

A Survey of Web APIs: Usages, Issues, and Expectations

Dear XXX:

My name is Neng Zhang (<https://person.zju.edu.cn/en/nengzhang>). I am a postdoctoral fellow at Zhejiang University, China. I am conducting a research project that aims to understand the use and issues of Web APIs (also known as Web services), as well as the users' expectations on Web APIs. Especially, there are a large number of Web APIs available on the Internet, e.g., 20,000+ Web APIs have been published in ProgrammableWeb (<https://www.programmableweb.com/>). However, the use and issues of these Web APIs are still not clear and we know very little about the users' expectations.

If you have used or tested some Web APIs, given your solid experience, we kindly ask you to fill in the following questionnaire. Your responses will help us better understand the usages, issues, and user expectations associated with Web APIs. Your responses would shine a light on the Web API development and management. We will share the result of our research with the participants of this survey.

The survey is **anonymous** and will **take approximately 15 minutes**. No personal information is collected. You can exit at any points! No more contact is required after the survey.

As an appreciation of your time and valuable inputs, we will give out 10 USD Amazon gift cards to 20% randomly selected participants who have completed the survey. If you want to enter the raffle, please kindly enter your email at the end of the survey. The email addresses will only be used for the raffle purpose. The participation in the raffle is completely voluntary.

Please feel free to contact me at nengzhang@zju.edu.cn if you have any questions.

Thank you!

Neng Zhang
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Part I. Demographics

Q1. How many **Web APIs** have you **used**?

- ☐ 0
- ☐ 1-5
- ☐ 6-10
- ☐ 11-20
- ☐ 20+

If your answer to **Q1** is 0, you do not need to answer the following questions.

Q2. How many **years of experience** do you have in using Web APIs?

- ☐ 0-1 years
- ☐ 1-3 years
- ☐ 3-7 years

- ☐ 7-12 years
- ☐ 12+ years

Q3. What is your **current country of residence**?

Part II. Important Features of Web APIs

Q4. Given a requirement, you may retrieve a number of candidate Web APIs using general search engines (e.g., Google) and/or the search engines provided by Web API registries/marketplaces (e.g., ProgrammableWeb and Microsoft Azure). Due to the limited time and budget, you may need to choose and test some promising candidate Web APIs, in order to find appropriate ones that can be used to address the requirement. Then, **how often do you need to choose Web APIs for testing?**

- ☐ Very often
- ☐ Often
- ☐ Neutral
- ☐ Rare
- ☐ Very rare

Q5. When you need to choose some candidate Web APIs for testing, what are the **top 3 most important features (i.e., characteristics)** of a Web API that make you **decide to test it?**

- ☐ Similar functional description to the requirement
- ☐ Well-known API provider (e.g., Google)
- ☐ Relatively high popularity (e.g., the number of followers and popularity score)
- ☐ Well-organized documentation
- ☐ Easy-to-test endpoints
- ☐ Free trial
- ☐ No charge for use
- ☐ Support (e.g., API client wrappers or sample codes) for familiar programming languages
- ☐ Standard request/response formats (e.g., JSON)
- ☐ Compatible license with the existing projects
- ☐ Accessible API forum
- ☐ Other (please specify): _____

Part III. Validation of Web API Issue Types

Q6. During the use of Web APIs, you may encounter some issues. By manually analyzing 1,886 Web API related questions posted in Stack Overflow, we summarized **24 Web API issue types (IT1-IT24)** that are grouped into five high-level categories, as listed below. **For each issue type, please confirm whether you have encountered it (Yes) or not (No).**

	Yes	No	I don't know
Authorization			
(IT1) Error: An authorization error occurs when creating an API key/access token or requesting a function with the created API key/access token.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(IT2) Expiration: The authorization (i.e., an API key/access token) expires after working for a period.			
Function			
(IT3) Request failure with unknown reasons: A request fails due to unknown reasons, excluding the failures caused by the other identified issue types (e.g., IT2 and IT4).			
(IT4) Change/Deprecation: Functions are changed or deprecated because of Web API updates.			
(IT5) Limitation: A function has a limited functionality, e.g., the maximum number of requests per day.			
(IT6) Lack of programming language support: There is a lack of support (e.g., a client wrapper or sample code) for a specific programming language.			
(IT7) Inconsistent results: The result of a function is inconsistent (including success or failure) when requesting the function on different platforms (e.g., Web browsers and devices) or using different methods (e.g., CRUL and Node.js).			
(IT8) Instability: A function is unstable, e.g., it works for a period but suddenly fails.			
(IT9) Unexpected result: The result of a function is unexpected, e.g., missing a required field.			
(IT10) Unsupported function: A desired function is not supported.			
(IT11) Unsatisfactory performance: The performance (e.g., response time) of a function is not satisfactory.			
(IT12) Implementation problem: A function has implementation problems or bugs.			
(IT13) Difficult to process result: The result of a function is difficult to process.			
Documentation			
(IT14) Missing: The documentation is not found.			
(IT15) Incorrect: The documentation has incorrect content, e.g., the explanation of a function does not match the actual result, a sample code does not work, etc.			
(IT16) Incomplete: The documentation has no explanation of some important elements, e.g., a parameter, a field in the result of a function, etc.			
(IT17) Out-of-date: The documentation does not match the latest Web API.			
(IT18) Difficult to read/understand: The documentation is not well-written, which makes it difficult to read and understand.			

Seeking for support			
(IT19) Enquiring about a particular function: A user wants to know whether a particular function is supported or how to implement a particular function.			
(IT20) Checking for Web API usage: A user wants to know how to use a Web API.			
(IT21) Enquiring about implementation: A user wants to know the implementation of a function.			
(IT22) Enquiring about authorization acquisition: A user wants to know how to acquire the authorization.			
Others			
(IT23) Web API searching: A user needs to search for a Web API that can achieve a requirement or an alternative Web API.			
(IT24) Unsuitable charge: Web API charges (i.e., pricing) are not suitable, e.g., unwanted features are required to be paid.			

Q7. Despite the 24 issue types in **Q6**, if you have encountered **other Web API issues**, please list them below:

Part IV. Expectations

Q8. Considering the Web API issues that you have encountered, **what expectations** do you have on the **development** and **management of Web APIs when the issues can be avoided**?

Q9. If you would like to participate in our raffle for a 10 USD Amazon gift card, please input your email here. Thanks!
