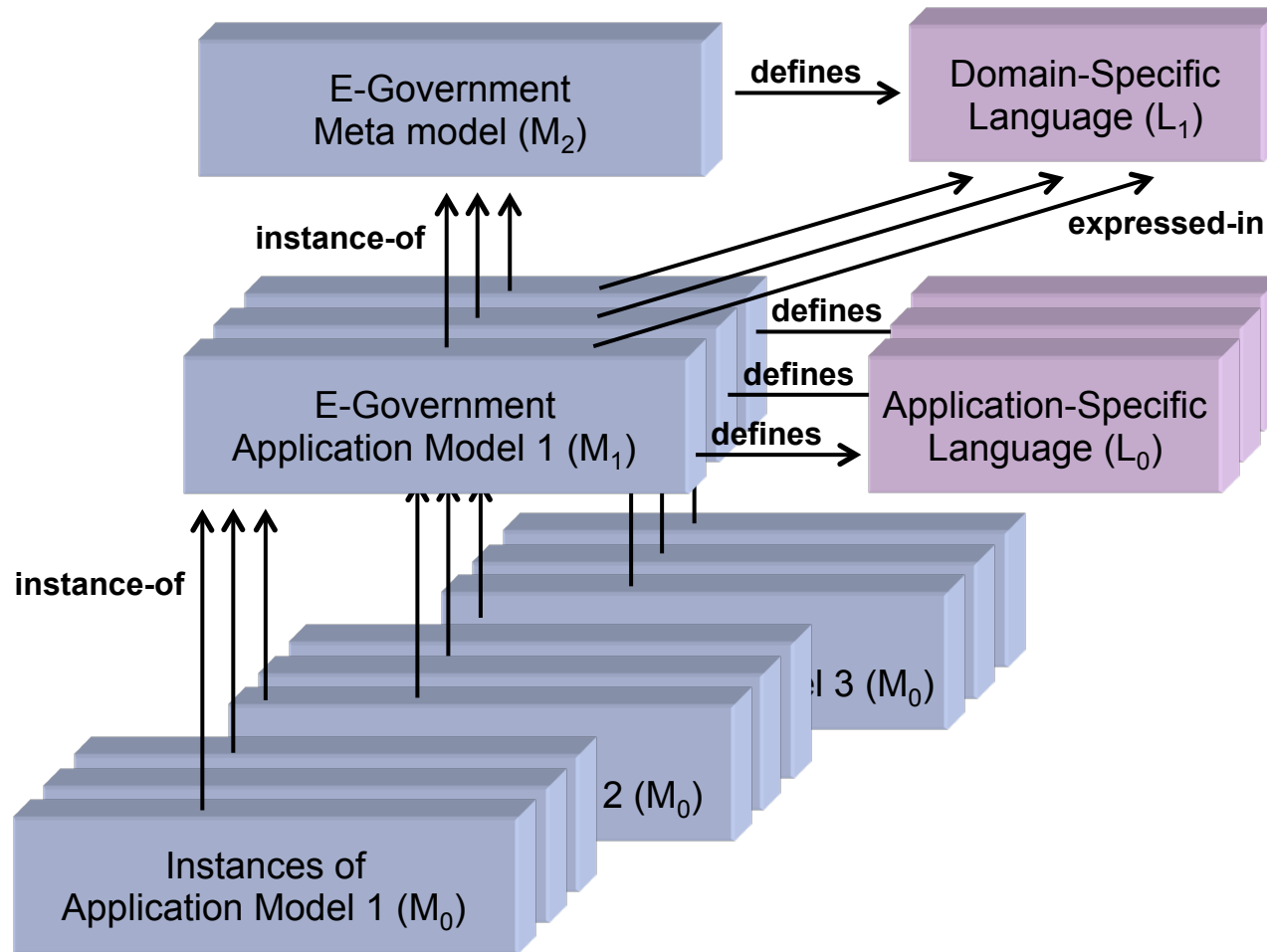
Hierarchy for model element “InteractionPattern”



