How to enable Holistic Approaches to Business Process Lifecycle Management

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During the seminar we discussed in working groups the following questions.

How to represent business processes for *business performers*?

- **Situation-specific modeling techniques:**
  - o Emphasis here is on *methods* to efficiently and effectively generate such specific techniques.
- **Domain-specific modeling techniques:**
  - o For some domains, general needs can be distinguished. Think of the general duties of a nurse. One can imagine visual schedules with important objects, case load, timing information, etc.
- **Process-type modeling techniques:**
  - o A categorization of business processes may reveal common needs for, for example, frequently instantiated processes, high-value processes, non-predictable processes, etc.
- **Challenge:**
  - o Look deeper and develop these techniques

What are challenges in process model understanding?

- **Fostering understandability during process modeling**
  - o Process navigation (role dependent, purpose dependent, context dependent etc.)
  - o replay the creation/history (and changes) of the process in such a way that domain experts, process designers, etc. can make sense of it (process model understanding is improved)
  - o animation and layout
  - o Come up with new notations, compare the different visualizations (could also be text), domain-specific?

- **Validation and communication of process models**
  - o How to efficiently and comprehensively validate a BP design
  - o Communication of domain expert and process designer, because process model might not be the most effective mean to foster this communication
  - o Use user/performer interfaces to help visualize the process model

- **Fostering understandability during process enactment**
  - o Contextualization/Personalization to understand during enactment (e.g. get current work list)
  - o how much information to show to performers/decision makers (respecting privacy issues), big picture
  - o provide additional material/documentation along with the process, challenge: how to integrate, how to put in context with user background/knowledge

How to support Human-Centric Business Process Management - links to corporate strategy?

Since corporate strategy is implemented through goals and tactics of middle management and executed by humans in lines of business the first challenge is to provide support for effective design and collaboration challenge between management and process performers. Management needs to be included in order to ensure that strategy is not violated. Similarly process performers need to be involved as the knowledge on how business processes are executed resides within them.

The second challenge is revolves around the split responsibility for process execution between business and IT. IT is responsible for building reliable work support systems that ensure properties such as data integrity, availability, and scalability. Correspondingly, IT has a stake in process design, but IT itself does not generate financial value, thus it does not directly execute the top strategy goal (making money). On the other hand, business is responsible for organizational responsibilities and quality of service for customer-facing operations such as deadlines, contracts, or penalties. Thus, not only does the above stated design and collaboration challenge extend to IT, but in addition we need to reconcile technical needs and business/strategy goals.

A third challenge is to link both quantitative and qualitative measures to either existing business processes or newly defined ones. How can business processes be identified and streamlined according top level goals? For new process designs, how can we obtain indicators that map tasks and events to the strategic goals of the organization? Which quantitative measures apart from financial ones are useful to guide a business process taxonomy / business process design? Conversely, which qualitative ones are useful for this task?

What are innovative techniques that (could) support BPM

Artifact-centric Approaches
Artifact-centric approaches use the concept of artifacts as the central focus element. A key improvement for collaborative work are multitouch/tables with the capability to move artifacts around. This moving includes the "throwing" of an artifact to another user: The artifact disappears at the device of one user and appears at the device of the other user. This user can then refine the artifact, check for consistency, etc. Thus, a collaborative design environment consists of multiple touch screen devices, where artifacts can be exchanged.

Business Process Reuse
The area of business process reuse also benefits from new techniques. Business process reuse is about identifying process fragments in a repository to reuse reoccurring parts of a process to reduce modeling efforts. At the interface level, multitouch interfaces can support the user in browsing for fragments. Nowadays, users seem to be hampered by the mouse and keyboard interface. They cannot browse through a fragment repository quickly. By using multitouch interfaces, we see a potential to improve browsing performance.
In the work of creating a process model, existing tools should display the existing fragments while the user models a process. This may be realized by a side bar, where possible fitting fragments are displayed in the order of matching. Another approach is to overlay the most potential fragment in the modeling canvas. The method used to display a fragment is also called "recommender system": The system recommends possible fragments to the user.

The following techniques and methods have been identified by Dagstuhl participants as most important to look at in the future:
- tangible modeling/tactical feedback
- voice recognition
- multitouch
- social networks (Twitter/Facebook)
- modeling without modeling intent (process mining)

What are challenges for interacting processes?

