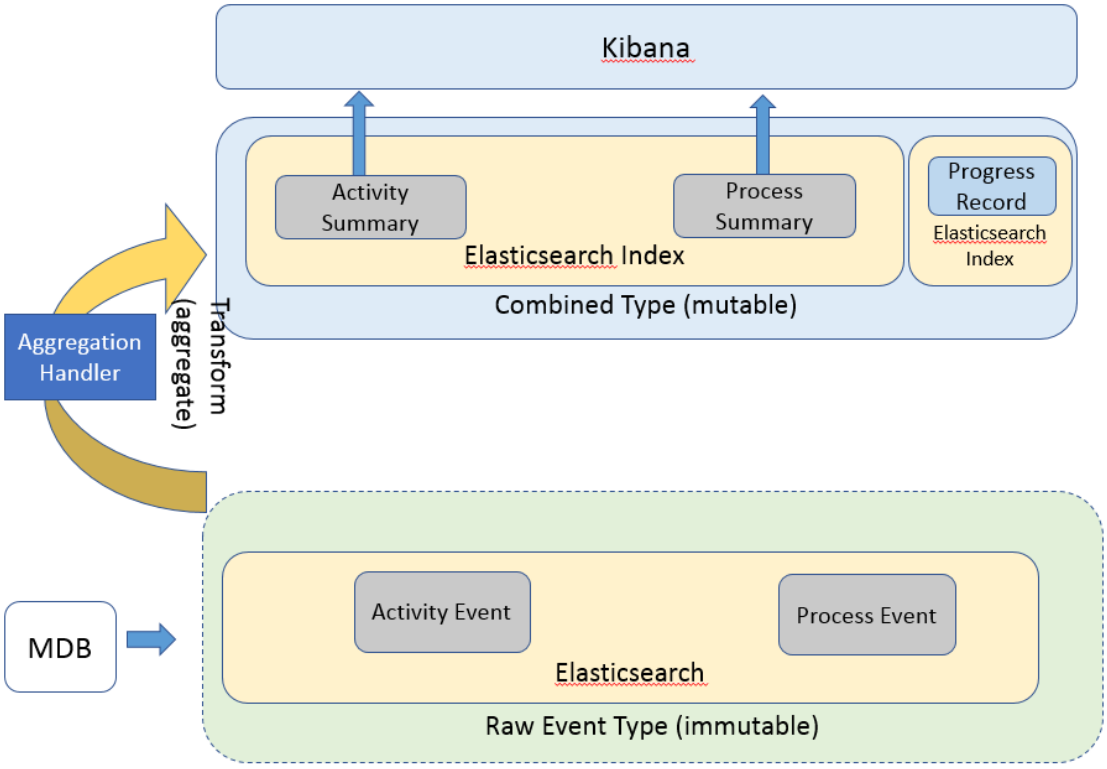
Understanding the data model

Two categories of documents are stored to an Elasticsearch index:

1. The raw events type
2. The combined type

The raw events type is created by the BPMEventEmitter application. Logically, it is equivalent to the Dynamic Event Framework (DEF) event but reformatted to JSON. A raw event includes two types of events: a *process event* and an *activity event*. The process event is triggered by the relevant actions of the business process definition (BPD: the process starts, suspends, resumes, or finishes. Another event is created by the Activity Event and the Gateway. Events starting with an uppercase letter, such as Start Event, Stop Event, Tracking Group Event, Timer Event, and so on, refer to the BPMN model. These events construct the BPMN flow. These Events are all considered as the *activity event* for IBM Business Process Manager Analytics.



Based on the raw event, the EventSummaryAgent application works as the *aggregation handler* to aggregate raw events to combined documents. The combined type includes the *activity summary*, *process* summary, and business data. The Kibana dashboard is created from the combined documents.

Schema definition of combined types

The following description of the schema design of combined types (activity summary, process summary, and business data) helps you understand the fields for each type of the document and create your own Kibana dashboard.

The JSON attributes in the following table do not cover all attributes for the document: the UUID of the IBM BPM system, reserved for internal use.

