Networking (Host perspective)

- A note about ethics
- IP addresses
- Mask
- Route
- LAN/WAN
- Ports
- Routers

Ethics/Laws (from a non-lawyer)

Ethics cont.

Questions to ask yourself:

- Do I own / have permission from the owner?
  - Even attempted breaking and entering is frowned upon
- Would I bother anyone else by doing this?
  - Keep in mind you are frequently not the only user of a network or resource
- Might anyone consider this abnormal / malicious?
  - Keep in mind sys-admins all along the way can see your traffic
- Is this going to cost me or the owner anything?
- How is the system likely to react?

IP addresses

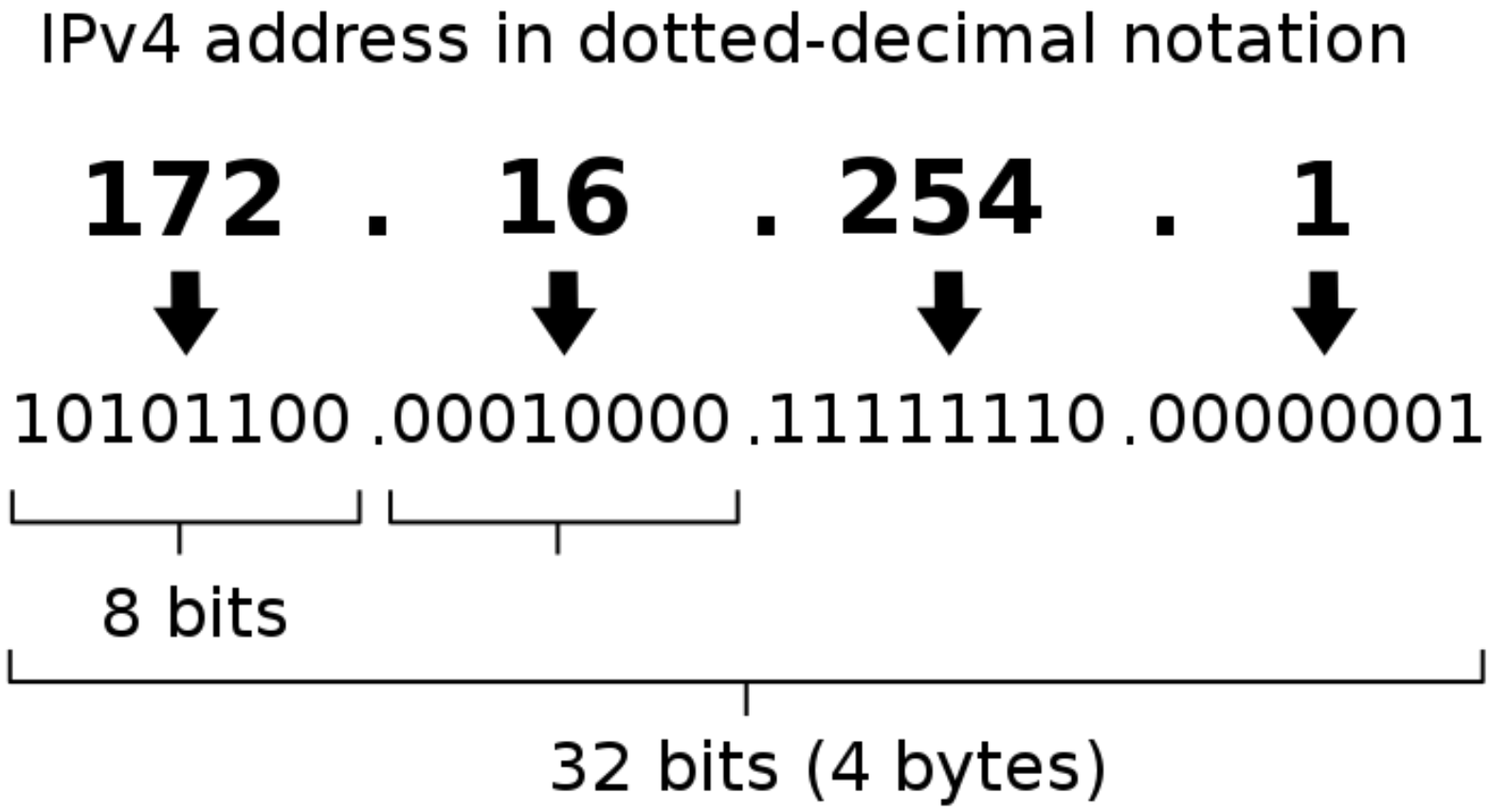

Figure 2: IP Dotted Decimal

Mask

- A network mask (netmask, subnetmask) is the dividing line between the host part and network part of the IP Address.
