

Enterprise Workflow Requirements

University of Washington

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Revisions

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EXECUTIVE SUMMARY

Project Summary

Several needs from across the UW organization were brought together to assess a possible Enterprise workflow solution. The projects with the most immediate needs are listed here:

- Need to identify solution for faculty effort certifications – eFECs project
- Need to rebuild or replace SAGE’s routing engine, so it can be expanded to route other forms required for the grant life-cycle

Moreover, process automation and workflow was identified as a major need by the UW Strategic Roadmap for Information Management and Administrative Systems.

Approach

A team of business analysts was formed to perform a needs assessment on six business processes that cross both central offices and campus units. The defined business scenarios were proposed by business partners and subject matter experts (SMEs) to represent a broad range of UW workflow needs.

The team collaborated with SMEs to document identified business scenarios and elicit workflow-related business requirements. Collaboration efforts included:

- Knowledge transfer of the business process “flow” to the business analysts
- High-level discussion of business rules for the business process to explore the degree of complexity to be supported by a workflow solution.
- Review documented process and associated business requirements

Scope of Assessment

The identified six business scenarios are curriculum review (Student Office), Faculty Effort Certification process (eFECs online certification project), budget allocation and revision, UW Hires recruitment, Advancement Fund Stewardship, and research lifecycle (SAGE workflow replacement and parallel compliance processes).

Each process was reviewed from an AS-IS perspective from which a process map was derived. The AS-IS map was modified to represent the business process if a workflow engine was implemented. Through SME interviews, process analysis, and workflow product reviews, requirements were derived.

About this Document

The following pages represent the generic business and technical requirements resulting from the individual scenario assessments. The document is organized by workflow categories starting with the most basic core workflow elements. These requirements are also aggregated into a matrix for quick review and to see distribution of requirements across the six source business scenarios. In support of this document are the specific process maps and product support documentation (requirements) for the six business scenarios.

1 WORKFLOW CORE

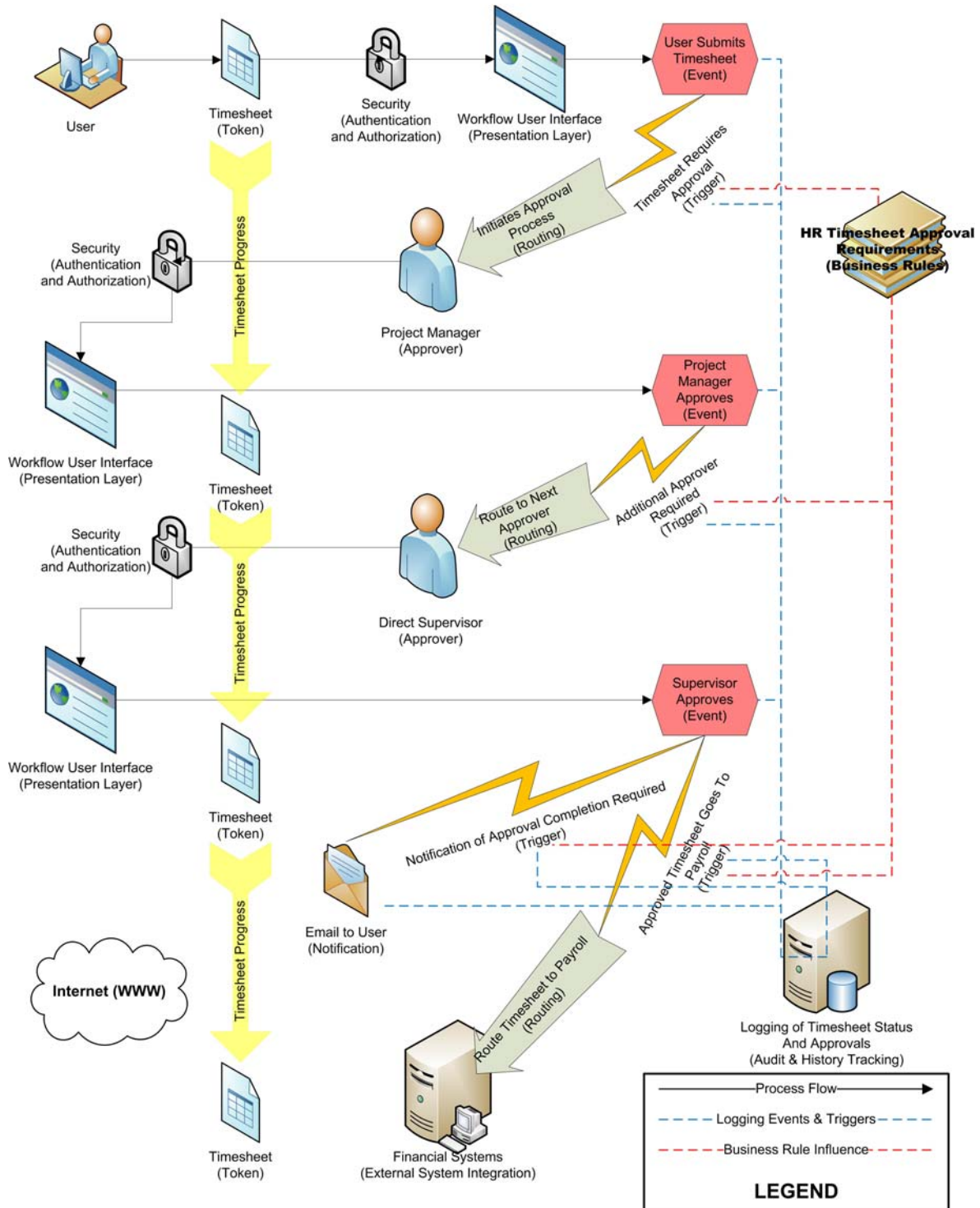
Workflow core elements are *events*, *triggers* and *routing*. One key construct to understanding workflow is the concept of a *token*; throughout this document this term will be used as the item passing through the business process (an e-form, document, etc.) within the workflow solution.

