

# stoQ'ing your Splunk

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Ryan Kovar

- Staff Security Strategist @Splunk
- Does Security things and then talks about them
- 17+ years defending networks



Marcus LaFerrera

- Director of Development @PUNCH
- Lead stoQ Developer
- 18+ years supporting the government

# Agenda

- Overview of stoQ
- Overview of Splunk
- A DFIR use case walk through
- Questions

TOOL \* N == :(

NOTHING COMMUNICATES  
AND MOST TOOLS  
REQUIRE MANUAL INTERACTION

**HOW'S THE WEATHER OUT THERE  
OLLIE?**

**IT'S  
CYBER**



**stoQ**

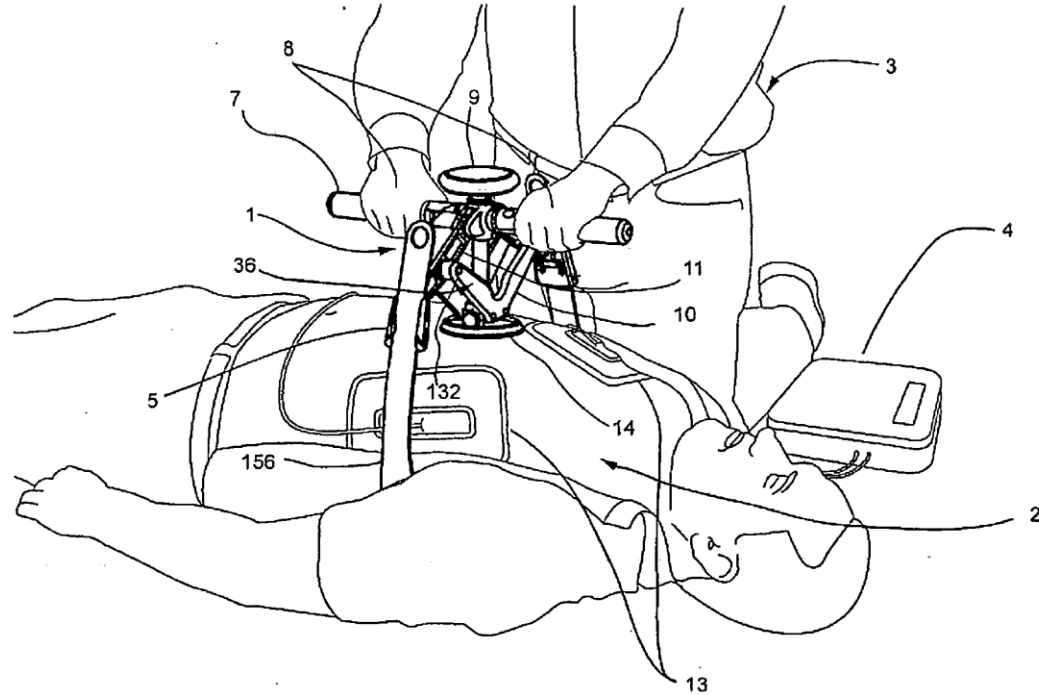
**STOQ IS A FRAMEWORK  
THAT ENABLES  
EVERYONE TO AUTOMATE  
PROCESSES, ANALYTICS,  
AND JUST ABOUT ANYTHING  
ELSE**

**AUTOMATE AND REDUCE  
THE MAJORITY  
OF YOUR MOST  
MUNDANE ANALYTIC TASKS**



**LEVERAGE ALL OF YOUR  
TOOLS SIMULTANEOUSLY,  
AND SAVE THOSE RESULTS  
FOR LATER**

# IT'S A **FORCE** MULTIPLIER



**LOOK AT YOUR DATA, RATHER THAN  
SEEKING WAYS TO CAPTURE OR  
PRODUCE IT**



**COMMAND LINE,  
INTERACTIVE SHELL,  
OR FULLY AUTOMATED**



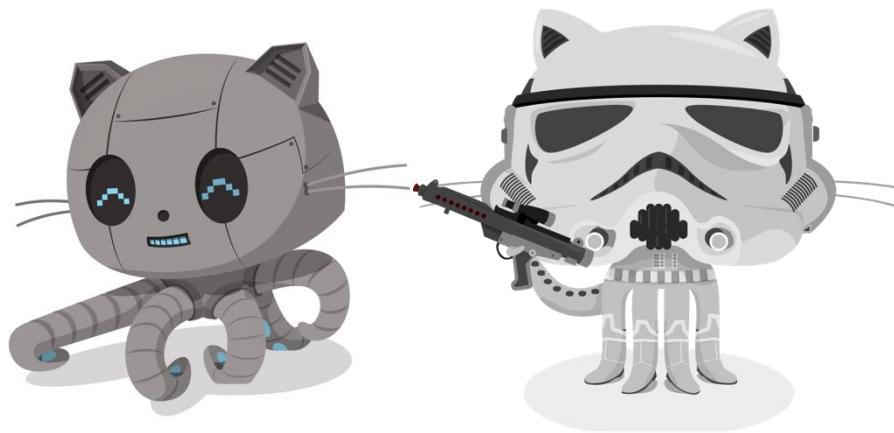
# Tell me more about Plugins...

