

# IoT Blockchain for the Enterprise



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Chief Technology Officer

<https://diode.io>

Bangkok Enterprise Blockchain Webinar  
10th Edition - 29th July 2020  
**Blockchain and IOT**



# ABOUT US



## Diode

Founder team from the IoT and Telecommunications..  
We started Diode to  
**solve IoT Security using Blockchain.**

- [BlockQuick paper](#) published on May 27, 2019
- PreNet Launched January 2020
- Diode Client v0.4.6
- Offices in Berlin and Taipei

Focusing on makers, Raspberry PI. Driving Network versatility. Broadcasting, secure tunneling, fleet management, VPN security, and storage.

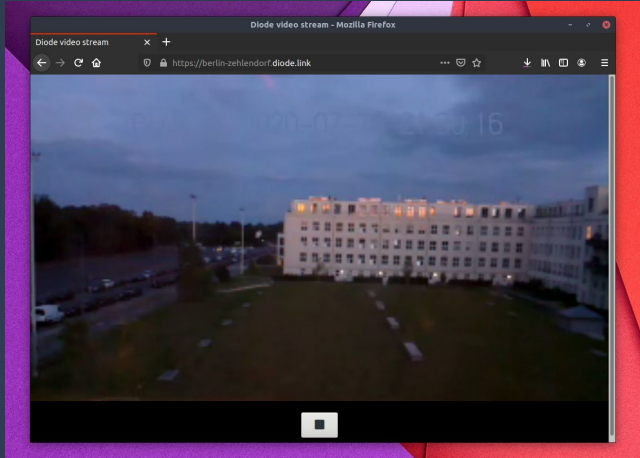
BlockQuick Validation for IoT



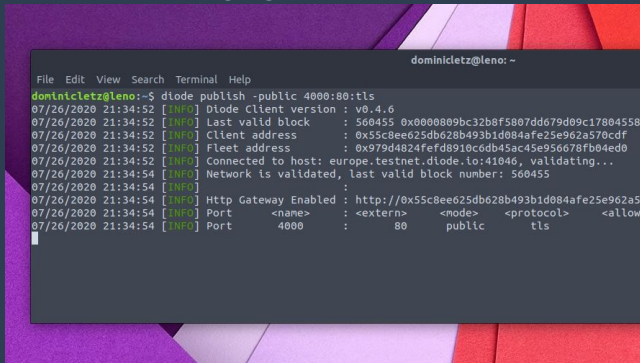
| Client         | Storage | Sync/Day |
|----------------|---------|----------|
| geth fast sync | 200 GB  | ~100 MB  |
| geth light     | 1.2 GB  | ~3.5 MB  |
| IOTA           | 8 GB    | ~1 GB    |
| BlockQuick     | 20 KB   | 20 KB    |

# APPS

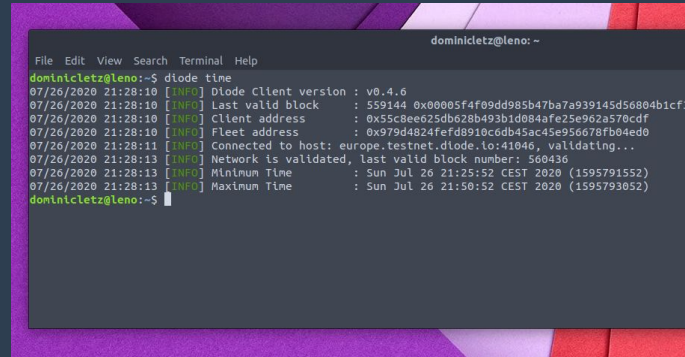
## Video Broadcasting



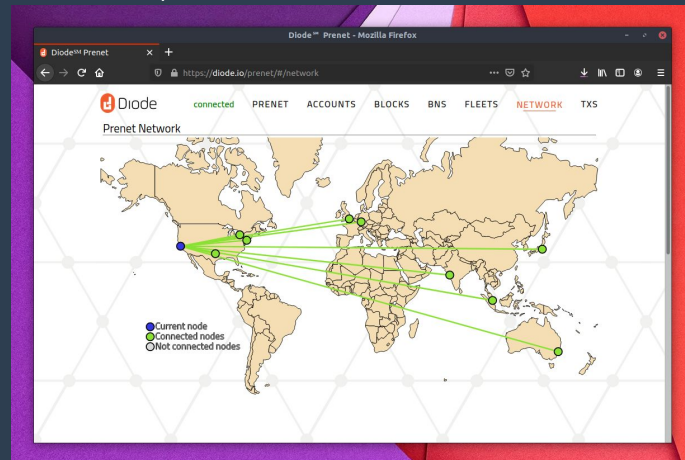
## Domain Publishing (ngrok on blockchain)



