Workflow Management Systems

# *Workflow Basics: Architecture and Applications*

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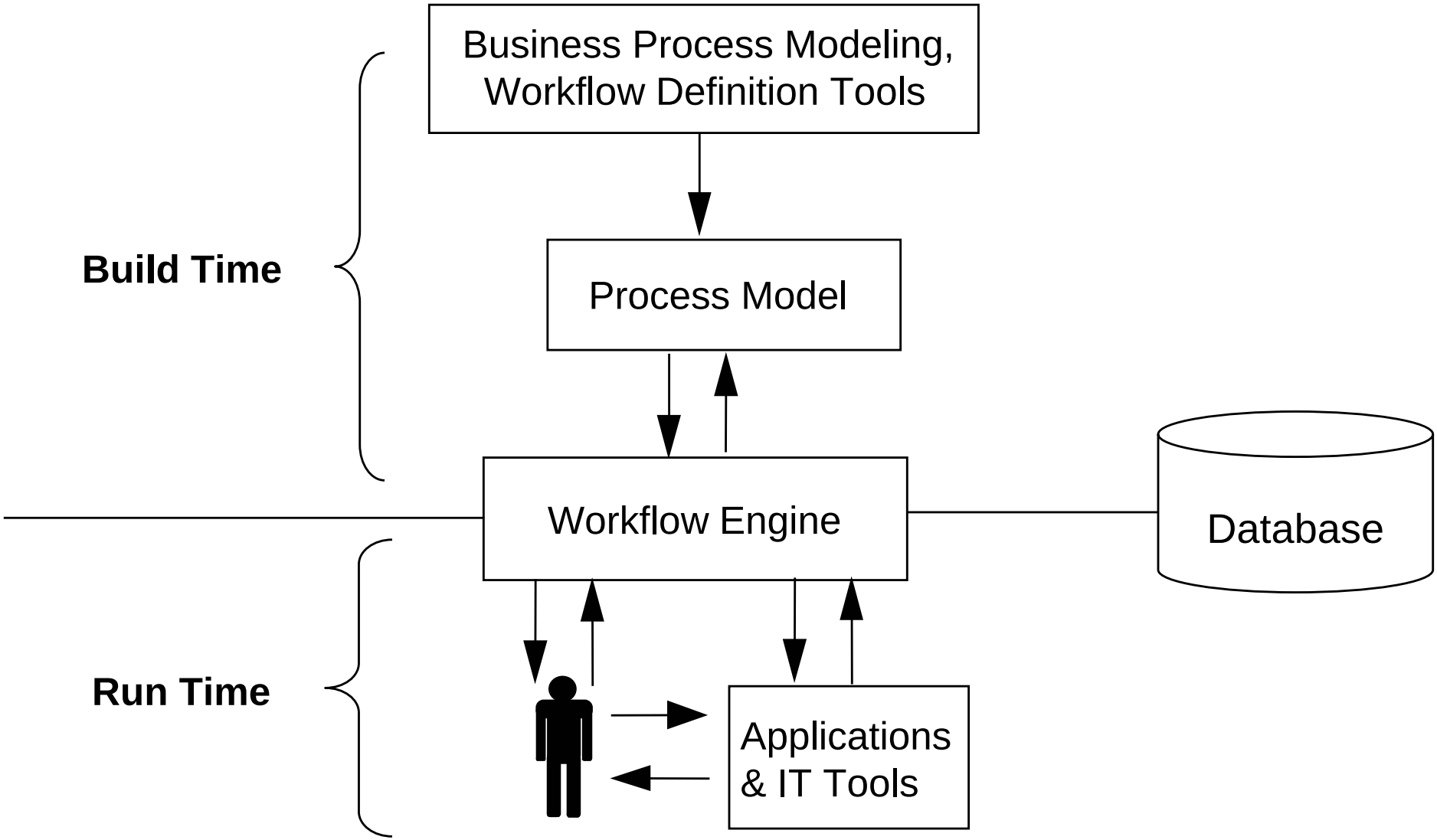
**SIG on Process Automation and Management**
**http://www.sigpam.org**

# Outline

1. Major Components of a WFMS
2. WfMC Architecture Standards
3. Example: Oracle Workflow System
4. Workflow as the e-Business Hub

# Components of a Workflow Management System



# Build Time and Run Time Activities

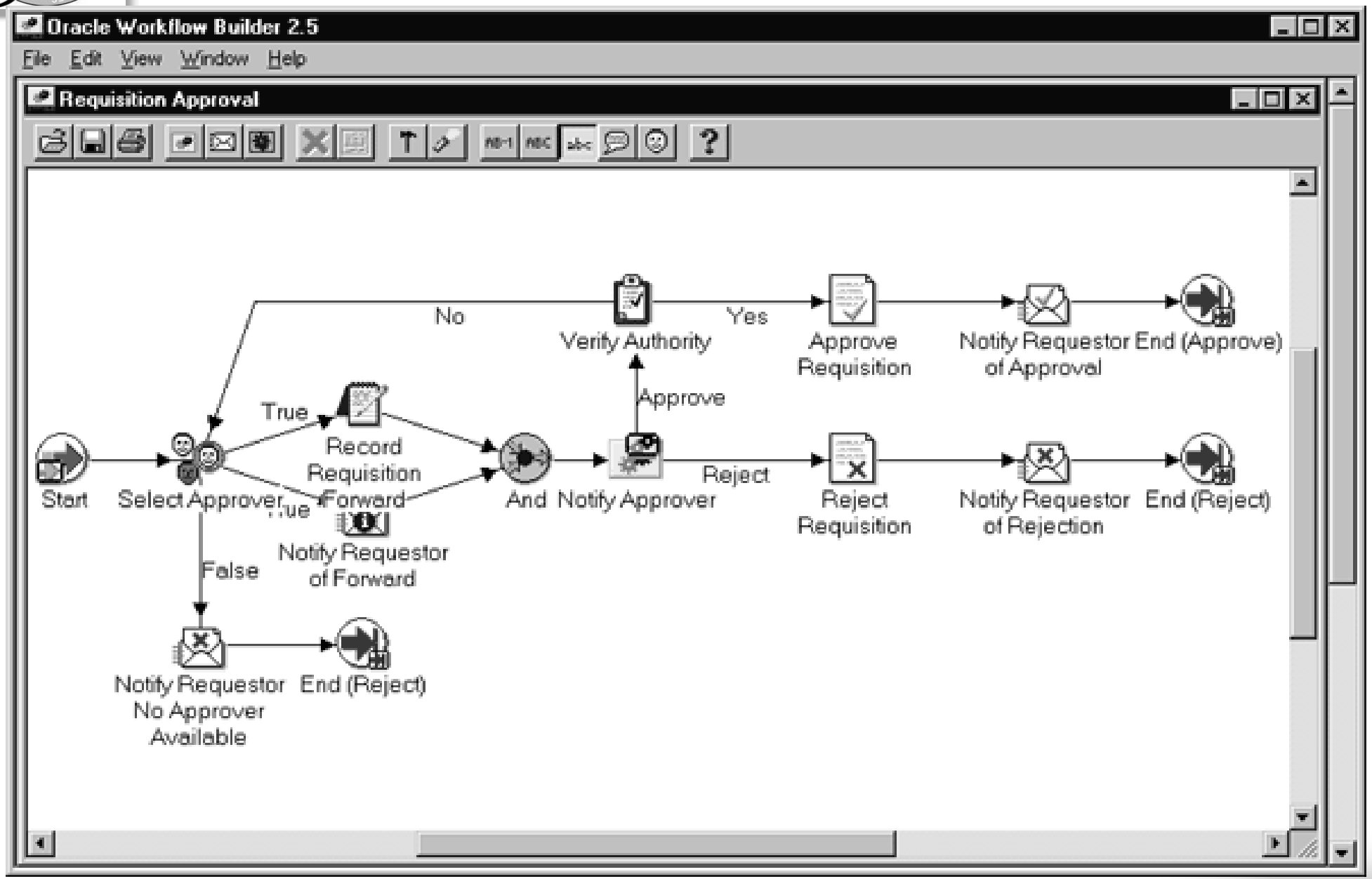
**Build Time:**

- Create the process model
- Create business rules
- Create User model

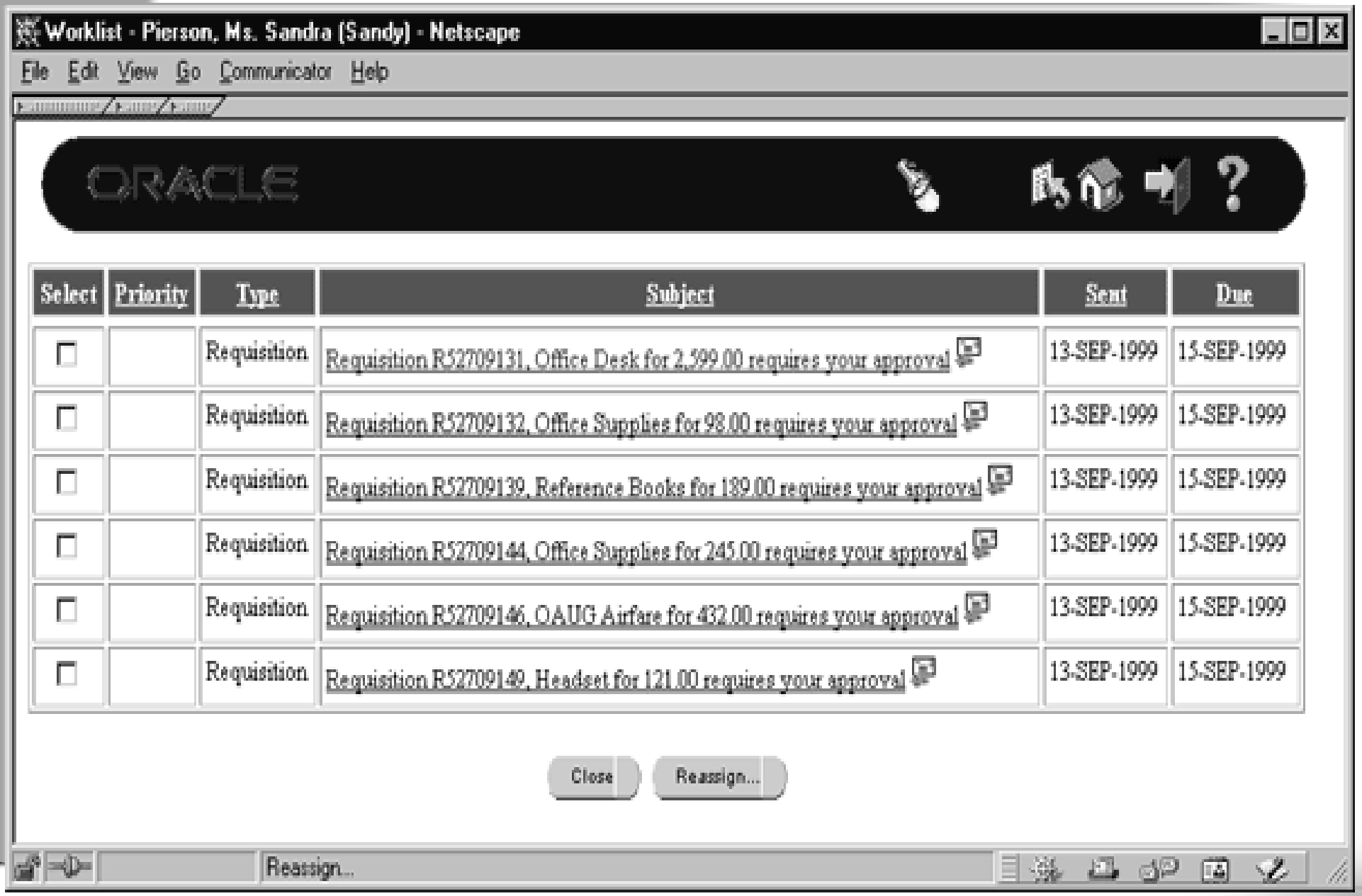
**Rule Time:**

- Create process instances
- Route activities
- Control processes and activities

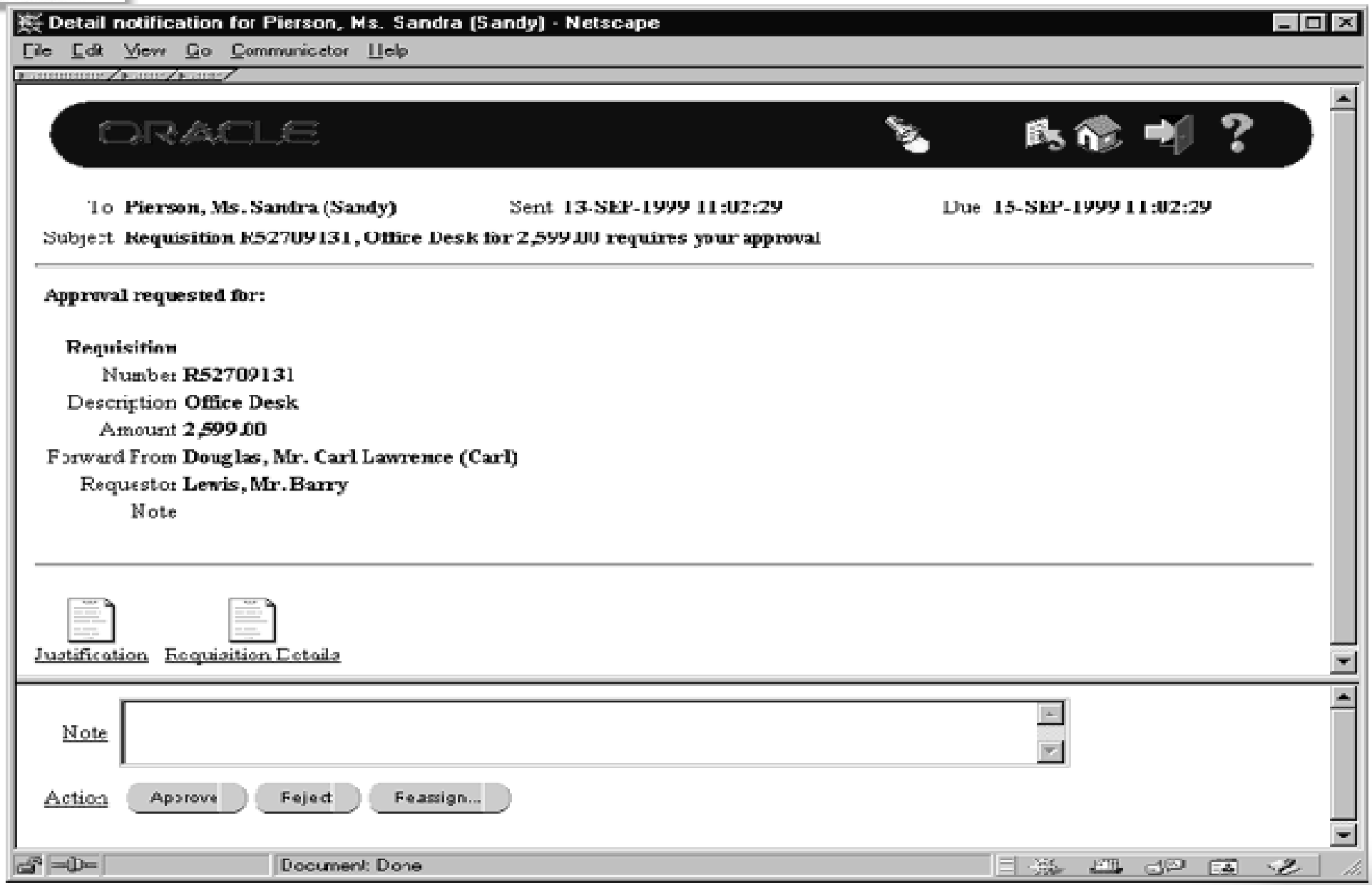
# Graphical Workflow Builder (Oracle)



