Routing Electronic Documents with OneStart Workflow – A White Paper

The workflow for business, academic, and student activities at Indiana University is increasingly being facilitated with "electronic documents," transactions that are authored and processed in Web-based enterprise systems. Just as these electronic documents (hereafter called "eDocs") make gathering the relevant information both easier and more accurate, they can now be routed through a workflow process in the University community more quickly and accurately than paper forms. OneStart Workflow is the University's enterprise system to perform this routing. And it works in concert with the University's OneStart enterprise portal to make the documents available to the appropriate people.

What is OneStart Workflow?

OneStart Workflow is a general-purpose electronic routing infrastructure, or "workflow" engine, for the University community. Applications can use Workflow to automate and regulate the approval process for the transactions/documents they create.

OneStart Workflow is based on the functionality pioneered in the University's FIS (Financial Information System). It starts with an eDoc that users compose in a Web-based "client" application. Workflow then "routes" the eDoc electronically to the attention of designated individuals, based on University or departmental policies. Routing is typically done for approval, so the route followed by an eDoc is functionally similar to that of a paper document, with some significant differences. For example, Workflow can separate approval from FYI or review and enable the eDoc to proceed on its approval path independent of the FYI. And with Workflow, users can access all types of eDocs routed to them from a single point - their Action List channel in the OneStart portal.

How does it work?

OneStart users can view the eDocs routed to them in their Action List portal channel. They can organize the eDocs as they wish, view their contents, and monitor their routing progress.

Suppose Bob needs to transfer an employee to another University position. Rather than route a paper Personnel Action Form, now he fills out the online eDoc form for Transfer Employee (HRE-TR) from one of his OneStart portal pages. When he finishes the form, Bob clicks the Submit button and he's done.

That's when OneStart Workflow takes over. It bases the routing on rules given it by the functional units responsible for the process. Workflow checks the eDoc,

determines the routing path from the type of eDoc it is and the information in it, and routes it on to Jane, the next person to review it in this case. Note that Bob did not need to know that Jane was the next person in the approval chain, unlike processes based on email.

Jane looks at her Action List channel in OneStart now, and sees that some eDocs have been routed to her. She opens up her Action List to see something like the following:

Action List `preferences` `filter`

151-160 of 239 Documents |◀ ◀ 131-140 | 141-150 | **151-160** | 161-170 | 171-180 ▶ ▶|

Routing ID	Document Type	Title	Route Status	Action Requested	Initiator	Date Created	Workgroup Request	Route Log
4263	Add/Modify EDEN Document Type Group	Add DocTypeGroup x	EXCEPTION	COMPLETE	pmckown	09/11/2003		🔍
4287	Add/Modify EDEN DocumentType	Add DocumentType HRE-HR	EXCEPTION	COMPLETE	abyrne	09/11/2003	✓	🔍
4290	Add/Modify EDEN DocumentType	Edit DocumentType SSRDocumentGroup.SSRInternalComponent	EXCEPTION	COMPLETE	temay	09/12/2003	✓	🔍
4313	Add/modify EDEN workgroup	Add Workgroup fakeyworkgroup	PROCESSED	ACKNOWLEDGE	rkirkend	09/15/2003		🔍
4314	Add/modify EDEN workgroup	Add Workgroup fakeyworkgroup1	PROCESSED	ACKNOWLEDGE	rkirkend	09/15/2003		🔍
4318	Add/modify EDEN workgroup	Edit Workgroup fakeyworkgroup1	PROCESSED	ACKNOWLEDGE	seiffert	09/15/2003		🔍
4322	Add/modify EDEN workgroup	Add Workgroup test TAM workgroup 5	EXCEPTION	COMPLETE	temay	09/15/2003	✓	🔍
4343	Add/modify EDEN workgroup	Add Workgroup Route Type Blanket Approve Workgroup	FINAL	ACKNOWLEDGE	rkirkend	09/17/2003		🔍
4344	Add/Modify EDEN RouteType	Add RouteType test	ENROUTE	ACKNOWLEDGE	rkirkend	09/17/2003		🔍
4347	Add/Modify EDEN DocumentType	Add DocumentType AddHRRv	EXCEPTION	COMPLETE	seiffert	09/18/2003	✓	🔍

151-160 of 239 Documents |◀ ◀ 131-140 | 141-150 | **151-160** | 161-170 | 171-180 ▶ ▶|

There is a link to this Action List at the top of all OneStart pages. Her List shows her all of the eDocs on which she is currently requested to act. Each line represents one eDoc, and each column indicates one of its properties. And she can sort the List by clicking on any of the column labels. After she responds to a request, the eDoc disappears from her Action List automatically.

