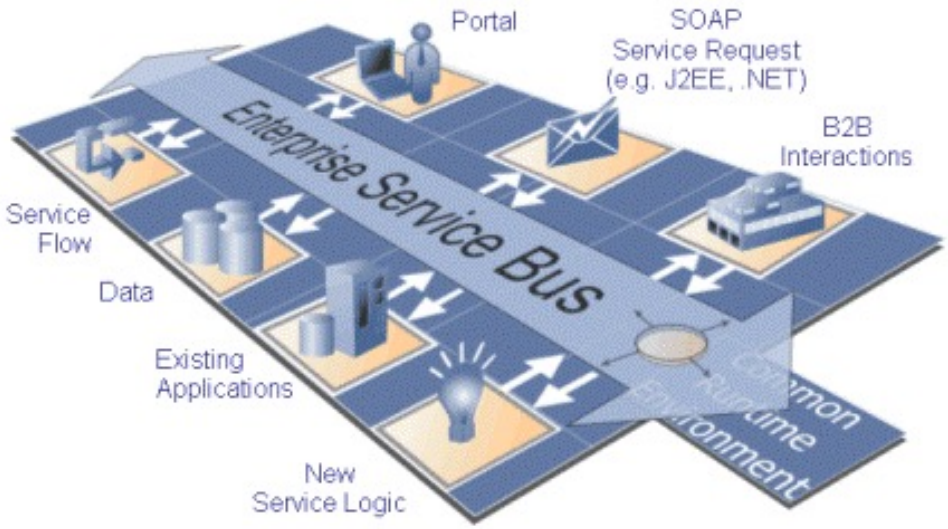
Enterprise Service Bus

Diogo Gomes dgomes@ua.pt

ESB ?

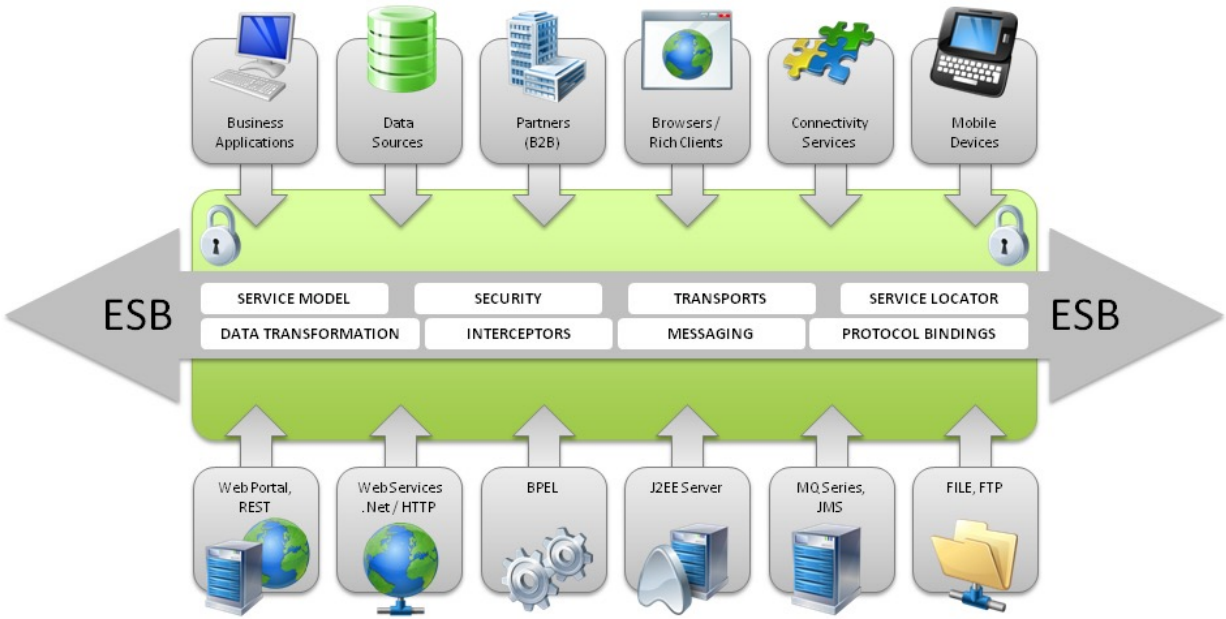


- An Enterprise Service Bus (ESB) is a software architecture for a middleware that provides fundamental services for more complex architectures.
- ESB can be used to implement SOA architectures
- ESB manages access to applications and services to present a single, simple, and consistent interface to end-users/services

Functionalities

- Distributes information across an enterprise quickly and easily.
- Masks differences among underlying platforms, software architectures, and network protocols.
- Ensures information delivery even when some systems or networks may go off-line.
- Re-routes, logs, and enriches information without requiring applications to be rewritten.
- Provide incremental solution implementations so all enterprise services and applications do not need to be changed immediately or all at once.