- Very **simple** and **easy** to write
- Lots of documentation and **examples**
- stoQ does most of the **heavy** lifting

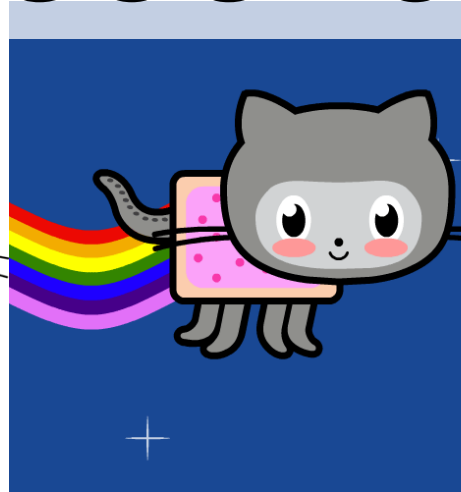
```
def api_call(self, endpoint, query):  
    url = "{}/{}/report/".format(self.url, endpoint)  
    params = {endpoint: query}  
    response = self.stoq.get_file(url, params=params)  
    return self.stoq.loads(response)
```

# Over 40 stoQ Plugins Available

- E-mail Parser
- **VTMIS**
- TotalHash
- **Yara**
- Censys
- Fireeye
- IOC Extract
- Pastebin
- PassiveTotal
- ClamAV
- Opswat
- **TRiD**
- RabbitMQ
- Suricata
- Tika
- **PEinfo**
- Excel
- XOR
- Base64
- Bit Rotation
- Bro Intel
- Fluentd
- Google Cloud Storage
- Amazon S3
- Slack
- ThreatCrowd
- MongoDB
- ElasticSearch
- **Exif**
- And many more...



# IT'S OPENSOURCED





## Installation and Usage

- Requires python 3.3 or greater
- Additional documentation can be found at [docs](#).

## Installation Script

If using Ubuntu, installation of the core framework and plugins can be installed utilizing the installation script provided with the framework.::

```
git clone https://github.com/PUNCH-Cyber/stoq.git
cd stoq/
./install.sh
```

*Note: stoQ has not been tested on other operating systems, however, if the required packages are available it should work without issue.*

## Detailed Installation

Install the core requirements via apt-get and pip::

```
sudo apt-add-repository -y multiverse
sudo apt-get install automake build-essential cython autoconf \
    python3 python3-dev python3-setuptools \
    libyaml-dev libffi-dev libfuzzy-dev \
    libxml2-dev libxslt1-dev libz-dev p7zip-full \
    p7zip-rar unace-nonfree libssl-dev libmagic-dev
sudo easy_install3 pip
```

It is recommended to install *stoQ* within a virtualenv. This is however completely optional. In order to setup the virtualenv, the following should be completed::

# Vagrant

If testing *stoQ* is something you are interested in doing, you can use Vagrant to setup a simple instance.

First, install Vagrant from <https://www.vagrantup.com/downloads>, then, install VirtualBox from <https://www.virtualbox.org/wiki/Downloads>.

Once the prerequisites are installed, download the Ubuntu box::

```
vagrant box add ubuntu/trusty64
```

Next, create a new directory named `stoq` and save the Vagrantfile in it::

```
wget -O Vagrantfile https://raw.githubusercontent.com/PUNCH-Cyber/stoq/master/Vagrantfile
```

