

# DNS Update

## -- Root DNS --

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M ROOT DNS は以下の組織によって運用されています



株式会社日本レジストリサービス



# Root DNS / Root Zone とは

毎年なのですが一応

- DNS データベースツリーの起点となる DNS サーバです

Root Zone

- “TLD (Top Level Domain)” の集合データである

Root DNS Server

- “Root Zone” を持った Authoritative DNS サーバです
- 13組織によって運営されています
- “Root DNS サーバ” を運用しているだけです
- “Root Zone” の中身に関しては何も感知しておりません

Root Zone は誰が管理？

- IANA です

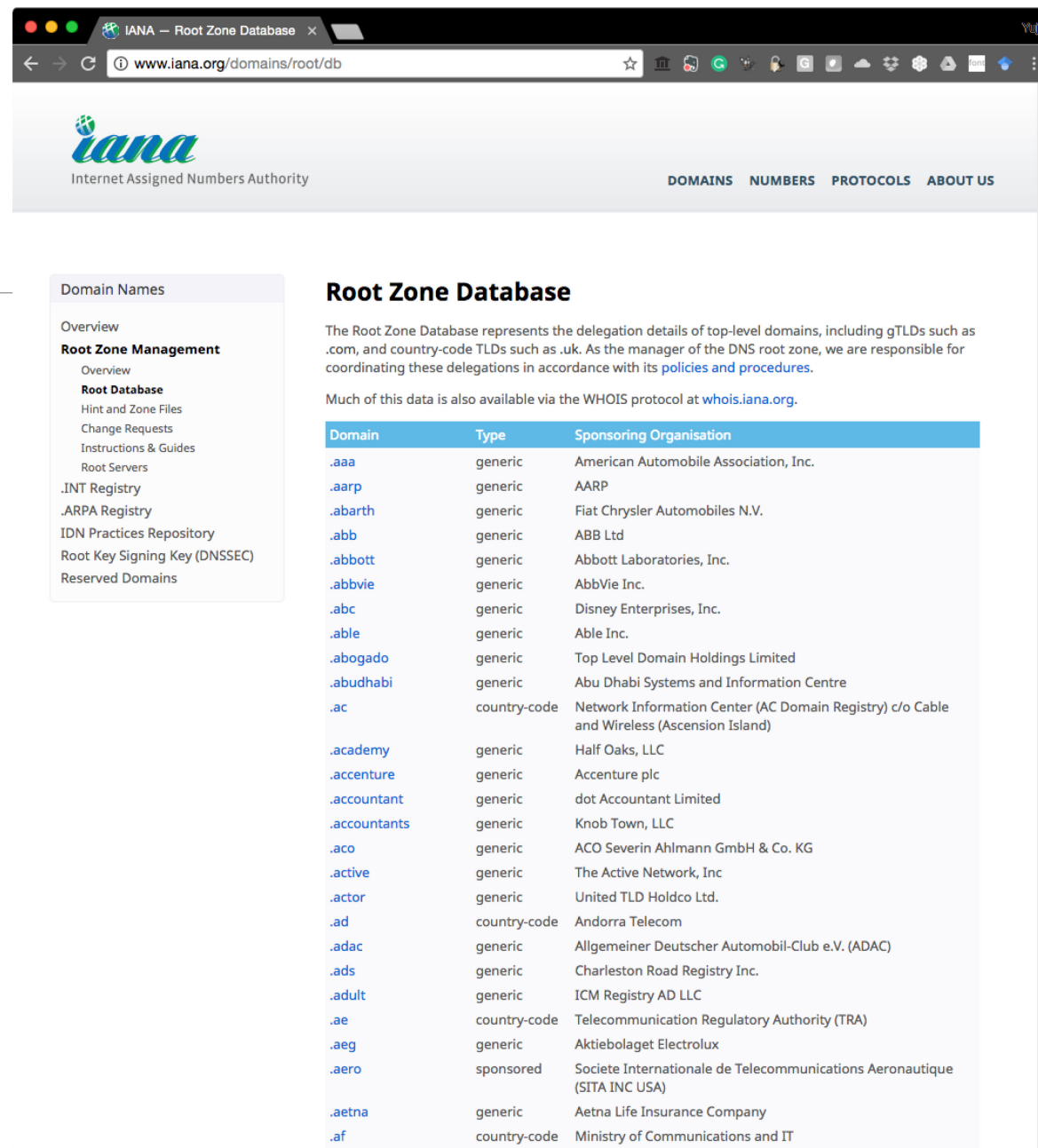
The screenshot shows the IANA Root Zone Management website. The browser address bar displays 'https://www.iana.org/domains/root'. The page features the IANA logo and navigation links for 'DOMAINS', 'NUMBERS', 'PROTOCOLS', and 'ABOUT US'. A sidebar on the left lists various resources under 'Domain Names', including 'Overview', 'Root Zone Management', 'Root Database', 'Hint and Zone Files', 'Change Requests', 'Instructions & Guides', 'Root Servers', '.INT Registry', '.ARPA Registry', 'IDN Practices Repository', 'Root Key Signing Key (DNSSEC)', and 'Reserved Domains'. The main content area is titled 'Root Zone Management' and contains sections for 'Browse', 'Maintain', 'Policy, Procedures and Guides', and 'DNSSEC Key Signing Key Information'. The footer includes links for 'Domain Names', 'Number Resources', 'Protocols', and 'About Us'.

