

***INFORMATION TECHNOLOGY  
NETWORKING  
STANDARDS***



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Office of Career Readiness, Adult Learning, and Education Options  
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*All Nevadans ready for success in the 21st century*

**MISSION**

*To improve student achievement and educator effectiveness by ensuring opportunities, facilitating learning, and promoting excellence*



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**BUSINESS AND INDUSTRY VALIDATION**

All CTE standards developed through the Nevada Department of Education are validated by business and industry through one or more of the following processes: (1) the standards are developed by a team consisting of business and industry representatives; or (2) a separate review panel was coordinated with industry experts to ensure the standards include the proper content; or (3) the adoption of nationally recognized standards endorsed by business and industry.

The IT Networking standards were validated with the adoption of the nationally recognized standards approved by Cisco.

**PROJECT COORDINATOR**

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## INTRODUCTION

The standards in this document are designed to clearly state what the student should know and be able to do upon completion of an advanced high school Information Technology Networking program. These standards are designed for a three-credit course sequence that prepares the student for a technical assessment directly aligned to the standards.

These exit-level standards are designed for the student to complete all standards through their completion of a program of study. These standards are intended to guide curriculum objectives for a program of study.

The standards are organized as follows:

- **Content Standards** are general statements that identify major areas of knowledge, understanding, and the skills students are expected to learn in key subject and career areas by the end of the program.
- **Performance Standards** follow each content standard. Performance standards identify the more specific components of each content standard and define the expected abilities of students within each content standard.
- **Performance Indicators** are very specific criteria statements for determining whether a student meets the performance standard. Performance indicators may also be used as learning outcomes, which teachers can identify as they plan their program learning objectives.

The crosswalk and alignment section of the document shows where the performance indicators support the Nevada Academic Content Standards. Where correlation with an academic content standard exists, students in the Information Technology Networking program perform learning activities that support, either directly or indirectly, achievement of the academic content standards that are listed.

All students are encouraged to participate in the career and technical student organization (CTSO) that relates to the Information Technology Networking program. CTSOs are co-curricular national organizations that directly reinforce learning in the CTE classroom through curriculum resources, competitive events, and leadership development. CTSOs provide students the ability to apply academic and technical knowledge, develop communication and teamwork skills, and cultivate leadership skills to ensure college and career readiness.

The Employability Skills for Career Readiness identify the “soft skills” needed to be successful in all careers and must be taught as an integrated component of all CTE course sequences. These standards are available in a separate document.

The **Standards Reference Code** is only used to identify or align performance indicators listed in the standards to daily lesson plans, curriculum documents, or national standards. The Standards Reference Code is an abbreviated name for the program, and the content standard, performance standard and performance indicator are referenced in the program standards. This abbreviated code for identifying standards uses each of these items. For example, INT is the Standards Reference Code for Information Technology Networking. For Content Standard 2, Performance Standard 3 and Performance Indicator 4 the Standards Reference Code would be INT.2.3.4.

**CONTENT STANDARD 1.0: INTEGRATE CAREER AND TECHNICAL STUDENT ORGANIZATIONS (CTSOs)\*****PERFORMANCE STANDARD 1.1: EXPLORE THE HISTORY AND ORGANIZATION OF CTSOs**

- 1.1.1 Discuss the requirements of CTSO participation/involvement as described in Carl D. Perkins Law
- 1.1.2 Research nationally recognized CTSOs
- 1.1.3 Investigate the impact of federal and state government regarding the progression and operation of CTSOs (e.g., Federal Statutes and Regulations, Nevada Administrative Code [NAC], Nevada Revised Statutes [NRS])

**PERFORMANCE STANDARD 1.2: DEVELOP LEADERSHIP SKILLS**

- 1.2.1 Discuss the purpose of parliamentary procedure
- 1.2.2 Demonstrate the proper use of parliamentary procedure
- 1.2.3 Differentiate between an office and a committee
- 1.2.4 Discuss the importance of participation in local, regional, state, and national conferences, events, and competitions
- 1.2.5 Participate in local, regional, state, or national conferences, events, or competitions
- 1.2.6 Describe the importance of a constitution and bylaws to the operation of a CTSO chapter

