



## Lotus Workflow – Best Practices Web

This document explains best practices for setting up a Web version of your LWF-application



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## Management Summary

## Development problems

### *CR-Database*

#### **Double Tickets**

Problem may be caused by double initiation. This problem hasn't been reproducible. But to avoid double initiation, **form-based initiation** would be helpful.

When using form-based initiation, the requestor creates an ordinary Notes-document.

This document will be initiated by the backgrounder, after the user has terminated working on this document.

See also chapter "Solutions – Form-based initiation"

#### **Binder document size**

Each time, the backgrounder works takes the document and makes even small changes, audit-trail and viewer-log will set additional information in the cover-document.

This situation will be enforced, when a document runs through several automated activities in a loop.

Therefore there are multiple solutions to this document:

- a) Reducing the number of loops within the process
- b) Switching of audit-trail
- c) Switching of workflow-viewer

The loss of viewer-functionalities might be a situation that will be hardly accepted by management, but will finally circumvent this problem.

Also enhancements to the process itself will help to avoid such problems.

For ways of streamlining the process please see chapter "Solutions – Enhancements".



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### Background-agent not running

Pretty often the background-agent stops because of one of the following reasons:  
So in case your background agent is not running properly, please check the following topics:

- a) Incomplete or corrupt **binders** (some documents have been deleted)
  - b) Usage of any **UI-Functions** within one of the included Libraries (OS Application Events or any agent that will be called from this library)
- Code that opens databases on **other servers** (will run manually but not started by the server)
- Unknown **mail-receivers** (incorrect Mail-Addresses for participants)
- No routing task activated or
- No mail-connection to **target domain** (especially non-adjunct mail-domains)
- Field **DOCNUMERATOROS** contains a wrong number (value should be the number of all documents within that binder).
- OKMail**-document exists in this database

### Background-agent hasn't taken ticket

Please see chapter above.

### Switching status when rerouting

Please see chapter "Solutions – Process upgrade"

### Mailing in LWF

Please see chapter "Solutions – Email-handling"

### Splitting of documents

To split documents there are 2 general options: Either to use the LWF-functionalities of split and join (useful if more than one user has to approve and later on those different Steps will come together again – scenario 1) or to create a new copy and treat this new copy as a new instance of a process (scenario 2).

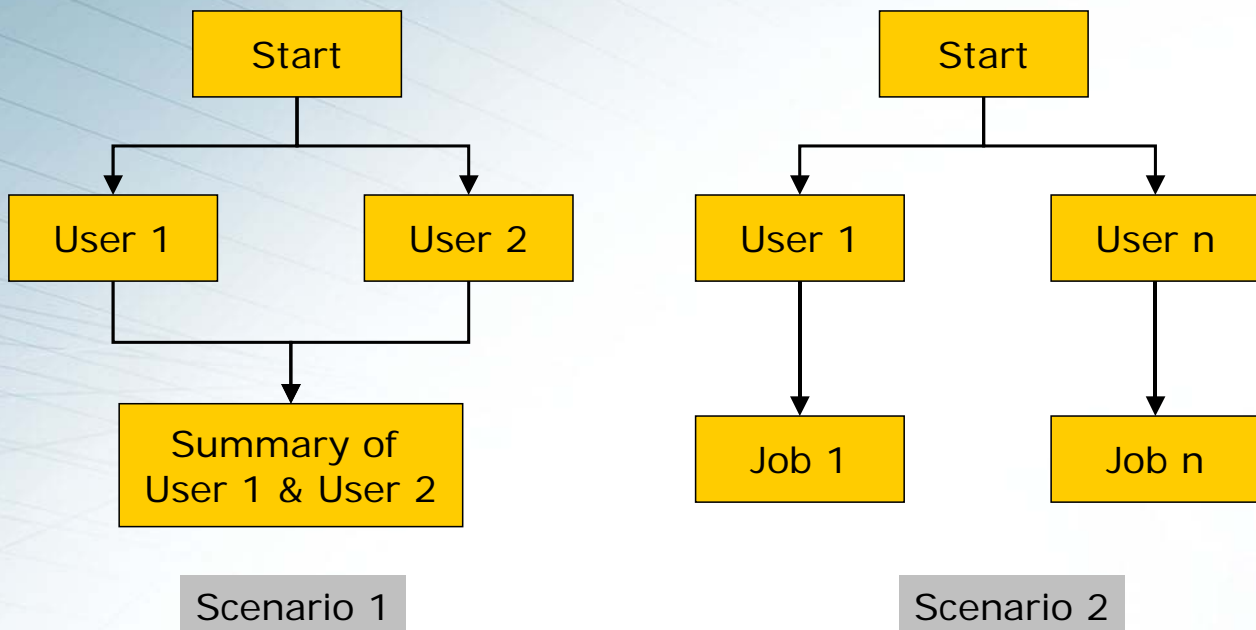


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**Graphic 1: Different scenarios for splitting**

If the number of new instances is not known in advance, the creation of new copies by using a form-based initiation is much better for overall performance and minimizing administrative workload.

