

Joget DX8

Hash Variable

 <http://facebook.com/jogetworkflow>

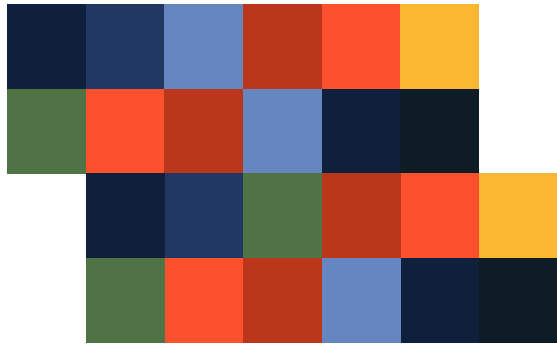
 <http://twitter.com/jogetworkflow>

Prerequisites

- General understanding on how to design an App using the Joget platform (i.e. Process, Form, List, UI).

Content

1. Introduction to Hash Variable
2. List of Hash Variable and Its Usages
3. Nested Hash Variable

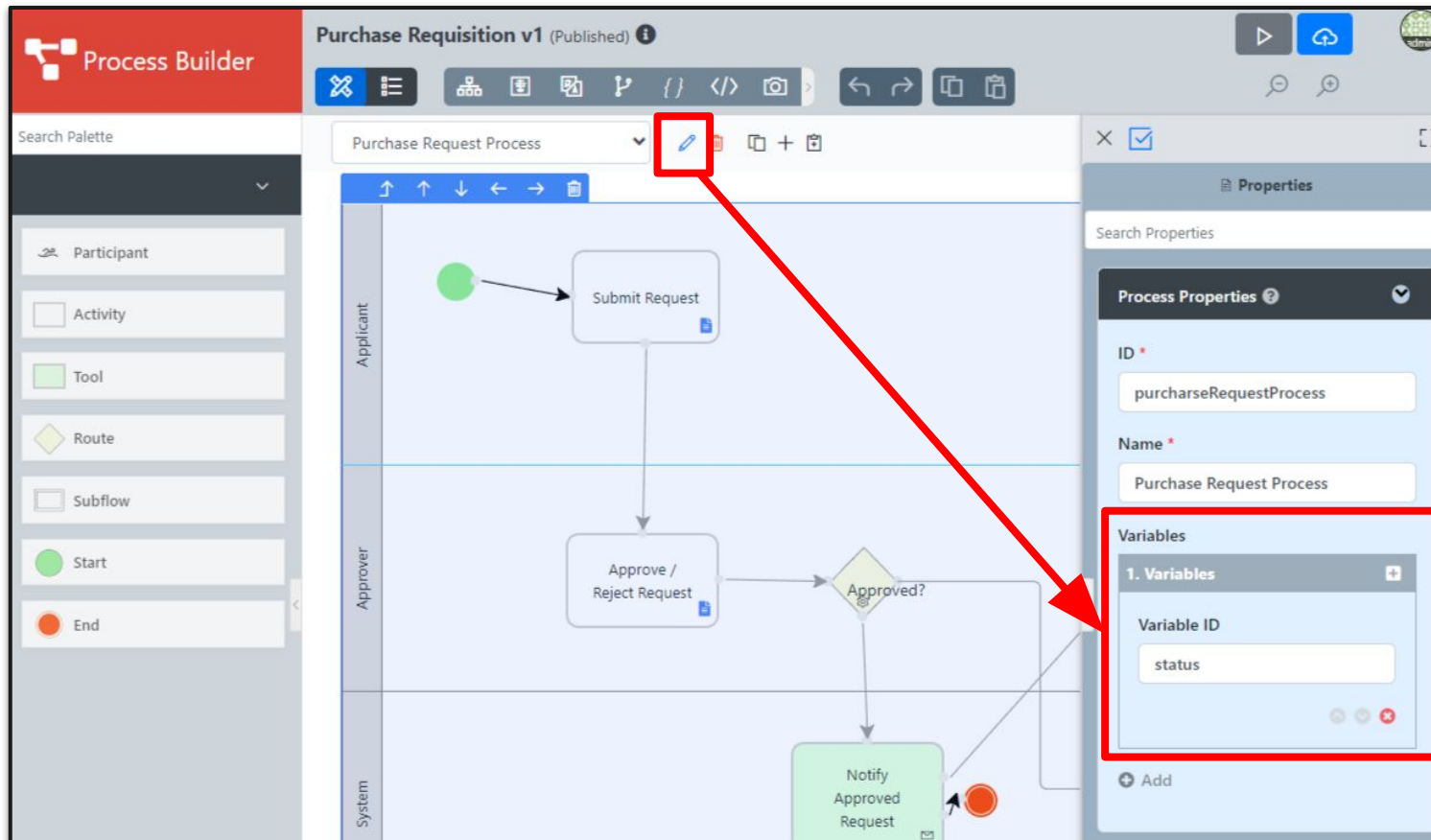


Chapter 1

Introduction to Hash Variable

What Is Hash Variable?

- Hash Variable **is not** Workflow Variable



What Is Hash Variable?

- Hash Variable is a special **hash-escaped keyword** that can be used in (but NOT limited to)...
 - Form Builder
 - List Builder
 - UI Builder
 - Supported plugin configuration properties
 - Activity name in Process Builder
 - External Form URL when mapping an activity to an external form
- ...to return the value of useful runtime variables from the (App) Variables.

Hash Variable

- Each Hash Variable element has its own **prefix**.

E.g.:

- **#date**.D-MMM-yyyy#
- **#form**.purchase_requests.name#
- **#variable**.status#
- **#i18n**.smtpServer#
- A new Hash Variable (with its own unique prefix) can be built through Joget plugin architecture.

Plugin Types



App Builder Components & Supported Plugin Types

UI Builder

- UI Menu
- UI Permission
- UI Theme
- UI Page Component

List Builder

- List Data Store
- List Action
- List Column Formatter
- List Filter Type
- List Template

Process Builder

- Deadline
- Process Participant
- Process Tool
- Process Form Modifier
- Decision Tool

Form Builder

- Form Field Element
- Form Load Data Store
- Form Save Data Store
- Form Options Data Store
- Form Validator
- Form Permission
- Process Form Modifier
- Post Form Submission Processing
- Generator

Addon Builder

- Custom Builder

App Platform

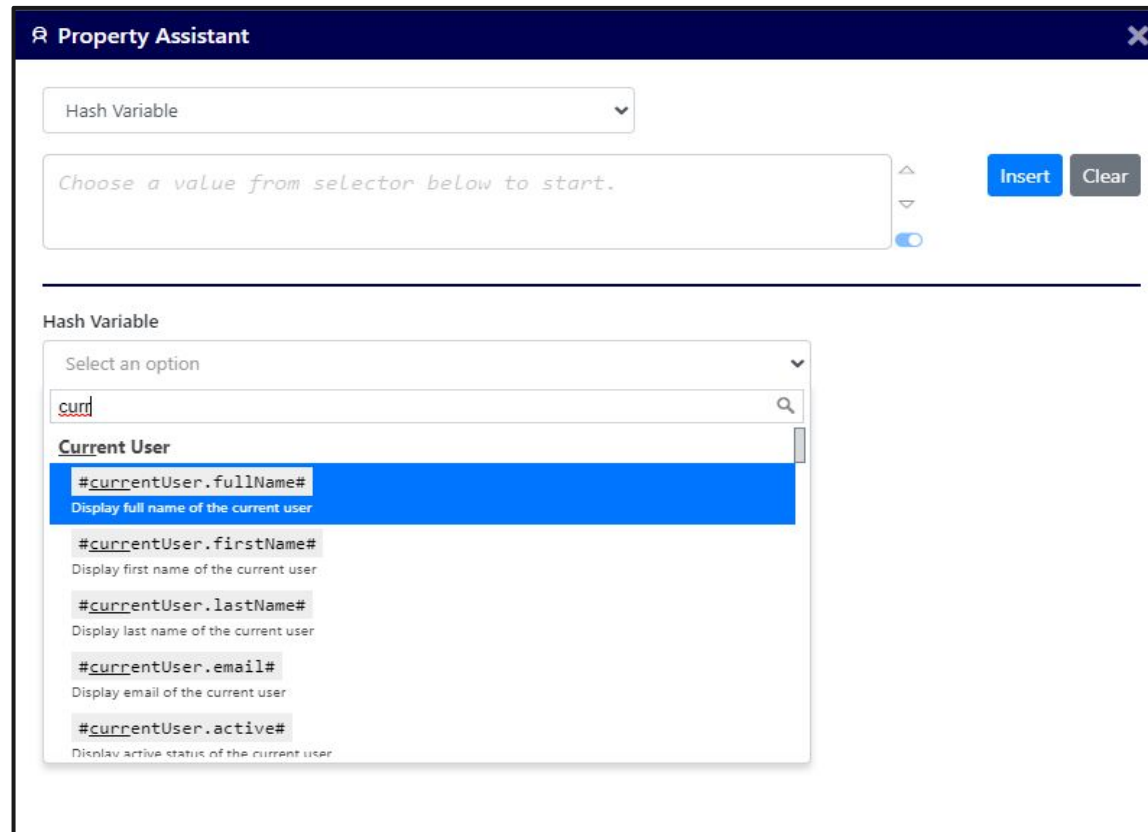
- Audit Trail
- Hash Variable
- Web Service

