Windows Communication Foundation

- Service Oriented Architecture
- What is WCF?

Object-Oriented

1980s

- Polymorphism
- Encapsulation
- Abstraction and Inheritance

Component-Based

1990s

- Build a DLL file
- Interface-based
- Dynamic Loading

Service-Oriented

2000s

- Message-based
- Schema + Contract
- Interoperability across technologies

1) Object Oriented Programming:

- Applications were built by working with real-world entities called classes and objects.
- Objects are built by classes, that host the data and functionality.

- Problems:
  - No reuse outside of application.

2) Component Oriented Programming (DLLs):

- The classes can be housed a component called DLL and can be consumed in other applications.

- Problems:
  - DLL file must be distributed to the clients manually.

3) Distributed Programming (COM+ / Remoting):

- The functionality will be available at server; and clients would access it, through network.

- Problems:
  - The Server and Client must be developed using homogenous environments.
    - Ex: Remoting Technology is meant for .NET to .NET.

4) Service Oriented Programming (Web Services):

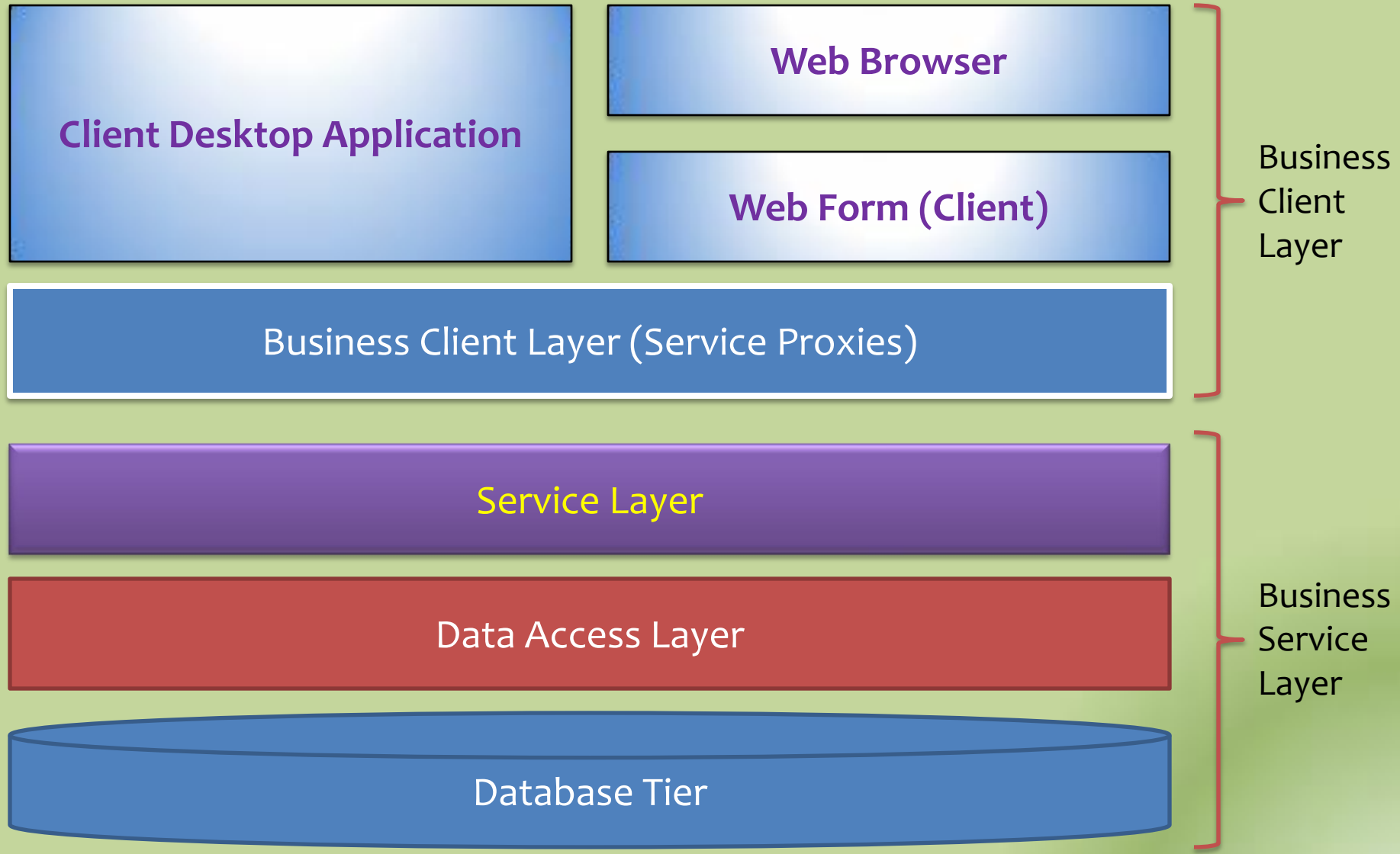
- The functionality will be available at server as a SERVICE; and clients would access it, through network.
- Present trend is SOA.

