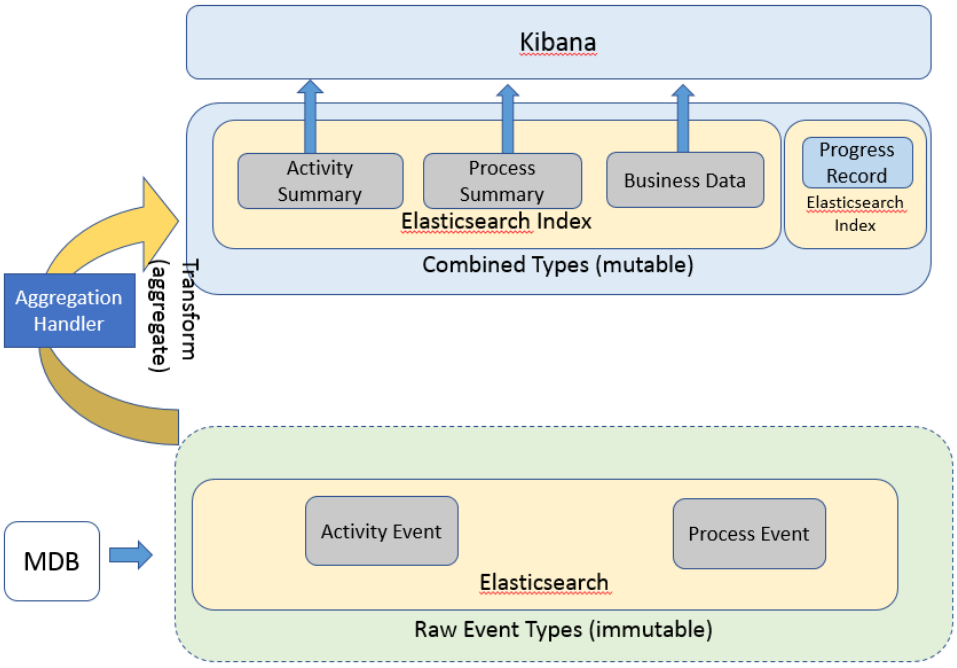
Understanding the data model

The documents stored in Elasticsearch belong to two categories:

1. Raw events type
2. Combined type

The raw events type is created by the BPMEventEmitter. Logically it is equivalent to the Dynamic Event Framework (DEF) event but reformatted to JSON. The raw event includes two types - the process event and the activity event. The process event is triggered by the relevant actions of the BPD process, for example, the process start, suspend, resume or finish. Another event is created by the Activity and Event (the Event starting with upper case letters belong to the concept at the BPMN, including Start Event, Stop Event, Tracking Group Event, Timer Event, etc. which construct the BPMN flow) and Gateway. These are all considered as the 'activity event' for IBM Business Process Manager (BPM) Analytics.



Based on the raw event, the BPMSummaryAgent works as the 'Aggregation Handler' to aggregate the raw events to the combined documents, the combined type includes the activity summary, process summary, and business data. The dashboard at Kibana is created based on the combined documents.

Schema definition of combined types

This section shows the schema design of the combined types (activity summary, process summary, and business data) to help you understand the fields for each type of the document and to help you create your own Kibana dashboard.

The JSON attributes in the following table may not cover all attributes for the document. The other attributes are the UUID of the BPM system, reserved to be used internally.

Process Summary

By default, use **GET monitor/ProcessSummary/_search** to get all process summary documents through the Dev Tools in Kibana.

JSON Attribute Name	Type	Description
jsonEventVersion	keyword	Version information of the document
bpmCellName	Text, with multi-fields: keyword which is the keyword type of the original field	BPM cell name which generates this event, it is configurable at the BPMEventEmitter
processApplicationSnapshotName	Text, with multi-fields: keyword which is the keyword type of the original field	Process application's snapshot name (Optional). Only available when the process is not a tip process
processApplicationName	Text, with multi-fields: keyword which is the keyword type of the original field	Process application name
processName	Text, with multi-fields: keyword which is the keyword type of the original field	BPD name
processInstanceId	long	Process instance ID
processState	Text, with multi-fields: keyword which is the keyword type of the original field	Process state, for example: Active, Suspended
processSnapshotName	Text, with multi-fields: keyword which is the keyword type of the original field	Process snapshot name, if the process belongs to a toolkit, it is different with the processApplicationSnapshotName
startingProcessInstanceFullID	Text, with multi-fields: keyword which is the keyword type of the original field	ID for the starting process instance, the linked and sub process' startingProcessInstanceFullID comes from the main process
processStartTime	Date	Start time of the process
processSuspendedTime	Date	Suspend time of the process (Optional)
processCompletedTime	Date	Complete time of the process (Optional)
processTerminatedTime	Date	Terminate time of the process (Optional)
processResumedTime	Date	Resume time of the process (Optional)
processAtRiskDateAssignedTime	Date	At risk assigned time of the process (Optional)
processFailedTime	Date	Fail time of the process (Optional)