Jane can see immediately who has initiated the eDocs that have been routed to her and the action requested on each. She can also see their unique routing ID, their document type, title, and creation date. If an eDoc was sent to her because of her membership in a Workgroup, the Workgroup Request is checked. And she can see the current route status for each eDoc both in text and by background color.

If she wants to email Bob about his eDoc, she can click on his user ID. Or if she wants to know the routing history of the eDoc, she can click on its Route Log icon 🔍 and view the Route Log report.

When Jane is ready to act on the request, she clicks the Routing Id number in the left-most column and views the eDoc contents, along with buttons to Approve or Disapprove it. After she approves it, she's done.

Then Workflow routes the eDoc to the next person. When all of the routing is done, Workflow notifies the client application that suports this type of eDoc, which in turn can do whatever it needs to, e.g., commit the information to a database table, and/or send an FYI eDoc to Bob.

If any of the reviewers disapproves his eDoc, an Acknowledge eDoc to that effect goes to Bob and any prior approvers, and routing for the eDoc stops.

Users find all of their eDocs in their Action List, regardless of their type or whether the request is to approve, complete, acknowledge, or FYI. Their Action List is the single access point to all eDocs routed to them.

What are the benefits?

Before OneStart Workflow, business transactions other than in the FIS have often been managed informally, with emails that are unarchived and easily missed. Even with electronic versions, different types of eDocs have required different types of responses. For example, a staff member may need to access the FIS system to view a Purchasing eDoc, then the HR system to approve an Employee Action eDoc, and a completely different system to approve PTO.

Workflow brings all of the benefits of online eDoc routing to any University application, whether it is an enterprise system or one developed locally:

- **Easy routing** – infrastructure is already in place
- **Quick routing** – routing to the next person is virtually immediate
- **Accurate routing** – follows University or departmental policies assigned to each type of transaction
- **One access point** – Action List gives quick and organized access to currently routed eDocs
- **Eliminates "paper trail"** – no need to move paper documents along each step of approval
- **Easy approval** – all eDocs may be viewed and approved from one screen
- **Workgroup approvals** – approval options are available for several people acting as a workgroup
- **Stored and audited** – eDocs and their routing activity are stored in the database, according to various retention guidelines defined by the functionally responsible unit
- **Document Search** – another OneStart channel that finds past or current eDocs according to user criteria – by initiator, document type, action requested, date created, etc.

In other words, OneStart Workflow is a shared, standardized service to route University or departmental eDocs, part of a "higher level of enterprise application integration."

What can it do?

OneStart Workflow routes eDocs to users for a variety of purposes – to approve them, to complete them, to acknowledge them, or just an FYI. After each of these activities, the eDoc is removed from one Action List and routed on to others as appropriate. As noted above, the eDoc can always be retrieved in the Document Search channel for review at a later date.

The best part: Workflow routing automatically follows the business rules of the University or department. It finds whatever information in the eDoc is relevant to establish the route. The rules might follow the organizational review hierarchy of the University or one of its departments, for example, or its fiscal approver assignments. And another benefit: Workflow recognizes the responsibility, rather than the individual person, in determining the route; changes in individual roles are followed automatically.

The process starts when a client application creates an eDoc online. When the application calls for routing the eDoc, Workflow adds the appropriate entries in the recipients' Action Lists.

Handling User Requests

What are users asked to do with eDocs routed to them?

- If the user is requested to **approve**, then the user can approve or disapprove the eDoc. Approval routes the eDoc to the next recipient(s); disapproval stops further routing.

- If the user is requested to **complete**, the user adds information to the eDoc and Workflow then routes it, with approval implied.

- Users **acknowledge** an eDoc in their Action List simply by viewing it. Acknowledgements are included in the audit record.

- Users **FYI** an eDoc in their Action List also by simply viewing it. FYIs are not included in the audit record.

Using Standard Route Types

What if we want an eDoc to route according to some standard routing scheme?

Of course Workflow is responsibile for establishing the route path for each eDoc that it is requested to handle. That path is built from a set of standardized *Route Types* registered with OneStart Workflow:

- Base Review Hierarchy Routing – route sequentially up the Org Review Hierarchy

- HRMS Review Hierarchy Routing – route sequentially up the HRMS Review Hierarchy

- Fiscal / UPAA Routing – route according to the assignments for Fiscal Approver / UPAA (<u>U</u>nit <u>P</u>ersonnel <u>A</u>ction <u>A</u>gent)

- Ad Hoc Routing – route to specific individual(s); may be invoked "ad hoc" by any recipient

- Application-Specific Routing – route according to policy specified by client application

Workflow will add other standard Route Types as requested.