Platform

- Directory Manager
- Web Service
- Governance Health Check

Property Assistant

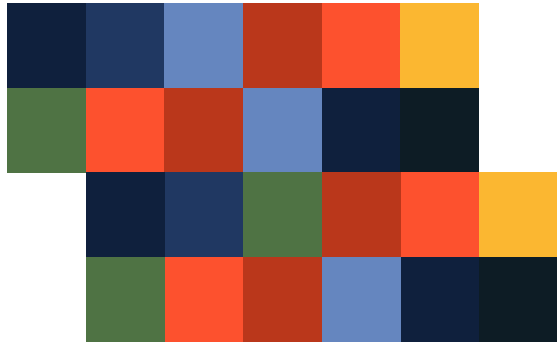
- Use **CTRL+SHIFT+3 (CTRL + #)** to open up the property assistant to help you autocomplete using hash variable.



The screenshot shows the 'Property Assistant' dialog box. At the top, there is a title bar with a search icon, the text 'Property Assistant', and a close button. Below the title bar, there is a dropdown menu labeled 'Hash Variable'. To the right of the dropdown is a search icon. Below the dropdown is a text input field with the placeholder text 'Choose a value from selector below to start.' To the right of the text input field are two buttons: 'Insert' (blue) and 'Clear' (grey). Below the text input field is a toggle switch. Below the toggle switch is a section titled 'Hash Variable'. This section contains a dropdown menu labeled 'Select an option' with a search icon. Below the dropdown menu is a list of options. The first option is 'Current User' and is highlighted in blue. Below 'Current User' are four options: '#currentUser.fullName#' (with the description 'Display full name of the current user'), '#currentUser.firstName#' (with the description 'Display first name of the current user'), '#currentUser.lastName#' (with the description 'Display last name of the current user'), and '#currentUser.email#' (with the description 'Display email of the current user'). Below these are two more options: '#currentUser.active#' (with the description 'Display active status of the current user').

Chapter Review

- Brief understanding on the purpose that Hash Variable serves.



Chapter 2

List of Hash Variables & Its Usages

Sample Use Case

- How to automatically display requestor's full name in a form?

Purchase Request Process - Submit Request

Request Details for Cat Grant

Name Cat Grant

Request Date * MM/DD/YYYY

Category Stationery

Items

Name	Quantity	Price
Click to edit	Click to edit	Click to edit
Add Row		

Remarks

Sample Use Case

- How to display requestor's full name in task / activity name instead of just "Approve / Reject Request"?

Activity Name	Process Name	Date Created	Service Level Monitor	Due Date
Approve / Reject Request Admin Admin	Purchase Request Process	29-09-2022 09:32 AM	-	-
Acknowledge Approval	Purchase Request Process	29-09-2022 09:30 AM	-	-
Submit Request	Purchase Request Process	29-09-2022 09:25 AM	-	-
Submit Request	Purchase Request Process	29-09-2022 09:24 AM	-	-
Submit Request	Purchase Request Process	29-09-2022 09:24 AM	-	-
Approve / Reject Request admin	Purchase Request Process	29-09-2022 09:23 AM	-	-
Submit Request	Purchase Request Process	29-09-2022 09:15 AM	-	-
Submit Request	Purchase Request Process	29-09-2022 09:15 AM	-	-

List of Hash Variables

- List Of Joget DX Hash Variables
 - Workflow Assignment Hash Variable
 - Workflow Process Hash Variable
 - Current User Hash Variable
 - Date Hash Variable
 - Environment Variable Hash Variable
 - App Variable Hash Variable
 - Form Data Hash Variable
 - Form Binder Hash Variable
 - App Definition Hash Variable
 - App Message Hash Variable (Internationalization)
 - Performer Hash Variable
 - Request Parameter Hash Variable
 - User Hash Variable
 - Userview Key Hash Variable
 - Workflow Variable Hash Variable
 - Request Hash Variable
 - Platform Hash Variable
 - Users Hash Variable
 - Bean Shell Hash Variable
 - Datalist Hash Variable
 - Expression Hash Variable
 - Report Builder Hash Variable
 - Code Builder Hash Variable

Reference:

<https://dev.joget.org/community/display/DX8/Hash+Variable>

Take 10~15 Minutes

Skim through all the hash variables in our Joget Community – Knowledge Base →

<https://dev.joget.org/community/display/DX8/Hash+Variable>

OR

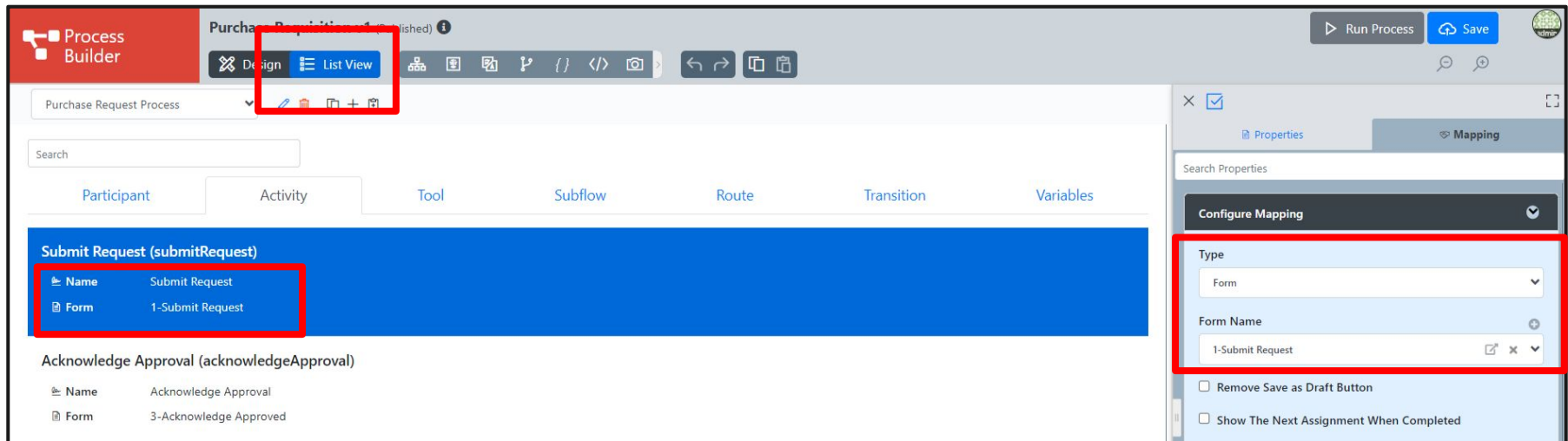
Go through slides 16 to 44 for the essentials.