mergedTrackedFields	Dynamic templates	Container of the merged tracked fields (Optional). Only available when enableBusinessDataAggregator is true
trackedFields	Dynamic templates	Container for the unmerged tracked fields
businessDataLatestUpdateTime	Date	Latest update time for the business data (tracked fields) (Optional). Only available when enableBusinessDataAggregator is true
businessDataLatestUpdateBy	Text, with multi-fields: keyword which is the keyword type of the original field	Latest activity to update the business data (tracked fields) (Optional). Only available when enableBusinessDataAggregator is true

The process summary is aggregated by the startingProcessInstanceFullID and the bpmCellName, that means in one BPM cell, the events belong to one starting process instance and will be combined to one process summary document.

This is the Elasticsearch date type definition for the **Text, with multi-fields: keyword which is the keyword type of the original field** (for example, processApplicationSnapshotName)**:**

```
"processApplicationSnapshotName": {
            "type": "text",
            "fields": {
              "keyword": {
                "type": "keyword"
              }
            }
          }
```

Activity Summary

By default, use **GET monitor/ActivitySummary/_search** to get all activity summary documents through the Dev Tools in Kibana.

JSON Attribute Name	Type	Description
jsonEventVersion	keyword	Version information of the document
bpmCellName	Text, with multi-fields: keyword which is the keyword type of the original field	BPM cell name which generates this event, it is configurable at the BPMEventEmitter
activityType	Text, with multi-fields: keyword which is the keyword type of the original field	Activity type
activityName	Text, with multi-fields: keyword which is the keyword type of the original field	Activity name
processApplicationName	Text, with multi-fields: keyword which is the	Process application name

	keyword type of the original field	
activityFullId	Text, with multi-fields: keyword which is the keyword type of the original field	Activity ID
startingProcessInstanceFullId	Text, with multi-fields: keyword which is the keyword type of the original field	ID for the starting process instance, the linked and sub process' startingProcessInstanceFullID comes from the main process
wleName	Text, with multi-fields: keyword which is the keyword type of the original field	Auto tracking event name
wleGroupName	Text, with multi-fields: keyword which is the keyword type of the original field	Tracking group name
wleTime	date	Auto tracking event occurrence time
taskState	Text, with multi-fields: keyword which is the keyword type of the original field	Task state
trackedFields	Dynamic templates	Container for the tracked fields
kpiData	Dynamic templates	Container for the KPI data
performerId	Text, with multi-fields: keyword which is the keyword type of the original field	User ID performing the task
performerName	Text, with multi-fields: keyword which is the keyword type of the original field	User name performing the task
taskInstanceId	long	Task instance ID
potentialPerformerId	Text, with multi-fields: keyword which is the keyword type of the original field	Group ID which is the potential performer for this task
potentialPerformerName	Text, with multi-fields: keyword which is the keyword type of the original field	Group name which is the potential performer for this task
potentialPerformerDocumentation	Text, with multi-fields: keyword which is the keyword type of the original field	
taskStartTime	date	Task start time
taskClaimedTime	date	Task claimed time
taskCompletedTime	date	Task completed time

taskTerminatedTime	date	Task terminated time
activityTotalDuration	long	Task execution duration, in milliseconds
processInstanceId	long	Process instance ID for this task
processName	Text, with multi-fields: keyword which is the keyword type of the original field	Process name for this task

The activity summary is aggregated by the activityFullId and bpmCellName, that means in one BPM cell, one activity maps to one activity summary.

Business Data

By default, use **GET monitor/BusinessData/_search** to get all business data documents through the Dev Tools in Kibana.

