

# IBM Cloud Pak for Automation

Lab instructions for

## Business Automation Insights

### BAI events setup for BPMN, Case and ODM with Kibana dashboards

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# 0 Introduction

In this lab, you will implement the complete IBM Business Automation Insights (BAI) sub-scenario of the Cloud Pak for Automation (CP4Automation) Labs and Demos. To do this you will primarily work with BAI tools but also work with some tools of IBM Business Automation Workflow (BAW) and IBM Operational Decision Manager (ODM).

The insights will be created for a Mortgage Application scenario that is based on a bank's solution to automate its handling of new mortgage applications. The mortgage application scenario uses all the pillars of the DBA platform but, in this lab, we will primarily focus on the available BAI emitters from BAW and ODM. You can build the BAW portion of the mortgage application solution in Lab 4 and the ODM portion in Lab 6.

Duration: ~10 hours.

## 0.1 Audience

Everyone interested in the Cloud Pak for Automation (CP4Automation) space, especially for those looking to create and view insights into their business and implementation. This will also be a pre-cursor to future labs that deal with Artificial Intelligence for the DBA platform. Some of the roles in the Audience can be:

### Business User

Gain insights using the business data from the CP4Automation solution(s). For example, in the Mortgage Application solution, see how many mortgages get approved despite a high-risk recommendation from ODM.

### Process Owner

Gain insights into the operations of the CP4Automation solution(s). For example, in the Mortgage Application solution, see which users are performing which tasks efficiently.

### DevOps / System Admins

Gain insights into the workings of the CP4Automation solution(s). For example, in the Mortgage Application solution, understand which tasks, processes and rules take the longest to complete.

## 0.2 Prerequisites

- Some experience in IBM Business Automation Workflow and IBM Operational Decision Manager would be useful but is not required.

### *0.3 Objectives*

As part of this sub-scenario, you will:

1. Learn the high-level architecture and features of BAI.
2. Get introduced to the tools that are a part of BAI.
3. Modify a BAW solution to emit business data – a BPMN Process and a Case.
4. Modify ODM rules to emit business data.
5. View the emitted data in BAI datastores (Elasticsearch/Kibana & Hadoop).
6. Anonymize data that goes into Hadoop as a General Data Protection Regulation (GDPR) measure.
7. Understand the basics of using Kibana.
8. Use the out-of-the-box dashboards that ship with BAI.
9. Create new visualizations and dashboards that use the emitted business data in Kibana.
10. Integrate your visualizations into a Workflow solution.
11. Create an application that reads the data being emitted to Kafka's egress topic.

## *0.4 Lab Structure*

This lab is subdivided into multiple exercises. Most exercises consist of the following sections:

- 1) Exercise Introduction  
Describes what you will learn & complete in this exercise.
- 2) Step by Step Instructions  
Guides you in easy to understand steps through the whole exercise. To be used by less experienced attendees.
- 3) Verification Instructions  
Guides you through how to test & verify your implementation.
- 4) Exercise Summary  
Summarizes what you have completed & learned.

## *0.5 Tools, User IDs and Passwords*

In this lab, you will access the following tools. The tool to access, along with the username and password will also be mentioned in the lab exercise itself.

For your convenience, we have prepared bookmarks in Chrome and Firefox for all the tools mentioned below.

Tool	Location in Chrome/Firefox Bookmarks Toolbar	User ID(s) / Password
Windows	N/A	Administrator / passw0rd
Kibana	BAI > Kibana <a href="https://mini:5601/">https://mini:5601/</a>	admin / passw0rd
Hadoop Filesystem	BAI > HDFS – Browse <a href="http://namenode:50070/explorer.html#/">http://namenode:50070/explorer.html#/</a>	Not needed
Workflow Center	BAW > Workflow Center <a href="https://ibmbaw:9443/WorkflowCenter/">https://ibmbaw:9443/WorkflowCenter/</a>	admin / admin
Case Administration tool	Available from the Workflow Center	admin / admin
Process Designer	Available from the Workflow Center	admin / admin
Mortgage Application Desktop	BAW > Desktops > Mortgage Application <a href="https://ibmbaw:9443/navigator/?desktop=MA">https://ibmbaw:9443/navigator/?desktop=MA</a>	admin / admin

Case Client	BAW > Desktops > BAW <a href="https://ibmbaw:9443/navigator/?desktop=baw">https://ibmbaw:9443/navigator/?desktop=baw</a>	admin / admin
ODM Rule Execution Server	ODM > Rule Execution Server <a href="http://localhost:9090/res/">http://localhost:9090/res/</a>	resAdmin / resAdmin
ODM Rule Execution Server	ODM > Decision Center Business Console <a href="http://localhost:9090/decisioncenter">http://localhost:9090/decisioncenter</a>	rtsAdmin / rtsAdmin

Note: User admin with password admin can be used for almost all tools in this scenario.

# 1 Exercise: Getting Started

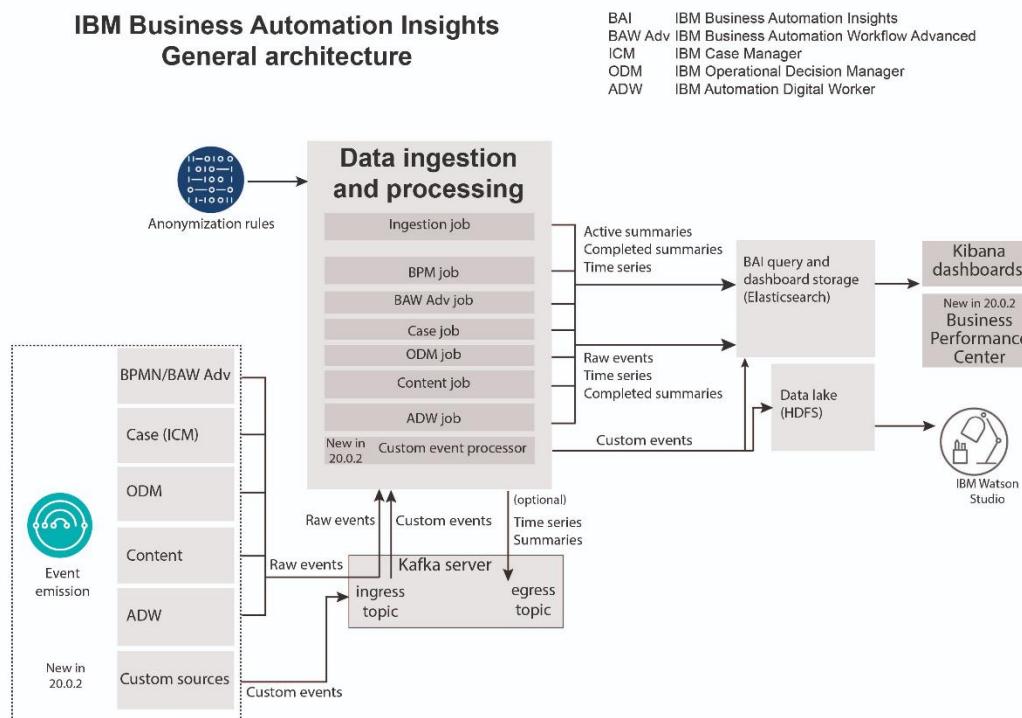
## 1.1 Getting Started – Introduction to BAI

In this exercise, you will:

1. Understand the high-level architecture of BAI.
2. Verify that your environment has started successfully.
3. Verify that you can login to the tools required for the remaining exercises.

IBM Business Automation Insights provides functionality to enable platform-level visual insights and feeds a data lake to infuse artificial intelligence into IBM Digital Business Automation.

A typical BAI high-availability deployment is done on an OpenShift platform with Kubernetes cluster. Let's look at BAI's architectural diagram on an OpenShift platform.



Important things to note from the architectural diagram above:

1. Currently, there are 5 emitters available for BAI from the CP4Automation platform – BPMN/BAW Advanced, Case, ODM, Content and Digital Worker.
2. Since BAI V20.0.2 there is a new way allowing processing of custom events described by Avro schema from custom sources.
3. Emitters from the different pillars of the CP4Automation platform send raw events in Business Event format to Kafka which are then processed by BAI and finally stored in different datastores.
4. Data is stored in Elasticsearch and a data lake (HDFS - if configured). You will explore the Elasticsearch datastore in [exercise 3](#).
5. The type of data stored is different in each datastore. E.g.: Only the Hadoop datastore stores the raw events.
6. Anonymization rules are available to anonymize data going into the long-term storage (Hadoop) as per GDPR requirements. You will create anonymization rules to protect business data in [exercise 4](#).
7. The data in the long-term storage can be used in conjunction with Watson or other Data Science technologies to enable artificial intelligence on the business data.
8. The data stored in Elasticsearch can be used to create UI based visualizations and dashboards in Kibana. You will work with Kibana in [exercises 5-7](#).
9. The visualizations created in Kibana can be embedded into other UIs such as the task UI for a knowledge worker in BAW. You will do this in [exercise 8](#).

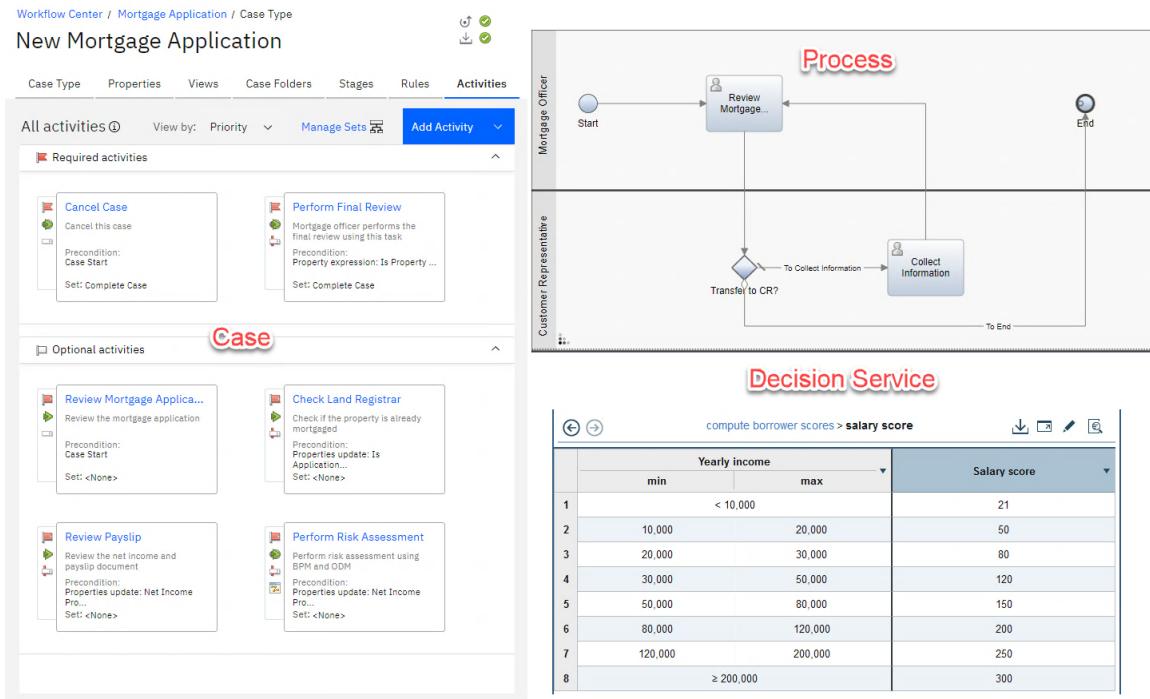
However, deployment to a single node in a development or production environment is also available. This is a simplified deployment used during the lab. It does not need Kubernetes cluster, just Docker with Docker Compose. It is a lightweight deployment with all the features available for BAW and ODM.

Additional information about BAI is also available in the [Knowledge Center](#). It can be Googled easily when searching e.g. for “IBM BAI knowledge center”.

## 1.2 Getting Started – Introduction to the solution

BAI always collects and processes events from some components. That's why it is important to understand context and details of the whole solution. What are the collected events, what business data are propagated and what is the expected outcome – processed data, dashboards, alerts, AI/ML inputs etc.

In our lab, BAI is processing events from a Case solution with a Case. The Case has couple of activities which are implemented as BPMN processes. And one of the processes (Perform Risk Assessment) calls ODM Decision Service for risk evaluation. All the components interact and exchange specific business data about the customer, loan, approvals, risk assessment etc.

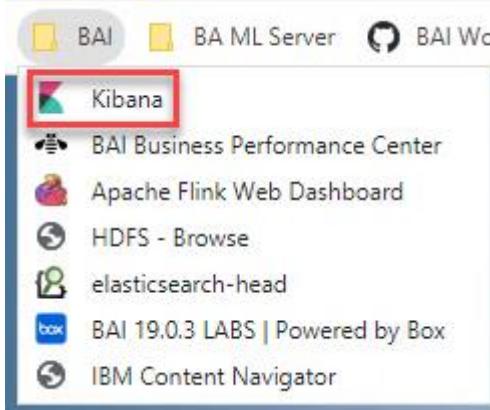


### 1.3 Getting Started – Step by Step Instructions

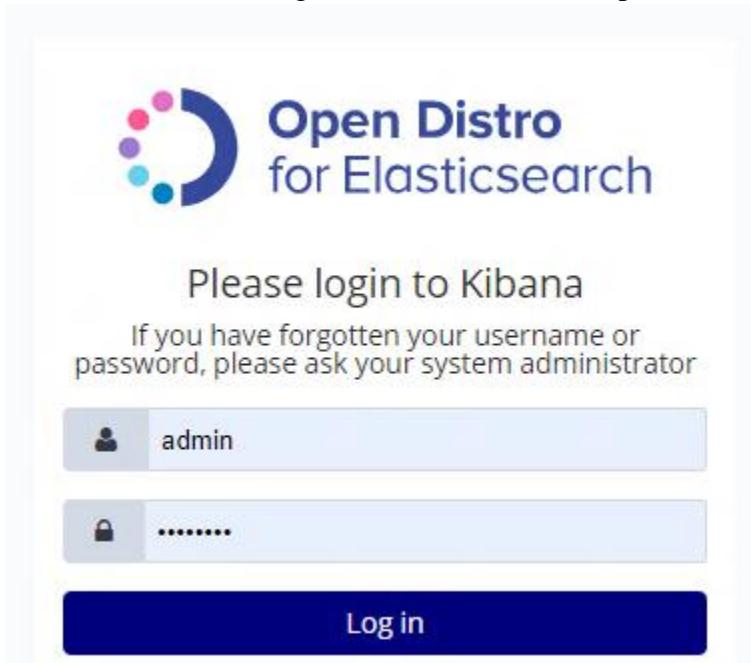
1. Open Chrome web browser from the Windows taskbar.



2. You can check that BAI is running by opening Kibana user interface in Chrome. In the Chrome's bookmarks bar open “BAI > Kibana”



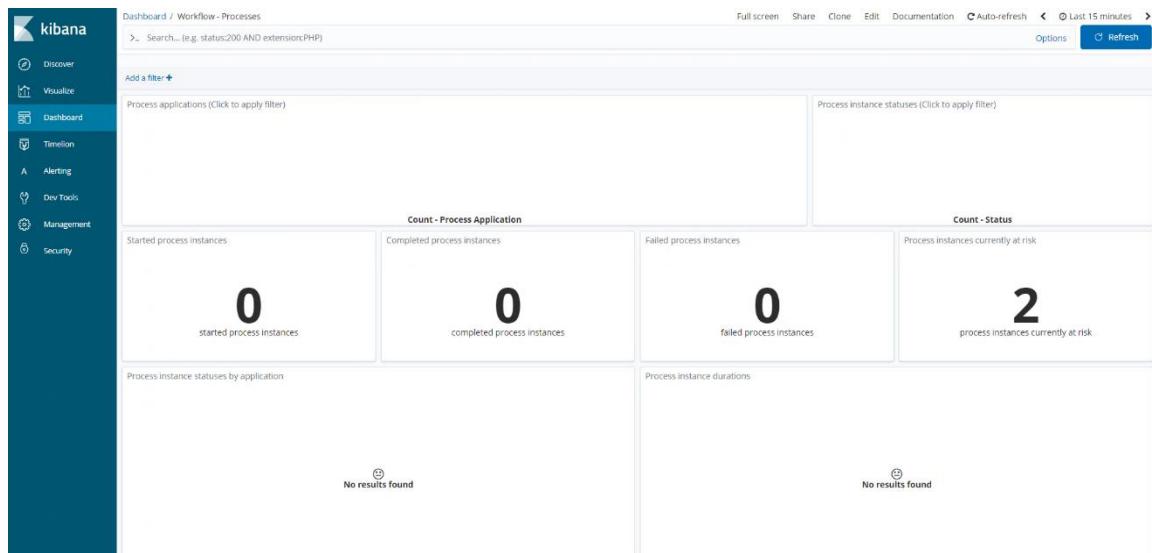
3. You can see Kibana login screen once it starts up.



Now you can login with pre-filled credentials – admin / passw0rd.

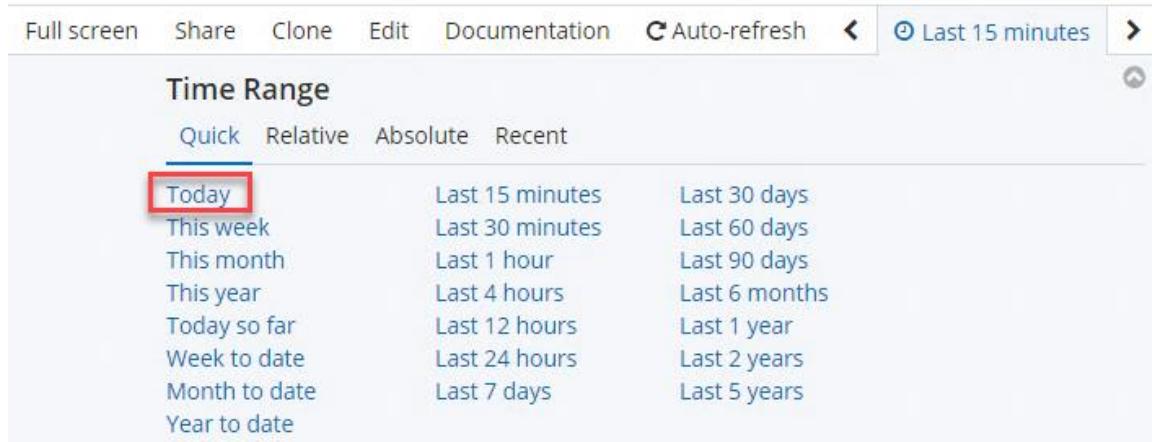
4. Click on Dashboard in the left sidebar.

- Click on the Workflow – Processes Dashboard. You should see a screen like the one below with zero in Started/Completed process instances. Which is fine as the default time period filter is last 15 minutes. Nothing has started or finished during this period.



Events will be generated in [exercise 2](#) by running a new instance of the mortgage application. You will also get an introduction to Kibana and import pre-generated events in [exercise 5](#).

- In the top-right corner, select the time range Last 15 minutes and choose the time range Today.



- The Dashboard should remain unchanged as there is no data being emitted to BAI yet today. If you can already see some data visible, it is also fine. You can also use e.g. “Year to date” if you want to play around. Do not forget to switch back to “Today” in that case.

8. Similarly, explore the other out of the box Dashboards and verify that they have no data. You will get a further deep dive into the out of the box Dashboards in [exercise 6](#).
9. Open a new tab (e.g. using CTRL+T) and open “BAI” > “HDFS - Browse” to open web browser of HDFS.
10. Go to the user folder under the Name column.

### Browse Directory

/								Go!
Permission	Owner	Group	Size	Last Modified	Replication	Block Size	Name	
-rw-r--r--	bai	supergroup	9.45 MB	11/5/2020, 11:13:21 AM	3	128 MB	sample_training_data.json	
drwxr-xr-x	bai	supergroup	0 B	11/5/2020, 8:11:00 AM	0	0 B	user	

From there, go to the “bai” folder and its “ibm-bai” subfolder.

Events will be created once you run an instance of the mortgage application solution.

#### Note

It might be that you see some files in this directory as shown in the below screenshot. You can safely ignore the differences.

### Browse Directory

/user/bai/ibm-bai								Go!
Permission	Owner	Group	Size	Last Modified	Replication	Block Size	Name	
drwxr-xr-x	bai	supergroup	0 B	11/5/2020, 8:05:24 PM	0	0 B	bpmn-summaries-completed	
drwxr-xr-x	bai	supergroup	0 B	11/5/2020, 8:05:11 PM	0	0 B	bpmn-timeseries	
drwxr-xr-x	bai	supergroup	0 B	11/5/2020, 8:05:13 PM	0	0 B	events	
drwxr-xr-x	bai	supergroup	0 B	11/5/2020, 8:05:14 PM	0	0 B	icm-summaries-completed	
drwxr-xr-x	bai	supergroup	0 B	11/5/2020, 7:56:52 PM	0	0 B	icm-timeseries	
drwxr-xr-x	bai	supergroup	0 B	11/5/2020, 8:05:14 PM	0	0 B	odm-timeseries	

11. Open Firefox browser from the Windows taskbar.



12. In Firefox bookmark folder, open “ODM” > “Rule Execution Server”.

13. Log in with username resAdmin and password resAdmin.

14. Click on the Explorer tab in the top toolbar.



15. Verify that you see the Loan\_Computation & Loan\_Evaluation RuleApps deployed.

2 RuleApp(s)

Select All   **Name**

-  Loan\_Computation
-  Loan\_Evaluation

16. Back in Chrome, open a new tab and in bookmark folder select “BAW” > “Workflow Center - Solutions”.

17. Log in with username admin and password admin.

Start building



### Case solutions

Enable content-based activities and unify information, processes, and roles around a persisted case object model.

[View all →](#)   [Create +](#)



### Process apps

Automate the services as well as the human-driven and system-driven activities involved in your business processes.

[View all →](#)   [Create +](#)

18. Click on Process apps and verify that the Risk Assessment Process app is present.

19. In the upper-left corner, click on the Menu icon and select Case.



20. Verify that the Mortgage Application Case solution is present.

## 1.4 Getting Started – Summary

In this exercise, you have:

1. Accessed the demo lab environment needed to perform the BAI sub-scenario.
2. Connected to and started VM in your environment.
3. Learned how to work with your environment and start-up the tools required for this lab.

4. Gotten introduced to some of the BAI / CP4Automation UIs and tools.
5. Gained a basic understanding of the high-level BAI architecture.

## 2 Exercise: Modify the CP4Automation Solution to Emit Data

### 2.1 *Modify the CP4Automation Solution to Emit Data – Introduction*

In this exercise, you will:

1. Modify the Case, BPM and ODM pillars of the Mortgage Application CP4Automation solution to emit specific business data into BAI.
2. Run an instance of the Mortgage Application solution and check Kibana to verify that the data is being emitted into BAI and processed.

Each pillar has its own types of events and a way to enable the emission of specific business data which became part of the payload of the events. You will go over each of these ways in this exercise. Once the emitters are configured, you will run an instance of the Mortgage Application solution to send the events to BAI.

BPMN, Case and ODM emitters are already configured and connected to BAI's Kafka. You can find configuration of the emitters in directory "C:\dba\bai\emitters" of the primary Windows VM.

#### BPMN Variables

To emit business data from a Process, you must [enable tracking for the variables](#) that need to be emitted into BAI. For this exercise, you will create a tracking group to emit business data from the Perform Final Review Process.

#### Case Properties

To emit business data from a Case, you must [configure the audit log](#) for the properties that need to be emitted into BAI. For this exercise, we will create an audit configuration that emits all the properties for the New Mortgage Application Case type.

#### ODM Ruleset Parameters

To emit data from an ODM ruleset, you must [set the built-in ruleset properties](#). In this exercise, you will set the built-in ruleset properties that emits the ruleset parameters and execution traces.

Note: These approaches are only possible after configuring the various pillars to emit events in the first place. This has already been done for the current lab environment.

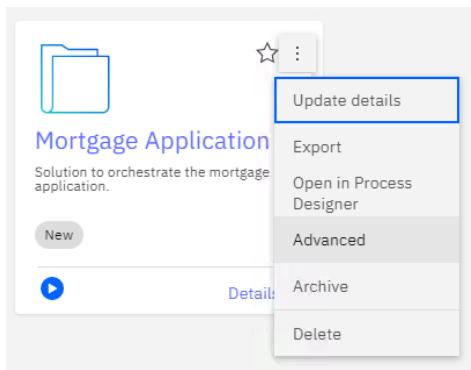
You are now ready to start this exercise.

## 2.2 Modify the CP4Automation Solution to Emit Data – Step by Step Instructions

1. Connect to the lab VM with all the components started as described in [Getting Started – Step by Step Instructions](#).
2. In Chrome bookmark folder, open “BAW” > “Workflow Center - Solution”.
3. Login with username admin and password admin.

First, you will [create an audit configuration](#) for the Case Solution to enable emission of specific business data of the case for all the properties of the New Mortgage Application Case type.

4. Click on the Case Solutions tile to open the list of Case solutions.
5. Hover on the Mortgage Application solution tile to see the dotted menu action button.
6. Click on the dotted menu and then click on Advanced. Opening the window and loading of the content make take a while for the first time.



7. In the IBM Business Automation Workflow Case administration window that opens, click once on the Mortgage Application solution.

Solution Name	Prefix	Project Area	Description	Integration Type
Account Opening	AO1	dev_env_connection_definition	Author: Jeff Goodhue; evolved from Retail Banking to Account Opening	PB
Legal Documentation	LD	dev_env_connection_definition	A case solution to validate documents for Legal Entities	PB
Mortgage Application	MA	dev_env_connection_definition	Solution to orchestrate the mortgage application.	PB
RetailBanking	RB	dev_env_connection_definition	Retail Banking Solution	PB

8. Click on Actions → Manage → Audit Configuration.
9. In the Manage Audit Configuration tab that opens, select the option Create an audit configuration.

- \* Options:
- Create an audit configuration
  - Edit an audit configuration

10. Click on the Next button.

11. Enter the name MA\_AuditConfiguration in the Audit manifest name field.

Name the audit configuration

The audit configuration stores a list of solution properties that can be audited.

Project area name: dev\_env\_connection\_definition

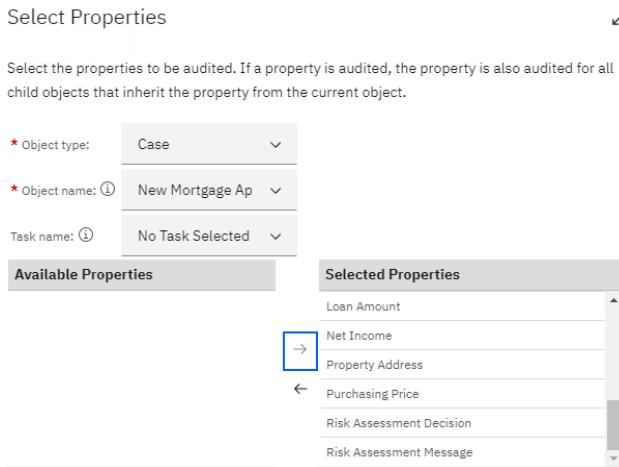
\* Audit manifest name: [\(i\)](#) MA\_AuditConfiguration

12. Click on the Next button.

13. Click on the button Add.

14. In the Select Properties dialog, add all the Available Properties to the Selected Properties section.

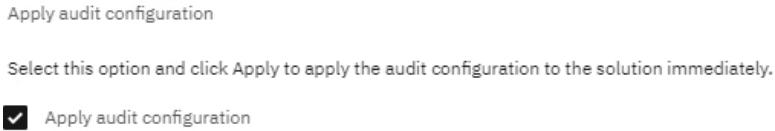
Hint: You can use Ctrl + A or use the Shift key to select multiple properties at once.



Note: The auditing can also be configured for Task properties. In the current DBA solution, no task properties are defined but in a production environment, the business analyst can identify case/task properties they want to see in BAI.

Note: The New Mortgage Application Case type is automatically selected as it is the only Case type in the Mortgage Application Case solution.

15. Click on the OK button.
16. Click on the Next button.
17. Check the checkbox Apply audit configuration.

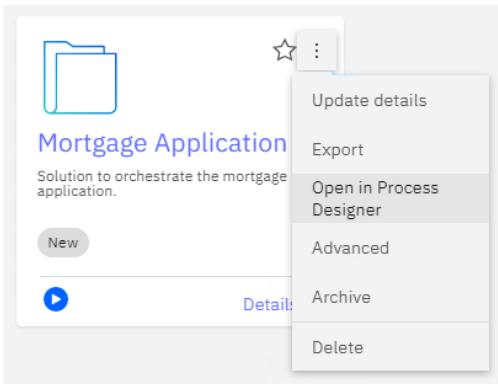


18. Click on the Apply button and wait for the Success message.

19. Close the Case administration browser window.

This completes the procedure required to emit business data for Case properties. Next, you will modify the Workflow solution to enable emission of business data for the BPMN component.

20. In Chrome bookmark folder, open “BAW” > “Workflow Center - Solution”.
21. Click on the Case solutions tile to open the list of Case solutions.
22. Hover on the Mortgage Application solution tile to see the dotted menu action button.
23. Click on Open in Process Designer.



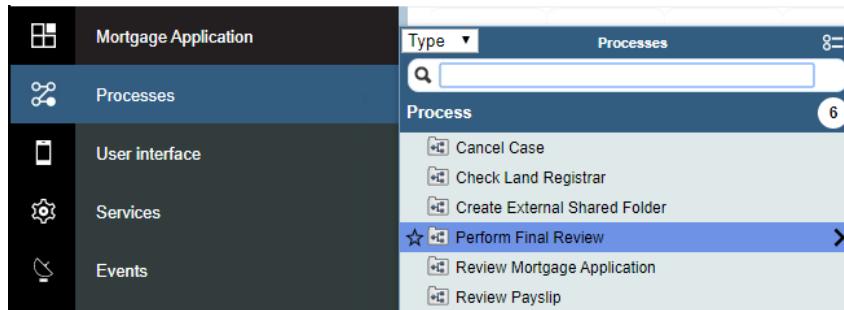
You will modify the Perform Final Review task that points to a BPM Process to emit some of the business data from the BPM. This is done by tracking the variables in the Process. There are [different ways to track variables in a Process](#). We will use the Tracking Groups approach to do so in this exercise. You can also enable auto tracking for the whole process.

Note: Ideally, you can just modify the Audit Configuration of the Case solution to emit the solution's properties but if the BPM Process contains variables in addition to the solution's properties, they will have to be emitted from the BPM Process. This approach

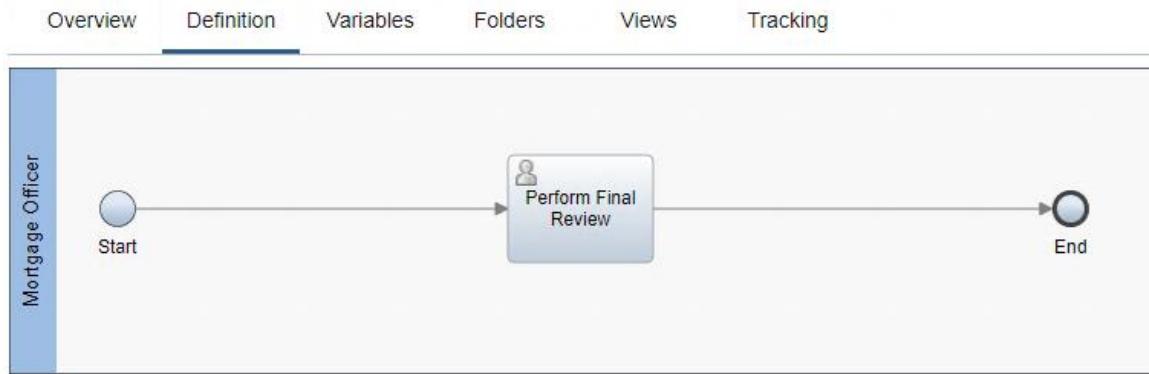
also showcases how to enable emission of specific business data for BPM Processes if you are not using Case.

**IMPORTANT – The way the tracking of process variables is defined in the process is exactly the same like for the tradition Performance Data Warehouse. From design perspective you simply do not need to care of the fact that at the end the events with data are emitted to the BAI. No new toolong support, no new skills needed. Simple. The same is valid for autotracking.**

24. From the Processes menu, open the Perform Final Review Process.



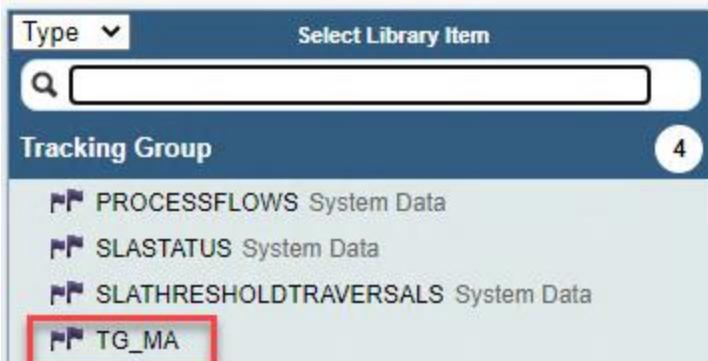
The process diagram with one human task opens looking like this:



25. In the Process editor, click on the Perform Final Review user task.

26. In the Properties section, click on the Tracking tab.

27. Under the “Pre Tracking Point” section, click on the Select button and select the “TG\_MA” tracking group.



The tracking group simply defines set of specific variables (business data) going to be tracked. To make the lab faster we have already defined it for you. TG\_<name> prefix allows later easier identification of data in Elasticsearch which are coming from a tracking group.

28. Click definition of the TG\_MA tracking group to review it.

29. You can see list of variables with specific data types in the tracking group definition.

The screenshot shows a list of variables under the heading "Tracked Fields". The variables listed are:

- loanAmount (number)
- dateOfBirth (datetime)
- country (string)
- customerName (string)
- purchasingPrice (number)
- riskAssessmentDecision (string)
- landRegistrarMessage (string)

30. Now you can close the tracing group definition and go back to the process and its task.

The screenshot shows the "DESIGNER" tab selected. Below it, the tracking group "TG\_MA" is selected, indicated by a red box around the "X" icon in the toolbar.

31. Back in the Tracking properties for the Perform Final Review task, the TG\_MA Tracking Group will now be selected with all the properties added.

32. Click on the variable picker icon to map the Process variables to the Tracking Group properties.

The screenshot shows the variable picker dialog with the variable "customerName (string)" selected, indicated by a red box around the "X" icon.

33. In the variable picker dialog, select the variable value matching the Tracking Field property.

The screenshot shows the variable picker dialog expanded to show the "value (String)" property, which is highlighted with a red box.

- caseProperties (New Mortgage Application)
  - + RiskAssessmentMessage (Risk Assess
  - + RiskAssessmentDecision (Risk Assess
  - + LandRegistrarMessage (Land Registrar
  - + LandRegistrarEvaluation (Land Registra
  - + IsMortgageApproved (Is Mortgage Approv
  - + Country (Country)
  - CustomerName (Customer Name)
    - + value (String)
    - + displayName (String)
- + LoanAmount (Loan Amount)

34. Repeat this for all properties.

#### Note

Map MADate.value to dateOfBirth. Map IsMortgageApproved.value to finalReview.

The screenshot shows the 'Pre Tracking Point' configuration screen. At the top, it displays the tracking group 'TG\_MA' and the performance warehouse ID '65ab5de7-acaa-4496-82d8-36ee90746400'. Below this, the 'Sort tracked fields by' dropdown is set to 'Default Order'. The main area lists variables with their corresponding tracking group properties:

tw.local.caseProperties.CustomerName.value	customerName (string)
tw.local.caseProperties.PropertyAddress.value	propertyAddress (string)
tw.local.caseProperties.Country.value	country (string)
tw.local.caseProperties.LoanAmount.value	loanAmount (number)
tw.local.caseProperties.NetIncome.value	netIncome (number)
tw.local.caseProperties.PurchasingPrice.value	purchasingPrice (number)
tw.local.caseProperties.MADate.value	dateOfBirth (datetime)
tw.local.caseProperties.RiskAssessmentDecision.value	riskAssessmentDecision (string)
tw.local.caseProperties.LandRegistrarEvaluation.value	landRegistrarEvaluation (string)
tw.local.caseProperties.LandRegistrarMessage.value	landRegistrarMessage (string)
tw.local.caseProperties.IsMortgageApproved.value	finalReview (string)

35. Do the same under the “Post Tracking Point” section, click on the Select... button.
36. Select the TG\_MA Tracking Group that you previously created.
37. Repeat the steps previously taken to map the Process variables to the Tracking Group properties.

Note: We add the tracking group to both before and after the Activity is completed as this can give us insight into the Process while the activity is in progress. This ensures that the business data gets sent to BAI both before and after the task is completed.

38. Click on the Finish Editing icon to unlock the Process.



39. Close the Process Designer browser window.

This completes the procedure required to emit business data for BPM variables. Next, you will update the ODM rules to emit business data. This can be done by [setting ruleset properties](#).

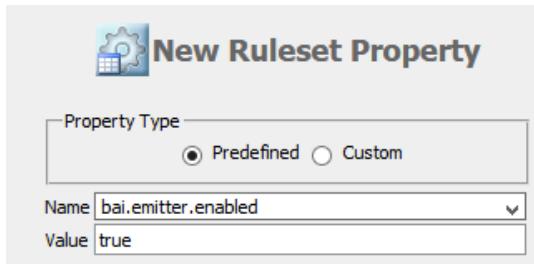
40. In Firefox, go to the ODM bookmark folder and click on the Rule Execution Server link.

41. If not already logged in, login with username resAdmin and password resAdmin.
42. Click on the Explorer tab.
43. Click on the RuleApp “Loan\_Computation”.
44. Click on the Ruleset “get\_scores\_and\_repayments”.
45. Click on Add Property in the top bar.

### Ruleset View



46. In the New Ruleset Property dialog, select the Name bai.emitter.enabled and set the Value to true.



This property enables the ODM emitter for the ruleset.

47. Click on the Add button.
48. Similarly, add the following properties:

Name	Value	Description
bai.emitter.input	true	Includes the input parameters in the emitted events.
bai.emitter.output	true	Includes the output parameters in the emitted events.
bai.emitter.trace	true	Includes the execution traces in the emitted events.

The details of each property are also described in the [Knowledge Center](#).

Hide Properties

<input type="checkbox"/> Select All	Name	Value
<input type="checkbox"/>	bai.emitter.enabled	true
<input type="checkbox"/>	bai.emitter.input	true
<input type="checkbox"/>	bai.emitter.output	true
<input type="checkbox"/>	bai.emitter.trace	true

49. Click on RuleApps in the top navigation bar.

Explorer > **RuleApps** > RuleApp > Ruleset

50. Repeat the previous steps to add the 4 properties for the ruleset in RuleApp “Loan\_Evaluation” with “Loan\_Evaluation” Ruleset inside.

51. Click on Sign Out to sign out of the RES Console.

You have now successfully modified the Case, BPMN and ODM implementations to emit specific business data for the Mortgage Application solution. Next, follow the verification instructions to run an instance of the New Mortgage Application Case type end-to-end and to verify that all the events with specific business data appear in BAI.

## 2.3 Modify the CP4Automation Solution to Emit Data – Verification Instructions

1. In Chrome bookmark folder, open “BAW” > “Desktops” > “Mortgage Application”. It opens a desktop of Content Navigator allowing to upload Loan Application and Payslip documents. The document repository and Case have defined events bound to these document classes.

Document Class	Event
Loan Application	A new case is created when a new document of this class is uploaded. The properties of the document are used to feed the new case with data. One property is customer name.
Payslip	When a new document of Payslip is uploaded a custom event is fired taking customer name as a parameter. This event tries to find an existing running case with the same customer name. If such case does exist, the Payslip document is added to this case.

It means that upload of any document of the classes above performs at the end some actions related with a new or existing case and its activities. You can explore all the case activities, their logic and pre-conditions in the “Mortgage Application” Case solution on Workflow Center.

2. If not already logged in, Log in with username admin and password admin.
3. In the “tos” store (Target Object Store), double-click on the folder Incoming Mortgage Application Documents to open it.

ICMtos

Name	↑	Modified By	Modified On
Incoming Mortgage Application Documents		admin	3/18/2020, 12:13 PM

4. In the top toolbar, select Add Document.



5. In the General section, enter the following values:
- Entry template: Loan Application Form Entry Template
  - File name: Choose any file on the system e.g.: one of the files in the C: drive

#### General

* Entry template:	Loan Application Form Entry Template
What do you want to save?	Local document
* File name:	<input type="button" value="Choose Files"/> dstudio.log <input checked="" type="checkbox"/> Major version ①

6. Enter the following details under the Properties section:

Property	Value
Document Title	John Moore Application Form
Customer Name	John Moore
Date of Birth	6/6/1972
Loan Amount	150000
Property Address	80 Trinity St, 07860 Newton, NJ
Purchasing Price	215000
Country	United States
EMail Address	johnmoore@example.com

Properties

* Class:	Loan Application Form
Document Title ①	John Moore Application Fo...
Customer Name ①	John Moore
Date of Birth ①	6/6/1972 <input type="button" value=""/>
Loan Amount ①	150,000
Property Address ①	80 Trinity St, 07860 Newto...
Purchasing Price ①	215,000
Country ①	United States
EMail Address ①	johnmoore@example.com

7. Click on the Add button to add the document.
8. Click on Add Document in the top bar to add another document.
9. In the Entry template field, select Payment Slip Entry Template.
10. Click on the Choose Files button to choose any file on the system e.g. one of the files in the C: drive.
11. Enter the following details under the Properties section:

Property	Value
Document Title	John Moore Payslip
Customer Name	John Moore
Payment Date	<i>leave it empty</i>
Net Income	18000

Properties ^

\* Class: Payslip

Document Title ⓘ	John Moore Payslip
Customer Name ⓘ	John Moore
Payment Date ⓘ	4/5/2020 <input type="button" value="…"/>
Net Income ⓘ	18,000

**Important: Customer Name must be the same for both documents as it is used as an correlation ID for assignment of the documents with same Customer Name to the same Case.**

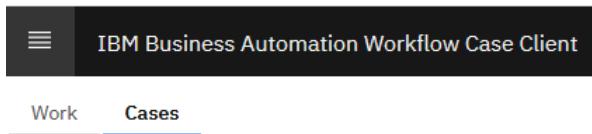
12. Click on the Add button to add the document.

You have now added documents that trigger the start of a new mortgage application in the Case Client.

