

Developing Requirements for a Web Service

Presented to: SWIM “Brown Bag”

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Federal Aviation
Administration



Agenda

- **Introducing FAA-STD-070**
- **Why do we need yet another requirements document?**
- **Where WSRD fits in the service documenting cycle**
- **Some highlights, or what's new and different**
- **A few things to consider before developing WSRD**



Introducing FAA-STD-070

- Standard Practice FAA-STD-070 “Preparation of Web Service Requirements Documents” was approved by NAS CCB on July 12, 2012
- The purpose of FAA-STD-070 is to establish a uniform content and structure for specifying a set of requirements for developing a Web service, consistent with FAA System Engineering principles
- FAA-STD-070 has been developed by the Service Registry Working Group (SRWG), a group chartered by the FAA Information Data Advisory Board (IDAB)



Introducing the WSRD

- FAA-STD-070 defines the content and structure of a Web Services Requirements Document (WSRD)
- A WSRD (*pronounced 'wizard'*) specifies requirements for a Web service as a part of the FAA's implementation of a service-oriented architecture (SOA)
- A WSRD is intended to be produced by FAA (or a contracting organization on FAA's behalf) and given to a contractor or vendor for development of the Web service



Motivation for developing FAA-STD-070

Corded or cordless?

Wall mountable?

Caller ID?

Large buttons?



Network?

OS?

Messaging?

Data?

Display?

CPU?

Camera?

Battery life?

New technologies call for new requirements

Motivation for developing FAA-STD-070 (cont.)

- Development of FAA-STD-070 was driven by the demand of organizations tasked with developing and supporting Web services
- Various organizations, which needed documentation specifically tailored for development of Web services, readily contributed resources to this effort

SWIM Requirements and Governance

ATO-T Terminal Planning & SE

ATO-E Program Operations (AJE-11, AJE-12D)

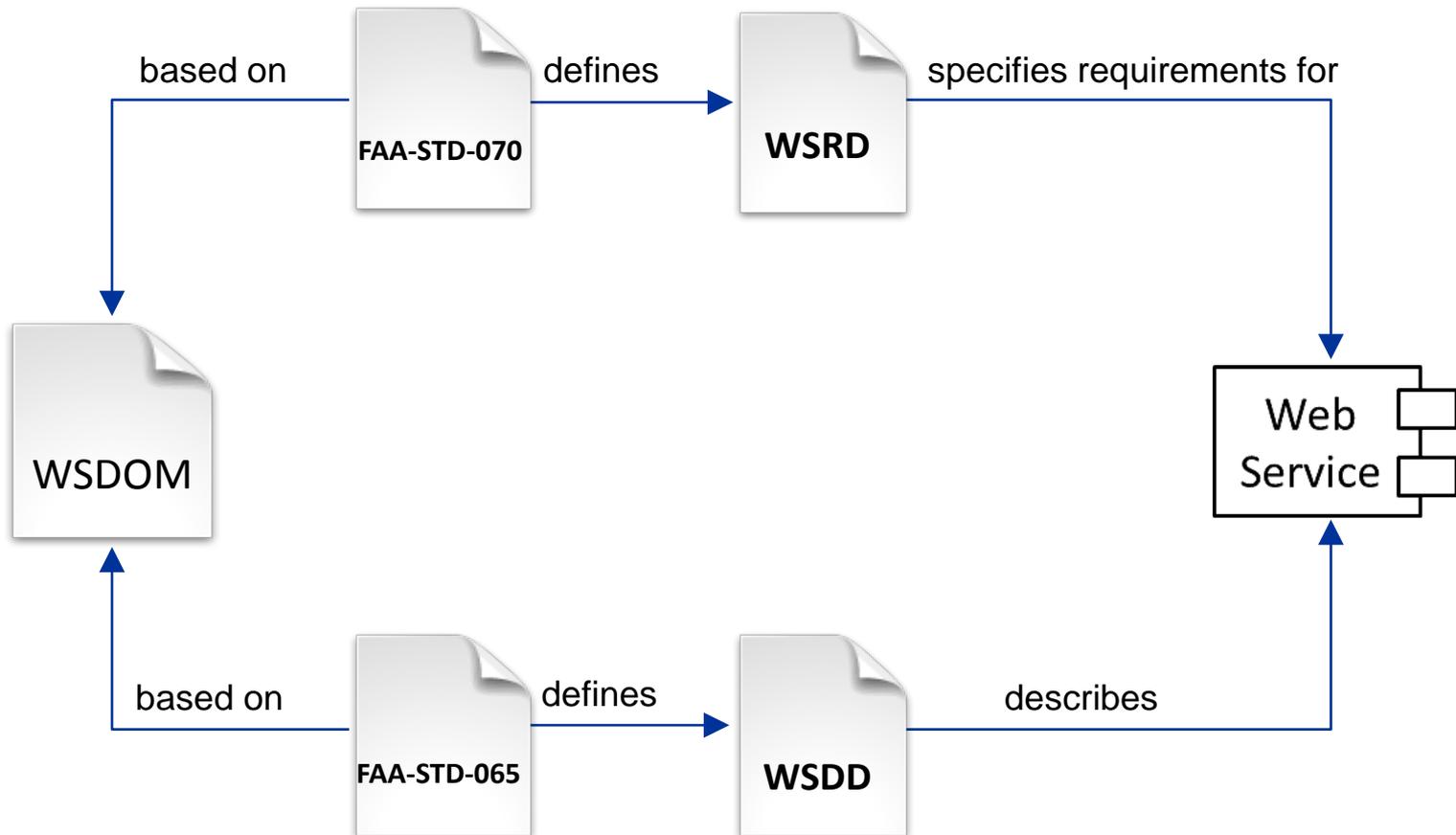
ATO-T Terminal Automation Modernization and Replacement (AJT-1710)

