

IXP Traffic During Major Sport Events

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Outline

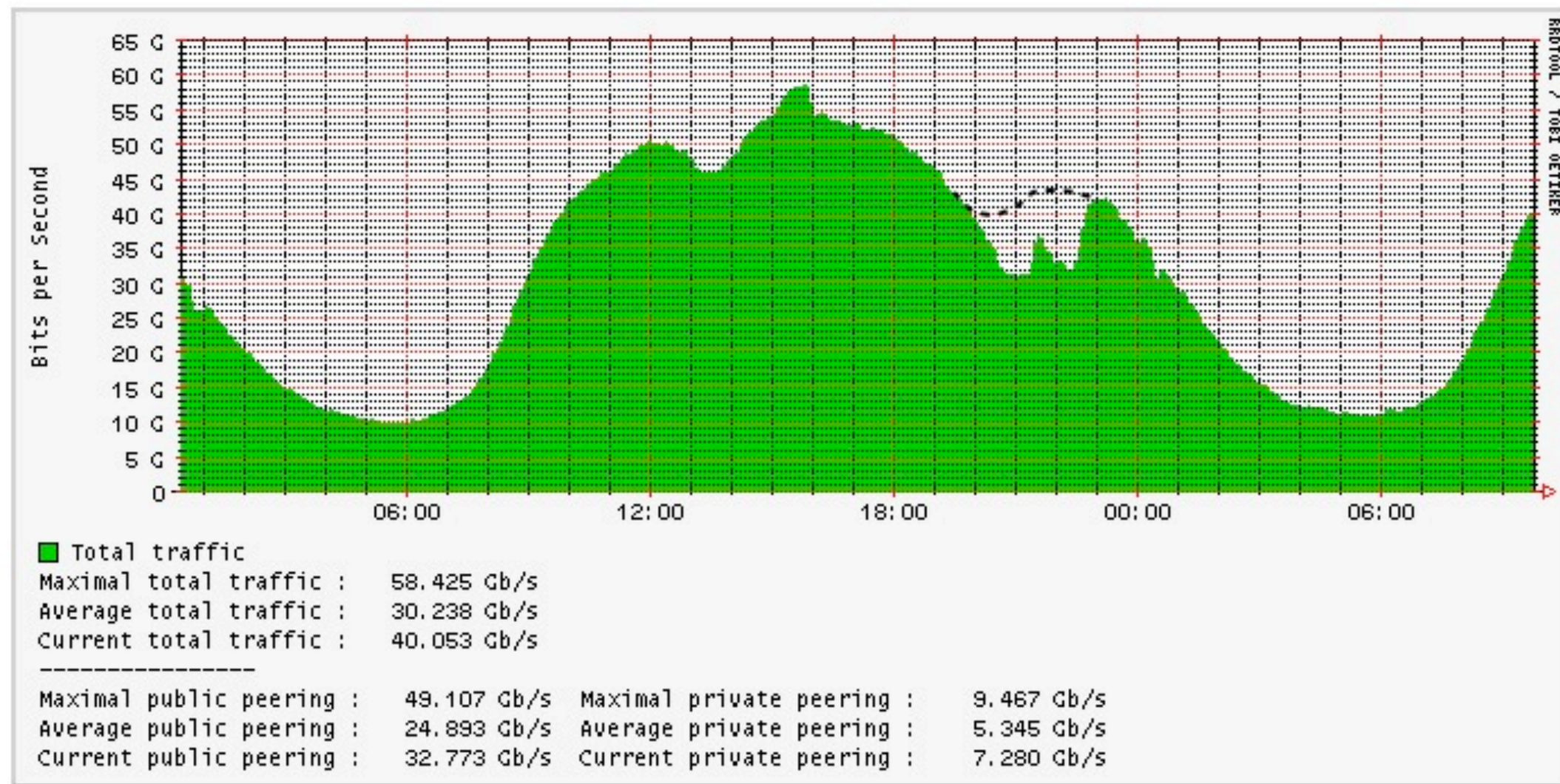
- FIFA World Cup 2010
- European Championship 2012
- Olympic Games 2012
- Conclusions

FIFA World Cup 2010

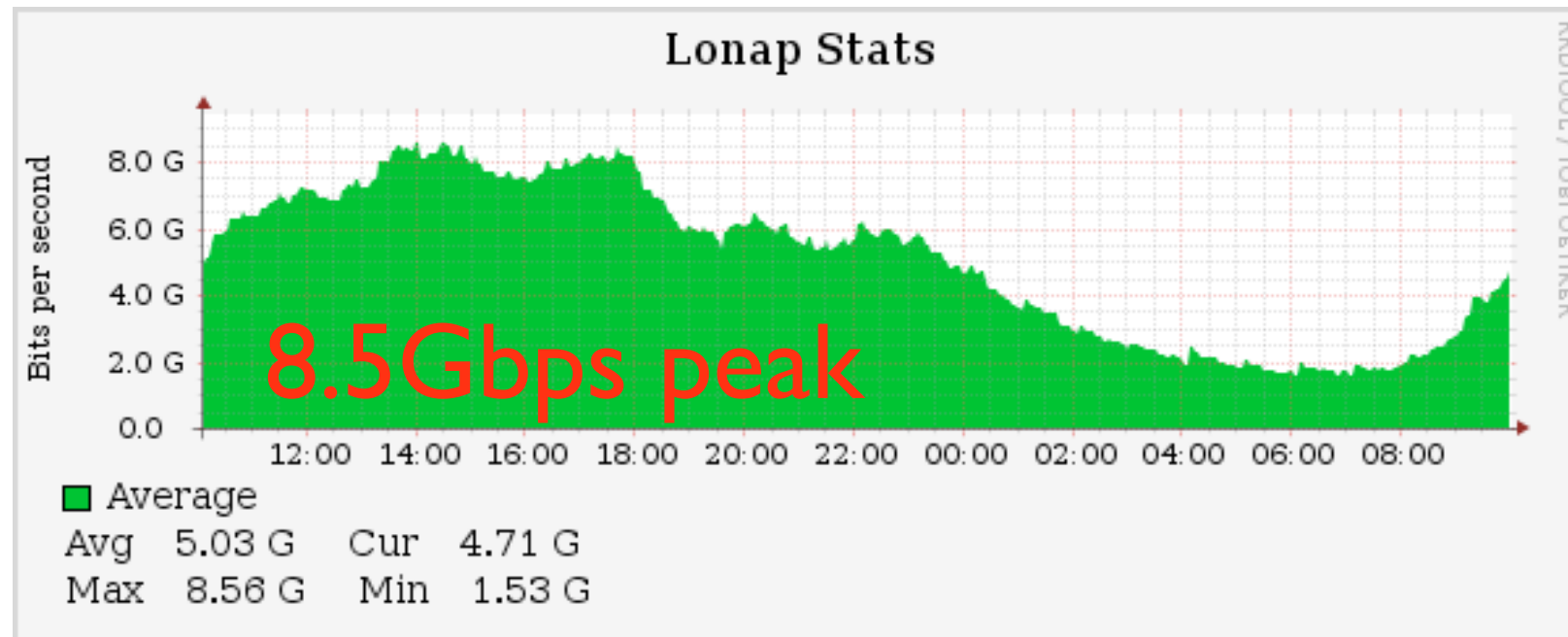
- Euro-IX looked at IXP traffic statistics during World Cup 2010 in South Africa
- Traffic variations
- Match-by-match traffic analysis
- Stats from IXPs in participating countries
- Aggregated stats from 51 IXPs

