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...beginning vision

Centre for Cloud Computing and Big Data

The iNoahites

And:

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A Head-start on Cloud

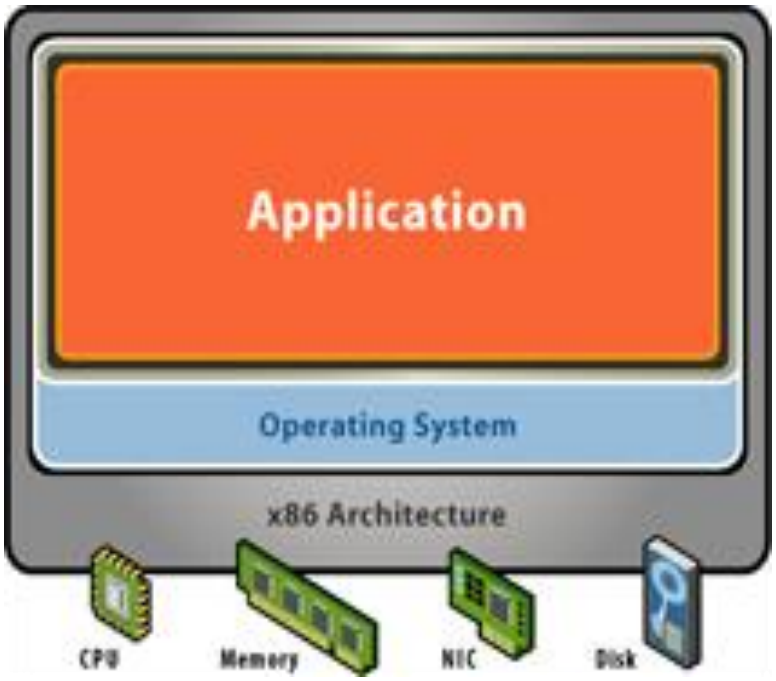
"Cloud Computing is a paradigm in which information is permanently stored in servers on the internet and cached temporarily on clients that include desktops, entertainment centres, table computers, notebooks, wall computers, hand helds etc."

Virtualisation

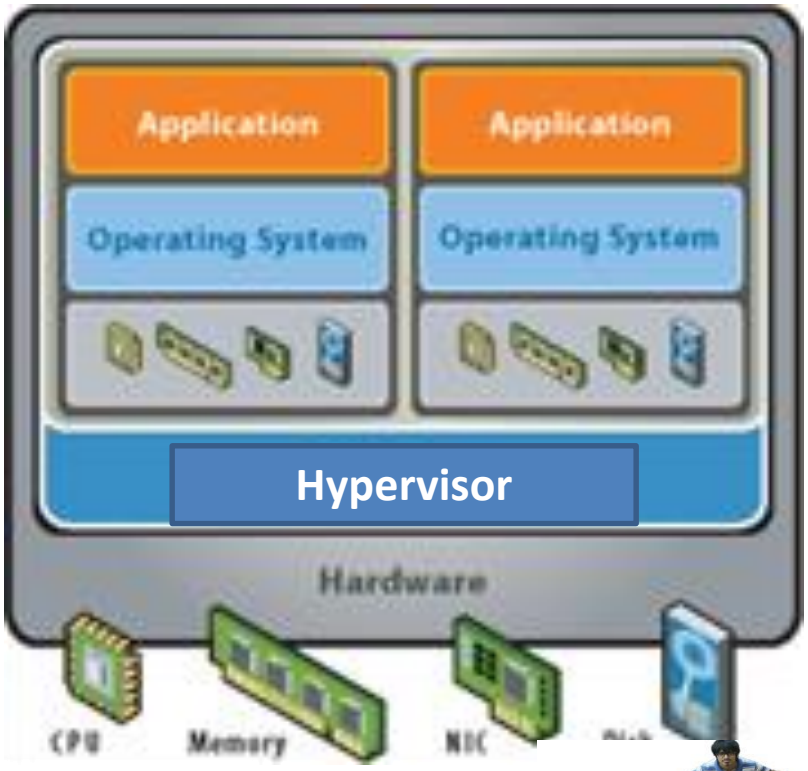
"Virtualization, in computing, is the creation of a virtual (rather than actual) version of something, such as a hardware platform, operating system, a storage device or network resources."

