IXP Traffic During Major Sport Events

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Outline

- Introduction to RIPE Labs
- IXP Project Background
  - FIFA World Cup 2010
- European Championship 2012
- Olympic Games 2012
- Conclusions

What is RIPE Labs?

- It's a website, but more importantly:
  - It is a platform and a tool **for the community**
  - Launched in Sept. 2009, constantly developed
- You can:
  - Test and evaluate new tools and prototypes
  - Contribute new ideas and research results
  - Provide feedback and discuss with others

http://labs.ripe.net/

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RIPE Labs

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- Share experience
- Showcase tools
- Present research

New contributions

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IPv6 RIPEness - More Stars

Emile Aben — Sep 26, 2012 03:25 PM

IPv6 RIPEness helped in creating awareness and got people into action with regards to their first steps towards deploying IPv6 in the RIPE NCC service region. Up until now IPv6 RIPEness didn't measure actual IPv6 deployment. In this article we propose a measure (a "5th star"), which attempts to measure actual IPv6 deployment at the edge.

Tags: statistics, ipv6

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2 comments

The 2012 IPv6 CPE Survey

Marco Hogewoning — Sep 26, 2012 03:01 PM

In response to a huge amount of demand, the RIPE NCC has conducted another survey on the level of IPv6 support for various vendor's Customer Premises

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Currently presented at #ripe65: IPv6 RIPEness - 5th Star, now on #RIPELabs: http://t.co/B2XCbtBb

Sep 26, 2012 03:26 PM

New on #RIPELabs: New version of IPv6 CPE Survey: http://t.co/QEz7yylN

Sep 26, 2012 03:19 PM

New on #RIPELabs: RIPE Atlas: A DENIC Case Study by Peter Koch: http://t.co/xLaulnvJ

Sep 25, 2012 02:48 PM

New on #RIPELabs: Counting DNSSEC by Geoff Huston: http://t.co/DFyVFjJN

Sep 24, 2012 10:06 AM

RIPE NCC presentations and ways to meet staff at RIPE 65: http://t.co/3Wwcy04A

Sep 20, 2012 02:31 PM

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Popular Content on RIPE Labs

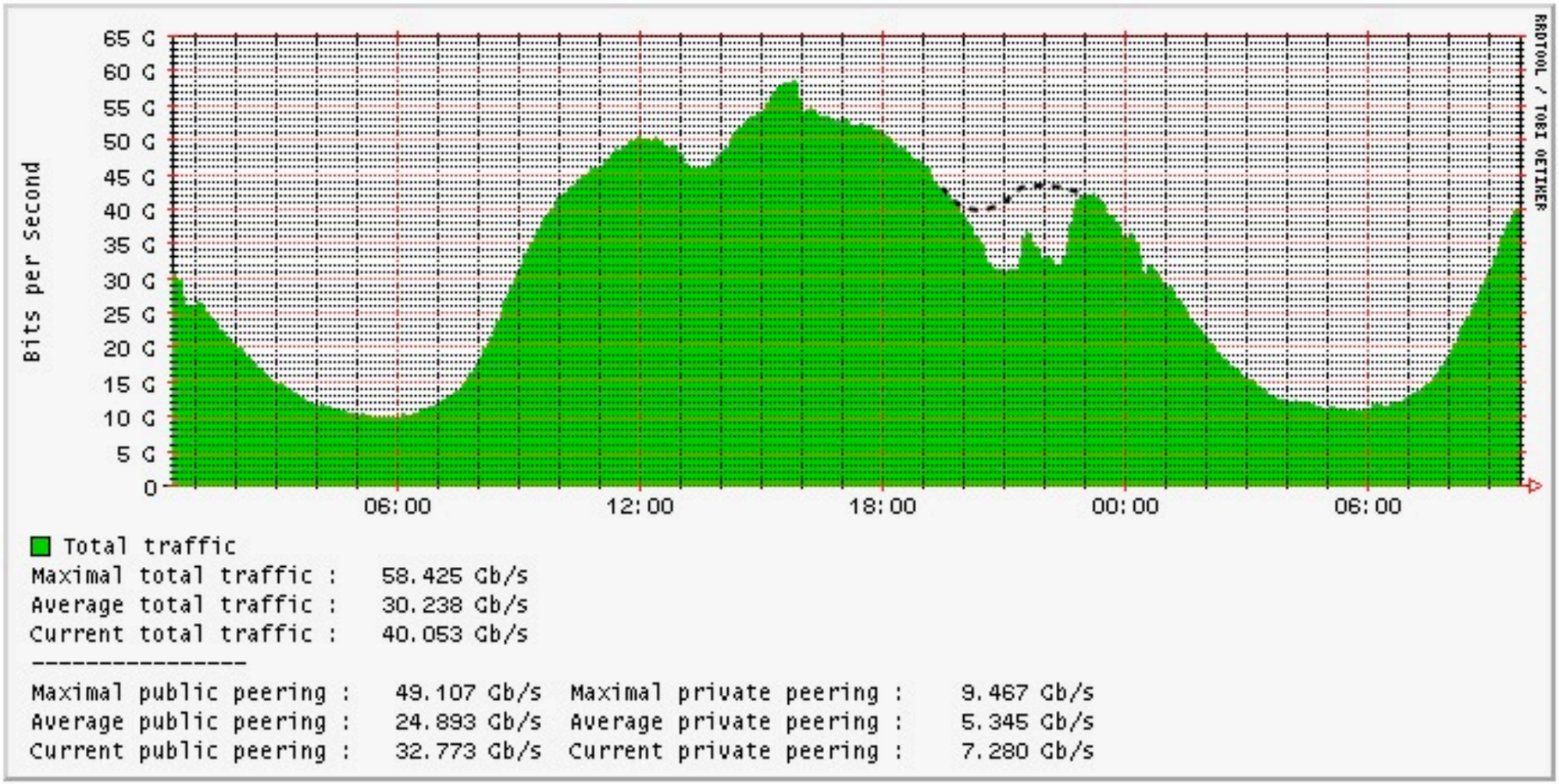
- IPv6 related topics
  - IPv6 CPE Survey, IPv6 Matrix, IPv6 by Members etc.
- Tools & Prototypes
  - RIPEstat, RIPE Atlas, IP Analyser, RIPE DB API etc.
- Statistics
  - IPv4, IPv6, RPKI, Routing, DNSSEC etc.
  - http://labs.ripe.net/statistics
- And a lot more

