

IBM Cloud Pak for Automation: BAI – Business Automation Insights

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IBM



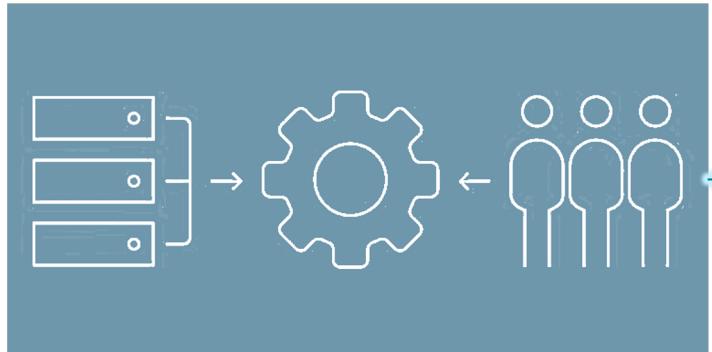
Agenda

- Overview
- Install and Configure
- What's in the Box?
- Dashboards
- Event Processing, Elastic Search and HDFS
- Kibana
- Cross DBA Event Correlation

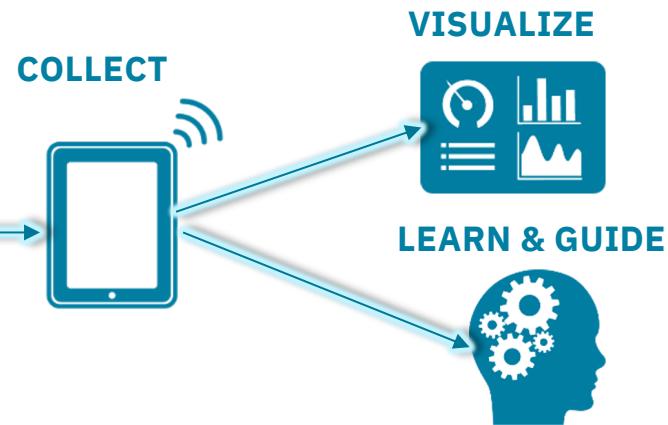


IBM Business Automation Insights

IBM DBA Automation Solutions



IBM Business Automation Insights



Business Automation Insights is a Digital Business Automation platform-level capability

Collects automation planform data

Provides 360° view of their operations to business owners

Feeds a data lake to enable infusing artificial intelligence to automated solutions



What is IBM Business Automation Insights?



COLLECT

Scalable cloud capability to capture end to end business data from DBA platform components to operational data store and long-term store (data lake)

For use to gain operational insights and machine learning opportunities



VISUALIZE

Provides real-time operational visibility to Business Managers via pre-defined or user configured dashboards.

Gain visibility and deep understanding of business operations running on the automation platform



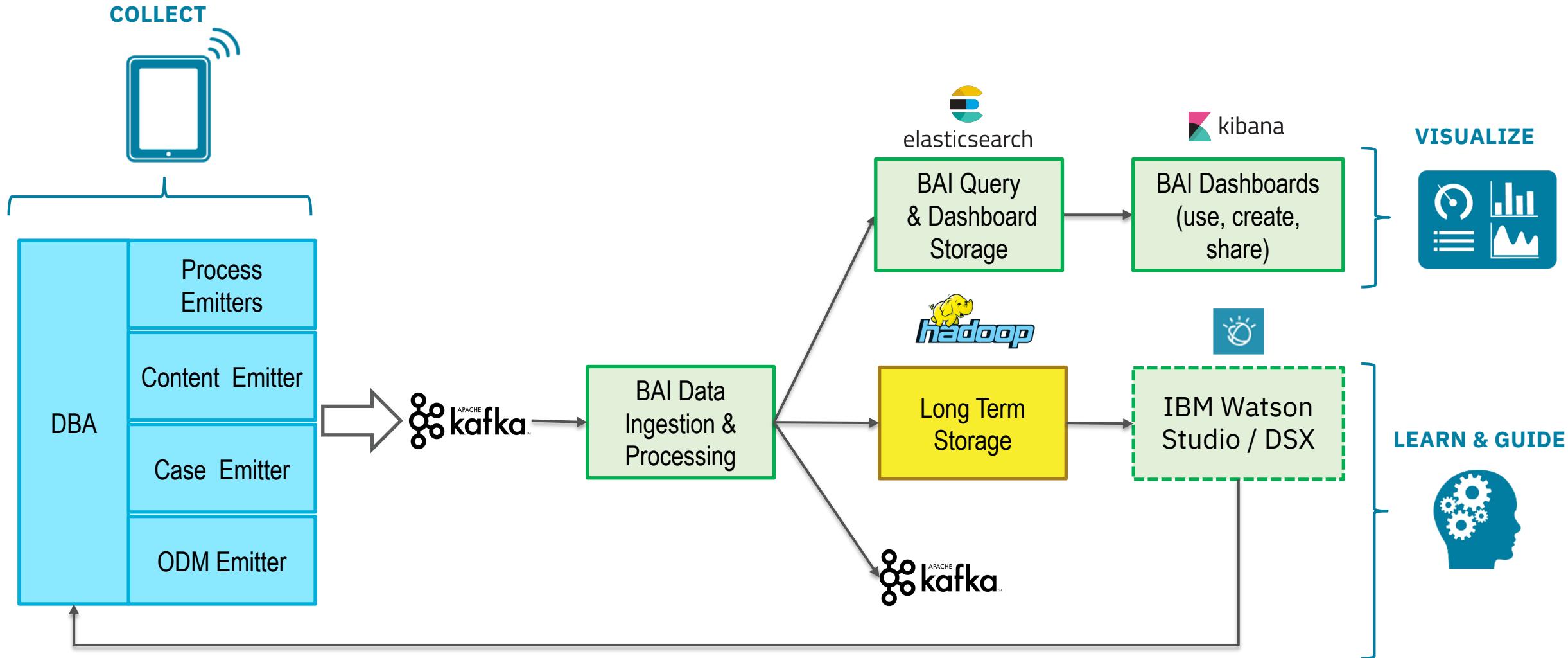
LEARN & GUIDE

Correlate and measure the data based on collected business and operational metrics.

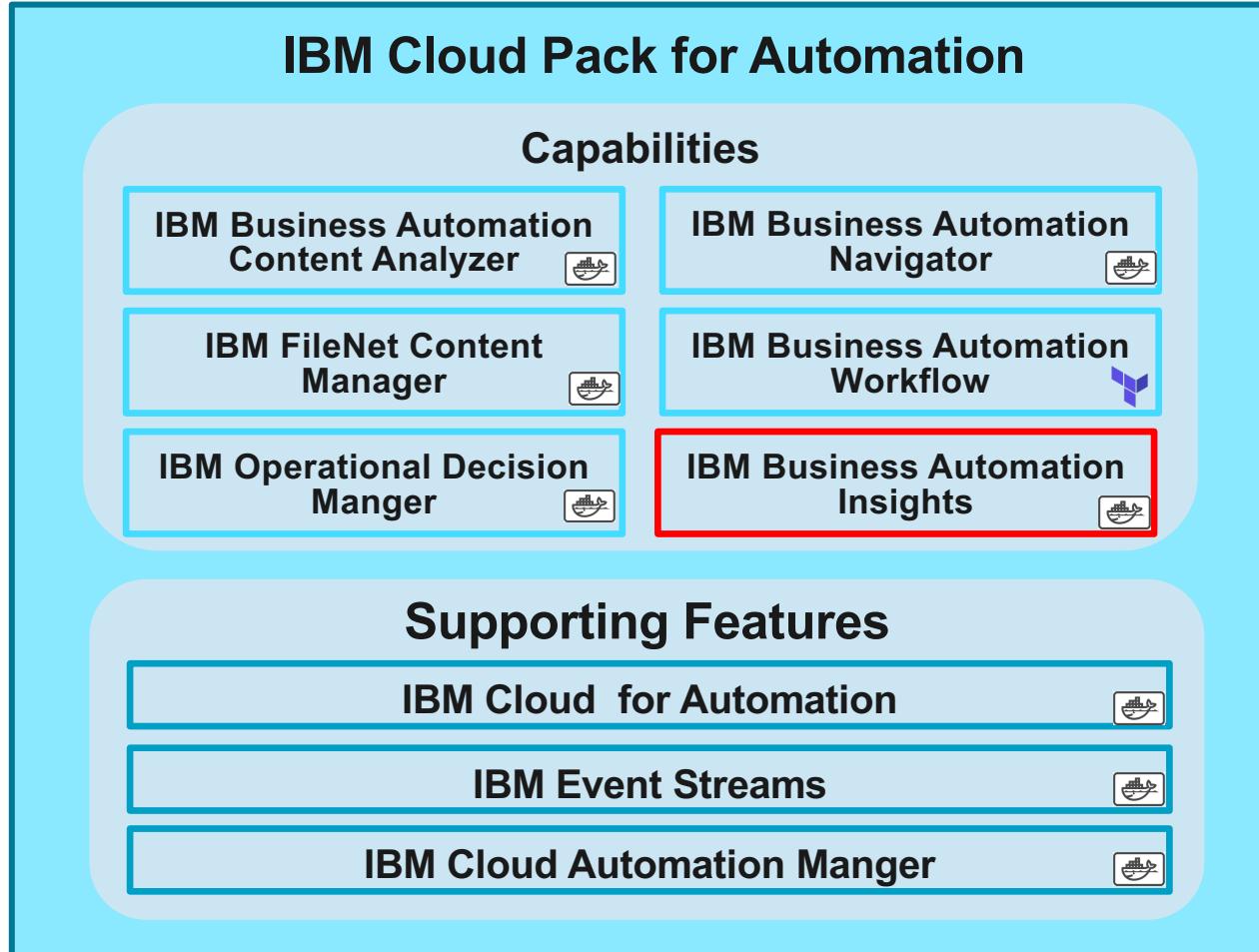
Apply MLs to the operational data lake to make recommendations to business managers and knowledge workers



Business Automation Insights Architecture



IBM Cloud Pak for Automation



- DBA Capabilities
 - Licensed software
 - Docker containers
 - Terraform based VMs (BAW)
- Supporting Features
 - Free when used with DBA
 - IBM Event streams when used with BAI
 - IBM Cloud Automation Manager
 - IBM Cloud for Automation (formerly BACC)
- Deployment
 - **Red Hat OpenShift certified**



BAI – Business Automation Insights

Install and Configure



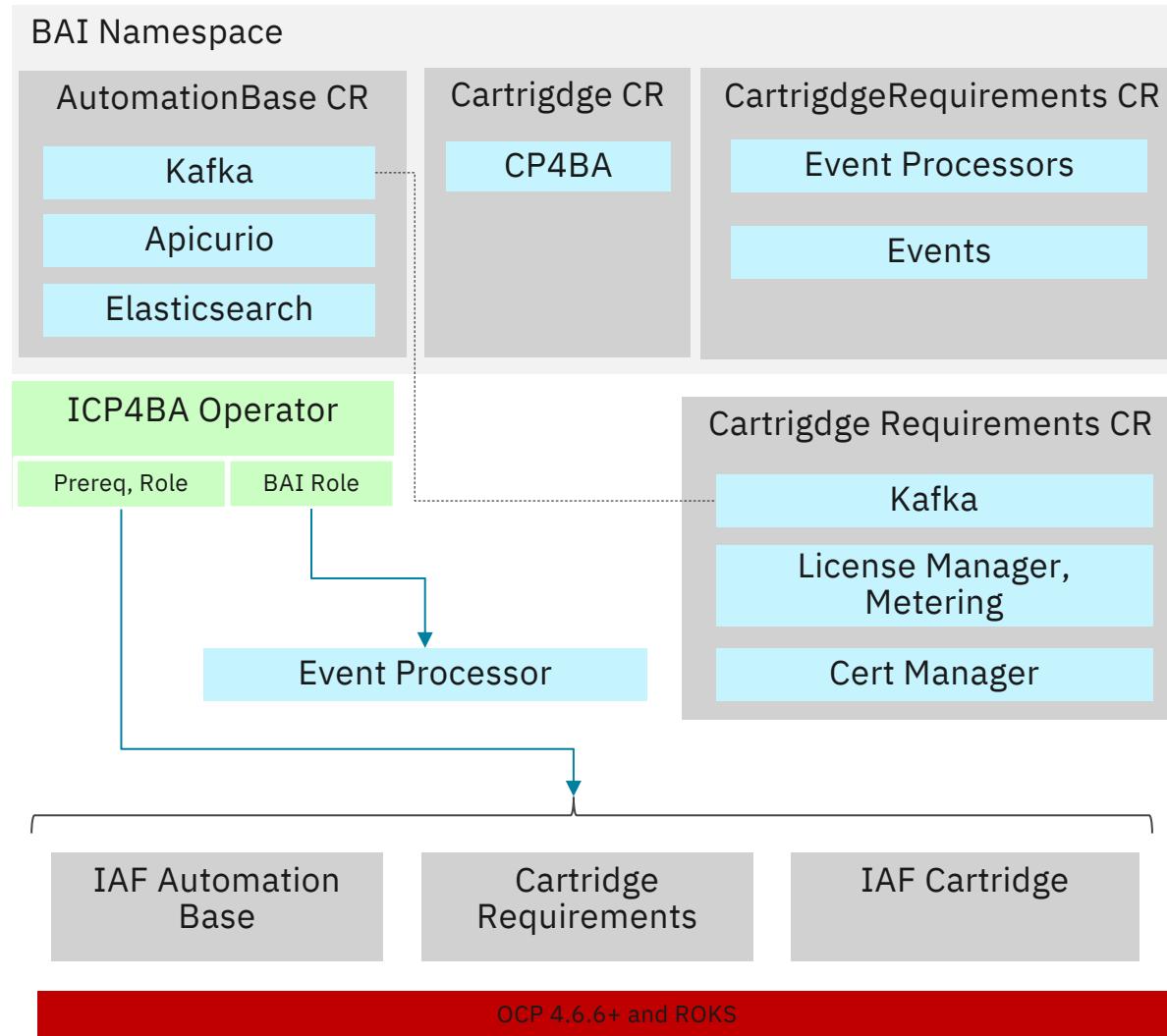
Operator Based BAI Installation with IAF

Name ↑	Managed Namespaces	Status	Provided APIs
 IBM Automation Foundation Core 0.0.1 provided by IBM	NS bai-iaf	 Succeeded Up to date	Automation UIConfig Cartridge
 IBM Automation Foundation 0.0.1 provided by IBM	NS bai-iaf	 Succeeded Up to date	AutomationBase CartridgeRequirement
 IBM Cloud Platform Common Services 3.7.0 provided by IBM	NS bai-iaf	 Succeeded Up to date	Common Service

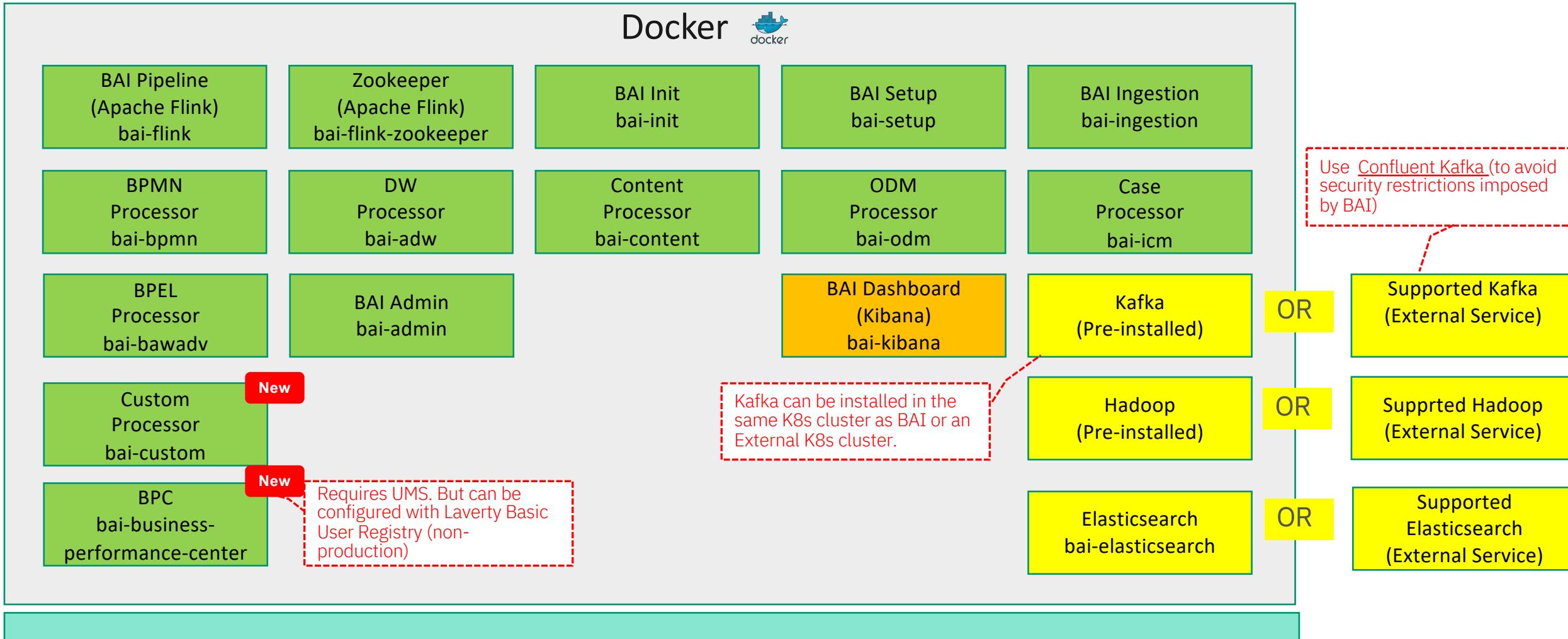
- IBM Automation Foundation (IAF) provides four operators
 - Automation Base (Kafka & ZooKeeper, Apicuiro, Elasticsearch)
 - Cartridge
 - Cartridge Requirements
 - Event Processor (manages a Flink Cluster sub-operator)
- The following BAI in v21.0.1 or higher serval components are now supplied IAF (no longer by BAI)
 - Kafka
 - Elasticsearch
 - Apicurio
 - Flink cluster



