iNOG 2016

WHY THE INTERNET SUCKS

GAMES

AGENDA

1. WHY THE INTERNET SUCKS
2. UNDERSTANDING THE INTERNET
3. WHAT DID RIOT DO
4. WHAT MORE CAN WE DO

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WHY LATENCY IS IMPORTANT

On my computer:
Arrow can’t miss you

On your computer:
You already dodged it

Image source:
http://www.polygon.com/

WHY LATENCY IS IMPORTANT

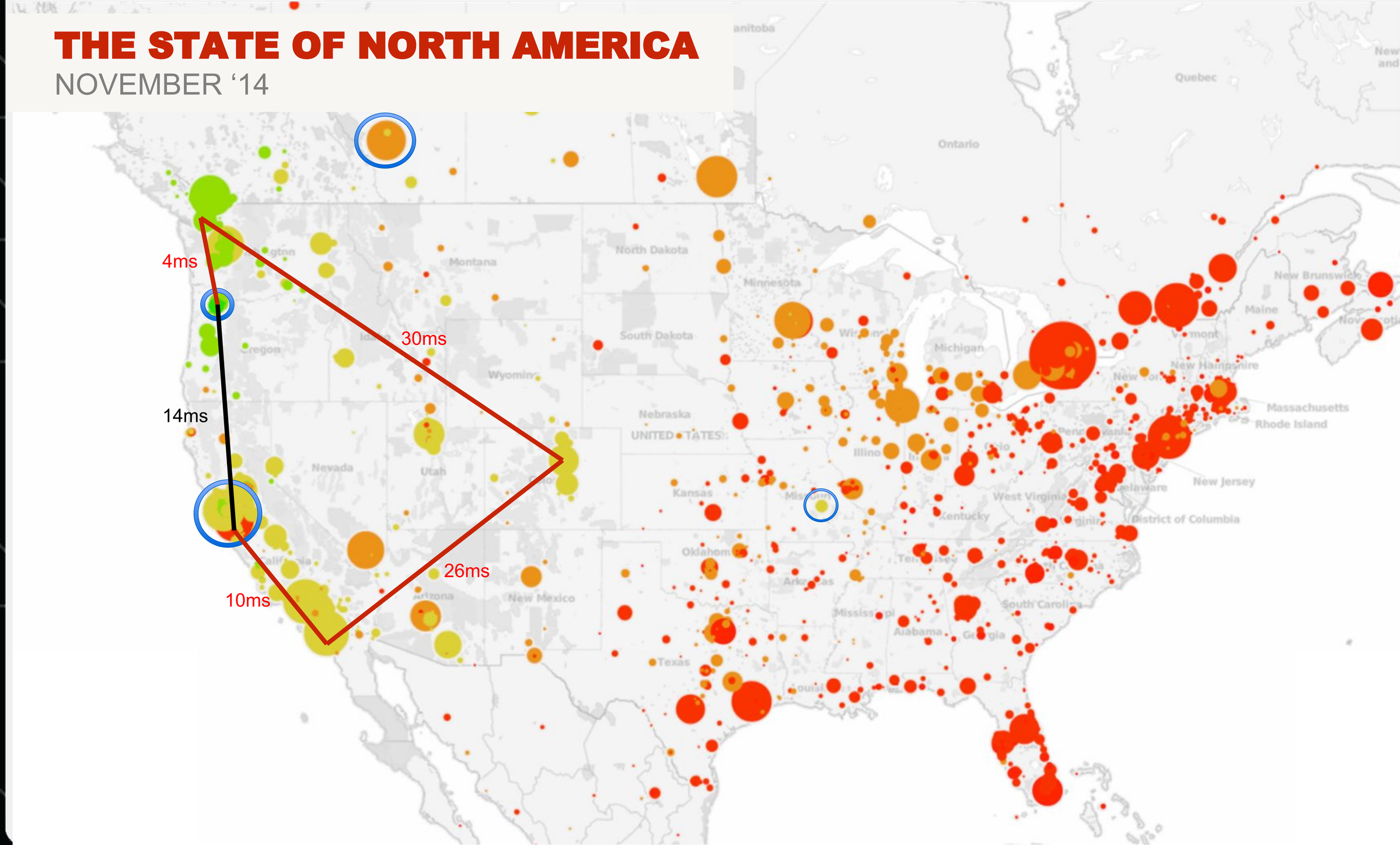
On my computer:
The arrow hit you

On your computer:
You dodged but still got hit

Image source:
http://www.polygon.com/

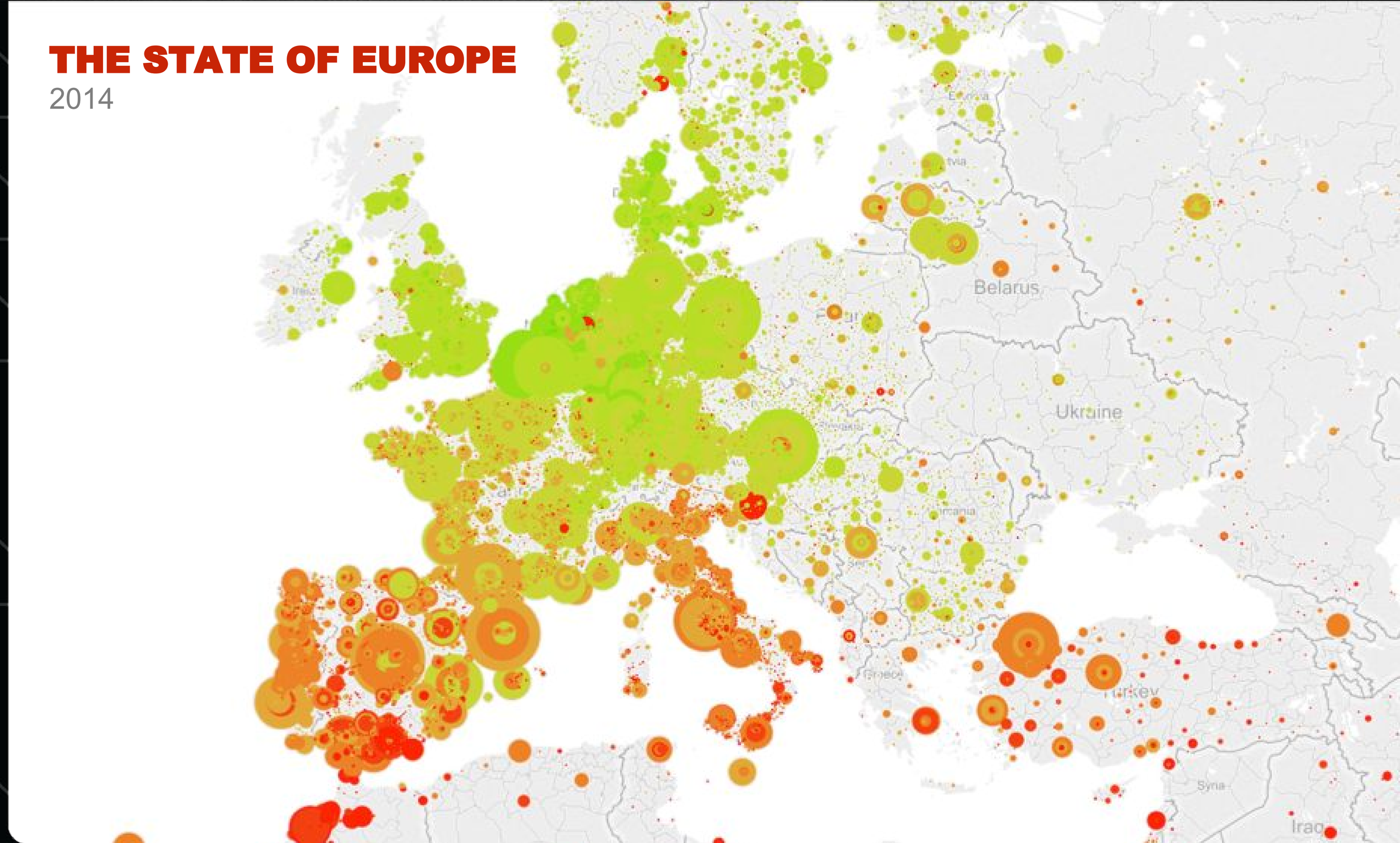
THE STATE OF NORTH AMERICA

NOVEMBER ‘14



THE STATE OF EUROPE

2014



AGENDA

1. WHY THE INTERNET SUCKS
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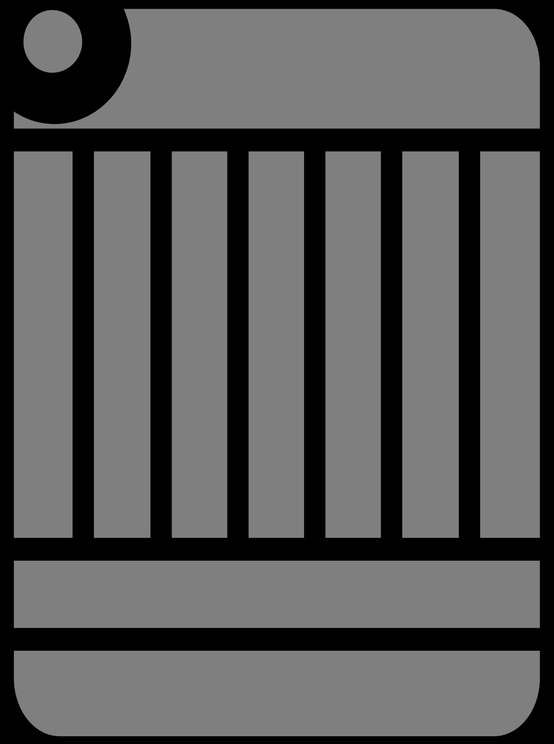
