



Indonesia Honeyynet Project

Building the National Honeyynet-based Cyber Security Threat Intelligence – Raising the bar on Cyber Situational Awareness



Dr. Charles Lim, Msc., CTIA, CHFI, EDRP, ECSA, ECSP, ECIH, CEH, CEI

Chapter Lead

Telkom University, Bandung, 12 November 2019

AGENDA

- About Me
- Honeynet Project
- Indonesia Honeynet Project (IHP)
- Our Contributions
- Monitoring Statistics
- Early Warning Systems
- Cyber Situational Awareness
- Honeynet-based Threat Sharing Platform
- IHP Workshop & Research Sharing
- Thank You



About Me

Dr. Charles Lim, Msc., CTIA, CHFI, EDRP, ECSA, ECSP, ECIH, CEH, CEI
Researcher – Information Security Research Group and Lecturer
Swiss German University

Charles.lims [at] gmail.com and charles.lim [at] sgu.ac.id

<http://people.sgu.ac.id/charleslim>

Research Interest

Malware, Intrusion Detection, Threats Intelligence, Digital Forensics, Cloud Security

Community

Indonesia Honeynet Project - Chapter Lead

Academy CSIRT – member

Asosiasi Digital Forensik Indonesia - member



Indonesia Honeynet Project



Honeynet Project Mission

ESTABLISHED

**Volunteer open source computer security
research organization since 1999
(US 501c3 non-profit)**

MISSION

**learn the tools, tactics and motives involved in
computer and network attacks,
and share the lessons learned**



HoneyNet Project – Know Your Tools

Home > Blogs > roberto.tanara's blog

Dionaea honeypot: from Conficker to WannaCry + SambaCry CVE 2017-7494

Tue, 05/30/2017 - 08:09 — roberto.tanara

[Twitter](#) [Facebook](#) [LinkedIn](#)

This is a contribution by Tan Kean Siong, follow him on Twitter [@gento_](#).

The open source honeypot Dionaea supported SMB since long but lacked support for the recent WannaCry ransomware SMB vulnerability and the most recent Samba RCE vulnerability CVE 2017-7494 dubbed "SambaCry" wormable attacks. With the recent changes, both attack vectors are supported and respective samples caught in the wild.

Dionaea is a low interaction, server side honeypot which emulates a vulnerable system or device. Its ultimate goal is to gain a copy of the malware. It supports various protocols and network stacks e.g. SMB, HTTP, FTP, TFTP, MSSQL, MySQL, SIP (VOIP). Recently it also got support to emulate an IoT device, SmartTV or XBOX with the UPnP and MQTT protocols enabled. Dionaea was created back in the years of the Conficker worm, and yet its solid SMB network stack proved to be useful in 2017 for the WannaCry worm hunt across the Internet.

WannaCry

In May 2017, the WannaCry ransomware outbreak infected millions of computers globally and got much attention due to the scale and the infected organizations. The attack targeted computers running Microsoft Windows by exploiting the MS17-010 SMB remote code execution vulnerability. Initially, the worm exploited the system with the EternalBlue exploit, and installed the DoublePulsar backdoor implant tool, thus deliver the ransomware onto the system. The worm would then continue to scan the Internet in order to find the next targets.

MEMBER IHP

Sarracenia: Enhancing the Performance and Stealthiness of SSH Honeypots using Virtual Machine Introspection

Stewart Sentanoe✉, Benjamin Taubmann, and Hans P. Reiser

University of Passau, Germany
{se,bt,hr}@sec.uni-passau.de

Abstract. Secure Shell (SSH) is a preferred target for attacks, as it is frequently used with password-based authentication, and weak passwords can be easily exploited using brute-force attacks. To learn more about adversaries, we can use a honeypot that provides information about attack and exploitation methods. The problem of current honeypot implementations is that attackers can easily detect that they are interacting with a honeypot and stop their activities immediately. Moreover, there is no freely available high-interaction SSH honeypot that provides in-depth tracing of attacks.

In this paper, we introduce *Sarracenia*, a virtual high-interaction SSH honeypot which improves the stealthiness of monitoring by using virtual machine introspection (VMI) based tracing. We discuss the design of the system and how to extract valuable information such as user credential, executed commands, and file changes.

Keywords: Honeypot, Virtual Machine Introspection, Secure Shell



Indonesia HoneyNet Project

Honeynet Project – Know Your Enemy

Home > Blogs > roberto.tanara's blog

KYE paper: Bots keep talking to us

Wed, 01/03/2018 - 16:14 — roberto.tanara

[Twitter](#) [Facebook](#) [LinkedIn](#)

Analysis of 24 Hours Internet Attacks: A Brief Overview of Malicious Traffic Targeting Featureless Servers on the

Attachment

[Bots_Keep_Talking_To_Us.pdf](#)

[roberto.tanara's blog](#) [Twitter](#) [Facebook](#) [LinkedIn](#)

Table 1.1: Overview of the Layer 7 Traffic Captured (24-hour capture)

Ports	Protocols	Number of Interactions
22	SSHv2	255796
53	DNS	28713
22	SSH	15206
80	HTTP	245
67	DHCP	114
5060	SIP	28
389	CLDAP	1

Table 2.0: Overview of Glastopf URIs (12-day capture)

Connection Attempts	Resource Requested
72	Connection attempts to PHP
6	http://httpheader.net/
5	/current_config/passwd
4	/meta-release-lts
3	/sitemap.xml
3	/ok.txt+d+cgi.force_redirect=0+d+cgi.redirect_status_env=0+n
2	/current_config/Account1
2	/recordings/
2	/muieblackcat
1	http://180.163.113.82/check_proxy
1	//system.ini?loginuse&loginpas
1	/shell?%75%6E%61%6D%65%20%2D%61
1	/script/live.js
1	/maque66959401/index.jsp
1	/manager/html



Honeynet Project Workshop 2012 - 2015



Honeynet Project Workshop 2016 - 2018



San Antonio 2016



HONEYNET PROJECT WORKSHOP 2017
University of New South Wales
Canberra, Australia

Canberra 2017



TAIPEI
TAIWAN
THE HONEYNET PROJECT
WORKSHOP 2018

Taipei 2018

Honeynet Project Workshop 2019



The Honeynet Project Annual Workshop 2019

Innsbruck, Austria — July 1st–3rd, 2019



Indonesia Honeynet Project

HoneyNet Project – 2019 Google Summer of Code



Ayush Dosaj

Injecting function-calls to Linux through a hypervisor

ORGANIZATION

The HoneyNet Project

This project is of type Improving an existing tool that includes cleaning up the existing codebase and adding the process injection support for Linux.



zed009

Adding (Updating) macOS support to Cuckoo SandBox

ORGANIZATION

The HoneyNet Project

Cuckoo Sandbox is a malware analysis platform which performs basic static file analysis to in-depth dynamic analysis of binaries. Even though macOS modules exist, they are not being

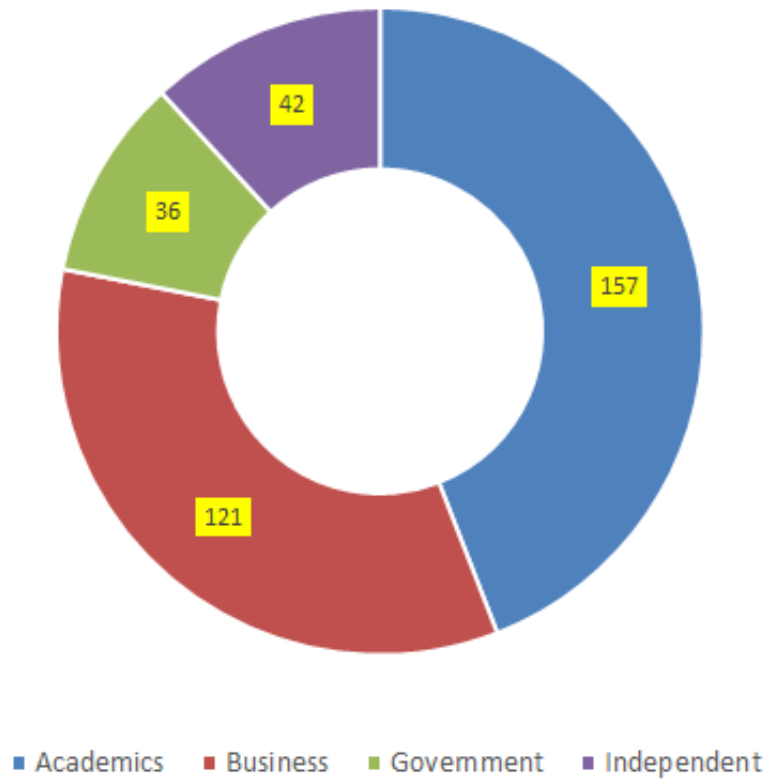


Indonesia Honeynet Project (IHP)

