Network Security

1. Some basic principles

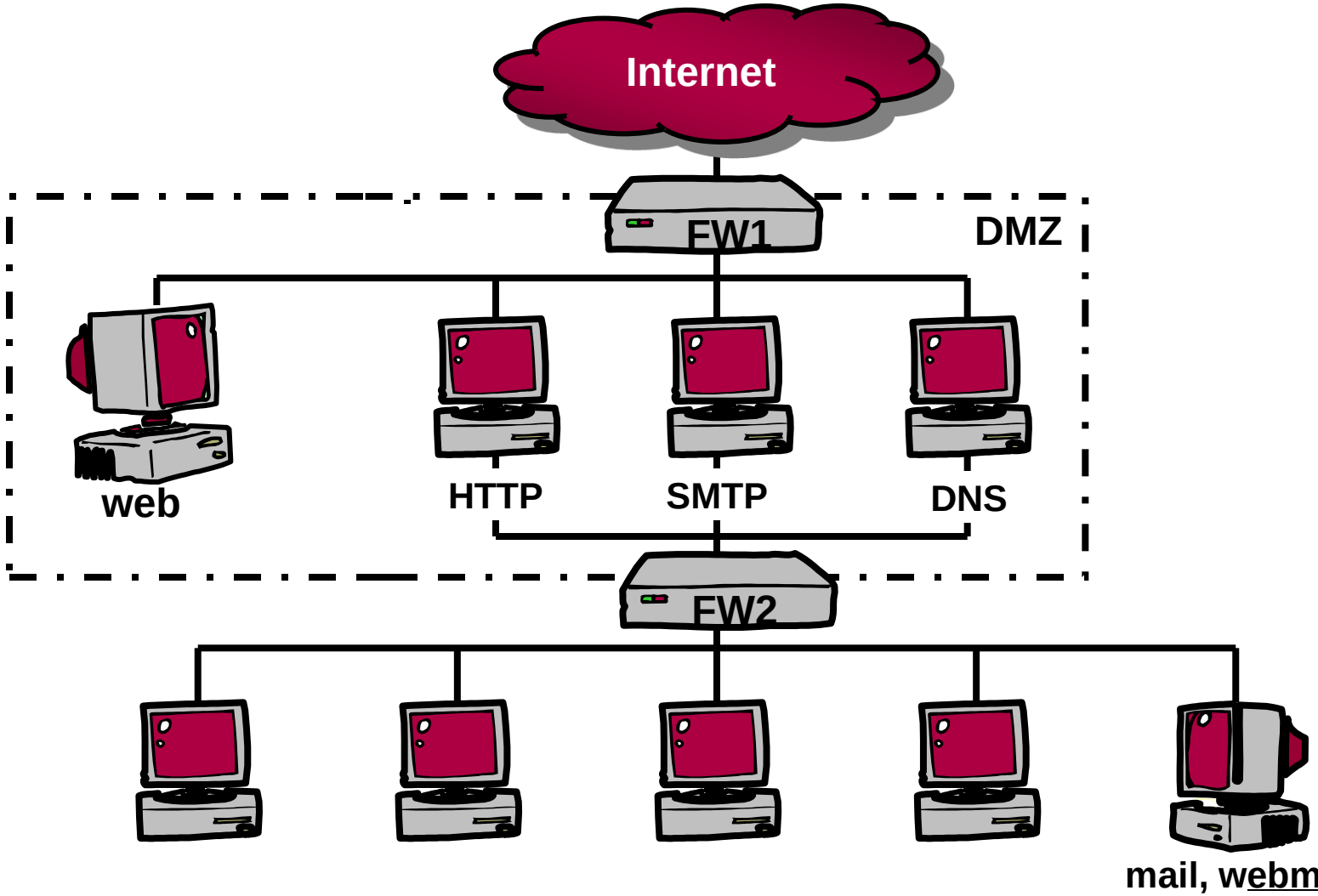
- Least privileges
  - You should only be able to do what you need to do
- Defense in depth
  - It is better to have several layers of security
- Simplicity
  - A complicated system will have more errors and be more difficult to audit

Some basic principles

- User participation
  - If security prevents users from working efficiently, they will find ways around
- Default deny
  - Better to deny everything and make exceptions (white list), than allowing everything and then specify what is forbidden (black list)
- Weakest link
  - A system is not more secure than its weakest part
  - Do not invest much effort on one aspect when other aspects are not covered.


