Sun City Summerlin Computer Club

Seminar

Introduction to Virtual Machines

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Agenda

- Virtual Machines – What Are They?
- Virtual Machines – How Used?
- Popular Virtual Machine Choices
- Host System Hardware Requirements
- Demo 1 - Creating An Empty Virtual Machine
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- Demo 3 – Optimizing a Virtual Machine
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Virtual Machines - What Are They?

- **Software Program That *Emulates* a x86 or x64 Hardware PC**
  - **The virtual machine "hardware" is described in a configuration file.**
  - **The virtual machine's hard drive(s) are just files on the host PC.**
  - **Very easy to make copies of a virtual machine for backup, cloning.**
- **Once a virtual machine has been created …**
  - **You can install an operating system onto its virtual hard drive e.g. Windows, LINUX, even Mac OS**
  - **You can also install applications, drivers and data.**
- **A virtual machine can be started like any other program**
- **You can move between the virtual machine's Guest OS and the Host PC OS.**
  - **Copy & Paste via the clipboard**
  - **Create drive maps between virtual machine OS and Host OS**
  - **Access the local area network and the Internet.**

Virtual Machines – How Used?

- **Backward Compatibility**
  - Old software can be run in a VM on an older Guest OS.
  - Running an older OS can ease the learning curve for a new OS.
- **Test Bed**
  - Keep a VM version of your Host OS (plus a backup).
  - Install new software, hot fixes, etc. in the VM and test.
  - If VM's virtual drive gets corrupted, just replace it with the backup.
- **Easy Backup**
  - A VM is just a set of files in a folder.
  - Very easy to copy them to / from a backup drive.
- **Hardware Consolidation**
  - Instead of two or three separate physical PCs, you can recreate them as separate VMs on a single larger PC.
  - Saves power, desk space, clutter.

Popular Virtual Machine Choices

- **Microsoft Client Hyper-V (Windows 10 / 11 Pro only)**
  - **Built in – just turn it on in Settings > Apps**
- **Oracle Virtual Box - Windows (10 / 11), Mac, Linux**
  - ***FREE* download from: http://www.virtualbox.org/**
- **VMWare Workstation Player for Windows**
  - **Free download for personal use: https://www.vmware.com/products/workstation-player.html**
- **Parallels Desktop (Mac)**
  - **$65 / year from parallels.com**
- **VMWare Fusion Player (Mac)**
  - **Free download for personal use.**
  - **Pro version: $199 Download from VMWare.com**