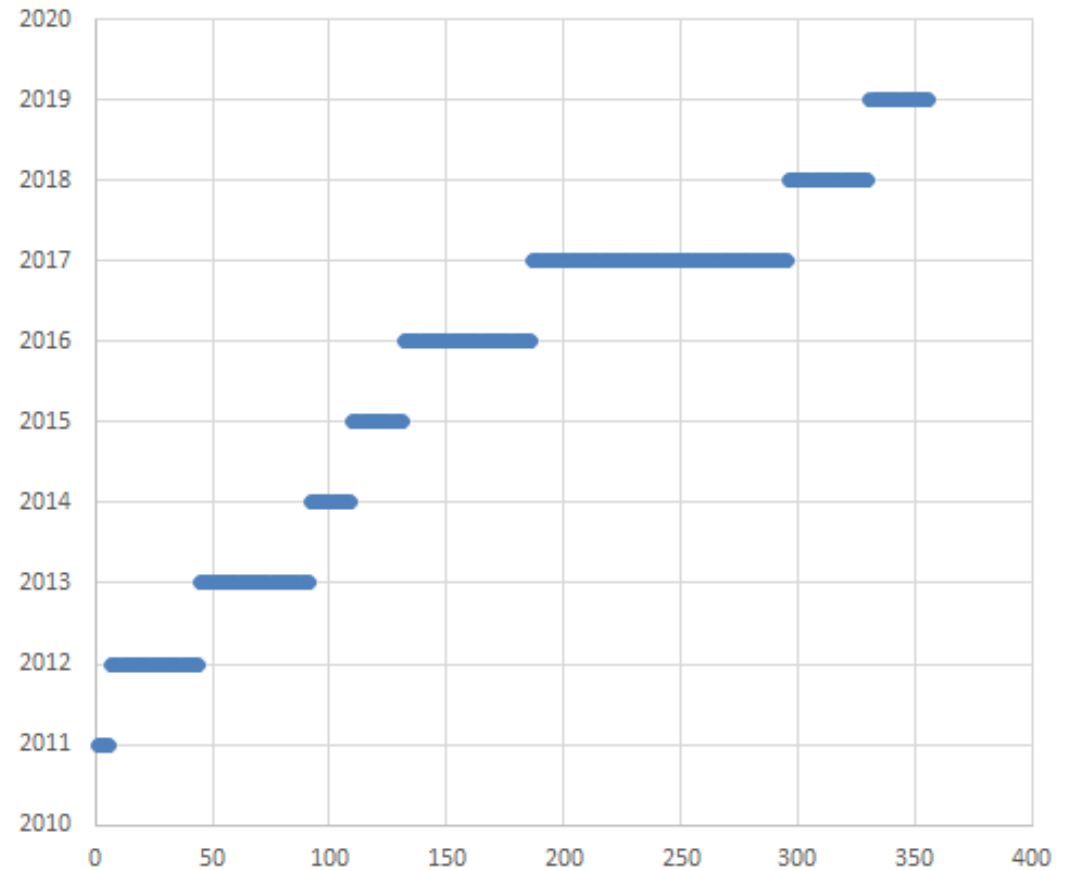


IHP Members – Composition & Growth

IHP Member Composition



IHP Membership Growth



IHP Activities

KOPDAR

- Half day
- Members Only
- Research-oriented
- Every 1-2 months

Workshop

- One Day
- Public
- Sponsorship
- Sharing Knowledge
- Every 1-2 months

Seminar

- One Day
- Public
- Sponsorship
- Sharing and Update
- Every 3-6 months

IHPCON

- 2-4 Days
- Public
- Sponsorship
- Exchange and Update
- Yearly



Honeynet Seminar and Workshop



10 September 2019 | Depok, Indonesia

Honeynet Seminar and Workshop



23-24 October 2018 | Banda Aceh, Indonesia



24 November 2018 | Tangerang, Indonesia

KOPDAR 2017



KOPI DARAT | January 2017 | Jakarta, Indonesia

IHPCON 2017 – C Level Breakfast



IHPCON 2017 | 5-6 September 2017 | Jakarta, Indonesia




IHPCON 2017 - Conference






IHPCON 2017 | 5-6 September 2017 | Jakarta, Indonesia

IHP Research Focus



  
Honeypots Fingerprint Deception Technology

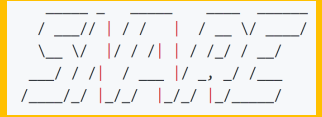

Deception Technology

   
EMU Panda MISP Threat Sharing

Malware

  
UNDERGROUND HOAX

Cyber Crime

 
droidbox
Android Application Sandbox

Tools

 
STATISTICS
DATA MINING
ARTIFICIAL INTELLIGENCE MACHINE LEARNING

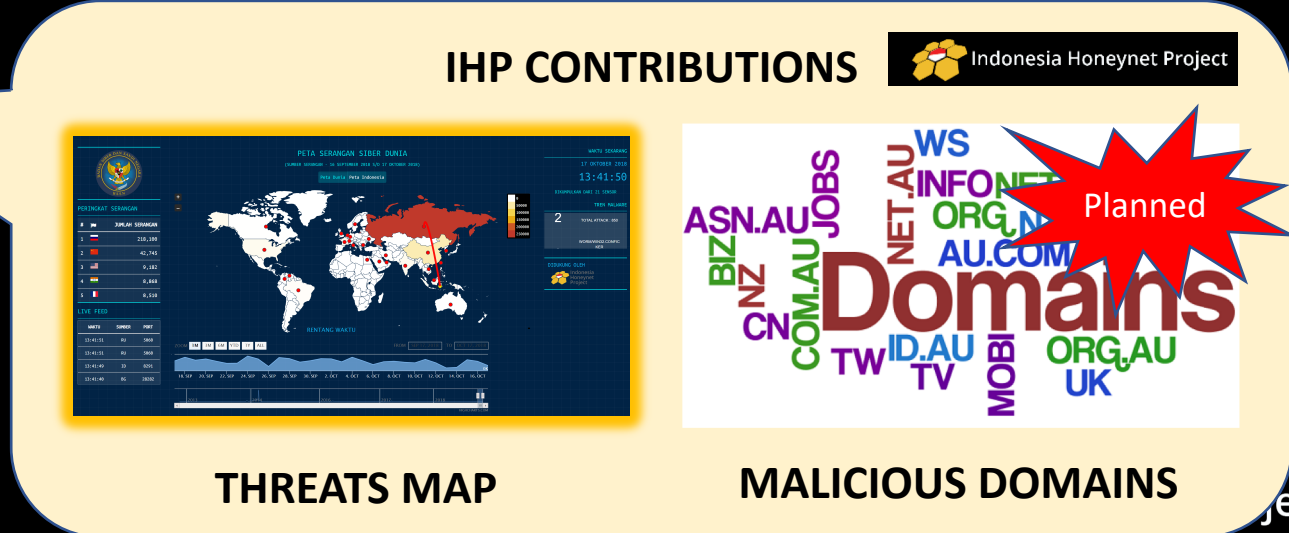
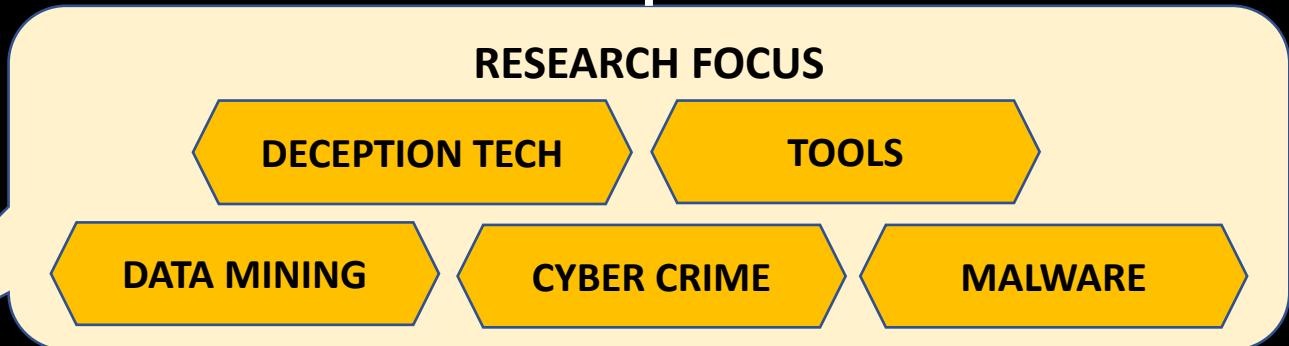
Data Mining

CYBER SECURITY

RESEARCH AND DEVELOPMENT

VALUE-ADDED SERVICES

BUSINESS AND GOV SERVICES



IHP Partners



ITS
Institut
Teknologi
Sepuluh Nopember



Universitas Bina Darma



KOMINFO



datacomm



aruba
a Hewlett Packard
Enterprise company

XECUREIT
Your IT Security, Our Passion

RSA

ADVANCED
TECHNOLOGIES PACIFIC

amandata

Course-Net
Empowering IT People

A10

paloalto
NETWORKS

id-SIRTII

EZ.net.id
The Internet Service Provider

id.cert

CBN

LayerSpeed

netciti



EC-Council

AFDI
ASASUATI PERHIMPUNAN DIGITAL INDONESIA

OWASP
Open Web Application
Security Project

ISACA
Trust in, and value from, information systems

(ISC)²



Indonesia HoneyNet Project

Our Contribution





PETA SERANGAN SIBER DUNIA

(SUMBER SERANGAN - 16 SEPTEMBER 2018 S/D 17 OKTOBER 2018)