# 現在の TLD

以前は gTLD と ccTLD が登録されていました

今は多くの種類の TLD が。。。

- もうよくわかんないっす
- 増える増える



The screenshot shows the IANA Root Zone Database website. The page title is "Root Zone Database" and the URL is "www.iana.org/domains/root/db". The page features a navigation menu with "DOMAINS", "NUMBERS", "PROTOCOLS", and "ABOUT US". A sidebar on the left lists "Domain Names" and "Root Zone Management" options. The main content area displays a table of domain names, their types, and their sponsoring organizations.

| Domain       | Type         | Sponsoring Organisation   |
|--------------|--------------|---|
| .aaa         | generic      | American Automobile Association, Inc.   |
| .aarp        | generic      | AARP  |
| .abarth      | generic      | Fiat Chrysler Automobiles N.V.  |
| .abb         | generic      | ABB Ltd   |
| .abbott      | generic      | Abbott Laboratories, Inc.   |
| .abbvie      | generic      | AbbVie Inc.   |
| .abc         | generic      | Disney Enterprises, Inc.  |
| .able        | generic      | Able Inc.   |
| .abogado     | generic      | Top Level Domain Holdings Limited   |
| .abudhabi    | generic      | Abu Dhabi Systems and Information Centre  |
| .ac          | country-code | Network Information Center (AC Domain Registry) c/o Cable and Wireless (Ascension Island) |
| .academy     | generic      | Half Oaks, LLC  |
| .accenture   | generic      | Accenture plc   |
| .accountant  | generic      | dot Accountant Limited  |
| .accountants | generic      | Knob Town, LLC  |
| .aco         | generic      | ACO Severin Ahlmann GmbH & Co. KG   |
| .active      | generic      | The Active Network, Inc   |
| .actor       | generic      | United TLD Holdco Ltd.  |
| .ad          | country-code | Andorra Telecom   |
| .adac        | generic      | Allgemeiner Deutscher Automobil-Club e.V. (ADAC)  |
| .ads         | generic      | Charleston Road Registry Inc.   |
| .adult       | generic      | ICM Registry AD LLC   |
| .ae          | country-code | Telecommunication Regulatory Authority (TRA)  |
| .aeg         | generic      | Aktiebolaget Electrolux   |
| .aero        | sponsored    | Societe Internationale de Telecommunications Aeronautique (SITA INC USA)                  |
| .aetna       | generic      | Aetna Life Insurance Company  |
| .af          | country-code | Ministry of Communications and IT   |

