Open Data **Standards** for Open Source Software Risk Management **Routines**: An Examination of SPDX

Georg Link

Coauthors: **Robin Gandhi** and **Matt Germonprez**

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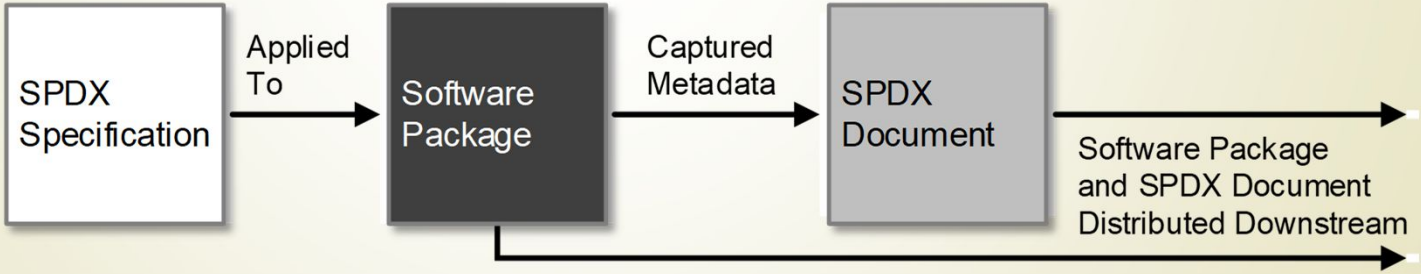
Paper https://doi.org/10.1145/3148330.3148333

The SPDX Specification

- "The Software Package Data Exchange® (SPDX®) specification is a **standard format** for communicating the components, licenses and copyrights associated with software packages." - www.spdx.org



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bjorn-helgaas vgaarb: Factor out EFI and fallback def

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```
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 * vgaarb.  plements the VGA arbitration. For details refer to
 * Documentation/vgaarbiter.txt
 *
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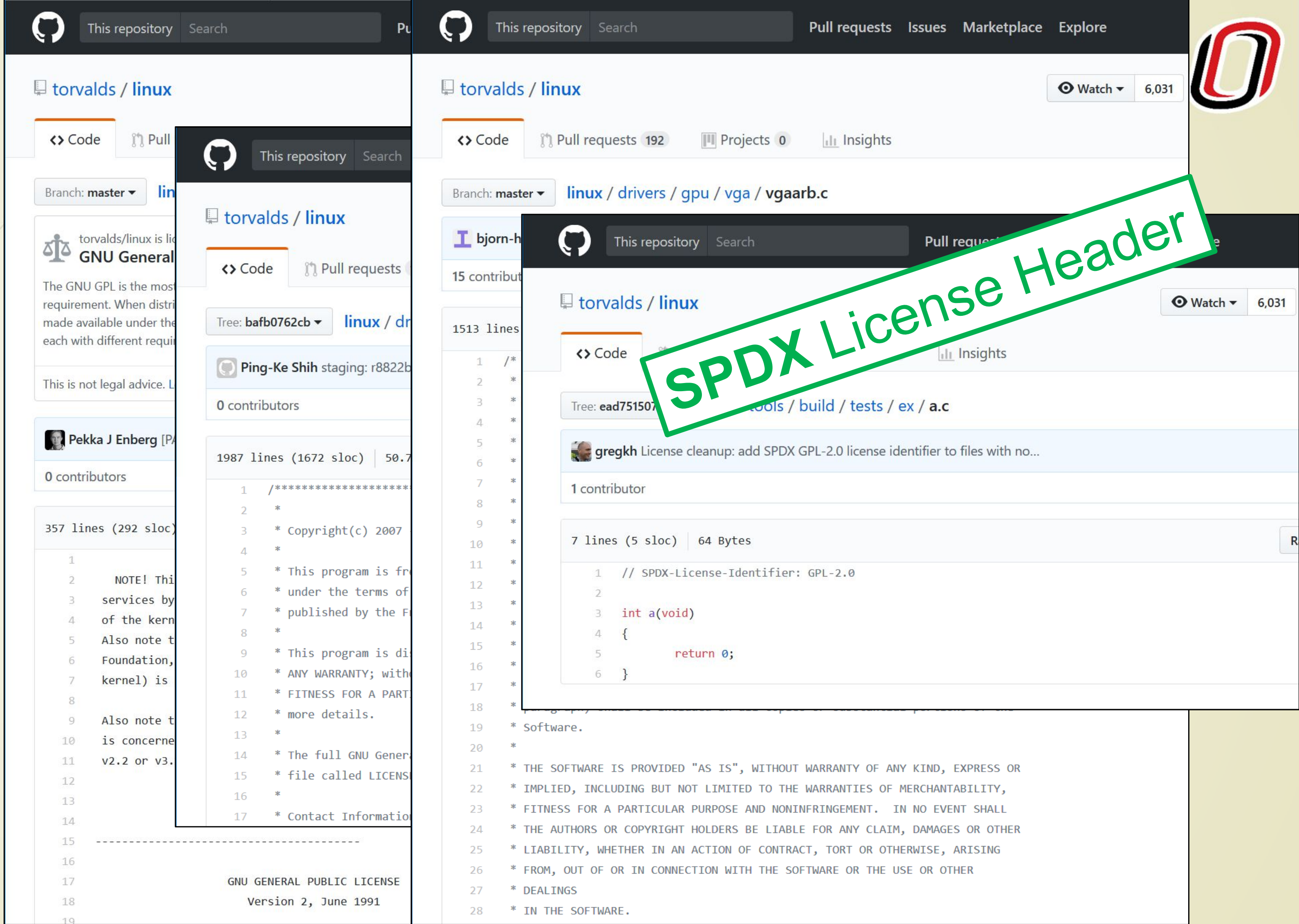

