Applying YAWL for the Automated Execution of Film Production Processes

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1 Introduction

The Business Process Management (BPM) Group at the Queensland University of Technology (QUT) is involved in a project [3] that aims at applying BPM to the Creative Industries. As part of QUT's Centre of Excellence for Creative Industries and Innovation, the project has progressed through close cooperation between QUT's BPM Group and the Australian Film, Television and Radio School (AFTRS). It proposes to apply the general principles, methods and tools of BPM into selected areas of the creative industries such as the Screen Business. The Screen Business comprises all creative and business related aspects and processes of film, television and new media content, from concept, to production and distribution. A value chain model for the screen business has been developed [9], which consists of four stages: *Development*, *Pre-Production*, *Production*, and *Post-Production*.

As part of the project, we used the open source workflow system YAWL (Yet Another Workflow Language) [1] to automate the execution of the *Film Production Process*. YAWL offers comprehensive support for workflow patterns, analysis at build time, persistence, automated form generation, and is based on XML technologies. Its service-oriented architecture facilitates the development of sophisticated extensions that enable developers to tailor a YAWL-based workflow system to the requirements of a particular setting, e.g. the Screen Business Production.

The term "Film Production Process" refers to the process within the Production stage of the Screen Business value chain for film-making. In most cases the Production stage is the most expensive one, as during this stage the movie is actually created and shot. The shooting procedure is carried out on a daily basis, and the production process covers the entire shooting period from the first shooting day to the last shooting day. During each day, a number of documents need to be filled, updated or generated on set, e.g., to record the daily shooting progress, to update the next day's shooting schedule, to calculate the staff worked hours and to set up the payments. Currently, a daily shooting procedure is manually operated, where processing and coordinating these daily documents is very time-consuming and error-prone, and in the worst case it may even cause delay to the next day's shooting schedule. Such a process can therefore benefit

from the application of a workflow system to optimize the process execution as well as to automate the daily document processing, which may further reduce the cost of the film production.

When applying YAWL to the Film Production Process, special attention needs to be paid to the creative and highly agile nature of the process and how it may be appropriately modeled. One goal is to automate the process without affecting nor limiting the creativity. This can be done by identifying creative tasks (e.g., updating the film script) as part of the overall process. On the one hand, a workflow system such as YAWL can be used to improve and automate the non-creative parts of the process, and as a result the film production team can spend more time on the creative tasks thus increasing the quality of creativity. On the other hand, it can open the opportunity to support creative tasks with appropriate techniques, methods and software tools.

Apart from its creative nature, a Film Production Process is also characterized with high demands for flexibility. For example, the process may be deployed across a central production office, where reports are produced and communicated, and a mobile unit for film shooting, as shown in Fig. 1. Unlike traditional business processes where the network connectivity is always ensured, the availability of network connection between the production office and the mobile shooting unit highly relies on the remote location of the unit (e.g., the unit may be located in a rural area without any network coverage). Hence, the traditional workflow model which requires network connection throughout the entire business process, needs to be revised so that the resulting model is capable to support the off-line execution of parts of the process.

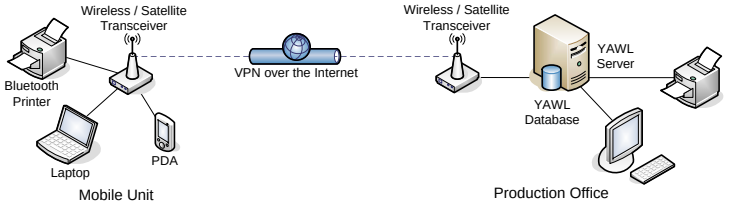

Fig. 1. A typical hardware infrastructure for the Film Production Process.

During the implementation of the Film Production Process, we developed extensions to the YAWL system to support this particular application. YAWL applies the XForms [4] technology to generate user interfaces. In particular, the Chiba XForms processor [7] is used to create XForms automatically and to gather and validate input from users dynamically. However, since Chiba only supports limited form formatting, we opted to implement customized user forms in JSP [8], so that the forms could match the formatting style of professional film production documents. The generated JSP forms have been integrated to YAWL as an alternative user interface to XForms.

Next, we briefly describe the YAWL process model from design to implementation. The YAWL System, as well as a set of screenshots of the running process are available at [2].