FIFA World Cup 2010

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

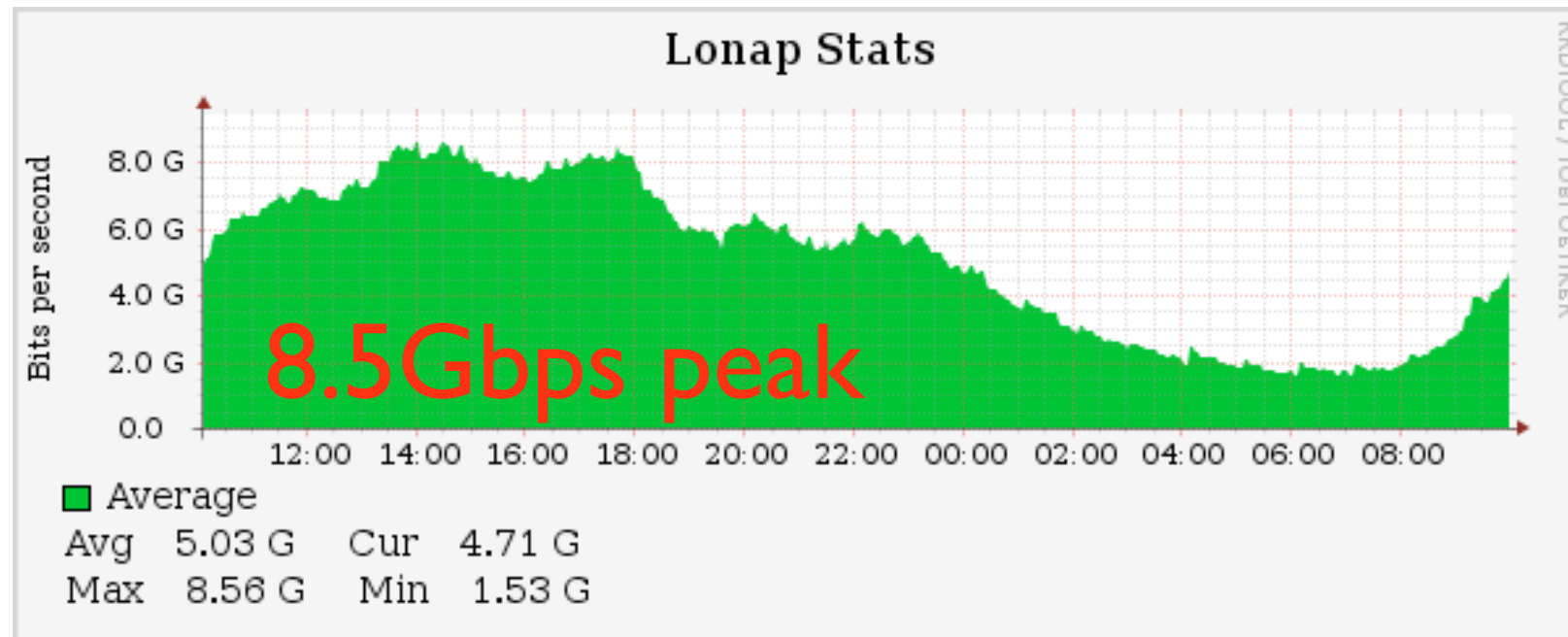


FIFA World Cup 2010

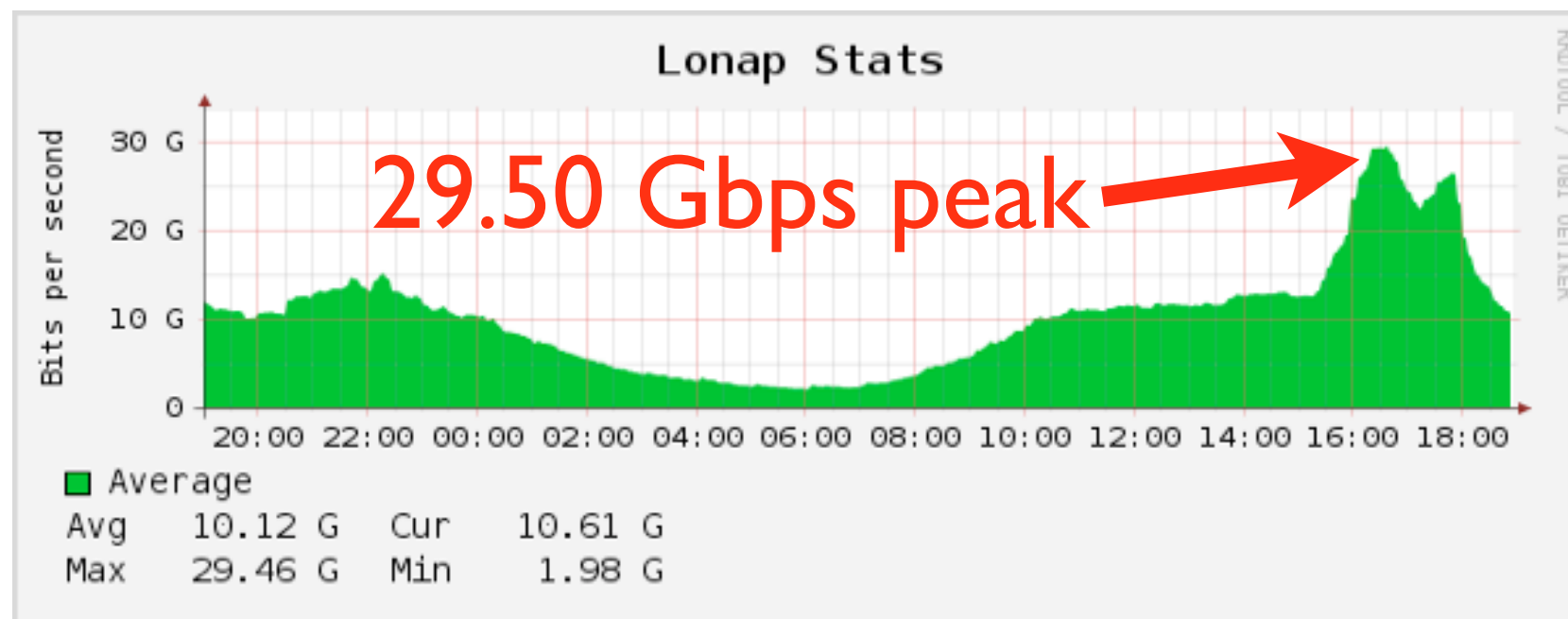


- LONAP (London) traffic on a 'normal' weekday
- Wed. afternoon WC 2010 England vs Slovenia

FIFA World Cup 2010



- LONAP (London) traffic on a 'normal' weekday



