ACTIVE
Knowledge-Powered Enterprise

Informal Knowledge Processes

The Long Tail of Business Processes

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2009-09-05, Bled
Summer School

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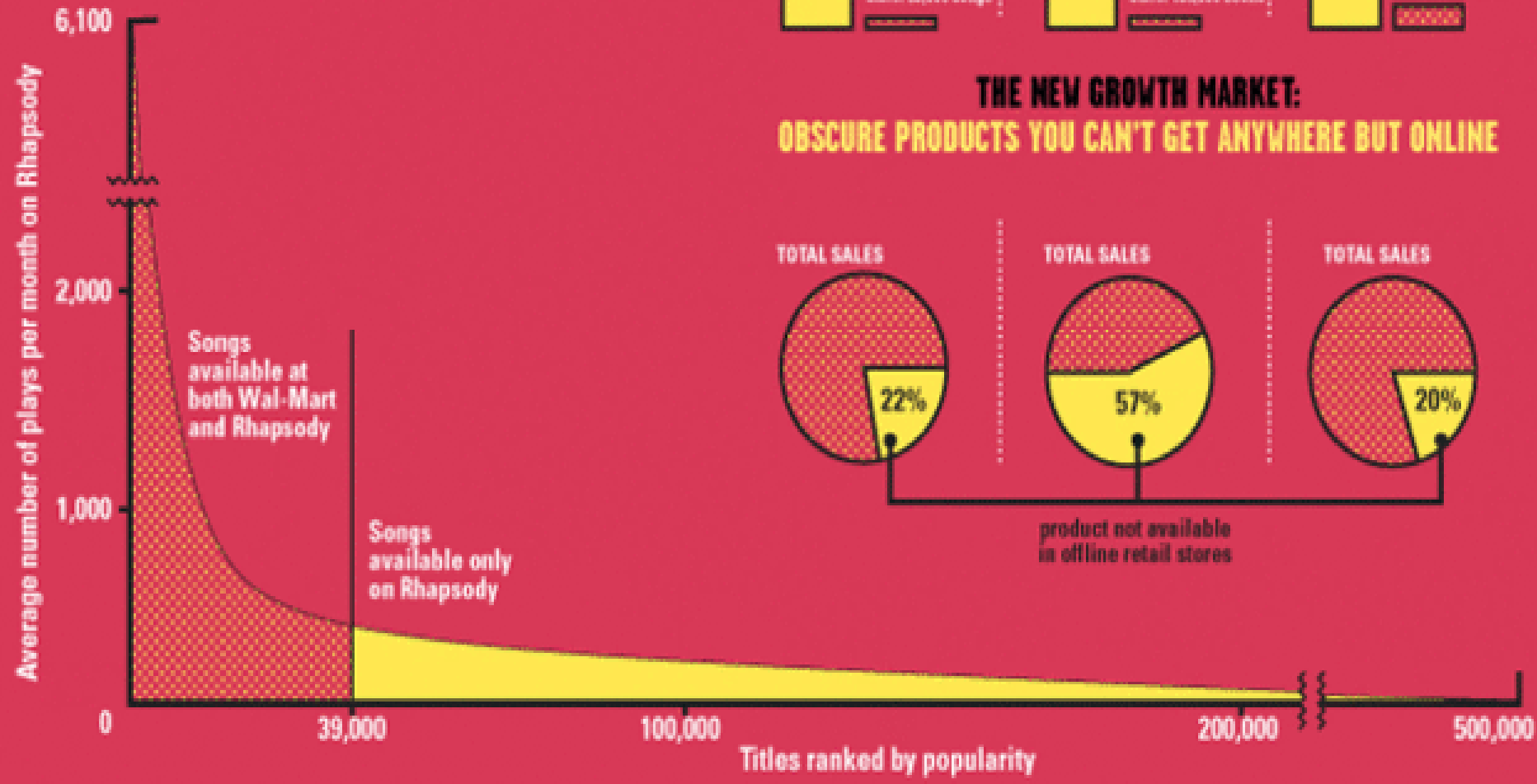
Agenda

- Knowledge Worker
- Business Processes and Informal Knowledge Processes
  - Motivations
  - Definitions
- Framework for Knowledge Processes
- Metrics for optimisation of Knowledge Process efficiencies
- Security and Privacy Aspects in Knowledge Processes

ANATOMY OF THE LONG TAIL

Online services carry far more inventory than traditional retailers. Rhapsody, for example, offers 19 times as many songs as Wal-Mart's stock of 39,000 tunes. The appetite for Rhapsody's more obscure tunes (charted below in yellow) makes up the so-called Long Tail. Meanwhile, even as consumers flock to mainstream books, music, and films (right), there is real demand for niche fare found only online.



THE NEW GROWTH MARKET:
OBSCURE PRODUCTS YOU CAN'T GET ANYWHERE BUT ONLINE

Sources: Erik Brynjolfsson and Jeffrey Hu, MIT, and Michael Smith, Carnegie Mellon; Barnes & Noble; Netflix; RealNetworks

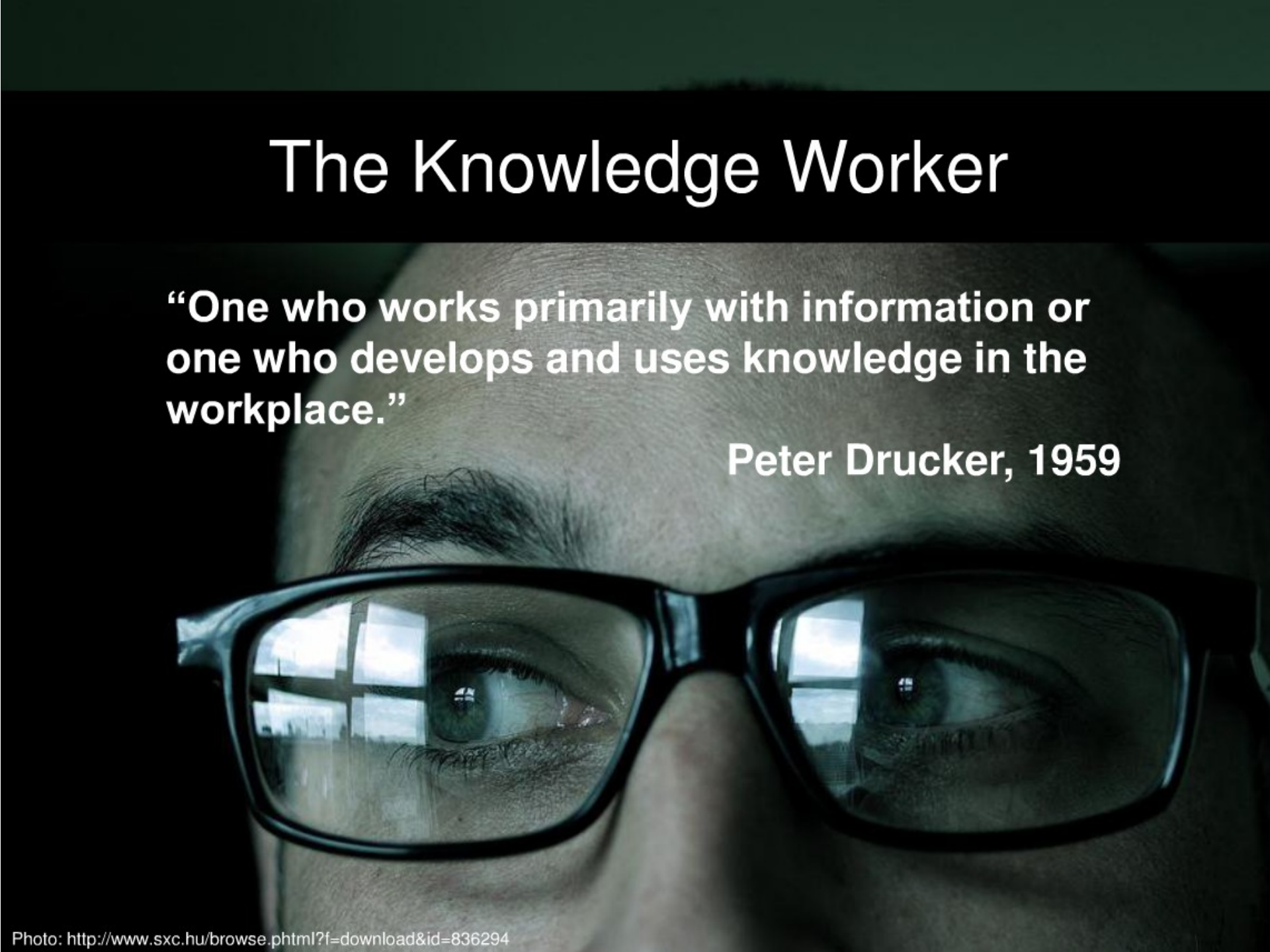
EXERCISE – before we start

Discuss with your neighbor the term

"**Knowledge worker**"!

2 min.

The Knowledge Worker



"One who works primarily with information or one who develops and uses knowledge in the workplace."

