

# IT-Netzwerke in Transformation IT-Neuordnung in Deutschland




Entwicklungstrends in der IT-Branche und  
Verwendung der e-Learning Angebote von Cisco



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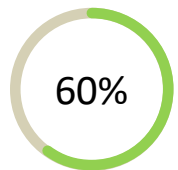
# Themen

-  Entwicklung der IT-Landschaft – Wandel der beruflichen Kompetenzanforderungen
-  Kompetenzen in den neuen IT-Berufen und Networking Academy
-  Cisco Networking Academy in NRW

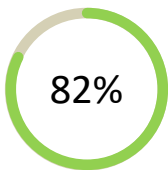
# Entwicklung der IT-Landschaft – Wandel der beruflichen Kompetenzanforderungen



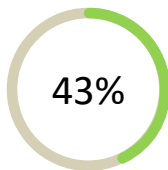
## The IT Landscape Is Rapidly Evolving



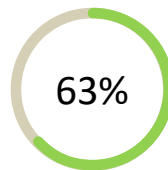
By 2023, Over 60% of enterprises will deem networking as core to their digital strategy, up from 20% today. (1)



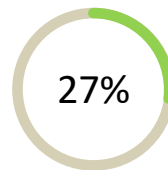
By 2022, internet video will represent 82% of all business internet traffic, VR/AR traffic will increase twelvefold.(2)



Globally, wireless devices will account for 43% of all networked devices by 2022. (3)



63% of IT leaders plan to put in place advanced networks that can dynamically meet business needs within three years. (4)



27% of IT leaders identified lack of necessary skills as a main obstacle to transitioning to an advanced network. (5)

As industries go through this digital transformation, the network architecture is changing to become vital to business agility, cybersecurity, and operational effectiveness.

The role of the networking professional is evolving and more vital than ever.

# The Network is changing ....

Enabling IT to adapt fast and at scale

Technologies powering digital transformation



**Virtualization & Cloud**  
Enabling new business models and global scaling on demand



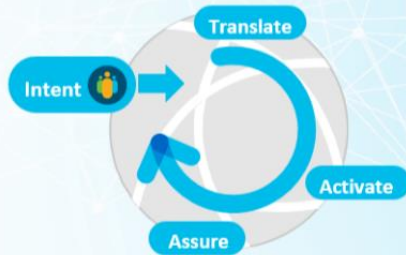
**Automation**  
Supporting over 4 billion users plus 10 billion IoT devices



**5G Mobility**  
Secure access to business critical applications and data



**Analytics & AI**  
Distilling zettabytes (10<sup>21</sup>) of data to find relevant insights



## Intent-Based Networks

Achieve business objectives using DevOps principles

Charakter



## Multi-Domain Networking

Unify and secure diverse networking domains

Netz-Infrastrukturen



## Programmable Networks

Drive automation, agility, and scale securely

Administration

# Neue Anforderungen an die IT-Infrastruktur und die neuen Technologien fordern erweiterte Kompetenzen (advanced skillset)



Digitale Geschäftsmodelle & -architekturen basieren auf Software-defined-Network (SDN)



Programmieren wird integraler Bestandteil für Systemadministration



Automatisierung und Virtualisierung breiten sich in alle Netzwerke aus



Wireless-Technologien verdrängen kabelgebundene Netzwerke



Netzwerk Device-Management entwickelt sich von CLI zu API



Wachsende Sicherheitbedrohungen verlangen neue Fähigkeiten

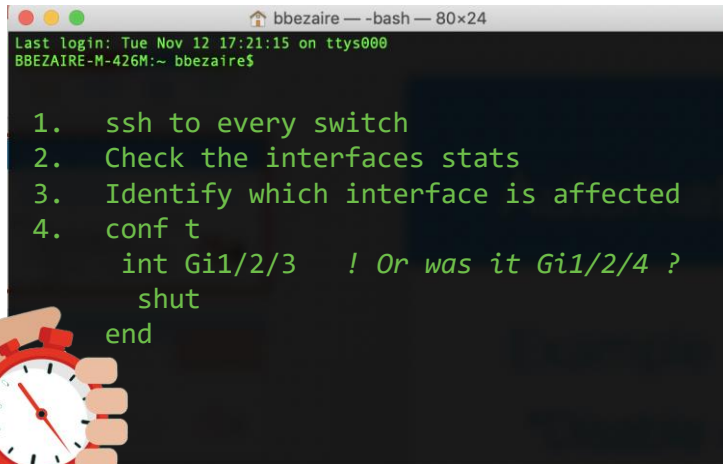
*Employers expect foundational IP skills and breadth of knowledge from network admins*

