Microservices

Proof of expertise

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software tech

Foreword

In order to “digitally transform” your business, your processes (internally, with employees and contractors) need to reflect a new way of doing business and an embrace of the tech stack.

Externally, you need to make sure your systems are easy and intuitive to use for an end-user. No one likes to land on a website or app and think it was built in 1994.

One way to think about upgrading your processes and systems is through microservices.

Many global names, forward-thinkers such as Pay Pal, Netflix, LinkedIn, Uber and the greatest store in the world- Amazon, have turned to a new modern practices, employing microservices and cloud technologies, and adopting agile methodologies.

Ever since our foundation in 2007, we have worked on numerous projects for clients for different industries. All of them were looking for a partner who has in-depth knowledge of the digital transformation and latest technology trends. This document will address several case studies and real-life examples of microservices imaplementation.

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Driving factors for the microservices architecture market:

Digital transformation

Customer-oriented businesses

Proliferation of connected devices

The Cloud Microservices Market was valued at USD 831.45 million in 2020 and is expected to reach USD 2701.36 million by 2026, registering a CAGR of approximately 21.7% over the forecast period (2021 - 2026).

Designing microservice architecture for leading German automotive company

Our customer provides best products in his business area (automotive industry) and with that also best software is needed to be ahead of competition and define new trends. Previously they had developed very large portal for customers with many advanced features.

Features were very attractive to users but due to size of code and large development team it was difficult to manage such a huge system where all different features are connected. It was difficult to separate features by teams and to work on same codebase.

Also, there was a lot of information retrieved from different systems many times which caused some difficulties in performance. Due to all these issues it was decided to redefine architecture and create new customer portal.

Microservices architecture approach was chosen and biggest challenge for customer was lack of expertise and engineering capacity to design and implement microservices based application.

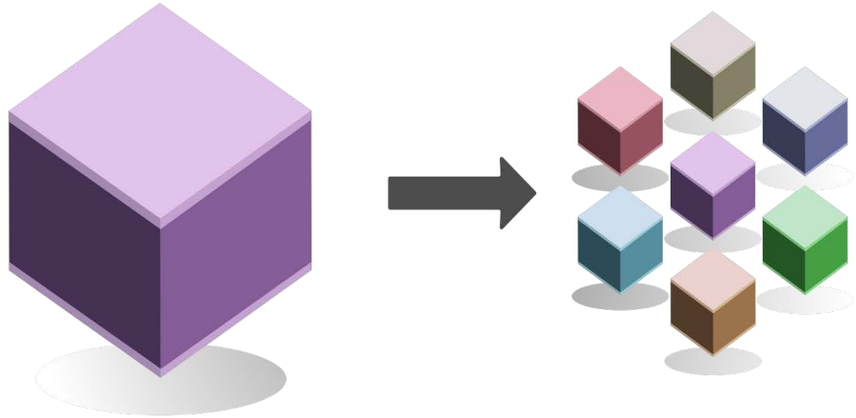
Our customer is leading German manufacturer of luxury cars that sets global trends in automotive industry development. Their broad portfolio of vehicles includes all categories of personal vehicles and trucks. With customers and sales offices in all parts of the world they have global presence.

Responsibilities

Serengeti provided development and maintenance service for new features for existing customer portal. Existing customer portal was monolith application developed by another company.

After we analyzed existing portal and got familiar with business logic we designed microservices architecture for new customer portal. After that the team started to work on development of new portal that is based on microservice architecture.

All existing features were split into small applications and developed from scratch for new platform.



Solution

To support the customer, a new team was formed. For the first two months, two Serengeti ambassadors were at the client's offices, studying the current situation of projects, work mode and business issues. During the first two weeks ambassadors were reading documentation and getting familiar with the project. Afterwards, they joined the scrum team and started to work on first tasks: fixing bugs and developing new features for existing portal.

After onsite period, most of the work was done from Serengeti office in Zagreb, with arrivals of Serengeti team lead every 3 weeks to scrum meetings at the client's office. It was important that Serengeti team lead hears new stories directly from product owner so that he can transfer all needed information to the rest of the team. Returning to Zagreb was the most challenging part for ambassadors since they were not in the room next to their colleagues.

It was important to keep successful communication and they managed to do it by having regular meetings and very intense communication together with strict and transparent processes on Jira board.

One year later project for portal migration to new microservices architecture started.

Serengeti engineers used their knowledge of system they were working on and knowledge of microservice architecture to design and prepare architecture for large number of small applications. Idea was to split existing large monolith into many small applications but to keep the same features in new system.