Now, let's bring up the Vagrant box::

```
vagrant up
```

Log into the new box::

```
vagrant ssh
```

Switch to the `stoq` user::

```
sudo su - stoq
```

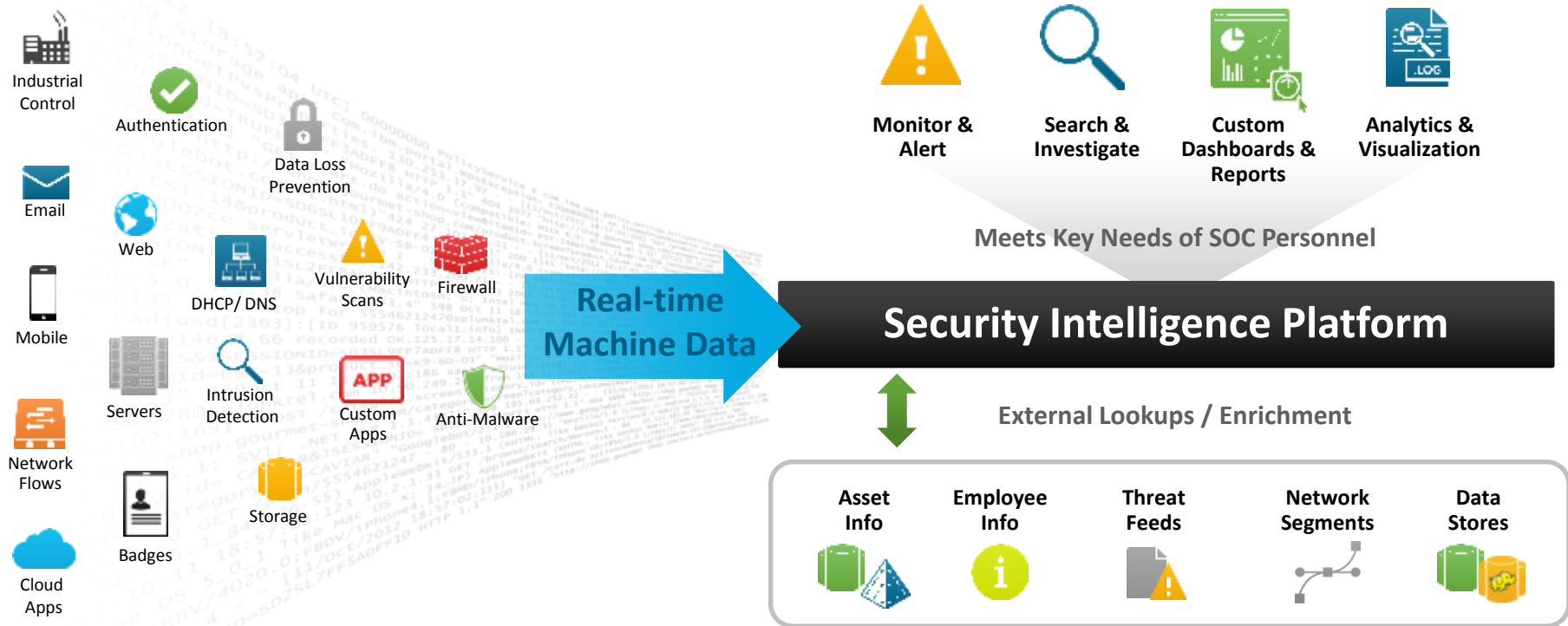
Your newly installed *stoQ* instance is now available in `/usr/local/stoq`.

All done!

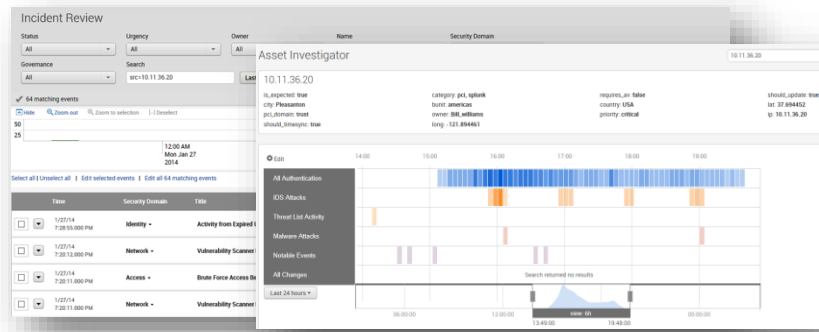
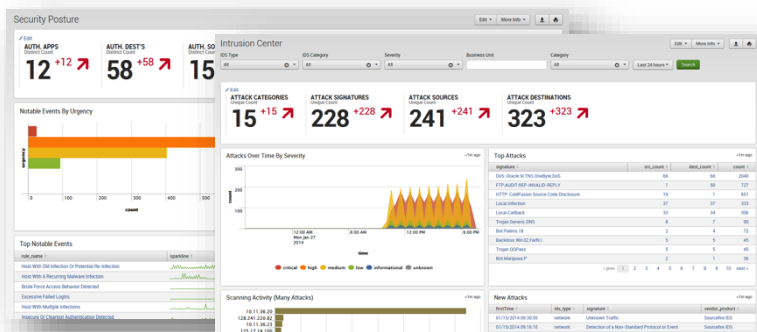
```
"date" : "2016-06-02T13:48:07.086822",
"payloads" : 2,
"plugins" : {
  "0" : "peinfo",
  "1" : "extractor:decompress"
},
"results" : [ {
  "md5" : "b3962f61a4819593233aa5893421c4d1",
  "payload_id" : 1,
  "plugin" : "extractor:decompress",
  "puuid" : "3bcead6f-7223-40eb-a4c1-4fa2cd0bd83e",
  "save" : "True",
  "scan" : {
    "compile_time" : "2015-05-22T11:41:33",
    "entrypoint" : "0x32c22",
    "imphash" : "624034686b9f93a31fb5346bd8172b80",
    "imports" : [
      {
        "addr" : "0x439154",
        "dll" : "USER32.dll",
        "name" : "TrackPopupMenuEx"
      }
    ]
  }
}]
```