# Automation – Save time, less mistakes

Example Business Intent:

“Disable all network access ports after 30 days of inactivity”


**Manual** (for EVERY switch)



```

bbezair@bbezair:~$ ssh to every switch
bbezair@bbezair:~$ Check the interfaces stats
bbezair@bbezair:~$ Identify which interface is affected
bbezair@bbezair:~$ conf t
bbezair@bbezair:~$   int Gi1/2/3   ! Or was it Gi1/2/4 ?
bbezair@bbezair:~$   shut
bbezair@bbezair:~$   end
    
```

**Automated** (run the code once)



```

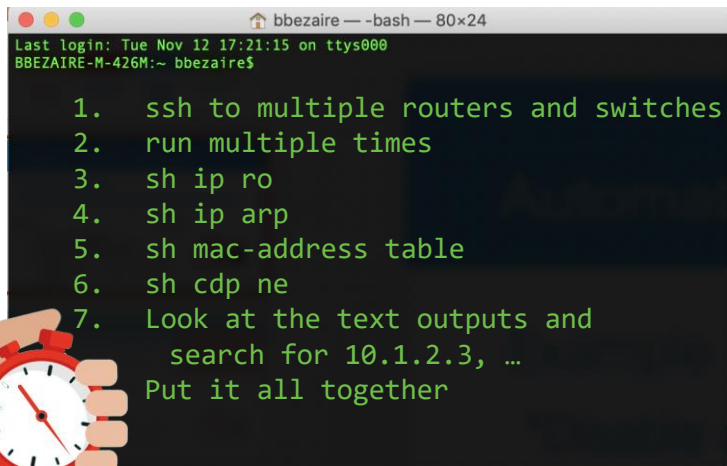
# ... some core removed for simplicity ...
for switch in my_network:
    for interface in switch:
        if interface.is_up() and interface.last_change() > thirty_days:
            interface.shutdown()
            interface.set_description("Interface disabled per Policy")
    
```

# Troubleshooting – Check a single source

Example Business Intent:

CyberOps request - “Where is 10.1.2.3 in our network?”

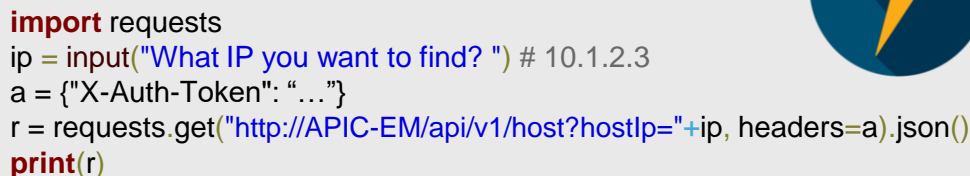
**Manual** (repeat for many locations)



```

bbezair@bbezair:~$ ssh to multiple routers and switches
bbezair@bbezair:~$ run multiple times
bbezair@bbezair:~$ sh ip ro
bbezair@bbezair:~$ sh ip arp
bbezair@bbezair:~$ sh mac-address table
bbezair@bbezair:~$ sh cdp ne
bbezair@bbezair:~$ Look at the text outputs and search for 10.1.2.3, ...
bbezair@bbezair:~$ Put it all together
    
```

**Automated** (code checks for you)

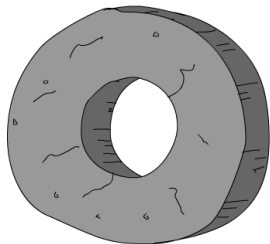


```

import requests
ip = input("What IP you want to find? ") # 10.1.2.3
a = {"X-Auth-Token": "..."}
r = requests.get("http://APIC-EM/api/v1/host?hostIp="+ip, headers=a).json()
print(r)
    
```



