22nd IEEE International Conference on Software Architecture (ICSA)

Mining Security Documentation Practices in OpenAPI Descriptions

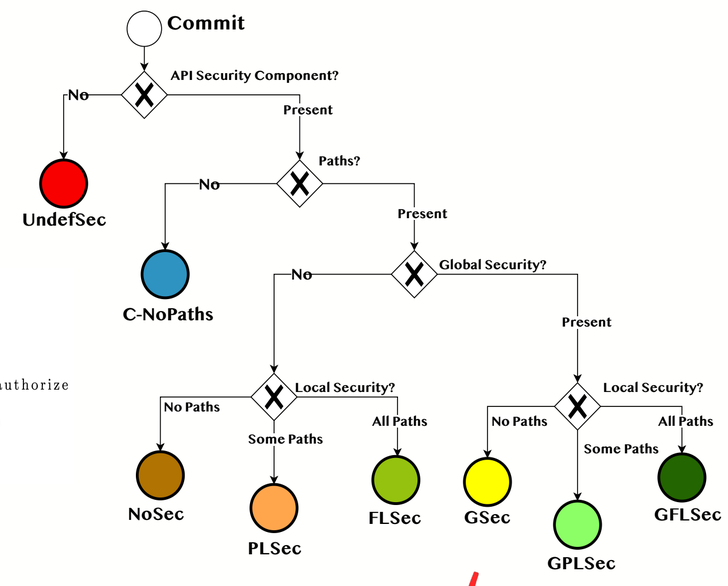
Research Questions:

R1. To what extent are security aspects documented in Web APIs described using Swagger 2.0 or OpenAPI 3.0?
R2. How does the level of detail in security documentation within OpenAPI descriptions vary along API histories?
R3. How does security coverage correlate with API size and evolve over time?

