DNS as a National Defense Layer

Presented by: Mark Gaudet

ICANN61 – TechDay

DNS as National Defense Layer

Agenda

- DNS as part of a defense in depth strategy
- CIRA DNS Firewall
- What we learned
- Vision for the service

Cybersecurity Challenge in Canada

Extensive use of antivirus software and firewalls

- 90% use firewalls
- 85% use antivirus software

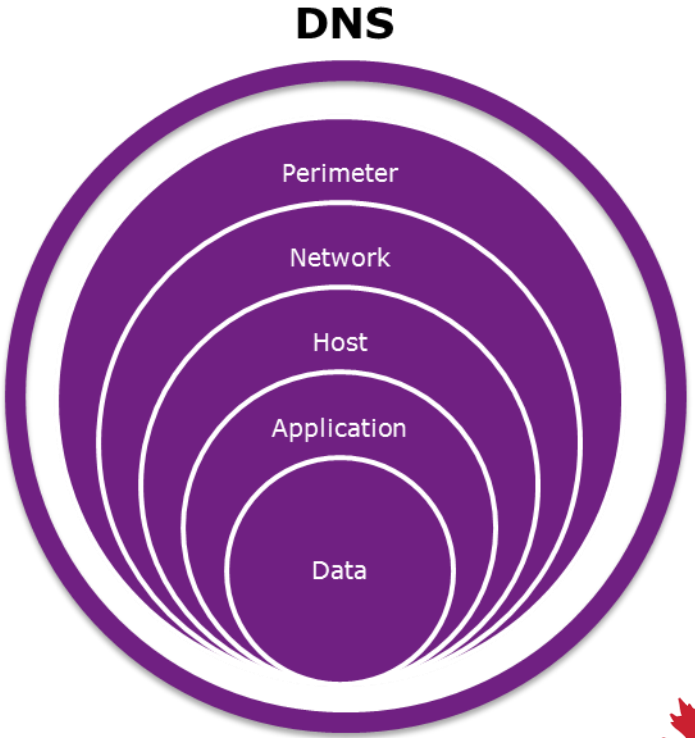
Ransomware and phishing attacks still getting through

- 19% were victims of a ransomware attack
- 32% fell victim to a phishing attack and divulged information to hackers

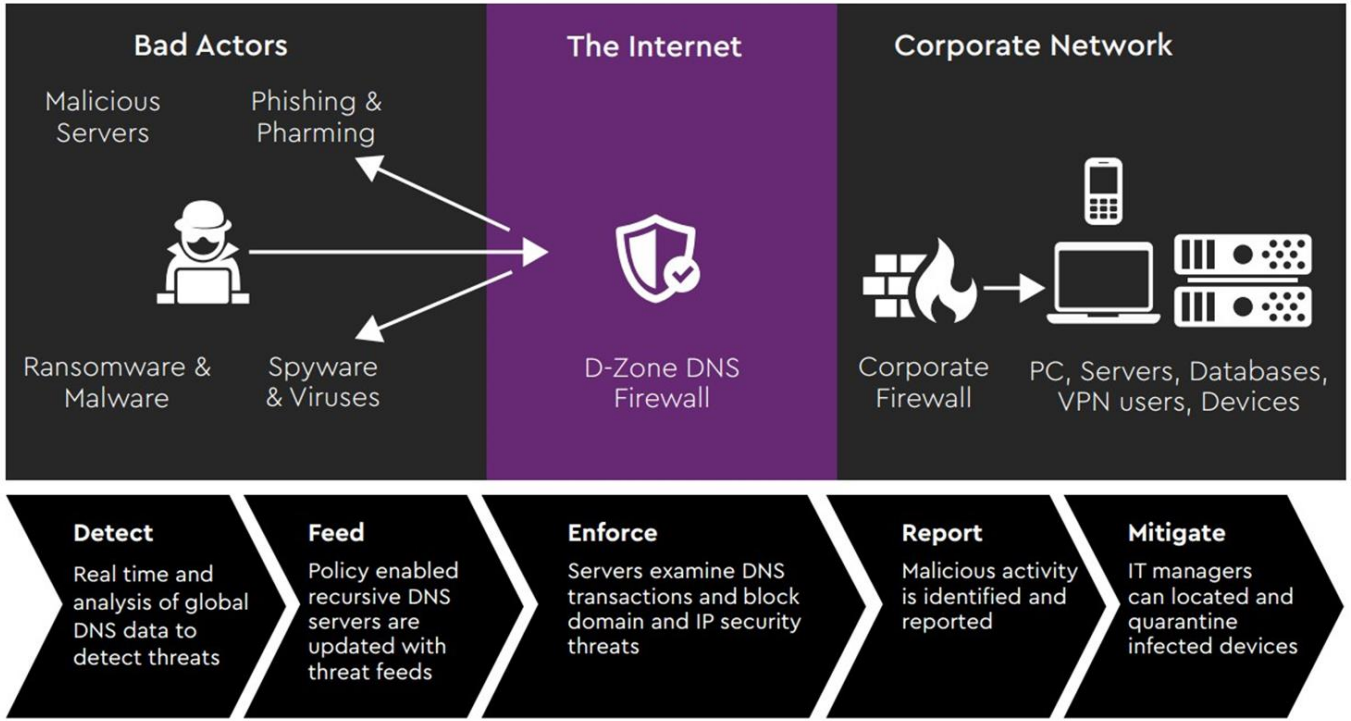
Results from the 2018 CIRA Canadian Internet Security Survey

