Unit 6
Internetworking Outlooks

Overview

Description
This unit contains three lessons.

- The first lesson highlights emerging technologies which bear promise to change outlooks and careers in internetworking.

- The second lesson discusses the history of internetworking and introduces emerging technology, including unified networks.

- The third lesson encourages self-discovery and thought toward networking careers in the context of skills learned in Internetworking Fundamentals.

Unit Table of Contents
This unit contains the following three lessons:

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<td>Lesson 6-1: Internetworking Careers</td>
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<td>Lesson 6-2: History of Internetworking</td>
<td>425-450</td>
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<td>Lesson 6-3: Emerging Technologies</td>
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Lesson 6-1: Internetworking Careers

At a Glance

Getting the job you want is a competitive process. The best technical jobs are not generally obtained by simply filling out an employment application. They are competitive, requiring research, a resume, personal interview(s), and perhaps negotiation. Your competitors may be highly motivated. If they are unemployed with bills to pay and dependents to feed, it is likely they will have an advantage of time, and be able to devote full-time effort to their job search and interview preparation. Other competitors will be currently employed, enjoying the advantage of experience, current income, and contacts to select for just the right job.

This lesson will emphasize the wide spectrum of internetworking jobs. The activities give you a chance to reflect on, document and organize what you have learned. They also provide a chance to practice obtaining and rehearsing for a technical interview.

What You Will Learn

After completing this unit, you will be able to:

- Place internetworking job titles in a progression sequence.
- Write a detailed internetworking position description.
- Organize a portfolio and resume to present your qualifications for a selected position opening.
- Prepare for obtaining and rehearsing for an appropriate level technical interview.
- Research and describe available industry networking certification tracks.
Tech Talk

- **Resume**—A one or two page summary of your employment-related education, skills and work, the resume indicates what you have done to support what you want to do. Typically presented by mail, email, or fax for the purpose of obtaining a personal interview.

- **Certification**—An industry training credential, typically achieved by passing a proctored electronic exam covering specific technical topics.

- **Employment Interview**—Face to face general and technical question and answer session in which the objective of the employer is to determine if the candidate is right for the job, and the objective of the candidate is to convince the employer to make an offer.

Internetworking Employment Overview

Your NetKnowledge learning has prepared you to consider entry level opportunities dealing with network systems. You have learned content and skills related to design, installation, troubleshooting, maintenance and management of network systems.

Below is a sample list of job titles that you may encounter in this field. You can use the Dictionary of Occupational Titles (US Dept of Labor, 1998) to determine differences in scope and responsibilities between jobs of interest.

- Network Specialist
- Network Operations Analyst
- Communications Analyst
- Network Analyst
- IS Support Associate
- IS Assistant – Entry Level
- Local Area Network Technician
- WAN Specialist
- Wide Area Network Technician
- Cabling Installer
- Network Administrator
- PC/Network Manager
- Systems Administrator
• UNIX Administrator
• NT System Administrator
• Novell/Notes Support
• IT Manager
• Network Project Manager
• Director of Information Technology
• Manager of Computer Operations
• Director/Manager of Information Services
• Network Maintenance Tech
• Network/PC Applications Support Specialist
• Hardware Support Tech
• Technical Support Engineer
• Telecommunications Technician
• Customer Service Coordinator
• Hardware Installer
• Technical Trainer
• Technical Writer/Documentation Specialist
• Field Application Engineer
• Network Technician
• Help/Call Desk Operator
• Systems Implementation Consultant
• Network Support Technician

Check Your Understanding

♦ What differences might there be between a network specialist and a network technician?

♦ Which jobs require the least contact and work with other people?
Lesson 6-1: Internetworking Careers

Group the list of job titles into related job families or progression sequences. Explain your grouping.

Job Progressions

The jobs you researched in the OSI lesson showed a range of different requirements employers set to screen applicants. These and the additional jobs listed in the lesson Overview can be arranged in a progression of skills and knowledge useful for considering your goals and how to achieve them.

In some organizations, advancement may require assuming management or supervisory responsibilities. Skills and experience in communications, human relations, and project direction would be required. Other organizations may have parallel advancement tracks for technical research and development staff. Sufficient “people skills” to get along with co-workers and contribute as a member of a team would be essential.

