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Adaptive Case Management
Leveraging open source technologies to perform knowledge work

Masterstudium:
Information and Knowledge Management

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Problem Definition

Public administrations deal with a wide range of investigative and case-related activities. The progress of a case is often driven by the circumstances or events that occur during the case itself and which depend on the knowledge of a team of case workers. The work performed by the case team is knowledge work, and non-traditional process automation techniques are required to support case workers. Based on the lessons learned from recent case management projects at the European Commission, the aim of this research is to identify a case management approach suitable for the domain of trade negotiations, as well as an open source-based technology stack able to support the chosen approach.

RQ1: Does a suitable case management approach for **highly unpredictable business domains** exist?

RQ2: Can this case management approach be supported by an **open source-based technology stack**?

RQ3: Can a business process execution engine be customised to allow for the **execution of unpredictable processes**?

Methodology and Approach

1. Research the **nature of knowledge** work and **existing approaches to case management**, based on review of available literature

2. Establish **core requirements** of Adaptive Case Management system

3. Review **lessons learned** from recent case management projects

4. Present application architecture for open source-based **Adaptive Case Management prototype**

5. Test prototype's capabilities for **executing unpredictable processes**

6. **Evaluate prototype** against core requirements of Adaptive Case Management
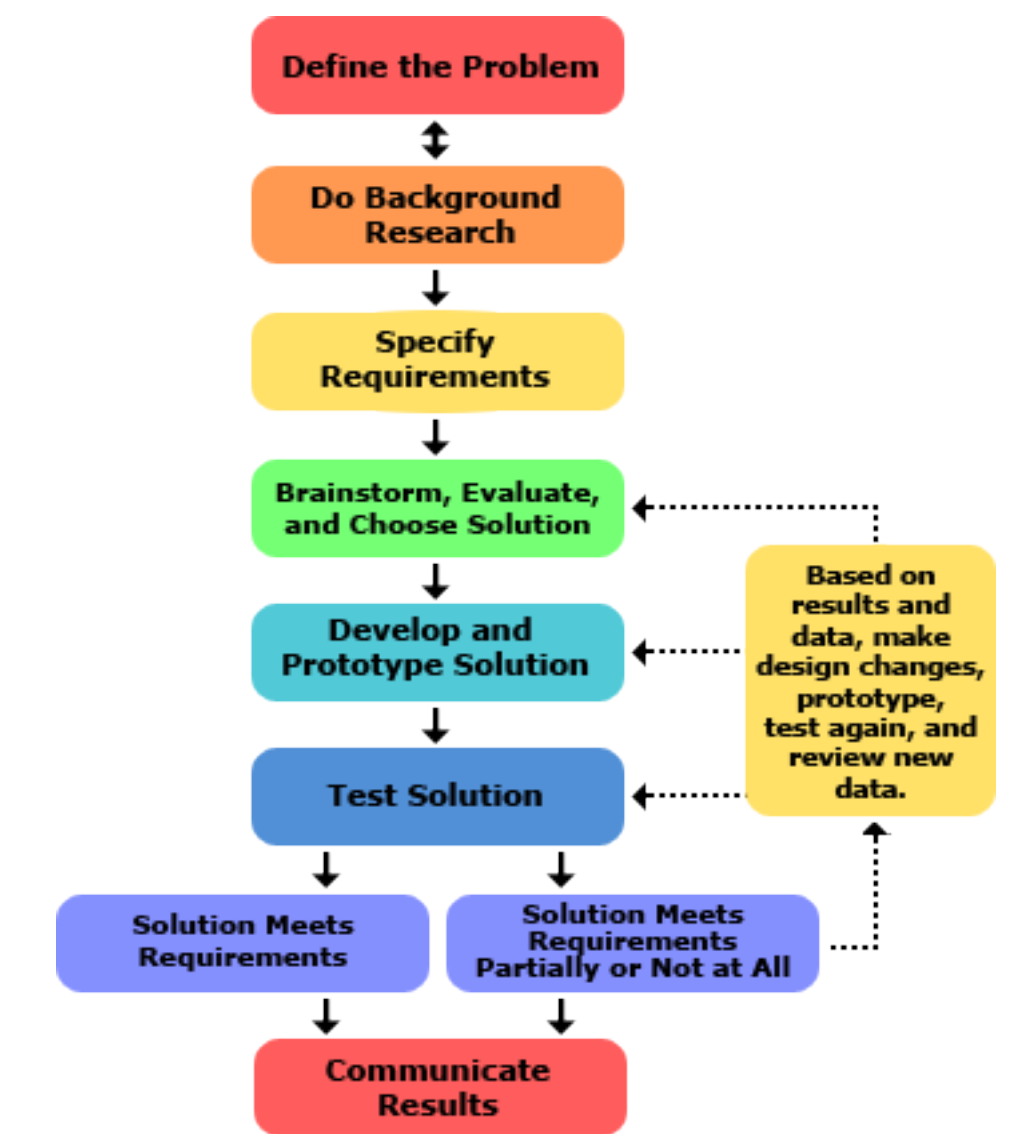
State of the Art