JSON Attribute Name	Type	Description
jsonEventVersion	keyword	Version information of the document
bpmCellName	Text, with multi-fields: keyword which is the keyword type of the original field	BPM cell name which generates this event, it is configurable at the BPMEventEmitter
processApplicationName	Text, with multi-fields: keyword which is the keyword type of the original field	Process application name
processApplicationSnapshotName	Text, with multi-fields: keyword which is the keyword type of the original field	Process application's snapshot name (Optional). Only available when the process is not a tip process
startingProcessInstanceFullId	Text, with multi-fields: keyword which is the keyword type of the original field	ID for the starting process instance, the linked and sub process' startingProcessInstanceFullID comes from the main process
processInstanceId	long	Process instance ID
processSnapshotName	Text, with multi-fields: keyword which is the keyword type of the original field	Process snapshot name, if the process belongs to a toolkit, it is different with the processApplicationSnapshotName
processName	Text, with multi-fields: keyword which is the keyword type of the original field	Process name
mergedTrackedFields	Dynamic templates	Container of the merged tracked fields (Optional). Only available when enableBusinessDataAggregator is true
trackedFields	Dynamic templates	Container for the un-merged tracked fields
businessDataLatestUpdateTime	date	Latest update time for the business data (tracked fields) (Optional). Only available when enableBusinessDataAggregator is true

businessDataLatestUpdateBy	Text, with multi-fields: keyword which is the keyword type of the original field	Latest activity to update the business data (tracked fields) (Optional). Only available when enableBusinessDataAggregator is true

Dynamic templates

Elasticsearch dynamic templates allow you to define custom mappings that can be applied to dynamically added fields based on the match condition. IBM BPM analytics uses the *path_match* to define the tracked fields and KPI field types dynamically, according to the name of the field.

```
"dynamic_templates": [
          {
            "data_key": {
              "mapping": {
                "type": "keyword",
                "index_options": "docs"
              },
              "path_match": "*.key"
            }
          },
          {
            "data_string": {
              "mapping": {
                "omit_norms": true,
                "type": "text",
                "fields": {
                  "keyword": {
                    "type": "keyword",
                    "index_options": "docs"
                  }
                },
                "index_options": "positions"
              },
              "path_match": "*.string"
            }
          },
          {
            "data_date": {
              "mapping": {
                "format": "dateOptionalTime",
                "type": "date",
                "index_options": "docs"
              },
              "path_match": "*.date"
            }
          },
          {
            "data_long": {
              "mapping": {
```

