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BuffaLogs

Authentication protection

Who we are

Federico Foschini

Threat detection team leader at Certego

GSoC mentor for Honeynet

Lecturer Master of cybersecurity UNIBO

Lorena Goldoni

Threat Detection Engineer at Certego & Master student

Principal Maintainer of BuffaLogs - open source project

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How BuffaLogs started

In Certego we are deeply committed to contributing to the open source community.

As detection specialists we decided to develop a new detection tool and we asked ourselves:

"What is the most valuable tool we could contribute?"

Our criteria:

- Broad impact: must solve real problems for most security teams
- Innovation: fill an existing gap in the security landscape
- Sustainability: manageable by a small dev team

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Identifying the right focus for our tool

Reviewing and evaluating existing products

Reviewing security incident we managed

Product evaluation

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How can we evaluate a product?

Gartner®

IDC

FIRST™
Improving Security Together

MITRE
ATT&CK™

FORRESTER®

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Every vendor claims perfect detection

Qualys Security Blog

Qualys Achieves 100% Major Step Detection in the 2024 MITRE ATT&CK Evaluations, Enterprise

In today's rapidly evolving threat landscape, ransomware continues to dominate as one of the most significant cybersecurity challenges.

3 weeks ago

Emsisoft

Emsisoft Enterprise Security + EDR Achieves 100% Detection in AVLab's September 2024 Test

In this rigorous test, Emsisoft Enterprise Security + EDR blocked all 510 malware samples, achieving a flawless 100% detection rate.

29 Oct 2024

Acronis

Acronis Advanced Security + EDR wins SE Labs Enterprise Advanced Security Award

SE Labs, an AMTSO member and independent, UK-based testing laboratory evaluated Acronis Cyber Protect Cloud with Acronis Advanced Security +...

1 Jul 2024

CrowdStrike

CrowdStrike Falcon Wins Best EDR Annual Security Award in SE Labs Evaluations

The CrowdStrike Falcon platform has received the best Endpoint Detection & Response 2024 award from SE Labs for the third consecutive year.

12 Apr 2024

SentinelOne

Mitre Attack Evaluations – SentinelOne Achieves 100% Protection and Detection

Microsoft

Microsoft Defender XDR demonstrates 100% detection coverage across all cyberattack stages in the 2024 MITRE ATT&CK® Evaluations: Enterprise

For the sixth year in a row, Microsoft Defender XDR recognized in the independent MITRE ATT&CK® Evaluations: Enterprise.

3 weeks ago

GlobeNewswire

Check Point Infinity XDR/XPR Achieves 100% Detection Rate in 2024 MITRE ATT&CK® Evaluations

Check Point Infinity XDR/XPR Delivers Unmatched Protection Against Ransomware and Endpoint Threats...

3 weeks ago

Sophos News

Sophos excels in the 2024 MITRE ATT&CK® Evaluations: Enterprise

Spoiler alert! Sophos has once again achieved exceptional results in the latest 2024 MITRE ATT&CK Evaluations for Enterprise.

3 weeks ago

KXAN Austin

Sophos XDR Excels in MITRE ATT&CK® Evaluations: Enterprise

100% of Sophos XDR detections for adversary activities targeting Windows and Linux devices provide rich analytic coverage and achieve the...

3 weeks ago

itvoice.in

Trend Micro Achieves 100% Coverage Rate in MITRE ATT&CK® Evaluations

Global cybersecurity leader Trend Micro Incorporated announced its exceptional scores in the latest round of the MITRE ATT&CK® Evaluations.

2 weeks ago

Sophos News

Sophos named a Leader in the 2024 Gartner® Magic Quadrant™ for Endpoint Protection Platforms

The Gartner® Magic Quadrant™ for Endpoint Protection Platforms provides readers with a comprehensive evaluation of the industry's most...

23 Sept 2024

CrowdStrike

CrowdStrike named a Leader by Gartner

CrowdStrike has been named a Leader in the 2024 Gartner® Magic Quadrant™ for Endpoint Protection Platforms for the fifth consecutive time.

1 Oct 2024

Microsoft

Microsoft is named a Leader in the 2024 Gartner® Magic Quadrant™ for Endpoint Protection Platforms

We are excited to announce that Gartner has named Microsoft a Leader in the 2024 Gartner Magic Quadrant for Endpoint Protection Platforms for the fifth...

25 Sept 2024

ChannelLife Australia

Trend Micro leads Gartner's endpoint security magic quadrant

Trend Micro has been placed in the Leaders' Quadrant of the 2024 Gartner Magic Quadrant for Endpoint Protection Platforms (EPP).

25 Sept 2024

SentinelOne

A Gartner Magic Quadrant Leader for Three Consecutive Years

For the third year in a row, SentinelOne has again been recognized as a Leader in the 2023 Gartner Magic Quadrant for Endpoint Protection Platforms.

17 Jan 2024

Trend Micro

Endpoint Gartner Magic Quadrant 18-Time Leader in 2024

Trend Micro is honored again to be named a Leader in the latest Gartner Magic Quadrant for Endpoint Protection Platforms.

