evidnet

OHDSI Poster 24

Standardization, automation and monitoring system for ETL process to improve CDM data quality

Abstract

- Each institution has a different way to store data, vocabulary and entity since it runs on various EMR system which leads to inefficiency takes up time.

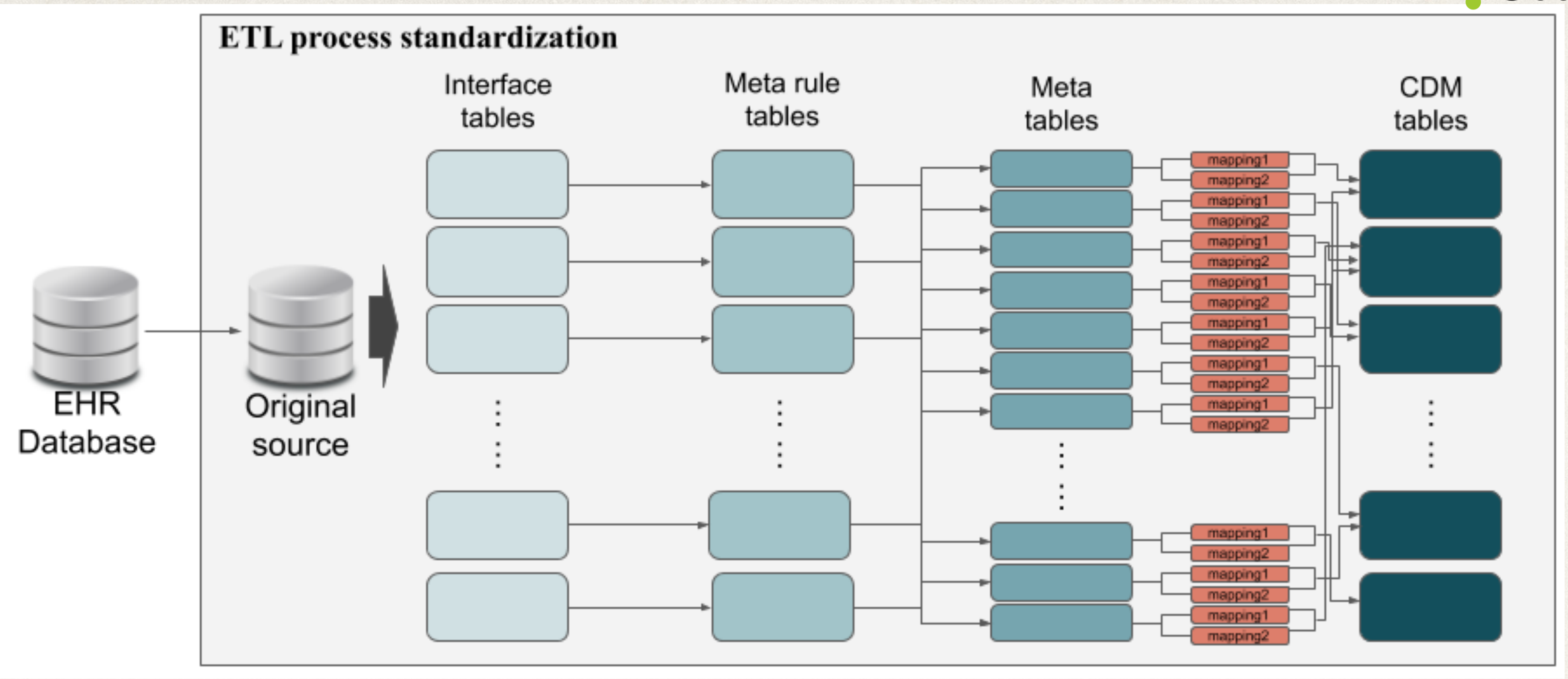
- **EvidNet** had standardized the ETL process with incremented knowledge and know-how from the repeated CDM conversion of 12 institutions, and now we have developed a rule check package named **EvidFormer** to reduce time for CDM establishment as well as to carry out efficient conversion work.