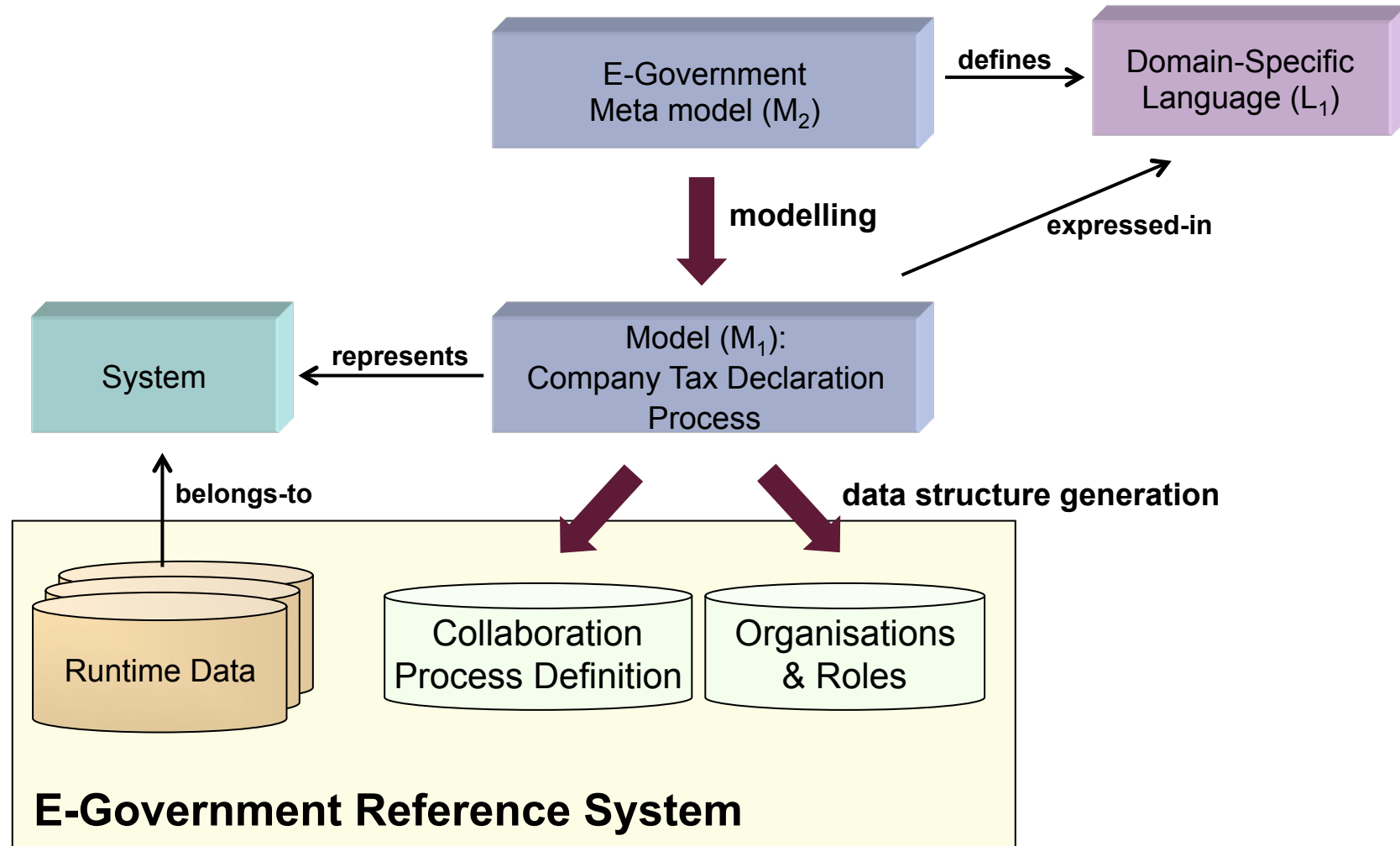
Hierarchy for model element “ProcessStructure”



Meta-model hierarchy (2)



Model-driven system generation





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Benefits for company tax declaration (1)

Process transparency:

Process participants can always look up current process status.

Faster communication:

due to seamless and instantaneous electronic information delivery

Complete records file:

Records file is completely in electronic format.

Correct processes:

Integrity constraints help to ensure correct processes.



