CHAPTER 11

TESTING YOUR NETWORK DESIGN

Expected Outcomes

Able to determine scope and components of test
Able to analyse the type of tests
Able to utilize the testing Tools

Reasons to Test

- Verify that the design meets key business and technical goals
- Validate LAN and WAN technology and device selections
- Verify that a service provider provides the agreed-up service
- Identify bottlenecks or connectivity problems
- Determine optimization techniques that will be necessary

Testing Your Network Design

- Use industry testing services
- Build and test a prototype system
- Use third-party and Cisco tools

Scope of a Prototype System

- It’s not generally practical to implement a full-scale system
- A prototype should verify important capabilities and functions that might not perform adequately
- Risky functions include complex, intricate functions and functions that were influenced by the need to make tradeoffs

Components of a Test Plan

- Test objectives and acceptance criteria
- The types of tests that will be run
- Network equipment and other resources required
- Testing scripts
- The timeline and milestones for the testing project

Test Objectives and Acceptance Criteria

- Specific and concrete
- Based on business and technical goals
- Clear criteria for declaring that a test passed or failed
- Avoid biases and preconceived notions about outcomes
- If appropriate, reference a baseline

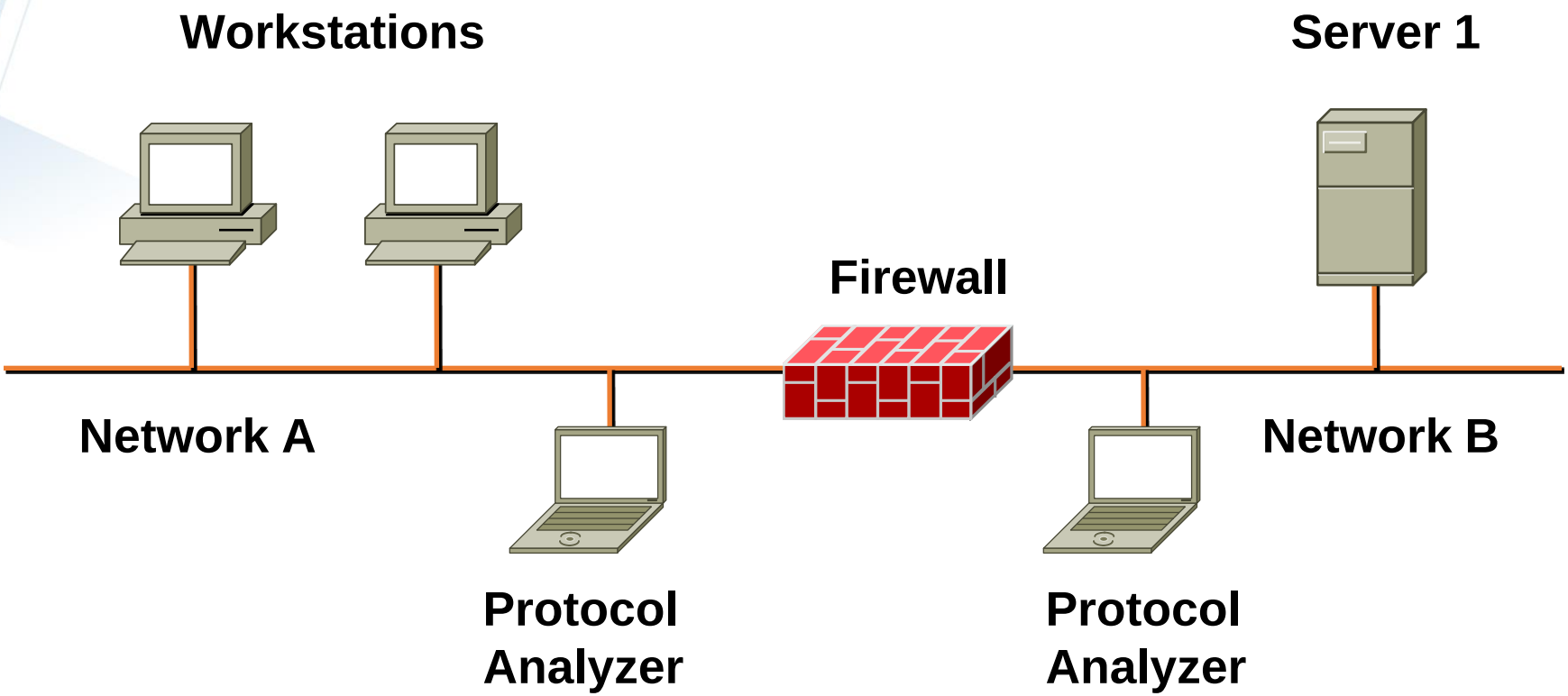
Types of Tests

- Application response-time tests
- Throughput tests
- Availability tests
- Regression tests

Resources Needed for Testing

- Scheduled time in a lab either at your site or the customer's site
- Power, air conditioning, rack space, and other physical resources
- Help from coworkers or customer staff
- Help from users to test applications
- Network addresses and names

Example Test Script



Example Test Script (continued)

- Test objective. Assess the firewall's capability to block Application ABC traffic, during both light and moderately heavy load conditions.
- Acceptance criterion. The firewall should block the TCP SYN request from every workstation on Network A that attempts to set up an Application ABC session with Server 1 on Network B. The firewall should send each workstation a TCP RST (reset) packet.

Example Test Script (continued)

1. Start capturing network traffic on the protocol analyzer on Network A.
2. Start capturing network traffic on the protocol analyzer on Network B.
3. Run Application ABC on a workstation located on Network A and access Server 1 on Network B.
4. Stop capturing network traffic on the protocol analyzers.
5. Display data on Network A's protocol analyzer and verify that the analyzer captured a TCP SYN packet from the workstation. Verify that the network layer destination address is Server 1 on Network B, and the destination port is port 1234 (the port number for Application ABC). Verify that the firewall responded to the workstation with a TCP RST packet.

Example Test Script (continued)

6. Display data on Network B's protocol analyzer and verify that the analyzer did not capture any Application-ABC traffic from the workstation.
7. Log the results of the test in the project log file.
8. Save the protocol-analyzer trace files to the project trace-file directory.
9. Gradually increase the workload on the firewall, by increasing the number of workstations on Network A one at a time, until 50 workstations are running Application ABC and attempting to reach Server 1. Repeat steps 1 through 8 after each workstation is added to the test.

Tools for Testing a Network Design

- Network-management and monitoring tools
- Traffic generation tools
- Modeling and simulation tools
- QoS and service-level management tools
- http://www.topdownbook.com/tools.html

Summary

- An untested network design probably won't work
- It's often not practical to test the entire design
- However, by using industry testing services and tools, as well as your own testing scripts, you can (and should) test the complex, risky, and key components of a network design

Review Questions

- Why is it important to test your network design?
- Why is regression testing important?
- What are some characteristics of well-written acceptance criteria?
- What are some characteristics of a good network simulation tool?