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# MULE ESB

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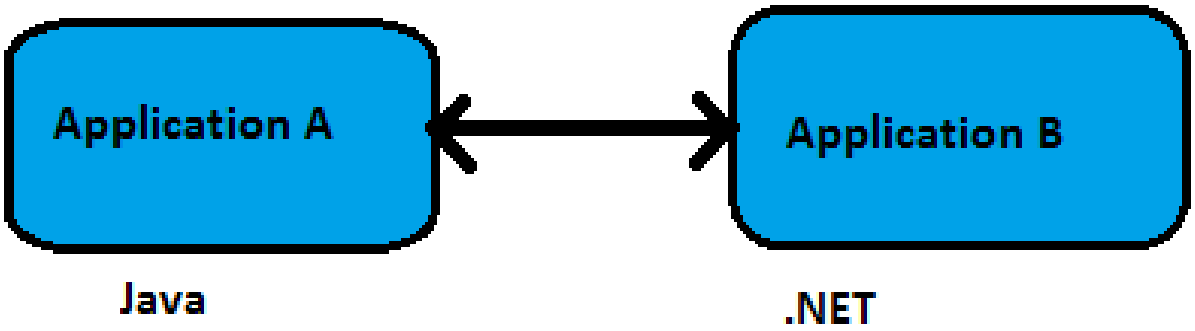
# Agenda

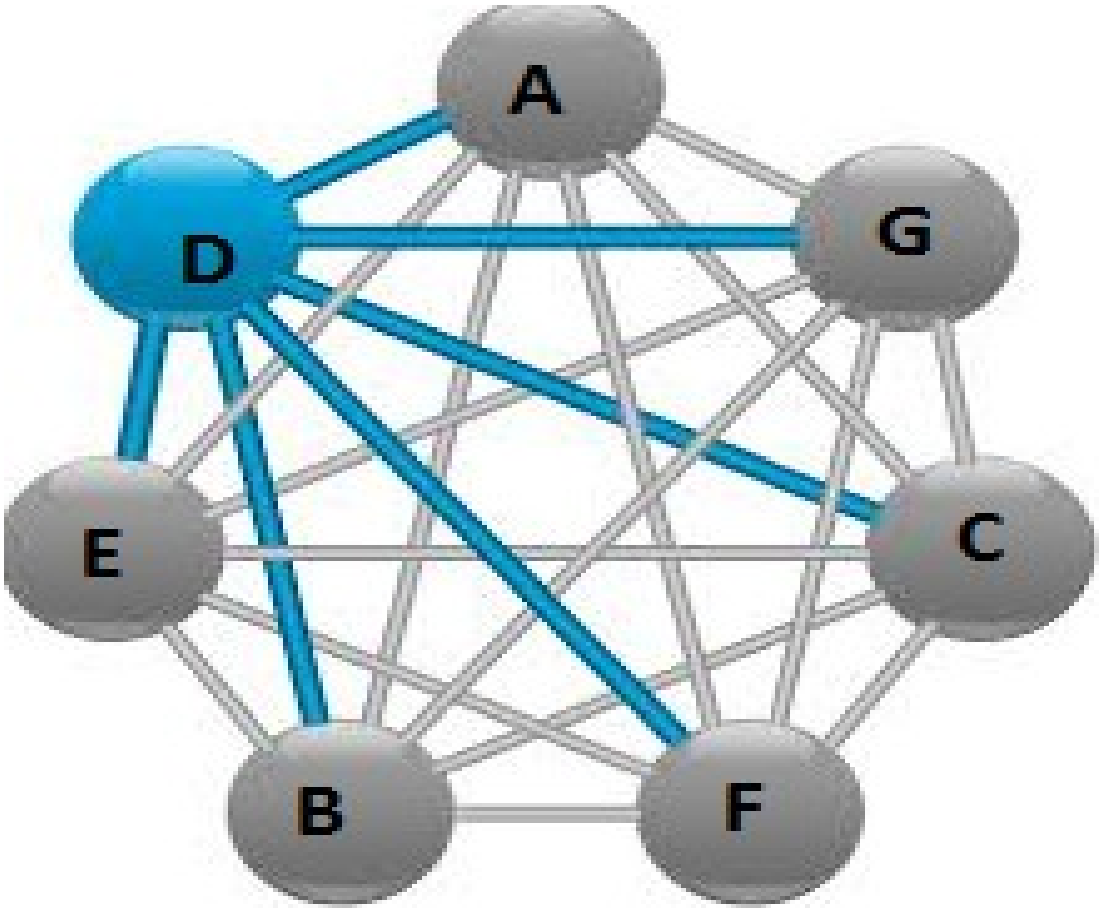
- What is Integration?
- What is ESB?and Why?
- ESB in SOA
- When to use ESB and When Not to use?
- Why Mule ESB?
- Mule Flow
- Mule Message
- Mule Studio Building Blocks
- Mule Management Console(MMC)
- DEMO