22 Jan 2024

Every vendor claims perfect detection

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22 Jan 2024

Has Infosec problem been solved? No, it's gotten harder

Infosec research council hard problems list (2005)

- Global scale identity management
- Insider threat
- Availability of time critical systems
- Building scalable secure systems
- Attack attribution and situational understanding
- Information provenance
- Security with privacy
- Enterprise level security metrics

20 years later we also have:

- More complexity
- Long tail of old technologies with new technologies
- Wider use cases by broader enterprise/consume base
- Ripple effects of breaches
- Monetization of data
- Kinetic effects of cyber attacks

Source: Wendy Nather

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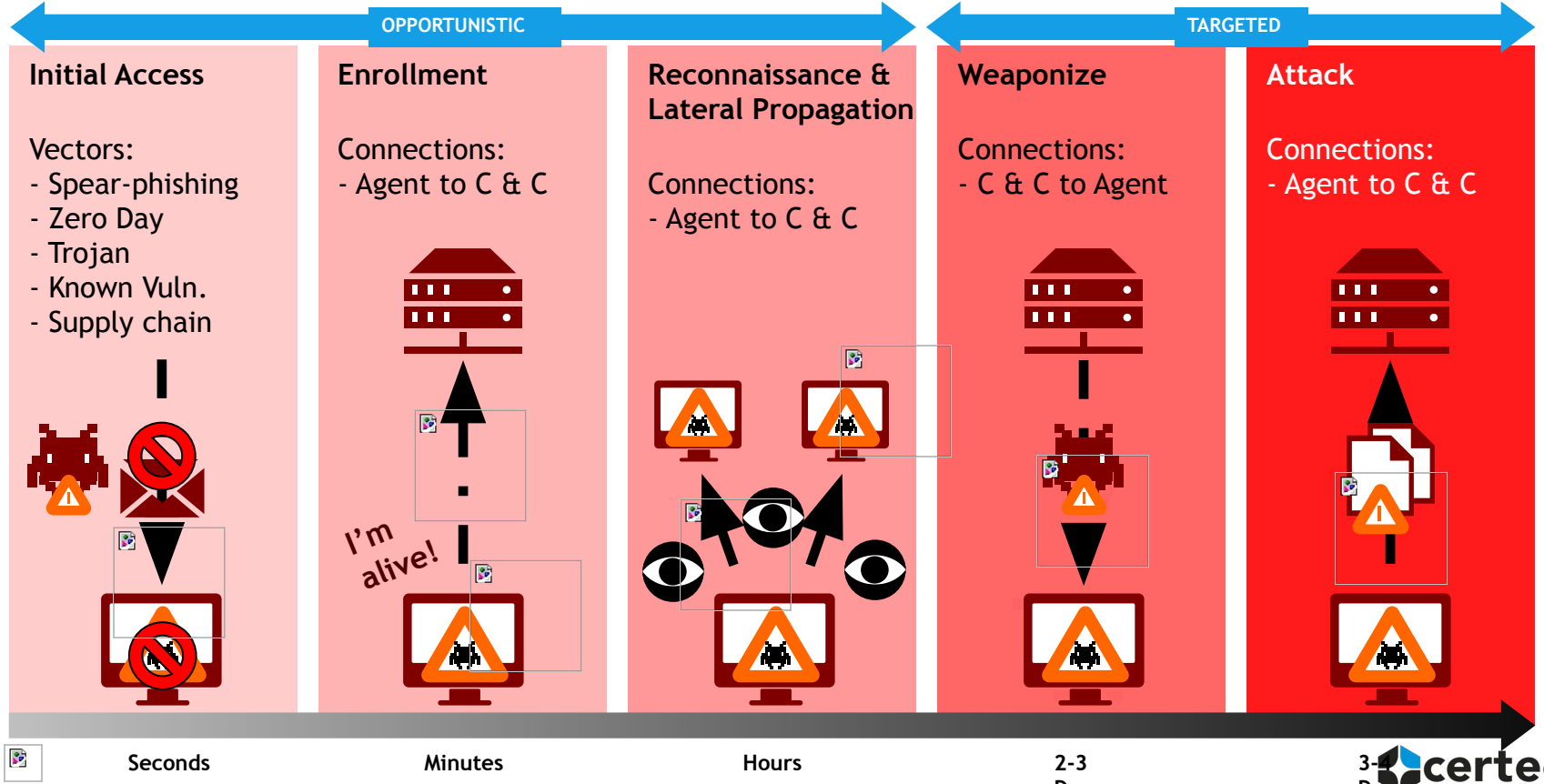
What we observed: Kill chain



What we observed: Security Incidents 2023-2024

10 Major Compromises:

Initial Access:

- 1 Bruteforce
- 2 Phishing campaigns
- 7 Compromised valid credentials

Key Attack Patterns:

- Remote Access Abuse
  - Consistent foreign IP login attempts
  - VPN and remote access tools exploitation

- Post-Compromise Activities
  - Lateral movement
  - Data encryption
  - Reverse shell deployment
  - Cryptocurrency mining

