Process Diagram Technique for Business Processes Modeling

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Agenda

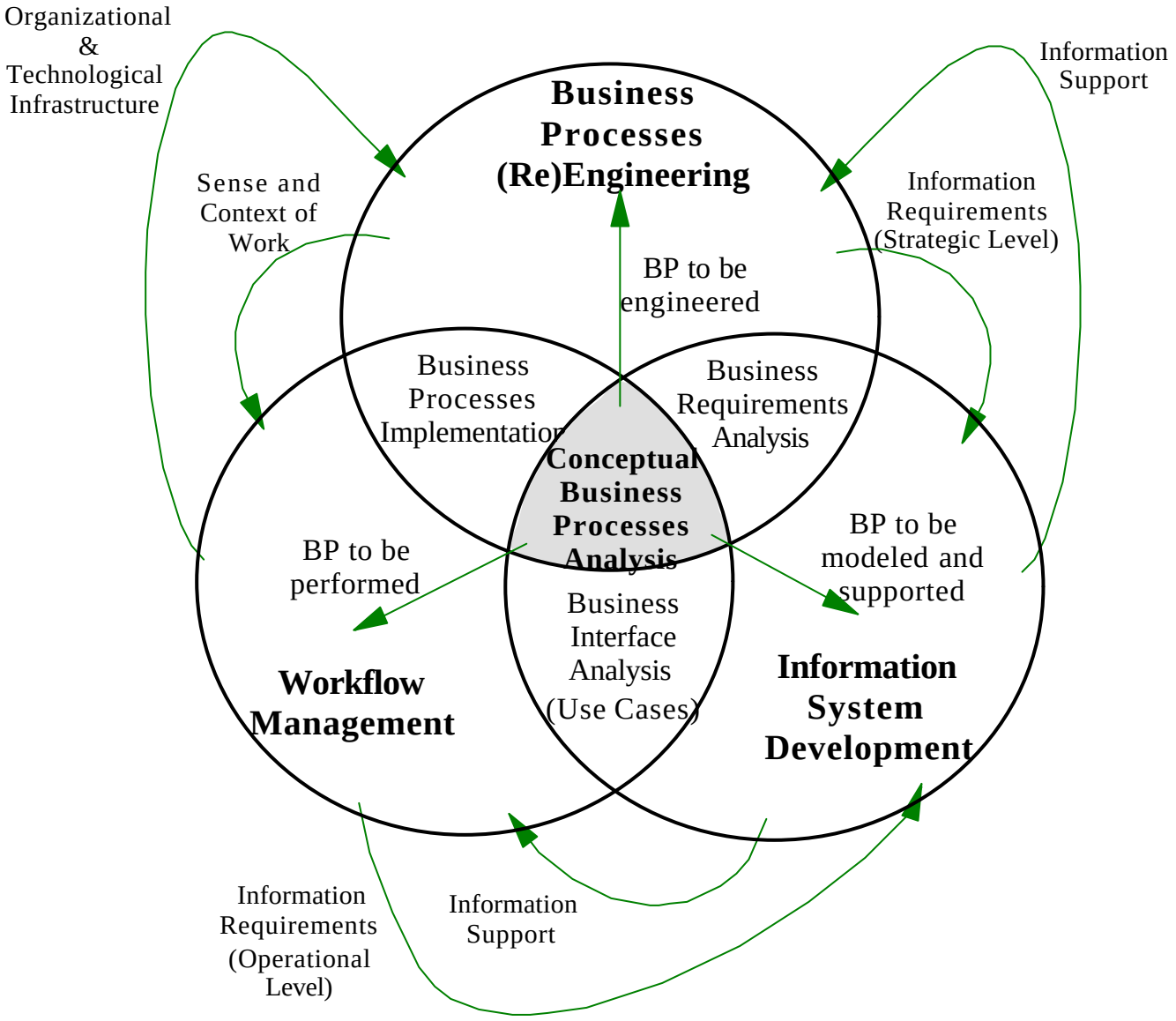
- The Scope
- The Technique
  - Diagram Elements
  - Process Meta-Model
  - Different Levels of the Technique
- Important Topics
  - Events, Activities, and States from the Object vs. Process Point of View (Consistency Rules)
  - Process Memory (Simple/Complex Processes)