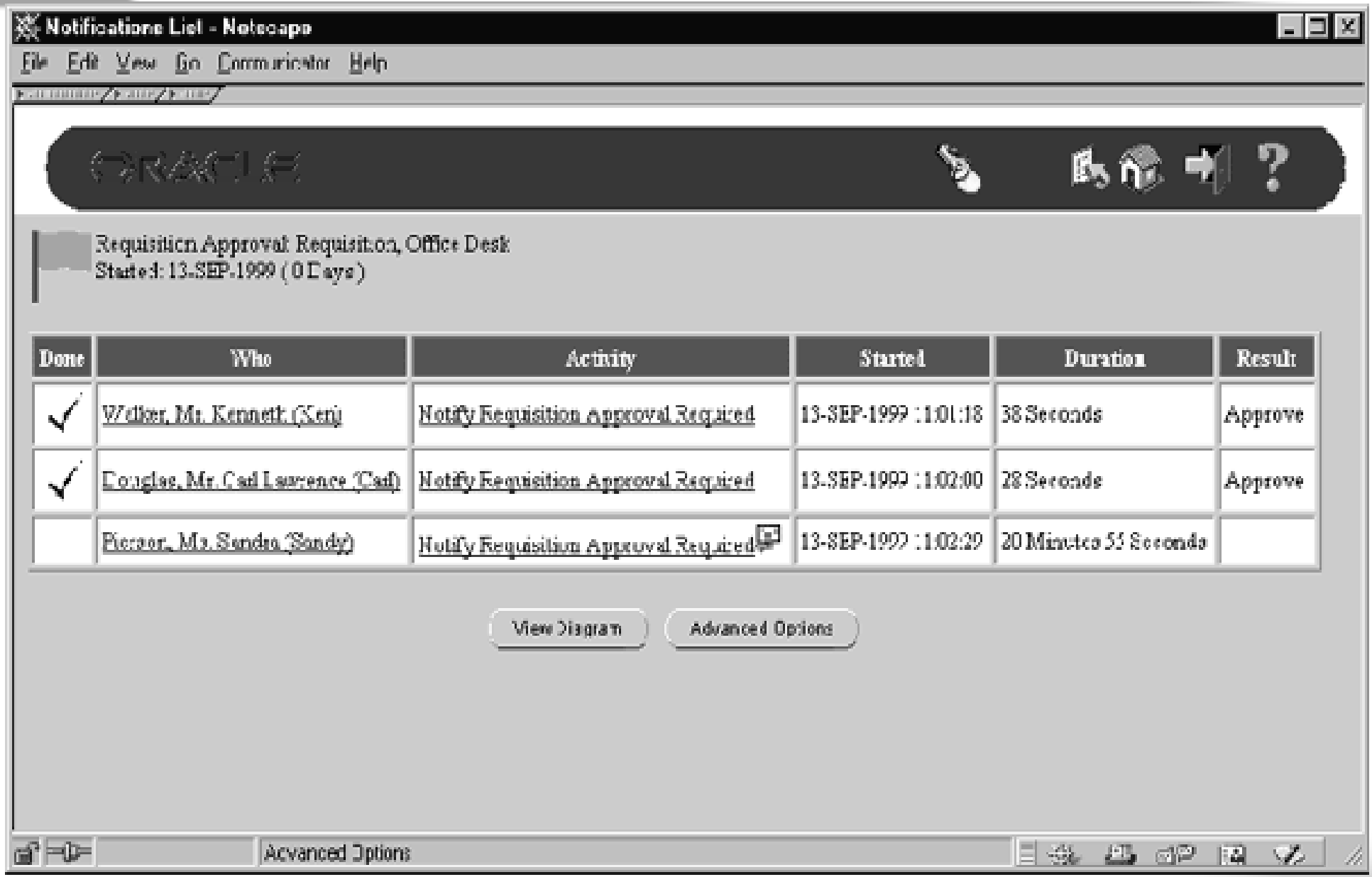
# Worklist


Worklist - Pierson, Ms. Sandra (Sandy) - Netscape
File Edit View Go Communicator Help
ORACLE
Select
Priority
Type
Subject
Sent
Due
Requisition
Requisition R52709131, Office Desk for 2,399.00 requires your approval
13-SEP-1999
15-SEP-1999
Requisition
Requisition R52709132, Office Supplies for 98.00 requires your approval
13-SEP-1999
15-SEP-1999
Requisition
Requisition R52709139, Reference Books for 189.00 requires your approval
13-SEP-1999
15-SEP-1999
Requisition
Requisition R52709144, Office Supplies for 245.00 requires your approval
13-SEP-1999
15-SEP-1999
Requisition
Requisition R52709146, OAUG Airfare for 432.00 requires your approval
13-SEP-1999
15-SEP-1999
Requisition
Requisition R52709149, Headset for 121.00 requires your approval
13-SEP-1999
15-SEP-1999
Close
Reassign...
Reassign...

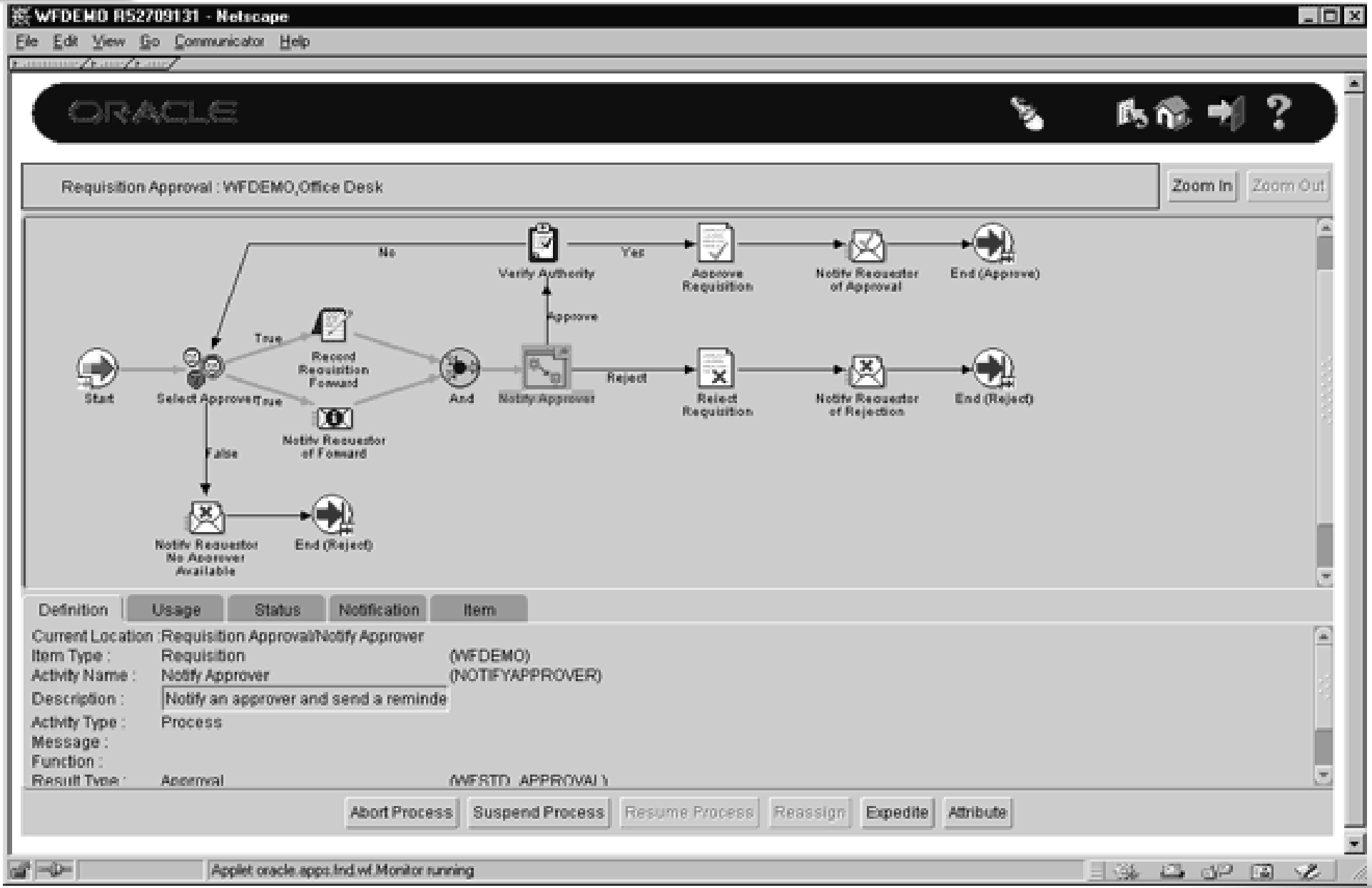
# Work Item


Detail notification for Pierson, Ms. Sandra (Sandy) - Netscape
File Edit View Go Communicator Help
ORACLE
To Pierson, Ms. Sandra (Sandy) Sent 13-SEP-1999 11:02:29 Due 15-SEP-1999 11:02:29
Subject Requisition R52709131, Office Desk for 2,599.00 requires your approval
Approval requested for:
Requisition
Number R52709131
Description Office Desk
Amount 2,599.00
Forward From Douglas, Mr. Carl Lawrence (Carl)
Requestor Lewis, Mr. Barry
Note
Justification
Requisition Details
Note
Action
Approve
Reject
Reassign...
Document: Done

