

LA基盤システム： Sakai-LMS-LAの紹介

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この時間は

- Sakai-LMS-LAをダウンロードしてみよう/コミットしよう
- 教育データの分析と「言われて」いるものの実例(デモ)
 - 法政大学では教育データの分析は行っておりません
- 設計が大切だが…

アジェンダ

- 背景
- Sakai-LMS-LAの紹介
- ダミーデータによる分析デモ
- まとめ

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なぜSakai(-LMS-LA)か



- 老舗オープンソースLMS
- 法政大学は2011年からSakaiを採用
- 理事に教育データ利活用を具申するのに別システムを提案するのは筋が悪い

Wilma Hodges · May 10, 2019 · 1 min read

Hosei University in Japan commits to Sakai LMS until 2025

One of the largest private universities in Japan, Hosei University, has renewed its contract with a leading Sakai vendor in Japan and a member of the Sakai community, Kanematsu Electronics, LTD (KEL). Hosei has been using Sakai for teaching and learning since 2011, but opened a new RFP for a learning management system to meet its future needs. Based on its previous work with Hosei and Sakai, KEL won the bid and will continue to implement Sakai for Hosei for an additional 5 years.

As one engineering faculty member from Hosei University said at a recent conference about teaching and learning, "Sakai is... a tool to improve quality of learning, [and its use helps us] come up with more ideas."

Furthermore, KEL has worked with Hosei to provide intensive development of Sakai. This has enabled them to understand Hosei's faculty needs, and provide a solution that works for the administration, faculty, and 28,000 students at Hosei University.

KEL will work with Hosei to provide a needed data migration project at a much lower cost, and with significantly more expertise than competing LMS solutions and hosting companies. It will also continue to provide high value teaching and learning support for Sakai.