Position announcements are often very brief (advertisements are expensive with cost based on size). Brief advertised descriptions usually reflect what an employer wants and needs done immediately. The combination of technical and personal skills needed for remaining successful and advancing in the job may not be listed.

Demonstrating knowledge and interest in job progression within an organization's career grouping is a positive indication of goal orientation. If industry certifications are required or desirable for a position, the place of the certification(s) in a vendor sequence may indicate job level. Research may get you partial information, but questions will still be necessary. Current employees holding related jobs may be able and willing to inform prospective co-workers.

Three sample job progression sequences could be as follows:

• Network Technician>>>Remote User Support>>>Networking Project Manager
• Network Tech I>>>Network Tech II>>>Network Tech III
• Network Technician>>>Tech Team Supervisor>>>VP of Networked Systems

To progress from one job to the next, the employee must build knowledge and experience. Employers may provide or pay for technical and supervisory training, or reimburse for job-related employee-initiated training. Rewards for advancement will also typically justify self-financing additional training and certifications.
Check Your Understanding

♦ Why are job ads so brief and vague?

♦ What is the advantage of understanding the range, hierarchy, and progression of jobs in your field?

♦ Get a feel for internetworking career progression by creating and writing a simple progression of three jobs of interest to you. Be prepared to explain your progression to the class.

Job Seeking Process

How do you convey to others what you have learned? Grades do not tell the whole story. You have produced network drawings. You wrote a proposal with specifications in response to an RFP. You have compared network design alternatives and given recommendations and justifications. Some tasks you performed alone. Others you contributed to as a member of a team.

You have several ways to convey your abilities to a potential employer:

• Transmittal letter
• Resume
• Certifications and credentials
• Personal interview
• Portfolio
• Work and personal references

In general, the typical scenario for competitive job seeking is to write a transmittal letter that conveys your resume in answer to an announced position opening. The letter and resume highlight your credentials, certifications and qualifications related to the posting. If your submittal is outstanding, you may obtain a personal interview at which you can present and explain your portfolio. References may be checked before or after the interview.
Resume

There are many books, guides and Internet sources for sample resumes. Basic principles include the following:

- Brevity, clarity and accuracy are critical.
- Organization and layout must enable reading at a glance, with key points highlighted for a thirty-second read.
- Increasing requirements for submission of resume data in simple electronic formats (often for scanning into databases) puts a premium on identifying key word descriptors for specific jobs.
- There must be NO errors.
- Progression and growth should be organized chronologically.
- Word and phrasing choices must be optimized to convey a sense of action and impact.
- The best approach is to identify what you can do for the employer, not what the employer can do for you.
- The highest quality hard copy or electronic transmittal format and media should be selected.

Categories of information to provide in a resume usually fall within the following headings:

- **Contact Information**—Name, address, phone, fax and/or e-mail
- **Education and Training**—Academic, personal, and technical
- **Work Experience**—Highlighting qualities applicable for this employer’s needs
- **Awards and honors**—Measures of excellence
- **Interests and Activities**—Indicating relevant qualities
- **References**—If requested

Portfolio

You may have been directed toward, or given a choice of, portfolio format at the beginning of the course. Now that you can review your own products in this grouping, you may wish to select a new format suiting your own individual taste and sense of professional presentation.

Following are some of the items you have compiled:

1. Familiar network sketch.
2. IP numbering scheme research.
3. Crimped Cat5 Ethernet cable.
4. Ethernet cable crimping wire pair notes
5. Summary of cable crimping procedure and issues.
7. OSI layer research descriptors.
8. Basic Sniffer packet tracking notes.
9. RFP for LAN design response.
10. WAN sketch.
11. Leased line research.

In this lesson you will add the following:

- Industry vendor certification track
- Resume.
- Transmittal letter.

These items can be shown to a potential employer, providing memorable and credible evidence of your scope of training and your ability. Portfolio objects help abate nervousness in the interview situation by shifting the focus from you to the items you display and describe.

**Check Your Understanding**

- List two advantages of a portfolio over a resume.

- You have a portfolio documenting these activities. For each significant task you may have received a grade or performance evaluation from your instructor. Consider whether the quality and form of your deliverable would have been acceptable to an employer. How much time did you spend on any one assignment? Place a dollar value on your work and show the basis for your calculation. Compare with classmates.

