Improvements in LibreOffice security

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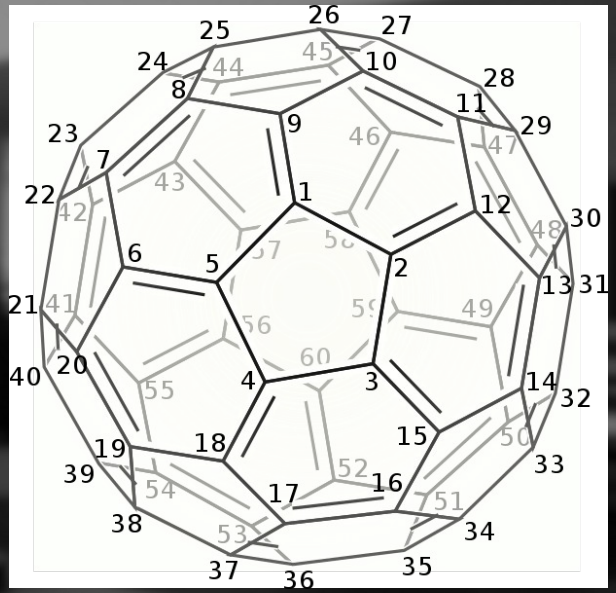
the company

- based in Hamburg – from where Star-/OpenOffice originated
- shareholders & leadership team
  - Thorsten Behrens (development, strategy & operations)
  - Uli Brandner & sales team at CIB (investments & sales)
- spin-off from CIB software
- focused on Free & OpenSource software and solutions



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Intro

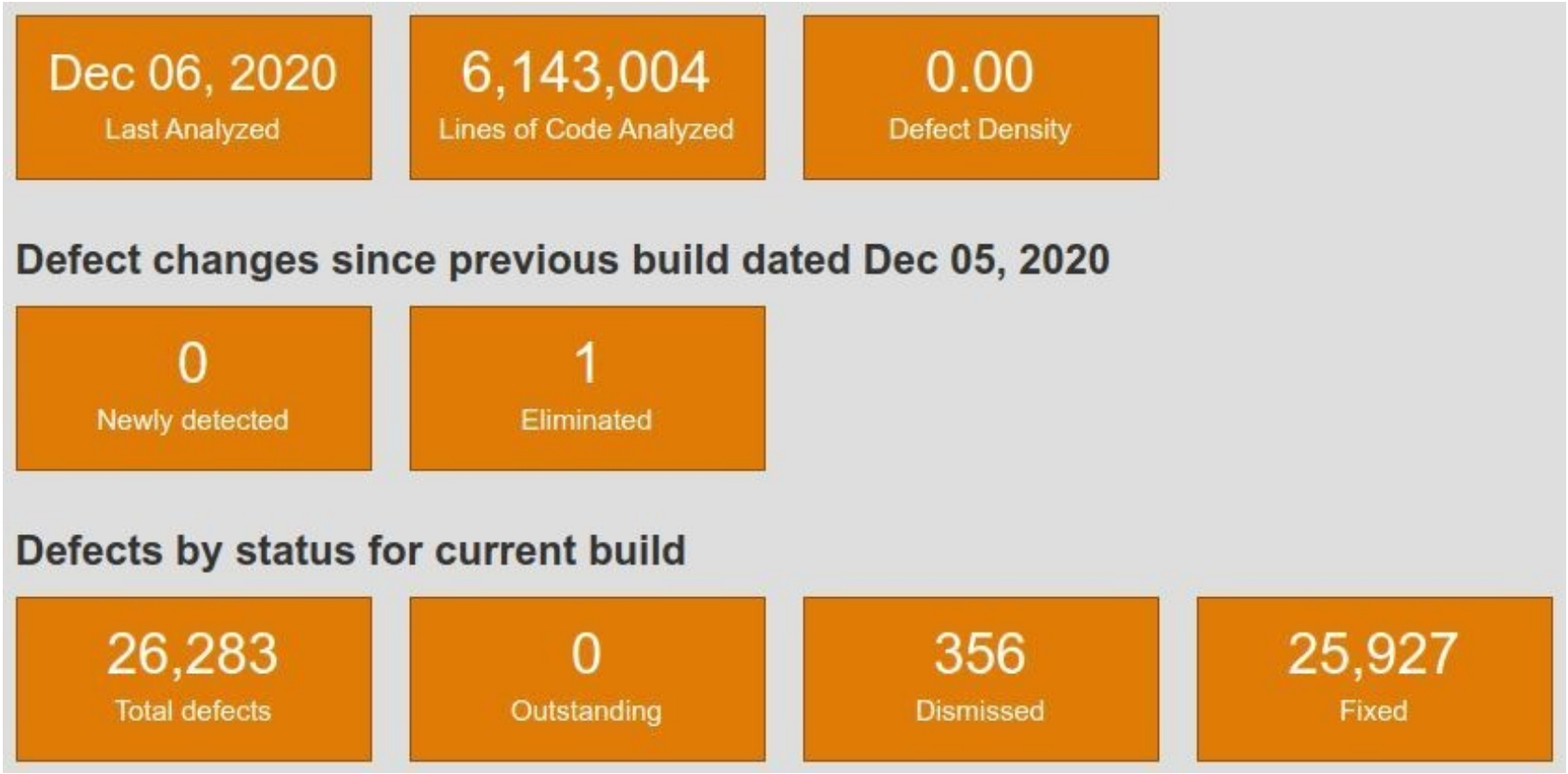
- software security - increasingly in focus
- see CRA, ransomware attacks & spying
- a priority for LibreOffice since 2010 - own CNA since 2018