Defense in Depth with DNS

- DNS is the fabric of the internet
- 91% of malware uses DNS for command and control
- No additional hardware or software
- Covers all devices



D-Zone DNS Firewall



Build versus Partner

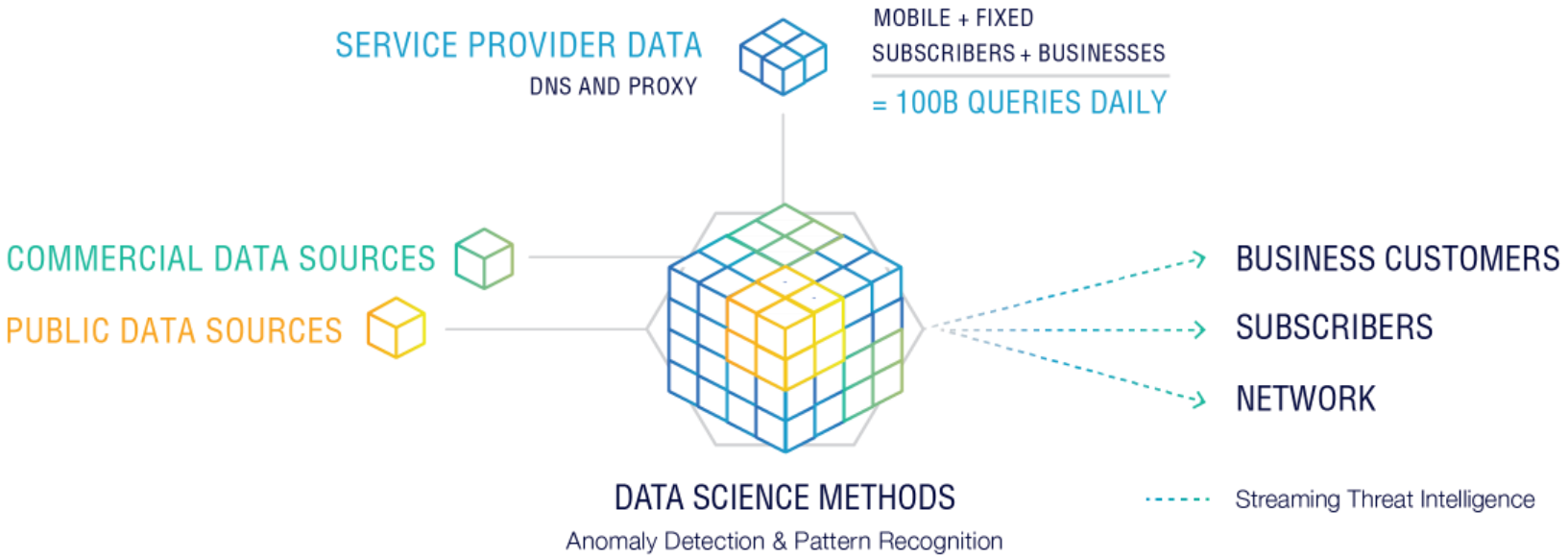
- DNS Software
  - BIND RPZ
  - Custom DNS development
- Threat feeds
  - Public feeds
  - Commercial feeds
- Value of a DNS security product is the threat feed