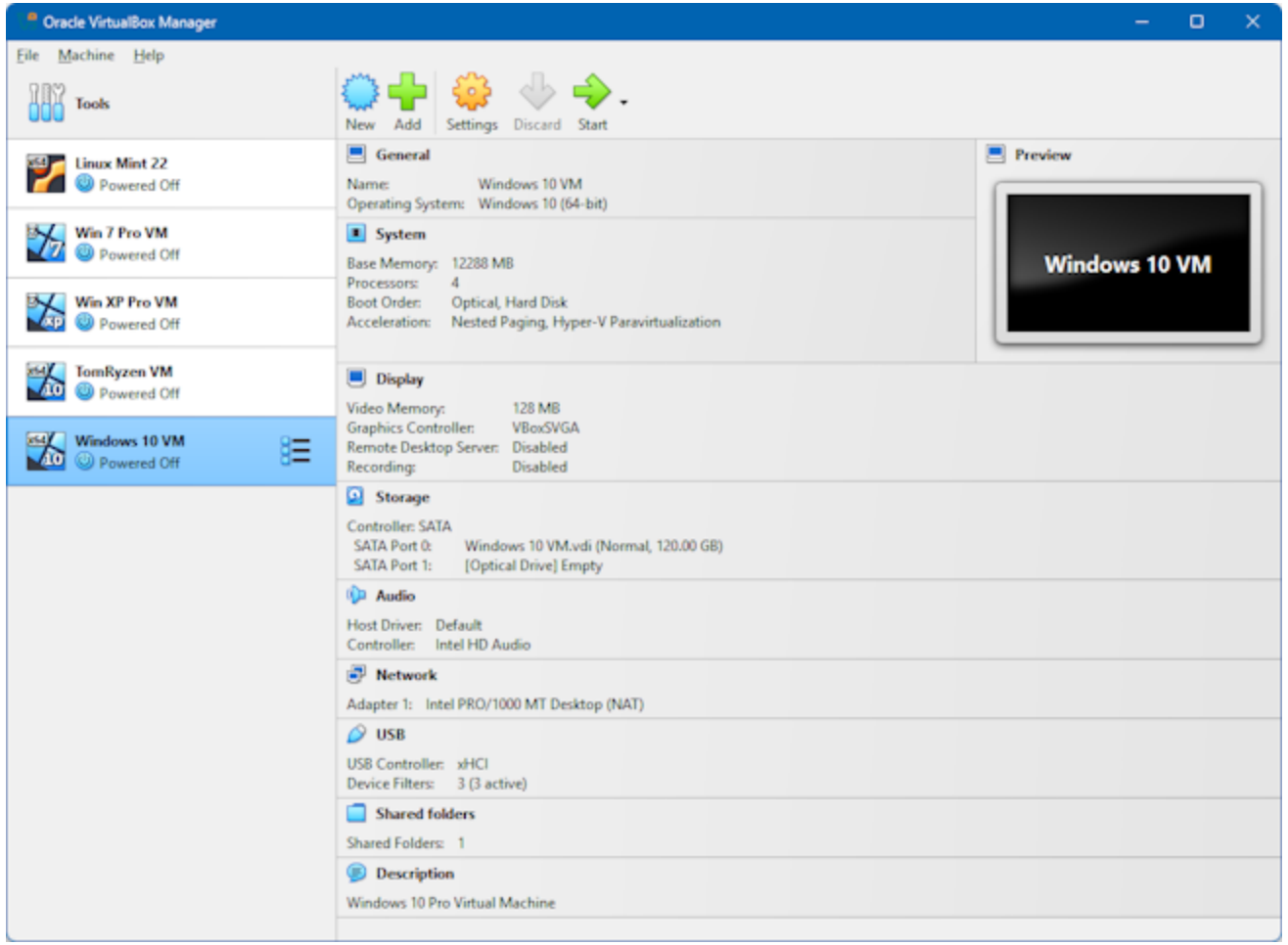
Host PC System Requirements

- **Recommend 8 GB *or more* of physical RAM**
- **Reasonably high-end CPU**
  - **1.8 GHz+ Intel Core I5 or equivalent AMD**
  - **2.4 GHz+ 4 or 8 Cores better, especially for virtualizing Win 10 or 11**
- **Adequate free hard drive space**
  - **Depends on the size of your virtual drive**
- **Host Operating System**
  - **Windows 10 / 11**
  - **Windows Server 2012, 2016 or higher**
  - **Linux Desktop or server (for Virtual Box or Xen)**
  - **Mac OS 11 or later**

Demo 1 - Create an Empty VM

- Start the Virtual Machine program (we'll use VirtualBox).
- Click "New Virtual Machine" (or similar).
- Follow the Step-by-step screens:
  - Choose a name to use in saving the virtual machine.
  - Specify the guest operating system (e.g. Win 10, Win 11, Linux).
  - Configure VM memory size (2 GB or more)
  - Configure VM hard disk size and physical location.
  - Set up some virtual USB ports.
  - Configure the virtual video card (64 or 128 MB VRAM)
  - Set the boot order to DVD, then hard drive
  - Finish.
  - You can revise most virtual machine settings *after* installing an OS.

