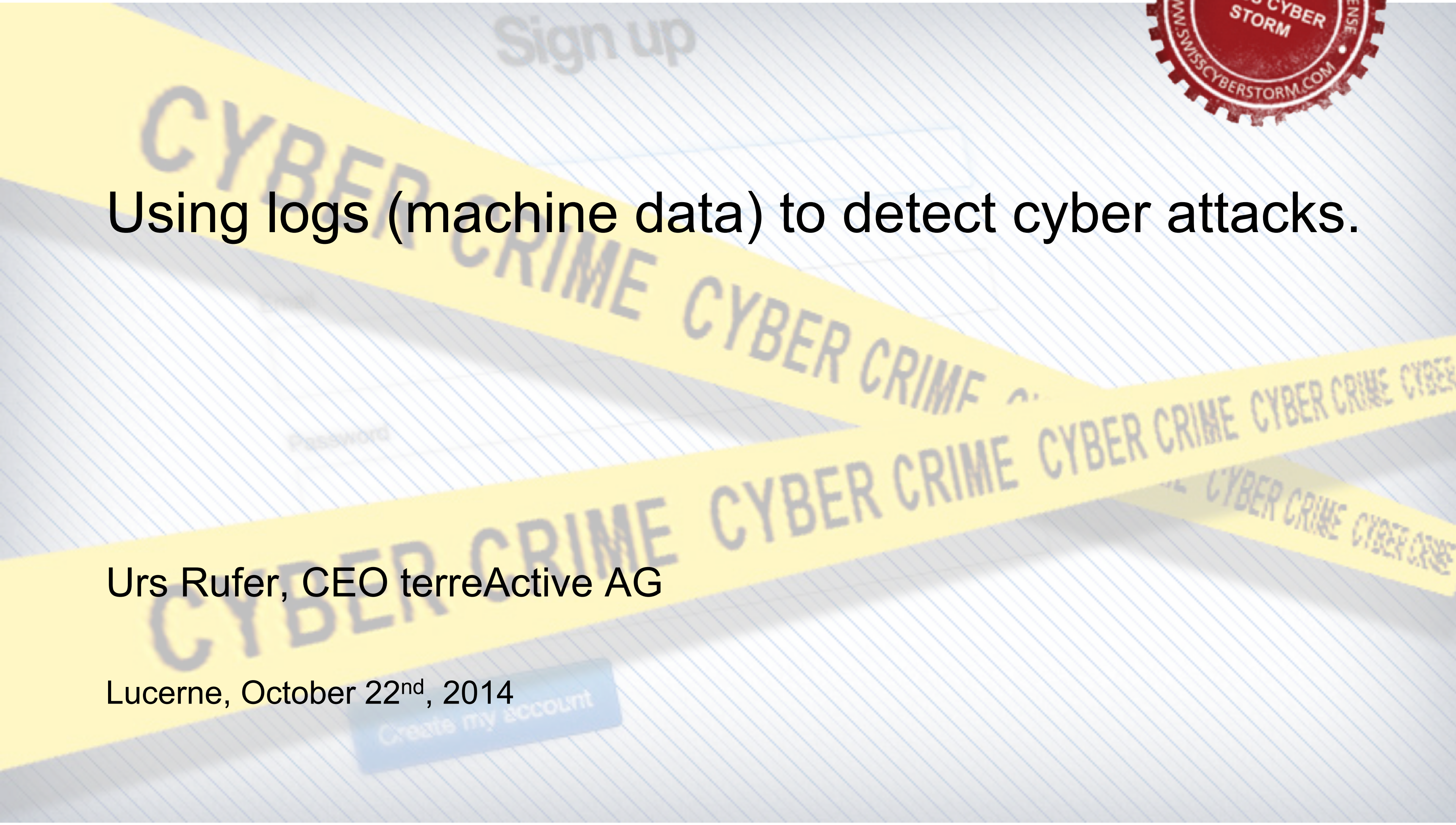
CYBER ATTACKS AND DEFENSE
SWISS CYBER STORM
WWW.SWISSCYBERSTORM.COM



Using logs (machine data) to detect cyber attacks.

Urs Rufer, CEO terreActive AG

Lucerne, October 22nd, 2014

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Agenda.

- About terreActive.
- Prevention not possible?
- Monitoring / Detection strategies.
- Money saved: real world examples.
- Conclusion / Summary.

terreActive AG.
About us.