Competitive Value is Data Science

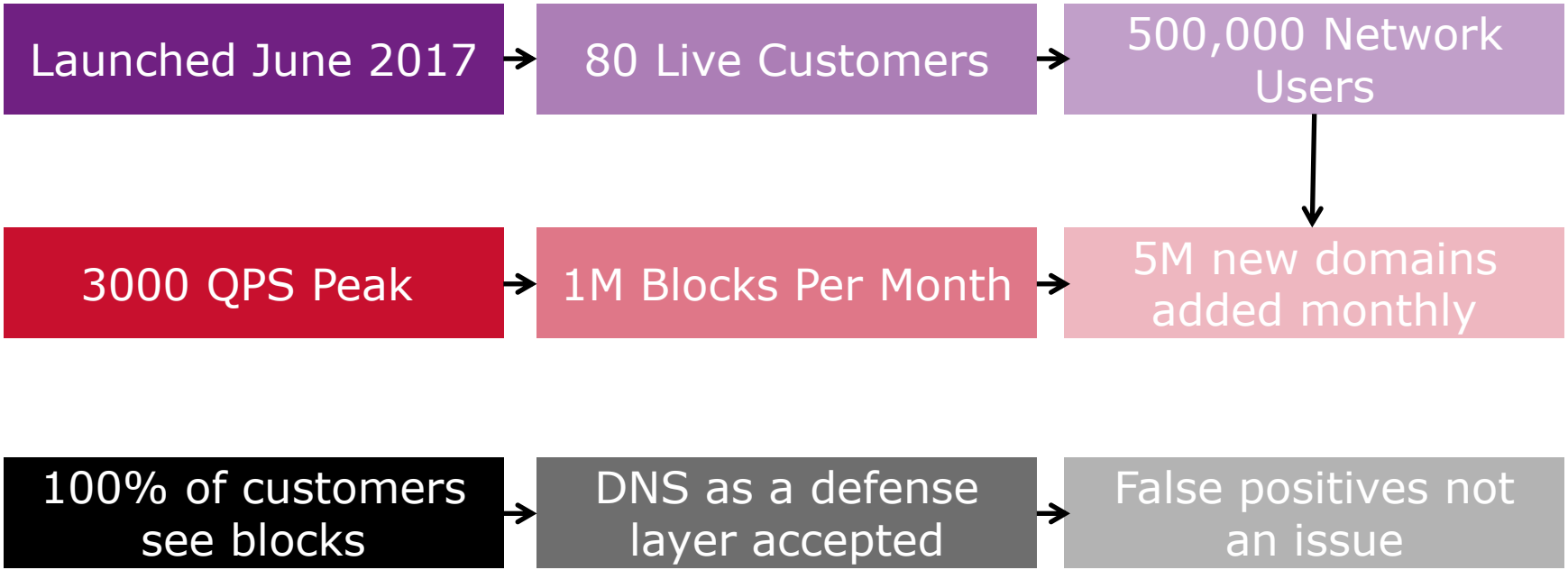
Analyze
100 billion queries
every day.