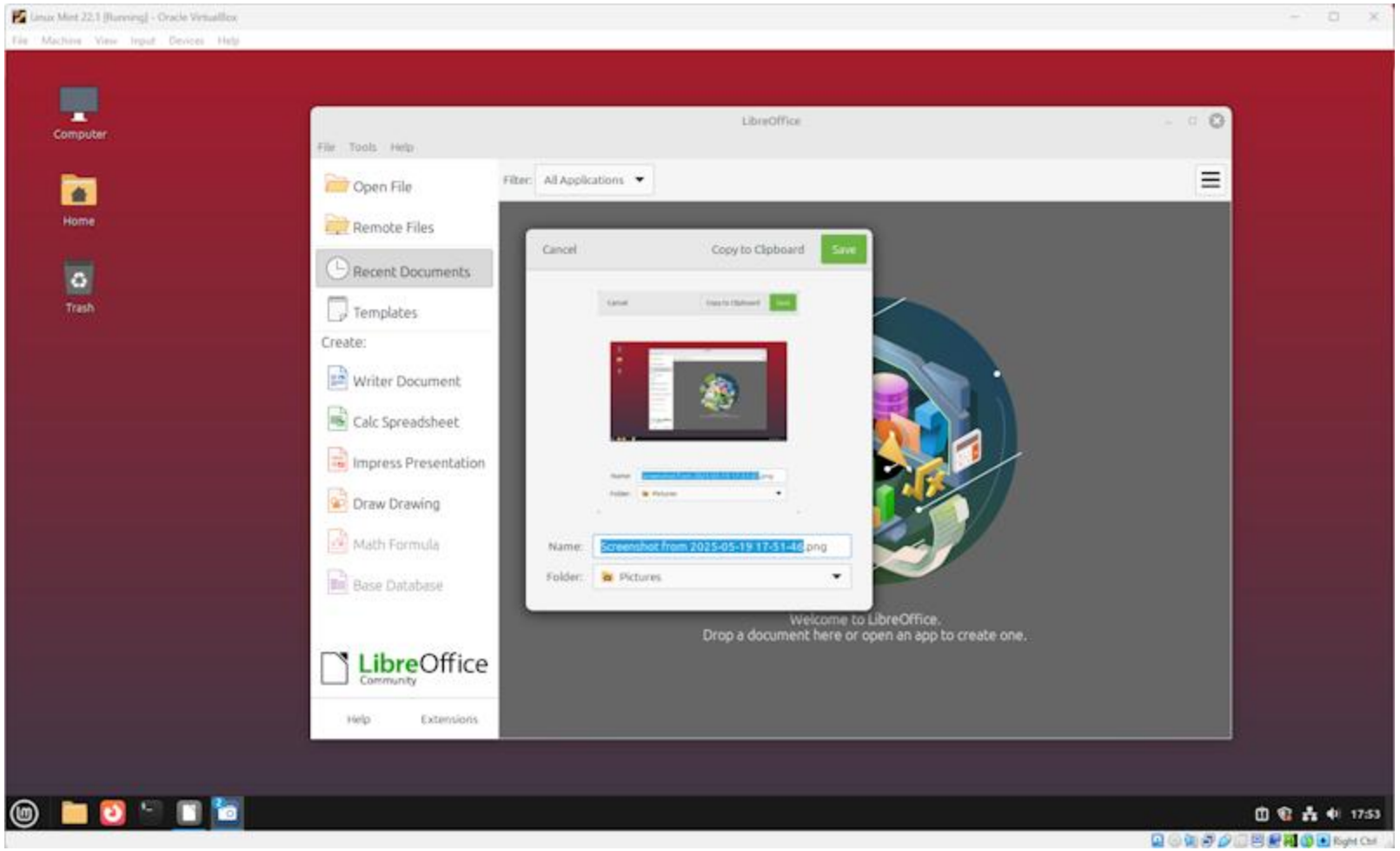
VirtualBox Management Screen



Demo 2 – Installing Linux Mint

- Linux Mint is a “distro” that is a Windows 7 work-alike.
- Place the Linux Mint setup DVD in the host’s DVD drive or (better) link the VM’s virtual DVD to an image (.iso) of the setup DVD.
- “Start / boot / Play” the [empty] virtual machine just created.
- If the virtual BIOS doesn’t detect the DVD, check the menus at the top. Enable the DVD. Make sure it’s first in the boot order.
- Follow the step by step for the Linux Mint setup.
  - Let Linux Mint partition and format the entire virtual drive.
  - Answer a few setup questions.
  - Finish the setup (Takes about 10 minutes – less if VHD is on a SSD).
- Finally reboot into Linux Mint in the VM.
- Insert the “Guest Editions” and run that setup (special drivers).
- Set your preferences – mainly wallpaper, screen resolution.
- Run the Update Manager to get latest security and feature updates.
- Use the Software Manager to install free apps.

