

Laboratorijske vežbe

Računarska mreža

Predmet: Računarske mreže

Predavač: dr Dušan Stefanović

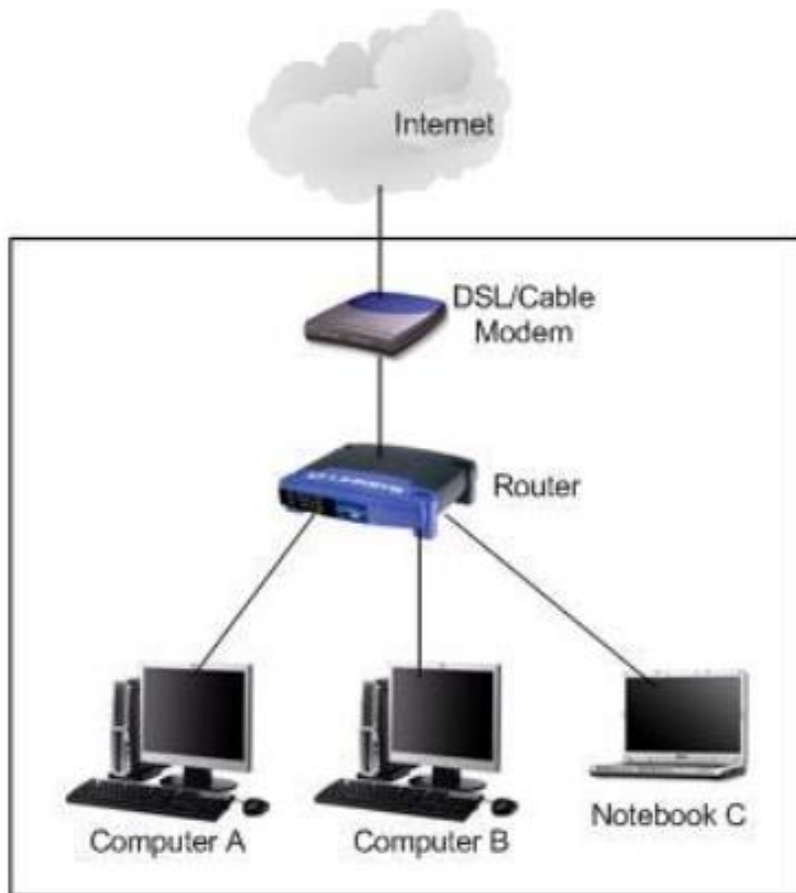
Asistent: Nikola Milutinović

Računarska mreža

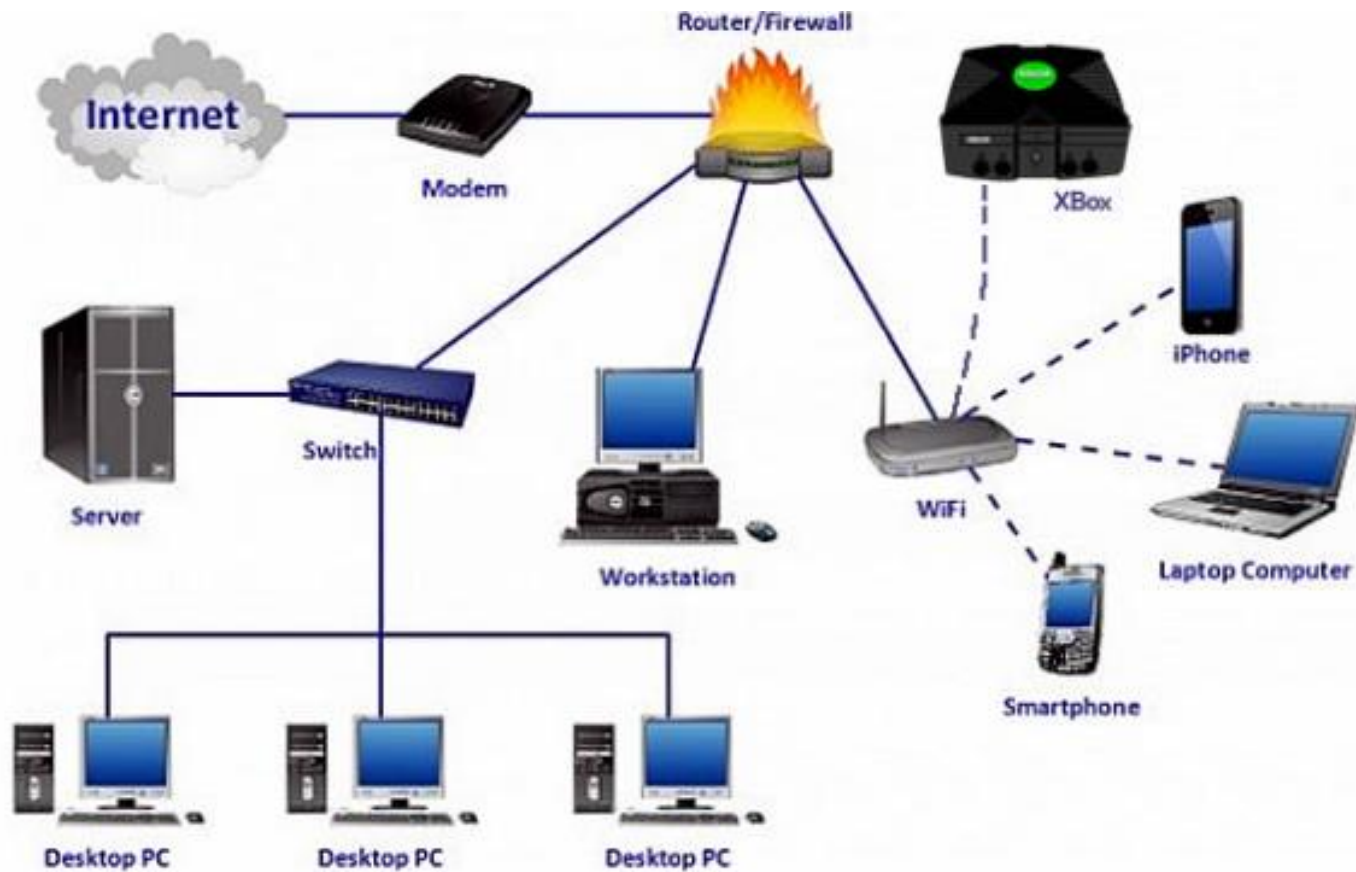
Računarska mreža je skup dva ili više međusobno povezanih računarskih sistema (računara, servera, mobilnih uređaja, IoT uređaja) koji međusobno razmenjuju podatke korišćenjem standardizovanih komunikacionih protokola.

Tip mreže	Opseg
LAN (Local Area Network)	Lokalna mreža (kuća, firma, laboratorija)
MAN (Metropolitan Area Network)	Grad
WAN (Wide Area Network)	Država / svet
Internet	Globalna WAN mreža

