

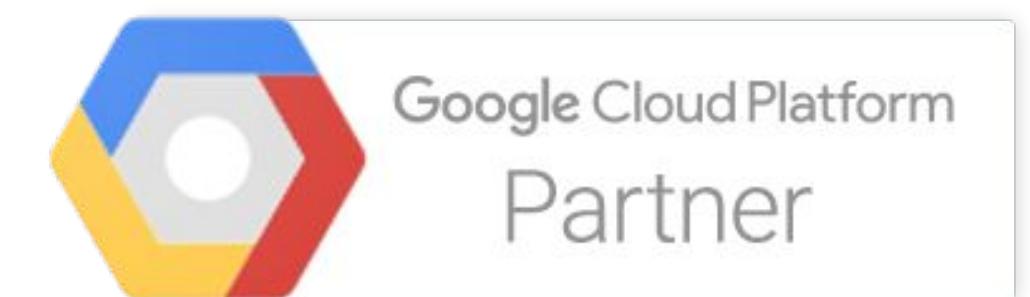
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# Case Study: BigQuery in Learnetic's eLearning Ecosystem



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Solw' IT | Let's Solve It

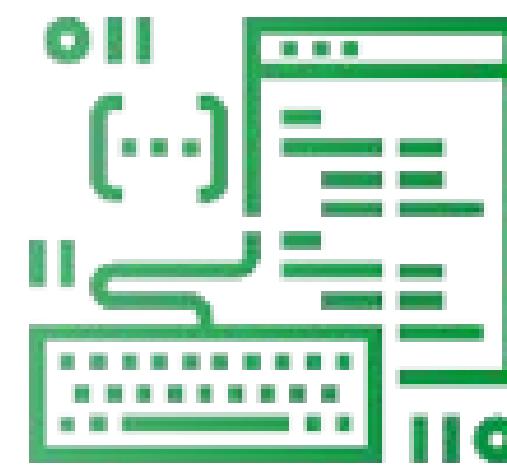




Who am I?



## SOFTWARE ENGINEERING



Software  
Development



Test  
Services



Cloud  
Transformation



Lab  
Infrastructure  
Management



**Learnetic**  
Everyone learns differently



NetDragon Websoft Inc.

**Porto  
Editora**  
a abrir horizontes



**ICT  
LEARNING**



**LTS**  
EDUCATION SYSTEMS™



CyberBook®

**MEGAMATMA®**

**PEARSON**



**BMG**  
BILUM MEDIA GROUP

**EDU  
KUSTANNUS**

**SPLC**

**PONS**

**Mc  
Graw  
Hill** Education

FUNDACIÓN  
*Carlos Slim*

**COMMEST**  
Multi média

**POSITIVO**  
INFORMÁTICA

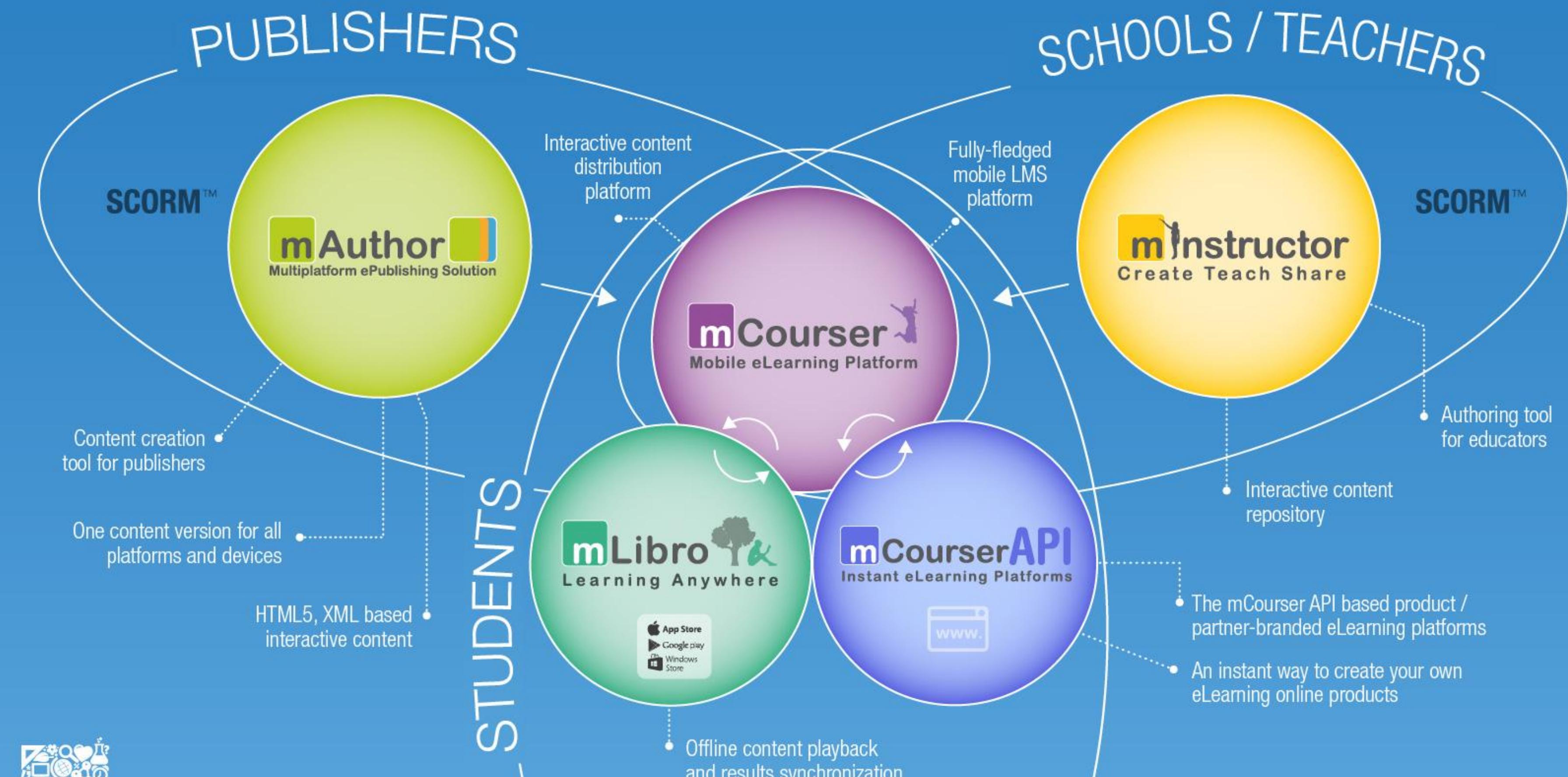
**ediciones sm**

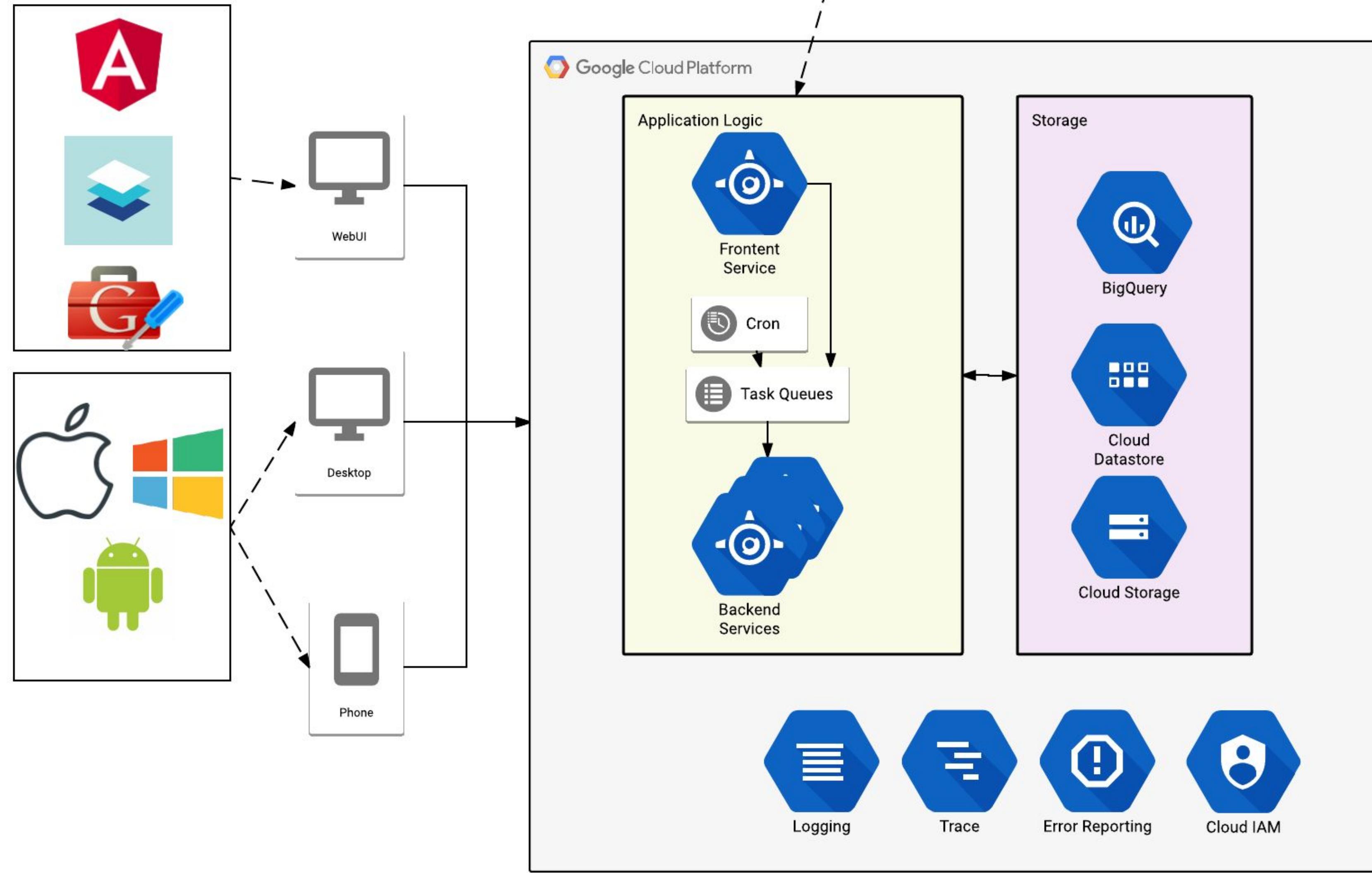
# Agenda

- Questions?
- Learnetic's technology services
- Focus on mCourse and content metrics
- What is there to analyze and report
- How we have stumbled upon BigQuery

# eLearning Ecosystem

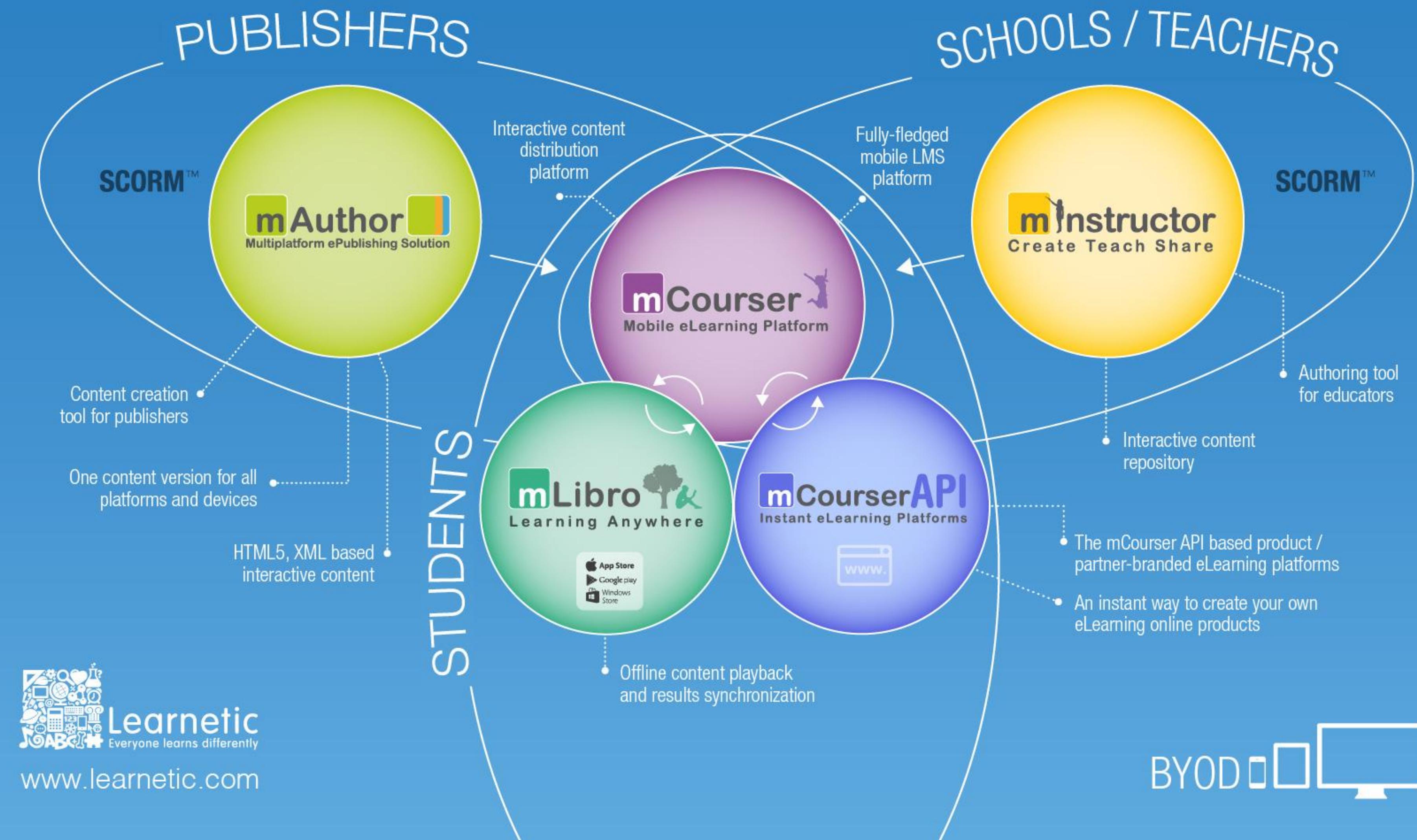
Complete SaaS solution to create, sell and deliver interactive educational content, including LMS and authoring tools for teachers and students.





# eLearning Ecosystem

Complete SaaS solution to create, sell and deliver interactive educational content, including LMS and authoring tools for teachers and students.



[www.mcourser.pl/lesson/view/5968977545658368/next/~courses~65](http://www.mcourser.pl/lesson/view/5968977545658368/next/~courses~65)

# nasz Elementarz

1 KLASA część 1

Str. 11 Co będziemy robić w szkole

1. Co cię interesuje? Co chcesz robić w szkole? Przedstaw swoje pomysły.

2. Zaznacz obrazek, który po

**321 math!**  
Content presentation

Set the hands.