13. In Firefox, go to the Workflow bookmark folder and click on the IBM BAW Case Client link.
14. Log in with username michelle and password passw0rd.
15. In the Mortgage Officer work basket, you should see two tasks – Review Mortgage Application & Review Payslip.

Step Name	Customer Name	Loan Amount	↑	Time Created
<a href="#">Review Payslip</a>	John Moore	150,000		4/5/2020, 6:50 PM
<a href="#">Review Mortgage Application</a>	John Moore	150,000		4/5/2020, 6:46 PM

16. Click on the activity – Review Mortgage Application.
17. In the dialog that pops up, click on the Claim button.
18. In the activity page, click on the Finish Review button to complete it.
19. Similarly, complete the Review Payslip task.
20. Click on the Cases tab in the upper-left corner.



21. Ensure that the date selected is the date when you added the 1<sup>st</sup> document to the Mortgage Application Desktop.
22. Click on the Search button.

Search:

Added On

[Search](#)

[Advanced Search](#)

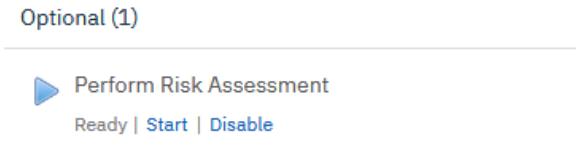
23. Click on the title of the Mortgage Application Case that shows up in the search results.

Title	Added On	↑	Case State	Modified By	Modified On
<a href="#">MA_NewMortgageApplication_000000100001</a>	4/5/2020, 6:46 PM		Working	admin	4/5/2020, 7:04 PM

24. In the Case Details, click on the Activities tab.



25. Scroll to the bottom of the list and click Start on the optional task Perform Risk Assessment.



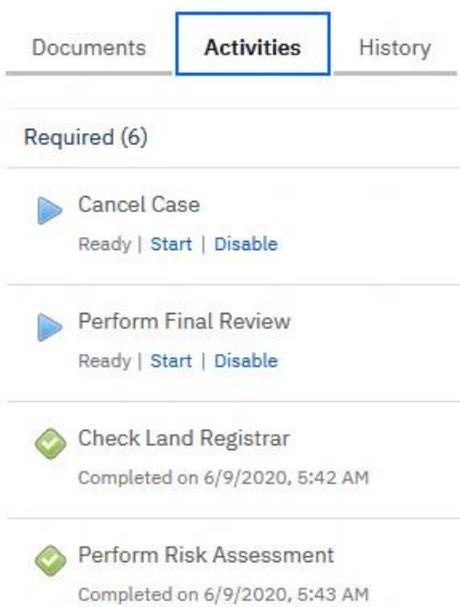
26. Click on Yes in the confirmation dialog.

27. Refresh the activities list by clicking on the Activities tab again.

28. Verify that the Perform Risk Assessment activity shows completed. If not, keep refreshing the Activities tab till it is.

29. Click on the Activities tab again to refresh the list of activities.

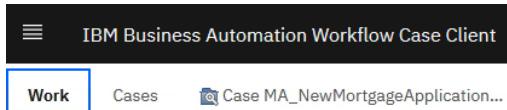
30. Verify that the Check Land Registrar activity shows completed. If not, keep refreshing the Activities tab till it is.



31. Click Start on the required task Perform Final Review.

32. Click on Yes in the confirmation dialog.

33. Go back to the Work tab.

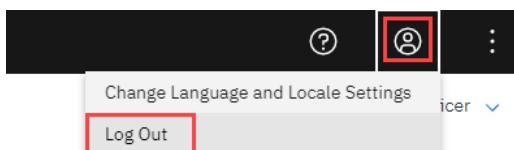


34. Click on the step Perform Final Review.

35. In the Claim Task dialog, click on the Claim button.

36. In the activity page, click on the Approve button.

37. Log out of the Case Client.



You have created and completed a new instance of the mortgage application. Now, let's verify that the business data is being emitted to BAI.

38. In Firefox, go to the BAI bookmark folder and click on the Kibana bookmark.

39. If not already logged in, log in with username admin and password passw0rd.

40. Click on the Management tab in the sidebar.

41. Click on Index Patterns.

Note: Once event emitters with new properties emit events, each of the index patterns listed here needs to be refreshed to include those properties. However, for this exercise, we will only refresh 3 of the index patterns. You will learn more about index patterns in [exercise 5](#).

This can be done by manually for each of the 3 index patterns by clicking the Refresh icon in the upper-right corner.

42. Click on the process-summaries\* index pattern to select it.

43. Click on the Refresh icon in the upper-right corner.



44. Click on the Refresh button in the Refresh field list dialog.

45. In the Filter field, type TG\_MA.

46. Verify that you see the properties newly added when creating the BPMN Tracking Group.

Name	Type	Format	Searchable	Aggregatable	Excluded
data.TG_MA.@ids.trackingGroupId	string		●		
data.TG_MA.@ids.trackingGroupId.keyword	string		●	●	
data.TG_MA.@ids.trackingGroupVersionId	string		●		
data.TG_MA.@ids.trackingGroupVersionId.keyword	string		●	●	
data.TG_MA.country.string	string		●		
data.TG_MA.country.string.keyword	string		●	●	
data.TG_MA.customerName.string	string		●		
data.TG_MA.customerName.string.keyword	string		●	●	
data.TG_MA.dateOfBirth.dateTime	date		●	●	
data.TG_MA.finalReview.string	string		●		

47. Similarly, refresh the case-summaries\* index pattern.

48. In the Filter field, type MA\_.

49. Verify that you see the properties added when configuring the audit log for the Case solution.

Name	Type	Format	Searchable	Aggregatable	Excluded
data.MA_Country	string		●		
data.MA_Country.keyword	string		●	●	
data.MA_CustomerName	string		●		
data.MA_CustomerName.keyword	string		●	●	
data.MA_LoanAmount	number		●	●	
data.MA_MADate	date		●	●	
data.MA_NetIncome	number		●	●	
data.MA_PropertyAddress	string		●		
data.MA_PropertyAddress.keyword	string		●	●	
data.MA_PurchasingPrice	number		●	●	

50. Similarly, refresh the odm-timeseries\* index pattern.

51. In the Filter field, type `Loan_Evaluation`.
52. Verify that you see the properties of the ruleset `Loan_Evaluation`.

Name	Type	Format	Searchable	Aggregatable	Excluded
<code>data.Loan_Evaluation.Loan_Evaluation.in.Applicant.age</code>	number		●	●	✎
<code>data.Loan_Evaluation.Loan_Evaluation.in.Applicant.corporateScore</code>	number		●	●	✎
<code>data.Loan_Evaluation.Loan_Evaluation.in.Applicant.name</code>	string		●		✎
<code>data.Loan_Evaluation.Loan_Evaluation.in.Applicant.name.keyword</code>	string		●	●	✎
<code>data.Loan_Evaluation.Loan_Evaluation.in.Applicant.yearlyIncome</code>	number		●	●	✎
<code>data.Loan_Evaluation.Loan_Evaluation.in.Applicant.zipCode</code>	string		●		✎
<code>data.Loan_Evaluation.Loan_Evaluation.in.Applicant.zipCode.keyword</code>	string		●	●	✎
<code>data.Loan_Evaluation.Loan_Evaluation.in.Offer.amount</code>	number		●	●	✎
<code>data.Loan_Evaluation.Loan_Evaluation.in.Offer.monthlyRepayment</code>	number		●	●	✎
<code>data.Loan_Evaluation.Loan_Evaluation.out.Approval.approved</code>	boolean		●	●	✎

Viewing the properties in the Index Patterns completes the verification of the events being emitted. You will build visualizations and dashboards with these properties in [exercises 5-7](#).

## 2.4 Modify the CP4Automation Solution to Emit Data – Summary

In this exercise, you have:

1. Modified a Case solution to emit Case properties.
2. Modified a BPMN Process to emit BPM variables.
3. Modified an ODM ruleset to emit the ruleset's parameters.
4. Started and completed a new instance of the Mortgage Application solution to verify that the emitted data is visible in BAI.

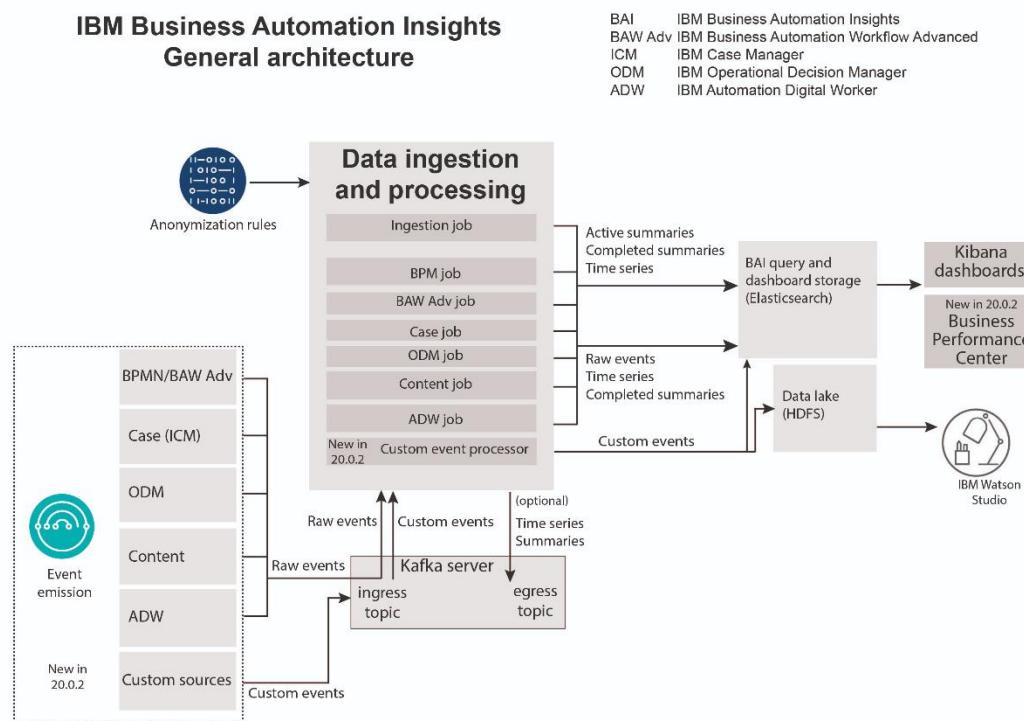
In the next exercise, you will learn the different concepts of event types in BAI and how they are stored in the various datastores.

### 3 Exercise: Explore Emitted Events in BAI

#### 3.1 Explore Emitted Events in BAI – Introduction

In this exercise, you will:

1. Learn about the different concepts of BAI events – Raw events, time series and summaries.
2. Explore the events emitted in the Elasticsearch datastore.



As you can see from the diagram above, the following datastores exist in BAI:

#### Elasticsearch

Elasticsearch allows for easy querying and visualization/dashboard storage. With Kibana on top of Elasticsearch, users of BAI can gain visual insights into their business. You will create these visualizations in [exercises 5-7](#).

#### Data lake (HDFS)

HDFS (Hadoop File System) enables data scientists to build artificial intelligence models using IBM Watson Studio or other data science tools. This datastore is optional and events will only be emitted to it if a data lake is configured. You can also protect the

business data in the Data lake by configuring anonymization rules. You will do this in [exercise 4](#).

As you can also see from the diagram above, there are 3 different concepts of the emitted events in the various datastores – Raw events, time series and summaries (active and completed).

#### Raw events

Each emitter emits events to Kafka. These events are later processed in BAI to be stored in various datastores. The raw event however is stored in the data lake (Hadoop).

Raw events from all pillars are available in the data lake.

#### Time series

These events are simplified and flattened versions of the raw events.

#### Summaries

These events are aggregations of time series. They can be active or completed. For example, a summary event is completed when a process, activity or case is completed.

Additional details for each of these concepts are available in the [Knowledge Center](#).

As you can also see from the diagram above, the following pillars of CP4Automation currently support BAI emitters:

Workflow ([BPMN](#) / [BPM Advanced](#) and [Case](#))

[ODM](#)

[Content](#)

[Digital Worker](#) - deprecated

You are now ready to start this exercise.

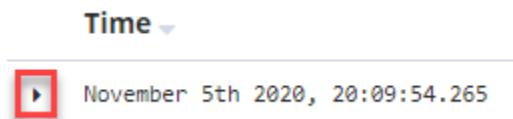
### 3.2 Explore Emitted Events in BAI – Step by Step Instructions

1. In Chrome, open “BAI” > “Kibana” in the bookmark folder.
2. Login as admin / passw0rd (with zero instead of o).
3. Click on the Discover tab in the left sidebar.
4. In the list of index patterns, select the process-summaries\* index pattern.



Note that “process-summaries\*” index pattern does use “completedTime” timestamp field of the events as the field’s associated core type. Other index patterns with similar names simply do use other timestamps like suspendedTime, resumedTime etc. That’s the reason why different index patterns have been defined. The same approach is implemented for case summaries.

5. In the upper-right corner, set the time range to This week.
6. The discover UI will now show you all the summary events from the BPMN emitter in the process-summaries\* index within the selected time range.
7. Click on the expand icon for the first event. The timestamp value can be different, it is OK.



8. Explore the data shown in the Table and JSON tabs.  
Note: The JSON tab shows the raw event data sent by the BAI Data Ingestion and Processing component to Elasticsearch while the Table tab makes it readable in a table form.
9. Similarly, select the case-summaries\* index pattern and explore the summary events from the Case emitter.
10. Similarly, select the odm-timeseries\* index pattern and explore the timeseries events from the ODM emitter.

You will build visualizations and dashboards with the BPMN and Case summary events in [exercises 5-7](#).

### *3.3 Explore Emitted Events in BAI – Summary*

In this exercise, you have:

1. Learned about the different event concepts and datastores in BAI.

In the next exercise, you will anonymize parts of the business data stored in the HDFS data lake.

## 4 Exercise: Protect Business Data in the HDFS Data Lake

### 4.1 Protect Business Data in the HDFS Data Lake – Introduction

In this exercise, you will:

1. Create anonymization rules that protect the business data stored in the HDFS data lake. The business data protected will be the customer's name, date of birth/age and property address/zip code.
2. Apply the anonymization rules to BAI.

First – using HDFS is a completely optional from the setup perspective if BAI. BAI does not need HDFS to run. On the other hand, propagating data to HDFS is very popular esp. when data collected by BAI are used for training of AI/ML models afterwards. These models are typically trained and exposed e.g. as a REST service which can be consumed/called e.g. by BAW and ODM to improve decisions in the business automation chain.

In BAI, by default, there is no protection for the data written into the HDFS data lake. Emitters could emit usernames for users performing a task and the event could also contain personal data about a customer within the business data. You can provide rules to obfuscate or remove this sensitive data from the events before it is written into the lake. This protection applies to all the event types (raw events, time series and summary events) and can also help you be GDPR compliant.

To define a rule, you must define a JSON that contains:

1. The business data fields and/or other sensitive in events to protect.
2. The protection mode.

The rules are defined in a JSON object as an array of actions:

```
{  
  "actions": [  
    <rule1>,  
    <rule2>,  
    ...,  
    <ruleN>  
  ]  
}
```

The general format of a rule is:

```
{  
  "type": <protectionMode>,           } The protection mode to apply to business data fields  
  "params": {  
    <protectionModeParameters>       } Parameters that depend of the chosen protection mode  
  },  
  "fields": [  
    <fieldPath1>,  
    <fieldPath2>,  
    ...  
    <fieldPathN>  
  ]  
}
```

Paths to business data fields in events in [JSONPath format](#).  
(cannot refer to non-business data fields of the events)

Note that business data paths may differ across event formats. For example, the path to a customer's name might be different in raw events, time series and summary events. If you are using multiple pillars of the CP4Automation platform, there might be an occurrence of the business data you want to protect in the events for all those pillars depending on how the solution is configured. The field paths allow you to specify all these paths as an array for a single protection mode.

There are 3 different types of protection modes available:

Protection Mode	Protection Type	Description
hash	Anonymization	Irreversibly destroys any way of re-identifying the business data.
encrypt	Pseudonymization	Substitutes business data with a reversible and consistent value in such a way that additional information is required to re-identify the data.
remove	Data removal	Business data is removed from the event if it contains it.

The hash protection mode uses the SHA-256 algorithm that requires no additional parameters.

The encrypt protection mode uses the AES CBC algorithm that requires additional parameters:

1. key: The value of a symmetric key encoded in Base64
2. iv: the value of an initial vector encoded in Base64

Note: Various online tools can be used to decrypt the encrypted data by AES CBC. Doing an online search for AES CBC Decryption will return several of those tools.

Once the rules are created, you will activate them by using the BAI API. Additional information is available about protecting HDFS data in the [Knowledge Center](#). Note that the business data in Elasticsearch cannot be protected using these rules.

For this exercise, you will use the pre-defined data protection rules, stored in “data-protection-rules.json” file in folder of this lab.

This json file contains rules to:

- Remove the mortgage applicant’s name in the Case events, BPMN tracking events and ODM events.
- Hash the date of birth in the Case events and the BPMN tracking events.
- Hash the age from the ODM events.
- Encrypt the property address in the Case events and the BPMN tracking events.
- Encrypt the zip code from the ODM events.

You are now ready to start this exercise.

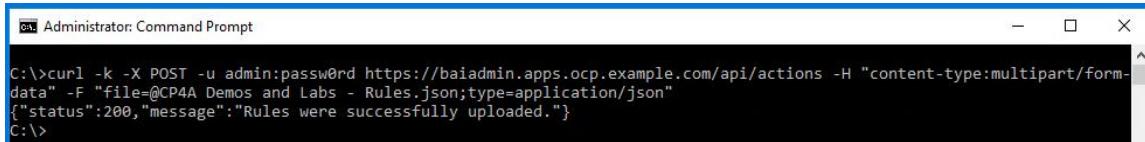
## 4.2 Protect Business Data in the HDFS Data Lake – Step by Step Instructions

1. Download the pre-defined CP4Automation Demos and Labs - Rules.json uploaded to the Lab 7 - Implement the BAI Sub-Scenario sub-folder of the [shared box folder](#).

```
{  
  "actions": [  
    {  
      "type": "remove",  
      "fields": [  
        "${data}'['MA_CustomerName']",  
        "${trackedFields}'['customerName.string']",  
        "${data}'['Loan_Evaluation.Loan_Evaluation.in.Applicant.name']"  
      ]  
    },  
    {  
      "type": "hash",  
      "fields": [  
        "${data}'['MA_MADate']",  
        "${trackedFields}'['dateOfBirth.dateTime']",  
        "${data}'['Loan_Evaluation.Loan_Evaluation.in.Applicant.age']"  
      ]  
    },  
    {  
      "type": "encrypt",  
      "params": {  
        "key": "MTIzNDU2NzgxMjM0NTY3OA==",  
        "iv": "MTIzNDU2Nzg4NzY1NDMyMQ=="  
      },  
      "fields": [  
        "${data}'['MA_PropertyAddress']",  
        "${trackedFields}'['propertyAddress.string']",  
        "${data}'['Loan_Evaluation.Loan_Evaluation.in.Applicant.zipCode']"  
      ]  
    }  
  ]  
}
```

2. Run the following command in the directory where the json file is downloaded:

```
curl -k -X POST -u admin:passw0rd  
https://baiadmin.apps.ocp.example.com/api/actions -H "content-type:multipart/form-data" -F "file=@CP4Automation Demos and Labs - Rules.json;type=application/json"
```



The screenshot shows a Windows Command Prompt window titled 'Administrator: Command Prompt'. The command entered is 'curl -k -X POST -u admin:passw0rd https://baiadmin.apps.ocp.example.com/api/actions -H "content-type:multipart/form-data" -F "file=@CP4Automation Demos and Labs - Rules.json;type=application/json"'. The output of the command is: '{"status":200,"message":"Rules were successfully uploaded."}'.

Ensure that there is a message confirming that the rules were successfully uploaded.

3. Close the command line window.

### *4.3 Protect Business Data in the HDFS Data Lake – Summary*

In this exercise, you have:

1. Learned about the different types of anonymization rules available for BAI.
2. Applied several anonymization rules for the business data of the Mortgage Application CP4Automation solution.

In the next exercise, you will get an introduction to Kibana.

## 5 Exercise: Getting started with Kibana

### 5.1 Getting started with Kibana – Introduction

This exercise is addressing the developer of a BAI solution. This persona is responsible to implement custom dashboards driven by business requirements based on the BAI offering.

You will be introduced to Kibana, basic concepts and theory which you need to understand to fully exploit the BAI technology.

#### Pre-requisites

- Overall knowledge of the DBA portfolio
- Some understanding of the architecture and concepts of Business Automation Insights (BAI)
- Basic understanding of Kibana based on the [Video on Getting started with Kibana](#) or [Kibana 4 Video Tutorials Part 1](#)
- BAI environment fully configured in terms of product integration, LDAP configuration, SSO and emitter configuration
- Mortgage Solution with ECM, Case - and BPM Process Manager, RPA, as well as ODM
- Basic understanding to the Case solution with the start condition, results, performer and according to this to the generated test data

### 5.2 Getting started with Kibana – Step by Step Instructions

#### Introduction

Kibana is an open source analytics and visualization platform designed to work with Elasticsearch. You use Kibana to search, view, and interact with data stored in Elasticsearch indexes. You can easily perform advanced data analysis and visualize your data in a variety of charts, tables, and maps.

Kibana makes it easy to understand large volumes of data. Its simple, browser-based interface enables you to quickly create and share dynamic dashboards that display changes to Elasticsearch queries in real time.

#### Disclaimer:

1. It is not the intention of this lab to replicate the Kibana Getting Started, online help, and Q&A documentation. Where required we explain this in the intro and step-by-step instructions per section, while you should refer to the given Kibana links.
2. This exercise includes step-by-step instructions. However, for introductory purposes several links and explanations have been added to provide background to subsequent exercises.

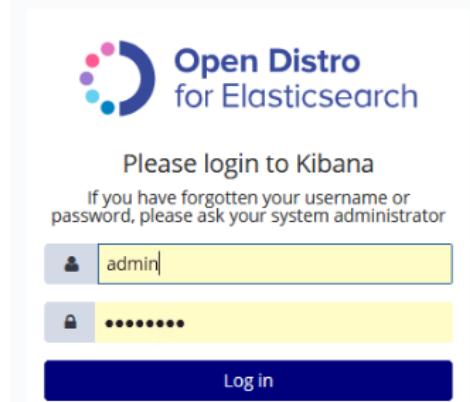
3. Some of the screenshots might be different from yours because they were captured with a different set of data compared with the test data in your lab environment.
4. Through this exercise you should save any artefacts you create with your initials as a prefix. This avoids overwriting your work with the provided solution proposal starting with <your initials> - MA – xxxx – version. This solution proposal will be imported at the end of an exercise to compare with your specification.

Note

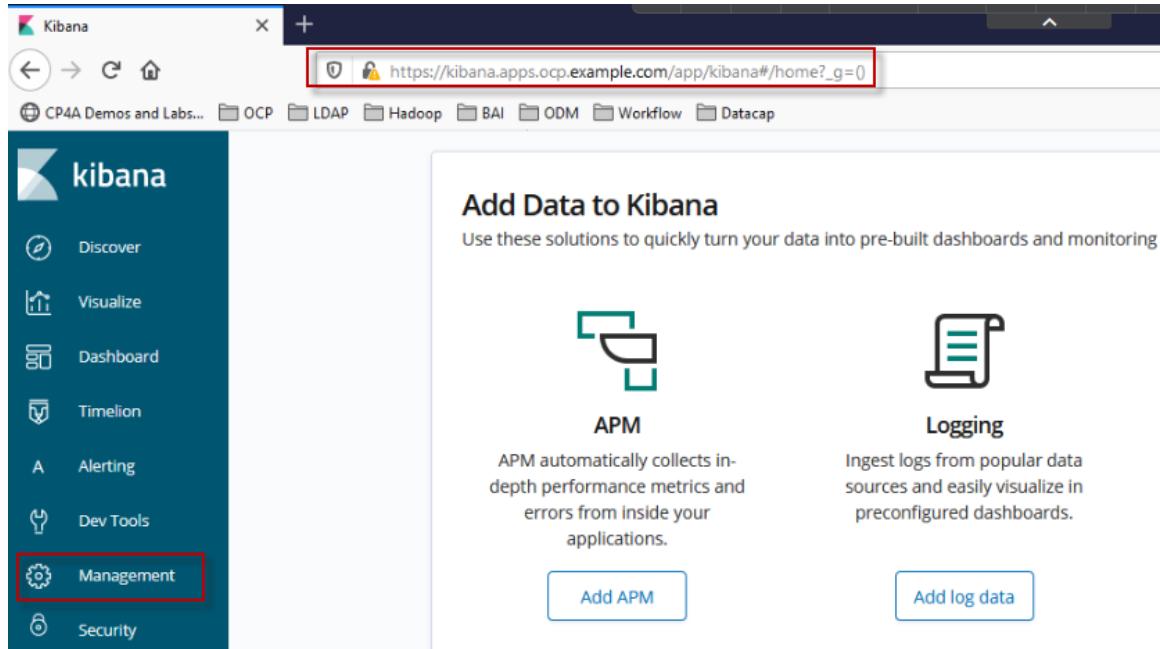
For exercise 5 to 7 you only use ElasticSearch and Kibana and don't have to wait for the DMgr, Node, and Server of BAW started.

### 5.2.1 Introduction to the Kibana Desktop and Navigation

1. Open Firefox.
2. Click on the BAI bookmark in the upper left corner and select the Kibana bookmark.
3. When a security window pops-up, click Advanced and confirm configuration.
4. The sign in window appears. Log in with following credentials:  
 Username: admin                      Password: passw0rd



5. The Kibana navigator is shown.
6. In the Kibana navigator select the Management tab.



## 5.2.2 Management: Understand and learn about Index Patterns

### Introduction

The Management application is where you perform your runtime configuration of Kibana, including both the initial setup and ongoing configuration of index patterns, advanced settings that tweak the behaviors of Kibana itself, and the various "objects" that you can save throughout Kibana such as searches, visualizations, and dashboards.

[Kibana Management](#) and [Kibana Defining your Index](#)

Index patterns tell Kibana which Elasticsearch indexes you want to explore. An index pattern can match the name of a single index or include a wildcard (\*) to match multiple indexes.

For example, process-.... typically creates a series of indexes in the format `process-YYYY.MM.DD`. To explore all the log data from April 2019, you could specify the index pattern `process-2019.04*`. An index pattern can also simply be the name of a single index.

\*summaries\*

This index pattern provides a way to parse all the summaries stored in Elasticsearch by IBM Business Automation Insights. It does not provide any time field. Therefore, all searches and visualizations based on this index pattern span the entire data set, and the time range picker is not available for them.

#### \*-summaries-\*

This index pattern enables you to parse all the summaries stored in Elasticsearch by IBM Business Automation Insights, based on the timestamp field. This allows you to filter out results by using the time range picker. The timestamp field is updated each time IBM Business Automation Insights updates a summary document

Refer to the [KC - Index Patterns](#), for example on

Table 2. Index patterns for process summaries

Index pattern	Time field	Process instance summary	Activity summary
New in 18.0.2 process-su*	Not applicable	Yes	Yes
New in 18.0.2 process-sum*	timestamp	Yes	Yes
process-summaries-*	startTime	Yes	Yes
process-summaries*	completedTime	Yes	Yes
process-summarie*	terminatedTime	Yes	Yes

Table 3. Index patterns for case summaries

Index pattern	Time field	Completed summary	Active summary
case-summarie*	start-time	Yes	Yes
case-summaries*	timestamp	Yes	Yes
case-summaries-*	end-time	Yes	No
New in 18.0.2 case-su*	None	Yes	Yes

Table 4. Index pattern for decisions time series

Index pattern	Time field	Description
odm-timeseries*	timestamp	Applies to time series documents in Elasticsearch

### 5.2.2.1 Management: Understand and use provided Index Patterns

BAI provides a set of index patterns for Cases, Processes and ODM/Decisions. We will explore some of these indexes now. The term index pattern and index are used interchangeably.

1. Click the Management tab.

Select Index Patterns.

The new window shows the available indexes. The [KC - Index Patterns](#) entry describes the purpose and scope of each index.

The screenshot shows the Kibana interface for the 'process-sum\*' index. The left sidebar has a 'Management' tab selected. In the center, under 'Index Patterns', there is a list of patterns starting with 'process-sum\*'. On the right, there is a table for fields:

Name	Type
_id	string
_index	string

The orange box always refers to the time filter field the index is optimized for when you use the Time Picker later on.

## 2. Select the case-summarie\* index.

The orange box shows the attribute the index is configured and optimized, here for the start-time of cases and case activities (tasks). It contains all documents containing a start-time.

The screenshot shows the Kibana interface for the 'case-summarie\*' index. The left sidebar has a 'Management' tab selected. In the center, under 'Index Patterns', there is a list of patterns starting with 'case-summarie\*'. On the right, there is a table for fields:

Name	Type
_id	string
_index	string

### Note

When this index is used during discover or in a visualization only these cases and case activities are listed whose start-time is within the time range of the time picker.

## 3. Select the index: case summaries-\* for comparison.

This index is configured and optimized for the end-time. It refers to all completed cases as well as case tasks. Although, the start-time is included as well in the index.

4. Select the index: case su\* for comparison reasons. This one includes all attributes on cases and case tasks on summary events without a timestamp.

5. Search for attributes in this index. Enter state in the query bar.

Name	Type	Format	Searchable	Aggregatable	Excluded
state	string		●		
state.keyword	string		●	●	

#### Note

See the pencil on the right for each attribute. This allows to modify the fields. This is practical for times or durations given in seconds to change the “human readable format”.

6. Familiarize yourself with one of each of a Case -, Process - and ODM/Decision-related indexes, their attributes, meaning and potential values.

## Study the [Case and Activity Summary Event Formats](#)

*Table 1. Case summary attributes*

Attribute	Description	Optional or required	Type
<code>case-folder-id</code>	The identifier of the case folder	Required	String
<code>category</code>	The category of the event	Required	The icm string constant
<code>case-instance-id</code>	The identifier of the case instance	Required	String
<code>case-instance-name</code>	The name of the case instance	Required	String
<code>type</code>	The type of the case summary	Required	The case string constant
<code>state</code>	The state of the case, based on the latest aggregated event	Required	A string constant Possible values: Active, Completed
<code>case-type-name</code>	The name of the case type	Required	String

as well as the [BPMN Summary Event Formats](#).

*Table 1. Process summary attributes*

Attribute	Description	Optional or required	Type
<code>version</code>	The process summary version	Required	A string constant, in the V.R.M format
<code>type</code>	The process summary type	Required	The string constant "process"
<code>timestamp</code>	The time stamp of the last aggregated event to produce this summary	Required	A string that contains an ISO8601 date in this format: <code>yyyy-mm-ddThh:mm:ss.nnn+-hh:mm</code>
<code>bpmCellName</code>	The name of the IBM Business Automation Workflow cell that emits raw events	Required	String
<code>processApplicationSnapshotName</code>	The name of the process application snapshot. Empty for the current (TIP) snapshot	Required	String
<code>processApplicationVersionId</code>	The identifier of the process application snapshot	Required	String
<code>processApplicationName</code>	The process application name	Required	String
<code>processApplicationId</code>	The process application identifier	Required	String

### 5.2.2.2 Download and Import generated test data

For the demonstration of dashboards about Cases, Process and Decisions we require a series of test data. Test data have been generated in a randomized fashion with varying values for the input data, decisions, state, etc. The data change in span a time window from 2020-03-22 till 2020-03-05 which must be considered when filtering these events.

Test data are available to you. Perform the following step to import them:

1. Download the test data CP4Automation Demos and Labs 20.0 – BAI Pregenerated Data.zip from the Lab 7 folder in the [material for participants box folder](#) to C:\CP4ADemo
2. Extract this zip file to this directory
3. This extracts the following files: icmt.json, the processt.json, the odmt.json, and and Import Data.bat

#### 4. Run the Import Data.bat file

This will load the test data for cases, processes, and decisions directly into Elasticsearch.

##### Note

The test data imported to Elasticsearch are immediately accessible via Kibana, i.e. even with an emitter, Kafka or the Flink jobs currently not available you could perform this lab using Kibana only. You can also import the data in your own installation of Elasticsearch with Kibana and perform the lab.

On the other hand, when you start and execute a case on your own as in [Modify the DBA Solution to Emit Data – Step by Step Instructions](#) your Red Hat Open Container Platform (OCP) environment must be healthy as well as VM 5 – RPA “running” and the user botrunner/passw0rd be logged in.

### 5.2.2.3 Refresh and Import Index Patterns

#### 5.2.2.3.1 Refresh Index Patterns

In chapter [Modify the DBA Solution to Emit Data – Verification Instructions](#) you had defined audit – and tracking variables which are executed in the case towards its completion. In order to be subsequently accessed it is required to refresh some of the index patterns. This is shown in the screenshot beneath.

Name	Type	Format	Searchable	Aggregatable	Excluded
_id	string	String	•	•	

When you Refresh an index you see that the number of fields will change.

Name	Type	Format	Searchable	Aggregatable	Excluded
_id	string	String	•	•	

After the refresh the audit – and tracking variables are available in the index as well.

Following conventions apply to these variables:

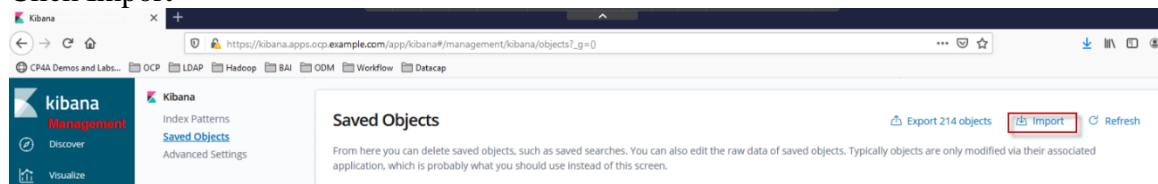
- a. data.MA\_... defined for available document classes
- b. data.MA\_... origin from the Mortgage Application Case solution
- c. data.TG\_... origin from the BPMN tracking groups
- d. data.LOAN\_... origin from ODM rules

After you have executed one or several case – or process instances you must manually refresh the major indexes. This updates the available indexes to show the tracking variables as well. They are available for use and queries and visualizations subsequently.

When you specify visualizations using tracking variables you need to ensure that all indexes have been refreshed. To save time you don't need to manually refresh every ootb index but to import indexes that have been updated already.

#### 5.2.2.3.2 Import Index Patterns

1. Download the entire Dashboards folder including the Indexes refreshed.json from the [Material for Participants box folder](#) to c:\CP4ADemo.
2. Click Management. Click Saved Objects.  
The Edit Saved Objects window appears
3. Click Import

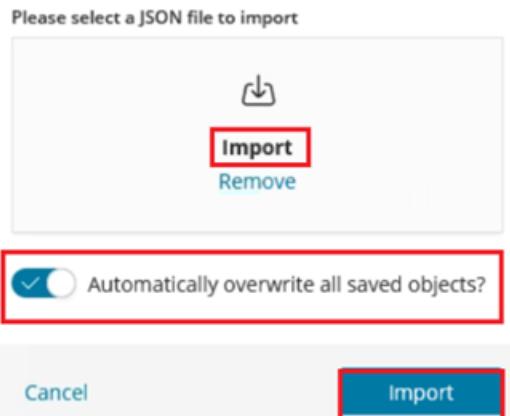


4. Navigate to the c:\CP4ADemo\KibanaExport2\_v2 expanded directory and locate the Indexes\_refreshed.json file that represents the objects to import.
5. Indicate whether to overwrite objects already in Kibana.
6. Click Import.

##### Note

If the import fails try to use another browser.

## Import saved objects

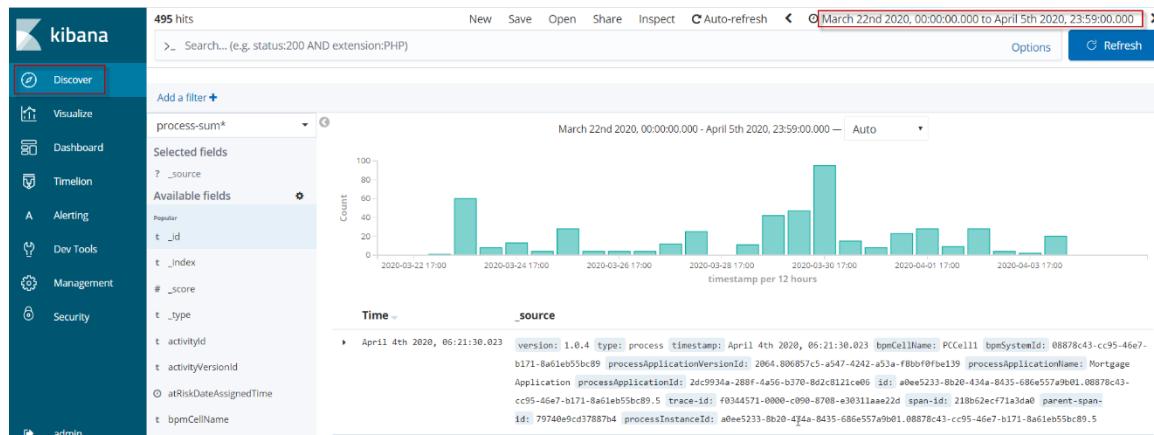


### 5.2.3 Discover the data in Elasticsearch and use Saved Searches

#### Introduction

The functionality of the Kibana “Discover” tab enables you to explore your data stored in Elasticsearch. You have access to every document in every index that matches the selected index pattern. You can submit search queries, filter the search results, and view document data. You can also see the number of documents that match the search query and get field value statistics. If a time field is configured for the selected index pattern, the distribution of documents over time is displayed in a histogram at the top of the page.

Ref: [Discover](#)



In this section you will

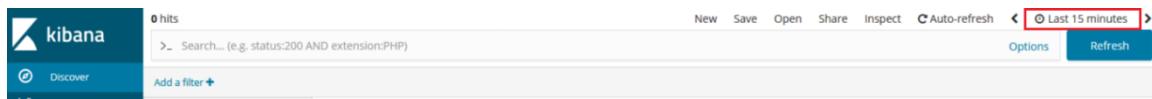
- be introduced to filtering and its syntax
- learn about documents and filters
- review tracking data in BAI summaries (indexes)
- learn about provided Saved Searches

- create your own Saved Search

### 5.2.3.1 Setting the time filter

The time filter restricts the search results to a specific time period. You can set a time filter if your index contains time-based events and a time-field is configured for the selected index pattern.

By default, the time filter is set to the last 15 minutes. You can use the time picker to change the time filter or select a specific time interval or time range in the histogram at the top of the page.



Filtering with the time picker

Click on the time picker. You can specify a time filter in one of four ways:

- Quick. Click your desired time window from the options listed.
- Relative. Specify a time filter relative to the current time. You can specify the end time relative to the current time. Relative times can be in the past or future.
- Absolute. Specify both the start and end times for the time filter. You can adjust the time by editing the To and From fields.
- Recent. Click one of the times from your list of recently used time filters.

 A screenshot of the Kibana time range picker. At the top, there are buttons for 'New', 'Save', 'Open', 'Share', 'Inspect', 'Auto-refresh', and a 'Time Range' button. The 'Time Range' button is highlighted with a blue box. Below it, there are tabs: 'Quick' (which is selected and underlined), 'Relative', 'Absolute', and 'Recent'. Under the 'Quick' tab, there is a table of time intervals:
 

Today	Last 15 minutes	Last 30 days
This week	Last 30 minutes	Last 60 days
This month	Last 1 hour	Last 90 days
This year	Last 4 hours	Last 6 months
Today so far	Last 12 hours	Last 1 year
Week to date	Last 24 hours	Last 2 years
Month to date	Last 7 days	Last 5 years
Year to date		

Normally the options under tab Quick are sufficient. However, if you want to filter more specifically, the other tabs are also recommended.

### 5.2.3.1 Specify absolute values for the time picker

### Note

Your Skytap environment includes test data that has been generated randomly using different amounts, countries, decisions, end users and start-dates. When you visualize case - / process data later you have to specify an absolute time range according to the time period of the generation.

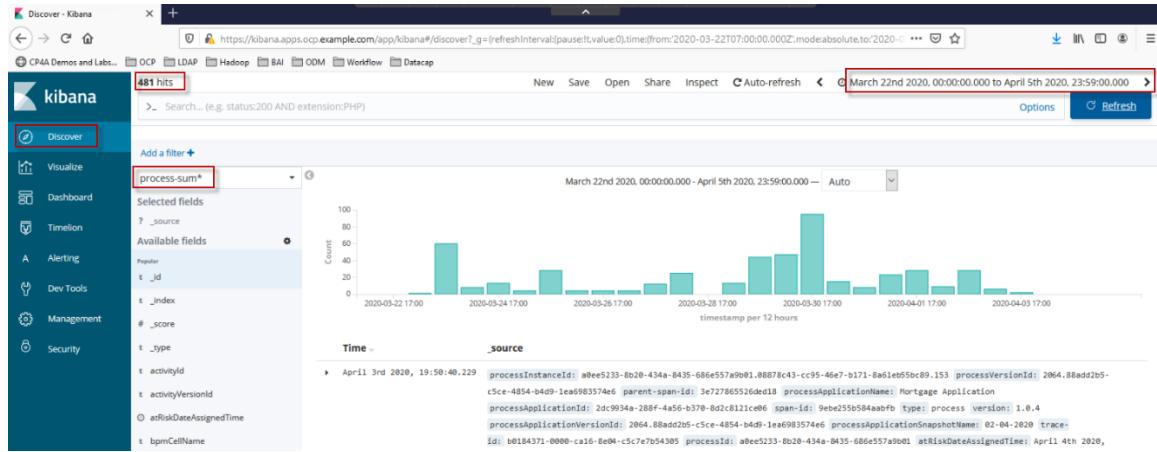
1. Select the Time Picker. Select Absolute Time Range.  
Specify the range from 2020-03-22 0:00:00.000 to 2020-04-05 23:59:00.000  
Press Go.

### Note

This is the time range of the pre-generated case-, process- and rules data imported before.

The screenshot shows a 'Time Range' picker. At the top, there's a search bar with the placeholder 'Auto-refresh' and a date range 'March 22nd 2020, 00:00:00.000 to April 5th 2020, 23:59:00.000'. Below it, tabs for 'Quick', 'Relative', and 'Absolute' are shown, with 'Absolute' being the active tab. The 'From' field contains '2020-03-22 00:00:00.000' and the 'To' field contains '2020-04-05 23:59:00.000'. Below these fields are date pickers for 'Set To Now'. The main part of the interface is a monthly calendar grid for March 2020 and April 2020. The days of the week are labeled at the top of each month. In March, the 22nd is highlighted with a dark gray box. In April, the 05th is highlighted with a dark gray box. Other dates are shown in a standard light gray. At the bottom right of the calendar area is a large blue 'Go' button.

