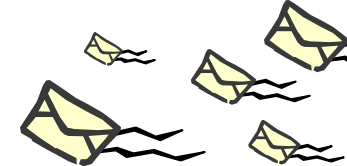# iBGPlay:
a system/service for monitoring **your** BGP routing

maurizio pizzonia

roma tre university
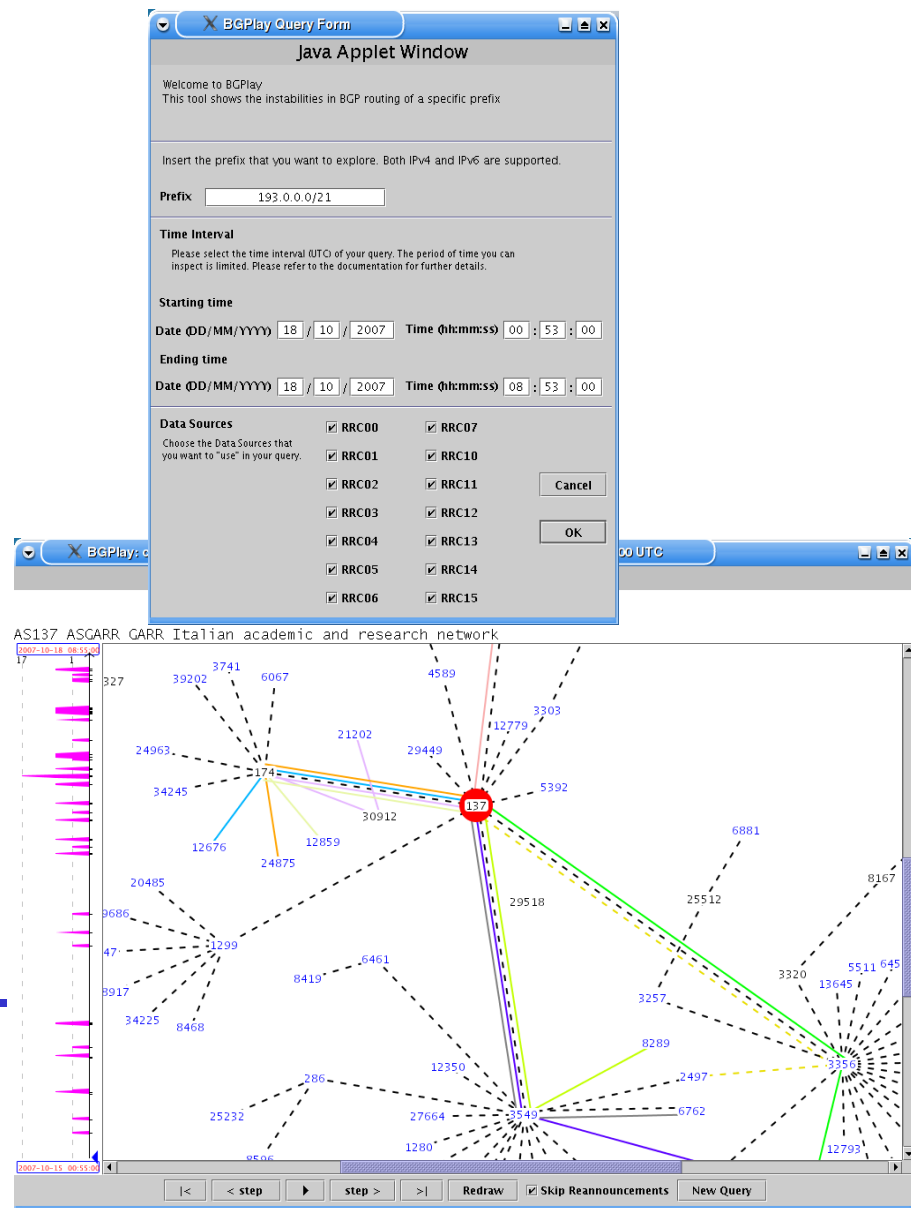
BGPlay team - ibgplay@dia.uniroma3.it

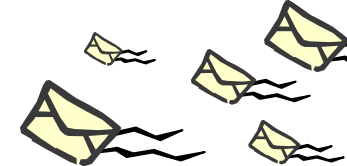www.ibgplay.org

BGPlay

- publicly avalable since 2004
  - Oregon RouteViews, RIPE RIS,
  - 200-300 queries per day

- graphically shows public data

- shows...
  - ...for a specified prefix...
  - ...incoming traffic paths from collector peers

iBGPlay

- graphically shows private BGP data of an ISP

- similar to BGPlay
  - ... but different semantic

- show for selected prefixes...

