Мрежова сигурност I

http://training.iseca.org/

Увод в мрежите

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Кой е Боян Кроснов

- Pre-1999
- ФМИ и Лирекс
- CCIE #8701
- Reykjavik; Dublin; London; Kuala Lumpur

- packetscale

Administrativia

- В следващите 4 седмици
  - Увод в мрежите (тази лекция)
  - Ethernet (от 20:15 и в четвъртък)
  - Wi-Fi
  - IP, IPv6
  - ICMP, UDP, TCP
  - DHCP
- Test – средата-края на ноември
- Demo
- Lightning Talks

- Открити лекции
- Записването за курса

Acknowledgements

Some materials are based on work by

- MIT OpenCourseWare – http://ocw.mit.edu/
- Flickr users

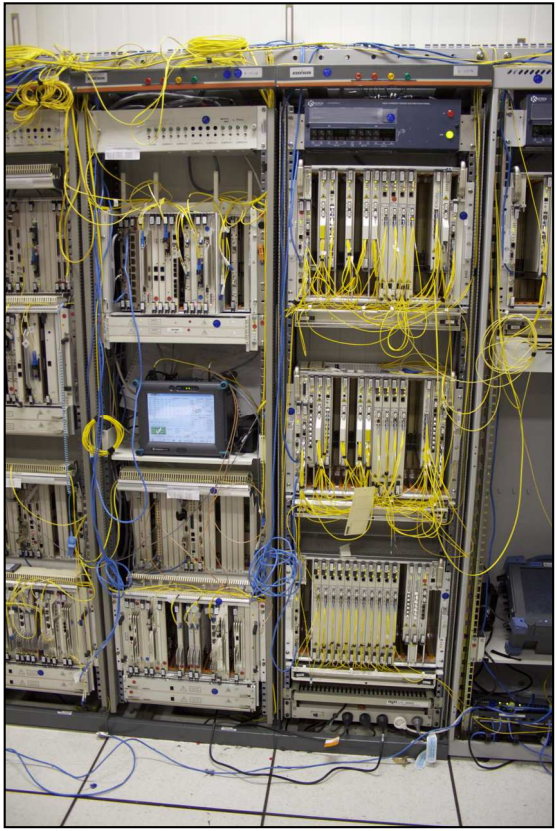
  photoblog0001, 10ch, sniffles, zoemaclean, williamhook, a_sorense, affan-basalamah
- Steve Deering – the IP hourglass

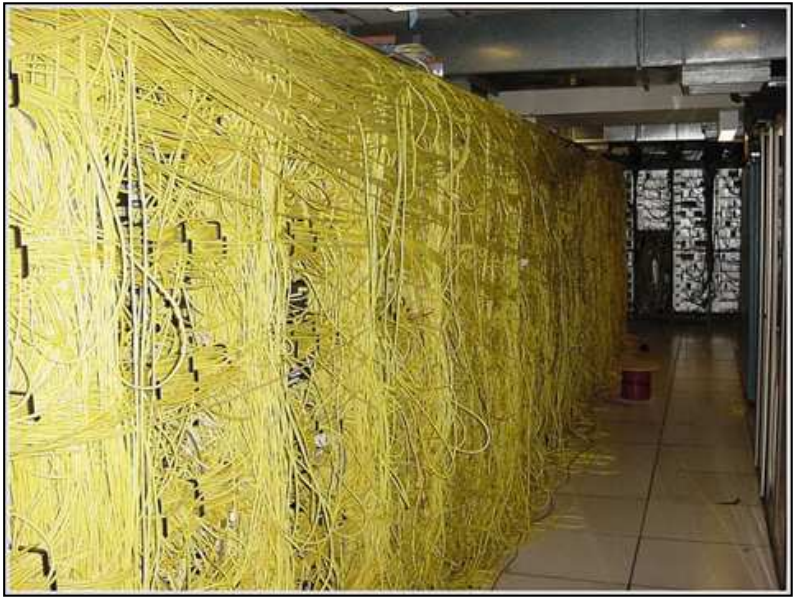
История на мрежите

История на Internet

- First packet switching networks - 1969
- ALOHAnet & early Ethernet– from 1970
- IP v4 – 1981, standard Ethernet - 1982
- военни мрежи, академични мрежи
- комерсиални мрежи
- Web – 1990

