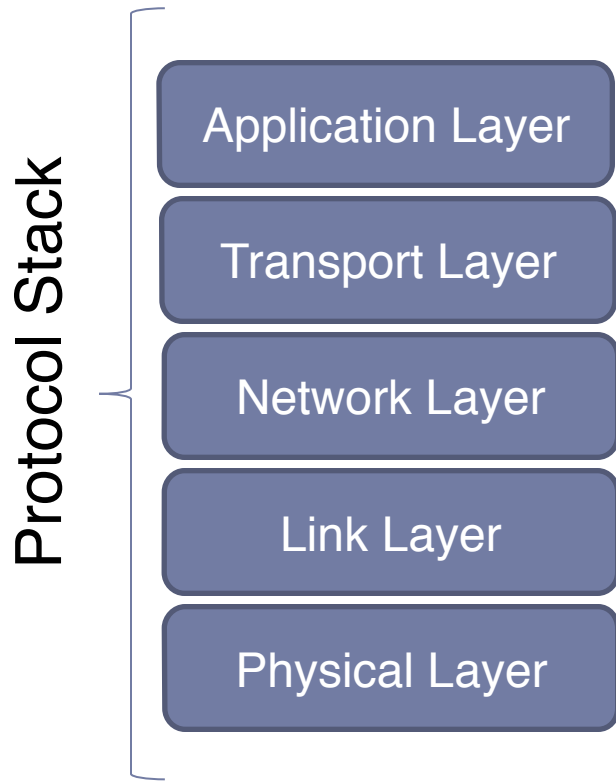


NASA雜談+電腦網路簡介

Prof. Michael Tsai

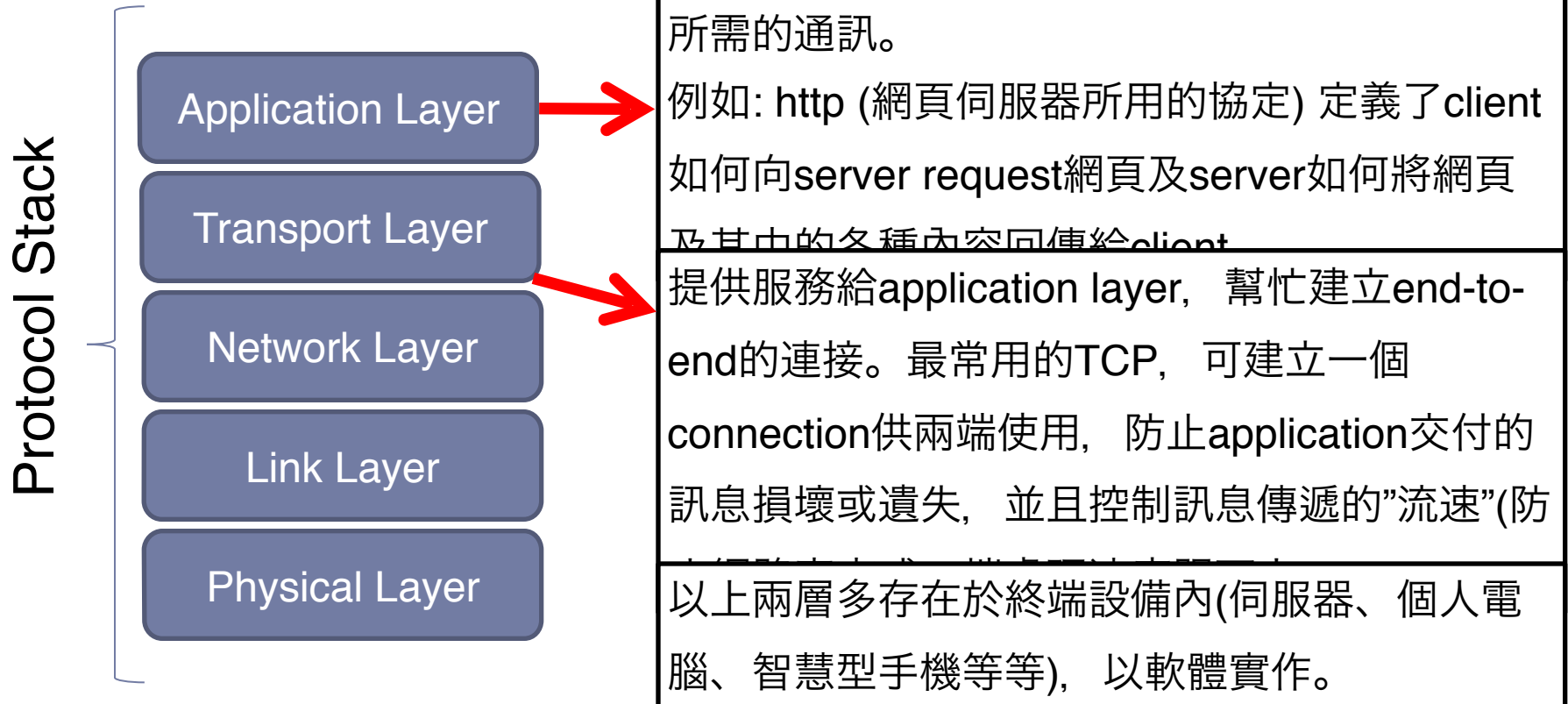
2015/03/02

Internet: 五層的架構

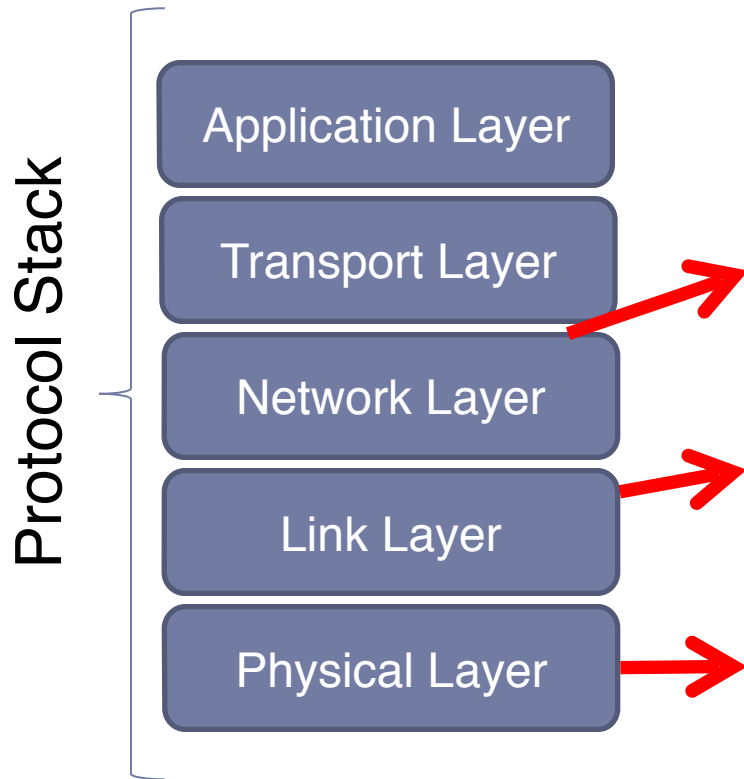


- ▶ 每一層使用下一層的服務來達成它的任務。
- ▶ (優點) 模組化。所以只要大家定義好介面(上下層的溝通方式), 那麼可以任意抽換某一層的協定。
 - ▶ 例如我們可以將Link Layer + Physical Layer從100 Mbps的Fast Ethernet有線網路抽換成54 Mbps的802.11g無線網路
- ▶ (缺點) 部分功能可能會重複出現在不同layer。
 - ▶ 例如: Retransmission 在 transport layer 及link layer都有類似的設計

Internet: Application & Transport Layers



Internet: Network, Link, & Physical Layers



Network layer的主要工作是把網路層的packet從一台機器傳到另外一台機器。根據transport layer所給的資料及一個地址(IP Address), network layer會找出一條(最佳)路徑(經過多台中

