



TRANSITION FROM MONOLITH TO MICROSERVICES: A DREAM OR A TESTER'S NIGHTMARE?

Natalja Pletneva, Okko.

DATE: OCTOBER 14

ökko WHO AM I?

- I got a Master's degree in Telecommunication.
- In testing since 2015.
- Work with Okko.tv in Saint-Petersburg.
- Started testing manually.
- Backend testing.



ökko

WHAT IS OKKO?

Okko – media-services provider:

- Service for watching TV episodes and movies on your devices.
- Online or stream right to your:
 - SmartTV, PlayStation 3, 4/4 PRO, Xbox;
 - AndroidTV, Nvidia Shield;
 - AppleTV;
 - iPhone/Android Phone;
 - Web site okko.tv.
- Okko is available in Russia.

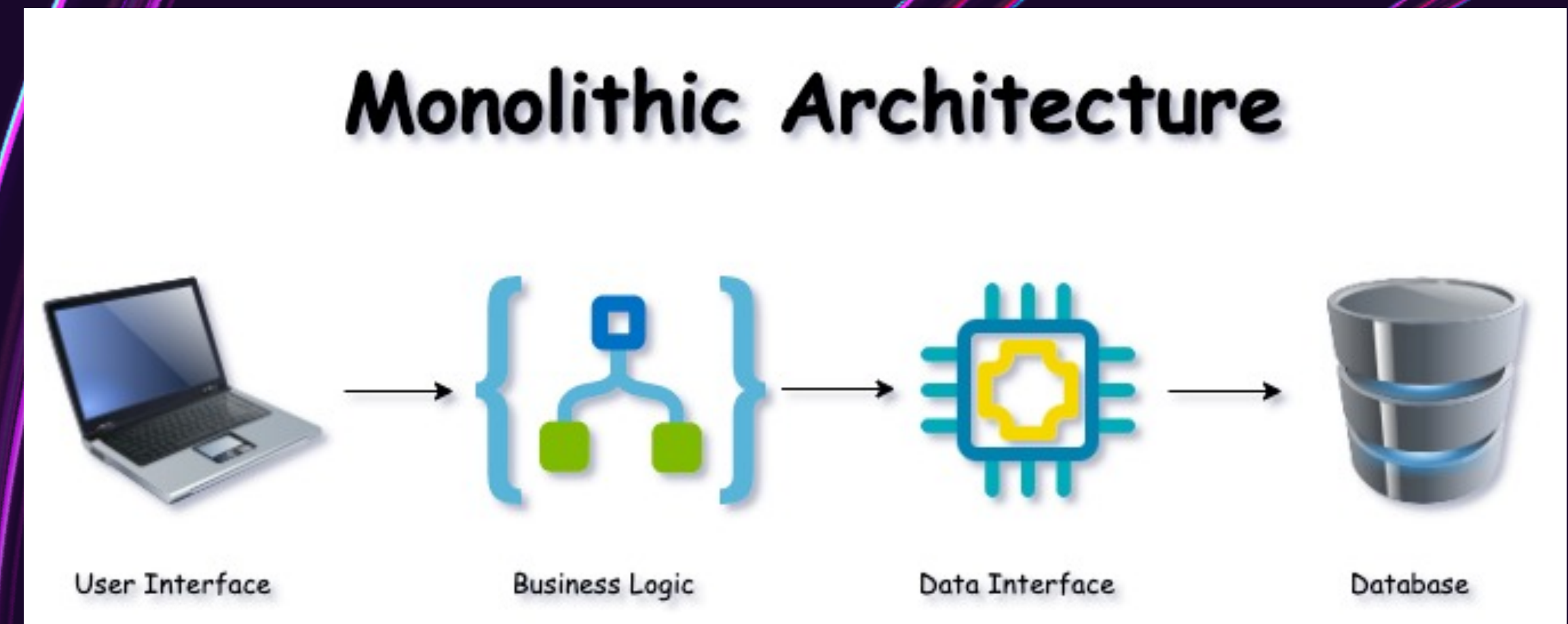


The English Premier League
only at Okko.Sport in Russia.



- The main problems with changing in testing process.
- Reappraisal of microservices testing approaches.
- Transition period.
- The main opportunities that arise when testing microservices.
- The main profit of the transition from the monolith to microservices.

- The client part (User Interface).
- The server part (Business Logic Layer and Data Access Layer).
- Database.



Benefits of Monolithic Architecture

In the early stages of the project without any complicated business logic:

- Simple to develop.
- Simple to deploy.
- Simple to test.
- Simple to scale horizontally by running multiple copies behind a load balancer.

ökko MONOLITHIC ARCHITECTURE

Benefits of Monolithic Architecture

- It was simple to maintain the monolith - few users
 - At the beginning we were in the dark ages, and no one wanted to pay for movies, pirates were everywhere
 - **More pirates - less paying users - less DB.**



ökko MONOLITHIC ARCHITECTURE

Why not a monolith?

- Increase written code.
- Limitation in size and complexity.
- Barrier to adopting new technologies.
- Single point of failure.
- Scalability (less pirates - more paying users).
- Any changes require redeploy the entire application.



ökko MONOLITHIC ARCHITECTURE

Monolith testing

- Difficulty getting test data.
- The load can affect the whole environment.
- Difficulty Testing the API.
- Bug analysis problematic.
- Full testing before release.
- Any changes require re-testing the entire monolith.
- Autotest coverage ~ 25%.



DIFFICULTY GETTING TEST DATA

ID	Type	Status	Split info	Merge policy	Group	Priority in group	Tag rule	Expression
load_test_users	Clone	NON_AUTOMATIC	ACTIVE	ADD	global	0		
loewe	Clone	AUTOMATIC	ACTIVE	IGNORE	global	0		(['device.manufacturer']?:'') matches '(?)LOEWE'
loewe_4k_mezzanine_dash_enabled	Clone	AUTOMATIC	ACTIVE	ADD	global	0	loewe&4k	
mac_os_client_type	Clone	AUTOMATIC	ACTIVE	IGNORE	global	0		(['device.clientType']?:'') matches 'macos'
ma_hny_svod_base_renewoff_and_unlink_group_test	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	global	0		
ma_hny_svod_base_renewoff_group_test	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	global	0		
ma_hny_svod_base_unlink_group_test	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	global	0		
mail_check_for_mindbox	Clone	AUTOMATIC	ACTIVE	IGNORE	global	0		(['user.email']?:'') matches '.+@.+.[^\.]{2,}'
makarov_test	Clone	NON_AUTOMATIC	ACTIVE	ADD	global	0		
mamut	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	global	0		
migration_to_optimum_old_name	Clone	NON_AUTOMATIC	ACTIVE	ADD	global	0		
mindbox	Clone	NON_AUTOMATIC	ACTIVE	ADD	global	0		
ml_split_level_1_control	Clone	NON_AUTOMATIC	ACTIVE	GROUP	ml_split_level_1	2		
ml_split_level_1_test	Clone	NON_AUTOMATIC	ACTIVE	GROUP	ml_split_level_1	1		
ml_split_level_2_group_1_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_1_30	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_2_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_2_30	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_3_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_3_30	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_4_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_4_30	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_5_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_5_30	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_6_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_7_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_8_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
ml_split_level_2_group_9_10	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	ml_split_level_2	0		
mobile	Clone	AUTOMATIC	ACTIVE	IGNORE	global	0		(['device.type']?:'') matches 'MOB'
mobile_test	Clone	NON_AUTOMATIC	ACTIVE	IGNORE	global	0		
monitor_network_status	Clone	AUTOMATIC	ACTIVE	IGNORE	global	0		#compareVersions(['device.appVersion'], '14.8.4725') >= 0
movie_free_preview	Clone	AUTOMATIC	ACTIVE	ADD	global	0	has_linked_card & !no_free_preview	#compareVersions(['device.appVersion'], '12.11') > 0
movie_free_preview_no_card	Clone	AUTOMATIC	ACTIVE	ADD	global	1	!has_linked_card & !(ios android) !& !no_free_preview	

List of tags (part). Be careful, everyone can be tagged. 😈

Назад

Гайная жизнь домашних жи ★★★★☆

The Secret Life of Pets 2

НОВИНКА

ТАЙНАЯ ЖИЗНЬ ДОМАШНИХ ЖИВОТНЫХ 2

▶ БЕСПЛАТНО 10 МИНУТ СМОТРЕТЬ ФИЛЬМ

Full HD

▶ ТРЕЙЛЕР + ЗАПОМНИТЬ ★ ОЦЕНИТЬ

О ФИЛЬМЕ ИНФОРМАЦИЯ ПОХОЖИЕ

КиноПоиск 7.0 IMDb 6.5 афиша 6.3

UNIVERSAL 2019 · США, Франция, Япония · 88 мин.

Мультфильмы, Комедии, Приключения, Семейное кино

Режиссер: Крис Рено

В ролях: Пэттон Освальт, Кевин Харт, Харрисон Форд, Эрик Стоунстрит

Почему человек так долго спит утром? Чем вкусно пахнет? Дай мне, дай, дай, дай! Как заставить человека чесать за

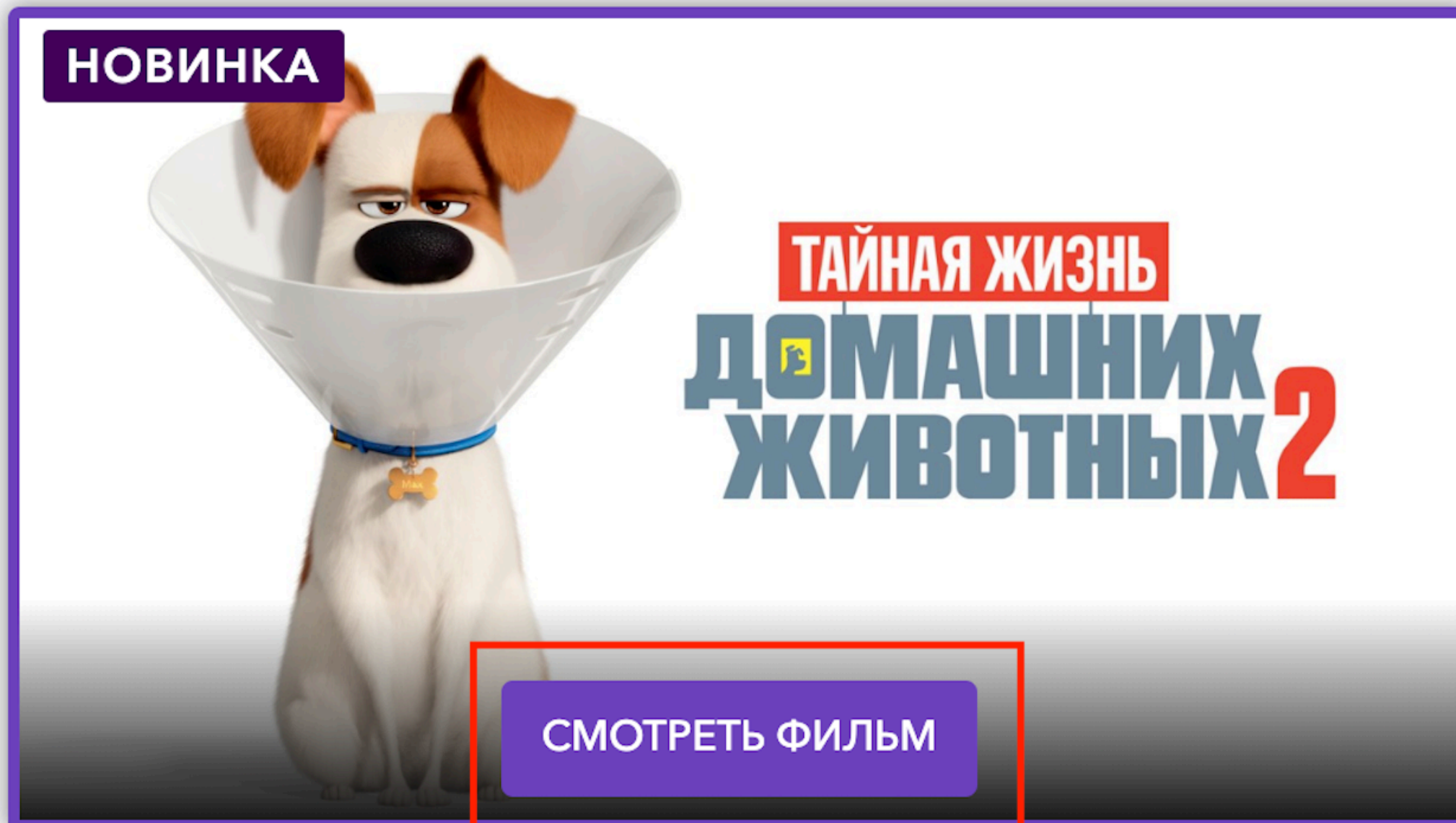
Free movie preview tag = true.

