

Microservices Fundamentals

INTRODUCING MICROSERVICES



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Overview



What are “microservices”?

Limitations of “monoliths”

Challenges of microservices

Sample application



Later in This Course



Architecting microservices



Building microservices



Communicating between microservices



Securing microservices



Delivering microservices

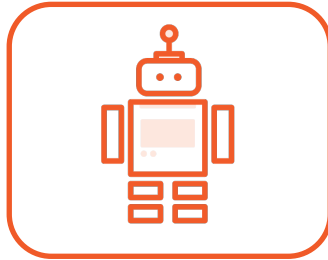
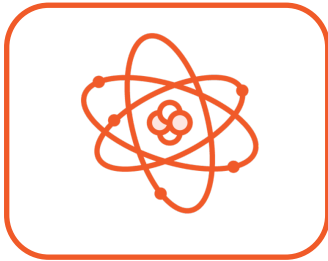




What are microservices?



Microservices

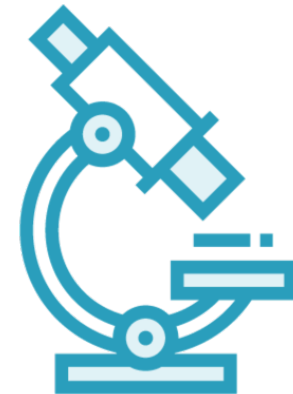


**autonomous,
independently
deployable services...**

...**collaborate** to
form an **application**



How **small** should
they be?





Why do we need
microservices?





“Monoliths”

Single codebase

Single process

Single host

Single database

Consistent technology



Monolith Benefits



Simplicity

One codebase

- Easy to find things

Deployment

- One application to replace

Monoliths are not “wrong”





Do you really need
microservices?



