



White Paper

**An Advanced Approach to
Task Reminders and Escalations**

A Workflow Design Pattern

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Overview

Adobe LiveCycle provides a mechanism for sending of notifications and reminders to task assignees, as well as managing escalations and deadlines. All this functionality is built into the User QPAC. However, sometimes the level of sophistication required by particular processes exceeds the control available in the User QPAC, and so a more flexible and sophisticated approach is required.

For example, the standard User QPAC allows you to specify a reminder email that is sent a certain period after the task has been assigned. However, the duration, subject, body and recipients of this email are fixed.

A more sophisticated particular process may require:

- a first reminder email to be sent after 5 business days to the assignee;
- the second reminder email is sent 3 business days later – it is more strongly worded, and the assignee's supervisor is cc-ed
- two days later, a third (and final) reminder is sent, even more strongly worded, and this time is sent to the assignee, cc-ing both the supervisor and the regional manager.
- In addition, all outgoing emails must contain specific data in the body and subject identifying the particular task that must be completed. For example, the email must contain the customer's name in the subject line, and the customer's name, address and contact details in the body.

This is not possible with the standard User QPAC.

This paper describes an approach that achieves this level of sophistication using a series of QPACs designed and developed by Avoka Technologies.

These QPACs are currently in beta test (as of 12 October 2006) – if you would like to try them out, please send an email to info@avoka.com.

In a nutshell

The fundamental idea of this approach is to use the Workflow engine itself to coordinate the reminders and escalations, rather than relying on hard-coded logic within the User QPAC itself. This means that the full flexibility of the Workflow Engine can be used.

The UserPlus QPAC does not have any tabs relating to reminders, escalations and deadlines. Instead, the UserPlus QPAC specifies another process which is used to manage the reminders. This reminder sub-process is started as soon as the task is assigned, and continues to run until the task is complete. (The completion event will terminate the reminder process.)

A separate reminder sub-process is started every time a UserPlus step is reached, so the reminders and escalations for each step are separately managed. A benefit of this approach is that each sub-process is listed in the admin-ui under the main process – this effectively means that an audit trail of all notifications sent can be viewed at any time.

The UserPlus QPAC passes the task-id of the allocated task to the sub-process, along with any other user-defined parameters. The task-id can be used by a number of other QPACs, including TaskUpdate, TaskEscalate, TaskSendReminder, and TaskDeadline to manipulate the task. Other QPACs, such as Wait, BusinessDays(*), Email, LDAP, UserLookup(*) and GroupLookup (*) can be used for further fine control of the reminder process.

(*) – Also available from Avoka.

The Escalation Process Tab

As shown in the figure below, the UserPlus QPAC specifies a sub-process to manage the escalation process. The QPACs in the sub-process require the task-id, so this is defined as one of the input variables in the sub-process, and passed to it. Other input parameters may be defined as required.