The Scope

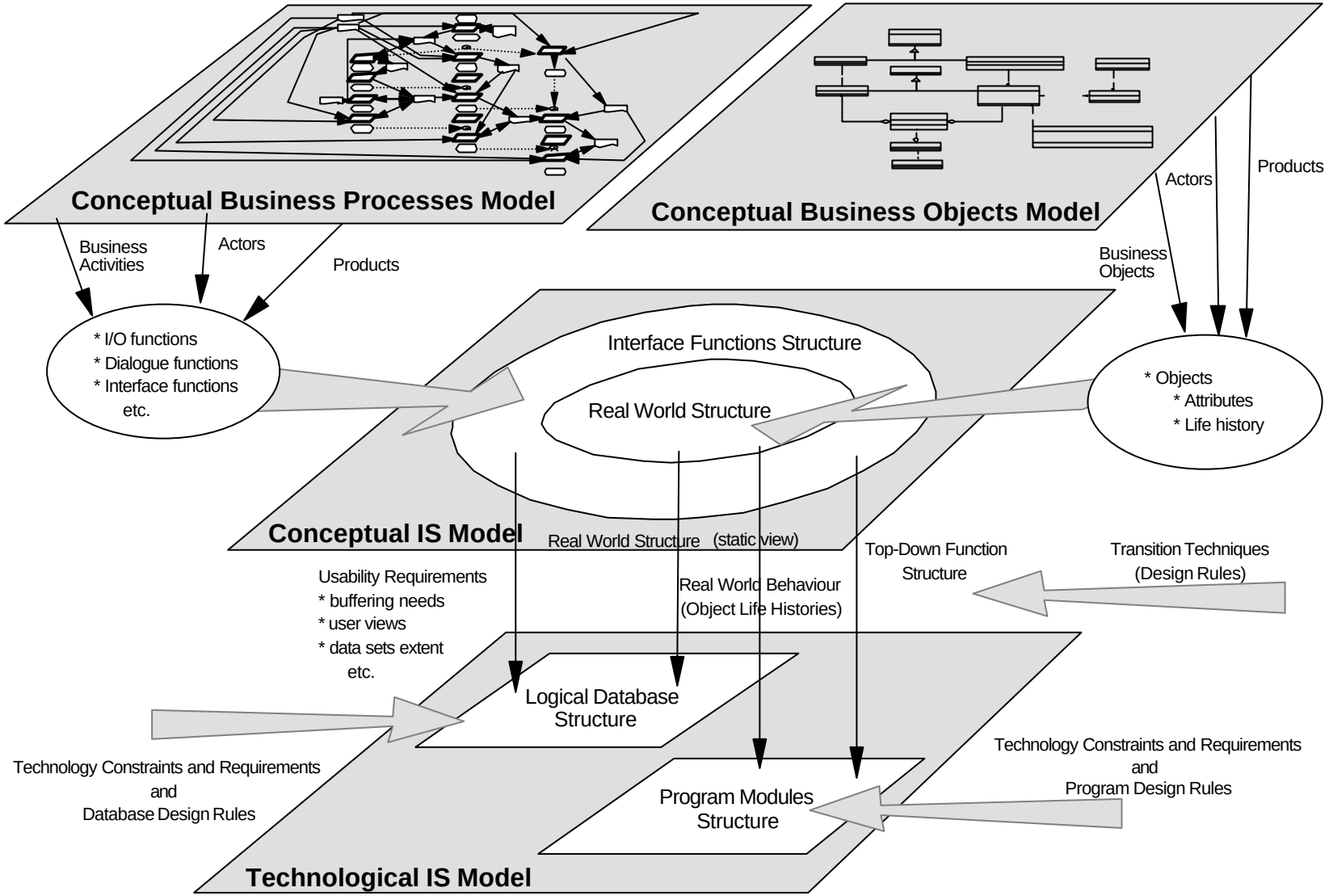
M**odel of the system of business processes** which:

- respects basic **objectives and goals, current state and specific characteristics** of the organization
- respects **objective circumstances** (those which are given outside the organization and are independent of the organization) which can play a significant role in the behavior of the organization
- **is "optimal"** in the sense of economic **efficiency** of the processes
- **is "optimal"** in the sense of maximum **simplicity** together with whole **functionality**
- is prepared for later **optimization, implementation and installation** of the system of processes which respect characteristics described above

