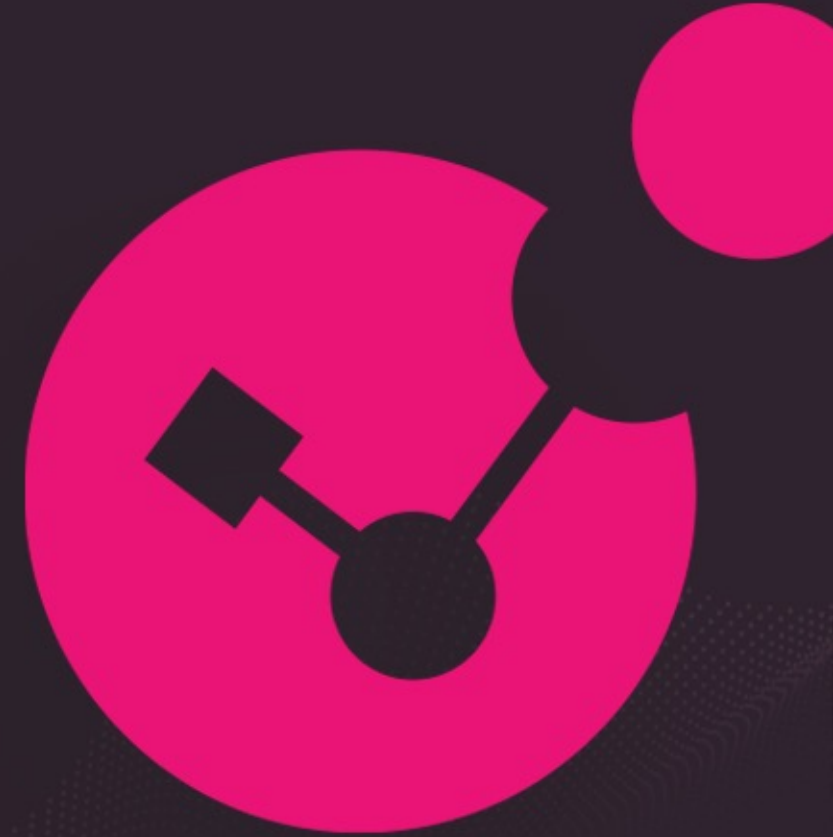




HyperFlow

Under The Hood | TechTalk, Mar 29th

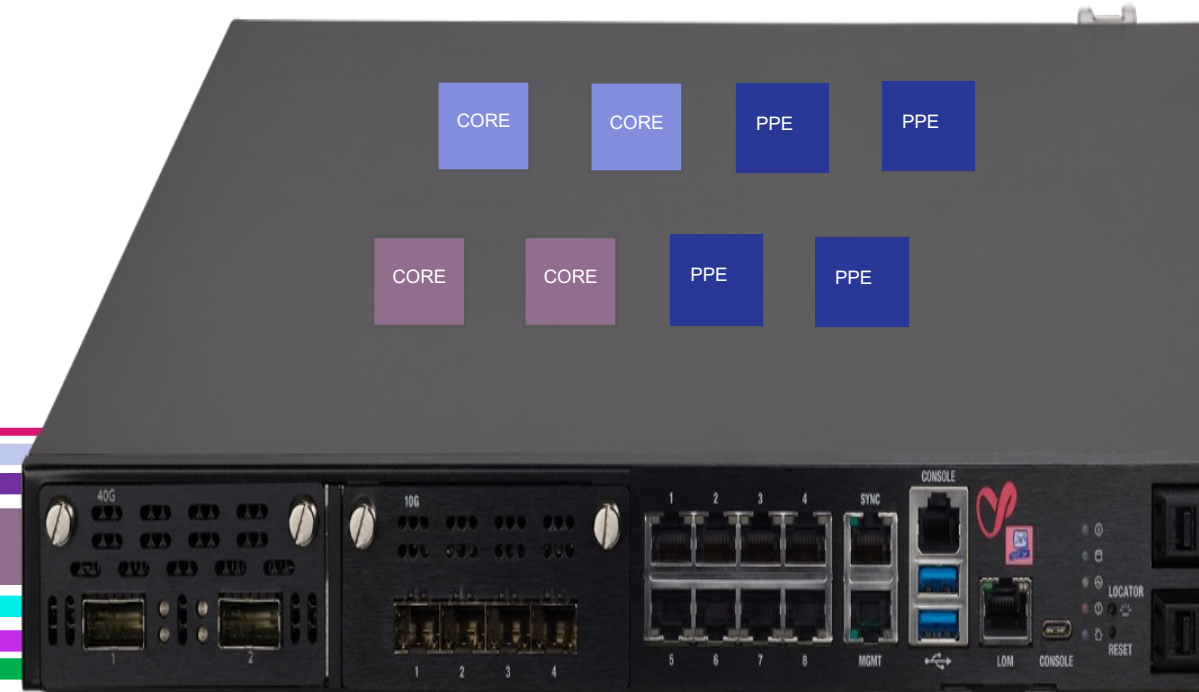


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HyperFlow Now Available in R81.20

- Automatic and reactive system resource management
- Load balancing on CPU cores

On by Default



HyperFlow Overview

- Automatic system resource management (load balancing on CPU cores)
- **Reactive** - No changes in core allocation until EF is detected.



