

4. Services Composition

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Services Composition

- Service Oriented application is composed by a set of services
- Services are (sometimes) aggregation of other services
- We speak about
 - Orchestration
 - Choreography
 - Mashups

Orchestration and Choreography

Orchestration vs. Choreography

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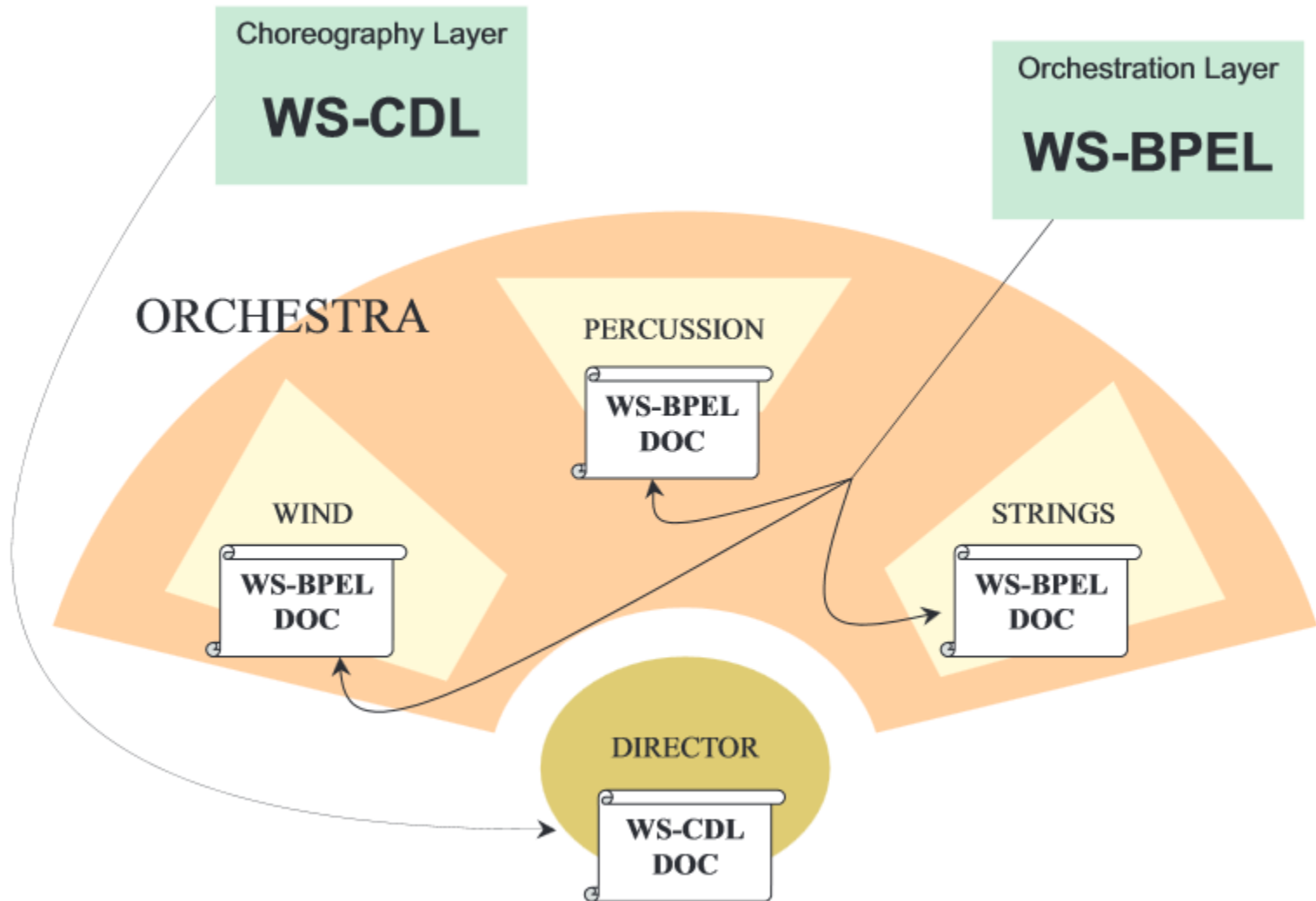
Orchestration vs. Choreography

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Orchestration vs. Choreography

