Profiling Cryptography Developers

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Goal

Correlation between crypto developer contribution on Stack Overflow and crypto developer activity on GitHub
Sample crypto question
Sample profile

Reputation 28'484
Crypto score 543
Crypto accepted answers 85
Did Jay use crypto APIs on GitHub?
Pipeline

Tag analysis
- Crypto tag

Stack Exchange
- Crypto user

Scraping
- Social media
- GitHub

GitHub API
- Repositories
- Crypto repo

Git Blame
- File author
- File committer
Tag analysis

11,130 crypto discussions

2,184 tags
Tag analysis

\[ \text{H1 of tag } "x" = \frac{\#\text{posts containing } "x" \text{ AND } "cryptography"}{\#\text{posts containing } "x"} \]

\[ \text{H2 of tag } "x" = \frac{\#\text{posts containing } "x" \text{ AND } "cryptography"}{\#\text{posts containing } "cryptography"} \]

\[ \text{H1} = 0.025 \]

\[ \text{H2} = 0.005 \]
## Tag analysis

<table>
<thead>
<tr>
<th>Tags</th>
<th>Tags</th>
</tr>
</thead>
<tbody>
<tr>
<td>3des</td>
<td>aes</td>
</tr>
<tr>
<td>bouncycastle</td>
<td>cng</td>
</tr>
<tr>
<td>crypto++</td>
<td>cryptoapi</td>
</tr>
<tr>
<td>cryptographic-hash-function</td>
<td>cryptography</td>
</tr>
<tr>
<td>cryptojs</td>
<td>des</td>
</tr>
<tr>
<td>diffie-hellman</td>
<td>digital-signature</td>
</tr>
<tr>
<td>ecdsa</td>
<td>elliptic-curve</td>
</tr>
<tr>
<td>encryption-asymmetric</td>
<td>encryption-symmetric</td>
</tr>
<tr>
<td>encryption</td>
<td>hash</td>
</tr>
<tr>
<td>hmac</td>
<td>jce</td>
</tr>
<tr>
<td>keystore</td>
<td>md5</td>
</tr>
<tr>
<td>openssl</td>
<td>pbkdf2</td>
</tr>
<tr>
<td>pkcs#7</td>
<td>pkcs#11</td>
</tr>
<tr>
<td>private-key</td>
<td>public-key-encryption</td>
</tr>
<tr>
<td>public-key</td>
<td>public-key</td>
</tr>
<tr>
<td>pycrypto</td>
<td>rijndael</td>
</tr>
<tr>
<td>rsa</td>
<td>salt</td>
</tr>
<tr>
<td>sha</td>
<td>sha1</td>
</tr>
<tr>
<td>sha1</td>
<td>sha256</td>
</tr>
<tr>
<td>smartcard</td>
<td>x509</td>
</tr>
<tr>
<td>x509certificate</td>
<td>Xor</td>
</tr>
</tbody>
</table>

**Total: 42 Tags**
Stack Exchange

42 tags

92,000 crypto discussions

UserId

Crypto score

Reputation

#Crypto accepted answer

#Crypto accepted answer > 10

Crypto score > 10

select userid, sum(score), reputation, count(+) as answers from (select distinct questions.
answers.score,
(select reputation from Users where id = us.Id) as reputation
from Posts as questions
left join Posts answers ON answers.ParentId = questions.id
left join Users us ON answers.OwnerUserId = us.id
left join posttags as pt on pt.postId = questions.id
where pt.tagId IN
    ( select id from tags
where tagname = 'cryptography' or
tagname like 'encryption' or
>tagname like 'hash'
or tagname like '3des'
or tagname like 'aes'
or tagname like 'cryptojs'
or tagname like 'sha'
or tagname like 'md5'
or tagname like 'openssl'
or tagname like 'sha1'
or tagname like 'sha256'
or tagname like 'smartcard'
or tagname like 's309'
or tagname like 'sha256'
or tagname like 'sbox'
or tagname like 'armor'
or tagname like 'pkcs#7'
or tagname like 'pkcs#2'
or tagname like 'keystore'
or tagname like 'mdac'
or tagname like 'pkcs11'
or tagname like 'bouncyCastle'
or tagname like 'cog'
or tagname like 'crypto++'
or tagname like 'cryptoapi'
or tagname like 'cryptographic-hash-function'
or tagname like 'des'
or tagname like 'diffie-hellman'
or tagname like 'digital-signature'
or tagname like 'ecc95'
or tagname like 'elliptic-curve'
or tagname like 'encryption-asymmetric'
or tagname like 'encryption-symmetric'
)
and Reputation > 20
and answers.PostTypeId = 2
) as us
    group by userid, reputation
having count(+) > 10 and sum(score) > 10
Stack OverFlow users
Stack OverFlow users

#Crypto accepted answers
Stack OverFlow users
Stack OverFlow users

Jay

Crypto score
#Crypto accepted answers
Stack OverFlow scraping
Stack OverFlow scraping
Manual search
Stack Overflow crypto users