It's nine o'clock.

It's eleven o'clock.

It's two o'clock.

It's seven o'clock.

[www.mcourser.pl/lesson/view/5968977545658368/next/~courses~65](http://www.mcourser.pl/lesson/view/5968977545658368/next/~courses~65)

1. Sprawdź, jakie znaki znajdują się w twojej szkole.

2. Uj najkrótszą drogę, która prowadzi z klasy do wyjścia korytarzy.

Wyjście

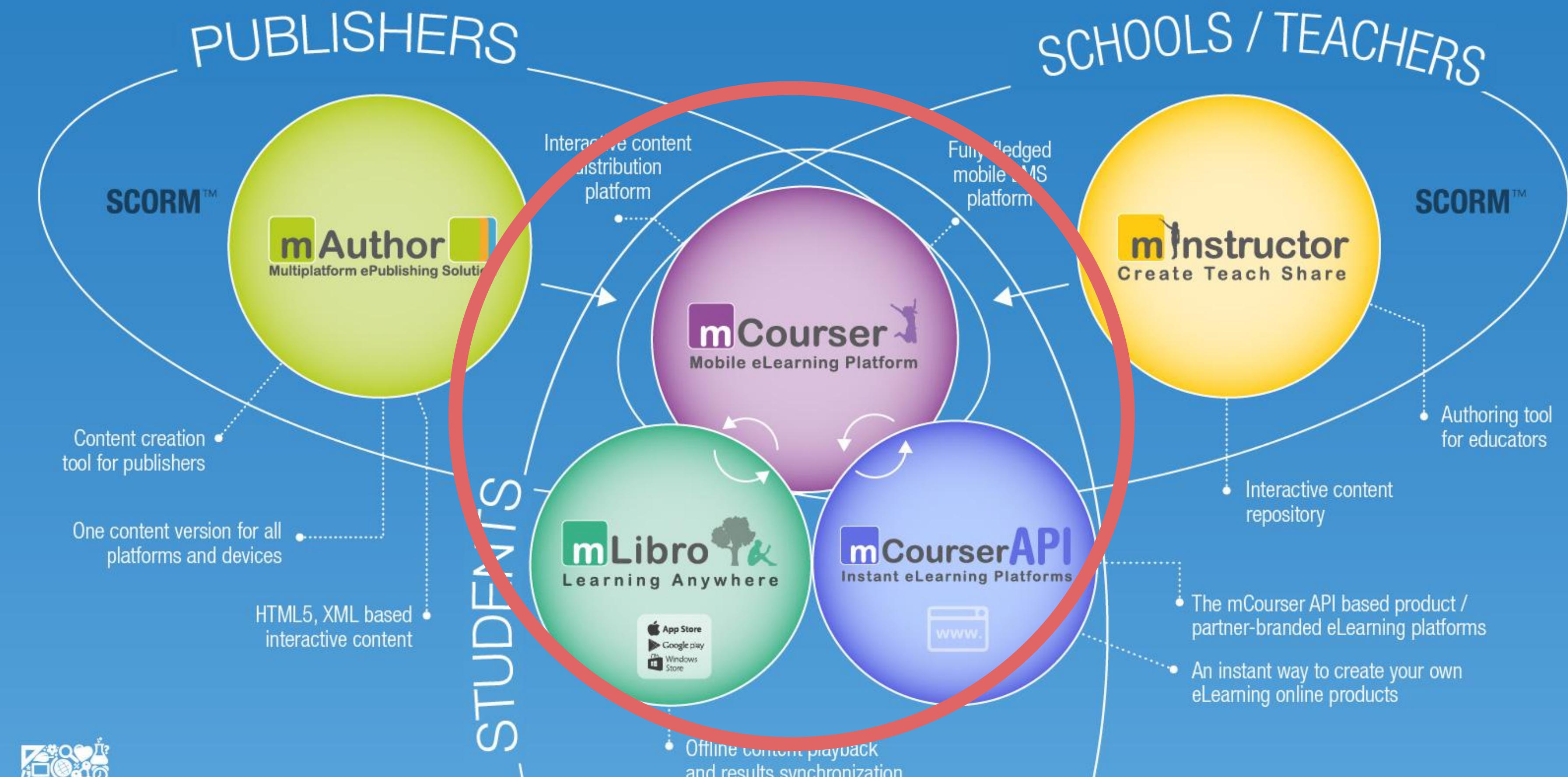
Klasa

3 4 5 6 7 8 9 10 11 12 13 14 ...



# eLearning Ecosystem

Complete SaaS solution to create, sell and deliver interactive educational content, including LMS and authoring tools for teachers and students.



www.mcourser.pl/structure

mCourser

Zaloguj się Zarejestruj się

Start Moje zasoby Kolekcje Społeczność Moja szkoła Zadania Głosowania Konkursy

## Kolekcje

WYDAWCY ▾

### Szukaj

Etap edukacyjny

Szkoła podstawowa - Klasy 1-3

Szkoła podstawowa - Klasy 4-6

Gimnazjum

Szkoły ponadgimnazjalne

Szkoły i kursy językowe

Specjalne potrzeby edukacyjne

Wydawcy

CKE Comtest Multimédia

Klett Konkurs Bóbr Learnetic

Megawiedza PONS

### Szkoła podstawowa - Klasy 1-3

321 matma! - klasa pierwsza

Learnetic

„321 matma!” – czyli czas na interaktywną matematykę najwyższej jakości, która pomoże rozwinąć kluczowe...

19.9 PLN

ZASOBY

321 matma! - klasa druga

Learnetic

„321 matma!” – czyli czas na interaktywną matematykę najwyższej jakości, która pomoże rozwinąć kluczowe...

19.9 PLN

ZASOBY

321 matma! - klasa trzecia

Learnetic

„321 matma!” – czyli czas na interaktywną matematykę najwyższej jakości, która pomoże rozwinąć kluczowe...

19.9 PLN

ZASOBY

Haloo Anna 1. Interaktywne zadania...

Klett

Haloo Anna 1. Interaktywne zadania dodatkowe to uzupełniający, multimedialny materiał ćwiczeniowy do...

7 PLN

ZASOBY

Haloo Anna 2. Interaktywne zadania...

Klett

Haloo Anna 2. Interaktywne zadania dodatkowe to uzupełniający, multimedialny materiał ćwiczeniowy do drugiego...

7 PLN

ZASOBY

Haloo Anna 3. Interaktywne zadania...

Klett

Haloo Anna 3. Interaktywne zadania dodatkowe to uzupełniający, multimedialny materiał ćwiczeniowy do trzeciego...

7 PLN

ZASOBY

Klasa 1 - Lato - Nasz Interaktywny...

Learnetic

Nasz Interaktywny Elementarz został przygotowany przez firmę Learnetic SA na podstawie wydawnictwa...

nasz Ele Mon Tarz

Klasa 2 - Lato - Nasza Interaktywna...

Learnetic

Nasza Interaktywna Szkoła Lato została przygotowana przez firmę Learnetic SA na podstawie wydawnictwa...

nasz SZKOŁA matematyka

Klasa 3 - Lato - Nasza Interaktywna...

Learnetic

Nasza Interaktywna Szkoła Lato została przygotowana przez firmę Learnetic SA na podstawie wydawnictwa...

nasz SZKOŁA matematyka

The screenshot shows a pirate-themed interface for a reading adventure. At the top, there's a sidebar with a cartoon boy icon, the name "Ali Nuri Demirtas", and a trophy count of "23422". Below this is a transcript of a conversation:

- 1 Hello!
- 2 Good morning!
- 3 What's your name?
- 4 Her name's Lucy.

A vertical menu on the right lists "Week 1" through "Week 13". A large question mark icon is in the top right corner. A "Print" button is at the bottom left.



This screenshot shows a matching game where numbered bottles need to be paired with numbered bases. There are nine numbered bottles and nine numbered bases, each with a checkmark indicating they are matched correctly. The sidebar on the left includes "My Pirate", "Log Out", and "Change Password".

This screenshot shows a map of a tropical island with various locations marked. The sidebar includes "My Pirate", "Log Out", "Change Password", and a progress bar showing a score of 23497. Below the map, there are four status icons: "inactive", "not started", "ongoing", and "completed".

[www.mcourser.pl/lesson/view/5968977545658368/next/~courses~65](http://www.mcourser.pl/lesson/view/5968977545658368/next/~courses~65)

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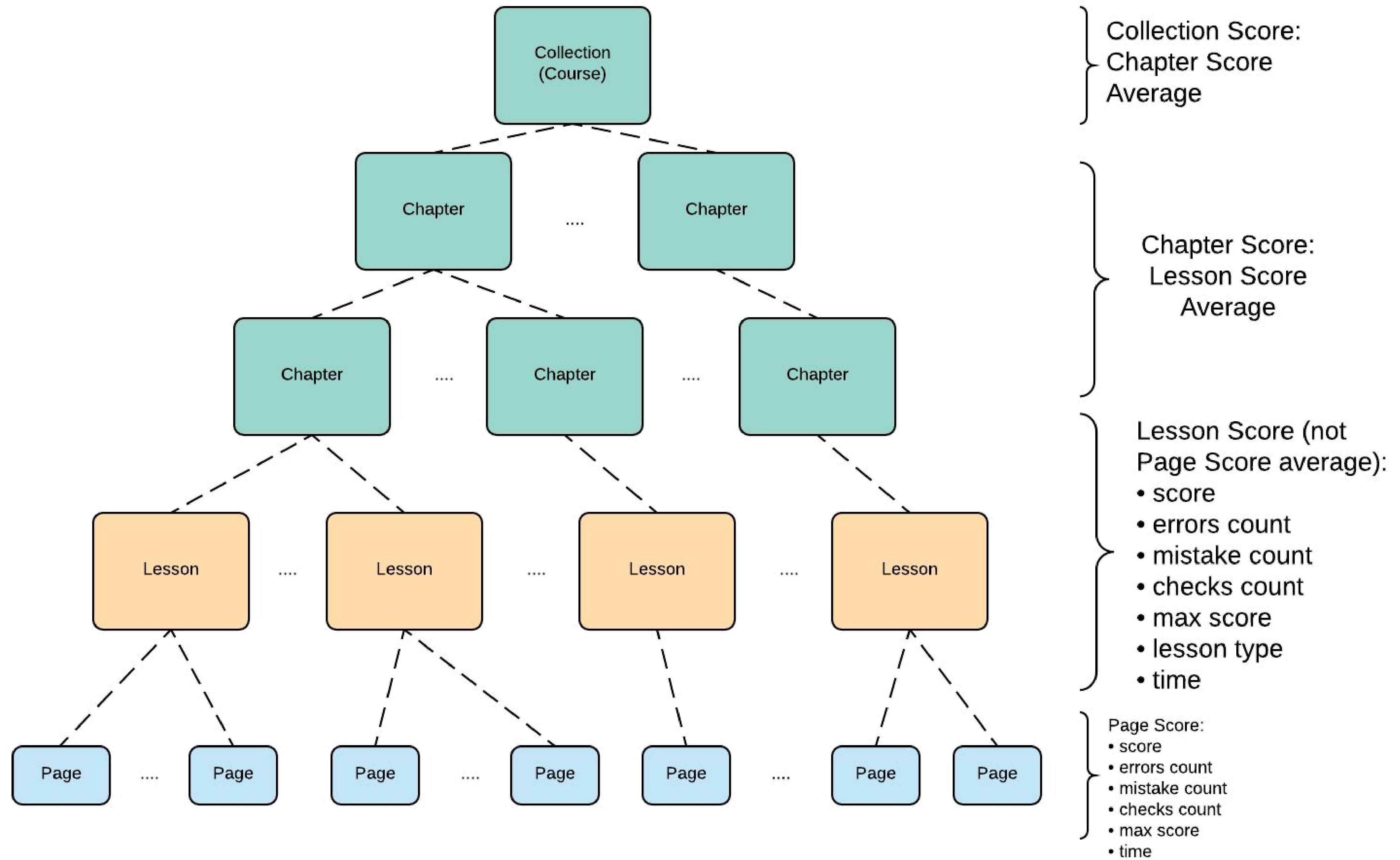
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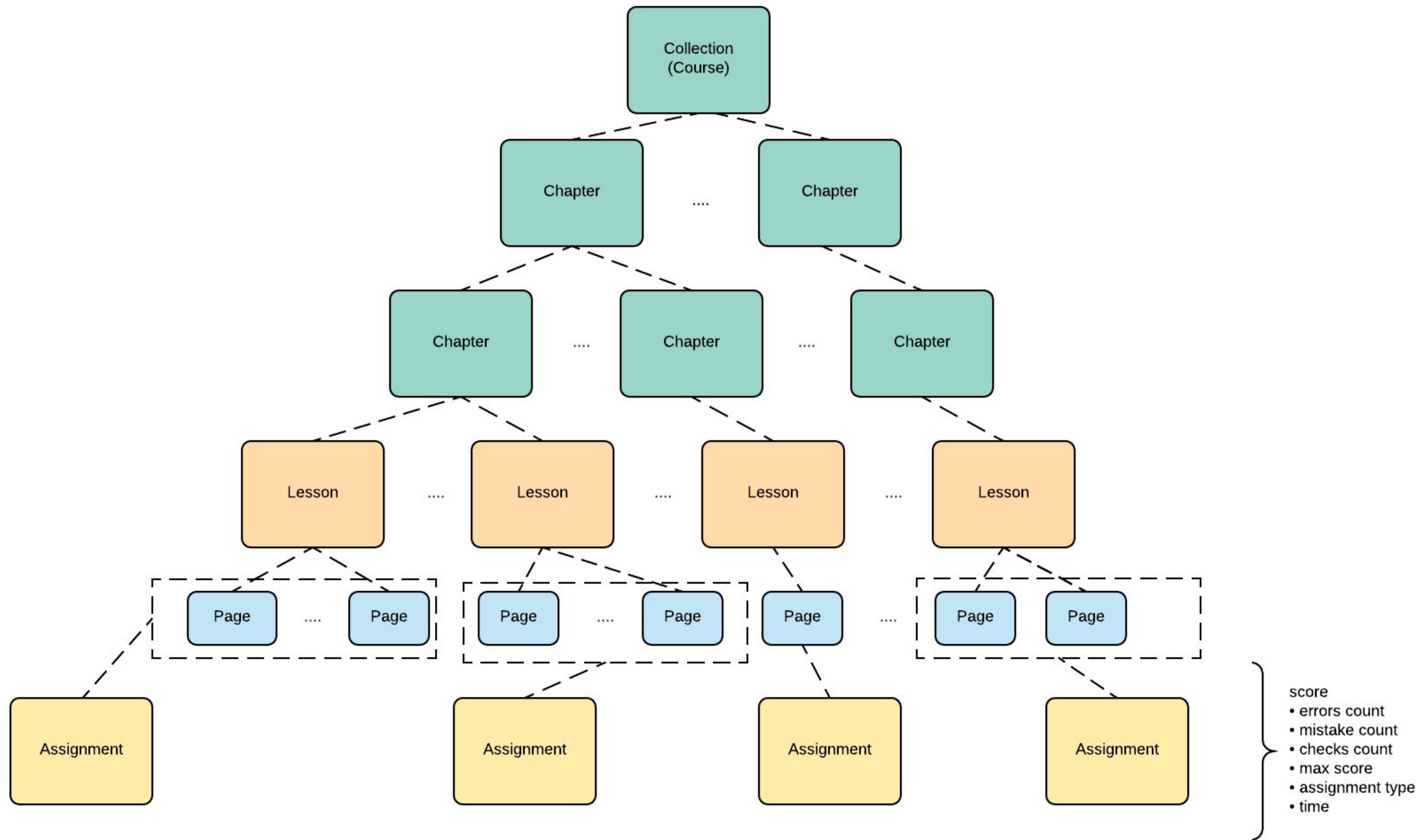
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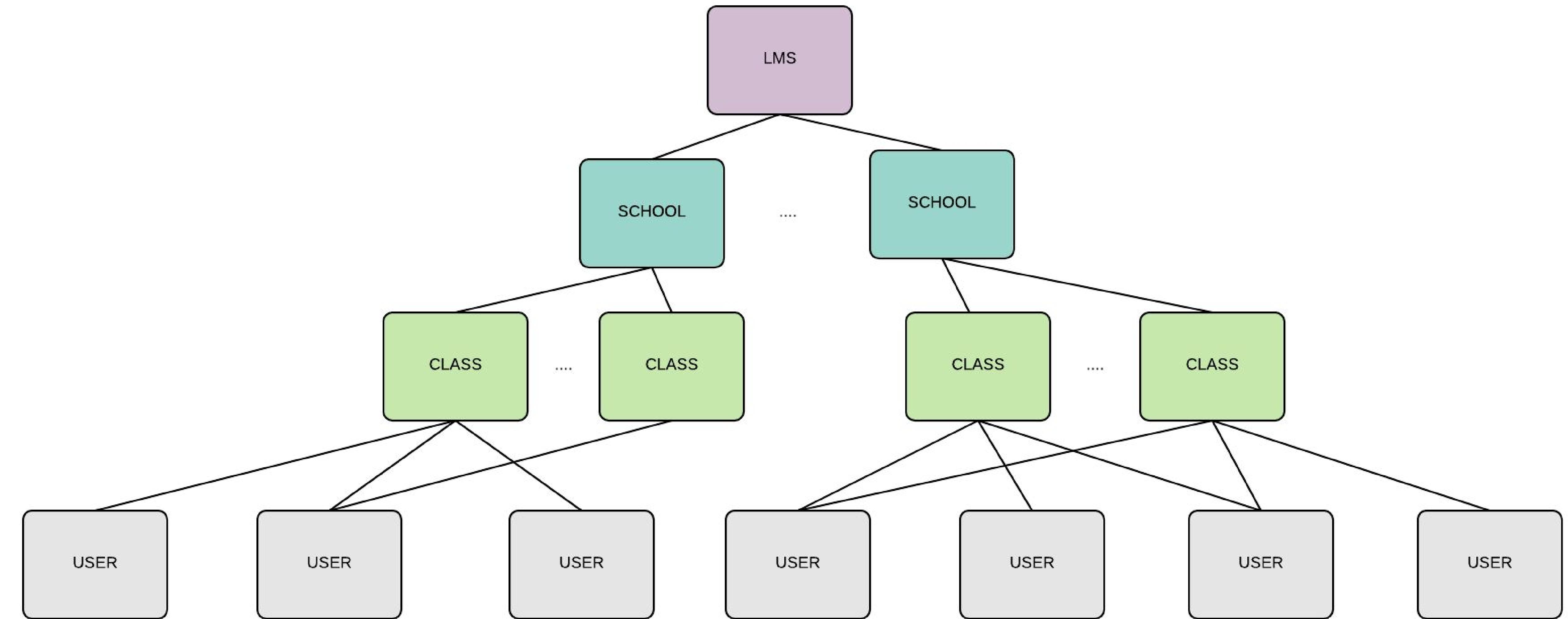
Wyjście