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ools / build / tests / ex / a.c

gregkh License cleanup: add SPDX GPL-2.0 license identifier to files with no...

1 contributor

7 lines (5 sloc) | 64 Bytes

```
// SPDX-License-Identifier: GPL-2.0

int a(void)
{
        return 0;
}
```

SPDX Community

- SPDX® (Software Package Data Exchange®)
- The vision of SPDX is to achieve license compliance with minimal cost across the supply chain
- SPDX community produces
  - License List
  - SPDX specification
  - Tools

OSS Risk Management Routines

Research Questions

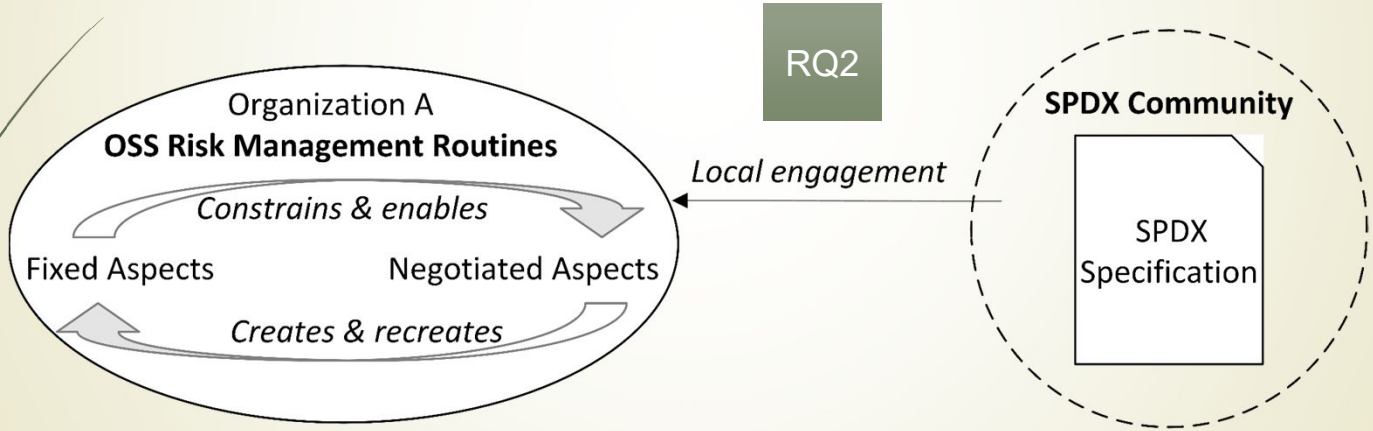
- RQ1: *How do organizations participating in the SPDX community describe their* **local interpretations** *of communally structured OSS risk management routines?*

