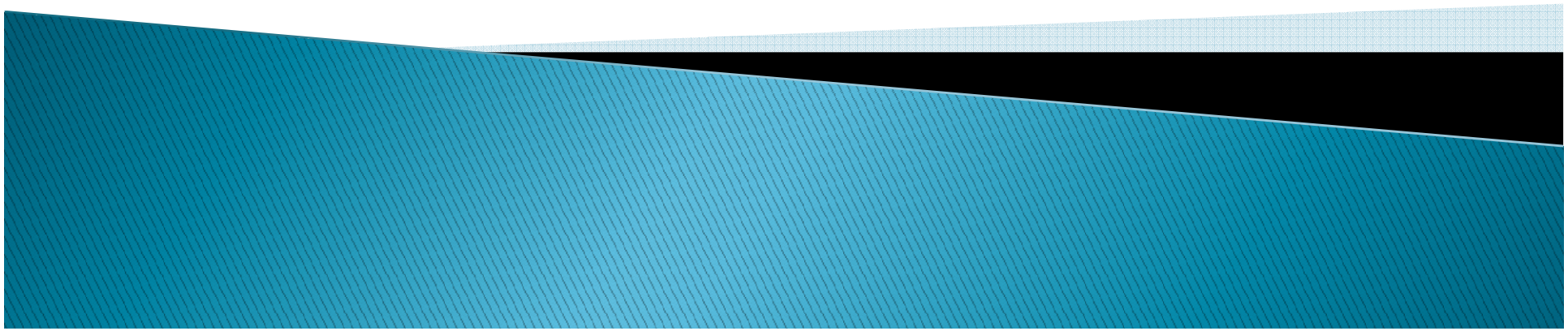
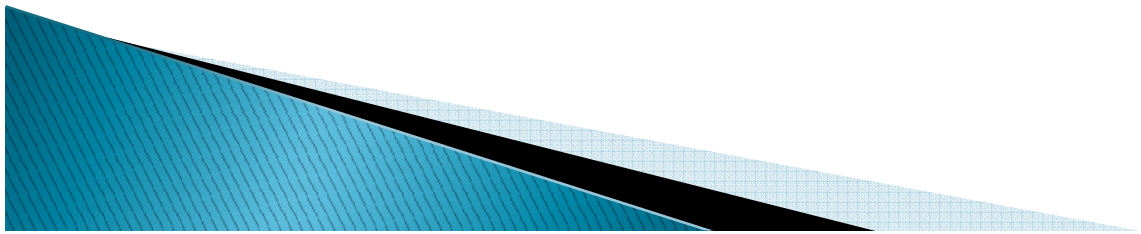
Virtualization

~Gajesh



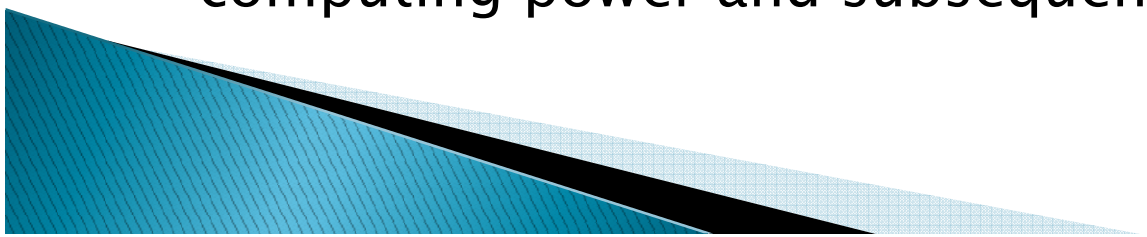
What is it

- One piece of hardware running multiple kernels
- Runs on top of a manager software for handling hardware utilization
- Eg: JTL Lab
- Eg: What we do in the lab
  - Copy observation and record
  - Showing same programs as others

