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Approaches to Web Development

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SAUDI FEDERATION FOR CYBERSECURITY, PROGRAMMING & DRONES

مهارات المستقبل

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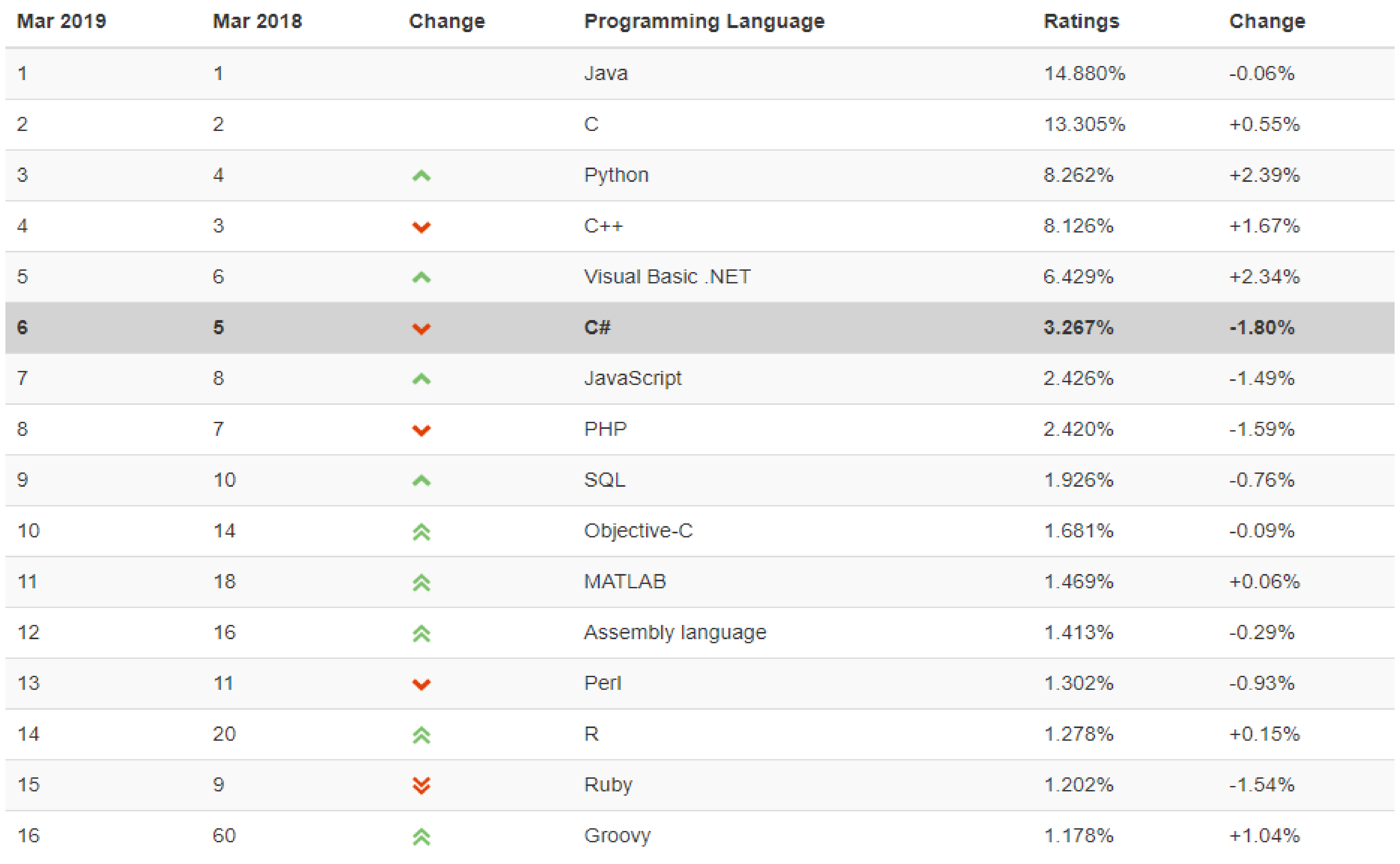
Languages for Web Development

Languages ranked by TIOBE Index:



Mar 2019	Mar 2018	Change	Programming Language	Ratings	Change
1	1		Java	14.880%	-0.06%
2	2		C	13.305%	+0.55%
3	4	↑	Python	8.262%	+2.39%
4	3	↓	C++	8.126%	+1.67%
5	6	↑	Visual Basic .NET	6.429%	+2.34%
6	**5**	↓	**C#**	**3.267%**	**-1.80%**
7	8	↑	JavaScript	2.426%	-1.49%
8	7	↓	PHP	2.420%	-1.59%
9	10	↑	SQL	1.926%	-0.76%
10	14	⇈	Objective-C	1.681%	-0.09%
11	18	⇈	MATLAB	1.469%	+0.06%
12	16	⇈	Assembly language	1.413%	-0.29%
13	11	↓	Perl	1.302%	-0.93%
14	20	⇈	R	1.278%	+0.15%
15	9	⇊	Ruby	1.202%	-1.54%
16	60	⇈	Groovy	1.178%	+1.04%

Frameworks for Web Development

- Opinionated and Un-opinionated Frameworks:
- Opinionated: those with opinions about the "right way" to handle any particular task
  - Support quick development
  - Less flexible at solving problems outside their main domain
  - Offer fewer choices regarding what components and approaches they can use

Frameworks for Web Development

- Un-opinionated: those with fewer restrictions on the best way to combine components to achieve a goal
  - Allow developers to use the best tools to complete a particular task, but need to find them yourself
  - Less flexible at solving problems outside their main domain
- Which framework to choose will depend on:
  - The programming language you are using
  - The popularity of the framework

Web Development Stacks

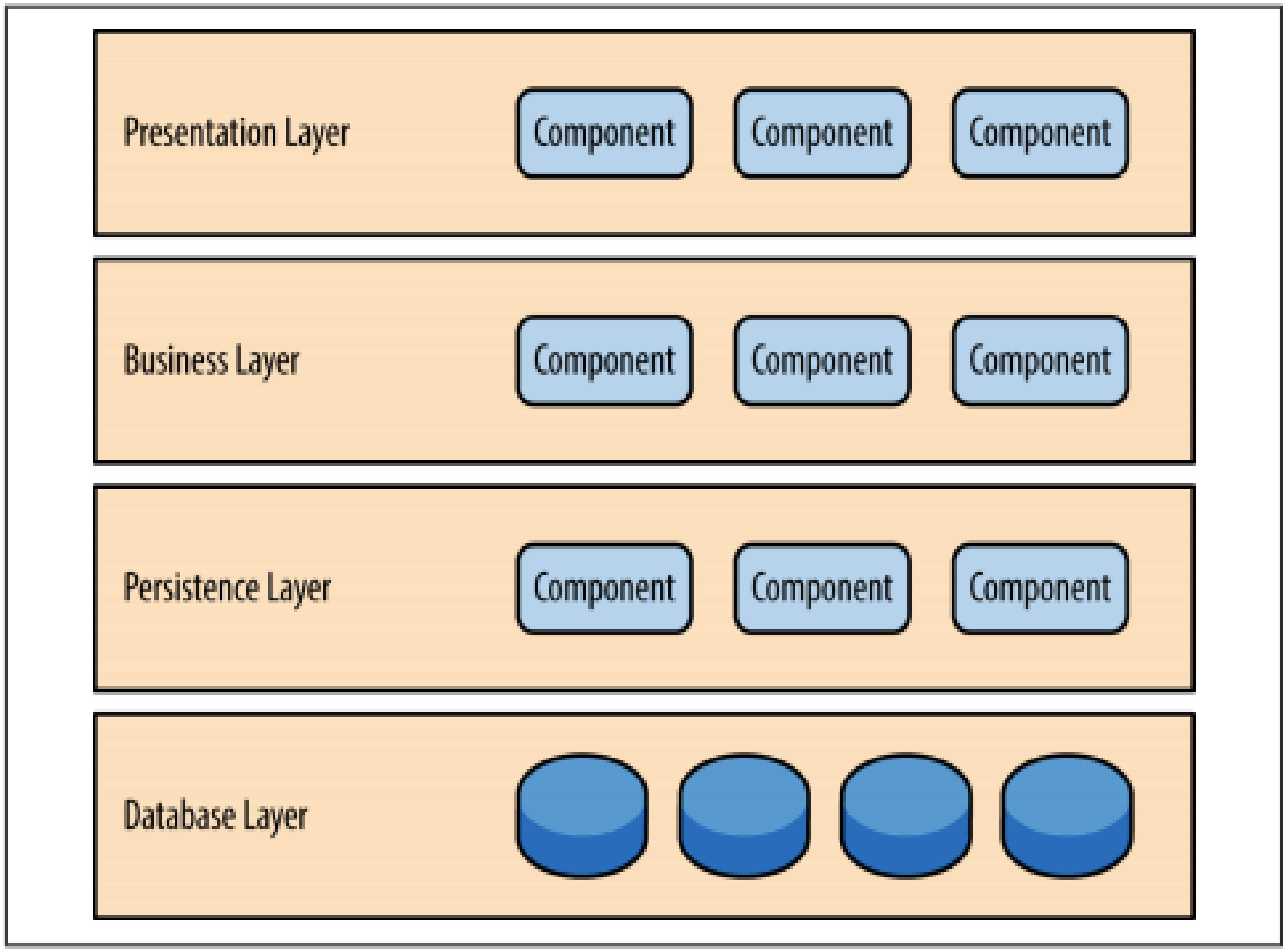
- Stack: collection of technologies that are used together to create a web application
- The LAMP stack: ie. a stack of technologies used to create web applications.
- The MEAN stack: MongoDB, Express, AngularJS, Node.js.
- The MERN stack: as React has become more popular, it is used in place of AngularJS in the MEAN stack. This has resulted in the MEAN stack being replaced with the MERN stack. We will focus on this.