Shared OSS Risk Management Routines In the Shared SPDX Standard Development

Research Questions

- RQ1: *How do organizations participating in the SPDX community describe their* **local interpretations** *of communally structured OSS risk management routines?*
- RQ2: *How do these local interpretations influence the extent of their SPDX* **adoption***?*

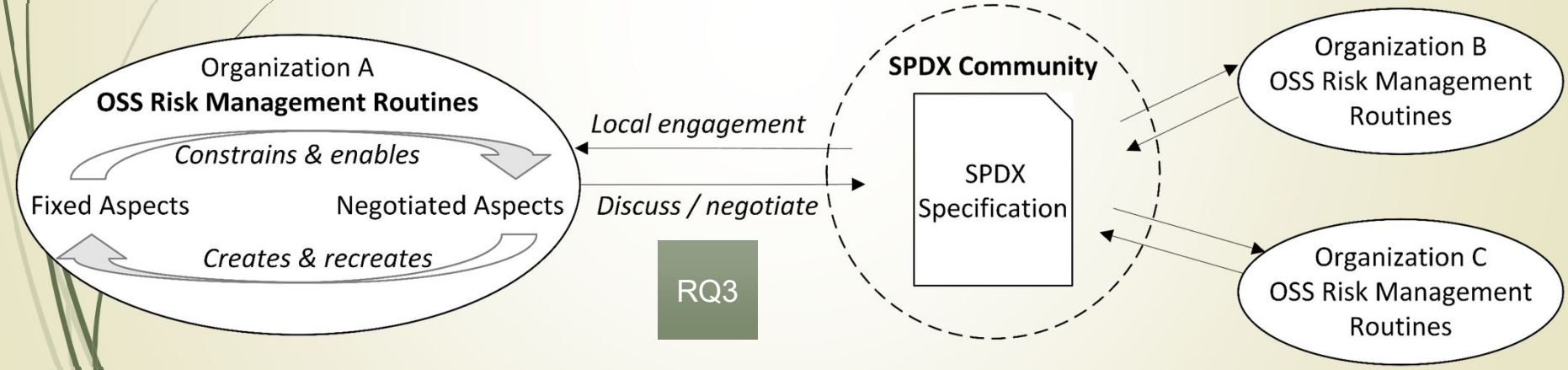
Shared OSS Risk Management Routines In the Shared SPDX Standard Development



Research Questions

- RQ1: *How do organizations participating in the SPDX community describe their* **local interpretations** *of communally structured OSS risk management routines?*
- RQ2: *How do these local interpretations influence the extent of their SPDX* **adoption***?*
- RQ3: *How do these member organizations seek to guide the* **advancement** *of the shared SPDX specification?*