Peter Drucker, 1959

Photo: http://www.sxc.hu/browse.phtml?f=download&id=836294

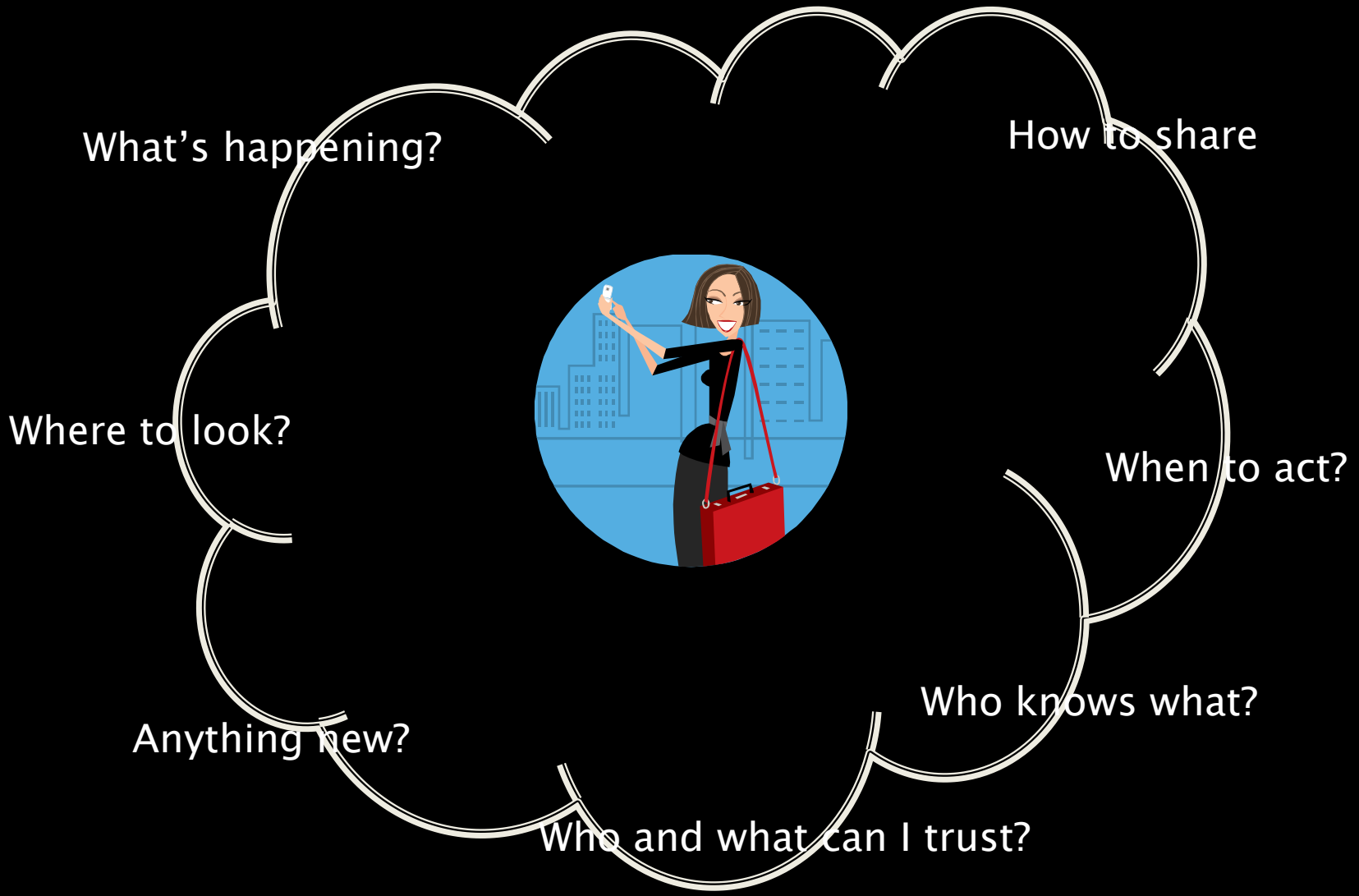
Knowledge Worker Revisited

- Thomas Davenport has defined *knowledge workers* as people who "think for a living" and discusses who they are, what they do, and how their number is growing [2005].
  - For our purposes we accept as a given that, for an increasing proportion of people in the world economy, work is to a large extent mental rather than physical.
  - To significantly increase economic productivity it is necessary, therefore, to increase the productivity of this knowledge-based and knowledge-driven work.

ACTIVE's Knowledge Worker

- A knowledge worker is a specialist or an expert dedicated to a specific knowledge intensive work domain within an enterprise.
- He principally uses his experience, skill, and current working context to understand summaries and create new knowledge from exiting pieces of work.
- Knowledge workers bring ingenuity and inventiveness along with intuitive dissension making in their daily work as well as for the team.
- Related tasks and workers benefit in terms of learning, modifying and enhancing their workflows.

The typical situation of a Knowledge Worker



EXCERCISE

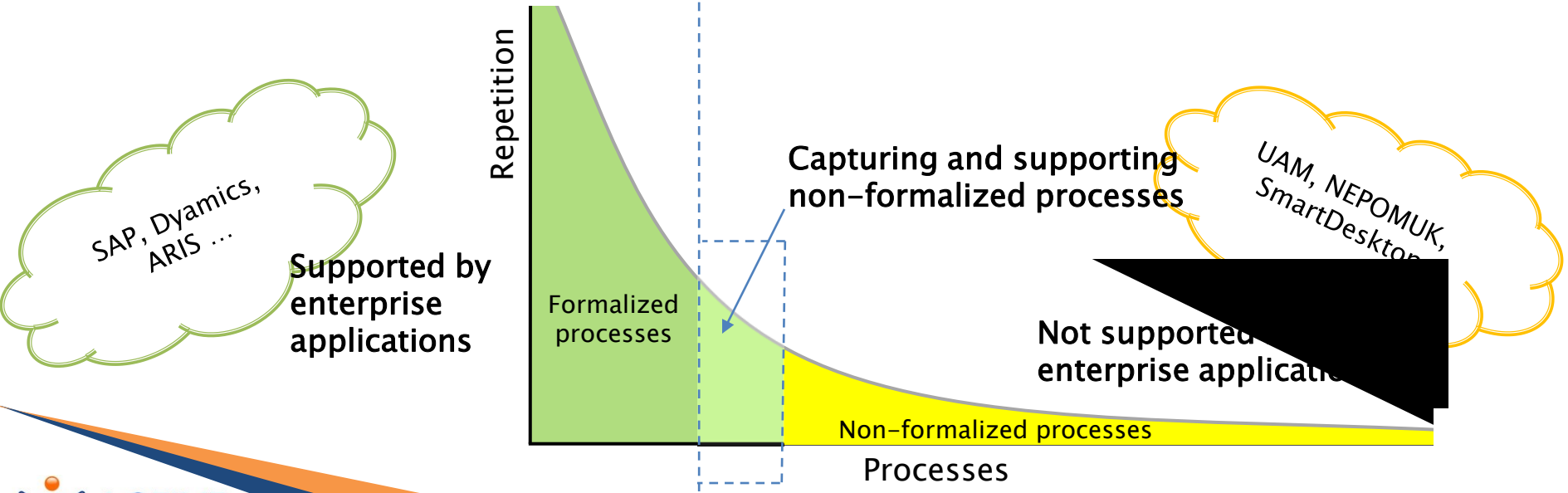
Discuss with your neighbor the term
"**informal knowledge process**"!

2 min.

The Long Tail …

- Complex Business Processes
  - High repetition rate
  - Mature
  - Involve defined roles
  - Enterprise driven

- Informal Processes*
  - Scope – user or small team
  - Repetition rate is low
  - Depend on skill, experience, and judgement of the knowledge worker



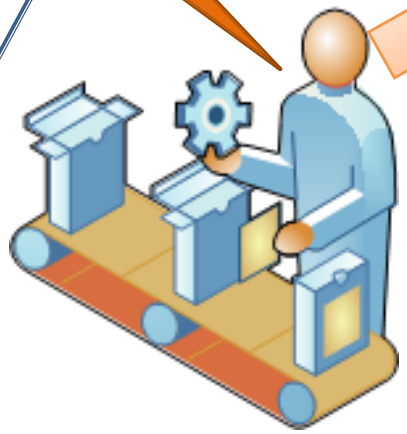
* aka Artful Processes, Knowledge Processes

Rules of Business…

People, empowerment, collaboration, …

The basis of the operation is the structure of the activities

Knowledge-based



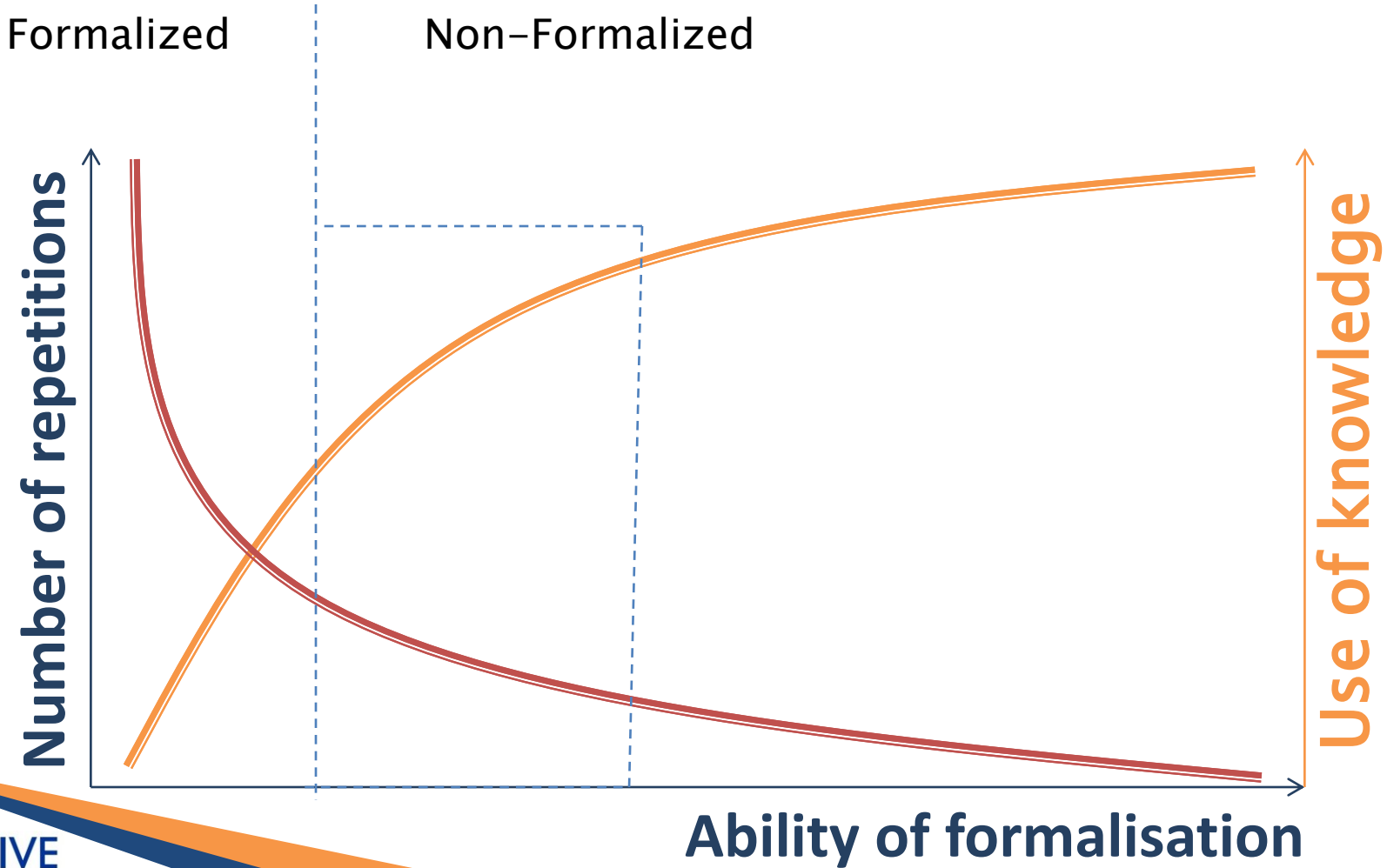
The basis of the operation is the **knowledge of individuals.**