Positioning

- IT security consulting and operation (MSS) as core competency
- Trusted partner for comprehensive and sustainable IT security solutions

Facts

- Founded in April 1996 - over 18 years of competency in IT security
- Swiss company
- 40 employees (30 engineers) in Aarau

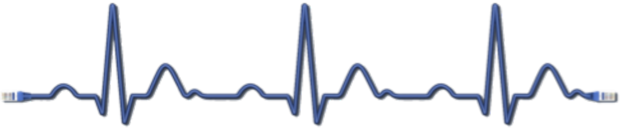
Profile

- Independent and solution-oriented
- Services in IT security lifecycle
- MSS since 1997 – share of turnover approx 2/3

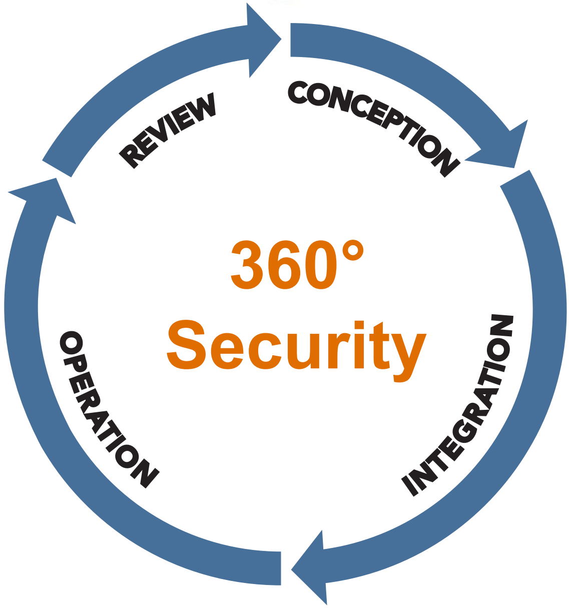
Customers

- Financial institutions (30%)
- Administration and organisations (30%)
- Telecom and IT service providers (20%)
- Industry and health services / Pharmaceuticals (20%)

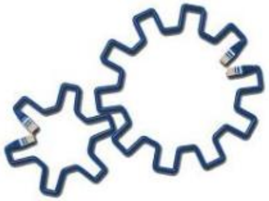
terreActive AG.
Our business segments.



Consulting



Operation



Integration

Development

tac
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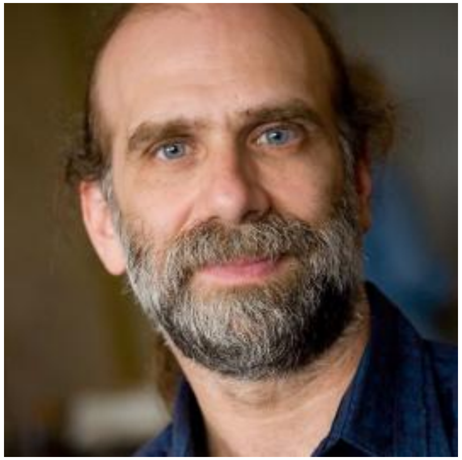
Prevention not possible?



«You can’t defend.

You can’t prevent.

The only thing you can do is detect and respond.»

© by Bruce Schneier

Bruce Schneier is an American cryptographer, computer security and privacy specialist, and writer. He is the author of several books on general security topics, computer security and cryptography.

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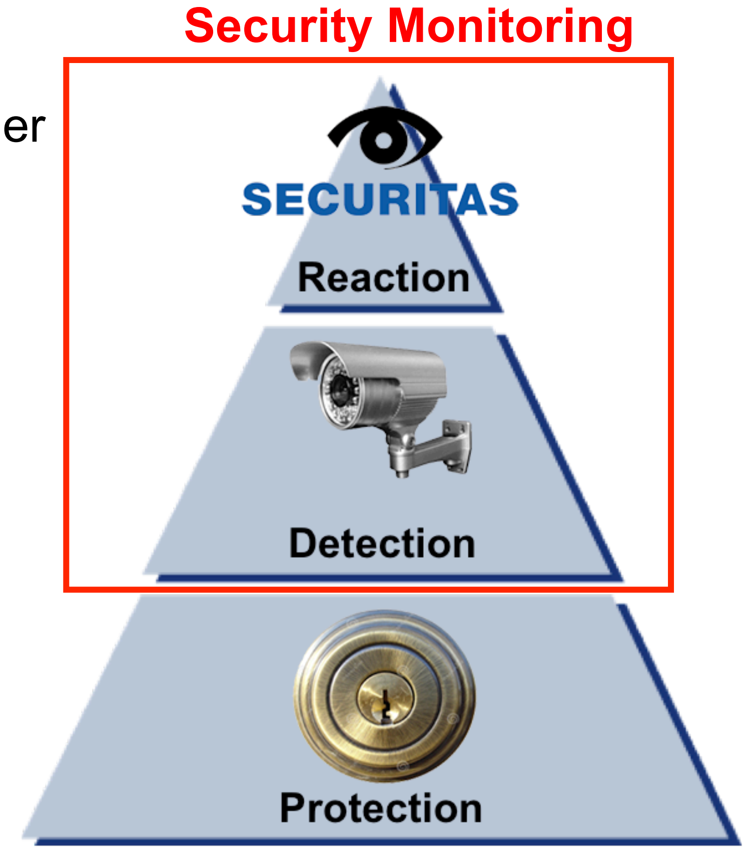
Monitoring / Detection definition.

