Visualizing PHPIDS Log Files for Better Understanding of Web Server Attacks

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Introduction

- PHPIDS
- Log visualization

Contributions

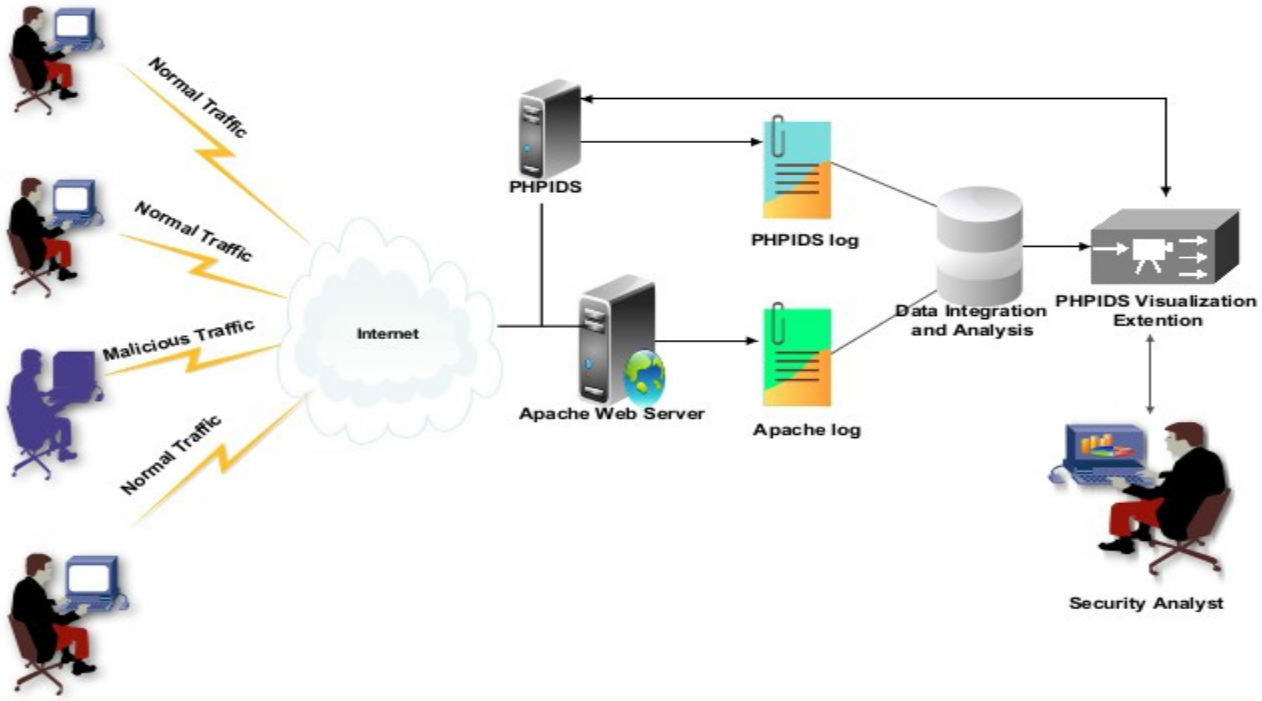
- Analysis and correlation of PHPIDS and web server logs
- PHPIDS visualization extension
- Experimentation on real-world datasets