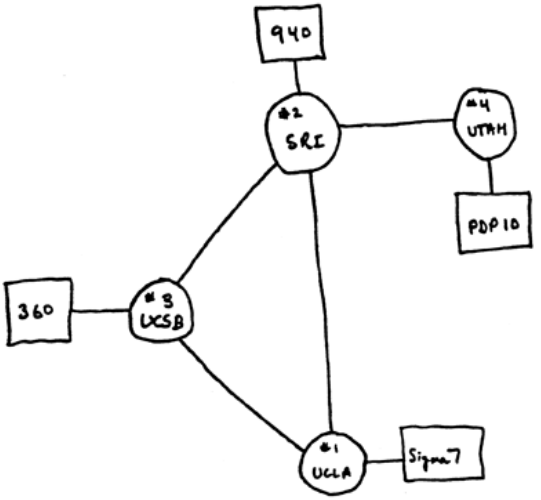
Internet днес

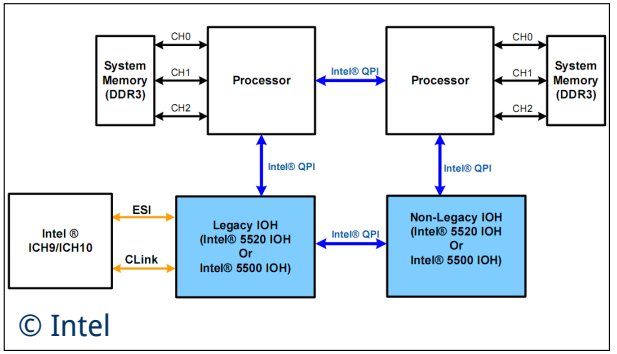


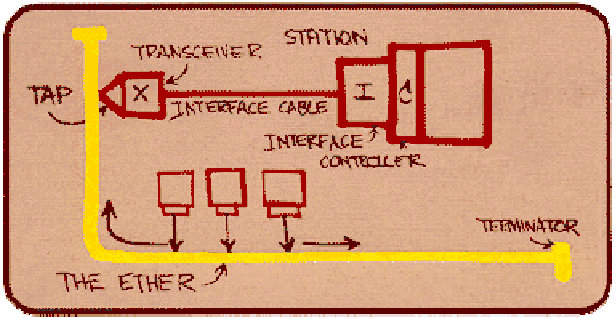


Мрежите утре

- M2M - Хладилника в интернет
- On-board network
- On-chip network

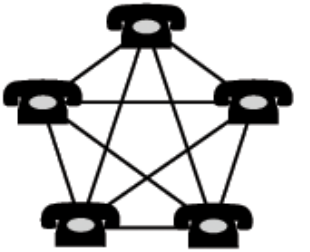




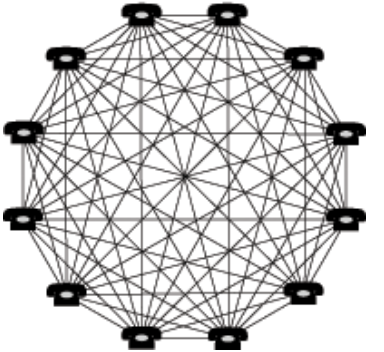


Защо мрежова сигурност

- Комуникация – email, sms, телефония, видео обаждания
- Забавления – игри, музика, филми
- Бизнес – банкиране, търговия
- Живот online



- Network effect
- Security in Depth



Circuit switched networks

- Предимства
  - Фиксирани закъснения
  - Гарантирана последователна и непрекъсната доставка на трафика
- Недостатъци
  - Връзките не се ползват когато сесията не е активна
  - Неефективни за bursty трафик
  - Типично се прави за фиксирани скорости (примерно 64 kbps)
  - Трудно се поддържат променливи скорости

Packet switched networks

- Пътят се избира за всеки пакет
- Отделните пакети може да следват различни пътища
- Пакетите може да пристигнат в разбъркан ред при получателя
- E.g., IP (The Internet Protocol)

- Circuit emulation / Virtual Circuit Switching
  - ATM
  - Pseudo-wire, TDMoIP, TDMoE, etc.

