

Performance

Comparison of DragonFlyBSD and other OSes.

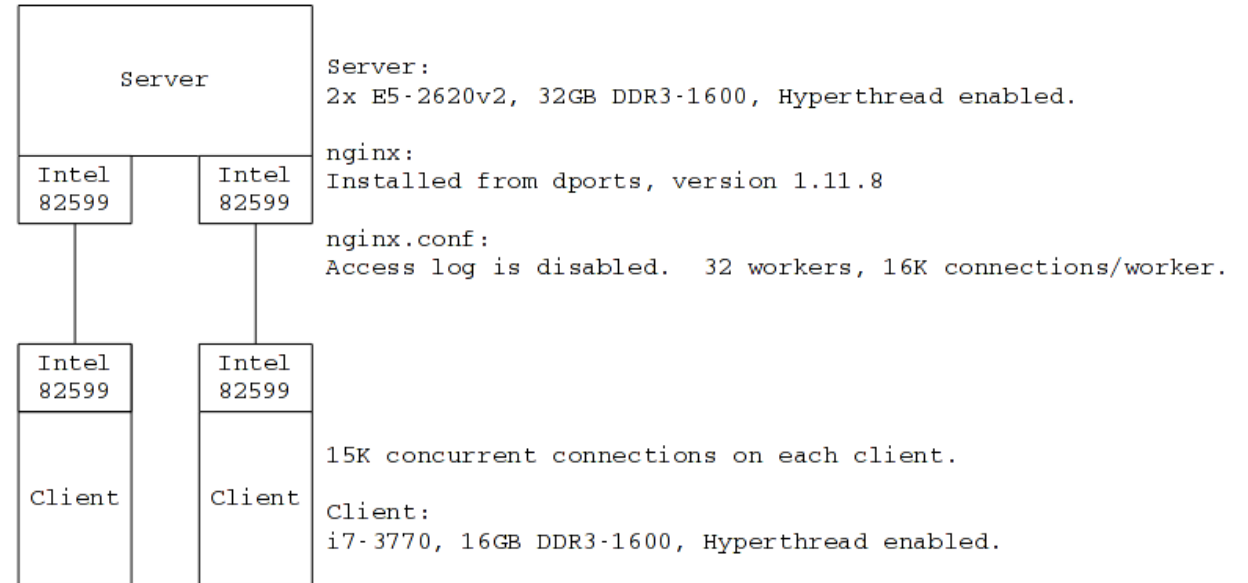
- DragonFlyBSD.
 - 719bf70a37139bc3bedc84ab0975df7107155714.
 - Label: **dragonfly**.
 - Label: **dragonfly-invariant**, kernel with “options INVARIANTS”.
- FreeBSD.
 - Label: **freebsd**, r314268, GENERIC-NODEBUG.
- Linux.
 - Label: **linux3.10**, Linux centos7 3.10.0-514.6.2.el7.x86_64.
 - Label: **linux4.9**, Linux deb 4.9.0-1-amd64, with 24 RX/TX rings.
 - Label: **linux4.9-16rxring**, Linux deb 4.9.0-1-amd64, with 16 RX/TX rings.

Performance

HTTP/1.1 short lived connections

Configuration:

- Nginx 'reuseport' is enabled on DragonFlyBSD and Linux.
 - Not applicable to FreeBSD.
- DragonFlyBSD polling(4) @1000Hz.
- Linux tuning.
 - Firewall is disabled.
 - SELinux is disabled.
 - NOFILE is increased to 40960 both system-wise and for each nginx worker.
 - net.core.netdev_max_backlog=65535
 - net.core.somaxconn=256



MSL on clients and server are changed to 10ms by:
route change -net net -msl 10

```
/boot/loader.conf:  
kern.ipc.nmbclusters=524288
```

```
/etc/sysctl.conf:  
machdep.mwait.CX.idle=AUTODEEP  
kern.ipc.somaxconn=256  
net.inet.ip.portrange.last=40000
```

Figure 1.15

Performance

HTTP/1.1 short lived connections

HTTP/1.1 traffic generator:

- <https://github.com/sepherosa/wrk>

- sephe/wrk branch.