**PERFORMANCE STANDARD 1.3: PARTICIPATE IN COMMUNITY SERVICE**

- 1.3.1 Explore opportunities in community service-related work-based learning (WBL)
- 1.3.2 Participate in a service learning (program related) and/or community service project or activity
- 1.3.3 Engage with business and industry partners for community service

**PERFORMANCE STANDARD 1.4: DEVELOP PROFESSIONAL AND CAREER SKILLS**

- 1.4.1 Demonstrate college and career readiness (e.g., applications, resumes, interview skills, presentation skills)
- 1.4.2 Describe the appropriate professional/workplace attire and its importance
- 1.4.3 Investigate industry-standard credentials/certifications available within this Career Cluster™
- 1.4.4 Participate in authentic contextualized instructional activities
- 1.4.5 Demonstrate technical skills in various student organization activities/events

**PERFORMANCE STANDARD 1.5: UNDERSTAND THE RELEVANCE OF CAREER AND TECHNICAL EDUCATION (CTE)**

- 1.5.1 Make a connection between program standards to career pathway(s)
- 1.5.2 Explain the importance of participation and completion of a program of study
- 1.5.3 Promote community awareness of local student organizations associated with CTE programs

\*Refer to the program of study Curriculum Framework for appropriate CTSO(s).

**CONTENT STANDARD 2.0: UTILIZE SAFETY PROCEDURES AND PROPER TOOLS****PERFORMANCE STANDARD 2.1: UTILIZE SAFETY PROCEDURES**

- 2.1.1 Define industry standard vocabulary
- 2.1.2 Explain the purpose of safe working conditions and safe lab procedures
- 2.1.3 Interpret Material Safety Data Sheets (MSDS)
- 2.1.4 Demonstrate the proper use of safety devices
- 2.1.5 Research the environmental impact of production, use, and disposal of technology materials
- 2.1.6 Research local, state, and federal regulations related to material handling
- 2.1.7 Demonstrate proper disposal of technology materials
- 2.1.8 Explain the relationship between organization and safety
- 2.1.9 Demonstrate an organized work environment

**PERFORMANCE STANDARD 2.2: UTILIZE PROPER TOOLS**

- 2.2.1 Identify industry standard tools for computer service, repair, and maintenance
- 2.2.2 Demonstrate the proper use, care, and storage of hand tools, test equipment, and diagnostic tools
- 2.2.3 Utilize appropriate documentation methods and procedures
- 2.2.4 Utilize appropriate inventory practices

**CONTENT STANDARD 3.0: EXAMINE NETWORK SYSTEM HARDWARE****PERFORMANCE STANDARD 3.1: IDENTIFY COMPUTER AND NETWORK HARDWARE**

- 3.1.1 Define industry standard vocabulary
- 3.1.2 Analyze and describe networking interfaces
- 3.1.3 Identify internetworking equipment
- 3.1.4 Identify various networking topologies
- 3.1.5 Differentiate between various network transmission media
- 3.1.6 Demonstrate proper cabling techniques
- 3.1.7 Discuss signal degradation
- 3.1.8 Describe the use of each of the classifications of hardware components
- 3.1.9 Categorize the various types of power supplies
- 3.1.10 Differentiate between the form factors of motherboards
- 3.1.11 Describe various levels and types of memory and storage devices
- 3.1.12 Classify various expansion adaptors
- 3.1.13 Differentiate between various CPU types and cooling types
- 3.1.14 Compare and configure network devices

**PERFORMANCE STANDARD 3.2: EXPLORE ROUTERS AND SWITCHES**

- 3.2.1 Describe industry standard ports
- 3.2.2 Compare media access control techniques and logical topologies used in networks
- 3.2.3 Build a simple network using the appropriate media
- 3.2.4 Analyze and describe industry standard router interfaces
- 3.2.5 Research the purpose of routers
- 3.2.6 Compare and contrast computers and routers
- 3.2.7 Relate routers and the network layers
- 3.2.8 Configure a router with basic configurations
- 3.2.9 Explain the operation of Ethernet
- 3.2.10 Explain how a switch operates
- 3.2.11 Demonstrate how network layer protocols and services support communication across data networks
- 3.2.12 Demonstrate how routers enable end-to-end connectivity in a small to medium-sized business
- 3.2.13 Demonstrate how devices route traffic in a small to medium-sized business network