Information Security Monitoring is the process involving **collection**, **analysis**, and **escalation** of indications and warnings in order to detect, track and respond to **security threats**.

Security threats include attacks, intrusions, policy violations, data leakage, software vulnerabilities, denial of service.

Security Monitoring as continuous Risk-Assessment



Security Architecture

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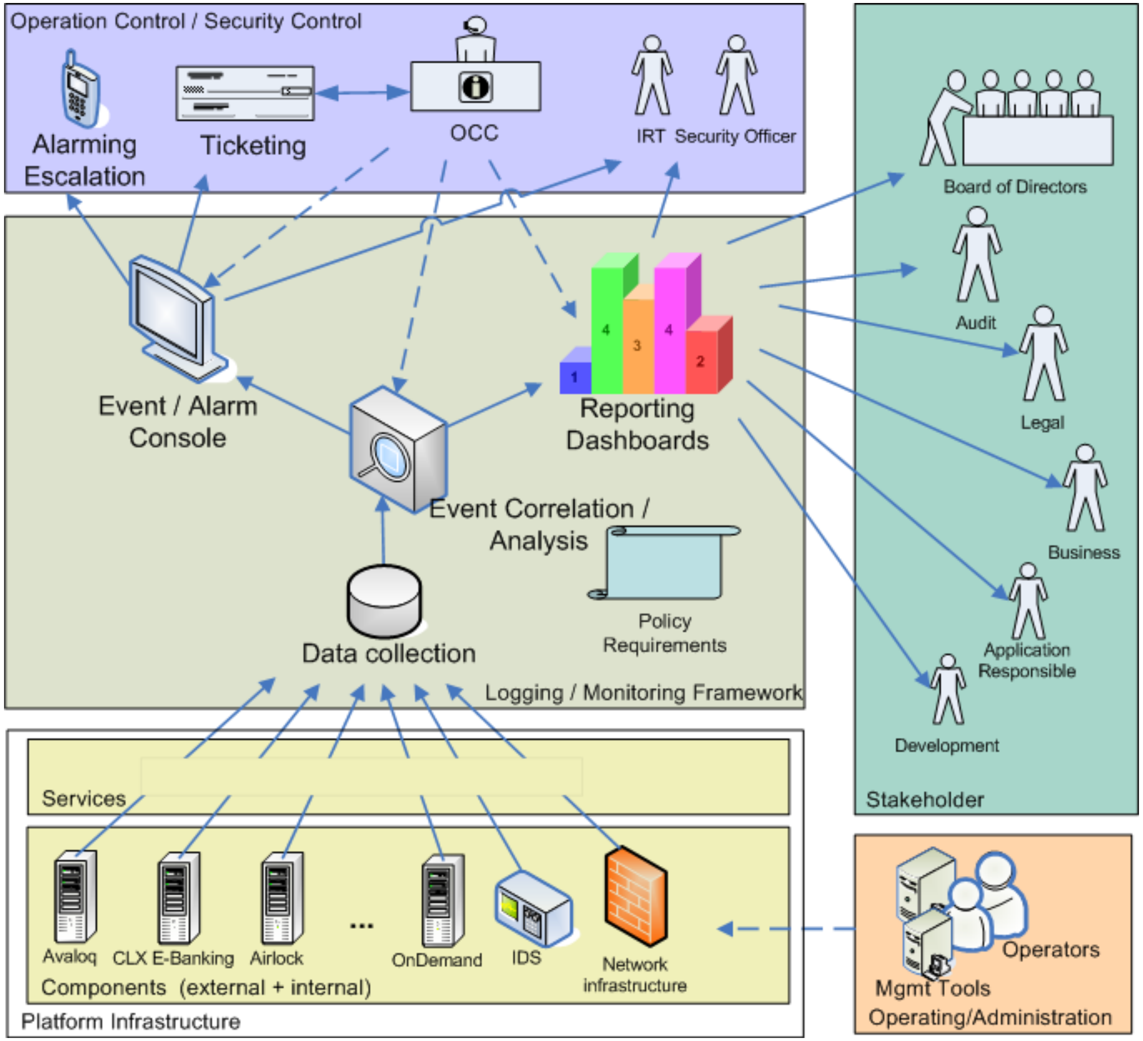
Monitoring / Detection strategies.