- Each client ran:

- ```
wrk -c 15000 -t 8 -d 120s --delay --latency --connreqs 1 http://server/X_K.bin
```

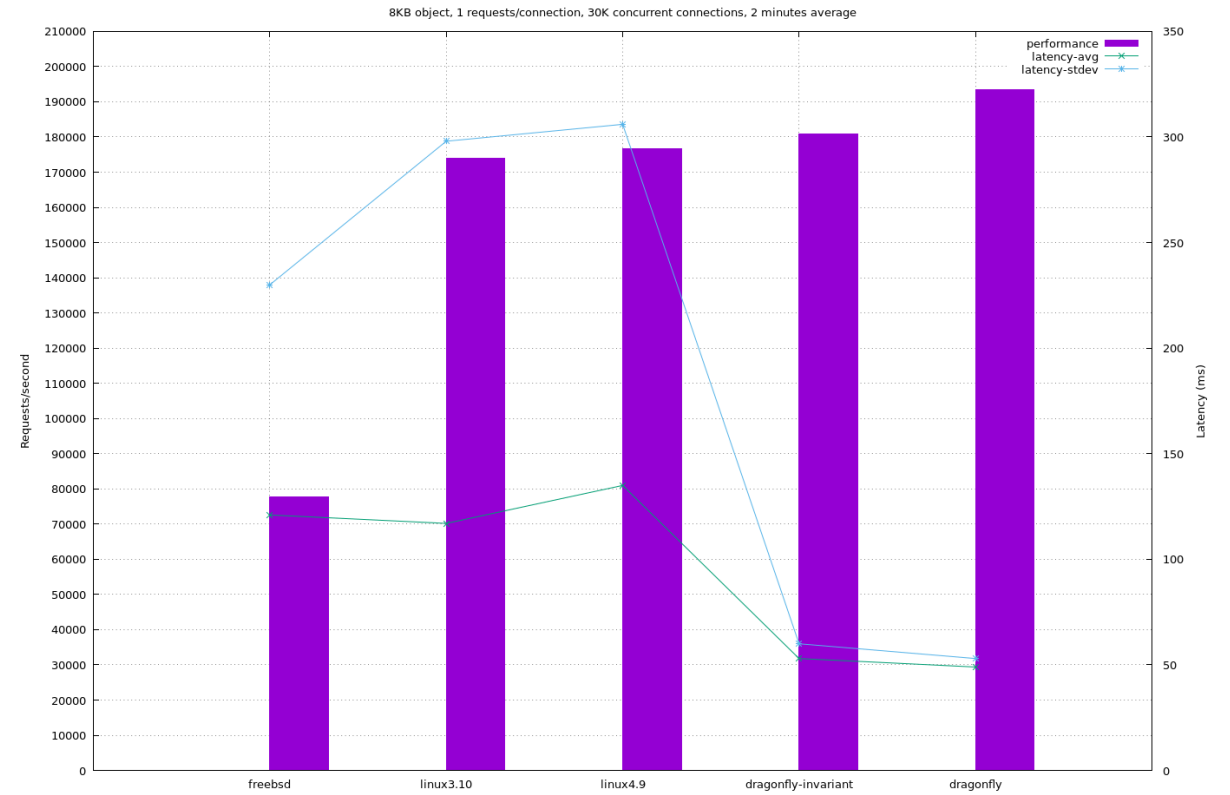
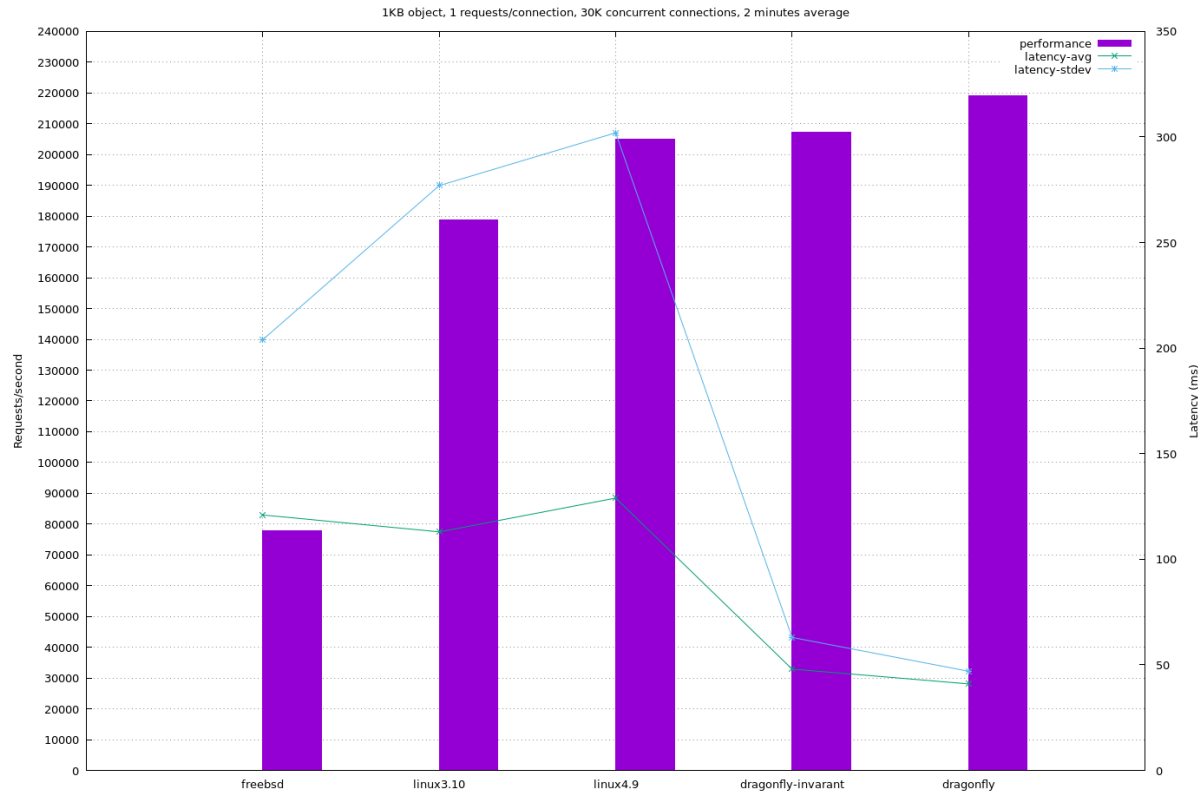
- Each client can generate 160Krequests/s.

