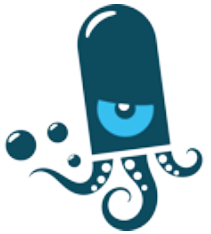


Introduction to pmacct

Paolo Lucente

pmacct

GRNOG Workshop #1, Athens – May 2017

whoami

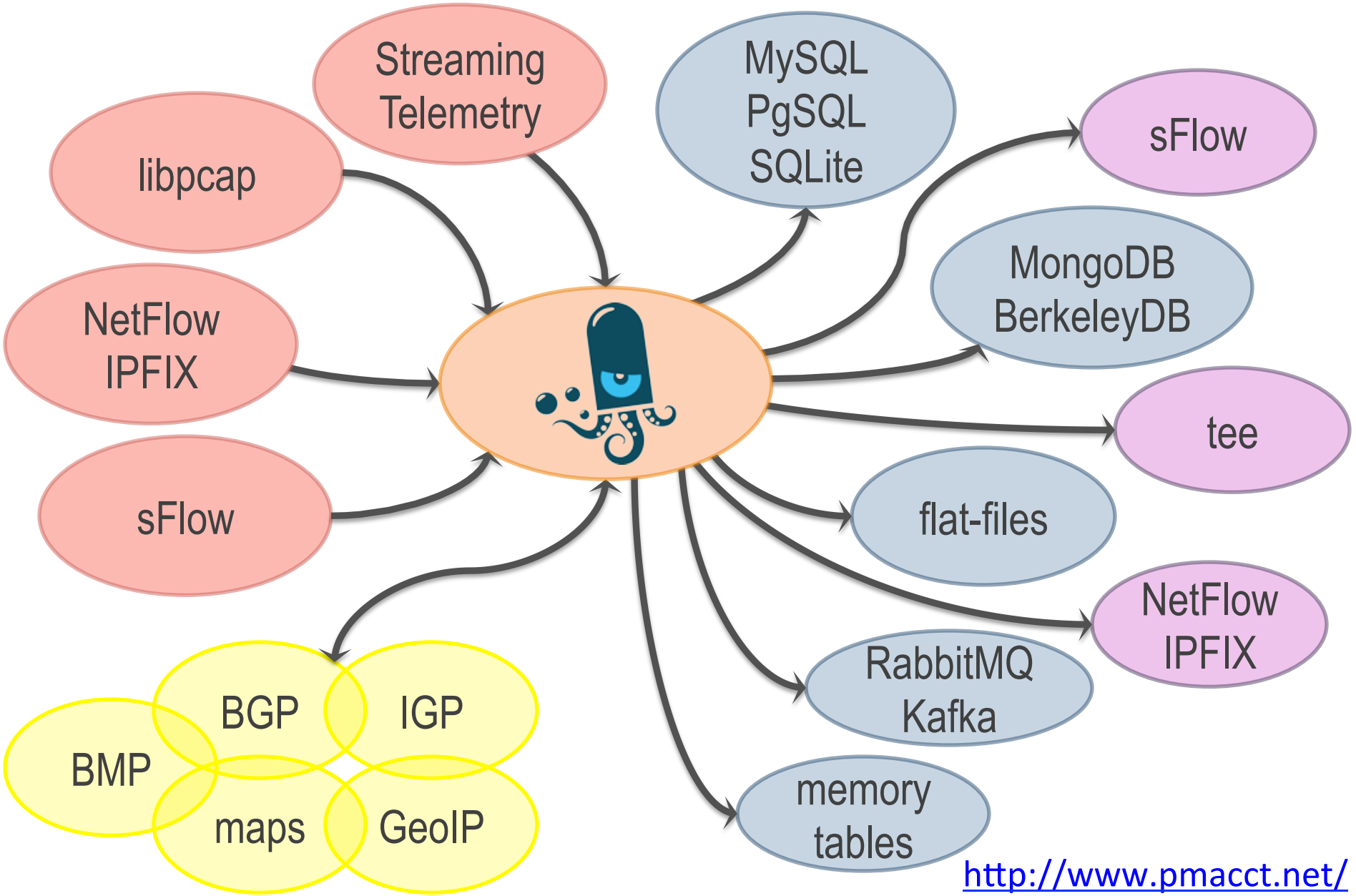
Paolo Lucente

GitHub: paololucente

LinkedIn: plucente

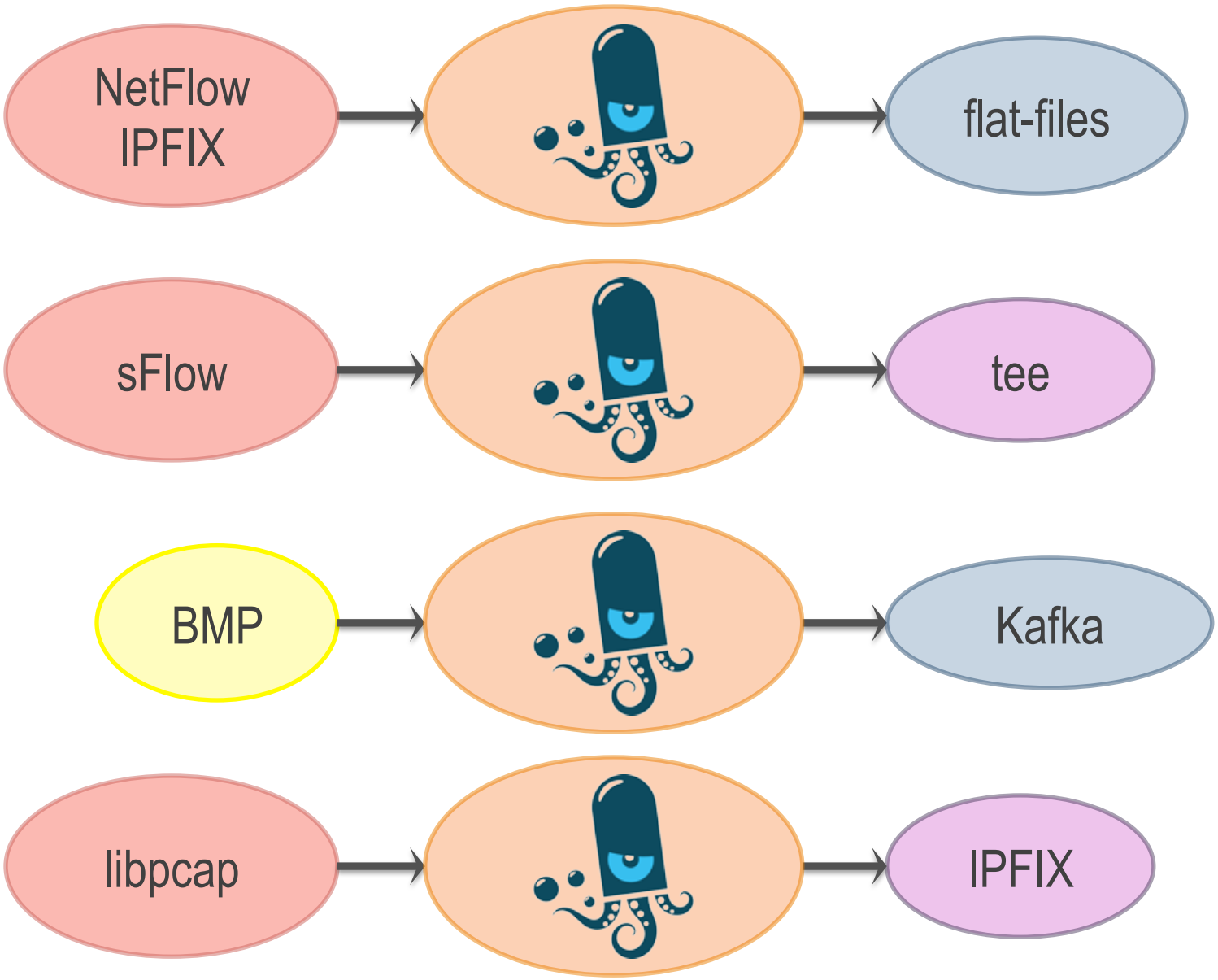
Digging data out of networks worldwide for fun and profit for more than 10 years