Structured-based

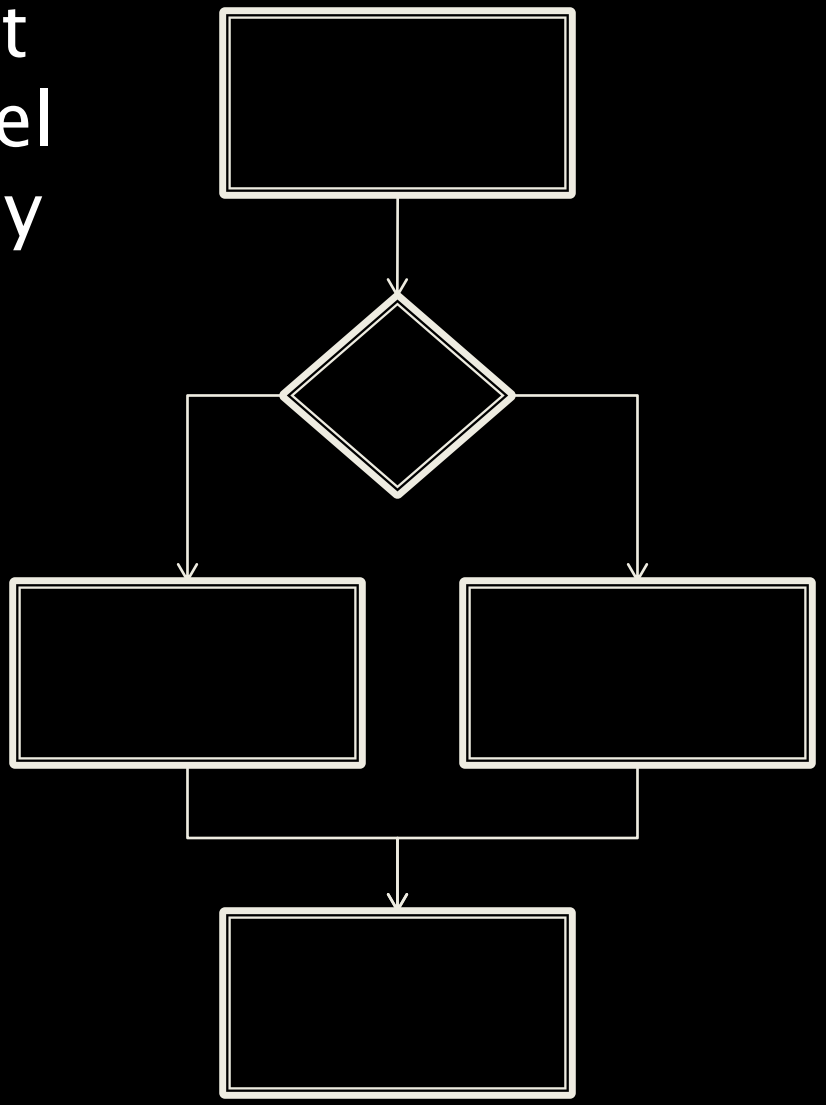
Procedures, control, compliance…

* taken from http://www.thecontenteconomy.com/2009/04/slides-from-our-enterprise-20-seminar.html

Where is the knowlegde?

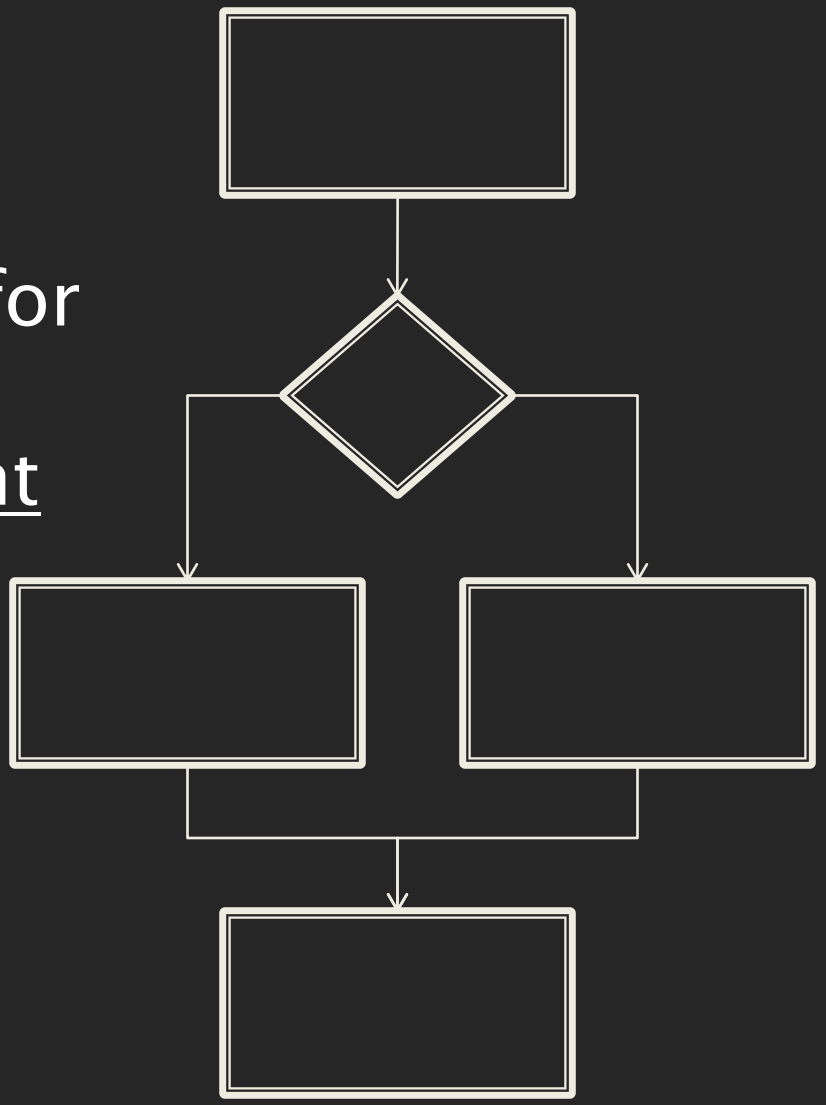


Workflow is a finite set of sequential/ parallel activities triggered by events.*



*taken from: Computer/Supported Coorperative Work, Uwe m. Borghoff and Johann H. Schlichter, Springer, 2000

Business Process is a collection of sequential/ parallel activities necessary for processing of economically relevant objects.*



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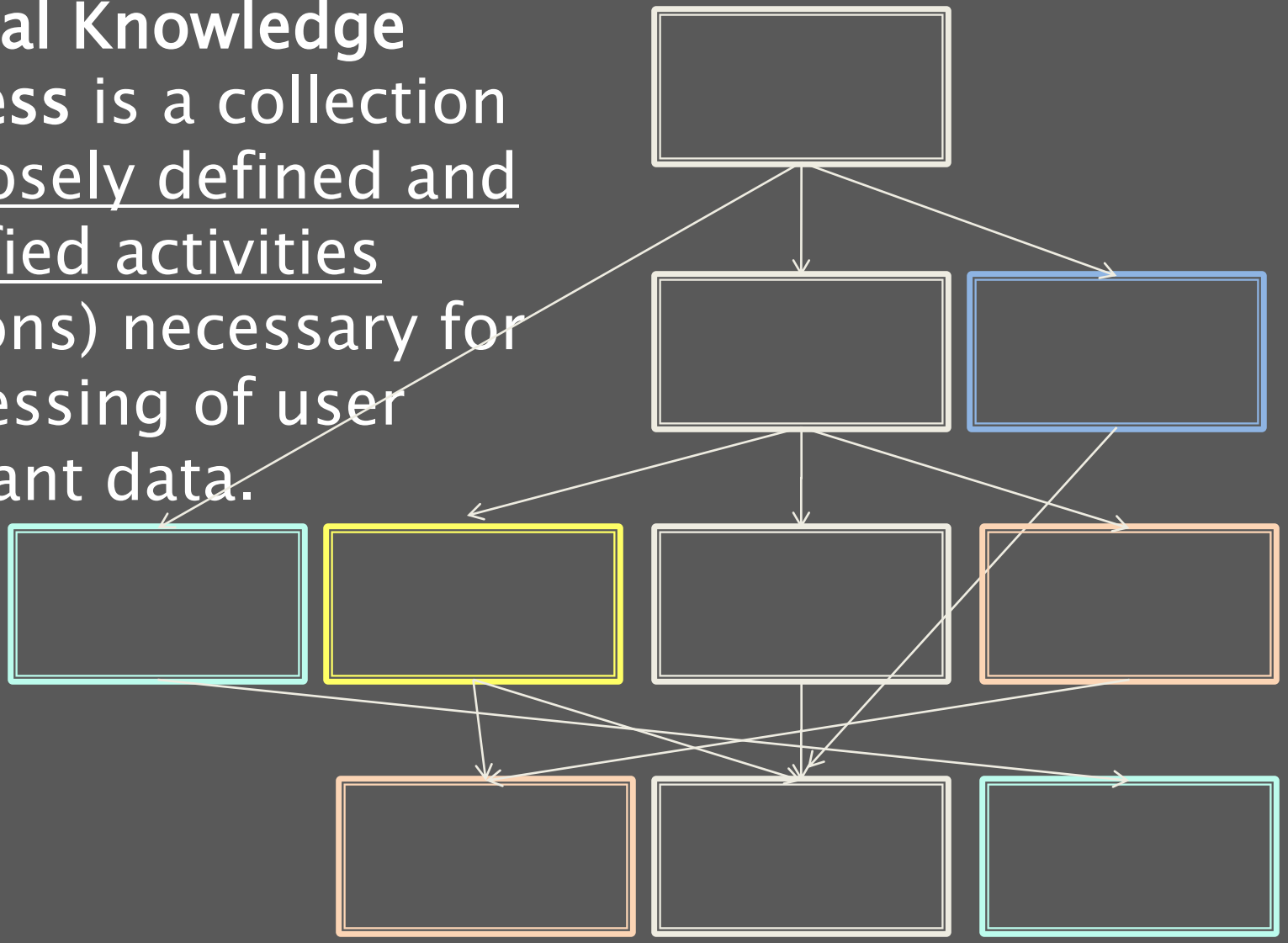
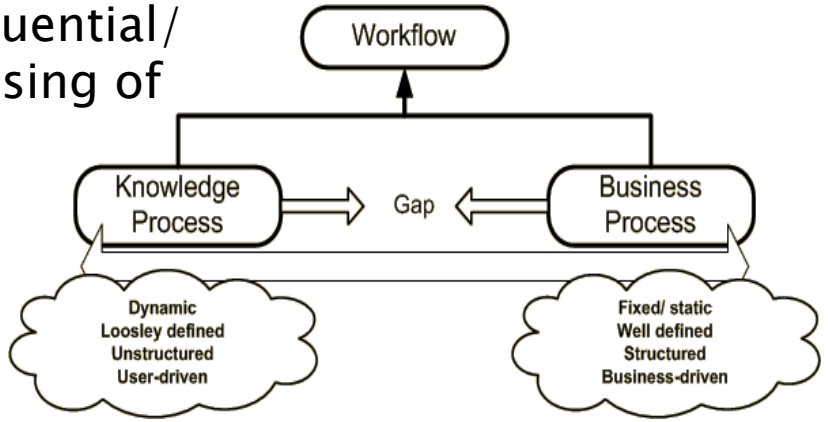
Informal Knowledge Process is a collection of loosely defined and ramified activities (actions) necessary for processing of user relevant data.



Workflows, Business Processes, Informal Knowledge Process

- **Workflow** is a finite set of sequential/ parallel activities triggered by events.*
- **Business Process** is a collection of sequential/ parallel activities necessary for processing of economically relevant objects.*
- **Informal Knowledge Process** is a collection of loosely defined and ramified activities (actions) necessary for processing of user relevant data.

