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

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DATE: OCTOBER 14
• I got a Master's degree in Telecommunication.
• In testing since 2015.
• Work with Okko.tv in Saint-Petersburg.
• Started testing manually.
• Backend testing.
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.
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.
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.
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%.
List of tags (part). Be careful, everyone can be tagged. 😈
EXAMPLES OF THE SAME APPLICATION SCREENS DEPENDING ON SET OF
TAGS

Free movie preview tag = true.
EXAMPLES OF THE SAME APPLICATION SCREENS DEPENDING ON SET OF TAGS

Тайная жизнь домашних ... ★★★★★
The Secret Life of Pets 2

ОФИЛЬМЕ ИНФОРМАЦИЯ ПОХОЖИЕ
КиноPoиск 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 Освалт, Кевин Харт, Харрисон Форд, Эрик Стоунстрит

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

Free movie preview tag = false.
EXAMPLE OF THE SAME START SCREENS DEPENDING ON SET OF TAGS
EXAMPLE OF THE SAME START SCREENS DEPENDING ON SET OF TAGS

МИРОВЫЕ ХИТЫ
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Выбирайте и смотрите в Okko
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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.
ARCHITECTURE 'BEFORE'

MONOLITH

- services-video-apı:billing
- services-video-catalog
- services-video-apı offers
- services-video-apı user

Components:
- Offer
- Tag
- CMS
- ScreenAPI
- Catalog Graph
- ContextElement
- Reservation
- ActiveMedia
- TaStat
- PA
- BCone
- APM
- ContextUser
- UserOffer
- Offer
- PromoCode
- RetailProduct
Why microservices?

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

Microservices user.

Tag in ClientFilter.

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 Strategies

- Unit Testing
- Integration Testing
- Component Testing
- Contract Testing
- End-to-End Testing
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.
THE PROBLEM OF COLLECTING LOGS IN ONE PLACE.

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
The Illusion «It is easier»:

- Easy to use.
- Little setup needed.
- Leightweighted JSON definition.
- Run tests using the JavaScript.
The Illusion «It is easier»:

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

Sample of Allure Report.
• 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.

WANT TO KNOW THE BEST SOFTWARE ARCHITECTURE?

Pangaea
300M years ago

LOOK AT THE EVOLUTION OF THE EARTH.

nowadays

Daniel Starc (turnoff.us)
THANK YOU!
LOAD AND DB

- We have our own CDN for movies that can serve about 40,000 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 $\rightarrow$ 30m
- Paying users $\rightarrow$ 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(?)