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Use Cases and Software Requirements Specification

Organization Process Modeling

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Acknowledgements

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- A Microsoft® PowerPoint file of this notebook is available by request. Send an email to John Artim (jartim@uistyle.com) requesting the Use Case Basics Notebook PowerPoint file in the Use Cases and Software Requirements Specification series. Please include your name, affiliation, and your intended use of the material.

A Note About Diagrams and UML

- Some approaches to process modeling are strongly text-based, others mix text and diagrams
- This approach introduces both text and diagrams representing a process model
 - This is done to help you better understand process models
 - It is not an assertion that either approach is better
- **Note:** It is always more important that participants in a project or organization agree on approach and notation rather than worry the specifics of either
- Notation in this notebook complies with UML
 - UML is the current standard of the software industry
 - Any variation from standard UML is explicitly noted

Goals of this Notebook

- Discuss Process Modeling Supporting
 - Understanding Cooperative Work
 - Business Process Engineering
 - Development Process Engineering
 - Requirements Specification
- Introduce Activity diagrams in UML notation

Browsing Time for this notebook is about 1 hour



Background for this Notebook

- You should have a basic understanding of use case modeling such as is outlined in the *Use Case Basics* notebook
- The material in the *Concept Modeling for Analysis and Specification* notebook is helpful but isn't absolutely necessary

What is an Organization?

- An organization is a group of two or more people performing a set of tasks in concert with one another
 - The grouping can be explicit
 - Business
 - Department
 - Non-profit group
 - Club
 - Or sometimes implicit
 - Neighbors
 - Drivers on the same stretch of road
- Members share common goals
- The focus on organization increases as tasks become more entwined

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What is a Process?

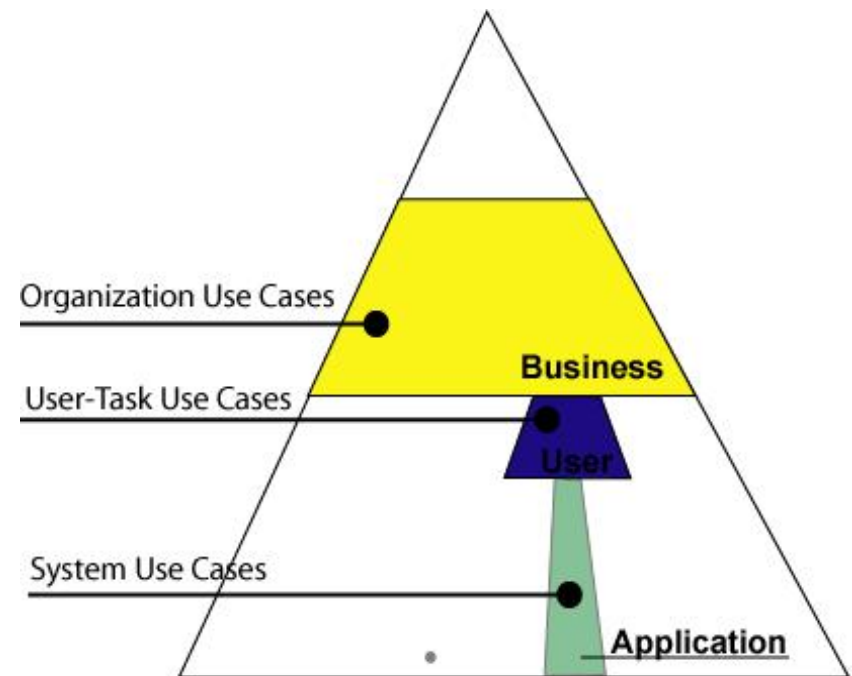
- A task performed by a group of actors
 - A process always involves one or more actors
 - Two or more human actors
 - Or by one or more humans and one or more automated agents
 - The task (process) goal is shared
 - And can be at odds with individual actor goals
 - Cooperation of the actors is always part of the focus
- Also known as a Business Process or a Workgroup Process

Why Model Processes?