LET’S TALK ABOUT ROUTERS

- Routers are the workhorses of the Internet
- Route Processors are extremely specialized
- Routers have to process, or read, every single packet



ROUTER

PACKET SIZE MATTERS

Standard Web Traffic

1500 Bytes

Standard Game Traffic

50ish Bytes

LET’S TALK ABOUT ROUTERS

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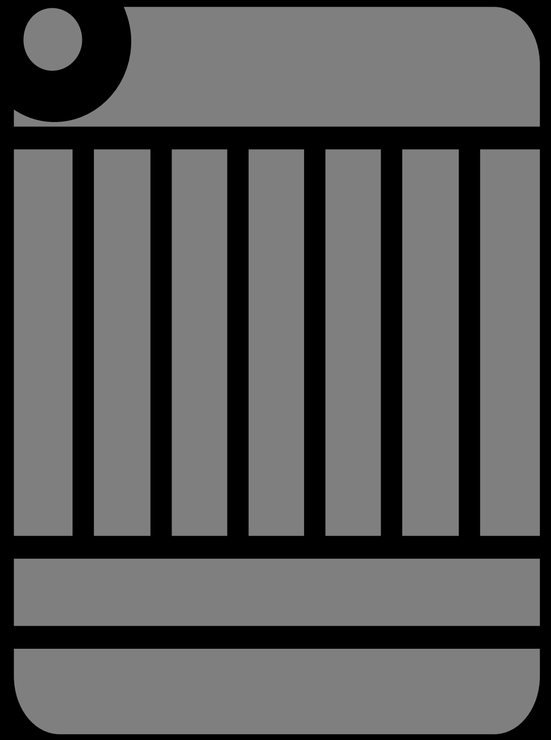
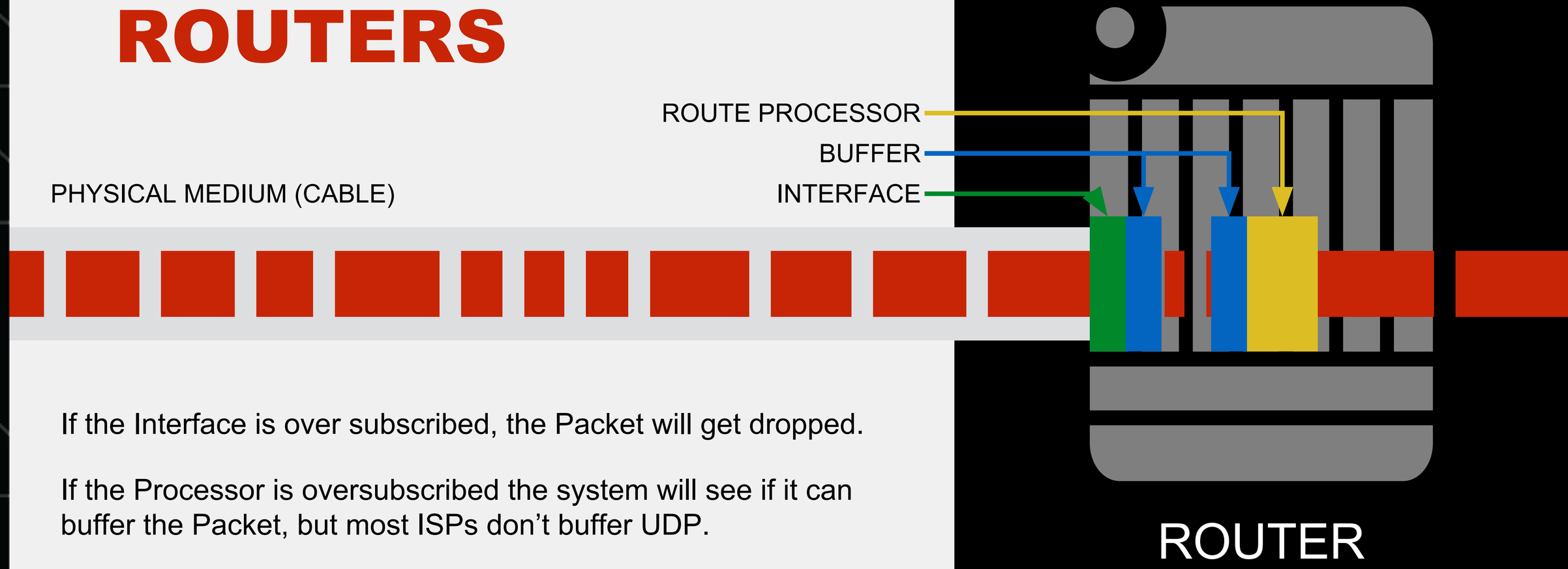
- Routers have to process, or read, every single packet
- Routers can be overwhelmed by our traffic
- Routers Try and use Buffers to fix this—but this must be configured, and most ISPs don’t configure buffer for UDP



ROUTER

LET’S TALK ABOUT ROUTERS

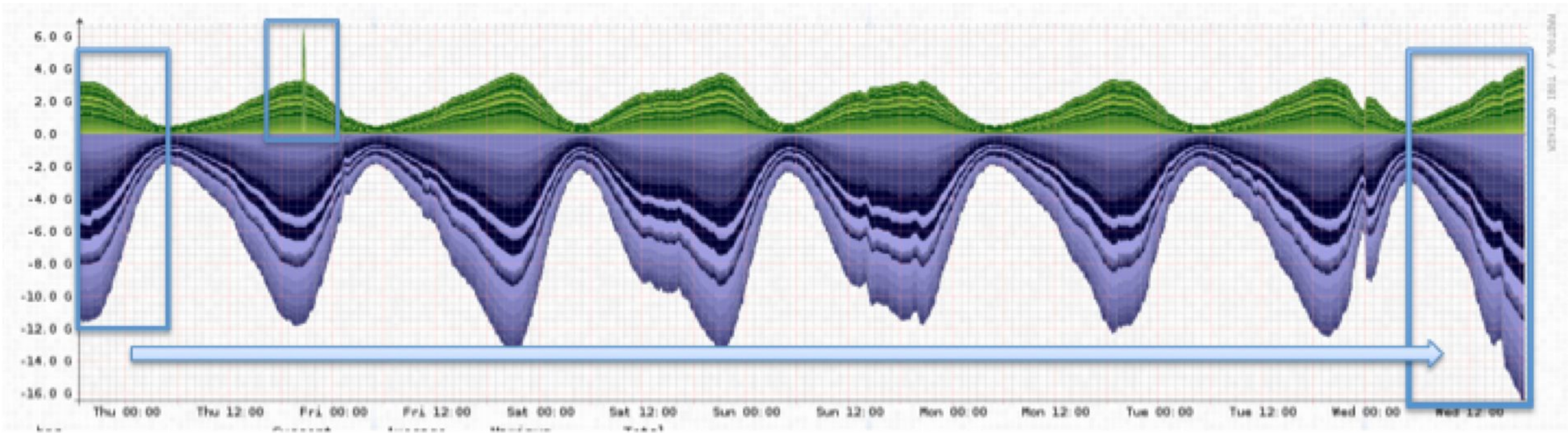


If the Interface is over subscribed, the Packet will get dropped.

