



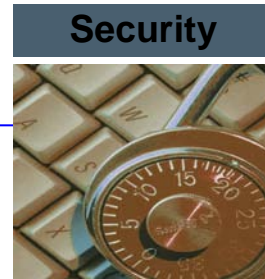
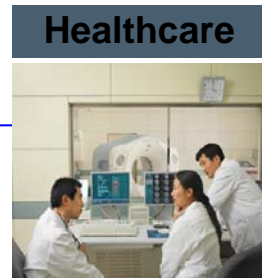
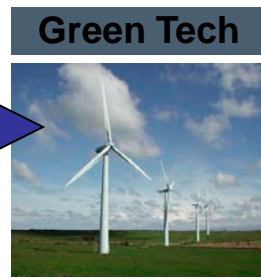
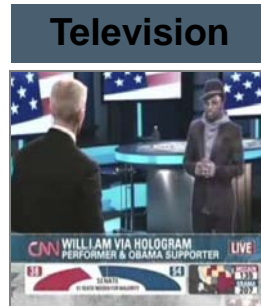
# Cisco Networking Academy

- **Filling critical needs**
- **Certification and standards alignment**
- **Academy courses and content**



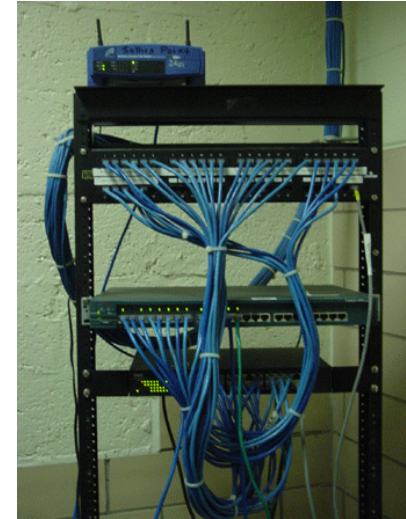
# What is networking?

- Gathering and presenting data
- Analyzing and creating conclusions
- Creating solutions
  - Provide access
  - Support collaboration
  - Protect people and property



# What is a Network Academy?

- Network Academies teach students how to design, build, troubleshoot and secure networks
- Content aligned to industry certifications
- Real-world learning and hands-on lab experiences



# A Unique Private/Public Partnership



## Educational Partners

- **Product**
- **Infrastructure**
- **Program Design and Support**
- **\$500M+ Contribution**



