Open Source and the Virtualization Revolution

George Dunlap, PhD
Citrix Systems UK, LTD
Virtualization is changing the computing landscape

30-year old technology just making it big

For technology-oriented entrepreneurs:
- Interesting case-study
- New opportunities

For business people
- Solving your problems
Outline

- What is Virtualization?
- Applications, Obvious and Not
- Citrix, virtualization, and open-source
Who am I? (Why listen to me?)

- Senior software engineer at Citrix
  - PhD in CS from University of Michigan
  - Worked with virtual machines for over 10 years
- Technical expert, business amateur
- First-hand experience with Open-source virtualization economics
Entrepreneurship

- Connecting problems with solutions in a way that makes money
- People with problems don't know there can be a solution
- People with the solutions don't know that there's a problem
Virtualization

- Software ("Hypervisor") that makes one physical computer into several virtual computers
- Virtual cpus, memory, hard disk network card
- Separate operating system
Problem: Multiple OSes

• The Situation
  – You own a Mac
  – A program you need only runs on Windows

• Solution
  – Create a Virtual Machine on your Mac
  – Install Windows
  – Mac Primary, Windows available
Business consideration

• Definite value proposition
• Market?
  – People who need to straddle OSes
• Opportunity for capturing value?
  – Customer already paying for software
Problem: Server proliferation

- Businesses have many servers
  - E-mail, web, file, database
- Best practice: One machine per server
- Most servers are idle most of the time
  - Taking up space
  - Burning electricity
  - Generating heat
Solution: Server consolidation

- Buy one slightly larger computer
- Make several virtual computers from it
  - Each VM can have a different OS
  - Each VM can reboot / crash without affecting the others
But wait, there's more

- Flexibility in creating new servers
- Live migration
  - Moving a running VM from one server to another
  - Use: Hardware downtime
  - Use: Temporary spikes
- Complete hardware agnosticism
  - Cloud Computing
A growing market

- Estimated 12% of servers virtualized in 2008
- Estimated 60% of servers virtualized by 2013
- Citrix XenServer / Xen Cloud Platform ecosystem
Desktop virtualization

- Desktops run in a corporate cloud
- Flexibility, management
Problem: Corporate laptops

- IT departments: Control
  - Ease of use
  - More importantly: Security
- Laptop users: Freedom
  - Games, skype, DVDs, &c
- Options
  - Carry two laptops?
  - Accept security risk
Solution: XenClient

- Personal VM
  - User installs whatever he wants
  - Direct access to video hardware

- Corporate VM
  - Locked down by IT

- Other advantages
  - Personal VM isolated f/ corporate network
  - Corporate VM automatically backed up
  - Migrating a XenDesktop VM
Citrix: Strategic Principles

- Began with one product: XenApp
  - Remote application execution
- Barriers to growth: other applications
- Strategic principles
  - Acquire a portfolio of software which is mutually supportive, so that you can give a customer a complete solution.
  - Keep marketing each component separately
Example: NetScaler

- XenApp over the internet
  - Traffic shaping
  - Load balancing

- Netscaler
  - Removes a barrier to growth
  - Still an excellent product on its own
Citrix and Xen

- Server virtualization alone?
  - Large, established competitor
    - Microsoft
    - Don't want to compete directly
- Virtual Desktop
  - New, wide-open market
  - Citrix core competencies
    - Remote display, computer image management, traffic shaping, user management
  - No hypervisor!
Community development

- Intel, AMD: Software using new hardware
- HP: A reason to buy top-tier hardware
- Fujitsu, Samsung, &c: Users
- Novell: Their own Xen offering
- Oracle: Ensuring performance of OracleDB
- Control your own destiny
Summary: Citrix and Xen

• XenDesktop
  – Key strategy for future growth
  – Citrix has lots of competencies
  – Needs a Citrix-branded hypervisor

• Other products benefit from Xen as well
  – Netscaler, PVS, &c

• Xen supports Citrix's strategic long-term goals
The Virtualization Revolution

- Opportunities for entrepreneurs
- Value for business people
- Xen open-source virtualization benefits everyone
Questions
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Intro: Virtualization

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- Click to add an outline