

Agent-Based Workflow Processing for Functional Integration & Process Re-engineering in the Healthcare Domain

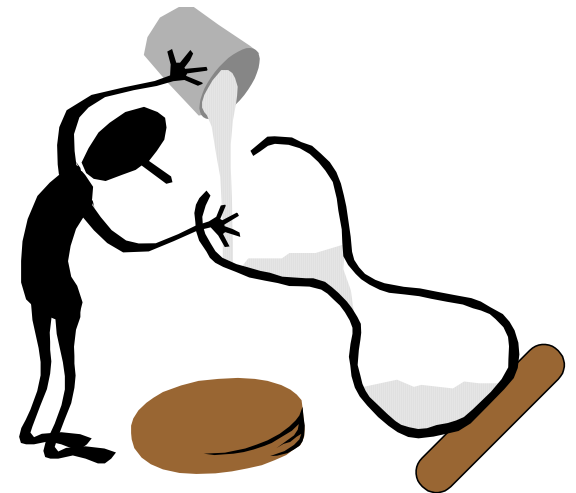
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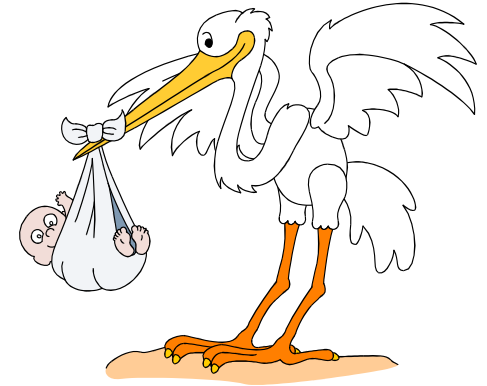
outline

- **motivation**
- **environment characteristics**
- **proposed architecture**
- **conclusions**



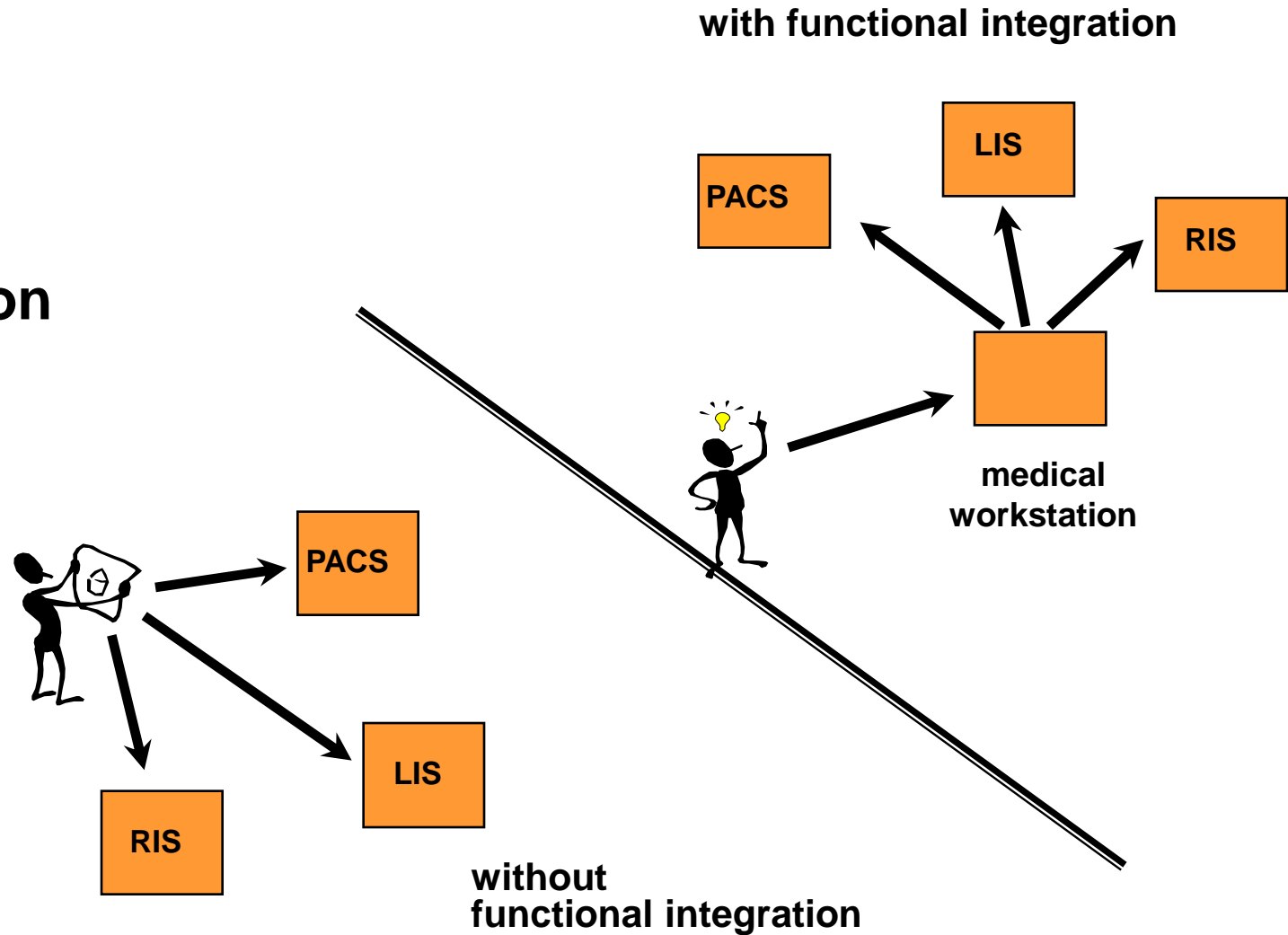
next generation healthcare networks

- **large number of information systems**
- **heterogeneous autonomous information systems**
- **knowledge-intensive applications**
- **large quantities of multimedia data**

