Network Security: Continued
CS 236
On-Line MS Program
Networks and Systems Security
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Firewall Configuration and Administration

- Again, the firewall is the point of attack for intruders
- Thus, it must be extraordinarily secure
- How do you achieve that level of security?

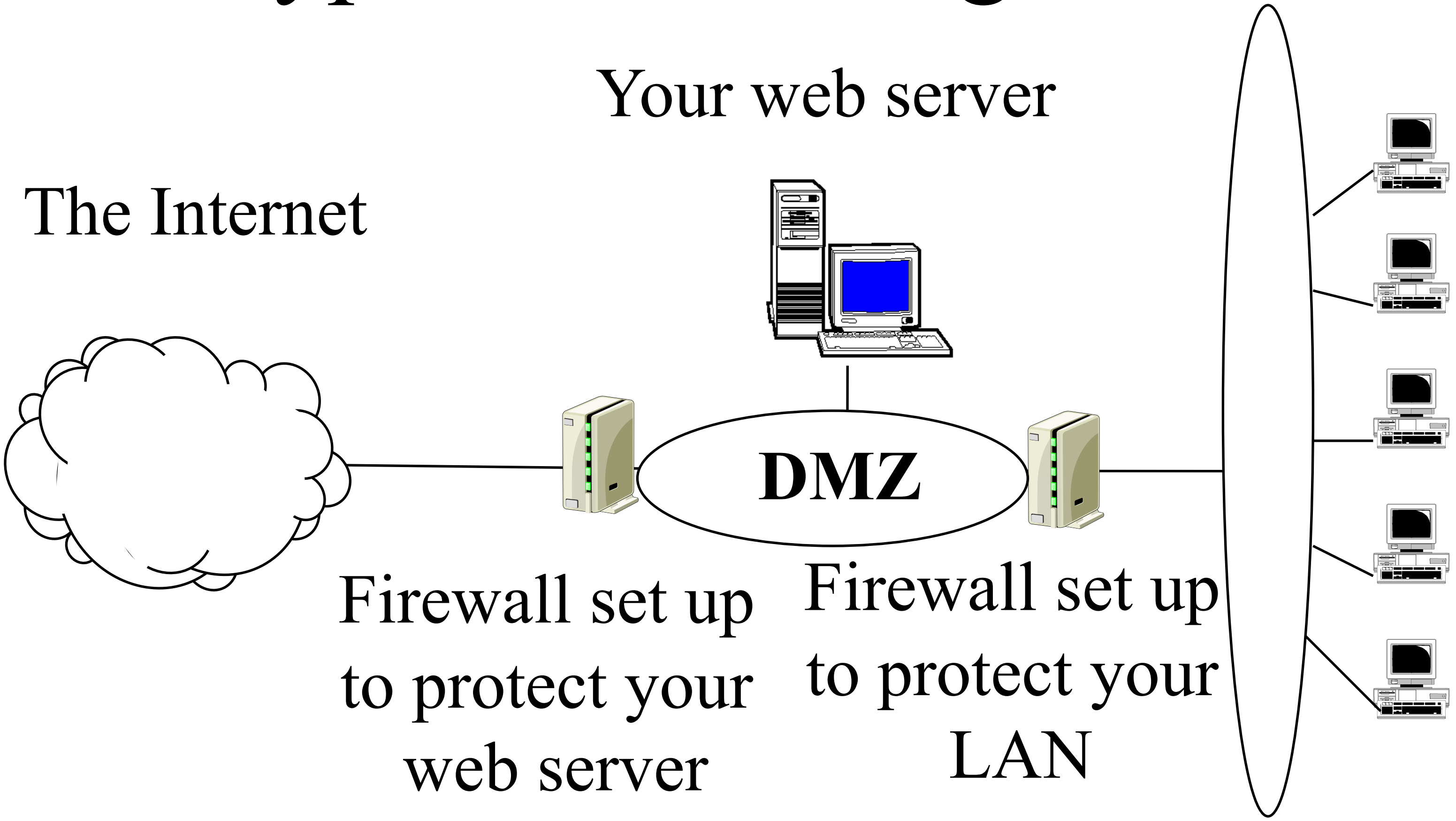
Firewall Location

- Clearly, between you and the bad guys
- But you may have some different types of machines/functionalities
- Sometimes makes sense to divide your network into segments
  - Typically, less secure public network and more secure internal network
  - Using separate firewalls

Firewalls and DMZs

- A standard way to configure multiple firewalls for a single organization
- Used when organization runs machines with different openness needs
    - And security requirements
- Basically, use firewalls to divide your network into segments

A Typical DMZ Organization



Your web server

The Internet

DMZ

Firewall set up to protect your web server

Firewall set up to protect your LAN

Your production LAN

Advantages of DMZ Approach

- Can customize firewalls for different purposes
- Can customize traffic analysis in different areas of network
- Keeps inherently less safe traffic away from critical resources