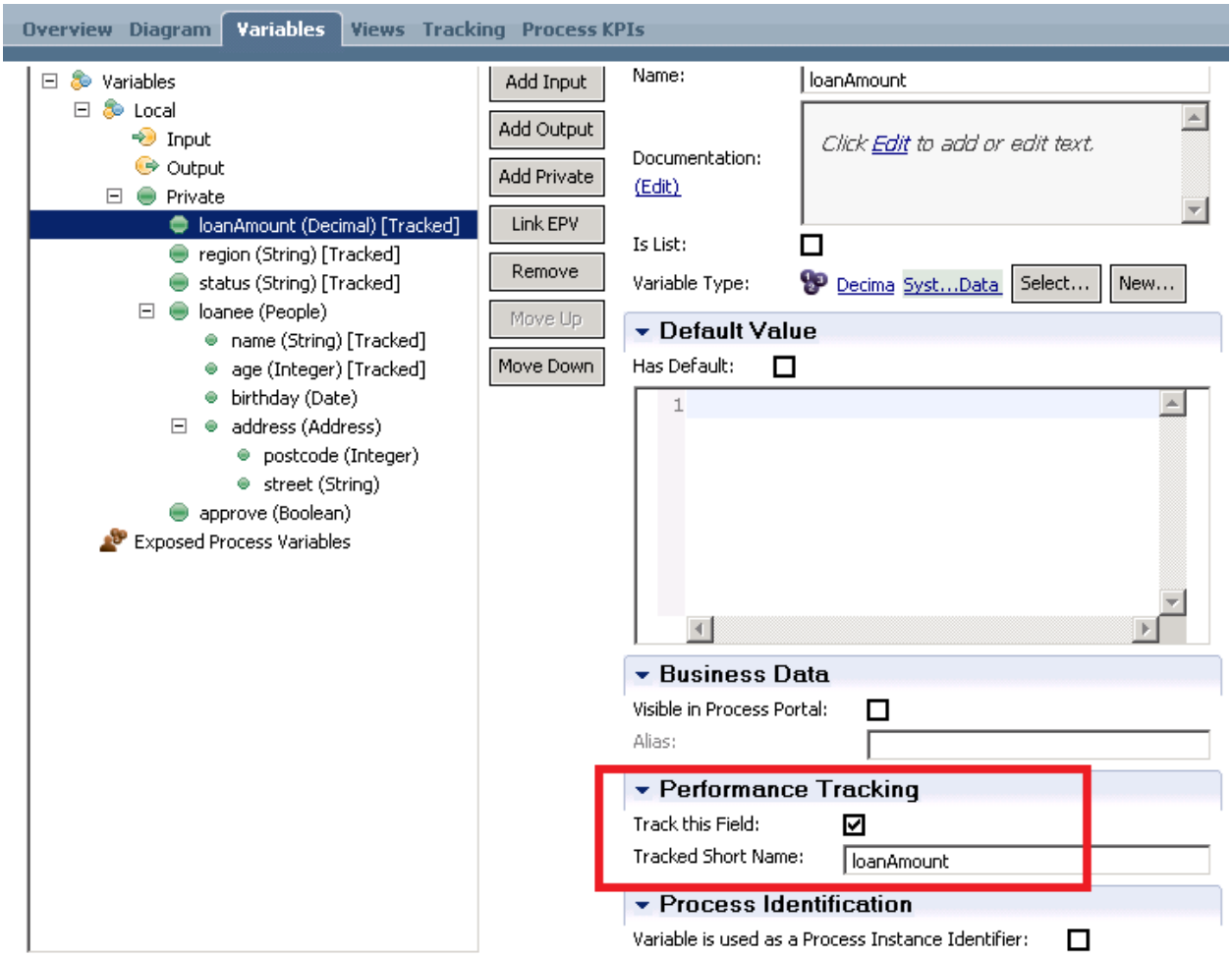
```
                "type": "long",
                "index_options": "docs"
              },
              "path_match": "*.long"
            }
          },
          {
            "data_double": {
              "mapping": {
                "type": "double",
                "index_options": "docs"
              },
              "path_match": "*.double"
            }
          },
          {
            "data_boolean": {
              "mapping": {
                "type": "boolean",
                "index_options": "docs"
              },
              "path_match": "*.boolean"
            }
          }
        ]
```

Create your first dashboard

By default, BPM analytics provides the 'Process Performance', 'Task', and 'Team Performance' dashboards. If you have KPI or business data that you want tracked at the dashboard, you must define your own dashboard in Kibana.