- **Instructors**
- **Students**
- **Classrooms**
- **Training**
- **Labs**

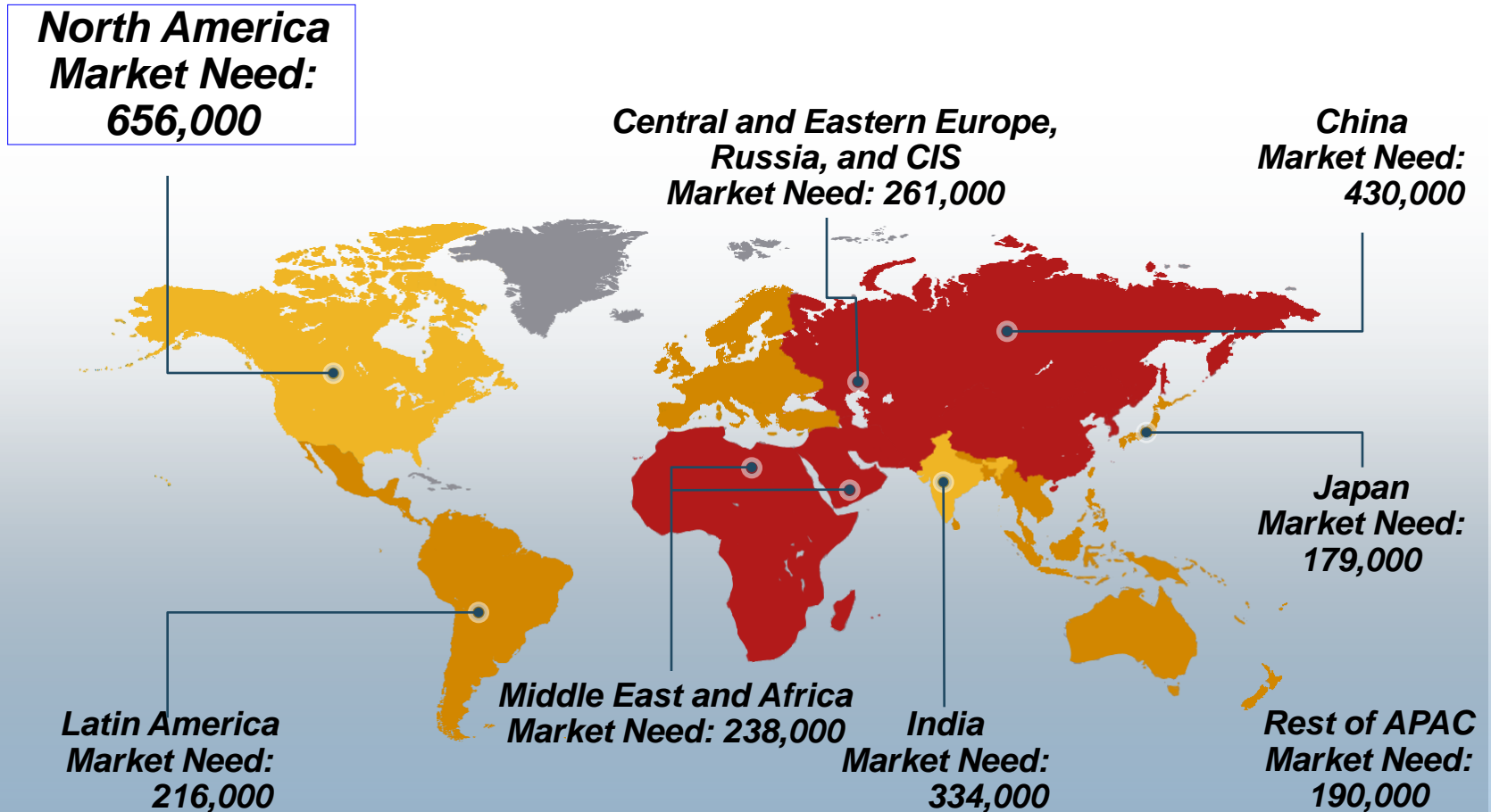
# Cisco Networking Academy:

*The world's largest  
classroom!*

- **1 million** students engaged in learning this year
- **3.75 million** students since inception
- **10 thousand** academies operating in 165 countries
- **1 million** online assessments delivered monthly
- **100 million** online assessments since inception
- **125 thousand** Facebook fans, and growing daily



# The Gap of Skilled Networking Professionals Is Growing!



Source: IDC Skill Gaps Research and Bain 2007 Global Job Market Analysis



# IT Careers and Job Trends in the United States

## The Ten Fastest Growing Occupations from 2006 to 2014\*

1. Network systems and data communications analyst
2. Physician assistant
3. Computer software engineer, applications
4. Computer software engineer, systems software
5. Network and computer systems administrator
6. Database administrator
7. Physical therapist
8. Medical scientist
9. Occupational therapist
10. College instructor

\*Money Magazine

# IT Occupational Data in Maryland

Occupation	Employment		Employment Change		Average Annual Openings	Occupational Employment as of May 2008 <sup>^</sup>
	2006	2016	Number	+%		
Computer Support Specialists	11,870	13,750	1,880	16	555	12,230
Computer Systems Analysts	12,465	16,435	3,970	31.8	727	12,520
Network and Computer Systems Administrators	9,080	12,230	3,150	34.7	523	9,640
Network Systems and Data Communications Analysts	8,990	13,965	4,975	55.3	681	8,020
Computer and Information Systems Managers	6,665	7,900	1,235	18.5	231	6,730

U.S. Department of Labor, Bureau of Labor Statistics, <http://www.projectionscentral.com>, based on data availability as of October 31, 2008

<sup>^</sup> U.S. Department of Labor, Bureau of Labor Statistics, May 2008 State Occupational Employment and Wage Estimates (by state),

<http://stat.bls.gov/oes/current/oesrcst.htm>

Mind Wide Open is a trademark of Cisco Networking Academy.