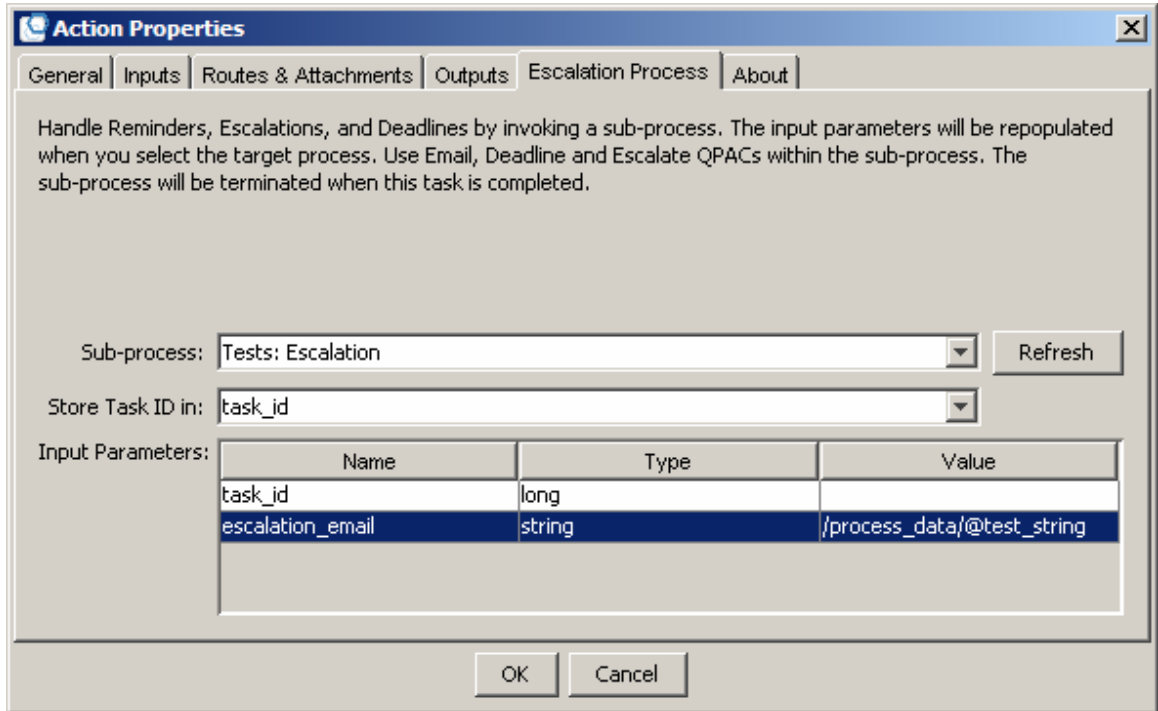


Fig 1: UserPlus Escalation process tab (Main process)

Note that there is no reminder, escalation or deadline tabs – these are handled in the escalation sub-process, if and when necessary.

Escalation Sub-process

A typical escalation process is shown below.

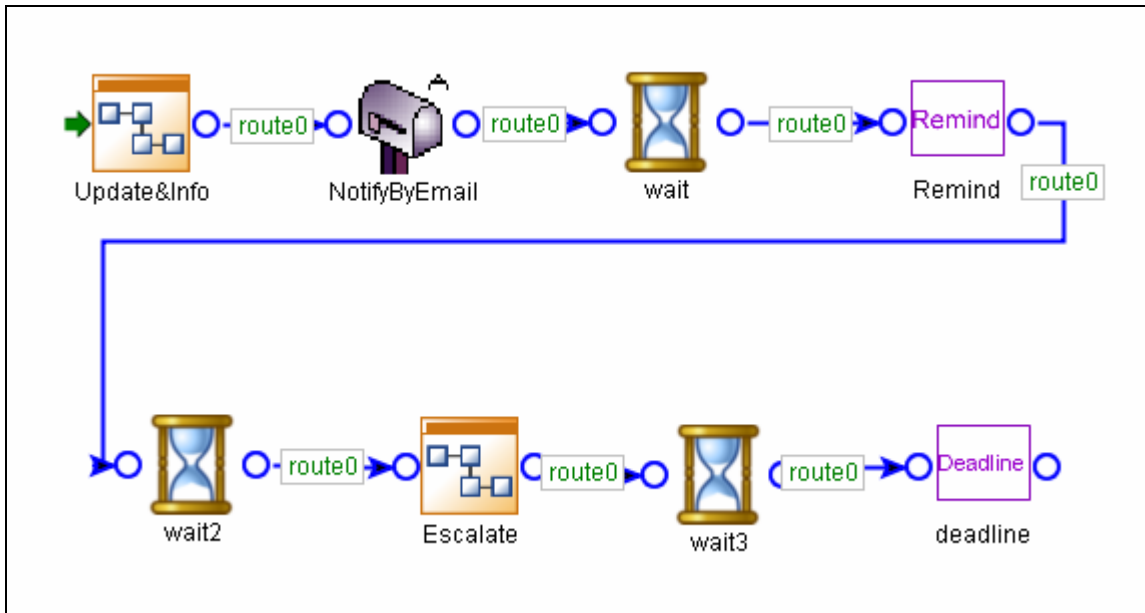


Fig 2: Escalation Process

The escalation process is invoked each time the UserPlus QPAC assigns a task. The escalation process will be terminated when the task is completed – so no further escalations or reminders will be sent. (Termination is automatic – as soon as the user completes the step, the sub-process will be terminated.)