- Processes define the work of a group
 - $\text{Work} = \text{Effort} + \text{Goal}$
- For manual systems understanding these processes helps:
 - Reduce effort by rationalizing processes
 - Align goals across business processes
- For mixed human-machine systems understanding processes helps to:
 - Find high-effort manual processes where technology adds value
 - Align functionality of machine subsystems with group goals
 - This is critical for business processes (that is, in commercial situations)

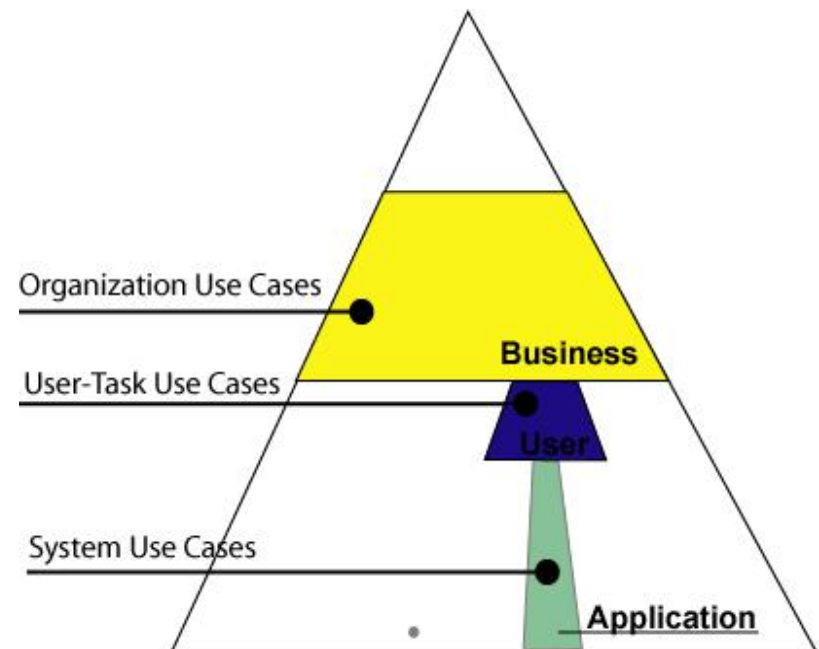
Review Point—Task Pyramid

- Level-of-Abstraction
 - Organization, user-task, and system use cases
 - Each level tied to the Actor who performs it



Difficulties in Process Modeling

- Typically, there are many processes
 - Size of yellow versus blue
 - Easy to get lost in
 - Harder to keep to a useful level of description
- Competing forces
 - Understanding group goals and needs keeps you high in the pyramid
 - Understanding the tie between a group and its participants pushes you low



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Solutions—Choose Your Focus

- Focus on critical organization hot spots
 - First, identify sub-groups, business units, roles, or processes of interest:
 - High levels of activity
 - Bottlenecks
 - High-value activities
 - High labor costs for repetitive activities
 - Duplication of effort
 - Then, tell a few short stories to illustrate hot spots
 - Your stories are use cases
 - You want broad coverage
 - But little effort!

Commercial Focus

- The rest of this notebook focuses on commercial examples
- But the principals apply to all human organizations and implicit groupings

Example—Global Container Shipping

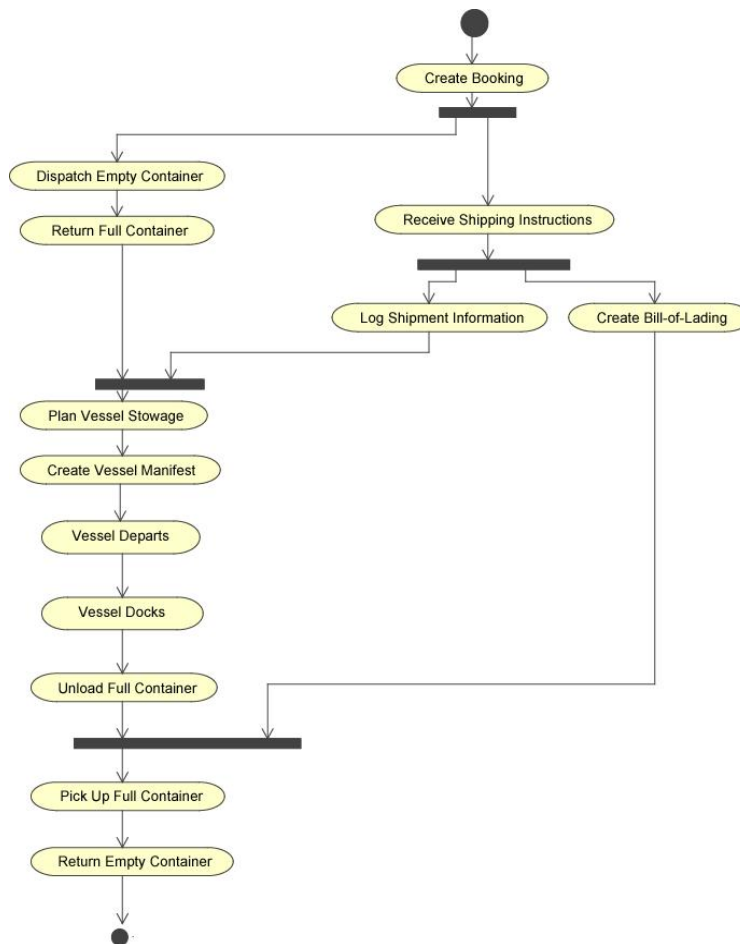
- Shipping Company Business Units:
 - Operations
 - Terminal Operations (Move Containers)
 - Plan, execute, record, and track
 - Vessel Operations
 - Customer Service
 - Take Shipment Bookings
 - Coordinate Documentation Flow
 - Among customers
 - Between customs authorities and customers
 - Coordinate with Operations

