

# Deterring Cybercrime via a Global CyberGrid

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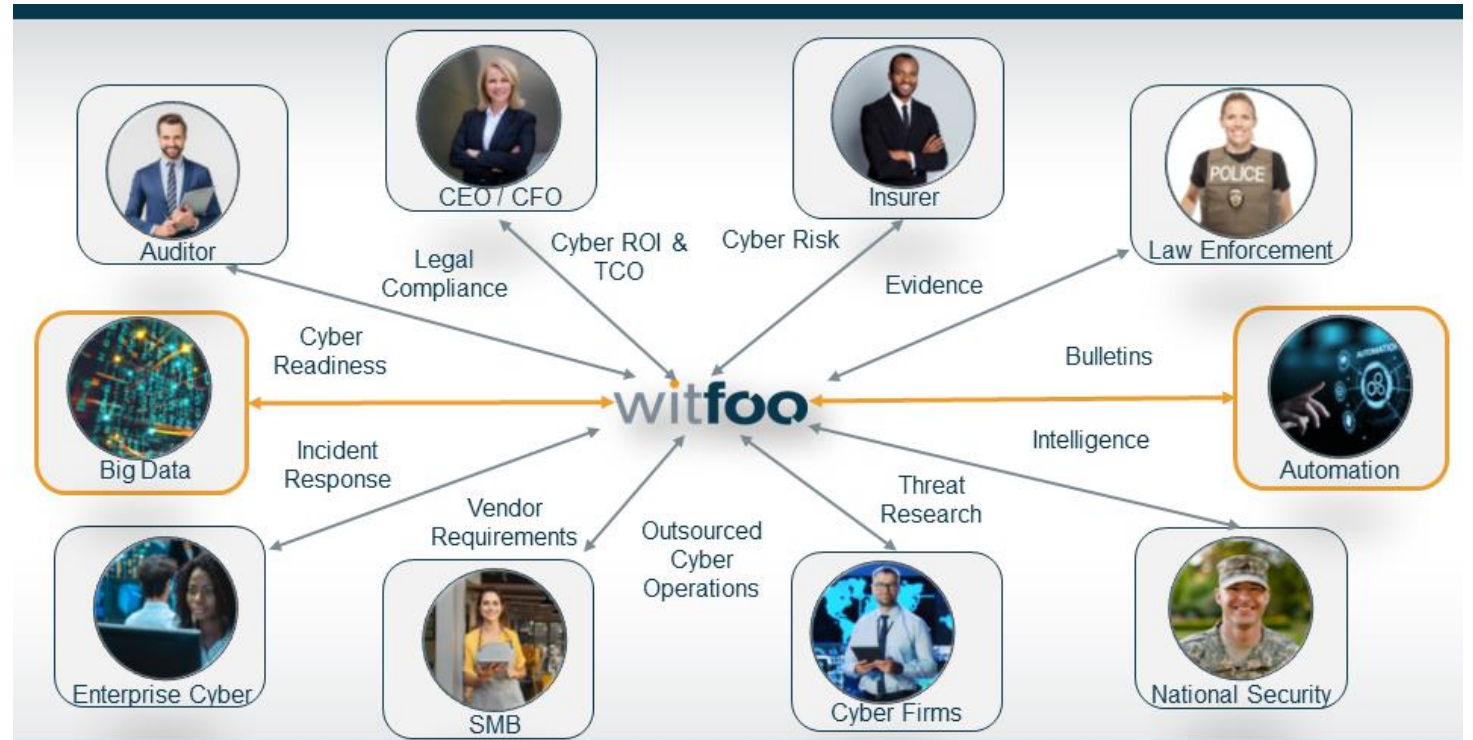


## About Charles

- WitFoo co-Founder and Project Lead (2016-)
- Cisco & Lancope Security Architect (2012-16)
- DoD Security & Data Consultant (2005-12)
- InfoWorld Test Center (2003-2008)
- US Navy Cyber Security (2002-2005)
- US Navy F/A 18 Hornet Avionics (1995-2002)
- Arkansas Drug Care Director of IT (1993-1995)

# WitFoo Research

- Founded by Veterans of the US Military, Law Enforcement & Cyber
- Research began in 2016 across 20+ private & public organizations
- Goal to create a CyberGrid across the Cyber Community





