

Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 1η

Θωμάς Καμαλάκης

Χαροκόπειο Πανεπιστήμιο Αθηνών

Οκτώβριος 2022

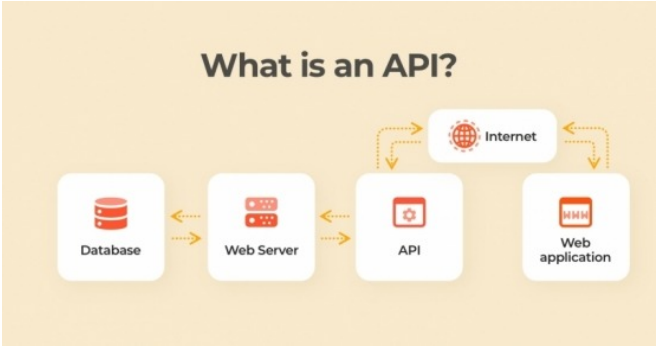
Λίγα λόγια για τον διδάσκοντα

- Θωμάς Καμαλάκης, Καθηγητής
- Είμαι στο τμήμα από το 2007(!) και το αντικείμενο μου είναι τα συστήματα επικοινωνιών.
- Ωστόσο τα τελευταία χρόνια ασχολούμαι ενεργά με το administration συστημάτων.
- Από το 2018 είμαι διευθυντής του ΠΜΣ “Πληροφορική και Τηλεματική” (οπότε τα παράπονα... κατευθείαν στην διεύθυνση).
- Επικοινωνία: thkam@hua.gr / +302109549406.

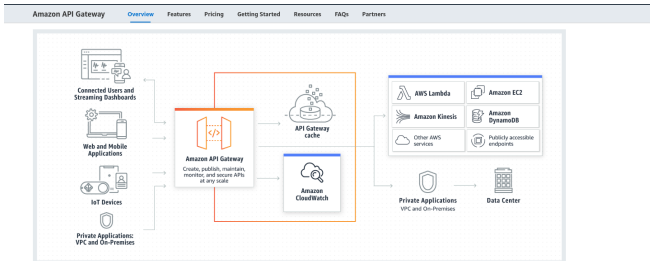
Η ανάγκη για το μάθημα

- Πολλές φορές είναι απαραίτητο να κάνουμε μαζικές ενέργειες σε ένα σύστημα ή να προτυποποιήσουμε κάποιες διαδικασίες.
- Θα δούμε μερικά παραδείγματα παρακάτω.
- Αρκετά συστήματα παρέχουν συνήθως κάποιο διαχειριστικό περιβάλλον, αλλά η επανάληψη της ίδιας διαδικασίας πολλές φορές είναι πολύ αργή και κουραστική.
- Άλλα συστήματα δεν έχουν καν διαχειριστικό περιβάλλον.

APIs



Παράδειγμα: AWS



SDKs

- Για την διαχείριση συστημάτων συνήθως χρησιμοποιούμε και SDKs - Software Development Kits.
- πρόκειται για συλλογές από εργαλεία ανάπτυξης λογισμικού που διατίθενται ενιαία.
- Υπάρχουν πολλά παραδείγματα, π.χ. Android SDK, iOS SDK, κτλ
- Ωστόσο και πολλές πλατφόρμες λογισμικού παρέχουν το δικό τους SDK που χτίζεται πάνω στο API.

Εργαλεία: Python

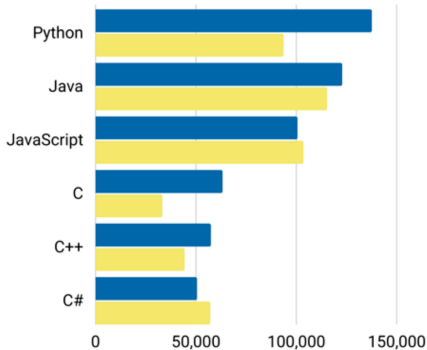
- Η Python έχει γίνει μία πολύ δημοφιλής γλώσσα για διάφορες εφαρμογές.
- Web Development
- Testing
- Web Scraping
- Data Analysis
- Graphics
- Machine Learning
- IoT
- Automation
- ...

Παραδείγματα Αυτοματοποίησης με Python

- Παραγωγή .docx .xlsx κτλ εγγράφων
- Δημιουργία χρηστών σε πλατφόρμα (π.χ. Google Workplace)
- Μαζική αποστολή e-mails
- Webscrapping
- Αλληλεπίδραση με ένα API
- Δημιουργία ιδεατών μηχανών
- Άντληση στοιχείων από βάσεις δεδομένων
- ...

Έχει νόημα να γίνει κανείς Pythonista;

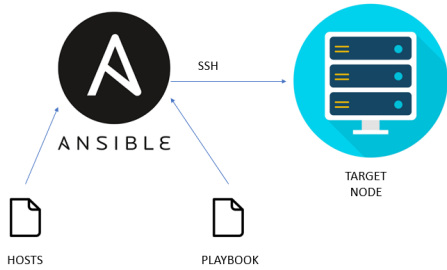
Most in-demand programming languages 2021-2022



Debug, debug, debug!



Εργαλεία: Ansible



Περιεχόμενα

- Ένα μικρό παράθυρο στον κόσμο του devops
- Python *from scratch!*
- DIY - εφαρμογές automation

Τρόπος Αξιολόγησης

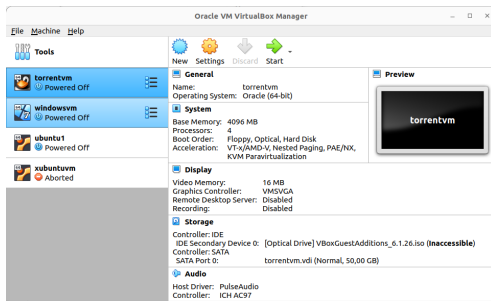
- Παράδοση 2 εργασιών
- Δεν έχουμε τελικές εξετάσεις!

Εργαλεία

- VirtualBox - θα το χρησιμοποιήσουμε για να στήσουμε μερικές ιδεατές μηχανές ώστε να μπορούμε να κάνουμε τα πειράματά μας, <https://www.virtualbox.org/>
- Atom - ένας Editor για να μπορούμε να γράφουμε τα script μας, <https://atom.io/>
- Αν θέλετε μπορείτε να χρησιμοποιήσετε και το PyCharm αλλά προσωπικά δεν μου αρέσει.

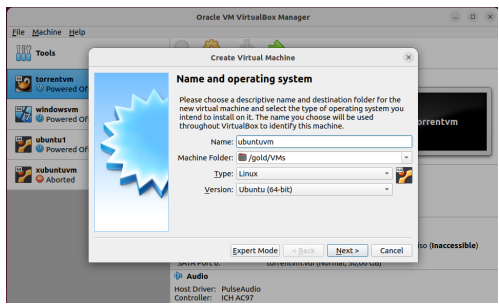
Try this at home! - Virtualbox

- Machine > New...



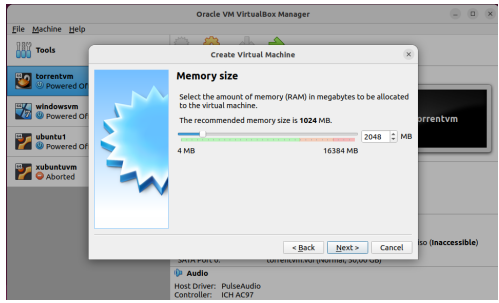
Try this at home! - Virtualbox

- Ονομάζουμε το νέο μας VM



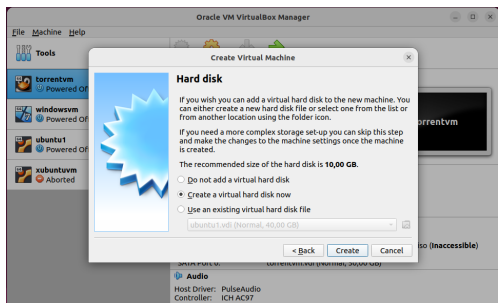
Try this at home! - Virtualbox

- Θέτουμε την μνήμη RAM ίση με 2GB



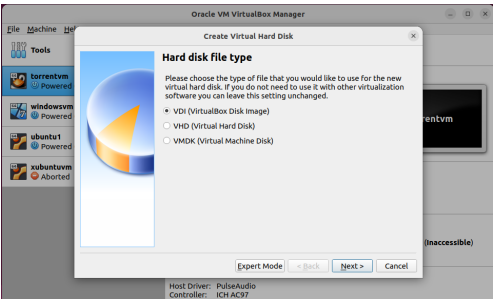
Try this at home! - Virtualbox

- Δημιουργούμε τον σκληρό δίσκο.



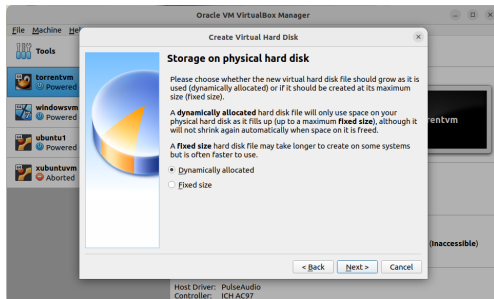
Try this at home! - Virtualbox

- Επιλέγουμε το είδος του δίσκου



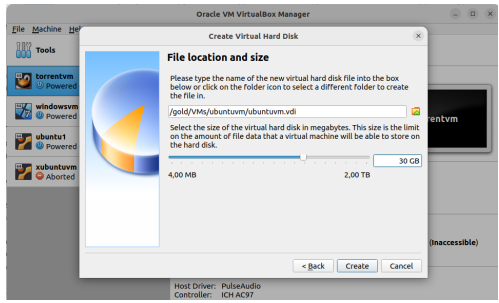
Try this at home! - Virtualbox

- Επιλέγουμε το είδος του δίσκου



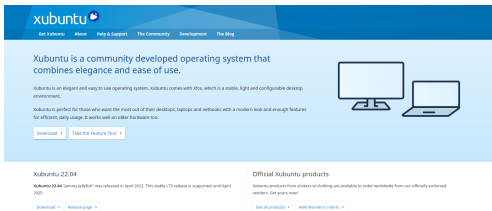
Try this at home! - Virtualbox

- Επιλέγουμε το μέγεθος του δίσκου



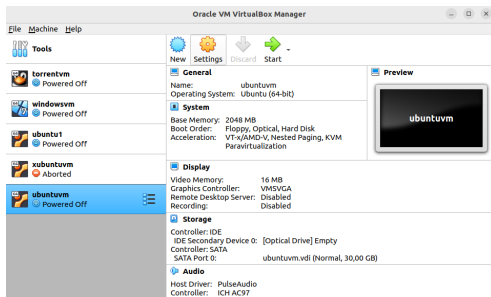
Try this at home! - Virtualbox

- Θα πρέπει τώρα να εγκαταστήσουμε κάποιο λειτουργικό σύστημα
- προτιμάμε κάποιο flavor του Ubuntu Linux, π.χ. το Xubuntu, <https://xubuntu.org/>



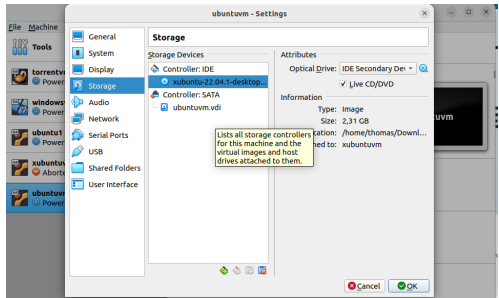
Try this at home! - Virtualbox

- Settings > Storage > Controller: IDE



Try this at home! - Virtualbox

- Επιλέγουμε το ISO file που έχουμε βρει
- Τσεκάρουμε το Live CD/DVD



Try this at home! - Virtualbox

- Πατάμε Start και το VM ξεκινάει
- Στην κονσόλα του VM, επιλέγουμε “Try or Install Xubuntu”



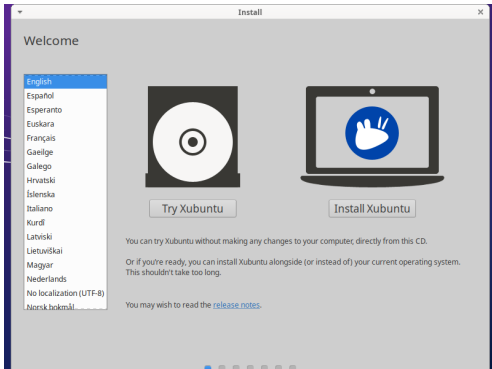
Try this at home! - Virtualbox

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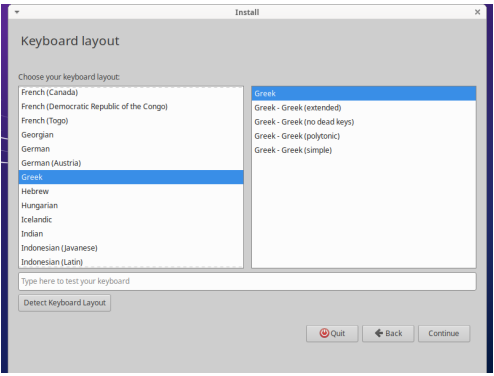
Try this at home! - Virtualbox

- το VM ξεκινάει και περιμένουμε λίγο να φορτώσει το πρόγραμμα εγκατάστασης.
- στην επόμενη οθόνη επιλέγουμε “Install Xubuntu”



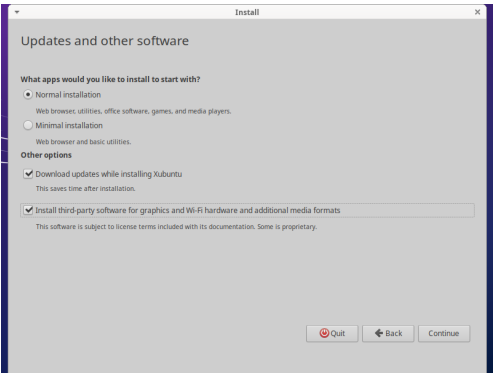
Try this at home! - Virtualbox

- Επιλέγουμε το keyboard Layout “Greek”



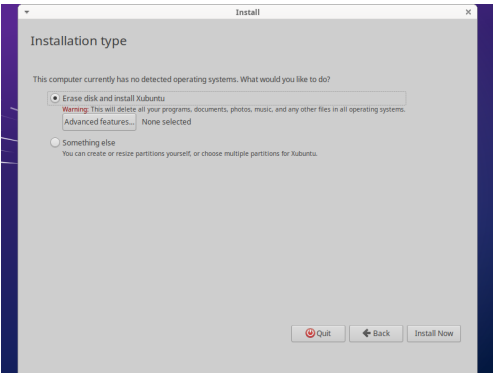
Try this at home! - Virtualbox

- Στην επόμενη οθόνη τσεκάρουμε την εγκατάσταση third-party software



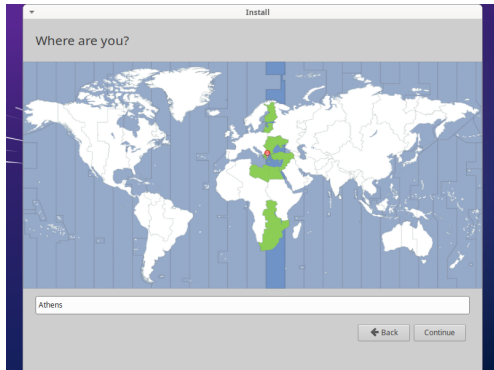
Try this at home! - Virtualbox

- Επιλέγουμε να σβήσει τον δίσκο του VM τελείως και να κάνει εγκατάσταση
- Πατάμε “Install Now” και επιβεβαιώνουμε τις αλλαγές στο δίσκο του VM.



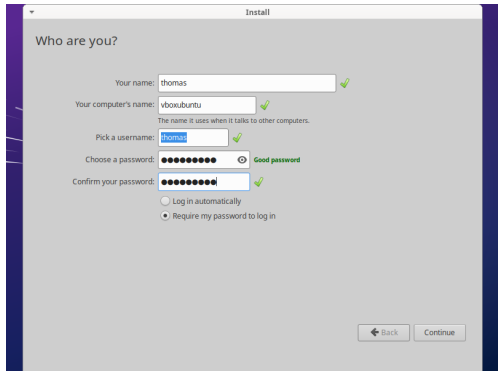
Try this at home! - Virtualbox

- Επιλέγουμε την τοποθεσία (λογικά θα την βρει μόνο του)



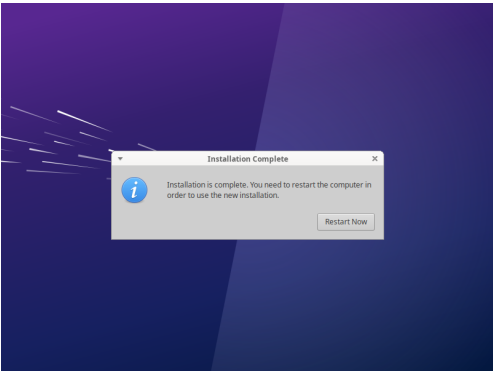
Try this at home! - Virtualbox

- Εισάγουμε τα στοιχεία του χρήστη του VM και η εγκατάσταση ξεκινάει...



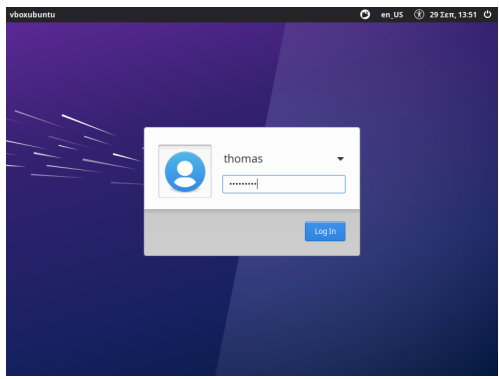
Try this at home! - Virtualbox

- Μετά κάνουμε restart! Καλύτερα να το κάνουμε από το Virtualbox, Machine > Reset



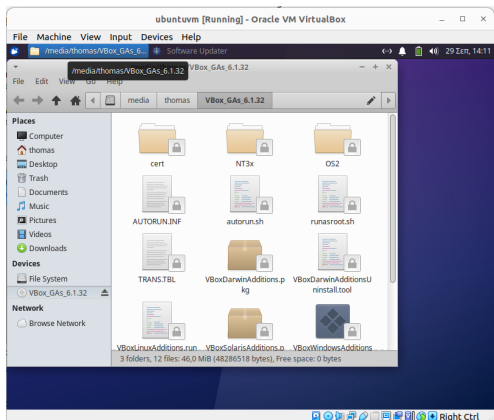
Try this at home! - Hello world!

- Αν όλα έχουν πάει καλά θα μας ζητήσει ένα password για να κάνουμε login.



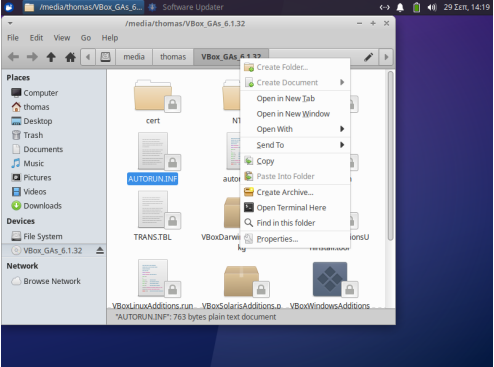
Try this at home! - Guest Additions

- Είναι καλό να χρησιμοποιήσουμε το Guest Additions CD, Devices > Insert Guest Additions CD Image



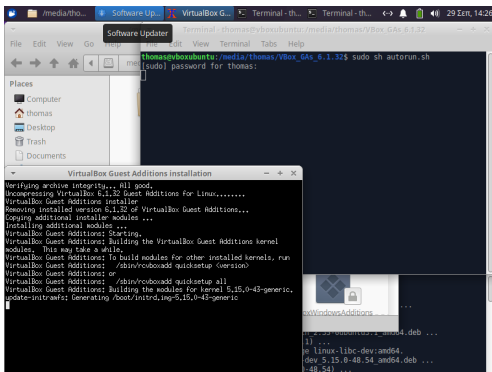
Try this at home! - Guest Additions

- Κάνουμε δεξί click πάνω στο πλαίσιο που λέει VBox... και επιλέγουμε Open terminal here.



Try this at home! - Guest Additions

- Στο terminal γράφουμε `sudo apt-get install -y dkms build-essential`
- Μετά: `sudo sh autorun.sh`



Try this at home! - Guest Additions

- Στο πρώτο sudo θα μας ζητήσει το password.
- Στη συνέχεια κάνουμε reboot το VM.
- Αν όλα έχουν πάει καλά θα πρέπει, αλλάζοντας το μέγεθος του παραθύρου να προσαρμόζεται ανάλογα η ανάλυση του VM.

Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 2η

Θωμάς Καμαλάκης

Χαροκόπαιο Πανεπιστήμιο Αθηνών

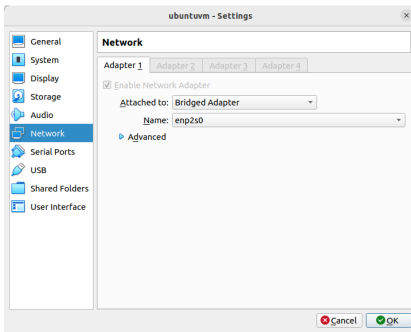
Οκτώβριος 2022

Πως συνδεόμαστε;

- Το θέμα της δικτύωσης στο Vbox θέλει κάποια προσοχή.
- Υπάρχουν διάφορες επιλογές για τις κάρτες δικτύου του VM
- NAT - Network Address Translation
- Bridge Networking
- Host-only Networking
- Internal Networking

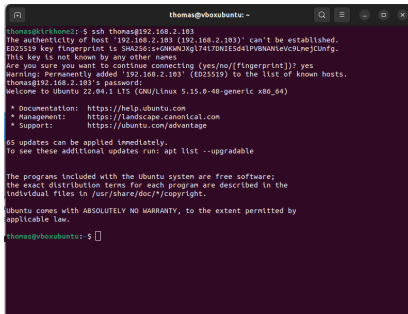
Πως συνδεόμαστε;

- Ιδανικά θα θέλαμε ο host και το VM να είναι στο ίδιο δίκτυο.
- Bridged Networking!
- Αλλά πολλές φορές αυτό δεν είναι εφικτό. Π.χ. δεν μας αφήνει να το κάνουμε κάποιο security policy.
- Καλό είναι να κάνουμε ένα restart το VM ή εναλλακτικά ένα
`sudo service networking restart.`



Πως συνδεόμαστε;

- Στη συνέχεια γράφουμε: `ssh thomas@192.168.2.103` ή οποια άλλη διεύθυνση είναι η IP.
- Αυτό ήταν! συνδεθήκαμε με SSH στον “server” μας



```
thomas@vboxubuntu: ~
thomas@192.168.2: $ ssh thomas@192.168.2.103
The authenticity of host '192.168.2.103 (192.168.2.103)' can't be established.
ED25519 key fingerprint is SHA256:s+GNKMJXqL74L7DNIESd4IPVBNANlevc9LneJCUnfg.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.2.103' (ED25519) to the list of known hosts.
thomas@192.168.2.103's password:
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-48-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

05 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

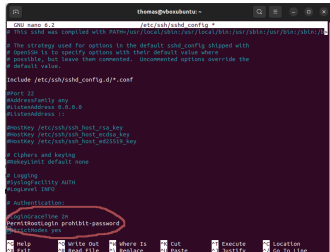
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

thomas@vboxubuntu: $
```

Παραμετροποίηση του SSH

- Υπάρχει ένα αρχείο, το `/etc/ssh/sshd_config` που περιέχει διάφορες ρυθμίσεις.
- Ανοίγουμε το αρχείο με έναν βασικό editor, π.χ. το nano.
- `sudo nano /etc/ssh/sshd_config` και αφαιρούμε το “#” στο `PermitRootLogin`
- Με τον τρόπο αυτό επιτρέπουμε στον χρήστη root να κάνει login με SSH.



```
thomas@vboxubuntu: ~
└─$ sudo nano /etc/ssh/sshd_config
GNU nano 2.8.2 /etc/ssh/sshd_config
# This sshd was compiled with PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
# The strategy used for options in the default sshd_config shipped with
# OpenSSH is to specify options with their default value where
# possible, but leave them commented. Uncommented options override the
# default value.
#include /etc/ssh/sshd_config.d/*conf

Host *
AddressFamily any
ListenAddress 0.0.0.0
ListenAddress ::

#HostKey /etc/ssh/ssh_host_rsa_key
#HostKey /etc/ssh/ssh_host_ecdsa_key
#HostKey /etc/ssh/ssh_host_ed25519_key

# Ciphers and keying
#IgnoreRhosts yes

# Logging
#LogLevel INFO

# Authentication:

#loginGraceTime 3m
#PermitRootLogin prohibit-password
#StrictHostKeyCheck yes

? help  ? write out  ? where is  ? Cut  ? Paste  ? Create  ? Location
? exit  ? read file  ? replace  ? Quit  ? buffer  ? Go To Line
```

Παραμετροποίηση του SSH

- Μπορούμε να κάνουμε ssh χωρίς password αλλά με κλειδιά.
- για τον σκοπό αυτό χρησιμοποιούμε το ssh-keygen στον *host*!
- Δουλεύει και στα Windows.