No Manual configuration

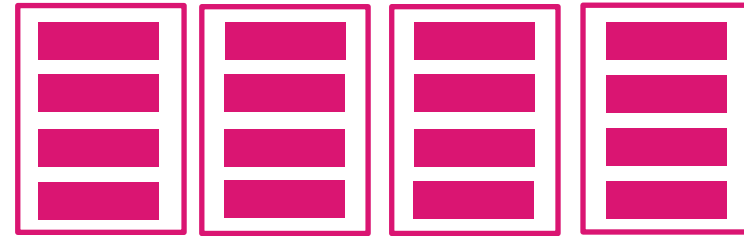


No reboots needed



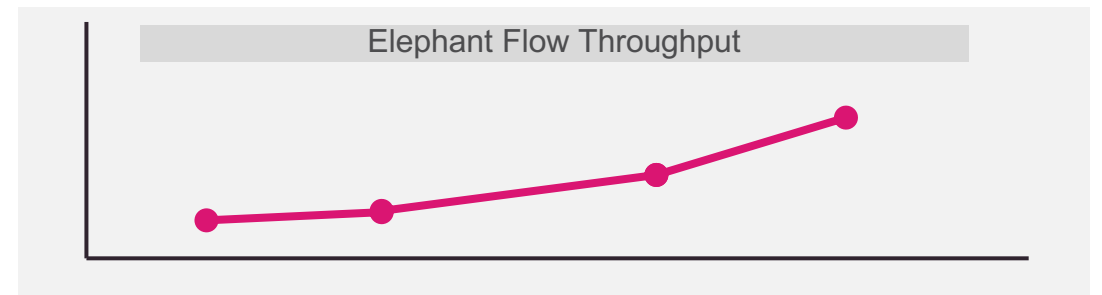
No Traffic loss

Increasing the Throughput of the Connection



Firewall Instance

Parallel Processing Instances



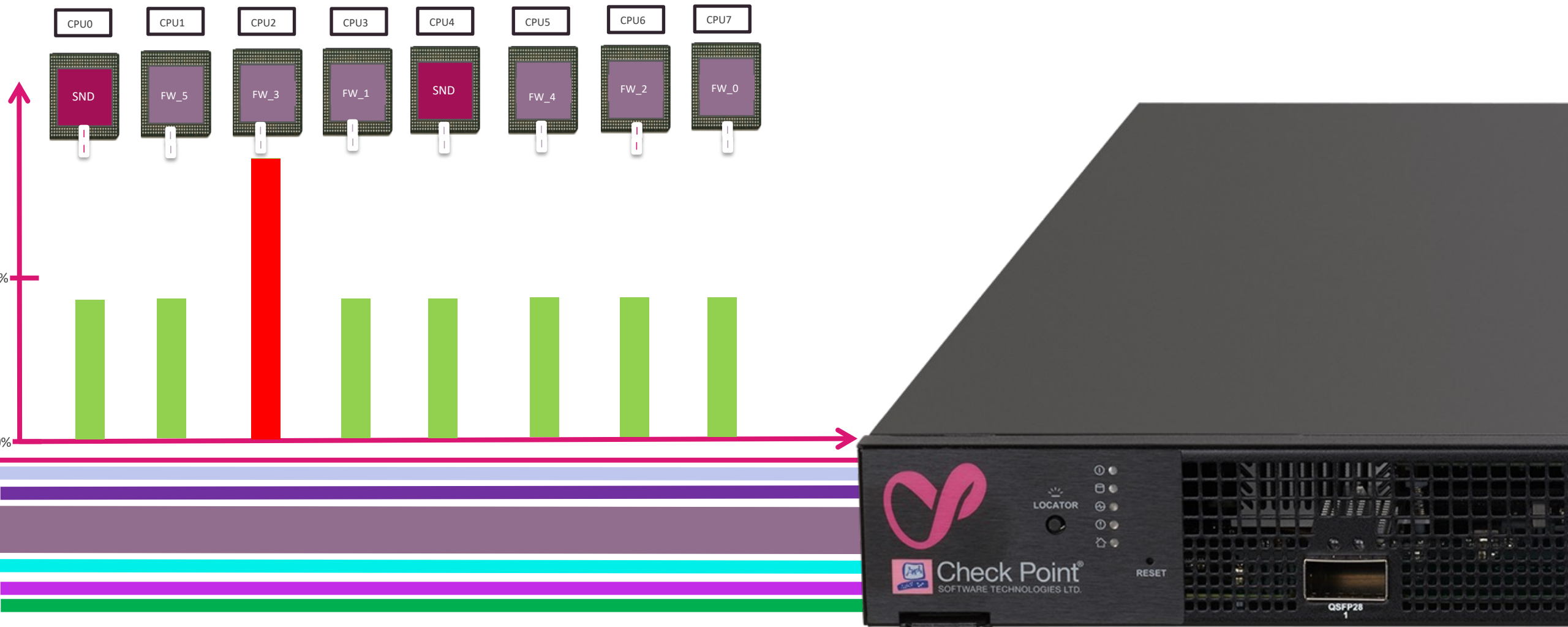
New Solution for in R81.20 | Dynamic Balancing