The Problem of Scale



Monoliths
can work
well for **small**
applications



Many developers



Many users



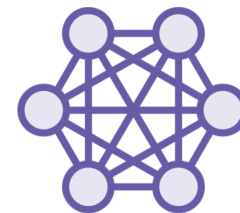
Big data



Difficult to maintain



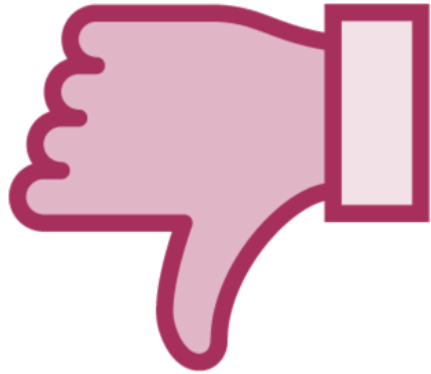
Technical debt



Entangled modules



Monolith Problems



Difficult to deploy

- Risky
- Requires downtime

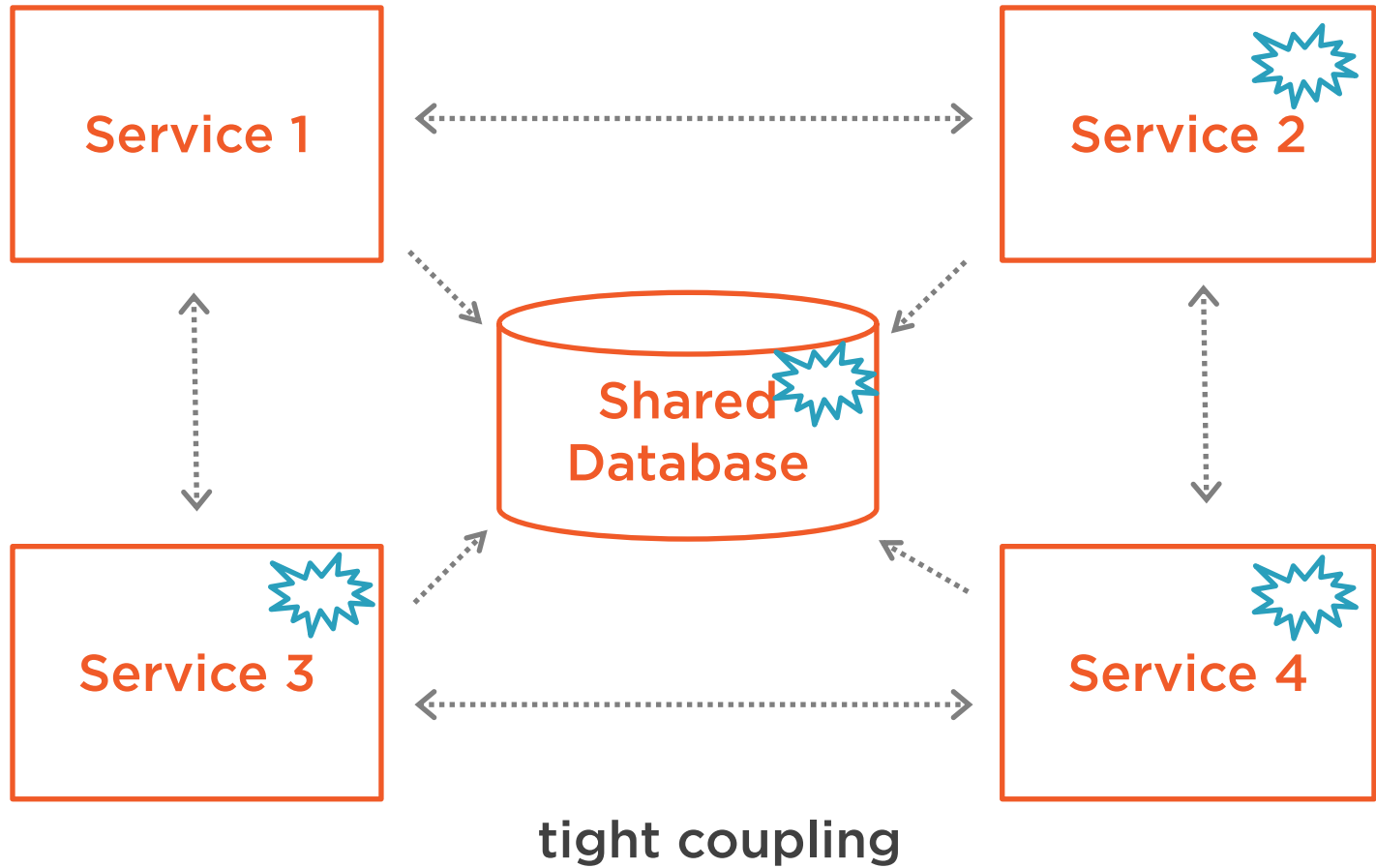
Difficult to scale

- Horizontal scaling often not possible
- Vertical scaling is expensive
- Whole application must be scaled

Wedded to legacy technology

- Reduces agility

Distributed Monoliths



Everything must
be deployed
together

New features
require **changes**
everywhere





How are microservices
better than monoliths?





How can microservices
help us?



Benefits of Microservices

Small Services

- Can be owned by a team
- Easier to understand
- Can be rewritten

Technology Choice

- Adopt new technology
- Use the right tool
- Standardize where it makes sense

Individual Deployment

- Lower risk
- Minimize downtime
- Frequent updates

Scaling

- Scale services individually
- Cost-effective

Agility

- Adapt rapidly
- Easier reuse





What are the downsides of
microservices?



Microservices solve some
problems, but bring new
challenges



Challenges of Microservices

Developer Productivity

How can we make it easy for developers to be productive working on the system?

Complex Interactions

Take care to avoid inefficient, chatty communications between microservices

Deployment

You will need to automate the process

Monitoring

We need a centralized place to check logs and monitor for problems



You can succeed with
microservices



Introducing the Demo Application



<https://github.com/dotnet-architecture/eShopOnContainers>

dotnet-architecture / eShopOnContainers

Watch

1.5k

★ Unstar

17.9k

Fork

7.6k

<> Code

Issues 38

Pull requests 11

Actions

Projects 1

Wiki

Security

Insights

dev

25 branches

17 tags

Go to file

Add file

Code



sughosneo Updated package (#1696)

✓ 08d3a2b 10 days ago

🕒 3,884 commits



.github/workflows

Prevent deploy jobs

2 months ago



build

remove azure pipelines

6 months ago



deploy

Fix perms

2 months ago



img

Feature/add mobile readme (#1606)

4 months ago



src

Updated package (#1696)

10 days ago



.gitattributes

Treat *.pfx as binary so CRLF will not change it

4 years ago



.gitignore

Upgrade key packages

5 months ago



CONTRIBUTING.md

Updated readme files (#1589)

4 months ago



LICENSE

Update LICENSE

5 years ago



README.md

Fix ordering-signalrhub workflow badge image (#1624)

3 months ago



branch-guide.md

Updated readme files (#1589)

4 months ago

About

Cross-platform .NET sample microservices and container based application that runs on Linux Windows and macOS. Powered by .NET 5, Docker Containers and Azure Kubernetes Services. Supports Visual Studio, VS for Mac and CLI based environments with Docker CLI, dotnet CLI, VS Code or any other code editor.