On average 100,000 new domains are dynamically added to the block list daily

Advanced, Predictive Intelligence



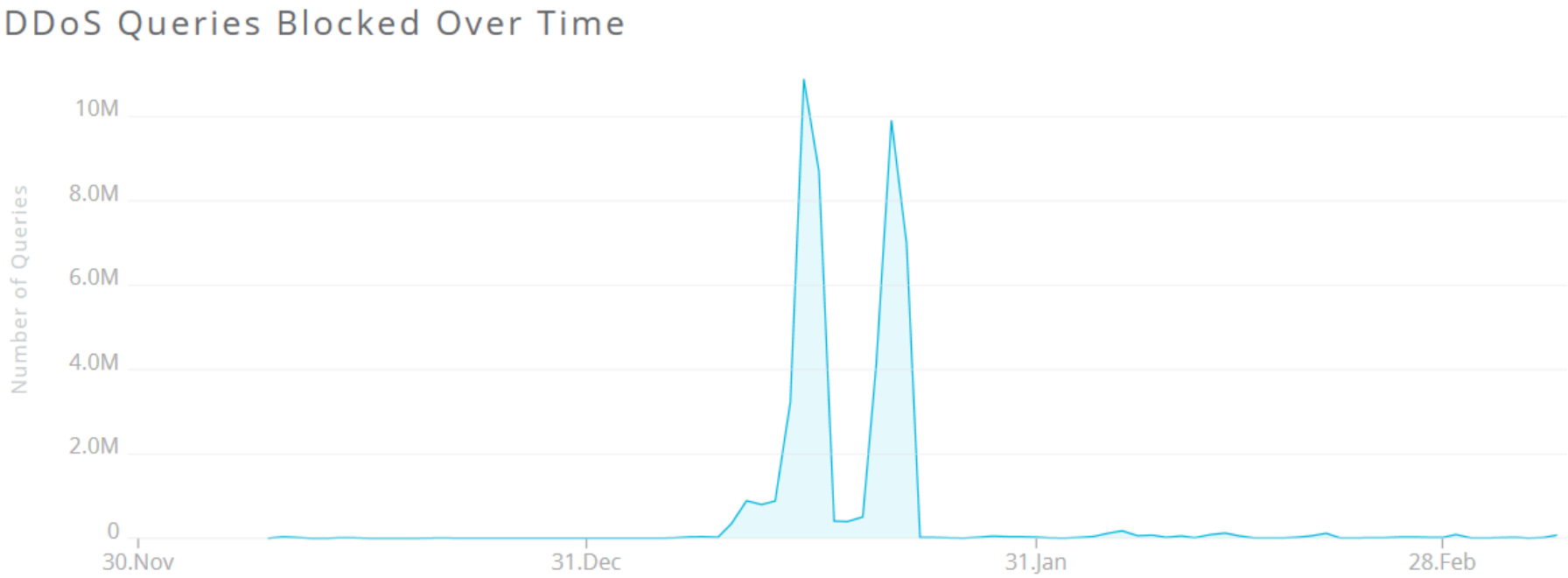
CIRA D-Zone DNS Firewall



What We Learned

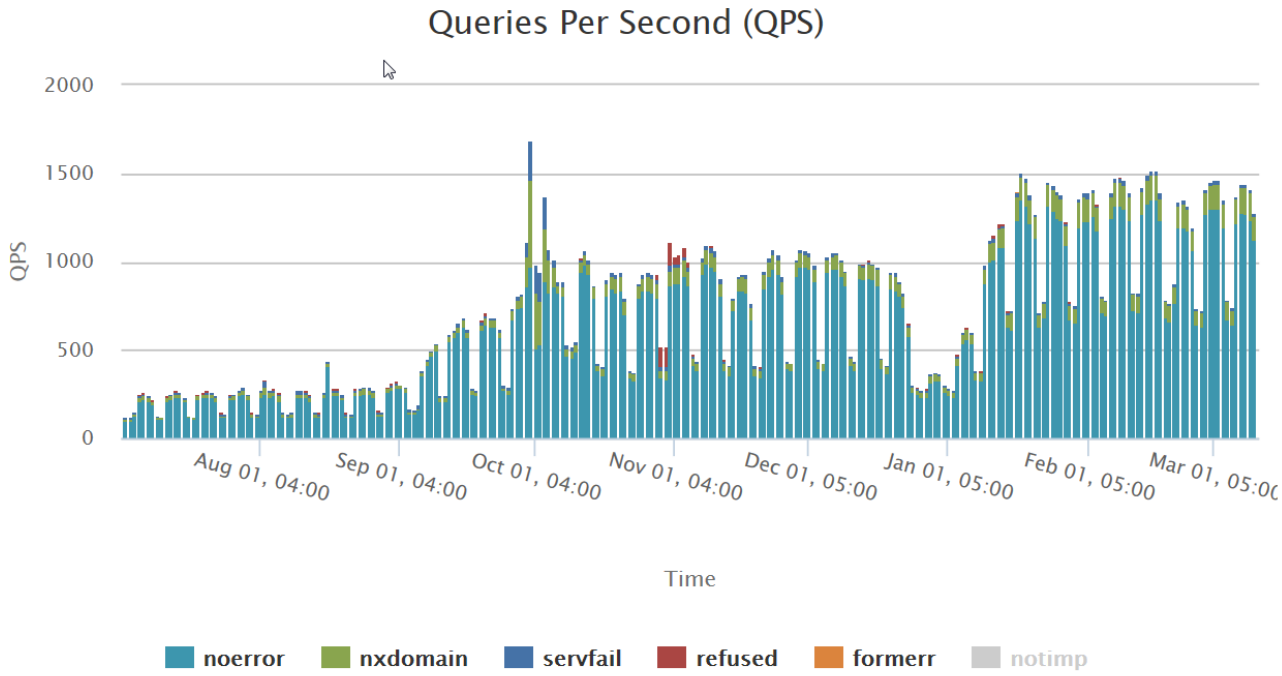
- Operational Requirements
- Customer experience and benefit
- Threat Landscape
- Benefits to CIRA

Operational - Resiliency



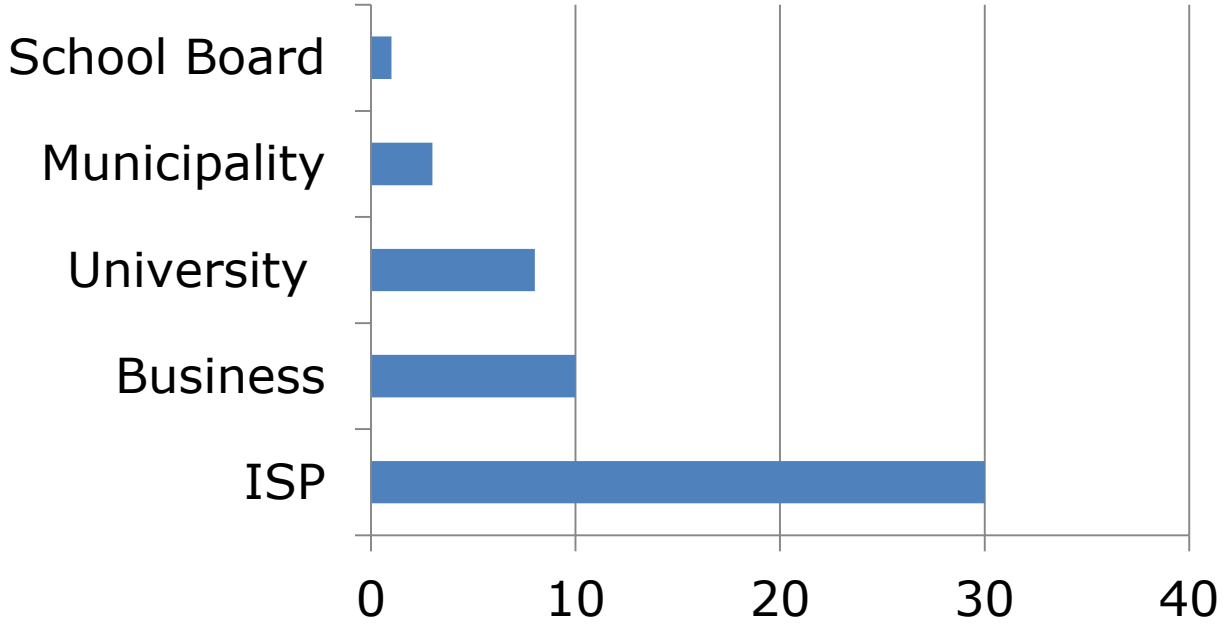
Recursive DNS services need to be DDoS resilient

