

ARKITEKTURE KOMPJUTERI

LEKSIONI VIII

SUBNETTING ,NDARJA E IP-ve SIPAS KLASAVE

Lektor

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KONCEPTE

PING – applications apo Tool qe sherben per te testuar konektivitetin.

Ping perdor protokollin ICMP, per te testuar nese X ip eshte online

ICMP – Internet Control Message Protocol

TTL – Time To Live.

Gabimet ne konfigurime te router-ave, ben qe rrjete te ndryshme te krijojne LOOPS
– C’jane LOOPS ??

Per kete arsye eshte krijuar nje COUNTER TTL, i cili nuk mund te jete me i madh se 255. Shumica e aplikacioneve perdorin TTL = 128.

KONCEPTE

- TTL = 128 , do te thote qe :

A. Rrjeti krijon LOOP

B. LOOP do shkaktonte qe paketa te sorrolatej ne internet pafundesisht.

- Problem i tille, krijon trafik parazitar, duke zene gjithe bandwidth-in e mundshem
- TTL – ben pikerisht kete kufizim sorollatjeje, duke bere te mundur qe paketa te “asgjesohet” pas 128 router-ave

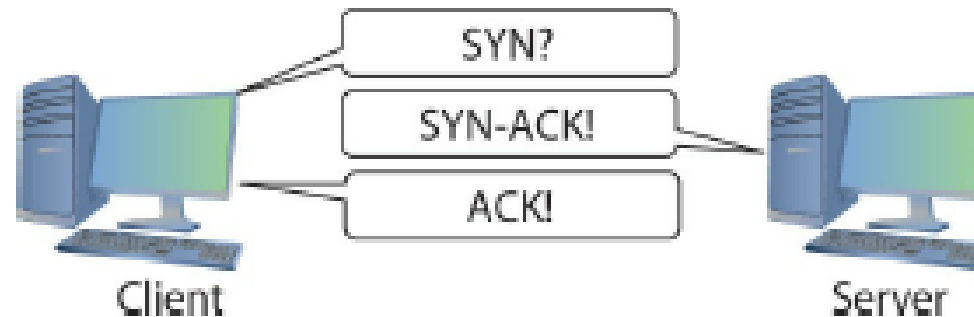
KONCEPTE

- TCP vs UDP

Connection Oriented

- TCP – Transmission Control Protocol

TCP – perdor rregulla komunikimi, qe kerkon qe te dy makinat (dhenesi dhe marresi), te njohin prezencen e njeri tjetrit. Kete proces e quajme THREE-WAY-HANDSHAKE, qe perbehet nga SYN, SYN-ACK, dhe ACK



KONCEPTE

Protokolli TCP ndan informacionin ne SEGMENTE. U jep ketyre te fundit nga nje SEQUENCE NUMBER. Dhe sigurohet qe ne destinacion, keto segmente te rigrupohen nga marresi.

Nese marresi nuk i ka marre te gjitha segmentet, athere ky l fundit l rikerkon derguesit qe te ridergoje segmentin e humbur rruges.

KONCEPTE

Connectionless Oriented

- UDP – User Datagram Protocol
- Kemi thene qe TCP/IP eshte bashkesi protokollesh. Nuk e kemi degjuar ndonje here UDP/IP. Per rrjedhoje, ne momentin qe hapim nje faqe interneti, apo kryejme ndonje funksion specifik, ne nuk kemi pse te specifikojme se cfare protokolli (TCP apo UDP) do perdorim.
- Per kete gje kujdesen vete aplikacionet, apo protokollet me te cilat ne punojme. Psh protokolli HTTP, apo HTTPS perdor protokollin TCP

KONCEPTE

- PORTAT
- Figura me poshte na paraqet nje pamje te thjeshtuar te PACKET HEADER.



