Virtual Machines in Computer Forensics Research

NSRL

National
Software
Reference
Library

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NIST United States Department of Commerce
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Statement of Disclosure

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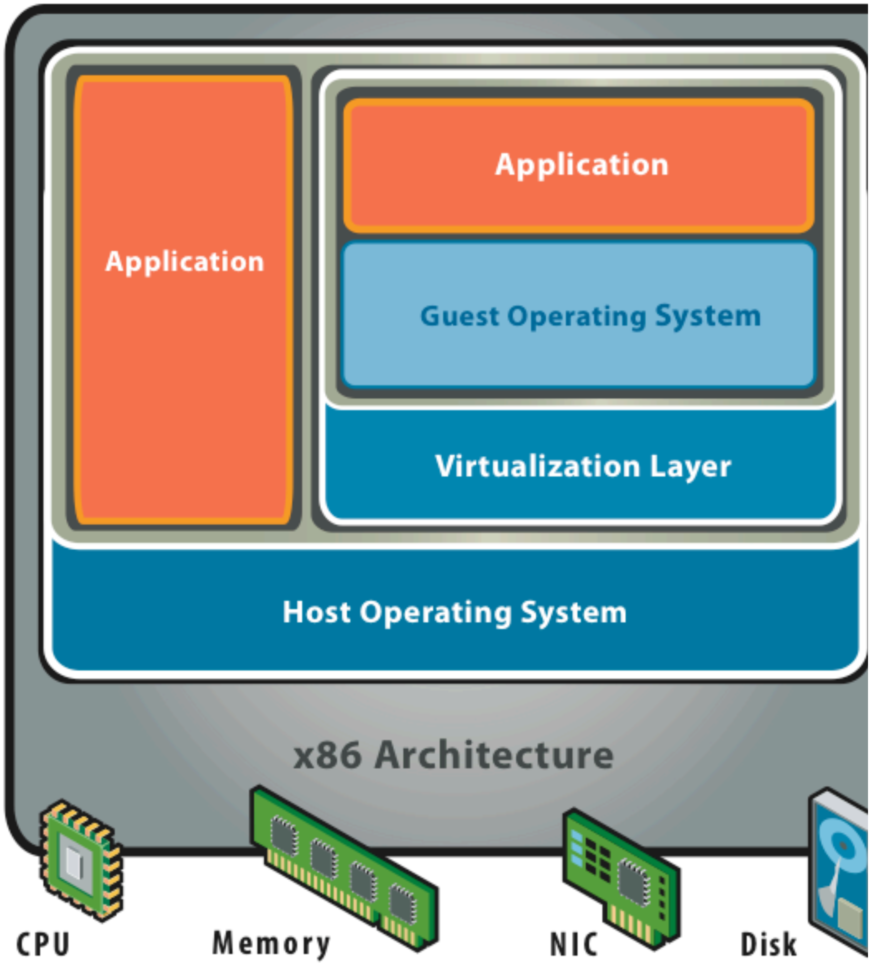
What is a Virtual Machine?

- VM Application simulates a physical computer
- Install operating system, applications, etc.
- Behaves exactly as a separate machine
- A “computer in a computer”



Advantages of Virtual Machines

- Standard machine state
- Control
  - resources, configuration, connectivity, etc.
- “Snapshots” capture machine state
  - before and after comparisons
- Isolated “lab” environment within the host computer

NSRL and VMs

- Document cause-effect relationships
- Measure RDS data set coverage
- Provide raw material for data set creation

Cause and effect

- Changes in system characteristics resulting from specific actions
  - Software/malware installation/uninstallation
  - Attempts to delete files, etc
- Begin state ⇒ Action ⇒ End state
  - Compare Begin and End States
  - Record differences
- Addition/deletion/modification of filesystem and/or Windows® registry entries

Data set coverage

- RDS data set is produced from installation media
- How does this compare with real systems?
- Begin state ⇒ Action (installation) ⇒ End state
  - Record changes
  - Compare with RDS
- Measurements of RDS coverage for standard packages ⇒ 75% - 90%

Reference Data Production

- Problem:
  - Need very high coverage?
  - Cannot access all data on installation media (DRM or unknown format)?
  - Time constraints?

Reference Data Production

- Solution:
  - Create VM w/4GB virtual hard drive
  - Install software into VM
  - Burn VM hard drive image to DVD
  - Process DVD in regular fashion
  - Archive hard drive image DVD with installation media

Thank You

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