NO
BICYCLE RIDING
ROLLERBLADING
ROLLERSKATING
SKATEBOARDING
SCOOTER RIDING
DRY CLEANERS
ale wireless

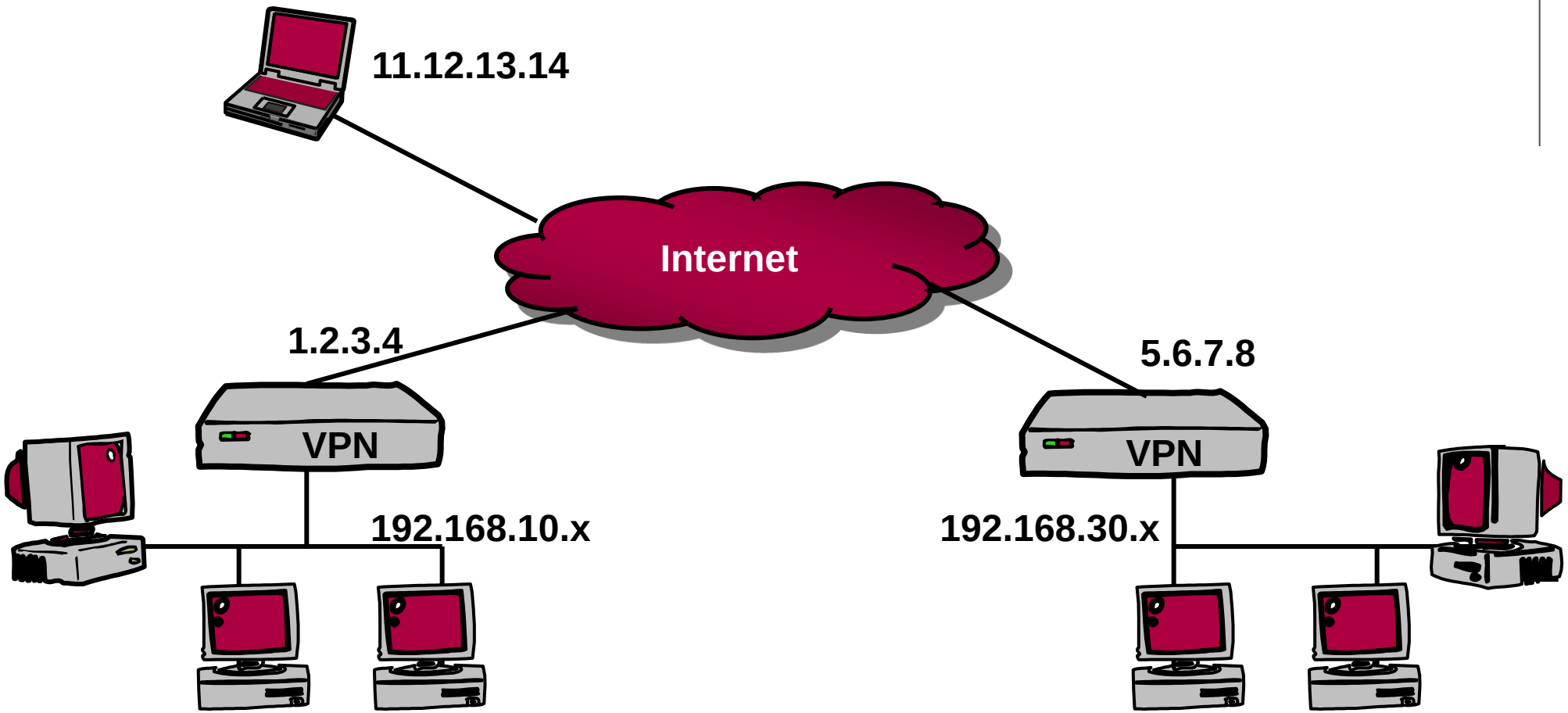
2. Classical network perimeter



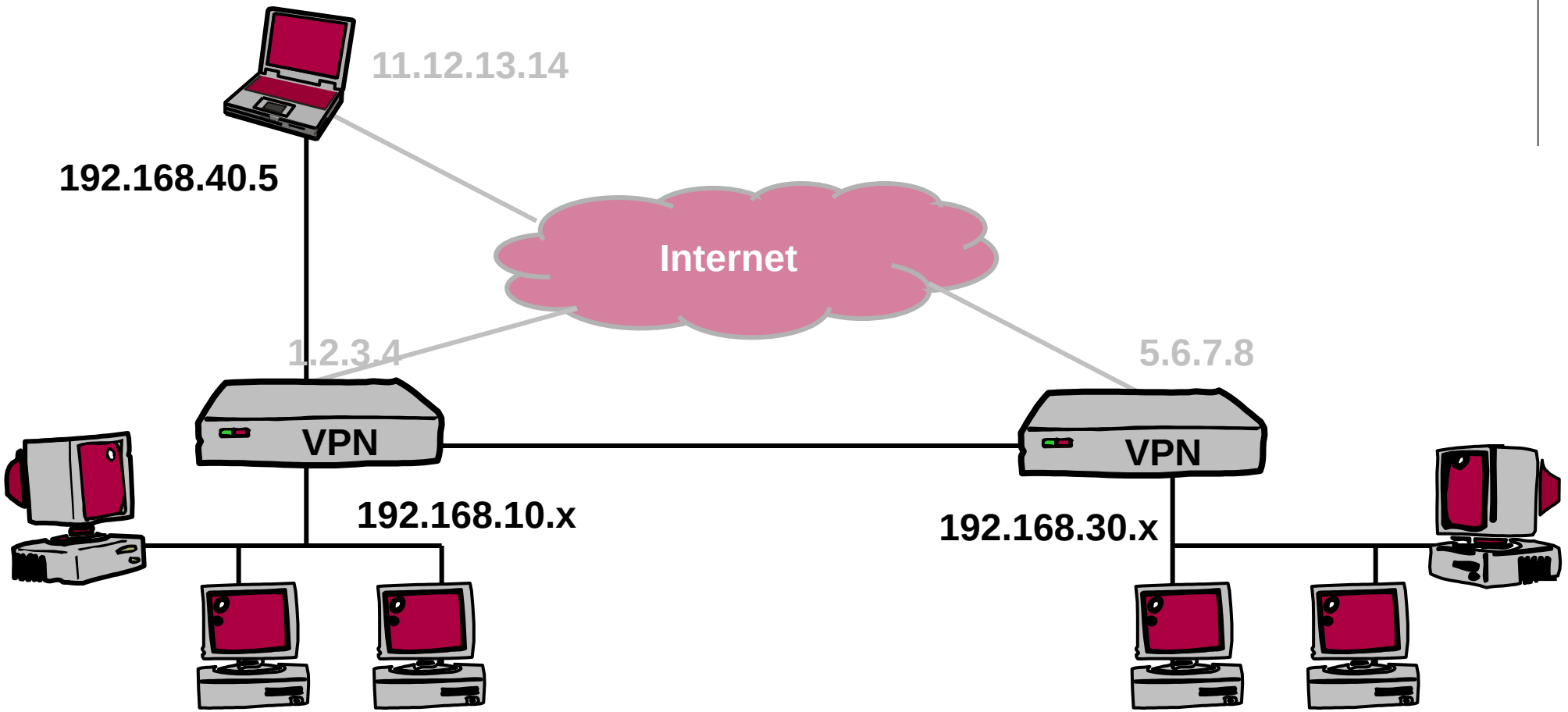
Classical perimeter

- Firewall: filter traffic at network level
- Proxy: filter/authenticate/analyze traffic at application level
- DMZ: limit the propagation of attacks
- Intrusion detection (IDS), Anti-virus, spam filter, Unified Threat Management (UTM),
  - Built into firewalls, or stand-alone
  - Analyze traffic, detect attacks