Continued next page



**PERFORMANCE STANDARD 3.3: INVESTIGATE WIRELESS NETWORKS**

- 3.3.1 Describe various wireless network standards
- 3.3.2 Compare and contrast authentication and encryption
- 3.3.3 Explain the properties of secure wireless networks
- 3.3.4 Identify wireless devices
- 3.3.5 Differentiate between industry standard wireless technologies
- 3.3.6 Diagram various wireless network topologies
- 3.3.7 Construct a network utilizing wireless Layer 2 devices

**PERFORMANCE STANDARD 3.4: TROUBLESHOOT HARDWARE**

- 3.4.1 Describe common symptoms for a given discrepancy
- 3.4.2 Explain key terms and acronyms used in diagnostic testing and troubleshooting
- 3.4.3 Develop a solution for a given discrepancy
- 3.4.4 Document the solution

**CONTENT STANDARD 4.0: UNDERSTAND COMPUTER SERVICE****PERFORMANCE STANDARD 4.1: PRACTICE INSTALLATION OF HARDWARE AND NETWORK SYSTEMS**

- 4.1.1 Select components appropriate to customer needs
- 4.1.2 Install key components
- 4.1.3 Select appropriate operating system features and tools based on customer needs

**PERFORMANCE STANDARD 4.2: CONFIGURE, INSTALL, AND MAINTAIN PERIPHERALS**

- 4.2.1 Install and configure interfaces for peripherals
- 4.2.2 Configure peripherals
- 4.2.3 Explain differences among various types of printers
- 4.2.4 Compare various types of display devices
- 4.2.5 Compare various types of audio devices
- 4.2.6 Perform regular maintenance on peripherals
- 4.2.7 Maintain proper documentation

**PERFORMANCE STANDARD 4.3: COMMUNICATE EFFECTIVELY WITH CUSTOMERS**

- 4.3.1 Analyze customer needs by asking relevant questions
- 4.3.2 Address customer's concerns without using jargon, slang, or acronyms
- 4.3.3 Maintain customer service log
- 4.3.4 Demonstrate appropriate netiquette
- 4.3.5 Discuss the role of ethics in IT services

**PERFORMANCE STANDARD 4.4: OPERATING SYSTEMS**

- 4.4.1 Compare and contrast Windows Operating Systems, Linux systems, and iOS
- 4.4.2 Explain various features of operating systems
- 4.4.3 Install and secure operating systems
- 4.4.4 Compare mobile operating systems
- 4.4.5 Explain basic features of a mobile operating system

**CONTENT STANDARD 5.0: ANALYZE SYSTEM NETWORK PROTOCOLS****PERFORMANCE STANDARD 5.1: UNDERSTAND NETWORK PROTOCOLS**

- 5.1.1 Describe the characteristics of each layer of the Open Systems Interconnection (OSI) model
- 5.1.2 Identify and explain functions and uses of routing protocols
- 5.1.3 Explain the role of the data link layer in supporting communication across the data networks
- 5.1.4 Explain how the address resolution protocol enables communication on a network
- 5.1.5 Explain how transport layer protocols and services support communications across data networks
- 5.1.6 Compare the operations of transport layer protocols in supporting end-to-end communication
- 5.1.7 Explain the operation of the application layer in providing support to end-user applications
- 5.1.8 Compare the TCP/IP model to the OSI model
- 5.1.9 Identify and formulate binary, decimal, and hexadecimal numbers
- 5.1.10 Explain the use of IPv4 and IPv6 addresses to provide connectivity in small to medium-sized business networks