Where's the Money Go?

- Operations
 - Terminal Operations
 - Vessel Operations
- Customer Service
 - Take Shipment Bookings
 - Coordinate Documentation Flow
 - Coordinate With Operations

High degree of duplication of effort
High labor costs

Flow of Activity



Process Modeling

- Organizations
 - Operations
 - Customer Service and Documentation (CSD)

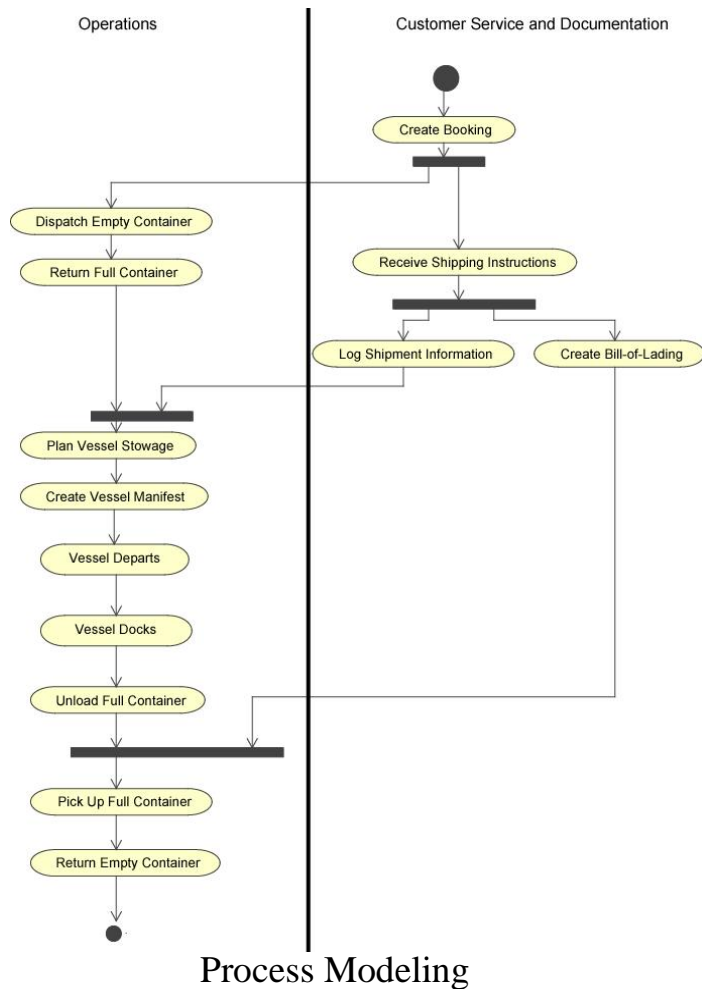
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Scenarios