2. The window is refreshed and shows the documents (single summary events) and a histogram on all events for the given index and time range.



### Note

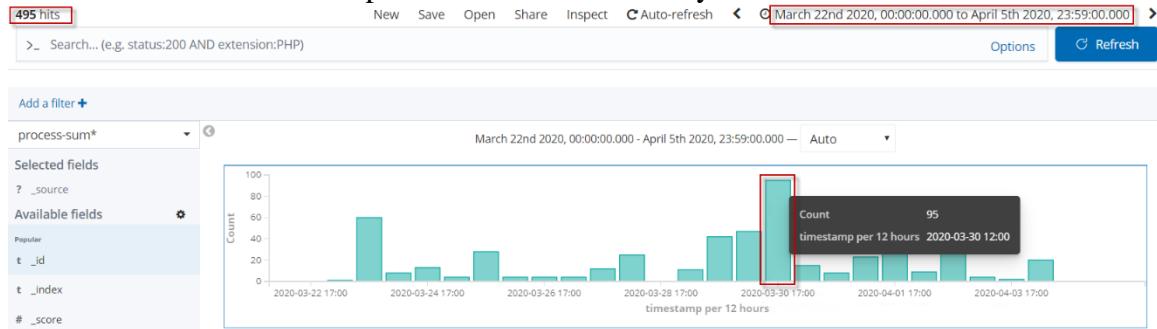
Throughout this lab instructions screenshots might be different to yours because they were captured with a different set or different time range compared with the test data in your Skytap environment.

#### 5.2.3.2 Filter and narrow down the time range in the histogram

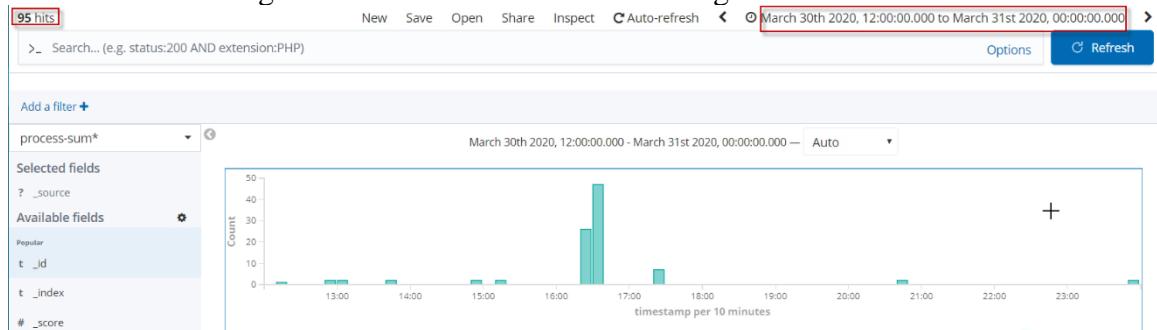
##### [Setting the time filter](#)

You can set a time filter from the histogram in one of two ways:

1. Click the vertical bar that represents the time interval you want to zoom in on.

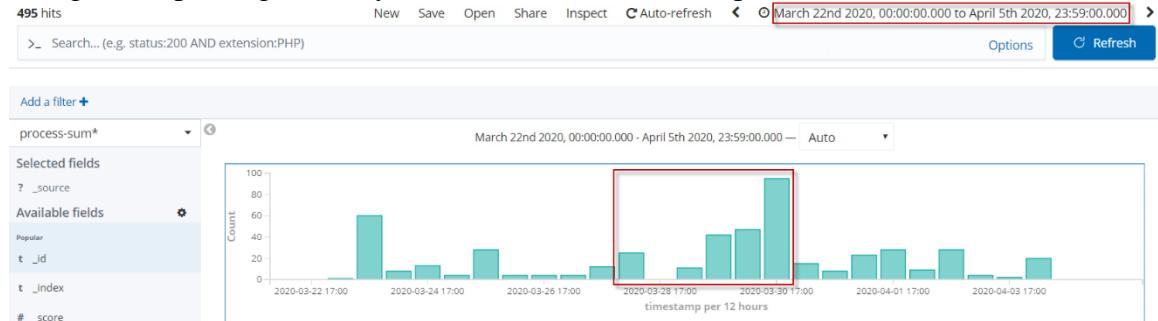


This results in a diagram for a narrowed down time range.

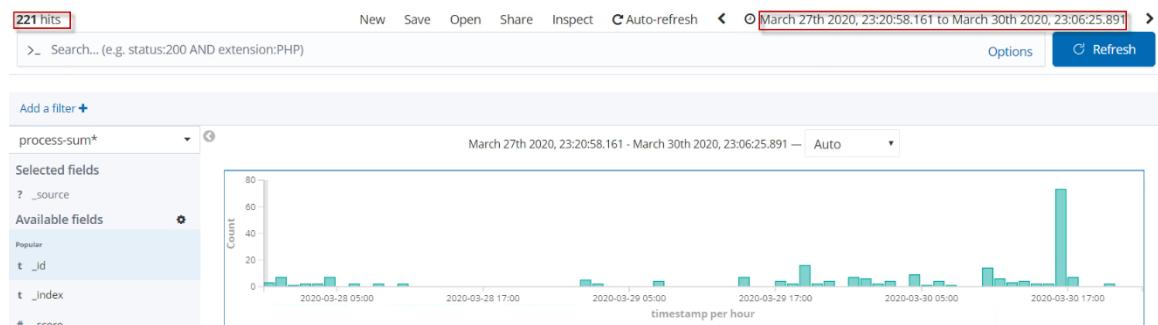


Note the time picker and the number of hits.

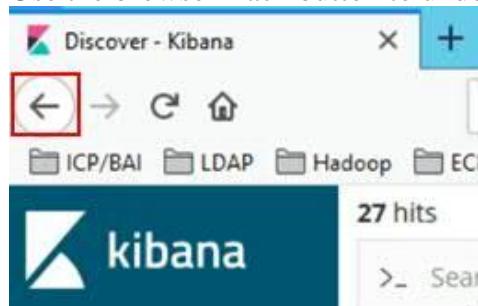
2. Use the Browser back button and ensure to change back the time range from 2020-03-22 to 2020-04-05.
3. Click and drag the cursor over an area to drill down on a specific timespan. You must start the selection with the cursor over the background of the chart—the cursor changes to a plus sign when you hover over a valid start point.



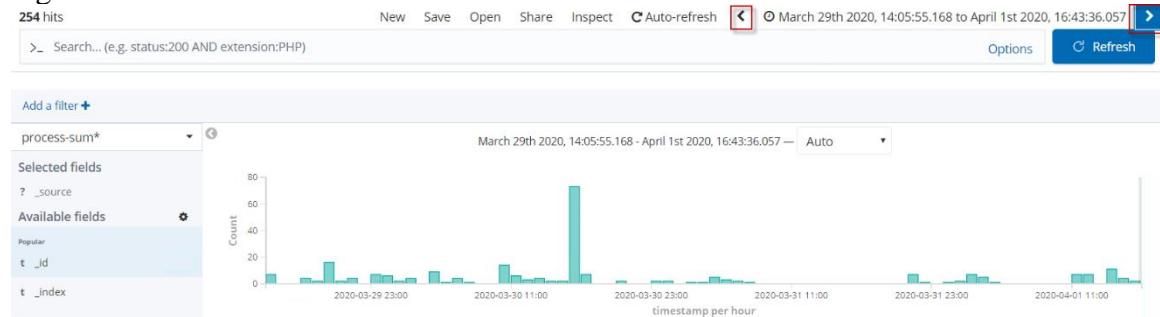
The diagram changes due to the narrowed down time range. Note the time picker and the number of hits change as well.



4. Use the browser Back button to undo your changes.



5. To move forward or backward in time, click the arrows to the left or right of the time range.

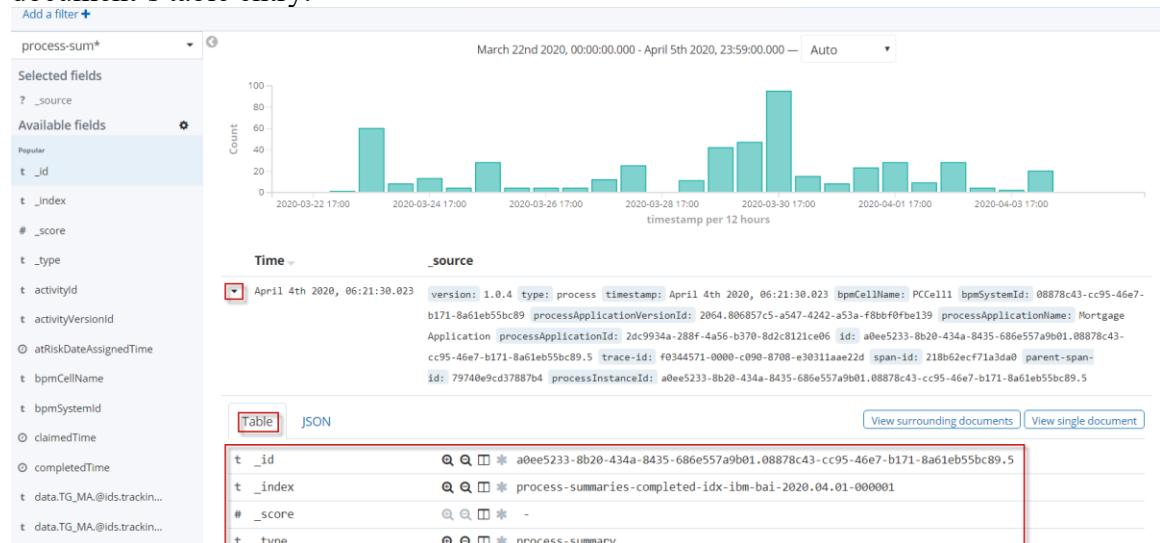


6. Ensure to change back the time range from 2020-03-22 to 2020-04-05.

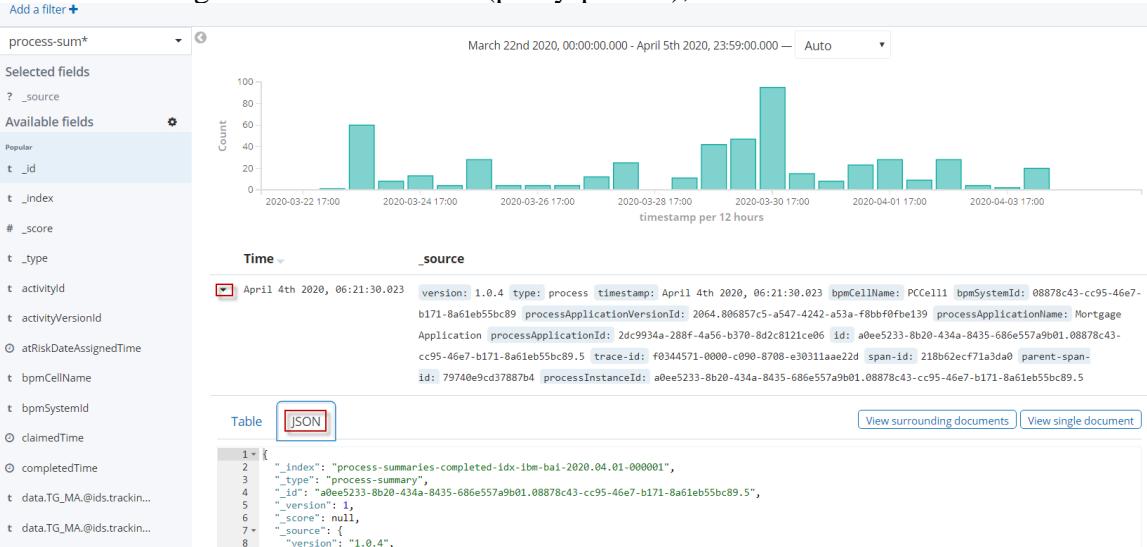
### 5.2.3.3 Viewing Document Data

When you submit a search query, the 500 most recent documents that match the query are listed in the Documents table. You can configure the number of documents shown in the table by setting the `discover:sampleSize` property in [Advanced Settings](#).

1. To view a document's field data, click the Expand button  to the left of the document's table entry.



2. To view the original JSON document (pretty-printed), click the JSON tab.



3. By default, the Documents table shows the localized version of the time field that is configured for the selected index pattern and the document `_source`. You can add fields to the table as columns from the Fields list or from a document's field data.

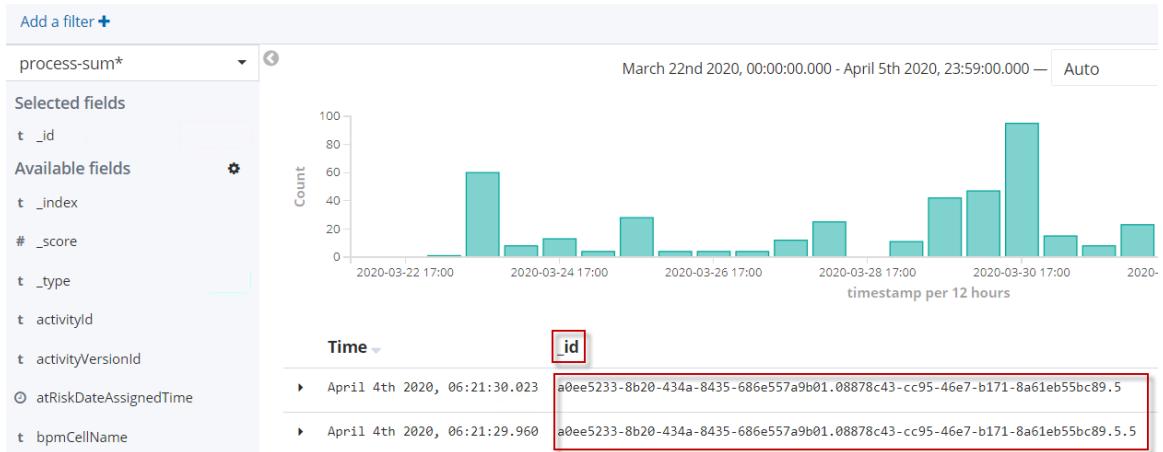
To [add](#) a field to the table hover over the field and click its add button.

#### [Adding columns](#)

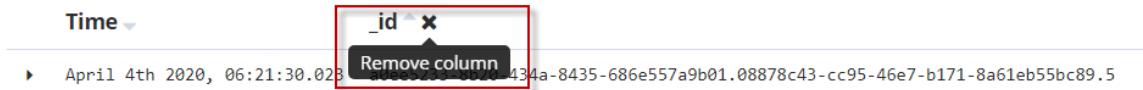
The screenshot shows the Elasticsearch interface with the "Discover" tab selected. The "Available fields" section displays the following fields:

- t \_id
- t \_index

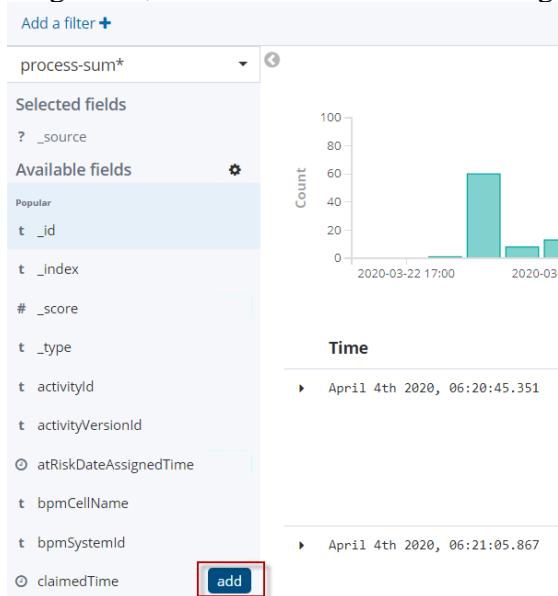
A blue "add" button is highlighted with a red box around it, indicating where to click to add fields to the table.



- To remove a field column from the Documents table, hover over the header of the column you want to remove and click the Remove button .



- The data can be ordered by time fields. Therefore, add field claimedTime from the field list. Hover over the claimedTime and select the arrow icon twice, until it is pointing down, to order the data in descending claimedTime order.



Time	claimedTime
▶ March 23rd 2020, 08:58:27.782	March 23rd 2020, 08:58:27.752
▶ March 23rd 2020, 12:11:18.253	March 23rd 2020, 10:23:20.362
▶ March 23rd 2020, 12:41:33.132	March 23rd 2020, 10:49:38.920

- Remove the claimedTime field from the table again.

### 5.2.3.4 Searching for Data

When you submit a search request, the indexes that match the currently selected index pattern are used to query available summary events. The current index pattern is shown below the toolbar.

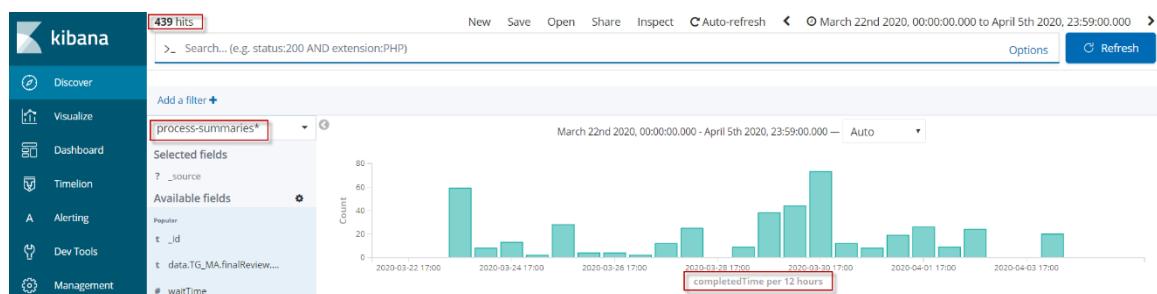
#### [Discover - Searching your data](#)

- Click the Discover tab.

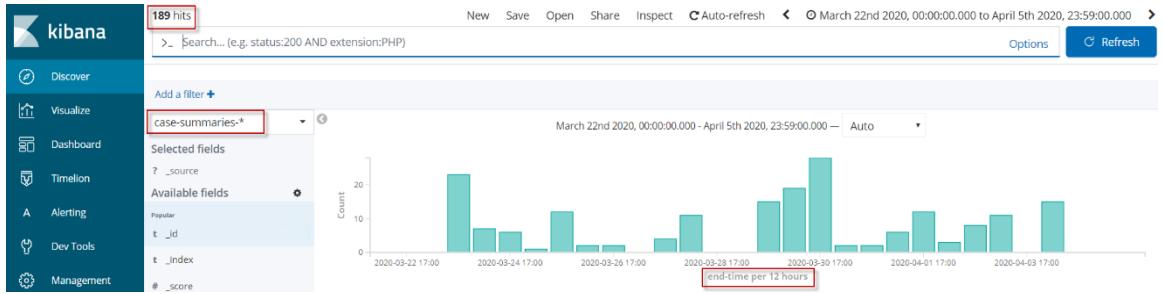
Select the process-summaries\* index pattern.

Ensure that the absolute time range is still set from 2020-03-22 till 2020-04-05.

Observe the number of hits in the upper box on the left.



- Select the case-summaries-\* index. See the different number of hits, a different histogram, and a different list of fields.



You can search the indexes that match the current index pattern by entering your search criteria in the Query bar. You can use Kibana's standard query language (based on Lucene [query syntax](#)) or the full JSON-based [Elasticsearch Query DSL](#).

## Apache Lucene - Query Parser Syntax

- [Overview](#)
- [Terms](#)
- [Fields](#)
- [Term Modifiers](#)
  - [Wildcard Searches](#)
  - [Fuzzy Searches](#)
  - [Proximity Searches](#)
  - [Range Searches](#)
  - [Boosting a Term](#)
- [Boolean Operators](#)
  - [AND](#)
  - [+](#)
  - [NOT](#)
  - [-](#)
- [Grouping](#)
- [Field Grouping](#)
- [Escaping Special Characters](#)

Familiarize yourself with the syntax.

## Query DSL

- [Query and filter context](#)
- [Match All Query](#)
- + [Full text queries](#)
- + [Term level queries](#)
- + [Compound queries](#)
- + [Joining queries](#)
- + [Geo queries](#)
- + [Specialized queries](#)
- + [Span queries](#)
- [Minimum Should Match](#)
- [Multi Term Query Rewrite](#)

To search your data, enter your search criteria in the Query bar and press Enter or click Search  to submit the request to Elasticsearch.

Ref: [Search](#)

3. Search
  - a. Continue with the case-summarie\* index pattern. This optimizes for the start-time.

Enter state:working in the query bar. Click the Update button.

The screenshot shows the Kibana Discover interface with a histogram visualization. The x-axis represents time in 12-hour intervals, and the y-axis represents the count of hits, ranging from 0 to 40. The histogram bars show a peak of approximately 35 hits on March 28th at 17:00. The 'Selected fields' dropdown is set to 'case-summary\*', and the 'Available fields' dropdown includes fields like '\_source', '\_id', '\_index', '\_score', '\_type', 'case-instance-id', 'case-instance-name', 'case-type-name', 'duration-seconds', 'start-time', and 'task-name'. The 'Time' range is set from 'March 22nd 2020, 00:00:00.000' to 'April 5th 2020, 23:59:00.000'. The 'Update' button in the top right corner is highlighted with a red box.

This results into 43 entries found.

The screenshot shows the Kibana Discover interface with a histogram visualization. The x-axis represents time in 12-hour intervals, and the y-axis represents the count of hits, ranging from 0 to 4. The histogram bars show a peak of approximately 4 hits on March 28th at 17:00. The 'Selected fields' dropdown is set to 'case-summary\*', and the 'Available fields' dropdown includes fields like '\_source', '\_id', '\_index', '\_score', '\_type', 'case-instance-id', 'case-instance-name', 'case-type-name', 'duration-seconds', 'start-time', and 'task-name'. The 'Time' range is set from 'March 22nd 2020, 00:00:00.000' to 'April 5th 2020, 23:59:00.000'. The 'source' field for an entry on April 3rd, 19:50:27.854, is expanded, showing log data including 'state: WORKING'. The 'Refresh' button in the top right corner is highlighted with a red box.

This results in all documents (summary events) where the latest state turned into “working”.

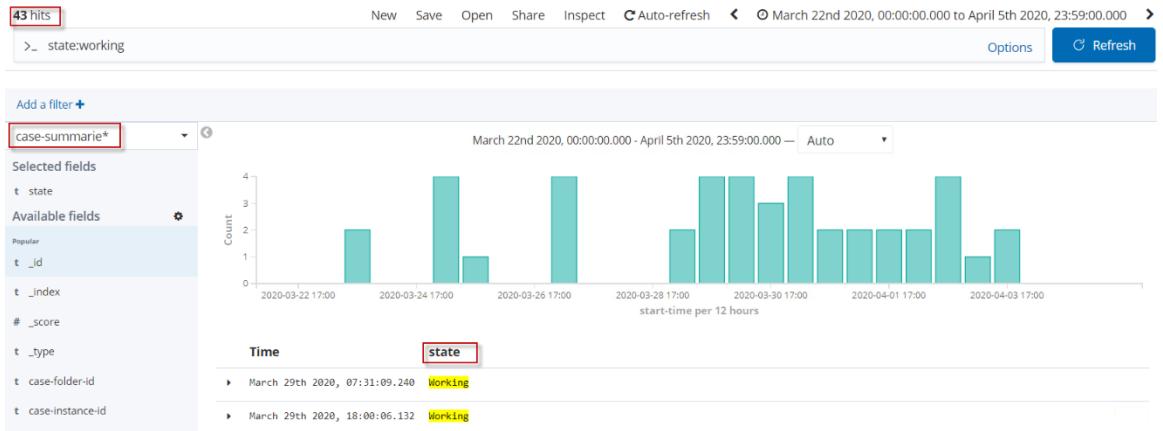
However, it includes entries of type:case as well as type:task.

b. Access the fields list.

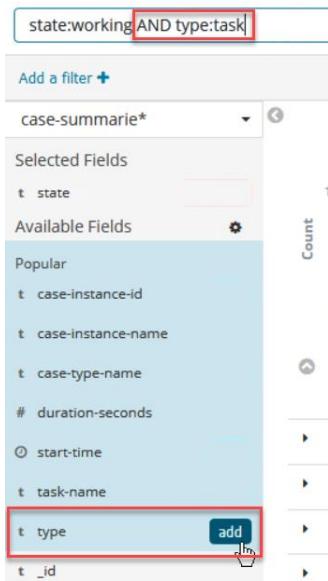
Hover over the state fields and click add.

The screenshot shows the 'Available Fields' list in Kibana. The list includes fields such as 'case-instance-id', 'case-instance-name', 'case-type-name', 'duration-seconds', 'start-time', 'state', and 'task-name'. The 'state' field is highlighted with a red box, and there is an 'add' button next to it. Other fields are listed below, including 'case-instance-id', 'case-instance-name', 'case-type-name', 'duration-seconds', and 'start-time'.

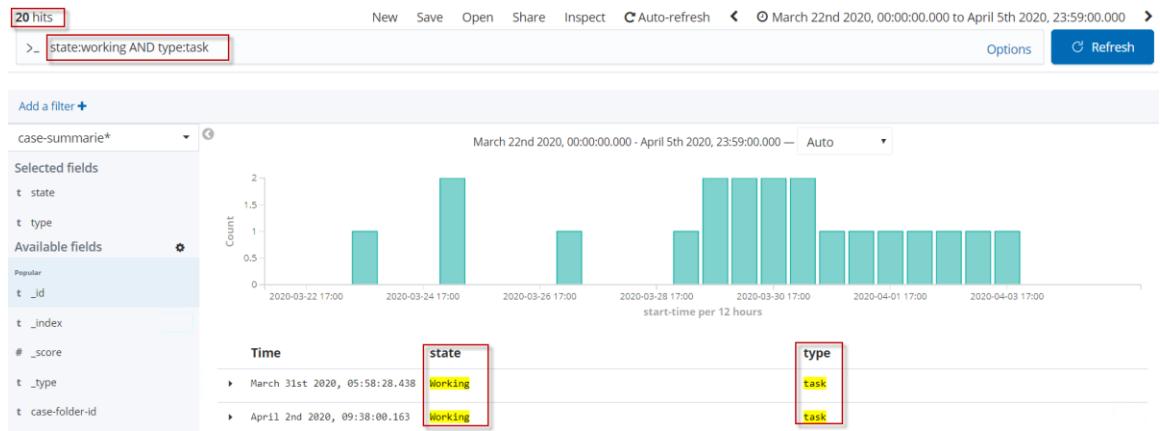
A table with the state field is created.



- c. Extend the current query by adding the following expression to the query bar:  
AND type:task. Click the Update button.  
Hover over the type field to add it to the table as well



The screenshot beneath shows the result.



### Note

In the field lists are two type fields available. The first type field is written with an underscore “\_”. This field is wrong. Add the second type field without an underscore.

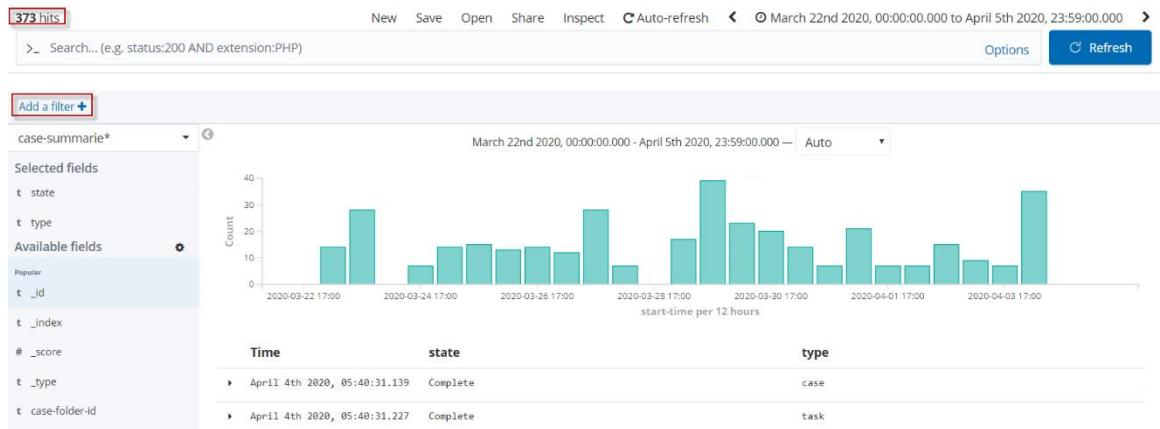
Another way to search for data is the Add a filter function. To demonstrate this, the previous search must be removed / deleted.

Ref: [Filtering by field](#)

#### 4. Add a filter

Delete the expressions in the query bar. Click the Update button. However, we leave the previously added fields in the table.

- Click the Add a filter + function



- Select state in the filter choice list.
- Select is in the operator choice list.
- Enter working in the value field.
- Press Save.

## Add filter

Filter [Edit Query DSL](#)

state ▾ is ▾ working

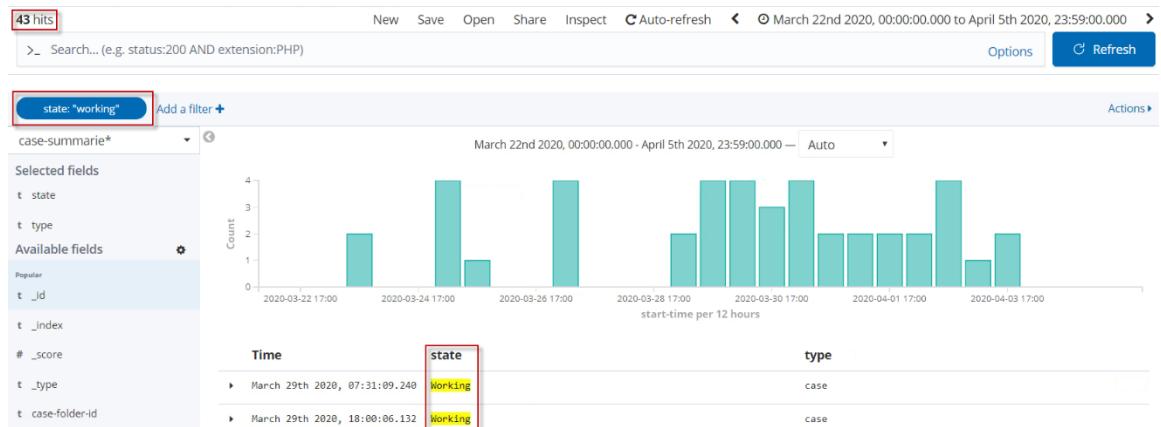
Label

Cancel **Save** 

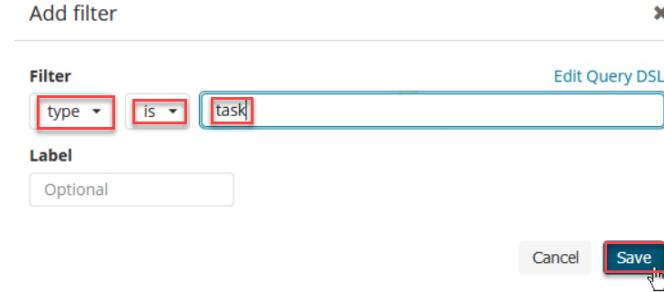
**Note**  
The functionality and results entering a search in the search bar or using the Filter expression builder is the same. However, the later on allows you perform following filter actions: Enable or Disable the Filter, to Pin Filter, to Invert Filter, Remove Filter, and Edit Filter.

   Actions ▾

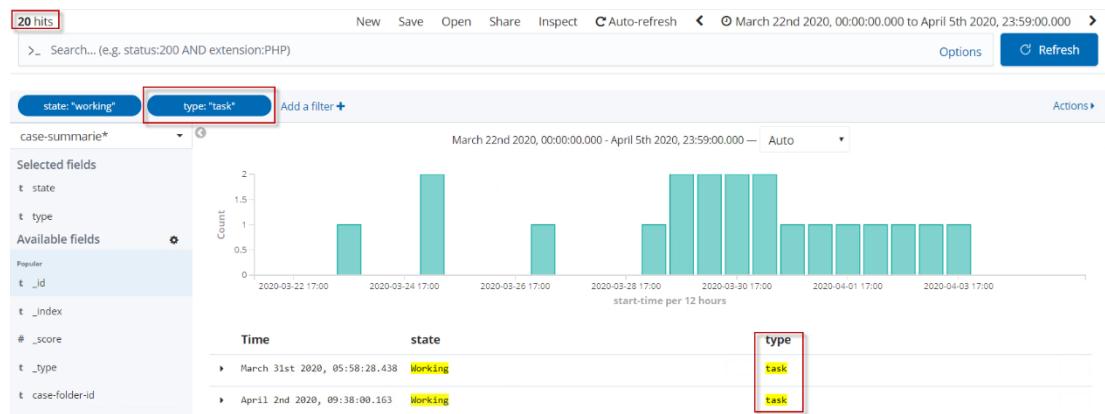
f. Check the result. It's like the search in the query bar above.



- g. Again, click the Add a filter + function.  
h. Select type in the filter choice list.  
i. Select is in the operator choice list.  
j. Enter task in the value field.  
k. Press Save.



Check the result. It's like the search in the query bar above.



### 5.2.3.5 Create and Save your own Searches for Tracking Data

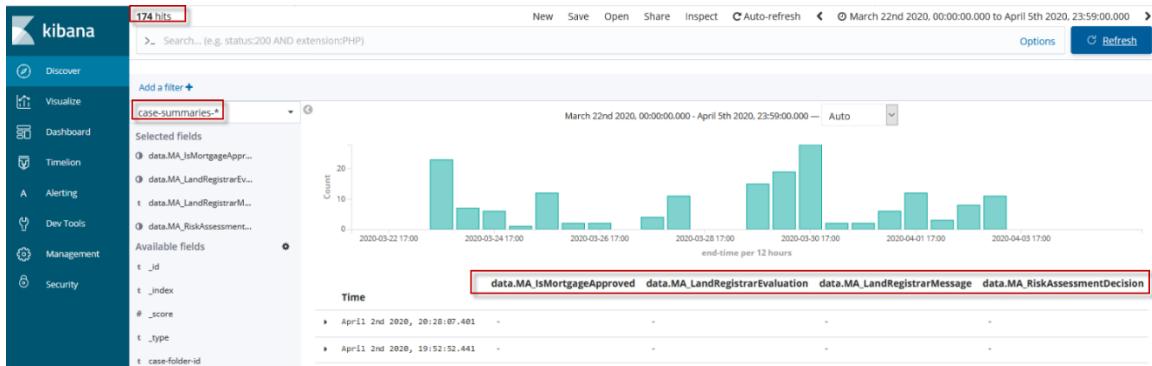
Saving searches enables you to reload them into Discover and use them as the basis for visualizations. Saving a search stores the index pattern it is based on, the filters/query applied and the table with the fields added.

For a later visualization we create a Saved Search:

1. Remove all filters that originate from the previous chapter

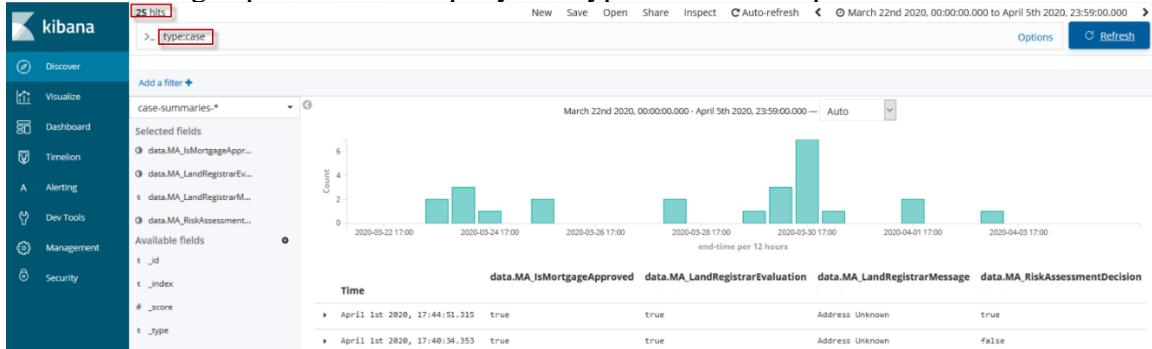


2. Select case-summaries-\* as index for the index pattern with an end-date
3. Add the following four fields from the field list by hovering the fields and click add:
  - a. data.MA\_IsMortgageApproved
  - b. data.MA\_LandRegistrarEvaluation
  - c. data.MA\_LandRegistrarMessage
  - d. data.MA\_RiskAssessmentDecision



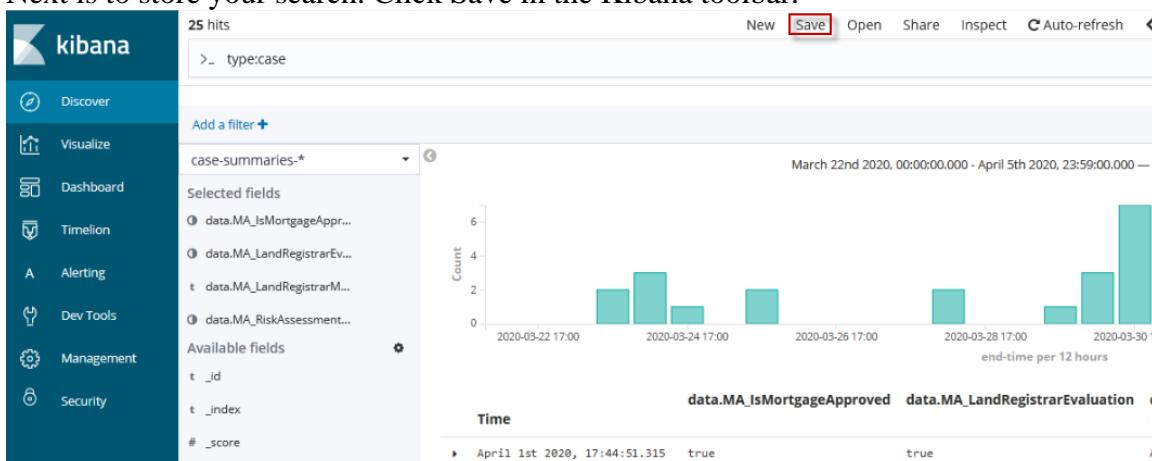
From the screenshot you can see that not all columns have values. This is because the index contains two different types: case and task. This is because the audit manifest specified the tracking variables on case level but not on case activity level. Therefore, we must add a filter to just use cases.

- Enter following expression in the query bar: type:case. Press Update.



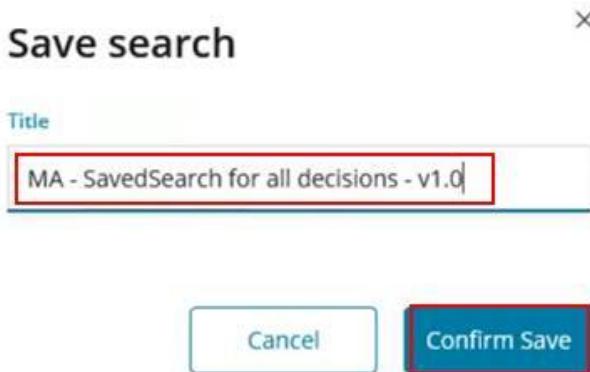
Now we have all decisions made in the case at a glance.

- Next is to store your search. Click Save in the Kibana toolbar.



- In the pop-up dialog enter a name for your Saved Search. For the Saved Search to be found quickly, please use the following naming convention.

<Initials of the student > - MA - SavedSearch for all decisions – v1.0  
Click Confirm Save.



#### 5.2.3.6 Opening existing Saved Searches

BAI comes with Saved Searches which are used in out-of-the-box visualizations. These can be viewed and explored. They should not be changed to avoid visualizations being negatively affected.

If you want to use and modify anything for your own purposes, perform a “Save as” for the out-of-the-box (ootb) Saved Search and store it with your initials and a new name.

[Save or open a search](#)

[KC: Searches related to Cases, Processes and Decisions](#)

1. Click Management.
2. Select Saved Objects.

A screenshot of the Kibana Management interface. On the left is a sidebar with icons for Discover, Visualize, Dashboard, Timeline, and Alerting. The 'Management' section is selected. In the center, there's a 'Saved Objects' section with a sub-menu for 'Index Patterns' and 'Saved Objects', with 'Saved Objects' also highlighted with a red border. To the right is a main panel titled 'Saved Objects' with a sub-header: 'From here you can delete saved objects, such as saved searches. You can also edit the raw data of saved objects. Typically objects are only modified via their associated application, which is probably what you should use instead of this screen.' It includes a search bar, a 'Type' dropdown menu (which is highlighted with a red border), and a 'Delete' button.

3. Expand Type field and select search.

Kibana

Index Patterns Saved Objects Advanced Settings

**Saved Objects**

From here you can delete saved objects, such as saved searches. You can also edit the raw data of saved objects. Typically objects are only modified via their associated application, which is probably what you should use instead of this screen.

Export 38 objects Import

search (38)

Type Delete

index-pattern (44)  
visualization (121)  
dashboard (12)

- Select the Saved Search named In-progress cases [do not change]

Kibana

Index Patterns Saved Objects Advanced Settings

**Saved Objects**

From here you can delete saved objects, such as saved searches. You can also edit the raw data of saved objects. Typically objects are only modified via their associated application, which is probably what you should use instead of this screen.

Export 38 objects Import Refresh

search (38)

Type Delete Export

In-progress cases [do not change]

Actions

- Click View search in the upper right corner

Index Patterns Saved Objects Advanced Settings

Edit search

Proceed with caution!