pmacct is open-source, free, GPL'ed software

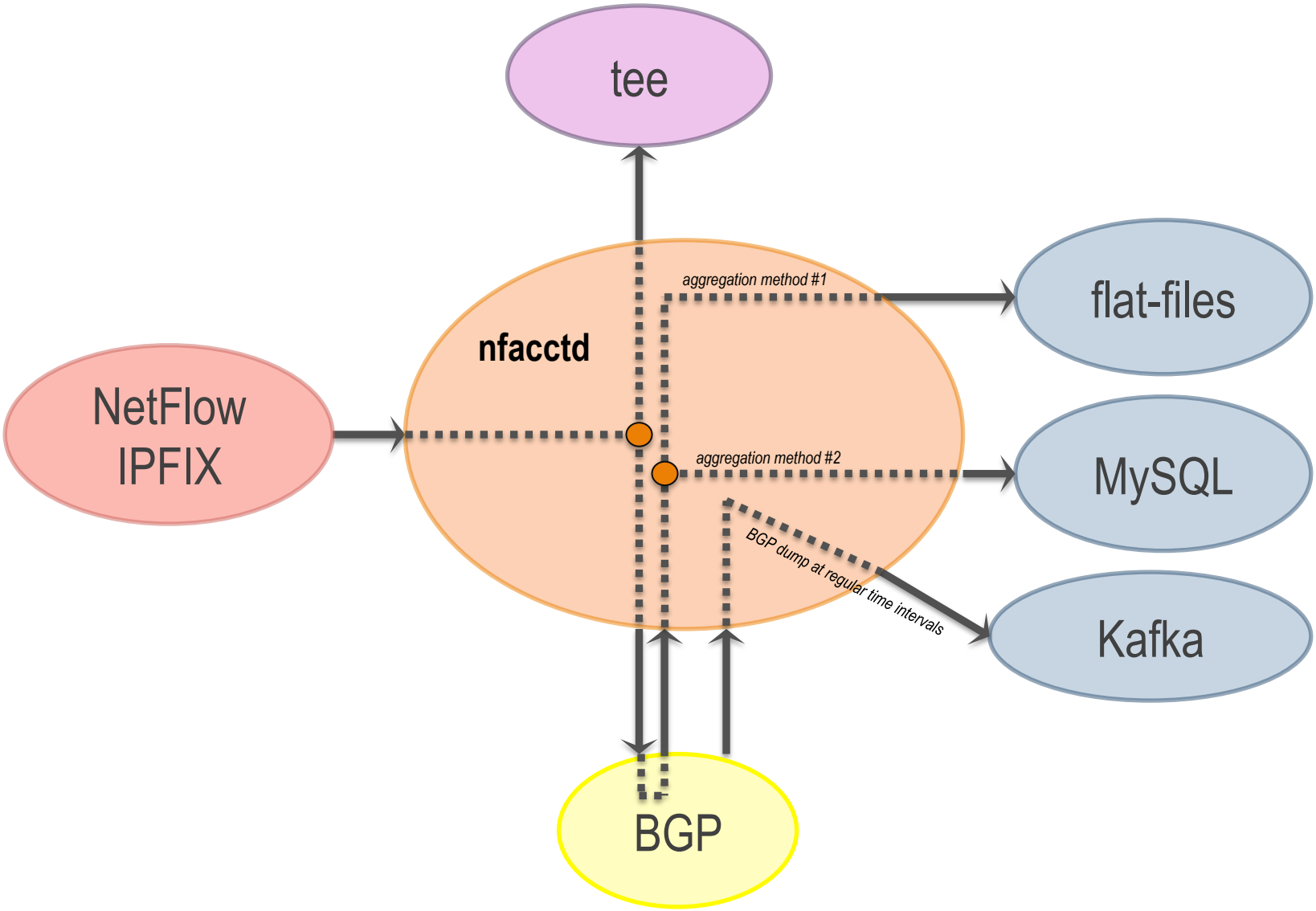


http://www.pmacct.net/

pmacct: a few simple use-cases

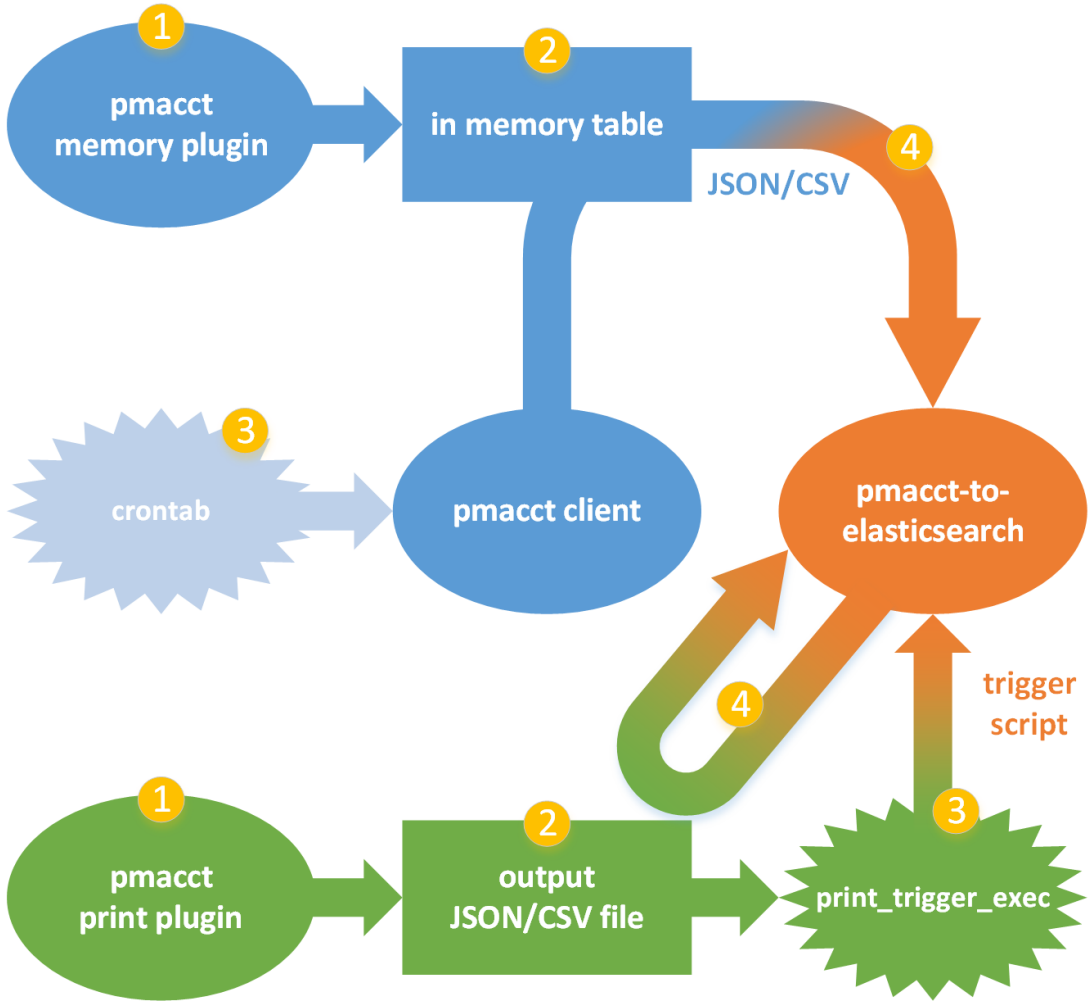


pmacct: a slightly more complex use-case



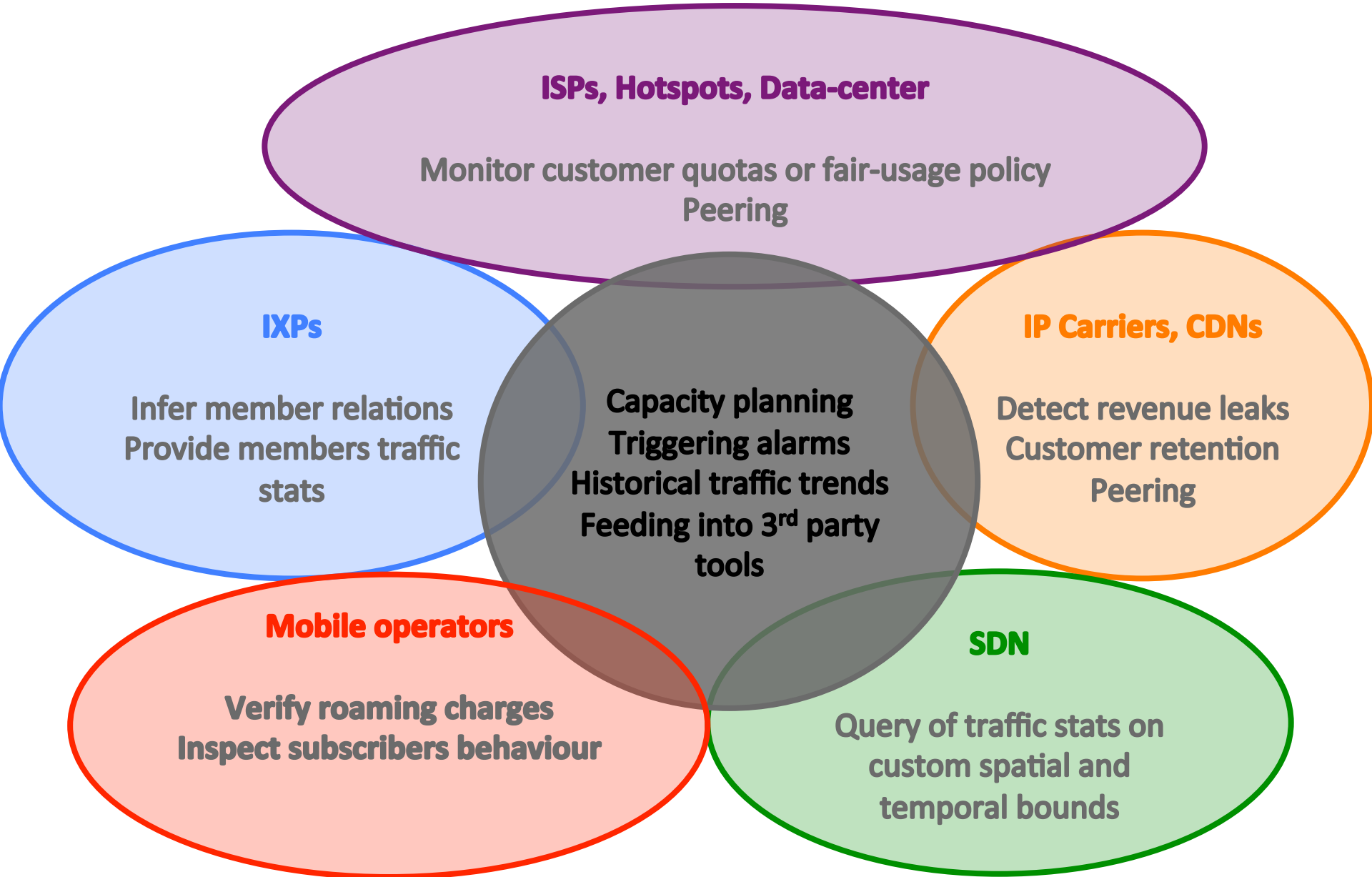
The use-case for message brokers

pmacct-to-elasticsearch 0.3.0



Credits to: Pier Carlo Chiodi, https://github.com/pierky/pmacct-to-elasticsearch

Use cases by industry



Key pmacct non-technical facts

- 10+ years old project
- Can’t spell the name after the second drink
- Free, open-source, independent
- Under active development
- Innovation being introduced
- Well deployed around, also large SPs
- Aims to be the traffic accounting tool closer to the SP community needs

Some technical facts (1/2)

- Pluggable architecture:
  - Can easily add support for new data sources and backends
- Correlation of data sources:
  - Natively supported data sources (ie. BGP, BMP, IGP, Streaming Telemetry)
  - External data sources via tags and labels
- Pervasive data-reduction techniques, ie.:
  - Data aggregation
  - Filtering
  - Sampling

Some technical facts (2/2)

- Build multiple views out of the very same collected network traffic dataset , ie.:
  - Unaggregated to flat-files for security and forensics; or to message brokers (RabbitMQ, Kafka) for Big Data
  - Aggregated as [<ingress router>, <ingress interface>, <BGP next-hop>, <peer destination ASN>] and sent to a SQL DB to build an internal traffic matrix for capacity planning purposes
- Enable analytics against the collected data sources (ie. BGP, BMP, Streaming Telemetry):
  - Stream real-time
  - Dump at regular time intervals (possible state compression)

Further information about pmacct

- https://github.com/pmacct/pmacct
  - Official GitHub repository, where star and watch us ☺
- http://www.pmacct.net/lucente_pmacct_uknof14.pdf
  - More about coupling telemetry and BGP
- http://ripe61.ripe.net/presentations/156-ripe61-bcp-planning-and-te.pdf
  - More about traffic matrices, capacity planning & TE
- https://github.com/pmacct/pmacct/wiki/
  - Wiki: docs, implementation notes, ecosystem, etc.

It just seemed Greece was the right place where to share octopus stories ..









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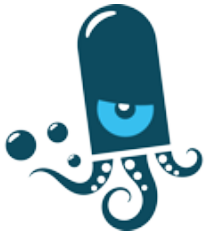
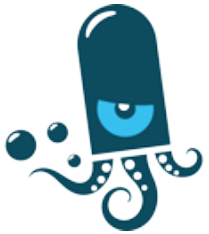


Introduction to pmacct

Thanks! Questions?