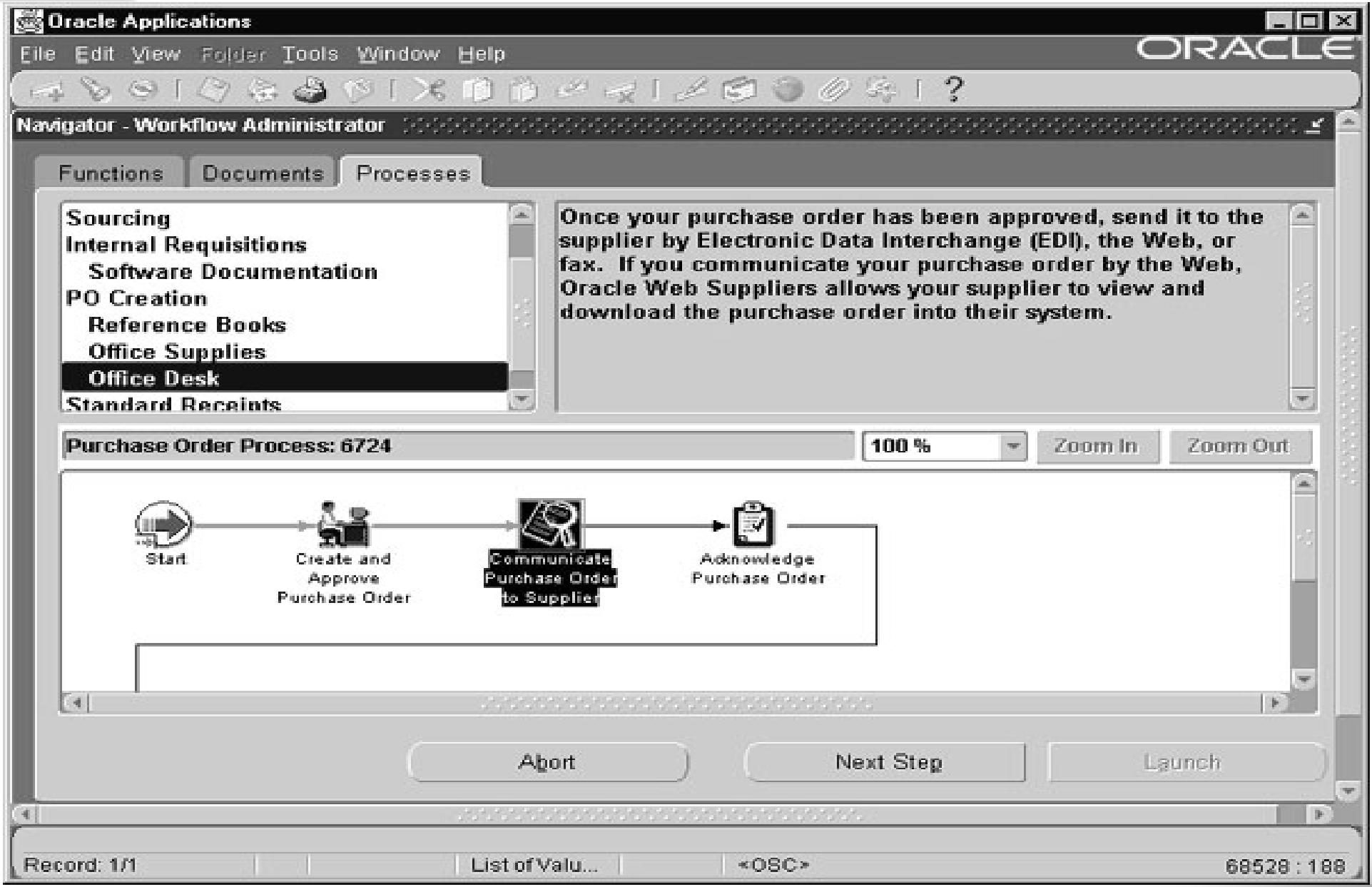
# Monitor the Approval Process



# Workflow Monitor Allows Process Control



# Workflow Navigator to Launch Processes



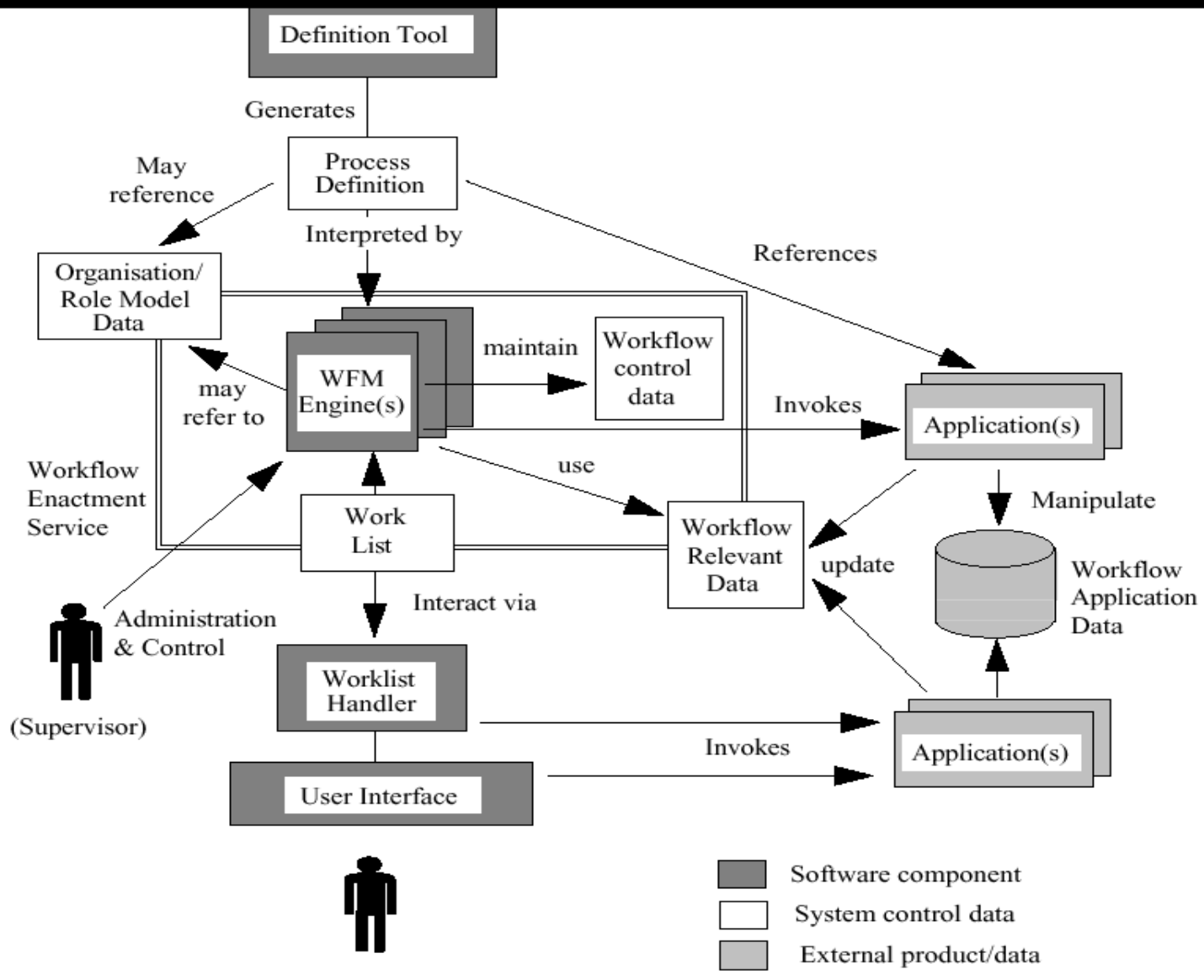
# Outline

1. Major Components of a WFMS
2. WfMC Architecture Standards
3. Example: Oracle Workflow System
4. Workflow as the e-Business Hub

# Workflow Management Coalition

- non-profit international body
- established Aug. 1993
- development and promotion of workflow standards
- http://www.aiai.ed.ac.uk/wfmc
- Workflow Glossary
- Workflow Reference Model
- Standards for Interface to Workflow Systems
- Demonstration of interoperability

# Architecture of Workflow Management System



# Build-time: Process Definition

- set of discrete activity steps
- associated human and/or computer operations
- rules for progression of process through steps
- may be altered at run-time
- various forms (textual, graphical, control flow, data flow)

# Run-time: Process Control

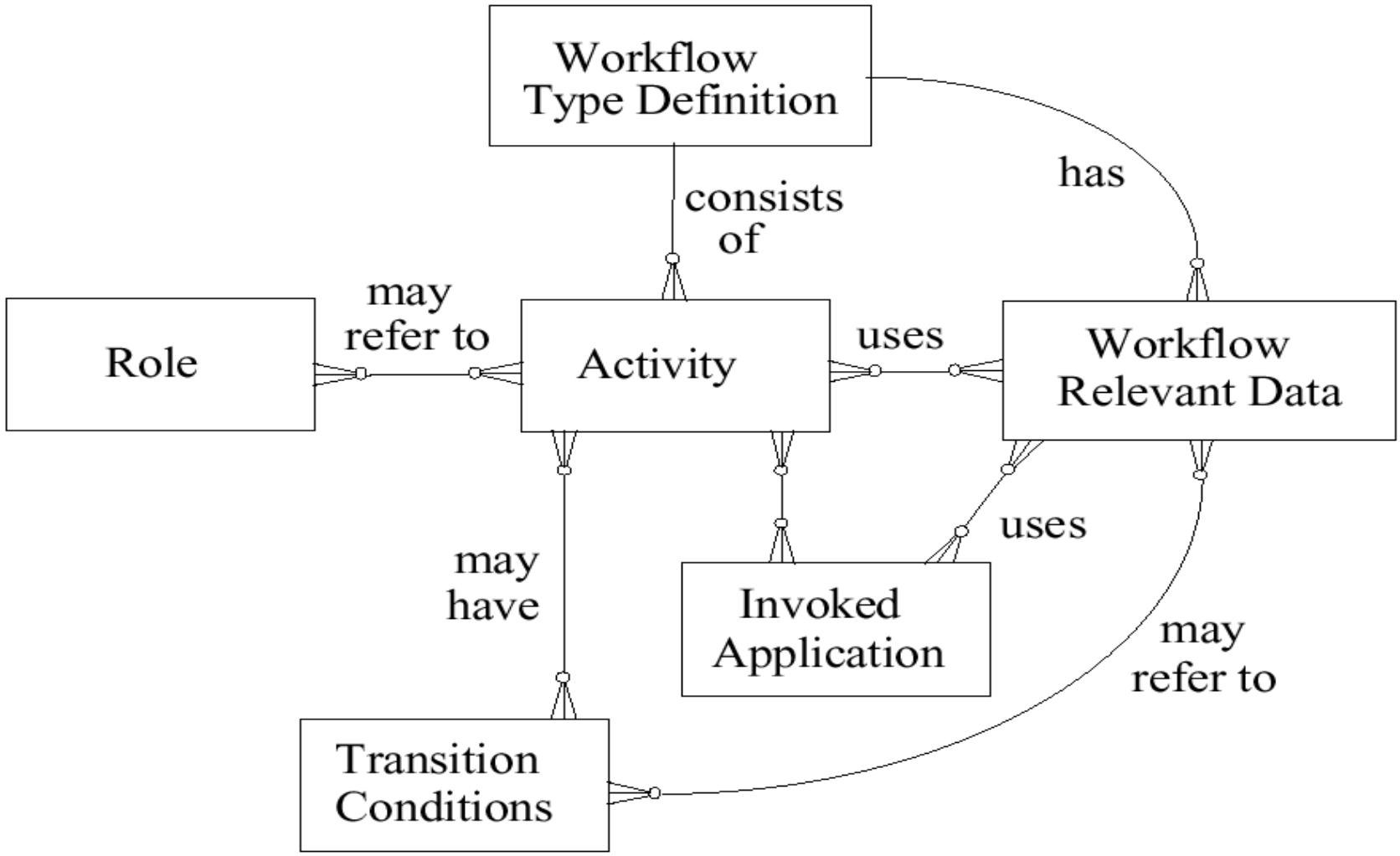
## Process control functions

- interpretation of process definition
- creating and controlling process instances
- scheduling activity steps
- invoking activities

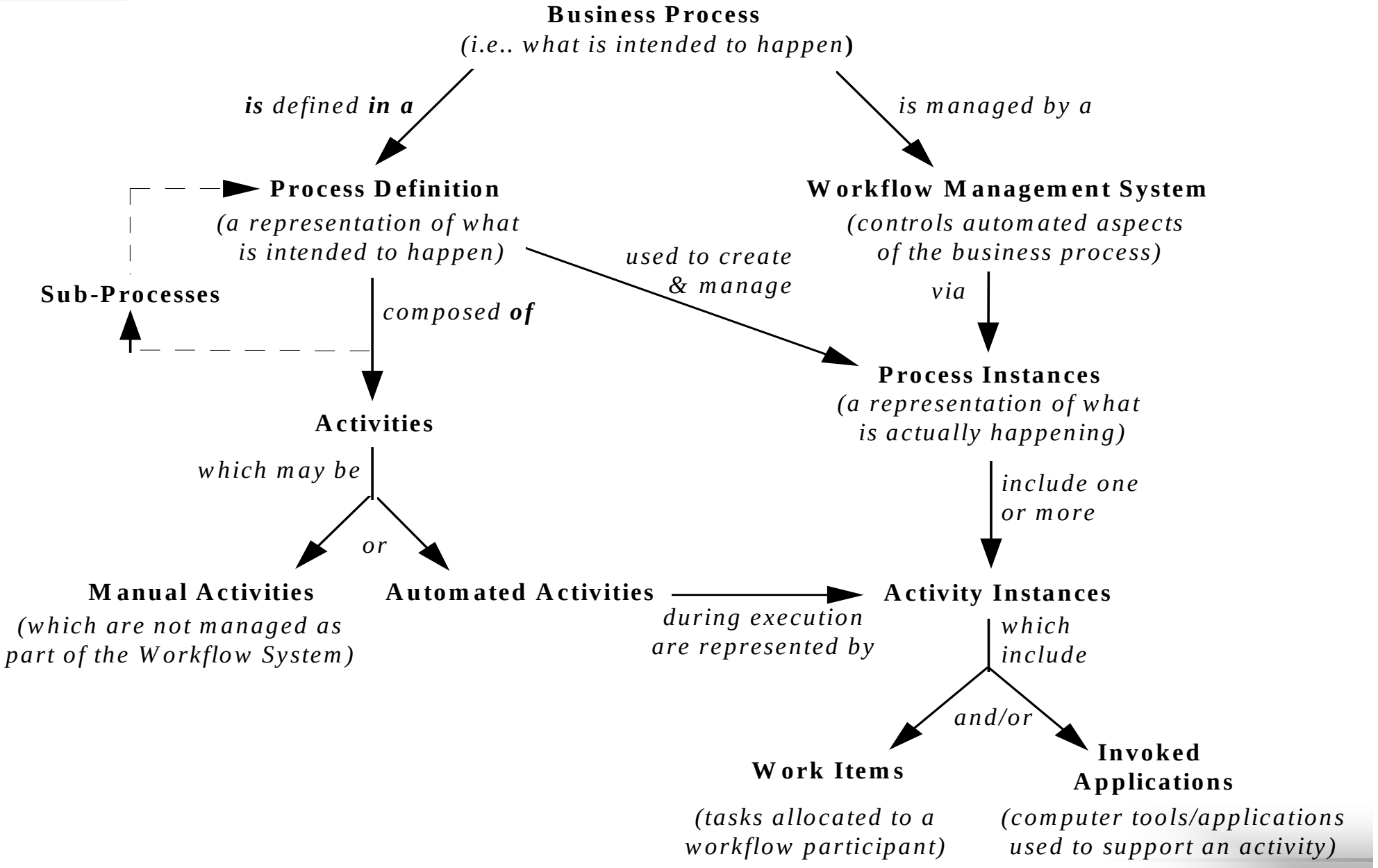
## Activity Interactions

- interaction with workflow participants
- interaction with IT-systems
- operations performed outside of WFMS
- Interaction:
  - transfer of control
  - ascertain operational status
  - invoke application tools
  - pass data

