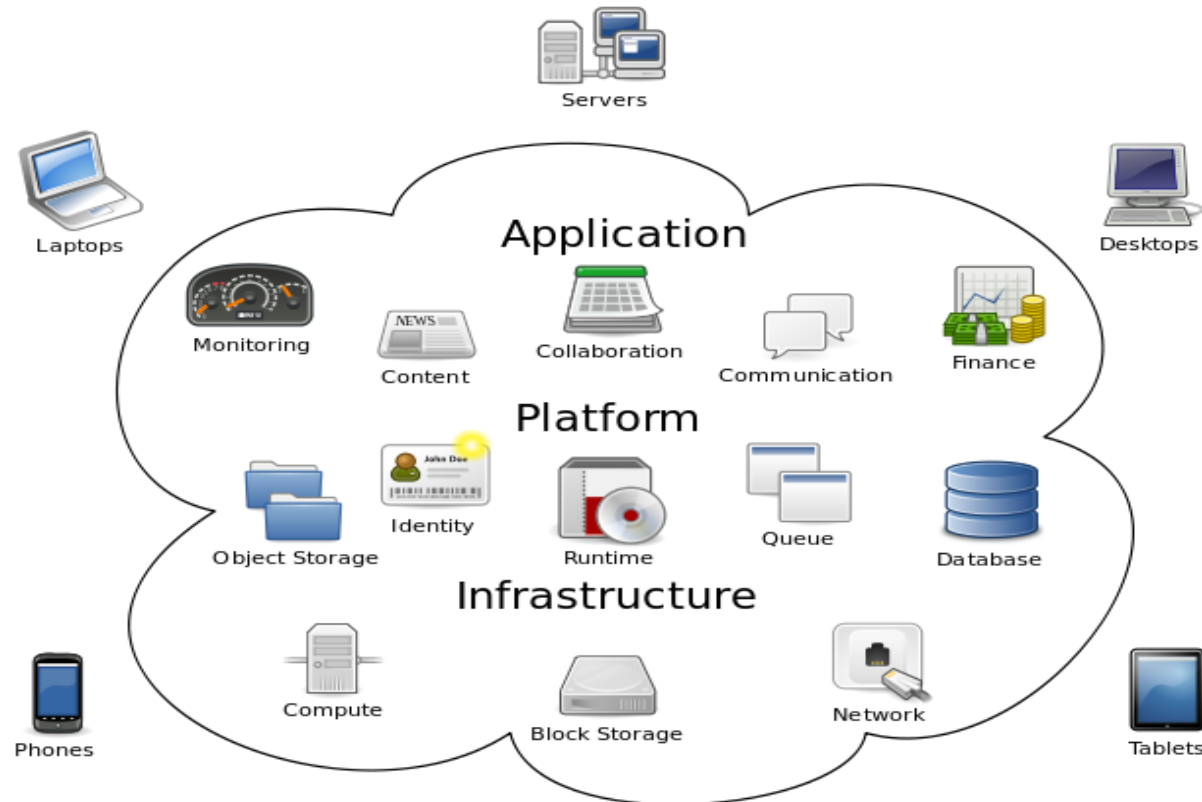


Network Basics for Cloud Computing

CODE: CS491

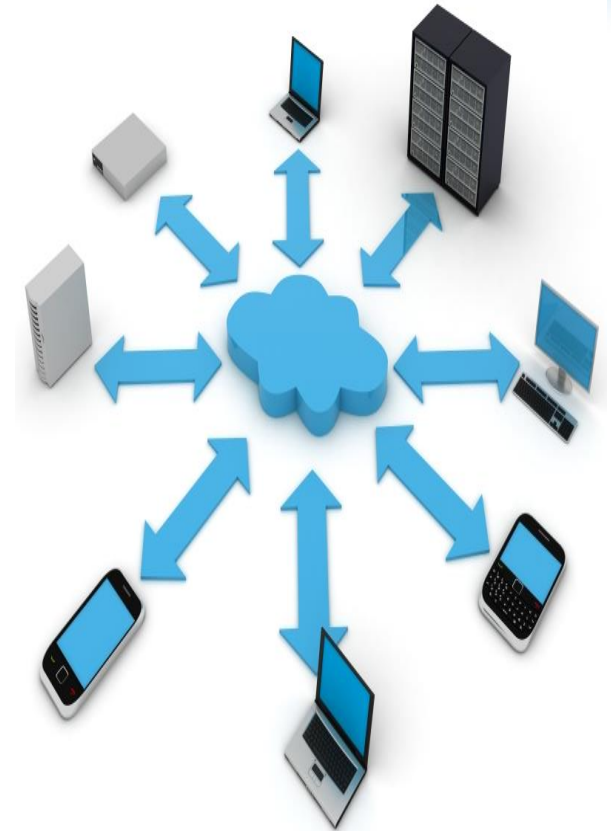
4



Cloud Computing

Contents

1. Introduction to distributed systems.
2. Overview of Cloud Computing; Advantages.
3. History.
4. Characteristics.
5. Service and Deployment Models.
6. Concepts of cloud computing services
 - such as Infrastructure as a Service (IaaS) Platform as a Service (PaaS) and Software as a Service (SaaS).
 - Virtualization Concepts.
 - Migration Approaches.
 - Resource.



Foreword

All clouds must be connected to the Network, which provides remote, anytime, anywhere access to IT resources. It can be said that Network technology is the essential support of cloud computing.

- The network consists of a variety of networking devices. In addition to the traditional physical network, the networks for a virtualized environment also include invisible networks running inside servers. This chapter will cover basic knowledge about both types of networks.

Objectives

- Upon completion of this chapter, you will:
 - Understand how Physical and Virtual switches work.
 - Understand the **Network Architecture** used for virtualized environments.
 - Understand the **Traffic flows** between VMs.
 - Understand concepts related to **VLAN**.

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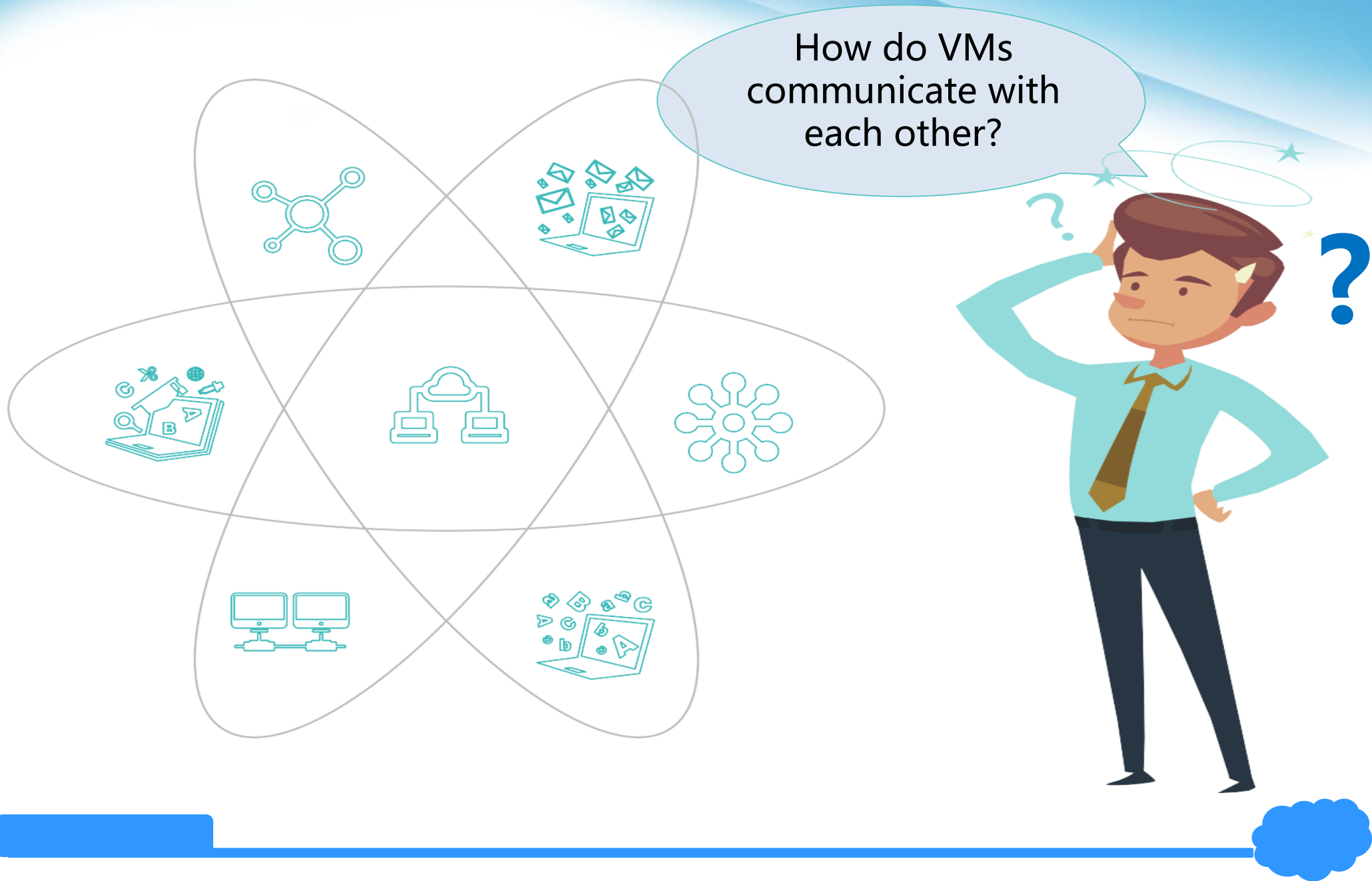
1. Network Architecture for Virtualization

2. Physical Network for Virtualization

3. Virtual Network for Virtualization

4. Network Features of Huawei Virtualization
Product

How Do VMs Communicate?