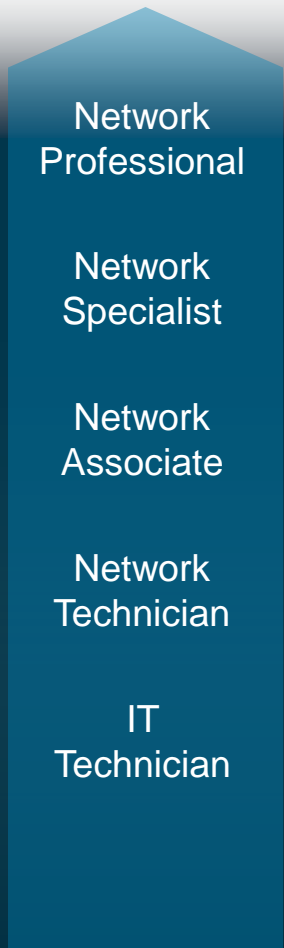


# Cybersecurity Skills Shortage

- “Desperate shortage” --currently need 20,000 – 30,000 cybersecurity professionals in US; current estimate is 1,000 available (*ComputerWeekly.com, 7/19/10*)
- Needed: people with foundational networking and network administration, programming, and security skills
- MD=“ground zero” for critical needs: NSA, DISA, BRAC

