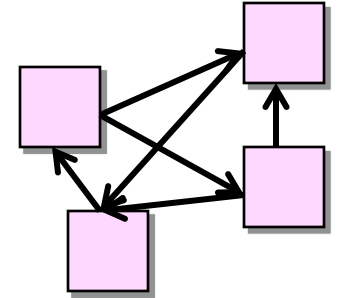


Service Oriented Architectures
Technologies

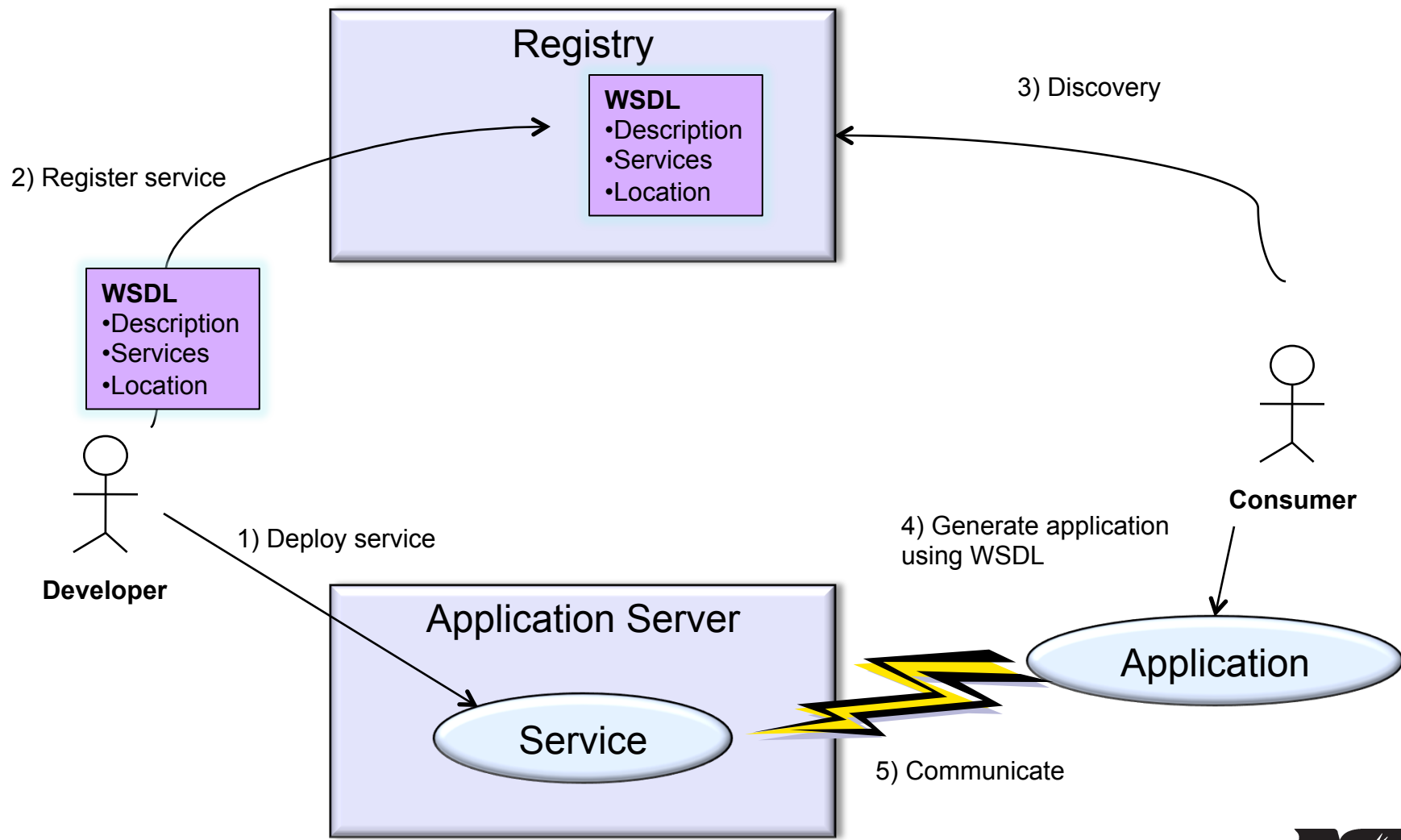
Characteristics of a Good Service

- Provides value to business
 - *Course-grained vs. fine-grained*
- Stateless: service requests not dependent on previous requests
- Discoverable: sufficiently described so it can be discovered and its intended purpose understood
- Composable: Can be assembled into larger services (e.g., a composite service, an orchestration, or a web application)
- Provides an interface that fully describes its services
- Loosely coupled and can be used with no dependencies
- Separate interface from the implementation (end-point)