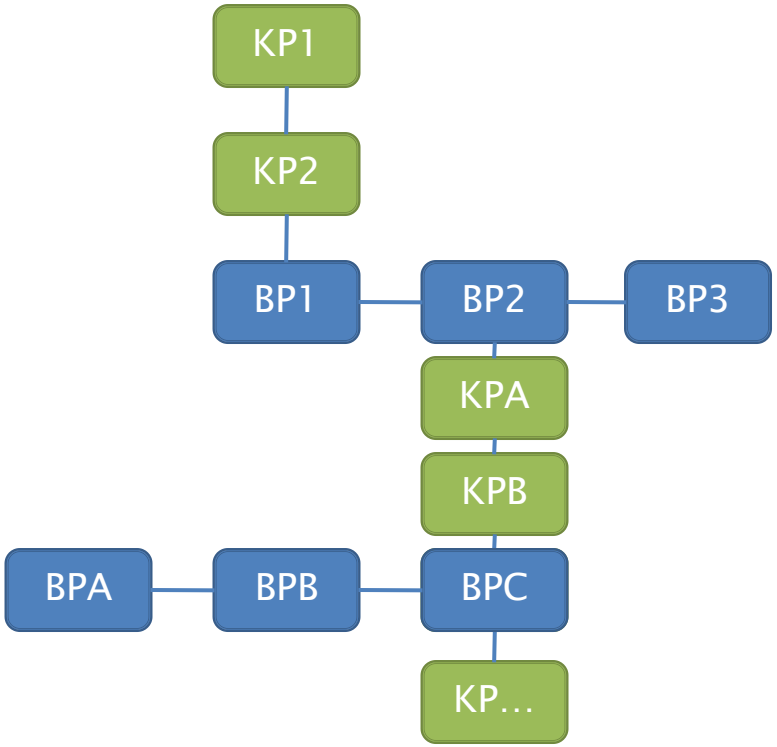


	Business Process	Informal Knowledge Process
Goal	Business-goal driven	User-goal driven
Scope	Enterprise	Individual
Structure	Static	Ramified
Description	Formal	Informal
Guided	Externally Coordinated	Ad-hoc/ Spontaneous
Analyzed	Monitored, Analyzed, Optimized	Not Monitored, Emerging

*taken from: Computer/Supported Coorperative Work, Uwe m. Borghoff and Johann H. Schlichter, Springer, 2000

Business Processes & KPs

- Business Processes trigger KPs (BPC)
- KPs can trigger BPs (KP2)
- KPs can connect business processes (KPA–KPB)

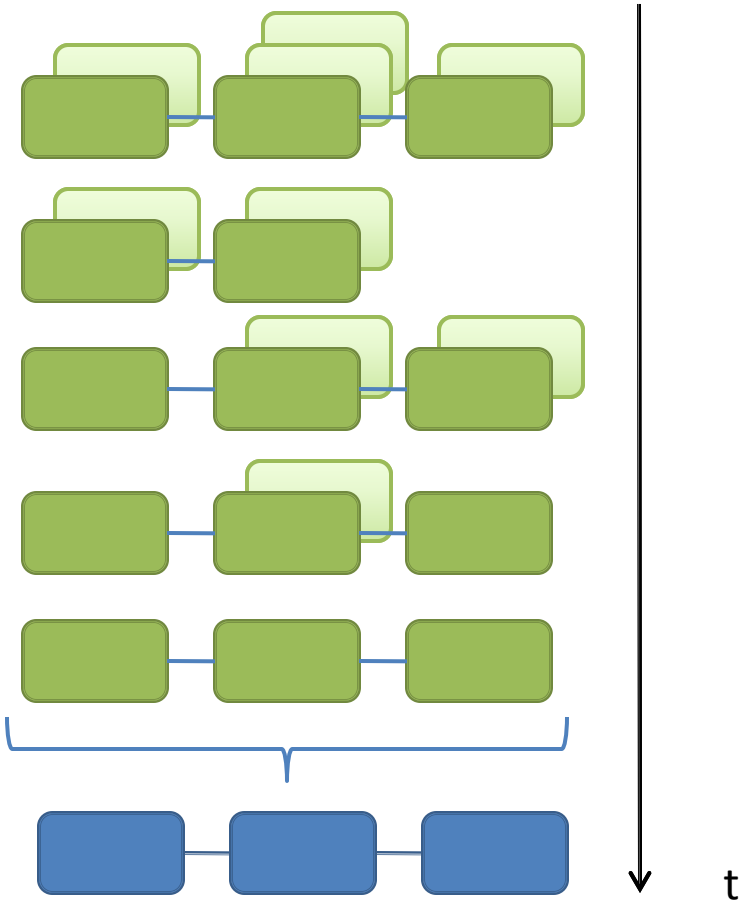


Business Process

Knowledge Process

Evolving Knowledge Processes

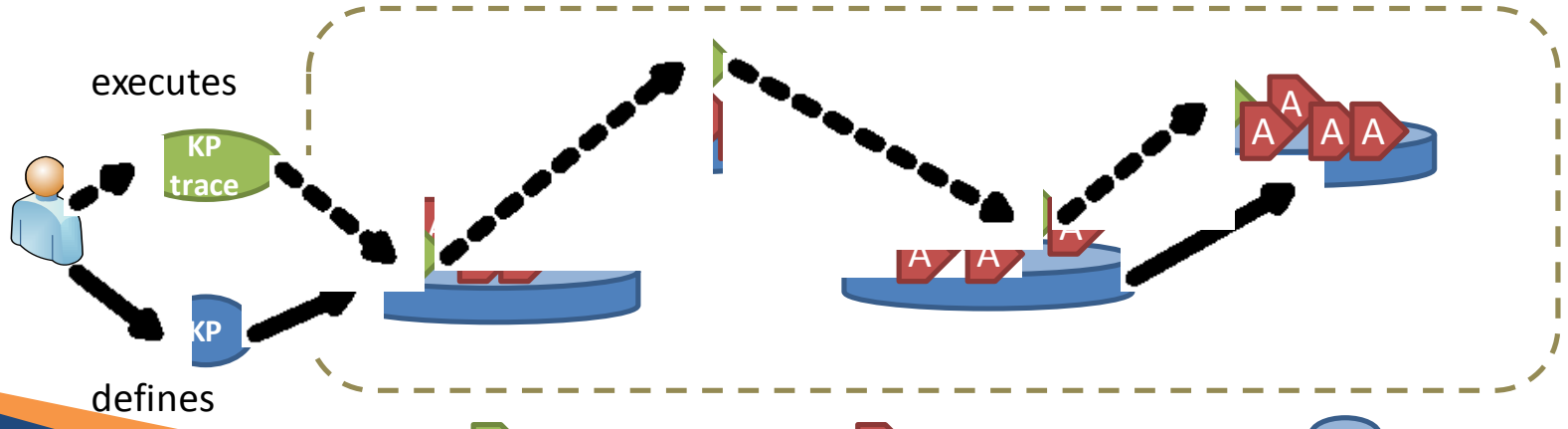
- KPs can transform to business processes over time when they become stable and static/ mature
- There are KPs without a business process context
  - Example:
    - Start-ups usually do not have well-defined business process. Knowledge worker just executing knowledge processes



Definition

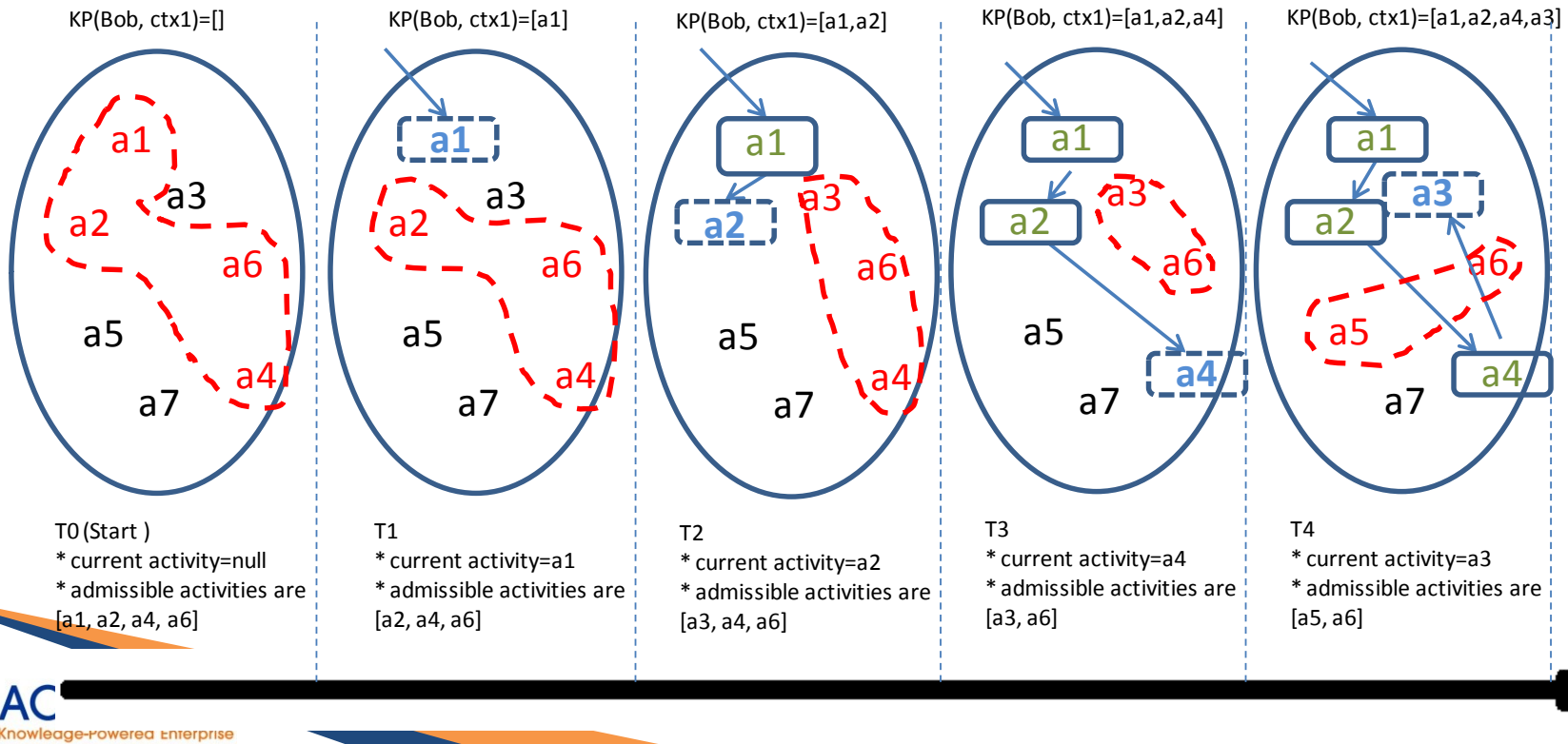
A *Knowledge Process* (KP) is…

- loosely defined and structural ramified collection of actions.
- not fully defined in terms of structure and the order of action are at its point of initiation
- in which actions require a decision by an actor about the follow-up action.
- in which the actor uses his knowledge and the context to decide for the successor action.
- in which decisions have to been taken during execution time over the process development path and lead to emerging structural ramification constituted by admissible alternatives.
- **in which dynamic ramification is the one of the key features.**