# Root DNS サーバ運用組織

| Hostname           | IP Addresses                      | Manager                                 |
|--------------------|-----------------------------------|---|
| a.root-servers.net | 198.41.0.4, 2001:503:ba3e::2:30   | VeriSign, Inc.                          |
| b.root-servers.net | 192.228.79.201, 2001:500:84::b    | University of Southern California (ISI) |
| c.root-servers.net | 192.33.4.12, 2001:500:2::c        | Cogent Communications                   |
| d.root-servers.net | 199.7.91.13, 2001:500:2d::d       | University of Maryland                  |
| e.root-servers.net | 192.203.230.10, 2001:500:a8::e    | NASA (Ames Research Center)             |
| f.root-servers.net | 192.5.5.241, 2001:500:2f::f       | Internet Systems Consortium, Inc.       |
| g.root-servers.net | 192.112.36.4, 2001:500:12::d0d    | US Department of Defense (NIC)          |
| h.root-servers.net | 198.97.190.53, 2001:500:1::53     | US Army (Research Lab)                  |
| i.root-servers.net | 192.36.148.17, 2001:7fe::53       | Netnod                                  |
| j.root-servers.net | 192.58.128.30, 2001:503:c27::2:30 | VeriSign, Inc.                          |
| k.root-servers.net | 193.0.14.129, 2001:7fd::1         | RIPE NCC                                |
| l.root-servers.net | 199.7.83.42, 2001:500:9f::42      | ICANN                                   |
| m.root-servers.net | 202.12.27.33, 2001:dc3::35        | WIDE Project                            |

出典 : <http://www.iana.org/domains/root/servers>



# 設置拠点

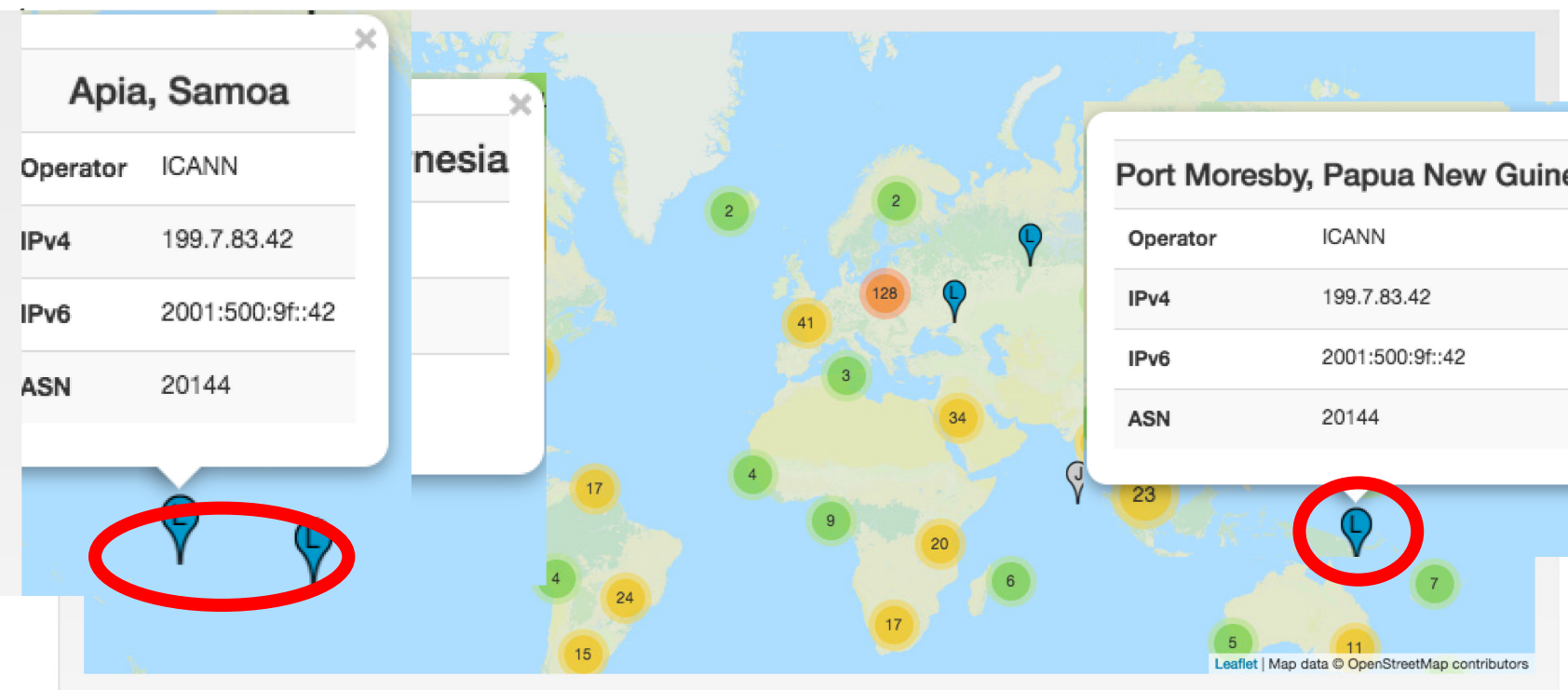
運営母体は 13 組織ですが、Root DNS サーバの台数は 13 台ではありません