Operator Based BAI Installation with IAF

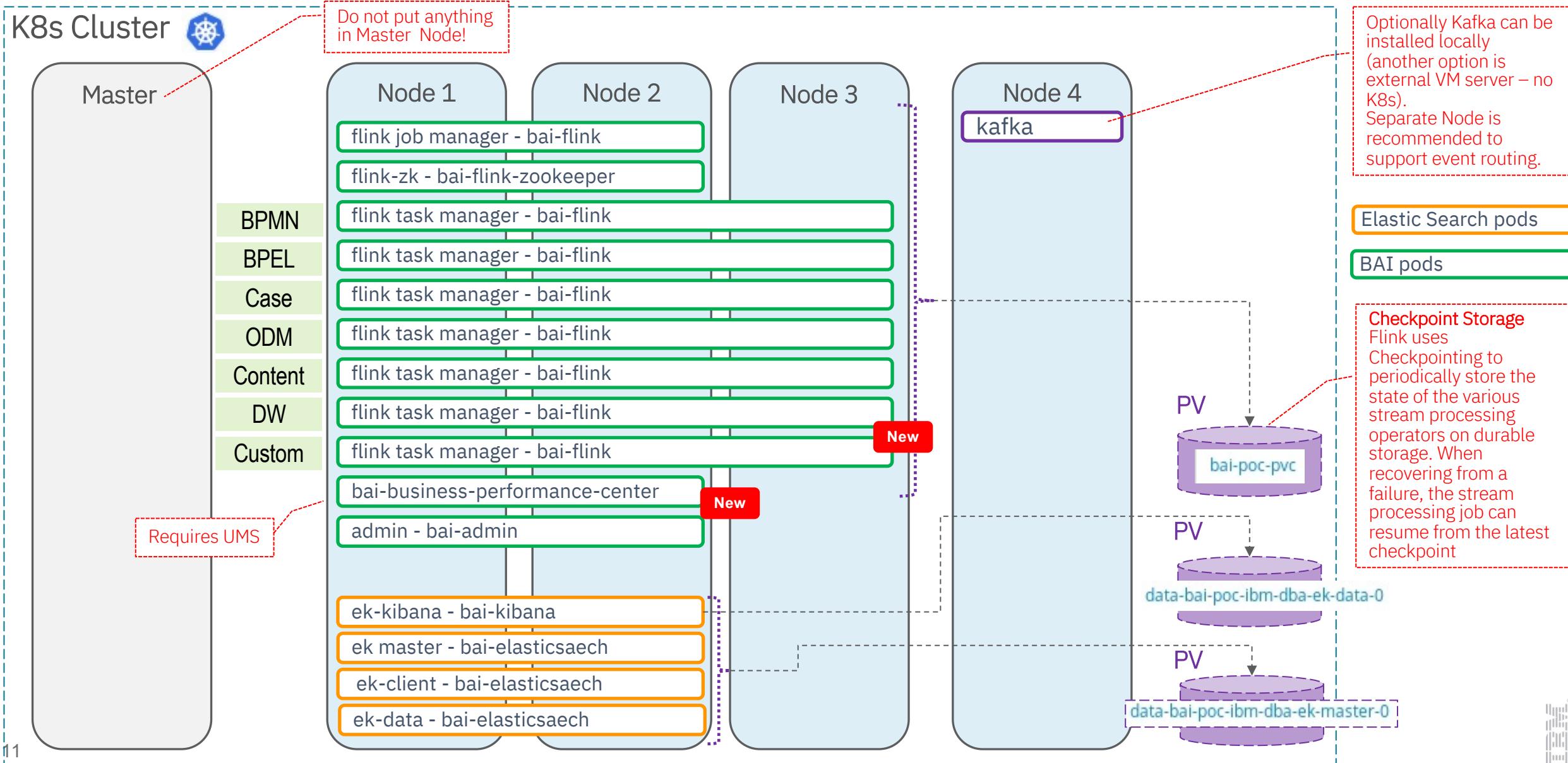


Business Automation Insights Docker Containers

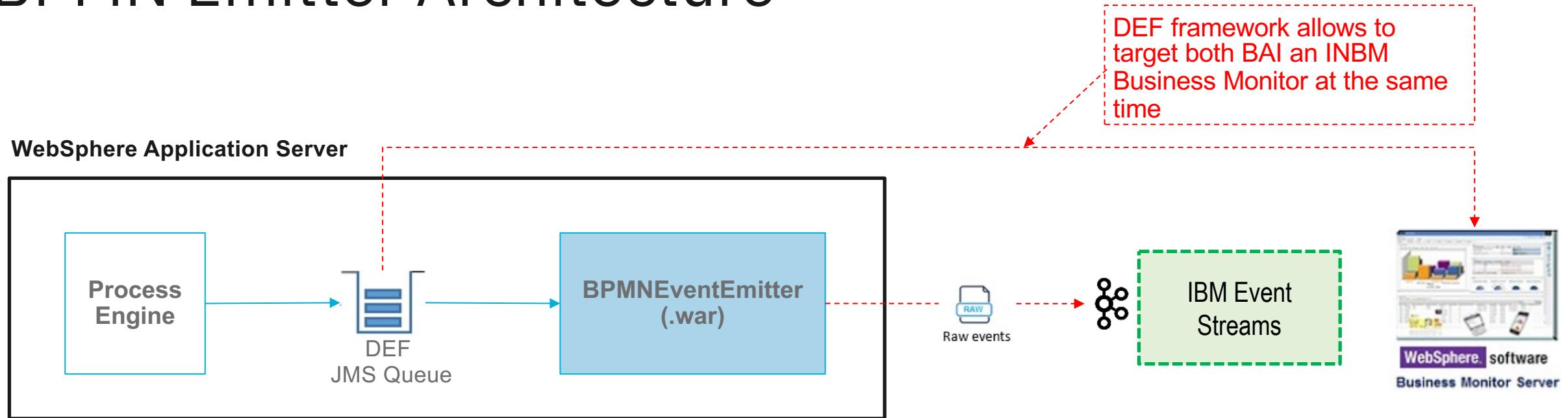


Red Hat OpenShift Container Platform or CNCF Certified Kubernetes

BAI Runtime Topology



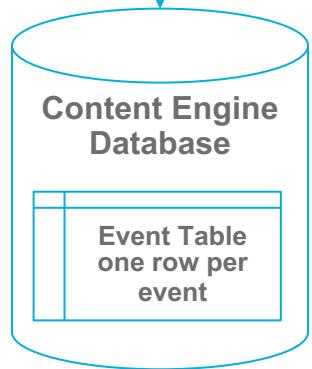
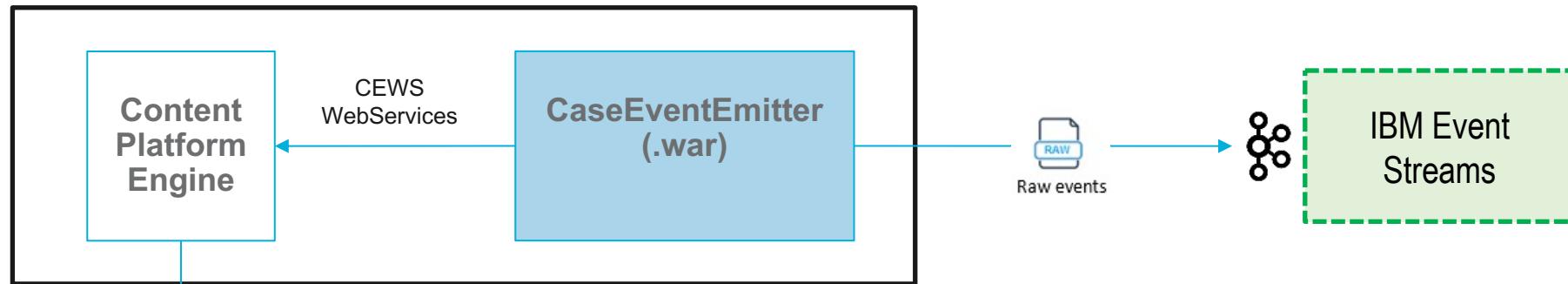
BPMN Emitter Architecture



- The BPMN event emitter is a Java MDB running on BAW App Server
- It gets events from the DEF JMS queue
- It formats DEF events as raw events in common JSON format
- It posts the raw events to Kafka Ingress Topic securely
- Performance Impact on the Workflow Server: 5-10%
 - See detailed study in Performance section of this deck

Case Emitter Architecture

WebSphere Application Server



- Case Event Emitter is installed as WAR file in BAW
- Case Event Emitter Polls CPE Engine (CE Database Event Table)
 - If there is a backlog of events to process, CaseEventEmitter polls the events continuously..
 - If there is no event to process, it polls for the events in exponential intervals of 2, 4, 8, 32, 64 secs..
- CPE Engine extract the Event Data form CE Database (Event Table)
- CPE Engine's "Audit Processing Bookmark" object is used to ensure events are not emitted multiple times
- Case Event Emitter formats Raw Events as JSON and posts them to Kafka Ingress Topic securely
- Performance Impact on the Workflow Server: no data



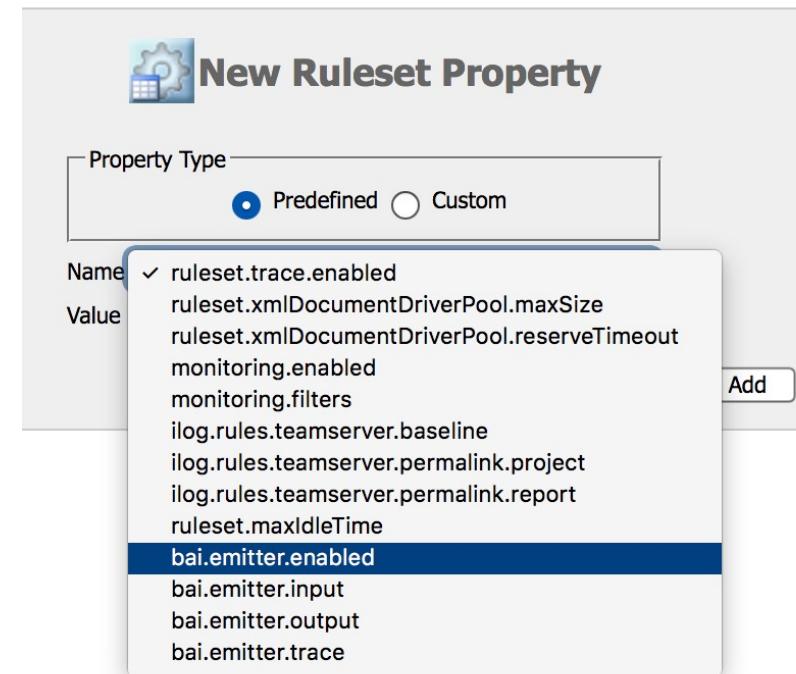
ODM Emitters - Install and Configure

1. Configure Emitters

- ICP
 - Use IBACC or the ODM helm chart
- On Prem using one the following:
 - ra.xml deployment descriptor
 - plugin-configuration.properties file
 - res-setup Ant task
- Configuration instructions:
 - https://www.ibm.com/support/knowledgecenter/en/SSQP76_8.10.0/com.ibm.odm.distrib.overview/topics/con_bai.html

2. Activate for selected ruleset

- Configuration instructions
 - <https://github.com/ODMDev/decision-s-bai-gettingstarted>



Content BAI Emitter

CP4BA

- Install and configure:
 - From boot master node of BAI ICP installation, retrieve the bai-content-emitter.jar file
 - In Admin Console for CPE configure BAI Emitter Event Action for each Object Store
 - You will need the bai-content-emitter.jar file
 - Configure Kafka security configuration in cpe-cfgstore/BAIConfiguration directory and create configuration file
 - Ex: Instead of using the default configuration properties to provide the keys and password, you can customize the configuration file by providing only the plain username and password combination



Historical Data BPMN Export to BAI - New REST API

POST	/std/bpm/historical_data_playback	Play back historical event data and send it to IBM Business Automation Insights.															
Plays back process-related events stored in the PDW and BPM databases and sends them to Business Automation Insights. Only Business Automation Workflow administrators are authorized to perform this call.																	
Parameters																	
<table><thead><tr><th>Name</th><th>Description</th></tr></thead><tbody><tr><td>BPMCSRFToken * required string (header)</td><td>Cross-site request forgery prevention token for IBM Business Automation Workflow REST APIs</td></tr><tr><td>containers array[string] (query)</td><td>A comma-separated list of container acronyms. Restricts the playback of events to instances that belong to the specified process application acronyms.</td></tr><tr><td>start_date string(\$date-time) (query)</td><td>The date from which to start processing events. If not specified, process instance data is played back up to the end_date, if specified.</td></tr><tr><td>end_date string(\$date-time) (query)</td><td>The date to stop processing events. If not specified, process instance data is played back up to the current date and time.</td></tr><tr><td>skip_duplicates_check boolean (query)</td><td>Use this parameter in conjunction with tracing to troubleshoot event playback. By default, events are generated and played back only once from Performance Data Warehouse; subsequent calls to the API will not send the same events again. However, you can replay these events without sending them to Business Automation Insights by setting this parameter to true.</td></tr><tr><td>event_count_only boolean (query)</td><td>If the value is set to true, return only an estimated count of the number of events that will be sent to IBM Business Automation Insights. The estimate is based on the values of the other parameters. If a value is not specified, the default is false.</td></tr></tbody></table>				Name	Description	BPMCSRFToken * required string (header)	Cross-site request forgery prevention token for IBM Business Automation Workflow REST APIs	containers array[string] (query)	A comma-separated list of container acronyms. Restricts the playback of events to instances that belong to the specified process application acronyms.	start_date string(\$date-time) (query)	The date from which to start processing events. If not specified, process instance data is played back up to the end_date , if specified.	end_date string(\$date-time) (query)	The date to stop processing events. If not specified, process instance data is played back up to the current date and time.	skip_duplicates_check boolean (query)	Use this parameter in conjunction with tracing to troubleshoot event playback. By default, events are generated and played back only once from Performance Data Warehouse; subsequent calls to the API will not send the same events again. However, you can replay these events without sending them to Business Automation Insights by setting this parameter to true.	event_count_only boolean (query)	If the value is set to true, return only an estimated count of the number of events that will be sent to IBM Business Automation Insights. The estimate is based on the values of the other parameters. If a value is not specified, the default is false.
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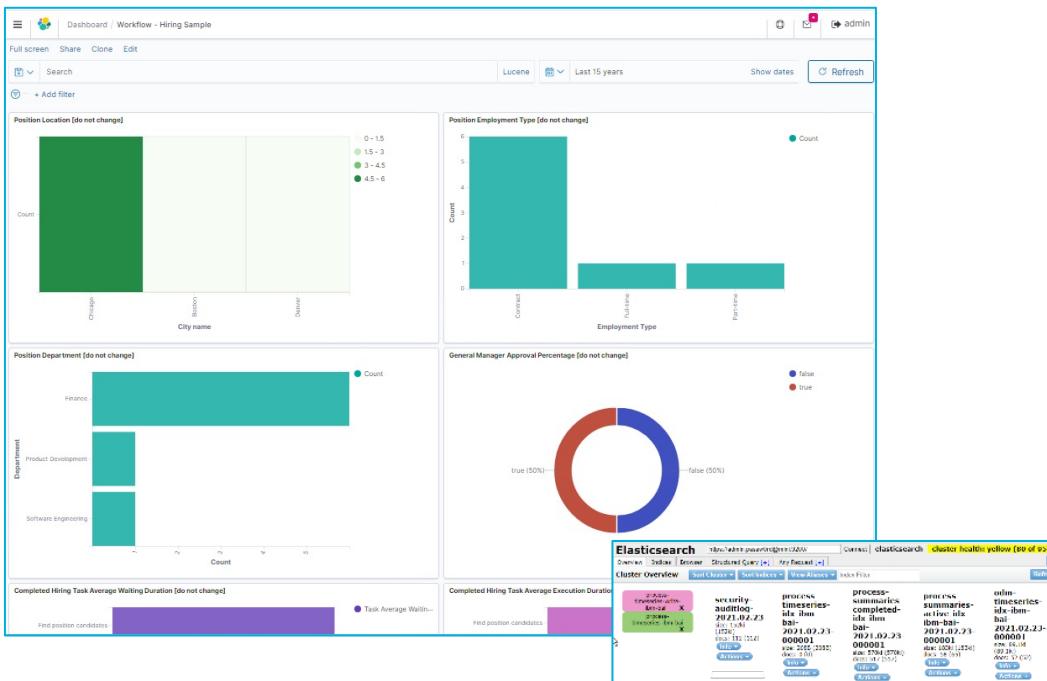
BAI – Business Automation Insights

What's in the Box?

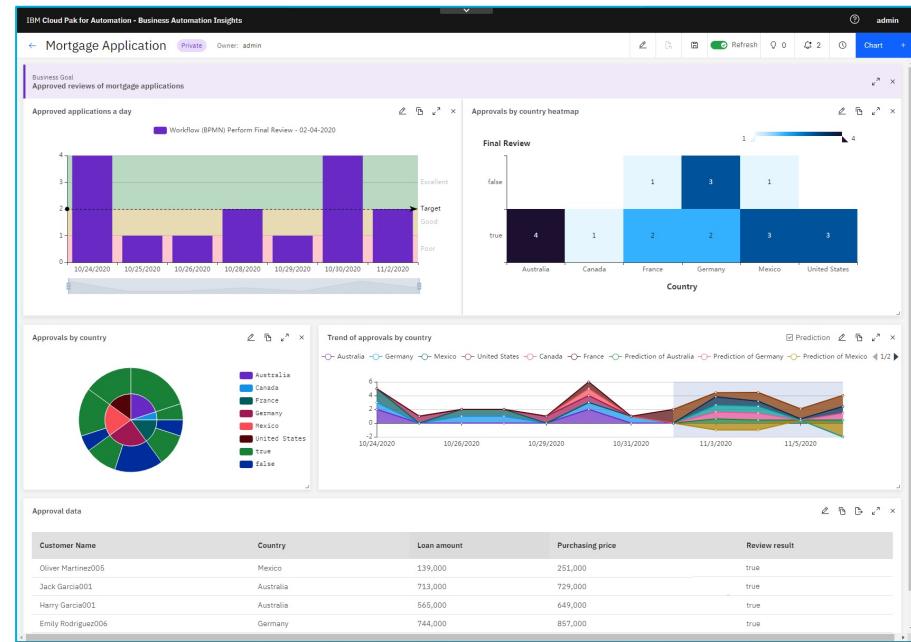


What's in the Box?

- Out of the box Elasticsearch artifacts
 - Elasticsearch Indices
 - Kibana* artifacts
 - Saved Searches, Visualizations, Dashboards for supported runtimes



- Business Performance Center (BPC)
 - Uses data from Elasticsearch
 - Includes out of the box
 - Charts and Dashboards for supported runtimes



BPC Tech intro: <https://ibm.box.com/v/BusinessPerformanceCenter>

140 Visualizations for CP4BA Kibana Dashboards

Visualizations			
Create visualization			
<input type="text"/> do not change			
Title	Type	Description	Actions
<input type="checkbox"/> Position Location [do not change]	Heat Map		<input type="button"/>
<input type="checkbox"/> Position Department [do not change]	Horizontal Bar		<input type="button"/>
<input type="checkbox"/> Activity specification [do not change]	Markdown		<input type="button"/>
<input type="checkbox"/> Case specification [do not change]	Markdown		<input type="button"/>
<input type="checkbox"/> Stage specification [do not change]	Markdown		<input type="button"/>
<input type="checkbox"/> User tasks currently not completed count [do not change]	Metric		<input type="button"/>
<input type="checkbox"/> Position Employment Type [do not change]	Vertical Bar		<input type="button"/>
<input type="checkbox"/> Hiring Manager Percentage [do not change]	Pie		<input type="button"/>
<input type="checkbox"/> Task Record Percentage [do not change]	Pie		<input type="button"/>
<input type="checkbox"/> Task Potential Performer [do not change]	Horizontal Bar		<input type="button"/>
<input type="checkbox"/> Task Record Priority [do not change]	Vertical Bar		<input type="button"/>
<input type="checkbox"/> Task Record Status [do not change]	Horizontal Bar		<input type="button"/>
<input type="checkbox"/> Process instance durations [do not change]	Line		<input type="button"/>
<input type="checkbox"/> Cases in progress [do not change]	Vertical Bar		<input type="button"/>
<input type="checkbox"/> Process applications cloud [do not change]	Tag Cloud		<input type="button"/>
<input type="checkbox"/> Task statuses cloud [do not change]	Tag Cloud		<input type="button"/>
<input type="checkbox"/> Average case duration [do not change]	Metric		<input type="button"/>
<input type="checkbox"/> Average activity duration [do not change]	Metric		<input type="button"/>
<input type="checkbox"/> Average stage duration [do not change]	Metric		<input type="button"/>
<input type="checkbox"/> Activities in progress [do not change]	Vertical Bar		<input type="button"/>

Rows per page: 20 < 1 2 3 4 5 >

Visualize

Visualize enables you to create visualizations of the data in your Elasticsearch indices. 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 you the trends, spikes, and dips you need to know about.

You can create visualizations from a search saved from [Discover](#) or start with a new search query.



243 Predefined Searches for DBA Visualizations

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.

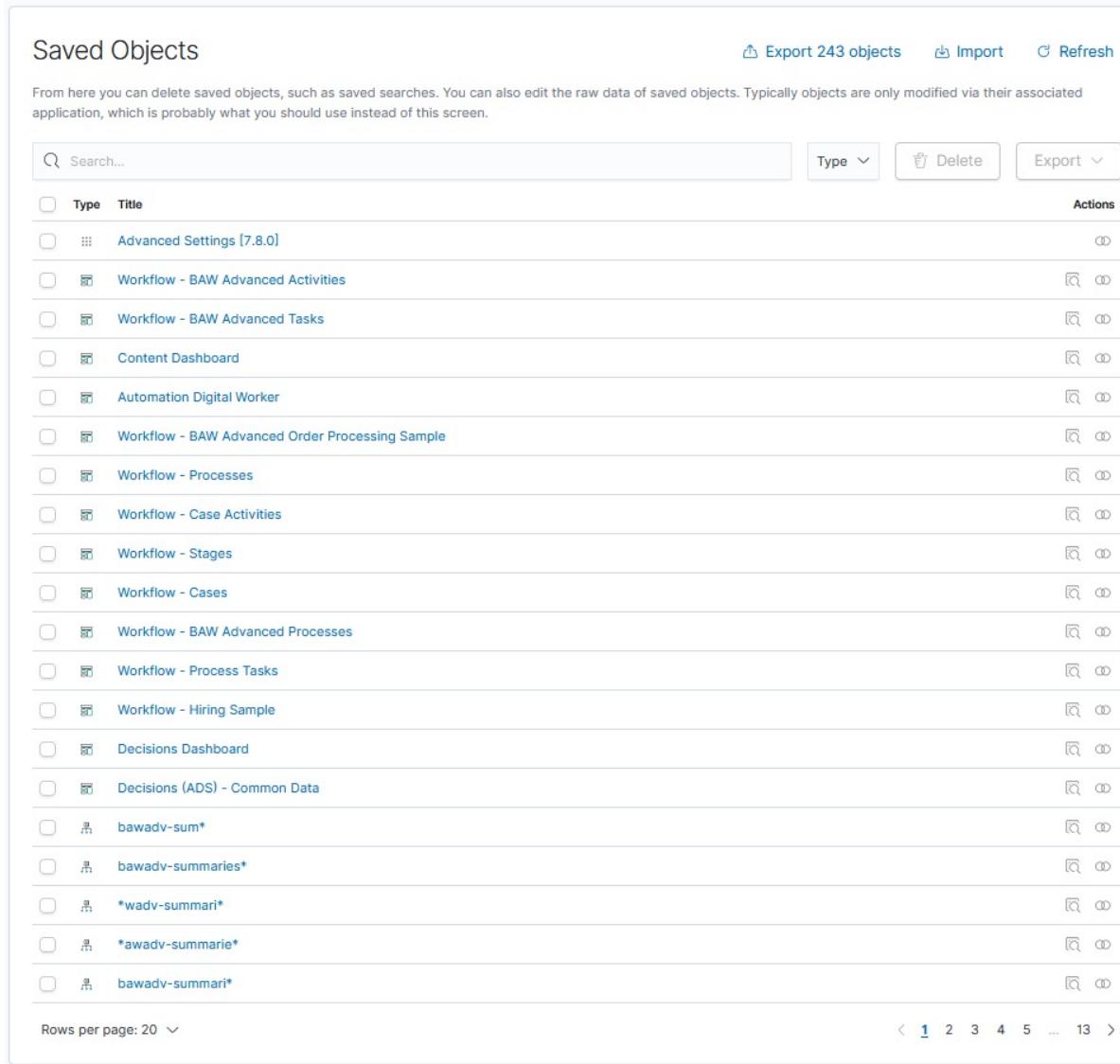
Export 243 objects Import Refresh

Search... Type Delete Export

Type Title

- Advanced Settings [7.8.0]
- Workflow - BAW Advanced Activities
- Workflow - BAW Advanced Tasks
- Content Dashboard
- Automation Digital Worker
- Workflow - BAW Advanced Order Processing Sample
- Workflow - Processes
- Workflow - Case Activities
- Workflow - Stages
- Workflow - Cases
- Workflow - BAW Advanced Processes
- Workflow - Process Tasks
- Workflow - Hiring Sample
- Decisions Dashboard
- Decisions (ADS) - Common Data
- bawadv-sum*
- bawadv-summaries*
- *wadv-summar*
- *awadv-summarie*
- bawadv-summar*

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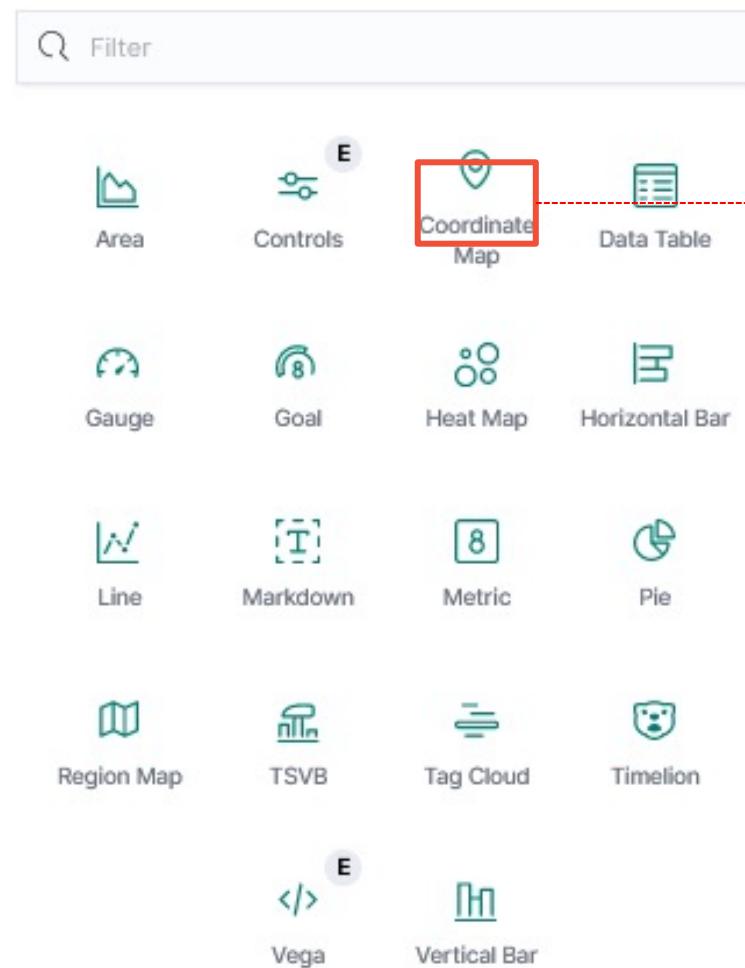
Searching Your Data

You can search the indices 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](#). Autocomplete and a simplified query syntax are available for the Kibana query language as experimental features which you can opt-in to under the options menu in the Query Bar.