Performer Hash Variable

- **Performer**

- To get **user information of the performer** of an activity.
 - #performer.*activityDefId*.id#,
 - #performer.*activityDefId*.username#,
 - #performer.*activityDefId*.firstName#,
 - #performer.*activityDefId*.lastName#,
 - #performer.*activityDefId*.email#,
 - #performer.*activityDefId*.active#,
 - #performer.*activityDefId*.timeZone#
- Replace “*activityDefId*” with the appropriate activity definition id.
- Reference:
<https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-PerformerHashVariable>

Performer Hash Variable

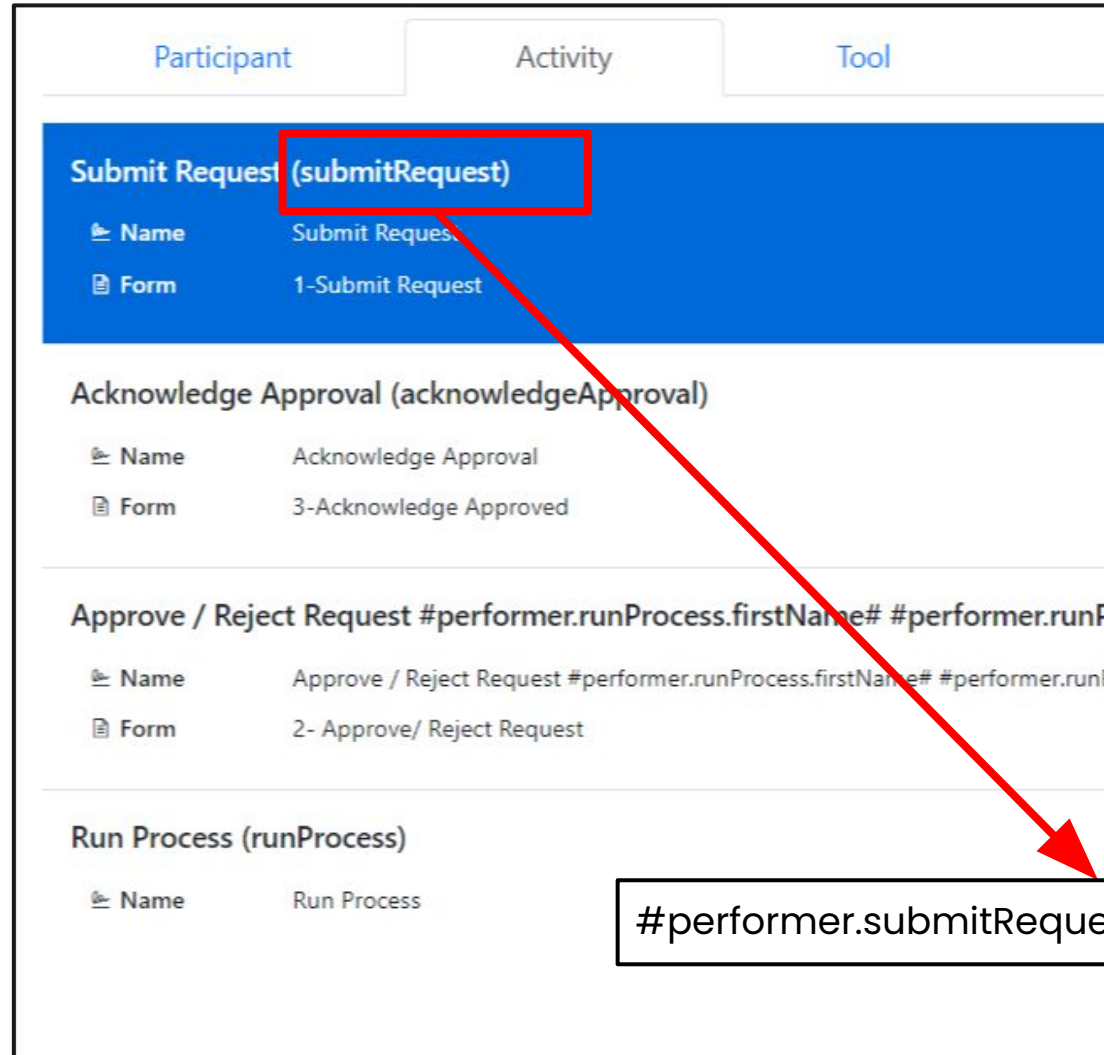


The screenshot displays the Joget Process Builder interface for a process named "Purchase Request Process". The "List View" tab is selected in the top navigation bar. The main workspace shows a list of activities, with "Submit Request (submitRequest)" highlighted. A red box highlights the "Name" and "Form" fields for this activity, showing "Submit Request" and "1-Submit Request" respectively. The right sidebar shows the "Configure Mapping" panel, which is also highlighted with a red box. It displays the "Type" as "Form" and the "Form Name" as "1-Submit Request".

Process Builder Interface:

- Top Bar:** Process Builder logo, "Purchase Request Process" title, "Design" and "List View" tabs, and "Run Process" and "Save" buttons.
- Search Bar:** A search input field.
- Activity List:** A list of activities with columns for Name, Form, and other details. The "Submit Request (submitRequest)" activity is highlighted.
- Configure Mapping Panel:** A panel on the right side of the interface, showing the "Type" as "Form" and the "Form Name" as "1-Submit Request".

Using #performer Hash Variable



The screenshot displays the Joget Designer interface with three tabs: Participant, Activity, and Tool. The 'Activity' tab is active, showing a list of activities in a table-like format. The first activity, 'Submit Request (submitRequest)', is highlighted with a red box. A red arrow points from this box to a text box containing the hash variable `#performer.submitRequest.username#`.

Activity Name	Form Name
Submit Request (submitRequest)	1-Submit Request
Acknowledge Approval (acknowledgeApproval)	3-Acknowledge Approved
Approve / Reject Request #performer.runProcess.firstName# #performer.runP	2- Approve/ Reject Request
Run Process (runProcess)	Run Process

Using #performer Hash Variable In Form Builder

Request Details **#performer.runProcess.firstName# #performer.runProcess.lastName#**

Name

Request Date *

Category ▼

Items

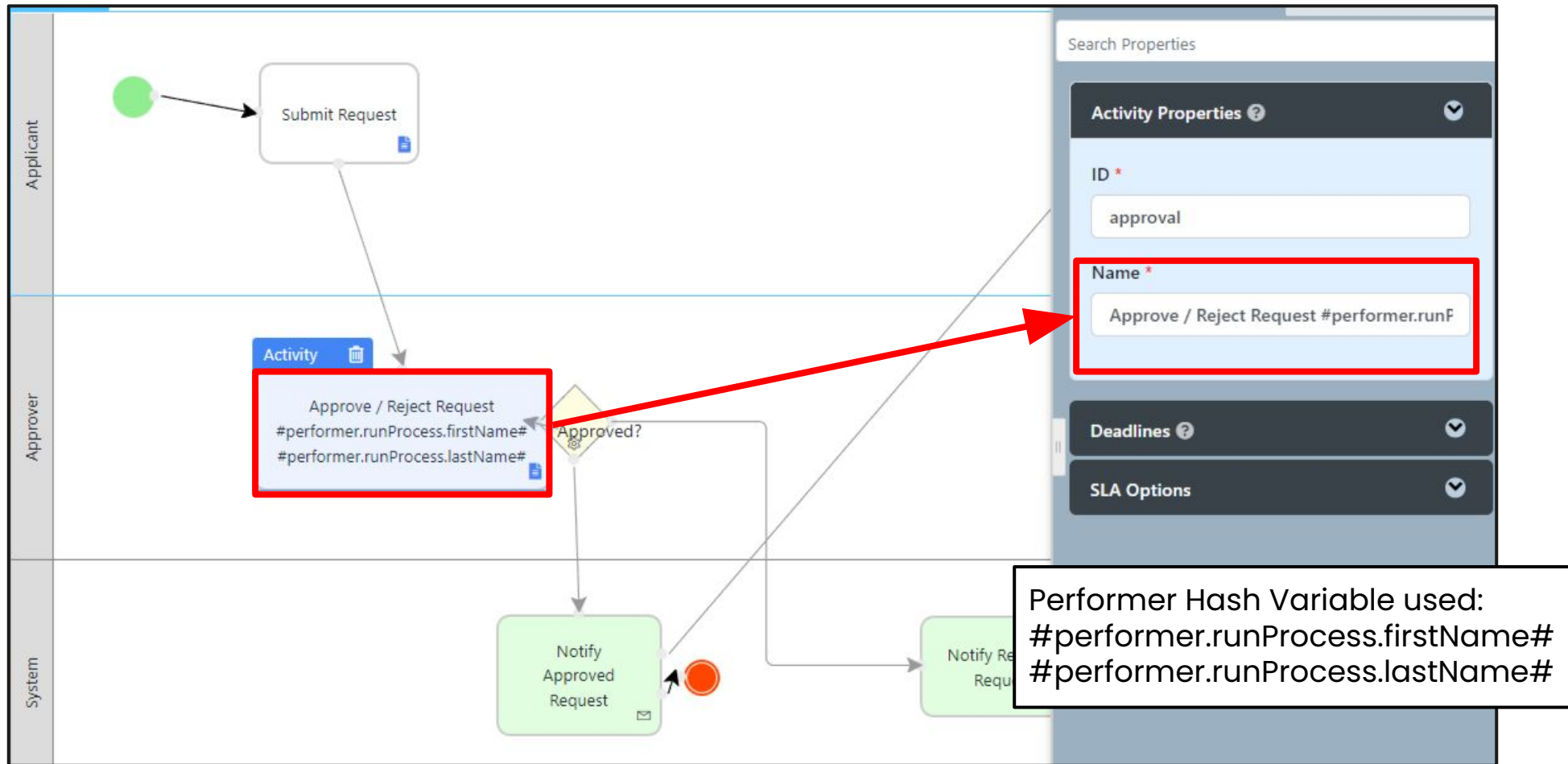
Name	Quantity	Price
Click to edit	Click to edit	Click to edit
Add Row		