- **EvidFormer** provides scheduling and automation service of ETL process as well as **'all in one solution'** to enable work management monitoring service for high-quality CDM data with minimal work time.

Application of EvidFormer(1)

1. ETL process standardization

- [PROBLEM]
  - From the variation of EMR systems, the vocabulary, entity, and data are stored with type and context variation, which lead to possible variations in vocabulary mapping, information and application rules in the process of converting hospital clinical data into the CDM.
- [SOLUTION]
  - We have standardized the process so that any hospital data can be converted through the same conversion process by grasping data attributes based on the conversion experience of various hospitals.



- A layer(1..N) was constructed according to the purpose and characteristics of the conversion path from source data to CDM data.

  (1) We created an 'Interface' table that was most similar to the source data and contained all of the meta information needed for conversion to the CDM

  (2) We create a 'Meta rule' table by performing data filtering classification and applying transformation rules.

  (3) After creating the 'Meta' table by deleting the data to be excluded from the generated interface table and applying the conversion rules, the conversion path was defined to create the 'CDM' table by joining with the term mapping table.

Application of EvidFormer(2)

2. Data validation

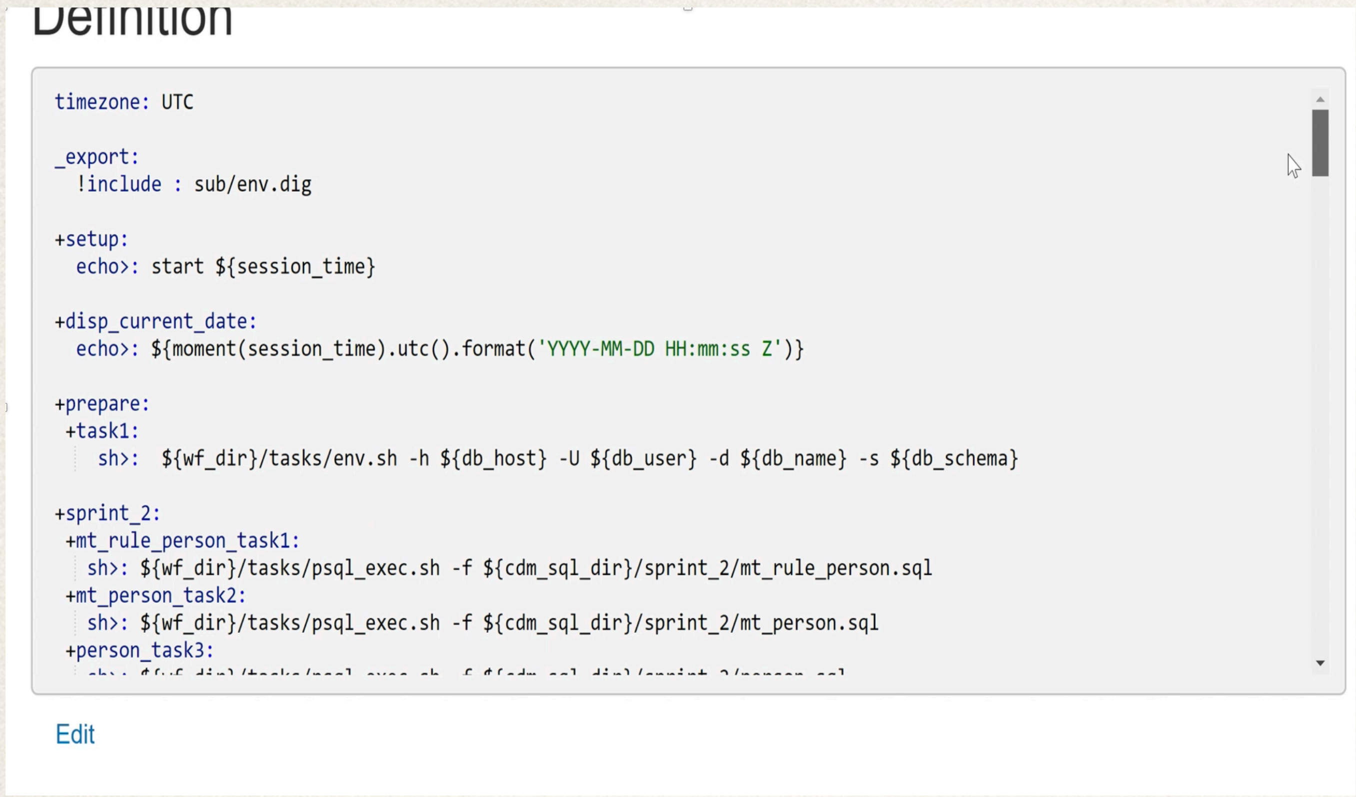
- [PROBLEM]
  - Achilles heel checks the errors of whole data, wrong part and correct the ETL conversion code only after completing CDM conversion. The conversion time may take longer than expected as the reconversion is performed at the end of the ETL process.
- [SOLUTION]
  - We has developed a rule check package for each domain by layer.
    - If the package finds an error data during the conversion process, it corrects the error and then continues to convert it to the final CDM.
    - This eliminates unnecessary processes such as re-conversion and satisfies data quality and time efficiency at the same time.