dot.net/architecture

docker

microservices

spa

xamarin

ddd

netcore

ddd-patterns

windowscontainers

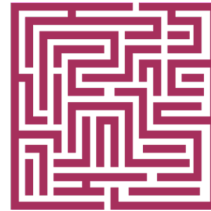
📖 README

📄 MIT License

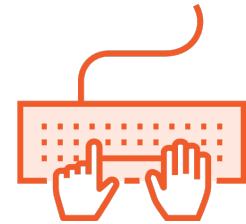




E-commerce



Non-trivial



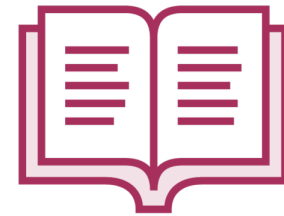
Actively Maintained



Containerized



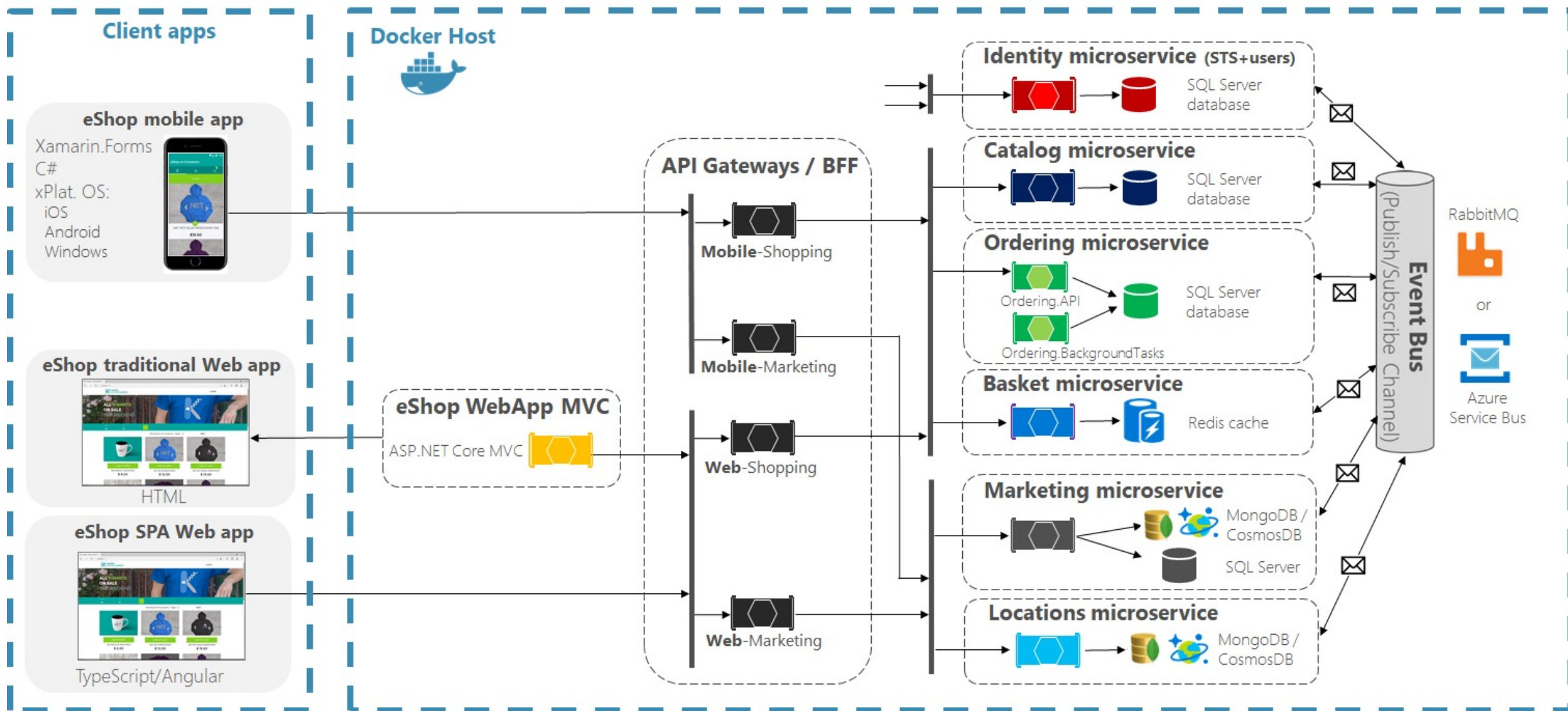
Cross-platform



Great documentation



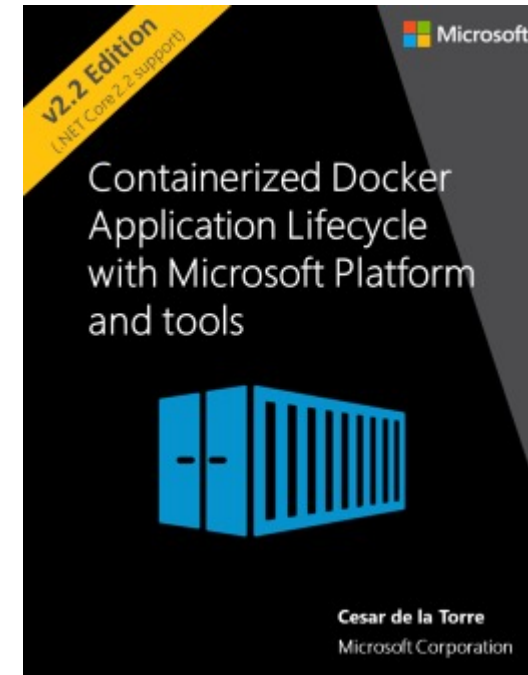
eShopOnContainers Architecture



Free e-Books



<https://aka.ms/microserviceesebook>



<https://aka.ms/dockerlifecycleebook>



Microservices Give You Choice



Microservices do not dictate technology choices



Use your favorite programming language and tools



eShopOnContainers uses .NET and Azure



Summary



Microservice architecture

- Comparison with monoliths
- Benefits over monoliths
- Challenges of microservices



Up next...

Architecting microservices