Software Architecture Patterns

Layered Architecture Pattern:

- Built using several layers
- Does not specify how many layers there will be or what each layer will do
- Each layer is isolated from the other layer in the sense that for the application to work as a whole, each layer does not need to know how the other layer works

Software Architecture Patterns

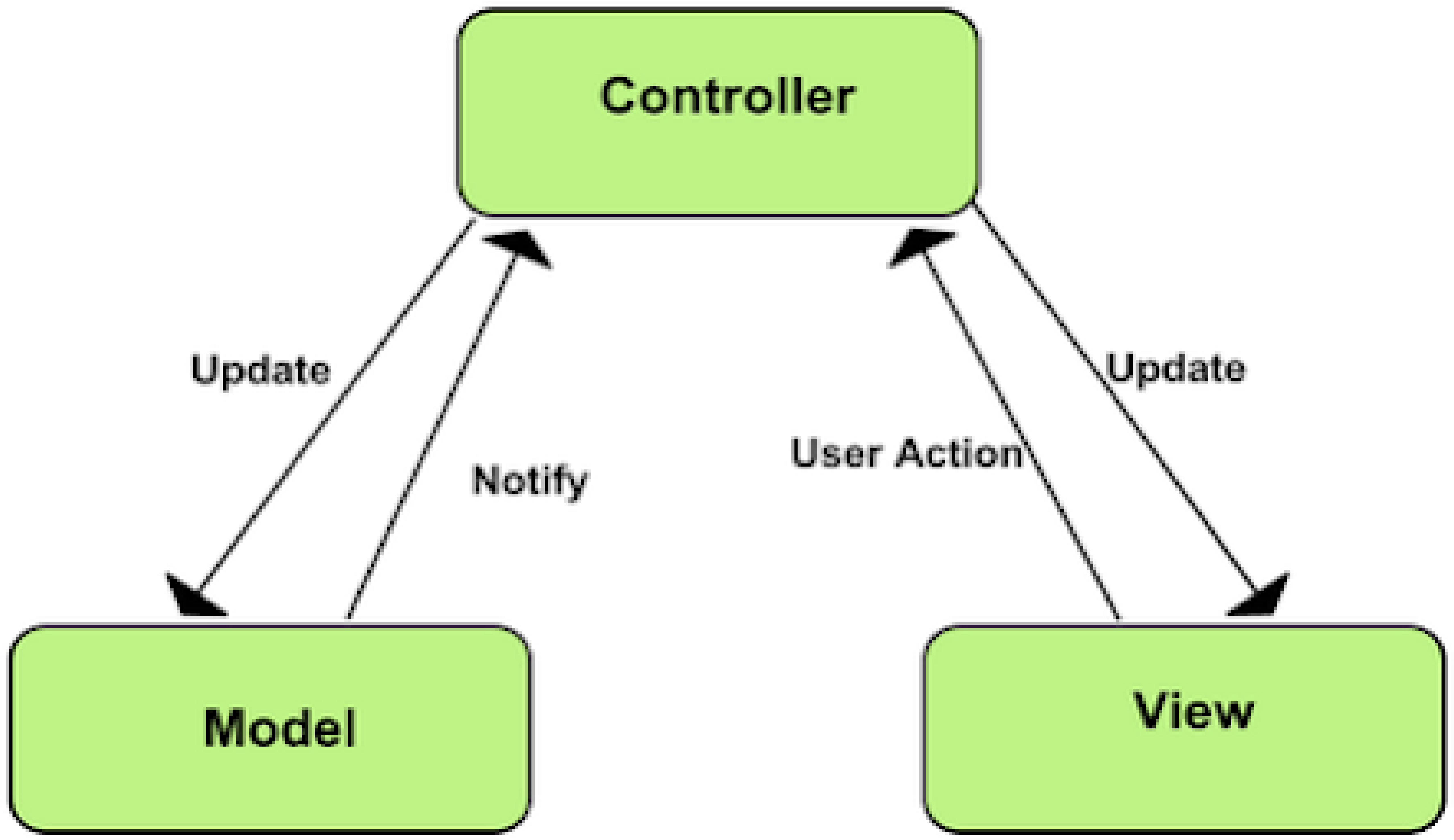


Layer architecture pattern as described by O'Reilly

