

IPT Netværk



HOUSE OF
TECHNOLOGY



– en del af **mercantec⁺**

IPT netværks protokoller

TDC IP telefoni Scale



IPT Netværk Services

- IP telefoner skal bruge noget konfiguration for at virke på et netværk
- Stor arbejdsbyde at taste alt informationen ind manuelt
- En masse arbejde for at skifte nummer/bruger/pladsering.
- Alt dette arbejde kan automatiseres med standard protokoller



IPT Netværk Services

- For at en IP Telefon kan ringes til kræver den noget information
 - IP adresse
 - Tid
 - Bruger konfiguration
 - LAN Konfiguration
- Denne information gives af følgende protokoller
 - DHCP (RFC2131)
 - NTP (RFC1305)
 - TFTP (RFC1350)
 - CDP/LLDP-MED (IEEE 802.1AB)



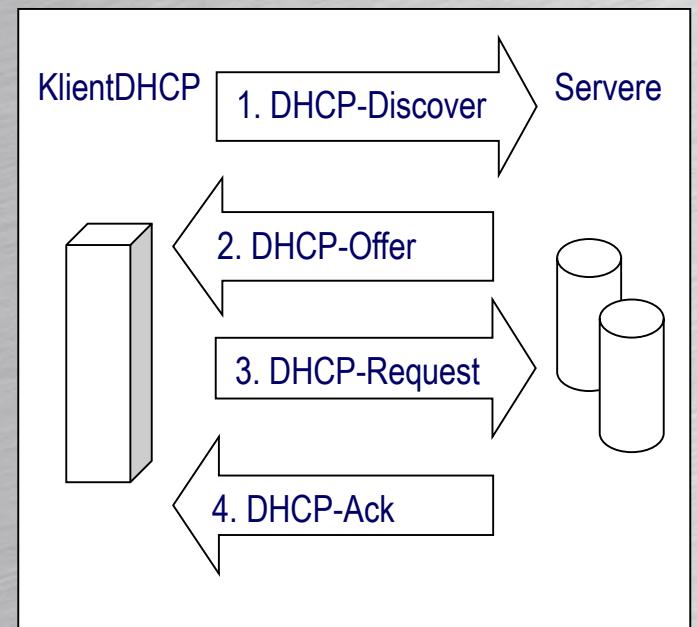
DHCP

- En DHCP servers funktion er at styre og konfigurere TCP/IP opsætningen på computere/klienter som anmoder om det.
- DHCP serveren letter det administrative arbejde betydeligt, idet der ikke manuelt tildeles IP adresser mv.
- Desuden kan den samme adresse ikke lejes ud 2 gange på samme tid, dvs. at man ikke kan få adresse konflikt.
- En DHCP server kan konfigurere DHCP klienter med mange forskellige parametre som fx:
 - En IP adresse
 - Subnet maske
 - Gateway adresse
 - Adressen på en eller flere DNS servere
 - WINS servere,
 - proxy server osv.



DHCP

- **DHCP-Discover**
 - Klient anmoder om konfiguration fra en DHCP-server
- **DHCP-Offer**
 - Servere tilbyder IP-adresse og øvrige standard opsætninger
- **DHCP-Request**
 - Klient vælger server og bekræfter de parametre serveren leverede
- **DHCP-Ack**
 - Serveren accepterer valget