Remarks

Custom HTML

Hash Variable can be used in Section Name & Form Element

Using #performer Hash Variable In Process Builder



Using #performer Hash Variable In Plugin Configuration

Configure Email ?

To (Specific email address)

#performer.submitRequest.email#

To (Participant ID)

CC

BCC

Subject

Rejected Request Notification

Message

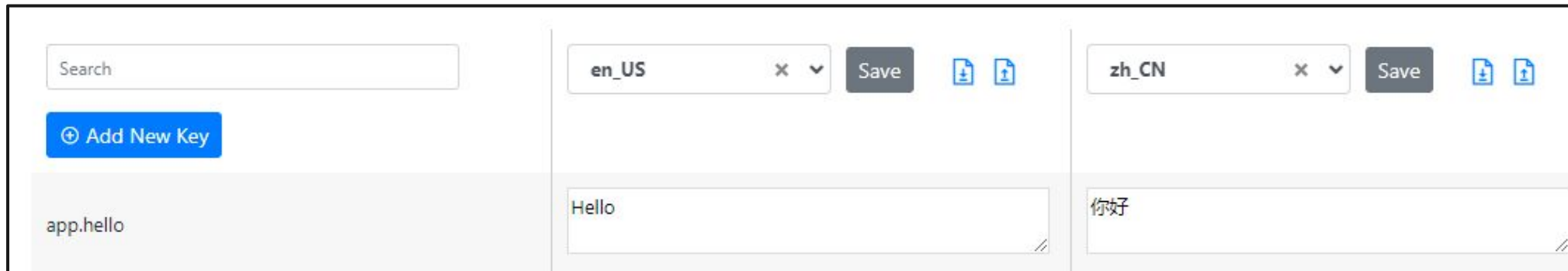
Dear,
#performer.submitRequest.firstName#
#performer.submitRequest.firstName#
Your Request Has Been Rejected

Internationalization Hash Variable

- **Internationalization support on application**
 - Support language localization on application level.
 - #i18n.*keyName*#
- Replace "*keyName*" with the appropriate message key.
- Reference:
[https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-AppMessageHashVariable\(Internationalization\)](https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-AppMessageHashVariable(Internationalization))

Using #i18n In UI Builder

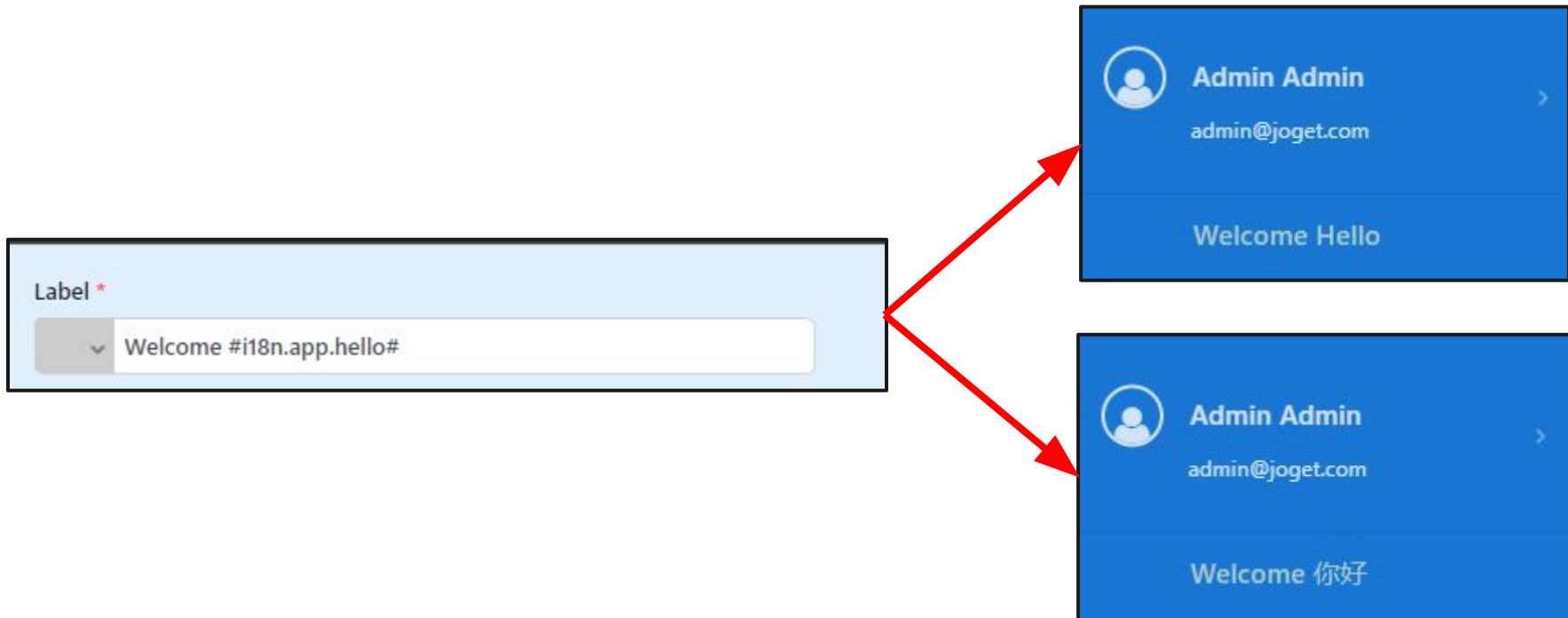
- The #i18n Hash Variable retrieves values from the **Message** set of the App.
- E.g. Message with key **app.hello** in 2 locales.



The screenshot displays the Joget UI Builder interface for configuring the #i18n Hash Variable. On the left, there is a search bar and a blue button labeled "Add New Key". Below these, the key "app.hello" is listed. The main area is divided into two panels for different locales: "en_US" and "zh_CN". Each panel has a "Save" button and two document icons. The "en_US" panel shows the value "Hello" in a text box, and the "zh_CN" panel shows the value "你好" (Ni hao) in a text box.

Using #i18n In UI Builder

- With the key defined, the hash variable can be used in the UI Builder to dynamically show corresponding value depending on the user's locale.