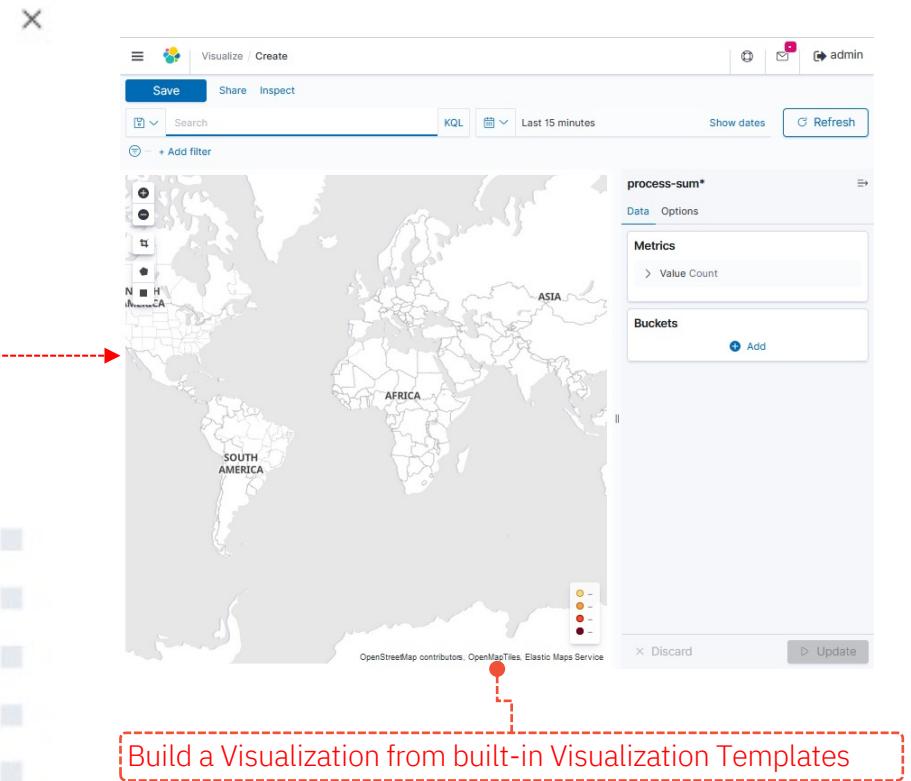
18 Standard Kibana Visualization Templates

New Visualization



Select a visualization type

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



Built your own custom Kibana Visualization Types: <https://www.elastic.co/blog/developing-new-kibana-visualizations>

BAI enabled AI Injection in BAW

-  Intelligent Task Prioritization
-  Decision Recommendation
-  Workflow Insights



ODM - Example of Watson Studio Notebooks

2. View the rule coverage distribution

You visualize the rule execution statistics metered when running a decision service. From these statistics you get insights on:

- the rules that are never executed. Rules can be never executed against a data set when their conditions are never met. Typically if they are triggered for specific cases that don't appear in your data set. Otherwise have a deeper look to your rules and dataset.
- the rules that are always executed. Common case is a rule that checks the compliance of input parameters. But if you see a rule that should be triggered on a subset of the requests and is reported with a 100% then check its conditions and the request set.

```
In [5]: from matplotlib import rcParams
import matplotlib.pyplot as plt; plt.rcParams()
import numpy as np
import matplotlib.pyplot as plt

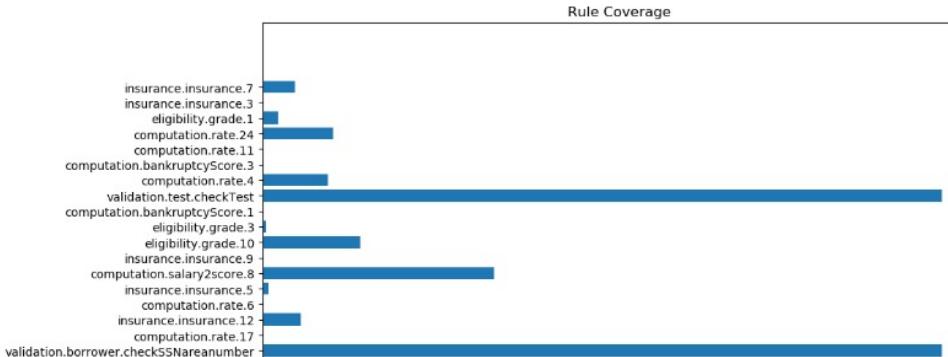
rcParams.update({'figure.autolayout': True})
rcParams.update({'font.size': 10})

plt.figure(figsize=(12, 16))
plt.yscale('log', nonposy='clip')

rules = df['Rule']
percentages = df['Percentage']
counts = df['Count']
y_pos = np.arange(len(rules))

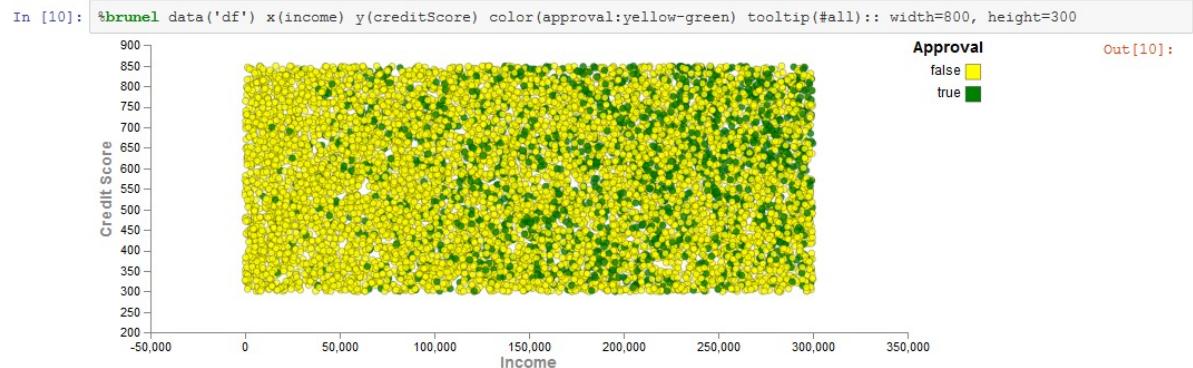
plt.barrh(y_pos, percentages, align='center')
plt.yticks(y_pos, rules)
plt.xlabel('percentage')
plt.title('Rule Coverage')
plt.ylabel('rule')
plt.savefig('rulecoverage.jpg')
plt.show()

/usr/local/src/conda3_runtime/home/envs/DSX-Python35-Spark/lib/python3.5/site-packages/matplotlib/figure.py:1999:
rWarning: This figure includes Axes that are not compatible with tight_layout, so results might be incorrect.
Warnings.warn("This figure includes Axes that are not compatible ")
```



4. View income on credit score distribution.

Do we see trends or limits in credit score or income for accepted loan applications? We can observe graphically that the larger are the credit score and income values the more accepted approval we get.

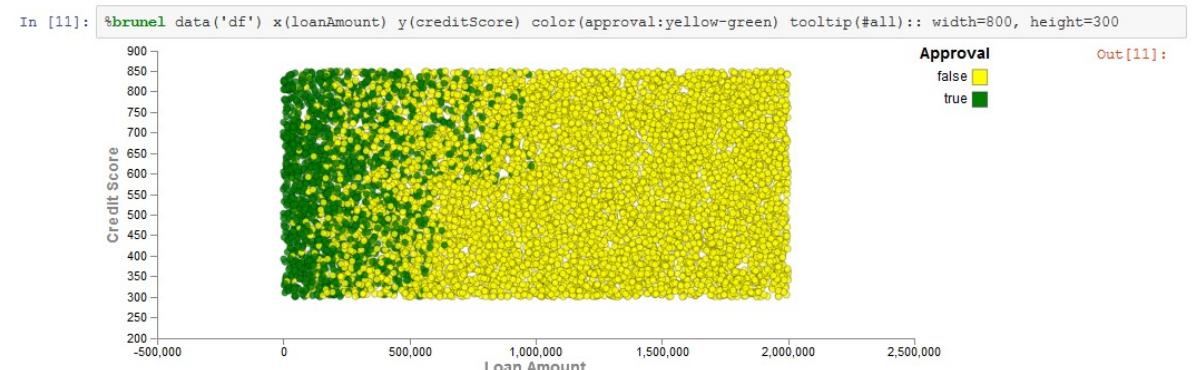


5. View loan amount / credit score distribution.

Do we see limits in score or amount for accepted loan applications? We observe that as expected:

- the higher the loan amount, the higher the rejection rate.
- the lower credit score, the higher the rejection rate.

We observe the absence of green points identified for loan amount greater than USD 1 000 000. It is consistent with a rule that rejects the application for amounts greater than this threshold.

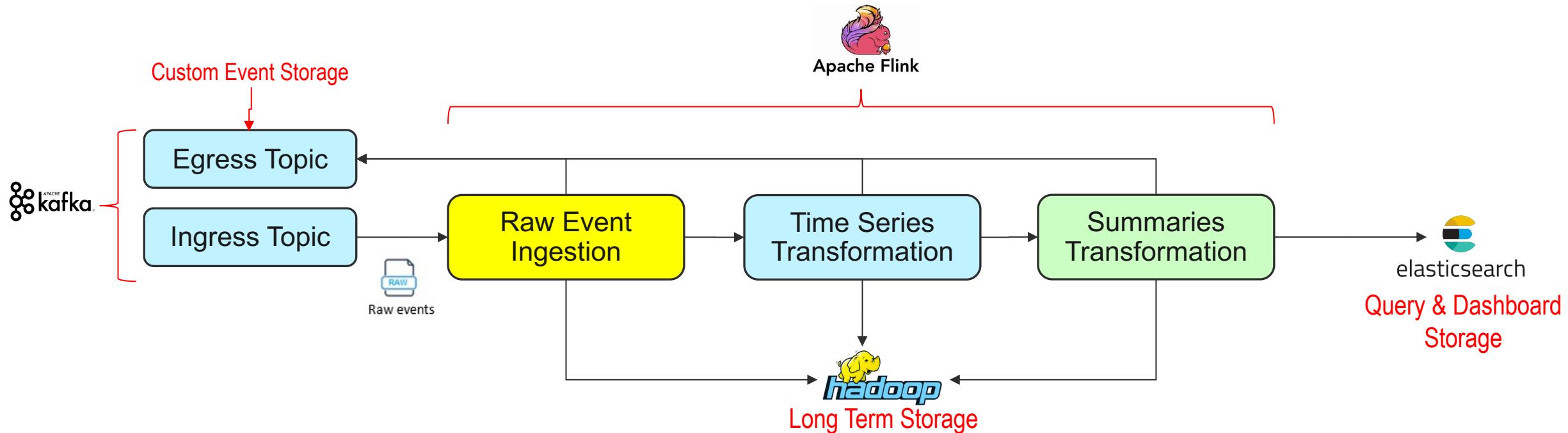


BAI – Business Automation Insights

Event Processing, Elastic Search and HDFS



BAI Event Processing

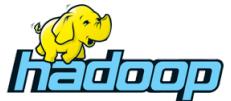


- Raw Events in common JSON format arrive from Processes and Cases
- Apache Flink jobs are responsible for event processing and staging
 - **Raw Event** Ingestion and distribution to: Egress Topic, HDFS
 - **Time Services** Transformation and distribution to: Egress Topic HDFS
 - **Summaries** Transformation and distribution to: Egress Topic, HDFS and Elasticsearch
- Flink includes persistent storage for point recovery and to store data between the three processing stages



Raw Events

Raw Event
Ingestion

- Raw Events are unprocessed JSONs as they come from BAI Event Emitters
 - Raw Events are deeply nested data structures, not suitable for indexing or AI processing algorithms
- Stateless operation in Flink
 - Passes Raw Events to the next stage of event processing
 - Delivers Raw Events unchanged to
 - Egress Topic  kafka
 - HDFS 



Time Series Events

- Time Series Events are flattened version of the Raw Events
 - Flattened data structures are suitable for indexing or AI processing
 - MI processing algorithms require flattened data – rows and columns
 - Ready to use by Data Scientist!
 - Easy to index by Elasticsearch
- Stateless operation in Flink
 - The Raw Events are parsed and transformed on the fly to Time Series Events and passed on in the pipeline for next stage of event processing
 - Delivers Time Series Events to **Egress Topic** and **HDFS**



Summary Transformation Events

Summaries
Transformation

- Summary Transformation Events are “time-aggregated” version of the Time Series Events
- Two type of events
 - **ACTIVE** - reflects the current state of a Process. Task or Case (current state, current duration)
 - **COMPLETED** - records the completed state of Process, Task Case (final state, final duration)
- **Stateful** operation in Flink
 - What is persisted?
 - Since Raw events can be emitted out of order, the Time Series are likely to arrive out of order, a state is used for process summary and activity summary to store events that can not be aggregated yet (for example activities or task that arrive before a process started event)
 - The current process/task event is recorded
 - The current process/task duration is recorded
 - Delivers Summary Events to **Elasticsearch**, **Egress Topic** and **HDFS** (only COMPLETED state)



Flink Dashboard to Monitor Jobs Execution

Apache Flink Dashboard

Overview Version: 1.5.2 Commit: 1a9b648

Overview Running Jobs Completed Jobs Task Managers Job Manager Submit new Job

Task Managers 3

Task Slots 6

Available Task Slots 0

Total Jobs

Status	Count
Running	3
Finished	0
Canceled	0
Failed	0

Running Jobs

Start Time	End Time	Duration	Job Name	Job ID	Tasks	Status
2018-08-16, 12:43:47	2018-08-20, 20:20:32	4d 7h	dba/bai-icm	cb7e650521d2c750a3b2161ff0e5daf8	16 0 0 0 16 0 0 0 0 0 0	RUNNING
2018-08-17, 17:58:30	2018-08-20, 20:20:32	3d 2h	dba/bai-ingestion	0b8cd76ff54a67c79242abd8bc86f897	6 0 0 0 8 0 0 0 0 0 0	RUNNING
2018-08-20, 10:59:56	2018-08-20, 20:20:32	9h 20m	dba/bai-bpmn	b781595ae99c81b36095cfe53f097d1c	16 0 0 0 16 0 0 0 0 0 0	RUNNING

Completed Jobs

Start Time	End Time	Duration	Job Name	Job ID	Tasks	Status

Data Retention - Elasticsearch

- Purging old events in Elasticsearch is a customer's responsibility
- In Elasticsearch customers are encouraged to regularly roll over their indices so they can then delete the old ones (this is an ES feature):
<https://www.elastic.co/guide/en/elasticsearch/reference/master/indices-rollover-index.html>
<https://github.ibm.com/dba/taiga-project/blob/master/architecture/decisions/0006-indices-architecture.md>
<https://github.ibm.com/dba/taiga-project/blob/master/architecture/decisions/0010-data-storage-and-rollover.md>
- BAI enables the ES Rollover features by
 - Writing to an index alias
 - Linking the write alias to one and only one index
- Example for Completed Summaries
 - Flink jobs write the completed summaries to index Alias
 - alias process-summaries-completed-write-ibm-bai
 - Which is linked to
 - index process-summaries-completed-idx-ibm-bai-{date}-000001

process-summaries-completed-idx-ibm-bai-2018.08.22-000001

size: 638ki (1.25Mi)
docs: 48 (96)



Data Retention - HDFS

- Purging unwanted events in HDFS is a customer's responsibility
- For HDFS the data path contains a date so it is easy to find "old" data and can be used for deleting events:
 - Process time series
`/ibm-bai/bpmn-timeseries/[processApplicationId]/[processApplicationVersionId]/process/[processId]/[date]/[part]`
 - Activity time series
`/ibm-bai/bpmn-timeseries/[processAppId]/[processAppVersionId]/activity/[processId]/[activityId]/[date] /[part]`
 - Tracking time series
`/ibm-bai/bpmn-timeseries/[processAppId]/[processAppVersionId]/tracking/[trackingGroupId]/[date]/[part]`



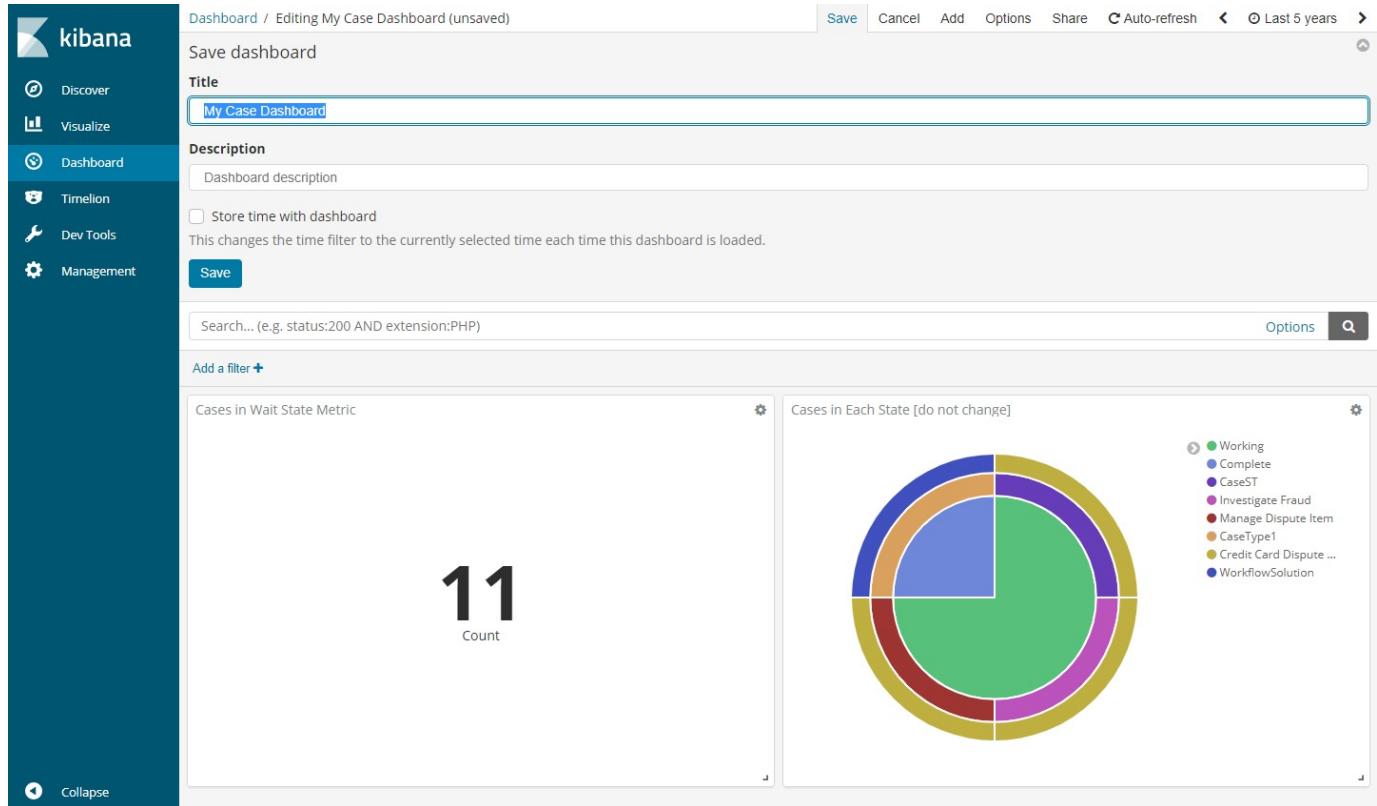
BAI – Business Automation Insights

Kibana



Building Kibana Dashboards

1. Create (reuse) Kibana Index Patterns
2. Create a Search
3. Create Visualization
4. Specify Source of Data for Visualization
5. Create a Dashboard
6. Add Visualizations to Dashboard



1. Create Index Patterns

The screenshot shows the Kibana Management interface. On the left is a sidebar with icons for Discover, Visualize, Dashboard, Timelion, Dev Tools, and Management. The Management section is currently selected. The main area is titled "Management / Kibana" and shows the "Index Patterns" tab is active. A button labeled "+ Create Index Pattern" is highlighted with a red dashed box. Below it is a list of existing index patterns, such as "*summaries*", "-summaries-*", and "process-summar*". To the right is a table with columns for Name and Fields (112). A red dashed box highlights the "Name" column, which lists fields like "_id", "_index", "_score", "_source", and "_type". A red arrow points from the "Fields (112)" section to the "Name" column.

