

Virtual Appliance Applications

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Outline

- ❑ Introduction to Virtual Appliances
- ❑ Case Study 1: License Server Virtual Appliance
- ❑ Case Study 2: Distributed Virtual Switch (DVS) Controller Virtual Appliance
- ❑ Intrusion Detection System VM

Introduction

- Virtual appliances to cloud computing
 - Is like Apps to iPhone or Android phones
- Ready to run (turnkey)
 - Can be deployed through the Internet
- Minimal initial setup
 - Networking and storage
- Web-based UI
 - For advanced configuration

What is a Virtual Appliance?

- ❑ It is self-contained **virtual machine** that includes a pre-installed **operating system**, **applications** and **services**.
- ❑ A virtual appliance allows you to quickly deploy POCs and full production deployments.
- ❑ Complex installations of SW solutions can be simplified and streamlined.
- ❑ Product installations can be performed in advance leaving little or no configuration left for the customer to perform.

Current State

- VMware claims 1000+ virtual appliances (www.vmware.com/appliances)
- Top categories
 - OS (Ubuntu, Fedora)
 - Networking (network mgmt, network monitoring)
 - IT (LAMP stack)
 - Enterprise Resource Planning (ERP) and CRM
 - Applications Infrastructure (ZEG Groupware, Zeus LB)
 - Storage (EMC, HP, FalconStor)
 - Collaboration, Systems Infrastructure, Content Distributions

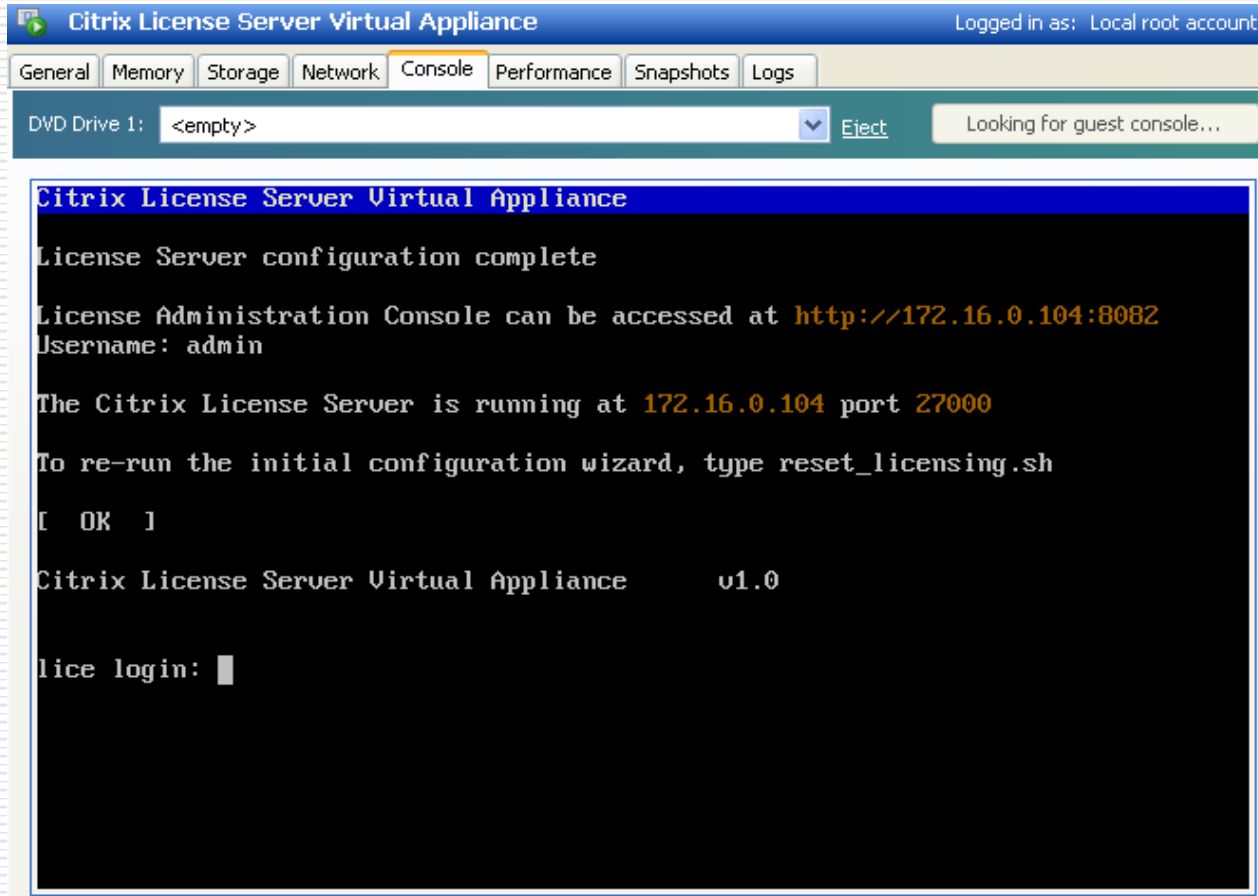
Current State (Cont'd)