- The mask determines how many hosts are available on the local network before needing more advanced network configuration for communications.

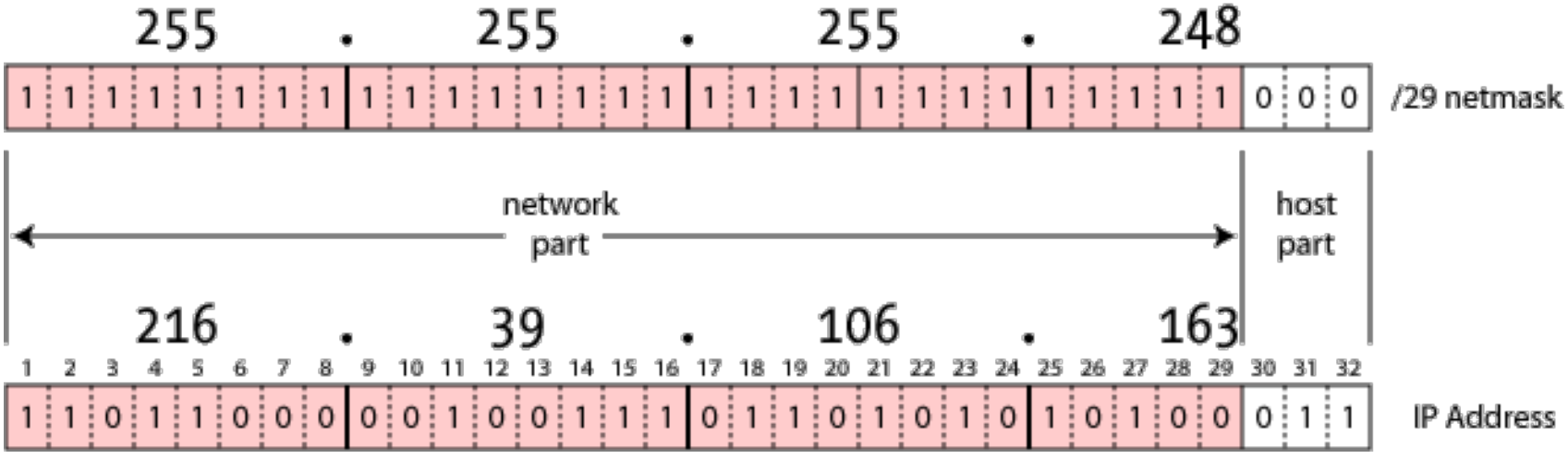

Figure 3: netmask

- Can be specified itself or via CIDR notation (/`number of bits in network part of IP`)
- `192.168.1.100 255.255.255.0 -> 192.168.1.100/24`

Route

- A Local Area Network or LAN includes all possible IP addresses within the range of the IP address and subnet specified by the subnet mask.
- In order to reach IP addresses outside of this subnetwork, you need a `route` to them.
- **gateways** and **routers** are host systems with specialized software to support routing network traffic between different networks
- A `route` consists of a Destination network (IP/subnet) and an IP/subnet for a specified **gateway**.
- **routers** typically have other software as well (firewall, DHCP, etc.)