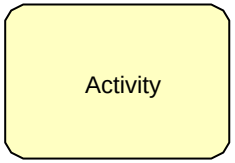
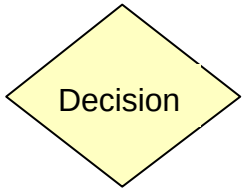
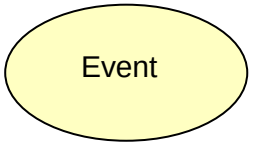
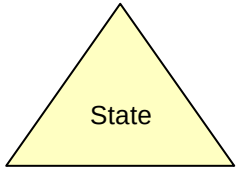
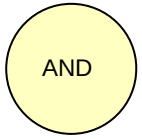
The Scope
Convergence of BPE, WfM, and ISD



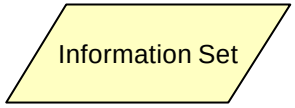
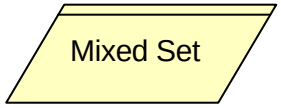
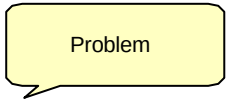
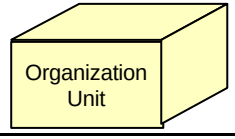
The Scope
Objects and processes as a basis for IS development



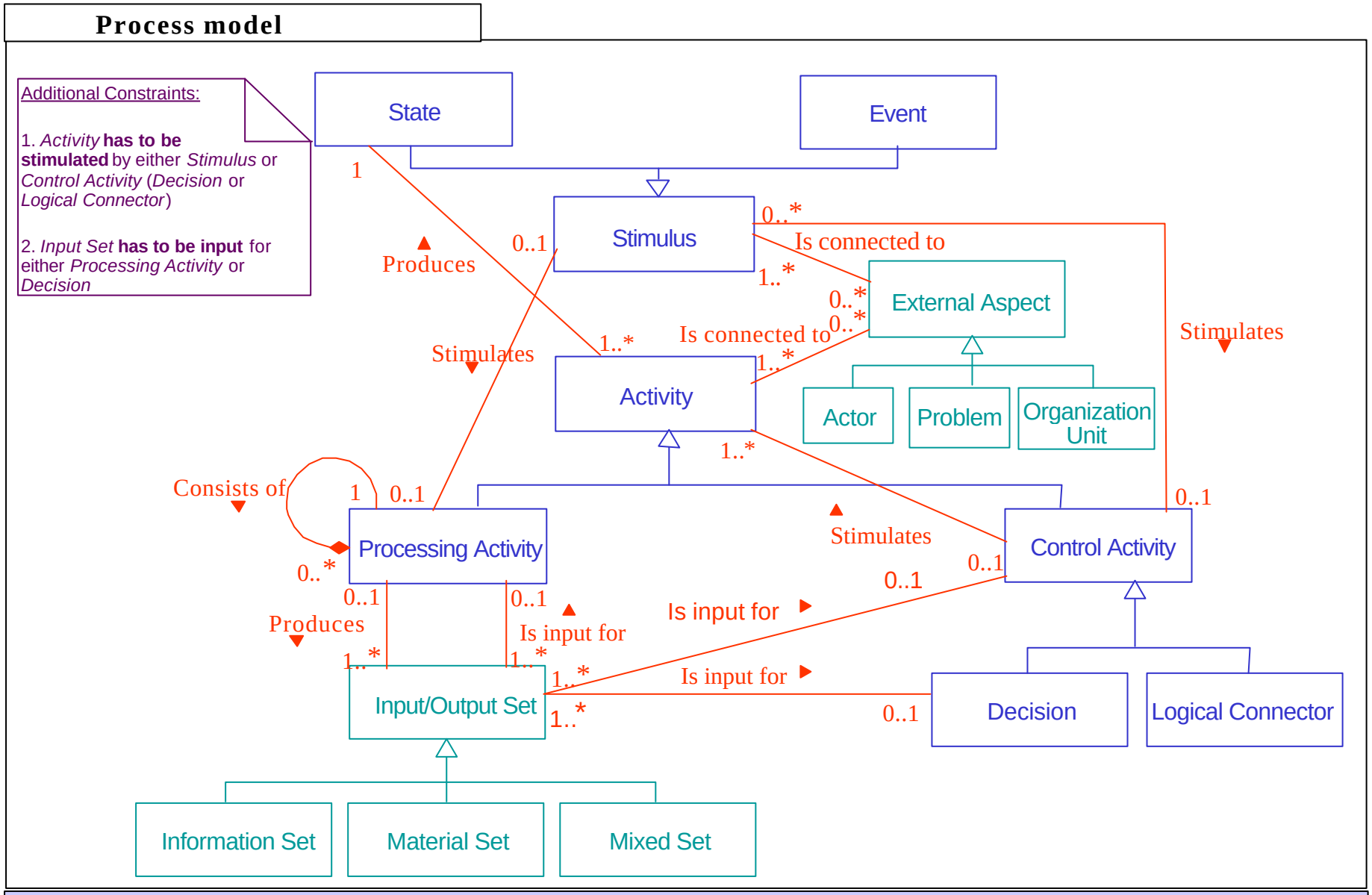
The Technique
Process modeling diagram elements - basic set