Network Architecture for Virtualization

North – South Traffic

Router

Aggregate Switch

Layer3 Switch

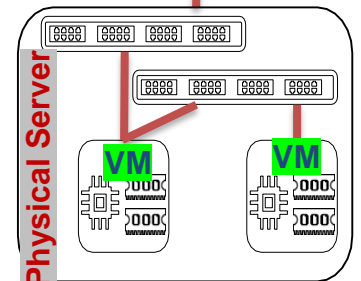
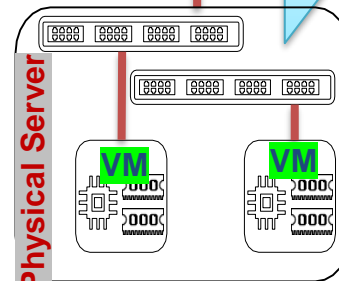
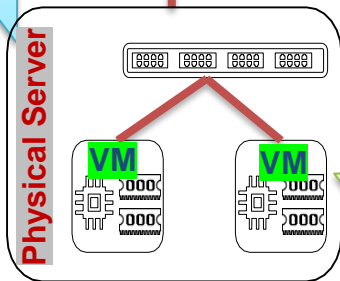
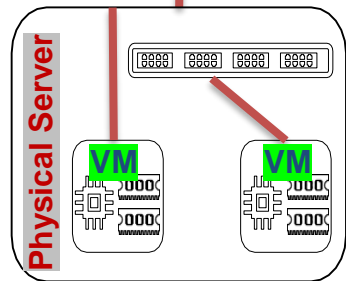
Access Switch

Layer2 Switch

East – West Traffic

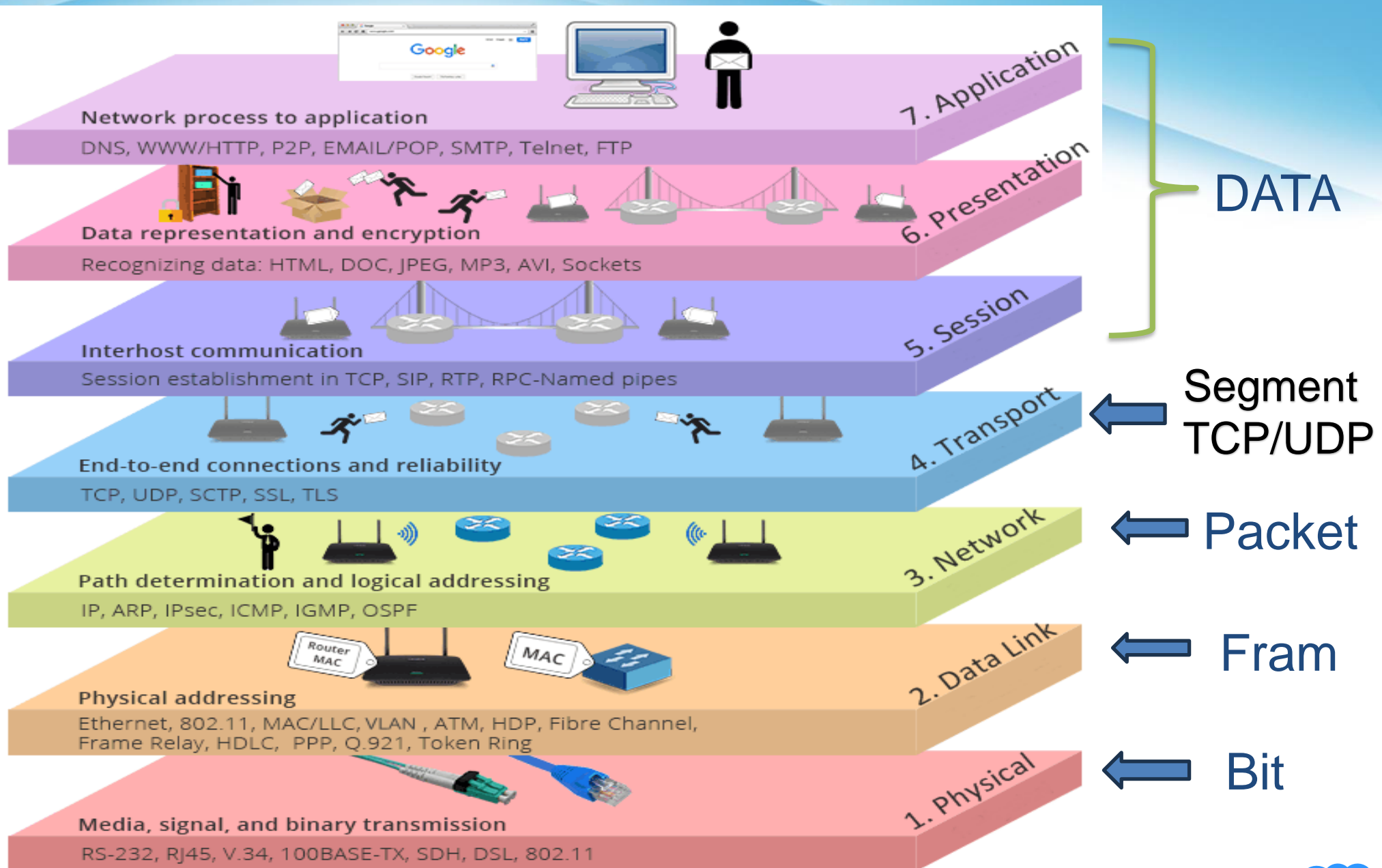
Servers

NIC

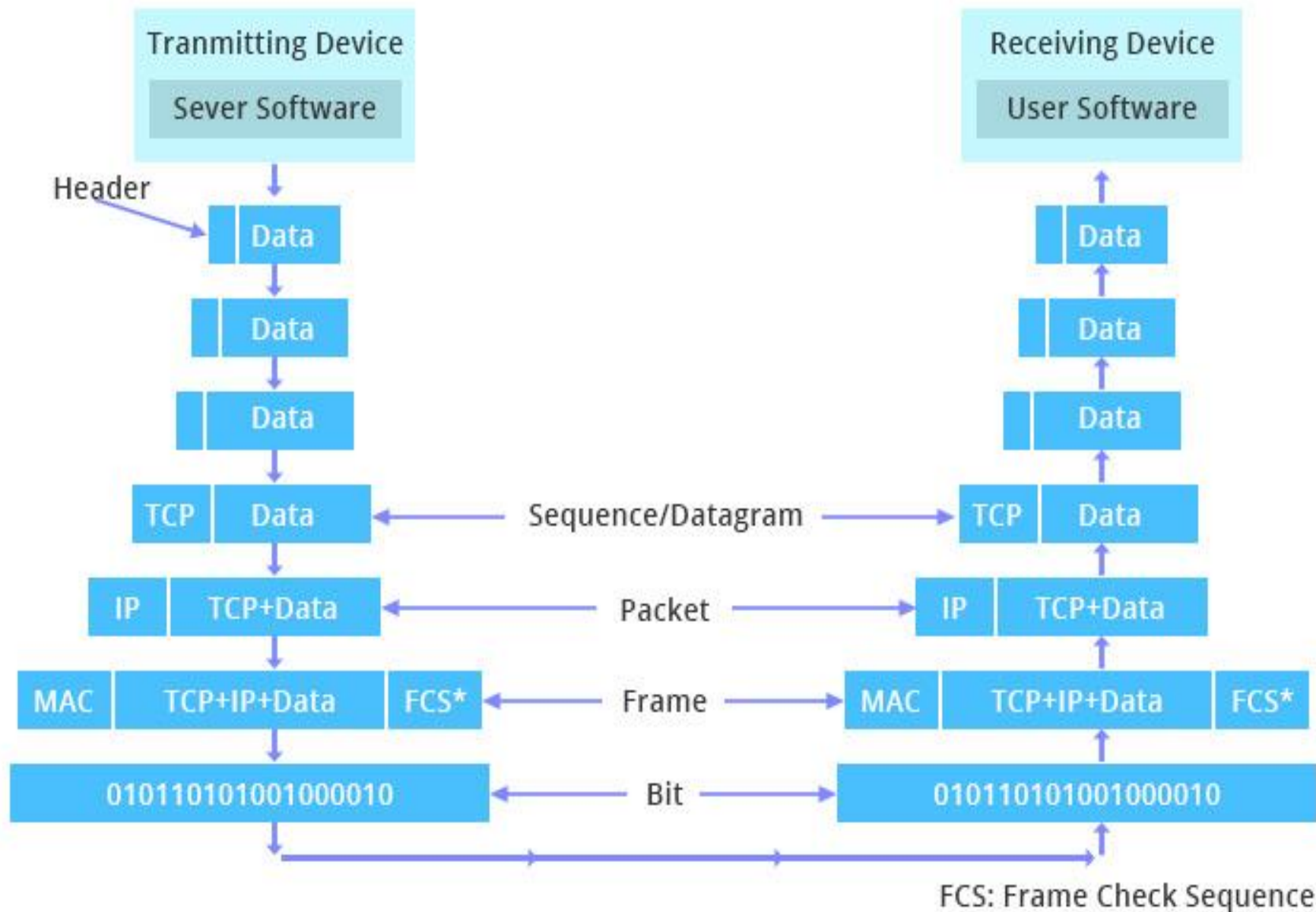


Traffic in a cloud environment

Seven Layers of The OSI Model.



Seven Layers of The OSI Model.

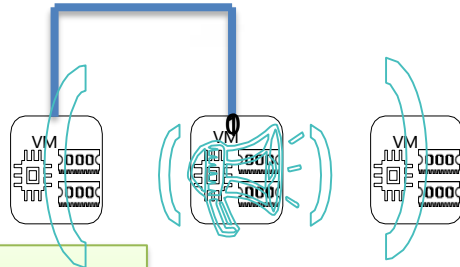


Basic Network Concepts

Broadcast: one speaks and all others listen.

Unicast: one speaks and another listens.

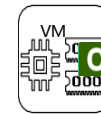
Multicast: one speaks and many other listen.