Paolo Lucente <paolo@pmacct.net>

http://www.pmacct.net/ | https://github.com/pmacct/pmacct



Latests on BGP monitoring

Paolo Lucente

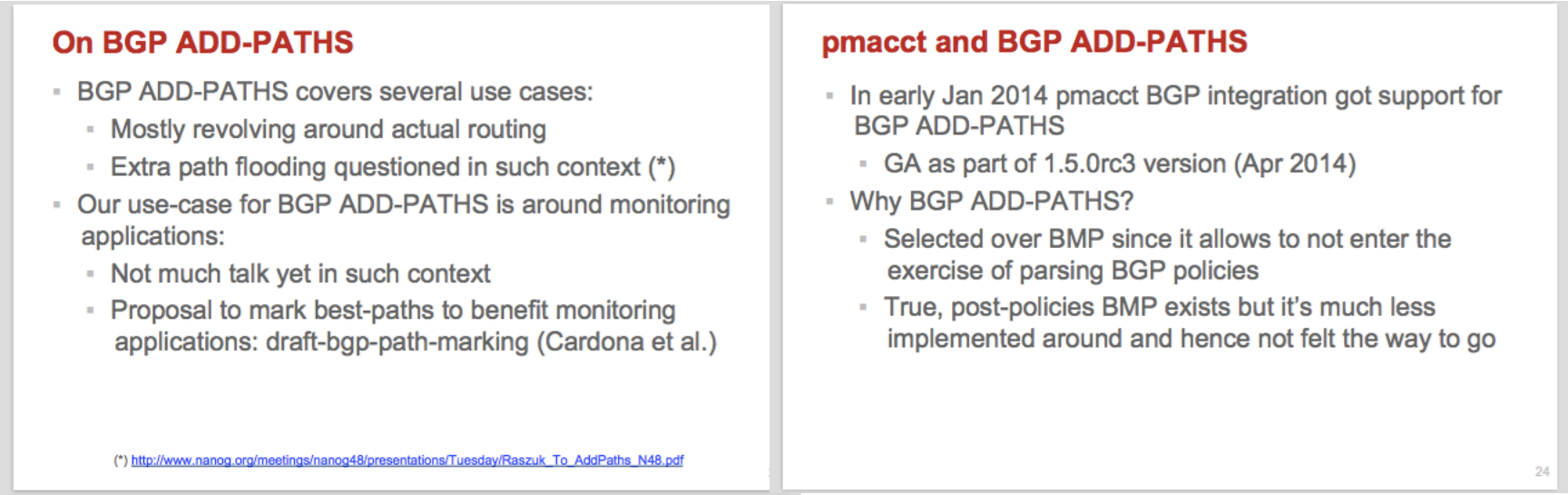
NTT Communications | pmacct

GRNOG Workshop #1, Athens – May 2017

BGP

- Protocol to advertise Reachability Information:
  - The Network Layer part of the story, while still dominant, is "old": BGP is used as transport for a variety of different info
- Good at policy control:
  - Although quality factors, ie. latency, jitter and packet loss, increasingly popular for content delivery in place of the traditional BGP selection algorithm
- Good at information hiding:
  - But, then again, this is the recipe for scaling to the current Internet size and beyond

Early attempts at gaining visibility



On BGP ADD-PATHS

- BGP ADD-PATHS covers several use cases:
  - Mostly revolving around actual routing
  - Extra path flooding questioned in such context (*)
- Our use-case for BGP ADD-PATHS is around monitoring applications:
  - Not much talk yet in such context
  - Proposal to mark best-paths to benefit monitoring applications: draft-bgp-path-marking (Cardona et al.)

(*) http://www.nanog.org/meetings/nanog48/presentations/Tuesday/Raszuk_To_AddPaths_N48.pdf

pmacct and BGP ADD-PATHS

- In early Jan 2014 pmacct BGP integration got support for BGP ADD-PATHS
  - GA as part of 1.5.0rc3 version (Apr 2014)
- Why BGP ADD-PATHS?
  - Selected over BMP since it allows to not enter the exercise of parsing BGP policies
  - True, post-policies BMP exists but it's much less implemented around and hence not felt the way to go

24

- Circa 2013
- Goal: see all paths in a BGP multi-path scenario, avoiding screen scraping

