An Analysis of Risk in Open-Source Project Dependencies

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Introduction

- Popularity of Open Source Software has shown a steady increase over time
  - 3.6 million repos depend on the top 50 open-source projects
- The use comes with the risk of software vulnerabilities
  - Attackers can exploit these
- Prediction of risk is important for this
  - Software metrics
  - Project Activity
  - Vulnerability Data

Background Research

Case Studies

Log4j Vulnerability

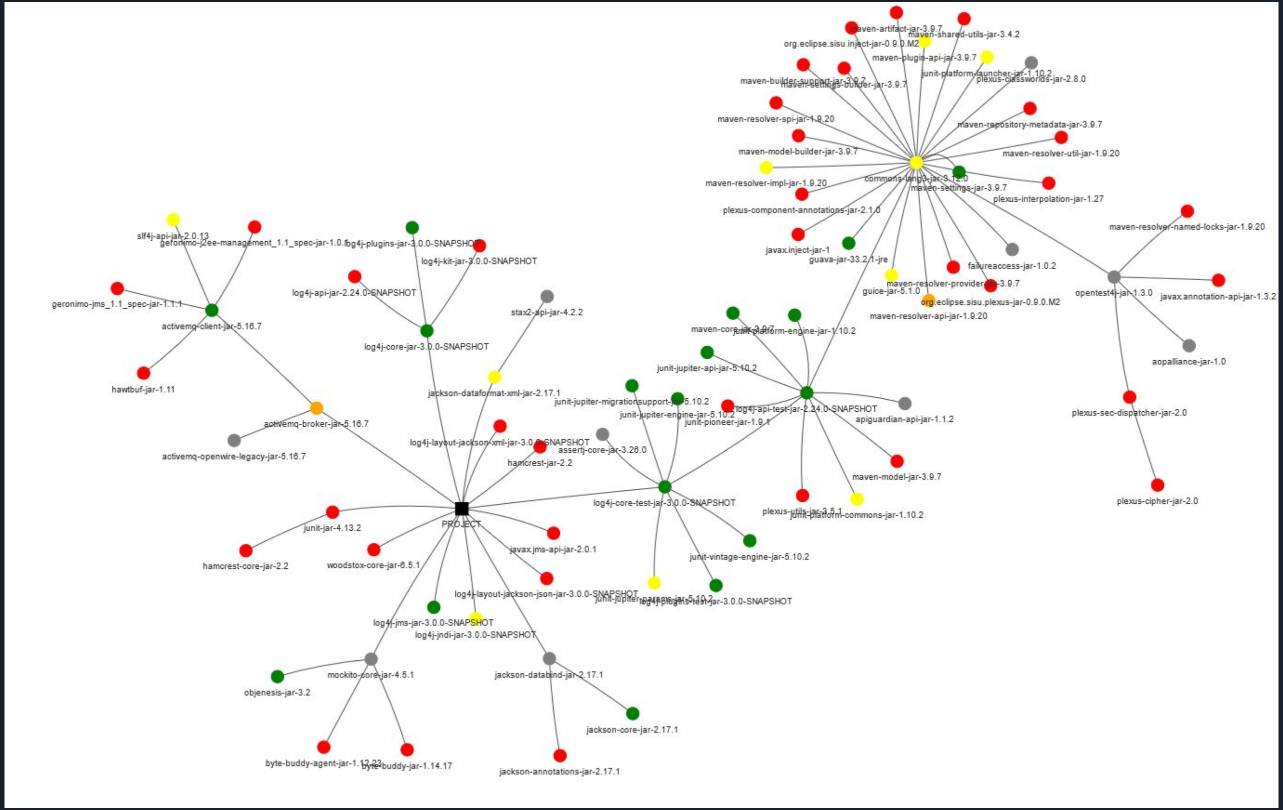
- ➔

Heartbleed Vulnerability

- ➔

Finding Package Dependencies

Example Final Graph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junit-platform-launcher-jar-1.10.2
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maven-resolver-spi-jar-1.9.20
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maven-model-builder-jar-3.9.7
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maven-resolver-impl-jar-1.9.20
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maven-settings-jar-3.9.7