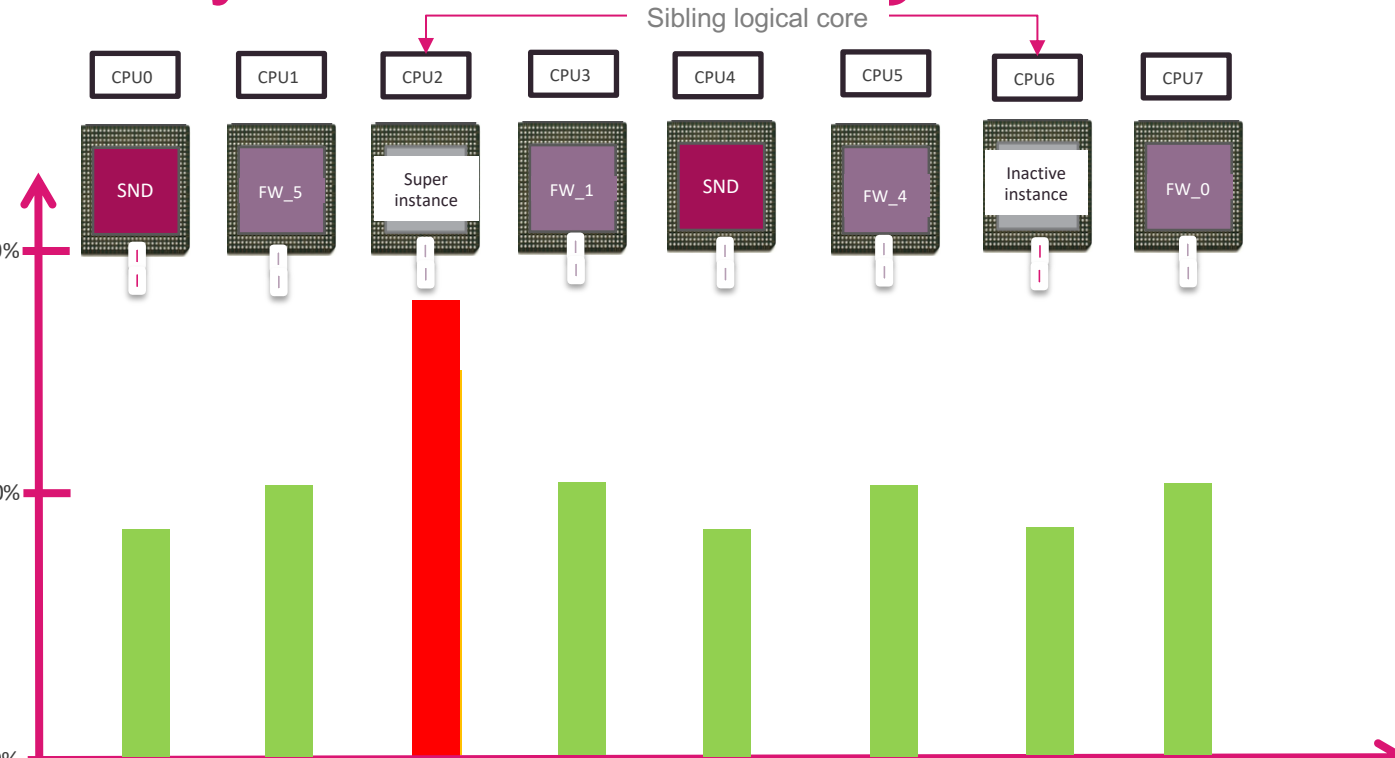
Super instance



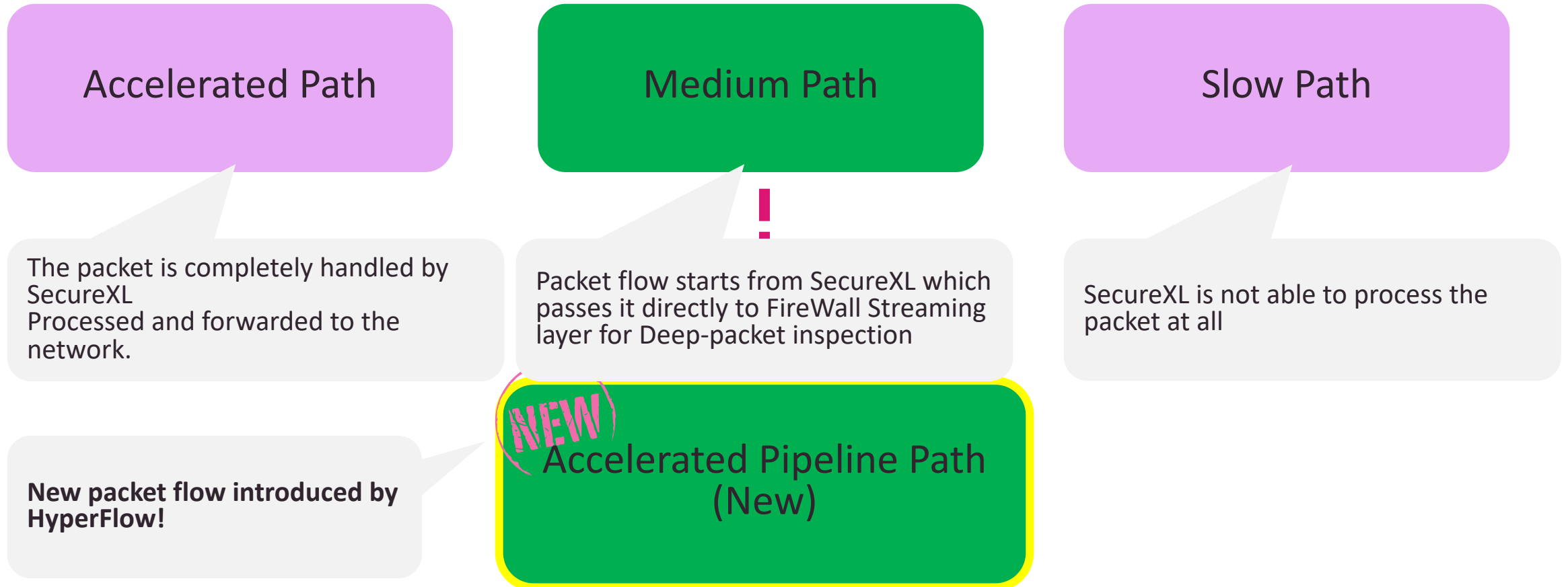
Dynamic Balancing – What's New in R81.20?



Dynamic Balancing – What's New in R81.20?