Datasets and methodology

- Datasets
- Prefuse toolkit
- Exploring various data visualization

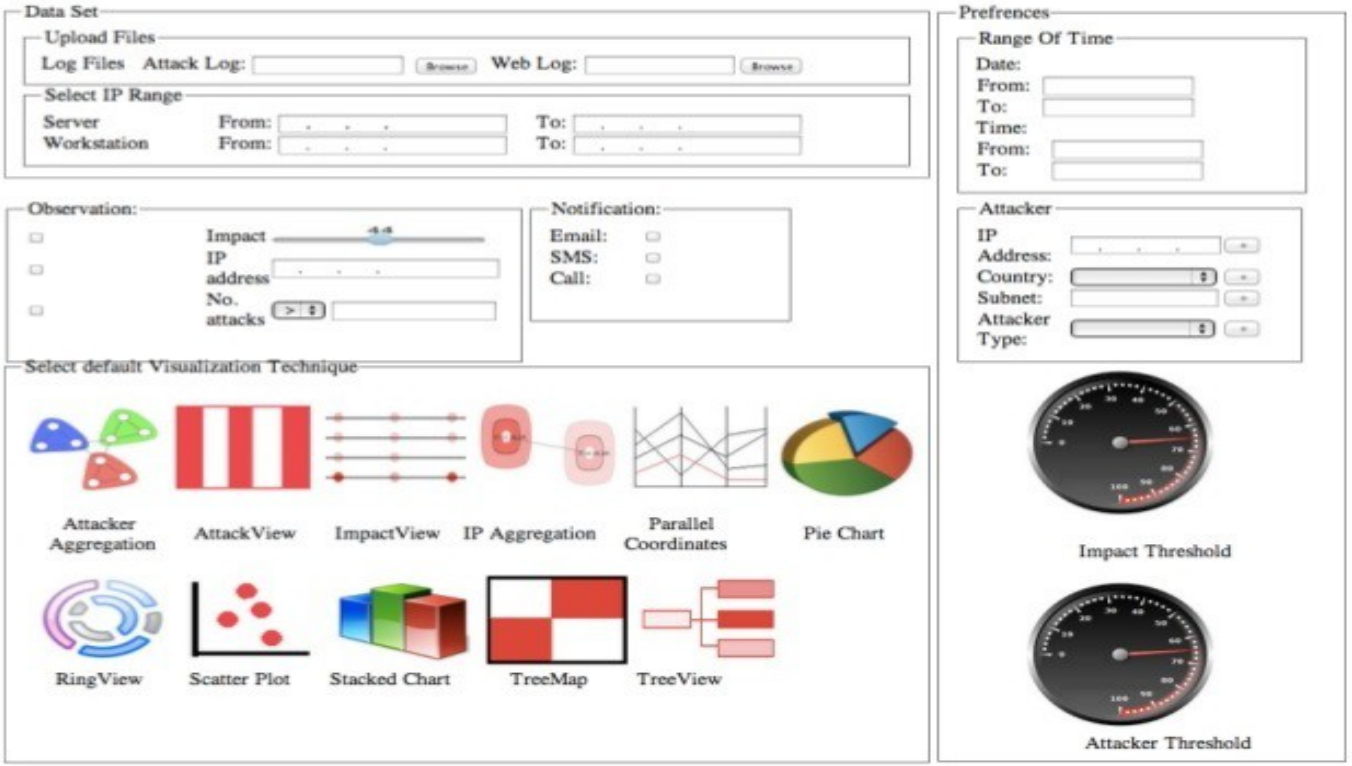
PHPIDS Visualization Extension

- System Design

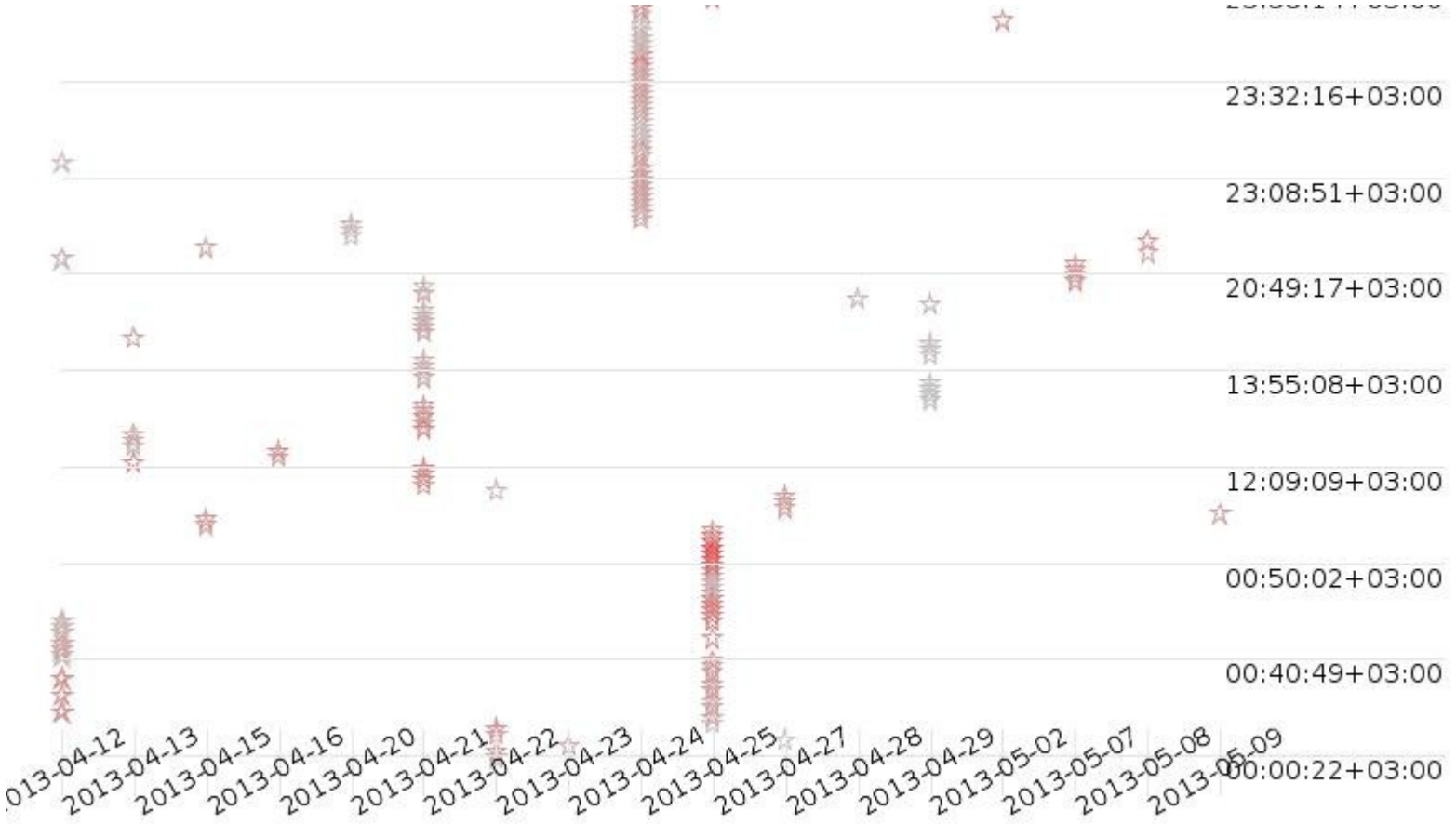


PHPIDS Visualization Extension

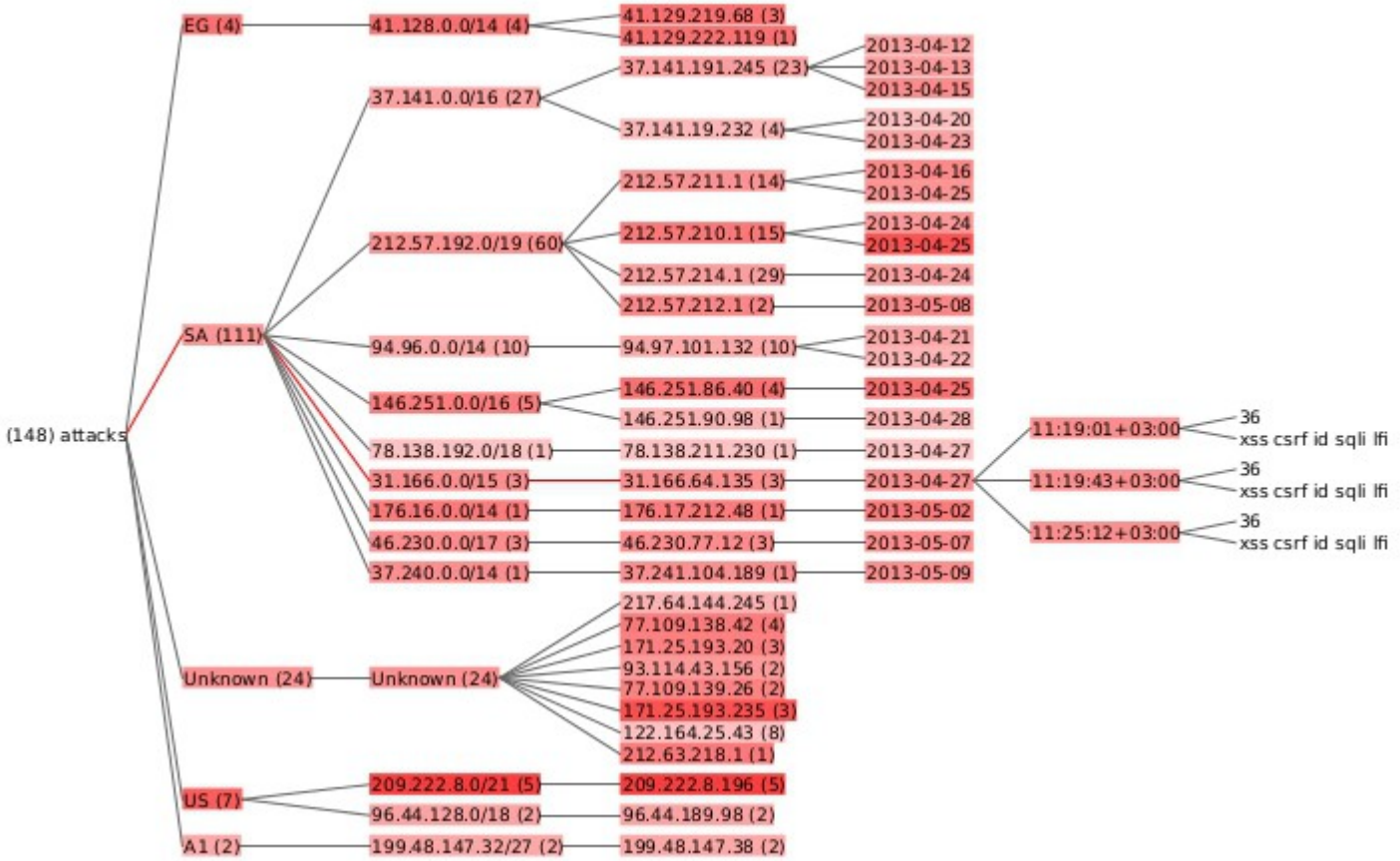
- Control console



Scatter Plot



TreeView


(148) attacks
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41.129.222.119 (1)
SA (111)
37.141.0.0/16 (27)
37.141.191.245 (23)
2013-04-12
2013-04-13
2013-04-15
37.141.19.232 (4)
2013-04-20