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	The name of the IBM BPM cell that generates this event. You can edit that name in the BPMEventEmitter application.
processApplicationSnapshotName	Text, with multi-fields: keyword, which is the keyword type of the original field	The snapshot name of the process application (optional). Available only when the process is not a tip process.
processApplicationName	Text, with multi-fields: keyword, which is the keyword type of the original field	The name of the process application
processName	Text, with multi-fields: keyword, which is the keyword type of the original field	The name of the business process definition
processInstanceId	long	The identifier of the process instance
processState	Text, with multi-fields: keyword, which is the keyword type of the original field	The current status of the process. For example: Active, Suspended
processSnapshotName	Text, with multi-fields: keyword, which is the keyword type of the original field	The name of the process snapshot. If the process belongs to a toolkit, that name is different from the name of the process application snapshot
startingProcessInstanceFullID	Text, with multi-fields: keyword, which is the keyword type of the original field	The identifier of the starting process instance. For linked processes and subprocesses, this identifier comes from the main process.
processStartTime	Date	The time at which the process starts
processSuspendedTime	Date	The time at which the process is suspended (optional)

processCompletedTime	Date	The time at which the process completes (optional)
processTerminatedTime	Date	The time at which the process terminates (optional)
processResumedTime	Date	Resume time of the process (Optional)
processAtRiskDateAssignedTime	Date	The time at which the process is considered at risk (optional)
processFailedTime	Date	Fail time of the process (Optional)
mergedTrackedFields	Dynamic templates	The container for merged tracked fields (optional). This field is available only when the enableBusinessDataAggregator property is set to true.
trackedFields	Dynamic templates	The container for unmerged tracked fields
businessDataLatestUpdateTime	Date	The latest time at which the business data was updated in tracked fields (optional). This field is available only when the enableBusinessDataAggregator property is set to true.
bpmSystemId	Keyword	ID for the IBM BPM deployment environment.
lastBusinessDataUpdateActivity	Text	The latest activity that updates the business data in tracked fields (optional). This field is available only when the enableBusinessDataAggregator property is set to true.
lastBusinessDataUpdatePerformer	Text	The latest task assignee to update the business data for tracked fields (optional). This field is available only when the enableBusinessDataAggregator property is set to true.
lastBusinessDataUpdateEvent	Text	The latest event that was updated in the business data for tracked fields (optional). This field is available only when the enableBusinessDataAggregator property is set to true.

The process summary is aggregated by the startingProcessInstanceFullID and the bpmSystemId values. Aggregation means that in a one BPM deployment environment, the events belong to one starting process instance and will be combined to one process summary document.

This code sample is the Elasticsearch data type definition for the above data type: **Text with multiple fields: a keyword of the same keyword type as 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	The name of the BPM cell name that generates this event. You can edit the name in the BPMEventEmitter application.
activityType	Text, with multi-fields: keyword, which is the keyword type of the original field	The type of activity
activityName	Text, with multi-fields: keyword, which is the keyword type of the original field	The name of the activity
processApplicationName	Text, with multi-fields: keyword, which is the keyword type of the original field	The name of the process application
activityFullId	Keyword	The identifier of the activity
startingProcessInstanceFullId	Keyword	The identifier of the starting process instance. The identifiers of the linked processes and subprocesses come from the main process.
trackingPointName	Text, with multi-fields: keyword, which is the keyword type of the original field	The name of the autotracking event
trackingGroupName	Text, with multi-fields: keyword, which is the keyword type of the original field	The of the tracking group
trackingPointOccurrenceTime	date	The time at which the autotracking event occurred
taskState	Text, with multi-fields: keyword, which is the keyword type of the original field	The state of the task
trackedFields	Dynamic templates	Container for the tracked fields
kpiData	Dynamic templates	Container for the KPI data
performerId	Keyword	The identifier of the user who performs the task

performerName	Text, with multi-fields: keyword, which is the keyword type of the original field	The name of the user who performs the task
taskInstanceId	long	The identifier of the task instance
potentialPerformerId	Keyword	The identifier of the group that is the potential performer of 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	A description of the potential task assignee.
taskStartTime	date	The time at which the task starts
taskClaimedTime	date	The time at which the task is claimed
taskCompletedTime	date	The time at which the task is completed
taskTerminatedTime	date	The time at which the task is terminated
activityTotalDuration	long	How long the execution of the task took, in milliseconds
processInstanceId	long	The identifier of the process instance for this task
processName	Text, with multi-fields: keyword, which is the keyword type of the original field	The name of the process for this task
bpmSystemId	Keyword	The identifier of the IBM BPM deployment environment.