- Ketu dallohen SOURCE dhe DESTINATION PORT
- Portat sherbejne per te krijuar nje lidhje ndermjet derguesit dhe marresit, qe paketa te shkoje ne destinacionin e duhur. Psh dergimi I nje email perdor porten 25, ose ndryshe protokollin SMTP

ROUTER vs SWITCH

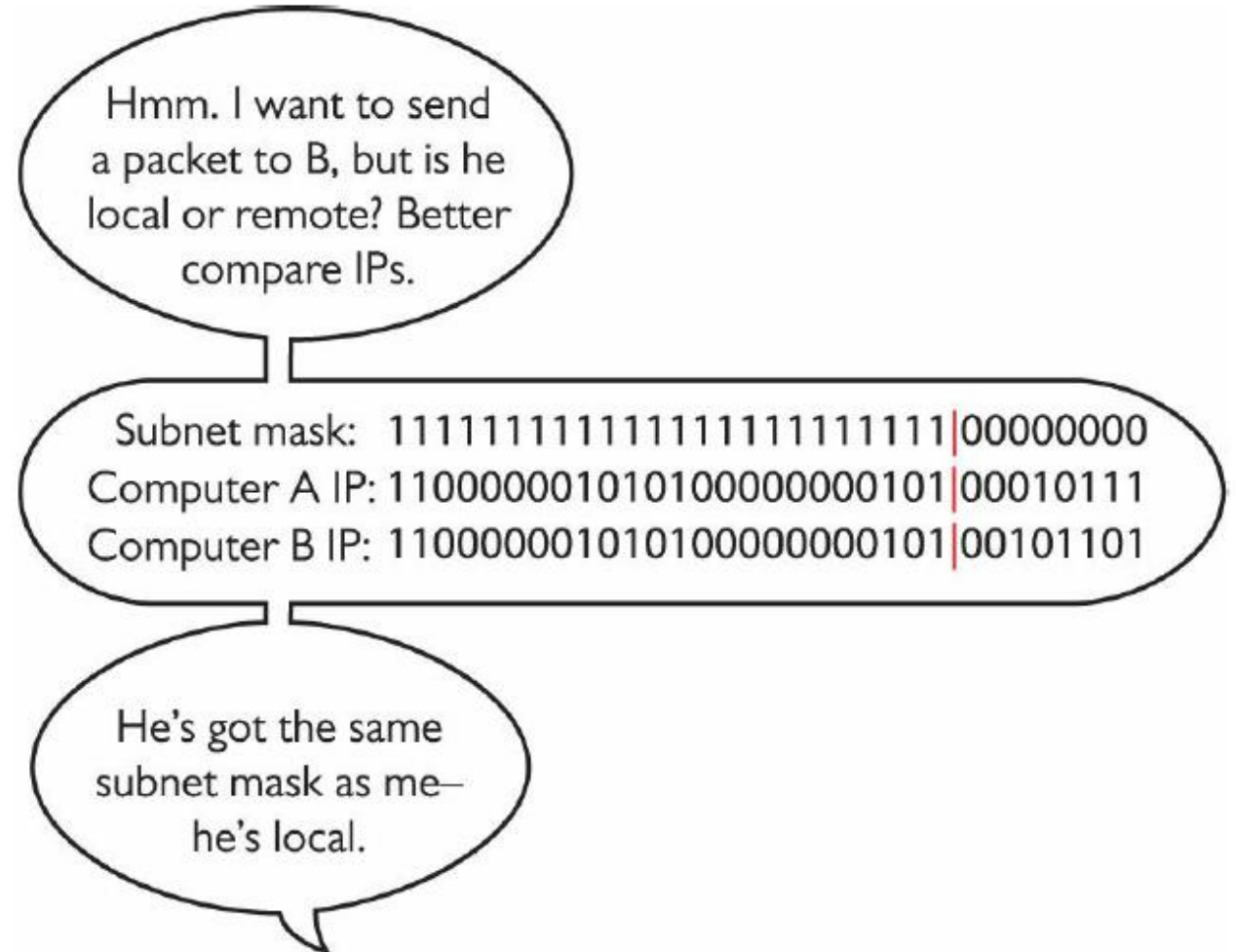
- PC-te qe jane pas nje Switchi – jane LOCAL apo REMOTE IP-s ?
- Po PC-te pas nje Routeri ?
- Si mund t'i dallojme nese PC marrese e informacionit eshte LOCAL apo REMOTE ?

