Service Oriented Architecture

.NET CORE

Service-oriented architecture (SOA) is a style of software design where services are provided to the other components by application components, through a communication protocol over a network.

https://en.wikipedia.org/wiki/service-oriented_architecture

SOA – Overview

https://www.ibm.com/support/knowledgecenter/SSMQ79_9.5.1/com.ibm.egl.pg.doc/topics/pegl_serv_overview.html#pegl_serv_overview__introsoa
https://en.wikipedia.org/wiki/Service-oriented_architecture#Patterns
https://docs.microsoft.com/en-us/dotnet/framework/wcf/whats-wcf#features-of-wcf

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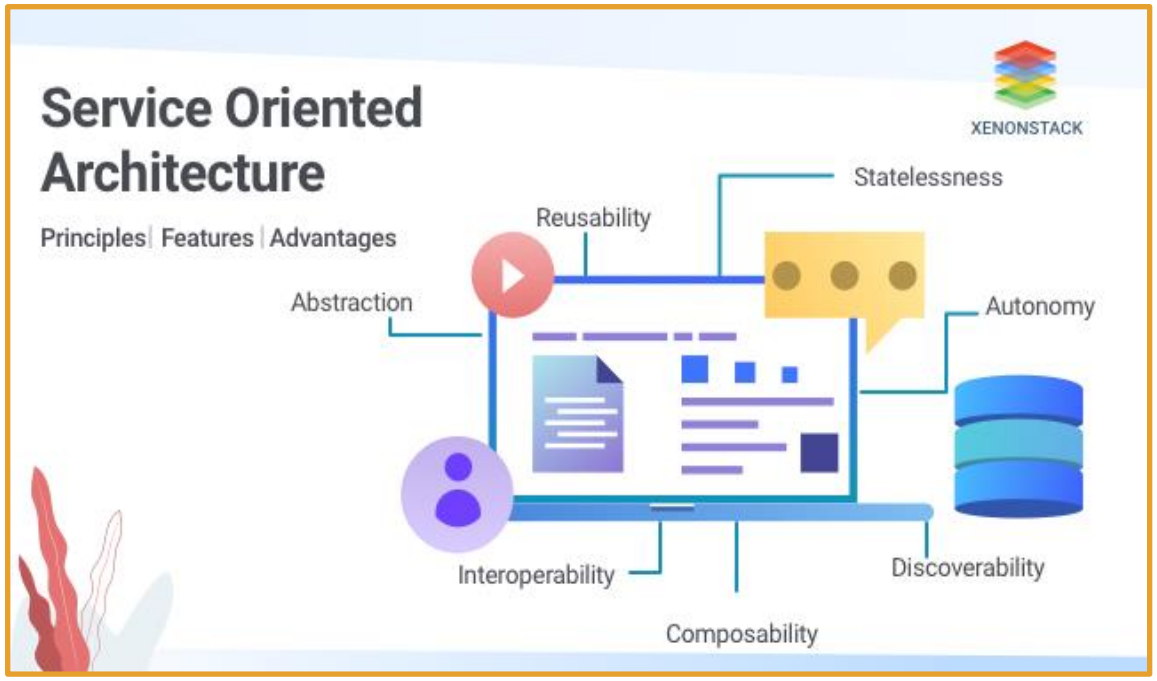
Service-oriented architecture (SOA) is the reliance on ***Web services*** to send and receive data. ***SOA*** involves the deployment of services that run in a network. A ***service*** has the following characteristics:

- It may handle a business process (calculating an insurance quote) with a specified outcome.
- It may handle a technical task such as accessing a database.
- It is self-contained and independent.
- It can access another service.
- It is a black box for users.

The independence of the service from the other software is called ***loose coupling***.

Usually, the services are deployed as ***Web Services*** so they are independent of platforms and programming languages.