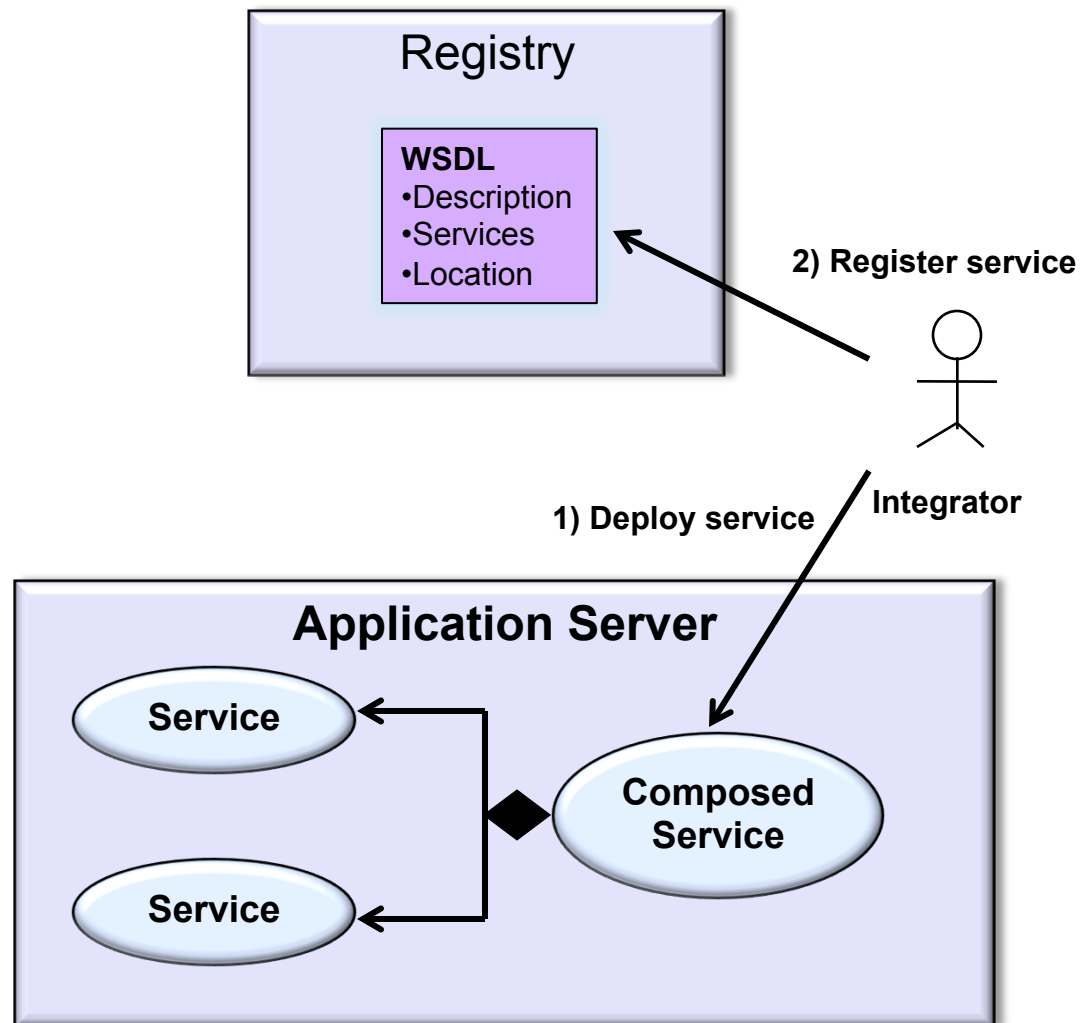
WEB SERVICES BIG PICTURE

Web Service Big Picture