A virtual machine is called an instance

Understanding Virtual Systems



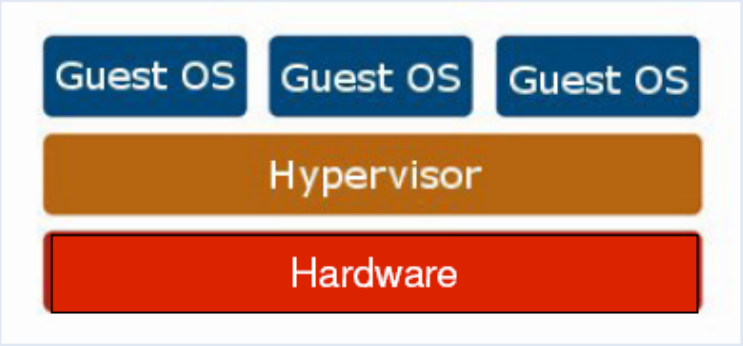
PHYSICAL
MACHINE



VIRTUAL
INFRASTRUCTURE

Virtualization Architecture

- OS assumes complete control of the underlying hardware.
- Virtualization architecture provides this illusion through a hypervisor/VMM.
- Hypervisor/VMM is a software layer which:
  - Allows multiple Guest OS (Virtual Machines) to run simultaneously on a single physical host
  - Provides hardware abstraction to the running Guest OSs and efficiently multiplexes underlying hardware resources.



Client-Server Vs Cloud Computing :The dilemma

- **Client-Server means there is some logical segregation of these components, services, and resources. Typically we see user-interfaces in a local execution [aka "client"] and business and data store and other resources in a remote execution [aka "server"]. (MSN Messenger, facebook,Stackoverflow)**

- **Cloud computing is an abstraction of traditional server hosting solutions. Instead of buying 10 servers to run and manage in our own operations datacentre, we now lease X servers from a vendor where X is a variable number decided by us whenever we want. (Windows Azure)**

Cost Comparison (virtual SAP landscape)

Physical Infrastructure	Virtual Infrastructure
45 servers	10 servers (56% saving)
Storage	Storage (same cost)
8 switches	2 switches (78% savings)
Backup Licensing	Backup Licensing (62% savings)
O/S Licensing	O/S Licensing (73% savings)

Cloud Computing Companies

amazon Google EMC²

- Amazon
- Windows Azure
- AT&T
- Google
- EMC2
- GoGrid

Adobe's creative cloud offers 20Gb of space at about 20 dollars a month i.e 14,400 rupees a year!!!

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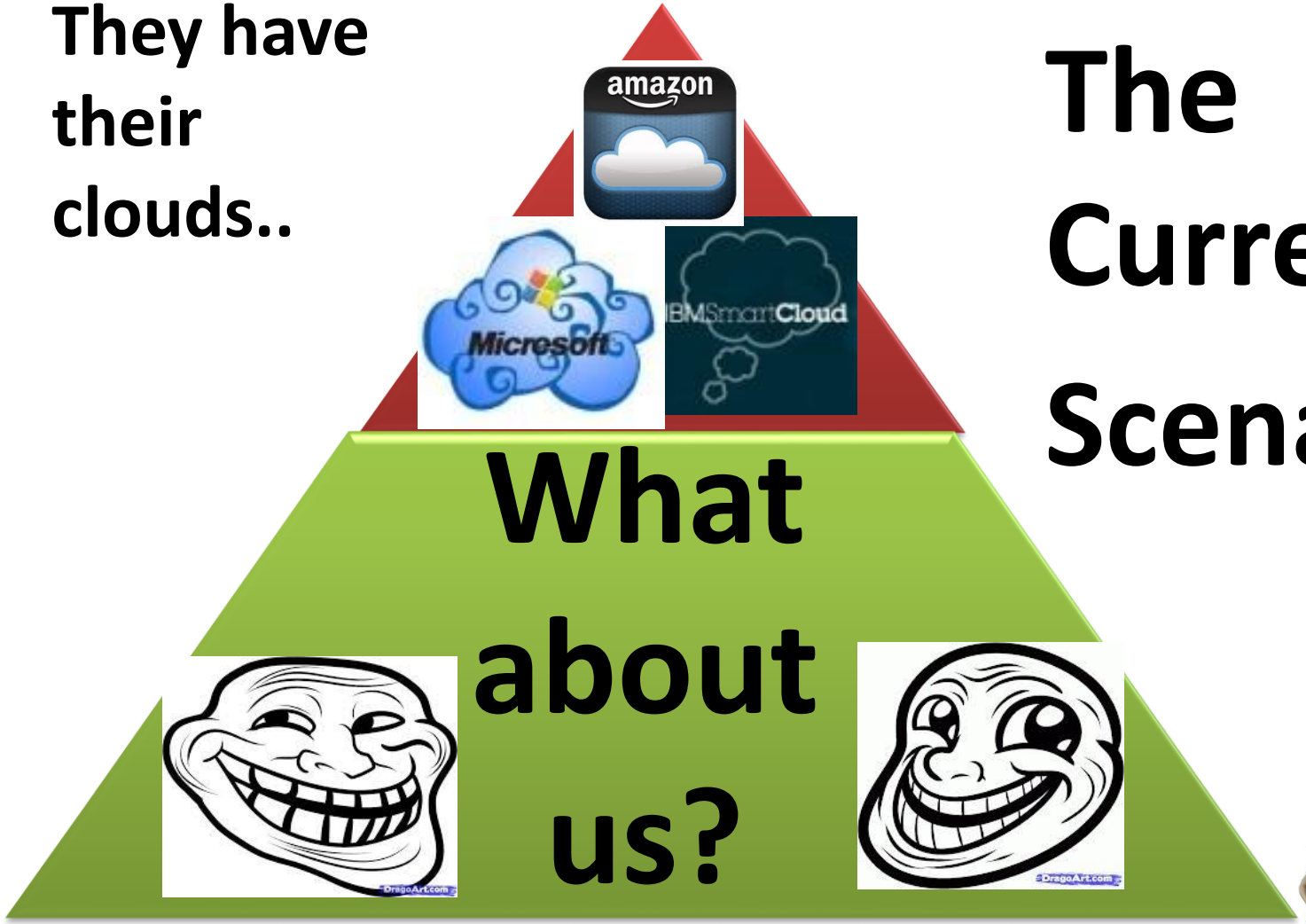
They have their clouds..