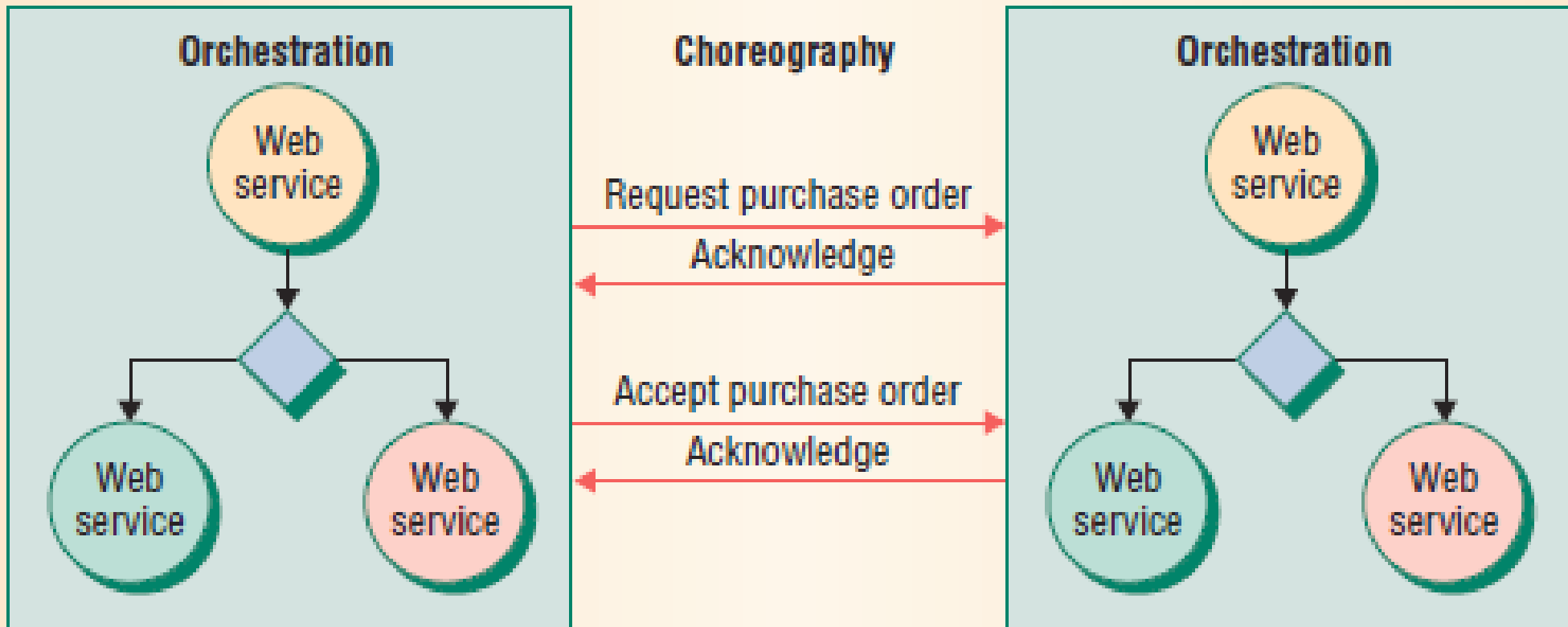
- *Orchestration or arrangement is the study and practice of **arranging** music for an orchestra or **Business Process Execution Language (WS-BPEL)** deciding which instruments should play which notes in a piece of music.*
- *Choreography is the **art of designing sequences** of movements in which motion, form, **Web Services Choreography Description Language (WS-CDL)** refer to the **design** itself, which is sometimes expressed by means of dance notation.*