Link layer的主要工作是將packet在一個連結上傳遞。其中可能包含了防止媒體上大家一起傳輸的協定, 或是確保每個訊息都可靠地傳達到連結的另一端的協定。

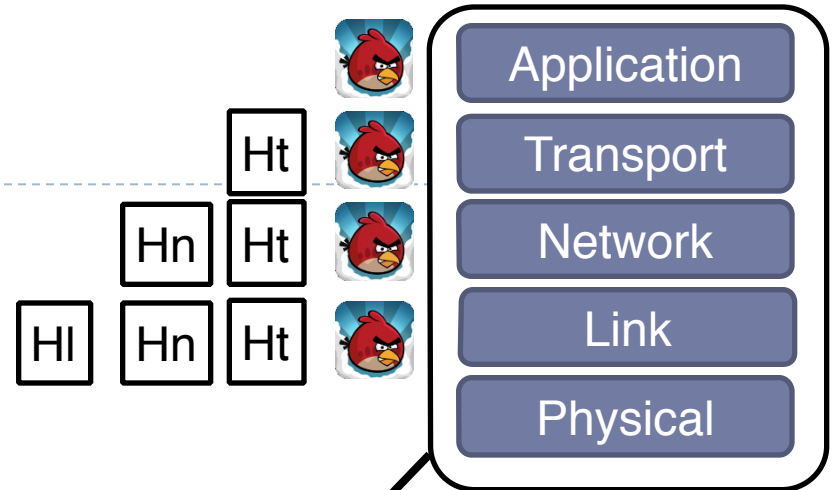
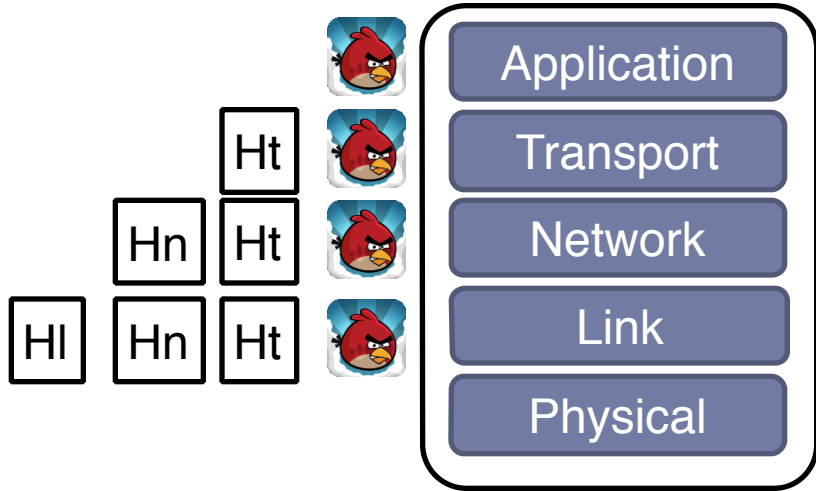
Physical layer的主要工作是將packet裡面的每個bit變成類比訊號, 在媒體上傳輸, 在連結的另外一端再根據類比訊號解碼成原本的數位bit。一般以硬體實作。

以上二層存在於終端設備內(伺服器、個人電腦、智慧型手機等等), 也在大多數網路的基礎設施內。網路管理, 主要是跟這三層的協定打交道!

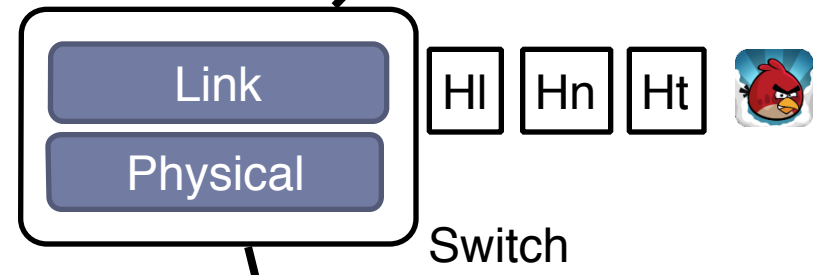
Downloading Angry Birds on Google Play Server



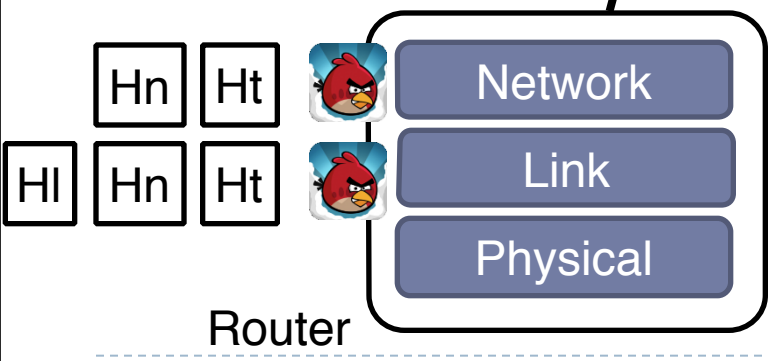
Your Smartphone



10 Gb/s 光纖

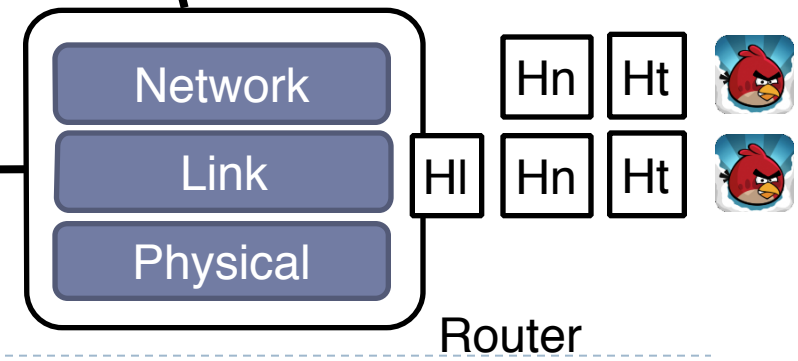


Switch



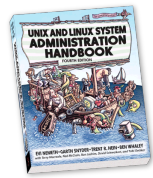
Router

1 Gb/s 光纖



Router

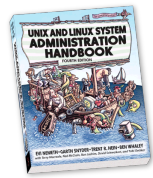




1.1

“系統”管理者的工作

- ▶ Account provisioning
- ▶ Adding and removing hardware
- ▶ Performing backups
- ▶ Installing and upgrading software
- ▶ Monitoring the system
- ▶ Troubleshooting
- ▶ Maintaining local documentation
- ▶ Vigilantly monitoring security
- ▶ Fire fighting



