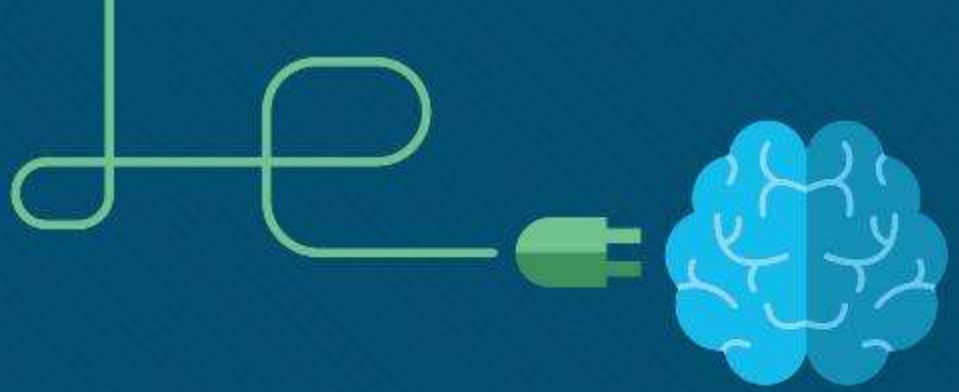
Networking Academy



Course and Technical Updates

Eugene Morozov

Technical Manager

3 May 2019
Hamburg

#NetAcadIPD

GFO TFE Technical Managers

IPD Week in 2017-18

177 sessions
created by
TFE and
instructors

15,974 hours
spent by
instructors to
watch sessions

4300 instructors
actively participate in
the IPD Week course

FY19 IPD Week Dates

17 - 21
September
2018

26 - 30
November
2018

25 February to
1 March
2019

13 - 17
May
2019

http://cs.co/IPD19

IPD Week February 2019

http://cs.co/IPD19

Program Updates

- Catch up on the latest strategies and products from Cisco Networking Academy!

Program Updates Special Session

- The netacad.com platform is being upgraded with the latest technology. Hear updates on what is changing, when, and how it affects you and your classes.

Technical Session Topics Include:

- Wireshark Tips & Tricks Part 4
- Puppet, Chef and Ansible
- Wireless Security
- Getting to know Cisco DNA Center
- REST API and JSON Encoded Data
- Wireless Architectures

Agenda

- Instructor Professional Development
- IT Essentials
- Equipment Updates
- Programming Essentials in Python
- Smart Grid Course
- Security Pathways
- IoT Security Course

IT Essentials

IT Essentials 7 - Update

What are the changes in the new course?

For the content changes the new course Scope and Sequence is available in the IPD Week Course: http://cs.co/IPD19 .

Some of the course features you'll see in the course are:

- Less text and increased video
- Increased Interactive Activities and Labs
- Increased focus on assessments.
  - Topical self-assessments included
  - Increased certification level practice opportunities
  - More assessments throughout the course

IT Essentials 7 - Update

When will it be released?

- June/July 2019

Will it require new instructor training?

- No, existing ITE instructor will be able to teach the new version.
- New instructors will need to take ITE 7

Will it require new hardware?

- The Scope and Sequence details the HW and SW requirements

Equipment

2900 ISR Router Replaced by ISR4321

- The 2900 Series router End-of-Sale date is December 9, 2017 and we will continue to support products for five years after that.
- Replacement router is the Cisco ISR 4321 (2GE,2NIM,4G FLASH,4G DRAM,IPB). Updated Equipment List by curriculum by following this path – NetAcad.com -> Resources -> Marketing and Program Resources -> Equipment Information -> Equipment Lists by Curriculum.

4321 Considerations:

- **Runs IOS XE for Network Programmability**
- **IOS syntax remains the same**
- **Comes with external power supply brick**

4321 Router Power Brick Placement Ideas

Credit: Thomas Meuser,
Fachbereich Elektrotechnik und Informatik an der Fachhochschule Niederrhein

1941 ISR Router Replaced by ISR4221

- The 1941 will continue to be **sold until September 29, 2018**
- Cisco will continue to support the 1941 (including IOS downloads) for **five years** after the End of Sale date
- The **End of Support date is September 30, 2023** - IOS downloads will be available on the Cisco site and through Cisco NetAcad Maintenance until this date
- Replacement option ISR4221

Updated Equipment Lists Includes ISR 4221

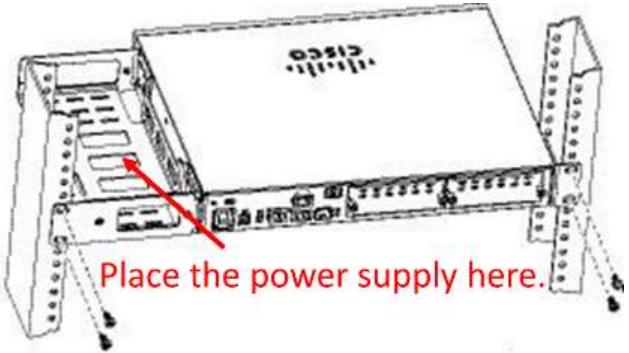
Equipment List (Option 1)

The Cisco 4221 router shown in Option 1 uses the newer IOS XE software. Regression testing information is available from the netacad.com Equipment Information>Equipment Lists by Curriculum section to assist the academy in determining which option would be the best fit for their specific curriculum delivery audience and budget.

Qty	Product Number	Description	Notes
3	ISR4221/K9	Cisco ISR 4221 (2GE, 2NIM, 8G FLASH, 4G DRAM,IPB)	1,2
3	NIM-2T=	2-Port Serial WAN Interface card	7
3	CAB-SS-V35MT=	V.35 Cable, DTE Male to Smart Serial, 10 Feet	
3	CAB-SS-V35FC=	V.35 Cable, DCE Female to Smart Serial, 10 Feet	
3	WS-C2960+24TC-L	Catalyst 2960 24 10/100 + 2 1000BT LAN Base Image	1, 2
2	Wireless Router	Wireless N-Router (b/g/n Wi-Fi) with Simultaneous Dual-Band, MIMO antenna array for expanded high speed coverage and reliability, 4 Gigabit Ethernet Ports, support for IPv6, WPA2 encryption and SPI Firewall, Quality of Service (QoS). **(Note: CCNA Routing & Switching version 6 does not require wireless router)**	10

Optional Products

Router Options (router models that may be substituted for the router/s in the Standard Equipment List above)		
	ISR4331/K9	Cisco ISR 4331 (3GE,2NIM,1SM,4G FLASH,4G DRAM,IPB)
	ACS-4220-RM-19=	19 inch rack mount kit for Cisco ISR 4220
	NIM-2T=	2-Port Serial WAN Interface card



For 4221 rack mount options, suggest purchase special rack mount kit

Added ISR4331 as Optional Router

- Instructor concerns about the size and management of the 4321 power brick in rack mount situations
- Requests to add a model with internal power supply
- Added ISR4331 to updated equipment lists
- NOTE – 4331 is an optional router, higher cost compared to 4321

