

**Bonus Issue**

**1**

UNDERSTANDING SHAREPOINT JOURNAL

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Bjørn Furuknap

# Secondary Workflows in SharePoint Designer

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UNDERSTANDING SHAREPOINT JOURNAL

# **Secondary Workflows in SharePoint Designer**

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*This book is dedicated to my wife.*

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Rubina Ranasgt. 10  
N-0190 Oslo, Norway  
Phone +47 91 39 85 86 • Web <http://www.understandingsharepoint.com/>

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# Credits

## About the Author



Bjørn Christoffer Thorsmæhlum Furuknap is a senior solutions architect, published author of *Building the SharePoint User Experience*, speaker, and passionate SharePointaholic. He has been doing software development professionally for 16 years for small companies as well as multinational corporations. He has also been a teacher at a college-level school, teaching programming and development to aspiring students, a job that inspired him to begin teaching what he has learned and learns every day.

## About Understanding SharePoint Journal

*Understanding SharePoint Journal* is a periodical published by UnderstandingSharePoint.com. The journal covers few topics in each issue, focusing to teach a deeper understanding of each topic while showing how to use SharePoint in real-life scenarios.

You can read more about *USP Journal*, as well as get other issues and sign up for regular updates, discounts, and previews of upcoming issues, at <http://www.understandingsharepoint.com/journal>.

## Other Credits

A great big thanks to Kim Wimpsett for doing the copyedit. The quality of work in this issue is greatly attributed to her skill.

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# Introduction

*Asking the right question, at the right time, to the right people, can trigger a landslide.*

Welcome to the first bonus issue of *Understanding SharePoint Journal*, covering secondary workflows in SharePoint Designer.

Now, you may wonder why I didn't just include the chapter in this bonus issue in the main issue. The reason is very simple.

This issue explains the details behind a webcast that I made on Friday, May 22, 2009, for EndUserSharePoint.com. Now, since the release of issue 4 was just three days later, the main issue was already completed and produced. Doing a second round of copyedit, layout, and proofreading would have delayed the main issue by at least a week.

Here it is, however, and I do hope you enjoy the bonus issue, and I certainly hope you have enjoyed the main issue, if you have read that.

If you have feedback, questions, comments, or topic ideas, feel free to email me at [journal@understandingsharepoint.com](mailto:journal@understandingsharepoint.com).

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# Secondary Workflows in SharePoint Designer

*They said it couldn't be done—but we did anyway.*

Since the introduction of SharePoint Designer in 2007, people have written volumes on the limitations of the software and why one should rather use Visual Studio workflows or another workflow product.

Now, I can certainly understand some of the complaints about SharePoint Designer, because your options are indeed more limited than a dedicated workflow-authoring environment.

However, some of the issues people cite as difficult or even impossible require but mere creativity and the right knowledge. Two important tools for solving these impossible tasks are primary and secondary workflows.

Throughout this issue, I will explain, step-by-step, how to create a primary workflow and a secondary workflow.

## Primary and Secondary Workflows?

Yeah, that's what they are called, and the idea is far more powerful than you may think.

The idea behind the primary and secondary workflow concept is to have one workflow trigger another workflow in some manner. To accomplish this, you would have a secondary workflow start automatically when an item in the list is either added or changed.

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I C O N   K E Y	
	Valuable information
	Test your knowledge
	Exercise
	Caution

### Note

The term secondary does not necessarily mean different. As you learned in the main issue, the retriggering can affect the same list. This creates an iterating workflow, enabling you to cycle through all the items in a list.

To trigger this secondary workflow, you have several options. The easiest option is to have the primary workflow update or add an item in the secondary workflow list. Another option is to have the primary workflow send an email to an email-enabled secondary list. Figure 1 illustrates the concept of primary and secondary workflows.



FIGURE 1. PRIMARY/SECONDARY WORKFLOW

The technique I will teach you in this journal takes this idea one step further. Rather than simply having the primary workflow trigger the secondary workflow, we will have the secondary workflow retrigger the primary workflow in a two-way interaction, as shown in Figure 2.

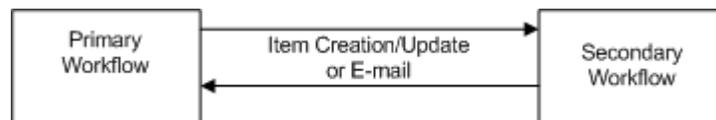


FIGURE 2. TWO-WAY INTERACTION

This technique in its simplicity is incredibly powerful. Here are a few task-related applications that can be developed using this technique, otherwise known as either “impossible” or “extremely difficult” in SharePoint Designer:

- Delegation or automatic approval of tasks after a time period
- Periodic reminders of task deadlines
- Dynamic number of approvers for a task
- Multiple individuals assigned to the same task simultaneously
- Email-based interaction with workflow tasks

Did I pique your interest? If so, feel free to read on.