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plexus-component-annotations-jar-2.1.0
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javax.inject-jar-1
guava-jar-33.2.1-jre
failureaccess-jar-1.0.2
maven-resolver-provider-jar-3.9.7
guice-jar-5.1.0
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javax.annotation-api-jar-1.3.2
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maven-core-jar-3.9.7
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junit-jupiter-api-jar-5.10.2
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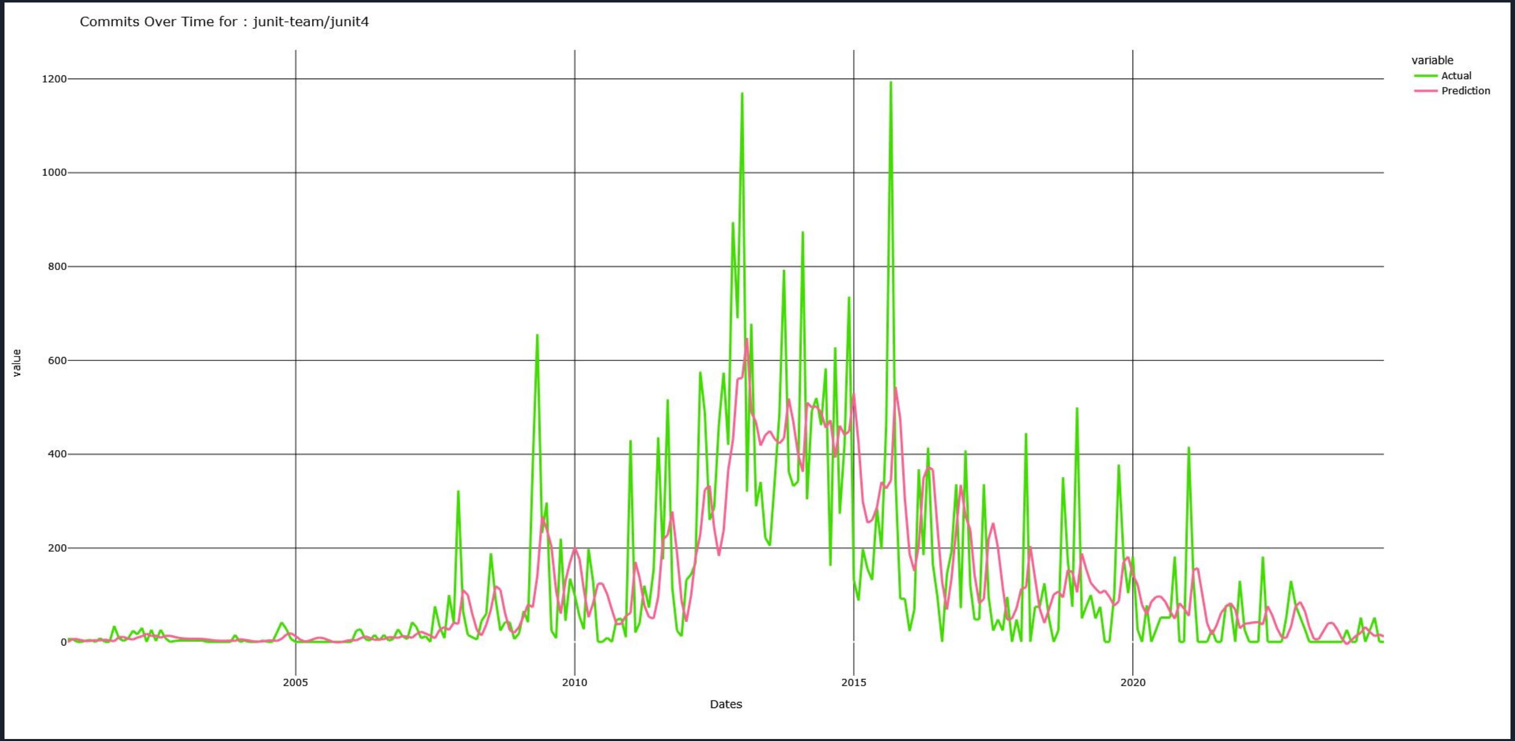
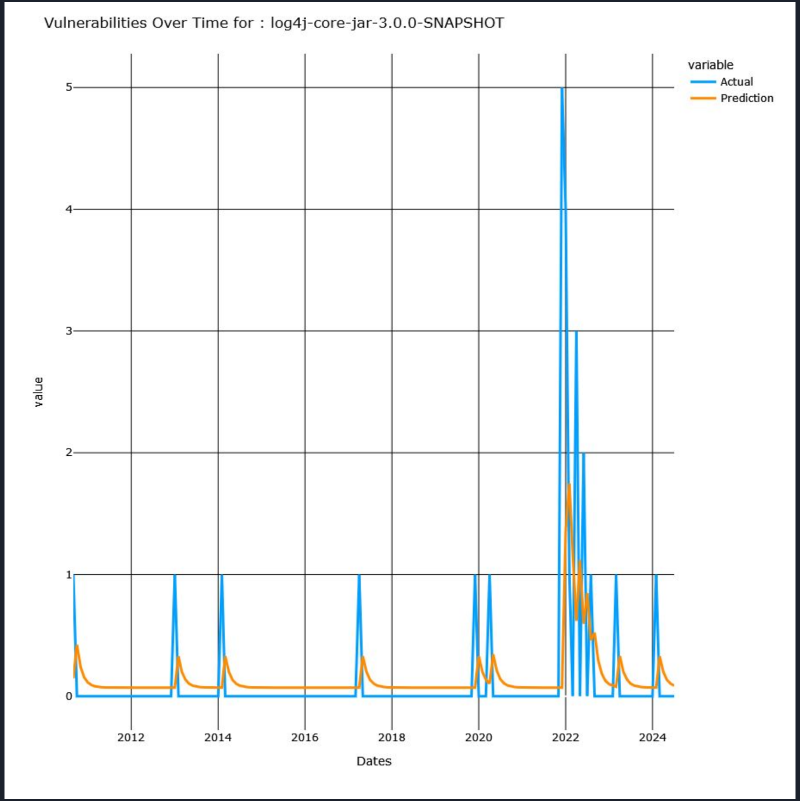
Risk Prediction

Example Graph of Project Activity Risk Prediction



Example Graph of Vulnerability Risk Prediction



Technical Challenges

Student Contribution

Róisín Ní Bhriain

- Gitlab setup + Issues
- Literature Review
- Software
- Practicum Paper First + Second Draft

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Conclusion

References

Thank You For Listening!