A side-benefit of using the sub-process approach is that a full audit-trail is kept for all reminders and escalations sent, which can be viewed via the admin-ui.

The various steps are described below:

Update&Info	<p>Using the task-id passed in from the UserPlus QPAC, the TaskUpdate QPAC allows us to modify various fields displayed in Form Manager, including Form Name, Description, Help Text, and Instructions. It is also possible to make the task visible or invisible, or increment the reminder count. (This does not actually send the reminder, but allows the reminder count to be incremented to match explicitly sent reminders. A task with a non-zero reminder count will be displayed in a different color in Task Manager. Several of these fields are not normally editable via the User QPAC.</p> <p>In addition, the TaskUpdate QPAC allows you to query the currently assigned user (or group). This may be different to that originally assigned, because it may have been reassigned within Form Manager by end users or an administrator. The “Assigned to Group” output is a Boolean – if true, this indicates that the Assigned User ID is in fact a Group ID.</p>
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Action Properties

General | **Inputs** | Outputs | About

It is often useful to be able to modify the attributes of a particular task and its associated form. Any field that is left blank will not be modified. Incrementing the reminder count will show the form in a different color in Form Manager

Task ID: ...

Form Name: ...

Description: ...

Help: ...

Instructions: ...

Increment Reminder Count:

Visibility: ...

OK Cancel

Fig 3: TaskUpdate Input Tab

Action Properties

General | Inputs | **Outputs** | About

Assigned User ID: ...

Assigned User Email: ...

Assigned User Login: ...

Assigned to Group: ...

Fig 4: TaskUpdate Output Tab

NotifyByEmail	The EmailWithAttachments QPAC is used to send a notification message to the assignee. This allows a specific subject line, body, and cc-list to be selected.
Wait	A delay. The Avoka BusinessCalendar QPACs can also be used to observe weekends and holidays.
GroupLookup	The GroupLookup QPAC (not shown here) can be used in the case of assignment to a group, to convert the assigned-id (which will be a group id) into a list of members' emails. This way, the email can be sent to all members of the assigned group.
Remind	The TaskSendReminder QPAC can be used to send a system generated reminder. This reminder will have the exact same functionality as a system-generated reminder sent by the regular User QPAC. The task in Form Manager will change color as usual. The Instructions field in Form Manager can be updated at this time.