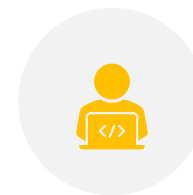
# Agenda



Theory &  
Philosophy



Benefits of  
Community  
Deterrence

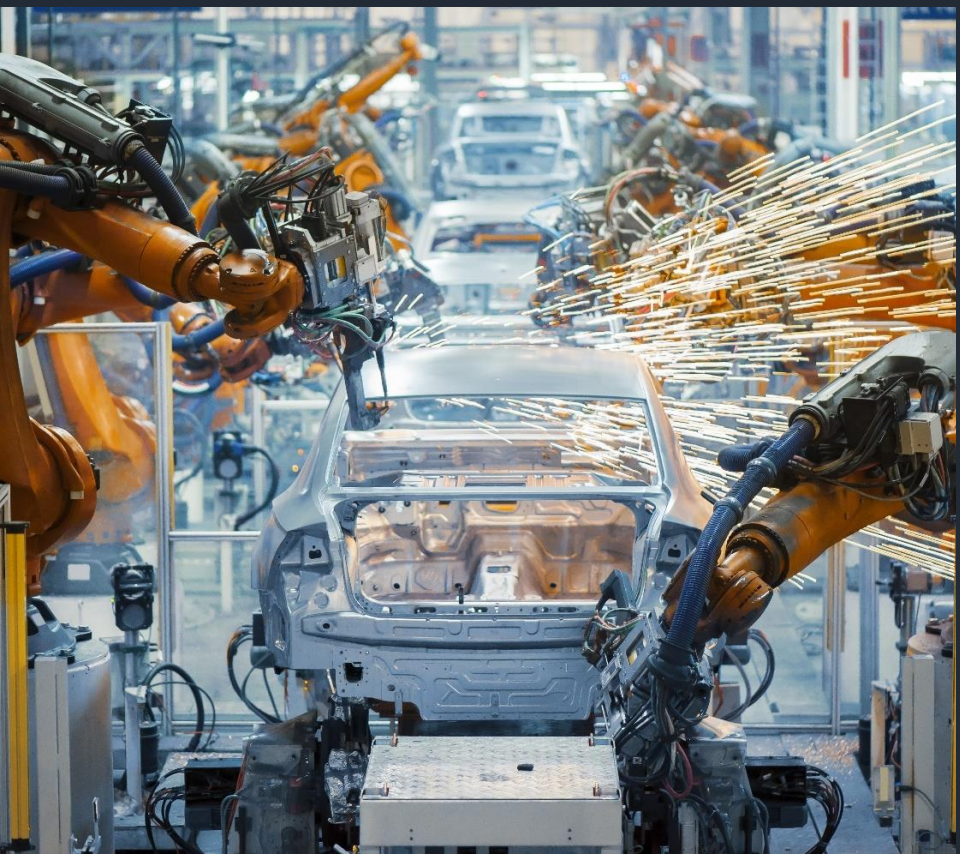


Implementation &  
State of Research

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# IT Evolved from Manufacturing



- Harvest Raw Materials
- Assemble New Units
- Ship & Store Units
- Linear Workflows
- Transactional/Unit Based



SECOPS is not IT



- Stop criminal activity
  - Prevention
  - Detection
  - Response
  - Remediation
- Non-linear workflows
- Based on Law Enforcement

