ROS-Industrial Basic Developer's Training Class: Linux Basics

Southwest Research Institute

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Outline

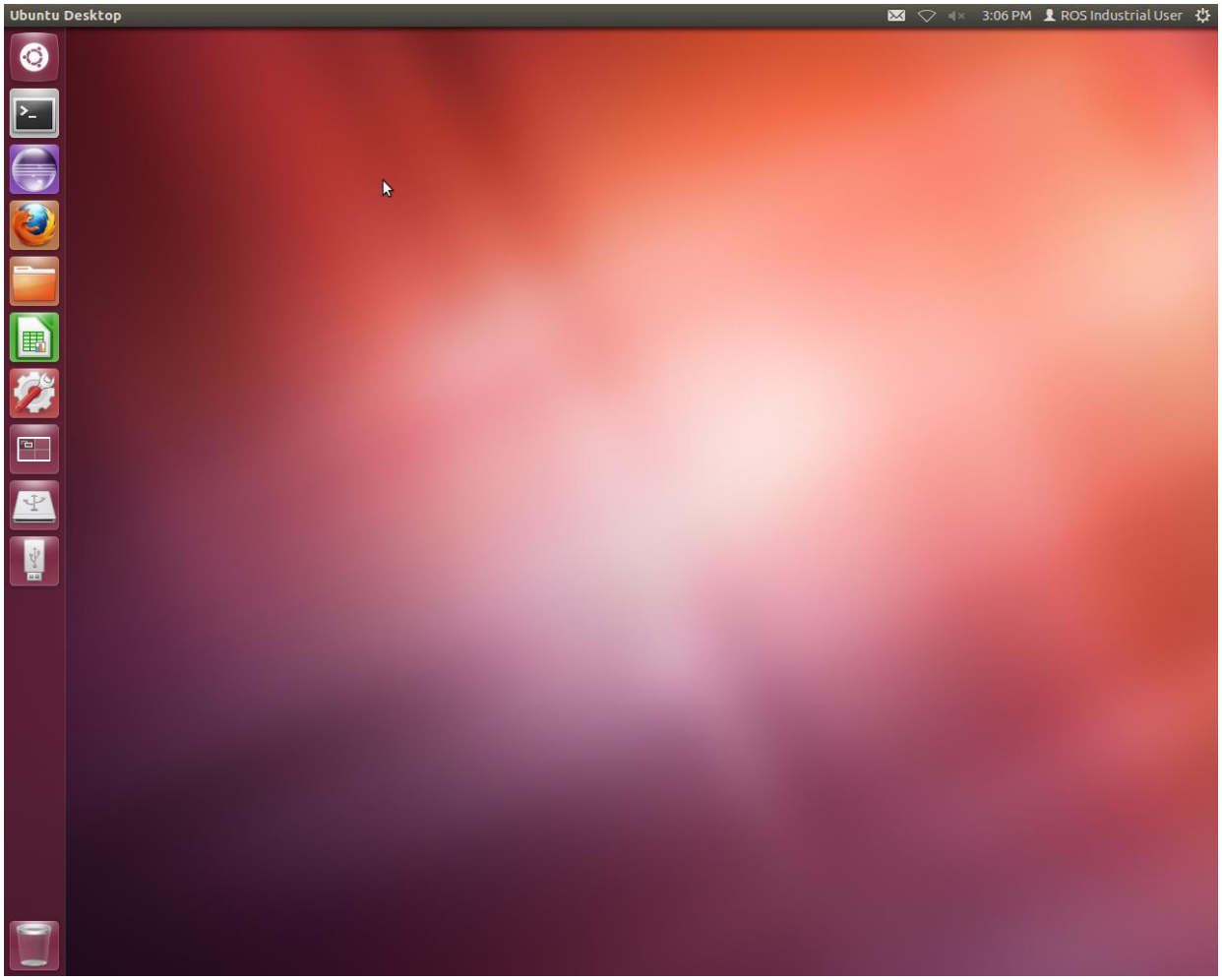
- What is Linux?
- Navigating the Ubuntu GUI
- Using the Terminal