Optional Products			
Router Options (router models that may be substituted for the router/s in the Standard Equipment List above)			
	ISR4331/K9	Cisco ISR 4331 (3GE,2NIM,1SM,4G FLASH,4G DRAM,IPB)	11
	ACS-4220-RM-19=	19 inch rack mount kit for Cisco ISR 4220	
	NIM-2T=	2-Port Serial WAN Interface card	7

Router Power

ISR4221

- External Power Brick
- Ability to purchase rack mount kit with space for power brick next to router

ISR4321

- External Power Brick
- Special rack mount kit NOT an option due to router width

ISR4331

- Internal Power Supply

Cisco 4000 Series Integrated Services Router Data Sheet - https://www.cisco.com/c/en/us/products/collateral/routers/4000-series-integrated-services-routers-isr/datasheet-c78-732542.html

Programming Essentials in Python

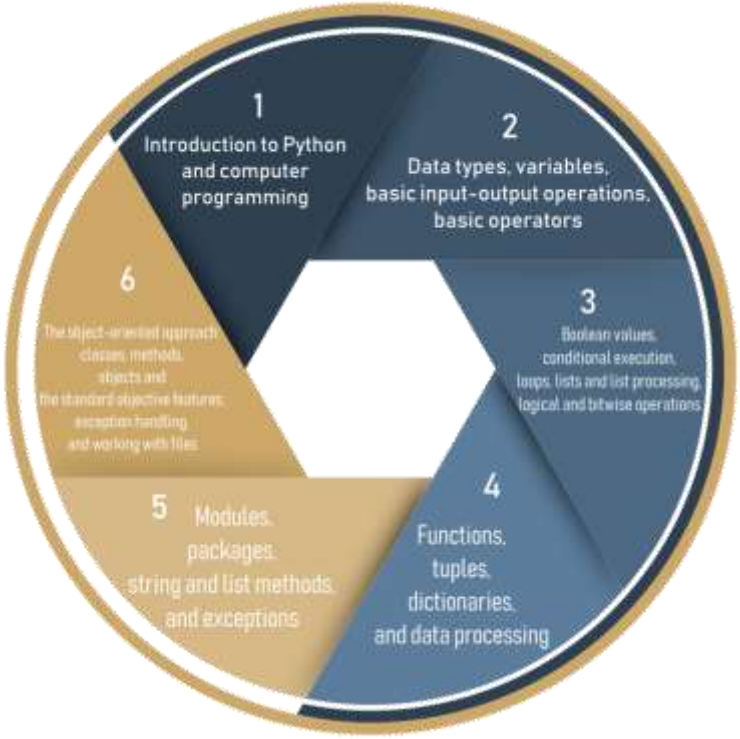
Python certifications path

Modules 1, 2, 3, 4, 5, and 6 will prepare you for:

PCAP | Certified Associate in Python Programming Certification

Modules 1, 2, 3, and 4 will prepare you for:

PCEP | Certified Entry-Level Python Programmer Certification



PCA: Programming Essentials in Python

Course Overview

Designed as easy to understand and beginner-friendly course focusing on various data collections, manipulation tools, logic and bit operations and creating basic REST APIs

Benefits

With PCA: Programming Essentials in Python you learn to design, write, debug, and run programs encoded in the Python language. No prior programming knowledge is required. The course begins with the very basics guiding you step by step until you become adept at solving more complex problems.

Learning Components

- 5 modules of interactive instructional content
- More than 30 practice labs
- Built-in online tool to perform labs and practice
- Chapter and Final exams

Certification Aligned

Features

Target Audience: High-school and college students

Prerequisites: None

Instructor Training Required: No

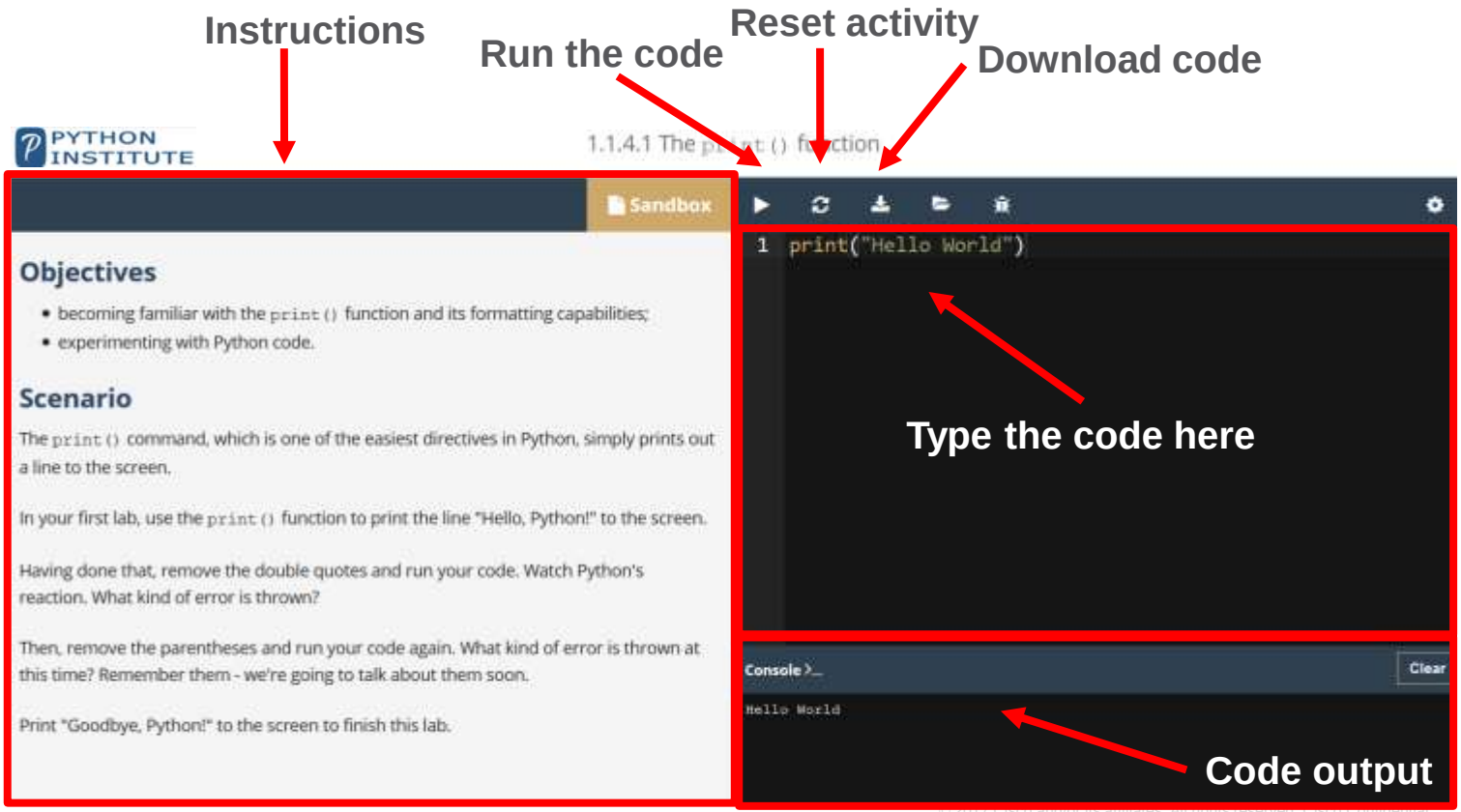
Languages: English

Course Delivery: Instructor-led

Estimated Time to Complete: 60-70 hours

Recommended Next Course: IoT Fundamentals, Networking Essentials, NDG Linux Essentials

