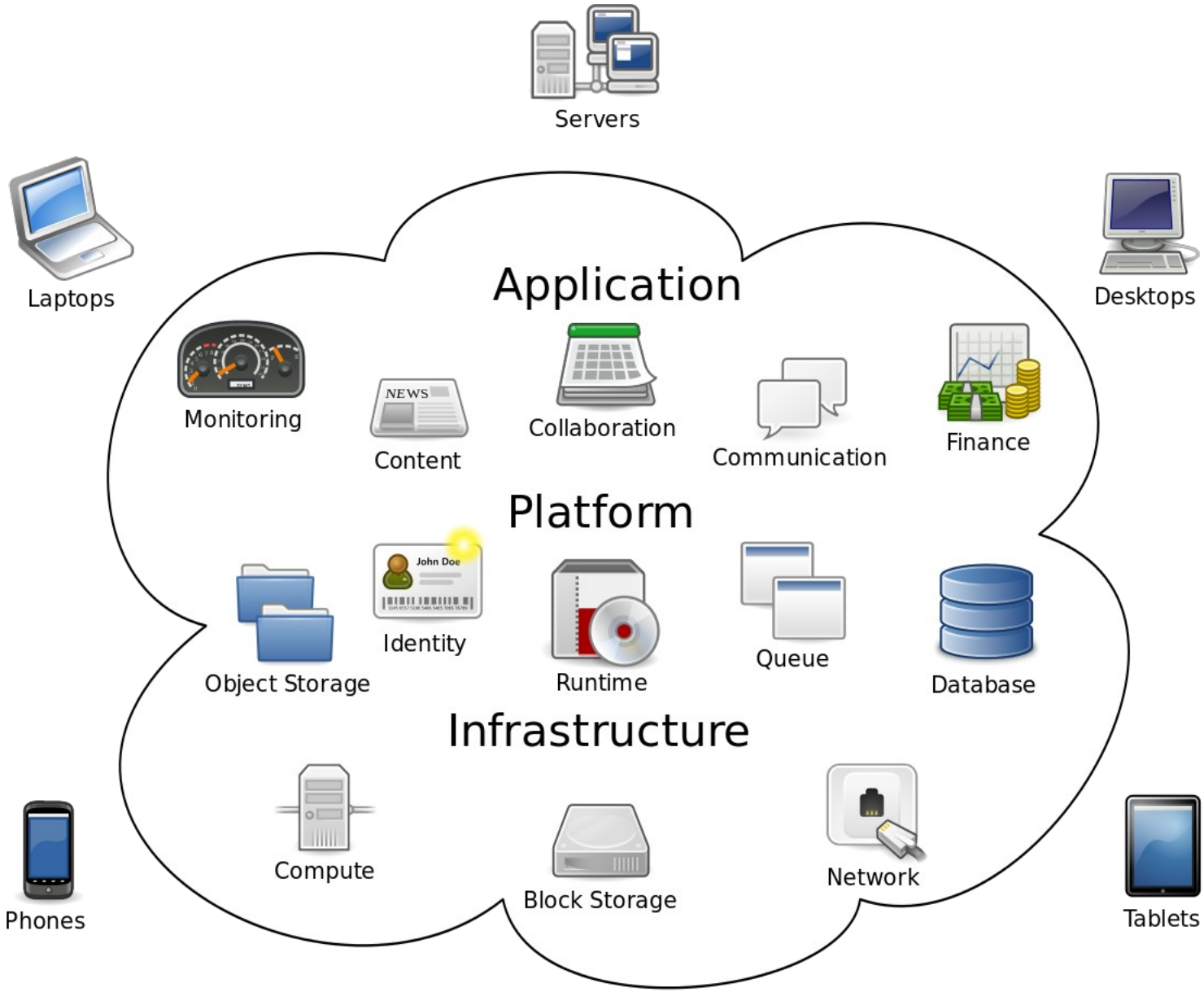
Understanding Cloud Computing and Virtualization