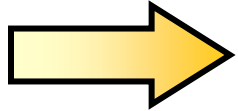


integration issues

- control
- data
- presentation
- function



functional integration

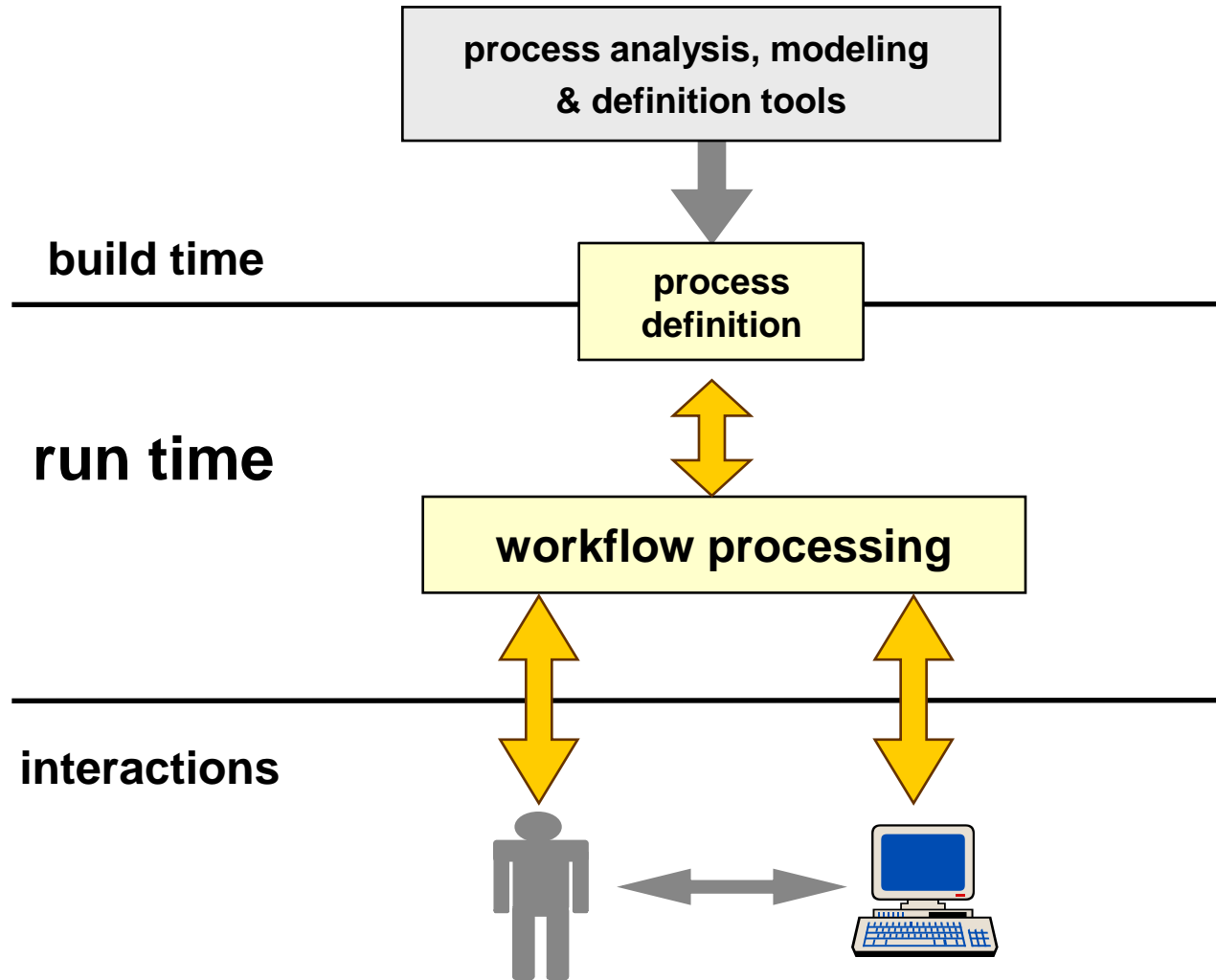


workflow based process automation & re-engineering

- ◆ **description in terms of tasks, activities,
processing entities**
- ◆ **execution supported by workflow
middleware services**



workflow management



confronting a dynamic environment



environment

- autonomous distributed modules
- heterogeneous infrastructure
- functionally expandable environment
- hierarchical virtual organizations

procedures

- dynamic predefined procedures
- ad hoc workflows
- work in disconnected networks
- interactions with other health-related organizations