Sakai News

599 views 0 comments

LA: Learning Analytics



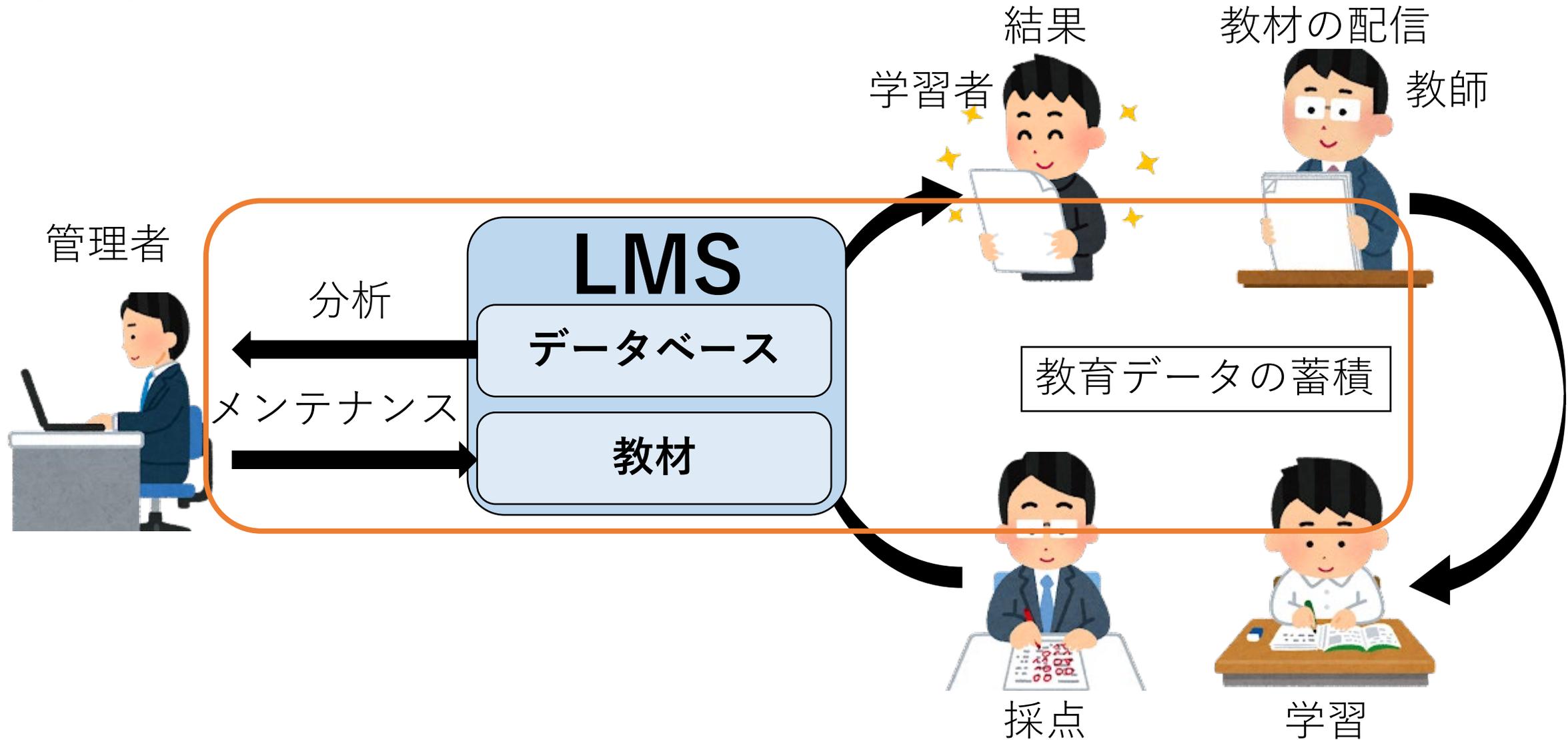
BECOME A MEMBER

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LEARNING ANALYTICS is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs, as defined back in 2011 for the first LAK, this general definition still holds true even as the field has grown. Learning analytics is both an academic field and commercial marketplace which have taken rapid shape over the last decade. As a research and teaching field, Learning Analytics sits at the convergence of **Learning** (e.g. educational research, learning and assessment sciences, educational technology), **Analytics** (e.g. statistics, visualization, computer/data sciences, artificial intelligence), and **Human-Centered Design** (e.g. usability, participatory design, sociotechnical systems thinking).

<https://www.solaresearch.org/about/what-is-learning-analytics/>

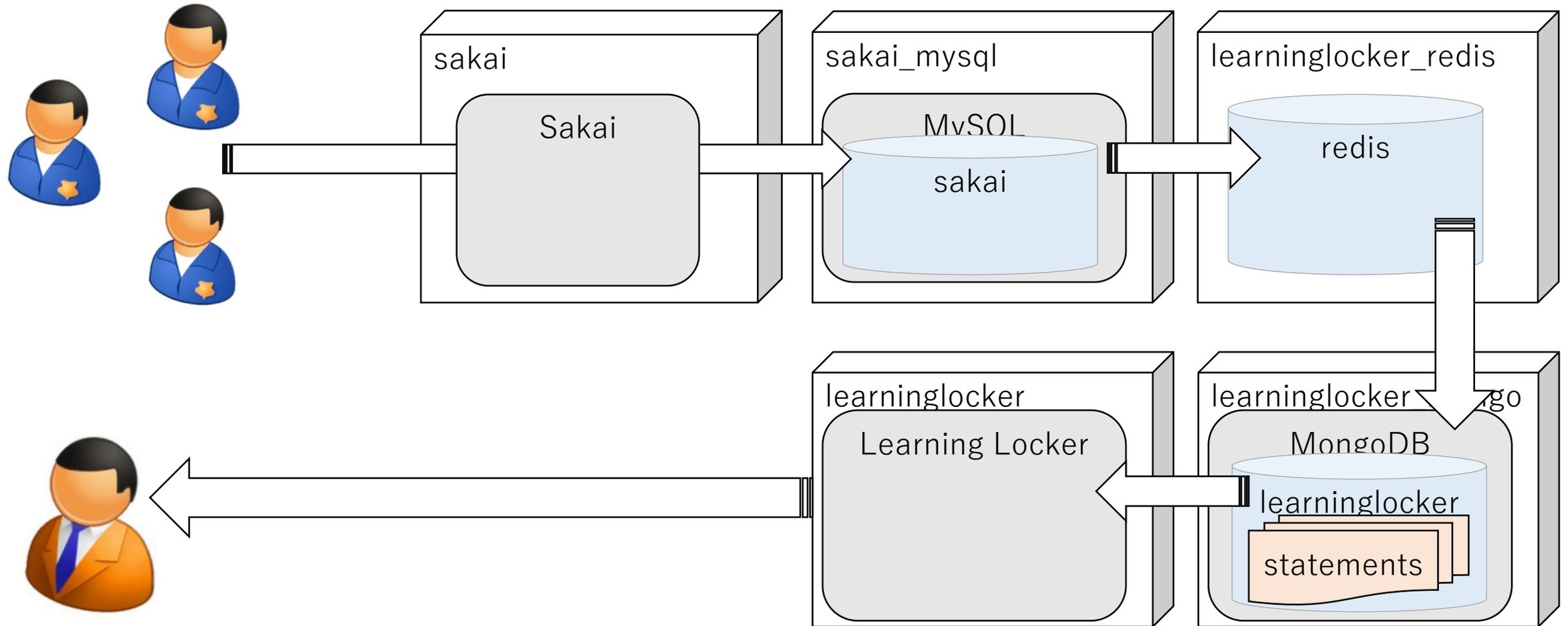
背景と理想



Sakai-LMS-LAのダウンロードとビルド

- <https://github.com/media-hosei-ac-jp/Sakai-LMS-LA/>
 - 2022年3月2日公開
 - NIIのLAaaS-dockerのForkかつサブセット
 - Sakai 12.6
 - LearningLocker 5.2.6
 - Superset 2.3.1
 - JupyterHub 2.2.0
 - 検証環境 (2023/3/7現在)
 - docker-compose 1.25.0
 - docker 20.10.21
 - Ubuntu 20.02 LTS on WSL2