ESB Architecture



Capabilities

- Routing
  - The ability to channel a request to a particular service provider based on deterministic or variable criteria.
  - Types of routing to consider:
    - Static or deterministic Routing
    - Content-based Routing
    - Policy-based Routing
    - Complex Rules-based Routing
- Message Transformation
  - The ability to convert the structure and format of the incoming business service request to the structure and format expected by the service provider

Capabilities

- Message Enhancement
- Protocol Transformation
- Service Mapping
- Message Processing
- Process Choreography
- Service Orchestration
- Transaction Management
- Security

Capabilities

- Message Enhancement
  - The ability to add or modify the information contained in the message as required by the service provider.
  - Types of Message Enhancement:
    - Date format conversion
    - Supplement data not included in original message
    - Data conversion(i.e. spaces to zero)
    - Rules-based enhancement

Capabilities

- Protocol Transformation
  - The ability to accept one type of protocol from the consumer as input (i.e. SOAP/JMS) and communicate to the service provider through a different protocol (i.e. IIOP)
  - A form of message transformation concerned with the message structure, not the message payload.
  - Has both physical connection attributes as well as logical connectivity attributes
  - Examples:
    - SOAP/JMS ▫ IIOP
    - XML/HTTP ▫ CICSMQ
    - XML/HTTP ▫ RMI/IIOP

Capabilities

- Service Mapping
  - The ability to translate a business service into the corresponding service implementation and provide binding and location information
  - Could be implemented through XML, a database, or embedded within the Mediator ESB component
  - Usually contains the following core information
    - Implementation Service Name
    - Service Protocol and binding information
    - Protocol specific info (i.e. timeouts, failover location)
    - Service-specific routing information
- Message Processing
  - The ability to manage state and perform request management by accepting an input request and ensuring delivery back to the client via message synchronization

Capabilities

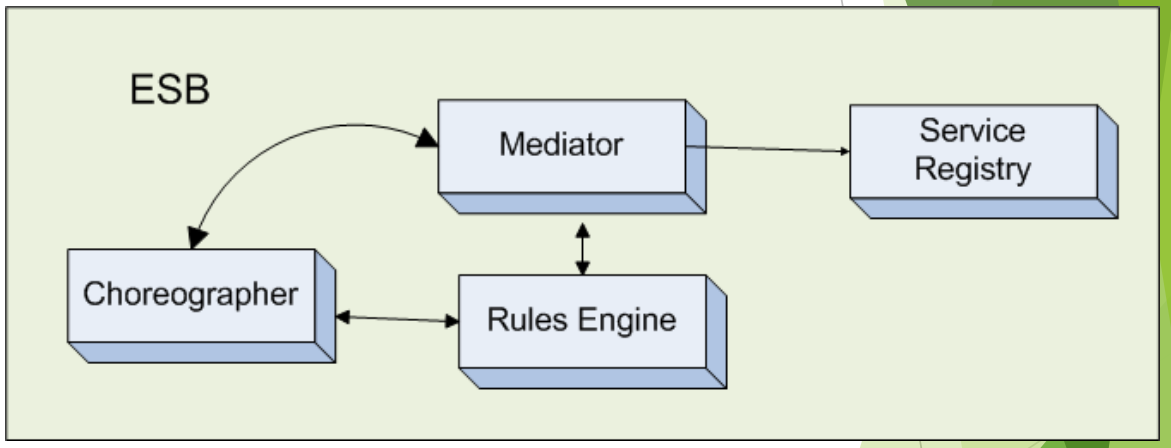
- Process Choreography
  - The ability to manage complex business process that requires the coordination of multiple business service to fulfill a single business service request
- Service Orchestration
  - The ability to manage the coordination of multiple implementation services
- Transaction Management
  - The ability to provide a single unit of work for a business service request by providing a framework for the co-ordination of multiple resources across multiple disparate services

Capabilities

- Security
  - The ability to protect enterprise services from unauthorized access
  - In SOA there are no more silos; services become visible to the entire enterprise through ESB
  - ESB should provide A4C mechanisms
    - Authentication, Authorization, Auditing, Accounting, Charging
  - ESB should access a security manager or authentication and authorization rather than have the direct responsibility

Components

- An ESB can be broken down into the following components
  - Mediator
  - Service Registry
  - Choreographer
  - Rules Engine



Mediator

- Routing
- Communication
- Message Transformation
- Message Enhancement
- Protocol Transformation
- Message Processing
- Error Handling
- Service Orchestration
- Transaction Management
- Security

Service Registry

- Service Catalog
- Provides Service Mapping
- Enables Service Discovery
- UDDI (Universal Description, Discovery and Integration)

Choreography

- Message Processing
- Process Choreography
- Transaction Management
- Security

Rules Engine

- Routing
- Message Transformation
- Message Enhancement