The Current Scenario....

- The motivation: To enable a person with basic computing knowledge to set up a cloud using bare minimum infrastructure.

iNoah

- iNoah is a Community based Cloud Computing Awareness Evangelism initiative at Ordell Ugo and CCBD

- iNoah aims to generate Cloud Awareness and provides a one stop solution for an optimized approach to cloud installation.

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Community based

-- Aimed at large communities capable of setting up and managing their cloud.

Cloud Computing Awareness

--"Cloud Computing Awareness " refers to study of the cloud ecosystem in its entirety focusing on the various hardware and software infrastructure available ,that are necessary for a cloud to function.

Cloud Computing Awareness Evangelism

--Cloud evangelism means to advocate the idea of cloud computing to large and/or regional communities.

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Roadmap

Cloud Computing

Cloud Computing Aware (CCA)

Congratulations! You have now obtained the CCA certification. You can set up and manage your cloud successfully!

Cloud Infrastructure Usage Aware (CIUA)

You are now aware of the backend processes in a cloud. CIUA certification obtained

Cloud Infrastructure Management Aware (CIMA)

You can now install the cloud infrastructure. CIMA certification obtained

Cloud Hardware Aware (CHA)

You are aware of the hardware required to set up a cloud . CHA certification obtained

Cloud Computing

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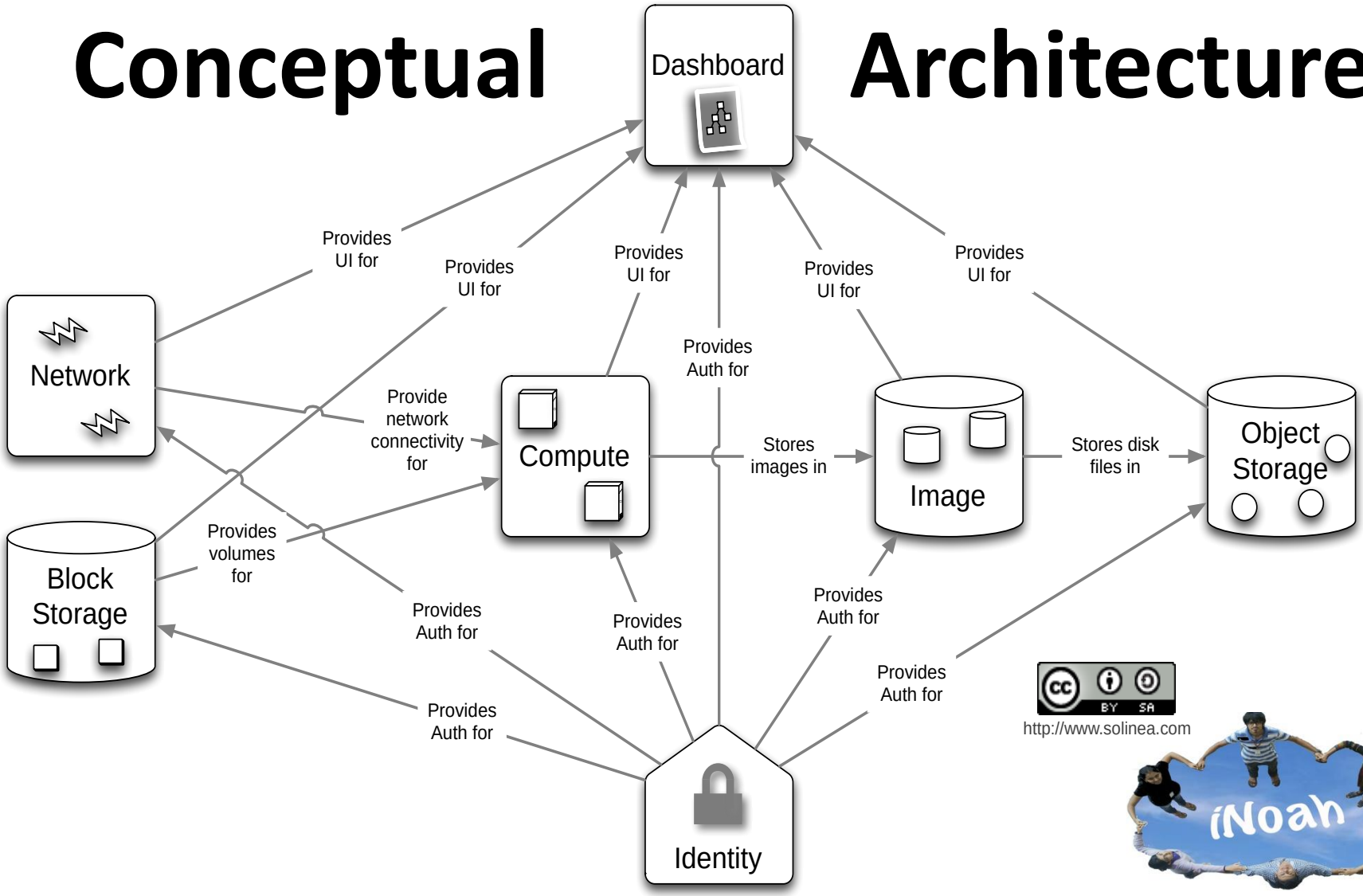
iNoah Session

Conceptual Architecture



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A few terms to be known before we begin …

IMPORTANT TERMS

1. IP address : An **Internet Protocol address** (**IP address**) is a numerical label assigned to each device (e.g., computer, printer) participating in a computer network that uses the Internet Protocol for communication. An IP address serves two principal functions: host or network interface identification and location addressing.

2. Netmask : A **netmask** is a 32-bit mask used to divide an IP address into subnets and specify the networks available hosts.

3. Gateway : A **gateway** is an address used as an entry point into another network.

4. DNS : Short for **Domain Name System** or **Domain Name Service**, a **DNS** is an Internet or other network server that helps to point domain names or the hostname to their associated IP address.

5. Switch : On a network, a **switch** is a hardware device that filters and forwards packets through the network. It is a device used to build a network connection between the attached computers (allows computers to talk to each other).

6. Router : A **router** is a computer whose software and hardware are customized to move data between computer networks. They are responsible for making sure traffic between computers gets where it needs to go.

7. Default route : A **default route** of a computer is the packet forwarding rule (route) taking effect when no other route can be determined for a given Internet Protocol (IP) destination address.

8. Host-name : A **hostname** is a label that is assigned to a device connected to a computer network and that is used to identify the device.