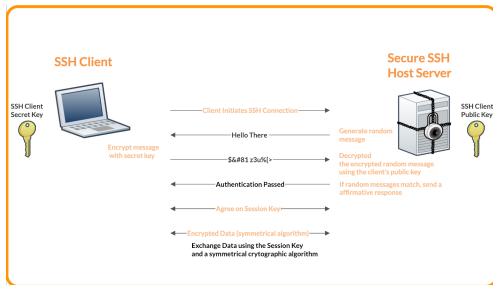
```
test@kirkhome2: ~
test@kirkhome2:~$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/home/test/.ssh/id_rsa):
Created directory '/home/test/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/test/.ssh/id_rsa
Your public key has been saved in /home/test/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:U42L4EL0ZUdw8vkY6qzfhrrhc+M7x2/6lVpPHkg958 test@kirkhome2
The key's randomart image is:
+----[RSA 3072]-----+
|
|      .  =o+       |
|     . o = +      |
|    . o = o       |
|   . . + + +      |
|  . . S . + o .   |
| . o..o + + .     |
|    oB  o E .     |
|   .+. =o B .     |
| .o=B+.+.o.       |
+----[SHA256]-----+
test@kirkhome2:~$
```

Παραμετροποίηση του SSH

- στον VM, γράφουμε `sudo su, cd ~, mkdir .ssh, nano authorized_keys.`
- εκεί κάνουμε copy paste το public key.
- στη συνέχεια `service ssh restart.`
- Θα πρέπει τώρα να κάνουμε login ως root χωρίς password από αυτό το μηχάνημα.

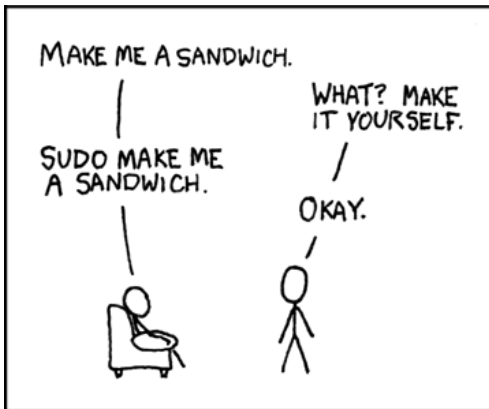
Public & Private Keys

- Τι κάναμε εδώ? Γεννήσαμε ένα *ιδιωτικό κλειδί* και το αντίστοιχο *δημόσιο κλειδί*.
- ο απομακρυσμένος server έχει το δημόσιο κλειδί. Με αυτό δοκιμάζει να δει αν ο client έχει το ιδιωτικό κλειδί (του βάζει ένα... αίνιγμα).

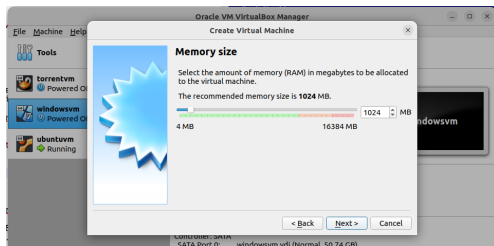


Ο χρήστης root

- Ο root χρήστης έχει God-like access.
- Μπορεί να διαχειρίζεται αρχεία, χρήστες, βάσεις κτλ υπάρχουν στο μηχάνημα
- “With great power comes great responsibility”.



Διαλέγουμε μνήμη



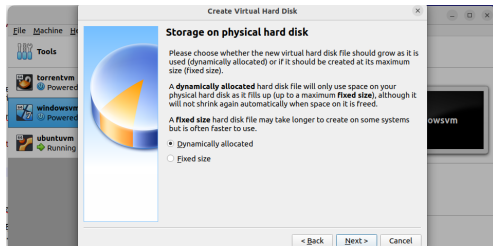
Διαλέγουμε δίσκο



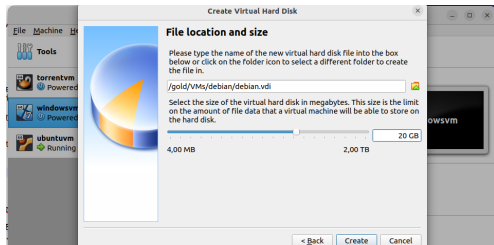
Διαλέγουμε δίσκο



Διαλέγουμε δίσκο



Διαλέγουμε δίσκο



Γλώσσα

```
[!] Select a language

Choose the language to be used for the installation process. The selected language will
also be the default language for the installed system.

Language:

      C              - No localization
Albanian           - Shqip
Arabic             - عربي
Asturian           - Asturianu
Basque             - Euskara
Belarusian         - Беларуская
Bosnian            - Босански
Bulgarian          - Български
Catalan            - Català
Chinese (Simplified) - 中文(简体)
Chinese (Traditional) - 中文(繁體)
Croatian           - Hrvatski
Czech              - Čeština
Danish             - Dansk
Dutch              - Nederlands
English            - English
Esperanto          - Esperanto
Estonian           - Eesti
Finnish            - Suomi
French             - Français
Galician           - Galego
Georgian           - ქართული
German             - Deutsch

<Go Back>
```

<Tab> moves: <Space> selects: <Enter> activates buttons

Περιοχή

```
[!] Select your location

The selected location will be used to set your time zone and also for example to help
select the system locale. Normally this should be the country where you live.

This is a shortlist of locations based on the language you selected. Choose "other" if
your location is not listed.

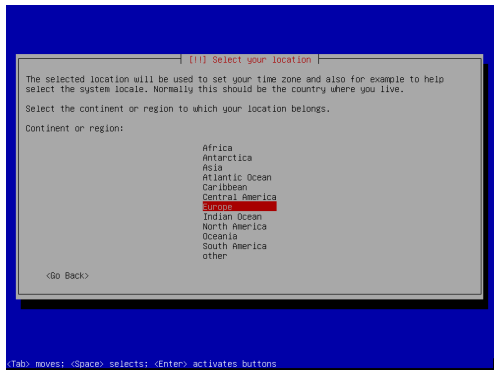
Country, territory or area:

    Antigua and Barbuda
    Australia
    Botswana
    Canada
    Hong Kong
    India
    Ireland
    Israel
    New Zealand
    Nigeria
    Philippines
    Seychelles
    Singapore
    South Africa
    United Kingdom
    United States
    Zambia
    Zimbabwe
    other

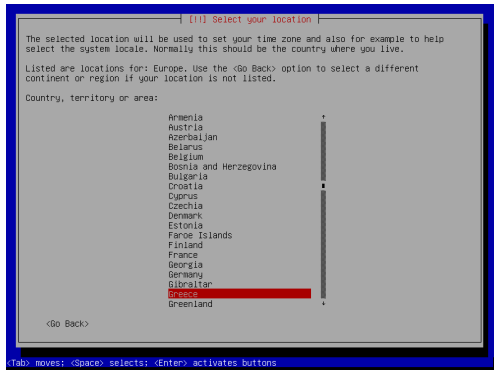
<Go Back>
```

<Tab> moves: <Space> selects: <Enter> activates buttons

Περιοχή



Περιοχή



Περιοχή

```
[!] Configure locales

There is no locale defined for the combination of language and country you have selected.
You can now select your preference from the locales available for the selected language.
The locale that will be used is listed in the second column.

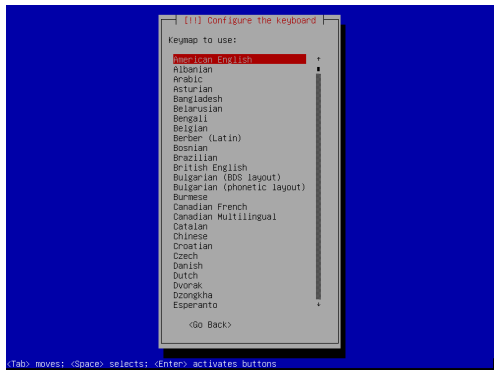
Country to base default locale settings on:

Antigua and Barbuda - en_AG
Australia            - en_AU.UTF-8
Botswana             - en_BW.UTF-8
Canada              - en_CA.UTF-8
Hong Kong           - en_HK.UTF-8
India               - en_IN
Ireland             - en_IE.UTF-8
Israel              - en_IL
New Zealand         - en_NZ.UTF-8
Nigeria            - en_NG
Philippines         - en_PH.UTF-8
Seychelles         - en_SC.UTF-8
Singapore          - en_SG.UTF-8
South Africa       - en_ZA.UTF-8
United Kingdom     - en_GB.UTF-8
United States      - en_US.UTF-8
Zambia             - en_ZM
Zimbabwe           - en_ZW.UTF-8

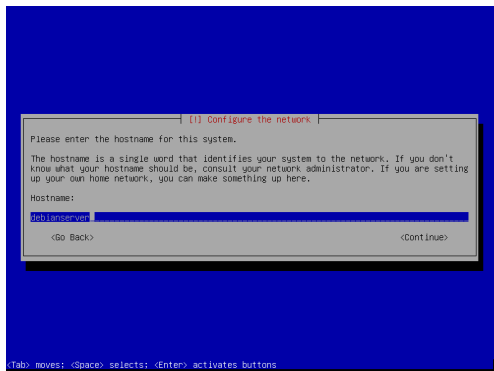
<Go Back>
```

Ⓜ️ for help: Ⓜ️ moves: Ⓜ️ selects: Ⓜ️ activates buttons

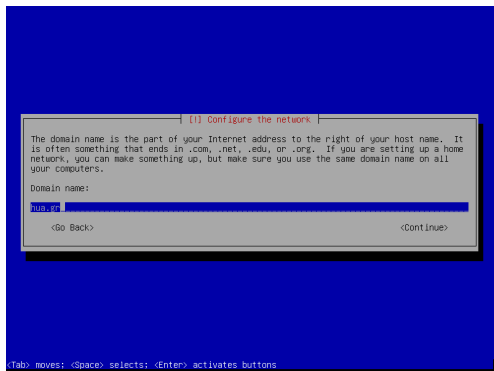
Πληκτρολόγιο



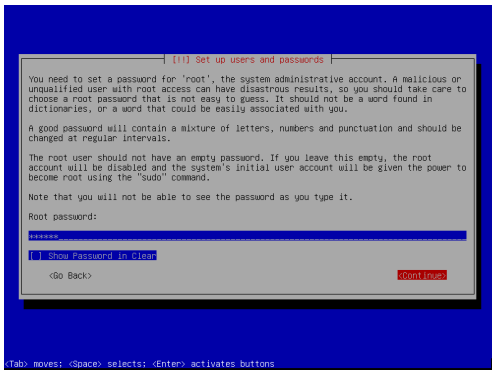
Όνομα του server



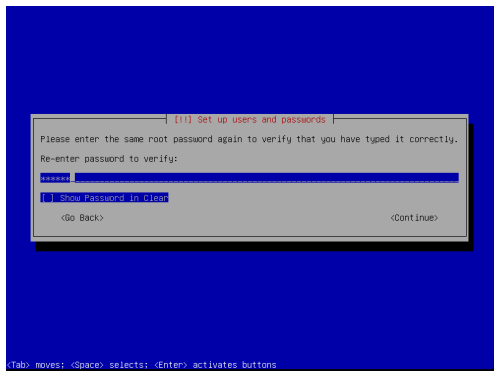
Domain



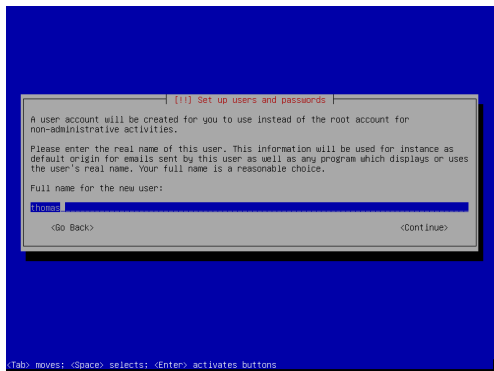
Root password



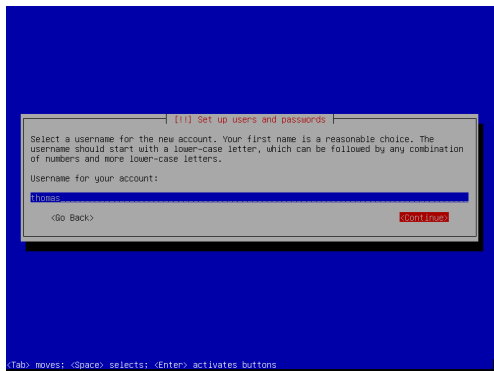
Root password



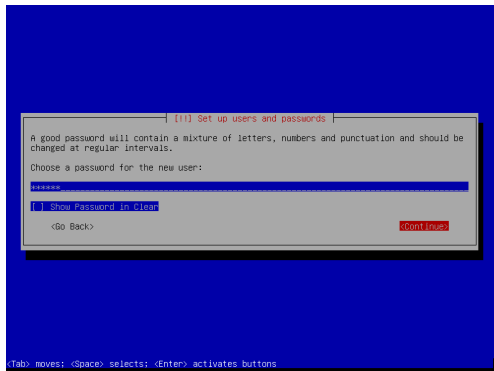
Χρήστης



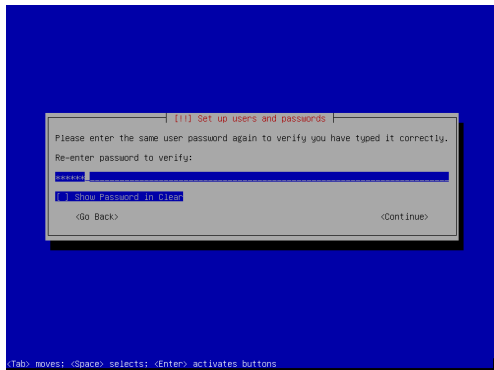
Χρήστης



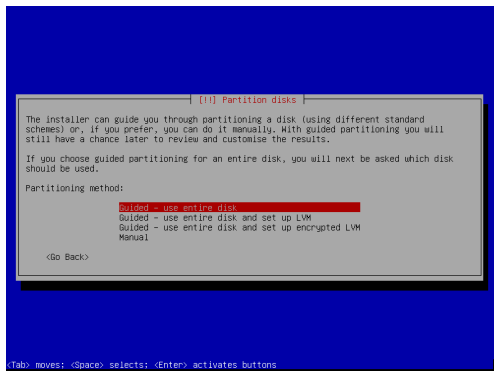
Password



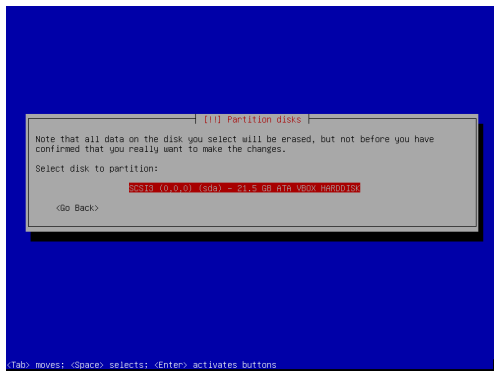
Password



Εγκατάσταση



Εγκατάσταση



Partition

```
[!] Partition disks

Selected for partitioning:

SCSI3 (0,0,0) (sda) - ATA VBOX HARDISK: 21.5 GB

The disk can be partitioned using one of several different schemes. If you are unsure,
choose the first one.

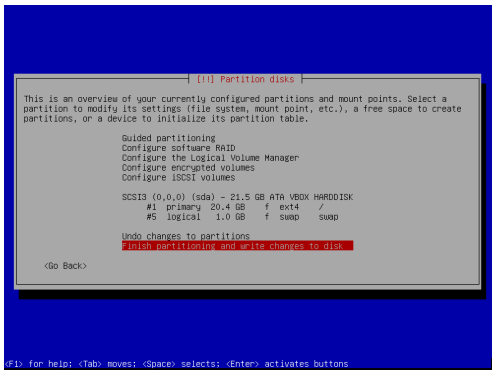
Partitioning scheme:

  All files in one partition (recommended for new users)
  Separate /home partition
  Separate /home, /var, and /tmp partitions

<Go Back>
```

<Tab> moves: <Space> selects: <Enter> activates buttons

Partition



Partition

```
[!!] Partition disks

If you continue, the changes listed below will be written to the disks. Otherwise, you
will be able to make further changes manually.

The partition tables of the following devices are changed:
SCSI3 (0,0,0) (sda)

The following partitions are going to be formatted:
partition #1 of SCSI3 (0,0,0) (sda) as ext4
partition #5 of SCSI3 (0,0,0) (sda) as swap

Write the changes to disks?

<Yes> <No>
```

<Tab> moves: <Space> selects: <Enter> activates buttons

Μέσα εγκατάστασης

```
[!] Configure the package manager

Scanning your installation media finds the label:
Debian GNU/Linux 11.5.0 _Bullseye_ - Official amd64 NETINST 20220910-10:38

You now have the option of scanning additional media for use by the package manager
(apt). Normally these should be from the same set as the one you booted from. If you do
not have any additional media, this step can just be skipped.

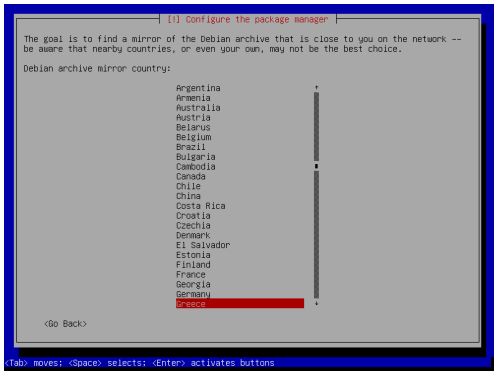
If you wish to scan more media, please insert another one now.

Scan extra installation media?

<Go Back>                                     <Yes> NO

<Tab> moves: <Space> selects: <Enter> activates buttons
```

Μέσα εγκατάστασης



Repo

```
[!] Configure the package manager

Please select a Debian archive mirror. You should use a mirror in your country or region
if you do not know which mirror has the best Internet connection to you.

Usually, deb.debian.org is a good choice.

Debian archive mirror:

ftp.gr.debian.org
debian.noc.ntua.gr
deb.debian.org
debian-archive.trafficmanager.net
debian.otenet.gr

<Go Back>
```

<Tab> moves: <Space> selects: <Enter> activates buttons

Popularity Contest(?)

```
[!] Configuring popularity-contest

The system may anonymously supply the distribution developers with statistics about the
most used packages on this system. This information influences decisions such as which
packages should go on the first distribution CD.

If you choose to participate, the automatic submission script will run once every week,
sending statistics to the distribution developers. The collected statistics can be viewed
on https://popcon.debian.org/.

This choice can be later modified by running "dpkg-reconfigure popularity-contest".

Participate in the package usage survey?

<Go Back>                                     <Yes> Yes
```

<Tab> moves: <Space> selects: <Enter> activates buttons

Λογισμικό

```
[!] Configuring popularity-contest

The system may anonymously supply the distribution developers with statistics about the
most used packages on this system. This information influences decisions such as which
packages should go on the first distribution CD.

If you choose to participate, the automatic submission script will run once every week,
sending statistics to the distribution developers. The collected statistics can be viewed
on https://popcon.debian.org/.

This choice can be later modified by running "dpkg-reconfigure popularity-contest".

Participate in the package usage survey?

  <Go Back>                               <Yes>  No
```

<Tab> moves: <Space> selects: <Enter> activates buttons

GRUB

```
[!] Configuring popularity-contest

The system may anonymously supply the distribution developers with statistics about the
most used packages on this system. This information influences decisions such as which
packages should go on the first distribution CD.

If you choose to participate, the automatic submission script will run once every week,
sending statistics to the distribution developers. The collected statistics can be viewed
on https://popcon.debian.org/.

This choice can be later modified by running "dpkg-reconfigure popularity-contest".

Participate in the package usage survey?

<Go Back>                               <Yes>  <No>
```

<Tab> moves: <Space> selects: <Enter> activates buttons

GRUB

```

(1) Software selection

At the moment, only the core of the system is installed. To tune the system to your
needs, you can choose to install one or more of the following predefined collections of
software.

Choose software to install:

[ ] Debian desktop environment
[ ] ... GNOME
[ ] ... Xfce
[ ] ... GNOME Flashback
[ ] ... KDE Plasma
[ ] ... Cinnamon
[ ] ... MATE
[ ] ... LXDE
[ ] ... LXQt
[ ] web server
[x] SSH server
[x] standard system utilities

<Continue>

<Tab> moves: <Space> selects: <Enter> activates buttons
  
```


Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 3η

Θωμάς Καμαλάκης

Χαροκόπειο Πανεπιστήμιο Αθηνών

Οκτώβριος 2022

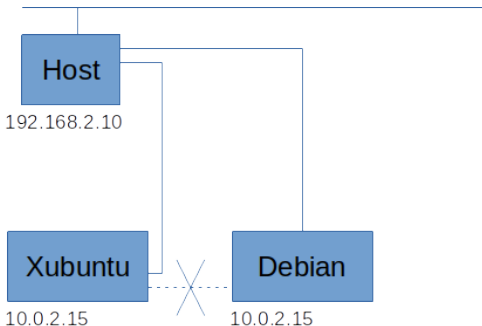
Περιεχόμενα

- 1 Networking
- 2 Το πρώτο μας script
- 3 Η γλώσσα Python
- 4 Python strings

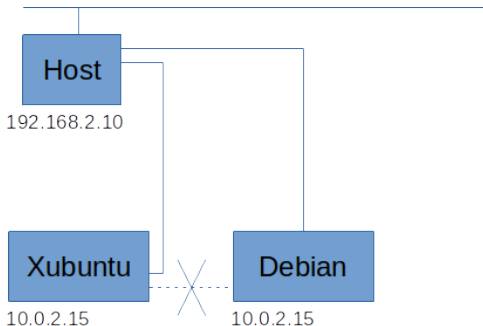
Networking

- Μέχρι τώρα έχουμε φτιάξει δύο ιδεατές μηχανές
- Μία που είναι ο client (xubuntu)
- Η άλλη είναι ο server (debian)
- Πως αυτά βλέπουν το ένα το άλλο;