**SharePoint  
Designer Workflow  
Webcast**

<http://www.endusersharepoint.com/?p=1680>

## Task Overview

OK, so the task here is to get familiarized with the concept of primary and secondary workflows. To accomplish this, we will create a primary and secondary workflow combination based on part 5 of the webcast series SharePoint Designer workflow introduction on EndUserSharePoint.com.

Our workflow setup will monitor an item for change every  $x$  minutes. We will do this by having a primary workflow check for the change, and if that change has not occurred, we will notify a secondary workflow. The secondary workflow will then pause for a few minutes before triggering the primary workflow again.

I will assume that you have read the main issue so that I can skip quickly over the basics and just explain what to do.

### What You Will Need

The requirements for these exercises are the same as those for the main issue. If you have not read that issue, just get SharePoint Designer, a new Team Site where you are allowed to do pretty much anything, and make sure you are running the latest service pack level.

I will also assume that you have seen the webcast series. Consider this issue an extension of that series, and I'll make numerous references to the series. If you haven't seen the series, do so now.

I'll wait right here.

### Disclaimer

Never, ever, ever do any of this in a production environment. I mean it. Bad things will happen.

Now, in your lab environment, feel free to go bananas. And you will. ☺

Let's get started.

## Creating the Lists

Our workflows will run in separate lists. These lists will be based on the Custom List template, so we should start by creating these lists.

**Creating the  
Primary and  
Secondary  
Lists**

### Primary List

The primary list is where the real work is done. This is where you would add all sorts of complex logic to ensure your workflow does what it is supposed to do. In our example, we will only log events to the history log, but you would be much more elaborate in a real-life scenario.

**Note**

While the primary workflow will perform some work, the secondary workflow will keep track of how that work is done.

In your Team Site, create a new list based on the Custom List template. The custom list is perfect for exercises, because it's extremely simple.

Name the list something descriptive, such as Primary List. To that list, add the following columns:

Column	Type
Tracking Item Created	Yes/No
Item Updated	Yes/No

⌘ <b>Important!</b>
---------------------

Set each of these columns to have the default value as No. We will use the Tracking Item Created column to check whether we have created the secondary tracking item that will be responsible for timing.

The Item Updated column is used to check whether the update we are looking for has happened. In a real-life scenario, you would want to have something more elaborate, but for now, this will suffice.

### Secondary List

The secondary workflow will be responsible for controlling the workflows and tracking progress, linking the primary and secondary workflow, and logging any control events.

Create a new list, still based on the Custom List template, and name it Tracking List. To that list, add the following column:

Column	Type
Primary Item ID	Single line of text

You can just accept the default settings for the column.

The Primary Item ID column is responsible for linking the correct tracking item to the corresponding primary item.

Right, that wasn't too hard, was it? Let's get on with the workflows.

## The Primary Workflow

As mentioned earlier, the primary workflow is where all the juicy logic happens. This workflow will create an item in the tracking list the first time the workflow runs. Then, the workflow will check to see whether the update we are waiting for has happened. If so, the workflow will move on, and if not, it will update the item in the tracking list to trigger the secondary workflow and then stop running.

There are some pitfalls, however, so be aware.

Start by creating a new workflow, and attach it to your primary list. Name it something simple, like Primary Workflow. Set the start options to start the workflow both on new item creation and on item change, as shown in Figure 3.

### Creating the Primary Workflow

**Define your new workflow**

Choose the type of workflow and the conditions under which this new workflow should run.

**Give a name to this workflow:**  
Primary Workflow

**What SharePoint list should this workflow be attached to?**  
Primary List

**Select workflow start options for items in Primary List:**

- Allow this workflow to be manually started from an item
- Automatically start this workflow when a new item is created
- Automatically start this workflow whenever an item is changed

**Help**

- The workflow name given here will be used to identify the workflow to end users.
- By attaching this workflow to a List, it makes it possible to initiate the workflow for Items in that List.
- The start options reflect when the workflow will be run for Items in the attached List.

[Click here for more help...](#)

Check Workflow   Initiation...   Variables...   Cancel   < Back   Next >   Finish

FIGURE 3. PRIMARY WORKFLOW START OPTIONS

Click Next to move on.

For the first step, we need to check whether we have created the tracking item already. Here comes the first pitfall.

Now, we need to create the tracking item and store some kind of reference back to our current item so that the tracking item will know which item to update. You may think, as I did, that using the item ID column is perfect for this task, but you would be wrong, as I was.

You may remember that we are using a string to hold the primary item ID in the tracking list. So, why are we not just storing the item ID as a number? Ah, very good question, and I touched briefly on this in the webcast series.

When we eventually get to creating the tracking workflow, we need to look up the item ID in the primary list to find the correct item to update. However, the item ID column is not a number at all, but a counter.

The pitfall here is that you cannot convert from a number to a counter, so if we store the item ID simply as a number, we have no way of linking back from the tracking workflow to the primary item.