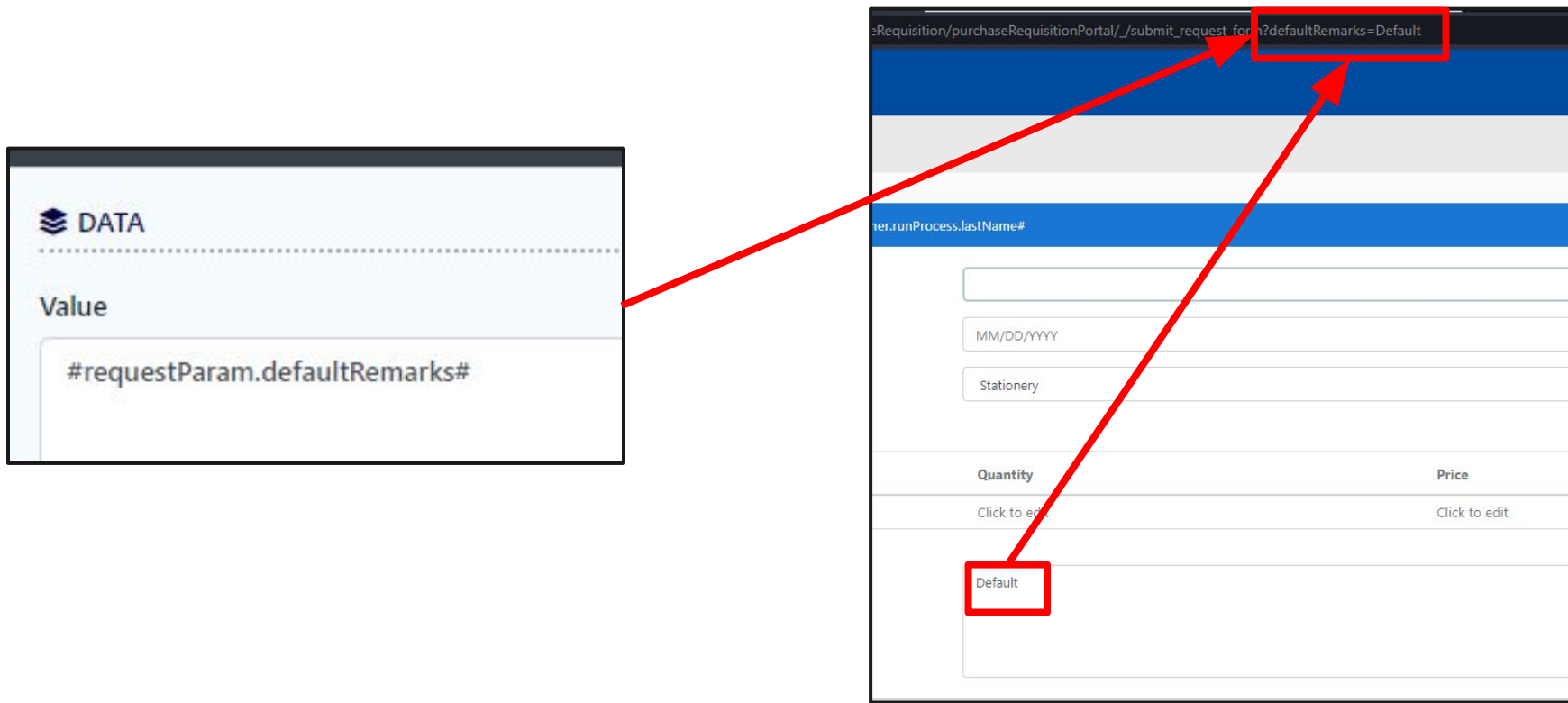


Request Parameter Hash Variable

- **Request Parameter**
 - For accessing request parameters.
 - #requestParam.*parameterName*#
- Replace “*parameterName*” with the appropriate request parameter name.
- Reference:
<https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-RequestParameterHashVariable>

Using #requestParam In Form Builder

- Useful to pre-populate form field.



The diagram illustrates the process of pre-populating a form field using a request parameter. On the left, a 'DATA' panel shows a 'Value' field containing the expression `#requestParam.defaultRemarks#`. A red arrow points from this expression to a form field in a web application. The web application is a purchase requisition portal. The URL bar shows `.../submit_request_for?defaultRemarks=Default`, with the `defaultRemarks=Default` part highlighted by a red box. Another red arrow points from the 'Default' value in the URL to a 'Default' button in the form, which is also highlighted by a red box. The form itself contains various input fields, including a date field (MM/DD/YYYY), a stationery field, and a table with columns for 'Quantity' and 'Price'.

App Variable Hash Variable

- **App Variable**

- Application level environment variable is typically used to store common or reusable values, such as company contact number.

- #appVariable.*keyName*#

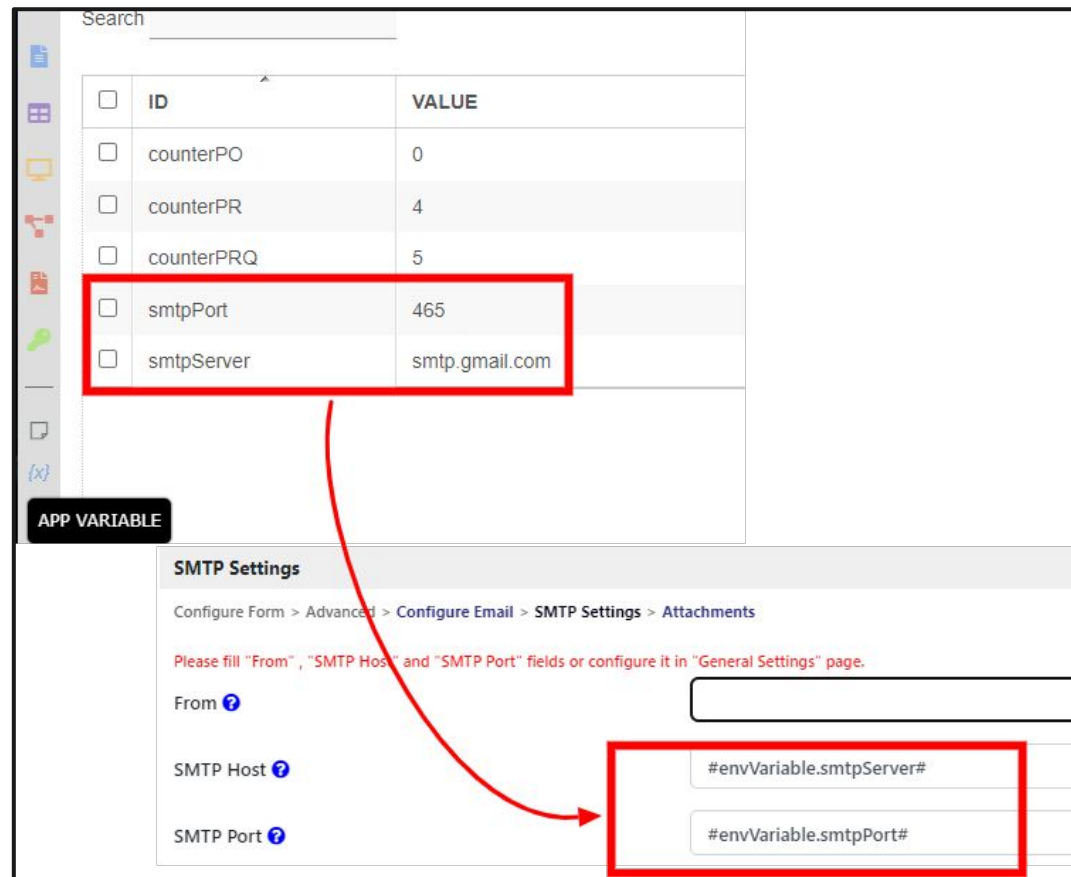
- Replace "*keyName*" with the appropriate App Variable name.

- Reference:

- <https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-EnvironmentVariableHashVariable>

Using #appVariable In Email Tool

- Use App Variable on Email Tool to ease maintenance.



The screenshot displays the Joget configuration interface. At the top, a table lists app variables with columns 'ID' and 'VALUE'. The variables are: counterPO (0), counterPR (4), counterPRQ (5), smtpPort (465), and smtpServer (smtp.gmail.com). The 'smtpPort' and 'smtpServer' rows are highlighted with a red box. Below this table is a section titled 'APP VARIABLE'. Further down, the 'SMTP Settings' section is shown, with a breadcrumb trail: 'Configure Form > Advanced > Configure Email > SMTP Settings > Attachments'. A red arrow points from the 'smtpServer' value in the table to the SMTP settings fields. The 'SMTP Host' field is set to '#envVariable.smtpServer#' and the 'SMTP Port' field is set to '#envVariable.smtpPort#', both of which are also highlighted with a red box.

ID	VALUE
counterPO	0
counterPR	4
counterPRQ	5
smtpPort	465
smtpServer	smtp.gmail.com

APP VARIABLE

SMTP Settings

Configure Form > Advanced > Configure Email > SMTP Settings > Attachments

Please fill "From", "SMTP Host" and "SMTP Port" fields or configure it in "General Settings" page.