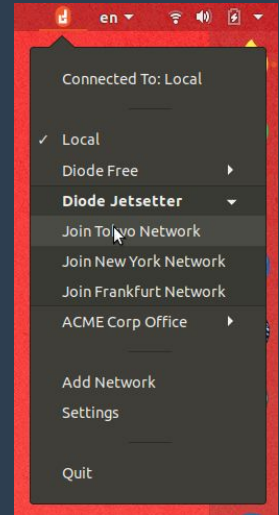
## Secure Time Consensus



## Network Explorer



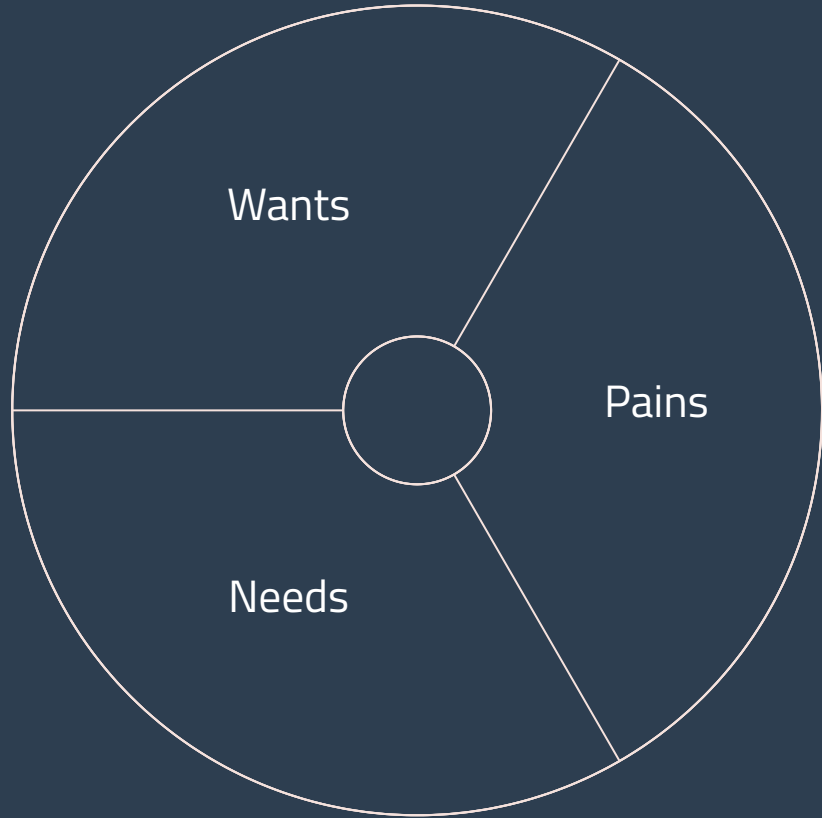
## Enterprise VPN



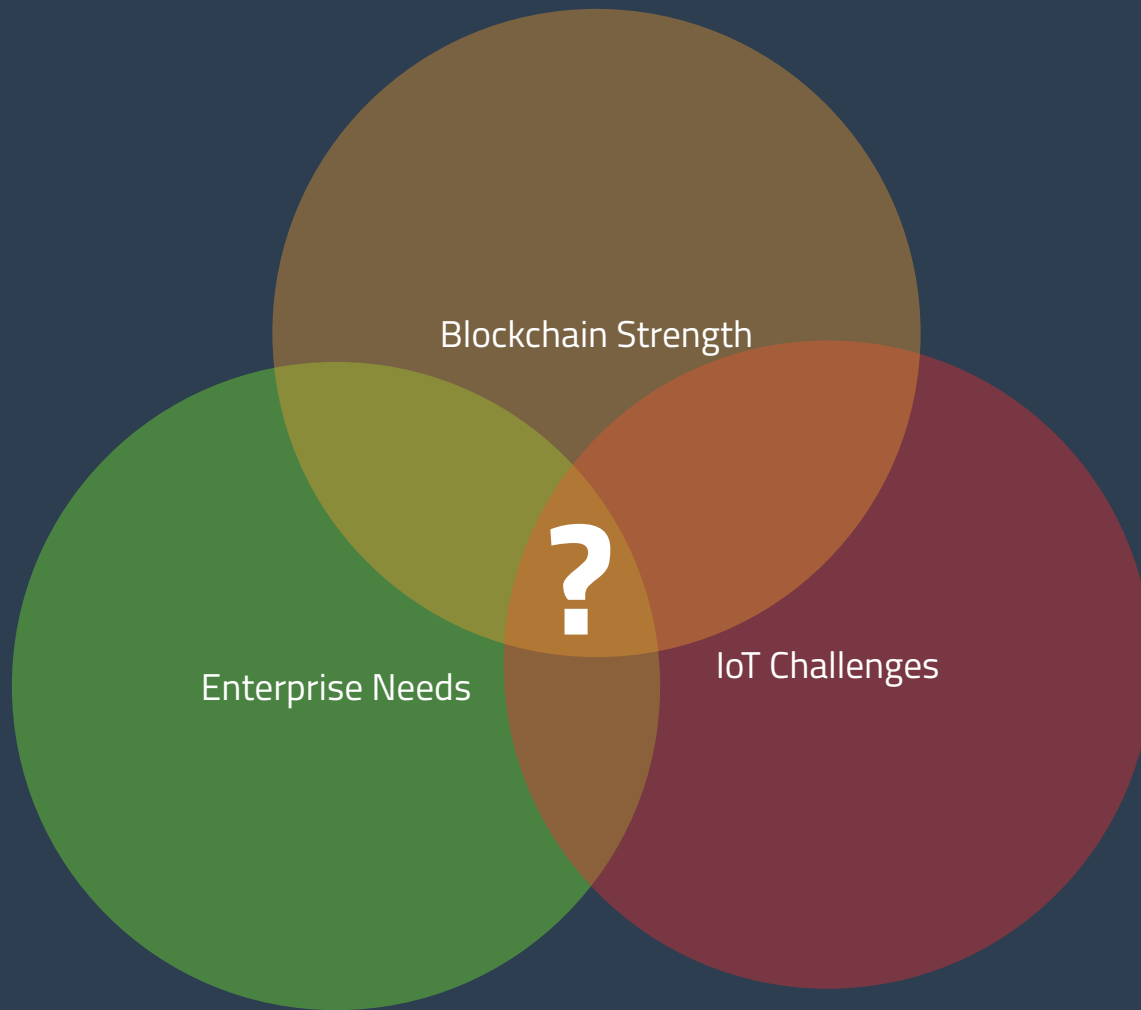
# What is the problem we are solving?

*"What is my return on investment?"*

# Enterprise Blockchain Application



# ROI?



# WEB3 SECURITY



Diode

Uber

Uber  @Uber · 3m

Due to Covid-19, we are giving back over \$10,000,000 in Bitcoin!



Jeff Bezos   
@JeffBezos

I have decided to give back to my community.

All Bitcoin sent to my address will be sent back doubled. I am only doing this for the next 30 minutes.

bc1qxy2kgdygjrqtz

Enjoy!

5:07 PM · Jul 15, 2020 · Twitter

1.4K Retweets and comments



Joe Biden   
@JoeBiden

I am giving back to the community.

All Bitcoin sent to the address below will be sent back doubled! If you send \$1,000, I will send you \$2,000. Only doing this for 30 minutes.

bc1qxy2kgdygjrqtzq2n0yrf2493p83kk



Bill Gates   
@BillGates

Everyone is giving back, and it's time.

I am doubling any BTC payment sent to my BTC address for the next 30 minutes.



Apple  @Apple · 35s

We are giving back to our community. We support Bitcoin and we believe you should too!

All Bitcoin sent to our address below will be sent back to you doubled!



Barack Obama   
@BarackObama

I am giving back to my community.

All Bitcoin sent to my address will be sent back doubled. If you send \$1,000, I will send you \$2,000. Only doing this for the next 30 minutes.