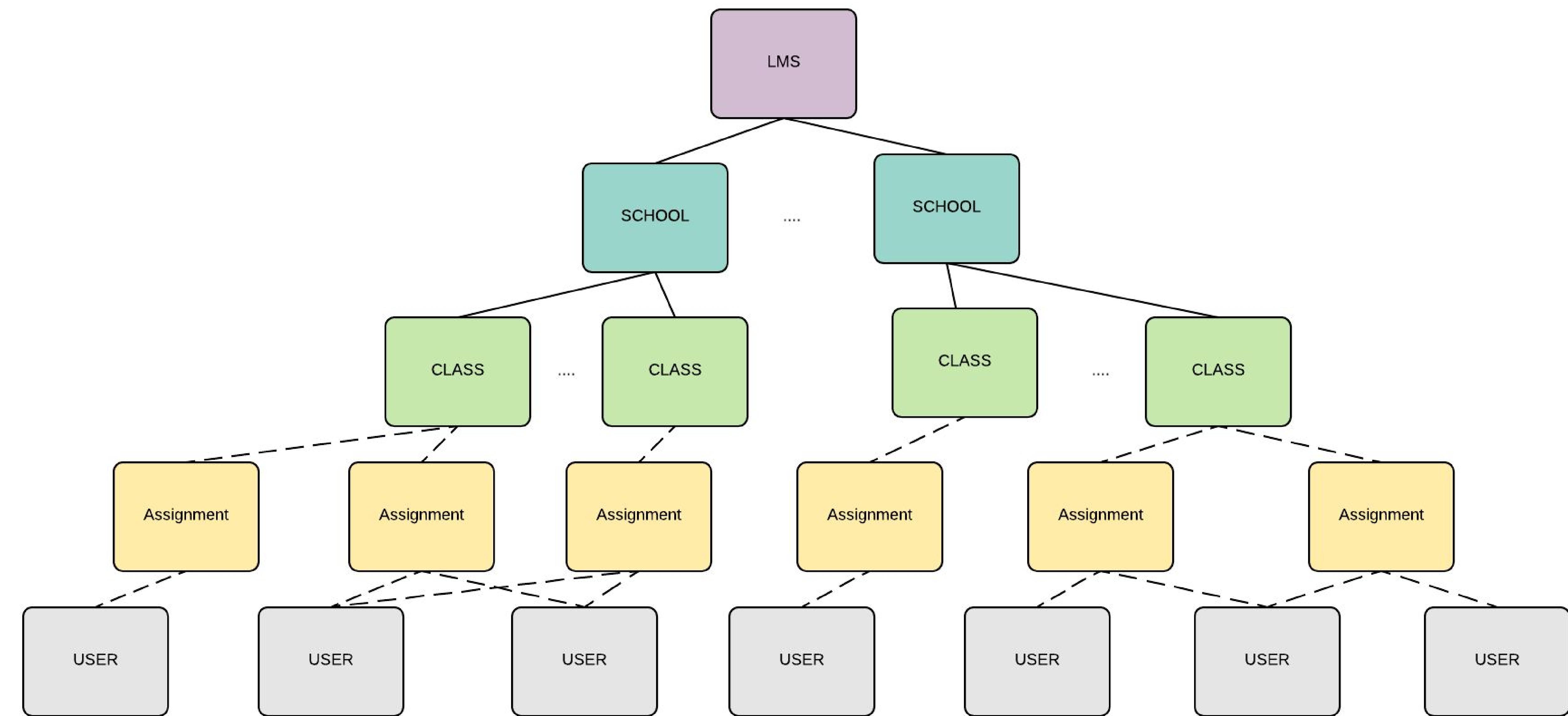
Klasa

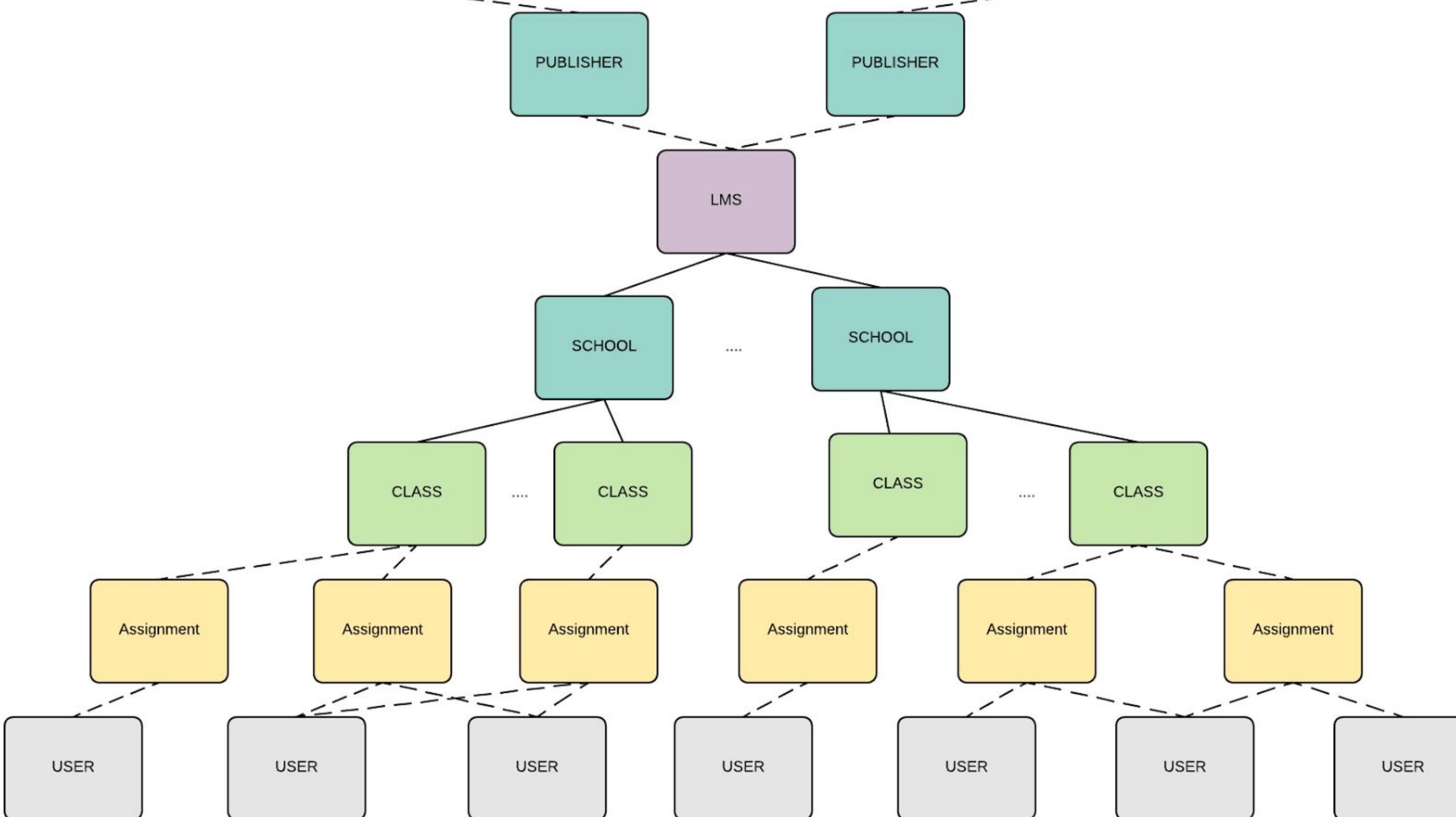
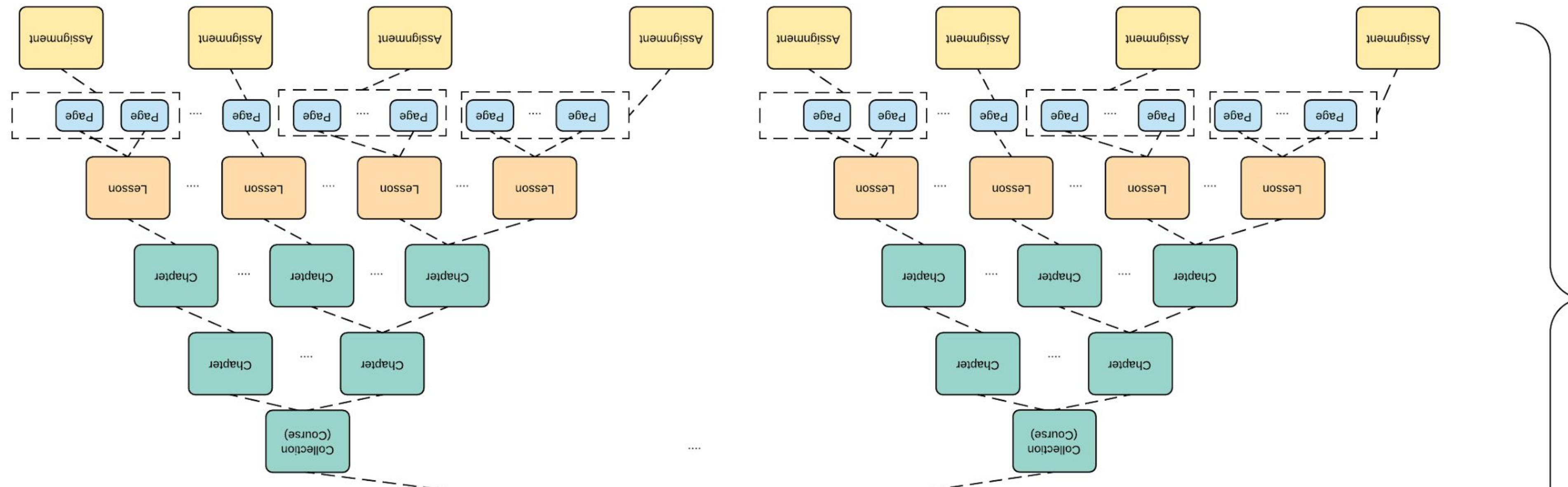
3 4 5 6 7 8 9 10 11 12 13 14 ...