Building a Path

What if we want an eDoc to use several of these Route Types?

That's a fairly common situation. So OneStart Workflow builds a sequence of Route Types that it performs, one after another. Each Route Type in the sequence is fully satisfied before Workflow proceeds to the next. Routing continues through the entire sequence, after which the eDoc has Final Approval.

But which sequence of Route Types does an eDoc follow? The answer is: the sequence established for the business transaction that the eDoc represents. EDocs that perform the same business function are all of the same *Document Type*, another designation registered with OneStart Workflow. That means eDocs of the same Document Type should all have the same sequence of Route Types. In fact, part of the definition of a Document Type is its Route Type sequence.

So client applications create eDocs of their Document Types, and each Document Type determines the Route Type it will follow. The bottom line: all eDocs of a certain Document Type have the same sequence of standard Route Types to start.

Client applications may also concoct their own dedicated routing, based on whatever content and rules they please. This is called Application-Specific Routing.

Furthermore, in the course of routing an eDoc, recipients may Ad Hoc route it to others not already in the path, as they please.

To summarize, an eDoc has a Document Type assigned by its client application. When routing begins, OneStart Workflow assigns it the sequence of Routes Types for its Document Type.

If it sounds complicated, then consider that Workflow brings a lot of flexibility to routing eDocs. Once an eDoc is handed over to Workflow, its basic routing is determined by its Document Type and its contents. Beyond that, the application or even the recipients can add routing as desired.

Channels to create and maintain Document Types and Route Types are available in the OneStart portal.

Routing to Workgroups

What if we want to route an eDoc to a group of people?

While Workflow can route eDocs to individuals in roles, we may also want to route eDocs to several people at once, to act on them as a workgroup. Workflow handles this situation with *Workgroups*. They are collections of individuals with a common organization or function that Workflow recognizes for routing purposes.

We further qualify Workgroups to Workflow by giving them a name and selecting an approval policy:

- **First Approve** – eDocs are approved by the first approval of any member of the Workgroup

- **All Approve** – eDocs are approved by all members of the Workgroup

Delegating Authority

What if we want to delegate approval for eDocs to someone else?

We may need to delegate the authority to approve (or disapprove) eDocs to another person or Workgroup. OneStart Workflow supports two delegation schemes:

- **Primary Delegation** – eDoc is routed directly to delegate, bypassing the delegator

- **Secondary Delegation** – eDoc is routed to the delegator and also to the delegate, in a separate Delegate Action List channel. This form is specified for a range of dates to delegate during an absence.

How can we use it?

Client application teams can use OneStart Workflow to handle their eDoc routing by assembling a few basic components. Each assumes some facility with component-based design and development in J2EE.

- Use Cases – developers can benefit greatly from preparing Use Cases to capture the interaction of their users with the eDoc information

- XML Representation – the eDoc contents are expressed to Workflow in XML, with all tags necessary to satisfy routing

- User Authorization – the client application handles authorization to compose or view the eDoc

- Doc Handler – displays the eDoc contents in the desired format

- Standardized Java Interfaces – the client application implements a small set of standard Java methods to access Workflow services, e.g., create, save or route an eDoc, etc.

- Postprocessor – performs any specific processing for the eDoc during or after routing, including committing to the database. A standard Postprocessor template is provided as a starting point.

- Route Modules (optional) – any specialized Route Modules required for routing the Document Type. Route Modules automate any business rules relevant to the eDoc. A standard Route Module template is provided as a starting point.

The UITS SIT (Systems Integration Team) is available and eager to work with development teams that wish to incorporate all of the advantages of OneStart Workflow into their applications.

What's coming?

The current release of OneStart Workflow provides the user and application services required to route eDocs in the variety of routing schemes discussed. For example, the HRMS EDocs are using Workflow to route over two dozen types of HR eDocs.

Additional services are planned, based on current requests:

- Web Services – Workflow services available to non-J2EE client applications

- FlexRM – Flexible Route Management, general-purpose routing based on rules rather than database tables

- Fiscal Officer routing

- Archive routing

- Automatic routing among business applications (B2B)

SIT encourages development teams to investigate new features and future opportunities with Workflow.

More information...

Check out these related links for more information about the teams and tools in back of OneStart Workflow:

 SIT – the UITS Systems Integration Team that develops and supports OneStart and OneStart Workflow

OneStart – Indiana University's enterprise portal of online services

HRMS EDocs – HRMS Electronic Documents

J2EE – Sun Microsystem's Java 2 Enterprise Edition standard development platform

UITS J2EE Development Standards – Development standards for UITS J2EE applications

XML – eXtensible Markup Language, the W3C open standard for information exchange

Best of all, contact SIT with any questions or requests: sit@indiana.edu.