The activity summary is aggregated by the activityFullId and bpmSystemId values. Aggregation means that in one IBM BPM deployment environment, one activity maps to one activity summary.

Dynamic templates

Elasticsearch dynamic templates allow you to define custom mappings which 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"
```

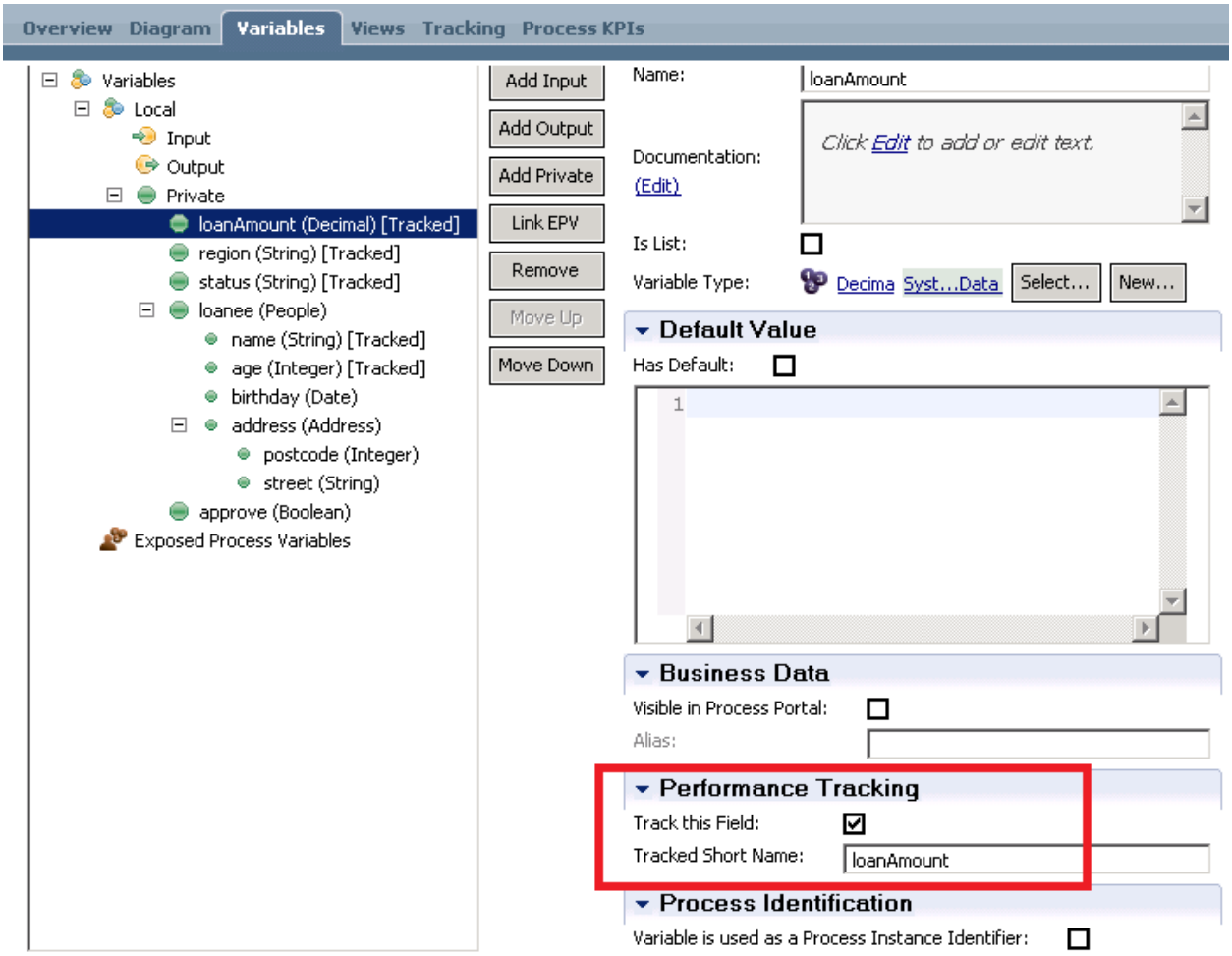
```
            }
        }
    ]
```

Creating your first dashboard

By default, IBM BPM Analytics provides the Process Performance, Task, and Team Performance dashboards. If you have KPI or business data that you want to be tracked in a dashboard, you must define your own dashboard in Kibana.

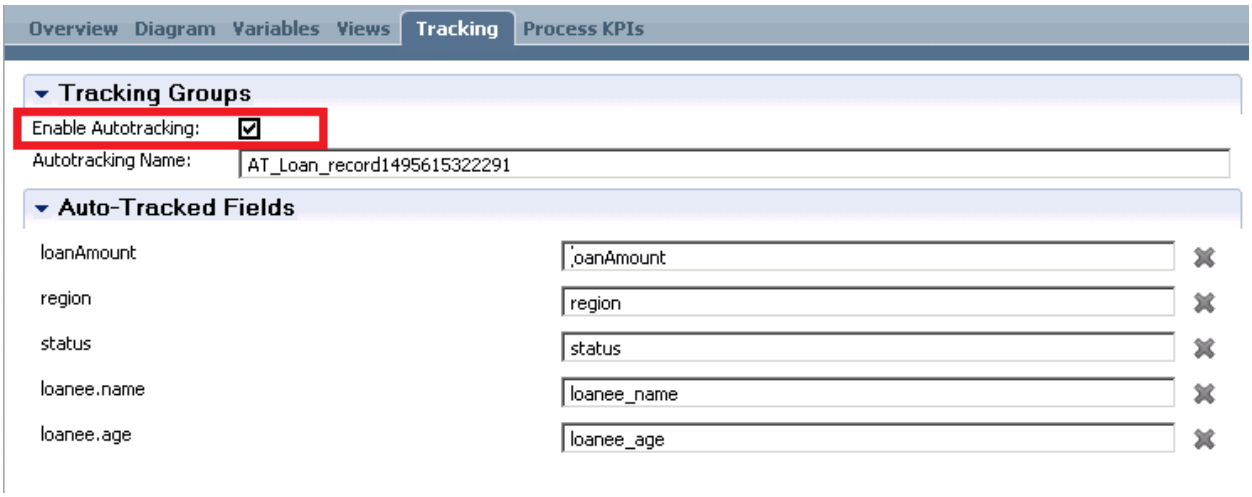
Enabling tracked fields

When you define process variables in Process Designer, you can enable the **Track this Field** option. If you select this option, the field is recorded as autotracking.



In this example of a loan process, the autotracked fields include: loanAmount, region, status, loanee.name, and loanee.age. The autotracking group name is AT_Loan_record1495615322291.

Note: For the tracked field and its value to be attached to the DEF event, the **Enable Autotracking** option must be selected in the Tracking Groups panel.



Enabling business data aggregation

After fields are enabled for tracking, their values can be found in raw activity events. In most cases, it is more convenient to use the combined event type, either Activity Summary or Process Summary. To enable business data aggregation, set the following configuration property to **true** in the EventSummaryAgent configuration file:

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

Checkingthe combined event

Before checking the combined event, make sure that at least one process instance completed and that the EventSummaryAgent application is started. Otherwise, the expected combined documents might not be generated.

By using the ProcessSummary type, you can find the mergedTrackedFields setting from the JSON document. This document contains the business data you tracked.

For more information about the mergedTrackedFields and trackedFields attributes, see the “Handling tracked business data” topic in the IBM BPM knowledge center.

```
"_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 step, you 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.