Application of EvidFormer(3)

3. Process automation and visualization

- [PROBLEM]
  - Since one person performs the whole conversion operation, mistakes can occur in the work process, which can affect data quality.
  - Most users also request detailed explanations of the workflow and data verification results to determine the reliability of the data.
- [SOLUTION]
  - Scheduling and automation service of ETL process was developed based on standardized conversion path.
    - This eliminates human errors that can occur during the conversion process.
    - This made the conversion work faster.
  - And we are developing a monitoring service to visualize the conversion and the data verification results for work management.

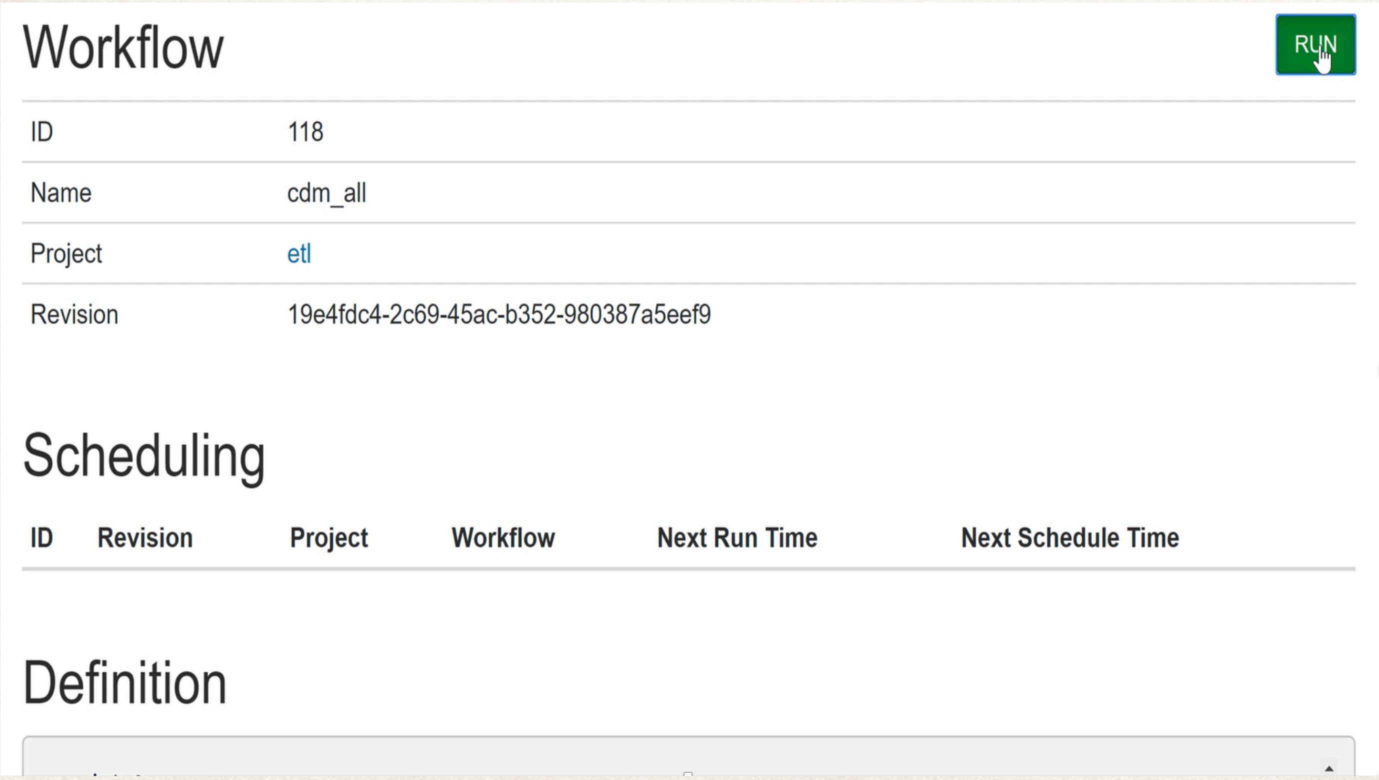
1. Workflow setup



Definition

```
timezone: UTC

_export:
  !include : sub/env.dig

+setup:
  echo>: start ${session_time}

+disp_current_date:
  echo>: ${moment(session_time).utc().format('YYYY-MM-DD HH:mm:ss Z')}

+prepare:
 +task1:
    sh>:  ${wf_dir}/tasks/env.sh -h ${db_host} -U ${db_user} -d ${db_name} -s ${db_schema}

+sprint_2:
 +mt_rule_person_task1:
   sh>: ${wf_dir}/tasks/psql_exec.sh -f ${cdm_sql_dir}/sprint_2/mt_rule_person.sql
 +mt_person_task2:
   sh>: ${wf_dir}/tasks/psql_exec.sh -f ${cdm_sql_dir}/sprint_2/mt_person.sql
 +person_task3:
   sh>: ${wf_dir}/tasks/psql_exec.sh -f ${cdm_sql_dir}/sprint_2/person.sql
```

