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API Deprecation: A Systematic Mapping Study

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Abstract: *This extended abstract is based on a study published at the 48th Euromicro Conference on Software Engineering and Advanced Applications (SEAA 2022). [BR22a]*

We conducted a systematic mapping study on API deprecation including 36 primary studies. Our analysis highlights five major gaps in research: studying remote APIs, investigating a broader range of static APIs, joining views of suppliers and clients, including humans in studies, and designing with deprecation in mind.

1 Introduction

Application Programming Interfaces (APIs) are the prevalent interaction method for software modules, components, and systems. As systems and APIs evolve, an API element may be marked as deprecated, indicating that its use is disapproved or that the feature will be removed in an upcoming version. Consequently, deprecation is a means of communication between developers and, ideally, complemented by further documentation, including suggestions for the developers of the API's clients.

Recent reports by practitioners claimed that research on APIs does not reflect the diversity of APIs in practice. In particular, research on remote APIs is demanded. [Ra21] In contrast to *static APIs* (statically linked, e.g., libraries), such *remote APIs* (e.g., REST services) are accessed via means of network communication at runtime.

2 Method

We conducted a systematic mapping study on API deprecation to classify the state of the art and identify gaps in the research field.

An initial search for `api AND deprecat*` in academic databases yielded a set of 103 unique results. Application of selection criteria and subsequent snowballing led to a final set of 36 primary studies. We evaluated these studies regarding general criteria for software engineering research (beneficiaries, type of contribution, research strategies) [St20] as well as criteria specific to API deprecation (type of API, aspect of deprecation).

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3 Results

We located five major gaps in previous research on API deprecation as opportunities for future studies:

1. **Uncharted Territory:** Deprecation of remote APIs has barely been considered.
2. **Out of Focus:** Research on the deprecation of static APIs has strongly focused on the Java programming language and the Android ecosystem.
3. **Unbridged Gap:** Suppliers and clients of an API have rarely been considered jointly.
4. **Human-out-of-the-loop:** Research strategies have been focused on data and did not include human perspectives.
5. **Prevention Better Than Cure:** Investigations have not included causes or prevention of deprecation.

Data Availability

The complete data set has been made available as open data via Zenodo [BR22b]. The files include all search results:

- Included studies with their complete classification.
- Excluded studies with the decisive exclusion criteria.
- A list of studies identified through snowballing.

References

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