Cloudera Edge Management 1.4.0

Using Agent Parameters in a Dataflow

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Contents

Overview of agent parameters in CEM

Cloudera Edge Management (CEM) is an edge management solution for IoT and streaming use cases. You can use CEM to manage, control, monitor thousands of MiNiFi agents deployed at the edge. Parameters provide the ability to parameterize the values of processors and service properties in the flow including sensitive properties. You can create and configure parameters within the CEM UI.

CEM helps customers to work on TechOps or IoT type use cases. The challenges with IoT are around edge management like the inability to control and manage edge agents, difficulty in collecting real-time data from edge devices directly and most importantly, the trouble with updating specific sets of agents with edge applications. CEM addresses those challenges. CEM paves the way for transformative solutions across IoT initiatives across multiple industry verticals.

By using CEM you can manage numerous use cases. Here is a list of examples:

- Monitoring oil rig data
- Trucking system
- Laptop tracking
- Monitoring oil refinery data

In this section we will describe two scenarios where you can use parameters.

In the first scenario, we will describe how to create a single flow, parameterize numerous agent IDs, and track data.

In the second scenario, we will describe how to create a single flow, parameterize the log location, and collect data when log location changes.

Tracking numerous agents scenario

You are a supervisor in an oil company that is engaged in exploration, development, and production of crude oil. Your company has deployed numerous oil rigs on site X and wants you to monitor data coming out for those oil rigs. Learn how to use parameters to solve such challenges.

Earlier, you needed to create one dataflow for each and every oil rig. So, you created numerous dataflows to monitor numerous oil rigs.

Solution

Parameters can solve this challenge of creating numerous dataflow for tracking purposes. With the parameter concept introduced in CEM, you can create a single dataflow and use this to monitor data from all the oil rigs.

1. You use your tooling to create agent specific parameter contexts for the agent IDs of the newly added servers.
2. With these items created, you then publish your flow and make the updates available to agents. EFM, when agents heartbeat in with a specific context, are given an update to a flow with the new V2 agent IDs provided. Those agents that have not had a specific context made will use the default, version 1 agent IDs.