# Cisco Networking Academy

## Curricula Portfolio



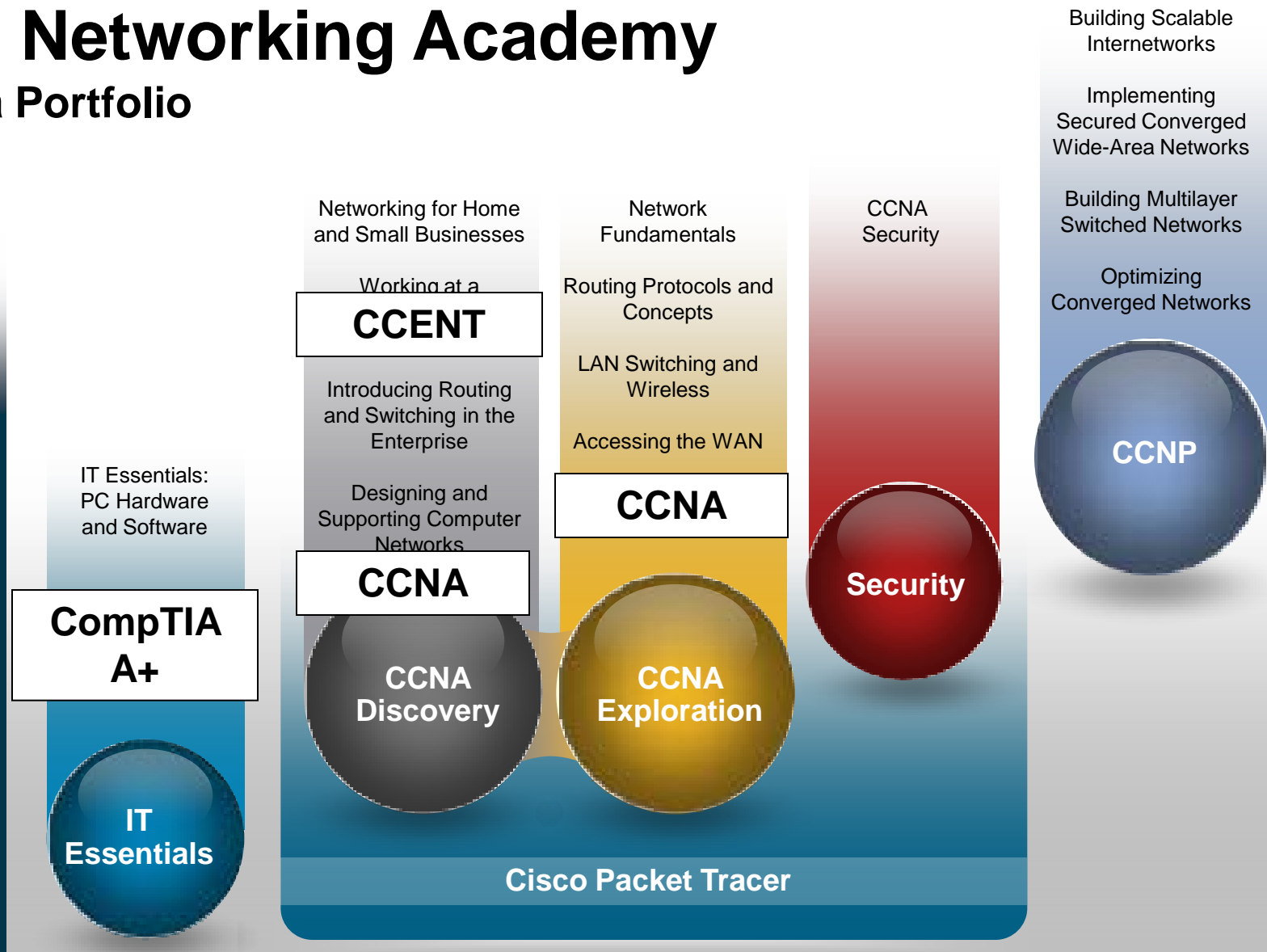
Network Professional

Network Specialist

Network Associate

Network Technician

IT Technician



IT Essentials:  
PC Hardware  
and Software

**CompTIA  
A+**

**IT  
Essentials**

Networking for Home  
and Small Businesses

Working at a  
**CCENT**

Introducing Routing  
and Switching in the  
Enterprise

Designing and  
Supporting Computer  
Networks

**CCNA**

**CCNA  
Discovery**

Network  
Fundamentals

Routing Protocols and  
Concepts

LAN Switching and  
Wireless

Accessing the WAN

**CCNA**

**CCNA  
Exploration**

CCNA  
Security

**Security**

Building Scalable  
Internetworks

Implementing  
Secured Converged  
Wide-Area Networks

Building Multilayer  
Switched Networks

Optimizing  
Converged Networks

**CCNP**

Cisco Packet Tracer

Student Networking Knowledge and Skills





# Course Alignment to Common Core and Next Generation Science Standards

## Embedded Common Core Standards

Cisco Networking Academy Course	Embedded Common Core Standards					
	Reading for Science and Technical Literacy	Anchor College and Career Readiness: Reading	Anchor College and Career Readiness: Writing	Anchor College and Career Readiness: Speaking and Listening	Anchor College and Career Readiness: Language	Mathematical Practice
IT Essentials, Chapters 1-10	✓	✓	✓	✓	✓	✓
CCNA Discovery 1: Networking for Home and Small Business, Chapters 1-10	✓	✓	✓	✓	✓	✓
CCNA Discovery 2: Working at a Small Business or Internet Service Provider (ISP), Chapters 1-10	✓	✓	✓	✓	✓	✓
CCNA Discovery 3: Introducing Routing and Switching in the Enterprise, Chapters 1-10	✓	✓	✓	✓	✓	✓
CCNA Discovery 4: Designing and Supporting Computer Networks, Chapters 1-10	✓	✓	✓	✓	✓	✓

# Courses Prepare for STEM Career Paths

Cisco Networking Academy builds a foundation for success in more than 430 STEM careers