- XenServer 5.6 Feature Pack 1 in Beta
 - Distributed virtual switching is big step towards network virtualization
- Network (nodes and links) in a box
- Switching capabilities absorbed into servers
- New types of hardware accelerations may be needed
 - TCP offloading, WAN optimization, Load Balancing
 - QoS and Queue Management

License Server Virtual Appliance

How SW vendors collect revenue

License Server as a VM



License Server GUI

CITRIX License Administration Console

Help Log Out

Dashboard Administration

Alerts

0 Critical

Concurrent Licenses

Vendor Daemon: CITRIX

Product	SA Date	In Use (Available)	Expiration	License Type
▶ Citrix Start-up License Server				

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License Server VM GUI (Cont'd)

The screenshot displays the Citrix License Administration Console interface. At the top, the header includes the Citrix logo and the text "License Administration Console". On the right side of the header, it shows "User Name: admin", "Help" (with a question mark icon), and "Log Out" (with a close icon). Below the header, there are two tabs: "Dashboard" and "Administration", with "Administration" being the active tab.

The main content area is titled "System Information" and contains the following details:

Release Version:	11.6.1 build 10007
License Server Manager Port Number in Use:	27000
Display:	/dev/console
Host Name:	licserv
Host Domain Name:	licserv.sfbay.sun.com
IPv4 Address:	10.7.2.122
IPv6 Address:	0:0:0:0:ffff:a07:27a
Ethernet Address:	a2b514d0d2fd
Local Stop Server Allowed:	No
Remote Stop Server Allowed:	No
License Reclaim Allowed:	No

On the left side of the main content area, there is a vertical navigation menu with five icons and their corresponding labels: "System Information" (selected), "User Configuration", "Alert Configuration", "Server Configuration", and "Vendor Daemon Configuration".

Import Licenses

The screenshot displays the Citrix License Administration Console interface. At the top, the title bar reads "CITRIX License Administration Console" and includes the user name "admin", a help icon, and a log out icon. Below the title bar, there are navigation links for "Dashboard" and "Administration". The main content area is titled "Vendor Daemon Configuration" and features a sidebar on the left with icons for "System Information", "User Configuration", "Alert Configuration", "Server Configuration", and "Vendor Daemon Configuration". In the main area, there is a red circle highlighting the "Import License" button, which is represented by a folder icon with a green plus sign. Below this button is a table with the following data:

Name	Status	Version	Port		
CITRIX	RUNNING	11.6	7279	Administer	Delete

At the bottom of the console, there is a copyright notice: "©2008 Accesso Software Inc. All Rights Reserved."

Populated Licenses

The screenshot displays the Citrix License Administration Console interface. At the top, the user is logged in as 'admin'. The main content area is divided into two sections: 'Alerts' and 'Concurrent Licenses'.

Alerts: Shows 0 Critical alerts. There are two icons: a red 'X' and a yellow warning triangle, both with a '0' below them.

Concurrent Licenses: Shows a table of licenses with the following columns: Product, SA Date, In Use (Available), Expiration, and License Type. The Vendor Daemon is identified as CITRIX.

