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?
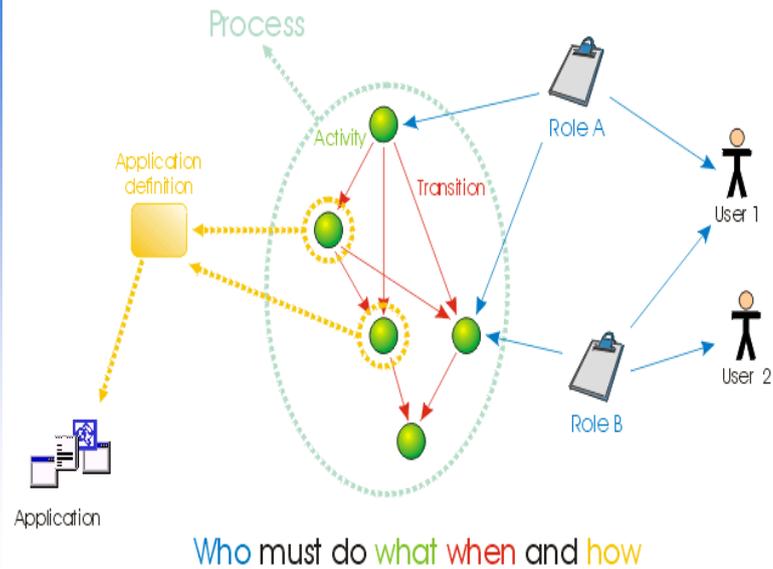
Workflows…

- 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 that one interface.
  ▶ Staff Turnover
    • Workflow Systems provides a more straight forward 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

AXMEDIS Workflow Integration

- **For AXMEDIS, the workflow will form a backbone for the automation of various production and distribution activities by inter-acting with various AXMEDIS tools.**

Workflow Engine
e.g. Openflow

Axmedis Editors		Axmedis Rule Editors	Axmedis Database Query Support
• Object Editor • Metadata Editor • DRM Editor		• AXEPTool Rule Editor • PnP Rule Editor	• Query Support UI
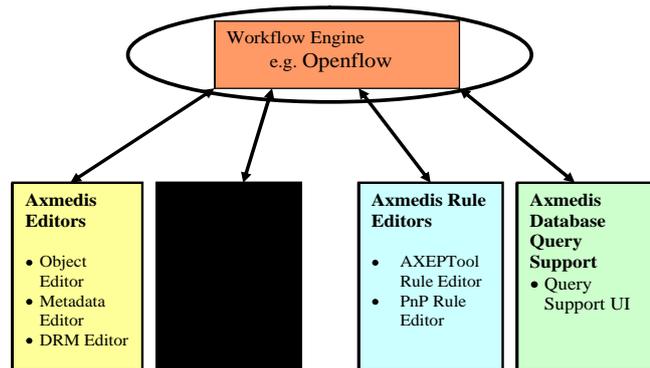
Benefits of OpenFlow

- **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?