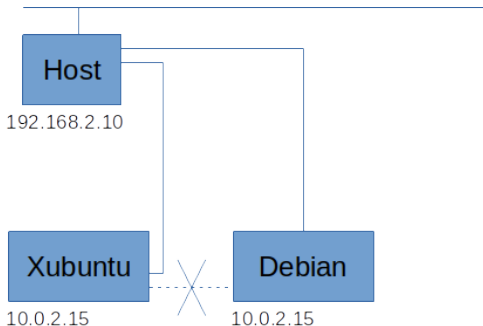
NAT Networking



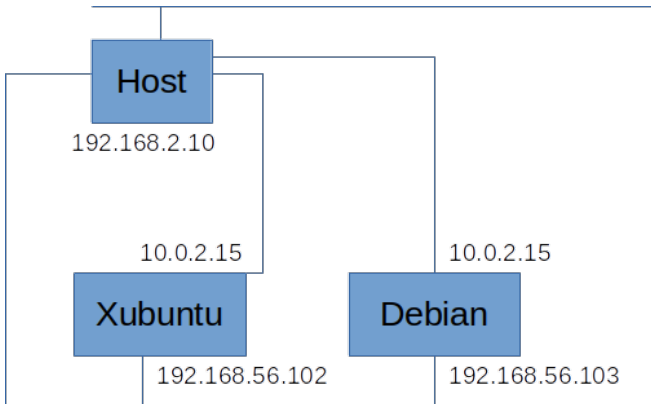
NAT Networking



NAT Networking



NAT Networking + Host-only Network

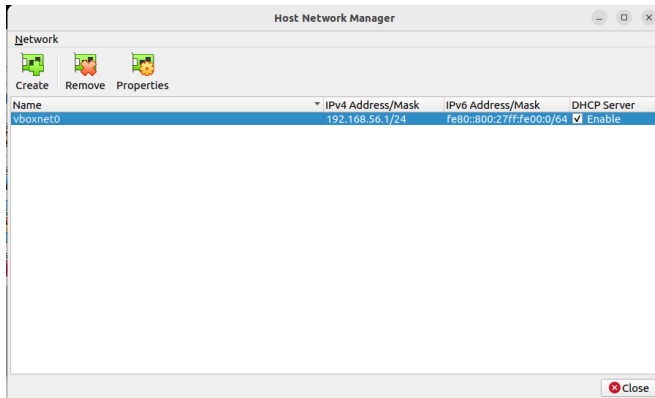


NAT Networking + Host-only Network

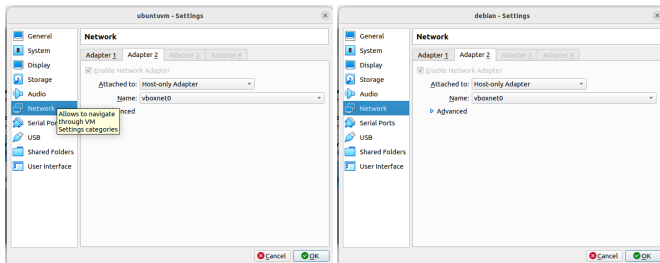
Με αυτή την αρχιτεκτονική τα δύο μηχανήματα:

- έχουν internet
- επικοινωνούν μεταξύ τους
- τα βλέπει και ο host

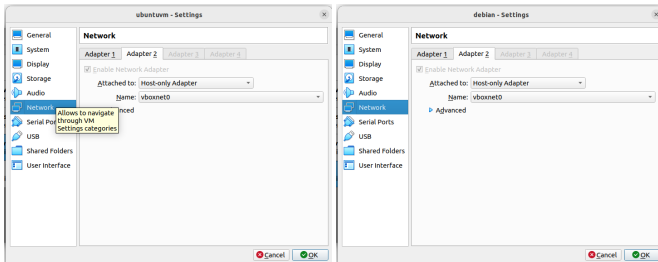
NAT Networking + Host-only Network



NAT Networking + Host-only Network



NAT Networking + Host-only Network



NAT Networking + Host-only Network

```

@Minnoo 5.4 /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
allow-hotplug eno53
iface eno53 inet dhcp

# vj@tualbox host-only network
allow-hotplug eno58
iface eno58 inet dhcp

```

```

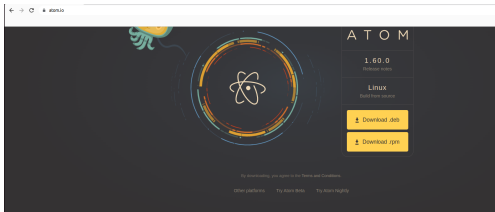
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Oct 7 18:31:31 EEST 2022 on tty1
root@debianserver:~# ls -l
-rw-r--r-- 1 root root 1024 Oct 7 18:31 /etc/network/interfaces
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eno53: <BRIDGE,CAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:15:74:18 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic eno53
        valid_lft 86394sec preferred_lft 86394sec
    inet6 fe80::a00:c7ff:fe7f:146a/64 scope link
        valid_lft forever preferred_lft forever
3: eno58: <BRIDGE,CAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:18:d5:2e brd ff:ff:ff:ff:ff:ff
    inet 192.168.56.101/24 brd 192.168.56.255 scope global dynamic eno58
        valid_lft 594sec preferred_lft 594sec
    inet6 fe80::a00:c7ff:fe7f:1e78:052e/64 scope link
        valid_lft forever preferred_lft forever
root@debianserver:~# ping 192.168.56.102
PING 192.168.56.102 (192.168.56.102) 56(84) bytes of data.
64 bytes from 192.168.56.102: icmp_seq=1 ttl=64 time=1.34 ms
64 bytes from 192.168.56.102: icmp_seq=2 ttl=64 time=0.760 ms
^C
--- 192.168.56.102 ping statistics ---
6 packets transmitted, 2 received, 68 packet loss, time 1002ms
rtt min/avg/max/udev = 0.738/1.040/1.343/0.302 ms
root@debianserver:~#

```

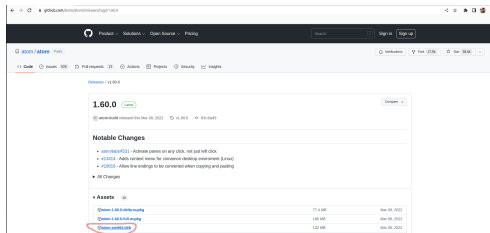
Εγκατάσταση του Atom

- Ένας καλός Editor πάντα χρειάζεται
- Μπορούμε να βάλουμε τον Atom, <https://atom.io>



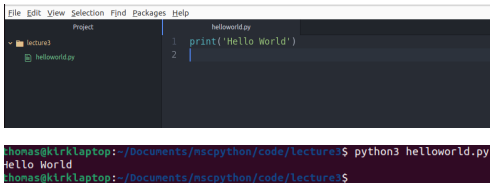
Εγκατάσταση του Atom

- Κατεβάζουμε το .deb αρχείο στο Xubuntu και γράφουμε σε ένα terminal `!stinline|sudo dpkg -i atom-amd64.deb|`.



Hello world!

- Φτιάχνουμε ένα αρχείο `helloworld.py` στον Atom που περιέχει μόνο μία εντολή
- `print('Hello world!')`
- το τρέχουμε με `python3 helloworld.py` στο terminal



The image shows a screenshot of the Atom text editor. The editor window displays a file named `helloworld.py` with the following code:

```
1 print('Hello World')  
2
```

Below the editor, a terminal window shows the command `python3 helloworld.py` being executed, resulting in the output `Hello World`.

Hello world - C

```
#include <stdio.h>

int main() {
    printf("Hello World");
    return 0;
}
```

Hello world - C++

```
#include <iostream>

int main() {
    std::cout << "Hello World";
    return 0;
}
```

Hello world - C#

```
namespace HelloWorld
{
    class Hello {
        static void Main(string[] args)
        {
            System.Console.WriteLine("Hello World");
        }
    }
}
```

Hello world - COBOL

```
IDENTIFICATION DIVISION.  
PROGRAM-ID. Hello-world.  
PROCEDURE DIVISION.  
    DISPLAY "Hello World".
```

Hello world - Java

```
/*package whatever //do not write package name here */  
  
import java.io.*;  
  
class GFG {  
    public static void main (String[] args) {  
        System.out.println("Hello World");  
    }  
}
```

Hello world - Javascript

```
console.log("Hello World");
```


Ιστορία

- Ξεκινάει το 1989 από τον Guido van Rossum
- Θεωρείται Benevolent dictator for life
- Πήρε το όνομα της από τους Monty Python
- Η έκδοση 2.0 ξεκίνησε το 2000
- Το 2008 βγήκε η έκδοση 3.0
- Προσοχή! Ποτέ δεν γράφουμε Python 2!

Zen of Python

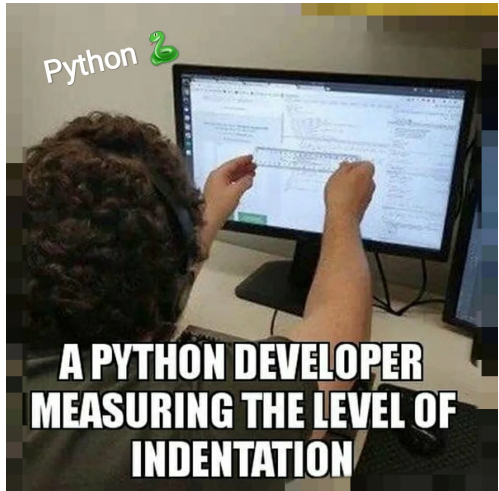
- Errors should never pass silently.
- Unless explicitly silenced.
- In the face of ambiguity, refuse the temptation to guess.
- There should be one– and preferably only one –obvious way to do it.
- Although that way may not be obvious at first unless you're Dutch.
- Now is better than never.
- Although never is often better than **right** now.
- If the implementation is hard to explain, it's a bad idea.
- If the implementation is easy to explain, it may be a good idea.
- Namespaces are one honking great idea – let's do more of those!

Εφαρμογές



Στοιχίση

“Readability counts”



Στοίχιση

```
1 x = 0
2 if x == 0:
3     print('x is zero')
4
```

```
thomas@kirklaptop:~/Documents/nscpython/code/lecture3$ python3 indentation.py
x is zero
```

Στοίχιση

```
1 x = 0
2 if x == 0:
3     print('x is zero')
4
```

```
thomas@klrklaptop:~/Documents/mscpython/code/lecture3$ python3 indentation.py
File "/home/thomas/Documents/mscpython/code/lecture3/indentation.py", line 3
    print('x is zero')
    ^
IndentationError: expected an indented block after 'if' statement on line 2
```


Σχόλια

“Readability counts”

```
1 # Set variable to zero
2 x = 0
3
4 # Check whether variable is zeros
5 if x == 0:
6     print('x is zero')
```

Σχόλια

“Readability counts”

```
1
2 x = 0 # Set variable to zero
3
4
5 if x == 0: # Check whether variable is zeros
6     print('x is zero')
```

Σχόλια

“Readability counts”

```
1 """
2 An example to demonstrate line and block comments
3
4 Created by Thomas Kamalakis
5 """
6
7 x = 0 # Set variable to zero
8
9 if x == 0: # Check whether variable is zeros
10     print('x is zero')
```

Μεταβλητές

- Μία μεταβλητή είναι κάτι που μπορεί να αλλάξει μέσα στο πρόγραμμα.
- Στην Python υπάρχουν διάφορα είδη μεταβλητών
- ακέραια μεταβλητή (int)
- μεταβλητή πραγματικού αριθμού (float)
- αλφαριθμητική μεταβλητή (string)
- μπορούμε να χρησιμοποιήσουμε και πιο πολύπλοκους τύπους μεταβλητών

Μεταβλητές

```
1 x = 1           # Integer
2 s = 'Thomas'   # String
3 S = "Thomas"   # String
4 y = 1.2        # Float
5
6 # Check out variable types
7 print( 'x is: ', type(x) )
8 print( 's is: ', type(s) )
9 print( 'S is: ', type(S) )
10 print( 'y is: ', type(y) )
```

```
thomas@kirklaptop:~/Documents/mscpython/code/lecture3$ python3 variables.py
x is: <class 'int'>
s is: <class 'str'>
S is: <class 'str'>
y is: <class 'float'>
```

Μεταβλητές

```
1 """
2 Simultaneous assignments
3 """
4 x, y, z = 0, "Thomas", 1.2
5
6 print(x)
7 print(y)
8 print(z)
```

```
thomas@kirklaptop:~/Documents/nscpython/code/lecture3$ python3 variables2.py
0
Thomas
1.2
```

Μεταβλητές - Casting

- Μπορούμε να αλλάξουμε τον τύπο μίας μεταβλητής, π.χ. από string σε ακέραιο.

```
1 """
2 Casting of variables
3 """
4 x = 2
5 s = str(x)
6 print ( type(s) )
7 print (s)
8
9 S = "4"
10 y = int(S)
11 print ( type(y) )
12 print (y)
```

```
thomas@kirkoffice:~/Documents/mscpython/code/lecture3$ python3 casting.py
<class 'str'>
2
<class 'int'>
4
```

Strings - Ανάθεση

```
1 """  
2 Strings  
3 """  
4 s = "Thomas"  
5 print(s)  
6  
7 S = ""  
8 Thomas  
9 Kamalakis  
10 ""  
11 print(S)
```

```
Thomas  
  
Thomas  
Kamalakis
```


Τμήματα από strings

- Μπορούμε να πάρουμε τμήματα από ένα string
- `s[i]`, ο `i+1` χαρακτήρας.
- `s[i:j]`, το string μεταξύ του `(i+1)` και του `j` χαρακτήρα.
- `s[i:]`, το string μεταξύ του `(i+1)` και του τελευταίου χαρακτήρα.
- `s[:j]`, το string μεταξύ του πρώτου και του `j` χαρακτήρα.

```
1 """
2 Slicing Strings
3 """
4 s = "Thomas Kamalakis"
5 print(s)
6
7 print(s[1])
8 print(s[1:5])
9 print(s[:5])
10 print(s[5:])
```

```
thomas@kirkoffice:~/Documents/mscpython/code/lecture3$ python3 slicingstrings.py
Thomas Kamalakis
h
homa
Thoma
s Kamalakis
```

String loops

- Μπορούμε να αναθέσουμε σε μία μεταβλητή τους διαδοχικούς χαρακτήρες ενός string.

```
1 """
2 String Loops
3 """
4
5 S = "Thomas Kamalakis"
6 for x in S:
7     print(x)
```

```
thomas@kirkoffice:~/Documents/mscpython/code/lecture3$ python3 stringloop.py
T
h
o
m
a
s
K
a
m
a
l
a
k
i
s
```

String in String

- μπορούμε να ελέγξουμε αν ένα string περιέχεται σε ένα άλλο string

```
1 """
2 String in String
3 """
4
5 S = "Thomas Kamalakis"
6 s = "Thomas"
7 if s in S:
8     print(s, 'is contained in', S)
9 else:
10    print(s, 'is not contained in', S)
11
12 s2 = "Tom"
13 if s2 in S:
14    print(s2, 'is contained in', S)
15 else:
16    print(s2, 'is not contained in', S)
```

```
thomas@kirkoffice:~/Documents/mscpython/code/lecture3$ python3 stringin.py
Thomas is contained in Thomas Kamalakis
Tom is not contained in Thomas Kamalakis
```

Μήκος string

- Η συνάρτηση `length` επιστρέφει τον αριθμό χαρακτήρων του string

```
1 """
2 Length of String
3 """
4
5 S = "Thomas Kamalakis"
6 l = len(S)
7 print(S, 'has ', l, 'characters')
```

```
thomas@kirkoffice:~/Documents/mscpython/code/lecture3$ python3 stringlen.py
Thomas Kamalakis has 16 characters
```

Μετασχηματισμοί String

```
1 """
2 Transform a String
3 """
4
5 S = "Thomas, Kamalakis"
6 print( S.upper() )
7 print( S.lower() )
8 print( S.strip() )
9 print( S.replace("Thomas", "Tom") )
10 print( S.split(",") )
11
12 S2 = "Thomas " + "Kamalakis"
13 print(S2)
```

```
y
THOMAS, KAMALAKIS
thomas, kamalakis
Thomas, Kamalakis
Tom, Kamalakis
['Thomas', ' Kamalakis']
Thomas Kamalakis
```

Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 4η

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Χαροκόπειο Πανεπιστήμιο Αθηνών

Οκτώβριος 2022

Περιεχόμενα

- 1 Python - Συνθήκες
- 2 Επανάληψη For
- 3 Επαναλήψεις while

Τελεστές

- Για κάθε είδος μεταβλητής μπορούμε να ελέγξουμε αν ισχύει μία συνθήκη ή όχι.
- Για το σκοπό αυτό χρησιμοποιούμε τους λογικούς τελεστές που έχουν διαφορετική ερμηνεία ανάλογα με τον τύπο της μεταβλητής.
- Για παράδειγμα αν τα a και b είναι ακέραιοι τότε το $a > b$ ισχύει εάν και μόνο εάν το a είναι μεγαλύτερο ως αριθμός από το b .
- Εάν τα a και b είναι `string`, τότε $a > b$ ισχύει εάν και μόνο εάν το a έπεται αλφαβητικά του b .

```
1 """
2 Example of boolean operators
3 """
4 a = 1
5 b = 2
6 print('Is a larger than b:', a > b)
7 print('Is a smaller than b:', a < b)
8
9 a = 'Alice'
10 b = 'Bob'
11
12 print('Is a larger than b:', a > b)
13 print('Is a smaller than b:', a < b)
```

```
thomas@kirkhome2:~/Documents/mscpython/code/lecture4$ python3 -i booleanops.py
Is a larger than b: False
Is a smaller than b: True
Is a larger than b: False
Is a smaller than b: True
```


Τελεστές

- Η ισότητα στην Python είναι ο τελεστής ==
- Ο τελεστής != είναι η ανισότητα, δηλαδή το $a \neq b$ είναι αληθές όταν το a δεν είναι ίσο με το b

```
1 """
2 Example of boolean operators
3 """
4 a = 1
5 b = 1
6
7 print('Is a equal to b:', a == b)
8 print('Is a not equal to than b:', a != b)
9
10 a = 'Alice'
11 b = 'Bob'
12
13 print('Is a equal to b:', a == b)
14 print('Is a not equal to than b:', a != b)
```

```
thomas@kirkhome2:~/Documents/mscpython/code/lecture4$ python3 -i booleanops2.py
Is a equal to b: True
Is a not equal to than b: False
Is a equal to b: False
Is a not equal to than b: True
```

Έλεγχος συνθηκών

- Μπορούμε να ελέγχουμε εάν μία συνθήκη ισχύει ή όχι χρησιμοποιώντας το `if...else`

```
1 if condition :  
2     """  
3     Actions to do when condition is true  
4     """  
5 else:  
6     """  
7     Actions to do when condition is false  
8     """
```

Έλεγχος Συνθηκών

```
1 """
2 Example if...else
3 """
4 a = 1
5 b = 2
6 if a > b:
7     print('a is larger than b')
8 else:
9     print('a is not larger than b')
10
11 a = "Thomas"
12 b = "hom"
13
14 if b in a:
15     print('b is contained in a')
16 else:
17     print('b is not contained in a')
```

```
thomas@klrhome2:~/Documents/nscpython/code/lectures$ python3 ifelseexample.py
a is not larger than b
b is contained in a
```

Έλεγχος Συνθηκών

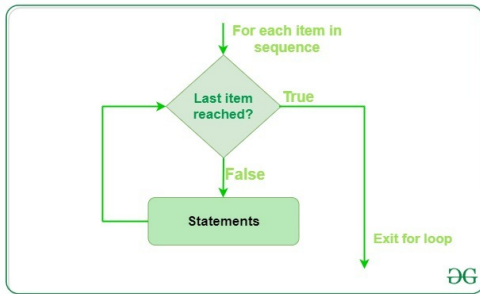
```
1 """
2 Example if...elif...else
3 """
4 a = 1
5 b = 1
6 if a > b:
7     print('a is larger than b')
8 elif a == b:
9     print('a is equal to b')
10 else:
11     print('a is smaller than b')
```

```
thomas@kirkhomet:~/Documents/nscpython/code/lecture4$ python3 ifelifelseex.py
a is equal to b
```

For loop

- Είδαμε ήδη ένα παράδειγμα με for σε προηγούμενη διάλεξη.
- Χρησιμοποιούμε την for για να κάνουμε κάτι για κάθε αντικείμενο σε μία συλλογή αντικειμένων

```
1 """  
2 For loop  
3 """  
4 for element in collection:  
5     """  
6     Actions for element  
7     """
```



For loop

```
1 """
2 For example
3 """
4 S = ""           #Empty string
5 for x in range(0, 10):
6     S = S + str(x)
7     print(S)
```

```
thomas@kirkhome2:~/Documents/mscpython/code/lecture4$ python3 forex1.py
0
01
012
0123
01234
012345
0123456
01234567
012345678
0123456789
```

For loop

```
1 """
2 For example
3 """
4 names = ['Alice', 'Bob', 'Eve']
5 for x in names:
6     print(x)
```

```
thomas@kirhome2:~/Documents/nscpython/code/lecture4$ python3 forex2.py
Alice
Bob
Eve
```

Παράδειγμα for + if

```
1 """
2 For and if example
3 """
4 names = ['Alice', 'Bob', 'Eve']
5 for x in names:
6     print(x)
7     if x == 'Bob':
8         print('Found Bob!')
```

```
Alice
Bob
Found Bob!
Eve
```


Παράδειγμα for + if

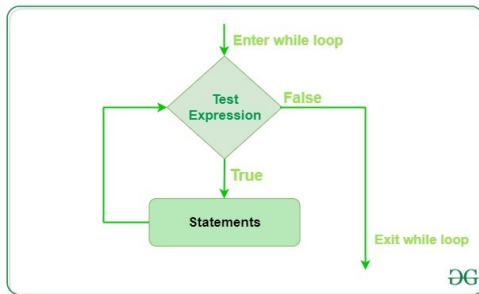
```
1 """
2 For and if example
3 """
4 names = ['Alice', 'Bob', 'Eve']
5 for x in names:
6     print(x)
7     sf = x.upper()
8     sr = x[::-1].upper()
9     if sf == sr:
10        print(x, 'is palindrome!')
11    else:
12        print(x, 'is not palindrome')
```

```
Alice
Alice is not palindrome
Bob
Bob is palindrome!
Eve
Eve is palindrome!
```

Επανάληψη while

- Η επανάληψη while επαναλαμβάνεται όσο να ικανοποιείται μία συνθήκη.

```
1 """  
2 While loop  
3 """  
4 while condition:  
5     """  
6     Do staff that needs to be done if condition holds  
7     """
```



Επανάληψη while

```
1 """
2 While loop example
3 """
4 x = 1
5
6 while x < 10:
7     print(x)
8     x = x + 1
9
10 print('Exiting the while loop x is equal to ',x)
```

```
thomas@ktrkhome2:~/Documents/mscpython/code/lecture:$ python3 whileex1.py
1
2
3
4
5
6
7
8
9
Exiting the while loop x is equal to 10
```

Επανάληψη while

```
1 """
2 While loop example
3 """
4 S = 0
5 a = input('Give me a number: ')
6 while a != "STOP":
7     S = S + float(a)
8     print('Sum is:', S)
9     a = input('Give me a number: ')
```

```
thomas@kirkhome2: ~/Documents/mscopython/code/lecture4 $ python3 whileex2.py
Give me a number: 10
Sum is: 10.0
Give me a number: 12
Sum is: 22.0
Give me a number: 14
Sum is: 36.0
Give me a number: 44
Sum is: 80.0
Give me a number: STOP
```

Επανάληψη while

```
1 """
2 While loop example
3 """
4 S = 0
5 a = input('Give me a number: ')
6 while a != "STOP":
7
8     is_number = True
9     for ch in a:
10         if ch not in ['0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '.']:
11             is_number = False
12
13     if is_number:
14         S = S + float(a)
15         print('Sum is:', S)
16     else:
17         print('You have not given me a number!')
18     a = input('Give me a number: ')
```

```
thomas@klrkhome2: ~/Documents/nscpython/code/lecture4 $ python3 whileex3.py
Give me a number: 10
Sum is: 10.0
Give me a number: dsaf
You have not given my a number!
Give me a number: 20
Sum is: 30.0
```

Συνθήκες με or και and

- Μπορούμε να φτιάξουμε πολύπλοκες συνθήκες συνδυάζοντας απλούστερες με τους τελεστές and και or.
- Για να είναι το A and B αληθές πρέπει και το A και το B να είναι αληθή.
- Για να είναι το A or B αληθές πρέπει το A ή το B να είναι αληθή (ή και τα δύο).

```
1 """
2 and or example
3 """
4 a = 10
5 if a <= 10 and a >= 0 :
6     print('a is between 0 and 10')
7
8 if a >= 5 or a <= 0:
9     print('a is larger than 5 or smaller than 0')
```

```
thomas@kirkhome2:~/documents/mscpython/code/lecture4$ python3 ifandor.py
a is between 0 and 10
a is larger than 5 or smaller than 0
```