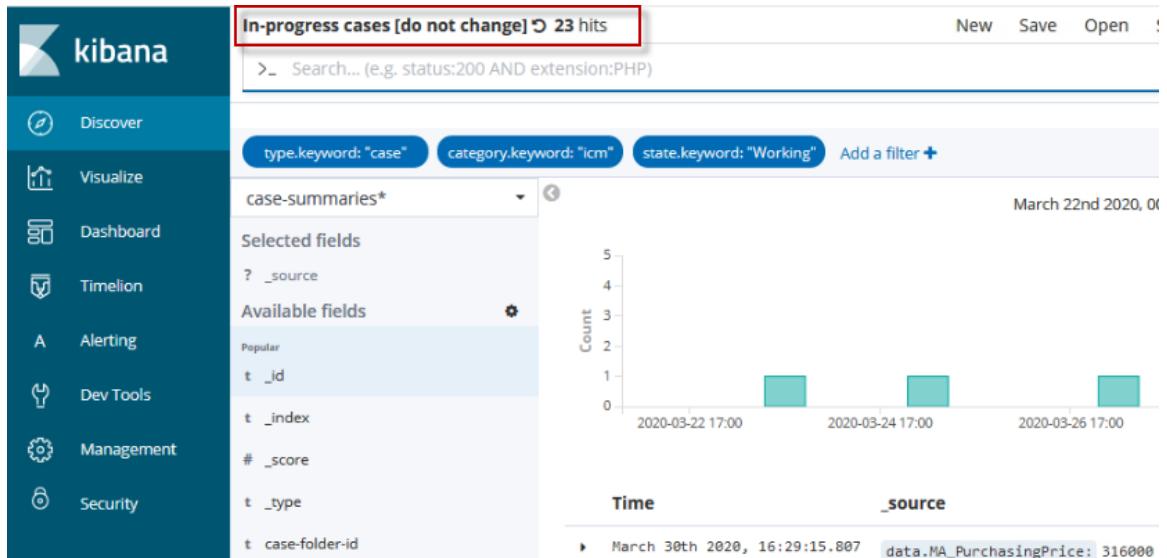
Modifying objects is for advanced users only. Object properties are not validated and invalid objects could cause errors, data loss, or worse. Unless someone with intimate knowledge of the code told you to be here, you probably shouldn't be.

title

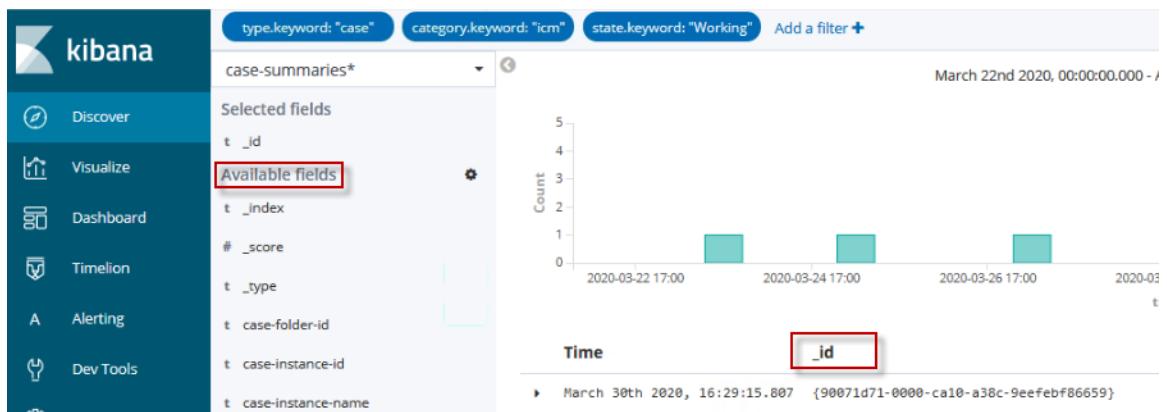
View search Delete search

The Saved Search In-progress cases [do not change] opens. Don't be afraid. You open and slightly modify it before saving it with a new name.

- Modify the Saved Search and save it as a new visualization.  
Add field \_id.



- Click Save in the Kibana toolbar.



- In the pop-up dialog enter a name for your Saved Search. To quickly find yours apply following naming convention.

<Initials of the student > - MA - SavedSearch for Overwriting – v1.0

Select the flag to Save as a new search. Press Confirm Save.



### 5.2.3.7 Refreshing the Search Results

As more documents are added to the indexes you are searching, the search results shown in Discover and used to display visualizations get stale. You can configure a [Autorefresh](#) to periodically resubmit your searches to retrieve the latest results.

To enable auto refresh:

1. Click the Auto refresh. in the Kibana toolbar.
2. Choose a refresh interval from the list.

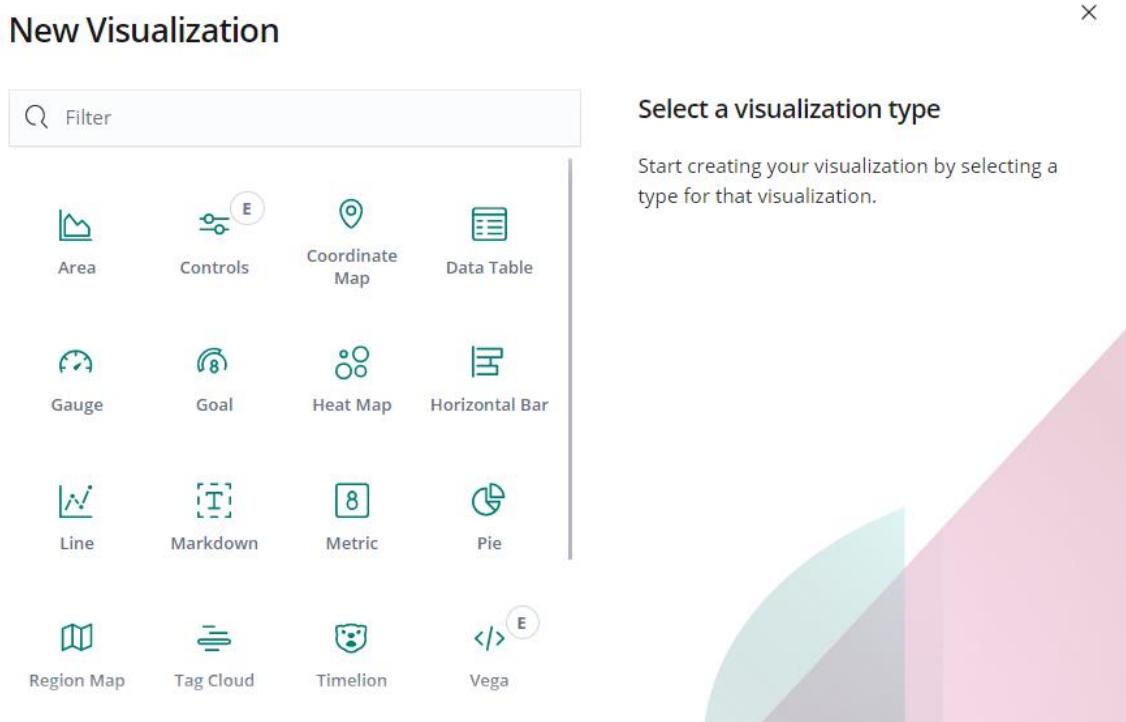
Refresh Interval			
<input type="button" value="Off"/>	5 seconds	1 minute	1 hour
	10 seconds	5 minutes	2 hours
	30 seconds	15 minutes	12 hours
	45 seconds	30 minutes	1 day

When auto refresh is enabled, the refresh interval is displayed next to the Time Picker, along with a Pause button. To temporarily disable auto refresh, click Off.

## 5.2.4 Visualizations

### Introduction

“Visualize” enables you to create visualizations of the data in your Elasticsearch indexes. You can then build [dashboards](#) that display related visualizations.



Kibana visualizations are based on Elasticsearch queries. By using a series of Elasticsearch [aggregations](#) to extract and process your data, you can create charts that show trends, spikes, and dips you may need to know about.

Kibana offers a rich set of different charts. Development of a visualization starts with the selection of a chart type.

### [Most frequently used visualizations](#)

1. Line, area, and bar charts — Compares different series in X/Y charts.
2. Pie chart — Displays each source contribution to a total.
3. Data table — Flattens aggregations into table format.
4. Metric — Displays a single number.
5. Goal and gauge — Displays a number with progress indicators.
6. Tag cloud — Displays words in a cloud, where the size of the word corresponds to its importance.

## TSVB

Visualizes time series data using pipeline aggregations.

## Timelion

Computes and combine data from multiple time series data sets.

## Maps

[Elastic Maps](#) — Displays geospatial data in Kibana (Region Map)

[Heat map](#) - Display shaded cells within a matrix.

## Dashboard tools

Markdown widget — Displays free-form information or instructions.

Controls — Adds interactive inputs to a dashboard.

## Vega

Completes control over query and display.

In general, you [create visualizations](#) from a search saved under [Discover](#) or start with a new search query.

Specify a search query to retrieve the data for your visualization:

- a. To enter new search criteria, select the index pattern for the indexes that contain the data you want to visualize. This opens the visualization builder with a wildcard query that matches all the documents in the selected indexes.

From a New Search, Select Index

The screenshot shows a search interface titled "From a New Search, Select Index". At the top, there is a search bar labeled "Filter..." and a status indicator "15 of 15". Below the search bar is a table with a single column labeled "Name". The table contains ten rows, each representing an index pattern. The first row is highlighted in light blue. The other rows are in white. The index patterns listed are: process-summar\*, process-summar\*, \*rocess-summaries\*, process-summ\*, \*rocess-summaries-\*, \*-summaries-\*, \*summaries\*, case-summarie\*, and case-summaries\*.

- b. To build a visualization from a saved search, click the name of the saved search you want to use. This opens the visualization builder and loads the selected query.

Or, From a Saved Search

Name
Active Cases [do not change]
Active Tasks [do not change]
Active [do not change]
CaseSummary [do not change]
Completed Cases [do not change]
Completed Processes in Hiring Sample [do not change]
Completed Tasks [do not change]
Completed Tasks in Hiring Sample [do not change]
Completed [do not change]
Completed process instances [do not change]
Completed user tasks [do not change]
Failed process instances [do not change]

2. In the visualization builder you select the Metric Aggregation for the visualization's Y axis:

### Metric Aggregations

- [count](#)
- [average](#)
- [sum](#)
- [min](#)
- [max](#)
- [standard deviation](#)
- [unique count](#)
- [median](#) (50th percentile)
- [percentiles](#)
- [percentile ranks](#)
- [top hit](#)
- [geo centroid](#)

### Parent Pipeline Aggregations:

- [derivative](#)
- [cumulative sum](#)
- [moving average](#)
- [serial diff](#)

### Sibling Pipeline Aggregations:

- [average bucket](#)
- [sum bucket](#)
- [min bucket](#)
- [max bucket](#)

For the visualizations X axis, select a bucket aggregation:

- [date histogram](#)
- [range](#)
- [terms](#)
- [filters](#)
- [significant terms](#)

Bar, line, or area chart visualizations use metrics for the y-axis and buckets for the x-axis.

3. Buckets are analogous to SQL GROUP BY statements. Pie charts, use the metric for the slice size and the bucket for the number of slices.

You can further break down the data by specifying sub aggregations. The first aggregation determines the data set for any subsequent aggregations. Sub aggregations are applied in order. You can drag the aggregations to change the order in which they're applied or temporarily switch them off.

In this section you will

- verify the provided visualizations
- create a new visualization and learn about the chart types
- create a visualization including tracked data
- copy and save an existing visualization
- verify out-of-the-box visualizations

BAI provides a set of predefined, out-of-the-box visualizations. These are later on used in ootb Case- , Process - or Decision dashboards.

These visualizations can be viewed or used as a template for new visualizations.

However, you should not overwrite the existing ones. If you want to create a modified visualization based on an ootb visualization save it under a new name to avoid inconsistencies.

In this section you will learn how to view these visualizations and create your own based on them. Let's begin.

Follow these steps to open and save an out of the box visualization using a new name

1. Navigate to Visualize
2. On the start page you can access or search for existing visualizations.  
Browse through the available BAI visualizations.
3. Click visualization Activities in progress [do not change]

The screenshot shows the Kibana interface. On the left is a sidebar with icons for Discover, Visualize (which is highlighted with a red box), Dashboard, Timelion, Dev Tools, and Management. To the right is a search bar with placeholder text "Search..." and a "Type" dropdown set to "Timelion". Below the search bar is a list of visualizations. The first item, "Activities completed statistics [do not change]", has a "Type" of "Timelion". The second item, "Activities in each state [do not change]", has a "Type" of "Pie". The third item, "Activities in progress [do not change]" (highlighted with a red box), has a "Type" of "Vertical Bar". The fourth item, "Activities started statistics [do not change]", has a "Type" of "Timelion".

Now we can edit this visualization. For our purposes it is sufficient to change the bars to lines.

4. Select the Metrics & Axes tab
5. Change Chart Type from bar to line
3. Click the “Apply Changes” button which is symbolized as a “Play”-icon. The diagram is refreshed.



4. Click the Save button in the toolbar on top.

[Visualize / Activities in progress \[do not change\]](#)

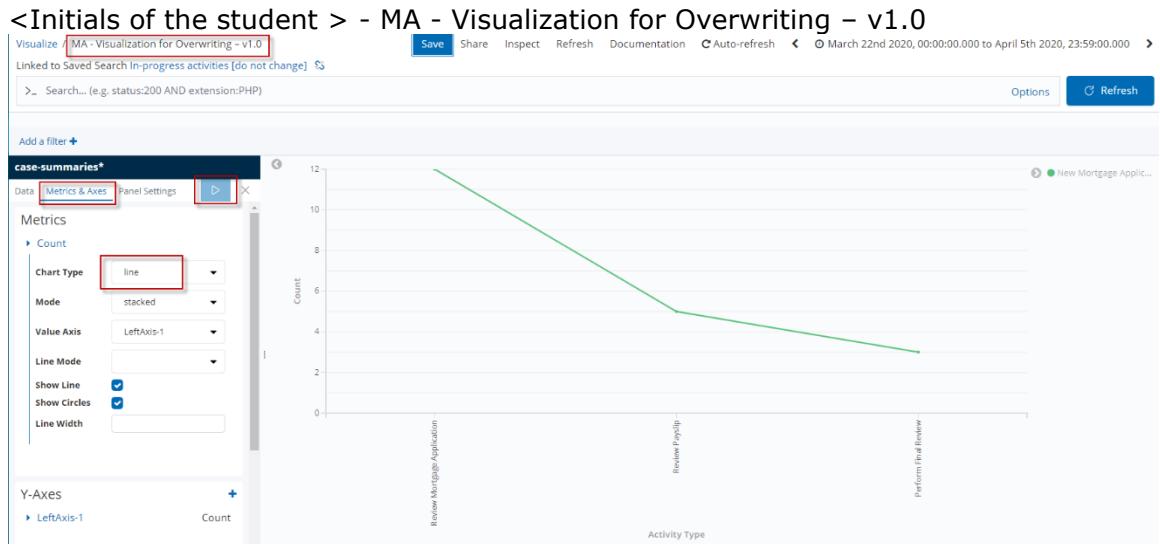
[Save](#) Share Inspect Refresh

Linked to Saved Search In-progress activities [do not change]

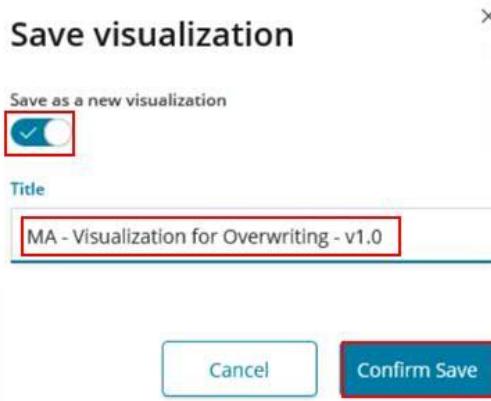
>\_ Search... (e.g. status:200 AND extension:PHP)

Add a filter

5. In the pop-up dialog enter a name for your Visualization. That the visualization can be identified easily apply following naming convention.



- Select the Control next to Save as a new visualization.  
Click Save.



#### 5.2.4.1 Create your first visualizations – Data Table

##### Objective

The goal of a data table is to get a compact view of a certain topic. In our case we want to display all decisions made during the Case in one table.

##### Detailed Requirements

All decisions made in the case are presented in one table. This includes the following four decisions:

- data.MA\_IsMortgageApproved
- data.MA\_LandRegistrarEvaluation
- data.MA\_LandRegistrarMessage
- data.MA\_RiskAssessmentDecision

Additionally, all results must be of type:case.

##### Key Considerations

It should be noted that all four decisions are only included in the case as soon as it is completed. Therefore, we use the index case-summaries-\* which contains all completed cases.

### Building the Visualization – High-Level Instructions

In a previous chapter, we already created a Saved Search that filters for type:case and includes the index case-summaries-\*. We just need to create the visualization based on this Saved Search.

1. Create a data table visualization based on your saved search created in chapter [2.2.3.5.](#) which include the following properties
  - data.MA\_IsMortgageApproved
  - data.MA\_LandRegistrarEvaluation
  - data.MA\_LandRegistrarMessage
  - data.MA\_RiskAssessmentDecision

### Building the Visualization – Step-by-Step Instructions

1. Click on Visualize in the side navigation.
2. Click the Create new visualization button or the „+“ button.

3. Select visualization type: Data Table

#### New Visualization

#### Select a visualization type

Start creating your visualization by selecting a type for that visualization.

4. Locate the previously created Saved Search:

<Initials of the student> - MA – Saved Search for all decisions – v1.0.

Click Enter.

#### Note

It is also possible to enter only a few words (keywords). Suggestions are generated immediately. Your Saved Search will be found in the search results.

Visualize / New / Choose search source

From a New Search, Select Index

Or, From a Saved Search

Q. Filter... 44 of 44

Name ▲

- \*awadv-summaries\*
- \*wadv-sum\*
- \*awadv-summar\*
- bawadv-summ\*
- bawadv-summa\*
- bawadv-summarie\*

Decisions - Search 1-9 of 9 Manage saved searches

Q. 3 – Saved Search for all decisions - v1.0

Name ▲

- MA - SavedSearch for Mortgage Applications grouped by amount - v1.0
- MA - SavedSearch for trend of accepted and rejected Mortgage Applications - v1.0
- MA - SavedSearch for Customer Information - v1.0
- MA - SavedSearch for Overwriting - v1.0
- MA - SavedSearch for all decisions - v1.0

5. Click on this Saved Search to select it.
6. Define the “rows” of the table:
  - a. In the Buckets area, select Split Rows

case-summaries\*

Data Options

Metrics

Metric Count

Add metrics

Buckets

Select buckets type

Split Rows

Split Table

- b. For the Aggregation field, select Terms
- c. As Field use data.MA\_IsMortgageApproved
- d. For the custom label enter Approved?
- e. Click the “Apply Changes” button which is symbolized as a “Play”-button at the top. The diagram is refreshed.

case-summaries\*

Data Options

Aggregation Terms

Field data.MA\_IsMortgageApproved

Order By metric: Count

Order Descending Size 5

Custom Label Approved?

	Count
false	15
true	15

Export: Raw Formatted

7. Repeat step 6 clicking Add sub-buckets for the other three field values:

- data.MA\_LandRegistrarEvaluation
- data.MA\_LandRegistrarMessage
- data.MA\_RiskAssessmentDecision

label: AlreadyMortgaged?  
label: RegistrarMessage  
label: RiskAssessment

8. When finished your Data Table definition should look like the screenshot beneath.

Approved?	AlreadyMortgaged?	RegistrarMessage	RiskAssessment	Count
false	true	Address Unknown	false	9
false	true	Address Unknown	true	1
false	false	N/A	false	5
true	true	Address Unknown	false	10
true	true	Address Unknown	true	5

When satisfied with your visualization click Save.

#### Note

Your data and counts might differ as the test data were generated randomly.

9. In the pop-up dialog enter the name for the visualization with your initials:

<Initials of the student > - MA - Data table for Decisions - v1.0

## Summary

With this Data Table you have a good overview on what decisions were made in the RPA- and ODM-implementation during the mortgage application as well as confirmed or overruled by the Mortgage Officer.

### 5.2.4.2 Create a Visualization of type Gauge

#### Objective

A goal or gauge visualization displays how your metric progresses towards a fixed goal.

A gauge visualization displays in which predefined range and color your metric falls.

In our scenario, as soon as too many Mortgage Applications are rejected, the pointer should turn yellow or red.

#### Detailed Requirements

We are interested in the number of rejected mortgages. Based on the number we must define limits, from when the number becomes critical. As we want to have all completed cases, we use the index: case-summaries-\*.

#### Key Considerations

You will specify ranges to correspond to a satisfaction level, similar to a critical parameter (key performance indicator - kpi). For our purposes we use 15 as the limit for the yellow, 30 as the limit of the red range.

#### Building the Visualization – High-Level Instructions

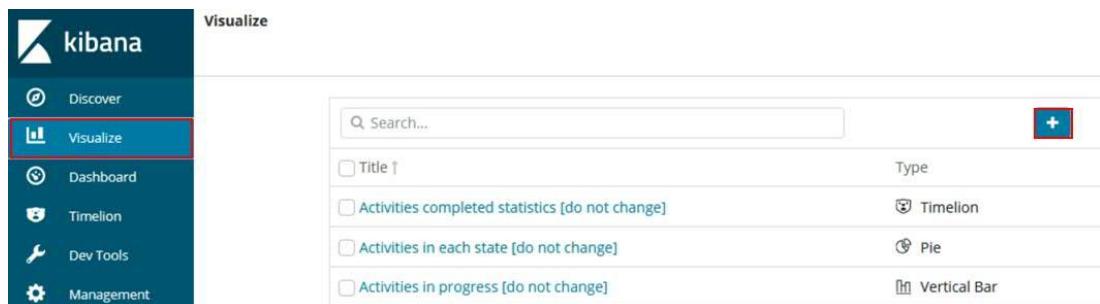
##### Note

You might try to create this second visualization on your own based on the high-level instructions.

1. Create a Gauge visualization
2. Use property data.MA\_isMortgageApproved:false for grouping the gauge.
3. Specify the ranges and label

#### Building the Visualization – Step-by-Step Instructions

1. Click on Visualize.
2. Click the Create new visualization button or the “+” button.



The screenshot shows the Kibana interface. On the left, there is a sidebar with icons for Discover, Visualize (which is highlighted with a red box), Dashboard, Timelion, Dev Tools, and Management. The main area is titled "Visualize". It contains a search bar labeled "Search..." and a list of visualization types with their corresponding icons and names: "Title ↑", "Activities completed statistics [do not change]", "Activities in each state [do not change]", "Activities in progress [do not change]", "Timelion", "Pie", and "Vertical Bar". A blue "+" button is located at the top right of the visualization list.

3. Select visualization type: Gauge



## Gauge

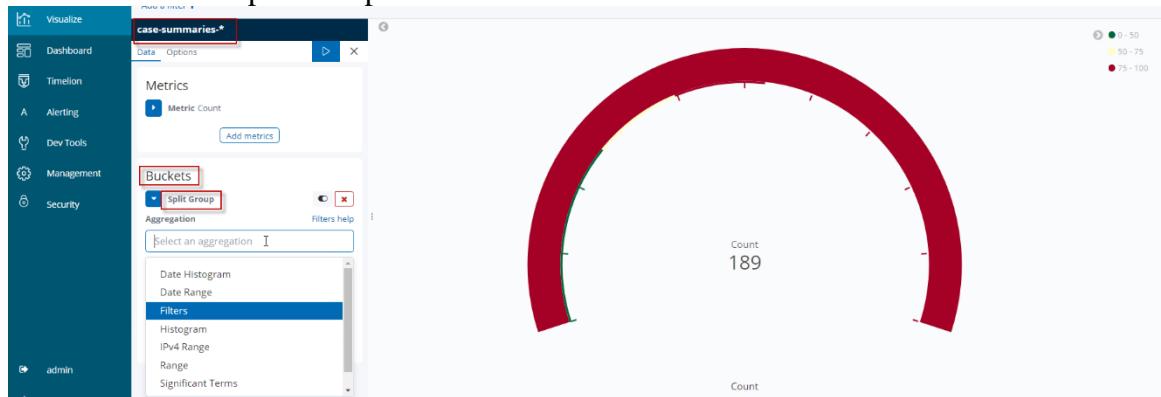
### 4. Use index case-summaries-\*

From a New Search, Select Index  
case-summaries-\*

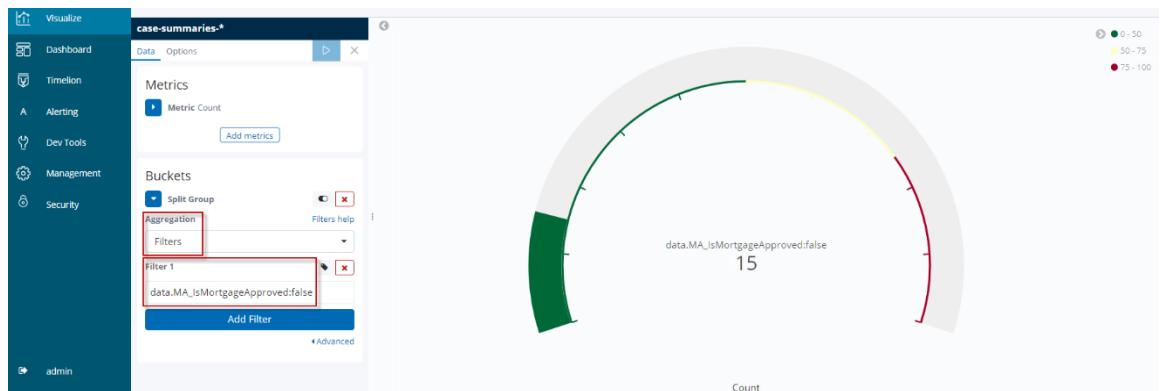
Name ▲  
case-summaries-\*

### 5. Specify the gauge:

#### a. Click Buckets > Split Group



- b. For the Aggregation field, select Filters
- c. For Filter1 enter data.MA\_IsMortgageApproved:false
- d. Click the “Apply Changes” button which is symbolized as a “Play”-button at the top. The diagram is refreshed.



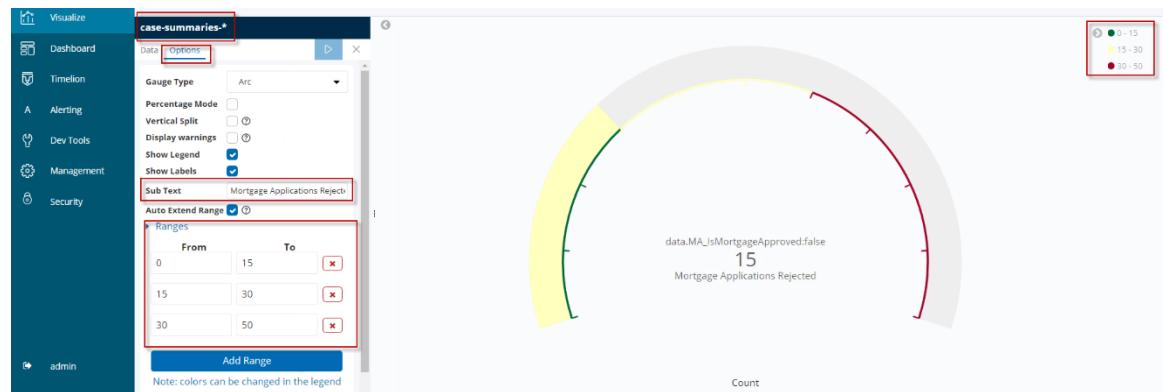
### 6. Specify the ranges:

- Click the Options tab
- Update the ranges:
  - From 0 to 15
  - From 15 to 30
  - From 30 to 50

Note

The values for the ranges might need to be adopted due to the amount of summary events (test data) and time period observed. This is being specified in the dashboard later on.

- Enter the name of the label Mortgage Applications Rejected in the Sub Text field
- Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



- When finished your Gauge definition should look like the screenshot above.  
When satisfied with your visualization click Save.

[Visualize / Activities in progress \[do not change\]](#) Save Share Inspect Refresh

Linked to Saved Search In-progress activities [do not change] [Edit](#)

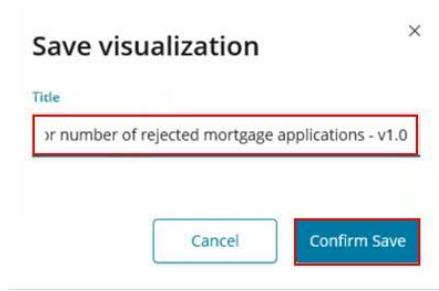
>\_ Search... (e.g. status:200 AND extension:PHP)

Add a filter +

- In the pop-up dialog enter the name for the visualization with your initials:

<Initials of the student > - MA- Gauge for number of rejected mortgage applications - v1.0

Click Confirm Save.



### Summary

This gauge displays the number of mortgage applications rejected. The ranges would need to be adopted for the proper business objectives.

#### 5.2.4.3 Create a Visualization of type Vertical Bar (Histogram)

##### Objective

With a vertical bar or a date histogram it is easy to display metrics and trends over time. In this section we display started cases over time. The cases are grouped according to their start times in weekly intervals. In addition, a trend line is specified for demo purposes.

##### Detailed Requirements

We summarize all mortgage applications of type case. These are aggregated by startTime in weekly time intervals. Therefore, we have to use the index case-summarie\* which contains all and is optimized for startTimes.

##### Key Considerations

To define a trend line based on the count of cases you need to create a sub-bucket for the y axis. This should calculate an average based on the count of the main bucket. To make sure that only mortgage applications of type case are displayed, the date histogram on the X-axis needs to be also filtered in addition to the date histogram.

##### Building the Visualization – High-Level Instructions

1. Create a vertical bar visualization.
2. Add as second y-axis with aggregation field average bucket.
3. Use Date Histogram for the x-axis
4. Filter for type:case
5. Modify the average bars to a line

##### Building the Visualization – Step-by-Step Instructions

1. Click on Visualize in the side navigation.
2. Click the Create new visualization button or the “+” button.

3. Select visualization type: Vertical bar



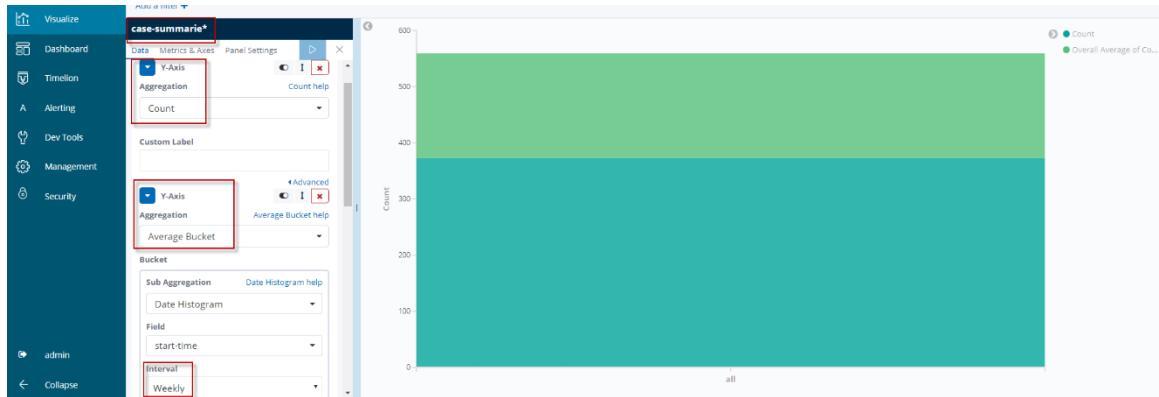
4. Use index case-summarie\*

Name
case-summarie*

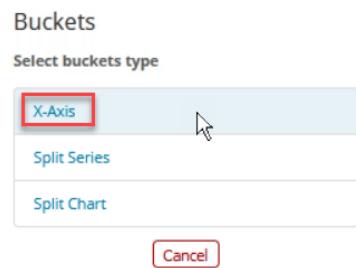
For the definitions of the vertical bar follow these steps.

1. Expand the Y-Axis. The Aggregation setting Count is set as default
2. Select the Add metrics function below the Custom Label field

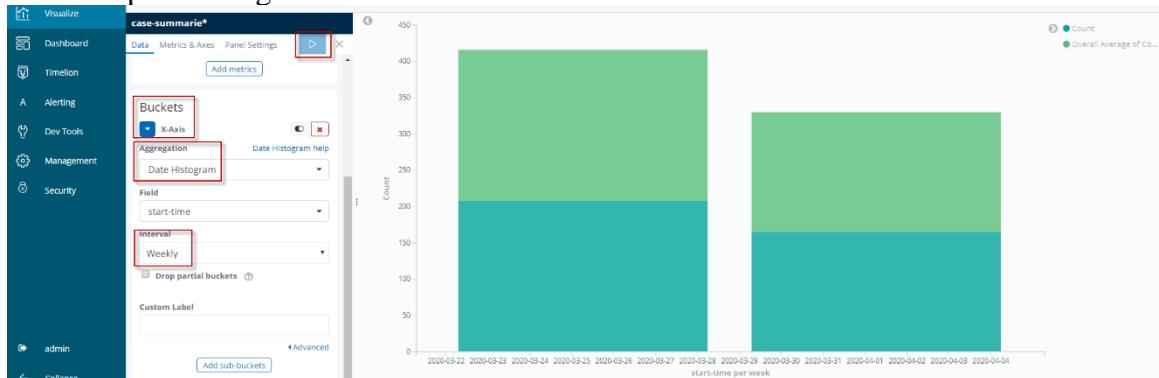
3. Select Y-Axis.
4. In the Aggregation field, select Average Bucket
5. Set interval from auto to Weekly
6. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



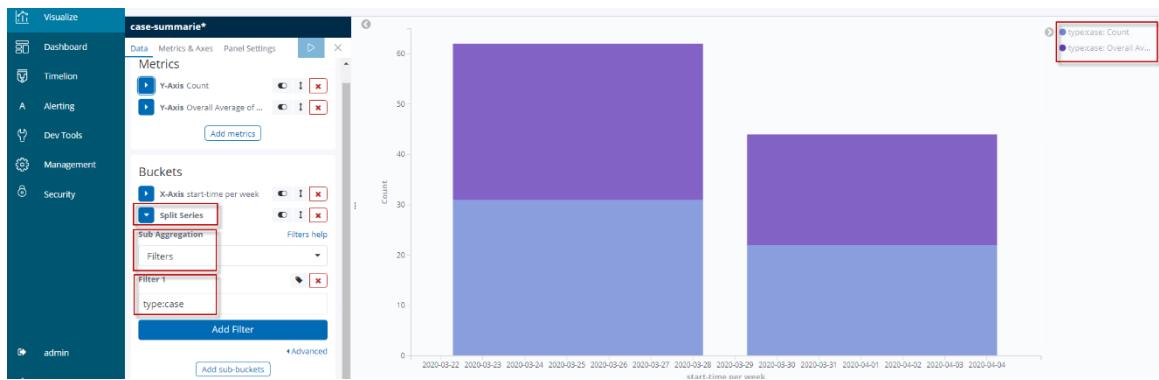
## 7. Select X-Axis in the Buckets area



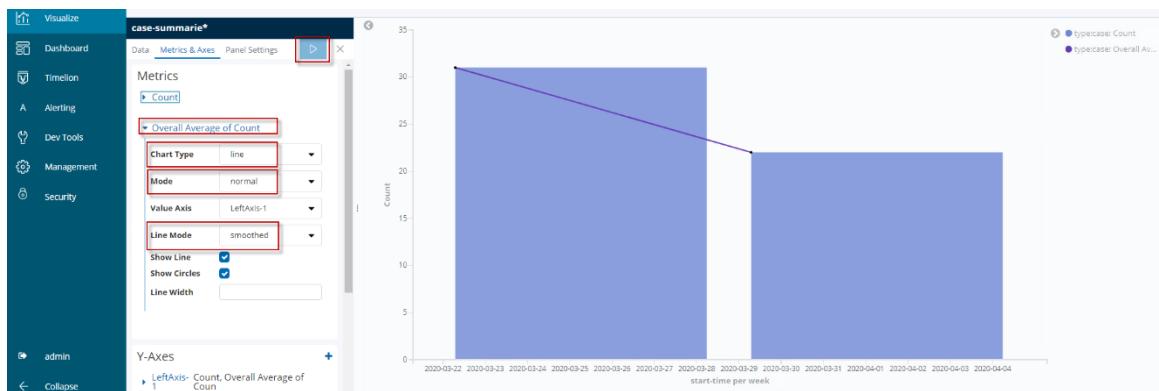
- In the Aggregation field, select Date Histogram
- Set interval from auto to Weekly.
- Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



- Click the Add Sub-bucket function
- Select Split Series
- In the Sub Aggregation field, select Filters
- Enter the following expression in the Filter field: type:case
- Click the “Apply Changes” button which is symbolized as a “Play”-button at the top. The diagram is refreshed.



8. Specify trend line
  - a. Navigate to the Metrics & Axes tab
  - b. Expand the Overall Average of Count tab
  - c. Select Chart type line
  - d. Select Mode normal
  - e. Select Line Mode smoothed
  - f. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



9. If you are satisfied with your visualization and it looks similar to the picture above, you can click Save.

[Visualize](#) / Activities in progress [do not change] Save Share Inspect Refresh

Linked to Saved Search [In-progress activities \[do not change\]](#)

>\_ Search... (e.g. status:200 AND extension:PHP)

Add a filter +

In the pop-up dialog enter the name for the visualization with your initials:

<Initials of the student > - MA – Vertical bar for started cases - v1.0

Click Confirm Save



## Summary

In a date histogram you can for example see how many cases are available in a given state, here started, per week. When historical data over several weeks exists, adding a trend line can provide further insights.

### 5.2.4.4 Create a Visualization of type Pie Chart

#### Objective

In this section you create a pie chart that is defined by the metrics aggregation. The slice size represents the number of process task named “Perform Final Review” any Mortgage Officer has performed.

#### Detailed Requirements

On the case level, no data about the employee performing a case activity is emitted. Therefore, we need a process index that contains the variable performerName for completed tasks: process-summaries\*.

#### Key Considerations

Since there are several tasks in the process index and the employee only takes over the task “Perform Final Review”, filtering for this variable is required:  
name:”Perform Final Review”.

#### Building the Visualization – High-Level Instructions

1. Create a pie visualization.
2. Filter for name:”Perform Final Review”
3. Aggregate by variable performerName.keyword

#### Building the Visualization – Step-by-Step Instructions

1. Click on Visualize in the side navigation.
2. Click the Create new visualization button or the „+“ button.

3. Select visualization type: Pie

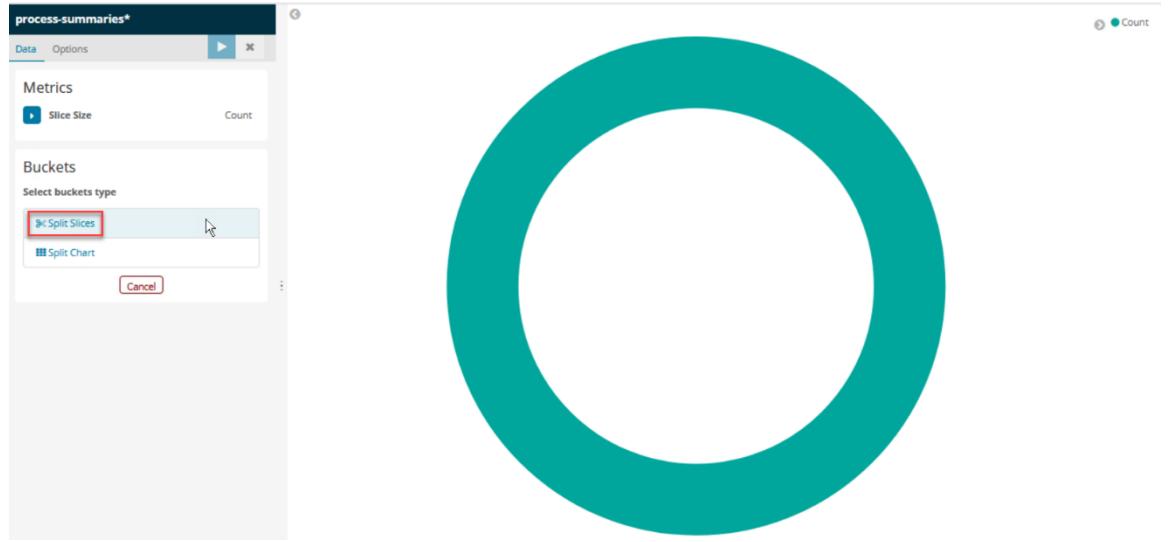


4. Use index process-summaries\*

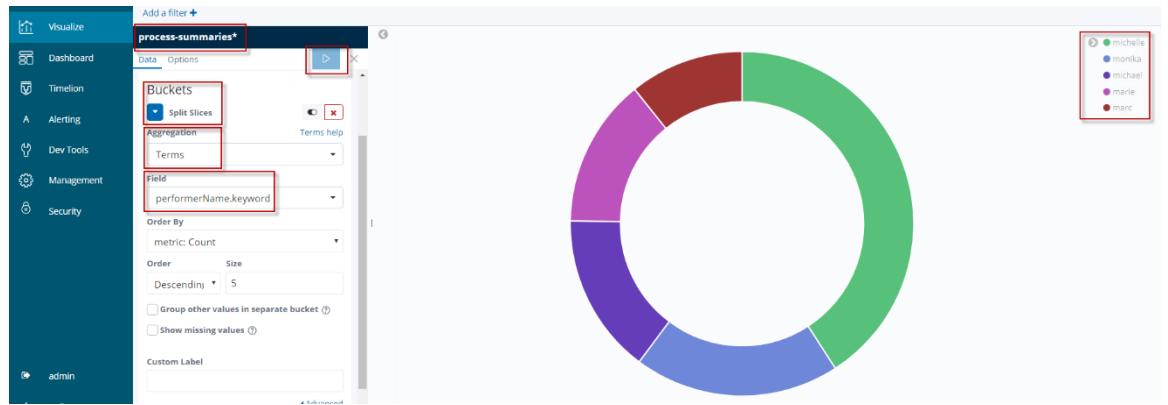
5. Specify the slices:

- Enter following expression in the Search bar: name: "Perform Final Review". Click the Update button.

- Select Buckets > Split Slices



- c. In the Aggregation field, select Terms
- d. In the field Field, select performerName.keyword
- e. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



4. If you are satisfied with your visualization and it looks similar to the picture above, you can click Save.

[Visualize](#) / Activities in progress [do not change] Save Share Inspect Refresh

Linked to Saved Search [In-progress activities](#) [do not change]

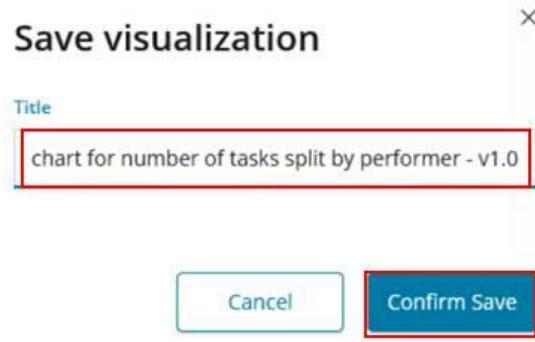
>\_ Search... (e.g. status:200 AND extension:PHP)

Add a filter +

In the pop-up dialog enter the following name for the visualization with your initials:

<Initials of the student > - MA – Pie chart for number of tasks split by performer - v1.0

Click Confirm Save



## Summary

A pie chart is a good means to represent the ratio or categories of variables and aggregations.

