A Small Study of DSCP Usage at U.S. Regional Providers

preseem

About

Dan Siemon

- CPO & Co-Founder @ Aterlo Networks (Preseem)
- Networking geek, product manager, start-up founder.
- Former ISP owner, network admin.

The Questions

- How prevalent is DSCP bleaching?
- What percentage of traffic is DSCP 0 (when it’s not all bleached)?
- What is the distribution of traffic by DSCP?
- Does the distribution of traffic by DSCP differ between peak and off-peak?
- Does the distribution of traffic by DSCP differ between downstream and upstream?
- Is the DSCP distribution different when looking at bytes vs packets?

Methodology

- Statistics collected from six ISPs
- Two mechanisms
- Two time periods (afternoon, evening)
- Two directions (downstream and upstream)
- Two metrics (bytes and packets)

56 Charts. We're not going to look at all of them.

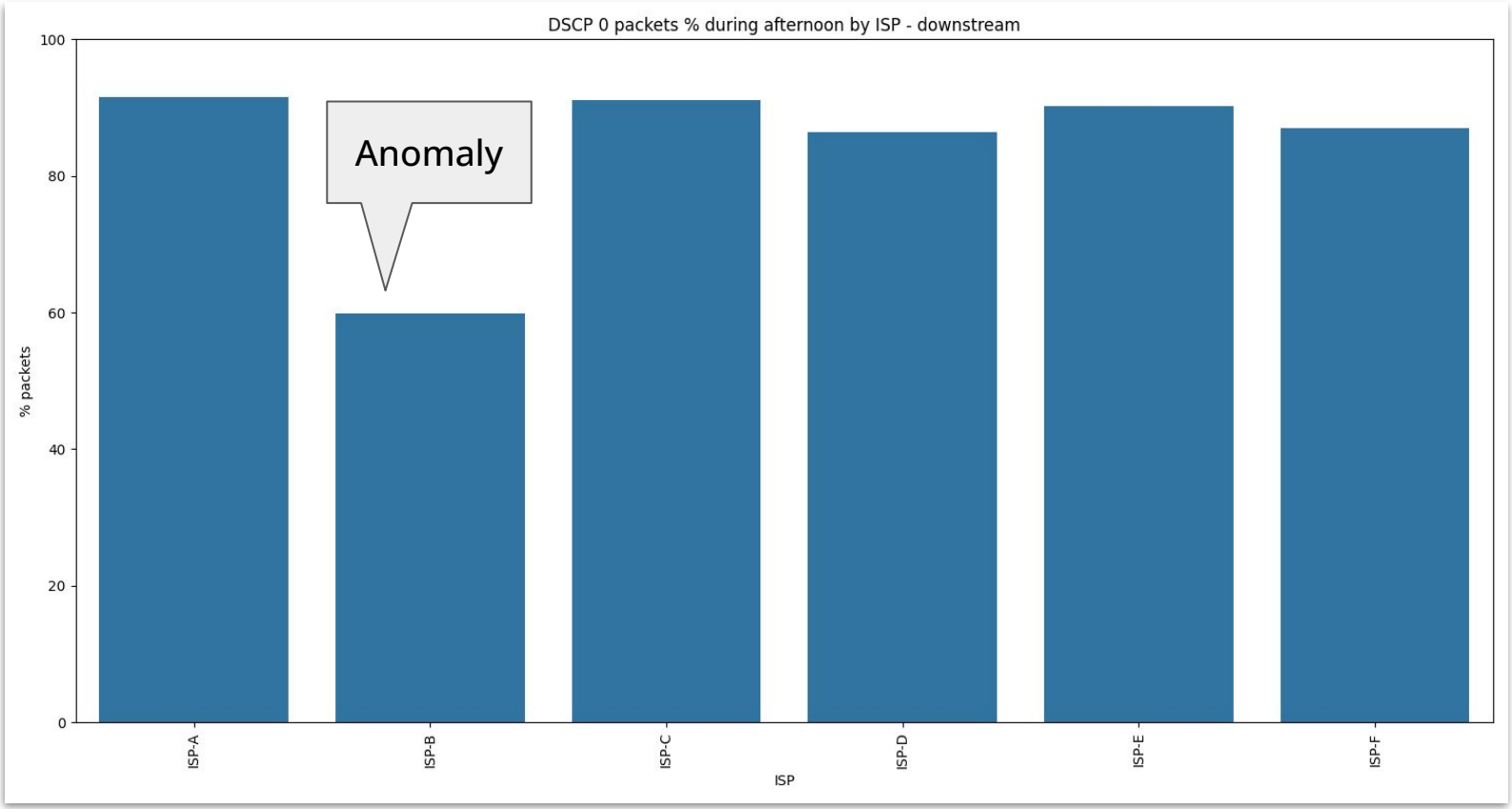
- Mechanism 1: Live program that counts by DSCP for longer durations at high rates attached to mirror ports
  - Two of the six ISPs
  - Hundreds of millions of packets per-ISP
- Mechanism 2: 250K packet capture in each direction
  - Four of the six ISPs