Simple Duplex
Half Duplex
Full Duplex

Broadcast & Unicast

Communication source



VM on network segment A

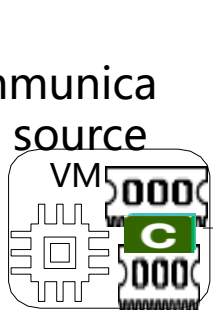
VM on network segment B

VM on network segment C

Routing

Default gateway

Communication source



VM on network segment A

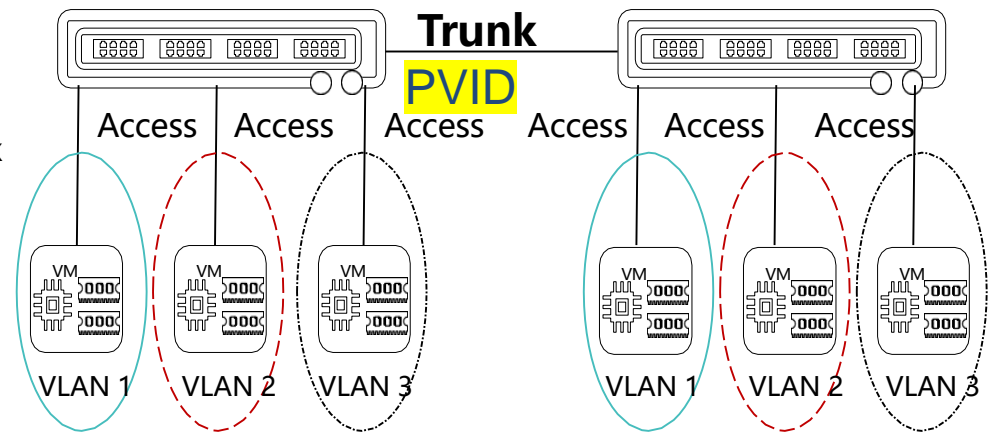
VM on network segment B

VM on network segment C

VLAN

DOT1Q

IP → 0-4095



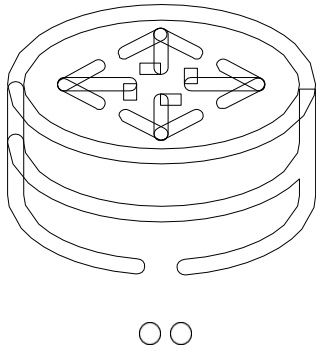
Broadcast Domain

CONTENTS

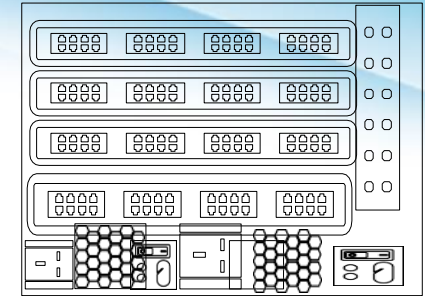
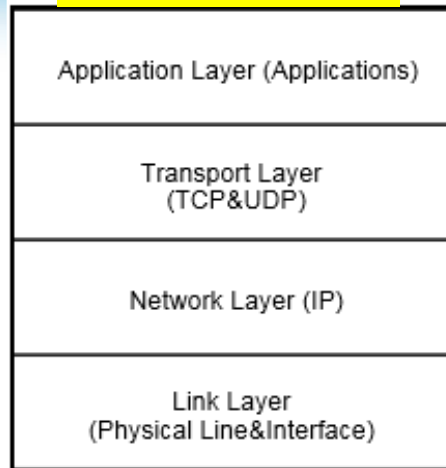
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3. Virtual Network for Virtualization
4. Network Features of Huawei Virtualization Product

Physical Network Devices

TCP/IP Protocol

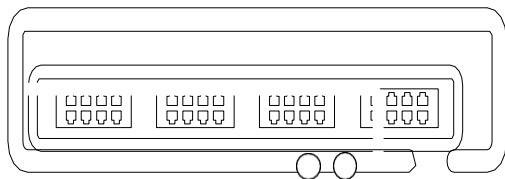


Router

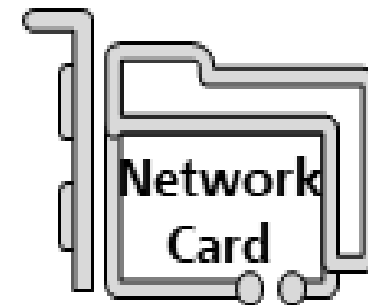


Layer 3 Switch

Layer 2 Switch

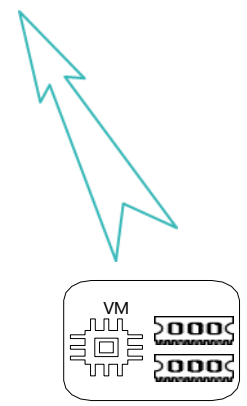
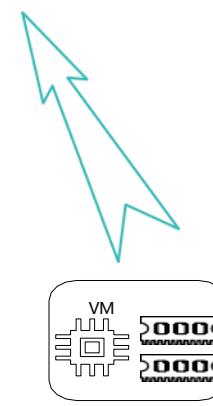
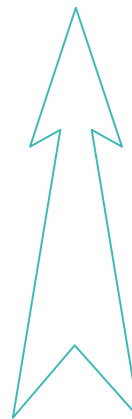
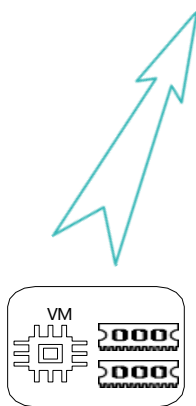
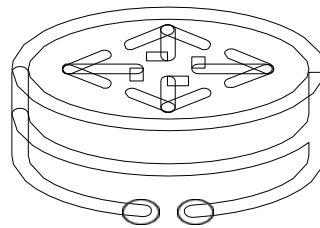


Server NIC

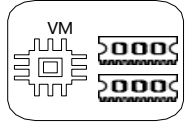
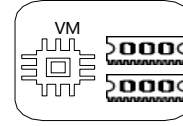
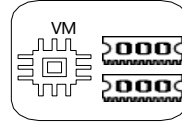
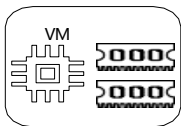
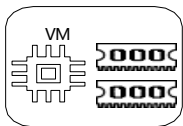
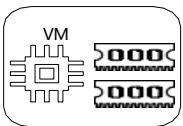
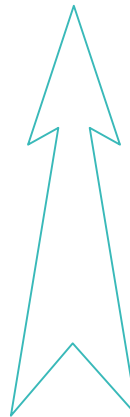
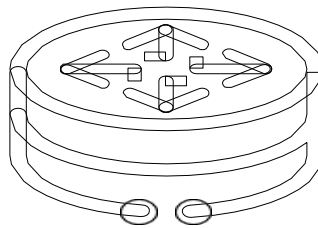