Orchestration vs. Choreography



Orchestration vs. Choreography

- Executable process vs. message sequences

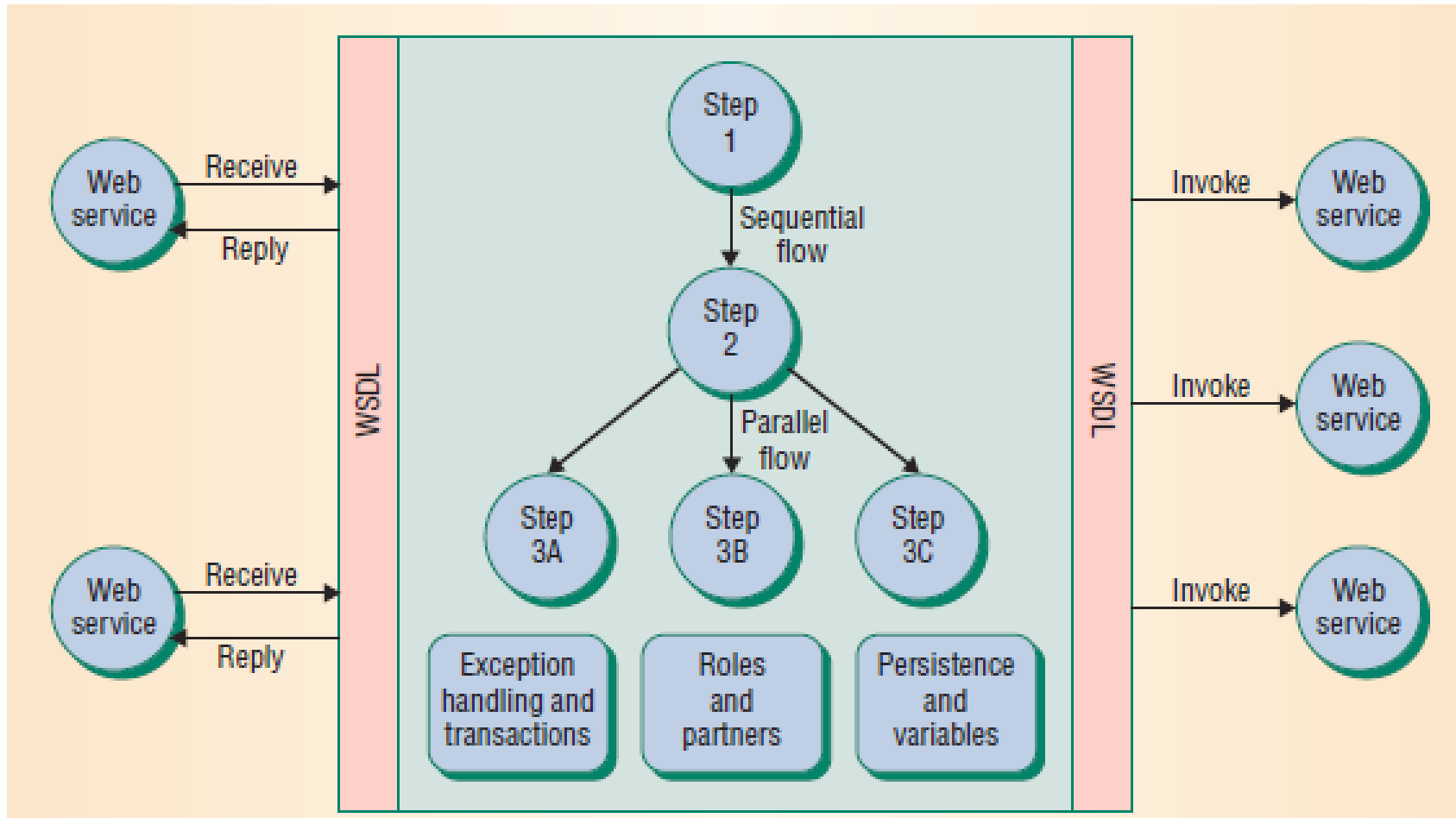


Orchestration

- Describes the automated arrangement, coordination, and management of services
- Represented by BPEL – runtime **executable process**
- Coordination of events in a process
- Directs and manages the on-demand assembly of multiple component services to create a composite application or business process.

Orchestration

● BPEL process example

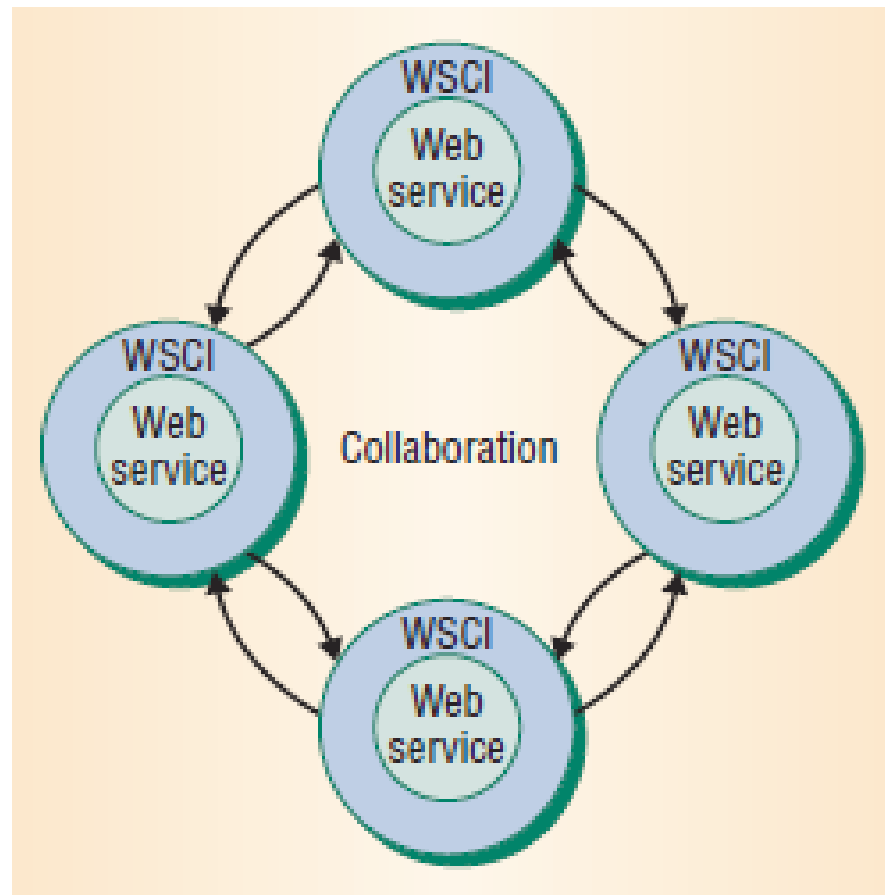


Choreography

- Multi-party Collaboration
- Choreography(Collaboration) Description Language (WS-CDL) – language for describing **multi-party contracts** (extension of WSDL)
- Describes the message exchange patterns
- Applies to shared co-ordination across multiple autonomous systems
- Can be used to monitor message exchanges

Choreography

- Interface address observable behavior between services (not a process)



Choreography Types

- **Abstract Choreography** defines

- Type of information exchanged
- Sequences and conditions

- Does not cover

- Physical message structures
- Endpoints
- Messaging conditions and control

Choreography Types

Portable Choreography defines

- Physical structure of the information that is exchanged (incl. WSDL, port types, operations)
- Details of technology used (security, reliability)
- Rules that express the conditions that are used to control the sequence of exchange of information