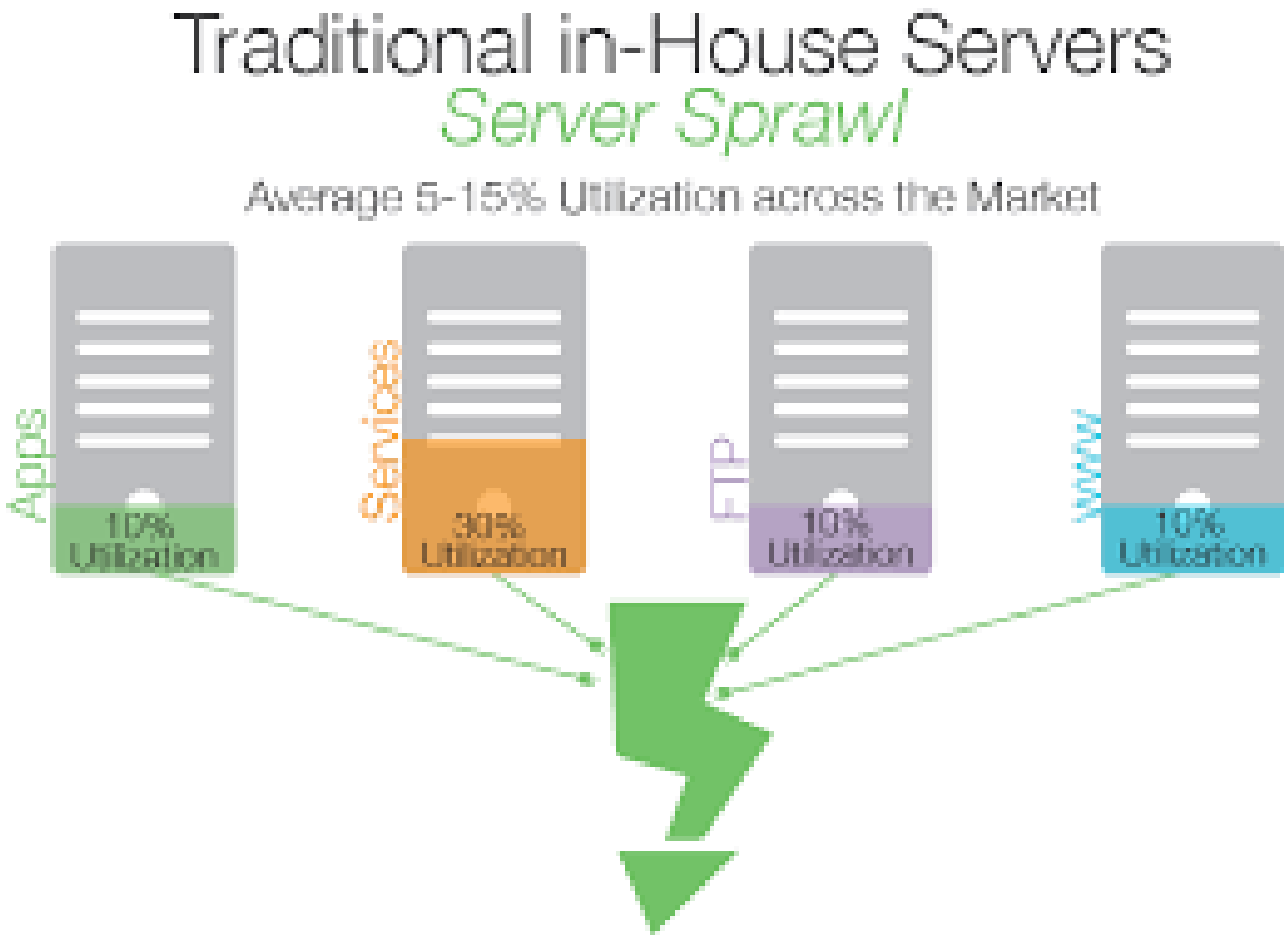


First Question: Why?