I'll remind you about this when we get to that step in the tracking workflow, but I wanted to mention this now so that you are at least aware of what goes on.

So, what are our options for finding the correct primary item? Well, we could use the title, but we are not guaranteed that the title will be unique.

SharePoint, however, includes a GUID value we can use. The GUID value is unique for every item in a list, and luckily, it is stored as a string, meaning we can use it to search for the correct primary item.

So, the first step is not actually to check whether we have created the tracking item at all, but rather will find and store the GUID so we know what to look for when we need to trigger the tracking workflow.

To do so, add a new variable to your workflow using the Variables button. Call the variable Primary GUID, and make sure it is of type String; then click OK to get back to the first step.

## Step 1

In the first step, add a new Set Workflow Variable action, as shown in Figure 4.

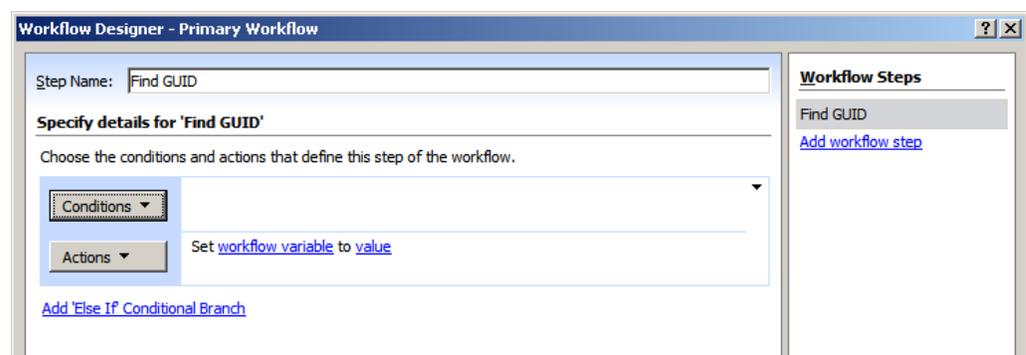


FIGURE 4. SET WORKFLOW VARIABLE ACTION

By the way, feel free to also rename the steps as you add them. I've added some suggestions to the figures, but use whatever makes sense to you.

Click the text "workflow variable," and select the Primary GUID variable.

Then, click the text value and then the lookup button (  ) to launch the Define Workflow Lookup dialog box. Select Current Item as the source and find GUID in the Field field, as shown in Figure 5.

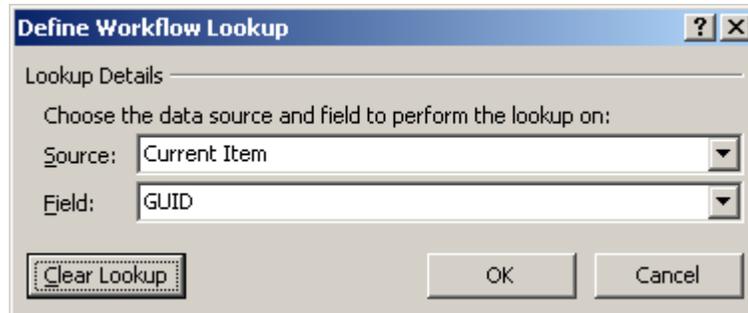


FIGURE 5. FINDING CURRENT ITEM GUID

Hit OK to get back to the main Workflow Designer window. Your first step is now complete, so let's get back to checking whether the tracking item has been created or whether we need to create it now.

## Step 2

In this step, we will ensure that the tracking item either is created or gets created. Oh, and there's a pitfall here as well.

Add a new step to your workflow.

Now, since we going to store the current item's GUID in the tracking item, it would be very easy to just look up the item in the tracking list that has the primary item ID set to the GUID value, right?

\*swoosh\*

That's the sound of falling down that pit.

I even mentioned this problem in the webcast series. You see, if a workflow lookup fails to locate an item, the entire workflow will fault and report an error. If you recall the iterative workflow from part 4, there was always an error on the last item of the list.

So, if we simply try to search for the tracking item having a primary item ID equal to our current item's GUID, our workflow will crash. Not good.

By the way, credit to you if you were tipped off by having to add a column to the primary list, called Tracking Item Created. What we need to do is to trust the column to hold the correct information regarding the creation of the tracking item.

To do so, add a new condition to your step 2, Compare Primary List field, as shown in Figure 6.