FIFA World Cup 2010

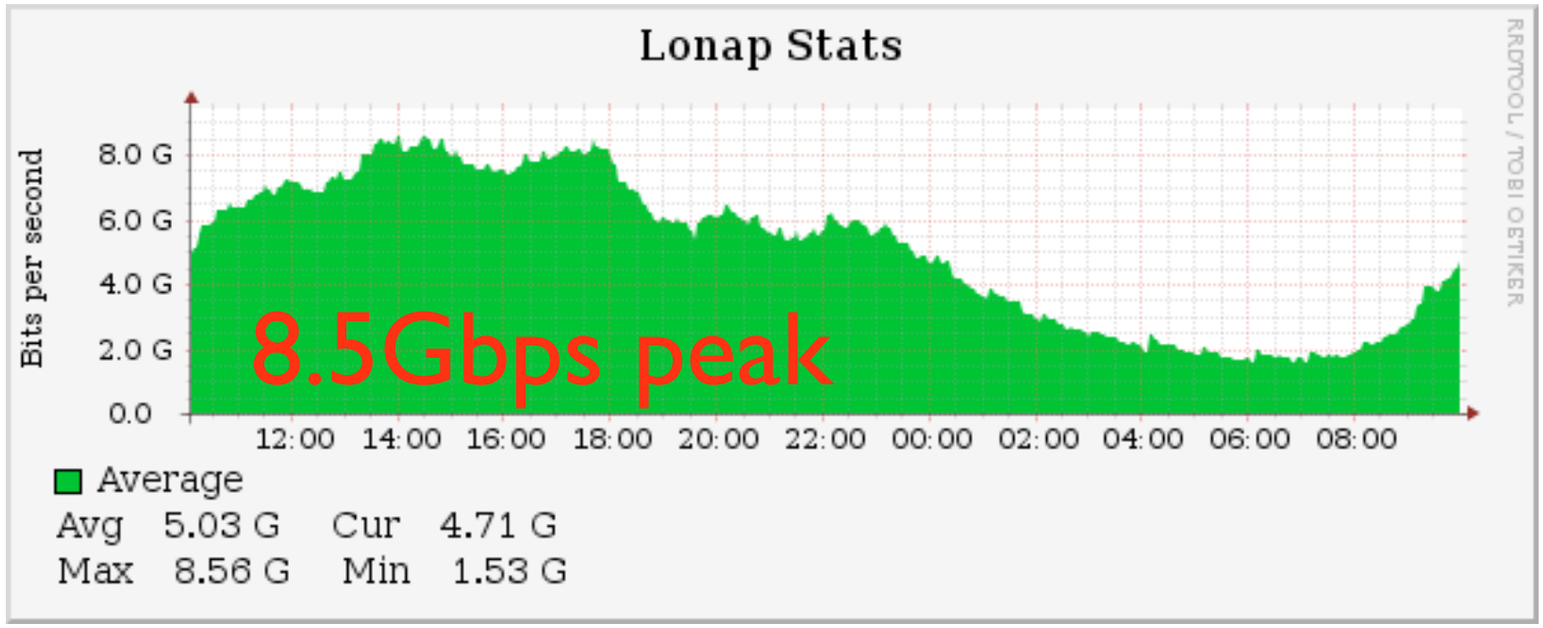
- Euro-IX looked at IXP traffic statistics during World Cup 2010 in South Africa
- Traffic variations
- Match-by-match traffic analysis
- Stats from IXPs in participating countries
- Aggregated stats from 51 IXPs

