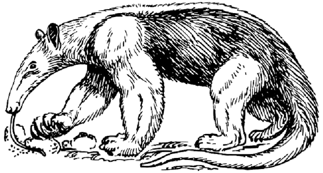
Anteater -
CI Gate Security

...

The Problem

- Approx 1000 Changesets a month / 70+ projects in OPNFV
- No security controls - projects can pull in binaries, scripts, artefacts from anywhere.
- Platform is then deployed into multiple NEP and Operator networks.

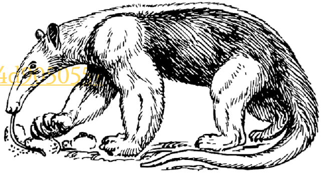


Why Anteater..?

Recent Attacks against CI environments

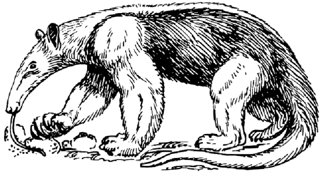
- Ticketing, bug tracking, and git provided secrets (e.g. crypto keys, seeds, hashes, credentials, and source code) provided hacker access to build systems.
- Wikis revealed administrative workflows, IP’s and VPN details
- Stolen Engineering credentials (ssh keys) were used to commit backdoors to version control which were self-approved and later deployed into production

https://medium.com/@chrismcnab/alexseys-ttps-1204d905055



What we have seen in OPNFV..

- Private keys stored in repos (CVE-2016-1000297).
- WGET script downloads from a developer's laptop.
- Lot’s of hard coded passwords
- Lot’s of binaries
- Uses of ‘eval’ and other functions that can be exploited.
- Clones of git repositories outside opnfv.



What does Anteater do?

Scans git patches for potential malicious strings or binaries.

If a potential malicious object is identified, it is *blocked from merging until reviewed.

* blocked as in -1 gerrit review

How?

Using standard regular expressions to search in scripts / code or any text file:

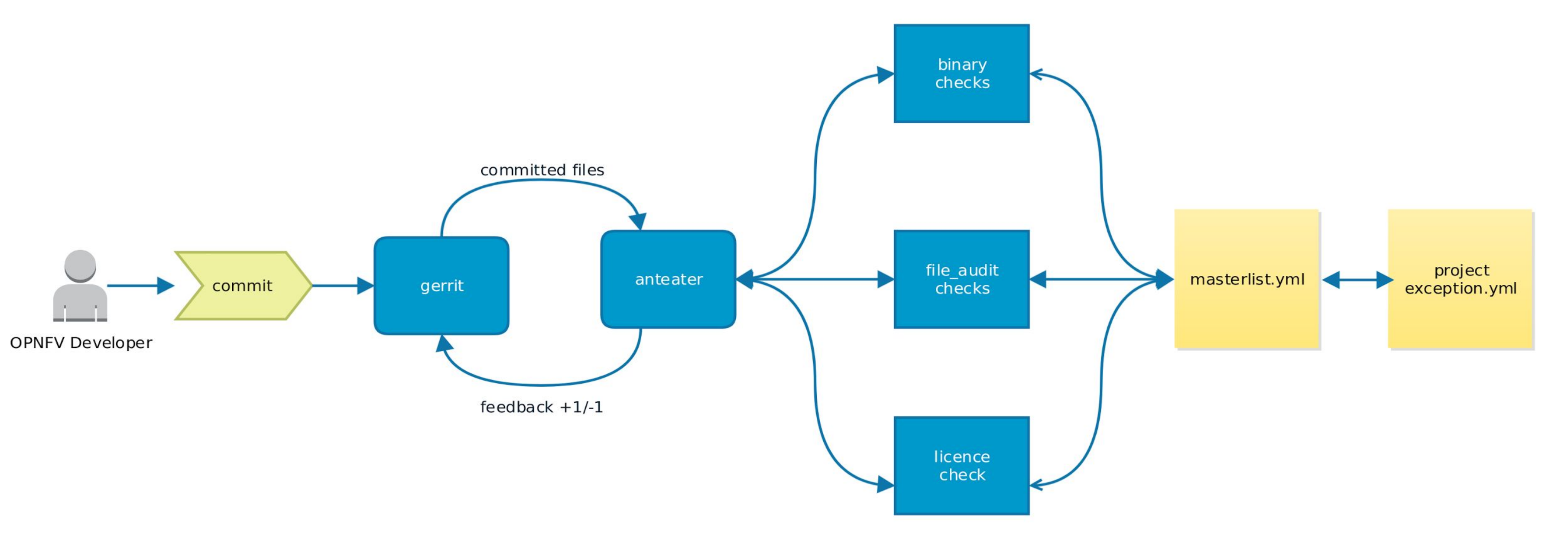
```
- "-----BEGIN\sRSA\sPRIVATE\sKEY----"
- "curl(.*?)bash"
- "git(.*?)clone"
- "sh(.*?)curl"
- "subprocess(.*?)shell(.*?)=(.*?)True"
```

How?