Назад

Тайная жизнь домашних ... ★★★★★

The Secret Life of Pets 2

НОВИНКА



Full HD

▶ ТРЕЙЛЕР

+ ЗАПОМНИТЬ

★ ОЦЕНИТЬ

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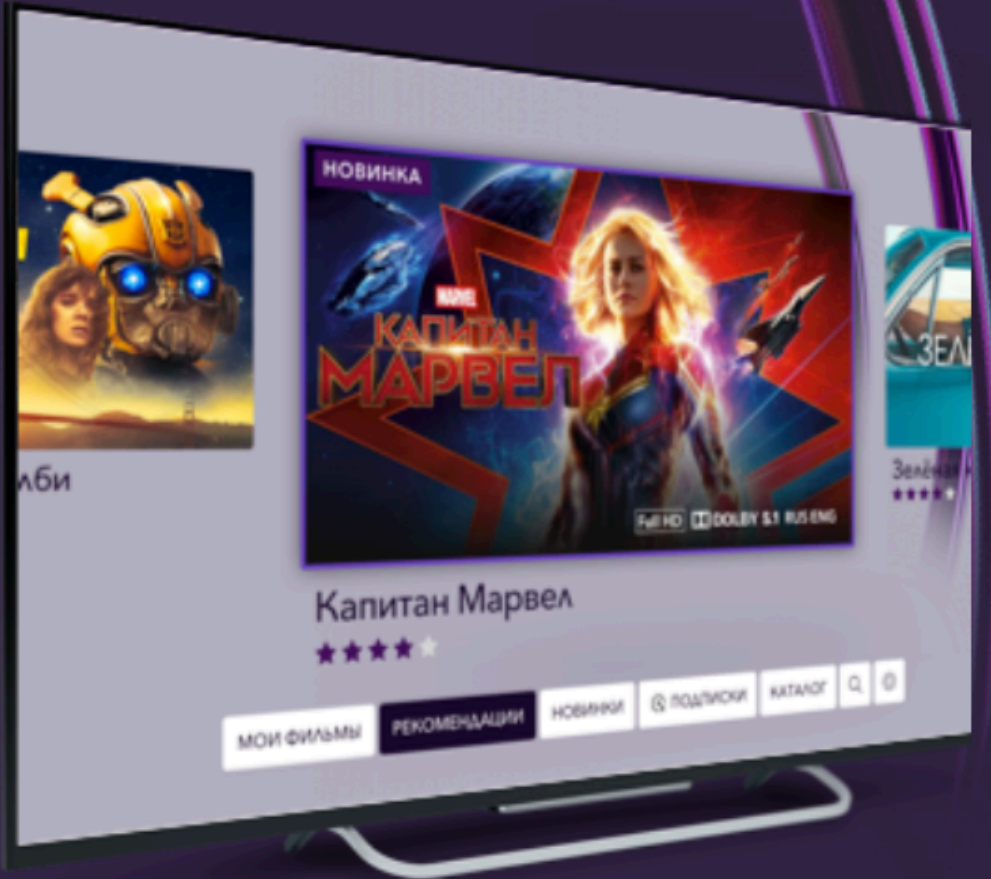


МИРОВЫЕ ХИТЫ

Попробуйте 7 дней бесплатно в Okko

Более 20 000 фильмов и сериалов в Full HD и без рекламы

[ПОПРОБОВАТЬ БЕСПЛАТНО](#)



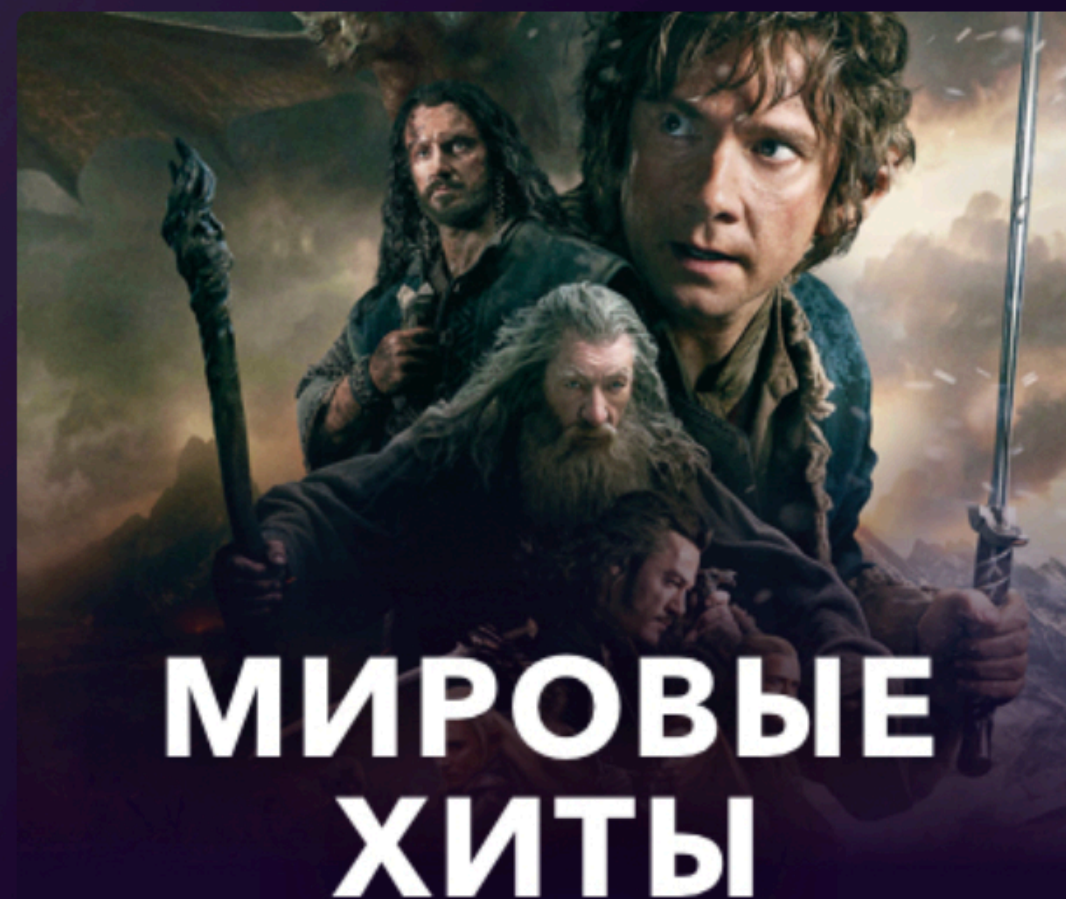
Выбирайте и смотрите в Okko

Более 35000 фильмов и сериалов в превосходном качестве, без рекламы

[ПЕРЕЙТИ В ПРИЛОЖЕНИЕ](#)

Есть промокод?

[ВВЕСТИ ПРОМОКОД](#)

