



Changing how we collect  
store, manage, transform  
and analyze clinical data,  
one microservice at a time

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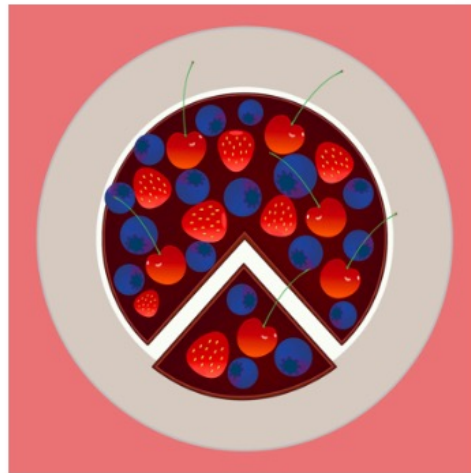
It is the reader's or audience's responsibility to determine where microservices would best suit their need.

Additionally, the authors do not endorse any specific commercial products or services.

# Software Architecture Evolution



With monolithic, tightly coupled applications, all changes must be pushed at once, making continuous deployment impossible.



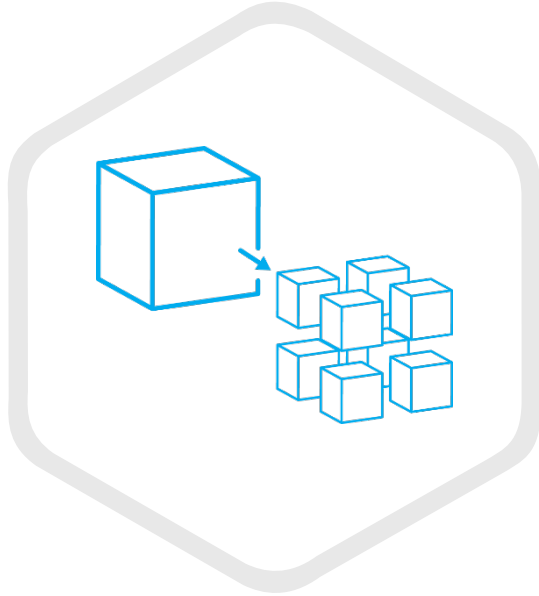
Traditional SOA allows you to make changes to individual pieces. But each piece must be carefully altered to fit into the overall design.



With a microservices architecture, developers create, maintain and improve new services independently, linking info through a shared data API.

<http://www.kanbansolutions.com/blog/microservices-architecture-friend-or-foe/>

# What are microservices?



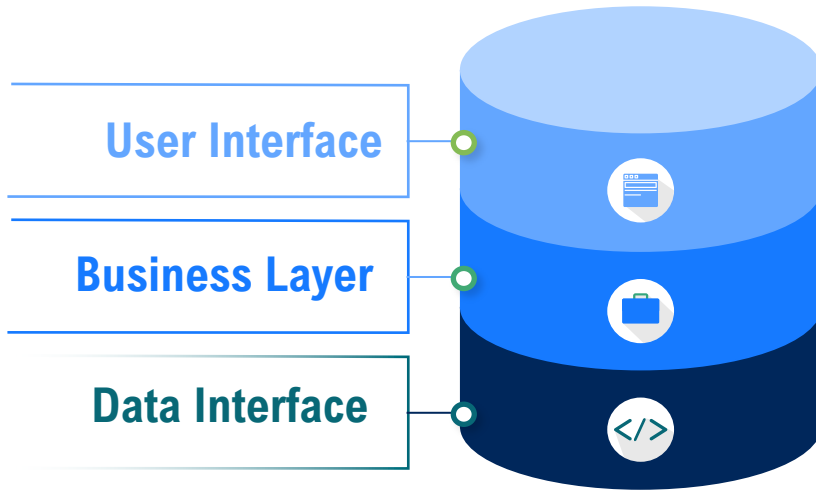
**Microservices are an architectural approach to software development that structures an application as a collection of small autonomous services, modeled around a business domain.**