### Parallel routing

Parallel routing is possible. But before setting up parallel routing and joining (see scenario 1 chapter before) a detailed analyse of the real needs of the user should take place. Probably parallel routing can be replaced by setting up a new instance of the process.

Parallel routing requires also a joining of the parallel processes and therefore may lead to a bottleneck within the process (on job is already approved and has to wait for the other one coming to the same activity).

This may lead to a situation, where the process-flow has been set up properly from LWF-point of view, but the clients will complain about not being able to continue.

### Performance (general)

Multiple aspects have to be taken into consideration when resolving performance-problems with LWF.

#### View-Indexing

First of all, a couple of internal view will discard their index after each use. This can lead to unnecessary work for server and system and up to 2 min wasted time.

This "bug" has been removed in LWF 3.01

Additional, lots of views will have pretty complex column-formula to display the right status. Instead of putting this display-logic in the views, the use of custom attributes within the architect can lead to less calculation-time for the system.





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The version of the same process shown above will move the job to status "Job completed". The Backgrounder will not work on documents in this status. By using new copy of an old job and form-based initiation, a new instance of the former rejected job can be initiated.

### Process Upgrade

See chapter "Solutions-Upgrade Process"

### Error-Handling

See chapter "Solutions - Error-Tracking"

### Creation of new ticket without saving

When a new document in the CR-Database will be created, this document will be set up as a new job. The initiation of LWF takes place immediately. Therefore lots of problems may arise with a solution like that:

- a) Slower response of the system because a lot of additional work has to be done by the system
- b) Probably incomplete binder may occur, because a user deletes a new job without deleting the complete binder but only the main-document.

By using form-based initiation (creation of a new document as ordinary notes-document and automated initiation by the backgrounder), the requester can use all Lotus-Notes-functionalities they are used to (create, edit, delete) without having the risk of corrupting binders in the LWF-system.

### *Sametime-Application*

Only one problem has been reported.

The not running Background-Agent and the missing update of documents in the process may be caused by implementing a relation accessing another server.

LWF is a Notes-Database-System and therefore all restrictions for developing and deploying applications in Lotus Domino are also valid for LWF.

One idea could be a solution based on mail-in-databases for submitting requests and queries to another server.

For streamlining the process itself, probably the implementation of a dummy-activity would be helpful.

When starting the request to `sametime.nsf`, the job can be set to a new activity. An external Lotus-Notes agent can check for the status of each document (job) in this activity and try to retrieve the information from the other data-source. As soon, as these information are available, the document can be forwarded to its next activity without any user-integration by a code like the following example:



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... YOUR CODE....

```
If BinderCol.count = 0 Then Exit Sub

For j = 1 To BinderCol.count
  Set HookDoc = Bindercol.GetNthDocument(j)
  Set Binder = GetBinder(HookDoc)
  If Binder.count = 0 Then ' ----- no Binder document can be found -----
    Print "Unexpected error, please check the agent: " & agent.name
    Exit Sub
  End If

  For i = 1 To Binder.count
    Set doc = Binder.GetNthDocument(i)
    If doc.CoverDocOS(0) = "yes" Then Set cover = doc
    If doc.MainDocOS(0) = "yes" Then Set maindoc = doc
  Next i

'### Call Custom Subroutine
str_IntID = maindoc.fd_intID(0)
Select Case str_IntID
Case "CR_1.0.0"
  SaveBinder = YourInternalCode (binder, cover, maindoc)
Case Else
  SaveBinder = False
End Select

'### Set WF-Fields
If SaveBinder = True Then
  Call WriteToViewerLog(cover, "A002", session.UserName,
cover.InstanceIDOS(0) & "#" & cover.ActivityIDOS(0))
  For i = 1 To binder.count
    Set doc = binder.GetNthDocument(i)
    If Not (doc Is Nothing) Then
      doc.FolderStatusOS = "Ready to route"
      doc.Autoroute = "yes"
      Call doc.Save(False, True)
    End If
  Next i
End If
Next j
Exit Sub
```

The above code has been taken from the Initialize-Event from an existing agent based on the Example for Customized Agents.