BGP Anycast と呼ばれる技術で分身しまくっています

<http://www.root-servers.org>

”L” がポツンとある場所が。

ほう。。。

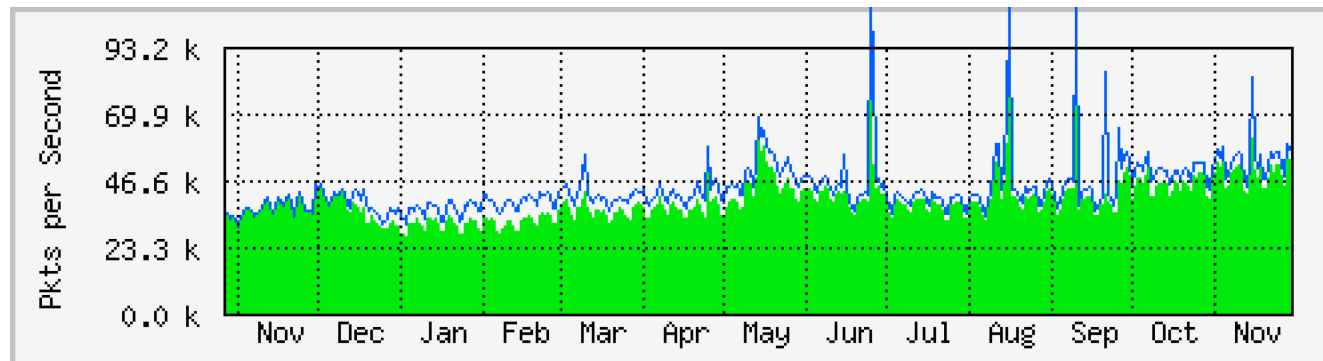
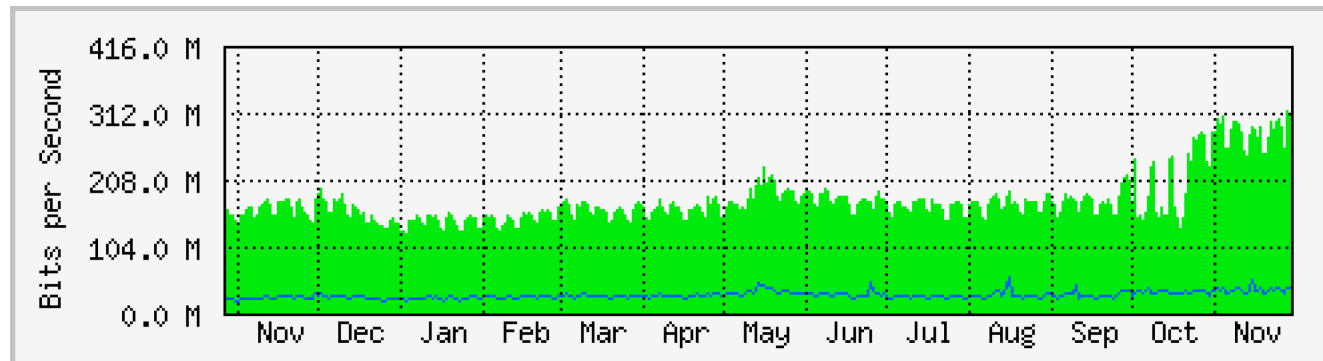