Pass

- Μερικές φορές βολεύει να μην κάνουμε τίποτα αν ισχύει μία συνθήκη και να κάνουμε κάτι αν δεν ισχύει.
- τότε χρησιμοποιούμε το pass

```
1 """
2 pass example
3 """
4 a = 20
5 if a <= 10 and a >= 0 :
6     pass
7 else:
8     print('a is not between 0 and 10')
9
10 b = 5
11 if b <= 10 and b >= 0 :
12     pass
13 else:
14     print('b is not between 0 and 10')
```

```
thomas@kirkhome2:~/Documents/mscpython/code/lecture4$ python3 ifpass.py
a is not between 0 and 10
```

break

- Άλλες φορές βολεύει σταματήσουμε μία επανάληψη *αμέσως*, αν ισχύει μία συνθήκη
- τότε χρησιμοποιούμε το `break`

```
1 """
2 break example
3 """
4 S = 0
5 a = input('Please give a number: ')
6 while a != 'STOP':
7     num = float(a)
8     print(num)
9     if num < 0:
10        break
11    S = S + num
12    print('Sum is: ', S)
13    a = input('Please give a number: ')
```

```
thomas@kirkhone2:~/Documents/mscpython/code/lecture4$ python3 break.py
Please give a number: 10
10.0
Sum is: 10.0
Please give a number: 20
20.0
Sum is: 30.0
Please give a number: 30
30.0
Sum is: 60.0
Please give a number: 40
40.0
Sum is: 100.0
Please give a number: -10
-10.0
```


Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 5η

Θωμάς Καμαλάκης

Χαροκόπειο Πανεπιστήμιο Αθηνών

Οκτώβριος 2022

Περιεχόμενα

- 1 Python - Λίστες
- 2 Python - Λεξικά
- 3 Python functions

Λίστες

- Οι λίστες χρησιμοποιούνται για να αποθηκεύουν πολλαπλά αντικείμενα σε μία μεταβλητή.

```
1 # List objects
2
3 l = [obj1, obj2, ..., obj3]
```

- Οι λίστες έχουν *διάταξη*, μεταβάλλονται και τα στοιχεία τους δεν χρειάζεται να είναι μοναδικά.

```
1 # List examples
2 l = ["1", 1, 4.0]
3 print(l)
4
5 # Order
6 print(l[0], l[1], l[2])
7
8 # Changeable
9 l[1] = 2
10 print(l)
11
12 # Duplicate
13 l = ["1", 1, 4.0, "1"]
14 print(l)
```

Λίστες: Παραδείγματα

```
1 """
2 List example
3 """
4
5 original = ["Thomas", "Kamalakis"]
6 final = ["Tom", "Camalakis"]
7 str_input = "Thomas Kamalakis is teaching a course on automation"
8 str_output = str_input
9
10 for i in range( len(original) ):
11     str_output = str_output.replace( original[i], final[i] )
12
13 print('Original string: ', str_input)
14 print('Final string: ', str_output)
```

```
thomas@kirklaptop:~/Documents/nscpython/code/lecture5$ python3 -i listsex2.py
Original string: Thomas Kamalakis is teaching a course on automation
Final string: Tom Camalakis is teaching a course on automation
```

Λίστες: enumerate

```
1 """
2 List example
3 """
4
5 original = ["Thomas", "Kamalakis"]
6 final = ["Tom", "Camalakis"]
7 str_input = "Thomas Kamalakis is teaching a course on automation"
8 str_output = str_input
9
10 for i, orig in enumerate(original):
11     str_output = str_output.replace( orig, final[i] )
12
13 print('Original string: ', str_input)
14 print('Final string: ', str_output)
```

```
thomas@kirkilaptop:~/Documents/nscpython/code/lecture3$ python3 listsex2b.py
Original string: Thomas Kamalakis is teaching a course on automation
Final string: Tom Camalakis is teaching a course on automation
```

Λίστες και αρχεία .csv

- Οι λίστες είναι ιδιαίτερα χρήσιμες για την επεξεργασία αρχείων .csv
- Πρόκειται για text αρχεία που παράγονται από το Excel, LibreOffice, κτλ
- Είναι μία προσπάθεια να αποθηκεύσουμε σε text μορφή τα δεδομένα

	A	B	C	D
1	givenName	surName	email	phone
2	Thomas	Kamalakis	thkam@hua.gr	2109549406
3	Giannis	Papadopoulos	gpapado@hua.gr	2019549333
4	Nikos	Gallis	ngallis@hua.gr	2109549111

```
givenName;surName;email;phone  
Thomas;Kamalakis;thkam@hua.gr;2109549406  
Giannis;Papadopoulos;gpapado@hua.gr;2019549333  
Nikos;Gallis;ngallis@hua.gr;2109549111
```

Λίστες και αρχεία .csv

- Η Python έχει μία δική της βιβλιοθήκη για την διαχείριση των αρχείων .csv
- Μπορεί κανείς να διαβάσει, να δημιουργήσει και να αλλάξει ένα αρχείο .csv
- Στη συνέχεια αυτό μπορεί να ανοίξει π.χ. στο Excel.

```
1 # Import Python's csv module
2 import csv
3
4 # Open the users csv file
5 csv_file = open('users.csv')
6
7 # Invoke the csv reader and use ";" as delimiter
8 csv_reader = csv.reader(csv_file, delimiter=';')
9
10 # Iterate through the rows of the file
11 for row in csv_reader:
12     print(row) # row is a LIST!
13
14 csv_file.close()
```

```
['givenName', 'surName', 'email', 'phone']
['Thomas', 'Kamalakis', 'thkam@hua.gr', '2109549406']
['Glannis', 'Papadopoulos', 'gpapado@hua.gr', '2019549333']
['Ntkos', 'Gallis', 'ngallis@hua.gr', '2109549111']
```

Λίστες και αρχεία .csv

```
1 import csv
2
3 csv_input = open('users.csv')
4 csv_reader = csv.reader(csv_input, delimiter=';')
5
6 csv_output = open('users_out.csv', 'w') # Open file to write
7 csv_writer = csv.writer(csv_output, delimiter = ';')
8
9 line_count = 0
10 for row in csv_reader:
11     print(row)
12     if line_count == 0: #Header line
13         write_row = ['givenName', 'surname', 'displayName', 'email', 'phone']
14     else:
15         display_name = row[0] + " " + row[1]
16         write_row = [row[0], row[1], display_name, row[2], row[3] ]
17         line_count = line_count + 1
18         csv_writer.writerow(write_row)
19
20 csv_input.close()
21 csv_output.close()
```

```
1 givenName;surname;displayName;email;phone
2 Thomas;Kamalakis;Thomas Kamalakis;thkam@hua.gr;2109549406
3 Giannis;Papadopoulos;Giannis Papadopoulos;gpapado@hua.gr;2019549333
4 Nikos;Gallis;Nikos Gallis;ngallis@hua.gr;2109549111
```


- Τα λεξικά (dict) είναι πολύ χρήσιμες δομές δεδομένων.
- Αντιστοιχούν λέξεις κλειδιά σε τιμές, κλειδί→τιμή
- Thomas→Kamalakis, age→15, κτλ

```
1 d = {'key1' : value1,  
2     'key2' : value2,  
3     ...  
4     }
```

- Κάθε κλειδί πρέπει να έχει μία και μόνο τιμή.
- Η αντιστοίχιση age→15 και age→25 δεν επιτρέπεται.

Python - Λεξικά

```
1 """
2 Dict Example
3 """
4 user = {'givenName' : 'Thomas',
5         'surname' : 'Kamalakis',
6         'email' : 'thkam@hua.gr',
7         'phone' : '2109549406',
8         'displayName' : 'Thomas Kamalakis' }
9
10 print( user )
11 print( user['phone'] )
```

```
thomas@krklaptop:~/Documents/nscpython/code/lecture5$ python3 dictex.py
{'givenName': 'Thomas', 'surname': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone'
: '2109549406', 'displayName': 'Thomas Kamalakis'}
2109549406
```

Λεξικά και for

```
1 """
2 Dict Example
3 """
4 user = {'givenName' : 'Thomas',
5         'surname' : 'Kamalakis',
6         'email' : 'thkam@hua.gr',
7         'phone' : '2109549406',
8         'displayName' : 'Thomas Kamalakis' }
9
10 for key in user:
11     print(key, ':', user[key])
```

```
thomas@ktrklaptop:~/Documents/nscpython/code/lecture5$ python3 dictfor.py
givenName : Thomas
surname : Kamalakis
email : thkam@hua.gr
phone : 2109549406
displayName : Thomas Kamalakis
```

items()

```
1 """
2 Dict Example
3 """
4 user = {'givenName' : 'Thomas',
5         'surname' : 'Kamalakis',
6         'email' : 'thkam@hua.gr',
7         'phone' : '2109549406',
8         'displayName' : 'Thomas Kamalakis' }
9
10 for key, val in user.items():
11     print(key, ':', val)
```

```
thomas@ktrklaptop:~/Documents/nscpython/code/lecture5$ python3 dictItems.py
givenName : Thomas
surname : Kamalakis
email : thkam@hua.gr
phone : 2109549406
displayName : Thomas Kamalakis
```

Παράδειγματα

```
1 import csv
2
3 csv_file = open('users.csv', 'r')
4 csv_reader = csv.reader(csv_file, delimiter = ';')
5
6 users = []           # Initialize empty list
7 line_count = 0
8 for row in csv_reader:
9     if line_count == 0:
10        pass
11    else:
12        d = {
13            'givenName' : row[0],
14            'surname'   : row[1],
15            'email'     : row[2],
16            'phone'    : row[3]
17        }
18        users.append( d ) # add to user list
19        line_count += 1
20 print(users)
21 csv_file.close()
```

```
thomas@kirkleptop:~/Documents/miscpython/code/lectures$ python3 -i dtctcsv.py
[{'givenName': 'Thomas', 'surname': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Giannis', 'surname': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surname': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

Παράδειγματα

```
1 import csv
2
3 csv_file = open('users.csv', 'r')
4 csv_reader = csv.reader(csv_file, delimiter = ';')
5
6 users = []           # Initialize empty list
7 line_count = 0
8 for row in csv_reader:
9     if line_count == 0:
10        keys = row
11    else:
12        d = {}        # Empty dictionary
13        for i, k in enumerate(keys):
14            d[k] = row[i]
15        users.append( d ) # add to user list
16        line_count += 1
17 print(users)
18
19 csv_file.close()
```

```
thomas@ktrklaptop:~/Documents/mscpython/code/lecture5$ python3 -i dictcsv2.py
[{'givenName': 'Thomas', 'surName': 'Kanalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Glannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallts', 'email': 'ngallts@hua.gr', 'phone': '2109549111'}]
>>> █
```

Παράδειγματα

```
1 import csv
2
3 csv_file = open('users.csv', 'r')
4 csv_reader = csv.reader(csv_file, delimiter = ';')
5
6 users = []           # Initialize empty list
7 keys = next(csv_reader) # Keys are located on the first row
8
9 for row in csv_reader:
10     d = {}           # Empty dictionary
11     for i, k in enumerate(keys):
12         d[k] = row[i]
13     users.append( d ) # add to user list
14 print(users)
15
16 csv_file.close()
```

```
thomas@kirklaptop:~/Documents/nscpython/code/lecture5$ python3 -i dictcsv4.py
[{'givenName': 'Thonas', 'surName': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Giannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

Παράδειγματα

```
1 import csv
2 users = [] # Initialize empty list
3
4 with open('users.csv', 'r') as csv_file:
5     csv_reader = csv.reader(csv_file, delimiter = ';')
6     keys = next(csv_reader) # Keys are located on the first row
7
8     for row in csv_reader:
9         d = {} # Empty dictionary
10        for i, k in enumerate(keys):
11            d[k] = row[i]
12            users.append( d ) # add to user list
13 print(users)
14 # No need to close csv_file !
```

```
thomas@kirkleptop:~/Documents/mcspython/code/lectures$ python3 -i dictcsv3.py
[{'givenName': 'Thomas', 'surName': 'Kamalakis', 'email': 'thkan@hua.gr', 'phone': '2109549406'}, {'givenName': 'Giannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```


Παράδειγματα

```
1 import csv
2 users = [] # Initialize empty list
3
4 with open('users.csv', 'r') as csv_file:
5     csv_reader = csv.reader(csv_file, delimiter = ';')
6     keys = next(csv_reader) # Keys are located on the first row
7
8     for row in csv_reader:
9         d = {k : row[i] for i, k in enumerate(keys)}
10            d[k] = row[i]
11            users.append( d ) # add to user list
12 print(users)
13 # No need to close csv_file !
```

```
thomas@kirkleptop:~/Documents/mscpython/code/lecture5$ python3 -i dictcsv5.py
[{'givenName': 'Thomas', 'surName': 'Kanalakis', 'email': 'thkan@hua.gr', 'phone': '2109549406'}, {'givenName': 'Giannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

Παράδειγματα

```
1 import csv
2
3 with open('users.csv', 'r') as csv_file:
4     csv_reader = csv.reader(csv_file, delimiter = ';')
5     keys = next(csv_reader) # Keys are located on the first row
6
7     users = [ {k : row[i] for i, k in enumerate(keys) } for row in csv_reader ]
8 print(users)
9 # No need to close csv_file !
```

```
thomas@kirklaptop:~/Documents/nscpython/code/lecture5$ python3 -i dictcsv6.py
[{'givenName': 'Thomas', 'surName': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone': '2109549406'}, {'givenName': 'Glannis', 'surName': 'Papadopoulos', 'email': 'gpapado@hua.gr', 'phone': '2019549333'}, {'givenName': 'Nikos', 'surName': 'Gallis', 'email': 'ngallis@hua.gr', 'phone': '2109549111'}]
>>>
```

DRY

- Μία βασική αρχή του coding είναι το DRY
- Do not Repeat Yourself
- Γράφουμε ένα τμήμα του κώδικα και το γράφουμε καλά
- Μετά προσπαθούμε να το χρησιμοποιήσουμε όσο το δυνατόν πιο συχνά



Python functions

- Ένας από τους τρόπους να το κάνουμε αυτό είναι να χρησιμοποιήσουμε συναρτήσεις
- Μία συνάρτηση μπορεί να δέχεται ορίσματα εισόδου και να επιστρέφει κάποια αποτελέσματα

```
1 def function( input_variables ):  
2     ...  
3     do staff here  
4     ...  
5  
6     return output_variables
```

Παραδείγματα

```
1 """
2 Function examples
3 """
4
5 def add(a, b):
6     return a + b
7
8 def user_dict(givenName, surname, email, phone):
9     displayName = givenName + surname
10    return {
11        'givenName' : givenName,
12        'surname' : surname,
13        'email' : email,
14        'phone' : phone,
15        'displayName' : displayName
16    }
17
18 c = add(1, 2)
19 print(c)
20 user = user_dict('Thomas', 'Kamalakis', 'thkam@hua.gr', '2109549406')
21 print( user )
```

```
thomas@ktrklaptop:~/Documents/nscpython/code/lecture3$ python3 -i funexamples.py
3
{'givenName': 'Thomas', 'surname': 'Kamalakis', 'email': 'thkam@hua.gr', 'phone':
: '2109549406', 'displayName': 'ThomasKamalakis'}
```

Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 6η

Θωμάς Καμαλάκης

Χαροκόπειο Πανεπιστήμιο Αθηνών

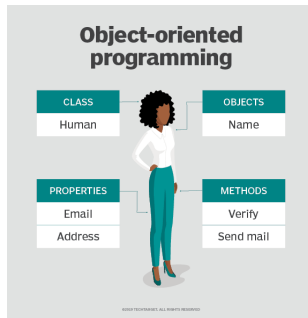
Οκτώβριος 2022

Περιεχόμενα

- 1 Python - Κλάσεις
- 2 Παίζοντας με την Postgres
- 3 Python & Postgres

Κλάσεις

- Η Python είναι μία αντικειμενοστραφής γλώσσα προγραμματισμού.
- Κάθε πράγμα που χρησιμοποιούμε άλλωστε στην Python είναι ένα αντικείμενο.
- Κάθε αντικείμενο έχει τα δικά του γνωρίσματα και μεθόδους.



Κλάσεις

- Κλάσεις: τύποι δεδομένων που ορίζονται από τον χρήστη.
- Αντικείμενα: Μεταβλητές που δημιουργούνται από τις κλάσεις.
- Γνωρίσματα: Εσωτερικές μεταβλητές που καθορίζουν την κατάσταση ενός αντικειμένου.
- Μέθοδοι: Συναρτήσεις που ορίζονται στην κλάση και καθορίζουν την συμπεριφορά του αντικειμένου.

Κλάσεις

- Ενθυλάκωση (encapsulation): Όλες οι απαραίτητες πληροφορίες για ένα αντικείμενο βρίσκονται μέσα του.
- Αφαίρεση (abstraction): Δεν πρέπει να μας ενδιαφέρει εσωτερικά πως είναι η κλάση όταν την χρησιμοποιούμε.
- Κληρονομικότητα (inheritance): Οι κλάσεις μπορεί να βασίζονται σε άλλες κλάσεις και να επαναχρησιμοποιούν στοιχεία τους.
- Πολυμορφισμός: Αν δύο κλάσεις έχουν παρόμοιες μεθόδους μπορούμε να τις διαχειριστούμε με τον ίδιο τρόπο.

Δημιουργία αντικειμένων

- Όταν δημιουργούμε ένα αντικείμενο που ανήκει σε μία κλάση, καλείται η `__init__()`

```
6 class user:
7
8     def __init__(self, name, surname, email, password):
9         self.name = name
10        self.surname = surname
11        self.email = email
12        self.password = password
13        self.display_name = name + " " + surname
```

Listing: user.py

- Η μέθοδος `__str__` καθορίζει τι τυπώνεται όταν το αντικείμενο συνδυάζεται με την `print()`

```
16 def __str__(self):  
17     return self.display_name + ' (' + self.email + ')'
```

Listing: user.py

```
1 # import the user class  
2 from user import user  
3  
4 # create a user object  
5 a = user('Thomas', 'Kamalakis', 'thkam@hua.gr', 'hua123')  
6  
7 # print the user object  
8 print(a)
```

```
thomas@kirkhome2:~/Documents/escpython/code/lecture6$ python3 -i userex.py  
Thomas Kamalakis (thkam@hua.gr)
```

Ορισμός Μεθόδων

- Δεν είναι λίγο περίεργο να αποθηκεύουμε το password απευθείας;
- Ας το κάνουμε hash

```
21 # Update the user password hash
22 def set_password(self, plain_text):
23     h = sha256( plain_text.encode() )
24     self.password = h.hexdigest()
```

Listing: user.py

```
7 class user:
8
9     def __init__(self, name, surname, email, password):
10         self.name = name
11         self.surname = surname
12         self.email = email
13         self.display_name = name + " " + surname
14         self.set_password( password )
```

Listing: user.py

Ορισμός Μεθόδων

```
28 # verify password
29 def verify_password(self, plain_text):
30     h = sha256(plain_text.encode())
31     return self.password == h.hexdigest()
32 #---checkpassword2
33
34 #---asdict1
35 def as_dict(self):
36     return {
37         'name' : self.name,
38         'surname' : self.surname,
39         'email' : self.email,
40         'display_name' : self.display_name,
41         'password' : self.password
42     }
43 #---asdict2
```

Listing: user.py

```
1 # import the user class
2 from user1 import user
3
4 # create a user object
5 a = user('Thomas', 'Kamalakis', 'thkam@hua.gr', 'hua123')
6
7 check = a.verify_password('hua')
8 print(check)
9
10 check = a.verify_password('hua123')
11 print(check)
```

Listing: userpass.py



SHA256

- Βασίζεται σε cryptographic hash functions.
- Πρόκειται για συναρτήσεις που πολύ δύσκολα αντιστρέφονται.
- Δημιουργήθηκε από την NSA (2001).
- Χρησιμοποιείται σε πολλές εφαρμογές (TLS, SSL, SSH, κτλ)



Ορισμός Μεθόδων

```
35 def as_dict(self):
36     return {
37         'name' : self.name,
38         'surname' : self.surname,
39         'email' : self.email,
40         'display_name' : self.display_name,
41         'password' : self.password
42     }
```

Listing: user.py

Λίγο διαφορετική `__init__()`

```
7 class user:
8
9     def __init__(self, *args):
10         # if there is one argument:
11
12         if len(args) == 1:
13             arg = args[0]
14             if isinstance(arg, dict):
15                 self.__set_user(arg['name'],
16                                 arg['surname'],
17                                 arg['email'],
18                                 arg['password'])
19
20             elif isinstance(arg, list):
21                 self.__set_user(arg[0],
22                                 arg[1],
23                                 arg[2],
24                                 arg[3])
25
26             elif len(args) == 4:
27                 self.__set_user(args[0],
28                                 args[1],
29                                 args[2],
30                                 args[3])
31
32             else:
33                 raise TypeError('You need to supply a single argument that is either a list or a dict, or
34                                 4 string arguments ')

```

Listing: user.py

Ιστορικά

- Πρόκειται για μία *σχεσιακή* βάση.
- Τα δεδομένα είναι οργανωμένα σε πίνακες
- Οι στήλες αποτελούν τα attributes, οι γραμμές τα αντίστοιχα δεδομένα.
- Ξεκίνησε από το UC Berkeley (1982)
- Είναι αρκετά διαδεδομένη βάση και χρησιμοποιείται πολύ συχνά σε συστήματα παραγωγής.