Linux Mint in a Virtual Machine

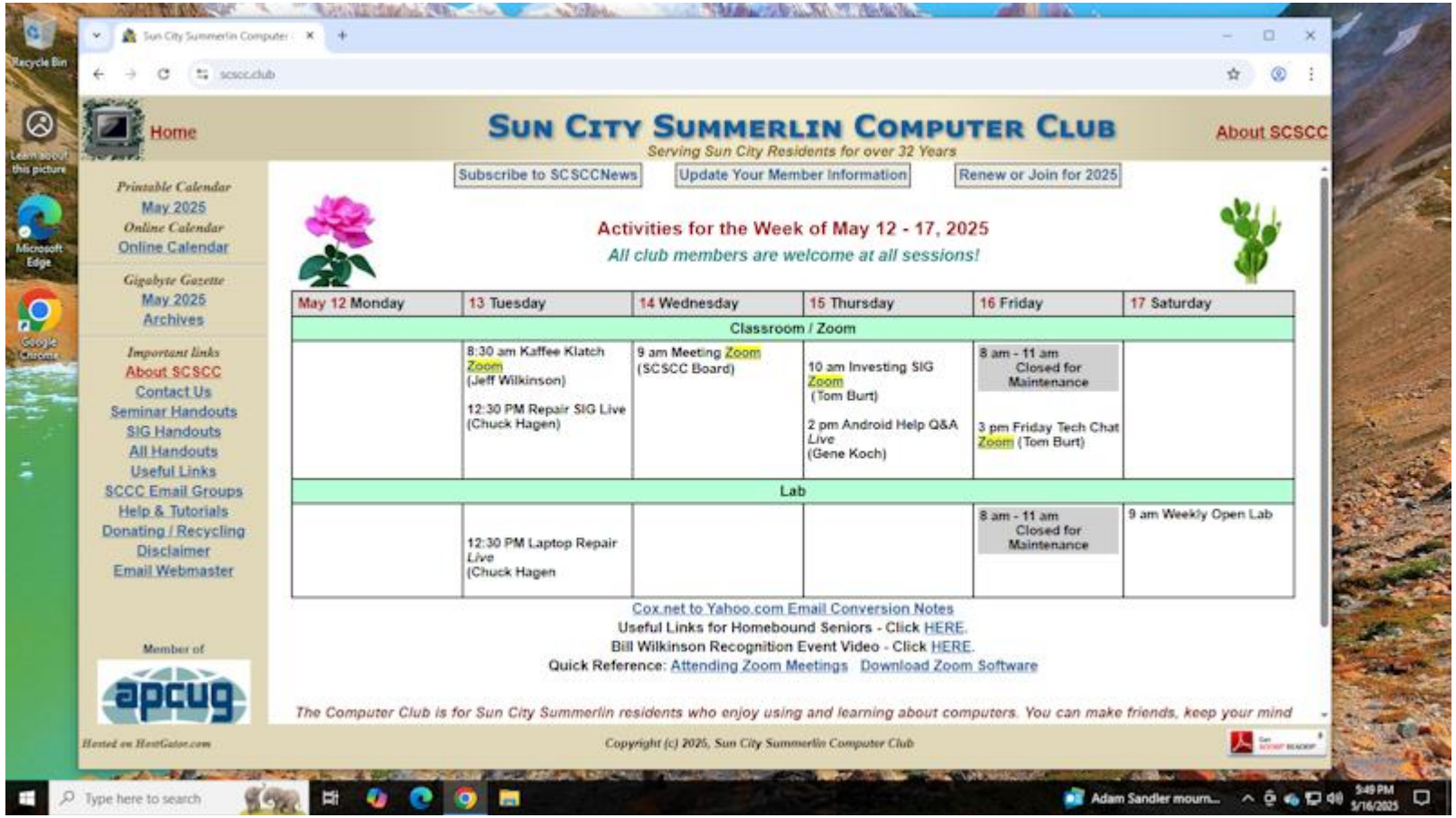


Intro to Virtual Machines

Demo 3 – Optimizing a VM

- **Some Virtual Machine managers have an option to install an "additions" package in the guest OS.**
  - **Set of drivers that make the guest OS aware it's running in a virtual machine.**
  - **Speeds up the guest OS.**
  - **Allows the mouse to move transparently between host & guest.**
  - **Allows clipboard operations between host & guest.**
  - **Allows file copy operations between host & guest.**
- **Run the setup for this from the Virtual Machine Manager's menu.**
- **Other configuration options:**
  - **Startup display (windowed, full screen), resolution**
  - **VM's RAM and CPU configuration.**
  - **Network (native NIC or use VM's NAT mode).**
  - **Virtual CDs and Floppys (can point to an image file).**
- **Create a desktop shortcut to boot your virtual machine.**

Windows 10 in a Virtual Machine



Intro to Virtual Machines

Demo 4 – Windows 10 in a VM

- A VirtualBox (or VMWare) virtual machine with Windows 10 installed can be created by doing a clean install.
- Once set up and configured and with the Extensions installed, the VM is ready to use.
- You can install Win 10/11 apps and drivers as needed.
- When finished, use the Win 10 Guest OS's Start menu to shut down the VM, just like a real PC.
- Possible to convert a physical instance of Windows 10 to a virtual machine running on Windows 11, MacOS or Linux.
  (See the web links – can be rather tricky.)

Virtual Machine – Web Links

- https://docs.microsoft.com/en-us/virtualization/hyper-v-on-windows/about/
- http://www.parallels.com/
- http://www.virtualbox.org/
- http://www.vmware.com/
- http://www.cl.cam.ac.uk/research/srg/netos/xen/
- http://technet.microsoft.com/en-us/sysinternals/ee656415.aspx (Disk2VHD)
- https://www.linuxmint.com/
- https://superuser.com/questions/468043/how-to-create-a-virtual-machine-from-a-img-disk-image

Questions
And
Answers