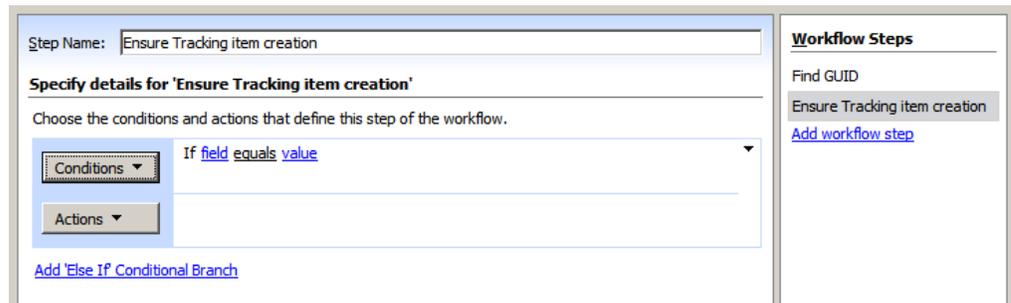


FIGURE 6. COMPARE PRIMARY LIST FIELD

Click the text field, and select the Tracking Item Created column. Next, click the text value, and select No.

So, if we haven't created the tracking item yet, we need to do so. Add a new Create List Item action. Click the text this list to launch the dialog box to create a new item.

Select Tracking List from the List drop-down. The Title column should be autopopulated to the column list.

Select the Title column, and click Modify. In the Value Assignment dialog box, click the lookup button.

In the Define Workflow Lookup dialog box, set Source to Current Item, and select Title from the Field drop-down. Hit OK twice to get back to the Create New List Item dialog box.

We now need to set the primary item ID of the new tracking item. Click Add, and select Primary Item ID from the "Set this field" drop-down. Then, click the lookup button, and select Workflow Data as the source and then the Primary GUID variable as the field.

Phew, that was quite a mouthful. Your Create New List Item should now resemble Figure 7.

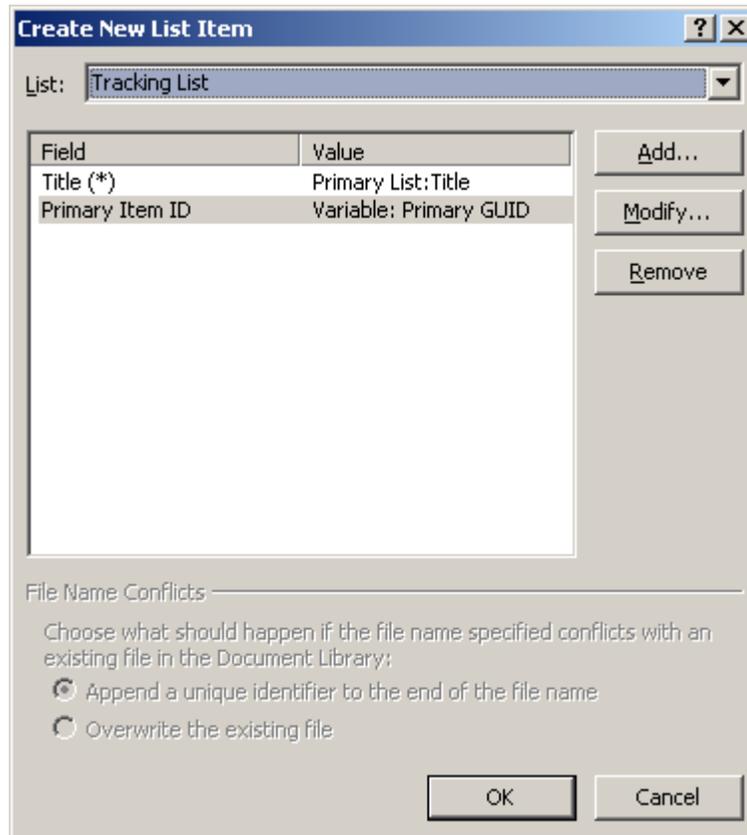


FIGURE 7. CREATE NEW LIST ITEM DIALOG BOX

If your dialog box does not look like this, retrace your steps; I'm sure you just missed something.

Finally, for step 2, we must now set Tracking Item Created to Yes so that we don't create a new tracking item every time the workflow launches.

To do so, simply add a Set Field in Current Item action, after the Create Item action. Select the Tracking Item Created column, and set it to Yes. You have now ensured that the tracking item gets created once, and only once.

Check that your step resembles Figure 8, and let's move on.

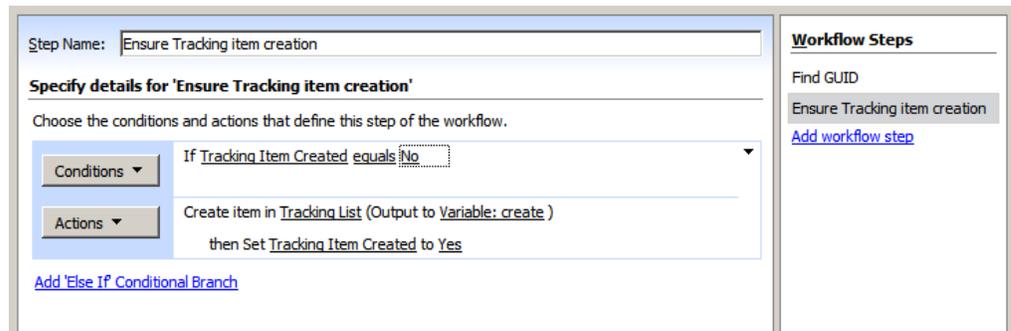


FIGURE 8. COMPLETED STEP 2

### Note

So, what happens if someone accidentally removes the checkbox on the Tracking Item Created column? Well, nothing really, you'll just get two tracking items for a single primary item.