Operational - Capacity



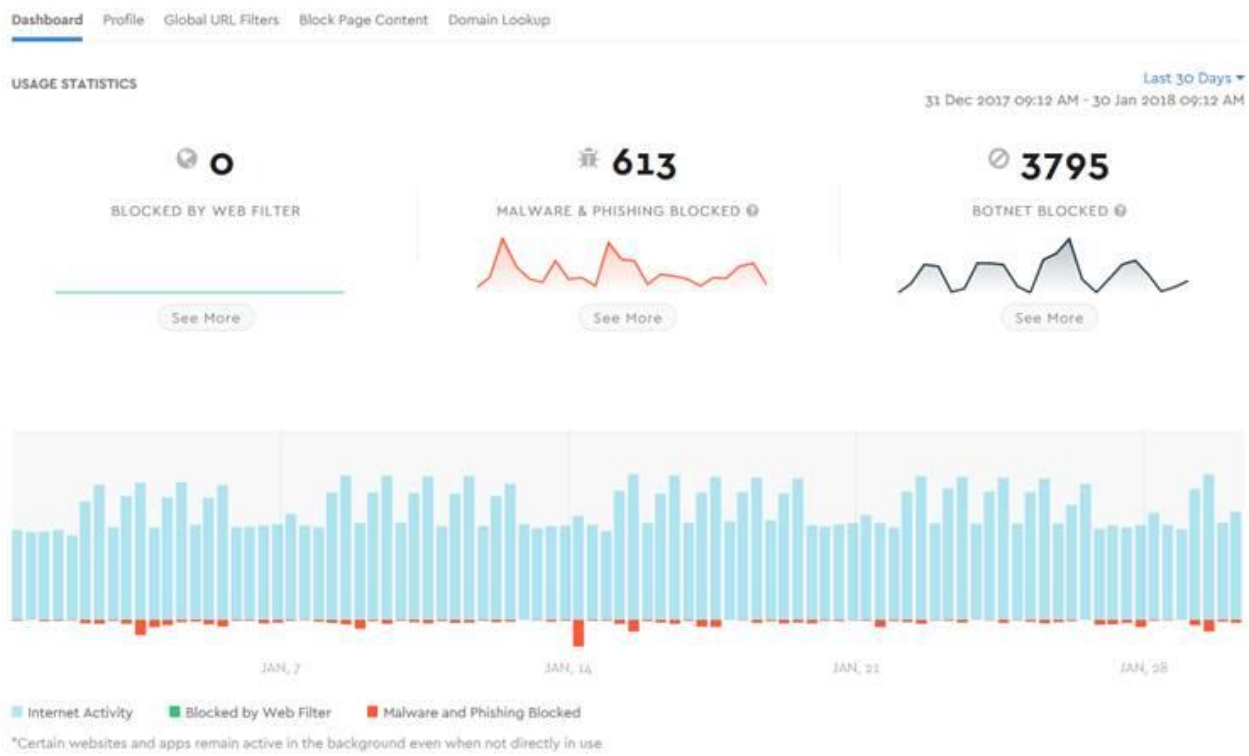
Need to understand the query traffic and required capacity

Operational - Modeling Capacity (QPS/1,000 users)



We can map our 200,000 QPS operational capacity in to number of network users for each type of organization