Router in a Virtualized Environment

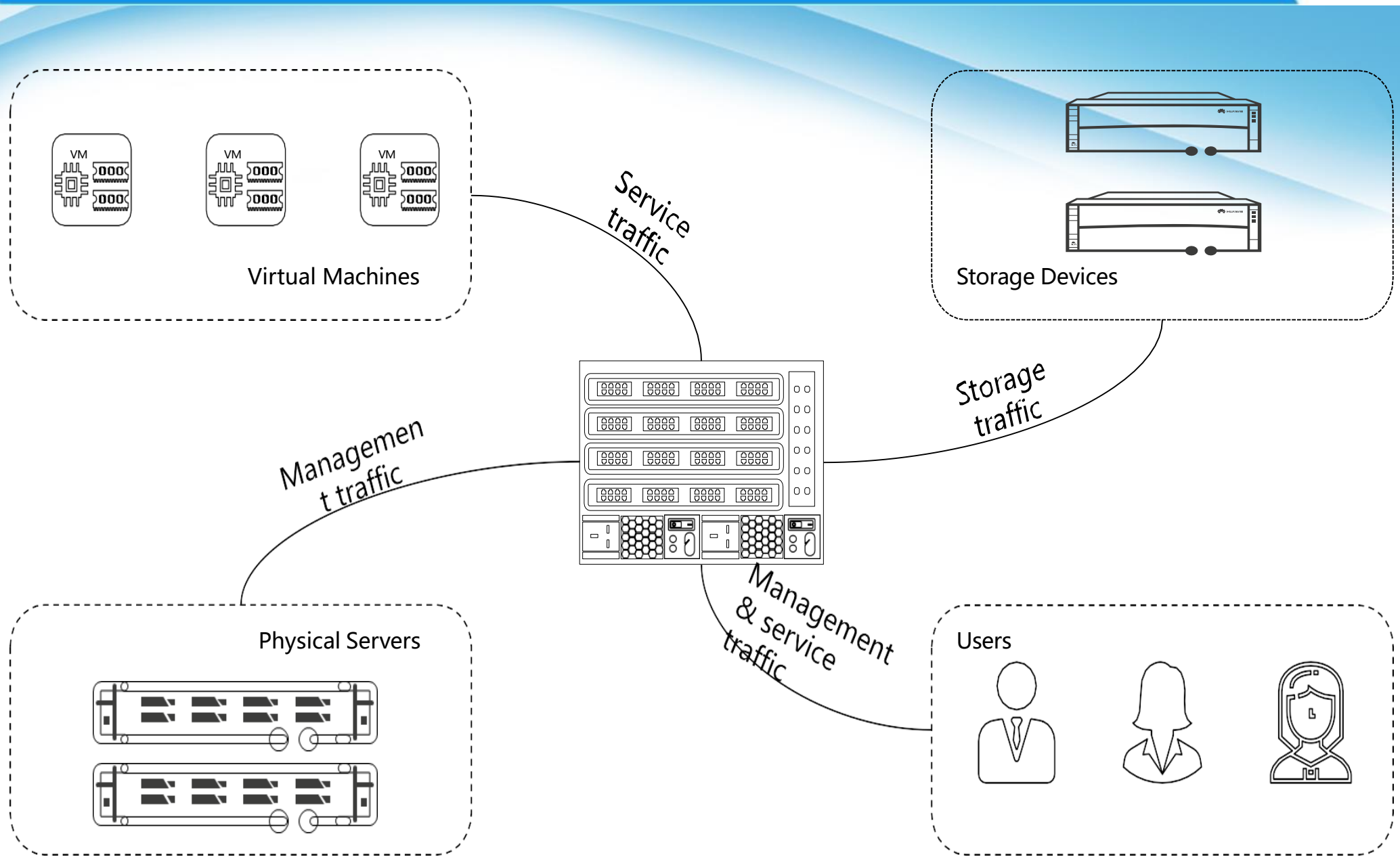
Internet



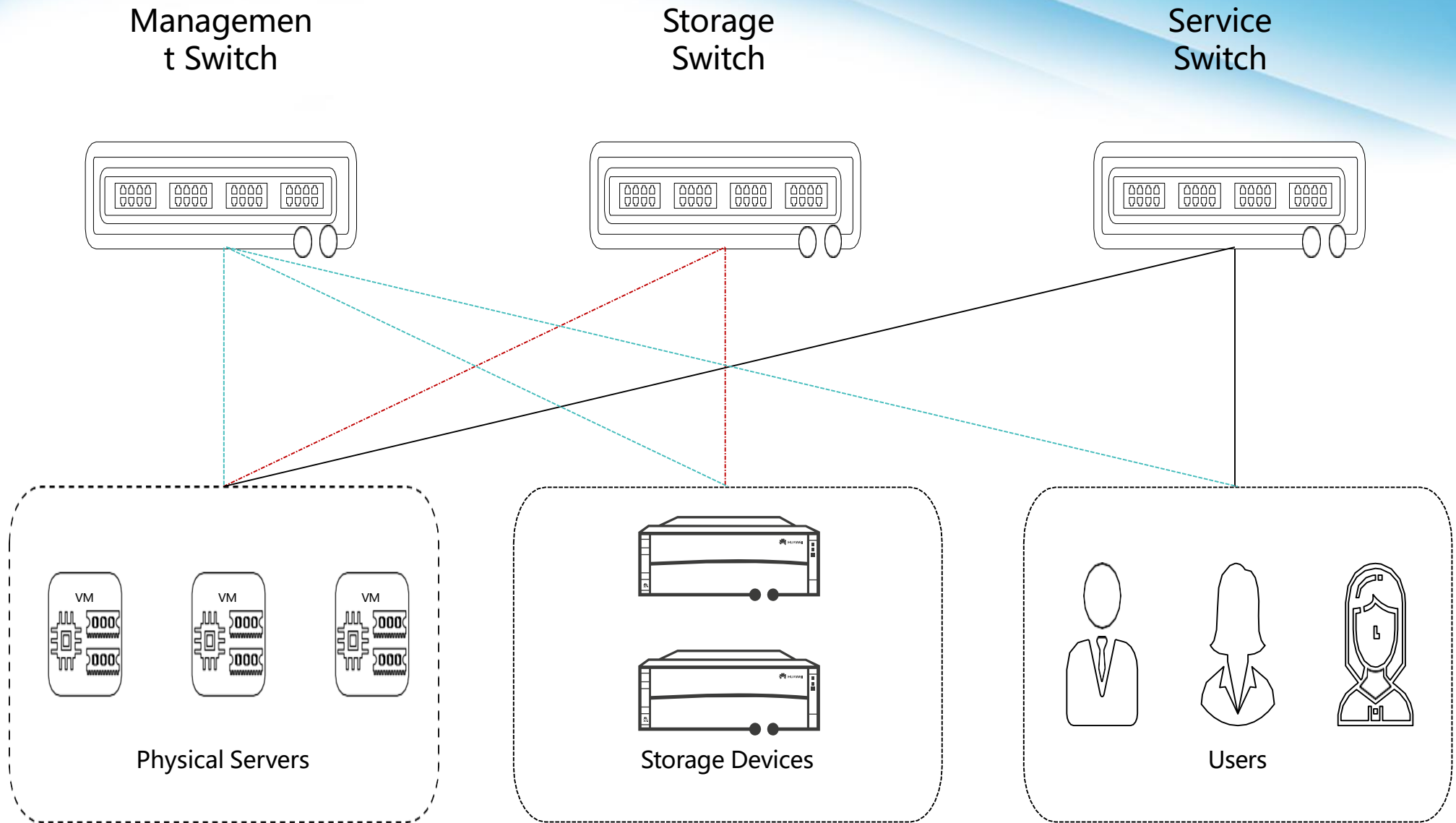
Router in a Virtualized Environment



Layer 3 Switch in a Virtualized Environment

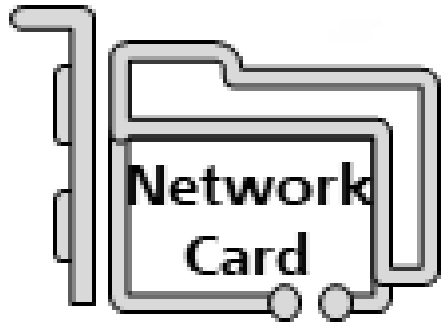


Layer 2 Switches in a Virtualized Environment

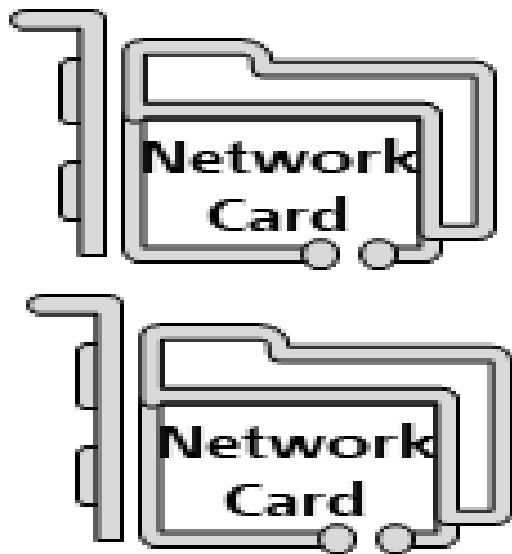


Physical NICs in a Virtualized Environment

Physical Form

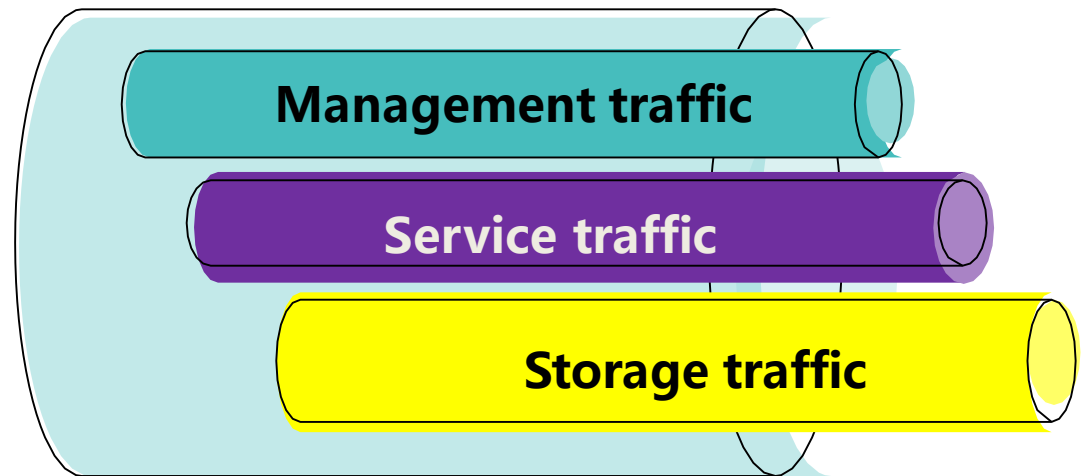


Not Bundled



Bundled

Logical Form

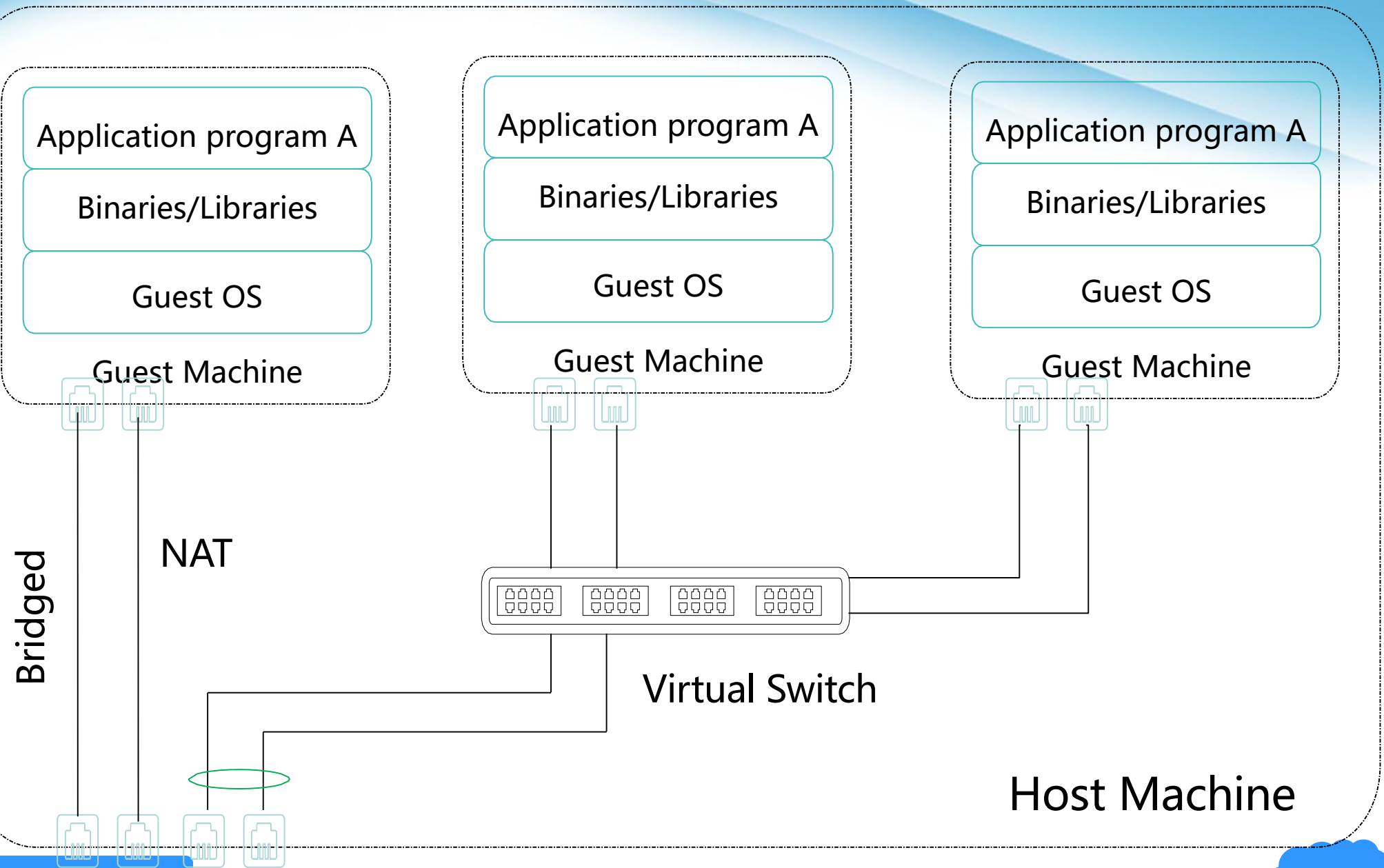


LACP allows multiple physical ports to be bonded into a logical port to increase the link bandwidth without upgrading hardware.

