https://javabypatel.blogspot.com/

API can be thought of as a bridge between two software systems that allows them to communicate. API testing entails evaluating application programming interfaces (APIs) both independently and as part of integration testing to see if they fulfill functionality, reliability, performance, and security requirements.

* API tests are only run when the build is complete.

What is SOAP

* SOAP stands for **S**imple **O**bject **A**ccess **P**rotocol and REST stands for **RE**presentational **S**tate **T**ransfer.
* Since SOAP is a protocol, it follows a strict standard to allow communication between the client and the server whereas REST is an architectural style that doesn’t follow any strict standard but follows six constraints defined by Roy Fielding in 2000. Those constraints are – Uniform Interface, Client-Server, Stateless, Cacheable, Layered System, Code on Demand.
* SOAP uses only XML for exchanging information in its message format whereas REST is not restricted to XML Media-Type to use like XML, JSON, Plain-text.
* Moreover, REST can use SOAP protocol but SOAP cannot use REST.
* On behalf of services interfaces to business logic, SOAP uses @WebService whereas REST instead of using interfaces uses URI like @Path.
* SOAP is difficult to implement and it requires more bandwidth whereas REST is easy to implement and requires less bandwidth such as smartphones.
* Benefits of SOAP over REST as SOAP has ACID compliance transaction. Some of the applications require transaction ability which is accepted by SOAP whereas REST lacks in it.
* On the basis of Security, SOAP has SSL( **S**ecure **S**ocket **L**ayer) and WS-security whereas REST has SSL and HTTPS. In the case of Bank Account Password, Card Number, etc. SOAP is preferred over REST. The security issue is all about your application requirement, you have to build security on your own. It’s about what type of protocol you use.

Difference between XML and JSON

XML JSON

1)It’s a markup language JSON is a dataformat

2)File size is larger File size is smaller , hence transferring data is faster

3) XML is often characterized JSON is known for simplicity of its structure and m For its complexity and old syntax makes JSON easier to be used and read by

fashioned standard due to the tag humans

structure that makes files bigger

and harder to read

4) XML is Extensible and stores data in tree JSON stores data like a map, which entails key-value

Structure pairs

5) Need XML parser , making it more difficult JSON can easily be parsed by a regular JavaScript and slow function since it is already integrated

When to go for automation?

<https://www.guru99.com/images/4-2016/040516_0528_TestingREST7.png>

Below are a few scenarios where we go for automation:

* Frequent regression testing, whenever a new feature introduced to the application we perform functional testing at the same time we also required to perform regression testing to ensure that new didn't affect the existing functionality negatively
* Repeated test case Execution is required, we may need to test a few functionalities again and again for a set of data like login details
* User Acceptance Tests, we write our code on a test environment, but we actually have to run the same code on UAT as well to check for bugs quickly
* Faster Feedback to the developers, when developers deployed something tester must be able to give the details of the deployment effect on basic functionalities of the application
* Reduce the Human Effort, When we test a functionality manually it takes a lot of time but automating reduces the effort
* Test the same application on multiple environments, like test env and Live env.

[Custom Locators in Selenium](https://chercher.tech/java/custom-locators-selenium-webdriver)