If the Processor is oversubscribed the system will see if it can buffer the Packet, but most ISPs don’t buffer UDP.

ESPECIALLY WHEN WE DO THIS...

NEW GAME MODE INCREASED TRAFFIC BY **40%** INSTANTLY



LET’S TALK ABOUT ROUTERS

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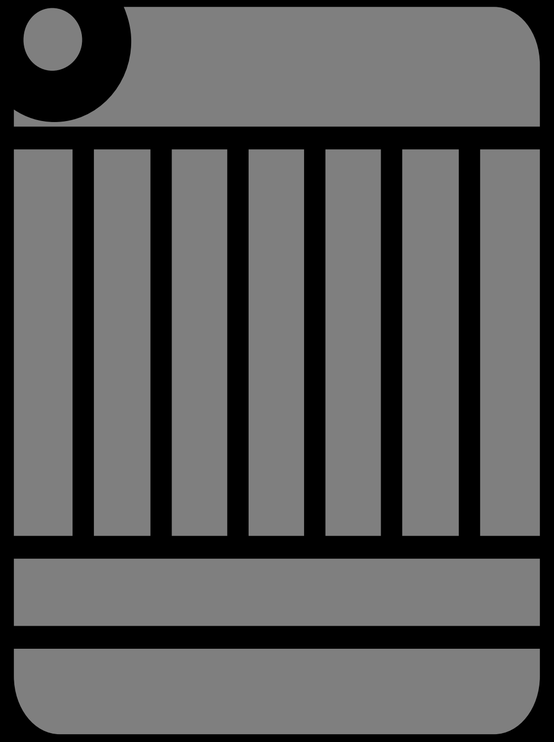
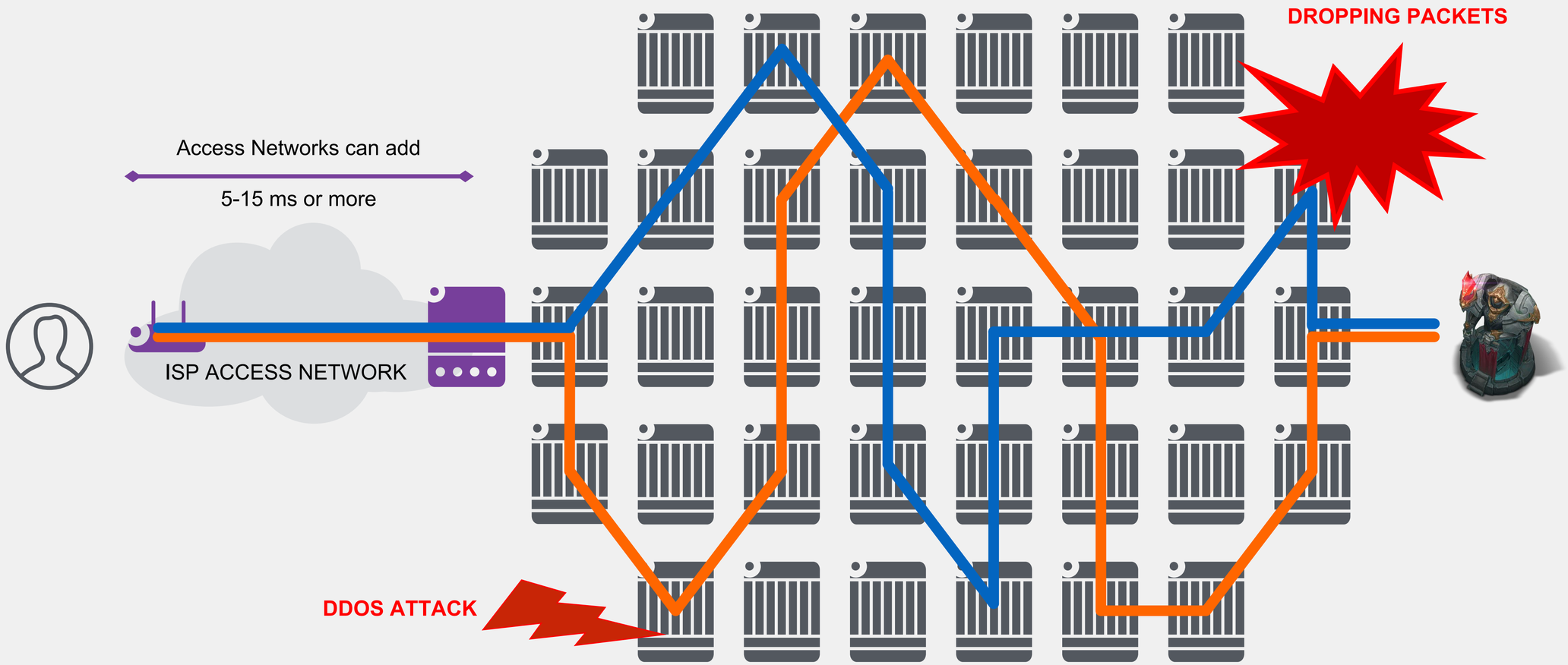
- Routers have to process, or read, every single packet
- Routers can be overwhelmed by our traffic
- Routers Try and use Buffers to fix this—but this must be configured, and most ISPs don’t configure buffer for UDP
- Routers work in a vacuum and make all decisions singularly

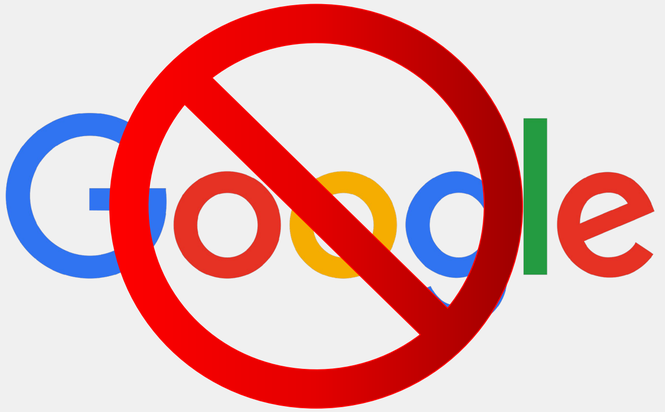


ROUTER

WHAT DOES THIS MEAN?