  - **outgoing** traffic paths...
  - ...form **your** routers...
  - ...to that prefixes

BGPlay vs. iBGPlay

BGPlay

how the public BGP collectors reach a prefix?

- focus on one AS and one of its originated prefixes
- many public collectors in several ASes
- AS paths for incoming traffic are shown
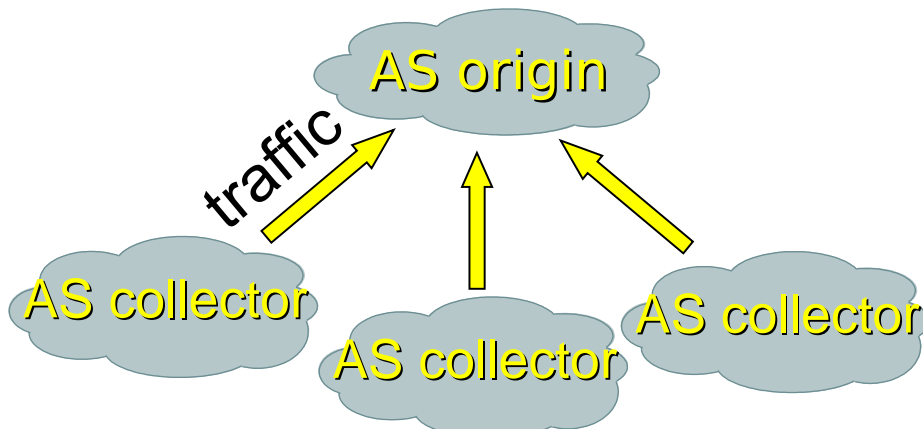
iBGPlay

how your routers reach any/many/all prefixes?"

- focus on **a set of prefixes** originated by any ASes in the Internet
- one or more routers in your AS
- AS paths for outgoing traffic are shown
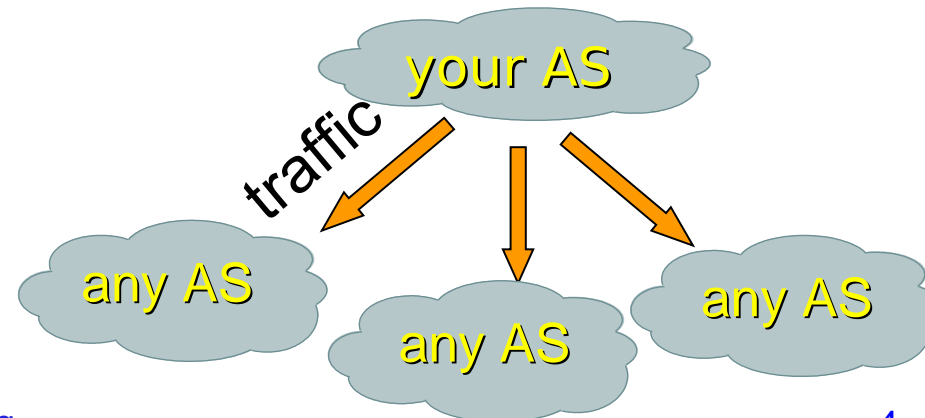
iBGPlay: key features

- integrated and easy-to-install BGP collecting+visualization solution
- quick, intuitive and interactive **play back** of routing events recorded by your routers
- **multi-router visual comparison**
- routing features visualization
  - internet exchange points traversals
  - next hops
  - traffic among border routers
  - stable vs. unstable AS paths
  - grouping of prefixes with the same behavior
- dashboard for **current routing view** (real time)