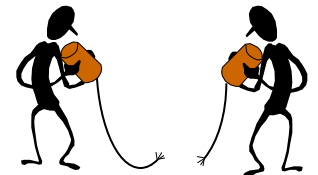
system requirements

architecture

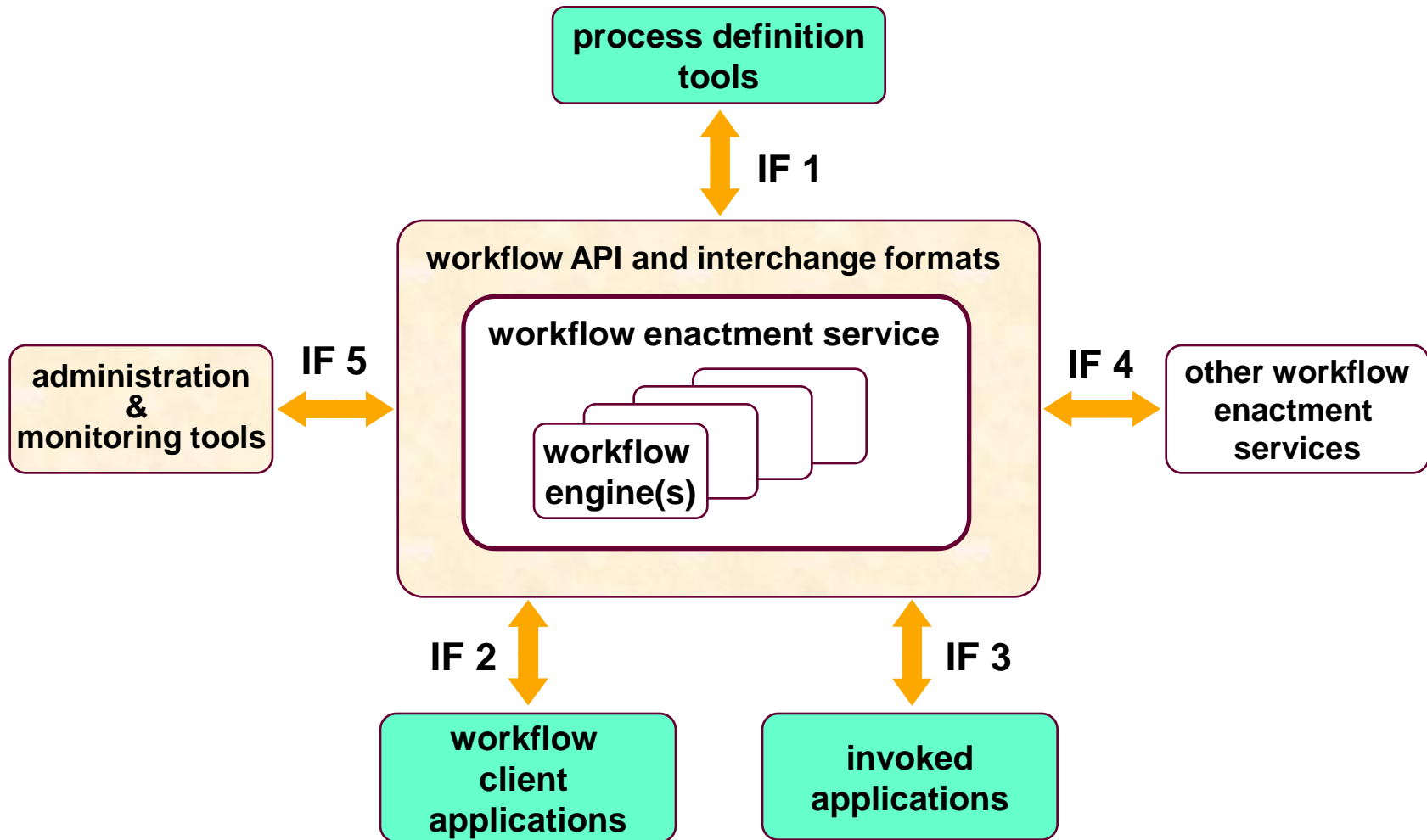
- modular and flexible architecture
- support technology and vendor diversity
- support evolution of technology and organizational structures
- expandable and scaleable architecture

procedures

- exception handling mechanisms
- support ad hoc workflows
- robust and persistent workflow processing
- conform to standards