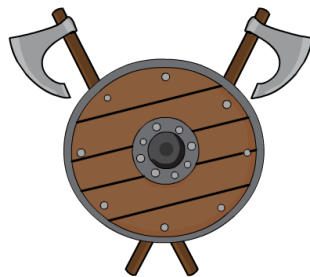




## Stone Age

Spanning Tree

VLANs



## Bronze Age

Routing Protocols

WAN Design

IP-magedon



## The Renaissance

SDN

OpenFlow

Controllers

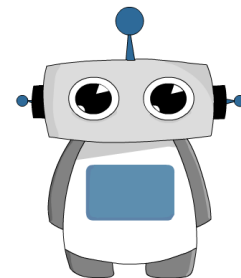
Overlays

MP-BGP

VXLAN

Micro-Segmentation

White Box



## Programmable Age

Cloud

Python

REST / APIs

NETCONF / YANG

“Fabrics”

Network Function  
Virtualization (NFV)

Containers

DevOps

NetDevOps!

# The Four Ages of Networking.....

# Beispiel: Meraki Dashboard und Datenanalyse



Meraki MR  
Wireless LAN



Meraki MS  
Ethernet Switches



Meraki MX  
Security Appliances



Meraki SM  
Mobile Device  
Management

# Beispiel: Dashboard API

- List devices in the network

```
GET /networks/:networkId/devices
```

- Get device information

```
GET /networks/:networkId/devices/:serial
```

- Get device clients

```
GET /devices/:serial/clients
```

- Get SSID information

```
GET /networks/:networkId/ssids
```

# What Does Digital Transformation Mean for Networking Careers?

Technologies  
powering digital  
transformation  
require new  
skillsets



**Programming** skills becoming essential to network admins

**Automation and virtualization** now extend across all network domains

**Wireless technologies** now prevalent in access networks

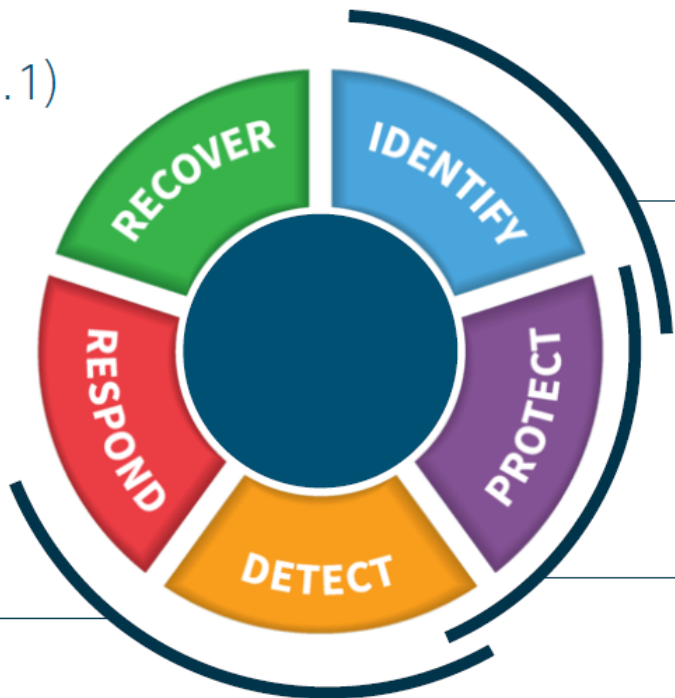
Expanding **security** threats require new analytics and corresponding skills

# NIST Cybersecurity Framework

## NIST Cybersecurity Framework Functions (v1.1)

[www.nist.gov/cyberframework](http://www.nist.gov/cyberframework)

- Detecting Intrusions
- Monitoring, analyzing
- First response



- Discovering Vulnerabilities
- Modeling Risk
- Suggest mitigations

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

# Neuordnung der IT-Berufe und Networking Academy



# Cisco Networking Academy



*YEARS OF  
CHANGING  
WORLDS*



# Courses Develop Networking Professionals

## EXPLORATORY



Intro to IoT  
Intro to Cybersecurity

Start with technology awareness and career discovery.

## FOUNDATIONAL



PCAP: Programming Essentials in Python  
NDG Linux Essentials  
IoT Fundamentals: Connecting Things

Move on to fundamental principles, procedures, and practices.

## CAREER READY



CCNA Routing & Switching Curriculum 1, 2, & 3

Learn how networks operate, from protocols and services to network management.



