Workflow Systems

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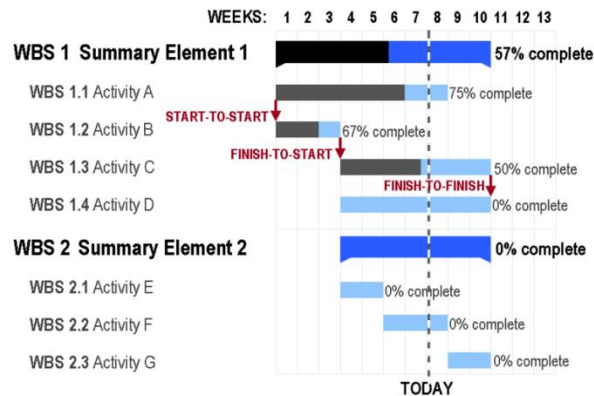
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Outline

- Overview of workflow systems
- Windows Workflow Foundation: hosted workflow engine
- BizTalk: Workflow, rules, transformation, messaging system.
- Microsoft Office SharePoint Server: Human workflows

Overview of Workflow Systems

- **Workflow: A systematic pattern of activity.**
- **Used in planning and scheduling real work**
  - Partially ordered set of activities required to finish a specific goal
  - Composed of a plan, activities, and an order
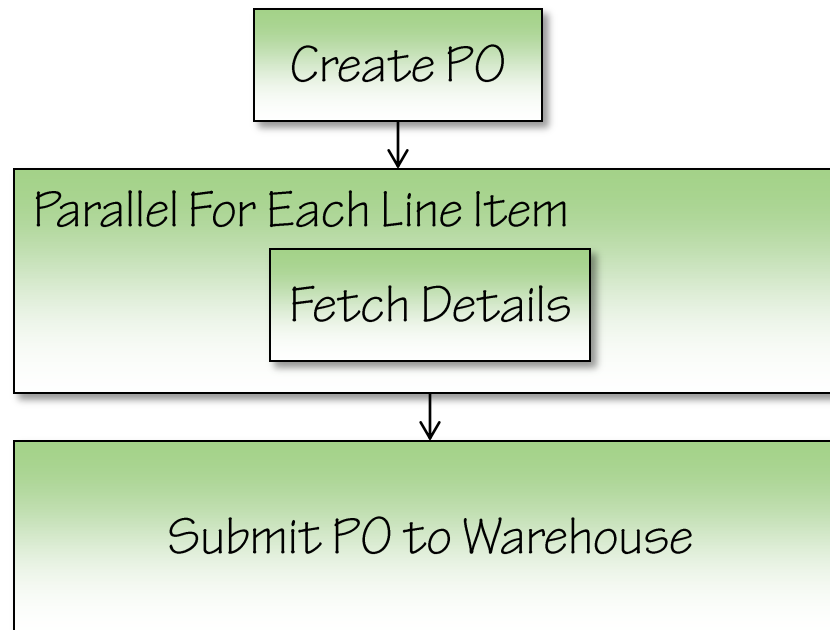- **Origin is manufacturing: Frederick Taylor and H. Gantt.**

- **Started to manage throughput and resource utilization**
- **Terminology from manufacturing also in workflow systems**

Workflow in Applications

- **First used by FileNet in business process automation software: WorkFlo (FileNet acquired by IBM in 2006)**
- **Used to visualize and implement a process**
- **Tools in use today**
  - Microsoft
    - Windows Workflow Foundation (WF)
    - BizTalk
    - SharePoint
  - Open Source
    - Java Workflow Toolkit
    - Apache Orchestration Director Engine (ODE)
  - Oracle BPEL Process Manager
  - IBM: WebSphere MQ Workflow
  - Many others
- **Early focus: workflow for documents**

Workflow Designers

- **Allow people to visually design algorithms**
- **Describe and implement workflow**
  - Logic
  - Dependencies
  - Express opportunities for work that can happen in parallel

```
Create PO
   |
   v
Parallel For Each Line Item
   Fetch Details
   |
   v
Submit PO to Warehouse
```

pluralsight
see what you can learn

Workflow Benefits

- Visual documentation: Business Analysts and others can read and update workflows, understand what is happening

- Conserve resources through passivation/activation cycle

- Scalable: workflows can be spread across many machines easily

- Status of workflow provided through automatic tracking: Unit of work/activity boundaries are well known.