Online Compiler



Smart Grid Essentials 2.0

Networking Academy

Kursangebot der Cisco Networking Academy

www.netacad.com

OS & IT

- Get Connected
- Linux Unhatched
- IT Essentials
- Linux Essentials
- Linux I
- Linux II

Networking

- Introduction to Packet Tracer
- Networking Essentials
- Mobility Fundamentals
- CCNA R&S (1-2)
- Network Programmability (ETW)
- CCNA R&S (3-4)
- CCNP R&S (1-3)

Security

- Introduction to Cybersecurity
- Cybersecurity Essentials
- CCNA Security
- CCNA Cybersecurity Operations

Internet of Things

- Introduction to Internet of Things
- Connecting Things
- Smart Grid Essentials
- Internet of Things Security
- Internet of Things Datacenter
- Big Data & Analytics
- Hackathon Playbook (ETW)

Programming

- Programming Essentials Python
- Programming Essentials C
- Programming Essentials C++
- REST APIs & Cisco Spark (ETW)
- Advanced Programming C++

Business

- Be Your Own Boss
- Entrepreneurship

Kontakt: Cisco Networking Academy Deutschland
Kurfürstendamm 22 · D-10719 Berlin
E-mail: netacad-deutschland@cisco.com
Web: www.netacad.com/web/de

CCNA
CCNP
ETW

Smart Grid Essentials Course Outline

Chapter	Chapter Titles	Summary Description
1	Grundlagen des Smart Grid	Kenntnisse über Energieerzeugung und –verteilung; Energiewende, volatile Energiequellen und Smart Grid Funktionsprinzipien, rechtlicher Rahmen
2	Die Technikzentrale	Kenntnisse und Fähigkeiten bezgl. Aufbau und Funktion der Technikzentrale im Smart Home, Zählerfeld, Einbau und Anschluss smarter Messtechnik
3	Netzwerktechnik und IT-Sicherheit	Kenntnisse und Fähigkeiten bezgl. Grundlagen der Netzwerktechnik, Datensicherheit, -integrität und -schutz; Übertragungsprotokolle
4	Inbetriebnahme, Änderungen und Störungsbeseitigung	Kenntnisse und Fähigkeiten bezgl. Montage und Inbetriebnahme; Fehleranalyse und -behebung

1.4.3 Grid Operations

Das neue, **intelligente Energieversorgungsnetzwerk** bietet völlig neue Möglichkeiten. So lassen sich viele Kleinerzeuger zu einem virtuellen Kraftwerk zusammenschließen oder Geräte je nach momentanen Strompreisen (Tarifen) ein- oder ausschalten. Jeder Haushalt kann seine Informationen über Verbrauch und Erzeugung von Energie nicht nur einmal jährlich, sondern z.B. im 15 Minutentakt übertragen.

Durch die neuen Techniken entstehen nicht nur immens große Datenmengen, die ausgewertet und analysiert werden müssen, sondern auch neue Marktteilnehmer, die diese Daten verwenden wollen.

Bild: : Im Smart Grid kommunizieren Erzeuger, Speicher, Verbraucher und Verteilnetz miteinander, um Erzeugung und Verbrauch von elektrischer Energie stets in der Waage zu halten.

3.4 Dienste und Rollen im Smart Grid

Im Smart Grid gibt es unterschiedliche Rollen, die auch unterschiedliche Daten oder Zugriffsrechte auf bestimmte Ressourcen benötigen. Messstellenbetreiber erfassen Verbräuche, Übertragungsnetzbetreiber schalten dezentrale Energieerzeuger ein- und aus, und der Letztverbraucher steuert im Smart-Home seine Verbraucher, abhängig vom derzeitigen Energiepreis.

In diesem Fall ist das SMGW der Server für die Meter und CLS-Geräte, aber gleichzeitig auch Client für die Dienste im Control-Center. Der Gateway-Administrator ist für die Konfiguration und Sicherheit des SMGWs und der Zähler (Meter) verantwortlich.

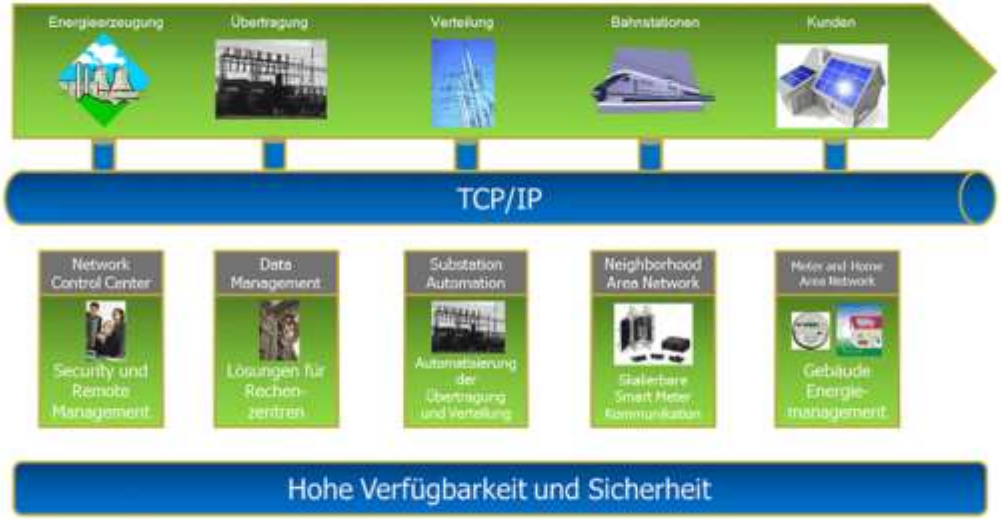


Bild: Rollen und Dienste im Smart Grid

Im Smart Grid gibt es viele Server- und Clientdienste, die über TCP/IP miteinander kommunizieren:

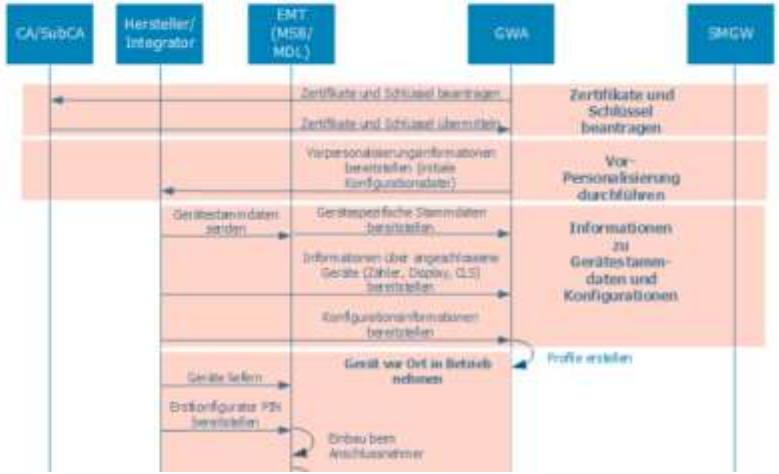
- Die Energieerzeuger stellen dem Control Center Daten über die momentan erzeugte Energie bereit, während das Control Center dem Energieerzeuger Steuerinformationen