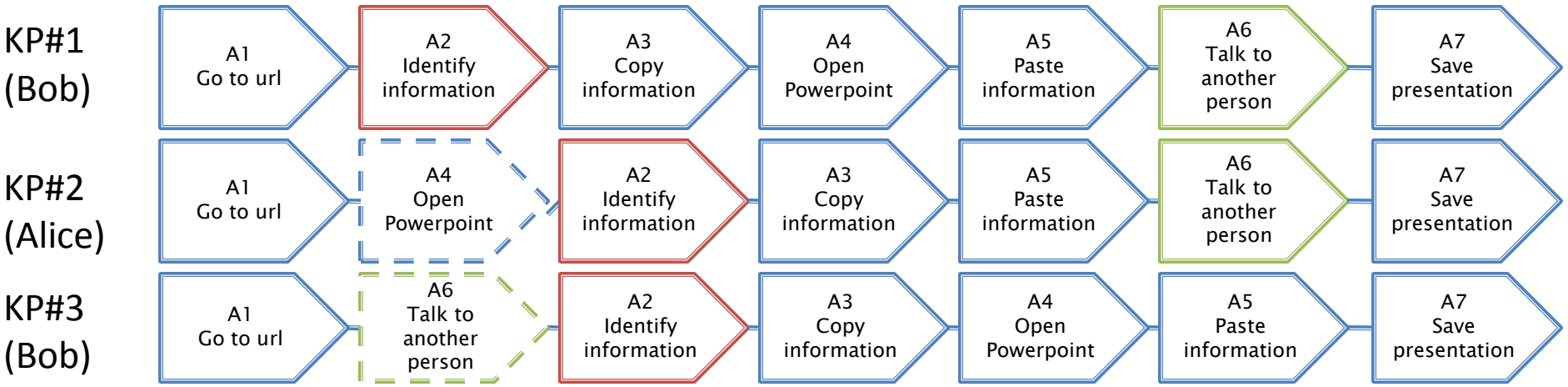


KP over time

- A knowledge process is a collection of actions (ramified, non-structure at the beginning)
- Actor makes a decision influenced by a driver about a follow-up action out of the admissible actions
- The driver is derived from the state of the context and the environment (situation)
- A follow-up action could trigger another knowledge process

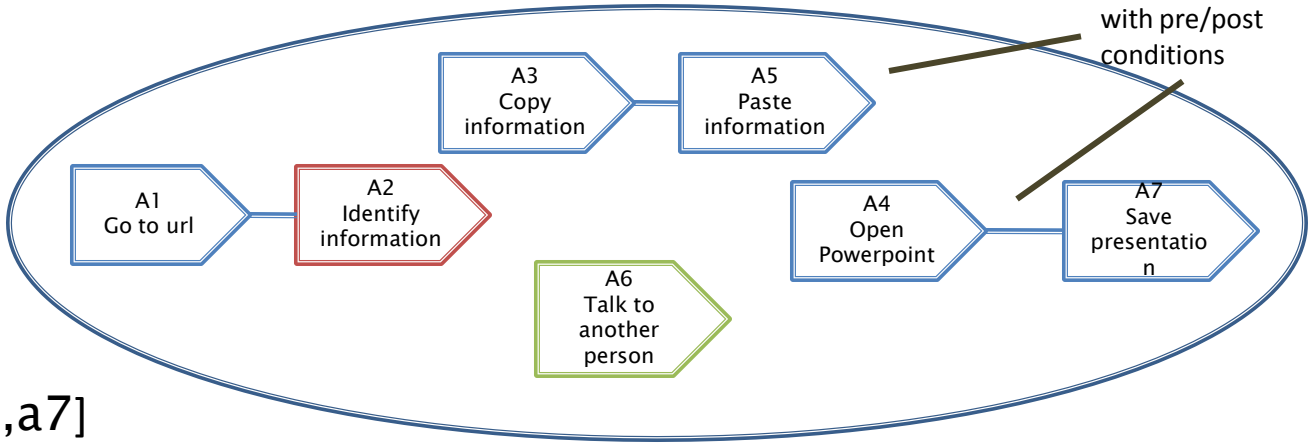


KP-Example: Prepare Presentation

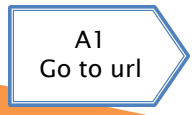


Knowledge Process:

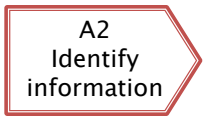
- Collection of actions
  - Ramified
  - non-structured
  - with constraints



KP = [a1,a2,a3,a4,a5,a6,a7]



triggers
System Event



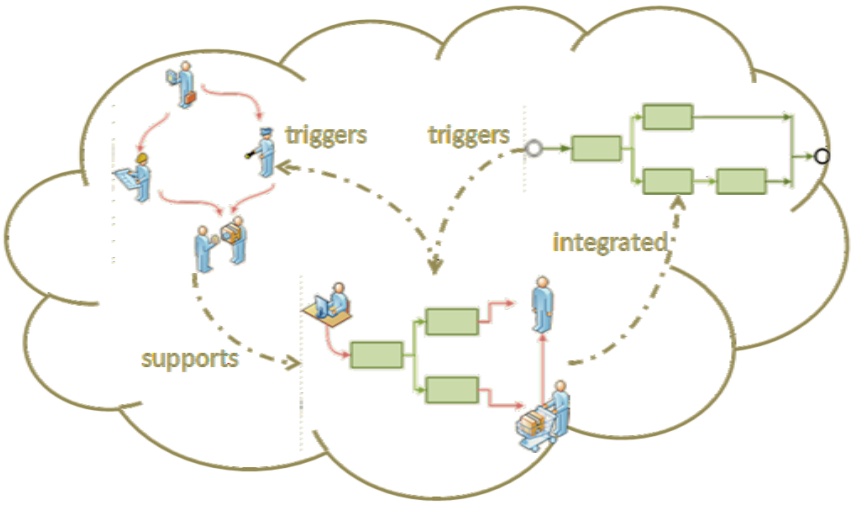
triggers
non-system Event

Triggers another
KP

Motivation

- Besides formal processes within the enterprise there are several informal processes
  - *Writing a proposal, scheduling a meeting, preparing a bid …*
- Use of formal process systems is reserved for enterprise level, not on user level
  - Common workflow modelling tools are considered as too complex
- Need for a …
  - → **lightweight**
  - → **knowledge worker-driven**
  - → **context-aware**
  - → **support of informal process**

… solution!



unstructured
highly flexible
interactive

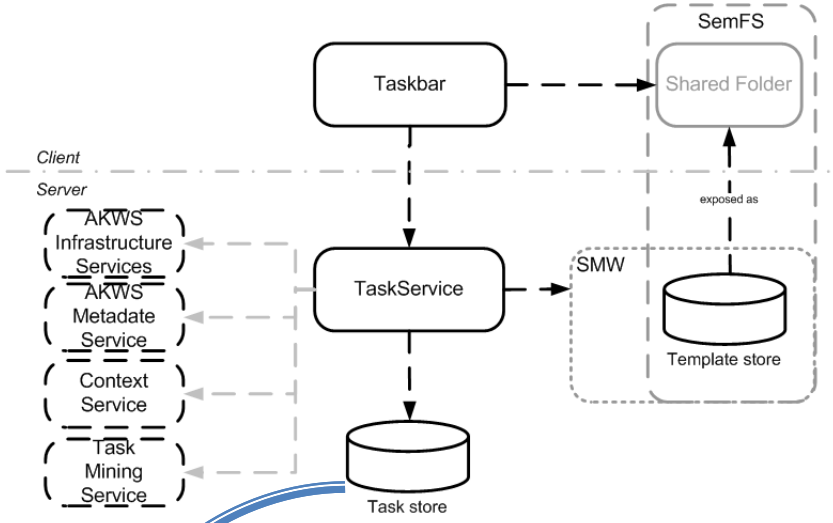
structured
static

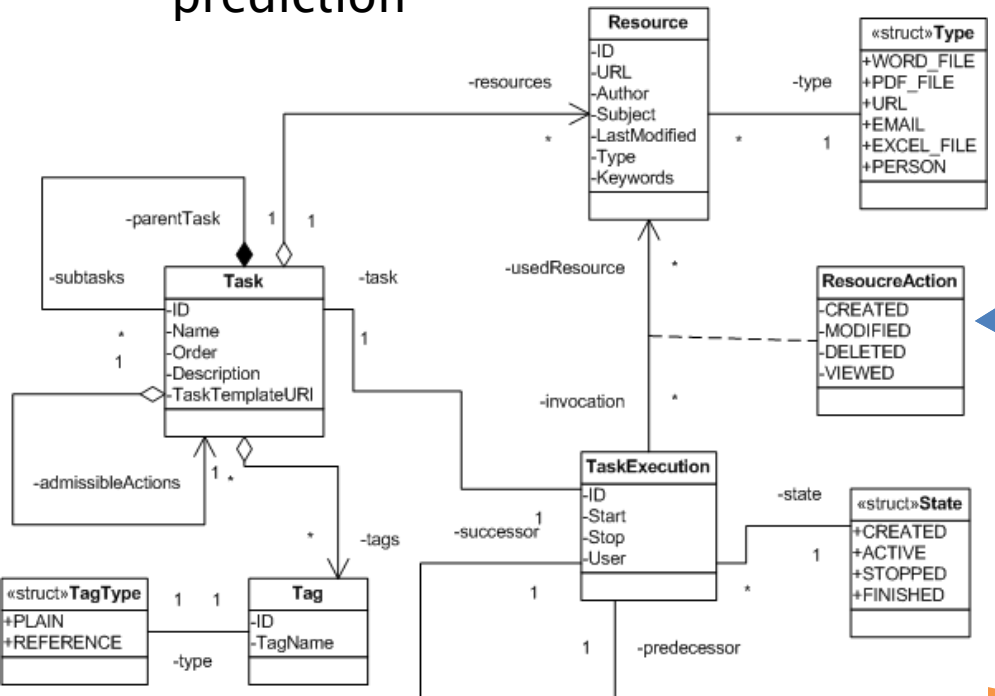
Knowledge Processes in ACTIVE

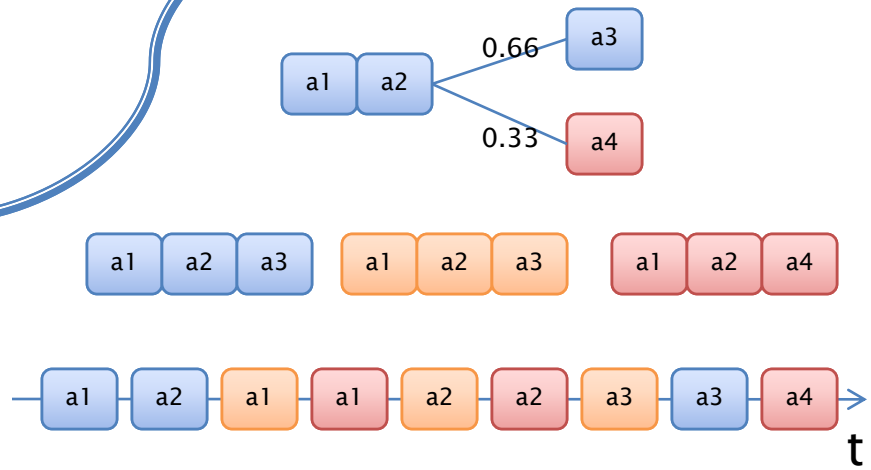
- In ACTIVE we will support knowledge processes with innovative application systems by transforming informal knowledge processes into more formalized knowledge processes.
- The developed "formalized knowledge processes" will support knowledge workers in their daily business.
- The worker still remains the driver of this process.
- The ACTIVE Knowledge Work is going to analyse the informal knowledge processes and tries to identify recurring sequences and patterns within a process of a single person or a team so that tacit knowledge becomes explicit as a result of knowledge process actions
- **Enhance knowledge workers‘ effectiveness and efficiency**