Create index pattern

Kibana uses index patterns to retrieve data from Elasticsearch indices for things like visualizations.

Step 1 of 2: Define index pattern

Index pattern

index-name-*

You can use a * as a wildcard in your index pattern.
You can't use spaces or the characters \, /, ?, ", <, >, |.

Your index pattern can match any of your **5 indices**, below.

.kibana

case-summaries-active-idx-ibm-bai-2018.08.22-000001

case-summaries-completed-idx-ibm-bai-2018.08.22-000001

process-summaries-active-idx-ibm-bai-2018.08.22-000001

process-summaries-completed-idx-ibm-bai-2018.08.22-000001

Step 1 of 2: Define index pattern

Index pattern

case*

You can use a * as a wildcard in your index pattern.
You can't use spaces or the characters \, /, ?, ", <, >, |.

✓ Success! Your index pattern matches **2 indices**.

case-summaries-active-idx-ibm-bai-2018.08.22-000001

case-summaries-completed-idx-ibm-bai-2018.08.22-000001

2. Create a Search

The screenshot shows the Kibana Discover interface with the following annotations:

- 1. Specify Index Pattern**: A red box highlights the index pattern dropdown containing `*-summaries-*`.
- 2. Use Lucene syntax to create a search.**: A red box highlights the search bar containing `state:waiting`.
- 3. Name the Search and Save**: A red box highlights the "Save Search" section with the name `Cases in Wait State`.
- The search displays the documents that match the search**: A red box highlights the table results showing four documents with the state `Waiting`.
- state search column results**: A red box highlights the "state" column in the table results.

Selected Fields

- t _id
- t state
- t solution-name
- start-time

Available Fields

- t _index
- # score
- t case-instance-id
- t case-instance-name
- t case-type-name
- t category

Time Range: January 1st 2018, 00:00:00.000 - October 2nd 2018, 14:25:37.291 — Auto

Count

Table Results

Time	state	_id	solution-name	start-time
August 26th 2018, 10:08:17.310	Waiting	{50907665-0200-c2b5-b4d2-07393f860ba8}	Credit Card Dispute Management	August 26th 2018, 10:08:17.310
August 26th 2018, 10:08:17.215	Waiting	{50907665-0100-cdf1-b74c-68e1518ee027}	Credit Card Dispute Management	August 26th 2018, 10:08:17.215
August 26th 2018, 10:08:17.356	Waiting	{50907665-0300-ca43-a2d5-8f3678e5c212}	Credit Card Dispute Management	August 26th 2018, 10:08:17.356
August 26th 2018, 10:08:17.373	Waiting	{50907665-0300-cda9-934f-c5a43df66cbc}	Credit Card Dispute Management	August 26th 2018, 10:08:17.373

3. Create a New Visualization

Visualize / New

Select visualization type

Search visualization types...

Basic Charts

- Area
- Heat Map
- Horizontal Bar
- Line
- Pie
- Vertical Bar

Data

- Data Table
- Gauge
- Goal
- Metric

Metric is highlighted with a red border and a red arrow points to it from a callout box.

Click the visualization type you want to instantiate

Maps

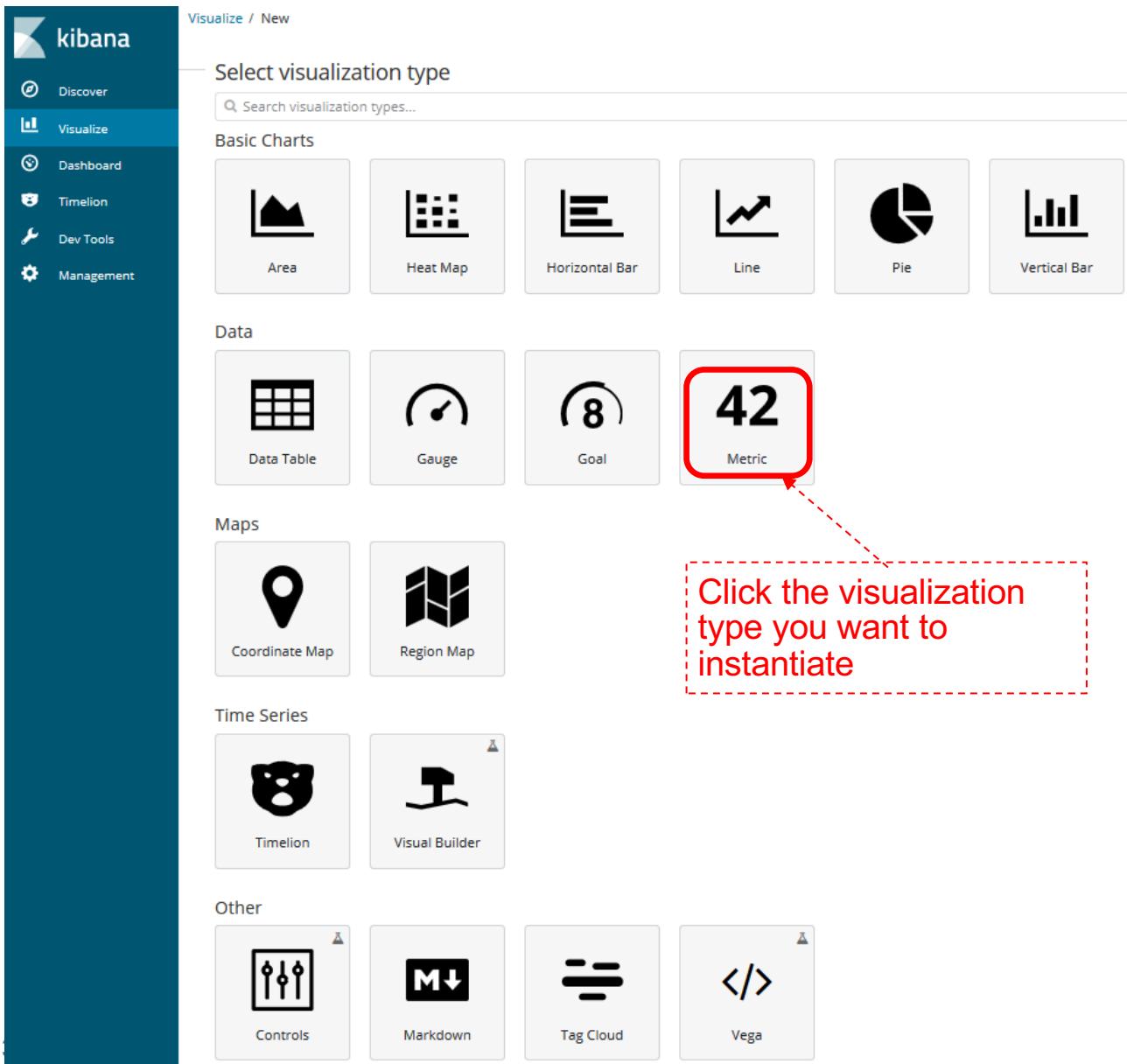
- Coordinate Map
- Region Map

Time Series

- Timelion
- Visual Builder

Other

- Controls
- Markdown
- Tag Cloud
- Vega



4. Specify Source of Data for Visualization

The screenshot shows the Kibana Visualize interface for creating a visualization titled "Cases in Wait State Metric".

Top Bar: Visualize / Cases in Wait State Metric (unsaved) | Save | Share | Refresh | Auto-refresh | Year to date |

Left Sidebar: kibana | Discover | **Visualize** (highlighted) | Dashboard | Timelion | Dev Tools | Management |

Save Visualization: Cases in Wait State Metric | Save |

Search Section: Linked to Saved Search: **Cases in Wait State** | Search... (e.g. status:200 AND extension:PHP) | Options |

Filter Section: Add a filter +

Metrics Section: *-summaries-* | Metrics | Metric | Count | Add metrics |

Buckets Section: Buckets | Select buckets type | Split Group | Cancel |

Result Area: 11 Count |

A red dashed box highlights the "Cases in Wait State" link under "Linked to Saved Search" with the label "Specify Search" above it.

5. Create Dashboard

Kibana

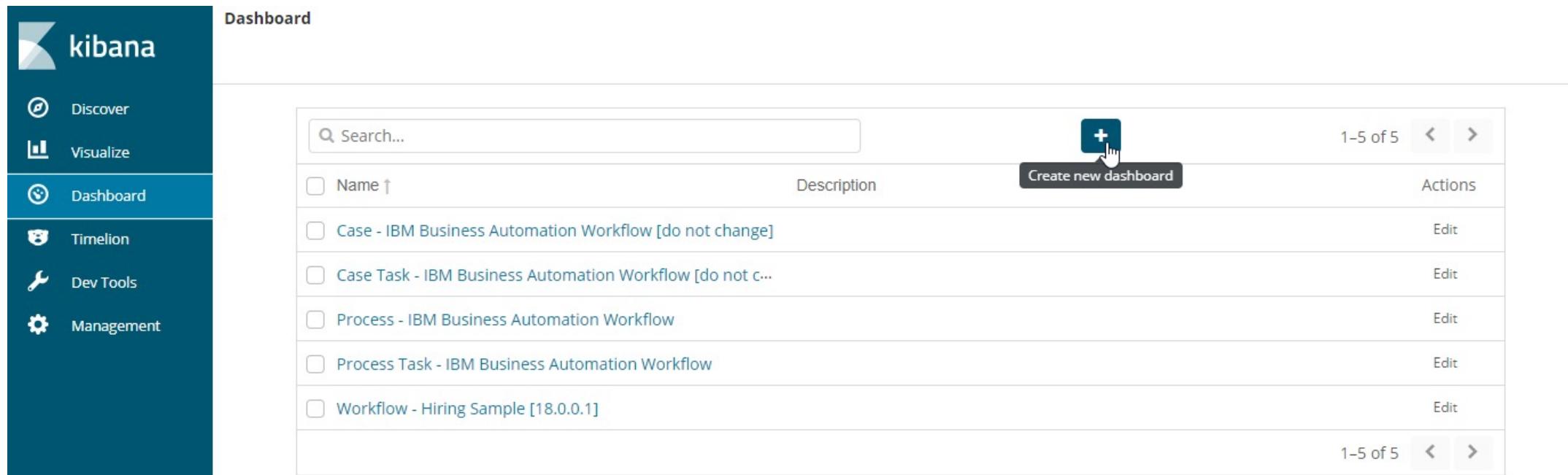
Discover Visualize Dashboard Timelion Dev Tools Management

Dashboard

Search...  1-5 of 5 < >

Name ↑	Description	Actions
Case - IBM Business Automation Workflow [do not change]		Edit
Case Task - IBM Business Automation Workflow [do not c...]		Edit
Process - IBM Business Automation Workflow		Edit
Process Task - IBM Business Automation Workflow		Edit
Workflow - Hiring Sample [18.0.0.1]		Edit

1-5 of 5 < >



6. Add Visualizations to Dashboard

Dashboard / Editing My Case Dashboard (unsaved)

Save Cancel Add Options Share Auto-refresh Last 5 years

Save dashboard

Title **My Case Dashboard**

Description Dashboard description

Store time with dashboard
This changes the time filter to the currently selected time each time this dashboard is loaded.

Save

Search... (e.g. status:200 AND extension:PHP) Options

Add a filter +

Cases in Wait State Metric

11 Count

Cases in Each State [do not change]

- Working
- Complete
- CaseST
- Investigate Fraud
- Manage Dispute Item
- CaseType1
- Credit Card Dispute ...
- WorkflowSolution

Collapse



Sharing Kibana Dashboards

- Kibana dashboards can be “shared”
- BPM Process Portal
 - Exposed as iFrame served from the Kibana server
 - Dashboard Client-Side Human Service can embed the iFrame in a Coach View
- IBM Content Navigator
 - ICN widgets available to display iFrame content

The screenshot shows the Kibana interface with a sidebar on the left containing links: Discover, Visualize, Dashboard, Timelion, Dev Tools, and Management. The main area displays a dashboard titled "Process - IBM Business Automation Workflow". At the top right of this dashboard are buttons for Full screen, Share, Clone, Edit, Auto-refresh, Last 60 days, and a refresh icon. A red box highlights the "Share" button. Below it is a section for "Share saved dashboard" with instructions and two "Embedded iframe" options: one for the full dashboard URL and one for a snapshot URL. To the right of the dashboard, a red dashed arrow points down to a "Kibana Based Operational Dashboards" page in the IBM Content Navigator. This page has a header "IBM Business Process Manager Team Performance" and tabs for Process Performance, Task, Team Performance (which is selected), KPI, and Business At a Glance. It features several charts: a donut chart titled "Task By Team", a bar chart titled "Average Task Duration by Team", and a legend listing team names like Philip, James, Harmon, Geraldine, Dan, Bill, Sidney, Lew, and Gloria.

Export and Import

Dashboard.json

Management / Kibana

Index Patterns **Saved Objects** Advanced Settings

Edit 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. Each tab is limited to 100 results. You can use the filter to find objects not in the default list.

Dashboards (6) Searches (25) Visualizations (62)

Search... Title Case - IBM Business Automation Workflow [do not change] Case Task - IBM Business Automation Workflow [do not change] My Case Dashboard

Import **Export** **Delete**

Import any Saved Object (including Dashboards).

Export any Saved Object (including Dashboards).

BAI – Business Automation Insights

Process Dashboards



Kibana BPMN Process Dashboard

Dashboard / Process - IBM Business Automation Workflow

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

Full screen Share Clone Edit Auto-refresh < > Year to date Options Q

Add a filter +

Process applications (Click to apply filter)
The container is too small to display the entire cloud. Tags might be cropped or omitted.

Hiring Sample for taiga_accept

Hiring Sample Nested Tasks

Claim Approval Sample

Hiring Sample clone for taiga accept

Count - Process Application

Process instance statuses (Click to apply filter)
Failed Terminated Deleted Completed Active

Count - Status

Started process instances

Completed process instance

Failed process instances

Process instances currently at risk

204 started process instances

175 completed process instances

3 failed process instances

0 process instances currently at risk

Process instance statuses by application

Number of process instances

Deleted Completed Terminated Active

Process instance durations

Average duration

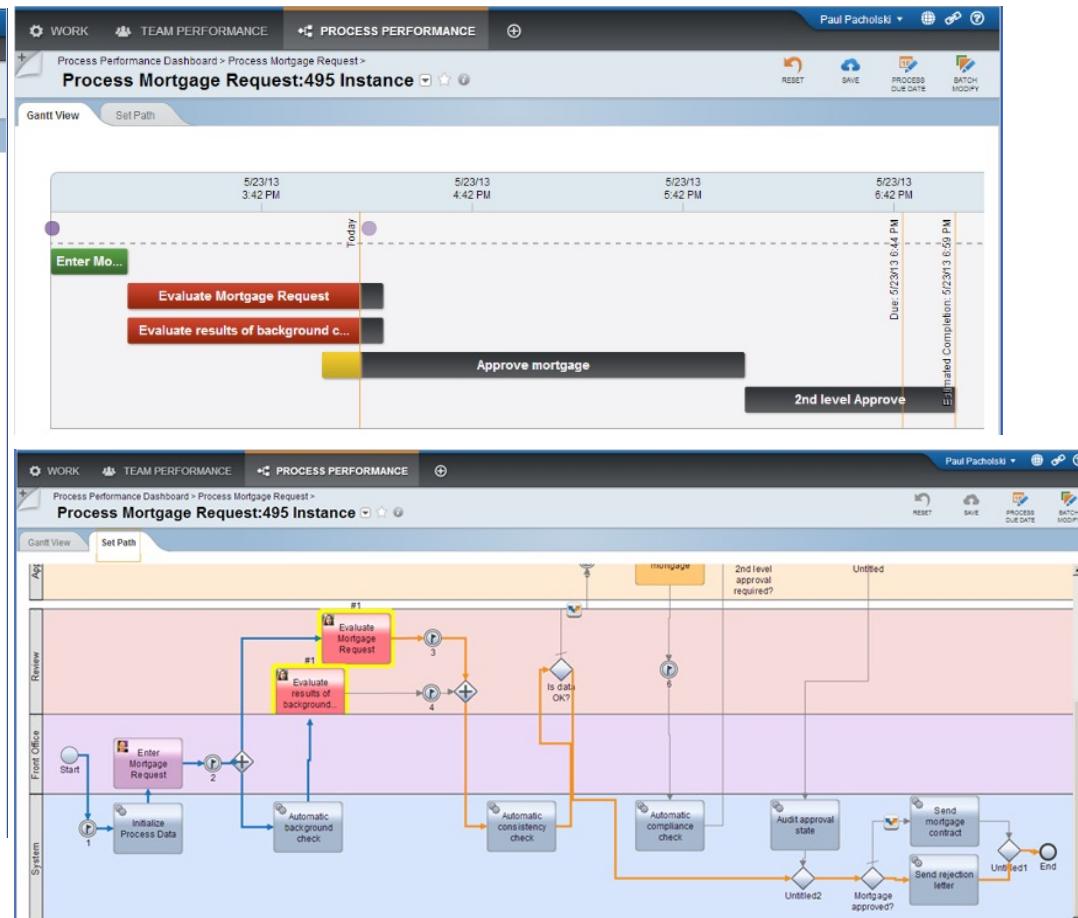
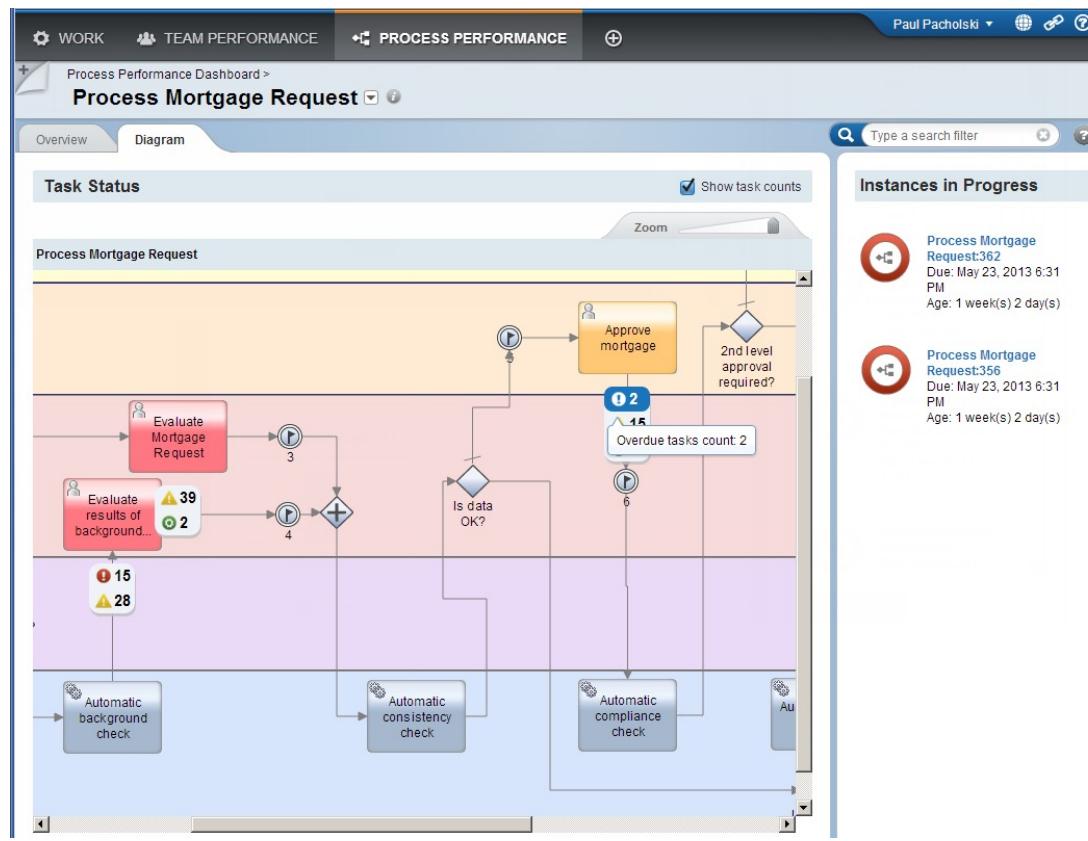
a day 17 hours

Collapse

This Kibana dashboard provides a comprehensive overview of a BPMN process. It includes a central visualization for process applications, four large numerical metrics for process instance counts, a stacked bar chart for instance statuses by application, and a histogram for process instance durations. The left sidebar offers navigation and search functionality, while the top right features standard dashboard controls like full screen, share, and auto-refresh.

