DYNAMIC CATENATION AND EXECUTION OF CROSS ORGANISATIONAL BUSINESS PROCESSES

THE JCPEX! APPROACH

S-BPM ONE 2010 - Karlsruhe

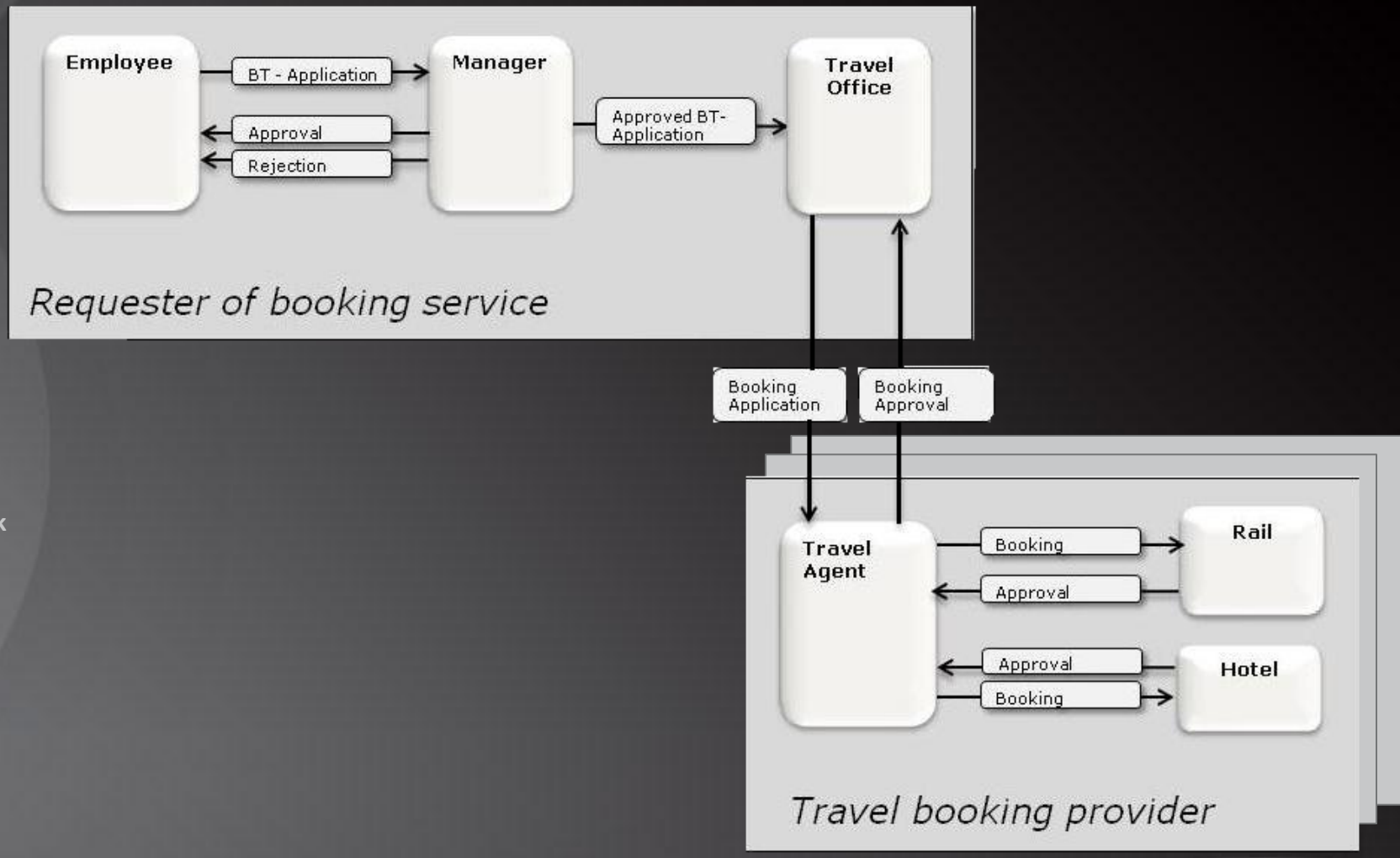
MOTIVATION I

- Globalization and increased market transparency
- Product and Service life cycle
- Complex products and services
- Dynamic cooperation between organisations
- Flexible cooperation and quick adaption to changes
- Partners selected for a short period
- Expand business processes to partners
- Process execution across organizational boundaries cause increased complexity

