



***Whitepaper:***

**Business process improvements by automating the  
workflow**

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## Intended Audience

This document is intended for organizations with the desire to improve a business process by automating the flow of work.

## Scope

Workflow can have several meanings with many purposes, but the common goal with automating a workflow is to formalize and improve an existing business process. This document focuses on utilizing software technology to automate a business process that involves the movement and management of transactional documents and reducing the labor cost associated within a business process workflow.

## “Workflow” Definition

The automatic routing of documents and responsibilities to users through the use of specific tasks and deadlines. Task completion automatically transfers the responsibility to the next user in the business process, until the final assignment is complete.

## Overview

The manual process of moving documents through an organization is subject to bottlenecks and processing errors, with difficulty in recognizing a problem until the nature of the issue becomes mission critical. Automating the business process electronically ensures that documents and decision making events move along at the desired pace.

## Why workflow automation?

- Improve customer service
- Reduce employee training
- Eliminate processing errors
- Maximize your labor resource
- Minimize liability

## Workflow Definitions

- **workflow** – Automation of a transactional business process.
- **workflow Case** – One transaction being run through a workflow from start to finish.
- **workflow Activity** – One manual or automated triggering event that takes place within a workflow case.
- **community** – A group of users. A community may be selected by a user, or automatically selected by the workflow engine
- **user** – A worker in an organization that will be involved with a workflow case.

Workflows are defined using the industry-standard Petri net model. This model defines workflows as a flow diagram that consists of *places*, *tokens*, *activities*, *guards*, and *arcs*.

- **places** – represent ‘stopping points’ within a workflow.
- **activities** - represent either human or automated activities that take place with a workflow.
- **guards** – tests associated with an activity that determines the branch of the workflow that is followed after the corresponding activity is completed.
- **arcs** – lines inter-connecting places and activities that depict the direction of flow within the workflow.
- **tokens** – indicate the current state within the workflow.

There are three possible types of activities used with a Petri net diagram:

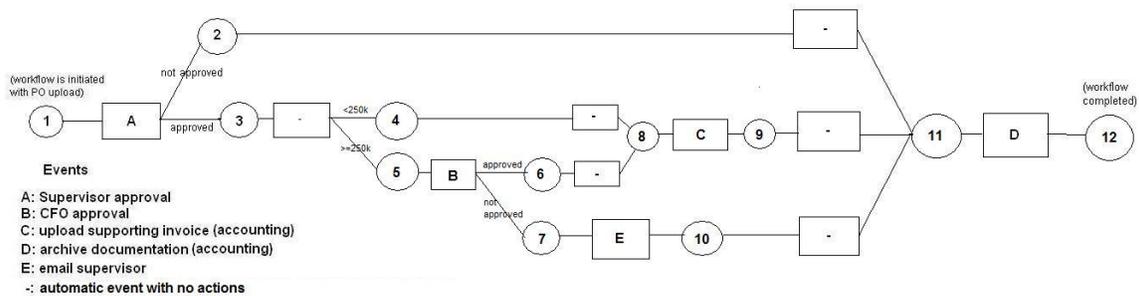
- **manual activities** – These are activities performed by a user.
- **automatic activities** – These are activities that are performed automatically within the solution. Automatic activities may be set to generate email messages, database lookups, and new workflow activities.
- **timed activities** – These are activities that automatically trigger after a specified time interval has passed. Timed activities such as email messages, escalation of an activity from one user to another, such as a supervisor or a co-worker.

A good workflow solution will follow the mathematical modeling language of a petri net (also known as a place/transition net) graphical diagram. This is a sound method for both technical and non technical people to communicate their desired business process. The petri net diagram is also a method for evaluating true workflow software solutions.

A complete description of the Petri net notation is outside the scope of this document; however the reader is referred to the following reference for more general information on Petri net diagrams:

Reference: [http://en.wikipedia.org/wiki/Petri\\_net](http://en.wikipedia.org/wiki/Petri_net)

The figure that follows is a depiction of a simple Petri net diagram for a workflow.