2:35 PM · Jul 15, 2020 · Twitter Web App

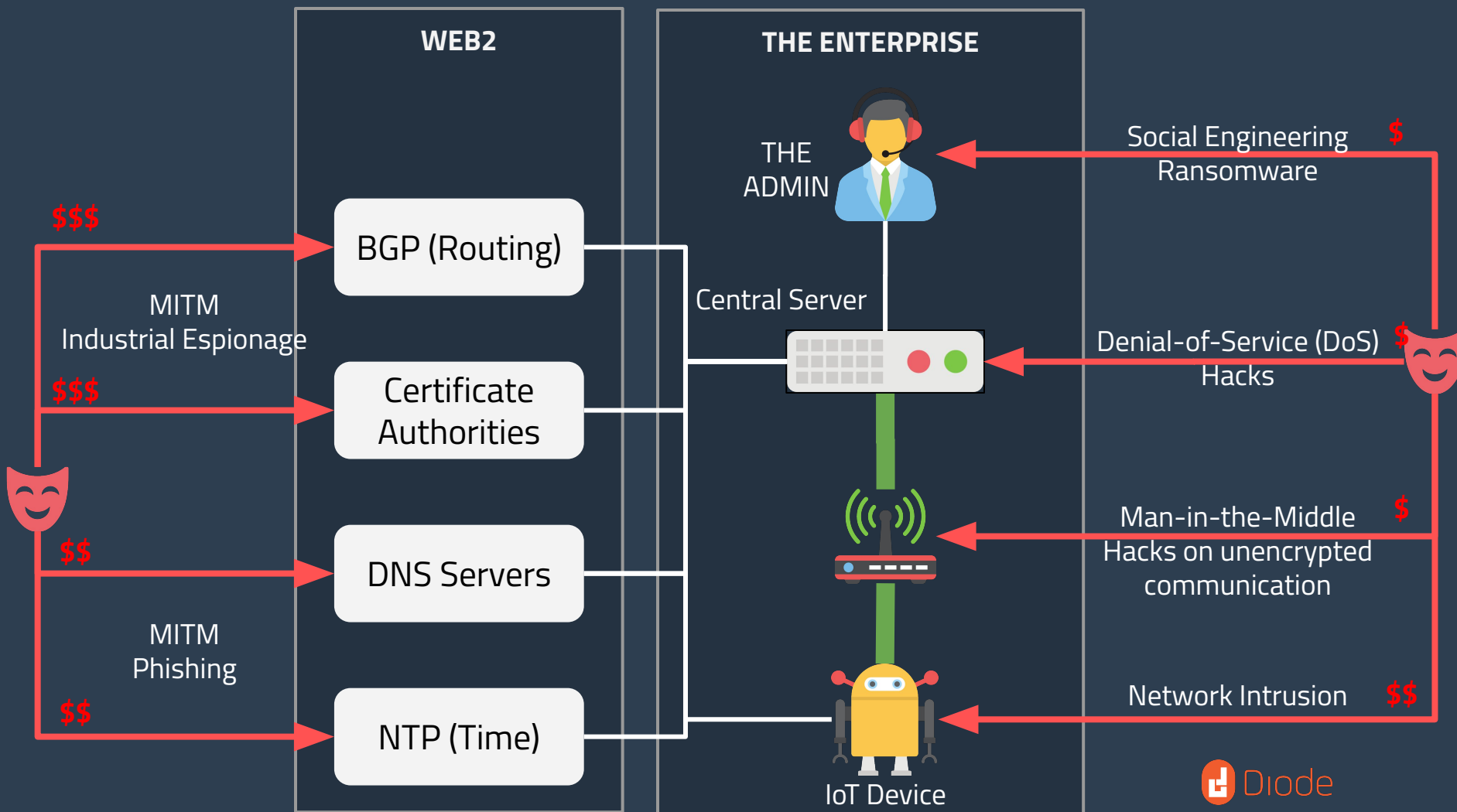


Elon Musk   
@elonmusk

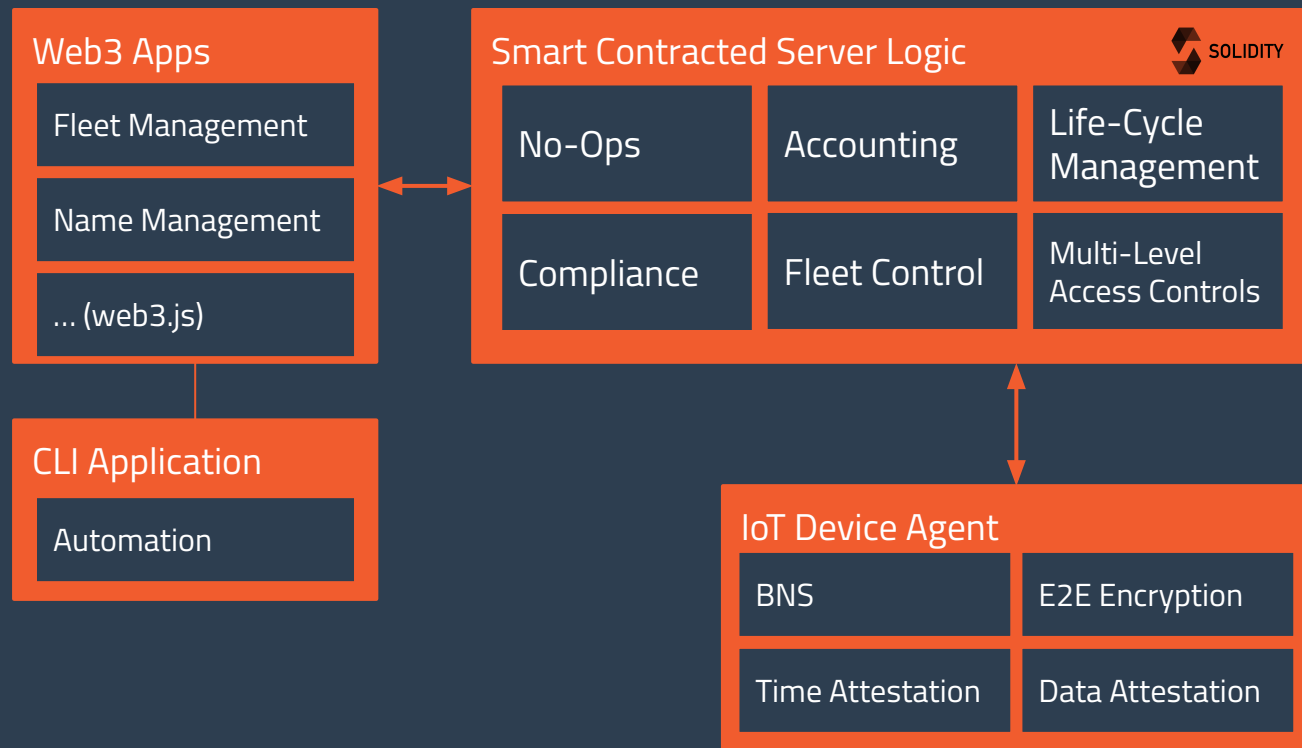
I'm feeling generous because of Covid-19.

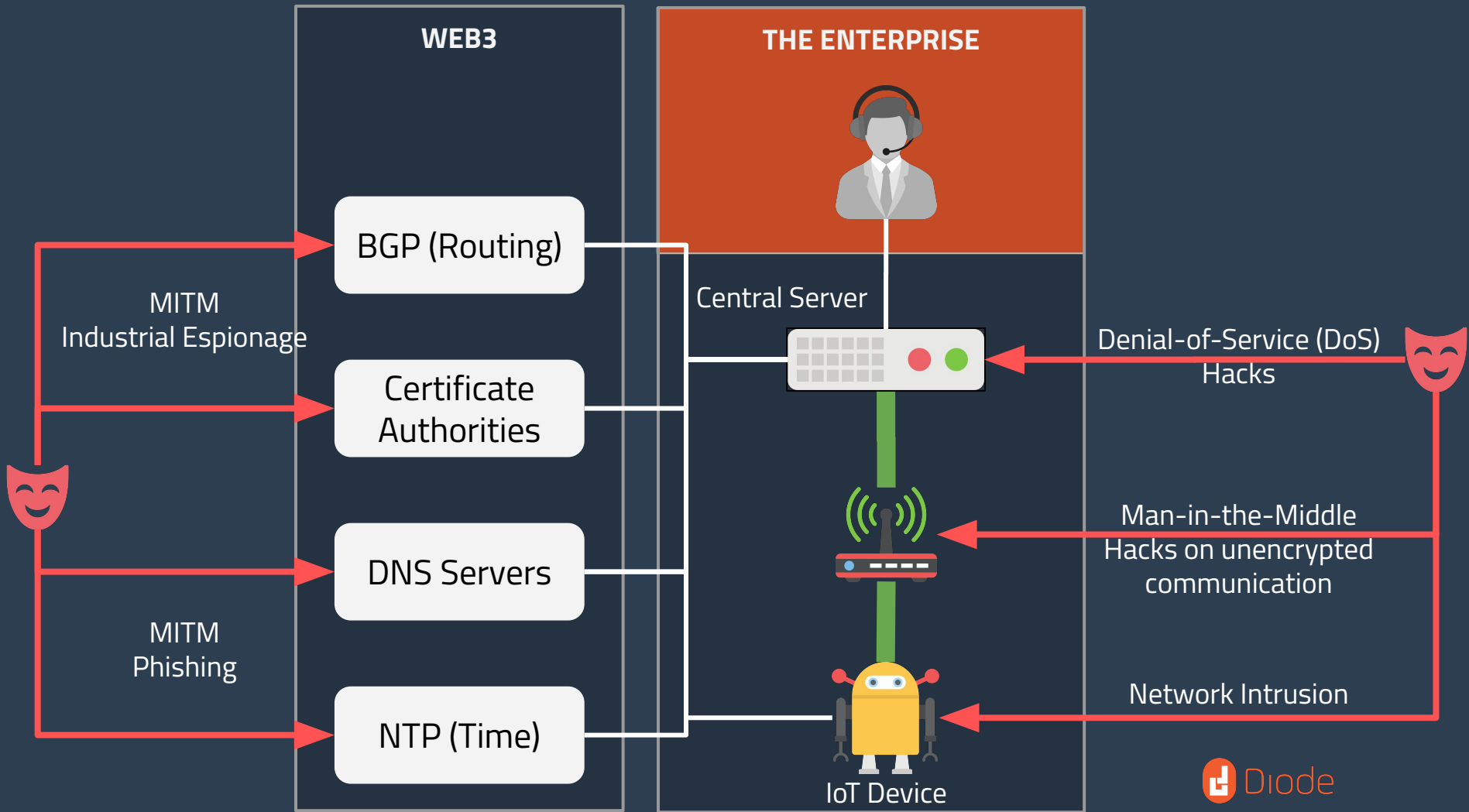
I'll double any BTC payment sent to my BTC address for the next hour. Good luck, and stay safe out there!





