Role Activity Diagrams

-- Introduction / Examples --

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Outline

Role Activity Diagrams

Role Activity

Introduction

Types

Business Processes

Difference to e-Business Processes

Control

"OR" Connector

"AND" Connector

Iteration

Interaction

Types

State

Events

Notation

Role

Activity

Event

Interaction

State
Introduction

- Original paper Ould & Roberts (1986)
- Formal semantics. Similar to Petri Nets. Can be mapped to other formal notations
- Widely used. Promoted by Praxis (Ould, Huckvale & others) & Coordination Systems (Roberts)
- Applied to a number of domains, e.g., Software Engineering, finance, Retail and Construction
3 Types of Processes

Management Processes

Customer request → Core Processes → Support processes → Customer satisfaction
Important Business Process Constructs

- Interactions?
- Parallel / concurrent threads?
- Choices?
- Iteration?
Role Activity Diagrams

RAD Notation

A Role

Goal reached

Write plan

Start new Designer

Project stated

State

State Description

An Activity

Start another Role

External Event Occurs

Designer
Roles and RADs

- Business depicted in terms of roles
- Roles are types - e.g., they describe the behaviour of a class of individuals
- A Role is independent of other roles, but communicates through interactions
- Instances of roles therefore act in parallel, with the interaction between roles being their only synchronisation mechanism
Basics: Role Activity Diagram (RAD)

Roles

Director

Designer

Project Manager
Role Behavior: Actions

- An action is an activity which the role carries out in isolation
- Carrying out an action moves the role from its present state to the next state
Basics: Role Activity Diagram (RAD)
Roles have State

- Not required to explicitly label the states of a role, though some authors prefer to do so.

- Labeling states (with circles or ellipses) helps the semantics of the role become clearer
  - Labels make explicit the pre-conditions, pre-actions and consequences (post-conditions) of each activity.
  - Sometimes need to separate parallel threads into separate (or main and sub) roles...

- Diagram becomes larger and this may hamper understanding
Basics: Role Activity Diagram (RAD)
Example: Design Project

Director

- New Project was accepted
- Determine PM

Project Manager

- Agreement on Project Guidelines
- Determine Designer
- Writing Project Guidelines for Designer
- Agreement on Project Guidelines

Designer
Behavior: Interactions

- An activity carried out at the same point as another activity (or other activities) in another role (or roles). A shared event.
- The consequence of an interaction is that all of the roles involved move from their current state to their next state.
- Interaction must be initiated by some (driving) role.
- Interactions are synchronous
Interactions

Role A

Role B

Role C

Buyer

Broker

Seller

Agreement on Budget

Organizes Purchase

Gets Product

Gets Money

Interaction Driver

Role Activity Diagrams
Control

- Thread of control in a role need not proceed sequentially
- Choice or case-refinement. There may be any number of alternative threads but only one of the threads (or cases) may be chosen
- Concurrent threads or part-refinement. Each thread represents part of the path. The threads all join together again after the split denoting that all paths have been completed
RAD: Control

- Alternative Paths, Case Refinement
  - Alternative paths depending on the condition ("case refinement")

- Concurrent paths, Part Refinement
  - Concurrent paths ("part refinement")
“AND” & “OR” Connectors

Role Activity Diagrams
Example: Design Project

Designer
- Select Method
- Make Proposal

Project Manager
- Agreement on Project Guidelines
- Receives Proposal
- Prepare Plan
- Hand over Plan

AND
Iteration

- **Iteration is where a state may be revisited.**
  **Shown by:**
  - Drawing a loop back to a previous point on the role.
  - Having the post-state of an action as a previously named state.

- **Typically used when there is some checking or control mechanism to be modeled**
Example: Design Project

Role Activity Diagrams

Designer

Quality Assurance

Yes

No

Design OK?

Handover Design

Project Manager

Hand over Plan

Write Report

Project finished

OR
“TOKENS”

Role Activity Diagrams
RAD Literature

- **Martyn A. Ould**: Business Processes: Modeling and Analysis for Re-engineering and Improvement
- **RAD Visio Stencils**: http://www.the-old-school.demon.co.uk/veniceresources.htm