If two tracking items are created, both serving the same purpose, it doesn't matter which one we update. The only downside is that the history log may be confusing.

### Step 3

The next thing we want to do is check whether our update has happened. If it has not, we need to find the correct tracking item and update that item.

Oh, yeah, do I need to mention that there is a pitfall here as well?

Start by, as always, adding a new step to your workflow. Add a new Compare Primary List field condition. Select the Item Updated column, and see whether it is still set to No, as shown in Figure 9.

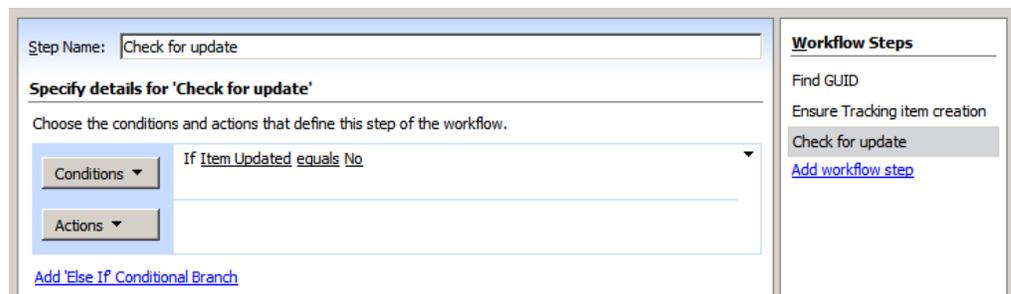


FIGURE 9. IF ITEM IS NOT UPDATED

Now, we just need to find the correct tracking item and update that.

Add a new Update List Item action. Click the “this list” text to launch the Update List Item dialog box.

First, select Tracking List from the List drop-down. This will modify the dialog box slightly and provide you with a section to locate the correct list item in that list.

Second, select Tracking List: Primary Item ID as the field, and click the lookup button to find the value for which we need to search.

Now, we are looking an item whose primary item ID matches the current item GUID, right? So, setting the source to Current Item and selecting the GUID value as the field would be logical, at least to me.

Well, turns out, this would have made you hear one of those \*swoosh\* sounds again. For some reason, comparing a text column, such as the primary item ID, to an item’s GUID column does not seem to work as expected. In fact, even if the string matches the GUID exactly, the condition will not be met, and our workflow crashes, claiming that the list item was not found.

Ah, but we have salvation. We created a variable holding the string version of the GUID earlier, so we can use that instead. Select the Workflow Data source and then the Primary GUID variable as the field before you hit OK to get back to the Update List Item dialog box.

One more thing. We are not going to update anything here. In fact, when you hit OK now, you have done all you need to trigger the secondary workflow that we will create in a moment.

The mere action Update List Item will trigger any update list item, even if we make no explicit changes. This is the same effect as hitting OK in the web user interface without changing any values; workflows still fire.

So, hit OK to close the Update List Item dialog box if it looks similar to Figure 10.

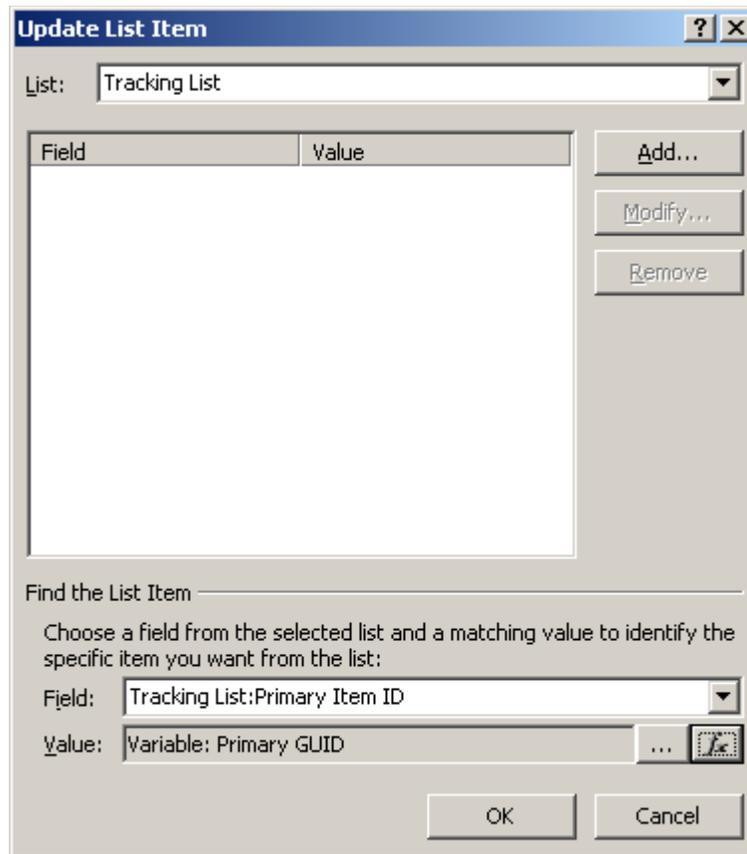


FIGURE 10. UPDATE LIST ITEM

One final step, and this is the key to the proverbial kingdom.