2013-04-23
212.57.192.0/19 (60)
212.57.211.1 (14)
2013-04-16
2013-04-25
212.57.210.1 (15)
2013-04-24
2013-04-25
212.57.214.1 (29)
2013-04-24
212.57.212.1 (2)
2013-05-08
94.96.0.0/14 (10)
94.97.101.132 (10)
2013-04-21
2013-04-22
146.251.0.0/16 (5)
146.251.86.40 (4)
2013-04-25
146.251.90.98 (1)
2013-04-28
78.138.192.0/18 (1)
78.138.211.230 (1)
2013-04-27
31.166.0.0/15 (3)
31.166.64.135 (3)
2013-04-27
11:19:01+03:00
36
xss csrf id sqli lfi
11:19:43+03:00
36
xss csrf id sqli lfi
11:25:12+03:00
36
xss csrf id sqli lfi
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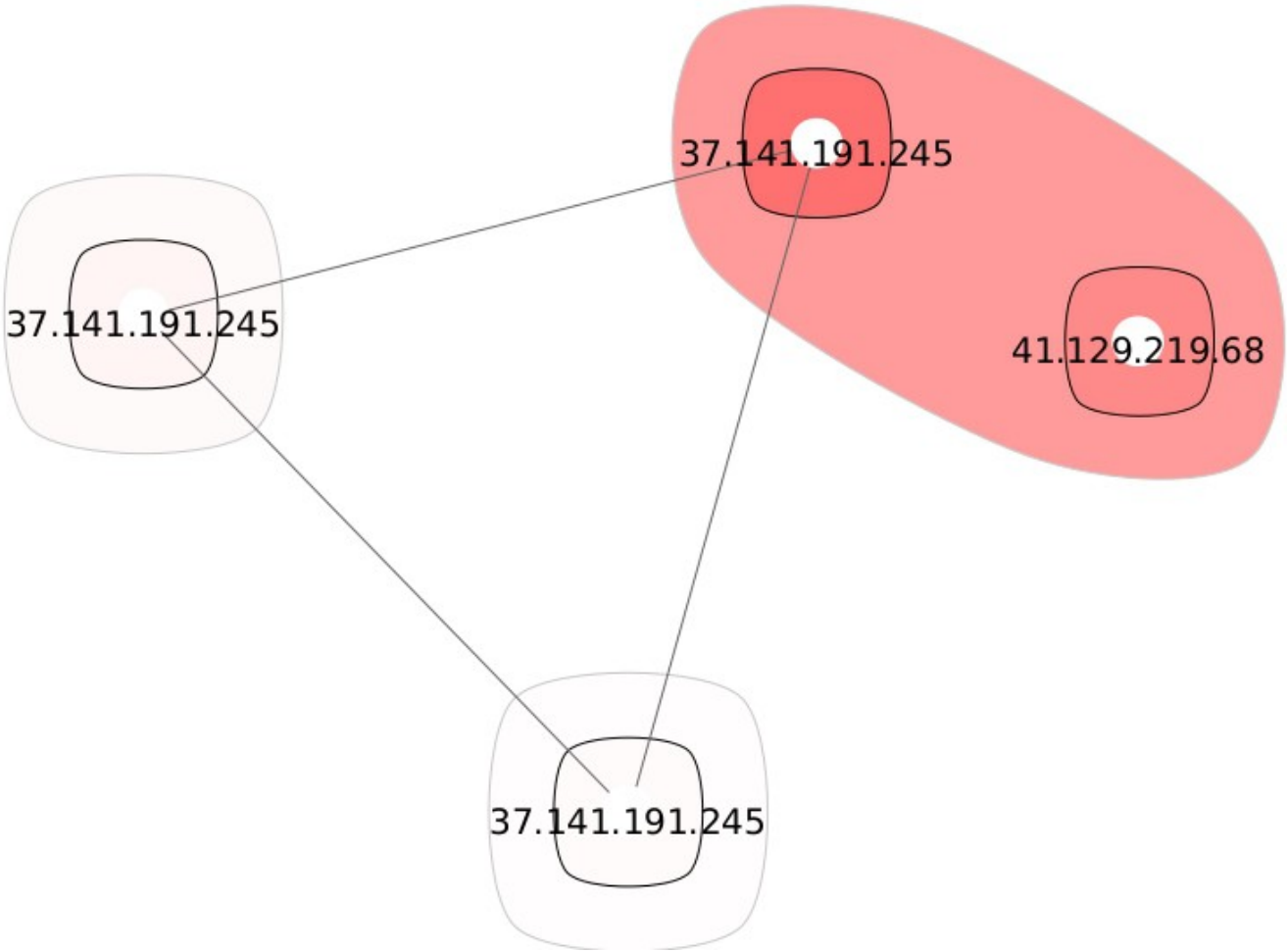
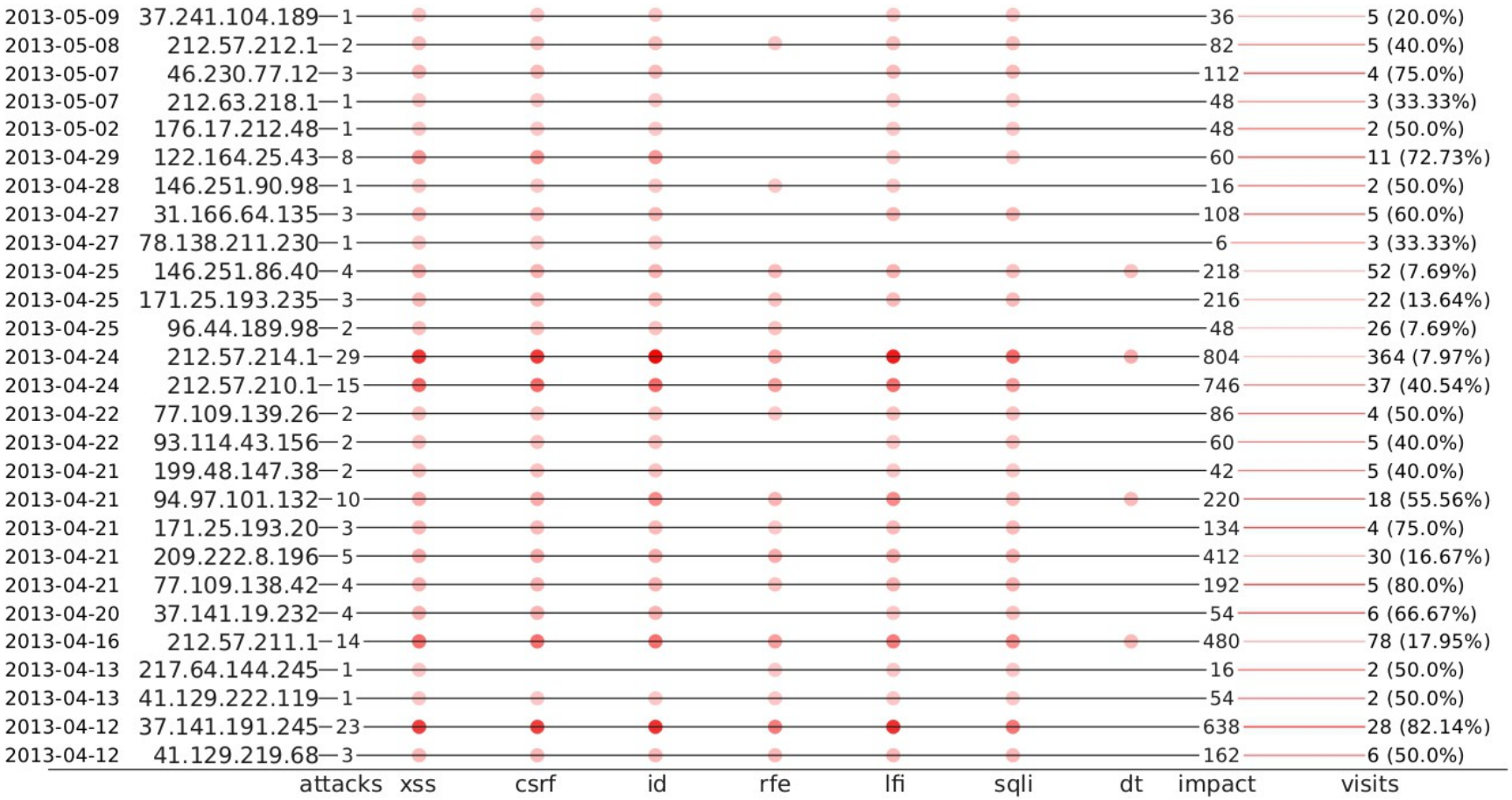
176.17.212.48 (1)
2013-05-02
46.230.0.0/17 (3)
46.230.77.12 (3)
2013-05-07
37.240.0.0/14 (1)
37.241.104.189 (1)
2013-05-09
Unknown (24)
Unknown (24)
217.64.144.245 (1)
77.109.138.42 (4)
171.25.193.20 (3)
93.114.43.156 (2)
77.109.139.26 (2)
171.25.193.235 (3)
122.164.25.43 (8)
212.63.218.1 (1)
US (7)
209.222.8.0/21 (5)
209.222.8.196 (5)
96.44.128.0/18 (2)
96.44.189.98 (2)
A1 (2)
199.48.147.32/27 (2)
199.48.147.38 (2)