# IT Outcomes in SECOPS



Blacklist / Block



Reimage / Restore



Reset / Lock

No Impact to Criminal Activity

# Legal Outcomes in SECOPS



Incarceration



Financial Recovery

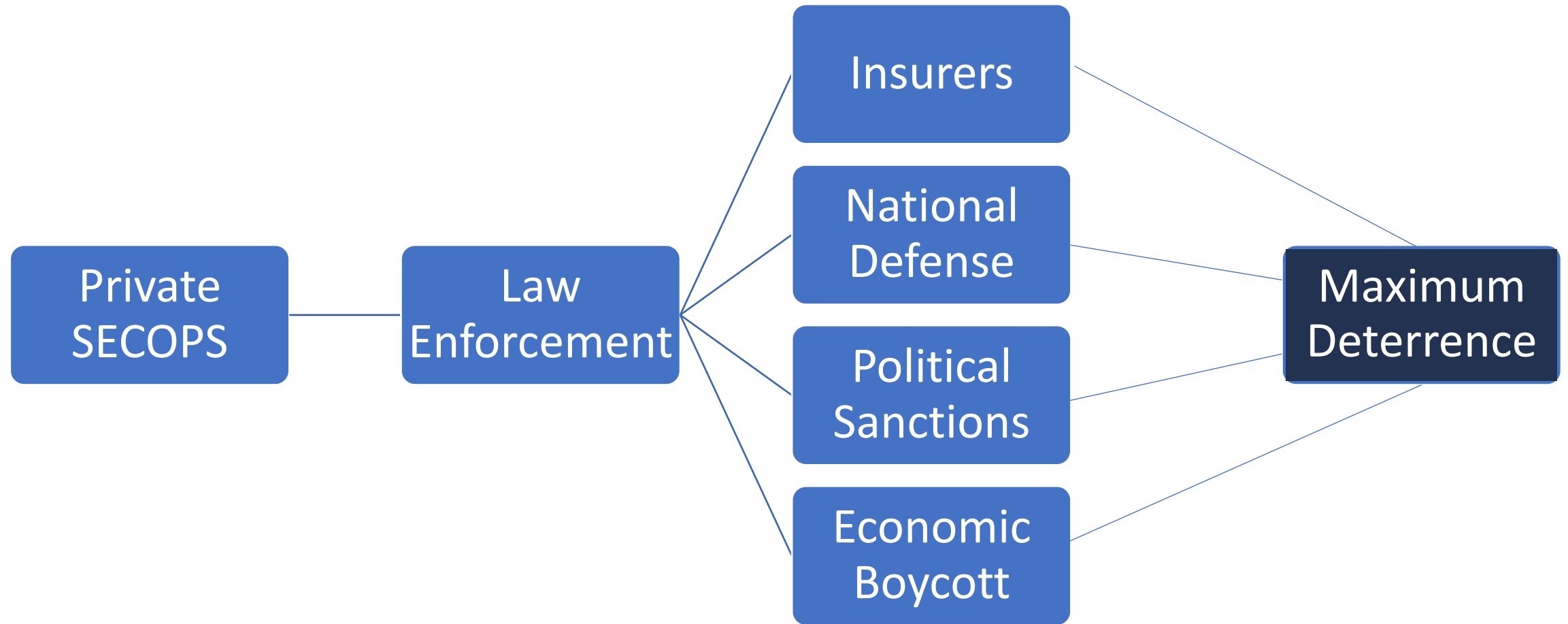


RICO Arrests

Increases Criminal Deterrence over Time



# Optimized Cyber Community



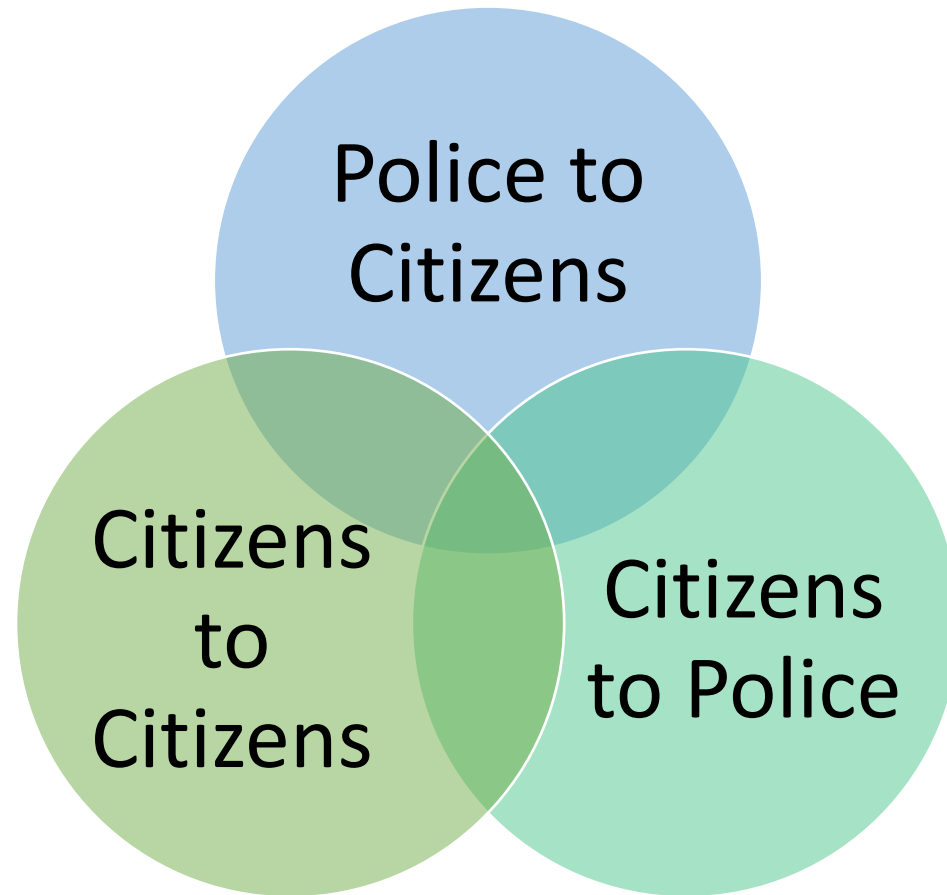
# Power of Deterrence

“...the certainty of being caught is a vastly more powerful deterrent than the punishment.”

- “*Five Things About Deterrence*” – DOJ  
2016



# Safe Communities Communication



# Short-term Benefits of Coordination



Recovery



Attribution



Root Cause

Reduce Future Risk & Near-Term Recovery

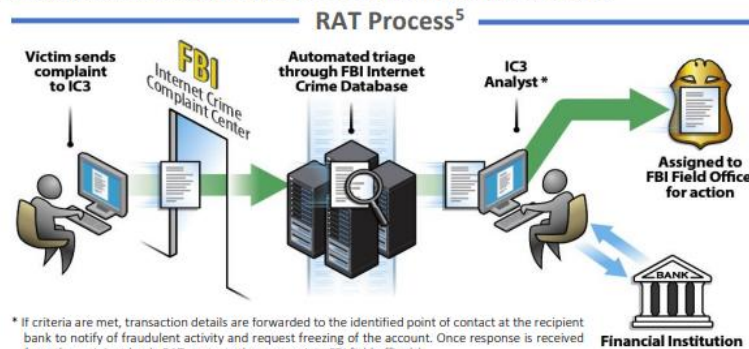


# Recovery

- Insurers coordinate with Law Enforcement
- Law Enforcement Recovery Success is High

## THE IC3 RECOVERY ASSET TEAM (RAT)

The Internet Crime Complaint Center's Recovery Asset Team (RAT) was established in February 2018 to streamline communication with financial institutions and assist FBI field offices with the freezing of funds for victims who made transfers to domestic accounts under fraudulent pretenses.



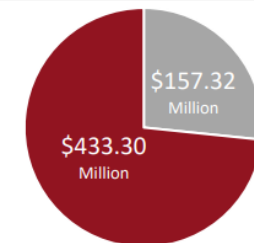
The RAT functions as a liaison between law enforcement and financial institutions supporting statistical and investigative analysis.

## RAT SUCCESSES<sup>6</sup>

### Success to Date

73% Success Rate  
2,838 Incidents  
\$590.62 Million Losses  
\$433.30 Million Frozen

■ Remaining Losses ■ Frozen Funds



\* 2022 FBI Internet Crime Report

# Attribution

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- Human Intelligence (HUMINT) is required for legal attribution
- Legal attribution is required for civil litigation
- Civil Litigation leads to expanded recovery of damages





# Root Cause

Physical, financial & third-party evidence

# Medium-term Benefits of Coordination



Reduced Costs



Improved Insurance



Quality Threat Intel

Reduce Costs & Improve Protection



# Barriers for Law Enforcement

- Missing Evidence
- Disorganized Data
- Poor Non-repudiation
- Insufficient Loss/Damages



# Barriers for Private SECOPS

- Over-disclosure risks (legal & brand)
- Law Enforcement over-reach
- Understaffed
- Lack of expertise





# Barriers to SECOPS Craft

- Multi-Petabyte Data
- Narrow-focus Tools/Controls
- Poor Collaboration Options
- Data Linguistics Complexity



# WitFoo Research Principles

Predestination of  
Data

Non-repudiation

Low Cost for Big-  
Data

Data  
Comprehension

Object Oriented  
Organization

Sharing Levels  
akin to Physical  
Security

Sharing  
Grid/Mesh across  
community





## Predestination of Data

*The entire lifespan of a datum must be established at its birth. Comprehension of syntax, source and intent must be extracted. Inference and potential impact of the datum must be established. Nature of creation and transmission must be preserved. All expected evolutions and iterations of the data need to be established for processing. The death (TTL) of the datum must be established at persistence.*

# Non-repudiation Approaches

- Block-chain
- Signal Time Hashing
- Object Time Hashing

- [Azure Confidential Locker](#)
- [AWS Blockchain](#)
- [Hash.WitFoo.com](#)
- [HyperLedger.org](#) (Freemium)
- [Corda](#) (Apache 2.0)



```
shasum /tmp/evidence.bin  
b6cf99ed08a03eac26e82fffb1908f5eaf361526d /tmp/evidence.bin
```

# Big-Data Total Cost of Ownership

- “Resource Sensitive Coding” – IOPS, RAM, Storage & Compute
- Avoid “Data Triage Licensing” – Vendor-centric ingest/storage
- Labor Costs of Parsers, Engineering & Logic

Name	Insgesant	= Konventioneller	+ Hoher Speicher
MSDOS	66,717 (65K)	66,717 (65K)	0
ZM-XBIOS	3,568 (3K)	3,568 (3K)	0
DHLSPACE	53,440 (52K)	53,440 (52K)	0
EMSDRVR	416 (0K)	416 (0K)	0
COMMAND	5,456 (5K)	5,456 (5K)	0
KEYB2	720 (1K)	720 (1K)	0
ADPVE	79,344 (77K)	79,344 (77K)	0
DOSKEY	4,144 (4K)	4,144 (4K)	0
Frei	507,000 (495K)	507,000 (495K)	0
<b>Speicher-Zusammenfassung:</b>			
Speichertyp	Insgesant	= Verwendet	+ Frei
Konventioneller	720,896	213,888	507,008
Hoher	0	0	0
Reserviert	0	0	0
Erweiterung (XMS)	0	0	0
Insg. Speicher	720,896	213,888	507,008
Insg. unter 1 MB			