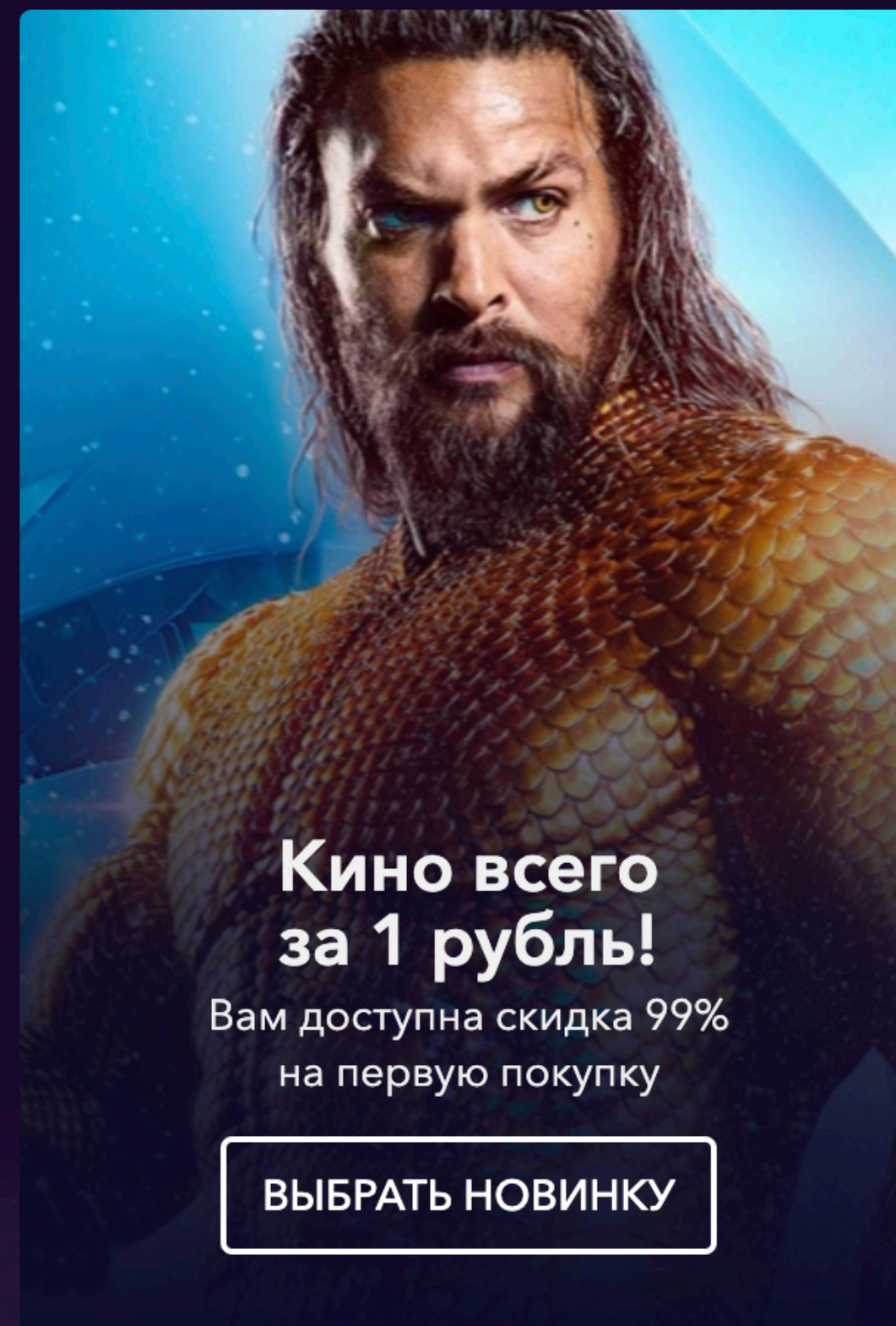


МИРОВЫЕ ХИТЫ

Попробуйте 7 дней бесплатно в Okko

Более 20 000 фильмов и сериалов в Full HD и без рекламы

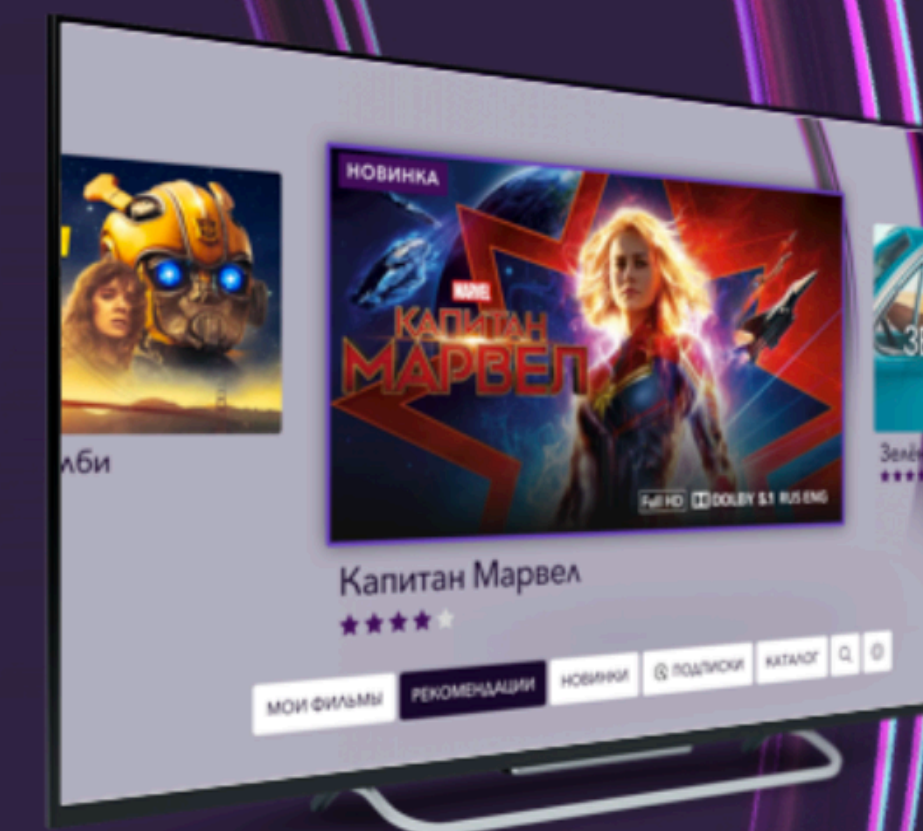
[ПОПРОБОВАТЬ БЕСПЛАТНО](#)



Кино всего за 1 рубль!

Вам доступна скидка 99% на первую покупку

[ВЫБРАТЬ НОВИНКУ](#)



Выбирайте и смотрите в Okko

Более 35000 фильмов и сериалов в превосходном качестве, без рекламы

[ПЕРЕЙТИ В ПРИЛОЖЕНИЕ](#)

Есть промокод?

[ВВЕСТИ ПРОМОКОД](#)

What we need for test:

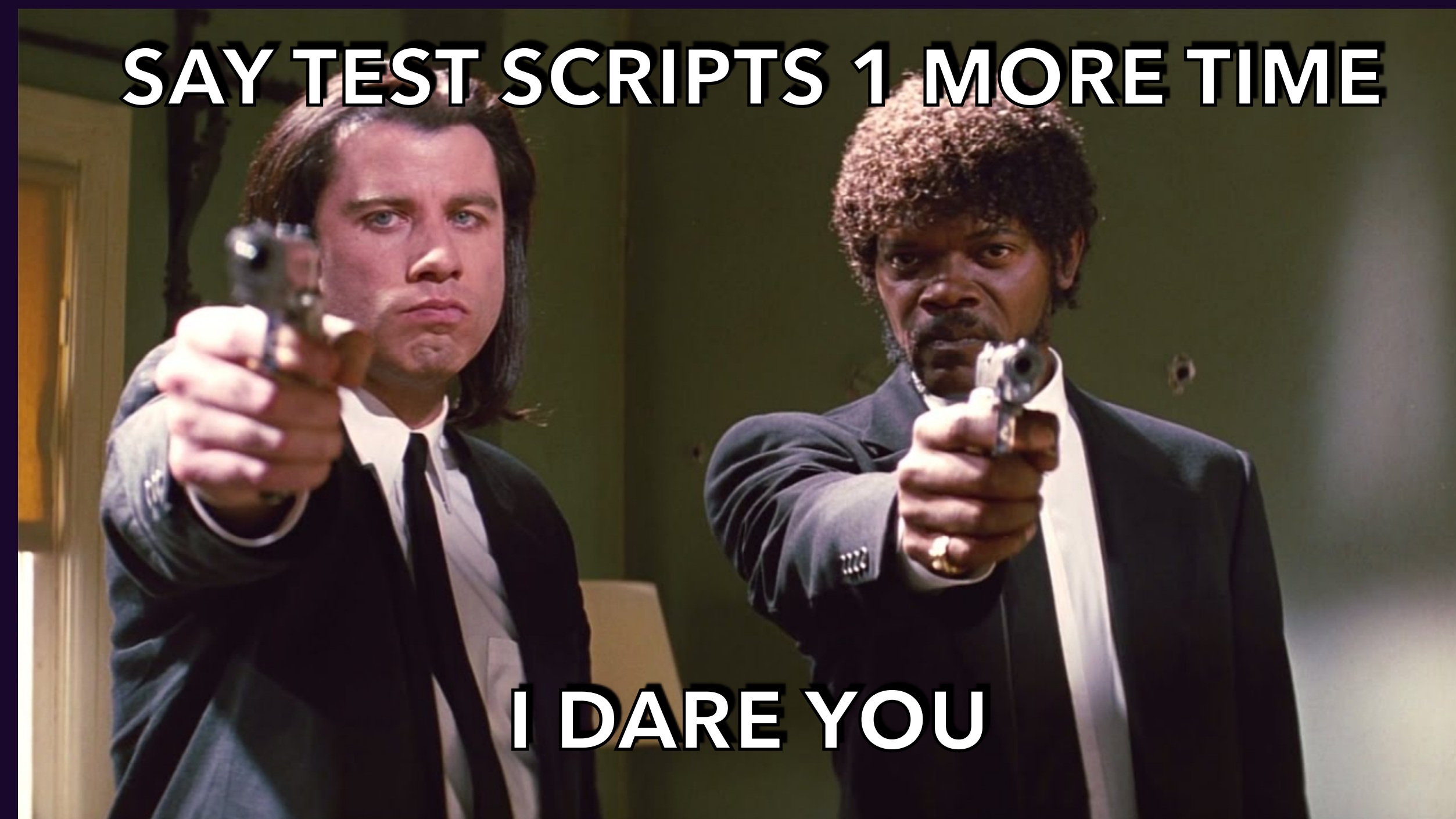
- Adapt tags to the user:
 - Create/ Delete
- Re-login into the app for activation tags.
- Prepare platform data depending on the device.
- The current state of the user (user context story).
- Prepare another data for tests.