MOTIVATION II

- Modelling inter-organisational cooperation
- Frequent partner change, selection during runtime
- Formalized decision criteria to define partners in advance
- Security and process interna hiding
- Only necessary aspects of internal process should be available to others
- Shared responsibility for whole model

EXAMPLE



REQUIREMENTS I

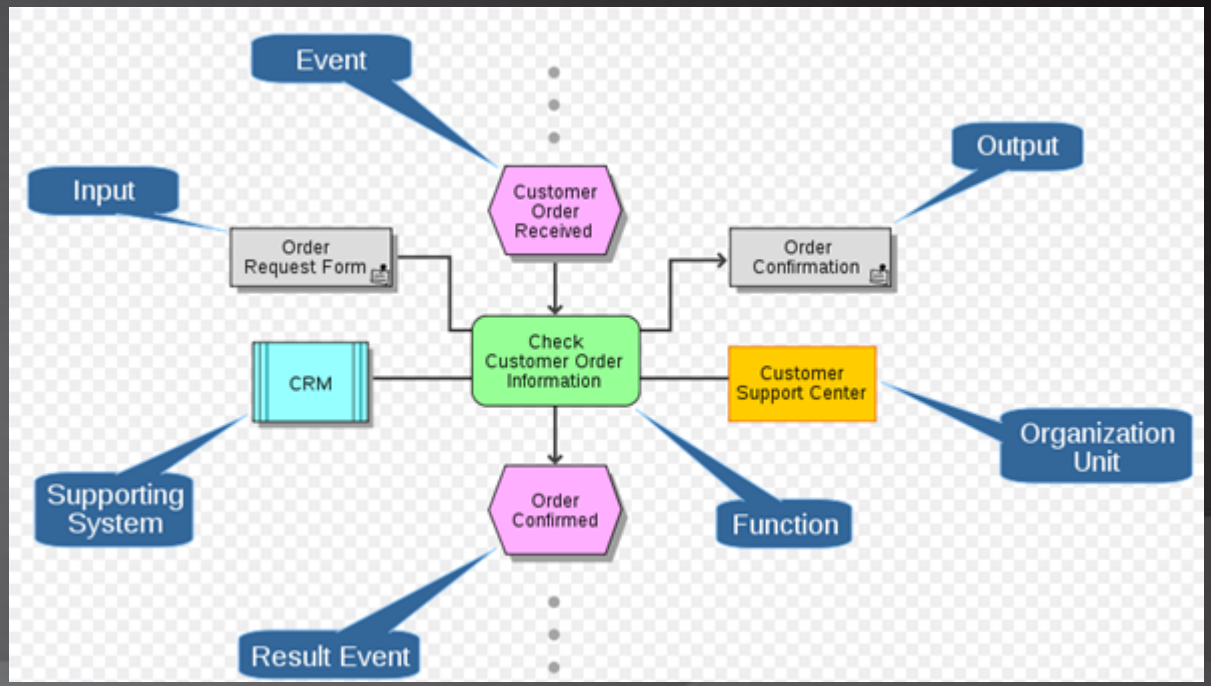
- **Modelling:**
  - Integrated modelling
  - One-to-many relationships
  - process dependent role definition
  - hiding of internal process events
  - dynamic catenation
  - relevance of observable behaviour

REQUIREMENTS II

- **Execution**
  - No central instance to control the message flow
  - Identification of potential partners at runtime
  - Automate partner selection in respect to predefined conditions

