

Διαχείριση Δικτύων – Ευφυή Δίκτυα

2η Ομάδα Ασκήσεων

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Τα traceroute dumps καθώς και τα generation scripts είναι συνημμένα στο τέλος της αναφοράς.

1.

Τα πεδία στα παρακάτω dumps είναι (hostname, IP, AS, Domain).

```
===== traceroute -P icmp www.geant.net =====
router                                     : 147.102.13.200      : 3323 : NTUA
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr : 194.177.209.117    : 5408 : GR
eie2-to-kol1.backbone.grnet.gr           : 195.251.27.54      : 5408 : GR
grnet.mx2.ath.gr.geant.net                 : 62.40.124.89        : 20965: GEANT
ae2.rt1.vie.at.geant.net                   : 62.40.112.165       : 20965: GEANT
SP2013NLB.geant.net                       : 62.40.105.162       : 20965: GEANT
===== traceroute -P icmp nova.torproject.org =====
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr : 194.177.209.117    : 5408 : GR
eie2-to-kol1.backbone.grnet.gr           : 195.251.27.54      : 5408 : GR
grnet.mx2.ath.gr.geant.net                 : 62.40.124.89        : 20965: GEANT
ae1.mx1.ath.gr.geant.net                   : 62.40.112.215       : 20965: GEANT
ae2.mx1.mil2.it.geant.net                   : 62.40.98.150        : 20965: GEANT
ae2.mx1.gen.ch.geant.net                    : 62.40.98.112        : 20965: GEANT
ae4.mx1.par.fr.geant.net                    : 62.40.98.152        : 20965: GEANT
ae1.mx1.lon.uk.geant.net                    : 62.40.98.76         : 20965: GEANT
ae0.mx1.ams.nl.geant.net                    : 62.40.98.81         : 20965: GEANT
nl-sar.nordu.net                           : 109.105.102.81      : 2603 : NORDUNET
ams16-core-1.gigabiteth8-1-0.swip.net       : 195.69.145.139      : 39923: AS
ams16-core-4.bundle-ether5.tele2.net        : 130.244.206.166     : 1257 : TELE
ams-core-2.bundle-ether2.tele2.net          : 130.244.39.234      : 1257 : TELE
fra36-core-1.bundle-ether4.tele2.net        : 130.244.64.200      : 1257 : TELE
wen1-core-2.bundle-ether7.tele2.net         : 130.244.206.29      : 1257 : TELE
wen3-core-1.tengigabiteth2-1-0.tele2.net    : 130.244.205.72      : 1257 : TELE
130.244.49.118                             : 130.244.49.118      : 1257 : TELE
c76wuni1-tge1-1.net.uta.at                 : 212.152.192.105     : 8437 : UTA
81.189.132.122                             : 81.189.132.122      : 8437 : UTA
nova.torproject.org                        : 86.59.30.40         : 3248 : SIL
```

2.

Στο πρώτο σχεδιάγραμμα φαίνονται οι κόμβοι χωρίς την πληροφορία των AS, και στο δεύτερο έχουν ομαδοποιηθεί με βάση το AS στο οποίο ανήκουν.

3.

Από ένα server εκτός του Ελληνικού χώρου, δεν μπορούμε να σχεδιάσουμε το σκαρίφημα του GR-IX, διότι η διασύνδεση των κόμβων γίνεται εσωτερικά (μέσω των υποδομών του GRNET) και δεν θα φαινόταν από ένα κόμβο εξωτερικό του δικτύου.

SCRIPTS

Batch script για traceroute

```
#!/usr/bin/env bash

outfile="lab2_output.text"

#question_template: "command | tee -a $outfile"
questions=(
#Q_2_1
    "traceroute -P icmp '{www.geant.net',nova.torproject.org}'" | tee -a $outfile
#Q_2_2
    "traceroute -P icmp
    '{www.auth.gr',aueb.gr',uoa.gr',duth.gr',uoc.gr',www.upatras.gr',ntua.gr',panteion.gr',uth.gr',aegean.gr',uoi.gr',
    www.unipi.gr}'" | tee -a $outfile
)

function report () {
    echo "===== "$1" =====" >> $outfile
    eval "$1"
    echo -e "\n" >> $outfile
}

IFS=""
rm -f "$outfile"
for i in "${questions[@]}"
do
    report "$i"
done
echo "Finished!"
```