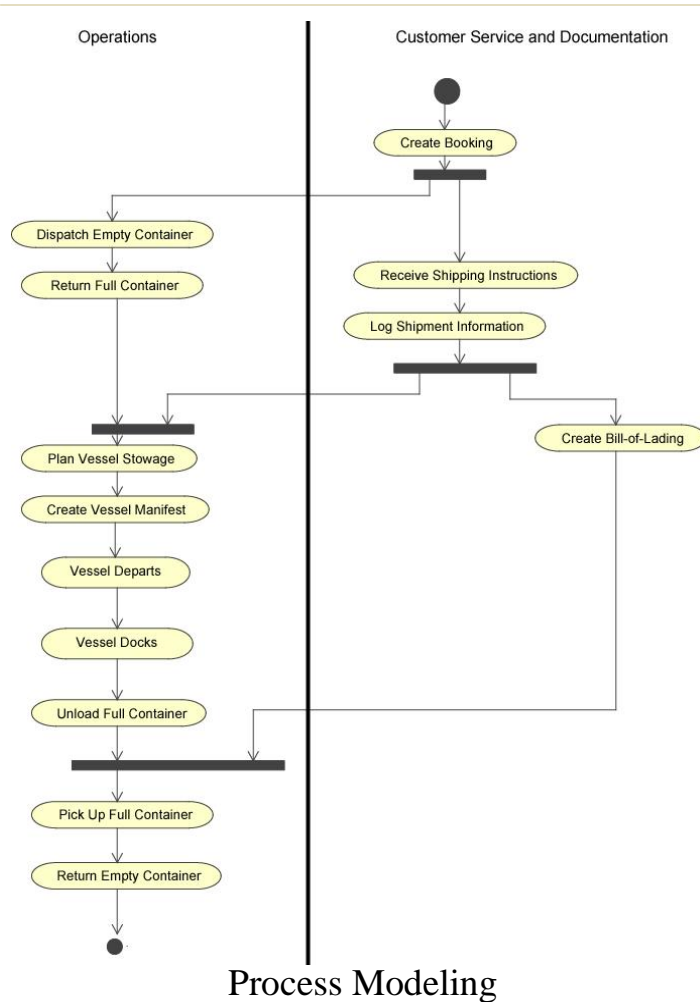
- Create Bill-of-Lading
 - Brief: Bill-of-Lading is a legal document of ownership and financial exchange whose content is detailed and where format is crucial.
 - Trigger: Receipt of Shipping Instructions starts twenty-four hour deadline for completion.
 - Step: Enter Booking Number
 - Step: Activate Create Bill-of-Lading for Booking
 - Step: Enter Customer Name, Port of Load, Port of Discharge, Cargo Type, Container Numbers, Quantity, Consignee, Forwarder, and other info as needed
 - Step: Format Bill-of-Lading
- Log Shipment Information
 - Brief: Shipping Information provides a summary of a shipment's cargo and who initiated the shipment.
 - Trigger: Receipt of Shipping Instructions
 - Step: Enter Booking Number
 - Step: Activate *Create Shipment Information* interface
 - Step: Enter Customer Name, Port of Load and Discharge, Cargo, Container Numbers, Quantity, Consignee, Forwarder, and so on
- Create Manifest
 - Trigger: Time is Twenty-Four Hours Prior to Vessel Sailing
 - Brief: this is a system reporting function based on Shipment Information for each container loaded at this port.

Business Process Issues



- **Bottleneck:** CSD feeds Operations information—this drives:
 - Load planning, loading and unloading
 - Coordination with Customs
 - But also CSD’s Bill-of-Lading
- **Labor Costs:** Information from Shipping Instructions entered twice:
 - Vessel Manifest Document and Load Planning Applications
 - Bill-of-Lading Document

Alternative



- Move common “data entry” into one process
- Keep document preparation separate

Guard Clauses

- When you want to direct activity flow use a guard clause
 - An expression, enclosed in square brackets, that describes what must be true before an activity flow can be traversed
- Example:
[Bill-of-Lading is Confirmed]

Decision Branch Points and Event Sources and Sinks

- These additional diagram features are available
- Use them with care and only when absolutely necessary
 - They can clutter a diagram and render it less readable
- Your goals:
 - One business process depicted in each activity diagram
 - Flow within the diagram is as uncluttered *as possible*

Uses of Process Modeling

- Requirements Specification
 - Helps in understanding the business context
- Business Process Re-engineering
 - Makes the business processes explicit so that division of work and goals across organizations can be evaluated
- Development Process Engineering
 - Makes explicit any mismatches in the way work is done across organizational units

Conclusions

- Groups of actors collaborate to perform processes
- The group has goals that motivate the processes
- Group and individual goals may align or not
 - Lack of alignment creates inefficiencies and usability issues
- Activity diagrams are useful for modeling group processes
 - Showing flow within one use case—that is, at a single level of detail
 - Modeling one possible flow for an organization use case
 - Exhaustively modeling flow through an organization use case
 - Showing the cooperation of two or more actors
 - Each activity bubble should correspond to a single use case