Windows Workflow Foundation (WF)

- **First released with .NET 3.0.**

- **Significant update in .NET 4.0.**

- **Base workflow types: Sequence and Flowchart**

- **Sequence: Do steps in order**

- **Flowchart: Given a decision, execute these sequences**

- **Activity types:**
    - Simple: Unit of work
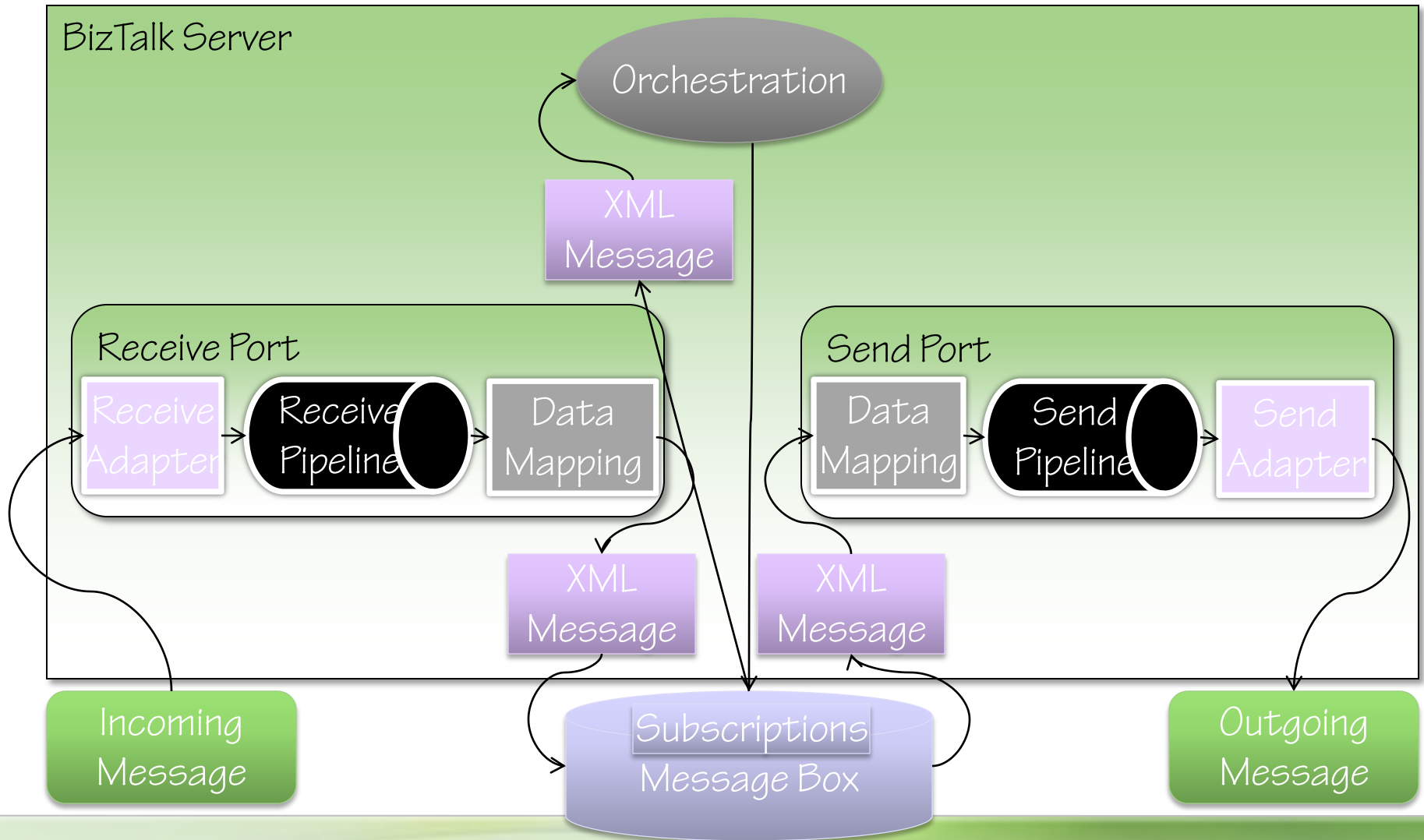   - Composite: Activity that contains more activities