Output processing και whois information

```
#!/usr/bin/env perl

use v5.14;
use warnings;
use strict;

my $DUMP;
open DUMP, "<", "lab2_output.text";
my $OUT;
open OUT, ">", "lab2_whois_output.text";

while (<DUMP>) {
    # Skip useless lines
    next if m/(?^\s+$) | (?:\*\s+ ){3} | (?= + )/x;
    # Find host and ip
```

```

my ($host, $ip) = $_ =~ m/(?:\s+)?\d+\s+ (.*)\s \(( (?:\d+\.){3}\d+ ) \)/x;
# Run whois on specified ip
my ($as_no, $domain) = `whois -h asn.shadowserver.org "origin $ip"` =~ m/^( \d+ ) \s+ \\\s+ .*\? \\\s+
([ ^ \\\s ]+ )/x;
say OUT join "\t-->\t", ($host, $ip, $as_no, $domain);
}

```

```

close OUT;
close DUMP;

```

OUTPUTS

```

===== traceroute -P icmp www.geant.net | tee -a lab2_output.text =====
1 router (147.102.13.200) 0.642 ms * 0.755 ms
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 37.828 ms 0.667 ms 0.613 ms
3 eie2-to-kol1.backbone.grnet.gr (195.251.27.54) 0.721 ms 0.652 ms 0.709 ms
4 grnet.mx2.ath.gr.geant.net (62.40.124.89) 0.871 ms 0.812 ms 0.757 ms
5 ae2.rt1.vie.at.geant.net (62.40.112.165) 29.906 ms 29.882 ms 46.063 ms
6 SP2013NLB.geant.net (62.40.105.162) 30.417 ms 30.165 ms 30.222 ms

```

```

===== traceroute -P icmp nova.torproject.org | tee -a lab2_output.text =====
1 * * *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 0.758 ms 0.579 ms 0.632 ms
3 eie2-to-kol1.backbone.grnet.gr (195.251.27.54) 153.176 ms 0.750 ms 0.754 ms
4 grnet.mx2.ath.gr.geant.net (62.40.124.89) 0.835 ms 0.765 ms 0.810 ms
5 ae1.mx1.ath.gr.geant.net (62.40.112.215) 0.857 ms 0.805 ms 0.851 ms
6 ae2.mx1.mil2.it.geant.net (62.40.98.150) 31.378 ms 31.332 ms 31.463 ms
7 ae2.mx1.gen.ch.geant.net (62.40.98.112) 38.429 ms 38.367 ms 38.425 ms
8 ae4.mx1.par.fr.geant.net (62.40.98.152) 45.578 ms 46.349 ms 45.660 ms
9 ae1.mx1.lon.uk.geant.net (62.40.98.76) 53.596 ms 53.560 ms 53.654 ms
10 ae0.mx1.ams.nl.geant.net (62.40.98.81) 58.933 ms 58.797 ms 58.786 ms
11 nl-sar.nordu.net (109.105.102.81) 61.210 ms 61.048 ms 61.229 ms
12 ams16-core-1.gigabiteth8-1-0.swip.net (195.69.145.139) 54.984 ms 56.135 ms 54.898 ms
13 ams16-core-4.bundle-ether5.tele2.net (130.244.206.166) 55.335 ms 55.709 ms 55.288 ms
14 ams-core-2.bundle-ether2.tele2.net (130.244.39.234) 55.344 ms 55.382 ms 56.925 ms
15 fra36-core-1.bundle-ether4.tele2.net (130.244.64.200) 55.447 ms 55.544 ms 55.446 ms
16 wen1-core-2.bundle-ether7.tele2.net (130.244.206.29) 55.671 ms 55.212 ms 55.458 ms
17 wen3-core-1.tengigabiteth2-1-0.tele2.net (130.244.205.72) 55.506 ms 55.487 ms 55.642 ms
18 130.244.49.118 (130.244.49.118) 55.081 ms 55.280 ms 55.162 ms
19 c76wuni1-tge1-1.net.uta.at (212.152.192.105) 55.184 ms 55.390 ms 55.545 ms
20 81.189.132.122 (81.189.132.122) 97.642 ms 99.053 ms 60.053 ms
21 nova.torproject.org (86.59.30.40) 55.480 ms 55.228 ms 57.843 ms