IP-te DERGIMI I INFORMACIONIT

- LOCAL vs REMOTE
- Krahasohen BITS
ne te djathte te ndarjes
qe ben Subnet Mask

Majtas – NETWORK ID

Djathtas – HOST ID



LOCAL vs REMOTE IPs

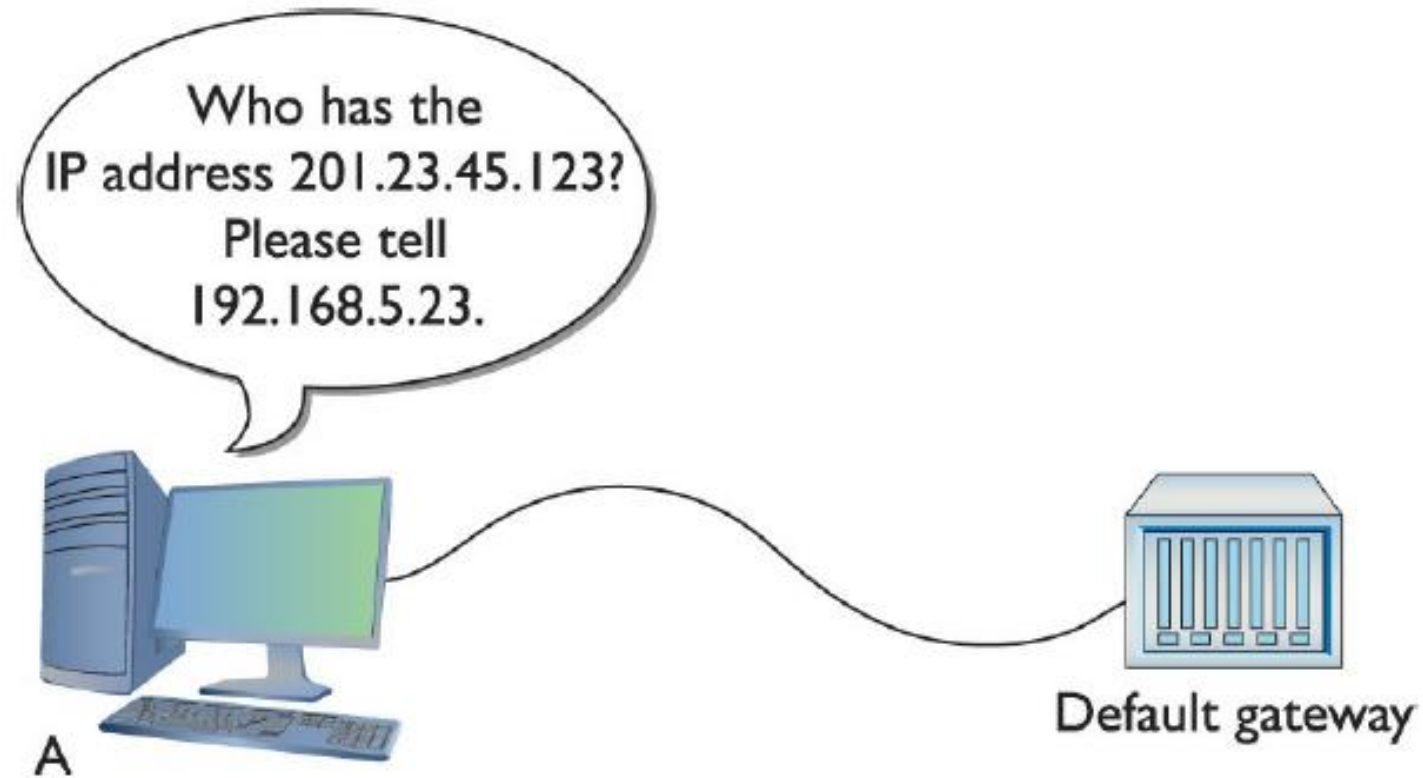
Hmm. I want to send a packet to B, but is he local or remote? Better compare IPs.

