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## 1.0 Introduction

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The real-time insights dashboard starter kit replay script simulates a z/TPF system and sends messages that are defined in a replay file to a Kafka broker. The following files and folders are provided in the `tpf_data_sci/tpfReplayScript` directory:

- o `tpf_ReplayScripts.jar`: The replay script. The source code is located in this file.
- o `scenario_lowVolTraffic/`: Contains a low volume traffic scenario captured by the replay script, ready to be sent by the replay script.
- o `scenario_tcpip/`: Contains a TCP/IP scenario captured by the replay script, ready to be sent by the replay script.
- o `lib/`: A directory that contains all of the necessary libraries used by the replay script.

## 2.0 Change history

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2019Dec18 Initial version  
2021Feb24 Fixes an issue that caused data points to be misaligned and lost upon replay

## 3.0 Prerequisites

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- o A Kafka broker that is accessible from the system that you plan to run the script on.
- o Kafka Topics UI Version 0.9.4 or later
- o A Java Runtime Environment (JRE) version 8 or later, installed on the system that you plan to run the script on.

## 4.0 Running the z/TPF real-time insights dashboard starter kit replay script

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The real-time insights dashboard starter kit replay script can capture data from Kafka and write that data to a file, and then replay the previously captured file to Kafka. The first argument (replay or capture) that is passed to the replay script determines whether the data is captured from Kafka or replayed to Kafka.

### Usage:

```
java -jar tpf_ReplayScripts.jar capture|replace KAFKA_HOST:KAFKA_PORT KAFKA_TOPIC FILE_PATH
[-sub [yyyy-MM-dd hh:mm:ss[.000]]]
```

## 4.1 Capturing data from Kafka

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Complete the following steps to run the replay script to capture data:

1. On your Linux system, navigate to the `tpf_data_sci/tpfReplayScript` directory.  
Enter the following command:  

```
java -jar tpf_ReplayScripts.jar capture <your_kafka_broker_url>:<your_kafka_broker_port>
<kafka_topic_name> test_capture.json
```

  
This captures all the data on the specified Kafka topic. For example:  

```
java -jar tpf_ReplayScripts.jar capture kafka.company.com:9093 TPF_CDC_DATA
test_capture_cdc.json
```
2. You can replay `test_capture_cdc.json` by using the steps for replay described in section 4.2.  
In this way, you can conveniently simulate live data from z/TPF using the same data.

The real-time insights dashboard starter kit also provides a shell script to run the replay script for data capture. If you have Docker configured on your Linux system, you can use the shell script as a simpler process to capture data with the replay script.

### Usage:

```
tpf_capture_data_from_kafka.sh scenario_directory_name
```

Complete the following steps to use the shell script:

1. On your Linux system, navigate to the `tpf_data_sci/Docker` directory.  
Enter the following command:  

```
tpf_capture_data_from_kafka.sh
```

  
A help message is displayed that shows the required argument. Specify a name that begins with "scenario\_" for the directory to be created with the replay files.
2. Enter a directory name as an argument, for example:  

```
tpf_capture_data_from_kafka.sh scenario_test_capture
```

This captures data from the default Kafka topics into separate files so that you can replay this same scenario later. The scenario directory is created in the `tpf_data_sci/tpfReplayScript` directory.

- o Data from Kafka topic `TPF_CDC_DATA` will be saved to `scenario_test_capture/tpf_sample_cdc.json`.
- o Data from Kafka topic `TPF_NVPC_DATA` will be saved to `scenario_test_capture/tpf_sample_nvpc.json`.
- o Data from Kafka topic `TPF_NVPC_VERT_DATA` will be saved to `scenario_test_capture/tpf_sample_nvpc_vert.json`.
- o Data from Kafka topic `TPF_JVM_DATA` will be saved to `scenario_test_capture/tpf_sample_jvm.json`.

## 4.2 Replaying data to Kafka

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Complete the following steps to run the replay script directly:

1. On your Linux system, navigate to the `tpf_data_sci/tpfReplayScript` directory. This directory contains the following folders and files:
  - o `lib`
  - o `scenario_lowVolTraffic`
  - o `scenario_tcpip`
  - o `tpf_ReplayScripts.jar`
  - o `README.txt`
2. Enter the following command to replay sample data to Kafka:

```
java -jar tpf_ReplayScripts.jar replay <your_kafka_broker_url>:<your_kafka_broker_port>  
    <new_kafka_topic_name> scenario_tcpip/tpf_sample_cdc.json
```

where:

- o `<your_kafka_broker_url>` is the URL of your Kafka broker.
- o `<your_kafka_broker_port>` is the port for your Kafka broker.
- o `<new_kafka_topic_name>` is the name of the Kafka topic that you want to replay data to.