An Introduction to Linux

- An operating system (think Windows/MacOS X)
- Used on everything from Android phones to web servers
- Open source – you can add software to/remove software from, modify internal workings, etc., to core components as needed
- Actually a loose collection of software collected together – There are multiple “distributions” of Linux
- We will be using Ubuntu for this course

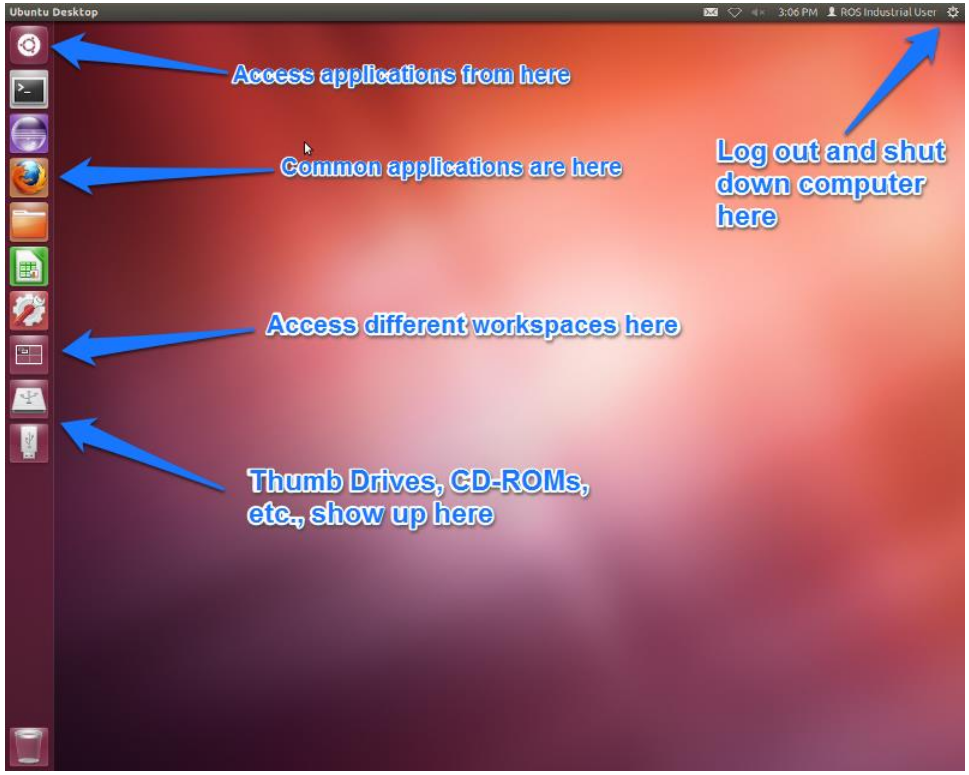
A Lightning Primer to the Ubuntu GUI

The Ubuntu GUI



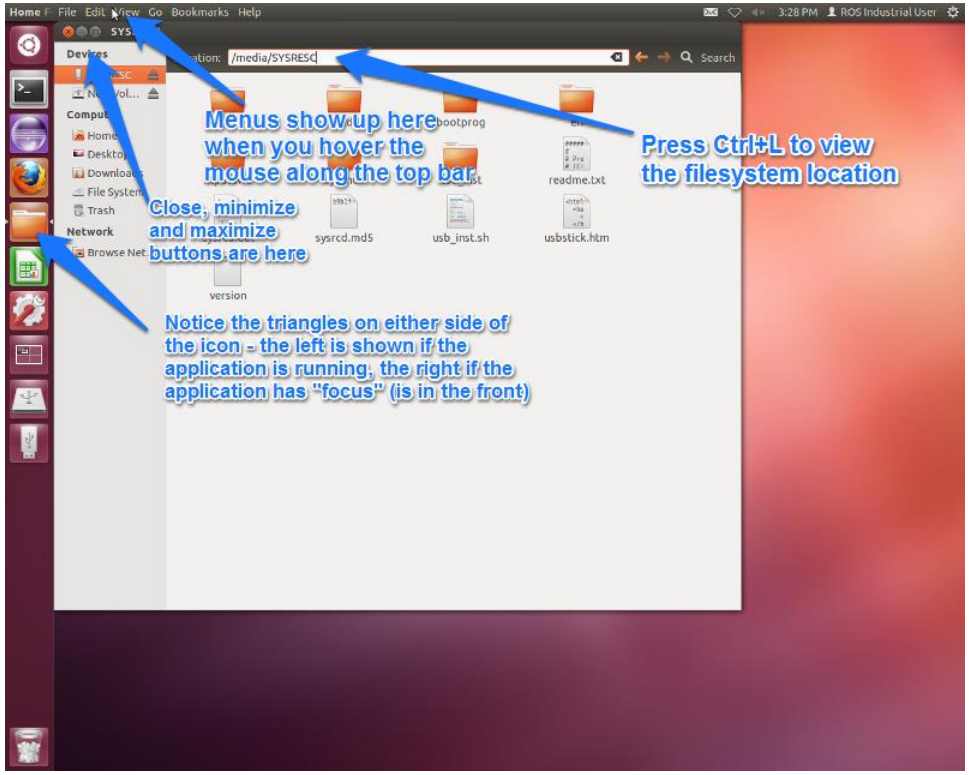
Where Is Everything?