DHCP

- DHCP

```
69:  [+] Bootstrap Protocol
    70:      Message type: Boot Reply (2)
    71:      Hardware type: Ethernet (0x01)
    72:      Hardware address length: 6
    73:      Hops: 0
    74:      Transaction ID: 0xd828b025
    75:      Seconds elapsed: 0
    76:  [+]
    77:  [+]
    78:  [+]
    79:  [+]
    80:  [+]
    81:  [+]
    82:  [+]
    83:  [+]
    84:  [+]
    85:  [+]
    86:  [+]
    87:  [+]
    88:  [+]
    89:  [+]
    90:  [+]
    91:  [+]
    92:  [+]
    93:  [+]
    94:  [+]
    95:  [+]
    96:  [+]
    97:  [+]
    98:  [+]
    99:  [+]
    100:  [+]
    101:  [+]
    102:  [+]
    103:  [+]
    104:  [+]
    105:  [+]
    106:  [+]
    107:  [+]
    108:  [+]
    109:  [+]
    110:  [+]
    111:  [+]
    112:  [+]
    113:  [+]
    114:  [+]
    115:  [+]
    116:  [+]
    117:  [+]
    118:  [+]
    119:  [+]
    120:  [+]
    121:  [+]
    122:  [+]
    123:  [+]
    124:  [+]
    125:  [+]
    126:  [+]
    127:  [+]
    128:  [+]
    129:  [+]
    130:  [+]
    131:  [+]
    132:  [+]
    133:  [+]
    134:  [+]
    135:  [+]
    136:  [+]
    137:  [+]
    138:  [+]
    139:  [+]
    140:  [+]
    141:  [+]
    142:  [+]
    143:  [+]
    144:  [+]
    145:  [+]
    146:  [+]
    147:  [+]
    148:  [+]
    149:  [+]
    150:  [+]
    151:  [+]
    152:  [+]
    153:  [+]
    154:  [+]
    155:  [+]
    156:  [+]
    157:  [+]
    158:  [+]
    159:  [+]
    160:  [+]
    161:  [+]
    162:  [+]
    163:  [+]
    164:  [+]
    165:  [+]
    166:  [+]
    167:  [+]
    168:  [+]
    169:  [+]
    170:  [+]
    171:  [+]
    172:  [+]
    173:  [+]
    174:  [+]
    175:  [+]
    176:  [+]
    177:  [+]
    178:  [+]
    179:  [+]
    180:  [+]
    181:  [+]
    182:  [+]
    183:  [+]
    184:  [+]
    185:  [+]
    186:  [+]
    187:  [+]
    188:  [+]
    189:  [+]
    190:  [+]
    191:  [+]
    192:  [+]
    193:  [+]
    194:  [+]
    195:  [+]
    196:  [+]
    197:  [+]
    198:  [+]
    199:  [+]
    200:  [+]
    201:  [+]
    202:  [+]
    203:  [+]
    204:  [+]
    205:  [+]
    206:  [+]
    207:  [+]
    208:  [+]
    209:  [+]
    210:  [+]
    211:  [+]
    212:  [+]
    213:  [+]
    214:  [+]
    215:  [+]
    216:  [+]
    217:  [+]
    218:  [+]
    219:  [+]
    220:  [+]
    221:  [+]
    222:  [+]
    223:  [+]
    224:  [+]
    225:  [+]
    226:  [+]
    227:  [+]
    228:  [+]
    229:  [+]
    230:  [+]
    231:  [+]
    232:  [+]
    233:  [+]
    234:  [+]
    235:  [+]
    236:  [+]
    237:  [+]
    238:  [+]
    239:  [+]
    240:  [+]
    241:  [+]
    242:  [+]
    243:  [+]
    244:  [+]
    245:  [+]
    246:  [+]
    247:  [+]
    248:  [+]
    249:  [+]
    250:  [+]
    251:  [+]
    252:  [+]
    253:  [+]
    254:  [+]
    255:  [+]
    256:  [+]
    257:  [+]
    258:  [+]
    259:  [+]
    260:  [+]
    261:  [+]
    262:  [+]
    263:  [+]
    264:  [+]
    265:  [+]
    266:  [+]
    267:  [+]
    268:  [+]
    269:  [+]
    270:  [+]
    271:  [+]
    272:  [+]
    273:  [+]
    274:  [+]
    275:  [+]
    276:  [+]
    277:  [+]
    278:  [+]
    279:  [+]