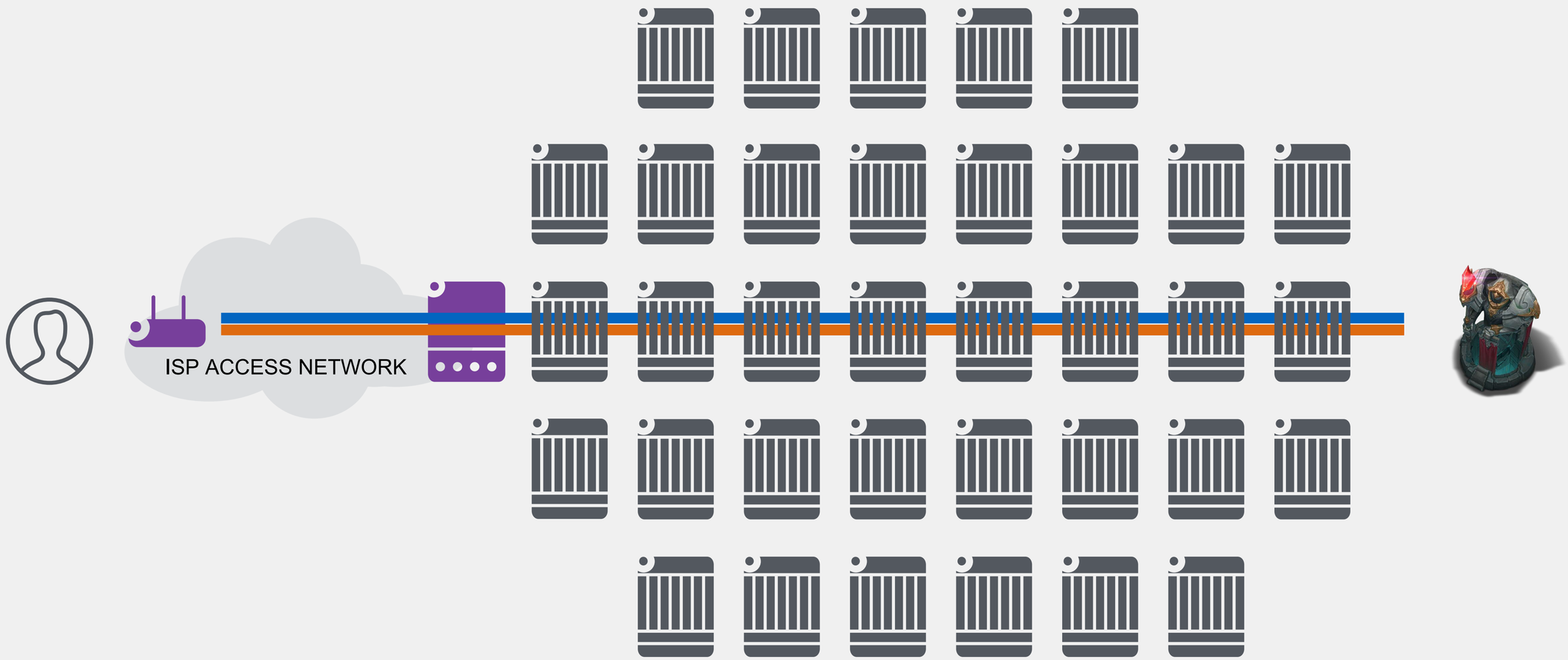


WHO DO WE COMPARE TO?



Goldman Sachs

WHAT DOES THIS MEAN?



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OUR GOAL

80ms

HOW DID WE COME UP WITH THAT?

WE TOOK LESSONS FROM

AUDIO TESTING

AND WE TOOK LESSONS FROM

VISUAL TESTING

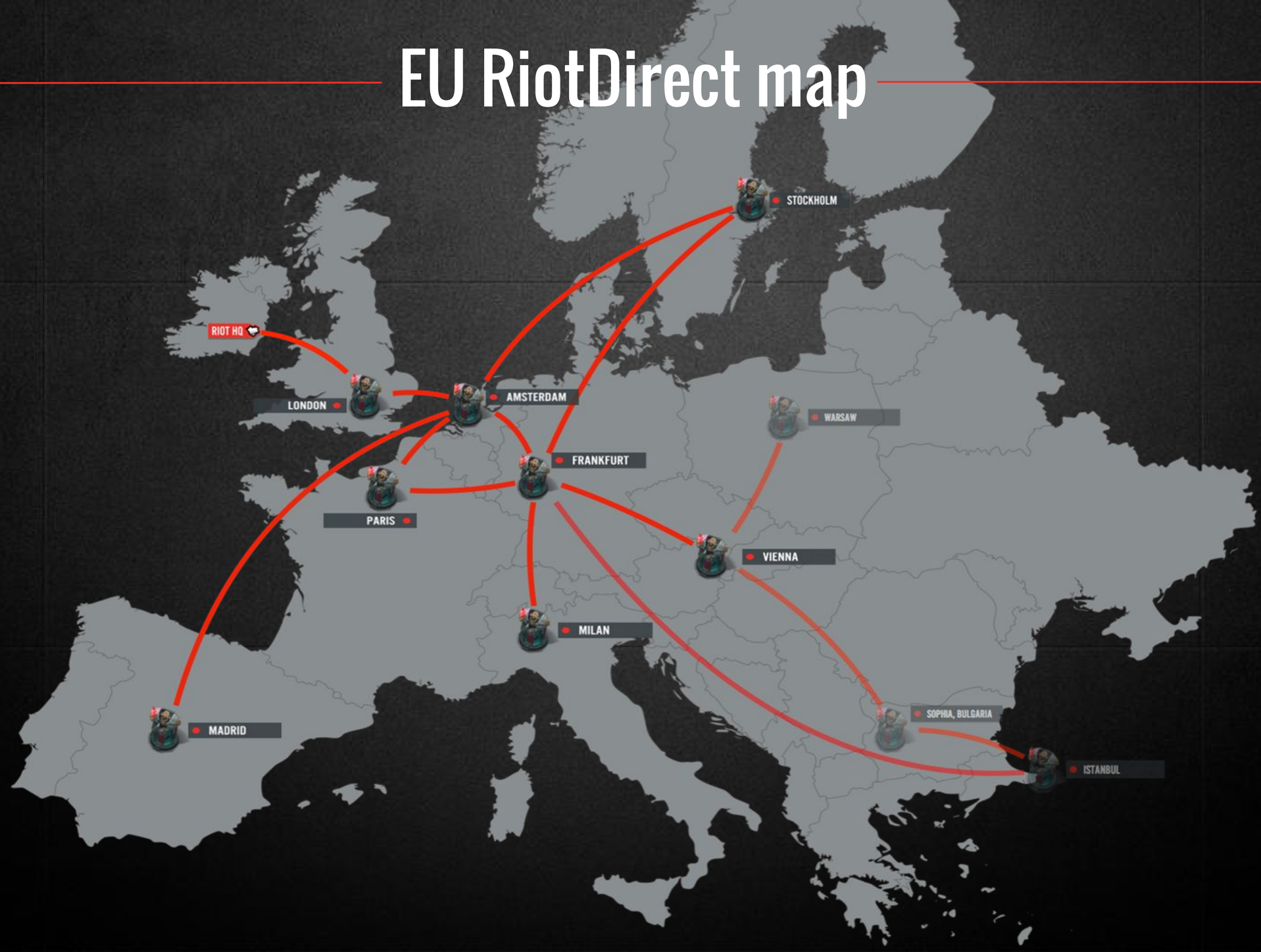
LET’S WATCH A

MOVIE

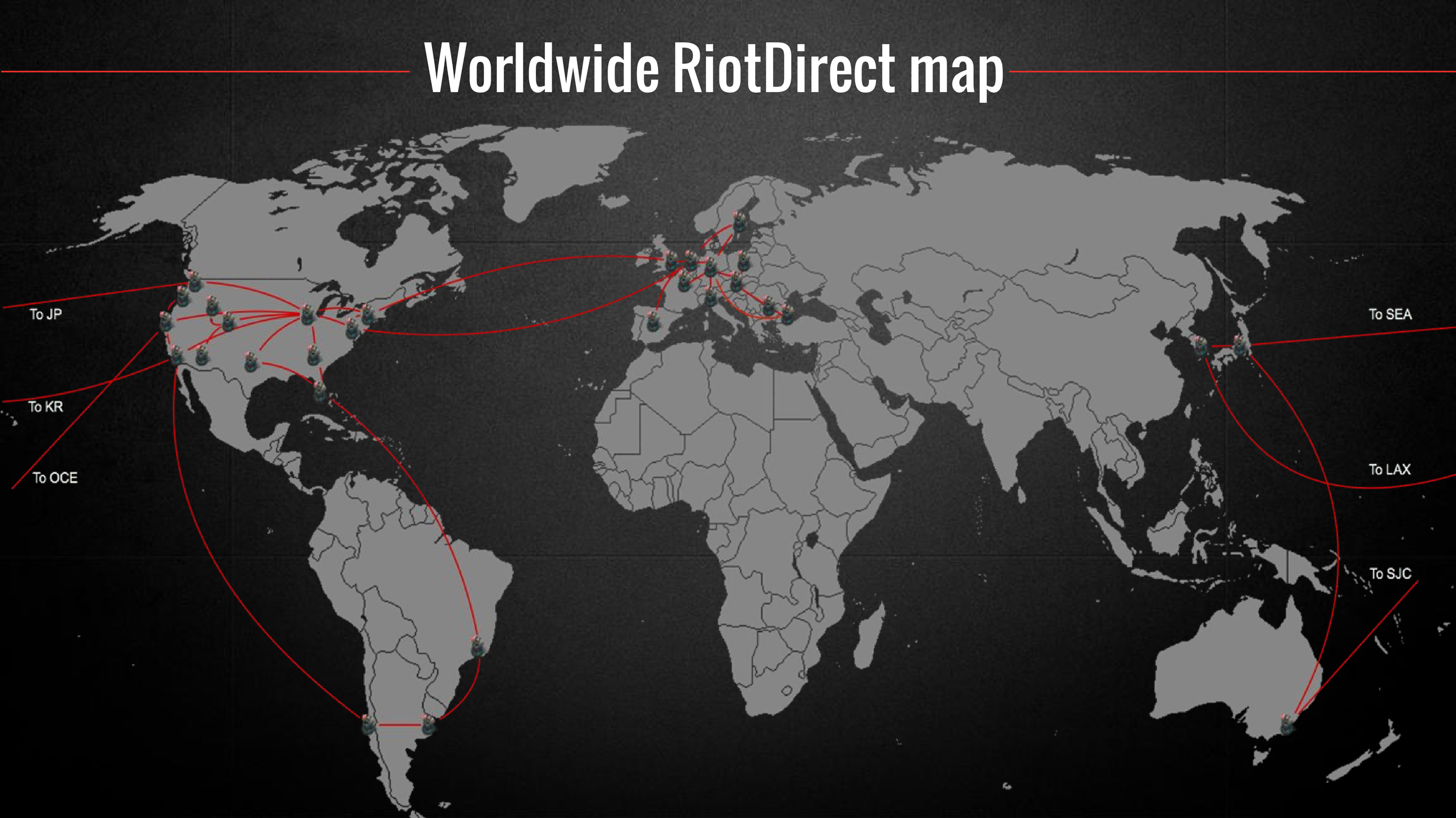
How did a Gaming company approach this problem?

