Service Oriented Architecture

UNIT-III

What is SOA?

- Service-oriented architecture (SOA) is an approach used to create an architecture based upon the use of services
- Creates and build services
- SOA binds these services to orchestration, or individually leverages these services
- Abstracting existing architecture to services in single domain
- Loosely coupled – re-usable
- Provide business agility

Evolution of SOA - XML

- Initially, used as meta-language to add intelligence to raw data
- Gained advantage with the advent of Internet
- Represent data in standard way, aids to create new specifications – XSD, XSLT
- XML data representation is the foundational layer of SOA
- SOA cant transfer data without XML
  - XSD – to preserve integrity of data
  - XSLT – to communicate between disparate data representation

Web Service

- Simple Object Access Protocol (SOAP) replacement of proprietary RPC communication
- In RPC, parameter data serialized and de-serialized at transmission ends
- eBusiness technology realized the use of proprietary-free Internet communications framework
- Led to development of web-service - A web-based, distributed technology, could leverage standardized communications to bridge the enormous disparity exist between and within organizations

Web Service components & Standards

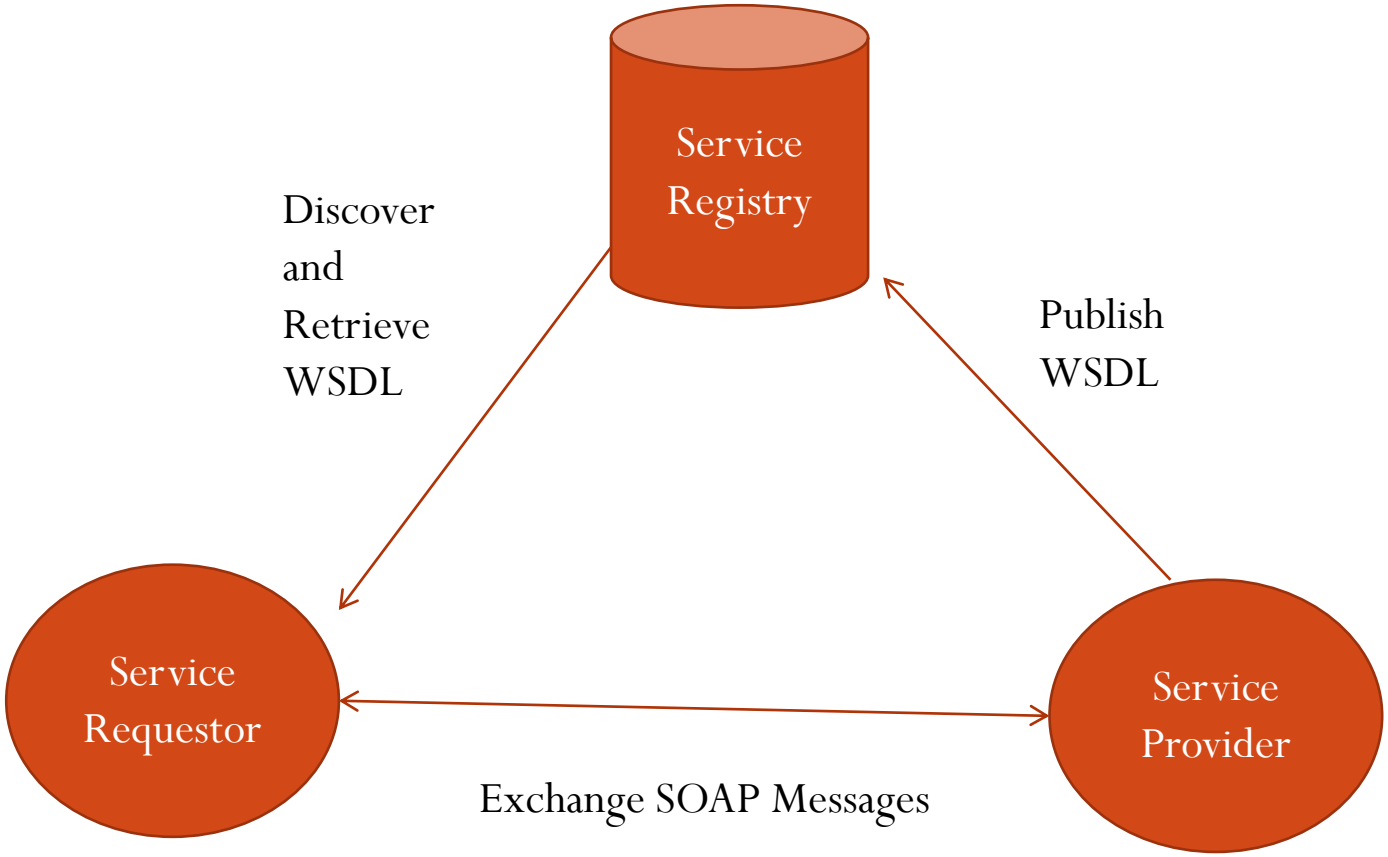
- Core Components – Services, messaging, registry