Cloud Computing

- Name comes because its Internet based
- Still on a physical server!
- Method by which you access resources
- Provided by big companies
- Cheaper – management be remote company
- Scales out easier
- Big issue is security

Cloud Services

- Infrastructure as a Service (IaaS)
  - Needs network management experience
  - Client provides and manages the software
- Platform as a Service (PaaS)
  - Adds a runtime layer to IaaS
    - Google App Engine
    - Amazon Web Services
- Software as a Service (SaaS)
  - Manages software and its deployment
    - Dropbox
    - Google Docs
    - Office 365



Cloud computing

Types of Cloud

- Private Cloud – within own network
- Public Cloud – third party company
- Hybrid Cloud – mix of the above
- Community Cloud – multiple organisations with common interests
    - Public but with better security

Important Cloud Features

- The National Institute of Standards and Technology (NIST)
  - US Department of Commerce body
  - Define 5 Characteristics
- On-demand self-service
- Broad Network Access
  - Multiple clients
  - What they want when they want – Ubiquitous Access
- Resource Pooling
- Rapid Elasticity (includes pay as you grow)
- Measured Service (Charged for what you use)
- CompTia A+ add
  - File Synchronisation
  - High Availability

Cloud Based Storage

- Where it all started
- No idea of hardware details (location, OS etc)
- Dropbox, iCloud, OneDrive, Google Drive etc
- Synchronisation
- Sharing

Cloud Based Applications

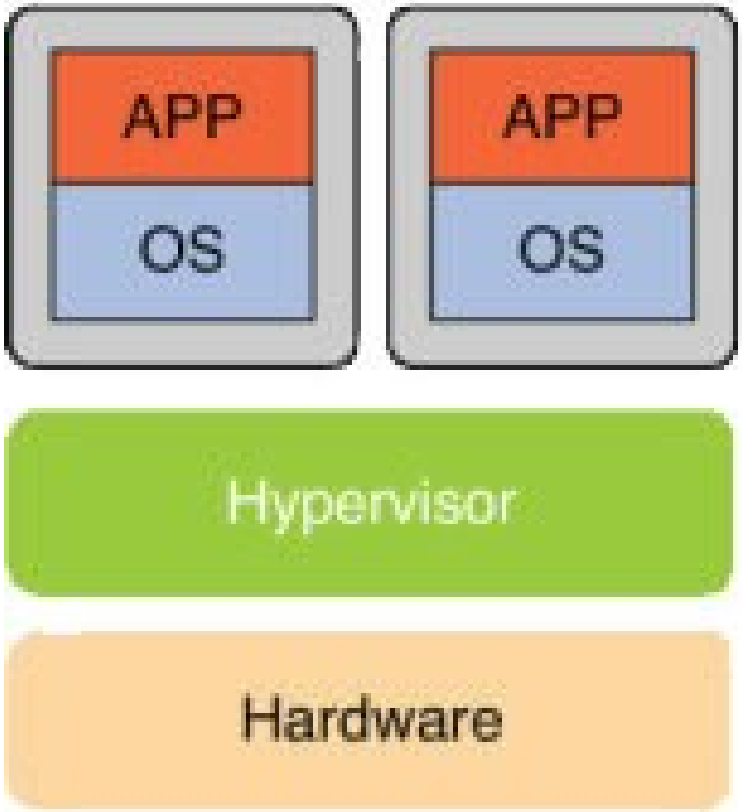
- Chromebook
- Office 365
- Tend to run through web browsers
- Netflix