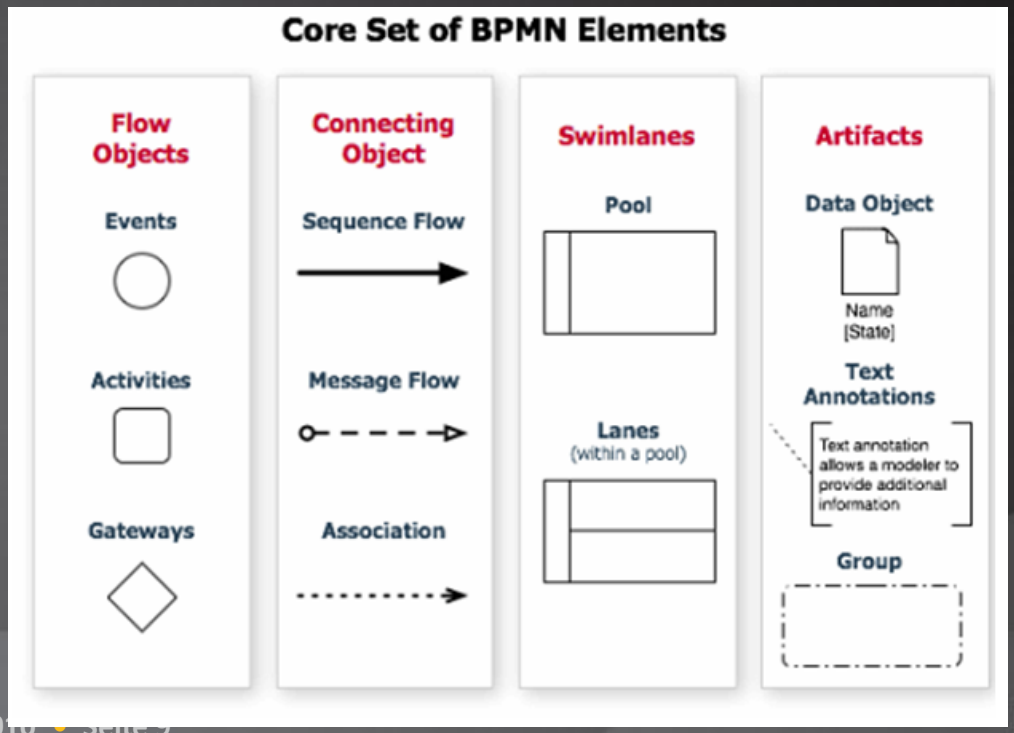
EVALUATION – EPC (EVENT DRIVEN PROCESS CHAIN)

- Important part of ARIS
- Control flow oriented
- Approaches for CBP exist: global processes, process views and private processes
- Modelling to execution transformation



EVALUATION – BPMN 2.0

- Graphical business process and workflow modelling language
- Collaboration, Choreography and Conversation → can lead to inconsistencies
- No 1-to-many semantics
- Gap between modelling and execution, no concrete execution semantic



EVALUATION – WS-CDL

- Web Service Choreography Language describes globally the interaction between participants
- Globally observable behaviour
- Problems: Formalism, reusability, semantic inconsistencies, multi-party interactions are missing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                Kanal Variable (channel variable)
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```


EVALUATION – LET'S DANCE

- Proposed by Queensland University and SAP Research Centre Australia
- Targets at behavioural aspects of service interactions
- Targeted at business analysts and software architects
- Generation of executable models possible
- Tightly coupled to the Interaction Patterns
- Modelling tool available
- Problems: Semantic gap between modelling and execution, lacks of fulfilling requirements like „rule based receiver selection“ and „roles“