4.3.5 Prozess der Inbetriebnahme des Gesamtsystems

Eine vollständige Prüfung des gesamten Messsystems kann nur unter Einbeziehung aller Rollen erfolgen. **Alle Prüfergebnisse werden im Inbetriebnahme-Protokoll dokumentiert.**

Die folgende Grafik veranschaulicht den gesamten Prozess der Inbetriebnahme:

Personalisierungsprozesse



Status und Verfügbarkeit

- Ist die Kursentwicklung abgeschlossen? JA
- Evaluiert? JA
- Quizze? JA
- Was noch ergänzend kommt: Packet Tracer Übungen
- Schon allgemein verfügbar? NEIN
- Vorab reinschauen? JA -> mzeisber@cisco.com
- Wann kann ich den Kurs „ganz normal“ anlegenen? Voraussichtlich ab Ende Juni 2019

Kein formales Instructor Training notwendig!

Mehr Information bei der kommenden IPD Week – 17.05.2019 um 13:00 Uhr

Dieter Ommen, Michael Zeisberger

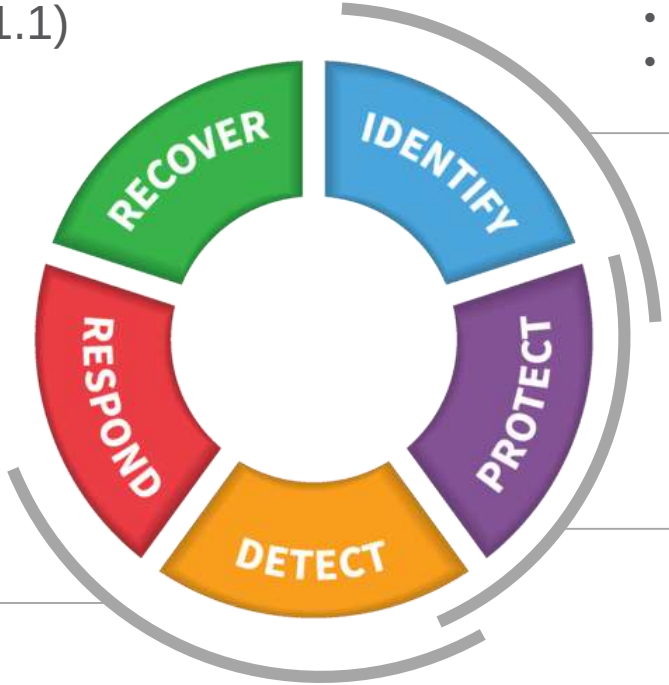
http://cs.co/IPD19

Cybersecurity Courses

Cybersecurity Lifecycle

NIST Cybersecurity Framework Functions (v1.1)
www.nist.gov/cyberframework

IoT Security
- Discovering Vulnerabilities
- Modeling Risk
- Suggest mitigations



CCNA Security
- Preventing Intrusions
- Hardening systems
- Securing, Implementing security policies

CCNA CyberOps
- Detecting Intrusions
- Monitoring, analyzing
- First response

The Networking Academy Learning Portfolio

Current & Planned

Aligns to Certification
Instructor Training required
Self-paced

* Available within 12 months

Collaborate for Impact

Introduction to Packet Tracer | Packet Tracer | Hackathons | Prototyping Lab | Internships

	Exploratory	Foundational	Career-Ready
Networking		**Networking Essentials** **Mobility Fundamentals** **Emerging Tech Workshop:** Network Programmability Using Cisco APIC-EM	**CCNA R&S:** Introduction to Networks, R&S Essentials, Scaling Networks, Connecting Networks **CCNP R&S:** Switch, Route, TShoot
Security	**Introduction to Cybersecurity**	**Cybersecurity Essentials**	**CCNA Security** **CCNA Cybersecurity Operations**
IoT & Analytics	**Introduction to IoT**	**IoT Fundamentals:** Connecting Things, Big Data & Analytics, IoT Security Hackathon Playbook	
OS & IT	**NDG Linux Unhatched**	**NDG Linux Essentials** **IT Essentials**	**NDG Linux I** **NDG Linux II**
Programming		**CLA: Programming Essentials in C** **CPA: Programming Essentials in C++** **PCAP: Programming Essentials in Python** **Emerging Tech Workshop:** Experimenting with REST APIs using WebEx Teams	**CLP: Advanced Programming in C** **CPP: Advanced Programming in C++**
Business	**Be Your Own Boss**	**Entrepreneurship**	
Digital Literacy	**Get Connected**		

Oct 2018

Introduction to Cybersecurity

Course Overview

The Introduction to Cybersecurity course explores cyber trends, threats and staying safe in cyberspace, and protecting personal and company data.

Benefits

Learn how to protect your personal data and privacy online and in social media, and why more and more IT jobs require cybersecurity awareness and understanding.

Learning Components

- 5 modules
- Interactive and instructional content
- 8 Activities and 7 lab exercises that reinforce learning
- 4 quizzes and 1 final exam
- Links to related resources

Features

Target Audience: Secondary and 2-Year college students, general audience

Prerequisites: None

Instructor Training Required: No

Languages: Chinese-S, English (2.1), French, **German**, Hebrew, Italian, Japanese, Spanish, Portuguese

Course Delivery: Instructor-led or Self-paced

Estimated Time to Complete: 15 hours

Cybersecurity Essentials

Course Overview

Cybersecurity Essentials covers foundational knowledge and essential skills for all cybersecurity domains including information security, systems security, network security, ethics and laws, and defense and mitigation techniques used in protecting businesses.

Benefits

This course is recommended for students planning to study any CCNA certification. It provides foundational security skills for entry-level networking and security roles.

Learning Components

- 8 chapters
- 34 interactive activities, 10 Cisco Packet Tracer Activities, 12 hands-on labs that reinforce learning
- 8 chapter quizzes, 1 final exam
- Links to related resources

Features

Target Audience: Secondary and 2-year college vocational students

Prerequisites: Introduction to Cybersecurity

Instructor Training Required: No

Languages: Chinese-S, English, French, **German**, Spanish, Japanese

Course Delivery: Instructor-led and Self-paced

Estimated Time to Complete: 30 hours

Recommended Next Course: CCNA R&S Introduction to Networks

CCNA Cyber Ops

Course Overview

CCNA Cyber Ops introduces the core security concepts and skills needed to monitor, detect, analyze and respond to cybercrime, cyberespionage, insider threats, advanced persistent threats, regulatory requirements, and other cybersecurity issues facing organizations. It emphasizes the practical application of the skills needed to maintain and ensure security operational readiness of secure networked systems.