From ?

SMTP Host ?

SMTP Port ?

#envVariable.smtpServer#

#envVariable.smtpPort#

Current User Hash Variable

- **Current User**

- Retrieve currently logged in user's information.

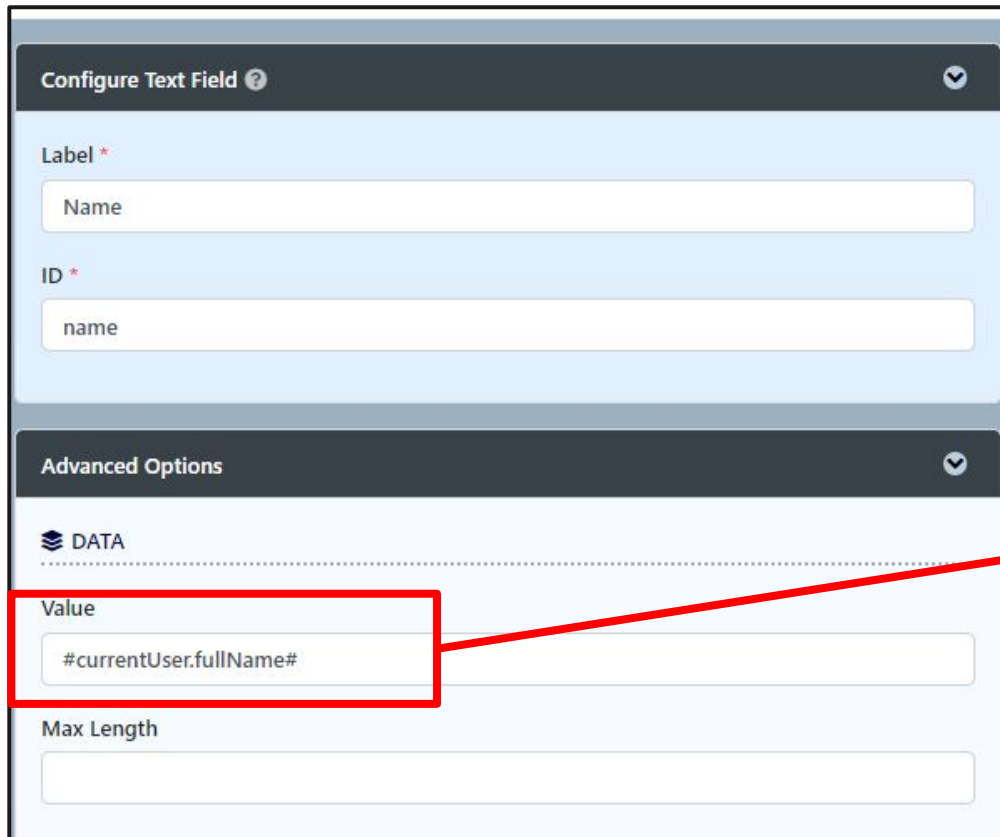
- #currentUser.username#
 - #currentUser.firstName#
 - #currentUser.lastName#
 - #currentUser.fullName#
 - #currentUser.email#
 - and many more...

- Reference:

- <https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-CurrentUserHashVariable>

Using #currentUser In Form Builder

- Prepopulate applicant's name in Form



Configure Text Field ?

Label *

Name

ID *

name

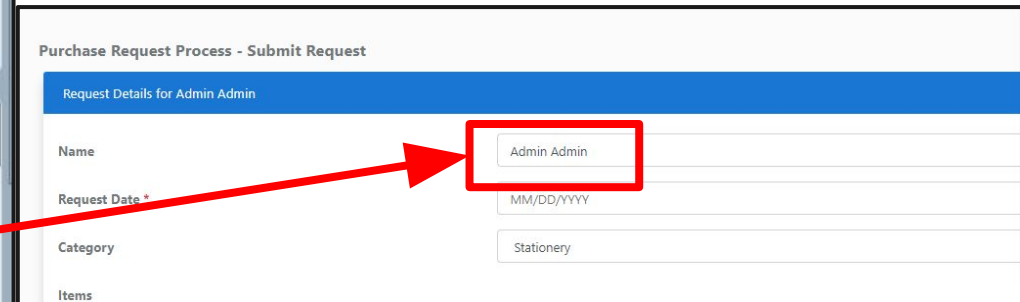
Advanced Options

DATA

Value

#currentUser.fullName#

Max Length



Purchase Request Process - Submit Request

Request Details for Admin Admin

Name

Request Date *

Category

Items

Admin Admin

MM/DD/YYYY

Stationery

User Hash Variable

- **User**

- To get **user information** based on **username**.

- #user.*username*.username#
 - #user.*username*.firstName#
 - #user.*username*.lastName#
 - #user.*username*.fullName#
 - #user.*username*.email#
 - and many more...

- Replace "*username*" with the appropriate user's username.

- Reference:

<https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-UserHashVariable>

Using #user Hash Variables

- To get user information based on the

Example:

#user.admin.email#

#user.cat.firstName#

#user.{form.purchase_requests.username}.firstName#

#user.{form.purchase_requests.username}.lastName#

This is a **Nested hash variable** where one can include a hash variable inside another hash variable.

Subsequent level of hash variable is encapsulated with a pair of **curly bracket**.

Assignment Hash Variable

- **Assignment**
 - To get **workflow activity information** of the current assignment.
 - #assignment.processId#
 - #assignment.processDefId#
 - #assignment.processDefIdWithoutVersion#
 - #assignment.processName#
 - #assignment.processVersion#
 - #assignment.processRequesterId#
 - #assignment.applId#
 - #assignment.activityId#
 - #assignment.activityName#
 - #assignment.activityDefId#
 - #assignment.assigneId#
- Reference:
<https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-WorkflowAssignmentHashVariable>

Using #assignment In Form Builder

- Retrieve current assignment information.

Custom HTML

#assignment.processId#
#assignment.processDefId#
#assignment.processDefIdWithoutVersion#
#assignment.processName#
#assignment.processVersion#
#assignment.processRequesterId#
#assignment.appId#
#assignment.activityId#
#assignment.activityName#
#assignment.activityDefId#
#assignment.assigneeId#

Remarks

903_purchaseRequisition_purchaseRequestProcess
purchaseRequisition#7#purchaseRequestProcess
purchaseRequestProcess
Purchase Request Process
7
admin
purchaseRequisition
903_903_purchaseRequisition_purchaseRequestProcess_submitRequest
Submit Request
submitRequest
admin

Form Data Hash Variable

- **Form**

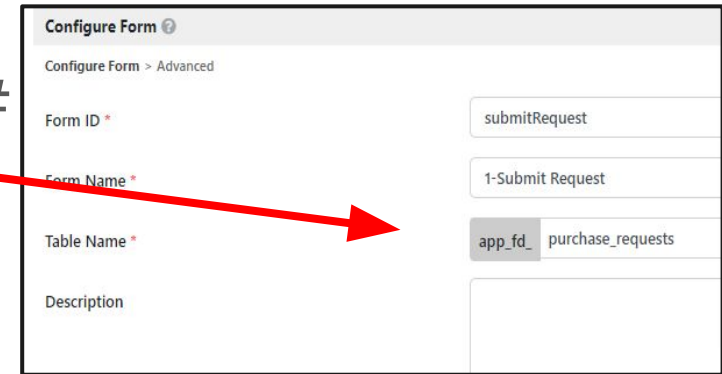
- To get **data from form table**.
- `#form.formDataTableName.fieldId#`

- Replace "*formDataTableName*" and "*fieldId*" with the appropriate table name and field id.

- `#form.purchase_requests.date_required#`

- Reference:

<https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-FormDataHashVariable>



Configure Form ?

Configure Form > Advanced

Form ID *

Form Name *

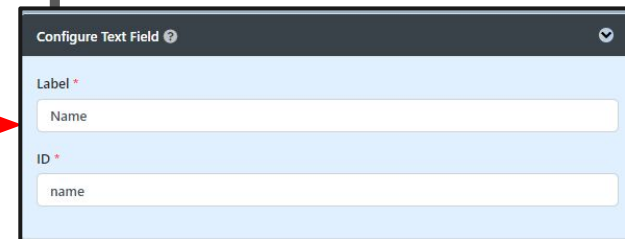
Table Name *

Description

submitRequest

1-Submit Request

app_fd_ purchase_requests



Configure Text Field ?