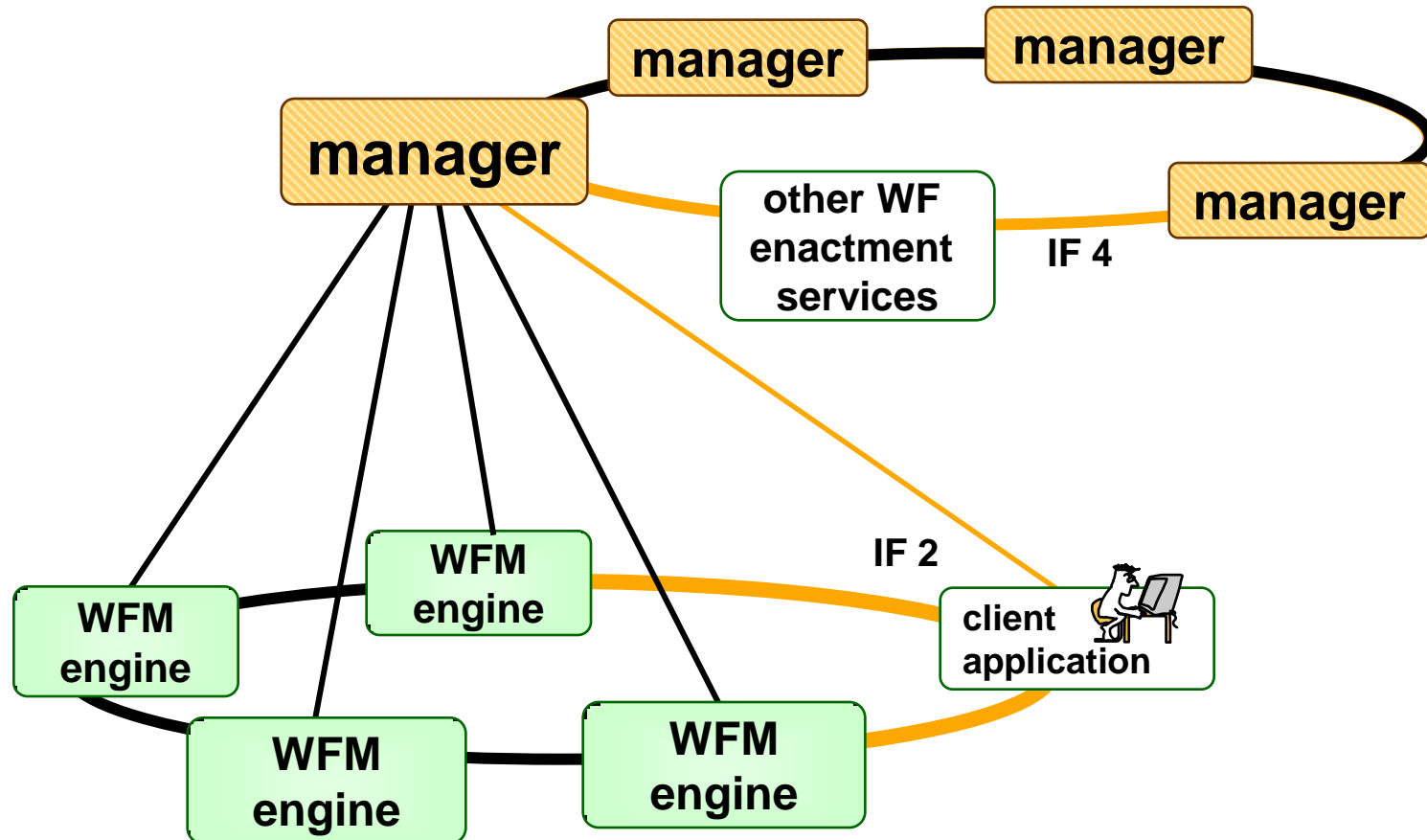


WfMC workflow reference model

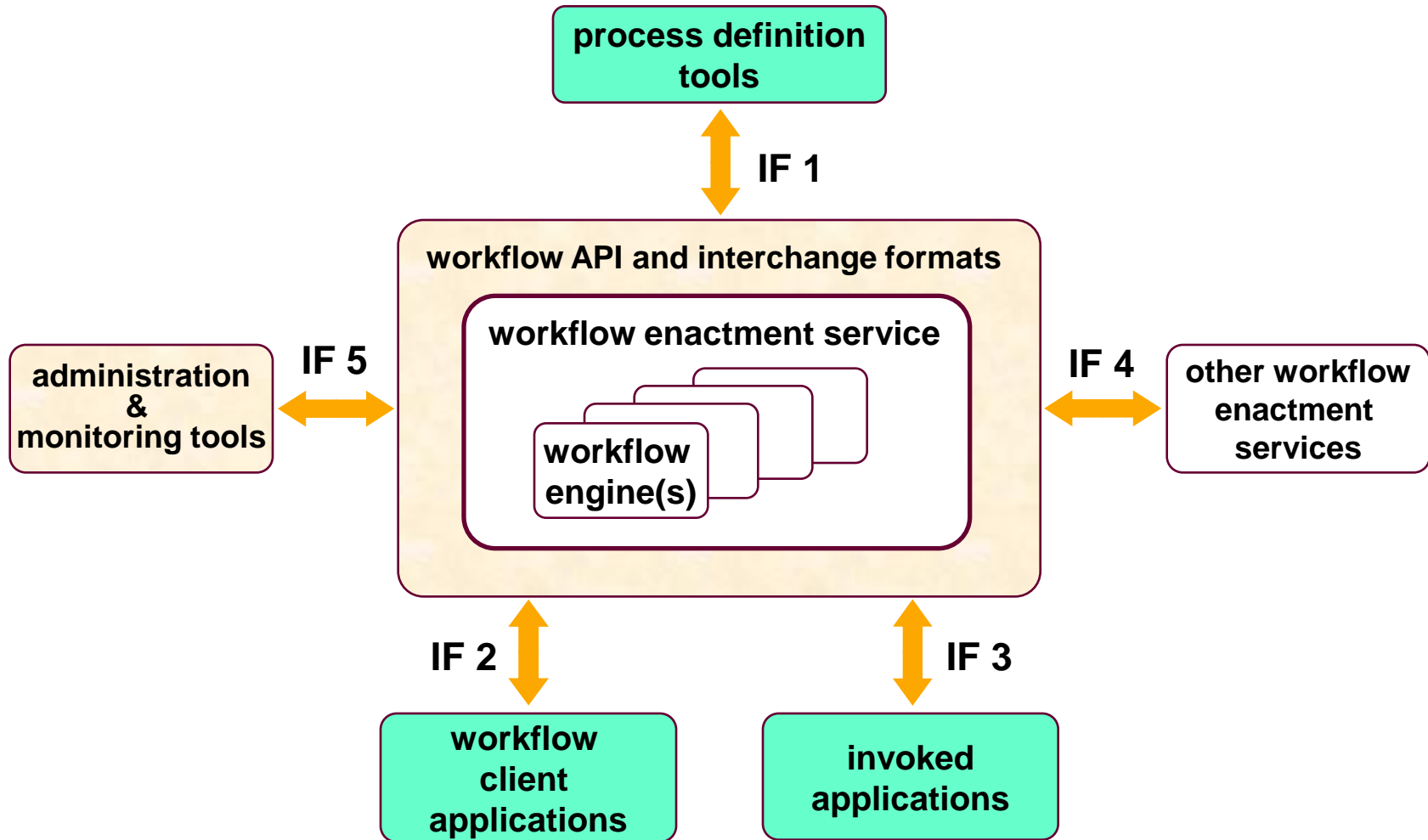


agent-based workflow processing

WOPE

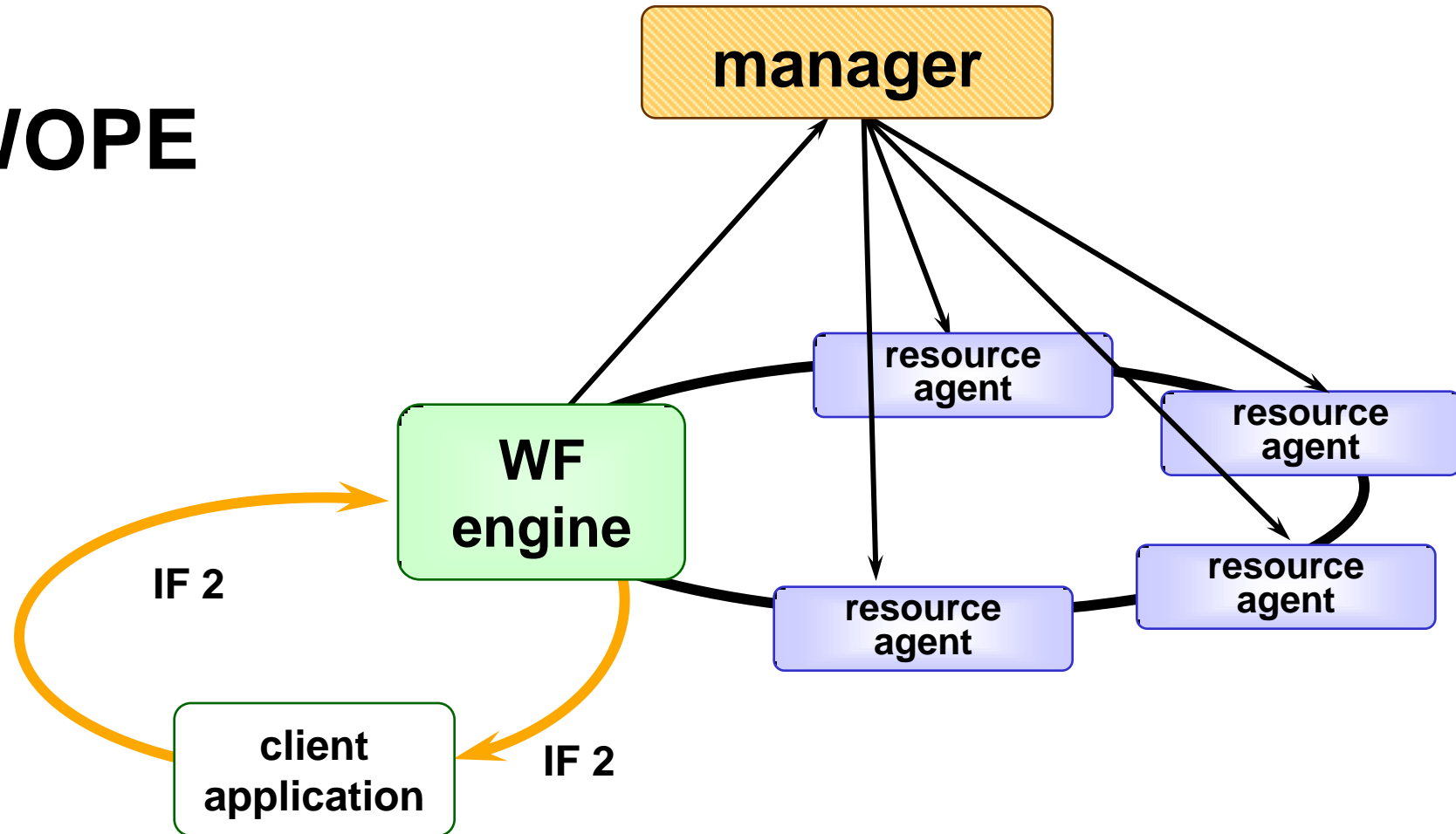


WfMC workflow reference model



agent-based workflow processing

WOPE



WOPE - resource agent

participant's representative