- We look at things from a technology point of view. But needs demand a business point of view as well
- Computer technology has evolved from a focus on managing transactions to harnessing business processes.
- Some firms specialize in human resource management, others in finance and accounting, and still others in manufacturing and supply chain management
- Traditional networks are now able to capture and manage more and different kinds of transactions than ever before, and this has created the need for increased computing power and subsequently more storage

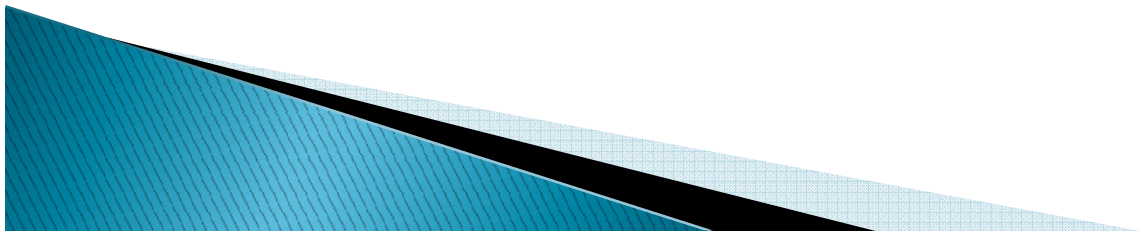


Server Sprawl



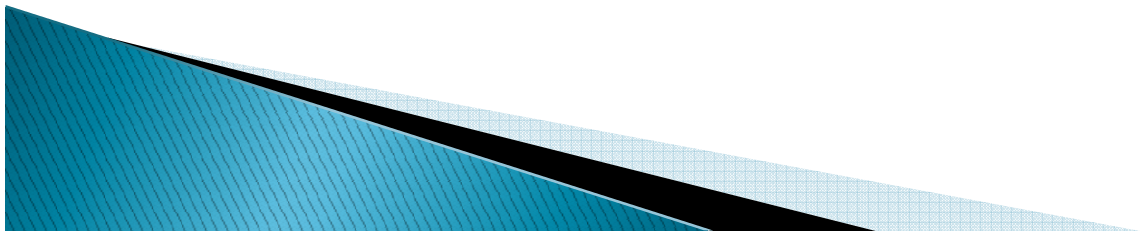
Server Sprawl

- Cluster of servers for different uses
- results
  - poor hardware resource utilization
  - poor system and software level security
  - wasted energy.