- Ubuntu icon at top left is “Start button”
- Applications show up below, can be “pinned” to launcher (some are already)
- 2x2 grid is workspace launcher; any thumb drives, CDs, etc. are shown below icon
- Top right hand corner is “system tray”/notification area
- The gear icon at top right can be used to shut down or log off computer.



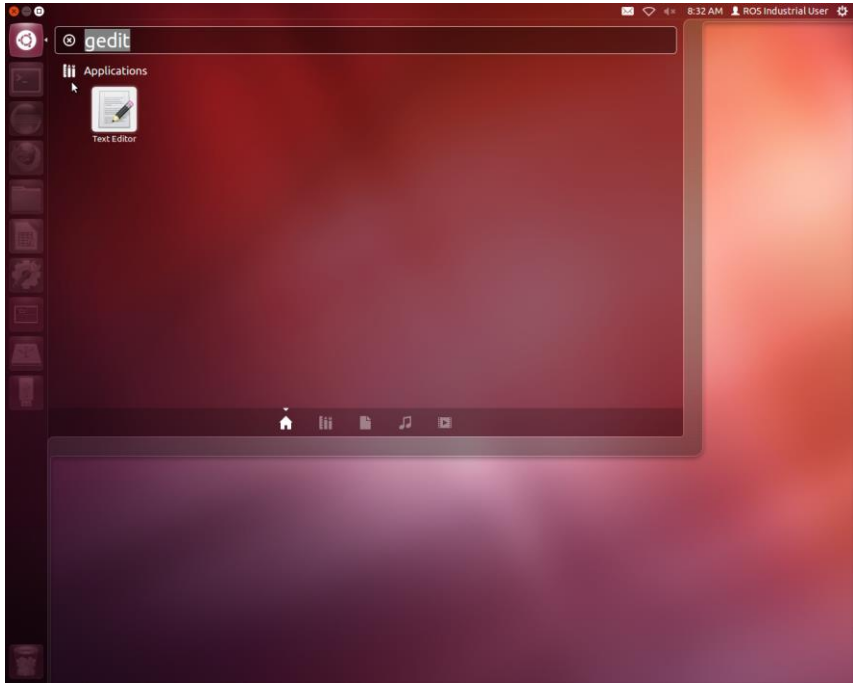
Ubuntu Windows

- Close, minimize, and maximize buttons are at top left of window, not top right
- Menu bar is at top of screen, not window (like Macs)
- Must hover mouse over top window to view



