Workflow & AXMEDIS

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Tutorial Organisation

- **Purpose**
  - To demonstrate the benefits of using Workflow for Automated Content Production

- **Overview**
  - General Workflow Overview
  - Role in AXMEDIS
  - Benefits Via Case Studies
  - Demonstrations

- **Intended Audience**
  - Project Managers
  - Workers of Content Production Factory
Tutorial Preface

General Overview, Benefits and Scenarios

Purpose of this Tutorial Part

- **Course Objectives**
  - To demonstrate the benefits of using the AXMEDIS Workflow for automated content production and distribution.

- **Expected Audience**
  - People working in content factories.
  - Managers

- **Learning outcomes**
  - What is a Workflow?
  - What is the Role of Workflow in AXMEDIS?
  - What different types of Workflows are available in AXMEDIS?
  - What benefits are achieved by using AXMEDIS workflow?
Workflow

General overview

Aims & Objectives

- **Aim**
  - To present Workflow systems and their generic role in any Organisation

- **Learning Objectives**
  - What is a Workflow?
  - What should the Workflow do?
  - What are the benefits of using workflow systems?
What are we talking about?

- BPRS – Business Process Re-engineering Systems
- CRMS – Customer Relation Management systems
- HRMS – Human Resource Management systems
- FSPMS – Finite State Production Management Systems
- CPWFMS – Content Production Workflow Management Systems
- SC/DMS – Supply Chain / Distribution Management Systems
- DMSS – Decision Management Support Systems
- …
- A whole world
Workflow… “Myths & Legends”

- A workflow system is much more than a system with workflow capabilities.

- What makes a Workflow System something different from a System that merely has workflow capabilities?
  - Workflow systems by their nature can be (re)-configured without having any complications.
  - In addition workflow systems were not designed for one process or a set of processes or an industry or a particular problem or set of problems.
  - Instead workflow systems were created with the idea of a continually evolving set of requirements and continually increasing efficiency, automation and reach.

Workflow and its “mysteries”

- Workflow at its simplest is the movement of documents and/or tasks through a work process.
- More specifically, workflow is the operational aspect of a work procedure:
  - how tasks are structured?
  - who performs them?
  - what their relative order is?
  - how they are synchronized?
  - how information flows to support the tasks?
  - how tasks are being tracked?

- Other names
  - Process Flow
  - Control Flow
  - Business Process Management (BPM)
Workflow... the glue of complexity

- A planned workflow is the underpinning of every efficient business process.
  - Whether a business is processing leads, updating a web page, evaluating a capital purchase, or approving new hires, certain actions must take place in order for the function to be completed.
  - Within these functions, multiple users perform a variety of steps to execute the business process.
  - It is in between these steps in the process where workflow automation becomes important.
  - Tasks must be efficiently transferred to the appropriate workers for the entire process to stay on track.

Workflow a process in itself

- Workflow involves the passing of content between people in a chain that abide by a predefined set of rules.
  - However, workflow automation is not only about using software to facilitate or automate content transfer
  - but it is also about tracking and recording the progress of an activity,
  - delivering the work to any of the appropriate and available users,
  - archiving work when necessary, and
  - providing a framework for what actions are to take place in predefined scenarios.
Workflow features

- At minimum should allow:
  - being able to represent any tasks structuring,
  - equally applicable to:
    - task scheduling
    - paper / electronic document flow organization
    - Process description, management, documentation...

- Involves a set of well coded steps:
  - Process Design
  - Process Execution & Monitoring
  - Process Revision & Upgrade

- But requires extensive and thorough customisation

When is workflow mgt. needed (I)

- There is no tried and true scoring sheet for determining what are the best things to convert into workflow applications

- However some guidelines as to the types of applications that will provide the highest return on investment.
  - Throughput
    - How many times is this process used per month?
  - Escalations
    - What effect does missing a deadline on one of the activities have for your organisation?
When is workflow mgt. needed (II)

- Additional guidelines as to the types of applications that will provide the highest return on investment comprise
  - Number of Steps
    - The more steps the more it lends itself to a workflow application?
  - Number of disparate systems currently needed
    - A workflow application should eliminate the users’ experience of dealing with information over more than one interface.
  - Staff Turnover
    - Workflow Systems provides a more straightforward learning experience as people see how the process works, these means there is less down time for new employees to get up to speed.