- Wed. afternoon WC 2010 England vs Slovenia



UEFA
EURO2012
POLAND-UKRAINE

Euro Championship 2012

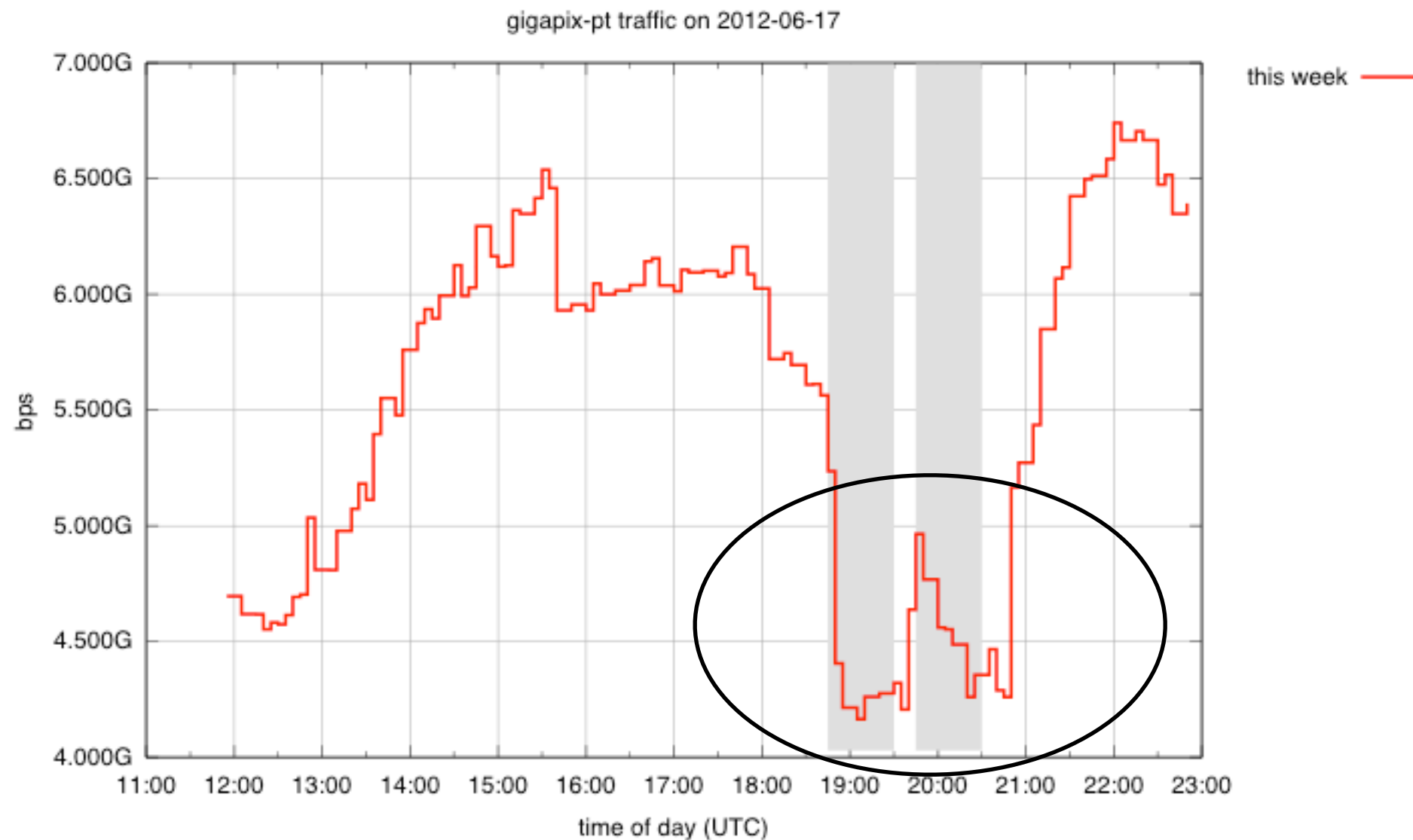
- Great Collaboration between Euro-IX & RIPE NCC
- Euro-IX asked for IXP volunteers to provide data
- 15 Euro-IX Member IXP participated
- Observed some interesting patterns during football matches