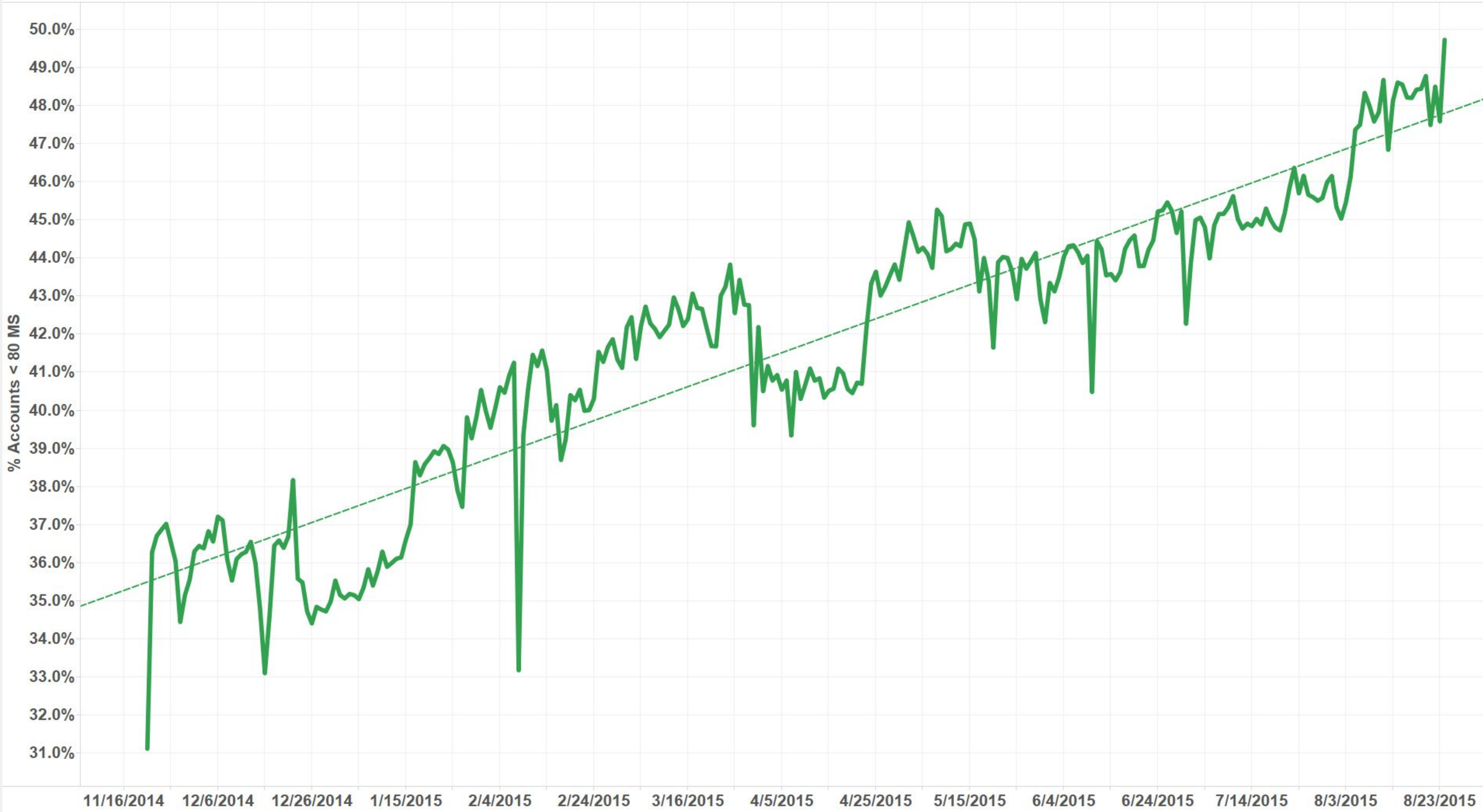
Riot

EU RiotDirect map



Worldwide RiotDirect map

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11/16/2014
12/6/2014
12/26/2014
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