iBGPlay:
a system/service for monitoring
your BGP routing

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BGPlay

• publicly available 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

ISP

your bgp routers

route collector

raw routing data

retriever

iBGPlay server

iBGPlay client

iBGPlay server machine

BGP events DB
“open” elements

ISP

quagga

route collector

mrt format

raw routing data

retriever

iBGPPlay server

BGP events DB

mysql

any GNU/Linux system

iBGP rr-client

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iBGPlay-specific elements

ISP

route collector

raw routing data

retriever

bash scripts

BGP events DB

iBGPlay server

java application

ISP

java applet/application
iBGPlay

• live demo...
iBGPlay query form

- the list of prefixes to be visualized
- edit or save the list, or open a previously saved list
- start of the time interval to inspect
- end of the time interval
- select one of your routers
- prefixes behaving the same are shown as if they would be one (to simplify visualization)
- you can aggregate your next-hop IP to show IXP
- performs a regular query
- start a continuous "real time" monitoring
### iBGPlay Prefix List Editing

#### Table:

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Origin</th>
<th>AS Name</th>
<th>AS Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>8220</td>
<td>COLT</td>
<td></td>
<td>COLT Telecommunications</td>
<td></td>
</tr>
<tr>
<td>15720</td>
<td>UNSPECIFIED</td>
<td></td>
<td>Postecom s.p.a. Autonomous Systems</td>
<td></td>
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<tr>
<td>1668</td>
<td>AT&amp;T</td>
<td></td>
<td>aol</td>
<td></td>
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<td>64.12.0.0/16</td>
<td></td>
<td></td>
<td>AOL Transit Data Network</td>
<td></td>
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<td>64.236.16.0/20</td>
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<td></td>
<td>Turner Broadcasting Systems</td>
<td>cnn.com</td>
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<td>65.54.128.0/19</td>
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<td></td>
<td>Microsoft</td>
<td>msn.com</td>
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<td>hotmail.com</td>
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<td>ebay.com</td>
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<td>eBay, Inc.</td>
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<td>Yahoo, Inc.</td>
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<td>Amazon, Inc.</td>
<td>amazon.com</td>
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<td>America Online</td>
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<td></td>
<td>Amazon.co.uk, ...</td>
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<td>145.97.32.0/20</td>
<td></td>
<td></td>
<td>SURFnet, The Netherlands</td>
<td>wikipedia.org</td>
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<td>ITnet S.p.A. Autonoma</td>
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<td>194.20.64.0/21</td>
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<td>194.24.4.0/16</td>
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<td>1267</td>
<td>AS-INFOGRAFIA</td>
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<td>AS-INFOGRAFIA</td>
<td></td>
</tr>
</tbody>
</table>

**Actions:**
- **AS origin**
- **Selected prefixes**
- **Description of the AS origin**
- **Name of the AS origin**
- **User annotations (in-place editing)**
- **Insert a prefix directly**
- **Query 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**
- **Query for all ASes whose description match**
- **Query for prefixes originated by a certain AS**
- **Query for all RIBs collected for peer 193.206.131.249**

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iBGPlay regular view

- Stable paths (dashed)
- Unstable paths (solid)
- Colors disambiguate your router currently visualized
- IXP aggregation
- BGP event details
- Blue Ases contain selected prefix
- VCR-like controls
- Events density: magenta: routing events, green: re-announcements
- Past, present, future
- Start time, end time
- Next-hop
iBGPlay dashboard view

- Always the last routing status in the DB is shown.
- Updated every 30 seconds (configurable).
- No VCR-like control. Only the extent of the past interval shown can be changed.
- Show the state of the routing one minute ago.
- You can switch to the regular interactive view at any time.
compare different router views

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
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?