### 5.2.5 Dashboards

#### Introduction

Now, as you understand how to create visualizations we may want to display them via a Dashboard.

Kibana offers *dashboards* for that purpose. Dashboards display a collection of visualizations and searches. You can arrange, resize, and edit the dashboard content and then save the dashboard so you can share it.

In this section you will

- verify the provided out-of-the-box dashboards
- create your own dashboard
- learn about dashboard layouts
- practice filtering, i.e. to disable, to pin, to exclude matches, to remove, and to edit filters
- export your dashboard

#### 5.2.5.1 Verify the out-of-the-box Dashboards

BAI provides a set of out-of-the-box dashboards. These can be viewed in the Dashboard tab. The dashboards visualize information about Cases, Processes, Decisions and are specific to the Hiring Sample.

Follow these steps to open an existing dashboard:

1. Navigate to the Dashboard tab

- On the start page for Dashboards you can search and select available dashboards.  
Open the Workflow – Process Tasks dashboard

The screenshot shows the Kibana interface with the 'Dashboards' tab selected in the sidebar. A list of dashboards is displayed, with 'Workflow - Process Tasks' highlighted by a red box and a red arrow pointing to it.

Title	Description	Actions
Workflow - Case Activities		Edit
Workflow - Cases		Edit
Decisions Dashboard		Edit
Workflow - Hiring Sample [18.0.0.1]		Edit
Workflow - Processes		Edit
<b>Workflow - Process Tasks</b>		
DBA Demos and Labs - Getting Started		Edit
DBA Demos and Labs - Business Dashboard for Mortgage Application		Edit

#### Note

The screenshot lists some custom dashboards not yet available at this stage in your environment.

- The Workflow – Process Tasks dashboard opens.

The screenshot shows the 'Workflow - Process Tasks' dashboard for a 'Mortgage Application Risk Assessment'. The dashboard features three main numerical metrics: 22 (not completed user tasks), 166 (started user tasks), and 141 (completed user tasks). The interface includes a sidebar with various Kibana navigation options and a top toolbar with search, refresh, and other settings.

These ootb dashboards will be introduced in the next exercise: [Understand the available dashboards on monitored Cases, Processes and Decisions](#). Therefore we will continue with editing dashboard next.

#### 5.2.5.2 Edit a dashboard

Continue with the Workflow – Process Tasks dashboard to edit, update and save it under a new name. For our purposes of this section it is sufficient to add one visualization.

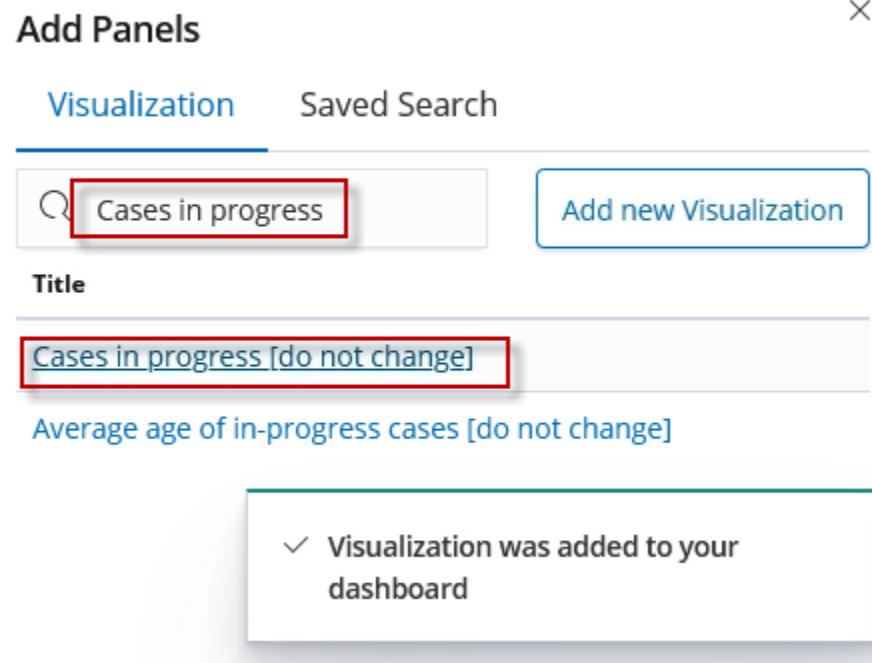
- Click Edit in the Kibana toolbar

The screenshot shows the Kibana toolbar with the 'Edit' button highlighted in red, indicating it is selected for editing the dashboard.

- Click Add in the Kibana toolbar

The screenshot shows the Kibana toolbar at the top of a dashboard. The 'Add' button is highlighted with a red box. Other buttons visible include 'Save', 'Cancel', 'Options', 'Share', 'Documentation', 'Auto-refresh', and 'Refresh'.

3. Select visualization Cases in progress [do not change]. Double-click to add it to the Dashboard. This visualization is based on a case. It is used for demonstration purposes.

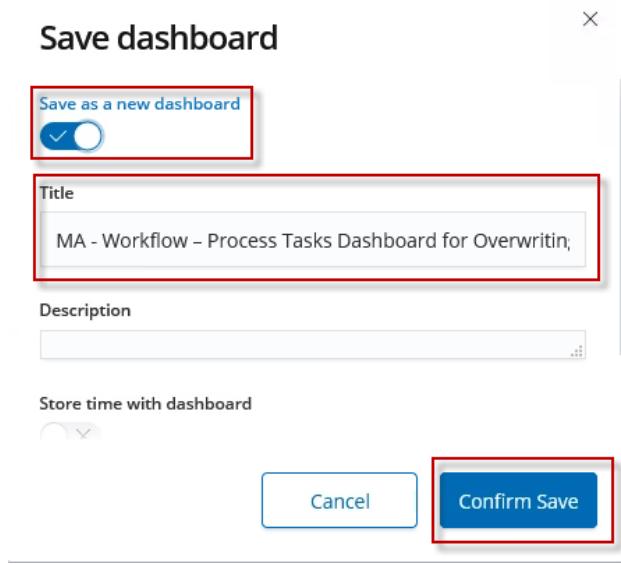


The visualization is added at the bottom of this dashboard.

3. Click Save in the Kibana toolbar.
4. In the pop-up dialog enter a name for your Dashboard. That the Dashboard can be found quickly, please use the following naming convention.

<Initials of the student > - MA - Workflow – Process Tasks Dashboard for Overwriting – v1.0

Select the option to Save as a new dashboard. Click Confirm Save.



### 5.2.5.3 Create and build a new Dashboard

The visualizations created in the previous chapters are now added to a new dashboard.  
[Building a Dashboard](#)

1. Navigate to Dashboard.
2. Click Create new dashboard.

The screenshot shows the Kibana Dashboards interface. On the left is a sidebar with icons for Discover, Visualize, Dashboard (which is selected and highlighted in red), Timeline, Dev Tools, and Management. The main area is titled 'Dashboards' and contains a table with the following data:

Title	Description	Actions
Workflow - Case Activities		Edit
Workflow - Cases		Edit
Decisions Dashboard		Edit
Workflow - Hiring Sample [18.0.0.1]		Edit

A red box highlights the 'Create new dashboard' button at the top right of the table.

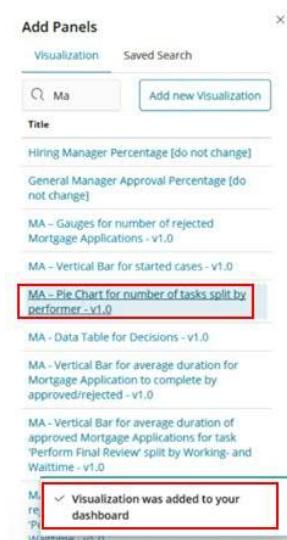
3. Click Add in the Kibana toolbar.

4. Use Add Panels to add visualizations and saved searches to the dashboard. Enter your Initials and click Enter.

Based on your initials you filter those visualizations you have recreated before. Following visualizations should be offered:

- <Initials of the student > - MA - Data table for Decisions - v1.0
- <Initials of the student > - MA - Gauges for number of rejected mortgage applications - v1.0
- <Initials of the student > - MA - Vertical bar for started cases - v1.0
- <Initials of the student > - MA - Pie chart for number of tasks split by performer - v1.0

5. Click on each of your visualizations to add them to the new dashboard.

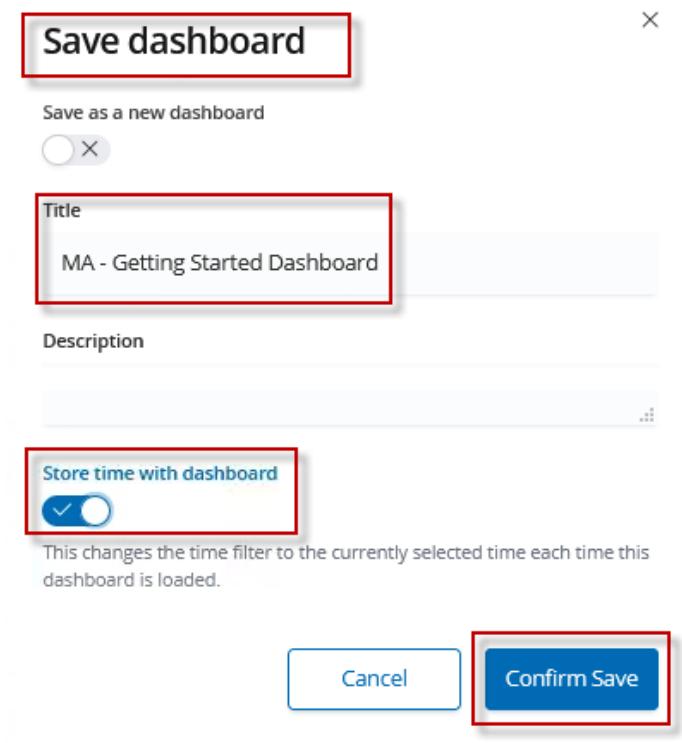


6. Click Save after you have added all four visualizations.
7. In the Save Dashboard dialog, enter the dashboard title and optionally a description. For our purpose use:  
<Initials of the student > - MA - Getting Started Dashboard
8. Select Store time with dashboard to store the time period specified in the time filter.

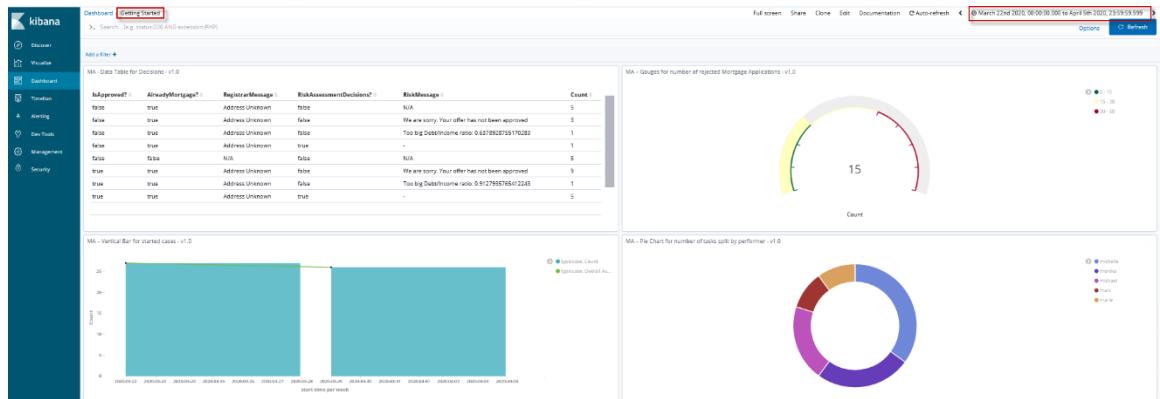
#### Note

Remember we had specified an absolute time period from 2020-03-22 till 2020-04-05.

Click Confirm Save.



Your dashboard should look similar to the screenshot below.

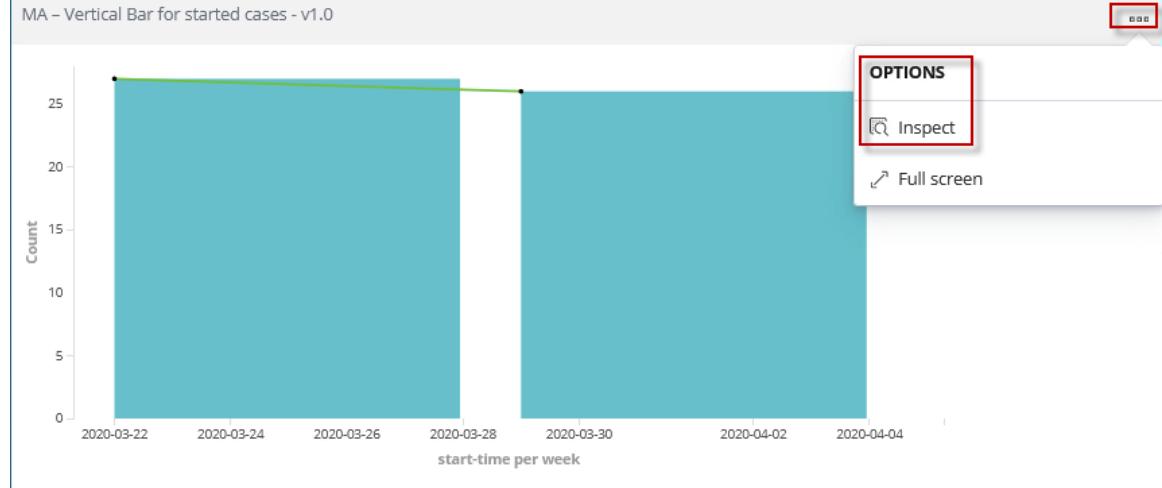


#### 5.2.5.4 Inspecting a Visualization in a Dashboard

Many visualizations allow you to inspect the data as an enduser, i.e. you are not in Edit mode. This opens a data table which shows the detailed metrics that feed the graphical representation.

A further kind of inspection is filtering by modifying the time period that is shown in the dashboards as introduced in [Filter and narrow down the time range in the histogram](#).  
Ref: [Inspecting a Visualization from the Dashboard](#)

1. Hover over the upper right corner of a visualization until three dots appear.



2. Click Options > Inspect

The source data for the bar chart are displayed in a data table.

MA - Vertical Bar for started cases - v1.0

View: Data

Download CSV

start-time per week	filters	Count	Overall Average of Count
2020-03-22	type:case	27	27
2020-03-29	type:case	26	26

Rows per page: 20

3. Optionally you can download the data in CSV format.

4. Filtering

Filtering is not only possible in visualizations, but in dashboards too. However, due to different indexes used in the visualizations some filters might not have an effect on all visualizations – “No results found”.

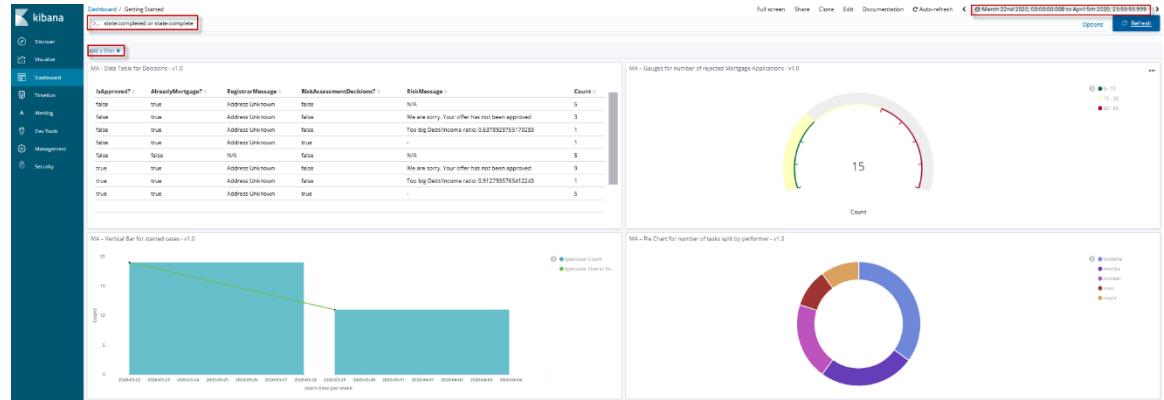
- a. Specify the filter in the query bar

Enter the following expression in the query bar: state:completed or state:complete.

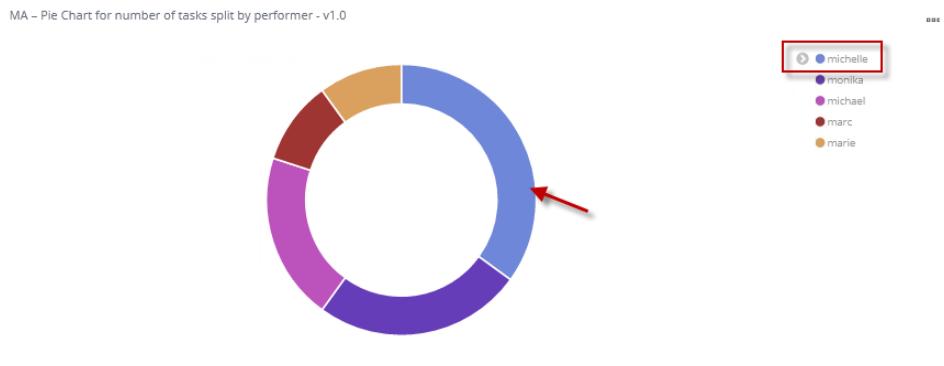
Note

“complete” is the state for a case, while “completed” is the state for a process (bottom right).

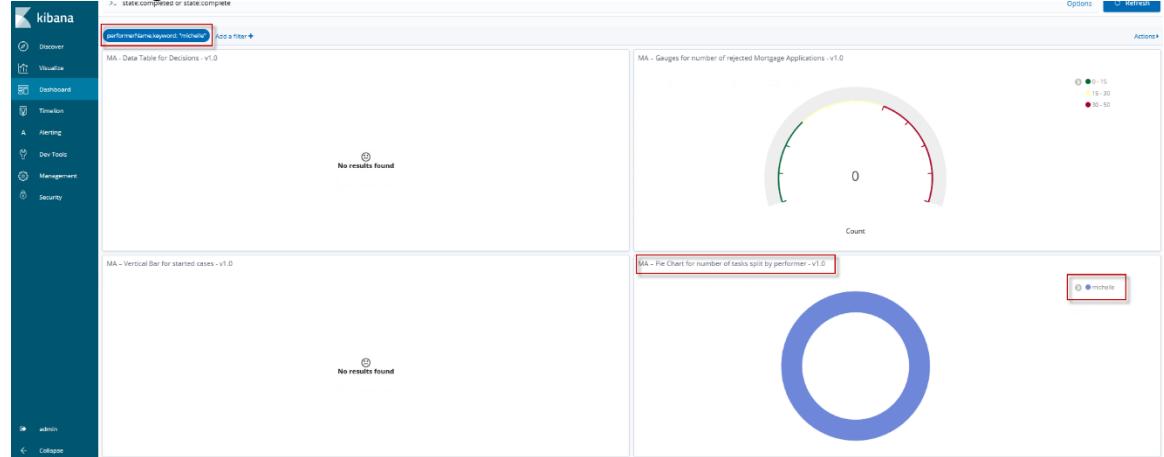
- b. Alternatively, you can configure your filter expression. Click Add a filter function.



- c. In some visualizations it is possible to click on an area or a bar. This sets a filter for this slice.



The other visualizations – due to its internal case index – don't cope with this filter setting.



### 5.2.5.5 Manipulate and arrange Dashboard Elements

The visualizations and searches in a dashboard are stored in panels that you can move, resize, edit, and delete.

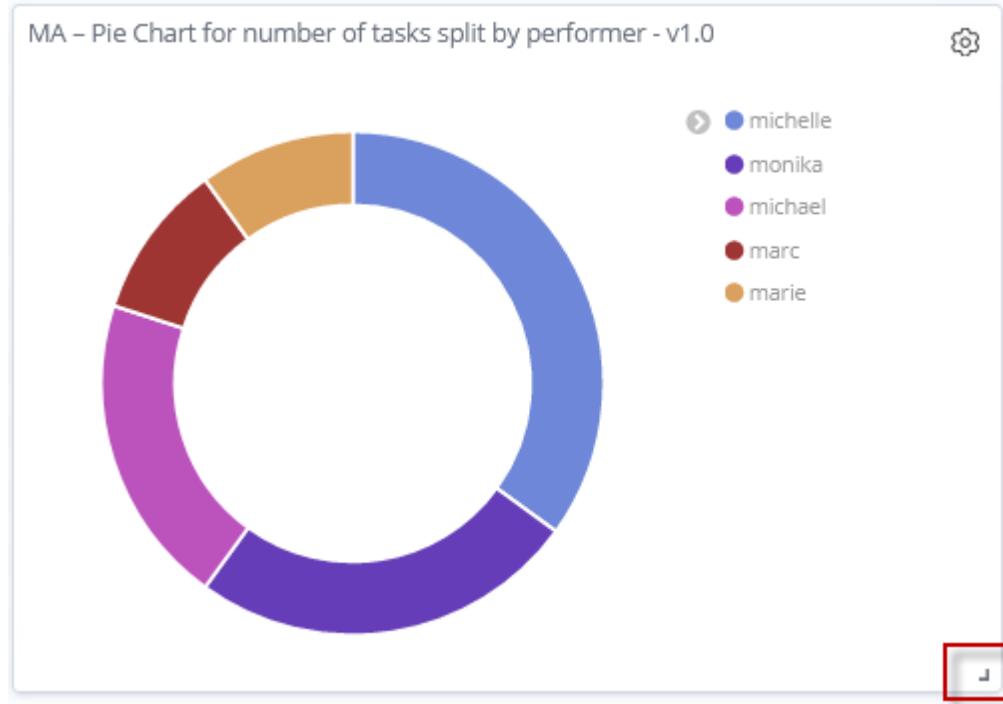
Ref: [Customize your dashboard](#).

To try this out follow these steps:

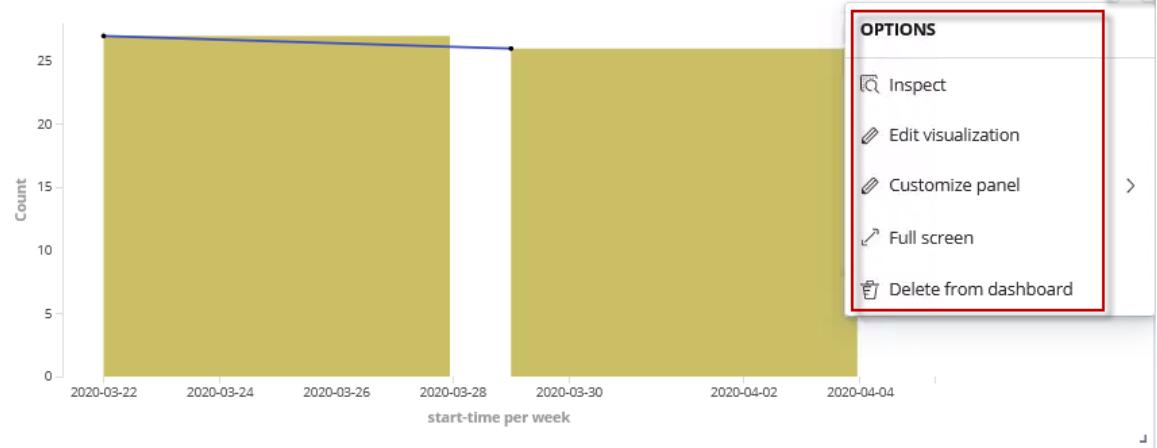
1. Click Edit in the menu bar to allow edit of your dashboard.



2. In order to move a visualization (widget), click at the top of a visualization and move it around or to a new location.
3. To resize a panel, click the resize control in the lower right and minimize/maximize to the new size.



4. Additional commands for managing the panel and its contents are in the gear menu in the upper right. You can optionally try out these features.
  - a. Inspect for more detail
  - b. Edit visualization  
In this mode you can modify any metrics, buckets, styles or specifications of that visualization.
  - c. Customize panel to resize the panel.
  - d. Full screen to maximize the panel.
  - e. Delete from Dashboard to remove the visualization.



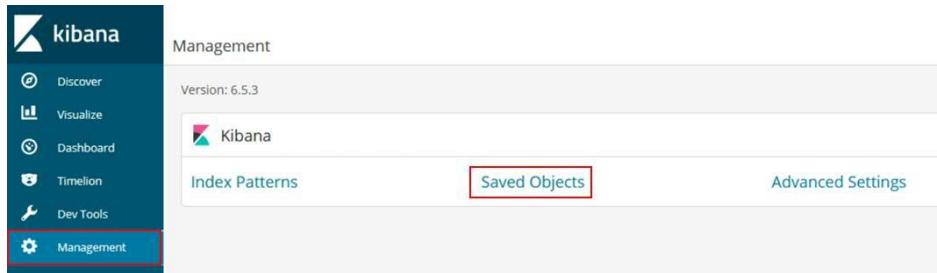
### 5.2.5.6 Export Dashboard

Often it is useful to save and backup your work or to [export](#) from a development environment into a production environment.

- You might have multiple environments for development and production. The export and import commands allow you to move objects between different Kibana instances.
- You have a large number of objects to update and want to batch this process. You can export the objects to JSON, make the JSON modification, and re-import the objects.
- If you select and export a dashboard, the nested artefacts are not included. Therefore, you need to select the dashboard, its visualizations, its saved searches, and its indexes.
- It is recommended to use a naming convention to filter out those artefacts that belong to one solution or business area.

Select the checkboxes of the objects you want to export and click Export. Or, to export objects by type:

1. Click Management and then Saved Object.



2. In the Search bar enter a value to search for: <your initials> and click Enter. Refine the search selecting Type and mark dashboard and visualization
3. Select all artefacts you want to export. Be aware that by default only 20 items are shown per page.

The screenshot shows the 'Saved Objects' list in Kibana. Several items are selected, indicated by blue checkmarks. The items listed are: 'MA - type:dashboard or visualization' (selected), 'MA - Workflow - Process Tasks Dashboard for Overwriting - v1.0' (selected), and 'MA - Timelion for trend of Mortgage Application Land Registrar Results - v1.0' (not selected). The 'Actions' column contains buttons for 'Type', 'Delete', and 'Export' (which is highlighted with a red box).

4. Click Export.
5. Select Save File in the appearing window and click OK



6. Save your export

Exported dashboards do not include their associated index patterns and scripted fields. Re-create the index patterns and scripted field manually before importing saved dashboards to a Kibana instance running on another Elasticsearch cluster.

## 5.2.6 Advanced Topics

In this section you will be introduced to additional and advanced features:

1. Scripted fields
2. Timelion

These features are used and explained in detail in exercise: [Create new Visualizations specific to the Mortgage Application Solution.](#)

### 5.2.6.1 Scripted Fields

Ref: [Scripted Fields](#)

#### Note

This section is used for documentation purposes only. Scripted fields are included in process-summaries\* index to calculate working- and waittimes. These will be used visualization called [Avg of Durations for a Mortgage Application to complete separated by rejected/accepted](#) later on.

Scripted fields compute data on the fly from the data in your Elasticsearch indexes. Scripted field data is shown on the Discover tab as part of the document data, and you can use scripted fields in your visualizations. Scripted field values are computed at query time so they aren't indexed and cannot be searched using Kibana's default query language. However they can be queried using Kibana's new [experimental query language](#). Scripted fields are also supported in the filter bar.

Computing data on the fly with scripted fields can be very resource intensive and can have a direct impact on Kibana's performance. Keep in mind that there's no built-in validation of a scripted field. If your scripts are buggy, you'll get exceptions whenever you try to view the dynamically generated data.

When you define a scripted field in Kibana, you have a choice of scripting languages. Starting with 5.0, the default options are [Lucene expressions](#) and [Painless](#). While you can use other scripting languages if you enable dynamic scripting for them in Elasticsearch, this is not recommended because they cannot be sufficiently [sandboxed](#).

Use of Groovy, JavaScript, and Python scripting is deprecated starting in Elasticsearch 5.0, and support for those scripting languages will be removed in the future.

You can reference any single value numeric field in your expressions, for example:

```
doc['field_name'].value
```

For more background on scripted fields and additional examples, refer to this blog: [Using Painless in Kibana scripted fields](#)

#### 5.2.6.1.1 *Creating a Scripted Field*

To create a scripted field:

1. Go to Management > Kibana > Index Patterns
2. Select the index pattern you want to add a scripted field to.
3. Go to the pattern's Scripted fields tab.
4. Click Add scripted field.
5. Enter a name for the scripted field.
6. Enter the expression that you want to use to compute a value on the fly from your index data.
7. Click Create field.

For more information about scripted fields in Elasticsearch, see [Scripting](#).

#### 5.2.6.1.2 *Updating a Scripted Field*

To modify a scripted field:

1. Go to Management > Kibana > Index Patterns
2. Click the index pattern's Scripted fields tab.
3. Click the Edit button for the scripted field you want to change.
4. Make your changes and then click Save field to update the field.

Keep in mind that there's no built-in validation of a scripted field. If your scripts are buggy, you'll get exceptions whenever you try to view the dynamically generated data.

#### 5.2.6.1.3 *Deleting a Scripted Field*

To delete a scripted field:

1. Go to Management > Kibana > Index Patterns
2. Click the index pattern's Scripted fields tab.
3. Click the Delete button for the scripted field you want to remove.
4. Click Delete in the confirmation window.

#### 5.2.6.2 Timelion

A Timelion is a time series data visualizer that enables you to combine totally independent data sources within a single visualization. It's driven by a simple expression language you use to retrieve time series data, perform calculations to tease out the answers to complex questions, and visualize the results.

For example, Timelion enables you to easily get the answers to questions like:

- How many pages does each unique user view over time?
- What's the difference in traffic volume between this Friday and last Friday?
- What percent of Japan's population came to my site today?
- What's the 10-day moving average of the S&P 500?
- What's the cumulative sum of all search requests received in the last 2 years?

You might also be interested in these tutorial videos:

- [Timelion: Magic, Math, and Everything in the Middle](#)
- [Timelion Plugin for Kibana Enables Time Series](#)
- [Using Kibana and Timelion to Analyze Earthquake Data](#)

In order to learn this language in detail, it is also recommended to work through this documentation: [Timelion](#)

### 5.3 Getting started with Kibana – Verification Instructions

The verification about successful completion of this exercise is postponed to the step-by-step instructions of the next chapter related to the results of visualizations in the out-of-the-box dashboards – [Questions](#) and Answer chapters.

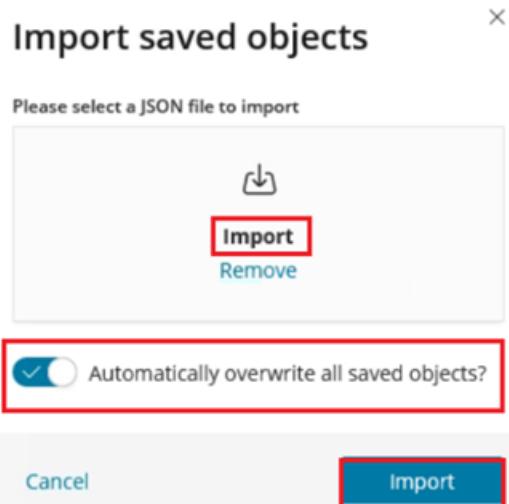
Optionally you might import the Getting Started Dashboard if you didn't have enough time to complete the exercise or if you want to compare your work with the provided master solution.

1. Download the MA– Getting Started Dashboard.json file from the [Material for Participants box folder](#) to c:\CPA4Demo
2. Click Management. Click Saved Objects.  
The Edit Saved Objects window appears
3. Click Import

The screenshot shows the Kibana Management / Kibana interface. At the top, there are tabs for Index Patterns, Saved Objects (which is selected), and Advanced Settings. Below the tabs, the title 'Saved Objects' is displayed, along with buttons for Export (149 objects), Import (highlighted with a red border), Refresh, and a search bar. There are also buttons for Type (dropdown), Delete, and Export. At the bottom, there are filters for Type (checkboxes for Type and Title) and Title (dropdown for Workflow - Case Activities), along with Actions buttons for Bulk Delete and Bulk Export.

4. Navigate to the c:\CPA4Demo directory and locate the MA– Getting Started Dashboard.json file that represents the objects to import.
5. Indicate whether to overwrite objects already in Kibana.

6. Click Import.

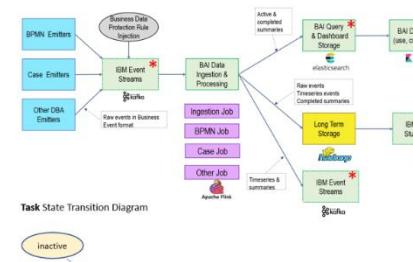


#### 5.4 Getting started with Kibana – Summary

In this exercise you should learnt how to use the functionality of Business Automation Insights and Kibana to discover summary events of cases, processes and decisions.

Furthermore, you practiced to use and build Saved Searches, Filters, Visualizations and Dashboards.

We want to repeat some of the concepts as their understanding is required for the next exercise. For better illustration everything was put into one slide.



**Activity summary format**

A summary for BPMN activities is a JSON object with the following attributes. In the following table, the `name` attribute refers to the top-level process, a subprocess, or a linked process, depending on the execution flow context. The `processId`, `processVersionId`, `processInstanceId`, `shortProcessInstanceId`, and `processName` attributes refer to the top-level process in the execution flow context. The value of the `Id` attribute is relative to the top-level process in the execution flow context.

Table 1: Activity summary attributes			
Attribute	Description	Optional or required	Type
<b>version</b>	The version number of the process summary.	Required	A string constant, in the VHM format.
<b>timestamp</b>	The time stamp of the last aggregated event to produce this summary.	Required	<b>processTimestamp</b> The unique identifier of the user who claimed the task.
			<b>processName</b> The name of the user who claimed the task.
<b>lpcnCallName</b>	The name of the IBM Business Automation Workflow class that emits raw events.	Required	<b>processLastEventId</b> The identifier of the group of users who can claim the task.
<b>type</b>	The type of the activity.	Required	<b>processName</b> The name of the group of users who can claim the task.
<b>processApplicationSnapshotId</b>	The name of the process application snapshot. Empty for the current (ITP) workflow.	Required	<b>processId</b> The process identifier.
<b>processApplicationVersionId</b>	The identifier of the process application snapshot.	Required	<b>processInstanceId</b> The unique identifier of this process instance. This identifier results from the combination of the process identifier, the <b>lpcnProcessId</b> value, and the process instance identifier assigned by the BPM runtime.
<b>processApplicationName</b>	The process application name.	Required	<b>processName</b> The non-fully qualified process instance name that corresponds to the process name identifier assigned by the BPM runtime.
<b>processApplicationId</b>	The process application identifier.	Required	<b>processName</b> The non-fully qualified process instance name that corresponds to the process name identifier assigned by the BPM runtime.
<b>activityId</b>	The identifier of the activity.	Required	<b>processName</b> The process identifier.
<b>activityVersionId</b>	The snapshot identifier of the activity.	Required	<b>processName</b> The unique identifier of the process.
<b>data</b>	The business data.	Optional - Present if data is collected for the activity.	<b>processName</b> The snapshot identifier of the process.
<b>taskInstanceId</b>	The task instance identifier.	Optional - Present if the task instance is in the ITB Bus Automation Workflow configuration.	<b>startTimestamp</b> The time at which the activity started. <b>claimTimestamp</b> The time at which the task was last claimed. <b>lastClaimTimestamp</b> The time at which the task was last claimed.
<b>terminationTime</b>	The time at which the activity was terminated.	Optional - Present if the task has been terminated.	<b>claimTimestamp</b> A string containing an ISO8601 date in the format yyyy-mm-ddTHH:mm:ss.sssZ.
<b>failureTime</b>	The time at which the activity failed.	Optional - Present if the task has failed.	<b>claimTimestamp</b> A string containing an ISO8601 date in the format yyyy-mm-ddTHH:mm:ss.sssZ.
<b>duration</b>	The activity duration in milliseconds.	Optional - Present if the task has been completed.	<b>lastClaimTimestamp</b> The time at which the activity completed. <b>lastClaimTimestamp</b> The time at which the task was last claimed. <b>lastClaimTimestamp</b> The time at which the task was last claimed.
<b>spdyActivityId</b>	The IBM Business Automation Workflow unique identifier of the activity instance.	Required	<b>processName</b> A string constant.
<b>id</b>	The unique identifier of the activity instance. This identifier results from the combination of the value of the <b>processId</b> column, the value of the <b>processInstanceId</b> column, and the process instance identifier that was assigned by the IBM Business Automation Workflow.	Required	<b>processName</b> A string constant.
Table 2: Task summary attributes			
Attribute	Description	Optional or required	Type
<b>spanId</b>	The span identifier corresponding to the task.	Required	String
<b>parentSpanId</b>	The parent span identifier.	Optional	String
<b>traceId</b>	The trace identifier.	Required	String

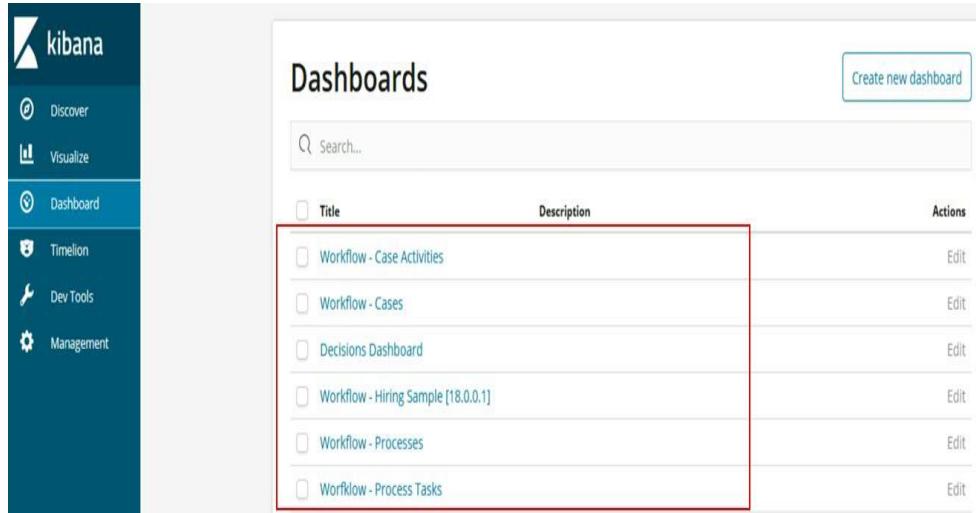
1. The BAI architecture diagram shows the transition, computing, aggregation, storage, and utilization of events from its source (emitter) until displayed in Kibana.
  2. The state transition diagram for a task (analogous for activities, process or cases) shows the states during the life cycle of these artefacts. With every state change event is emitted.  
If you have auto-tracking enabled, tracking variables and – groups, or audit variables for cases specified the events would include business data as well.
  3. The activity summary formats lists the attributes, description, and details about them. You accessed, filtered, or represented them in the Discover section or when building a Saved Search or Data Table.
  4. Finally you see the index patterns with its cryptic names for different types states and corresponding timestamps. Depending on the objectives for a specific search or visualization you have to select the best index when you want to filter a huge amount of summary events - based on your process throughput and the time range specified.

With that you have successfully finished the implementation of the Exercise 5 of the BAI Lab. Congratulations!

## 6 Exercise: Understand the available dashboards on monitored Cases, Processes and Decisions

### 6.1 *Understand the available out-of-the-box dashboards – Introduction*

In this exercise you will learn about the provided, out-of-the-box dashboards. These will be used process owners and administrators responsible for Case solutions and business processes in terms of efficiency, quality, volumes, in time processing or responsible for the employees performing human activities.



The screenshot shows the Kibana interface with a sidebar on the left containing icons for Discover, Visualize, Dashboard, Timeline, Dev Tools, and Management. The main area is titled 'Dashboards' with a search bar and a 'Create new dashboard' button. A table lists six dashboards:

Title	Description	Actions
Workflow - Case Activities		Edit
Workflow - Cases		Edit
Decisions Dashboard		Edit
Workflow - Hiring Sample [18.0.0.1]		Edit
Workflow - Processes		Edit
Workflow - Process Tasks		Edit

#### Objective

Endusers should learn

- how to use and interpret the ootb dashboards for the analysis of cases, processes and decisions
- what kind of visualizations are available at all and meaningful for endusers
- how visualizations can be copied and adopted for your own needs
- what underlying indexes, saved searches, filters are used for a given visualizations

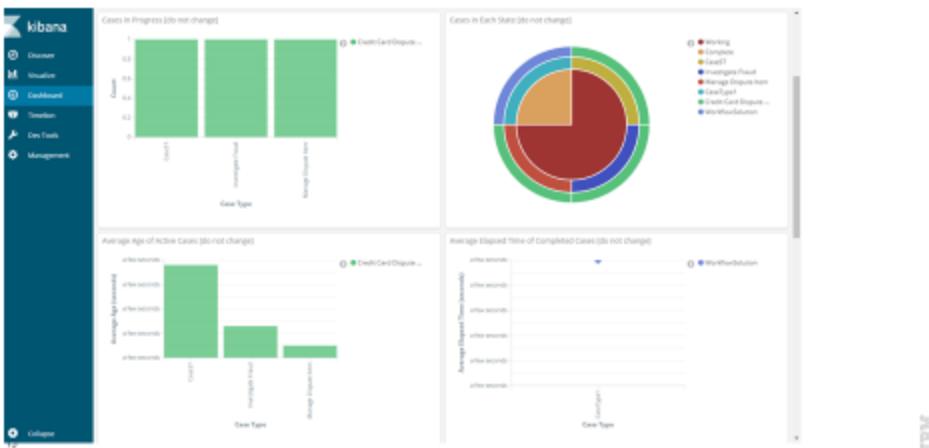
#### 6.1.1 Workflow - Cases Dashboard

Business Automation Insight provides following visualizations, diagrams, tables, etc. to analyse cases based on events emitted by the Business Automation Workflow – Case capability.

Open the Case Dashboard to see the visualization while reading about its definition and specification.