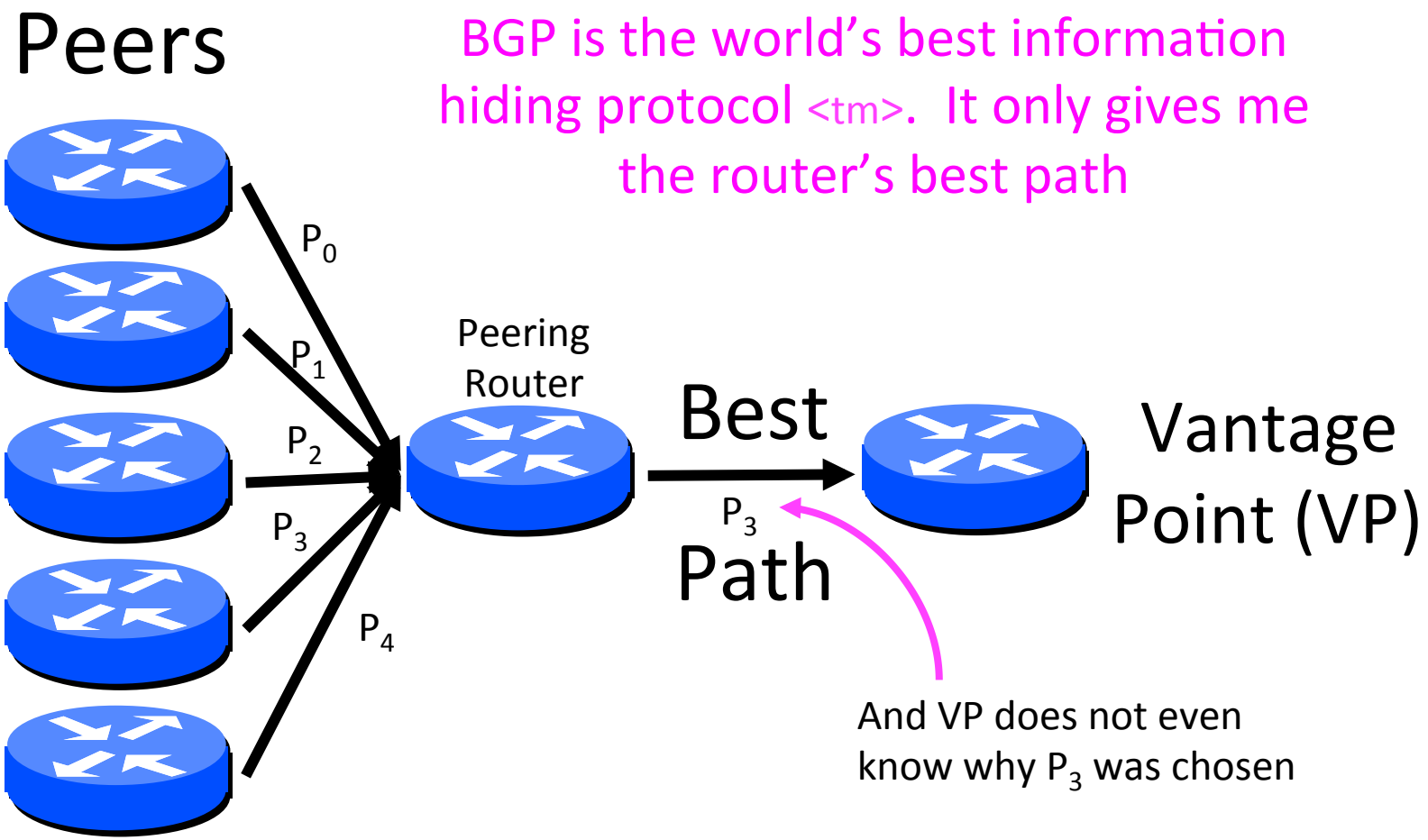
Credits to: E. Jasinska (Netflix), P. Lucente (pmacct) @ NANOG61

BMP

- BGP Monitoring Protocol
- RFC 7854:
  - first draft in 2008, sparse work until 2012;
  - stall between 2012 and 2015;
  - real traction kicks in: 10 drafts between 2015 and 2016;
  - RFC award in Jun 2016
- Uncomplicated protocol design 
- Great effort but ..
  - .. industry evolved all these years
  - increased hunger for data