**PERFORMANCE STANDARD 5.2: IMPLEMENT NETWORK PROTOCOLS**

- 5.2.1 Demonstrate the configuration of various network protocols
- 5.2.2 Given a set of requirements, implement a VLSM addressing scheme to provide connectivity to end users in a business network
- 5.2.3 Use common testing utilities to verify and test network connectivity
- 5.2.4 Implement an IPv4 and IPv6 addressing scheme to enable end-to-end connectivity in a business network
- 5.2.5 Explain design considerations for implementing IPv4 and IPv6 in a business network

**CONTENT STANDARD 6.0: UNDERSTAND SECURITY OF PHYSICAL LAYERS, SOFTWARE, AND NETWORK ACCESS****PERFORMANCE STANDARD 6.1: PROTECTING NETWORKS**

- 6.1.1 Identify common security threats
- 6.1.2 Analyze types of current cyber threats
- 6.1.3 Describe methods to prevent breaches in security, e.g., pass phrase, OS patch management, disabling unused accounts
- 6.1.4 Describe physical security vs. digital security
- 6.1.5 Explain current security trends in mobile applications
- 6.1.6 Explain key terms related to security
- 6.1.7 Identify the prevention of and protections against cyber threats

**PERFORMANCE STANDARD 6.2: CONFIGURATION**

- 6.2.1 Implement best practices to secure a workstation
- 6.2.2 Secure a SOHO wireless/wired network
- 6.2.3 Document a plan of disaster recovery
- 6.2.4 Implement security best practices with customer's sensitive information and data
- 6.2.5 Use common show commands and utilities to establish a relative baseline for the network

**PERFORMANCE STANDARD 6.3: EVENT HANDLING**

- 6.3.1 Research the need for network security
- 6.3.2 Evaluate threats to network security
- 6.3.3 Describe the purpose of firewall operations
- 6.3.4 Explain proper password implementation
- 6.3.5 Describe user and group accounts
- 6.3.6 Investigate user and group security policies
- 6.3.7 Explain the differences between the various iOS and OS security settings
- 6.3.8 Create incident reports according to policies and procedures
- 6.3.9 Explain the difference between data stored, data in transit, and data being processed
- 6.3.10 Discuss how data can be compromised, corrupted, or lost
- 6.3.11 Define virtualization technology

**PERFORMANCE STANDARD 6.4: UNDERSTAND ETHICS IN RELATION TO CYBERSECURITY**

- 6.4.1 Distinguish among types of ethical concerns
- 6.4.2 Identify actions that constitute cyber bullying
- 6.4.3 Identify laws applicable to cybersecurity
- 6.4.4 Explain the concept of "personally identifiable information"
- 6.4.5 Analyze the social and legal significance of the ongoing collection of personal digital information

**CONTENT STANDARD 7.0: CONSTRUCT NETWORK SYSTEMS****PERFORMANCE STANDARD 7.1: IDENTIFY NETWORK SYSTEM NEEDS**

- 7.1.1 Identify and describe the benefits of the hierarchical network model
- 7.1.2 Define the acronyms for telecommunications
- 7.1.3 Perform a customer network needs assessment
- 7.1.4 Analyze the network needs assessment for solutions
- 7.1.5 Evaluate the physical and logical topology considerations
- 7.1.6 Evaluate network media usage and connectivity functions

**PERFORMANCE STANDARD 7.2: DESIGN AND EVALUATE NETWORK SYSTEMS**

- 7.2.1 Create unshielded twisted pair (UTP) cables, e.g., straight, rollover, crossover
- 7.2.2 Choose and implement the appropriate network solution (peer-to-peer vs. client-server)
- 7.2.3 Design and evaluate performance of various types of networks
- 7.2.4 Diagram the network infrastructure (i.e., physical and logical topology)
- 7.2.5 Explain factors that enhance a network's throughput
- 7.2.6 Critique final network designs

**PERFORMANCE STANDARD 7.3: CONSTRUCT NETWORK SYSTEMS**

- 7.3.1 Construct Local Area Networks (LAN) utilizing network designs
- 7.3.2 Construct Wide Area Networks (WAN) using multiple Local Area Networks (LAN)
- 7.3.3 Configure wireless devices (i.e., wireless access points, bridges, etc.)
- 7.3.4 Describe internet connection types and features
- 7.3.5 Compare and contrast Mesh, Ring, Bus, Star, Hybrid
- 7.3.6 Compare and contrast network types, e.g., LAN, WAN, PAN, MAN