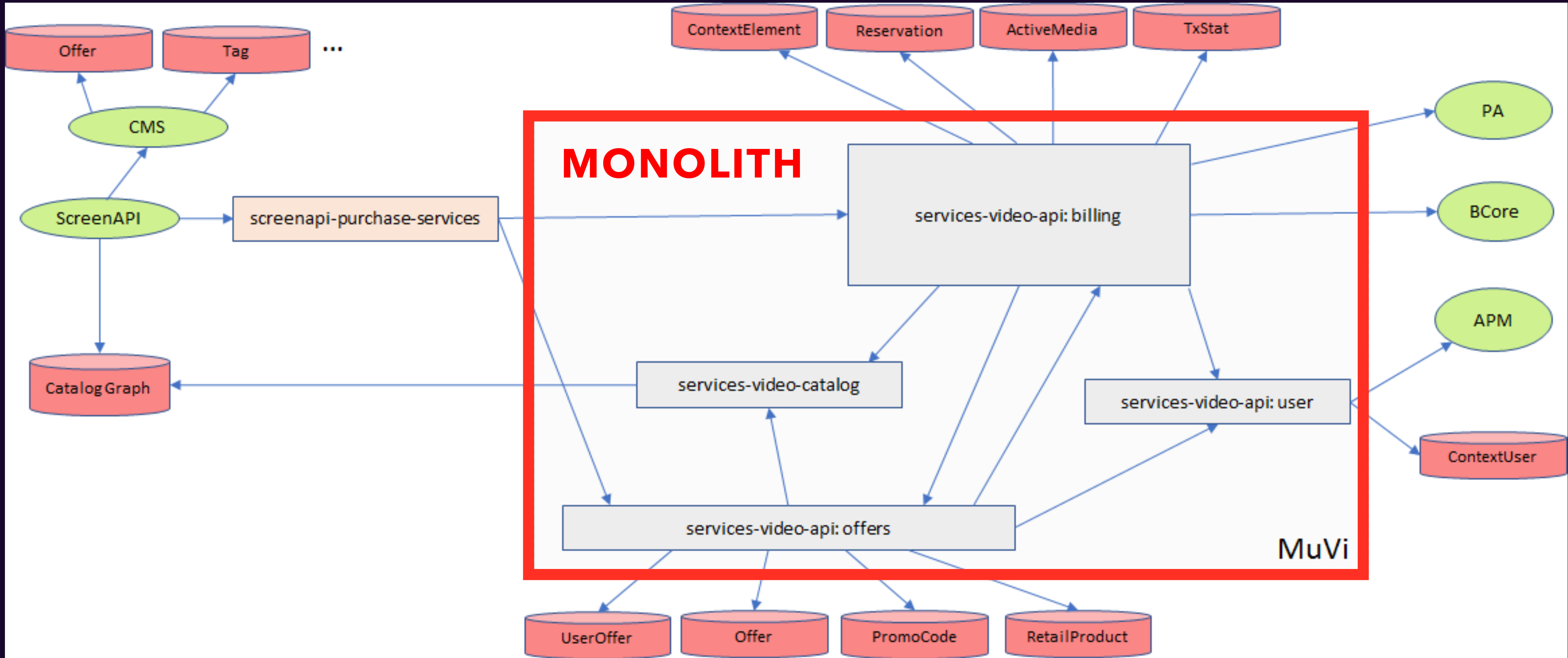


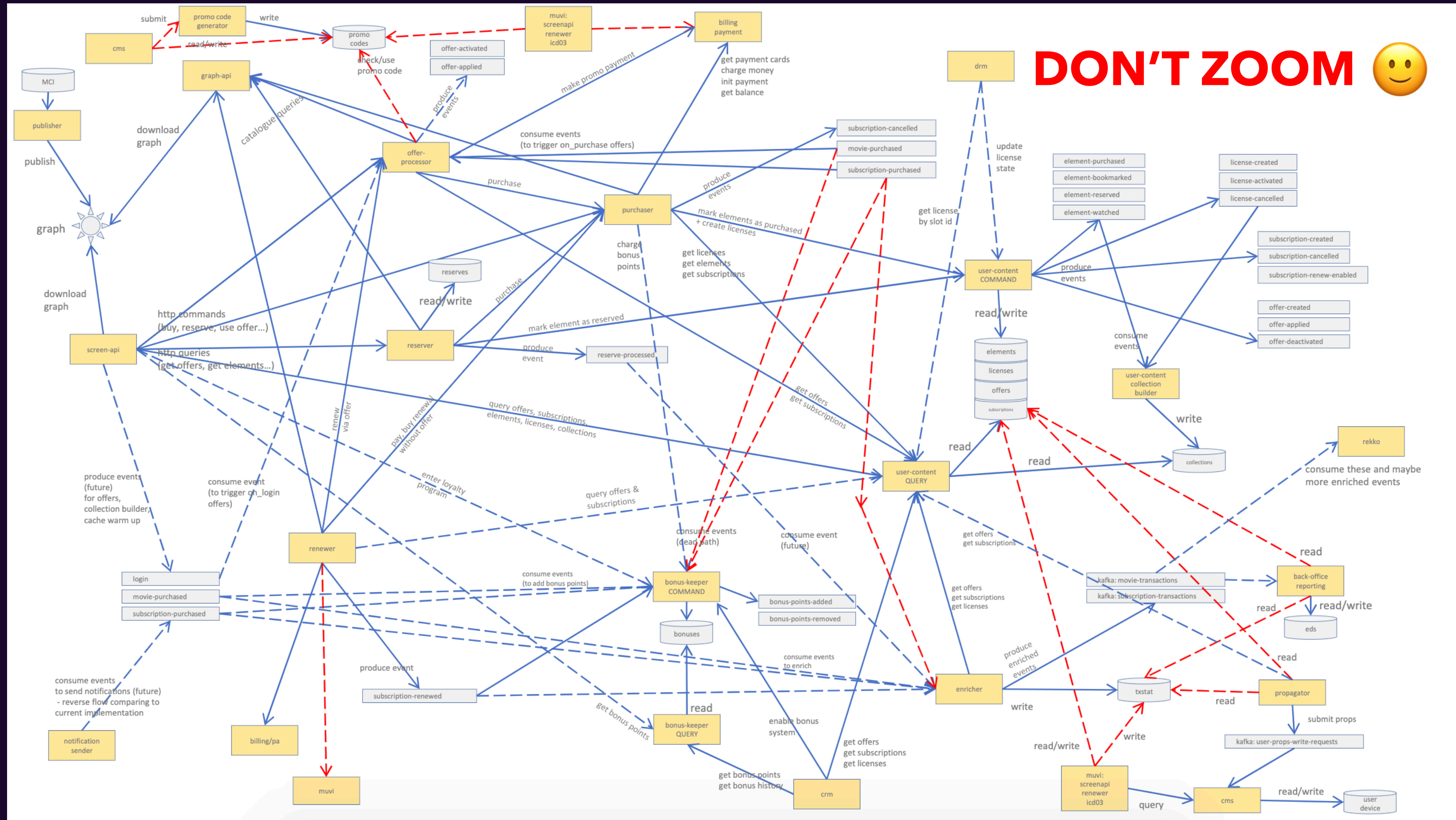


DIFFICULTY GETTING TEST DATA

- Regular copy DB from the production env for data flexibility.
- Change content rights and prices - almost all new movies get subscription rights over time.







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MICROSERVICES ARCHITECTURE

Why microservices?

- Less code for one service.
- Implementation independence.
- No single point of failure.
- Independent deployment.
- Independent testing.
- Scalable at every level when needed.





Microservices user.

Tag [JSON] [Properties]

id
pnsqc_tag
unique human readable alias which is used as id. allowed characters: 0..9a..z_ example: like "vip"/"samsung_2014"/"android"/"mobile"/"paying"/etc.

User tag.

Client Filter [JSON] [Properties]

id
support_microservices_light
unique human readable alias which is used as id. allowed characters: 0..9a..z_

enabled
true
enable/disable unconditionally

tagRule
pnsqc_tag
optional (should be used if this client filter can be applied depending on some tags). condition defined as logical rule containing

Tag in ClientFilter.

microServiceMigrationFlags [JSON]

item 1
USE_MERGER
[x item] [down arrow]

item 2
USE_PURCHASER_FOR_LAZY_SUBSCRIPTION
[x item] [up arrow] [down arrow]

item 3
USE_PURCHASER_FOR_FREE_EPISODE
[x item] [up arrow] [down arrow]

item 4
USE_PURCHASER_FOR_FREE_PREVIEW
[x item] [up arrow] [down arrow]

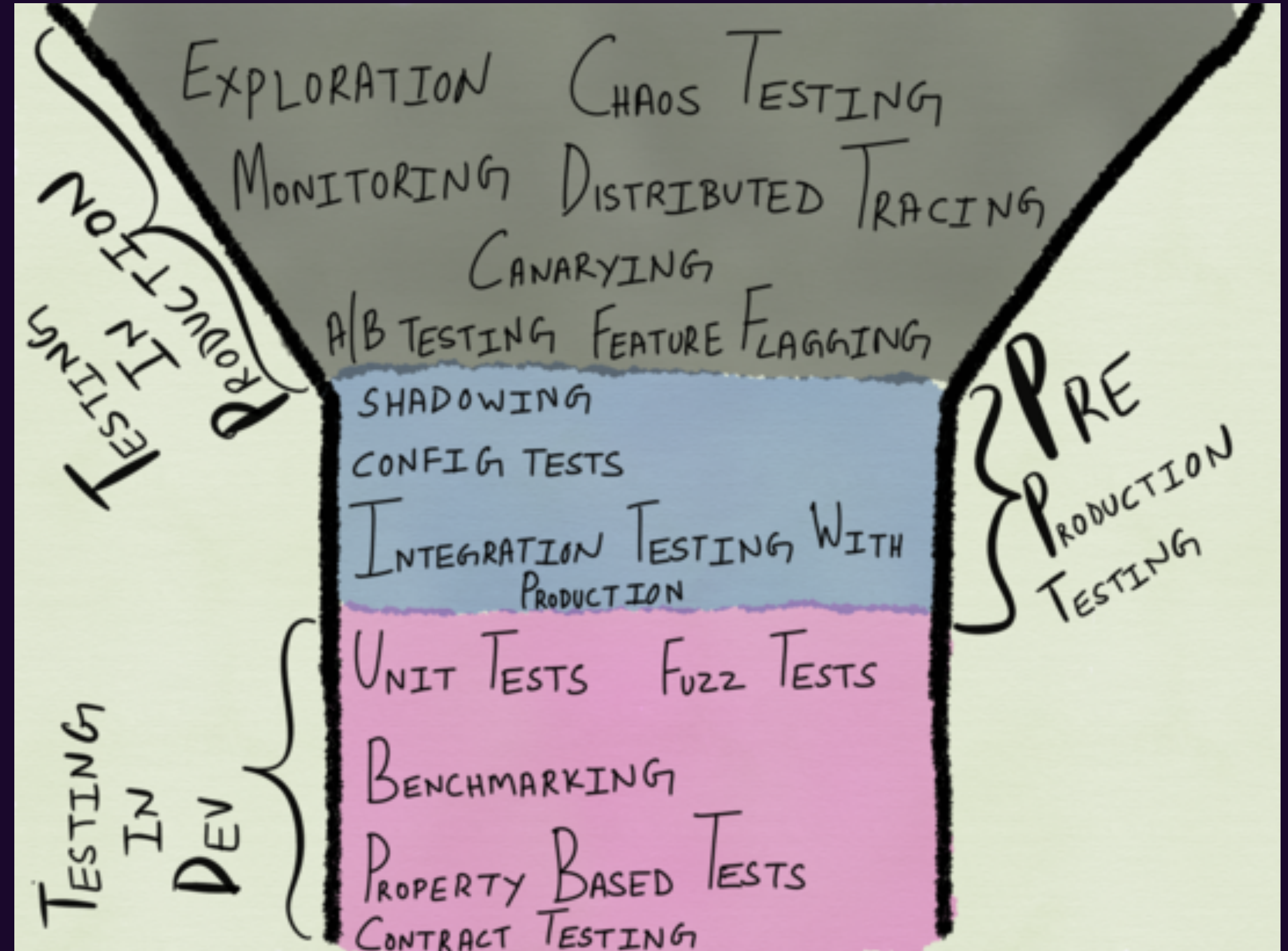
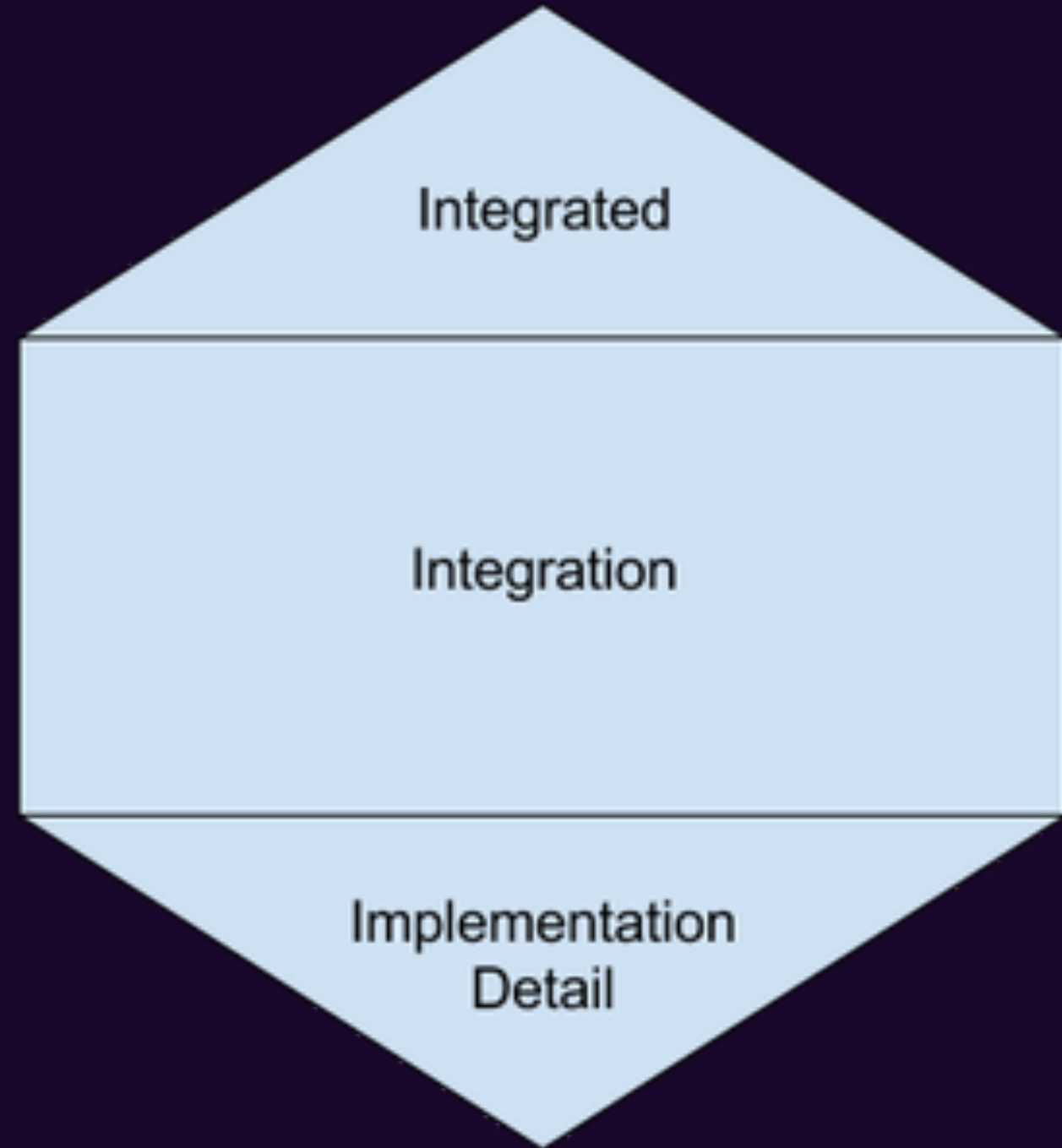
item 5
USE_PURCHASER_FOR_EPISODE_PURCHASE_VIA_SEASON
[x item] [up arrow] [down arrow]