- **Business Process Management** (BPM): „The practice of developing, running, performance measuring and simulating business processes to effect the continued improvement of those processes."

- **Production Case Management** (PCM): „An approach to supporting knowledge workers which is programmed by specially-trained technical people, and offers collections of operations that a knowledge worker may choose to use, depending on the specific needs of the case."

- **Adaptive Case Management** (ACM): „A productive system that deploys not only the organization and process structure, but becomes the system of record for the business data entities and content involved."

Core Requirements

1. **Interoperability**: ACM has to provide a universal approach integrating various knowledge silos into a unified and meaningful view.

2. **Process Execution**: ACM requires the ability to adapt all elements of a case at run-time.

3. **Decision Making**: Business rules have to be evaluated in the context of a specific process instance.

4. **Content Management**: Process and content are meaningless without each other.

5. **Identity and Access Management**: Users must be authorised to perform actions on interactive process elements.

6. **Accountability and Transparency**: Historical information must be recorded and made accessible.
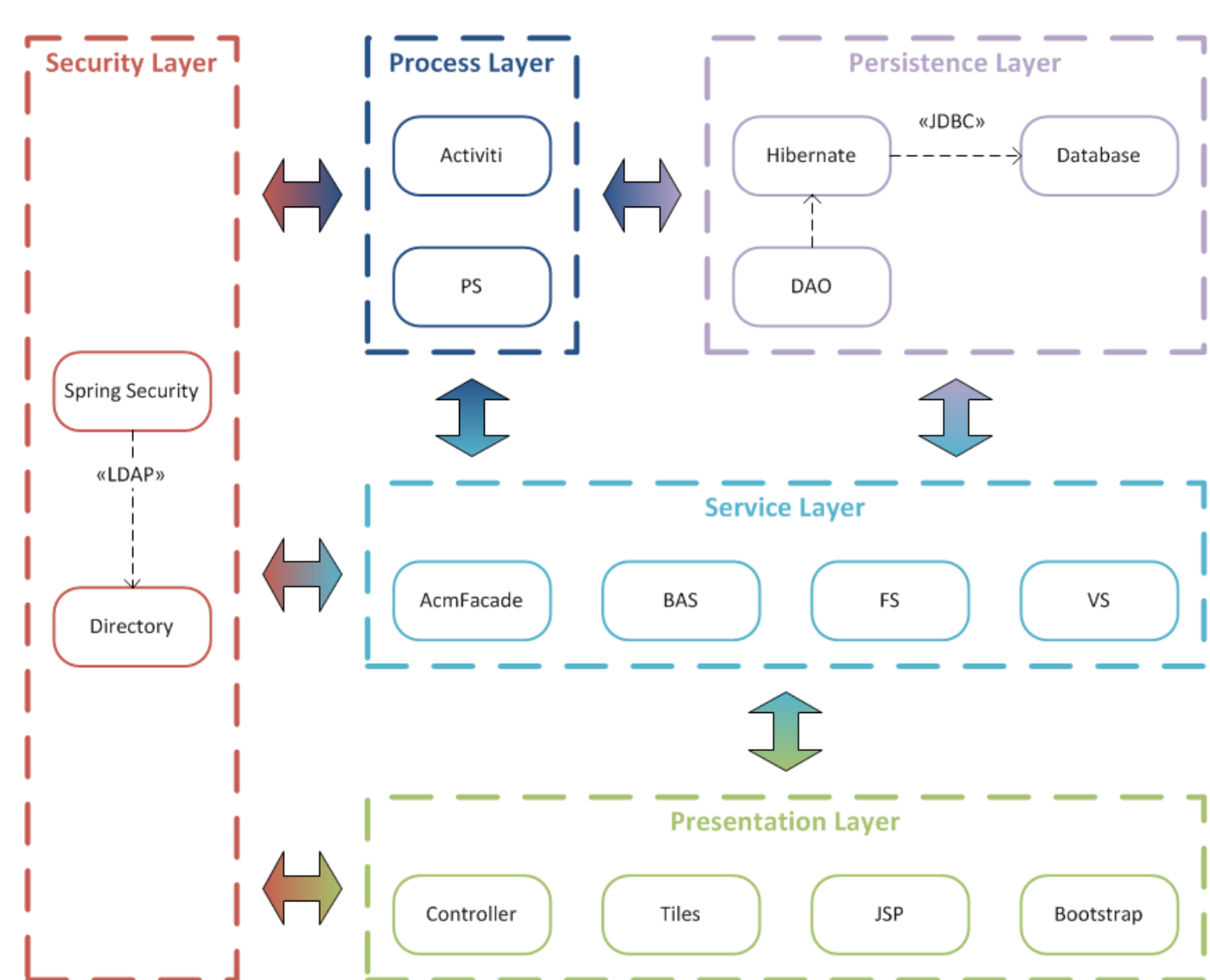
Lessons Learned

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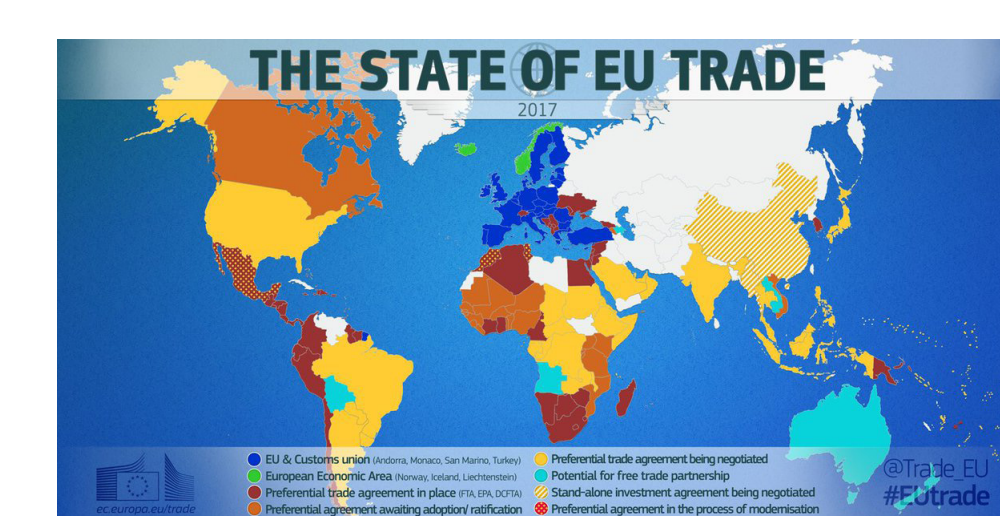
Trade negotiations offer a lot of room for flexibility, and can benefit greatly from an adaptive approach to case management.