**PERFORMANCE STANDARD 7.4: PERFORM NETWORK ADMINISTRATION AND MONITORING**

- 7.4.1 Create documentation of a network baseline
- 7.4.2 Diagram and update changes to the physical and logical topologies
- 7.4.3 Describe common issues that occur during network administration and monitoring
- 7.4.4 Utilize diagnostic tools to validate the interconnectivity of network designs (i.e., Ping, Tracert, Netstat, Nslookup, etc.)
- 7.4.5 Utilize iOS diagnostic tools to validate the interconnectivity of network designs (i.e., show interfaces, show MAC address tables, etc.)

**CONTENT STANDARD 8.0: MAINTAIN NETWORK SYSTEMS****PERFORMANCE STANDARD 8.1: DEMONSTRATE NETWORK TROUBLESHOOTING AND DIAGNOSTICS**

- 8.1.1 Explain troubleshooting theory
- 8.1.2 Describe the stages of network documentation processes
- 8.1.3 Explain key terms and acronyms used in diagnostic testing and troubleshooting
- 8.1.4 Describe the layered models and how they are used for troubleshooting
- 8.1.5 Investigate and diagnose network failures
- 8.1.6 Demonstrate password implementation and recovery
- 8.1.7 Utilize diagnostic tools
- 8.1.8 Troubleshoot a network

**PERFORMANCE STANDARD 8.2: DEMONSTRATE NETWORK MAINTENANCE**

- 8.2.1 Install and configure firewall services
- 8.2.2 Install and update anti-virus software
- 8.2.3 Develop a routine maintenance plan
- 8.2.4 Document network diagrams for various types of networks
- 8.2.5 Revise network design for scalability and maintainability

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## CROSSWALKS AND ALIGNMENTS

### CROSSWALKS (ACADEMIC STANDARDS)

The crosswalk of the Information Technology Networking Standards shows links to the Nevada Academic Content Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Information Technology Networking program support academic learning. The performance indicators are grouped according to their content standard and are crosswalked to the Nevada Academic Content Standards in English Language Arts, Mathematics, and Science.

### ALIGNMENTS (MATHEMATICAL PRACTICES)

In addition to correlation with the Nevada Academic Content Standards for Mathematics, many performance indicators support the Mathematical Practices. The following table illustrates the alignment of the Information Technology Networking Standards Performance Indicators and the Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Information Technology Networking program support academic learning.

### ALIGNMENTS (SCIENCE AND ENGINEERING PRACTICES)

In addition to correlation with the Nevada Academic Content Standards for Science, many performance indicators support the Science and Engineering Practices. The following table illustrates the alignment of the Information Technology Networking Standards Performance Indicators and the Science and Engineering Practices. This alignment identifies the performance indicators in which the learning objectives in the Information Technology Networking program support academic learning.

### CROSSWALKS (COMMON CAREER TECHNICAL CORE)

The crosswalk of the Information Technology Networking Standards shows links to the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Information Technology Networking program support the Common Career Technical Core. The Common Career Technical Core defines what students should know and be able to do after completing instruction in a program of study. The Information Technology Networking Standards are crosswalked to the Information Technology Networking and the Network Systems Career Pathway.



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**CROSSWALK OF INFORMATION TECHNOLOGY NETWORKING STANDARDS  
AND THE NEVADA ACADEMIC CONTENT STANDARDS**

**CONTENT STANDARD 1.0: INTEGRATE CAREER AND TECHNICAL STUDENT ORGANIZATIONS (CTSOs)**

Performance Indicators	Nevada Academic Content Standards
1.1.1	<p><b>English Language Arts: Speaking and Listening Standards</b></p> <p>SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>
1.1.2	<p><b>English Language Arts: Speaking and Listening Standards</b></p> <p>SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b></p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>
1.1.3	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b></p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>