Peta Dunia Peta Indonesia

WAKTU SEKARANG

17 OKTOBER 2018

13:41:50

DIKUMPULKAN DARI 21 SENSOR

TREN MALWARE

2

TOTAL ATTACK : 850

WORMWIN32.CONFIC
KER

DIDUKUNG OLEH



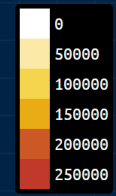
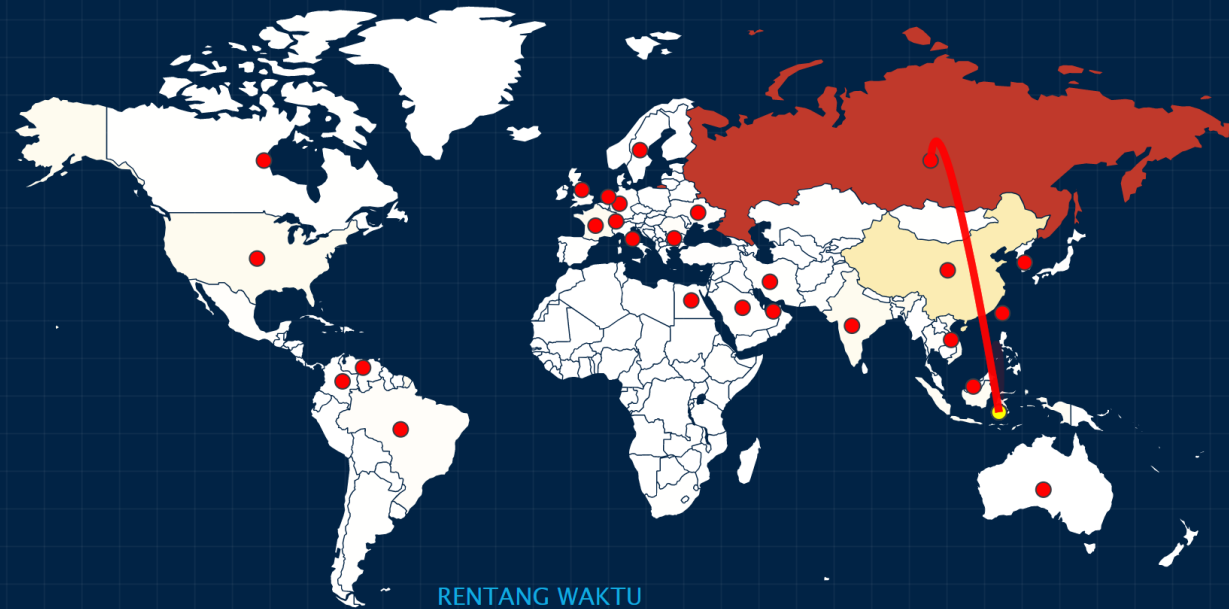
PERINGKAT SERANGAN

#	🇺🇸	JUMLAH SERANGAN
1		218,100
2		42,745
3		9,182
4		8,868
5		8,510

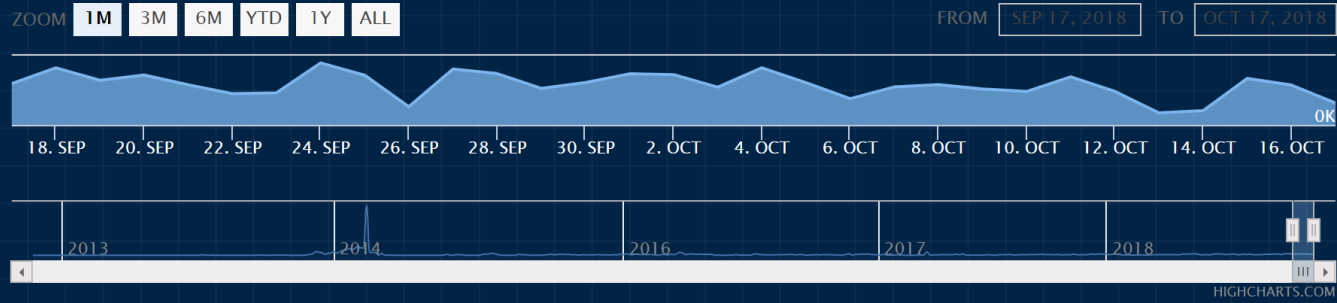
LIVE FEED

WAKTU	SUMBER	PORT
13:41:51	RU	5060
13:41:51	RU	5060
13:41:49	ID	8291
13:41:40	BG	28282

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-



RENTANG WAKTU



HoneyNet Map Portal untuk public: <http://honeynet.bssn.go.id>



Jawa Timur (16-09-2018 s/d 17-10-2018)

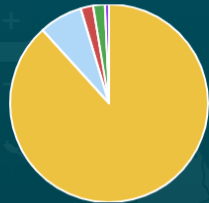
Jumlah Serangan: 252970 kali

PETA SERANGAN SIBER KE INDONESIA

(PROVINSI SASARAN : 16 SEPTEMBER 2018 S/D 17 OKTOBER 2018)

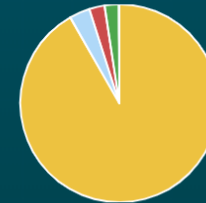
Peta Dunia Peta Indonesia

IP Penyerang



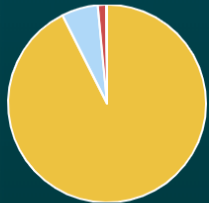
- 176.15.11.122
- 176.15.5.122
- 79.111.214.67
- 176.194.39.84
- 95.76.179.171

Port Sasaran



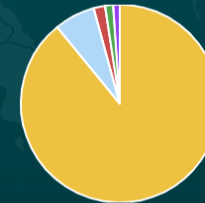
- 445 (smbd)
- 80 (httpd)
- 3306 (mysqld)
- 1433 (mssqld)
- 5060 (SipSession)

Malware



- Win32/Conficker.worm.167765
- Win32/Conficker.worm.161612
- Win32/Conficker.worm.168096
- Win32/Kido.worm.165141
- Worm/Win32.Conficker