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

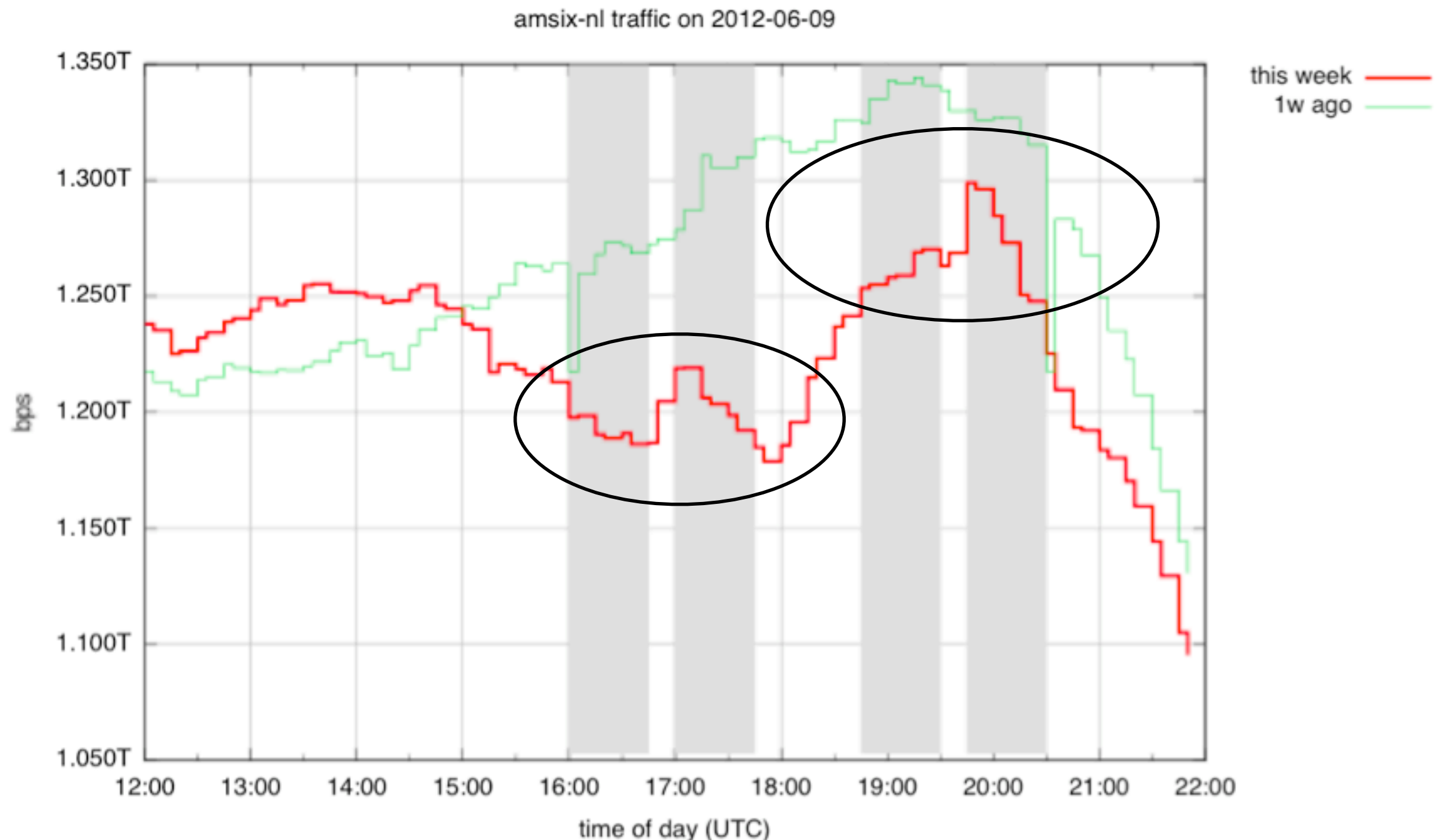
Typical Patterns during Match (1)

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



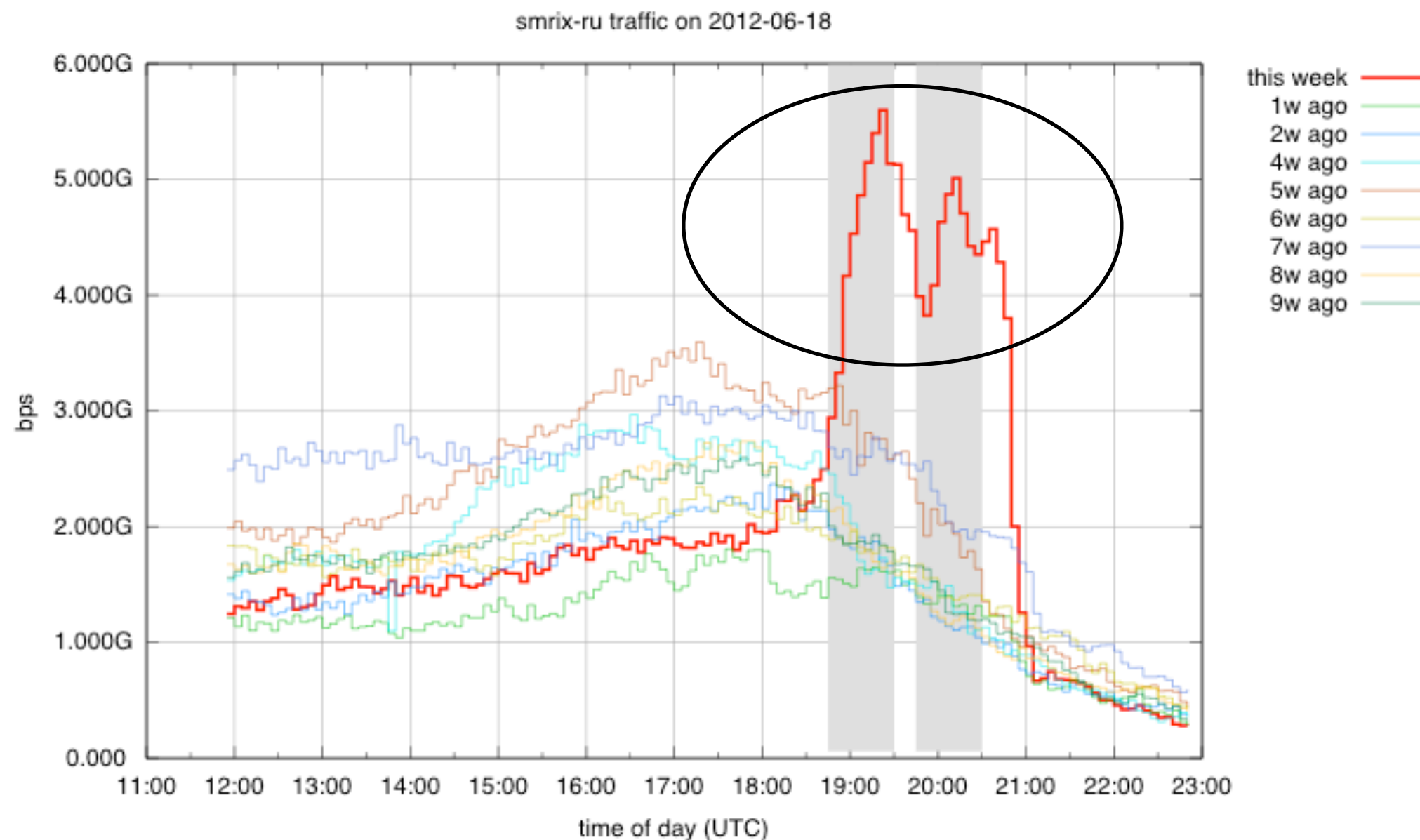
Typical Patterns during Match (2)