ANG-B NAS Requirements Services (ANG-B1)

AIO IT Enterprise Research and Development (ARD-1)

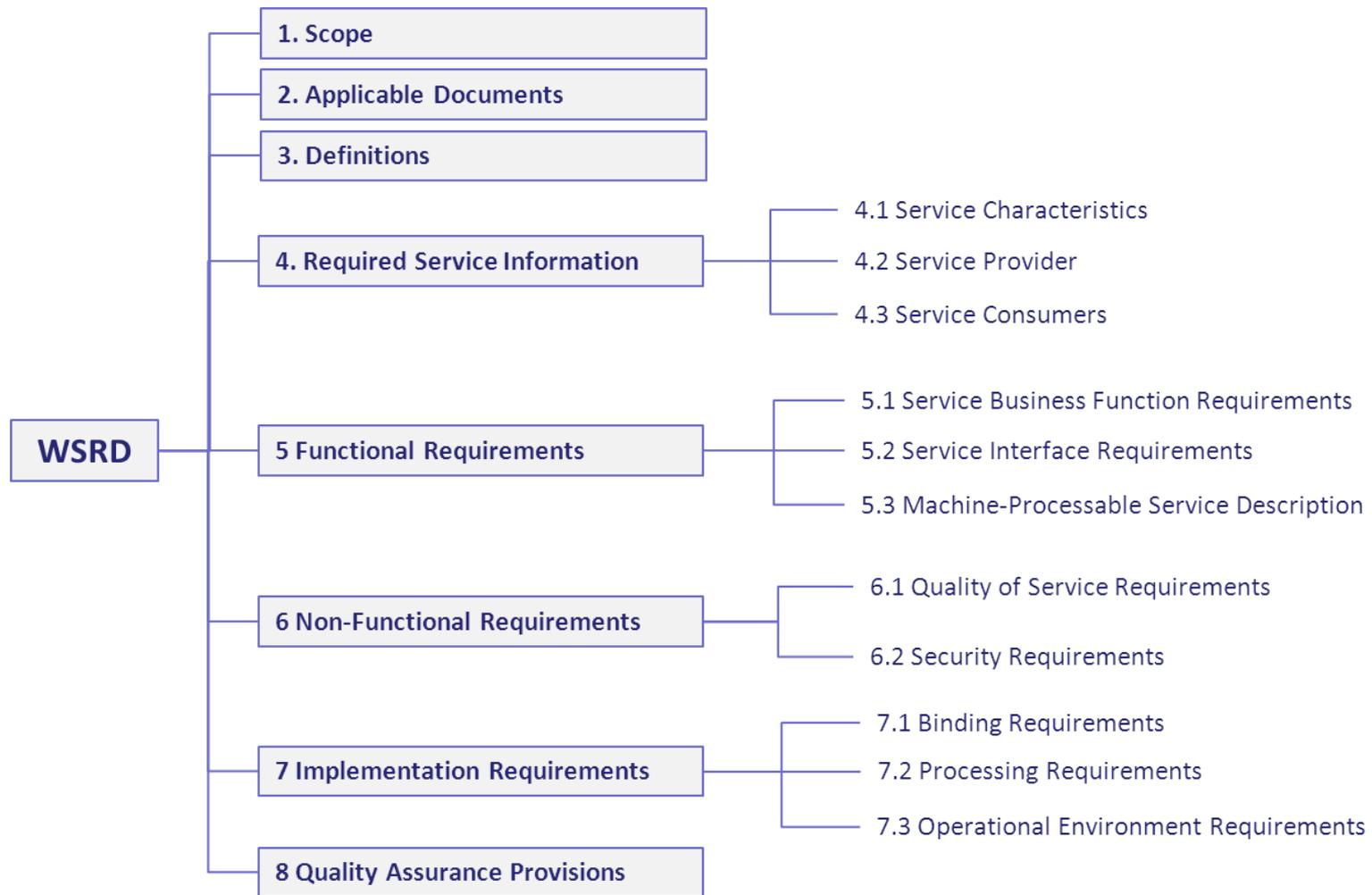
AVS Architecture, Strategy & Planning (AQS-220)