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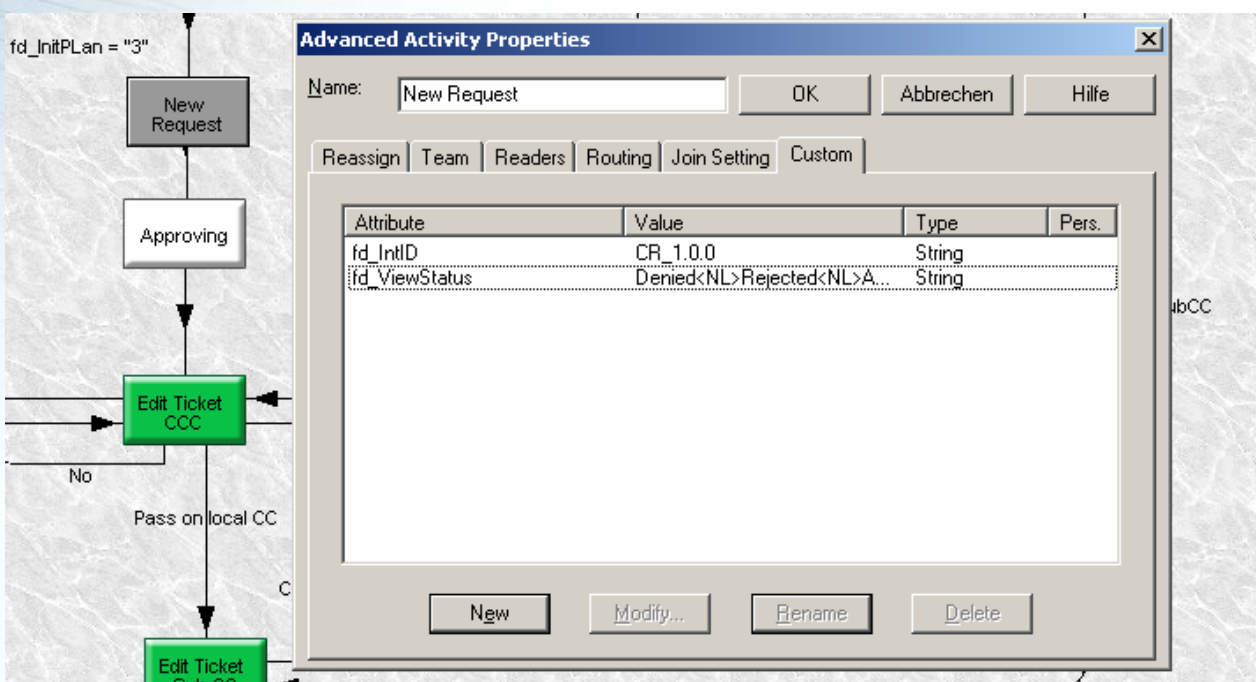


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## Solutions

### General Hints (Tips & Tricks)

Stamp each activity (no matter if automated or not) with the same field and an unique value to clearly detect what's your current position in the process:



Graphic 4: Identification of Process

Please use a unique naming-convention throughout all processes within the company to be independent from the current process and be able to test each wf-application in a "test-environment".

Also stamp each activity with additional values to be displayed in views. Setting the values within the architect, makes it harder to do small changes for view-display (activate new version of process) but will lead to a much faster performance of the system.

Switch of all unnecessary logs and protocols (viewer, audit-trail) in your productive environment.

Remove all unnecessary design-elements:

- All elements containing "DD" are only necessary for Domino.Doc-Integration
- All elements containing "\$\$" or "Web" are only required for web-application.
- See the database "BasicWFElements". The elements within this database should give an overview about minimum set of design-elements. **THIS IS NOT A VERIFIED LIST. EACH OF THE DESIGN-ELEMENTS HAVE TO BE CHECKED BEFORE DEPLOYING THIS SET OF DESIGN-ELEMENTS**



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### ***Form-based initiation***

For basic information to form-based initiation please have a look at "LWF 3.0 Process Designer Guide".

Field name	Purpose
NewProcessNameOS	Determines which process should be started by the form.
NewJobNameOS	Determines the name of the job started by the form.
NewJobPriorityOS	Determines the job priority.
MailStatusOS	If the field is empty ("") or contains "2", the document becomes the main document in the binder.
A button in the form displays a keyword list.	If the field contains "3", the document will be deleted. If the field has any other content, the document becomes a binder document.
InitiateOS	If the field is empty, or contains "no", the document won't be used to start a job. If the field contains "Yes", the document will start a job based on the other fields in this table.
ExternalInitiatorOS	You may optionally use this field to specify the person's name that is responsible for initiating this new job. Within the process design, you can refer to this field using the Job Property "External Initiator".  We recommend that you use a canonicalized user name.