# わが M ROOT は

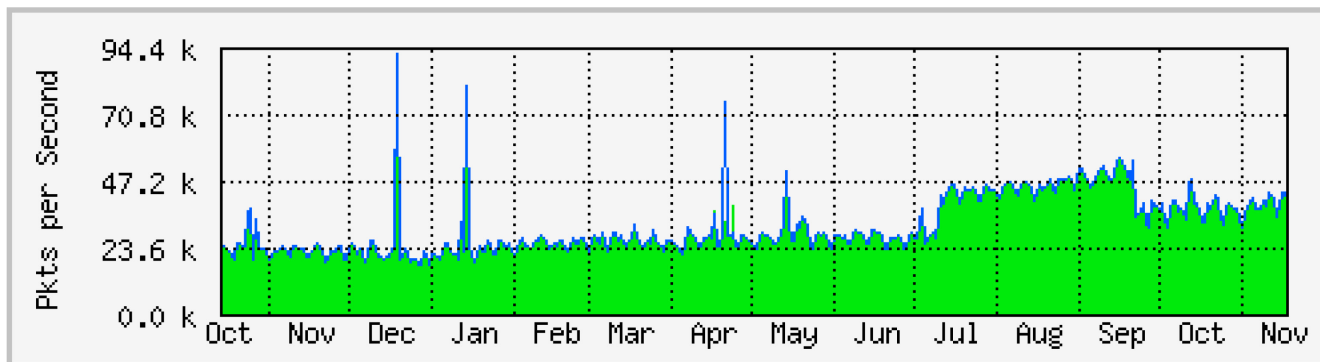
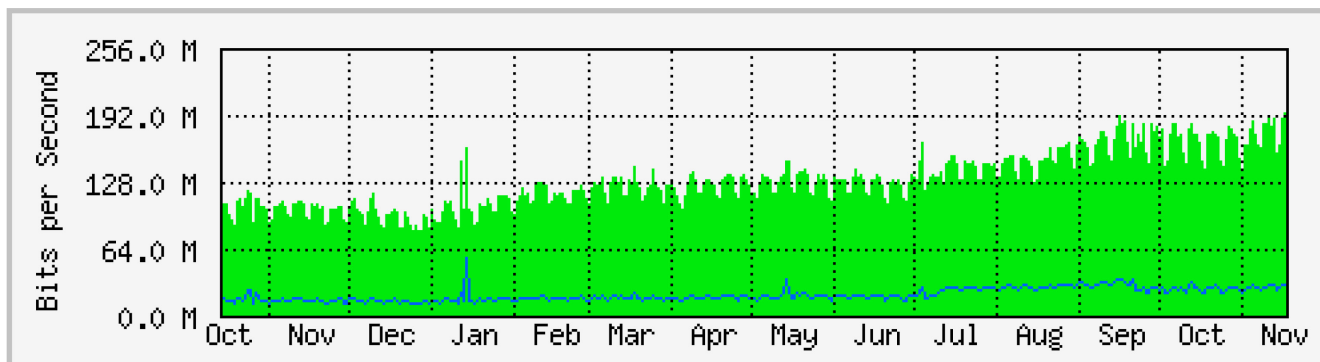
設置都市数は変わっていません  
が、フランス (パリ) が今年 2拠点になりました

|            |   |                          |                                |                               |                       |
|------------|---|--------------------------|--------------------------------|-------------------------------|-----------------------|
| Operator:  | WIDE Project  | <a href="#">Homepage</a> | <a href="#">Peering Policy</a> | <a href="#">Contact Email</a> | <a href="#">RSSAC</a> |
| Locations: | Sites: 8<br><a href="#">Osaka, JP</a> <a href="#">Paris, FR</a> <a href="#">San Francisco, US</a> <a href="#">Seoul, KR</a> <a href="#">Tokyo, JP</a> |                          |                                |                               |                       |
| IPs:       | IPv4: 202.12.27.33<br>IPv6: 2001:dc3::35  |                          |                                |                               |                       |
| ASN:       | 7500  |                          |                                |                               |                       |

# 2016年のトラフィック傾向



# 参考までに 2015年





# 発生した事象 (1)

2015/11/30

On November 30, 2015 and December 1, 2015, over two separate intervals, several of the Internet Domain Name System's root name servers received a high rate of queries. This report explains the nature and impact of the incident.

<http://www.root-servers.org/news/events-of-20151130.txt>

夜中に起こされるんですよ。。。



data: RIPE DNSmon  
red: >30% loss  
(some sites ~99% loss!)

What happened?