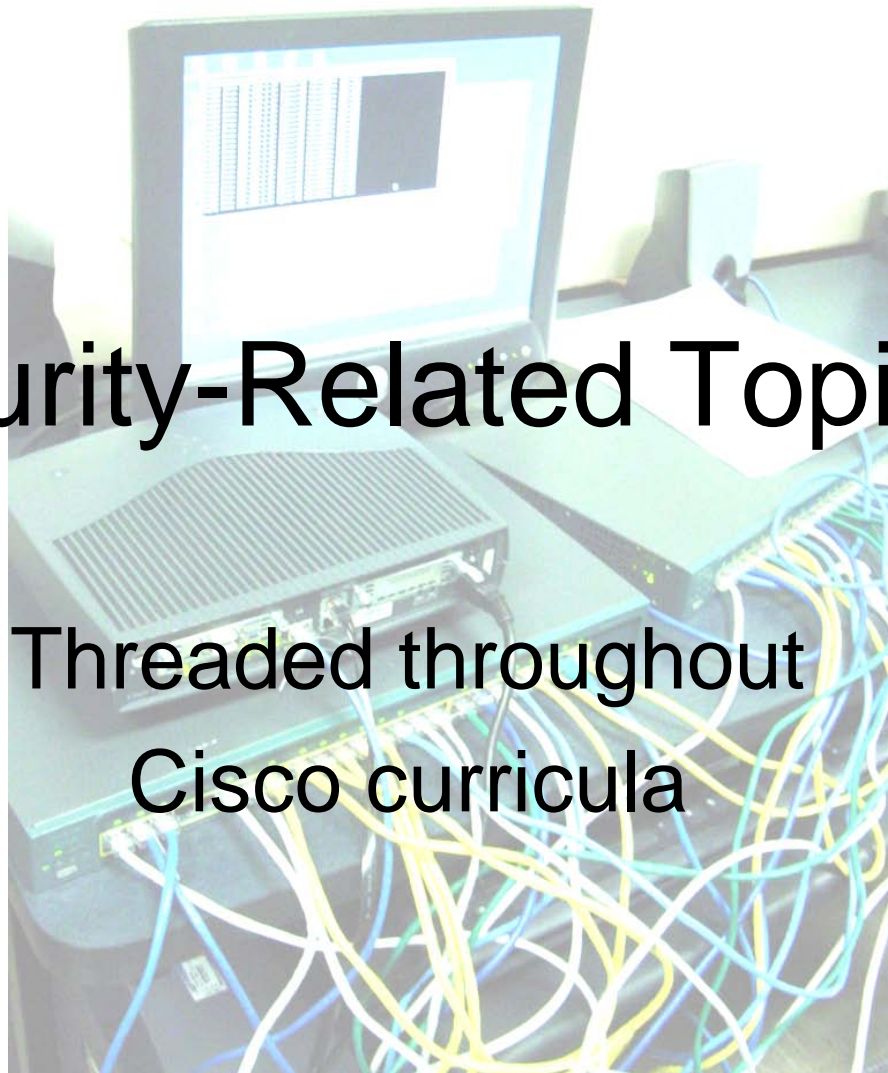


**STEM Designated Degree Programs**  
Effective date: April 8, 2008; Updated April 18, 2008

CIP Code Family	CIP Code	Numeric Order	CIP Code Title
15	15.0805		
15	15.0901		Mechanical Engineering/Mechanical Technology/Technician.
15	15.0903		Mining Technology/Technician.
15	15.1001		Petroleum Technology/Technician.
15	15.1102		Construction Engineering Technology/Technician.
15	15.1103		Surveying Technology/Technician.
15	15.1201		Hydraulics and Fluid Power Technology/Technician.
15	15.1202		Computer Engineering Technology/Technician.
15	15.1203		Computer Technology/Computer Systems Technology.
15	15.1204		Computer Hardware Technology/Technician.
15	15.1301		Computer Software Technology/Technician.
15	15.1302		Drafting and Design Technology/Technician.
15	15.1303		CAD/CADD Drafting and/or Design Technician, General.
15	15.1304		Architectural Drafting and Architectural Technician.
15	15.1305		Civil Drafting and Civil Engineering CAD/CADD.
15	15.1306		Electrical/Electronics Drafting and Electrical/Electronics CAD/CADD.
15	15.1401		Mechanical Drafting and Mechanical Drafting CAD/CADD.
26	15.1501		Nuclear Engineering Technology/Technician.
26	26.0101		Engineering/Industrial Management.
26	26.0102		Biology/Biological Sciences, General.
26	26.0202		Biomedical Sciences, General.
26	26.0203		Biochemistry.
26	26.0204		Biophysics.
26	26.0205		Molecular Biology.