So we are talking about

Who must do what when and how

AXMEDIS Architecture
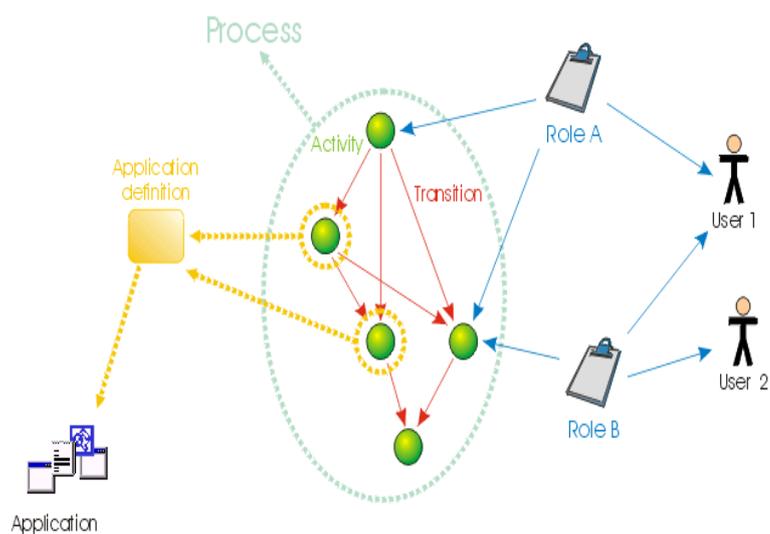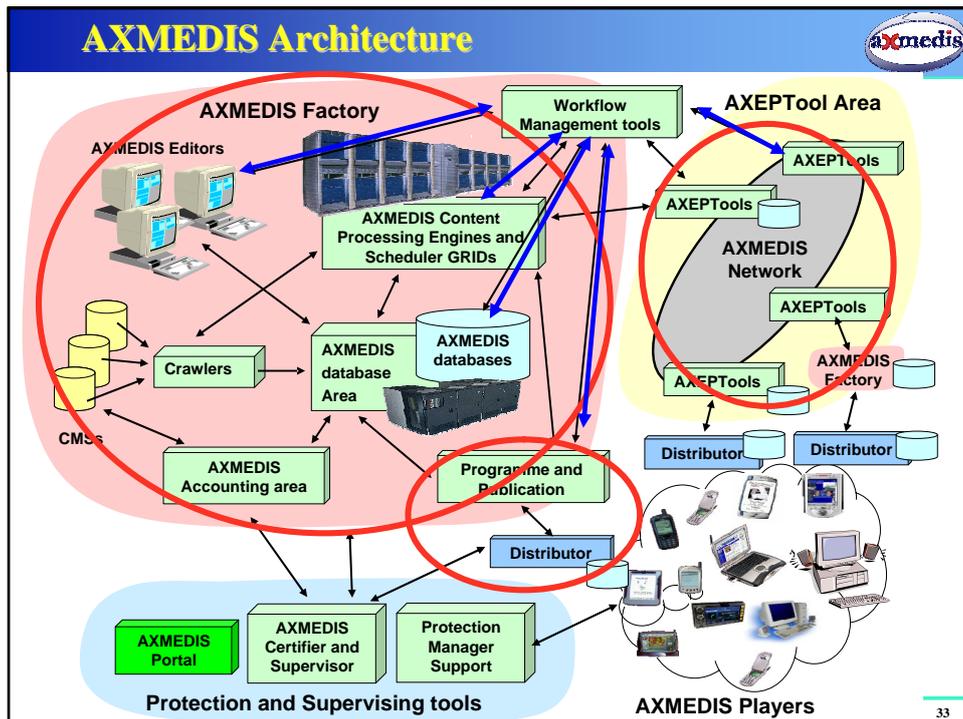
Benefits (I)

- **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.