Performance Indicators	Nevada Academic Content Standards
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1.2.5	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b></p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
1.4.1	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b></p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

Performance Indicators	Nevada Academic Content Standards
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1.4.3	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b></p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>
1.4.4	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b></p> <p>WHST.11-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.</p>
1.4.5	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b></p> <p>WHST.11-12.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.</p>

Performance Indicators	Nevada Academic Content Standards
1.5.2	<p><b>English Language Arts: Language Standards</b>  L.11-12.6 Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.</p> <p><b>English Language Arts: Speaking and Listening Standards</b>  SL.11-12.1a Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>

**CONTENT STANDARD 2.0: UTILIZE SAFETY PROCEDURES AND PROPER TOOLS**

Performance Indicators	Nevada Academic Content Standards
2.1.2	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
2.1.5	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.</p>
2.2.3	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

## CONTENT STANDARD 3.0: EXAMINE NETWORK SYSTEM HARDWARE

Performance Indicators	Nevada Academic Content Standards
3.1.2	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>  RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
3.1.7	<p><b>English Language Arts: Speaking and Listening Standards</b></p> <p>SL.11-12.2 Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.</p> <p>SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>
3.3.5	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>  RST.11-12.6 Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
3.3.6	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
3.4.4	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

**CONTENT STANDARD 4.0: UNDERSTAND COMPUTER SERVICE**

Performance Indicators	Nevada Academic Content Standards
4.3.1	<p><b>English Language Arts: Speaking and Listening Standards</b>                      SL.11-12.1c Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.</p>
4.3.2	<p><b>English Language Arts: Speaking and Listening Standards</b>                      SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>
4.3.5	<p><b>English Language Arts: Speaking and Listening Standards</b>                      SL.11-12.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.                       SL.11-12.1d Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.</p>
4.4.2	<p><b>English Language Arts: Speaking and Listening Standards</b>                      SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.</p>
4.4.5	<p><b>English Language Arts: Speaking and Listening Standards</b>                      SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.</p>



## CONTENT STANDARD 5.0: ANALYZE SYSTEM NETWORK PROTOCOLS

Performance Indicators	Nevada Academic Content Standards
5.1.1	<b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b> WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.
5.1.2	<b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics. <b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b> WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5.1.3	<b>English Language Arts: Speaking and Listening Standards</b> SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
5.1.4	<b>English Language Arts: Speaking and Listening Standards</b> SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
5.1.5	<b>English Language Arts: Speaking and Listening Standards</b> SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
5.1.7	<b>English Language Arts: Speaking and Listening Standards</b> SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
5.2.5	<b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b> WHST.11-12.9 Draw evidence from informational texts to support analysis, reflection, and research.

CONTENT STANDARD 6.0: UNDERSTAND SECURITY OF PHYSICAL LAYERS, SOFTWARE, AND NETWORK ACCESS

Performance Indicators	Nevada Academic Content Standards
6.1.2	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.</p>
6.1.7	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.</p>
6.2.2	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
6.2.3	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
6.3.3	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.                       WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
6.3.5	<p><b>English Language Arts: Speaking and Listening Standards</b>                      SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>
6.3.7	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p>
6.3.8	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.2d Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.</p>
6.3.10	<p><b>English Language Arts: Speaking and Listening Standards</b>                      SL.11-12.4 Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.</p>

## CONTENT STANDARD 7.0: CONSTRUCT NETWORK SYSTEMS

Performance Indicators	Nevada Academic Content Standards
7.1.1	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b> WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.1.2	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b> WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.1.3	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b> WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.1.4	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>
7.1.5	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>
7.2.3	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b> WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.2.4	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b> WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

Performance Indicators	Nevada Academic Content Standards
7.2.5	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.2.6	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.4.1	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.4.2	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.4.3	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>                      WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
7.4.4	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
7.4.5	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>                      RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>

## CONTENT STANDARD 8.0: MAINTAIN NETWORK SYSTEMS

Performance Indicators	Nevada Academic Content Standards
8.1.2	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>  RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
8.1.4	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>  RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p>RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
8.2.1	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>  RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
8.2.2	<p><b>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</b>  RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p>
8.2.3	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
8.2.4	<p><b>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</b>  WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>