# Integration

# Integrate Two Applications



# Integrate More Applications Using Point to Point Connection



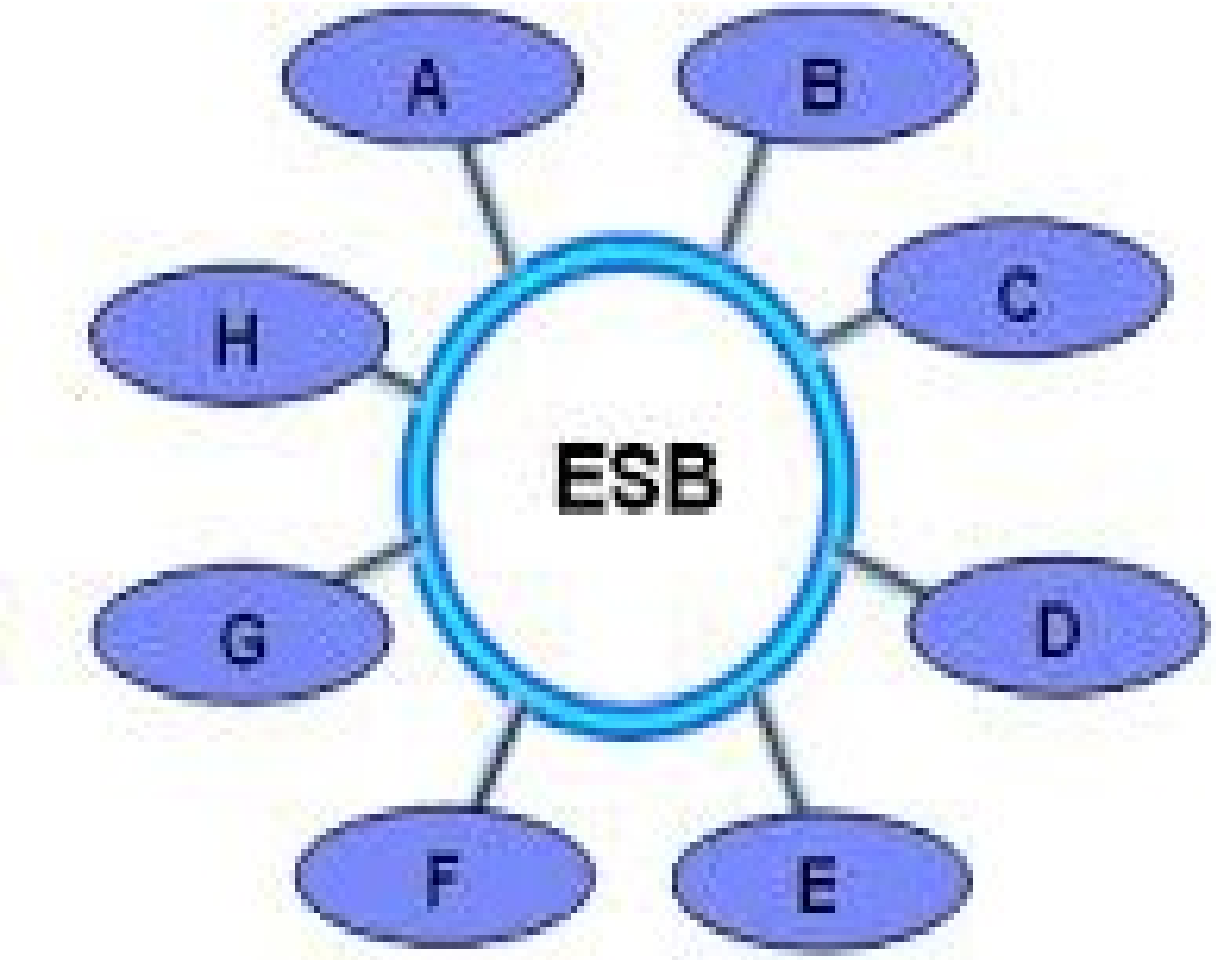
# Problems in Point to Point Integration

- Change in Message Producer's **Endpoint URL** will affect the message consumers which are accessing it.
- If Message Producers and consumers are Exposed by different **Protocols**,they cant interact.
- If **Message type** of two applications are differs.
- Doesn't scale
- Single Points Of Failure
- Happens more at application to application level,may not be aligned properly with business goals
- **Tightly Coupled** connections between components.

# Enterprise Service Bus what and why?

# Integrate more Applications Using ESB

ESB used to eliminate drawbacks of P2P integration



# Common Integration Requirements

- Adapters
- Transformation
- Routing
- Filtering

# Enterprise Service Bus

- An enterprise service bus (ESB) is a software architecture for middleware that provides fundamental services for more complex architectures.

- Large IT organizations increasingly face the challenge of integrating various web services, applications, and other technologies into a single network.

- The ESB pattern enables the connection of software running in parallel on different platforms, written in different programming languages and using different programming models.

