DJango Rest Framework:

API:

API Application Programming Interface

The main objective of API is two applications can communicate with each other. API allows external agent to communicate (integrate and exchange information) with our application.

In Simple way: 'Methods of communication between software components'

Eg1: By using API a java application can communicate with python application.

Bookmyshow application can communicate with Payment gateway application to complete our booking.

Eg2: Authentication with Facebook

Note: Interface of communication between the user and application is nothing but API.

The user can be Human user, an android app or desktop application etc

Web API/Web Service:

The interface of communication between the user and application over the web by using HTTP is nothing but Web API.

REST: Representational State Transfer:

Representational State Transfer(REST) is an architectural style.

It defines several Rules/Guidelines to develop Web APIs/Web Services

By using REST, we can develop web APIs very easily in concise way.

Hence REST is the most popular Architecture to develop Web Services

RESTFul API:

The API which is developed by using REST Architecture is nothing but RESTFul API. i.e

interface between the user and application where API implements REST Architecture.

Note: REST is basically an architecture where as RESTFul API is an API that implements REST.

DJango Rest Framework:

Django REST framework is a powerful and flexible toolkit for building Web APIs.

It is the most commonly used framework in Python World to build WEB APIs.

This framework internally uses all Django facilities like models, views, templates, ORM etc

website: https://www.django-rest-framework.org/
Current Version of DJango Rest Framework: 3.9
It requires:

REST framework requires the following:

- Python (3.6, 3.7, 3.8, 3.9, 3.10)
- Django (2.2, 3.0, 3.1, 3.2, 4.0)

Java App --> API --> .NET App

By using Web Services, Any application in the world can communicates with any other application irrespective of language (like Java, Python, .Net etc) and platform (like windows,Linux,MAC etc).

The applications can communicate by using HTTP Protocol as the common language.
The Message Format is XML or JSON.

API: Can be used to access functionality of any application.
It may be standalone application/web application/enterprise application

Web API/Web Service:
Can be used to access functionality of web application by using HTTP

REST: It is an architecture, which provides several guidelines to develop web APIs very easily and effectively.
RESTful API: The Web API which implements REST principles is called RESTful API.
Django REST Framework:
It provides toolkit to develop RESTful APIs for django based applications very easily.
The main objective of web APIs is interoperability. ie different applications can communicate with each other irrespective of develop language and platform.
The common communication language is: HTTP
The common message format is: XML/JSON
Note: The most common data representation in web API is Java Script Object Notation
(JSON). It is a collection of key-value pairs just like python dictionaries.

The main advantage of JSON over XML is, it is Machine Friendly and Human Friendly Form.
HTTP Verbs:
HTTP Verbs represent the type of operation what we required.
Based on requirement we have to use the corresponding HTTP verb.
The following are various HTTP Verbs
1) GET : To get one/more existing resources
2) POST : To create a new resource
3) PUT : To update an existing resource like update all fields of employee
4) PATCH : To perform partial updation of an existing resource like updating only salary
of employee
5) DELETE To delete an existing resource.
Note: These are only important HTTP Verbs/Request Methods. The following are not that much important verbs.
OPTIONS
HEAD
CONNECT
TRACE
LOCK
MOVE
PROFIND
Etc

HTTP Verbs vs Database CRUD Operations:
C (CREATE) -> POST
R (RETRIEVE/READ) -> GET
U (UPDATE) -> PUT/PATCH
D (DELETE) -> DELETE

Installation

Install using `pip`, including any optional packages you want...

```
pip install djangorestframework

pip install markdown       # Markdown support for the browsable API.

pip install django-filter  # Filtering support
```

`'rest_framework'` to your `INSTALLED_APPS` setting.

```
INSTALLED_APPS = [
    ...
    'rest_framework',
]
```

Types of Web Services:
There are 2 types of web services
1) SOAP Based WebServices
2) RESTful WebServices

1) SOAP Based Web Services:
SOAP: Simple Object Access Protocol.
SOAP is an XML based protocol for accessing web services.
To describe SOAP based web services we have to use a special language: WSDL (Web Service Description Language).
SOAP based web services are more secured. We can consume by using RPC Method calls. These web services can provide support for multiple protocols like HTTP, SMTP,FTP etc
Limitations:
1) SOAP Based web services will always provide data only in XML format. Parsing of this XML data is very slow, which creates performance problems.
2) Transfter of XML data over network requires more bandwidth.
3) Implementing SOAP Based Web Services is very difficult.