Static Code Analysis

- Tool: *Coverity Scan*
  - Free for open source projects
- Detects dead code, uninitialized variables, uncaught exceptions...
- Defect density reduced from 1.1 to ~0,00x
  - Density measured in defects every 1.000 lines
  - Average density for similar sized projects: 0.71

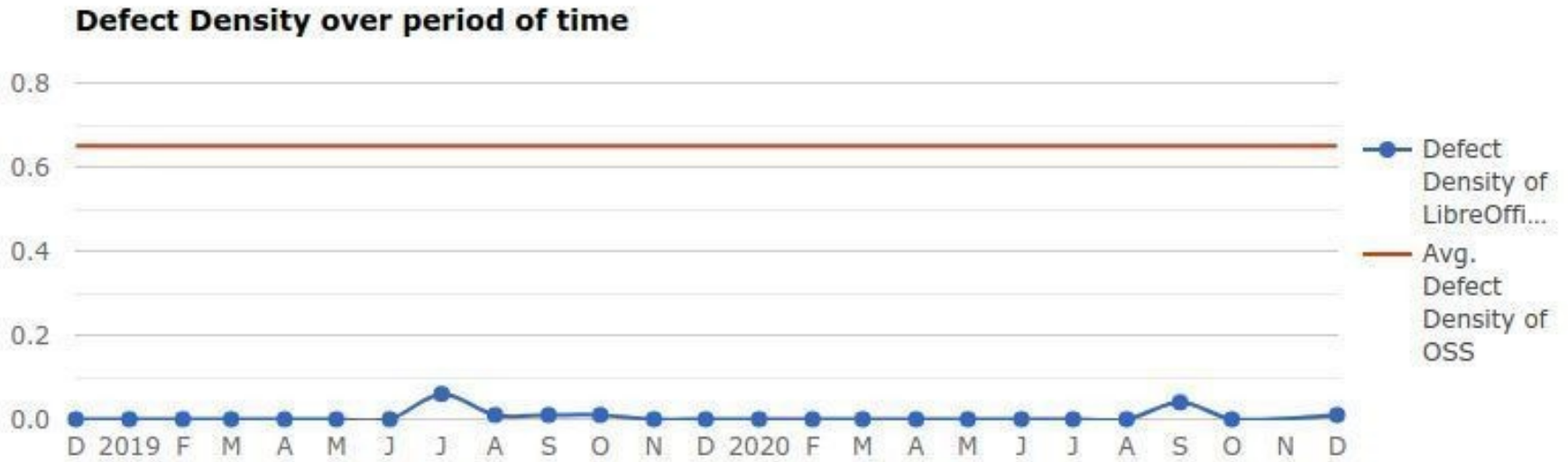