Monitoring Blueprint

- Alarming / Reaction
- Searching / Reporting
- Event correletion / analysis
- Data collection and processing
- Data sources



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Monitoring / Detection strategies.

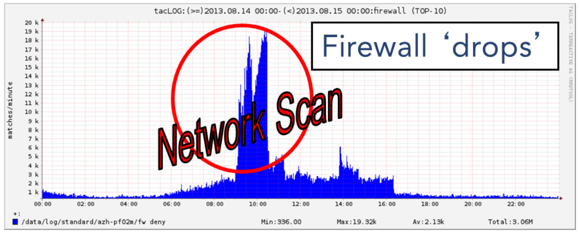
Data Sources Types

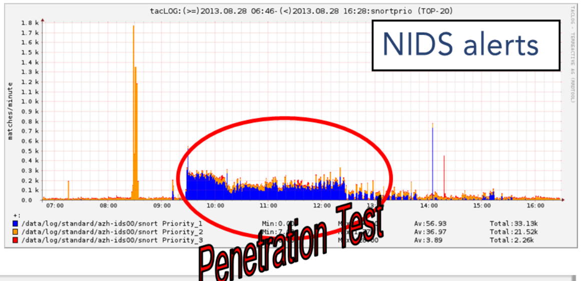
Pattern Matching

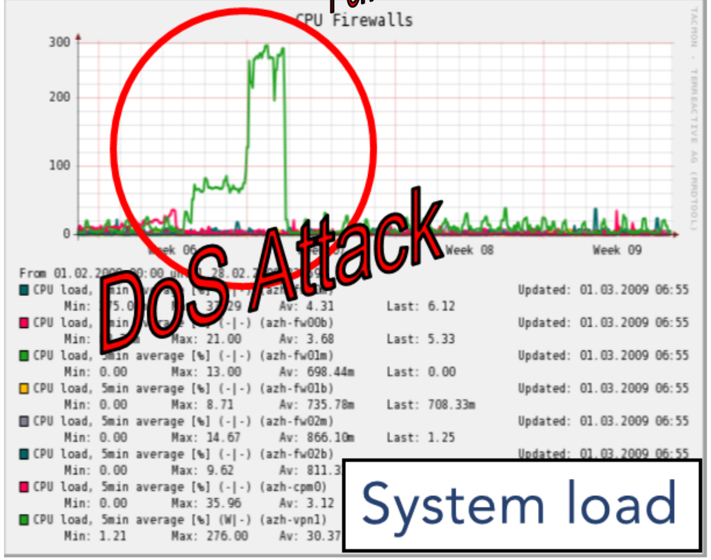
- Firewall
- Network IDS
- Web Application Firewall / Reverse Proxy
- Application Logs

Performance

- Bits/s
- Logs/s
- CPU load







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Data loss: the facts!