- **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 (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
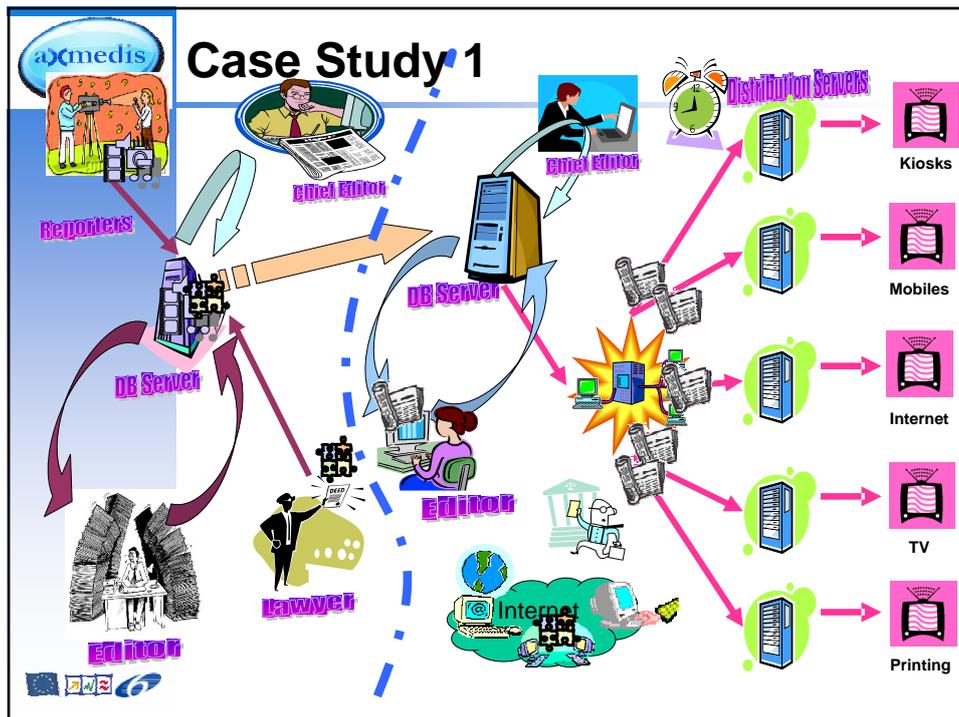
![axmedis logo] **Problems (I)**

■ **Involves many manual task.**
  ▶ 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.**

- **New B2B & B2C relationships cannot happen instantaneously.**
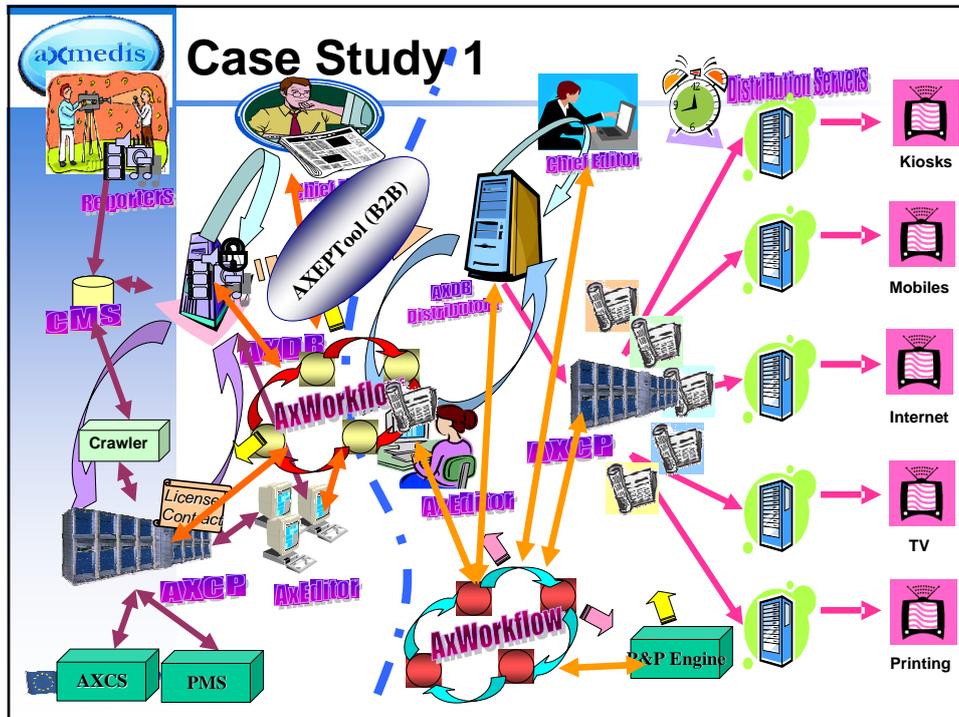
Case Study 1