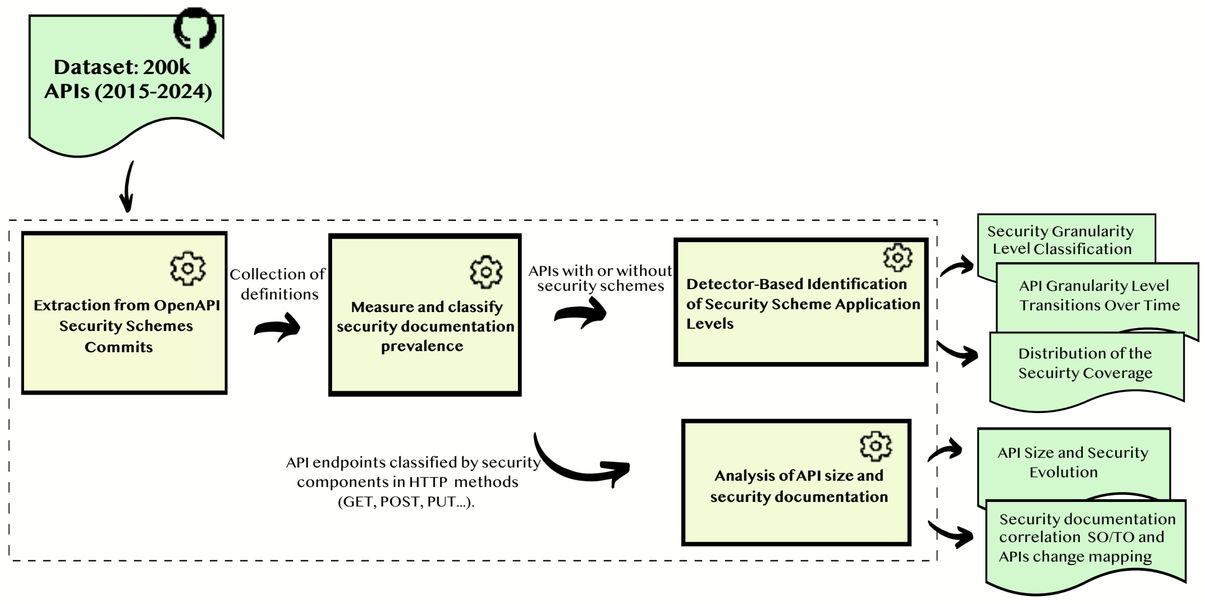
OpenAPI Specification - Input Example

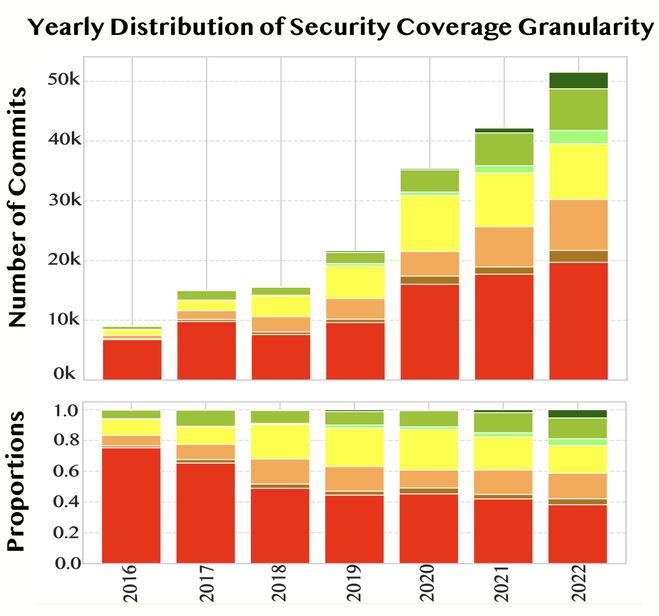
```yaml
openapi: 3.0.3
info:
  contact:
    email: support@socialmedia.com
  title: Social Media API
  version: 1.0.0
security:
  - OAuth2: [read, write]
paths: ...
  /posts:
    get:
      security:
        - OAuth2: [read]
    post:
      security:
        - OAuth2: [write]
components:
  securitySchemes:
    OAuth2:  # Custom name for the OAuth2 security scheme
      type: oauth2
      flows:
        authorizationCode:
          authorizationUrl: https://socialmedia.com/oauth/authorize
          tokenUrl: https://socialmedia.com/oauth/token
          refreshUrl: https://socialmedia.com/oauth/refresh
          scopes:
            read: Read access to user's posts
            write: Write access to user's posts
```