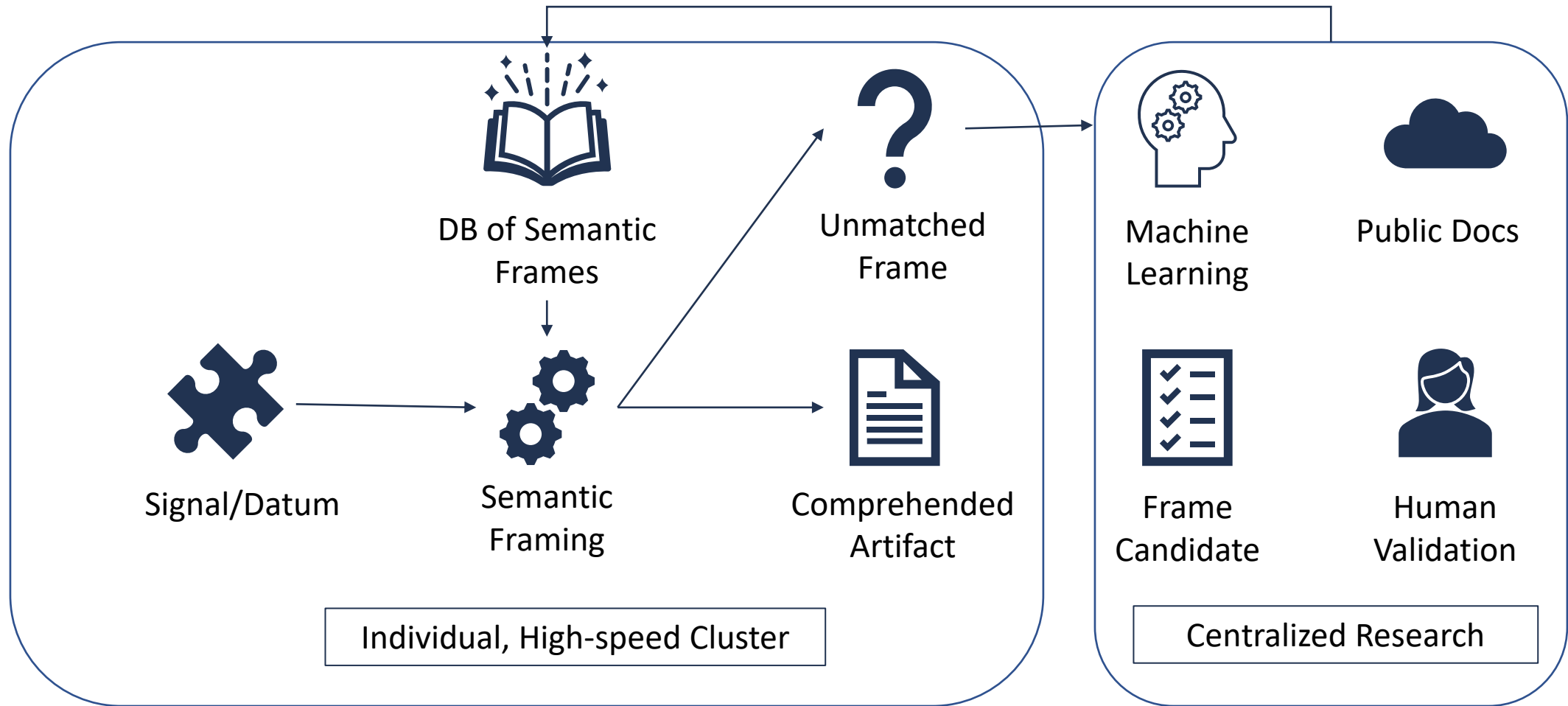
# Data Comprehension

- Sematic Framing (Grammar)
  - Framing Validation
  - Illogical Computer Formats
- Data Validation
  - Data Context (Encyclopedia)
  - Data Inference (Chatter)
- Low Compute Cost at High Rate