Negara Penyerang



- Russia
- People's Republic of China
- India
- Romania
- Hong Kong

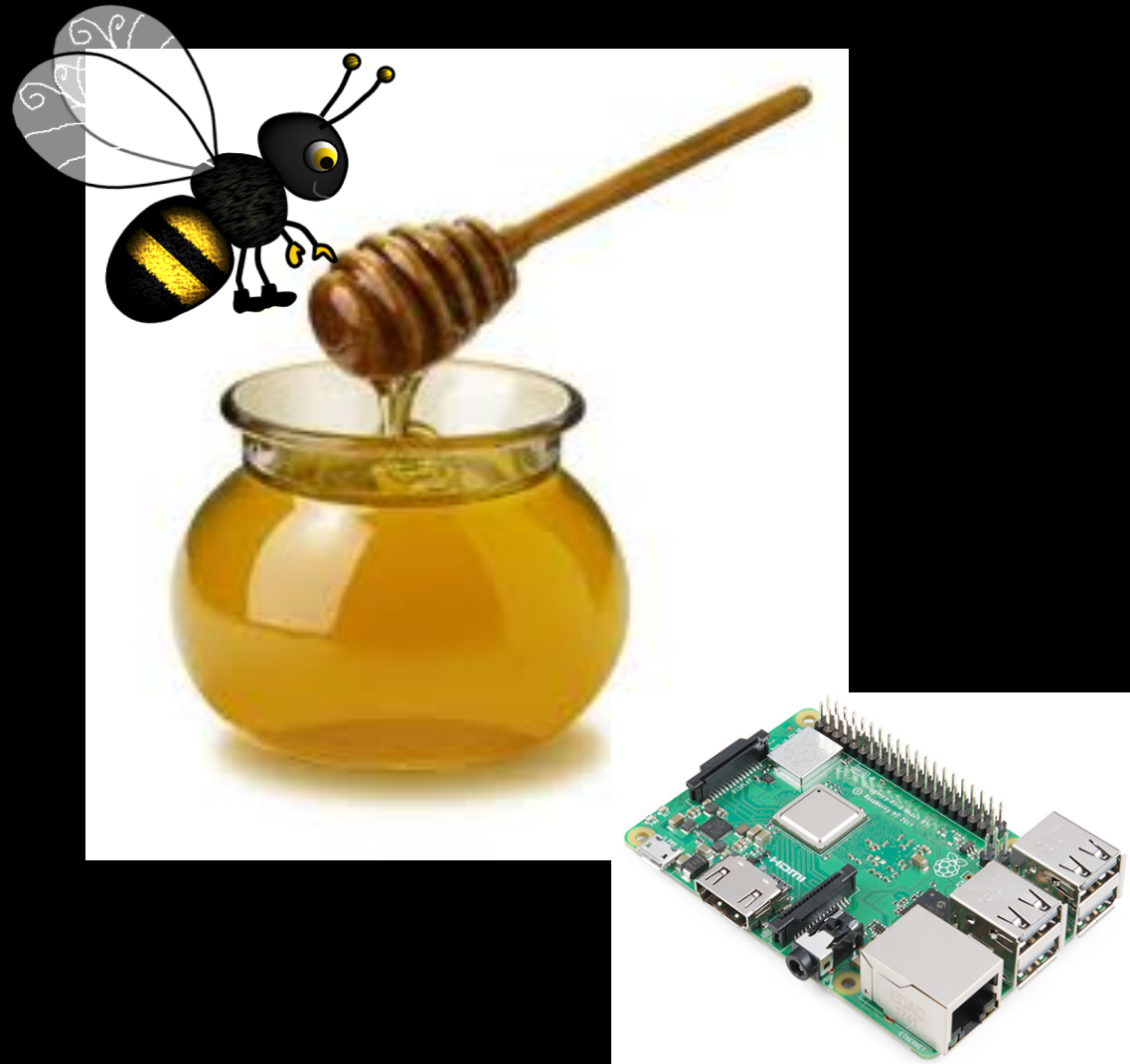
Honeynet Map Portal untuk publik

<http://public.honeynet.id>



Indonesia Honeynet Project

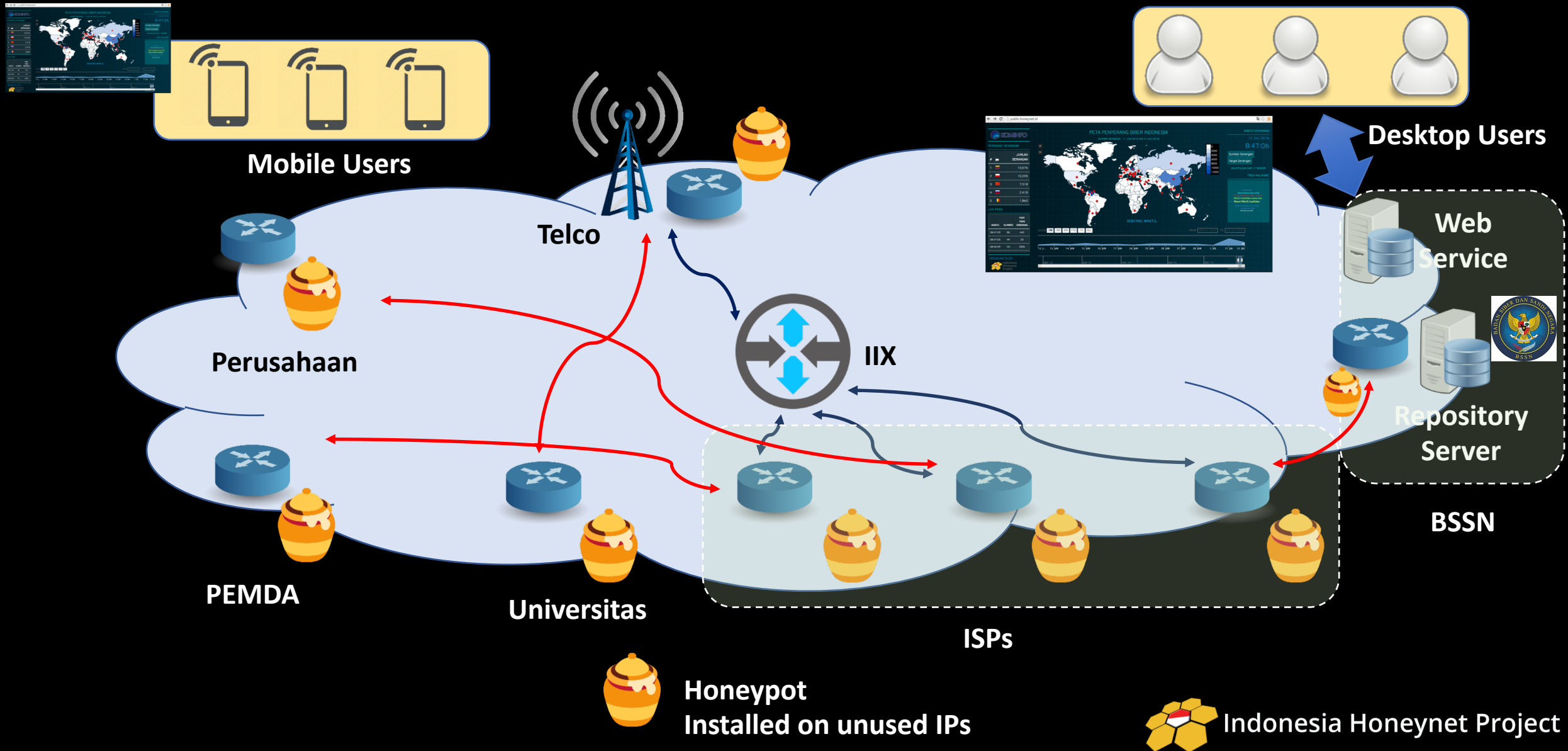
Honeypot

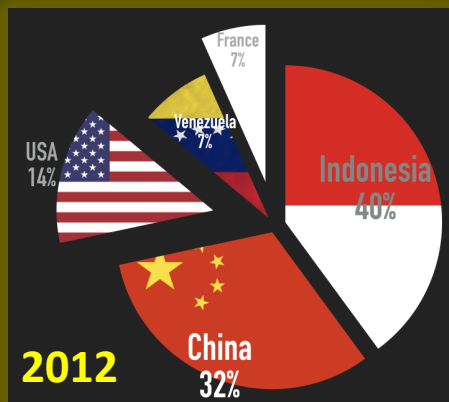
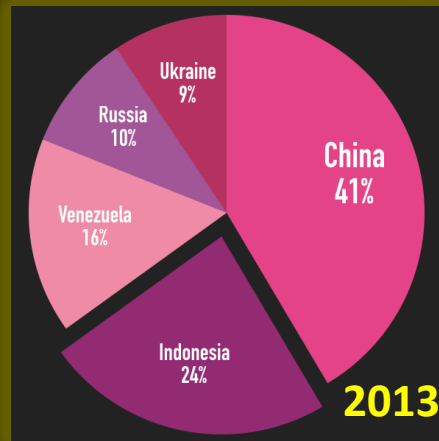
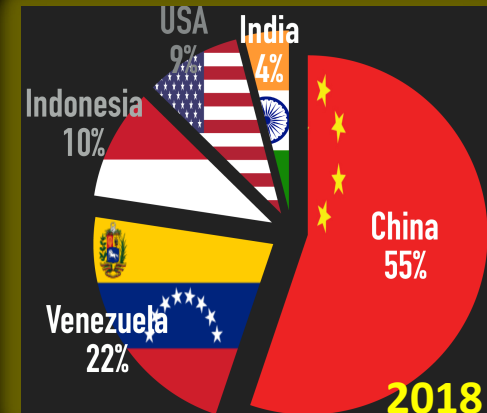
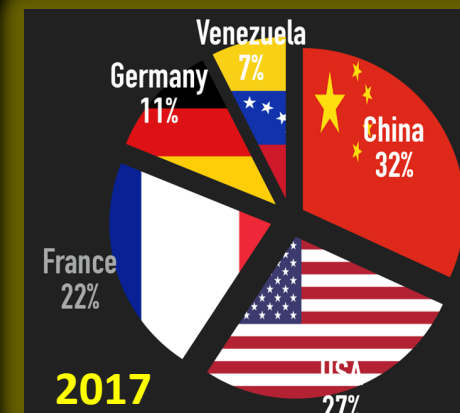
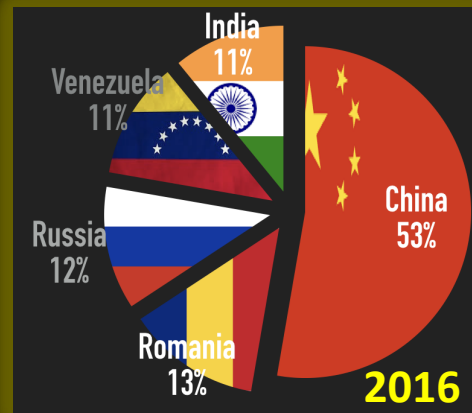
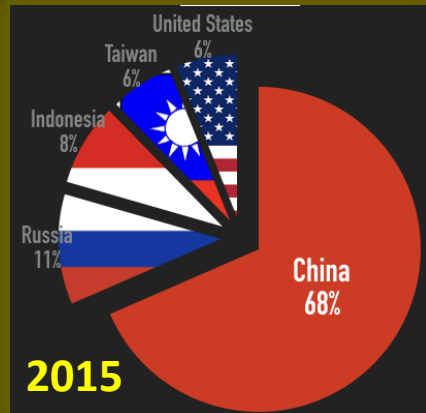
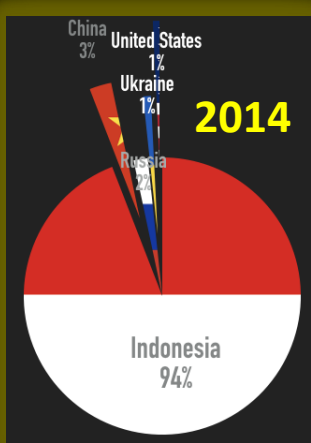


Honeypot adalah sistem keamanan (dibuat mirip dengan sistem sebenarnya) yang sengaja dirancang rentan untuk diserang.

Honeynet adalah sistem yang terdiri dari kumpulan honeypot, yang sengaja dibuat mirip dengan sever produksi.

National Honeynet Infrastructure





Monitoring Stats

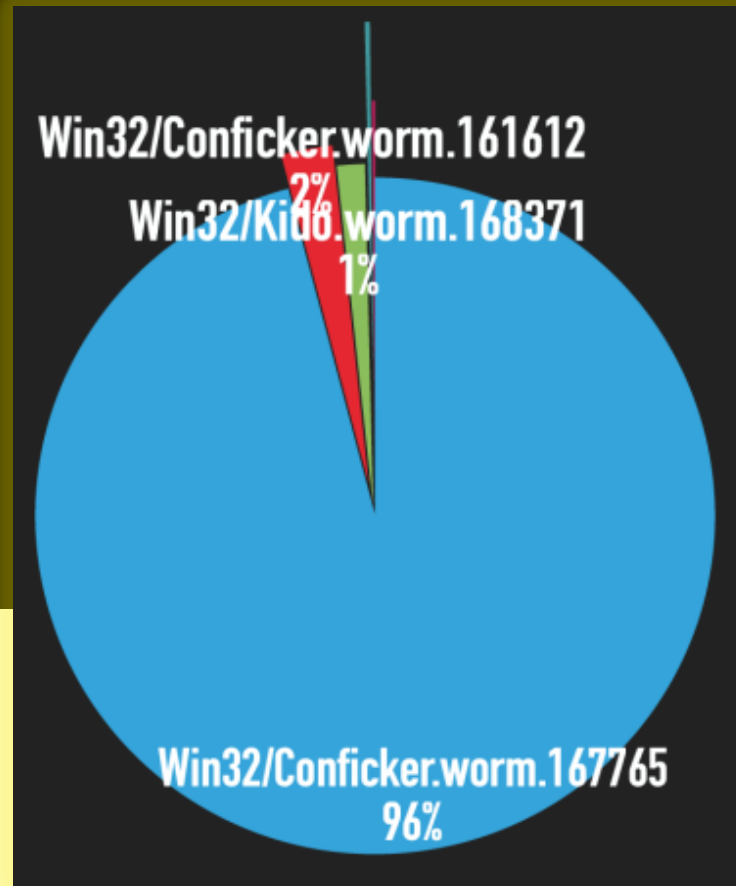
3.101 UNIQUE MALWARE ATTACK SUMATRA, JAVA, AND BALI