3. Virtual private networks (physical network)

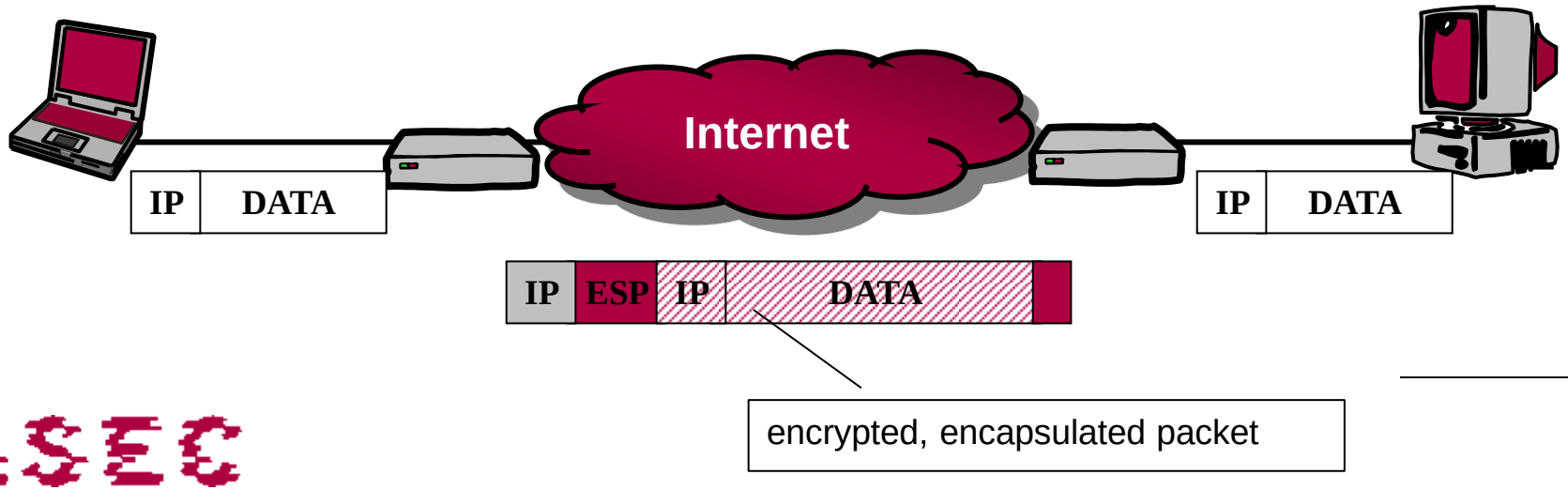


VPN: virtual network

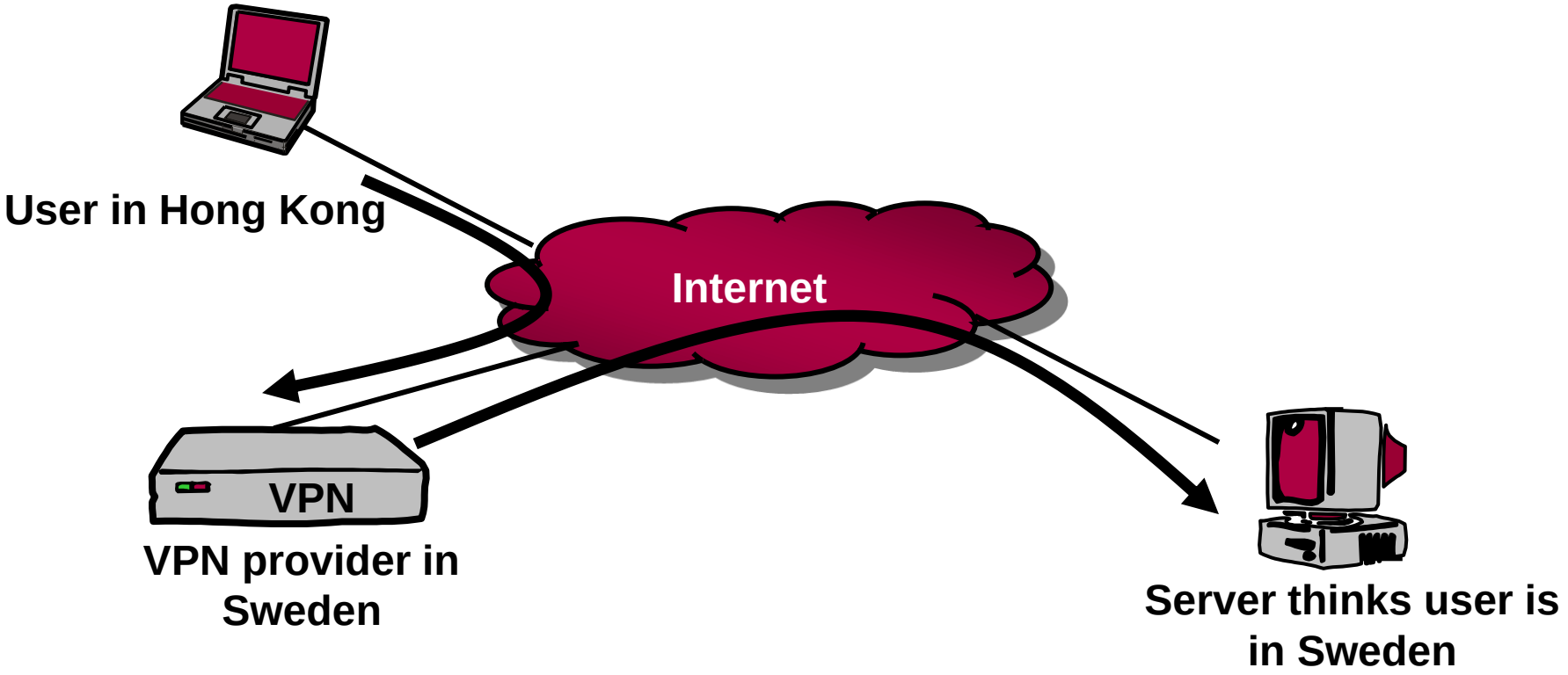


VPN: basic elements

- VPN software on routers and/or computers
- Encapsulation of IP packets for their trip through the Internet
- Encryption of data to protect confidentiality