Process Performance

- Most features included in Kibana Processes Dashboard
- But does not include Gant Charts or Process Path and Aggregated Task Status views



BPEL Process Instances

BAW Advanced - Process Instance statuses cloud [do not change]

PROCESS_COMPLETED

PROCESS_TERMINATED PROCESS_STARTED PROCESS_DELETED PROCESS_FAILED

BAW Advanced - Started process instances count [do not change]

31
Count

BAW Advanced - Completed process instances count [do not change]

27
Count

BAW Advanced - Failed process instances count [do not change]

1
Count

BAW Advanced - Process instance statuses by process template [do not change]



BAW Advanced - Process instance durations for completed processes [do not change]



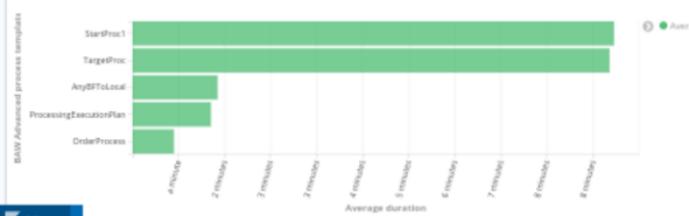
BAW Advanced - Started process instances statistics [do not change]



BAW Advanced - Completed process instances statistics [do not change]



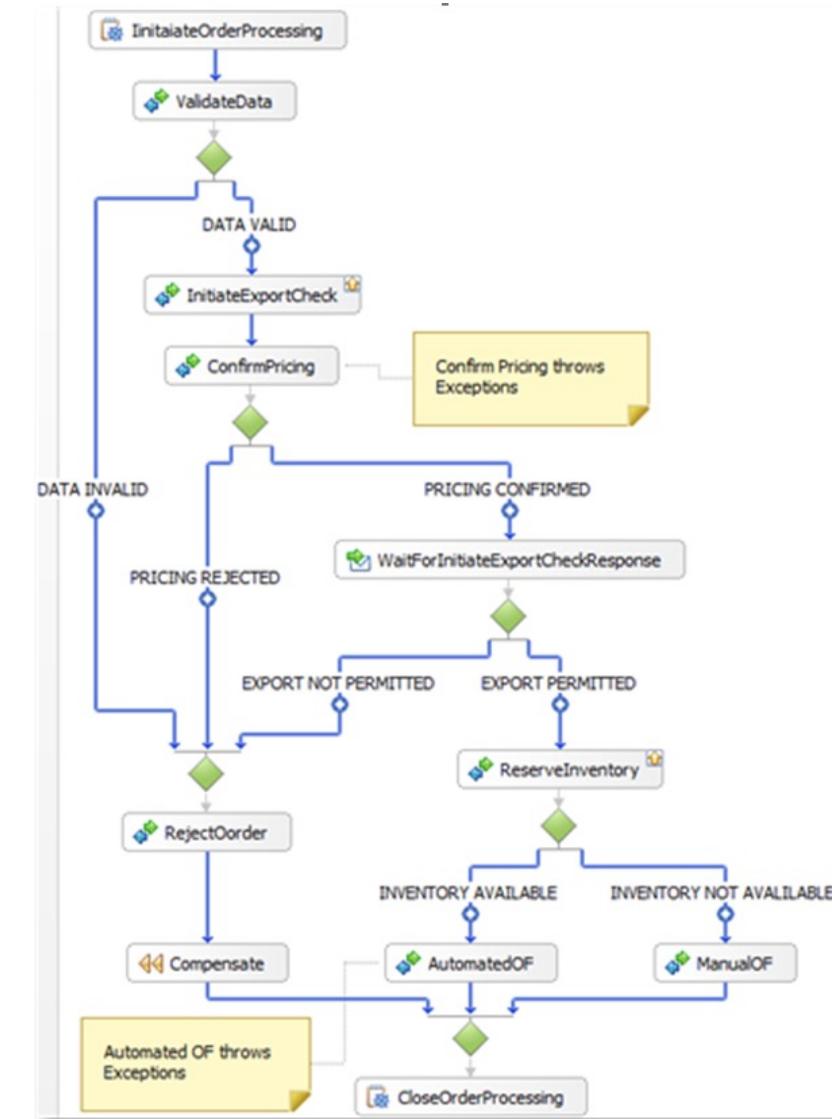
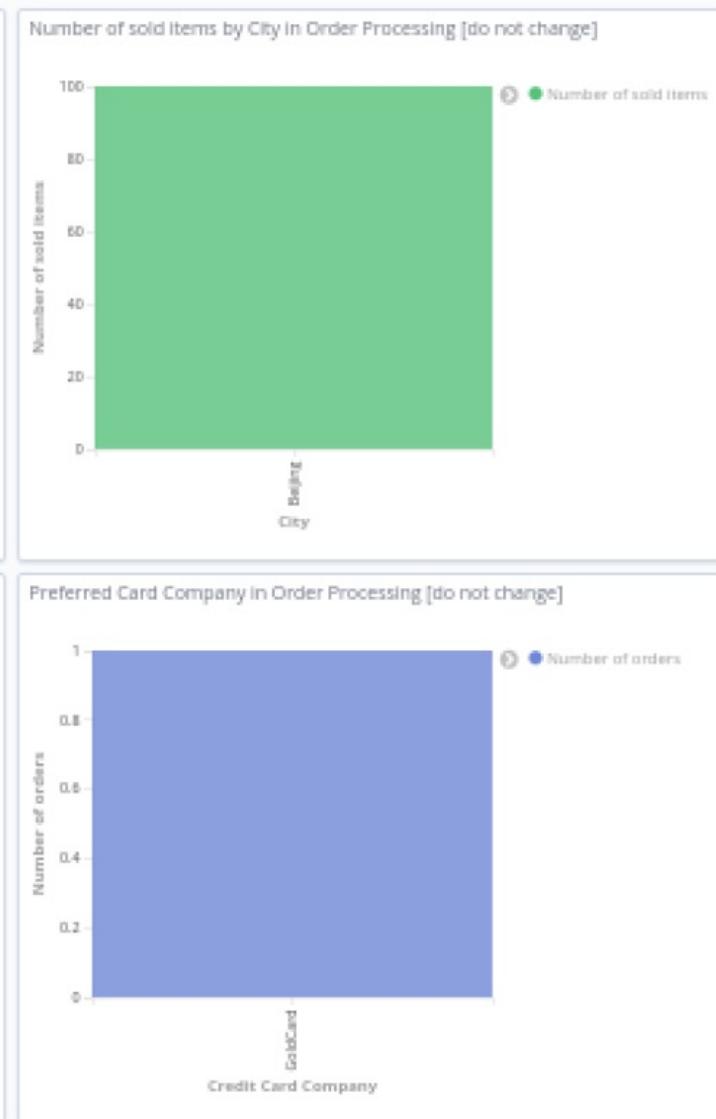
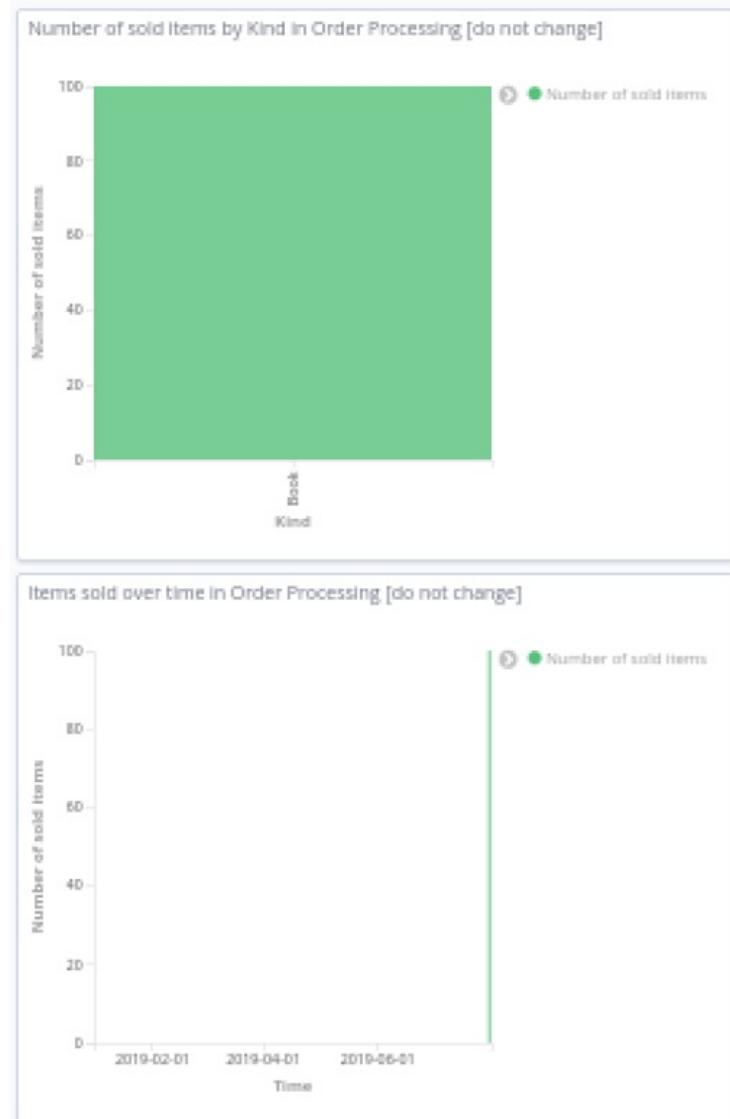
BAW Advanced - Average process duration by template [do not change]



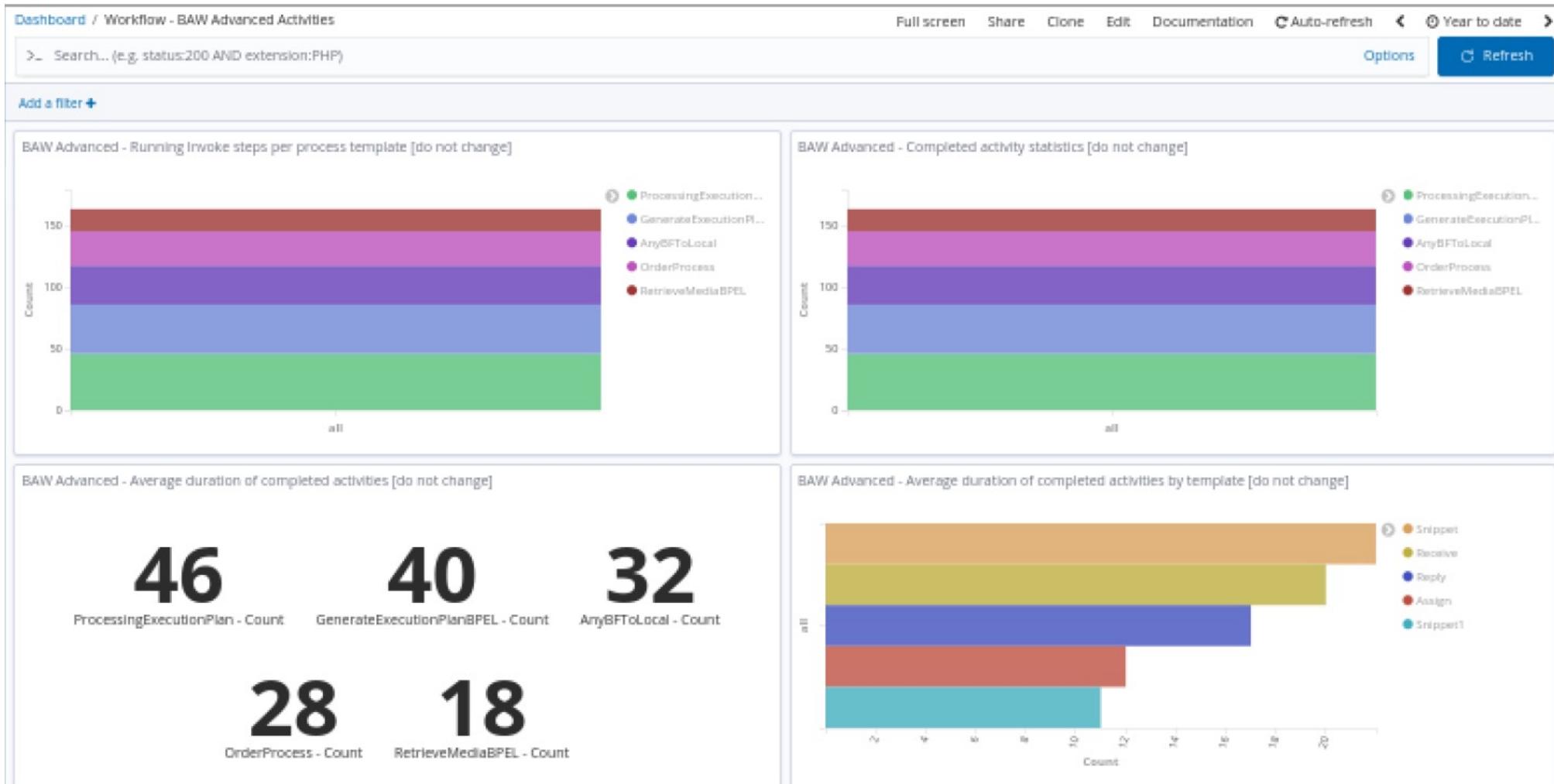
BAW Advanced - Completed, terminated, deleted, suspended and failed process instances [do not change]



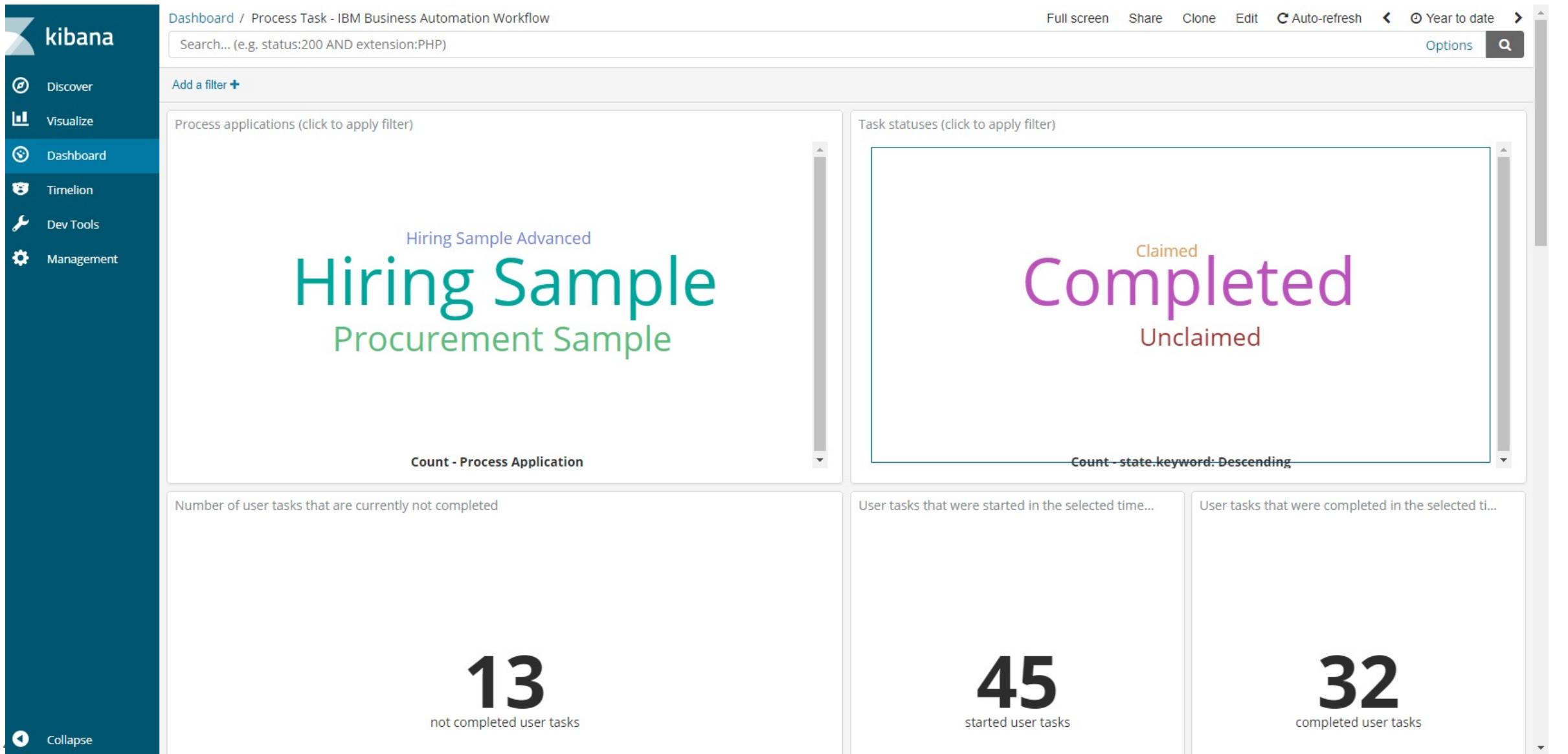
Example of a Custom BPEL Process Dashboards



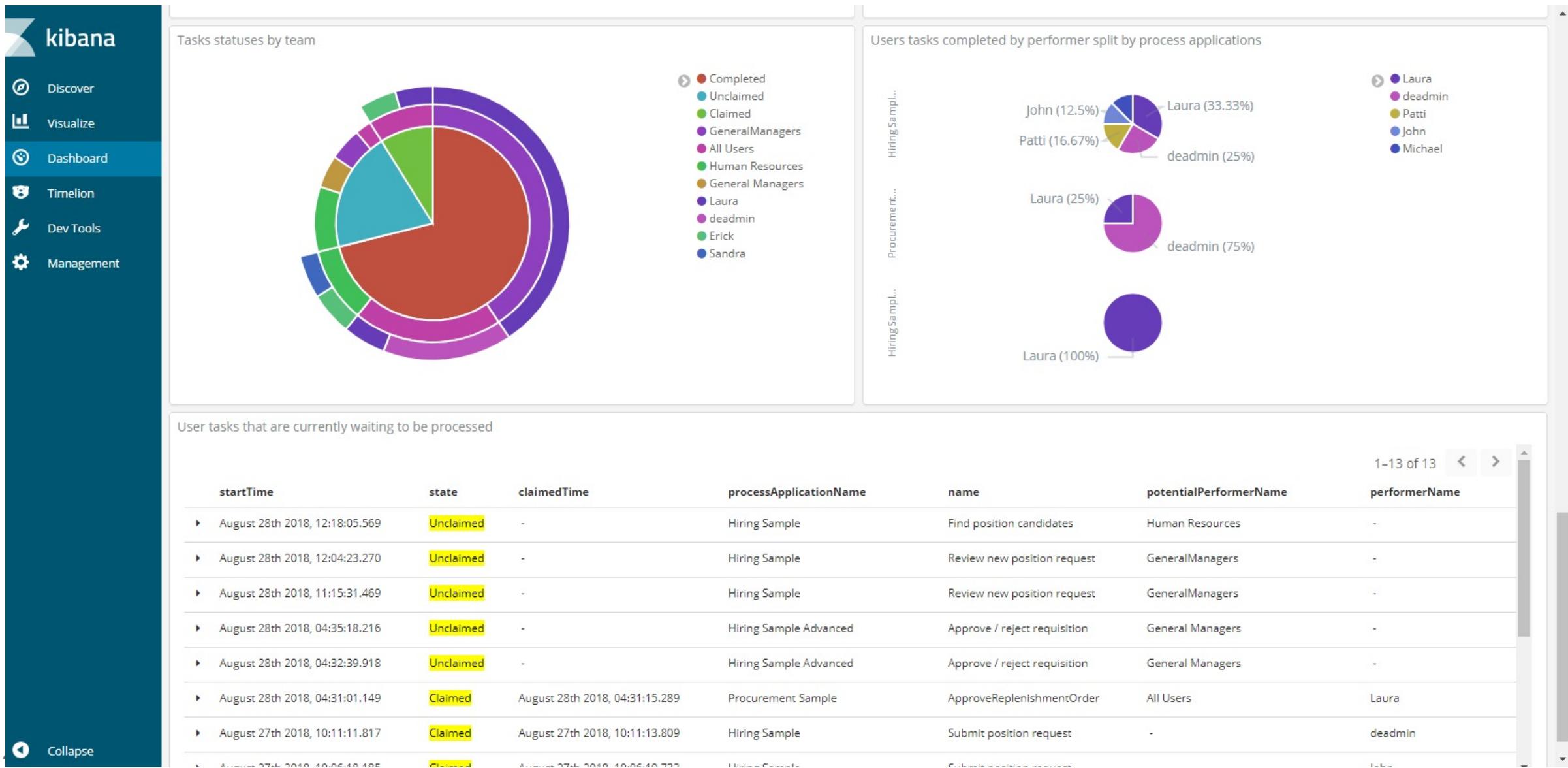
BPEL Process Activities



Kibana BPMN Process Tasks Dashboard



Kibana BPMN Process Tasks Dashboard



BPMN Process Tasks

- Equivalent to Team Performance
- But does not include any actionable capabilities such as Modify Task, View Process Diagram, Assign Task, etc.