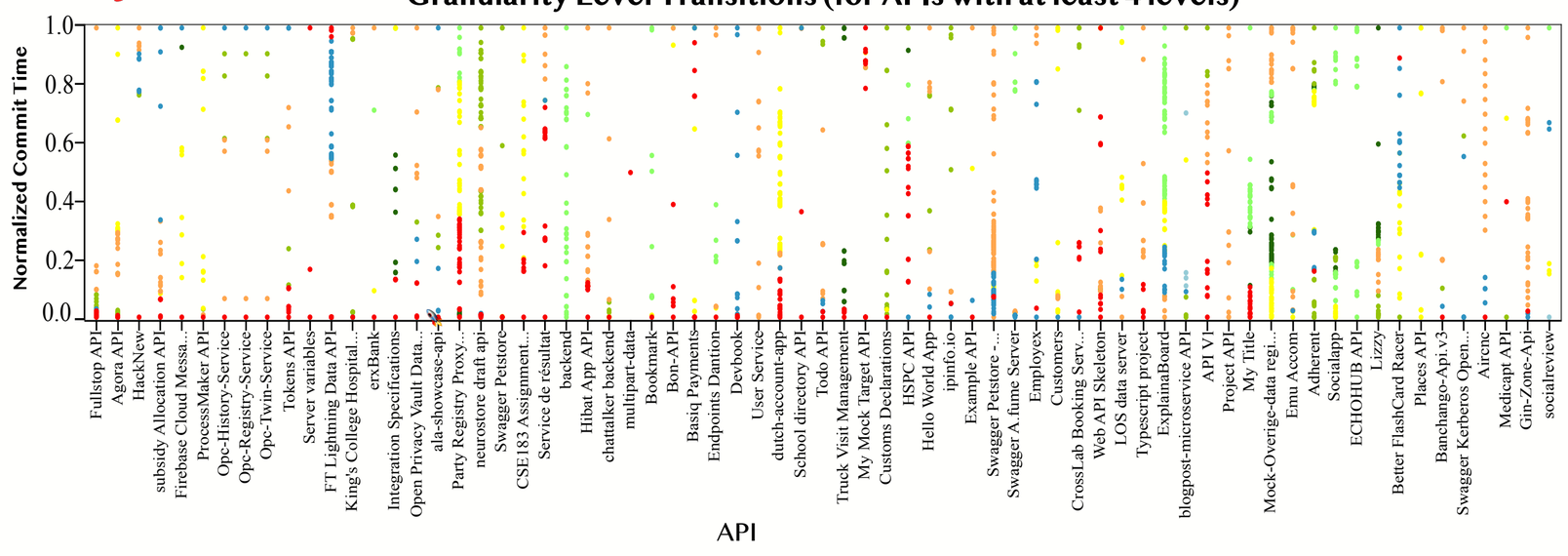
Security Coverage Granularity

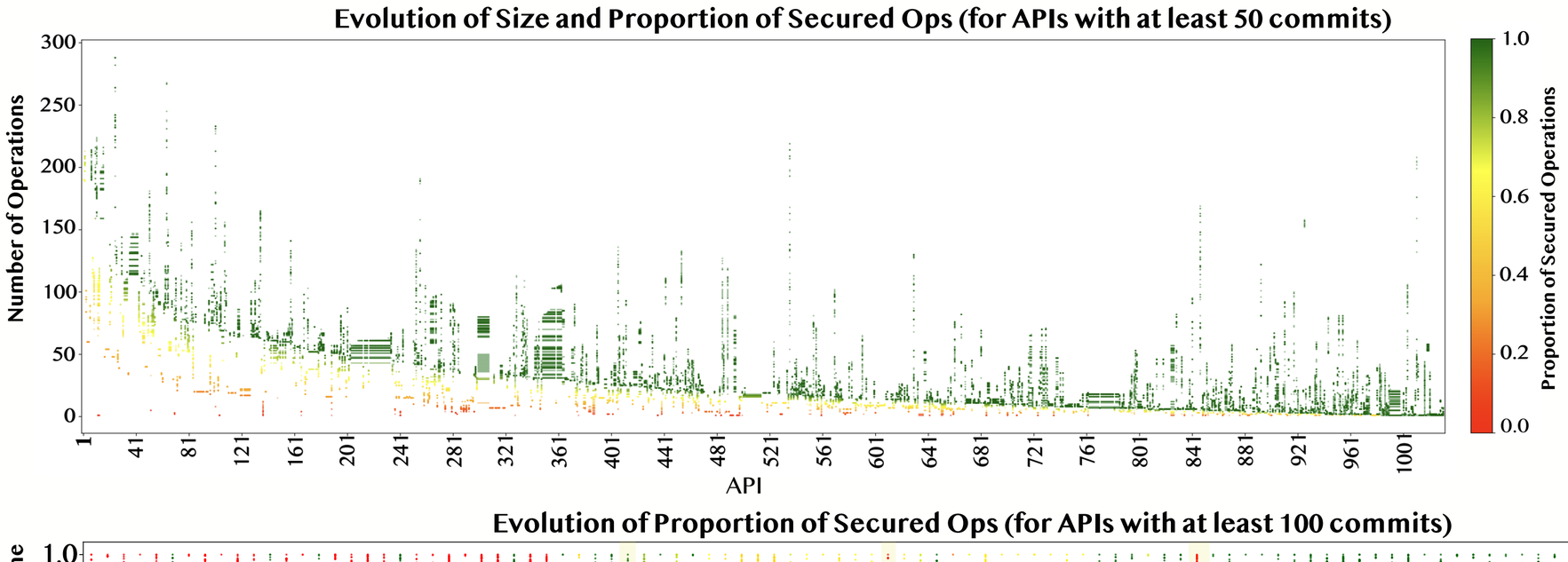


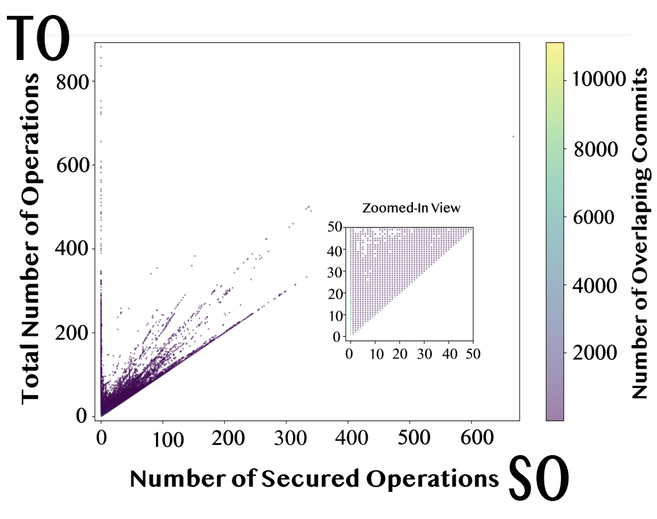