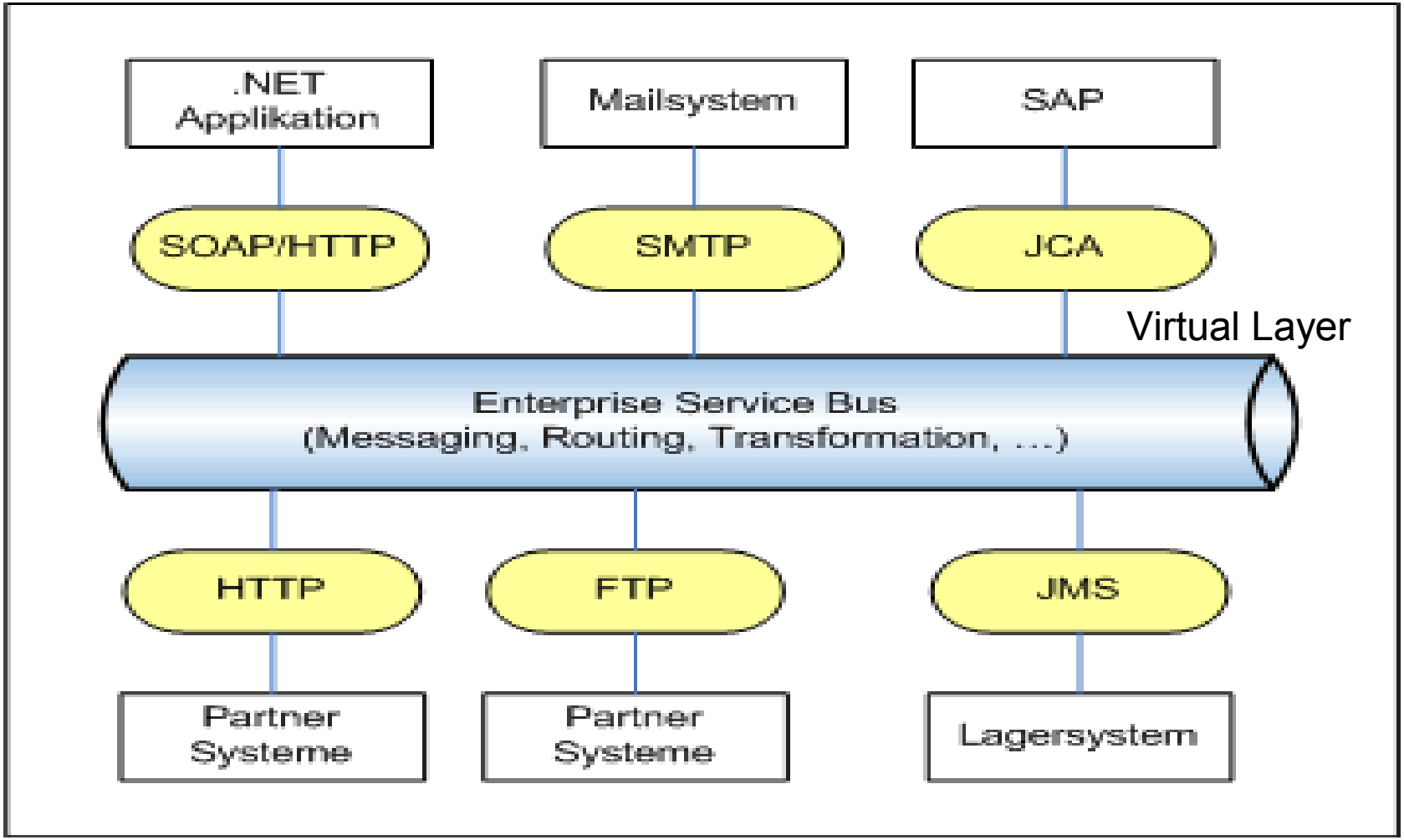
- Mediator VS ESB

- One advantage of connecting clients and services via an enterprise service bus is that clients need only look for services in a single location.
Lot of Design patterns in ESB.

# ESB in SOA Architecture

# Enterprise Service Bus

Service consumers




Service Providers

# When to Use ESB and When Not to Use?

# NOT TO ESB

- I'm Only Using Web services.
- I just Need FTP and a file transfer only.
- We need access to a message queue.
- We need only Two Integration Points.
- Web services frameworks are very good at handling HTTP and SOAP

What are the different ESBs in Market?

# Enterprise Service Bus

- ESB is an architecture, not a Product.
- Choose the Right ESB for Your Integration Needs.

**Commercial ESB**

- **Software AG Web methods**
- **TIBCO AM Service bus**
- **Oracle Enterprise service Bus**
- **Progress Software FUSE ESB**
- **IBM Web sphere ESB**

**Open Source ESB**

- **Mule Soft Mule ESB**
- **WSO2 ESB**
- **Apache Service Mix**
- **Apache Camel**
- **JBOSS ESB**
- **Open ESB**

# Why MULE ESB?

**Founder**
Ross Mason,2006

# MULE ESB

- The world's most used enterprise service bus. With over 3,200 production deployments in mission-critical environments and an active road map for future development and support.

- Mule ESB takes the complexity out of integration, enabling developers to easily build high-performance, secure, multi-protocol interactions between heterogeneous systems and services.