The screenshot displays a user interface for managing BPMN process tasks, specifically focusing on team performance and assigned tasks.

Team Performance Dashboard: This section shows four pie charts representing different roles and their status:

- Mortgage Approvers:** 4 Overdue (red), 12 At Risk (yellow), 5 On Track (green).
- Senior Mortgage Approvers:** 1 Overdue (red), 1 At Risk (yellow), 1 On Track (green).
- Reviewers:** 3 Overdue (red), 33 At Risk (yellow), 2 On Track (green).
- Front Office:** 4 Overdue (red), 24 At Risk (yellow), 1 On Track (green).

Open Tasks: This section lists tasks categorized by due date:

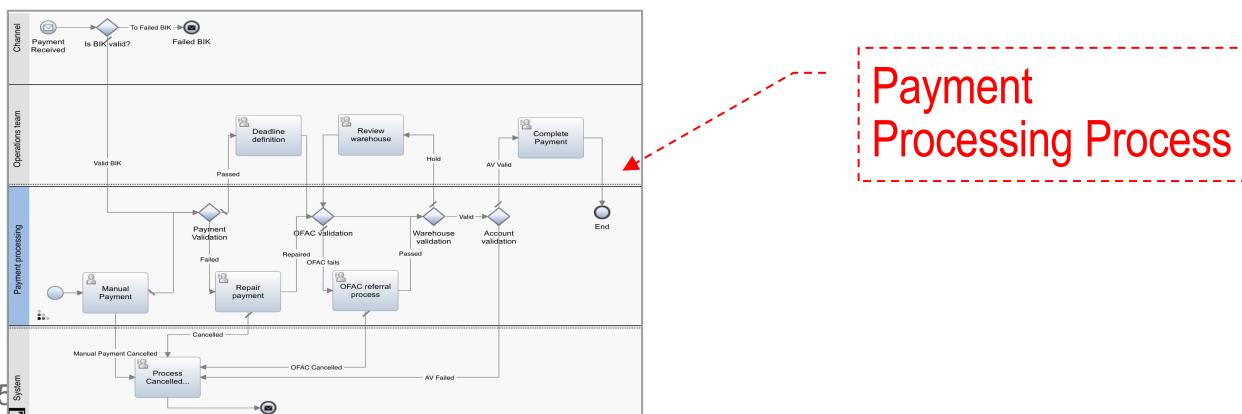
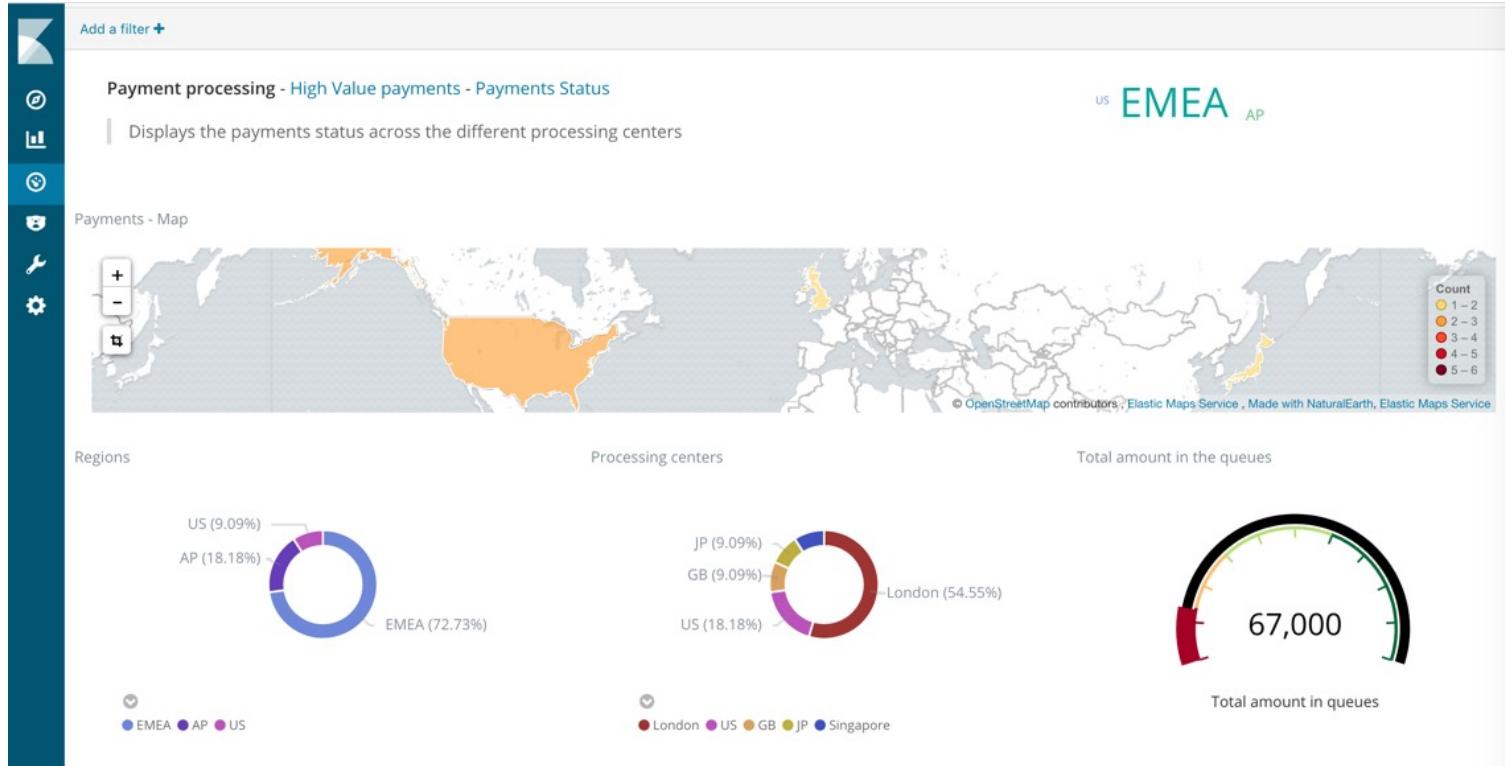
- Older (0):** No tasks listed.
- This week:** A timeline from Monday (M) to Sunday (S). The days from Tuesday (T) to Friday (F) are highlighted in yellow, indicating they have open tasks.
- Overdue (3):** Two tasks are listed under this category:
 - Step: Approve mortgage** (Process Mortgage Request: 356): Due May 22, 2013 at 2:58 PM. Actions available: Modify Task, Reassign Back to Team, View Instance, Modify Instance, View Audit History, View Process Diagram.
 - Step: Approve mortgage** (Process Mortgage Request: 356): Due May 22, 2013 at 2:58 PM. Assigned to Allen Makowski.

Assign: Step: Approve mortgage: A modal dialog for assigning the task to a specific user, Paul Pacholski. The "Assigned To" field contains "Paul Pacholski". An "Assign" button is visible.

Roster: A sidebar providing information about the team members and their assigned tasks.

- Allen Makowski:** Assigned Tasks: 1, Tasks Completed Today: 5.
- A note states: "Individual counts are total counts for all teams. People at the top of the roster have open tasks in the task list."

Example of a Custom Process Dashboard



BAI – Business Automation Insights

Case Dashboards

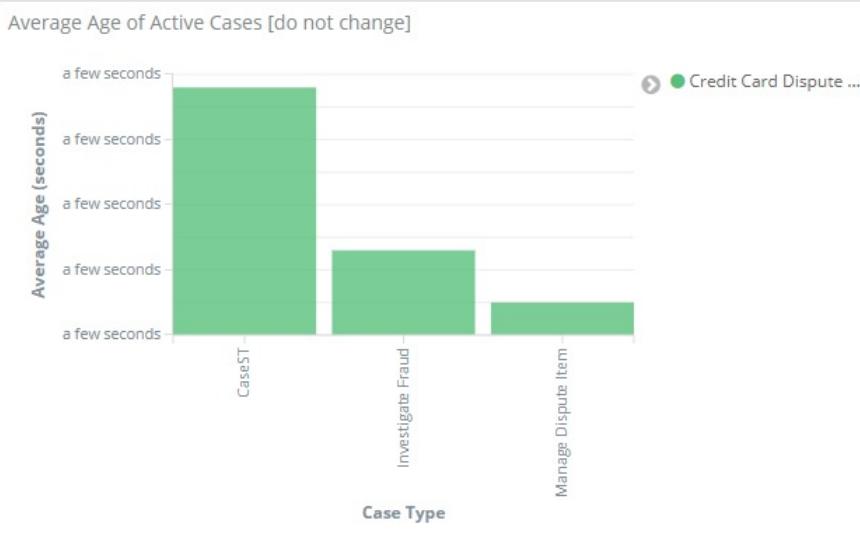
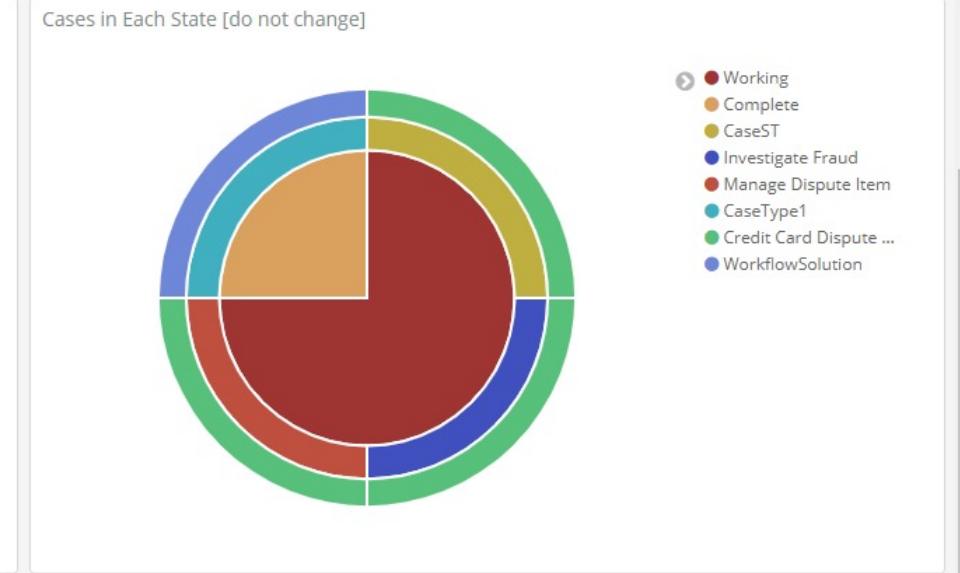
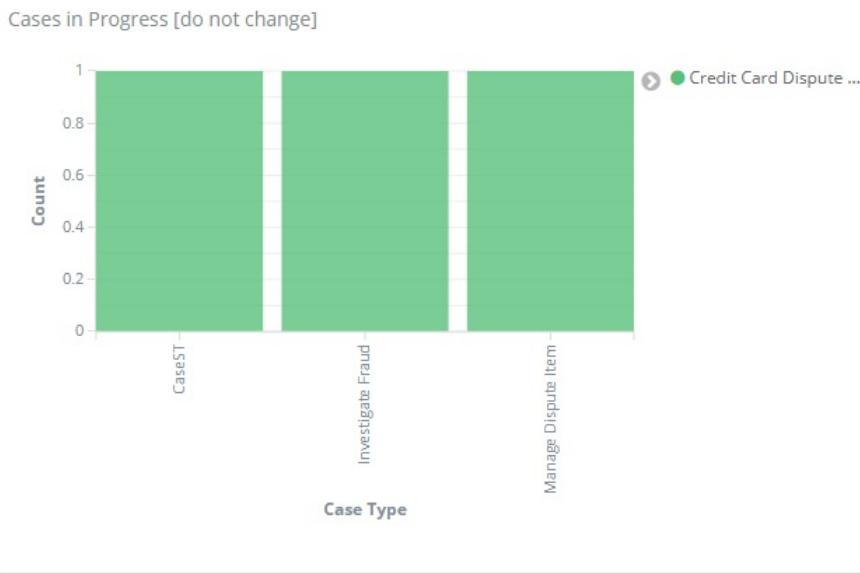


Kibana Case Dashboard

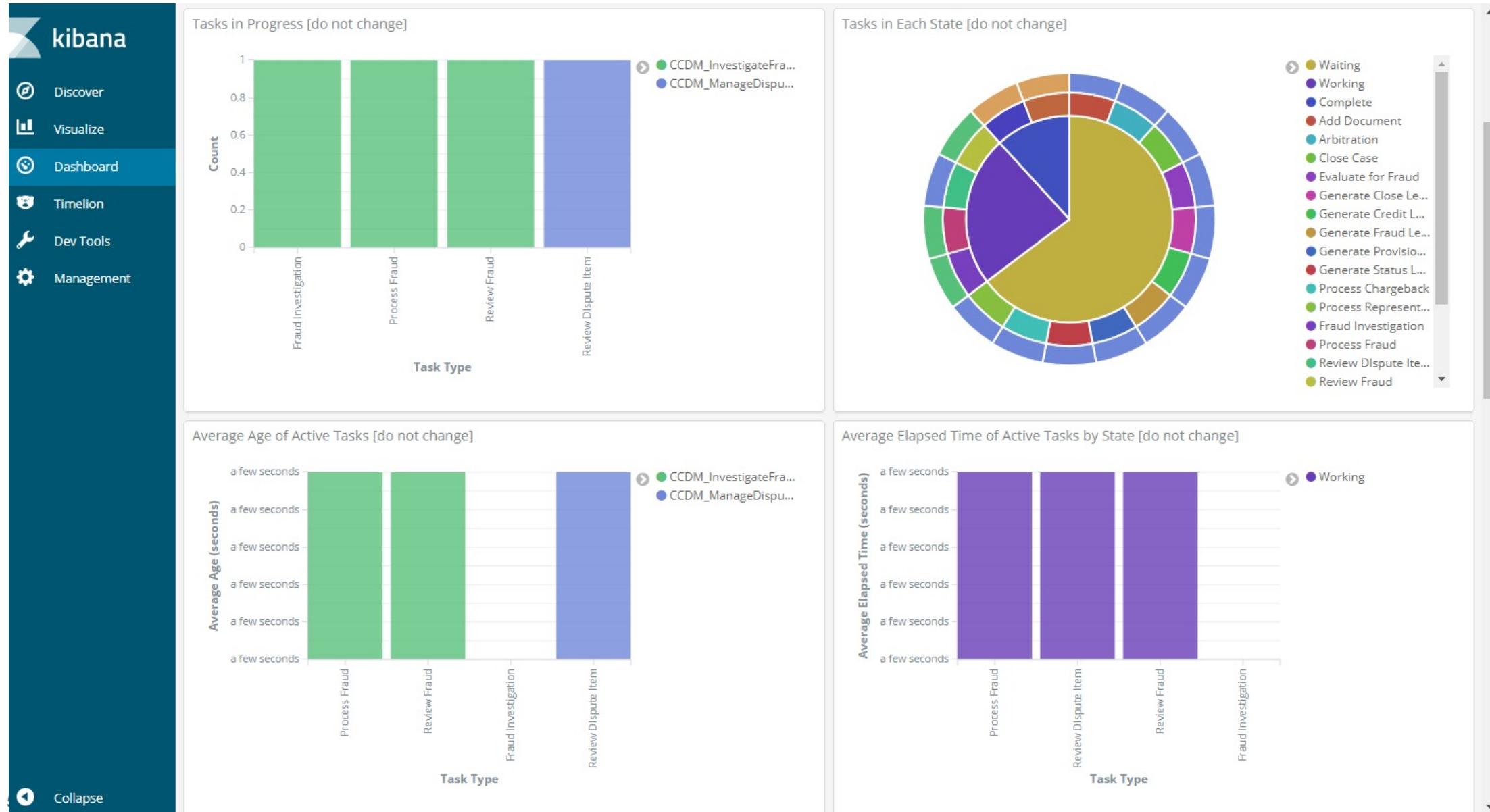
kibana

- Discover
- Visualize
- Dashboard
- Timeline
- Dev Tools
- Management

Collapse



Case Task Business Automation Workflow Dashboard



Case Stages Support in Business Automation Insights New

In this release we added full support for Case Stages in BAI

- Modified Case Event Emitter to process stage objects and produce new ‘stage’ type events.
- Added new Flink job to
 - Process the stage events and store the timeseries in HDFS
 - Create and store the stage summaries in ElasticSearch

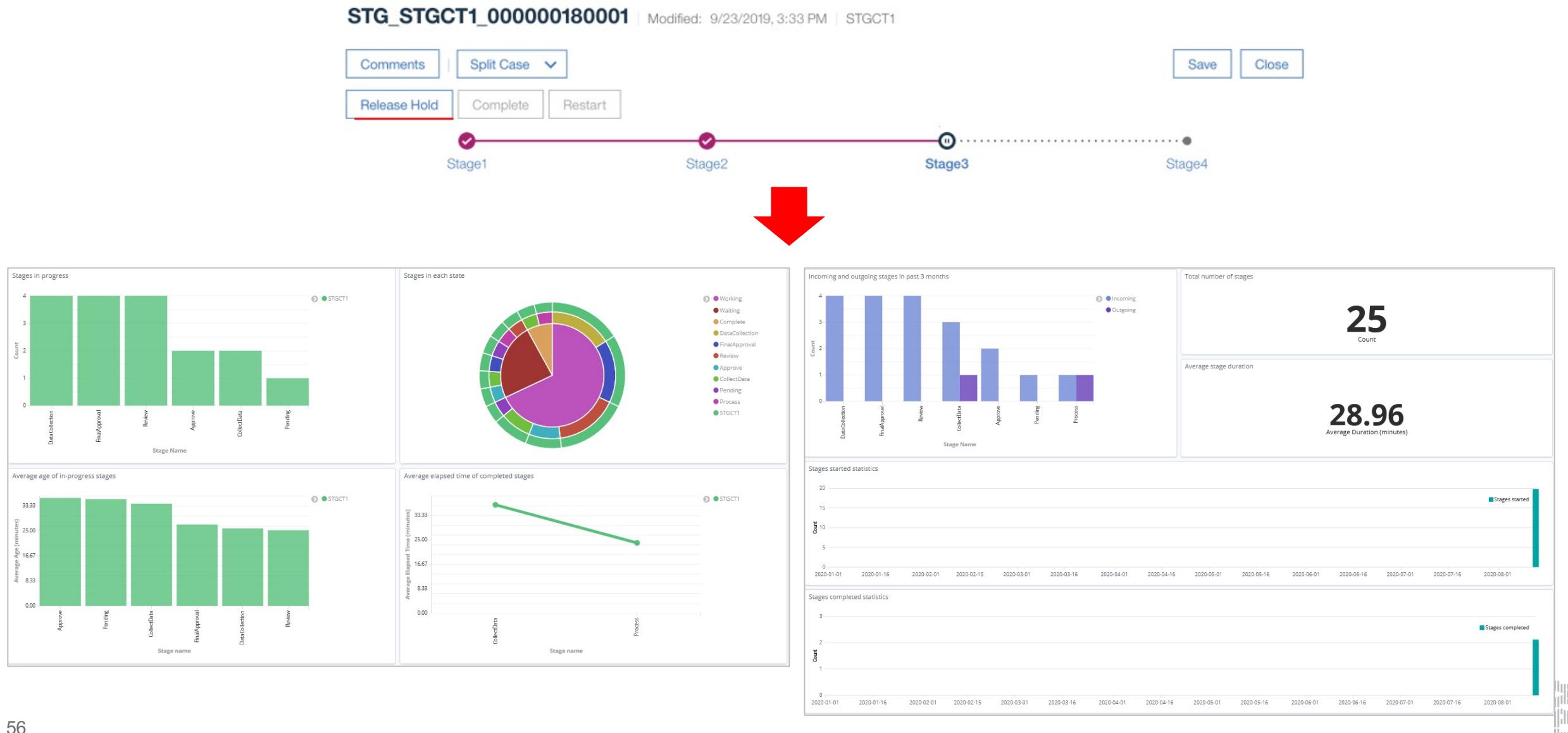
<input type="checkbox"/>	Workflow - Stages
<input type="checkbox"/>	In-progress stages [do not change]
<input type="checkbox"/>	Completed stages [do not change]
<input type="checkbox"/>	Stage summaries [do not change]
<input type="checkbox"/>	Incoming and outgoing stages [do not change]
<input type="checkbox"/>	Incoming and outgoing stages [do not change]
<input type="checkbox"/>	Average age of in-progress stages [do not change]
<input type="checkbox"/>	Stages in progress [do not change]
<input type="checkbox"/>	Stages in each state [do not change]
<input type="checkbox"/>	Incoming and outgoing stages in past 3 months [do not change]
<input type="checkbox"/>	Stage specification [do not change]
<input type="checkbox"/>	Total number of stages [do not change]
<input type="checkbox"/>	Average elapsed time of completed stages [do not change]
<input type="checkbox"/>	Average stage duration [do not change]
<input type="checkbox"/>	Stages completed statistics [do not change]
<input type="checkbox"/>	Stages started statistics [do not change]

Kibana artifacts related to Case Stages:
• 5 Searches
• 10 Visualizations
• 1 Dashboard