FIFA World Cup 2010

- Italy vs. Paraguay
- MIX Milan - clear drop in IXP traffic during match



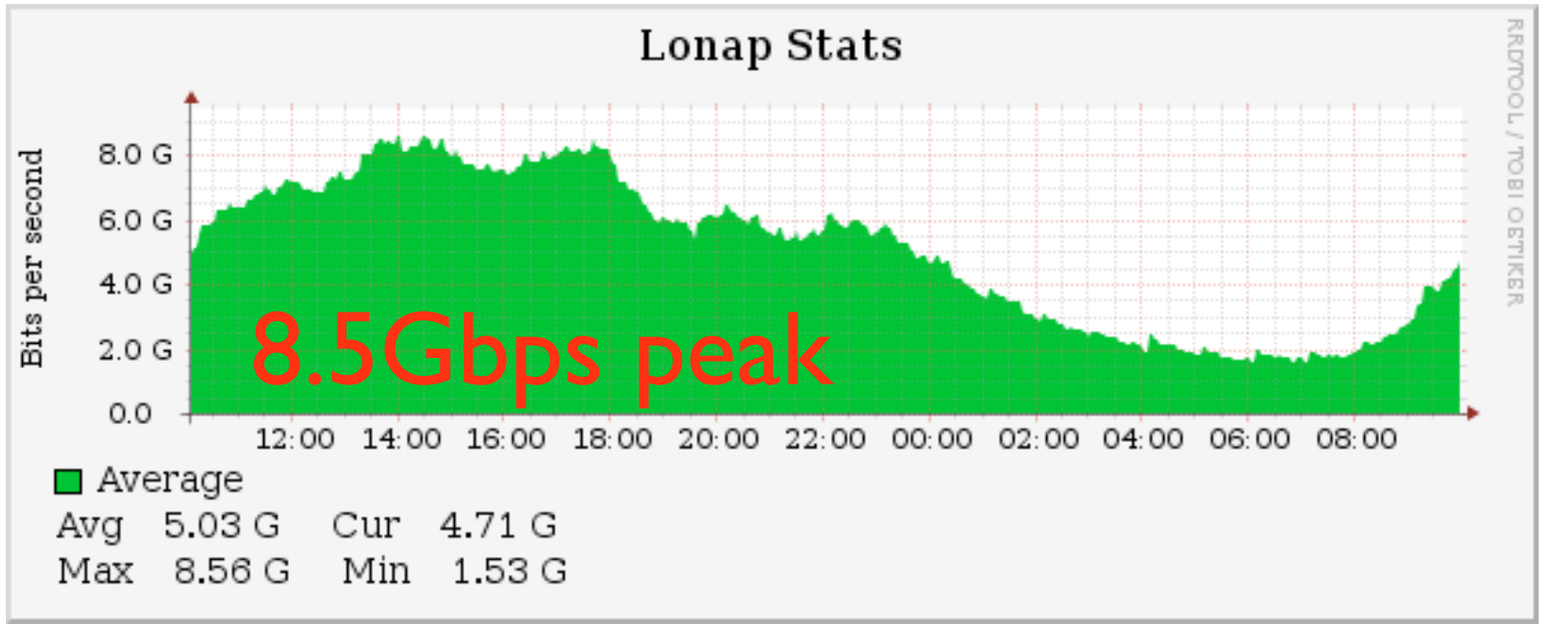
FIFA World Cup 2010



- LONAP (London) traffic on a ‘normal’ weekday

- Wed. afternoon WC 2010 England vs Slovenia

FIFA World Cup 2010



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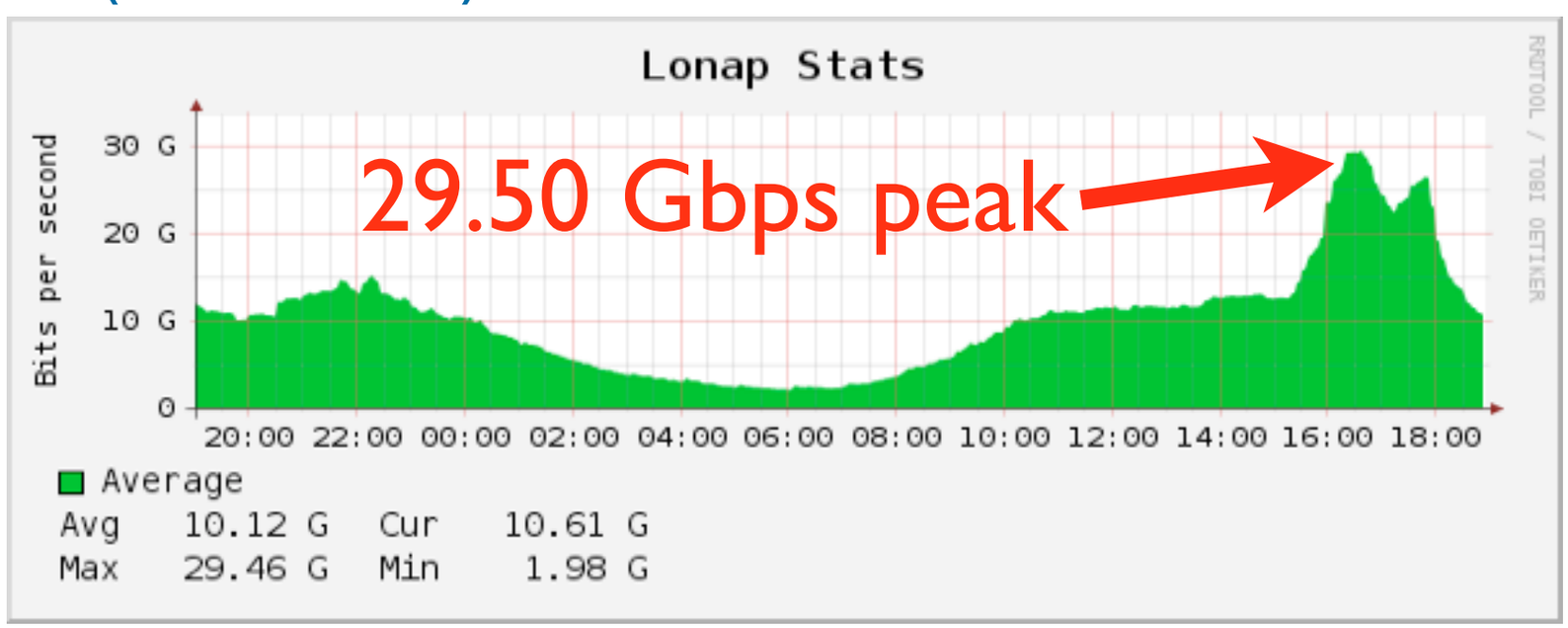


- Wed. afternoon WC 2010 England vs Slovenia

UEFA

EURO2012

POLAND-UKRAINE

Euro Championship 2012

- Great Collaboration between Euro-IX & RIPE NCC
- Euro-IX asked for IXP volunteers to provide data
- 15 Euro-IX member IXPs participated
- Observed some interesting patterns during football matches

Five Articles during Matches

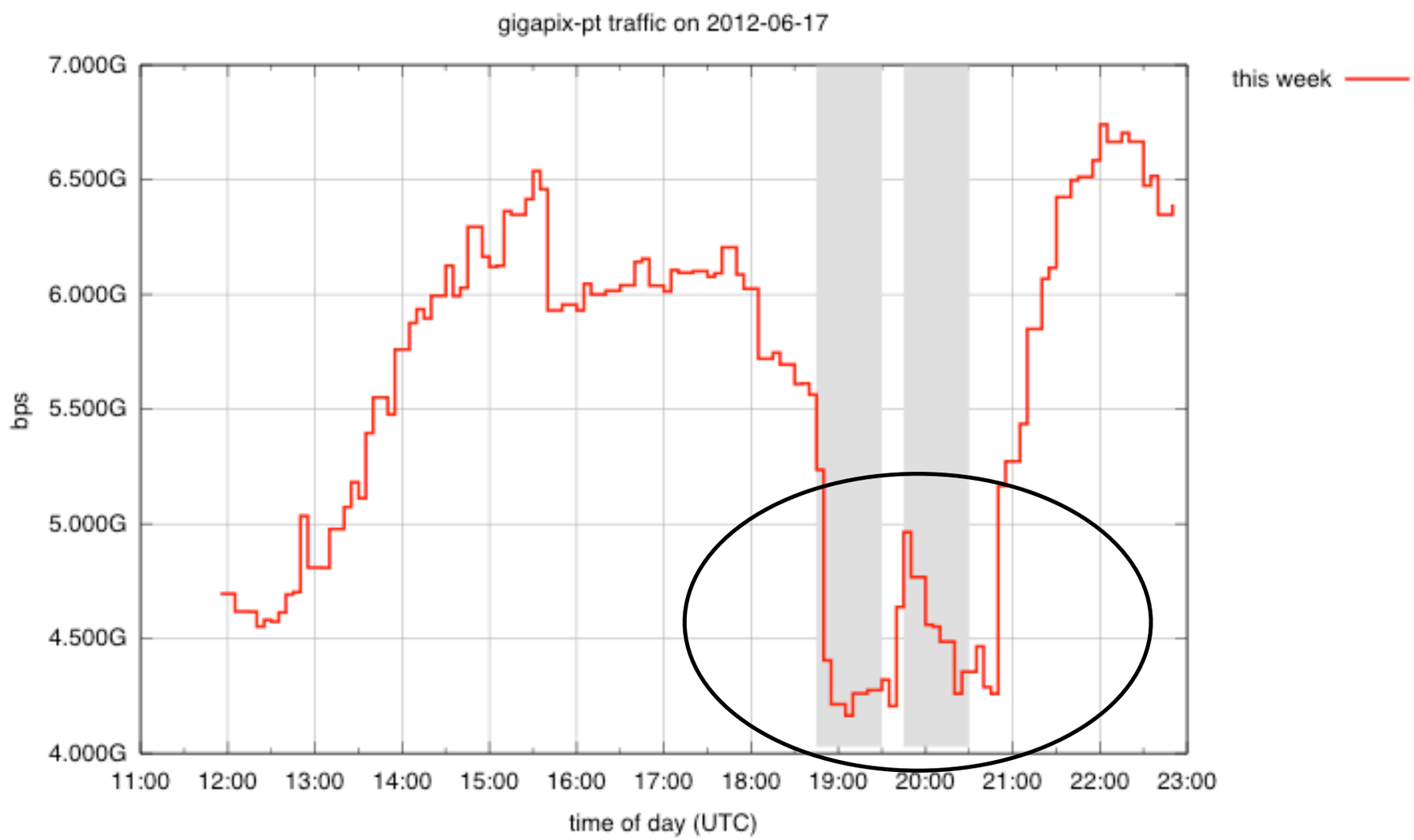
- Preparations before Euro 2012
- After first round of group matches
- At the end of the group stages
- After quarter finals
- Final conclusions after Euro 2012

What Do We See at an IXP?

- It depends on:
  - Who is participating at the IXP
  - Private interconnect vs. public peering over the IXP peering LAN (we only see traffic volumes of the latter)
  - Is end user to content distribution traffic traversing the IXP or not?