# Integrated Enterprise Solution





372

2.157

6.828



**Twitter Support** ✓ @TwitterSupport · 16. Juli

Our investigation is still ongoing but here's what we know so far:

484

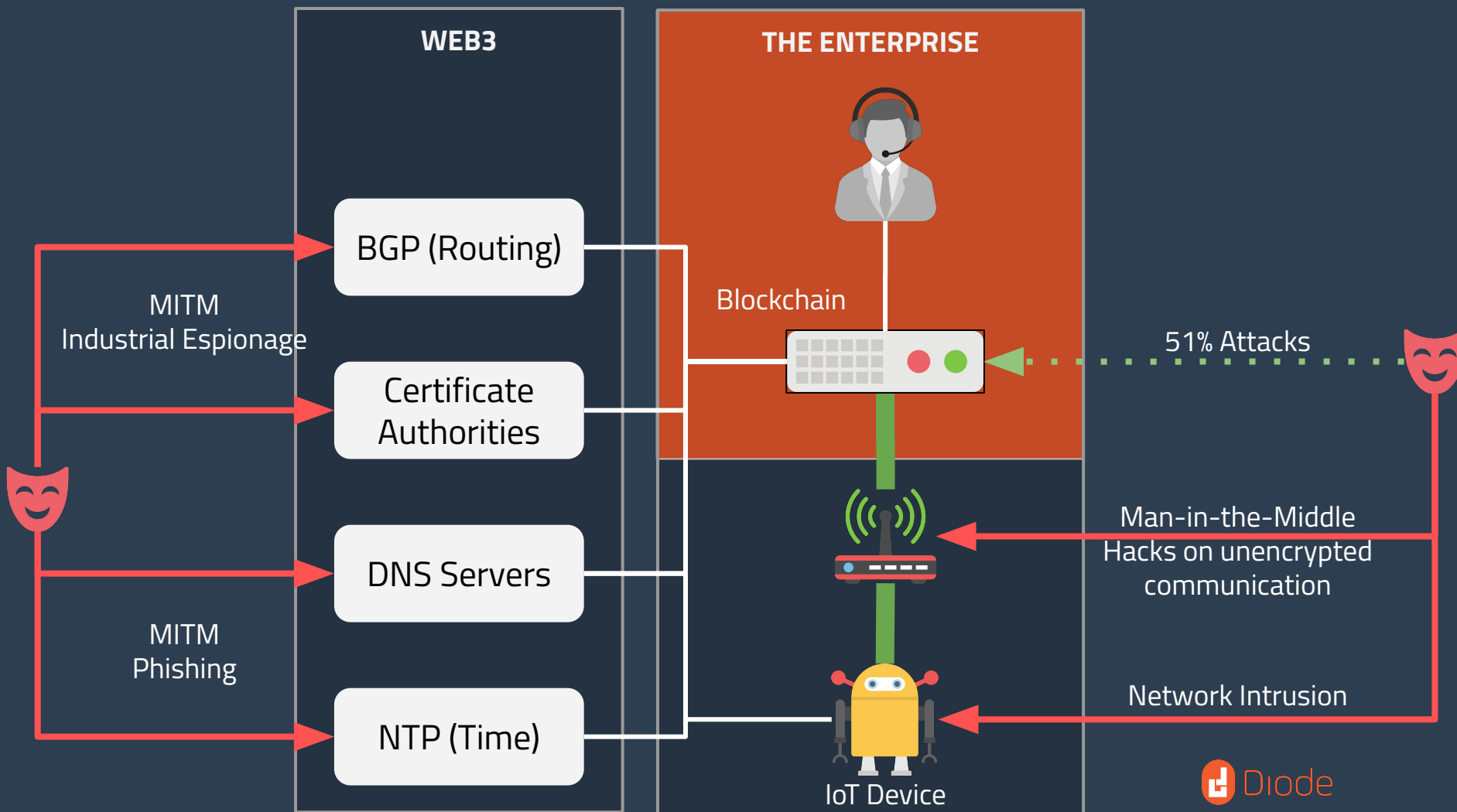
4.214

8.790



**Twitter Support** ✓ @TwitterSupport · 16. Juli

We detected what we believe to be a coordinated **social engineering** attack by people who successfully targeted some of our employees with access to internal systems and tools.



# Garmin

The screenshot shows a web browser window with the URL <https://connect.garmin.com/status/>. The page has a dark header with the 'connect' logo and a 'Get' link. The main content area has a light gray background and displays the following information:

Current Status at 5:16:54 PM GMT+2

We are currently experiencing an outage that affects Garmin.com and Garmin Connect. We are currently unable to receive any calls, emails or online chats. We are working to resolve this as quickly as possible to minimize inconvenience.

Below the message is a list of services, each preceded by a red 'DOWN' button:

- ActivityDetails
- ActivityUploads
- Challenges
- Connections
- Courses
- DailySummary
- DeviceRegistration
- GearTracking
- Leaderboards
- ModernDashboard
- MyFitnessPal
- PushAPI(ThirdParties)
- Reports
- SegmentMatching
- SleepSync
- StepSync
- Groups