Subnet mask: 11111111111111111111111111111111|00000000
Computer A IP: 110000001010100000000101|00010111
Computer B IP: 101101101101110100000011|00101101

No match! It's a long-distance call !

ARP REQUEST

- PC – A ne kete rast dergon ARP Request drejt GATEWAY



KLASAT PRIVATE IP

- IP-te I kemi PRIVATE dhe PUBLIKE
- Cilat jane klasat PRIVATE ?

KLASAT IP PRIVATE dhe PUBLIKE

	First Decimal Value	Addresses	Hosts per Network ID
Class A	1–126	1.0.0.0–126.255.255.255	16,277,214
Class B	128–191	128.0.0.0–191.255.255.255	65,534
Class C	192–223	192.0.0.0–223.255.255.255	254
Class D	224–239	224.0.0.0–239.255.255.255	Multicast
Class E	240–254	240.0.0.0–254.255.255.255	Experimental

IANA & SHPERNDARJA e IP-ve

- IANA – Internet Assigned Numbers Authority
- Eshte autoriteti qe ben shperndarjen e IP-ve.
- Ne fillimet e veta, IANA filloi duke dhene IP pa hesap kundrejt ISP-ve te ndryshme.
- Te njejten gje bene edhe nenndarjet e IANA-s neper bote – RIRs – Regional Internet Registries.
- Kjo suate solli nje problem jo te vogel, pasi shume IP filluan te digjeshin kot, pasi ishin marre nga ISP qe nuk i shfrytezonin !!

SHPERNDARJA IP - CIDR

Psh, dikur nese nje ISP donte te merrte 2000 IP, athere duhej te merrte 1 klase B, duke marre mbi 16000 IP, ose te merrte 8 klasa C.

Per te shmangur kete problem, u zhvillua koncepti CIDR

CIDR – Classless Interdomain Routing.

CIDR eshte produkt i SUBNETTING

SUBNETTING

- Perktheni ne kod decimal, keto IP te shprehura ne kod binar

11000000101010000000010000100000
11000000101010000000010000100001
11000000101010000000010000100010
.....
11000000101010000000010000111101
11000000101010000000010000111110
11000000101010000000010000111111
.....
11000000101010000000010001100000
11000000101010000000010001100001
11000000101010000000010001100010
.....

CIDR

- Cili network i perfshin keto 3 IP, ne nje klase te vetme

The diagram illustrates CIDR notation by showing three groups of IP addresses in binary, separated by vertical lines. The first two groups show a common prefix of 26 bits (110000001010100000000100001), followed by a vertical line and the remaining bits. The third group shows a common prefix of 27 bits (1100000010101000000001000011), followed by a vertical line and the remaining bits. The common prefixes are highlighted in blue, and the remaining bits are highlighted in red.

Group 1:

```
110000001010100000000100001000000
110000001010100000000100001000001
110000001010100000000100001000010
```

Group 2:

```
11000000101010000000010000111101
11000000101010000000010000111110
11000000101010000000010000111111
```

Group 3:

```
110000001010100000000100011000000
110000001010100000000100011000001
110000001010100000000100011000010
```

