



# 私人裝置的 偵測、認證與存取控制

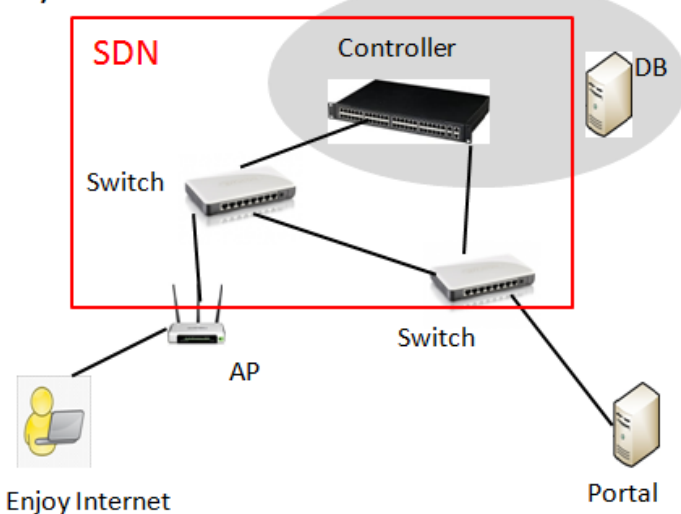
戴筱芸

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# 研究方向

- 採用SDN架構，針對透過AP連上網路的網路裝置作認證與存取控制。
- 使用的controller為FloodLight
- 首先，在認證伺服器上存放一組白名單(Device Table)：
  - 若所透過連上網路的AP已被註冊，即可使用網路資源。
- 當裝置經由未註冊的AP試圖使用網路資源：
  - 控制器將授權請求導向認證伺服器，合法使用者(User Table)可以輸入帳號密碼得到認證授權，第一個使用者同時也會註冊AP。

System architecture



Database Table

User  
(Legal user)

Account	Password
userA	pwA
userB	pwB
userC	pwC
userD	pwD

Device  
(Registered AP)

Account	AP MAC

# 實作- Packet Redirection

- 我們將改寫的code嵌入Forwarding.java這個FloodLight當中主要處理packet的檔案
- Mininet測試：當h2試圖連到h1時，會被導向h3

The image shows three terminal windows from a Mininet environment. The top-left window is for Node h1, the top-right for Node h2, and the bottom-left for Node h3. Node h1 and h3 are running iperf as servers on port 5001. Node h2 is running iperf as a client connecting to 10.0.0.1. The output shows that h2's connection is redirected to h3.

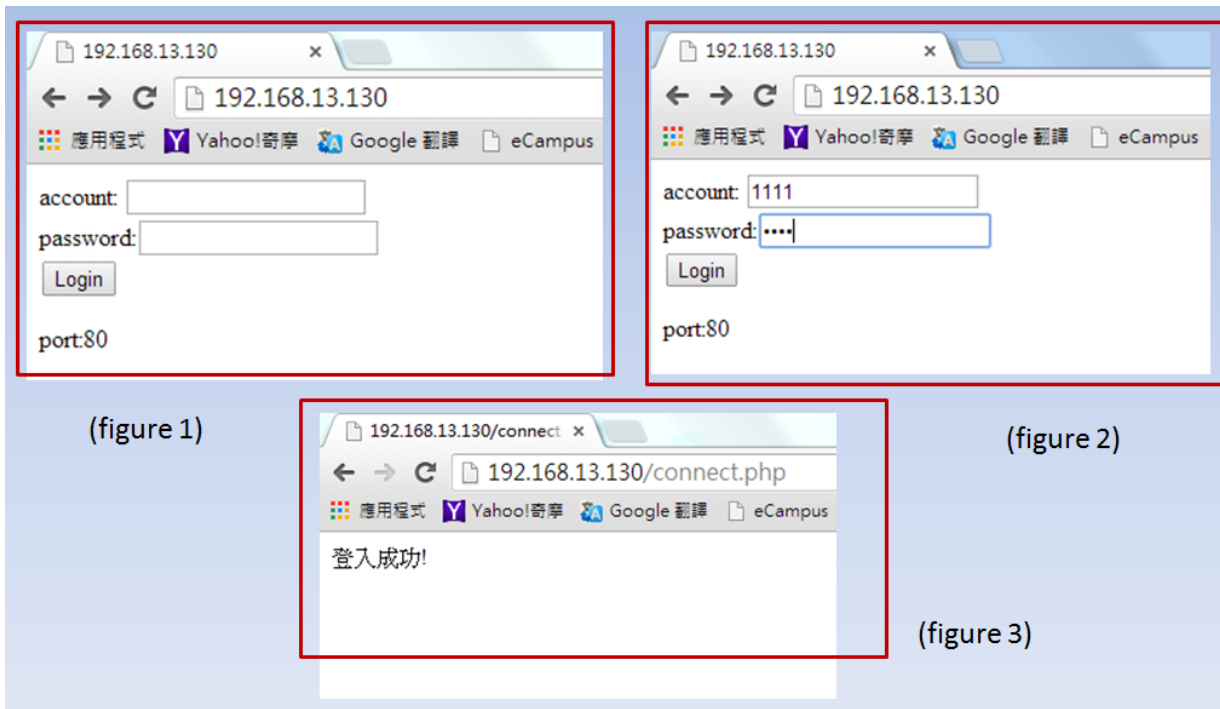
```
Node: h1
root@ubuntu:~# iperf -s -i 1
-----
Server listening on TCP port 5001
TCP window size: 85.3 KByte (default)
-----
[]

Node: h2
root@ubuntu:~# iperf -c 10.0.0.1 -n 8
-----
Client connecting to 10.0.0.1, TCP port 5001
TCP window size: 85.3 KByte (default)
-----
[ 4] local 10.0.0.2 port 36188 connected with 10.0.0.1 port 5001
[ ID] Interval      Transfer    Bandwidth
[ 4] 0.0- 0.2 sec   128 KBytes  4.61 Mbits/sec
root@ubuntu:~#

Node: h3
root@ubuntu:~# iperf -s -i 1
-----
Server listening on TCP port 5001
TCP window size: 85.3 KByte (default)
-----
[ 5] local 10.0.0.3 port 5001 connected with 10.0.0.2 port 36188
[ ID] Interval      Transfer    Bandwidth
[ 5] 0.0- 0.6 sec   128 KBytes  1.77 Mbits/sec
[]
```

# 實作- Portal

- 安裝Apache，使用 PHP + MYSQL
- 修改設定檔，將認證網頁的port設為3000
- 任意輸入網址都會被導向port:3000
- Insert 合法使用者到User table測試登入是否成功



The image displays three browser screenshots illustrating the portal login process:

- (figure 1)**: A browser window at `192.168.13.130` showing a login form with fields for "account:" and "password:", a "Login" button, and the text "port:80".
- (figure 2)**: The same browser window with the "account:" field filled with "1111" and the "password:" field filled with "....".
- (figure 3)**: A browser window at `192.168.13.130/connect.php` displaying the message "登入成功!" (Login successful!).

# 未來目標

- 在Forwarding.java加入資料庫的查找與新增功能並將以上兩者合併在一起。
- 將使用openwrt作為OpenFlow switch，並且用一台D-link AP來測試我們的program。
- 未來可對使用者做分類並且賦予不同的角色，去提供一個更安全也更完備的管理機制以及資源分配。