

# RIPE

# SIX

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## Slovenian Internet Exchange



Matjaž Straus Istenič, SIX/ARNES

četrtek, 08. september 2011

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From Serge:

I have promised the rest of the programme committee that the IXP updates are going to stay away from traffic and member number graphs, so please do drop these ;-). As for as content goes, we are basically looking for:

- Background of Slovenia (population, internet penetration, number of ISPs, is there an incumbent, the internet scene in general)
- History of the IXP
- Why did the IXP get started
- Where there any issues or problems in getting the IXP off the ground?
- Where are you today? How many participants? Peak Traffic?
- Are you currently facing any issues? And/or what are your recent developments at the IXP?
- what about the future? Plans? Growth? Anything else you feel would be of interest?

But remember 10 minutes please ;-)

# Slovenia

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- small country (2 mio people, 20 cm of sea shore for each one)
- ... but we like high peaks



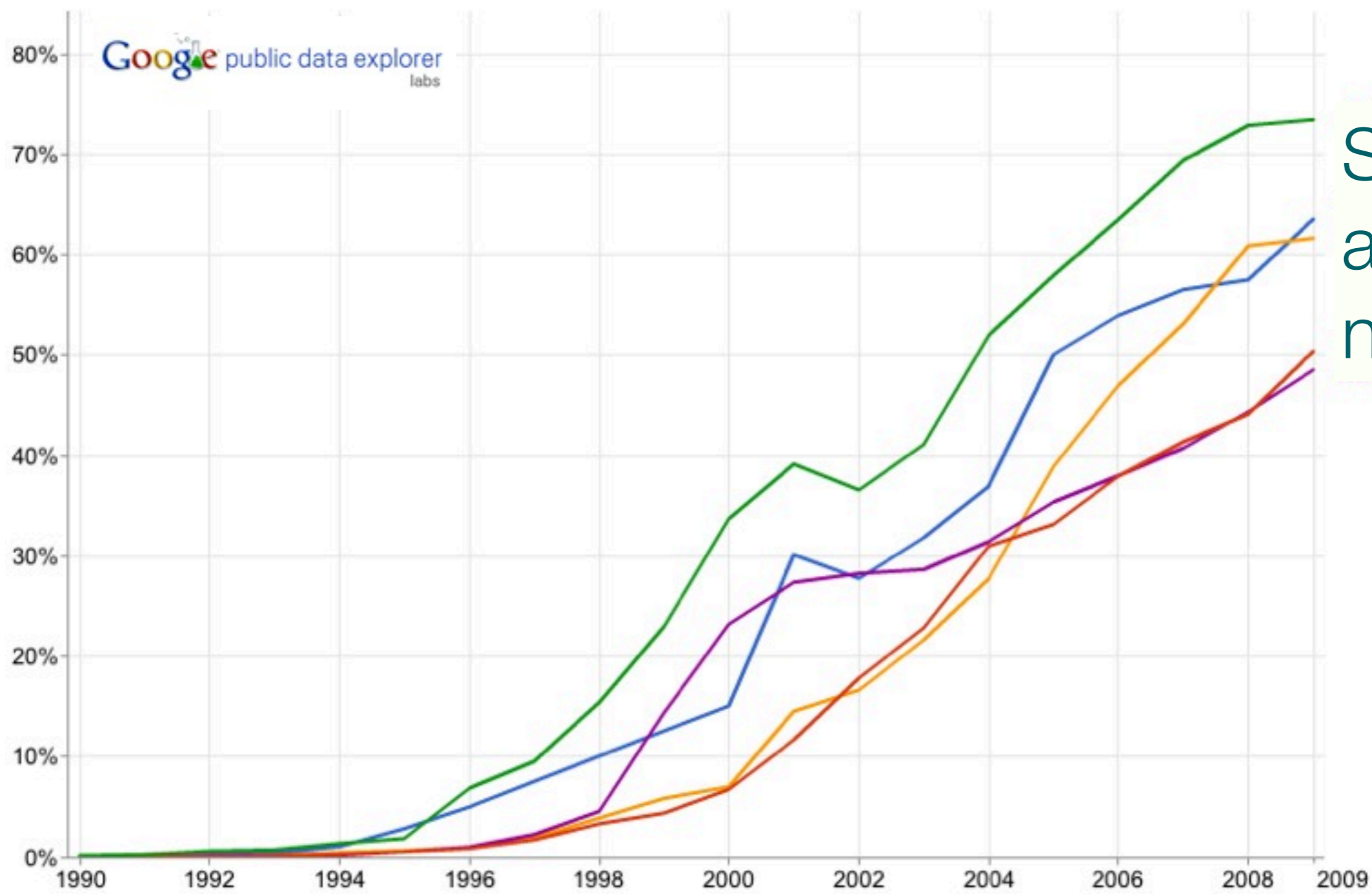
Mt. Triglav (2.864 m). Photo: K. Kunaver /STB



# Internet in Slovenia

- guess who?