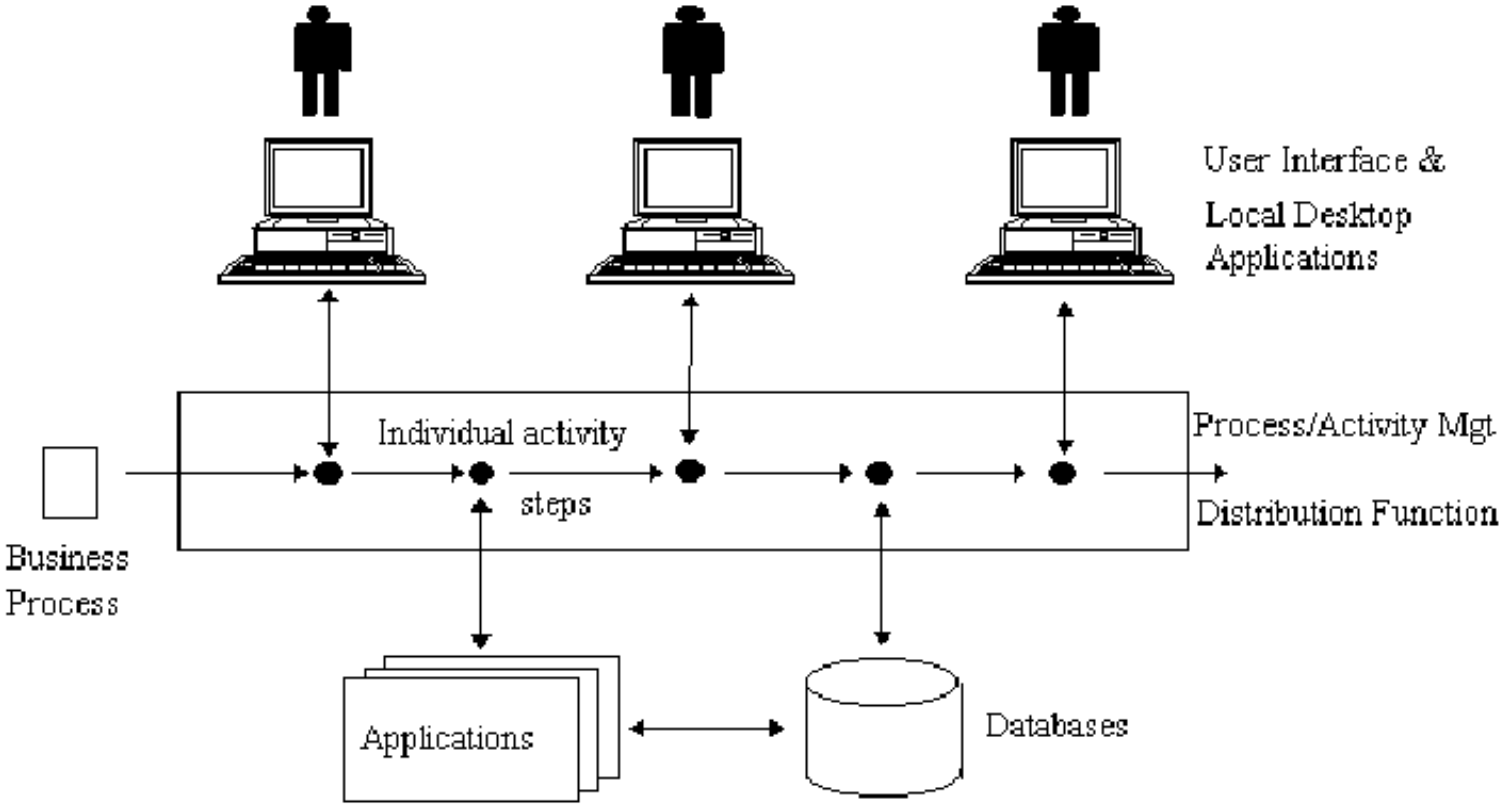
# Process Definition Model



# Relationships among Workflow Concepts

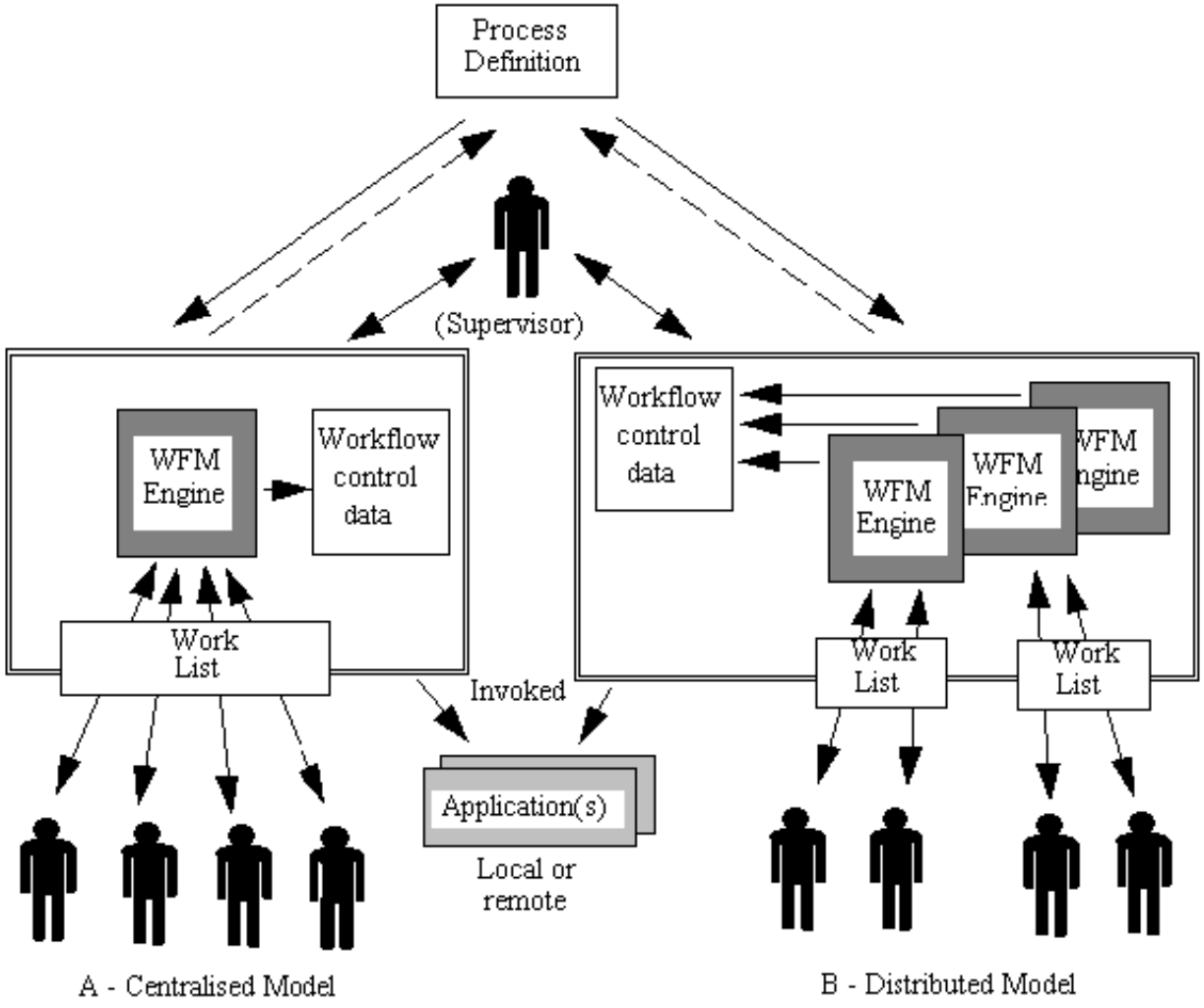


# Distribution and System Interface



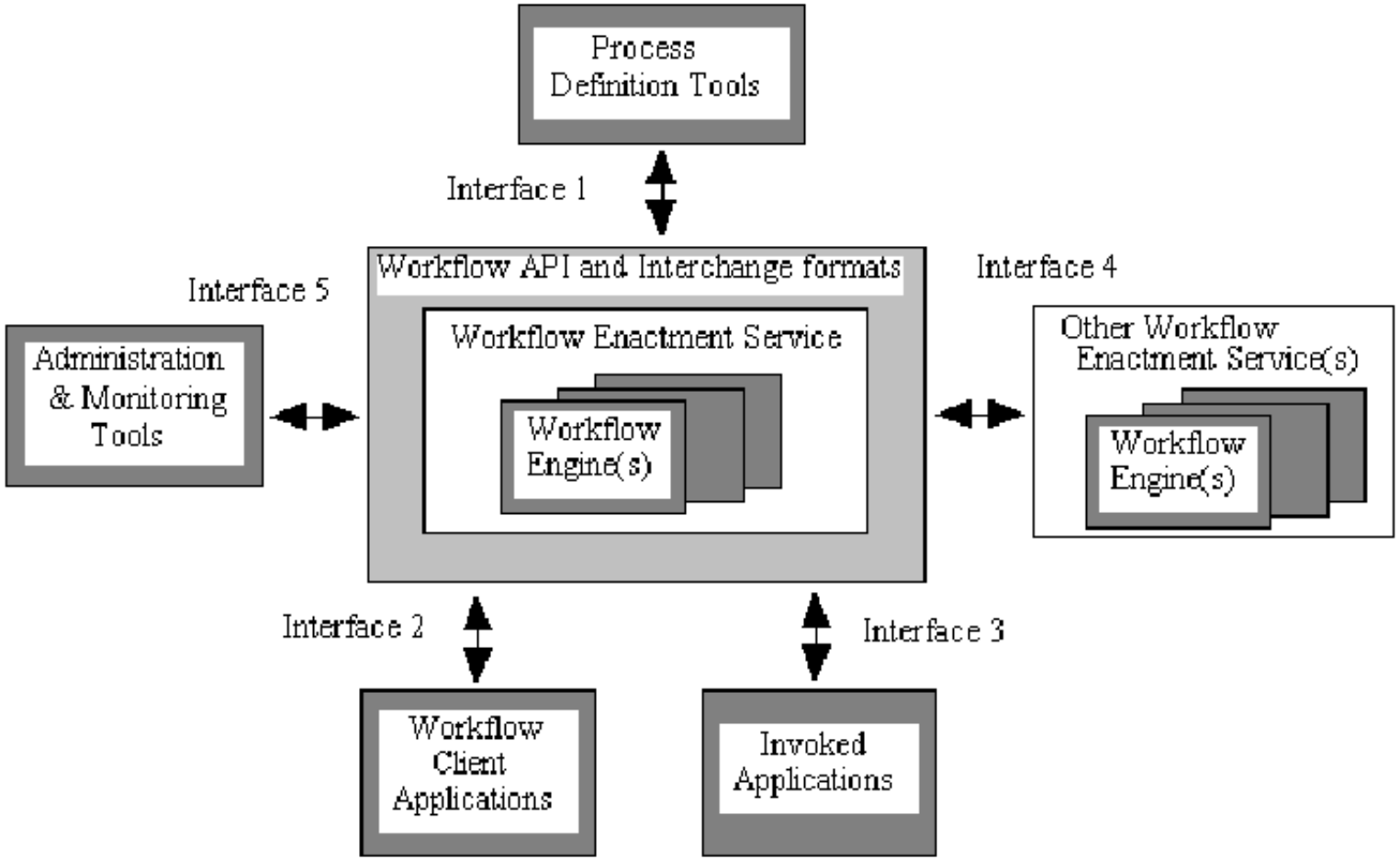

(source: WfMC)

# Workflow Enactment Software



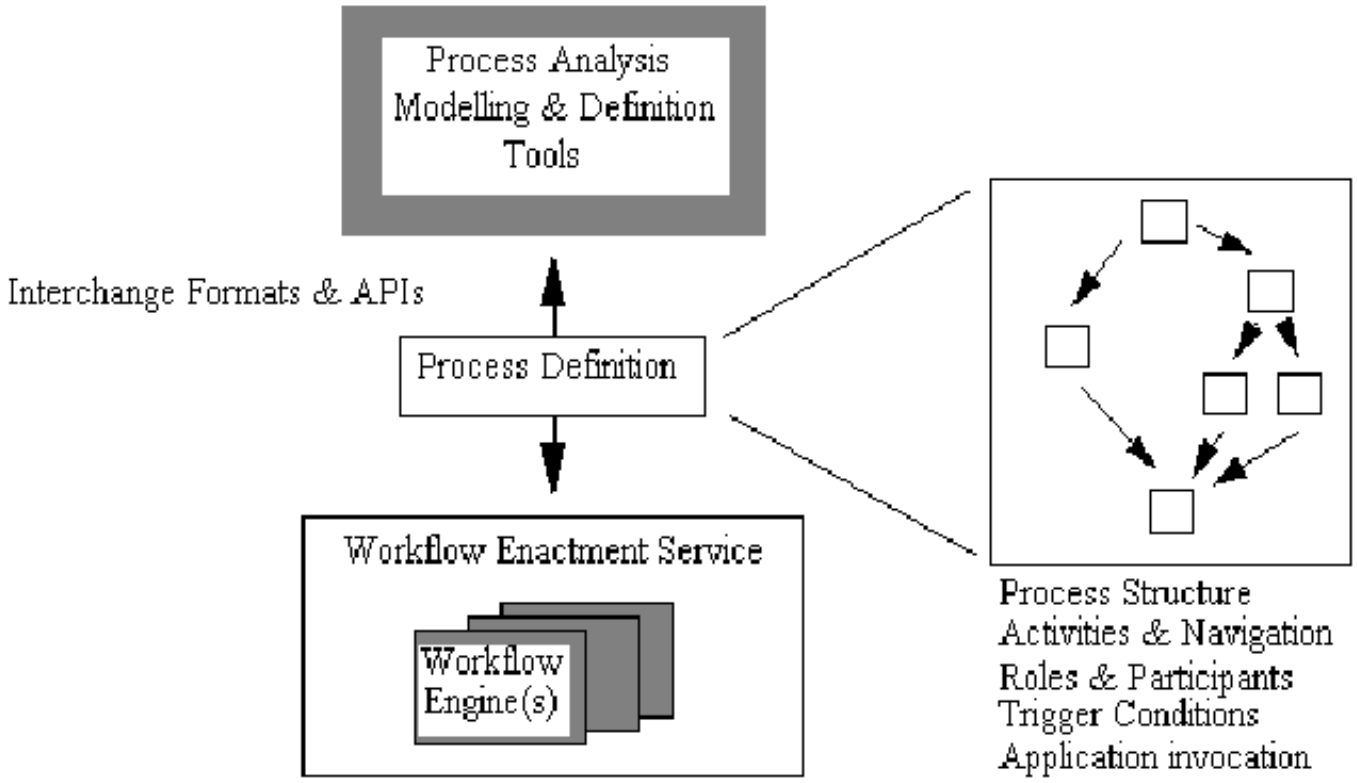

(source: WfMC)

# Workflow Reference Model



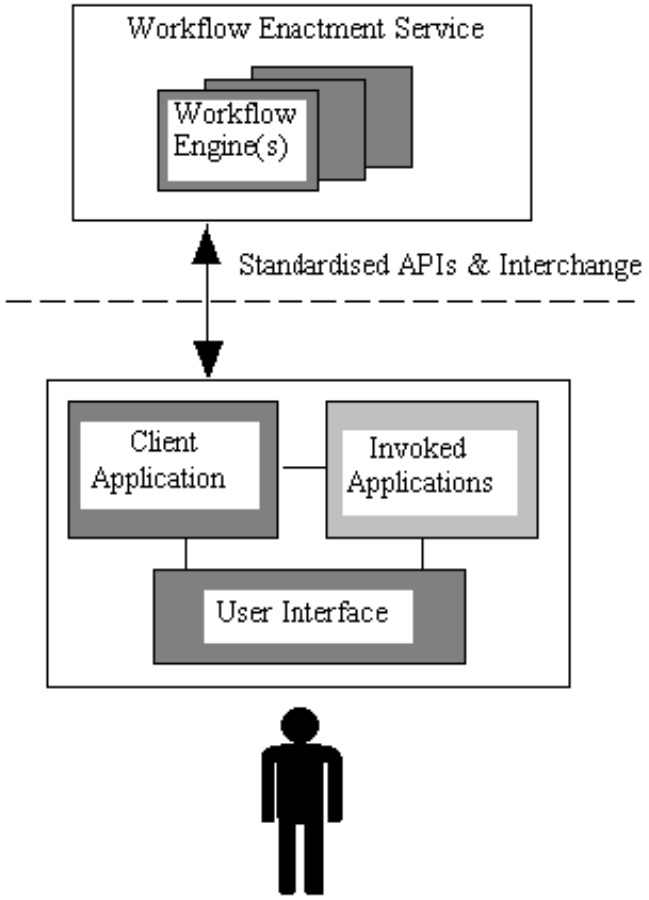

(source: WfMC)

# Interface 1: Workflow Definition Interchange




(source: WfMC)