Sakai-LMS-LAの構成 -データ蓄積-



Sakai v12.6の Core Tools xAPI実装

- ドキュメントを見つけられない…
 - コードベースで調査し整理した文書を公開
 - <https://github.com/media-hosei-ac-jp/Sakai-LMS-LA/blob/main/docs/statements/README.adoc>
 - イベント一覧
 - <https://sakaiproject.atlassian.net/wiki/spaces/UDAT/pages/10225156725/Sakai+12.x+Event+Table+Descriptions>
 - SiteStatsでフォローできないイベントが多数

xAPIによるデータ蓄積の意義

目次	sakaiで得られるデータ	xAPIで得られるデータ
1. Login and Logout	現在のユーザー欄で確認 	
1.1. Login	確認不可能 一方で、現在のユーザー欄から授業ページを閲覧しているユーザーが確認可能。 統計量からはロール（access, maintainユーザー）やユーザーごとの授業ページにアクセスした回数を確認可能。ただし、直近7日間以上細かく見る事が不可能。	http://www.adlnet.gov/expapi/verbs/initialized に http://localhost:8888/portal として記録される。
1.2. Logout	確認不可能 一方で、授業ページを閲覧していないことは現在のユーザー欄から確認が可能。	http://www.adlnet.gov/expapi/verbs/exited に http://localhost:8888/portal/logout として記録される。

xAPIによるデータ蓄積の意義

3.1. Grading Submission

maintainで確認可能、設定によってはstudentでも確認可能になる。
採点した時刻はログに残らない。

- maintainユーザーでの表示

登録済フィルタ 7人の受講生を表示

学籍	コース成績	課題1 合計: 4 締切: 05/31/2022	課題2 合計: 5 締切: 05/31/2022	課題3 合計: 4 締切: 05/31/2022	課題4 合計: 5 締切: 05/31/2022	課題5 合計: 7 締切: 05/30/2022	授業内提示状での課題 合計: 5 締切: 06/30/2022
test0008	F (48%)	0	5	0	0	7	
test0001	F (34%)	0	2	2	5	0	
test0002	F (40%)	0	5	0	5	0	
test0003	D (64%)	0	5	0	5	5	
test0005	F (28%)	4	1	1	1	0	
test0006	F (30%)	3	1	1	1	2	1