An event is the occurrence of a particular situation or condition which has significance to one or more workflows; they may initiate or terminate process, cause change status, enable routing to start/restart/complete, signal a condition for other processes or sub-process instances (Source: Workflow Management Coalition – www.wfmc.org). An event usually has a trigger, also known as the cause, which initiates a particular action to be taken or response made. Routing is the passing of a token through the process as initiated by a trigger/event. (For detailed descriptions of these terms, see the Glossary.)

Illustrated in the following diagram is a simple business process facilitated by a workflow engine. A timesheet is submitted, routed through the appropriate approvers and then passed to another system. The primary workflow core elements and further workflow terms are shown (further detailed definitions can be found in the glossary) for reference. The workflow core elements are represented as:

- Token: the timesheet being moved through the approval process
- Events: the submission of the timesheet and approval of the timesheet
- Triggers: initiation and progression of the timesheet approval process (influenced by business rules) and initiation of notification
- Routing: passing the timesheet to the appropriate approvers and into the external financial system

Sample Workflow Handling and Terms



Other various workflow terms used in this document are represented in this illustration and defined further in the glossary.

1.1.1 Assumptions

- Any workflow engine manages *tokens* through events and routing with various triggering options.
- Not all events result in triggers or routing

The Enterprise Workflow engine should be able to:

1.1.2 Manage and support event types:

- Create, Retrieve, Update or Delete a token
- Status Changes (may or may not include routing)
- Approval Activity (to include approved, declined, need more information etc.)
- Notifications
- eSignatures (associated with statements of certification, recognition of review or receipt, document management etc.)
- Legal statement of acceptance or contract - Policy issues related to e-signature and legally binding actions that may require a higher degree of authentication than normal processing. (i.e. University Advancement – Fund Stewardship)
- Batch Processes (Example: The Fiscal Year Allocations : a batch process would be used to compare files and conduct a reconciliation process on a routine basis. A batch of allocations would be extracted from a local database to create available "tokens" in a workflow tool).