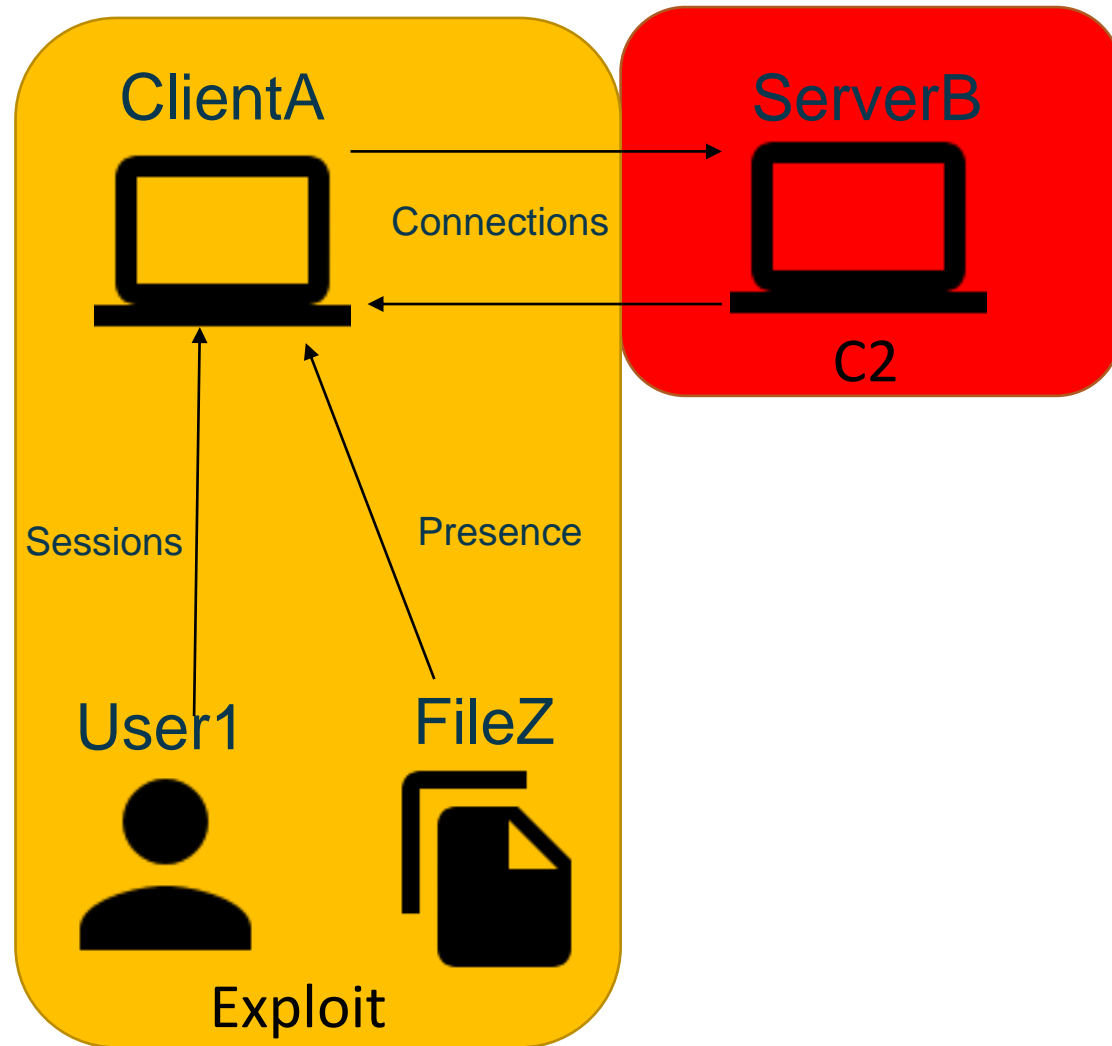




# Consolidated Human Asst. Learning



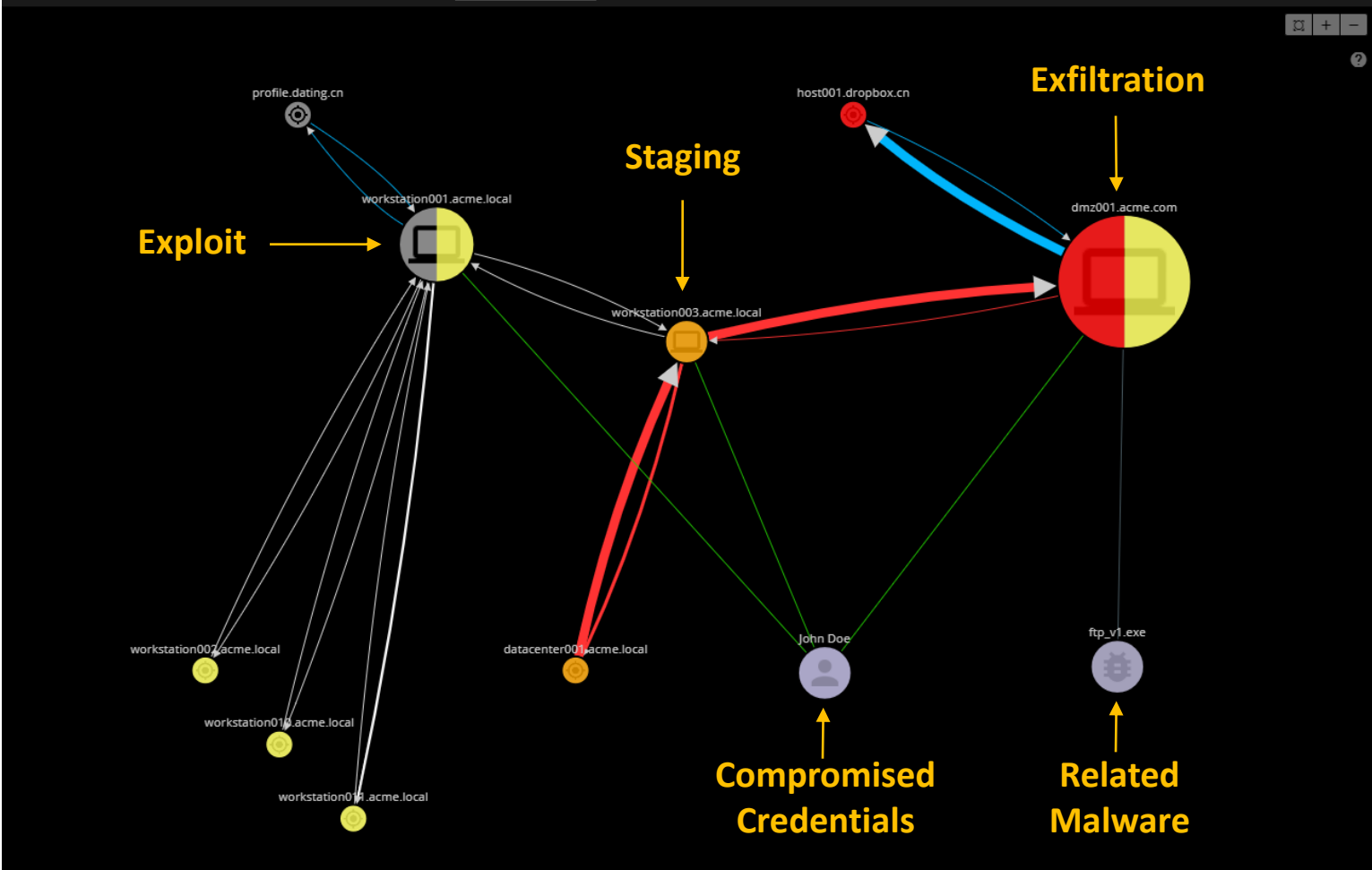
# Object Oriented Organization



Artifacts
<ul style="list-style-type: none"><li>• ClientName: ClientA</li><li>• ClientIP: 10.10.10.43</li><li>• ClientMAC: 00-DC-EF-23-15-12</li><li>• Product: MS DHCP</li><li>• MessageType: DHCP Lease</li><li>• Intent: Asset Info</li></ul>
<ul style="list-style-type: none"><li>• ClientName: ClientA</li><li>• User: User1</li><li>• File: FileZ</li><li>• Product: Crowdstrike Falcon</li><li>• MessageType: Malware Detected</li><li>• Intent: Exploit Detection</li></ul>
<ul style="list-style-type: none"><li>• ClientIP: 10.10.10.43</li><li>• ServerName: ServerB</li><li>• Product: Cisco Firepower</li><li>• MessageType: C2 Detected</li><li>• Intent: C2 Detection</li></ul>