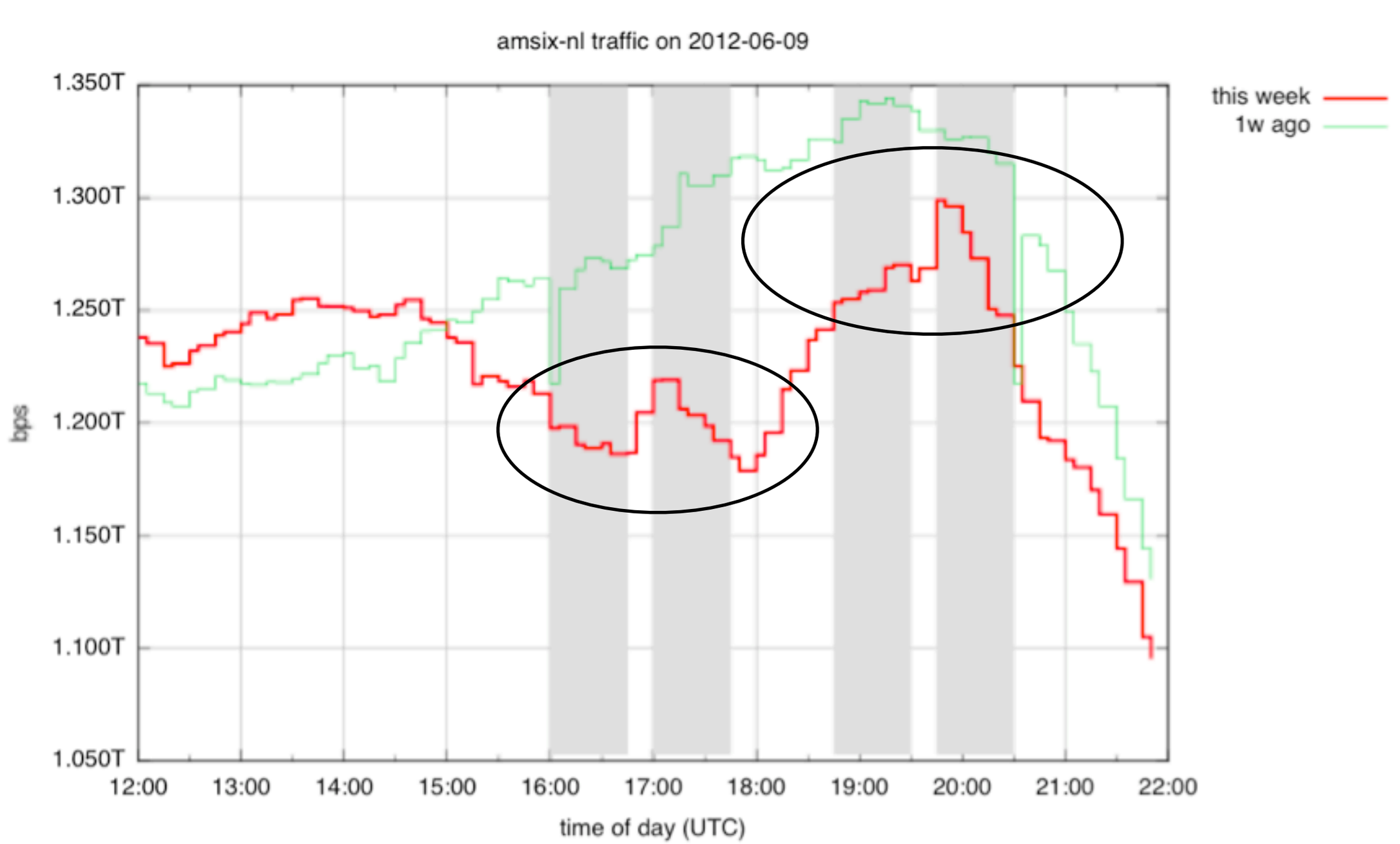
Typical Patterns during Match (1)

- Double dip during first and second half
  - GIGAPIX: Portugal vs Netherlands



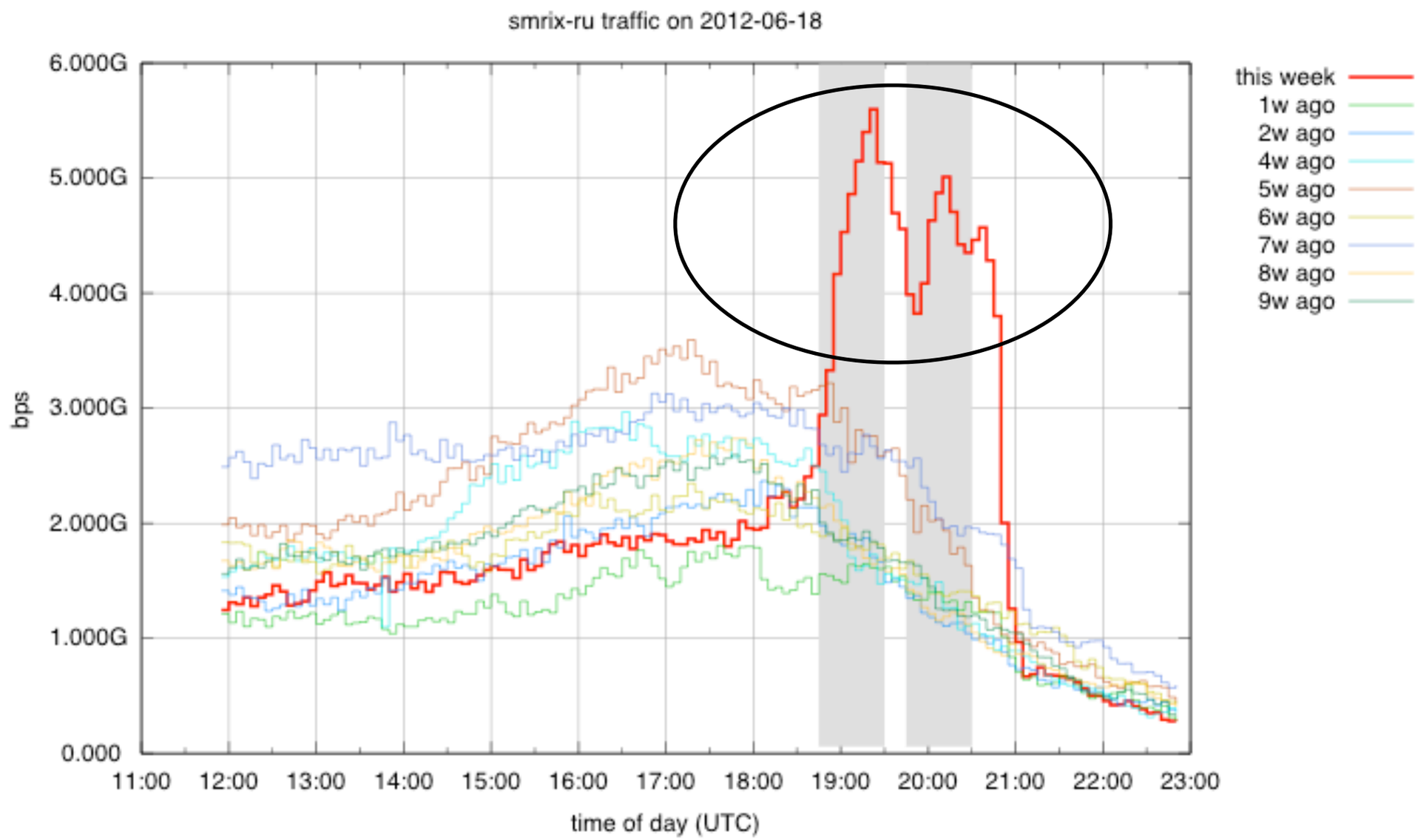
Typical Patterns during Match (2)

