CLOUD COMPUTING APPLICATIONS
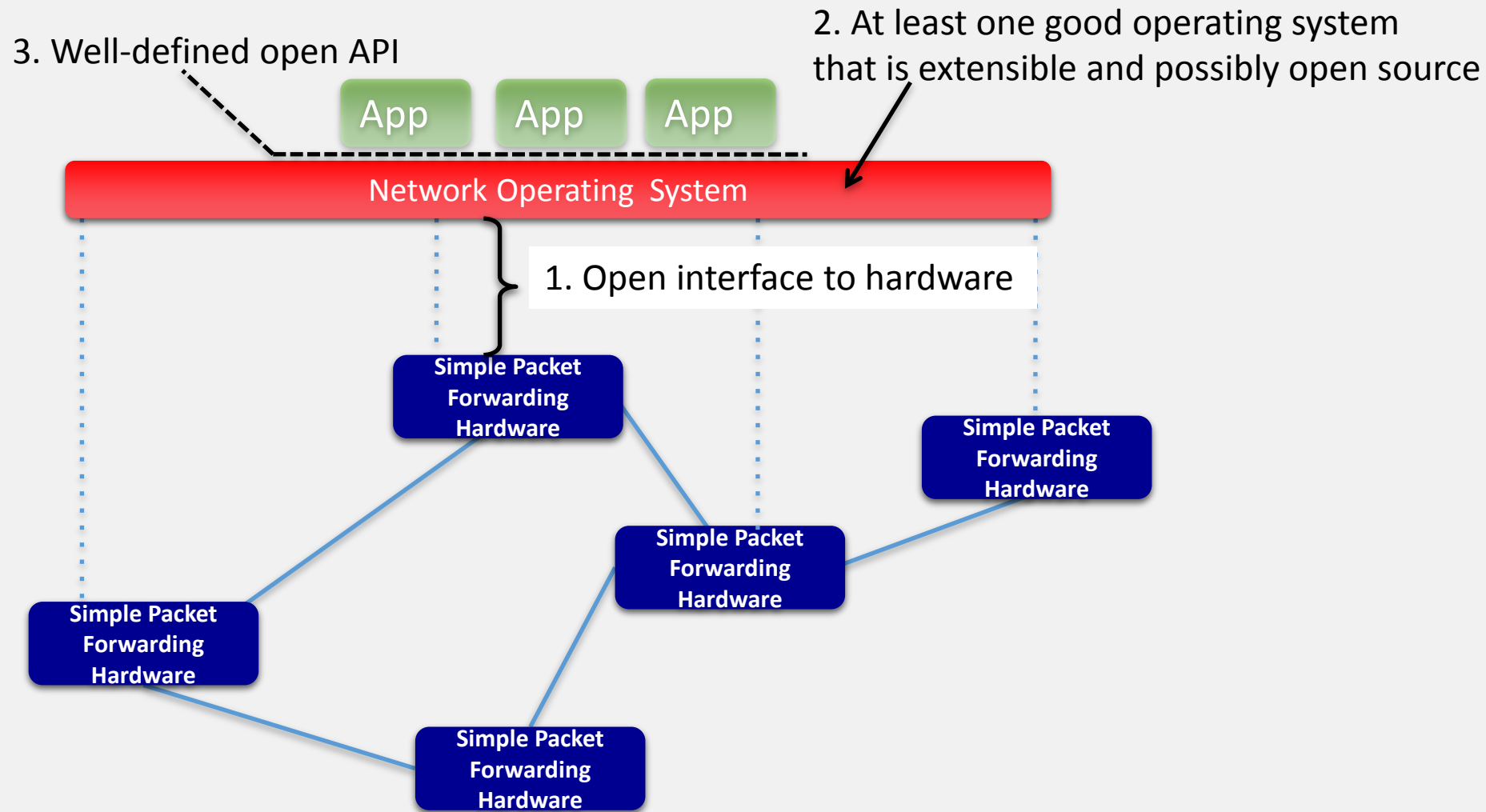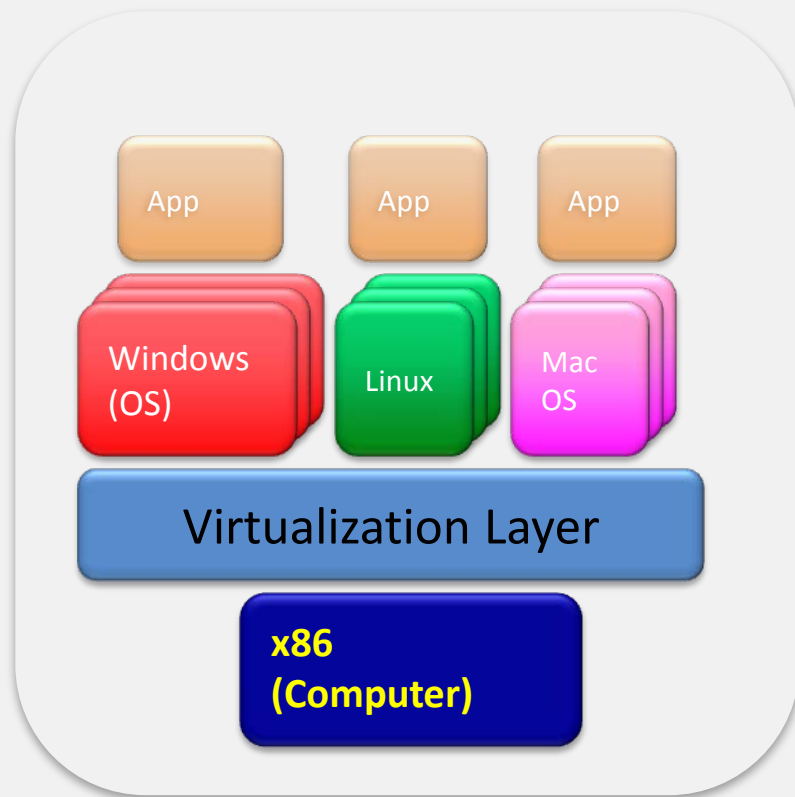
Virtualizing the Network and Storage