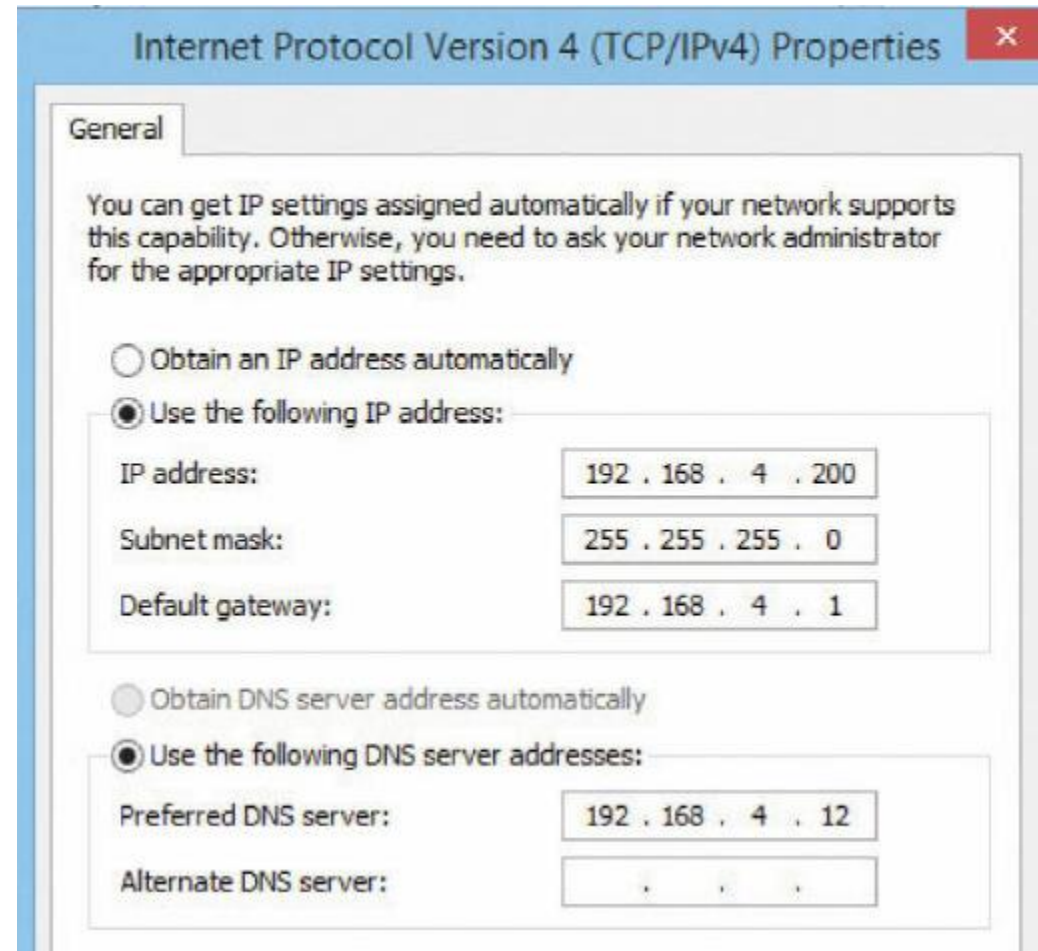
CIDR

- Percaktoni GW, SM te perbashket te ketyre IP-ve
- 192.168.20.50/29
- 192.168.20.10/28
- 192.168.20.2/25
- 192.168.20.100/27

CIDR

- Percaktoni GW, SM te perbashket te ketyre IP-ve
- 192.168.20.50/29
- 192.168.30.10/23
- 192.168.20.2/25
- 192.168.40.100/23

STATIC vs DHCP



The image shows a Windows network configuration window titled "Internet Protocol Version 4 (TCP/IPv4) Properties". The "General" tab is selected. It contains instructions about automatic IP assignment and two main configuration sections. The first section, "Use the following IP address:", is selected with a radio button. It includes input fields for "IP address:" (192 . 168 . 4 . 200), "Subnet mask:" (255 . 255 . 255 . 0), and "Default gateway:" (192 . 168 . 4 . 1). The second section, "Use the following DNS server addresses:", is also selected. It includes a "Preferred DNS server:" field (192 . 168 . 4 . 12) and an "Alternate DNS server:" field (empty).

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 4 . 200

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 4 . 1

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 192 . 168 . 4 . 12

Alternate DNS server: . . .