



### **Organizing Workflows**

- > Work
  - Produce All things Ourselves?
  - Organize into business units
- > Business Process
  - Different types of works, e.g. designing house, making bread
  - In all examples → One tangible *thing* that is produced or modified house, bread *thing* or *case*
  - Working on a  $case \rightarrow Discrete$
  - Each case involves a process (procedure) being performed
    - Process number of tasks that need to be carried out and a set of conditions that determines order of tasks
  - Task → Logical unit of work that is carried out as a single whole by one resource
  - Resource → Generic name of person, machine or group that can perform specific tasks

### **Process - Example**

#### Processing of a Claim by Insurance Company

- 1. *Recording* of receipt of claim;
- 2. Establishing *type* of claim (fire, vehicle, professional);
- Checking client's *policy*, to confirm that it does in principle cover what has been claimed for;
- 4. Checking the *premium*, to confirm that payments are up to date;
- 5. Rejection  $\rightarrow$  if task 3 or 4 has a negative result;
- 6. Producing a rejection letter
- 7. Estimating *amount to be paid*, based upon the claim details;
- 8. Appointment of an *assessor* to reach the circumstances of the damages and to establish its value;
- 9. Consideration of *emergency measures* to limit further damages or relieve distress;

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- 10. Provision of *emergency measures* if approved as part of task 8;
- 11. Establishment or revision of an *amount to be paid* and offer to client;
- 12. Recording of client's *reaction*: acceptance or objection;
- Assessment of objection and decision to reverse (task 11) or to take legal proceedings (task 14);
- 14. Legal proceedings;
- 15. Payment of claim; and
- 16. Closure of claim: filing

### **Process Diagram**

#### Sequence

 Two or more task that must be performed in strict order

#### Selection

Choice between two or more task

#### Synchronization

Both task must be completed before 'rejection' can begin

#### Iteration

 Repeated assessment of an objection or revision of amount to be paid



# Process > Knowledge

- - Tacit Knowledge
    - Stored in Mind by Experience
  - Explicit Knowledge
    - Learning and Information Retrieval
  - Knowledge Management
    - Acquisition, Enrichment, Distribution of Knowledge at Right Time to fulfill a task

#### > Atomic Process

Process that cannot be subdivided any further

#### > Activity

Performance of a task by a resource

#### Process Categories

- Primary  $\rightarrow$  Production Processes, Generates Income, Customer Oriented
- Secondary  $\rightarrow$  Support Processes, Maintaining means of Production
- Tertiary  $\rightarrow$  Managerial Processes, Directs & Coordinates Pr/Sec Process

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### Groupware

Working Together is fundamental to modern Organization

#### Categories of Groupware (3C's)

- Communication
  - Sending information, request, instructions
- Collaboration
  - Working together on joint projects
- Coordination
  - Participants in Process, Coordination is workflow ...
- Communication Products
  - E-mail, chat, fax solutions, video Conferencing
- Collaboration Products
  - Lotus Notes, Document Management System, CAD
- Coordination Products

IBM, Staffware, FileNet, Ultimus, etc.
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### Groupware

#### Coordination Products

- Structured or Semi-Structured Process
  - Reviews, Approvals, Processing Orders, Handling Applications
  - Projects
- Groupware → Workflow Automation
  - Process is essence of workflow or coordination
    - Design, Display, Monitor, Measure Business Process
  - Processes can be structured or semi-structured
    - Never be purely ad-hoc  $\rightarrow$  Logic/Structure for automation
  - Workflow is Proactive  $\rightarrow$  Push towards reaching goal/outcome
  - Coordination or Workflow  $\rightarrow$  Every Organization in some way

#### Workflow Defined

- A Sequence of Structured or Semi-Structured tasks performed in series or parallel by two or more individuals to reach a common goal
  - Workflow is a sequence of tasks
  - There is some logic to a workflow not on purely ad-hoc basis
  - Series or in parallel Logic
  - At least two individuals Individual cannot constitute wokflow
  - Workflow is geared towards producing results



#### Example - Purchase Requisition Workflow



• Workflow has numerous exceptions  $\rightarrow$  Too complex to present graphically

- Supervisor may not be at work
- Buyer may not have enough info for purchase, return back order for clarification
- Every workflow requires monitoring
  - Employee need to know <u>status</u> of his application
- Every step in workflow → Time and Cost
  - Measuring Time and Cost, improvement in business process

#### Examples of Business Process - Workflow

| Order Processing and Fulfillment | Change Orders                  |
|----------------------------------|--------------------------------|
| Performance Reviews              | Purchase Requisitions          |
| Capital Appropriations           | New Hire Processing            |
| Defect Tracking and Resolution   | New Product Development        |
| Document Approval Routing        | Leads Management               |
| Medical/Insurance Claims         | Customer Care Processes        |
| Expense Reports                  | Return Material Authorizations |
| Warranty Management              | Invoice Processing             |
| Employee Self-Service Processes  | Correspondence Tracking        |

Number and Type of workflow process vary from organization to organization

### Workflow Vs Workflow Automation

#### Workflow

- Simple routing of work from one person to another
- Email attachment  $\rightarrow$  Work has flowed from one to another
- Not Workflow automation, Why?
- $\bullet$  Emails  $\rightarrow$  Facilitates workflow but does not automate workflow

#### Workflow Automation

- Proactive control of *entire* workflow process, Start to Finish!
- Ability to monitor status of workflow, handle exceptions, generate metrics to improve performance of system
- Software Applications → Microsoft exchange, Lotus Notes, Intelligent web sites, etc.,
  - Workflow features but they are <u>not automating workflow</u>
- Workflow automation  $\rightarrow$  Similarities with EAI (automation of system-centric processes)