- adds tasks to the participant's worklist
- monitors status of current processes
- performs intermediate communication
- estimates remaining execution time
- calculates execution cost

data management

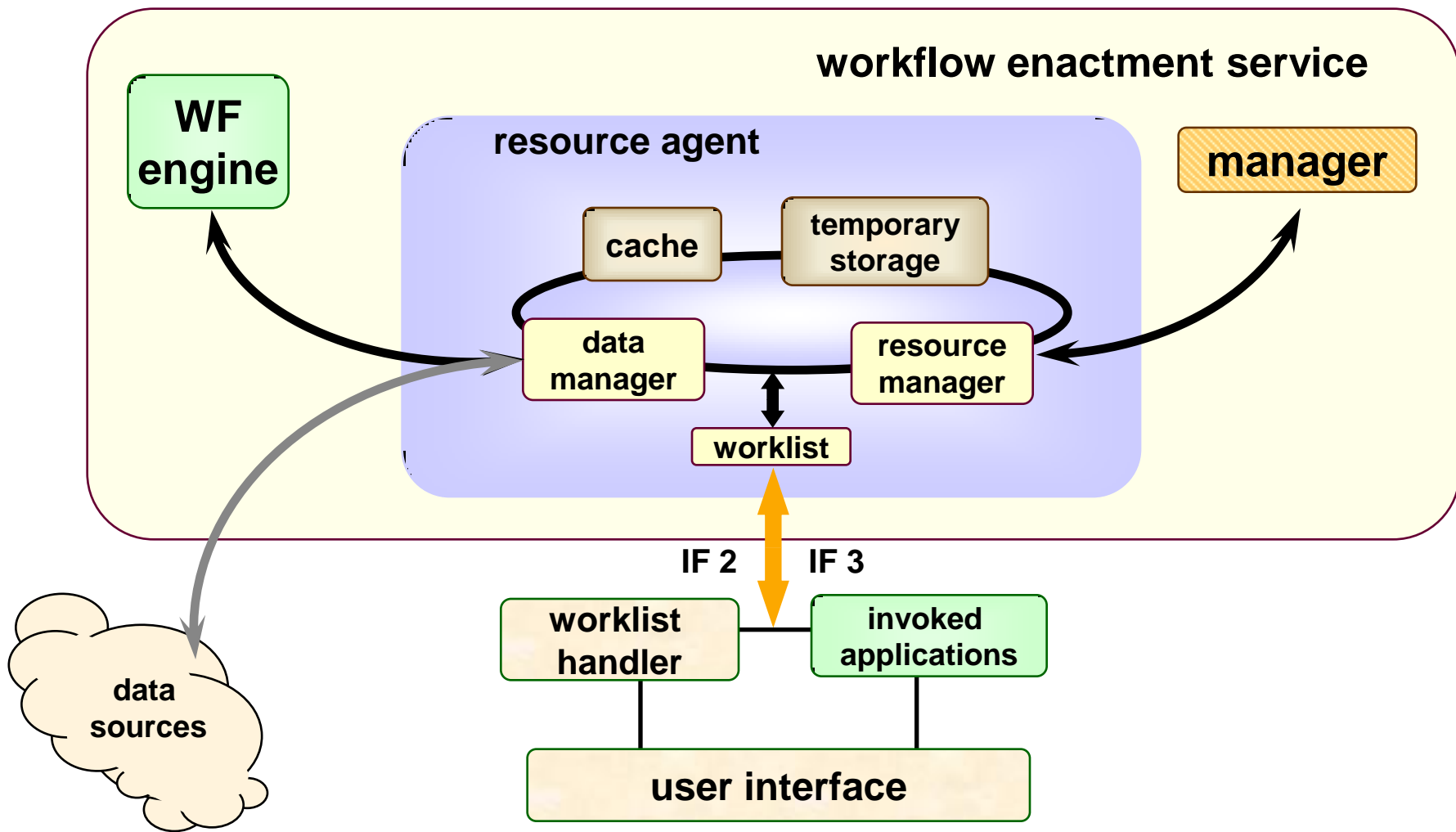
- status of cache
- data prefetching
- intelligent data delivery