```

```

===== traceroute -P icmp www.auth.gr | tee -a lab2_output.text =====
1 router (147.102.13.200) 0.447 ms * 0.757 ms
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 0.582 ms 0.552 ms 0.585 ms
3 eie2-to-koletti1.backbone.grnet.gr (195.251.27.46) 0.747 ms 0.709 ms 0.690 ms
4 auth-thes-4.eie-2.access-link.grnet.gr (62.217.98.23) 12.724 ms 11.302 ms 13.517 ms
5 www.ccf.auth.gr (155.207.1.12) 8.418 ms 8.369 ms 8.319 ms

```

```

===== traceroute -P icmp aueb.gr | tee -a lab2_output.text =====
1 * * *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 0.744 ms 0.588 ms 0.626 ms

```

3 aueb-2.koletti-1.access-link.grnet.gr (195.251.24.6) 0.826 ms 0.767 ms 0.798 ms
4 eclass2.aueb.gr (195.251.255.190) 0.781 ms 0.696 ms 0.704 ms
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===== traceroute -P icmp uoa.gr | tee -a lab2_output.text =====

```
1 router (147.102.13.200) 0.489 ms * *
2 147.102.224.34 (147.102.224.34) 1.051 ms 0.711 ms 0.667 ms
3 195.134.71.229 (195.134.71.229) 0.669 ms 0.531 ms 0.590 ms
```

===== traceroute -P icmp duth.gr | tee -a lab2_output.text =====

```
1 * * *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 2.052 ms 1.155 ms 2.273 ms
3 eie2-to-kol1.backbone.grnet.gr (195.251.27.54) 0.973 ms 0.922 ms 0.844 ms
4 eie1-to-eie2.backbone.grnet.gr (195.251.27.154) 0.904 ms 0.833 ms 0.809 ms
5 thessaloniki2-to-eie1.backbone.grnet.gr (195.251.27.58) 8.657 ms 8.631 ms 8.665 ms
6 xanthi2-to-thessaloniki2.backbone.grnet.gr (195.251.27.50) 12.099 ms 12.068 ms 12.109 ms
7 duth-xan-13.xanthi-2.access-link.grnet.gr (62.217.96.11) 19.427 ms 22.611 ms *
8 duth.gr (192.108.114.80) 12.479 ms 12.265 ms 12.250 ms
```

===== traceroute -P icmp uoc.gr | tee -a lab2_output.text =====

```
1 router (147.102.13.200) 0.472 ms * *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 0.853 ms 0.614 ms 0.548 ms
3 eie2-to-koletti1.backbone.grnet.gr (195.251.27.46) 0.685 ms 0.681 ms 0.692 ms
4 uoc-knossos-1.eie-2.access-link.grnet.gr (195.251.25.206) 7.968 ms 7.685 ms 7.647 ms
5 147.52.1.246 (147.52.1.246) 7.913 ms 7.886 ms 7.693 ms
6 ns.uoc.gr (147.52.80.1) 7.840 ms 7.862 ms 7.893 ms
```

===== traceroute -P icmp panteion.gr | tee -a lab2_output.text =====

```
1 * * *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 4.854 ms 6.146 ms 0.617 ms
3 eie2-to-koletti1.backbone.grnet.gr (195.251.27.46) 0.751 ms 0.738 ms 0.724 ms
4 panteion-2.eie-2.access-link.grnet.gr (195.251.24.142) 1.534 ms 1.283 ms 1.295 ms
5 sociology.panteion.gr (194.177.218.53) 1.766 ms 1.434 ms 1.341 ms
```

===== traceroute -P icmp uth.gr | tee -a lab2_output.text =====

```
1 * * *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 0.815 ms 0.606 ms 0.567 ms
3 eie2-to-koletti1.backbone.grnet.gr (195.251.27.46) 0.698 ms 0.682 ms 0.745 ms
4 uth-volareos-2.eie-2.access-link.grnet.gr (195.251.24.242) 6.615 ms 6.490 ms 6.425 ms
5 ira.uth.gr (194.177.200.10) 6.659 ms 6.678 ms 6.679 ms
```

===== traceroute -P icmp aegean.gr | tee -a lab2_output.text =====

```
1 * * router (147.102.13.200) 0.668 ms
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 16.928 ms 6.299 ms 0.627 ms
3 eie2-to-kol1.backbone.grnet.gr (195.251.27.54) 0.969 ms 0.829 ms 0.873 ms
4 heraklio-2-to-koletti-1.backbone.grnet.gr (195.251.27.90) 7.638 ms 7.436 ms 7.466 ms
5 Syros-to-Heraklio2.backbone.grnet.gr (195.251.27.81) 11.574 ms 11.507 ms 11.441 ms
```