# 2019

https://www.bbc.com/news/technology-48770128



iod

## Second US town pays up to ransomware hackers

26 June 2019



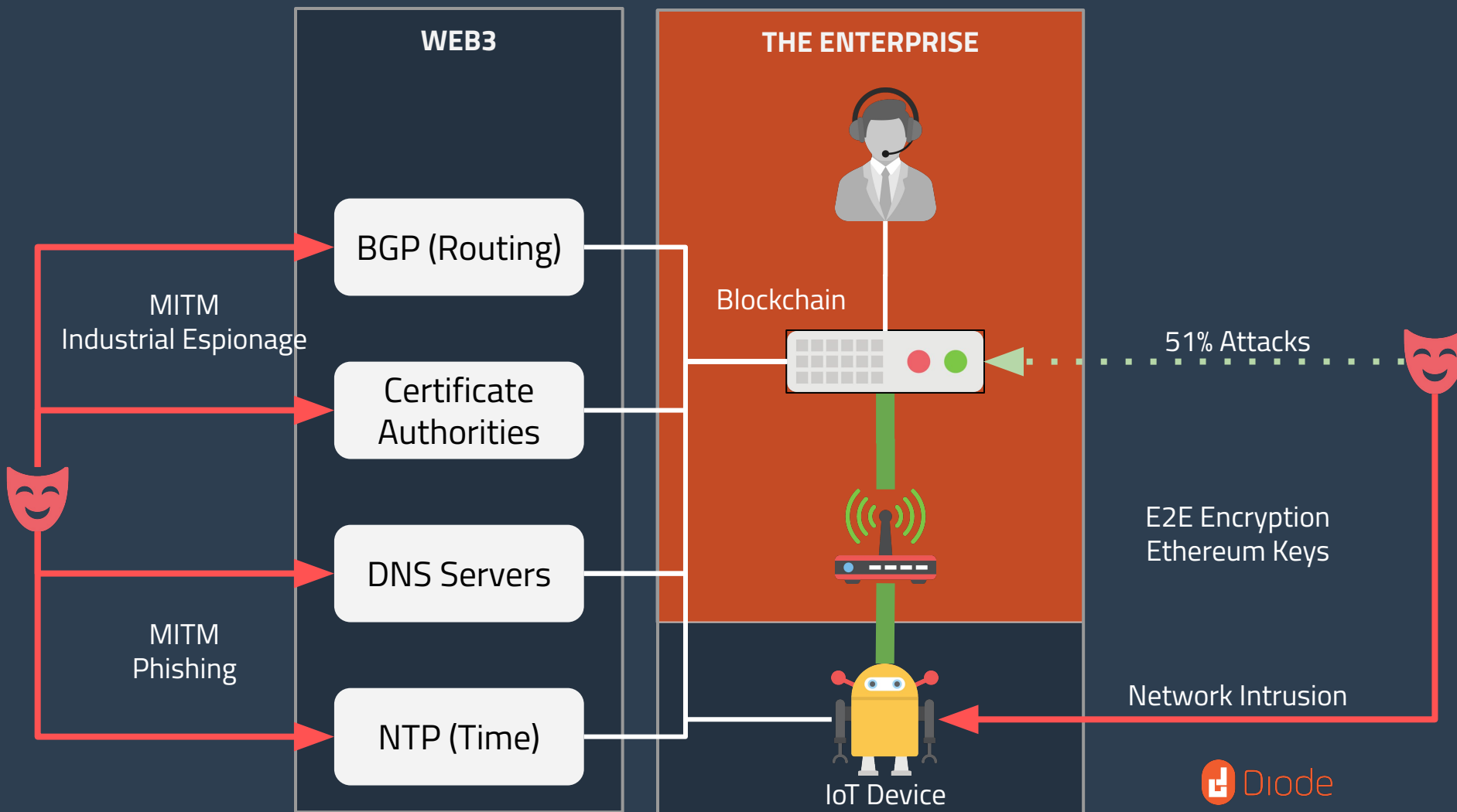
## 22 Texas towns hit by coordinated ransomware attack

POLICY TECH CYBERSECURITY

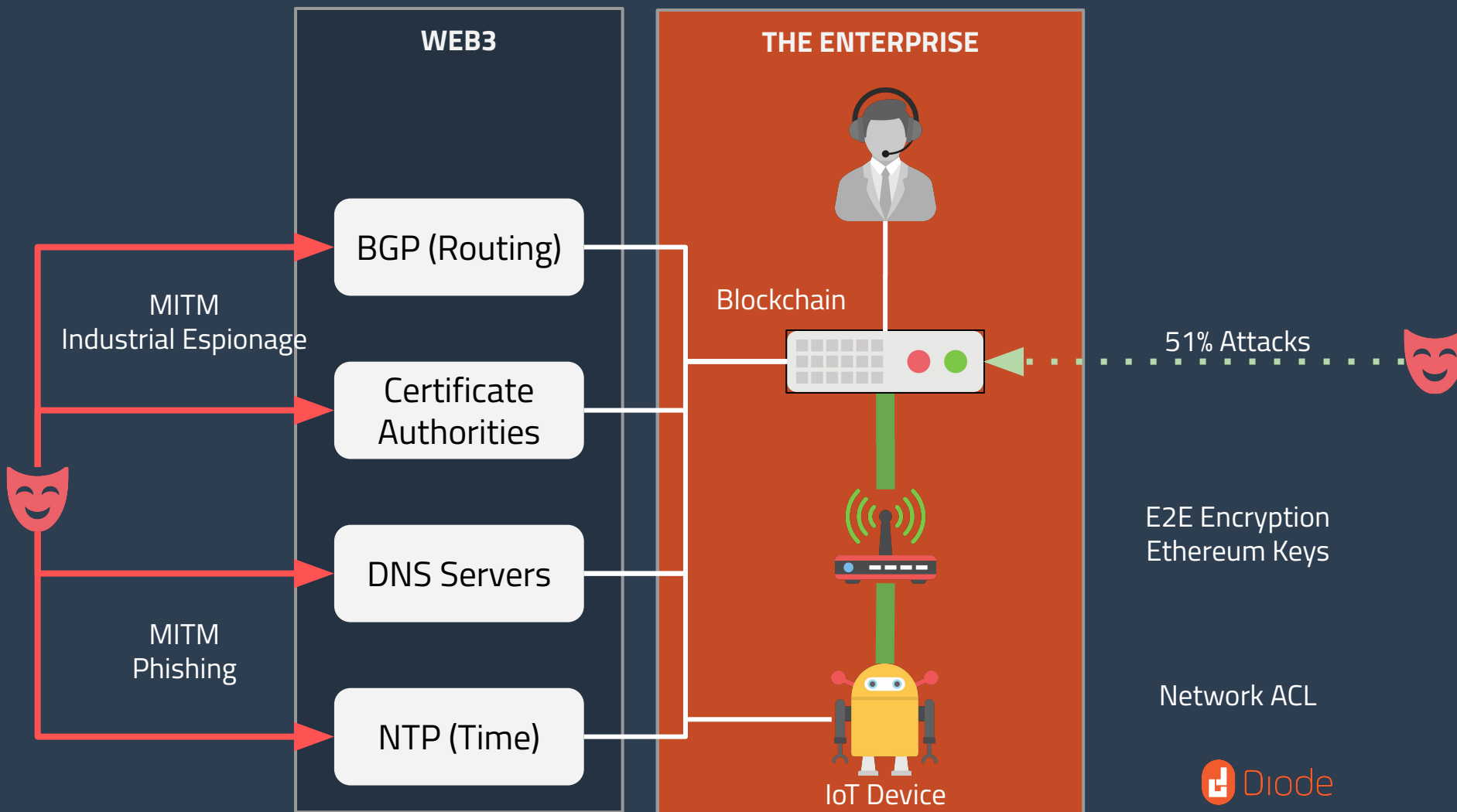
*The latest of several recent ransomware attacks on US municipalities*