Roy Campbell & Reza Farivar

The "Software-defined Network"

3. Well-defined open API

2. At least one good operating system
that is extensible and possibly open source

App   App   App

Network Operating System

1. Open interface to hardware

Simple Packet Forwarding Hardware

Simple Packet Forwarding Hardware

Simple Packet Forwarding Hardware

Simple Packet Forwarding Hardware

Simple Packet Forwarding Hardware
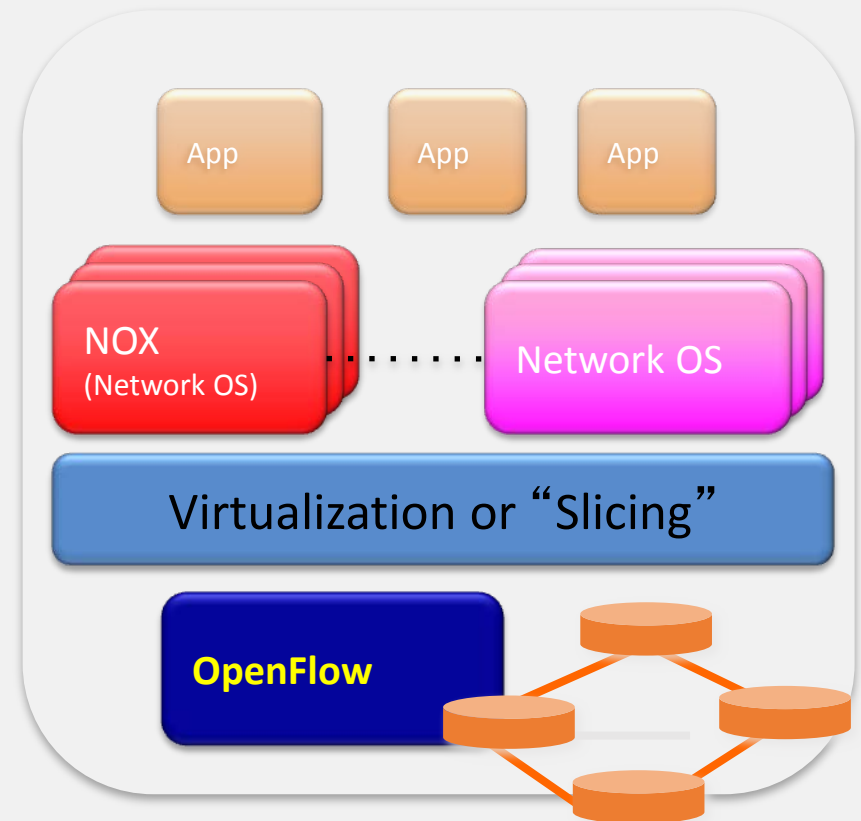
Trend Virtualized OS + Virtualized Network

Computer Industry

Network Industry

Simple common stable hardware substrate below + programmability + strong isolation model + competition above = faster innovation

Trend — Then Add Virtualized Storage

App App App

Windows (OS) | Linux | Mac OS

Virtualization Layer

x86 (Computer)

Computer Industry

App App App

NOX (Network OS) ...... Controller Network OS

"Slicing"

OpenFlow

Network Industry

App App App

HDFS ...... HBase

Virtualization

Distributed FS Storage Area Network

Storage Industry