EVALUATION – EXECUTION

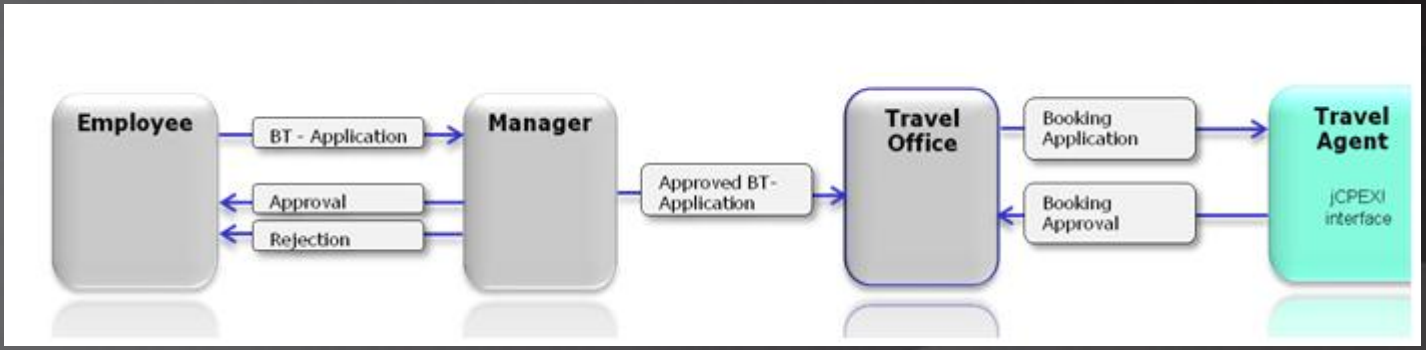
- Typically realized by workflow engines (Apache ODE, Bonita, FlowMind, imixs, jBPM,…)
- Cross-organisational communication realized by service calls → who is responsible for the whole process?
- Systems like SAP XI / ccBPM for connecting SAP and foreign systems: BPEL based → rules for message routing are stored centrally
- EDI: EDIFACT, RosettaNet describe data formats → no process support, no support of 1-n scenarios, dynamic connection of different organizations not covered

EVALUATION – SUMMARY

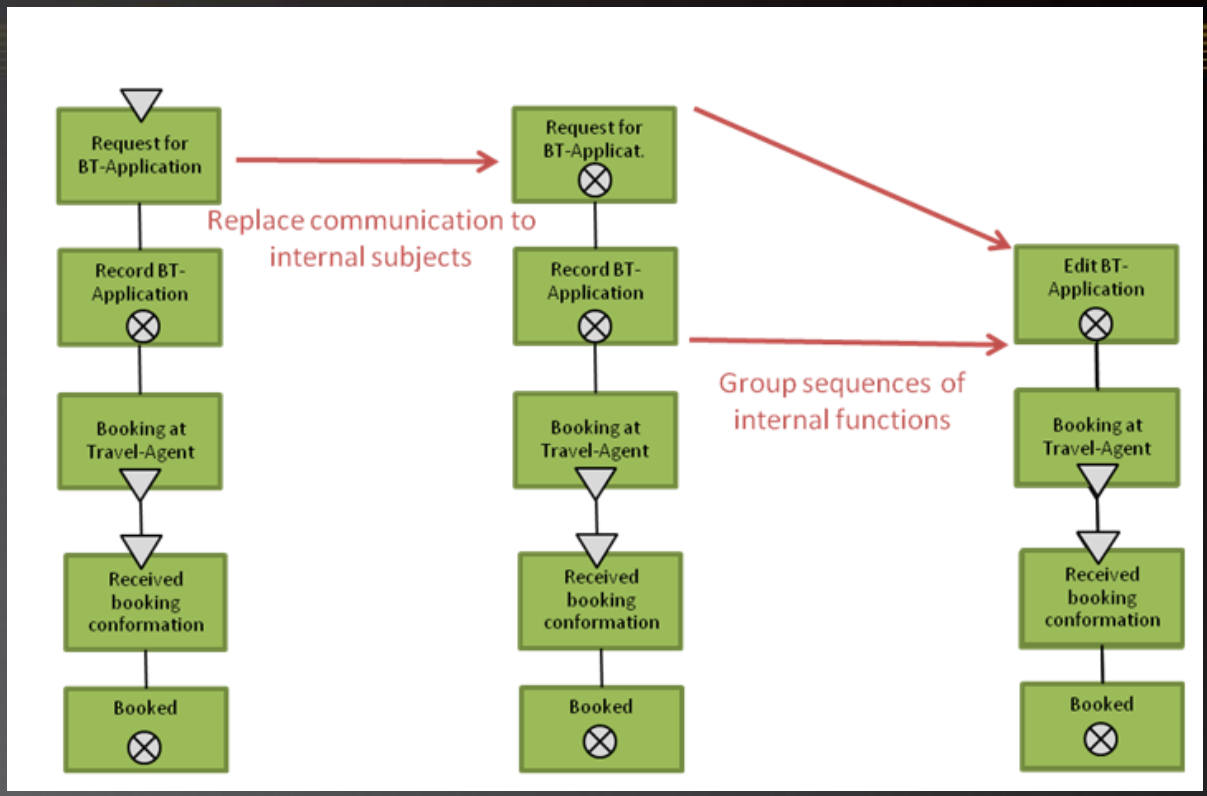
	EPC	BPMN 2.0	WS-CDL	Let's Dance	ATHENA
Integrated modelling	-	~	-	~	~
One-to-Many relationships	-	~	-	+	-
Process dependent role definition	-	-	-	-	-
Hiding of internal process events	-	~	+	+	+
Dynamic catenation	n.a.	~	~	~	~
Relevance of Observable Behaviour	~	~	~	~	~