Internet users as percentage of population



Slovenia and its neighbors

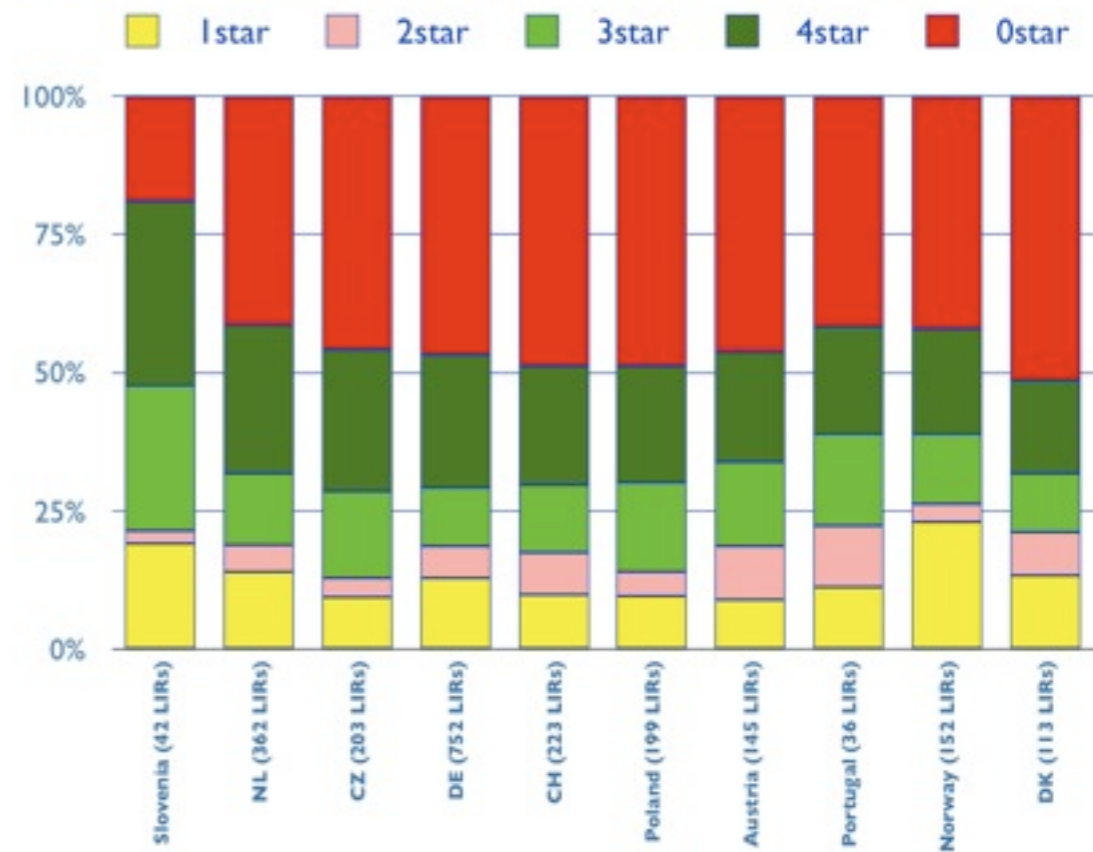




# Slovenia

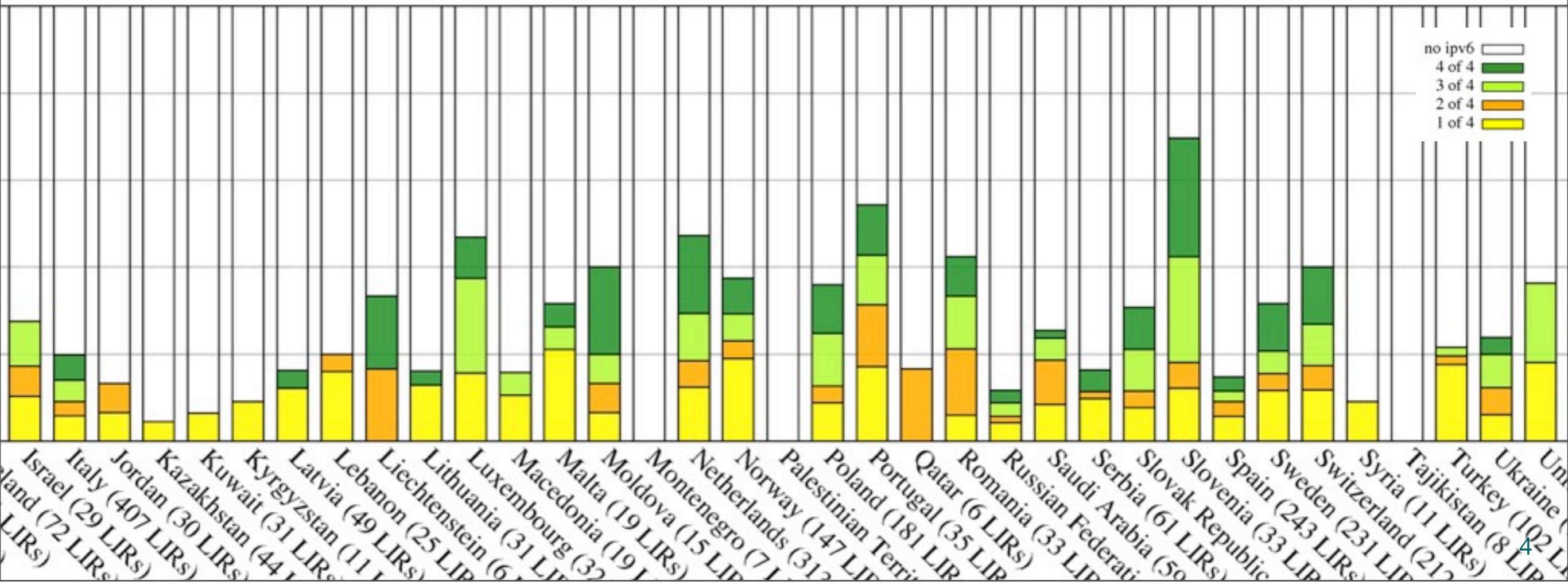
## IPv6 RIPEness: relative (28 April 2011)

- ... and - we adore IPv6



http://labs.ripe.net/Members/becha/content-ipv6-ripeness, April 2010

IPv6 'ripeness'-rating of LIRs per country (countries with 5+ LIRs)



We have tradition - not only in breweries