*A **name** indicates what we seek. An **address** indicates where it is. A **route** indicates how to get there.*

For houses and buildings

Similarly for a computer in a network

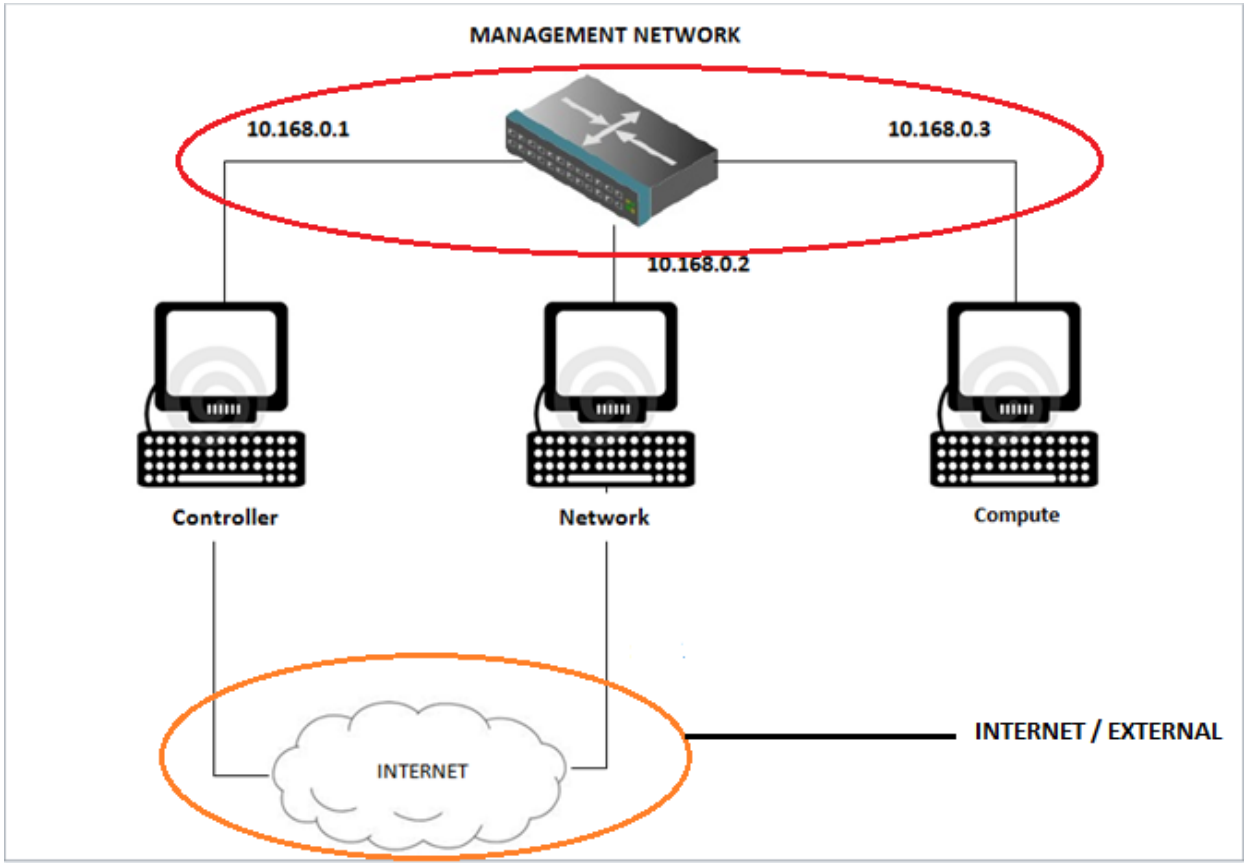
Host-name indicates what we seek. **IP address** is the address. **Netmask** indicates which locality the computer is in. **Gateway** is the point of entry into the locality. **DNS** helps find the IP address of the computer given the host-name

PHYSICAL ARCHITECTURE

The main components of the architecture are :

1. Networking
2. Computer requirements
3. Reasons for choosing the architecture

Networking



There are two networks :

1. Internal or Management network
2. External or Internet network

1. INTERNAL / MANAGEMENT NETWORK:

→ This network is present for internal connection between the machines.
→ The IP addresses for the network must be reachable only by the admin.

2. INTERNET / EXTERNAL NETWORK :

→ provides the VMs with internet access in some scenarios.
→ The IP addresses are reachable by anyone on the internet.

- Note the IP addresses of the two networks. They are **different.**
- The networks **must** be different from each other.
- They are **isolated** from one another.

REASONS FOR CHOOSING THIS ARCHITECTURE

1. Clarity
2. Clear demarcation of roles
3. Ease of debugging
4. Easy to understand

iNoah-Specification Table

	Controller	Network	Compute
Hard-disk	2x1 TB	500 GB	500 GB
RAM	2x4 GB	4 GB	4 GB
NIC	2	2	1

NIC – Network Interface Card. Preferably D-Link with 10/100 interface.
Switch – D-Link Switch.
Cables – CAT 5E with RJ-11 connectors.