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What we obs 23-2024

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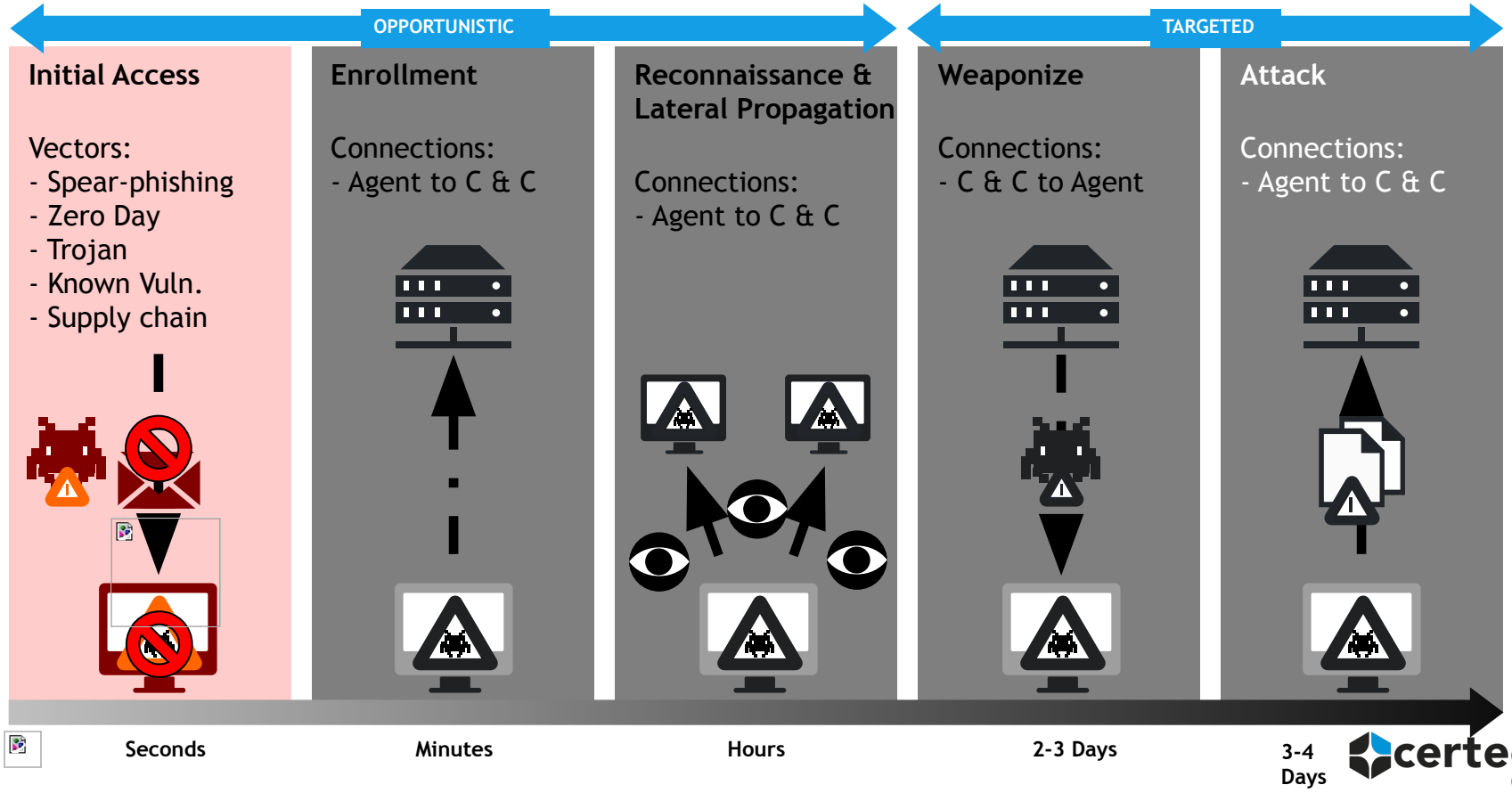
Focus on initial access