Virtual Machines

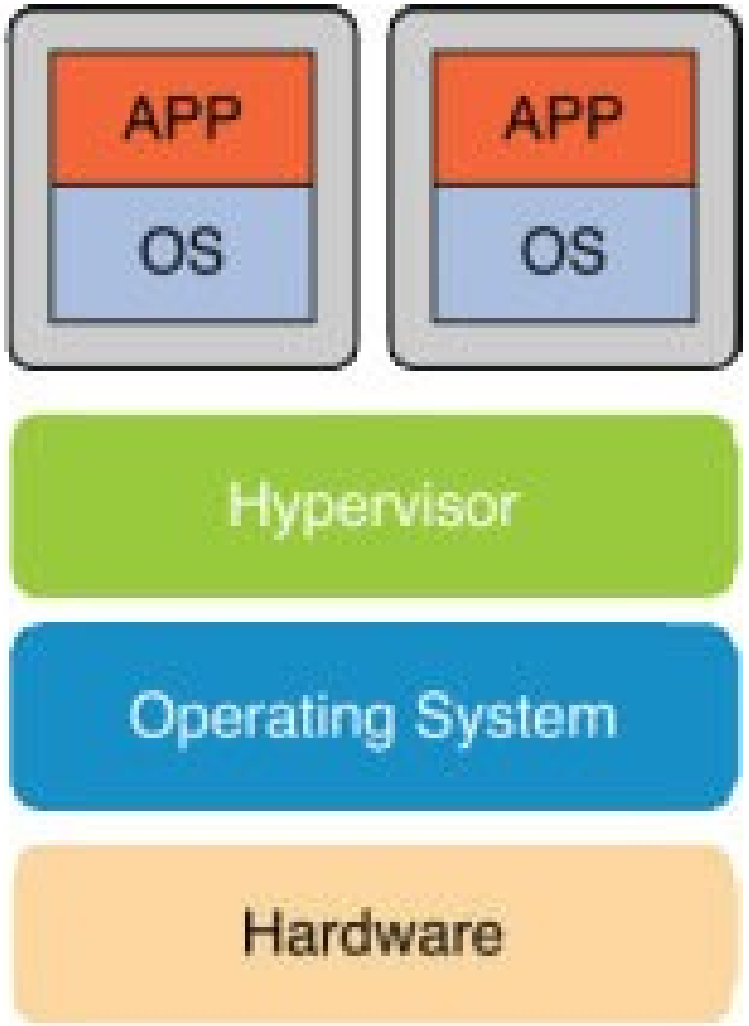
- Allow multiple O/S on one platform
- Removes the need for dual boot machines
- Saves money

Hypervisor

- Key Software is called the Hypervisor
- Also called Virtual Machine Manager (VMM)
- Two types