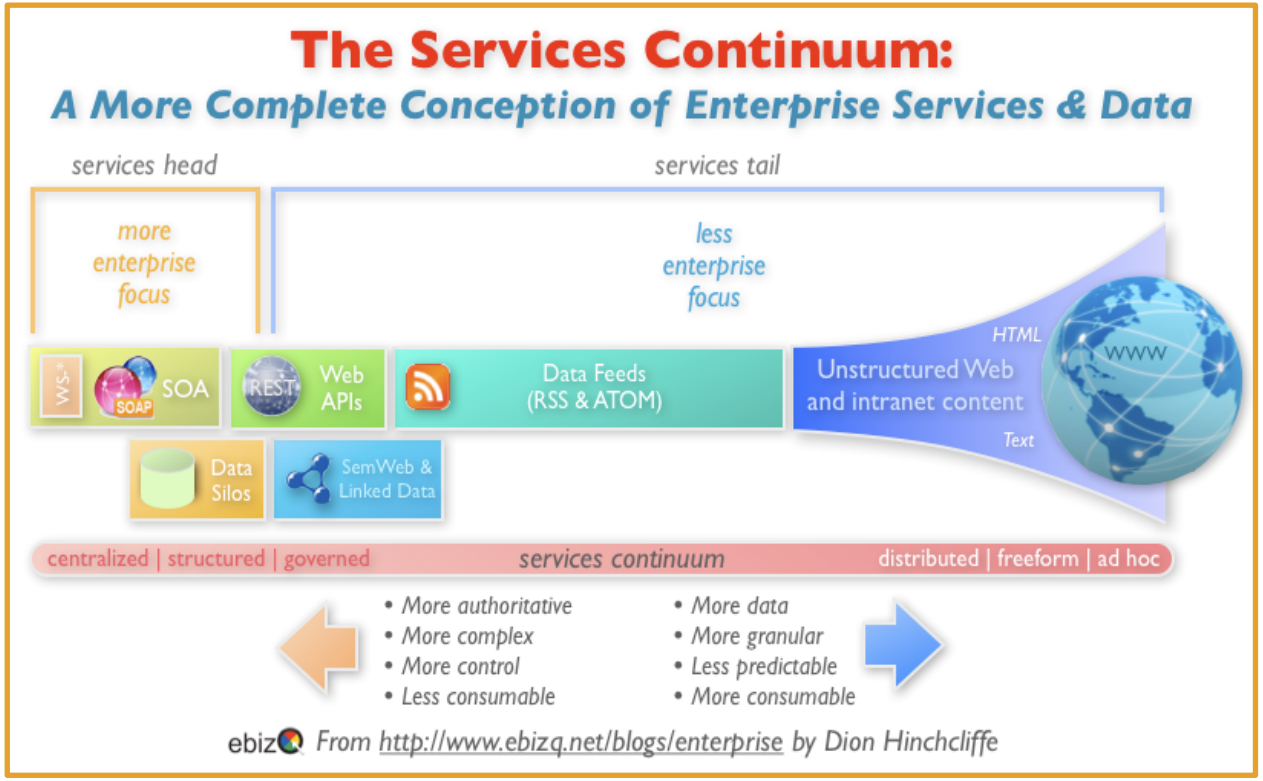


SOA – Overview

https://en.wikipedia.org/wiki/Service-oriented_architecture#Patterns

SOA is part of an organizational continuum. This continuum:

1. begins at the older concepts of distributed computing and modular programming, then
2. moves to SOA, and then
3. moves on to the offspring of SOA.
   - Mashups,
   - SaaS, and
   - cloud computing.