Benefits for company tax declaration (2)

Elimination of errors:

no media breaks

Elimination of duplicate efforts:

by triggering several (sub-)processes from the same data, like

- tax on profits
- value-added tax



Main contributions

- Web-based support of **cross-organisational end-to-end e-government processes**
- Combine **process control** and **collaboration support**
- **Interaction patterns**: controlling collaboration while retaining necessary degree of freedom
- High degree of reusability of approach through
 - **reference architecture**
 - **model-driven approach**



Future work

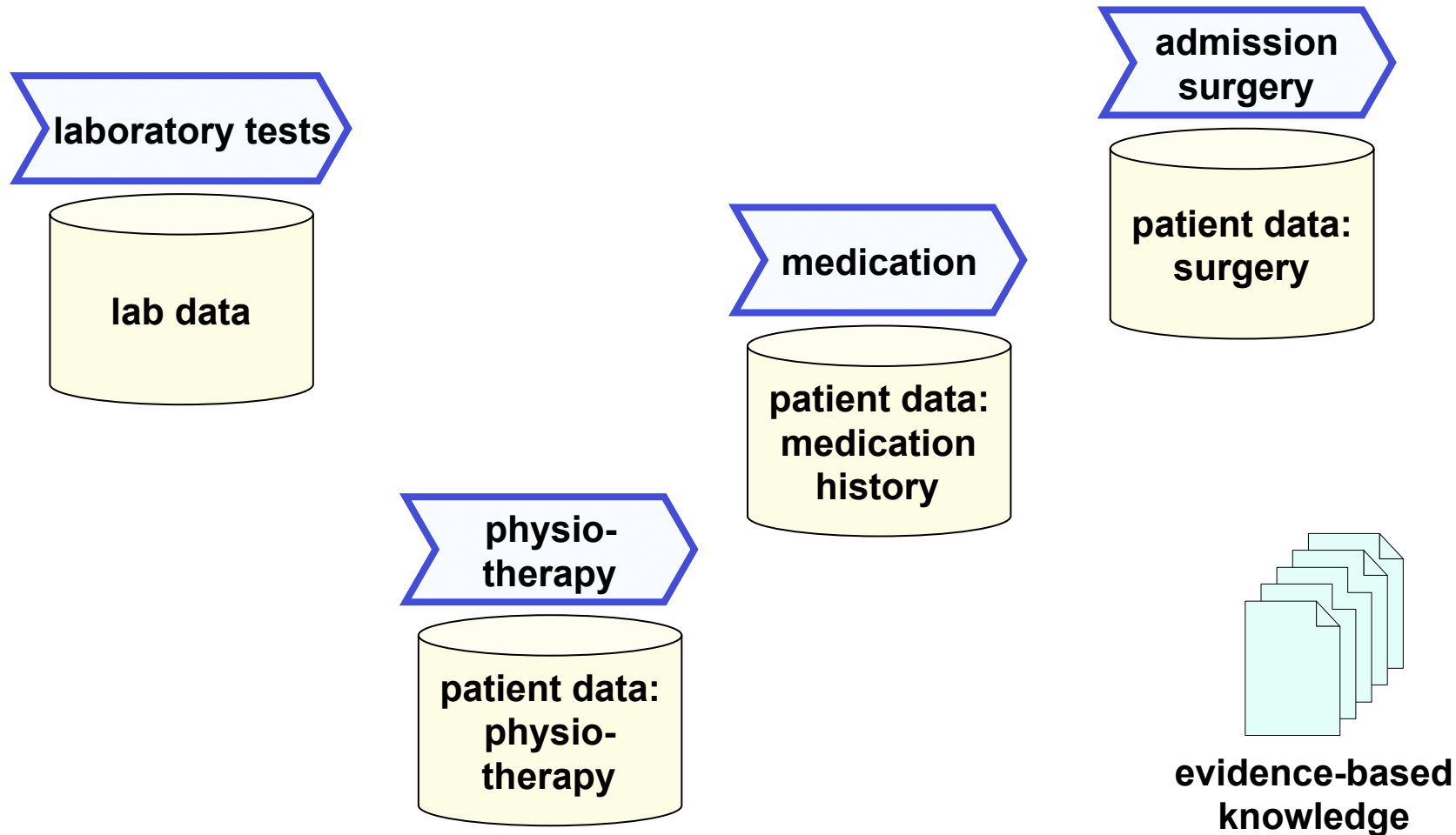
- Domain-specific language for e-government applications
- Framework for editor generation from DSL
- Integrate information provision and capturing into interaction patterns
- Transfer and generalise approach to other domains