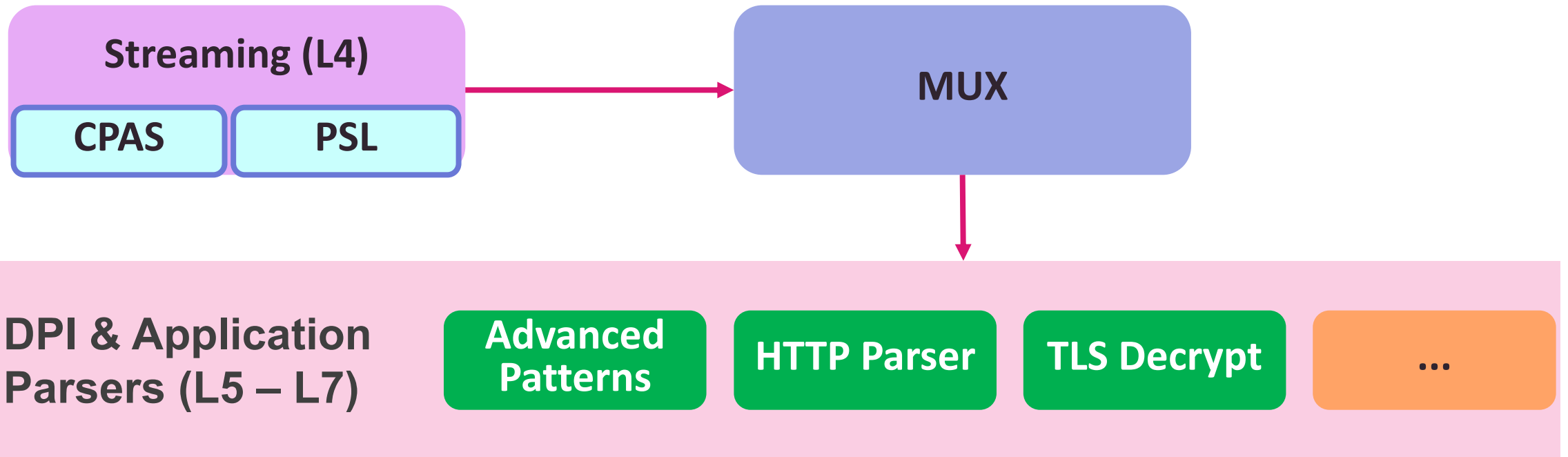


FW Architecture Overview

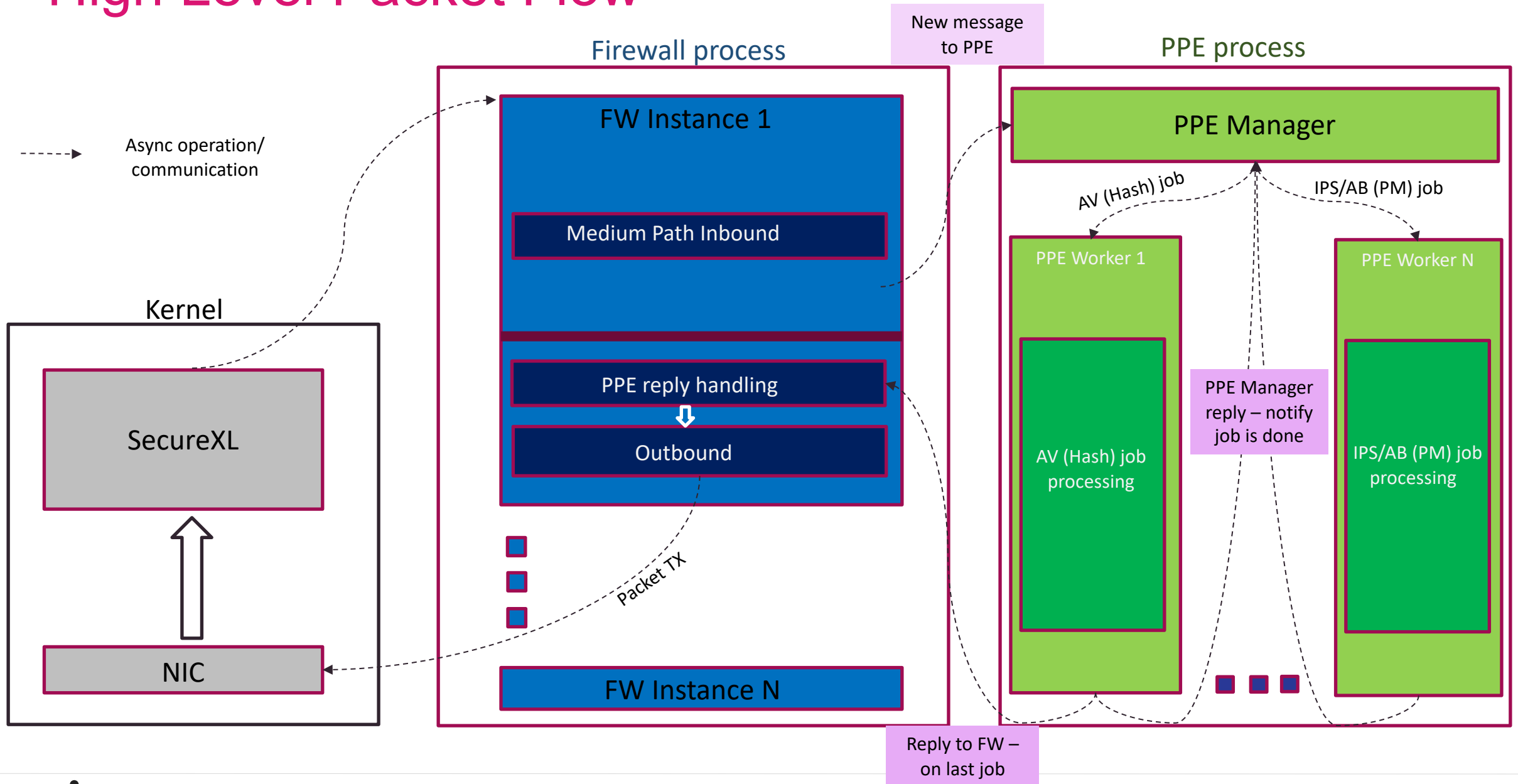


FW Architecture Overview – Cont.

Firewall



High Level Packet Flow



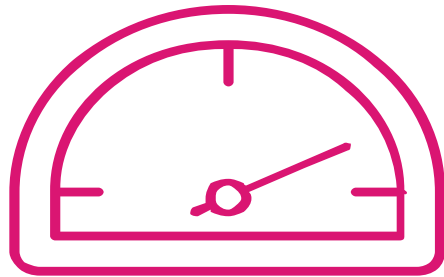
HyperFlow in R81.20



HyperFlow Value



- Major parameters:

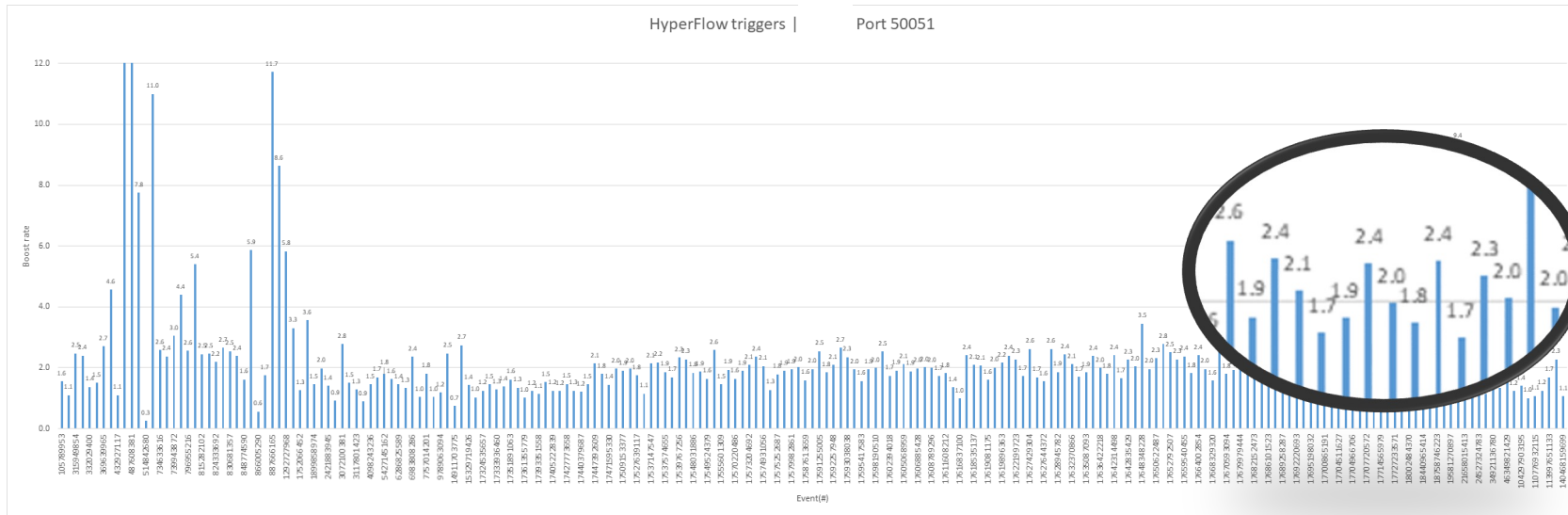


Boost ratio

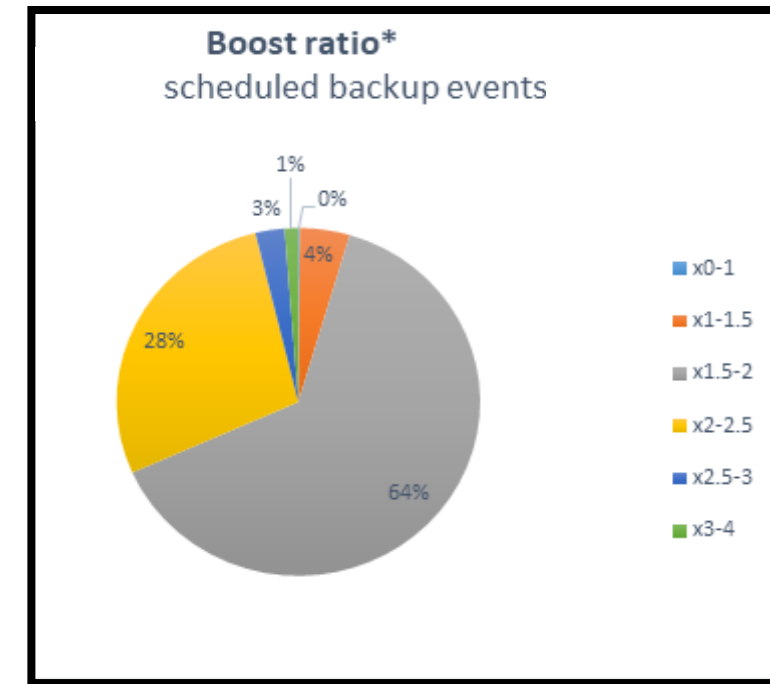


**Reduced
processing duration**

HyperFlow Value – Boost Ratio



Boost ratio calculated per event

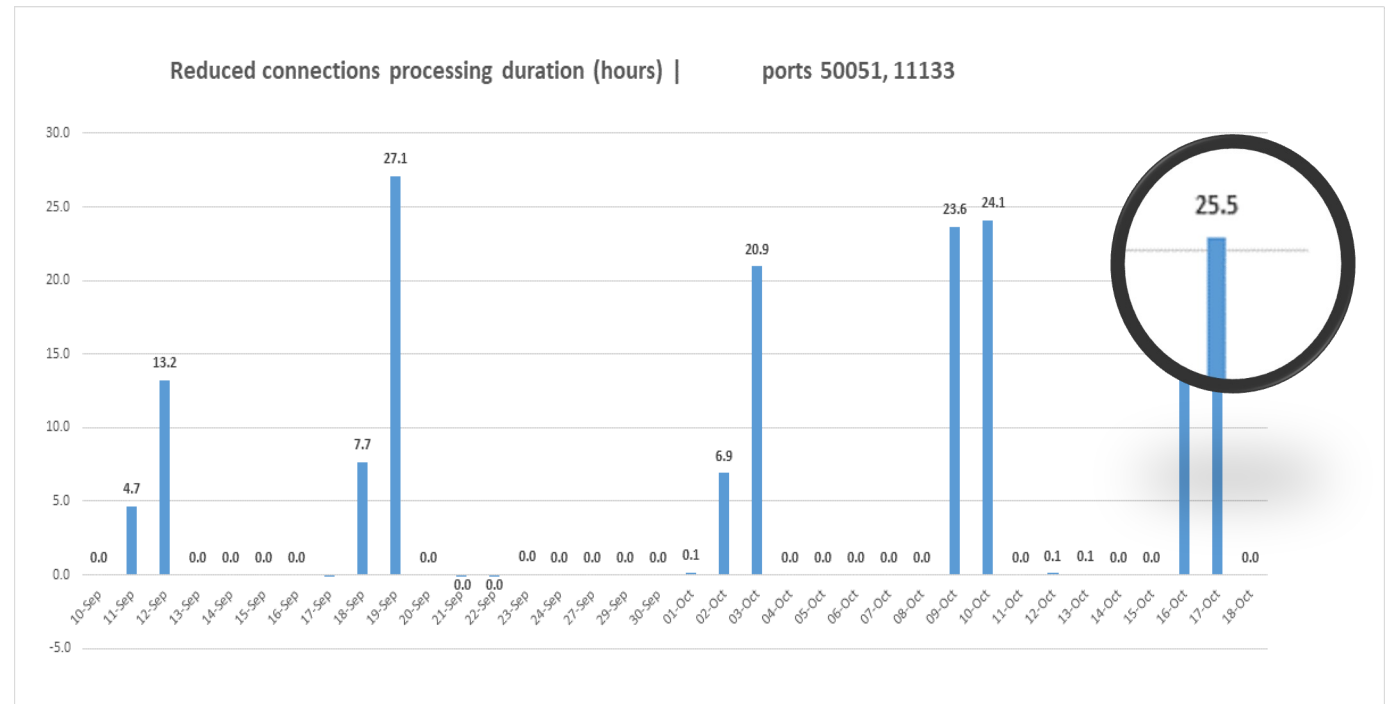


Boost ratio breakdown

HyperFlow Value – Reduced Processing Duration

- **Reduced processing duration**
 - 39-days timeframe
 - Ports: 50051, 11133 (backup traffic)
 - Represented in **hours**

- The accumulated diff is calculated by: $Acc_{diff} = \sum(D_{red_i})$
 - i = Heavy connection event index



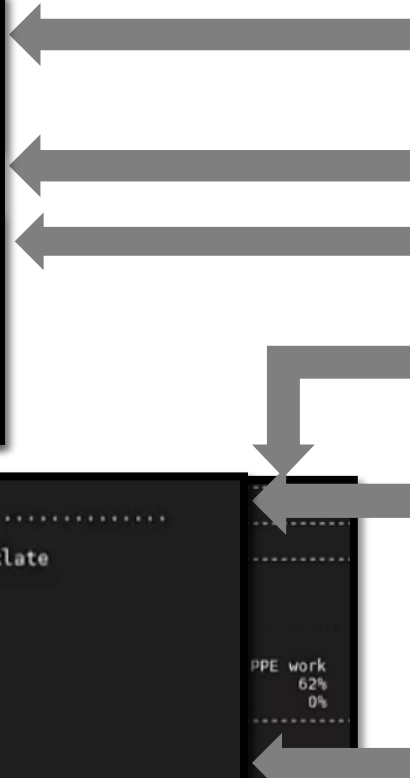
HyperFlow Diagnostics

```
CPVIEW.CPU
-----
Overview SysInfo Network CPU I/O Software-blades Hardware-Health Advanced
-----
Overview Top-Protocols Top-Connections Spikes
-----
Host
-----
Overview:
-----
CPU:
-----
CPU Type      User System Idle   I/O wait  Interrupts
0 CoreXL_SND  0%   1%  99%    0%        27,032
1 CoreXL_SND  0%  10%  90%    0%        27,033
2 CoreXL_SND  0%  11%  89%    0%        27,044
3 CoreXL_FW   9%  13%  78%    0%        27,044
4 CoreXL_FW   3%   8%  88%    0%        27,038
5 CoreXL_FW   6%  12%  82%    0%        27,038