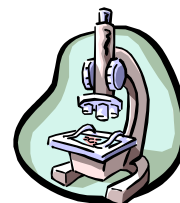Phil McKown
UITS Systems Integration Team

Addendum: Technical Overview

OneStart Workflow brings enterprise-level routing services to the University. It is composed of flexible, scalable components, created in the Java 2 Enterprise Edition (J2EE) open platform. It is developed and supported by the UITS Systems Integration Team.

Workflow deals with eDocs that are created by client applications. The information in the eDocs must be expressed in valid XML, an open standard for information exchange. Workflow identifies the elements in the XML representation that are relevant to routing a given Document Type, e.g., Chart and Org codes.

Under the covers, Workflow provides a single module for client applications to access: the *Workflow Engine*. Applications make all requests for workflow services through the Engine.

Beyond that, Workflow runs a set of internal modules, as shown below.
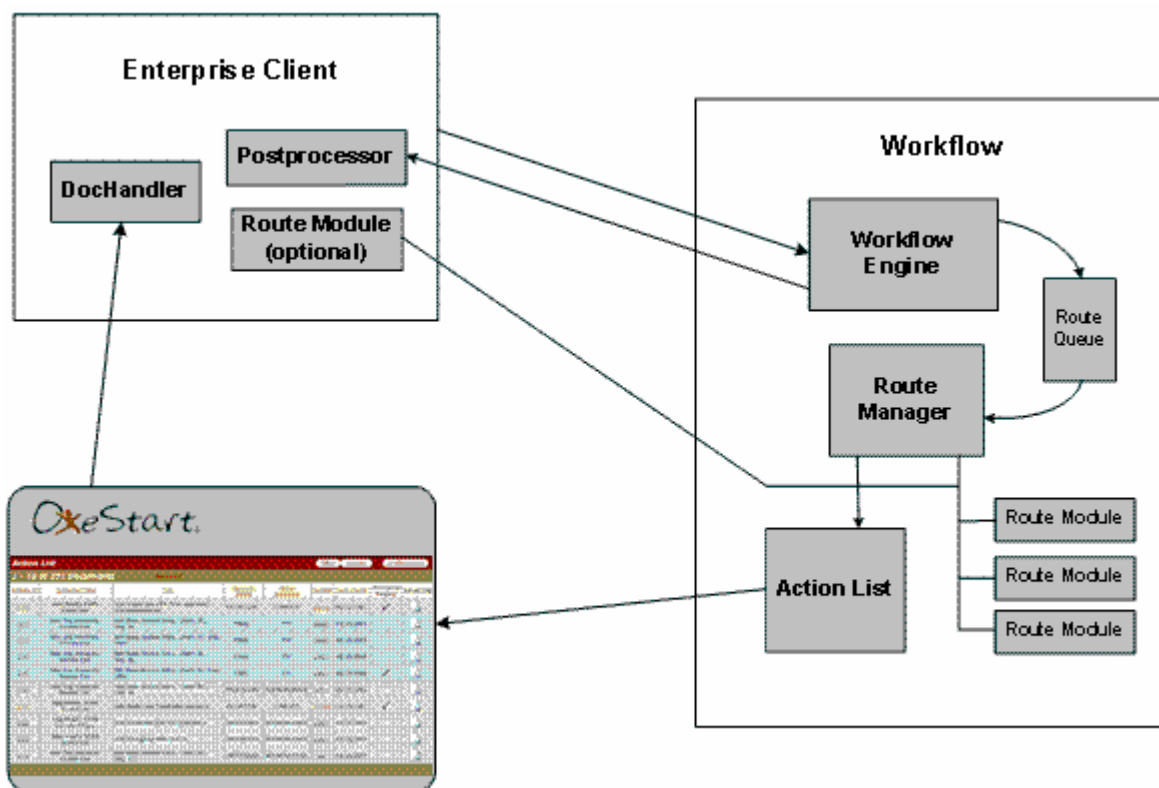
Its *Route Manager* takes service requests from a queue and runs the *Route Modules* for the particular Route Types needed. These Route Modules are "pluggable", i.e., they are independent components that conduct their particular business logic when called.

Application teams may elect to write their own Route Modules, with rules specific to their client applications. These modules may be used together with the standard Route Modules that Workflow provides. They are completely optional.

OneStart Workflow also has an *Action List* module that provides eDoc entries for the current screen to its Action List counterpart in OneStart.