BuffaLogs started

An Open source solution for the authentication protection of your organization

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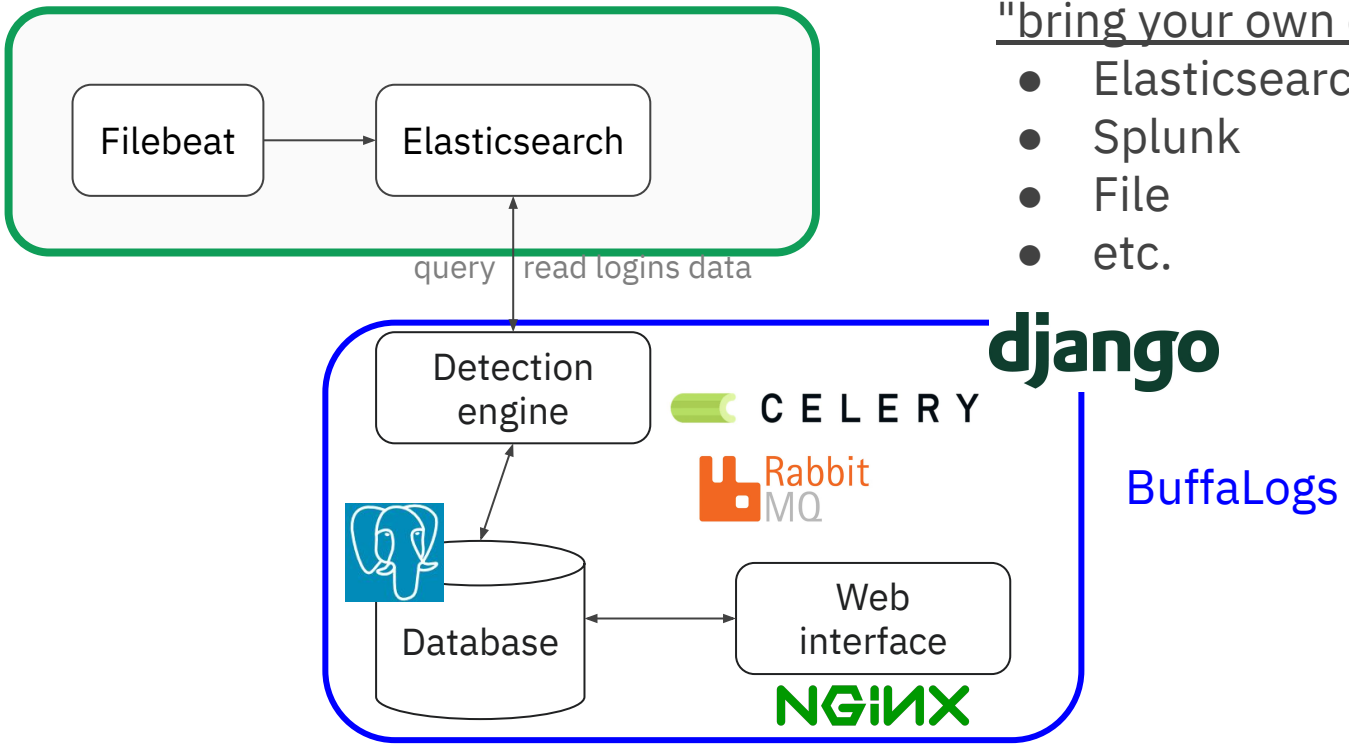
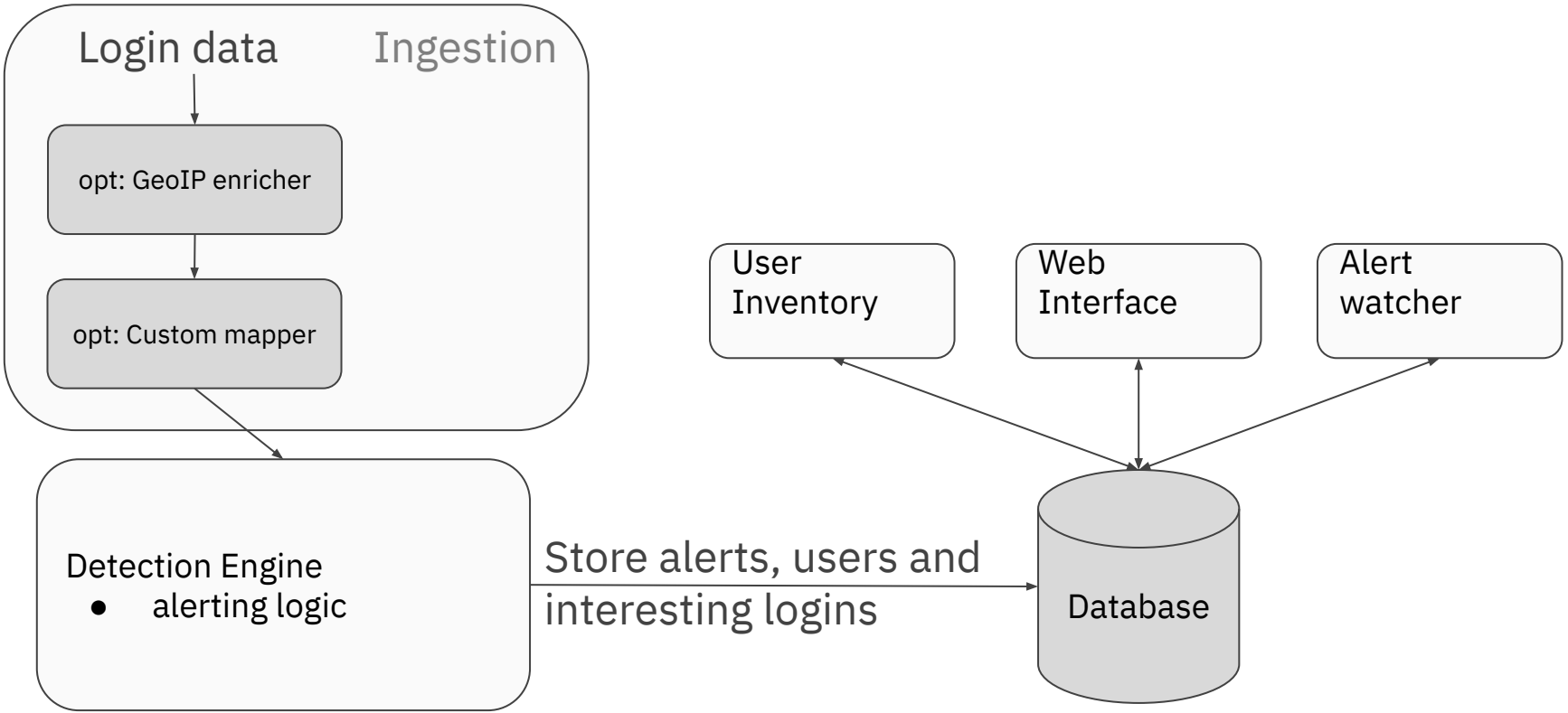
BuffaLogs overview



"bring your own database"

- Elasticsearch
- Splunk
- File
- etc.