Product	SA Date	In Use (Available)	Expiration	License Type
▼ Citrix Provisioning Services Concurrent System	2010.1231	0 (200)	31-DEC-2010	Technology Preview
▼ Citrix Start-up License Server	2038.0101	0 (4000)	PERMANENT	System
▼ Citrix XenServer Advanced Concurrent System	2010.1231	0 (50)	31-DEC-2010	Technology Preview
▼ Citrix XenServer Enterprise Concurrent System	2010.1231	0 (50)	31-DEC-2010	Technology Preview
▼ Citrix XenServer Platinum Concurrent System	2010.1231	0 (50)	31-DEC-2010	Technology Preview

Why Licensing Is Important

- Protect SW development return on investment (ROI)
- Foundation of a flourishing SW industry
- Help move from a consumer-based industry to enterprise and datacenter-centric industry
 - Consumer industry – SW is add-on, usually free with HW purchase
 - Enterprises/data center – HW platforms are relatively low cost (“commodity”) compared with SW licensing cost

Case Study 2: DVS Controller Virtual Appliance

Networking in a box

DVS Controller Basics

- Each server has multiple virtual networks
- Servers are aggregated into a ***“resource pool”***
 - Each resource pool is identified a **“pool master”** server
- DVS Controller manages multiple resource pools

Adding Resource Pools

The screenshot displays the Citrix Distributed Virtual Switch Controller (DVSC) web interface. The top navigation bar includes 'Dashboard', 'Visibility & Control', and 'Settings'. The main content area is titled 'All Resource Pools' and features a table with columns for 'Resource Pool', '# Servers', '# Networks', '# VMs', and 'Status'. An 'Add Resource Pool' button is visible in the top right of this section. A modal dialog box titled 'Add Resource Pool' is open, containing the following fields and options:

- Pool Master Server (DNS/IP): 172.16.0.102
- Login Username: root
- Login Password: [masked]
- Steal: If checked, forcibly replaces any existing controller.

Buttons for 'Connect' and 'Cancel' are located at the bottom of the dialog.

Adding Resource Pools (Cont'd)

Version: 0.9.5+build3697 Online Help Logout user: admin

CITRIX Distributed Virtual Switch Controller™

Dashboard Visibility & Control Settings

Status Flow Statistics Access Control Port Configuration

Search

All Resource Pools

- XenServer Pool
 - Pool-wide Networks
 - XenServers
 - All VMs
- Address Groups
- VM Groups

All Resource Pools Add Resource Pool

Resource Pool	# Servers	# Networks	# VMs	Status	
XenServer Pool	1	2	6	●	

RSPAN Target VLAN IDs

Click + to add an item to this list Save Target VLAN Changes Undo Changes

+ -

Distributed Virtual Switch

- Consists of
 - a virtualization-aware switch (the *vSwitch*) running on each host
 - *DVS Controller*, a centralized server that manages and coordinates the behavior of each individual vSwitch to provide the appearance of a single distributed virtual switch.

DVS Features

- ❑ The DVS Controller supports fine-grained security policies to control the flow of traffic sent to and from a VM.
- ❑ It also provides detailed visibility into the behavior and performance of all traffic sent in the virtual network environment.

DVS Controller Features

□ Dashboard

- Server Statistics
- Network Statistics
- Network Event
- Aggregate Throughput and Packet Rate