Benefits

Students acquire and applied skills in the rapidly growing area of cybersecurity operations at the associate level, with alignment to the Cisco CCNA Cybersecurity Operations certification.

Learning Components

- 13 Chapters, modifiable chapter quizzes and chapter exams
- 13 terms & concepts practice quizzlets
- 54 interactive activities
- 45 hands-on labs (27 uses VM)
- 5 Packet Tracer activities
- One each: Skill-based assessment, practice final exam, final exam
- 2 certification practice exams
    - 1x 210-250 SECFND
    - 1x 210-255 SECOPS

Certification Aligned

Features

Target Audience: Students enrolled in technology degree programs at institutions of higher education and IT professionals who wants to pursue a career in Security Operations.

Entry Knowledge: Basic operating system and networking knowledge

Languages: English

Course Delivery: Instructor-led

Estimated Time to Complete: 70 hours

Recommended Next Course: CCNA Security

Instructor Training: Required

CCNA Cyber Ops Certification Vouchers

75% or higher on first attempt of qualifying course final exam

+

"Complete" in NetAcad grade book

=

Certification Exam Discount Voucher

Understanding Cisco Cybersecurity Fundamentals (SECFND) certification exam (210-250)	Voucher Validity – 3 months
Implementing Cisco Cybersecurity Operations (SECOPS) certification exam (210-255)	Voucher Validity – 6 months

Students	Instructors	Instructor Trainers
60% Discount	70% Discount	80% Discount

Instructor Training Options by ITC

New instructor or prefer in-person training

Experienced instructors with one or more qualifying skills

Instructor candidates with CCNA Cyber Ops certification

Option 1

Instructor Trainer-led In-person

Best in class training by a Cisco Qualified Instructor Trainer

- Instructor Trainer will deliver instructor-led training in an in-person format
- Recommended minimum duration is seven working days

Option 2

Instructor Trainer-led Remote

Most flexible solution for experienced instructors

- Instructor Trainer will deliver instructor-led training in a remote format
- ITC Academy opens online class and administers exam/assessment online

Option 3

Instructor Trainer-led Remote + In-person

Experienced instructors that require some in-person support in some elements of the training

- Instructor Trainer will deliver instructor-led training in remote format and an in-person format
- Recommended minimum duration for in-person portion is three working days and includes review of chapters 1 to 11, instruction on chapters 12 & 13, and final multiple-choice assessment and skills-based assessment

Option 4

Instructor Fast track

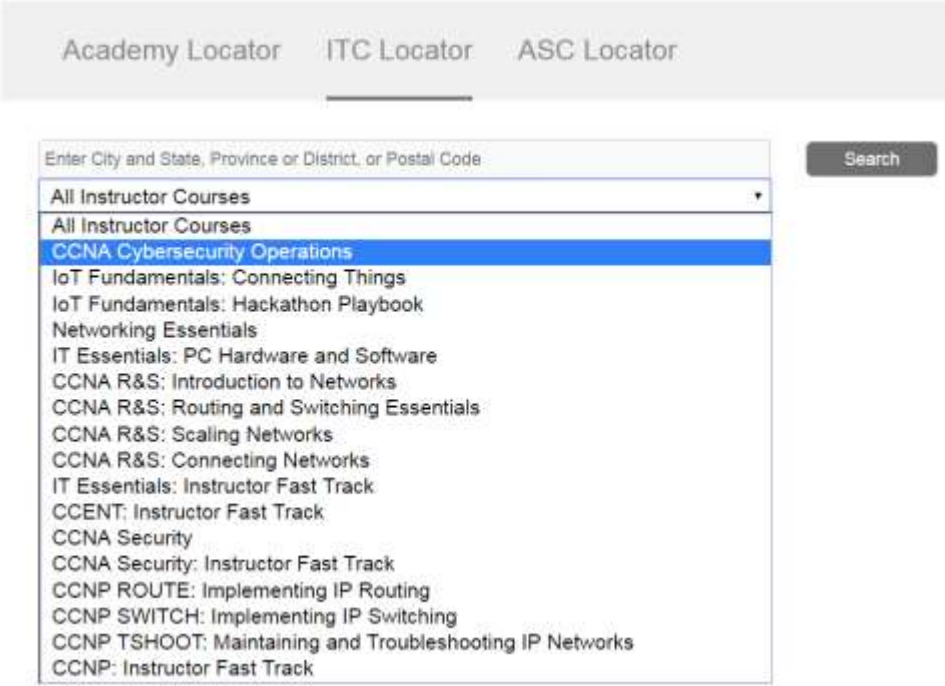
CCNA Cyber Ops certified instructor candidates demonstrate hands-on skills knowledge

- Candidate provides proof of certification and demonstrates they have the skills needed to teach the course.
- Instructor Trainer administers skills-based assessment.

cisco

Finding Instructor Trainings

1. Use ITC Locator
2. Filter by CCNA Cyber Ops



https://www.netacad.com/get-started/instructor-training-locator/

CCNA Cyber Ops

Equipment Requirements

Curriculum requirements: 1 student Personal Computer (Desktop/Notebook) per student (recommended), at most 2 students per PC

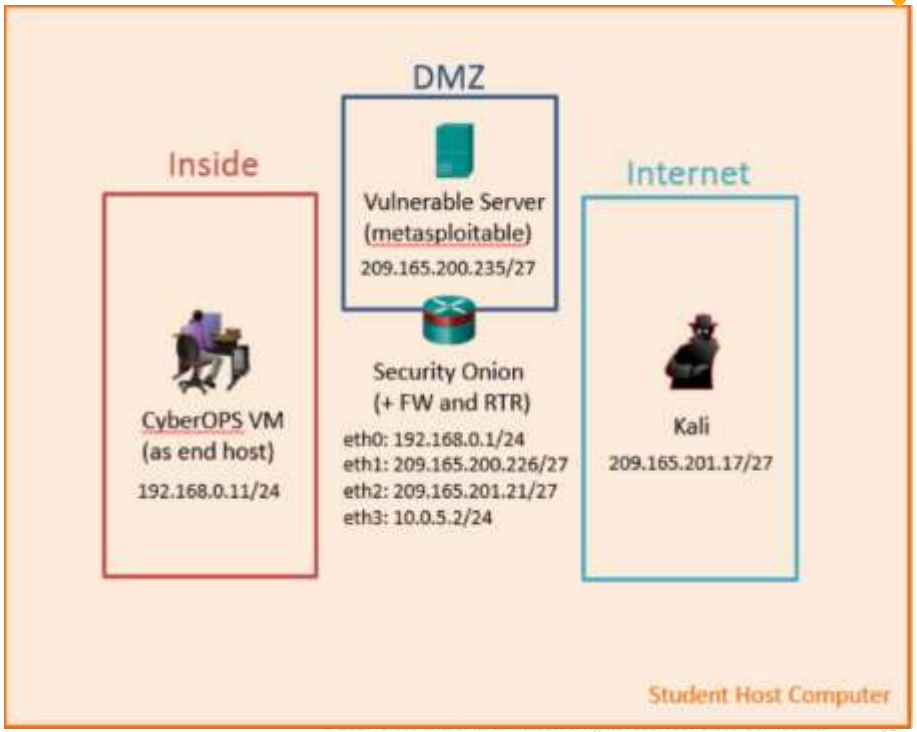
Platform	Description
Desktop PC	• OS: Windows 7, 8, or 10, MAC OSX • Processor: Intel Core i7 4600U 2.7GHz (with Virtualization Support) • Memory: 8 gigabyte (GB) RAM (standard) or 4 GB (alternate option) • Display Adapter: PCI, PCIe (recommended), or AGP video card (DirectX 9 graphics device with WDDM driver) • Disk: 45 GB hard drive. See table in the next slide for details. • Network: 1 Ethernet Card or 1 Wireless Ethernet Card
Web Browser	The most recent version of Microsoft Internet Explorer, Google Chrome, or Mozilla Firefox with the most recent versions of Java and Flash Player installed.
Oracle VirtualBox	The latest version. Currently 5.2.6
Windows Experience Index (WEI)	6.5 (recommended)
Packet Tracer	Version 7.0 Latest build