Outline

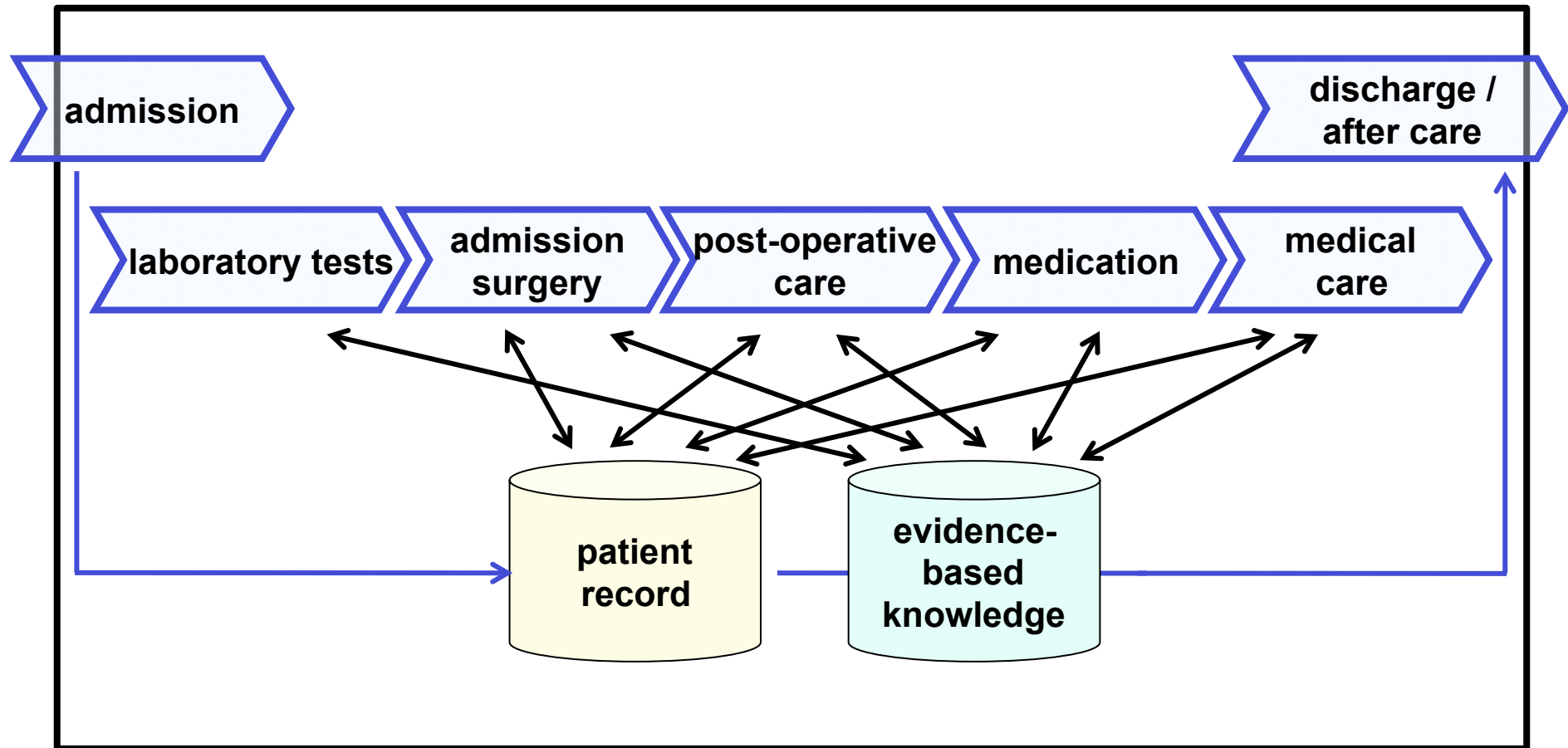
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Hospital: Fragmented processes and information supply