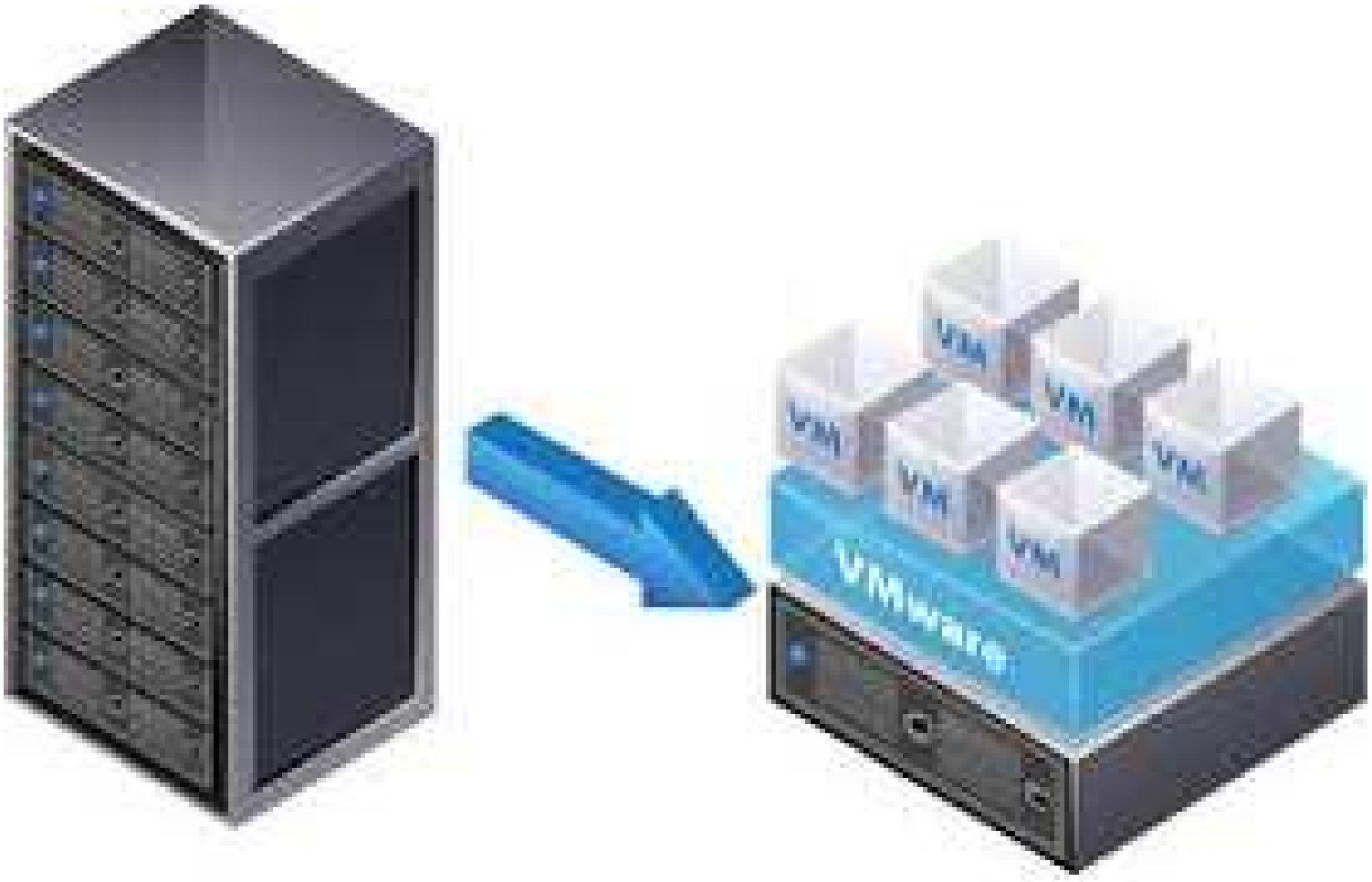


Features

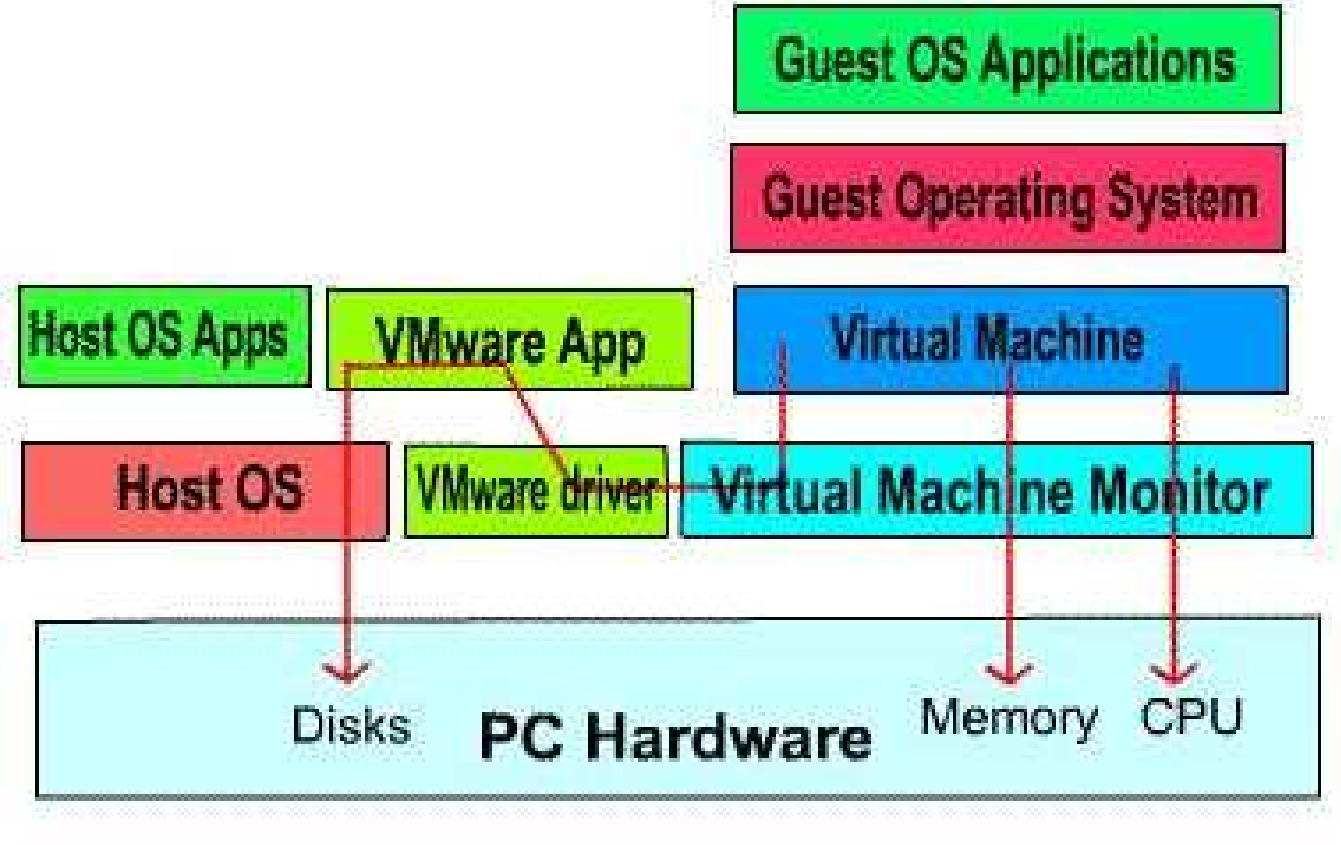
- High Performance Computing
  - Linux allows SMT –Simultaneous Multithreading
  - 2 threads can run in same processor simultaneously
- Workload Management
  - Linux allows you to partition a single server into many smaller ones (they can be of different sizes)