Shared OSS Risk Management Routines In the Shared SPDX Standard Development



RQ3

Data Collection and Validation

- Assurance Case Method

- 16 Interviews
- 15 Organizations
- 10 hours of recording
- Field notes

Validation

- Focus Group with 15 SPDX members at Open Source Leadership Summit 2017

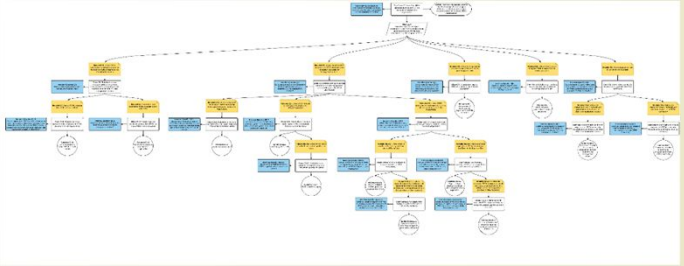
Interview Protocol

SPDX Case Study
IRB Approved: #473-19-EX

Main Interview Question:
In the context of software exchange, could you describe your organization's OSS risk management routines?

Follow-up questions:

Sense Making	**Q1**: How did your organization become familiar with or adopt SPDX?
Adoption Strategies	**Q1.1**: Can you speak about SPDX adoption strategies in your organization and how those strategies have been informed (i.e., through the SPDX website, discussions in the SPDX community, upstream and downstream vendors, or elsewhere)?
SPDX Use Cases	**Q1.2**: Could you describe SPDX-related use cases for your existing OSS risk management routines?
Compatibility	**Q2**: Could you comment on the compatibility of SPDX specification with your **existing** OSS risk management routines?
Usefulness	**Q2.1**: Approximately what percentage of SPDX fields are you currently using or plan to use? Could you comment on the use of these fields or the non-use of others?
Integration Points	**Q2.2**: Are SPDX fields used for enforcing automatic "gates" in the development build and release cycles? If yes, where would such "gates" be?
Tooling Feasibility	**Q2.2.1**: Are you using or custom developing SPDX compatible tools to support such "gates"?



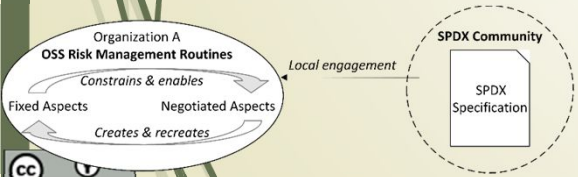
https://github.com/SPDX-CaseStudy/files

Answering the Research Question 1

- RQ1: *How do organizations participating in the SPDX community describe their* **local interpretations** *of communally structured OSS risk management routines?*
  - **Very differently, ranging from using full standard to learning from early adopters.**
    - *"When I hear my guys having modeling discussions, I often say, 'look at SPDX, if it's a coin flip what to call this field, let's go with the standard.'"*

Answering the Research Question 2

- RQ2: *How do these local interpretations influence the extent of their SPDX* **adoption***?*
  - ***Local interpretation is the adoption of SPDX for local needs.***
    - *"The cost of distributing license information was our business driver for adopting SPDX."*



Answering the Research Question 3

- RQ3: *How do these member organizations seek to guide the* **advancement** *of the shared SPDX specification?*
  - ***Local interpretations are source of innovation for communal practices.***
    - *"[In the SPDX group] we talked about the merits of different fields, how to characterize them, and how to serialize formats."*

Implications for Research and Practice

- **Parallels to risk practices**
  - Many organizations attempt to address risk close to delivery
  - Federating risk practices throughout product development can be successful
- **Built-in gradation for adoption**
  - Partial and successive implementation enables maturing local practices

Implications for Research and Practice

- **Stabilizing highly dynamic practices**
  - SPDX specification improves guidance by declaring potential risks in OSS
  - SPDX stabilizes the complexities in software design
  - SPDX is itself entails responsive design within the duality of routines
- **Strategic and brokered communities**
  - Brokers, such as the Linux Foundation, shape the ecosystem
  - SPDX is one example of a community that enables new interactions
  - Brokered engagements can include internal communal needs and external needs from brokering foundations

Contributions to

- **Routines:** Uncover complexities involved in the development of communal risk related open data standards.
- **Open source:** Report how the SPDX project is changing the open source ecosystem by developing shared routines and encoding fixed elements in the SPDX specification
- **Standard setting:** Demonstrate how shared practices shape standards
- **Methodology:** Demonstrate the use of the assurance case driven case study design.