- 1K.bin, 8K.bin, and 16K.bin are static files.

- DragonFlyBSD on hammerfs.
  - Linux on ext4.
  - FreeBSD on UFS2.

# Performance

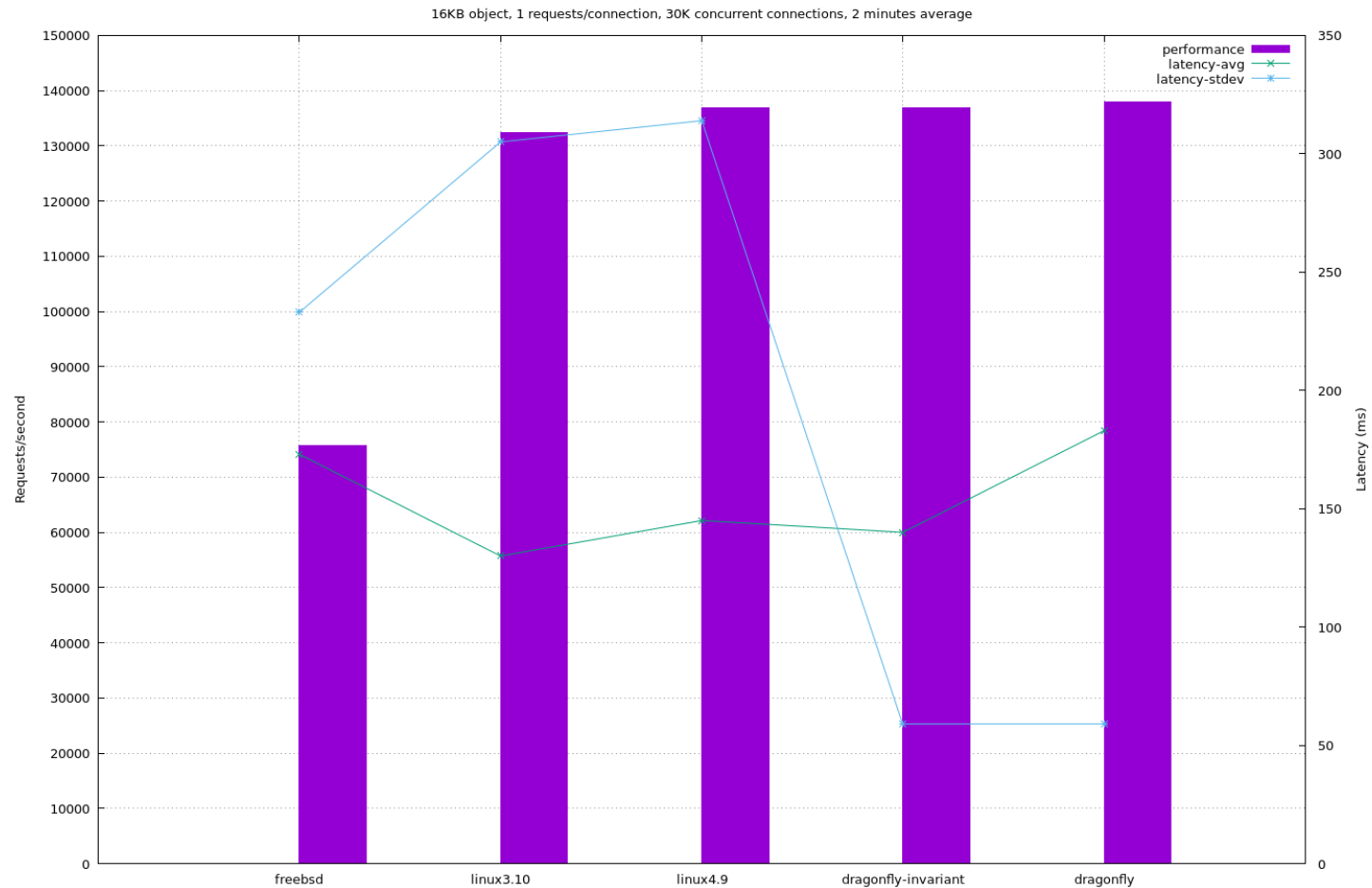
## HTTP/1.1 short lived connections



# Performance

## HTTP/1.1 short lived connections

**DragonFlyBSD and Linux 4.9 reach 9.5Gbps on each NIC with 16KB web object.**

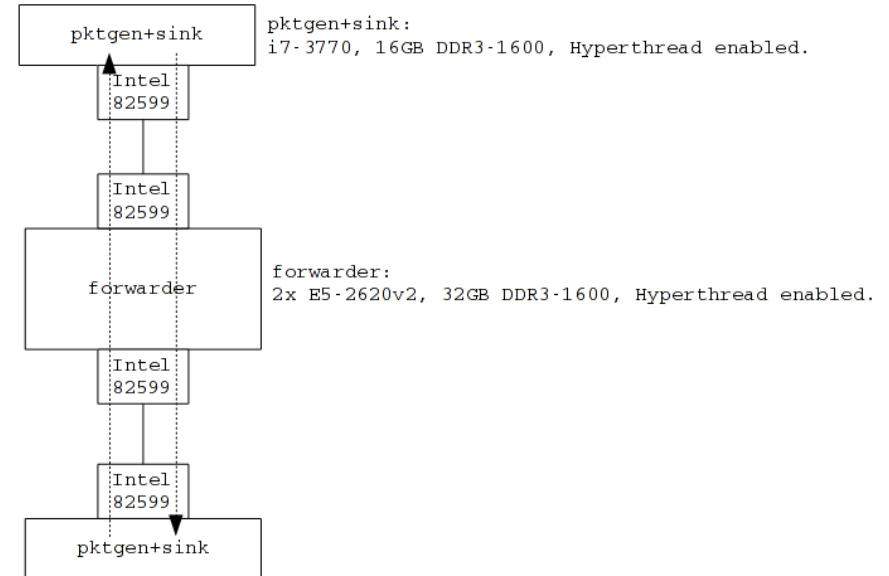


# Performance

## Bi-directional IPv4 forwarding

### Configuration:

- DragonFlyBSD polling(4).
  - 6000Hz, default polling rate.
  - Reserved 5% cpu time for userspace.
- Linux tuning.
  - Firewall is disabled.
  - SELinux is disabled.
  - net.core.netdev\_max\_backlog=65535



```
/boot/loader.conf:
kern.ipc.nmbclusters=5242880
```

```
/etc/sysctl.conf:
machdep.mwait.CX.idle=AUTODEEP
```

```
Traffic generator:
DragonFlyBSD's in kernel packet generator, which
has no issue to generate 14.8Mpps.
```

```
Traffic sink:
ifconfig ix0 monitor
```

```
Flow control is disabled on all testing machines:
ifconfig ix0 -mediaopt flowcontrol
```

```
Traffic:
Each pktgen targets 208 IPv4 addresses, which are
mapped to one link layer address on 'forwarder'.
```

```
Performance counting:
Only packets sent by 'forwarder' are counted.
```

Figure 1.16

# Performance

## Bi-directional IPv4 forwarding

- DragonFlyBSD is impacted quite a lot by 'options INVARIANTS' for this test.
- Linux 4.9 Intel 82599 driver uses "flow director".
  - Can use all 64 RX/TX rings.
  - 24 RX/TX rings are used here.
  - Not RSS, i.e. DragonFlyBSD cannot use it.
- Just for comparison purpose, Linux 4.9 using 16 RX/TX rings (linux4.9-16rxring) is benched.
  - Slower than DragonFlyBSD with the same number of RX/TX rings.