Dangers of a DMZ

- Things in the DMZ aren’t well protected
  - If they’re compromised, provide a foothold into your network
- One problem in DMZ might compromise all machines there
- Vital that main network doesn’t treat machines in DMZ as trusted
- Must avoid back doors from DMZ to network

Firewall Hardening

- Devote a special machine only to firewall duties
- Alter OS operations on that machine
  - To allow only firewall activities
  - And to close known vulnerabilities
- Strictly limit access to the machine
  - Both login and remote execution

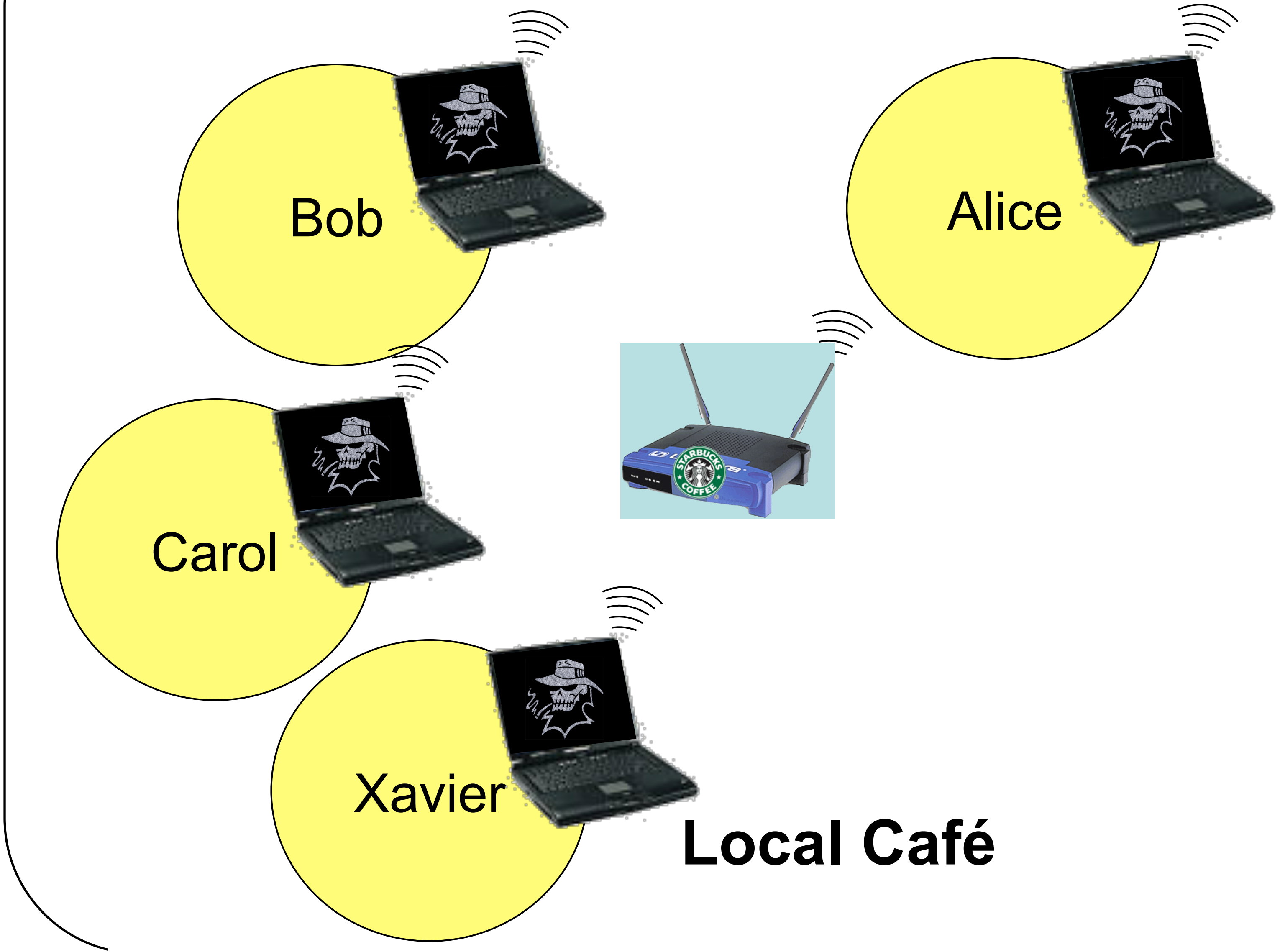
Keep Your Firewall Current

- New vulnerabilities are discovered all the time
- Must update your firewall to fix them
- Even more important, sometimes you have to open doors temporarily
  - Make sure you shut them again later
- Can automate some updates to firewalls
- How about getting rid of old stuff?