- The resume is a truthful summary of your strengths and abilities intended to convince employers of your worth for their needs. Would you have any reservations about posting it on the bulletin board? Discuss any reservations you have and how to adjust for them.
The Technical Interview

Winning a job offer based on a competitive technical interview requires preparation. Identifying what relevant topics you do and do not know well is desirable as far ahead of time as possible. Some combination of additional learning, review, cramming, and rehearsal is then in order. Immediately below are some typical general questions that might be asked in any interview, along with some brief sample responses. Consider how your own responses would differ. Further below is a list of more technically specific questions that you could use to practice formulating your own answers, and then to compare with classmates.

General Q & A Samples

This list includes very basic questions presented here mainly to startle any who are unprepared with concise responses. Research will uncover limitless sources of additional questions (and sample good and bad answers) to help you prepare. Check your school library and the Internet to quickly expand your awareness of the range of questions you should anticipate. Then actually write out brief answers and pair off with another person to practice delivering oral answers spontaneously.

1. Tell me about yourself.
   
   Answer: Three to five minute mini-profile such as the progression of events that led you to your current career interest.

2. Why do you want to join this organization?
   
   Answer: Demonstrate your knowledge of the company.

3. What are two of your strengths? Two of your weaknesses?
   
   Answer: Back up claims of strength with examples. Indicate for minor weaknesses how you are improving.

4. What are your goals two, five, and ten years from now?
   
   Answer: Indicate your progression path to a goal. Be flexible about the timing for accomplishment.

5. Why should I hire you?
   
   Answer: Describe how your strengths will contribute to the needs advertised.

6. What can you do for this organization?
   
   Answer: Describe what you can do toward the mission.
7. How have your experiences demonstrated your ability to work with a team?

Answer: Give concrete examples of your teamwork.

8. How do you keep up to date in your field of expertise?

Answer: Read regularly in your field.

9. What kind of work environment are you seeking?

Answer: Reflect key features of this job, based on research.

10. Describe your ideal job.

Answer: Reflect conditions of this job if known.

**Technical Q & A Samples**

Specifics of technical questions will vary depending on the job sought. Here are ten samples that cross a range of possible entry level jobs in the field of internetworking.

1. How does the term “peer-to-peer” apply in client/server computing?

Answer: Communication between equal parts of the system such as protocols used between similar OSI layers on each side of the system.

2. What are the advantages of client/server computing?

Answer: Reduced hardware costs, greater interoperability, better price/performance, improved productivity.

3. What are comparative advantages between star and daisy chain physical LAN topologies?

Answer: Daisy chain uses less cable; star provides central hub for ease of node connection and system reconfiguration.

4. What factors would you use to decide which LAN cabling to install?

Answer: Resistance to electromagnetic interference suggests fiber-optic, then shielded twisted pair and coaxial. Cost and low bulk ease of installation points to UTP. Greater distance without repeaters is obtained with fiber, then coaxial, then UTP.
5. Describe the OSI model and its significance in internetworking.

Answer: The OSI model has seven layers that provide a reference framework for developing communication protocols and describing standards for interoperability.

6. Explain TCP/IP.

Answer: Department of Defense-specified protocols now in wide use (notably on the Internet), which provide standards for data format, sequence, signal strength, and transmitting speed to allow diverse kinds of computers to communicate.

7. What does the IEEE 802.3 standard describe?

Answer: Ethernet physical topology, cabling and protocol characteristics.

8. List five key functions of network management.

Answer: Management of faults, configurations, assets, security and performance.

9. Describe the depth of your knowledge of network operating systems.

Answer: Research key differences between Novell, UNIX, and Windows NT.

10. What do you now know that you don’t yet know about networking?

Answer: Middle and upper OSI layer aspects are treated in greater depth in subsequent courses.

Check Your Understanding

♦ Why might a technical interview require preparation?

♦ From all sources you researched, compile your own list of 25 questions you think you should be able to answer for an internetworking job of interest. Write out short answers to each question. Pair with another student who has done the same and conduct practice oral interview sessions with constructive critiques.
Try It Out

Research Industry Certifications

Materials Needed

- None

1. As a class, divide into groups, with each group responsible for researching and reporting on one industry vendor certification track relevant to internetworking.

2. Determine what jobs from the list in the lesson Overview might require, or benefit from, specific certifications offered by your group’s vendor.