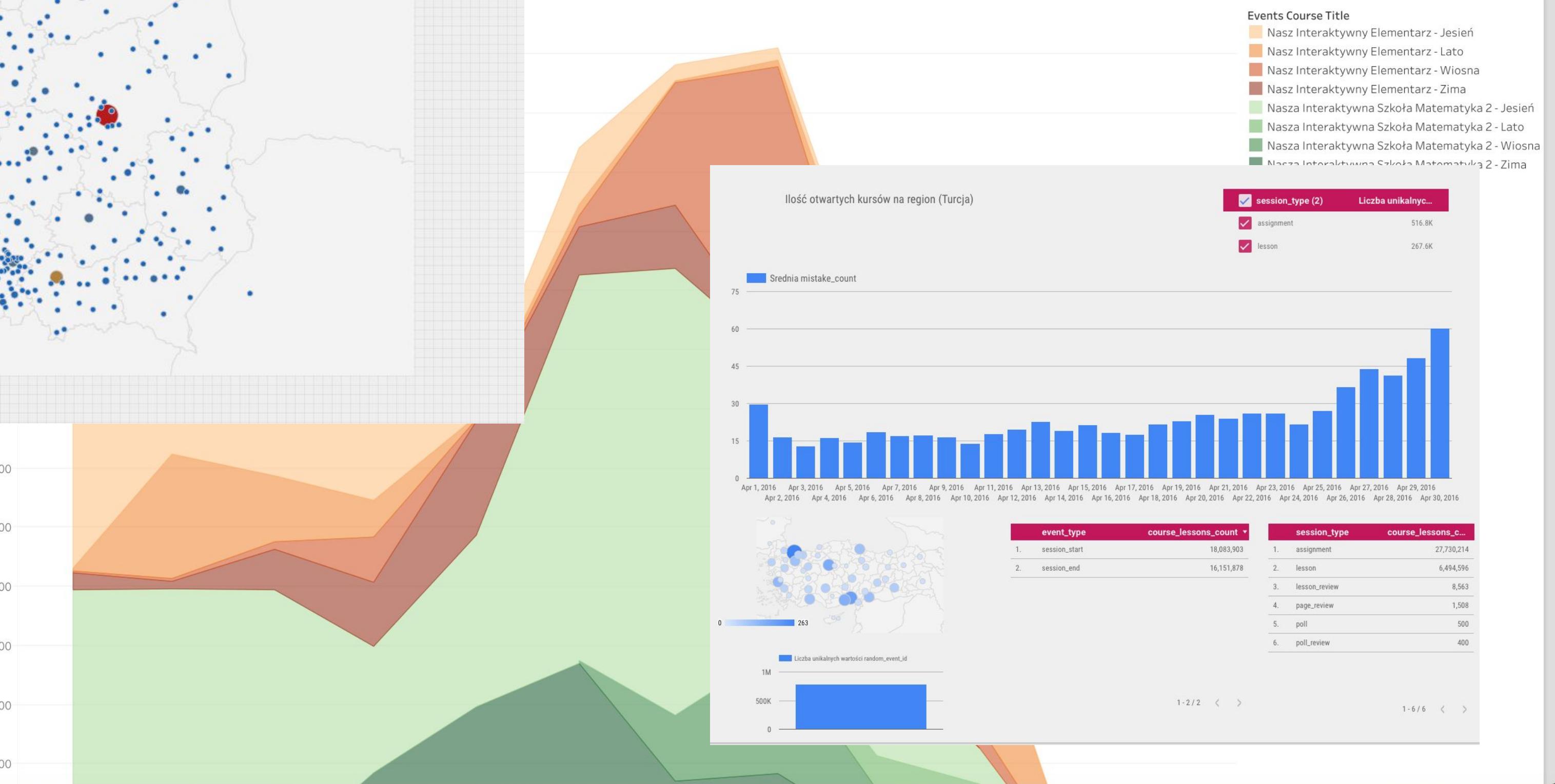
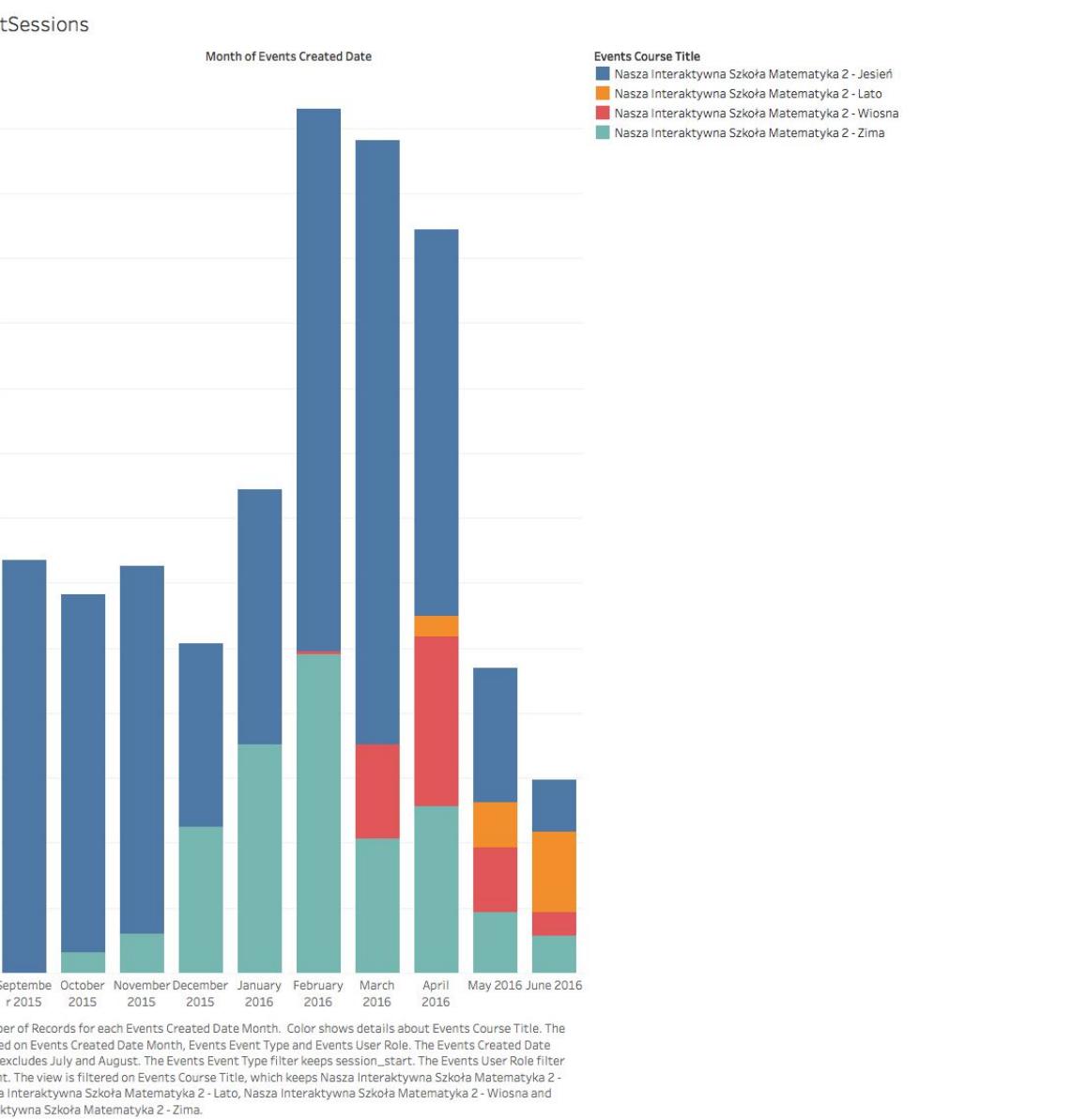
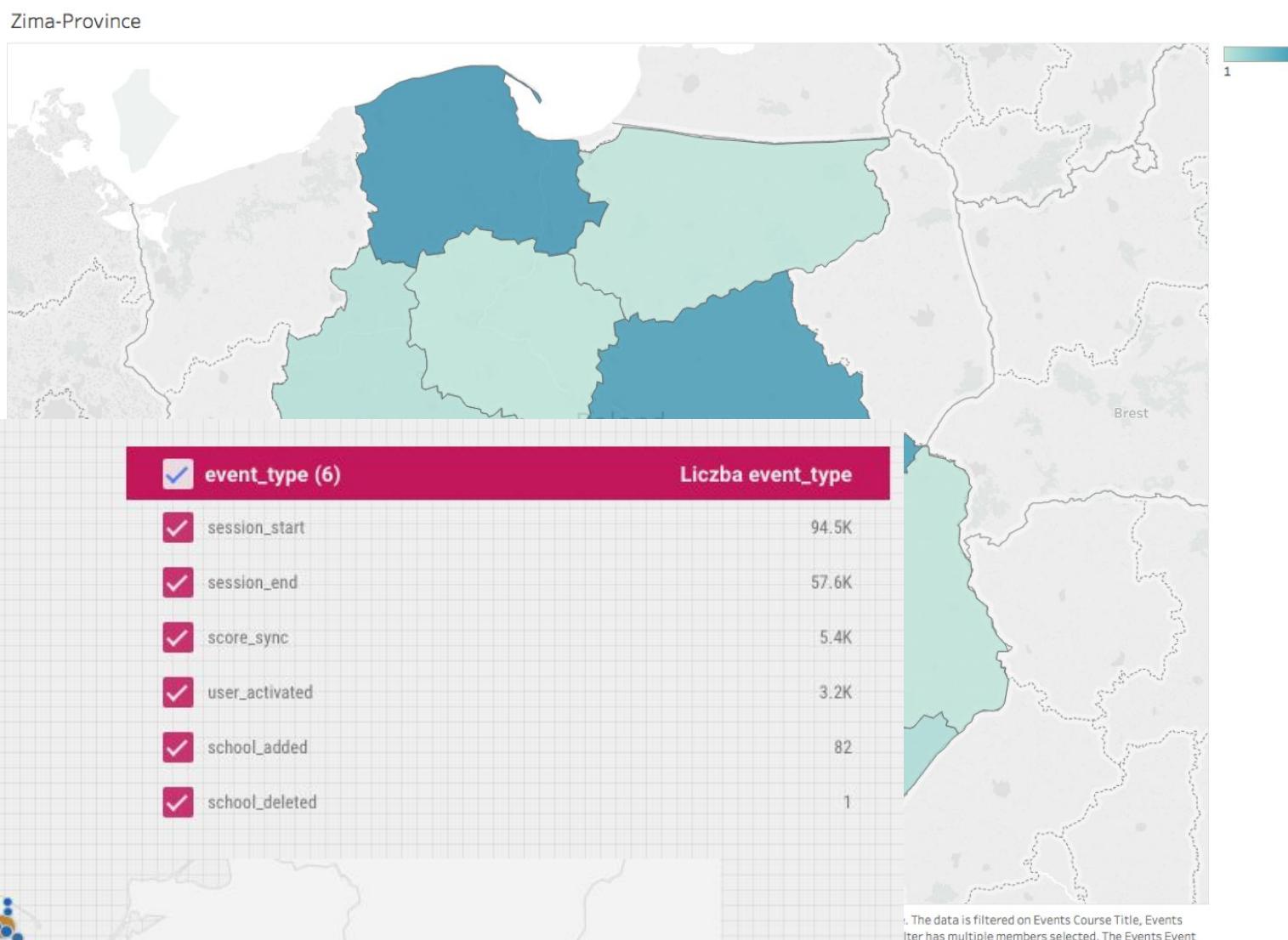
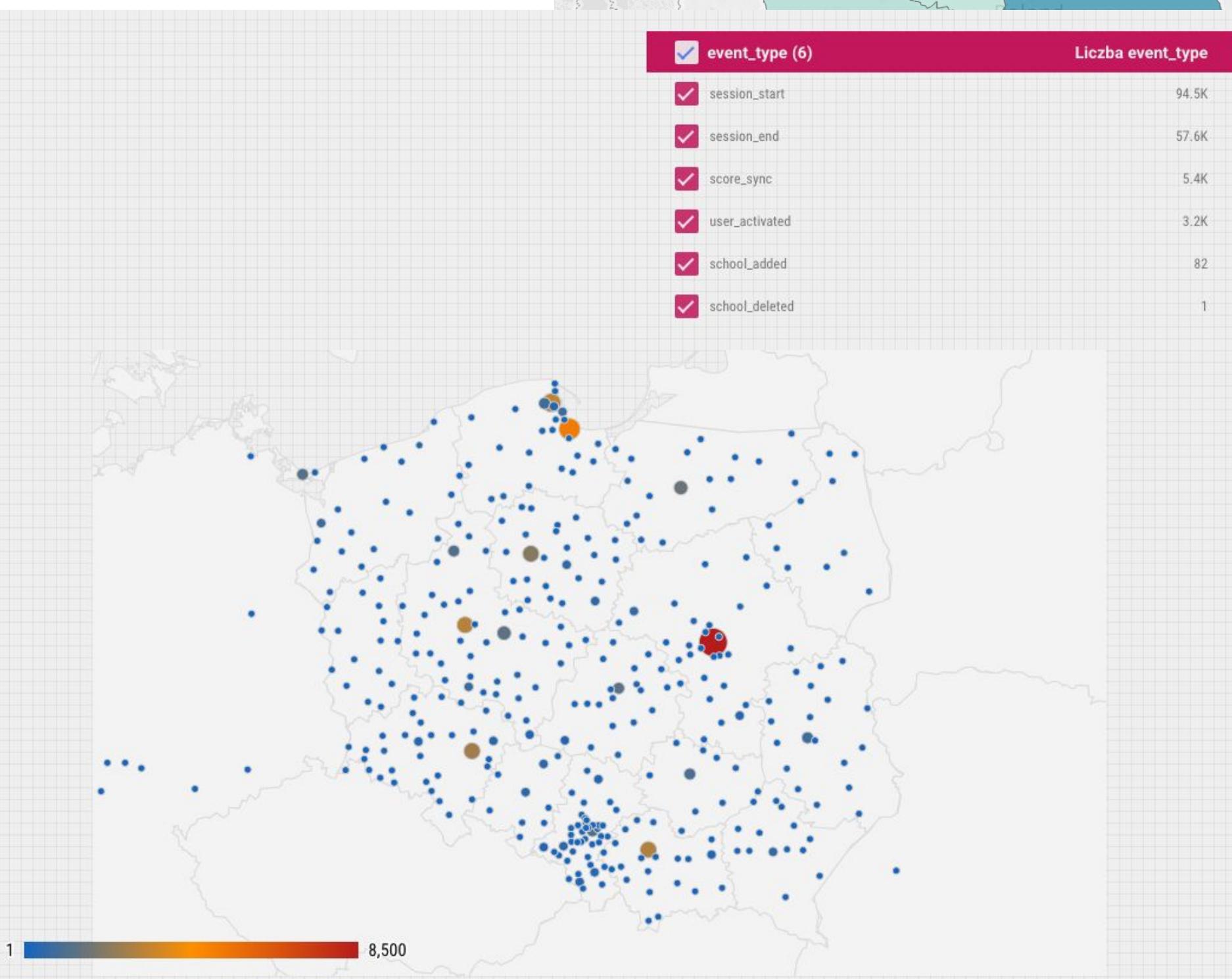
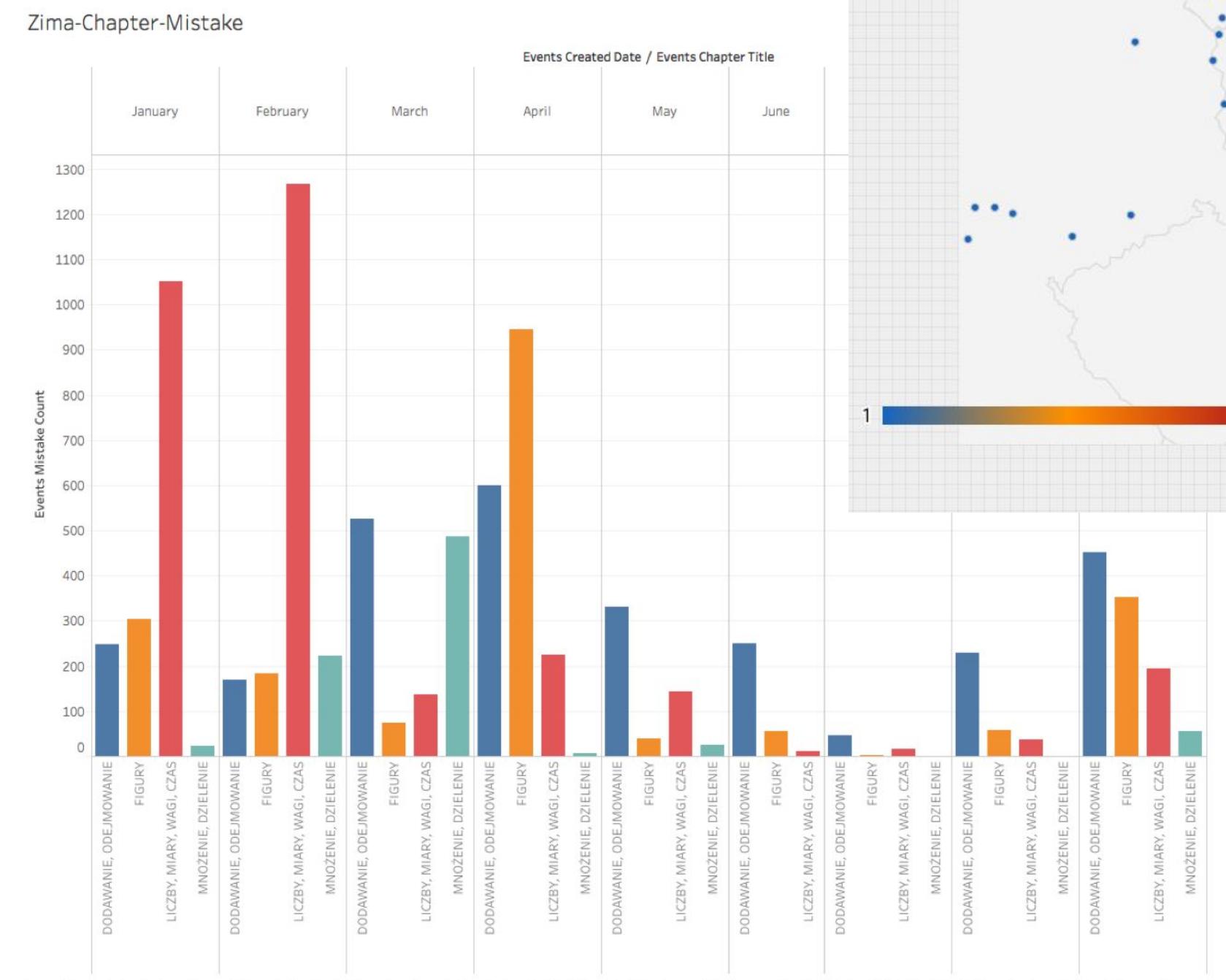