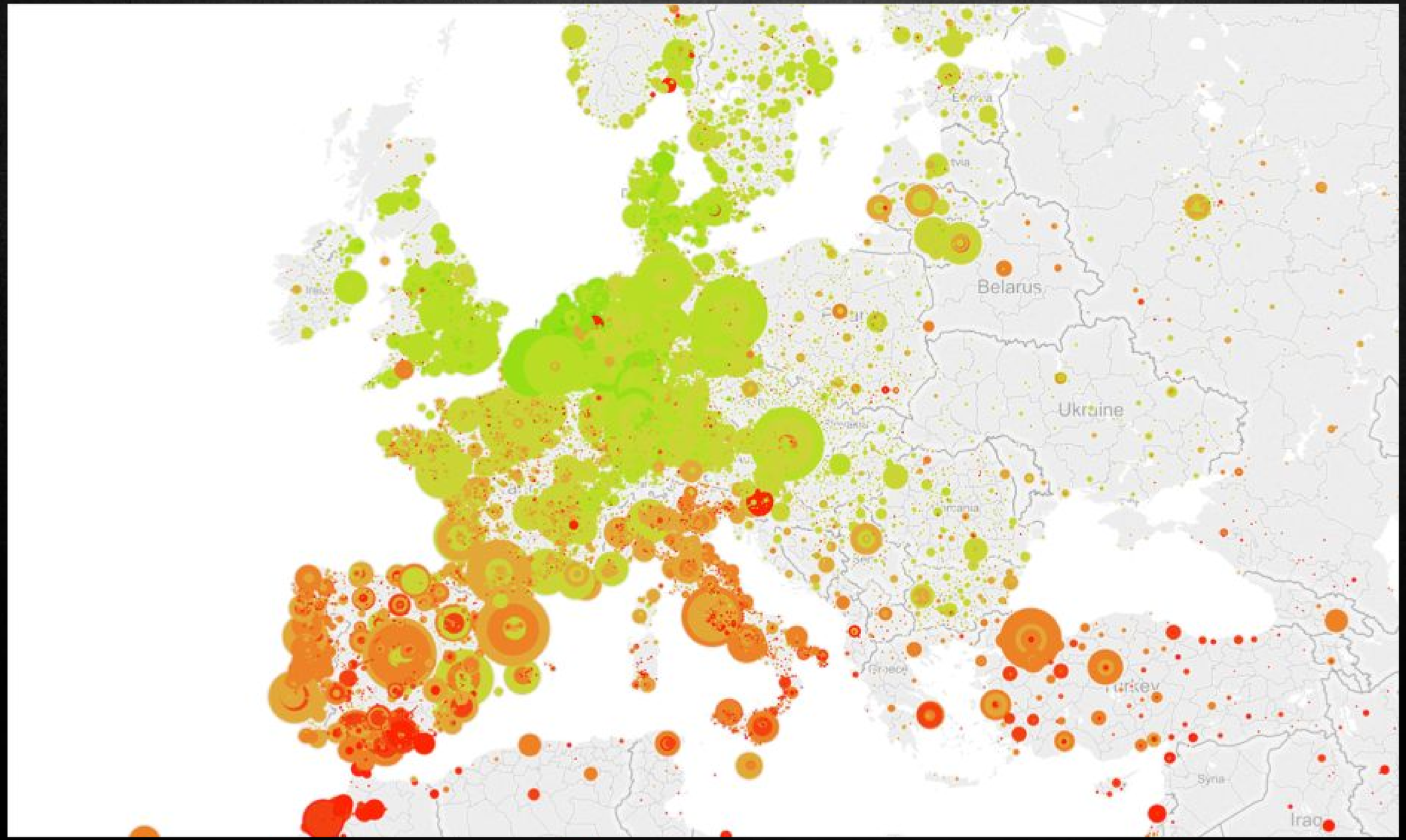
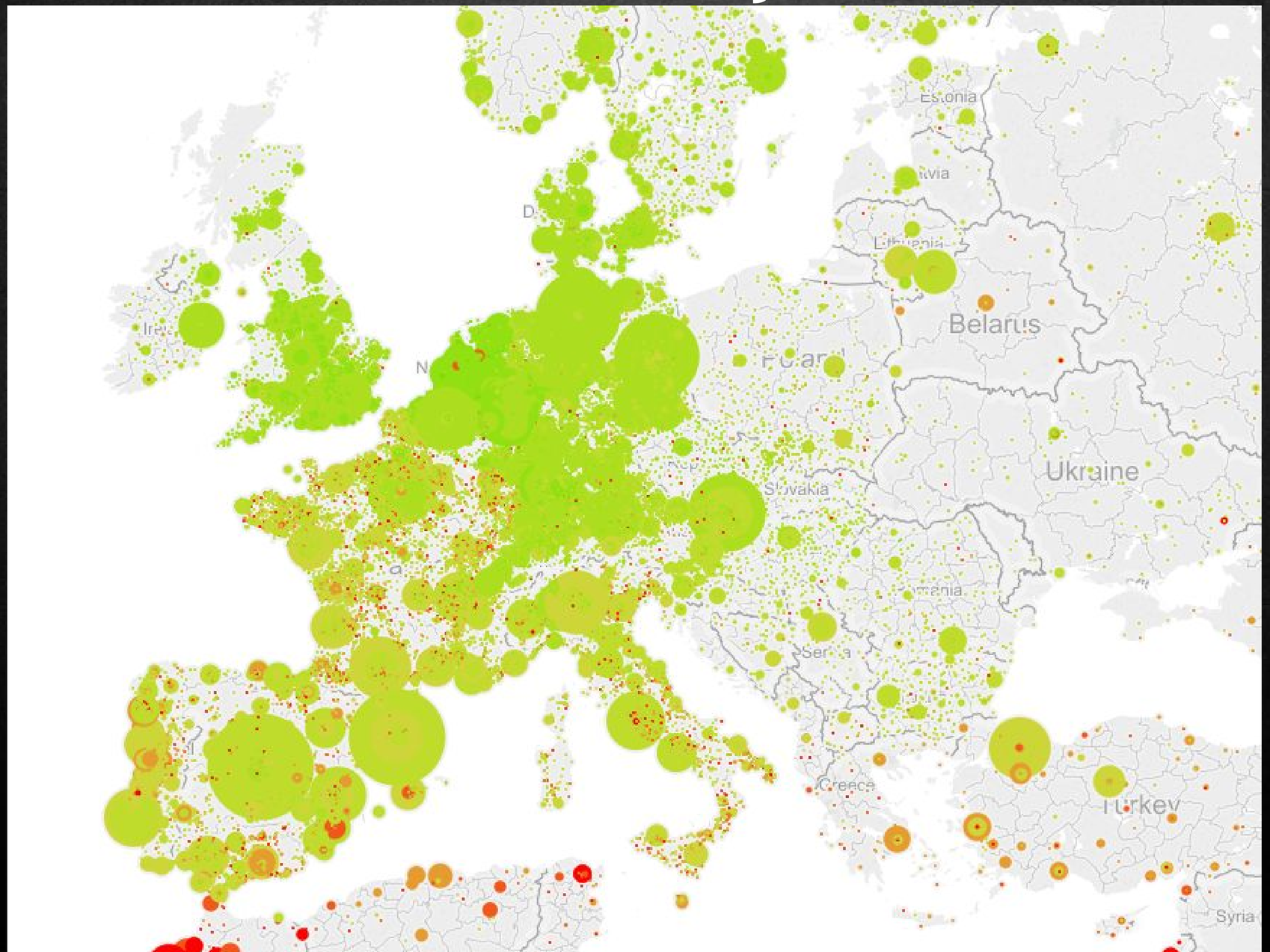
2/24/2015
3/16/2015
4/5/2015
4/25/2015
5/15/2015
6/4/2015
6/24/2015
7/14/2015
8/3/2015
8/23/2015

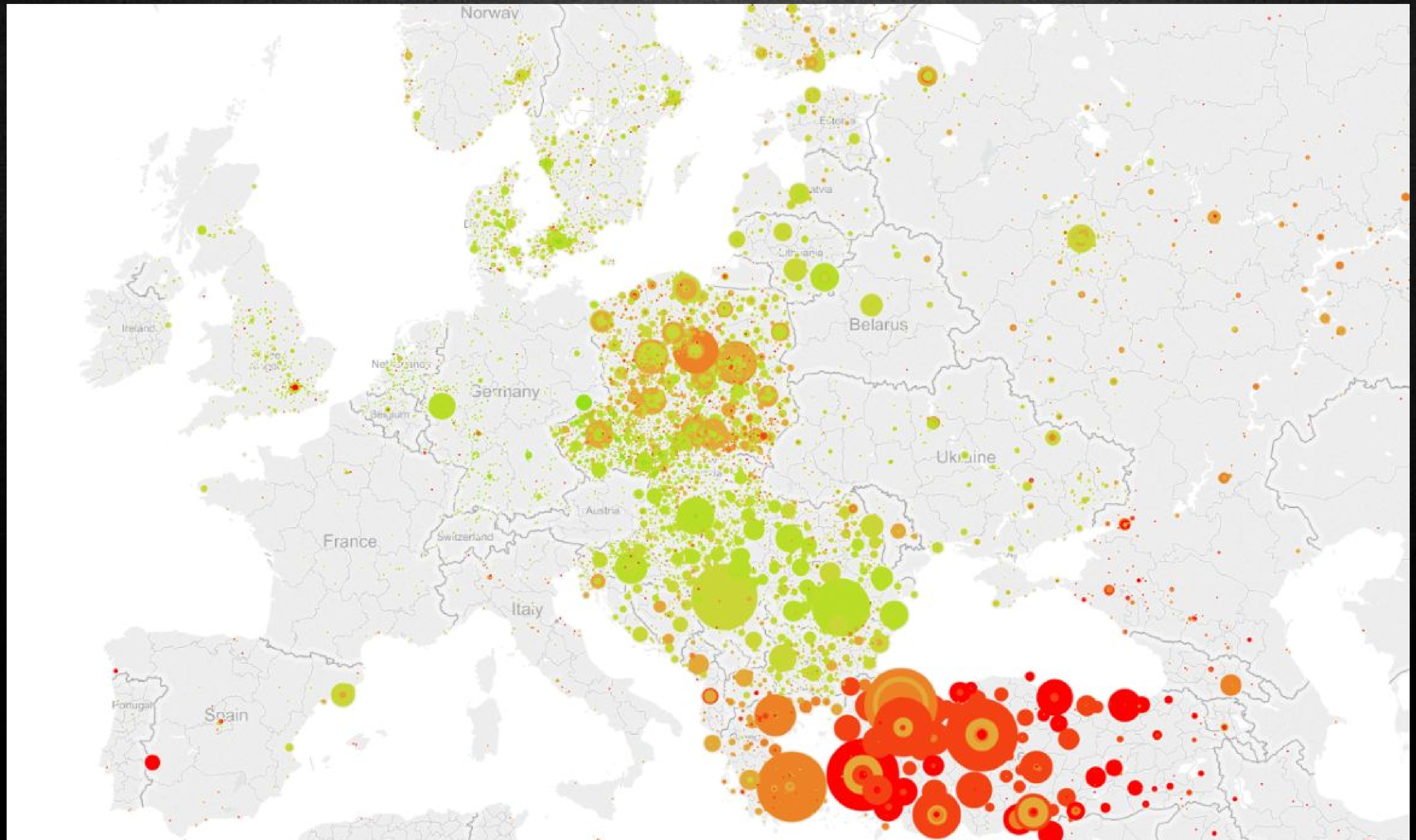
EUW Before (2014)