33.856.720 Connection Attacks

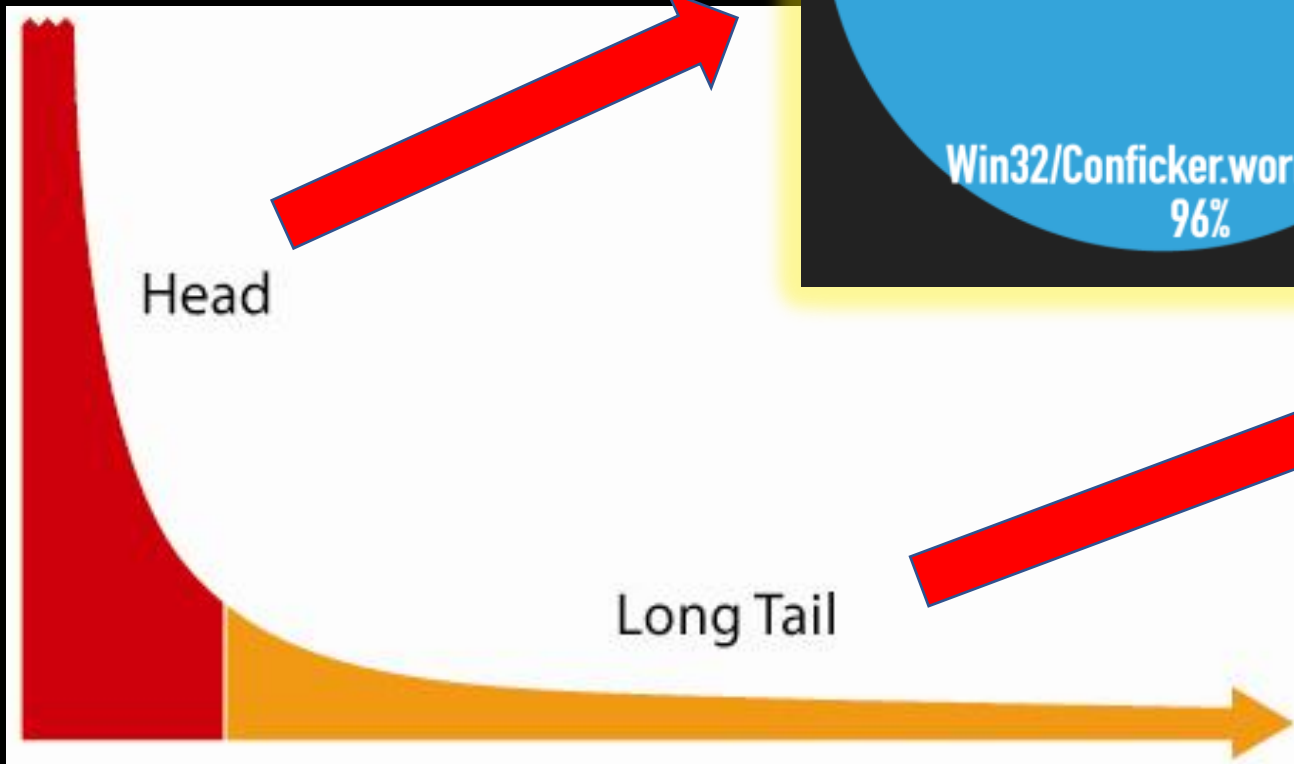


21 Honeypots In Sumatra, Jawa & Bali

**3.101 UNIQUE MALWARE
ATTACK SUMATRA, JAVA, AND BALI**



Malware Stats (2019)



Malware	Hit
Win-Trojan/Agent.33128.B	98
Win-Trojan/Agent.22458	13
Win-Trojan/Starman.Gen	1
Worm/Win32.IRCBot	1

Early Warning System



Early Warning System Components

Risk Knowledge

Monitoring System

Signals

Response



RISKS

Factors that lead to higher risks

Monitoring

Monitoring sensors for meaningful changes

Signals

What signals provide me the best insight

Response

What actions will be taken





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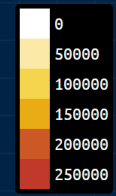
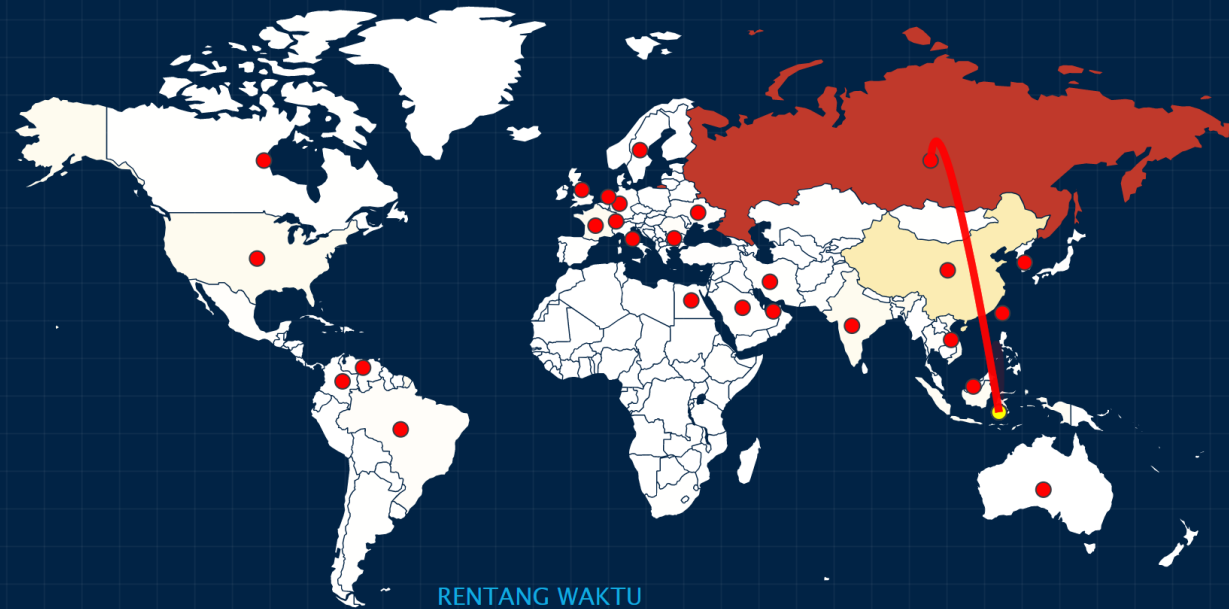
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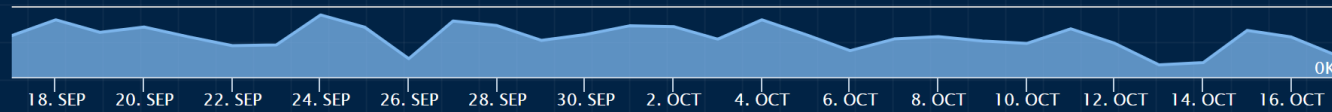
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RENTANG WAKTU