Choreography Types

- Final type of choreography is **Concrete Choreography** with all the details specified

	Abstract	Portable	Concrete
<i>Types of Messages</i>	Identified	Identified	Identified
<i>Message Structure</i>	Not Defined	Defined	Defined
<i>Conditions</i>	Identified	Identified	Identified
<i>Condition evaluation rules</i>	Not defined	Defined as far as possible	Defined as far as possible
<i>Technology used</i>	Not defined	Defined	Defined
<i>Message Endpoint Data</i>	Not defined	Not Defined	Defined

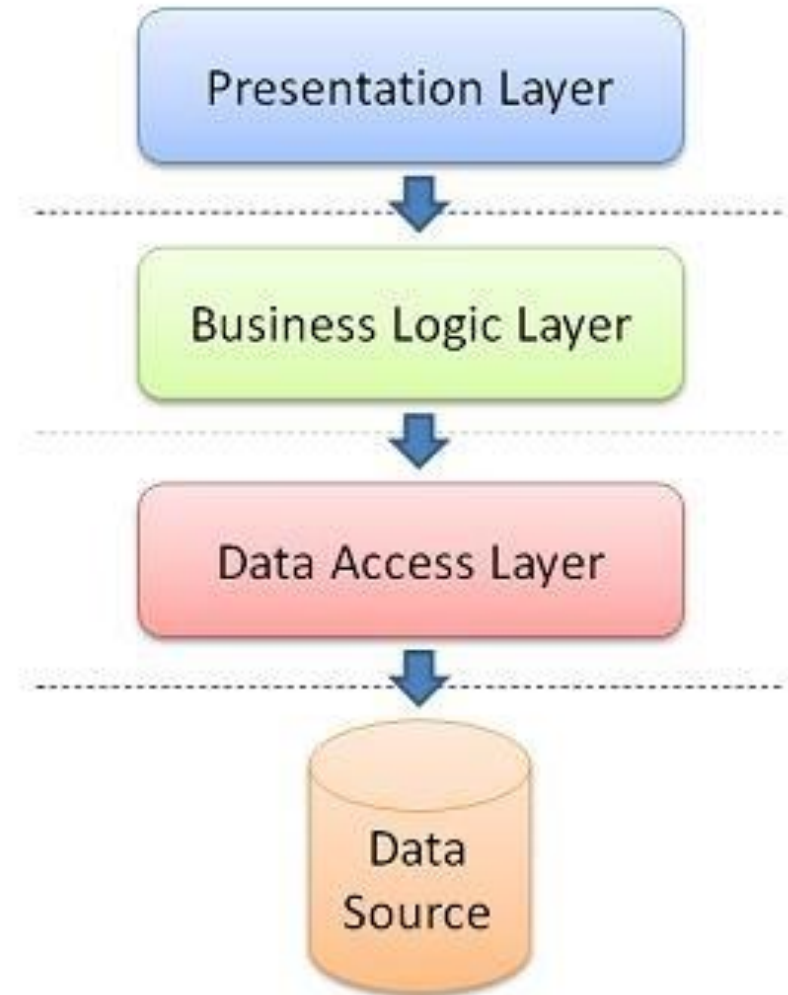
Mashups

Mashup

- ***Mashup*** is a web page or application that uses and combines data, presentation or functionality from two or more sources to create new services
- Data mashups – composed service from several data sources (uses single representation)
- Consumer mashups – combines different data types (visual elements and data from various sources)
- Business mashups – combined application

