Workstations

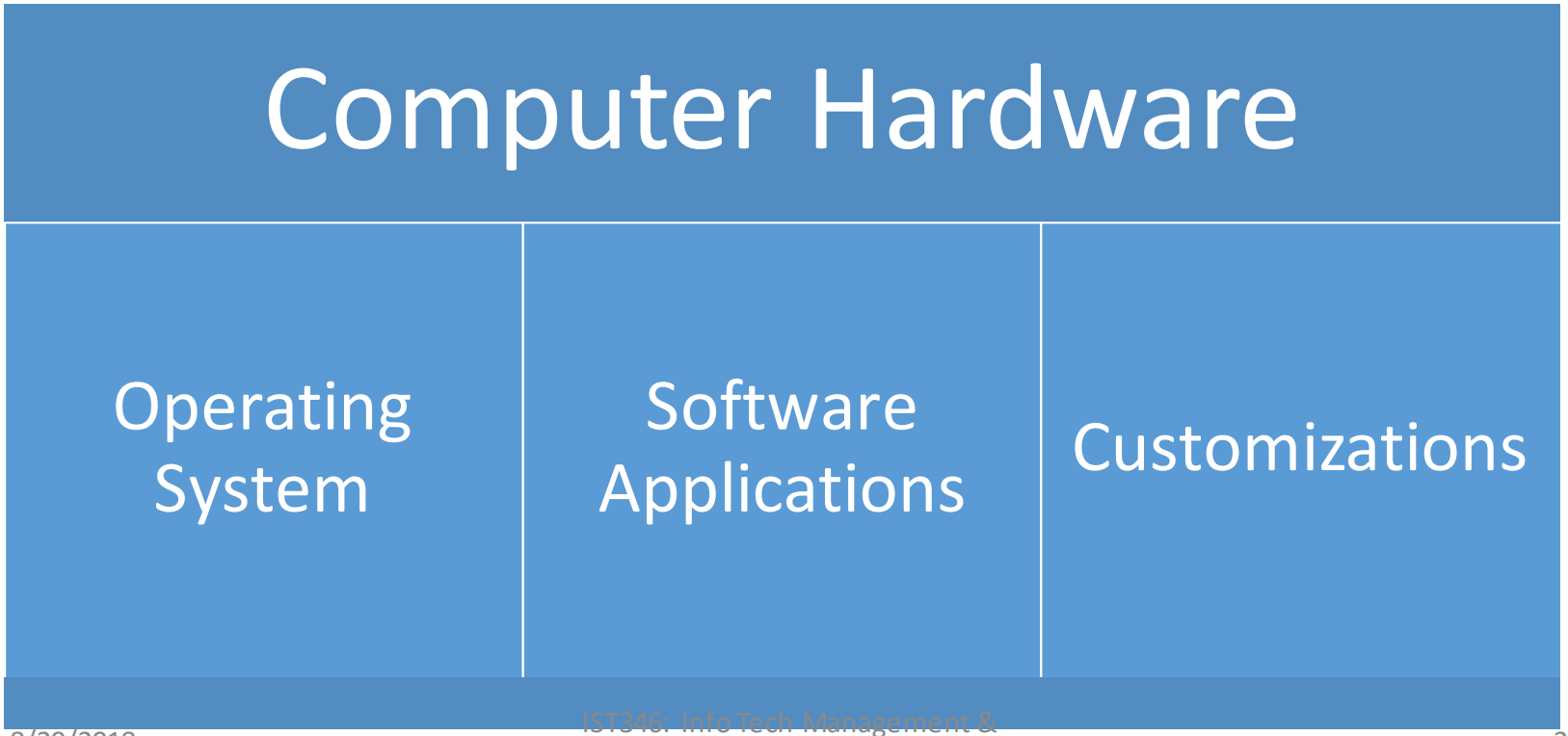



Agenda

- Look at the computer from the administration viewpoint.
- Discuss common workstation operating systems
- Discuss computer workstations, their role in organizations, and strategies for their administration.

