What is an Enterprise Service Bus (ESB)?

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Integration of highly dispersed application functionalities across organizations and networks is often done in a loosely coupled manner. What can help us design and ensure the adhesion of these dispersed technologies of application functionality?

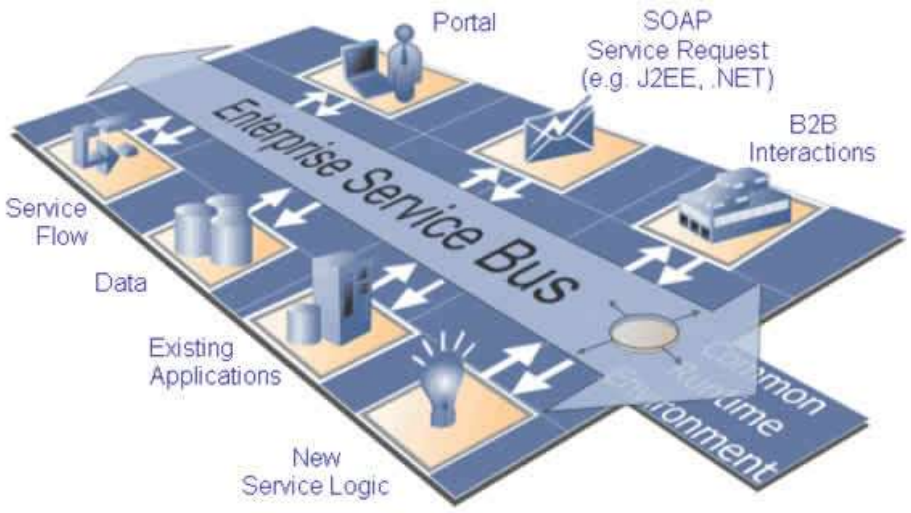

Figure 1: The Enterprise Service Bus. [1]

Enterprise Service Bus (ESB) is a standards-based integration platform combining messaging, web services, data transformation, and intelligent routing to reliably connect and coordinate the interaction of significant numbers of diverse applications across an organization and its business partners while maintaining transactional integrity. It draws traits from Service Oriented Architecture (SOA), Enterprise Application Integration (EAI), Business-to-Business (B2B), and web services. [2] Today, many applications can be under the control of a single organization, but are separated by geography, network boundary devices (i.e., routers and firewalls), and other security mechanisms cross companies.

ESB has been defined as an architectural model, a single software product, and in other cases, as a group of software products. Regardless, it can be viewed as a platform for which web application services are implemented while separating the services from the transport

mediums. [3] Globalization of business has led to the same for organizational networks and applications.

Interoperability of enterprise applications across global resources has led to the embrace of multiple standards and implementing them in middleware leading us to the ESB. This middleware is often based on technologies such as XML, SOAP, UDDI, MOM, and their protection mechanisms such as SAML assertions, XML Encryption, XML Firewalls, and WS-Security (as described in Chapter 11 of our Distributed Systems Security text book). [4]

Microsoft's ESB guidance stresses, "… ESB is only one of many building blocks that make up a comprehensive Service-Oriented Infrastructure (SOI)." They recommend thinking of ESB as, "a collection of architectural patterns based on traditional enterprise application integration (EAI), message-oriented middleware, Web services, .NET and Java interoperability, host system integration, and interoperability with service registries and asset repositories." [5]

ESB is a central component of Service-Oriented Architectures (SOA). In short, it's a platform for defining service routing, messaging, service interfacing, protocols and technologies (i.e., HTTPS) allowing for network application service interactions and assists with technology integration (e.g., databases, legacy apps, service mapping, and language specific service invocations. It can be a foundation for security implementation as mentioned earlier and help with data validation, authentication, and authorization. These technologies can be implemented through middleware COTS/GOTS or open standards. [6]

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1. image: www.jot.fm/issues/issue_2004_09/column5/
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