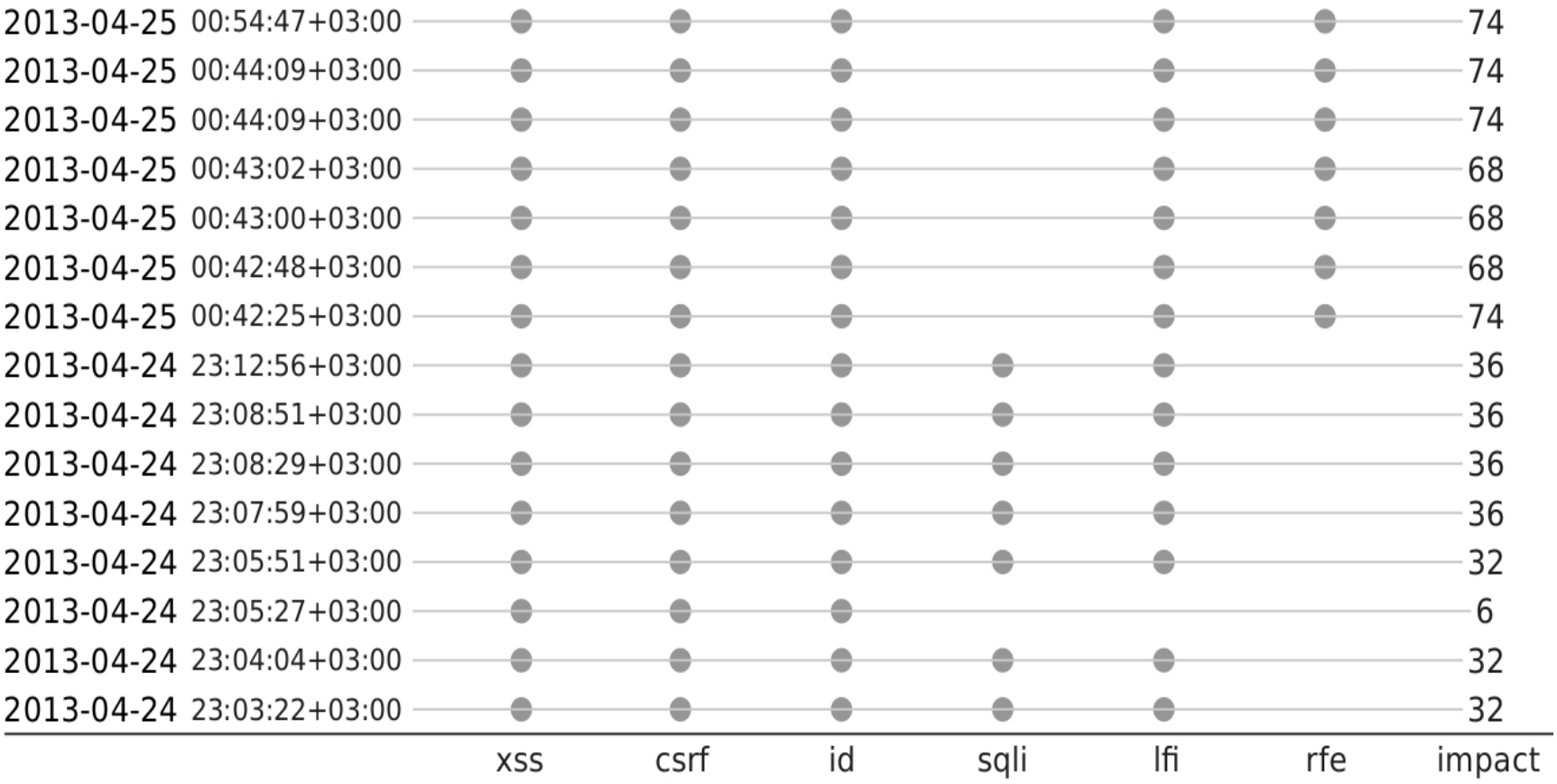
IP Address Aggregator



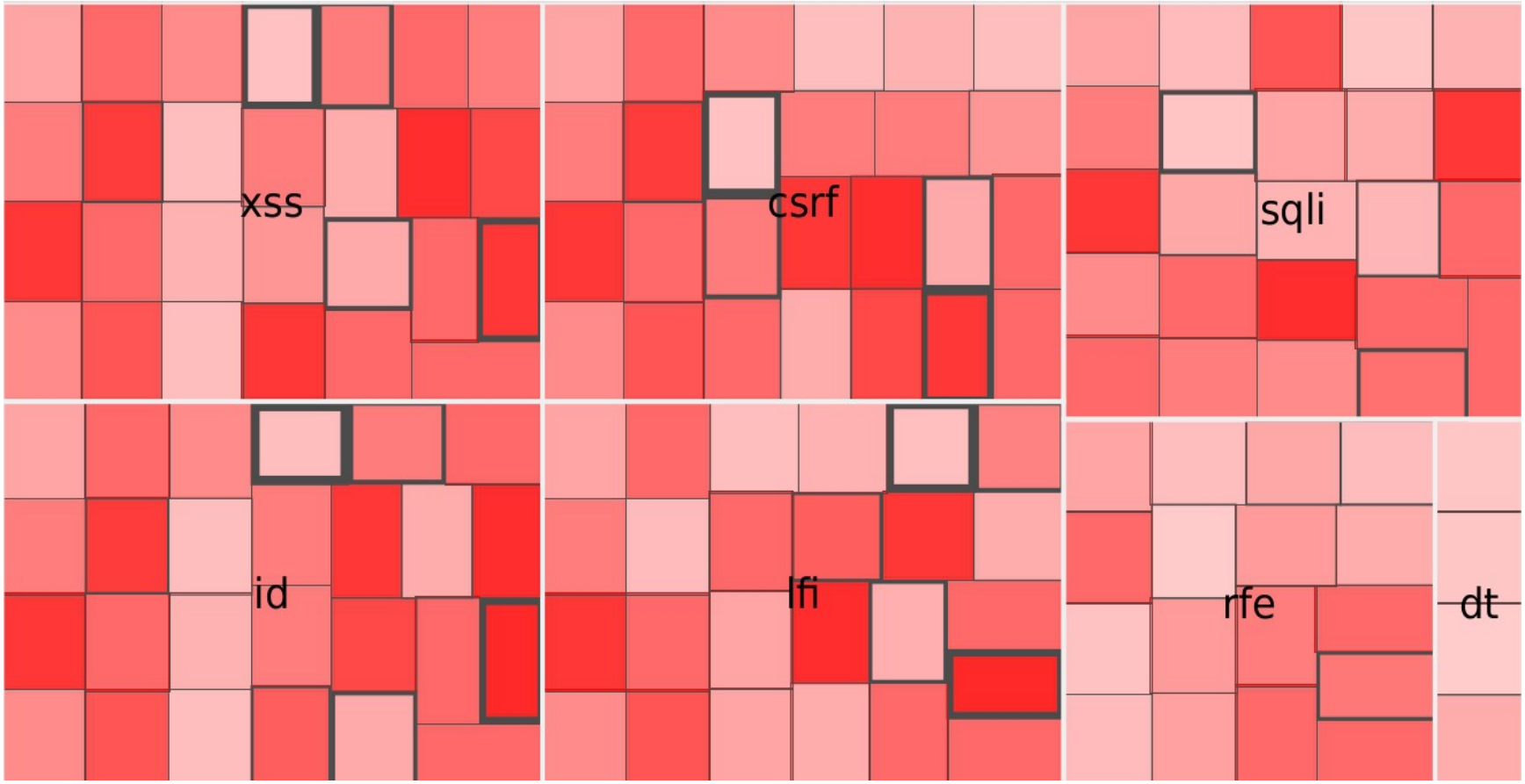
Attack Frequency View



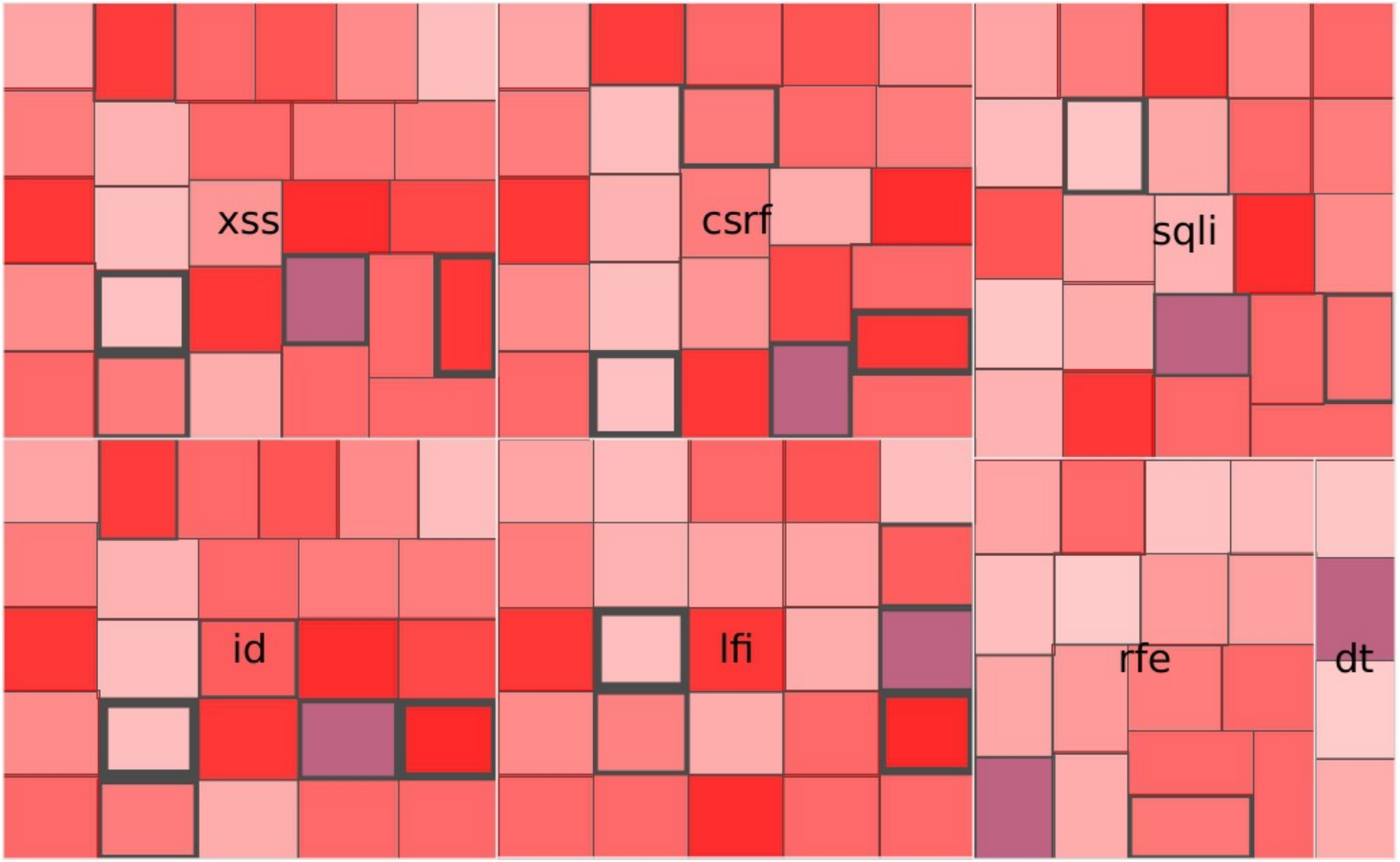
Attack Frequency View



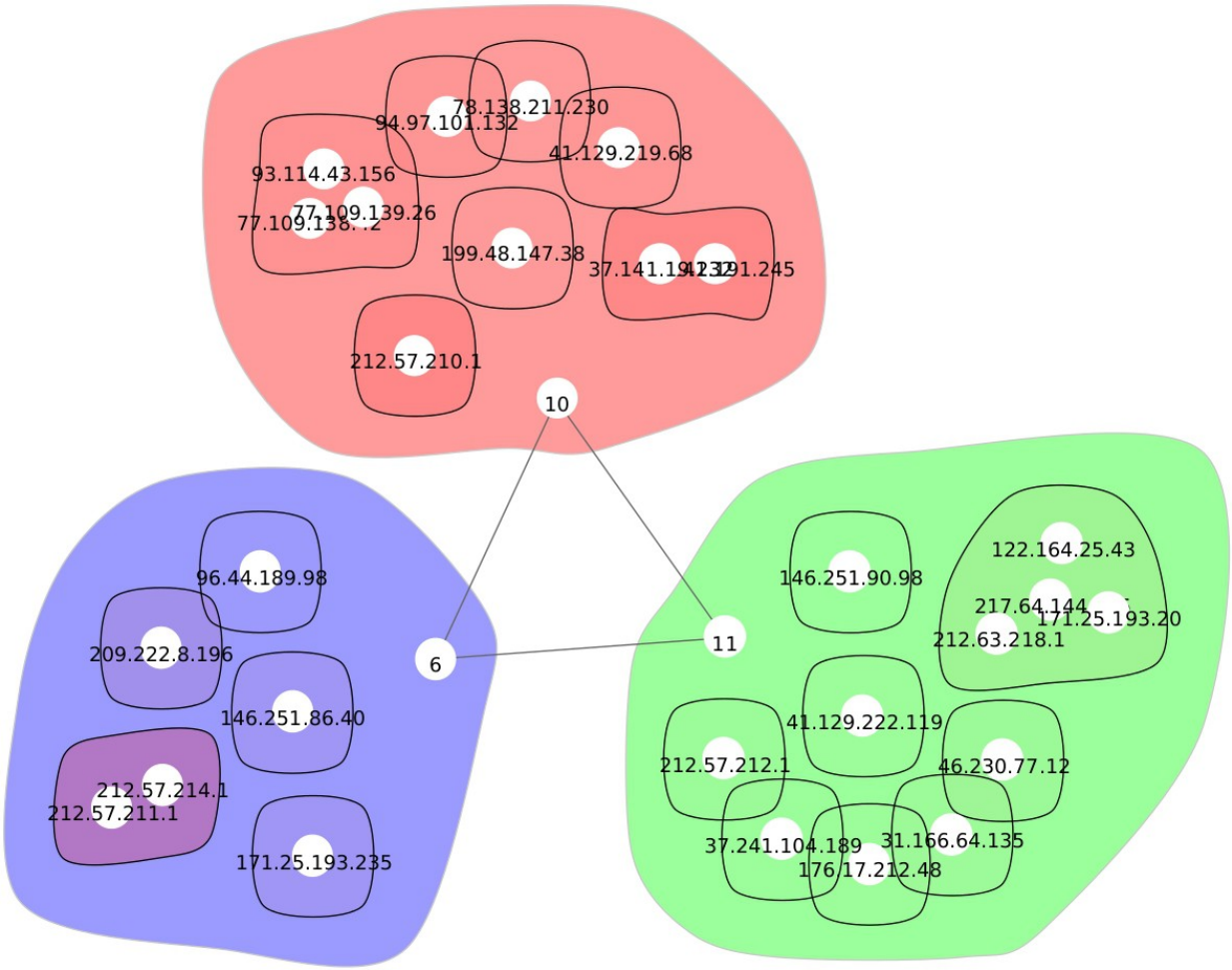
