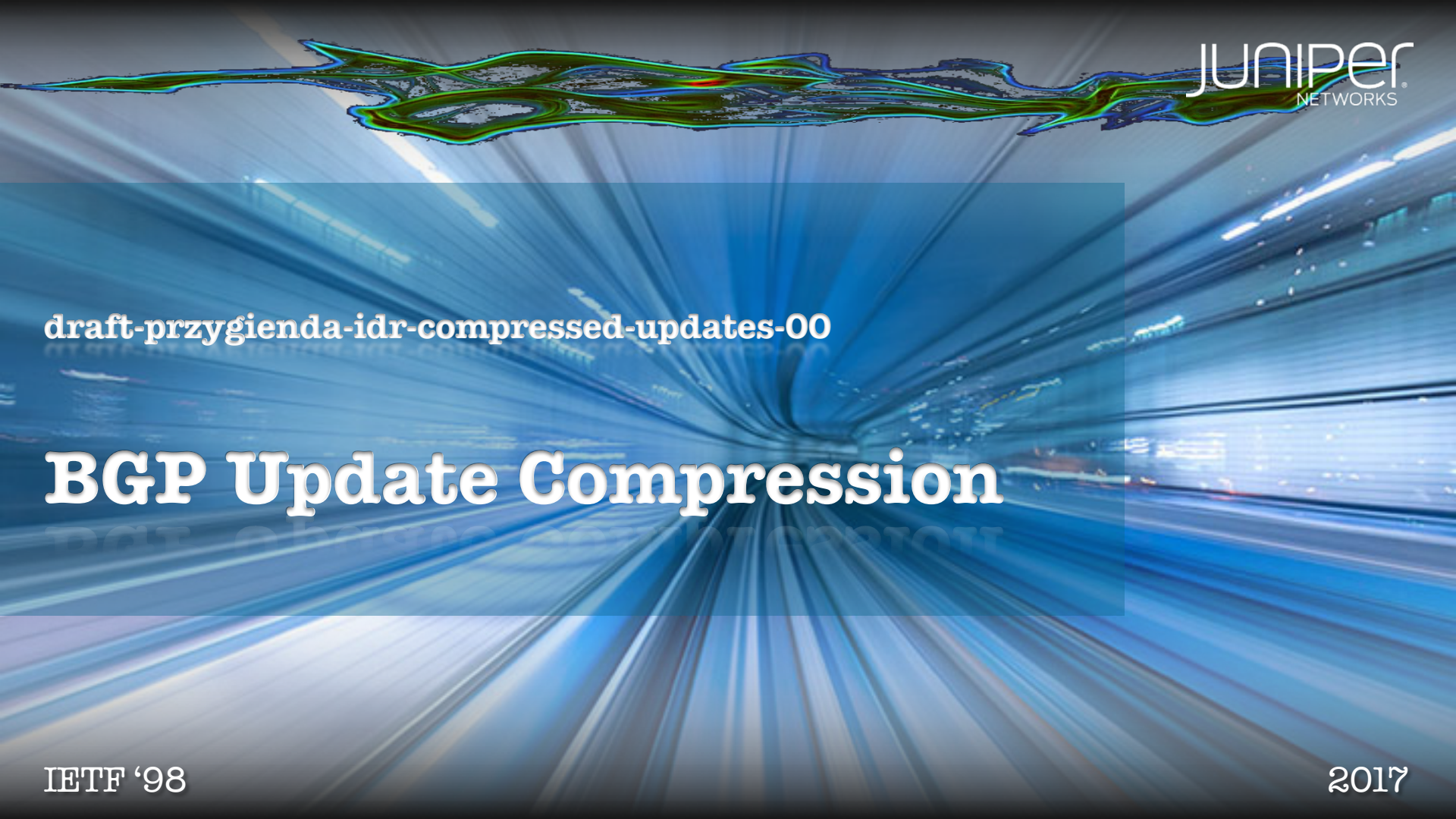

draft-przygienda-idr-compressed-updates-00
BGP Update Compression
IETF '98
2017


• Problem Overview
• Solution Overview

Problem Overview

- Problem: BGP is becoming an ALIDDB (any layer information distributed database)
  - BGP update volume is going up steadily (v6, add-path, EVPN, NFV, more and more attributes and AFs)
  - Certain scenarios like virtualized environments make BGP I/O costly
    - Multiple context switches overhead
    - Many-hops TCP paths
  - vRR, VPE, vRS are becoming more and more common
- Opportunity:
  - We have now more idle cores to run control plane on controller cards and CPU cores in virtualized environments are plentiful
  - Idle CPU can be used to extend “I/O envelope” available to BGP by “compression”