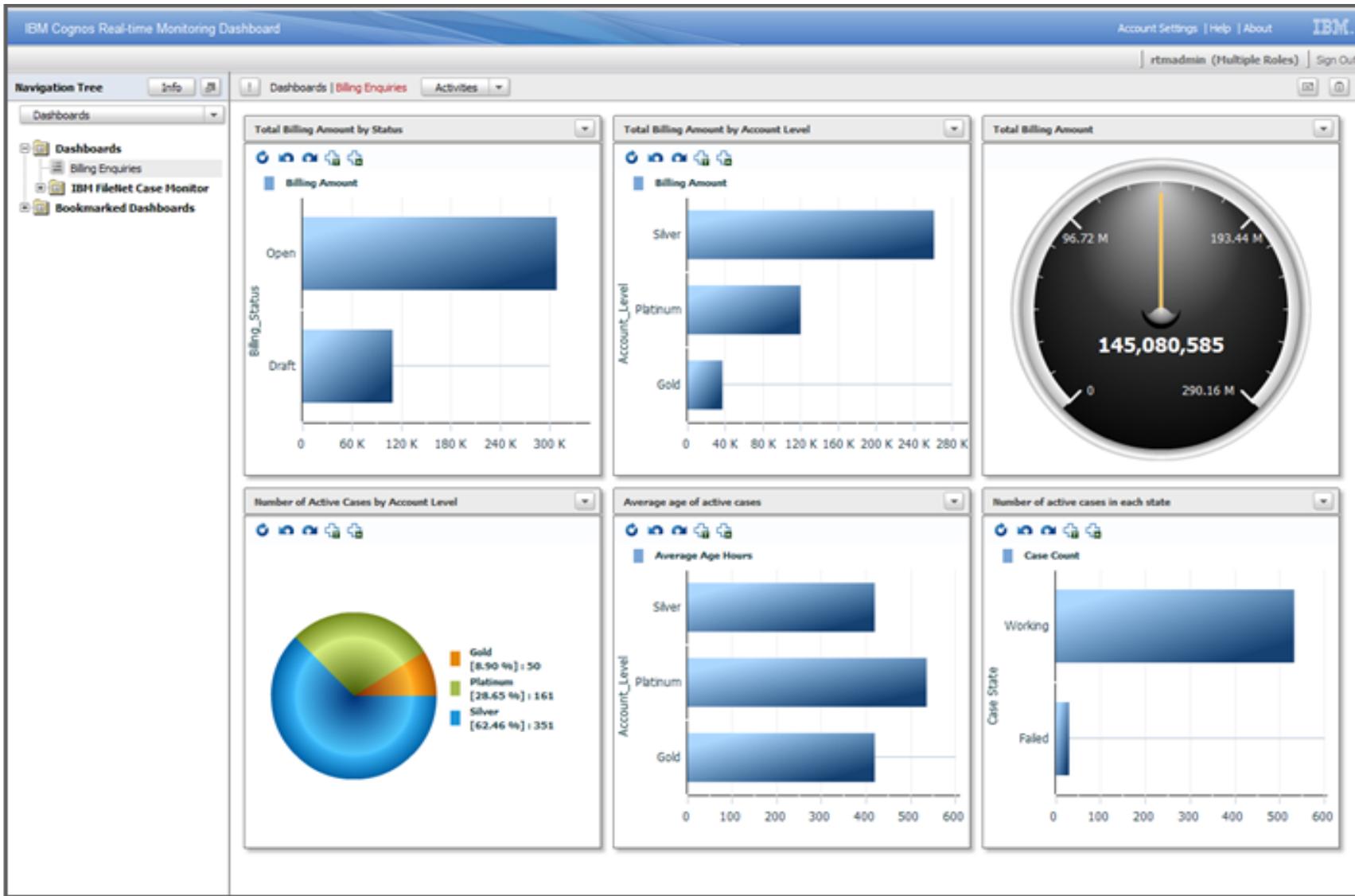


Case Stages Dashboard and Visualizations

New

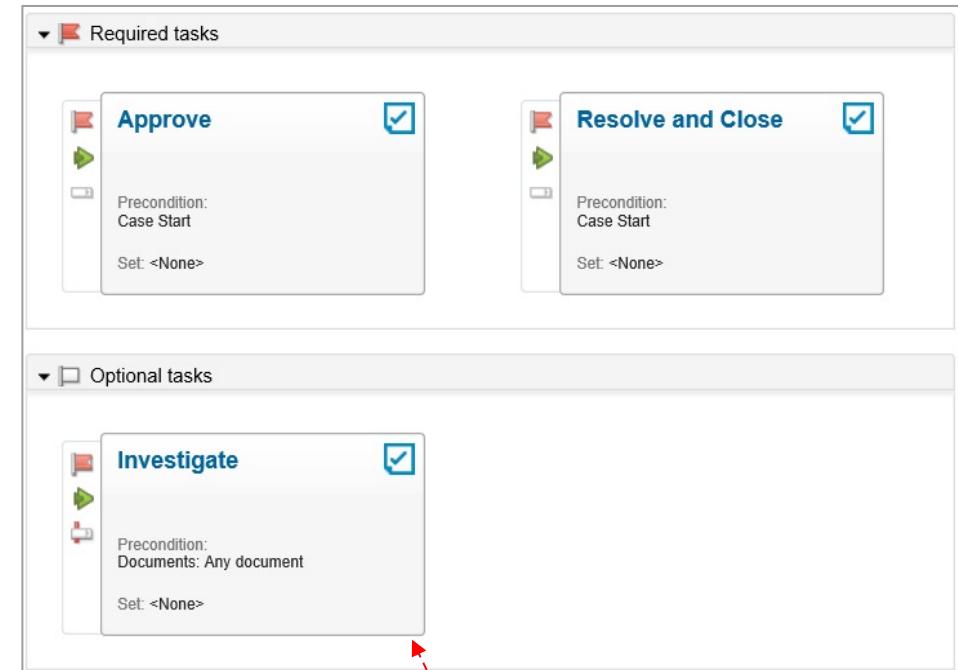
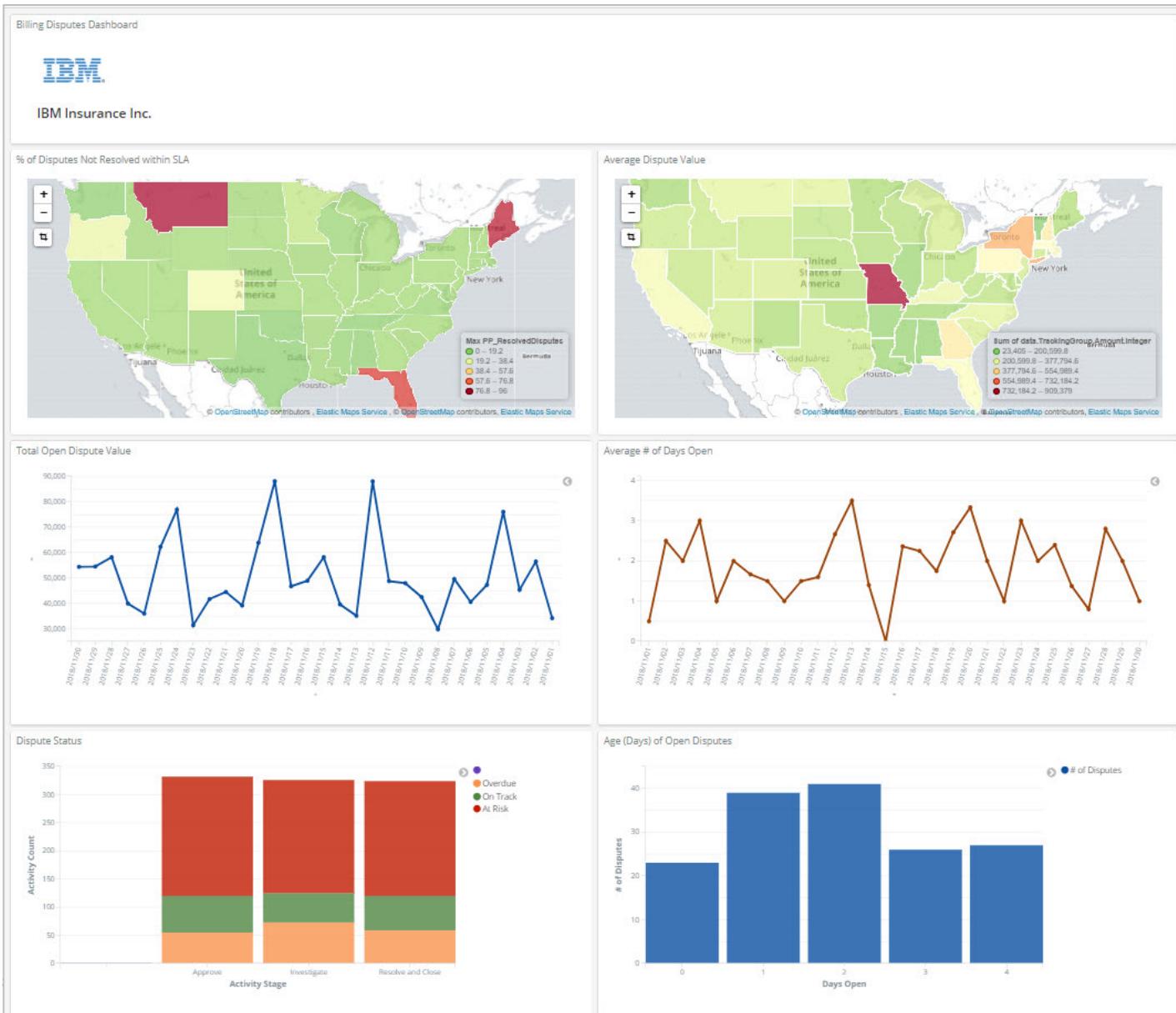


IBM Case Monitor Dashboards



Kibana Case Dashboards were inspired
by the IBM Case Monitor dashboards

Example of a Custom Case Dashboards



Billing Dispute Resolution Case

Billing Disputes Case



Using Data Lake for Data Science

IBM Watson Studio Projects Tools Community Services Manage Support Docs Paul Pacholski's Account

In []:

In [1]: *# The code was removed by Watson Studio for sharing.*

Out[1]:

	State	Process Stage	Task Age	Task Status	Dispute Amount	Time Stamp	Open Disputes
0	OR	Approve	0	On Track	49433	2018/11/21	2114
1	DE	Resolve and Close	0	On Track	22540	2018/11/21	2641
2	NV	Investigate	4	Overdue	55039	2018/11/24	1292
3	OK	Investigate	4	Overdue	50521	2018/11/05	2962
4	ID	Approve	4	Overdue	37206	2018/11/08	1875

In [29]:
newdf = df_data_1
newdf = newdf.drop('State', axis=1)

In [33]: df = pd.concat([pd.get_dummies(df_data_1[['State']]), newdf], axis=1)

In [18]: df_data_1['NumericState'] = le.transform(df_data_1['State'])

In [23]:
import numpy as np
np.sqrt(0.8)

Out[23]: 0.89442719099991586

In [34]: df.corr()

Out[34]:

	State_AK	State_AL	State_AR	State_AS	State_AZ	State_CA	State_CO	State_CT	State_DC	State_DE	...	State_VI	State_V
State_AK	1.000000	-0.016545	-0.017911	-0.017604	-0.017082	-0.016654	-0.018012	-0.016869	-0.017082	-0.019656	...	-0.018112	-0.01771
State_AL	-0.016545	1.000000	-0.016932	-0.016642	-0.016149	-0.015744	-0.017028	-0.015948	-0.016149	-0.018582	...	-0.017123	-0.01671

State	Task Age	Dispute Amount	Open Disputes
State_NY	0.057523	0.568539	-0.002725
State_TX	-0.024151	0.322863	0.004377
State_MO	0.065641	0.446561	-0.008155
State_CA	0.062294	0.155869	0.007074
State_FL	0.071575	0.142554	0.002970

Significant correlation discovered between certain states and key process metrics

BAI – Business Automation Insights

Decision Dashboards



ODM - Predefined ODM Views

Select items for your own
predefined dashboards

<input type="checkbox"/> Decisions average duration	 Vertical Bar	<input type="checkbox"/> Decisions rules table	 Data Table
<input type="checkbox"/> Decisions average per second	 Metric	<input type="checkbox"/> Decisions Ruleset in error	 Data Table
<input type="checkbox"/> Decisions count	 Metric	<input type="checkbox"/>  Decisions Ruleset selector	 Controls
<input type="checkbox"/> Decisions distribution	 Pie	<input type="checkbox"/> Decisions tasks table	 Data Table
<input type="checkbox"/> Decisions duration	 Vertical Bar	<input type="checkbox"/> Decisions timeline	 Vertical Bar
<input type="checkbox"/> Decisions errors cloud	 Tag Cloud	<input type="checkbox"/>  Decisions trace selector	 Controls
<input type="checkbox"/> Decisions global distributions	 Timelion		



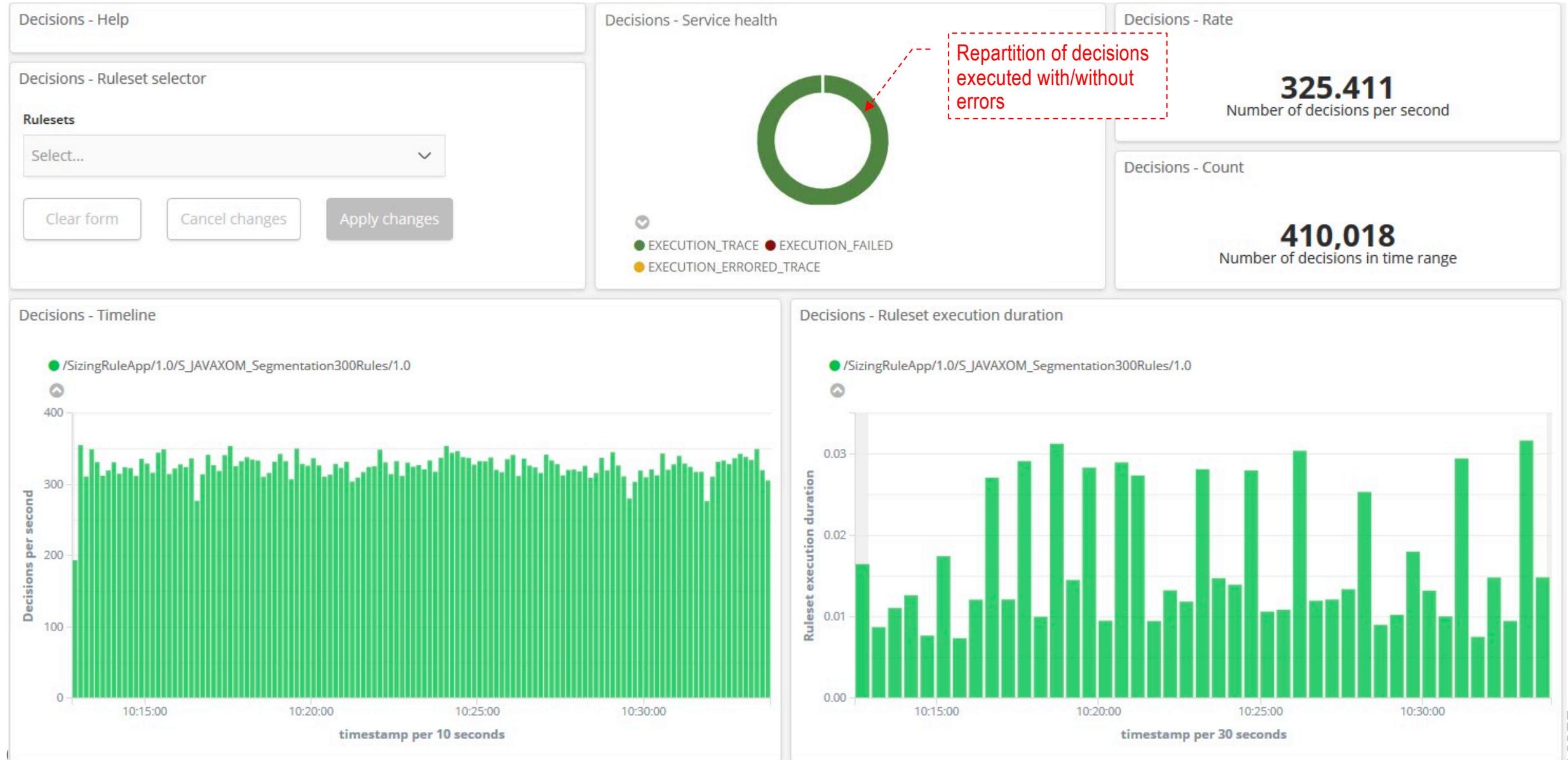
ODM - Decision data

1-50 of 5

Time	rulesetPath	duration	type
▼ February 5th 2019, 13:37:55.481	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	1.00	EXECUTION_TRACE
Table JSON		View surrounding documents	View sir
Detailed decision data (input, output, executed rules) – Used to create visualizations			
t _id		Q Q □ * 05b92ab8-cb7c-41fb-bfa4-225dd9c512fa0	
t _index		Q Q □ * odm-timeseries-write	
# _score		Q Q □ * -	
t _type		Q Q □ * odm-timeseries	
# data.test_deployment.loan_validation_with_score_and_grade.in.borrower.birth		Q Q □ * -101,779,200,000	
# data.test_deployment.loan_validation_with_score_and_grade.in.borrower.birthDate		Q Q □ * -101,779,200,000	
# data.test_deployment.loan_validation_with_score_and_grade.in.borrower.creditScore		Q Q □ * 600	
t data.test_deployment.loan_validation_with_score_and_grade.in.borrower.firstName		Q Q □ * Paul	
t data.test_deployment.loan_validation_with_score_and_grade.in.borrower.lastName		Q Q □ * Wilson	
? data.test_deployment.loan_validation_with_score_and_grade.in.borrower.latestBankruptcy		Q Q □ * ⚠ -	
# data.test_deployment.loan_validation_with_score_and_grade.in.borrower.latestBankruptcyChapter		Q Q □ * -1	
# data.test_deployment.loan_validation_with_score_and_grade.in.borrower.latestBankruptcyDate		Q Q □ * -	
t data.test_deployment.loan_validation_with_score_and_grade.in.borrower.latestBankruptcyReason		Q Q □ * -	
? data.test_deployment.loan_validation_with_score_and_grade.in.borrower.spouse		Q Q □ * ⚠ -	
t data.test_deployment.loan_validation_with_score_and_grade.in.borrower.ssn.areaNumber		Q Q □ * 89	
# data.test_deployment.loan_validation_with_score_and_grade.in.borrower.ssn.digits		Q Q □ * 7	
t data.test_deployment.loan_validation_with_score_and_grade.in.borrower.ssn.fullNumber		Q Q □ * 89-45-896	
t data.test_deployment.loan_validation_with_score_and_grade.in.borrower.ssn.groupCode		Q Q □ * 45	
t data.test_deployment.loan_validation_with_score_and_grade.in.borrower.ssn.serialNumber		Q Q □ * 896	
t data.test_deployment.loan_validation_with_score_and_grade.in.borrower.ssncode		Q Q □ * 89-45-896	
# data.test_deployment.loan_validation_with_score_and_grade.in.borrower.yearlyIncome		Q Q □ * 554,000	



ODM - Decision performance monitoring



ODM - Detailed decision artifact executions

Decisions - Tasks table

Tasks	Rulesets	
loanvalidation	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	.grade/1.0
loanvalidation#initResult	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	.grade/1.0
loanvalidation#validation	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	
loanvalidation#computation	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	
loanvalidation#eligibility	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	
loanvalidation#insurance	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	

Executed tasks sequence

Decisions - Rules table

Rules	
validation.borrower.checkAge	/test_deployment/1.0/loan_validation_with_score_a
validation.borrower.checkName	/test_deployment/1.0/loan_validation_with_score_a
validation.borrower.checkSSNareanumber	/test_deployment/1.0/loan_validation_with_score_a
validation.borrower.checkSSNdigits	/test_deployment/1.0/loan_validation_with_score_a
validation.borrower.checkZipcode	/test_deployment/1.0/loan_validation_with_score_a
computation.initialCorporateScore	/test_deployment/1.0/loan_validation_with_score_a
computation.neverBankruptcy	/test deployment/1.0/loan validation with score a

Executed rules sequence

Decisions - Rulesets table

Rulesets
/test_deployment/1.0/loan_validation_with_score_and_grade/1.0

Ruleset list

Executions Average Execution duration (ms)

1,000 0.33

ODM - Decision Health monitoring

The screenshot displays the ODM Decision Health monitoring interface with the following components:

- Decisions - Status selector:** A panel with a dropdown menu for "Status" (with options "Select...", "Running", "Completed", "Failed", "Aborted"), and buttons for "Clear form", "Cancel changes", and "Apply changes".
- Decisions - Errors cloud:** A panel showing execution error messages if any.
- Decisions - Rulesets in error:** A panel displaying the message "No results found".
- Errors - Messages:** A table titled "Errors - Messages" showing a list of messages. The columns are "Time", "rulesetPath", "value", and "type". The data is as follows:

Time	rulesetPath	value	type
February 5th 2019, 13:37:55.481	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	1.00	EXECUTION_TRACE
February 5th 2019, 13:37:55.481	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	3.00	EXECUTION_TRACE
February 5th 2019, 13:37:55.465	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	3.00	EXECUTION_TRACE
February 5th 2019, 13:37:55.278	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	1.00	EXECUTION_TRACE
February 5th 2019, 13:37:55.262	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	2.00	EXECUTION_TRACE
February 5th 2019, 13:37:55.262	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	1.00	EXECUTION_TRACE
February 5th 2019, 13:37:55.242	/test_deployment/1.0/loan_validation_with_score_and_grade/1.0	5.00	EXECUTION_TRACE

Annotations in red boxes highlight specific areas:

- A red dashed box labeled "Execution error messages if any" points to the "Errors cloud" panel.
- A red dashed box labeled "Decisions list with detailed data" points to the "Search" table.