ZOOM 1M 3M 6M YTD 1Y ALL

FROM SEP 17, 2018 TO OCT 17, 2018

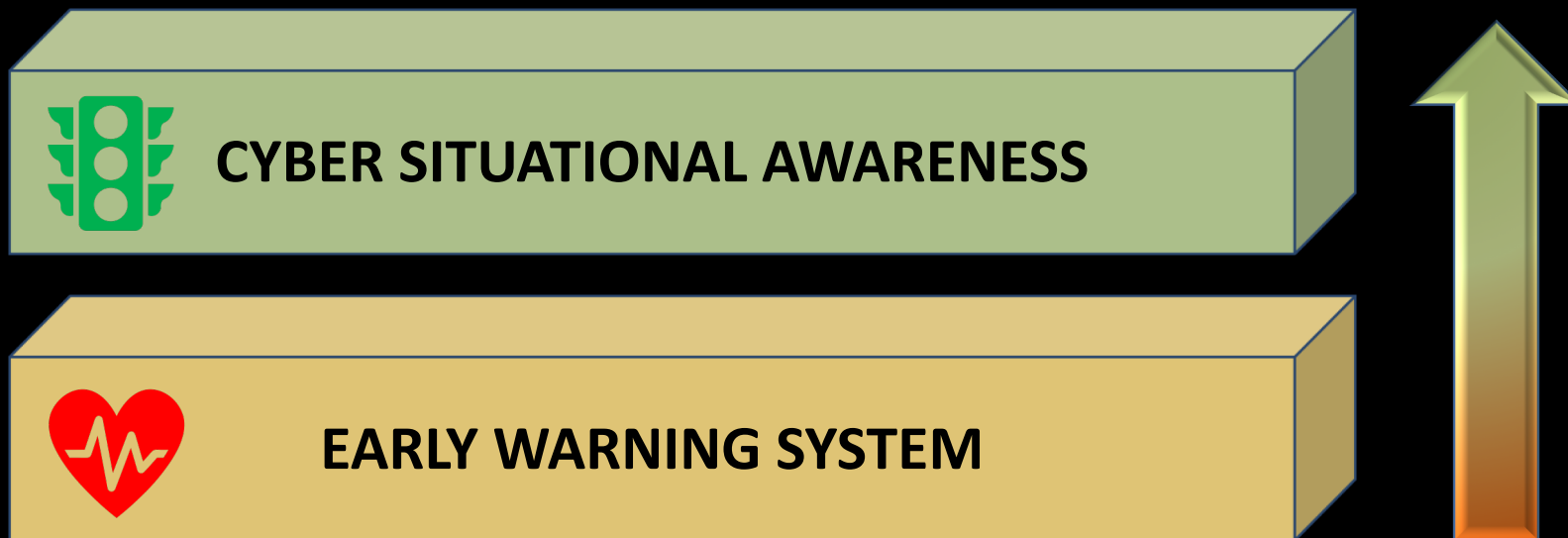


HIGHCHARTS.COM

HoneyNet Map Portal untuk public: <http://honeynet.bssn.go.id>



From Early Warning System To Cyber Security Situational Awareness



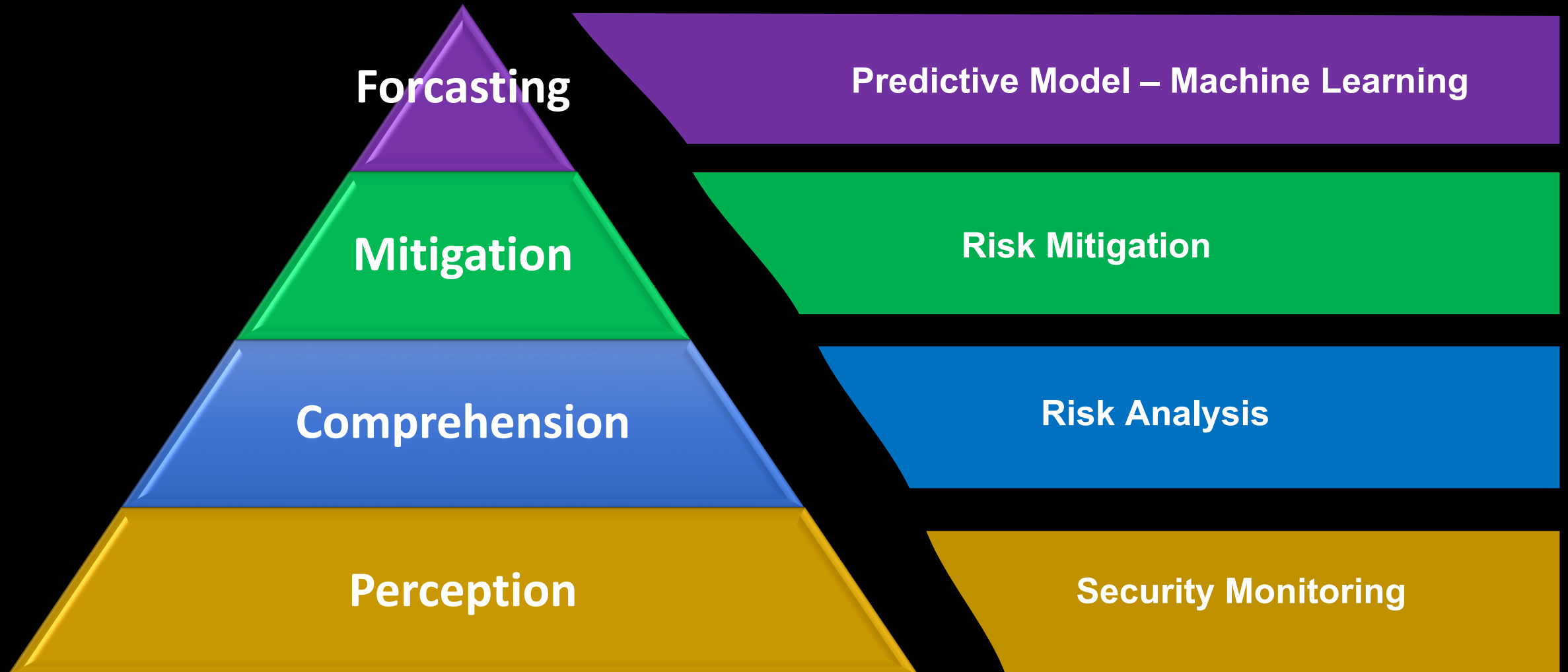
Cyber Situational Awareness

- Do we know our **assets**?
- Do we know our **security threats**?
- Do we have a **holistic** view of our defense on these assets?

Network Awareness	Threat Awareness	Mission Awareness
<ul style="list-style-type: none">• Disciplined asset and configuration management• Routine vulnerability auditing• Patch management & compliance reporting• Recognize and share incident awareness across the organization	<ul style="list-style-type: none">• Identify and track internal incidents and suspicious behavior• Incorporate knowledge of external threats• Participate in cross-industry or cross-government threat-sharing communities on possible indicators and warnings	<ul style="list-style-type: none">• Develop a comprehensive picture of the critical dependencies (and specific components) to operate in cyberspace• Understanding these critical dependencies to support mission-impact in forensic analysis (after a situation); triage and real-time crisis-action response (during a situation); risk/readiness assessments prior to task execution (anticipating and avoiding situations); and informed defense planning (preparing to mitigate the impact of a future situation).
Today	Evolving	Needed



Cyber Situational Awareness



Cyber Situational Awareness – Honeytrap Data

```
["connection_type": "reject", "local_port": 408, "connection_parent": null, "remote_host": "89.248.160.150", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "reject", "local_port": 33389, "connection_parent": null, "remote_host": "185.222.211.114", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "reject", "local_port": 3511, "connection_parent": null, "remote_host": "185.175.93.105", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "reject", "local_port": 13190, "connection_parent": null, "remote_host": "185.176.27.174", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "accept", "local_port": 445, "connection_parent": null, "remote_host": "180.93.66.195", "eventid": "connection", "connection_protocol": "smbd", "connection_root": null}, {"connection_type": "reject", "local_port": 49152, "connection_parent": null, "remote_host": "172.105.224.78", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "reject", "local_port": 88, "connection_parent": null, "remote_host": "186.5.201.227", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "reject", "local_port": 7000, "connection_parent": null, "remote_host": "159.203.199.181", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "reject", "local_port": 33096, "connection_parent": null, "remote_host": "185.176.27.34", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "accept", "local_port": 445, "connection_parent": null, "remote_host": "185.92.74.123", "eventid": "connection", "connection_protocol": "smbd", "connection_root": null}, {"connection_type": "reject", "local_port": 3329, "connection_parent": null, "remote_host": "193.32.163.71", "eventid": "connection", "connection_protocol": "pcap", "connection_root": null}, {"connection_type": "accept", "local_port": 445, "connection_parent": null, "remote_host": "42.202.133.2", "eventid": "connection", "connection_protocol": "smbd", "connection_root": null}, {"connection_type": "accept", "local_port": 445, "connection_parent": null, "remote_host": "42.202.133.2", "eventid": "connection", "connection_protocol": "smbd", "connection_root": null}, {"connection_type": "accept", "local_port": 445, "connection_parent": null, "remote_host": "180.93.66.195", "eventid": "connection", "connection_protocol": "smbd", "connection_root": null}
```

Honeytrap Log

```
"AttributeTag": []
}
200
{"u'Event': {u'orgc_id': u'1', u'ShadowAttribute': [], u'id': u'759', u'threat_level_id': u'2', u'uuid': u'1', u'name': u'HONEYNET-ID'}, u'Org': {u'uuid': u'5d4ae08d-3b70-4942-9867-548c2f741d05', u'orgc_id': u'2019-09-07', u'disable_correlation': False, u'info': u'honeytrap_dionaea', u'locked': False, u'proposal_email_lock': False, u'distribution': u'0', u'proposal_email_lock': False, u'Galaxy': []}}
{"name": "An Internal Error Has Occurred"}
500
```

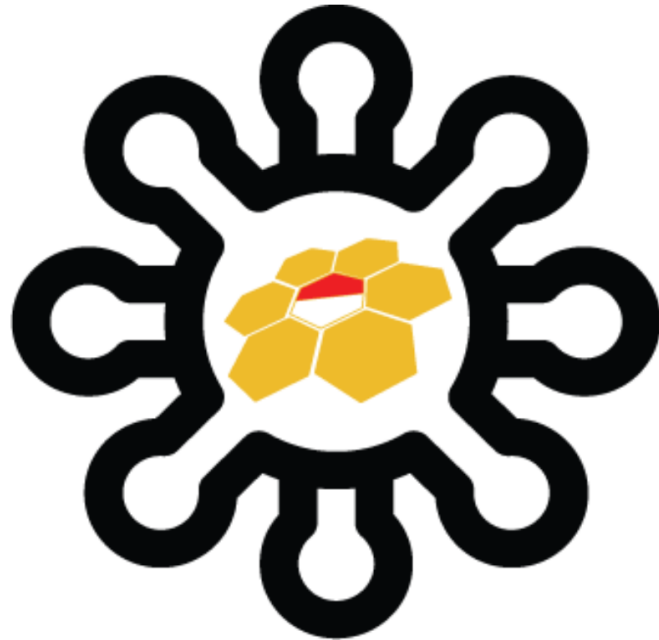
JSON File

Date	Event Type	IP	Details
2019-09-07	Payload delivery	text 222.222.251.142	2019-09-07T08:35:45.265314Z--> [mssql login]sa:password
			2019-09-07T08:35:45.265314Z--> [mssql fingerprint]
			hostname:HDWW3-1
			clientname:.Net SqlClient Data Provider
			appname:.Net SqlClient Data Provider
			2019-09-07T08:35:46.000332Z--> [mssql login] sa:PASSWORD
			2019-09-07T08:35:46.000332Z--> [mssql fingerprint]
			hostname:HDWW3-1
			clientname:.Net SqlClient Data Provider
			appname:.Net SqlClient Data Provider
			2019-09-07T08:35:46.591119Z--> [mssql login] sa:123.com
			2019-09-07T08:35:46.591119Z--> [mssql fingerprint]
			hostname:HDWW3-1

MISP Records



Cyber Situational Awareness – Threat Sharing Platform



Malware Threat Sharing Platform

Welcome to Malware Threat Intelligence Sharing Platform

Login

Email

Password

Login

**Honeynet
Malware Threat Sharing Platform**

View Event

- View Correlation Graph
- View Event History
- Edit Event
- Delete Event
- Add Attribute
- Add Object
- Add Attachment
- Populate from...
- Enrich Event
- Merge attributes from...
- Publish Event
- Publish (no email)
- Delegate Publishing
- Publish event to ZMQ
- Contact Reporter
- Download as...
- List Events
- Add Event

honeypot_dionaea

Event ID	759
UUID	5d7325a4-f134-46f0-b613-61702bfb61c2
Creator org	HONEYNET-ID
Owner org	HONEYNET-ID
Email	ryandydjap.rd@gmail.com
Tags	
Date	2019-09-07
Threat Level	Medium
Analysis	Initial
Distribution	Your organisation only
Info	honeypot_dionaea
Published	No
#Attributes	32 (0 Object)
First recorded change	2019-09-07 03:36:08
Last change	2019-09-07 03:36:08
Modification map	
Sightings	0 (0) - restricted to own organisation only

— Pivots — Galaxy + Event graph + Correlation graph + ATT&CK matrix — Attributes — Discussion

759: honeyp...