44.8% Match

- No GitHub: 552
- GitHub - Scraping: 380
- GitHub - Manual search: 68
GitHub API - PyGithub

- 448 GitHub users
- 23'634 Repositories
- Crypto-related

Exact Match

RegEx

Exact Crypto-related
Languages

Total: 23634 Repositories
Selected languages
## Crypto libraries

<table>
<thead>
<tr>
<th>Python</th>
<th>Ruby</th>
<th>C</th>
<th>Perl</th>
<th>C++</th>
<th>Java</th>
<th>C#</th>
<th>PHP</th>
<th>Rust</th>
</tr>
</thead>
<tbody>
<tr>
<td>from passlib.</td>
<td>require 'rbacl'</td>
<td>include &quot;tomcrypt_&quot;</td>
<td>include &lt;botan/&gt;</td>
<td></td>
<td>Java.security</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>import passlib</td>
<td>require 'digest'</td>
<td>include &lt;tomcrypt.h&gt;</td>
<td>include &quot;cryptlib.h&quot;</td>
<td>Javax.crypto</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>import pbkdf2_sha256</td>
<td>require 'openssl'</td>
<td>include &quot;paillier.h&quot;</td>
<td>include &lt;cryptlib&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>import nacl</td>
<td>require 'bcrypt'</td>
<td>include &quot;rsa.h&quot;</td>
<td>include &quot;aes.h&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>from nacl</td>
<td>include &quot;x509.h&quot;</td>
<td>using CryptoPP::</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>import hashlib</td>
<td>include &quot;crypto_&quot;</td>
<td>include &lt;des.h&gt;</td>
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<td></td>
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</tr>
<tr>
<td>from hashlib</td>
<td>include &lt;openssl&gt;</td>
<td>include &quot;blowfish.h&quot;</td>
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<td></td>
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<td></td>
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<tr>
<td>from crypto</td>
<td>include &lt;themis/&gt;</td>
<td>include &lt;wolfssl/&gt;</td>
<td>include &quot;secblock.h&quot;</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>import crypto</td>
<td>include &quot;xxhash.h&quot;</td>
<td>include &quot;eccrypto.h&quot;</td>
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<tr>
<td>from pyelliptic</td>
<td>include &quot;aes.h&quot;</td>
<td>include &lt;helib/&gt;</td>
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<tr>
<td>import bCrypt</td>
<td>include &quot;md5.h&quot;</td>
<td>include &quot;cryptopp/&quot;</td>
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<td>from bCrypt</td>
<td>include &quot;sha1.h&quot;</td>
<td>include &lt;cryptopp/&gt;</td>
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<td></td>
<td>include &quot;sha256.h&quot;</td>
<td>include &lt;openssl/&gt;</td>
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</tr>
</tbody>
</table>
Crypto-related repositories

- Python: 2.5%
- Ruby: 2.9%
- C: 5.6%
- C++: 2.1%
- Java: 9.2%

Legend:
- Non-crypto repository
- Crypto-related repository
Crypto-related repositories

- Python
- Ruby
- C
- C++
- Java

Non-crypto repository
Crypto-related repository

GitBlame
Crypto file contributor

- **C**
  - #Developer contributed to crypto file: 39
  - #Developer contributed to crypto project: 25

- **RUBY**
  - #Developer contributed to crypto file: 37
  - #Developer contributed to crypto project: 9

- **PYTHON**
  - #Developer contributed to crypto file: 36
  - #Developer contributed to crypto project: 11

- **C++**
  - #Developer contributed to crypto file: 6
  - #Developer contributed to crypto project: 3

- **JAVA**
  - #Developer contributed to crypto file: 58
  - #Developer contributed to crypto project: 22
Next steps
Remaining steps

**Contributed to crypto files**

**Contributed to crypto projects**

**No crypto projects**

**crypto score**

**reputation**

**crypto score and reputation**
Remaining steps

Contributed to crypto files

Contributed to crypto projects

No crypto projects

? crypto score

reputation

crypto score and reputation
Remaining steps

Contributed to crypto files
Contributed to crypto projects
No crypto projects

crypto score
reputation
crypto score and reputation
How experienced is Jay?

Reputation 28'484
Crypto accepted answers 85
Crypto score 543
Repositories 45
Crypto repositories 3
Crypto files 87
Crypto files contribution 5
Summary

Tag analysis
- Crypto tag
- Stack Exchange
- Scaping
- GitHub API
- Git Blame

- Crypto user
- Social media
- GitHub
- Repositiorie
- File author
- File committer

448 GitHub Users
23634 Repositories

Exact Match
CodeSearch API

Crypto-related

RegEx

Exact Crypto-related

Python 2.5% 29
Ruby 2.9% 37
C 5.6% 36
C++ 2.1% 6
Java 9.2% 58

File Contributor No File Contributor

C 39 29
Ruby 37 9
Python 36 11
C++ 6 3
Java 58 22