#### Essential Requirements for Workflow Automation

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- Graphical workflow representation
- Roles or job functions
- Rules embedding
- Exception handling
- Monitor status of workflow incidents
- Metrics (cost-effectiveness and timeliness)
- Integration with third party applications
- Proactive
- Database connectivity
- Workflow inbox

### **Enterprise Application Integration**

#### Evolution

- EAI → Automate movement of data, applications ⇔ computers
- Workflow automation, movement of data between people
- Departmental solutions → Emergence of EAI
  - Point Integration Solution





Adaptor

#### Unified Integration Framework

- Interface standardization
- Data transformation
- Mapping
- Synchronization



### Workflow Automation Vs EAI

### > Comparison

|                             | EAI         | Workflow<br>Automation |  |
|-----------------------------|-------------|------------------------|--|
| Speed                       | High        | Moderate               |  |
| User Interface              | None        | Extensive              |  |
| Number of Participants      | Small       | Large                  |  |
| Number of Exceptions        | Small       | Large                  |  |
| Number of Business Rules    | Moderate    | Large                  |  |
| Data Transformation/Mapping | High        | Low                    |  |
| Primary Value Proposition   | Integration | Process automation     |  |
|                             |             |                        |  |
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### Allocating/Accepting Work

## ≻Role

• Principals  $\rightarrow$  The Boss and The Customer Organizations have Hierarchy • Contractor or Resource  $\rightarrow$  Person Who is Assigned a Task Resource – Assignments can also be done by machines • Actor  $\rightarrow$  Describes Principals and Contractors Can play both roles – Principal or Subcontractor (or resource) Contractor Can redirect or subcontract work to third parties • The Role of Customer  $\rightarrow$  Depends on Situation IRD – Taxpayers, Prison Service – Criminals, etc.



### Allocating/Accepting Work

### >Actor

- Responsible for Process
- Can assign or outsource task as whole to contractor
- Can decompose into process
  - Network of tasks
  - Each of which he assigns to a contractor
  - Contract Tree
- Another Approach
  - Network of tasks is created
  - (Sub)contractors are selected





- Establishes how the work carried out by the organization in question is divided up amongst its staff
  - Division of authorities and responsibilities

#### Organizational Structure

- Hierarchical organization
- Matrix organization
- Network organization



- Hierarchical organization
  - Purely hierarchical organizations  $\rightarrow$  Virtually extinct now
  - Designing
    - The capacity group People with same skills, Same department
    - The functional department (Accounting, Maintenance)
    - Process or production departments
- Matrix organization
  - Two dimensions
    - Functional (depends on tasks)
    - Hierarchical (same as earlier)
  - Each Person
    - Hierarchical boss
    - Functional boss

 $_{\text{COMP 5524}}$  • Example  $\rightarrow$  Operate on Project Basis, Contractors

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|             | Project-A | Project-B | Project-C |
|-------------|-----------|-----------|-----------|
| Supervisors | Louise    | Anita     | John      |
| Carpenters  | Pete      | Karl      | Geraldine |
| Masons      | Henry     | Tom       | Jerry     |
| Painters    | Bert      | Simone    | Simone    |
| Plasterers  | Charles   | Peter     | Paul      |

- Network Organization
  - Autonomous actors collaborate to supply products or services
  - Virtual organization
  - No formal permanent employment relationship
  - More and more network organizations are being created
    - Control fixed cost
    - Specialist companies
  - Difference with matrix organization
    - Resources do not have to be from the same employer

### Managing Process

- Management system and a Managed system
- ➢ System → People, machines, and IS that carry out particular processes
- Managed System
  - Low level management system
    - Managed System
      - Managed system at lowest level  $\rightarrow$  an *enactment* system
- Process Management
  - A system of interlinked processes, involves concerted efforts to map, improve, and adhere to organizational processes





- Process
  - Assets
  - Should be managed and continuously improved
  - IT is an essential enabler
- Process Management
  - **1. Real-time management**
  - 2. Operational management
  - 3. Tactical management
  - 4. Strategic management





# Process Management

| Management<br>level | Type of decisions                        | Supporting methods                            |  |
|---------------------|--|---|--|
| Real-time           | Equipment control                        | Control theory                                |  |
| Operational         | Recourse assignment                      | Combinational optimization                    |  |
| Tactical            | Recourse capacity planning and budgeting | Stochastic models (e.g., queuing models)      |  |
| Strategic           | Process design and recourse types        | Financial models, multi-<br>criteria analysis |  |

### **Decision Making**

#### Definition

What the problem is, and what scope a solution to it must be found

#### Creation

To formulate one or more solutions that fall within the scope defined

#### ➢ Evolution

 To access different solutions, for instance by multicriteria analysis

#### Selection

 To select one solution that works in order to implement it

### **Evolution of Information Systems**

#### ▶ 1965-1975

- Decompose Applications → There was no exchange of data between different applications
- ▶ 1975-1985
  - Database Management → The use of database has the advantages that data managed by different applications can be combined
- ▶ 1985-1995
  - UIMS → User-Interface Management
- > 1995-2005
  - WFMS, Workflow Management → To support business process (procedure)



### **Process Management Lifecycle**

- Set organizational goals
- Inventory all organizational process
- Rank
- Choose
- Determine incremental or radical improvement
- Implement
- Monitor
- Repeat step 4





### Workflow Systems

Focus on classical workflow management systems, but ...

- Four types of *workflow-like* systems:
- 1. Information systems with hard-coded workflows (process& organization specific)
- 2. Custom-made information systems with generic workflow support (organization specific)
- 3. Generic software with embedded workflow functionality (example, the workflow components of ERP, CRM, PDM, etc. systems)

4. Generic software focusing on workflow functionality (example, Staffware, MQSeries Workflow, FLOWer, COSA, Oracle BPEL, Filenet, etc.)