What is a **workstation?**

- A **workstation** is a computer dedicated to a single customer's work.
  - Typically a notebook or desktop computer
  - Components of a workstation:



Workstation configuration Per End User roles

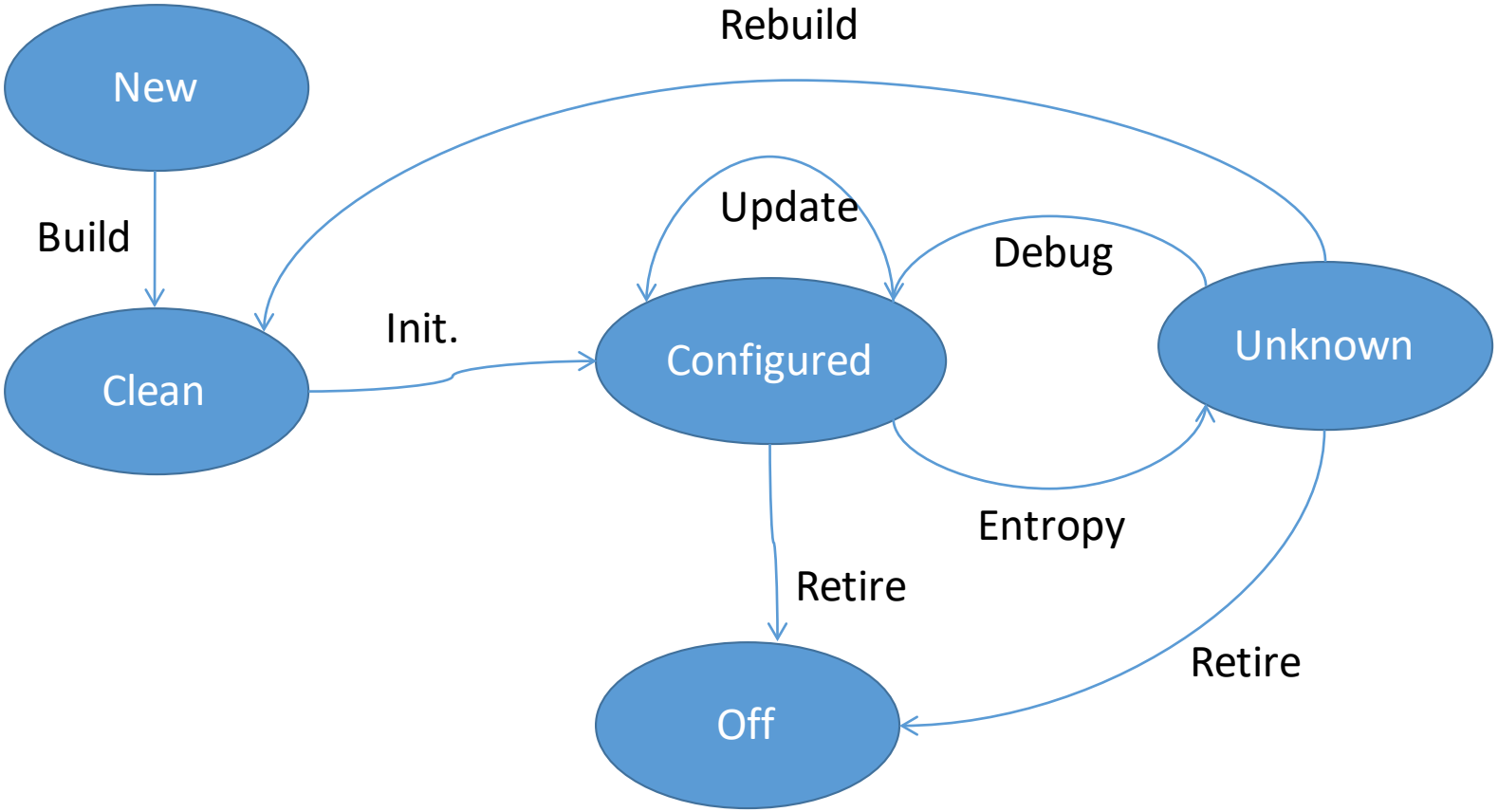
- **Task worker** –
  - Use IT to perform their job specific job function.
  - Easy to manage in numbers of users, since the IT role is well defined.
  - Eg. Call centers operators, insurance claim representatives, accounting clerks
- **Knowledge worker** –
  - Use IT to create knowledge and solve problems
  - Challenging to manage in quantity users since each user has unique needs.
  - Eg. College professors, engineers, business analysts, systems administrators ☺
- The configuration of the workstation is dependent on the role of the end user.
- The effort associated with supporting workstations depends on the number of different roles as opposed to the quantity of actual users

IT Economics: Workstation Lifecycle Management

- **Goal:** How do you budget adequately for workstations?
- #1 Project how long will the workstation last?
  - 3 years? 4 years? 6 years?
- #2 Calculate the direct costs of the workstation
- #3 Annual budget = #2 divided by #1

Example: A Computer lab workstation Costs $2000 in hardware & software and has a useful expectancy of 4 years. You should budget $2000/4 = $500/year.

Evard's Cycle (for Workstation configs)



Workstation management is

Difficult!