D-Zone DNS Firewall – Customer Value



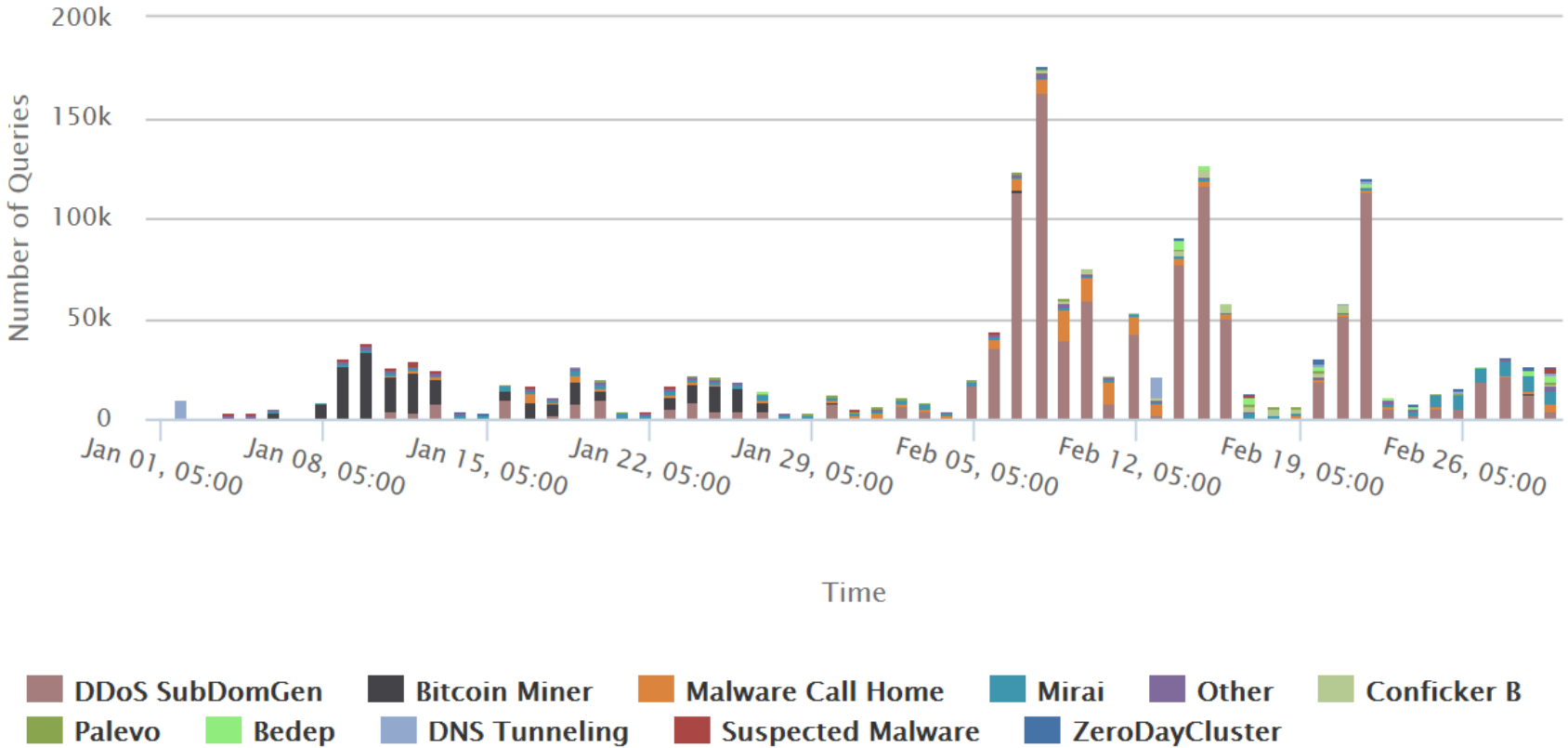
Need for additional malware phishing protection