WfMS - What should be there?

- Management Reporting
  - How important is it for management to see at what stage everything is at?

- Data Integrity
  - What is the current state of data integrity?

- Security
  - Is the data secure from: malicious users, the departure of key personnel?
Workflow in AXMEDIS

Aims & Objectives

- **Aim**
  - To present the Workflow support available in AXMEDIS Framework and its role.

- **Learning Objectives**
  - What is the role of a Workflow in AXMEDIS?
  - What different workflows are available in AXMEDIS?
  - What are the features of the available workflow systems?
Workflow in AXMEDIS

- The Workflow Management System (WfMS) supports the coordination of resources and activities during product development and distribution.
- The WfMS will need to update status of, or trigger certain actions based on status of a AXMEDIS Object in respect to:
  - Who will need to act on any AXMEDIS Object next
  - What will anyone need to do on any AXMEDIS Object at any time
  - Where will any action need to be done on any given AXMEDIS Object at any time
  - When will any action need to be done on any AXMEDIS Object

What have we used in AXMEDIS

- **OpenFlow**
  - open source
  - less flexibility but also a much more limited cost impact (limited to customisation and set-up time)
- **Microsoft BizTalk Server**
  - commercial license
  - more flexibility but also higher deployment costs as it requires (aside the licensing) the consultancy for set-up and customisation (beside set-up time and other needed resources)
- **But other WfMS can be easily integrated thanks to AXMEDIS Framework:**
  - Service Oriented Architecture
  - Open Standards
AXMEDIS workflow requirements

- Operate within the key Operating Systems (OS); for example the Windows, Linux, Mac Environments.
- Interact with the AXMEDIS Object Manager to access objects and query and update their status.
- Manage more than one workflow process instances.
- Based upon an open source distributed product through LGL, BSD or similar licences.
- Provides a seamless interface to AXMEDIS native tools (Content Production, Formatting, Databases and Distribution tools).

Requirements fulfilled

- Service Interface (API) used for developing plug-in for:
  - AXMEDIS Editor
  - Content Processing Engine
  - Program and Publication Engine
  - Protection Tool Engine
  - AXEPTool
  - Rule Editor
  - Programme Editor
For AXMEDIS, the workflow will form a backbone for the automation of various production and distribution activities by inter-acting with various AXMEDIS tools.

- AXMEDIS Editors
  - Object Editor
  - Metadata Editor
  - DRM Editor
- AXMEDIS Rule Editors
  - AXEPTool Rule Editor
  - PoP Rule Editor
- AXMEDIS Database Query Support
  - Query Support UI

**AXMEDIS Workflow Integration**

**Benefits of OpenFlow**

- OpenFlow is a workflow engine developed and released as free software under a GNU GPL license.
- It is based on an object-oriented structure and has a powerful exception handling system along with dynamic redesign support.
- These features make OpenFlow much more flexible than any other existing workflow engines.
Benefits of OpenFlow

- OpenFlow supports most of the open standards (XML/XML-RPC) including also the web standards.

- It has got a simple access to most of the relational DBMSs and thus it facilitates the integration of heterogeneous system.

- OpenFlow is activity-based, web-based, WFMC inspired, built and integrated with the application server Zope.

- OpenFlow is capable of running on most operating systems including Linux, Windows 9x, NT/2000, XP, MacOs.

Benefits of OpenFlow

- Through an integrated role assignment system, OpenFlow can assign tasks and activities to single users or workgroups and also to automatic applications.

- At every moment OpenFlow can trace the complete history of a certain situation e.g. participants involved, activities and actions executed and invoked.

- It is possible to carry out performance and efficiency analysis and verify the correct implementation of the adopted model.
Benefits of OpenFlow

- OpenFlow is strongly web-oriented and offers complete support for developing and executing workflows via a browser.
- The interaction with OpenFlow uses simple HTTP requests as in, for example, process modelling, assignment of users to activities, definition of the interaction with the applications.
- Every user receives his task which interacts with appropriate applications through the network.