Questions

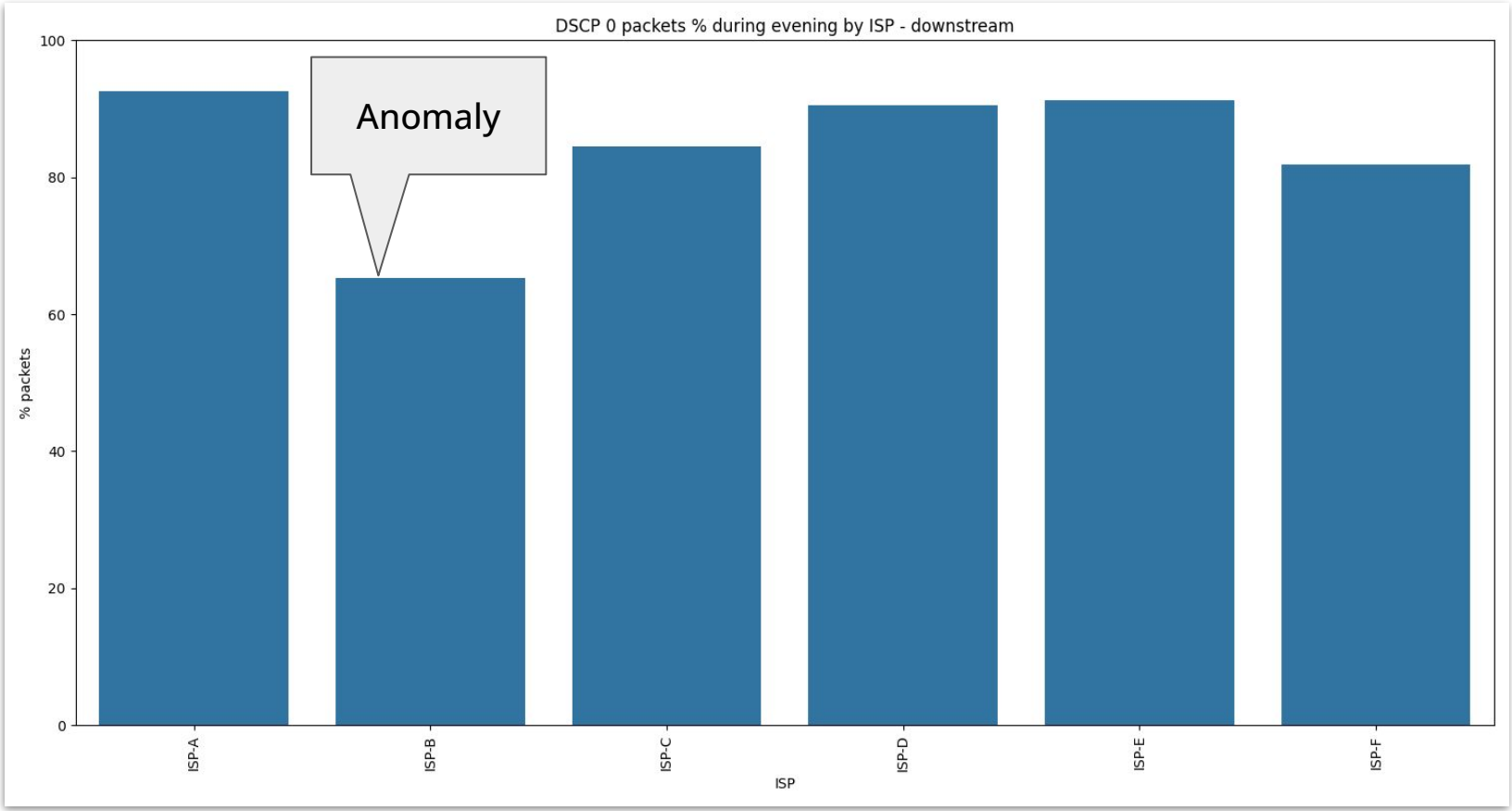
How prevalent is DSCP bleaching?