**“Do one thing, and do it well”**

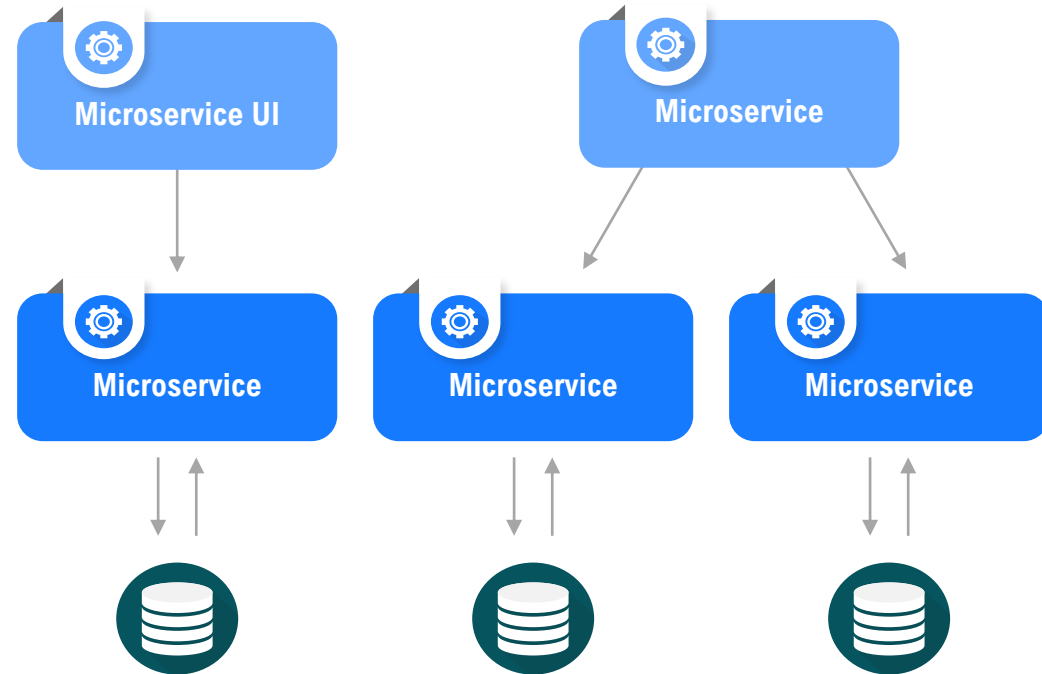


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# MONOLITHIC ARCHITECTURE



# MICROSERVICES ARCHITECTURE



There are multiple characteristics of microservices. Some of them are

## Characteristics



- SPECIALIZED
- AUTONOMOUS
- LOOSELY COUPLED
- DECENTRALIZED
- BUILD IT, RUN IT
- POLYGLOT
- BLACK BOX

BENEFITS

# of microservices

01



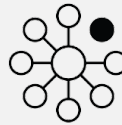
**Independent  
Deployment**

02



**Independent  
Development**

03



**Fault  
Isolation**

04



**Mixed  
Technology  
Stack**

05



**Flexible  
Scaling**

# Downsides



- ✗ Complexity of a distributed system to manage and integrate the microservices
- ✗ Because the components are distributed, end-to-end testing can become complicated and tedious
- ✗ Developers must put additional effort and attention/rigor into implementing microservices
- ✗ Microservices require experienced developers with a very high level of expertise

# Use

To accommodate scalability, agility, manageability and delivery speed

To rewrite legacy applications in today's programming languages or tech stacks

When you have standalone business applications or modules that must be reused across diverse channels.



# Not to use

Complexity, more than anything else, is the problem for which microservices are a solution

If you don't have separate teams to handle microservices independently

Some applications by their nature require tight integration between individual components and services.



# Use Case – Legacy vs Microservices-based

Legacy SCE



Microservice-based SCE



# Our Legacy SCE



- Single SCE application
- On premise deployment
- Grown internal complexity of the web app
- Software written by one development team in a very integrated way

# Microservices-based SCE



- Flexible capacity
- Cloud based environment
- Software is written in separate microservices
- Functionality has been developed as separate modules

# Microservices in healthcare

- To upgrade healthcare modernization, microservice is the right way to go. Modernizing app development and accelerating the go-to-market time does seem like an attractive way to go.
- For example, A portal of patients can be managed with multiple services and then scaled individually across different instances and sharing in a central database.
- It would significantly cut the building cost of a portal, maintenance and also enable further scalability. Though, we have to keep in mind the security aspect as well.
- Moreover, this would enhance the data analysis, as it would enable data to process globally, consecutively correlating live with legacy and public data.



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# Thank You

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