Label *

ID *

Name

name

Using #form In Email Tool/ Plugin Configuration

Format:

#form.*formDataTableName*.*fieldId*#

- Examples:

- #form.purchase_requests.name#
- #form.purchase_requests.request_date#
- #form.purchase_requests.approval[0001]#
 - To retrieve the field value by specifying a specific record primary key value, 0001.
- **#form.purchase_requests.approval[{variable.recordId}]#**
//using **nested Hash Variable** with curly bracket.
 - To achieve the same result like the previous point but by making reference to another Hash Variable for its record primary key value.

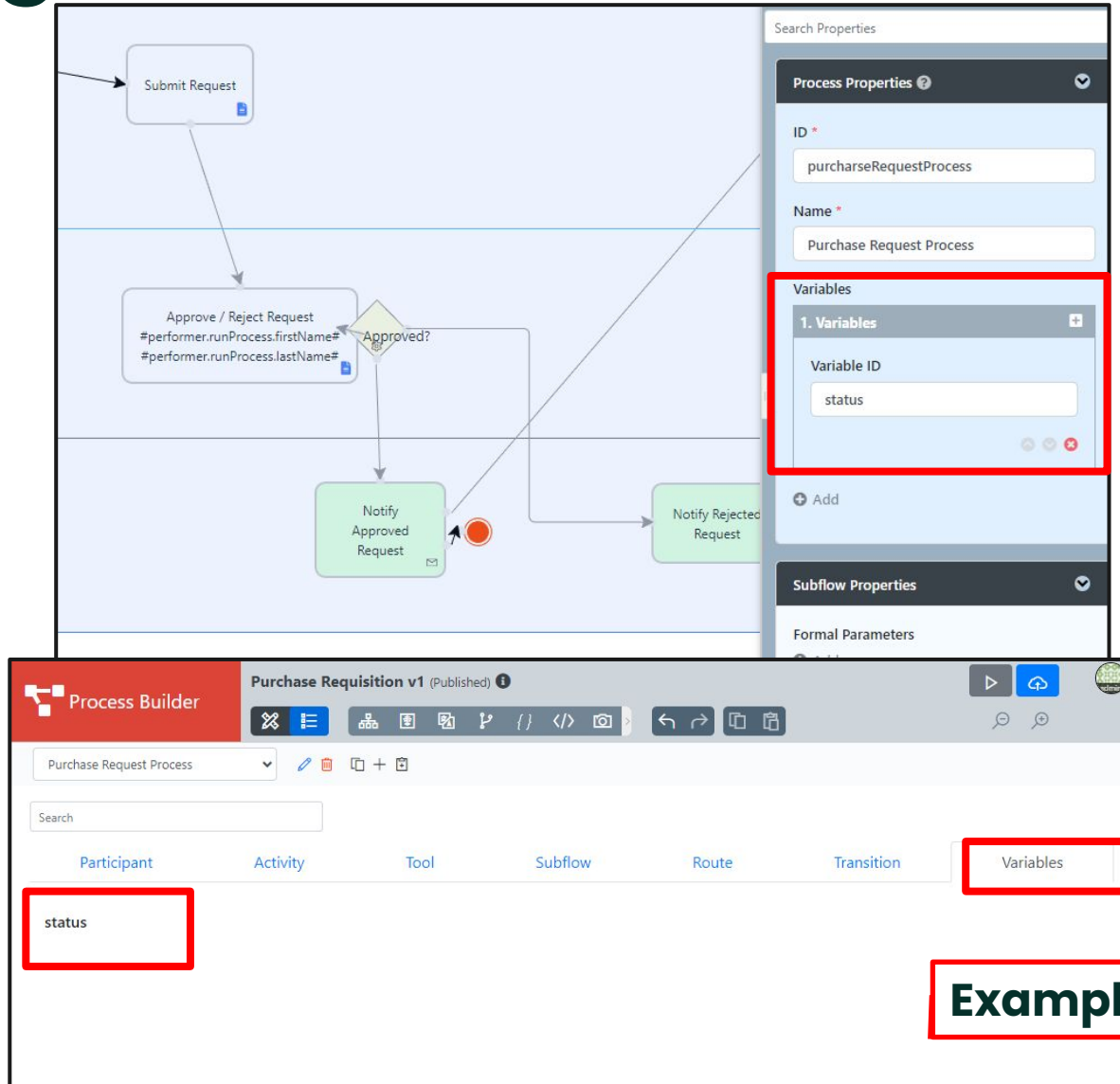
Using #form In Email Tool / Plugin Configuration

CC	<input type="text"/>
BCC	<input type="text"/>
Subject	Rejected Purchase Request Notification
Message	<div>Dear #performer.submitRequest.userName# Your Purchase Request Has Been Rejected Items Requested: #form.purchase_requests.items#</div>

Workflow Variable Hash Variable

- **Workflow Variable**
 - To get the **value of a workflow variable**.
 - `#variable.variableName#`
- Replace “*variableName*” with the appropriate workflow variable name.
- Reference:
<https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-WorkflowVariableHashVariable>

Using #variable Hash Variable



The screenshot displays the Joget Process Builder interface for a process named "Purchase Requisition v1". The main canvas shows a workflow with the following steps:

- Submit Request**: The starting activity.
- Approve / Reject Request**: A decision activity that uses hash variables `#performer.runProcess.firstName#` and `#performer.runProcess.lastName#`. It has a decision diamond labeled "Approved?".
- Notify Approved Request**: A task activity reached if the request is approved.
- Notify Rejected Request**: A task activity reached if the request is rejected.

On the right side, the "Properties" panel is open, showing the configuration for the selected activity:

- Process Properties**: ID is `purchaseRequestProcess`, Name is `Purchase Request Process`.
- Variables**: A section titled "1. Variables" containing a **Variable ID** field with the value `status`. This section is highlighted with a red box.
- Subflow Properties**: Formal Parameters section is visible below.

At the bottom, the "Process Builder" toolbar is visible, showing tabs for Participant, Activity, Tool, Subflow, Route, Transition, and Variables. The "Variables" tab is selected and highlighted with a red box. Below the tabs, a search bar and a list of variables are shown, with `status` highlighted in a red box.

Example: #variable.status#

Date Hash Variable

- **Date**

- To **get date time** according to a specified format.

- `#date.dateFormat#`

- `#date.[DAY/MONTH/YEAR][+/-]IntegerValue.dateFormat#`

- Examples:

- **`#date.h:mm a#`** will produce
12:08 PM

- **`#date.EEE, d MMM yyyy h:mm:ss a#`** will produce
Wed, 4 Jul 2009 12:08:56 PM

- Replace “*dateFormat*” with the appropriate keyword documented in **SimpleDateFormat** class

- <https://docs.oracle.com/javase/8/docs/api/java/text/SimpleDateFormat.html>

- Reference:

- <https://dev.joget.org/community/display/DX8/Hash+Variable#HashVariable-DateHashVariable>

Using #date Hash Variables

- Source:
<https://docs.oracle.com/javase/8/docs/api/java/text/SimpleDateFormat.html>

Letter	Date or Time Component	Presentation	Examples
G	Era designator	Text	AD
y	Year	Year	1996; 96
Y	Week year	Year	2009; 09
M	Month in year (context sensitive)	Month	July; Jul; 07
L	Month in year (standalone form)	Month	July; Jul; 07
w	Week in year	Number	27
W	Week in month	Number	2
D	Day in year	Number	189
d	Day in month	Number	10
F	Day of week in month	Number	2
E	Day name in week	Text	Tuesday; Tue
u	Day number of week (1 = Monday, ..., 7 = Sunday)	Number	1
a	Am/pm marker	Text	PM
H	Hour in day (0-23)	Number	0
k	Hour in day (1-24)	Number	24
K	Hour in am/pm (0-11)	Number	0
h	Hour in am/pm (1-12)	Number	12
m	Minute in hour	Number	30
s	Second in minute	Number	55
S	Millisecond	Number	978
z	Time zone	General time zone	Pacific Standard Time; PST; GMT-08:00
Z	Time zone	RFC 822 time zone	-0800
X	Time zone	ISO 8601 time zone	-08; -0800; -08:00


Using #date Hash Variables

- Example: #date.**EEE, d MMM yyyy h:mm:ss a**#


Java SimpleDateFormat

- Sample Output: **Mon, 28 Dec 2019 11:27:26 AM**

Using #date Hash Variables

- Example: `#date.DAY+7.EEE, d MMM yyyy
h:mm:ss a#`

- Sample Output: **Mon, 4 Jan 2020 11:27:26 AM**

Using #date Hash Variables

- Example: `#date.MONTH-2.EEE, d MMM yyyy
h:mm:ss a#`

- Sample Output: **Wed, 28 Oct 2019 11:27:26 AM**

Using #date Hash Variables

- Example: `#date.YEAR+1.EEE, d MMM yyyy
h:mm:ss a#`

- Sample Output: **Tue, 28 Dec 2020 11:27:26 AM**

Chapter Review

- Appreciate the flexibility and convenience brought by the Hash Variable.
- Able to apply the Hash Variable feature into app development.