TaskService/TaskBar Integration

- Provides methods to store tasks and associate resources
- Provides methods to structure and restructure tasks lists during runtime (user-driven)
  - lightweight and top-down approach
- Logs task executions for mining and prediction



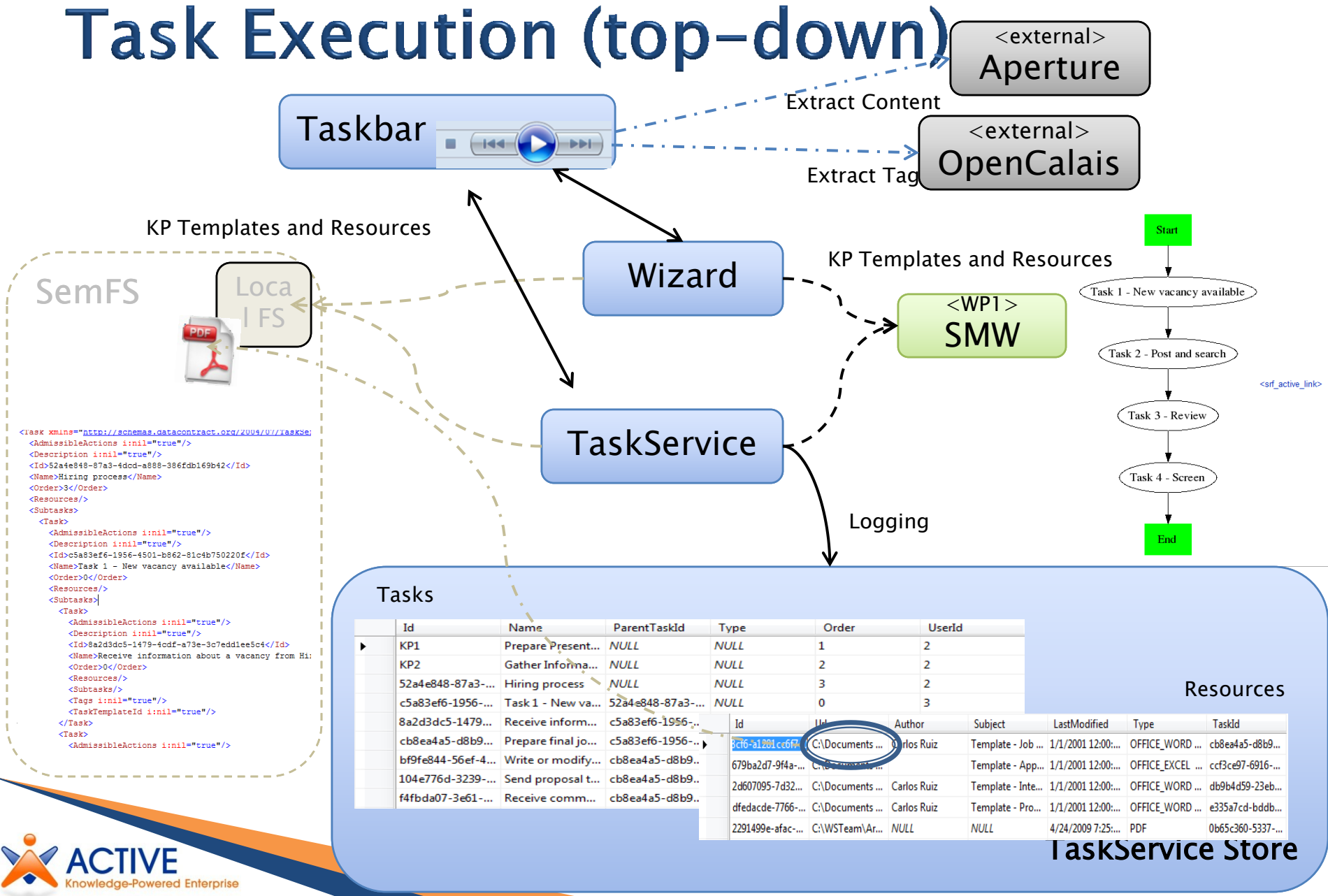




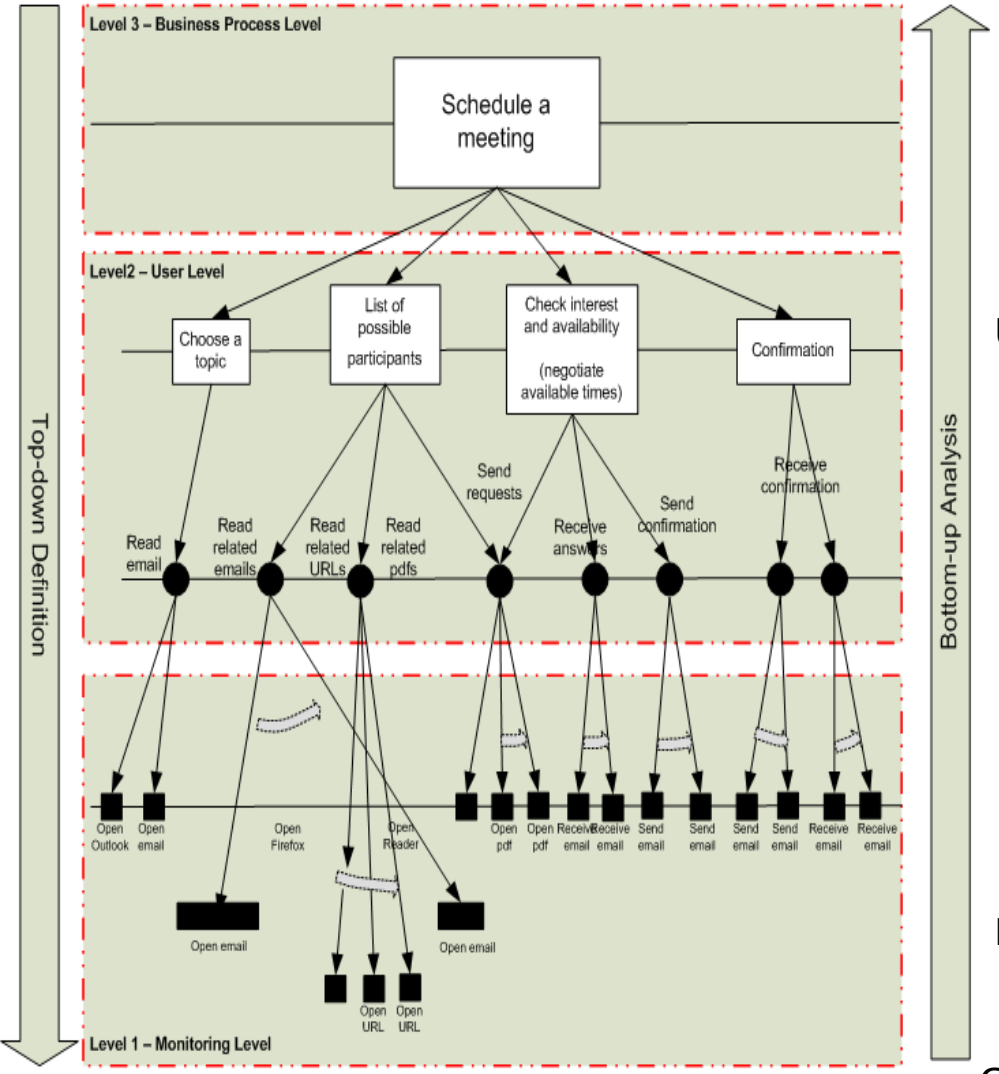
Task Management as a Web Service

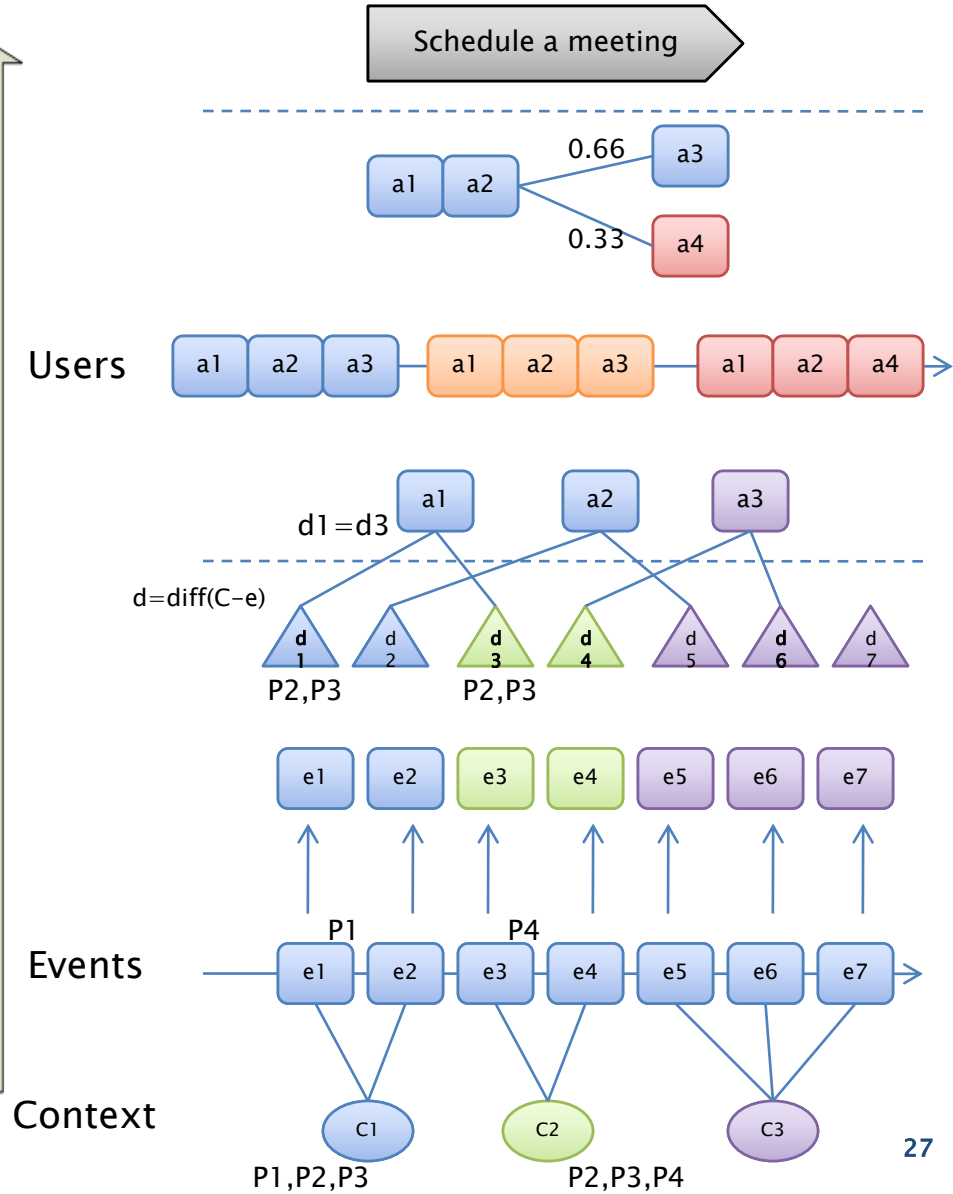
`Task[] GetTasks();`	Returns all top level tasks (knowledge process traces) of a specific user from the store
`Task[] GetSubTasks(string TaskId);`	Returns the next level of tasks for a given parent task from store
`string CreateTask(Task NewTask);`	Creates a new task (knowledge process trace) as a top level task
`string AddTask(string TaskId, Task SubTask);`	Adds a sub task to a given parent task
`void DeleteTask(string TaskId);`	Deletes a task
`void UpdateTask(Task Task);`	Updates a task; it is important that the ID of the task exists in the store
`string AddResourceToTask(string TaskId, Resource Resource);`	Adds a resource (file, URL, person) to a task
`void RemoveResource(string ResourceId);`	Removes a resource from the store
`void UpdateResource(Resource Resource);`	Updates a resource in the store; it is manadtory that the resource ID exists
`string AddTaskInnvocation(string TaskId, TaskExecution NewTaskExecution);`	Adds TaskExecution data to a task
`void UpdateTaskInnvocation(TaskExecution TaskInnvocation);`	Updates TaskExecution data; it is important that the ID of the TaskExecution exists in the store
`void RemoveTag(string TaskId, string TagId);`	Removes a tag from a task
`String AddTag(string TaskId, Tag NewTag);`	Associate a task with a tag

