

Questionnaire on Opening-Up Software Platforms

Introduction

Software Platforms: From Closed to Open

Software platforms form the basis for multiple systems in a specific domain. They typically classify into *closed* and *open platforms*. Closed platforms are proprietary, maintained by a single vendor, and usually not extensible. Open platforms, in contrast, allow third-parties to contribute extensions to the platform. Typical examples of open platforms are the Android platform for mobile apps, the Eclipse IDE for highly customized development environments, the SAP ERP platform for business-management software, the Unity Engine for game development, or Photoshop with its plugin system for image manipulation. In industry, open platforms are not always created from scratch, but are often the result of opening up a formerly closed and proprietary platform. In this process, choosing the correct technical mechanisms and strategies is core to the open platform's immediate and long-term success.

Goal and Target Audience

With this questionnaire, we investigate how platforms are opened-up by collecting knowledge from individuals (architects, developers, managers etc.) who have been involved in a platform-opening process in the industry. Our focus is on the technical mechanisms and the process, but we also ask about the reasons for opening and the consequences it had. Answering this questionnaire will take no more than 15 minutes. Your data will be treated confidentially and will only be used to evaluate the results of this questionnaire. For further information, see <http://gsd.uwaterloo.ca/openPlatformStudy>.

Your Benefits

Your participation will allow you to reflect on your practices and learn about other companies' practices. At the end of the questionnaire, you can choose to receive a state-of-the-art report with the results of our study. Your participation is also highly valuable to the research community and to tool vendors, to better understand the techniques and processes for opening-up platforms and to build better tools.

If any questions do not apply to your situation, please feel free to omit answers (e.g., because you are still in the process of opening the platform or canceled the process).

Best regards,

Christoph Seidl (Technical University of Braunschweig, Germany),

Christoph Elsner (Siemens AG, Germany),

Benedikt Schultis (Siemens AG, Germany),

Sara Johansson (University of Gothenburg, Sweden),

Markus Erlach (University of Gothenburg, Sweden), and

Thorsten Berger (Chalmers | University of Gothenburg, Sweden)

General Properties of the Open Platform

Note: Questions marked with an asterisk (*) are mandatory.

1. What is the name of your platform?

2. What is the domain of your platform (e.g., finance, software development, games, content management)? *

3. If you had to characterize your open platform by comparing it to other well-known platforms, to which extent do you agree it is similar to one of the following platforms?

Our platform is very similar to ...

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Linux kernel (extensible with driver modules) *	<input type="radio"/>				
Android OS (extensible with apps) *	<input type="radio"/>				
Apple iOS (extensible with apps) *	<input type="radio"/>				
Photoshop (extensible with plugins) *	<input type="radio"/>				
Eclipse IDE (extensible with plugin bundles) *	<input type="radio"/>				
<input type="text" value="Enter another option"/>	<input type="radio"/>				

4. Who are the users of your platform? *

- Non-technically skilled consumers
- Technically skilled consumers
- Highly technically skilled consumers (experts)
- Other developers
- Other departments in our organization
- Other companies
- Other

5. Using which of the following programming language(s) is your platform realized? *

- C
- C++
- C#
- Java
- PHP
- Ruby
- Other:

6. What are the extensions to your platform called? *

- Plugins
- Packages
- Components
- Scripts
- Binaries
- Other:

7. How large is your platform currently in lines of code (LOC)? *

- < 50,000 LOC
- 50,000 – 150,000 LOC
- 150,001 – 500,000 LOC
- 500,001 – 1,000,000 LOC
- 1,000,001 – 5,000,000 LOC
- 5,000,001 LOC – 20,000,000 LOC
- 20,000,001 LOC – 50,000,000 LOC
- > 50,000,000 LOC

8. How many people are *currently* and *actively* involved in *developing*, *maintaining*, and *testing* the platform? *

- < 5
- 5 – 15
- 16 – 50
- 51 – 100
- 101 – 250
- 251 – 500
- 501 – 1,000
- > 1,000

Rationales for Opening Up the Platform

Note: Questions marked with an asterisk (*) are mandatory.

9. Were there any problems with the closed platforms that led to opening it up? *

- Strong competition in the market
- Difficult to maintain
- Too many new requirements
- Decreasing number of users
- Lack of compatibility with other platforms
- Others:
- No Problems

10. What were the business intentions for opening up the platform? *

- Increase number of users
- Increase value for existing users
- Increase attractiveness for new users
- Increase user binding
- Foster innovation through extensions by third-parties
- Share cost of innovation
- Reduce commodity burden (focus on core organizational's expertise by outsourcing common functionality)
- Establish a unique selling point
- Stabilize market position
- Establish a value chain (for resellers, third-party offerings, support services, etc.)

Other:

11. What were the technical intentions for opening up the platform? *

- Enable external realization of specialized requirements
- Realize functionality that is beyond the organization's capacity
- Establish compatibility with other platforms
- Modernize the platform's codebase
- Increase compatibility with other platforms

Other:

Note: Questions marked with an asterisk (*) are mandatory.