Τι θα κάνουμε

- Θα στήσουμε μία Postgres στο debian VM
- Θα χρησιμοποιήσουμε την βιβλιοθήκη psycopg2 για να αυτοματοποιήσουμε διάφορες διεργασίες
- Θα δούμε παραδείγματα Create Read Update Delete (CRUD)
- πρόκειται για μία απλή περίπτωση απομακρυσμένου ελέγχου συστήματος.
- Φυσικά πολλά από τα παραδείγματα εύκολα μεταφέρονται και σε άλλες σχεσιακές βάσεις, π.χ. MySQL

Εγκατάσταση

```
Linux debian 5.10.0-19-amd64 #1 SMP Debian 5.10.149-2 (2022-10-21) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
root@debian:~# apt install postgresql postgresql-contrib
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  liblvm1 libpq5 libsensors-config libsensors5 libxslt1.1 libz3-4 postgresql-13 postgresql-client-13 postgresql-client-common postgresql-common ssl-cert sysstat
Suggested packages:
  is-sensors postgresql-doc postgresql-doc-13 libjson-perl isag
The following NEW packages will be installed:
  liblvm1 libpq5 libsensors-config libsensors5 libxslt1.1 libz3-4 postgresql postgresql-13 postgresql-client-13 postgresql-client-common postgresql-common postgresql-contrib
  ssl-cert sysstat
0 upgraded, 14 newly installed, 0 to remove and 0 not upgraded.
Need to get 43.1 MB of archives.
After this operation, 168 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Ο χρήστης postgres

```
root@debian:~# passwd postgres
New password:
Retype new password:
passwd: password updated successfully
```

```
root@debian:~# su - postgres
postgres@debian:~$
```

Δημιουργία Βάσης

```
root@debian:~# passwd postgres
New password:
Retype new password:
passwd: password updated successfully
root@debian:~# su - postgres
postgres@debian:~$ createdb userdb
postgres@debian:~$ psql userdb
psql (13.8 (Debian 13.8-0+deb11u1))
Type "help" for help.

userdb=# CREATE TABLE users (
userdb(#   email VARCHAR(100) PRIMARY KEY,
userdb(#   givenName VARCHAR(100),
userdb(#   surname VARCHAR(150),
userdb(#   password VARCHAR(200) );
CREATE TABLE
userdb=# \dt
          List of relations
 Schema | Name | Type | Owner
-----+-----+-----+-----
 public | users | table | postgres
(1 row)

userdb=#
```

Δημιουργία Βάσης

```
userdb=# \d+ users
          Table "public.users"
  Column      |          Type          | Collation | Nullable | Default | Storage  | Stats target | Description
-----|-----|-----|-----|-----|-----|-----|-----
 email       | character varying(100) |           | not null |         | extended |              |
 givenname   | character varying(100) |           |          |         | extended |              |
 surname     | character varying(150) |           |          |         | extended |              |
 password    | character varying(200) |           |          |         | extended |              |
Indexes:
  "users_pkey" PRIMARY KEY, btree (email)
Access method: heap
```

Απομακρυσμένη Σύνδεση

```
postgres=# ALTER USER postgres WITH PASSWORD 'hual23';  
ALTER ROLE
```

```
GNU nano 5.4 /etc/postgresql/13/main/postgresql.conf *  
# FILE LOCATIONS  
#-----  
# The default values of these variables are driven from the -D command-line  
# option or PGDATA environment variable, represented here as ConfigDir.  
  
data_directory = '/var/lib/postgresql/13/main' # use data in another d  
# (change requires restart)  
hba_file = '/etc/postgresql/13/main/pg_hba.conf' # host-based authentica  
# (change requires restart)  
ident_file = '/etc/postgresql/13/main/pg_ident.conf' # ident configuration f  
# (change requires restart)  
  
# If external_pid_file is not explicitly set, no extra PID file is written.  
external_pid_file = '/var/run/postgresql/13-main.pid' # write  
# (change requires restart)  
  
#-----  
# CONNECTIONS AND AUTHENTICATION  
#-----  
# - Connection Settings -  
listen_addresses = '*' # what IP address(es) to listen on;  
# comma-separated list of addresses;  
# defaults to 'localhost'; use '*' for  
# (change requires restart)  
port = 5432 # (change requires restart)  
max_connections = 100 # (change requires restart)
```


Απομακρυσμένη Σύνδεση

```
GNU nano 5.4 /etc/postgresql/13/main/pg_hba.conf *
# available for which authentication methods.
#
# Database and user names containing spaces, commas, quotes and other
# special characters must be quoted. Quoting one of the keywords
# "all", "sameuser", "samerole" or "replication" makes the name lose
# its special character, and just match a database or username with
# that name.
#
# This file is read on server startup and when the server receives a
# SIGHUP signal. If you edit the file on a running system, you have to
# SIGHUP the server for the changes to take effect, run "pg_ctl reload",
# or execute "SELECT pg_reload_conf()".
#
# Put your actual configuration here
# -----
#
# If you want to allow non-local connections, you need to add more
# "host" records. In that case you will also need to make PostgreSQL
# listen on a non-local interface via the listen addresses
# configuration parameter, or via the -i or -h command line switches.
#
# DO NOT DISABLE!
# If you change this first entry you will need to make sure that the
# database superuser can access the database using some other method.
# Noninteractive access to all databases is required during automatic
# maintenance (custom daily cronjobs, replication, and similar tasks).
#
# Database administrative login by Unix domain socket
local all postgres peer
# TYPE DATABASE USER ADDRESS METHOD
# "local" is for Unix domain socket connections only
local all all peer
# IPv4 local connections:
host all all 127.0.0.1/32 md5
# IPv6 local connections:
host all all ::1/128 md5
# Allow replication connections from localhost, by a user with the
# replication privilege.
local replication all peer
host replication all 127.0.0.1/32 md5
host replication all ::1/128 md5
host all all 0.0.0.0/0 md5
host all all ::/0 md5
```

Ακούει κανείς; netstat

- Πολλές φορές θέλουμε να δούμε αν τρέχει ένα service όπως η postgres
- Μπορούμε να χρησιμοποιήσουμε διάφορα εργαλεία για αυτό
- Ένα από αυτά είναι το netstat
- netstat -tuln
 - -t : TCP connections
 - -u : UDP connections
 - -l : listening sockets (ποιός ακούει)
 - -p : να μας δείξει πιο πρόγραμμα (program) ακούει
 - -n : δείξε μας τα IP

Εγκατάσταση

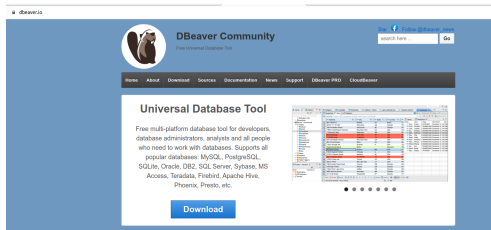
```
root@debian:~# apt-get install net-tools
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
 net-tools
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 250 kB of archives.
After this operation, 1015 kB of additional disk space will be used.
Get:1 http://deb.debian.org/debian bullseye/main amd64 net-tools amd64 1.60+git20181103.0eebece-1 [250 kB]
Fetched 250 kB in 0s (976 kB/s)
apt-listchanges: Can't set locale; make sure $LC_* and $LANG are correct!
perl: warning: Setting locale failed.
perl: warning: Please check that your locale settings:
    LANGUAGE = "en_US:en",
    LC_ALL = (unset),
    LC_TIME = "el_GR.UTF-8",
    LC_MONETARY = "el_GR.UTF-8",
    LC_ADDRESS = "el_GR.UTF-8",
    LC_TELEPHONE = "el_GR.UTF-8",
    LC_NAME = "el_GR.UTF-8",
    LC_MEASUREMENT = "el_GR.UTF-8",
    LC_IDENTIFICATION = "el_GR.UTF-8",
    LC_NUMERIC = "el_GR.UTF-8",
    LC_PAPER = "el_GR.UTF-8",
    LANG = "en_US.UTF-8"
are supported and installed on your system.
perl: warning: Falling back to a fallback locale ("en_US.UTF-8").
locale: Cannot set LC_ALL to default locale: No such file or directory
Selecting unselected package net-tools.
(Reading database ... 35467 files and directories currently installed.)
Preparing to unpack .../net-tools_1.60+git20181103.0eebece-1_amd64.deb ...
Unpacking net-tools (1.60+git20181103.0eebece-1) ...
Setting up net-tools (1.60+git20181103.0eebece-1) ...
Processing triggers for man-db (2.9.4-2) ...
root@debian:~#
```

netstat -tupln

```
root@debian:~# netstat -tupln
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
PID/Program name
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
758/sshd: /usr/sbin
tcp        0      0 0.0.0.0:5432            0.0.0.0:*               LISTEN
4419/postgres
tcp6       0      0 :::22                  :::*                    LISTEN
758/sshd: /usr/sbin
tcp6       0      0 :::5432                 :::*                    LISTEN
4419/postgres
udp        0      0 0.0.0.0:68             0.0.0.0:*
689/dhclient
udp        0      0 0.0.0.0:68             0.0.0.0:*
647/dhclient
root@debian:~#
```

Dbeaver

- Ένας πολύ καλός client για να διαχειριζόμαστε τις βάσεις
- ΕΛ/ΛΑΚ



Dbeaver

Dbeaver 22.1.2 - public

File Edit Navigate Search SQL Editor Database Window Help

Database Navigator x Projects x master x postgres x public x

Enter a part of object name here

postgres - 195.730.90.742:7423

postgres

Databases

postgres

Roles

Administrator

System info

zabbix - 10.100.0.8.104.3

Project - General x

Name

Bookmarks

ER Diagrams

Scripts

Connection "postgres" configuration

PostgreSQL connection settings

Connection settings

Initialization

Shell Commands

Client Identical

Transactions

General

Metadata

Errors and timeouts

Data editor

SQL editor

Main PostgreSQL Driver properties SSH Proxy SSL

Server

Host: 192.168.56.102 Port: 5432

Database: userdb

Authentication

Authentication: Database Native

Username: postgres

Password: ***** Save password locally

Advanced

Session role: Local Client:

Local client is needed for some administrative tasks like database dump/restore.

Driver name: PostgreSQL Edit Driver Settings

Test Connection... Cancel OK

Database object "master" is not assoc...

null, message from server: "Host "83.21.org.kiss.dbeaver.m...

null, message from server: "Host "83.org.kiss.dbeaver.m...

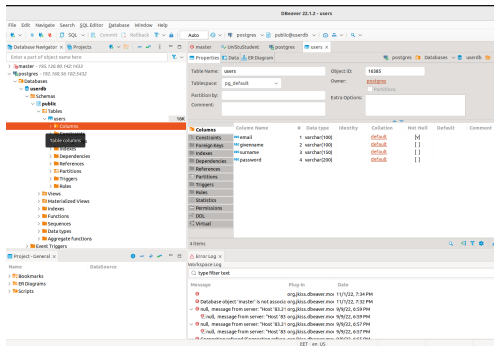
null, message from server: "Host "83.21.org.kiss.dbeaver.m...

null, message from server: "Host "83.org.kiss.dbeaver.m...

Connection refused Connection refuse...

Connection refused Connection refuse...

Dbeaver



Εγκατάσταση του pycorp2

```
root@kirkllaptop:/home/thomas# apt-get install libpq-dev
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  bridge-utils libgsoap-2.8.117 liblzfl python3-docker python3-dockerpty
  python3-docopt python3-dotenv python3-texttable python3-websocket ubuntu-fan
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libssl-dev
Suggested packages:
  postgresql-doc-14 libssl-doc
The following NEW packages will be installed:
  libpq-dev libssl-dev
0 upgraded, 2 newly installed, 0 to remove and 39 not upgraded.
Need to get 2517 kB of archives.
After this operation, 12,9 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

```
root@kirkllaptop:/home/thomas# pip3 install pycorp2
Collecting pycorp2
  Downloading pycorp2-2.9.5.tar.gz (384 kB)
    384.3/384.3 KB 2.7 MB/s eta 0:00:00
  Preparing metadata (setup.py) ... done
Building wheels for collected packages: pycorp2
  Building wheel for pycorp2 (setup.py) ... -
```


Δημιουργία κλάσης userdb

```
74 class userdb:
75     def __init__(self, server_ip = SERVER_IP,
76                 db_name = DB_NAME,
77                 db_user = DB_USER,
78                 db_password = DB_PASSWORD ):
79
80         self.server_ip = server_ip
81         self.db_name = db_name
82         self.db_user = db_user
83         self.db_password = db_password
```

Listing: user.py

Σύνδεση

```
86 def connect(self):
87     self.conn = psycopg2.connect(
88         host = self.server_ip,
89         database = self.db_name,
90         user = self.db_user,
91         password = self.db_password)
92
93 def close(self):
94     self.conn.close()
```

Listing: user.py

Εισαγωγή

```
97     def insert_user(self, user):
98         cursor = self.conn.cursor()
99         name = user.name
100        surname = user.surname
101        email = user.email
102        password = user.password
103        query = """INSERT INTO users (email, givenName, surname, password) VALUES ('%s', '%s', '%s',
104        '%s') """ % (email, name, surname, password)
105        cursor.execute(query)
106        self.conn.commit()
```

Listing: user.py

Εισαγωγή

```
1 from user import user, userdb
2
3 a = userdb()
4 a.connect()
5 a.insert_user(
6     user('Thomas', 'Kamalakis', 'thkam@hua.gr', 'hua123')
7 )
8 a.close()
```

Listing: psql.py

Ανάγνωση

```
108     def get_user(self, email):
109         cursor = self.conn.cursor()
110         query = """SELECT * FROM users WHERE (email='%s') """ %email
111         cursor.execute(query)
112         if cursor.rowcount == 1:
113             u = cursor.fetchall()[0]
114             return user( u[1], u[2], u[0], u[3] )
```

Listing: user.py

Ανάγνωση

```
1 from user import user, userdb
2
3 a = userdb()
4 a.connect()
5 u = a.get_user('thkam@hua.gr')
6 print(u)
```

Listing: psql.py

Ενημέρωση

```
117 def update_name(self, name, email):
118     cursor = self.conn.cursor()
119     query = """UPDATE users SET givenName = '%s' WHERE email = '%s' """ % (name, email)
120     cursor.execute(query)
121     self.conn.commit()
122
123 def update_surname(self, surname, email):
124     cursor = self.conn.cursor()
125     query = """UPDATE users SET surname = '%s' WHERE email = '%s' """ % (surname, email)
126     cursor.execute(query)
127     self.conn.commit()
```

Listing: user.py

Ενημέρωση

```
130 def update_password_hash(self, hash, email):
131     cursor = self.conn.cursor()
132     query = """UPDATE users SET password = '%s' WHERE email = '%s' """ % (hash, email)
133     cursor.execute(query)
134     self.conn.commit()
135
136 def update_password(self, password, email):
137     cursor = self.conn.cursor()
138     hash = sha256( password.encode() ).hexdigest()
139     query = """UPDATE users SET password = '%s' WHERE email = '%s' """ % (hash, email)
140     cursor.execute(query)
141     self.conn.commit()
```

Listing: user.py

Εισαγωγή

```
1 from user import user, userdb
2
3 a = userdb()
4 a.connect()
5 a.update_name('Tom', 'thkam@hua.gr')
6 a.update_surname('Hanks', 'thkam@hua.gr')
7 a.update_password('hua', 'thkam@hua.gr')
```

Listing: psql.py

Εξαγωγή

```
144     def all_users(self):
145         cursor = self.conn.cursor()
146         query = """SELECT * FROM users """
147         cursor.execute(query)
148         rows = cursor.fetchall()
149         users = { u[0] : user( u[1], u[2], u[0], u[3] ) for u in rows }
150         return users
```

Listing: user.py

Εξαγωγή

```
153 def export_to_csv(self, filename):
154     with open(filename, 'w') as f:
155         writer = csv.writer(f, delimiter = ';')
156         writer.writerow(CSV_HEADERS)
157
158         users = self.all_users()
159         for email, user in users.items():
160             writer.writerow( [ user.email,
161                             user.name,
162                             user.surname,
163                             user.password ] )
```

Listing: user.py

Εξαγωγή

```
1 from user import user, userdb
2
3 a = userdb()
4 a.connect()
5
6 users = a.all_users()
7 print(users)
8
9 a.export_to_csv('users.csv')
10 a.close()
```

Listing: pgslexport1.py

Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 7η

Θωμάς Καμαλάκης

Χαροκόπειο Πανεπιστήμιο Αθηνών

Οκτώβριος 2022

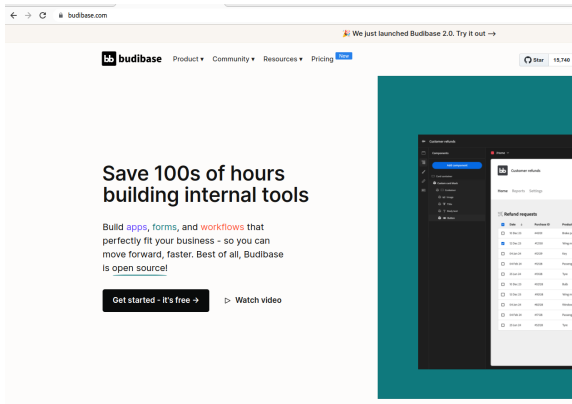
Περιεχόμενα

- 1 Budibase
- 2 Εγκατάσταση
- 3 Μία απλή εφαρμογή

Εισαγωγή

- Στα προηγούμενα είδαμε την διαχείριση μίας βάσης postgres
- Αυτό γινόταν με την βοήθεια της βιβλιοθήκης psycopg2
- Θα δούμε τώρα ένα παράδειγμα χρήσης API, χωρίς βιβλιοθήκη
- για τον σκοπό αυτό θα χρησιμοποιήσουμε την πλατφόρμα Budibase

Budibase















Budibase

Connect to anything

Securely connect to a number of datasources including Postgres, MySQL, MSSQL, Oracle, Google Sheets, and build apps in minutes.

Add data source

With Budibase, you can connect to a data source or start from scratch.

 MySQL RELATIONAL	 PostgreSQL RELATIONAL	 SQL Server RELATIONAL
 OracleDB RELATIONAL	 Rest API API	 MongoDB NON-RELATIONAL
 Google Sheets SPREADSHEET	 CouchDB NON-RELATIONAL	 DynamoDB NON-RELATIONAL
 Airtable SPREADSHEET	 Elasticsearch SEARCH	 ArangoDB GRAPH

Budibase

Internal database

Create apps from scratch with our no-code internal database.

The screenshot shows the 'Employees' table in the Budibase internal database. The table has columns for 'NAME' and 'PHOTO'. The data is as follows:

EDIT	NAME	PHOTO
<input type="checkbox"/> EDIT	Xi Dasada	
<input type="checkbox"/> EDIT	Prishna Khatri	
<input type="checkbox"/> EDIT	Lisa Harvey	
<input type="checkbox"/> EDIT	Magglioma Bak	

Rest API connector NEW

Use our powerful Rest API connector to connect with REST APIs, fetch data, receive form data, authenticate with external APIs, and build modern business apps in minutes.

The screenshot shows the 'Dog breeds' Rest API connector interface. The request method is 'GET' and the URL is 'https://dog.ceo/api/breeds/list/all'. The response is shown in JSON format:

```
{
  "message": {
    "affenpinscher": [],
    "afrikaner": []
  }
}
```

Budibase



Conditional UI

Change your user interface based on app conditions.



Actions

Choose from a number of actions to chain to user events.



Roles

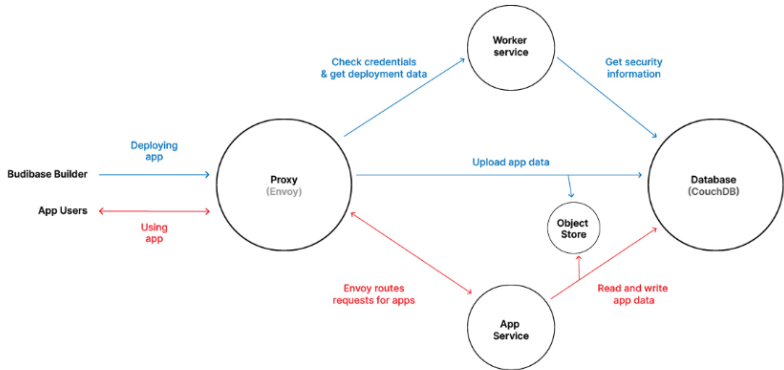
Ensure certain groups of people can only access certain screens.



JavaScript

Increase the power of your apps with JS and Handlebars.

Αρχιτεκτονική



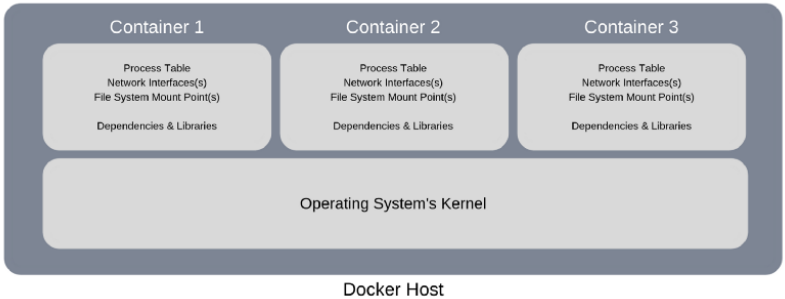
Worker + app service

- Worker: ελέγχει την πρόσβαση των χρηστών στα διάφορα συστατικά στοιχεία (π.χ. admin περιβάλλον κτλ)
- App: ο κορμός του Budibase, εκεί εκτελούνται οι εφαρμογές και το API.
- Proxy: Ένας webserver (Nginx) που καθορίζει την πρόσβαση των εφαρμογών μέσω Web.

Docker

- Μία πλατφόρμα για την απλοποίηση της δημιουργίας, εκτέλεσης και διαχείρισης εφαρμογών.
- Το docker δημιουργεί containers που δανείζονται το λειτουργικό σύστημα.
- Δεν είναι ιδεατές μηχανές!
- Κάθε container έχει τις δικές (ιδεατές) του κάρτες δικτύου, file system κτλ.
- Κάθε container είναι απομονωμένος από τους υπόλοιπους: τρέχει το δικό του λογισμικό, βιβλιοθήκες κτλ.
- Η επικοινωνία γίνεται με συγκεκριμένο τρόπο που ελέγχεται από το docker.
- Μία εφαρμογή που χρησιμοποιεί το docker λογικά θα πρέπει να εγκαθίσταται και να τρέχει με παρόμοιο τρόπο σε διαφορετικά περιβάλλοντα host.

Docker



Docker

```
root@debian:~# apt-get update
Get:1 http://security.debian.org/debian-security bullseye-security InRelease [48.4 kB]
Hit:2 http://deb.debian.org/debian bullseye InRelease
Get:3 http://deb.debian.org/debian bullseye-updates InRelease [44.1 kB]
Get:4 http://security.debian.org/debian-security bullseye-security/main Sources [167 kB]
Get:5 http://security.debian.org/debian-security bullseye-security/main amd64 Packages [194 kB]
Get:6 http://security.debian.org/debian-security bullseye-security/main Translation-en [123 kB]
Fetched 577 kB in 1s (727 kB/s)
Reading package lists... Done
root@debian:~#
```

Docker

```
root@debian:~# apt-get install ca-certificates curl gnupg lsb-release
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ca-certificates is already the newest version (20210119).
lsb-release is already the newest version (11.1.0).
lsb-release set to manually installed.
The following additional packages will be installed:
  dirmngr gnupg-l10n gnupg-utils gpg gpg-agent gpg-wks-client
  gpg-wks-server gpgconf gpgsm libassuan0 libcurl4 libksba8 libnpt0
  pinentry-curses
Suggested packages:
  dbus-user-session pinentry-gnome3 tor parcimonie xloadimage scdemon
  pinentry-doc
The following NEW packages will be installed:
  curl dirmngr gnupg gnupg-l10n gnupg-utils gpg gpg-agent gpg-wks-client
  gpg-wks-server gpgconf gpgsm libassuan0 libcurl4 libksba8 libnpt0
  pinentry-curses
0 upgraded, 16 newly installed, 0 to remove and 1 not upgraded.
Need to get 8280 kB of archives.
After this operation, 16.9 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Docker

```
root@debian:~# mkdir -p /etc/apt/keyrings
root@debian:~# curl -fsSL https://download.docker.com/linux/debian/gpg | sudo gpg --dearmor -o /etc/ap
t/keyrings/docker.gpg
-bash: sudo: command not found
(23) Failed writing body
root@debian:~# curl -fsSL https://download.docker.com/linux/debian/gpg | gpg --dearmor -o /etc/apt/key
rings/docker.gpg
root@debian:~# echo \
"deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.gpg] https://download.doc
ker.com/linux/debian \
$(lsb_release -cs) stable" | tee /etc/apt/sources.list.d/docker.list > /dev/null
root@debian:~#
```

Docker

```
root@debian:~# apt-get update
Get:1 https://download.docker.com/linux/debian bullseye InRelease [43.3 kB]
Hit:2 http://deb.debian.org/debian bullseye InRelease
Hit:3 http://security.debian.org/debian-security bullseye-security InRelease
Hit:4 http://deb.debian.org/debian bullseye-updates InRelease
Get:5 https://download.docker.com/linux/debian bullseye/stable amd64 Packages [14.7 kB]
Fetched 58.0 kB in 1s (97.1 kB/s)
Reading package lists... Done
root@debian:~#
```

