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Modeling and Verification of Workflows for e-Society

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Process Oriented Approach in Business

1990 1995 2000 2005

Business Process Reengineering

Enterprise Resource Planning

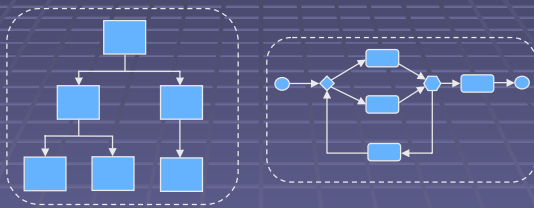
Workflow Management

Enterprise Application Integration

Business Process Modeling

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Process Oriented Approach in Business



Organization View

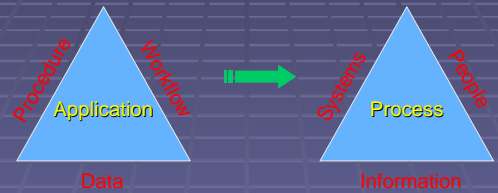
Transition

Process View

+ Optimal Resource Assignment

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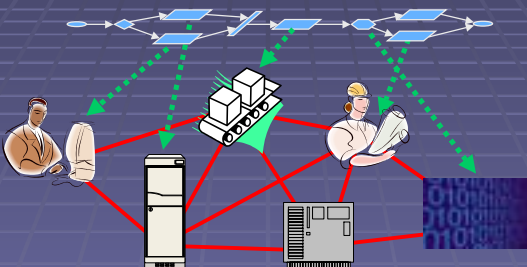
Process Oriented Approach in Business



by Howard Smith, CTO of Computer Science Corporation

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Workflows Integrate People, Systems and Information



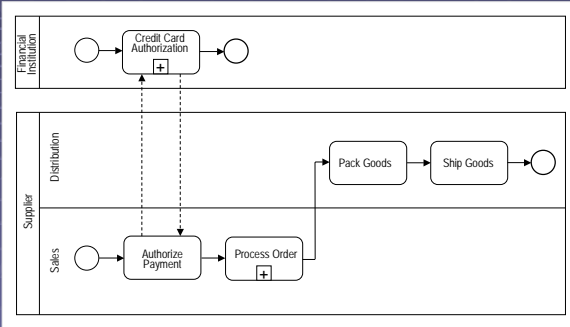
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Business Process Modeling Languages

- IDEF (Integrated Definition Method)
- BPMI (Business Process Management Initiative)
 - BPML (Business Process Modeling Language)
 - BPMN (Business Process Modeling Notation)
 - BPQL (Business Process Query Language)
- WfMC (Workflow Management Coalition)
 - Wf-XML
- ebXML (Electronic Business XML)
- UML (Unified Modeling Language) Activity Diagram
- ...

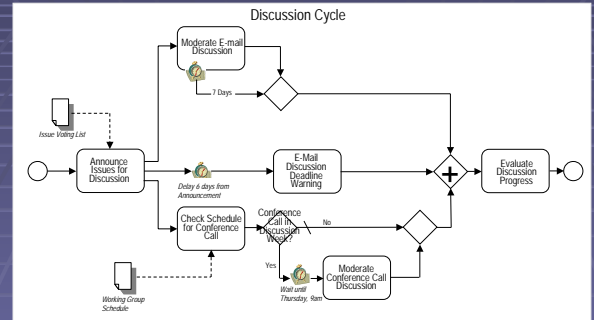
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Example: BPMN



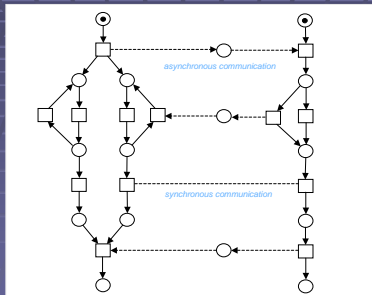
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Example: BPMN



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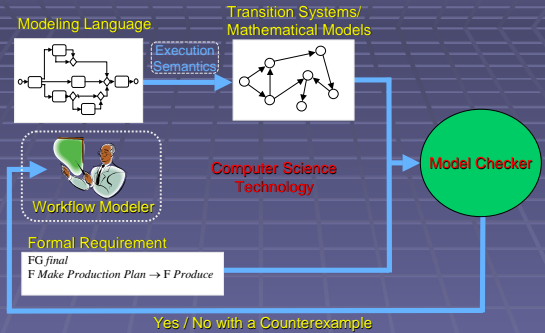
Background Mathematical Formalism