# Interface 2: Workflow Client Application Interface

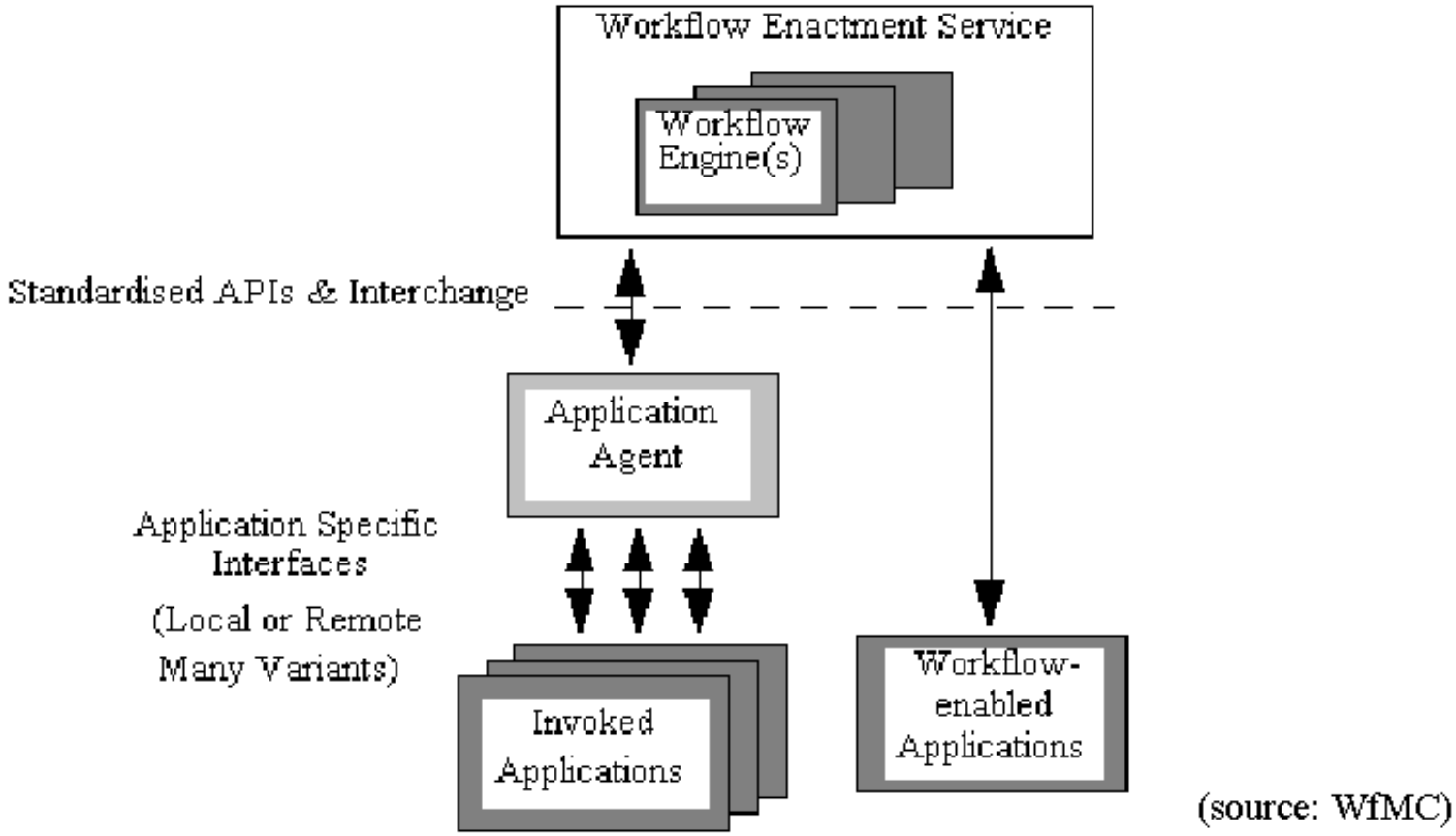



Command Set

- Connection/Disconnection
- Process and Activity Control Functions
- Process Status Functions
- Worklist Manipulation Commands

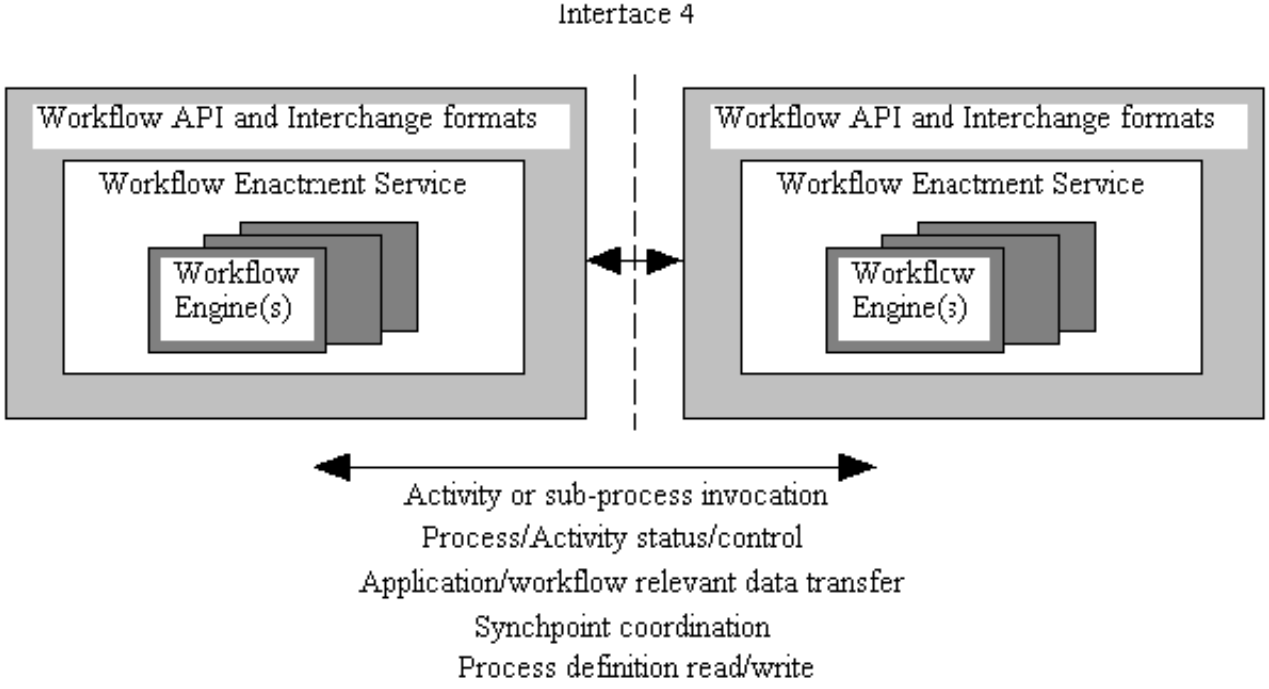
(source: WfMC)

# Interface 3: Invoked Applications Interface



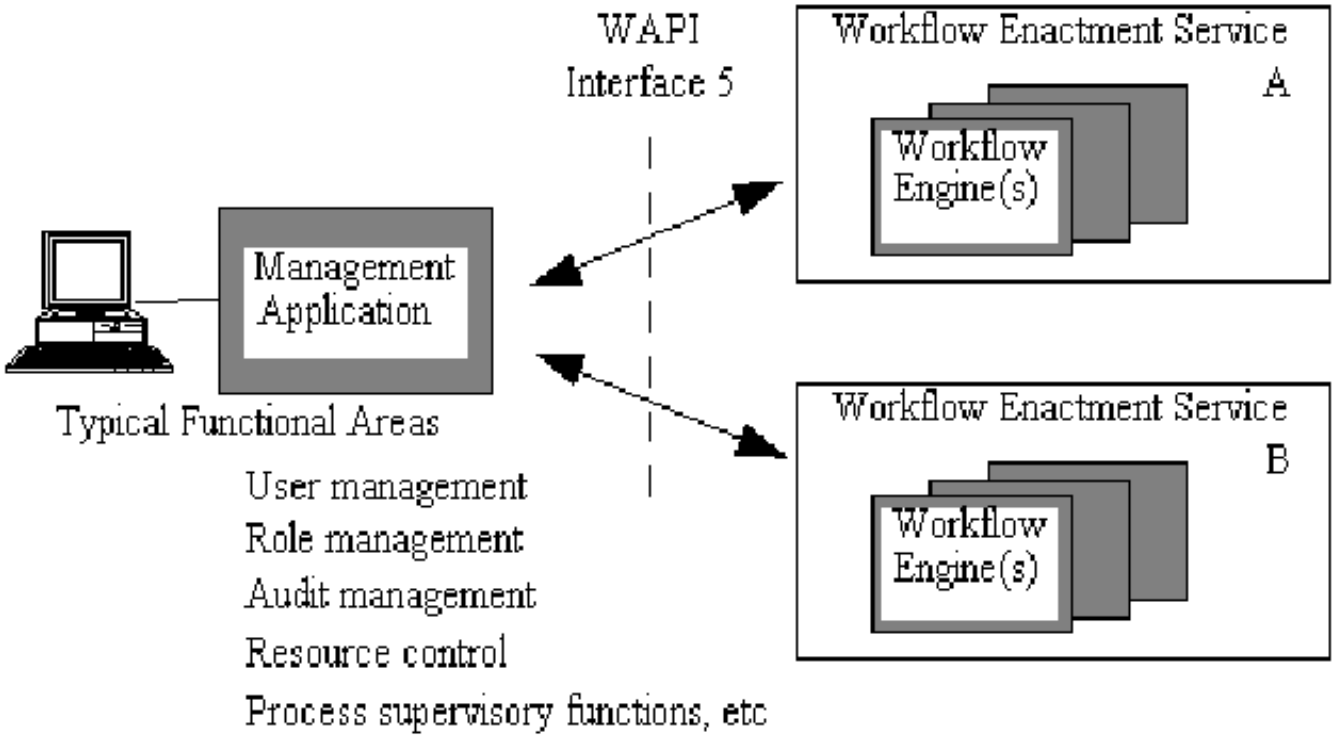

(source: WfMC)

# Interface 4:
# WAPI Interoperability Functions




(source: WfMC)

# Interface 5:
# System Administration Interface




(source: WfMC)

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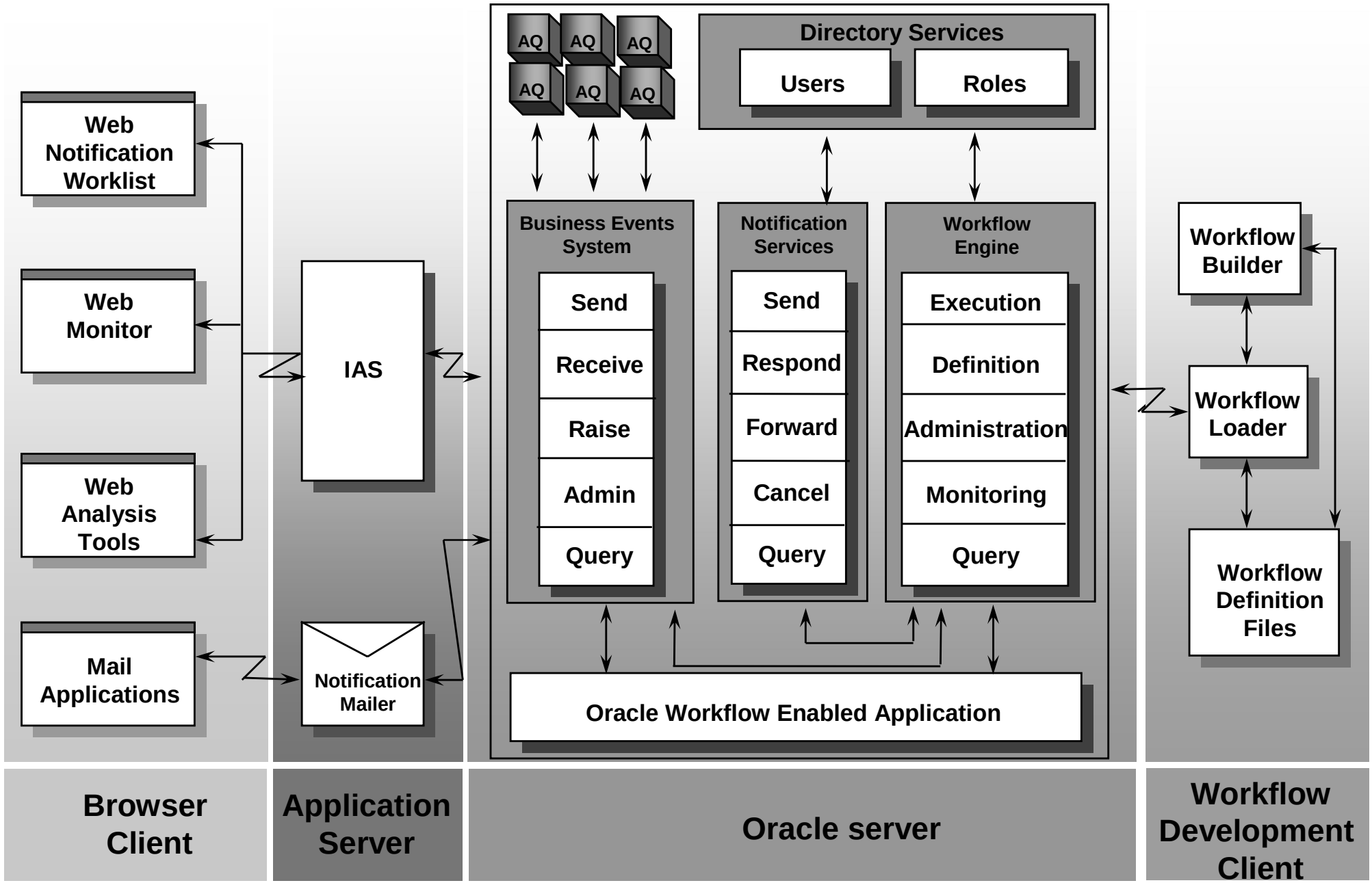
# Oracle Workflow Components