Thank you!

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Robin


Matt


Georg

Assurance case and interview protocol:
https://github.com/SPDX-CaseStudy/files

Full Paper:
https://doi.org/10.1145/3148330.3148333

BRIDGE LAB

University of Nebraska Omaha

Backup Slides

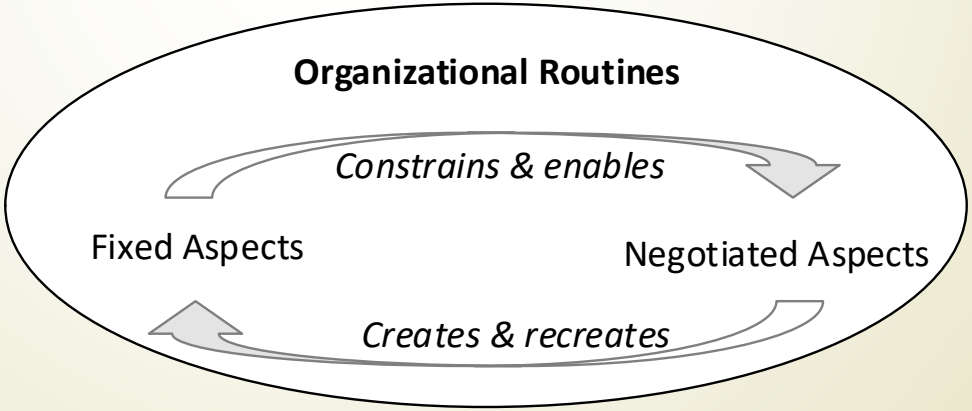
Key Findings

Rebuttal	Elimination Summary
Rebuttal R1: Unless the SPDX specification is deemed complex for operational needs of local OSS risk management routines.	**Rebuttal R1** is not eliminated for organizations just starting with SPDX. Organizations engaged in the SPDX community for a long time easily address the rebuttal.
Rebuttal R2: Unless the information recorded in an SPDX document does not support local OSS risk management routines.	**Rebuttal R2** is eliminated in most organizations by mapping parts of SPDX to local OSS risk management routines.
Rebuttal R3: Unless the organization does not require SPDX documents upon supply or intake.	**Rebuttal R3** is not eliminated in most organizations as SPDX adoption in OSS supply chains is not widespread. Few organization are starting to use and ship SPDX to customers.
Rebuttal R4: Unless SPDX does not integrate well in to organizational training programs.	**Rebuttal R4** is partially eliminated by the inclusion of License List in developer training and best practices. However, there is only mention of SPDX in formal training.
Rebuttal R5: Unless engagement with SPDX community is difficult.	**Rebuttal R5** is eliminated in organizations that directly participate, observe, or engage through proxy representation in the SPDX community. SPDX community is perceived as open and inviting.

Table 1. Rebuttals and summary of findings.