Virtual Server



Structure

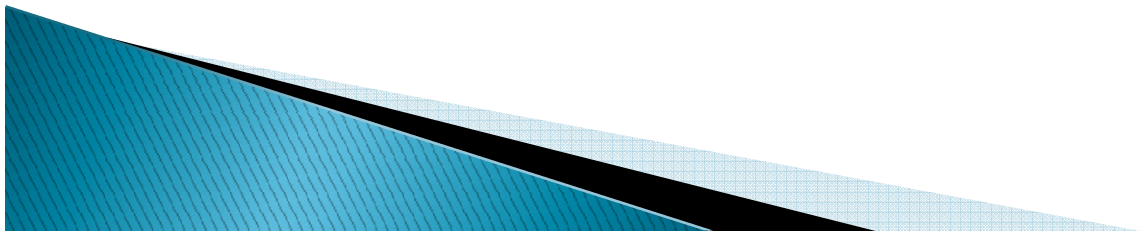


VMware Workstation Architecture

Note: Hypervisor == VMM

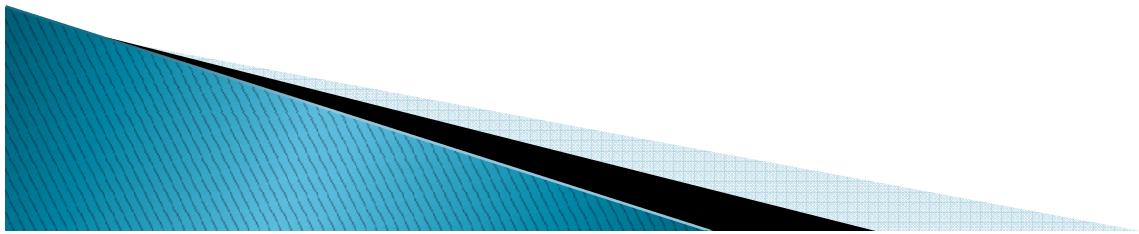
XEN

- What does it do? (should be obvious by now)
- Requirements
  - 256MB RAM
  - Grub must be your boot loader
  - SELinux (Security Enhanced Linux)
    - setting –permissive or disabled(preffered)
    - Set at etc/selinux/config
- Hypercalls supported