| **No** | **SOAP** | **REST** |
| --- | --- | --- |
| **1** | SOAP stands for Simple Object Access Protocol. | REST stands for **RE**presentational **S**tate **T**ransfer. |
| **2** | SOAP is a protocol, which says how client and server will communicate that is the way they will exchange information. | REST is a software architectural style (concept) as how the system should be designed to solve common occurring problems in many applications.  Even though an architectural pattern conveys an image of a system, it is not an architecture.  REST is simply a concept and protocol for exchanging information is up to implementer. |
| **3** | SOAP protocol uses XML as a medium for exchanging information between client and server. | REST keeps it open to implementer as what protocol they want to use.  Protocol here is not fixed, Implementer can use XML, JSON Plain text, HTML etc as a medium for exchanging information between client and server. |
| **4** | One of the most important point is, SOAP uses services interfaces to expose the business logic.  **@WebService**  interface WeatherService{    **@WebMethod**    public String getWeather(String      cityName);   }  In SOAP, we expose the above WeatherService interface and operation inside it. For above sample service, getWeather() method is exposed to outside world which take city name as input and return weather details as output. | In REST, intsead of Service interface, URI are exposed to outside world.  **@Path("/WeatherService")** class WeatherService{      **@Path("/GetWeather/{cityName}**     public String getWeather(          @PathParam("cityName") String          cityName){         ....     } }  So the URI to invoke above method will be:  http:/**/<**AppName>:**/**WeatherService/GetWeather/ |
| **5** | SOAP defines much standards that need to strictly followed for communication.  Eg: Any exceptions in communication from service should go in Fault section. | REST does not define too much standards like SOAP and implementer can have there own way of implementing things. |
| **6** | SOAP requires more bandwidth and resource than REST because Payload created in XML is large in size. | REST generally uses JSON due to which it requires less bandwidth and resource compared to SOAP.  Payload created in JSON is not as large compared to XML. |
| **7** | SOAP defines its own security by using WS-Security extensions.  SOAP calls can be secure with HTTP SSL encryption & WS-Security encryption for its SOAP messages. | RESTful web services inherits security measures from the underlying transport layer used.  REST calls can be secure only with HTTP SSL encryption. |
| **8** | SOAP uses WSDL(Web Services Description Language) for describing the functionality offered by a web service. | REST uses WADL(Web Application Description Language) for describing the functionality offered by a web service. |

|  |  |  |
| --- | --- | --- |
| **9** | SOAP has built-in Error handling features. So if there is problem with the SOAP request sent, SOAP response will contain error information of it. | In case of REST there is no standard in built error handling feature provided and developer need to handle by passing custom response codes. |
| **10** | SOAP messages can be sent not only over HTTP protocol but also with SMTP and other protocols that is SOAP is Language, platform, and transport independent | REST requires use of HTTP. |
| **11** | SOAP uses XML for exchanging information and parsing of XML is complex compared to JSON and require explicit parsers for handling it. | REST uses JSON for exchanging information and biggest advantage of JSON is its in-built support with JavaScript and the browser, making the API consuming and parsing lot more easy. |
| **12** | Avoid the use of SOAP in situations where bandwidth is very limited. Example: In case of Mobile client consuming the services. | Make use of REST services where bandwidth and resource is constraint as JSON is more lightweight compared to XML. |
| **13** | The disadvantage of SOAP is. If say you already have JSON, CSV parsers in your application and your need is to consume SOAP web services than it is compulsory for you to include/write XML parser because you cannot use JSON, CSV parsers already exist in your project. | Biggest advantage of REST is. If say you already have CSV parser in your application and your need is to consume REST web services than REST service has ability to send response in not only JSON format but it is free to send response in the format client understands. |
| **14** | SOAP is standardized and contains pre-build extensibility in the form of the WS\* extensions. For enterprise applications SOAP is more preferred because of security it provides. | REST is not standardized and is becoming popular day by day. REST is generally less preferred where security is biggest concern like banking applications. |
| **15** | SOAP services are not cacheable as there is a need to explicitly form a SOAP request so that server can understand.   Say if you like to purchase any mobile and want to share details of that mobile with your friend in this case you need to explicitly tell your friend to go to xyz url and then press this button etc. which is painful. | REST services are cacheable.  This feature is very useful, Say if you want to share with your friend a Mobile details that you are planning to purchase, what you need to do is just share the link which is a REST call. |
| **16** | SOAP request are send using HTTP POST method only because SOAP request formed is usually big and cannot be send in Query string and that is why SOAP request cannot be bookmarked.  (It says SOAP request can use HTTP GET method as well. I have not came across till now any SOAP request passed using HTTP GET method) | REST request are send using both HTTP GET and POST request due to which GET request can be cached here. |
| **17** | SOAP requires learning and ultimately takes time. | With REST, learning curve is less and one can easily produce and consume services. |
| **18** | SOAP WSDL file can be extracted from endpoint in the way shown below.  **{Service\_Endpoint}?WSDL** | REST WADL file can be extracted from endpoint in the way shown below,  **http://{ip}:{port}/{AppName}/{web.xml mapping to REST container}/application.wadl** |
| **19** | Challenge with SOAP request is the exposing of WSDl for client implementation, If there is any change in the server API like the method name or parameter variable name then that needs to be notified to all the clients as the WSDL will be changed and client has to recreate the client API's for compatible with new changes. this becomes more challenging if you have multiple clients. | With REST, since you are going to share the URI, this is not a bigger problem in REST. |