Стандарти

- IETF, IEEE, TIA
- Metro Ethernet Forum
- Wimax Forum / WiSOA
- Wi-Fi Alliance
- 3GPP
- W3C, etc.

- Повечето широко-използвани протоколи в мрежите са свободни

Слоести референтни модели

Слоести модели

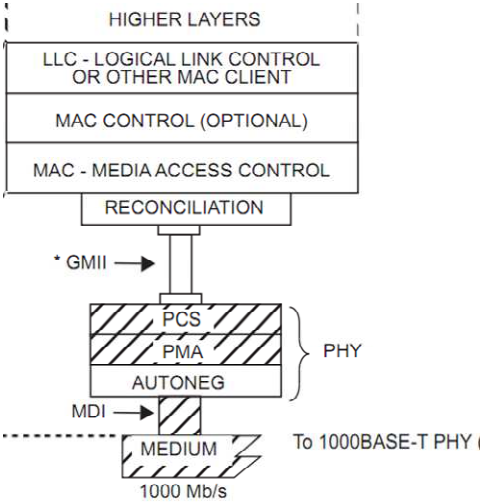
- Открийте разликите

```
+---------------------+
|     higher-level    |
+---------------------+
|       session       |
+---------------------+
|  internet protocol  |
+---------------------+
|communication network|
+---------------------+
```