**splunk**<sup>®</sup>>enterprise

# Splunk Can Ingest ALL THE DATA

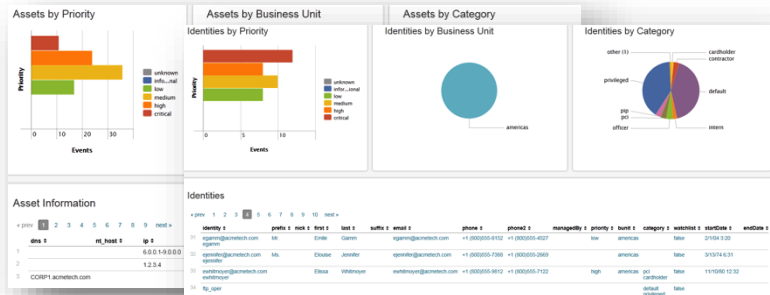
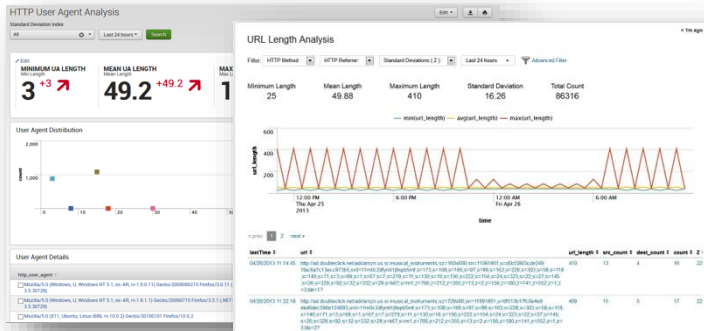


# Then Build Security Dashboards



## Dashboards and Reports

## Incident Investigations & Management



## Statistical Outliers

## Asset and Identity Aware



**By These  
Tools  
Combined...**

# The Splunk App for stoQ

## Overview

Edit ▾ More Info ▾



### Most Recent Submissions

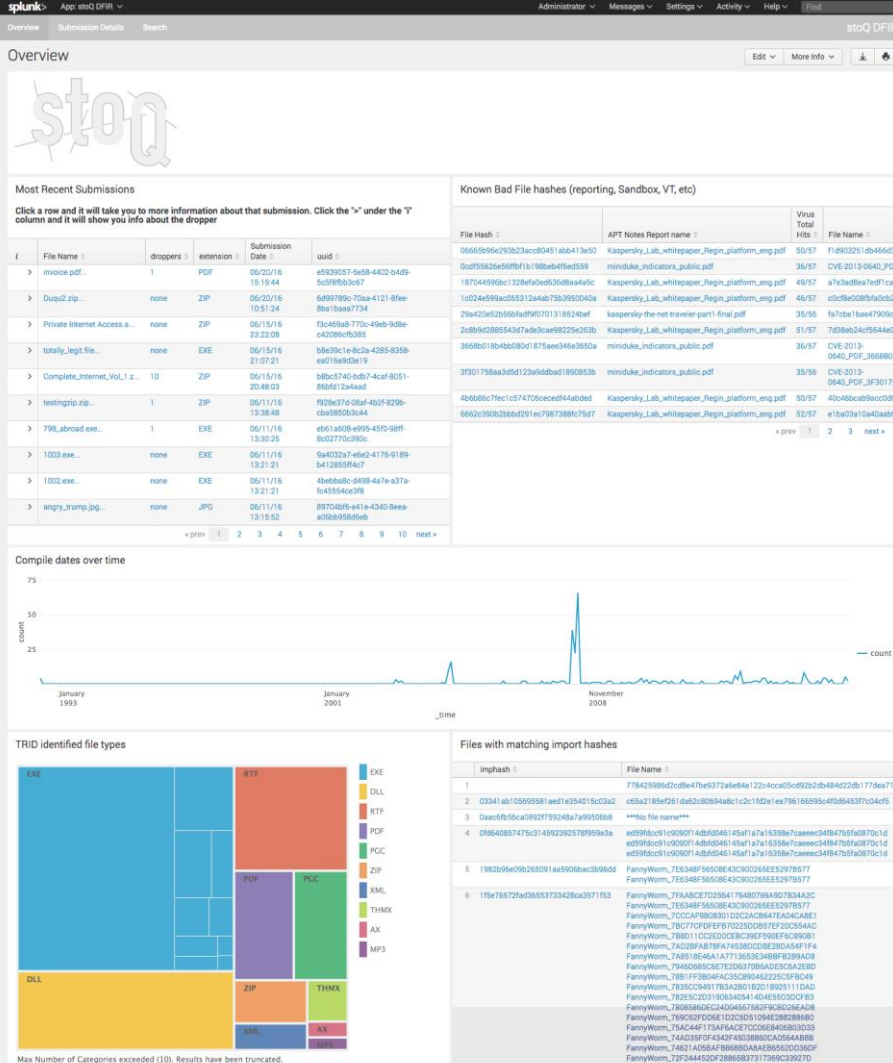
Click a row and it will take you to more information about that submission. Click the ">" under the "i" column and it will show you info about the dropper