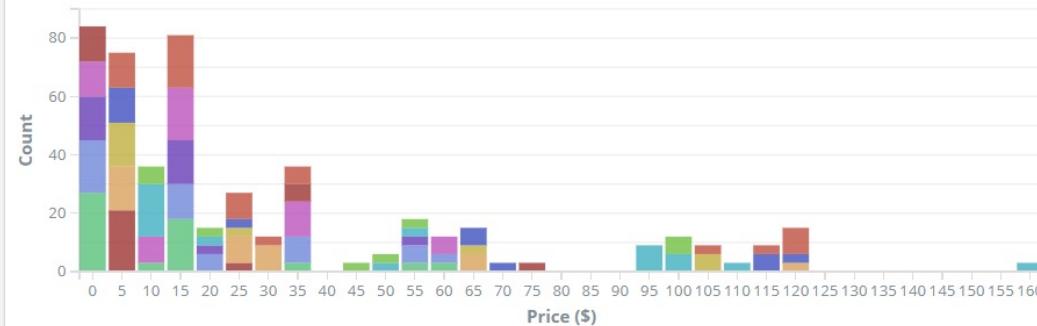
ODM - Example of Custom Business Dashboard

Sample Decisions Shipment - Help

Sample Decisions Shipment - Count

600
Shipment pricing requests **29.225**
Average price (\$)

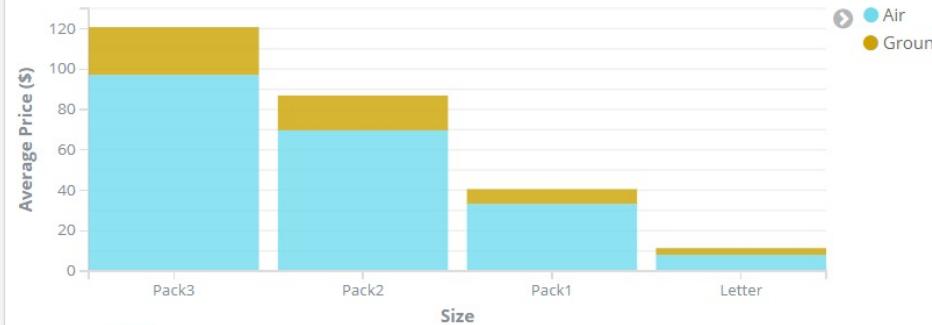
Sample Decisions Shipment - Price per distance



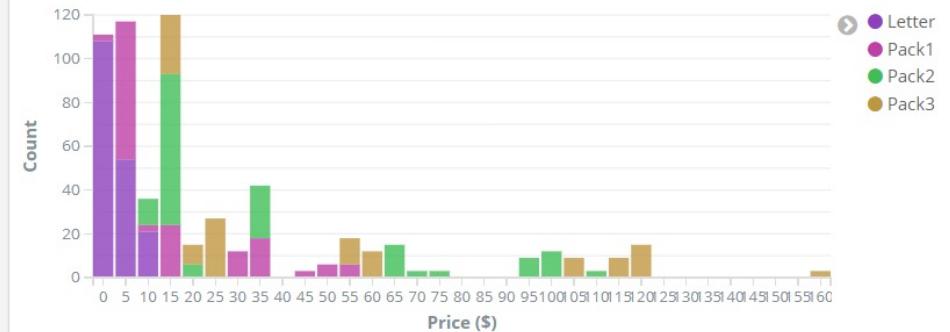
Sample Decisions Shipment - Distribution



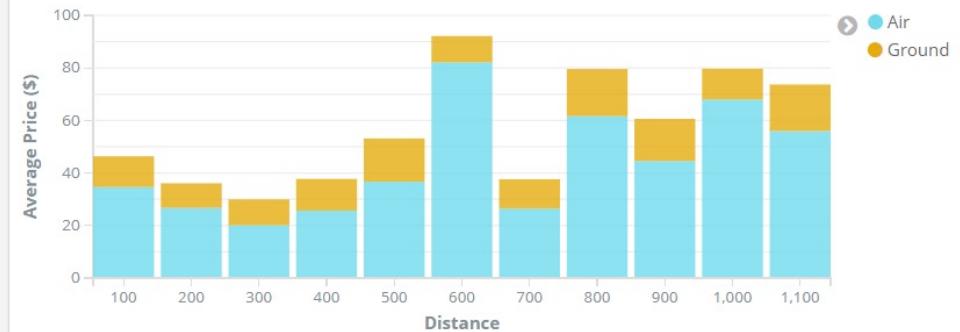
Sample Decisions Shipment - Average Price per size



Sample Decisions Shipment - Price per size



Sample Decisions Shipment - Average price per distance

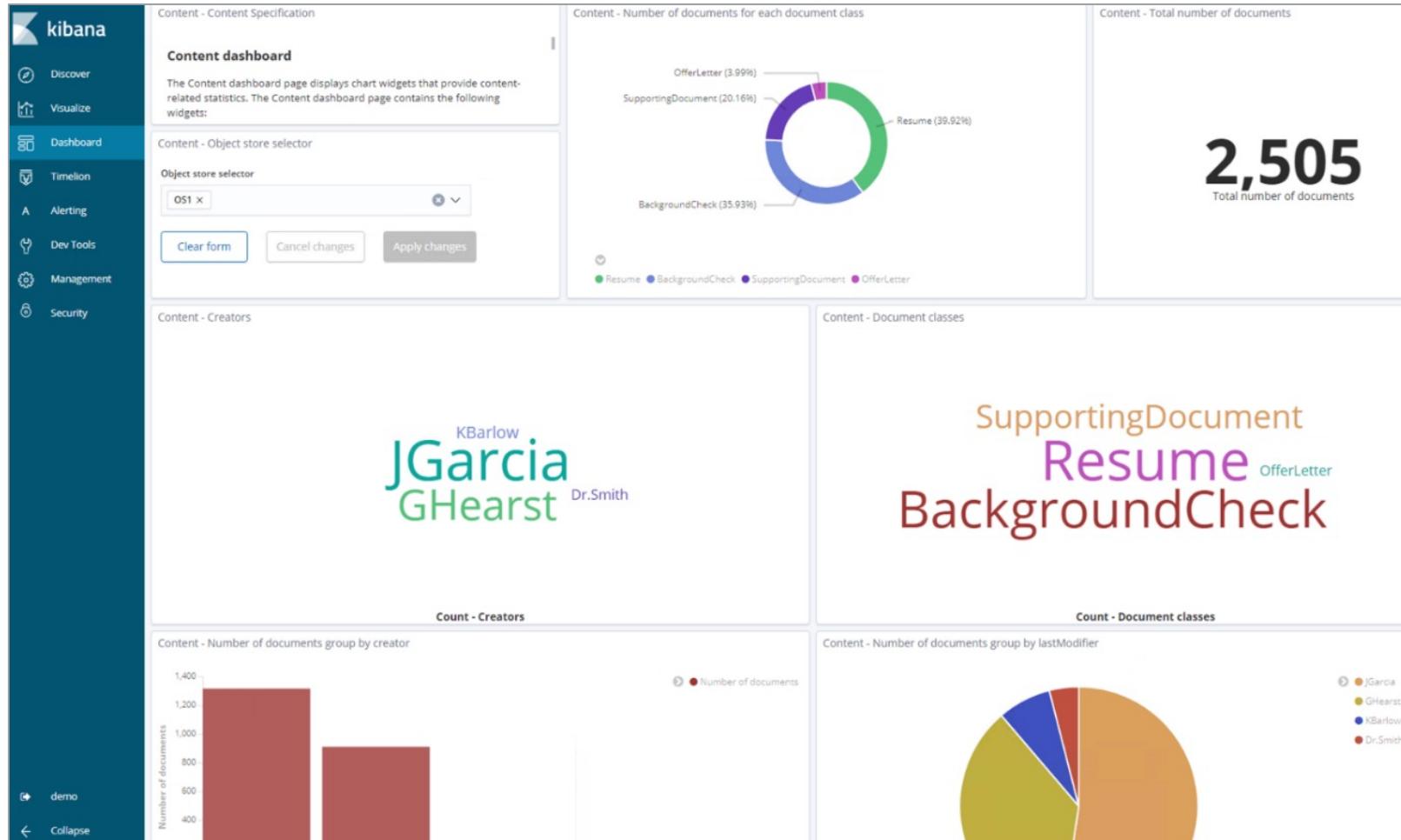


BAI – Business Automation Insights

Content Dashboards



FileNet Content Manager Dashboards



The Content dashboard page displays chart widgets that provide content-related statistics. The Content dashboard page contains the following widgets:

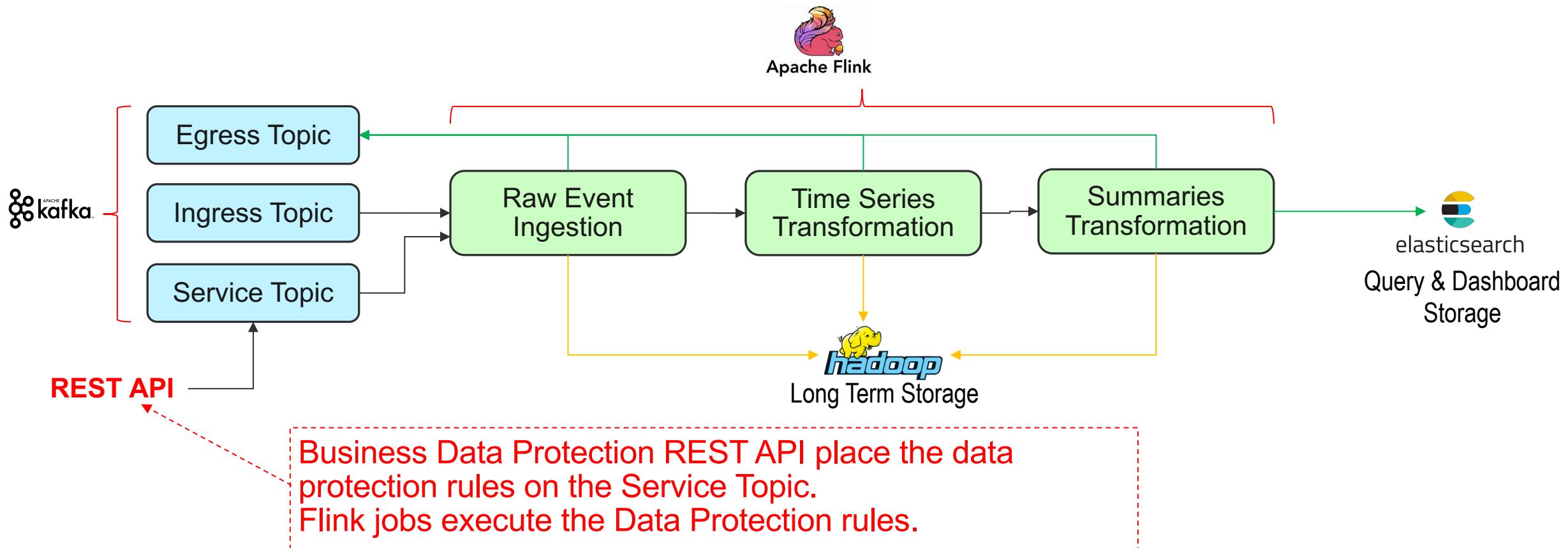
- Object store selector: select the object store to analyze
- Creators: show top 5 creators in descending order
- Document classes: show top 5 document classes in descending order
- Number of documents: show number of unique documents in the object store
- Number of documents group by creator
- Number of documents group by lastModifier
- Number of documents for each document class
- Number of created documents by timestamp
- Detail of content event meta data information

BAI – Business Automation Insights

Business Data Protection



Enabling Business Data Protection



- Data Protection Rules are injected using Admin REST API which post the rules to the Admin Service Topic
- Only data destined to Long Term Storage has data protection feature enabled



Enabling Business Data Protection REST API

- **Enabling** business data protection
 - First, the rules must be uploaded as JSON files using REST API.
 - The REST API endpoint for uploading the rules can be Ingress or NodePort
 - Ingress Example:

```
curl -X POST https://mycluster.icp/admin/api/actions
-H 'content-type: multipart/form-data'
-F file=@/users/bai/validRules.json
```
- **Disabling** business data protection
 - Restart the Flink processing job (ICM/BPMN/Ingestion)
 - Or upload an empty JSON object {} using above method



Example of Pseudonymization Rule for Tracking Group

```
{  
  "type": "encrypt",  
  "params": {  
    "key": "MTIzNDU2NzgxMjM0NTY3OA==",  
    "iv": "MTIzNDU2Nzg4NzY1NDMyMQ=="  
  },  
  "fields": [  
    "$['trackedFields']['HiringManager.string']",  
    "$['data']['aEmpRequisition121381434563922']['HiringManager.string']",  
    "$['data']['bpm']['tracking-point']['tracked-field'][?(@.name=='HiringManager')]['content']"  
  ]  
}
```

JSON Paths to three fields that have the name of he Hiring Manger

Pre Tracking Point

Tracking group:

 [TrackingGroup](#)

Select...

New...



Performance warehouse ID:

323edbc2-fd27-44bf-8239-8feb456a33e3

Sort tracked fields by:

Default Order



tw.local.requisition.reqNum



HiringManager (string)

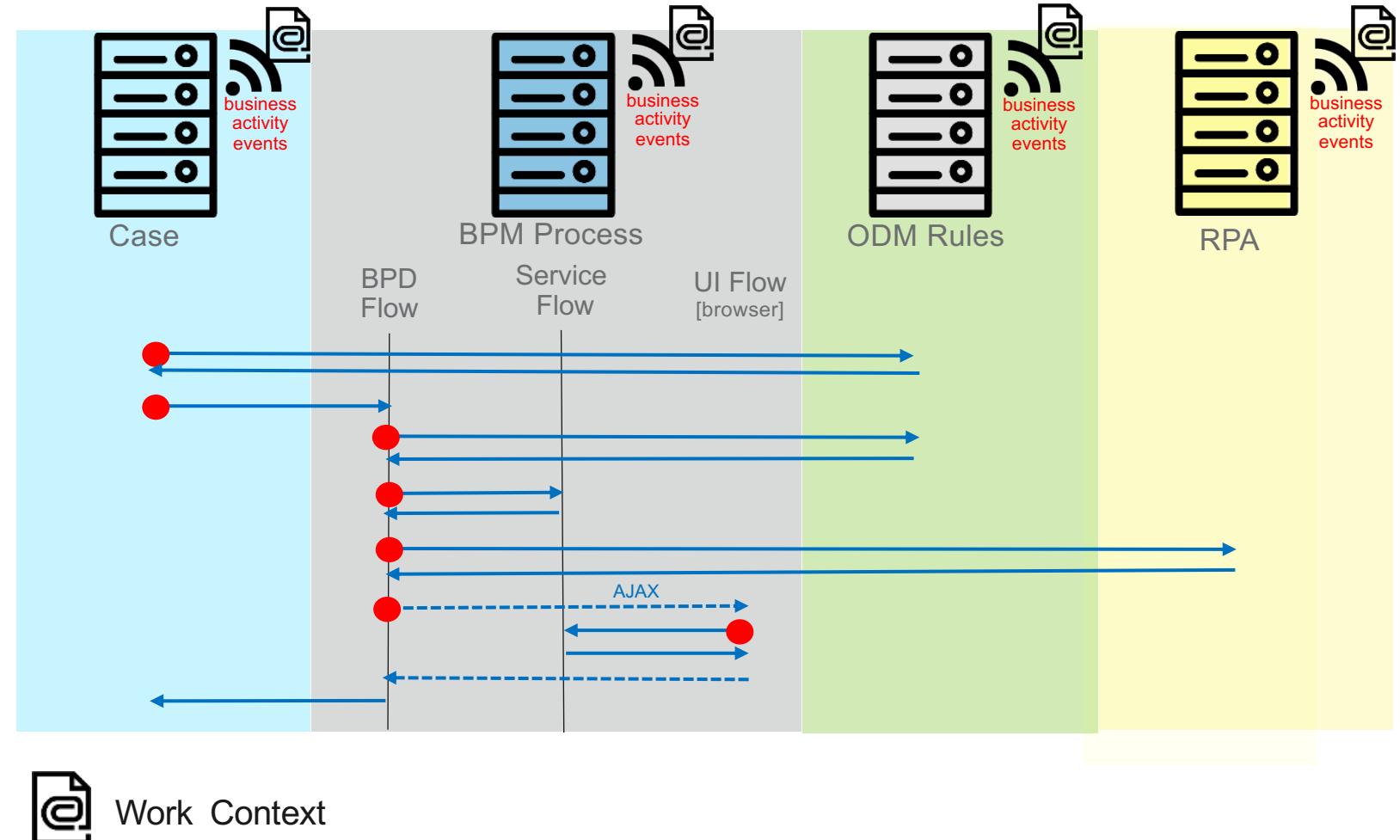
BAI – Business Automation Insights

Cross DBA Event Correlation



What is Cross DBA Event Correlation?

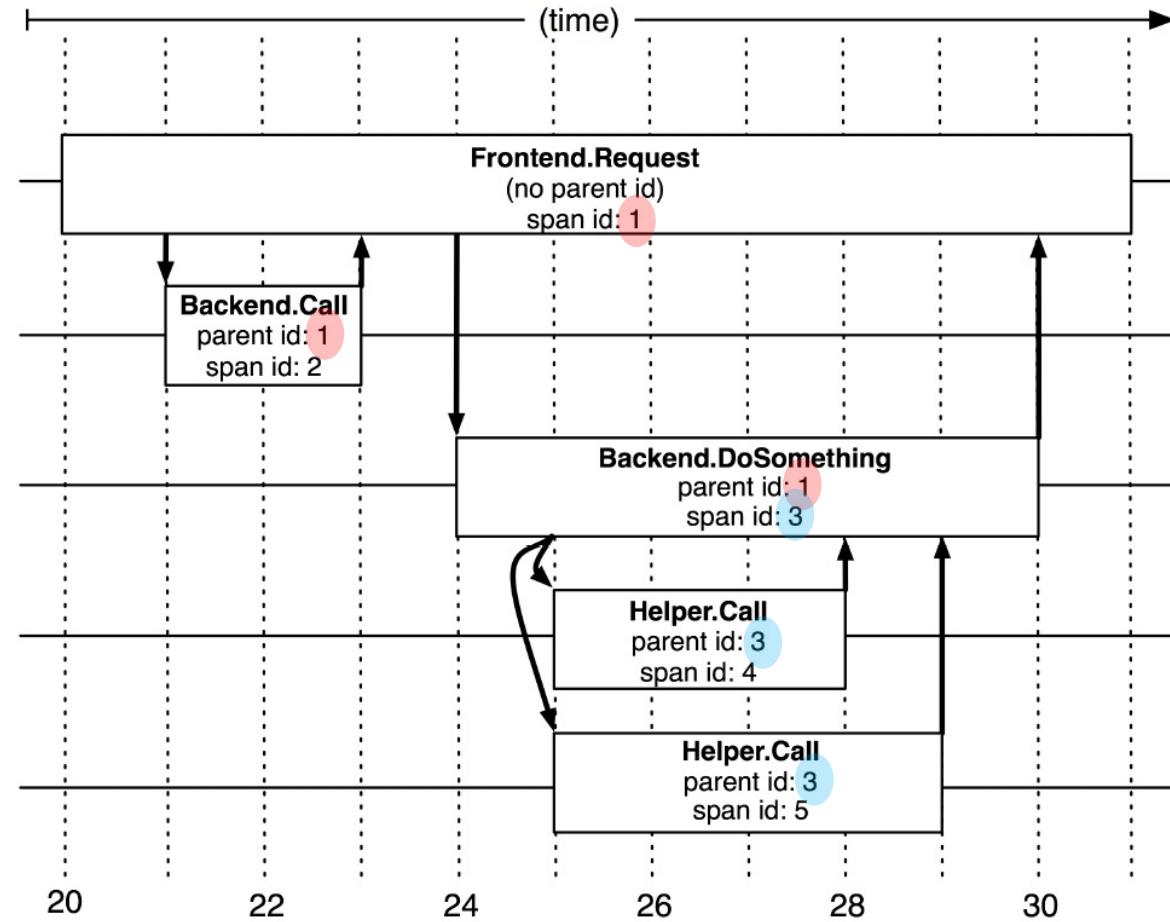
- Ability to trace the chain of calls across the separate DBA components (Case, BPM, ODM, RPA, Content etc.) as they interact with each other as part of user work.
- To be able to identify source of events and trace determine how they propagate to each DBA component, we added BAI Event “Work Context”



https://www.ibm.com/support/knowledgecenter/SSYHZ8_20.0.x/com.ibm.dba.bai/topics/con_bai_events_workcontext_correlation.html

Work Context Propagation

- Parent component manages the Work Context
 - Adds to BAI event
 - Passes it to a child (which is another DBA component i.e. Process calls ODM Decision)
- Work Context
 - Parent id 
 - Span Id
 - Null (if top parent)
 - Span Id of parent
 - Span Id
 - Parent Id + n (where n is the number of calls made by a component, first call n=1)
- Kibana or MI tools can use Work Context to reconstruct the call sequence



Demo