Customer Value - Hospital

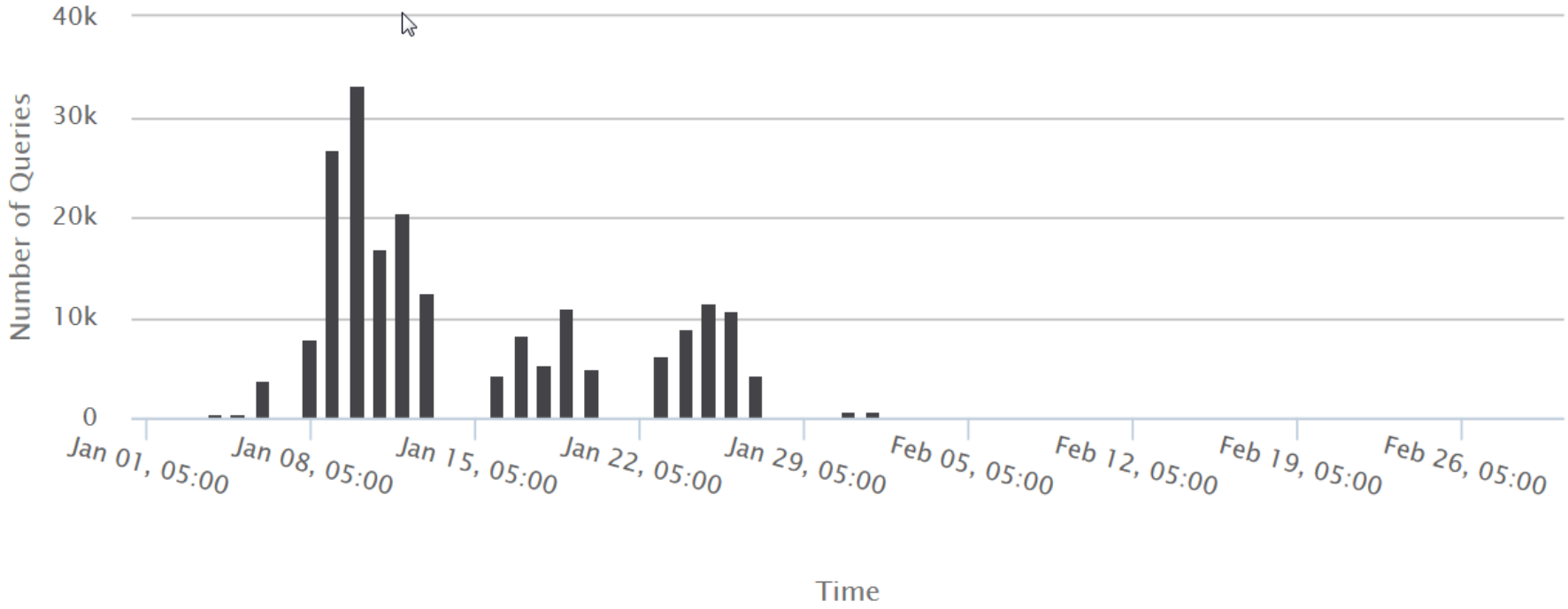
Clients

Address	First Seen	Last Seen	Threat Name	Count
[redacted]	2017-09-13 16:50 UTC	2018-03-09 22:55 UTC	Palevo	24 352
	2017-09-18 14:10 UTC	2018-03-08 22:00 UTC	Malware Call Home	1443
	2017-10-01 12:10 UTC	2018-02-27 13:30 UTC	Malware-Adware/A	54
	2017-11-15 16:35 UTC	2018-03-02 17:10 UTC	Ransomware	34
	2017-12-04 23:55 UTC	2018-03-09 22:50 UTC	Suspected Malware	4034
	2018-01-03 19:50 UTC	2018-03-09 19:25 UTC	Bitcoin Miner	155
	2018-01-30 18:30 UTC	2018-02-17 21:30 UTC	RoughTed	2
	2018-02-28 15:35 UTC	2018-02-28 15:40 UTC	Mirai	1
	2018-03-08 03:30 UTC	2018-03-09 22:50 UTC	Ramnit	16