Microsoft BizTalk Server

- BizTalk Server 2004, an integration server, lets you to develop, deploy, and manage integrated business processes and XML-based Web services.
- Traditionally, BizTalk Server has been used for application integration, where the following two scenarios are most important:
  - Connecting applications within a single organization, commonly referred to as enterprise application integration (EAI)
  - Connecting applications in different organizations, often called business-to-business (B2B) integration
Microsoft BizTalk Server

- BizTalk Server 2004 also adds technology for creating Human Workflow Services (HWS), making possible business processes that people can interact with from Microsoft Outlook and other familiar clients.

- The HWS infrastructure is accessed through Web services, and so it can be used by any client application.

Benefits of Using AXMEDIS Workflow

OpenFlow & MS BizTalk Server
Aims & Objectives

- **Aim**
  - To present the benefits of using the available Workflow systems for the AXMEDIS Framework

- **Learning Objectives**
  - What benefits are achieved by using the Workflow systems in AXMEDIS Framework?

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So we are talking about
**AXMEDIS Architecture**

**AXMEDIS Factory**
- AXMEDIS Editors
- AXMEDIS Control
- Processing Engines and Scheduler GRIDs

**AXMEDIS Content Processing Engines and GRIDs**
- AXMEDIS database Area
- AXMEDIS Accounting area

**AXMEDIS Portal**
- AXMEDIS Players
- Protection and Supervising tools

**AXMEDIS Network**
- AXEPTools
- AXMEDIS Players

**AXMEDIS Editors**
- Distributor
- AxEditor
  - Users can launch the AxEditor directly through workflow
  - The particular AXMEDIS Object will be directly loaded in the Editor
  - Allows Tracking of the Object’s History

**Benefits (I)**

- **Workflow forms the backbone by**
  - Enabling communications amongst AXMEDIS Tools
  - Tools Monitoring & Management
  - Error Control

- **Can be used to integrate B2B activities**
  - Scenarios can be across organisational boundaries.
  - Each organisations may retain independent WfMS customised for their own use.
Benefits (II)

- AXCP Rule Editor
  - Users can launch the AXCP Rule Editor directly through workflow.
  - The Rule to be edited can be directly loaded in the AXCP Rule Editor.
  - The New Rule is managed in the Workflow for later use.

- AXCP Scheduler
  - Can Install & Activate execution of any AXCP Rule in the AXMEDIS Content Processing Engine automatically.
  - Can Track the logs for each of the Rule being executed in the AXCP Engine.
  - Can completely manage, monitor & control execution of all the rules in AXCP Engine.

Benefits (III)

- AXDB
  - Can Lock & Unlock any objects for any particular user.
  - Can Activate Selections for any users.
  - Can Load & Save any object from AXDB.
  - Can Edit & Manage Selections in the AXDB.
  - Supports both synchronous & Asynchronous modes.

- AXEPTool
  - Can activate any Selection or Rule directly in the AXEPTool both for Uploading & Downloading.
  - Enables Automatic Sharing of Contents between Partners (B2B).
Benefits (IV)

P&P Engine & Editor

- Users can launch the P&P Editor directly through workflow
- The Programme to be edited can be directly loaded in the Editor
- The New Programme is managed in the Workflow for later use
- Can Activate the Programme directly in the P&P Engine
- Can Handle Dynamic Process requests from P&P Engine
  - E.g. Dynamic Transcoding
- Control, Monitor & Track each Programme in the P&P Engine

Case Study 1: News Paper Production House
Aims & Objectives

- **Aim**
  - To present the benefits of Workflow Systems & AXMEDIS Framework using a real world scenario for News Paper Production House.

- **Learning Objectives**
  - What are the main steps involved in News Paper Production?
  - What are the limitations of traditional approach?
  - How can it be modelled by AXMEDIS Framework?
  - What are the benefits gained by using AXMEDIS Framework & Workflow System?