Coverity Scan

Coverity Scan Score



Coverity Scan @ LibreOffice

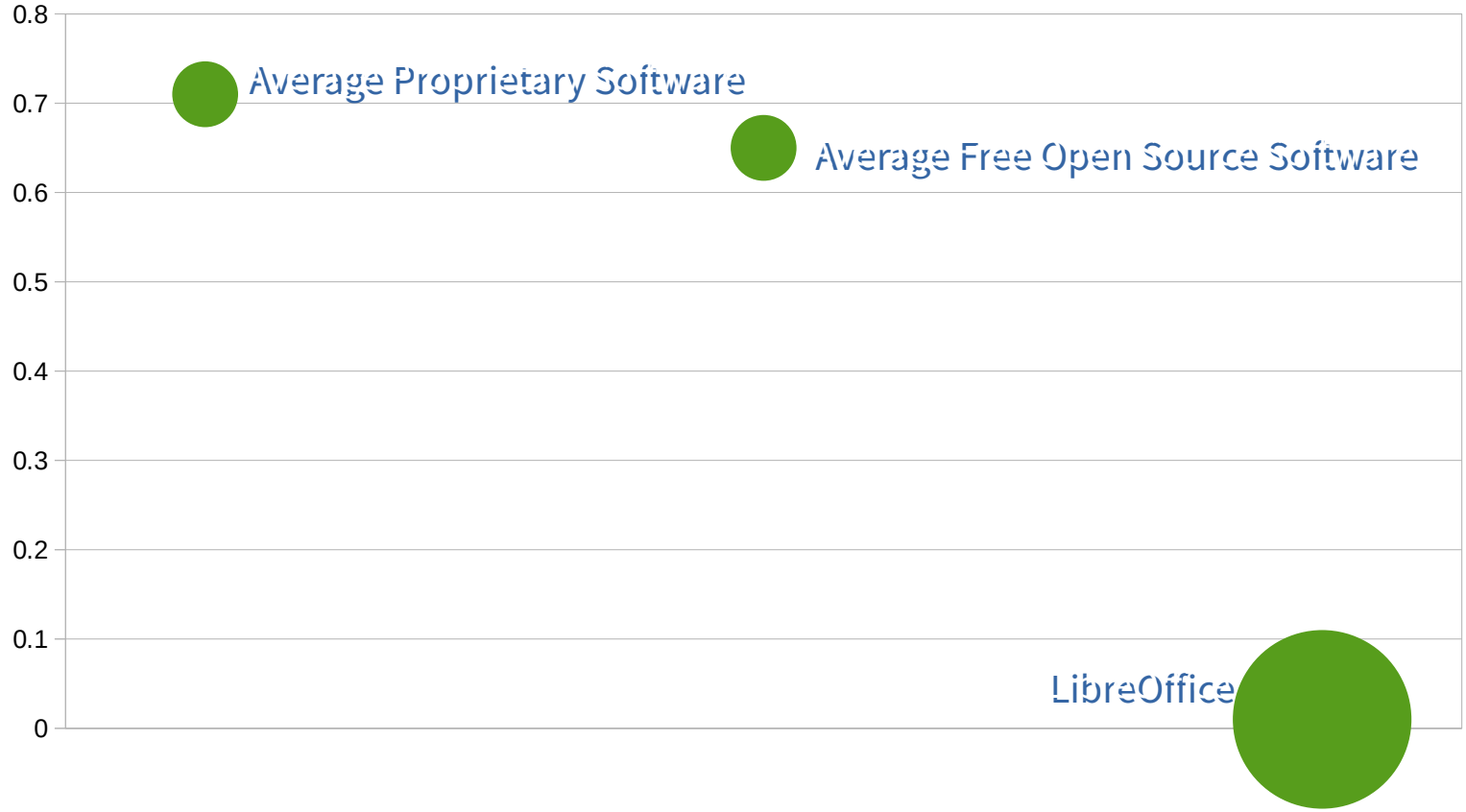
Coverity Scan @ LibreOffice



The graph compares the defect density of the project with the average defect density of open source projects that are similar in size (i.e. more than 1 million lines of code)