- AMS-IX: First match: NL vs Denmark
- AMS-IX: Second match: Germany vs Portugal



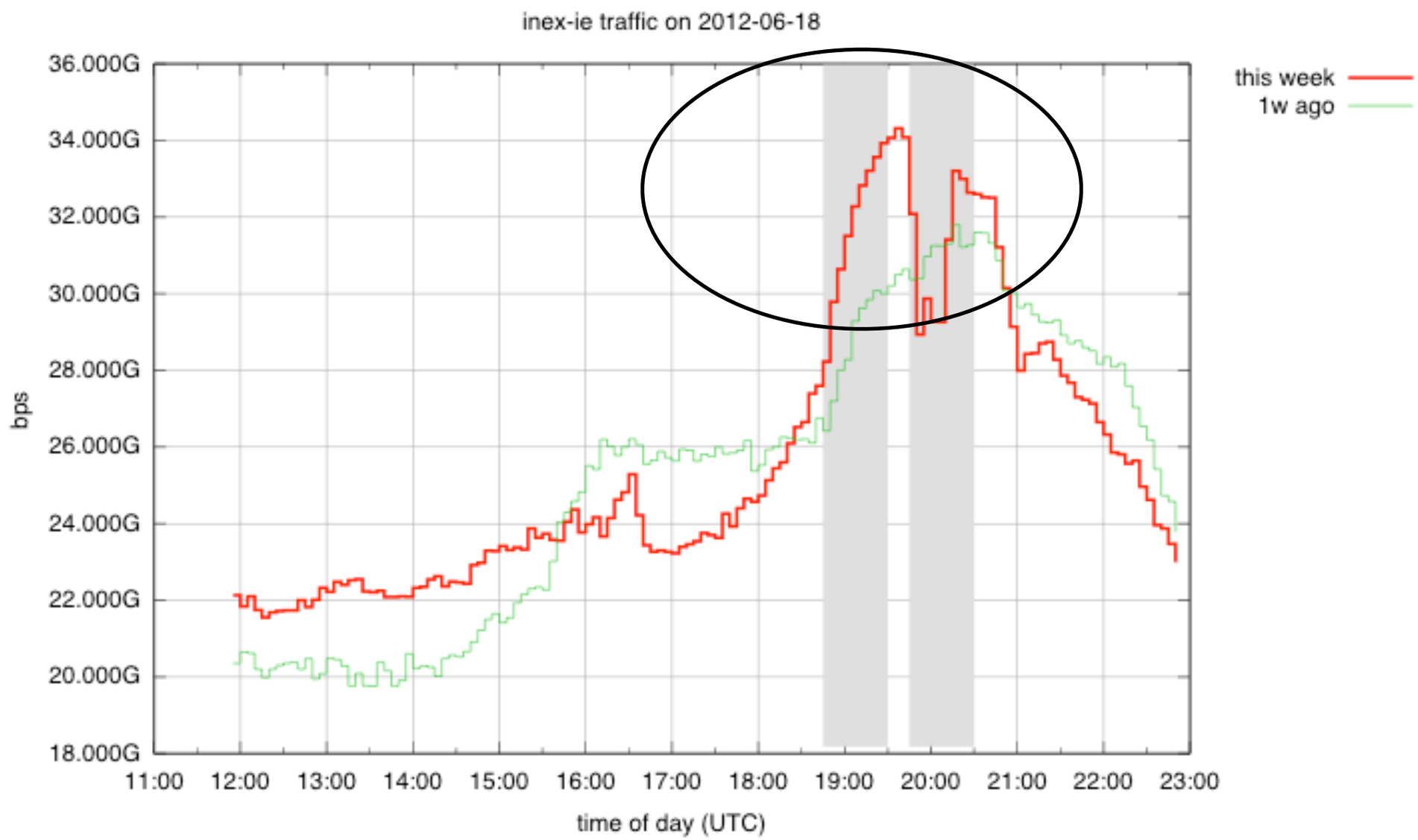
Typical Patterns during Match (3)

- Double bump (traffic increase of around 90%)
- Samara-IX: Spain vs Croatia and Ireland vs Italy



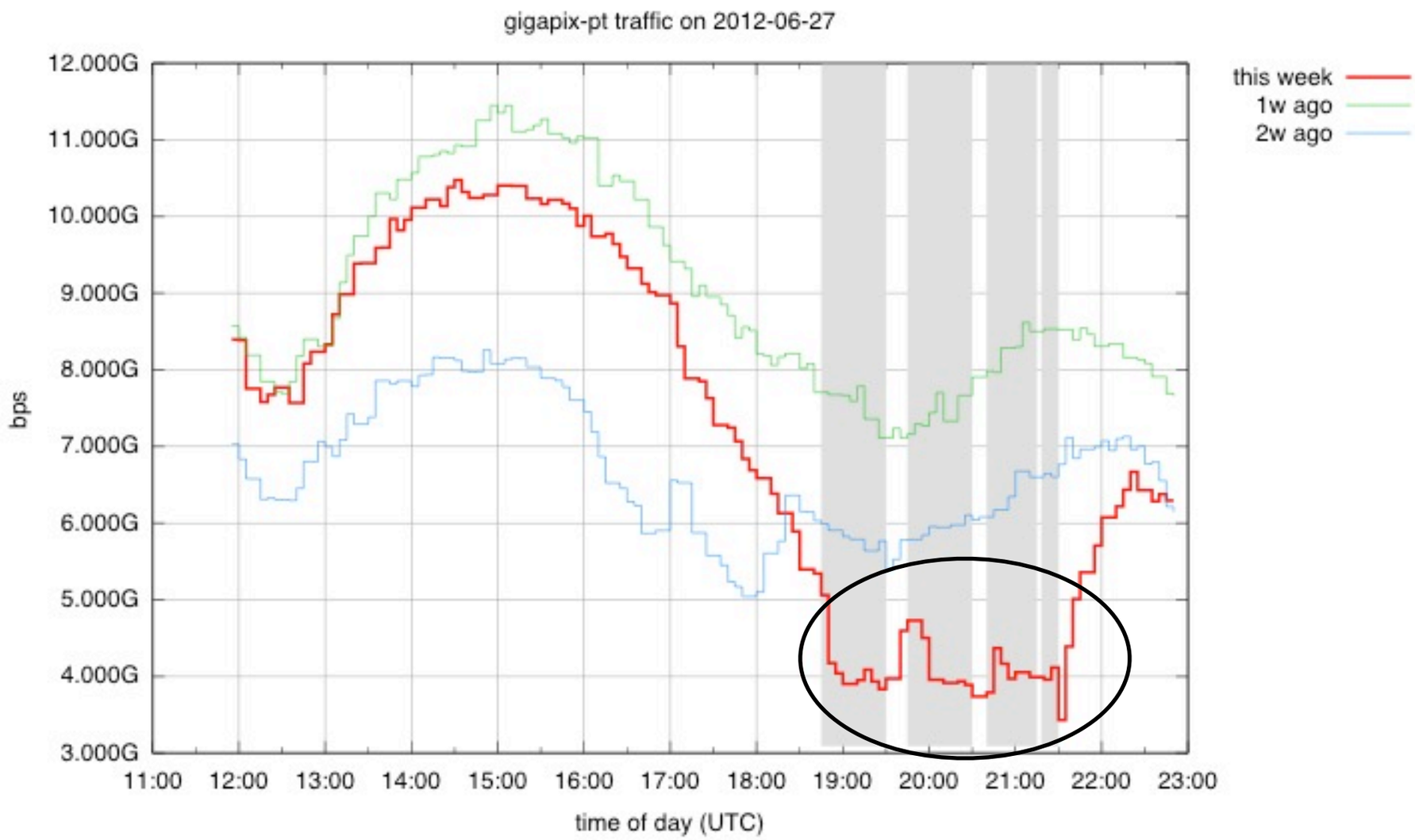
Typical Patterns during Match (4)