Task Execution (top-down)



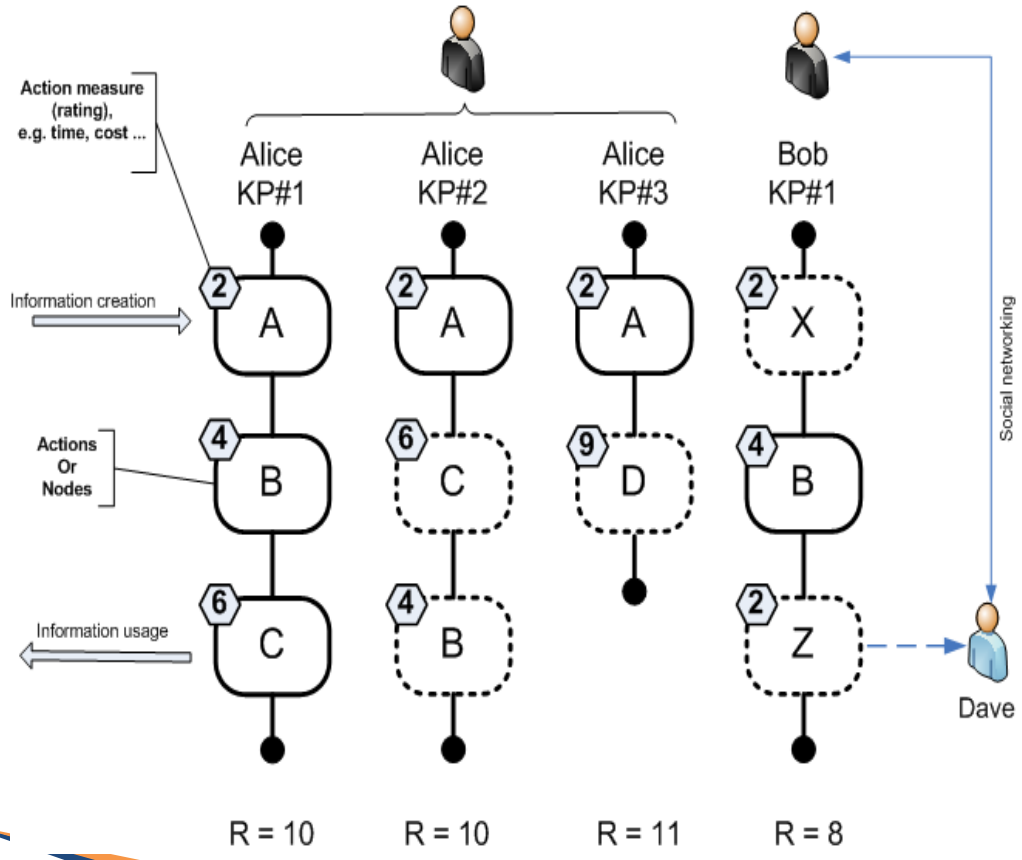
KProcess Execution Level





The Top-down definition: helps to define KP templates (recording actions, apps, resources in a refining process)
The Botton-up analysis: helps to suggest new actions, activities, KPs (mining data at different levels)

Metrics and Measures for KPs



Measures

- Size S
  - S(G) = count (N)
- Dependability D
  - D(G)= count(N_{in})+ count(N_{out})
- Diversity V $V(G) = \sum_{i=1}^{n} count(T_i)$
- Separability Y $Y(G) = \sum_{i=1}^{n} (N_{Ui} - N_{Ci})$
- Structural Complexity SC

$$SC = \sum_{i=1}^{n} SC_i = \sum_{i=1}^{n} count(N_i)$$

- Performance, external costs

User-dependable values

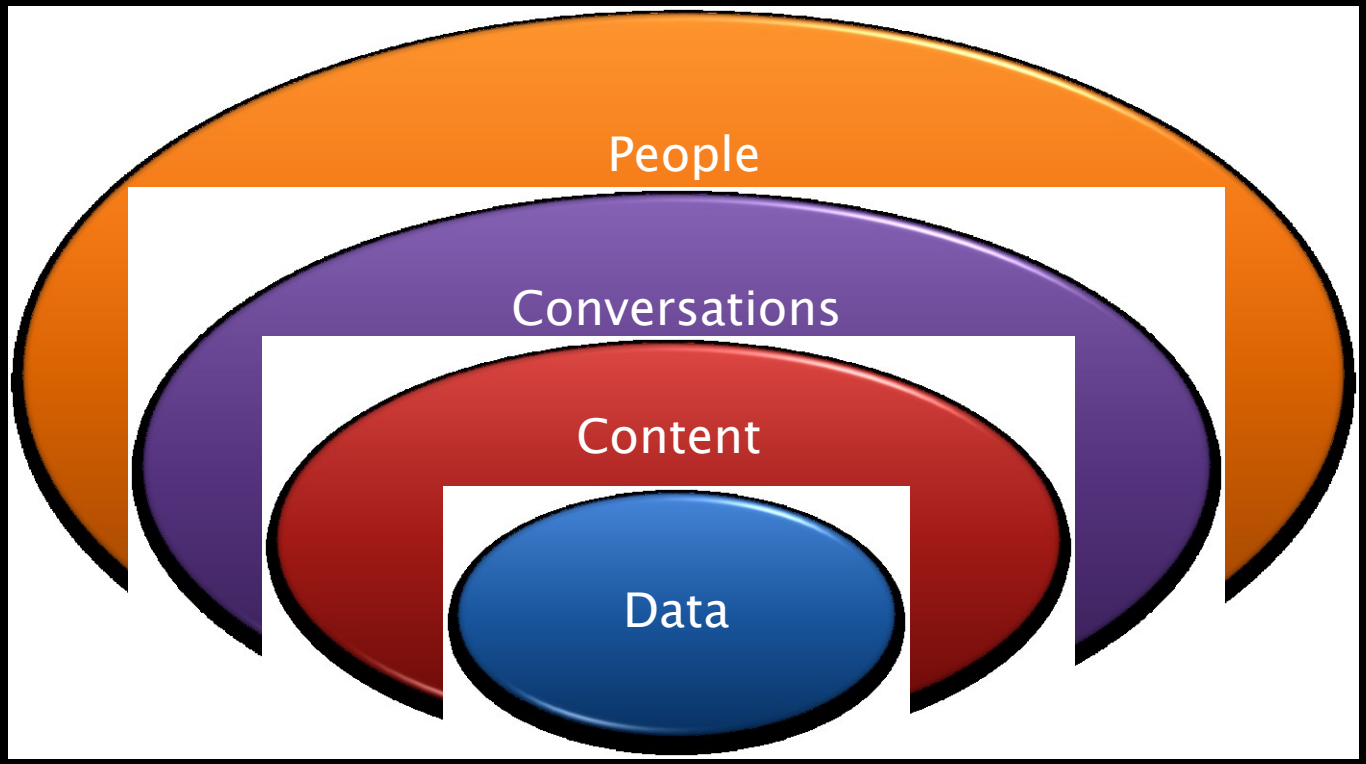
- Skill Value Vector
- Feasibility

Subjective values

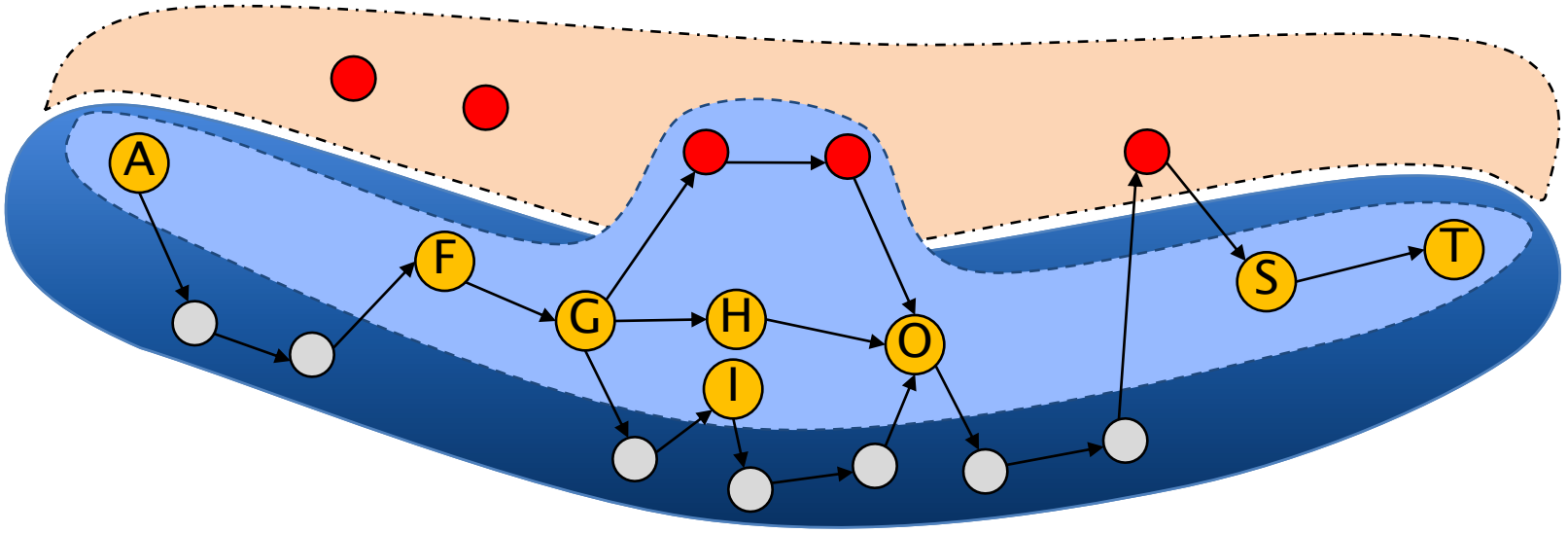
- Quality of the result
- Satisfaction with the process