Process and Actors

- **Process:**
  - To publish daily news on different channels, including printed paper, online news website, TV-TEXT, e-Paper downloadable at Kiosks, or on-demand mobile distribution

- **Actors:**
  - News Collector, Creator, Reporter
  - First Editor (Producer), Chief Editor
  - Second Editor (Distributor), Chief Editor
Case Study 1

Problems (I)

- Involves many manual tasks.
  - Not a cost effective solution

- Any changes to be done has to follow long chain of actions.

- Multiple channels are supported only by creating multiple versions of same news and stored in the database for each different channels.
  - Not a cost effective solution

- For B2B Scenario, the contracts and licenses has to be pre-agreed.
Problems

- On-Demand Scenario is difficult to implement on dynamic basis.
Case Study 1

- For Distributors supporting on-Demand Scenarios,
  - The request is received by the distribution server for a particular News Object.
  - The correct object is downloaded from AXDB.
  - It is automatically transcoded to match the target channel and device using an AXCP rule.
  - The object is distributed according to the On-Demand P&P Programme.

Benefits (I)

- Reduced Cost by (re-)using same content for different channels and for different kind of requests.

- Royalties, license and DRMs are taken care for automatically.

- The scenario can be executed automatically using Workflow Manager.

- Multiple channels are supported using a single object dynamically transcoded for distributions towards each channel.
Benefits (II)

- On-Demand Scenario is supported automatically by dynamic adaptation of original object.
- New B2B & B2C relationship are exposed by dynamic support for licences and contracts.
- Most of the activities are automatically executed using workflow support, and hence reduces the overall cost.
- With an Integrated Workflow, the AXMEDIS Framework can reduce the overall production cost with better control and management.

Case Study 2: Online Distribution of Music
Aims & Objectives

Aim
- To present the benefits of Workflow Systems & AXMEDIS Framework using a real world scenario for Online Music Distribution.

Learning Objectives
- What are the main steps involved in Online Distribution of Music?
- What are the limitations of traditional approach?
- How can it be modelled by AXMEDIS Framework?
- What are the benefits gained by using AXMEDIS Framework & Workflow System?

Process and Actors

Process:
- To distribute music files through internet, kiosk, mobiles, etc respecting the royalties and licenses for each such files

Actors:
- Editor
- Licence Creator
- Quality Inspector
- Validator
Case Study 2

Problems

- Many Human Actors.
  - Slow production
  - Costly

- Follows a strict routine which cannot be altered easily for exposing new possibilities.

- Distribution toward mobiles requires pre-transcoded music files for all the supported devices.
  - Costly
  - Limited to selected devices
Case Study 2

Benefits

- Reduced Cost by (re-)using same content for different channels and for different kind of requests.
- Audits, license and DRMs are taken care for automatically.
- The scenario can be executed automatically using Workflow Manager.
- There can be many possible processes for the production and distributions, which can be easily implemented and executed and thus providing more flexibility.
Case Study 3: Publication of Art History on Kiosks & Mobiles

ILABS Scenario

Aims & Objectives

- **Aim**
  - To present the benefits of Workflow Systems & AXMEDIS Framework using a real world scenario for Publication of Art History on Kiosks & Mobiles.

- **Learning Objectives**
  - What are the main steps involved in Production & Distribution of Art History on Kiosks & Mobiles?
  - What are the limitations of traditional approach?
  - How can it be modelled by AXMEDIS Framework?
  - What are the benefits gained by using AXMEDIS Framework & Workflow System?
Process & Actors

- **Process:**
  - To create and distribute “A sample content on history of art” website on a mobile device.

- **Users:**
  - Editor,
  - Supervisor

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Case Study 3

1. HTML, Images, Etc
2. Metadata
3. Verification
4. Verified
5. Adaptations
6. Verification
7. Publication
8. Website
9. Adapted Website
10. Supervisor
11. Editor 1
12. Art History
13. Supervisor
14. Editor 2
15. Mobile Portal
16. Published

*Portal*
Problems (I)

- Labour intensive process
  - Each step is slower and more expensive, in particular the repetitive tasks.