resource monitoring

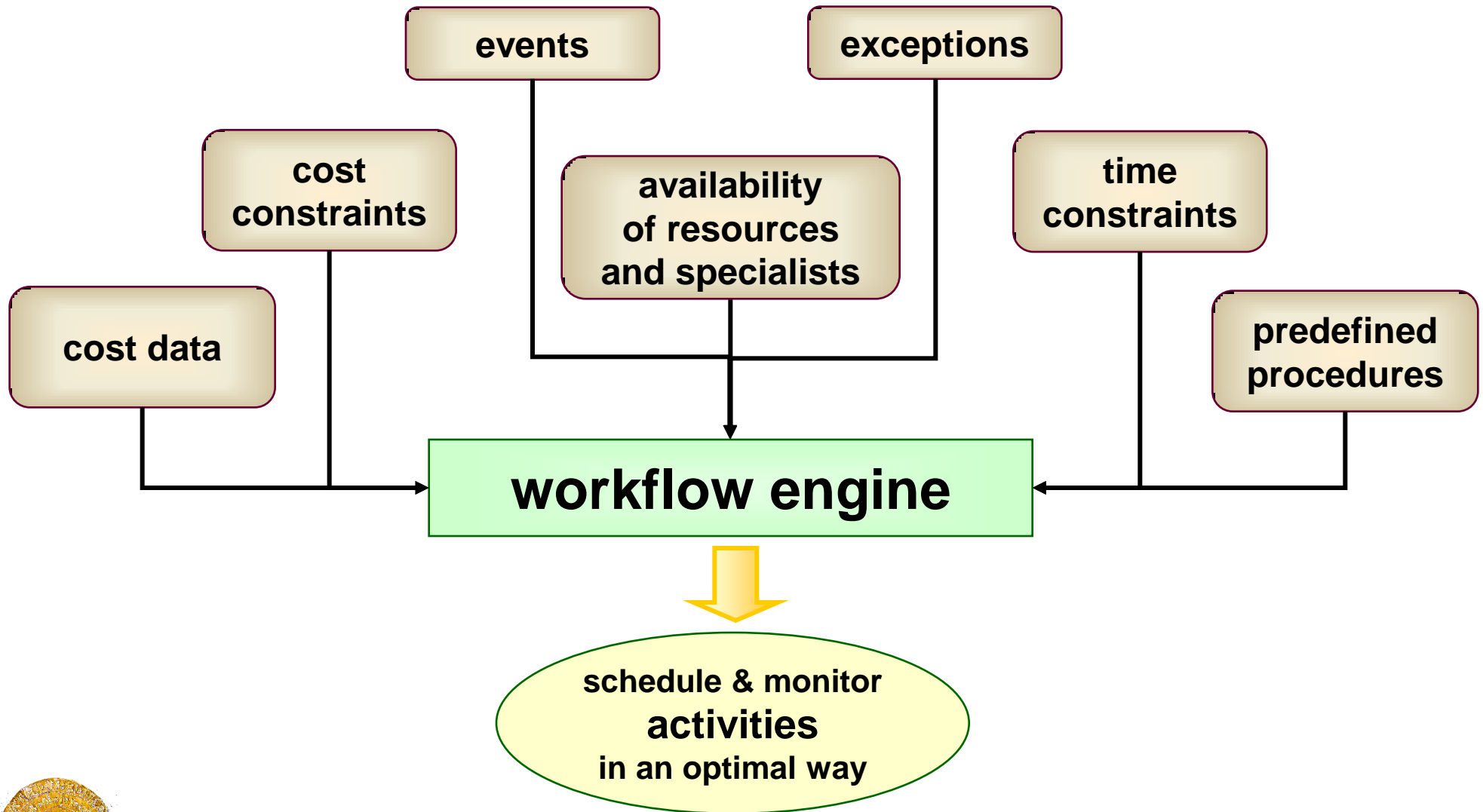
- information about local participant
- current status of local participant