    280:  [+]
    281:  [+]
    282:  [+]
    283:  [+]
    284:  [+]
    285:  [+]
    286:  [+]
    287:  [+]
    288:  [+]
    289:  [+]
    290:  [+]
    291:  [+]
    292:  [+]
    293:  [+]
    294:  [+]
    295:  [+]
    296:  [+]
    297:  [+]
    298:  [+]
    299:  [+]
    300:  [+]
    301:  [+]
    302:  [+]
    303:  [+]
    304:  [+]
    305:  [+]
    306:  [+]
    307:  [+]
    308:  [+]
    309:  [+]
    310:  [+]
    311:  [+]
    312:  [+]
    313:  [+]
    314:  [+]
    315:  [+]
    316:  [+]
    317:  [+]
    318:  [+]
    319:  [+]
    320:  [+]
    321:  [+]
    322:  [+]
    323:  [+]
    324:  [+]
    325:  [+]
    326:  [+]
    327:  [+]
    328:  [+]
    329:  [+]
    330:  [+]
    331:  [+]
    332:  [+]
    333:  [+]
    334:  [+]
    335:  [+]
    336:  [+]
    337:  [+]
    338:  [+]
    339:  [+]
    340:  [+]
    341:  [+]
    342:  [+]
    343:  [+]
    344:  [+]
    345:  [+]
    346:  [+]
    347:  [+]
    348:  [+]
    349:  [+]
    350:  [+]
    351:  [+]
    352:  [+]
    353:  [+]
    354:  [+]
    355:  [+]
    356:  [+]
    357:  [+]
    358:  [+]
    359:  [+]
    360:  [+]
    361:  [+]
    362:  [+]
    363:  [+]
    364:  [+]
    365:  [+]
    366:  [+]
    367:  [+]
    368:  [+]
    369:  [+]
    370:  [+]
    371:  [+]
    372:  [+]
    373:  [+]
    374:  [+]
    375:  [+]
    376:  [+]
    377:  [+]
    378:  [+]
    379:  [+]
    380:  [+]
    381:  [+]
    382:  [+]
    383:  [+]
    384:  [+]
    385:  [+]
    386:  [+]
    387:  [+]
    388:  [+]
    389:  [+]
    390:  [+]
    391:  [+]
    392:  [+]
    393:  [+]
    394:  [+]
    395:  [+]
    396:  [+]
    397:  [+]
    398:  [+]
    399:  [+]
    400:  [+]
    401:  [+]
    402:  [+]
    403:  [+]
    404:  [+]
    405:  [+]
    406:  [+]
    407:  [+]
    408:  [+]
    409:  [+]
    410:  [+]
    411:  [+]
    412:  [+]
    413:  [+]
    414:  [+]
    415:  [+]
    416:  [+]
    417:  [+]
    418:  [+]
    419:  [+]
    420:  [+]
    421:  [+]
    422:  [+]
    423:  [+]
    424:  [+]
    425:  [+]
    426:  [+]
    427:  [+]
    428:  [+]
    429:  [+]
    430:  [+]
    431:  [+]
    432:  [+]
    433:  [+]
    434:  [+]
    435:  [+]
    436:  [+]
    437:  [+]
    438:  [+]
    439:  [+]
    440:  [+]
    441:  [+]
    442:  [+]
    443:  [+]
    444:  [+]
    445:  [+]
    446:  [+]
    447:  [+]
    448:  [+]
    449:  [+]
    450:  [+]
    451:  [+]
    452:  [+]
    453:  [+]
    454:  [+]
    455:  [+]
    456:  [+]
    457:  [+]
    458:  [+]
    459:  [+]
    460:  [+]
    461:  [+]
    462:  [+]
    463:  [+]
    464:  [+]
    465:  [+]
    466:  [+]
    467:  [+]
    468:  [+]
    469:  [+]
    470:  [+]
    471:  [+]
    472:  [+]
    473:  [+]
    474:  [+]
    475:  [+]
    476:  [+]
    477:  [+]
    478:  [+]
    479:  [+]
    480:  [+]
    481:  [+]
    482:  [+]
    483:  [+]
    484:  [+]
    485:  [+]
    486:  [+]
    487:  [+]
    488:  [+]
    489:  [+]
    490:  [+]
    491:  [+]
    492:  [+]
    493:  [+]
    494:  [+]
    495:  [+]
    496:  [+]
    497:  [+]
    498:  [+]
    499:  [+]
    500:  [+]
```