i	File Name ▾	droppers ▾	extension ▾	Submission Date ▾	uuid ▾
>	freetibbet.pdf...	3	EXE	06/20/16 16:03:41	d5e7362a-c50c-45af-ac19-8e0886d0e62e
>	invoice.pdf...	1	PDF	06/20/16 15:19:44	e5939057-5e58-4402-b4d9-5c5f8fbb3c67
>	Duqu2.zip...	none	ZIP	06/20/16 10:51:24	6d99789c-70aa-4121-8fee-8ba1baaa7734
>	Private Internet Access.a...	none	ZIP	06/15/16 23:22:08	f3c469a8-770c-49eb-9d8e-c42086cfb385
>	totally_legit.file...	none	EXE	06/15/16 21:07:21	b8e39c1e-8c2a-4285-8358-ea016a9d3e19

### Known Bad File hashes (reporting, Sandbox, VT, etc)

File Hash ▾	APT Notes Report name ▾	Virus Total Hits ▾	File Name ▾
06665b96e293b23acc80451abb413e50	Kaspersky_Lab_whitepaper_Regin_platform_eng.pdf	50/57	f1d903251db46
0cdf55626e56ffb1b198beb4f6ed559	miniduke_indicators_public.pdf	36/57	CVE-2013-0640
187044596bc1328efa0ed636d8aa4a5c	Kaspersky_Lab_whitepaper_Regin_platform_eng.pdf	49/57	a7e3ad8ea7edi
18f5f6f08a2271b7b360c0eea1e68cde	Diary_of_Scott_Roberts	10/55	freetibbet.pdf
1c024e599ac055312a4ab75b3950040a	Kaspersky_Lab_whitepaper_Regin_platform_eng.pdf	46/57	c0cf8e008fbfa
29a420e52b56bfad9f0701318524bef	kaspersky-the-net-traveler-part1-final.pdf	35/56	fa7cbe1bae479
2c8b9d2885543d7ade3cae98225e263b	Kaspersky_Lab_whitepaper_Regin_platform_eng.pdf	51/57	7d38eb24cf564
3668b018b4bb080d1875aee346e3650a	miniduke_indicators_public.pdf	36/57	CVE-2013-0640_PDF_366
3f301758aa3d5d123a9ddbd1890853b	miniduke_indicators_public.pdf	35/56	CVE-2013-





# THE STOQ DFIR APP FOR SPLUNK!

- **ALLOWS YOU TO VISUALIZE STOQ RESULTS**
- **MAKE CONNECTIONS THAT WERE DIFFICULT TO SEE BEFORE**
- **QUICKLY PIVOT TO NEW DATA SOURCES**
- **APPLY THREAT INTELLIGENCE TO STOQ DATA**


# A DFIR Scenario

You are an analyst at a Fortune  
100 company





A user reports an email  
with a **suspicious**  
attachment



We need to quickly  
identify if the file is good  
or bad



## Overview

Edit 

More Info 



### Most Recent Submissions

Click a row and it will take you to more information about that submission. Click the ">" under the "I" column and it will show you info about the dropper

i	File Name	droppers	extension	Submission Date	uuid
>	reallynotjokingfreetibbet...	3	EXE	06/20/16 16:08:28	f5ed6182-1d6a-40e8-b822-88113920a614
>	freetibbet.pdf...	3	EXE	06/20/16 16:03:41	d5e7362a-c50c-45af-ac19-8e0886d0e62e
>	invoice.pdf...	1	PDF	06/20/16 15:19:44	e5939057-5e58-4402-b4d9-5c5f8fbb3c67
>	Duqu2.zip...	no	ZIP	06/20/16 16:51:31	6d99789c-70aa-4121-8fee-81... 7781
>	Private Internet Access.a...				
>	totally_legit.file...				
>	Complete_Internet_Vol_1.z				
>	testingzip.zip...	1	ZIP	06/11/16 13:38:48	f928e37d-08af-4b2f-829b-cba5850b3c44
>	798_abroad.exe...	1	EXE	06/11/16	eb61a608-e995-45f0-98ff-