Medical workbench centered around the clinical pathways



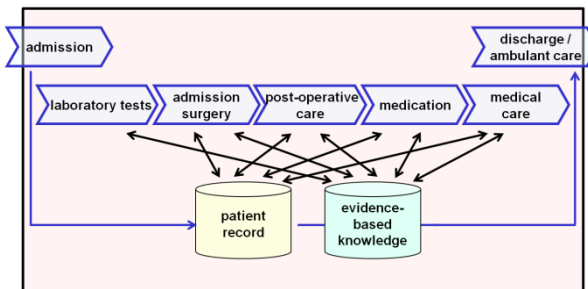
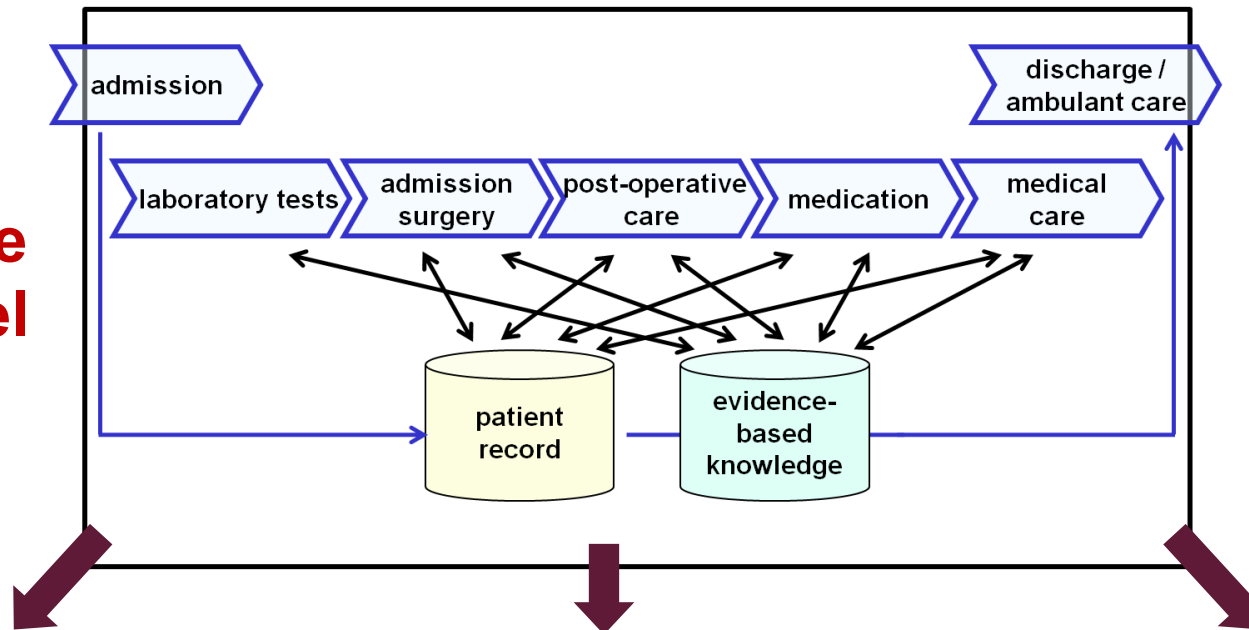


Medical workbench: characteristics

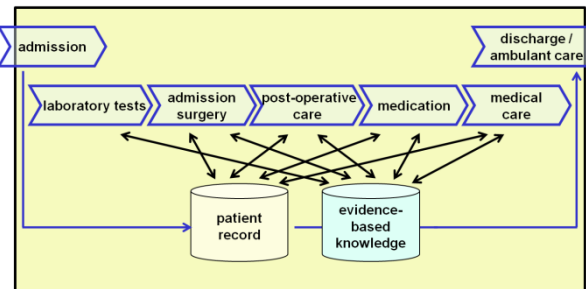
- information supply along clinical pathways:
electronic patient record
- knowledge supply along clinical pathways:
evidence-based medicine
- clinical pathways as weakly structured processes
- cross-organisational processes:
admission and discharge management
with subsequent after care