Type 1 Bare Metal



Type 2 Hosted

Type 1

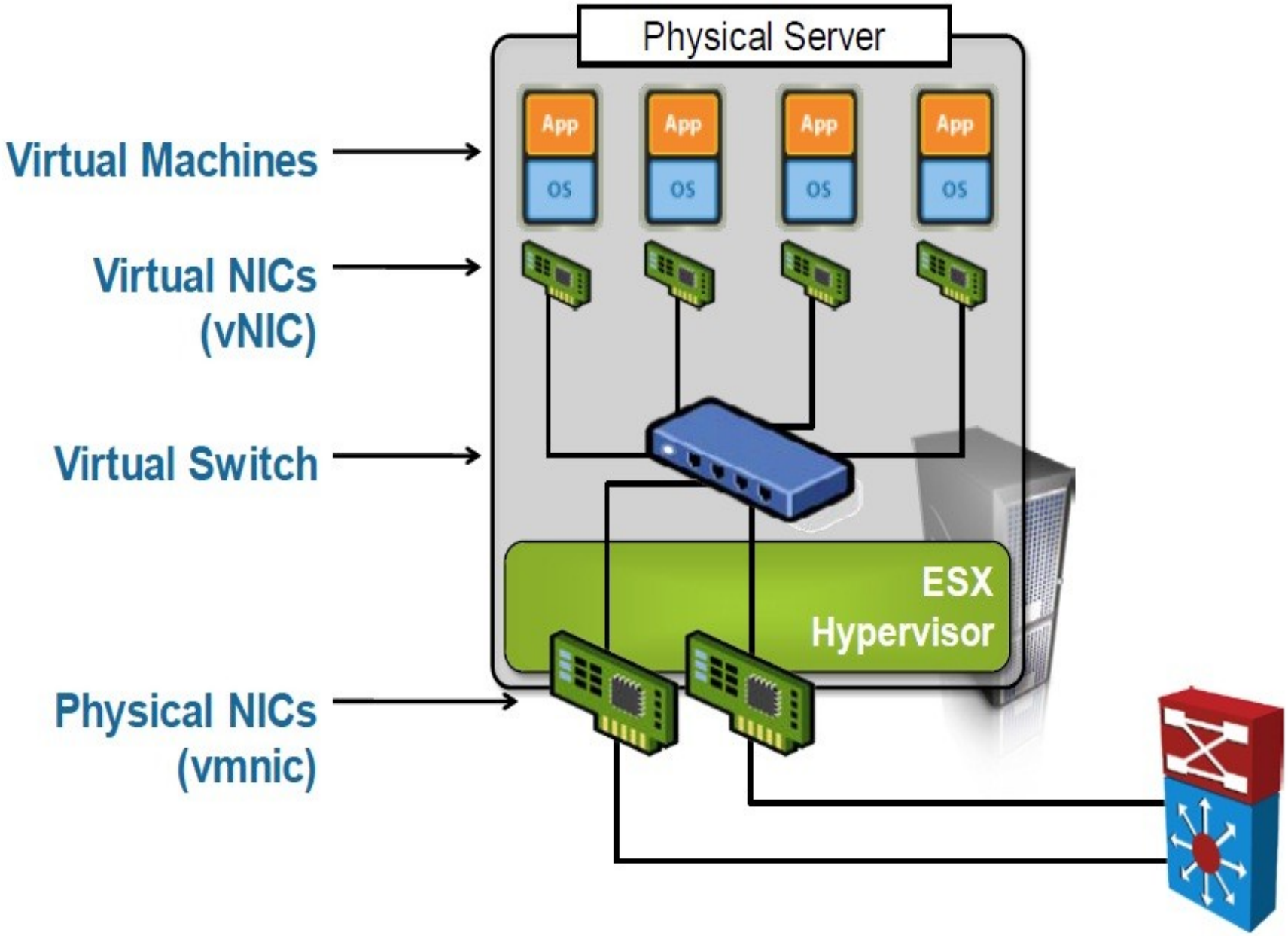
- Type 1 – Bare Metal Hypervisor
- Common on Server Side
- Low requirements on Hardware as no host OS
- Better performance than type 2
    - Microsoft Hyper-V
    - VMware ESX
    - Citrix XenServer