All applications were packed into Docker images. Images were uploaded to cloud provider registry and container cluster was created. Docker containers are than deployed to cloud. Containers communicated and worked together. To organize the team and managing the project, industry-recommended standards and tools are used - Scrum & Kanban, Jira, Confluence, GitLab, unit testing, CI / CD etc.

Result

Within few months from start of cooperation Serengeti developers were completely into the project and worked equally to other team members.

Use of modern microservices technologies made application scalable and flexible.

With help from Serengeti customer implemented proven and reliable microservices based application on time. Team tracked applications usage and depending on that scaled needed memory for every app and feature. During development different cloud providers were used depending on client contracts and decisions. Usage of Docker also made those changes easy. For developers it was easy to deploy and configure applications for different cloud providers.

After the successful first phase of co-operation, the Serengeti team has expanded.

Our team was in charge of complete development of different applications. Backend developers worked on backend part of application in charge for requests and data retrieval while frontend developers worked on user interface.

All application developed by our team followed similar architecture and it was not difficult for developers to switch between different applications. Successful cooperation and team cohesion were proven in this cooperation and long term partnership with customer was established.

Migration to Microservices Helps Digital Enterprise Transformation

Our client is a strong and well-known international financial group, a large banking group from Austria.

They offer their customers a full range of banking and other financial services through the following entities: real estate savings bank, leasing, voluntary pension fund management, pension insurance, investing, consulting, factoring, and bonuses. Its subsidiaries in Central and Eastern Europe cover de facto the entire region.

More than 16 million customers are serviced through 2.200 business outlets in corporate and private customer segments as well as in investment banking.

The client had a vision of transforming the bank into a digital enterprise by improving the effectiveness and performance of products, services, and processes. The goal was to customize the bank according to the needs of new generations of users and new business ecosystems.

Responsibilities

The client had a vision of transforming the bank into a digital enterprise by improving the effectiveness and performance of products, services, and processes. The goal was to customize the bank according to the needs of new generations of users and new business ecosystems. Apart from increasing flexibility, it is important to enable the integration of the bank with the new EU directives in short time periods.

To reach this speed and agility level is not possible with legacy IT systems and monolith architectures. Introducing modern technologies and tools, new flexible models, design principles and agile methodologies to development is key in supporting the aforementioned goals. Implementing modern technologies like microservices requires specific know-how and engineering capacity.

Our client needed support from a partner that already has experience in microservice architectures and that could help with design and implementation.

Solution

Serengeti provided microservice architecture design services and implementation services.

We developed a microservice platform for the needs of the client's mobile applications and for the needs of the incorporation of various EU directives into the banking system integration.

In order to accomplish these goals, Serengeti assigned its experts to existing client teams according to the proven Team Extension Model.

The Team Extension Engagement Model is a step-by-step process that ensures fast and efficient onboarding and reaching the external team's optimum productivity level very fast. Together, Serengeti's team and the internal team worked on the overall platform architecture design and implementation.

Microservice architecture has proven to be the best solution in this case because it enables continuous delivery and deployment of large-scale complex applications. It also gives the organization the opportunity to easily upgrade the technologies it uses. Scaling applications is much easier than scaling large monolithic applications because microservices can be scaled individually.

Another advantage of this approach is that different teams can independently develop and deploy all microservices without much coordination with other teams. By using modern cloud technologies, we have solved business problems like fast delivery and reuse of common parts.

The OpenShift ecosystem delivers a variety of technologies, from monitoring container metrics and application performance inside a container, to supporting various Java and other technologies and software environments. Some of the services offered by the OpenShift platform to the applications running on that platform are high availability/ load balancing, single sign-on, a unique system for collecting, accessing and managing application logs, a CI/CD system for creating and installing applications, and service discovery. All these services were used in the overall system design.

Result

By making sound design choices and implementing the best practices of microservice architecture, many long-term benefits were achieved, such as improved communication across teams, improved collaboration and communication efficiency, independent implementation of new features, independent scaling, failure and resource isolation, easier maintenance, and potential heterogeneity since developers were free to pick the language and stack best suited for their service.

Serengeti provided the client with a team of experts that had wide experience in the banking industry and microservice architectures. This allowed the client to get access to right skill set and know-how fast. It also enabled the Serengeti team to reach the optimum team productivity very fast with little engagement needed from the client's key technical people.

MPSI | eXact in microservices

Mercury Processing Services International (MPSI), a company established in 2009, provides payment solutions to its clients from the financial and banking sectors across Central & Eastern Europe, Middle East, and North Africa.