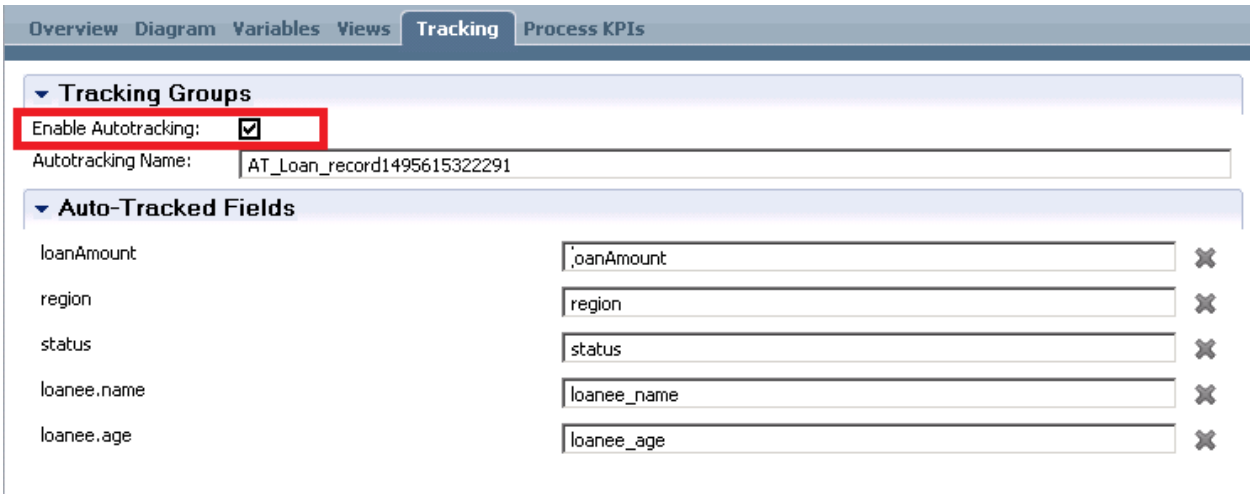
Enable tracked fields

In the Process Designer, when defining the process variables, you can enable **Track this Field**. This means that the field will be recorded as the auto tracking.



In this example, there is a loan process. The auto tracked fields include: loanAmount, region, status, loanee.name, and loanee.age. The auto tracking group name is AT_Loan_record1495615322291.

Note: the **Enable Autotracking** must be selected to ensure that the tracked field and its value will be attached at the DEF event:



Enable business data aggregation

After enabling tracked fields, the value can be found in the raw activity event. In most cases, it is more convenient to use the combined event type, either the BusinessData or ProcessSummary. To enable the business data aggregation, the following configuration property must be set to **true** in the EventSummaryAgent configuration file:

```
# Whether enable the business data aggregator
enableBusinessDataAggregator: true
```

Check the combined event

By using the BusinessData type, you can find the mergedTrackedFields from the JSON document, it contains the business data you tracked.

If you query the ProcessSummary type, the returned tracked fields are the same. To create the mergedTrackedFields or trackedFields, see the usage guide.


```
"_source": {
  "jsonEventVersion": "0.1.0",
  "startingProcessInstanceUUID": "bpmCell01-a88f01e3-5e4a-4408-95bf-2158758f5721.2064.090986
  "bpmCellName": "bpmCell01",
  "processApplicationName": "Test Emit Monitor Event",
  "startingProcessInstanceFullId": "a88f01e3-5e4a-4408-95bf-2158758f5721.2064.090986ff-b994-
  "processFullId": "a88f01e3-5e4a-4408-95bf-2158758f5721.2064.090986ff-b994-424b-9cff-52e8c8
  "processVersion": "2064.090986ff-b994-424b-9cff-52e8c894efcd",
  "processInstanceId": 44000005708,
  "processName": "Julybank BB Loan",
  "processPOId": "a88f01e3-5e4a-4408-95bf-2158758f5721",
  "mergedTrackedFields": {
    "loanAmount.integer": 6800,
    "status.string": "Origination",
    "loanee_name.string": "David",
    "loan_age.integer": 36,
    "loanee_age.integer": 36,
    "region.string": "UK"
  },
  "trackedFields": {},
  "businessDataLatestUpdateTime": "2017-06-08T16:10:00.565+08:00",
  "businessDataLatestUpdateBy": "approval by 1st line:ACTIVITY_RESOURCE_ASSIGNED"
},
```


Creating the dashboard in Kibana

Based on the business data from the previous section, we can create a Pie chart. The dimension is the region, the matrix is the sum of the loan amount, and the result is for this month.