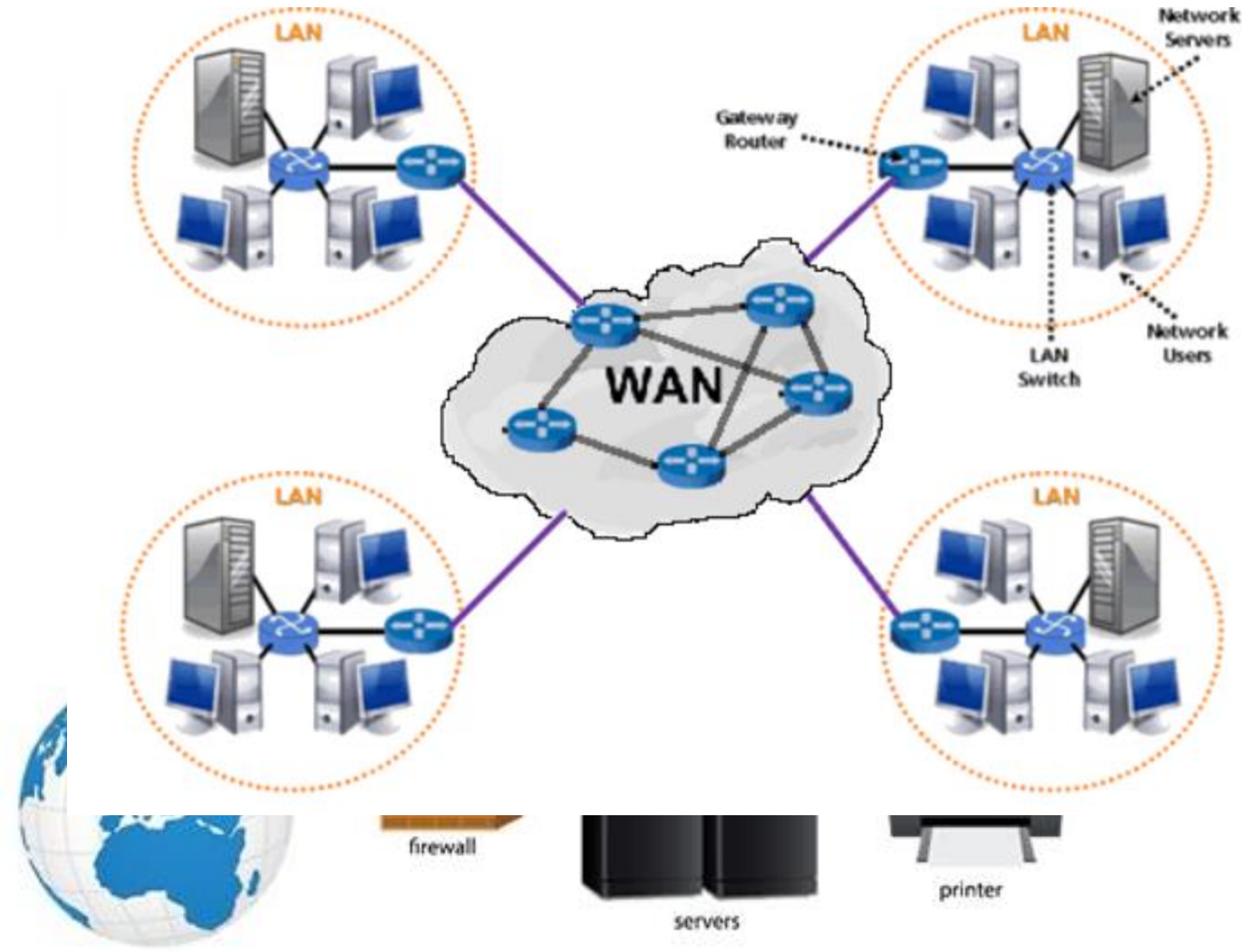
Kućna računarska mreža



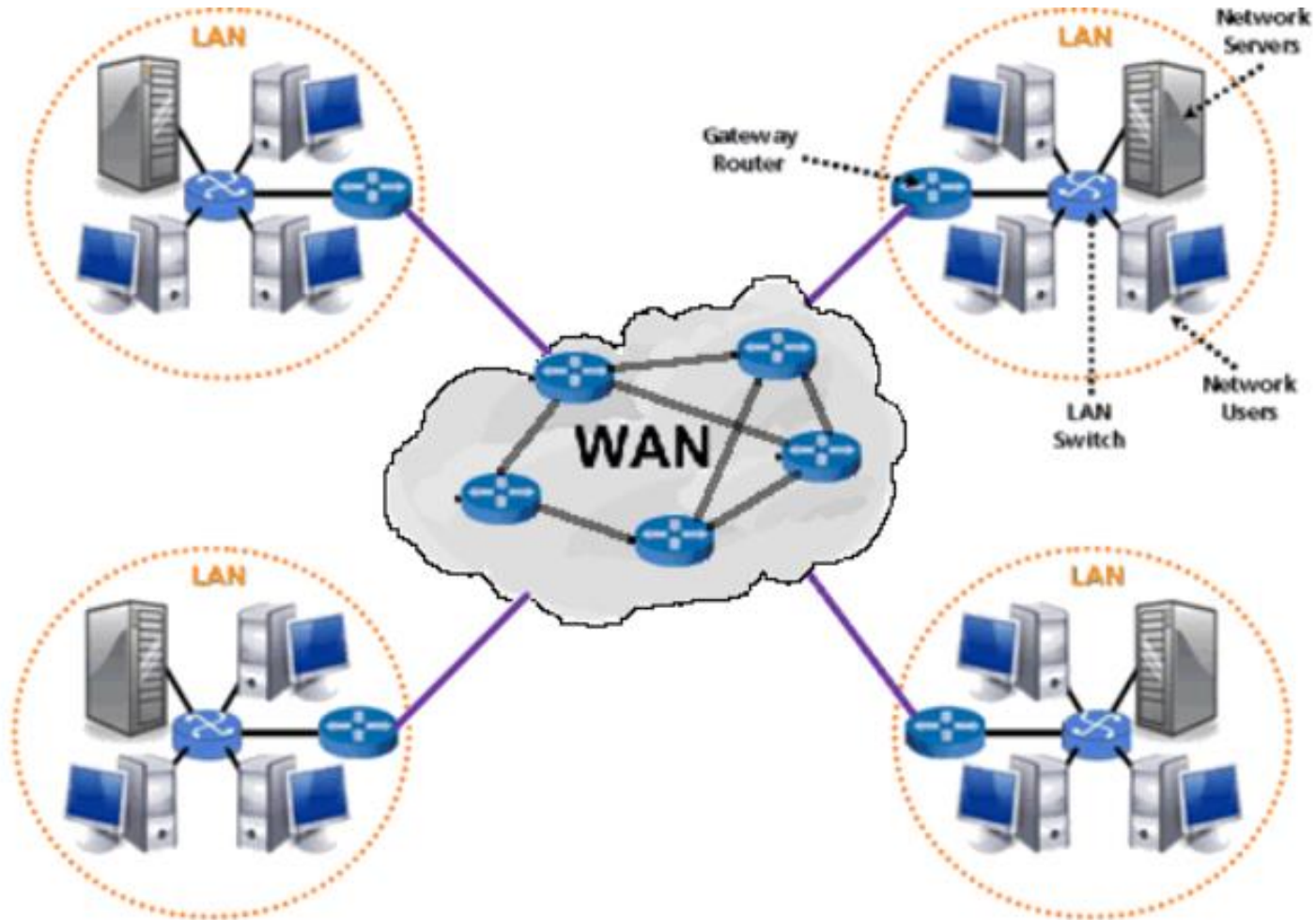
Napredna kućna računarska mreža



Biznis računarska mreža



Simulacija računarska mreža



Cisco Packet Tracer

The screenshot displays a network topology on the left and the configuration window for PC2 on the right. The topology includes a central Router (2911) connected to several switches (2960-24TT) and various devices like a server, PCs, a tablet, and a smartphone. IP addresses are assigned to various interfaces, such as 192.168.1.0/25, 192.168.2.0/28, and 212.1.1.0/30.