- INEX: Ireland vs Italy
- Irelands last match of series
- This was record peak traffic at INEX (34 Gbps)



Other Interesting Patterns

- Semi-final Spain-Portugal with penalties
  - Triple dip at GIGAPIX (Portugal) [Spain won]



LONDON
2012

Olympic Games 2012 (1)

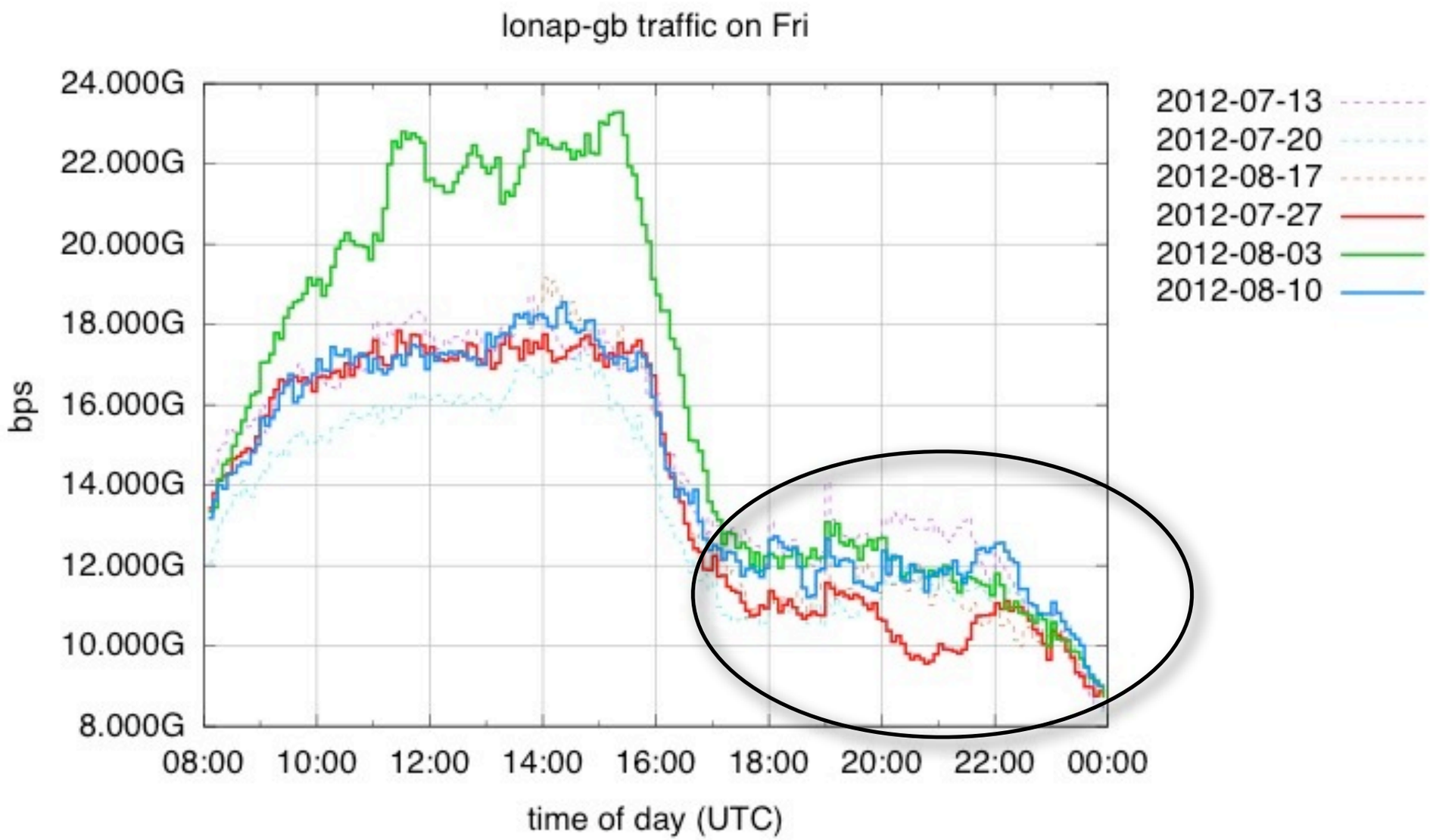
- Expected different patterns due to different spread of events during Olympics
- More difficult to identify typical pattern
- Events took place both during office hours and in the evenings
- We could correlate certain patterns in traffic with certain popular sport events during Olympics

Olympic Games 2012 (2)

- We took multiple samples of weekly snapshots of the IXP traffic patterns
- On the same day of the week both one and two weeks before the event took place
- On the same day of the week both one and two weeks after the event