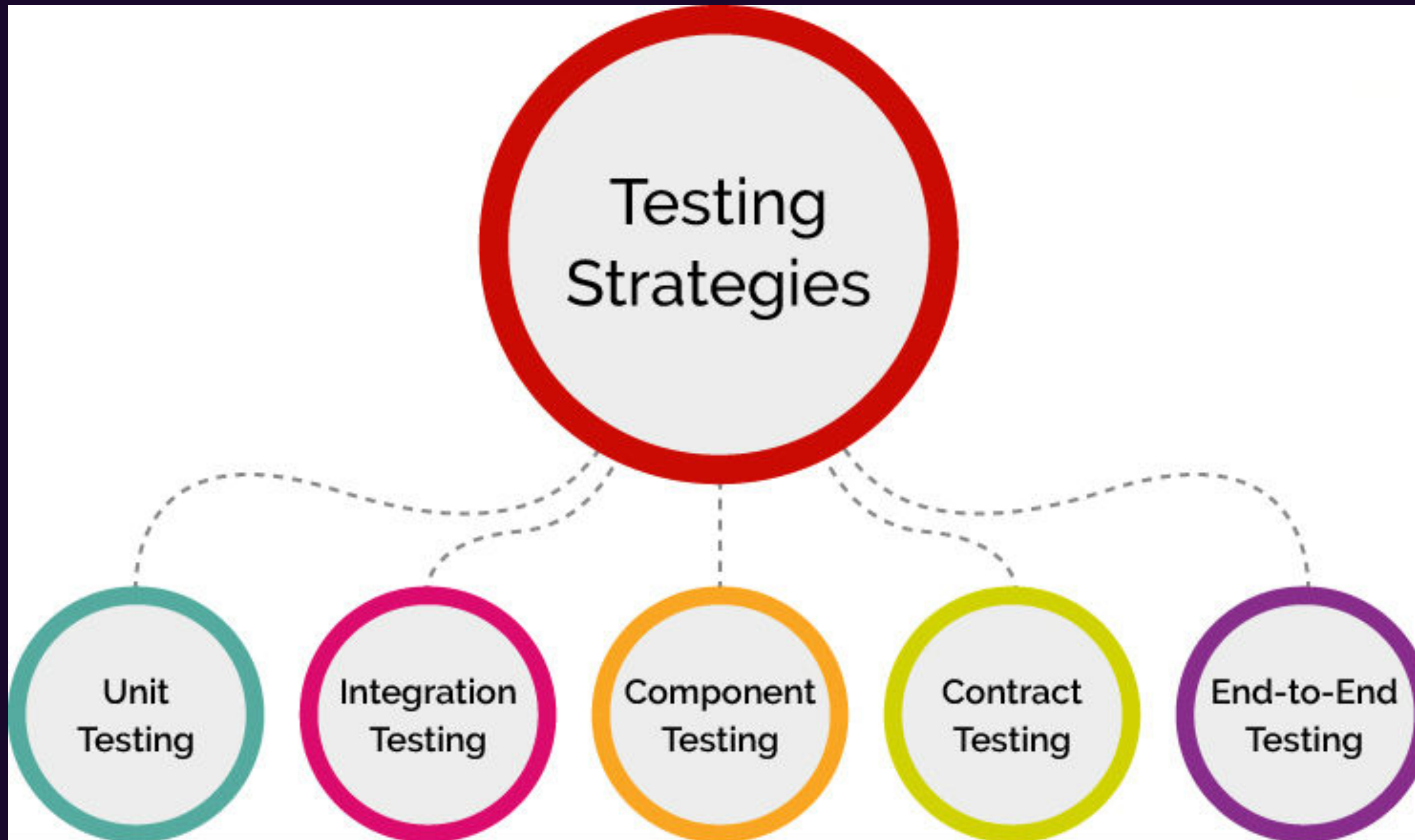
Client Filter flags.

What do we get for testing finally?

- A set of functionally complete services.
- Interaction between services either synchronously via HTTP / HTTPS or asynchronously through a message manager
 - Mixed Type Architecture
- Standard messaging interface.

Testing department.





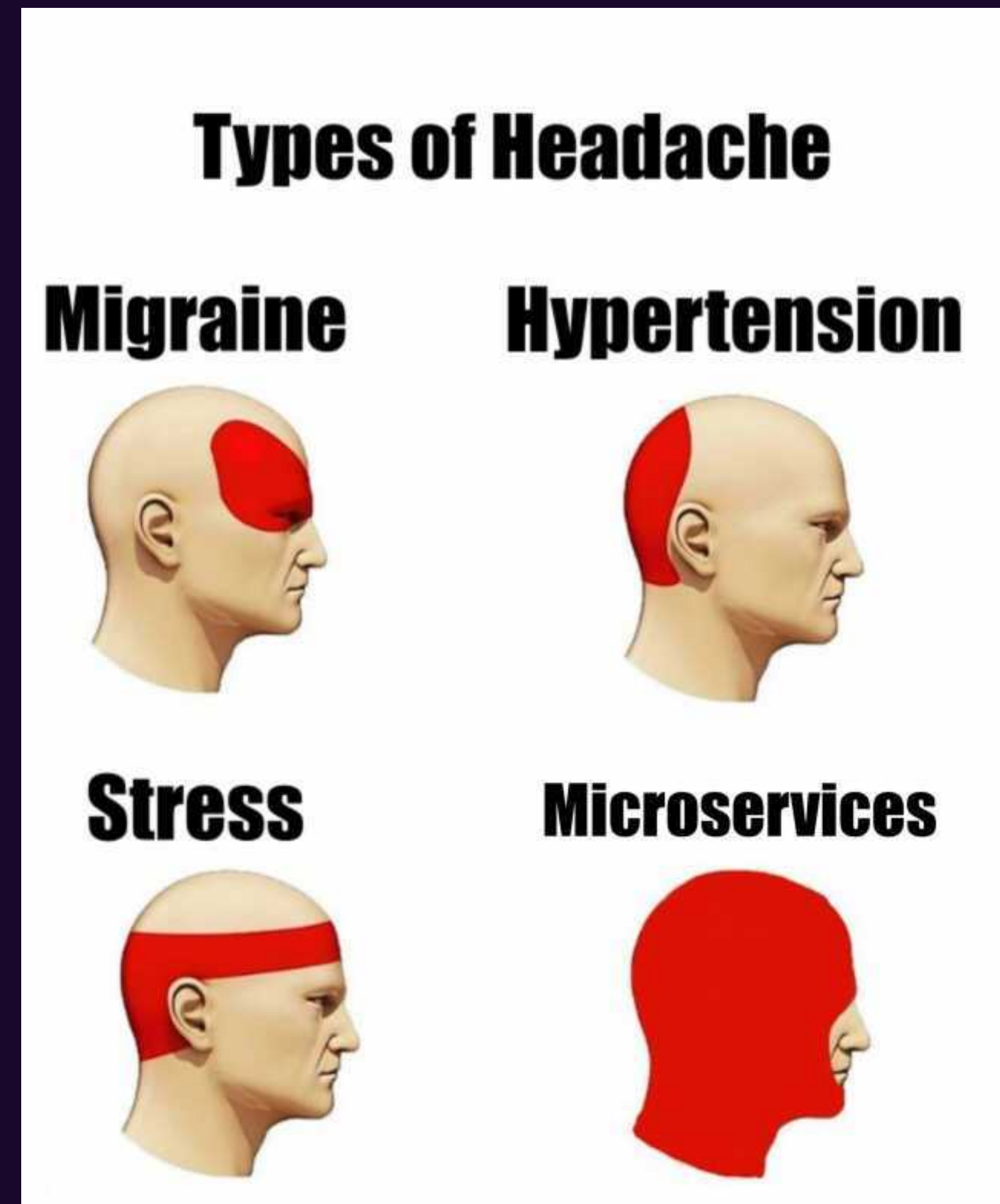
WE USED TO HAVE MONOLITH

**WE HAVE MICROSERVICES
NOW**



Illusions of Microservices Boom

1. «It is faster».
2. «It is easier».
3. «Microservices are better for testing».