BuffaLogs architecture



Installation & Setup

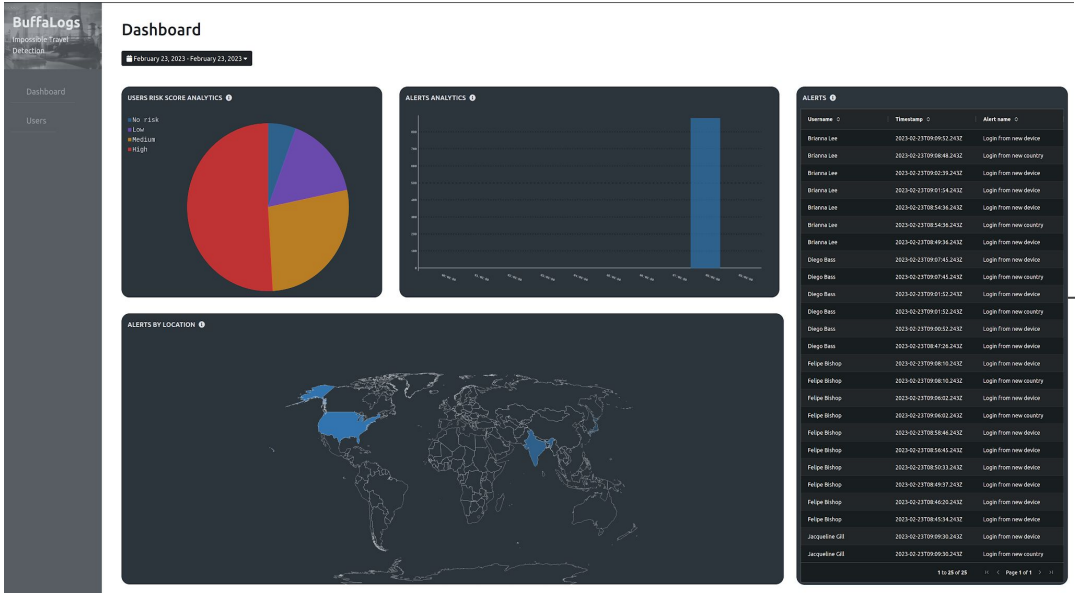
Docker containerized application
& Django Reusable App

1. Clone BuffaLogs locally:
   > git clone git@github.com:certego/BuffaLogs.git
2. Run the application container:
   > docker compose up -d buffalogs
3. Create django superuser
   > docker exec -it buffalogs python3 manage.py createsuperuser
4. Visualize django admin and homepage:
   > localhost:8000/admin/
   > localhost:8000/

BuffaLogs web interface - v1

Users risk score analytics

Alerts geo map



Alerts analytics period

Alerts list

Detection types

- New Device
- New Country | Atypical country WIP
- Impossible Travel
- User Risk Threshold WIP
- Anonymous Ip Login WIP
- Stale account WIP

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Alerts types - example

Three login seen:

- 3:00 Milan
- 3:30 Rome

} 600 km / 0,5 h = 1200 km/h → Impossible travel

- 12:50 Vienna → New Country
  - ... 30 days later: Austria Login → Atypical Country

If also:

- with different user-agents → New Device
- with anonymous IPs → Anonymous IP Login

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Alerts types - Stale accounts example

BuffaLogs can be configured to keep a list of users in a system (now supported: LDAP, Azure AD)

User name	Creation Date
o.bennett	10/01/2025
e.wright	20/01/2025
a.blackwood	29/01/2025
m.turner	09/06/2024
j.doe	10/12/2024

diff

User name	Last Login
o.bennett	10/01/2025
e.wright	27/01/2025
a.blackwood	29/01/2025
m.turner	20/07/2024

Alert Stale accounts:

- m.turner last login is more than 30 days ago
- j.doe is active but they never logged in

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Detection logic

Processing: normalization

Document

event.category: authentication @timestamp: Jan 7, 2025 @ 11:41:
agent.id: b0540b62-c53c-42a4-8b36-998bbcfa3283 agent.name: file
azure.correlationId: 1dd9ea88-8bc7-4334-9cf8-bcc2b2427536 azure
azure.resourceId: [redacted]
azure.service.application.displayName: Microsoft Teams azure.se

event.category: authentication @timestamp: Jan 7, 2025 @ 11:41:
agent.id: b0540b62-c53c-42a4-8b36-998bbcfa3283 agent.name: file
azure.correlationId: e2334398-00f3-41b7-8bda-e7bee66dc483 azure
azure.resourceId: [redacted]
when the user was signing-in. azure.result.signature: None azur

event.category: authentication @timestamp: Jan 7, 2025 @ 11:41:
agent.id: b0540b62-c53c-42a4-8b36-998bbcfa3283 agent.name: file
azure.correlationId: 3ce68113-ac9a-4795-9041-f7d796a45979 azure
azure.resourceId: [redacted]
azure.service.application.displayName: Microsoft App Access Pane

event.category: authentication @timestamp: Jan 7, 2025 @ 11:41:
agent.id: b0540b62-c53c-42a4-8b36-998bbcfa3283 agent.name: file
azure.correlationId: 15ed6421-cf88-40fe-a7f7-7754cecd6a2d azure

every
30 mins

```
"timestamp": "<login_datetime>",
"index": "<log_source_index>",
"id": "<log_unique_id>"
"user": {
      "name": "<user_name>"
   },
   "source": {
      "geo": {
         "country_name": "<country_origin_log>",
         "location": {
            "lat": "<log_latitude>",
            "lon": "<log_longitude>"
         }
      },
      "as": {
         "organization": {
            "name": "<ISP_name>"
         }
      },
      "ip": "<log_source_ip>"
   },
   "user_agent": {
      "original": "<log_device_user_agent>"
   },
"event": { "type": "start", "category": "authentication",
"outcome": "success"}}
```