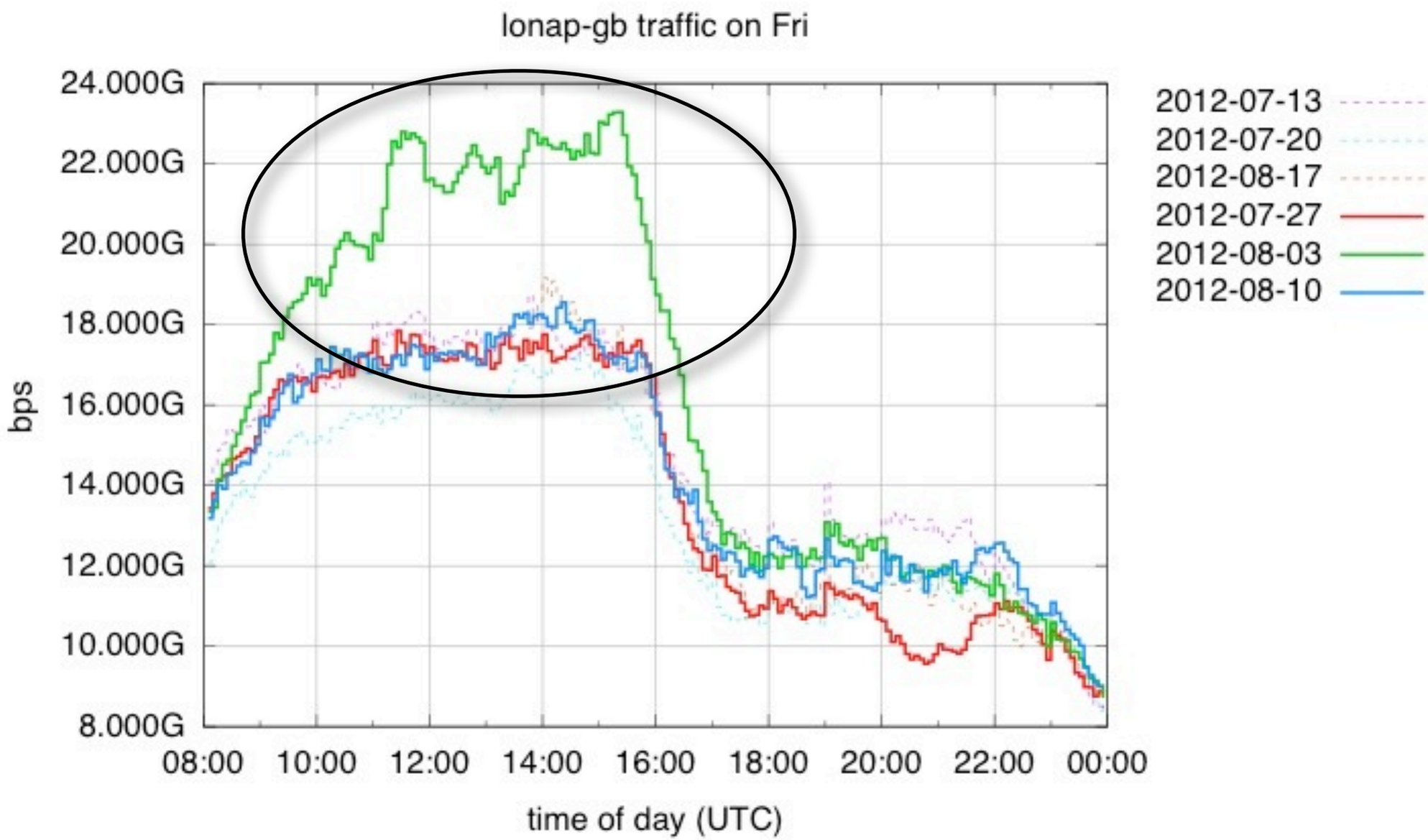
Popular Events out of Office Hours

- LONAP: Opening ceremony in evening (red line)



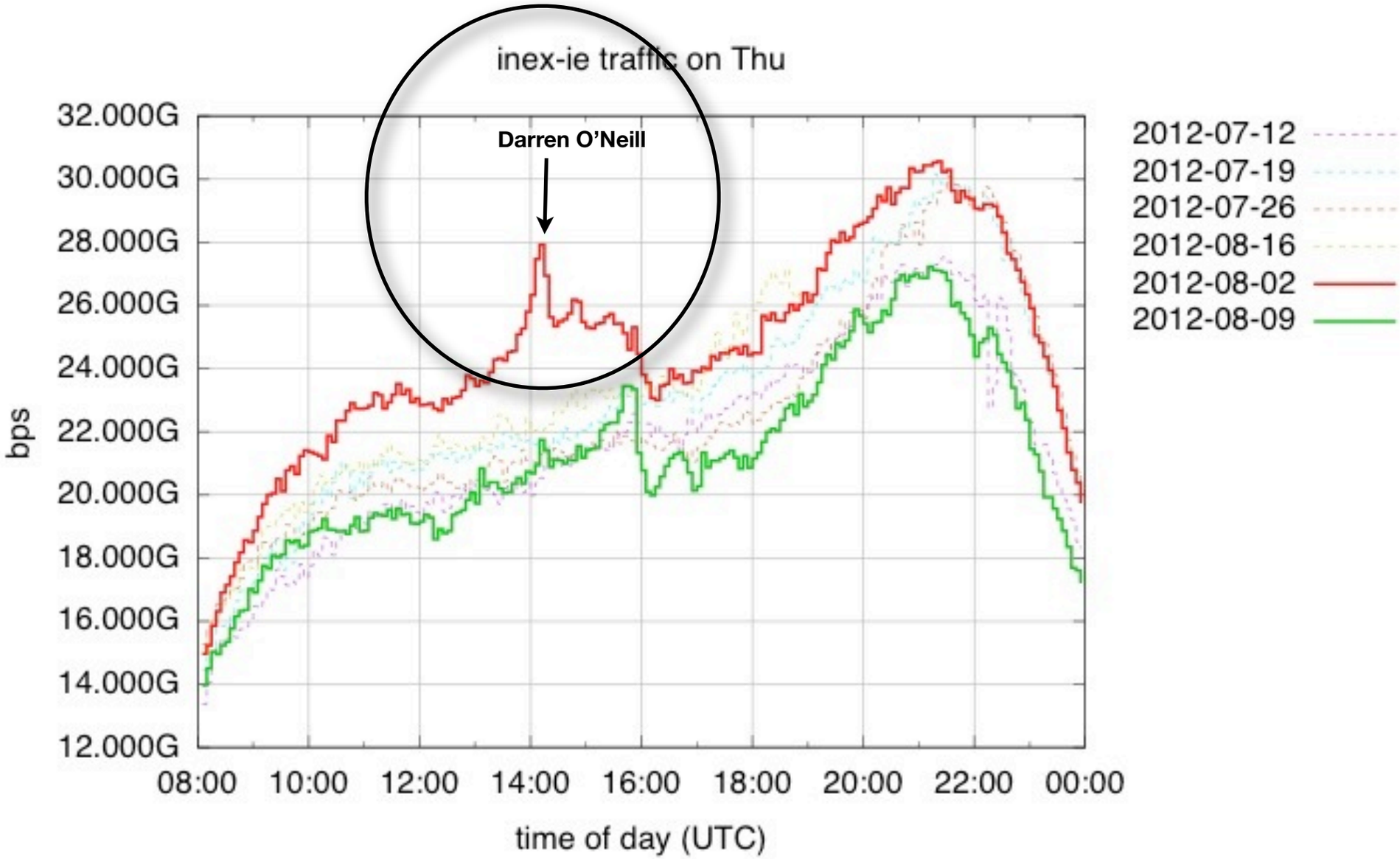
Popular Events during Office Hours

- LONAP: Friday during office hours
  - Heptathlon, cycling, tennis in the UK (green line)