iBGPlay architecture

your bgp routers

ISP

route collector

raw routing data

retriever

BGP events DB

iBGPlay server

iBGPlay client
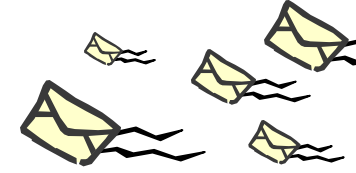
iBGPlay server machine
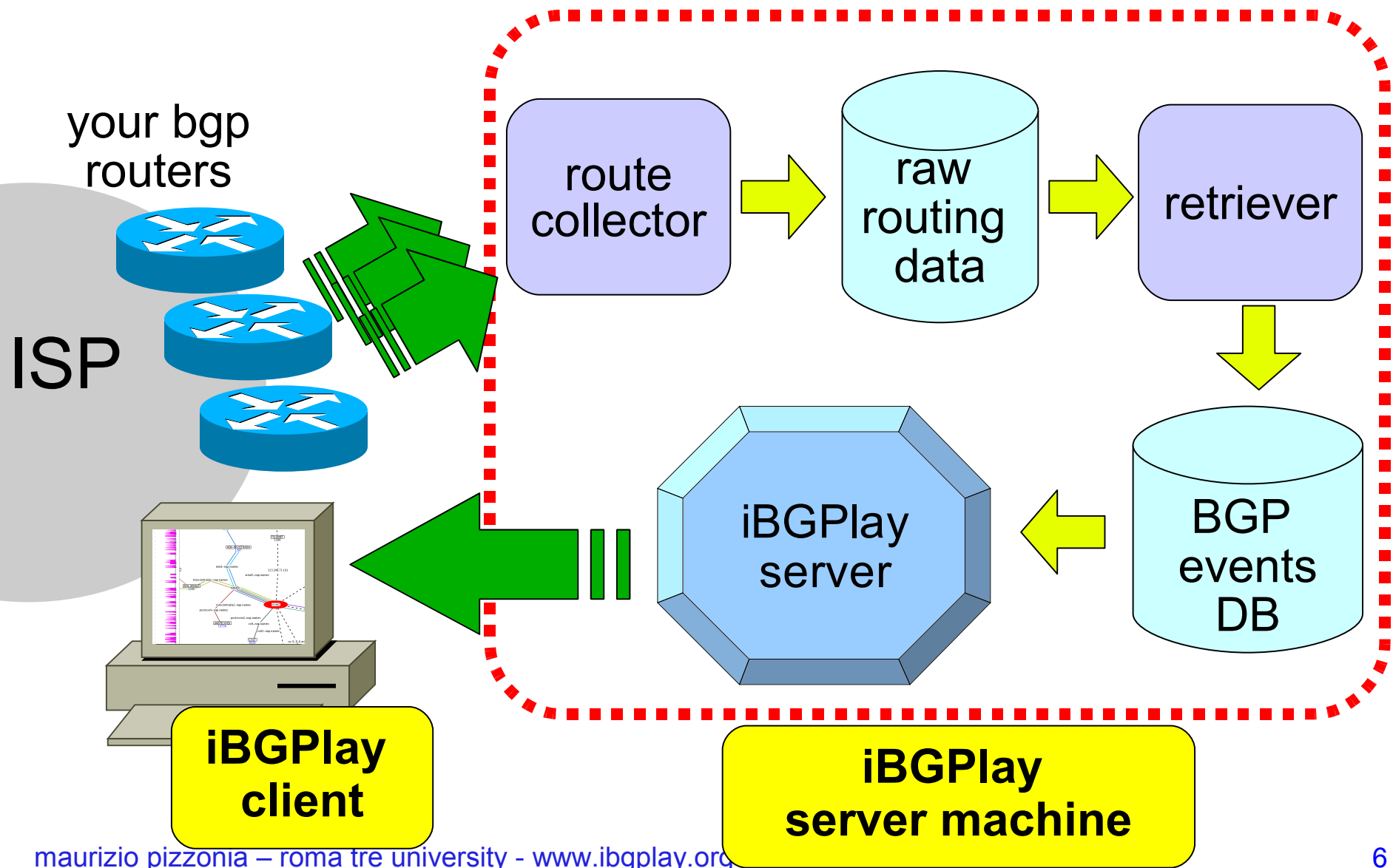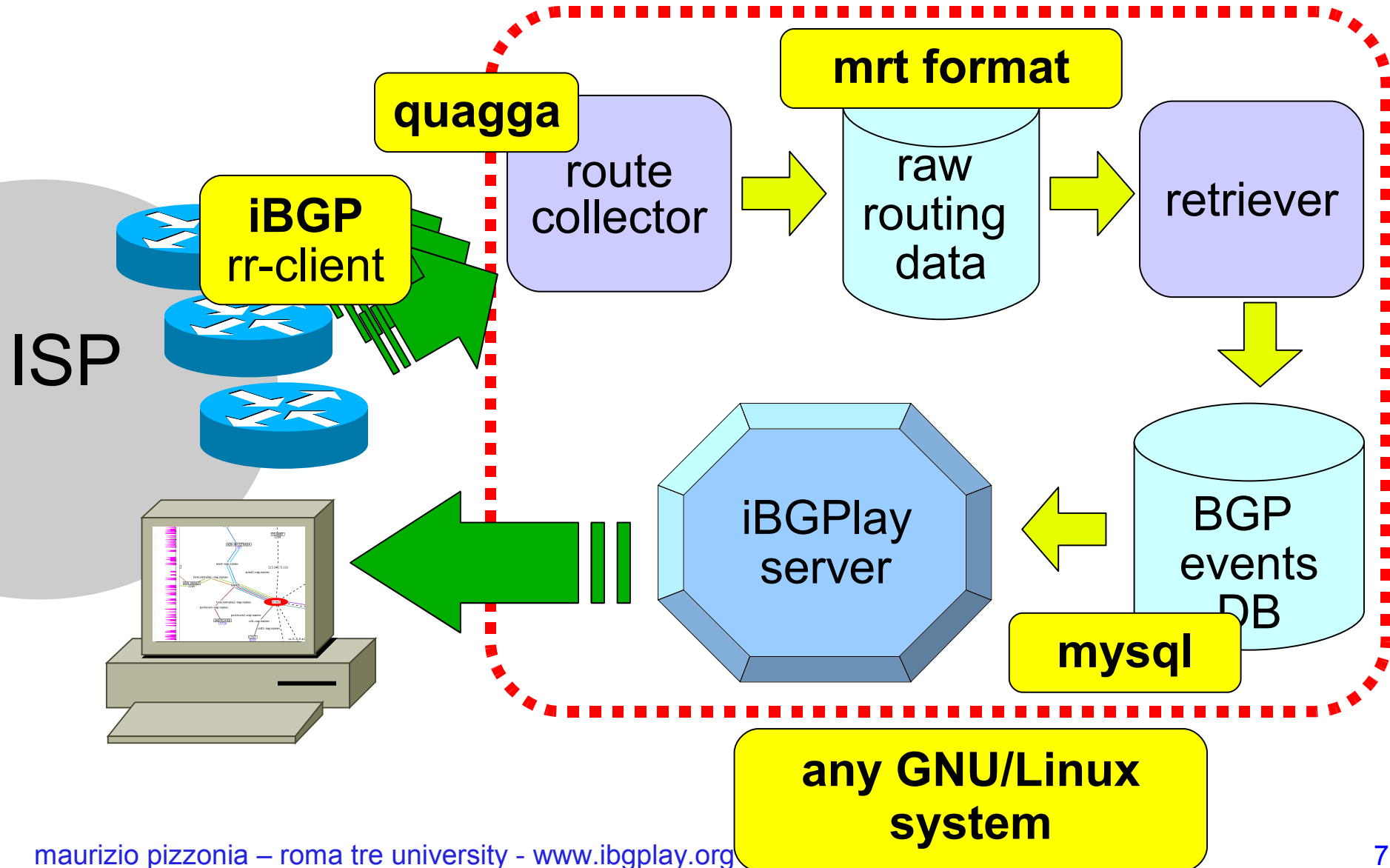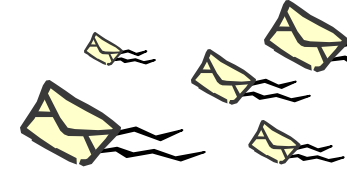
"open" elements