1.1.3 Handle triggers:

- For each event type listed above
- Scheduled (specified date/time)
- Time based intervals (window of time from an event or from a scheduled trigger)
- Condition based (i.e. a threshold reached)
- Manually launched
- Launch another workflow and or be launched by another workflow

1.1.4 Routing options:

- Parallel paths (two types)
 - Simultaneous routing path (may include approvals) where the triggers and events are not dependent upon each other until they reach a common event
 - Simultaneous routing path (may include approvals) where the triggers or events are dependent upon each other.
- Conditional
 - Routing path to be defined by event or token attributes.
- Ad-Hoc
 - Ability to escalate or re-route, add to, modify routing process (with specific security permissions)
 - Ability to spawn localized or sub-process workflow routing within an event or trigger.
 - Support “black-box” routing where user manages trigger or event rather than allow workflow engine to route.
 - Manual routing of *token*
 - User defined to reach next workflow controlled event

2 BUSINESS RULES

Business rules describe the operations, definitions and constraints that apply to an organization in achieving its goals (Source: Wikipedia – www.wikipedia.org). For workflow, this is the logic that defines who must take action, if certain events get added/included to the process, when a notification is sent, how a status may change, if an item is eligible for approval, etc.

Any enterprise workflow implementation must support all existing business rules within existing workflow systems or processes for those systems that will replace or re-factor their workflow to use the enterprise tool selected. The current level of complexity within UW workflow solutions should be supported and many UW business units would additionally like the complexity expanded.

2.1.1 Assumptions

- Routing is implied with the implementation of business rules.
- Business rules may be part of business applications, workflow engine and notification mechanism.
- Business rules within a workflow solution may be managed through a separate business rules engine rather than within the workflow solution itself.
- Business rules should be administered and modified by an end user rather than by a developer

Workflow should support business rules with:

- 2.1.2 High level of complexity (more than 15 layers of dependent rules)
- 2.1.3 Ability to specify business rules for the *token* type, Organization Code (ORG), Role, User, metadata element, time period (or any combination of above rules) etc.
- 2.1.4 Control over views of workflow elements (based on modifiers specified above) (Example: a specific business rule may define that watcher within ORG code X can only view the approval details of a token at their access level or below.)
- 2.1.5 Allow for ad-hoc modifications to business rules with defined security access.
 - Currently existing UW workflows allow ad-hoc changes per token but do not allow those ad-hoc changes to be permanently applied as a new rule.
- 2.1.6 Ability to add business rules for a new *token* type or ORG/Role/User etc without code changes (for example: with the use of an administrative user interface).
- 2.1.7 Ability to define escalation route(s), triggers or events for a specific *token* type or attribute.
- 2.1.8 Ability to provide business rule templates and copy/clone options of existing business rules.
- 2.1.9 Support the elimination of “empty” approval nodes on the workflow process.
 - On set-up warning of a rule resulting in an empty approval event.
 - When a contact removal results in an empty node a notification for reconciliation is generated.

3 NOTIFICATIONS

Notification engines are a combination of software and hardware that provides a means of delivering a message to a set of recipients (Source: Wikipedia – www.wikipedia.org). The messages can be sent via email, RSS feed, text message, digest of several messages, tasks on a user’s calendar, phone call, IM

notice or other means. A message will include basic information to identify a workflow item and could be informational or request action be taken on the part of the recipient.

3.1.1 Assumptions

- Notifications may or may not be managed within the workflow engine, but workflow must support notifications
- A Notification engine may be separate from a workflow solution.
- Notifications may be informative or require action.
- A Notification engine must be robust and handle all different notification types as well as a high volume of messages.
- The notification engine must support notifications not only text based, but also audio/phone notices.

Workflow notifications should be able to:

- 3.1.2 Automatically notify individuals of tasks that they must perform. (Example: Approve token, review supporting information, respond to a request, etc.) via various mechanisms available through the workflow engine.
- 3.1.3 Automatically notify the creator of the *token* when task completion or outcome occurs (if specified by the user, role or business rule).
- 3.1.4 Support time-based triggered notification.
- 3.1.5 Record when system messages are sent and retain copies of sent messages.
- 3.1.6 Fetch data (any/all data sources) and include it in a notification message.
- 3.1.7 Create or include hyperlink to *token* defined destination within application or workflow engine.
- 3.1.8 Support delivery verification with a delivery receipt where needed/requested.
- 3.1.9 Security options for control of what type of messages can be sent via certain mechanisms (using reliable messaging that provides underlying infrastructure for security).
- 3.1.10 Users should be able to configure notifications preferences to support their desired delivery method, display, etc.

4 AUDIT & HISTORY TRACKING

Within workflow the audit and history tracking enables organizations to construct a meaningful picture of what has or hasn't happened to a token. Audit and history tracking also provides a greater level of accountability, so that in addition to determining what happened to a token, organizations can also determine who made what changes when.