What percentage of traffic is DSCP 0 (when it’s not all bleached)?

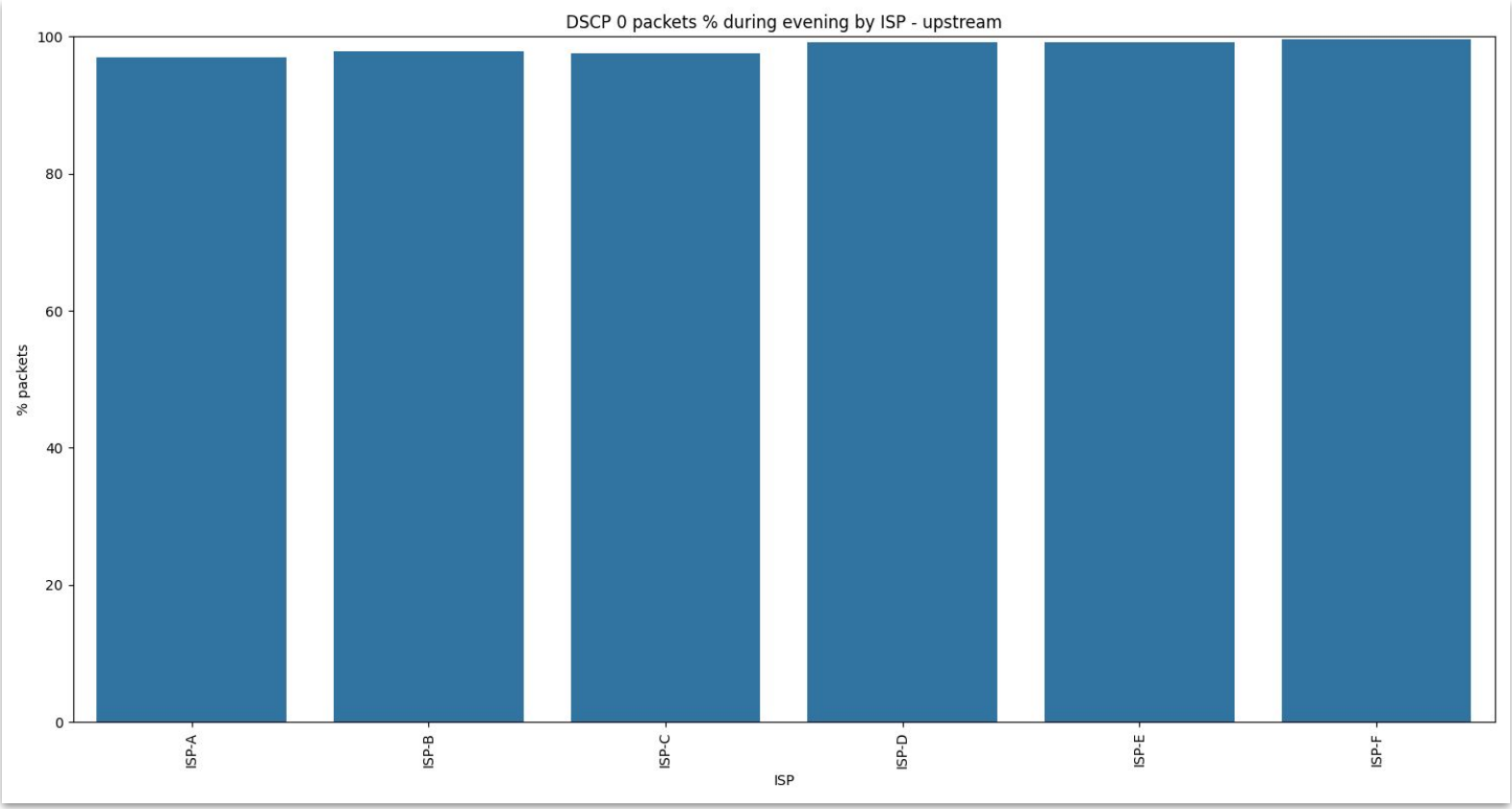
DSCP 0 - Packets, Afternoon, Downstream



DSCP 0 - Packets, Evening, Downstream



DSCP 0 - Packets, Evening, Upstream



Upstream is much more consistent and higher

The Questions, Observations

How prevalent is DSCP bleaching?