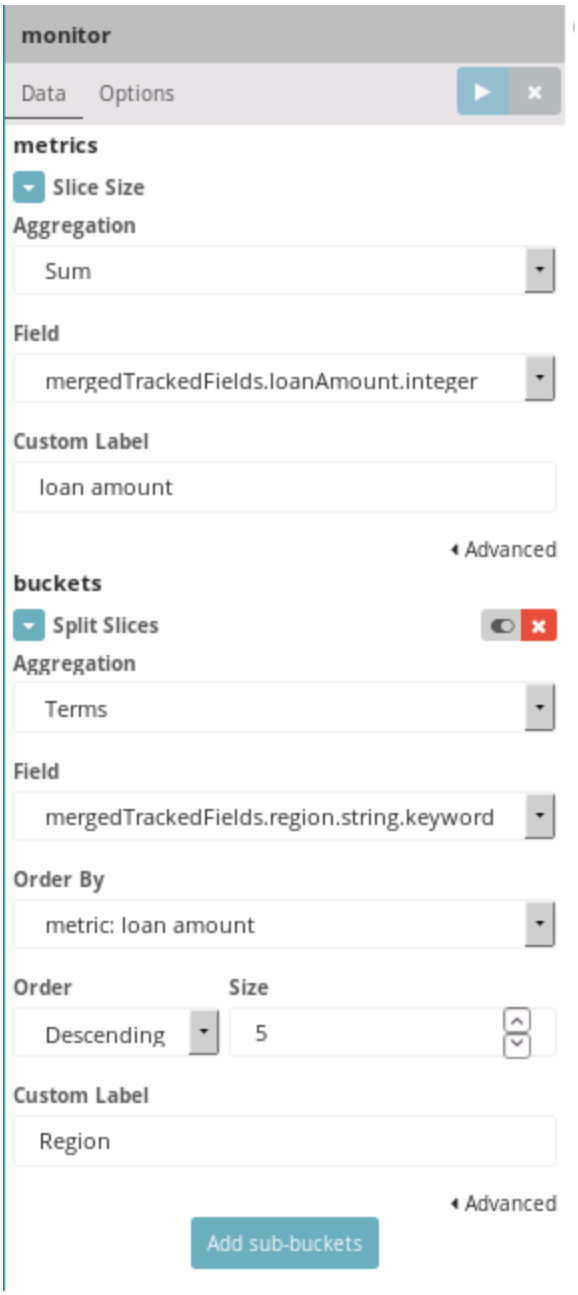
Refreshing the index field list

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

Creating a visualization

From the Visualize panel, select **Pie chart**. If you do not have a predefined 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 you click  (Run), you can review the chart on the right side.



Selecting the time range

The use case for this example shows the sum of loan amounts for this month. To do that, a search filter must be applied to the visualization.

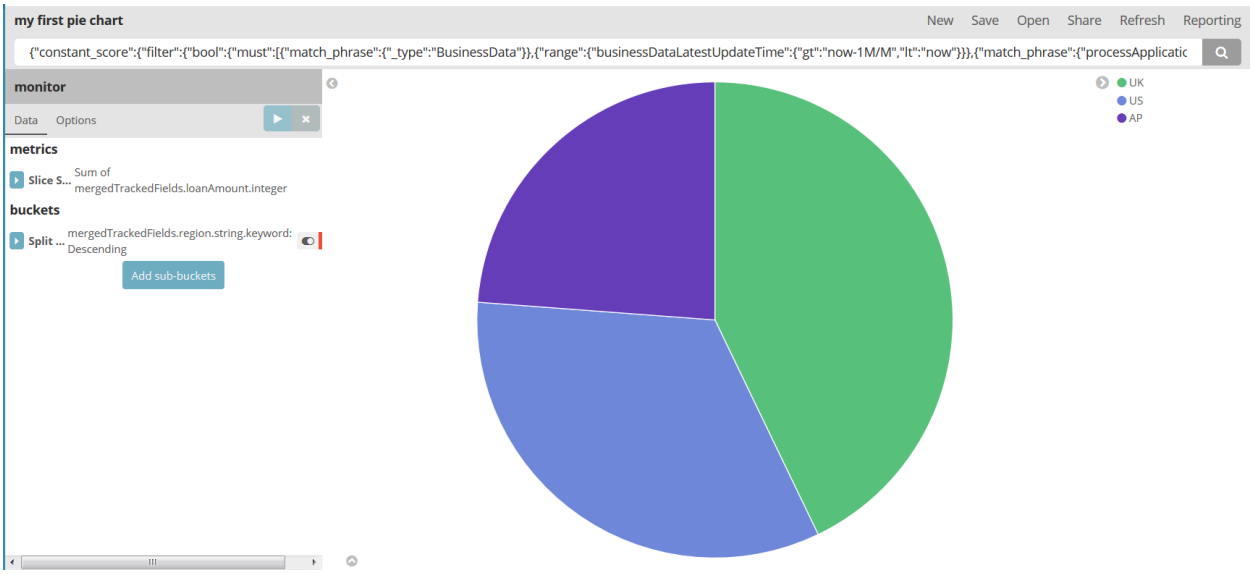
Note that the total loan amount is double that of the real value. This is because when the sum is calculated, it includes the loanAmount value from the business data (which is not exposed for direct use, but so far only designed for internal purpose) and the ProcessSummary documents. To avoid this issue, apply a search filter to the visualization.