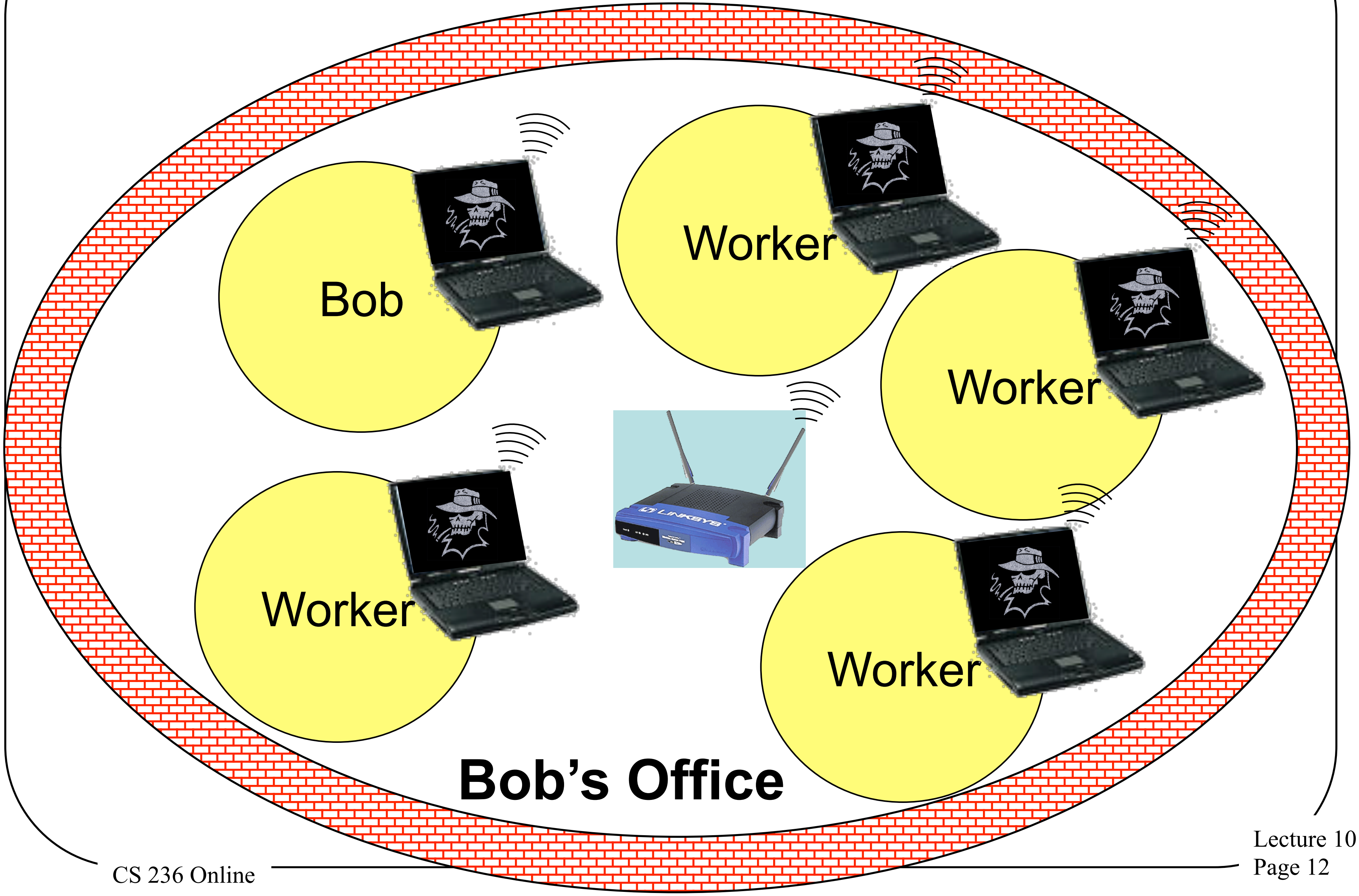
Closing the Back Doors

- Firewall security is based on assumption that all traffic goes through the firewall
- So be careful with:
  - Wireless connections
  - Portable computers
  - Sneakernet mechanisms and other entry points
- Put a firewall at every entry point to your network
- And make sure all your firewalls are up to date

What About Portable Computers?



Now Bob Goes To Work . . .



How To Handle This Problem?

- Essentially *quarantine* the portable computer until it's safe
- Don't permit connection to wireless access point until you're satisfied that the portable is safe
  - Or put them in constrained network
- Common in Cisco, Microsoft, and other companies' products
  - *Network access control*

Single Machine Firewalls

- Instead of separate machine protecting network,
- A machine puts software between the outside world and the rest of machine
- Under its own control
- To protect itself
- Available on most modern systems

Pros and Cons of Individual Firewalls

- +Customized to particular machine
  - –Specific to local software and usage
- +Under machine owner’s control
- +Can use in-machine knowledge for its decisions
- +May be able to do deeper inspection
- +Provides defense in depth

Cons of Personal Firewalls

- Only protects that machine
- Less likely to be properly configured
  - Since most users don’t understand security well
  - And/or don’t view it as their job
  - Probably set to the default
- On the whole, generally viewed as valuable