Diagram Element	Symbol	Explanation
Activity		Basic element of the process - input(s) to output(s) processing. Activity is decomposable on principle, i.e. it can be always regarded as the process (on the deeper level of detail).
Decision		Elementary (i.e. undecomposable) activity. Decision on the particular follow-up of the process.
Event		External stimulus for the activity. Information about the event outside of the process and independent of it.
State		Internal stimulus for the activity. Result of the preceding activity.
Logical Connector		Primitive decision without any information at the input (predefined decision). The only AND and OR (XOR) connectors are allowable.

The Technique
Process modeling diagram elements - external elements

Diagram Element	Symbol	Explanation
Information Set		Set of the information for process control. Examples: manufacturing plan, strategic investment intention, delivery note etc.
Material Set		Set of the subjects of processing. I.e. raw material (at the input) or product (at the output), no matter whether it is material or data. Examples: engine component, car (final product) in the case of car manufacturing. Stock list, investment advice (final product) in the case of broker's business (information plays the role of the material here).
Mixed Set		Set of the combination of the subjects of processing as well as the information for controlling it. Example: delivery together with the delivery note
Actor		Abstract person - all kinds of the attendee of the process (person, organization unit, system, position, profession, role, entity etc.).
Problem		Problem related to the process in the particular point.
Organization Unit		Unit of the organization where the process runs.

The Technique
Process meta-model



The Technique
Three levels of model simplification

Level	Description	Purpose of simplification
level 0	Full complexity. All elements used.	
level 1	Model without actors, problems and organization units.	Description of the process itself without the respect to the related external aspects (actors, problems and organization). There is no possibility to analyze those external aspects (for the purpose of the information analysis of the legal IS for example).
level 2	Level 1 model without sets (material, information or mixed).	Description of the process itself without the respect to the inputs and outputs of the activities. Such a model describes the succession of the activities together with the process control (activity stimuli). It does not describe the substance of the processing.
level 3	Level 2 model without states and control activities.	Description of the process itself without the respect to the inputs and outputs of the activities. Such a model describes the succession of the activities only. No internal control is described.

Consistency of processes and objects

Outline of the consistency rules requirements concerning external facts (different meanings of the same fact)

Fact	Object Model	Business Process Model
Event	Stimulus for: • object internal state change • possible communication with other objects (send the message) in the case of the "common action"	Stimulus for: • operation execution • process state change • output production • possible communication with other processes (processes co-ordination)
Output	Consequence of • object action • object internal state change	Consequence of: • operation execution (product) • process state change

Outline of the consistency rules requirements concerning internal concepts (different meanings of the same concept)

Concept	Object Model	Business Process Model
Action	Action executed/allowed by the object Causes: • object state change • possible output production • possible communication with other objects (send the message) in the case of the "common action"	Activity inside the process Causes: • process state change • possible output production • possible communication with other processes (co-ordination of processes)
State	Object life cycle state • starting point for action processing • result of action processing	Process course state • starting point for operation execution • result of operation execution

Illustration

Process Memory

Why:

•**The need to store the information about the actual process state** in controlling complex processes (which often have complex relationships to other processes).
•**The need to reduce the complexity** of the process description.