Issues x 1000 Lines of Source Code

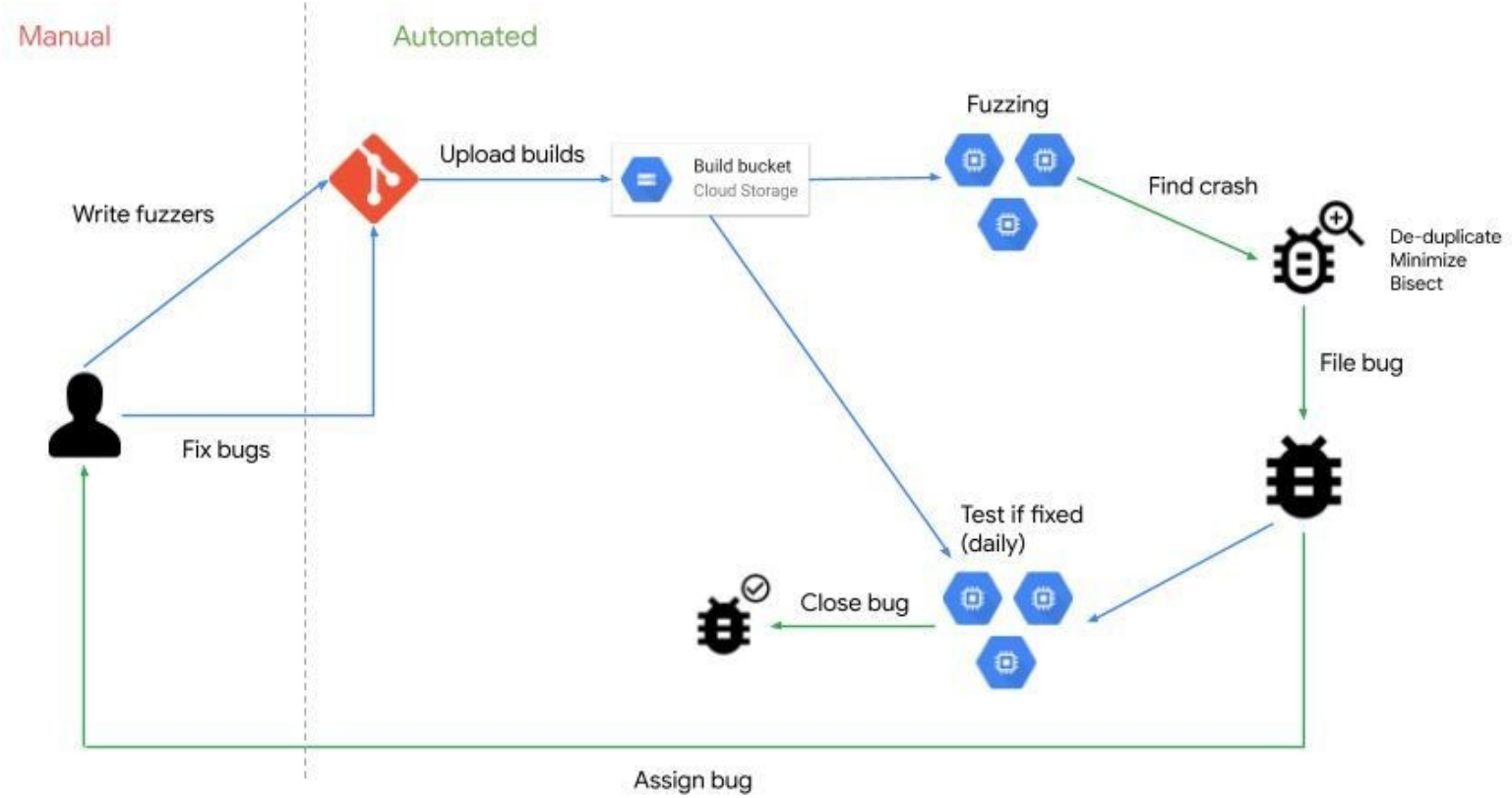
Source Code Scan by Coverity Scan (since 2015)