**Table 1: List of fields for form-based initiation**

For an enhanced way of setting up form-based initiation we suggest the following procedure:

Field name	Purpose
NewProcessNameOS	"Change Request"
NewJobNameOS	@Text(@Name([CN];@UserName))+ " - "+@Text(@Created)
NewJobPriorityOS	"Medium"
MailStatusOS	"2"
InitiateOS	" "
ExternalInitiatorOS	@Name([Canonicalize]; ExternalInitiatorOS)
Fd_LoadDominoWF	"0"
Fd_InitPlan	" "

**Table 2: List of proposed default values**

Create an additional view to display those documents that haven't been initiated so far (InitiateOS=" " as selection criteria) and make sure that the user is only able to see his documents within that view.



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Include the LWF-sub-form based on a formula depending from the content in the field fd\_LoadDominoWF:

```
@if(fd_LoadDominoWF="1";" (OS Domino Workflow Information)";" ")
```

Create an action to save the document only (@Command([FileSave])) and another action to initiate the document as a new job:

Field InitiateOS:="yes"

Field fd\_LoadDominoWF:="1";

Field fd\_InitPlan:="3";

```
@Command([FileSave]);@PostedCommand([FileCloseWindow])
```

The document will disappear from the view with not yet initiated documents and the next time the background-agent runs, the new WF-job will be initiated.

Hidden Section ----- Form-Based Init

Process name:

Job name:

Priority:

Document becomes:

Initiation:

External Initiator:

Form:

Standart Domino Workflow Informations: Computed Subform

Load "(OS Domino Workflow WEB)" yes = 1 / no = 0

Additional Routing Option Approve = 1 / Planing = 0

<Computed Subform>

Hidden Fields -----

Objects | Reference

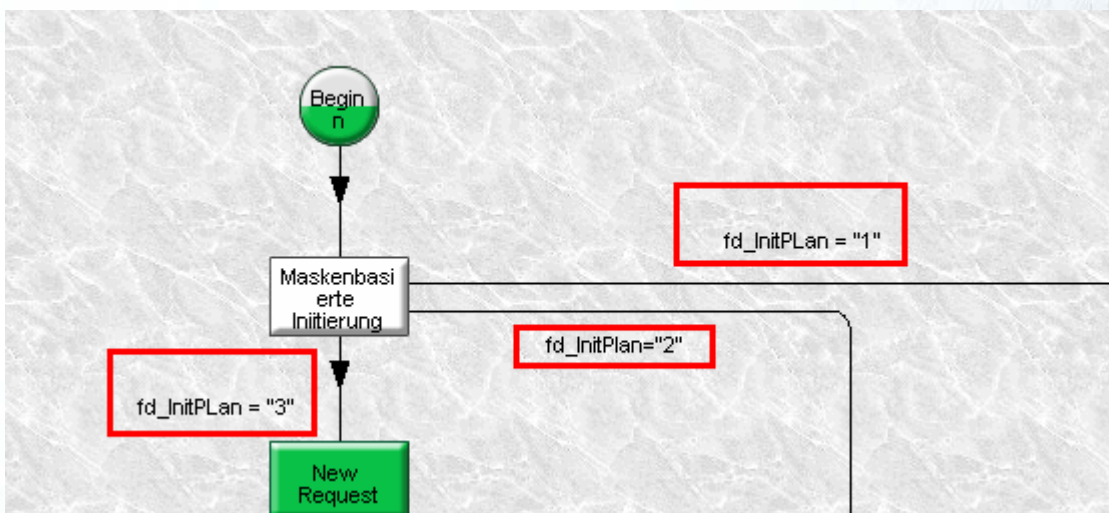
- Computed (Subform)
  - Default Value
- Computed Text

Computed (Subform) : Default Value

Run:

@If(fd\_LoadDominoWFWeb = 0; ""; "(OS Domino Workflow WEB)")

Graphic 5: Example for form-based initiation





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### Graphic 6: Process-Definition for example above

According to the settings of the field "fd\_InitPlan" the new job will be routed to the corresponding activity.

Following example-code will allow to initiate a new copy from a currently selected document and route it to a position in the process defined by the current situation:

```
Function ResetWorkflow(doc_Curr As NotesDocument) As Integer
'### (c) Florian Lier; 12052003
'### Deletes all Workflow relevant fields
    ResetWorkflow = False
    Forall Item In doc_Curr .Items
        If Instr(1, Item.Name, "OS") > 0 Then
            Select Case Item.Name

                Case "fd_kw_CostAccount"

                Case "fd_OpenPos"

                Case "fd_kw_CostAccount_1"

                Case Else
                    Call Item.Remove
                End Select
            End If
        End Forall
        ResetWorkflow = True
    End Function
```

