From textbook 'Conceptual Computer Networks'

PF_PACKET SOCKETS

V 1.2

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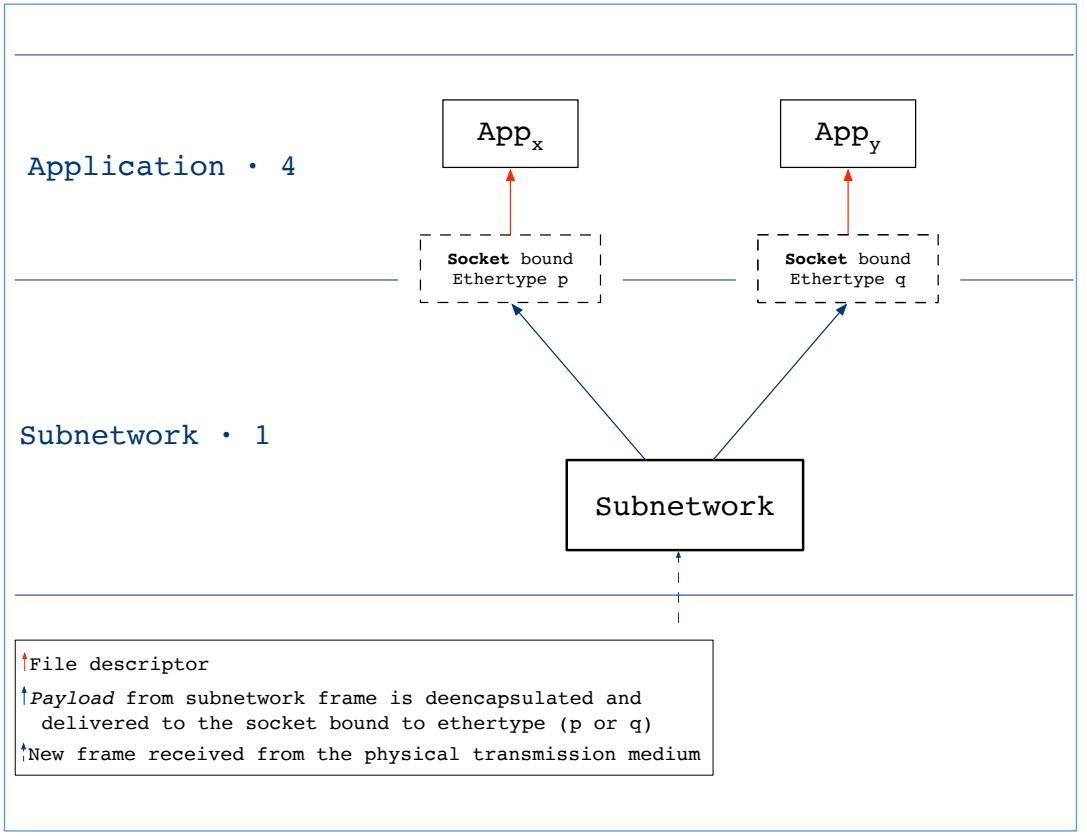
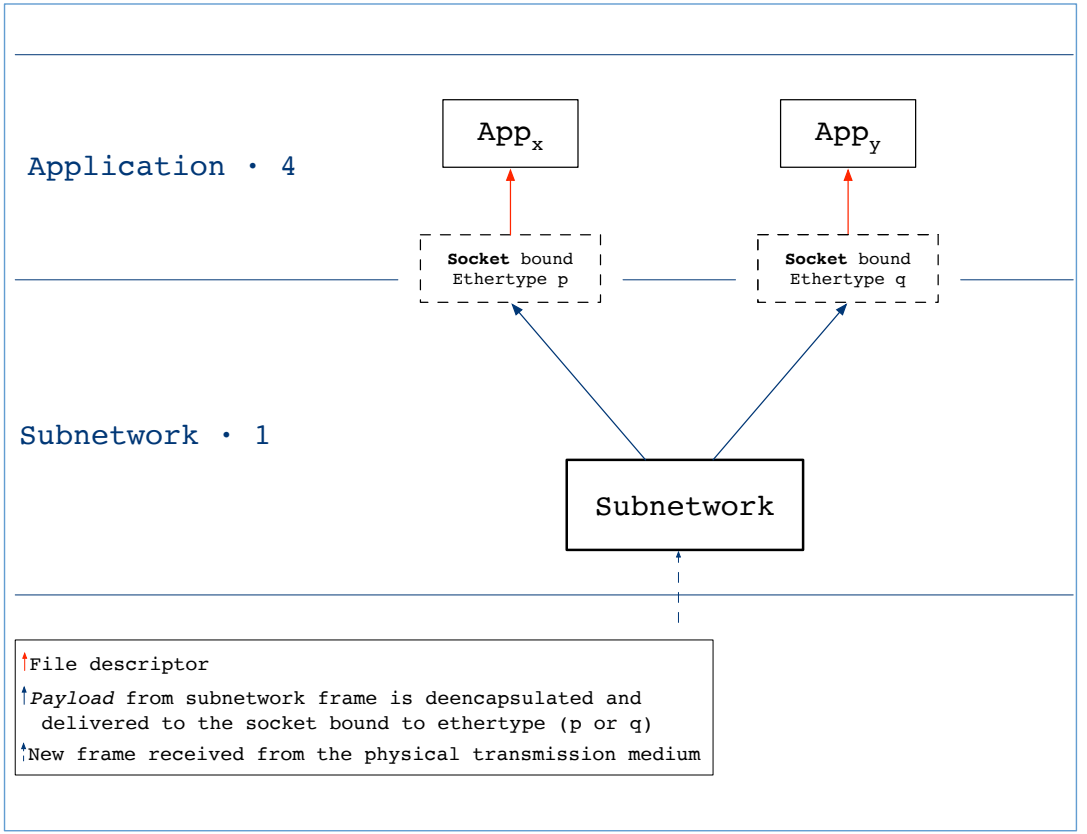
PF_PACKET Sockets