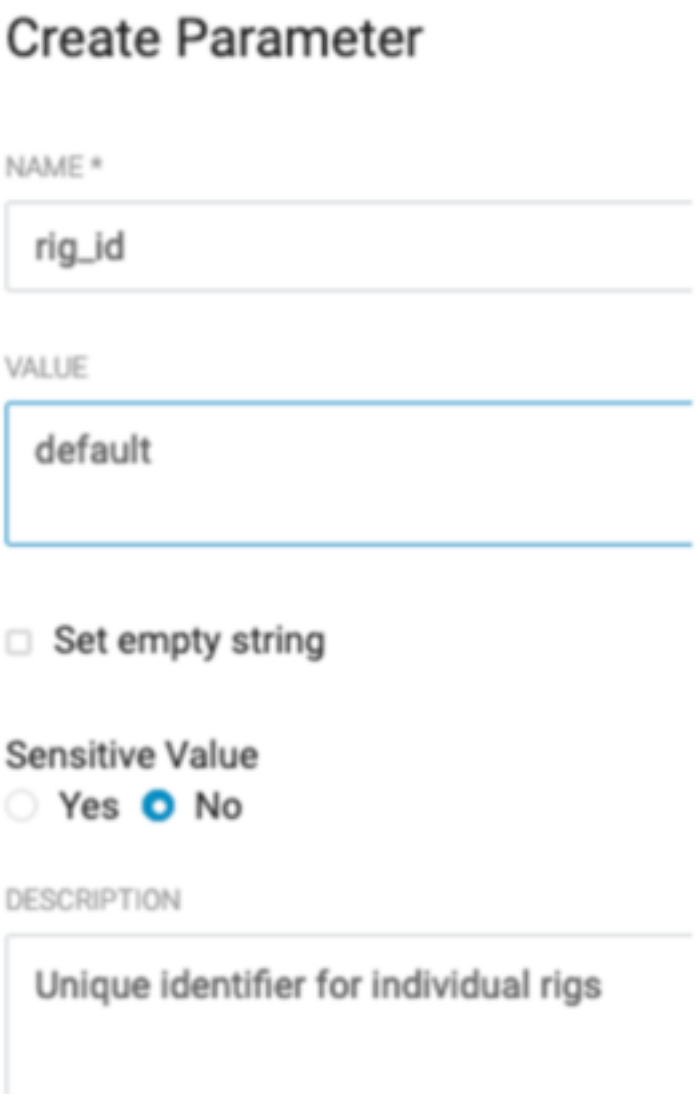
Initial setup

You have a class with numerous MiNiFi agents deployed on all the oil rigs and running. You have built a dataflow inside this class, and published this dataflow to all the MiNiFi agents deployed on the oil rigs. The dataflow gathers logs from the desired location, for example /opt/myapp/logs, on the machines and then performs the associated logic to only get the content which is WARNING or ERROR. You are managing and monitoring the warnings and errors that are collected at the EFM server for every heartbeat from the oil rigs.

Actual steps

1. To have the agents running the same flow assigned, assign them all to the same class, design your flow, establish your processors and controller services. In this example, the class is RigClass.
2. Open the controller service you want to parameterize and select the blue arrow next to the property of interest.

3. Specify the name as rig_id for the parameter and an optional default value (here, listed as default) with optional description. Once populated, select Add.



4. Select Apply on the Controller Service pane to complete this configuration.

   This establishes a parameter context for the flow. You can provide agent-specific values to override the default values of rig_id. Alternatively, you can choose to deploy the flow with default values.

5. Given that there are potentially a large number of instances we are addressing, the design choice was made to make this available programmatically without any specific UX at this juncture. You can issue these commands from the command line, a REST client in your program of choice, or through the Swagger UI (http://<efm address:port>/efm/swagger/ui.html). This example shows command line curl and Swagger approaches for addressing these items. If you manually assigned IDs to your agents, through nifi.c2.agent.identifier in bootstrap.conf, compile your list of those entities. If you have not, we can collect the auto-generated identifiers.

   - For collecting the auto-generated IDs, use the REST API.

     Through Swagger, use the following endpoint: http://localhost/efm/swagger/ui.html#/Agents/getAgents

     By clicking Try it out, you can execute. Look through the results and extract the agent identifiers, such as:

```
{
   "identifier": "myagentidentifier1",
   "agentClass": "RigClass",
   "agentManifestId": "b472989e-705a-3125-a2dd-7f26bdd908b9",
```

```
    "status": {
      "uptime": 1572535845540
    },
    "state": "ONLINE",
    "firstSeen": 1572535764479,
    "lastSeen": 1572535845662
    }
```

Through the command line, use curl and the jq tool to extract these, such as highlighted in this script (get_agents_for_class.sh):

```
#!/bin/bash -e

# Specify the base location of the EFM server
efm_address='http://localhost'
efm_api_base_url="${efm_address}/efm/api"

[ -z "$1" ] && { echo "No class name supplied"; exit; }

query_class=$1

# Select all agent identifiers for the provided query_class and
class_agents=$(curl -s -X GET "${efm_api_base_url}/agents" -H  "accept:
 application/json" |
                jq -r --arg class "$query_class" \
                    '.[]
                    | select(.agentClass == $class)
                    | .identifier')

echo "${class_agents}"
```

This gives a listing of all identifiers:

```
./get_agents_for_class.sh RigClass
3c7b311f-c9c0-4f5f-bb03-c10be82beab6
Myagentidentifier1
```

- You would then like to assign values for each instance and formulate an update to change these items. As you were thinking about scaling, you decided to opt for programmatic changes in lieu of manually editing each item. Again, you can address this in two manners, either through Swagger or command line.

  Through Swagger, use the following endpoint: http://localhost/efm/swagger/ui.html#/Agents/createAgentParameters

  By clicking Try it out, you can generate the payload and hit execute. In the case of multiple overrides, additional JSON objects to this payload would be provided.