# Security-Related Topics:

Threaded throughout  
Cisco curricula

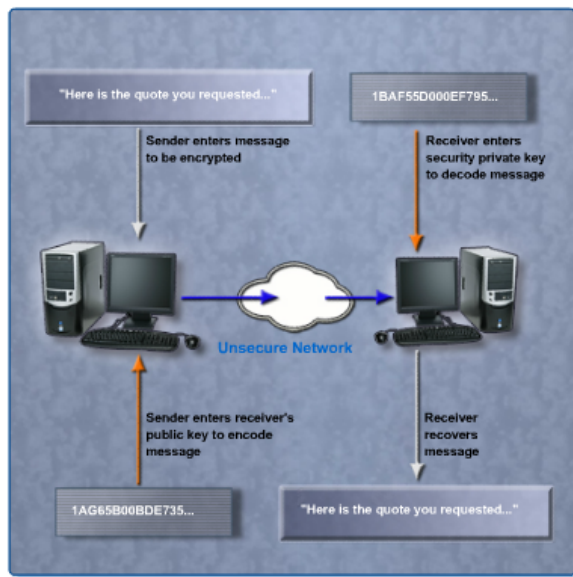


# IT Essentials

- Focus on the PC: computer fundamentals
- Hands-on learning: hardware & software

- Be
- Ba

## Asymmetric Encryption



## 16.2 Select security components based on customer needs

### 16.2.1 Describe and compare security techniques

A technician should determine the appropriate techniques to secure equipment and data for the customer. Depending on the situation, more than one technique may be required.

#### Passwords

Using secure, encrypted login information for computers with network access should be a minimum requirement in any organization. Malicious software monitors the network and may record plaintext passwords. If passwords are encrypted, attackers would have to decode the encryption to learn the passwords.

#### Logging and Auditing

Event logging and auditing should be enabled to monitor activity on the network. The network administrator audits the log file of events to investigate network access by unauthorized users.

#### Wireless Configurations

Wireless connections are especially vulnerable to access by attackers. Wireless clients should be configured to encrypt data.

#### Security Technologies

Security technologies include hash encoding, symmetric encryption, asymmetric encryption, and Virtual Private Networks (VPNs). Each technology is used for a specific purpose:

# Discovery 1:

## Networking for Home & Small Businesses

- Small network planning, installation & troubleshooting

- Rec

- Con

8 Basic Security  
8.4 Using Firewalls  
8.4.2 Using a Firewall

CCNA Discovery  
Networking for Home and Small Businesses

By placing the firewall between the internal network ([intranet](#)) and the Internet as a border device, all traffic to and from the Internet can be monitored and controlled. This creates a clear line of defense between the internal and external network. However, there may be some external customers that require access to internal resources. A [demilitarized zone \(DMZ\)](#) can be configured to accomplish this.

The term demilitarized zone is borrowed from the military, where a DMZ is a designated area between two powers where military activity is not permitted. In computer networking, a DMZ refers to an area of the network that is accessible to both internal and external users. It is more secure than the external network but not as secure as the internal network. It is created by one or more firewalls to separate the internal, DMZ and external networks. Web servers for public access are frequently placed in a DMZ.

The diagram illustrates a network architecture with three distinct zones: Internal Network, DMZ, and External Network. The Internal Network contains an FTP Server and several desktop computers. The DMZ contains a WEB Server. The External Network is connected to the Internet. Two firewalls (represented by red brick walls) separate the Internal Network from the DMZ, and the DMZ from the External Network. A central router connects the Internal Network to the DMZ, and another router connects the DMZ to the External Network. The Internet is represented by a cloud icon.

Click Play to see request flow from internal and external hosts.