- **"The decomposition of a system into autonomous, discoverable, interoperable and secured units called Services"**

- SOA separates applications into services.
- Services are resides at the down-level of your business layer.
- Communication will be done with the help of messages.
- Allows connectivity of dissimilar technologies.
- Is NOT a product. It is an architectural paradigm.
- Next evolution of programming paradigms.

- SOA is NOT a replacement for Component-oriented or Object-oriented.
  - Usually incorporate Object-oriented components as a service to heterogeneous platforms and applications, build in a Enterprise.

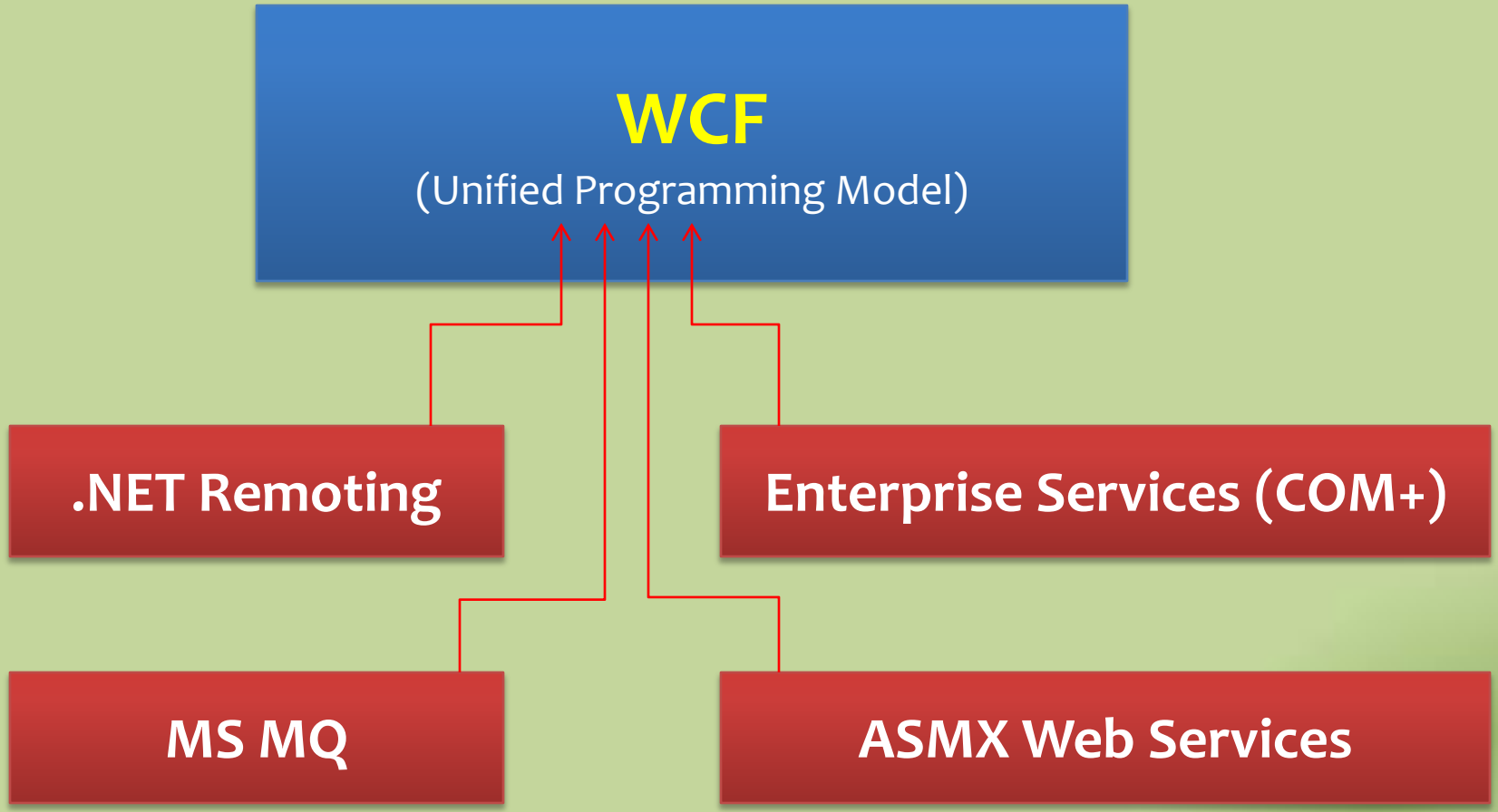
Service Oriented Architecture



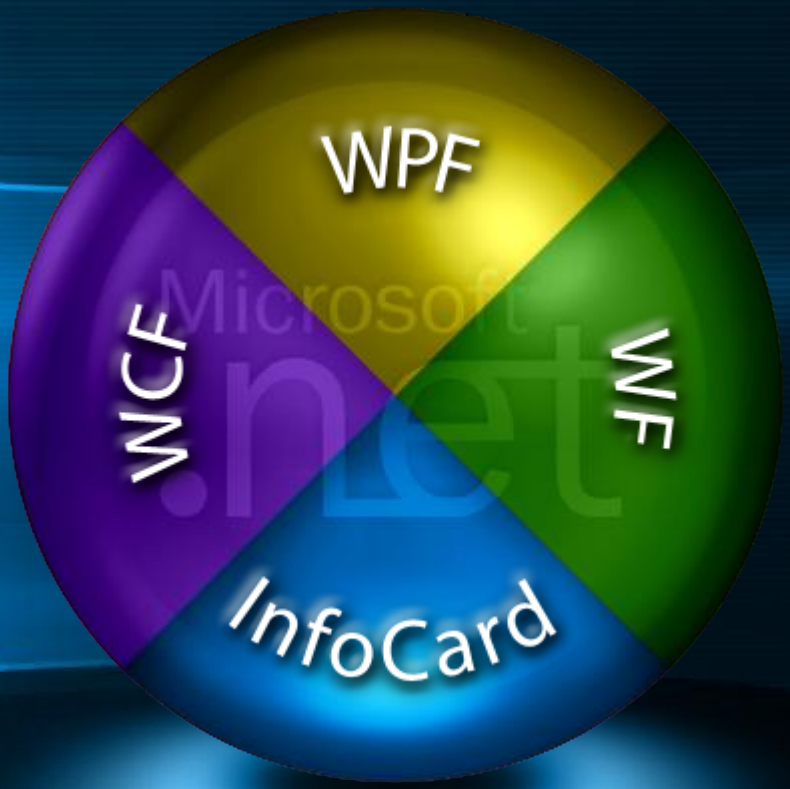
Service Oriented / Distributed Technologies prior to WCF