Direct involvement of Member States and the magnitude of both stakeholders and user base require strict control over the lifecycle of customs decisions.
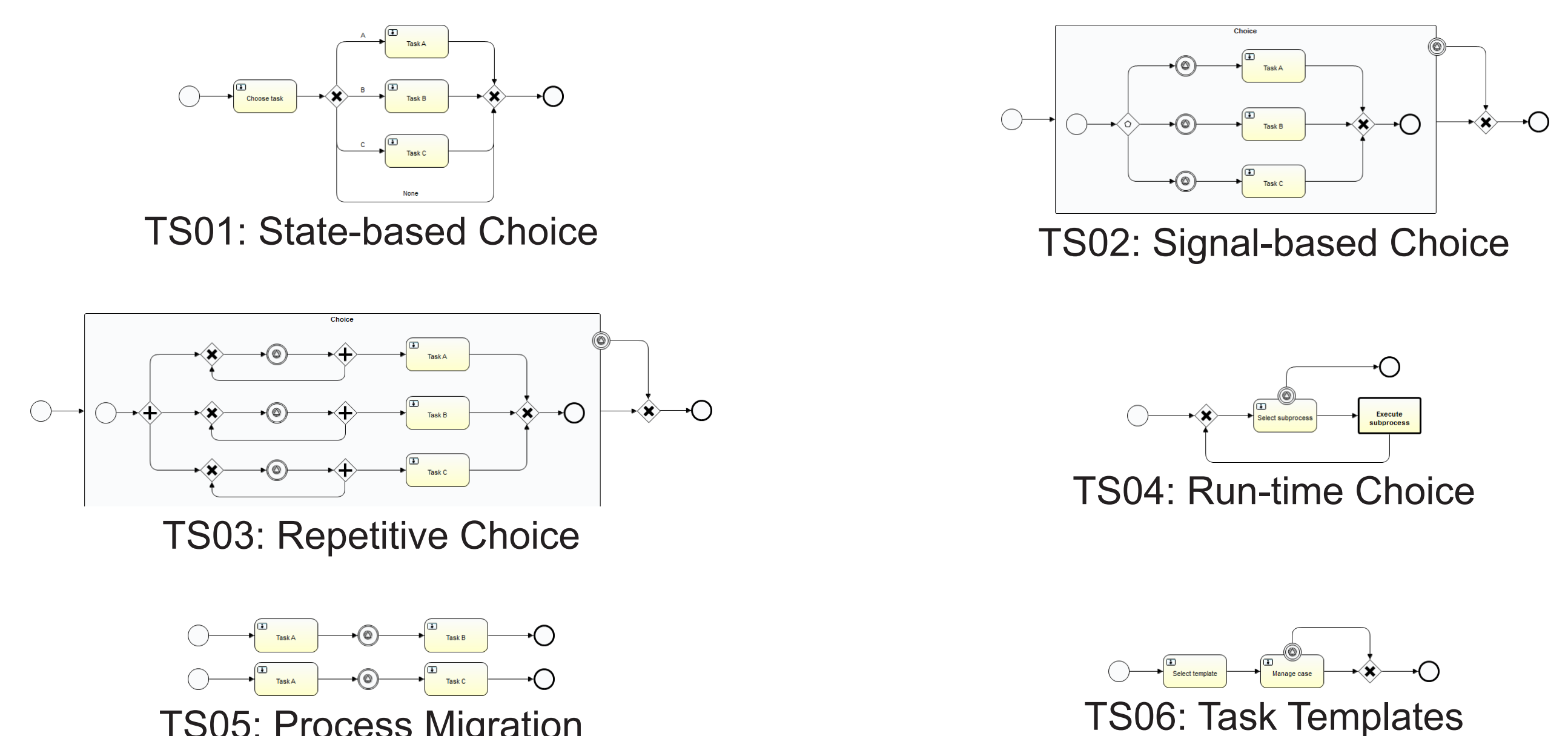
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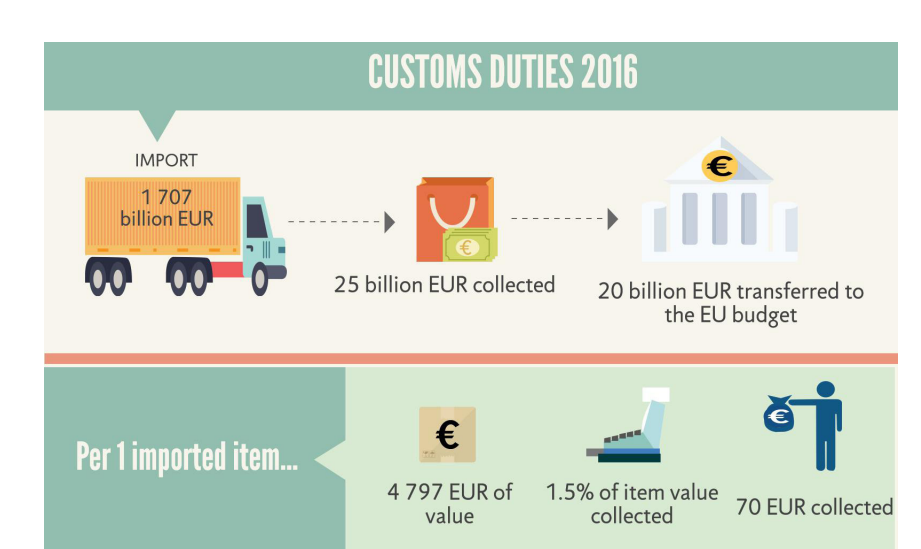
Prototype