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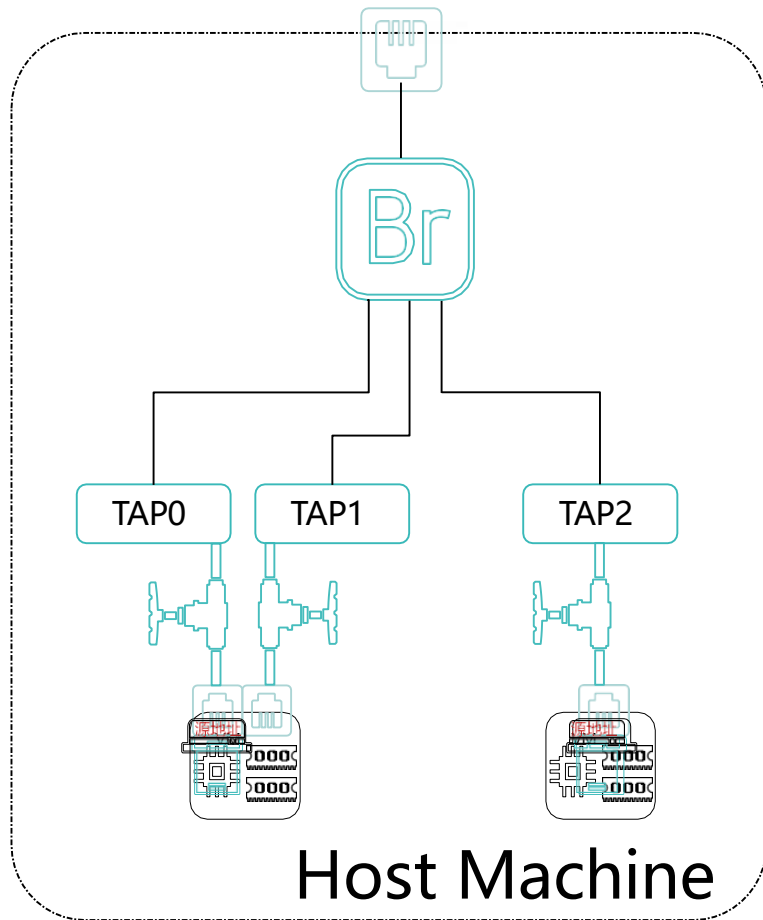
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Mainstream Virtual Network Architecture

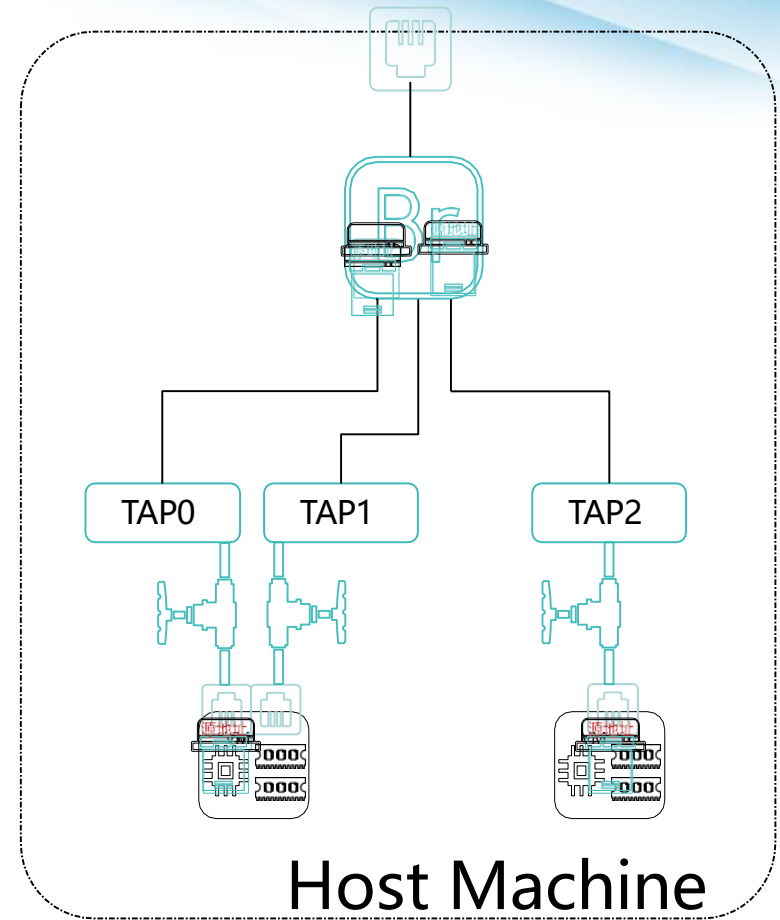


Bridged vs. NAT

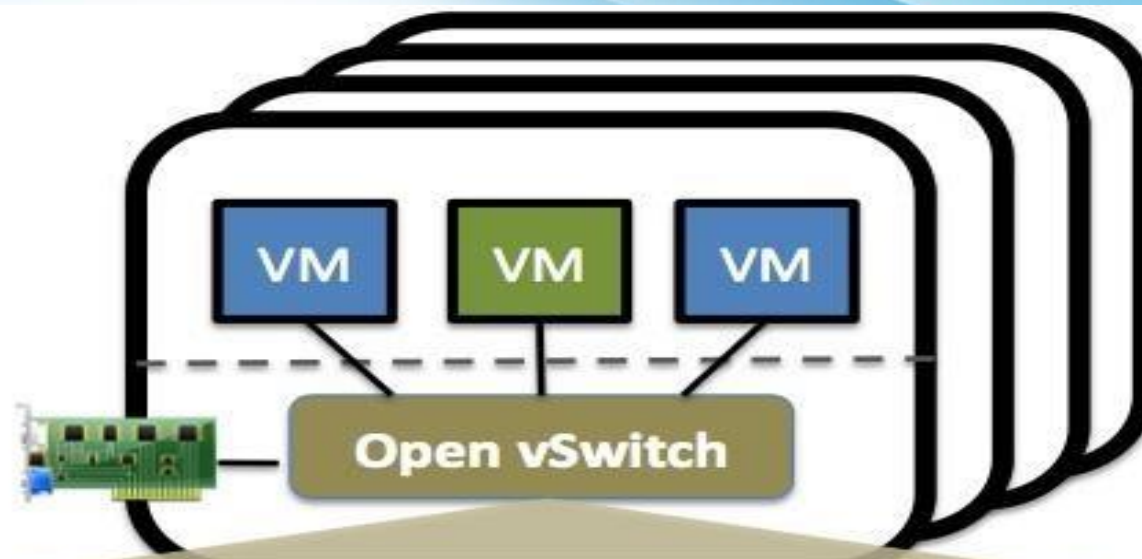
Bridged



NAT



Virtual Switch - Open vSwitch (OVS)