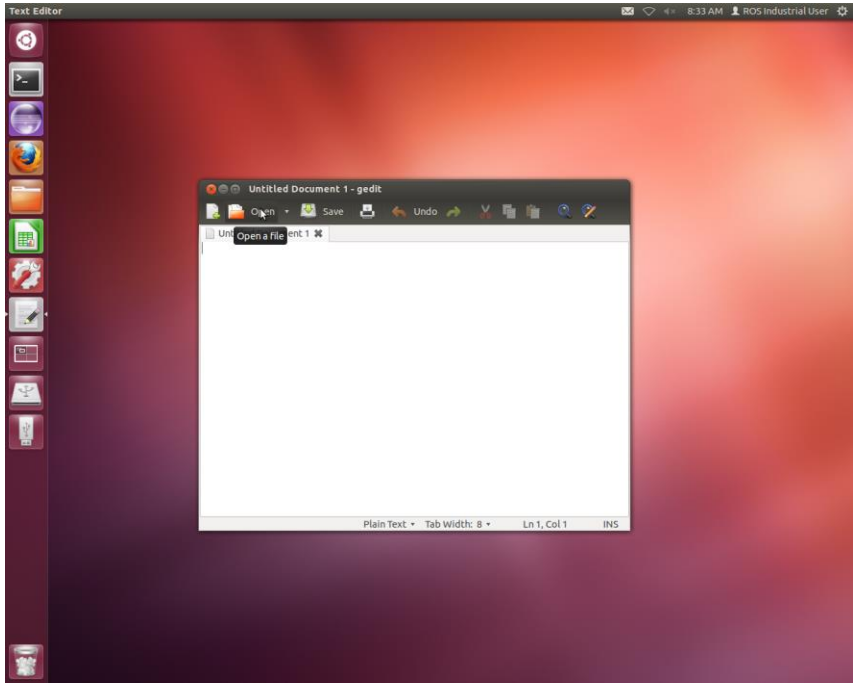
Starting Applications

- Click on the Ubuntu icon and start typing
- Searches application filenames, titles, descriptions, etc., for your input
- When the application shows up, click on it to start
- Also searches files, etc. for search terms



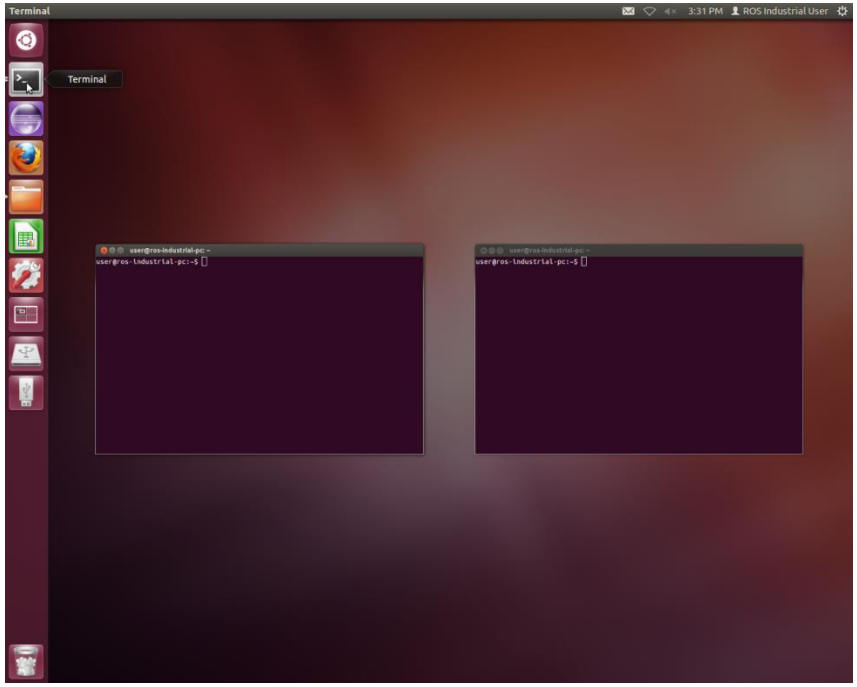
Launcher Bar

- Little triangles on the left side of the icon shows that there are windows of that application open
- Triangle on the right hand side shows which window has focus
- To pin launcher, right-click on icon and select “Add to launcher”



Bringing Windows to Foreground

- If you have multiple windows of the same type open, multiple triangles show up on left hand side
- Single Window: Clicking on icon will bring window to foreground
- If you click on an icon with multiple windows open, all of the possible windows are brought to the foreground.