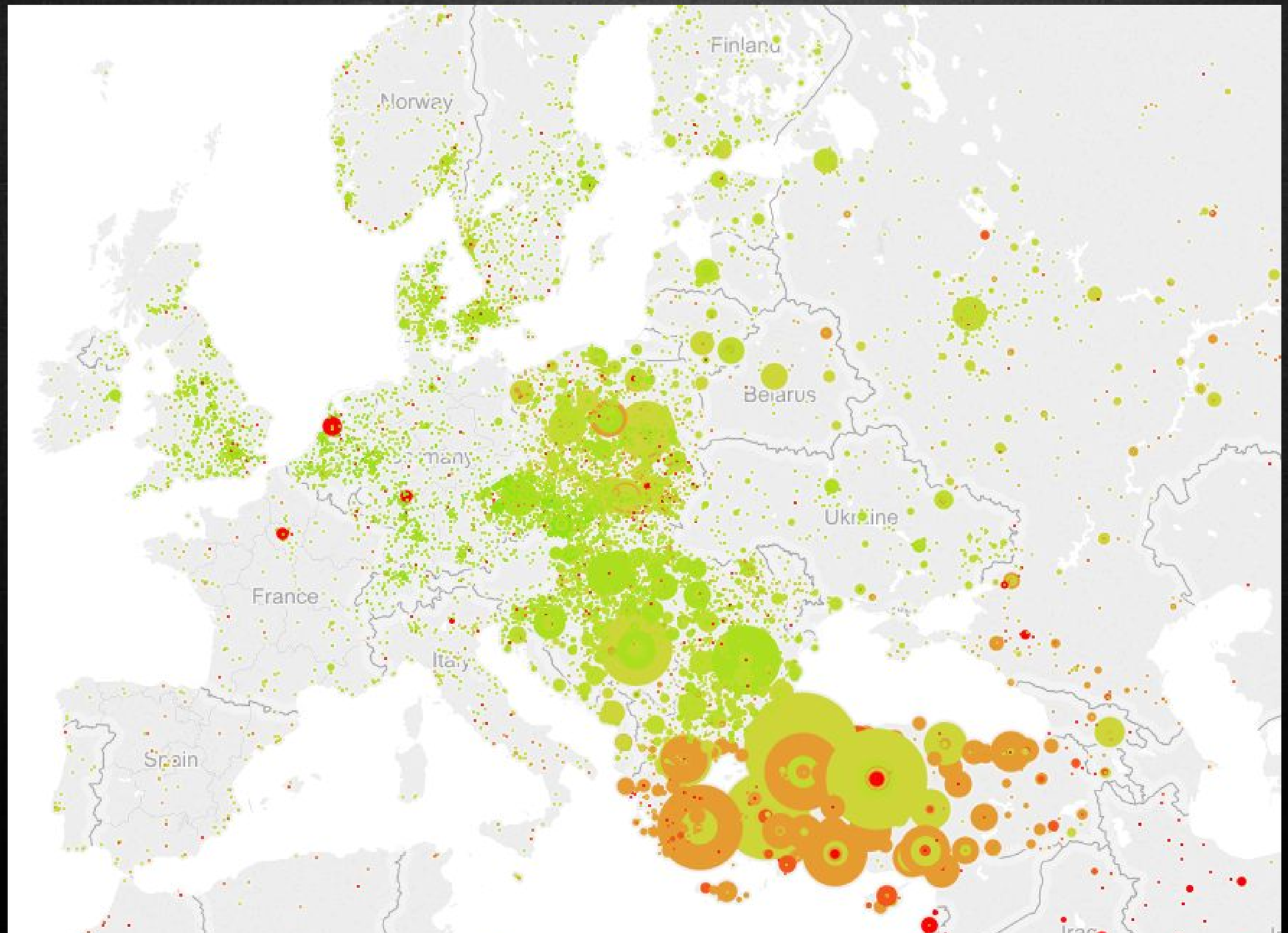
EUW After (May 2016)



EUNE Before (2014)

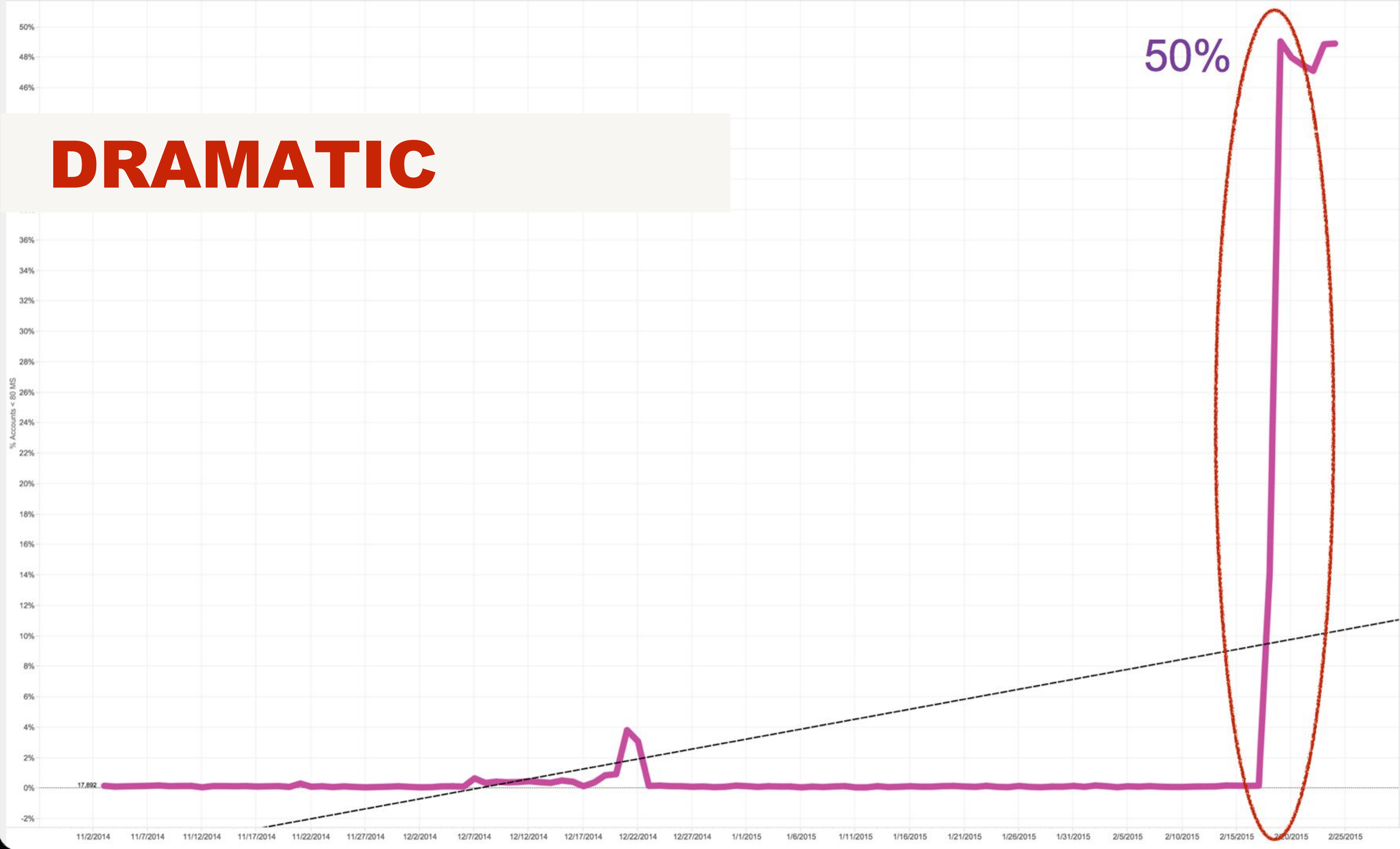


EUNE After (May 2016)