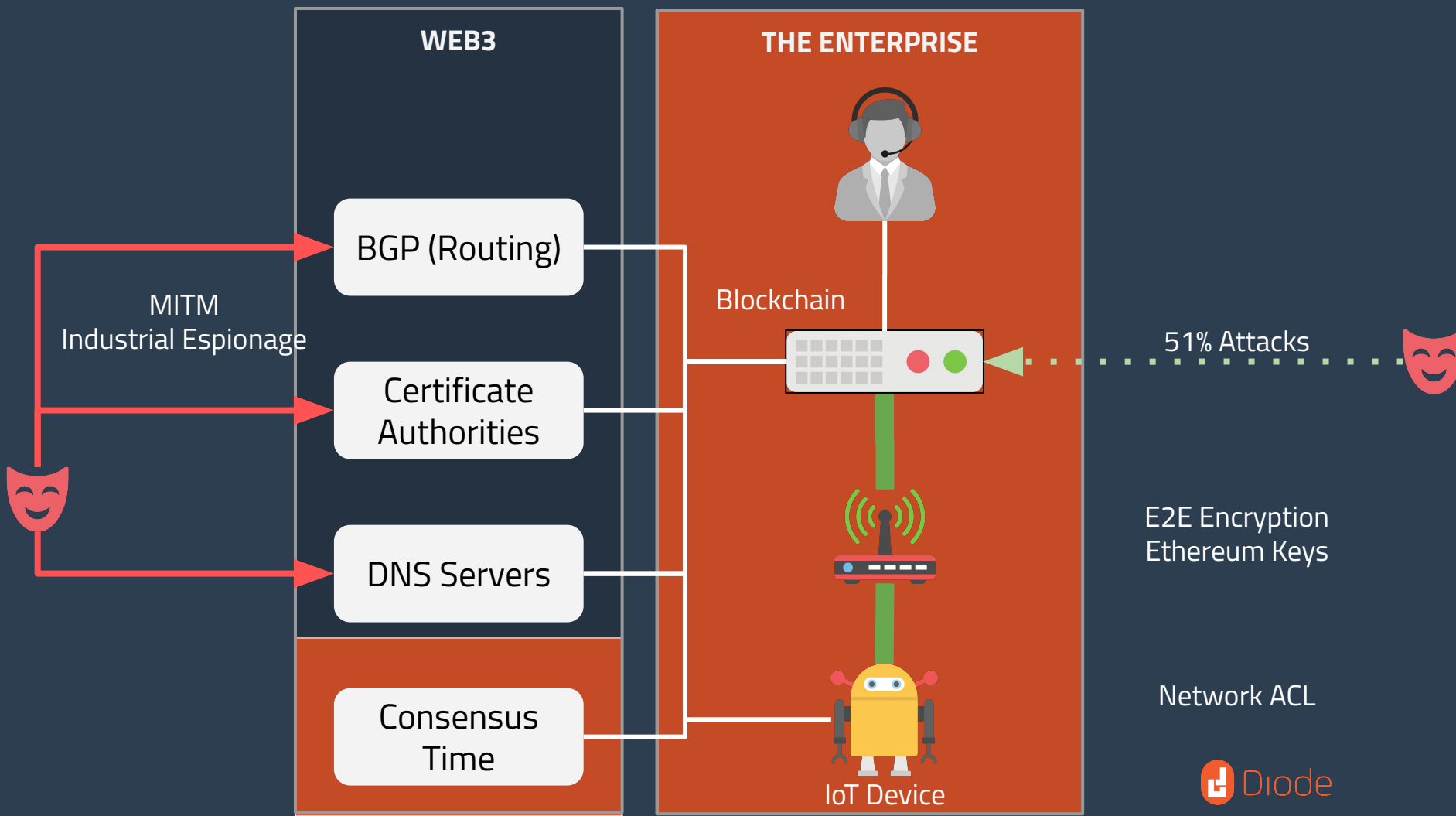
By Jay Peters | Aug 20, 2019, 3:55pm EDT

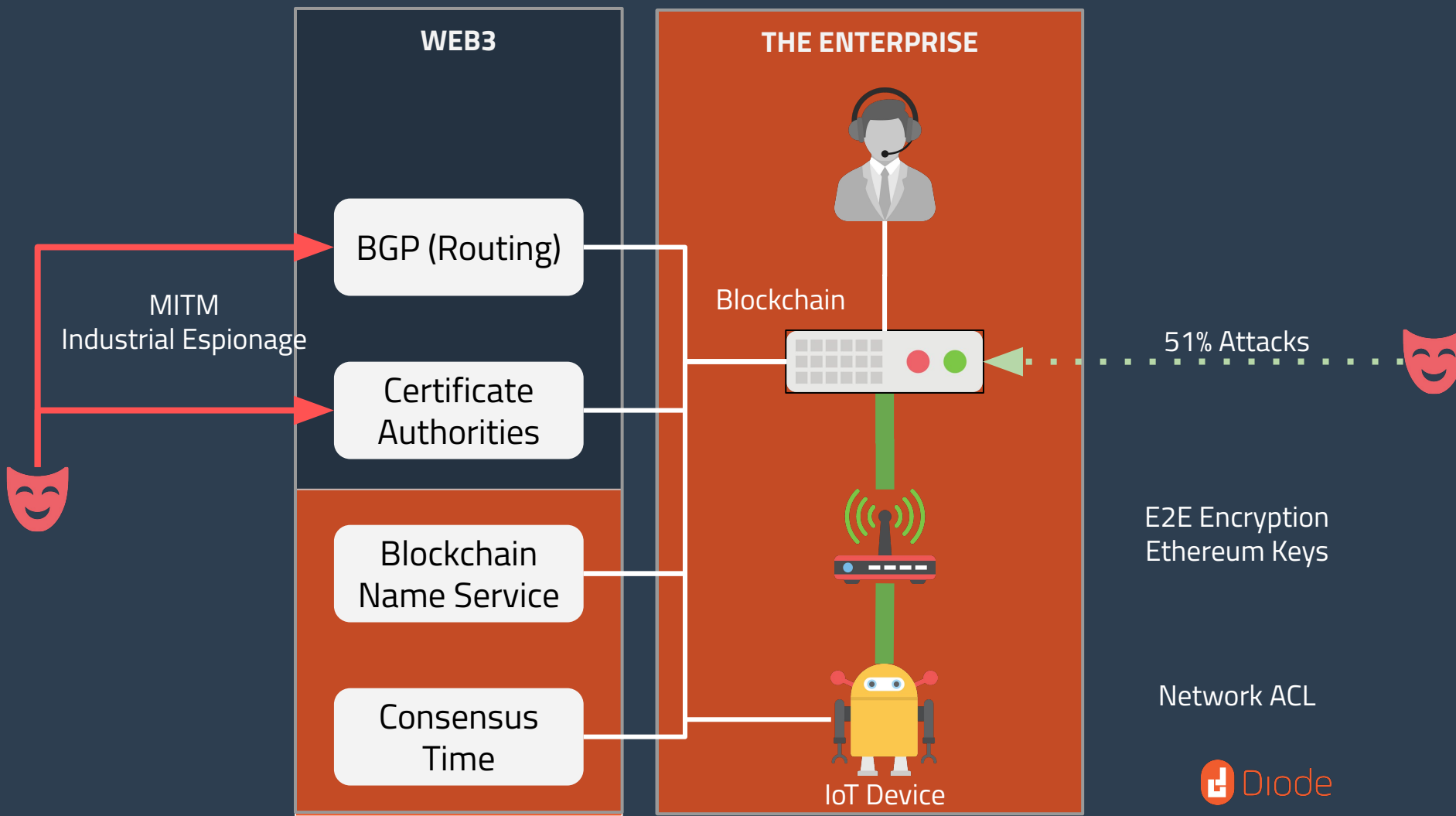
- July 25, 2019: City Power, the electric utility for Johannesburg, South Africa, discloses ransomware attack.
- June 26, 2019: Lake City, Florida agrees to pay ransomware.
- June 20, 2019: Riviera Beach, Florida, discloses ransomware attack and payment.
- May 7, 2019: City of Baltimore hit with ransomware attack.
- April 2019: Cleveland Hopkins International Airport suffered a ransomware attack.
- April 2019: Augusta, Maine, suffered a highly targeted malware attack that froze the city's entire network and forced the city center to close.
- April 2019: Hackers stole roughly \$498,000 from the city of Tallahassee.
- March 2019: Albany, New York, suffered a ransomware attack.
- March 2019: Jackson County, Georgia officials paid cybercriminals \$400,000 after a cyberattack shut down the county's computer systems.
- March 2018: Atlanta, Georgia suffered a major ransomware attack.
- February 2018: Colorado Department of Transportation (CDOT) employee computers temporarily were shut down due to a SamSam ransomware virus cyberattack.











# Brazilian banking customers targeted by IoT DNS hijacking attacks

Aug 15, 2018

NEWS by [Robert Abel](#)

A DNS hijacking campaign has been discovered targeting Banco de Brasil and Itau Unibanco customer credentials through the end-user IoT devices.