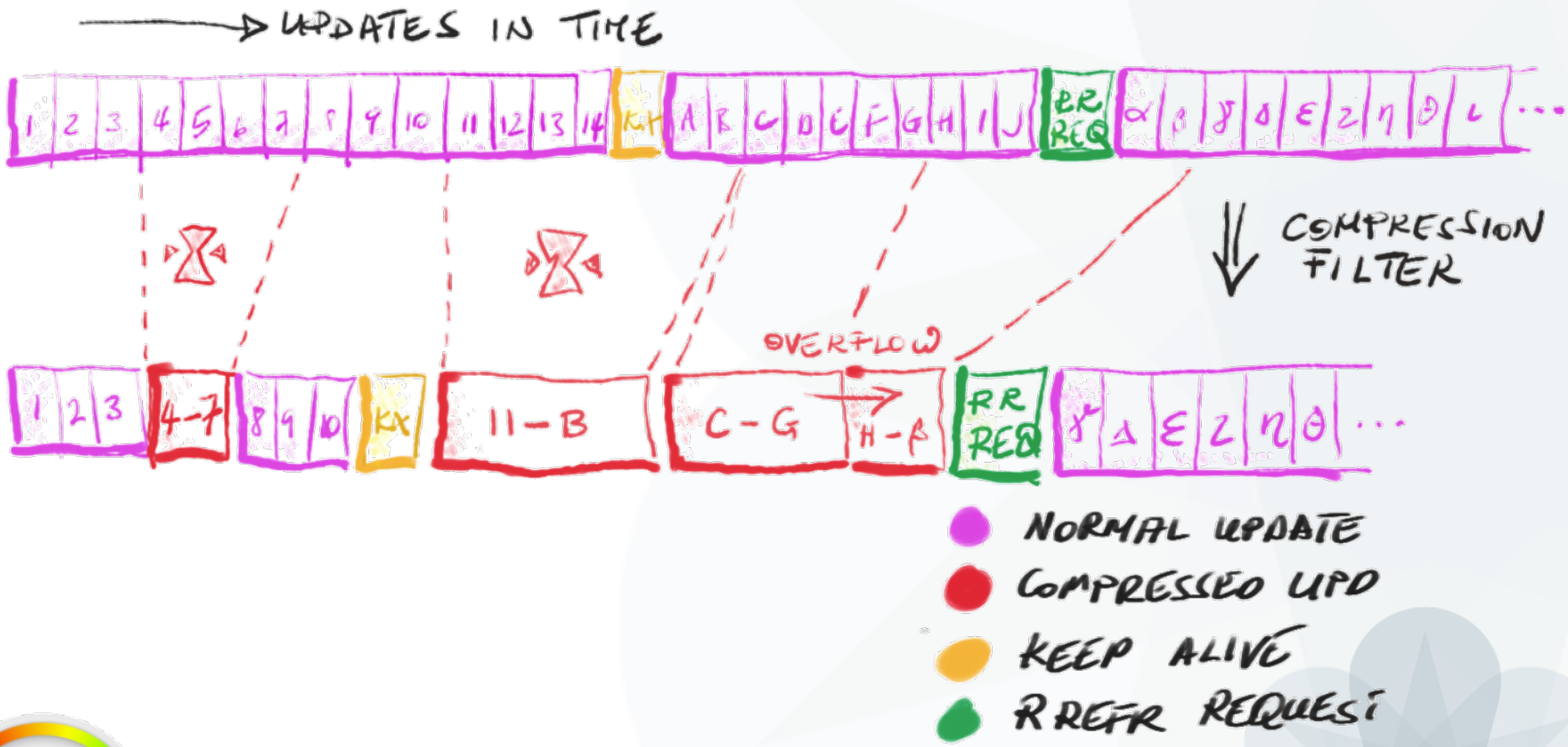
Problem Overview Cont'd

- Further observations
  - BGP encoding is very "chatty" and may stress TCP I/O with tons of "small things to say"
  - I/O bottleneck is always limited by the "weakest" link which is any of
    - Kernel/Process Context switching/Hypervisor switching
    - Slowest element in the TCP processing chain
    - Packet engine processing
    - Controller to packet engine communication
- Compression is asymmetric
  - Decoding is far, far cheaper than compression and hence easy and inexpensive to implement inline for low end "clients"
- Compression is classical case of a "channel filter" like "de-noiser" or "encryption"
  - Huffman encoding is very well understood and one of the most stable, portable open source libraries
  - Compression could be "stacked" with other filters in the future to provide desired "channel characteristics". "Channel filters" are a well understood systems software pattern
  - Compression is agnostic to data carried, e.g. AFs and with that future proof
- Yes, BGP could peer over compressed tunnels with its own set of problems

Solution Overview: Compression

- We optionally compress BGP updates
  - New optional capability to advertise “can decompress”
    - On reception of such capability the receiver MAY compress
  - Compressed and uncompressed updates can be mixed at sender’s discretion
  - Asymmetric
    - Compression is independent of decompression implementation (system can choose to support any combination of both)

One Picture



Solution Overview: Subtle Details

- Multiple compressors can be run on stream at same time
- Sender can reset compressor at any time and signal receiver (forcing it to reset decompressor)
- Sender indicates on compressed message
  - Buffer size needed to decompress the message
  - Possible overflow (compressed message followed immediately by another fragment delivering total up to 8K compressed data)
  - Number of the compressor (up to 8)
  - Possible reset