Security: VLAN isolation, traffic filtering



Monitoring: Netflow, sFlow, SPAN, RSPAN

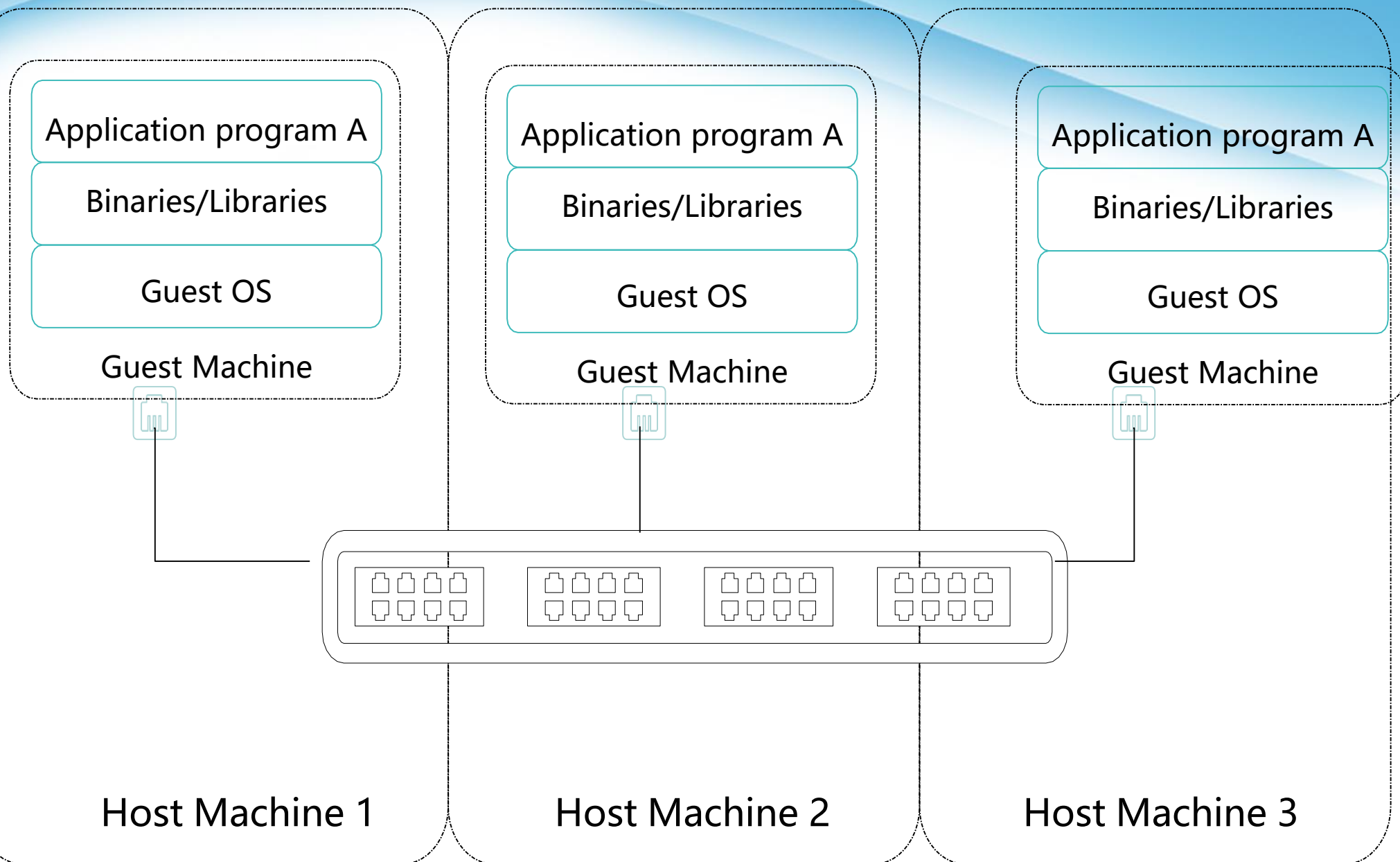


QoS: traffic queuing and traffic shaping



Automated Control: OpenFlow, OVSDB mgmt. protocol

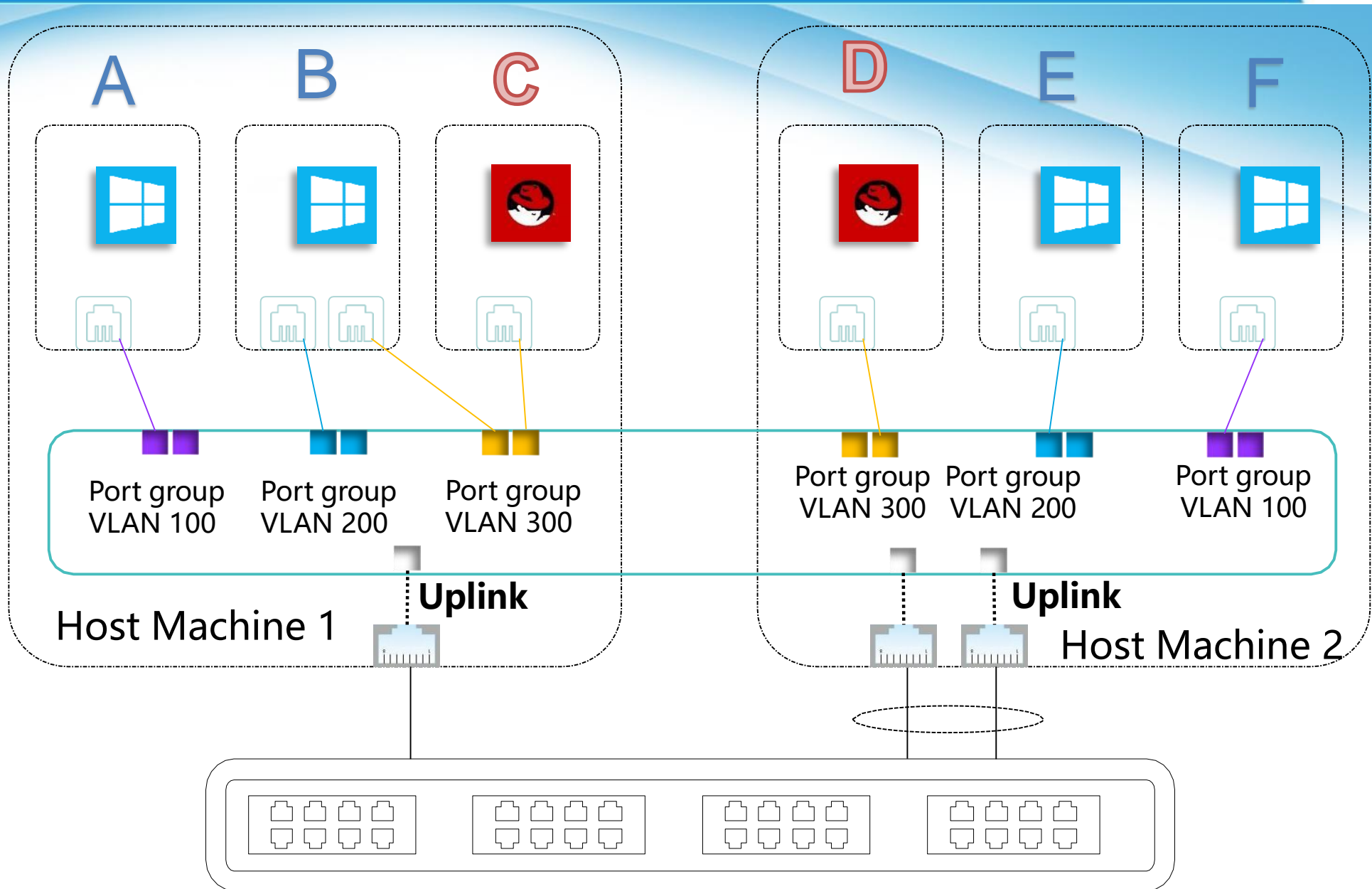
Distributed Virtual Switch



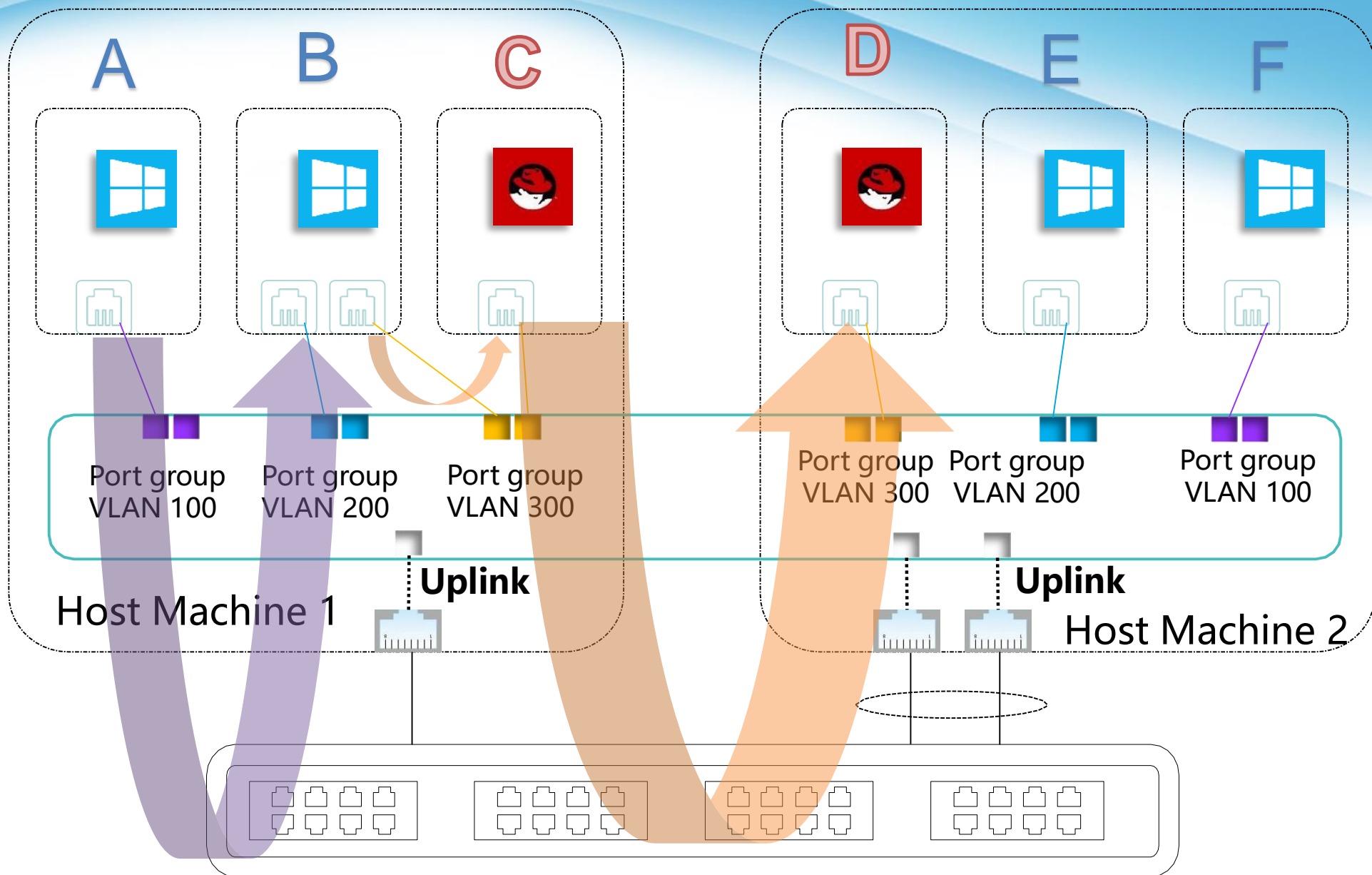
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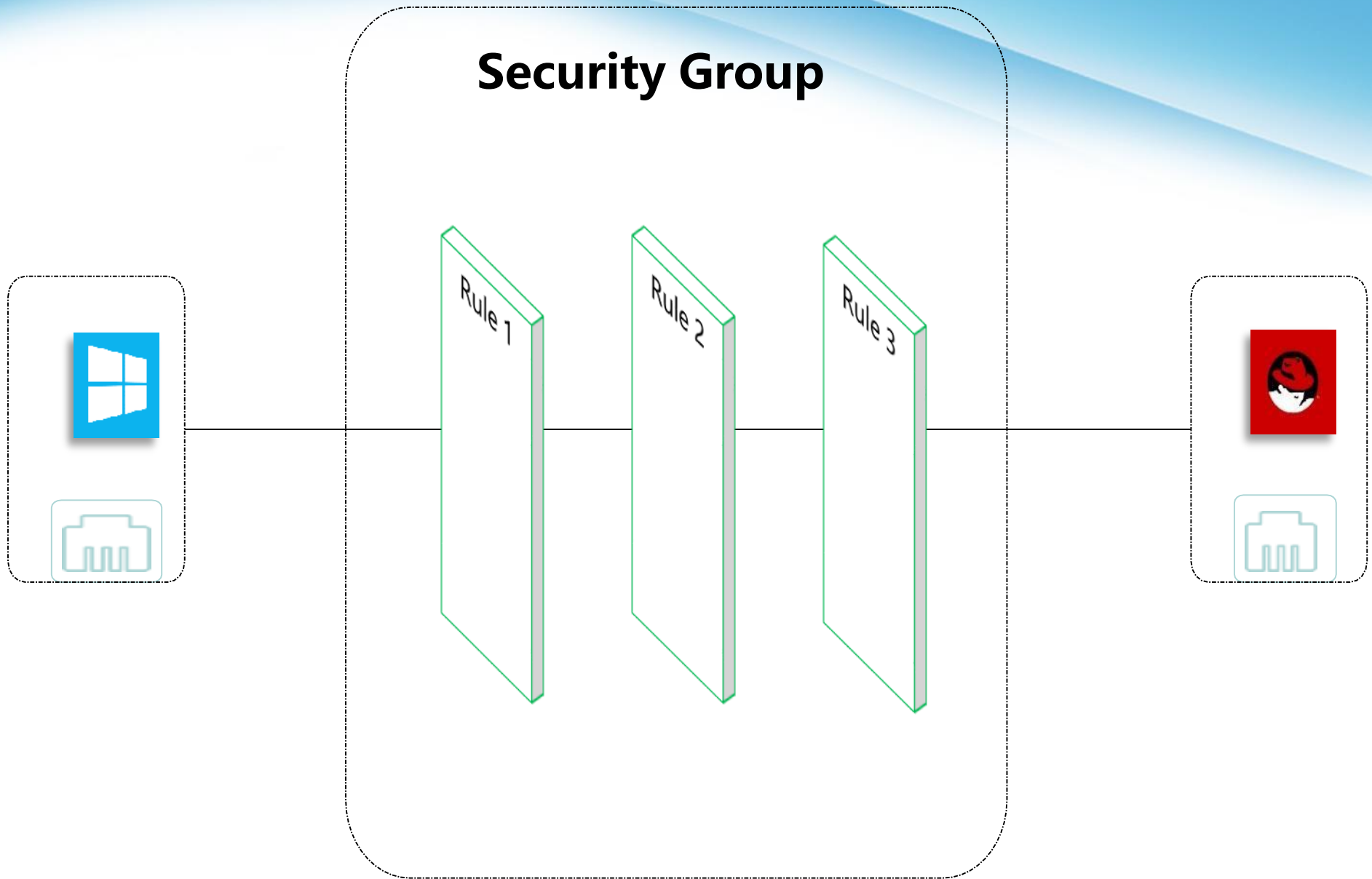
FusionCompute Network Architecture