TreeMap



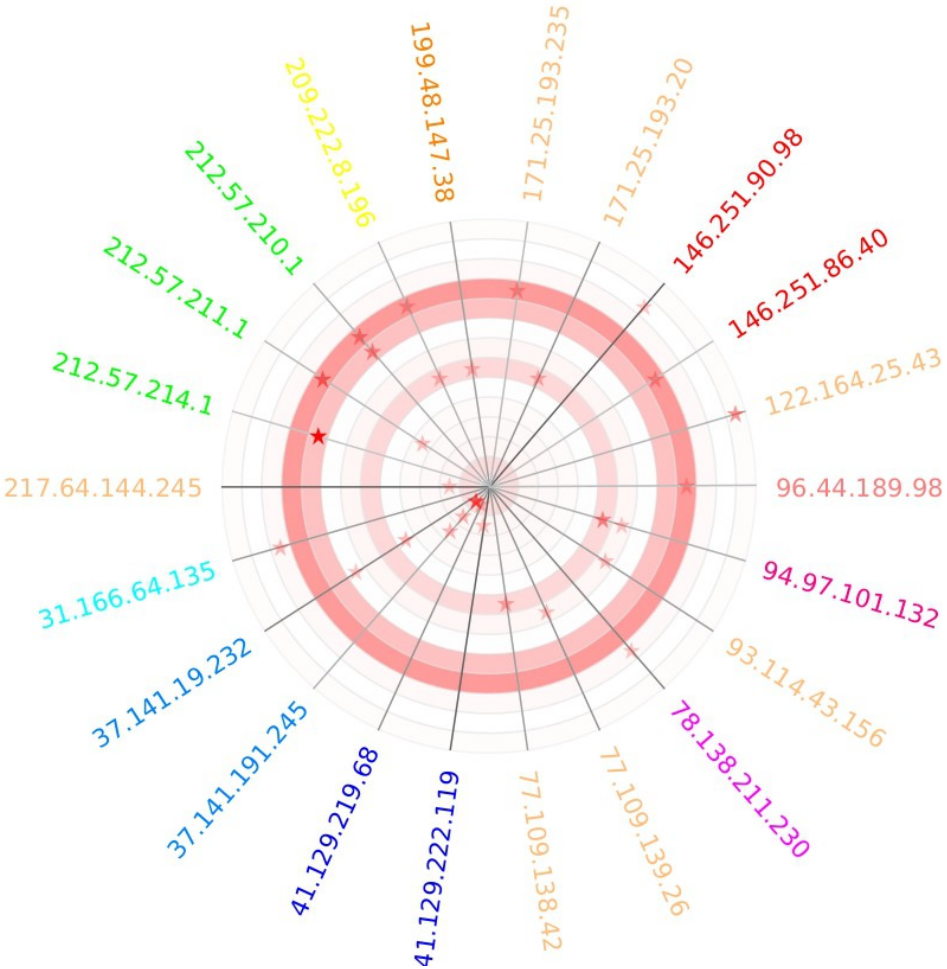
TreeMap



Attacker Aggregation



RingView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122.164.25.43
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94.97.101.132
93.114.43.156