The code above removes all workflow-fields from the currently selected document. But please make sure, that you are not deleting other important fields containing the letter-combination "os" within its name (cost-account....)

```
'### Clear WF-Fields
    success = ResetWorkflow(doc_RW)

'### Set New WF-Fields
    doc_RW.Form = "frmRequest"
    doc_RW.NewJobNameOS = doc_Template.NewJobNameOS(0) & "\SomeText"
    doc_RW.NewProcessNameOS = "Change Request"
    doc_RW.Int_ID = "Your Starting_ID"
    doc_RW.fd_InitPlan = "2" `the position you want to root to...
'### if document will be opened in UI-Mode, the following fields can be retrieved from your form
    doc_RW.fd_LoadDominoWF="1"
    doc_RW.InitiatorOS = "Your designated UserName"
    doc_RW.ExternalInitiatorOS = "Your designated UserName"
    doc_RW.MailStatusOS = "2"
    doc_RW.InitiateOS = "yes"
```



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### *Automated Routing*

Under automated routing we will understand the routing of documents based on the context and not based on user activities. Possible triggers for that may be:

- a) A user hasn't processed this job for a certain time-span (auto-approval, auto-rejection)
- b) Some external information have been arrived (status in another database has been changed)
- c) Some additional approver have changed the status in other documents than the main-document

For such kind of enhanced functions, lots of possible ways may lead to the same result. A solution, that has been worked fine in several different projects will be described as a smart way of solving such requirements.

Set up an additional agent, that selects documents based on workflow-relevant information (like all documents in Status XXX).

Use one of the example-agents as a base for your customisation.

Trigger the agent independent from your original process as another (additional) agent within your database.

So use a workflow-based template but do not include this agent within your process-definition.

'### search string for Binders that should be routed automatically

```
search$ = "((ACTIVITYOS="Prepare" | ACTIVITYOS="Approve" |  
ACTIVITYOS="Implement" | ACTIVITYOS="CPL Review No" |ACTIVITYOS="CPL  
Review Yes" |ACTIVITYOS="CR Accept") & FolderStatusOS<>"Job completed")"
```

Find above a possible selection-criteria for documents for this additional agent.

Use the custom subroutine-function to handle the logic of your situation like comparing Time/Date-values or checking external data-sources.

If your condition is true, set the return-value of this function to true.

In the initialise-event use the return-value to check, whether this job has to be rerouted or not. If your subroutine has a valid result (document has to be rerouted) simply set the field "FolderStatusOS" for each document within this binder to "Ready to Route" and save the binder.

The next time your background agent is running, it will route this binder to its new position.

To set the possible targets, one option is to define routing-criterias based on the result of your sub-routine.

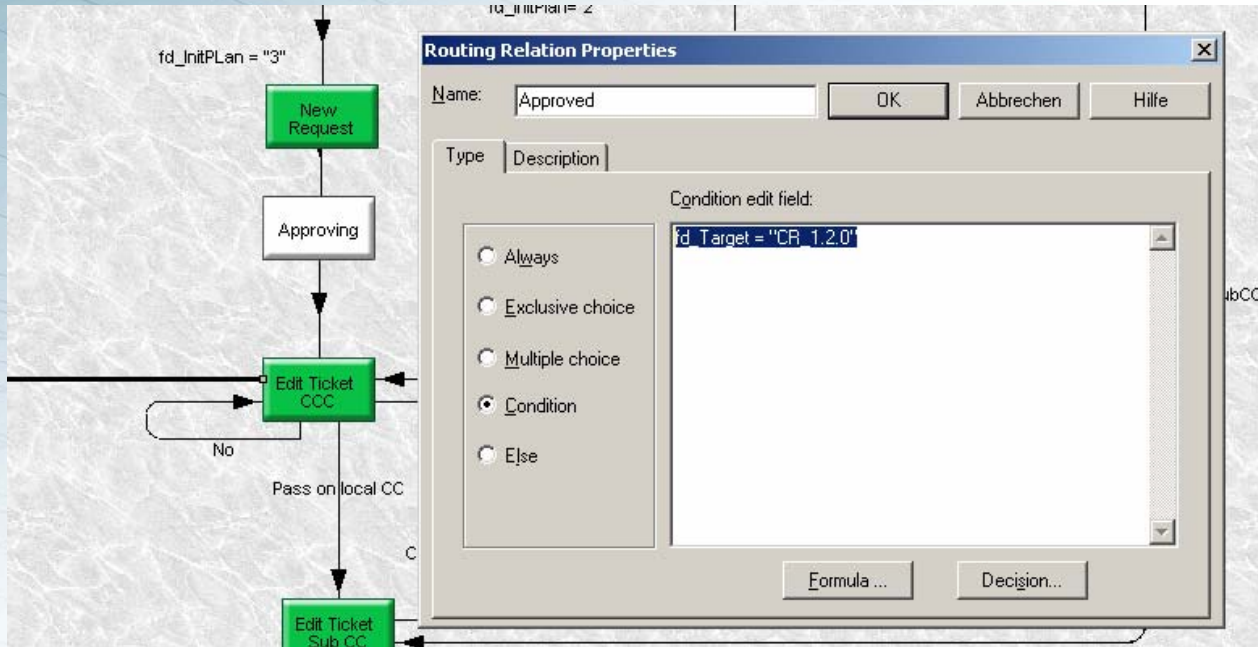


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**Graphic 7: Process-definition example for automated routing**

When you are setting the value of the field "fd\_Target" to "CR\_1.2.0" within the custom subroutine of your agent (or any other function you are calling), LWF will rout the binder to the corresponding next activity).