4.1.1 Assumptions

- If required, the application supporting the token would handle tracking of the token value changes and expose that history through a presentation layer (either the application or workflow).
- If the application supporting the token could not manage the history/audit of changes the workflow tool should be able to support the tracking of workflow changes (this does not assume the tracking within the workflow tool would include application data outside of workflow).

The audit and tracking within the Enterprise Workflow tool should be able to:

- 4.1.2 When a token is passed through the workflow each status and activity change should allow for user comments.
- 4.1.3 Record the ID of the person or system who performs any activity in the system, as well as when and where the activity takes place (within what application or what portal, etc).
- 4.1.4 Display a record of all the statuses a *token* goes through, and date/time the *token* changes status.
- 4.1.5 Maintain and display a snapshot or version of the token at key routing points within the workflow. – This may be handled with other mechanisms such as “track changes” (i.e. wiki) or capture only with certain data field/type changes.
- 4.1.6 Include notification information within the audit and history trail
 - Who, when (trigger), how and a copy of message text to be included in the history.

5 PRESENTATION LAYER

An enterprise workflow solution must be transparent to its users. Users need to know the status of tokens as they move through the workflow. For example, Payroll Coordinators would want to see the statuses of timesheets belonging to the employees over which they have control.

- 5.1.1 Assumptions
 - The enterprise workflow tool may or may not include a presentation layer or portal for use.
 - Presentation layer may be native to the workflow solution or supported through integration of an existing portal or an additional portal product/solution.

The presentation layer needs of an enterprise solution must allow the following features:

- 5.1.2 Different portals for the different defined roles
 - Options to extract data to provide to a system outside of workflow to deliver the information to the public or read-only views.
- 5.1.3 End-user applications may require their own separate presentation layer within their application.
 - If the workflow tool is used across distinct applications the user should have a seamless navigation to the workflow features and functions.
 - The workflow tool should allow for the branding of an individual application instance (i.e. logo, colors, etc.)
- 5.1.4 Information about the state of each *token* in the workflow is easily accessible.
- 5.1.5 List of *tokens* and their metadata that allow for sorting and filtering.
- 5.1.6 Profile of users or roles to allow for view definitions.
- 5.1.7 Graphical representation of workflow process and progress.
- 5.1.8 Provide color-coding options for activities, status and flow as required for escalation and critical paths, etc. (Color coding should enhance data, but not be the only way of defining status; there must be support for screen readers or color blind disabilities.)
- 5.1.9 Allow for control of notification preferences through the presentation layer (rather than through the workflow configuration). (Examples: Daily Digest, RSS, etc.)
- 5.1.10 Expose audit and history trail of the token (view to be defined at the user or role or application level).

- 5.1.11 Presentation layer accessibility should be defined by workflow security settings and desired exposure (Web, desktop, embed in other system, etc)

6 SECURITY

Workflow security must support all University authentication (AuthN) and authorization (AuthZ) standards. Authentication is a process of determining whether someone or something is, in fact, who or what it is declared to be (University Example: Pubcookie). Authorization determines a user's access to information, services, etc. with defined policies within an application (University Example: ASTRA).

Security for workflow should:

- 6.1.1 Integrate with single sign-on solutions
- 6.1.2 Integrate with ASTRA roles as currently used.
- 6.1.3 Workflow roles must be mapped to security roles.
- 6.1.4 Support existing workflow roles within implemented workflow products and allow expansion to the current access (each workflow process may have its own set of roles and needs – see individual process requirements).
 - Creator
 - Stakeholder
 - Approver
 - Approver Delegate
 - Leader
 - Reviewer
 - Watcher
 - Viewer
 - Public (for external exposure if desired) – Read Only
- 6.1.5 Should have a standard set of security roles, but also allow configurable workflow roles
 - Workflow roles (as listed above) are for the purpose of interacting within the workflow engine. These should be configurable based on the needs of the specific process.
- 6.1.6 Display different views for different security roles.
- 6.1.7 Provide the ability to set an encryption or security level for a *token* type, *token* data element, extract files or attachment to meet with confidentiality requirements for each unit.