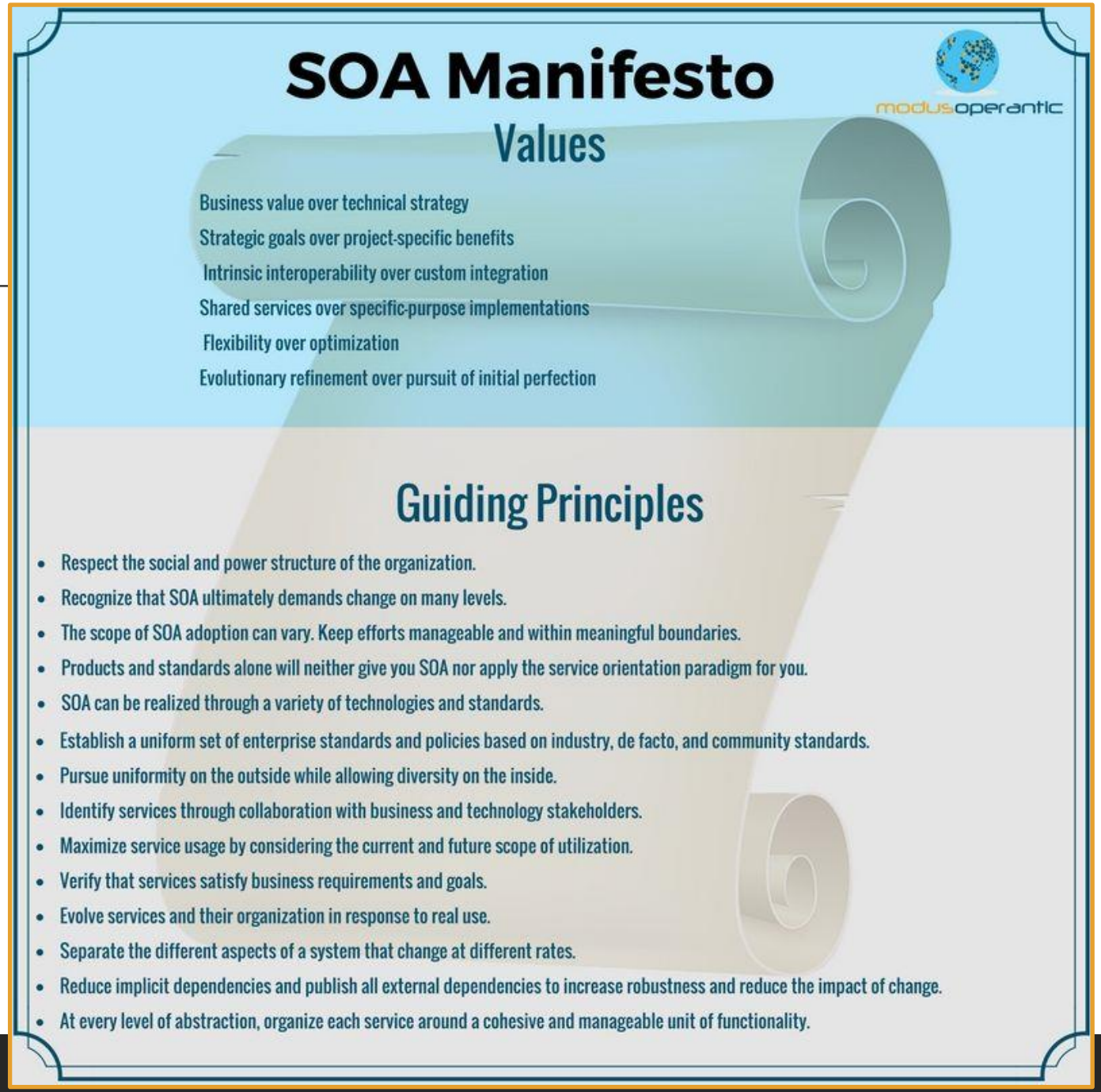


SOA – Principles

https://en.wikipedia.org/wiki/Service-oriented_architecture#Patterns
https://www.modusoperantic.com/en/the-soa-manifesto/

The six core values of Service-Oriented Architecture are:

1. Business value is given more importance than technical strategy.
2. Strategic goals are given more importance than project-specific benefits.
3. Intrinsic interoperability is given more importance than custom integration.
4. Shared services are given more importance than specific-purpose implementations.
5. Flexibility is given more importance than optimization.
6. Evolutionary refinement is given more importance than pursuit of initial perfection.