  More likely however, you will have a repository/store of information you would like to impart on each asset. Doing this programmatically via CLI (or other tooling) is the most common path we have seen and could be accomplished through an interaction as shown in (create_params_for_agent.sh):

```
#!/bin/sh -e

efm_address='http://localhost'
efm_api_base_url="${efm_address}/efm/api"

[ -z "$1" ] && { echo "No agent ID specified"; exit; }
agent_id=$1
agent_key=$2
agent_value=$3

# Update the agent i
```

```
echo "Updating Agent ID: ${agent_id} parameter context to override va
lue for ${agent_key} to ${agent_value}"
curl -s -X DELETE "${efm_api_base_url}/agents/${agent_id}/parameters"
curl -s -X POST "${efm_api_base_url}/agents/${agent_id}/parameters" \
                  -H  "accept: application/json" \
                  -H  "Content-Type: application/json" \
                  -d "[{
                          \"name\": \"${agent_id}\",
                          \"sensitive\": false,
                          \"description\": \"Agent overridden value\",
                          \"value\": \"${agent_value}\"
                      }]"
```

By iterating over the identifiers we found before with their associated values.

```
./create_params_for_agent.sh myagentidentifier1 rig_id rigid1
Updating Agent ID: myagentidentifier1 parameter context to override va
lue for rig_id to rigid1
{"id":"cfd553d8-fc2c-491d-af1b-9554a59c90d2","name":"Agent specific con
text for agent myagentidentifier1","parameters":[{"name":"myagentidentif
ier1","sensitive":false,"description":"Agent overridden value","value":"
rigid1"}]}{"id":"038d0129-1150-4016-ab99-328ffbf09437","name":"Agent spe
cific context for agent myagentidentifier1","parameters":[{"name":"myage
ntidentifier1","sensitive":false,"description":"Agent overridden value",
"value":"rigid1"}]}
```

6. With everything configured, go back to the flow and publish.

   Next time agents heartbeat in, the agents receive the updated flow with their associated overrides based on their identifiers. Do note that these parameter overrides are immutable, so if you want to adjust, add, or remove values for an agent, it will need to first be deleted for the agent before creating it.

Log collection aggregation scenario

You are a supervisor in a car rental company that is engaged in renting cars and trucks. Your company has put numerous cars and trucks on rent and you monitor logs coming out for those vehicles. If the log path changes in this situation, then you need to update each and every dataflow to update the path. Learn how to use parameters to solve such challenges.

In this log monitoring scenario, eventually, you have more servers doing this same processing and they are provisioned with a new version of myapp and the log location has changed. Earlier, for example, your logs resided in /opt/myapp/logs. Now, for example, your logs reside in /opt/myappv2/logs. Due to policy on making Configuration Management changes on existing servers, you have the same content and flow but have different needs on configuration for this source data.

This caters to a log collection aggregation use case. In this scenario, agents may be deployed on a large number of servers that are all performing this log collection process.

CEM has a standard way to filter and transform these logs to filter out only the events of interest.

Earlier, you needed to create one dataflow for each and every vehicle. So, you created numerous dataflows to monitor numerous vehicles. If the log path changed in this situation, then you updated each and every dataflow to update the path.

Solution

Parameters can solve this challenge. With the parameter concept introduced in CEM, you can create a single dataflow to monitor data from all the vehicles and parameterize the log path in the flow. So, if the log path changes, you just need to update it in the dataflow once.