The key challenge is to understand the nature of artifacts. It has to be distinguished what an artifact is and what is not an artifact. At first sight, an artifact has an internal state and constraints on its behavior. The possible state changes may be represented by a state machine, which does need to be finite.
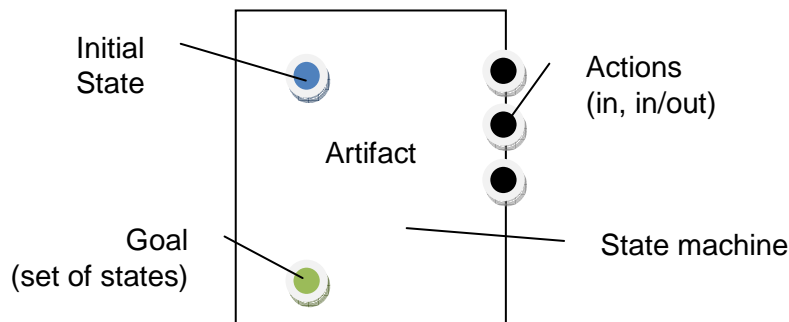

Figure : A first sight on an artifact

The constraints on the evolution of the artifact have to be identified. The constraints may reside on a public (contractual) basis and on a private (local, policy-driven) basis. To get a design of an artifact model, practice should be analyzed. The analysis should include existing (workflow) systems to generate an artifact model. This model may consist of different levels: the information level, the behavior level and finally, a contract should be extracted and proposed.

An artifact may offer different views (perspectives) on it. For instance, one sees only a part of the artifact and can apply only certain operations depending on ones role and the state of the artifact. This is related to the general concept of roles, views and access control.

The interaction between artifacts has to be described and analyzed. The interaction has to be correct, sound and consistent with other requirements and obligations. It has to comply to specifications and contracts. Data has to be protected and kept private. The reasoning on the interaction is a distributed reasoning between autonomous artifacts (agents). The local reasoning is based on the context where the artifact resides. Besides communication between artifacts, the interaction may also happen between existing systems (legacy systems) and between a workflow engine and an artifact system. An artifact may be accessed by multiple agents. Thus, there has to be some sort of concurrency control. Solutions to that include a limitation of concurrency and an understanding where concurrency control is required and where the system works without it.

What are challenges for business process reuse?

Research challenges
- o *Discovery of reusable BPs*
- o *Semantics for business processes*
- o *Personalized (graphical) reuse*
- o *Relationship between process models*
- o *Reliability for process model reuse*
- o Fragment granularity

Application challenges
- o *Business process patterns*
- o *Composition/integration*

o   *Understandability of fragments*

Towards a Unified Theory of Process Modeling: Bridging: Data and Theory

The goal of this working group is to develop a common understanding of the tradeoffs between *data-centric* and *process-centric* approaches to process modeling.

To progress in the discussion, we tried to think what could make one approach "better" than another. We started by putting a few hypotheses on when/how is an approach better than another:

1. *** In the case of processes that are not purely case-based but instead there significant amount of batch processing, the data-driven approach leads to more "natural" or "understandable" models.

2. *** In the case of processes where changes are very frequent, the data-driven approach leads to more "natural" or "understandable" models

3. ** For Enterprise Application Integration, where the interfaces of external application components are fixed and the goal is to integrate these components by providing inputs and collecting outputs in a particular order (data-flow connections), a process-centric view is more natural/effective models. In particular, guaranteeing that all required input/output are available at the right moment, is "easier" to verify. This might have to do with the existing state of the art on verification of this kind of systems rather than any fundamental reasons.

4. ** Where process monitoring (e.g. case tracking) is an important requirement, data-centric approaches are more appropriate. Example is the patient treatment process where the doctor wants to see the status of the patient.

5. *** When privacy is an important requirement, the data-centric approach would lead to more understandable/effective models, because we can formulate privacy constraints in a finer-grained manner than setting privacy constraints and access control constraints at the process level. At the same time, we acknowledge that the process perspective needs to be taken into account – for example a reviewer might have the right of seeing a piece of data at some phases of the reviewing process, but not at others.

6. ** Once we have started the modeling process, all three models are important and need to co-evolve, i.e. the data/objects model, the interactions/contracts model and the internal process model.

7. *** If we start from the data-centric view (and specifically the artifact-centric view) is it easy to derive the process view from it, but on the other hand, to start from the process view and to derive the data-centric view from there, is tricky in the general case. There could be many ways of translating or mediating between the two viewpoints.

8. *** At the non-technical level (e.g. managers) tend to prefer the data-centric perspective. For example, managers will think in terms of "loan being approved" or "loan being processes". On the other hand, IT people have to implement this, and they have to add procedural details. At this level, sometimes the data-centric is better and sometimes the process-centric view is better. Conclusion is that for managers, it might be more beneficial to look at the end-to-end process from a activity-centric perspective.

9. *** When there is a requirement that a very broad set of people (e.g. business people) get an understanding of how the process work, for example for process documentation and business improvement, then process-centric approaches are more effective.

10. * When there is a requirement for optimizing the execution of processes, an integrated view (where none of the views is predominant) is more effective.

11. *** Activity-centric view provides a more end-to-end view on the process, and this is beneficial when communicating with the customer. It's an effective abstraction to reason about the customer's interactions with the enterprise.

12. Activity-centric view is more "convenient" for analyzing temporal aspects of a process.

13. *** Business process compliance is "easier" on integrated views (data+process) of processes.

14. *** Naming the "data-centric" approach "data-centric" leads to a lot of confusion. There will less misunderstandings if we use "integrated view" instead of "data-centric".