# Publisher Reports

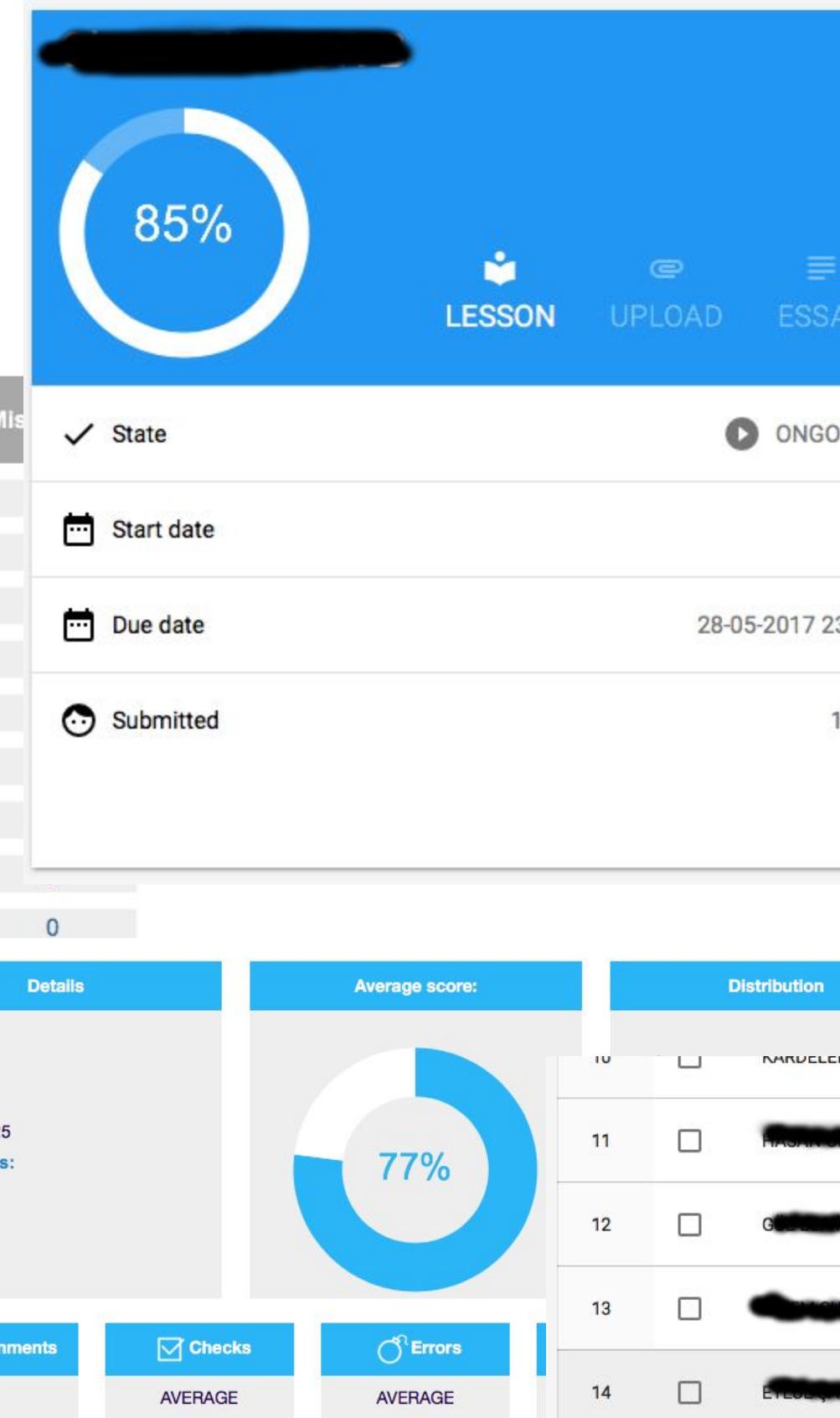


# School Reports

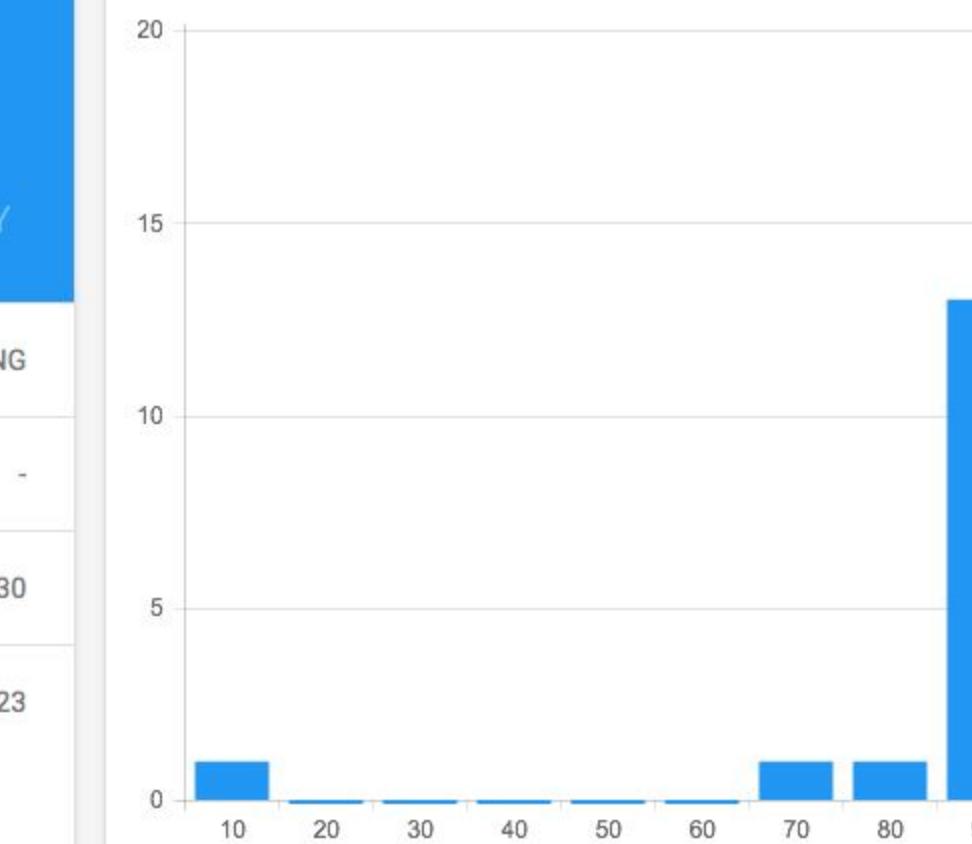
## Unit 1 Online Homework 3

There is no description

Student ▾	Number of results	Score	Checks	Errors	Mis
[REDACTED]	0/13	0%	0	0	
[REDACTED]	0/13	0%	0	0	
[REDACTED]	9/13	8%	0	0	
A [REDACTED]	13/13	15%	0	0	
[REDACTED]	13/13	12%	0	0	
V [REDACTED]	13/13	0%	0	0	
[REDACTED]	13/13	0%	0	0	
C [REDACTED]	13/13	5%	0	0	
S [REDACTED]	13/13	1%	0	0	
N [REDACTED]	13/13	3%	0	0	
M [REDACTED]	13/13	0%	0	0	
M [REDACTED]	13/13	0%	0	0	
[REDACTED]	13/13	0%	0	0	
[REDACTED]	13/13	1%	0	0	
N [REDACTED]	13/13	1%	0	0	
G [REDACTED]	13/13	0%	0	0	
G [REDACTED]	13/13	0%	0	0	
E [REDACTED]	13/13	33%	1	0	
E [REDACTED]	13/13	0%	0	0	



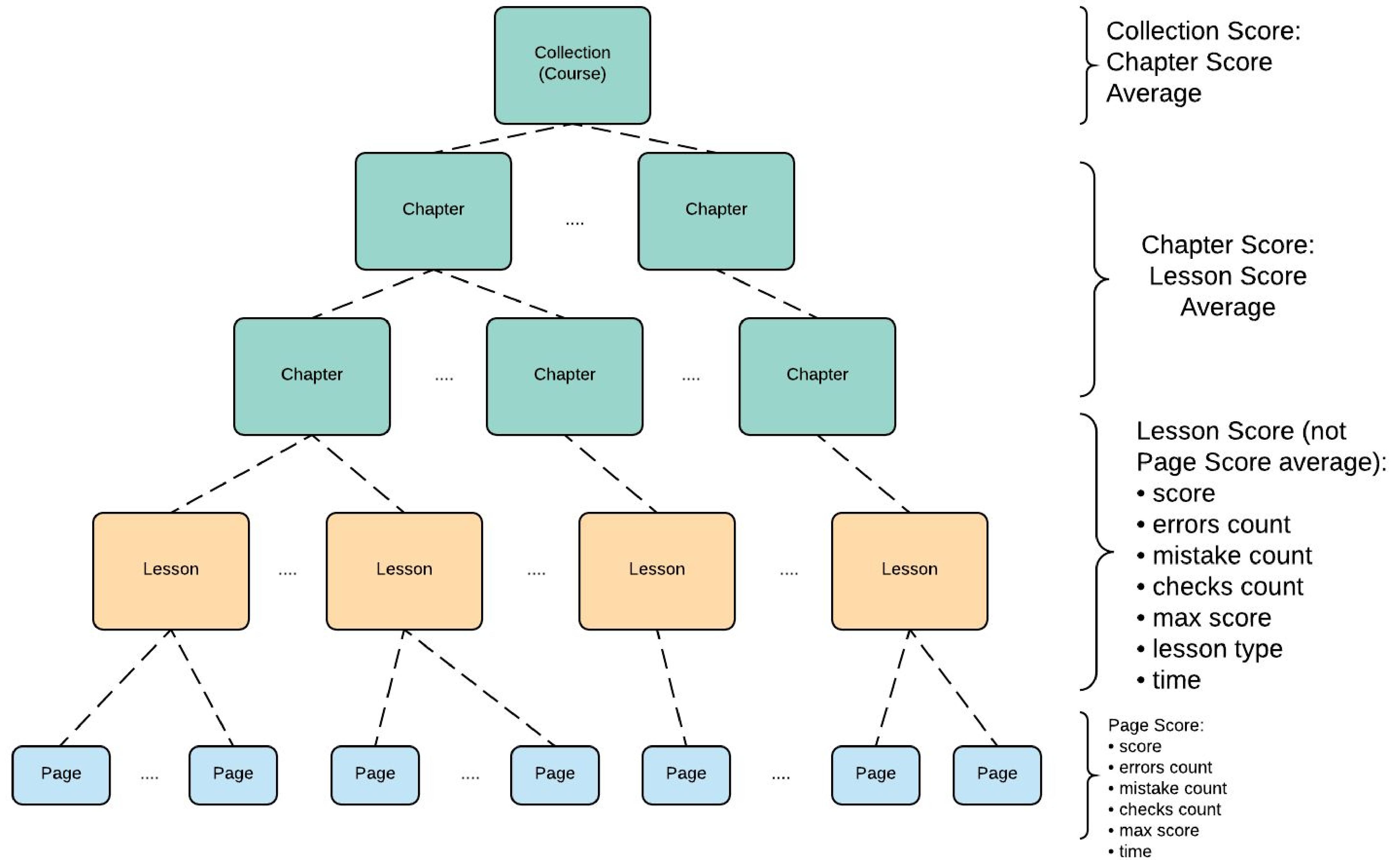
### Distribution



### Lesson

#### Unit 1 Online Homework 3

✓ Average Checks	9				
✗ Average Errors	1				
⚡ Average Mistakes	12				
⌚ Average Time	00:28:19				
<b>Class report - Courses</b>					
Back					
Details	Average score:				
School class: [REDACTED]	25				
Courses: 13	4%				
Distribution					
Students	27				
Checks	AVERAGE 0				
Errors	AVERAGE 0				
Mistakes	AVERAGE 0				
Time	AVERAGE 00:00:01				
DETAILS					
Student ▾	Score				
Activities					
Title —	Score —	Checks —	Errors —	Mistakes —	Time —
Lead-in	100 %	1	0	0	00:06:12
Main Input	100 %	0	0	0	00:01:53
Practice 1	100 %	1	0	0	00:04:59
Practice 2	100 %	0	0	0	00:00:15
Practice 3	100 %	1	0	0	00:00:59
Practice 4	100 %	1	0	0	00:00:27
Practice 5	100 %	2	0	0	00:00:53
English To Take Away	100 %	1	0	0	00:00:52



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# Choices ?