IETF

7. Application
6. Presentation
5. Session
4. Transport
3. Network
2. Data Link
1. Physical

OSI reference



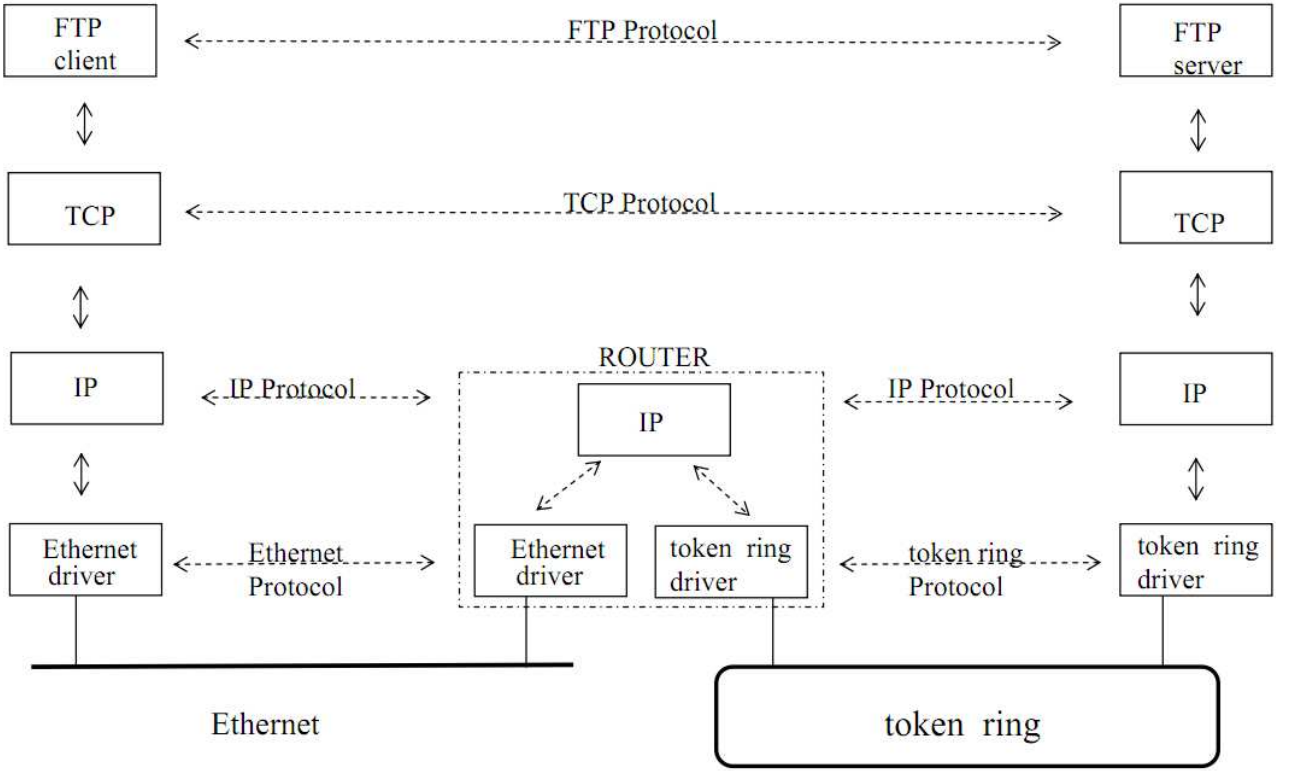
IEEE

Протоколни стекове

- TCP/IP
- SS7

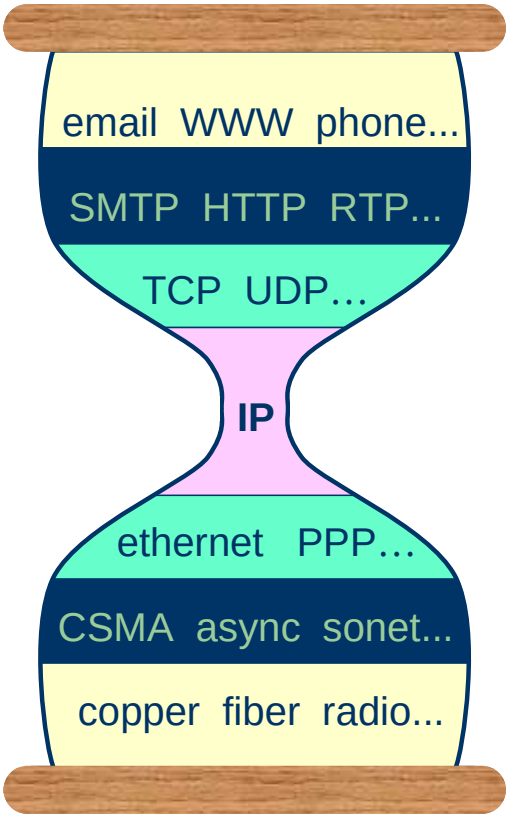
- OSI, Appletalk, IPX, SNA etc.

TCP/IP стек


FTP client
FTP Protocol
FTP server
TCP
TCP Protocol
TCP
IP
IP Protocol
ROUTER
IP
IP Protocol
IP
Ethernet driver
Ethernet Protocol
Ethernet driver
token ring driver
token ring Protocol
token ring driver
Ethernet
token ring

TCP/IP стек

7. HTTP, FTP, SMTP, POP3, IMAP4, SIP, XMPP, IRC, SNMP, SSH, DNS, NTP, DHCP
4/5. TCP, UDP, RTP, SCTP
3. IP / IPv6
2. Ethernet, Wi-Fi, etc.
1. physical media, modulation and coding



TCP/IP стек

7. HTTP, FTP, SMTP, POP3, IMAP4, SIP, XMPP, IRC, SNMP, SSH, DNS, NTP, DHCP

SSL/TLS

4/5. TCP, UDP, RTP, SCTP

IGMP, MLD

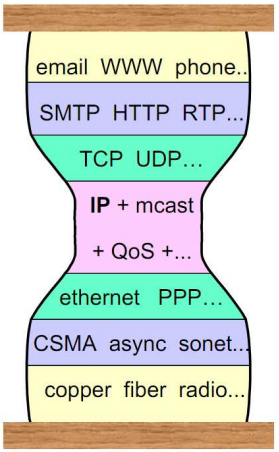
3. IP / IPv6

ARP

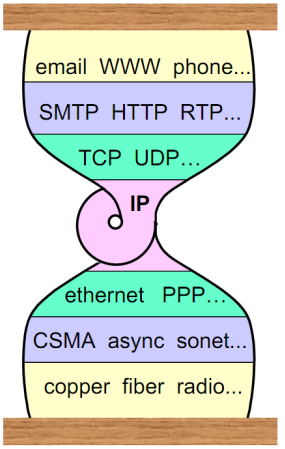
2. Ethernet, Wi-Fi, etc.