- None of these ISPs bleach **all** traffic in either direction

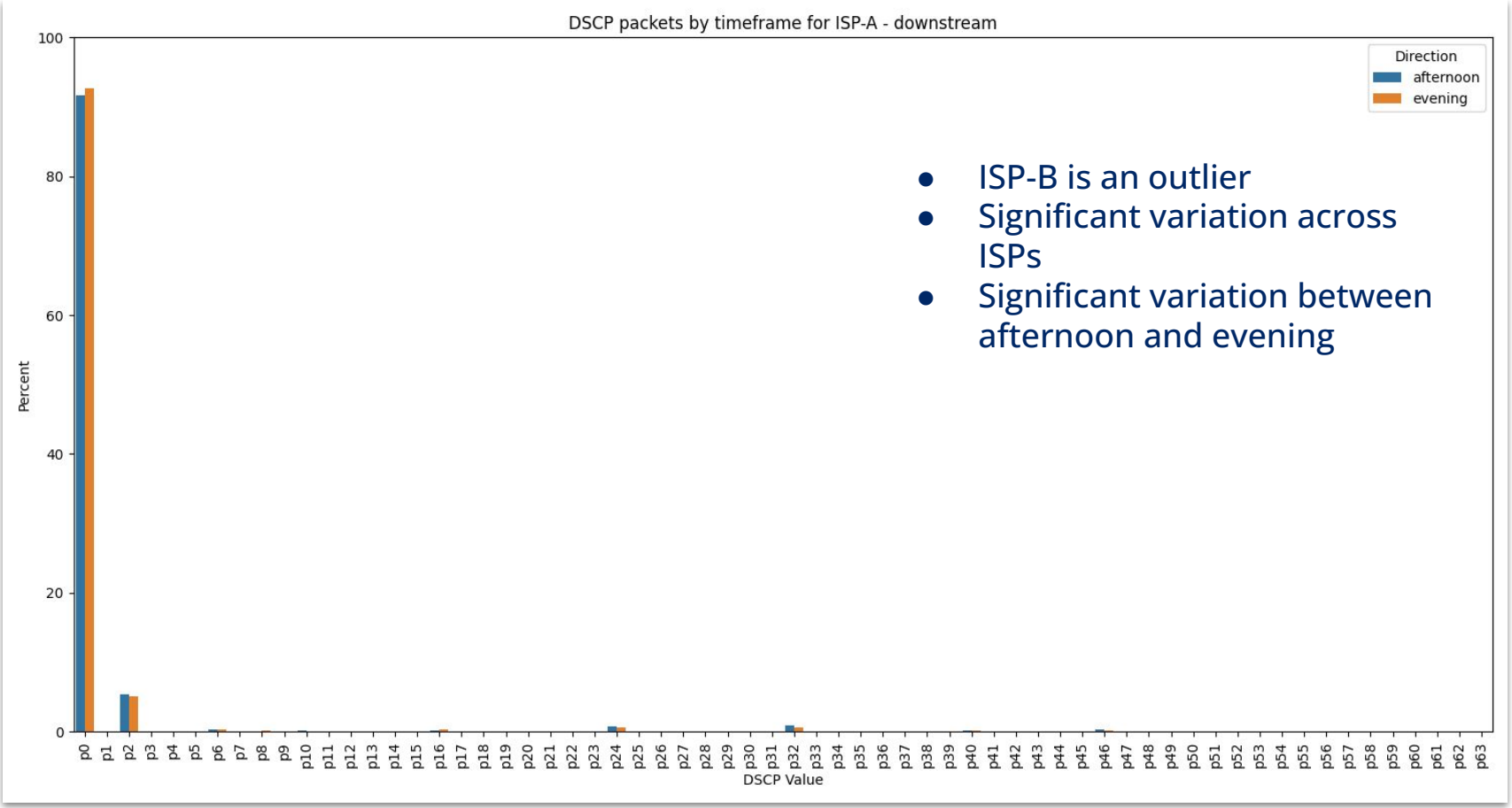
What percentage of traffic is DSCP 0 (when it's not all bleached)?