# Discovery 2:

## Working at a Small-to-Medium Business or ISP

- IOS device installation, configuration & troubleshooting

8 ISP Responsibility

8.4 Backups and Disaster Recovery

8.4.4 Disaster Recovery Plan


1 2 3 4

CCNA Discovery  
Working at a Small-to-Medium Business or ISP

CISCO

When designing a disaster recovery plan, it is important to understand the needs of the organization. It is also important to gain the support necessary for a disaster recovery plan. There are several steps to accomplish designing an effective recovery plan.

- **Vulnerability assessment** - Assess how vulnerable the critical business processes and associated applications are to common disasters.
- **Risk assessment** - Analyze the risk of a disaster occurring and the associated effects and costs to the business. Part of a risk assessment is creating a list of the top-ten potential disasters and the effects, including the scenario of the business being completely destroyed.
- **Management awareness** - Use the information gathered on vulnerability and risks to get senior management approval on the disaster recovery project. Maintaining equipment and locations in the event of a possible disaster recovery could be expensive. Senior management must understand the possible effect of any disaster situation.
- **Planning group** - Establish a planning group to manage the development and implementation of the disaster recovery strategy and plan. When a disaster occurs, be it small or large scale, it is important that individuals understand their roles and responsibilities.
- **Prioritize** - Assign a priority for each disaster scenario, such as



Vulnerability Assessment

Risk Assessment

Management Awareness

Planning Group

Prioritize

# Discovery 3:

## Introducing Routing & Switching in the Enterprise

- **Permitting or denying specific traffic**

### 8 Filtering Traffic Using Access Control Lists

#### 8.4 Permitting and Denying Specific Types of Traffic

#### 8.4.4 Analyzing Network ACLs and Placement

CCNA Discovery

Introducing Routing and Switching in the Enterprise



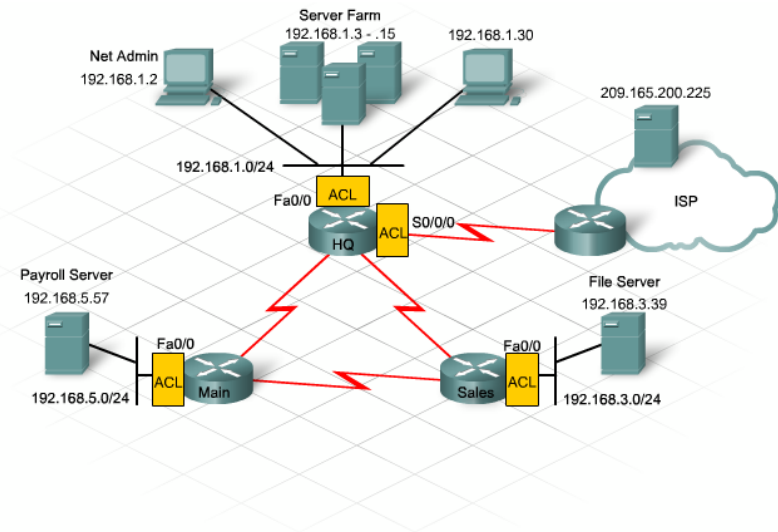
Network administrators evaluate the effect of every statement in an ACL prior to implementation. An improperly designed ACL can immediately cause problems when it is applied to an interface. These problems range from a false sense of security to an unnecessary load on a router or even a non-functioning network.

Administrators need to examine the ACL, one line at a time, and answer the following questions:

- What service does the statement deny?
- What is the source and what is the destination?
- What port numbers are denied?
- What would happen if the ACL was moved to another interface?
- What would happen if the ACL filtered traffic in a different direction?
- Is NAT an issue?

When evaluating an Extended ACL, it is important to remember these key points:

- The keyword `tcp` permits or denies protocols like FTP, HTTP, Telnet, and so on.
- The key phrase `permit ip` is used to permit all IP, including any TCP, UDP, and ICMP protocols.



Click the ACLs to view the function of each.