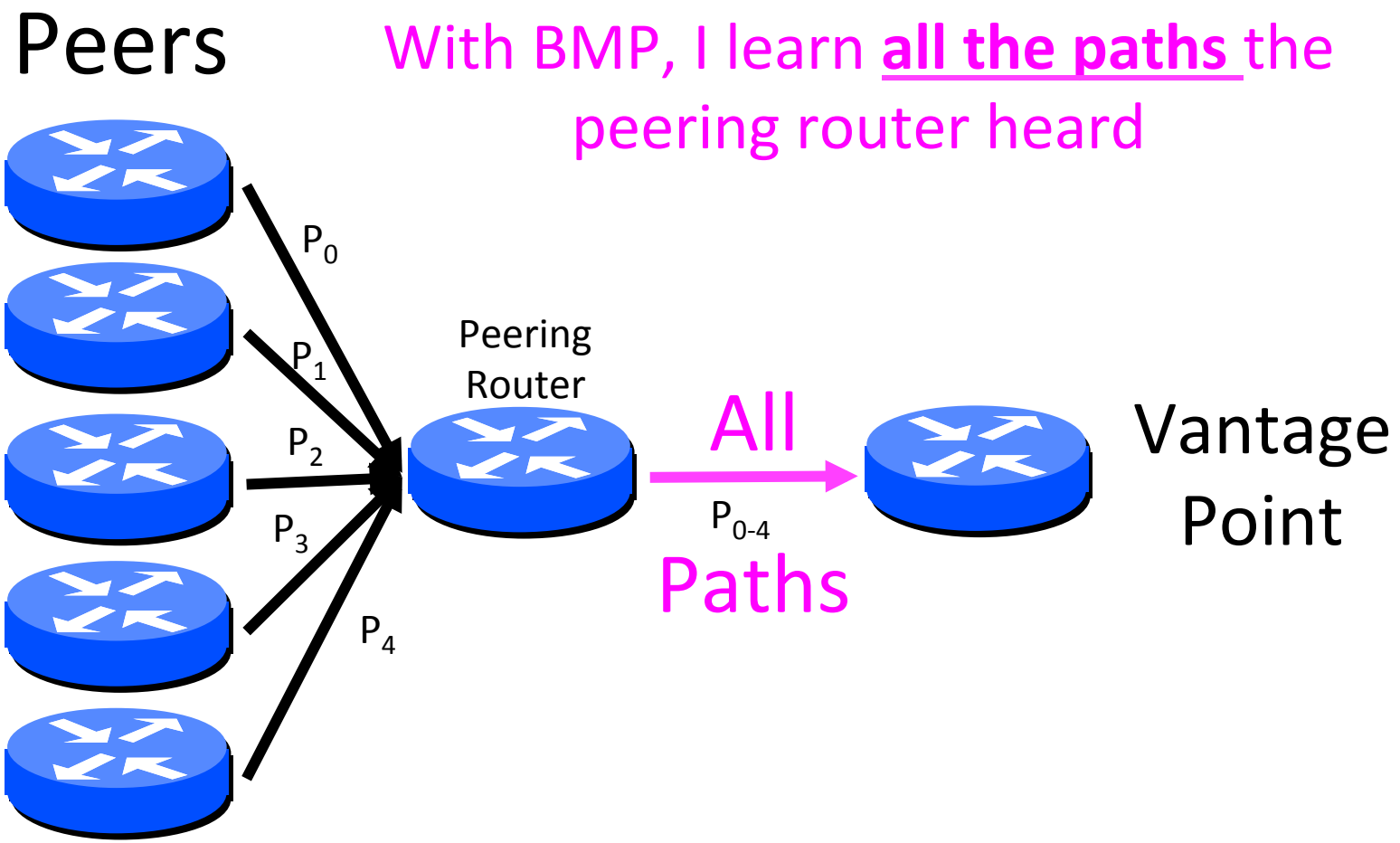
A DevOps guy during lunch break

Traditional BGP monitoring



Credits to: R. Bush (IIJ) @ BMP BoF, RIPE74

BGP monitoring with BMP (1/2)



Credits to: R. Bush (IIJ) @ BMP BoF, RIPE74

BGP monitoring with BMP (2/2)

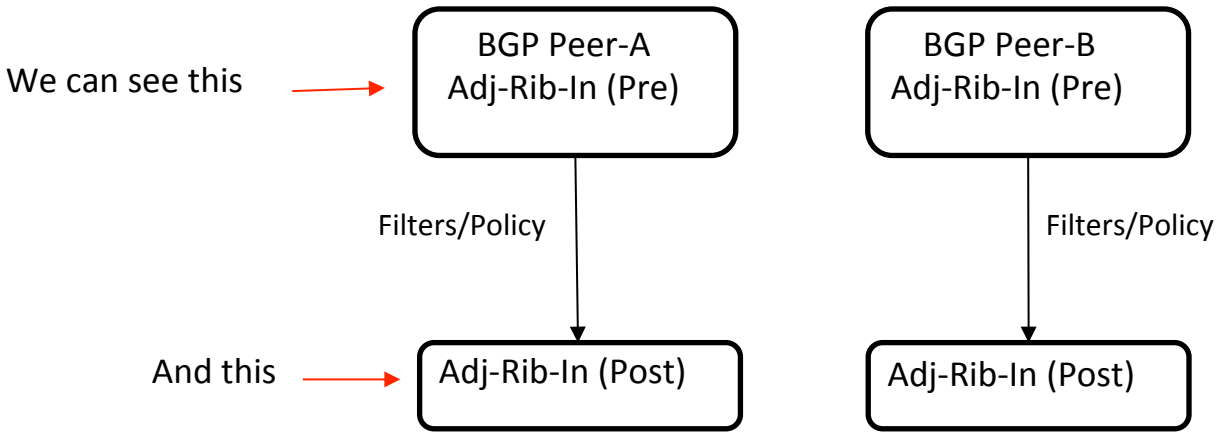
- Message Type (1 byte): This identifies the type of the BMP message. A BMP implementation MUST ignore unrecognized message types upon receipt.

  * Type = 0: Route Monitoring
  * Type = 1: Statistics Report
  * Type = 2: Peer Down Notification
  * Type = 3: Peer Up Notification
  * Type = 4: Initiation Message
  * Type = 5: Termination Message
  * Type = 6: Route Mirroring Message