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### ***Error-Tracking***

If the background agent is running on any error, there is a big risk, that the agent will not continue working and therefore will not change any documents in its unprocessed cue. Therefore finding occurred errors within your system is very important to keep your system running and alive.

Besides typical, user-defined errors from the LWF-system itself (corrupt relations...) also your internal code may contain unknown errors. Because the Workflow-engine-code is included in script-libraries there is no change to debug your code and find the reason of failure.

Therefore it would be a great help, to set up an additional logging-function to be able to detect possible errors as soon as possible and as detailed as possible.

The following described solution is just one option, but also has approved as a great help in multiple projects.

For eliminating the reason of errors the following information are very helpful:

- a) Where has the error occurred (which agent, which function)
- b) When has the error occurred (user-frontend, backend...)
- c) Which document / job has caused the error

Because not all of this information will be described by LWF-Errorlog, we recommend to set up an individual error-log.

Implement in each function within your system (OS Application-Events, all agents...) an enhanced error-handling like the following one:

On Error Goto ErrorHandler

... YOUR CODE

ErrorHandler:

If doc Is Nothing Then

    Call ErrorHandler(i\_AgentFunction, str\_AgentFunction)

Else

    Call ErrorHandler(i\_AgentFunction, str\_AgentFunction & " - DOC: " & doc.UniversalID)

End If

... YOUR CODE

Add the enhanced Error-Handler-function to all your LS-Design-elements:

```
Function ErrorHandler(i_AgentFunction As Integer, str_AgentFunction As String) As Integer
```

```
    Call EH.Catch(i_AgentFunction, str_AgentFunction, str_AgentObject)
```

```
End Function
```



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And create an additional log-entry in another database. To find the location of this database either customize the customisable sub-form within your application-setup-document or create another setup-document to store the location-information for this database.

### LogEntry

Titel:	<b>agentRecalculateRules =&gt; CLASSRules</b>	
Erstellt am:	21.05.2003 16:09	
Protokolierte Aktionen		
Protokolierte Fehler	6 Error(s) detected ==> 0 of them were fatale (red)	

#### Inhalt

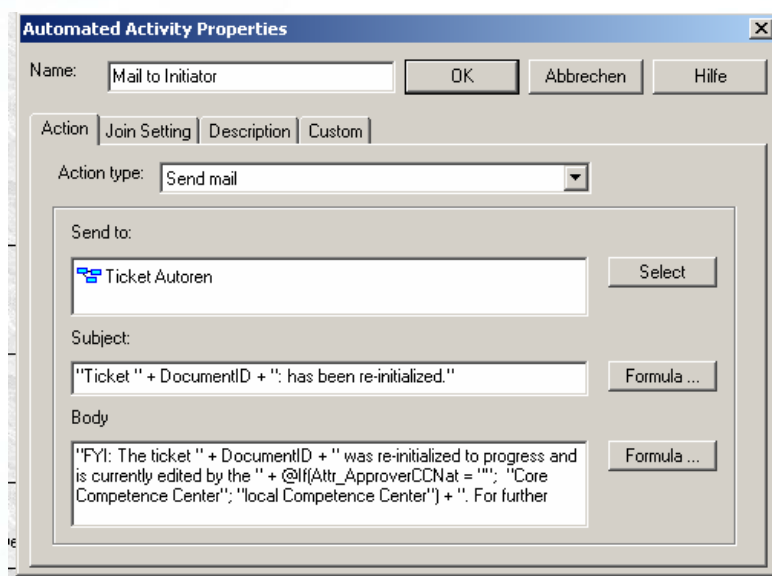
Error: CLASSRules in Function UniqueValues - 91CFD2F76F53312342256D2D004C1E3F -- 8005	21.05.2003 16:10:56
Error: 91 in Line 538 -- Object variable not set	21.05.2003 16:10:56
Error: CLASSRules in Function UniqueValues -- 8005	21.05.2003 16:10:56
Error: 91 in Line 538 -- Object variable not set	21.05.2003 16:10:56
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Error: CLASSRules in Function UniqueValues -- 8005	21.05.2003 16:10:56
Error: 91 in Line 538 -- Object variable not set	21.05.2003 16:10:56

Graphic 8: suggestions of error-log

With an error-log like the one above, you are able to easily find out the reason of the occurred error. You have the reference to the responsible document and can easily detect in which function of your system the workflow-engine has retrieved a unexpected exception.