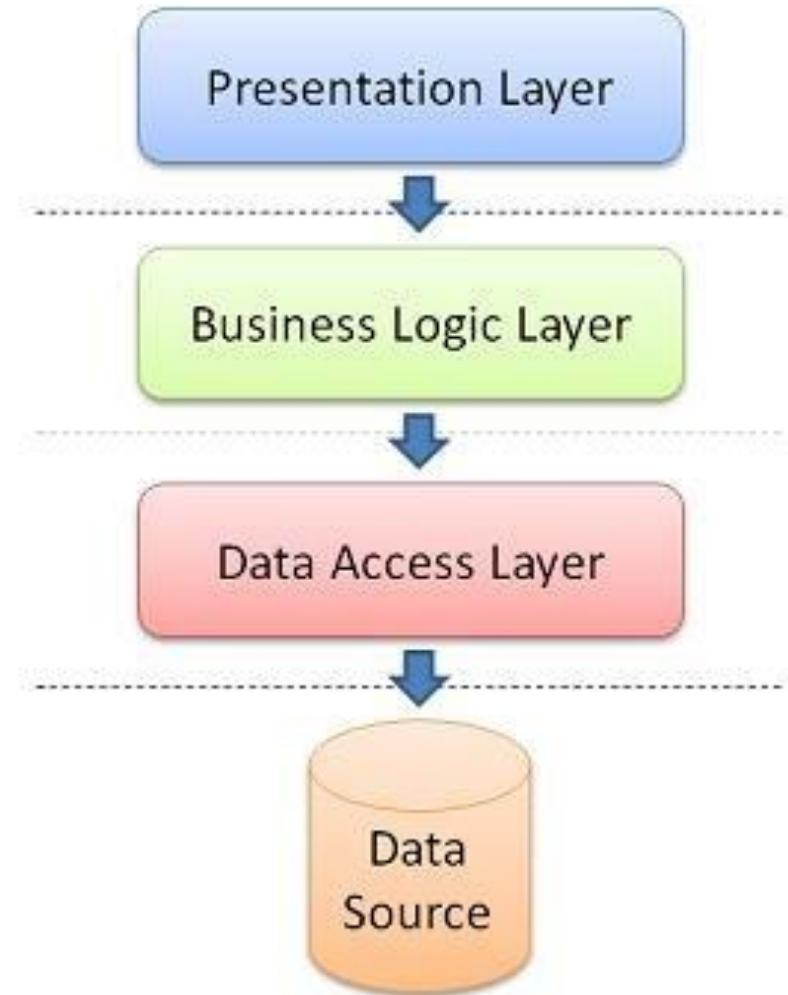
Mashup

- 3-tier architecture
- Presentation – clients and external interfaces
- Business logic on server
- Database management



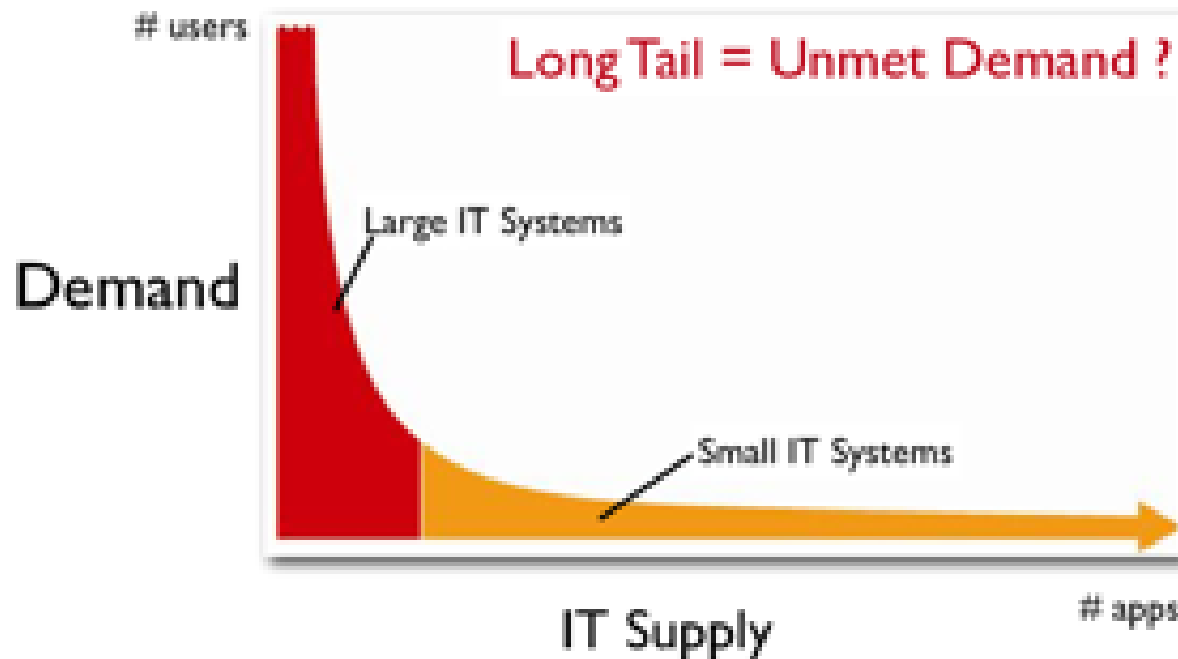
Mashup

- 3-tier architecture
- Presentation – clients and external interfaces
(1-2 years)
- Business logic on server
(2-5 years)
- Database management
(10 years +)