Ref: [Workflow - Cases Dashboards](#)

## Kibana Case Dashboard



Visualizations of the ootb Cases dashboard:

### 1. Cases in progress

This widget displays a bar graph in which each bar shows the number of cases that are in progress for a case type. When you hover over a bar in the graph, a tooltip displays the solution name, the name of the case type, and the number of cases in progress.

### 2. Cases in each state

This widget displays a pie chart that shows the proportion of cases in each state: Working and Complete. This result is further sorted by Case Type and Solution Name. When you hover over a sector of the pie chart, a tooltip displays the number of cases in that state, the case state, the case type, and the solution name.

### 3. Average age of in-progress cases

This widget displays a bar graph in which each bar shows the average age of in-progress cases for each case type. The average age is calculated by adding the age for each case and dividing by the number of cases. When you hover over a bar in the graph, a tooltip displays the name of the case type, the solution name, and the average age.

#### Note

Due to Kibana constraints, the age of a case in progress is taken as the difference between the time of the last processed event on that case and the start time of that case.

### 4. Average elapsed time of completed cases

This widget displays a line graph that shows the average elapsed time for each type of the cases that are completed. When you hover over a point in the line, a tooltip displays the solution name, the name of the case type, and the average elapsed time of completed cases.

### 5. Incoming and outgoing cases in past 3 months

This widget displays a bar graph in which two bars show the number of cases that opened and closed in the past three months for a case type. When you hover over a bar in the graph, a tooltip indicates whether the bar represents incoming or

outgoing cases. The tooltip also displays the case type name and the number of incoming or outgoing cases.

6. Total number of cases

This widget displays the total number of cases.

7. Average case duration

This widget displays the average duration of the cases in minutes.

8. Cases started statistics

This widget displays the cases that have been started, based on the selected time frame in Kibana.

9. Cases completed statistics

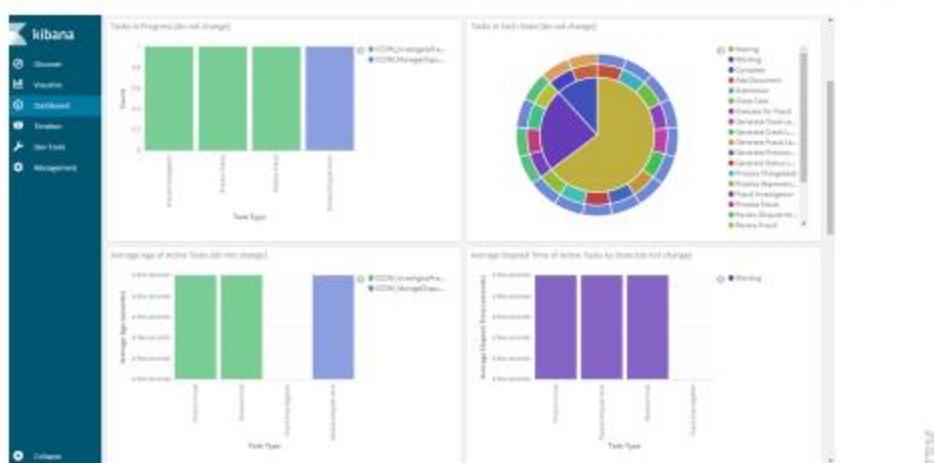
This widget displays the completed cases, based on the selected time frame in Kibana.

### 6.1.2 Workflow – Case Activities Dashboard

Business Automation Insight provides following visualizations, diagrams, tables, etc. to analyse cases activities based on events emitted by the Business Automation Workflow – Case capability.

Open the Case Activities Dashboard to see the visualization while reading about its definition and specification.

Case Task Business Automation Workflow Dashboard



Visualizations of the ootb Case Activities dashboard:

1. Activities in Progress

This widget displays a bar graph in which each bar shows the number of activities that are in progress for an activity type. When you hover over a bar in the graph, a tooltip displays the case type, the name of the activity type, and the number of activities in progress.

2. Activities in each state

This widget displays a pie chart that shows the proportion of activities in each of the states: Waiting, Ready, Working, Complete, and Failed. When you hover over

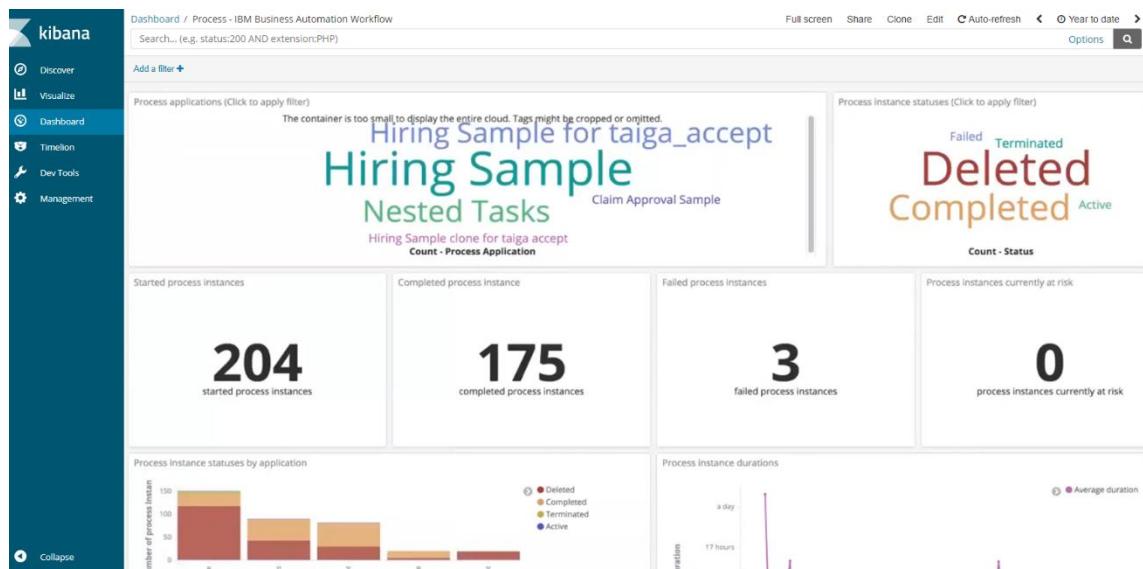
- a sector of the pie, a tooltip displays the number of activities in that state. The tooltip also displays the case type and activity type.
3. Average age of in-progress activities  
This widget displays a bar graph in which each bar shows the average age of in-progress activities for an activity type. The average age is calculated by adding the age for each activity and dividing by the number of activities. When you hover over a bar in the graph, a tooltip displays the activity type, the case type, and the average age.  
**Note**  
Due to Kibana constraints, the age of an in-progress activity is taken as the difference between the time of the last processed event on that activity and the start time of that activity.
  4. Average elapsed time of in-progress activities by state  
This widget displays a bar graph in which each bar shows for an activity type the average elapsed time of in-progress activities in a particular state. When you hover over a bar in the graph, a tooltip displays the name of the activity type, the activity state, and the average elapsed time of that activity type in a particular state.  
**Note**  
Due to Kibana constraints, the elapsed time of an in-progress activity is taken as the difference between the time of the last processed event on that activity and the start time of that activity.
  5. Incoming and outgoing activities in past 3 months  
This widget displays a bar graph in which two bars show the number of activities that opened and closed in the past three months for an activity type. When you hover over a bar in the graph, a tooltip indicates whether the bar represents incoming or outgoing activities. The tooltip also displays the activity type name and the number of incoming or outgoing activities.
  6. Average elapsed time of completed activities  
This widget displays a line graph that shows the average elapsed time for each type of the activities that completed. The elapsed time of a completed activity is calculated as the difference between the start time of the activity and end time of the activity. When you hover over a point in the line, a tooltip displays the case type name, the activity type name, and the average elapsed time of completed activities.
  7. Total number of activities  
This widget displays the total number of case activities.
  8. Average activity duration  
This widget displays the average duration of the case activities in minutes.
  9. Activities started statistics  
This widget displays the activities that have been started, based on the selected time frame in Kibana.
  10. Activities completed statistics  
This widget displays the completed activities, based on the selected time frame in Kibana.

### 6.1.3 Workflow - Processes Dashboard

Business Automation Insight provides the following visualizations, diagrams, tables, etc. to analyse processes based on events emitted by the Business Automation Workflow – Business Process Manager capability.

Open the Process Dashboard to see the visualization while reading about its definition and specification.

Ref: [Business Process Dashboards](#)



Visualizations of the ootb Processes dashboard:

#### 1. Process applications

This widget displays a cloud of the process applications names of the BPMN summaries for which the `timestamp` field is within the Kibana selected time range. Clicking a process application name filters the entire dashboard to show only the data for the selected process application.

#### 2. Process instance statuses

This widget displays a cloud of the process instance statuses of the BPMN summaries for which the `timestamp` field is within the Kibana selected time range. Clicking a process instance status filters the entire dashboard to show only the data for the selected process instance status.

#### 3. Started process instances

This widget displays the number of process instances for which the `startTime` field is within the Kibana selected time range.

#### 4. Completed process instances

This widget displays the number of process instances for which the `completedTime` field is within the Kibana selected time range.

#### 5. Failed process instances

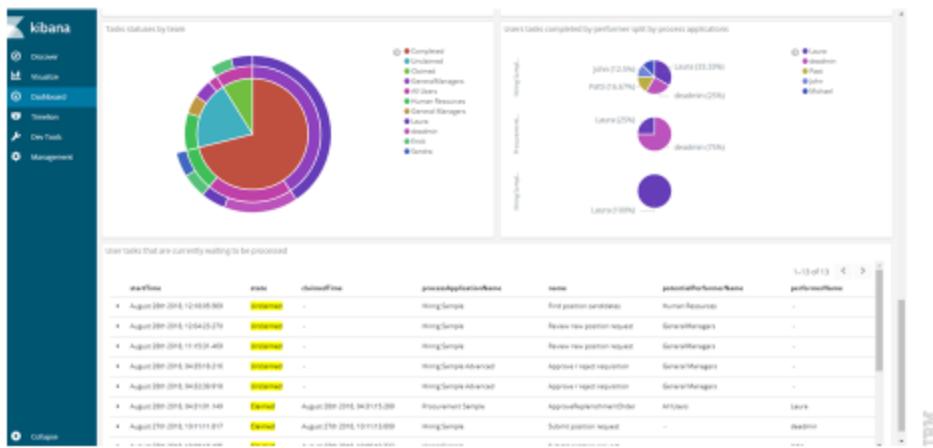
This widget displays the number of process instances for which the `failedTime` field is within the Kibana selected time range.

6. Process instances currently at risk  
This widget displays the number of process instances that are in Active, Suspended, Resumed, or Migrated state and for which the `atRiskDateAssignedTime` field is set to a date in the past. This widget does not depend on the Kibana selected time range.
7. Process instance statuses by application  
This widget displays a bar graph in which each bar corresponds to a process application and the Y-axis is the number of process instances. Each bar is split based on the status of the process instances.
8. Process instance durations  
This widget displays a line chart where the X-axis is the start time of process instances and the Y-axis is the average duration of the process instances.
9. Started process instances statistics  
This widget is a Timelion graph, which displays a bar chart. The X-Axis shows the `startTime` field of process instances. The Y-axis shows the number of process instances. Each bar is split based on the process application names.
10. Completed process instances statistics  
This widget is a Timelion graph, which displays a bar chart. The X-Axis shows the `completedTime` field of process instances. The Y-axis shows the number of process instances. Each bar is split based on the process application names.
11. Process instances by IBM Business Automation Workflow system  
This widget displays a pie chart that shows how process instances are distributed across the IBM Business Automation Workflow systems that send events to IBM Business Automation Insights.
12. Average process duration by application  
This widget is a horizontal bar chart, which displays the average duration (X-Axis) for each process application (Y-Axis). This chart is populated with the process summaries for which the `timestamp` field is within the Kibana selected time range.
13. Completed, terminated, deleted, suspended and failed process instances  
This widget displays a line chart, which shows the `timestamp` field on the X-Axis and the number of process instances on the Y-Axis. Each line corresponds to one of the following statuses: Completed, Terminated, Deleted, Suspended, or Failed.

#### 6.1.4 Workflow - Process Tasks Dashboard

Business Automation Insight provides the following visualizations, diagrams, tables, etc. to analyse process tasks based on events emitted by the Business Automation Workflow – Business Process Manager capability.

## Kibana Process Tasks Dashboard



Visualizations of the ootb Process Tasks dashboard:

- Process applications**  
This widget displays a cloud of the process applications names of the BPMN summaries for which the `timestamp` field is within the Kibana selected time range. Clicking a process application name filters the entire dashboard to show only the data for the selected process application.
- Task statuses**  
This widget displays a cloud of the user task statuses of the BPBPMN summaries for which the `timestamp` field is within the Kibana selected time range. Clicking a task status filters the entire dashboard to show only the data for the selected task status.
- User activities that are currently not completed**  
This widget displays the number of activities that are in Created, Claimed, Active, or Unclaimed state. This widget does not depend on the Kibana selected time range.
- User activities that were started in the selected time frame**  
This widget displays the number of user activities for which the `startTime` field is within the Kibana selected time range.
- User activities that were completed in the selected time frame**  
This widget displays the number of user activities for which the `completedTime` field is within the Kibana selected time range.
- User activities completed by team**  
This widget is a Timelion graph, which displays a bar chart. The X-Axis is the `completedTime` field of user activities. The Y-axis is the number of user activities. Each bar is split based on the teams that own the activities.
- User activities started by team**  
This widget is a Timelion graph, which displays a bar chart. The X-Axis is the `startTime` field of user activities. The Y-axis is the number of user activities. Each bar is split based on the teams that own the activities.

#### 8. User activities failed by team

This widget is a Timelion graph, which displays a bar chart. The X-Axis is the `failedTime` field of user activities. The Y-axis is the number of user activities. Each bar is split based on the teams that own the activities.

#### 9. User activities not completed by performer

This widget is a 2-level pie chart that displays, for each performer who owns noncompleted user activities, the name and number of these activities.

#### 10. Task statuses by team

This widget is a 3-level pie chart that displays the number of activities for each existing user task status, split by teams, and then split by individual user.

#### 11. Users activities completed by performer split by process applications

This widget displays a pie chart for each process application name that holds user activities for which the `completedTime` field is within the Kibana selected time range. For each wedge of the pie chart, you can see who the users are who completed these user activities.

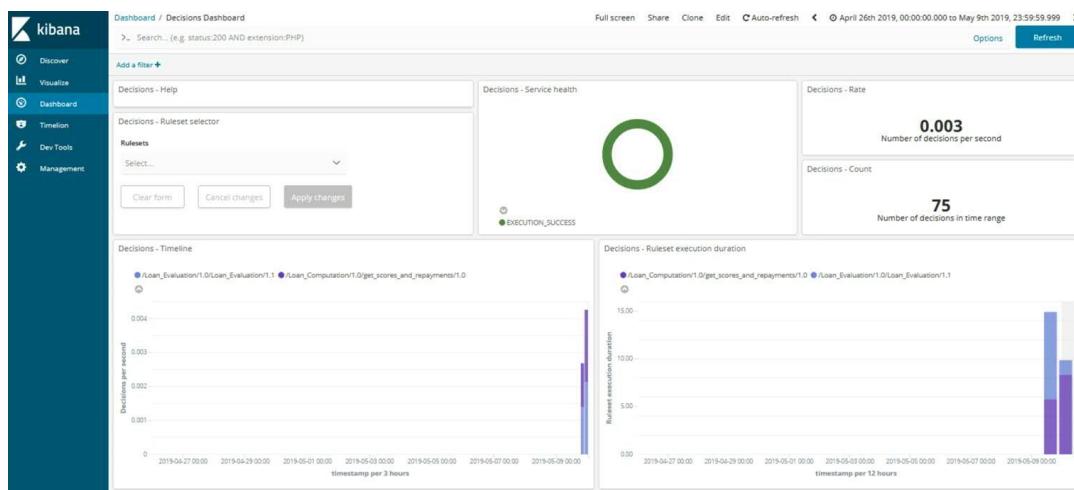
#### 12. User activities that are currently waiting to be processed

This widget displays a Kibana saved search, which lists details about all the activities that are in Created, Claimed, Active, or Unclaimed state.

### 6.1.5 Decisions Dashboard

Business Automation Insight provides the following visualizations, diagrams, tables, etc. to analyse decisions based on events emitted by the Operational Decision Manager capability.

Ref: [Decisions Dashboard](#)



Visualizations of the ootb Decisons dashboard:

#### 1. Help

This widget gives a brief description of the dashboard and points you to IBM documentation for more information. To read it, open it up full screen, then

minimize it again when you are done.

## 2. Ruleset selector

From this widget, you filter the rulesets for which you want to see the resulting decisions. From the menu, select the ruleset names, then click outside the menu.

Click Apply changes for the filter to take effect and display the corresponding decisions in the dashboard. To disable the filter, click Clear form or use the Kibana user interface.

## 3. Service health

This widget displays a pie chart that shows how the decisions are distributed by type of execution results.

The EXECUTION\_SUCCESS part counts all the decisions that ran successfully and provided the expected event.

The TRACE\_GENERATION\_ERROR part counts the decisions that ran successfully but the associated trace failed to be generated.

The EXECUTION\_FAILURE part counts the decisions that failed to complete.

## 4. Rate

This widget gives the number of decisions per second. This is an average count which is computed from the selected time range. This widget is correlated to the [Timeline](#) widget which shows the distribution in time of the same decisions.

## 5. Count

This widget gives the total number of decisions in the selected time range.

## 6. Timeline

This widget displays a bar graph in which each bar shows how many decisions per second were taken during the period that is marked by the displayed time stamp. The graph shows a maximum of 10 rulesets. Therefore, it does not reflect the exact detail of the rate number that applies to all rulesets.

When you hover over a bar in the graph, a tooltip displays the number of decisions per second, the ruleset, the time stamp, and the bucket size for the time unit considered. The bucket size represents the number of decisions that were grouped to be represented as the same bar. This size depends on the time range filter level. You can zoom in on a bar by selecting an area around it. The represented period and the time range picker reflect the change accordingly.

## 7. Ruleset execution duration

This widget displays a bar graph in which each bar shows the average duration of ruleset execution for the period that is marked by the displayed time stamp. It shows a maximum of 10 rulesets. When you hover over a bar in the graph, a

tooltip displays the average execution duration, the ruleset, the time stamp, and the bucket size for the time unit considered. This size depends on the zoom level. Note: this average duration reflects only the execution of the ruleset. It does not include the duration of the event emission process.

#### 8. Tasks table

The table columns reflect the following data.

Tasks	The task name, in the following format: <i>RuleflowName&gt;TaskName</i> .
Rulesets	The ruleset name, in the following format: <i>RuleAppName/RuleAppVersion/RulesetName/RulesetVersion</i>
Executions	The number of executions of this task.

#### 9. Rules table

The table columns reflect the following data.

Rules	The rule name. For decision tables, the rule name is suffixed with <i>_rowNumber</i> .
Rulesets	The ruleset name, in the following format: <i>RuleAppName/RuleAppVersion/RulesetName/RulesetVersion</i>
Executions	The number of executions of this rule.

#### 10. Rulesets table

The table columns reflect the following data.

Rulesets	The ruleset name, in the following format: <i>RuleAppName/RuleAppVersion/RulesetName/RulesetVersion</i>
Executions	The number of executions of this ruleset.
Average execution duration	The average duration of ruleset execution, which is computed by dividing the sum of all execution durations by the number of executions.

##### 6.1.6 Hiring Sample Dashboard

Refer to [Hiring Sample Dashboard](#).

The custom dashboard for the Hiring sample shows an example of how to define widgets, such as pie chart, bar chart, and more, to visualize your business data. It provides visualizations based on the execution of the BPMN process and tasks including auto-tracking data.

This dashboard is not subject to the DBA demos labs.

## 6.2 Understand the available dashboards – Step by Step Instructions

To perform exercises documented in step-by-step instructions on pre-defined dashboards doesn't make much sense. Instead we want to provide a series of questions for you to validate

- a. whether the previously practiced Kibana concepts
- b. whether the concepts and charts about Case -, Process - and Decision metrics, histograms, ranges, or enduser performance

are understood. So try to learn about the different kind of charts, representations and purpose for user in the role of a Process Owner.

Some of these questions might be open for interpretation. So make your own decisions if required.

### 6.2.1 Questions

#### 6.2.1.1 Average age of in progress-cases

1. Determine the average age of cases in progress in minutes.  
Result: \_\_\_\_\_
2. Determine the index used for this visualization.  
Result: \_\_\_\_\_
3. Update the “duration” used from minutes to human readable form.
4. Update the visualization itself and apply the changes.
5. Determine the value of the average age in human readable form  
Result: \_\_\_\_\_

#### 6.2.1.2 Determine indexes used

Determine the indexes used for following visualizations. Refer to the [KC - Index Patterns](#).

1. Enter your suggestion about the index used
2. Validate your decision by opening/editing the visualization

Visualization	Your suggestion	Verification as specified in the visualization
Failed process instances		
User tasks that were started in the selected time frame		
Case in progress		
(Case) Activities in each state		
Average Activity Duration for Case Activities		

Decisions - Rate		
------------------	--	--

### 6.2.1.3 Total number of Cases

Determine the total number of completed cases from 2020-04-01 till 2020-04-05..

Use the Discover functionality, time picker, correct case-sum... index, and filter criteria.

Result: \_\_\_\_\_

Compare with the number in Workflow - Cases Dashboard, visualization for completed cases.

Metric: \_\_\_\_\_

If the numbers are different find out why?

Investigation: \_\_\_\_\_

### 6.2.1.4 Number of started Process Instances

Determine the number of started processes from 2020-04-01 till 2020-04-05.

Use the Discover functionality, time picker, correct process-sum..xxxx index, and filter criteria.

Result: \_\_\_\_\_

Compare with the number in Workflow - Processes Dashboard, visualization for started BPMN Processes.

Metric: \_\_\_\_\_

If the numbers are different find out why?

Investigation: \_\_\_\_\_

## 6.2.2 Answers

See the answers and how to verify them in the associated visualization.

### 6.2.2.1 Answer to [Average age of in progress-cases](#)

1. Determine the average age of cases in minutes.

Result:

Average age of in-progress cases



2. Open the visualization Average age of in progress-cases.

Determine the index used for this visualization.

Result: case-summaries\*

3. Determine the specification for the age

Result:

Visualize / Average age of in-progress cases [do not change]  
Linked to Saved Search MA - SavedSearch for Overwriting - v1.0  
Save Share  
Discover Visualize Dashboard Timelion Alerting Dev Tools Management Security  
case-summaries\*  
Add a filter +  
Metrics  
Y-Axis  
Aggregation Average help  
Field duration-seconds  
Custom Label Average Age (minutes)  
Advanced Add metrics

while the output format of the duration-seconds is in Minutes.

The screenshot shows the Kibana Management interface with the 'Management' tab selected. On the left, there's a sidebar with various navigation options like Discover, Visualize, Dashboard, Timelion, Alerting, Dev Tools, and Security. The main area displays the 'Index Patterns' section for the 'case-summaries\*' pattern. The pattern list includes items such as process-sum\*, awadv-sum\*, awadv-summ\*, awadv-summa\*, awadv-summar\*, awadv-summarie\*, awadv-summaries\*, awadv-summaries-\*, process-summar\*, process-summarie\*, process-summaries\*, process-summaries-\*, wadv-sum\*, wadv-summa\*, wadv-summar\*, wadv-summarie\*, wadv-summaries\*, wadv-summaries-\*, and adw-timeseries\*. On the right, there's a configuration panel for the 'case-summaries\*' pattern. It shows the 'Edit duration-seconds' button highlighted with a red box. The 'Type' dropdown is set to 'number'. Under 'Format (Default: number )', the 'Duration' dropdown is selected. Below it, there's a note about formatting. The 'Input format' dropdown is set to 'Seconds' and is also highlighted with a red box. The 'Output format' dropdown is set to 'Minutes' and is also highlighted with a red box. The 'Decimal places' input field is set to '2'.

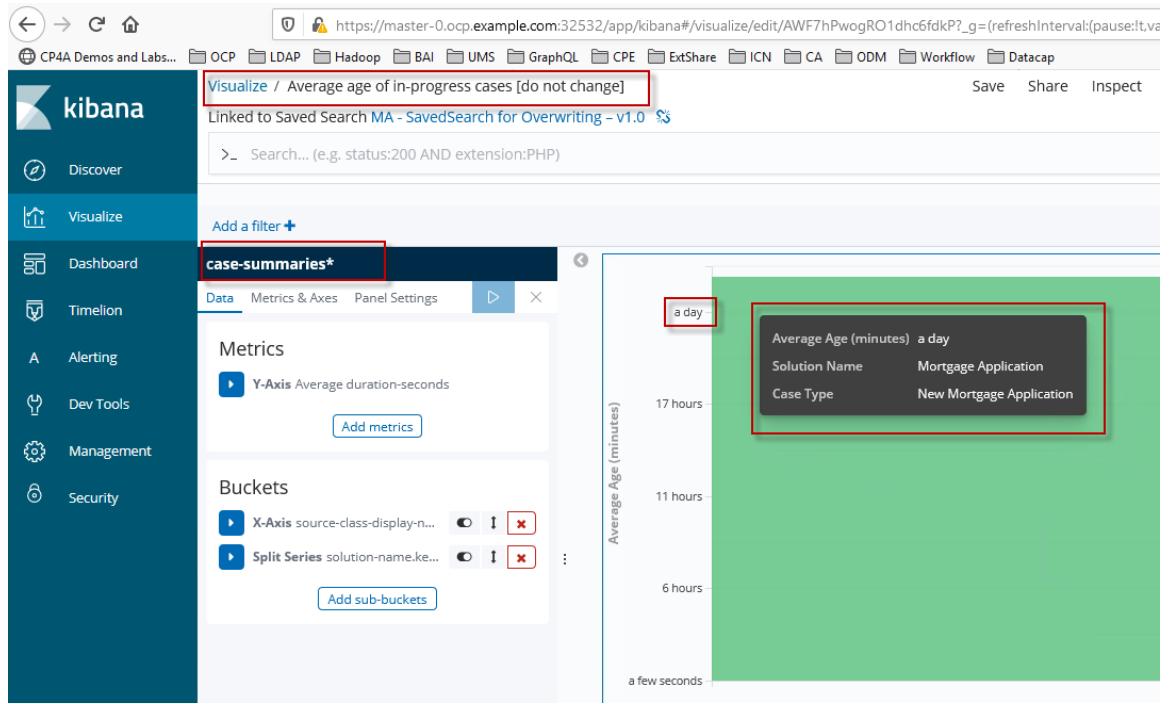
4. Update the duration used from Minutes to Human Readable form.

This screenshot shows the 'Edit duration-seconds' configuration screen for the 'case-summaries\*' index pattern. The 'Input format' dropdown is set to 'Seconds' and is highlighted with a red box. The 'Output format' dropdown is set to 'Minutes' and is also highlighted with a red box. To the right of these dropdowns, the text 'Human Readable' is displayed in red, indicating the current output format. Below the dropdowns, there's a 'Decimal places' input field set to '2'.

Press Save field.

5. Update the label to Average Age (human readable form) and apply the changes.
6. Determine the value of the average age in human readable form

Result:



Note

To update the format of a duration to Human Readable is quite important in situations where a long duration is even given in seconds.

#### 6.2.2.2 Answers to [Determine indexes used](#)

1. Determine the index used for following visualizations. Refer to the [KC - Index Patterns](#).
2. Enter your suggestion about the index used
3. Validate your decision by opening/editing the visualization

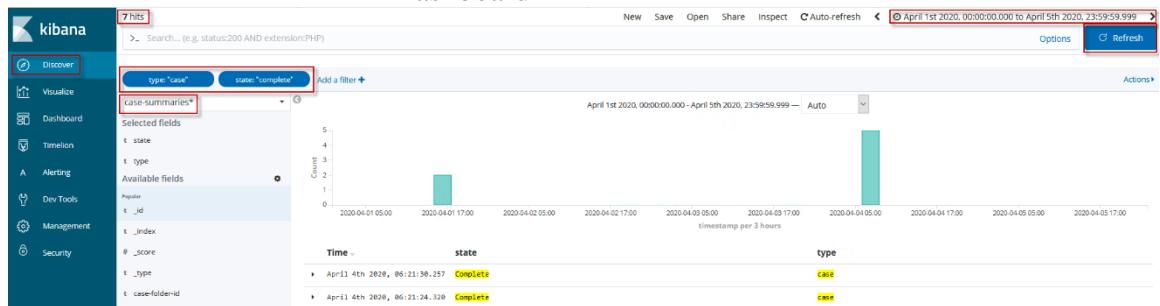
Visualization	Your suggestion	Verification as specified in the visualization
Failed process instances	-	*process-summaries-*
User tasks that were started in the selected time frame	-	process-summaries-*
Case in progress	-	case-summaries* in addition with state:working
(Case) Activities in each state	-	case-summaries* in addition with state:working
Average Activity Duration for Case Activities	-	case-summaries* in addition with type:task
Decisions - Rate	-	odm-timeseries*

### 6.2.2.3 Answer to Total number of Cases

Determine the total number of completed cases from 2020-04-01 till 2020-04-05.  
Use the Discover functionality

- time picker

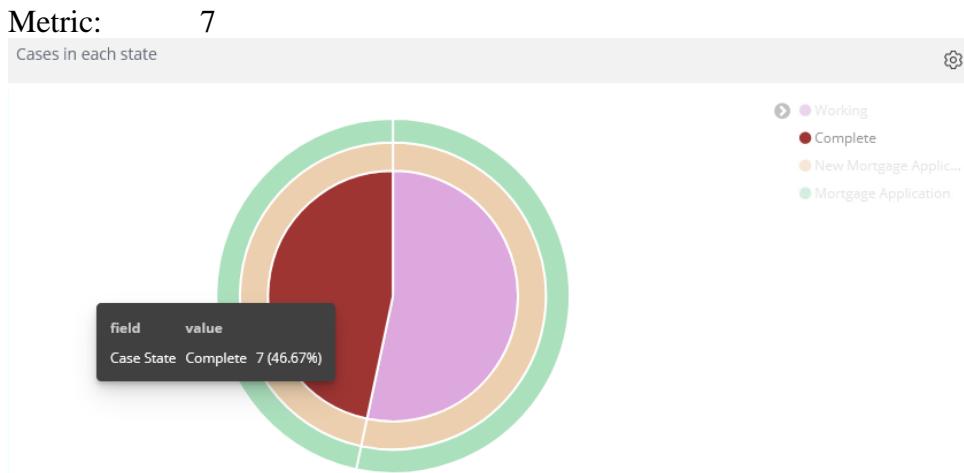
2020-04-01 till 2020-04-05 - Refresh  
during Discover as well as Workflow - Cases  
Dashboard



- correct case-sum... index
- filter criteria

Result: 7  
case-summaries\*  
according to [KC - Index Patterns](#)

Compare with the number in Workflow - Cases Dashboard, visualization for completed cases.



If the numbers are different find out why?

Investigation: \_\_\_\_\_

### 6.2.2.4 Answer to Number of started Process Instances

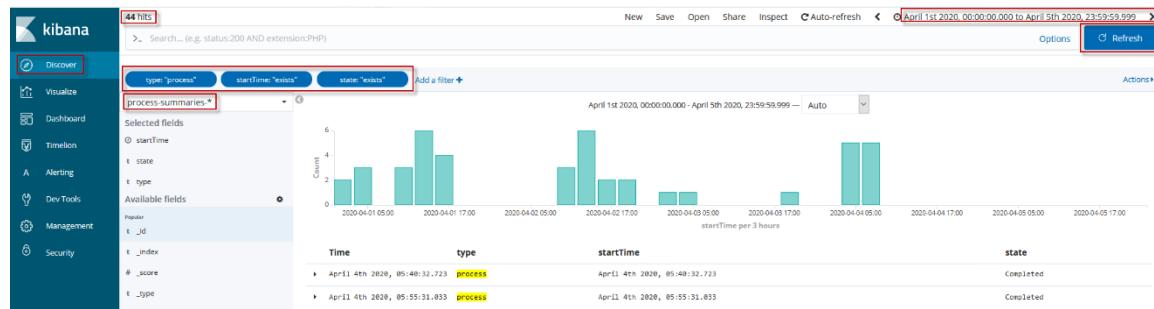
Determine the number of started processes from 2020-04-01 till 2020-04-05.

Use the Discover functionality

- time picker 2020-04-01 till 2020-04-05  
during Discover as well as Process Dashboard
  - correct process-summary index process-summaries-\* startTime  
according to [KC - Index Patterns](#)
  - filter criteria type:process  
all of them have a start-time and can be in any state

### Result:

44



Compare with the number in Process Dashboard, visualization for started BPMN Processes.

Metric: 44

Started process instances



If the numbers are different find out why?

Investigation: \_\_\_\_\_

### **6.3 Understand the available dashboards – Summary**

You should have familiarized by answering the questions with the different kind of charts, representations and purpose for user in the role of a Process Owner.

With that you have successfully finished the implementation of the Exercise 6 of the BAI Lab. Congratulations!

## 7 Exercise: Create new Visualizations specific to the Mortgage Application Solution

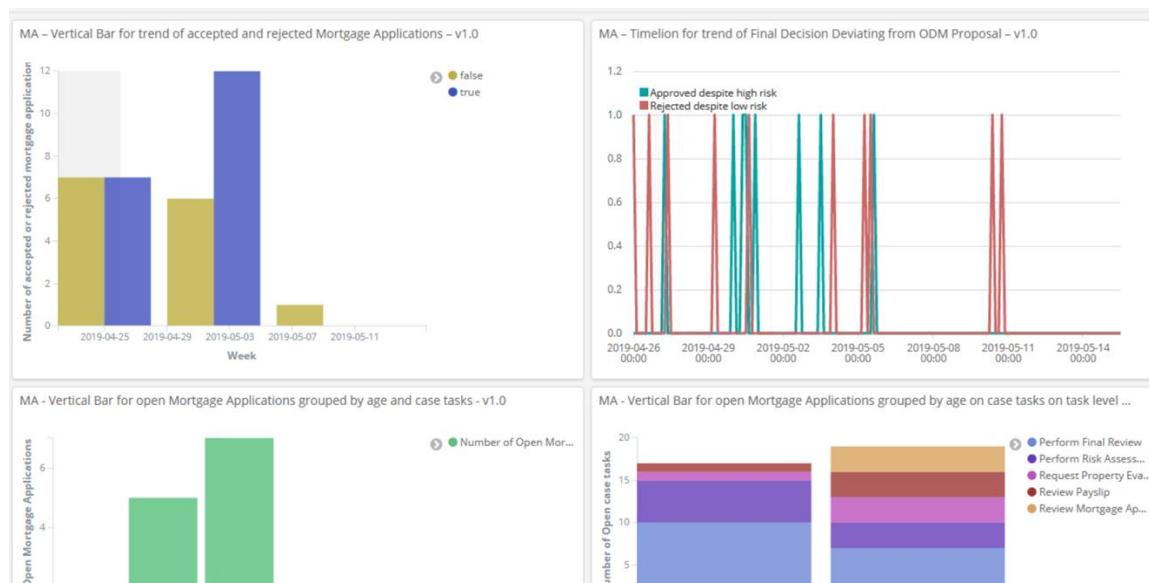
### 7.1 Create new Visualizations and a Dashboard for the Mortgage Application Solution – Introduction

This section addresses the requirements of the Business User about the status and performance of Mortgage Applications.

A Business User is – beyond reports on the number of cases and processes per period and state – interested in business-oriented values, decisions, outcome, or reasons for rejections of mortgage applications. The out-of-the box dashboards can't provide such application – or industry-related and data specific visualization. Therefore we have to create our custom visualization based on emitted audit – or tracking variable.

During this exercise you develop and configure more sophisticated visualizations. These make use of decisions from the ODM rules or the Mortgage Officer. The charts should enable the Business Owner to make better business decisions, reduce the risk for bad mortgages, or to improve efficiency. The charts transmit outcome on the current status and recent dates. They also show diagrams with the progression and trends of the business based on historical data.

For the development of these more complex charts we don't want to emphasize on the mechanics of them. We try to follow a design approach or methodology to start with the requirements, i.e. the information needed by the business owner to make their decisions.



## 7.2 Create new Visualizations and a Dashboard for the Mortgage Application Solution – Step by Step Instructions

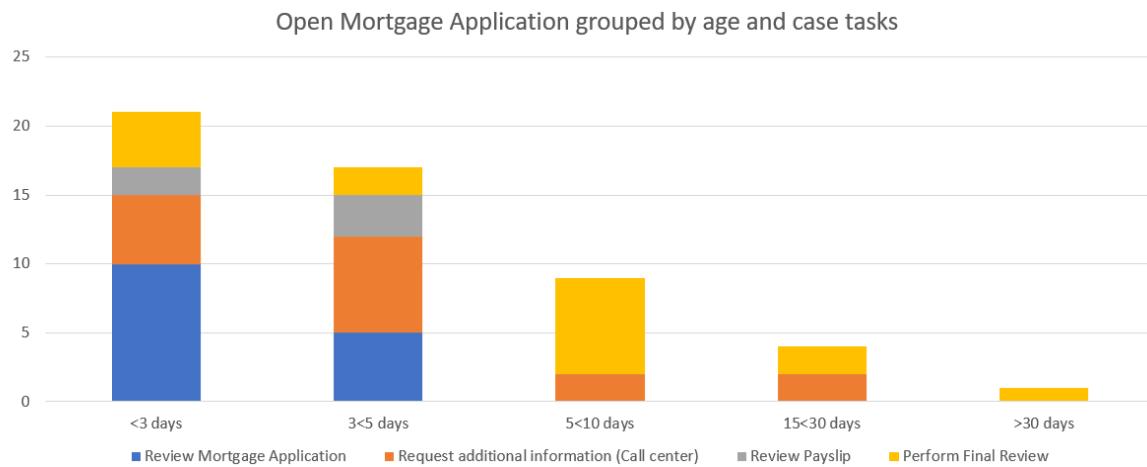
### 7.2.1 Open mortgage applications grouped by age

#### Objective

In the context of the Mortgage Application solution the business owner of the mortgage business needs to understand how long a mortgage application is already being processed (grouped by age ranges) and the activities that are currently worked on by range.

This allows the business owner to see patterns of healthy or unhealthy state of their mortgage business, where a drill down and individual actions might be required to achieve timely completion of mortgage requests.

In this task you will learn how to create a vertical bar chart based on SavedSearch.



#### Detailed Requirements

##### Note

This section summarizes the content of the visualization, points to the chart type required and the buckets to be specified.

The key requirements to implement this visualization are:

1. Consider only “active/working” cases of case type “New Mortgage Application”
2. Group Mortgage Application cases into ranges by age calculated from the start-date
3. It is not necessary to filter according to a time filter, as we consider the complete time period. We are only interested in the age of the cases.
4. For each open Mortgage Application case show the active/working case activities in the respective range as a stacked bar chart

#### Key Considerations

To build a visualization that represents above business requirement, it is necessary to be able to:

1. Utilize all Case Summary Events independent from the date range selected for the dashboard.

2. Filter and group by data of Case Summary Events (for those cases that are active and to get their start-date to compute their age)
3. Show type and number of their dependent Case Activity Summary Events (those belonging to active cases and that are active themselves)

One aspect to consider is to select an index that is not influenced by the selected date range for the dashboard but that selects all active cases. The reason is that all open Mortgage Applications are to be shown. Otherwise it could happen that some are accidentally not shown as their start date may be outside of the selected time window.

With the current data structure of the summary events for both Cases and Case Activities when filtering an index for active Cases only, associated Case Activities get excluded. Similarly, when filtering for active Case Activities information about their parent Cases gets excluded.

The same applies to all requirements that need to set Case Activities in relation to Cases or vice versa or where a relationship between Activities and Process Instances is required.

Therefore, the combined requirement can currently not be implemented. Instead it has to be split up into two visualizations to achieve a similar result:

1. Active cases per date range – without case tasks
2. Count of active case activities – using the start-date of the case activity for grouping by age

#### Building the Visualization – High-Level Instructions

1. Determine the index or saved search to be used:  
As we look for active cases we need a case index that doesn't include timestamp (case-su\*)
2. Determine and specify the visualization to be used:
  - a) For the first visualization “Active cases per date range”  
Use a vertical bar visualization with an aggregation type of Date Range for the X-Axis based on the start-date for the case
  - b) For the second visualization “Count of active case activities”  
Use a vertical bar visualization with an aggregation type of Date Range for the X-Axis based on the start-date for the case activity

Specify a first bucket splitting the bar based on the variable task-name.keyword with the aggregation type Term.

#### Building the Visualization – Step-by-Step Instructions

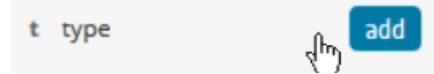
For the first visualization “Active cases per date range”

## Creating a Saved Search:

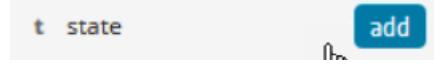
1. In the navigation tree on the left, click Discover
2. Expand the Index-Field and select case-su\*. For our purposes, we need to exclude timestamps.

**case-su\***

3. Below the Available Fields label, hover over the type field and click the button "add" that appears.



4. Repeat Step 4 with the field state



5. In the filter input field. Enter the following expression and click the search button:  
type:case NOT state:complete NOT state:Failed

Because only open mortgage application cases are looked at, we limit the selection to type:case and exclude the completed and failed mortgage application cases.

6. Click on the Update button to populate your visualization.  
In the picture below, you can see the results of your filter options and the previously selected fields type and state with their values.

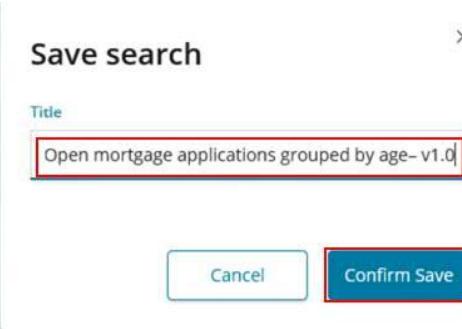
7. To save your newly created Saved Search click Save in the toolbar at the top of the window.

type	state
case	Working

8. In the pop-up dialog enter a name for your Saved Search. For the Saved Search to be found quickly, please use the following naming convention.

<Initials of the student > - MA - SavedSearch for Open mortgage applications grouped by age- v1.0

Then click Confirm Save.