Galaxies

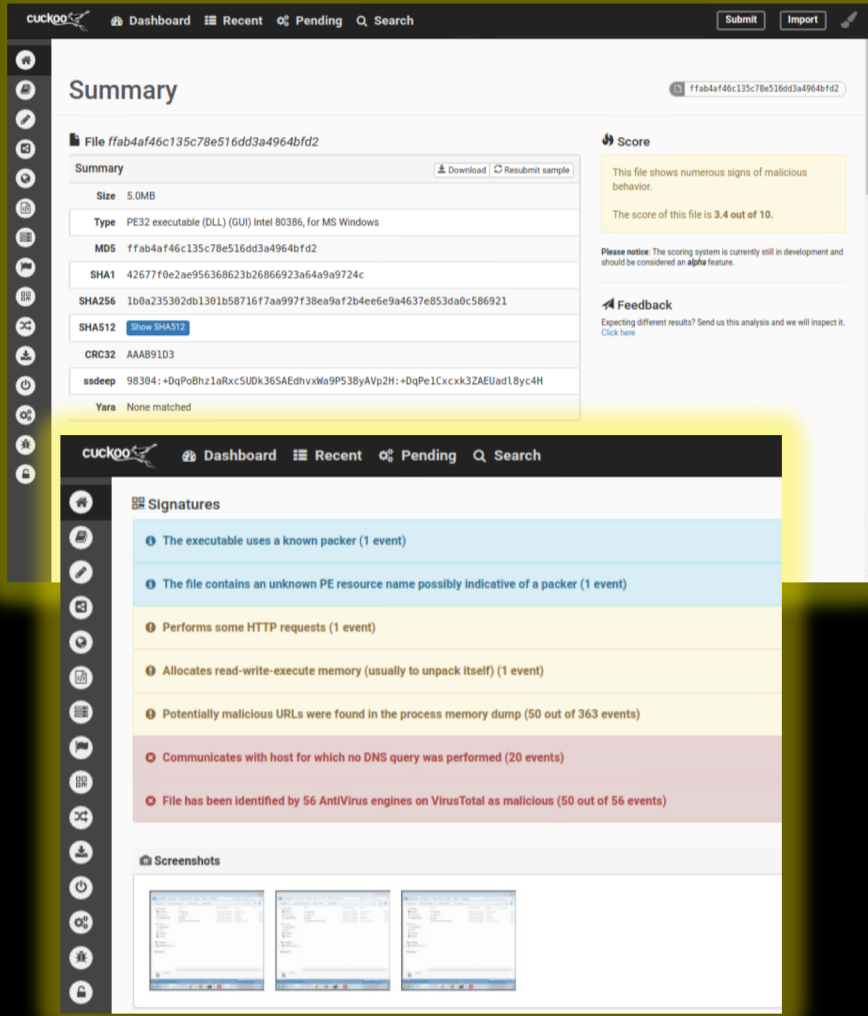
« previous next » view all

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Indonesia Honeynet Project

Cyber Situational Awareness – Threat Sharing Platform



The screenshot shows the Cuckoo Sandbox Summary page for a file with MD5 hash `ffab4af46c135c78e516dd3a4964bfd2`. The file is a PE32 executable (DLL) for MS Windows, with a size of 5.0MB. The analysis shows a score of 3.4 out of 10, indicating malicious behavior. The Signatures section lists several events, including HTTP requests, memory allocation, and communication with the host. Screenshots of the process are also visible at the bottom.

Summary

File `ffab4af46c135c78e516dd3a4964bfd2`

Score: 3.4 out of 10

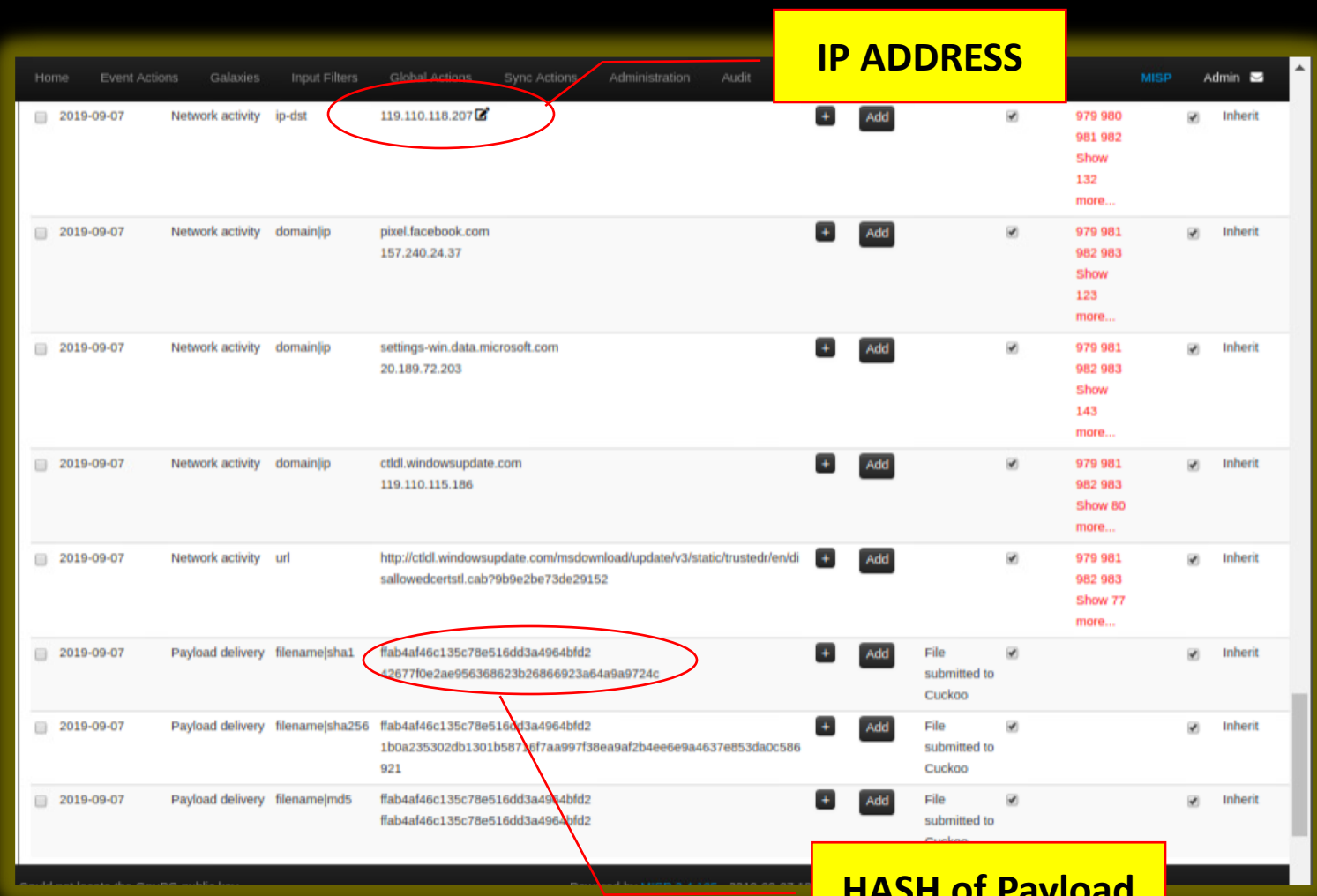
This file shows numerous signs of malicious behavior.

Please notice: The scoring system is currently still in development and should be considered an alpha feature.

Feedback: Expecting different results? Send us this analysis and we will inspect it.

Signatures

- The executable uses a known packer (1 event)
- The file contains an unknown PE resource name possibly indicative of a packer (1 event)
- Performs some HTTP requests (1 event)
- Allocates read-write-execute memory (usually to unpack itself) (1 event)
- Potentially malicious URLs were found in the process memory dump (50 out of 363 events)
- Communicates with host for which no DNS query was performed (20 events)
- File has been identified by 56 AntiVirus engines on VirusTotal as malicious (50 out of 56 events)