- Applications can register for receiving frames directly from the subnetwork layer
- Protocol family PF_PACKET is exclusive of Linux



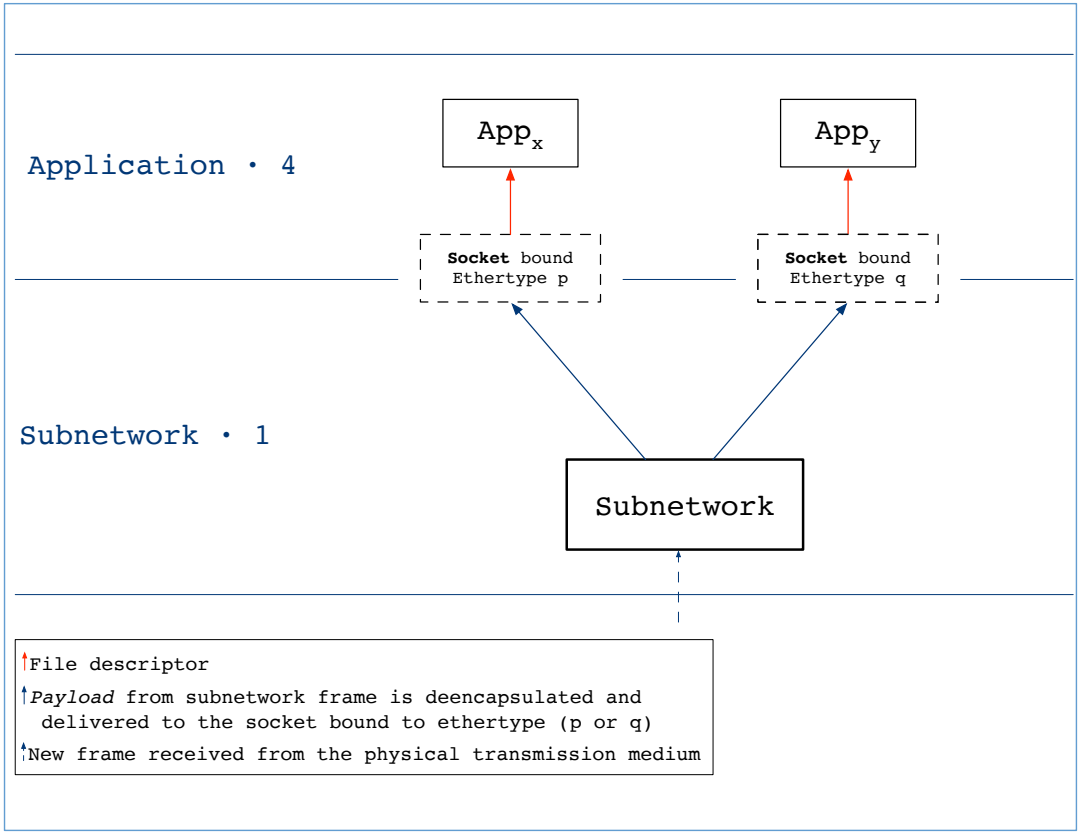
Two types of PF_PACKET sockets

- Datagram (SOCK_DGRAM)
  - Only the frame payload is delivered to the application
- Raw (SOCK_RAW)
  - Both, the frame header and the frame payload are delivered to the application