BMP: problem statement

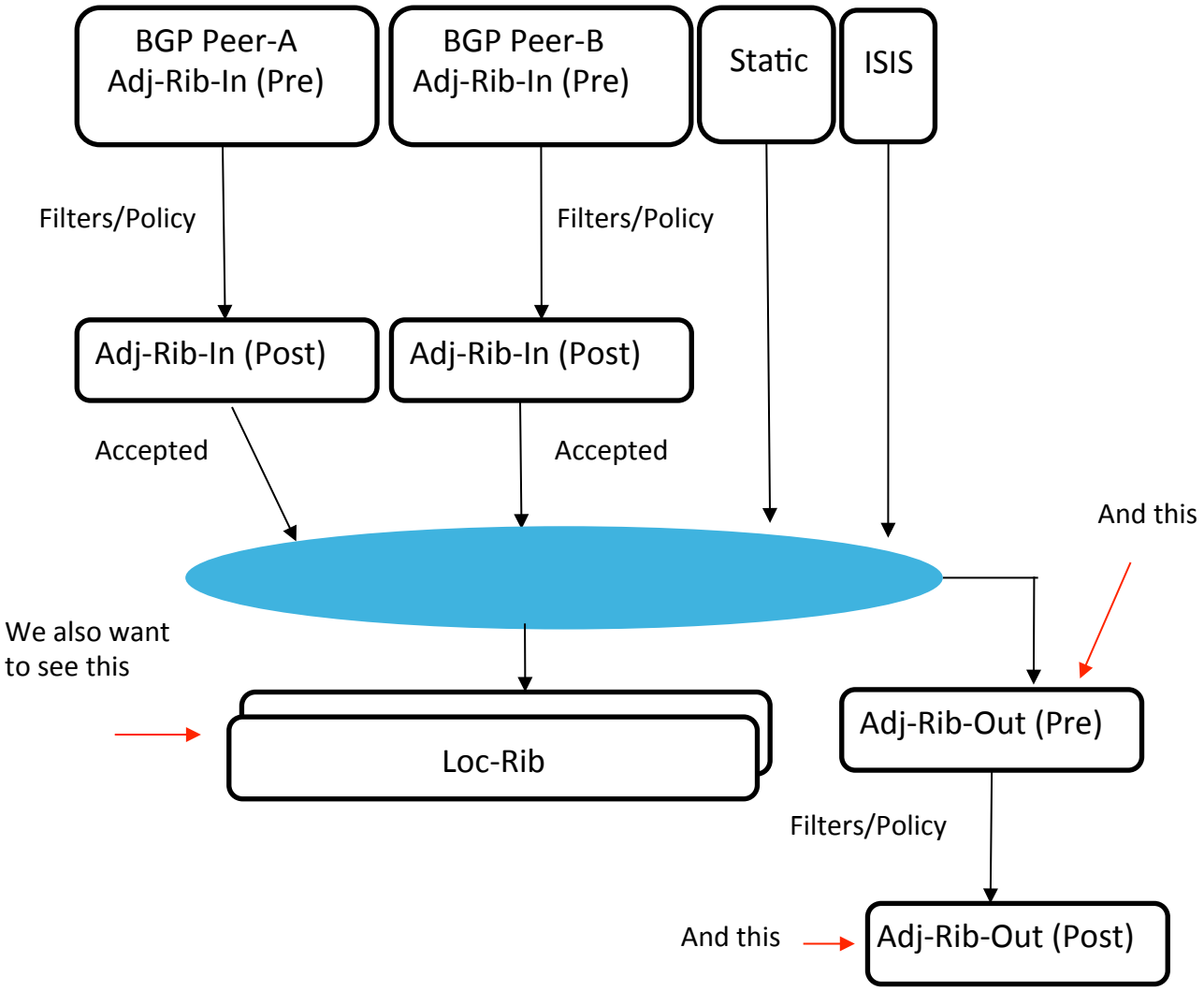
- The BGP protocol is one of the very few protocols running on the Internet that has a standardized, clean and separate monitoring plane, BMP (think, for example, to DNS ..)
- Still BMP, in its current shape, does cover only pre- and post- policies Adj-RIB-In; an operator would probably need:
  - Actual BGP peering(s) for loc-RIB
  - Worse-case, screen scraping for Adj-RIB-Out

Problem statement visualized



Credits to: T. Evens (Cisco), S. Bayraktar (Cisco), P. Lucente (NTT) @ GROW WG, IETF 98

Proposal: extend BMP to loc-RIB and Adj-RIB-Out (1/3)



Credits to: T. Evens (Cisco), S. Bayraktar (Cisco), P. Lucente (NTT) @ GROW WG, IETF 98

Proposal: extend BMP to loc-RIB and Adj-RIB-Out (2/3)

Global Routing Operations
Internet-Draft
Updates: 7854 (if approved)
Intended Status: Standards Track
Expires: October 1, 2017

T. Evens
S. Bayraktar
Cisco Systems
P. Lucente
NTT Communications
P. Mi
Tencent
S. Zhuang
Huawei

March 30, 2017

Support for Adj-RIB-Out in BGP Monitoring Protocol (BMP)
draft-evens-grow-bmp-adj-rib-out-01

Abstract

The BGP Monitoring Protocol (BMP) defines access to only the Adj-RIB-In Routing Information Bases (RIBs). This document updates the BGP Monitoring Protocol (BMP) RFC 7854 by adding access to the Adj-RIB-Out RIBs. It adds a new flag to the peer header to distinguish Adj-RIB-In and Adj-RIB-Out.

Proposal: extend BMP to loc-RIB and Adj-RIB-Out (3/3)

Global Routing Operations
Internet-Draft
Intended Status: Standards Track
Expires: September 11, 2017
March 10, 2017

T. Evens
S. Bayraktar
M. Bhardwaj
Cisco Systems
P. Lucente
NTT Communications

Support for Local RIB in BGP Monitoring Protocol (BMP)
draft-evens-grow-bmp-local-rib-00

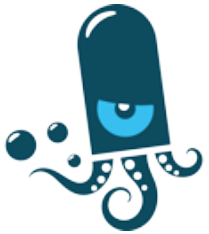
Abstract

The BGP Monitoring Protocol (BMP) defines access to the Adj-RIB-In and locally originated routes (e.g. routes distributed into BGP from protocols such as static) but not access to the BGP instance Loc-RIB. This document updates the BGP Monitoring Protocol (BMP) RFC 7854 by adding access to the BGP instance Local-RIB, as defined in RFC 4271 the routes that have been selected by the local BGP speaker's Decision Process. These are the routes over all peers, locally originated, and after best-path selection.

draft-evens-grow-bmp-{local-rib,adj-rib-out} use-cases

- Loc-RIB:
  - Monitor routes selected and user by the router:
    - ECMP
    - Correlation with NetFlow/IPFIX
    - Next-hop preservation
  - Monitor locally originated and BGP routes without requiring peering
  - Policy verification
- Adj-RIB-Out:
  - Monitor routes advertised to peers
  - Policy verification

Credits to: T. Evens (Cisco), S. Bayraktar (Cisco), P. Lucente (NTT) @ GROW WG, IETF 98



Latests on BGP monitoring

Thanks! Questions?

Paolo Lucente

NTT Communications | pmacct

GRNOG Workshop #1, Athens – May 2017