```
root@debian:~# apt-get install docker-ce docker-ce-cli containerd.io docker-compose-plugin
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  dbus-user-session docker-ce-rootless-extras docker-scan-plugin git git-man iptables liberror-perl
  libip6tc2 libltdl7 libnetfilter-contrack3 libnfnetlink0 libslirp0 patch pkgz slirp4netns
Suggested packages:
  aufs-tools cgroupfs-mount | cgroup-lite git-daemon-run | git-daemon-sysvinit git-doc git-el
  git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn firewalld ed diffutils-doc
The following NEW packages will be installed:
  containerd.io dbus-user-session docker-ce docker-ce-cli docker-ce-rootless-extras
  docker-compose-plugin docker-scan-plugin git git-man iptables liberror-perl libip6tc2 libltdl7
  libnetfilter-contrack3 libnfnetlink0 libslirp0 patch pkgz slirp4netns
0 upgraded, 19 newly installed, 0 to remove and 1 not upgraded.
Need to get 120 MB of archives.
After this operation, 469 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Docker

```
root@debian:~# docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:e18f0a777aefabe047a671ab3ec3eed05414477c951ab1a6f352a06974245fe7
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/

root@debian:~#
```

```
root@debian:~# docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS          PORTS          NAMES
dc0bf7f612d2  hello-world   "/hello"                24 seconds ago Exited (0) 23 seconds ago          crazy_b
rown

root@debian:~#
```

docker-compose

```
root@debian:~# curl -SL https://github.com/docker/compose/releases/download/v2.12.2/docker-compose-linux-x86_64 -o /usr/local/bin/docker-compose
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           % Dload  % Upload   Total   Spent    Left   Speed
  0  0     0    0     0     0      0     0  --:--:--  --:--:--  --:--:--    0
100 42.8M 100 42.8M    0     0 4386k    0  0:00:10  0:00:10  --:--:-- 3916k
root@debian:~#
```

```
root@debian:~# linux-x86_64 -o /usr/local/bin/docker-compose
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           % Dload  % Upload   Total   Spent    Left   Speed
  0  0     0    0     0     0      0     0  --:--:--  --:--:--  --:--:--    0
100 42.8M 100 42.8M    0     0 4386k    0  0:00:10  0:00:10  --:--:-- 3916k
root@debian:~# ln -s /usr/local/bin/docker-compose /usr/bin/docker-compose
root@debian:~#
```

```
root@debian:~# chmod +x /usr/local/bin/docker-compose
root@debian:~#
```

```
root@debian:~# docker-compose version
Docker Compose version v2.12.2
root@debian:~#
```

Budibase

```
root@debian:~# wget https://github.com/Budibase/budibase/releases/latest/download/cli-linux
--2022-11-06 12:12:50-- https://github.com/Budibase/budibase/releases/latest/download/cli-linux
Resolving github.com (github.com)... 140.82.121.4
Connecting to github.com (github.com)|140.82.121.4|:443... connected.
HTTP request sent, awaiting response... 302 Found
Location: https://github.com/Budibase/budibase/releases/download/v2.1.15/cli-linux [following]
--2022-11-06 12:12:51-- https://github.com/Budibase/budibase/releases/download/v2.1.15/cli-linux
Reusing existing connection to github.com:443.
HTTP request sent, awaiting response... 302 Found
Location: https://objects.githubusercontent.com/github-production-release-asset-2e65be/190729906/4e36b7de-7820-4fac-b807-156f3ae63545?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWNJYAX4CSVEH53A%2F20221106%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20221106T101251Z&X-Amz-Expires=300&X-Amz-Signature=6c7b6d84adc58fba0162ac517f762fc5d60f8955d0fc4e8697ae82e1dedba08c&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=190729906&response-content-disposition=attachment%3B%20filename%3Dcli-linux&response-content-type=application%2Foctet-stream [following]
--2022-11-06 12:12:51-- https://objects.githubusercontent.com/github-production-release-asset-2e65be/190729906/4e36b7de-7820-4fac-b807-156f3ae63545?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWNJYAX4CSVEH53A%2F20221106%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20221106T101251Z&X-Amz-Expires=300&X-Amz-Signature=6c7b6d84adc58fba0162ac517f762fc5d60f8955d0fc4e8697ae82e1dedba08c&X-Amz-SignedHeaders=host&actor_id=0&key_id=0&repo_id=190729906&response-content-disposition=attachment%3B%20filename%3Dcli-linux&response-content-type=application%2Foctet-stream
Resolving objects.githubusercontent.com (objects.githubusercontent.com)... 185.199.108.133, 185.199.111.133, 185.199.110.133, ...
Connecting to objects.githubusercontent.com (objects.githubusercontent.com)|185.199.108.133|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 158473361 (144M) [application/octet-stream]
Saving to: 'cli-linux'
```


Budibase

```
cli-linux
root@debian:~# mkdir budibase
root@debian:~# mv cli-linux budibase/
root@debian:~#
```

```
cli-linux
root@debian:~# mkdir budibase
root@debian:~# mv cli-linux budibase/
root@debian:~# cd budibase/
root@debian:~/budibase# ls -la
total 146956
drwxr-xr-x 2 root root   4096 Nov  6 12:16 .
drwx----- 5 root root   4096 Nov  6 12:16 ..
-rwxr-xr-x 1 root root 150473361 Nov  4 23:06 cli-linux
root@debian:~/budibase# mv cli-linux budi
root@debian:~/budibase#
```

Budibase

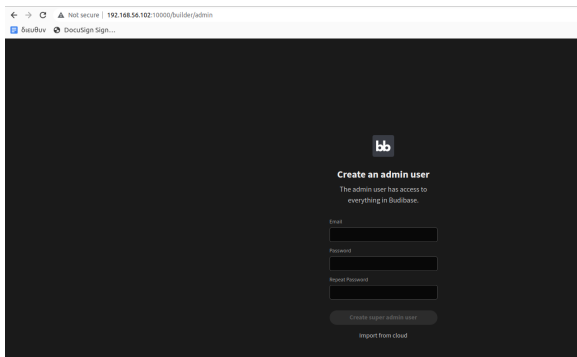
```
root@debian:~/budibase# ./budl hosting --init
bb-alert: No JWT Secret supplied, cannot configure JWT strategy
? This will create multiple files in current directory, should continue? Yes
? Please enter the port on which you want your installation to run: 10000
Configuration has been written successfully - please check /root/budibase/.env for more details.
root@debian:~/budibase#
```

```
root@debian:~/budibase# ./budl hosting --start
Starting services, this may take a moment - first time this may take a few minutes to download images.
time="2022-11-06T12:18:46+02:00" level=warning msg="The \"BB_ADMIN_USER_EMAIL\" variable is not set. D
efaulting to a blank string."
time="2022-11-06T12:18:46+02:00" level=warning msg="The \"BB_ADMIN_USER_PASSWORD\" variable is not set
. Defaulting to a blank string."
time="2022-11-06T12:18:46+02:00" level=warning msg="The \"PLUGINS_DIR\" variable is not set. Defaultin
g to a blank string."
app-service Pulling
worker-service Pulling
minio-service Pulling
proxy-service Pulling
couchdb-service Pulling
couch-init Pulling
redis-service Pulling
watchtower-service Pulling
e9995326b091 Pulling fs layer
71689475aec? Pulling fs layer
```

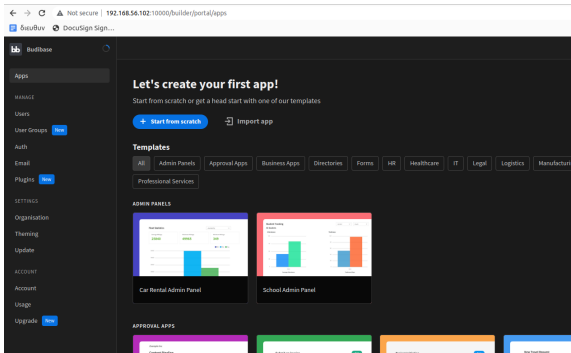
```
Container budibase-minio-service-1 Starting
Container budibase-redis-service-1 Starting
Container budibase-couchdb-service-1 Starting
Container budibase-watchtower-service-1 Starting
Container budibase-minio-service-1 Started
Container budibase-watchtower-service-1 Started
Container budibase-couchdb-service-1 Started
Container budibase-couch-init-1 Starting
Container budibase-redis-service-1 Started
Container budibase-couch-init-1 Started
Container bbworker Starting
Container bbworker Started
Container bbapps Starting
Container bbapps Started
Container bbproxy Starting
Container bbproxy Started
Services started, please go to http://localhost:10000 for next steps.
root@debian:~/budibase#
```



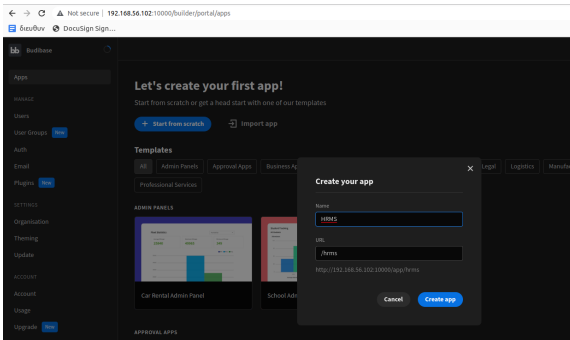
Admin Χρήστης



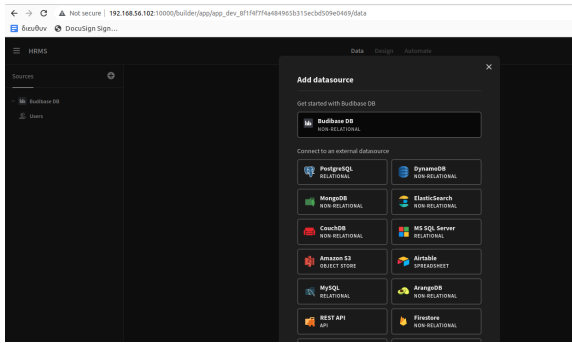
Landing Page



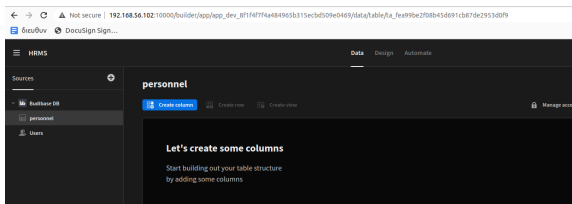
Δημιουργία



Δεδομένα



Δεδομένα

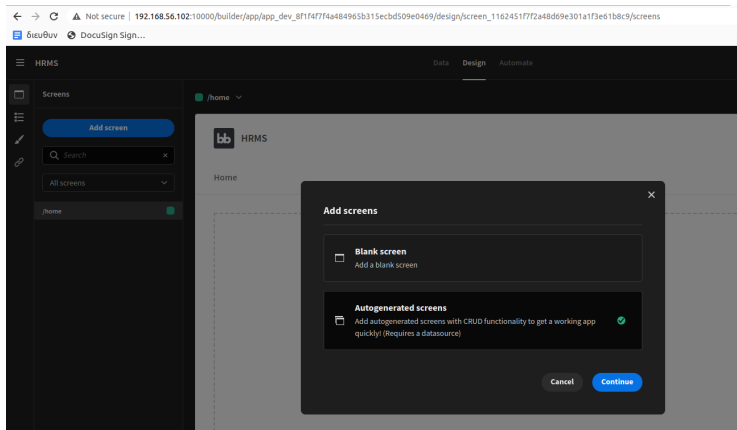


Δεδομένα

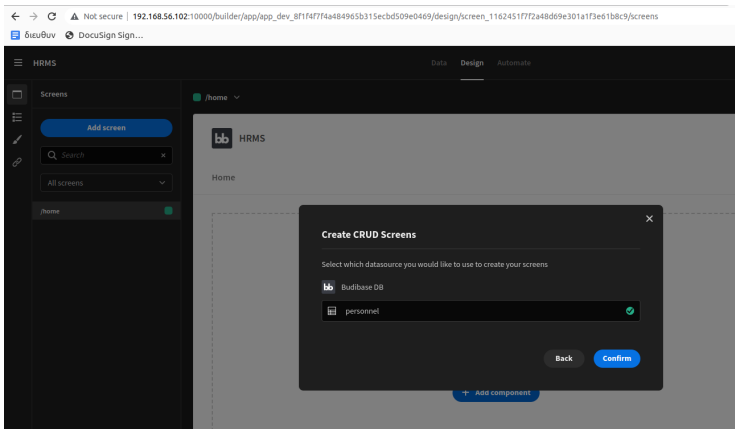
The screenshot displays the Budibase interface for an HRMS application. The browser address bar shows the URL: 192.168.56.102:10000/builder/app/dev_8f1f477fe4849e5b315ecb509e0469/data/table/ta_fea99be2708b45d691cb87d62953d0f9. The application title is 'HRMS'. The main view is titled 'personnel' and includes a 'Create view' button. Below the title is a table with the following columns: GIVERNAME, SURNAME, IDNUMBER, DEPARTMENT, TITLE, and NOTES. The table is currently empty, and a message prompts the user to 'Now let's add a row'.

GIVERNAME	SURNAME	IDNUMBER	DEPARTMENT	TITLE	NOTES
-----------	---------	----------	------------	-------	-------

UI



UI

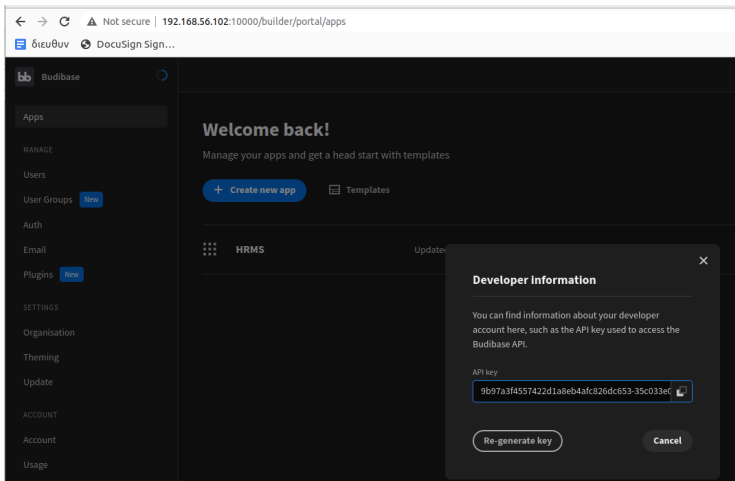


Δοκιμαστικά Δεδομένα

The screenshot shows the Budibase web interface. The browser address bar displays the URL: `192.168.56.102:10000/builder/app/app_dev_8f1f4f7f4a484965b315ecbd509e0469/data/table/ta_fea99be2f08b45d691cb87de29`. The interface is in dark mode and shows a table named 'personnel' with columns 'GIVENNAME' and 'SURNAME'. A 'Create Row' dialog is open on the right, with the following data entered:

GivenName	Surname	IdNumber	Department	Title	Notes
Thomas	Kamalakis	83875476	Informatics and Telematics	Professor	

API key



Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 8η

Θωμάς Καμαλάκης

Χαροκόπειο Πανεπιστήμιο Αθηνών

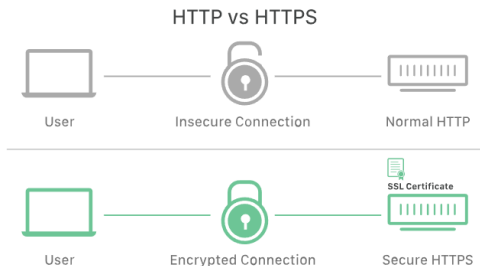
Οκτώβριος 2022

Εισαγωγή

- Για να χρησιμοποιήσουμε το API του Budibase θα χρειαστούμε την βιβλιοθήκη requests της Python.
- Είναι builtin.
- Μας βοηθάει να στείλουμε HTTP requests σε κάποιο URL.
- Εκεί συνήθως ζει ένα micro-service που μας απαντάει.
- Στο budibase, το URL είναι της μορφής
`http://192.168.56.102:10000/api/public/v1/`

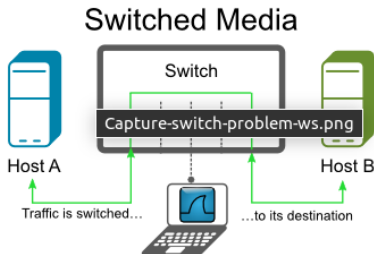
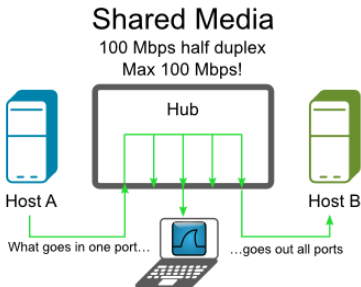
Προσοχή!

- Εμείς θα χρησιμοποιήσουμε http αλλά δεν είναι ασφαλές!
- Δεν θα δουλεύαμε έτσι σε production περιβάλλον.
- Εκεί θα έπρεπε να χρησιμοποιήσουμε https.



Προσοχή!

- Με ένα wireshark μπορεί κάποιος να ακούσει τα πακέτα μας.
- Βέβαια στα σύγχρονα ενσύρματα δίκτυα έχουμε switched αρχιτεκτονική.



Υλοποίηση

```
2 API_KEY = '9b97a3f4557422d1a8eb4afc826dc653-35
      c033e048e478935d278bdc8d15773e17c4ef3b57c38c640746c9e0a0054578f0718d1006281b55'
3 URL = 'http://192.168.56.102:10000/api/public/v1'
4 APP_MAP = {
5     'HRMS' : 'app_7a2fcd762e6a47d19ed0a5557296417d'
6 }
7 TABLE_IDS = {
8     'personnel' : 'ta_a4fd098cc1dd4a4cac9a889d4ccecf86d'
9 }
10
11 import requests
12 import json
13 class budiapi:
14
15     def __init__(self, api_key = API_KEY, master_url = URL, app_map = APP_MAP, table_ids = TABLE_IDS):
16         self.api_key = api_key
17         self.master_url = master_url
18         self.app_map = app_map
19         self.table_ids = table_ids
```

Listing: budi.py

Υλοποίηση

```
22 def post_headers(self, app_id = None):
23     headers = {"Accept": "application/json",
24               "Content-Type": "application/json",
25               "x-budibase-api-key" : self.api_key }
26     if app_id is not None:
27         headers['x-budibase-app-id'] = app_id
28
29     return headers
```

Listing: budi.py

Υλοποίηση

```
32 def get_table_info(self, table_name, app_name):
33     table_id = self.table_ids[ table_name ]
34     app_id = self.app_map[ app_name ]
35     url = self.master_url + '/tables/' + table_id
36     headers = self.post_headers( app_id = app_id )
37     response = requests.get(url, headers = headers)
38     return json.loads(response.text)[ 'data' ]
```

Listing: budi.py

Υλοποίηση

```
41 def get_table_data(self, table_name, app_name):
42     table_id = self.table_ids[ table_name ]
43     app_id = self.app_map[ app_name ]
44     url = self.master_url + '/tables/' + table_id + '/rows/search'
45     headers = self.post_headers( app_id = app_id )
46     response = requests.post(url, headers = headers)
47     return json.loads(response.text)[ 'data' ]
```

Listing: budi.py

Απλή δοκιμή

```
1 from budi import budiapi
2 b = budiapi()
3 info = b.get_table_info('personnel', 'HRMS')
4 print(info)
5
6 data = b.get_table_data('personnel', 'HRMS')
7 print(data)
```

Listing: table.py

```
[{'_id': 'ro_ta_fea99be2f08b45d691cb87de2953d0f9_a0826f72896c4ba9b79ab0d902092512', 'notes': '', 'title': 'Professor', 'department': 'Informatics and Telematics', 'idNumber': '83875476', 'surname': 'Kamalakis', 'givenName': 'Thomas', 'tableId': 'ta_fea99be2f08b45d691cb87de2953d0f9', 'Auto ID': 1, 'Created At': '2022-11-06T10:52:56.424Z', 'Updated At': '2022-11-06T10:52:56.424Z', 'type': 'row', 'createdAt': '2022-11-06T10:52:57.003Z', 'updatedAt': '2022-11-06T10:52:57.003Z', 'Created By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94026d75a1', 'primaryDisplay': 'thomas@hua.gr'}], 'Updated By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94026d75a1', 'primaryDisplay': 'thomas@hua.gr'}]
]>>>
```

Δημιουργία

```
50 def create_row(self, table_name, app_name, value_dict):
51     table_id = self.table_ids[ table_name ]
52     app_id = self.app_map[ app_name ]
53     url = self.master_url + '/tables/' + table_id + '/rows'
54     headers = self.post_headers( app_id = app_id )
55     response = requests.post(url, headers = headers, json = value_dict)
56     return json.loads(response.text)[ 'data' ]
```

Listing: budi.py

```
1 from budi import budiapi
2 b = budiapi()
3 r = b.create_row('personnel', 'HRMS',
4                 {'notes': 'nada',
5                  'title': 'Professor',
6                  'department': 'Informatics and Telematics',
7                  'idNumber': '12345',
8                  'surname': 'Ayiannis',
9                  'givenName': 'Yiannis' })
10 print(r)
```

Listing: createrow.py

Δημιουργία

The screenshot shows the Budibase interface for an HRMS system. The main view is a table named 'personnel'. The table has the following columns: GIVENAME, SURNAME, IDNUMBER, DEPARTMENT, and TITLE. There are two rows of data:

GIVENAME	SURNAME	IDNUMBER	DEPARTMENT	TITLE
Thomas	Karalakis	63375476	Informatics and Telematics	Professor
Yiannis	Ayiannis	12345	Informatics and Telematics	Professor

```

thomas@kirkklaptop:~/Documents/mscopython/code/lecture8$ python3 -i createrow.py
{'notes': 'nada', 'title': 'Professor', 'department': 'Informatics and Telematic
s', 'idNumber': '12345', 'surname': 'Ayiannis', 'givenName': 'Yiannis', 'tableId
': 'ta fea99be2f08b45d691cb87de2953d0f9', 'type': 'row', '_id': 'ro ta fea99be2f
08b45d691cb87de2953d0f9_2e835f28918a405b8774bd8d74178c10', 'Auto ID': 2, 'Create
d At': '2022-11-13T12:38:31.509Z', 'Updated At': '2022-11-13T12:38:31.509Z', 'Cr
eated By': [{'_id': 'ro ta users us_7271ae1007bd4522a5c2ae94026d75a1', '_rev': '
2-be9845daefd0459fe36206e3dfd40ac4', 'createdAt': '1667730273312', 'email': 'thoma
s@hua.gr', 'builder': {'global': True}, 'admin': {'global': True}, 'tenantId': '
default', 'status': 'active', 'updatedAt': '2022-11-13T12:18:19.760Z', 'dayPassR
ecordedAt': '2022-11-13T12:18:19.760Z', 'roleId': 'ADMIN', 'tableId': 'ta_users'
}], 'Updated By': [{'_id': 'ro ta users us_7271ae1007bd4522a5c2ae94026d75a1', '
rev': '2-be9845daefd0459fe36206e3dfd40ac4', 'createdAt': '1667730273312', 'email':
'thomas@hua.gr', 'builder': {'global': True}, 'admin': {'global': True}, 'tenan
tId': 'default', 'status': 'active', 'updatedAt': '2022-11-13T12:18:19.760Z', 'd
ayPassRecordedAt': '2022-11-13T12:18:19.760Z', 'roleId': 'ADMIN', 'tableId': 'ta
_users'}}]
>>>
  
```

Αναζήτηση

```
59 def search_rows(self, table_name, app_name, query_dict):
60     table_id = self.table_ids[ table_name ]
61     app_id = self.app_map[ app_name ]
62     url = self.master_url + '/tables/' + table_id + '/rows/search'
63     headers = self.post_headers( app_id = app_id )
64     payload = { 'query' : { 'string' : query_dict } }
65     response = requests.post(url, headers = headers, json = payload )
66     return json.loads(response.text)[ 'data' ]
```

Listing: budi.py

```
1 from budi import budiapi
2 b = budiapi()
3 r = b.search_rows('personnel', 'HRMS',
4                 { 'title': 'Professor' } )
5 print(r)
6
7 r = b.search_rows('personnel', 'HRMS',
8                 { 'surname': 'Kamalakis' } )
9 print(r)
```