Where WSRD fits in the Web service documentation development cycle



(WSDOM = Web Service Description Ontological Model)

Structure of a WSRD



Section 4 - Required Service Information

- Section 4 of the WSRD provides required information and metadata about the service characteristics, the service provider, and the service consumers
- Section 4 doesn't contain any requirements. It is informative in nature, and its purpose is to help developers and reviewers of the WSRD to have a better understanding of requirements



Section 5 - Functional Requirements

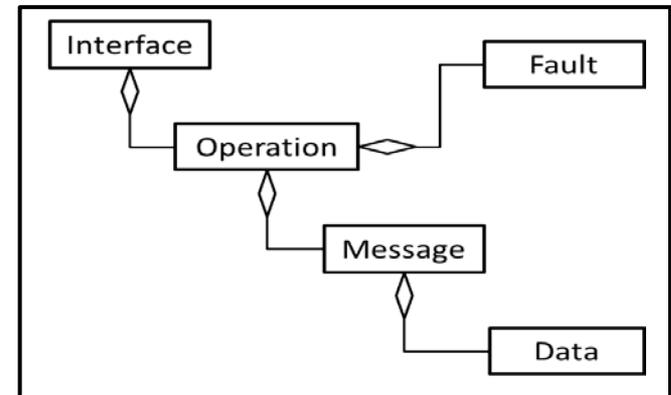


Section 5.1 - Service Business Function Requirements

- This section addresses requirements for the functionality of the service from a business point of view, e.g., a response to a request for information, a change in state of some shared entities, etc.
- These requirements don't deal with the mechanics of interacting with the service, but rather they specify what activities need to happen in order to achieve the service's ultimate purpose
- It is recommended that Service Business Function Requirements reference the requirements established in higher level requirements documents instead of writing (re-writing) new requirements

Section 5.2 - Service Interface Requirements

- FAA-STD-070 follows the abstract model defined by the W3C in the WSDL specification
 - An *interface* groups together operations without any commitment to transport or wire format
 - An *operation* is a sequence of messages related to a single Web service action
 - A *message* is an identifiable collection of units of information (data elements)
 - A *data element* is a unit of data for which the definition, identification, representation and permissible values are specified by means of a set of attributes
 - A *fault* is a message that is returned as a result of an error



Section 5.3 - Machine-Processable Service Description Document

- Web services are self-describing; that is, a service should be presented with an externalized and accessible *service description document* that defines and describes its interface and invocation bindings
- Such a document is rendered via a common XML grammar, and because of this it is usually referred to as "machine-processable" (e.g., a WSDL file, an XML Capabilities document)
- The Machine-Processable Service Description Document is an integral part of a Web service and as such should be created as part of the development of the service