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
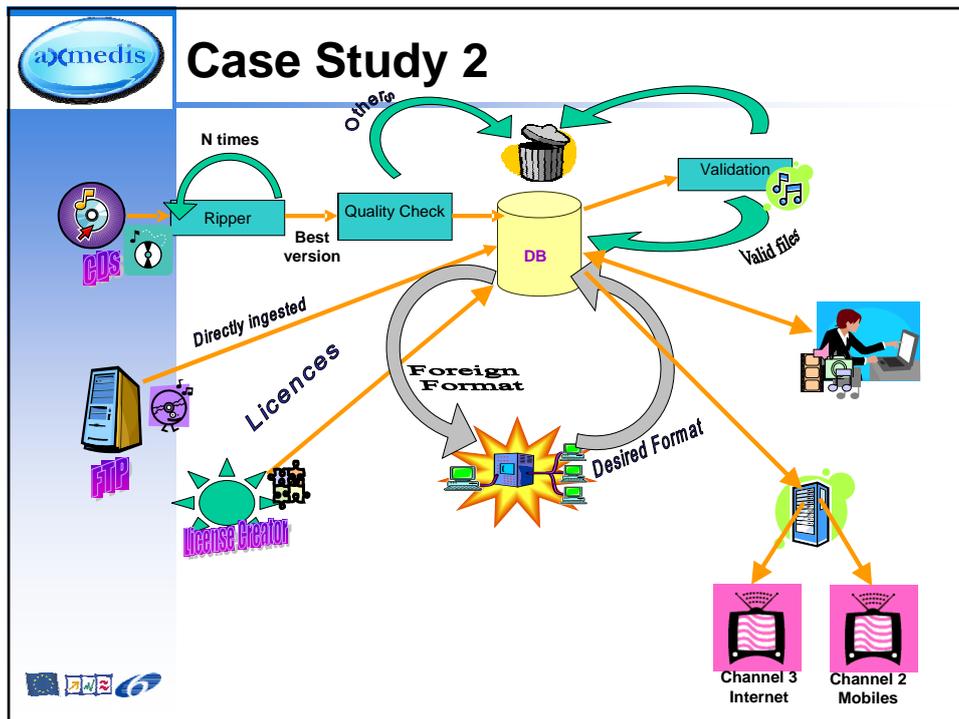
Problems

- **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

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 distributed "A sample content on history of art" website on a mobile device.

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

Case Study 3
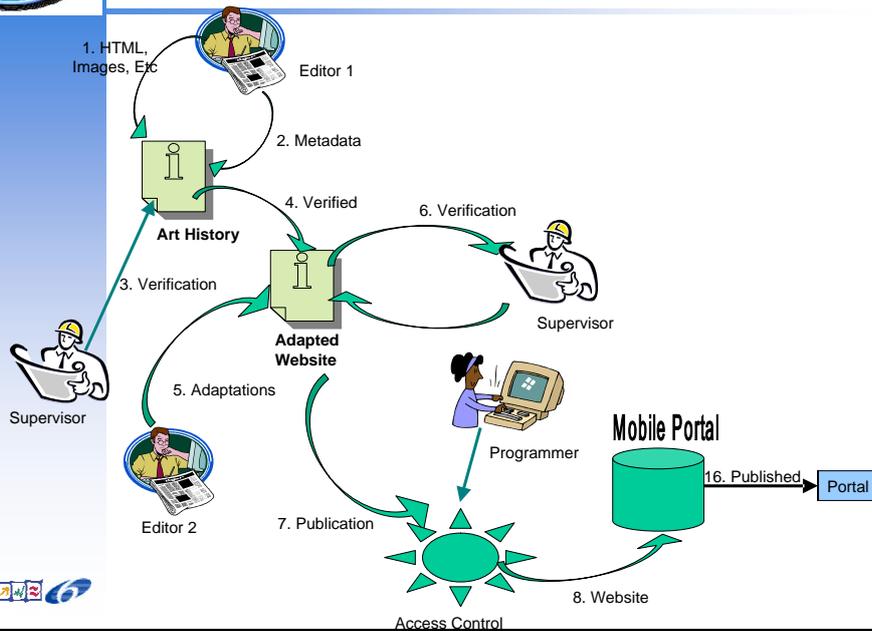
Problems (I)