    - It´s Open

    - It´s Light and it´s Fast:

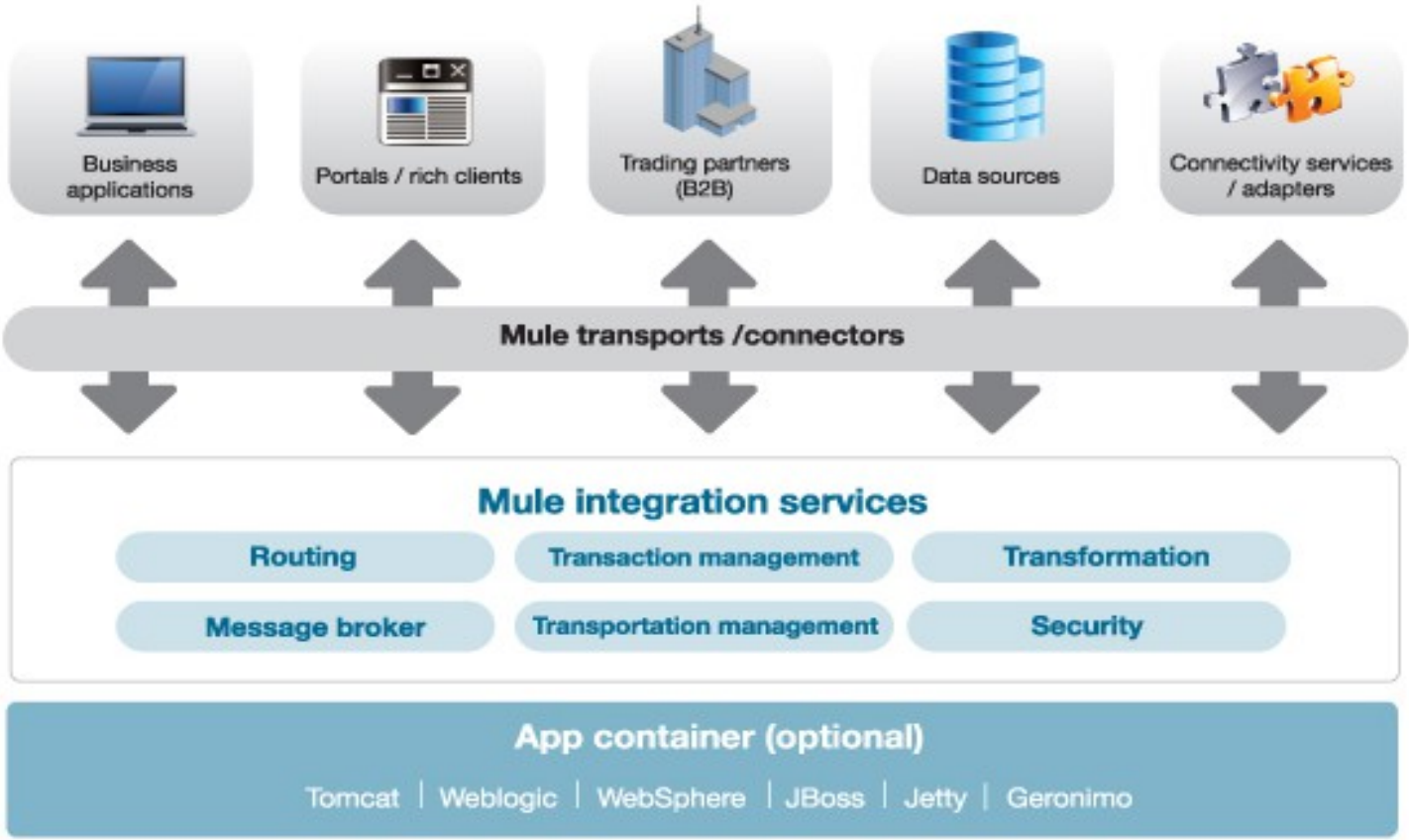
    - It´s Developer friendly:

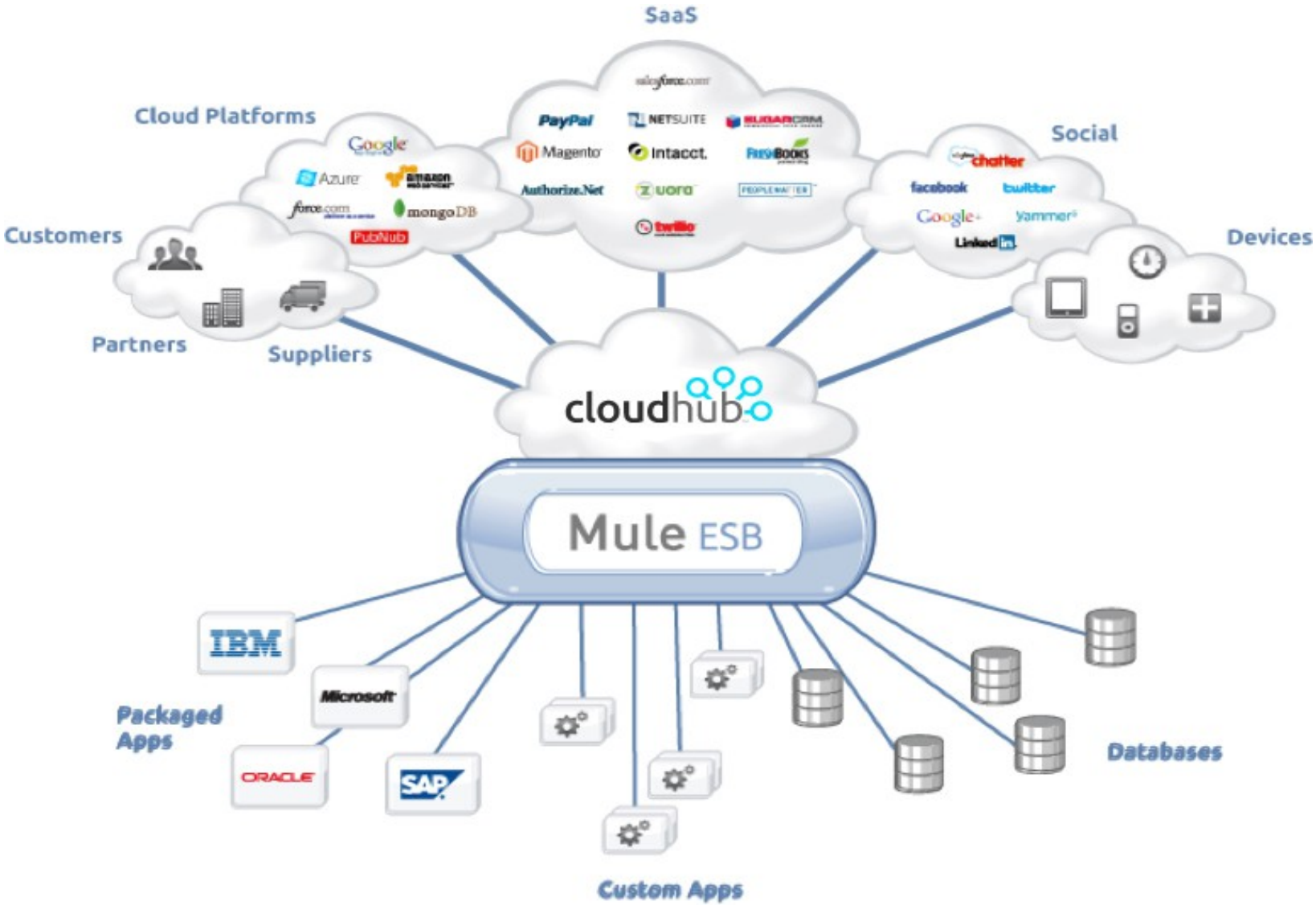
    - It´s Cloud ready:

# MULE ESB

- Mule has been designed to provide a simple, powerful model of wiring POJO (Plain Old Java Object) services together using endpoints
- Mule is a messaging platform.
- Ease of use – services can be configured easily in one configuration file
- The heart of the system, the messaging bus, is what routes messages between endpoints.
- Extensive data transformations out of the box
- Small footprint: memory and disk, no application server required
- These endpoints provide a simple and consistent interface to vastly disparate technologies such as JMS, SMTP, JDBC, TCP, HTTP,IMAP,JMS, FILE,FTP,JMS etc.
- Mule allows us to quickly develop components and then change the way they behave through configuration instead of coding.
- Through Mule ESB we can integrate third party application like LinkedIn, Twitter, Facebook and we can expose and consume web services also.(SOAP & REST)