Company / Application

- Online Web-Shop

Attack

- Software exploit in web application which resulted in data leakage

Detection approach

- Various automatic alarms triggered: Network load, NIDS, IDS and app logs

Mitigation

- Inform Web-/DB-Operator
- Shutdown the system
- Possibly too late

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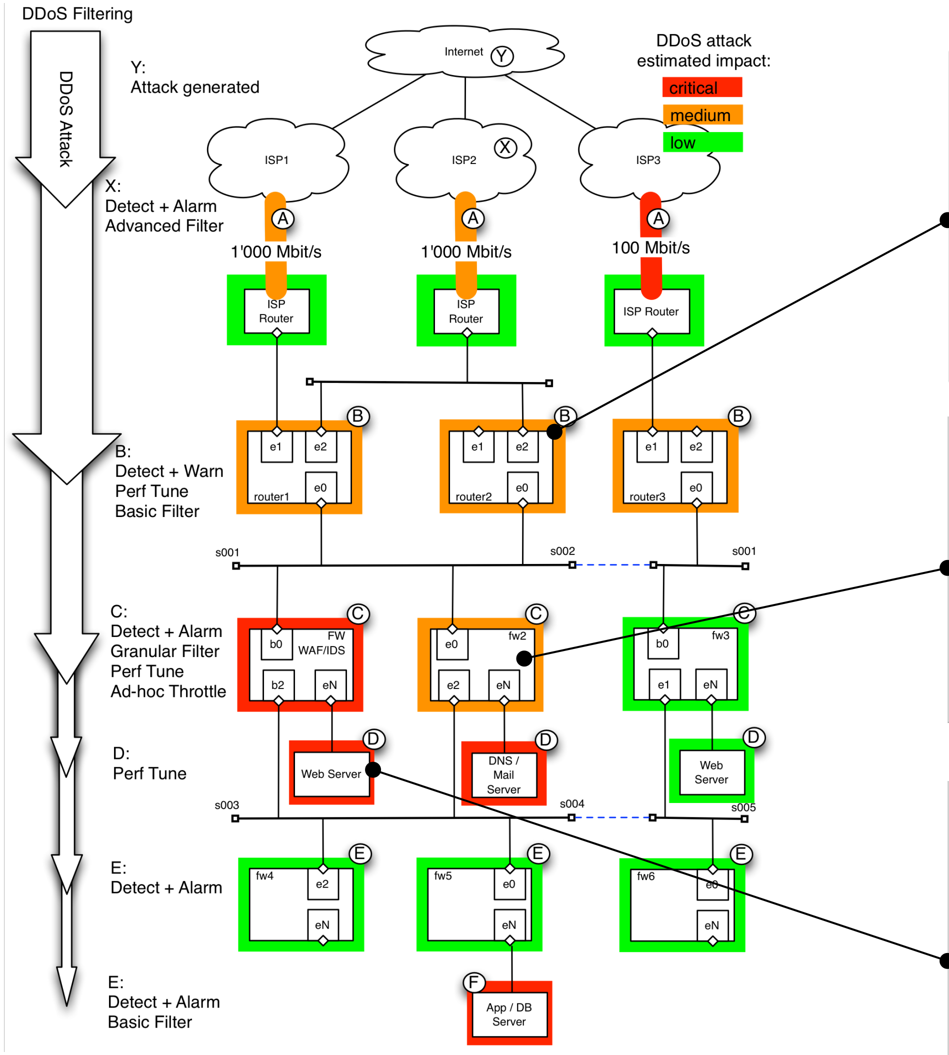
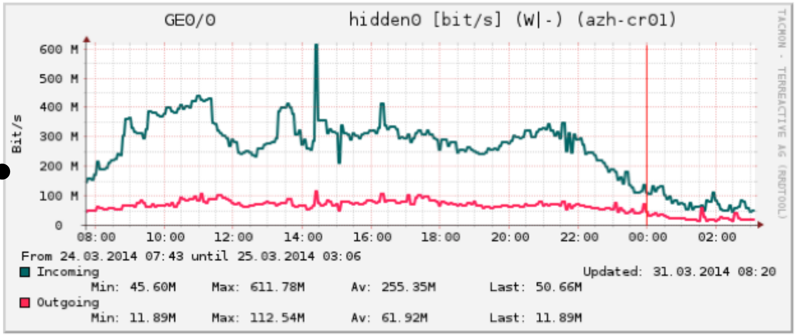
Data loss: technical details.