Section 6 – Non-Functional Requirements

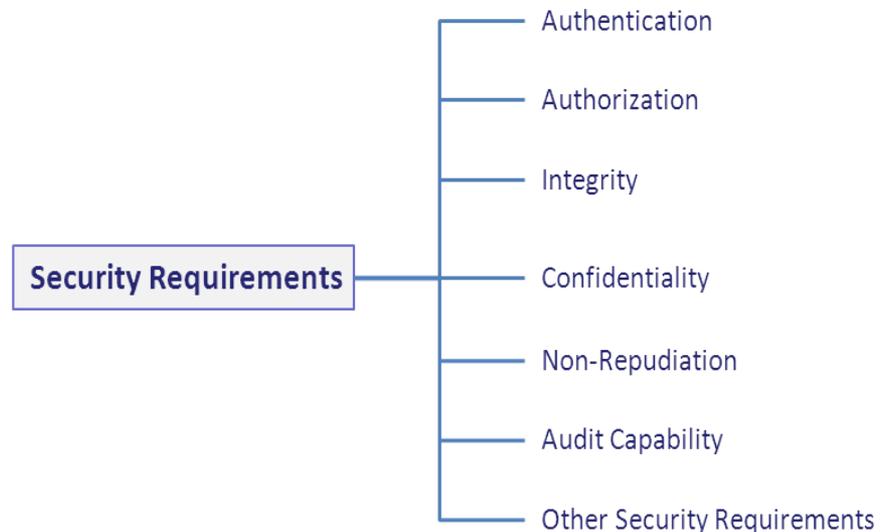


Section 6.1 - Quality of Service Requirements

- FAA-STD-070 requires that all QoS should be documented by specifying each QoS parameter's name, definition, value or range of values, the method to be used to measure or calculate its values, and the units of measure
- FAA-STD-070 contains a comprehensive but not necessarily complete list of QoS parameters that are typical for Web services
- The developers of a WSRD should use QoS defined in FAA-STD-070 or define their own the way it's prescribed in the standard

Section 6.2 - Security Requirements

- Section 6.2 of the WSRD specifies requirements for all security mechanisms that should be established for the Web service
- FAA-STD-070 provides a comprehensive requirements framework for the most commonly recognized security mechanisms implemented in SOA deployments using Web services

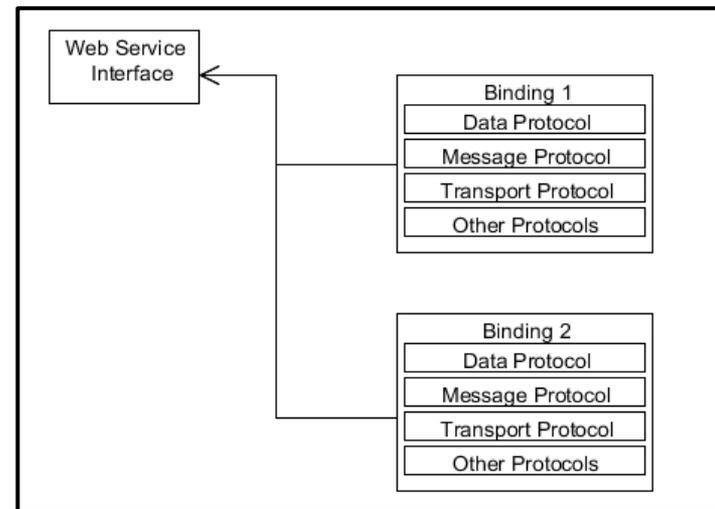


Section 7 - Implementation Requirements



Section 7.1 - Binding Requirements

- A binding is an association between an interface, a concrete protocol and a data format. It specifies the protocols and data formats to be used in transmitting messages defined by the associated interface
- A protocol is a formal set of conventions governing the format and control of interaction among communicating functional units
 - A *data protocol* governs data encoding and coordination for data exchange among SOA components
 - A *message protocol* governs procedure calls and responses among communicating SOA components
 - A *transport protocol* governs message transmission and port handling among communicating SOA components

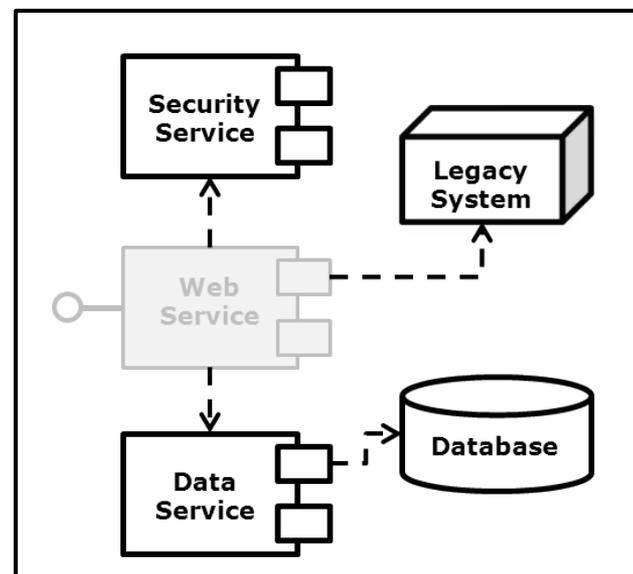


Section 7.2 - Processing Requirements

- The processing requirements section specifies steps or actions which are required to be taken on data that is received as part of a Web service request (input) in order to produce the desired output
- Such actions on data might be (but are not limited to) transformations, calculations, algorithms, unique logic, or business rules; e.g., priority processing requirements, overload handling requirements, or timing limitations