Chapter 3

Nested Hash Variable

Nested Hash Variable

- **Hash Variable** can be used inside another **Hash Variable** to form a **Nested Hash Variable**.
- The syntax for the inner and subsequent Hash Variables is wrapped by a pair of curly bracket '{' and '}' instead of the usual pair of #.
- Example: **#prefix.{prefix.variableKey}#**
- There is **no** limit to the depth of the nested variable.

Example of Nested Hash Variable

- `#date.{envVariable.dateFormat}#`
- `#user.{variable.username}.fullName#`
- `#form.tableChild.field[{form.tableParent.childId}]#`

Chapter Review

- Appreciate the flexibility and convenience brought by the Hash Variable.
- Able to apply the Hash Variable feature into application development.

Exercise 1

In “Request” form, pre-populate the applicant’s name using hash variable.

Name	<input type="text" value="Admin Admin"/>
Request Date *	<input type="text" value="MM/DD/YYYY"/>
Category	<input type="text" value="Stationery"/>

Exercise 2

In “**Notify Rejected Request**” Email Tool, compose the message as the following using hash variable.

Go through the process flow to send out the test email.

Dear **[applicant name]**,

Your request has been **[status]** due to the following reason:-

[rejected reason]

Thank you.

Exercise 3

In Inbox, instead of just showing “Approve / Reject Request”, include the applicant’s name to the example as follow:-

Activity Name	Process Name
Approve / Reject Request Admin Admin	Purchase Request Process

Exercise 4

Create a new request list that will only show requests that are submitted by the *current logged in user*.

- Create a new List
Add filter criteria in “Extra Filter Condition”.
 - E.g. (**c_name = 'Cat Grant'**)
 - Replace 'Cat Grant' with the appropriate Hash Variable
- Add the created list into the existing UI

Reference:

<https://dev.joget.org/community/display/DX8/Form+Data+Binder>

Exercise 5 – Optional

Make use of App Variable to store commonly used settings or attributes

- e.g. Branding in (more than one) form/page.

Then, display this app variable value where applicable in your app.

Reference: <https://dev.joget.org/community/display/DX8/App+Variable>

Exercise 5 – Optional

Branding in (more than one) form/page.

Purchase Request Process - Submit Request

Company letterhead/branding here

Request Details Admin Admin

Name

Request Date * 

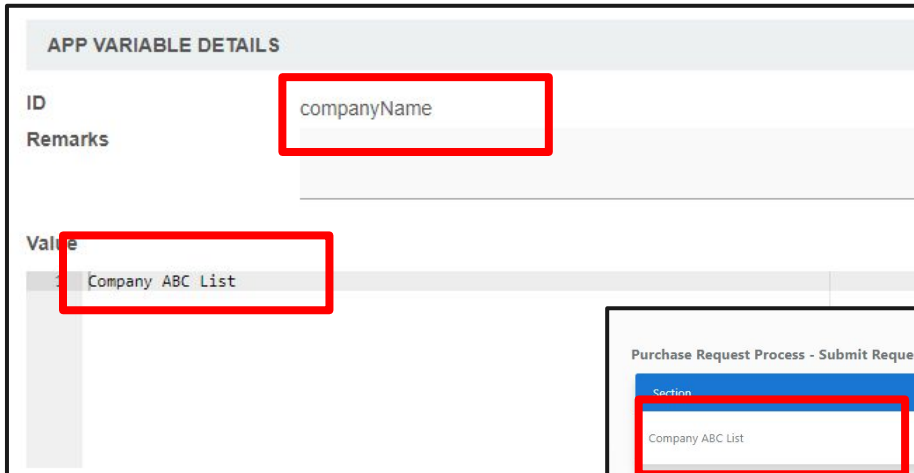
Category 

Items

Name	Quantity	Price
------	----------	-------

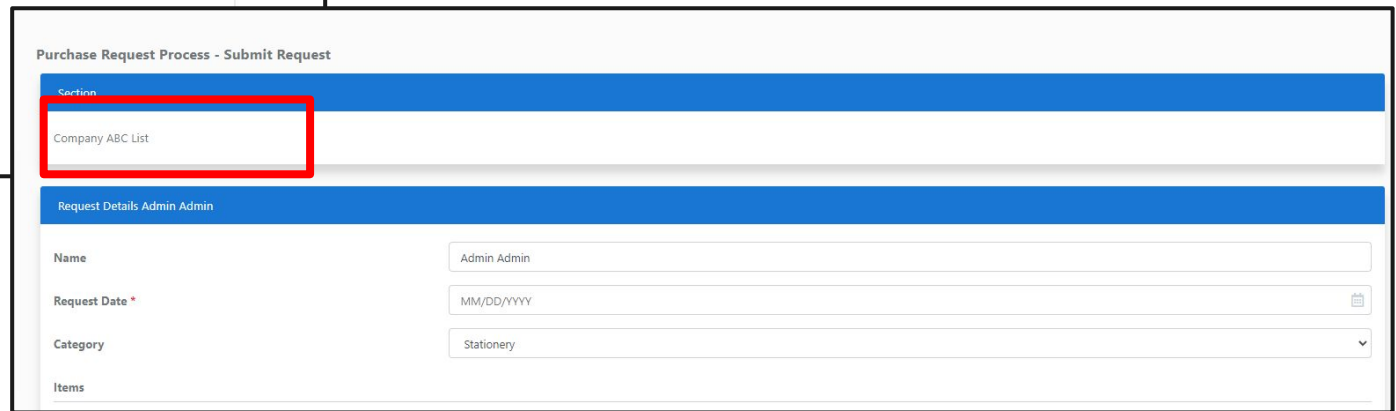
Exercise 5 - Optional

Branding in (more than one) form/page.



APP VARIABLE DETAILS

ID	companyName
Remarks	
Value	Company ABC List



Purchase Request Process - Submit Request

Section

Company ABC List

Request Details Admin Admin

Name	Admin Admin
Request Date *	MM/DD/YYYY
Category	Stationery
Items	

In the form design, drag in a **Custom HTML form element**, use hash variable to obtain the app variable value.

Exercise 6 – Optional

Retrieve the total count of records from a specific List.

Hint: Do refer to KB!

Configure Custom HTML ?

ID *

field10

Custom HTML

1	Total Count of Records
2	#datalist.total.exercise4#

Exercise 6

Total Count of Records 3

Exercise 7 – Optional

Retrieve the total count of records from a specific List using **Information Tile**

Hint: Information Tile is a new feature in Joget DX8. Do refer to KB!

Components to display statistics or summarized values.



3

TOTAL RECORDS IN LIST "EXERCISE 4"



15

TOTAL RECORDS IN LIST "Request List"

Materials

Completed App with the optional exercises can be obtained from the file 9.3.jwa.

Discussion

- When will the hash variables be parsed?
- Can end user write hash variable when submitting form?
- Can we develop a new hash variable plugin?
- Can we have redundant hash variable prefix?
(e.g.: another hash variable plugin with the same prefix as currently available ones)

Module Review

1. Introduction to Hash Variable
2. List of Hash Variable and Its Usages
3. Nested Hash Variable

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