Traffic Internet Link

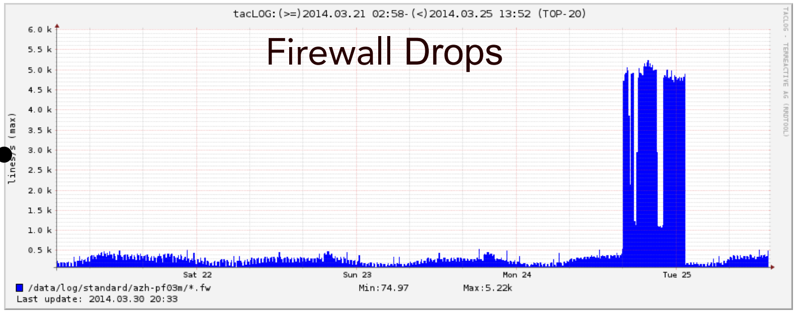


From 24.03.2014 07:43 until 25.03.2014 03:06

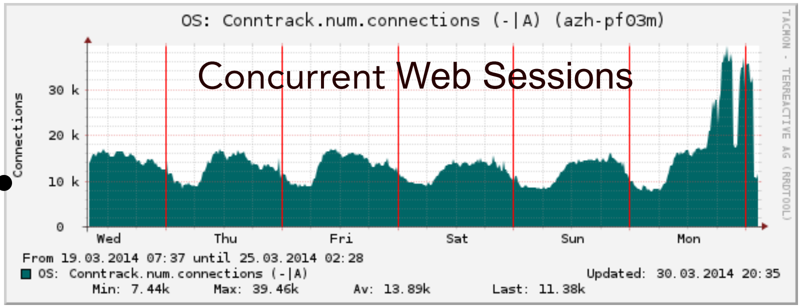
Updated: 31.03.2014 08:20

🟩 Incoming
Min: 45.60M Max: 611.78M Av: 255.35M Last: 50.66M

🟥 Outgoing
Min: 11.89M Max: 112.54M Av: 61.92M Last: 11.89M



🟦 /data/log/standard/azh-pf03m/*.fw Min:74.97 Max:5.22k
Last update: 2014.03.30 20:33



From 19.03.2014 07:37 until 25.03.2014 02:28

Updated: 30.03.2014 20:35

🟩 OS: Conntrack.num.connections (-|A)
Min: 7.44k Max: 39.46k Av: 13.89k Last: 11.38k

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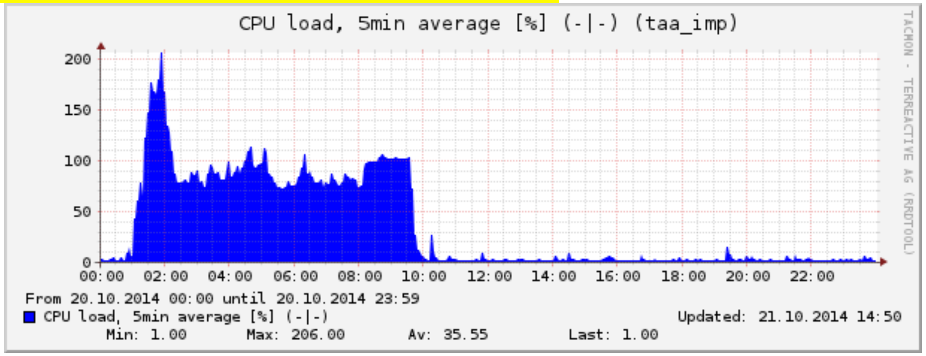
Data loss: technical details.

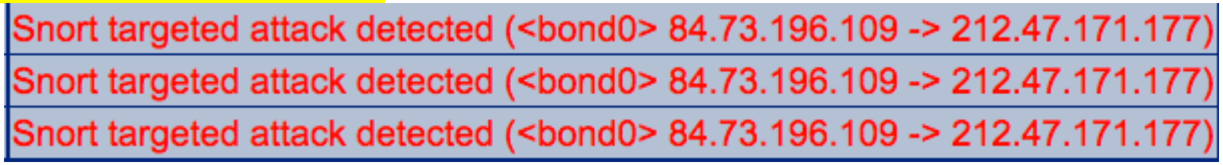
Web Application Errors

```
91.121.202.95 - - [04/Aug/2014:23:31:50
+0000] "GET /DigitalScribe/stuworkdisplay
.php?ID=-1)%20UNION 20ALL20SELECT
200x4f70656e5641532d53514c2d496e6a
656374696f6e2d54657374,2,3,4,5,6,7,8,
9,10,11%23 HTTP/1.1" 200 27 "-" ”
Mozilla/5.0 (X11; Linux; rv:17.0) Gecko
/17.0 Firefox/17.0"
```

System Overload (CPU/Network)