# Graph vs. Crime Theory

- Meaningful Graph Relationships
- Modus Operandi of Attacker
- Combines, standardizes diverse data
- Hierarchical JSON
- *SECOPS & LE Unit of Work*





# Power of JSON

- High Compression (net & disk)
- REST Powered Transmission
- Easy to Hash & Version
- Hierarchical Structures

## Incident JSON View



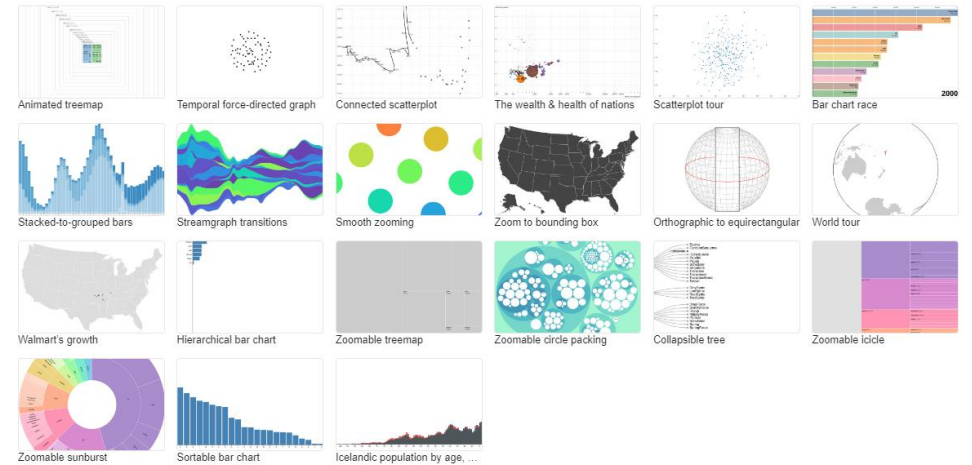
```
id: "53ba6ed0-ed35-11ed-8a89-053651253e65"
partition: "53babcf0-ed35-11ed-8a89-053651253e65"
nodes: Object {"52801a10-ed35-11ed-8a89-053651253e65":{"id":"52801a10-ed35-11ed-8a89-053651253e65","partition":"53b89a10-ed35-11ed-8a89-053651253e65"}
  52801a10-ed35-11ed-8a89-053651253e65: Object {"id":"52801a10-ed35-11ed-8a89-053651253e65","partition":"53b89a10-ed35-11ed-8a89-053651253e65"}
    id: "52801a10-ed35-11ed-8a89-053651253e65"
    partition: "53b89a10-ed35-11ed-8a89-053651253e65"
    ip_address: "10.10.10.3"
    ip: "10.10.10.3"
    org: ""
    orgId: 1
    mac: ""
    guid: ""
    internal: true
```

# JSON Visualization - d3js

- MIT License
- JSON Data
- Dozens of easy JSON to chart visualizations

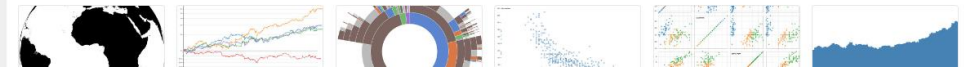
## Animation

D3's [data join](#), [interpolators](#), and [easings](#) enable flexible [animated transitions](#) between views while preserving [object constancy](#).



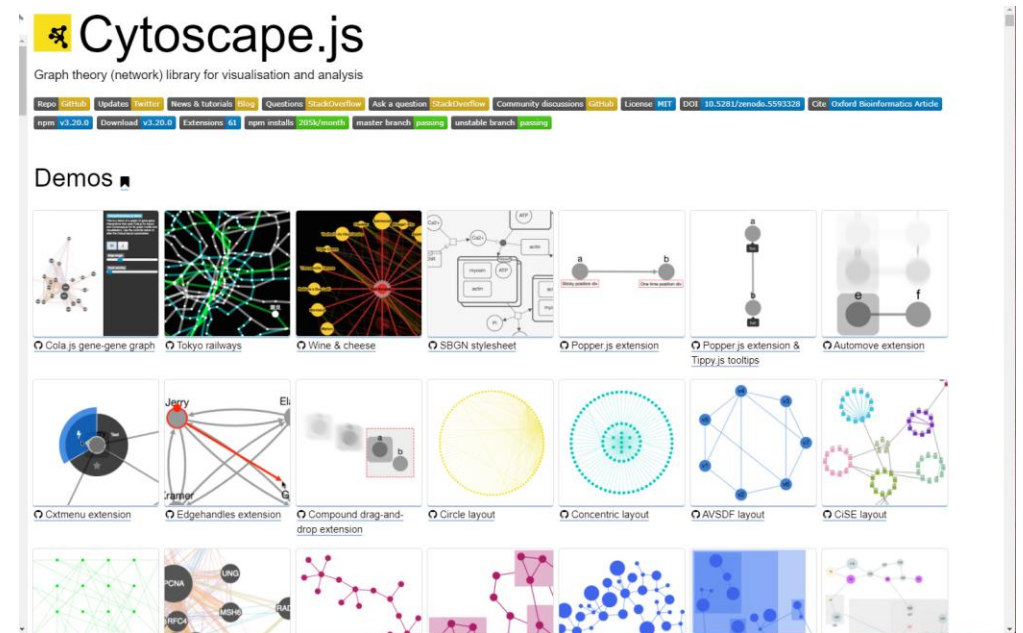
## Interaction

D3's low-level approach allows for performant incremental updates during interaction. And D3 supports popular interaction methods including [dragging](#), [brushing](#), and [zooming](#).