THREE WORDS TO DESCRIBE PEERING

DRAMATIC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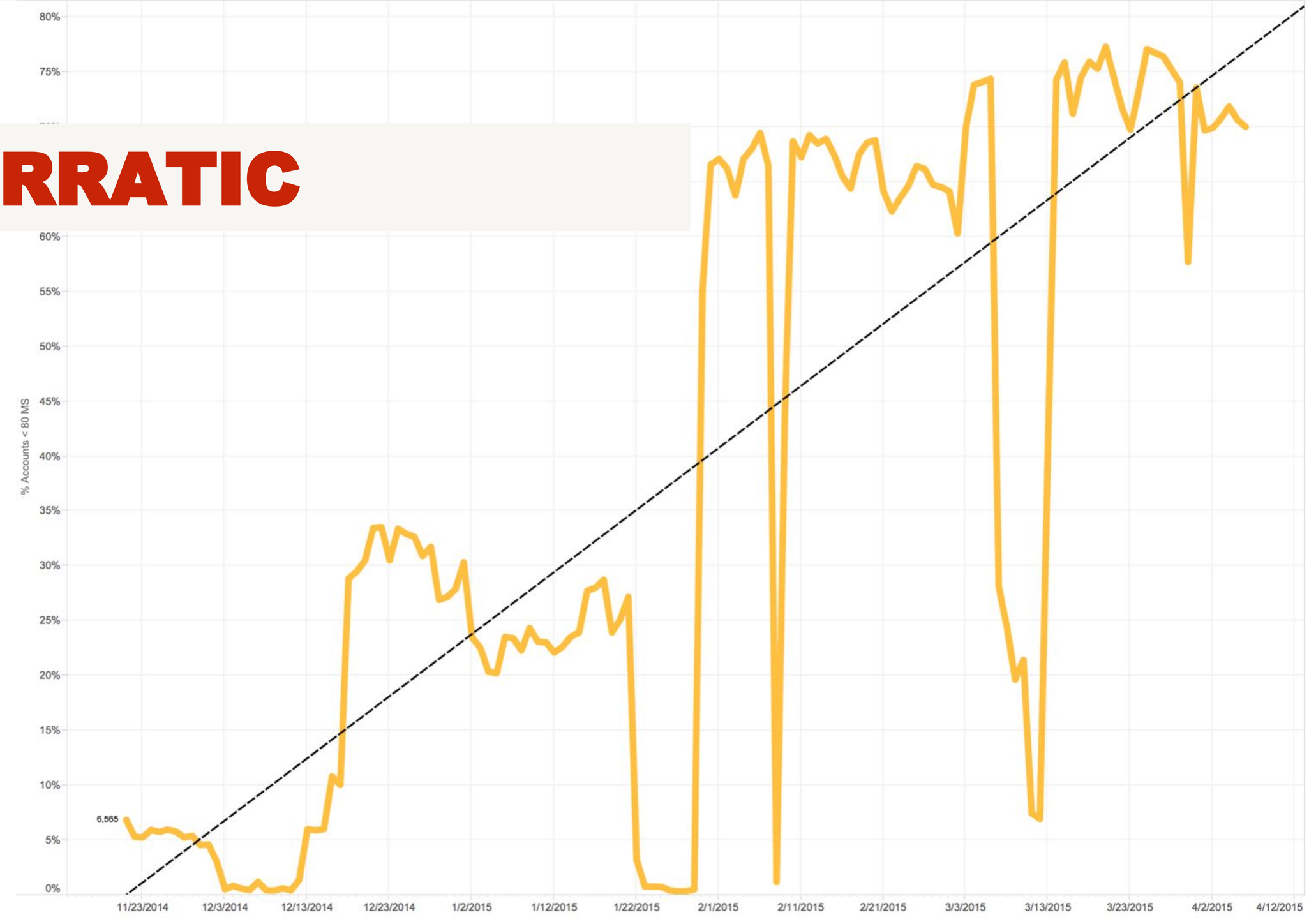
2/25/2015

ERRATIC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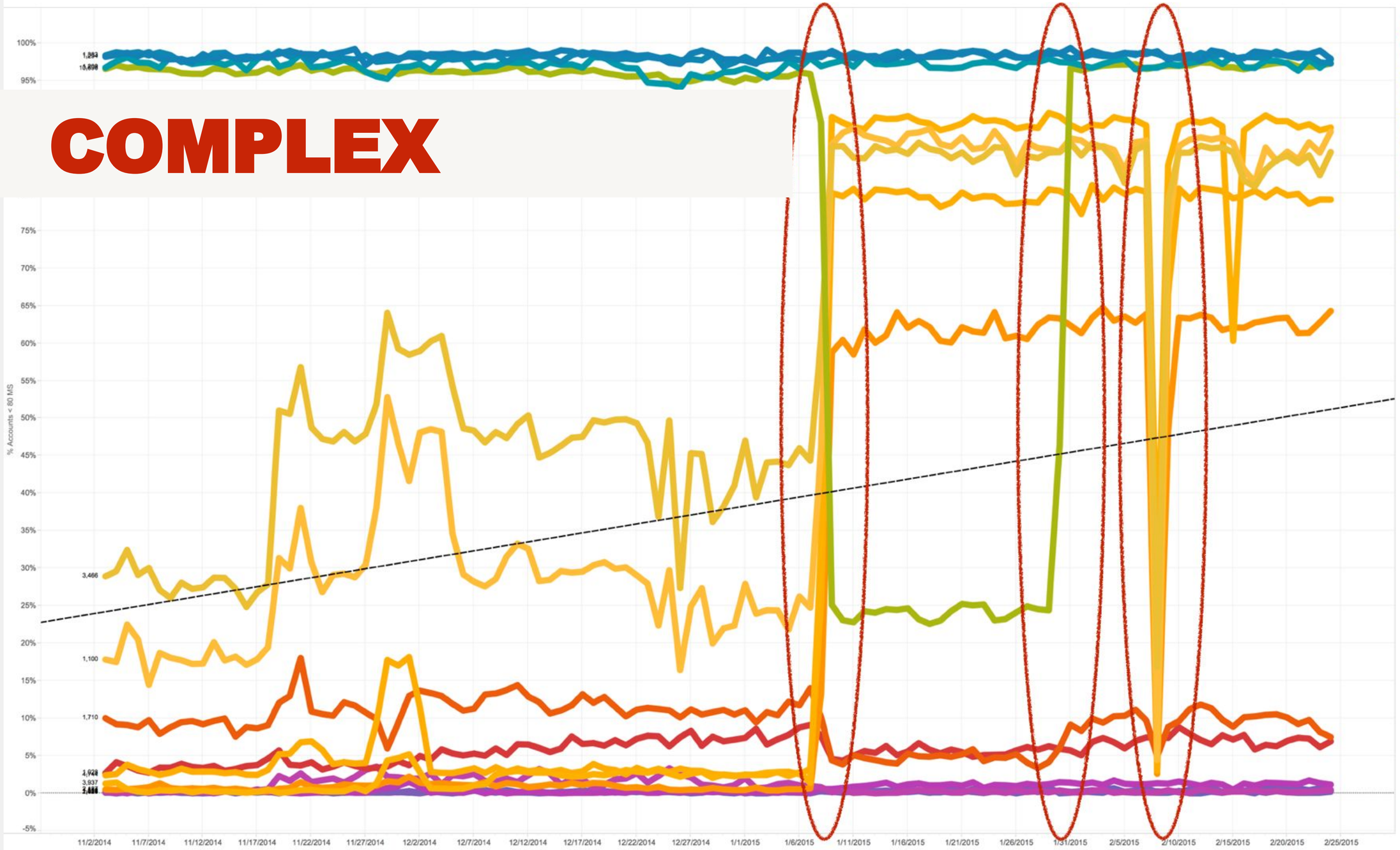
COMPLEX


ISP + Region
Charter Communications, WA
Charter Communications, OR
Charter Communications, NV
Charter Communications, CA
Charter Communications, MO
Charter Communications, IL
Charter Communications, MI
Charter Communications, WI
Charter Communications, MN
Charter Communications, TX
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2/20/2015
2/25/2015

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WHAT
ELSE?

- Faster Peering
- More Robust DDoS Mechanisms
- Dynamic and Scalable
- We might be building our own Routers

Q&A


Topper
GRÊMIO
anrisul
CAUTION
DON'T CHASE
Riot
GAMES

THANK YOU