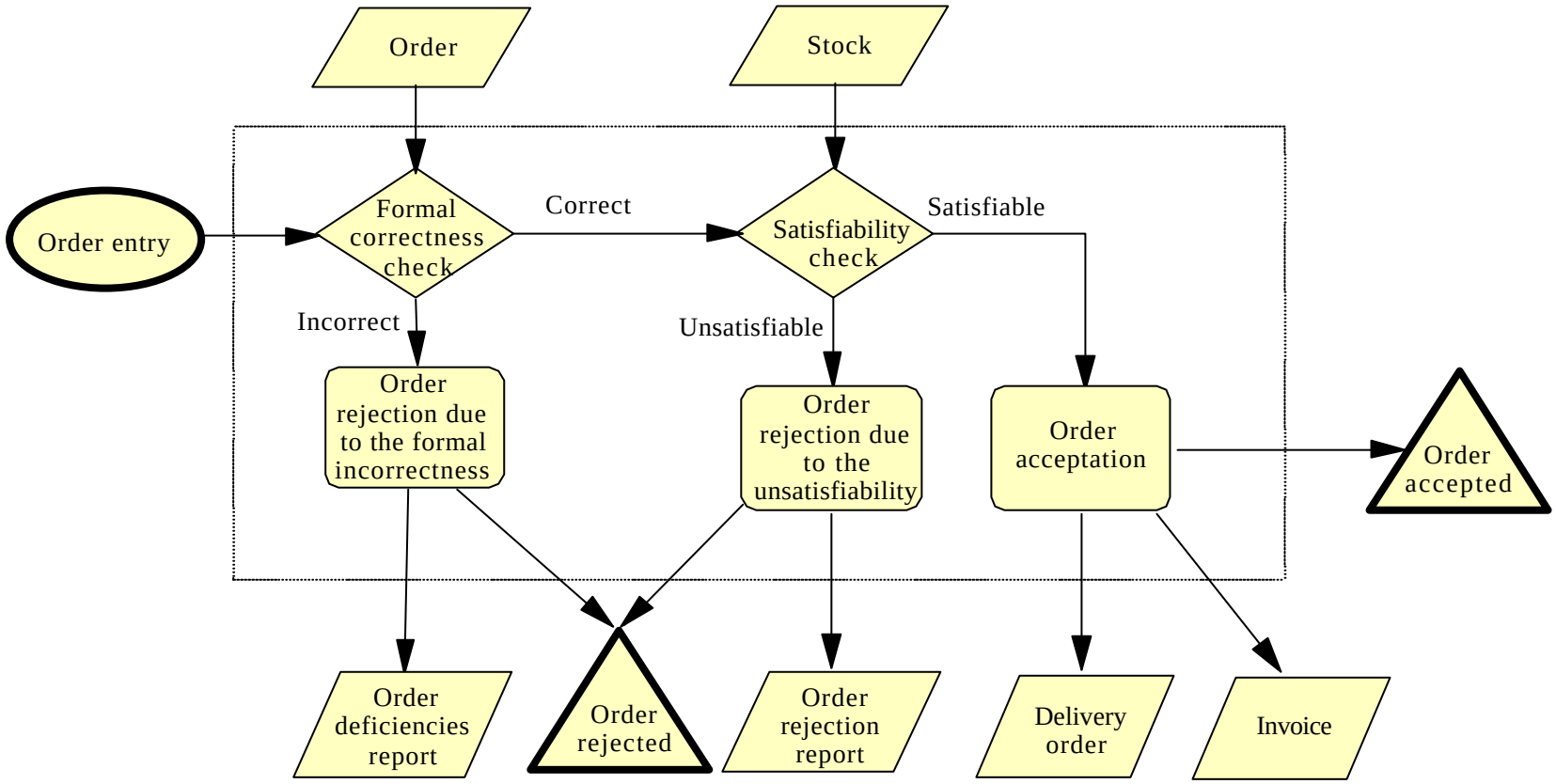
Process memory includes:

- actual **process state identification**
- **attributes** of actual state of the process
- **data gathered** by the process activities
  (once the data are gathered, they exist inside the process and can be used by its activities without any limitation (global data access))