# JSON Graph Visualization - Cytoscape.js

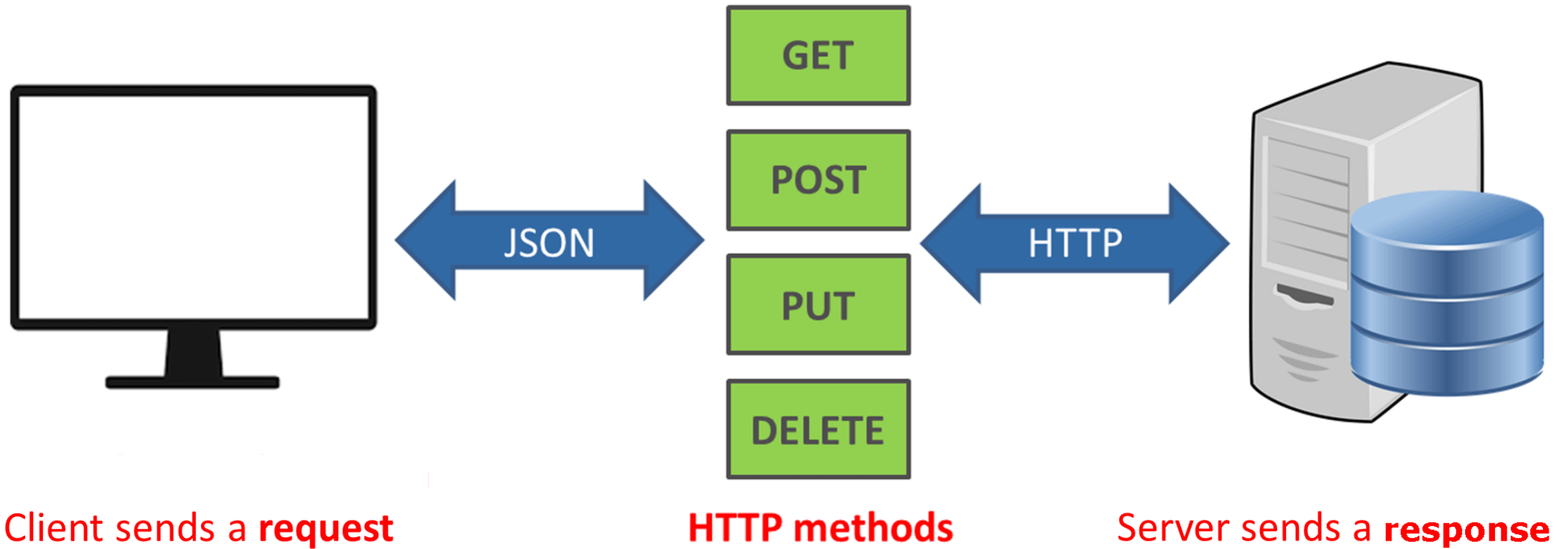
- MIT License
- JSON Data
- Graph Relationship interaction
- Bioinformatic Research



The image shows a screenshot of the Cytoscape.js website. The header features the Cytoscape.js logo and the text "Graph theory (network) library for visualisation and analysis". Below the header is a navigation bar with links for Repo, Updates, News & tutorials, Questions, StackOverflow, Ask a question, Community discussions, License MIT, DOI, and Cite. The main content area is titled "Demos" and displays a grid of 18 different graph visualization examples, each with a small thumbnail and a title. The examples include: Cola.js gene-gene graph, Tokyo railways, Wine & cheese, SBN stylesheet, Popper.js extension, Popper.js extension & Tippy.js tooltips, Automove extension, Cxmenu extension, Edghandles extension, Compound drag-and-drop extension, Circle layout, Concentric layout, AVSDF layout, and CISE layout.



# REST Basics





# JSON Sharable Objects

Incident Collections

Threat Intel

Bulletins

Job Execution

Reports



# Anonymous Tips

- Automatically & Anonymously Submitted Across CyberGrid
- Corroboration types: Technology & Victims

The screenshot shows a search interface with the IP address 146.88.240.4 entered in the search bar. Below the search bar, there are tabs for 'Items', 'Geography Data', and 'Relationships'. The main content area displays 'WitFoo Global IOC' with a score of 0.94 and '6 Technologies'. To the right, it shows '822 Reports'. Below this, a table lists detection methods and behaviors.

SCORE	DETECTION METHODS	SUBMISSIONS	BEHAVIORS
0.94	ASA Firewall, AWS VPC Security, Checkpoint FW, Meraki, Fortigate, PAN NGFW	822	Exploiting Host

# Law Enforcement Requests

The screenshot shows the Witfoo dashboard with a list of incidents on the left and a detailed view of 'Extensive Catshark 233048' in the center. The incident details include a network diagram, a summary, and a casebook table. A blue arrow points from the 'Evidence Requests' section in the incident details to a separate modal window on the right.

Incident Name	Modus Operandi	Score	First Seen	Last Seen
Extensive Catshark 233048	Data Theft	1.000	19 hours ago	18 hours ago
Greasy Opossum 233048	Data Theft	1.000	19 hours ago	19 hours ago
Round Hornet 233048	Data Theft	0.976	19 hours ago	19 hours ago
Successful Flamingo 233048	Ransomware	0.953	19 hours ago	19 hours ago
Glorious Snail 233049	Financial Fraud	0.947	18 hours ago	18 hours ago
Foolish Donkey 233049	SCADA Attack	0.947	18 hours ago	18 hours ago
Abrupt Parakeet 233048	Degraded Service/Outage	0.895	18 hours ago	18 hours ago
Wonderful Vulture 233048			19 hours ago	

**Incident Summary:** This is an attempted **Data Theft** incident. It began at 6:40 PM on Sunday, May 7, 2023, and was last observed at 7:12 PM on Sunday, May 7, 2023. It has a suspicion score of 1.00 in a range where 0.0 represents certainty of a false positive and 1.0 represents certainty it is real and nefarious matching the modus operandi of **Data Theft**.

