

Making Sense of Measurement

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IXP Overview

i n e x
i n t e r n e t n e u t r a l e x c h a n g e

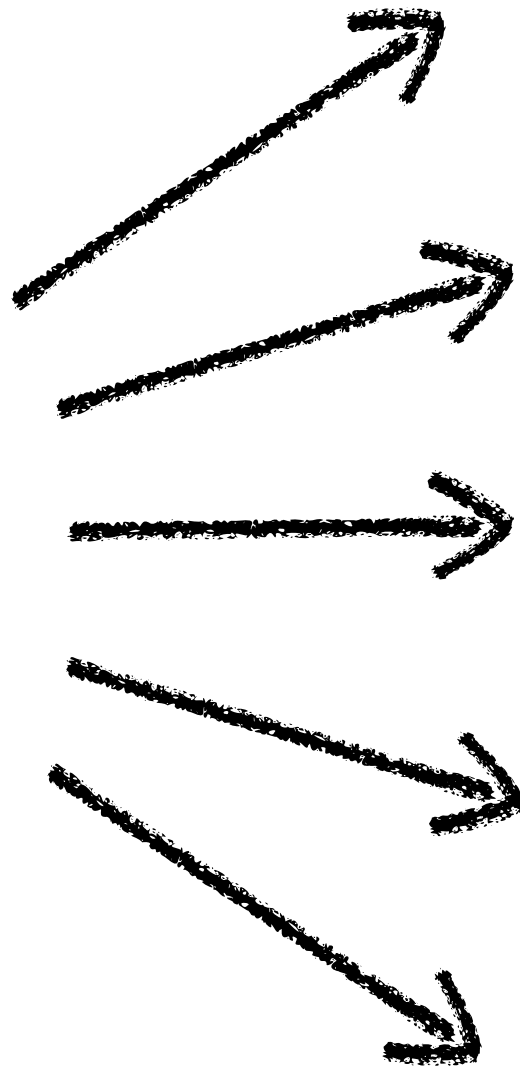
inex



i n t e r n e t n e u t r a l e x c h a n g e

IXP Overview

inex



founded in 1996

90 peering organisations

140gbit/s traffic peaks

dual infrastructure

6 points of presence



Things We Do

i n e x
i n t e r n e t n e u t r a l e x c h a n g e

interconnection enablement



Things We Do

i n e x
i n t e r n e t n e u t r a l e x c h a n g e

interconnection enablement



IXP Manager



Things We Do

i n e x
i n t e r n e t n e u t r a l e x c h a n g e

interconnection enablement



IXP Manager



automation



i n t e r n e t n e u t r a l e x c h a n g e

Things We Do

interconnection enablement



IXP Manager



automation



efficiency



Things We Do

i n e x
i n t e r n e t n e u t r a l e x c h a n g e

interconnection enablement



IXP Manager



automation



efficiency

no politics



i n t e r n e t n e u t r a l e x c h a n g e

Things We Do

interconnection enablement



IXP Manager



automation



efficiency

no politics



outreach



i n t e r n e t n e u t r a l e x c h a n g e

Things We Do

interconnection enablement



IXP Manager



automation



efficiency

no politics



outreach



good of the internet



Measurement - What's Important

i n t e r n e t n e u t r a l e x c h a n g e

throughput



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - What's Important

throughput

latency



i n t e r n e t n e u t r a l e x c h a n g e

Measurement - What's Important

throughput



capacity

latency



i n t e r n e t n e u t r a l e x c h a n g e

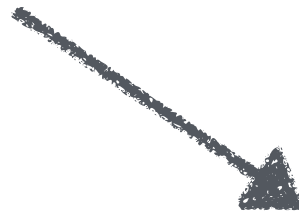
Measurement - What's Important

throughput

capacity

latency

packet loss





i n t e r n e t n e u t r a l e x c h a n g e

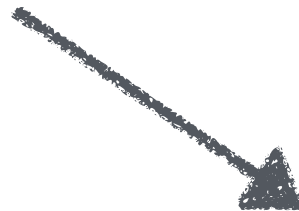
Measurement - What's Important

throughput

capacity

latency

packet loss





Measurement - What's Important to Consumers

i n t e r n e t n e u t r a l e x c h a n g e

“the internet is slow”



Measurement - What's Important to Consumers

i n t e r n e t n e u t r a l e x c h a n g e

"I'm not getting what I
paid for"



Measurement - What's Important to Consumers

i n t e r n e t n e u t r a l e x c h a n g e

“I’m not getting what I
think I paid for”