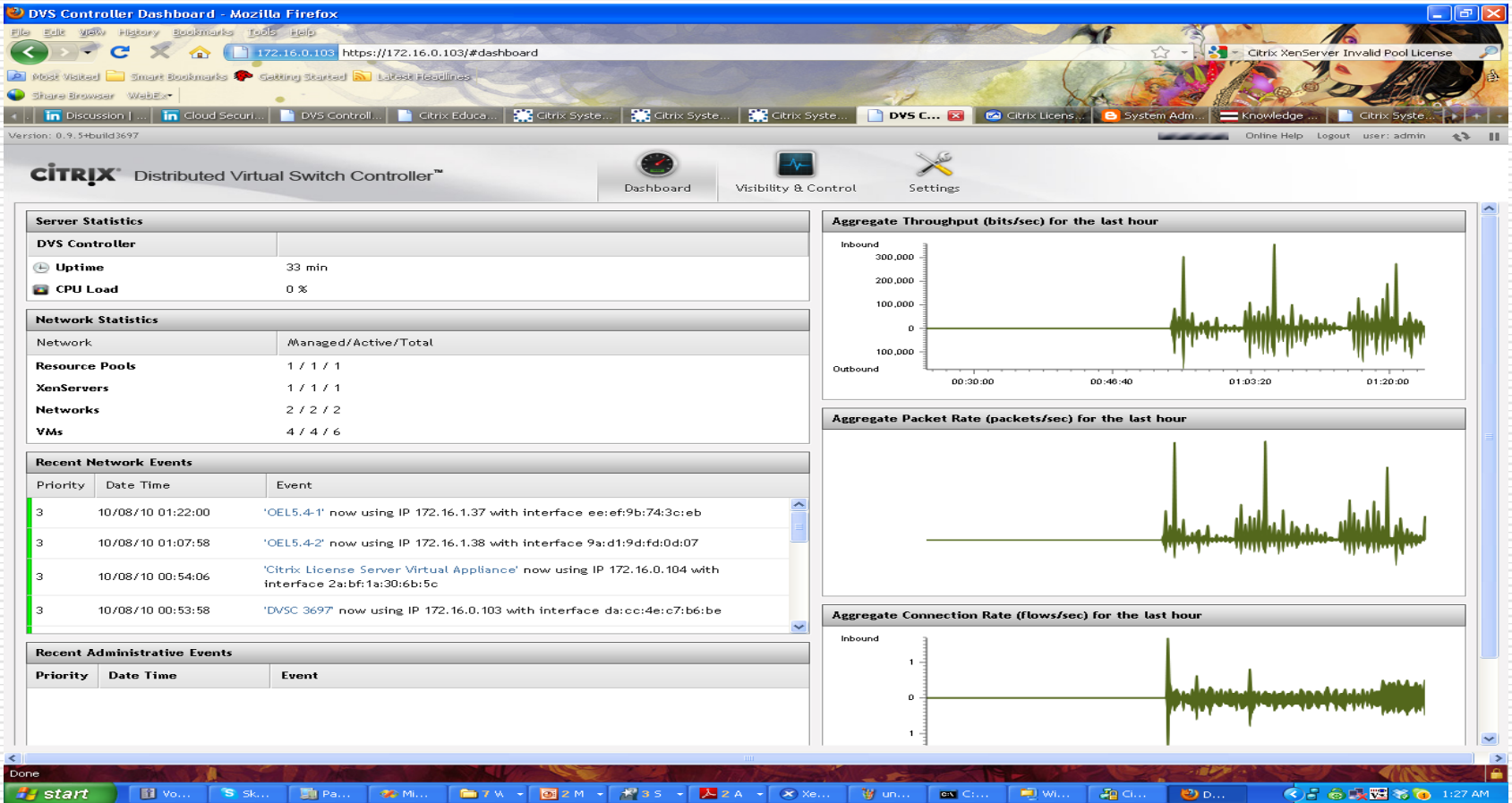
□ Visibility and Control

- Status
- Flow Statistics
- Access Control
- Port Configuration

□ Settings

- IP Configuration
- SW Version and Upgrade
- Server Maintenance
- Administrative Accounts
- Configuration Snapshots
- Time and NTP
- Syslog

DVS Controller Dashboard



DVS Controller Flow Statistics



DVS Controller Security Policy

Status Flow Statistics **Access Control** Port Configuration

Security Policy Save Policy Changes Undo Changes

▼ Global Policy

Action	Protocol	Direction	Remote Addresses	<input checked="" type="radio"/> Description <input type="radio"/> Rule Details	
allow	ARP	to / from	Any	allow ARP to and from VMs	
allow	DHCP	to	Any	allow VMs to acquire an IP via DHCP	
allow	DNS	to	Any	allow VMs to perform DNS lookups	
Placeholder for more specific Pool, Network, VM, and Interface policies.					
allow	Any	to / from	Any	allow all traffic to and from VMs	

[Add New ACL Above](#)
[Add New ACL Below](#)

DVS Controller Port Configuration

QoS Policy

- Rate limiting (Kb/s, Mb/s, or Gb/s) with burst size of Kbits, Mbits or Gbits
- Applied at the VIF level
- Policy hierarchy
 - Global: all VIFs in all resource pools
 - Resource pools: all VIFs in a particular resource pool
 - Port-wide networks: all VIFs attached to a particular network
 - VMs: all VIFs attached to a particular VM
 - VIFs: a single VIF