- Downstream, Afternoon: ~ >90%
- Downstream, Evening: ~ <90%
- Upstream, Evening: ~98%

Questions

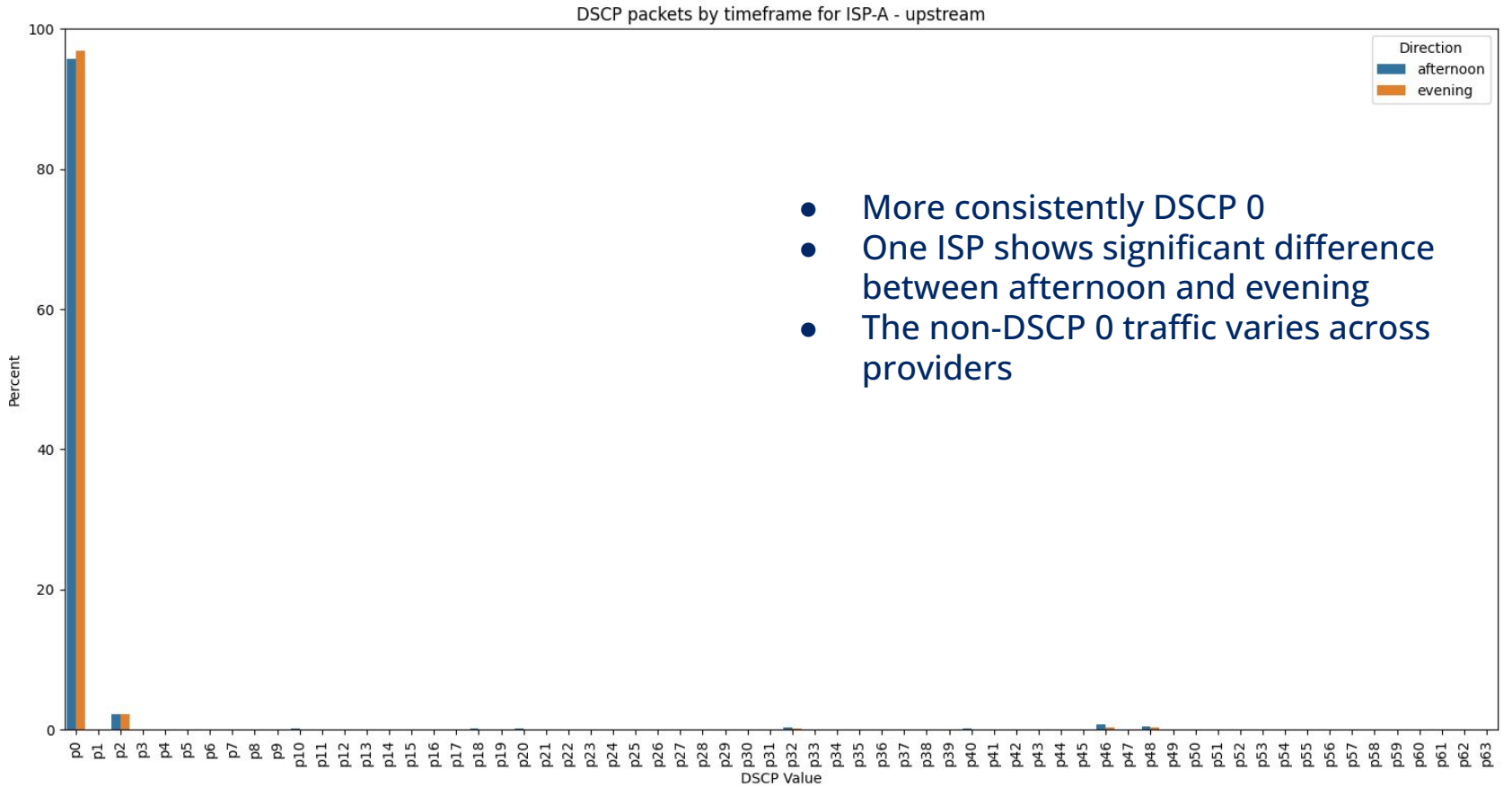
Does the distribution of traffic by DSCP differ between peak and off-peak?