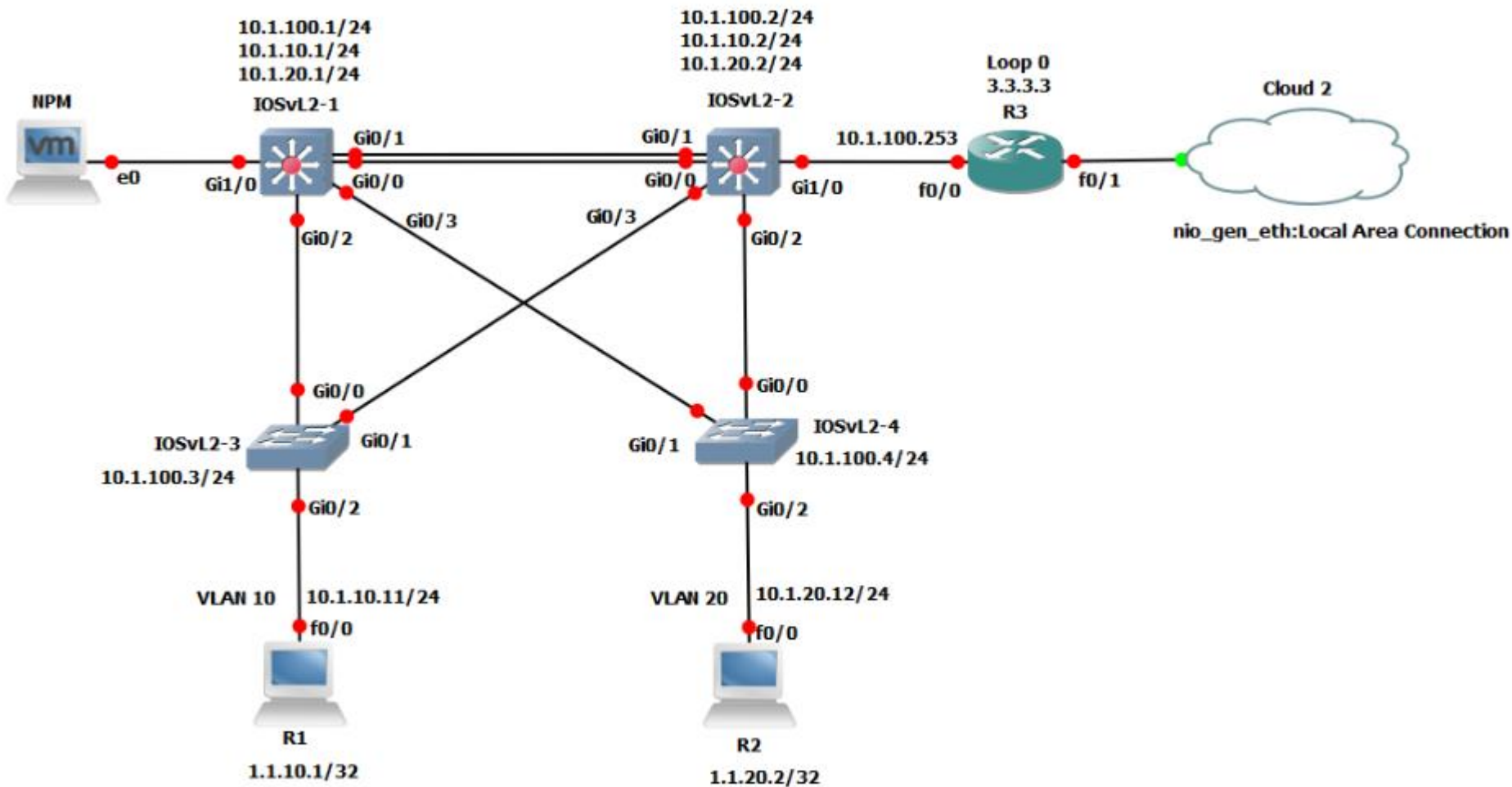
The configuration window for PC2 is open to the 'Desktop' tab, showing the 'IP Configuration' section. The 'FastEthernet0' interface is selected, and the configuration is set to DHCP. The 'IPv6 Configuration' section is also visible, showing 'Static' configuration with an IPv6 address of FE80::20B:BEFF:FEAA:7BAE.

The 'Simulation Panel' on the right shows an 'Event List' table with the following data:

Vis.	Time(sec)	Last Device
	0.000	--
	0.000	--
	0.001	PC2
	0.001	--
	0.002	PC2
	0.002	Switch1
	0.002	Switch1
	0.003	Access Point0
	0.003	Access Point0
	0.003	Switch1
	0.003	Switch1
	0.003	Switch0
	0.003	Switch0
	0.003	Access Point0
	0.004	Access Point0
	0.004	Access Point0
	0.004	Switch0
	0.004	Switch0
	0.004	Access Point0

At the bottom of the Simulation Panel, there are 'Reset Simulation' and 'Constant Delay' (checked) buttons, and a 'Play Controls' section with play, pause, and stop buttons. The 'Event List Filters - Visible Events' section shows 'DHCP' selected, with 'Edit Filters' and 'Show All/None' buttons.