- studentユーザーでの表示

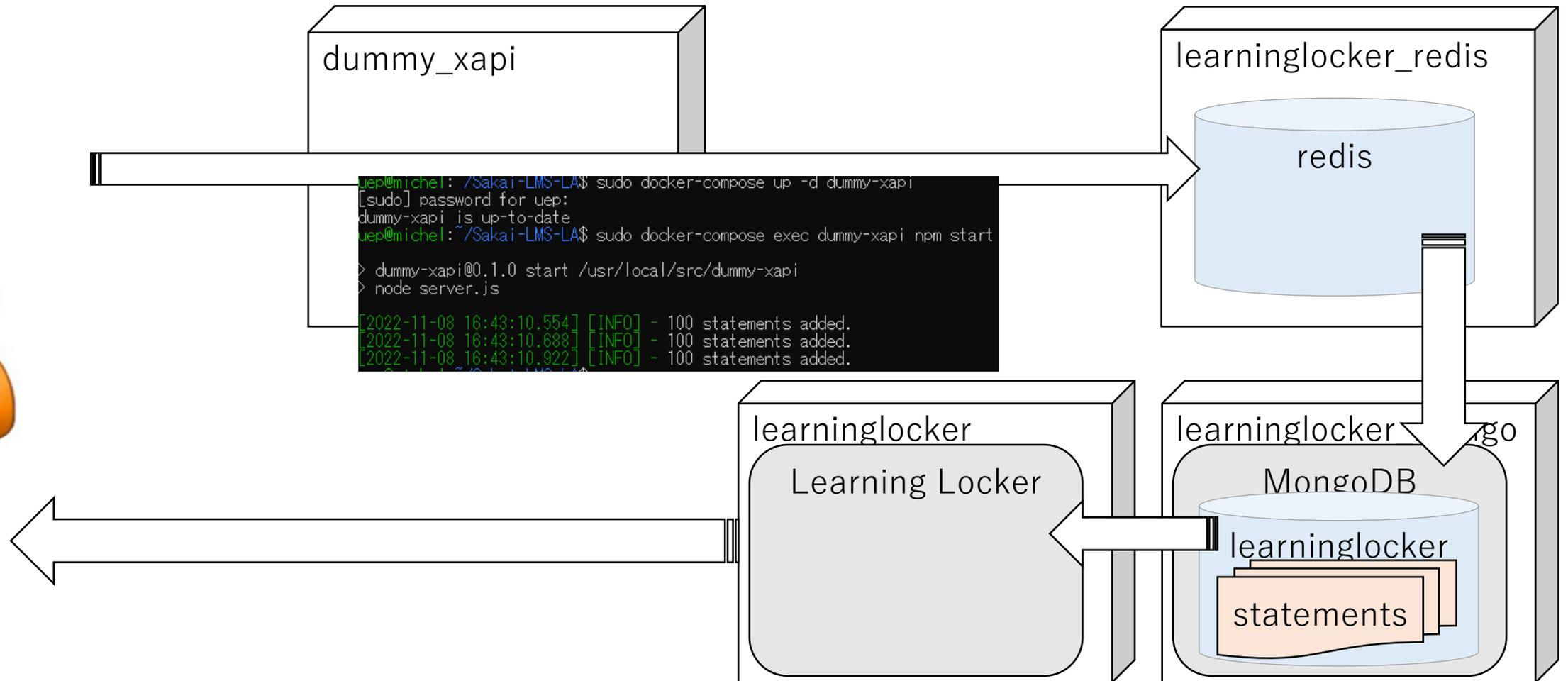
test0004の成績レポート

コース成績: F (48%)
[12/25]

成績簿アイテム	成績	締切日
授業内提示状での課題	- / 5	06/30/2022
課題1	0 / 4	05/31/2022
課題2	5 / 5	05/31/2022
課題3	0 / 4	05/31/2022
課題4	0 / 5	05/31/2022
課題5	7 / 7	05/30/2022

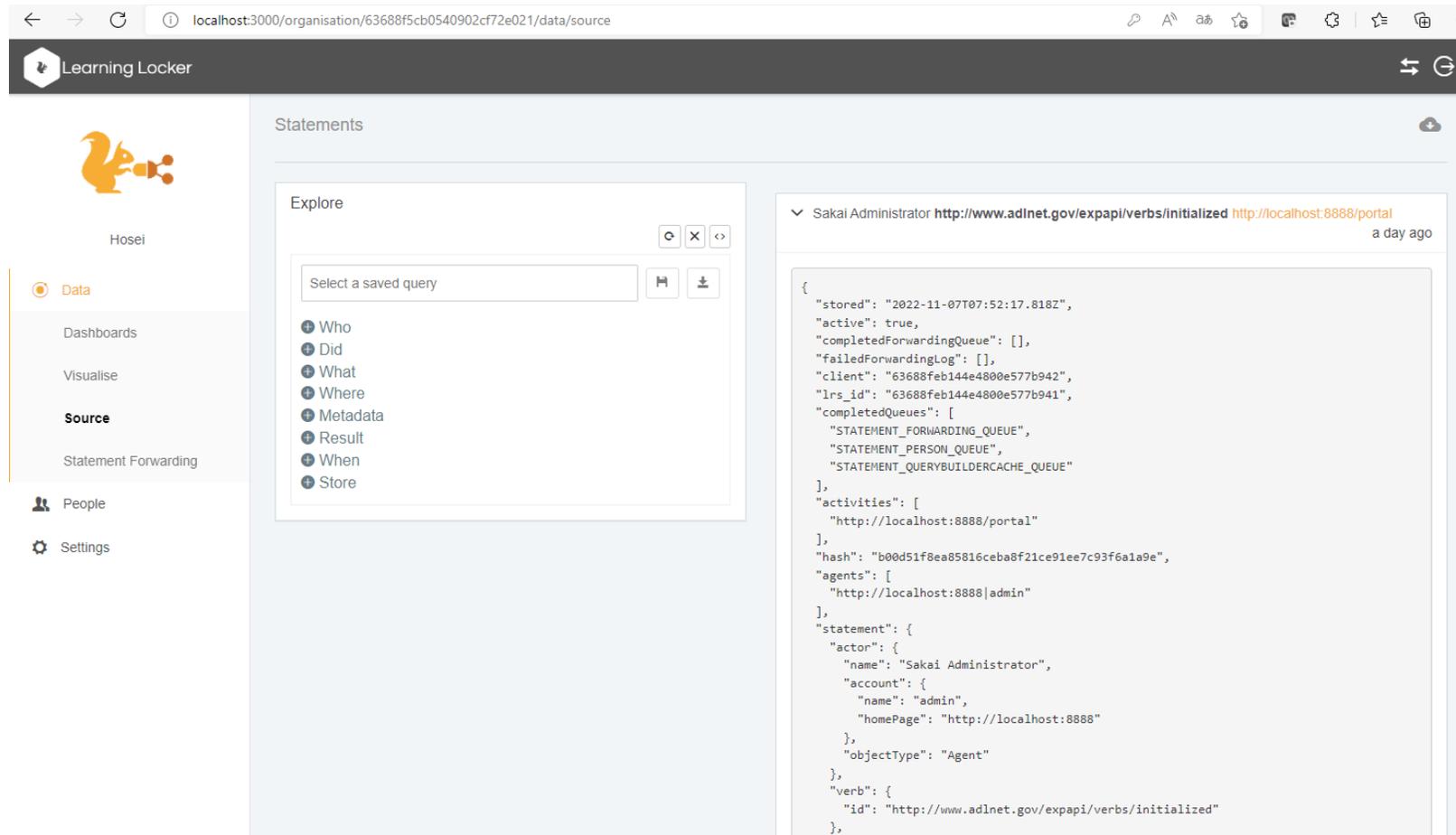
<http://www.adlnet.gov/expapi/verbs/scored>に
User received a gradeとして記録される。