Stop the workflow. Just add an action to stop the workflow at this point. The action is called Stop Workflow, and you need to click the “this message” text to provide an explanation for why you apparently changed your mind and didn’t want to run the workflow anyway.

I just write “Item not updated” as the text, but you can add anything you like.

You see, by stopping now, right after updating the tracking item, we prevent our workflow from moving ahead. Of course, had we checked the Item Updated checkbox, this branch would not trigger at all, and the workflow would move on.

See the logic now? Anything you add after this step will happen only after someone clicks the checkbox in the item.

We’re done. If you want, add a final step and just log a message to the history list to verify that you are indeed moving ahead after clicking the checkbox in the item.

Click finish, and be proud of yourself.

## Secondary Workflow

OK, last stretch, and I promise, this will be much quicker and easier.

In fact, this workflow has three steps, but one of them is a repeat of step 1 in the primary. One of them is to wait for three minutes. The final is to find the right item in the primary list and update that item. Let's try.

Start by creating a new workflow, this time attached to the Tracking List. Name it Tracking Workflow or something like that. You only need to set the workflow to trigger on item updates, because we always update the tracking item as part of the primary workflow unless the primary item is already updated.

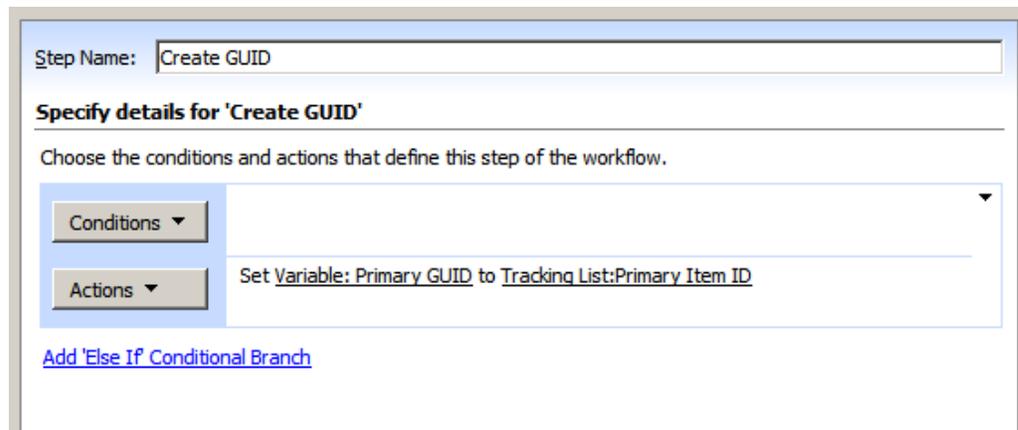
### Step 1

I might have mentioned this already, but since we are going to search for the GUID value, we still need to convert that value to a string.

However, this is a repeat of step 1 of the primary workflow with one small difference. Simply go back if you need to get instructions for adding the first step of creating and setting a workflow variable, but this time, rather than setting the value to the current item's GUID, set it to the current item's primary item ID.

Go ahead, we'll be done very soon, and I'll just sit here and wait for you to finish.

**Creating the  
Secondary  
Workflow**



The screenshot shows a workflow configuration window. At the top, there is a text input field labeled 'Step Name:' containing the text 'Create GUID'. Below this is a section titled 'Specify details for 'Create GUID'' with a subtitle 'Choose the conditions and actions that define this step of the workflow.' There are two dropdown menus: 'Conditions' and 'Actions'. The 'Actions' dropdown is expanded, showing a single action: 'Set Variable: Primary GUID to Tracking List:Primary Item ID'. At the bottom of the configuration area, there is a blue link that says 'Add 'Else If Conditional Branch''.

FIGURE 11. FIRST STEP, TAKE TWO

Does your first step resemble Figure 11? If so, you're good to go on to the next step.

### Step 2

Oh, this is even easier. We're just going to pause for three minutes here.

“Ah,” you say, “but we can't do that, since I have watched the webcast series and know that time resolution is not accurate to the minute.”

And if you said that, good for you, you are absolutely correct. SharePoint controls timing of workflows using a timer job that runs every five minutes. So, every time control mechanism in SharePoint workflows is always off by one to four minutes.

With that little note, create a new workflow step, name it “Pause for 3 minutes,” and add a single “Pause for duration” action. Set the number of minutes to 3, and be amazed at how easy this step was.