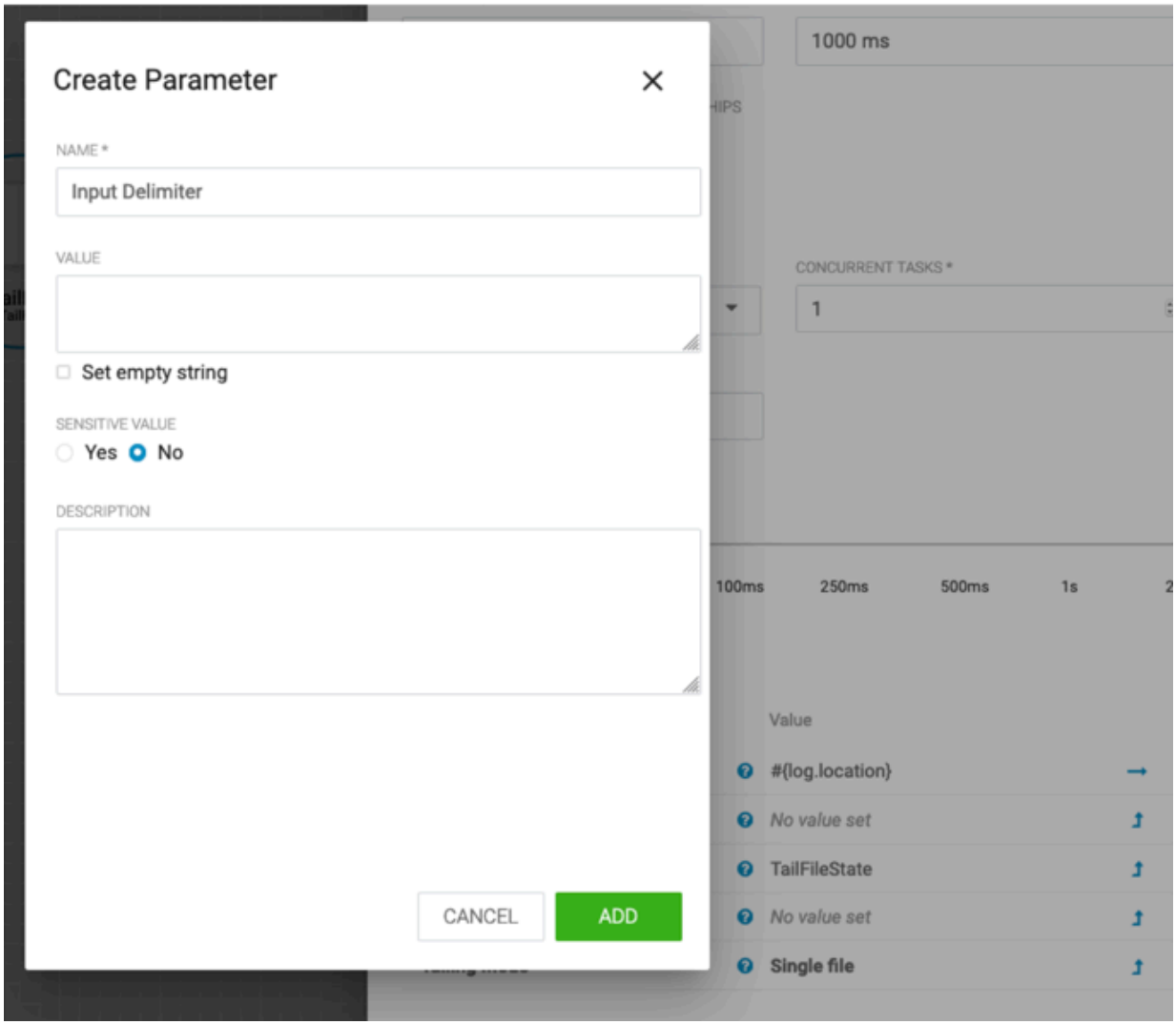
1. You first update your LogCollection flow for your class to parameterize the GetFile location to log.location and specify the default value of /opt/myapp/logs.
2. With these items created, you then publish your flow and make the update available to agents. EFM, when agents heartbeat in with a specific context, are given an update to a flow with the new v2 location provided. Those agents that have not had a specific context made will use the default, version 1 location of the logs.

Initial setup

You have a class called LogCollection with numerous MiNiFi agents deployed on all the vehicles and running. You have built a dataflow inside this class and published this dataflow to all the MiNiFi agents deployed on the vehicles. The dataflow gathers logs from the desired location, for example /opt/myapp/logs, on the machines and then performs the associated logic to only get the content which is WARNING or ERROR. You are managing and monitoring the warnings and errors that are collected at the EFM server for every heartbeat from the vehicles.

Actual steps

1. Open the flow for the LogCollection agent class.
2. Design the flow.
3. Find the one or more properties or configurations that may need unique values on a per agent basis and create parameters. Keep track of name which will be used as an ID in our REST API calls. You will reference this as parameter name moving forward.