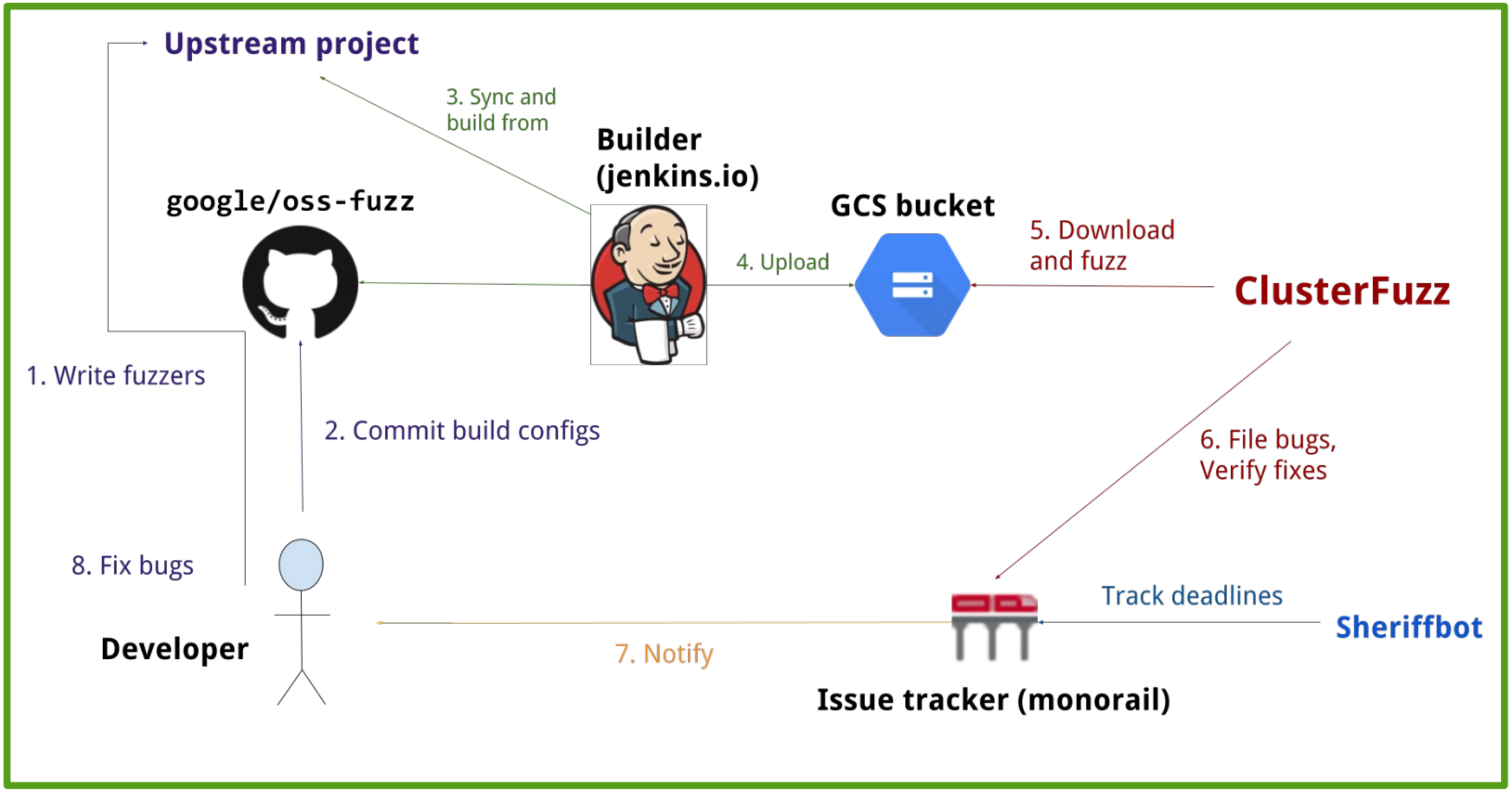
Fuzzing

- Feeding a program random data in order to induce faults
- Black box fuzzing assumes nothing about the expectations of the program
- White box fuzzing knows about the underlying formats and protocols