iBGPlay-specific elements

bash scripts

ISP

route collector → raw routing data → retriever

retriever → BGP events DB

BGP events DB → iBGPlay server

java application

java applet/application
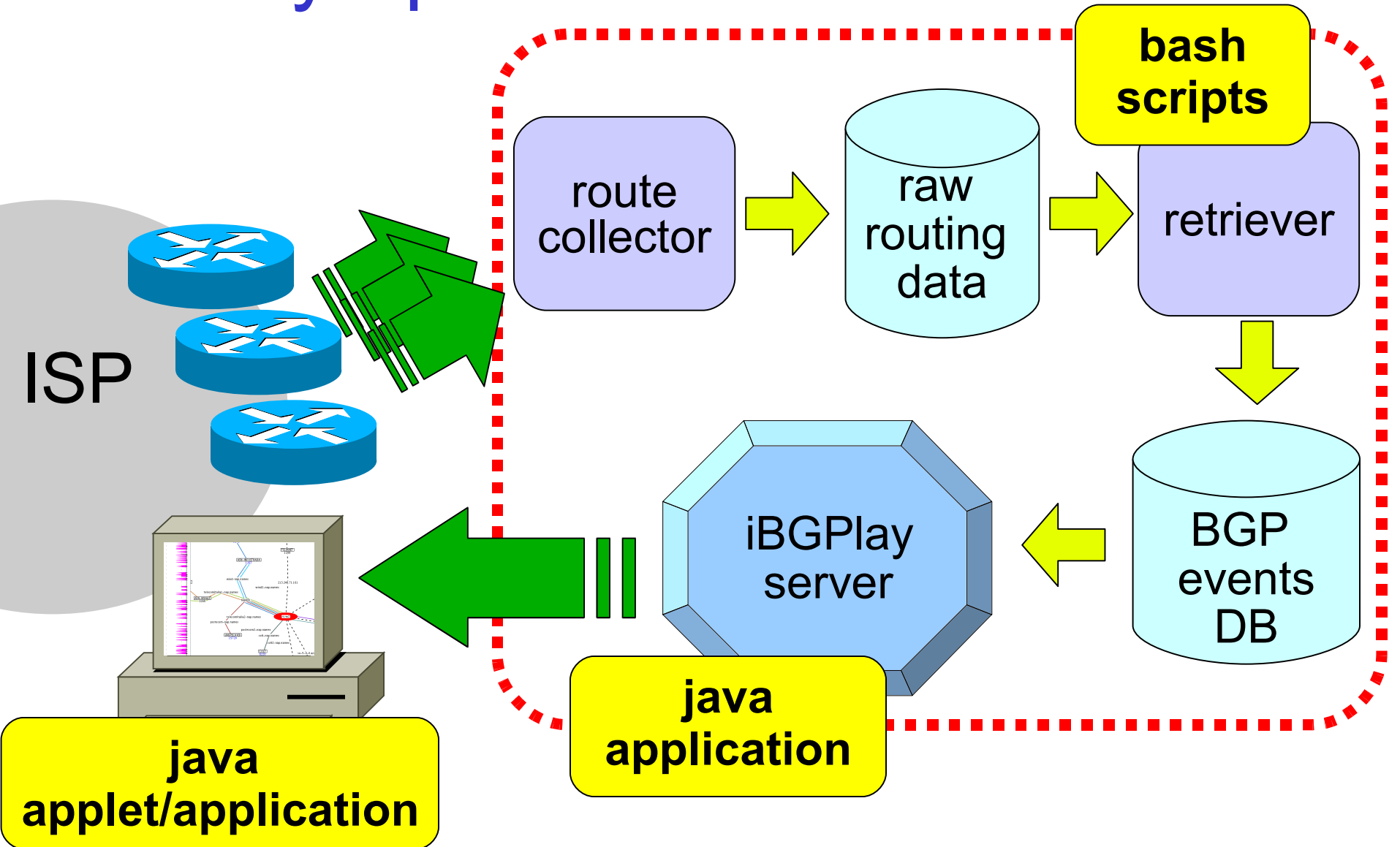
iBGPlay

- live demo...

iBGPlay query form
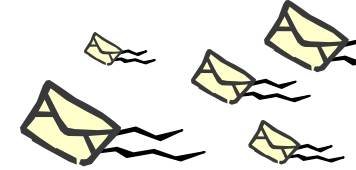
the list of prefixes to be visulaized

edit or save the list, or open a previously saved list

...ay - Graphical visualization of iBGP updat...

Welcome to iBGPlay. This tool shows the RIB...