Listing: searchrow.py

Αναζήτηση

```

[{'_id': 'ro_ta_fea99be2f08b45d691cb87de2953d0f9_a0826f72896c4ba9b79ab0d902092512', 'notes': '', 'title': 'Professor', 'department': 'Informatics and Telematics', 'idNumber': '83875476', 'surname': 'Kamalakis', 'givenName': 'Thomas', 'tableId': 'ta_fea99be2f08b45d691cb87de2953d0f9', 'Auto ID': 1, 'Created At': '2022-11-06T10:52:56.424Z', 'Updated At': '2022-11-06T10:52:56.424Z', 'type': 'row', 'createdAt': '2022-11-06T10:52:57.003Z', 'updatedAt': '2022-11-06T10:52:57.003Z', 'Created By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94026d75a1', 'primaryDisplay': 'thomas@hua.gr'}], 'Updated By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94026d75a1', 'primaryDisplay': 'thomas@hua.gr'}]}, {'_id': 'ro_ta_fea99be2f08b45d691cb87de2953d0f9_2e835f28918a405b8774bd8d74178c10', 'notes': 'nada', 'title': 'Professor', 'department': 'Informatics and Telematics', 'idNumber': '12345', 'surname': 'Yiannis', 'givenName': 'Yiannis', 'tableId': 'ta_fea99be2f08b45d691cb87de2953d0f9', 'type': 'row', 'Auto ID': 2, 'Created At': '2022-11-13T12:38:31.509Z', 'Updated At': '2022-11-13T12:38:31.509Z', 'createdAt': '2022-11-13T12:38:31.875Z', 'updatedAt': '2022-11-13T12:38:31.875Z', 'Created By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94026d75a1', 'primaryDisplay': 'thomas@hua.gr'}], 'Updated By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94026d75a1', 'primaryDisplay': 'thomas@hua.gr'}]}, {'_id': 'ro_ta_fea99be2f08b45d691cb87de2953d0f9_a0826f72896c4ba9b79ab0d902092512', 'notes': '', 'title': 'Professor', 'department': 'Informatics and Telematics', 'idNumber': '83875476', 'surname': 'Kamalakis', 'givenName': 'Thomas', 'tableId': 'ta_fea99be2f08b45d691cb87de2953d0f9', 'Auto ID': 1, 'Created At': '2022-11-06T10:52:56.424Z', 'Updated At': '2022-11-06T10:52:56.424Z', 'type': 'row', 'createdAt': '2022-11-06T10:52:57.003Z', 'updatedAt': '2022-11-06T10:52:57.003Z', 'Created By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94026d75a1', 'primaryDisplay': 'thomas@hua.gr'}], 'Updated By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94026d75a1', 'primaryDisplay': 'thomas@hua.gr'}]}]
>>>

```

Ενημέρωση

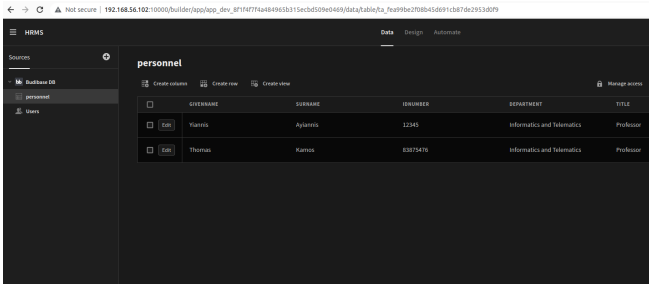
```
69 def update_row(self, table_name, app_name, query_dict, value_dict):
70
71     rows = self.search_rows(table_name, app_name, query_dict)
72     if len(rows) == 1:
73         table_id = self.table_ids[ table_name ]
74         app_id = self.app_map[ app_name ]
75         row_id = rows[0]['_id']
76         url = self.master_url + '/tables/' + table_id + '/rows/' + row_id
77         headers = self.post_headers( app_id = app_id )
78         response = requests.put(url, headers = headers, json = value_dict)
79         return json.loads(response.text)[ 'data' ]
80     else:
81         raise ValueError('Number of matching rows must be exactly 1 not ' + str(len(rows)) + '.')
```

Listing: budi.py

```
1 from budi import budiapi
2 b = budiapi()
3
4 r = b.update_row('personnel', 'HRMS',
5                 {'surname': 'Kamalakis' },
6                 {'surname' : 'Kamos'})
7 print(r)
```

Listing: updatetrow.py

Ενημέρωση



```
thomas@kirkclaptop:~/Documents/mcspython/code/lecture8$ python3 -i updatetow.py
{'_id': 'ro_ta_fea99be2f08b45d691cb87de2953d0f9_a0826f72896c4ba9b79ab0d902092512', 'notes': '', 'title': 'Professor', 'department': 'Informatics and Telematics', 'idNumber': '83875476', 'surname': 'Kamos', 'givenName': 'Thomas', 'tableId': 'ta_fea99be2f08b45d691cb87de2953d0f9', 'Auto ID': 1, 'Created At': '2022-11-06T10:52:56.424Z', 'Updated At': '2022-11-13T12:18:19.760Z', 'type': 'row', 'Created By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94826d75a1', 'rev': '2-be9845dae1d0459fe36206e3df40bac4', 'createdAt': '1667730273312', 'email': 'thomas@hua.gr', 'builder': {'global': True}, 'admin': {'global': True}, 'tenantId': 'default', 'status': 'active', 'updatedAt': '2022-11-13T12:18:19.760Z', 'dayPassRecordedAt': '2022-11-13T12:18:19.760Z', 'roleId': 'ADMIN', 'tableId': 'ta_users'}], 'Updated By': [{'_id': 'ro_ta_users_us_7271ae1007bd4522a5c2ae94826d75a1', 'rev': '2-be9845dae1d0459fe36206e3df40bac4', 'createdAt': '1667730273312', 'email': 'thomas@hua.gr', 'builder': {'global': True}, 'admin': {'global': True}, 'tenantId': 'default', 'status': 'active', 'updatedAt': '2022-11-13T12:18:19.760Z', 'dayPassRecordedAt': '2022-11-13T12:18:19.760Z', 'roleId': 'ADMIN', 'tableId': 'ta_users'}}]
>>>
```


OAuth2.0

- “Open Authorization”
- Επιτρέπει την πρόσβαση σε πόρους από υπηρεσίες εκ μέρους ενός χρήστη από μία εφαρμογή.
- Ο χρήστης θα πρέπει να δώσει την συγκατάθεση του.
- Τότε η εφαρμογή μπορεί να έχει οριοθετημένη πρόσβαση στους πόρους χωρίς να γνωρίζει τους κωδικούς πρόσβασης του χρήστη.

OAuth2.0

- **Resource server:** εκεί που υπάρχουν οι πόροι τους οποίους θέλουμε να χρησιμοποιήσουμε.
- **Resource owner:** αυτός που έχει την εξουσιοδότηση να δώσει πρόσβαση στους πόρους.
- **Client application:** η εφαρμογή που θέλει να έχει πρόσβαση στους πόρους
- **Authorization server:** αυτός που εκδίδει κουπόνια που επιτρέπουν την πρόσβαση αφού δώσει την συγκατάθεση του ο owner.
- **Scope:** καθορίζει ακριβώς τι μπορεί να κάνει η εφαρμογή πάνω στους πόρους που διαχειρίζεται.

OAuth2.0: τα υπέρ



- Χρησιμοποιεί SSL για την κωδικοποίηση της επικοινωνίας
- Δίνει περιορισμένη πρόσβαση (Scope)
- Συνδυάζεται με λύσεις single-sign-on
- Υλοποιείται με https οπότε μπορεί να εφαρμοστεί σε mobile, desktop, web εφαρμογές.
- Αρκετό documentation
- Αρκετές έτοιμες βιβλιοθήκες
- Ήδη χρησιμοποιείται από τους “γίγαντες” (Google, κτλ)
- Δεν εκθέτει τους κωδικούς του χρήστη

To API το gmail

- Πως στέλνουμε ένα e-mail από ένα Python script;
- Ο παραδοσιακός τρόπος είναι να χρησιμοποιήσουμε την βιβλιοθήκη smtplib.
- Ωστόσο με τον τρόπο αυτό θα πρέπει να βάλουμε κάπου το κωδικό που έχει ο λογαριασμός στον mail server.
- Η Google (πλέον) δεν υποστηρίζει τον τρόπο αυτό (τουλάχιστον στους standard λογαριασμούς)

Gmail Is Disabling Less Secure Apps: What To Do Next

Last updated on Jun 16, 2022 by Claire Broadley

   86 SHARES

Google has announced that it's disabling the Less Secure Apps feature on some Google accounts from May 30th, 2022.

If you're using Gmail SMTP details with our Other SMTP mailer, you may have difficulty sending emails when this feature is disabled.

We know that many of our customers rely on Gmail to send emails from

Disclaimer

- Προσοχή!
- Με τα παρακάτω παραδείγματα θα δώσουμε στον κώδικα μας πλήρη έλεγχο πάνω στο @gmail.com λογαριασμό μας.
- Όπως είμαστε προσεκτικοί με τα κλειδιά μας έτσι είμαστε και με τα κουπόνια μας.
- Π.χ. δεν τα ανεβάζουμε σε heros, δεν τα αφήνουμε σε server που δεν ελέγχουμε πλήρως κτλ.
- Καλύτερα να χρησιμοποιήσετε ένα δοκιμαστικό λογαριασμό αν το περιεχόμενο του γραμματοκιβωτίου είναι σημαντικό για εσάς.

Disclaimer



Ξεκινάμε από το GCP



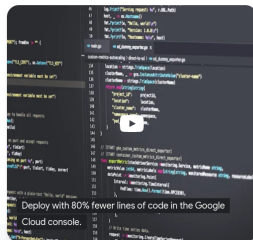
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Get started for free

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For developers What's new

DEVELOPER CENTER

Explore technical blogs, how-tos, and resources



QUICKSTART

Create a Linux VM with Compute Engine



DEVELOPER ADVOCATES

Connect with Google engineers to support your cloud journey



Δημιουργούμε έναν client

The screenshot shows the Google Cloud IAM & Admin console. The left sidebar contains a navigation menu with items like IAM, Identity & Organization, Policy Troubleshooter, Policy Analyzer, Organization Policies, Service Accounts (highlighted), Workload Identity Federat..., Labels, Tags, Settings, Privacy & Security, Identity-Aware Proxy, Roles, Audit Logs, Asset Inventory, and Essential Contacts. The main content area is titled 'Service Accounts' and displays a message: 'To view this page, select a project.' Below this, there is a section 'Select a recent project' with a card for 'My Project' containing the following information: Project ID: iomio-subject-170905, Organization: No-organization, and Accessed: Jun 16, 2017. At the top right of the main area, there are buttons for 'SELECT PROJECT' and 'CREATE PROJECT'.

Δημιουργούμε έναν client

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Google Cloud Search Products, resources, docs (/)

New Project

Warning: You have 11 projects remaining in your quota. Request an increase or delete projects. [Learn more](#)

[MANAGE QUOTAS](#)

Project name *
automationcourse

Project ID: automationcourse-368707. It cannot be changed later. [EDIT](#)

Location *
No organization [BROWSE](#)

Parent organization or folder

[CREATE](#) [CANCEL](#)

Δημιουργούμε έναν client

The screenshot shows the Google Cloud IAM & Admin console. The browser address bar displays the URL: `console.cloud.google.com/iam-admin/serviceaccounts/project=automationcourse-368707&supportedpurview=project`. The page title is "Service accounts for project 'automationcourse'".

On the left sidebar, the "Service Accounts" option is selected under the "IAM & Admin" section.

The main content area shows the "Service accounts" page for project "automationcourse". It includes a search bar, a filter input, and a table with the following columns: Email, Status, Name, Description, Key ID, Key creation date, OAuth 2 Client ID, and Actions. The table is currently empty, displaying "No rows to display".

On the right side, there is a "Recommended for" section with several links and descriptions related to service accounts, such as "Service accounts", "Creating and managing accounts", "Management access to projects and organizations", "Create and manage service keys", and "Managing service account impersonation".

Δημιουργούμε έναν client

console.cloud.google.com/iam-admin/serviceaccounts/create?project=automationcourse-368707&supportedpurview=project

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Google Cloud automationcourse Search Products, resources, docs (/)

IAM & Admin Create service account

1 Service account details

Service account name
automation

Display name for this service account

Service account ID *
automation

Email address: automation@automationcourse-368707-iam.gserviceaccount.com

Copy to clipboard

Describe what this service account will do

[CREATE AND CONTINUE](#)

2 Grant this service account access to project (optional)

Δημιουργούμε έναν client

The screenshot shows the Google Cloud IAM & Admin console interface. The browser address bar displays the URL: `console.cloud.google.com/iam-admin/serviceaccounts/create?project=automationcourse-368707&supportedpurview=project`. The page title is "Create service account".

The left sidebar shows the navigation menu with "Service Accounts" selected. The main content area displays the "Create service account" wizard with the following steps:

- 1 Service account details** (checked)
- 2 Grant this service account access to project (optional)**
 - Grant this service account access to automationcourse so that it has permission to complete specific actions on the resources in your project. [Learn more](#)
 - Select a role:
 - IAM condition (optional) [?](#)
[+ ADD IAM CONDITION](#)
 - [+ ADD ANOTHER ROLE](#)
 - [CONTINUE](#)
- 3 Grant users access to this service account (optional)**
 - [DONE](#) [CANCEL](#)

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IAM & Admin automation

DETAILS PERMISSIONS KEYS METRICS LOGS

Keys

⚠ Service account keys could pose a security risk if compromised. We recommend you avoid downloading service account keys and instead use the [Workload Identity Federation](#). You can learn more about the authenticate service accounts on Google Cloud [here](#).

Add a new key pair or upload a public key certificate from an existing key pair.

Block service account key creation using [organization policies](#).
[Learn more about setting organization policies for service accounts](#)

ADD KEY ▾

Create new key	Key creation date	Key expiration date
Upload existing key		

Δημιουργούμε έναν client

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APIs & Services

APIs & Services + ENABLE APIS AND SERVICES

Enabled APIs & services

- Library
- Credentials
- OAuth consent screen
- Domain verification
- Page usage agreements

1 hour 6 hours 12 hours **1 day** 2 days 4

Traffic

1.0%
0.8%
0.6%
0.4%
0.2%
0

12 PM 6 PM Tue 15 6 AM

Errors

100%
80%
60%
40%
20%
0

12 PM 6 PM Tue 15 6 AM

Median latency


No data is available for the selected time frame.

12 PM 6 PM Tu

Filter

Name	Requests	Errors (%)	Latency median (ms)	Latency 95% (ms)
BigQuery API				

Ανοίγουμε το Gmail API

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Google Cloud automationcourse ▾

API API Library

gmail

API Library > "gmail"

Filter Type to filter

2 results

Visibility ^

Public (2)

Category ^

Google Workspace (2)

Other (1)



Gmail API

Google

With the Gmail API, you can view and manage Gmail mailbox data like threads, messages, and labels.



Gmail Postmaster Tools API

Google

The Gmail Postmaster API is a RESTful API that provides programmatic access to email traffic metrics (like spam reports, delivery errors etc) otherwise available through the Gmail Postmaster Tools UI currently.

Ανοίγουμε το Gmail API

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☰ Google Cloud ▶ automationcourse ▾

←



Gmail API

Google

View and manage Gmail mailbox data.

[ENABLE](#) [TRY THIS API ↗](#)

- OVERVIEW
- DOCUMENTATION
- SUPPORT

Overview

With the Gmail API, you can view and manage Gmail mailbox data like threads, messages, and labels.

[Learn more ↗](#)

Additional details

Type: [SaaS & APIs](#)

Last updated: 11/7/22

Category: [Google Workspace](#)

Ανοίγουμε το Gmail API

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Google Cloud automationcourse

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APIs & Services

- Enabled APIs & services
- Library
- Credentials
- OAuth consent screen
- Domain verification
- Page usage agreements

API/Service Details

DISABLE API

Gmail API

The Gmail API lets you view and manage Gmail mailbox data like threads, messages, and labels.

By Google

Service name	Type	Status	OVERVIEW	QUICKSTARTS	API REFERENCE
gmail.googleapis.com	Public API	Enabled			

METRICS QUOTAS CREDENTIALS

Select Graphs
4 Graphs

1 hour 6 hours 12 hours 1 day 2 days 4 days

Filters: Credentials: 11711546516500729551... Methods: GetDiscovery and GetDisc...

Traffic by response code

Εγκαθιστούμε τις απαραίτητες βιβλιοθήκες

```
root@debian:~# apt-get install python3-pip
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
 binutils binutils-common binutils-x86-64-linux-gnu build-essential cpp
 cpp-10 dpkg-dev fakeroot fontconfig-config fonts-dejavu-core g++ g++-10 gcc
 gcc-10 javascript-common libalgorithm-diff-perl libalgorithm-diff-xs-perl
 libalgorithm-merge-perl libasan6 libatomic1 libbinutils libc-dev-bin
 libc-devtools libc6-dev libcc1-0 libcrypt-dev libctf-nobfd0 libctf0
 libdeflate0 libdpkg-perl libexpat1-dev libfakeroot libfile-fcntllock-perl
 libfontconfig1 libgcc-10-dev libgd3 libgomp1 libisl23 libitm1 libjbig0
 libjpeg62-turbo libjs-jquery libjs-sphinxdoc libjs-underscore liblsan0
 libmpc3 libmpfr6 libnsl-dev libpython3-dev libpython3.9 libpython3.9-dev
```

Εγκαθιστούμε τις απαραίτητες βιβλιοθήκες

```
Don't periodically check PyPI to determine
whether a new version of pip is available for
download. Implied with --no-index.
--no-color          Suppress colored output.
--no-python-version-warning
                    Silence deprecation warnings for upcoming
                    unsupported Pythons.
--use-feature <feature>
                    Enable new functionality, that may be backward
                    incompatible.
--use-deprecated <feature>
                    Enable deprecated functionality, that will be
                    removed in the future.
root@debian:~# pip install --upgrade google-api-python-client google-auth-httplib2
google-auth-oauthlib
```

Gmail Quickstart

```
2 import os.path
3 from google.auth.transport.requests import Request
4 from google.oauth2.credentials import Credentials
5 from google_auth_oauthlib.flow import InstalledAppFlow
6 from googleapiclient.discovery import build
7 from googleapiclient.errors import HttpError
8
9 # API scope
10 SCOPES = ['https://mail.google.com/']
11 creds = None
```

Listing: testgmail.py

Gmail Quickstart

```
13 # Do we already have a token?
14 if os.path.exists('token.json'):
15     # If so get credentials from token file
16     creds = Credentials.from_authorized_user_file('token.json', SCOPES)
17 # Now check whether we need to refresh the token or obtain a new one
18 if not creds or not creds.valid:
19
20     # If the token has expired, refresh it
21     if creds and creds.expired and creds.refresh_token:
22         creds.refresh(Request())
23
24     # otherwise we must login
25     else:
26         flow = InstalledAppFlow.from_client_secrets_file(
27             'credentials.json', SCOPES)
28         creds = flow.run_local_server(port=0)
29
30     # Save the token for the next run
31     with open('token.json', 'w') as token:
32         token.write(creds.to_json())
```

Listing: testgmail.py

Gmail Quickstart

```
34 try:
35     # Call the Gmail API
36     service = build('gmail', 'v1', credentials=creds)
37     results = service.users().labels().list(userId='me').execute()
38     labels = results.get('labels', [])
39
40     if not labels:
41         print('No labels found.')
42     else:
43         print('Labels:')
44         for label in labels:
45             print(label['name'])
46
47 except HttpError as error:
48     print(f'An error occurred: {error}')
```

Listing: testgmail.py

Gmail Quickstart

```
34 try:
35     # Call the Gmail API
36     service = build('gmail', 'v1', credentials=creds)
37     results = service.users().labels().list(userId='me').execute()
38     labels = results.get('labels', [])
39
40     if not labels:
41         print('No labels found.')
42     else:
43         print('Labels:')
44         for label in labels:
45             print(label['name'])
46
47 except HttpError as error:
48     print(f'An error occurred: {error}')
```

Listing: testgmail.py

Βασικές Λειτουργίες - libgmail.py

```
2 import mimetypes
3 import os.path
4 from google.auth.transport.requests import Request
5 from google.oauth2.credentials import Credentials
6 from google_auth_oauthlib.flow import InstalledAppFlow
7 from googleapiclient.discovery import build
8 from googleapiclient.errors import HttpError
9 import base64
10 from email.message import EmailMessage
11
12 SCOPES = ['https://mail.google.com/']
```

Listing: testgmail.py

Βασικές Λειτουργίες - libgmail.py

```
14 class gmailapi:
15
16     def __init__(self, token_file = 'token.json', credentials_file = 'credentials.json', from_ad = '
17         thomaskamalakis@gmail.com'):
18         self.from_ad = from_ad
19         try:
20             creds = None
21             if os.path.exists(token_file):
22                 creds = Credentials.from_authorized_user_file(token_file, SCOPES)
23
24             if not creds or not creds.valid:
25                 if creds and creds.expired and creds.refresh_token:
26                     creds.refresh(Request())
27                 else:
28                     flow = InstalledAppFlow.from_client_secrets_file(
29                         credentials_file, SCOPES)
30                     creds = flow.run_local_server(port = 0)
31                 with open(token_file, 'w') as token:
32                     token.write(creds.to_json())
33
34             self.service = build('gmail', 'v1', credentials = creds)
35
36     except HttpError as error:
37         print(f'An error occurred: {error}')
```

Listing: testgmail.py

Βασικές Λειτουργίες - libgmail.py

```
38 def build_message(self, to, subject, body):
39     message = EmailMessage()
40
41     message['To'] = to
42     message['From'] = self.from_ad
43     message['Subject'] = subject
44     message.set_content( body )
45     return message
```

Listing: libmail.py

Βασικές Λειτουργίες - libgmail.py

```
47 def build_draft(self, message):
48     encoded_message = base64.urlsafe_b64encode(message.as_bytes()).decode()
49     create_message = {
50         'message': {
51             'raw': encoded_message
52         }
53     }
54     draft = self.service.users().drafts().create(userId = "me",
55                                                  body = create_message).execute()
56     return draft
```

Listing: libmail.py

Βασικές Λειτουργίες - libgmail.py

```
58 def create_draft(self, to, subject, body):
59     message = self.build_message(to, subject, body)
60     return self.build_draft(message)
61
62 def create_draft_with_attachments(self, to, subject, body, attachments = []):
63     message = self.build_message(to, subject, body)
64
65     for attachment in attachments:
66         type_subtype, _ = mimetypes.guess_type(attachment)
67         maintype, subtype = type_subtype.split('/')
68
69         with open(attachment, 'rb') as f:
70             data = f.read()
71             filename = os.path.basename( attachment )
72             message.add_attachment(data, maintype, subtype, filename = filename)
73     return self.build_draft( message )
```

Listing: libmail.py

Δημιουργία προσωρινού e-mail

```
75     def send(self, to, subject, body, attachments = []):
76         draft_dict = self.create_draft_with_attachments(to, subject, body, attachments = attachments)
77         id = draft_dict['id']
78         draft = self.service.users().drafts().send(body = {'id': id}, userId = 'me').execute()
```

Listing: libmail.py

```
1 from libgmail import gmailapi
2
3 subject = 'Test e-mail'
4 to = 'thkam@hua.gr'
5 body = \
6 """
7 This is a test email
8 using the gmail API
9 """
10
11 g = gmailapi()
12 g.create_draft(to, subject, body)
```

Listing: testdraft.py

Αποστολή e-mail

```
1 from libgmail import gmailapi
2
3 subject = 'Test e-mail'
4 to = 'thkam@hua.gr'
5 body = \
6 """
7 This is a test email
8 using the gmail API
9 """
10
11 attachment = 'pic.png'
12 g = gmailapi()
13 g.send(to, subject, body, attachments = [attachment])
```

[Listing: testsend.py](#)



Disclaimer



Calendar Quickstart

```
2 import datetime
3 import os.path
4
5 from google.auth.transport.requests import Request
6 from google.oauth2.credentials import Credentials
7 from google_auth_oauthlib.flow import InstalledAppFlow
8 from googleapiclient.discovery import build
9 from googleapiclient.errors import HttpError
10
11 SCOPES = ['https://www.googleapis.com/auth/calendar']
```

Listing: testcalendar.py

Calendar Quickstart

```
13 creds = None
14 if os.path.exists('cal_token.json'):
15     creds = Credentials.from_authorized_user_file('cal_token.json', SCOPES)
16 if not creds or not creds.valid:
17     if creds and creds.expired and creds.refresh_token:
18         creds.refresh(Request())
19     else:
20         flow = InstalledAppFlow.from_client_secrets_file(
21             'calendar_creds.json', SCOPES)
22         creds = flow.run_local_server(port=0)
23     with open('cal_token.json', 'w') as token:
24         token.write(creds.to_json())
```

Listing: testcalendar.py

Calendar Quickstart

```

26 try:
27     service = build('calendar', 'v3', credentials=creds)
28
29     # Call the Calendar API
30     now = datetime.datetime.utcnow().isoformat() + 'Z' # 'Z' indicates UTC time
31     print('Getting the upcoming 10 events')
32     events_result = service.events().list(calendarId='primary', timeMin=now,
33                                         maxResults=10, singleEvents=True,
34                                         orderBy='startTime').execute()
35     events = events_result.get('items', [])

```

Listing: testcalendar.py

Calendar Quickstart

```
37     if not events:
38         print('No upcoming events found.')
39     else:
40
41         # Prints the start and name of the next 10 events
42         for event in events:
43             start = event['start'].get('dateTime', event['start'].get('date'))
44             print(start, event['summary'])
45
46 except HttpError as error:
47     print('An error occurred: %s' % error)
```

Listing: testcalendar.py

Αυτοματοποιημένη Διαχείριση Συστημάτων

Διάλεξη 10η

Θωμάς Καμαλάκης

Χαροκόπειο Πανεπιστήμιο Αθηνών

Οκτώβριος 2022

Αυτοματοποιημένοι Έλεγχοι

- Πολύ συχνά στην ανάπτυξη λογισμικού και στην διαχείριση συστημάτων χρησιμοποιούμε αυτοματοποιημένους ελέγχους.
- Συχνά ο έλεγχος γίνεται ανά μονάδες (units).
- Υπάρχουν διάφορα παραδείγματα αυτοματοποιημένου ελέγχου αλλά εμείς θα επικεντρώσουμε σε ένα.
- Μπορούν οι χρήστες του Πανεπιστημίου να κάνουν login στην Google;

Εργαλεία Παρακολούθησης

- Πολύ συχνά ένας οργανισμός πρέπει να στήσει εργαλεία παρακολούθησης των συστημάτων του.
- Τα εργαλεία αυτά παρακολουθούν τις δικτυακές και υπολογιστικές υποδομές και χρησιμοποιούνται για έγκαιρη αναγνώριση αστοχιών υλικού ή λογισμικού.
- Παραδείγματα τέτοιων εργαλείου είναι το Zabbix και το Nagios
- Εκεί κανείς μπορεί να προγραμματίσει ελέγχους και σε περίπτωση όπου κάποιος έλεγχος αποτύχει να ειδοποιηθούν οι διαχειριστές.