All binary files are blocked, unless a sha256 checksum of the file is provided.

```
[architecture.png, 407fb352a8b709fa1890f200fee5186455fe815fb6c7808305f210e2f1faf76d]
[architecture.pdf, 90517f282ed8137978c9a5e8da06450371fa1a7a783423ee28ba7a5d61f2d1e6]
```

How does this work in CI Gate?



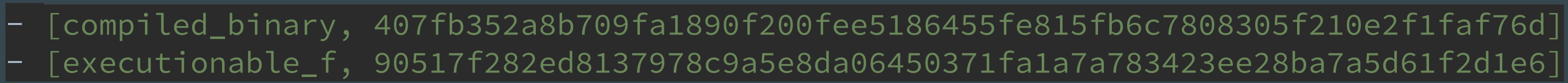
A patchset file list is provided by JJB

```
/home/jjb/repo/fileone.py

/home/jjb/repo/somebinary

/home/jjb/somescript.sh
```

If the file is a binary, it is blocked unless it has an exception (as below).



```
- [compiled_binary, 407fb352a8b709fa1890f200fee5186455fe815fb6c7808305f210e2f1faf76d]
- [executionable_f, 90517f282ed8137978c9a5e8da06450371fa1a7a783423ee28ba7a5d61f2d1e6]
```

- *Blocked means -1 at gate*

If a file is not a binary, the contents are checked

```
file_contents:
 - -----BEGIN\sRSA\sPRIVATE\sKEY----
 - "curl(.*?)bash"
 - "git(.*?)clone"
 - "sh(.*?)curl"
 - dual_ec_drbg
 - eval
 - gost
 - md[245]
```

Unless an exception is provided:

```
file_contents:
 - "wget http://repo1\\.maven\\.org"
 - paramiko\.RSAKey\.from_private_key_file\(pkey_file\)
 - "git clone(.*)\\.openstack\\.org"
 - "git clone(.*)gerrit\\.opnfv\\.org"
```

Example One

A project needs to clone the following repo in a script / code file:

https://github.com/john_doe/repo

Developer submits a patch to releng-anteater with the following regex:

```
- "git (.*)github\\.com\\john_doe/repo"
```