A Petri-net-based model for interorganizational workflows

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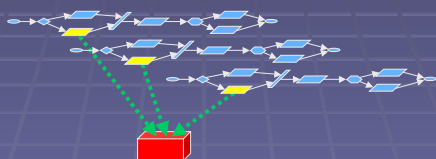
Formal Verification of Workflow



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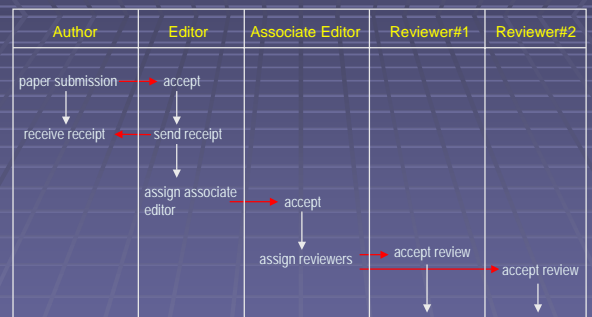
Performance Evaluation of Workflow

- Each workflow is a template of a business process.
- Many instances of workflows are running in the information system.
- Optimal resource (people, machines, companies, ...) assignment is necessary.



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Example: Review Process of an Academic Journal



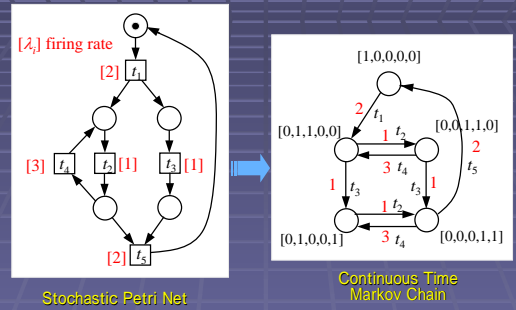
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Example: Review Process of an Academic Journal

- **Given:**
 - Workflow
 - Statistical data on paper submission
 - Upper bound of the number of papers each associate editor can handle
- **Find:**
 - Optimal number of associate editors in each research fields
- **Method:**
 - Stochastic Petri net

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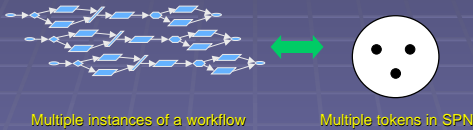
Example: Review Process of an Academic Journal



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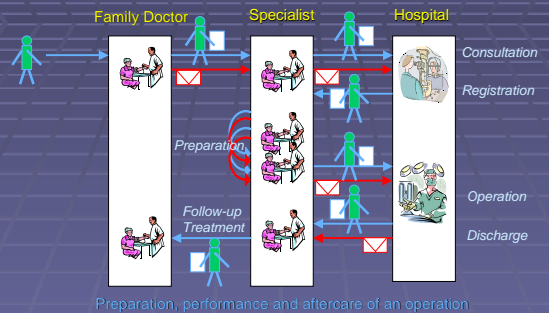
Example: Review Process of an Academic Journal

- **Statistical data:**
 - Average number of paper submissions per month
 - Average length of review periods
- Using SPN, we can know the number of papers each associate editor must handles on average.



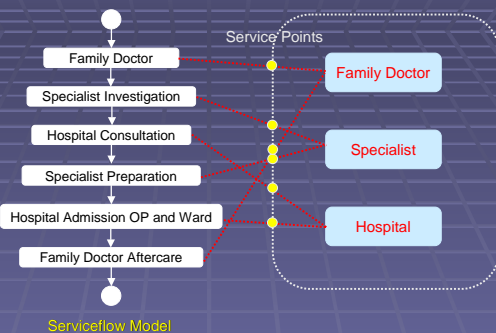
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Concept of Serviceflow



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Concept of Serviceflow



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Concept of Serviceflow

- Serviceflow should have priority over other subprocesses.
- Designing functions available at each service point is important.
- Using concept of serviceflow, we can evaluate the quality of workflows from the customer's point of view.

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Summary

- Process oriented approach in business
- Business process modeling languages
- Background mathematical formalism
- Formal verification of workflow
- Performance evaluation of workflow
- Concept of serviceflow