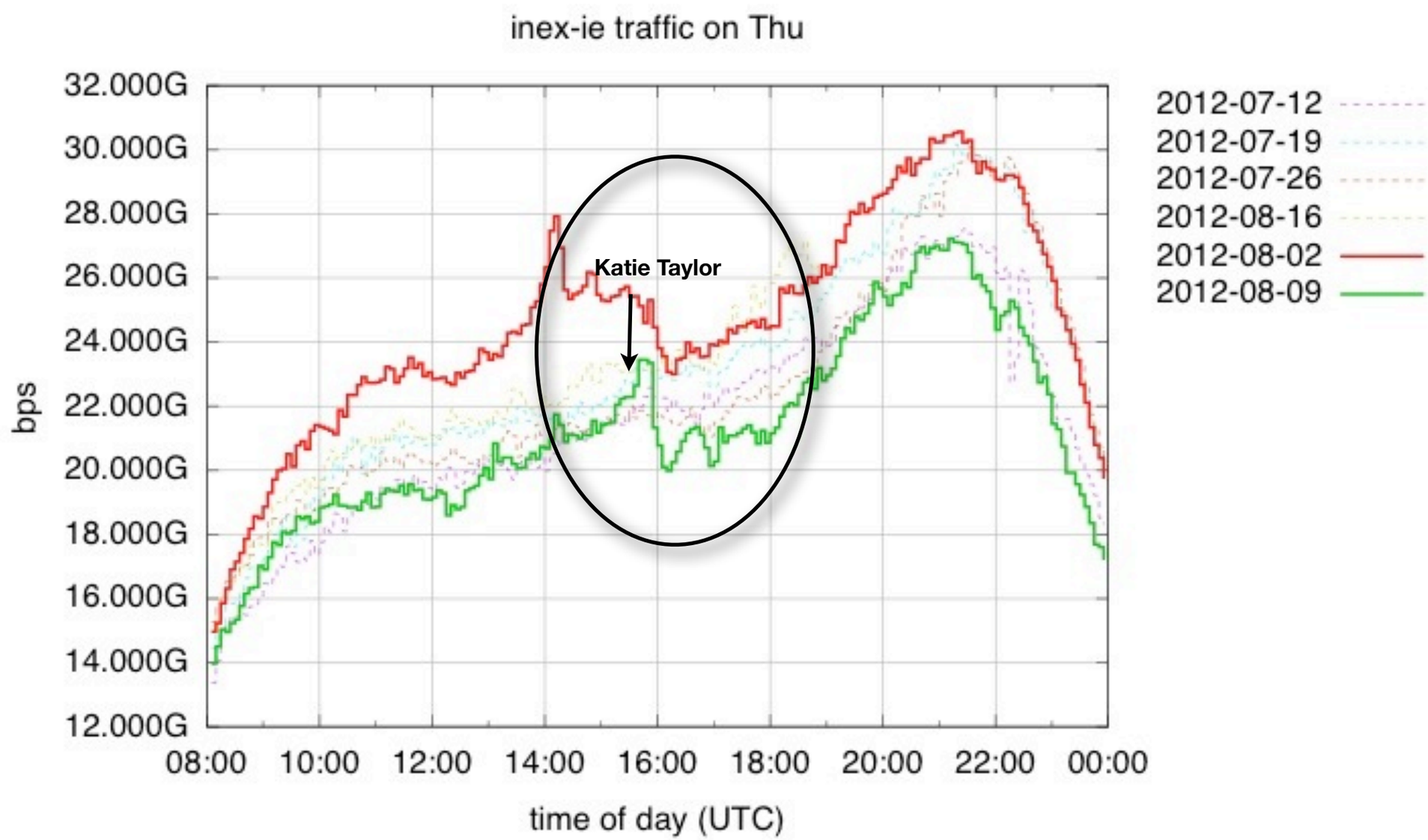
Popular Event in a Country (1)

- Boxing in Ireland - INEX (Dublin) office hours



Popular Event in a Country (2)

- Boxing in Ireland - INEX (Dublin) office hours



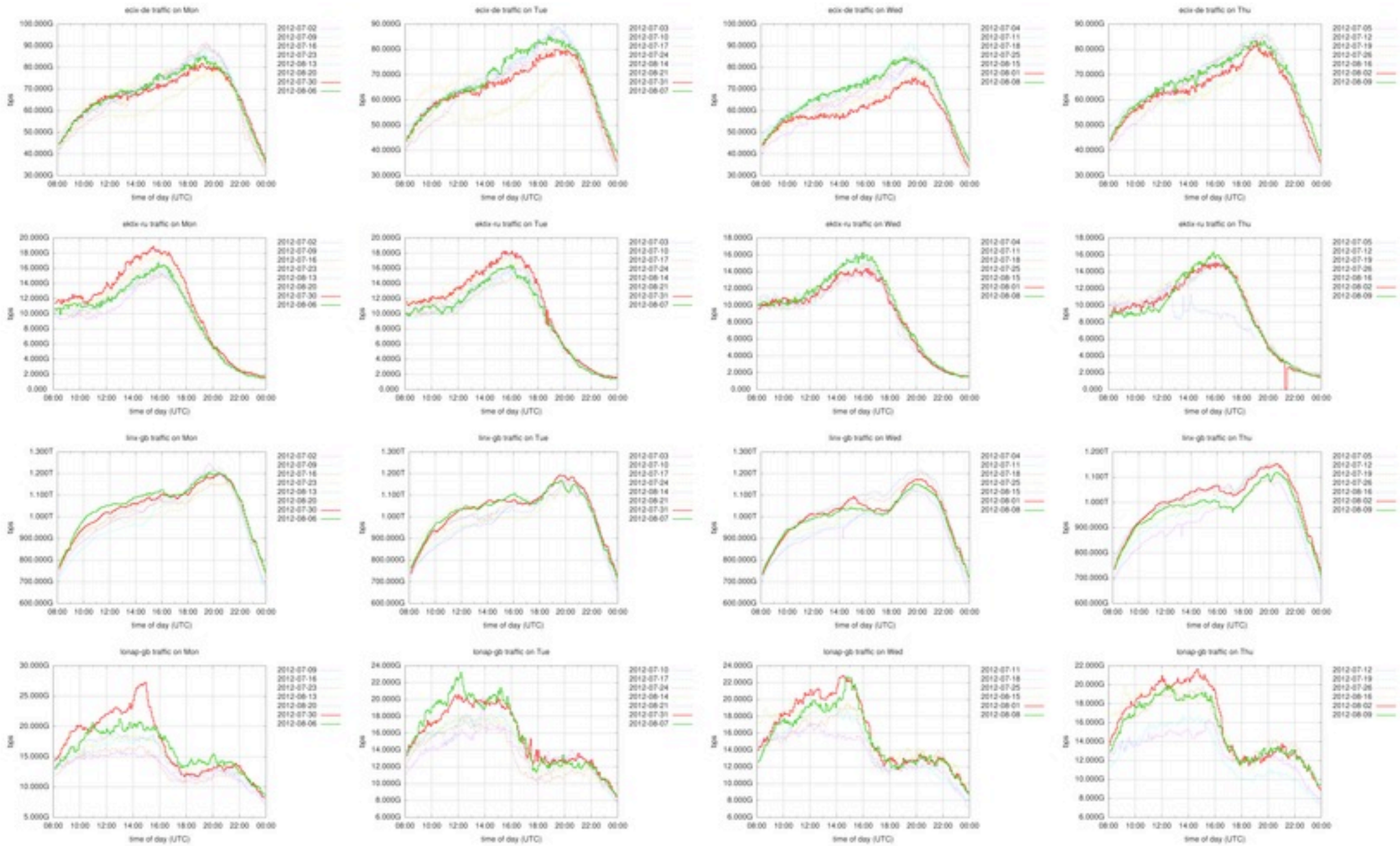
Overview Page of IXP Data (Snapshot)

ecix-de

ektix-ru

linx-gb

lonap-gb



RIPE Atlas Measurements

- How much traffic is exchanged at the IXPs?
- IPv4-traceroute to www.bbc.co.uk from 161 RIPE Atlas probes located in the UK
  - for 28 probes traceroute went through LONAP
  - for 55 probes traceroute went through LINX
  - the other half (78 probes) took other routes
- Gives an idea what we measure when looking at IXP traffic levels

Main Conclusions

- Great collaboration & participation
  - by Euro-IX IXPs
  - by RIPE Labs participants
- Major sporting events seem to be having a greater impact on IXP traffic volumes
- Discovered typical pattern for football matches
- Despite big peaks at times, Internet can cope
- Good exercise for other major events
  - Can we find patterns for certain events?

Thanks to the IXPs that Took Part!

Links & References

- Euro-IX Website
  - http:www.euro-ix.net/

- All articles on RIPE Labs
  - https://labs.ripe.net

- All the Olympics 2012 IXP graphs:
  - http://albatross.ripe.net/demo-area/ixp-olympics/

Questions?