78.138.211.230
77.109.139.26
77.109.138.42
41.129.222.119
41.129.219.68
37.141.191.245
37.141.19.232
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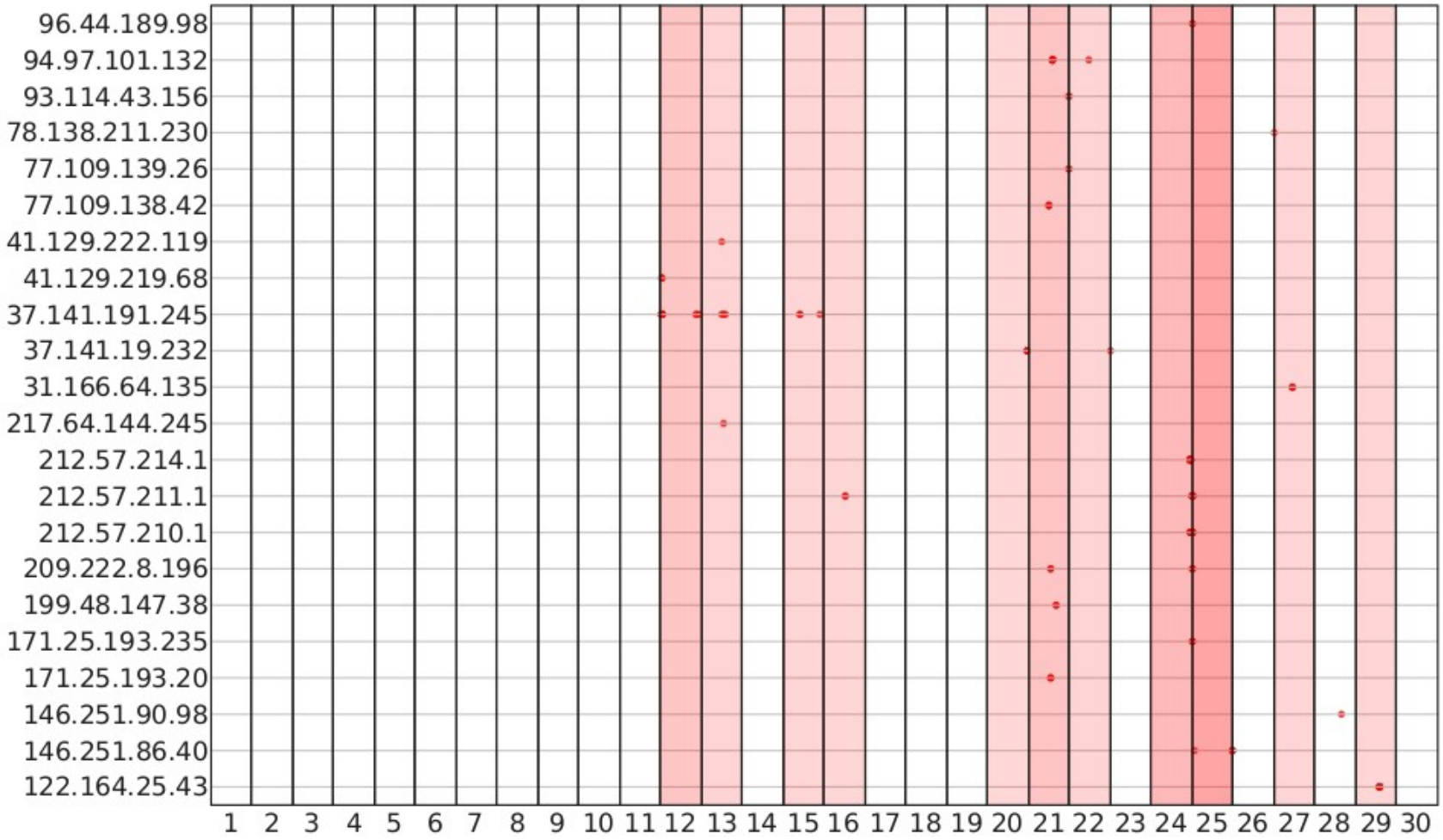
212.57.211.1
212.57.210.1
209.222.8.196