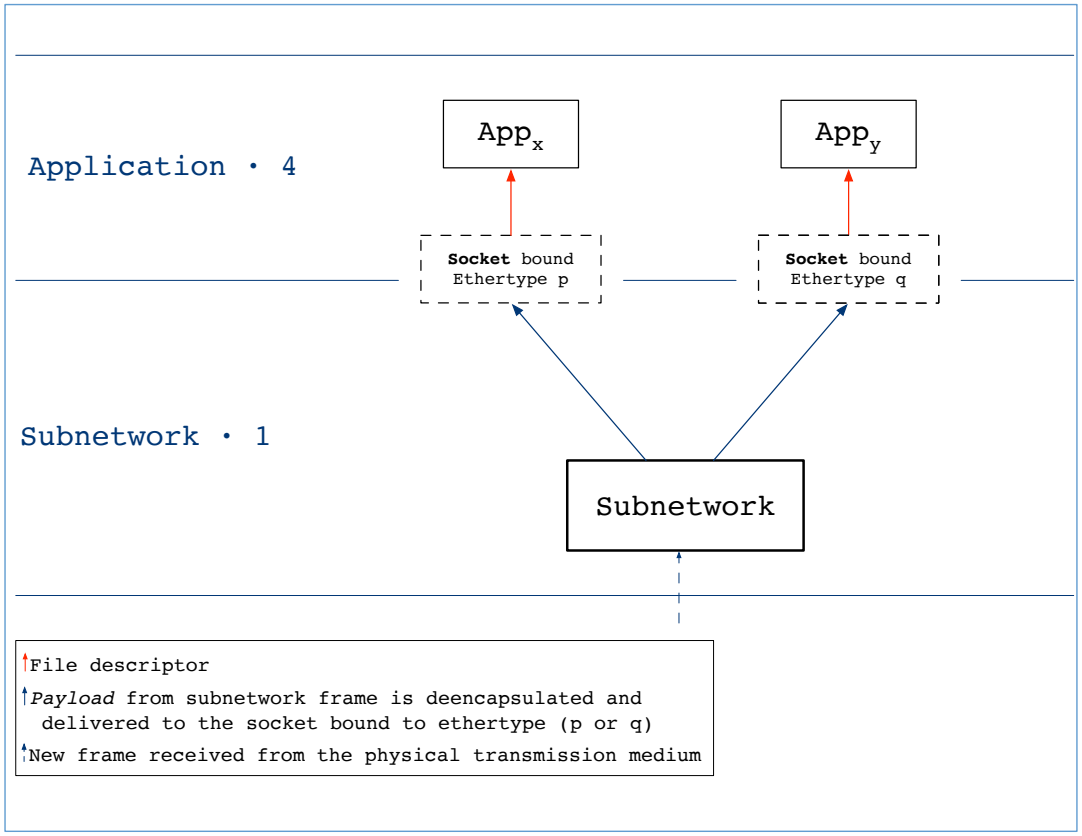
Sending with PF_PACKET sockets

- Application can only send the full frame:
  - The header
  - And the payload



Link-layer header for PF_PACKET sockets

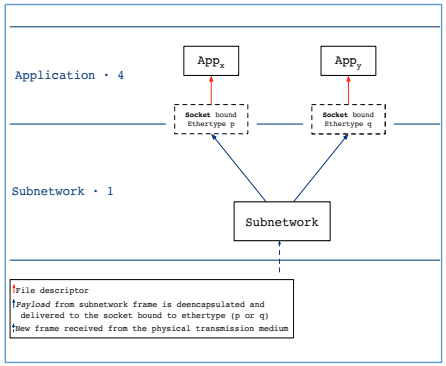
- Application must send the full frame:
  - Sending through this type of socket includes a **link-layer header** which fields are **derived** from the **sockaddr_ll** passed on to the write call made by the application.



Link-layer header for PF_PACKET sockets

- Assume a PF_PACKET socket is created; sockaddr_ll fields meaning follows:
- **sll_family** must be assigned PF_PACKET
- **sll_protocol** is the link-layer protocol field value (Type or Ethertype in the case of an Ethernet frame) that we wish to have demultiplexed. If the value of sll_protocol is htons(ETH_P_ALL), then all protocols encapsulated in the link-layer frame will be accepted by the socket. This precludes the socket having IP_HDRINCL option set, in which case, receiving all IP's protocols is not supported. Standard values for sll_protocol are declared in /usr/include/linux/if_ether.h.
- **sll_ifindex** the underlying network interface index
- **sll_hatype (For ARP)**
- **sll_pktype**
- **sll_halen (For ARP)**
- **sll_addr[8]** is used for storing the interface's MAC address htons() function call reorders the bytes of a short int to the network byte ordering format (Network byte order). This byte-ordering is usually applied in networking and is the same as the big-endian ordering of MIPS and other microprocessors.

```
struct sockaddr_ll {
        unsigned short      sll_family;
        __be16              sll_protocol;
        int                 sll_ifindex;
        unsigned short      sll_hatype;
        unsigned char       sll_pkttype;
        unsigned char       sll_halen;
        unsigned char       sll_addr[8];
};
```



socket() for PF_PACKET


```
#include <sys/types.h>
#include <sys/socket.h>
```

```
int socket(int domain, int type, int protocol);
```

```
int s = socket( PF_PACKET,
                SOCK_DGRAM,
                0x07ff);
```

recvfrom() and sendto()


```
#include <sys/types.h>
#include <sys/socket.h>
```

```
ssize_t recvfrom(int sockfd, void *buf, size_t len, int flags,
                 struct sockaddr *src_addr, socklen_t *addrlen);
```

```
ssize_t sendto(int sockfd, const void *buf, size_t len, int flags,
               const struct sockaddr *dest_addr, socklen_t addrlen);
```