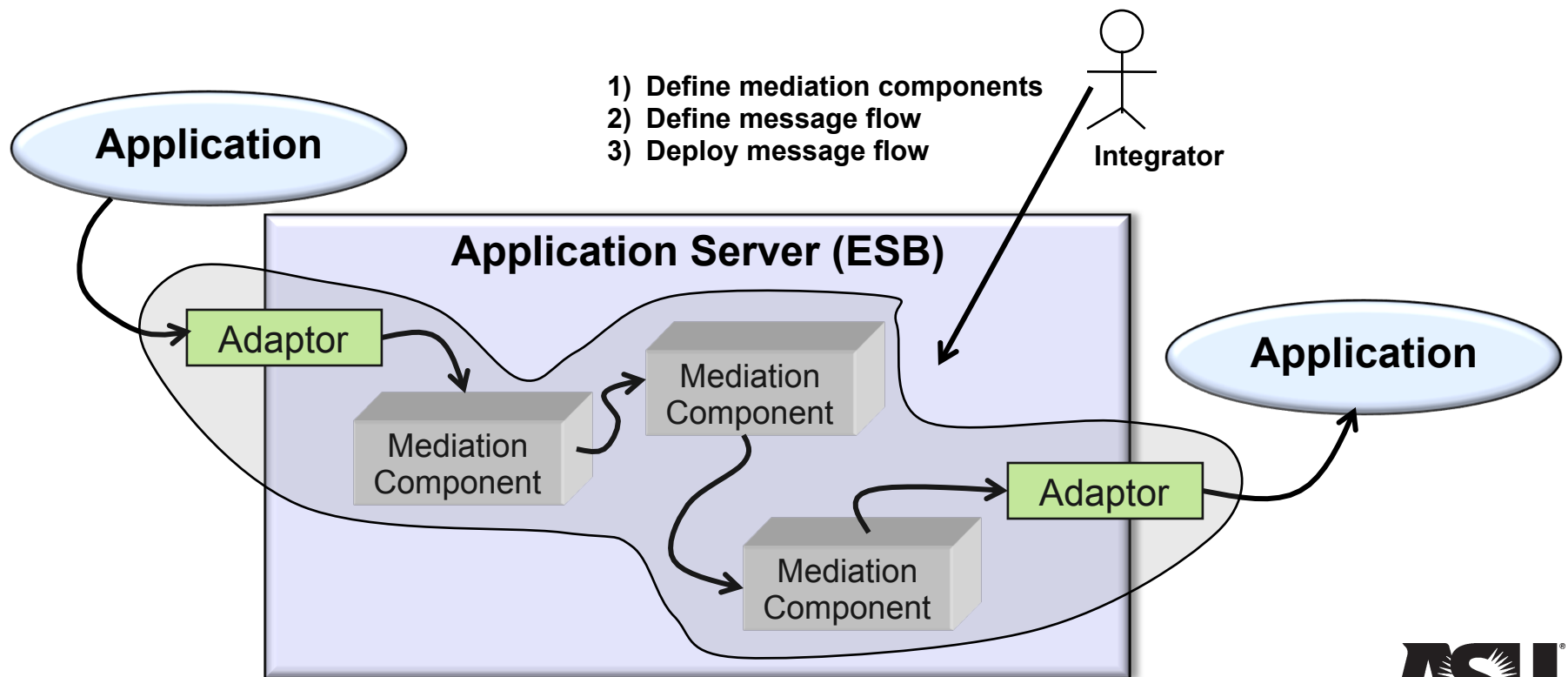
Web Services Bigger Picture (Service Composition)

