

1.7 Web Services

Raúl Estrada

Noviembre 2020

About Web Services

- The Web services platform is defined through a number of industry standards that are supported throughout the vendor community.
- This platform can be partitioned into two clearly identifiable generations, each associated with a collection of standards and specifications:

First Generation

The original Web services technology platform is comprised of the following core open technologies and specifications:

- Web Services Description Language (WSDL)
- XML Schema Definition Language (XSD)
- SOAP (formerly the Simple Object Access Protocol)
- UDDI (Universal Description, Discovery, and Integration)
- WS-I Basic Profile

First Generation (2)

- These specifications have been around for some time and have been adopted across the IT industry.
- However, the platform they collectively represent seriously lacks several of the quality of service features required to deliver mission critical, enterprise-level production functionality.

Second Generation

- Some of the greatest quality of service-related gaps in the first-generation platform lie in the areas of message-level security, cross-service transactions, and reliable messaging.
- These, along with many other extensions, are being provided by the second-generation Web services platform.
- Consisting of numerous specifications that build upon the fundamental first-generation messaging framework, this set of Web services technologies (generally labeled as “WS-* extensions”) provides a rich feature-set far more complex both in technology and in design.

Second Generation (2)

Some of the notable WS-* specifications include:

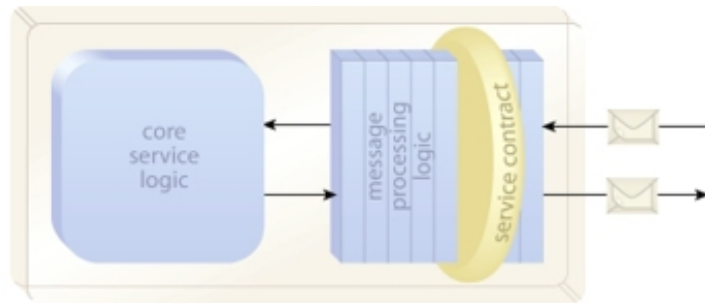
- WS-Security (and WS-SX)
- WS-Coordination, WS-AtomicTransaction, WS-BusinessActivity (and WS-TX)
- WS-ReliableMessaging (and WS-RX)
- WS-Policy
- WS-Addressing

Web service elements

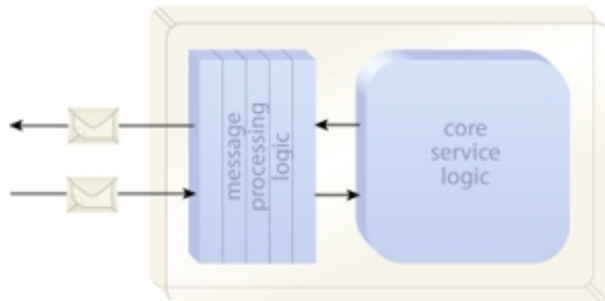
- A physically decoupled technical *service contract* consisting of a WSDL definition, an XML schema definition, and possibly a WS-Policy definition.
- This service contract exposes public functions (called operations) and is therefore comparable to a traditional application programming interface (API).
- A body of programming logic. This logic may be custom-developed for the Web service, or it may exist as legacy logic that is being wrapped by a Web service in order for its functionality to be made available via Web services communication standards.
- In the case that logic is custom-developed, it generally is created as components and is referred to as the *core service logic* (or *business logic*).

Web service elements (2)

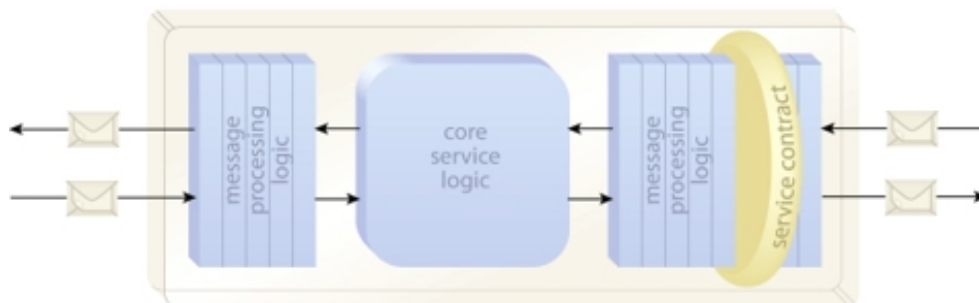
- Message processing logic that exists as a combination of parsers, processors, and service agents.
- Much of this logic is provided by the runtime environment, but it can also be customized.
- The programs that carry out message-related processing are primarily event-driven and therefore can intercept a message subsequent to transmission or prior to receipt.
- It is common for multiple message processing programs to be invoked with every message exchange.



Web service acting as a service provider



Portions of a Web service acting as a service consumer



Web service transitioning through service consumer and provider roles

"SOA: Principles of Service Design"
Copyright Prentice Hall/PearsonPTR

Three variations of a single Web service showing the different physical parts of its architecture that come into play, depending on the role it assumes at runtime.

Web Services

- A Web service can be associated with temporary roles, depending on its utilization at runtime.
- For example, it acts as a *service provider* when it receives and responds to request messages, but can also assume the role of *service consumer* when it is required to issue request messages to other Web services.

Web Services (2)

- When Web services are positioned within service compositions, it is common for them to transition through service provider and service consumer roles.
- Note also that regular programs, components, and legacy systems can also act as service consumers as long as they are able to communicate using Web services standards.