12. How long did the platform exist *before* it was opened? *

Year(s)

13. How long did it take to open up the platform? Leave empty if still ongoing

Years

14. What was the starting point of the opening process? *

- A previously closed platform existed. The open platform is a re-engineering, refactoring or extension of the previous platform.
- A previously closed platform existed. The open platform is a complete re-implementation.
- No previous platform existed. The open platform is a completely new implementation.
- Other:

15. How many people were/are *actively* involved in *opening up* the platform? *

- < 5
- 5 – 15
- 16 – 50
- 51 – 100
- 101 – 250
- 251 – 500
- 501 – 1,000
- > 1,000

16. Can you briefly describe the process or strategy you followed when opening the platform? *

17. How is the execution of the deployed platform controlled? *

- The platform executes the extensions (inversion of control principle)
- The extensions execute the platform
- Other:

18. Which of the following extension mechanisms did you incorporate to open the platform and which technology was used? *

Application Programming Interface (API), specifically:

Web service, specifically:

Domain-specific language (DSL) to be used by external contributors, specifically:

Plug-in system, specifically:

Isolated runtime containers (sandbox), specifically:

Conditional compilation (e.g., #IFDEF), specifically:

Explicitly formulated conventions, specifically:

19. For opening the platform, did you need to **significantly** change one of the following aspects?

We needed to significantly change ... *

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Our business model	<input type="radio"/>				
Our platform architecture	<input type="radio"/>				
Our platform development process	<input type="radio"/>				
Our organization of the development (e.g., team structure)	<input type="radio"/>				

20. Did you face any particular challenges when opening-up the platform? If so, where? *

- Maintaining backwards compatibility
- Restructuring teams
- Restructuring the architecture
- Introducing new technologies
- User acceptance
- Modeling the ecosystem
- Other:

Consequences and Success Criteria

Note: Questions marked with an asterisk (*) are mandatory.

21. Considering the entire process of opening up the software platform, to which extent do you agree with the following statement?

Strongly Agree Agree Neutral Disagree Strongly Disagree

Overall, the platform opening was a success.

22. How did the size of the code base change as result of the platform opening process? *

Decreased in percent (%) by

No significant change

Increased in percent (%) by

23. What were the particular benefits of opening-up the platform?

24. What were the particular drawbacks after opening-up the platform?

Note: Questions marked with an asterisk (*) are mandatory.

25. Which of the following aspects do you find **very important** for sustaining your open platform?

A **very important** aspect for sustaining the success of the open platform is ...

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Software quality of the platform (e.g., stability, maintainability, extensibility) *	<input type="radio"/>				
Software quality of the extensions (e.g., stability, maintainability, extensibility) *	<input type="radio"/>				
Stable extension mechanisms *	<input type="radio"/>				
Quality assurance of the extensions (e.g., certification process, development guidelines, SDKs) *	<input type="radio"/>				
Large number of extensions *	<input type="radio"/>				
Market place for extensions (e.g., app store) *	<input type="radio"/>				
Community management (e.g., forum, blog, social channels) *	<input type="radio"/>				
<input type="text" value="Enter another option"/>	<input type="radio"/>				
<input type="text" value="Enter another option"/>	<input type="radio"/>				
<input type="text" value="Enter another option"/>	<input type="radio"/>				

26. How do you support the development of extensions? *

- Tutorials / how-tos
- Development guidelines
- Code examples
- Code templates
- Software Development Kit (SDK)
- Interface/API documentation
- Other:

27. Which mechanisms do you use to verify the quality of third-party/external extensions? *

- Manual technical review of extensions
- Automated technical review of extensions
- Certification of extensions
- Certification of contributors
- Certification of development process
- Evaluating ratings of extensions (e.g., end-users rate extension quality)
- Evaluating ratings of contributors (e.g., acceptance rate of extensions)
- Use contracts to oblige contributors to use certain quality assurance mechanisms
- Other:

28. How many extensions exist for the open platform (apps, plug-ins, components etc.)? *

- < 5
- 6 - 25
- 26 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- > 10,000

29. At which stage of the platform lifecycle does the platform first get in contact with an extension? *

Before platform release

- Continuous integration (single source code base for platform and extensions)
- Regularly and multiple times per release (e.g., repository with multiple branches)
- Explicit integration phase for each release
- Other (before release)

After platform release

- Explicit phase for commissioning/deployment (i.e., extensions are applied to platform before system can run at end customer)
- End-user adds it to running system
- Other (after release)

Role and Personal Details

To put your responses into context and for potential follow-up questions, we would appreciate if you could share some information about your organization and yourself.

30. What have been your roles in software-platform development?

- | | |
|---|---|
| <input type="checkbox"/> Developer | <input type="checkbox"/> Domain Expert |
| <input type="checkbox"/> Modeler | <input type="checkbox"/> Researcher |
| <input type="checkbox"/> Software Architect | <input type="checkbox"/> Product Manager |
| <input type="checkbox"/> Team Leader | <input type="checkbox"/> Marketing Expert |
| <input type="checkbox"/> Project Manager | <input type="checkbox"/> Other: |

31. How many years of industrial experience do you have in software engineering?

- <1 year 1-2 years 3-5 years 5-10 years >10 years

32. Do you want to receive a report with the results of the study?

- Yes, please send me a report via e-mail.

33. May we contact you with clarification questions on your answers?

- Yes, you may contact me via e-mail.

Final Remarks

34. If you are willing to be contacted for further clarification questions or to receive the study results, please give us your name and email address.

Name

E-Mail address

35. Are there any final remarks you would like to tell us (e.g., if you canceled the opening process or the procedure failed, please give reasons)?

Thank You!

Thank you for your participation!