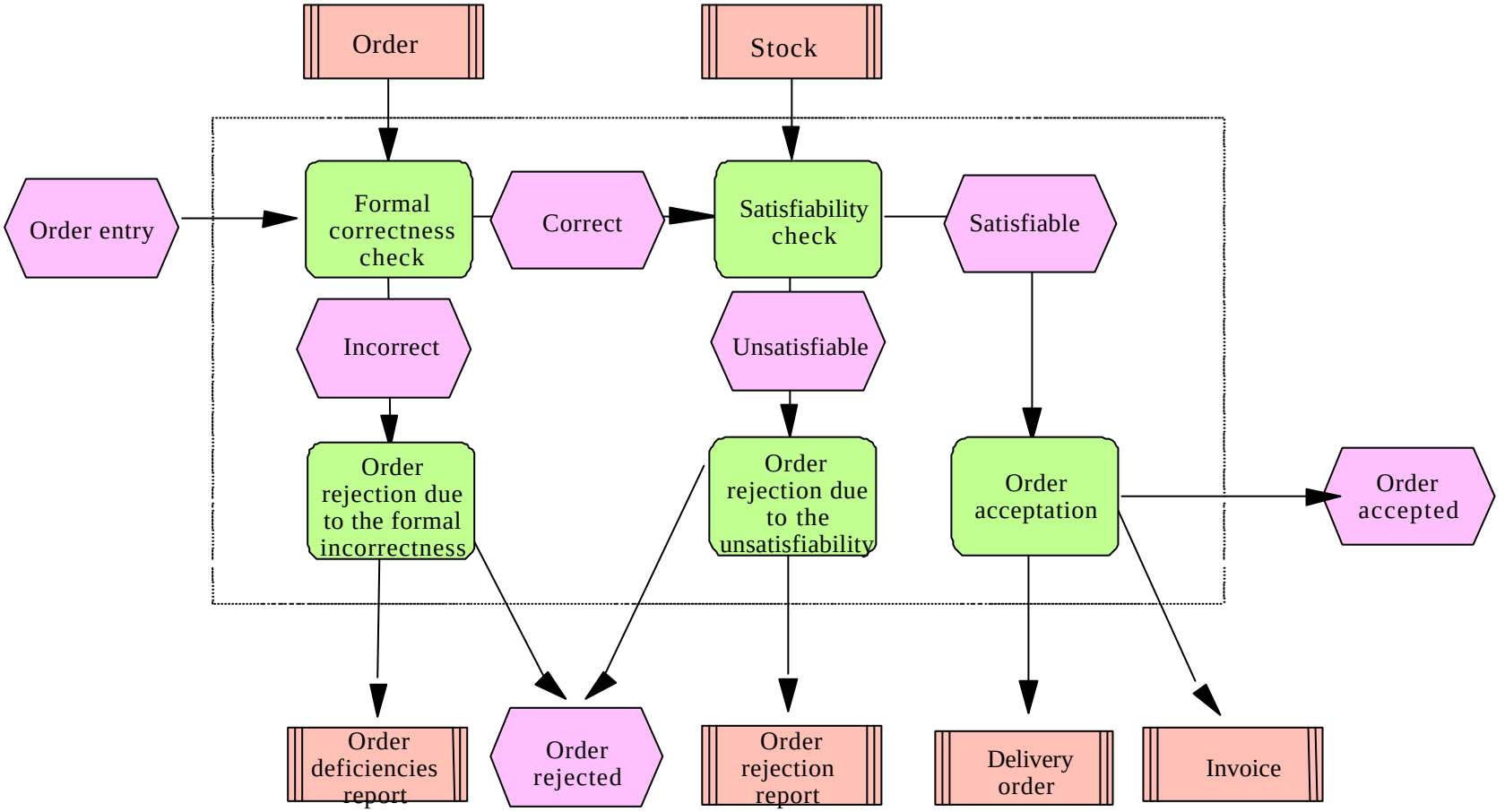
Consequences:

- criterion for **distinguishing between primitive and complex processes**.
  (process without the need to store the information about the state is so simple that it is possible to take it (and implement it, as well) as a simple algorithm)
- indicates the **possible parallelism inside the process** or at least in the communication with other processes.

Primitive Process (Order Receiving)



Primitive Process (Order Receiving) - Aris Notation



Complex Process (Order Transaction)