Exchanging Organizational Routines

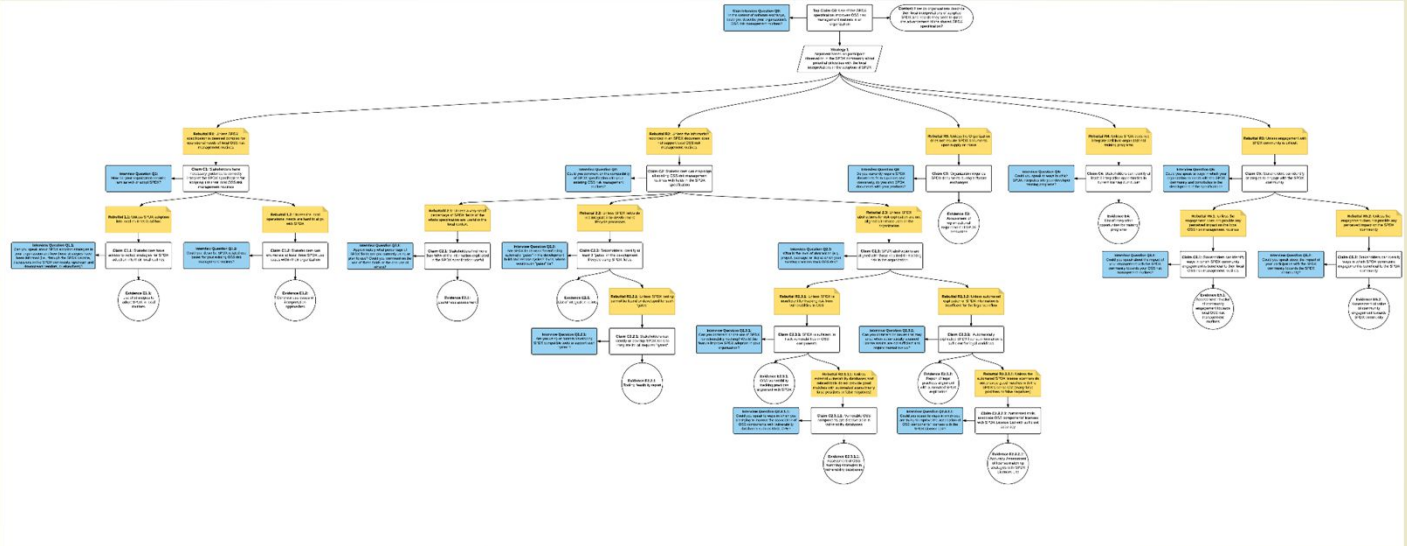
- Routine = Set of actions executed repeatedly with reliable outcomes
- Fixed vs. negotiated aspects
  - Fixed: artifacts, workflows, forms, tools, standards, …
  - Negotiated: actual use, workarounds, shortcuts, …
- Knowledge boundary complicates exchange of routines



Creating Shared Routines through Shared Standards

- Shared standards embody the fixed aspects of shared routines
- Achieve compatability and foster exchange
- Requires building shared understanding
  - Adoption is local interpretation
  - Unexpected implementations result from deviant interpretations
  - Audits and certifications assure uniform implementations
- Standardization process benefits participant organizations
  - Align standard with local interpretation
  - Align organization with emerging standard
  - Information advantage

Method: Assurance Case

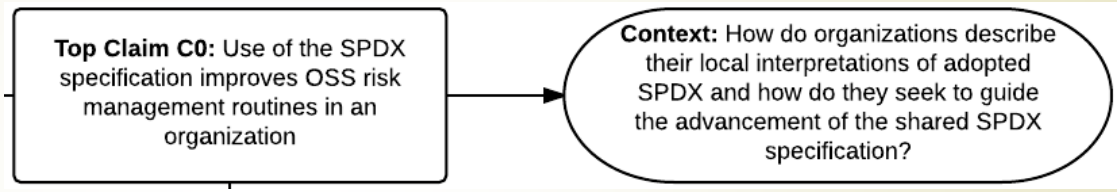


https://github.com/SPDX-CaseStudy/files

Assurance Case: Top Claim C0

Top Claim C0: Use of the SPDX specification improves OSS risk management routines in an organization

Assurance Case: Top Claim C0



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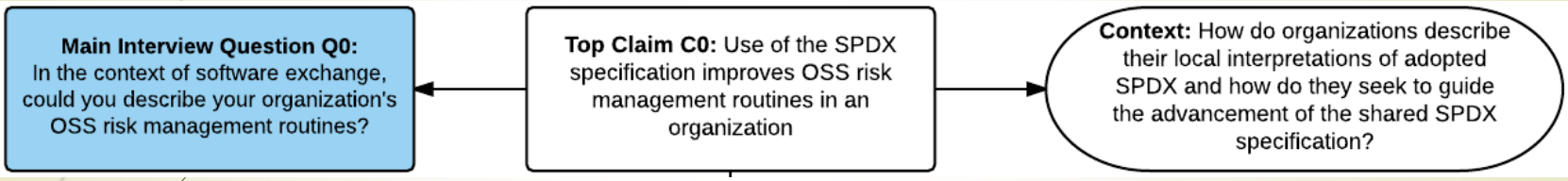