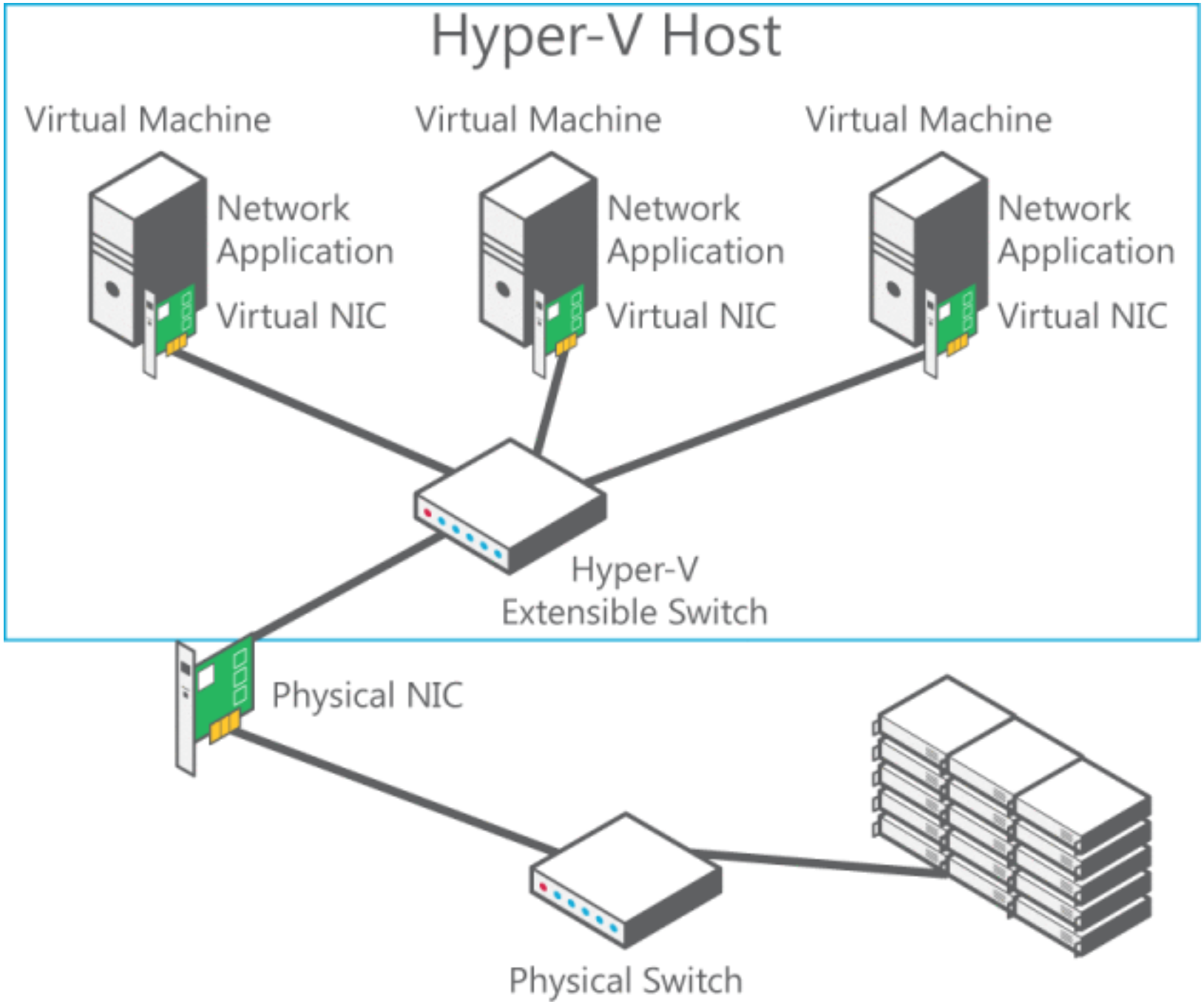
Type 2

- Sits on a host OS
- Client Side Virtualisation
- Multiple OS possible
  - Concurrent
  - Independent
- Host OS consumes resources
- Host OS crash = guests crash
  - Microsoft Virtual PC
  - Microsoft Virtual Server
  - Oracle Virtual Box
  - VMware Workstation
  - KVM

Client Side Virtualisation

- Resources are key
- Hypervisor contains optimisation options
- Options in the BIOS to turn on or off
- Intel chips have Virtualization Technology (VT)
- AMD chips have AMD-V
- Need resources, lots of resources
- Virtual Desktop Interface (VDI)
- Virtual NIC to actual NIC


Physical Server
App
OS
App
OS
App
OS
App
OS
Virtual Machines
Virtual NICs
(vNIC)
Virtual Switch
ESX
Hypervisor
Physical NICs
(vmnic)


Hyper-V Host
Virtual Machine
Network Application
Virtual NIC
Virtual Machine
Network Application
Virtual NIC
Virtual Machine
Network Application
Virtual NIC
Hyper-V Extensible Switch
Physical NIC
Physical Switch

Emulator

- Emulator and Hypervisor are not the same
- Emulator appears to work as one OS
- Hypervisor supports multiple OS’s
- Hypervisor and Emulator need to be compatible

CompTIA Need to Know

- Know the roles of various servers
- Understand where servers need to be placed
  - All behind a firewall.
  - If users need to get server from internet – DMZ
- Understand how DHCP server works
- Know What DNS Servers do
- Know difference between IDS and IPS
- Know difference between SaaS, IaaS, and PaaS
- Understand the purpose of Virtual Machines
- Know the role of the Hypervisor