8.4.4.1

# Discovery 4:

## Designing & Supporting Computer Networks

Wholistic, capstone project designing, modeling, testing and documenting a fully-networked stadium network

### 3 Characterizing the Existing Network

#### 3.1 Documenting the Existing Network

##### 3.1.4 Strengths and Weaknesses of the Existing Network

1 2 3

#### CCNA Discovery

Designing and Supporting Computer Networks



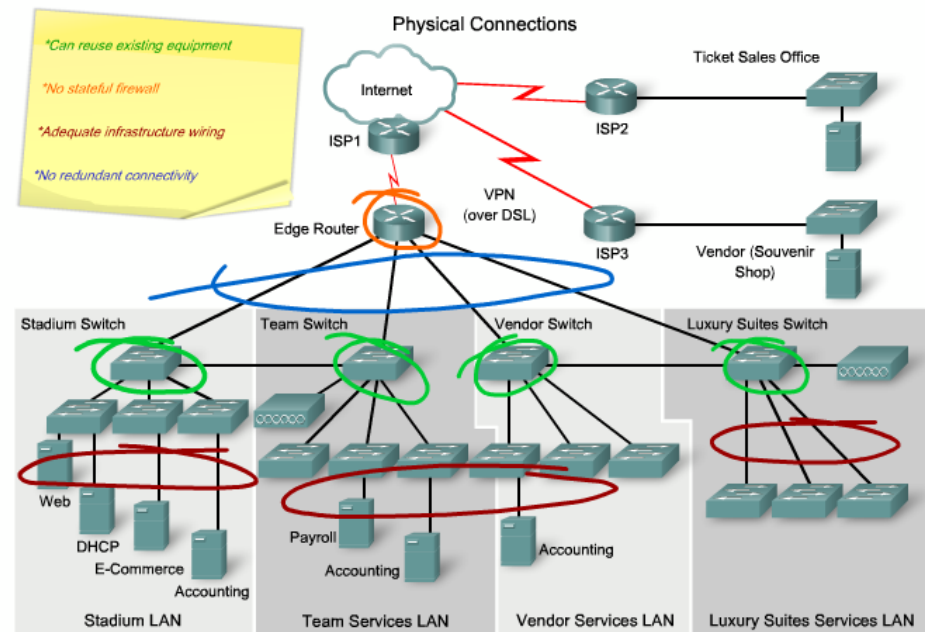
After reviewing the diagrams and the existing equipment inventories, the network designer lists the strengths and weaknesses of the current stadium network:

#### Strengths:

- New wiring and adequate wiring closets
- Adequate space for a new data center
- Servers and PCs are current models and will not need to be replaced
- Some existing network switches and routers can be used in the new design

#### Weaknesses:

- Flat network design
- No Distribution Layer
- No true Core Layer
- Servers poorly located
- Multiple networks that can be difficult to maintain
- Inadequate IP addressing structure
- No dedicated bandwidth for WAN connectivity
- Poorly-implemented wireless
- Limited security implementations



# Supplemental resources offer real-world challenges!

## Passport21 to Entrepreneurship

### Five Case Studies:

1. Charging for Expertise
2. Starting an Internet Café
3. Making a Business Successful
4. Providing Outsource Services
5. Building a Contracting Business



### Cisco ASPIRE game:

- Problem injector
- Simulated time and economy
- Money management
- Experiential learning

# Academy resources *make connections*

Academy Netspace:

Global problem-solving  
challenges

Social networking



Networking Academy content equips students  
with both 'hard skills' and 'soft skills'

# NetRiders Skills Challenge



- US and Canada high school competition
- Promotes networking and IT skills
- Virtual and in-person
- Identifies top talent for potential employers



# *Networking Academies are changing the way CTE looks!*

1. Requiring the use of communications skills, standard language, and grammar in IT projects
2. Acquiring new IT vocabulary through hands-on experiences
3. Learning and practicing entrepreneurship skills by applying IT knowledge to real-world projects
4. Diversifying student choices as they transition from secondary to postsecondary experiences
5. Making the “end game” a career, not just a job