i	File Name	droppers
>	reallynotjokingfreetibbet...	3

### Known Bad File hashes (reporting, Sandbox, VT, etc)

File Hash	APT Notes Report name	Virus Total Hits	File Name
06665b96e293b23acc80451abb413e50	Kaspersky_Lab_whitepaper_Regin_platform_eng.pdf	50/57	f1d903251db46
0cdf55626e56ffbf1b198beb4f6ed559	miniduke_indicators_public.pdf	36/57	CVE-2013-0640
187044596bc1328efa0ed636d8aa4a5c	Kaspersky_Lab_whitepaper_Regin_platform_eng.pdf	49/57	a7e3ad8ea7ed1
1c024e599ac055312a4ab75b3950040a	Kaspersky_Lab_whitepaper_Regin_platform_eng.pdf	46/57	c0cf8e008fbfa
29a420e52b56bfad9f0701318524bef	kaspersky-the-net-traveler-part1-final.pdf	35/56	fa7cbe1bae479
2c8b9d2885543d7ade3cae98225e263b	Kaspersky_Lab_whitepaper_Regin_platform_eng.pdf	51/57	7d38eb24cf56a
3668b018b4bb080d1875aee346e3650a	miniduke_indicators_public.pdf	36/57	CVE-2013-0640 PDF 36/57

<i>i</i>	File Name ↕	droppers ↕	extension ↕	Submission Date ↕	uuid ↕
>	reallynotjokingfreetibbet...	3	EXE	06/20/16 16:08:28	f5ed6182-1d6a-40e8-b822-88113920a614



Submit

VTMIS

i	md5 ↕	File Name ↕	AV Hits ↕	Yara Rule ↕	File Type ↕	APT Report Name ↕	uuid ↕
▼	7faabce7d2564176480769a9d7b34a2c	reallynotjokingfreetibbet.pdf	Virus Total Detection	Equation_Kaspersky_FannyWorm Str_Win32_Winsock2_Library <a href="#">apt_equation_exploitlib_mutexes</a> <a href="#">dos_stub</a>	Win32 DLL	Diary_of_Scott_Roberts	f5ed6182-1d6a-40e8-b822-88113920a614
	Dropper ↕	uuid ↕		md5 ↕		extension ↕	payloads ↕
	Present	fb25f932-e1f8-4574-ac33-d545afaa8e43		91985cf1b695f95a72df8e27c75eafc5		DLL	4
	Present	a877b4d0-9167-465a-8cf3-16171c7958cb		ddc9915a5158a9560ad1ef2f16cce9a6		EXE	4

## Import Hash Matches

md5	File Name	uuid
7faabce7d2564176480769a9d7b34a2c	reallynotjokingfreetibbet.pdf	f5ed6182-1d6a-40e8-b822-88113920a614
7e6348f56508e43c900265ee5297b577	FannyWorm_7E6348F56508E43C900265EE5297B577	26f68a80-8aaf-45b5-aa6d-c5288ed8b56d
7cccaf9b08301d2c2ac647ea04ca8e1	FannyWorm_7CCCAF9B08301D2C2AC6B47EA04CA8E1	c5003d33-732f-4e93-bb78-94598f48baff
7bc77cfdfeb70225ddb57ef20c554ac	FannyWorm_7BC77CFDFEFB70225DDDB57EF20C554AC	eab81adc-dc7a-4592-bf01-8e83a3c534fe
7b8d11cc2ed0cebc39ef590ef6c890b1	FannyWorm_7B8D11CC2ED0CEBC39EF590EF6C890B1	07b129a6-cd11-4e6a-8fa6-ac58ca5ecf9e
7ad2bfab78fa74538dcdb28da54f1f4	FannyWorm_7AD2BFAB78FA74538DCDBE28DA54F1F4	8ce20f64-190c-486e-9178-5135b0a64271
7a8518e46a1a7713653e34bbfb2b9ad8	FannyWorm_7A8518E46A1A7713653E34BBFB2B9AD8	4171772a-7564-4da7-bd79-01020d576ca1
7946d685c6e7e2d6370b6ade5c6a2e8d	FannyWorm_7946D685C6E7E2D6370B6ADE5C6A2E8D	d193419e-1089-4c21-ab3a-80fee8f645f5
78b1ff3b04fac35c890462225c5fbc49	FannyWorm_78B1FF3B04FAC35C890462225C5FBC49	bbf16e7c-0d29-4d65-8123-e63f60b7e080