Located in Croatia and Slovenia, the foundations of MPSI rely on complementary strengths of the two strongest cards businesses, Privredna Banka Zagreb and Banka Koper, and their transition from local companies into a fully international organization.

Its specialties are Payment Processing Services, Issuing Solutions, Acquiring Solutions, Payment Acceptance, and Value Added Services.

MPSI uses a wide range of technology when developing its services and, as an enterprise organization it systemizes departments to maximize the efficiency of the system itself.

Software development is organized in following departments: architecture, development, build management, application management, testing, data warehouse, etc.

Responsibilities

An internally developed back-office application within MPSI, eXact, provides functionalities to support Merchant and Card Payment Processing activities.

The main features of eXact include:

- Web portal integrating acquiring, issuing, clearing and settlement authorization, authentication, mobile and fraud case management functionality
- Online reporting
- Generated output batch interfaces available in the eXact web portal, available for manual or automatic download
- A set of common input/output interfaces across markets (institutions)
- Modules/batches separated for issuing and acquiring transaction processing web services provision (supporting various technologies; that may or may not be Client specific)
- Provision of file stores (not content management; that may or may not be Client specific)

Solution

eXact was designed as a monolithic application. MPSI gained new partners and their transactions needed to be processed. Scalability and maintenance of the current system started being an issue, so it was decided to transition from monolithic to microservice architecture. MPSI found a reliable partner in Serengeti to support them in this challenging project.

Experienced team members from Serengeti combined with architects from MPSI communicate on a daily basis, aiming to design and develop eXact in a microservice architecture, following state-of-the-art techniques and the best practices. Depending on the type and need of a microservice, both relational and NoSQL databases were used.

Microservices were developed in .NET Core, containerized in Docker on deployed on RedHat's OpenShift platform (Kubernetes, Istio) and are communicating with each other via async event-based communication based on IBM MQ and Kafka.

To support MPSI during this important project in the best possible way, it was important that the Serengeti team consists of very competent, experienced and research-oriented engineers. With the quality of developed and documented microservices and the level of details in written documentation, new developers were quickly ready to jump in and start working on the product.

The project is still ongoing. So far, the Serengeti team developed over 20 microservices.

Our team completed, among other things, the StandIn module on the acquiring side. The focus is now shifting to the issuing side where new challenges await. This is a long-term project in which architectural design is crucial so everything has to be (and is done) in a very precise and well thought out way.

Closing Words

Simply put, Microservices is when a developer works on software as a series of independent, small, modular services. Each service runs a particular process and communicates with a lightweight mechanism (often an HTTP resource API) to serve an end business goal.

You can think of it as a software architectural pattern-breaking interfaces down into APIs designed with one particular purpose. When building a database, a software team might be tasked with capturing first name, last name, phone number, etc. They could build each user field out as a microservice; then, if someone else internal to the organization needed just phone numbers, he/she could access that - as opposed to calling out for all data.

This approach contrasts with a monolithic architectural style, where everything is built as a single unit. Monolithic approaches to software worked for generations, but as more applications deploy to the cloud, microservices have gained in popularity among developers. Change cycles are often tied together, so in monolithic architecture, one small change requires an entirely new complete unit.

When talking about microservices, maybe it's the best way to observe simple examples such as this one with the flight-booking application.

People search for flights many times before they book one, right? Indeed. So the load in the search module is multiple times higher than the load in the reservation module.

When you implement microservices, you can configure multiple instances of the search service with multiple instances of the reservation service. Based on load, specific microservices can be increased or decreased, making the overall application perform much better.

What you need is expertise

And many have expertise, but you need to find the right fit and someone (or a team) that understands the interplay of all the technical factors driving growth right now. That's a common reason companies will do outsourced software development -- because they want to find a team with diverse expertise and backgrounds to drive their business forward too.

Let us know if you need help with implementation of microservices. We would be happy to help you.

Microservices characteristics:

High Code Quality

Small and Lightweight

Message-Based

Stateless

Single Business Capability

Independent Team

Independently Deployable

Automated Build and Release

Event-Driven

Who are we?

An international nearshoring and offshoring software development and consulting company. With our unique Team Extension Model, we help companies with each stage of the development lifecycle, not only with development but also with consulting services. Technical consulting in different domains like Architecture Design, Automated Testing, DevOps and SCRUM was recognized in 300+ projects across different industries such as finance, logistics, industrial manufacturing, healthcare, energy, and retail.

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