## Email-Handling

We have one option to send emails directly from the LWF-Architect:





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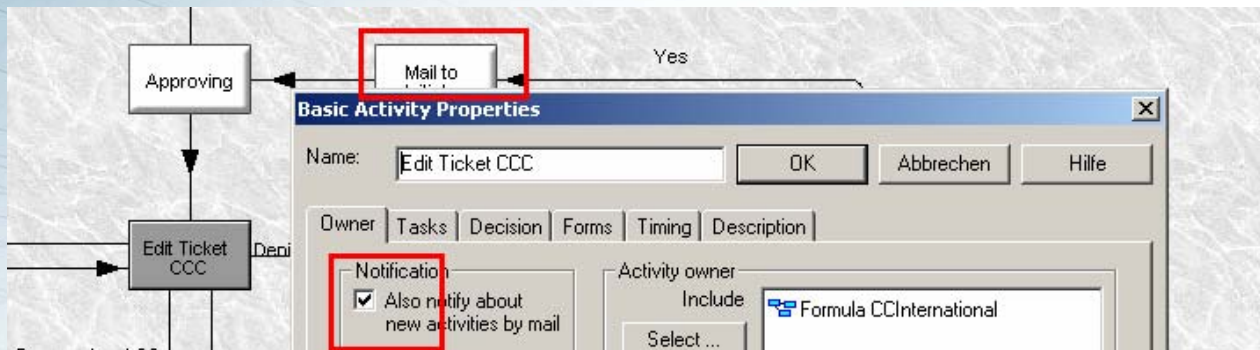
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**Graphic 9: Email-function in LWF architect**

Other options for sending emails from the architect are the Inbox and over-due-mails.



**Graphic 10: Inbox-Notification**

These mails will be triggered by the background-agent. Before sending these mails, the background-agent initialises corresponding events in the OS-Application Events.

When using email-Notifications in LWF we are facing the following problems:

- Users will complain about spam-mailing (especially in complex processes and if people are involved in multiple processes)
- Users will probably receive a huge amount of same emails (rerouting, not being in the office for a couple of days and short period for over-due notifications)
- Email-text is not very detailed and no process-relevant information is delivered
- People receiving links on database, cover, URL-Links... and not all of them are useful
- Time-settings in email are not matching the local time-zone of receiver (3:00 AM in Düsseldorf is not equal to 3:00 AM in New York...)
- Email-Functions have to be maintained at different locations
- When using option 1 (Architect), changes in the email will always require changes to the process
- Pretty often people receive email and do not know where they are in the process and what they have to do
- Email will be sent with ID of signer of database and replies will run into Nirvana...

As we can see from the list above the number of possible problems is pretty big.

Therefore setting up an enhanced mail-function has been useful for working with LWF. If we build a Script-Library (Email-Class) we can use this class within the OS-Application-Events and within any LS-agent.

Because of each document has a clear ID in any activity of the process (see general hints) we can identify the current situation by this id and select an enhanced setup-document to send better customisable emails.

Therefore we need:

- 1.) A database that contains the setup-documents
- 2.) A method to create a new email-object
- 3.) A method / property to take a base-text from this setup



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- 4.) A method to replace place-holders within this text by values from the current document
- 5.) In the gold-version an option to check if the receiver of this email has already received it (reroute...) or will receive notifications in general.

The location of this setup-document-database can be stored either in the Setup-document of LWF in the customisable sub-form or in an additional setup-document.

Such an enhanced setup-document may look like the following example:

Mailnotification			
<b>Keyword - Schlüsselwort</b>	1DCCPS0400		<b>Parameter (Activity- Reminder)</b>
<b>Parameter (Risk)</b>	<input type="checkbox"/> Normal <input type="checkbox"/> Emergency <input type="checkbox"/> Urgent <input checked="" type="checkbox"/> Crises	<b>Mail to:</b>	Aktivität - Activity <input type="checkbox"/> Change Requester <input checked="" type="checkbox"/> Change Section <input type="checkbox"/> Change Manager <input type="checkbox"/> Change Process <input type="checkbox"/> Change Group Leader <input type="checkbox"/> Change Notificati <input type="checkbox"/> Change Coordinator
<b>Description - Beschreibung</b>	crisis: Preparation Team		<b>DueSpan - Fälligkeitsspanne</b>
<b>Subject - Betreff</b>	CHAMPS - prepare CRISIS RFC: <%=RFCTITLE%>		
<b>Body</b>	<p>The - C R I S I S - Change Request No.: &lt;%=RFCNO%&gt; created &lt;%=CREATED%&gt; with RFC Title "            &lt;%=RFCTITLE%&gt;"            scheduled to begin at &lt;%=STARTDATE%&gt; GMT (CET = GMT + 1 hour)            submitted by &lt;%=FROM%&gt;            is ready to be prepared.</p> <p>Please follow the link for further details: &lt;%=HTTPURL%&gt;</p> <p>PLEASE CHANGE STATUS TO "prepared" WHEN PREPERATION IS DONE!</p> <p>Thank You            IT Change Management</p> <p>(Das eingetragene Team das die Vorbereitung durchführen soll            muss den Status auf "prepared" setzen wenn die Vorbereitungen abgeschlossen sind)</p>		