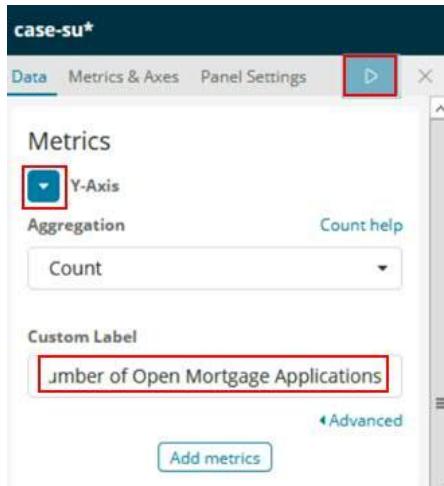
### Creating the Visualization based on the Save Search

1. In the navigation tree on the left side, click Visualize.
2. Click the “+”-Button.
3. In the “Select visualisation type”-window, choose the Vertical Bar widget.
4. Enter the previously given name for the Saved Seach and press Enter (It is also possible to enter only a few words (keywords). Suggestions are generated immediately). Your saved Saved Search will be found in the search results. Click on this Saved Search.

### Or, From a Saved Search

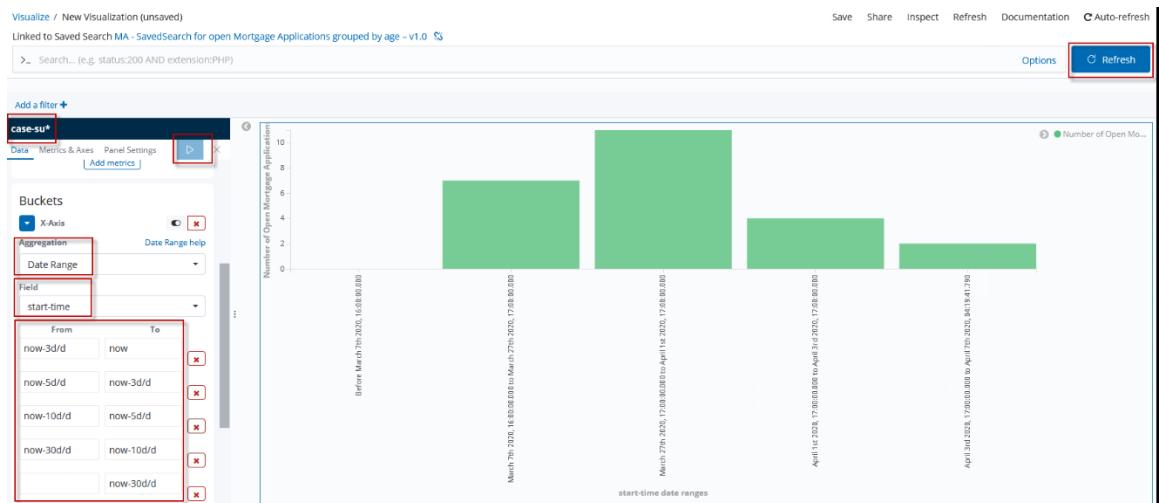
For the Y-Axis perform the following steps:

5. Expand the Y-Axis
6. As Custom Label, enter the following name: Number of Open Mortgage Applications
7. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



For the X-Axis perform the following steps:

8. Click on X-Axis under Select buckets type.
9. Select Date Range in the Aggregation field.
10. Select start-time in the dropdown labeled Field.
11. Add the ranges as shown in the picture below like from: now-3d/d to: now
12. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



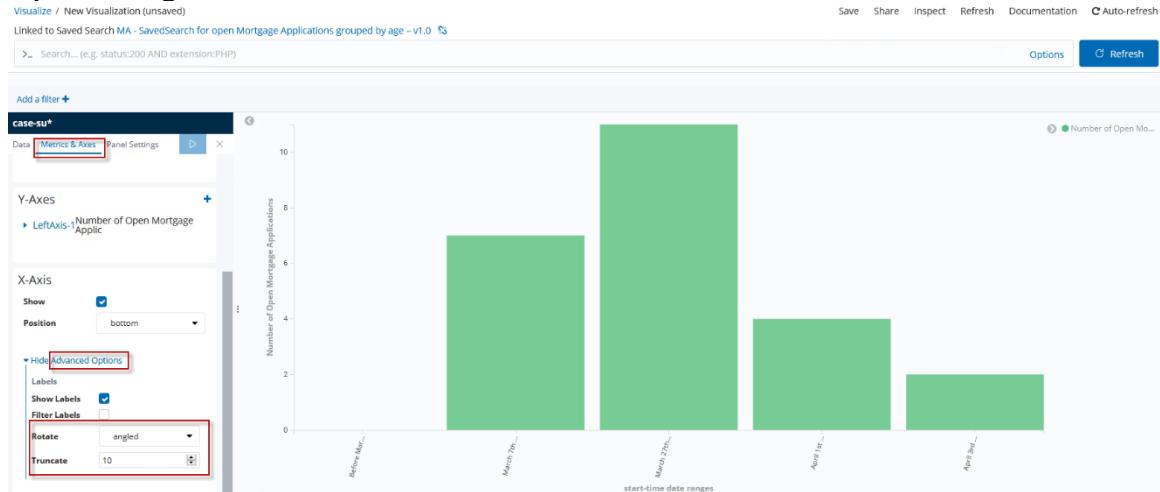
To ensure a more legible and business user-friendly presentation, modify the diagram:

13. Select the Metric & Axes tab
14. Expand Show/Hide Advanced Options section

15. Select angled in the Rotate choice list

16. Enter 10 into the Truncate input field

17. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.

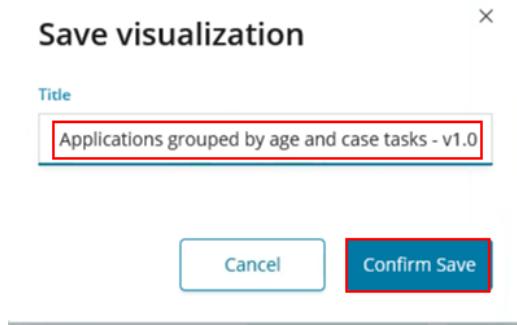


18. If you are satisfied with your visualization and it looks similar to the picture above, you can click Save.

In the pop-up dialog enter the following name for the visualization with your initials:

<Initials of the student> - MA- Vertical Bar for Open Mortgage Applications grouped by age and case tasks - v1.0

Click Confirm Save



For the second case “Count of active case activities”

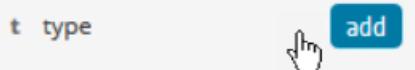
Creating a Saved Search:

1. In the navigation tree on the left side, press Discover

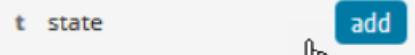
2. Expand the Index-Field and select case-su\*.

case-su\*

3. Below the Available Fields label, hover over the type field. A button "add" appears. Click this button.



4. Repeat Step 4 with field state



5. In the filter input field. Enter the following expression and click the search button:  
type:task NOT state:complete NOT state:Failed

Because the tasks of open mortgage applications are sought, we exclude the completed and failed mortgage applications and filter only for type task.

Then click on the search button. In the picture below, you can see the results of your filter options. You also can see the previously selected fields type and state with its values.

6. In the top of the right side. Click Save.

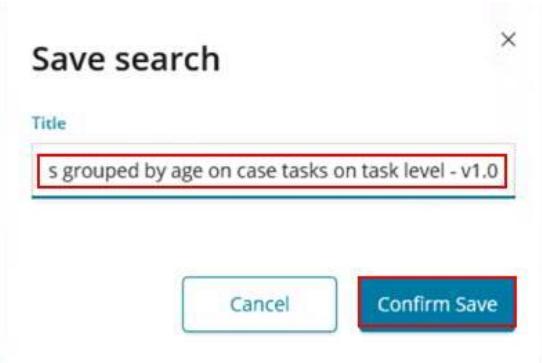
type	state
task	Working
task	Ready
task	Working

7. The input area pops up. Enter a name for your SavedSearch. That the SavedSearch can be found quickly, it is a useful to follow a naming convention..

Use the following name with your initials:

<Initials of the student > - MA - Vertical Bar for open Mortgage Applications grouped by age on case tasks on task level - v1.0

Then press Confirm Save.



### Creating the Visualization based on the Saved Search

1. In the navigation tree on the left side, click Visualize.
2. Click the “+”-Button.
3. In the Select visualisation type window, choose the Vertical Bar widget.
4. Enter the previously given name for the SavedSearch and press Enter (It is also possible to enter only a few words (keywords). Suggestions are generated immediately). Your saved SavedSearch will be found in the search results. Click on this SavedSearch.

### Or, From a Saved Search

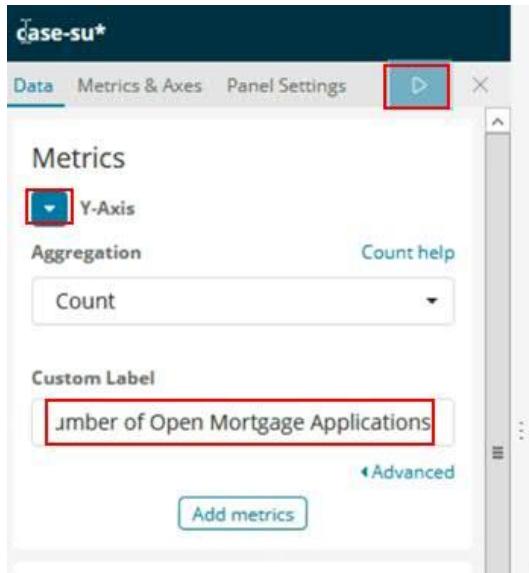
MA

1-7 of 7 Manage saved searches

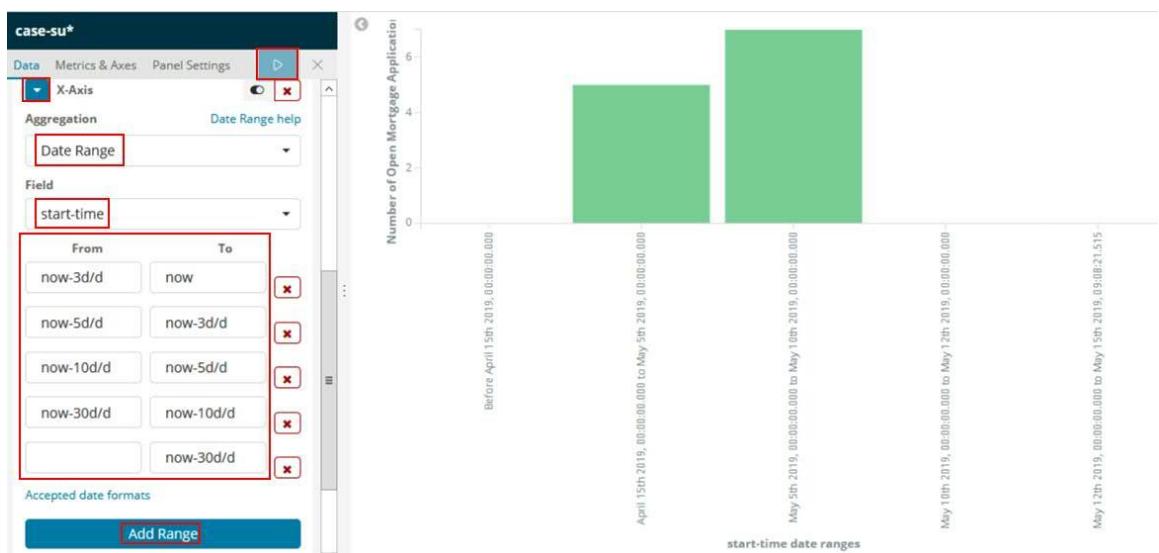
Name ▲

- MA - SavedSearch for Mortgage Applications grouped by amount - v1.0
- MA - SavedSearch for trend of accepted and rejected Mortgage Applications – v1.0
- MA - SavedSearch for Customer Information - v1.0
- MA - SavedSearch for all decisions - v1.0
- MA - SavedSearch for number of Mortgage Applications completed by Lead Mortgage Officer split by accepted/rejected and deviations from recommendation v1.0
- MA - SavedSearch for open Mortgage Applications grouped by age on task level - v1.0**
- MA - SavedSearch for open Mortgage Applications grouped by age - v1.0

5. Expand the Y-Axis
6. As Custom Label, enter the following name: Number of Open Mortgage Applications
7. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



8. Click on X-Axis under Select buckets type.
9. Select Date Range in the aggregation field.
10. Select start-time in the Field field.
11. Add the following ranges as shown in the picture below
12. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



13. Click on the Add sub-buckets Label



14. Select Split Series.

15. In the Sub Aggregation field, select Terms.

16. In the Field field, select the property task-name.keyword.

Now the diagram will be split according to the string values of the term task-name.keyword.

17. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



To ensure a more legible and user-friendly presentation, modify as indicated below:

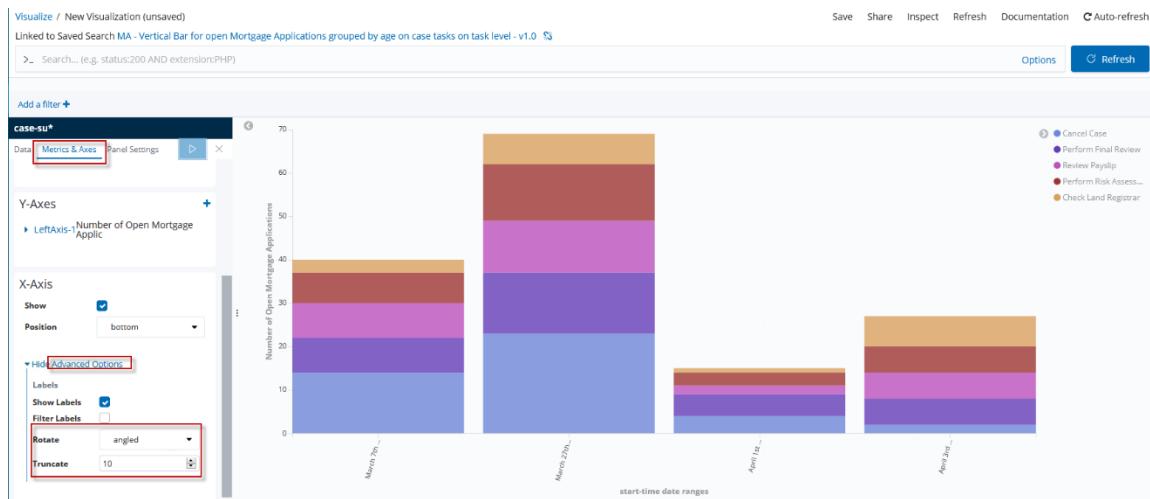
18. Select the Metric & Axes tab

19. Expand Show/Hide Advanced Options under X-Axis

20. Select angled in the Rotate choice list

21. Enter 10 into the Truncate input field

22. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.

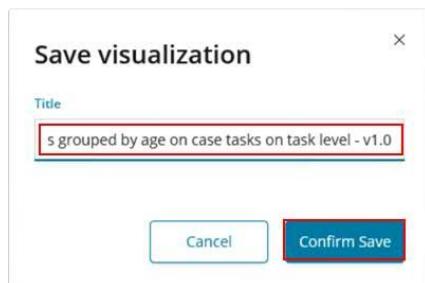


23. If you are satisfied with your visualization and it looks similar to the picture, then you can click the Save button.

When the input area pops up, enter the following name with your initials:

<Initials of the student> - MA - Vertical Bar for Open Mortgage Applications grouped by age on task level - v1.0

Click Confirm Save



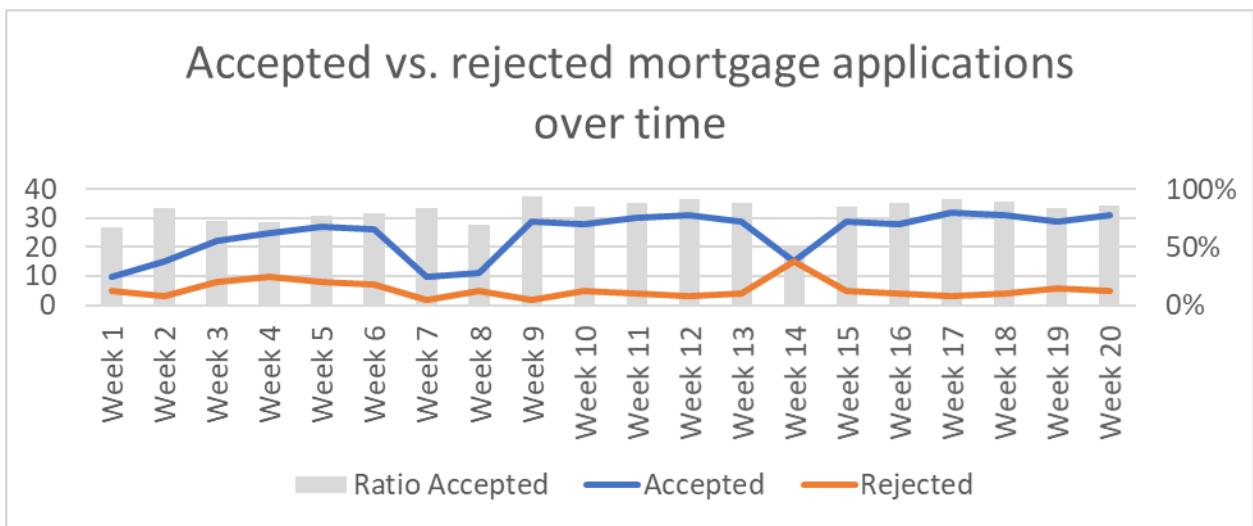
## Summary

Modelling is possible for either cases grouped by age or only or case-tasks grouped by age. Both isn't possible yet. With a merge-index function like the join in sql it would be easy to resolve the issue. Actually, we try to fix this.

### 7.2.2 Trend of accepted vs. rejected mortgage applications

#### Objective

Comparison between trends of accepted and rejected mortgage applications over time. Business users can recognize deviations from this visualization and react if necessary. In this task you will learn how to create a vertical bar chart.



#### Detailed Requirements

##### Note

This section summarizes the content of the visualization, points to the chart type required and the buckets to be specified.

The key requirements to implement this visualization are:

1. Interest only in property “data.MA\_IsMortgageApproved” of “complete” cases of case type New Mortgage Application
2. The mortgage applications are summarized on a weekly basis.
3. Separated or stacked by the value of the boolean property “data.MA\_IsMortgageApproved”

#### Key Considerations

There are some limitations regarding the ratio. Only for numeric properties it's possible to compute and display the ratio. We use a boolean property, so we can't display the ratio.

The same problem exists when displaying the right y-axis in percent.

The index you use includes all completed cases. So, we use case-summaries-\*.

#### Building the Visualization – High-Level Instructions

1. Determine the index or saved search:  
As we look for completed case we need a case index that includes timefield end-time with covering the case state “completed”: (case-summaries-\*)
2. Determine and specify the visualization required or recommended  
Use a vertical bar visualization with an aggregation type of Date Histogram for the X-Axis based on the end-time for the case and select weekly under the interval tab.

Specify a first bucket splitting the bar based on the variable data.MA\_IsMortgageApproved with the aggregation type Term.

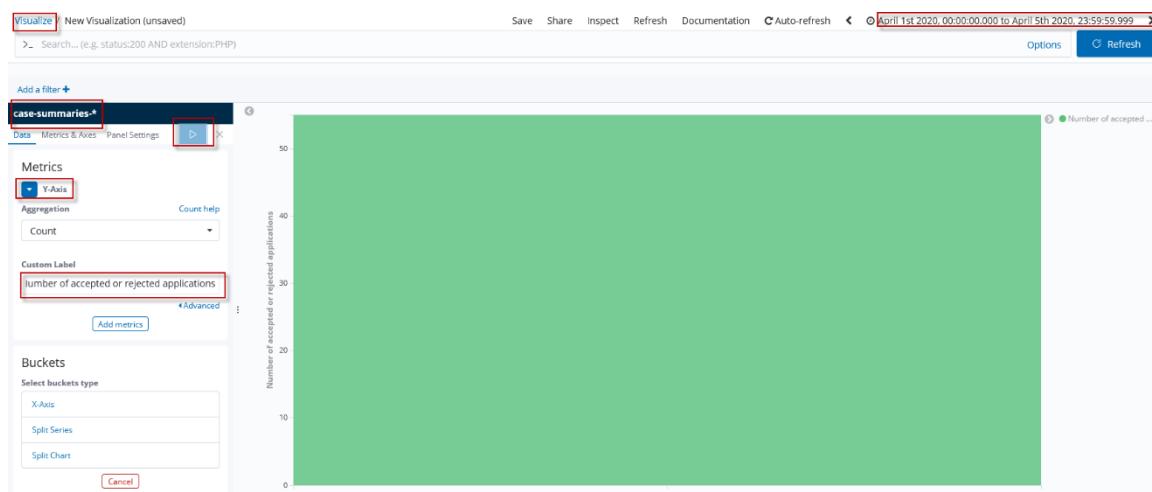
## Building the Visualization – Step-by-Step Instructions

1. In the navigation tree on the left side, click Visualize.
2. Click the “+”-button.
3. In the Select visualisation type window, choose the Vertical Bar widget.
4. Select index case-summaries-\* which includes the end-time from the left choice list.

### From a New Search, Select Index

The screenshot shows a search interface with a filter bar at the top. Below it is a list of index names. The entry 'case-summaries-\*' is highlighted with a red box. Other entries visible include 'process-sum\*' and 'process-summaries\*'. The interface has a light gray background with some shadows and highlights.

5. Expand the Y-Axis.
6. As Custom Label, enter the following name: Number of accepted or rejected applications.
7. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



8. Click on X-Axis under Select buckets type.

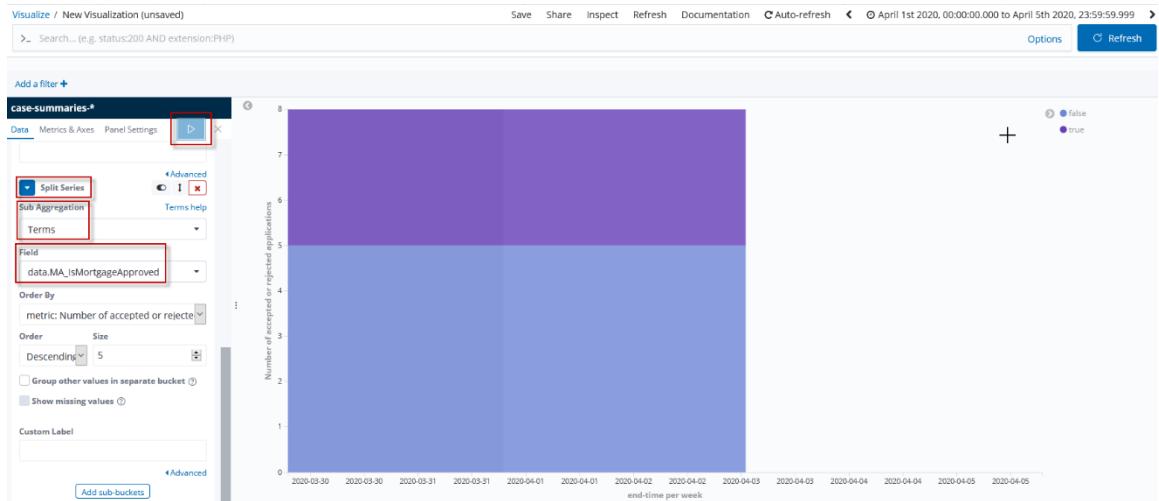
9. Select Date Histogram in the aggregation field.
10. Select end-time in the Field field.
11. In the Interval choice list, select Weekly.
12. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



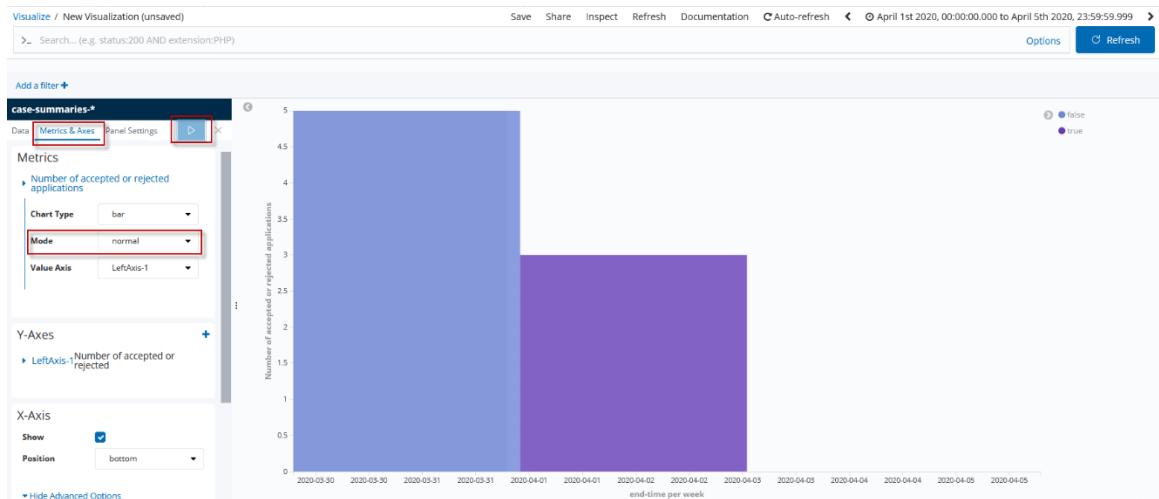
13. Select Split Series
14. In the Sub Aggregation field, select Terms.
15. In the Field field, select the property data.MA\_IsMortgageApproved.

Now the diagram will be split according to the boolean values of the term data.MA\_IsMortgageApproved.

16. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



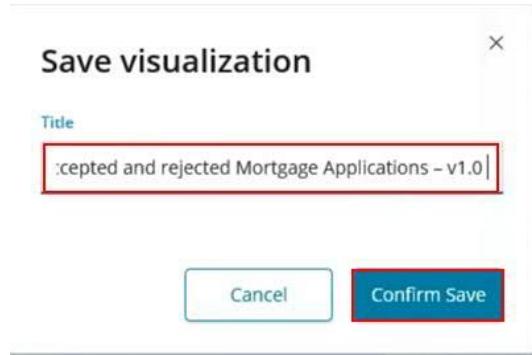
17. In the navigation tree, click Metrics & Axes.
18. Expand the Mode label and set it to normal. Now the splits are no longer stacked. The two bars are easier to read next to each other.
19. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



20. If you are satisfied with your visualization and it looks similar to the picture, then you can click the Save button.  
If the input area pops up, enter the following name with your initials:

<Initials of the student > - MA – Vertical Bar for trend of accepted and rejected Mortgage Applications – v1.0

Click Confirm Save



### Summary

Modelling is possible, but you have some limitations regarding the fine-tuning for the visualization. It's not possible to display the percentage on the right x-axis or to show the ration in the chart.

### 7.2.3 Trend of Final Decision Deviating from ODM Proposal

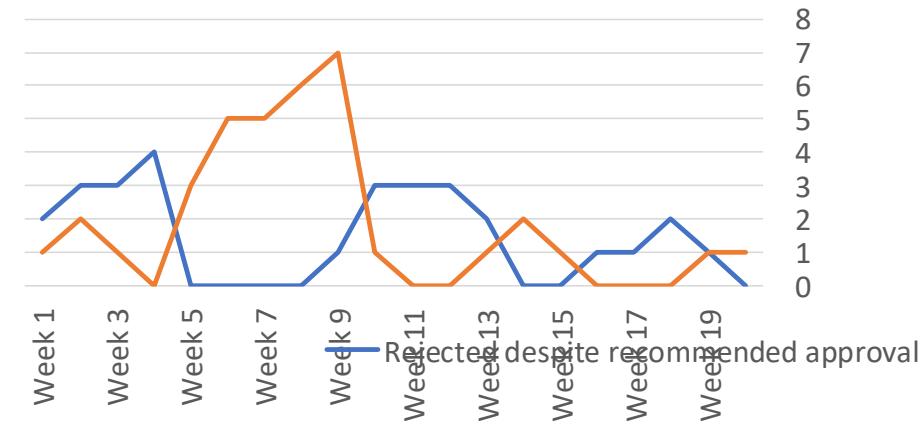
#### Objective

Comparison between the final decision from the mortgage officer to the proposed decision from the risk management system. In detail, the widget shows the overruled decisions by the mortgage officer:

- approved by ODM and rejected by Mortgage Officer
- rejected by ODM but overruled and approved by Mortgage Officer

In this section you will learn how to use a timelion visualization.

## Mortgage Application Final Decisions compared to Proposed Decision by Risk Management System



### Detailed Requirements

#### Note

This section summarizes the content of the visualization, points to the chart type required and the buckets to be specified.

The key requirements to implement this visualization are:

1. Interest in the combination of the boolean variables  
data.MA\_RiskAssessmentDecision and data.MA\_IsMortgageApproved
8. Also interest only in “completed” cases of case type New Mortgage Application (case-summaries-\*)
9. The mortgage applications are summarized on a weekly basis.
10. Separated or stacked by the combination of the values  
data.MA\_RiskAssessmentDecision:true AND  
data.MA\_IsMortgageApproved:false OR data.MA\_RiskAssessmentDecision:false AND data.MA\_IsMortgageApproved:true (Both possibilities for overruling are covered)

### Key Considerations

In the vertical bar option settings, you only have one opportunity to select the sub-bucket “split series”. For this visualization you need two sub-buckets of type split series. In the first case you must filter for “data.MA\_RiskAssessmentDecision:true AND data.MA\_IsMortgageApproved:false” and in the second case for “data.MA\_RiskAssessmentDecision:false AND data.MA\_IsMortgageApproved:true”. Both in one filter query isn’t possible because in this case you will have only one line in the chart.  
(You can solve the problem with split chart but then you will have two charts)

Therefore we are using a Timelion Expression. In a Timelion expression there are also some limitations regarding the split-option, but a workaround with a second .es() is

possible. Why is the split-option not working? Because this option only splits the series for one property. We are using a combination of properties.

## Building the Visualization – High-Level Instructions

Determine and specify the visualization required or recommended

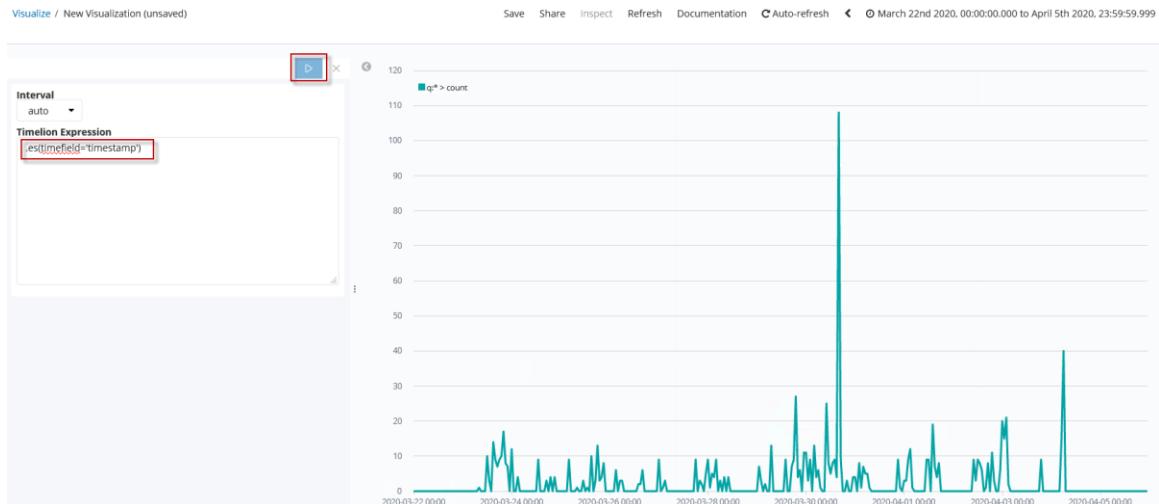
1. Use a timelion visualization
2. As we look for completed case we need a case index that includes timefield end-time with covering the case state completed. (case-summaries-\*)
3. We could use “timestamp” for the timefield (represented in the x-axis).
4. Filter in query option for approved by ODM and rejected by the Mortgage Officer
5. Repeat Step 2-4 with a new .es()-query and filter option: rejected by ODM and approved by Mortgage Officer

## Building the Visualization – Step-by-Step Instructions

1. In the navigation tree on the left side, click Visualize.
2. Click the “+”-button.
3. In the select visualization type window, select Timelion.
4. In the timelion.expression text-field, enter the following expression:

```
.es(timefield='timestamp')
```

5. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



6. Add the following expression to your timelion expression in the text-field after ‘timestamp’: and prior to “)”.  
The final expression should be: `.es(timefield='timestamp') q> count`

```
, index='case-summaries-*'
```

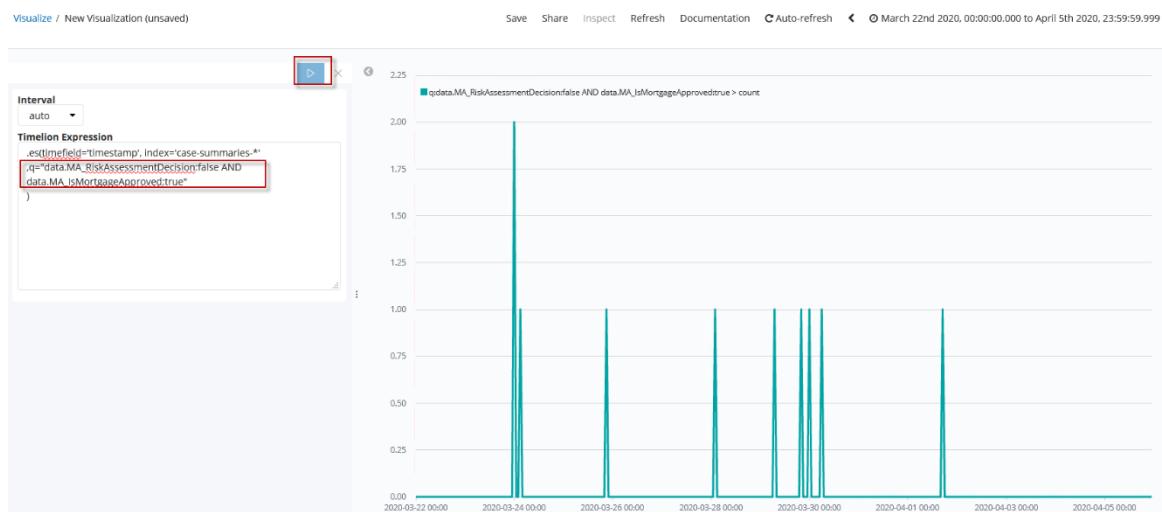
7. Press Play in the upper right corner



8. Add the following query-expression to your timelion expression:

```
, q="data.MA_RiskAssessmentDecision:false AND  
data.MA_IsMortgageApproved:true"
```

9. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



10. We have now developed the first curve for the graph. The first curve represents the accepted mortgage applications although it was recommended by the ODM system to reject the mortgage application.

Now a curve has to be added for the reverse case. The proposal from the ODM system was an approval, but the final decision to approve the mortgage application was rejected.

In this case only the values of the properties have to be changed from false to true or from true to false.

Therefore, we can copy the current expression and append it to the expression. After that only the boolean values have to be exchanged.

11. Or you add the following expression in the timelion expression text-field:

```
, .es(timestamp, index='case-summaries-*', q="data.MA_RiskAssessmentDecision:true AND data.MA_IsMortgageApproved:false" )
```

12. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.

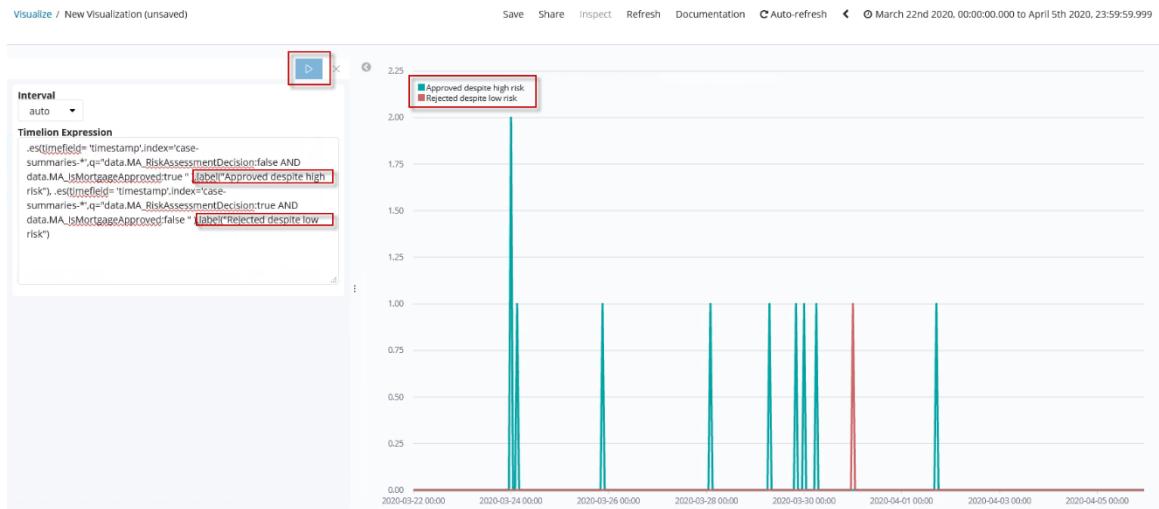


13. To make sure everyone understands what the curves mean, we update the legend. For each .es() function we add a .label() with the name of the legend after the parenthesis of the .es() function.

Add the following expressions after the parenthesis of the .es() functions:

- a) .label("Approved despite high risk")
- b) .label("Rejected despite low risk")

14. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



16. For verification the whole timelion expression is shown below:

```
.es(timestamp='timestamp', index='case-summaries-*', q="data.MA_RiskAssessmentDecision:false AND data.MA_IsMortgageApproved:true").label("Approved despite high risk"), .es(timestamp='timestamp', index='case-summaries-*', q="data.MA_RiskAssessmentDecision:true AND data.MA_IsMortgageApproved:false").label("Rejected despite low risk")
```

17. If you are satisfied with your visualization and it looks similar to the picture, then you can click the Save button.

If the input area pops up, enter the followiung name with your initials:

<Initials of the student > - MA – Timelion for trend of Final Decision Deviating from ODM Proposal – v1.0

Click Confirm Save.



## Summary

Modelling is possible. You may have problems with the vertical bar widget or with the split option in timelion expression but you can fix the issue by using a second .es()-query. Timelion expression is much more powerful than other widgets, because you can react flexibly and individually to diagrams. However, the error rate is much higher due to syntax errors. Using Good Practices or experience help to avoid these problems.

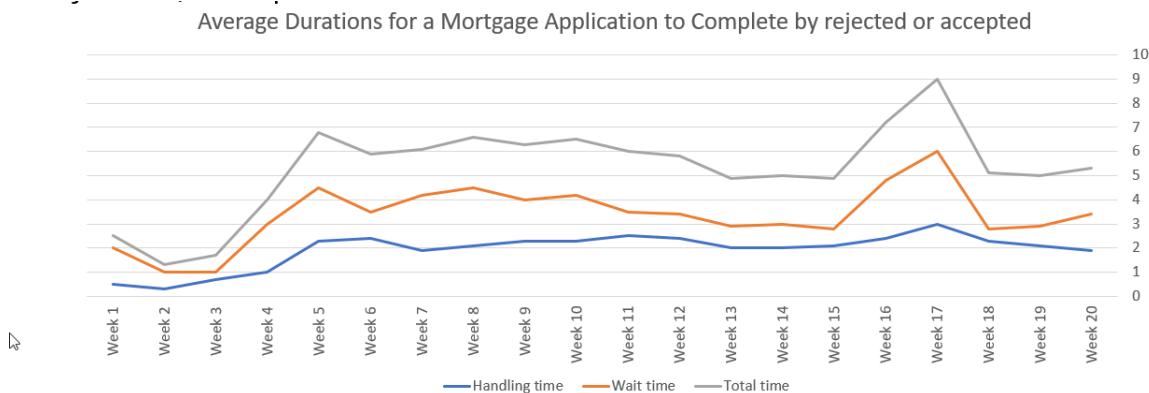
## 7.2.4 Avg of Durations for a Mortgage Application to complete separated by rejected/accepted

### Objective

Total -, wait - and working time of mortgage applications separated by accepted or rejected and compared to each other in one visualization. In this task you will learn how to create Scripted Fields and learn how to use them in a vertical bar visualization.

### Note

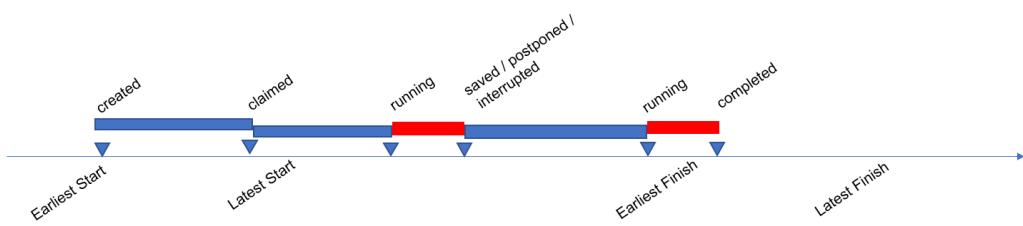
This requires precise definitions about these individual times on process/case - and activity/tasks level considering the life cycle of these – refer to state transition diagrams.



### Note

In the current release BAI includes a duration for processes and activities. However, when you want to further investigate times spent for human tasks you need to compute this on your own based on the knowledge of the possible states and state changes of human tasks and their time stamps. The slide beneath illustrates this.

Total Duration Total Time / Elapsed Time	Timestamp [completed]	Timestamp [started, created]	
Wait Duration	Timestamp [claimed]	Timestamp [started, created]	
Handling Duration ? (Execution Time)	Timestamp [completed]	Timestamp [claimed]	
Working Duration	Timestamp [completed]	Timestamp [running]	You might have multiple periods in state „running“ per task instance



### Detailed Requirements

### Note

This section summarizes the content of the visualization, points to the chart type required and the buckets to be specified.

The key requirements to implement this visualization are

1. Interest in completed mortgage applications of case type New Mortgage Application  
(case-summaries-\*)
2. Split series by total time, wait time and working time for accepted or rejected mortgage applications
3. Wait time: time between states created and claimed
4. Working time: time between states claimed and completed
5. The mortgage applications are summarized on a weekly basis.

### Key Considerations

BAI currently has a few limitations regarding durations. It provides overall durations, while wait time and working time are not included in the existing indexes. There is the possibility to compute these durations via Scripted Fields together timestamps for state changes.