6 aegean-limn-1.syros.access-link.grnet.gr (194.177.209.18) 18.540 ms 18.449 ms 18.517 ms
7 lemnos-dc.aegean.gr (195.251.152.1) 18.820 ms 18.638 ms 18.692 ms

===== traceroute -P icmp uoi.gr | tee -a lab2_output.text =====

1 * router (147.102.13.200) 2.060 ms *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 0.701 ms 0.541 ms 0.583 ms
3 patra2-to-koletti1.backbone.grnet.gr (195.251.27.37) 3.550 ms 3.492 ms 3.456 ms
4 ioannina2-to-patra2.backbone.grnet.gr (195.251.27.73) 7.079 ms 7.037 ms 7.090 ms
5 uoi-5.ioannina-2.access-link.grnet.gr (195.251.24.210) 28.455 ms 18.848 ms 13.185 ms
6 boufos.bbr.uoi.gr (195.130.120.244) 7.761 ms 7.398 ms 7.377 ms
7 web2.noc.uoi.gr (195.130.120.107) 7.411 ms 7.258 ms 7.304 ms

===== traceroute -P icmp www.unipi.gr | tee -a lab2_output.text =====

1 * * *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 1.363 ms 0.627 ms 0.651 ms
3 eie2-to-koletti1.backbone.grnet.gr (195.251.27.46) 0.750 ms 0.681 ms 0.750 ms
4 unipi-2.eie-2.access-link.grnet.gr (195.251.24.134) 1.273 ms 1.132 ms 1.236 ms
5 spider.unipi.gr (195.251.229.6) 1.288 ms 1.176 ms 1.241 ms