- Datastore
- Cloud SQL
- MySQL & other
- BigQuery

---

# BigQuery ?

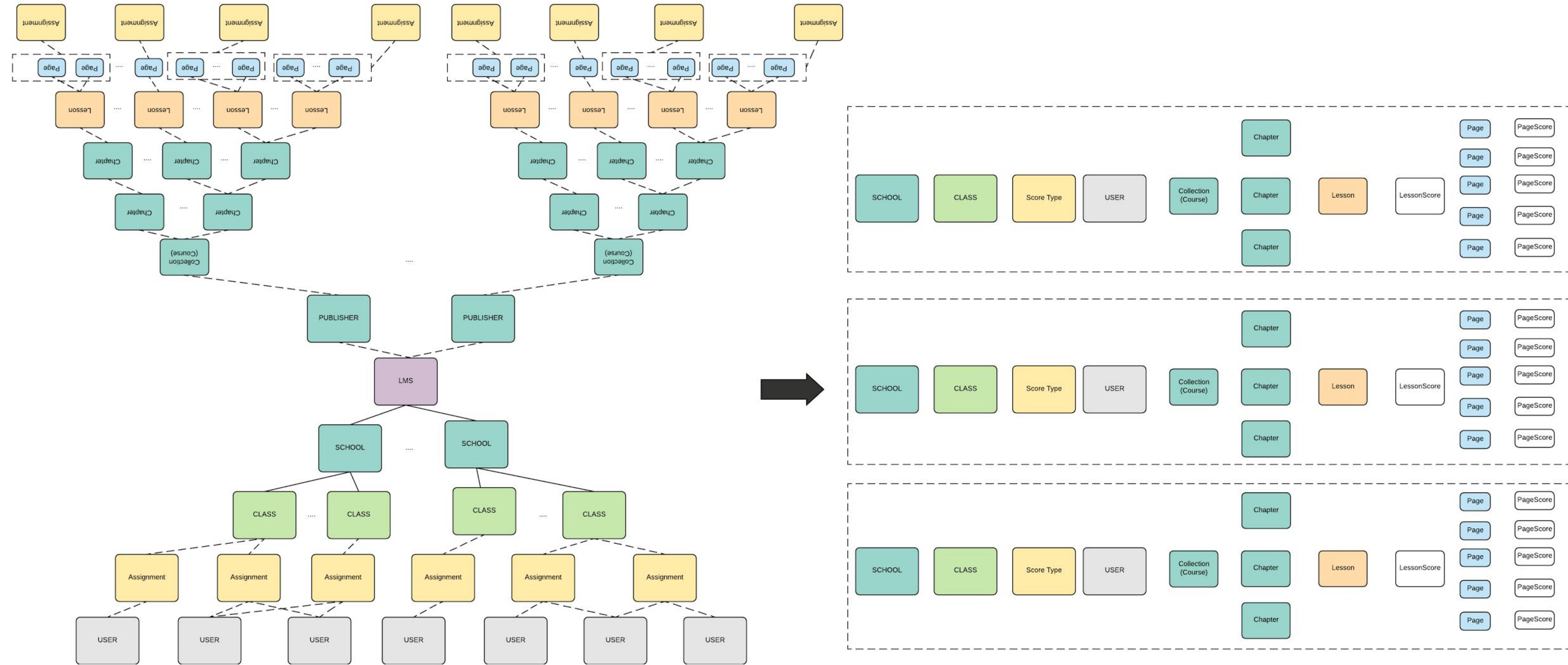
- characteristics

# BigQuery ?

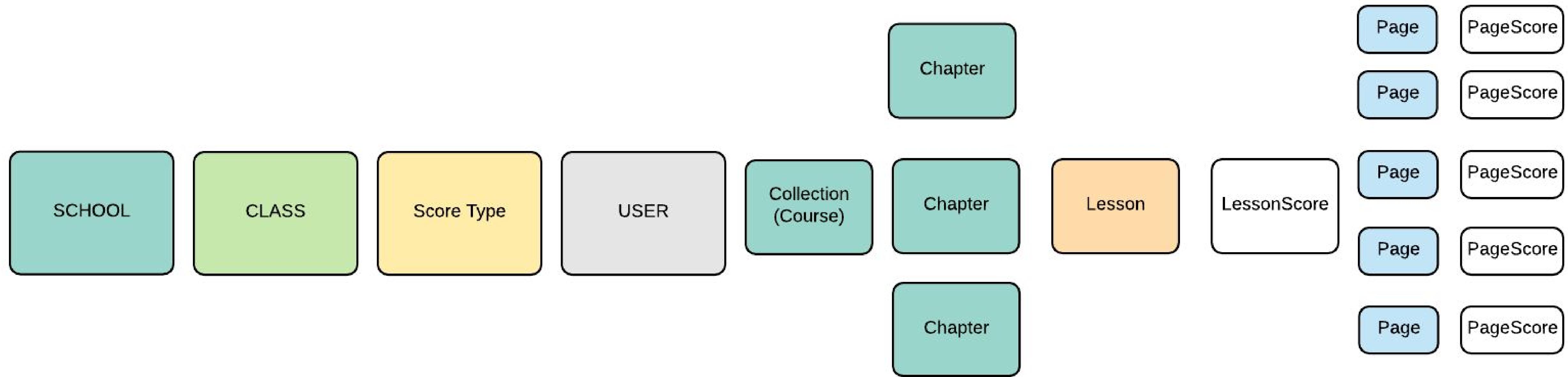
**Laziness:** Fully managed: it scales: (no replication, no servers, no credential management , API's, console, client libraries (this came later), SQL'ish then but now full SQL, had Tableau and others - now even DataStudio

**Cost:** petabyte scale?, cheap storage (and google keeps making it cheaper so far), cached queries, cheap and fast (comparing to datastore very fast)

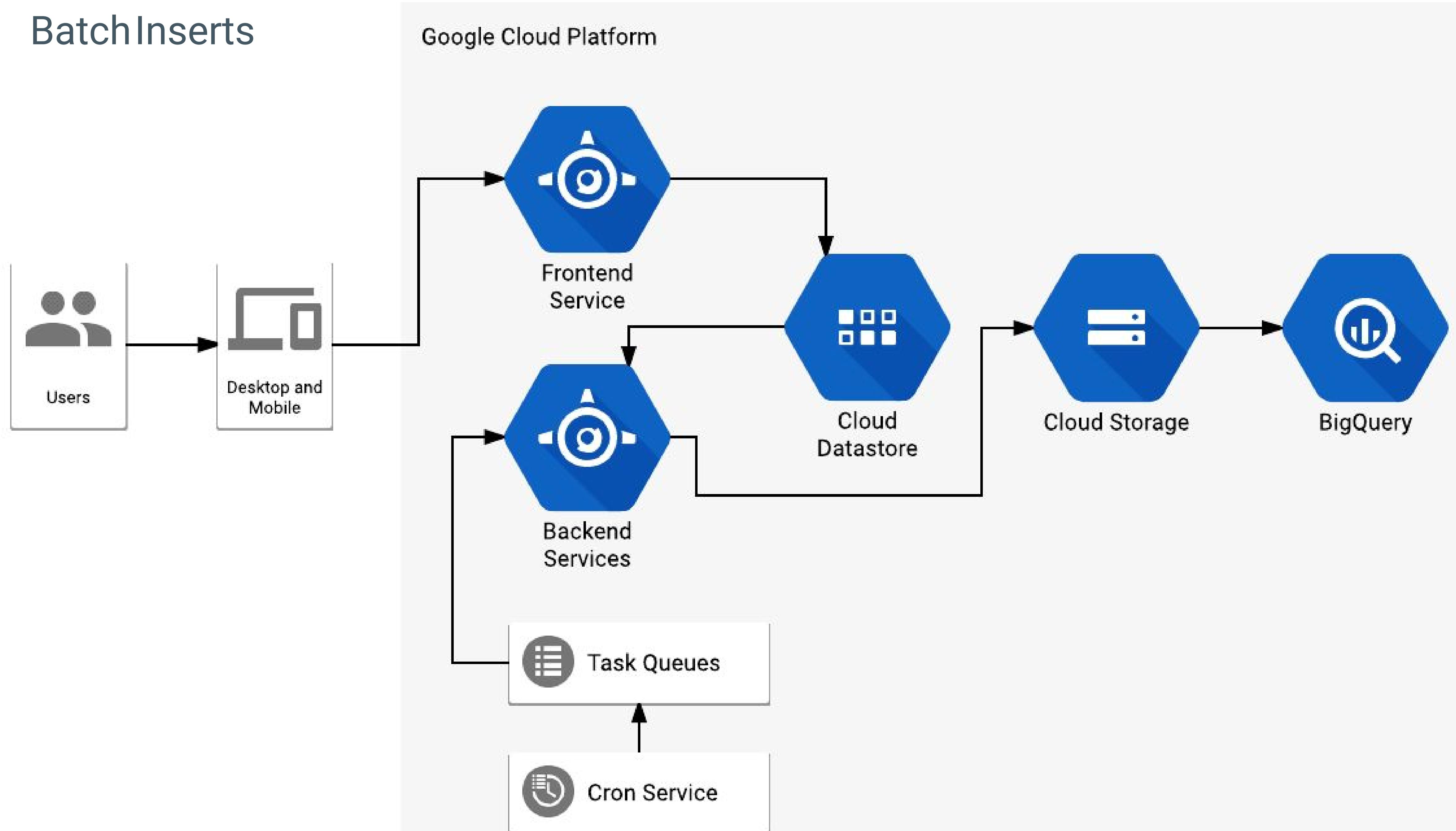
**Weird stuff:** no RDBM, no updates ( currently limited number of updates/deletes and inserts), limits on UDF, joins discouraged - flat data plus nested data, streaming or bulk updates