DSCP Packets, Downstream by ISP



- ISP-B is an outlier
- Significant variation across ISPs
- Significant variation between afternoon and evening

DSCP Packets, Upstream by ISP



- More consistently DSCP 0
- One ISP shows significant difference between afternoon and evening
- The non-DSCP 0 traffic varies across providers

The Questions, Observations

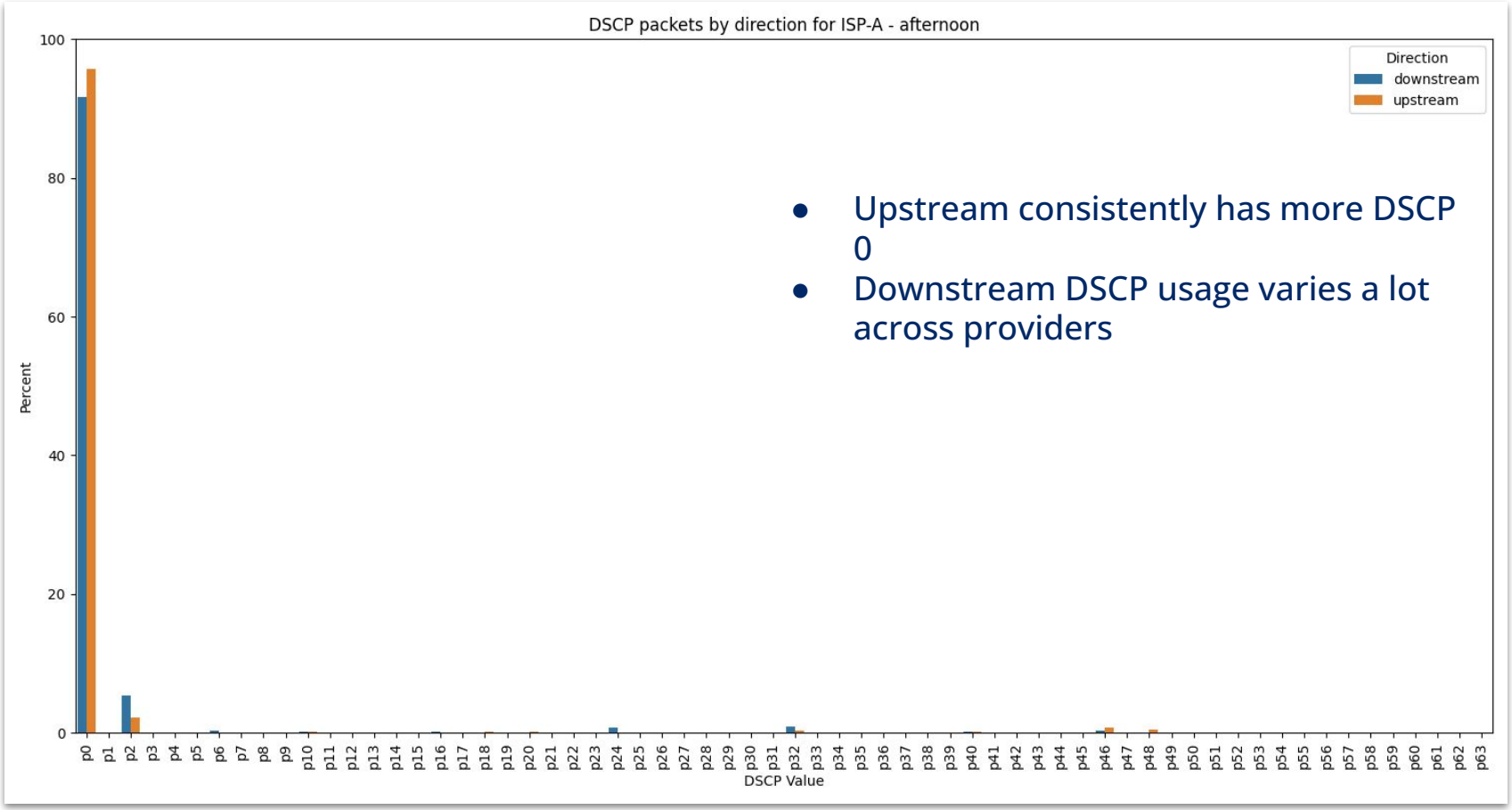
Does the distribution of traffic by DSCP differ between peak and off-peak?