Sakai-LMS-LAの構成 - ダミーステートメントの登録 -



Learning Locker

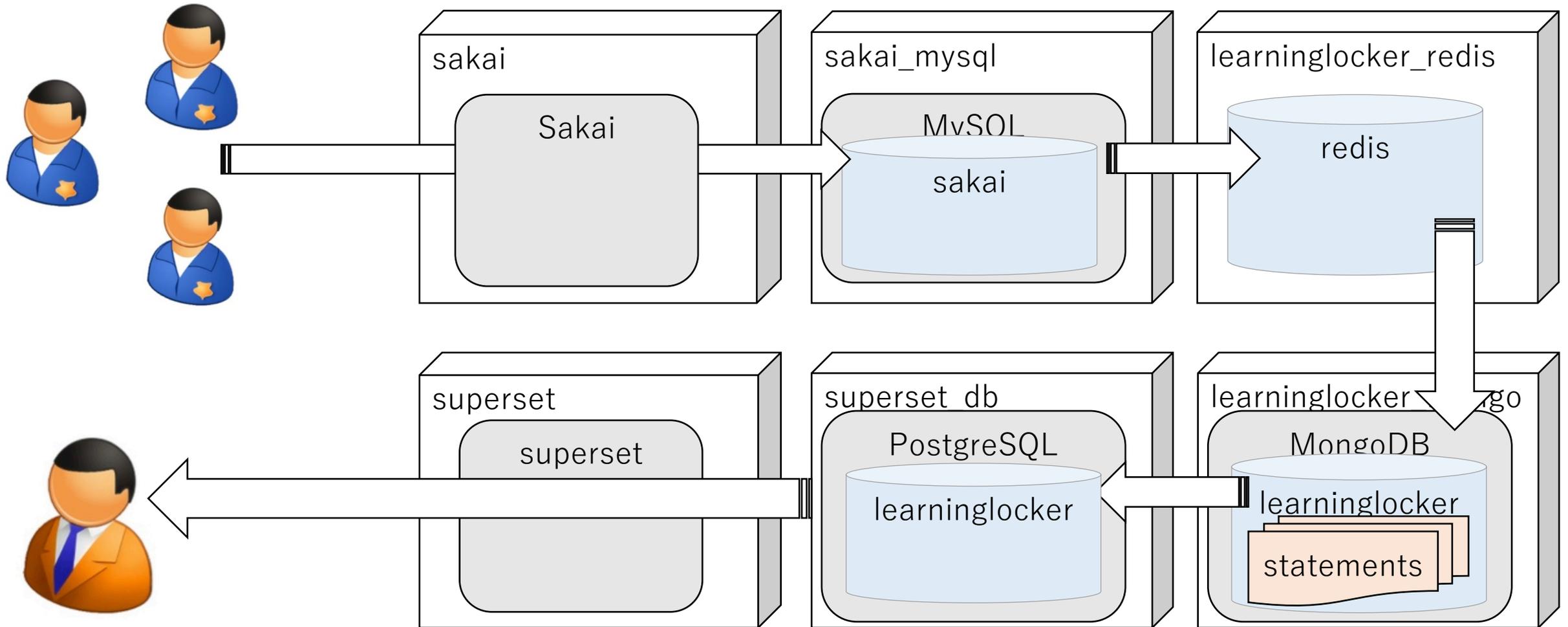
- xAPIログを蓄積するためのLearning Record Store(LRS)



The screenshot displays the Learning Locker web application interface. The browser address bar shows the URL `localhost:3000/organisation/63688f5cb0540902cf72e021/data/source`. The page title is "Learning Locker". On the left, there is a navigation menu with the following items: "Hosei" (with a logo), "Data" (selected), "Dashboards", "Visualise", "Source", "Statement Forwarding", "People", and "Settings". The main content area is titled "Statements" and contains an "Explore" panel with a search box and a list of filters: "Who", "Did", "What", "Where", "Metadata", "Result", "When", and "Store". The main view shows a statement log entry for "Sakai Administrator" at `http://www.adlnet.gov/expapi/verbs/initialized` on `http://localhost:8888/portal`, recorded "a day ago". The statement details are as follows:

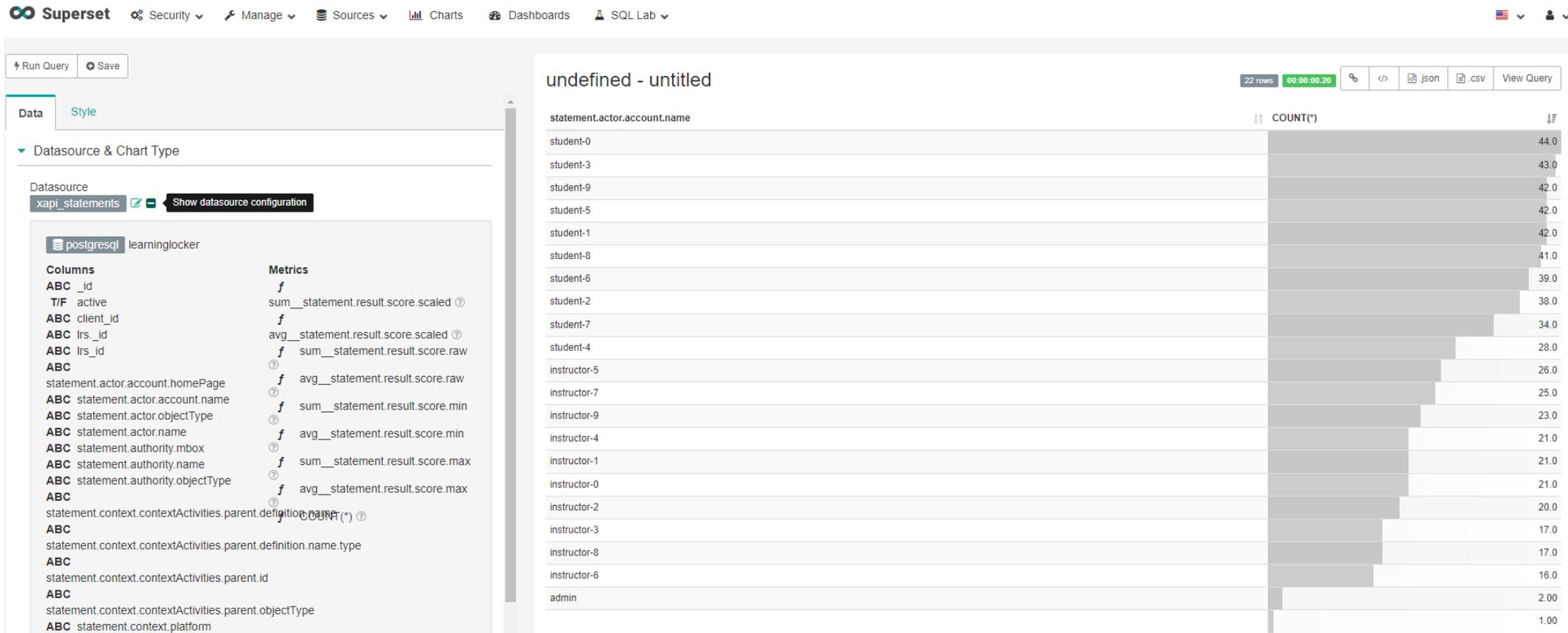
```
{
  "stored": "2022-11-07T07:52:17.818Z",
  "active": true,
  "completedForwardingQueue": [],
  "failedForwardingLog": [],
  "client": "63688feb144e4800e577b942",
  "lrs_id": "63688feb144e4800e577b941",
  "completedQueues": [
    "STATEMENT_FORWARDING_QUEUE",
    "STATEMENT_PERSON_QUEUE",
    "STATEMENT_QUERYBUILDERCACHE_QUEUE"
  ],
  "activities": [
    "http://localhost:8888/portal"
  ],
  "hash": "b00d51f8ea85816ceba8f21ce91ee7c93f6a1a9e",
  "agents": [
    "http://localhost:8888|admin"
  ],
  "statement": {
    "actor": {
      "name": "Sakai Administrator",
      "account": {
        "name": "admin",
        "homePage": "http://localhost:8888"
      }
    },
    "objectType": "Agent"
  },
  "verb": {
    "id": "http://www.adlnet.gov/expapi/verbs/initialized"
  }
}
```