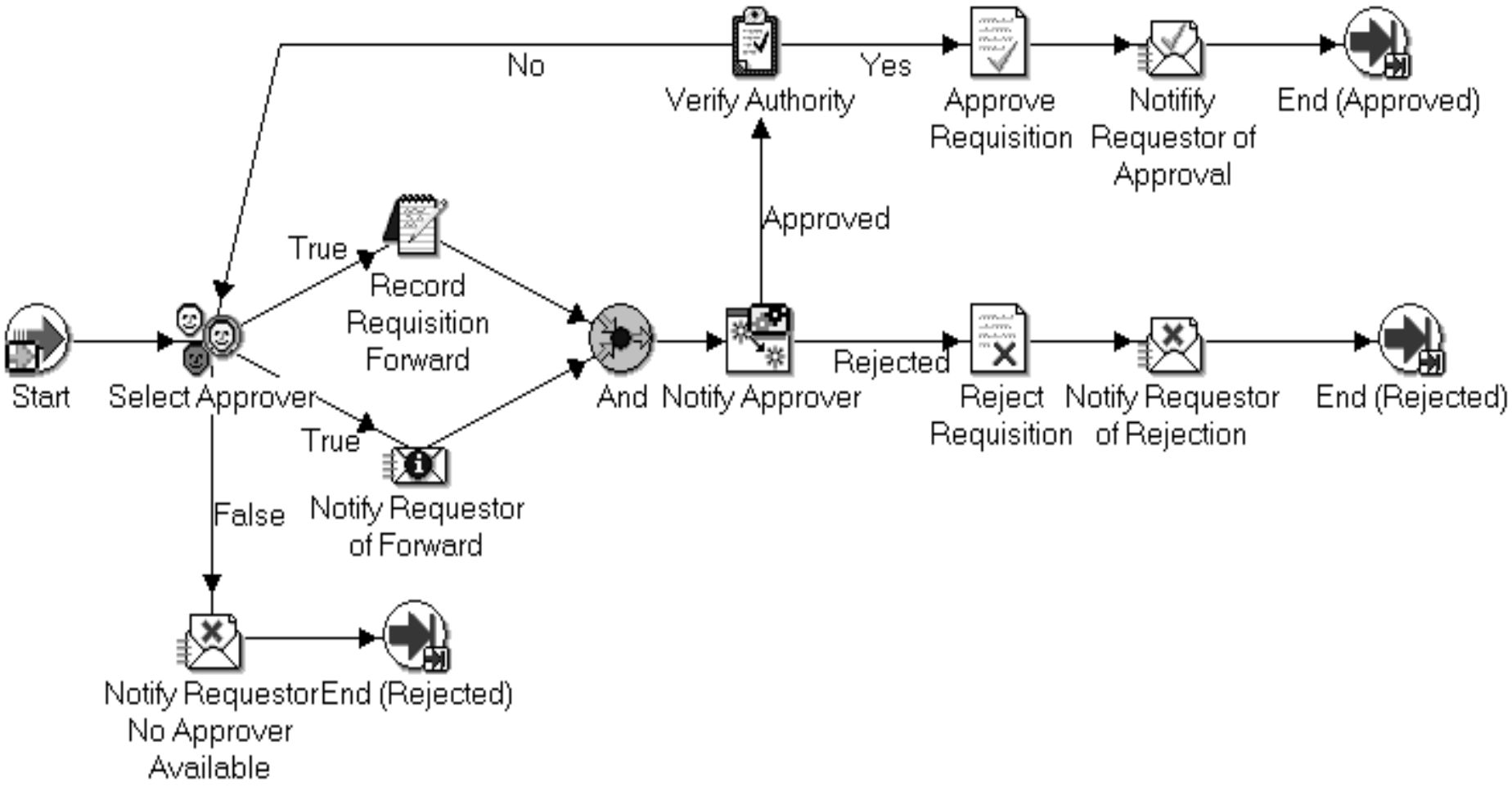


# Workflow as Process Management Tool

- Modeling the Business Process
  - How are Requisitions Approved
  - What Happens After a Candidate Accepts an Offer
- Automating Business Rules
  - What Functions Need to be Executed
  - Who is the Next Approver
  - What Happens if Somebody Does Not Take Action
  - Who Gets Notified of Progress
- Separation of Application and Process Logic
  - Changes in the Business Process Need Not Affect the Code

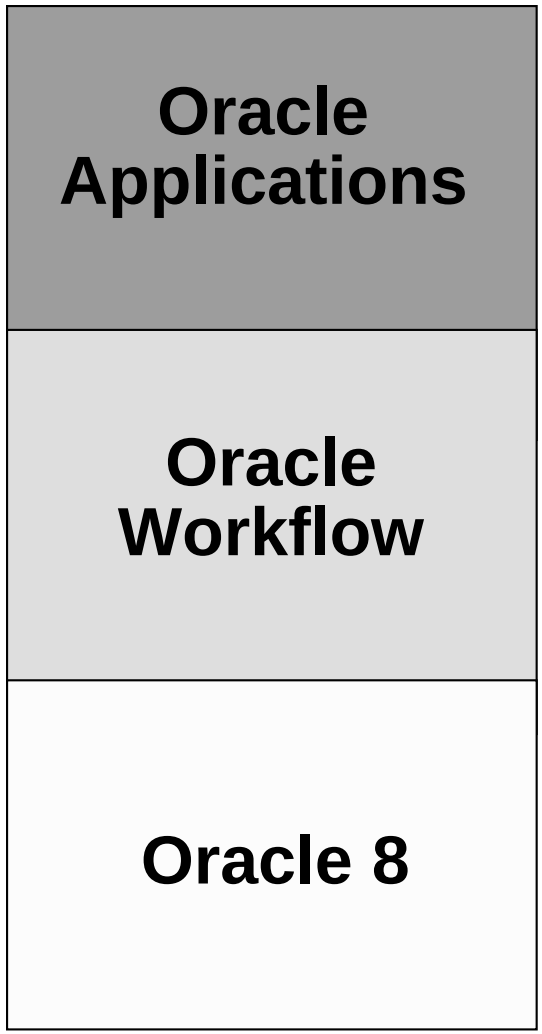
# Model The Business Process

## Example Process: Requisition Approval



# Rule-Based Workflow Engine

## Server Side Architecture Ensures Optimal Performance

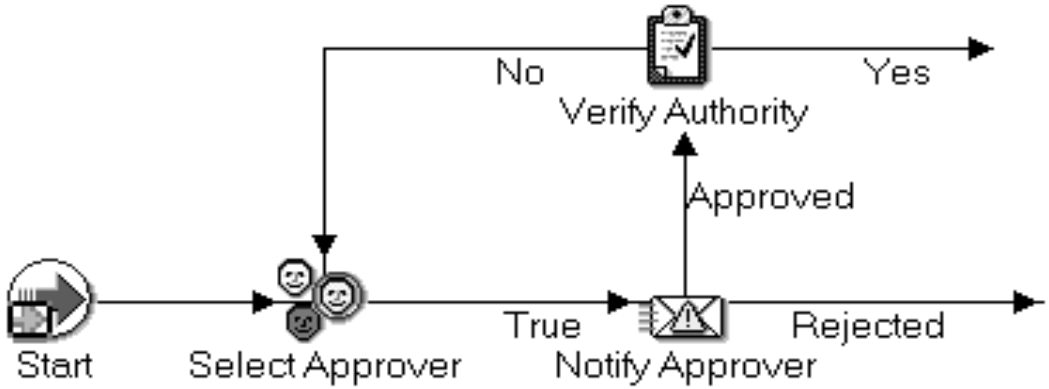



- Manages the Execution of a Business Process
- Immediate and Background Operation
- Generates 100% Audit Trail
- Delivers Notifications When Human Activities are Required
- Oracle 8 Transactional Integrity Guarantees Consistency Between Application and Workflow State

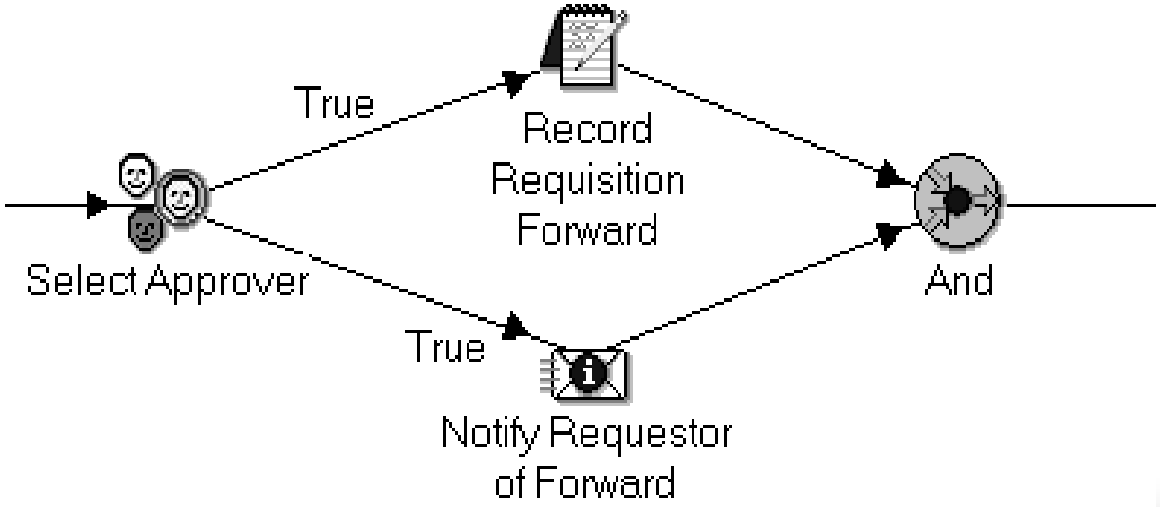
# Rule-Based Workflow Engine

## Supports Sophisticated Constructs

- Looping
- Results-Based Branching

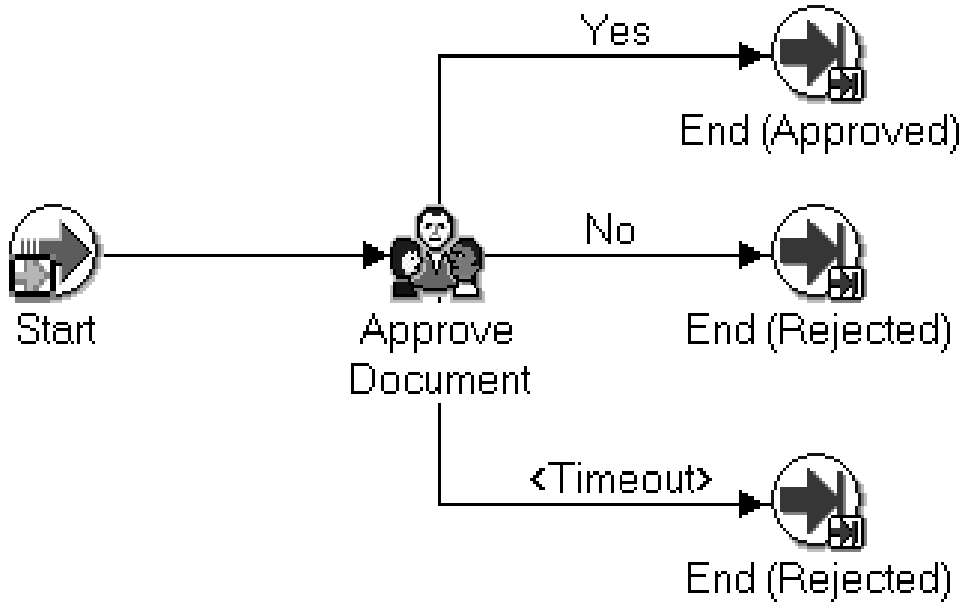



- Parallel Flows
- Rendezvous

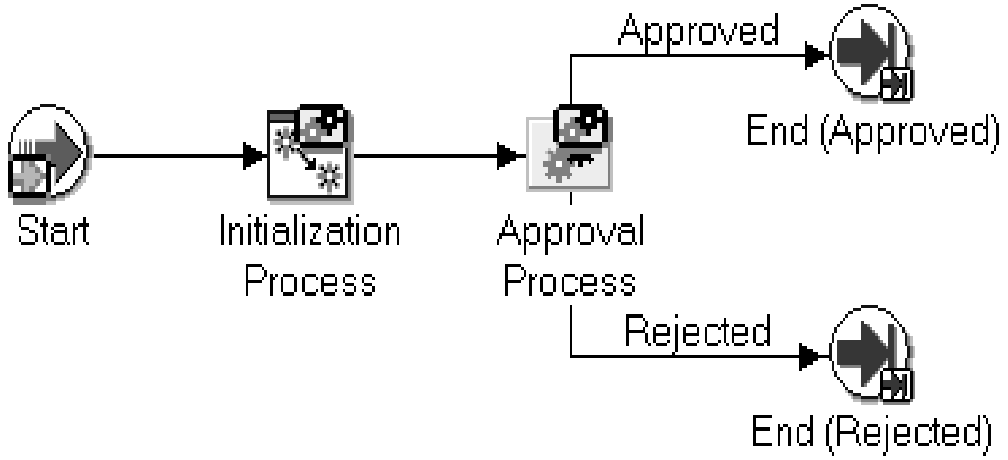


# Rule-Based Workflow Engine

- Voting
- Time-outs
  - Escalations
  - Automatic Forwarding



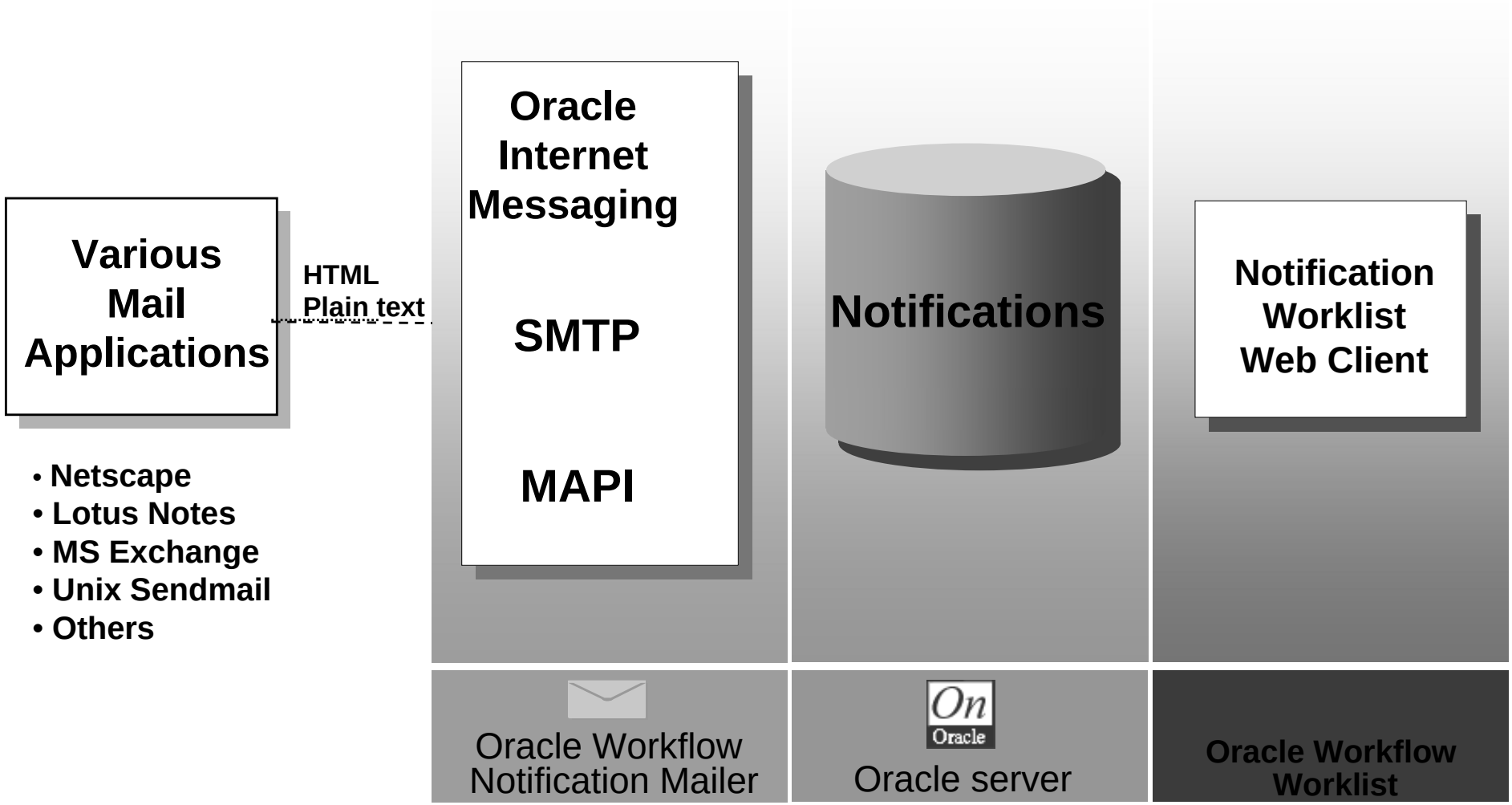

- Sub-Processes
  - Unlimited Hierarchy of Sub-Processes



# Rule-Based Workflow Engine

- **Complete Programmatic Extensibility**
  - Express Any Complex Business Rule as a PL/SQL Activity, and Allow Workflow to Branch on the Result
  - Write Custom Code as a PL/SQL Activity and Have the Workflow Engine Execute Your Code
- **PL/SQL API Available for All Engine Operations**
  - Communicate with the Workflow Engine Via Any Application Capable of Making  a Remote Procedure Call to an Oracle Server