CCNA Cyber Ops

Equipment Requirements

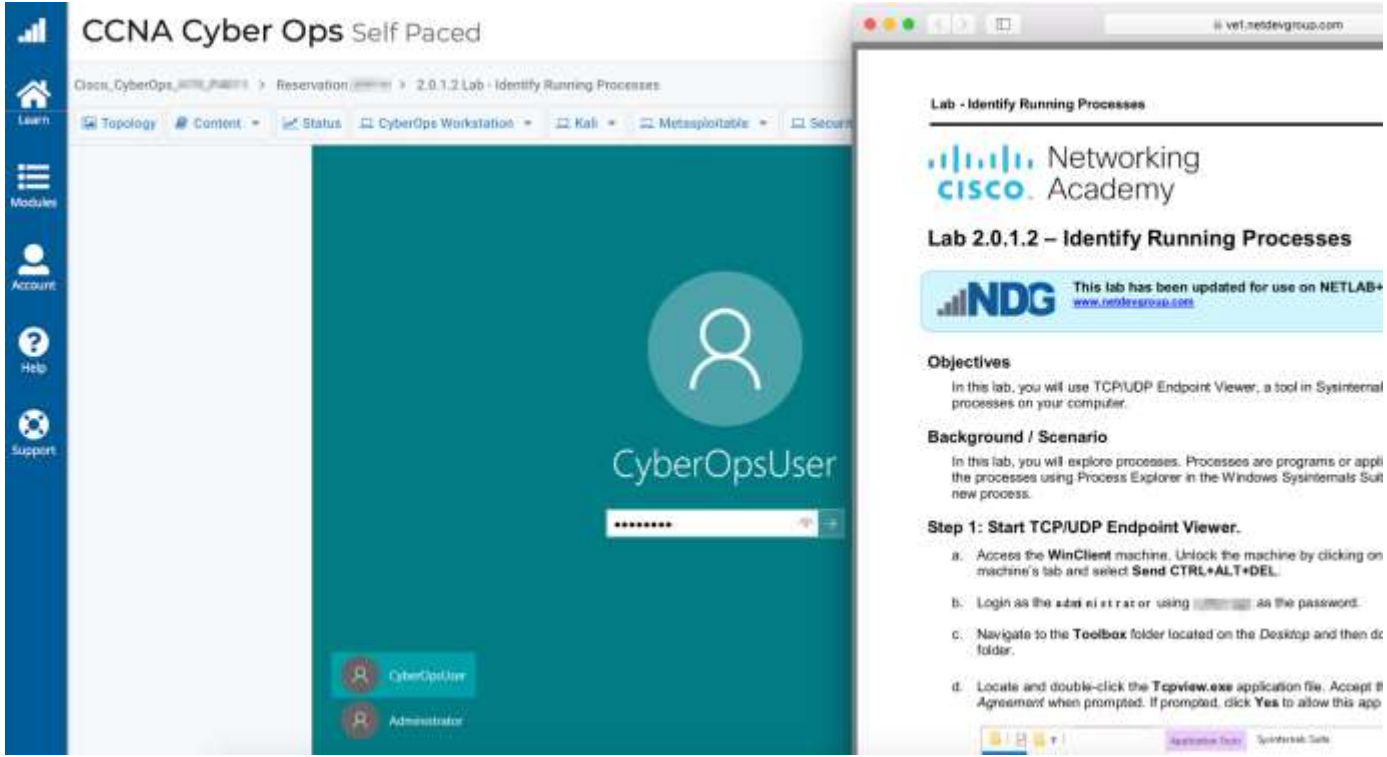
Virtual Machine Name	Disk Space	RAM
CyberOps Workstation VM	7 GB	1 GB
Kali Linux VM	10 GB	*1 GB
MetaSploitable VM	8 GB	*512 MB
Security Onion VM	10 GB	4 GB (standard) 3 GB (alternate option)

* Not needed for alternate option

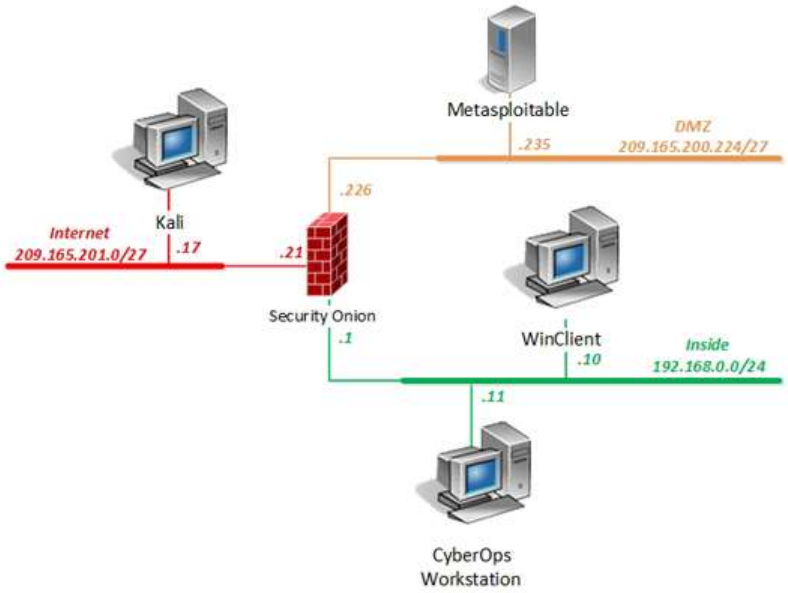


Lab Setup

NDG Online Labs as a Service: CCNA Cyber Ops



NDG Online Labs as a Service - Topology



- **Available on Cisco NetAcad LMS as part of a course template**

- **Available on NETLAB+**

If your organization is participating in the Cisco Networking Academy, you can use this course for Instructor-Led Training (ILT). To enable the NDG CCNA Cyber Ops labs, complete the following steps:

- **From the NetAcad Home page, select the Teach tab**
- **Go to your CCNA Cyber Ops course and click Launch Course**
- **In the course, click on the "Modules" tab**
- **Click the publish icon on the right-hand side of the NDG Online lab service items. Repeat for each chapter where NDG labs are present.**

*Please note that when clicking on the NDG labs, participants will be directed to the NDG Online Portal to create an NDG Online Portal account and to purchase the labs. For more information about the lab enrollment process, visit our CCNA Cyber Ops Lab Enrollment Guide.

