



WHITE PAPER

Enterprise Imaging

Task-driven workflows

Why use a workflow engine?

1. Introduction

Healthcare applications are designed to improve patient care and minimize operational costs. To accomplish this they need to:

- Offer a method for organizing work – this allows efficient work scheduling, helps to avoid mistakes, improves communication, etc.
- Permit customization – to tune the way of working and easily accept local differences.
- Provide the possibility of measuring different characteristics of the healthcare processes in order to improve them.

Workflow management technology is not used in healthcare as often as in other domains. For the Agfa HealthCare's Enterprise Imaging solution, a workflow engine was selected for a number of reasons.

For most existing PACS systems, a status-driven approach is chosen; users search for studies with a specific status and then must determine for themselves the next steps. This means the users themselves are responsible for searching for outstanding work. They need to drive their own work. With a task-driven workflow, on the other hand, the engine pushes the work to the user by creating tasks and adding these directly to one of the user's task lists. The user knows exactly what to do because each task has a type that uniquely specifies its content.

A workflow engine makes processes more transparent. An analyst can describe the workflow and easily understand the changes without needing to review the code used to implement the solution. The process abstraction that a workflow engine delivers can be used as the foundation for discussion between the analysts and the developers.

A workflow engine makes an organization more agile. Workflow engines are more suited for change than a status-driven approach, as the latter create rigid rather than flexible workflows. Deviations in a status-driven workflow are typically handled by adding extra comments to studies, while with a workflow engine it is easy to configure a different next step.

The remainder of this document will discuss why a workflow engine is particularly suited to fulfill the three prerequisites stated above.

2. Organizing work

Each workday consists of a limited number of hours. During these hours, people can perform different tasks. Without a workflow engine, they need to organize their work themselves, making sure they perform the tasks in the right order, with the highest priorities first.

There are several reasons why this tends to be an error-prone approach:

- People are interrupted multiple times a day. A colleague may need help. The person may need the help of someone else to continue his work. A more urgent task may suddenly arise, which needs to be finished first. A meeting can be scheduled before the task is completed. The person may simply need a break. After each interruption, the person must recall what he had done for the previous task in order to continue afterwards.
- The more interruptions, the harder it is to have an overview of the work that still needs to be done.
- People determine their own, 'local' priorities, which do not correspond with the global priorities of the organization.
- People consider something as completed when it is not.
- People are not notified or are notified belatedly of the completion of a preceding step in the flow.

A task-driven workflow, in which each task is a unit of work, helps to solve these issues:

- It is easy to get an overview of any work that still needs to be done. The person can create a list with all tasks assigned to him.
- This list can be sorted according to priority. Any new task is automatically added at the right place in the list. If the user works on a task list that is sorted on priority, he is sure to follow the correct order.
- A task can be interrupted, making it easy to switch to a more urgent task first. Afterwards the user can return to the previous task, as it was at the moment of interruption.
- Only when all information is available can a task be completed, ensuring that no details are forgotten. This makes the system more organized and even allows the integration of clinical guidelines if needed.
- Users can communicate by creating tasks. If a user needs input from someone, he can create a task for that person. This second user will see the task appear on his task list.
- Balancing work is easier because there is a better method of measuring how much work the user still needs to do. Work can be assigned to another individual based on this information.
- Tasks can enforce hospital-defined workflows, and a workflow engine can be used to validate that these good practices are being followed.

3. Customization

Organizations and individuals work differently, whether due to local differences or for legal reasons, etc. This calls for a flexible and user-friendly customization mechanism.

When using a workflow engine, customization is available on various levels:

- The workflow itself is customizable, which allows the creation of different tasks in different environments or under different circumstances. For example, in some environments an extra, manual quality check is needed when sending images to the Radiology Information System (RIS). In these cases, the workflow is configured to create an extra quality check task.
- The specification of the person capable of completing a task is configurable. In some organizations, anyone may create a medical report. In other organizations, only persons from a certain department may create reports.
- The priority of a task is customizable, and can depend on its purpose. Tasks for emergency patients can be given higher priority than tasks for other patients.

All these customizations can be described with 'business rules', which are presented using a natural language. This provides a user-friendly and easy mechanism for configuring the system at runtime according to local needs. As an example, consider the case of configuring the person who may complete a task. A 'business rule' says that only radiologists are allowed to create reports. Another rule states that only a secretary is allowed to correct reports. A final rule states that after correction the creator of the report needs to give his approval. These rules can be configured in a natural language format in the configuration tool. This means sentences like "each approval task is assigned to the creator of the report" can be configured. The underlying engine will translate the sentences into a technical format and apply the rules.

On top of that, a workflow engine enables the centralization of all configurations, simplifying the setup for service engineers as they don't need to search for properties in different locations.

4. Activity monitoring

A workflow enables users to measure the efficiency of their processes. Based on the outcome, the configuration can be changed to optimize the processes and minimize operational costs. The evolution can be monitored.

Users can choose all kinds of measure points. These can be easily understood, interpreted and compiled into readable documents.

5. Conclusion

The Agfa HealthCare Enterprise Imaging platform solution, uses a workflow engine which offers several advantages compared to not using a workflow engine.

The organization of day-to-day work can be optimized. The workload can be balanced more easily between different users. Human error may be reduced, and hospital-defined flows can be validated.

Workflow engines are highly customizable, which makes any application using them more robust. Furthermore, processes can be measured and improved upon with ease and efficiency.

Agfa HealthCare, a member of the Agfa-Gevaert Group, is a leading global provider of diagnostic imaging and healthcare IT solutions. The company has nearly a century of healthcare experience and has been a pioneer on the healthcare IT market since the early 1990's. Today Agfa HealthCare designs, develops and delivers state-of-the-art systems for capturing, managing and processing diagnostic images and clinical/administrative information for hospitals and healthcare facilities, as well as contrast media solutions to enable effective medical imaging results.

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