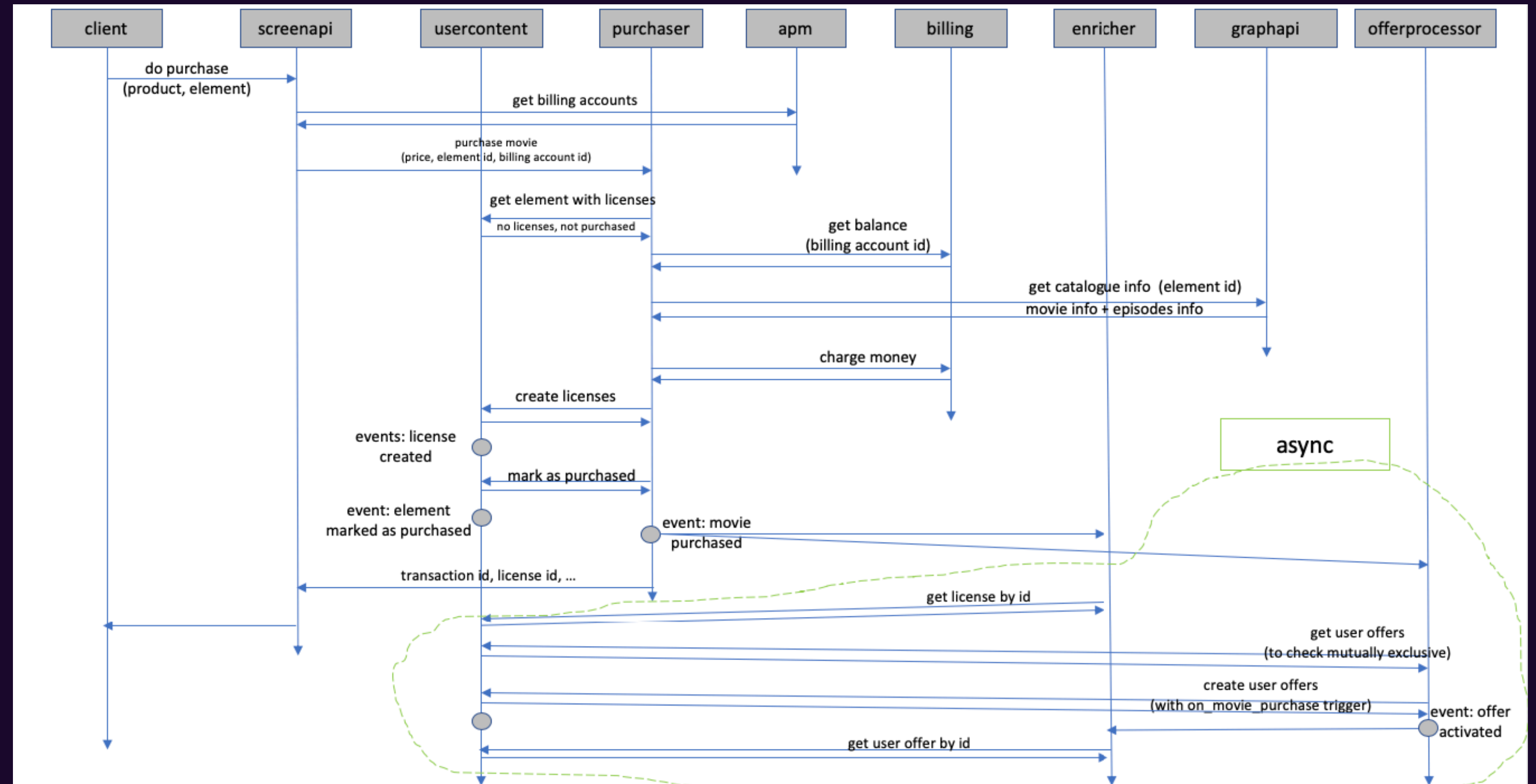


The Illusion «It is faster»:

- Separate functional testing - more coverage and less pain.
- Integration testing of properly working microservices also reduces complexity.
- Monitoring and debugging.
- Added testing in production.

Problems:

- You have to remember all interactions.
- It is difficult to find a problem in such distributed scenarios.

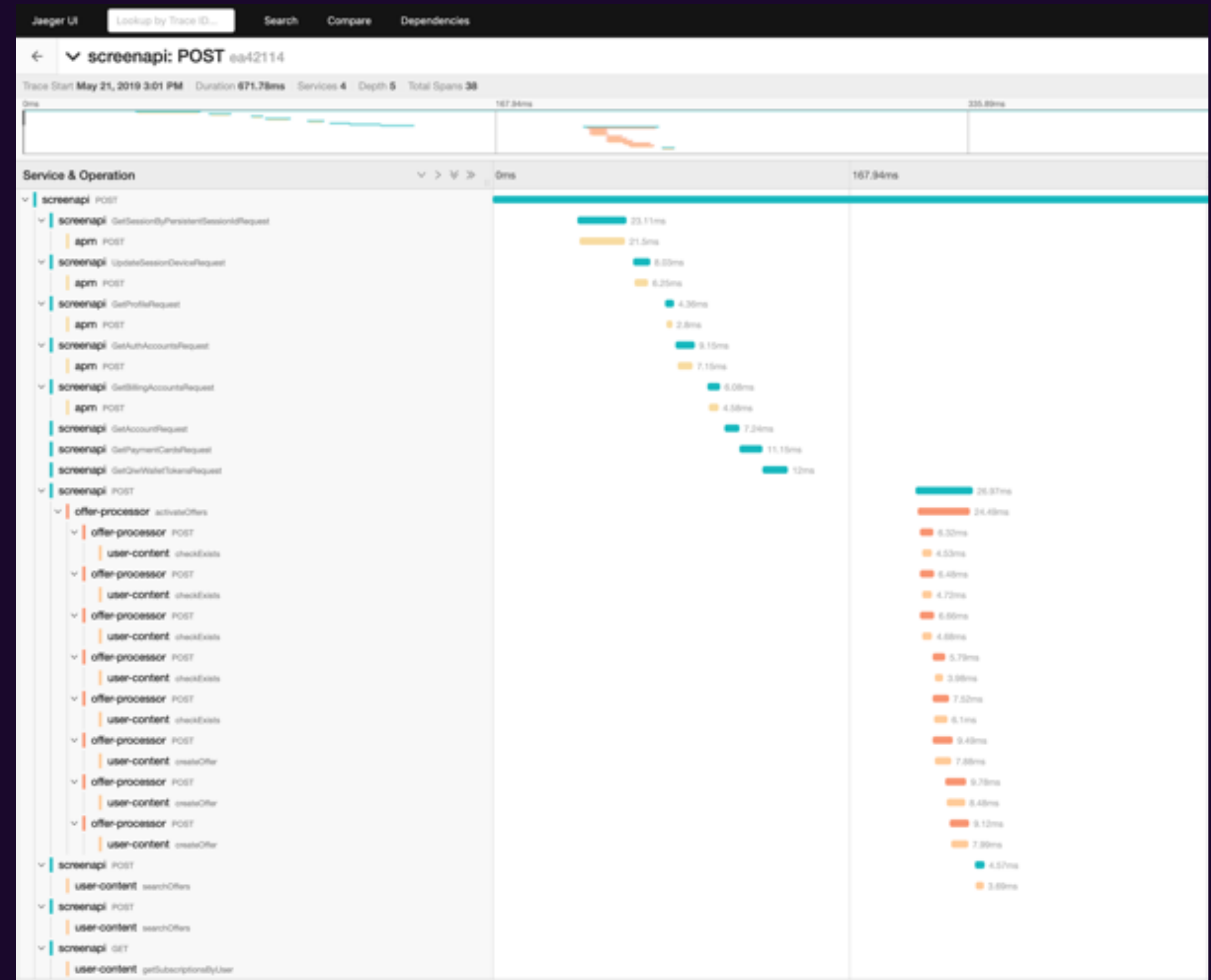


Sample scenario: movie purchase.

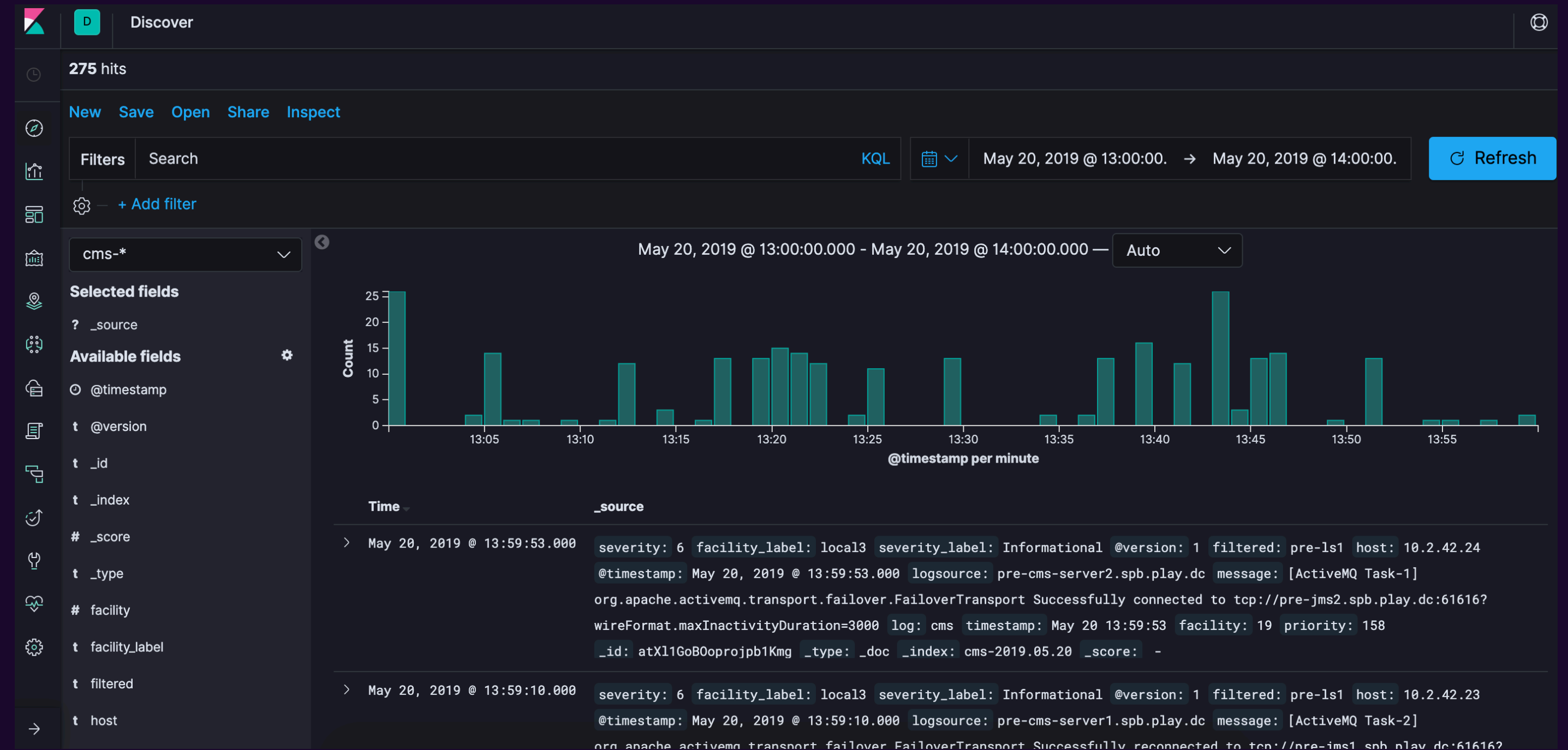
Solution:

Jaeger OpenTracing:

- HTTP
- RabbitMQ
- DB

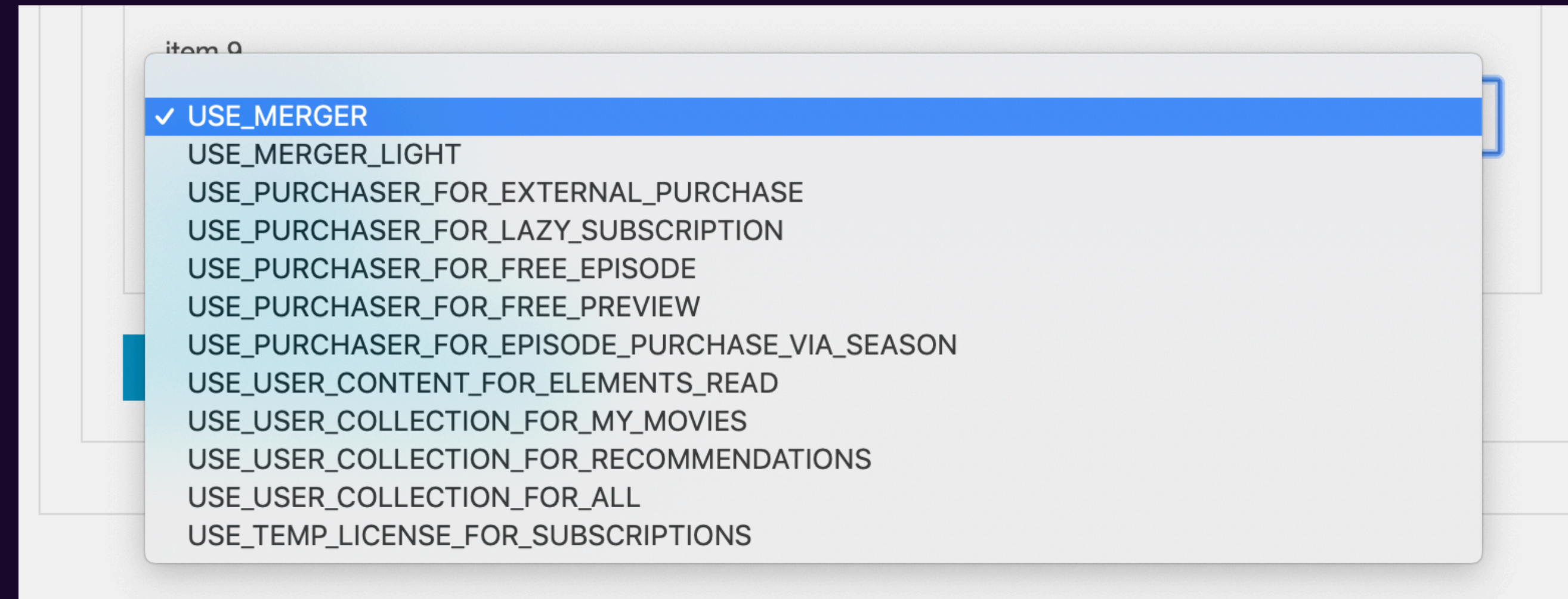


- Log virtualization.
- Client / Server.
- Acceptable search
 - Filtration
 - Index Search
- Charts, patterns for search, dashboards.



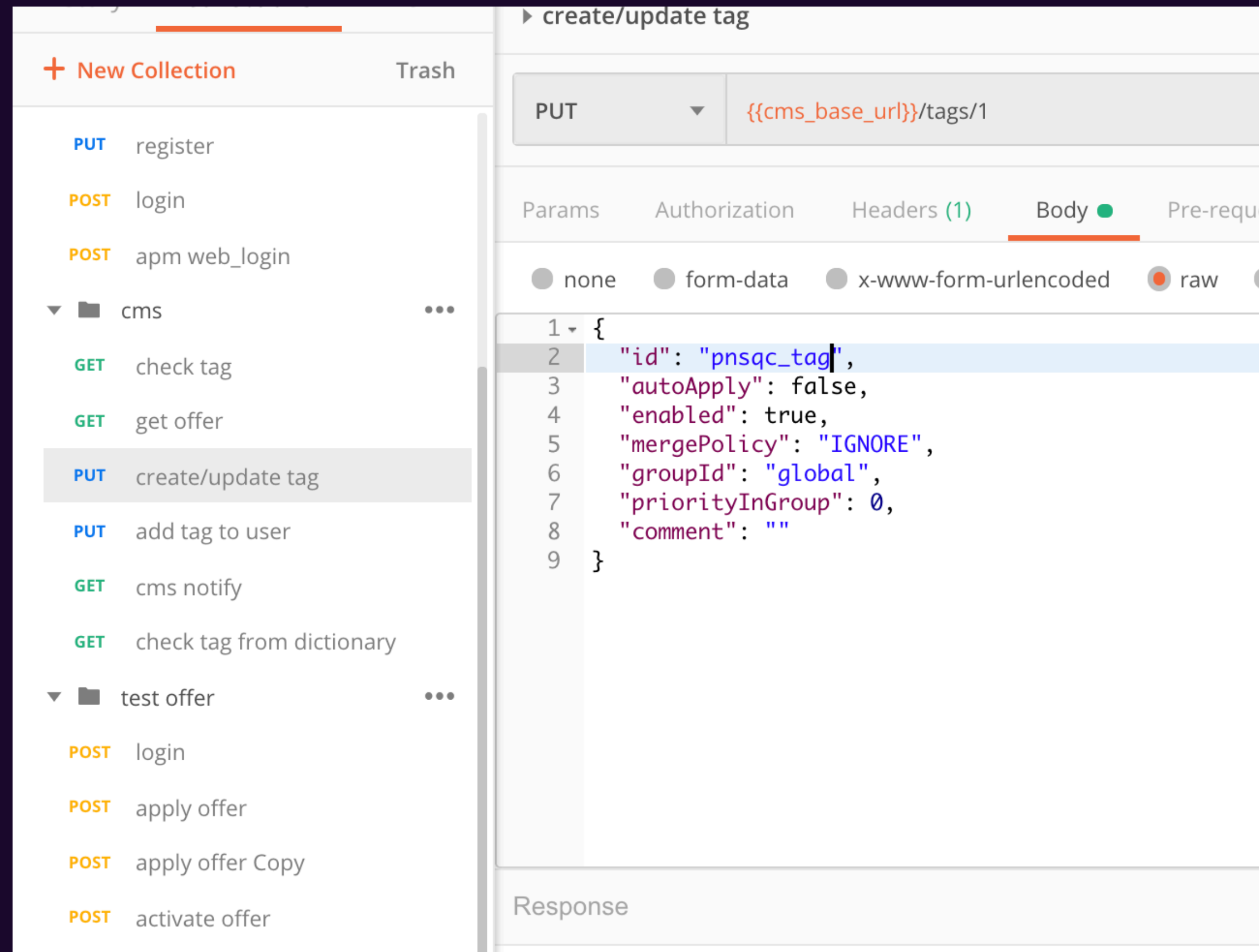
The Illusion «It is easier»:

- Monolith + microservices.
- What about getting data?
 - Separate microservice with tags and filters
 - Separate microservice with catalog data



ökko MICROSERVICES TESTING

The Illusion «It is easier»:



- Easy to use.
- Little setup needed.
- Lightweight JSON definition.
- Run tests using the JavaScript.

Postman Collection.

The Illusion «It is easier»:

The screenshot shows the Swagger UI for an API. At the top, it says 'Swagger' and 'Supported by SMARTBEAR'. Below that, it says 'Select a definition' with a dropdown menu set to 'default'. The main heading is 'Api Documentation 1.0' with a sub-heading '[Base URL: pre-purchaser1.spb.play.dc:8080/]' and a link 'http://pre-purchaser1.spb.play.dc:8080/doc/v2/api-docs'. There are links for 'Api Documentation', 'Terms of service', and 'Apache 2.0'. The main section is titled 'movie-purchase-controller Movie Purchase Controller'. Below this, there is a list of endpoints, each with a 'POST' method and a description:

- POST /v1/users/{userId}/movies/{elementId}/cancel cancelMovie
- POST /v1/users/{userId}/movies/{elementId}/cancel-reserve cancelReserve
- POST /v1/users/{userId}/movies/{elementId}/external externalMovie
- POST /v1/users/{userId}/movies/{elementId}/new-episode newEpisode
- POST /v1/users/{userId}/movies/{elementId}/pilot-episode pilotEpisode
- POST /v1/users/{userId}/movies/{elementId}/preview previewMovie
- POST /v1/users/{userId}/movies/{elementId}/purchase purchaseMovie
- POST /v1/users/{userId}/movies/{elementId}/reserve reserveMovie
- POST /v1/users/{userId}/movies/{elementId}/view viewMovie

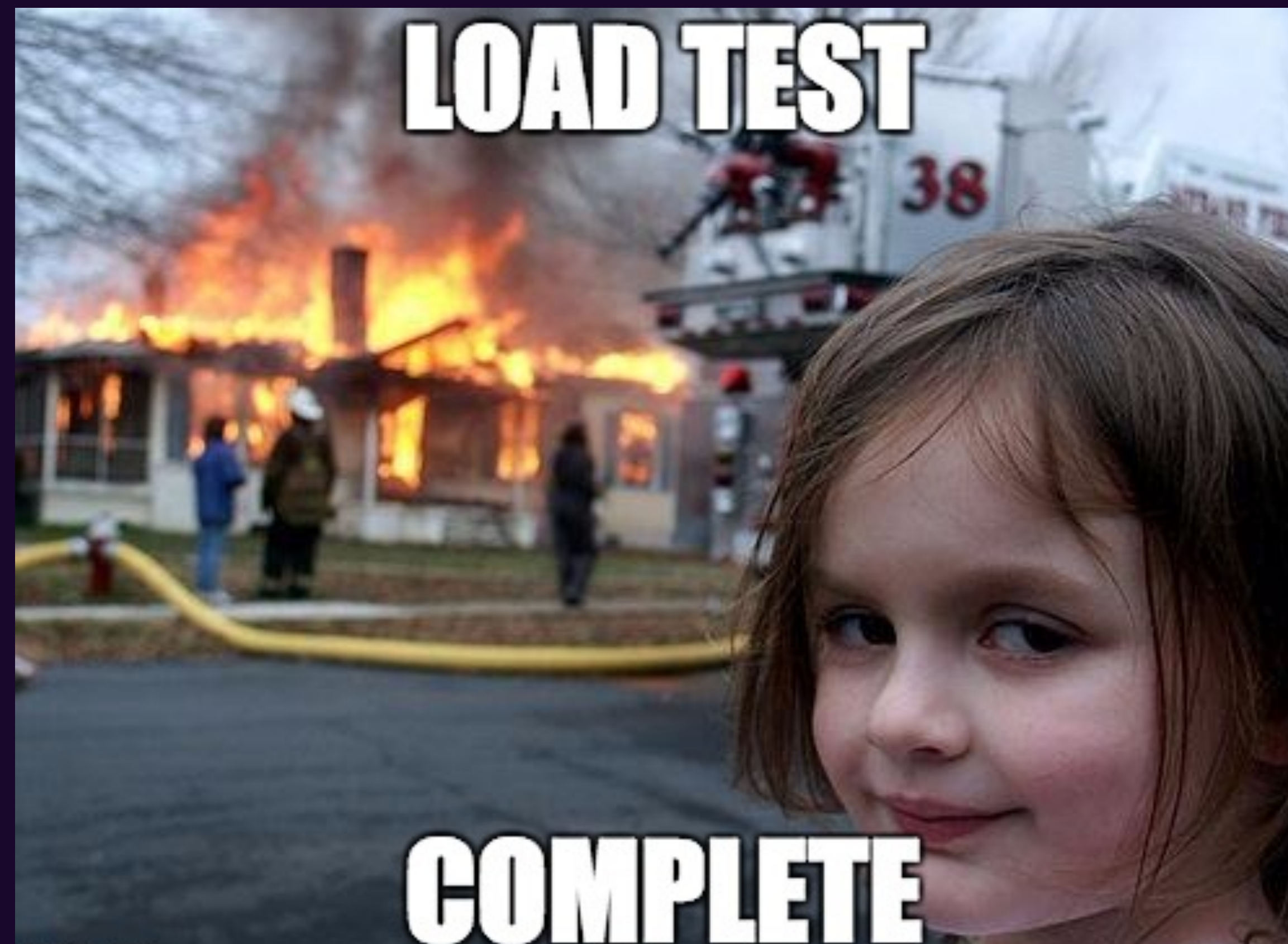
- Part of the methods include a session ID, it helps to identify user and device (this information is also needed to select proper data filter)
 - All requests of these methods should have special HTTP header which contains method signature