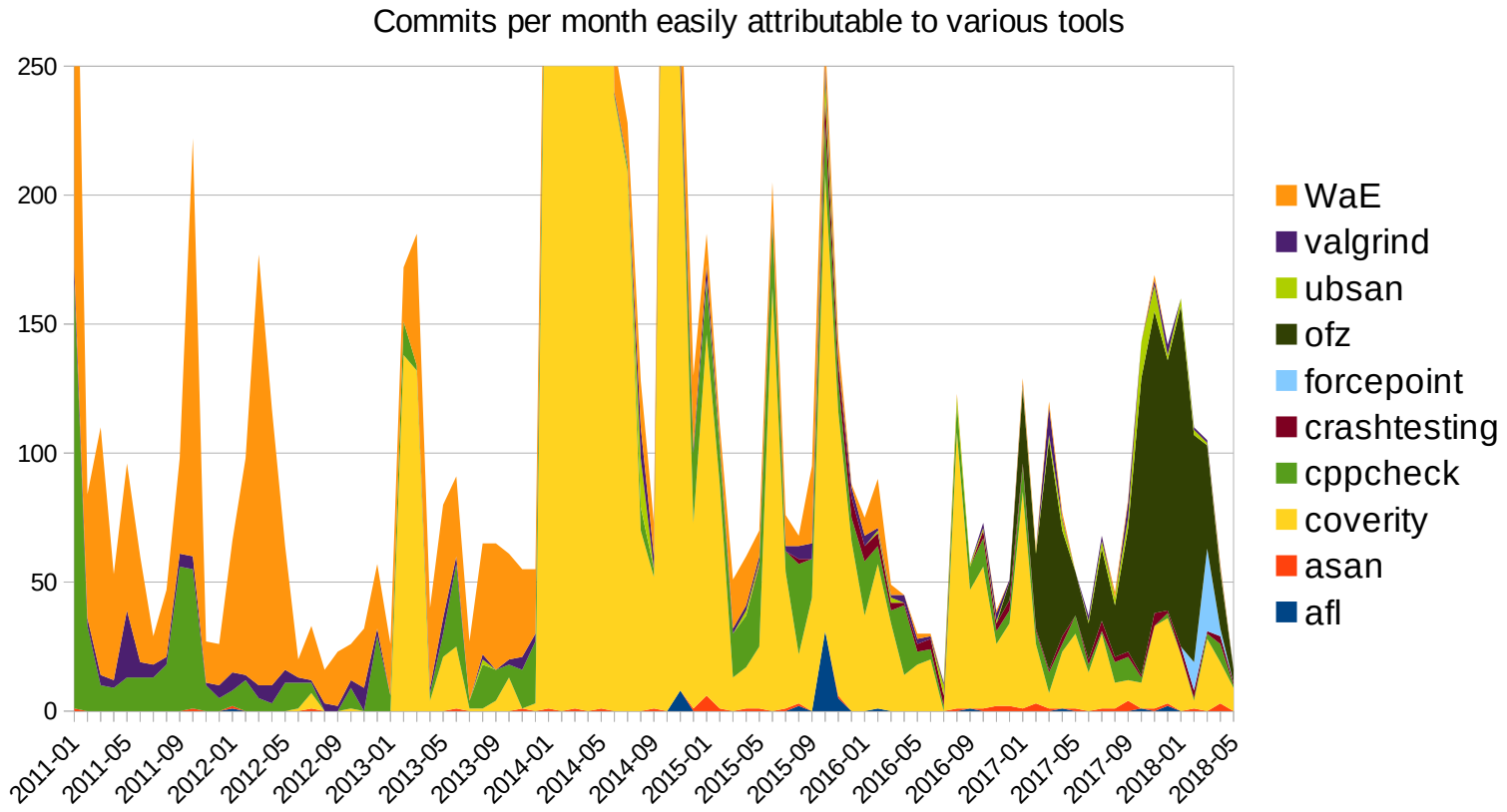
Fuzzing


Manual
Automated
Write fuzzers
Upload builds
Build bucket
Cloud Storage
Fuzzing
Find crash
De-duplicate
Minimize
Bisect
File bug
Fix bugs
Test if fixed
(daily)
Close bug
Assign bug

Google’s OSS-Fuzz



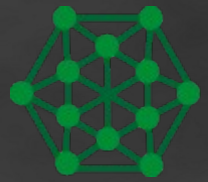
Commits Based on Fuzzing



Fuzzing: the Take Home ...

- New tools find new bugs, and the number reduces over time
- Hard to see: not everyone uses consistent git commit tooling references, for instance Crashtesting is badly under-represented

News



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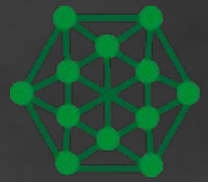
- fully automatic background updates under Windows (*for 24.8*)
- bulk disabling of active content (*since 24.2*)
- non-overridable admin configurations for all of LibreOffice (*since 24.2*)
- better password security (*since 24.2*), including much-improved ODF document encryption (*for 24.8*)
- disabling and removal of unsafe network protocols (*since 24.2*)

Past efforts



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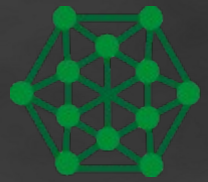
- security patch process since 2011
- coverity since 2012
- oss-fuzz since 2016
- own CNA since 2018
- BSI whitepaper on secure config (2022)
- OSS security audit (2023)

Why bother?