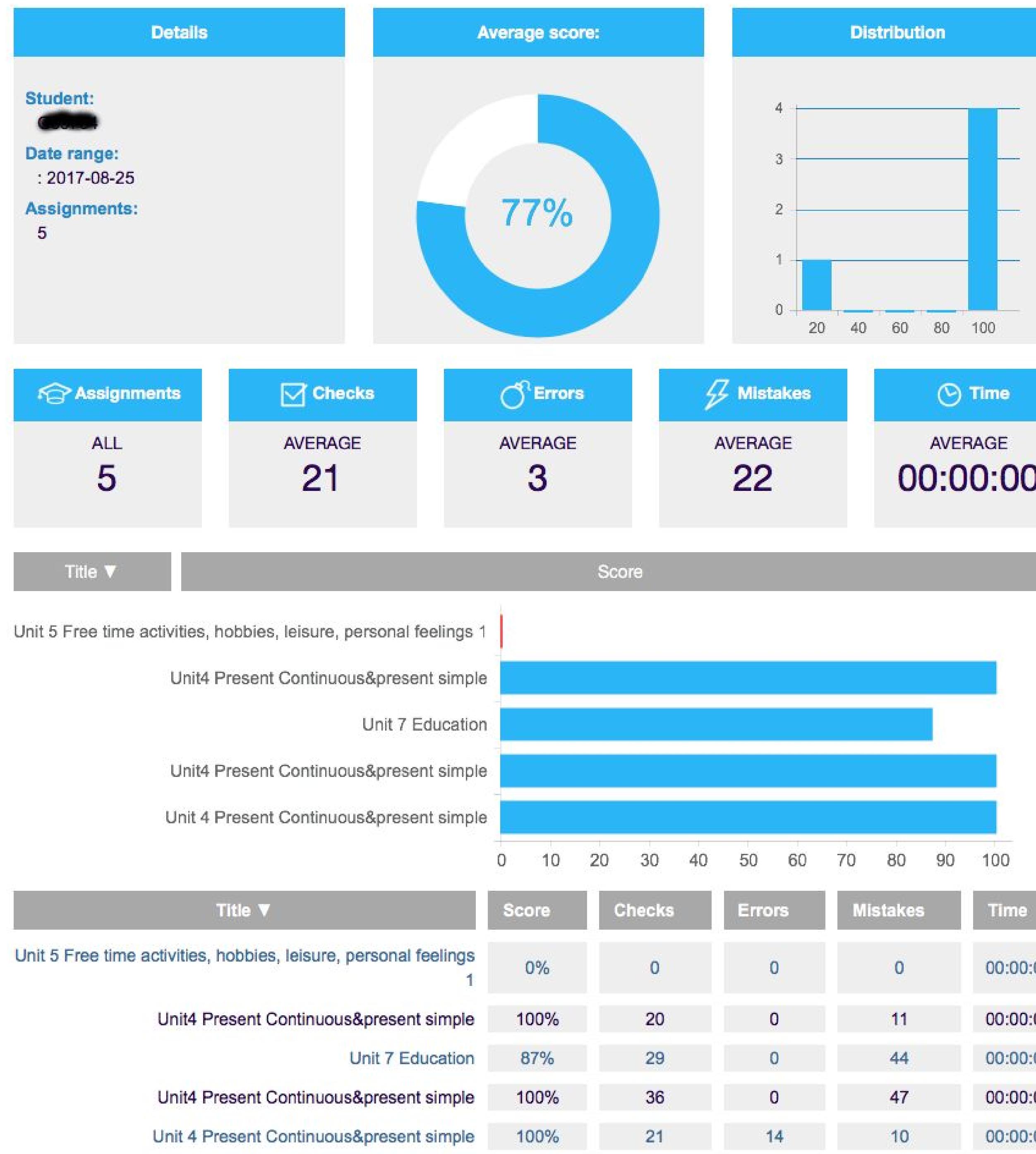


# Flattened data



# Batch Inserts





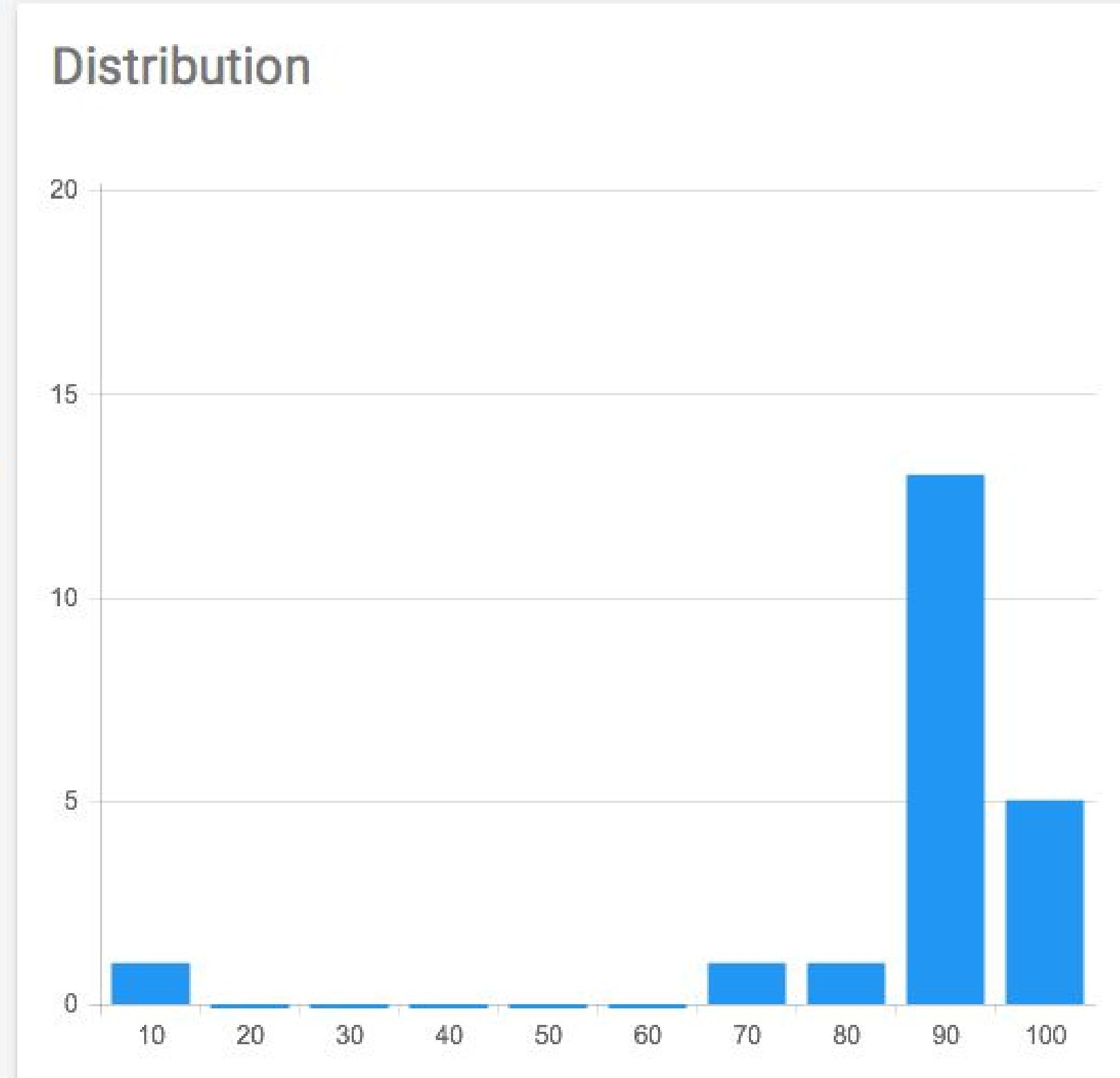
10	<input type="checkbox"/>	MARVELLEN DALA		ONGOING		99 %		2		0		0		00:00:00	<a href="#">DETAILS</a>
11	<input type="checkbox"/>	HAGAN OMEN DAY, 2011		ONGOING		100 %		18		0		10		00:00:00	<a href="#">DETAILS</a>
12	<input type="checkbox"/>	G...		NOT STARTED		-		-		-		-		00:00:00	<a href="#">DETAILS</a>
13	<input type="checkbox"/>	...		ONGOING		100 %		0		0		0		00:00:00	<a href="#">DETAILS</a>
14	<input type="checkbox"/>	EVELE, 2011		ONGOING		97 %		0		2		0		00:00:00	<a href="#">DETAILS</a>
15	<input type="checkbox"/>	...		NOT STARTED		-		-		-		-		00:00:00	<a href="#">DETAILS</a>
16	<input type="checkbox"/>	B...		ONGOING		100 %		7		0		0		00:00:00	<a href="#">DETAILS</a>
17	<input type="checkbox"/>	...		NOT STARTED		-		-		-		-		00:00:00	<a href="#">DETAILS</a>
18	<input type="checkbox"/>	D...		ONGOING		88 %		53		6		83		00:00:00	<a href="#">DETAILS</a>
19	<input type="checkbox"/>	...		ONGOING		100 %		15		0		0		00:00:00	<a href="#">DETAILS</a>
20	<input type="checkbox"/>	B...		ONGOING		96 %		0		2		0		00:00:00	<a href="#">DETAILS</a>
21	<input type="checkbox"/>	...		ONGOING		100 %		0		0		0		00:00:00	<a href="#">DETAILS</a>
22	<input type="checkbox"/>	...		SUBMITTED		100 %		7		0		0		00:16:46	<a href="#">DETAILS</a>

# Unit 1 Online Homework 3

There is no description

A screenshot of the homework interface. At the top left is a large blue circular progress bar with '85%' in white. To its right are three buttons: 'LESSON' with a person icon, 'UPLOAD' with a cloud icon, and 'ESSAY' with a document icon. Below the progress bar, there are four rows of information:

- ✓ State: ONGOING
- 📅 Start date: -
- 📅 Due date: 28-05-2017 23:30
- ⌚ Submitted: 1/23



## Lesson

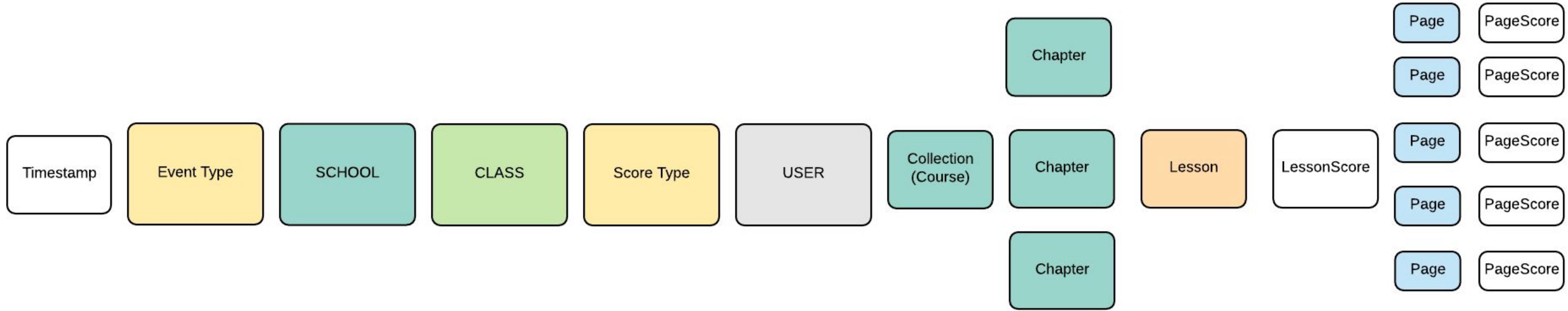
### Unit 1 Online Homework 3

✓ Average Checks 9

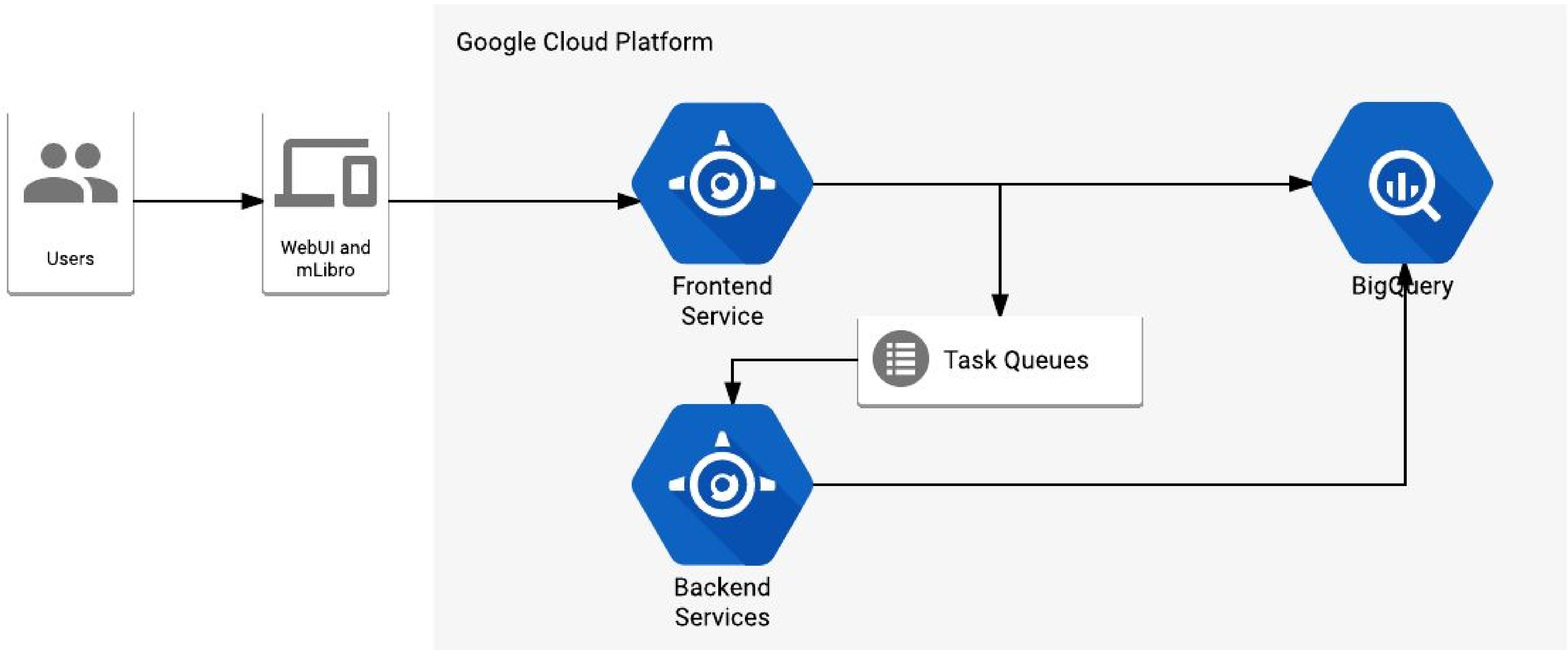
✗ Average Errors 1

⚡ Average Mistakes 12

⌚ Average Time 00:28:19

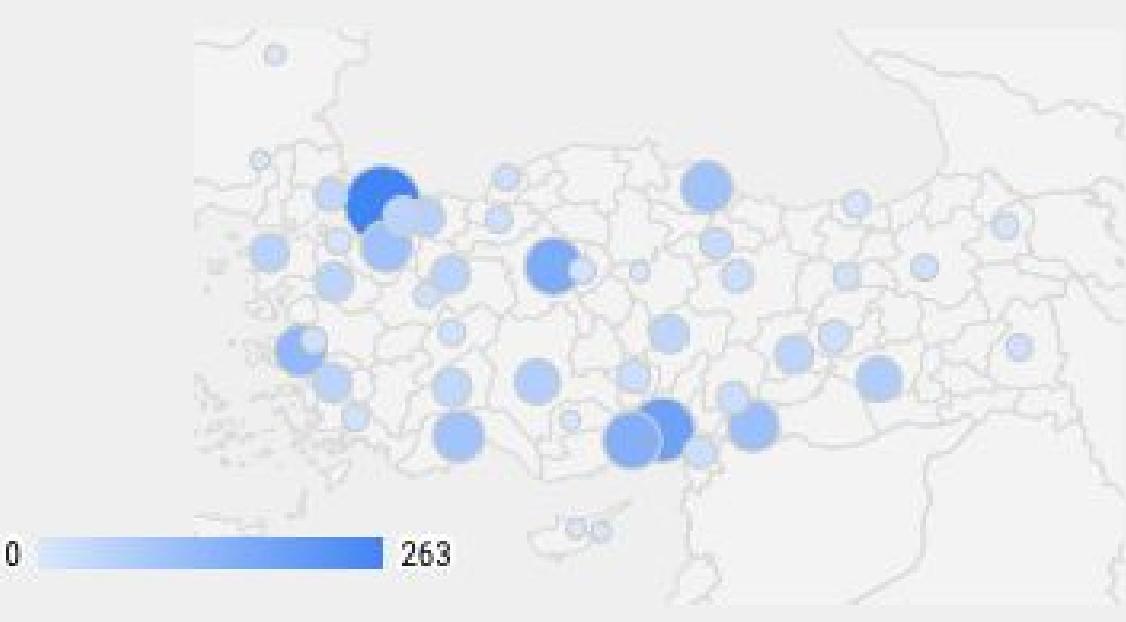
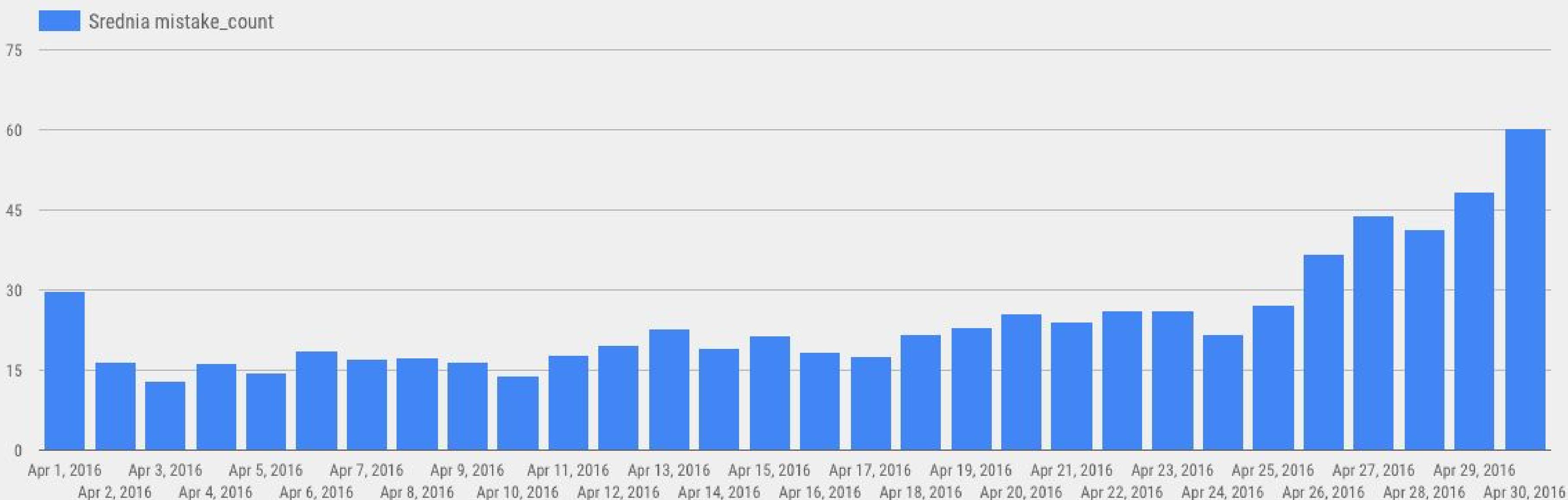