# Human Notification System



# Electronic Notifications

**Reaching *Inside* and *Outside* the Enterprise**

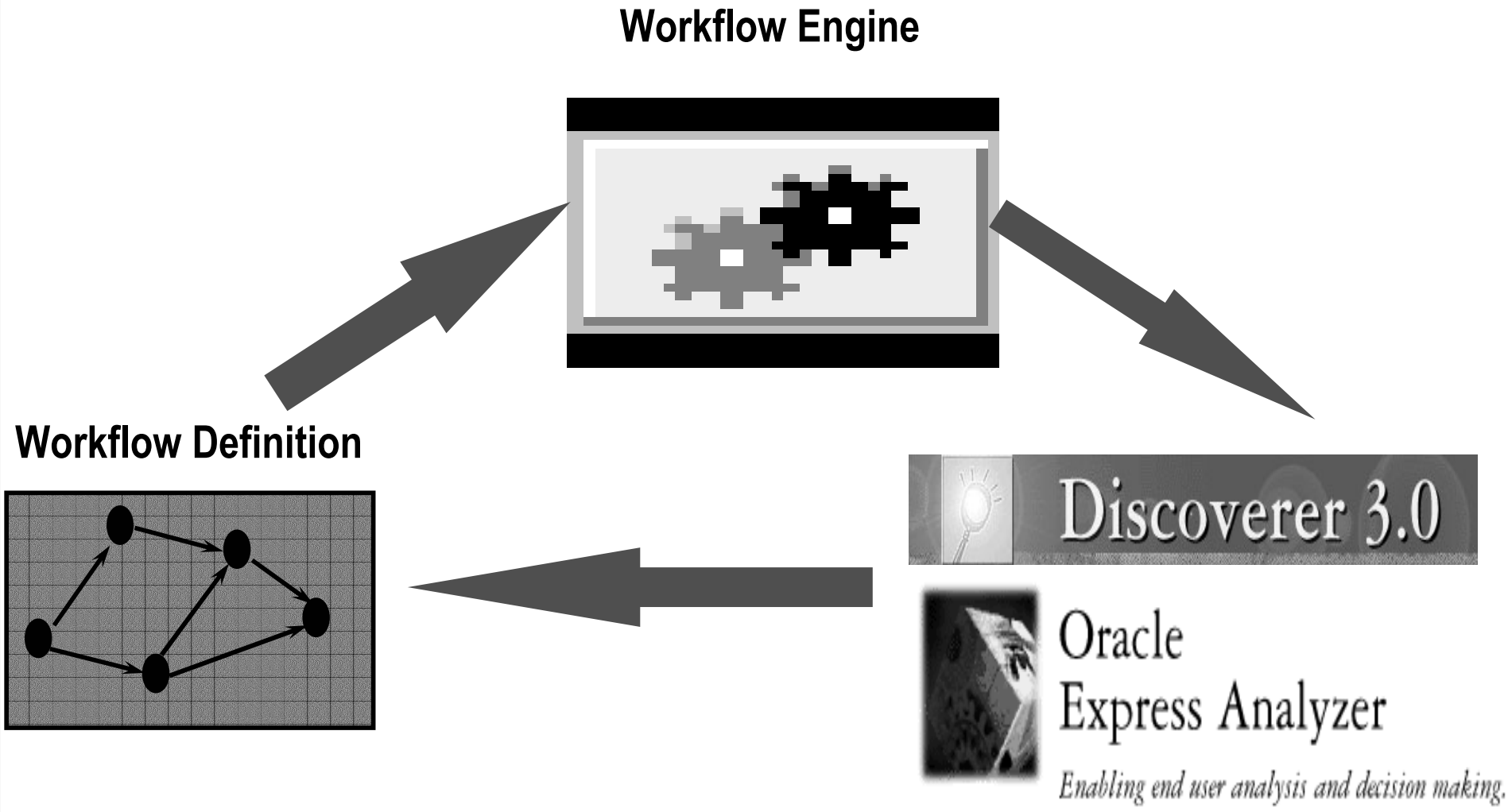
- Notify Users to Handle Activities that Cannot Be Automated
- Send Notifications to Individuals, Roles or Workgroups
  - Change the Participants in a Role Without Changing the Process
- Automatic Notification Forwarding
  - When User Is Unavailable (Vacation, Sick Leave)
  - When User Wants to Temporarily Delegate a Task

# Electronic Notifications

## Multiple Notification Methods

- Central Notification Viewer Form
  - Ideal for Regular Oracle Applications Users
  - Allows Drill-Down to Oracle Applications Screens to Facilitate Task Completion
- Internet-Enabled
  - Use Standard Web Browser to Review and Respond to Notifications
  - Allows Drill-Down to Any URL to Facilitate Task Completion
- Email (Oracle InterOffice, MAPI, UNIX Sendmail)
  - Detail and Summary Formats
  - Plain Text Email or HTML Attachment
  - True Disconnected Work

# Closing the Business Process Reengineering Loop



# Oracle Workflow Future Plans

- Integration With Document Management Systems
  - Oracle InterOffice Document Library
  - Third Party Document Management Systems
- CORBA
  - Interface to Oracle Workflow Engine
  - Object Management Group, Workflow Management Facility
- Workflow Management Coalition
  - Interface II Compliance
- 100% Java

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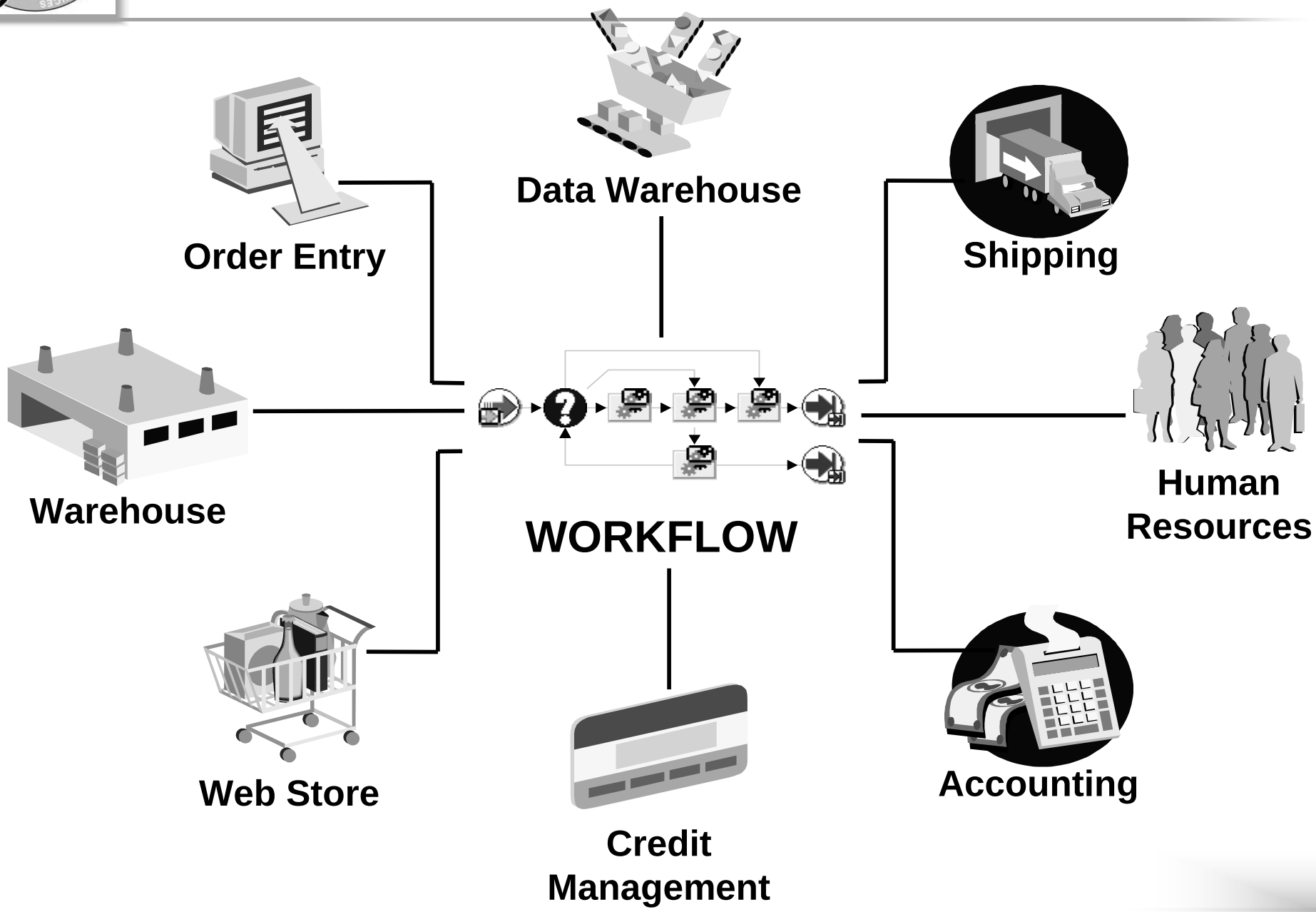
# e-business Integration

- e-business is accelerating demand for integration
  - Business-to-Business Commerce
  - Corporate Self-Service
  - Virtual Supply Chains
  - Customer Relationship Management
  - Application Service Providers/Hosting
- Communication is required between systems both within and beyond the enterprise

# Model Driven Integration



# Workflow Embedded In Oracle Applications

- Core Technology Embedded Since Release 10.7
- Over 700 Workflow Activities Will Be Shipped with Release 11

- **Oracle Purchasing**
- **Oracle General Ledger**
- **Oracle Projects**
- **Oracle Payables**
- **Oracle Human Resources**

- Oracle Service
- Oracle Engineering
- Oracle Web Employees
- Oracle Web Customers
- Oracle Web Suppliers

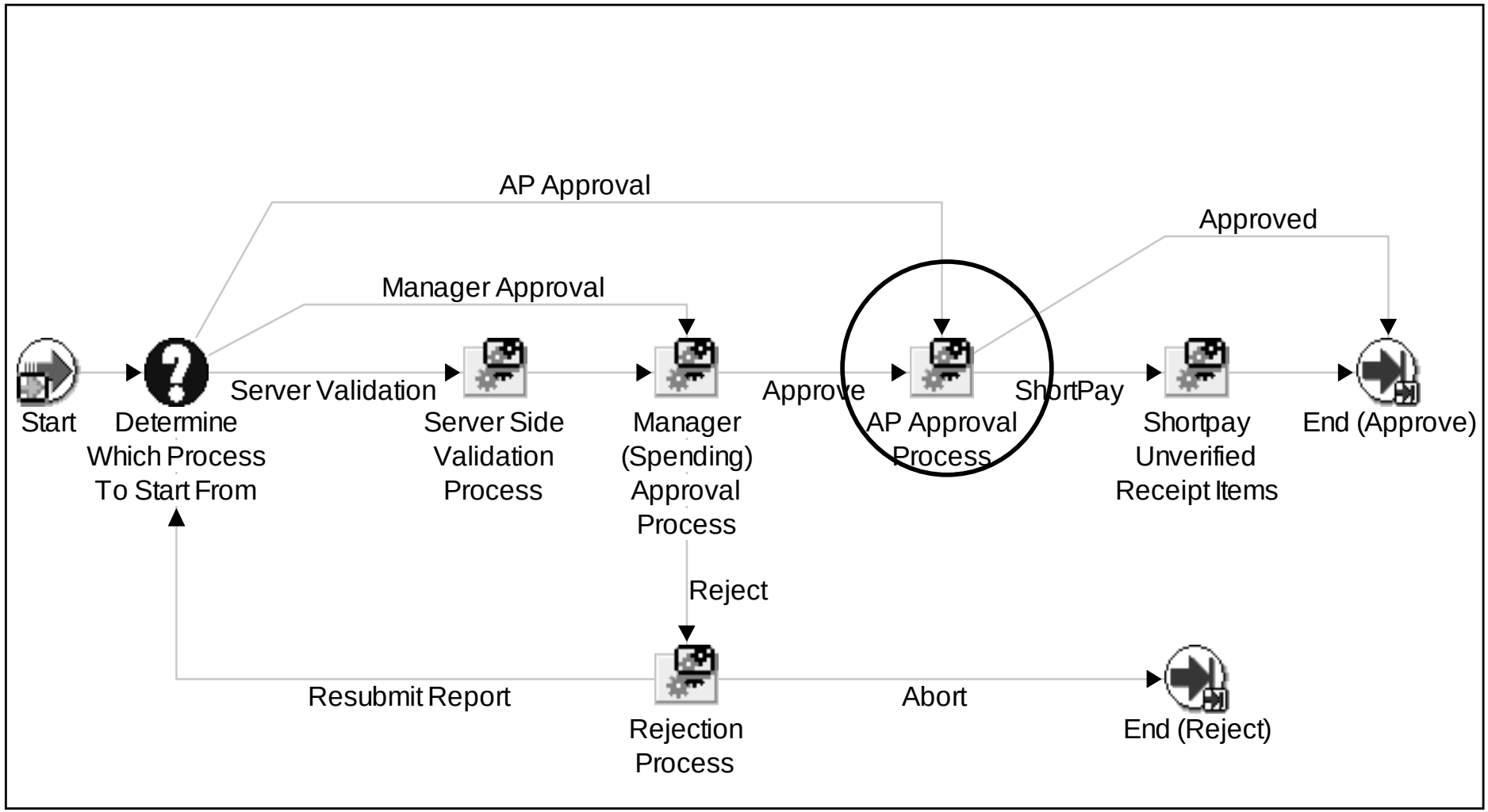
# Workflow is Essential

***Workflow enables continuous process improvement***

- Complete process representation
  - Crosses organizational, company boundaries
  - Build in management metrics, performance goals
- Adaptable workflow processes
  - Provides alternatives
  - Allow for refinement
- Analyze time and costs of entire processes with multi-dimensional analysis
  - Reducing costs and time