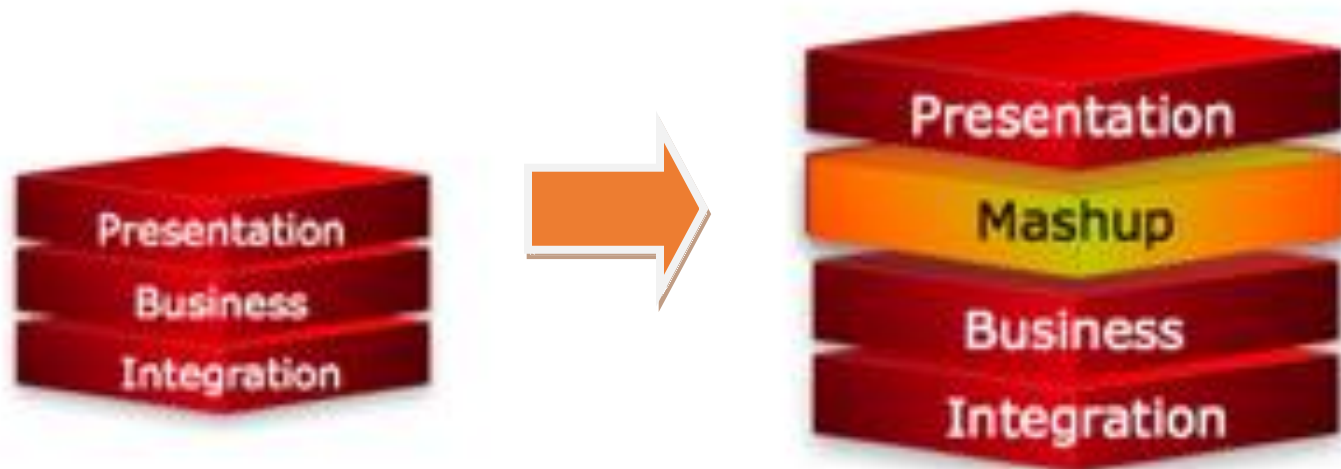
Mashup

● Long Tail of Enterprise Software Demand



Mashup

- Long Tail of Enterprise Software Demand
- Flexible presentation tier -> mashup



Aspect of Composition

- Component Model
- Composition Technique
- Composition Language

1970s Composition (UNIX)

● Component Model

- UNIX commands (filters)

● Composition Technique

- Pipes (Stdin, Stdout, Stderr)

● Composition Language

- Shell Scripts

- Makefiles

```
cat $1 |  
tr -cs A-Za-z '\n' |  
tr A-Z a-z |  
sort |  
uniq -c |  
sort -rn |  
sed 10q
```

2000s Composition (web services)

- Component Model
 - Web services (WSDL interface)
- Composition Technique
 - SOAP/HTTP Messages
- Composition Language
 - BPMN, BPEL, UML, ...
 - JOpera, WebML, XI, ...
 - Java, C#, ...

Mashups Composition

- Component Model

- Web services

- Composition Technique

- RPC over HTTP (SOAP, PO-XML, JSON, RSS/ATOM)

- Composition Language

- Javascript, PHP, Ruby, JOpera...

What Is Mashup Again?

Mashup (music)

From Wikipedia, the free encyclopedia

A **mashup** (also **mesh**, **mash up**, **mash-up**, **blend**, **bootleg**^[1] and **bastard pop/rock**) is a song or composition created by blending two or more pre-recorded songs, usually by overlaying the vocal track of one song seamlessly over the instrumental track of .^[2] To the extent that such works are "**transformative**" of original content, they may find protection from copyright claims under the "**fair use**" doctrine of copyright law.^[3]



What Is Mashup Again?

- Web application composing existing Web services and data sources
- Easy of reuse
- Lightweight programming
- ... anyone can do it!