- **Security Layer**: prevents unauthenticated or unauthorised access

- **Persistence Layer**: responsible for storage and retrieval of data

- **Service Layer**: includes the custom business logic implemented by the prototype

- **Process Layer**: contains the components required to execute long-running and distributed workflows

- **Presentation Layer**: consists of the controllers responsible for assigning a model to a view, as well as various components used to display a view

Test Scenarios

TS01: State-based Choice

TS02: Signal-based Choice

TS03: Repetitive Choice

TS04: Run-time Choice

TS05: Process Migration

TS06: Task Templates

Evaluation

1. **Interoperability**: ACM prototype makes extensive use of existing standards described to facilitate interaction with external IT systems.

2. **Process Execution**: Research indicates that extensive customisation of Activiti could allow for the use of an unstructured container for case activities based on task templates.

3. **Decision Making**: Research indicates that non-explicit ordering of case activities, as well as a definition of process completion goals can be achieved through custom application logic similar.

4. **Content Management**: Full integration of external document and record management system is possible, but requires extensive coding to implement all available operations.

5. **Identity and Access Management**: ACM prototype demonstrates access control based on tenants, users, groups and roles, applying a collaborator lifecycle for all process entities.

6. **Accountability and Transparency**: ACM prototype keeps a historical record of both process state and business objects, and makes this information available in the user interface.

Conclusion

- **RQ1**: Thanks to its focus on run-time flexibility, which empowers knowledge workers to plan their case as it happens, and adapt to changing circumstances that could not be foreseen at design-time, **Adaptive Case Management is a suitable approach for unpredictable business domains** such as trade negotiations.

- **RQ2**: The prototype developed for this thesis is based entirely on open source software, but the implementation effort is considerable, as **built-in capabilities of vendor-based solutions have to be developed from scratch**.

- **RQ3**: Activiti offers a very promising foundation for building an IT application capable of executing unpredictable processes, but the required application logic is complex, and **maintaining a customised fork of an open source project is in itself no mean feat**.

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