3. Summarize your findings in writing for your portfolio and report orally to the other groups.

Rubric: Suggested Evaluation Criteria and Weightings

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<tr>
<th>Criteria</th>
<th>%</th>
<th>Your Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certification track formatted clearly and concisely</td>
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<td></td>
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<tr>
<td>Quality written analysis and conclusions</td>
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<td></td>
</tr>
<tr>
<td>Documentation of a variety of research sources</td>
<td>25</td>
<td></td>
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<tr>
<td>Oral presentation of findings</td>
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<td></td>
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<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
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Stretch Yourself

Prepare for a Job Search

Materials Needed

- Internet connection

1. Organize your portfolio and develop a resume based on your newly acquired NetKnowledge technical understanding, skills, product competencies, teamwork, and communications.

2. Use the Internet or a newspaper to find three internetworking position openings of interest to you.

3. Highlight your current and previous work experience in terms relevant to seeking one or more of the selected internetworking positions.

4. Research what the employer does and needs done by the new hire, and write a transmittal letter highlighting your resume and what you can do for the employer.

5. Exchange your resume with several members of your class and compare how they have shown their NetKnowledge training. Identify and describe the differences in a summary to the class.

Rubric: Suggested Evaluation Criteria and Weightings

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<th>Criteria</th>
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<td>Quality resume geared to selected job ad</td>
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<td></td>
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<tr>
<td>Effective transmittal letter</td>
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<td></td>
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<tr>
<td>Comparative analysis of selected resumes</td>
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Network Wizards

Interviewing Research

Use the Internet or your library to find interviewing advice and sample questions.

Materials Needed

- Internet connection (optional)

1. List ten key questions you think appropriate in a technical interview for the jobs you selected.

2. Write out brief answers to each of the questions.

3. Compare the questions you selected to those of your classmates. Compare answers for any questions you chose in common.

4. Practice asking the questions to a partner to become comfortable with oral interview situations.

5. Provide and receive written and oral critiques between partners concerning eye contact, body language, grammar, poise and overall delivery.

6. Repeat the practice session using variations such as different questions or with videotape playback for self-analysis.

7. Summarize in one page what you learned to improve your interviewing.

Rubric: Suggested Evaluation Criteria and Weightings

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<th>Criteria</th>
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<tr>
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<td>Documented critique/constructive suggestions</td>
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<td>One page summary of learning</td>
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Summary

In this unit, you learned the following:

- The diversity of job titles in the spectrum of internetworking employment.
- Relative knowledge, skills and other attributes needed for a continuum of internetworking job titles.
- Components of your portfolio, technical resume and transmittal letter.
- Oral interviewing practice and preparation techniques.
- Available industry vendor certifications in internetworking.

Review Questions

Lesson 6-1: Internetworking Outlooks

Technical Review Bowl Rounds 1 & 2

From the technical interview questions and answers that class members have created, shared, and practiced, compile a quiz bank on index cards. Place questions on one side and answers on the other. Divide the class in half. In Round 1, one team will answer questions while the other critiques the answers and awards points. Make up your own rules. In Round 2 the roles reverse. You will be individually scored based on your own participation and performance according to criteria the class formulates in advance. Vary your questions as short answer, multiple choice, and true/false with justification. In some cases, you may choose to give an answer and challenge a team to compose a good interview question. Keep track of the topics that you personally need to review for optimum performance in a real technical job interview.

Here are two general questions you may wish to include for review of key career starting concepts:

1. A resume is used to
   a. get a job
   b. interest an employer in interviewing you
   c. tell the employer what kind of job you want
   d. present your personal history
   e. all of the above
2. The primary objective of the job interview is to
   a. negotiate salary
   b. convince the employer you are right for the job
   c. describe as much about yourself as possible
   d. state what you are looking for in the job

Scoring

Rubric: Suggested Evaluation Criteria and Weightings

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<tr>
<td>Technical Review Bowl Round 2: Participation and performance</td>
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<tr>
<td>TOTAL</td>
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Portfolio Products:

| Try It Out: Certifications Research         | 100|            |
| Stretch Yourself: Portfolio, Resume and Letter | 100|            |
| For Network Wizards: Interview Q & A        | 100|            |
| FINAL TOTAL                                  | 400|            |

Resources