NTP

- Manuel indtastning af tid på alt udstyr er også en arbejdstung opgave
- Hvordan sikrer man sig millisekunders præcision?
- Præcis til er meget vigtigt når man skal fejlfinde i logfiler.
- Network Time Protocol kan automatisere processen.
- RFC1305



NTP

- Kan virke på 3 forskellige måder
 - Client: En vejs synkronisering mod en server
 - Symmetric: Peer synkronisering imellem 2 enheder
 - Broadcast: En NTP broadcast beskred indstiller uret på den lokale maskine (Sikkerhed!?)
- Bruger stratum niveauer for at definere præcision
 - Stratum 0 har en lokal tid. (Atom/GPS/Frk. Klokken)
 - Stratum 1 har synkroniseret med en st. 0
 - Stratum 2 har synkroniseret med en st.1
 - Osv...



NTP

- NTP Pakke i wireshark

No.	Time	Source	Destination	Protocol	Length	Info
14	4.678	10.197.1.100	87.48.133.100	NTP	90	NTP Version 1, client
15	4.726	87.48.133.100	10.197.1.100	NTP	90	NTP Version 1, server

Filter: ntp Expression... Clear Apply Save

[+] Internet Protocol Version 4, Src: 87.48.133.100 (87.48.133.100), Dst: 10.197.1.100
[+] User Datagram Protocol, Src Port: ntp (123), Dst Port: 1024 (1024)
[-] Network Time Protocol (NTP Version 1, server)
[+] Flags: 0x0c
 Peer Clock Stratum: secondary reference (2)
 Peer Polling Interval: invalid (0)
 Peer Clock Precision: 0,000001 sec
 Root Delay: 0,0038 sec
 Root Dispersion: 0,0454 sec
 Reference ID: 192.66.185.7
 Reference Timestamp: Sep 15, 2014 13:36:17.971198000 UTC
 Origin Timestamp: Jan 1, 1970 00:00:00.000000000 UTC
 Receive Timestamp: Sep 15, 2014 13:50:43.074099000 UTC
 Transmit Timestamp: Sep 15, 2014 13:50:43.074110000 UTC



TFTP

- Trivial File Transfer Protocol
- Simpel fil overførsels protokol (som navnet antyder)
- Kan implementeres med minimal kode da den er stateless.
 - Read request: file.config
 - Data Packet, Block 1
 - ACK, Block 1
 - Data Packet, Block 2
 - ACK, Block 2



TFTP

- TFTP med Wireshark

Filter: tftp Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
45	395.4	10.197.0.114	87.48.133.100	TFTP	72	Read Request, File: sysconf_8815e_sip.cfg,
46	395.5	87.48.133.100	10.197.0.114	TFTP	558	Data Packet, Block: 1
47	395.5	10.197.0.114	87.48.133.100	TFTP	60	Acknowledgement, Block: 1
48	395.5	87.48.133.100	10.197.0.114	TFTP	558	Data Packet, Block: 2
49	395.5	10.197.0.114	87.48.133.100	TFTP	60	Acknowledgement, Block: 2

Frame 46: 558 bytes on wire (4464 bits), 558 bytes captured (4464 bits) on interface 0
Ethernet II, Src: Motorola_be:4c:84 (00:24:37:be:4c:84), Dst: Lg-Erics_c4:4b:a0 (b4:0e:dc:c4:4b:a0)
Internet Protocol Version 4, Src: 87.48.133.100 (87.48.133.100), Dst: 10.197.0.114 (10.197.0.114)
User Datagram Protocol, Src Port: 43035 (43035), Dst Port: csd-monitor (3072)
Trivial File Transfer Protocol
[Source File: sysconf_8815e_sip.cfg]
Opcode: Data Packet (3)
Block: 1
Data (512 bytes)
Data: 3b5349502044656661756c742047656e6572696320436f6e...
[Length: 512]