Sakai-LMS-LAの構成 -可視化-

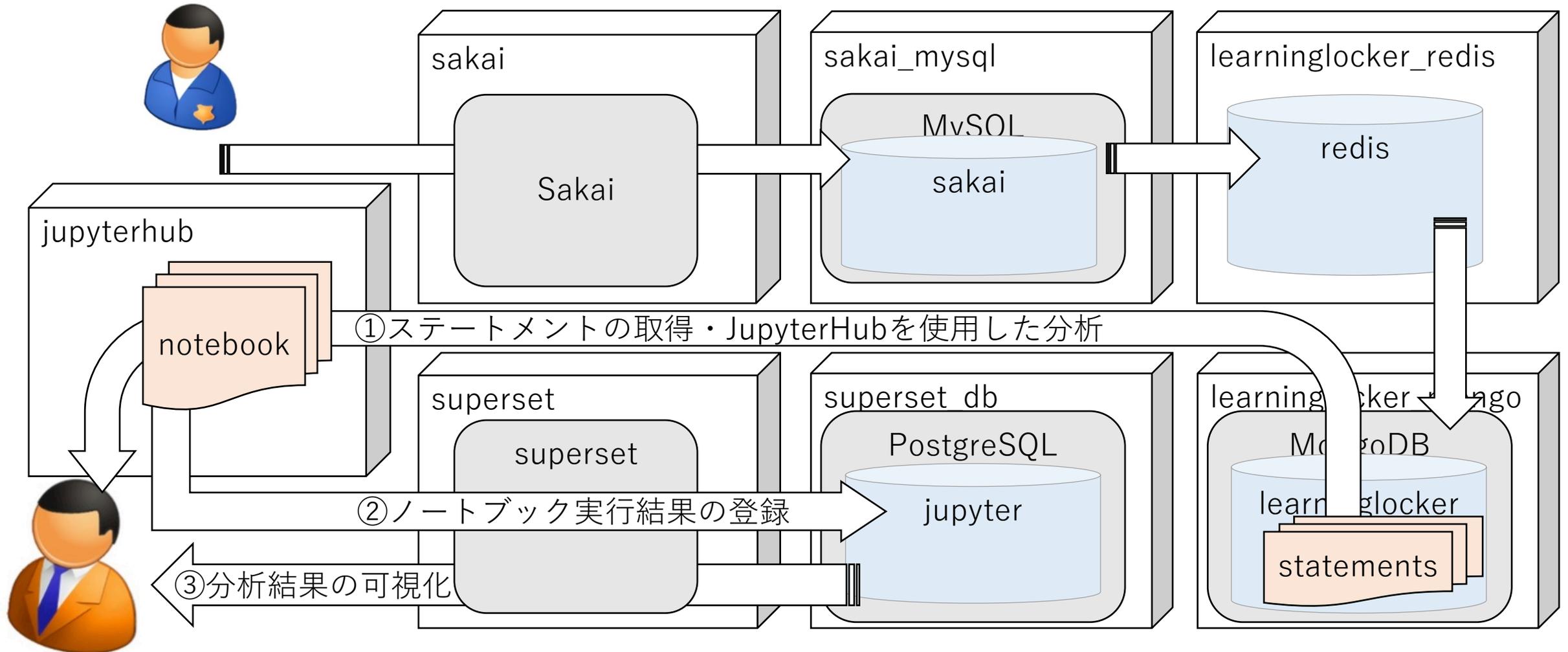


Superset

• OSSのBIツール

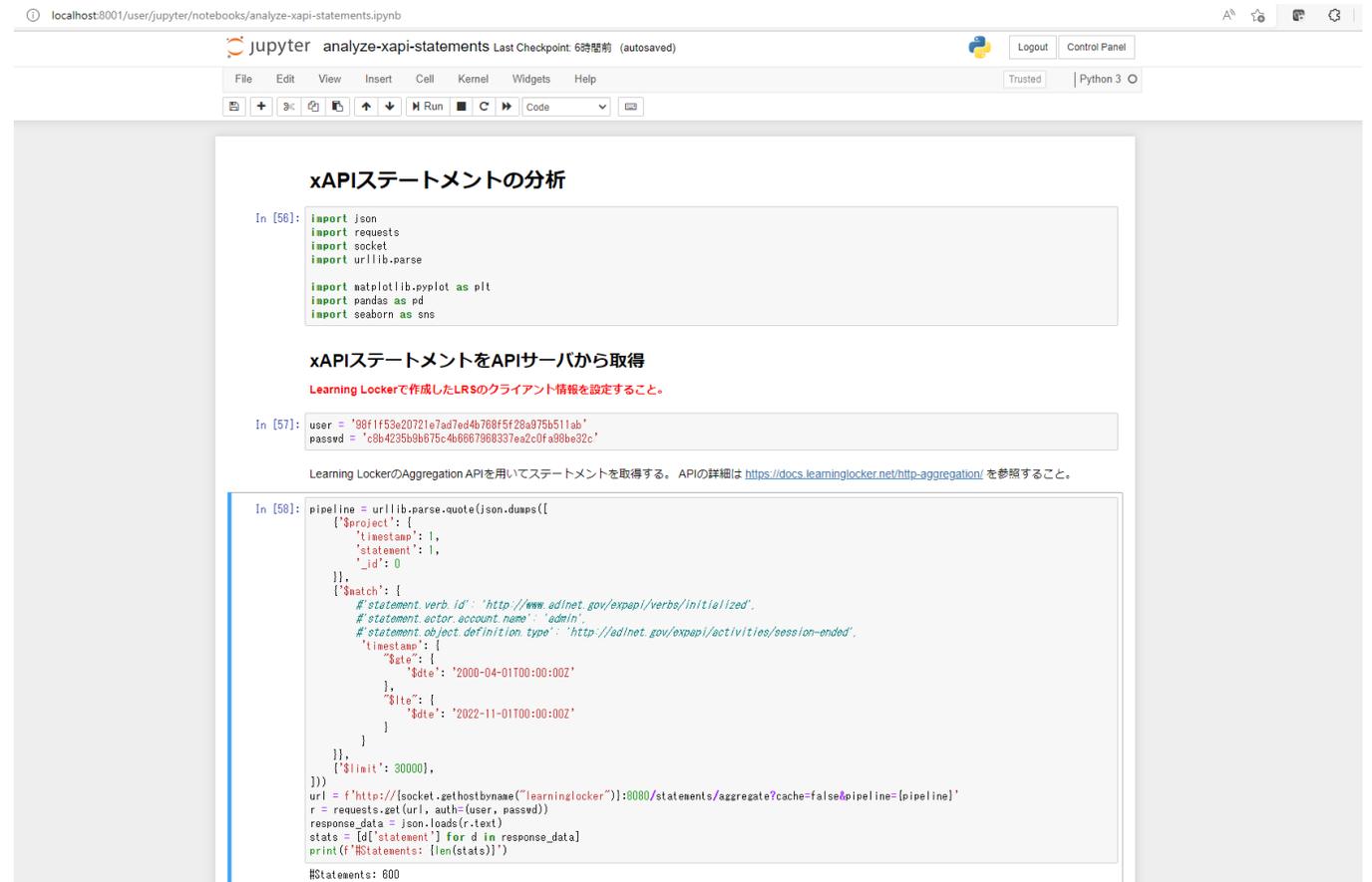


Sakai-LMS-LAの構成 -分析・可視化-



JupyterHub

- Jupyter notebookをオンライン/複数ユーザで利用できる環境
- Statementの加工と分析
 - LearningLockerから取得
 - RDBに登録



The screenshot shows a Jupyter notebook titled "analyze-xapi-statements.ipynb" running on localhost:8001. The notebook content is as follows:

```
In [56]: import json
import requests
import socket
import urllib.parse

import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns

xAPIステートメントをAPIサーバから取得
Learning Lockerで作成したLRSのクライアント情報を設定すること。

In [57]: user = "98f1f53e20721e7ad7ed4b768f5f28a075b511ab"
passwd = "c8b4235b9b675c4b666796837ea2c0fa98be32c"

Learning LockerのAggregation APIを用いてステートメントを取得する。APIの詳細は https://docs.learninglocker.net/http-aggregation/ を参照すること。

In [58]: pipeline = urllib.parse.quote(json.dumps([
    {"project": {
        "timestamp": 1,
        "statement": 1,
        "_id": 0
    }},
    {"$match": {
        "#statement.verb.id": "http://www.adlnet.gov/expapi/verbs/initialized",
        "#statement.actor.account.name": "admin",
        "#statement.object.definition.type": "http://adlnet.gov/expapi/activities/session-ended",
        "timestamp": {
            "$gte": {
                "$date": "2000-04-01T00:00:00Z"
            },
            "$lte": {
                "$date": "2022-11-01T00:00:00Z"
            }
        }
    }},
    {"$limit": 30000},
]))
url = f"http://{socket.gethostbyname('learninglocker')}:8080/statements/aggragate?cache=false&pipeline={pipeline}"