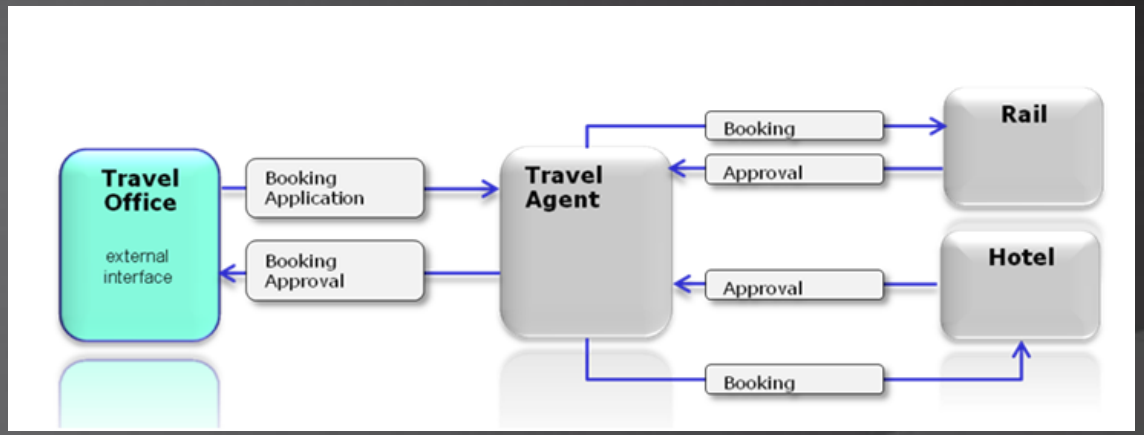
OUR SOLUTION – INFORMATION HIDING I

- Subject-oriented modelling helps to hide internal matter
- Usually one subject is responsible for inter-organizational communication → message exchange of this subject with other internal subjects is hidden
- Creation of an „interface subject“, which can be seen as the observable behaviour of the whole process
- „Behavioural Interface“ (BI)
- Sequence of message flow and contained decisions is preserved