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



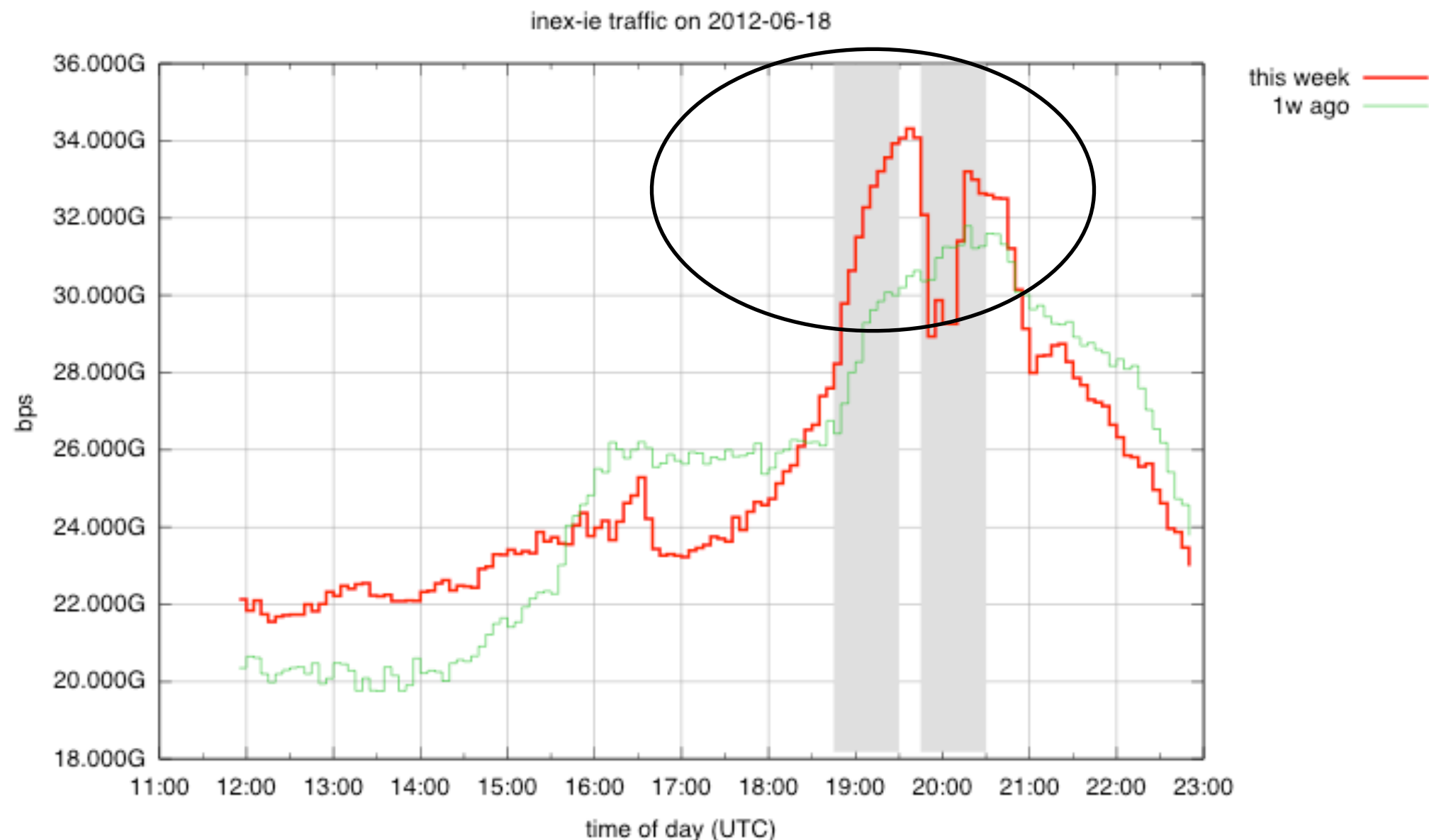
Typical Patterns during Match (3)