**ALIGNMENT OF IT NETWORKING STANDARDS  
AND THE MATHEMATICAL PRACTICES**

Mathematical Practices	IT Networking Performance Indicators
1. Make sense of problems and persevere in solving them.	3.4.4 4.2.6; 4.3.1 8.1.8; 8.2.5
2. Reason abstractly and quantitatively.	3.3.7
3. Construct viable arguments and critique the reasoning of others.	6.1.2 7.1.3; 7.2.6
4. Model with mathematics.	
5. Use appropriate tools strategically.	2.1.6; 2.2.2, 2.2.3 4.1.3
6. Attend to precision.	2.2.4 3.1.15; 3.2.3, 3.2.8 4.1.2; 4.2.1, 4.2.2; 4.4.3
7. Look for and make use of structure.	5.2.4 6.1.2; 6.3.2
8. Look for and express regularity in repeated reasoning.	

**ALIGNMENT OF IT NETWORKING STANDARDS  
AND THE SCIENCE AND ENGINEERING PRACTICES**

Science and Engineering Practices	IT Networking Performance Indicators
1. Asking questions (for science) and defining problems (for engineering).	4.1.3; 4.3.1 6.2.3
2. Developing and using models.	
3. Planning and carrying out investigations.	7.1.3, 7.1.5, 7.1.6; 7.4.5 8.1.5, 8.1.7, 8.1.8
4. Analyzing and interpreting data.	
5. Using mathematics and computational thinking.	5.1.9
6. Constructing explanations (for science) and designing solutions (for engineering).	3.1.15; 3.2.3 4.2.2 5.2.1 7.2.3, 7.2.4
7. Engaging in argument from evidence.	
8. Obtaining, evaluating, and communicating information.	7.4.1 8.2.4

**CROSSWALKS OF IT NETWORKING STANDARDS  
AND THE COMMON CAREER TECHNICAL CORE**

Information Technology Career Cluster™	Performance Indicators
1. Demonstrate effective professional communication skills and practices that enable positive customer relationships.	2.1.1 4.3.1-4.3.5
2. Use product or service design processes and guidelines to produce a quality information technology (IT) product or service.	3.1.15; 3.2.3, 3.2.7, 3.2.8 3.2.11-3.2.13 4.4.1-4.4.5
3. Demonstrate the use of cross-functional teams in achieving IT project goals.	
4. Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.	4.3.5 6.4.1-6.4.4
5. Explain the implications of IT on business development.	
6. Describe trends in emerging and evolving computer technologies and their influence on IT practices.	
7. Perform standard computer backup and restore procedures to protect IT information.	8.1.1-8.1.8; 8.2.1-8.2.5
8. Recognize and analyze potential IT security threats to develop and maintain security requirements.	6.1.1-6.1.7; 6.2.1-6.2.5 6.3.1-6.3.11
9. Describe quality assurance practices and methods employed in producing and providing quality IT products and services.	3.4.1-3.4.4; 5.1.2
10. Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.	6.3.1-6.3.11
11. Demonstrate knowledge of the hardware components associated with information systems.	2.2.1 4.1.1-4.1.3 4.2.1-4.2.7; 4.4.1-4.4.5
12. Compare key functions and applications of software and determine maintenance strategies for computer systems.	4.1.1; 4.2.1, 4.2.2



Network Systems Career Pathway	Performance Indicators
1. Analyze customer or organizational network system needs and requirements.	7.1.3-7.1.6; 7.3.1-7.3.6
2. Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power, security).	3.3.1-3.3.7 7.3.5
3. Design a network system using technologies, tools and standards.	3.1.1-3.1.15; 3.2.1-3.1.13 5.2.5 6.2.1-6.2.5 7.2.1-7.2.6
4. Perform network system installation and configuration.	5.1.1-5.1.10; 5.2.1-5.2.5
5. Perform network administration, monitoring and support to maintain a network system.	7.4.1-7.4.5 8.1.1-8.1.8; 8.2.1-8.2.5