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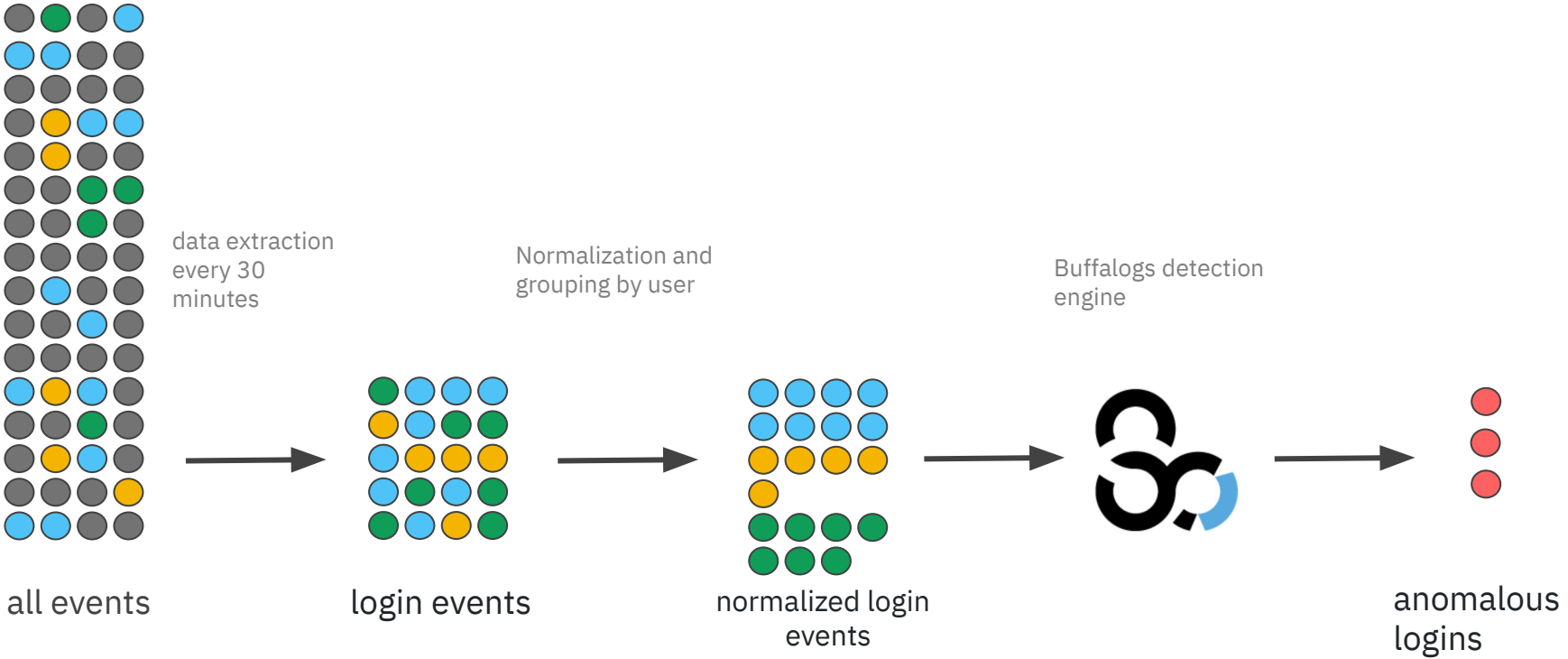
Processing: collecting logins



What we have learned

We have deployed BuffaLogs in Certego detection platform:

- monitoring 300.000 logins each hour
- monitoring 30+ customers

Event logs collected from:

- Azure AD (Entra ID)
- VPN
- LDAP

Critical aspects

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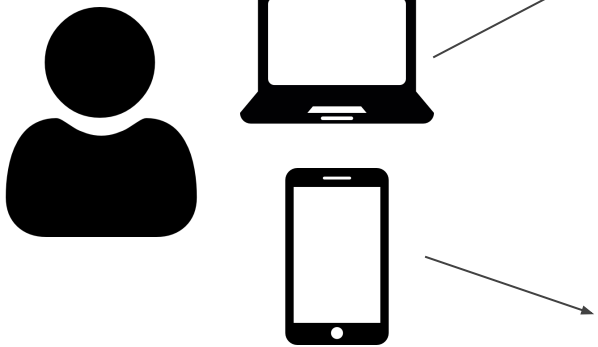
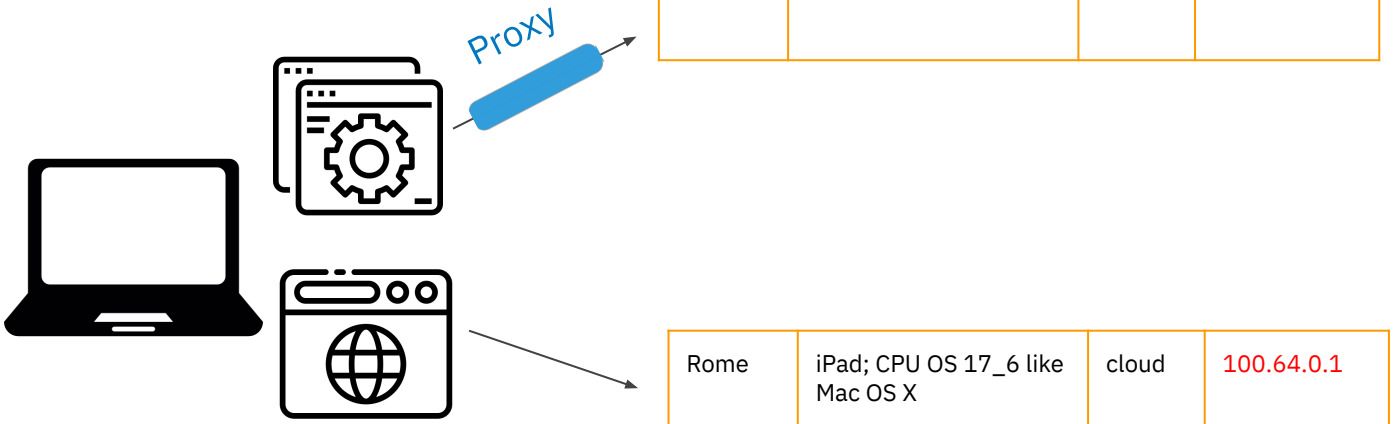
Smartphone/Computer - the aspect