Section 7.3 - Operational Environment Requirements

- A Web service is usually subject to some constraints of its operational environment (i.e., infrastructure established by supporting organizations, other SOA components, enterprise network, etc.)
- The WSRD doesn't impose requirements for other components that constitute the operational environment, but should specify requirements that establish interoperability and conformity with this environment

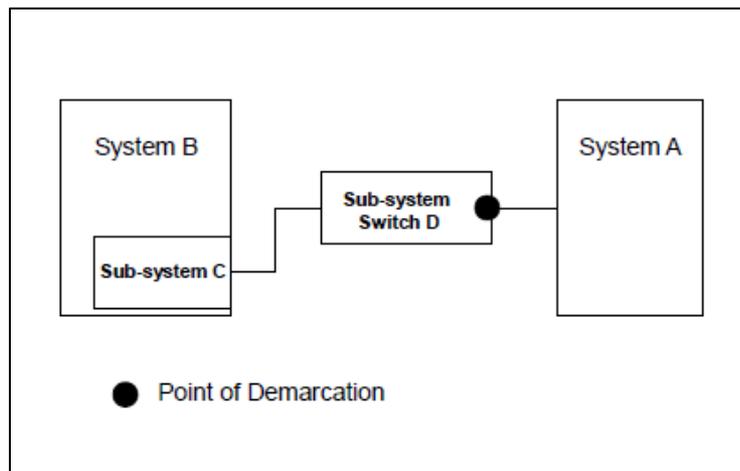




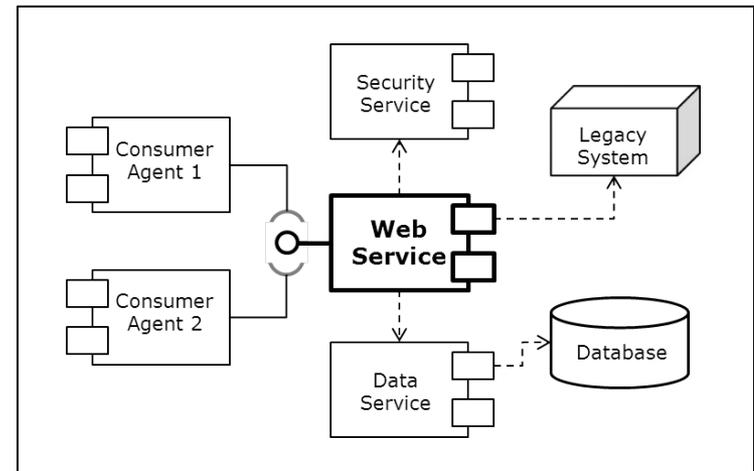
A few things to consider before starting WSRD development

A WSRD is not an “IRD for a Web service”

- Conceptually, IRD and WSRD are different: an IRD specifies requirements for an interface between two or more systems; a WSRD specifies requirements for a single Web service which may interact with various SOA components
- Fitting the IRD context into a WSRD format leads to various conceptual and semantic mismatches