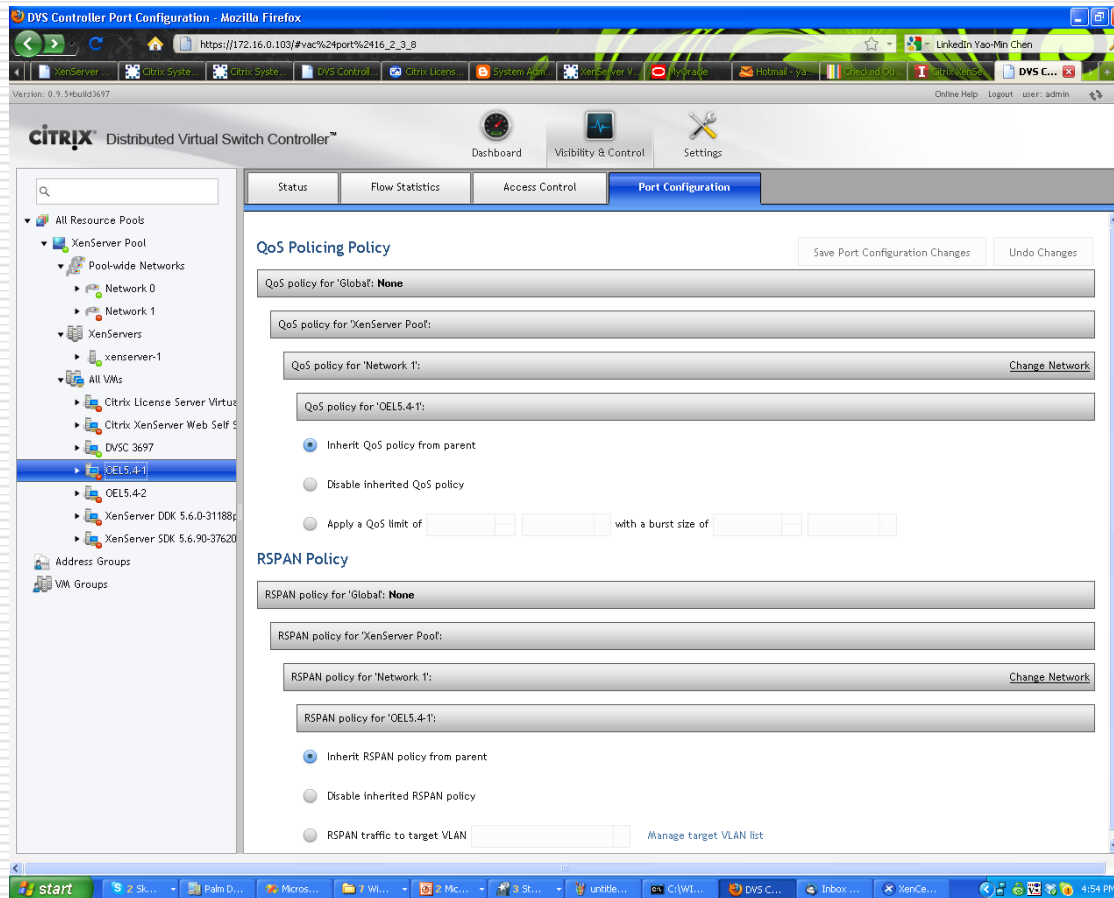
Why is QoS Important?

- ❑ Cloud providers charge tenants based on usage (Gbps, gigabytes etc).
- ❑ Elastic aspect of Clouds requires accurate measurement and monitoring of usage traffic for sizing, capacity planning, and migration.
 - Predictability is the key.

DVS Controller Port Configuration (Cont'd)

- Traffic Monitoring (RSPAN) Policy
 - Mirroring traffic
 - Which is sent or received on a VIF to a VLAN
 - To support traffic monitoring applications
 - Can be configured at the global, resource pool, network, VM and VIF levels
 - Configurations at a given level override the configurations at the higher levels

Multi-layer Hierarchy for Policies



Why is RSPAN Important

- Security
 - Intrusion detection
- Auditing
 - Enabling 3rd-party “auditor appliances”
- Accounting and charging
 - Usage-based charging
- Marketing
 - Building usage profiles – “marketing research appliances”

Some Concluding Remarks

Where do we go from here?

To Do's for DVSC

- ❑ Good initial step, but it only manages the virtual switches inside Xen hosts but not physical switch
- ❑ Right now, cannot monitor and enforce policies from end to end

Two Views on Virtual Appliances

□ LiveCD view

- Before installing full-fledged OS, try the LiveCD first
- Before installing production-ready product, try the virtual edition first

□ C² View

- The product (with OS bundled) lives in the cloud, and is not tied down to particular hardware boxes
- Nomadic servers

Welcome Further Discussions

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