LAN/WAN

- Local Area Network
  - The subnet that your host system is connected to
- Wide Area Network connecting multiple LAN's together

CIDR block	Address range	Number of addresses
10.0.0.0/8	10.0.0.0 – 10.255.255.255	16777216
172.16.0.0/12	172.16.0.0 – 172.31.255.255	1048576
192.168.0.0/16	192.168.0.0 – 192.168.255.255	65536

IP communications

All data is sent in **packets** with a standard format.

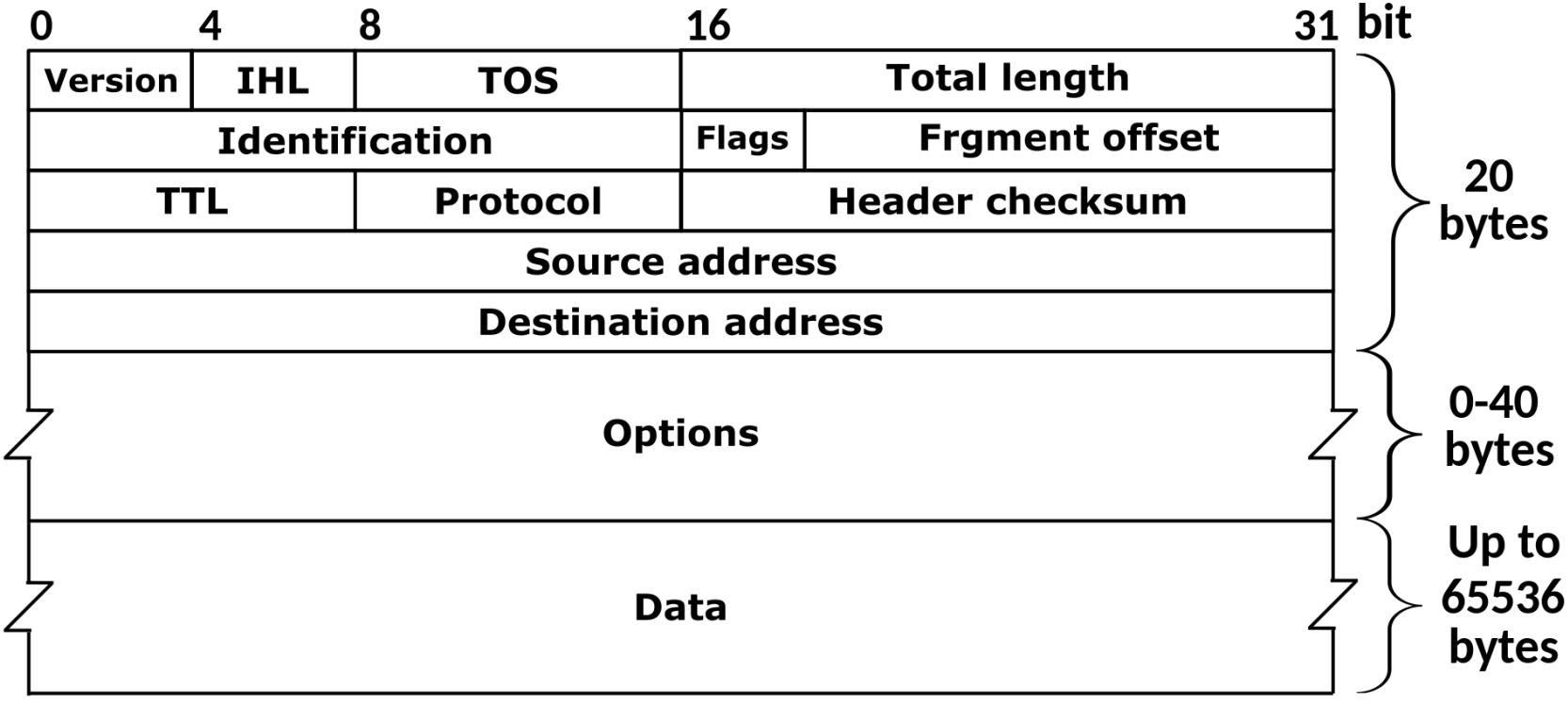

Figure 4: IPv4-packet

Enter TCP

- TCP is commonly used alongside IP to facilitate communications between applications on different hosts on a network.
- The TCP segment is standard part of the data included in an IP packet.