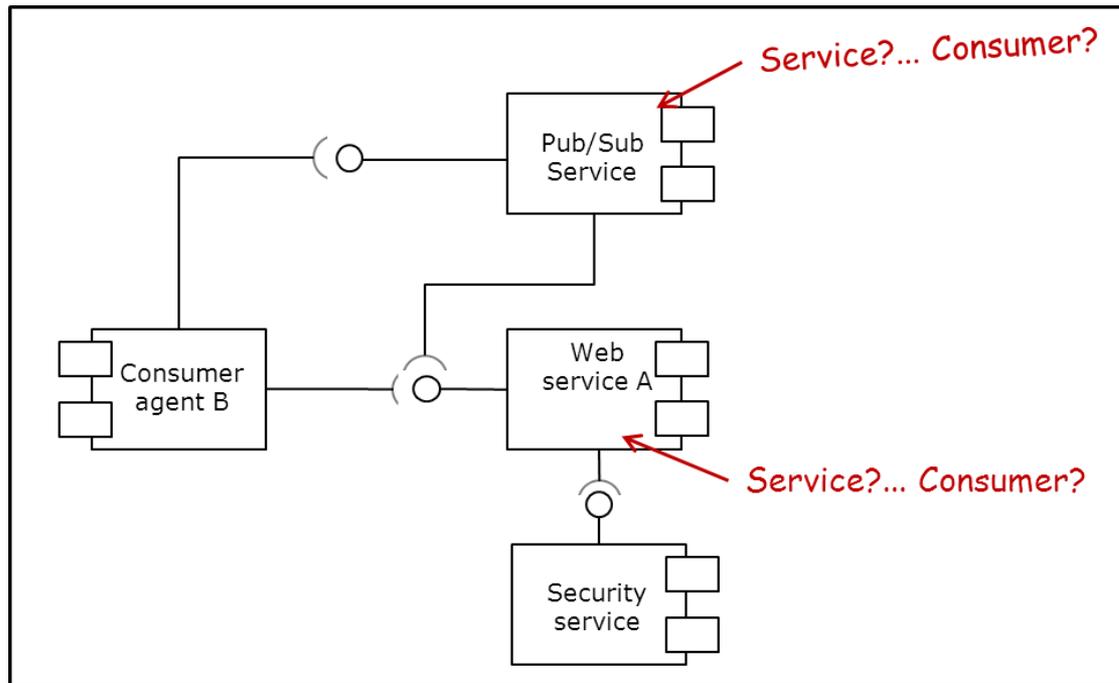


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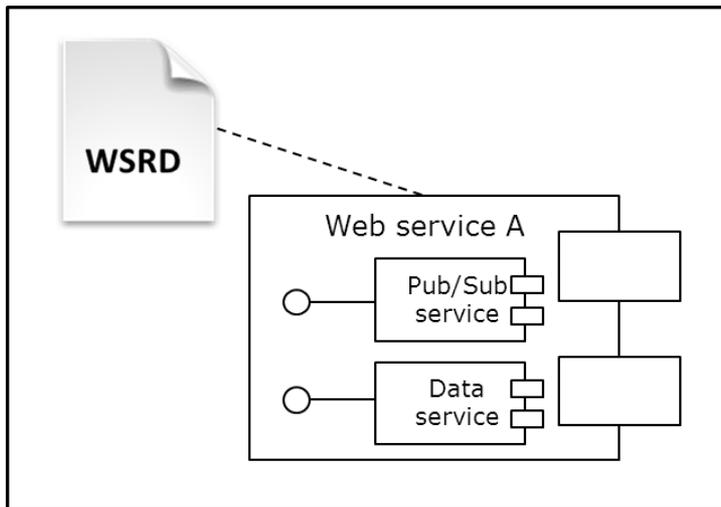
Identify “who is who” in WSRD context

- In a complex SOA-based environment, it is very important – although not always easy – to clearly identify roles for all components involved in an interaction with the Web service, and then document these components accordingly

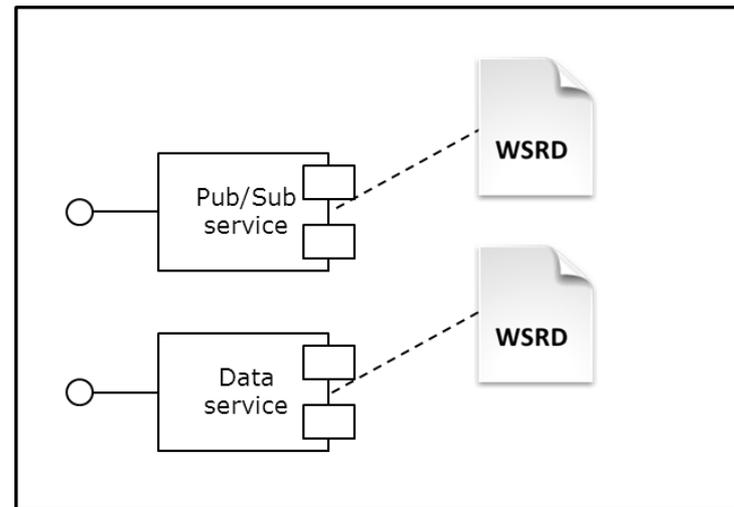


One WSRD for one Web service

- The WSRD was designed as a set of requirements for a single, atomic service
- Writing a single WSRD for multiple services results in a document that's hard to follow and a service that's hard to design



Hard to develop, hard to document



Easier!



For noted errors and/or suggestions about improving
FAA-STD-070 contact Mark Kaplun (mark.kaplun@faa.gov)