OpenAPI Security Analysis Pipeline

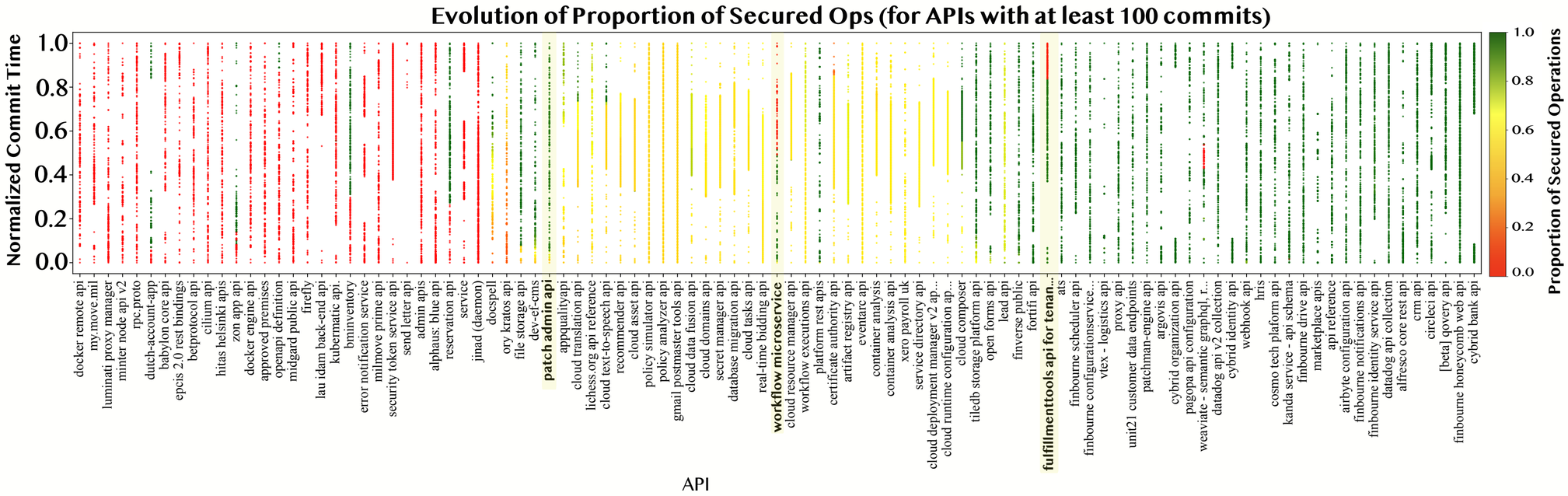












$$SOC = \frac{SO\,(api)}{TO\,(api)}$$

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