1. Web Services
2. Remoting
3. Enterprise Services (COM+)
4. MS MQ

Service Oriented / Distributed Technologies prior to WCF



Unified framework for
rapidly building
service-oriented applications



WCF introduced in .NET Framework 3.0

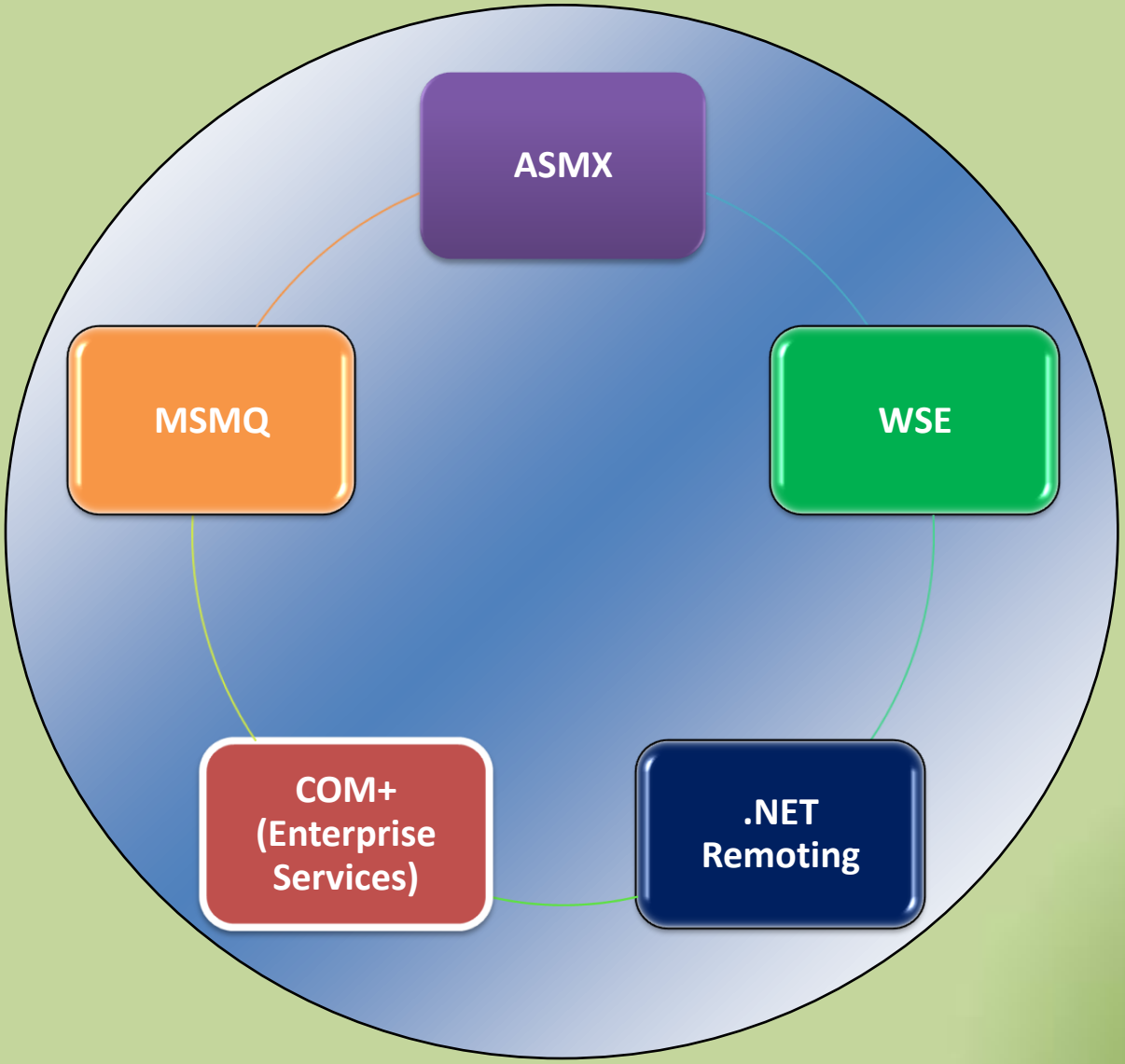
Its code name is "Indigo"

- It can be accessed only over HTTP.
- It works in stateless environment.
- It support interoperability across platforms, and are ideal for heterogeneous environments.
- Can be hosted only by IIS.

- It can be accessed over HTTP and TCP protocol.
- Provide support for both state-ful and stateless environments through Single-ton and Single-call objects.
- Uses binary communication.
- Ideal for homogenous environment.
- Can be hosted in your application; that is known "Self-Hosting".

- It can be accessed over "Named Pipes" protocol itself.
- Uses binary communication.
- Ideal for homogenous environment, running on a single machine.

What Does WCF Replace?



Features of WCF

i. WCF supports almost all protocols like TCP, MS MQ, Named Pipes, Peer-to-Peer and also HTTP.

ii. WCF can be hosted in a Self-Hosted Application, IIS and WAS (Windows Activation Service).

iii. WCF is used to implement Service Oriented Architecture.

iv. WCF Services can be consumed across the platforms and heterogeneous environments.

v. WCF Services can be developed in any .NET language (C#.NET / VB.NET etc.)

Web Services (vs) WCF

Feature	Web Services	WCF
Hosting	It can be hosted in IIS only.	It can be hosted in IIS, WAS (Windows Activation Service), Self-Hosting, Windows Service Hosting.
Service Class Declaration	[WebService] attribute has to be added to the service class	[ServiceContract] attribute has to be added to the interface
Methods	[WebMethod] attribute has to be added to the methods, that are to be exposed to the clients.	[OperationContract] attribute has to be added to the methods, that are to be exposed to the clients.
Transport Protocols	Can be accessed through HTTP only.	Can be accessed through almost all protocols like HTTP, TCP, Named Pipes, MS MQ, Peer-to-Peer.
Message Structure and Serialization	XmlSerializer class	DataContractSerializer class
Types of Operations	One-Way, Request-Response are the different types of operations supported in web service	One-Way, Request-Response, Duplex are different types of operations supported in WCF.