## Submission Details

Edit

More Info



UUID of Submission

f5ed6182-1d6a-40e8-b822-88113920a

Submit

Overview

PEinfo

Exif

Yara

TRID

VTMIS

## PEinfo High Level Info

PEinfo Results	Results
is_dll	true
is_driver	false
is_exe	false
is_packed	false

## PEinfo detailed names and DLLs Info

DLLs in Submission	Names in Submission
ADVAPI32.dll	??2@YAPAXI@Z
KERNEL32.dll	??3@YAXPAX@Z
MSVCRT.dll	AccessCheck
USER32.dll	AddAccessAllowedAce
WS2_32.dll	AllocateAndInitializeSid
	BeginUpdateResourceA
	CloseHandle
	CopyFileA
	CreateFileA
	CreateFileMappingA
	CreateFileW
	CreateMutexA
	CreateMutexW
	CreateProcessA
	CreateThread
	CreateWindowExW
	DeleteFileA
	DestroyWindow
	DuplicateTokenEx
	EndUpdateResourceA
	FindClose
	FindFirstFileA
	FindNextFileA
	FindResourceA
	FreeLibrary
	FreeSid
	GetComputerNameA
	GetCurrentProcess
	GetCurrentProcessId
	GetCurrentThread



## Submission Details

Edit

More Info



UUID of Submission

f5ed6182-1d6a-40e8-b822-88113920a

Submit

Overview

PEInfo

Exif

Yara

TRID

VTMIS

## EXIF

Exif Results

Results

CodeSize

53248

Directory

/usr/local/stoq/temp

EntryPoint

0xd41b

ExifToolVersion

10.02

FileAccessDate

2016:06:20 20:08:28+00:00

FileNodeChangeDate

2016:06:20 20:08:28+00:00

FileModifyDate

2016:06:20 20:08:28+00:00

FileName

90503f9a-d627-4c05-9146-454d9003f951.stoq

FilePermissions

rw-r--

FileSize

180 kB

FileType

Win32 DLL

FileTypeExtension

dll

ImageVersion

0.0

InitializedDataSize

126976

LinkerVersion

6.0

MIMEType

application/octet-stream

MachineType

Intel 386 or later, and compatibles

OSVersion

4.0

PEType

PE32

# Submission Details

Edit ▾More Info ▾

⬇️🖨️

UUID of Submission

f5ed6182-1d6a-40e8-b822-88113920a

Submit

OverviewPEInfoExifYaraTRIDVTMIS

## YARA

Yara Results ▾	Results ▾
matches	true true true true
meta.author	@adricnet Florian Roth
meta.copyright	Kaspersky Lab
meta.date	2015/02/16
meta.description	Match Winsock 2 API library declaration Rule to detect Equation group's Exploitation library <a href="http://goo.gl/ivt8EW">http://goo.gl/ivt8EW</a> Equation Group Malware - Fanny Worm
meta.hash	1f0ae54ac3f10d533013f74f48849de4e65817a7
meta.last_modified	2015-02-16
meta.method	String match
meta.plugin	carver:pe
meta.reference	<a href="http://securelist.com/blog/research/68750/equation-the-death-star-of-malware-galaxy/">http://securelist.com/blog/research/68750/equation-the-death-star-of-malware-galaxy/</a> <a href="http://goo.gl/ivt8EW">http://goo.gl/ivt8EW</a>
« prev12next »	

## Submission Details

Edit

More Info



UUID of Submission

f5ed6182-1d6a-40e8-b822-88113920a

Submit

Overview

PEInfo

Exif

Yara

TRID

VTMIS

## TRID

Type	Likelihood	File Extension
Win32 Executable MS Visual C++ (generic) (31206/45/13)	78.5%	EXE
Win32 Executable (generic) (4508/7/1)	11.3%	EXE
Generic Win/DOS Executable (2002/3)	5.0%	EXE
DOS Executable Generic (2000/1)	5.0%	EXE

## Submission Details

Edit

More Info



UUID of Submission

f5ed6182-1d6a-40e8-b822-88113920a

Submit

Overview

PEinfo

Exif

Yara

TRID

VTMIS

## VTMIS Submission Info

VTMIS Extra Info	Results
Virus Total Hits	51/55
first_seen	2012-10-23 17:16:42
last_seen	2016-06-16 17:58:23
times_submitted	5
unique_sources	5
tags{}	armadillo pedll