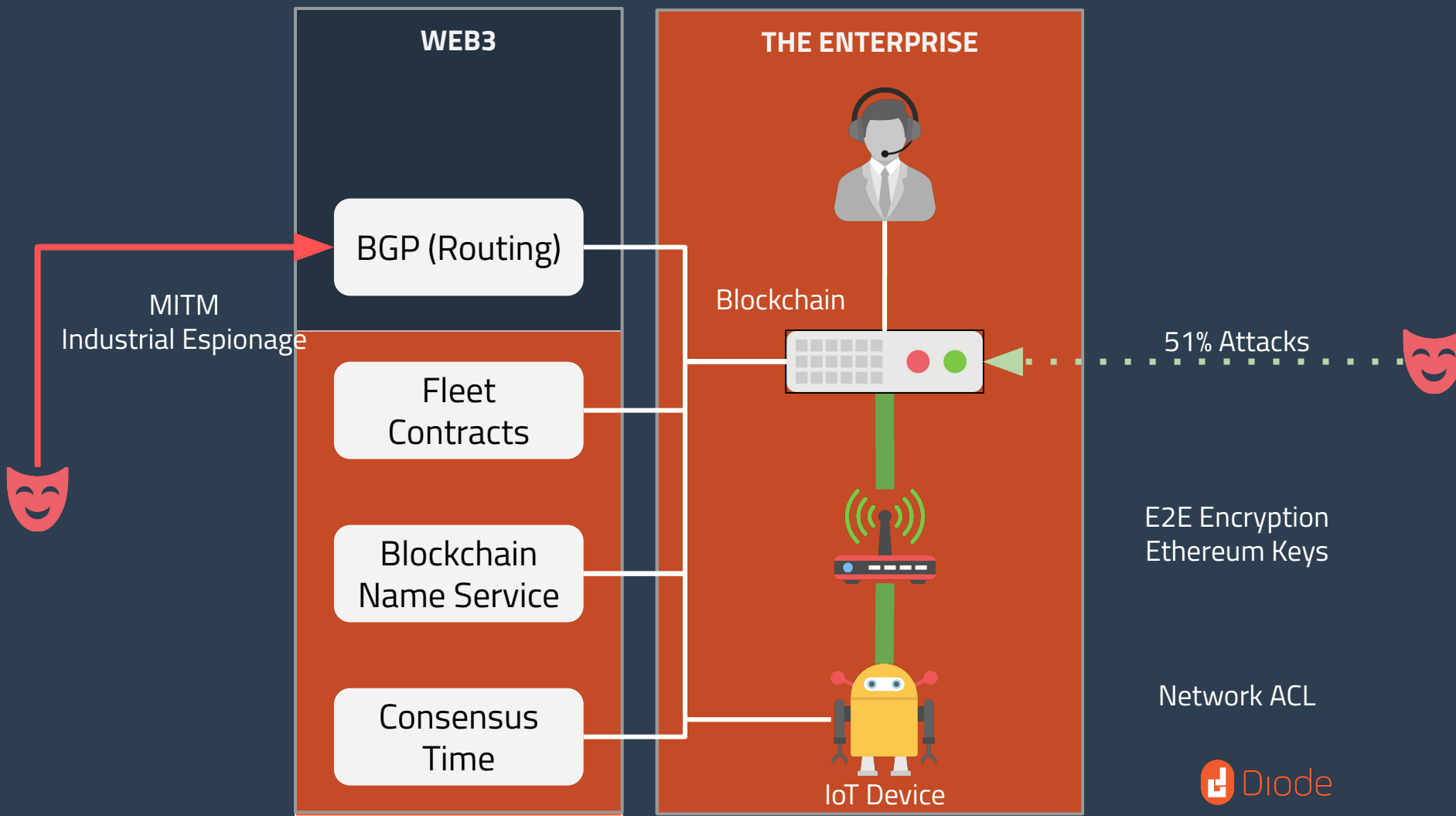


A DNS hijacking campaign has been discovered targeting Banco de Brasil and Itau Unibanco customer credentials through the end-user IoT devices.

Radware researchers said this is the first time modems and routers have been remotely exploited for performing DNS hijacking and as a result of the compromise any device with internet access in the home of an affected user is prone to be redirected to the fake websites, according to an 10 August [advisory](#) from the firm.

All the while, the user is completely unaware of the change since the hijacking works without crafting or changing URLs in the user's browser.

The attack redirects users seeking popular financial site, such as those used to pay a bill or check a bank statement, to a phishing site instead. Researchers said the malicious DNS server controlling the attacks effectively becomes the middleman that provides the malicious actor with the flexibility to bring up fake portals and web fronts to collect sensitive information from users whose routers were infected.



# When Indirect Trust Fails

|                 |   |      |                  |
|-----------------|---|------|------------------|
| 6308            | 9198  | 9198 | 2019-07-17 12:43 |
| Majority Record |   |      |                  |
| CN              | *.facebook.com  |      |                  |
| O               | Facebook, Inc.  |      |                  |
| C               | US  |      |                  |
| Not Before      | 2019-06-06T00:00:00Z  |      |                  |
| Not After       | 2019-09-04T12:00:00Z  |      |                  |
| SHA1            | C5:22:F1:15:F8:B2:AD:AE:12:63:BC:8D:5F:A7:B   |      |                  |
| MD5             | EC:B8:53:F1:12:34:C8:35:22:23:F5:78:3F:4E:A6  |      |                  |
| subjectAltName  | *.facebook.com<br>messenger.com<br>*.fbcdn.net<br>*.fb.com<br>*.m.facebook.com<br>fb.com<br>*.facebook.net<br>*.xx.fbcdn.net<br>*.xz.fbcdn.net<br>*.messenger.com<br>*.fbstatic.com<br>*.xy.fbcdn.net<br>facebook.com |      |                  |
| ▼               |   |      |                  |
| CN              | DigiCert SHA2 High Assurance Server CA  |      |                  |
| O               | DigiCert Inc  |      |                  |
| C               | US  |      |                  |
| Not             | 2013-10-22T12:00:00Z  |      |                  |

