Real World Integration Challenges and Enterprise Service Bus (ESB)

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Software Integration

Software integration means to assemble the existing applications and data sources to fulfill the growing requirements of an enterprise.

Also known as:
Enterprise Application Integration (EAI)
Benefits of Software Integration

✓ Cost saving
✓ Time saving
✓ Rapid adaptation to new changes
✓ Better customer and self service
Integration Patterns

Peer-to-Peer
Integration Patterns

Client-Server / Hub ‘n Spoke
Integration Patterns

Pipeline
Integration Patterns
Service Oriented Architecture (SOA)

SOA is an *enterprise-scale* architecture for linking resources on demand. A resource, also known as *service*, is the primary structuring element and building block in SOA.
Service Oriented Architecture (SOA)

Services are discrete sets of functionality that are *loosely coupled* but can be used together in order to fulfill a business need.
Service Oriented Architecture (SOA)
Service Oriented Architecture (SOA)

- Cash Withdrawal Service
- Withdraw Cash
- Check Balance
- Update Balance

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Service Oriented Architecture (SOA)

- Check Balance
- Withdraw Cash
- Update Balance
- Cash Withdrawal Service
Enterprise Service Bus (ESB)

An Enterprise Service Bus (ESB) is a middleware that connects different applications and/or services together and allows them to communicate with each other.
Enterprise Service Bus (ESB)
Enterprise Service Bus (ESB)

Key features:

✓ Intelligent Routing
✓ Reliable Messaging
✓ Data Transformation
Mule ESB

Mule ESB is a lightweight Java-based ESB and integration platform that allows developers to connect applications together quickly and easily, enabling them to exchange data.
Mule ESB

Mule ESB enables *easy integration* of *existing systems*, regardless of the different technologies that the applications use, including JMS, Web Services, JDBC, HTTP, and more.
Why Mule?
Mule ESB

Reasons to use Mule ESB:

✓ Open Source
✓ Platform Independent
✓ Service Hosting/Creation
✓ Service Mediation
✓ Multi-protocol support
Mule ESB

Reasons to use Mule ESB:

✓ Transparent
✓ Vendor-neutral
✓ API independent
✓ Supports POJO (Plain Old Java Object)
✓ Multiple Topologies
Mule ESB

Mule transports/connectors

Mule integration services
- Routing
- Transaction management
- Transformation
- Message broker
- Transportation management
- Security

App container (optional)
- Tomcat
- Weblogic
- WebSphere
- JBoss
- Jetty
- Geronimo
Mule ESB

Endpoints
Mule Configuration

XML File

Model

Service

Inbound

Transformer

Component

Transformer

Outbound
Mule Example

A Basic Example:

- **Inbound**: Standard Input Console
- **Outbound**: Standard Output Console
- **Component**: POJO
- **Connector**
Mule Example
Mule Example
Mule Example

- Standard I/O Console
- POJO
- Web Services SOAP/Http

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Mule ESB

Customer Inputs:

- **String** Name;
- **Long** CNIC;
- **Double** Amount;
- **Int** Duration_In_Months;

```
Somename,123456,15000,5
```
Mule ESB

Loan Broker Input:

<table>
<thead>
<tr>
<th>LoanQuoteRequest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name : String</td>
</tr>
<tr>
<td>CNIC : Long</td>
</tr>
<tr>
<td>Amount : Double</td>
</tr>
<tr>
<td>Duration : Integer</td>
</tr>
<tr>
<td>AgencyResponse : String</td>
</tr>
</tbody>
</table>

Loan Broker Output:

Bank-1 has the lowest quote of 4.4%
Mule ESB

Bank’s Input

**CNIC** : **Amount** : **Duration** : **AgencyResponse**

123456789:15000:2:“Eligible”

Bank’s Output

0.442354
Mule Example

Loan Broker

Standard I/O Console

POJO

Web Services SOAP/Http

FTP

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## References

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Questions?
Thank you!