Example Two

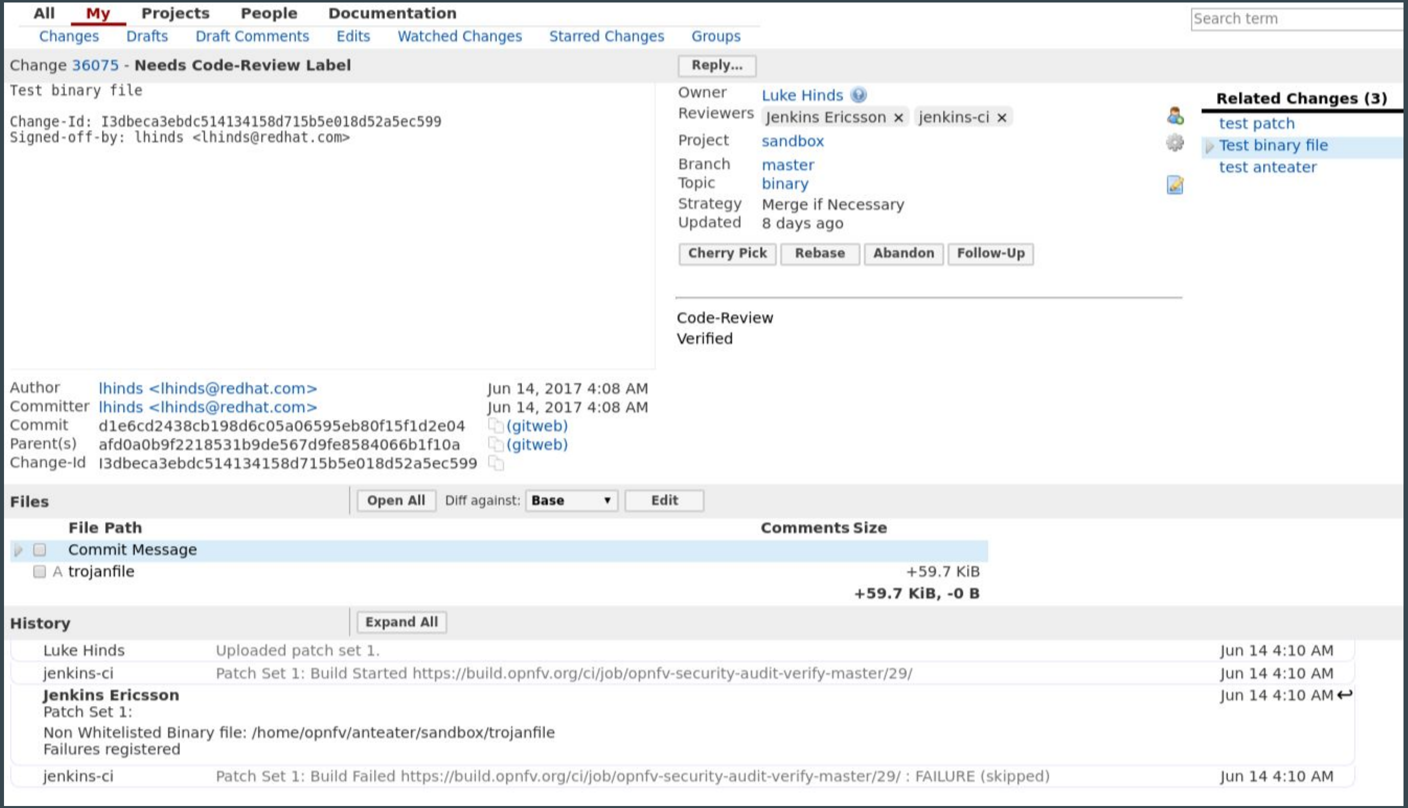
A project has the following in script

```
wget https://trusted.com/somepackage.rpm
```

Developer submits a patch to releng-anteater with the following regex:

```
file_contents:
  - "wget(.*)trusted\\.com/somepackage.rpm"
```

Example Patch



Change 36075 - **Needs Code-Review Label**

```
Test binary file

Change-Id: I3dbeca3ebdc514134158d715b5e018d52a5ec599
Signed-off-by: lhinds <lhinds@redhat.com>
```

Owner Luke Hinds
Reviewers Jenkins Ericsson × jenkins-ci ×
Project sandbox
Branch master
Topic binary
Strategy Merge if Necessary
Updated 8 days ago

Code-Review
Verified

Related Changes (3)

- test patch
- Test binary file
- test anteater

Author	lhinds <lhinds@redhat.com>	Jun 14, 2017 4:08 AM
Committer	lhinds <lhinds@redhat.com>	Jun 14, 2017 4:08 AM
Commit	d1e6cd2438cb198d6c05a06595eb80f15f1d2e04	(gitweb)
Parent(s)	afd0a0b9f2218531b9de567d9fe8584066b1f10a	(gitweb)
Change-Id	I3dbeca3ebdc514134158d715b5e018d52a5ec599	

Files

	File Path	Comments	Size
□	Commit Message		
□ A	trojanfile		+59.7 KiB
			+59.7 KiB, -0 B

History

Luke Hinds	Uploaded patch set 1.	Jun 14 4:10 AM
jenkins-ci	Patch Set 1: Build Started https://build.opnfv.org/ci/job/opnfv-security-audit-verify-master/29/	Jun 14 4:10 AM
Jenkins Ericsson Patch Set 1: Non Whitelisted Binary file: /home/opnfv/anteater/sandbox/trojanfile Failures registered		Jun 14 4:10 AM
jenkins-ci	Patch Set 1: Build Failed https://build.opnfv.org/ci/job/opnfv-security-audit-verify-master/29/ : FAILURE (skipped)	Jun 14 4:10 AM

How is this being phased in.

During E release, non voting. Voting for F release.

Tool will be available on PyPi for developers to test locally.

Works against patchset, not entire repo (although repo can be scanned / daily cron)

New features planned

ClamAV Scanning of all files

HTML rendered reports

Possible Integration with Black Duck Hub API

Developer tools for generating exception regular expressions

Github integration

More information

Wiki: https://wiki.opnfv.org/pages/viewpage.action?pageId=10294496

Git Mirror: https://github.com/opnfv/releng-anteater