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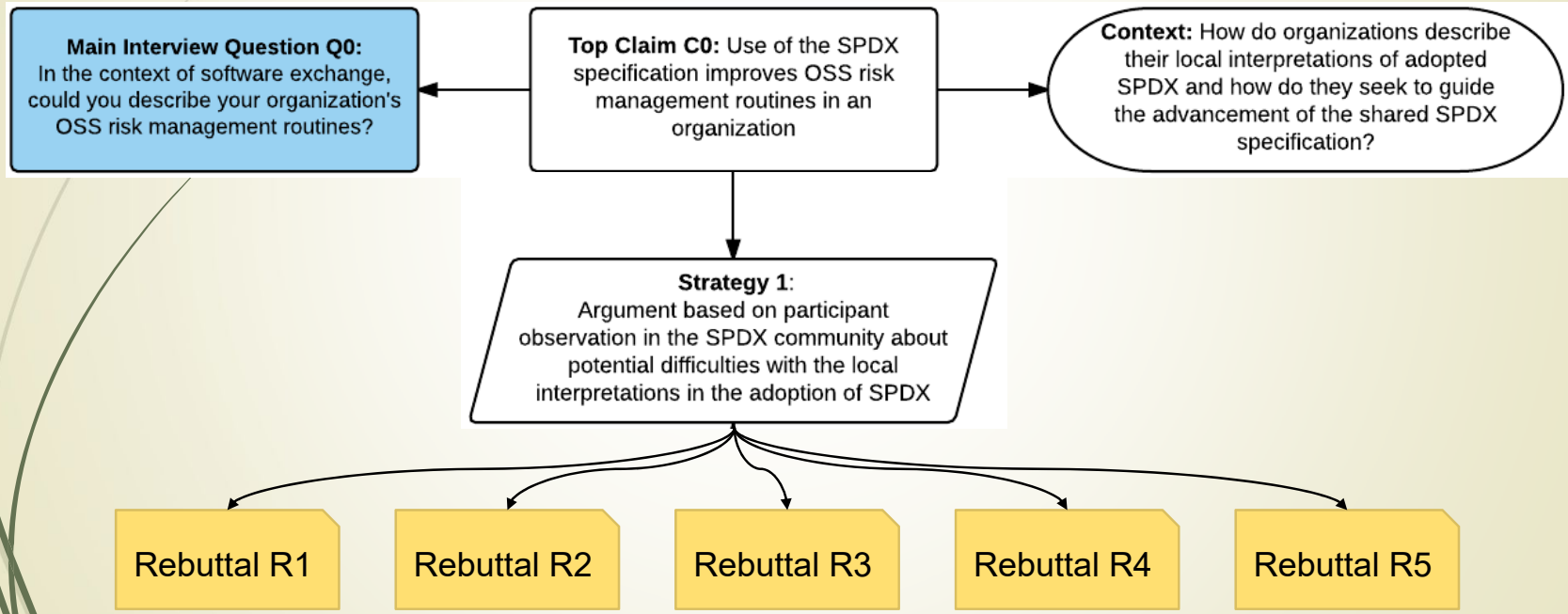
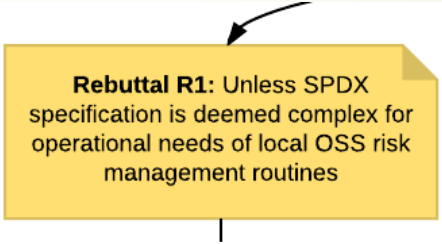
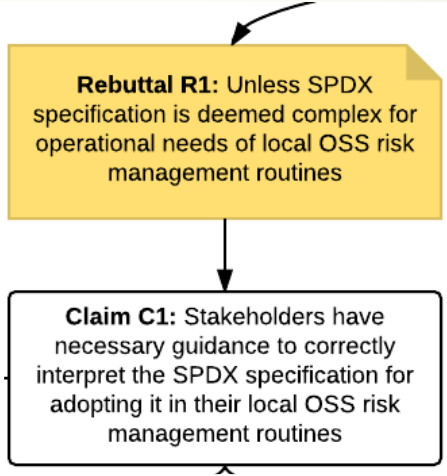