The Linux File System

- Hierarchical file system, similar to Windows/Mac
- Major differences from Windows:
  - Linux uses '/' character for separating directories, not '\'
  - No concept of "C: Drive" – the primary hard drive is mounted as the root (/) folder, and all CD-ROMs, network drives, etc. are mounted as subfolders of the root, e.g. /media/THUMBDRIVE
  - Linux file system can contain more than files (disk drives, serial ports, etc.)

The Linux File System (cont'd).

- Users ordinarily only have full access to their home directory (`/home/<username>`)
- Files don't have hidden attribute, like Windows. Instead, all files which begin with a "." are "hidden"

Using the Linux Terminal

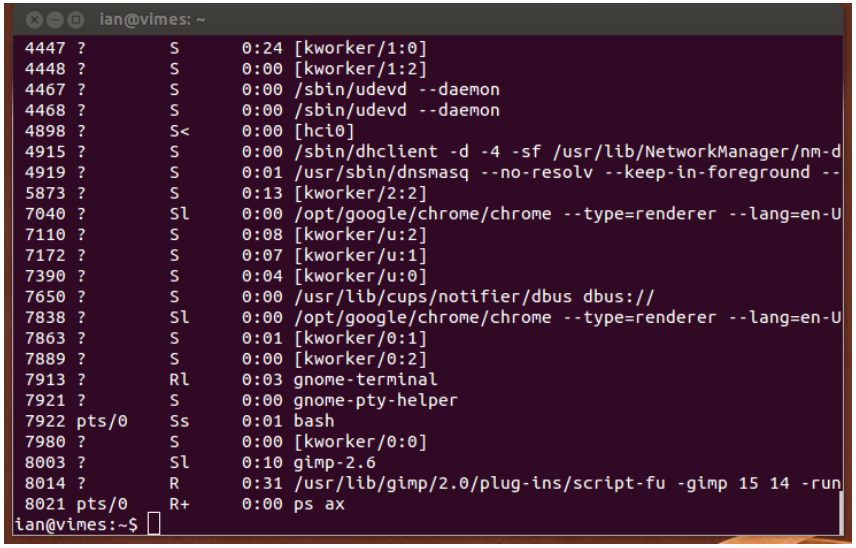
Using the Linux Terminal

- Similar to Windows command prompt, but “on steroids”
- Essential for developing ROS applications
- Click on the terminal icon to open a terminal

- Open new terminal window
  - Menu→File→Open Terminal
  - Ctrl+Shift+N
- Terminals can have multiple tabs
  - Menu→File→Open Tab
  - Ctrl+Shift+T
- You can use “*” and “?” characters as wildcards when specifying names

Running Commands in Linux

- Terminal opens with prompt
- Type command, followed by enter
- Command will run, then return with prompt
- If command needs to be “killed”, press Control and C simultaneously (often abbreviated “Ctrl+C”)
- Hovering on right hand side will show you the scroll bar
- The tab key is your friend!



Standard Commands for Linux

- `ls` – Lists files and folders. Specifying a file or wild card will show only the files listed
- `ls -a` – Lists hidden files as well.
- `cd <folder>` - Changes the working folder to the given folder
- `pwd` – Prints the current working folder
- `cp <src> <dest>` - Copies <src> to <dest>
- `mv <src> <dest>` - Moves/renames <src> to <dest>
- `rm <file>` - Removes <file>
- `ps ax` – Shows all processes running on computer
- `kill <pid>` - Kills program with process <pid>