4. Switch over to Swagger to perform manual steps for update (this could be automated through Configuration Management tooling like Salt, Puppet, and Ansible).
5. Confirm the agent identifier(s) you wish to augment (this is driven by the value provided by users for nifi.c2.agent.identifier or automatically generated) by specifying a custom value for the one or more parameter name values created above.

   Through Swagger, use the following endpoint: http://localhost/efm/swagger/ui.html#/Agents/getAgents

```
curl -X GET "http://localhost/efm/api/agents" -H  "accept: application/json"
```

   Sample response:

```
[
  {
    "identifier": "test_agent_1",
    "agentClass": "default",
    "agentManifestId": "39344613-9b36-41e7-9416-e6b755d038c9",
    "flowId": "7650ef4e-5258-11ea-ba2c-0242ac120002",
    "deviceId": "15831645727656044827",
    "status": {
      "uptime": 1434101,
      "repositories": {
        "flowfile": {
          "size": 0
        },
        "provenance": {
          "size": 0
        }
      },
      "components": {
        "FlowController": {
          "running": true
        }
      }
    },
    "state": "MISSING",
    "firstSeen": 1582035123611,
    "lastSeen": 1582036507014
  },
  {
    "identifier": "test_agent_2",
    "agentClass": "default",
    "agentManifestId": "39344613-9b36-41e7-9416-e6b755d038c9",
    "flowId": "c4a1627c-5259-11ea-be90-0242ac120009",
    "deviceId": "12645594159739466366",
    "status": {
      "uptime": 888065,
      "repositories": {
        "flowfile": {
          "size": 0
        },
        "provenance": {
          "size": 0
        }
      },
      "components": {
        "FlowController": {
          "running": true
        }
      }
    },
```

```
    "state": "MISSING",
    "firstSeen": 1582035621624,
    "lastSeen": 1582036507139
  },
  {
    "identifier": "test_agent_3",
    "agentClass": "default",
    "agentManifestId": "39344613-9b36-41e7-9416-e6b755d038c9",
    "flowId": "c4a1922e-5259-11ea-ba73-0242ac120008",
    "deviceId": "11582531828015679 96",
    "status": {
      "uptime": 889065,
      "repositories": {
        "flowfile": {
          "size": 0
        },
        "provenance": {
          "size": 0
        }
      },
      "components": {
        "FlowController": {
          "running": true
        }
      }
    },
    "state": "MISSING",
    "firstSeen": 1582035621721,
    "lastSeen": 1582036508237
  }
]
```

6. Create agent specific parameter contexts for those properties you wish to override.

   Through Swagger, use the following endpoint: http://localhost/efm/swagger/ui.html#/Agents/createAgentParameters

   ```
   curl -X POST "http://localhost/efm/api/agents/<AGENT ID>/parameters" -H
    "accept: application/json" -H  "Content-Type: application/json"
   ```

   The body that gets posted contains one or more key value names for the designated parameter name values.

   Sample body (one parameter for an agent):

   ```
   [
          {
            "name": "parameter name 1",
            "sensitive": false,
            "description": "Agent parameter name override ",
            "value": "parameter value"
          }
        ]
   Sample body (multiple parameters for an agent):
   [
          {
            "name": "parameter name 1",
            "sensitive": false,
            "description": "Agent parameter name override ",
            "value": "parameter value 1"
          },
          {
            "name": "parameter name 2",
            "sensitive": false,
            "description": "Agent parameter name override ",
   ```

```
          "value": "parameter value 2"
        }
 ...
     ]
```

7. Optionally, confirm the creation of the agent parameter contexts by using Swagger or curl.

   Through Swagger, use the following endpoint: http://localhost/efm/swagger/ui.html#/Agents/getAgentParameters

   ```
   curl -X GET "http://localhost/efm/api/agents/<AGENT ID>/parameters" -H "
   accept: application/json"
   ```

   Sample response:

   ```
   [
          {
            "name": "parameter name 1",
            "sensitive": false,
            "description": "Agent parameter name override ",
            "value": "parameter value"
          }
    ]
   ```

8. In the CEM UI, push publish to deploy flow to agents with associated parameter contexts.