SELinux setting

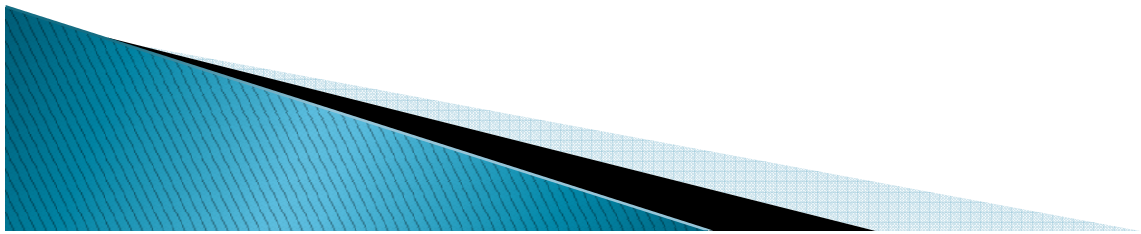
```
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
# enforcing - SELinux security policy is enforced.
# permissive - SELinux prints warnings instead of
  enforcing.
# disabled - SELinux is fully disabled.
SELINUX=Disabled
# SELINUXTYPE= type of policy in use. Possible values
  are:
# targeted - Only targeted network daemons are
  protected.
# strict - Full SELinux protection.
SELINUXTYPE=targeted
```



Install xen

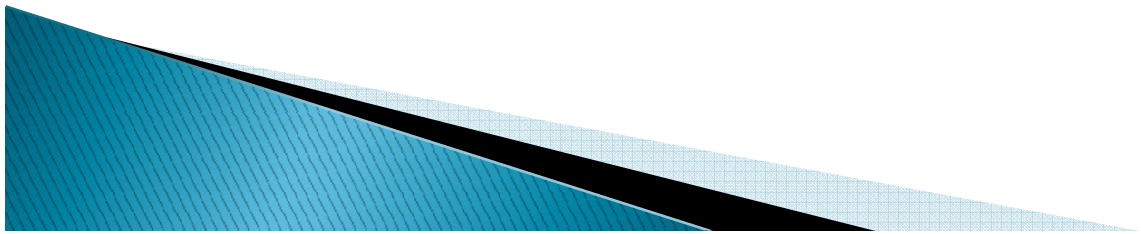
- # yum install kernel-xen0
- xen0 as the first kernel choice in /boot/grub/grub.conf, but not the default
- To set default:
- default=1 ➔ default=0 in /boot/grub/grub.conf
- Now reboot

- At this point your XEN is ready, all that is left is the guests on top.

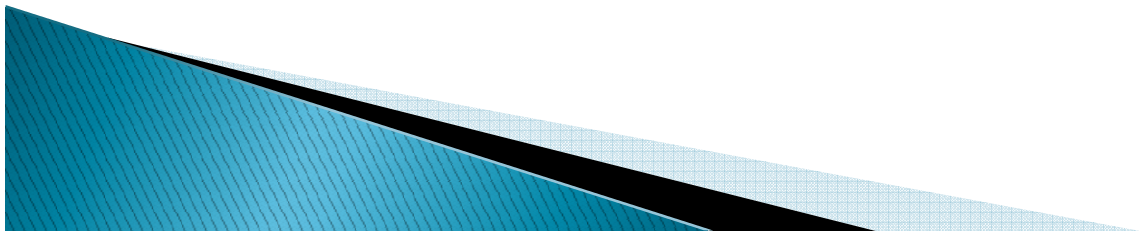


The last ingredient

- Setting up guest OS
  1. Get the os ready in an installation disk
  2. Run the script: **xenguest-install.py**
     1. What is the name of your virtual machine? **Guest1**
     2. How much RAM should be allocated (in megabytes)? **256**
     3. What would you like to use as the disk (path)? **/xenguest**
     4. What is the install location? **http://127.0.0.1/dvd**
  3. Proceed normally as you would for that distribution
  4. The last screen will ask you to reboot. Unmount the DVD and eject it. You will be rebooting only your new guest system, not Xen or the host.



- Xen does not start the guest operating system automatically
  - type this command on the host: **xm create guest1**
- To check if they are working properly, try
  - **xm list**
  - **Xentop**
- To automatically run xen domains, the commands are:
  - **/sbin/chkconfig --level 345 xendomains on**
  - **# /sbin/service xendomains start**
- For more details, type
  - **# man xmdomain.cfg**



Quick Recap

- A computer on which a hypervisor runs one or more virtual machines is called a host machine; and each virtual machine is called a guest machine.
- All guest OSs think that it is the only OS
- Server Sprawl
- Hypervisor
- SELinux and it's modes
- XEN