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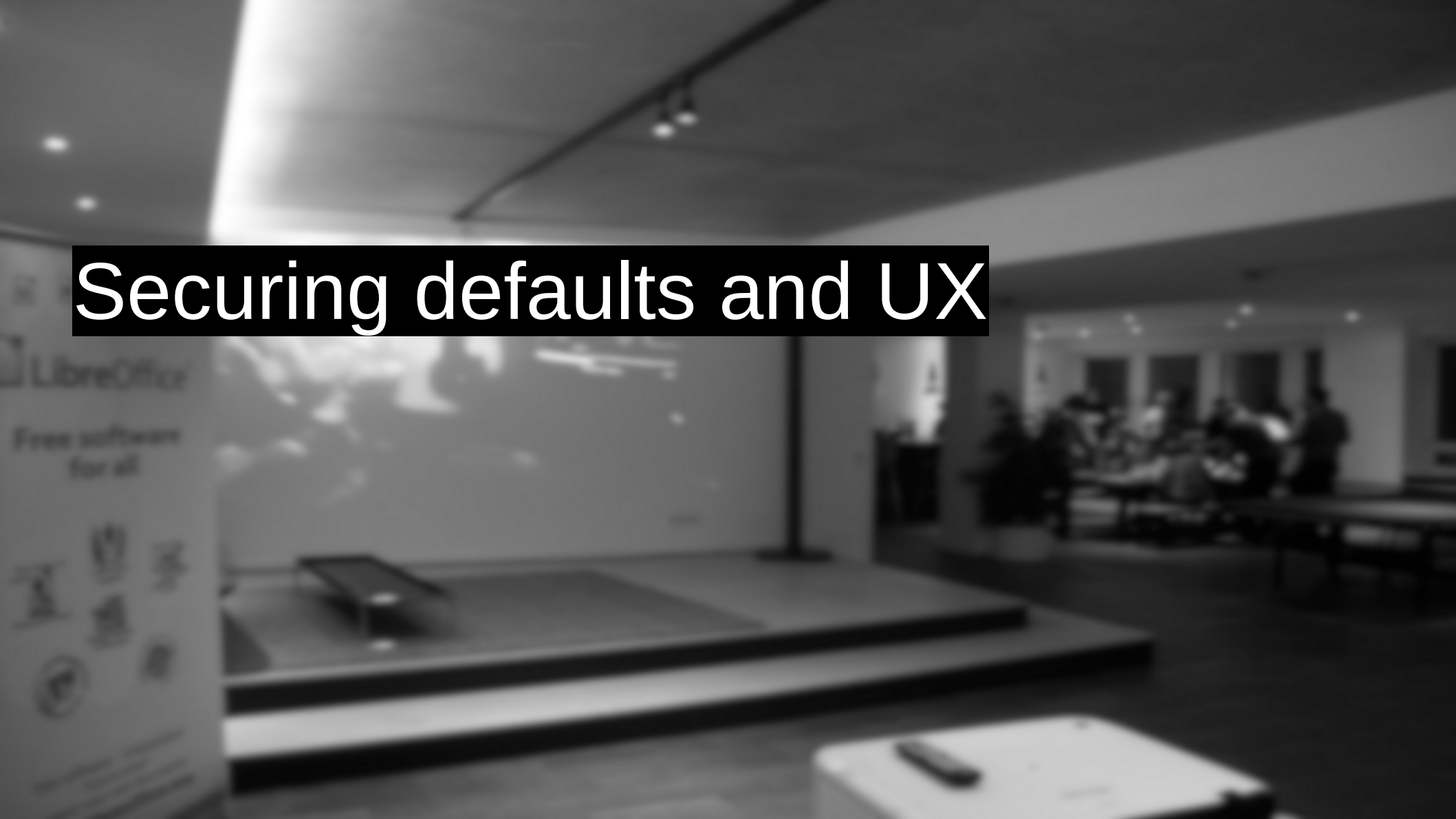
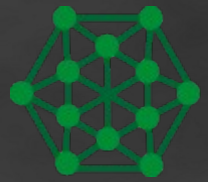
- LibreOffice: ~200 million users
- from fortune 500 to home users
- digital sovereignty - IT-Planungsrat needs choice & secure options
- improvements needed, more secure defaults and better features



Securing defaults and UX

Improved Macro security



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- checking cert is now mandatory
- more obvious cert owner checks
- warn if cert is expired
- add option for temp permission

Remove insecure protocols

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- remove FTP
- add `Office::Security::Net::AllowInsecureProtocols`
- add `Office::Security::Net::AllowInsecureUNORemoteProtocol`
- try https whereever possible
- optionally block UNO socket server (`--accept=socket,host=..,port=...;urp;...`)
- default-off for Impress Wifi remote protocol