- Deploy a composite service
- Service built from existing services
- Clients continue to use WSDL to invoke service
 - Doesn't know (nor care) if it invokes a composite service



Web Services Bigger Picture (Service Mediation)

- Application integration with touching the application
- Mediation components can augment message, restructuring data, adding data, and/or routing message



WEB SERVICES SPECIFICATIONS

Web Service Specifications

- Standards providing features for web services
- Services are Composable
 - Some work in isolation but most are combined with other services to provide a rich web service environment
 - Applications can incrementally add new services without effecting other participants
- Specified by W3C and OASIS
 - World Wide Web Consortium - <http://www.w3c.org>
 - Organization for the Advancement of Structured Information Standards - <http://www.oasis-open.org>

BPEL4WS, Management	Enterprise
WS-Security, WS-Reliable Messaging, WS-Policy, WS-Coordination, WS-Transactions	Quality of Service
XSD*, WSDL, UDDI, WSIL	Description/Discovery
XML*, SOAP, WS-Addressing	Messaging
HTTP*, HTTPS*, SMTP*, JMS*, ...	Transports

* non-WS specifications

Example WS Service Specifications

WS-Addressing	How to send message between endpoints, removing it from the transport protocol (e.g. http URI). Can send request and receive response of any transport (e.g. messaging, email).
WS-Security	Provides message integrity, confidentiality, and authentication.
WS-ReliableMessaging	Reliable message delivery in presence of system and network failures.
WS-Policy	Describes the communication policies of a web service.
WS-Trust	Establishes trust relationships through security tokens and credentials (password authentication)
WS-MetadataExchange	Describe what other endpoints need to know to interact with them (includes WSDL, WS-Policy, XML Schema)
WS-Federation	allow different security realms to federate by allowing and brokering trust of identities, attributes, authentication between Web services (includes WS-MEX)
...	

<https://www.innoq.com/resources/ws-standards-poster/> - see how busy that diagram is, and it is over a decade old now! More have been added, though standards work has slowed down

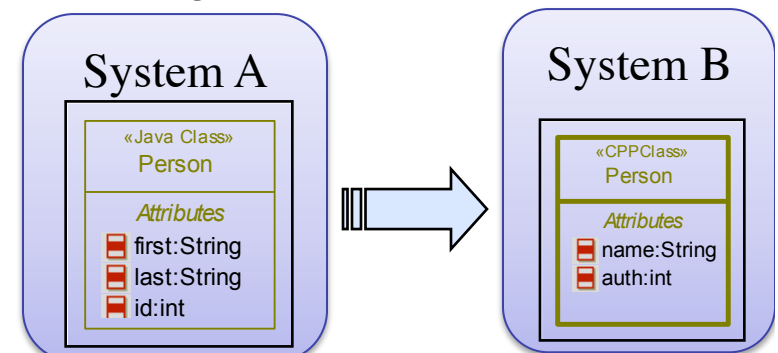
**SELECTED WEB SERVICES
STANDARDS AND VALUE-ADD**

Messaging Services

- Facilities for message senders & receivers to communicate
- Messages *normalized* to common format (commonly XML)
- Supports multiple models
 - Peer – message sent from source to destination
 - Publish-subscribe – messages sent to all subscribers
- Standards – WS-Notification, WS-ReliableMessaging