**Note**

If you want to add your own flair to this step, choose another number. Anything between one and four minutes will more or less result in the same result, although I am certain some mathematical genius will correct me on this and write an angry blog post on how bad my math skills are. I can live with that.

**Step 3**

OK, goal in sight, soon done, and this is also close to what we did in step 3 of the primary workflow.

Start by adding a new step, and to that step add an “Update list item” action. Click the “this list” text to start the Update List Item.

Select Primary List as the list. Notice again the slight change in the dialog box when you do this.

Click to select the Primary List: GUID field in the lower section of the dialog box. Then, click the lookup button to start the Define Lookup Dialog box, which is the last time for now.

Select Workflow Data as the source, and select the variable you created in step 1 as the field.

Hit OK to return to the Update List Item dialog box, and ensure that it resembles Figure 12.

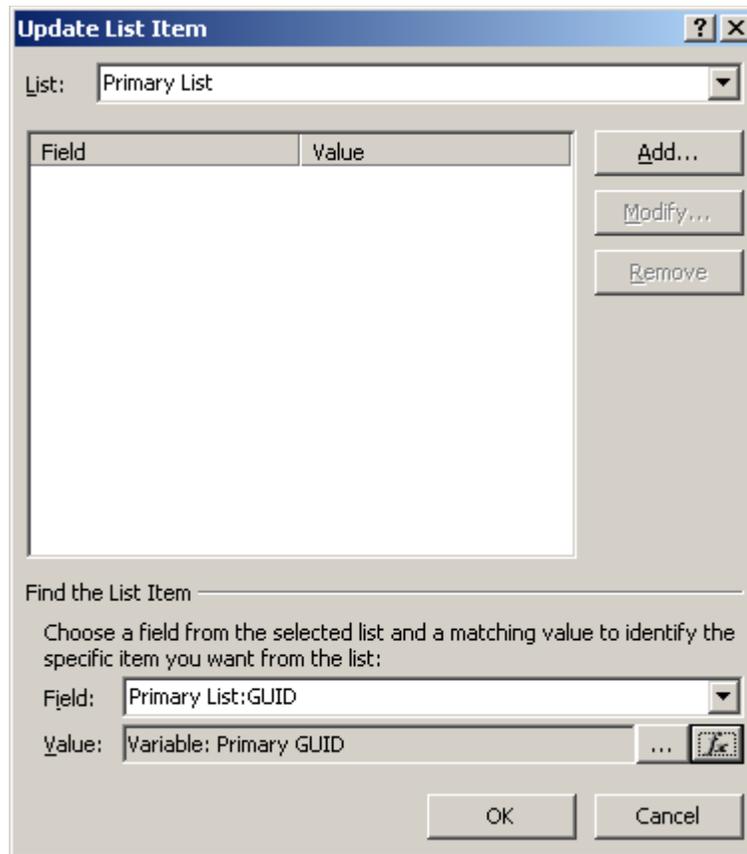


FIGURE 12. UPDATE LIST ITEM AGAIN

Finally, check your workflow for errors, and hit Finish to deploy your new workflow.

Wasn't that cool? Let's test this and then wrap up with some bound-to-be-asked questions.

## Testing

OK, if everything has worked out so far, it's time to test this madness.

Go to your primary list in your site, and create a new item. Notice that when you hit OK, the workflow starts automatically but completes very quickly afterward, as shown in Figure 13.

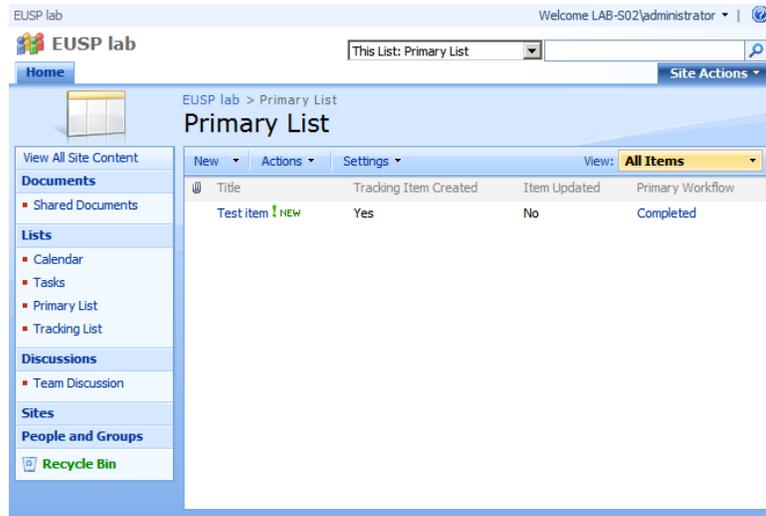


FIGURE 13. PRIMARY WORKFLOW COMPLETED

### Note

If you didn't set the workflow to start automatically, you can always launch it manually, but make sure that at least the "automatic on change" start option has been set for both the workflows.