CCNA Security

Delve deep into networking security, focusing on design, implementation and protection of secure networks.

## CERTIFICATION AND EMPLOYMENT



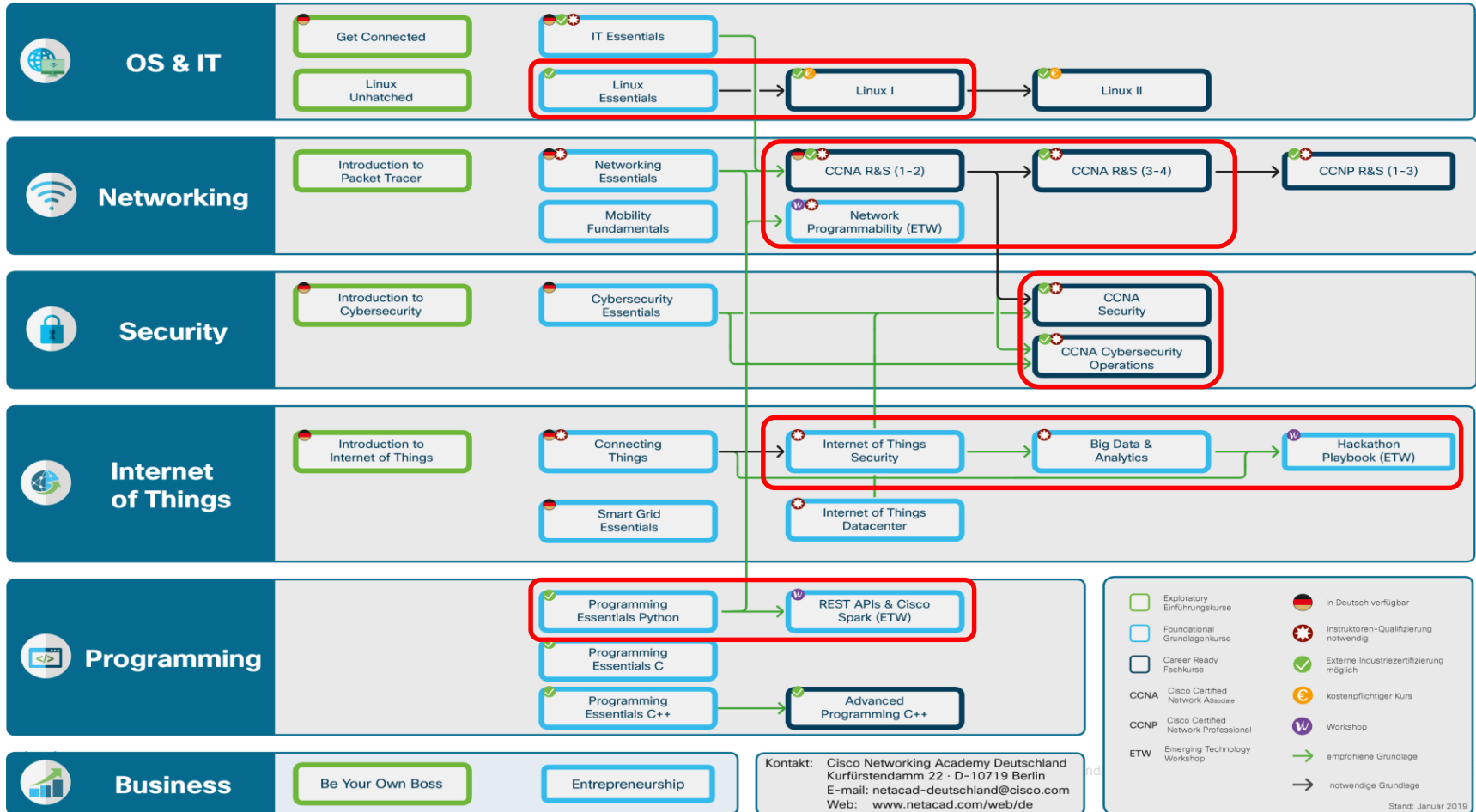
Certification opportunities

Stackable certifications attract employers, and our career programs help connect students to jobs.