62.85.160.0/19 – AS8220 (COLT) ▼ | Clear | Edit | Load | Save

start of the time interval to inspect

Starting Time

Date (DD/MM/YYYY) 16 / 10 / 2007   Time (hh:mm:ss) 09 : 47 : 58

end of the time interval

...ding Time

Date (DD/MM/YYYY) 18 / 10 / 2007   Time (hh:mm:ss) 09 : 47 : 58

Time Zone

UTC ▼

select on of your routers

prefixes behaving the same are shown as if they would be one (to simplify visualization)

Peer

rt.rm2 193.206.131.249 ▼ | Refresh peer list

you can aggregate your next-hop ip to show IXP

Equivalence Classes

File: ./cfg/aggregator.cfg Load

☑ Visualize prefixes in classes

performs a regular query

start a continous "real time" monitoring

Submit | DashBoard | Quit

iBGPlay prefix list editing

29 prefixes in list...

Every search is performed on the last RIB collected for peer 193.206.131.249

Prefix	Origin	AS Name	AS Description	Note
	8220	COLT	COLT Telecommunications	
	15720	UNSPECIFIED	Postecom s.p.a. Autonomous Syst...	poste.it
64.12.0.0/16	1668	ATDN	AOL Transit Data Network	aol
64.236.16.0/20	5662	TBS	Turner Broadcasting Systems	cnn.com
65.54.128.0/19	8075	MICROSOF		msn.com
.../19	8075	MICROSOF	MICROSOFT	hotmail.com
66.135.192.0/19	11643	EBAYNET	eBay, Inc.	ebay.com
69.147.96.0/19	14779	YAHOO-RE		yahoo.com
72.21.192.0/19	16509	AMAZON-		amazon.com
84.53.139.0/24		AKAMAI-ASN1	Amazon ES DC98	foxnews.com
87.238.80.0/23		...		amazon.co.uk, ...
145.97.32.0/20		SURFNET-NL	SURFnet, The Netherlands	wikipedia.org
151.1.0.0/16		ASN-ITNET # AS-ITNET CONVE...	ITnet S.p.A. Auton	
194.20.0.0/15		TIPNET-ITALY	Netscalibur SpA	
194.20.64.0/21		VODAFONE-ITALY	VODAFONE Auton	
194.244.0.0/16		TIPNET-ITALY	Netscalibur SpA	
195.210.64.0/19	1267	ASN-INFOSTRADA	Infostrad	

AS orgin

selected prefixes

description of the AS origin

user annotations (in-place editing)

name of the AS origin

query for prefixes originated by a certain AS

insert a prefix directly

IP Prefix   [   ] Search

AS Origin   [   ] Search

Orig... **Show All**

AS Description [   ] Search

AS Announcer [   ] Search

Announcers **Show All**

query for all ASes whose description match

Hostname [   ] Search

Next Hop [   ] Search

Next Hops **Show All**

iquery for prefixes related to an hostname

query for prefixes having a certain next-hop in the last RIB

query for prefixes announced to us by a certain AS directly

iBGPlay regular view

Request --> Date: from 2007-10-16 09:47:58 to 2007-10-18 09:47:58 UTC - Collector: 193.206.131.249

97/190   2007-10-17 09:50:14   Path Change   from rt.rm2 colt-nap.namex 8220

Collector: rt.rm2   62.85.160.0/19   to rt.rm2 colt2-nap.namex 8220

AS14325 ASN-OSHEAN   Ocean State Higher Ed., Econ. Dev. and Admin. Network

bgp event details

2007-10-18 09:47:58

end time

future

past

start time

2007-10-16 09:47:58

TELECOMPLETE-AS
6320

SN-ITNET # AS-ITNET CONVERTED TO ASN-ITNET FOR RPSL COMPLIANCE
3242

TELIANET
1299

stable paths (dashed)

unstable paths (solid). colors disambiguates

wind-nap.namex

wind2-nap.namex

213.248.