Hex	Dec	ASCII
0020	00 72 a8 1b 0c 00 02 0c	r..... .K....;S
0030	49 50 20 44 65 66 61 75	IP Defau lt Gener
0040	69 63 20 43 6f 6e 66 69	ic Confir guration
0050	20 46 69 6c 65 0a 3b 3d	File.;= =====
0060	3d 3d 3d 3d 3d 3d 3d	===== =====
0070	3d 3d 3d 3d 3d 3d 3d	===== =====
0080	3d 3d 3d 3d 3d 3d 3d	===== =====
0090	3d 3d 3d 3d 3d 3d 3d	===== =====
00a0	0a 3b 20 49 50 2d 38 38	; IP-88 XX confi
00b0	58 58 20 63 6f 6e 66 69	guration informa
00c0	67 75 72 61 74 69 6f 6e	tion(v1. 0).; cop
00d0	66 6f 72 6d 61 74 69 6f	right L GE since
00e0	79 72 69 67 68 74 20 4c	2003.; Modified
00f0	47 45 20 73 69 6e 63 65	by SB (22-10-20
0100	20 32 30 30 33 0a 3b 20	13).;== =====
0110	4d 6f 64 69 66 69 65 64	===== =====
0120	20 62 79 20 53 42 20 28	===== =====
0130	32 32 2d 31 30 2d 32 30	===== =====
0140	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0150	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0160	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0170	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0180	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0190	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
01a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
01b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
01c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
01d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
01e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
01f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0200	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0210	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0220	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0230	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0240	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0250	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0260	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0270	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0280	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0290	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
02a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
02b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
02c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
02d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
02e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
02f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0300	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0310	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0320	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0330	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0340	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0350	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0360	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0370	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0380	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0390	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
03a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
03b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
03c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
03d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
03e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
03f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0400	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0410	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0420	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0430	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0440	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0450	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0460	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0470	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0480	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0490	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
04a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
04b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
04c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
04d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
04e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
04f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0500	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0510	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0520	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0530	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0540	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0550	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0560	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0570	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0580	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0590	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
05a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
05b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
05c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
05d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
05e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
05f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0600	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0610	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0620	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0630	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0640	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0650	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0660	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0670	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0680	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0690	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
06a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
06b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
06c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
06d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
06e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
06f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0700	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0710	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0720	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0730	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0740	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0750	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0760	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0770	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0780	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0790	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
07a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
07b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
07c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
07d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
07e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
07f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0800	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0810	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0820	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0830	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0840	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0850	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0860	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0870	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0880	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0890	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
08a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
08b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
08c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
08d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
08e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
08f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0900	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0910	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0920	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0930	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0940	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0950	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0960	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0970	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0980	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0990	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
09a0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
09b0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
09c0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
09d0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
09e0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
09f0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a00	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a10	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a20	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a30	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a40	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a50	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a60	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a70	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a80	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0a90	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0aa0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ab0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ac0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ad0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ae0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0af0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b00	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b10	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b20	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b30	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b40	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b50	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b60	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b70	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b80	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b90	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ba0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b10	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b20	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b30	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b40	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b50	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b60	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b70	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b80	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b90	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ba0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b10	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b20	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b30	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b40	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b50	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b60	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b70	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b80	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b90	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ba0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b10	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b20	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b30	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b40	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b50	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b60	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b70	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b80	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b90	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ba0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b10	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b20	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b30	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b40	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b50	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b60	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b70	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b80	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b90	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0ba0	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b10	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b20	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b30	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b40	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b50	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b60	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b70	3d 3d 3d 3d 3d 3d 3d 3d	===== =====
0b80	3d	



TFTP

- Konfigurations fil

```
[VOIP]
max_line_num 1
preferred_codec pcma pcmu g729
message_url 403
[LAN]
network_mode DHCP
tftp_server_address 87.48.133.100
[DSP]
ringer_off on
headset_mode disable
[SYSTEM]
lang 3
lock_outgoing_call 0
[VOIP]
line1_proxy_address vk102113.hvoip.dk
line1_proxy_port 5060
line1_displayname "Viborg 403"
line1_name mercantec403
line1_authname mercantec403@vk102113.hvoip.dk
line1_password 0R9APLug03
line1_type private
[PROG]
add 2 2
label 2 ""
add 3 1
```



CDP

- Cisco Discovery Protocol (Proprietær)
- Lag 2 protokol til at finde naboer
- Aktiveret som default på alt Cisco udstyr
- Sender information omkring enheden til naboerne
 - Navn
 - Funktioner (Switch, router, bridge, host)
 - Strøm
 - Software
 - Adresser
 - Afsender port



CDP

- CDP i Wireshark

Filter: cdp Expression... C

No.	Time	Source	Destination	Protocol
1	0.000	LnSritha_ab:63:20		CDP/VTP/DTP/PAgP/ICDP
2	0.254	LnSritha_ab:63:20		CDP/VTP/DTP/PAgP/ICDP

Frame 1: 118 bytes on wire (944 bits), 118 bytes captured
IEEE 802.3 Ethernet
Logical-Link Control
Cisco Discovery Protocol
Version: 2
TTL: 180 seconds
Checksum: 0x2fa5 [correct]
Device ID: LN001A7EAB6320
Port ID: port 1
Capabilities
Software Version
Platform: LG-Ericsson LIP 8830
VoIP VLAN Query: 512
Power Consumption: 6300 mw



LLDP

- Link Layer Discovery Protocol
 - IEEE 802.1AB
 - LLDP Media Endpoint Discovery (LLDP-MED)
- Cisco switcher understøtter følgende TLV'er (type/length/values)
 - Port description TLV
 - System name TLV
 - System description TLV
 - System capabilities TLV
 - Management address TLV
 - Og andre...