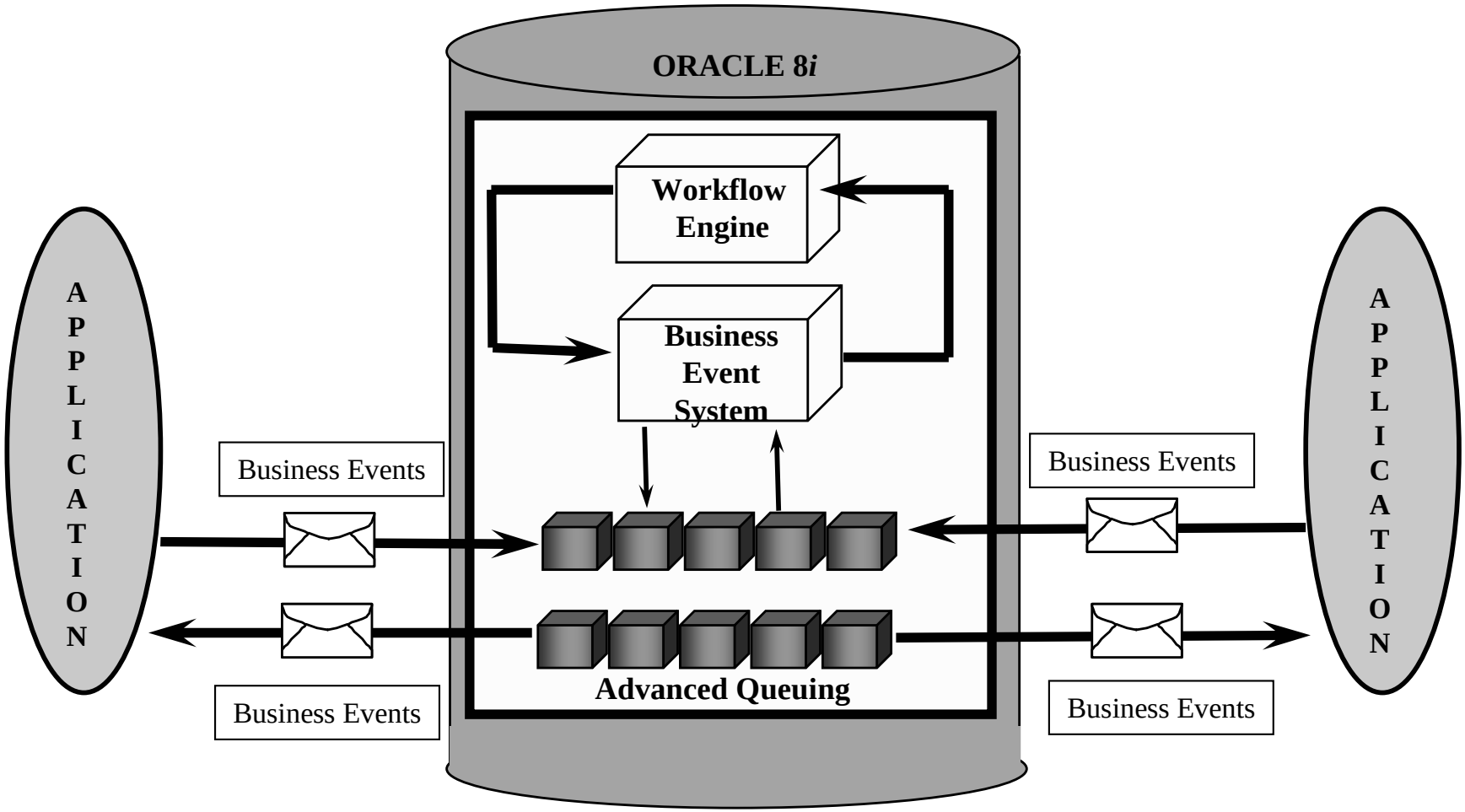
# Expense Report Processing @ Oracle

## AP Standard Expense Report Process

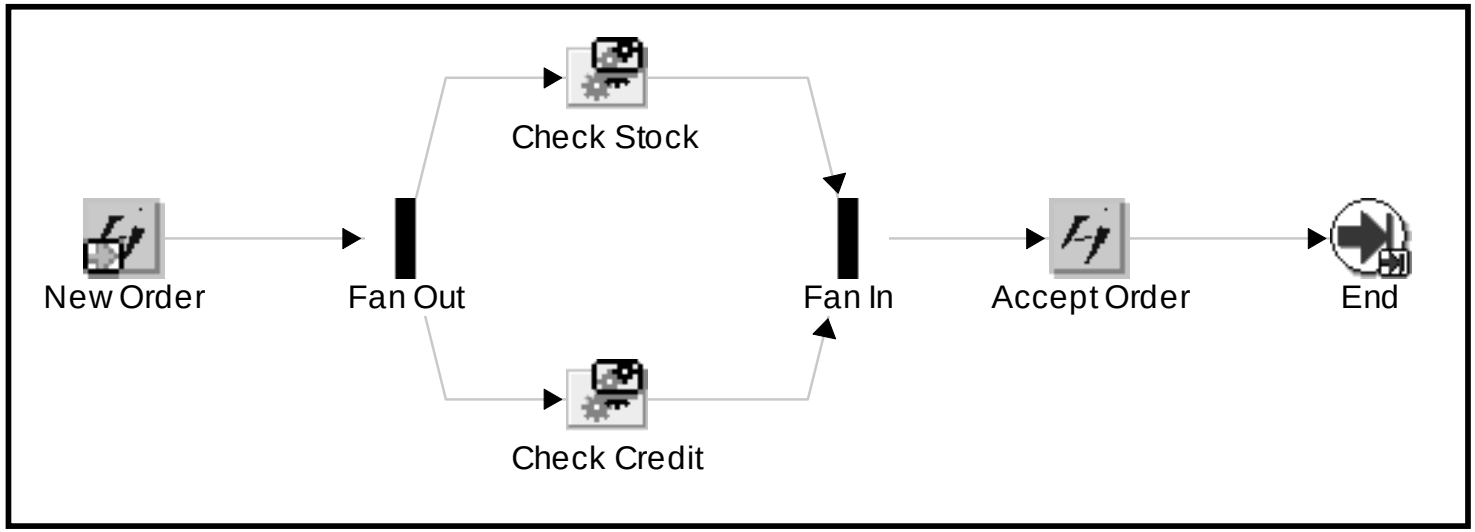


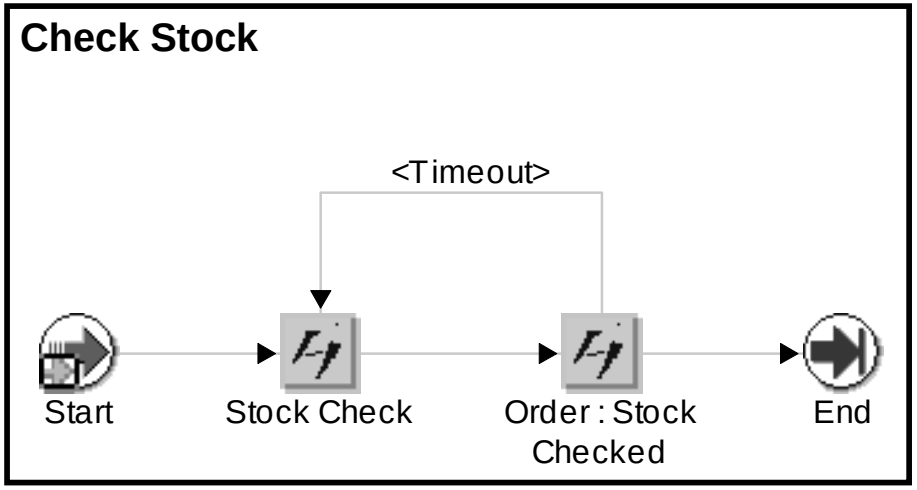
# Business Event Driven Workflow

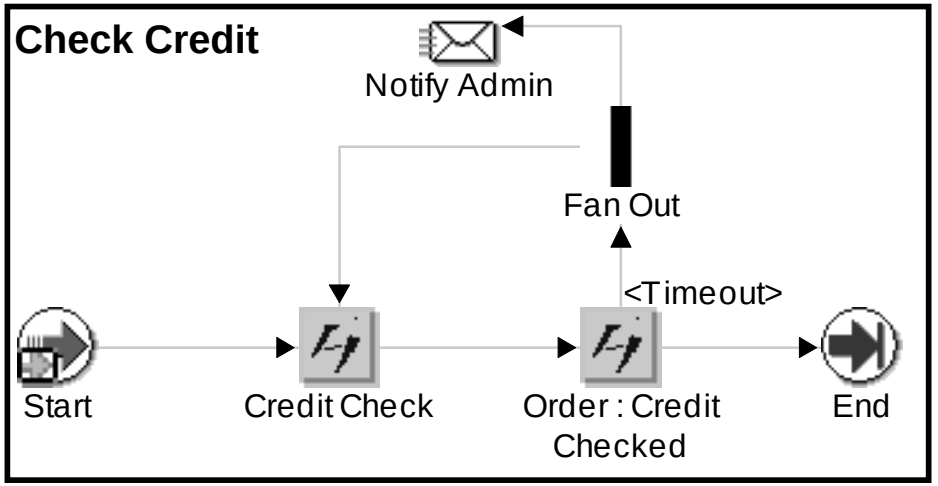
## *System Integration Messaging Hub*



# Workflow Business Events - Example

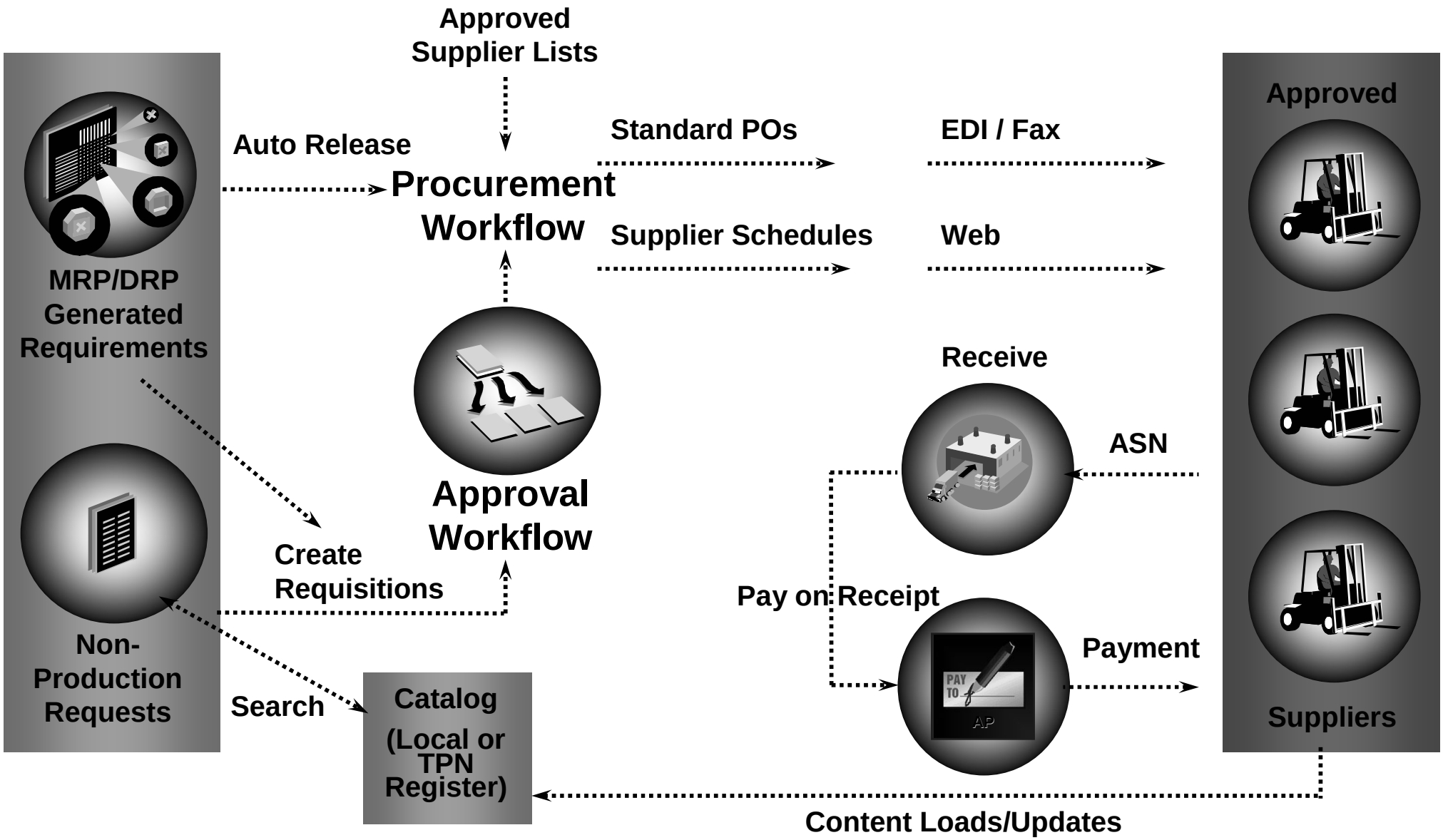


# Internet Procurement 100% Lifecycle Automation

***Workflow is much more than approvals***



Questions
Remarks