‚Inter' – action Matters

- How do other use resources/ information?
  - Actions, Skills, Experiences
- Discover and share Knowledge processes
  - Organisation /Social Network
- What is the context?
  - Business Process, Knowledge Process



Hot-dog theory



Knowledge workspace Enterprise Inter-prise

Active nodes Dumb nodes External nodes

- Active node are specialists that define the process dynamics and can only have an interface to the Enterprise knowledge portals
- Dumb nodes are non specialists and are information/data pushers and these roles may be incorporated into the enterprise information systems
- External node are specialists in a sub-process level and therefore should be considered while designing the enterprise information systems

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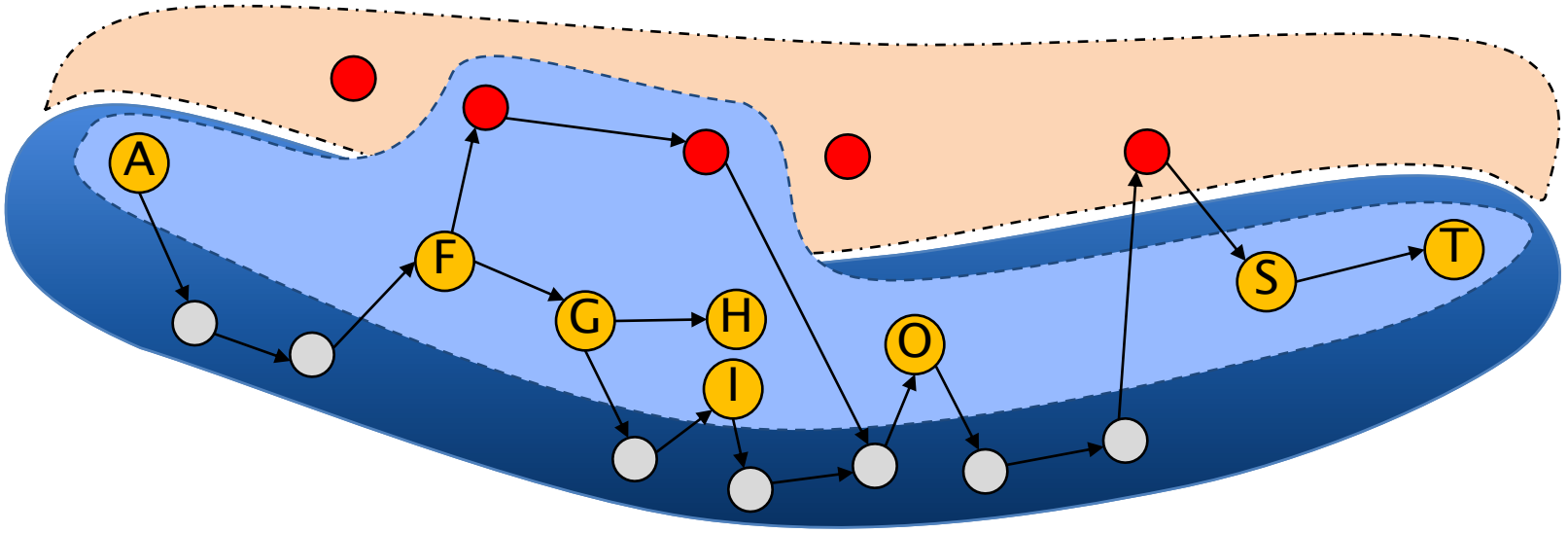

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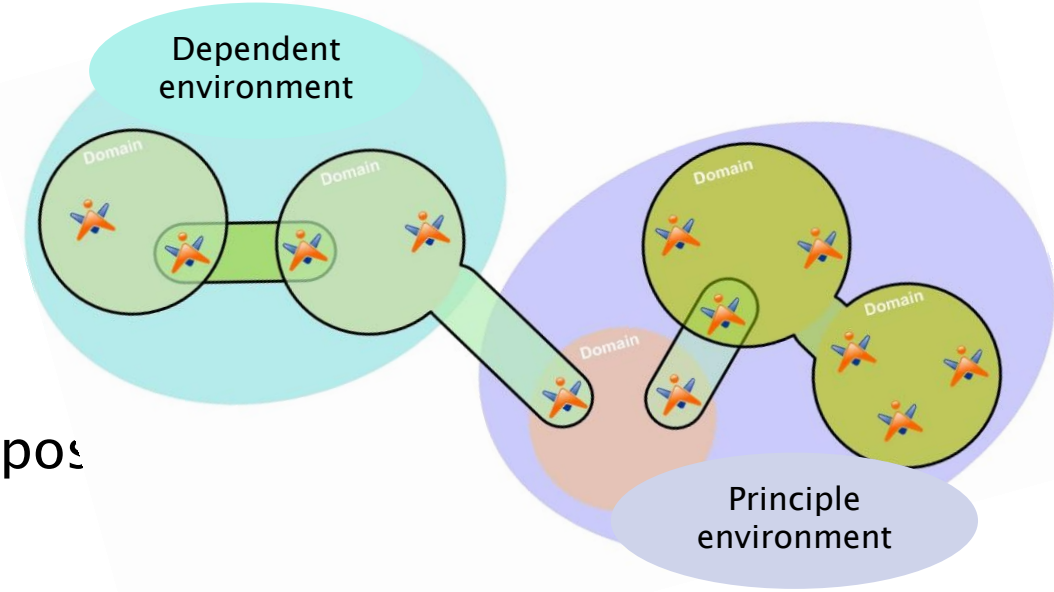
Security-aware Knowledge Processes

- Knowledge Processes are defined, used and shared across different administrative groups and domains.
  - → Key for enhancing the value of a corporation.
  - → Social interactions: virtual boundaries

- Security framework:
  - powerful,
  - flexible,
  - semantically rich,
  - automate as much as pos



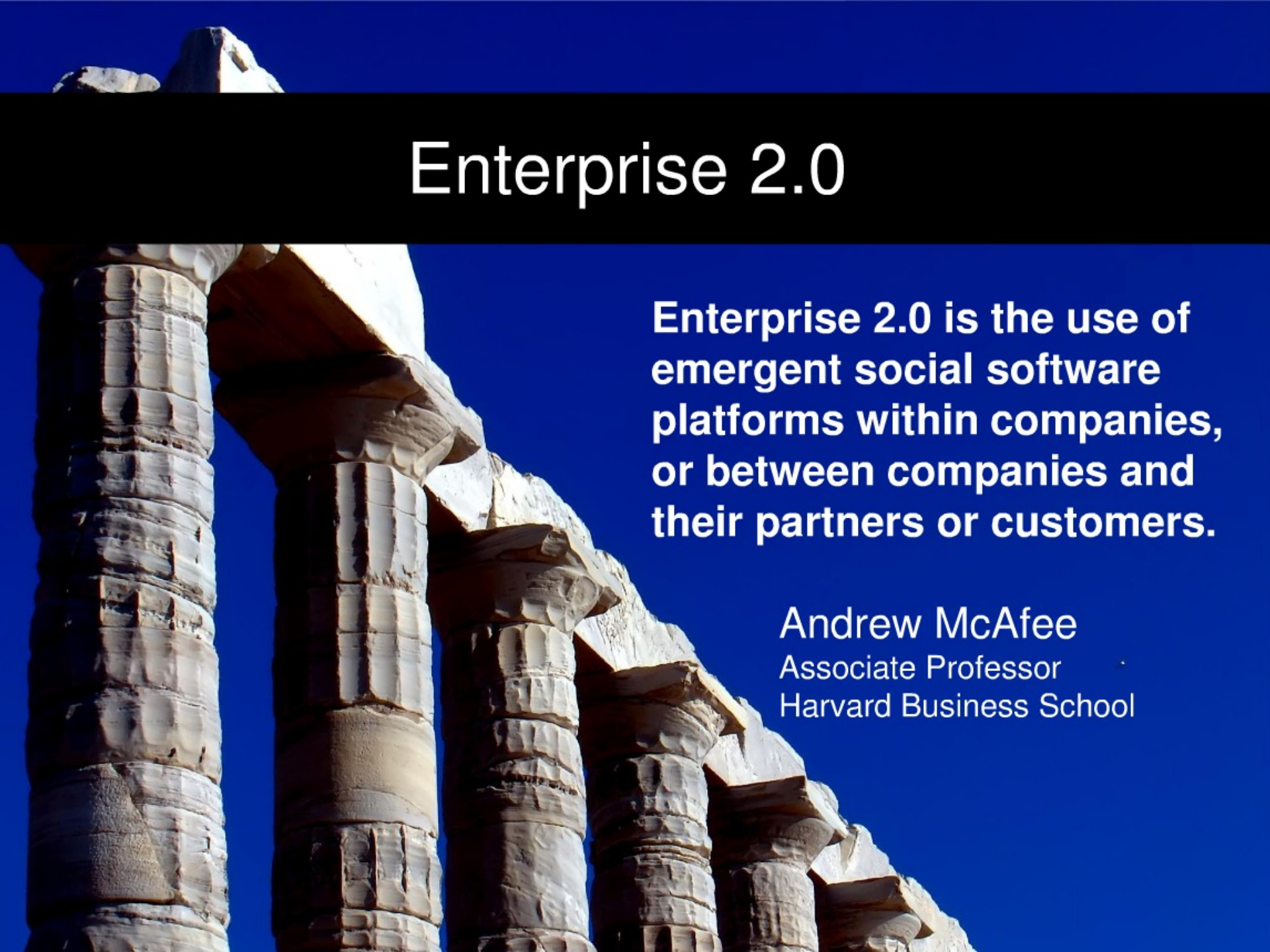
Security-aware Knowledge Processes

- Provide mechanisms to handle security and privacy issues for Knowledge Processes across different domains and organizations
  - **Semantic security policies and annotations**: pose constraints on system's behaviour and to dynamically control and automate the system options.
  - **Grid technologies**: virtual organization as a transparent approach for enabling distributed applications from multiple administrative domains, with and security requirements
  - **Trust management**: how trust is managed based on their previous user's interactions in modern open and decentralized systems.

Summary

- Informal Knowledge Processes are the norm in certain industries
  - Not supported by enterprise applications
- Proposed a semi-automated approach
  - Combination of Top-down and Bottom-up
  - No *'Auto-Magic'*: Magic does not work!
- Approach to quantify and evaluate Knowledge Processes
  - Make them comparable and reusable
  - Support '*refactoring*' for optimisation
- Security and Privacy is important

Enterprise 2.0



Enterprise 2.0 is the use of emergent social software platforms within companies, or between companies and their partners or customers.

Andrew McAfee
Associate Professor
Harvard Business School

References

- Some slides I took from http://www.thecontenteconomy.com/2009/04/slides-from-our-enterprise-20-seminar.html
- The “Long Tail” slide is taken from http://ldc.upenn.edu/myl/llog/LongTail.gif

Many Thanks!

Q&A