NDG Online Labs as a Service – Hosted Labs

- **(1) One Month - $11.95**
- **(3) Three Month - $29.95**
- **(6) Six Month – $39.95**
- **School can purchase access for learners in bulk**
- **Instructors accredited to teach CCNA Cyber Ops can create class and use the lab service**

IoT Security Course

The increasing digitization of our world is transforming the way we live and work. As the widespread integration of technology into our daily lives continues, ensuring the safety of our people, systems and networks is an ongoing challenge.

THERE WILL BE MORE THAN

20 BILLION

CONNECTED DEVICES

BY *2020*

SMART HOMES
SMART WORKSPACES
SMART TRANSPORT
AND MORE

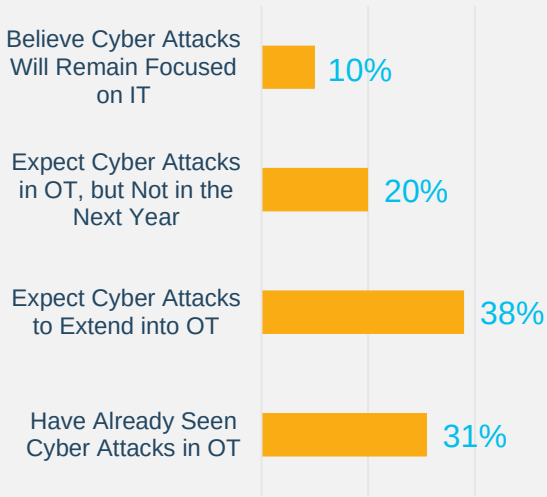
THE NUMBER OF US DATA BREACHES REACHED AN ALL-TIME HIGH OF

1,093

BREACHES *IN 2016*

32%

OF IT LEADERS CITE SECURITY AS A TOP BARRIER TO IOT SUCCESS.



Sources: Gartner and the Identity Theft Resource Center
Cisco 2018 Security report

Networking Academy

Digital Disruption requires Cybersecurity

Everything becomes **connected**

Everything needs to be **secured**

3X

Cybersecurity jobs are growing THREE TIMES FASTER than IT jobs in general.

53%

53% of employers currently take longer than SIX MONTHS to find qualified cybersecurity professionals.

3M

There will be a global shortage of 3 MILLION cybersecurity professionals by 2021.

84%

84% of organizations believe that 50% or fewer applicants for open security jobs are qualified.

Source: ISACA Cybersecurity Skills Gap 2016, US Information Systems Audit and Controls Association, Cybersecurity Business Report

Cisco Networking Academy

The Networking Academy Learning Portfolio

Current & Planned

Aligns to Certification
Instructor Training required
Self-paced

* Available within 12 months

Collaborate for Impact

Introduction to Packet Tracer | Packet Tracer | Hackathons | Prototyping Lab | Internships

	Exploratory	Foundational	Career-Ready
Networking		**Networking Essentials** **Mobility Fundamentals** **Emerging Tech Workshop:** Network Programmability Using Cisco APIC-EM	**CCNA R&S:** Introduction to Networks, R&S Essentials, Scaling Networks, Connecting Networks **CCNP R&S:** Switch, Route, TShoot
Security	**Introduction to Cybersecurity**	**Cybersecurity Essentials**	**CCNA Security** **CCNA Cybersecurity Operations**
IoT & Analytics	**Introduction to IoT**	**IoT Fundamentals:** Connecting Things, Big Data & Analytics, IoT Security Hackathon Playbook	
OS & IT	**NDG Linux Unhatched**	**NDG Linux Essentials** **IT Essentials**	**NDG Linux I** **NDG Linux II**
Programming		**CLA: Programming Essentials in C** **CPA: Programming Essentials in C++** **PCAP: Programming Essentials in Python** **Emerging Tech Workshop:** Experimenting with REST APIs using WebEx Teams	**CLP: Advanced Programming in C** **CPP: Advanced Programming in C++**
Business	**Be Your Own Boss**	**Entrepreneurship**	
Digital Literacy	**Get Connected**		

Oct 2018

IoT Security

Course Overview

The explosive growth of connected IoT devices enables the digitization of industries, but also increases the exposure to security threats. Upon completion students will be able to perform vulnerability and risk assessments, and research and recommend risk mitigation strategies for common security threats in IoT systems.

Benefits

Students seeking a career in the rapidly growing IoT and security domains will learn practical tools for evaluating security vulnerabilities in IoT solutions, perform threat modeling, and use risk management frameworks to recommend threat mitigation measures. These skills are relevant across IoT and other network architectures.

Learning Components

- Conduct end-to-end threat modeling and evaluate security risks within IoT solutions
- Discover and demonstrate a vulnerability using real-world penetration testing tools such as Kali Linux
- Gain hands-on experience with IoT Prototypes using a Raspberry Pi
- Increase awareness of emerging technologies used in the IoT Security space, such as Blockchain

Features

Target Audience: Vocational, 2-year and 4-year College, 4-Year University students

Prerequisites:

- IoT Fundamentals: Connecting Things course
- Networking and security knowledge equivalent of Networking Essentials and Cybersecurity Essentials

Languages: English

Course Delivery: Instructor-led

Estimated Time to Complete: 50 hours

IoT Security Course Outline

Chapter	Chapter Titles	Chapter Summary Description
1	The IoT Under Attack	Presents the cybersecurity risk associated with IoT, presenting the anatomy of important attacks. In the first chapter students learn also how to setup the lab environment with the Kali Linux distribution and Raspberry Pi.
2	IoT Systems and Architectures	Covers industry-standard for networking and IoT models to explain security requirements in IoT systems and explore the area of IoT threat modeling.
3	The IoT Physical Device Attack Surface	In this chapter students will learn about and discover physical vulnerabilities in a mock-up IoT system with physical access to a Raspberry Pi and other tools. Perform a threat modeling exercise in Packet Tracer to model IoT physical vulnerabilities.
4	IoT Communication Layer Vulnerabilities	This chapter deals with wired and wireless protocols and their vulnerabilities. Students will use Kali Linux to scan for vulnerabilities in the lab environment. Perform a threat modeling exercise in Packet Tracer to model IoT communication vulnerabilities.
5	IoT Application Security	Application vulnerabilities in local or cloud applications. In this chapter students will perform a MITM attack to exploit MQTT vulnerabilities in a lab environment. Perform a threat modeling exercise in Packet Tracer to model IoT application vulnerabilities.
6	Assessing Vulnerability and Risk in an IoT System	I the last chapter students will put everything together and learn about risk assessment and risk metrics. Use the STRIDE and DREAD models to identify and assess risk and use risk management strategies. Explore emerging technologies in IoT security such as Blockchain.