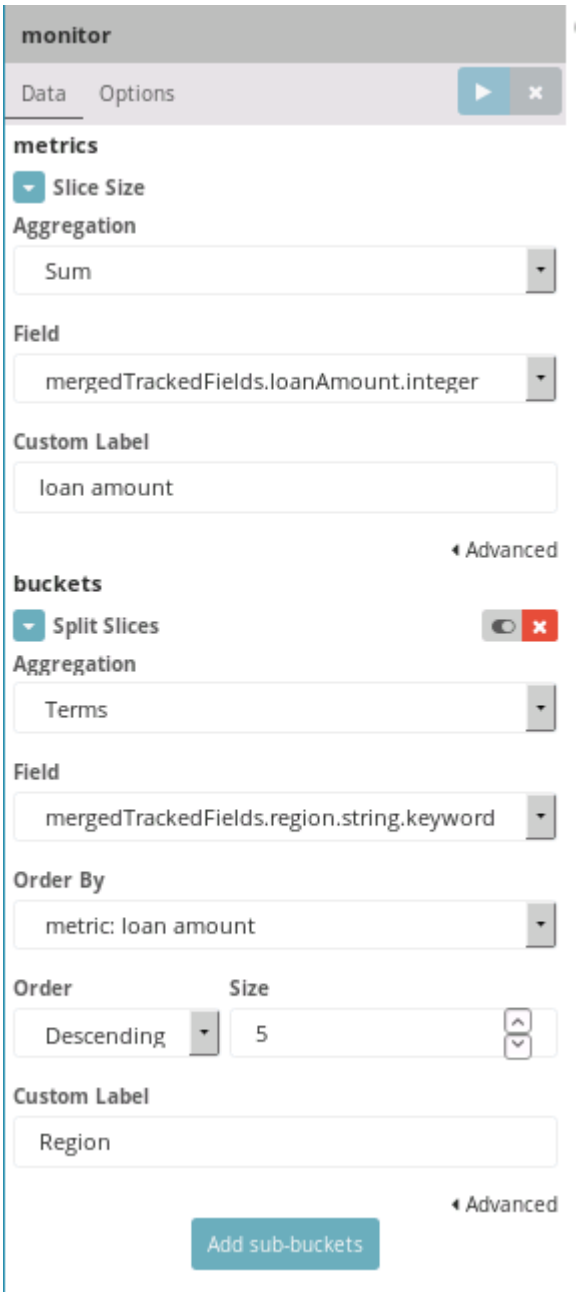
Refresh the index field list

To refresh the index field list in Kibana, select **Management->Index Patterns->monitor->**  **(Refresh field list)**

Create a visualization

From the Visualize panel, select **Pie chart**. If you do not have the pre-defined saved search, select the monitor index at **From a New Search, Select Index** section.

From the metrics section, for the aggregation logic, select **Sum** and the Field is 'mergedTrackedFields.loanAmount.integer'. In **buckets**, select the aggregation by **Terms** and Fields is 'mergedTrackedFields.region.string.keyword'. For the other fields, you can use the default values. After clicking  (run), you can review the chart on the right side.



Select the time range

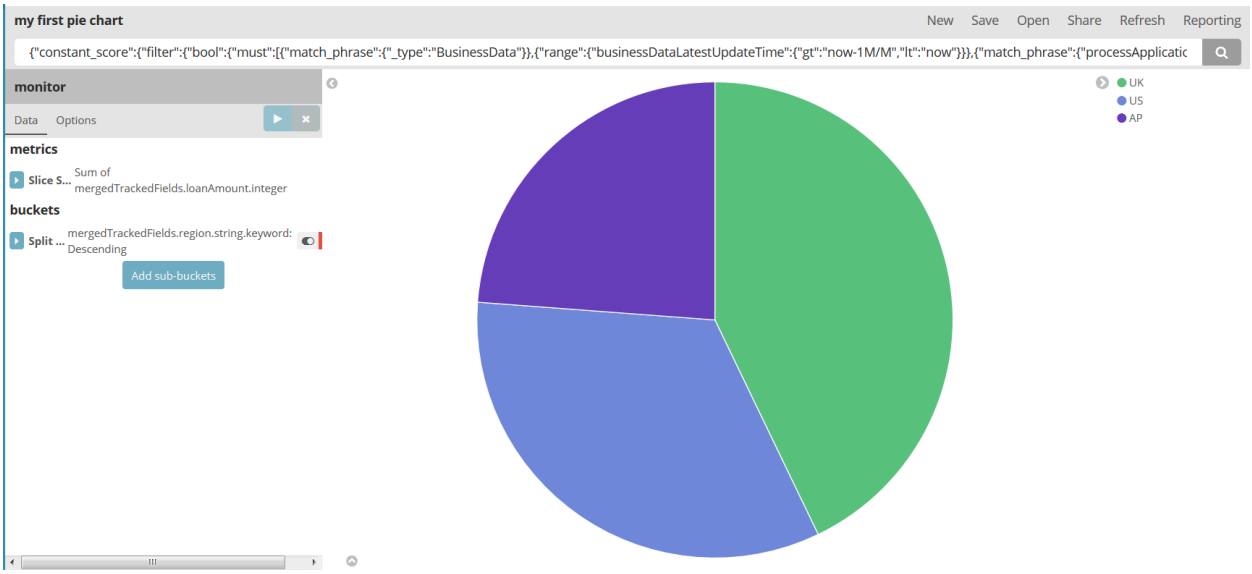
The use case for this example is meant to show the sum loan amount for this month. To do that, a search filter must be applied to the visualization.