WOPE - resource agent



WOPE - workflow enactment service

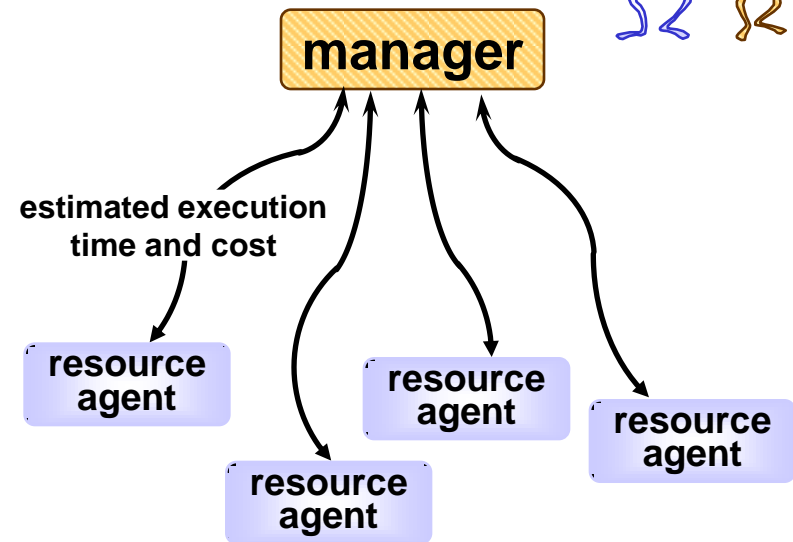


resource allocation



bid

- performance of local resources
- current state of local resources
- task profile
- self-confidence
- agent's policies



task assignment

- minimum cost
- minimum execution time
- reliability of bidder



WOPE - manager

participant's directory

- local resources
- other managers

workflow pool

- process definitions
- process logging & accounting information

authentication

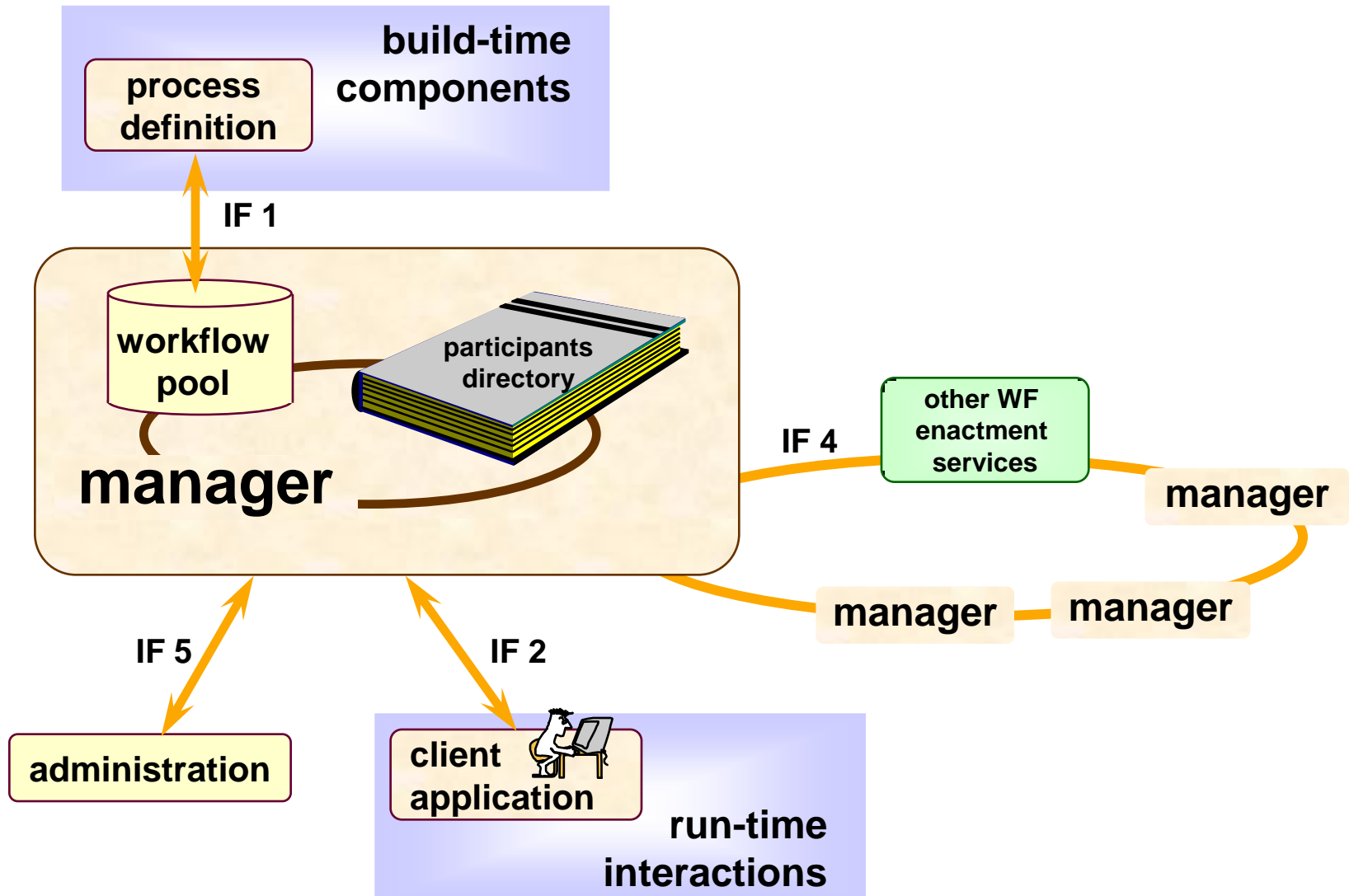
- user authentication
- manager authentication