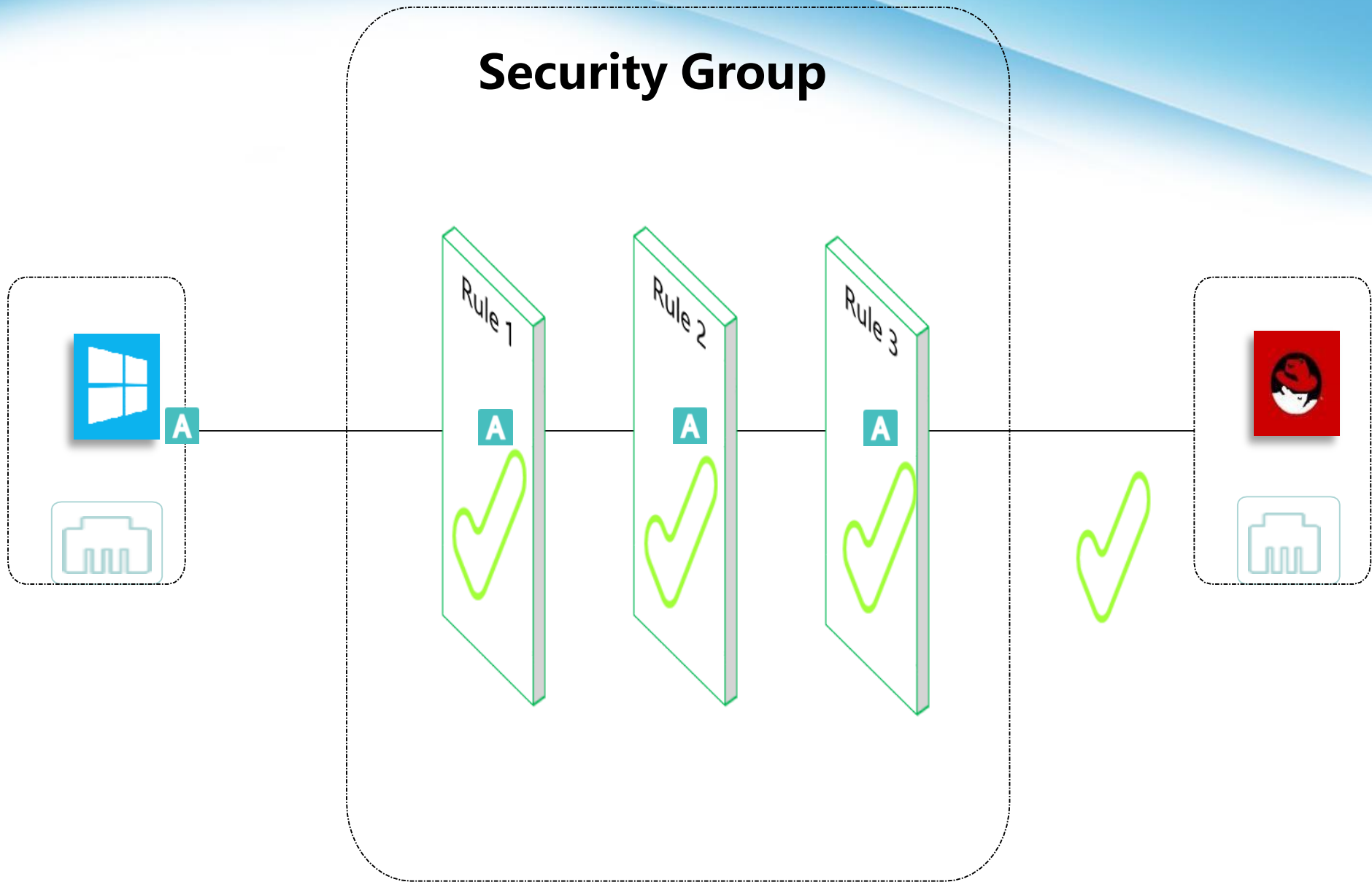
DVS Traffic Flow



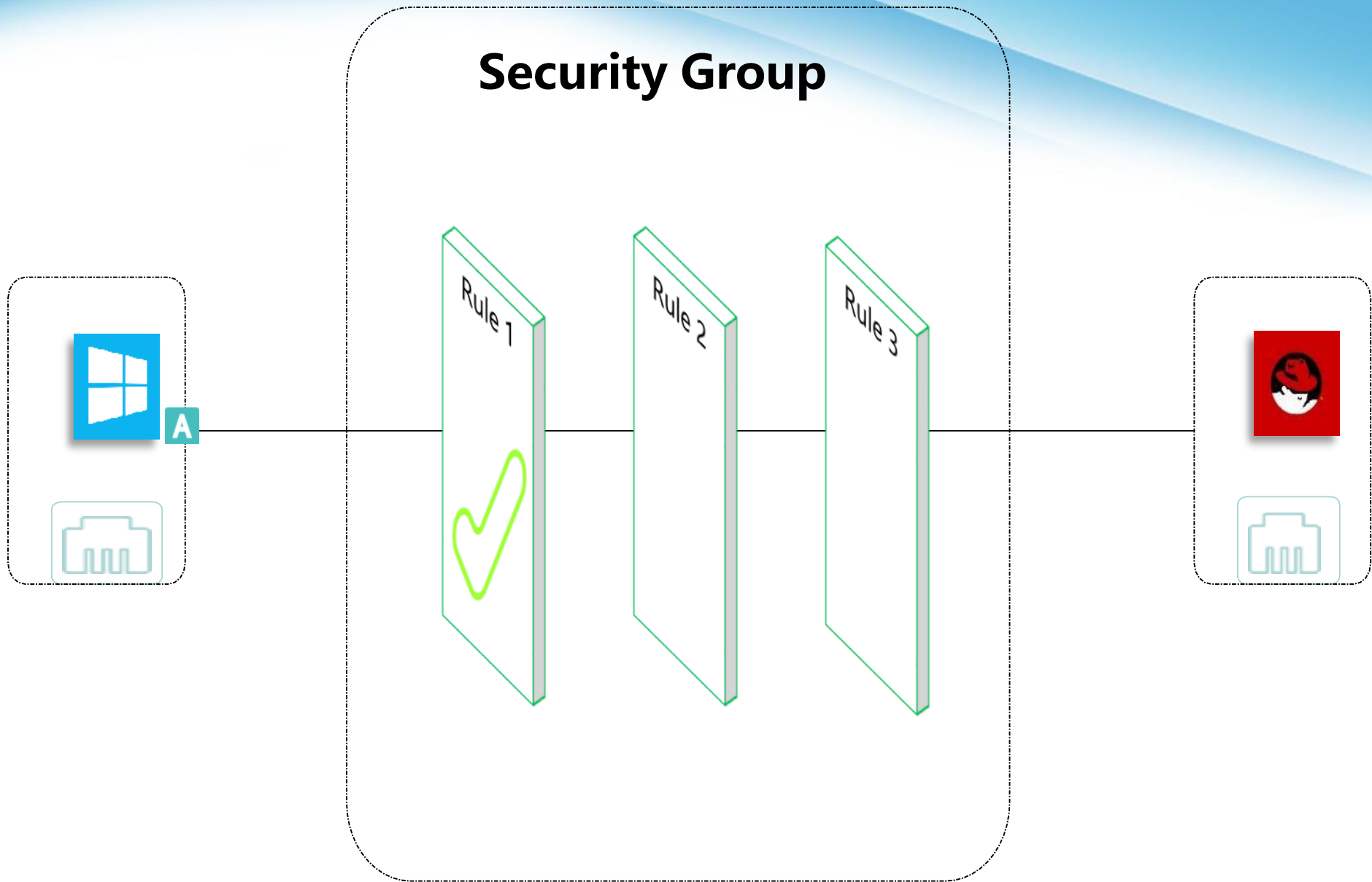
Security Group



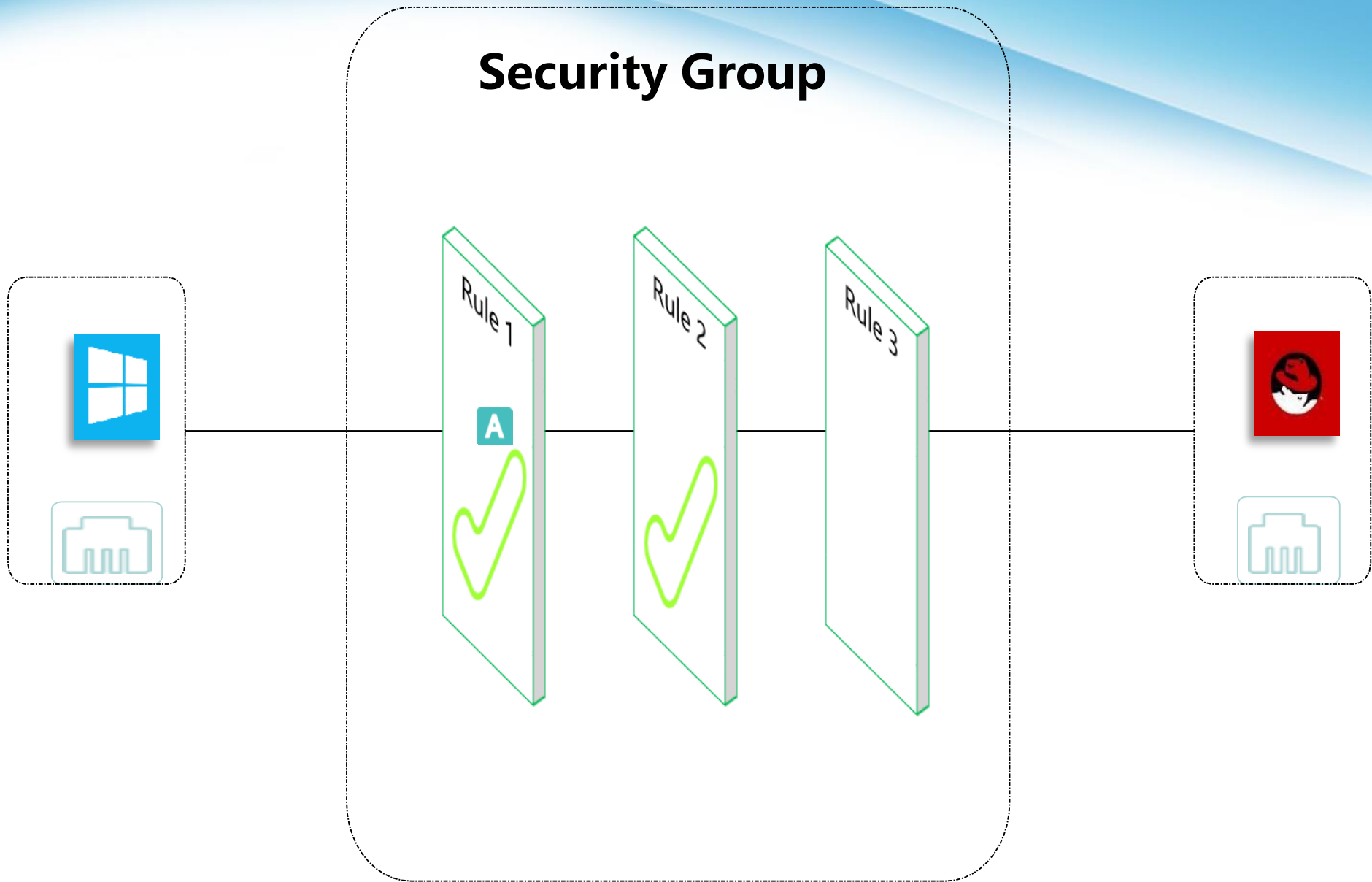
Security Group (Traffic Accepted)



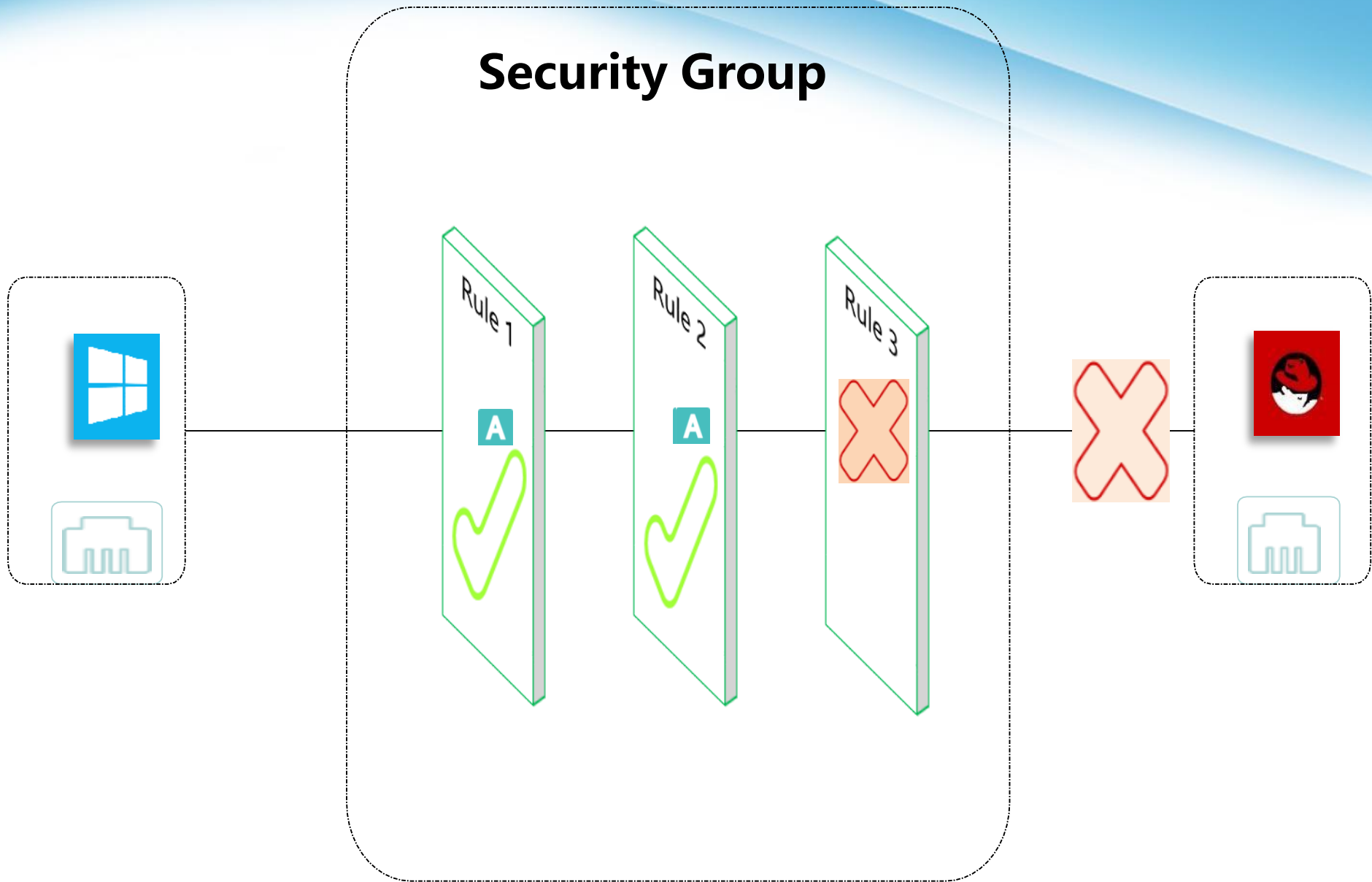
Security Group (Traffic Rejected)



Security Group (Traffic Rejected)



Security Group (Traffic Rejected)



Quiz

1. **Which of the following falls into the category of “north-south traffic” ?**
 - A. Traffic between VMs in a data center
 - B. Traffic generated when users access the data center through the Internet
 - C. Traffic generated during VM live migration
 - D. Traffic between VMs in different data centers
2. **One VM can have multiple virtual NICs connecting it to different virtual switches.**
 - A. TRUE
 - B. FALSE

Summary

- This chapter covers basic knowledge about the physical and virtual networks used in virtualized environments.

Recommendations

- Huawei e-Learning website:
 - <http://support.huawei.com/learning/Index!toTrainIndex>
- Huawei Support case library:
 - <http://support.huawei.com/enterprise/servicecenter?lang=en>
- HCIA-Cloud Computing v4.0 online forum
 - <https://forum.huawei.com/enterprise/en/Huawei-Official-Communication-Channel-HCNA-Cloud-Certification-Course/thread/456287-911>

قيمة الإنسان

سئل الخوارزمي عالم الرياضيات عن الإنسان فأجاب :

1

= إذا كان الإنسان ذو (أخلاق) فهو

10

= وإذا كان ذو (جمال) فأضف الى الواحد صفراً

100

= وإذا كان ذو (مال) أيضاً فأضف صفراً آخر

1000

= وإذا كان ذو (حسب ونسب) فأضف صفراً آخر

10000

= وإذا كان ذو (سلطنة) فأضف صفراً آخر

~~10000~~

فإذا ذهب العدد واحد وهو (الأخلاق)

” ذهب قيمة الإنسان وبقيت الأصفار التي لا قيمة لها ”

قيمة الإنسان

إذا كان في الإنسان عشر خصال :

تسعة منها صالحة وواحدة هي سوء الخلق

أفسدت هذه الخصلة تلك التسعة.

إذا كان في الإنسان عشر خصال :

تسعة منها صالحة وواحدة

هي سوء الخلق

أفسدت هذه الخصلة تلك

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