r = requests.get(url, auth=(user, passwd))
response_data = json.loads(r.text)
stats = [{"statement"} for d in response_data]
print(f"#Statements: {len(stats)}")

#Statements: 600
```

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```

| http://localhost:8888/portal/site/8b4b4188-4539-4bb7-99a8-2bf
e1e | Activity
  2a97bb45-baa2-4c1e-8a87-c8aadb40c6a6 | 2021-08-09 19:34:51 | 2022-11-07 07:47:11.624 | Dummy Instr
| instructor-5 | http://localhost:8888 | Agent | http://www.adlnet.gov/expapi/ver
eracted | http://adlnet.gov/expapi/activities/new-poll | http://localhost:8888/po
oll

```

```

| Activity
| User created a poll with text:example-poll-7
| User created a poll

```

```

uep@miche:~/Sakai-LMS-LA$ sudo docker-compose exec dummy-xapi npm start
[sudo] password for uep:

```

```

> dummy-xapi@0.1.0 start /usr/local/src/dummy-xapi
> node server.js

```

```

[2022-11-08 22:39:20.178] [INFO] - 100 statements added.
[2022-11-08 22:39:20.328] [INFO] - 100 statements added.
[2022-11-08 22:39:20.604] [INFO] - 100 statements added.

```

```

uep@miche:~/Sakai-LMS-LA$

```

```

uep@miche:~/Sakai-LMS-LA$ ls
Dockerfile README.md Sakai-LMS-LA context.xml docker-compose.yml docs dummy-xapi notebooks

```

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Sakai-LMS-LAの意義

- Sakai-LMS-LAがある ≠ 何かすごいことができる
- 端的には既存システムの組み合わせを再現可能にしたもの
- Sakaiはロギングが貧弱なためxAPIで補完
 - xAPI実装にコミットできる余地がある
- 教育データの分析基盤を自分の手元で動作させることが可能
 - いわゆるLAの学内の合意形成に活用できる
 - Moodleの方はNIIのLAaaS-dockerをどうぞ

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