7 TECHNICAL INTEGRATION POINTS - EXTERNAL SYSTEM INTEGRATION

The University computing system is not homogeneous. Instead it contains numerous individual systems of different technologies. For a successful implementation of an enterprise workflow solution it must interoperate with systems across UW. Moreover, the systems need to interoperate on several different levels. For example, the security mechanisms of one system need to be aware of the security mechanisms of another; data being transferred from one system to another must be normalized or mapped appropriately to ensure data integrity.

The following section lists the current U.W. systems that would need to interoperate with each other, and the ways in which they would need to interoperate. This list is not intended to be an exhaustive but include some of the systems and integrations points specified by Subject Matter Experts with regards to their business process needs.

7.1 Systems (Databases, etc)

Enterprise Workflow engine may require integration with the following systems:

- 7.1.1 Enterprise Data Warehouse
- 7.1.2 Other Workflow Systems
 - SharePoint (HR, etc.)
 - Ariba (Procurement, Travel, etc.)
 - Click Commerce (Human Subjects, etc.)
 - KualI RICE (KEW) (Student, etc.)
- 7.1.3 ODS
- 7.1.4 College/Dept Shadow Systems
- 7.1.5 Standards based systems (APIs) (Business Applications examples below, not exhaustive)
 - eFECs
 - SAGE/SPAERC
 - DORA (HSD)
 - UWHires
 - Finance
 - Payroll
 - Etc.
- 7.1.6 Security
 - Authentication (AuthN)
 - Single Sign-on
 - Pubcookie
 - SHIBB (Federated Idm)
 - Authorization (AuthZ)
 - ASTRA
- 7.1.7 Rest/SOAP Web Services
 - ORG Code
 - Appointee
 - Student Information
 - Sponsor
 - Person
- 7.1.8 LDAP
- 7.1.9 University Portal
 - MyUW
- 7.1.10 Notifications Engine
- 7.1.11 The Internet

7.2 Interactions (i.e. Normalization of Data, Data Share, etc)

Workflow interactions should include:

- 7.2.1 Support the normalization of data within the various systems inside and outside of a UW business unit utilizing workflow.
 - *Token* data elements should be normalized across systems within the workflow handoff. It should contain required elements for sharing
- 7.2.2 Facilitate *token* metadata share within workflow systems
- 7.2.3 System verification of required approvals, data elements, etc. across multiple systems.
- 7.2.4 Batch & extract files (input or output of token data)
- 7.2.5 Data retrieval for display within workflow or application
- 7.2.6 Data retrieval for business rules processing of workflow, notifications, and display restrictions on the presentation layer.

7.3 Technical Constraints

- 7.3.1 The Workflow system has to allow for integration with other systems, business applications and workflows.
 - University systems and business applications implemented upon various technology frameworks should be supported.
- 7.3.2 The Workflow system must be standards based.
 - To be determined by Technical Eval and TAG groups.

GLOSSARY

audit trail

An audit trail is a record of activities performed by the workflow system from which a history may be reconstituted.

event

The occurrence of a particular situation or condition which has (or may have) significance to one or more workflows. The significance may be:

- to initiate or terminate a workflow process instance (or instances) or, more generally,
- to change its (their) state(s)
- to enable a particular activity to be started, re-started or completed
- to signal a condition to other process or sub-process instances, which is then used in subsequent processing by that (sub-) process instance or instances

(Source: Workflow Management Coalition www.wfmc.org)

notification

Notifications allow users to be kept aware of changes being made to the token data within the workflow system. Users can be notified through email, RSS feeds, daily digests, web services, and so on. **Note:** The presentation layer can be separate from the workflow engine.

presentation layer

The presentation layer includes the presentation of data through a single application or by means of a “mash-up” of data from numerous sources. **Note:** The presentation layer can be separate from the workflow engine.

routing

Routing, in the context of a workflow, represents the sequence flow. It describes how a requisition traverses from the start to the end.

system

The term “System” in the context of this document includes UW databases, UW business applications, UW security applications and the World Wide Web (WWW).

token

A Token is a descriptive construct used to describe how the flow of a process will proceed at runtime. By tracking how the token traverses the process, gets diverted through alternative paths, and gets split into parallel paths, the normal Sequence flow should be completely definable.ⁱ

trigger

The recognition of some predefined set of circumstances associated with the operation of the system which causes a particular action to be taken or response made.

(Source: Workflow Management Coalition www.wfmc.org)

ⁱ Business Process Modeling Notation, v1.1

DRAFT