SOA – Uses

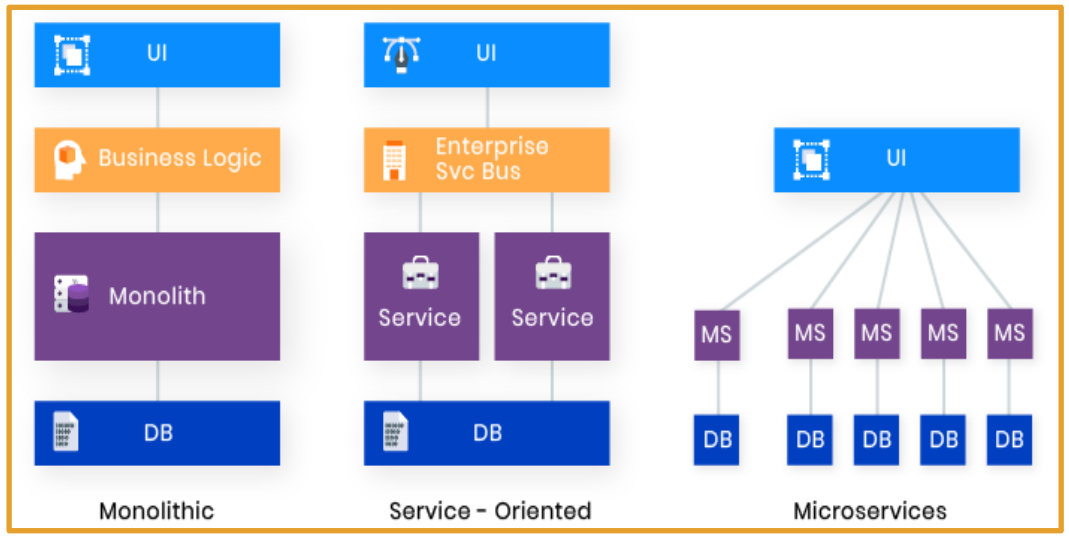
https://www.ibm.com/support/knowledgecenter/SSMQ79_9.5.1/com.ibm.egl.pg.doc/topics/pegl_serv_overview.html#pegl_serv_overview__introsoa

SOA is mainly implemented from the ground up on new services.

There are some instances where old code might be converted to SOA architecture.

If the application:

- has UI logic, business processing, and data access tightly coupled making the code difficult to test.
- is hard to understand due to repeated patching rather than being rewritten when needed. Updates are time consuming and complex resulting in additional errors.
- inventory has duplicate logic, requiring changes in several places.