Software Architecture Patterns

MVC (model-view-controller) Architecture Pattern:

- A layered architecture pattern
- 3 layers:
  - The view
  - The model
  - The controller



Software Architecture Patterns

Django’s MVT Implementation:

- The MVC pattern has formed the basis of many other patterns. The components are implemented in Django:
  - View
  - Template
  - Model

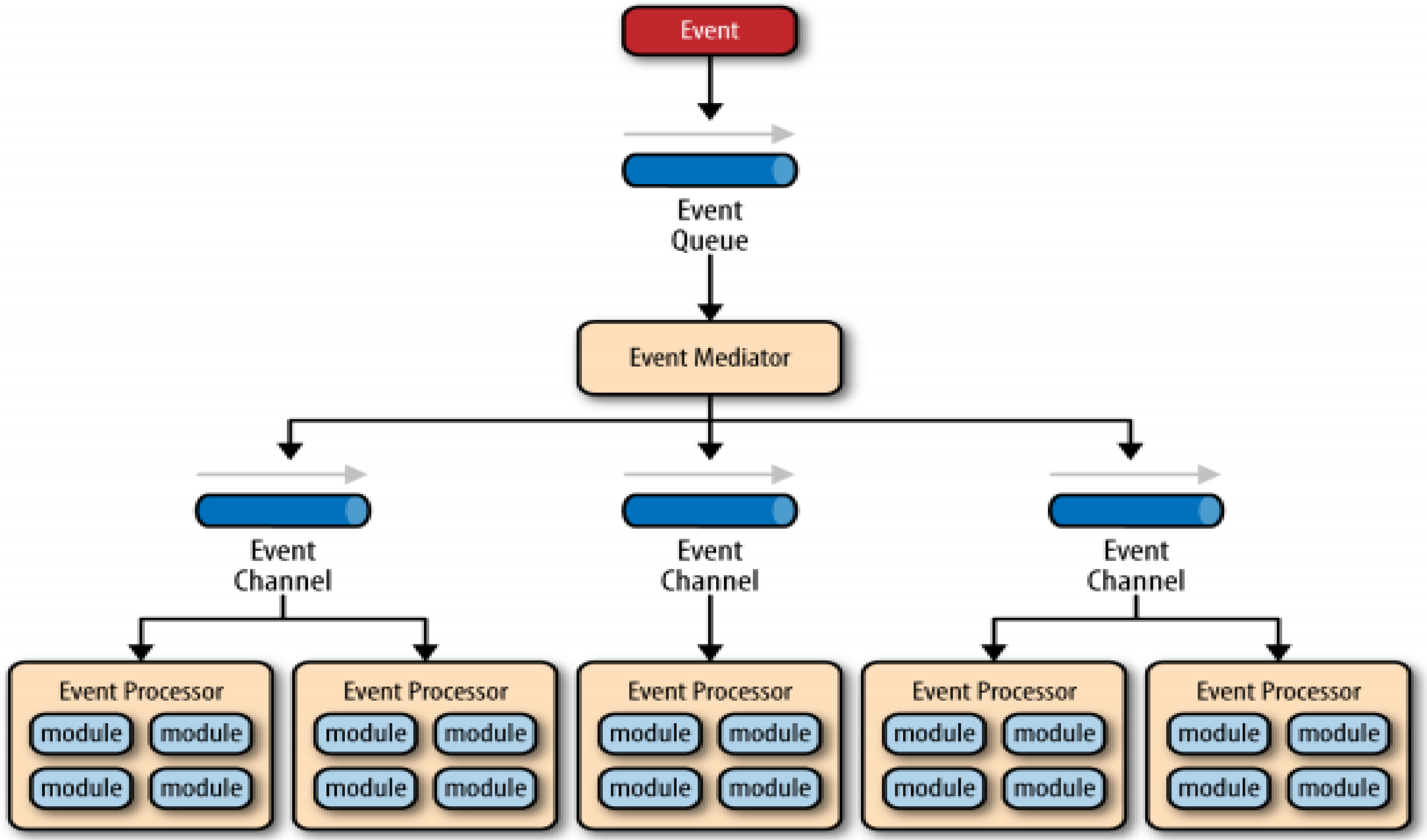
Software Architecture Patterns

Event-Driven Architecture Pattern:

- Used to describe distributed asynchronous, highly scalable applications
- Main topologies:
  - The mediator
  - The broker

Software Architecture Patterns

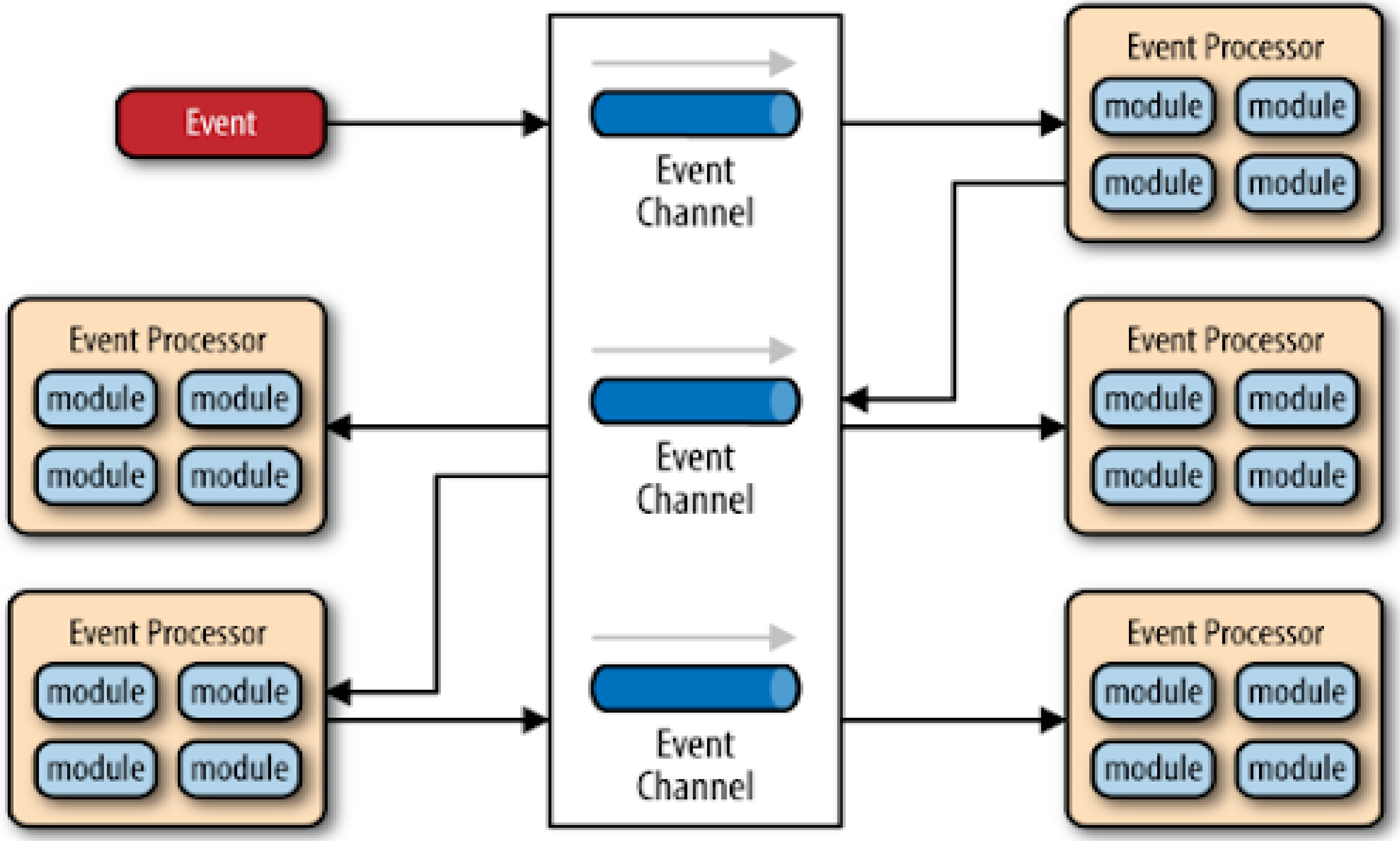
Mediator Topology:



Event-driven architecture pattern: the mediator topology as described by O'Reilly

Software Architecture Patterns

Broker Topology:

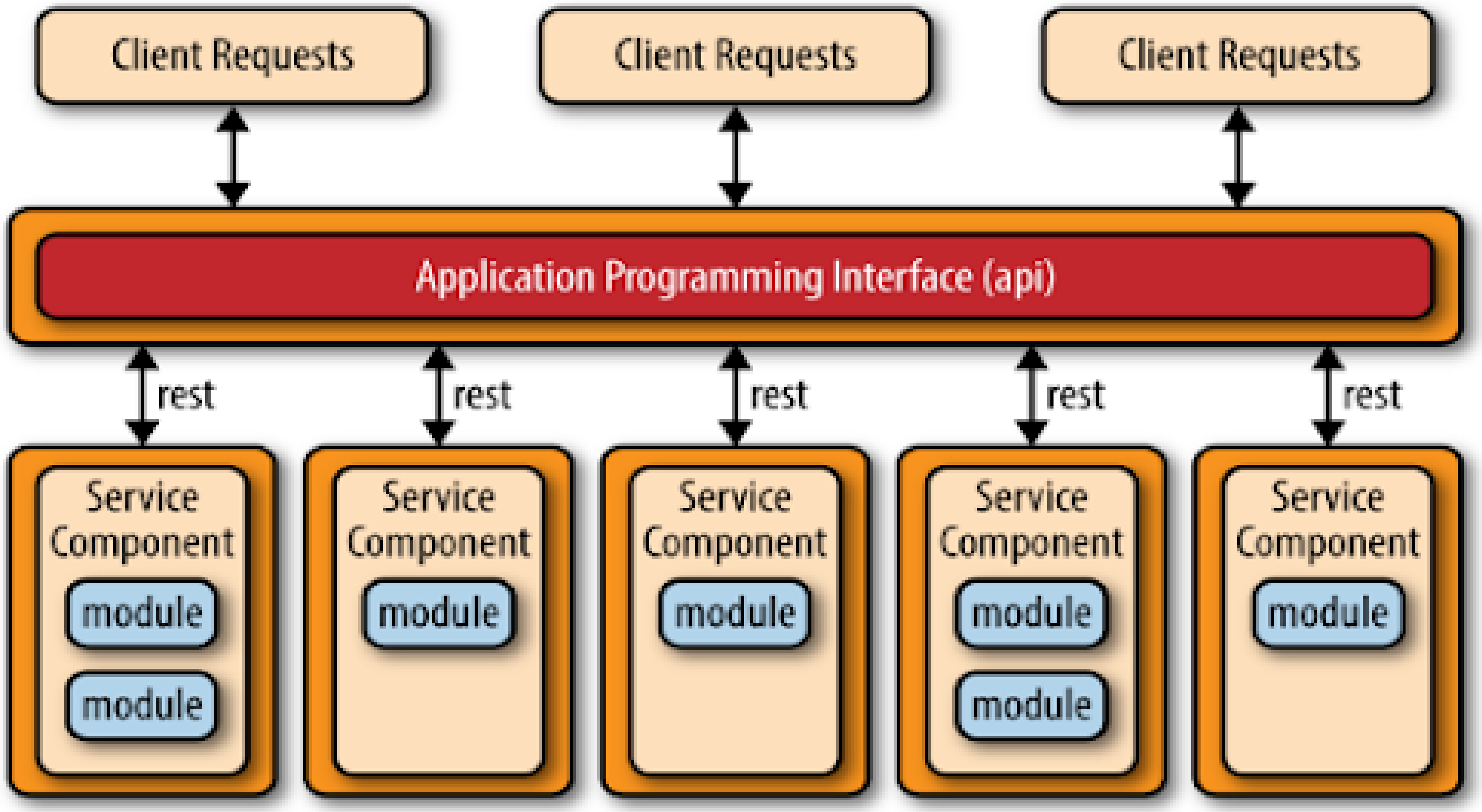


Event-driven architecture pattern: the mediator topology as described by O’Reilly

Software Architecture Patterns

Micro-Services Architecture Pattern:

- Used for systems that are made up of decoupled, distributed service components



The micro-services architecture pattern as described by O'Reilly