Milan	Windows ; CPU OS 17_6 like Mac OS X	cloud	233.252.0.3
Rome	iPad; CPU OS 17_6 like Mac OS X	cloud	100.64.0.1

Proxied IPs - the aspect



Milan	iPad; CPU OS 17_6 like Mac OS X	cloud	233.252.0.3

Rome	iPad; CPU OS 17_6 like Mac OS X	cloud	100.64.0.1

Proxied IPs - the impact

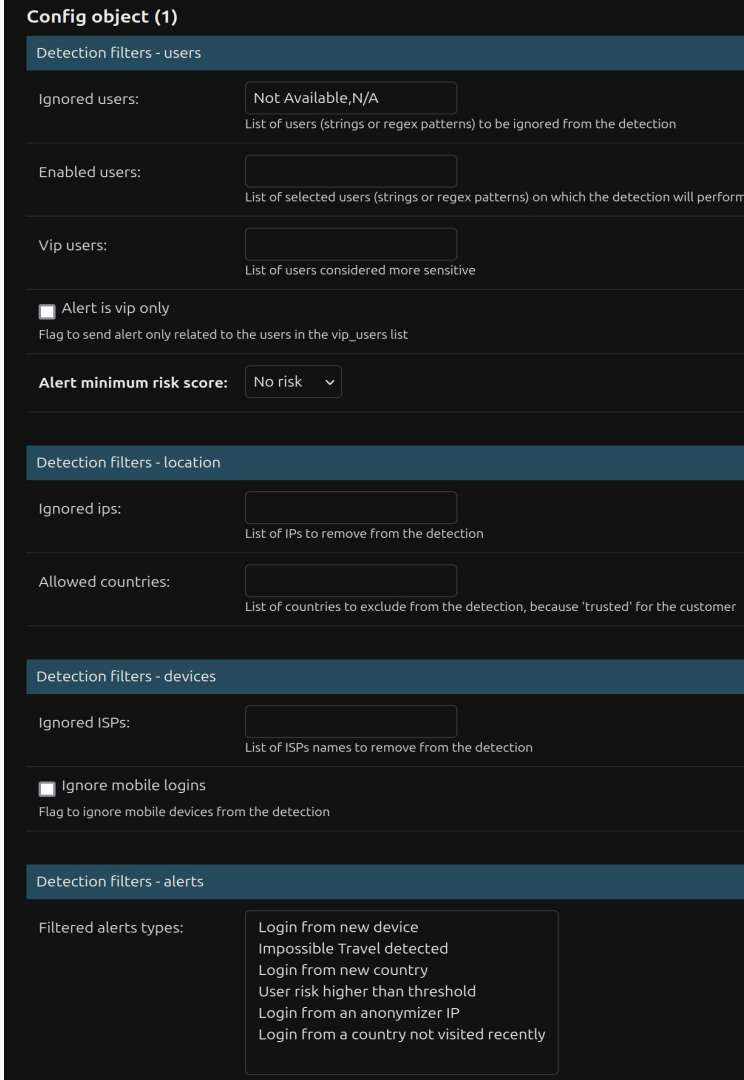
Too many alerts

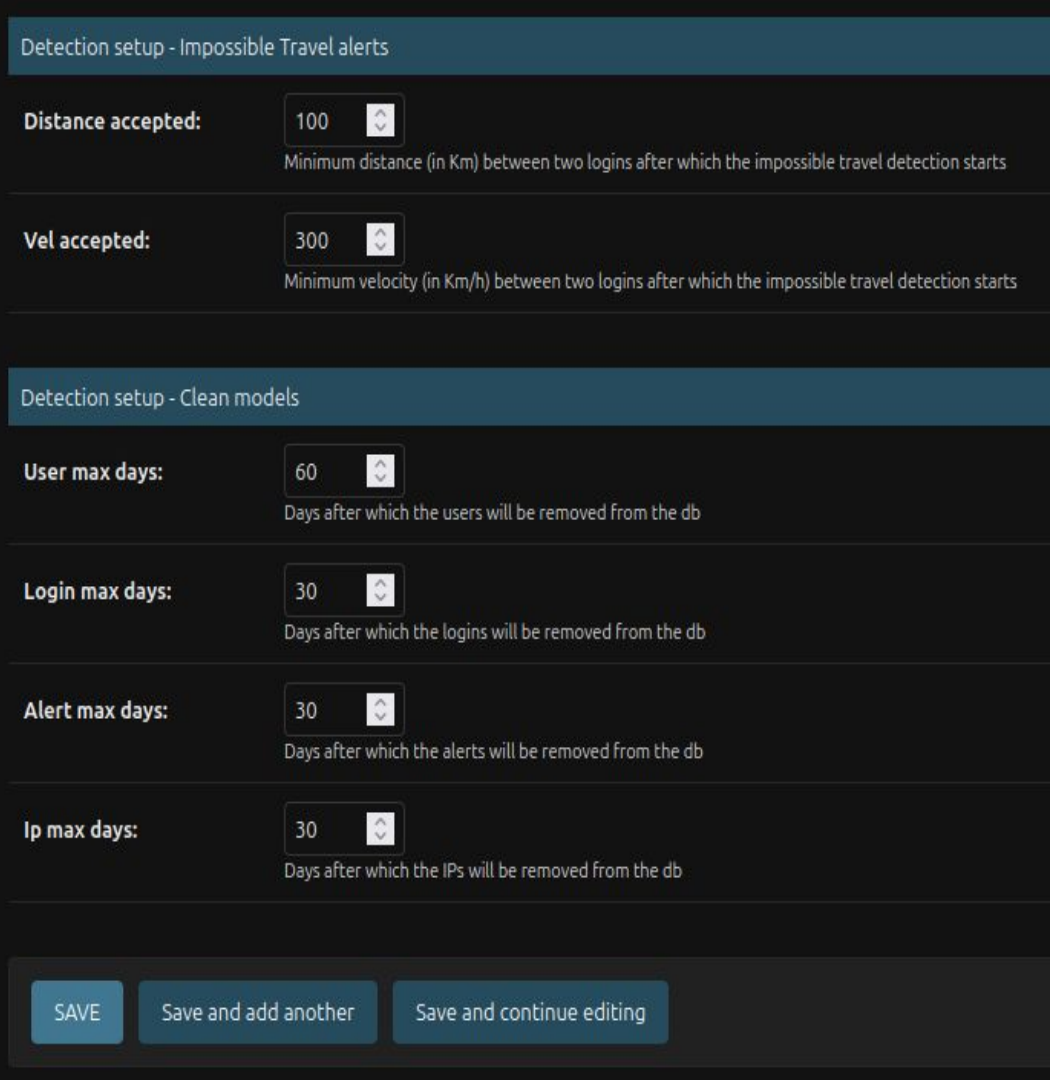
and... User profile creation (based on behaviors) was made impossible