Hence, our sponsor of the week…

Google™

Chrome OS

The Microsoft for the next decade?

Approaches to Building workstations

- Manual
  - Most error prone and time consuming method
  - Documented manual processes are less error prone, but still time consuming
- Unattended
  - Automating the manual process
    - Windows: Unattended / Group Policy, Linux Kickstart / apt / yum.
- Cloning
  - Duplicating the disk of a clean computer
  - Some automation required to get to configured state.
  - Eg. Ghost, Acronis, Clonezilla

Workstation entropy?

- Entropy
  - a process of degeneration as a result of degrees of uncertainty, disorder, fragmentation, chaos, etc
- Some causes of “entropy” in a workstation computer
  - Direct causes
    - Installation of software (conflicts, incorrectly configured)
    - Changing of hardware drivers
    - Altering system settings
  - Indirect causes
    - Repetitive use
    - Malware
    - System degeneration (hardware failure, disk fragmentation, corruption)

Techniques to minimize entropy

- **Reactive approaches:**
  - Anti virus / Anti Malware software
  - Desktop firewalls
  - “Undo” software: deepfreeze, steady state
- **Proactive approaches:**
  - Apply/automate changes, updates and patches using the one-some-many approach
  - Automate system configuration as much as possible to minimize one-off customizations
  - Principle of least privilege –give the user only enough access to operate the system, not change it.
- A combination of all of these approaches is the best method.
- What’s the ultimate secret? Consistency!

The Harsh Reality of "Least Privilege"

- The more rights the user has to the workstation, the more quickly the system will suffer entropy.
- Users who are not Administrators or root cannot install software and change many of the system-wide configurations. This greatly helps reduce inadvertent changes to the system and malware installs.
- Some configurations are difficult to use under least privilege (Windows on a notebook, but getting better)
- Better approaches are becoming available:
  - Windows: User-Account-Control
  - Linux: sudo

The automated update process

- One – Some – Many
- **One.** Test the automated update on one computer (usually a test machine). Document the impact of the update.
- **Some.** Apply the update to a few computers. Usually, the remaning test machines of various configurations and always to the computers in the IT department. (We call this *dogfooding* – eating your own dog food.)
- **Many.** Apply the update to the rest of the organization, making sure to inform users of the potential impact of the update.

Automated Patch Management Options For Popular Operating Systems

- Windows
  - WSUS: (Windows Software update Services)
  - For One System:
    `wuauclt.exe /resetauthorization /detectnow`
  - For Some / Many: (WSUS Server)
    http://technet.microsoft.com/en-us/wsus/default.aspx
- Linux
  - APT / YUM
  - For One System:
    `apt-get update && apt-get upgrade`
  - For Some / Many: (Roll your own apt repository)
    https://help.launchpad.net/Packaging/PPA

Configuration & Customization

- Configuration and Customization are the final steps in the build process. For all the things that are the same about a computer, there need to be certain things that are unique to each system.
- What needs to be configured/customized?
  - Name of computer
  - IP address of computer
  - Other settings based on the computer's role:
    - Is it a lab workstation?
    - Is it a notebook?
    - Etc…
  - Software
  - Printers or other hardware (drivers)

Automating Configurations

- There are numerous tools for automating customizations.
  - Customize IP Address, using the DHCP service to dynamically assign an IP address at startup.
  - Computer Name / host name, using the DNS service which resolves IP addresses to host names.
  - For windows operating systems the Sysprep tool can assist with computer naming and other basic settings
- Startup scripts can help with the last bit of customizations
  - If you're lucky.
- It is just as important to automate customizations as it is to automate the build process.
  - Example: Group policy objects used here on SU campus computers (Active Directory tool)

Automating Customizations

- There are numerous tools for automating customizations.
  - At SU we use Group Policy for handling most customizations with Windows-based computers.
  - There are also other paid tools in the industry such as Altiris, Landesk, SCCM (system center configuration manager, by Microsoft)
- These tools can automate a multitude of functions
  - Software installation
  - Drive mappings (homedir, shared drives, etc…)
  - Printer drivers, security settings, etc…
- And of course the dreaded “hands-on” configuration tasks, for when things can’t be automated.

Automated Customization Example: Group Policy Objects

- An industry standard toolset that can be used for Windows computers joined to an Active Directory domain.
- Group policy can automate both computer and user settings, and are refreshed on intervals.
- After policies are applied
  - User-specific settings are applied at login, ex: home drives mapped, printers configured
  - Computer-specific settings are applied during machine startup, ex: workstation firewall settings altered, windows updates(patch management) setup, common software automatically installed

References / Further Reading

- Least Privilege (great links in article)
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