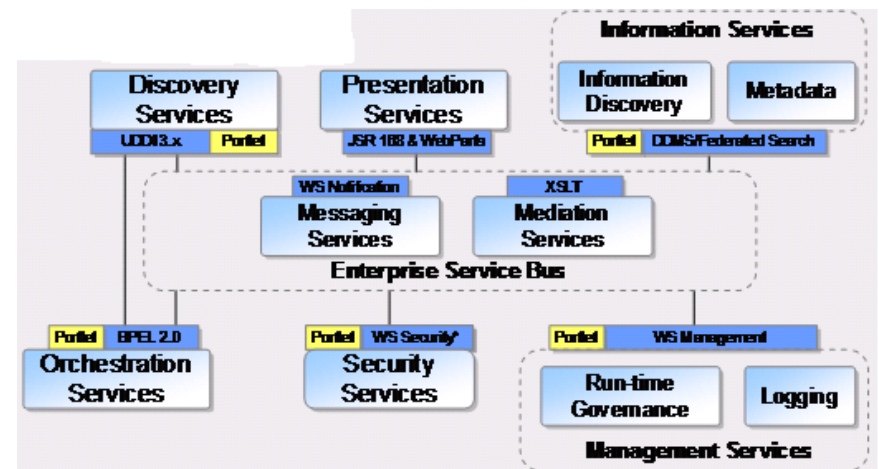
Mediation Services

- Provides data transformation and protocol adaptation
 - Mediation modifies message during delivery
 - Routing: determine message path at run-time based on message/system state
 - Transformation – restructure and/or add content to message
- Applicable standards – XML, XSLT
 - Mediation logic typically vendor-dependent



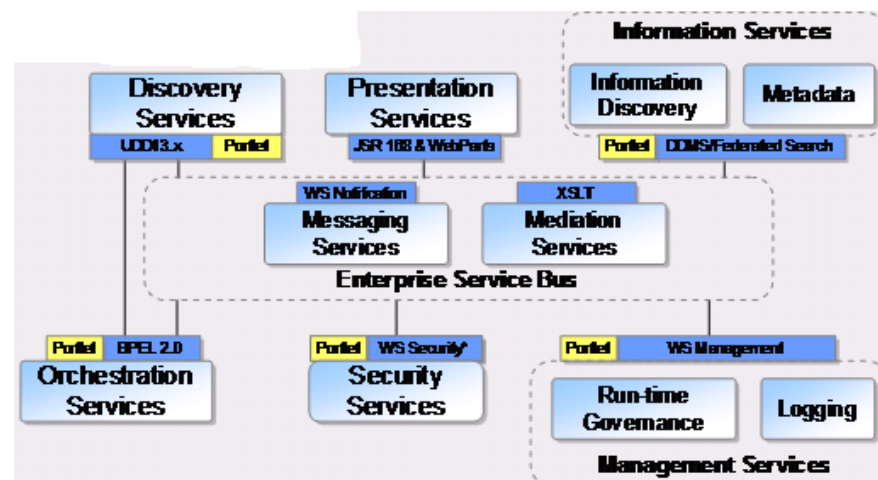
Security Services

- Provides
 - Identity management
 - Authentication
 - Authorization
 - Confidentiality
 - Security policy enforcement
- Applicable standards
 - LDAP
 - WS-Security, WS-Federation, WS-Policy, SAML



Management Services

- Monitor, enforce, and manage service policies
 - Monitor: monitor service activities and collect metrics
 - Enforce: ensure policy rules and report deviations
 - Manage: declare services configuration and policy rules; act on reported policy deviations
- Applicable standards
 - WS-Management, WS-Policy, Common Information Model (CIM)



Information Services : Metadata/Discovery

- Describes and discover data and other types of resources
 - Structural: structure of data or resource
 - XML files, XSD files, WSDL files, database schemas, etc.
 - Typically stored in Metadata Registry or Service Repository
 - Resource: Describe data item (an instance of metadata)
 - Typically stored in a Metadata Catalog, Service Registry and/or Service Repository
 - Standards – UDDI, ebXML,
- Search engines enable metadata-based discovery
- Information Services process
 1. Metadata specification (define business vocabularies)
 2. Service and data published (producer)
 3. Search and discovery
 4. Present to user