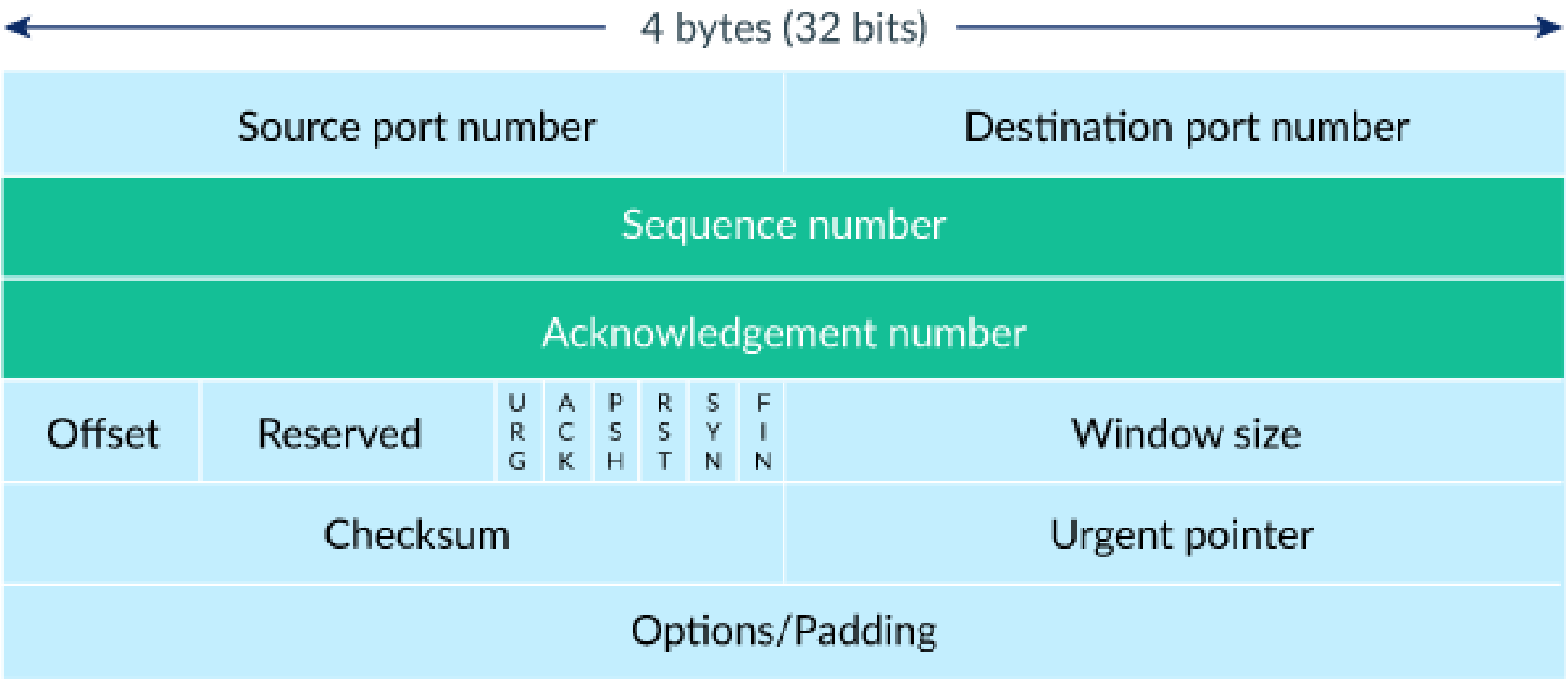

Figure 5: tcp

Ports

List of common TCP ports

Firewalls

- Access Control List (ACL) that controls flow of packets.
- Can specify Networks, Hosts, IPs, Ports, and some other methods to allow/deny/manipulate network flow.
- Still hand-wavy till next week

Routers

- DHCP for automated network configuration