- **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
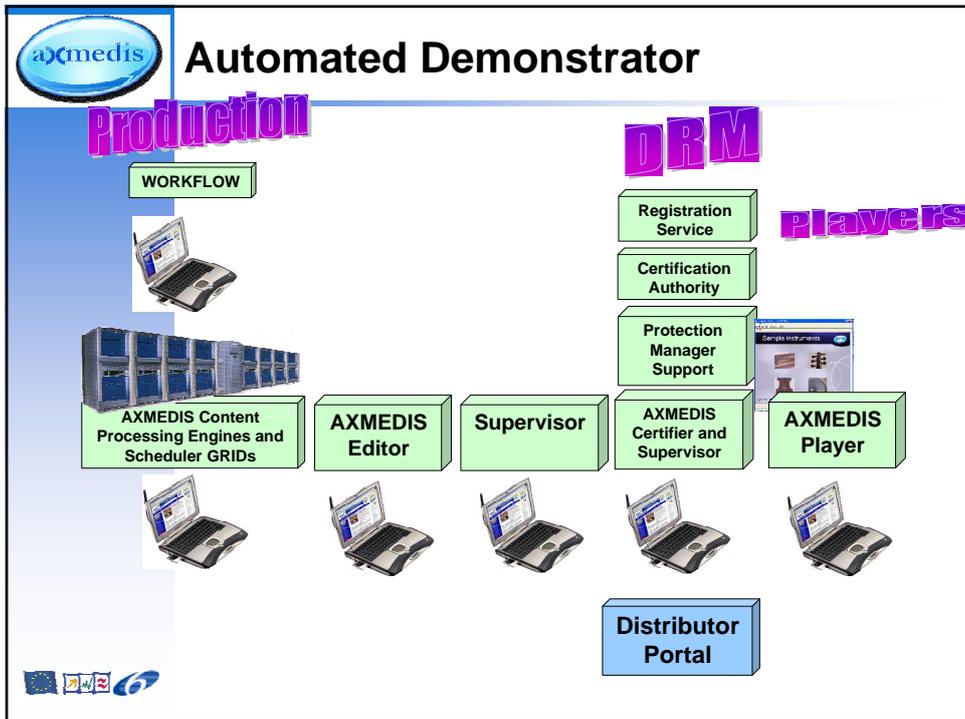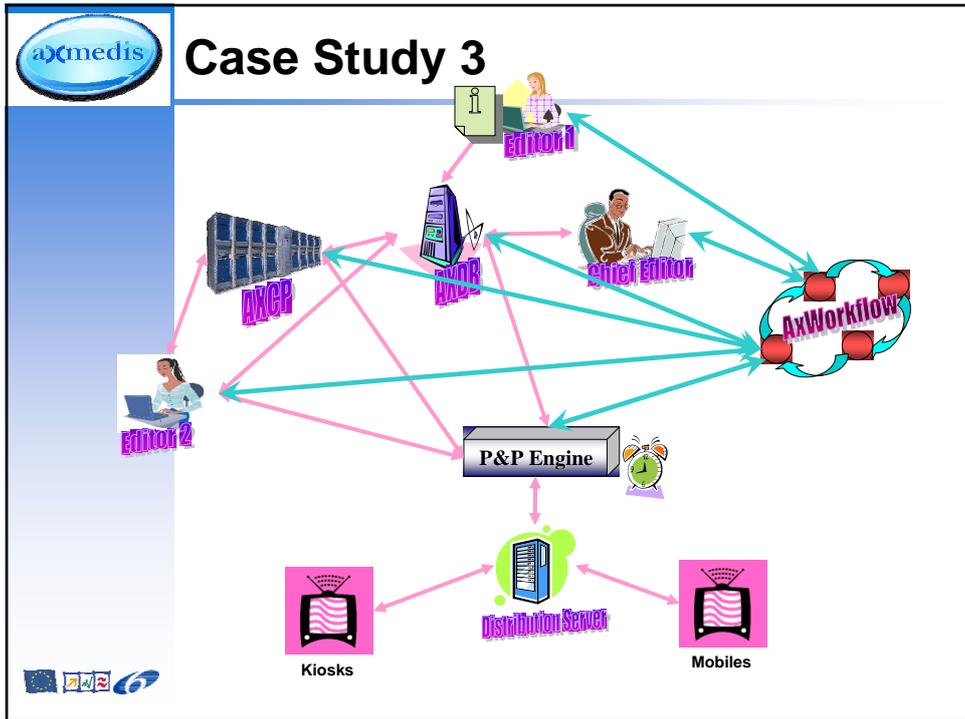
Benefits