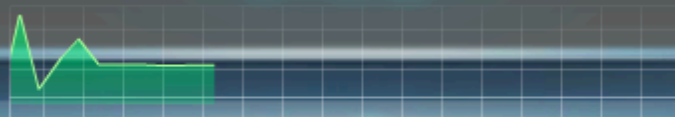
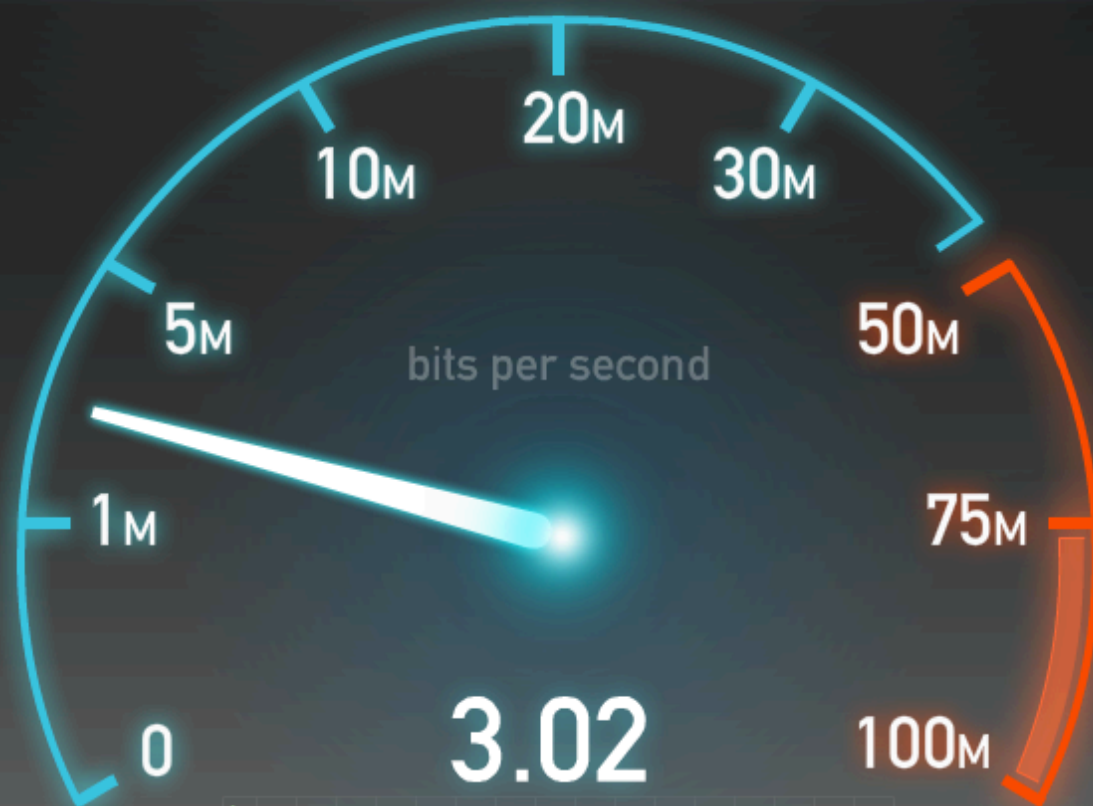
PING
26 ms



DOWNLOAD SPEED



UPLOAD SPEED



46.182.8.8

Network Ability Limited



Rate Your ISP

Dublin

Hosted by
Digiweb



Measurement - Perception

i n t e r n e t n e u t r a l e x c h a n g e

confirmation:

“the internet is slow”



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - The Provider Position

“there is a difference
between what you paid for
and what you’re getting”



DOWNLOAD

420.36 Mb/s



UPLOAD

20.92 Mb/s



PING: **10 ms**



RATING: ★★★★★



ISP



CABLESURF



SERVER

CARLOW

7/8/2016 at 3:18 PM PDT

ID: 5462745653

TAKE A SPEED TEST

Compare your own result



Measurement - Last Mile Problems

i n t e r n e t n e u t r a l e x c h a n g e





i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Last Mile Problems





i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Last Mile Problems





Measurement - Customer Difficulties

i n e t e x
i n t e r n e t n e u t r a l e x c h a n g e

entire household
watching netflix



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Customer Difficulties

windows update

entire household
watching netflix



inex
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Customer Difficulties

windows update

entire household
watching netflix

trojans



inex
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Customer Difficulties

windows update

ddos

entire household
watching netflix

trojans



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Customer Difficulties

windows update

ddos

entire household
watching netflix

spam

trojans



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Customer Difficulties

bittorrent

windows update

ddos

entire household
watching netflix

spam

trojans



i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Customer Difficulties

bittorrent

windows update

ddos

entire household
watching netflix

ancient wifi cpes

spam

trojans



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Customer Difficulties

bittorrent

windows update

entire household
watching netflix

delivery
problems

ddos

spam

trojans

Xtratherm®

Xtratherm

Xtratherm

Xtratherm

Xtratherm

Xtratherm

Xtratherm



21

160



Measurement - Reconciling the Gap

i n e x
i n t e r n e t n e u t r a l e x c h a n g e

consumer side problems account for
huge performance degradation



Measurement - Reconciling the Gap

i n e x
i n t e r n e t n e u t r a l e x c h a n g e

consumer side problems account for
huge performance degradation

online measurement results often
contaminated by consumer problems



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Reconciling the Gap

consumer side problems account for
huge performance degradation

online measurement results often
contaminated by consumer problems

fttx / cable / xdsl / mobile



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Reconciling the Gap

consumer side problems account for
huge performance degradation

online measurement results often
contaminated by consumer problems

fttx / cable / xdsl / mobile

latency and packet
loss are easy



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Reconciling the Gap

consumer side problems account for
huge performance degradation

online measurement results often
contaminated by consumer problems

fttx / cable / xdsl / mobile

throughput
is difficult

latency and packet
loss are easy



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Reconciling the Gap

consumer side problems account for
huge performance degradation

online measurement results often
contaminated by consumer problems

fttx / cable / xdsl / mobile

throughput
is difficult

latency and packet
loss are easy

higher speed
throughput is much
more difficult



Measurement - Takeaways

i n t e r n e t n e u t r a l e x c h a n g e

there is a chasm between accurate
measurement and customer perception



i n e x
i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Takeaways

there is a chasm between accurate
measurement and customer perception

measurement is hard but do-able



i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Takeaways

there is a chasm between accurate
measurement and customer perception

different technologies require
different approaches

measurement is hard but do-able



i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Takeaways

there is a chasm between accurate measurement and customer perception

different technologies require different approaches

measurement is hard but do-able

careful scope definition is critical



i n t e r n e t n e u t r a l e x c h a n g e

Measurement - Takeaways

there is a chasm between accurate measurement and customer perception

different technologies require different approaches

measurement is hard but do-able

careful scope definition is critical

consumer problems usually dwarf interconnection problems