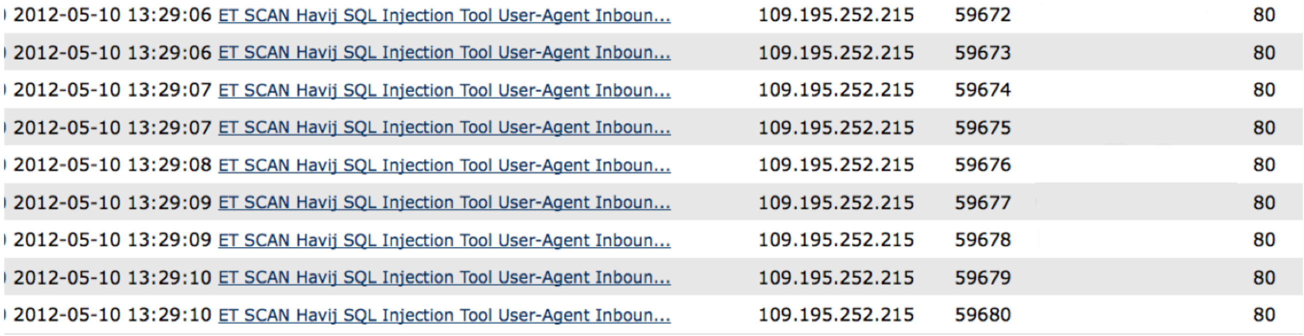


NIDS Generic Alerts



```
Snort targeted attack detected (<bond0> 84.73.196.109 -> 212.47.171.177)
Snort targeted attack detected (<bond0> 84.73.196.109 -> 212.47.171.177)
Snort targeted attack detected (<bond0> 84.73.196.109 -> 212.47.171.177)
```

IDS Specific Alerts



2012-05-10 13:29:06	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59672	80
2012-05-10 13:29:06	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59673	80
2012-05-10 13:29:07	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59674	80
2012-05-10 13:29:07	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59675	80
2012-05-10 13:29:08	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59676	80
2012-05-10 13:29:09	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59677	80
2012-05-10 13:29:09	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59678	80
2012-05-10 13:29:10	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59679	80
2012-05-10 13:29:10	ET SCAN Havij SQL Injection Tool User-Agent Inboun...	109.195.252.215	59680	80

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Money saved: the facts!

Company / Application

- Globally active private bank
- Web-Banking

Attack

- Malware: Men-in-the-browser / Trojan

Detection approach

- Unusual behaviour in WAF logs as part of daily log check detected
- Manual analysis of attack
- Report / search for defined pattern developed

Mitigation

- Identify accounts
- Block / cancel payments
- Money saved in this case: ca. 200k CHF!

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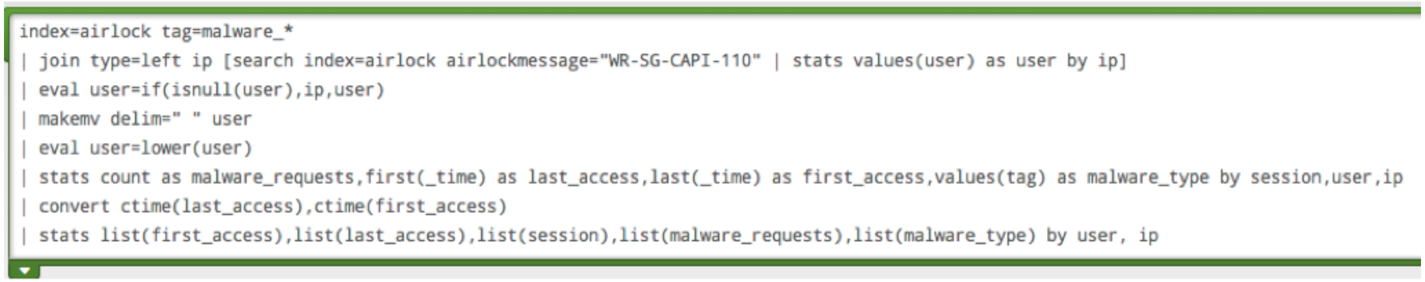
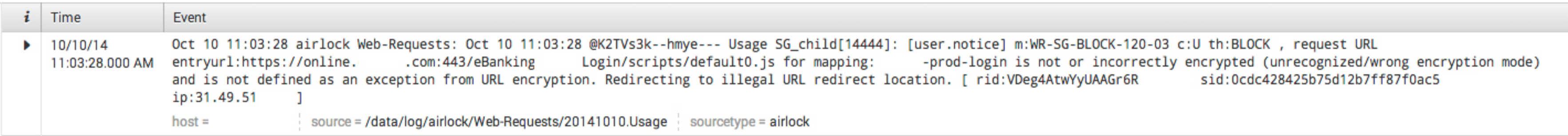
Money saved: technical details!