Εργαλεία Παρακολούθησης

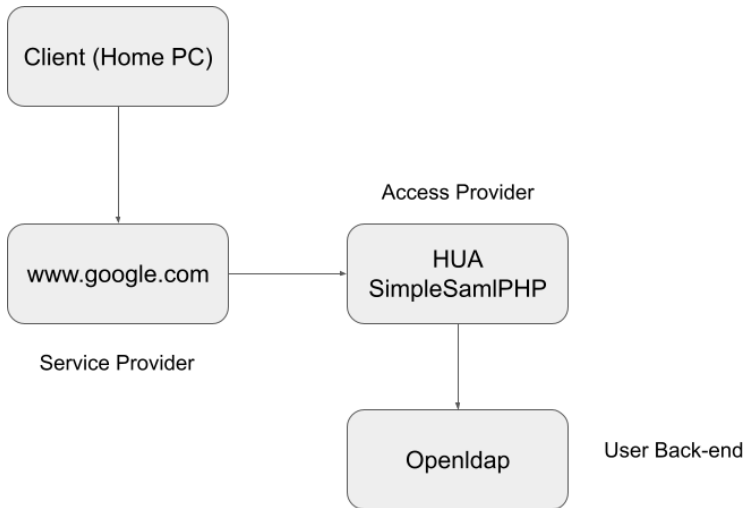


Εργαλεία Παρακολούθησης

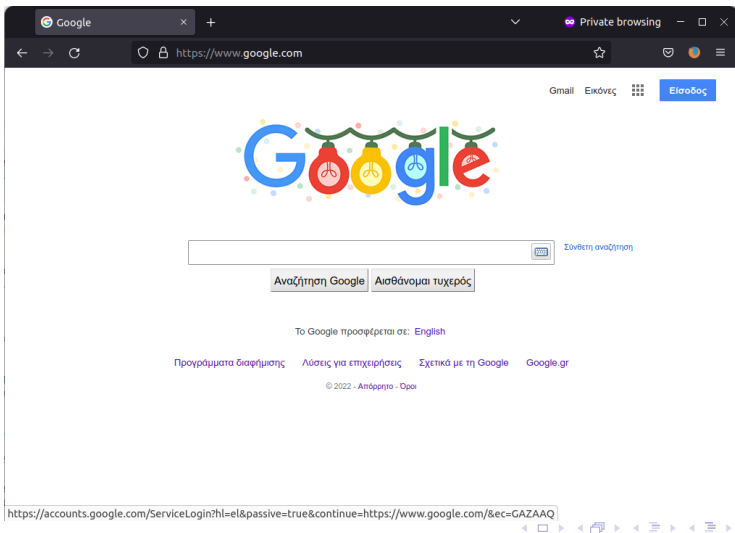
The screenshot displays the ZABBIX web interface. On the left is a dark sidebar with navigation options: Monitoring, Dashboard, Problems, Hosts, Latest data, Maps, Discovery, Services, Inventory, Reports, Configuration, Administration, Support, and Integrations. The main content area is titled 'Host configuration' and includes several input fields: Name, Host groups (with a search box and 'Select' button), IP, DNS, and Port. There are also checkboxes for 'Show hosts in maintenance' and 'Show suppressed problems'. A 'Severity' section contains checkboxes for 'Not classified', 'Warning', 'High', 'Information', 'Average', and 'Disaster'. At the top right, there are buttons for 'Any', 'Enabled', and 'Disabled', and a 'Tags' section with 'And/Or' and 'Or' options, a 'tag' input, a 'Contains' dropdown, and a 'value' input. Below these are 'Save as', 'Apply', and 'Reset' buttons. The bottom part of the interface shows a table of hosts with columns for Name, Interface, Availability, Tags, Status, Latest data, Problems, Graphs, and Das.

Name	Interface	Availability	Tags	Status	Latest data	Problems	Graphs	Das
accountsweb	10.100.59.199-10050	ZBX		Enabled	Latest data 110	2	Graphs 22	Das
bbb1	83.212.240.41-10050	ZBX		Enabled	Latest data 97	1	Graphs 23	Das
bbb2	83.212.240.42-10050	ZBX		Enabled	Latest data 97	1	Graphs 23	Das
bbb3	83.212.240.43-10050	ZBX		Enabled	Latest data 58	1	Graphs 12	Das
bbb4	83.212.240.44-10050	ZBX		Enabled	Latest data 97	1	Graphs 23	Das
bbb5	83.212.240.45-10050	ZBX		Enabled	Latest data 97	1	Graphs 23	Das
bbbfileserver	10.100.59.170-10050	ZBX		Enabled	Latest data 93	Problems	Graphs 23	Das
bbbpostgres	10.100.59.172-10050	ZBX		Enabled	Latest data 120	1	Graphs 27	Das

Google sign in

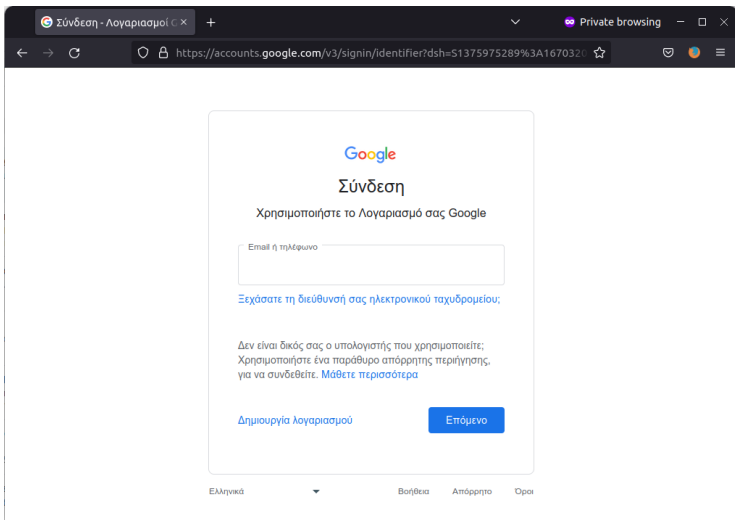


www.google.com

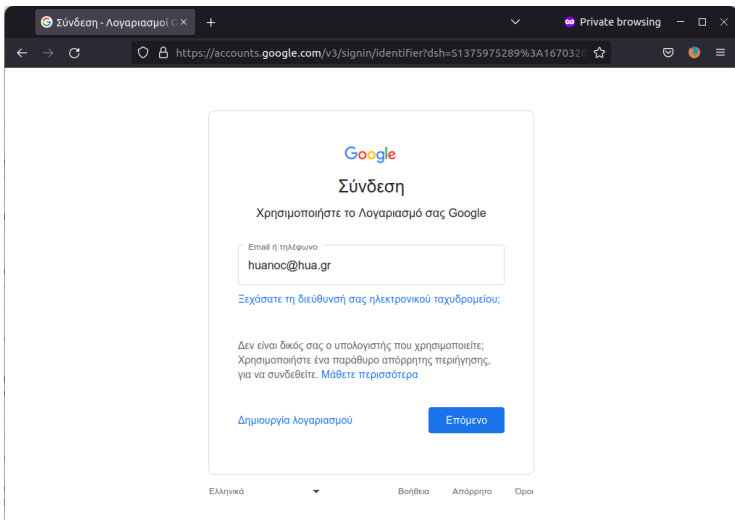


https://accounts.google.com/ServiceLogin?hl=el&passive=true&continue=https://www.google.com/&ec=GAZAAQ

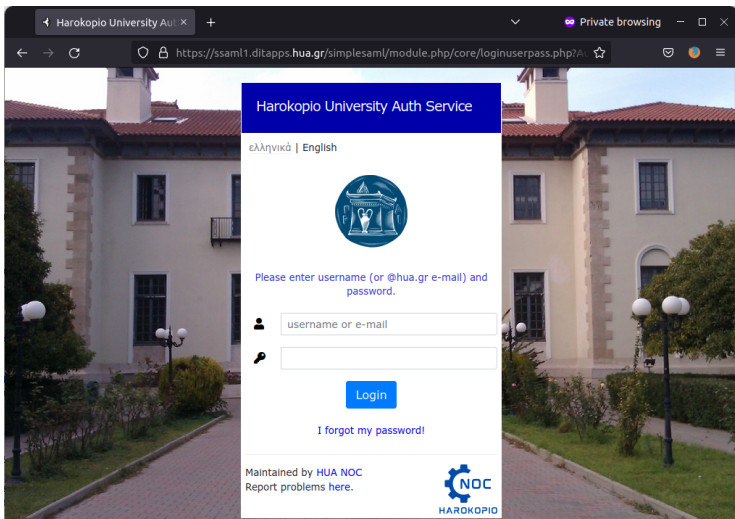
www.google.com



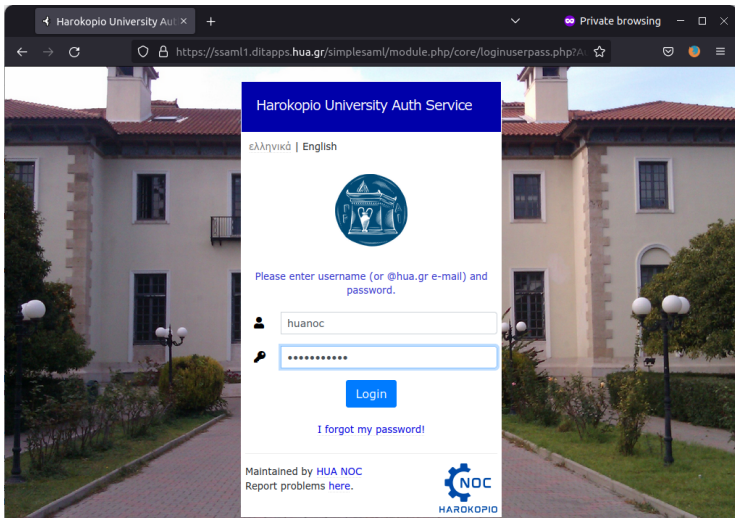
www.google.com



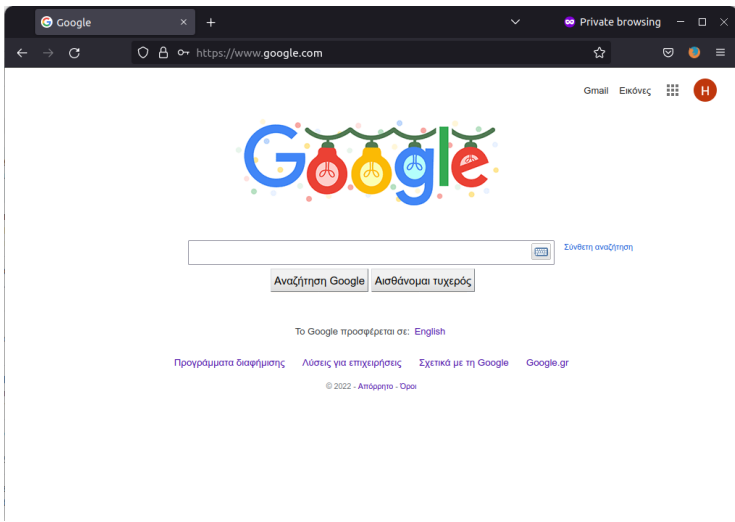
SSO



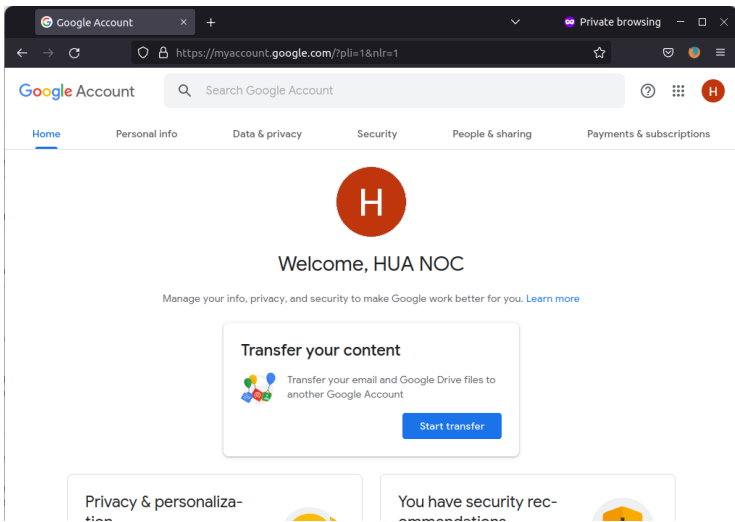
SSO



www.google.com



accounts.google.com



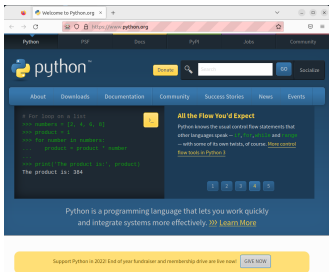
Selenium

- Μία συλλογή από εργαλεία για να αυτοματοποιήσουμε ελέγχους μέσω browser.
- Αν και έχει δικό του IDE εμείς θα χρησιμοποιήσουμε την βιβλιοθήκη της Python.
- δεν είναι standard οπότε θα πρέπει να την εγκαταστήσουμε με το pip3 install selenium

Παράδειγμα

```
1 from selenium import webdriver
2 from selenium.webdriver.common.by import By
3
4 driver = webdriver.Firefox()
5 driver.get('https://www.python.org')
6 print(driver.title)
```

Listing: testsel.py



```
thomas@klrkhome2:~/Documents/nscpython/code/lecture1$ python3 -l testsel.py
Welcome to Python.org
>>> █
```

Παράδειγμα: αναζήτηση

```
1 from selenium import webdriver
2 from selenium.webdriver.common.by import By
3
4 driver = webdriver.Firefox()
5 driver.get('https://www.python.org')
6 ps = driver.find_elements(By.TAG_NAME, 'p')
7 for i, p in enumerate(ps):
8     print('-----')
9     print('Element: %d' % i)
10    print(p.text)
11    print('-----')
```

Listing: testp.py

```
Element: 18
Reimagining data science with Python-based operators in Einblick's visual canvas
by Becca Weng
-----
Element: 19
More
-----
Element: 20
The mission of the Python Software Foundation is to promote, protect, and advance
the Python programming language, and to support and facilitate the growth of a
diverse and international community of Python programmers. Learn more
-----
Element: 21
Become a Member Donate to the PSF
-----
Element: 22
Copyright ©2001-2022. Python Software Foundation Legal Statements Privacy Policy
Powered by Heroku
-----
```

Παράδειγμα: κλικ

```
1 from selenium import webdriver
2 from selenium.webdriver.common.by import By
3
4 driver = webdriver.Firefox()
5 driver.get('https://www.python.org')
6 button = driver.find_element(By.ID, 'submit')
7 button.click()
```

Listing: testclick

Παράμετροι

```
2 from selenium import webdriver
3 from selenium.webdriver.common.by import By
4 import time
5 import configparser
6
7 USERNAME = 'testuser1@hua.gr'
8 ACCEPT_TERMS = 'Αποδοχή όλων'
9 USER_GREETINGS = 'James Kirk'
10 PASSWORD_FILE = 'password.conf'
11
12 config = configparser.ConfigParser()
13 config.read(PASSWORD_FILE)
14 password = config['DEFAULT']['password']
```

Listing: testgoogle.py

Βήμα 1ο: accept terms

```
1 Αποδοχήδολων
17 driver = webdriver.Firefox()
18 driver.get('https://www.google.com')
19 time.sleep(2)
20 buttons = driver.find_elements(By.ID, 'L2AGLb')
21 assert len(buttons) == 1
22 select = buttons[0]
23 select.click()
```

Listing: testgoogle.py

Βήμα 2ο: Login

```
1 Αποδοχή όλων
26 links = driver.find_elements(By.LINK_TEXT, 'Είσοδος')
27 assert len(links) == 1
28 select = links[0]
29 select.click()
30
31 username_elements = driver.find_elements(By.ID, 'identifierId')
32 assert len(username_elements) == 1
33 select = username_elements[0]
34 select.send_keys(USERNAME)
35
36 next_elements = driver.find_elements(By.ID, 'identifierNext')
37 assert len(next_elements) == 1
38 select = next_elements[0]
39 select.click()
```

Listing: testgoogle.py

Βήμα 2ο: Login

The screenshot shows the Chrome DevTools Inspector with the HTML tree expanded to a login button. The button's href attribute is highlighted in blue. The href points to the Google Accounts login page with the following parameters: hl=en, passive=true, continue=https://www.google.com/sec=GAZAmq0, and target=top.

```
Search HTML
<div class="L3eUgb" data-hveid="1"> [event] [flex]
  <div class="o3j99 nlxJcf Ne6nSd"> [flex]
    <style data-ml="1670330775695"> [style]
    <div class="LX3sZb">
      <div id="gb" class="gb_ua gb_3d gb_6a gb_Rc">
        <div class="gb_ld gb_3a gb_Pd" data-ogsr-up=""> [flex]
          <div> [div]
          <div class="gb_We">
            <div class="gb_Xc"> [div]
              <a class="gb_7 gb_8 gb_de gb_dd" href="https://accounts.google.com/ServiceLogin?hl=en&passive=true&continue=https://www.google.com/sec=GAZAmq0" target="top">Είσοδος</a> [event]
            </div>
            <div style="overflow: hidden; position: absolute; top: 0px; visibility: ...; height: 0.3s ease-in-out 0s; right: 0px; margin-right: 4px;"> [div]
          </div>
        </div>
      </div>
    </div>
  <div class="o3j99 LLD4me LS80J"> [div] [flex]
  <div class="o3j99 ikrT4e om7nvf"> [div] [flex]
```

Βήμα 2ο: Login

```
<div jsslot="">
  <div class="d2CFce cD5mF cxMOTc" jscontroller="Y9IaVe" jsaction="keydown:C9BaXe;022p3e;0p2Z0;AHmwu;JtIEX;rcu06b;rcu06b;Yq05N.Lu06b;EJh3N;rcu06b;SPVj8e;d10fJ;RXQ14b;.CLIENT;TGB85e;.CLIENT" jsname="dwnPKM" data-allow-at-sign="true" role="presentation" data-is-rendered="true">
    <div class="rFrNMe N3Hzgf jJwyfe Q80rY zKHdkd sdJrJc Tyc9J" jscontroller="pxq3x" jsaction="clickonly:KjsqPd; focus:JtIEX; blur:fpfTE; input:Lg55V" jsshadow="" jsname="Ufn60">
      <div class="aCsJod oJeWuf">
        <div class="aXBTI Wic03c"> flex
          <div class="Xb9hP"> flex
            <input id="identifierId" class="whs0nd zHQkBF" type="email" jsname="YPqjbf" autocomplete="username" spellcheck="false" tabindex="0" aria-label="Email ή τηλέφωνο" name="identifier" value="" autocapitalize="none" dir="ltr" data-initial-dir="ltr" data-initial-value=""> event
            <div class="AxOyFc snByac" jsname="YRMnle" aria-hidden="true">Email ή τηλέφωνο</div>
          </div>
          <div class="19lrp mIZhlc"> </div>
          <div class="0ab0Me cXrdqd Y2Zypf" jsname="XmwAc"></div>
        </div>
      </div>
    <div class="LXRPh"> </div> flex
  </div>
```

Βήμα 3ο: HUA SSO & Google Accounts

```
1 Αποδοχή όλων Είσοδος
41
42 time.sleep(5)
43 assert "Harokopio" in driver.title
44
45 select = driver.find_element(By.ID, 'username')
46 select.send_keys(USERNAME)
47 select = driver.find_element(By.ID, 'password')
48 select.send_keys(password)
49 button = driver.find_element(By.ID, 'submit_button')
50 button.click()
```

Listing: testgoogle.py

Βήμα 3ο: ΗΥΑ SSO & Google Accounts

```
▶ <div class="row"> ... </div> flex
▶ <div class="row"> ... </div> flex
▼ <div class="row"> flex
  ▼ <div class="col text-center">
    ▼ <form action="" method="post" name="f">
      ▼ <div class="form-group">
        ▼ <div class="input-group mb-3"> flex
          ▶ <div class="input-group-prepend"> ... </div> flex
            <!--<label for="username">Username</label> -->
            <input id="username" class="form-control form-control-sm" type="text"
              name="username" autocomplete="username" placeholder="username or e-mail"
              value="">
          </div>
        </div>
      </form>
    </div>
  </div>
  ▶ <div class="form-group"> ... </div>
  ▶ <div class="row"> ... </div> flex
    <input id="processing_trans" type="hidden" value="Processing...">
```

Βήμα 3ο: HUA SSO & Google Accounts

```
        </div>
      </div>
    </form>
  </div>
</div>
<div class="form-group">
  <div class="input-group mb-3"> flex
    <div class="input-group-prepend"> </div> flex
    <!--<label for="password">Password</label><br> -->
    <input id="password" class="form-control form-control-sm" type="password"
      tabindex="2" name="password" autocomplete="current-password">
  </div>
</div>
<div class="row"> </div> flex
  <input id="processing_trans" type="hidden" value="Processing...">
  <input type="hidden" name="AuthState"
    value="_cc13f70c8e8759eaf4ebb2b52c326ea4a77dcb14fa:https://ssaml1.d...
    SqMQVu04G1w6YsesXY1v2Ti5eep1wuX5LtyeLA&cookieTime=1670331517">
  <div class="row"> </div> flex
</div>
```