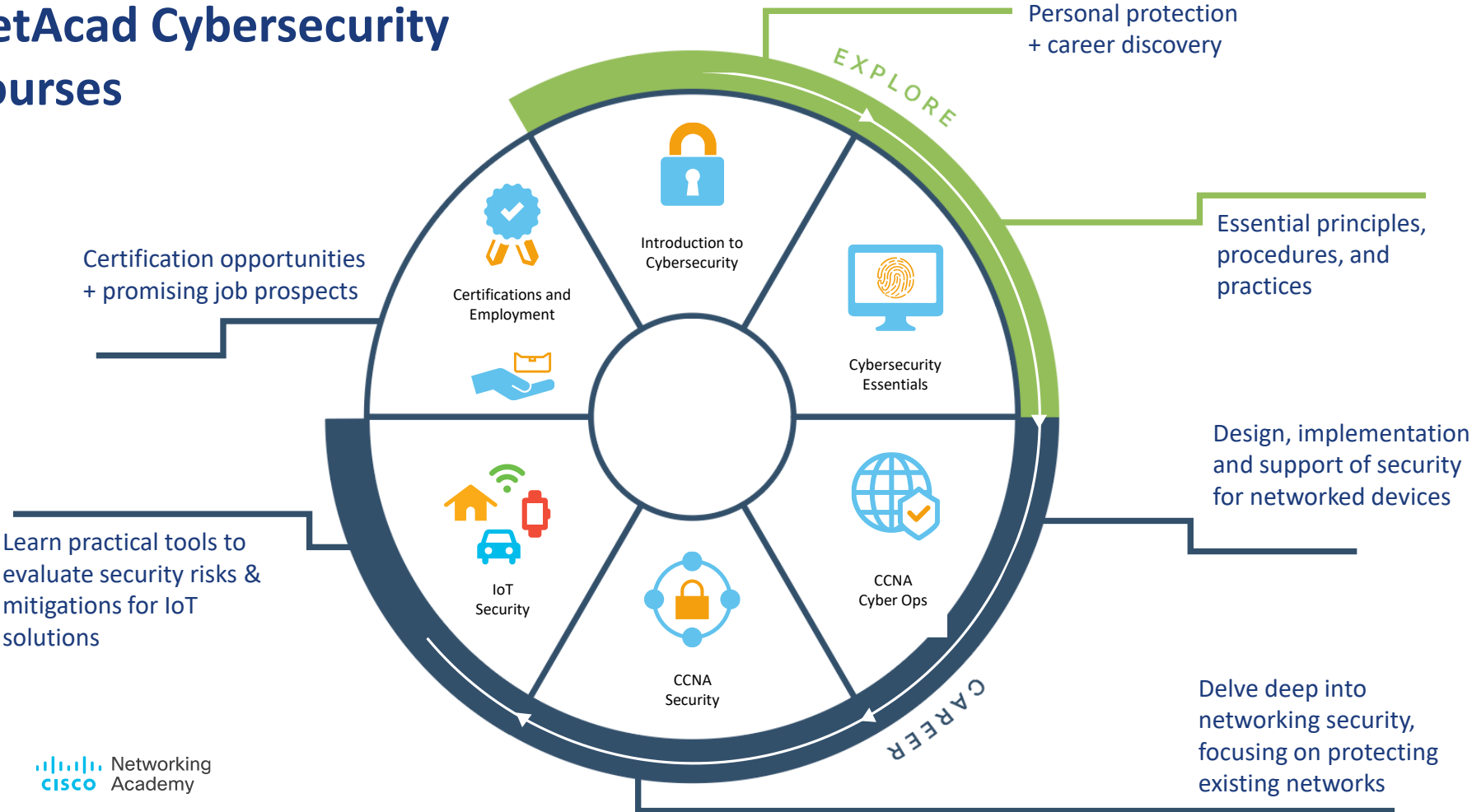


Promising job prospects





# NetAcad Cybersecurity Courses



Personal protection + career discovery

EXPLORE

Essential principles, procedures, and practices

Certification opportunities + promising job prospects

Introduction to Cybersecurity



Cybersecurity Essentials

Design, implementation and support of security for networked devices



CCNA Cyber Ops

Delve deep into networking security, focusing on protecting existing networks

CAREER

CCNA Security



Learn practical tools to evaluate security risks & mitigations for IoT solutions



IoT Security



Certifications and Employment