1. physical media, modulation and coding

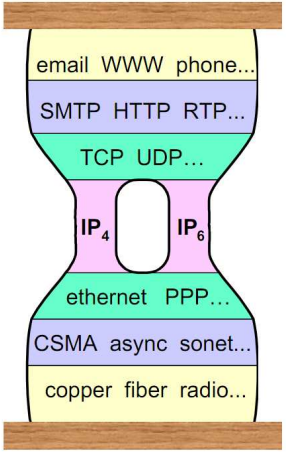
Fat hourglass



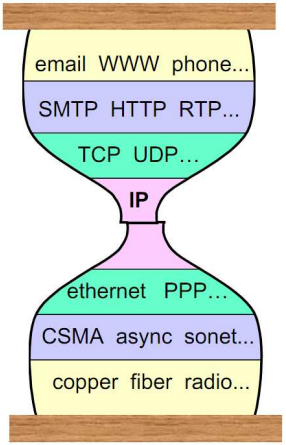
Tunneling



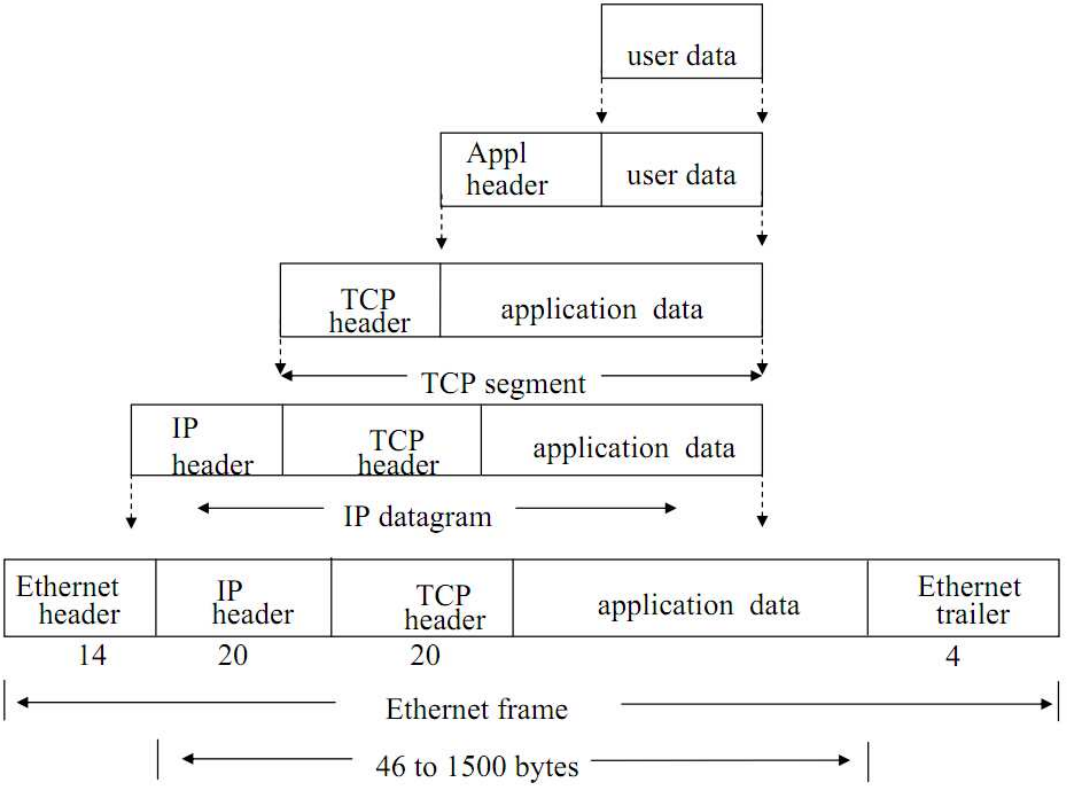
IPv6

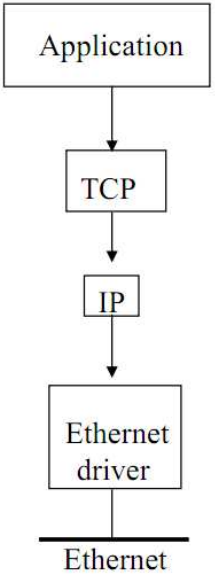