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



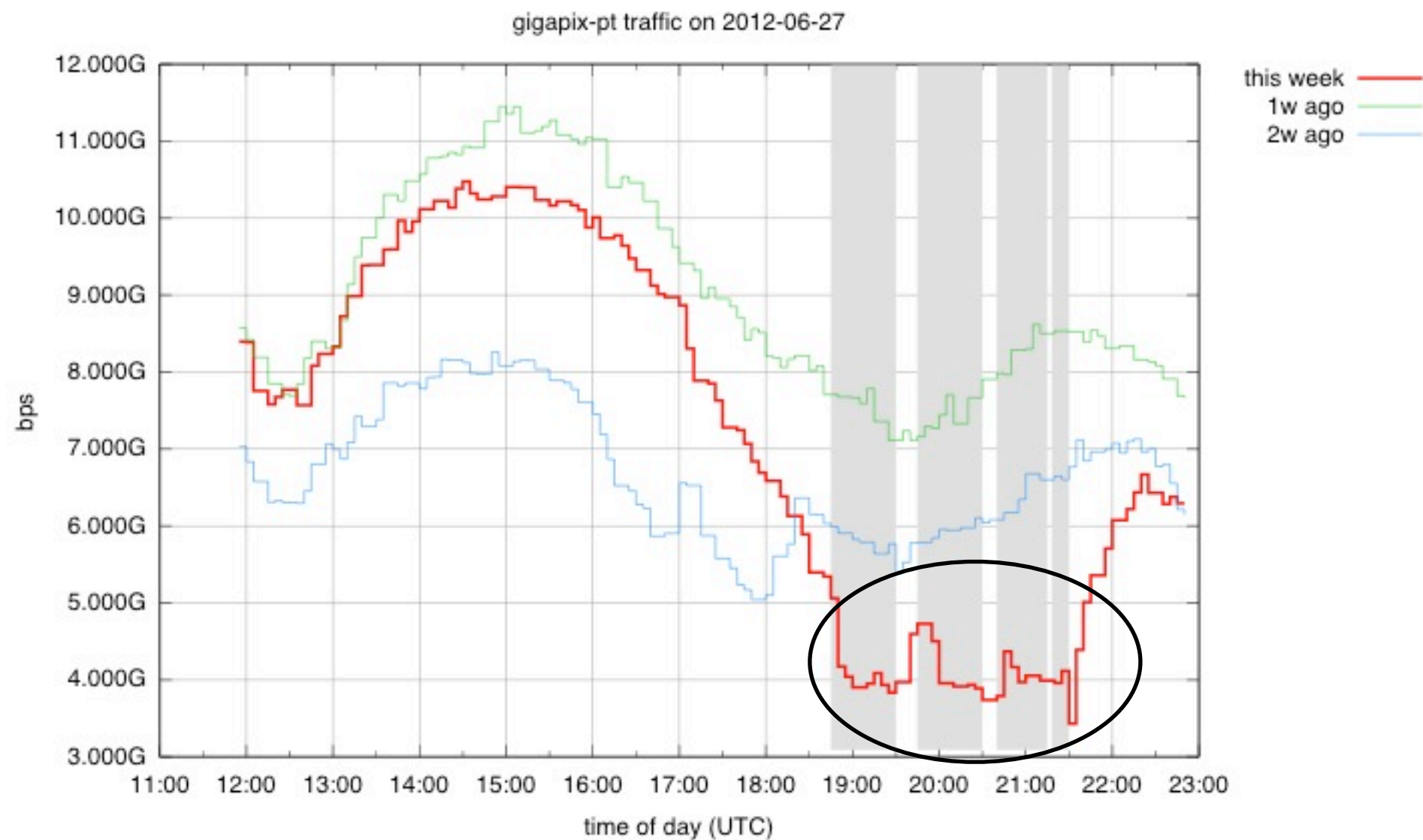
Typical Patterns during Match (4)

- INEX (Dublin): 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]





Olympic Games 2012 (1)

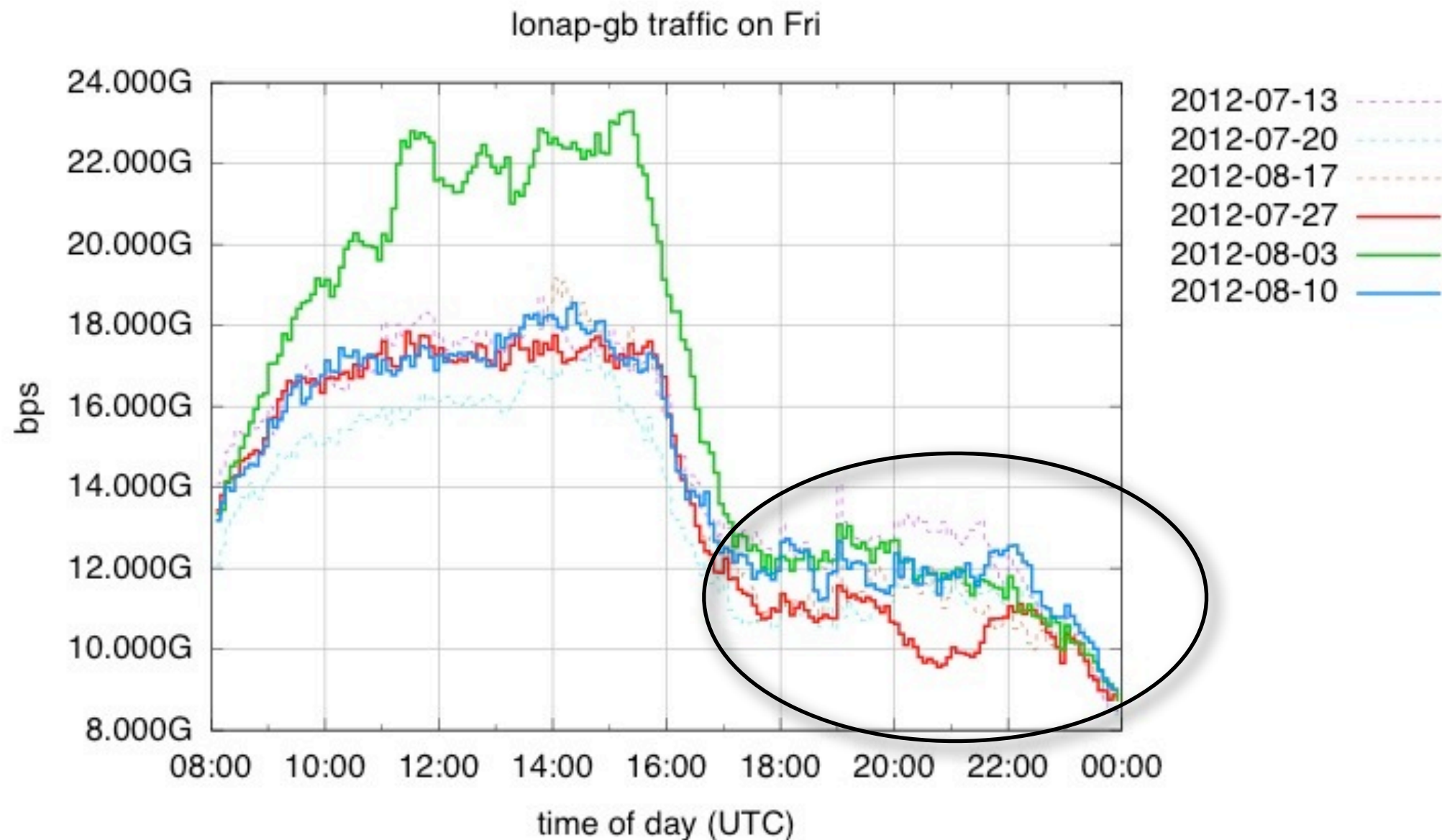
- Expected different patterns due to different spread of events during Olympics
- More difficult to identify typical pattern
- Events took place both during office hours and in the evenings
- We could correlate certain patterns in traffic with certain popular sport events during Olympics