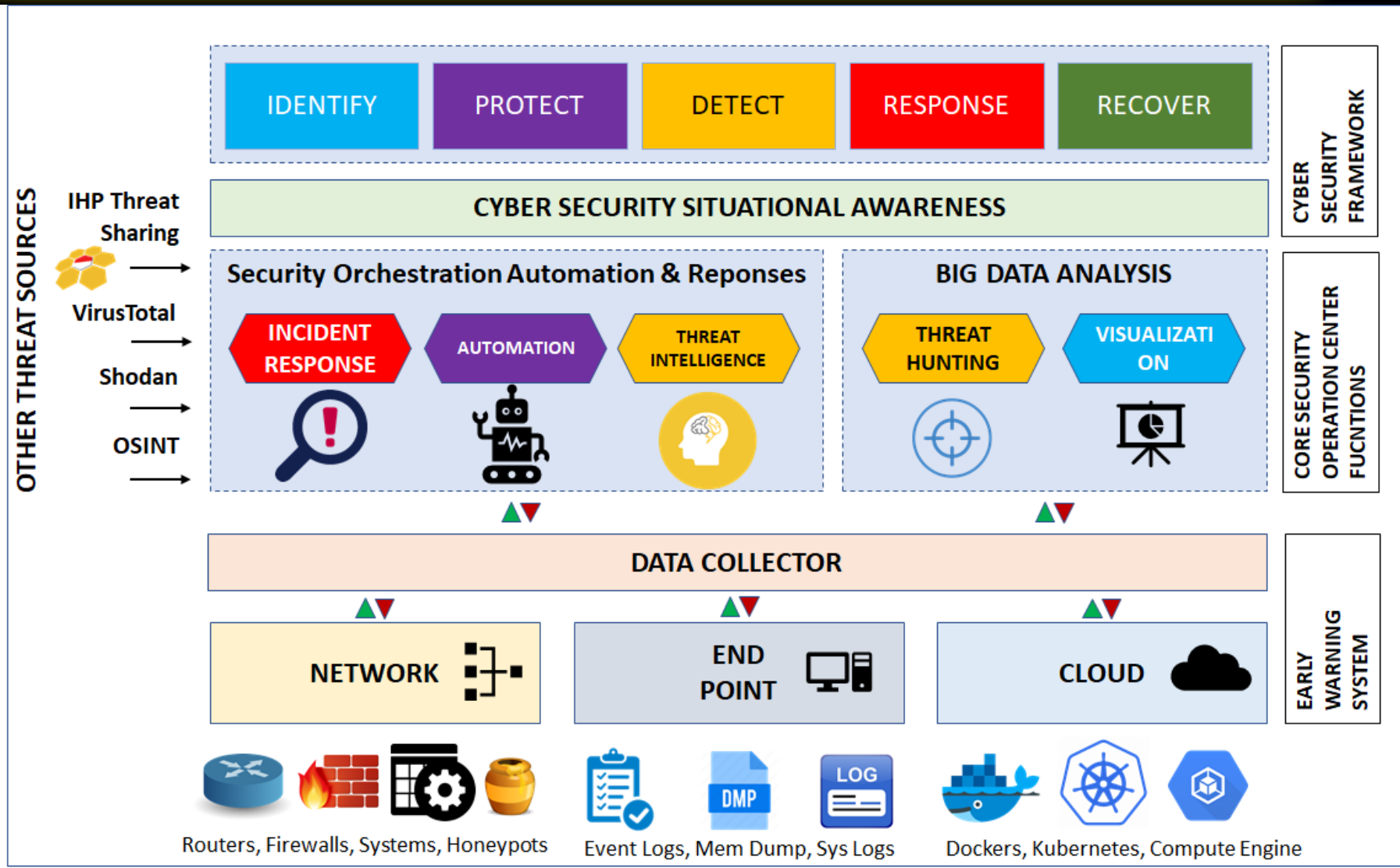


The screenshot shows the MISP interface with a table of events. A red circle highlights the IP address `119.110.118.207` in the first row. Another red circle highlights the SHA1 hash `ffab4af46c135c78e516dd3a4964bfd2` in the fifth row. A yellow box labeled "IP ADDRESS" points to the first row, and another yellow box labeled "HASH of Payload" points to the fifth row.

Date	Event Type	Category	Object	Value	Score	Confidence	Source	Destination	
2019-09-07	Network activity	ip-dst	ip-dst	119.110.118.207	979 980	981 982	Show	more...	Inherit
2019-09-07	Network activity	domain/ip	domain/ip	pixel.facebook.com 157.240.24.37	979 981	982 983	Show	123 more...	Inherit
2019-09-07	Network activity	domain/ip	domain/ip	settings-win.data.microsoft.com 20.189.72.203	979 981	982 983	Show	143 more...	Inherit
2019-09-07	Network activity	domain/ip	domain/ip	ctdl.windowsupdate.com 119.110.115.186	979 981	982 983	Show	80 more...	Inherit
2019-09-07	Network activity	url	url	http://ctdl.windowsupdate.com/msdownload/update/v3/static/trustedr/enu/di/sallowedcertstl.cab?9b9e2be73de29152	979 981	982 983	Show	77 more...	Inherit
2019-09-07	Payload delivery	filename/sha1	filename/sha1	ffab4af46c135c78e516dd3a4964bfd2 42677f0e2ae956368623b26866923a64a9a9724c			File submitted to Cuckoo		Inherit
2019-09-07	Payload delivery	filename/sha256	filename/sha256	ffab4af46c135c78e516dd3a4964bfd2 1b0a235302db1301b5873cf7aa997f38ea9af2b4ee6e9a4637e853da0c586921			File submitted to Cuckoo		Inherit
2019-09-07	Payload delivery	filename/md5	filename/md5	ffab4af46c135c78e516dd3a4964bfd2 ffab4af46c135c78e516dd3a4964bfd2			File submitted to Cuckoo		Inherit

Malware Analysis (Cuckoo) → MISP

Cyber Situational Awareness in Action



SOC:

- Incident Response
- Automation
- Threat Intelligence
- Threat Hunting
- Visualization

Honeynet-based Threat Sharing Platform

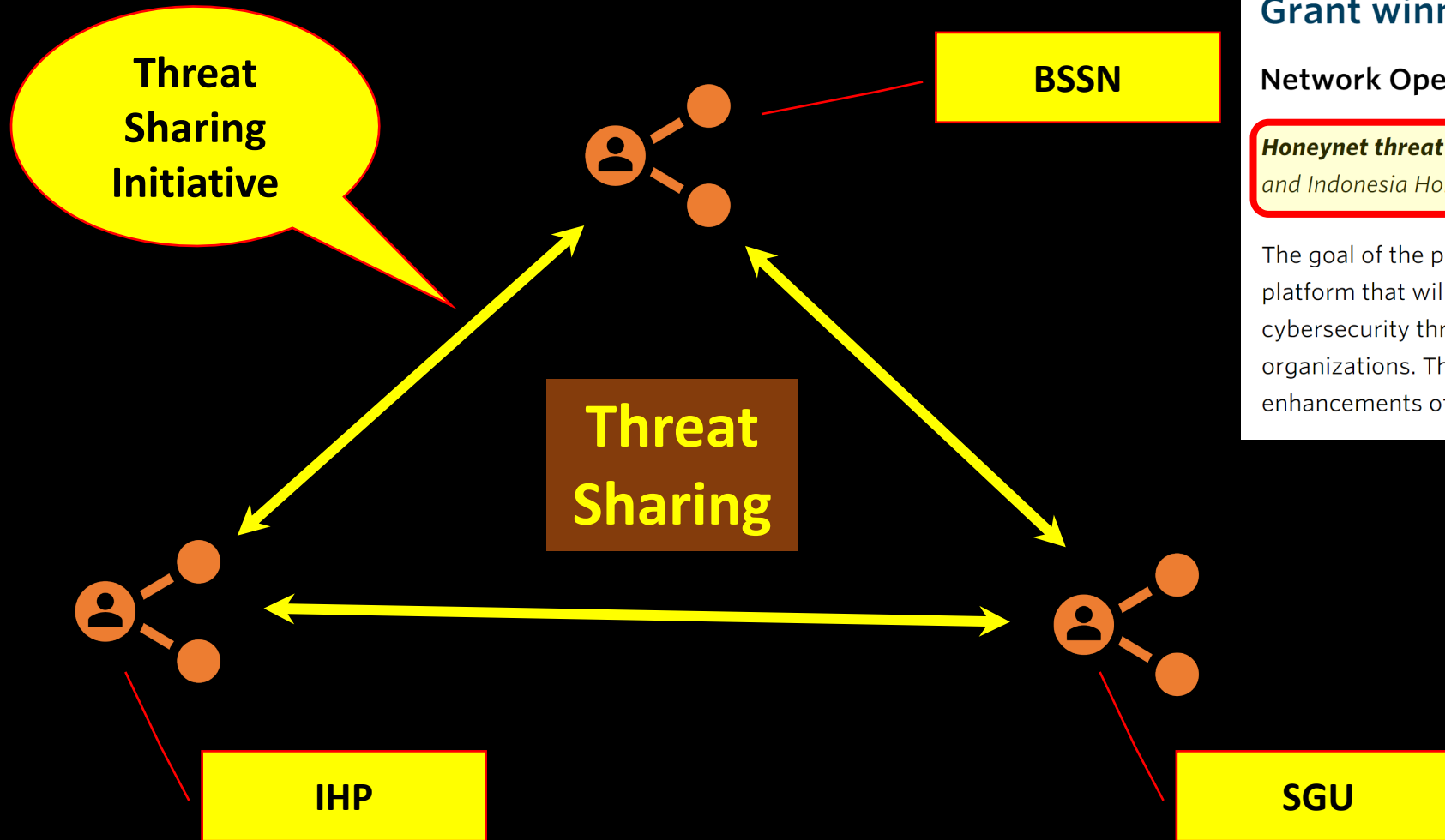


Grant winners

Network Operations Research Grants

Honeynet threat sharing platform. SGU, BSSN (Badan Siber & Sandi Negara) and Indonesia Honeynet Project (IHP). Indonesia. USD 20,000

The goal of the project is to develop and implement a honeynet threat sharing platform that will collect, store and add contextual information of cybersecurity threats. This information would then be shared with relevant organizations. The project will first be implemented in Indonesia, with future enhancements of the platform to expand to other Asia Pacific economies.



IHP Workshop 2019



IHP-BSSN Workshop

Track A BSSN-IHP

- Deception Technology
- Visualizing & Sharing Threats
- Threat Intelligence

Track B BSSN-IHP

- Malware Threat Sharing
- Windows Malware Analysis
- Hardening Azure Cloud

Track C IHP-Palo

- Incident Response
- Detect, Investigate, dan Respond Cortex XDR
- Threat Hunting

Track D ARUBA-TelU

- Aruba 360 Security Exchange
- Technological Advance in Crypto
- Digital Forensics



IHP Research Sharing



Ruang P 213



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Terima Kasih



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Tools



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