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OVERVIEW

- **What’s fuzzing?**
- **Zzuf introduction**
- **Getting started**
- **Our way to a few 0-days**
- **What next?**

What's fuzzing?

- Feed a program with random data
  - White noise
  - Slightly modified input
  - Content-aware fuzzing
- Increasing use nowadays
  - Test suites
  - Attack tools

What to fuzz?

- **Complex data formats**
  - **Images, sound, videos...**
  - **Executables, bytecode**
- **Protocols**
  - **Network protocols**
  - **Databases**
- **Any user-provided data**

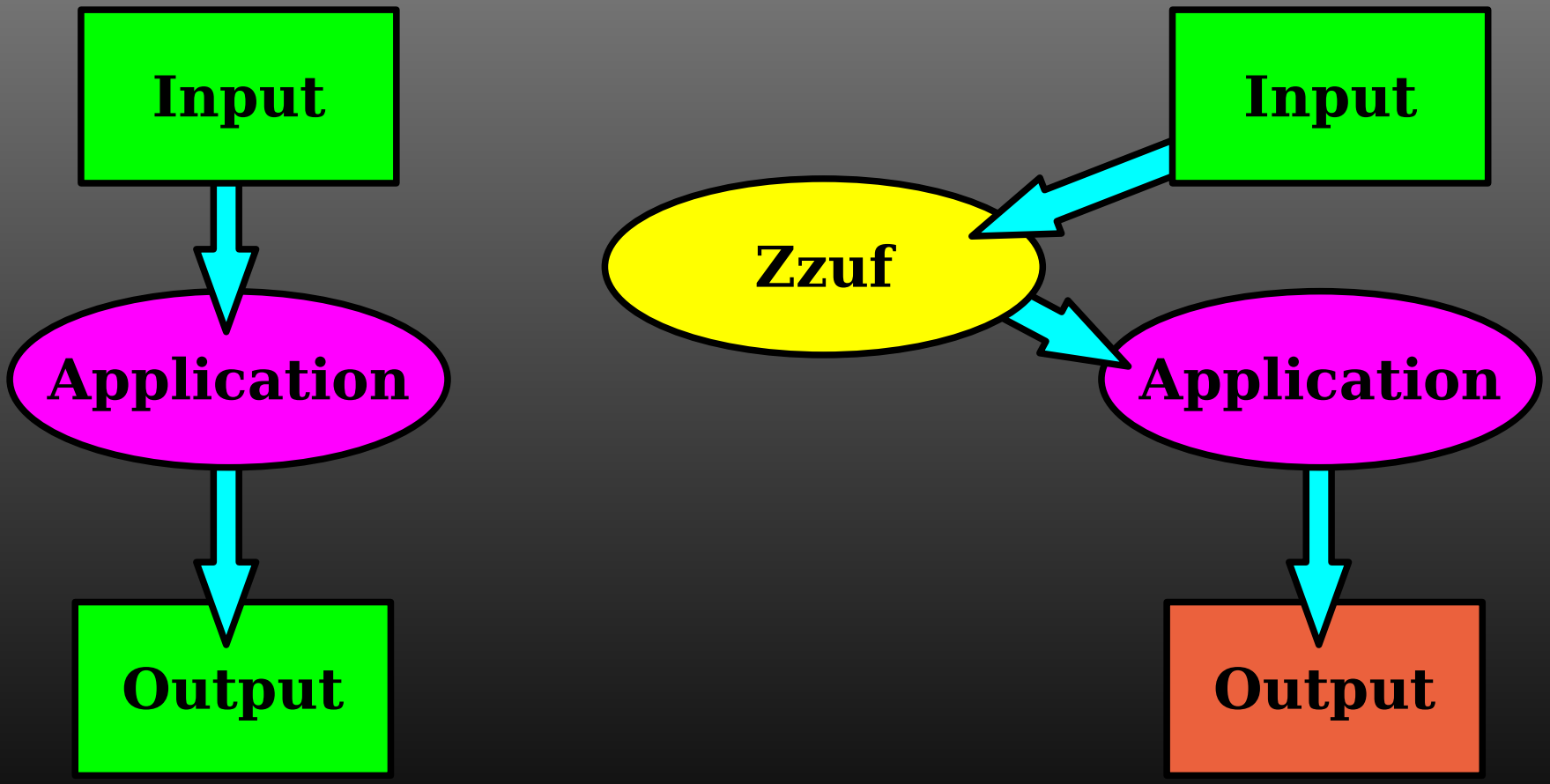
Fuzzing Results

- **Bugs**
  - **Exploitable bugs: good old buffer overflows**
  - **DoS: crashes, memory exhaustion, CPU bombs, deadlocks, data corruption...**
- **Without even reading the code!**

zzuf introduction

- All-in-one fuzzing tool
  - Easy to use
  - Reproducible behaviour
  - Fuzzes everything on the fly
- Simple
  - No configuration file
  - No context-aware fuzzing

zzuf architecture



zzuf internals

- Controlling `zzuf` binary
  - forks tested program
  - checks `stdout`, exit value, signals...
- `LD_PRELOAD` mechanism
  - intercepts file reading functions
    - `open()`, `read()`, `fopen()`, `fread()`...
  - also `malloc()` to check memory usage

Basic features

- Random seeds (`-s`)
- Fuzzing ratio (`-r`)
- Cherry-pick fuzzed data
  - Include/exclude file patterns (`-I`, `-E`)
  - Network (`-n`), standard input (`-i`)
  - Fuzz depending on byte offsets (`-b`)
  - Fuzz depending on byte values (`-P`)

Other features

- Parallel processing (`-j`)
- Detect stuck processes
  - Set maximum memory allocation (`-M`)
  - Set maximum running time (`-T`)
  - Set maximum `stdout` output (`-B`)
- See manual page for more

Getting started

- **http://libcaca.eu/wiki/zzuf**
- **From Subversion:**
  - `svn co svn://svn.zoy.org/libcaca/zzuf/trunk`
  - `./bootstrap`
  - `./configure`
  - `make`
  - **You're done!**

First steps

- **Standard utilities**
  - **cat, more**
  - **grep**
  - **cp, dd**
- **Network fuzzing**
- **Finding a real bug**

Finding 0-day bugs

- **objdump**
- **Image viewers**
- **MPlayer**
- **Firefox**
- ***[your suggestion here]***

conclusions

- **Fuzzing is cheap and easy**
- **It finds real, scary bugs**
- **Binary formats == easy targets**
- **Seldom used == seldom tested**
- **Warning: zzuf-proof != bug-free**

ZZUF'S FUTURE

- **Context-dependent fuzzing**
  - **ignore or recompute CRCs**
  - **divert the zlib library, too (for PNGs)**
- **Finish the Windows® port**
  - **help needed**
- **Attach to a debugger**
- **Visit http://libcaca.eu/wiki/zzuf**


LOL @ FIREFOX
LOL @ MPLAYER
THANKS!
ANY QUESTIONS?