Graphic 11: Example for enhanced mail-setup

The corresponding mail-object can be initiated from either the OS-Application Events or any custom subroutine in any agent within an automated activity.

```

'### Get ID of main-document
If main.hasItem("fd_IntID") then
    str_IntID = main.fd_IntID(0)
else
    str_IntID = "Default"
End if

```

```

Dim mail As New EmailTemplate(str_IntID) ' Create New E-Mail Template
Dim va_fieldList As Variant
'### Mail Recipient List
va_fieldlist = mail.recipientList
va_itemValue = doc_main.GetItemValue(va_fieldlist)
'### Set Principal to have the initiator of job as recipient of reply...
mail.Principal= doc_main.fd_CRFfullName(0)
'### Set receivers
Call mail.AppendSendTo(va_itemvalue)
'### Combine Mail
success = WriteMail(doc_main, mail)

```



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When setting up such a functionality on a proper configuration, this can be used in each and every process in the complete company.

To disable the standard emails processed by LWF, set the Variable "Continue" to false within the OS-Application Events

```
Private Function QueryInboxOverDueMail_(Continue As Integer, CoverDocument As NotesDocument)
On Error goto ErrorHandler
Continue = False
```

Your code goes here...

Exit function

ErrorHandler:

```
'### In case of error send standard-mail to continue processing of complete system....
Continue = true
Your ErrorHandler goes here...
```

## ***Upgrade Process***

To upgrade workflow-processes in production the following steps have been pretty helpful.

- a) Analyse what will be the results of the process-upgrade (which documents will be affected)
- b) Create a decision-table of which documents have to be rerouted to the new process and which documents can finish under the existing process
- c) Are there any documents that have to be rerouted to a new activity
- d) Inform your users about upgrade and sell the changes as new features (enhancements) – also give users a chance to track new features / functionalities
- e) Define maintenance-window and remove all user from all involved databases (set access-rights to no access)
- f) Create replica of all databases as security copy on local drive....
- g) Replace design if there are any code-changes...
- h) Export current process-definition in the architect from the current productive system
- i) Remove all inactive processes from the Process-Definition-Database (delete documents)
- j) Import new process via the import-filter in the architect
- k) Activate new process
- l) Upgrade process-cache
- m) Reroute all binders to the current process that need to finish under the new process
- n) Eventually disable all mail-functions to "Not inform" users of rerouting (might be annoying for them to receive mails...)
- o) Reroute all binders to their new position according to your decision-table
- p) Create a new job to check the new process-definition
- q) (Re-)Grant access to users in the productive environment

From now on, your old jobs will end their lifecycle under the old process-definition and the rerouted jobs will end their lifecycle under the new release of the process-definition.



## Lotus Workflow – Best Practices Web

This document explains best practices for setting up a Web version of your LWF-application



13.04.2008

### *Avoiding / resolving errors*

On of the biggest problems when deploying LWF-applications are user- or administration-based bottlenecks within the system.

Pretty often occurring problems are:

- OU-Changes in the name (person has no more access to system or its jobs)
- Changes in responsibilities (user moves to a new position and will be adjusted several jobs before changes has been updated in LWF-system)
- Selection of invalid user names if the user can define the following processors manually
- Incomplete deleted binders
- Replication-conflicts
- Documents pin in Automated activities or FolderStatusOS = "Waiting for Join" or "Ready to Route"

Therefore it would be pretty helpful, if a clear structured administration-area will be deployed with the database and the employees that are responsible have a best-practice-guide for administration.

Errors like replication-conflicts have to be removed asap, to be able to keep the system running at all

When deleting replication conflicts please make sure that the content of field DocNumeratorOS contains the right value (number of all documents in binder). Probably the value of this field is 1 too high, if a replication-conflict will be deleted.



## Lotus Workflow – Best Practices Web

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Double Tickets .....	1
Binder document size .....	1
Background-agent not running.....	2
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Mailing in LWF .....	2
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