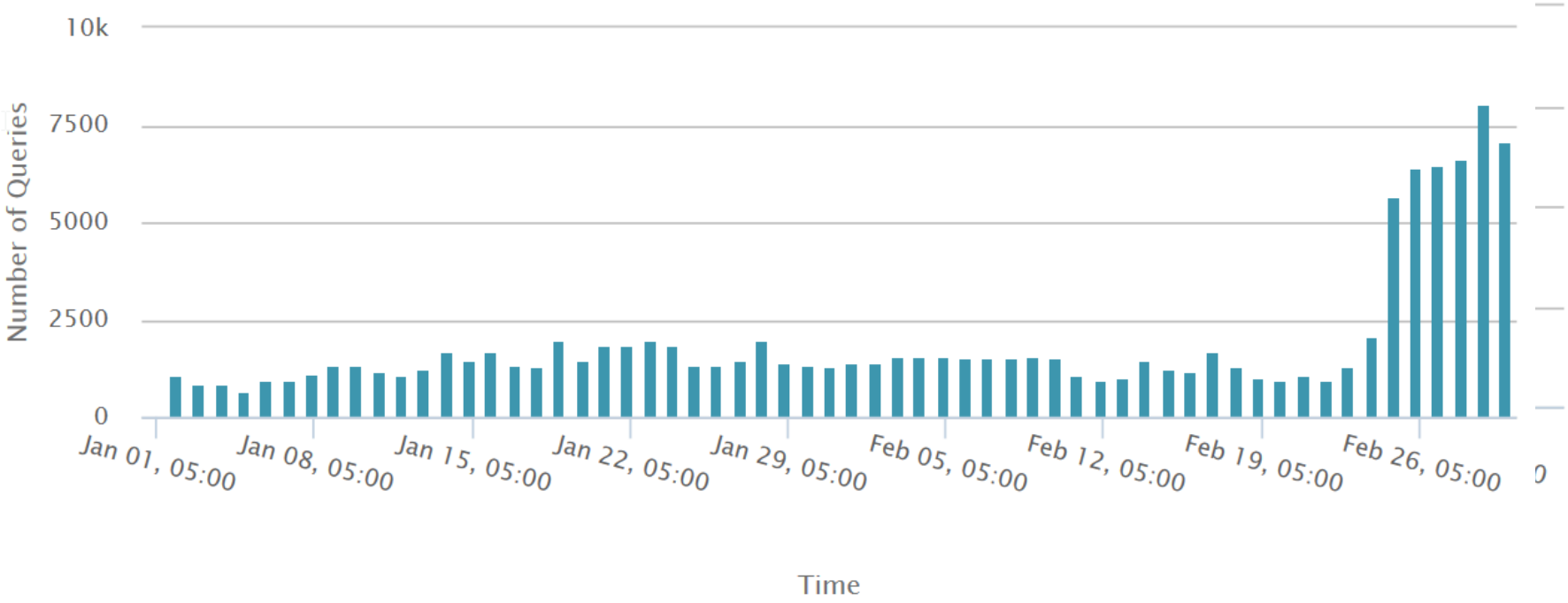
Threat Landscape – Aggregate Threats



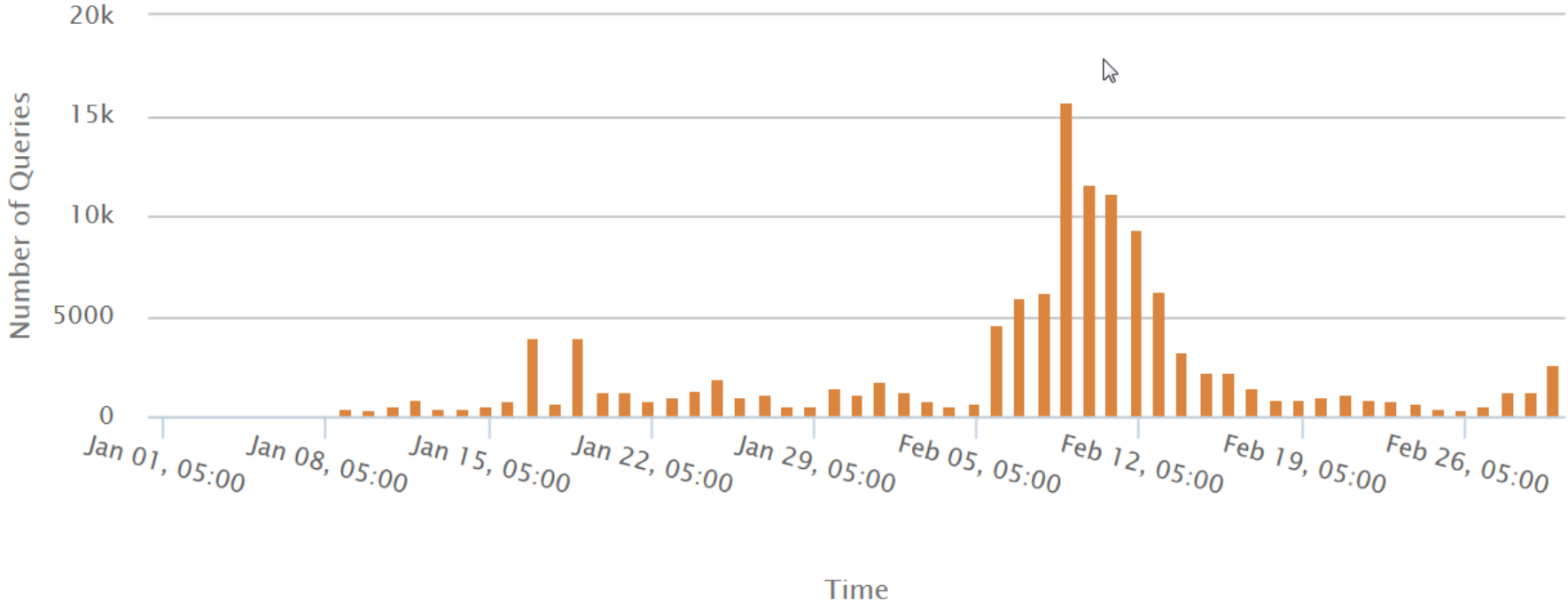
Threat Landscape – Bitcoin Mining



Threat Landscape – Mirai



Threat Landscape – Malware



Benefits to CIRA

- View of threat landscape in Canada
- Ability to identify threats specific to Canada
- Inform and educate
- Protection for Canadians
- Create communities of interest to share threat data
- Elevates CIRA to a national Cybersecurity Role in Canada

DNS Firewall Vision

- Make D-Zone DNS Firewall a critical part of Canada’s cybersecurity
- Create communities of interest to share threat data
- Improve data sovereignty
- Augment service with Canadian Threat Data
- A secure recursive DNS available to all Canadians

Conclusion

- Partnership with Nominum/Akamai helped us move quickly with a carrier grade service
- DNS is gaining momentum as a critical part of a defense in depth strategy
- Operating a national DNS is great fit with CIRA's mandate for a better online Canada
- DNS service and data is a valued resource that can be leveraged to improve national cybersecurity

Questions?

Mark Gaudet
mark.gaudet@cira.ca