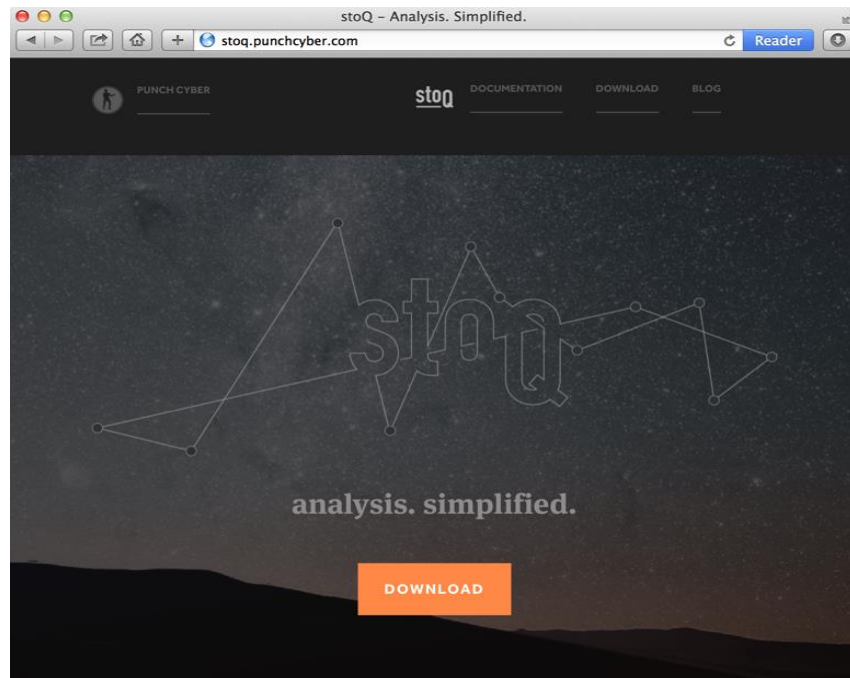
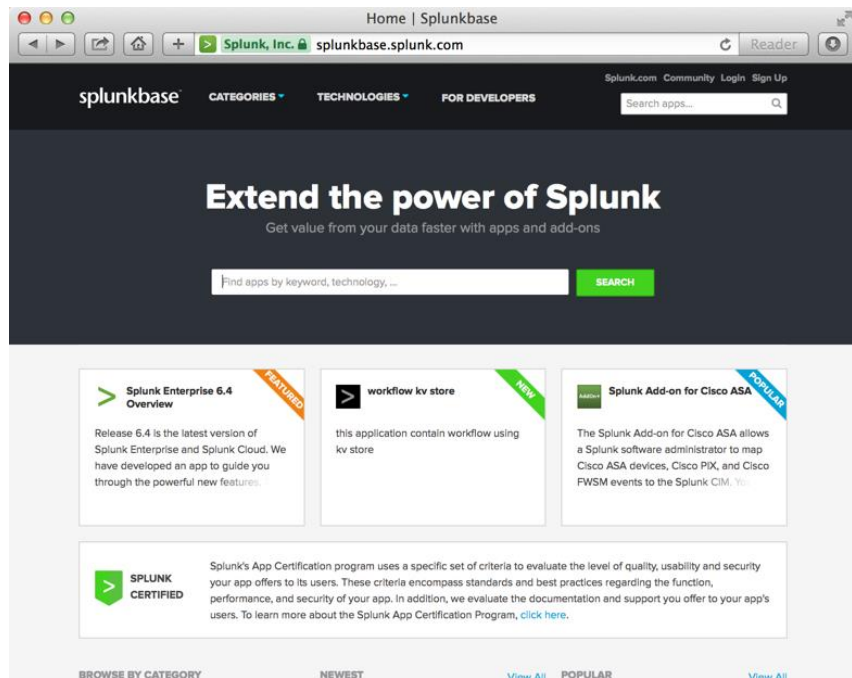
## VTMIS Detection

AV Engine	detection
ALYac	Trojan.Dropper.SRY
AVG	Downloader.Agent2.TUI
AVware	Trojan-Downloader.Win32.Agent.ckhe (v)
Ad-Aware	Trojan.Dropper.SRY
AegisLab	Troj.Downloader.W32.Agent.ckhe!c
AhnLab-V3	Trojan/Win32.Agent
Alibaba	No threat detected by this vendor
Antiy-AVL	Worm/Win32.AutoRun
Arcabit	Trojan.Dropper.SRY
Avast	Win32:Trojan-gen
Avira	TR/Drop.Agent.aeb
Baidu	Win32.Trojan-Downloader.Agent.o
Baidu-International	Trojan.Win32.Agent.OSW
BitDefender	Trojan.Dropper.SRY
CAT-QuickHeal	TrojanDownloader.Zlob.A4
CMC	Trojan-Downloader.Win32.Agent!O
ClamAV	Win.Worm.Autorun-7948
Comodo	TrojWare.Win32.TrojanDownloader.Agent.ckcr
Cyren	W32/Worm.BKUP-7878

# WHERE DO I GET ALL OF THIS INCREDIBLENESS???

<https://splunkbase.splunk.com/app/3196/>

<http://stoq.punchcyber.com>



# Questions? Try it out instead 😊

<https://demo.stoq.io>

Username: dfir2016

Password: stoqingyoursplunk

Ryan Kovar  
rkovar@splunk.com  
@meansec

Marcus LaFerrera  
marcus@punchcyber.com  
@mlaFerrera