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

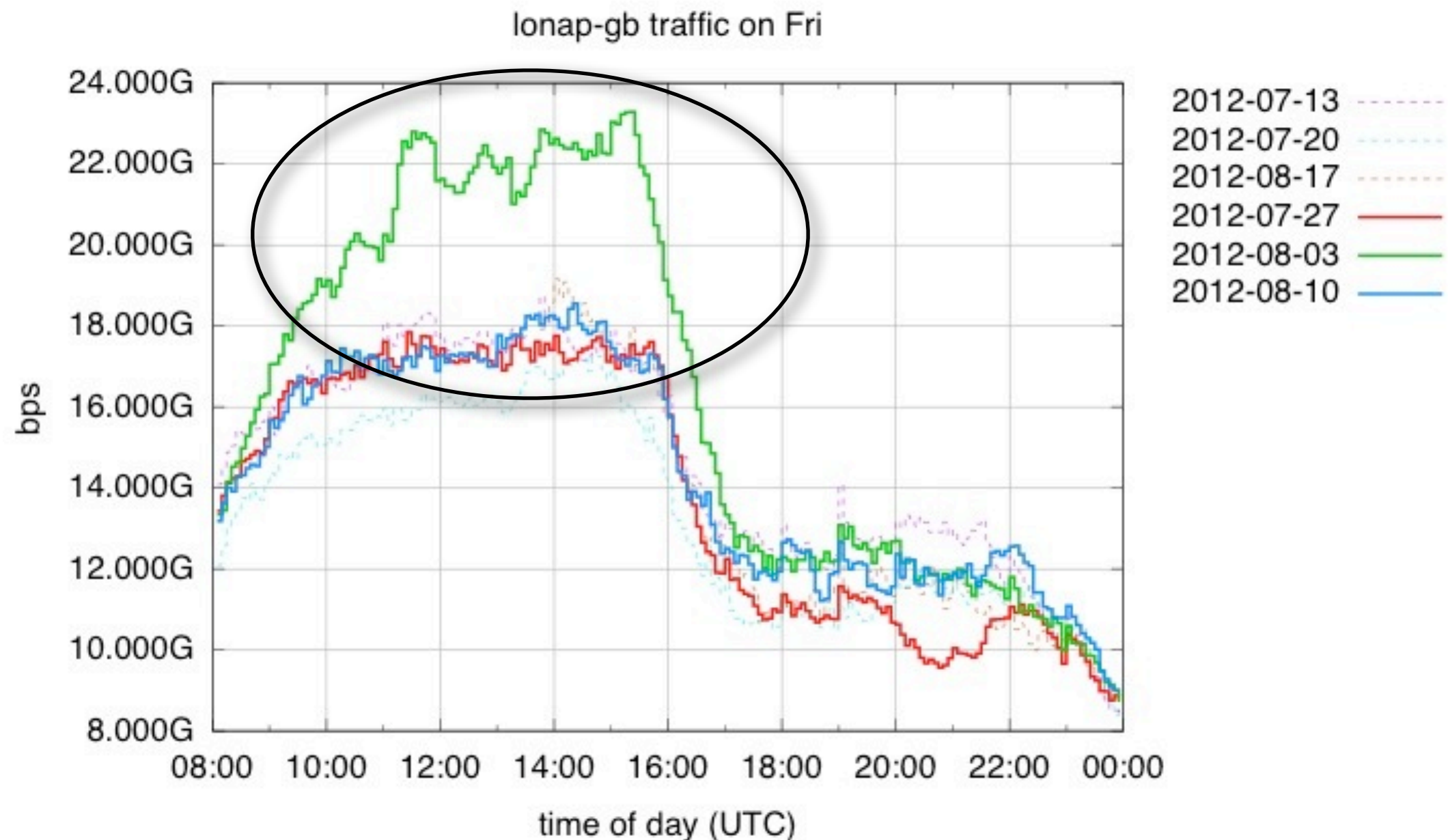
Popular Events out of Office Hours

- LONAP: Opening ceremony in evening (red line)