NATs, proxies



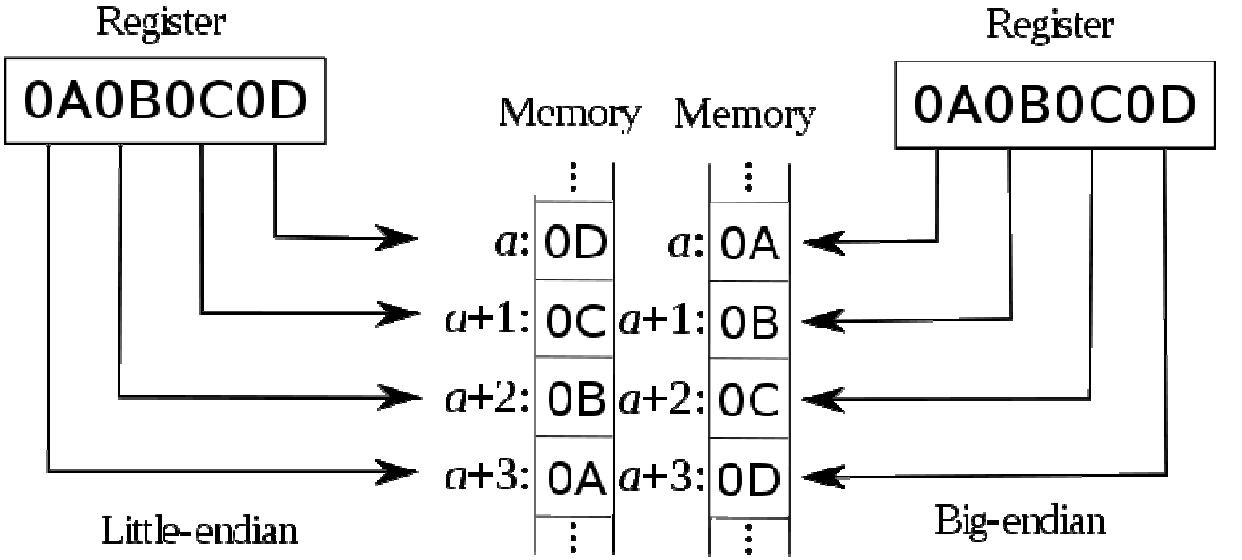
TCP/IP Encapsulation





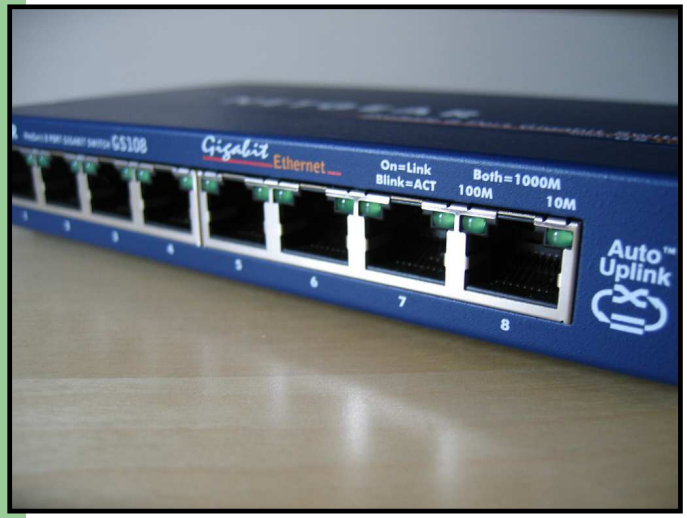
Byte order

- Octet vs. Byte
- LSB first – little endian – x86
- MSB first – big endian – TCP/IP