so-7-0-3.edge1

blue Ases contain selected prefix

telecomitalia1-nap.namex

ASN-IBSNAZ

NAMEX

currently visualized instant

omitalia2-nap.name

postecom2-n

UNSPECIFIED
15720

colt2-nap.namex

COLT

so-5-0-0.ar2

MIX

cogent.mix-it

IXP aggregation

rt.rm2

garr.rt1

GEANT
20965

INTERNET2
11537

SURFNET-NL
1103

your router

next-hop

TISCALI-BACKBONE
AMAZON-IAD-C1 257   MICROSOFT
16509   8075

EBAYNET
11643

ATDN
1668

LEVEL3
3356

GOOGLE
15169

LVLT-7911 -   nmunica

ASN-OSHEAN
14325

GIGAPOP-NE - Harvard Universit
10578

MIT-GATEWAYS
3

events density:
magenta: routing events
green: re-announcements

vcr-like controls

|< | < | ▶ | > | >| | Redraw | Show ... | ...escriptions | Save Img | ☑ Skip Reannouncements

maurizio pizzonia – roma tre university - www.ibgplay.org   12

iBGPlay dashboard view

DashBoard --> Date: from 2007-10-17 11:22:52 to 2007-10-18 11:22:52 UTC - Collector: 193.206.131.249

96/96 2007-10-18 11:11:13   Path Change   from rt.rm2 postecom2-nap.namex 15720

Collector: rt.rm2

- always the last routing status in the DB is shown
- updated every 30 seconds (configurable)

show the state of the routing one minute ago

no vcr-like control only the extent of the past interval shown can be changed

you can switch to the regular interactive view at any time

2007-10-18 11:22:52

3269

147

telecomitalia1-nap.name

postecom-nap.namex

15720

telecomitalia2-nap.namex

3549

NAMEX

wind-nap.namex

3242

1267

postecom2-nap.namex

so-5-0-0.ar2

wind2-nap.namex

rt.rm2

3313

inet.mix-it

garr.rt1

20

MIX

olt-nap.namex

colt2-nap.namex

213.248.71.16

1299

so-7-0

2007-10-17 11:22:52

☑ One Day   ☐ One Week   ☐ One Month   Explore   Force Refresh

compare different router views

Request --> Date: from 2008-05-14 11:41:00 to 2008-05-14 11:...
1/158 2008-05-14 11:43:43   2 Path Changes   from rt.to...
Collector: rt.to1
72.14.199.0/24 (Eq. C1...) to rt.to1
AS15169 GOOGLE   Google, Inc