GNS3 softver



Wireshark

The screenshot shows the Wireshark interface with a network capture file named 'tv-netflix-problems-2011-07-06.pcap'. The main pane displays a list of network packets. Packet 349 is selected, showing a DNS response from 192.168.0.1 to 192.168.0.21. The details pane below shows the structure of the DNS response, including the transaction ID (0x2188), flags, and the answer section which identifies the authoritative nameserver as 'esuite.net'.

No.	Time	Source	Destination	Protocol	Length	Info
343	65.142415	192.168.0.21	174.129.249.228	TCP	66	40555 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=491519346 TSecr=551811827
344	65.142715	192.168.0.21	174.129.249.228	HTTP	253	GET /clients/netflix/flash/application.swf?flash_version=flash_lite_2.1&v=1.5&n...
345	65.230738	174.129.249.228	192.168.0.21	TCP	66	80 → 40555 [ACK] Seq=1 Ack=188 Win=6864 Len=0 TSval=551811850 TSecr=491519347
346	65.240742	174.129.249.228	192.168.0.21	HTTP	828	HTTP/1.1 302 Moved Temporarily
347	65.241592	192.168.0.21	174.129.249.228	TCP	66	40555 → 80 [ACK] Seq=188 Ack=763 Win=7424 Len=0 TSval=491519446 TSecr=551811852
348	65.242532	192.168.0.21	192.168.0.1	DNS	77	Standard query 0x2188 A cdn-0.nflximg.com
349	65.276870	192.168.0.1	192.168.0.21	DNS	489	Standard query response 0x2188 A cdn-0.nflximg.com CNAME images.netflix.com.edge...
350	65.277992	192.168.0.21	63.80.242.48	TCP	74	37063 → 80 [SYN] Seq=0 Win=5040 Len=0 MSS=1460 SACK_PERM=1 TSval=491519402 TSecr=...
351	65.297757	63.80.242.48	192.168.0.21	TCP	74	80 → 37063 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK_PERM=1 TSval=3295...
352	65.298396	192.168.0.21	63.80.242.48	TCP	66	37063 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=491519502 TSecr=3295534130
353	65.298687	192.168.0.21	63.80.242.48	HTTP	153	GET /us/nrd/clients/flash/814540.bun HTTP/1.1
354	65.318730	63.80.242.48	192.168.0.21	TCP	66	80 → 37063 [ACK] Seq=1 Ack=88 Win=5792 Len=0 TSval=3295534151 TSecr=491519503
355	65.321733	63.80.242.48	192.168.0.21	TCP	1514	[TCP segment of a reassembled PDU]

Details for Frame 349:

- Ethernet II, Src: Globalsc_00:3b:0a (f0:ad:4e:00:3b:0a), Dst: Vizio_14:8a:e1 (00:19:9d:14:8a:e1)
- Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.21
- User Datagram Protocol, Src Port: 53 (53), Dst Port: 34036 (34036)
- Domain Name System (response)
 - Request In: 348
 - Time: 0.034338000 seconds
 - Transaction ID: 0x2188
 - Flags: 0x8180 Standard query response, No error
 - Questions: 1
 - Answer RRs: 4
 - Authority RRs: 9
 - Additional RRs: 9
 - Queries
 - cdn-0.nflximg.com: type A, class IN
 - Answers
 - Authoritative nameservers

Hex dump of the DNS response:

```

0020  00 15 00 35 84 f4 01 c7 83 3f 21 88 01 00 00 01  ...5....?.
0030  00 04 00 09 00 09 05 63 64 6e 2d 30 07 6e 66 6c  .....c dn-nfl
0040  78 69 6d 67 03 63 6f 6d 00 00 01 00 01 c0 0c 00  xing.com .....
0050  05 00 01 00 00 05 29 00 22 06 69 6d 61 67 65 73  .....). "images
0060  07 6e 65 74 66 6c 69 78 03 63 6f 6d 09 65 64 67  .netflix.com.edge
0070  65 73 75 69 74 65 03 6e 65 74 00 c0 2f 00 05 00  esuite.net....
    
```