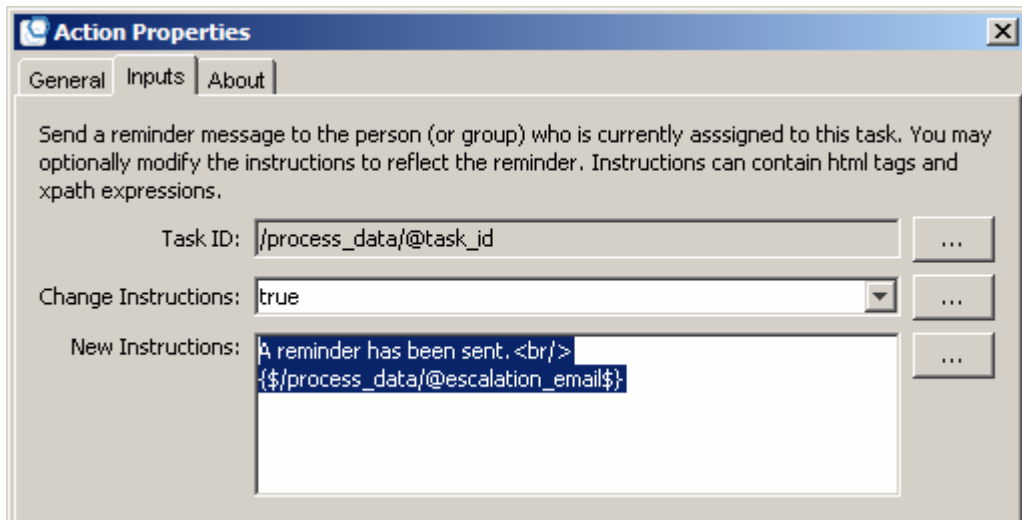


Fig 5: TaskSendReminder QPAC

Escalate	The TaskEscalate QPAC will escalate the task. In Workflow, escalation means that the task will be reassigned to a different user or group. The usual emails will be sent out, based on user preferences, when this occurs.
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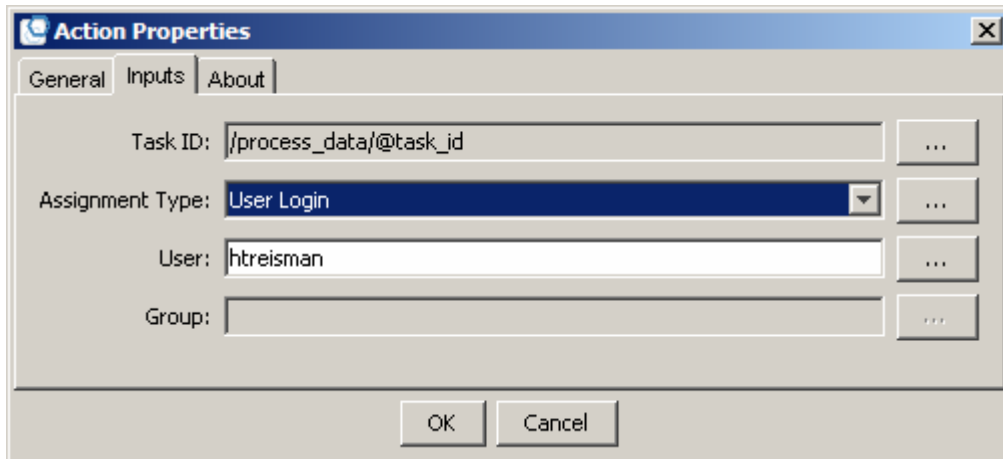


Fig 6: TaskEscalate QPAC

Deadline	<p>The TaskDeadline QPAC will deadline the task. In Workflow, dead-lining means that the task will complete, without waiting for the user to complete the task. The workflow will then continue to run the step(s) following the User step. The usual emails will be sent out, based on user preferences, when this occurs.</p> <p>In this QPAC, you can change the task's instructions to indicate that the deadline has occurred. You can also specify either a specific route to follow, or for Workflow to follow the first route that evaluates to true.</p> <p>Note: The route-name (if specified) must be the exact name of a route in the parent process.</p>
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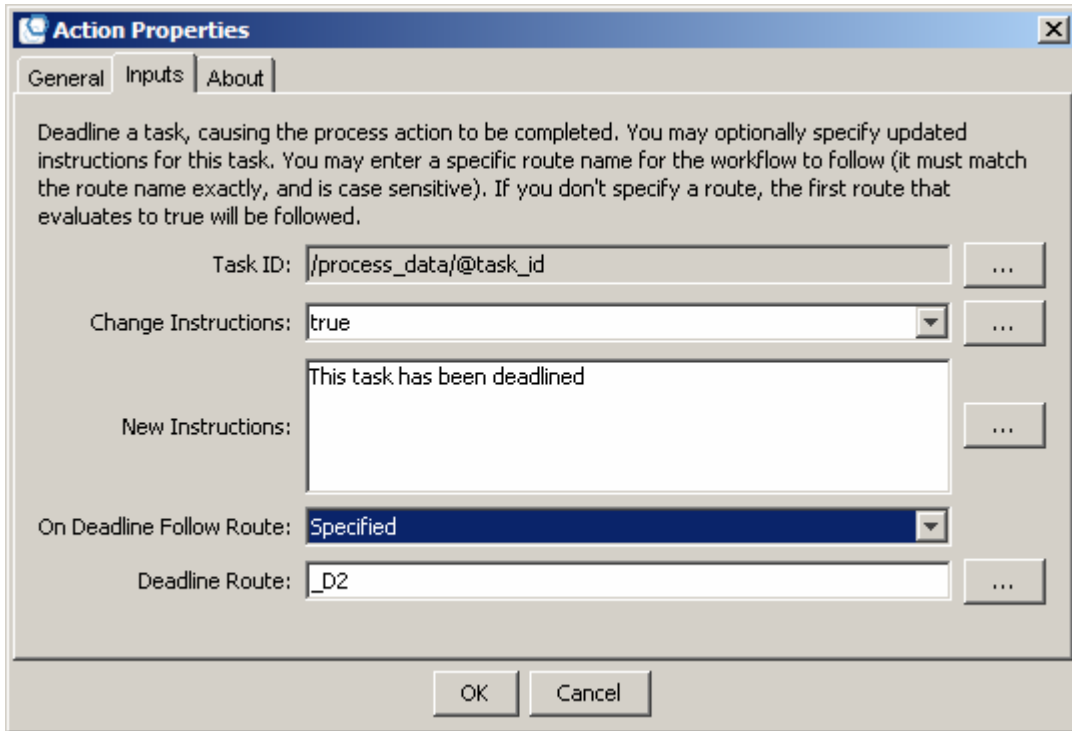