- **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

Case Study 4

1. Snapshots

Editor 1

2. Metadata

Snapshots

3. Verification

4. Verified

6. Verification

Supervisor

Snapshots + Metadata

5. Thumbnails and gallery

Supervisor

Editor 2

7. HTML Gallery

gallery

FTP SERVER

16. Published

Portal

8. HTML Gallery
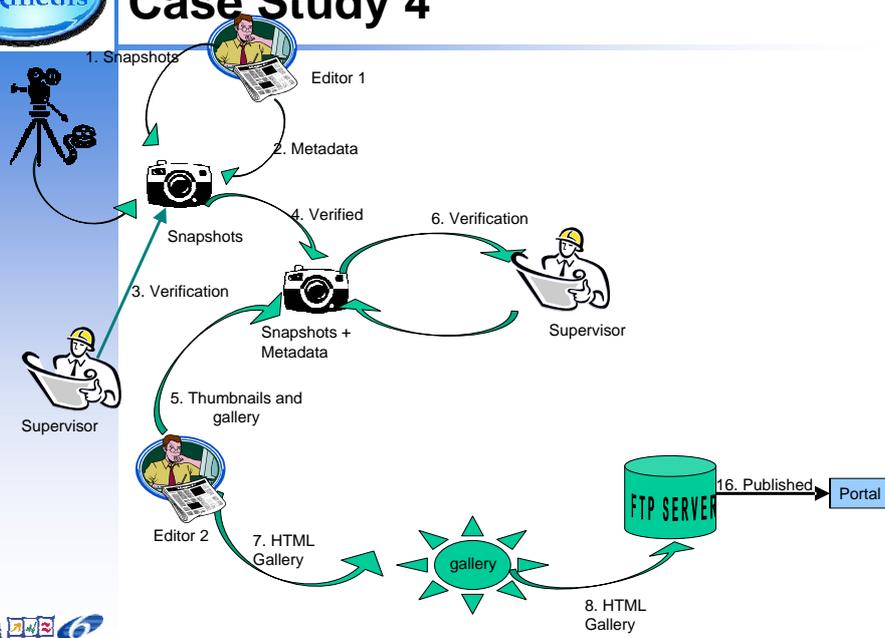
Problems with Existing Approach

- **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

Movie

Gallery

AXCP

AXOR

Editor 1

Chief Editor

AxWorkflow

Editor 2

P&P Engine

Distribution Server

Mobiles

Internet

Automated Demonstrator

Production

WORKFLOW

DRM

Registration Service

Certification Authority

Protection Manager Support

Players

AXMEDIS Content Processing Engines and Scheduler GRIDs

AXMEDIS Editor

Supervisor

AXMEDIS Certifier and Supervisor

AXMEDIS Player

Distributor Portal

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'.
  - You find yourself terms like 'continuity', 'Process Instance' and 'workitem' like in casual conversation.
  - 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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