What does “red”  
really mean?

Anycast vs. DDoS  
in general?

# 発生した事象 (2)

2016/06/25

On June 25, 2016 all of the Internet Domain Name System's root name servers received a high rate of TCP SYN and ICMP traffic. This report explains the nature and impact of the incident.

<http://www.root-servers.org/news/events-of-20160625.txt>

夜中に起こされるんですよ。。。



# 避難訓練

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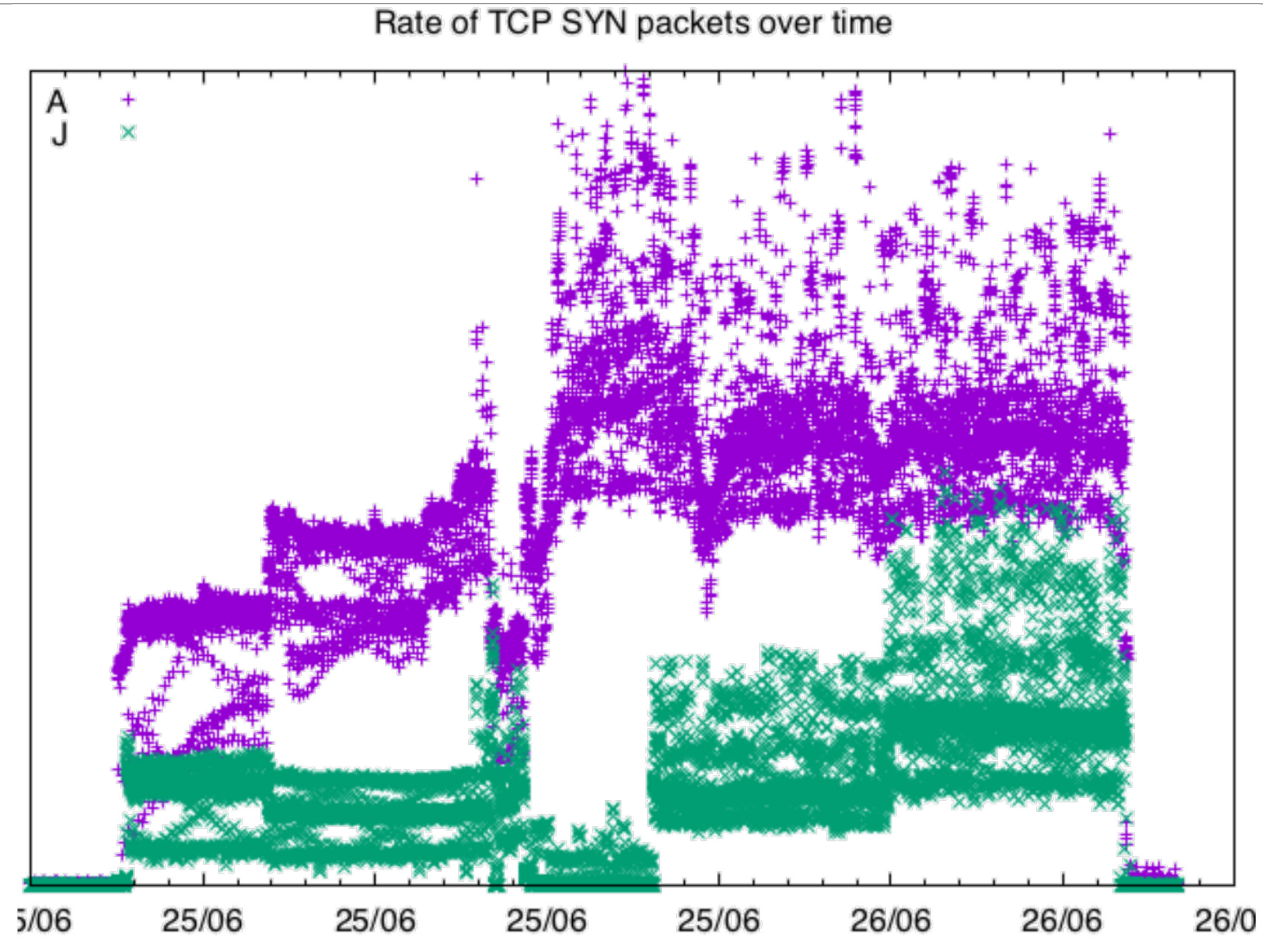
The 2015 Root Server Operators' Exercise on Emergency Response