Proxied IPs - the solution

Config model for custom filters:

- about **users**:
  - ignored/enabled users
  - vip users & alert is vip only
  - alert minimum *risk_score*
- about **location**:
  - ignored IPs
  - allowed countries
- about **devices**:
  - ignored ISPs
  - ignore mobile logins
- about **alerts**:
  - filtered alerts types





Proxied IPs - the solution

- impossible travel **metrics**:
  - distance & speed accepted for considering a trip “licit”
- clean models **metrics**:
  - users/logins/alert/ip max info expiration in days

→ sort of “bring your own detection”

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wrong Geolocation - the aspect

IP	IPGeolocation.io	Maxmind's GeoLite2 Database	IP2Location Lite	ip2c.org	GeoIP Nekudo	IP API
xxx.180.170.246	Rome, Italy	Reggio Emilia, Italy	Modena (MO), Italy	Italy	Fidenza, Italy	Bomporto, Italy
xxx.161.229.3	Berlin, Germany	Bruxelles, Belgium	Bruxelles, Belgium	Germany	Frankfurt am Main, Germany	Bruxelles, Belgium

- the impact - wrong login locations
- the solution - on our event data, MaxMind has proven to be the most effective geolocation service
  - You should try out different geolocation provider and see what fit best your data

BuffaLogs future plan

- Adding additional log sources
- Adding active alert notifications
- Adding users sync features
- **Automatic user blocking**
  - When a risk level of a user becomes too high, the system blocks the user automatically
- AI/ML/LLM (really?)

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BuffaLogs and Google Summer of Code

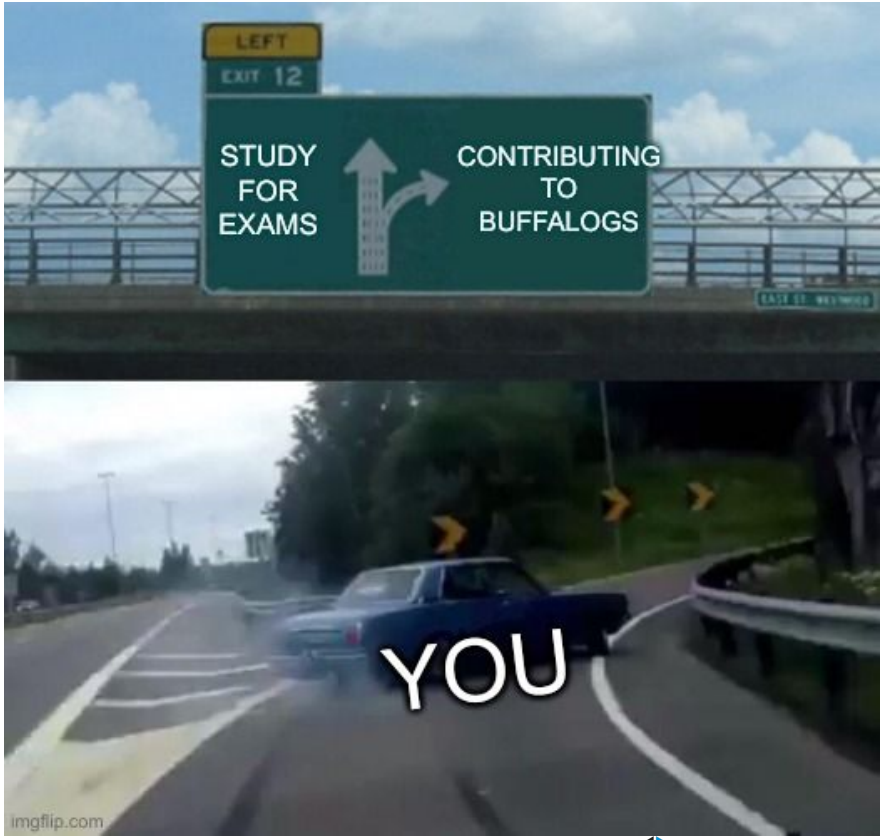
Since the very beginning of this project we participated in the Google Summer of Code.

Google Summer of Code

We are looking for enthusiastic new contributors!

Please check our repo for updates:

https://github.com/certego/BuffaLogs



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Thank you!

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via F. Lamborghini, 81 (MO) – Italy
T: +39 059 7353333
info@certego.net
www.certego.net