Locked config items

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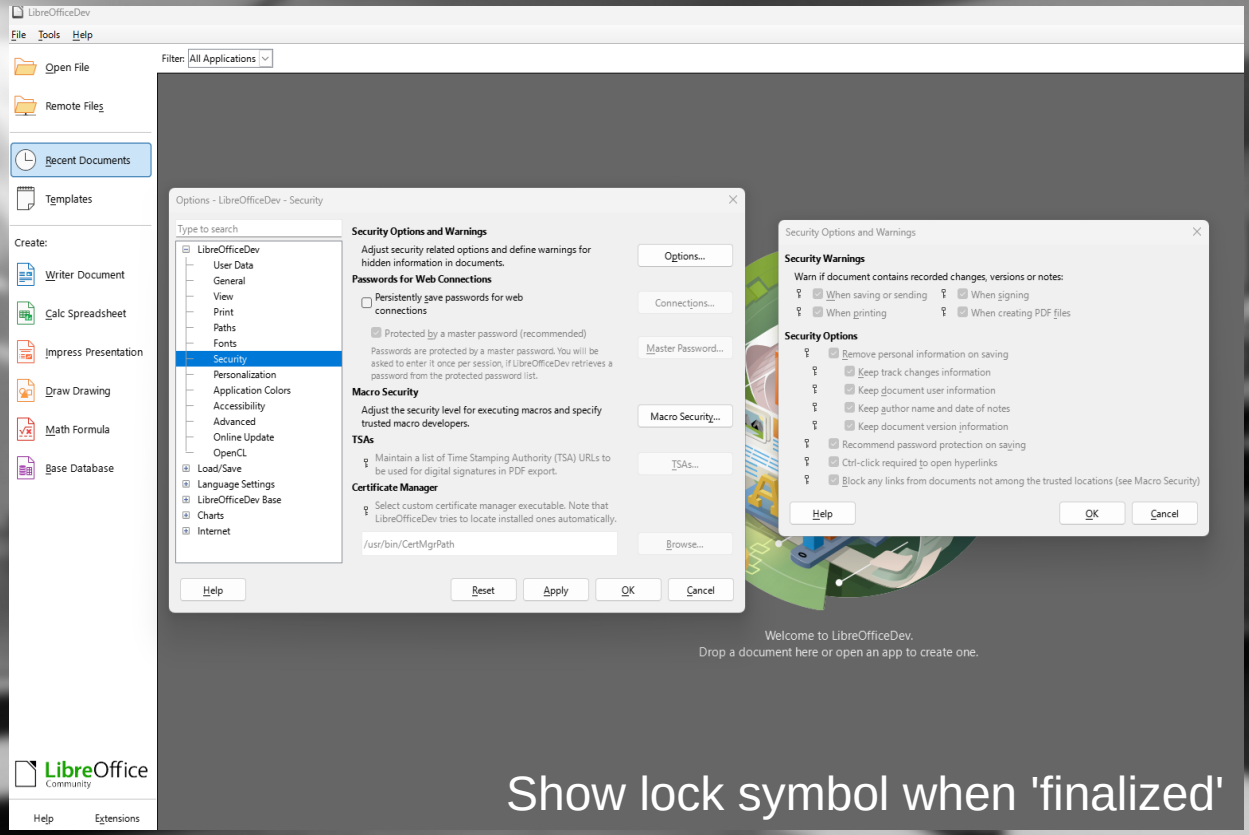


Show lock symbol when 'finalized'

Disable active content

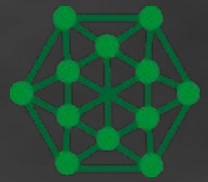
- LibreLogo (via `DisableMacrosExecution` or `DisablePythonRuntime`)
- DDE
- OLE
- Macros (all: see Tools->Options->Security)

Hidden metadata

- old feature: box on every save
- moved to infobar
- added shortcut to config page

Automatic software updates

What & Why



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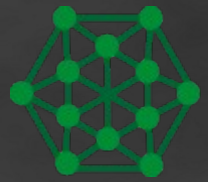
- https://wiki.documentfoundation.org/Development/Online_Update
- using MAR updater code and service from Mozilla
- list of changes
- cherry-pick code from moz central

How does that work?



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- if enabled:
- regular check of this URL
- download, then delegate install to 'LibreOffice Updater Service'
- just like for Firefox & Thunderbird

Password security

Password strength-meter

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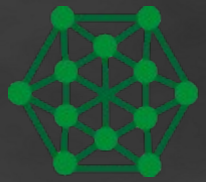
Strength-Meter dialog

Password policy

- new config items `PasswordPolicy` and `PasswordPolicyErrorMessage`
- uses regexp, e.g. `^(?=.*[a-z])(?=.*[A-Z])(?=.*\d)[a-zA-Z\d]{8,}$`


Improved expert settings

Better expert settings



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- added type checking and validation
- visual highlight of changed entries
- optional: show changes only
- show settings property documentation
- handle finalized config settings properly
- cleanup old / unused config
  - e.g. `org.openoffice.Office.Common.Security.Scripting.OfficeBasic`

Wholesome ODF package encryption

Downsides old version

- encrypting each package entry separately
- running PBKDF2 for *all* files
- a lot of known plaintext
- a lot of entropy needed
- hard to compress after encryption

Improvements

- store normal ODF document, then encrypt once
- runs PBKDF2 / Argon2 only once per save
- a lot less known plaintext, frugal with entropy
- compresses like plain ODF

Implementation

- https://issues.oasis-open.org/browse/OFFICE-4153
- more performant due to deriving a key only once per package
- more tamper-resistant with authenticated encryption (‘‘‘AES-GCM’’’)
- better hiding of metadata to reduce information leaks
- higher resistance to brute forcing using memory-hard ‘‘‘Argon2id’’’ key derivation function


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Questions & Answers!
OSB Open Source Business ALLIANCE
OASIS MEMBER
LibreOffice The Document Foundation