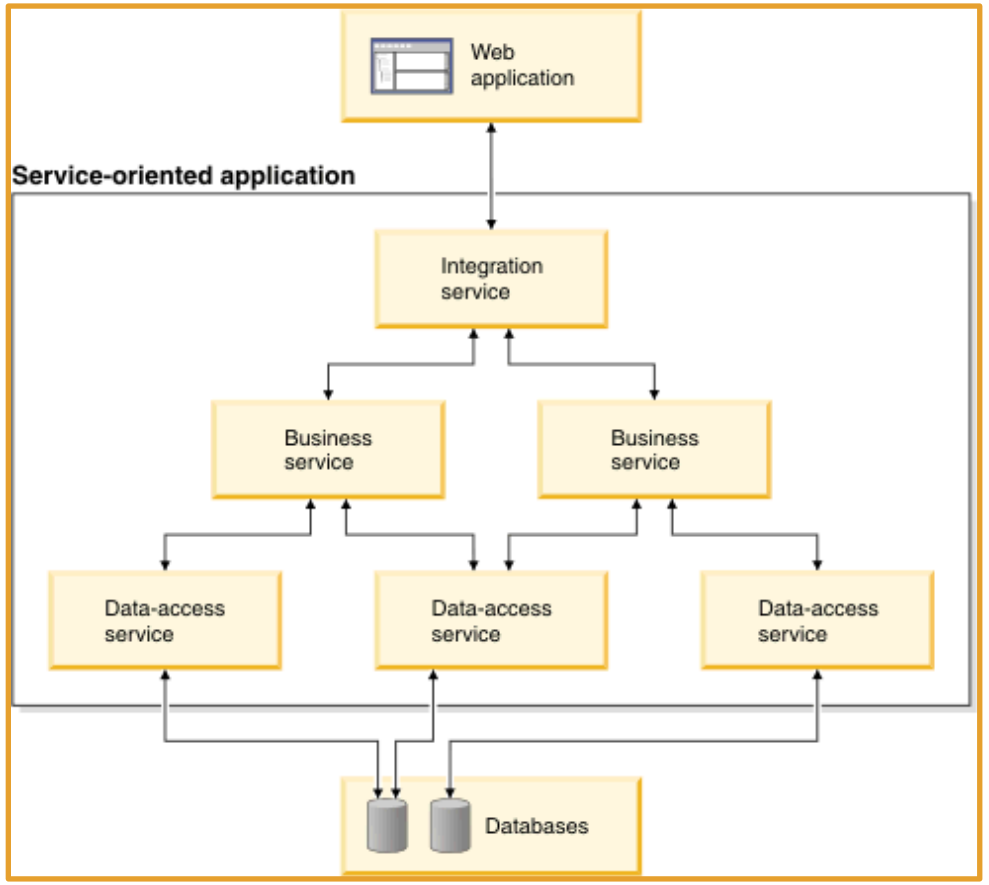
SOA – Design Patterns

ibm.com/support/knowledgecenter/SSMQ79_9.5.1/com.ibm.egl.pg.doc/topics/pegl_serv_overview.html#pegl_serv_overview__introsoa

A Service-Oriented Application is a collection of independent services organized into a hierarchy.

The topmost level of the SOA receives data from the UI (the user) and sends requests via HTTP to the appropriate Business service API.

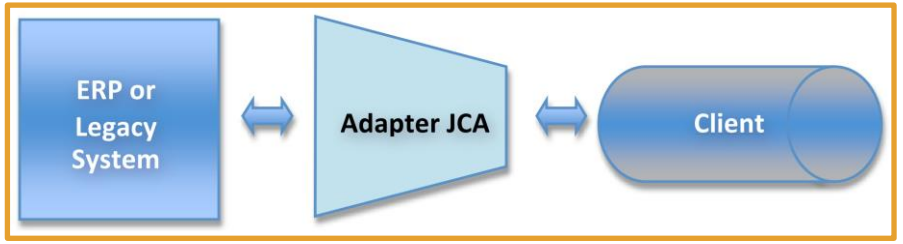
The Business Service may manipulate the data or send another request to a Data Access Services, or access a Database, depending on what is needed.