VPN for «anonymous» surfing

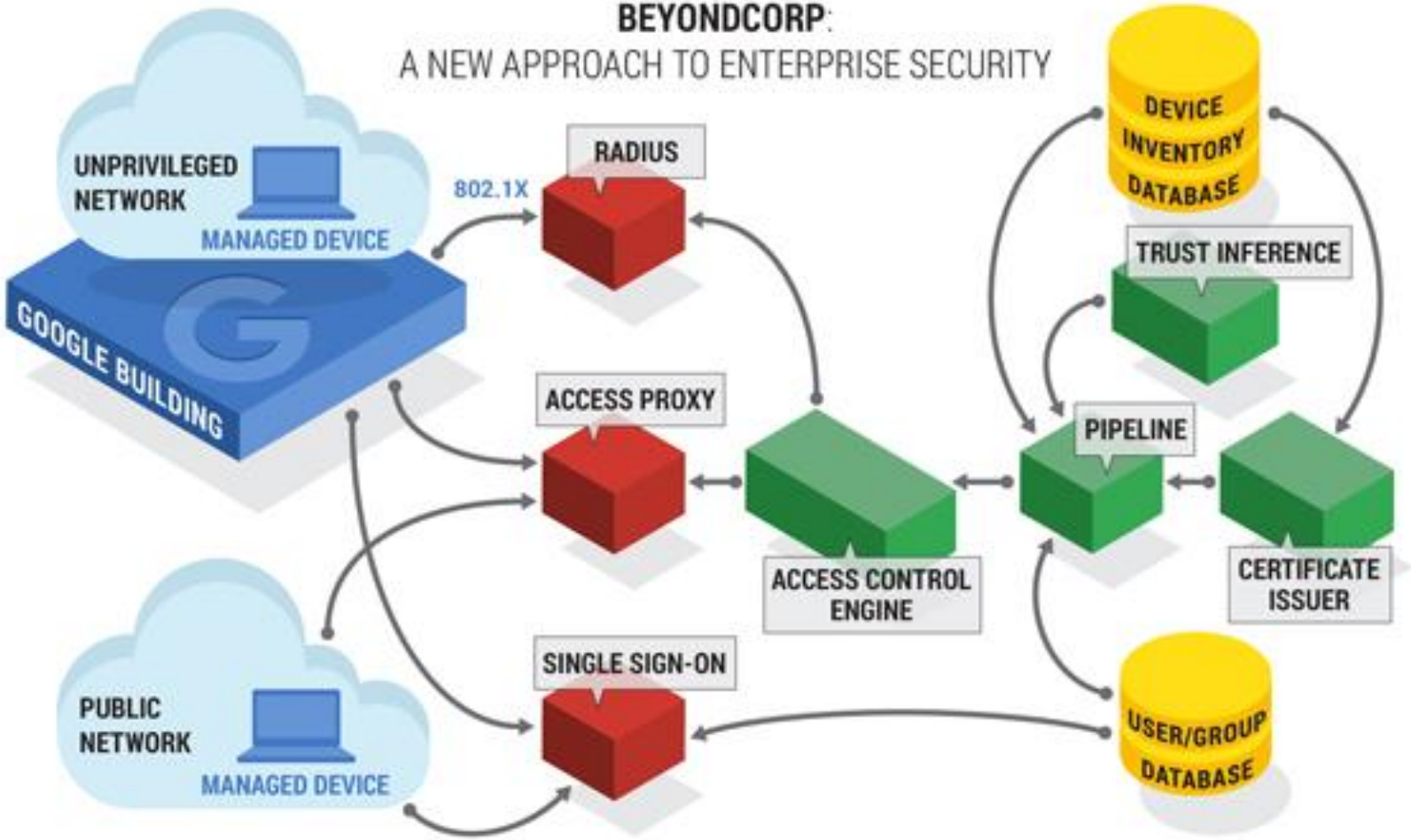


- VPN provider knows exactly where you come from and where you got to !
- Can be useful in a public hotspot.

4. BeyondCorp

- Google: "We want to completely get rid of the idea of having some sort of perimeter,"
- "Effectively, firewalls don't help and a lot of other gatekeeper tools that rely on a perimeter simply don't help."
- Strong authentication of devices and users
- Cloud based services behind an access proxy
- Automatic inherence of least privilege

BeyondCorp



BeyondCorp components and access flow