Note that the total load amount is double that of the real value. This is because when the sum is calculated, it includes loadAmount from the BusinessData and the ProcessSummary documents. This can be solved by applying a search filter to the visualization.

This is the search filter definition, for the detailed syntax, see www.elastic.co for more information:

```
{
   "constant_score": {
    "filter": {
     "bool": {
      "must": [
       {
        "match_phrase": {
         "_type": "BusinessData"
        }
       },
       {
        "range": {
         "businessDataLatestUpdateTime": {
          "gt": "now-1M/M",
          "lt": "now"
         }
        }
       },
       {
        "match_phrase": {
         "processApplicationName": "Test Emit Monitor Event"
        }
       },
       {
        "match_phrase": {
         "processName": "Julybank BB Loan"
        }
       }
      ]
     }
    }
   }
  }
```

Paste the search filter in the search field of the visualization and click  , the pie chart will be refreshed according to the filter.



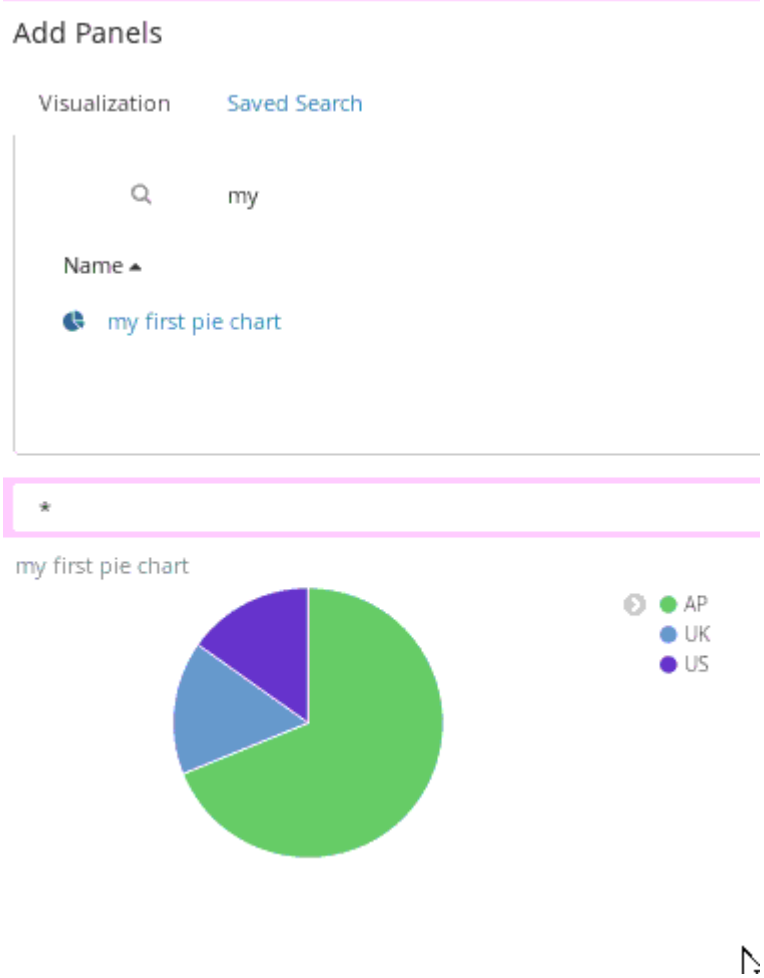
Save the visualization

You can save the visualization once you think it is complete. For example purposes, we have saved it as 'my first pie chart'.

Add the visualization to the dashboard

Select **Dashboard->new->add** to create a new dashboard. The wizard will guide you to select the existing visualization, and to find our example we created, we entered 'my' in the Search field. Kibana then provides

the available options, and we selected ‘my first pie chart’ to add the visualization to the dashboard.



Save the dashboard

You can save the dashboard once you think it is complete. For example purposes, we have saved it as ‘my first dashboard.

Summary

This document provides the basic steps to create a Kibana dashboard, for more information, see www.elastic.co