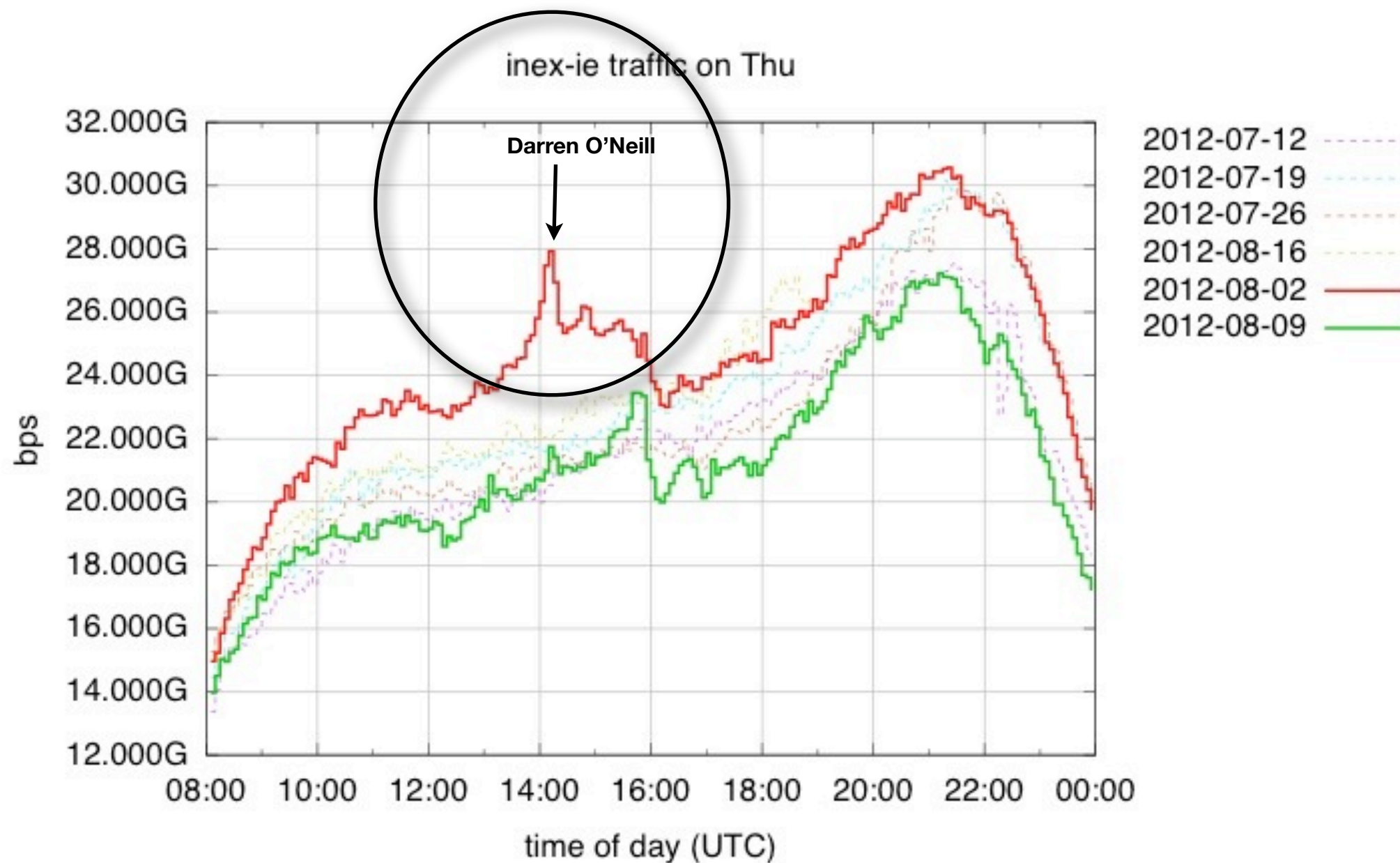
Popular Events During Office Hours

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



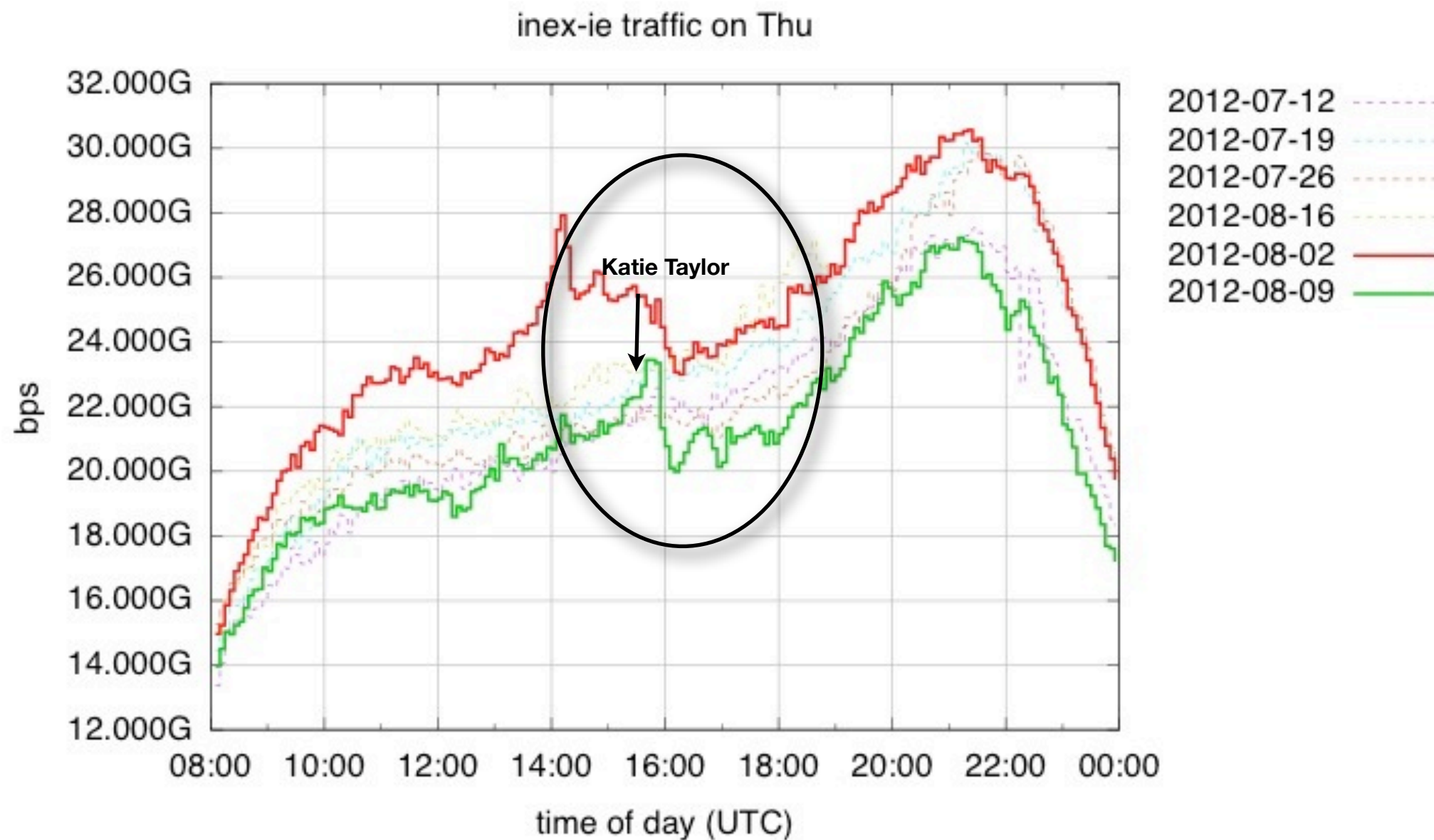
Popular Event in a Country (1)

- Boxing in Ireland - INEX (Dublin) office hours



Popular Event in a Country (2)

- Boxing in Ireland - INEX (Dublin) office hours



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 IXP's 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?