IT organization's role & task

- ▶ Our name: IT (information technology) support organization
- ▶ Role: support the needs of the organization (users)
- ▶ Tasks:
 - ▶ Maintain a list of open tasks
 - ▶ Prioritize its task list and allocate resources
 - ▶ Communicate task status to users and the enterprise
 - ▶ Work with the enterprise to ensure its needs are met
 - ▶ Monitor the computing environment, including security
 - ▶ Track emerging technologies
 - ▶ Develop skills in its staff
 - ▶ Assist with regulatory compliance
 - ▶ Document and follow repeatable processes

IT organization's role & task

- ▶ Measure progress toward negotiated goals and report status
- ▶ Plan for and be ready for disasters
- ▶ Be flexible enough to keep users happy while being disciplined enough to keep administrators happy
- ▶ So who is our customer? (in the department)

Service Level Agreement

- ▶ SA is a **service**
- ▶ People and computers are the **recipient of the service**
- ▶ Service Level Agreement (SLA) sets appropriate expectations (we don't have an official one here)
- ▶ Users are happy when:
 - ▶ Computers are up and running
 - ▶ Printers and file servers are available
 - ▶ Data files stay as they left them
 - ▶ Application software installed and works as it's supposed to
- ▶ 9 ▶ Friendly, knowledgeable help is available when needed

Service Level Agreement

- ▶ When are users miserable?
 - ▶ Downtime, **scheduled** or **unscheduled**
 - ▶ Upgrades introduce sudden, incompatible changes
 - ▶ They receive incomprehensible messages from the system or system administrators
 - ▶ They receive long explanations of why things aren't working
- ▶ “No news is good news” (無名英雄)

Prioritize the queue

- ▶ Many people cannot work
- ▶ One person cannot work
- ▶ Requests for improvements

- ▶ Which one is more severe
- ▶ FIFO

一個管理者應該有的態度

資訊系強者 神級人物

學生常有的心態

一個管理者應該有的態度



案例：皮卡丘升級無線網路韌體

- ▶ 皮卡丘是資訊系負責無線網路系統的管理者。他發現最近無線網路基地台及管理器有新版的韌體可以升級並且解決目前使用者人數過多時連線緩慢的問題。於是他發布了公告，約定要在周三凌晨5:00-6:00來進行升級的工作。然而事情不盡人意，在進行了半小時的升級工作以後，發現新版韌體在我們的環境下會造成三、四、五樓的基地台每分鐘當機一次。

 - ▶ 請問該怎麼辦？
-



案例一：皮卡丘升級無線網路韌體

- ▶ 強者心態1: 我相信我再看十分鐘就可以找出問題了。一定是有些設定我沒有設對。拚下去就對了!
 - ▶ 強者心態2: 現在才早上五點, 又沒有人會在系館用無線網路, 我可以再繼續努力試試看!
 - ▶ 強者心態3: 我先弄到六點, 看看能不能成功。不能成功再把舊版韌體上回去好了(舊版韌體可能要打電話跟原廠要T_T)
-



案例二：趴趴熊升級switch

- ▶ 趴趴熊安排了寒假一整天的時間要來升級系上老舊的switch，並且已經公告了停機時間。原本預估升級一台只需要一個小時，實作之下才發現光插網路線和仔細的插對網路線們就快一小時了。真正需要的時間是快兩倍的時間。



案例二：趴趴熊升級switch

- ▶ 強者心態：要一次全部升級完才是男子漢!
- ▶ 可能的後果：
 - ▶ 網路線插錯孔而且完全不知道(事後使用者才打來通知)
 - ▶ 網路線沒插好(也不會通)
 - ▶ 拿錯設定檔來復原(也不會通)
- ▶ 正確的作法?



管理者應該有的原則

- ▶ 系統是否可以提供(大部分)使用者服務為第一優先
 - ▶ 約定好的停機/上線時間應該遵守
(通常大部分的使用者不在意升級的內容,
只在意能不能用!)
- ▶ 給自己留後路：舊的設定檔和舊的機器應該處於可使用狀態，必要時可以回復到原本的配置
 - ▶ 預留回復到原始狀態的作業時間，知道什麼時候應該收手：設立停損點。
- ▶ 先做好功課：作業前務必擬定詳細的、一個一個步驟的維護計畫。如果可能的話，應該在備用系統上先行測試。
 - ▶ 至少要在腦海中反覆思考操作，找不出任何可預期的問題，才能真正開始進行維護。