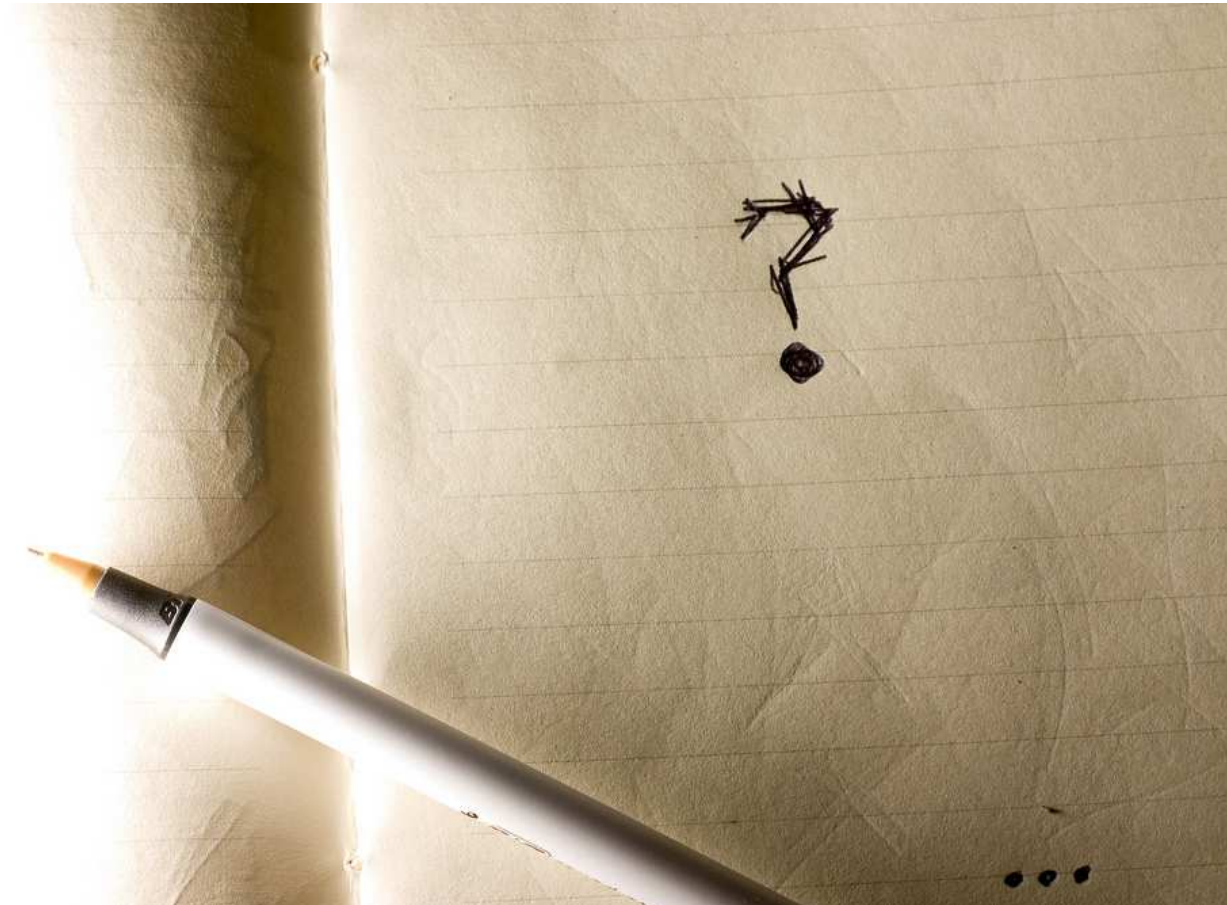
Кутии


LINKSYS
LINKSYS
CD & Documentation
Start Here


GS108
Gigabit
Ethernet
On=Link
Blink=ACT
Both=1000M
100M
10M
Auto
Uplink
5
6
7
8


CISCO 7609

Въпроси



Следва

- Ethernet
- Wi-Fi
- IP, IPv6
- ICMP, UDP, TCP
- DHCP