# SIX - operated by ARNES since 1994

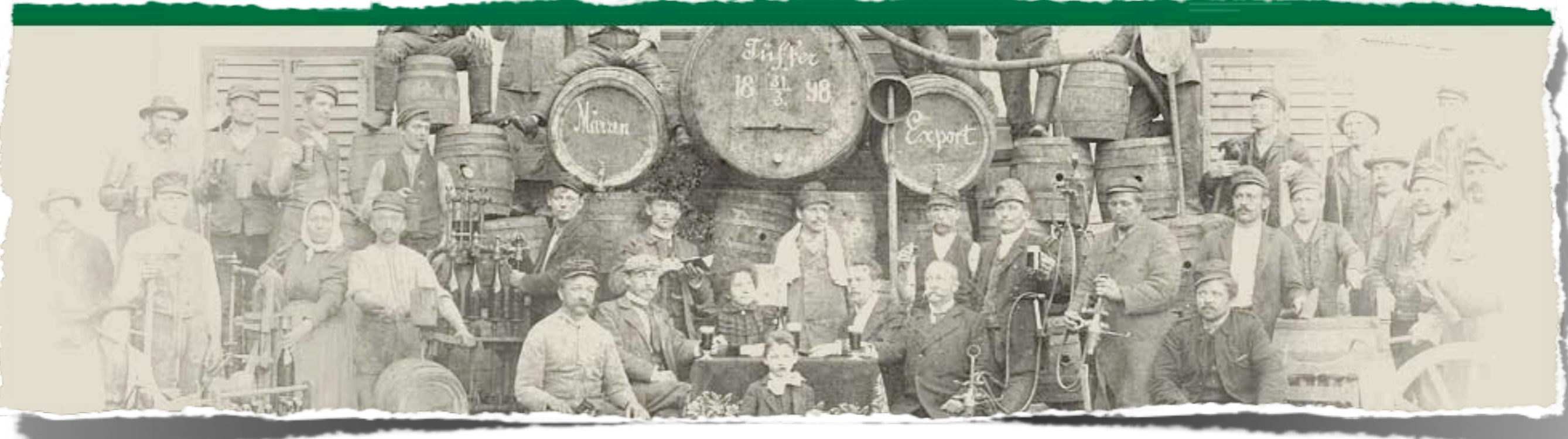


photo: <http://www.pivo-lasko.si/>





# Prehistory

- started in february 1994  
ARNES and SInet/EUnet (NIL d.o.o.)
  - ARNES PoP at Telekom premises
- 1995: two more mebers
- 1996: two more... (K2.net)
  - and the **big one**  
Telekom Slovenije (SiOL)
- 1997 ... 2002: alternatives - S-NET, Amis, Telemach, SoftNet, Netsi, Voljatel ...
- 2003: multiple locations, including LIX
- 2006: first IPv6 at SIX - Amis - ARNES