- Standard for services - Web Service Description Language (WSDL) - service identity and its invocation
- Standard for messaging - Standardized messaging framework - supports RPC-style and document-style message types
- Standard for Registry - UDDI specification - allows creation of standardized service description registries both within and outside of organization boundaries

Contd..

- Using standards, custom Web services developed to accommodate a variety of specialized business requirements
- It also incorporated in messaging-oriented middleware (MOM) products
- Used in B2B data exchange as an alternative to EDI

Basic SOA Architecture



Generations

- **First Generation**
- From a physical architecture perspective, did not require the use of a service registry
- Instead, discoverability is promoted on a service-level, through service orientation principles
- **Second Generation or WS-* Specifications**
- Numerous extensions included to address specific functional areas
- Elevates web services platform to an enterprise level

Contd…

- **Third Generation**
- Business logic is encapsulated and abstracted from the underlying automation technology
- Also, WS-BPEL enables for decomposing series of services and bridging between them
- It is a language for expressing business logic in concrete and executable format for composition and decomposition of services

Issues faced to retrofit existing implementation to SOA

- Data representation & service modeling to be aligned for SOA
- XML documents should be modeled wrt to SOAP messages
- SOA use document style messaging than RPC style
- XML need to represent bundled data for more context
- Implement interim solution to accommodate complex headers for complex message exchanges

Standards, Specifications, Extensions in SOA

- Standard - An accepted standard, contains number of XML specifications
- Specification - A proposed or accepted standard
- Extension - An extension typically represents a WS-* specification or a feature provided by a WS-* specification.

Standard Organization contributes to SOA

- W3C four separate working groups contributed
- SOAP and WSDL standards
- Web Services Choreography Description Language (WS-CDL) - a specification that governs standardized inter-service exchange patterns
- Web Services Architecture document (evolving)

Contd...

- **OASIS (Organization for the Advancement of Structured Information Standards)**
- WS-BPEL specification
- Development of ebXML - a specification that aims to establish a standardized means of B2B data interchange
- contributes to the UDDI specification
- Development of XML and Web services security extensions - Security Assertion Markup Language (SAML) and Extensible Access Control Markup Language (XACML)

Contd...

- **The Web Services Interoperability Organization (WS-I)**
- Does not create new standards, but ensure that goal of open interoperability is realized
- Released Basic Profile, a recommendation-based document contains info about collective standards that results in most desirable interoperability architecture
- Basic Security profile - collection of Web services and XML security technologies for interoperability

Architectures

- **Application Architecture:**
- A standardized definition of baseline application that could act as a template for all others
- A blueprint to application development team
- A single architecture document represents a distinct solution environment
- It reflects immediate solution requirements, long-term solutions, strategic IT goals
- Multiple application architectures aligned using enterprise architecture

Contd...

- **Enterprise Architecture**
- Used larger IT environments - When numerous, complex disparate application architectures co-exist
- A common master specification /document to provide high-level overview of heterogeneity in enterprise and definition of supporting infrastructure
- Coordinates and control many application architectures
- Changes to enterprise architectures affects application architectures
- Contains long term vision

Contd...

- **SOA Architecture:**
- Spans both enterprise and application architecture domains across multiple solution environments
- A approach for building reusable and interoperable services based on a vendor-neutral communications platform
- Because of the composable nature of SOA, an organization may have more than one SOA