For example:

```
java -jar tpf_ReplayScripts.jar replay kafka.company.com:9093 TPF_CDC_DATA  
scenario_tcpip/tpf_sample_cdc.json
```

Note: `tpf_ReplayScripts.jar` will NOT create Kafka topics. You must create the topic before running the JAR. Use `tpf_data_sci/Docker/tpf_create_kafka_topics.sh` to create the Kafka topics to ensure that they are configured correctly.

Notes:

- o You can safely ignore any warning messages that mention SLF4J. This is a logging mechanism requested by a library that is not included.
- o To adjust the timestamps for the messages that are sent to Kafka to be relative to the start time of the script, use the `-sub` parameter. For example, consider the following command:

```
java -jar tpf_ReplayScripts.jar replay kafka.company.com:9093 TPF_CDC_DATA  
scenario_tcpip/tpf_sample_cdc.json -sub
```

In this example, if the script is started on March 7, 2020 at 9:32:05 AM, and the second message is sent 5 seconds after the first message, the timestamp for the second message is 2020-03-07 09:32:10.000 instead of the original timestamps that are defined in the replay script.

- o You also can specify a specific start time in UTC with the `-sub` parameter, in the following format:

```
yyyy-MM-dd hh:mm:ss[.000]
```

where:

yyyy is the year.  
MM is the 2-digit month (01 - 12).  
dd is the 2-digit day (01 - 31).  
hh is the 2-digit hour in 24-hour format (00 - 23).  
mm is the 2- digit minute (00 - 59).  
ss is the 2-digit second (00 - 59).  
000 is the 3-digit milliseconds. Optional. If present, this must be 000.

The date component of the timestamp must come before the time component, and the date and time components must be separated by a space. The date must be valid. For example, 2020-04-31 is not valid because there is no April 31st.

For example, the following command adjusts the base time to August 22, 2019 at 12:14:39 AM:

```
java -jar tpf_ReplayScripts.jar replay kafka.company.com:9093 TPF_CDC_DATA  
scenario_tcpip/tpf_sample_cdc.json -sub 2019-08-22 00:14:39
```

The adjusted timestamps are persistent, so they will remain adjusted when read from

the Kafka topic.

The replay script will send messages to your Kafka broker at the same time intervals that the Kafka broker on the TPF lab system received messages from the online system when the data was collected.

3. Open your Kafka Topic UI in a browser at:

`http://<your_kafka_broker_url>:8000`

For example:

`http://kafka.company.com:8000`

4. The topic you specified in step 2 is displayed with the list of topics on the left of the page. For example, based on the command in the previous examples, a topic named `TPF_CDC_DATA` is listed. Click the topic to view the contents.
5. A table opens on the right that contains the messages associated with the selected topic. Each message has a Key and a Value object.

Expand the Value object to view the message data. Under the Value object, there are two more objects: header and body.

6. Expand the header to view the runtime metrics collection header for the message. The header contains the following fields:

- o version: The version of this header.
- o complex name: The name of the z/TPF complex that the data was collected from.
- o processor\_id: The processor that data was collected on.
- o collection\_start\_utc\_time: The start time for name-value pair data. This field also marks the start time for continuous data collection (CDC) data, but is disregarded by z/TPF runtime metrics collection because the internal CDC headers in the data will have the start and end time.
- o collection\_period: The length of time in milliseconds that the collection ran for.
- o source: The type of data that is sent.
- o parameters: Optional, miscellaneous parameters. This is an arbitrary JSON string and might not be present.

7. Expand the body object to explore the data that was collected. The format of this object will vary based on what the source field in the runtime metrics collection header object is set to.

The real-time insights dashboard starter kit also provides a shell script to run the replay script. If you have Docker configured on your Linux system, you can use this as a simpler process to deploy the replay script.

Usage:

`tpf_start_replay_script.sh scenario_directory_name`

You can use this shell script by completing the following steps:

1. On your Linux system, navigate to the `tpf_data_sci/Docker` directory.  
Enter the following command:  
`tpf_start_replay_script.sh`

A help message is displayed that shows the scenario directories available for replay. These are the directories in `tpf_data_sci/tpfReplayScript` beginning with "scenario\_".

2. Enter one of these directories as an argument, for example:  
`tpf_start_replay_script.sh scenario_tcpip`

This replays each of the files in the directory to their default Kafka topics so that you can replay a complete scenario consisting of multiple data types.

For example, in the case of `scenario_tcpip`:

tpf\_sample\_cdc.json will be sent to Kafka topic TPF\_CDC\_DATA.  
tpf\_sample\_nvpc.json will be sent to Kafka topic TPF\_NVPC\_DATA.  
tpf\_sample\_nvpc\_vert.json will be sent to kafka topic TPF\_NVPC\_VERT\_DATA.  
tpf\_sample\_jvm.json will be sent to Kafka topic TPF\_JVM\_DATA.

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