-----
Overview Firewall-messages Jobs Comm PPE_THREADS Shared Memory Memory
-----
PPE_0
-----
PPE_MGR overview
-----
PPE_MGR state:  Active
-----
Pipeline status
```

```
# Overhead Command Shared Object Symbol
# .....
#
23.85% fwk0_0 libfw_kern_64_us_0.so [...] kiss_thin_nfa_exec_one_buf_parallel_xlate
12.48% fwk0_0 libfw_kern_64_us_0.so [...] cp_md5_block_data_order
8.34% fwk0_0 [kernel.kallsyms] [k] e1000_xmit_frame
4.59% fwk0_0 [kernel.kallsyms] [k] copy_user_generic_unrolled
1.47% fwk0_0 libfw_kern_64_us_0.so [...] fwmultik_process_entry
1.30% fwk0_0 libc-2.17.so [...] _GI_ioctl
1.30% fwk0_0 libfw_kern_64_us_0.so [...] psl_handle_packet
1.20% fwk0_0 [kernel.kallsyms] [k] fwkdrv_ioctl
1.15% fwk0_0 libfw_kern_64_us_0.so [...] hash_find_hashent
1.10% fwk0_0 libfw_kern_64_us_0.so [...] fw_do_cksum
1.07% fwk0_0 [kernel.kallsyms] [k] fwkdrv_handle_packet
1.05% fwk0_0 libfw_kern_64_us_0.so [...] fwuser_queue_read.lto_priv.5500
1.02% fwk0_0 libfw_kern_64_us_0.so [...] fw_je_malloc
0.92% fwk0_0 libfw_kern_64_us_0.so [...] cmi_execute_ex
0.85% fwk0_0 libfw_kern_64_us_0.so [...] cp_md5_block_data_order
```

Diagnostics majors:

- **HyperFlow cores** (dynamic) allocation monitoring
- CPU usage advanced monitoring
- **PPE_MGR state** (changing live from Asleep to Active)
- **Jobs details & count** (processed by HyperFlow engine)
- **Heavy connection logger** and functions running on the CPU during each spike(Spike detective)



Heavy Conn Table

- Run by command: ***'fw ctl multik print_heavy_conn'***
- Contains diagnostic of HyperFlow's activity per connection event
- Listing per event
- Separate diagnostics for:
 - Async throughput
 - Sync throughput

```
[Expert@Gateway_172.29.31.135:0]# fw ctl multik print_heavy_conn --pretty
[fw_1]; Conn: 172.29.32.130:34950 → 20.200.0.2:8001 IPP 6
Instance load: 44%
Connection instance load: 99%
StartTime: 11/01/23 17:49:45
Duration: 8
IdentificationTime: 11/01/23 17:49:48
Service: 6:8001
Total Packets: 759701
Total Bytes: 1074482848
Num of PM jobs: 570118
Num of MD5 jobs: 570118
Num of buffers sent to Main: 0
DDE Heavy Duration: 7
Async Duration: 7
Async Bytes: 951014898
Async Transitions: 0
Async Avg Load: 68%
Sync Avg Load: 44%
Medium Well eligible: Yes (PSL)
```

HYPERFLOW

FOLLOWING PLAN



HyperFlow- Following Plan



CIFS Support



UDP traffic support



Additional protocols &
jobs

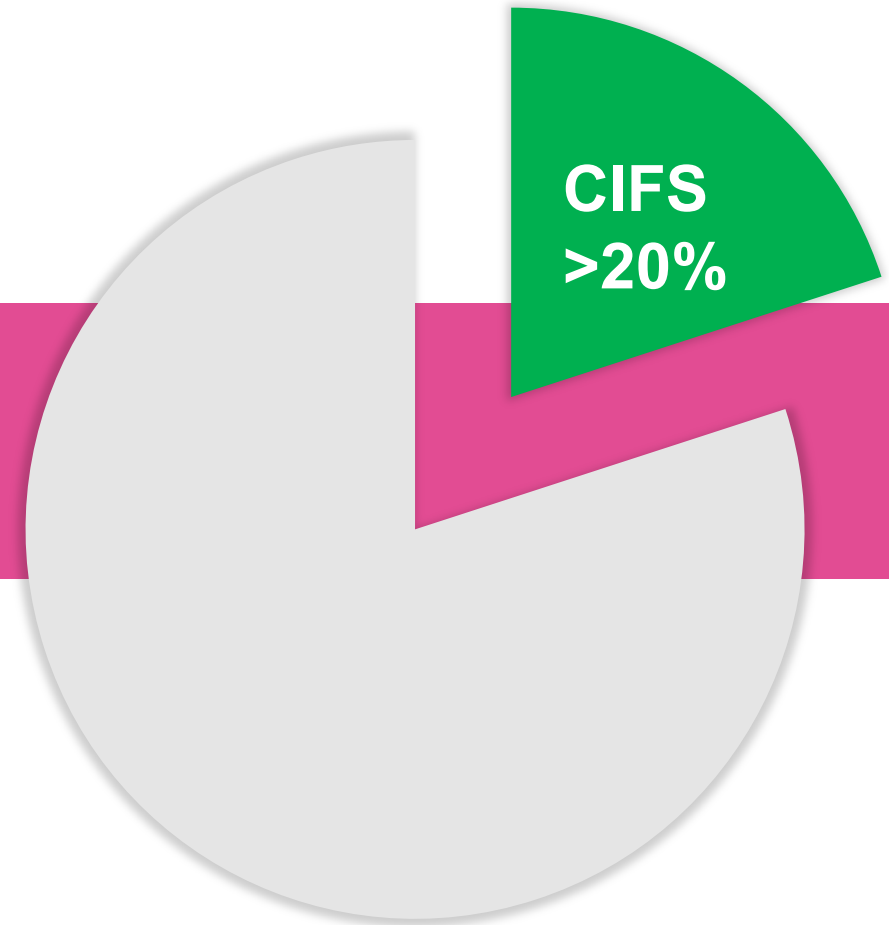


Debugging and
diagnostics

HyperFlow Following Plan

CIFS support

- ❖ Addressing customer feedbacks
- ❖ Expanding HyperFlow customers



HyperFlow Following Plan

Additional protocols & jobs, UDP traffic support

- ❖ **Keeping customers pain-points in mind**
- ❖ **Improving Infrastructure to expand supported heavy connection events**

HyperFlow Following Plan

**HyperFlow activity
summary**

**New heavy
connections table**

Debugging & diagnostics

**Performance
statistics**

**HyperFlow
triggers log**



THANK YOU

Contact us:

eladni@checkpoint.com

chenmu@checkpoint.com

roic@checkpoint.com

yonatanz@checkpoint.com

A large, stylized graphic on the right side of the slide. It consists of a large pink circle containing a black network icon with three nodes and connecting lines. To its right is a smaller pink circle. Below these circles are several horizontal bars in shades of pink, purple, and blue.

**YOU DESERVE THE
BEST SECURITY**