2 System Description

The Film Production Process was implemented as a YAWL process model capturing the control-flow, data, and the human resources involved in a film production. The model, depicted in Fig. 2, is based on a loop structure, where each loop instance captures a daily shooting procedure and the number of instances executed captures the number of the shooting days carried out. When a shooting day starts, four tasks are executed in parallel to fill out respectively the Continuity Report, the Sound Sheet, the Camera Sheet, and the Assistant Director's (AD) Report. For each of these tasks it is possible to submit a partially filled document before completion, which can be seen on-the-fly by the central production office. This feature is usually required to monitor the shooting progress. Once the four tasks are all completed, a Daily Progress Report (DPR) is automatically generated as a collection of key information from the above four documents. Next, the process splits into two parallel paths. The lower path is used for DPR distribution, where the DPR is first sent to the Producer and then forwarded to the Executive Producer and the Completion Guarantor. The upper path is used for the generation of the Call Sheet, which contains the most up-to-date schedule for the next shooting day. After updating the Schedule, the Shotlist, the Storyboard and the Script, the Call Sheet can be filled out. Once the Call Sheet is completed, it is distributed to all cast and crew. This completes the daily shooting procedure.

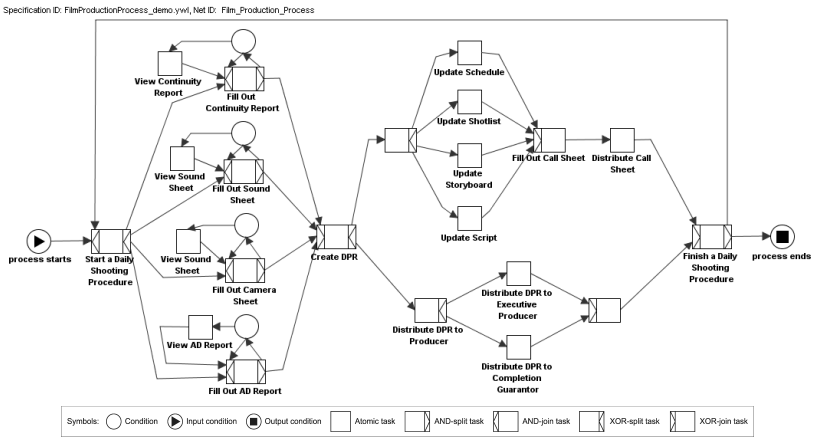

Fig. 2. The YAWL model of a film production process.

The tasks between the start of a daily shooting procedure and the automatic generation of the DPR are mainly performed on set (i.e., where the mobile unit is located), while the tasks between the generation of the DPR and the distribution of the Call Sheet are mainly performed at the production office. If no network connection exists between the production office and the mobile unit, the original process model needs to be split into two models – one executed at the mobile unit,

the other at the production office. These two processes are indeed dependent on each other, as the first produces a DPR an output and needs a Call Sheet as input, whilst the other produces a Call Sheet as output and needs a DPR as input. Exchanging such documents between the two processes would need to be supported by other means, e.g., a courier.

XML Schema [5] was used to represent the data documents of the process. The assignment of human resources to process tasks is supported by the YAWL Editor (at deign-time) and by the YAWL Administrative Tool (at run-time). We used these tools to assign production crew roles to each task, e.g. the role Sound Editor has been assigned the task "Fill Out Sound Sheet". Due to space limitations, we do not show the details of the data and resources implementation.

Professional-looking forms were created in HTML, and then wrapped in JSP to capture the logic behind the data representation. On each JSP form we implemented the following features: "Load" – to open a data file into the JSP form, "Save" – to store the input data to the local system (e.g. the laptop of a crew member), and "Submit" – to submit the input data back to the YAWL engine that runs the process. For persistency purposes, the submitted form is also saved into the server where the engine is installed. We used JAXB [6] to handle the manipulation of XML files in Java between JSP forms and YAWL.

To validate the Film Production Process and the YAWL system from a practical perspective, we will deploy the process in the production of a real feature movie with a Sydney's film company. The movie will be shot by two mobile units in rural areas of New South Wales (no network coverage), while the production office will be set up in town.

About the demonstration. The demonstration will show the YAWL model for the Film Production Process, with a focus on the process control-flow and on the data and resources involved. A running instance of the process model will also be shown, using sample documents provided by the AFTRS.

References

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