- There is significant variation in the downstream
- There is little variation in the upstream
- There is variation across providers

Questions

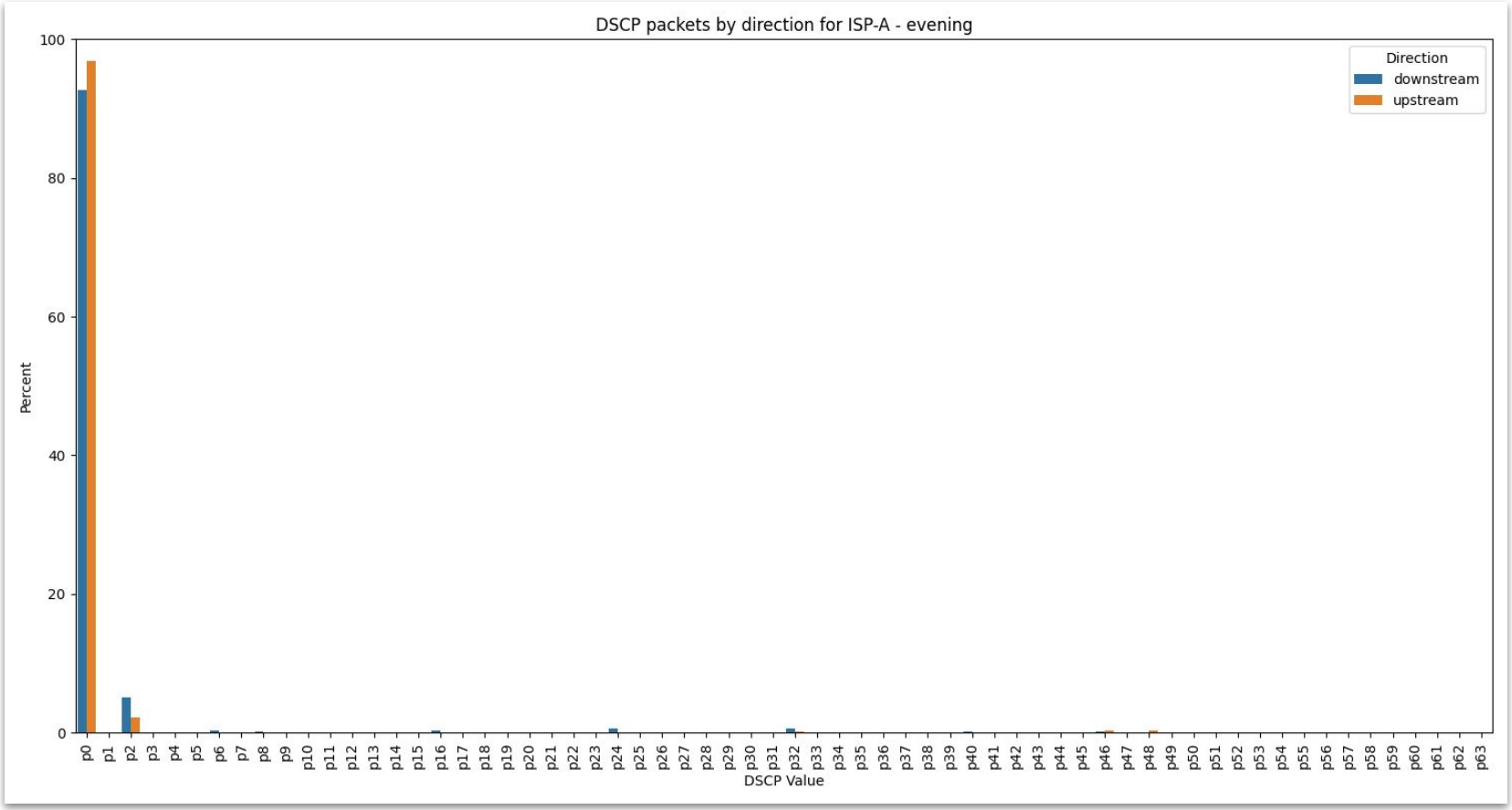
Does the distribution of traffic by DSCP differ between downstream and upstream?

DSCP Packets, Afternoon, ISP



- Upstream consistently has more DSCP 0
- Downstream DSCP usage varies a lot across providers