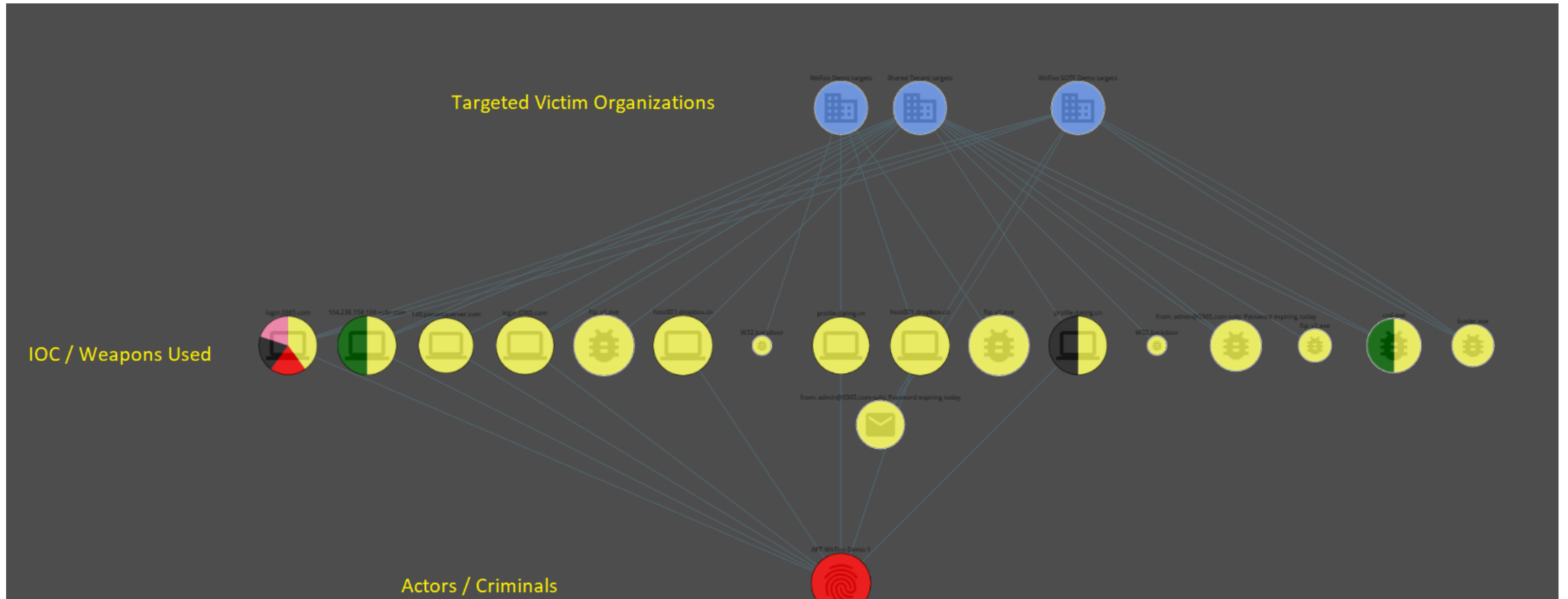
### Evidence Requests

**Request Subject**  
Incident Details Requested by Metro PD on - Extensive Catshark 233048

**Actor Details**  
Metro PD is looking for evidence to arrest and convict this criminal group engaged in criminal activity.

[Submit](#) [Decline](#)

# Incidents to Campaigns



# Law Enforcement Resources

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- [Infragard](#)
  - FBI and Private Critical Infrastructure
- [Cyber Fraud Task Forces](#)
  - Secret Service on Financial Fraud
- [IC3](#)
  - FBI Cybercrime Reporting
- [CISA Critical Infrastructure Areas](#)



Jamil Farshchi • 2nd

Equifax CISO | UKG Board Member | FBI Advisor

22h •

[+ Follow](#)

A gift of 124 hours

I was walking out of [NBC News](#)' studios in NYC and had one last meeting before I could finally get home to ATL.

Just as I hop in the car, my phone starts blowing up.

**It's CISA.**

[Equifax](#) was about to get hit with a cyberattack by a prolific ransomware threat actor. One that'd already left many other corporate victims in their wake.

It wasn't a general "heads-up." The intelligence was exacting. The insights were concretely actionable.

**Next it's the FBI.**

Their Cleveland-based team that specializes on this threat actor briefed us on every behavior we needed to know to cover our bases against these guys.

Our federal partners armed us with what we needed.

Now **it was up to us** to make good on the gift we'd received. And we did.



# Transmitting to Law Enforcement

## Manual or Automatic

**Ready to file a complaint?** To see if your information should be reported to IC3, read the following descriptions about the different types of crimes we investigate. Also see our FAQs for more details about filing a complaint. [See Our FAQs](#)

**Business Email Compromise**  
Criminals typically send an email message that appears to come from a business or individual you know—such as one of your business vendors, your organization's CEO, or the title company for your home. The email requests a seemingly legitimate payment, often urgently, via a wire transfer. However, it is all a scam. [More info.](#)

**Elder Fraud (Victims 60 and Over)**  
Criminals target millions of elderly Americans each year with many different types of financial fraud or confidence schemes, such as romance, lottery, investment, or sweepstakes scams. Criminals may impersonate family members, government agencies, tech support professionals, and others to steal your money and information. [More info.](#)

**Ransomware**  
You are prevented from accessing your computer files, systems, or networks after they are infected with malicious software, or malware. Criminals then demand that you pay a ransom for your files or systems to be unlocked or decrypted. [More info.](#)

**Other Cyber Crime**  
There are many other types of cyber crime that impact both businesses and consumers, including cryptocurrency investment schemes, identity theft, non-payment or non-delivery of merchandise ordered online, credit card fraud, computer intrusions, corporate data breaches, and denial of service website attacks.  
Please file a report with IC3 even if you're unsure of whether your complaint or report qualifies as a cyber crime.

Don't see the crime you want to report listed here? The IC3 focuses on collecting cyber-enabled crime. Crimes against children should be filed with the National Center for Missing and Exploited Children. Other types of crimes, such as threats of terrorism, should be reported at [tips.fbi.gov](https://tips.fbi.gov). The links at right will direct you to these alternate reporting sites.

[Report Suspected Terrorism, Threat to Life, or Other Threats](#)

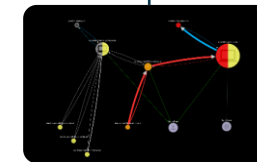
[Report Information Regarding Missing or Exploited Children](#)

<https://IC3.gov>



Law.WitFooCloud.com

“Powered by WitFoo”  
Technology



# “Powered by WitFoo” Resources



- Free Training on [WitFoo Community](#)
- Free [Educational Licensing](#)
- Free Licensing to [US Law Enforcement](#)
- Free RaspberryPi4 ([WitFooPi](#)) licensing for training
- [www.WitFoo.com](http://www.WitFoo.com) or [Charles@WitFoo.com](mailto:Charles@WitFoo.com)



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