OUR SOLUTION – INFORMATION HIDING II





OUR SOLUTION – ENABLE DYNAMIC CHANGE OF PARTNERS

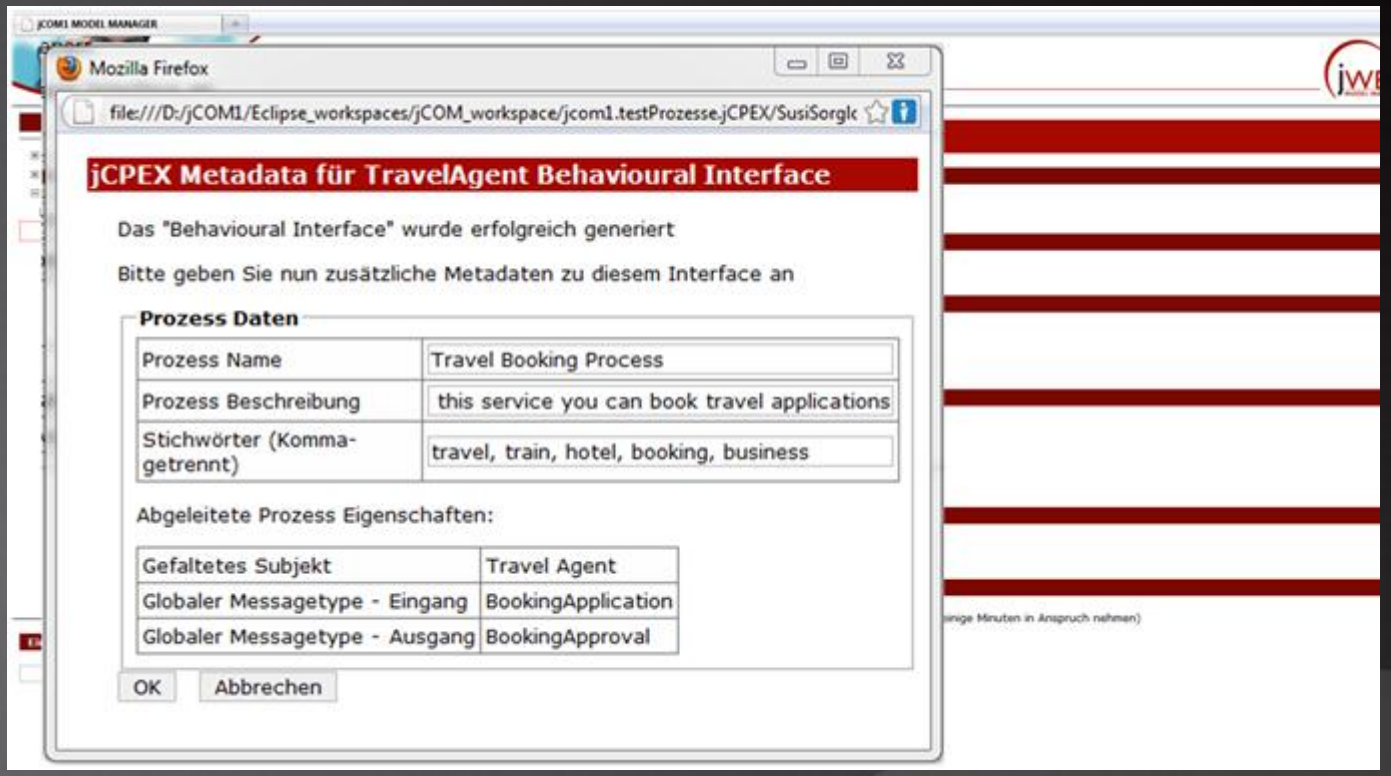
- Behavioural Interface can be publicy announced
- Enable partners to model their processes suitable to this interface
- Further organizations can offer implementations for theses Behavioural Interfaces
- All processes fulfilling this interface can be found and/or substituted during runtime

OUR SOLUTION – GENERATION AND PUBLICATION OF THE BEHAVIOURAL INTERFACE

- After modelling and validation process description is internally deployed to the runtime
- When engine notices an external jCPEX! Subject, the user can define an URI in order to enable other companies to implement their services compatible to this BI
- Once this URI is given to an interfaces, the „observable behaviour“ of the process is calculated and published

OUR SOLUTION – ADDING METADATA

- After BI generation, the user provides additional information about this BI in order to be findable by other companies



OUR SOLUTION – MODELLING SUITABLE PARTNER PROCESS

- Multi-Level search queries are possible
- Identify appropriate processes of potential partners
- An URI of the BI is returned by the search engine (for each entry)
- During modelling subjects can be marked with this URI