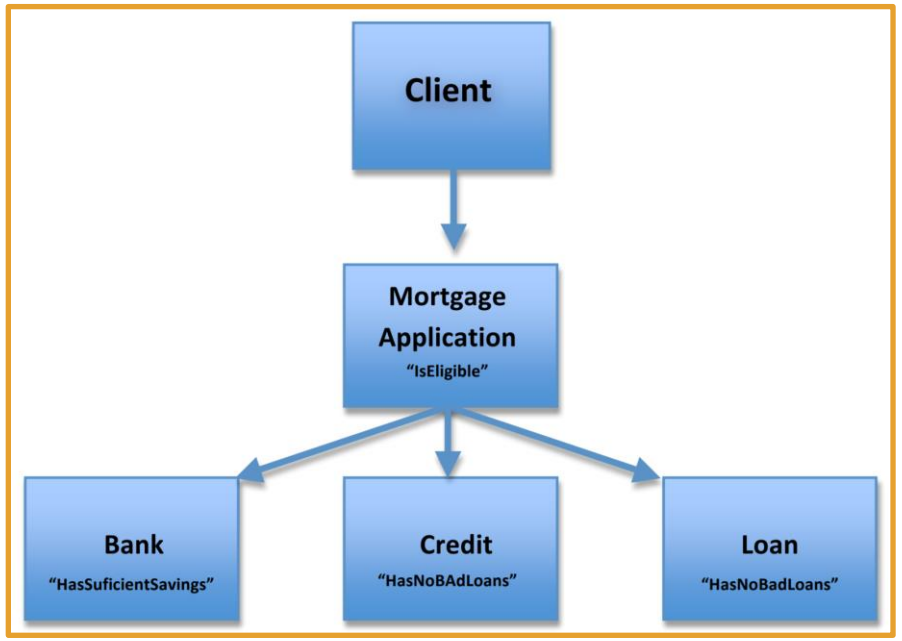


SOA – Web Service Design Patterns

https://www.mercurymagazines.com/pdf/Bst_Prctcs_Dsgn_Ptrns.pdf

- Adapter - Allows the continued use of existing applications by implementing a **wrapper** around them to modify output to what the modern client expects.
- Façade: Placed between the client and the services used. It Loosens the coupling between client and server components.





SOA – Web Service Design Patterns

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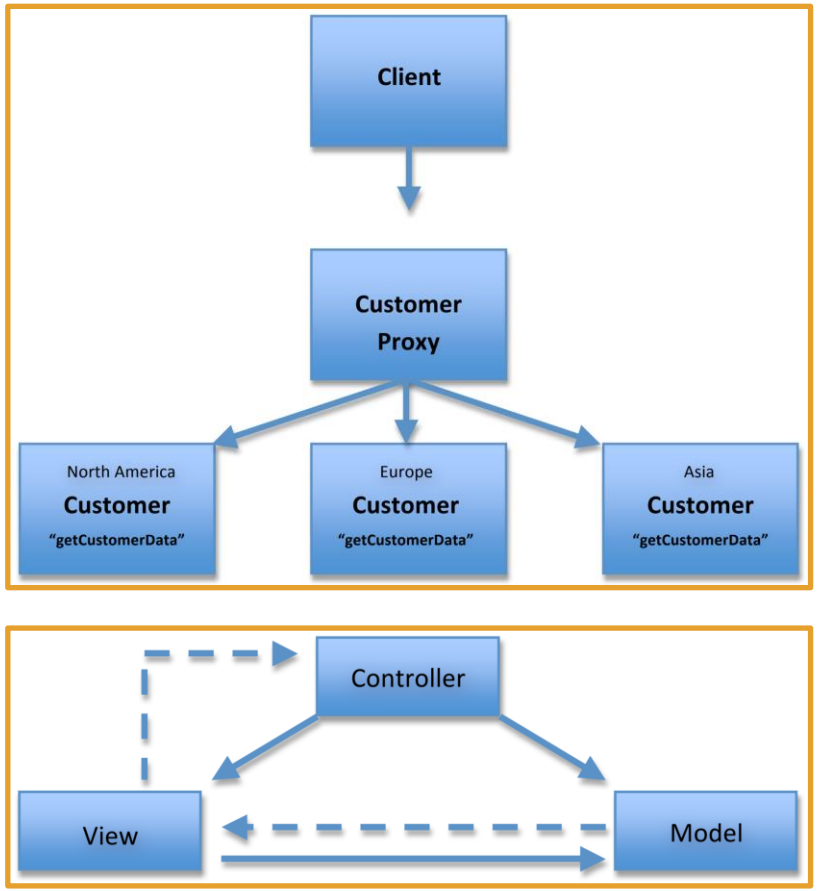
- Proxy - Used to consolidate the messages sent to separate services into a single service. The ***Proxy*** dispatches the request to the appropriate back-end service. This simplifies interactions with multiple services.
- Controller - ***Controller*** is a key component of MVC architecture. A Controller can be used in SOA architectures to encapsulate the ***Business Logic*** of the target service.