Fig 7: TaskDeadline QPAC

Other features

A number of additional features have been added to the UserPlus and associated QPACs.

- Flexible Assignment options. Assign by:
 - User Login: The login id that the user uses to log in
 - User Email: The user's email address
 - User ID: the internal GUID (globally unique ID) used to identify users in LiveCycle
 - Creator: The process initiator
 - Group Name: The name of a group
 - Random User in Group: Given a group name, randomly assign to a specific user in that group.
 - Any of the above can be hard-coded, or specified as an xpath expression.

- Test Mode
 - When testing a newly designed workflow, it is often tedious to have to log out of Form Manager as one user, and log in as a different user, in order to verify that the form is assigned to the correct person at each step. By creating a "test mode" process-variable, you can put the UserPlus QPAC in "Test Mode". In this mode, the form will always be assigned to the process initiator, but the Instructions will be updated to indicate who the "real" assignee would have been.

- "Invisible" routes.
 - Normally, any route coming out of a User QPAC will be populated into the standard form dropdown field in a workflow form. Sometimes it is useful to have "internal" routes that don't appear in this dropdown list, which are used on for task Deadlines. Any route coming out of a UserPlus QPAC that is prefixed by an underscore "_" will not be populated into the form (and therefore the end-user will not be able to select this route), but is available to the TaskDeadline QPAC as a deadline route.

Further Enhancements

This approach allows further features and enhancements to be developed. Avoka welcomes feedback from customers regarding the usefulness of some of these enhancements:

- More sophisticated task assignment options. Rather than simply assigning to a random user in a group, more sophisticated load-balancing algorithms can be designed. These include:
 - Allocate to the user in the group with the least number of tasks in their queue
 - Allocate to the user in the group who most recently completed a task of this type.
 - Allocate based on a SQL query.
 - Allocate based on a sub-workflow that returns a user as an output parameter.
 - Allocate by matching a process-oriented “difficulty” factor against a “skill” rating for users in a group.
 - Allocate based on a call to a rules-engine.
- Support for Workflow 7.2 features, such as lists of documents used as attachments.
- Support for adding attachments from the file system.
- Support for automatically determining a user’s manager by navigating LDAP relationships.

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About the Author



Howard Treisman is the Technical Director of Avoka Technologies, an Adobe Enterprise Partner based in Sydney Australia.

Howard has been working with the Adobe LiveCycle Workflow product (and its predecessor) for four years, and the LiveCycle suite for the last two years. He has been instrumental in delivering several enterprise-class LiveCycle applications to customers in Australia and internationally.

In addition, Howard spear-headed Avoka's development of over 50 QPACs (re-usable workflow components), many of which have been developed in direct response to customer needs, as well as the Workflow QPAC development environment for Adobe.

Howard's hands-on experience has provided a thorough understanding of the intricacies of the LiveCycle technologies, and how to apply these technologies to solve real-world problems.