resource management

- bid evaluation
- charging

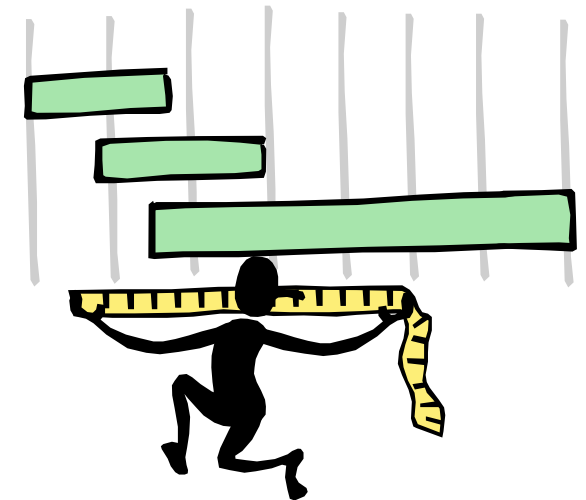


WOPE - manager

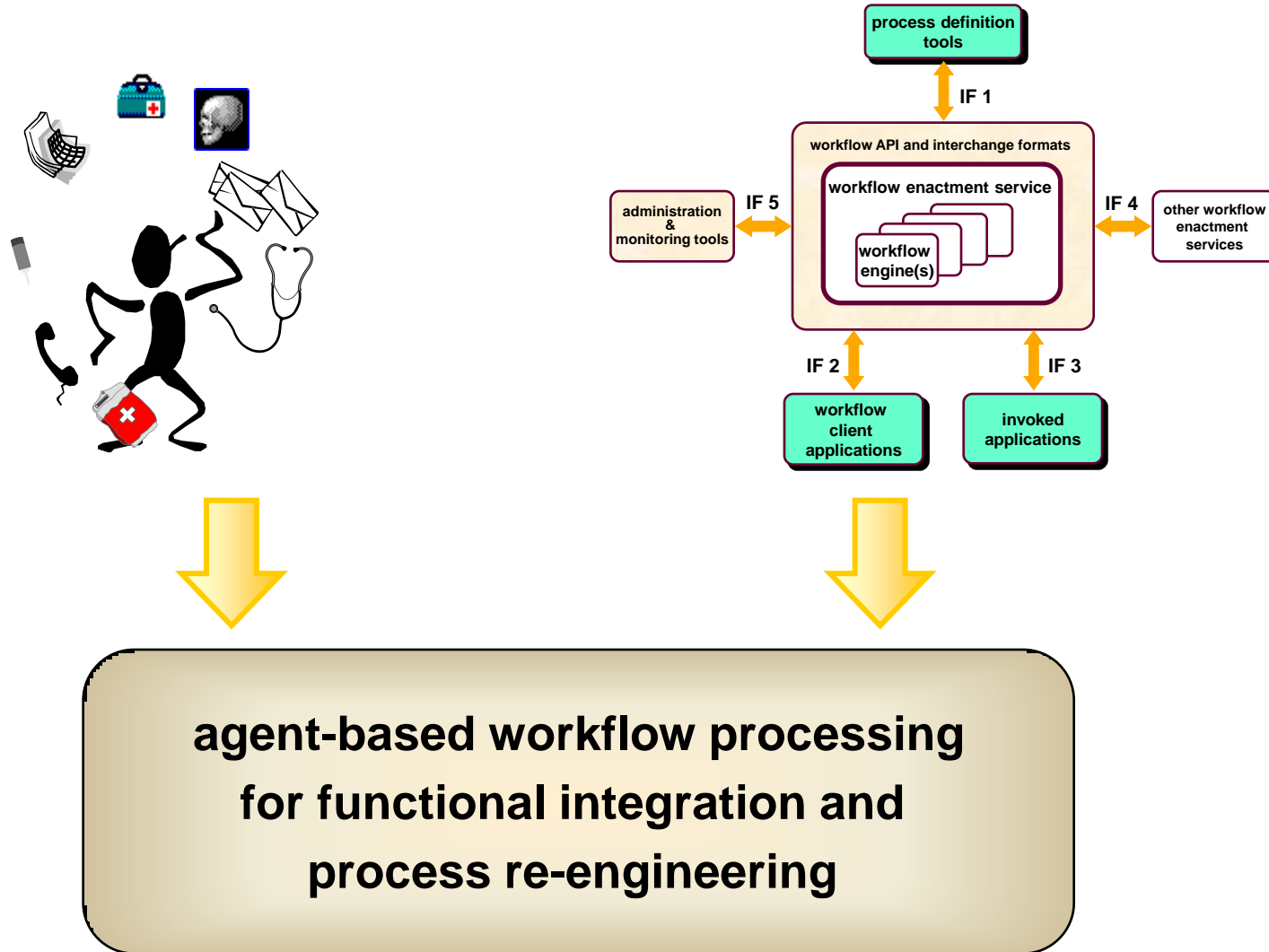


current state of work

- **agents**
based on DIPE, an environment supporting image processing services
- **interfaces**
WfMC (IF1, IF2, IF4) - CORBA
- **resource allocation**
simulation experiments
- **exception handling**
intelligent agent-based mechanisms
- **scripting**
extend roles and policies of agents



conclusion



cite as

E. Kaldoudi, M. Zikos, E. Leisch, and S.C. Orphanoudakis, “Agent-Based Workflow Processing for Functional Integration and Process Re-engineering in the Health Care Domain”, Proceedings of EuroPACS’97, Pisa, Italy, September 25-27, 1997