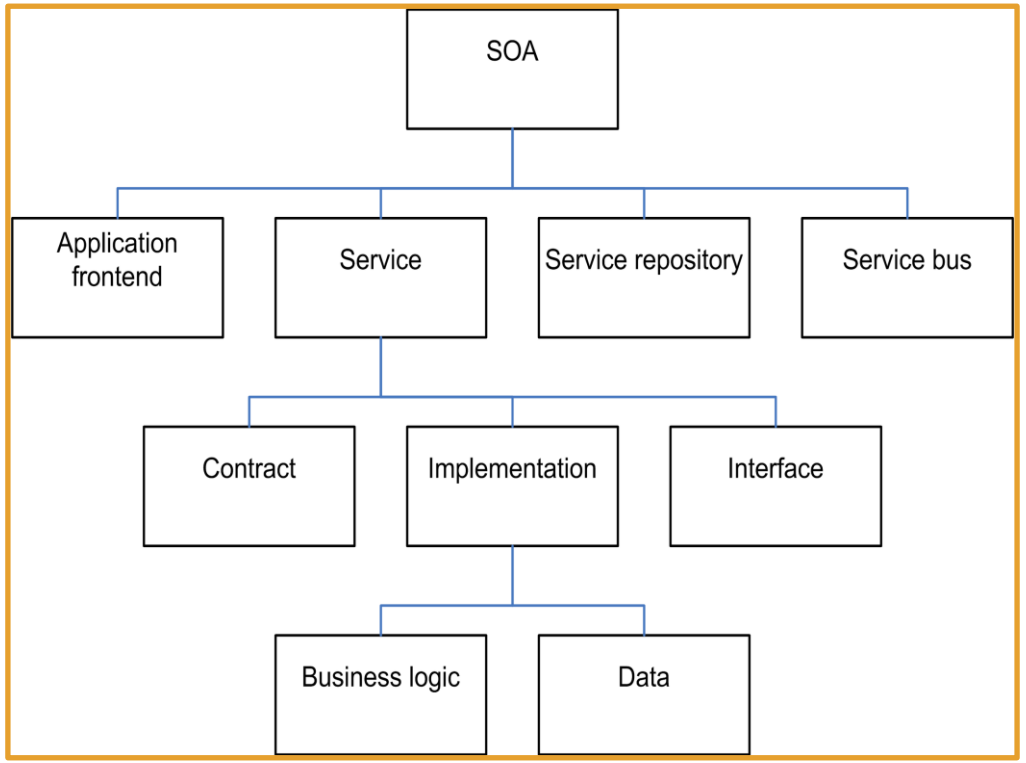
SOA - Implementations

https://en.wikipedia.org/wiki/Service-oriented_architecture#Patterns

SOA's are often implemented using Web Services. The most common Web Service SOA implementations use ***SOAP*** and ***REST*** technologies but there are many others.

SOA architectures can implement many different technologies due to their ***loosely coupled*** nature. The various services comprising a SOA must decide on a protocol for communication. This is often done with a formal document called a ***Web Services Description Language (WSDL)*** Document.

When using a WSDL, no responding service needs to know anything about the calling service. Each service is a black box



SOA – Benefits

https://www.mercurymagazines.com/pdf/Bst_Prctcs_Dsgn_Ptrns.pdf

With Service-Oriented Architecture, you can integrate legacy code to with new, mixed technologies to reuse existing applications. This reduces development costs.

Decoupling a service from its presentation reduces expenses and decreases development time. SOA makes applications more dynamic by exposing information and data sharing across the organization and focusing development on the best ways to improve overall operations.

SOA – Challenges

https://www.mercurymagazines.com/pdf/Bst_Prctcs_Dsgn_Ptrns.pdf
https://martinfowler.com/bliki/ServiceOrientedAmbiguity.html

SOA services, being typically ***loosely coupled.*** They have more latency than ***tightly coupled*** implementations. This can present challenges with the implementation of real-time, dynamic requirements.

SOA is meant to create an environment where legacy systems can work together, but new business practices like the standardization of naming, definitions, and identification can present implementation challenges.

To overcome the challenge of blending legacy applications with new, more strict, standards, you can simply implement ***Services*** to handle those tasks for the legacy application.