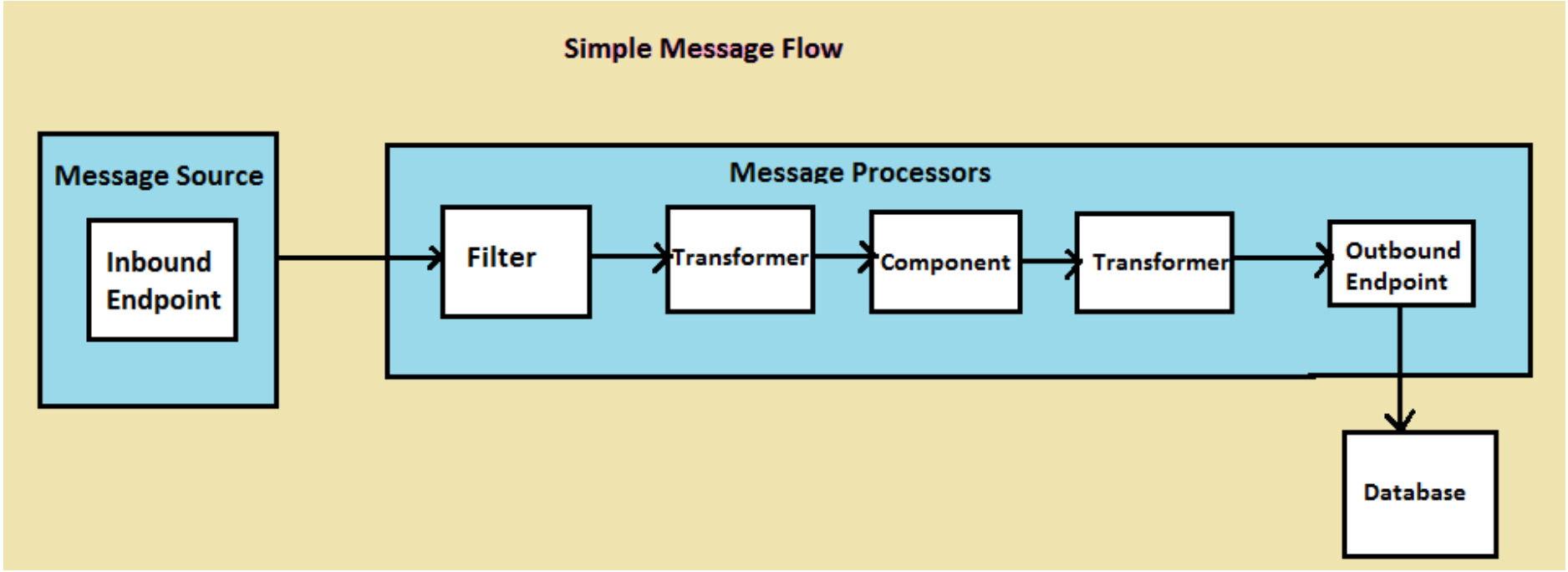
# Mule Architecture





# Mule Flow

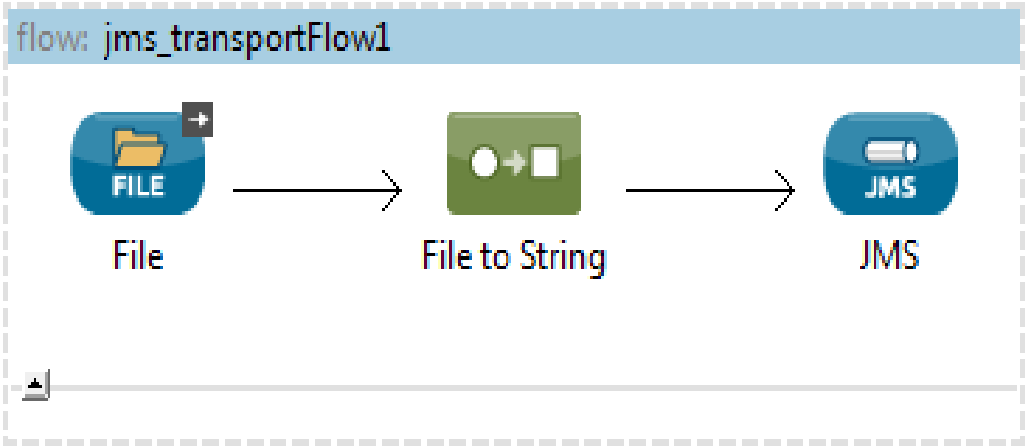
# Mule Flow

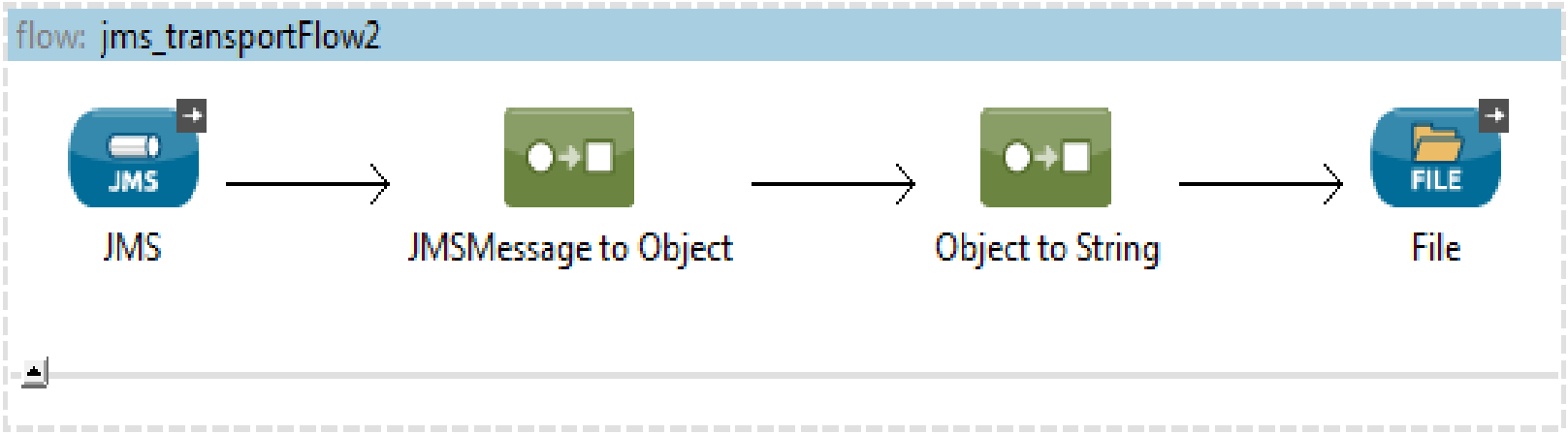


# Mule Flow

- How Message is Passing among different applications.
- Carrying data from Message Providers to Message consumers.
- While Carrying data it may transform,Route or Filtered.
- Single flow can integrate number of applications.
- Configure XML
- Sub-flows

