INF3190 Group lecture
Lecture #8

Jan Anders Bremer

UiO - IFI

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Contact information

Phone: 91125994
Mail: janabr@ifi.uio.no
IRC: janabr at irc.ifi.uio.no (currently in #ping.uio.no and #cyb, but you can always /msg me)
Feel free to send questions, suggestions and feedback.

Contents

- Additional presentation about C
- Network layer - routing

Some dark corners of C

- Presentation by Rob Kendrick
- Link
- Do (almost) any of these if you wish to fail the exam.

Packet fragmentation

- Split a packet into smaller packets when the mtu is less than your packet's size
- Re-assemble at destination or in firewall close to destination
- Exploitable against certain vulnerable systems
- If a fragment is missing - retransmit.

Routing in a router

- Receive packet
- If direct neighbour: choose appropriate link
- If not, check routing table. If no special rules apply, choose default.
- If fail: return ICMP-message (maybe)
- Possible errors: receiver is in local network, but unable to receive (link is down), ttl expired, deny rule, malformed packet

Autonomous Systems

- A part of the internet, but selv-governed
- As efficient as possible routing within the AS
- Routing between ASes might be affected by political, security or economical policies
- Use of a link in other ASes have differnet cost. This may effect performance given to the end-user

Subnet problems and solutions

- Solutions have been discussed previously - NAT, port forwarding, routers maintaining temporary port forwarding and other.
- Other solution: intermediate servers

Design philosophy - internet

- Best effort
- Robust
- Hierachical

IPv4-addresses - limitations

- Routers need seperate IPs
- One person uses multiple IPs - every single one of you with laptops here have a seperate public IP!
- A lot of empty subnets
- CIDR - Classless Inter-Domain Routing, cluster subnets in a more logical way - avoid rapid growth in routing tables

IPv4-Header

- Version, Internet Header Length, Differentiated Services Code Point, Explicit Congestion Notification, Total Length, Identification, Flags, Fragment Offset, Time To Live, Protocol, Header Checksum, Source address, Destination address, (post-data) Options
- We will never "lack" a field since we can always make our using Options
- Fragment offset is not needed if there is no fragmentation
- A lot of the other options aren't needed unless you are doing certain specific actions

DHCP

- Dynamic Host Configuration Protocol
- Automated IP-configuration on local networks

IPv6 vs IPv4

- Differenet ARP - Neighbor Solicitation (group broadcasts)
- Massive improvements (but not limited) to: address space, multicast (used in ARP!), simpler packet, no fragmentation - mtu used instead, mobility and many other areas
- Next header replaces protocol version