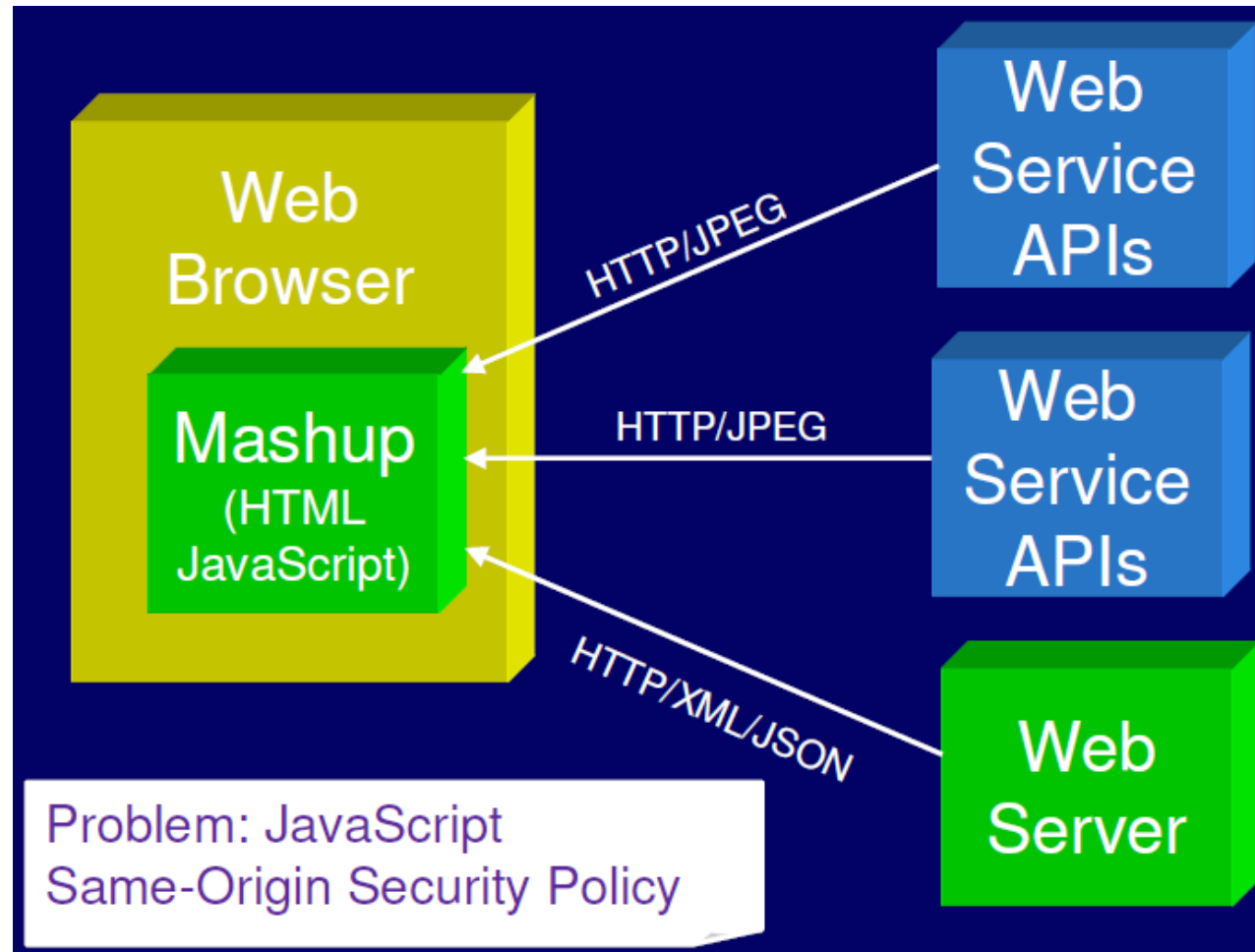
Mashup

- Client based
- Server based

Mashup

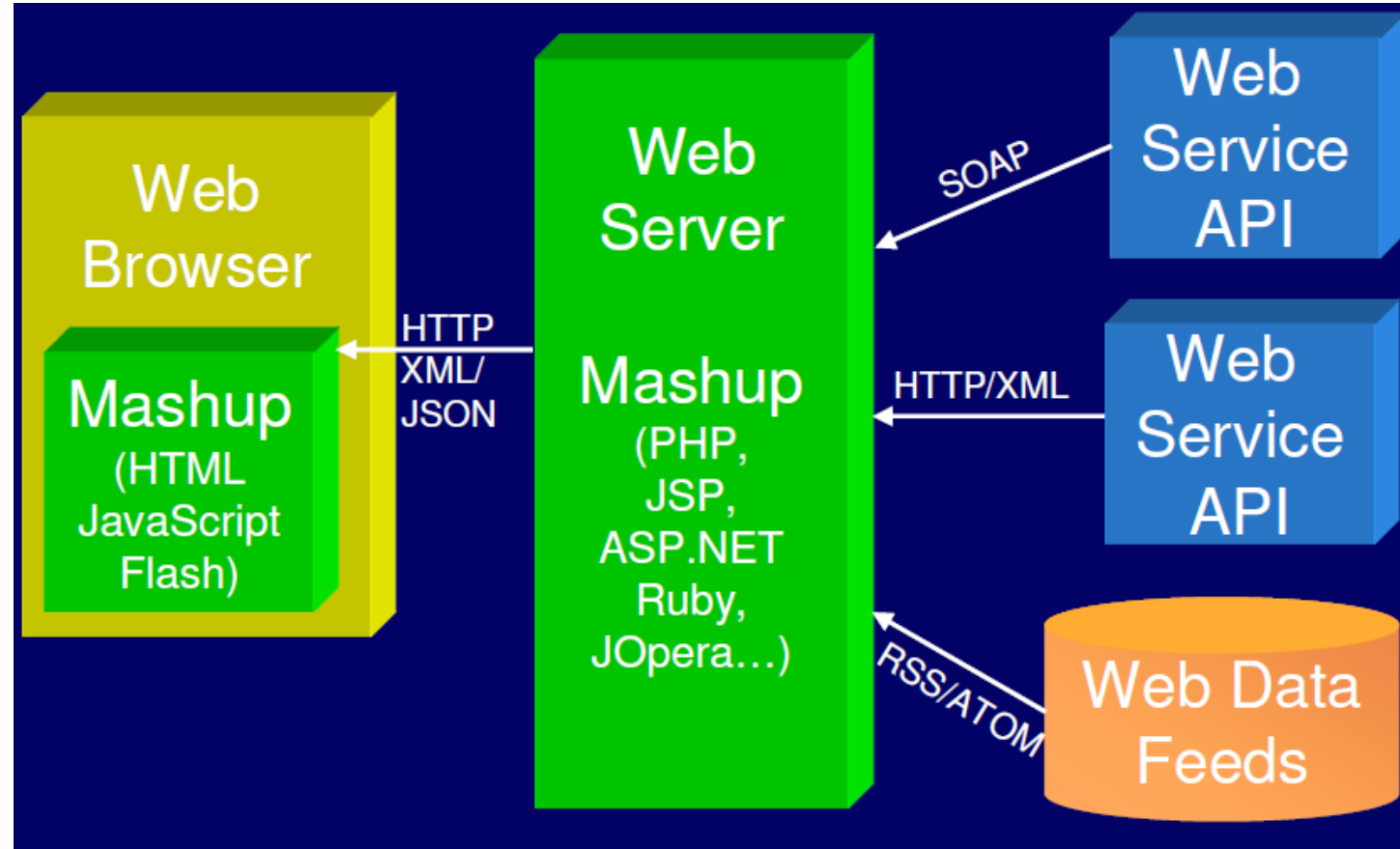
- **Client based**

- Server based



Mashup

- Client based
- **Server based**



Build Your Mashup

- Select a mashup metaphor
- Find services and data providers
- Study and test API
- Build the mashup using your favorite technologies or tools

Build Your Mashup

- Metaphors – map, calendar, data stream, wiki, portal, presentation, photo-gallery, ...
- Tools – Yahoo Pipes, Mozilla Webmaker, ...
- Widget libraries – Google/Yahoo maps, Google web toolkit, Dojo, ...