# Streaming Inserts

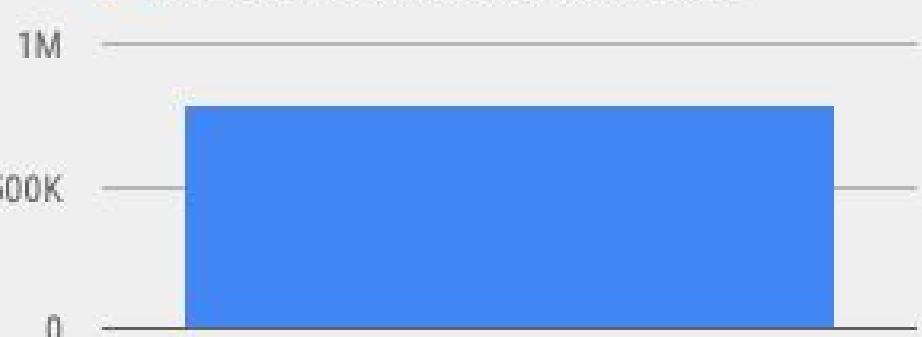


## Ilość otwartych kursów na region (Turcja)

<input checked="" type="checkbox"/> session_type (2)	Liczba unikalnych...
<input checked="" type="checkbox"/> assignment	516.8K
<input checked="" type="checkbox"/> lesson	267.6K

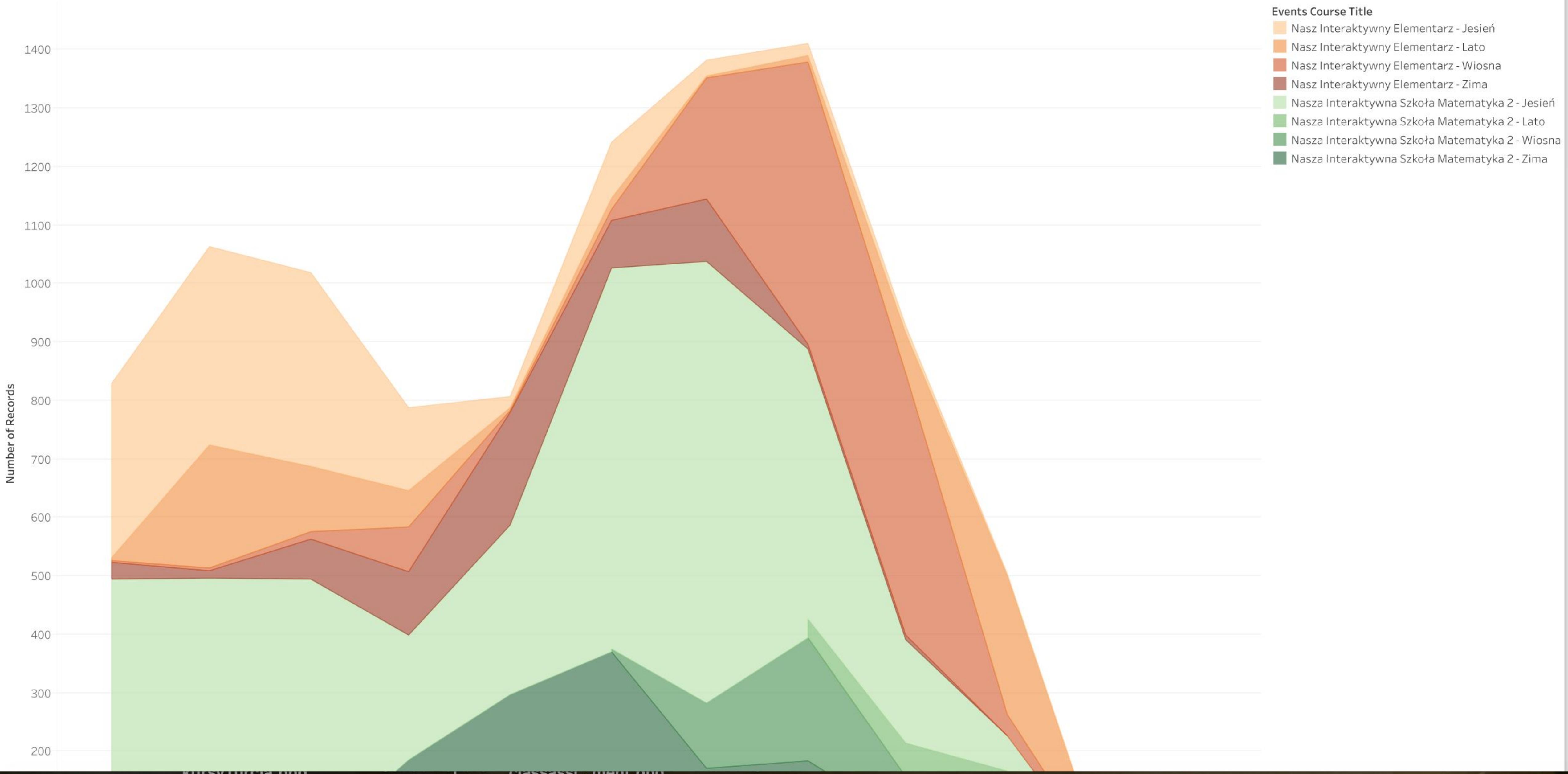


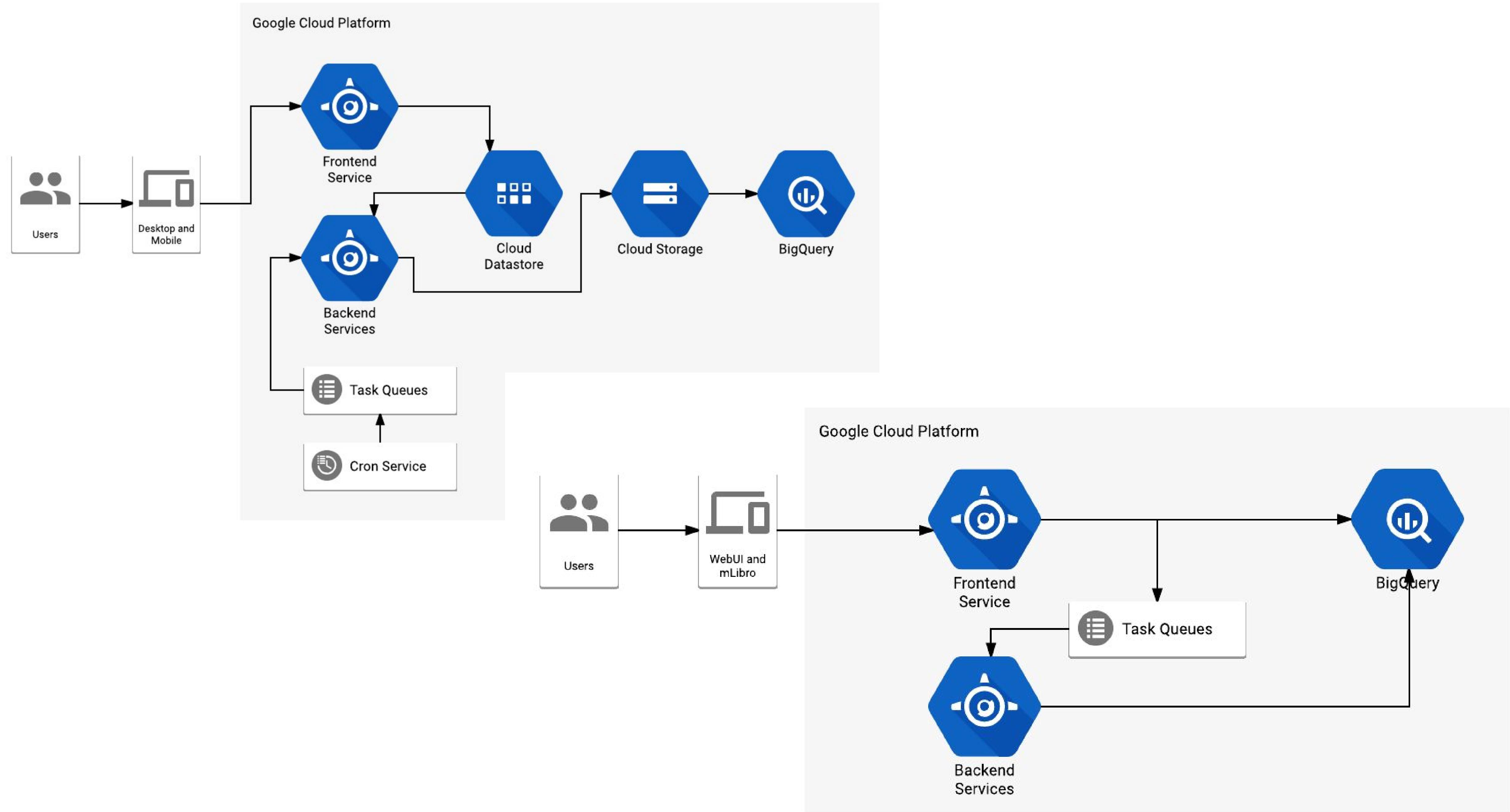
Liczba unikalnych wartości random\_event\_id

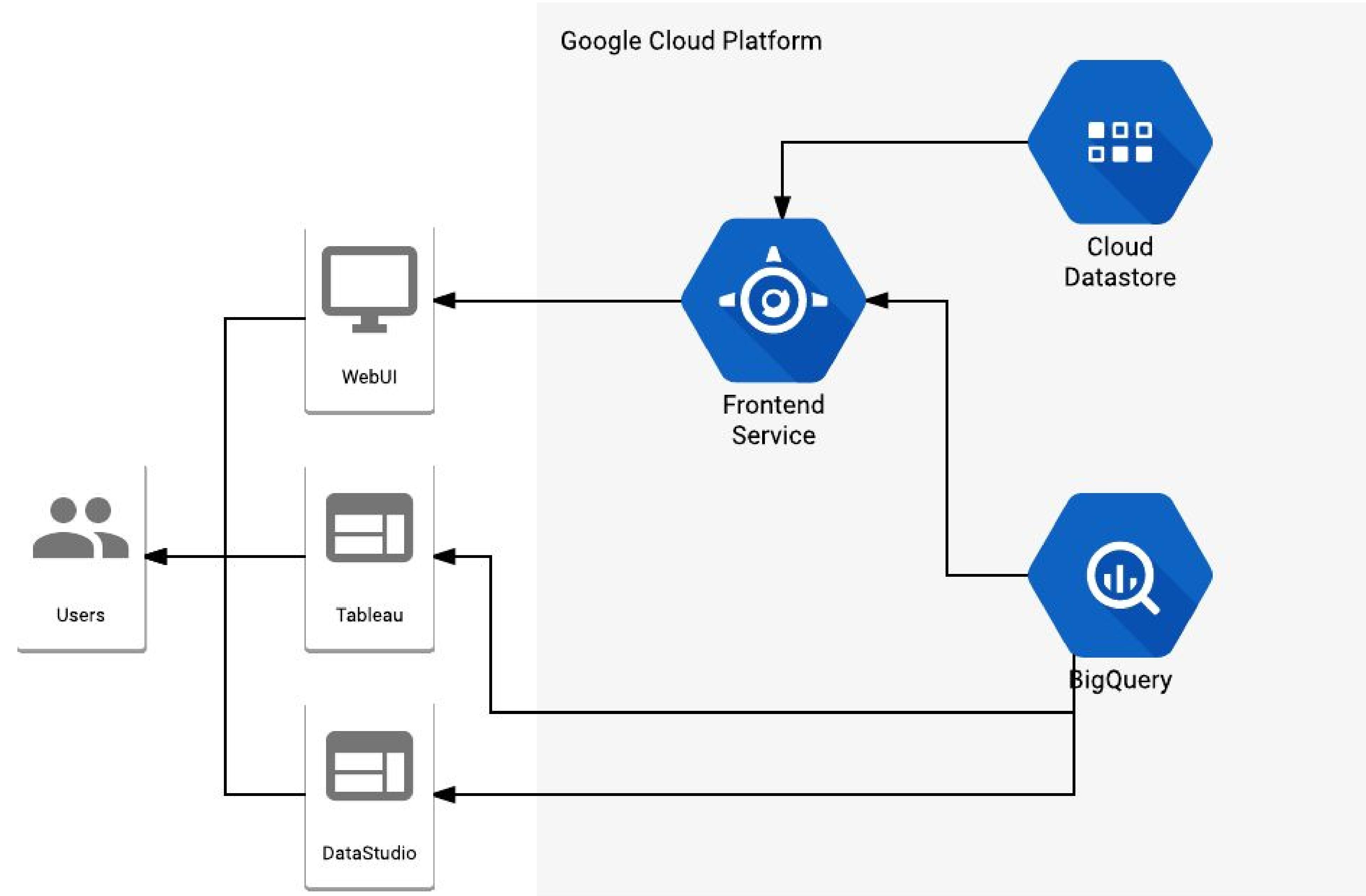


event_type	course_lessons_count	session_type	course_lessons_c...
1. session_start	18,083,903	1. assignment	27,730,214
2. session_end	16,151,878	2. lesson	6,494,596
		3. lesson_review	8,563
		4. page_review	1,508
		5. poll	500
		6. poll_review	400

## Elementarz I i II - porównanie na osi czasu







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# Conclusions ?

- flatten your data
- scales up but most importantly scales down
- cached queries are your friend
- consistency

---

# Should you do it ?

- Do you have any data to analyze?
- Do you have petabytes of data to analyze?
- Do you know what a server is?
- Do you like fancy report dashboards?
- Are you lazy?
- Can you think of your data as a stream of events?