BarView


96.44.189.98
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41.129.219.68
37.141.191.245
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212.57.214.1
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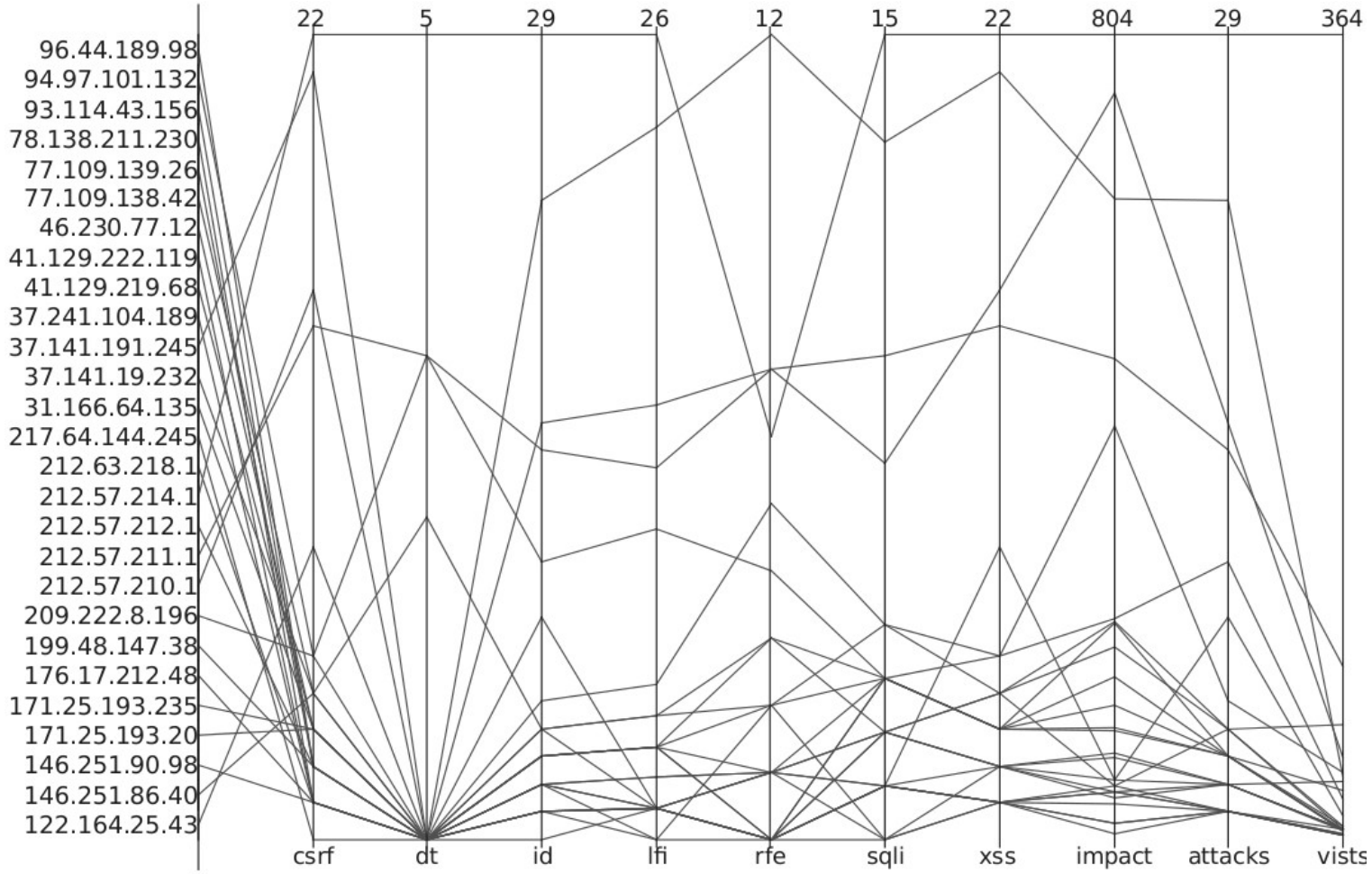
146.251.90.98
146.251.86.40
122.164.25.43
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Parallel Coordinates



Limitations and future work

- Different visual representations
- Cluttered plots
- Correlating other logs
- Experimenting on large logs
- Gathering feedback from administrators in the field

Conclusion

- PHPIDS visualization extension
- Analyzing and correlating PHPIDS and Apache web server log
- Using real-world PHPIDS and Apache log files
- Data visualization feature

Questions