Reference model for a medical workbench

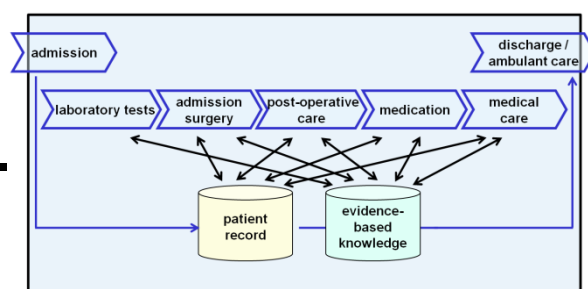
**reference
model**



Hospital Davos



Hospital Basel



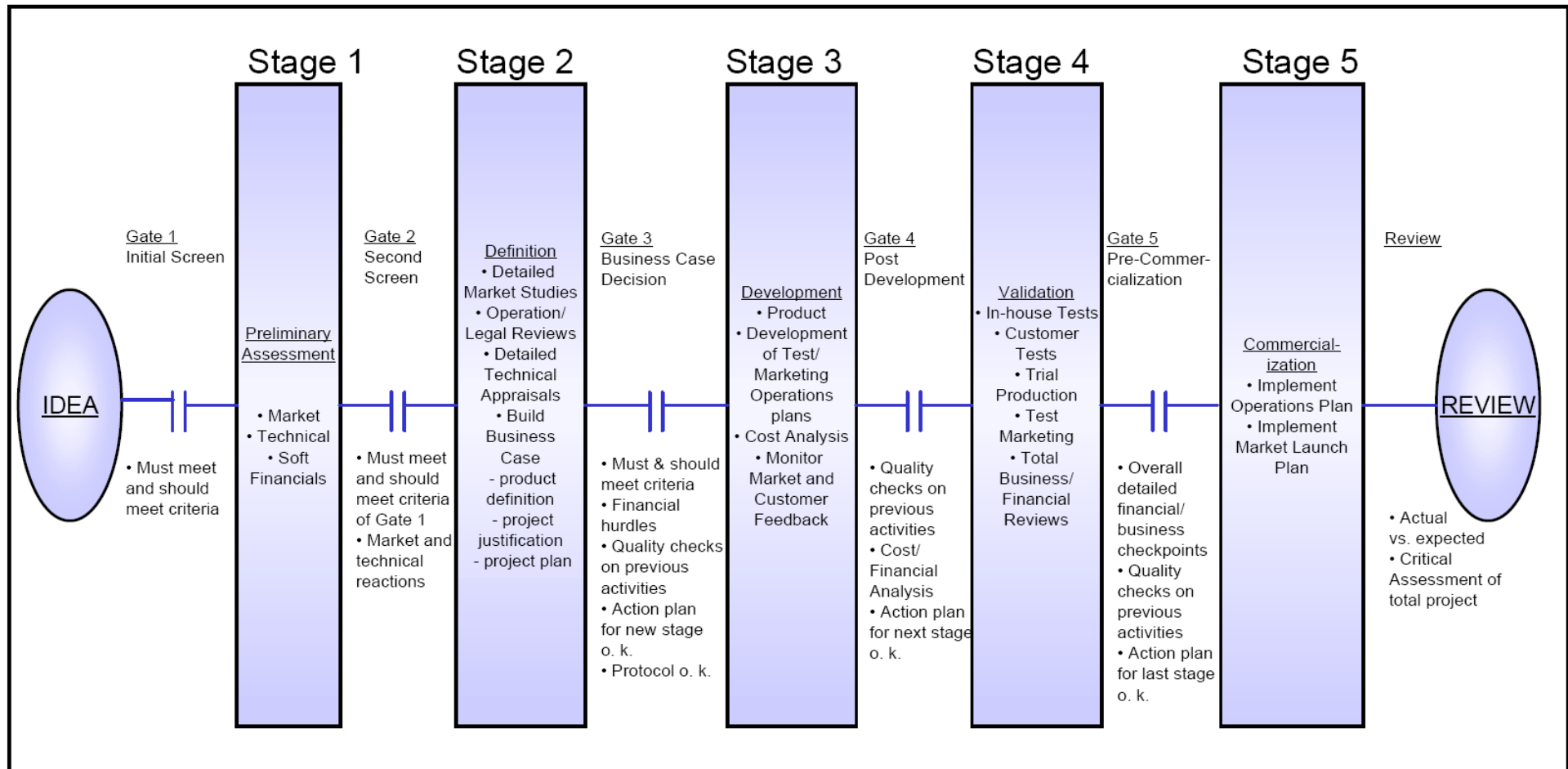
Hospital Flawil



Outline

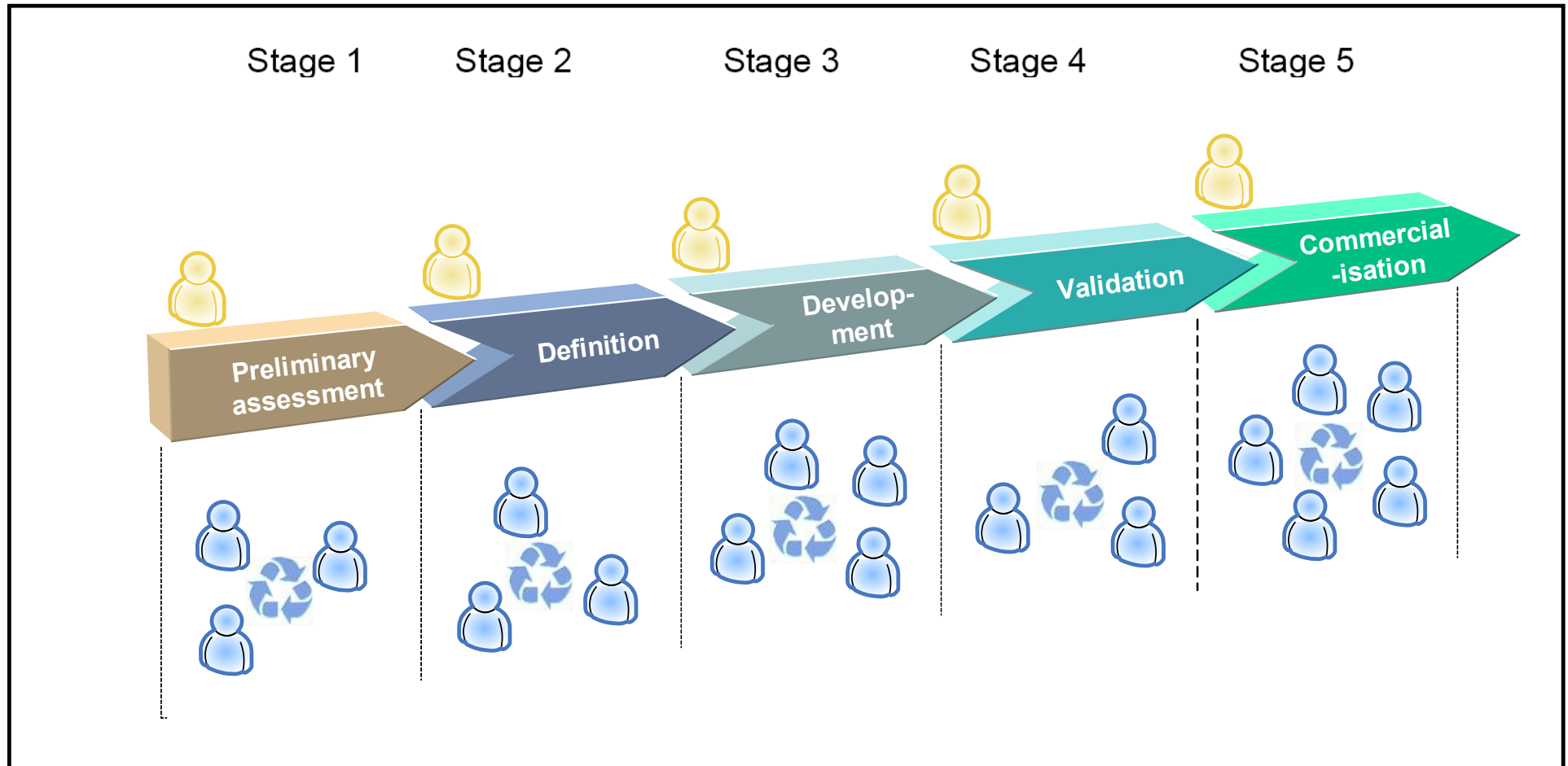
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A staged innovation process model: Classical




from: Cooper, R.G., Kleinschmidt, E.J.: New Products: The Key Factors in Success. American Marketing Association, Chicago (1990)

A staged innovation process model: New approach





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Overall conclusions & open issues

- Creating and maintaining information systems by:
meta-modeling + reference system
- How does reference modeling relate to meta modeling?
- How does a reference system correspond to a meta model instance?
- How to calibrate between
meta model size and size of meta model taxonomy?