Google map example

● Customizable layers

The screenshot displays the Google Maps web interface. At the top, the Google logo is on the left, a search bar is in the center, and a search button is on the right. Below the search bar, there are buttons for "Vyhledat trasu" (Find route) and "Moje místa" (My places), along with icons for printing and sharing. The left sidebar contains a weather section titled "Počasí" (Weather) for "Praha, Česká republika" (Prague, Czech Republic). It shows a current temperature of 5°C and a 5-day forecast. The main map area shows a street view of Prague, with various landmarks and buildings labeled. A red line indicates a route through the city. The map is overlaid with several customizable layers, including a "Layers" panel on the right side.

Počasí
°C | °F | km/h | mil/h | m/s

Počasí pro: Praha, Česká republika

5°C
13°C 7°C

Pá So Ne Po
12°C 12°C 17°C 16°C
2°C 5°C 9°C 6°C

Přehánky
Vlhkost: 100 %
Vitr: JZ rychlostí 9km/h
weather.com

Každou hodinu | 10 dnů

immo.search.ch example

- Real estate search machine (11 data sources)

The screenshot displays the immo.search.ch website interface. At the top, there are navigation tabs: Start, Phone directory, Map, Routing, Weather, Timetable, Real estate (selected), and More services. Below these, search filters are set: Apartment/flat, rent, Price: 0 - 4'750+, Rooms: 1 - 5½, Area: 0 - 170+ m², and Town: To. A green bar contains a list of links: List with map, Property browser, Favorites, Print file, E-mail notification, Advertise, and Help.

Below the links, a table lists 164 matches. The table has columns for ZIP, Age, Price, Rm, m², and M. The first 15 rows are shown, with the first 10 rows having a red 'X' icon in the first column. The table is titled '164 matches' and 'Entries prior to 17.10.2013 10:11'.

	ZIP	Age	Price	Rm	m²	M
Attraktive Wohnu..	3007	2 hours	1'100	3	?	
Zentrale Wohnung..	3097	2 hours	1'150	3½	72	
Helle Dachwohnun..	3006	2 hours	1'635	3	?	
Wohnen im Ostri..	3006	2 hours	865	1	30	
Wohnen im Ostri..	3006	2 hours	890	1	30	
Schöne 3-Zimmerw..	3007	2 hours	1'368	3	65	
Hier wohnen Sie ..	3007	1 Day	1'415	3	64	
Inmitten einer g..	3072	1 Day	2'235	5½	115	
Attraktive Lage ..	3012	1 Day	1'240	2	50	
Wohnen an zentra..	3007	2 Days	1'403	3	74	
Schöne 3½-Zimmer..	3072	2 Days	1'120	3	58	
5 Zimmer Wohnung..	3122	2 Days	1'870	5	100	
Fischermätteliqu..	3008	2 Days	910	1½	31	
Helle Wohnung mi..	3097	5 Days	1'080	2	?	
Länggasse, Muesm..	3012	5 Days	1'880	4	96	

On the right side, there is a map of Bern, Switzerland, showing various locations like Länggasse, Mattenhof, Weissenbühl, Kirchen, Wabern, and Spiegel bei Bern. The map is titled 'Map' and 'Aerial'.

mobile.de example

● Online vehicle marketplace

SEARCH

OFFER

Make

Any

Model

Price until

Any

First Registration starting from

Any

Kilometer up to

Any

Fuel Type

Any

Country

Any





Zip




Radius

None

> Detailed Search

Show results



Počet výsledků: 10 242		1 € = 25.68 Kč
Zúžit hledání		Cena: od nejnižší
	Ford Mondeo 11/1993 279 000 km Manuální 66 kW (90 PS)	100 € (brutto) 2 568 Kč
06193 Wettin-Löbejün (Soukromý prodejce)		Vzdálenost: 243 km
	Ford Mondeo 04/1997 196 000 km Manuální 85 kW (116 PS)	150 € (brutto) 3 852 Kč
83043 Bad aibling (Soukromý prodejce)		Vzdálenost: 302 km
	Ford Mondeo Turnier CLX 04/1993 250 000 km Manuální 85 kW (116 PS)	150 € (brutto) 3 852 Kč
01723 Kesselsdorf (Soukromý prodejce)		Vzdálenost: 123 km

woozor.co example

Weather in Prague, Czech Republic (Europe)



Thursday, October 17 2013

Day



Rain.

Night






Rain.

High : 14°C


Low : 8°C

Wind : WSW at 19 km/h

 [More information](#)

 °C  °F

 km/h  m/h

 [Evolutions](#)