Next, head over to the tracking list. You should see now that there is a single item there, most likely having a workflow in process, as shown in Figure 14.

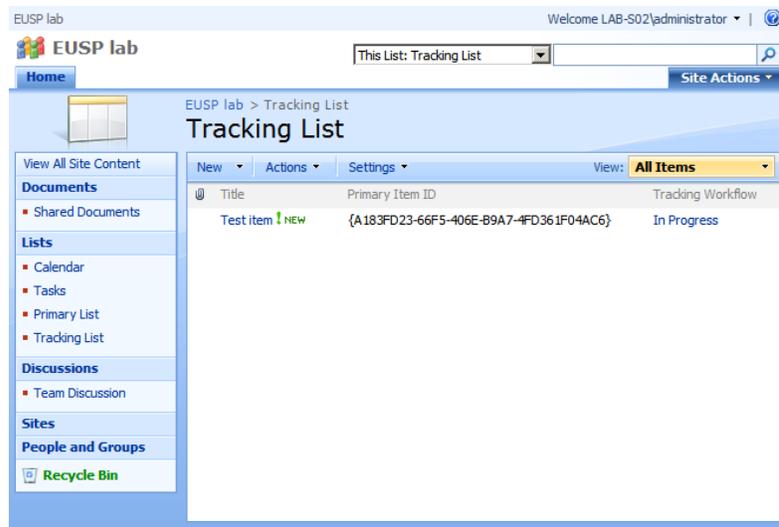


FIGURE 14. TRAKING ITEM CREATED AND WAITING

Now, after a while, feel free to edit the primary item you created and click the Item Updated checkbox. Then, sip a cup of coffee for a few minutes while the tracking workflow waits to trigger the update one final time.

There's not much to see after that, since we didn't add any additional steps, but read on, I still have some goodies for you.

## **Suggestions**

OK, I hope you have gotten at least a glimpse into how you can use secondary workflows to control the flow of a primary workflow. However, this is just the tip of the iceberg.

I have some suggestions for you for how you can make this extremely simple example a lot more interesting.

### **Logging to History**

First, consider logging the steps of both workflows to at least the history list. In fact, just to test that your workflow progresses as expected, add at least one logging action to every step and every branch, and add one after the steps we have created so far as well. This will allow you to get some debugging information if your workflow goes wrong.

Speaking of the next step...

### **Delete Tracking Item**

Consider the dilemma of an accidental deselecting of Tracking Item Created. This will create a new item, which may not be a horrible thing, but it can be avoided.

Also, what would happen the next time you ran the workflow on the same item? Since Tracking Item Created is already set by the previous workflow run, you would never create the tracking item. Of course, the tracking item would still exist, so the workflow would continue to function, but there may be some confusion as to the current status of the workflow if Tracking Item Created was still set.

You can overcome both these issues if you delete the tracking item and deselect the checkbox after you are done using them.

For example, as the next step after the ones we created earlier, just add an Update field in the current item action, and set Tracking Item Created to No. Then, add a Delete item, and configure that action to remove the previously created tracking item.

Your tracking item list will look a bit tidier.

## Some Questions You May Have

I have taken the pro-active route here and answered some bound-to-be-asked questions. Really, someone is going to email me, asking these questions.

### **What About Performance?**

One good reason why you should never do this in a production environment is that each workflow run will create a lot of logging. If you forget the item, it will run forever, filling up space in your logs and slowing down your system. Do this on 10,000 tasks, and you will have a very angry SharePoint administrator come visit you with his baseball bat.

Of course, you could work with the techniques I have shown you in this issue to create a better performance management system.

But that's another show.

### **What If I Skip the Three-Minute Wait?**

That may seem like a good idea in theory. What would happen is that your tracking workflow would immediately refire the primary item. Apparently this would give you instant results and avoid the whole five-minute resolution problem.

However, after having your ears filled with loving words from that SharePoint administrator again for taking just about every resource available on the server, you are faced with yet another problem. You won't be able to save the changes you make to the item.

The reason for this is that the workflows will have updated the item before you can save your changes. In SharePoint, this constitutes a save conflict, and you'll have a long and exciting walk through all of the SharePoint logs to try to find out why you only get an unknown error message.

So don't. And save yourself a bit of frustration.

I just wish I had read this issue before I started testing this earlier today.

# So Long, and Thanks for All the Fish!

*Did you have fun? I did!*

I hope you have enjoyed this little bonus package and “Thank You, Mark!” issue of *USP Journal*. I appreciate you taking the time to read everything; I know you are probably at least as busy as I am.

Now, before I leave you to your other duties, I would like to reiterate the importance that you do not try any of what you have learned in a production environment. Seeing your company web pages go down because you forgot to add that “Pause for duration” must surely be a very bad sight.

So, until I hopefully talk to you again, have a great SharePoint experience!

.b