===== traceroute -P icmp ntua.gr | tee -a lab2_output.text =====

1 * * *
2 achilles.noc.ntua.gr (147.102.222.210) 0.580 ms 0.375 ms 0.412 ms

===== traceroute -P icmp www.upatras.gr | tee -a lab2_output.text =====

1 * * *
2 ntua-zogr-4-gw.koletti-1.access-link.grnet.gr (194.177.209.117) 0.777 ms 0.564 ms 0.597 ms
3 upatras-1.koletti-1.access-link.grnet.gr (195.251.24.46) 4.094 ms 3.904 ms 3.909 ms
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router --> 147.102.13.200 --> 3323 --> NTUA
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koll.backbone.grnet.gr --> 195.251.27.54 --> 5408 --> GR
grnet.mx2.ath.gr.geant.net --> 62.40.124.89 --> 20965 --> GEANT
ae2.rt1.vie.at.geant.net --> 62.40.112.165 --> 20965 --> GEANT
SP2013NLB.geant.net --> 62.40.105.162 --> 20965 --> GEANT
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koll.backbone.grnet.gr --> 195.251.27.54 --> 5408 --> GR
grnet.mx2.ath.gr.geant.net --> 62.40.124.89 --> 20965 --> GEANT
ae1.mx1.ath.gr.geant.net --> 62.40.112.215 --> 20965 --> GEANT
ae2.mx1.mil2.it.geant.net --> 62.40.98.150 --> 20965 --> GEANT
ae2.mx1.gen.ch.geant.net --> 62.40.98.112 --> 20965 --> GEANT
ae4.mx1.par.fr.geant.net --> 62.40.98.152 --> 20965 --> GEANT
ae1.mx1.lon.uk.geant.net --> 62.40.98.76 --> 20965 --> GEANT
ae0.mx1.ams.nl.geant.net --> 62.40.98.81 --> 20965 --> GEANT
nl-sar.nordu.net --> 109.105.102.81 --> 2603 --> NORDUNET
ams16-core-1.gigabith8-1-0.swip.net --> 195.69.145.139 --> 39923 --> AS
ams16-core-4.bundle-ether5.tele2.net --> 130.244.206.166 --> 1257 --> TELE
ams-core-2.bundle-ether2.tele2.net --> 130.244.39.234 --> 1257 --> TELE

```

fra36-core-1.bundle-ether4.tele2.net --> 130.244.64.200 --> 1257 --> TELE
wen1-core-2.bundle-ether7.tele2.net --> 130.244.206.29 --> 1257 --> TELE
wen3-core-1.tengigabiteth2-1-0.tele2.net --> 130.244.205.72 --> 1257 --> TELE
130.244.49.118 --> 130.244.49.118 --> 1257 --> TELE
c76wuni1-tge1-1.net.uta.at --> 212.152.192.105 --> 8437 --> UTA
81.189.132.122 --> 81.189.132.122 --> 8437 --> UTA
nova.torproject.org --> 86.59.30.40 --> 3248 --> SIL
router --> 147.102.13.200 --> 3323 --> NTUA
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koletti1.backbone.grnet.gr --> 195.251.27.46 --> 5408 --> GR
auth-thes-4.eie-2.access-link.grnet.gr --> 62.217.98.23 --> 5408 --> GR
www.ccf.auth.gr --> 155.207.1.12 --> 5470 --> ASAUTHNET
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
aueb-2.koletti-1.access-link.grnet.gr --> 195.251.24.6 --> 5408 --> GR
eclass2.aueb.gr --> 195.251.255.190 --> 5408 --> GR
router --> 147.102.13.200 --> 3323 --> NTUA
147.102.224.34 --> 147.102.224.34 --> 3323 --> NTUA
195.134.71.229 --> 195.134.71.229 --> 8643 --> ATHENANET
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koll1.backbone.grnet.gr --> 195.251.27.54 --> 5408 --> GR
eie1-to-eie2.backbone.grnet.gr --> 195.251.27.154 --> 5408 --> GR
thessaloniki2-to-eie1.backbone.grnet.gr --> 195.251.27.58 --> 5408 --> GR
xanthi2-to-thessaloniki2.backbone.grnet.gr --> 195.251.27.50 --> 5408 --> GR
duth-xan-13.xanthi-2.access-link.grnet.gr --> 62.217.96.11 --> 5408 --> GR
duth.gr --> 192.108.114.80 --> 8253 --> DUTHNET
router --> 147.102.13.200 --> 3323 --> NTUA
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koletti1.backbone.grnet.gr --> 195.251.27.46 --> 5408 --> GR
uoc-knossos-1.eie-2.access-link.grnet.gr --> 195.251.25.206 --> 5408 --> GR
147.52.1.246 --> 147.52.1.246 --> 6867 --> UCNET
ns.uoc.gr --> 147.52.80.1 --> 6867 --> UCNET
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koletti1.backbone.grnet.gr --> 195.251.27.46 --> 5408 --> GR
panteion-2.eie-2.access-link.grnet.gr --> 195.251.24.142 --> 5408 --> GR
sociology.panteion.gr --> 194.177.218.53 --> 5408 --> GR
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koletti1.backbone.grnet.gr --> 195.251.27.46 --> 5408 --> GR
uth-volareos-2.eie-2.access-link.grnet.gr --> 195.251.24.242 --> 5408 --> GR
ira.uth.gr --> 194.177.200.10 --> 5408 --> GR
* * router --> 147.102.13.200 --> 3323 --> NTUA
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koll1.backbone.grnet.gr --> 195.251.27.54 --> 5408 --> GR
heraklio-2-to-koletti-1.backbone.grnet.gr --> 195.251.27.90 --> 5408 --> GR
Syros-to-Heraklio2.backbone.grnet.gr --> 195.251.27.81 --> 5408 --> GR
aegean-limn-1.syros.access-link.grnet.gr --> 194.177.209.18 --> 5408 --> GR
lemnos-dc.aegean.gr --> 195.251.152.1 --> 5408 --> GR
* router --> 147.102.13.200 --> 3323 --> NTUA
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
patra2-to-koletti1.backbone.grnet.gr --> 195.251.27.37 --> 5408 --> GR
ioannina2-to-patra2.backbone.grnet.gr --> 195.251.27.73 --> 5408 --> GR
uoi-5.ioannina-2.access-link.grnet.gr --> 195.251.24.210 --> 5408 --> GR
boufos.bbr.uoi.gr --> 195.130.120.244 --> 5408 --> GR
web2.noc.uoi.gr --> 195.130.120.107 --> 5408 --> GR
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
eie2-to-koletti1.backbone.grnet.gr --> 195.251.27.46 --> 5408 --> GR
unipi-2.eie-2.access-link.grnet.gr --> 195.251.24.134 --> 5408 --> GR

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spider.unipi.gr --> 195.251.229.6 --> 5408 --> GR
achilles.noc.ntua.gr --> 147.102.222.210 --> 3323 --> NTUA
ntua-zogr-4-gw.koletti-1.access-link.grnet.gr --> 194.177.209.117 --> 5408 --> GR
upatras-1.koletti-1.access-link.grnet.gr --> 195.251.24.46 --> 5408 --> GR