For human activities three timestamps are required: startTime, claimedTime and completedTime. This allows to calculate the workingTime and waitTime for activities. On process level we can only display the total / elapsed duration.

A further restriction is to aggregate and to calculate these activity durations per process instance as well as to determine min, max and average values on a process template level.

Therefore we decided to specify the total duration on process level, separated by the attribute IsMortgageApproved {true, false}, to specified in [Vertical Bar for Average Duration for Mortgage Application to complete by approved/rejected](#).

In this section we focus and practice how to create a vertical bar chart on activity level with total -, wait- and working time for the BPMN task “Perform Final Review”.

A second requirement is to separate on approved or rejected mortgages, e.g. to determine the “wasted” time. This would result in six lines/bars in a single visualization. In order to improve the readability of the chart we decided to develop two widget. Actually to copy the first one and adopt the filter criteria.

### Building the Visualization – High-Level Instructions

1. Create two Scripted Fields (waitTime and workTime)
2. Use a vertical bar visualization
3. Determine the index:  
As we look for the activity “Perform Final Review” we need a process index that includes timefield end-time with covering the task state “completed”:  
(process-summaries\*)

4. Add two Y-axis with aggregation field average
5. Select for each Y-Axis workingTime and waitTime
6. We could use “startTime” for the timefield (represented in the X-Axis).
7. Filter in query option for  
type:userTask AND name:'Perform Final Review' AND  
data.TG\_MA.finalReview.string:true

## Building the Visualization – Step-by-Step Instructions

### Creating Scripted Fields

#### Note

As we have imported all indexes in section [Import Index Patterns](#) the scripted fields for working- and waitTimes are already specified in the process-summaries\* index. Therefore you can continue with [Creating the visualization](#).

1. In the navigation tree on the left side, click Management.
2. Select Index Patterns

The screenshot shows the Kibana Management interface. On the left, there is a sidebar with icons for Discover, Visualize, Dashboard, Timelion, Dev Tools, and Management. The Management icon is highlighted with a red box. The main area has a header "Management" and "Version: 6.3.1". Below the header are tabs: "Index Patterns" (which is highlighted with a red box), "Saved Objects", and "Advanced Settings".

3. Select index process-summaries\*
4. Click on tab Scripted fields
5. Click button Add scripted field

The screenshot shows the Kibana Index Patterns page for the "process-summaries\*" index. At the top, there are tabs: "Index Patterns" (highlighted with a red box), "Saved Objects", and "Advanced Settings". Below the tabs, there is a "Create Index Pattern" button and a list of index patterns: "process-summaries\*", "-sumaries-\*", "\*process-summarie\*", "\*process-summaries\*", "\*process-summaries-\*", "\*sumaries\*", "case-summarie\*", "case-summaries\*", "case-summaries-\*", and "-sumaries-\*". The "process-summaries\*" entry is highlighted with a red box. To the right, there is a section titled "Scripted fields" with a note: "You can use scripted fields in visualizations and display them in your documents. However, you cannot search scripted fields." Below this is a "Add scripted field" button, which is also highlighted with a red box.

7. Name : waitTime. (It's important to use exactly this name)

8. Language: painless

9. Type: number

10. Format: Duration

11. Input Format: Milliseconds

12. Output Format: Human Readable

13. Script:

```
if (!doc['claimedTime'].empty && !doc['startTime'].empty){  
    return doc['claimedTime'].date.millis - doc['startTime'].date.millis}
```

### ★ process-summaries\*

Create Scripted Field

Name

waitTime

**Mapping Conflict:** You already have a field with the name waitTime. Naming your scripted field with the same name means you won't be able to query both fields at the same time.

Language

painless

Type

number

Format (Default: Number)

Duration

⚠ Warning

Input Format

Milliseconds

Output Format

Human Readable

Samples

-123

Input

minus a few seconds

Formatted

1

a few seconds

### Script

```
if (!doc['claimedTime'].empty && !doc['startTime'].empty){  
    return doc['claimedTime'].date.millis - doc['startTime'].date.millis  
}
```

14. Create Scripted Field by clicking on the Create Field button below.

- Common mathematic functions: `abs` `ceil` `exp` `floor` `ln` `log10` `logn` `min` `max` `sqrt` `pow`
- Trigonometric library functions: `acosh` `acos` `asinh` `asin` `atanh` `atan` `atan2` `cosh` `cos` `sinh` `sin` `tanh` `tan`
- Distance functions: `haversin`
- Miscellaneous functions: `min`, `max`

Create Field

Cancel

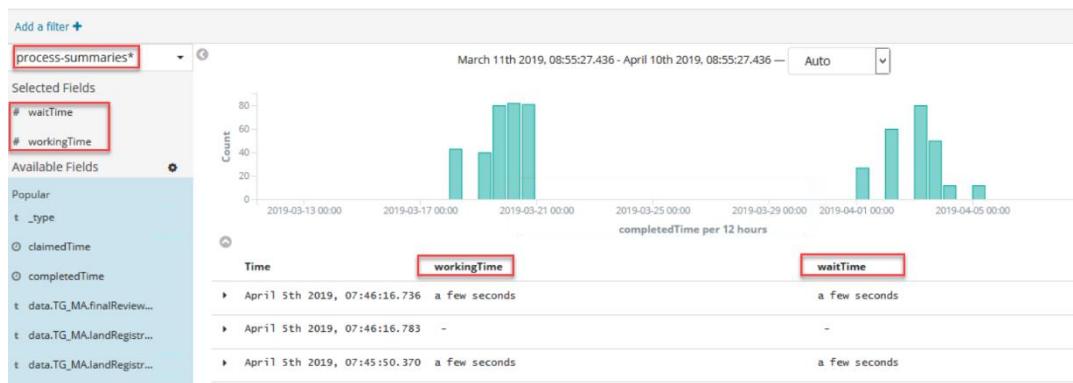
15. Repeat Step 6-14 with following changes:

- Name: workingTime
- Script:  
if (!doc['claimedTime'].empty && !doc['completedTime'].empty){ return doc['completedTime'].date.millis -doc['claimedTime'].date.millis }

In the navigation tree click Discover and verify if the scripted fields have been added:

16. Select index process-summaries\*

17. Add waitTime and workingTime among Selected Fields



Creating the visualization

1. Click Visualize in the navigation tree.
2. Click the “+”-button.
3. In the select visualization type window, select vertical bar
4. An index must be added so that the end time is present in the results. Therefore select process-summaries\*

### From a New Search, Select Index

A screenshot of a search results interface. At the top left is a search bar with the placeholder "Q Filter...". To its right is the text "18 of 18". Below the search bar is a table with a single column labeled "Name ▲". The table contains 18 rows, each representing an index name. The row for "process-summaries\*" has a red rectangular box drawn around it. Other visible index names include "process-summar\*", "odm-timeseries\*", "process-summarie\*", "process-summaries-\*", "process-summar\*", "process-su\*", "process-summar\*", "process-summaries-\*", "process-summ\*", "process-summa\*", "process-summarie\*", and "process-summaries\*".

5. Expand the Y-Axis
6. In the aggregation field, select Average.
7. In Field field, select duration
8. Enter Average Total Duration for the custom label.

A screenshot of the "Metrics & Axes" configuration screen for the index "process-summaries\*". The top navigation bar includes "Data", "Metrics & Axes", and "Panel Settings". A red box highlights the "Metrics & Axes" tab. Below the tabs, there's a title "Metrics" followed by a "Y-Axis" section. Under "Y-Axis", the "Aggregation" dropdown is set to "Average" (highlighted with a red box). The "Field" dropdown is set to "duration". Below these, a "Custom Label" input field contains "Average Total Duration" (highlighted with a red box). At the bottom right of the configuration area is a "Advanced" link.

9. Click Y-Axis in the Select metrics type area

A screenshot of the "Select metrics type" dialog box. It contains two options: "Y-Axis" and "Dot Size". The "Y-Axis" option is highlighted with a red box. At the bottom of the dialog is a "Cancel" button.

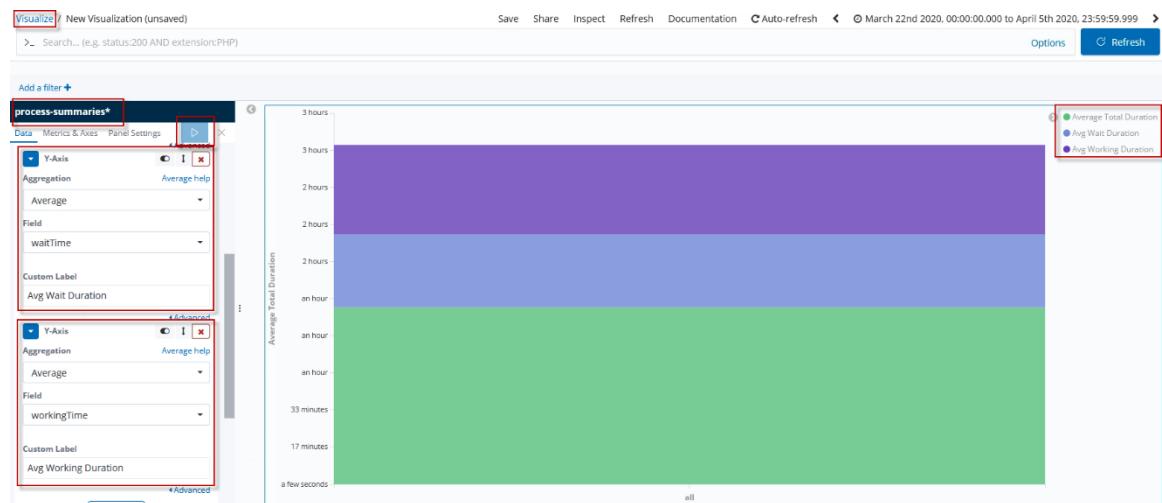
10. Repeat steps 6-8 two times with following changes:

First time: Field: waitTime  
Custom label: Avg Wait Duration

Click Add metrics >Y-Axis



Second time: Field: workingTime  
Custom label: Avg Working Duration



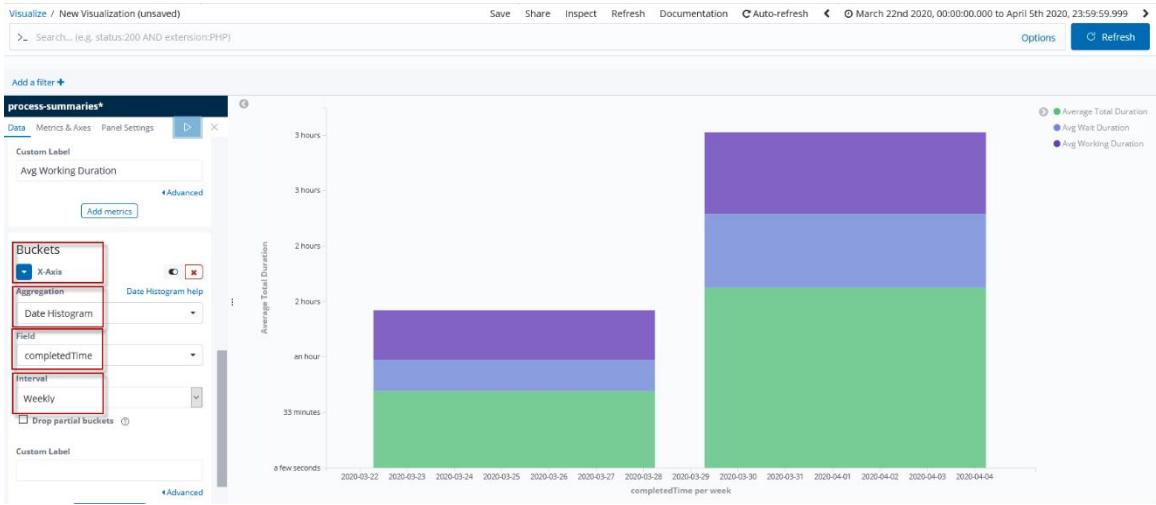
11. Click on X-Axis under Select buckets type.

12. Select Date Histogram in the aggregation field.

13. Select completedTime in the Field Field.

14. In the Interval choice list, select Weekly.

15. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



16. Click on the Add sub-buckets label
17. Select Split Series
18. In the Sub Aggregation field, select Filters.
19. In the Filter 1 field, enter the following expression:

```
type:userTask AND name:'Perform Final Review' AND
data.TG_MA.finalReview.string:true
```

20. Click on the Black Arrow
21. Enter the letter A
22. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.



23. Navigate to Metrics & Axes Tab
24. Expand Average Total Duration
25. Change field Mode from stacked to normal
26. Repeat steps 24-25 for Avg Wait Duration and Avg Working Duration
27. Click the “Apply Changes” button which is symbolized as a “Play” button at the top. The diagram is refreshed.

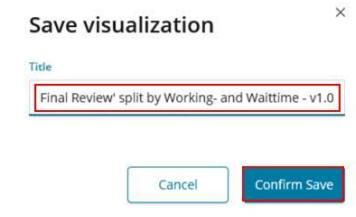


28. When you are satisfied with your visualization and it looks similar to the picture, then you can click the Save button.

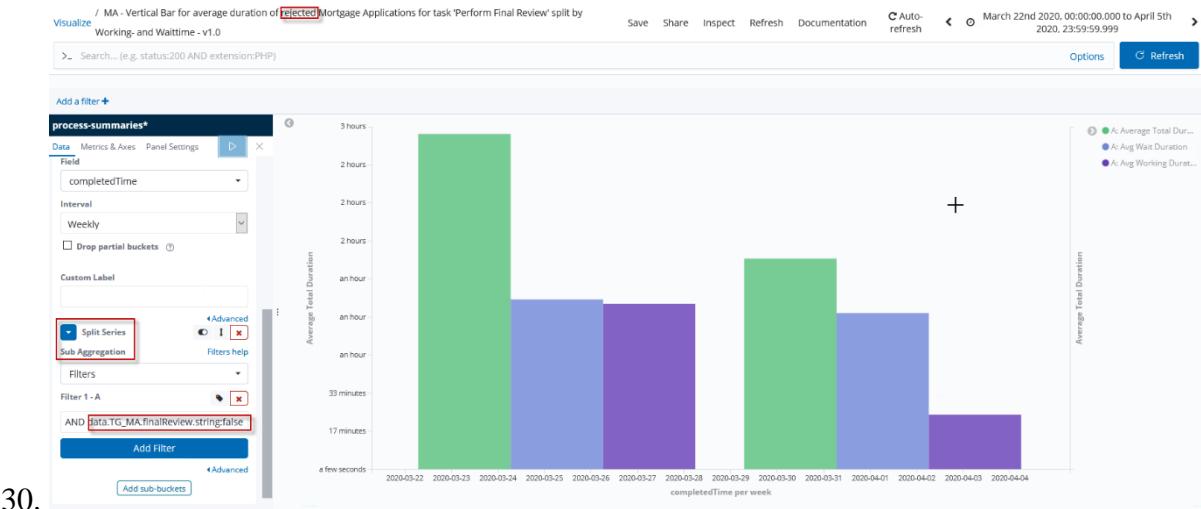
When the input area pops up, enter the following name with your initials:

<Initials of the student> - MA - Vertical Bar for average duration of approved Mortgage Applications for task 'Perform Final Review' split by Working- and Waittime - v1.0

Press Confirm Save



29. After successfully completing this visualization, you can now try the visualization for the rejected case. You only have to set the variable data.TG\_MA.finalReview.string from true to false.



30.

Save this with name:

<Initials of the student > - MA - Vertical Bar for average duration of rejected Mortgage Applications for task 'Perform Final Review' split by Working- and Waittime - v1.0

## Summary

Modelling is not possible yet. Only on process level in our example for activity “Perform Final Review” it is possible to separate totalTime, waitTime and workingTime. This might be change in future updates.

Potentially after future updates, it may become possible to compute the entire total, wait and working on bpmn-level via a trace id.

### 7.2.5 Create a new Dashboard for the Mortgage Application-specific solution

In this section you will execute the following steps as you have leaned in [Building a Dashboard](#).

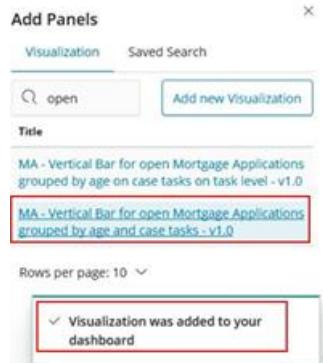
The business-related visualizations created in the previous sections are now added to a new dashboard

1. In the side navigation, click Dashboard.
2. Click Create new dashboard.

The screenshot shows the Kibana sidebar with "Dashboard" selected. The main area is titled "Dashboards" and shows a list of existing dashboards: Workflow - Case Activities, Workflow - Cases, Decisions Dashboard, Workflow - Hiring Sample [18.0.0.1], and Workflow - Processes. A "Create new dashboard" button is located in the top right corner of the dashboard list area.

3. Click Add in the Kibana toolbar at the top.
4. Enter the names of your previously created visualizations and click to add them:

- <Initials of the student > - MA - Vertical Bar for average duration of **rejected** Mortgage Applications for task 'Perform Final Review' split by Working- and Waittime - v1.0
- <Initials of the student > - MA - Vertical Bar for average duration of **approved** Mortgage Applications for task 'Perform Final Review' split by Working- and Waittime - v1.0
- <Initials of the student > - MA - Timelion for trend of Final Decision Deviating from ODM Proposal - v1.0
- <Initials of the student > - MA - Vertical Bar for trend of accepted and rejected Mortgage Applications - v1.0
- <Initials of the student > - MA - Vertical Bar for Open Mortgage Applications grouped by age on task level - v1.0
- <Initials of the student > - MA - Vertical Bar for Open Mortgage Applications grouped by age and case tasks - v1.0



5. When you're finished adding and arranging the panels, go to the menu bar and click Save.
6. In Save Dashboard, enter a dashboard title and optionally a description. For our purpose use: <Initials of the student > - MA - Business Dashboard for Mortgage Application – v1.0

To store the time period specified in the time filter, enable Store time with dashboard.

Click Confirm Save.

Save dashboard

Title

MA - Business Dashboard for Mortgage Application – v1.0

Description

Store time with dashboard

This changes the time filter to the currently selected time each time this dashboard is loaded.

Cancel

Confirm Save

The dashboard with the visualizations added should look similar to the screenshot beneath.



## 7.2.6 Create mortgage-specific visualizations without step-by-step instructions

In preceding sections you already created several general as well as specific visualizations for a Business Expert in the Mortgage Department of an enterprise. You followed the top-down method to design, implement and test visualizations.

Now its time again to practice what you learned. Follow the high level instructions to build at least one of your own.

1. Understand the objectives
2. Specify the detailed requirements
3. Outline the Key Considerations
4. Building the visualization
  - a. Determine the index or saved search
  - b. Determine and specify the visualization you want to use
  - c. Specify the Y-Axis
  - d. Specify the buckets and aggregations for the X-Axis
5. Build and test your visualization
6. Save the visualization with your initials and a meaningful name

Don't be afraid. At the end of the exercise you will import a master solution with the following visualizations. Remember, you might start with an existing visualization, save it with a new name and adopt the specification to the attributes of the event/index and syntax for the type of visualization.

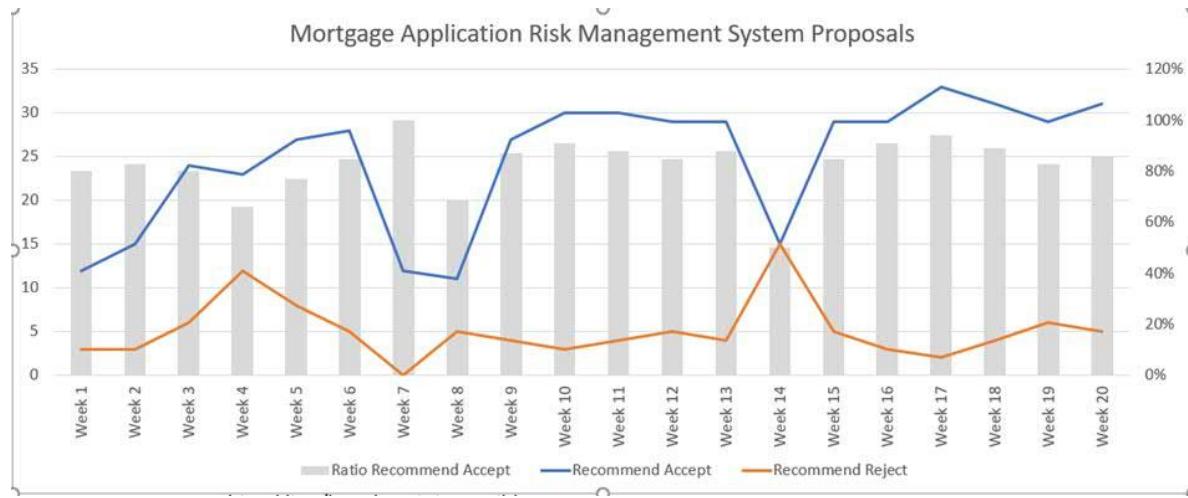
You might also directly import these additonal visualizations and Business Dashboard to see the final graphs and reports as descrbied on [Create new Visualizations and a Dashboard for the Mortgage Application Solution – Verification Instructions](#).

### 7.2.6.1 Trend of proposed approval/rejection by ODM

#### Objective

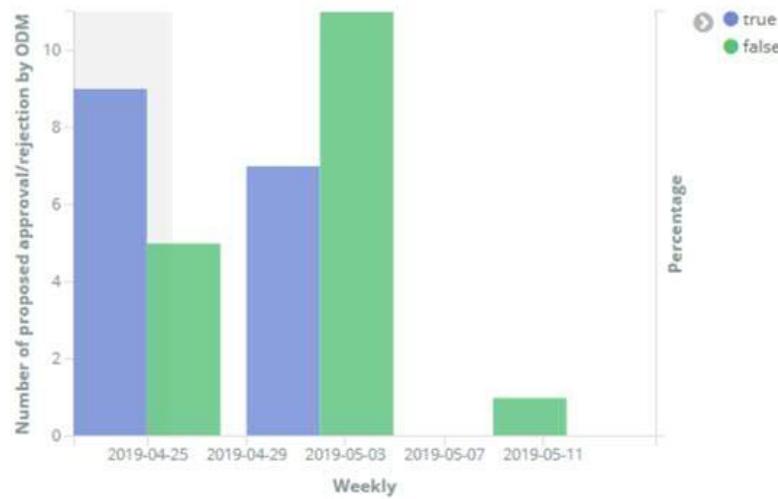
1. Show the absolute numbers (and trend) of decision to accept and reject mortgage requests per week (as lines or bars)
2. Show the percentage and trend of recommended accepts vs rejects (as bars)
3. Show the trend over the last x weeks (x to be defined)
4. The chart is based on executing second decision service with the Perform Risk Assessment case activity and associated BPMN

#### Requirement



## Design

MA – Vertical Bar for trend of proposed approval/rejection by ODM – v1.0



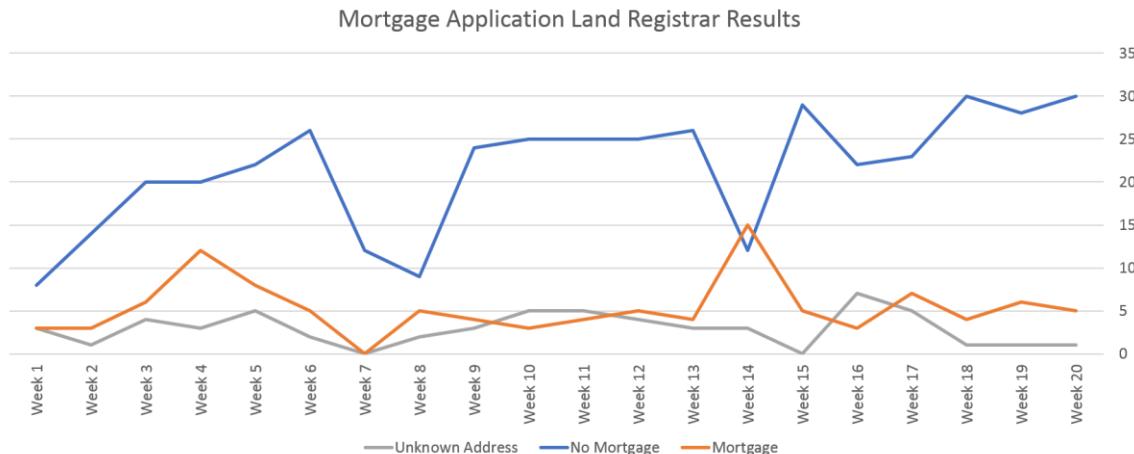
### 7.2.6.2 Trend of Mortgage Application Land Registrar Results

#### Objective

1. Show the absolute numbers (and trend) of the results from Land Registrar as lines or bars.
2. *Show the trend over the last x weeks (x to be defined)*
3. As described in the legend in the pictures below there are three possibilities:
  - Address Unknown
  - Address Known and Mortgage Blocked
  - Address Known and Mortgage not blocked.

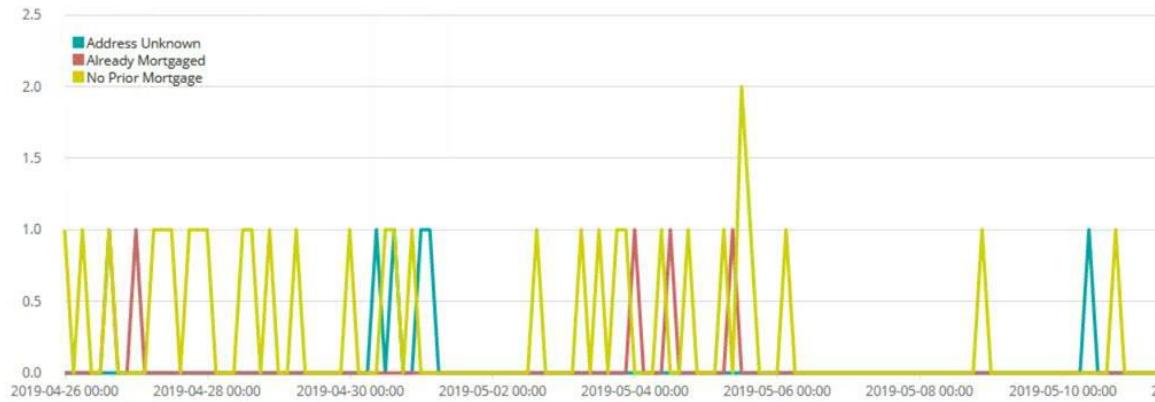
To reach this you must work in combination with two properties.  
Land Registrar Message and Land Registrar Decision

## Requirement



## Design

MA - Timelion for trend of Mortgage Application Land Registrar Results - v1.0



### 7.2.6.3 Number of Mortgage Applications completed by Mortgage Officer split by accepted/rejected and deviations from ODM proposal

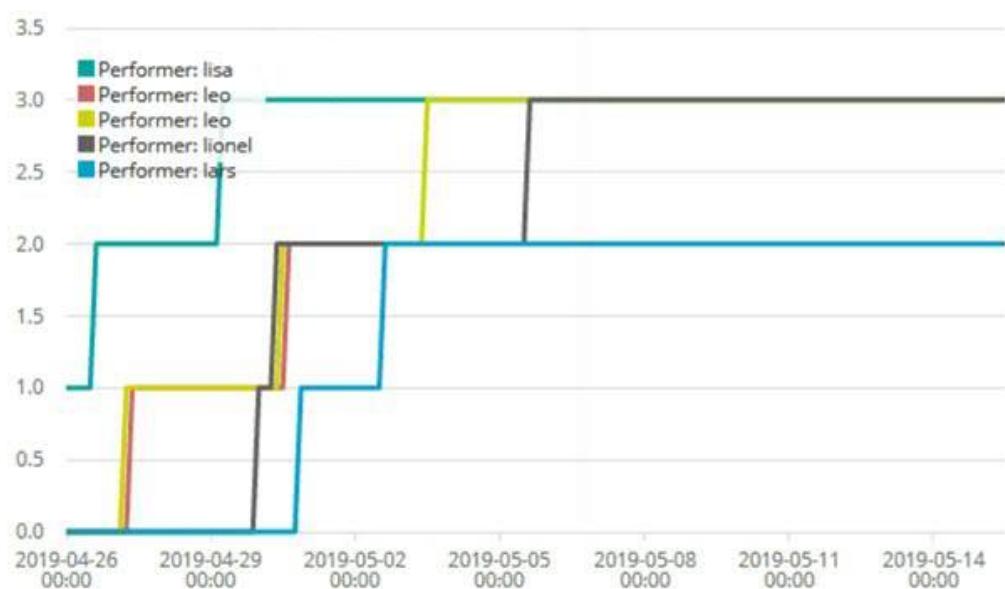
#### Objective

1. Show the number of mortgage applications split by the performing mortgage officer
2. You can either display the number per week in bars. Or you can create a line cumulating the number.
3. *Show the trend over the last x weeks (x to be defined)*
4. Since no performers are displayed at case level, we refer to the process task "Perform Final Review". Therefore, you must use a process index.

## Requirement

## Design

MA - Timelion for number of Mortgage Applications completed by Lead Mortgage Officer spl...



#### 7.2.6.4 Mortgage Applications grouped by amount

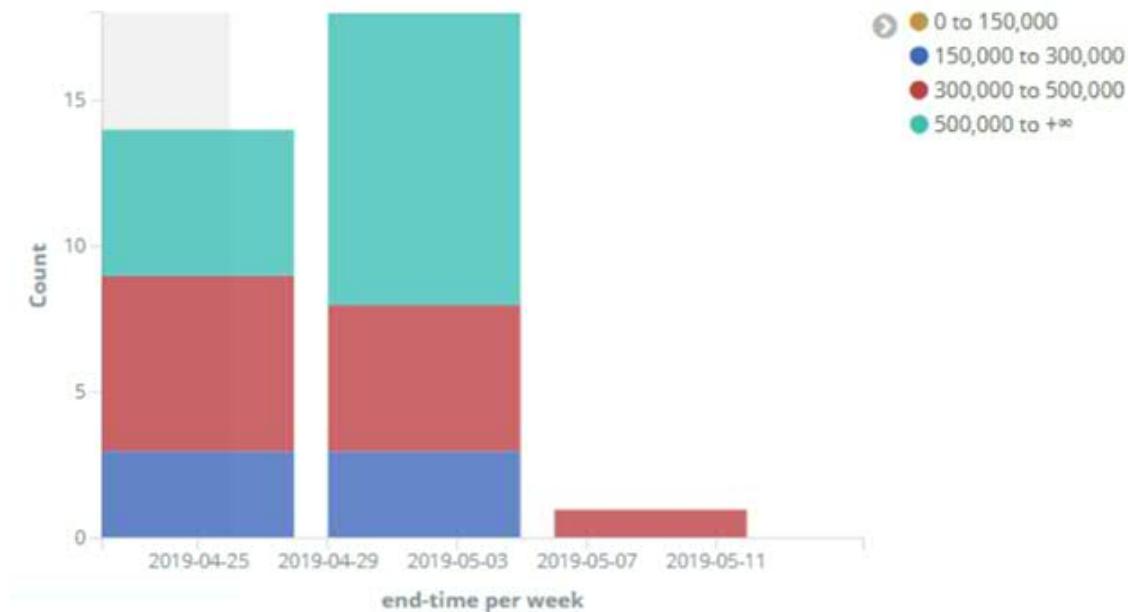
##### Objective

1. Show the overall number of mortgage applications per week grouped by the Loan Amount
2. Grouping is done based on the requested amount case property.
3. *Show the trend over the last x weeks (x to be defined)*
4. The generated data have amounts between 0 and 1200000. Note this when grouping

##### Requirement

##### Design

MA - Vertical Bar for Mortgage Applications grouped by amount - v1.0



## 7.2.6.5 Data Table for Customer Information

### Objective

1. Show all customer information as well as the according information of the mortgage application in a table

### Requirement

As the head of the Mortgages Organization I need a compact summary of all customer information at a glance.

### Design

MA - Data Table for Customer Information - v1.0

Name	Country	Address	Net Income	Purchasing Price	Date of Birth	Loan Amount
Olivia Smith029	United States	1085 Unnamed Street, 20613 Your City, CP	11,773	551,000	January 24th 2005, 18:39:24.000	549,000
Olivia Miller016	Canada	1309 Unnamed Street, 17158 Your City, BN	19,607	524,000	November 7th 1993, 20:56:28.000	386,000
Olivia Johnson004	Germany	1214 Unnamed Street, 49222 Your City, WQ	10,325	224,000	April 7th 1986, 20:39:16.000	204,000
Olivia Davis037	Mexico	1897 Unnamed Street, 62912 Your City, QH	9,713	564,000	March 27th 1992, 11:00:20.000	425,000
Olivia Brown026	United States	375 Unnamed Street, 75717 Your City, MJ	6,908	641,000	July 3rd 1960, 01:27:54.000	580,000
Oliver Garcia038	Germany	1534 Unnamed Street, 64171 Your City, WG	6,840	267,000	February 18th 1972, 16:34:07.000	180,000
Jack Miller005	United States	1040 Unnamed Street, 31203 Your City, DR	6,656	646,000	April 13th 1980, 22:37:50.000	572,000

## 7.2.6.6 Mortgage Applications with LoanAmount by country

### Objective

1. Show the sum of all Loan Amounts per country in a world map (region map)

### Requirement

As the head of the Mortgages Organization I need an overview of the total loan amounts in each country. With this information, the company can concentrate on the countries that have the highest loan amounts.

### Design

MA - Region Map for Mortgage Applications with LoanAmount by country - v1.0



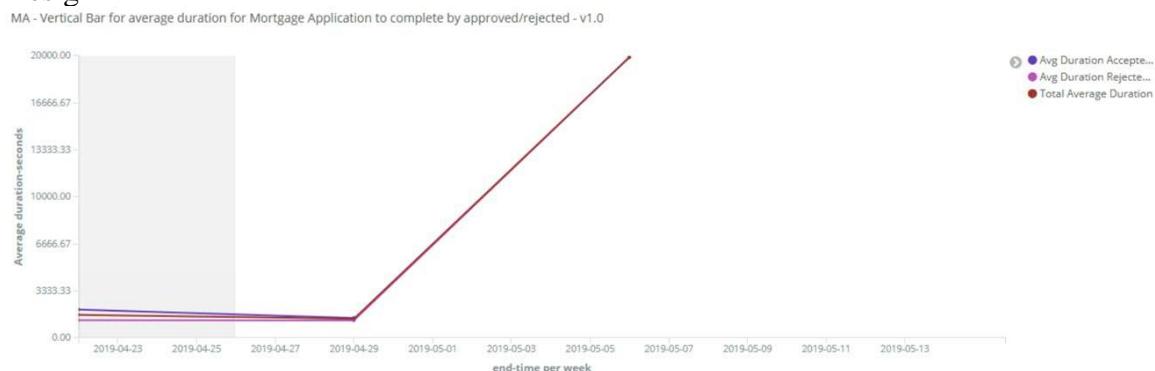
### 7.2.6.7 Vertical Bar for Average Duration for Mortgage Application to complete by approved/rejected

#### Objective

1. Show the average duration in lines for accepted and rejected cases. In addition, display the total average duration.

#### Requirements

#### Design



### 7.2.6.8 Add your own visualizations to the Business Dashboard

Add your own visualizations to your dashboard created in [Create a new Dashboard for Mortgage Application specific solution](#).

<Initials of the student> - MA - Business Dashboard for Mortgage Application

## 7.3 Create new Visualizations and a Dashboard for the Mortgage Application Solution – Verification Instructions

As part of the validation of the artefacts created on your own you can import the master solution of the MA –Business Dashboard for Mortgage Application in order

- a. to compare them with your specification and diagram
- b. to demonstrate them as part of the end-to-end scenario

Follow these steps:

1. Download the MA\_SavedSearch\_Visualizations.json and MA - Business Dashboard.json from [Material for Participants box folder](#) to your c:\CPA4Demo folder if not already done so
2. Import the and associated artefacts (visualizations) and Business Dashboard

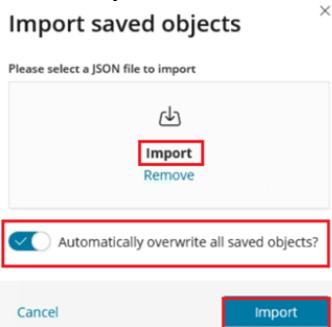
- a. Click Management in the navigation tree
- b. Select Saved Objects

The screenshot shows the Kibana Management interface. On the left, there's a sidebar with icons for Discover, Visualize, Dashboard, Timeline, Dev Tools, and Management. The Management icon is highlighted with a red box. The main area has a title 'Management' and a sub-header 'Version: 6.5.3'. Below that is a section for 'Index Patterns' and 'Saved Objects'. The 'Saved Objects' tab is highlighted with a red box. At the bottom, there are buttons for 'Export 150 objects', 'Import' (which is also highlighted with a red box), and 'Refresh'.

- c. Click Import.

- Saved Objects**
- [Export 150 objects](#) [Import](#) [Refresh](#)
- d. Click Import again
  - e. Navigate to the MASavedSearch\_Visualizations.json file that represents the objects to import.
  - f. Indicate whether to overwrite objects already in Kibana. This should not be the case as you named your artefacts with initials.
  - g. Repeat steps c. to f. for the MA - Business Dashboard.json file

3. Click Import.



4. Open the dashboard and verify the additional visualizations with yours

#### Note

We don't claim that our solutions of these additional visualizations are the only and best way to convey results and reports on business data. Therefore, your work might be different or more expressive. Feel free to share your solution with us.

## *7.4 Create new Visualizations and a Dashboard for the Mortgage Application Solution – Summary*

In this exercise you learnt how to build visualizations for the Business User. Remember to develop widget to enable the Business Owner to make better business decisions, to reduce the risk for bad mortgages, or to improve efficiency.

Follow the method to gather the business requirements for monitoring applications when you design them for customer in different industries.

With that you have successfully finished the implementation of the Exercise 7 of the BAI Lab. Congratulations!

## 8 Exercise: Add Kibana Visualizations to a Task UI

### 8.1 Add Kibana Visualizations to a Task UI – Introduction

In this exercise, you will:

1. Modify the Perform Final Review activity to include Kibana visualizations.
2. Run the modified version of Perform Final Review to view the Kibana visualizations.

Kibana visualizations and dashboards have a share function that allows live embedded iFrames containing the visualization to be placed on any website. We can use this functionality to allow business users to reference insights relevant to the task at hand. This can be done within the task UI so that the users don't have to go to Kibana.

You are now ready to start this exercise.

### 8.2 Add Kibana Visualizations to a Task UI – Step by Step Instructions

1. In Firefox, go to the BAI bookmark folder and click on the Kibana bookmark.
2. If not already logged in, log in with the username admin and password passw0rd.
3. In the sidebar on the left, click on Visualize.
4. In the Search... field, type “Data Table for Decisions” (quotes included).

The screenshot shows the Kibana Visualize interface. On the left, there is a sidebar with icons for Discover, Visualize (which is highlighted with a red border), Dashboard, Timelion, Dev Tools, and Management. The main area is titled 'Visualize' and contains a search bar with the query "Data Table for Decisions" (also highlighted with a red border). Below the search bar, there are two results listed: "Title ↑" and "MA - Data Table for Decisions - v1.0". To the right of these results, there is a column labeled "Type" with "Data Table" next to the second result. At the bottom of the results list, it says "0 items selected".

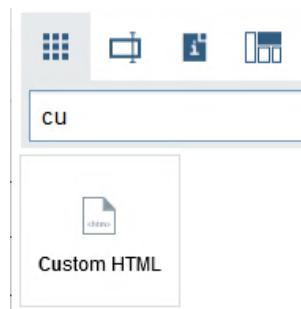
5. Click on the first result MA – Data Table for Decisions – v1.0.
6. In the Visualization, click on the Share button in the upper-right corner.
7. Click on the Embed code option.



8. Click on the Saved object option.
9. Click on the Copy iFrame code button.
10. Finally, paste it into a text editor like Notepad++.

Now, we will use the copied code in the Task UI for the Perform Final Review task.

11. In Firefox, go to the Workflow bookmark folder and click on the IBM Workflow Center bookmark.
12. If not already logged in, log in with the username admin and password passw0rd.
13. In the Workflow Center, click on Case solutions.
14. Hover over the Mortgage Application solution and click on Menu (3 dots) → Open in Process Designer.
15. In the sidebar on the left click on User Interface, then click on Perform Final Review Client-Side Human Service.
16. In the tabs on top, click on the tab Coach.
17. Click on the Add content here button below the Loan to Yearly Income Ratio field.
18. In the dialog popup, enter the filter text Custom HTML.



19. Click on the Custom HTML Coach View.

20. In the bottom of the screen, in the properties pane, click on the HTML tab.

Note: If you don't see the properties pane, click on the Properties icon to open it.



21. In the HTML tab, click on the option Text.

22. Copy the code from the text editor in step 10 into the Text field.

Note: If you look at the end of the embedded code, it also contains the size parameters for the width and the height of the visualization.

```
<iframe src="https://master-0.ocp.example.com:32532/app/kibana#/visualize/edit/<id>?embed=true&_g=()" height="600" width="800"></iframe>
```

23. Optionally, repeat the steps above for a 2<sup>nd</sup> visualization MA – Timelion for trend of Final Decision Deviating from ODM Proposal – v1.0.

Keep the Perform Final Review Client-Side Human Service open as you will require it for the [verification instructions](#).

### *8.3 Add Kibana Visualizations to a Task UI – Verification Instructions*

1. Re-open the Perform Final Review Client-Side Human Service if closed.
2. In the Perform Final Review Client-Side Human Service, click on the Run button in the upper-right corner.



Note: You may get an error about pop-up windows. If you do, allow the pop-up windows and close the window that opens right after.

3. In the window that opens, verify that the visualizations added to the Coach are successfully displayed.

Note: The business data fields in the Task UI have no values because the service was run directly and not through a Case. You can, optionally, run a new instance of the New Mortgage Application Case type to view the visualizations alongside the business data.

Note: Since this is a PoC environment for BAI, there is no SSO setup between the Workflow Server and Elasticsearch/Kibana. Because of this reason, in this lab, you may be asked to sign into Kibana to view the visualizations in the Task UI.

### *8.4 Add Kibana Visualizations to a Task UI – Summary*

In this exercise, you have:

1. Copied the embed code for a visualization from Kibana.
2. Embedded the visualization within a Workflow's Task UI.

With that you have successfully finished the implementation of the BAI sub-scenario. Congratulations!