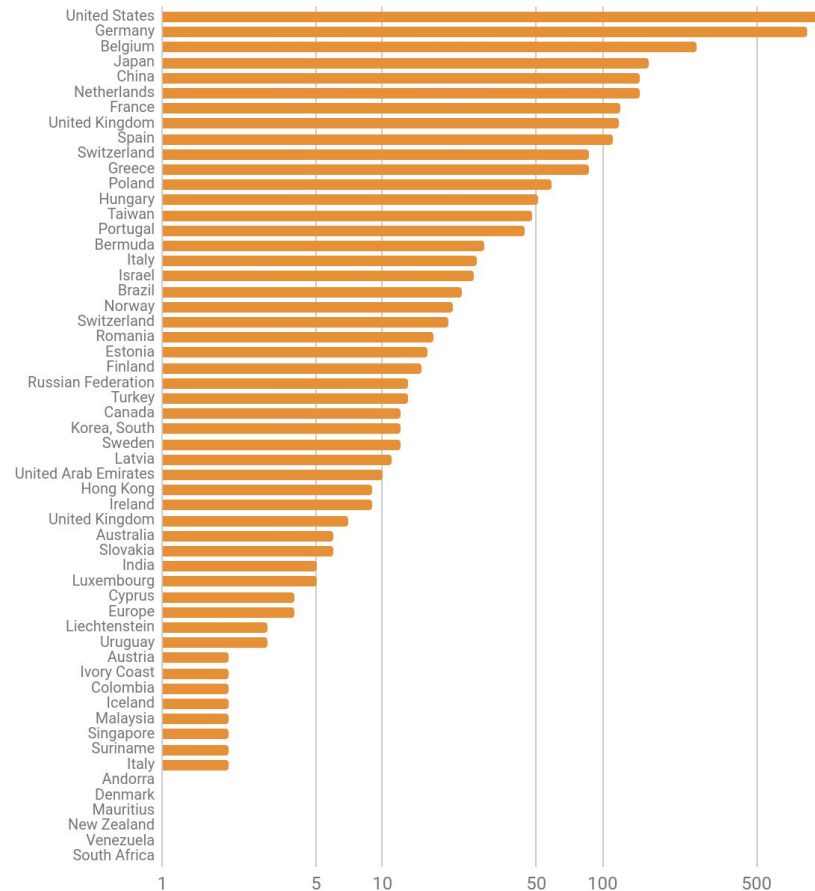
| No             | Time  | Name * |
|----------------|---|--------|
| This Record    |   |        |
| CN             | *.facebook.com  |        |
| O              | Facebook, Inc.  |        |
| C              | US  |        |
| Not Before     | 2019-07-16T12:39:52Z  |        |
| Not After      | 2020-07-15T12:39:52Z  |        |
| SHA1           | 5F:55:F8:28:2C:9B:AA:79:0A:5C:C2:76:CD:D7:81:7C:BC:   |        |
| MD5            | F6:9F:EF:F3:07:84:D1:D4:F2:48:6A:FA:58:C3:F2:FA   |        |
| subjectAltName | *.facebook.com<br>messenger.com<br>*.fbcdn.net<br>*.fb.com<br>*.m.facebook.com<br>fb.com<br>*.facebook.net<br>*.xx.fbcdn.net<br>*.xz.fbcdn.net<br>*.messenger.com<br>*.fbstatic.com<br>*.xy.fbcdn.net<br>facebook.com |        |
| ▼              |   |        |
| CN             | Security Certificate  |        |
| O              | No data   |        |
| C              | KZ  |        |
| Not            | 2018-02-12T06:36:56Z  |        |

# Intermediary Root Certificates



Координационный центр  
национального домена сети Интернет

~3000 entries



## WEB3

BGP (Routing)

Fleet  
Contracts

Blockchain  
Name Service

Consensus  
Time

## THE ENTERPRISE



Blockchain



IoT Device

E2E Encryption  
Ethereum Keys  
\$\$\$\$

51% Attacks \$\$\$\$

E2E Encryption  
Ethereum Keys

Network ACL



# China Telecom's Internet Traffic Misdirection

Routing leak sent US domestic traffic through China



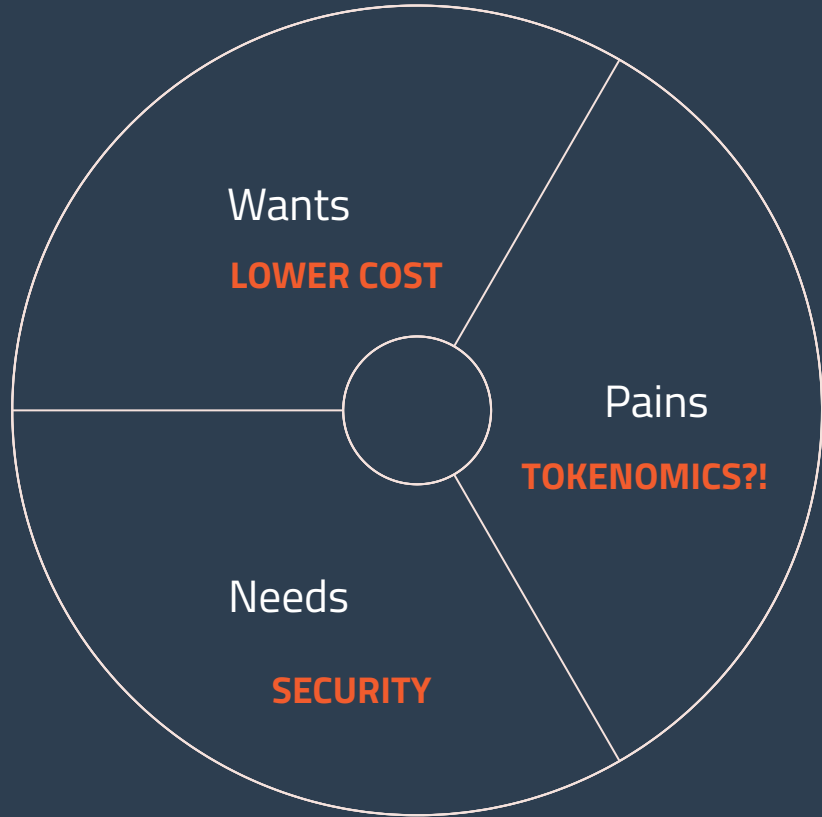
## Traffic misdirection by AS4134

On 9 December 2015, SK Broadband (formerly Hanaro) experienced a brief routing leak lasting little more than a minute. During the incident, SK's ASN, AS9318, announced over 300 Verizon routes that were picked up by OpenDNS's BGPstream service:

The background consists of several overlapping triangles in various shades of orange and yellow, creating a dynamic, geometric pattern. The word "SECURITY!" is centered in a bold, white, sans-serif font.

**SECURITY!**

# Enterprise Blockchain Application



# SECURITY

# Diode Next Steps



Diode Client



Work In Progress



On Roadmap

DNS 3.0

VPN

Blockchain  
SD-WAN

Data  
Storage

Managed  
Certificate  
Chains

Network  
Tunnel

Data  
Broadcast

Desktop  
Client

Websocket  
Translation

Secure  
Time

E2E  
Encryption

Remote  
Access

Fleet  
Access  
Control

Managed  
DNS

Global  
Endpoint  
Publishing

## BlockQuick Security

# Takeaways

1. Diode is the company that invented BlockQuick
2. As an industry we have to solve "THE ADMIN" problem

# Thank You!



<https://diode.io>



[https://t.me/diode\\_chain](https://t.me/diode_chain)



[https://twitter.com/diode\\_chain](https://twitter.com/diode_chain)



<https://www.linkedin.com/company/diode-chain>



[partner@diode.io](mailto:partner@diode.io)

# BACKUP

# IoT Device Boot



## Traditional PKI

```
int main() {  
  
    IP address = dns_lookup("time.google.com");  
  
    Date timestamp = ntp_lookup(IP);  
  
    address = dns_lookup("plant-control.com");  
  
    Connection conn = ssl_connect_with_pki(  
        address, "plant-control.com", timestamp  
    );  
  
    ...  
}
```

unsafe lookup

insecure protocol

unsafe lookup #2

validating using manipulated date,  
wrong ips,  
no revocation checking,  
how & when update roots?

## Blockchain Based

```
int main() {  
  
    Diode io = connect_blockchain();  
    Date timestamp = io.latest_block;  
  
    char* FLEET = "0xdb0d6541b738c3f71b3a360b5bdaf5";  
    IP address = lookup_map(io, FLEET, 0, "server_ip");  
    char* signature = lookup_map(io, FLEET, 0, "signature");  
  
    Connection conn = ssl_connect_with_signature(  
        address, signature  
    );  
  
    ...  
}
```

securely connecting to the  
blockchain

getting secure timestamp

fetching contract state &  
merkle proofing



# Team

Our team consists of IoT and Blockchain experts both with from technology and business backgrounds. We're dedicated to deliver a new level of security to IoT



**DOMINIC  
LETZ**

Chief  
Technology  
Officer



**GREG  
BELCHER**

VP Business  
Development



**HANS  
REMPEL**

CEO



**PETER LAI**

Blockchain  
Security  
Software  
Engineer



**YAH SIN  
HUANG**

Social Media  
Manager