[http://www.root-servers.org/news/Root\\_Server\\_Operators\\_Exercise\\_on\\_Emergency\\_Response.pdf](http://www.root-servers.org/news/Root_Server_Operators_Exercise_on_Emergency_Response.pdf)

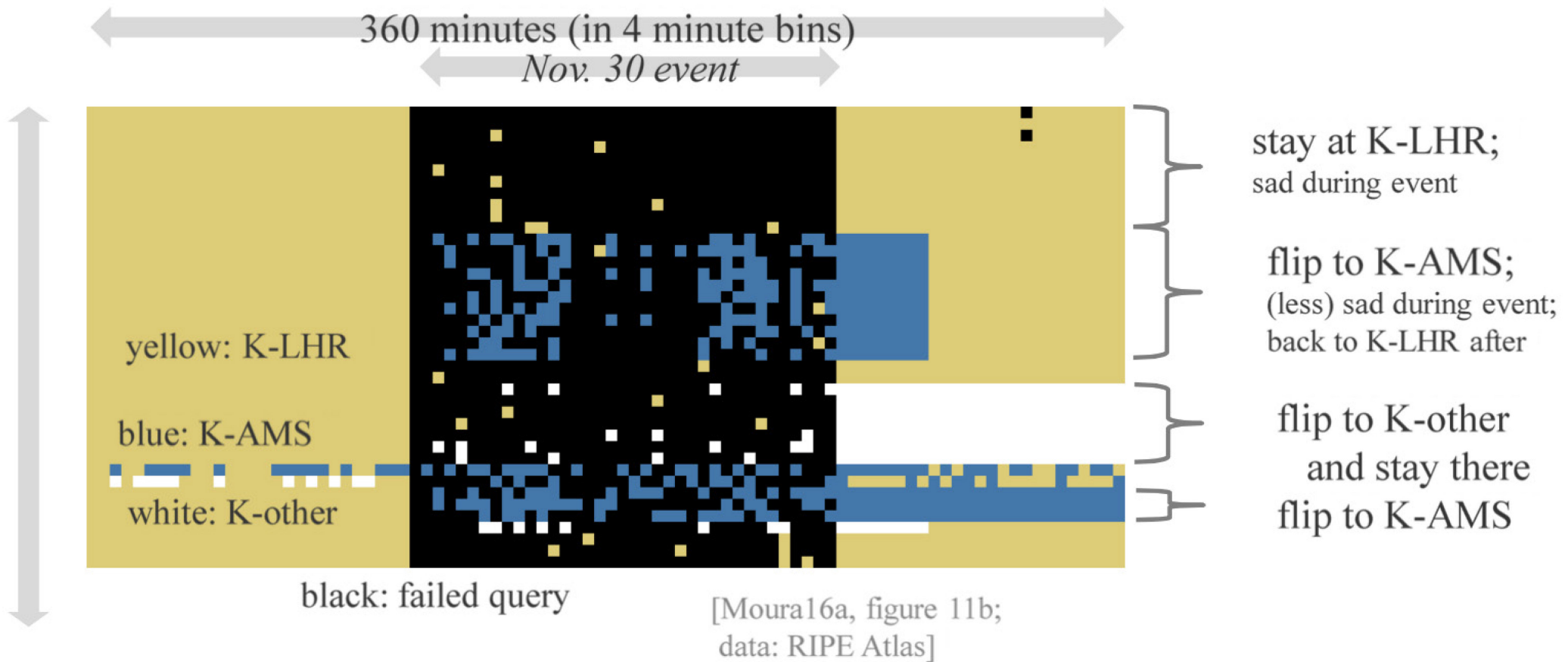
こんなこともやっています

夜中に起こされるんですよ。。。

# TCP SYN



# BGP Anycast の問題点



# 対策方法

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古典的な攻撃

けれども不特定多数にサービスしているサーバでは当然防ぐのが難しい

そこで

**コントロールプレーンとデータプレーンの分離ですよ！**

どっかで聞いた言葉だな。。。