Here is the search filter definition. For the detailed syntax, see the www.elastic.co web site.

```
{
```

```
  "constant_score": {
   "filter": {
    "bool": {
     "must": [
      {
       "match_phrase": {
        "_type": " ProcessSummary "
       }
      },
      {
       "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 panel and click  . The pie chart is refreshed according to the filter.

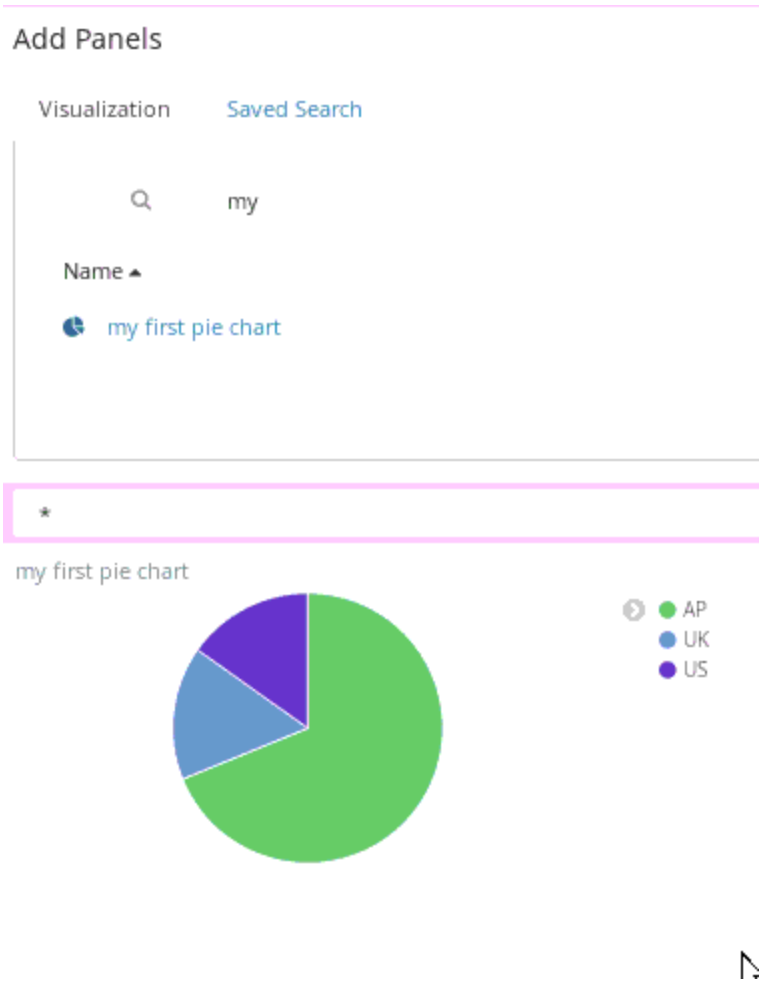


Saving the visualization

After you are finished defining the visualization, you can save it. In this example, it is saved as `my first pie chart`.

Adding the visualization to the dashboard

Select **Dashboard->new->add** to create a new dashboard. The wizard guides you to select the existing visualization. To find the example, enter `my` in the Search field. When Kibana provides the available options, select `my first pie chart` to add the visualization to the dashboard.



Saving the dashboard

When you are finished, you can save the dashboard. In this example, it is saved as `my first dashboard`.

Summary

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