2. Workflow run



Workflow

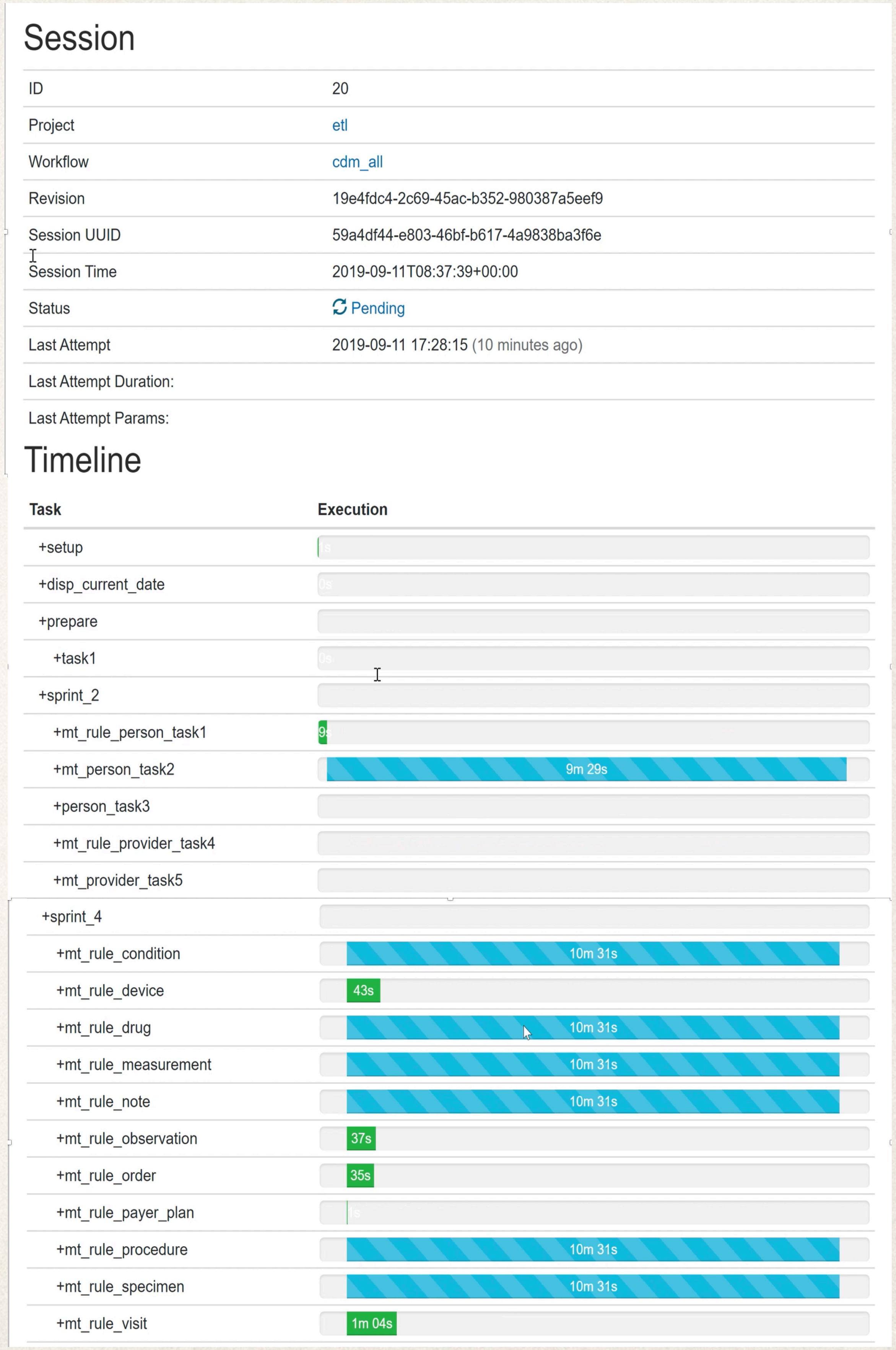
ID	118
Name	cdm_all
Project	etl
Revision	19e4fdc4-2c69-45ac-b352-980387a5eef9

Scheduling

ID	Revision	Project	Workflow	Next Run Time	Next Schedule Time

Definition

3. Workflow monitoring



Session

ID	20
Project	etl
Workflow	cdm_all
Revision	19e4fdc4-2c69-45ac-b352-980387a5eef9
Session UUID	59a4df44-e803-46bf-b617-4a9838ba3f6e
Session Time	2019-09-11T08:37:39+00:00
Status	Pending
Last Attempt	2019-09-11 17:28:15 (10 minutes ago)
Last Attempt Duration:	
Last Attempt Params:	

Timeline

Task	Execution
+setup	1s
+disp_current_date	0s
+prepare	
+task1	0s
+sprint_2	
+mt_rule_person_task1	9s
+mt_person_task2	9m 29s
+person_task3	
+mt_rule_provider_task4	
+mt_provider_task5	
+sprint_4	
+mt_rule_condition	10m 31s
+mt_rule_device	43s
+mt_rule_drug	10m 31s
+mt_rule_measurement	10m 31s
+mt_rule_note	10m 31s
+mt_rule_observation	37s
+mt_rule_order	35s
+mt_rule_payer_plan	1s
+mt_rule_procedure	10m 31s
+mt_rule_specimen	10m 31s
+mt_rule_visit	1m 04s

Conclusion – All in One Solution

- As shown in the previous section, ETL, data validation, and monitoring can be provided through a single tool **(all in one solution)**, ETL personnel are expected to be easy to manage and highly time efficient with our proposed EvidFormer.

- The end users can get answers and explanations for their fundamental questions whether the CDM data is reliable or how the local source data enters the CDM from our proposed solution.

"Thank you"

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