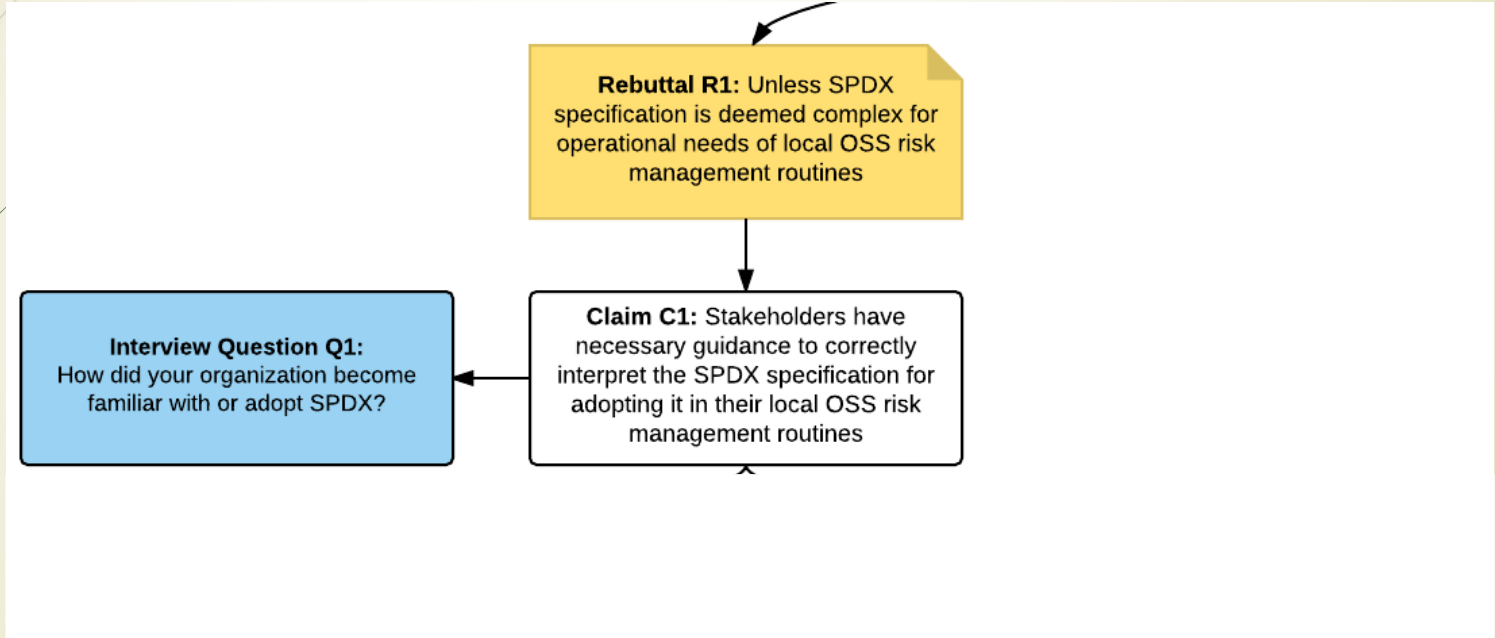
Assurance Case: Rebuttal R1



Assurance Case: Rebuttal R1



Assurance Case: Rebuttal R1



Assurance Case: Rebuttal R1