## How a Workflow Case is Started

A new workflow case is created according to the following criteria:

- A new document is added to the EDMS solution and the meta data field value or a combination of meta data values match the criteria for starting a new workflow case.
- A user manually chooses to start a new workflow case

## Assigning Activities to Users

A new user activity is assigned according to the following criteria:

- The value of a document's meta data field is associated with a new manual activity. The value may be text, numeric or a currency amount.
- A deadline for an activity is reached and the activity is moved to a new designated user or community of users.
- A user chooses to forward a new activity to another user from a dropdown list.
- A required document population is met, for a specific place, therefore generating a new user activity. For example, a purchase order, bill of lading and invoice must be in the system before a new activity for accounting can be created.

## Automated Activities

An automated activity is triggered according to the following criteria:

- The value of a document's meta data field is associated with the creation of a new workflow case. The new workflow case is generated along with the first activity assignment.
- A meta data value is analyzed, therefore generating a new activity. For example, a meta data value is compared to an amount field in another application, such as units ordered, amount of purchase or value of order. If the amounts do not match or if the amount exceeds the criteria, then a new activity is triggered for a specific user or community of users. For example, a purchase order amount exceeds a set limit of \$1,000.00 so the next activity generated will be for the CFO instead of a user in the purchasing department.
- A time limit is reached and so an activity is automatically escalated to a new user or community of users. For example, a loan officer must approve a loan application within 10 days or the activity will be escalated to a supervisor.
- An email is generated for a recipient. For example, the email might alert a user of a new activity assigned to them. An email might also alert a supervisor of a pending deadline expiration. An email might also be a delivery device of documents to a customer. For this example, once the workflow engine is satisfied that the purchase order, bill of lading and invoice have all arrived for a specific transaction, then the customer will automatically receive an email containing the bill of lading and the invoice.

## Document Watches

Watching for a collection of documents that belong with the same workflow case (transaction):

- A workflow activity might require that certain document types are collected prior to closing the present activity and starting a new one for someone else in the workflow case. For example, in the healthcare industry there could be a watch activity that requires 15 different document types to be present prior to closing the activity and starting a new discharge activity. In the mortgage industry, the watch activity might require 10 different loan documents to be present before closing that activity and starting a new one. The loan officer, receiving the new activity, will expect all required documents to be present.
- If the number of documents is undetermined, then a user will be required to inspect the batch of documents and close the activity manually. For example, a watch activity is looking for all invoices for the same regional office, with the same vendor and week. Only those invoices with the same region, vendor name description and the same week will qualify as being added to the activity. The accounting person reviews the activity to see if all expected invoices have arrived. Once they have all arrived, accounting closes the activity and pays the batch of invoices for the total amount.

## Warnings and Deadlines

Warnings and deadlines are set and visible to all of the users involved in a workflow case, so that the expectations for closing a business process is understood and inspected.

- Warnings are set to bring a potential late transaction to the attention of the users involved with a workflow case. The attention getter might be a highlighted activity or an email message warning for the user or supervisor.
- The deadline generally indicates that the transaction is late or expired and an action is performed. The action might be an email sent to a supervisor or the late activity might be automatically reassigned to another user or a supervisor.
- Variable warnings and deadlines allow users involved in the workflow case to change the time period based upon current working knowledge

## Conclusion

The success of your new automated workflow process may initially require several discussions between your in-house users and the solution provider equipping your organization with the technology.

Your organization will draft a write up of the business process based on the current flow of work. Next the organization will draft a write up of the business process as they desire the flow of work to be once automated. This information will be provided to the solution provider, which will in turn, develop a petri net diagram based on the written business processes provided. The organization and solution provider will review the petri net together and edit it according to the organization's needs. A final version of the petri net diagram is reviewed and final sign-off is given by the organization. The solution provider then configures the solution to reflect the business process workflow outlined in the final petri net diagram. The time invested by both the customer and the solution provider will result in a very productive and cost effective automated workflow solution, specific to the organization's needs.