# Mule Flow looks like in Mule Studio



# Mule Message

# Mule Message

## What?

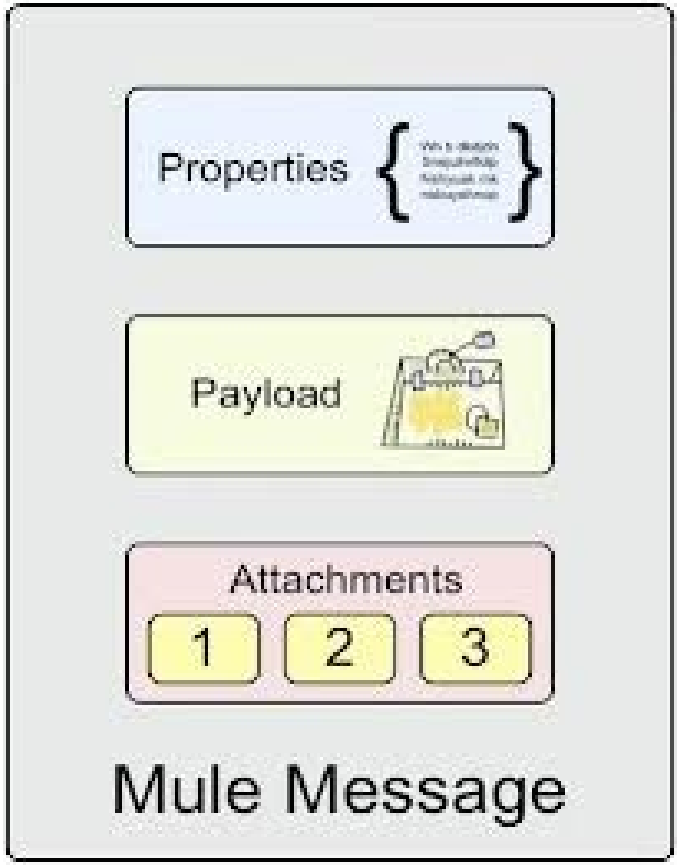
The data that passes through an application via one or more flows.

- **Properties**

  **Inbound** :Header
  **Outbound**:Payload.

- **Variables**

**Flow variables**
Apply only to the flow in which they exist.
**Session variables**
Apply across all flows within the same application.
**Record variables**
Apply to only to records processed as part of a batch




- Access using MEL(Mule Expression Language).

# How To Work with MULE ESB

# MULE Environment

- To Editions In MuleSoft to Work With Mule Studio IDE.
- Community Edition : 80 % of features available for Free.
- Enterprise Edition : 20 % of features are Licensed.
- Download

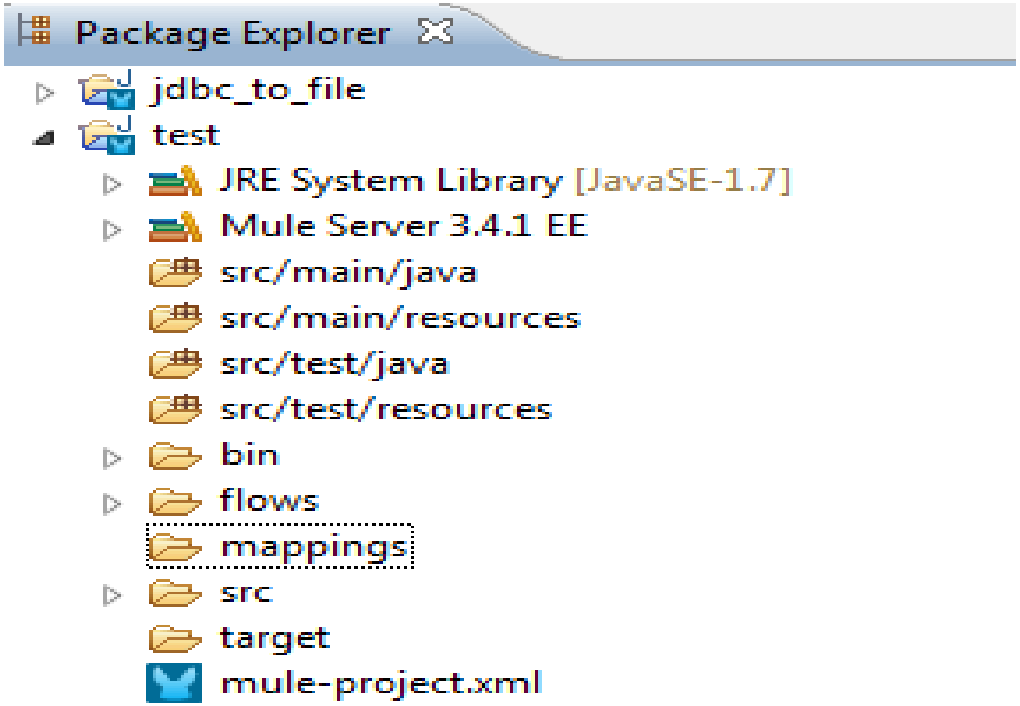
  Mule Studio IDE

  Mule Management Console(MMC)
- The java and mule environment variables must be setup correctly for mule to start.
- MULE_HOME - should be the location of the mule install
- JAVA_HOME - should be the location of the JDK
- PATH - should have both JAVA_HOME\bin and MULE_HOME\bin in the path.