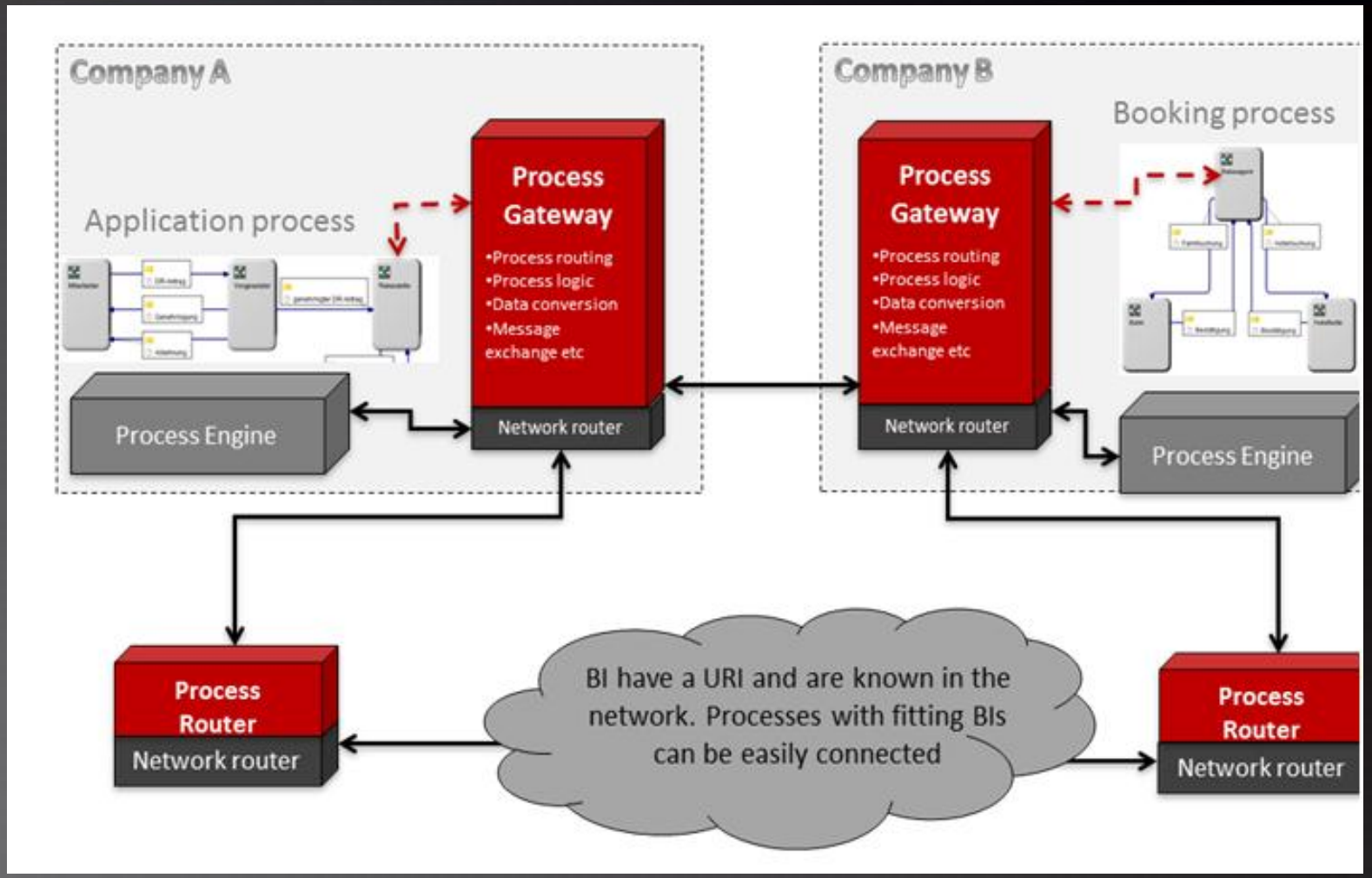
OUR SOLUTION – PROCESS EXECUTION

- Agent is able to execute cross organizational business process after deployment
- When process reaches a state, where a message has to be sent to an external jCPEX! Subject, the process engine forwards the message to the „Process Gateway“
- Each implemtation of an BI returns data-structure which defines different „roles“ shown to the initiator

OUR SOLUTION – PROCESS RULES

- Rules can restrict possible receivers or select a particular service provider
- E.g. validation of Business Objects (Sender rules)
- On the other side, receiver rules can act like „process firewalls“ and reject messages
- Rules reside within the Process Gateway
- Front-End to generate and edit rules
- Very generic rules

OUR SOLUTION – DECENTRALIZED ARCHITECTURE



CONCLUSION AND FUTURE WORK

- Several requirements were deduced regarding modelling & execution
- Evaluation of common CBPM approaches
- Introduction of our jCPEX! Solution, which fulfills all requirements
- “Subject Oriented” modelling already gave the appropriate granularity
- Gap between modelling and execution is minimized
- Future work is necessary regarding
  - security and effective search capabilities
  - appropriate description of organizations
  - appropriate definition of „Capabilities“

METASONIC

METASONIC process. in tune.

METASONIC BASE

METASONIC BUILD

METASONIC FLOW

METASONIC PROOF