DSCP Packets, Evening, ISP



The Questions, Observations

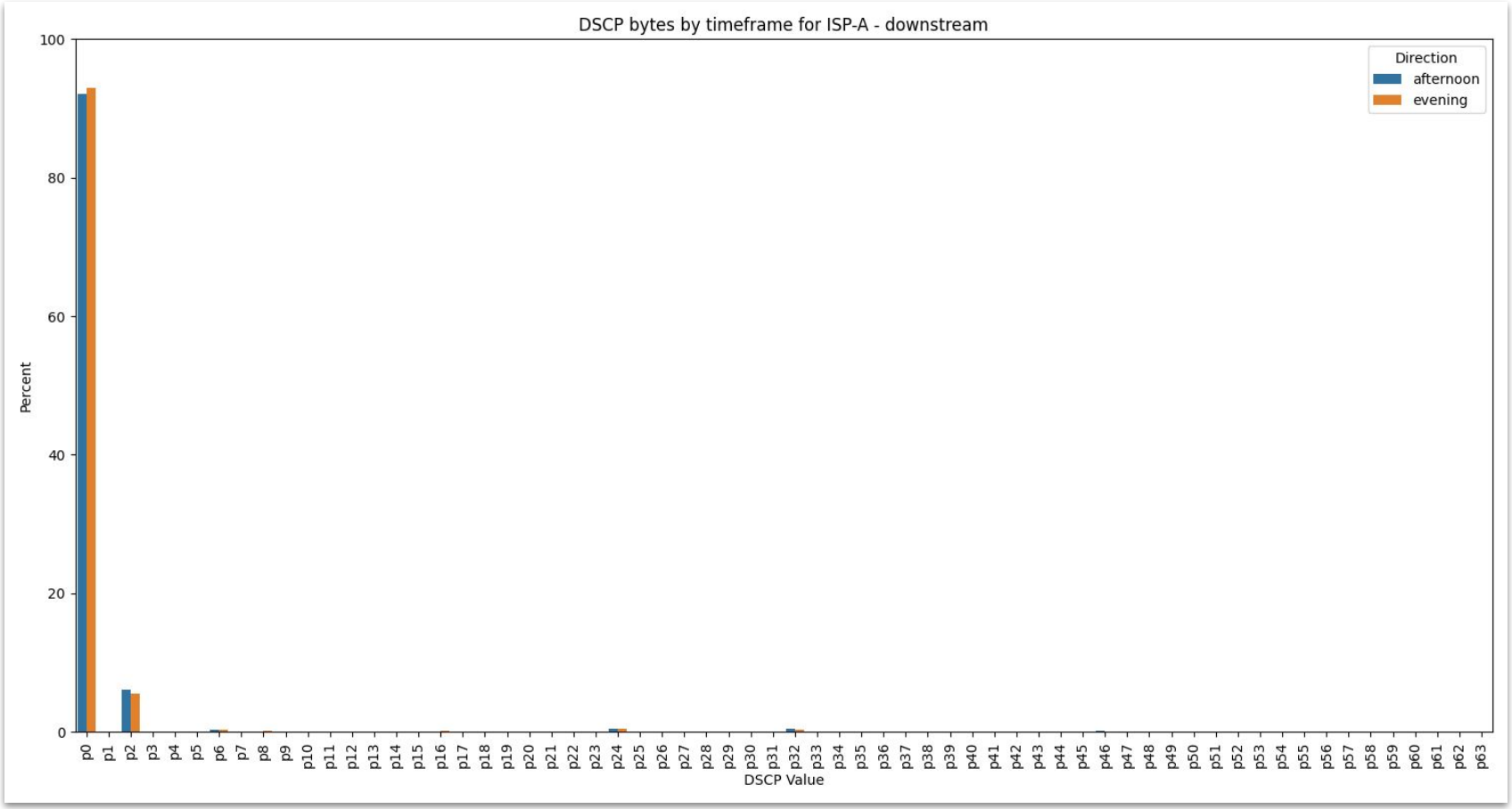
Does the distribution of traffic by DSCP differ between downstream and upstream?

- Upstream is more consistently DSCP 0
- There is significant difference between ISPs in the downstream

Questions

Is the DSCP distribution different when looking at bytes vs packets?

DSCP Packets and Bytes, Downstream for ISP A



The Questions, Observations

Is the DSCP distribution different when looking at bytes vs packets?

- Looking at ISP-A, there is little difference in the distribution when counting packets or bytes. Not presented, the other ISPs show a similar pattern.

Observations Summary & Questions

- **Most traffic is marked with DSCP 0**
  - Implications?
- **For the non-DSCP 0 traffic, there is a large amount of variation across ISPs**
  - Why? It's probably not the subscriber population as all six ISPs are regional U.S. providers.
- **Afternoon traffic has a higher percentage of DSCP 0 than the evening**
- **Upstream traffic has a much more consistent DSCP distribution than downstream traffic**

Interested in protocols? Take a look at the AT Protocol that underlies BlueSky.

Me: @coverfire.com
Network Nook (feed focused on networking)