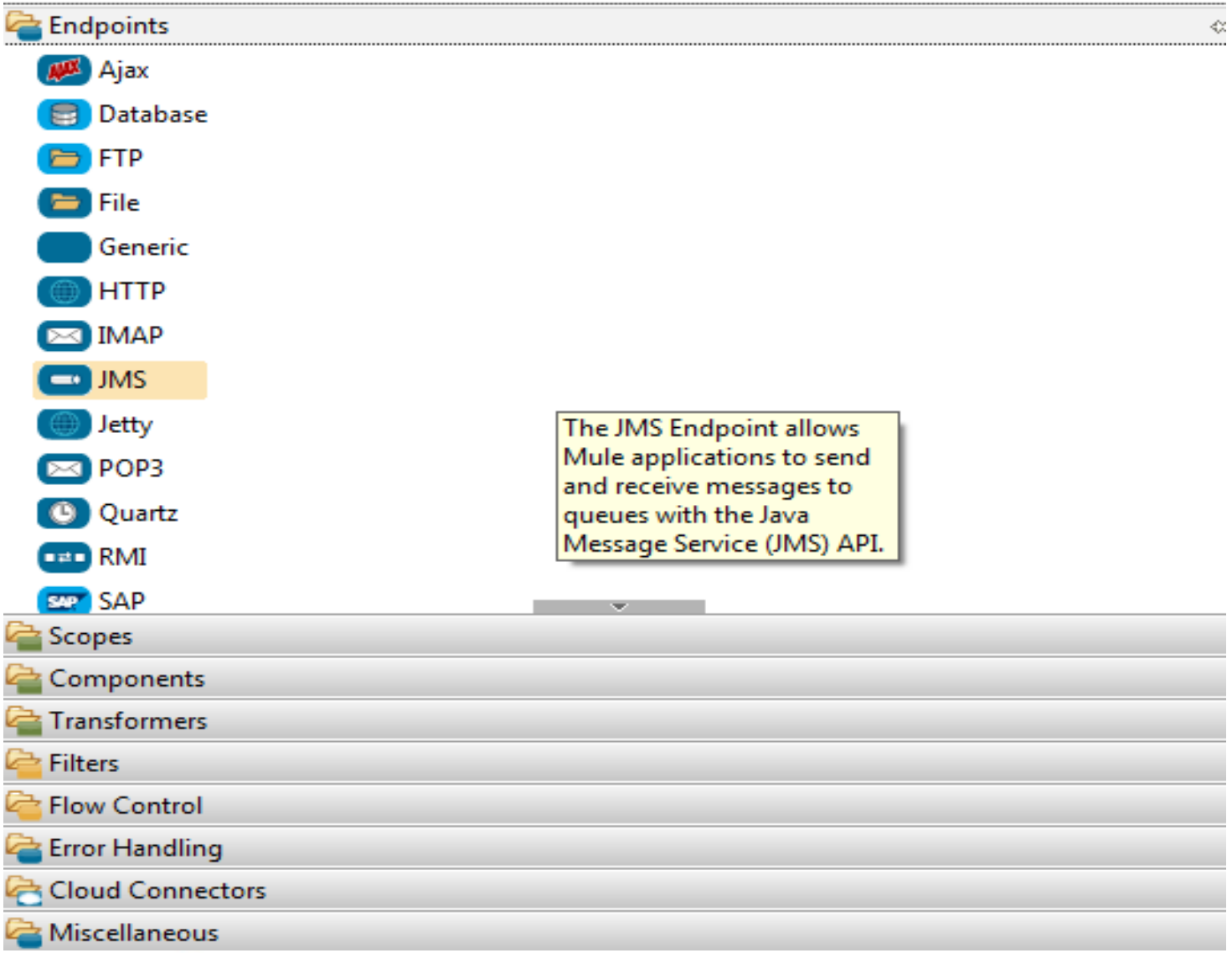
# Mule Studio

Mule Studio easily creates flows as well as edit and test them in a few minutes. Allows two-way editing and easy to debug.

- **Package tree**



# Component Palette



# Mule Components

## Palette

- **Endpoints**

  It is an object on which services will receive (inbound) and send (outbound) message.

  **Messaging Styles**

  Asynchronous : Fire and forget a message to a service

  Synchronous : Request-Response

- **Components**

  Message Processors Execute Logic on messages.

  Scripting/Web-service/HTTP/Other components.

- **Scopes**

  Encapsulate other message processors so that they function as a single unit.

# Mule Component Palette

**Transformers**

Convert data from one format to another.

**Filters**

Filters decide which Mule messages are processed

**Flow Control**

To direct or otherwise control messages within a flow.
Act as splitters or aggregators, splitting messages

**Error Handling**

Errors, or faults, that occur within Mule are referred to as exceptions.

## Mule Enterprise Security

- Restrict access based on client IP addresses Leverage proven security standards such as SAML, Oauth,and WSSecurity,LDAP authentication.

## Global Elements

- Configure once, then reference many times from elements within multiple flows.

- We can refer this global component using **Connector-ref** attribute.

# Cloud Connectors

## Anypoint Platform for SaaS

This is Enterprise Edition feature and we can access it by acquire License

# Mule Management Console

# Mule Management Console

# Mule Management Console

Management and monitoring functions for all your Mule ESB Enterprise deployments.

## Benefits

- Centralized Management and Monitoring
- Fine-Grained ESB Control
- Simplified troubleshooting through quick access to the most relevant information
- Enhanced availability, scalability, and performance through clustering

# DEMO

# References

- http://www.mulesoft.org/
- **Forum:** http://forum.mulesoft.org/mulesoft
- https://www.facebook.com/MuleSoft

# Thank you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