četrtek, 08. september 2011

Avgust Jauk (Arnes), 6/2003:

Zaradi potreb po izmenjavi prometa med Arnesom in prvim komercialnim ponudnikom Interneta v Sloveniji EUNET-om (servis podjetja NIL d.o.o.) je Arnes februarja 1994 v Ljubljani vzpostavil SIX (Slovenian Internet Exchange). Skrb za delovanje te storitve je ena od rednih dejavnosti Arnesa.

Ker je bil takrat PTT (predhodnik Telekoma Slovenije) monopolni ponudnik zakupljenih vodov v Sloveniji, smo SIX vzpostavili kar v okviru vozlišca Arnes, ki se je nahajalo v prostorih PTT na Cigaletovi 10 v Ljubljani. Preko te lokacije so potekali vsi glavni telekomunikacijski vodi in je bila zato tako tehnično kot tudi cenovno najbolj ugodna.

Z leti se je stevilo Internet ponudnikov v Sloveniji postopoma večalo). Za popoln dnevnik priklopov ponudnikov na SIX si bo nekoc treba vzeti čas in ga temeljito preveriti. Zaenkrat zgolj prvi rezultati:

- 02.1994 : ARNES in SInet/EUNET (NIL d.o.o.) zacetek februarja!
- 1995 : Quantum d.o.o. in ABM d.o.o. (slednji vsekakor pred 1.7.1995) vrstni red zaenkrat ni znan
- maj 1996 : [K2.net](#)
- december 1996: Perftech d.o.o.
- 27.12.1996 : SIOL d.o.o.
- 18.8.1997 : S-NET
- 2.4.1998 : MEDINET/AMIS
- april 1998 : SoftNet (enkrat po 16.4.1998)
- junij 2000 : Telemach (enkrat med 26 junijem in 1. julijem)
- 5.2.2002 : [Netsi.net](#) (Metaling d.o.o.)
- 15.4.2002 : Voljatel

Nekateri ponudniki ne obstajajo vec:

- SIOL je od NIL d.o.o. kupil SInet/EUNET
- Quantum, S-NET in ABM so opustili to dejavnost

Da bi si zmanjšali stroške delovanja (mednarodne linije so bile v Sloveniji vedno zelo drage), so pri PTT oz. kasneje pri Telekomu Slovenije do SIX-a zakupili telekomunikacijski vod, preko katerega so izmenjevali promet z ostalimi člani SIX-a.

S postopno liberalizacijo trga telekomunikacij so se pojavili alternativni ponudniki telekomunikacijskih vodov, pri katerih so bili vodi na voljo po mnogo ugodnejših cenah kot pri Telekomu Slovenije. Podobno kot v tujini so alternativni ponudniki tudi pri nas ponudili v zakup optična vlakna, preko katerih je moc relativno poceni doseci nekaj razredov vecje hitrosti prenosa podatkov kot preko priblizno enako dragih bakrenih zakupljenih vodov Telekoma Slovenije.

Ker so potrebe po kapacitetah z razvojem Interneta v Sloveniji zelo hitro narascale, so bili ponudniki interneta prisiljeni poseci po optičnih vlaknih.

Now

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**20 members**  
**50% of them with IPv6**  
**15 Gb/s (total average)**

<http://www.arnes.si/en/infrastructure/six-internet-exchange/traffic-statistics.html>

**two locations**  
**a single LAN**  
**cisco 4900M**



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looking-glass router  
but no route servers,  
no portal,  
yet





**2 birds in flight**  
(a portal after landing)

**renumbering v4**  
(next wednesday at 4:00 in the morning)



# QoS dilemma

## Some members demand for QoS (mostly for VoIP)

- feedback from RIPE 62
  - QoS is a marketing term for “dropping packets”
  - a fantastic L1 solution was proposed:  
a patch cable - or - maybe, more of them ...
- L2 (preferred, but trunk ports needed) or L3?
- **Are we allowed to control/drop the traffic?**