ökko MICROSERVICES TESTING

The Illusion «It is easier»:

- Put out the server.
- Increased the response time.
- Put out the messenger.
- Ran the high load.
- Blocked network traffic.



- Chelsea vs Liverpool
- Retry storm:
 - API gateway, which proxies microservices and fragment of a monolith, suffered from monolith errors on the background of mass retrays.

Anger in Russia as Premier League fans have trouble watching games

Technical problems for Rambler Group have left fans unable to watch some of the action despite having paid for a subscription



THE GUARDIAN.

ökko AS A CONCLUSION

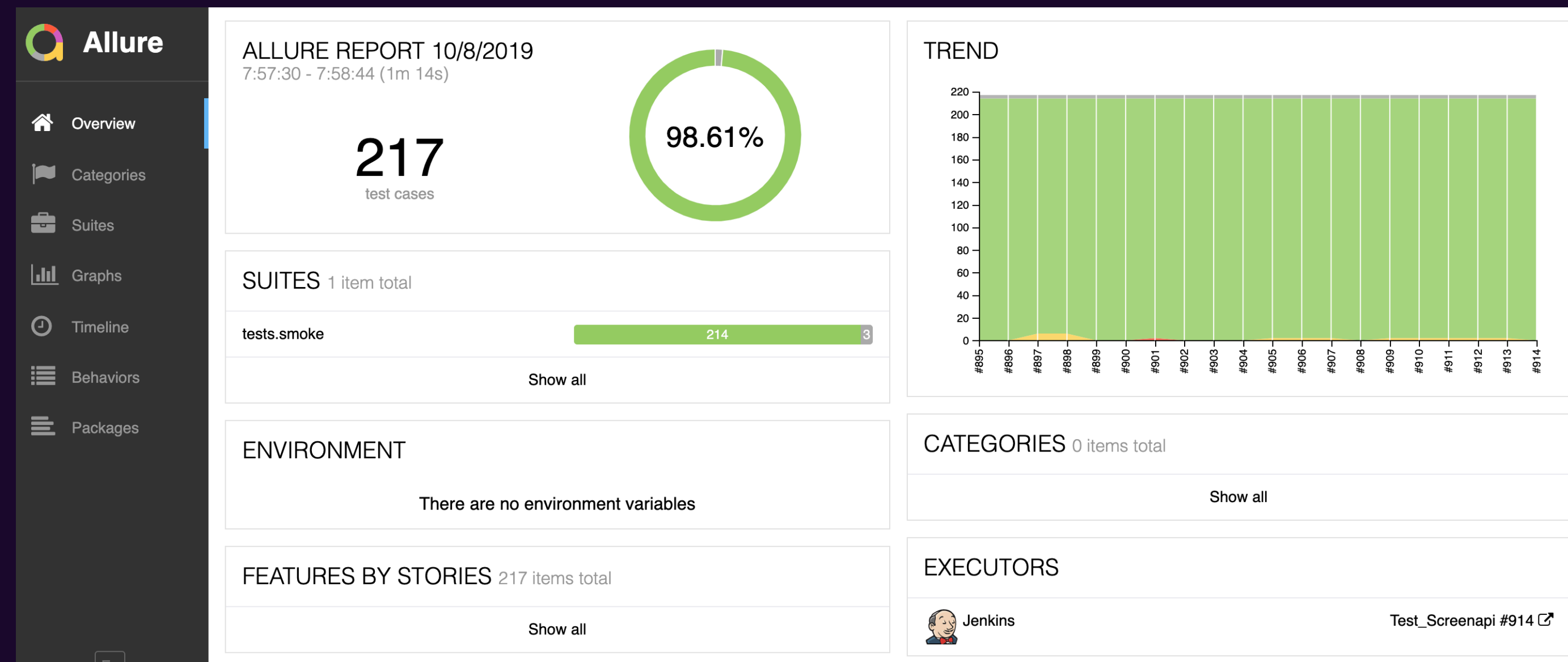
The Illusion «Microservices are better for testing»:

- **pros**

- Testing has become clearer.
- Freedom to do load tests.
- Getting test data.
- Organization and structuring of testing processes.
- Automated tests.

ökko AS A CONCLUSION

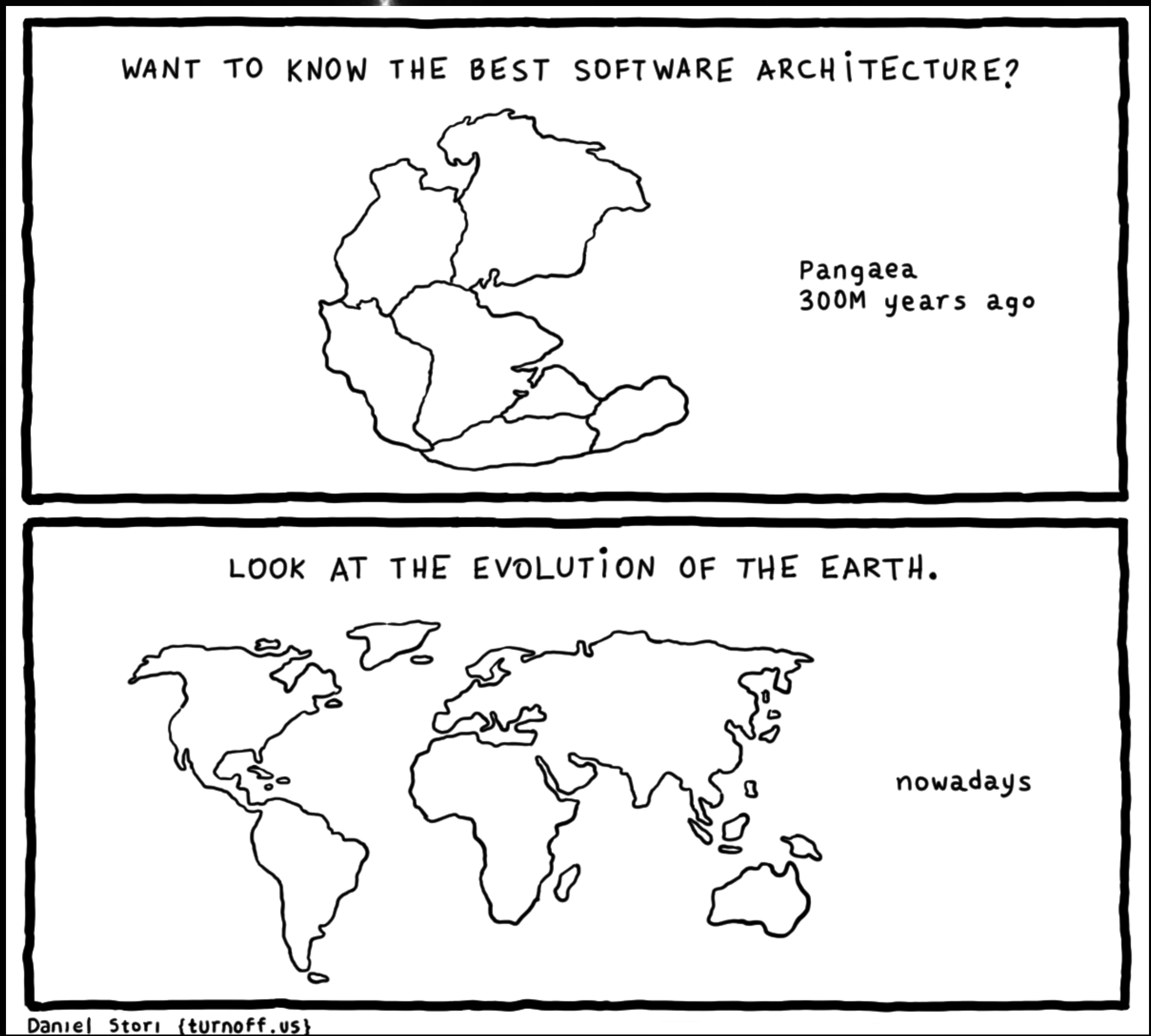
- Python
 - Pytest (+ Allure Reports)
 - Locust (Redis + Grafana/Zabbix)
- Postman
- Autotests coverage
 - 25 % monolith vs 80% microservices



Sample of Allure Report.

ökko AS A CONCLUSION

- **cons**
 - Constant synchronization with the team.
 - Monitoring and storage of logs → but you will find a problem faster.
 - It was worth it, or it wasn't.



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THANK YOU!

LOAD AND DB

- We have our own CDN for movies that can serve about 40000 simultaneous FHD views. In addition we have 2 connected CDNs each can serve more than 200K views.
- For live events we have 3 CDNs connected
- So we believe that together they can serve about 1M simultaneous views
- Login requests in the app per month → 30m
- Paying users → 100+ ths

Security:

- All connections are only through https.
- Billing information is protected by external banking companies.
- Monitoring of suspicious attacks on balancers.
- We do not keep any personal information of users, encrypted data.

- Movie - from \$3 to \$7
- Subscription - from \$7 to \$12 per month
- Impact on users after the transition - minimal
- Our competitors:
 - There are 4 major companies in this market
 - Including Netflix (but this service is not so popular in Russia)

- 30% - monolith, 70% - microservices
- Autotest coverage - 80%
- Split all microservices between testing department (4-6 services for 1 employee)
- Documentation we use:
 - Jira
 - Confluence
 - TestPad
- Kubernetes - next step(?)