Search

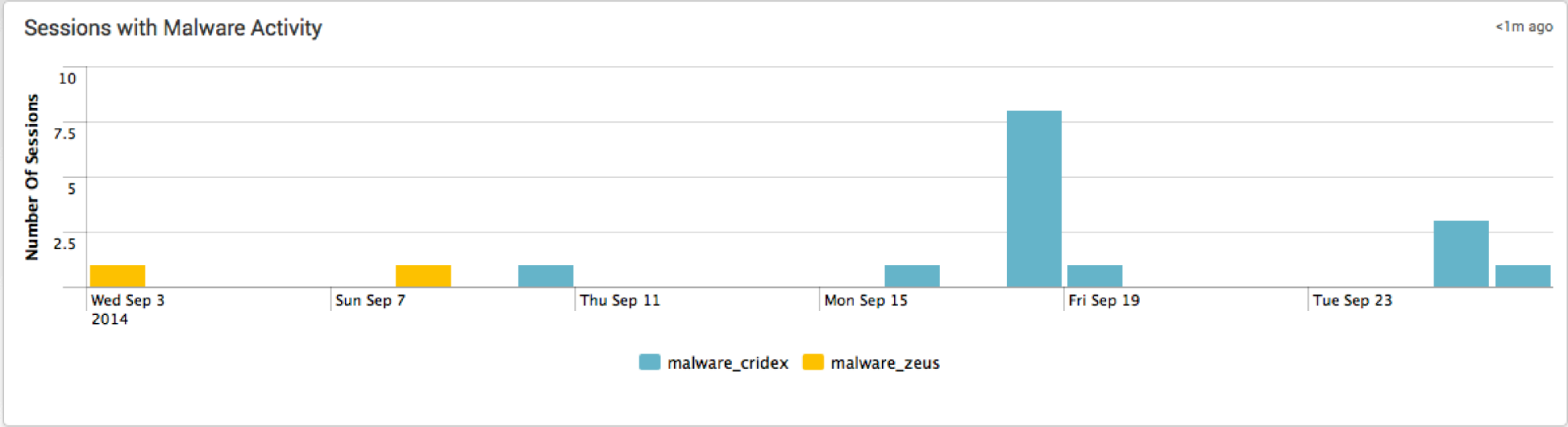


```
index=airlock tag=malware_*
| join type=left ip [search index=airlock airlockmessage="WR-SG-CAPI-110" | stats values(user) as user by ip]
| eval user=if(isnull(user),ip,user)
| makemv delim=" " user
| eval user=lower(user)
| stats count as malware_requests,first(_time) as last_access,last(_time) as first_access,values(tag) as malware_type by session,user,ip
| convert ctime(last_access),ctime(first_access)
| stats list(first_access),list(last_access),list(session),list(malware_requests),list(malware_type) by user, ip
```



i	Time	Event
▶	10/10/14 11:03:28.000 AM	Oct 10 11:03:28 airlock Web-Requests: Oct 10 11:03:28 @K2TVs3k--hmye--- Usage SG_child[14444]: [user.notice] m:WR-SG-BLOCK-120-03 c:U th:BLOCK , request URL entryurl:https://online. .com:443/eBanking Login/scripts/default0.js for mapping: -prod-login is not or incorrectly encrypted (unrecognized/wrong encryption mode) and is not defined as an exception from URL encryption. Redirecting to illegal URL redirect location. [rid:VDeg4AtwYyUAAGr6R sid:0cdc428425b75d12b7ff87f0ac5 ip:31.49.51] host = ⁞ source = /data/log/airlock/Web-Requests/20141010.Usage ⁞ sourcetype = airlock

Report



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Summary.

Monitoring / Detection lessons learned

- Logs and other machine data can be very valuable
- Detection works well in a «clean» infrastructure
- Combine automated alerting and manual (human) analysis for best results
- Establish a dedicated Security Operations Center in bigger organisations
- Start with your core applications (e.g. e-Banking) and expand with the experience
- Don’t forget: «listen to your logs»

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Conclusion.

Good detection based on automatic alerting and manual analysis makes prevention possible and can save money before it’s too late!

«You can’t FULLY defend.
You can’t FULLY prevent.
A GOOD thing TO do is detect and respond.»

Thank you for your attention!
We safeguard your success!

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