- Need to limit the availability to supported mobile devices planned in advance.

- No facility for DRM. This must either be enforced by restricting user access via passwords/registration mechanisms, denying access or risking piracy.

Problems (II)

- No ‘economies of scale’
  - Process has to be completely repeated for each similar project.

- More prone to mistakes and errors, adding more cost and time in debugging.

- Mistakes and errors can also impact quality of product delivered to end-user.
Case Study 3

Automated Demonstrator

WORKFLOW

AXMEDIS Content Processing Engines and Scheduler GRIDs

AXMEDIS Editor

Supervisor

AXMEDIS Certifier and Supervisor

AXMEDIS Player

Distributor Portal

Registration Service

Certification Authority

Protection Manager Support
Benefits

- Reduced Cost by (re-)using same content for different channels and for different kind of requests (Devices).

- Royalties, license and DRMs are taken care for automatically.

- AXMEDIS approach allows new devices to be supported without redesigning the content.

Benefits

- Similar Projects are executed entirely automated with AXMEDIS Workflow.

- Some of the automation benefits can be achieved using AXMEDIS scripts without the WF, but the main benefits of WF relate to:
  - The overall process automation from end to end (content creation through to distribution)
  - Efficient use of designers and other expensive human resources by scheduling and synchronising their input to the process
Case Study 4: Creation and Publication of Online Movie Galleries

XIM Scenario

Aims & Objectives

- **Aim**
  - To present the benefits of Workflow Systems & AXMEDIS Framework using a real world scenario for Production of Online Movie Gallery.

- **Learning Objectives**
  - What are the main steps involved in Production of a Movie Gallery?
  - What are the limitations of traditional approach?
  - How can it be modelled by AXMEDIS Framework?
  - What are the benefits gained by using AXMEDIS Framework & Workflow System?
Process and Actors

- **Process:**
  - To publish a gallery of movie-related images onto multiple channels (web and mobile) to allow for end-user selection and download, respecting DRM rules.

- **Users:**
  - Editor #1,
  - Editor #2,
  - Supervisor,
  - Programmer

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Case Study 4

1. Snapshots
2. Metadata
3. Verification
4. Verified
5. Snapshots + Metadata
6. Verification
7. Thumbnails and gallery
8. HTML Gallery
9. FTP Server
10. Published
11. Portal
Problems with Existing Approach

- Problems:
  - Labour intensive process - each step is slower and more expensive. In particular the repetitive tasks.
  - No ‘economies of scale’ - process has to be completely repeated for each similar project.
  - More prone to mistakes and errors, adding more cost and time in debugging.
  - Mistakes and errors can also impact quality of product delivered to end-user.

Case Study 4

[Diagram showing the P&P Engine and its connection to the Internet and Mobiles]
Benefits (I)

- **Benefits:**
  - The scenario can be executed automatically using Workflow Manager.
  - Can distribute to multiple channels at little or no additional effort - (manually, we would have to repeat most steps for each channel).
  - Can use less expensive resources to repeat steps once the process has been automated.
  - Royalties, license and DRMs are taken care for automatically.
Benefits (II)

- Reduced cost makes it possible to offer increased product complexity and quality for the same price.
- Reduced cost also makes it viable to offer content to smaller niche markets or narrow distribution channels.
- Some of the automation benefits can be achieved using AXMEDIS scripts without the WF, but the main benefits of WF relate to:
  - The overall process automation from end to end (content creation through to distribution)
  - Efficient use of designers and other expensive human resources by scheduling and synchronising their input to the process

Drawbacks & Limitations
Workflow Drawbacks

- **Workflow Addiction**
  - You try to type words like ‘flower’ and ‘workplace’ and end up typing ‘workflow’.
  - When you need to cook you find yourself trying to automate as many steps as possible.
  - You say something stupid and wish you had designed your reality to have a rollback function.

Comments, Acknowledgements & Contact Information
Contact Information

- If you like to know more about the AXMEDIS framework and other AXMEDIS technologies and functionalities please do not hesitate to contact the project coordinator:

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