Types of Activites

- **Primitives: Assign, Delay, InvokeMethod, WriteLine**
- **Control Flow**
  - Logic: If, Switch, FlowDecision
  - Looping: While, DoWhile, ForEach, ParallelForEach
  - One of: Pick, PickBranch
- **Messaging**
  - Correlation: CorrelationScope, InitializeCorrelation
  - Send: Send, SendAndReceiveReply
  - Receive: Receive, ReceiveAndSendReply
- **Collection: AddToCollection, RemoveFromCollection, ClearCollection, ExistsInCollection**
- **Transaction**
  - Scope: TransactionScope, CancellationScope
  - Compensation: Compensate, CompensableActivity
- **Error: TryCatch, Throw, Rethrow**

BizTalk Server

- **Microsoft's Enterprise Service Bus**
- **Handles Enterprise Application Integration through connectors from Microsoft and the ISV community**
  - SAP, Oracle, Siebel, SQL Server, MQ Series, MSMQ
  - EDI, HL7, e-mail: POP3 and SMTP, SOAP, WS-*, XML, …
- **Business Rules Engine**
- **Editors for Developers and Business Analysts**
- **Business Activity Monitor**
- **Integration with SharePoint, Excel, Office PerformancePoint Server, SQL Reporting Services**
- **RFID Server**

BizTalk Architecture

Microsoft Office SharePoint Server 2010

- **Microsoft's Business Intelligence, Collaboration, CMS, Human Workflow tool**
- **Human workflow: A flow of work whose inputs and transitions are driven by people.**
- **Benefit of using an application**
  - Codify rules about who completes the next task
  - Monitor state of workflow
  - Automate pieces that don't require a human
  - Can create web pages for users to interact with
  - Consistency

Tools Used for SharePoint Workflow

- **Out of the box: Workflows for common scenarios.**
  - Apply workflow to item via web browser
- **InfoPath**
- **SharePoint Designer**
  - Modify existing workflows
  - Create new workflows
- **Visual Studio**
  - Custom Activities
  - Advanced modeling
  - Attach workflow to events
- **Version of WF in use: WF 3.5.**
  - Concepts between 3.5 and 4.0 fairly similar.
  - 4.0 contains a Migration activity to execute 3.5 WF

Summary

- **Microsoft ships 3 workflow systems: Windows Workflow Foundation, BizTalk Server, and SharePoint Server**

- **WF: Self hosted workflows, used primarily by developers with support for business analysts.**

- **BizTalk Server: Used by developers and business analysts. Sophisticated monitoring and connectivity to enterprise systems (Oracle, Siebel, IBM, others)**

- **SharePoint Server: Human workflow engine.**
  - Attach workflows through the browser
  - Create workflows in SharePoint Designer
  - Add heavy duty code integration to workflows in Visual Studio

Resources

- David Chappell, The Workflow Way. http://www.davidchappell.com/TheWorkflowWay--Chappell.pdf
- BizTalk Server Virtual Labs: http://msdn.microsoft.com/en-us/aa740373.aspx