2008-05-14 11:48:56

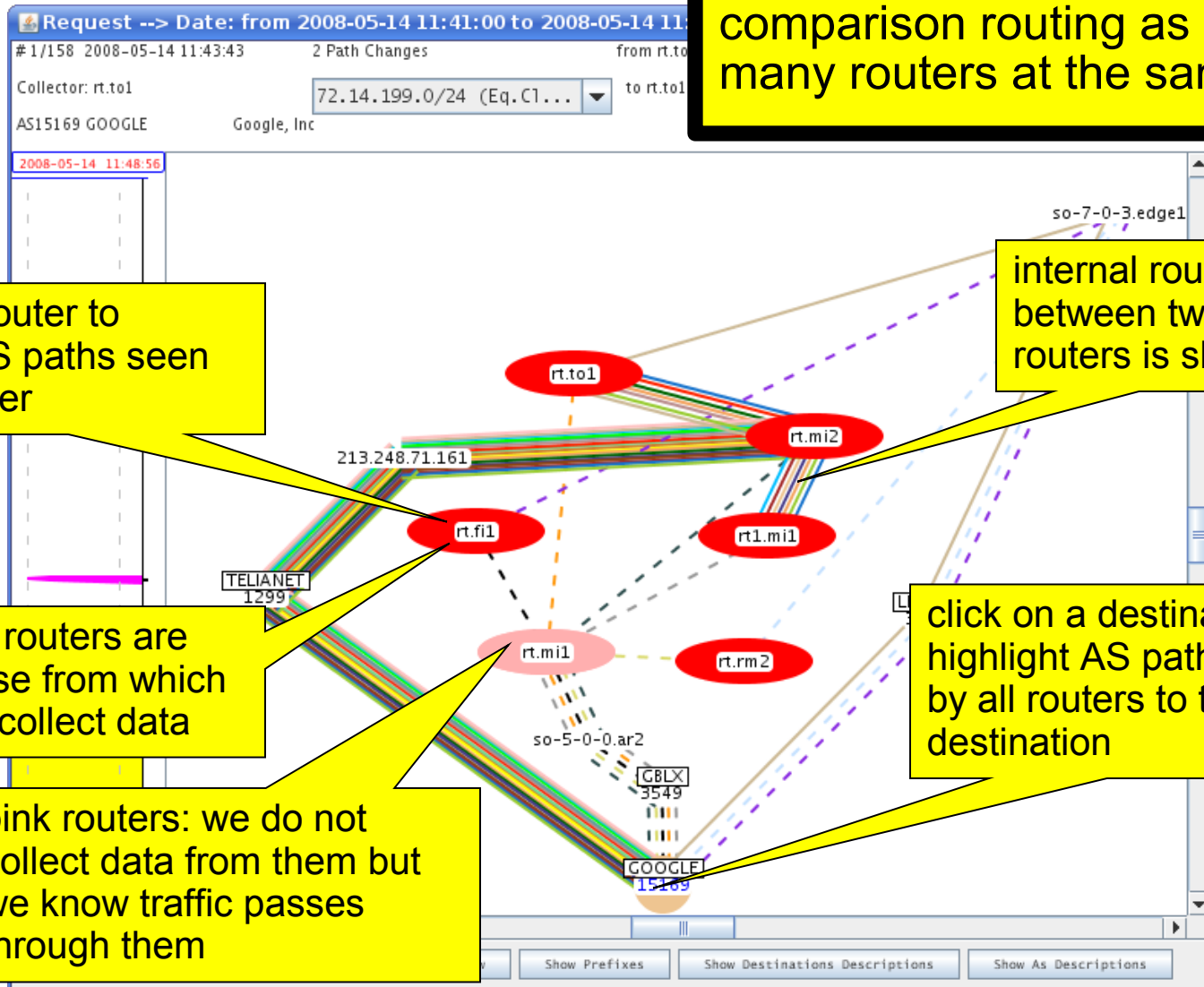**comparison routing as seen by many routers at the same time**

click on a router to highlight AS paths seen by that router

internal routing between two BGP routers is shown

red routers are those from which we collect data

click on a destination to highlight AS paths seen by all routers to that destination

pink routers: we do not collect data from them but we know traffic passes through them

so-7-0-3.edge1
rt.to1
rt.mi2
213.248.71.161
rt.fi1
rt1.mi1
TELIANET 1299
rt.mi1
rt.rm2
so-5-0-0.ar2
GBLX 3549
GOOGLE 15169

Show Prefixes   Show Destinations Descriptions   Show As Descriptions

iBGPlay distribution

- two functionally equivalent solutions
- iBGPlay LITE – *service*
  - the server and the collector are at Roma Tre university
  - the ISP BGP data are stored in Rome
  - the ISP set up BGP sessions with our collector and has a web access to the service
- iBGPlay FULL - *software*
  - server and collector are installed at the ISP by the ISP
    - easy installation but you need a machine for that
  - the ISP privately stores its BGP data
  - the ISP set up BGP sessions with its collector and run the client to visually access the collected BGP data

why should I care about it?

- graphically track past routing events
  - easy troubleshooting
  - forensic analysis

- traffic engineering
  - are my peerings appropriately used? (e.g. based on cost)
  - verify peerings usage over time

- quality assessment
  - check the quality of upstream providers
  - check service level agreements

iBGPlay: facts

- users
  - 1 IXP provides iBGPlay for consortium members (NaMeX)
    - and as "Next Generation" looking glass
  - 16 ISP uses iBGPlay as service
  - 10 ISP have iBGPlay FULL on their own machines
  - more than 5000 queries served in about 2-3 months
- requests
  - about one new contact each day
- iBGPlay is developed by Computer Network Research Group di Roma Tre
  - 9 people

future works

- enrich iBGPlay with tools to grasp the "big picture"
  - summary visualization of **whole address space** vs. **BGP peers** vs. **routers**
    - ...than select and inspect the details
  - **upstream quality assessment**
    - ...then inspect in detail why an upstream is better than another
- IGP visualization using the same techniques
  - **MPLS** and **OSPF**
  - integration with current visualization

are you interested?

- contact us by email
  - ibgplay@dia.uniroma3.it
- ...or better contact me here!

Questions?