Lab Equipment

Student pod:

- ❑ Existing Cisco Prototyping Lab Kit from Connecting Things
  - 1x Raspberry Pi with Cisco PL-App Image for IoT Security
  - 1x USB-to-Serial (3.3V) cable
- ❑ 1 computer with
  - Cisco PL-App Launcher
  - IoT Security Kali Linux VM Image

+

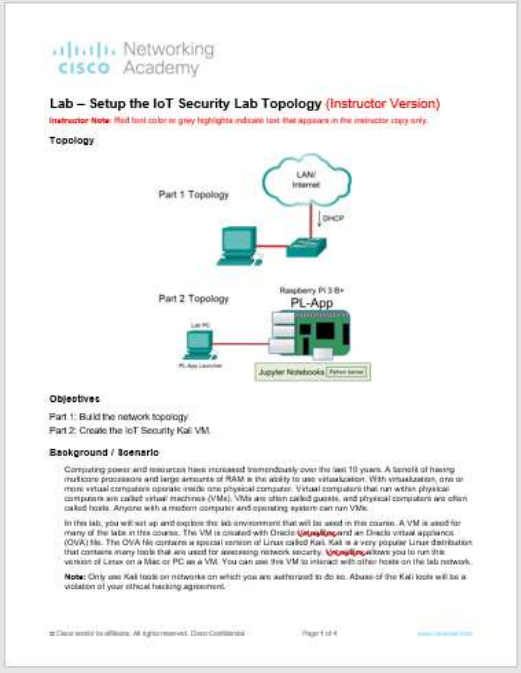
KALI LINUX

Virtualbox VM

Minimum: 1 pod per two students
Recommended: 1 pod per student

Hands-On Lab Activities

- All hands-on lab activities run in a separated network segment.
- Raspberry Pi serves as a physical model of a real-world vulnerable IoT system.
- Kali Linux is installed in a Virtualbox VM environment on the student's PC.
- Students develop skills using real-world cybersecurity tools to discover vulnerabilities.



Networking Academy

Lab – Setup the IoT Security Lab Topology (Instructor Version)

Instructor Note: Red font color or gray highlights indicate text that appears in the instructor copy only.

Topology

Objectives

Part 1: Build the network topology.
Part 2: Create the IoT Security Kali VM.

Background / Scenario

Computing power and resources have increased tremendously over the last 10 years. A benefit of having multicore processors and large amounts of RAM is the ability to use virtualization. With virtualization, one or more virtual computers operate inside one physical computer. Virtual computers that run within physical computers are called virtual machines (VMs). VMs are often called guests, and physical computers are often called hosts. Anyone with a modern computer and operating system can run VMs.

In this lab, you will set up and explore the lab environment that will be used in the course. A VM is used for many of the labs in this course. The VM is created with Oracle VirtualBox and an Oracle virtual appliance (OVA) file. The OVA file contains a special version of Linux called Kali. Kali is a very popular Linux distribution that contains many tools that are used for assessing network security. VirtualBox allows you to run this version of Linux on a Mac or PC as a VM. You can use this VM to interact with other hosts on the lab network.

Note: Only use Kali tools on networks on which you are authorized to do so. Abuse of the Kali tools will be a violation of your ethical hacking agreement.

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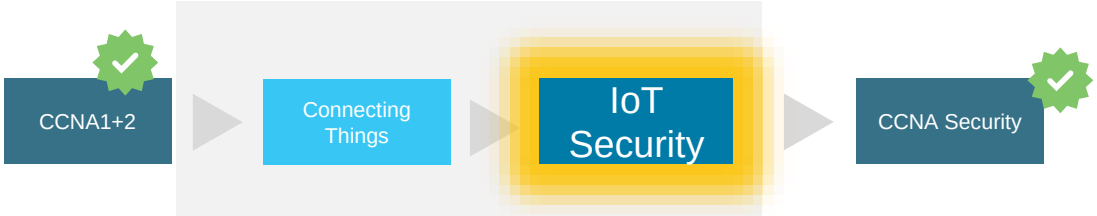
Pathway examples

Increase Employability with White Hat Hacker Skills

Cybersecurity Analyst Track

Network Security Administrator Track



Certification

IoT Fundamentals
Instructor Training Requirements

Recommended Qualifying Skills
- Connecting Things

Recommended Knowledge
- Networking and security knowledge equivalent of Networking Essentials and Cybersecurity Essentials

Instructor Training & Support:
1. Academies must align with an ASC.
2. Instructor Training is required for Connecting Things, Big Data & Analytics and IoT Security.
3. Instructors can register for training with an ITC.

or Enroll in a self-paced basic training course on their own.

NOTES:
Access enrollment links on the IoT Fundamentals Resources page on Netacad.com

Instructor Training Options*

Novice in the domain or prefer in-person training

Option 1

ITC Value-Add Course

Best in class training by a Cisco Qualified Instructor Trainer

ITC Academy training can include:

- Teaching in local language
- Supervising and coaching in-person, especially for hands-on activities
- Expanded training on prerequisite knowledge to accommodate different backgrounds
- Contextualizing training with regional or national initiatives

Experienced in one or more disciplines of the domain

Option 2

Online Self-Paced Course

Most flexible solution for experienced instructors planning immediate adoption

* Consistent with other IoT Fundamentals courses.

Instructor Course Resources Page

https://www.netacad.com/group/resources/iotf-security

In addition to this Overview PPT, you'll find:

- FAQ
- Instructor Training Approach
- Related Quick Links
- Specific resources for each course
  - IoT Fundamentals Curriculum Overview
  - Scope & Sequence
  - **Self-paced Instructor Training URL** (for experienced instructors)
  - Instructor PPTs
  - Instructor Lab Source Files
  - Student Lab Source Files
  - Release Notes

IPD Week – http://cs.co/IPD19/

Archive:

Topic	Recording Link
Security and CyberSecurity	
• Tools for Teaching Cybersecurity	Playback/Download
• Cybersecurity Essentials course Deep Dive	Playback / Download
• Cybersecurity - requirements, challenges and growing demand for Security-professionals	Playback / Download
• Introduction to Cybersecurity course Deep Dive	Playback / Download
• Best Practices in Teaching the new CyberSecurity Courses	Playback / Download
• CCNA Cyber Ops Course Deep Dive	Playback / Download
• Understanding an attack using Security Onion	Playback / Download
• Zone Based Firewalls	Playback / Download
• IPv6 Security	Playback / Download
• Network Scanning: Using NMAP and Wireshark	Playback / Download
• Metasploit - Let's understand how hackers attack	Playback / Download
• Introduction to Cisco Umbrella	Playback / Download

IPD Week 25 February – 1 March

- **Wireshark Tips & Tricks Part 3**
- **Vulnerability Assessment with Kali Linux**
- VIRL on DevNet Sandbox
- IoT: Connecting Things - A Learning Lab
- Increasing Student Learning by Flipping the Classroom
- **Hands on experience with the new IoT Security course**

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