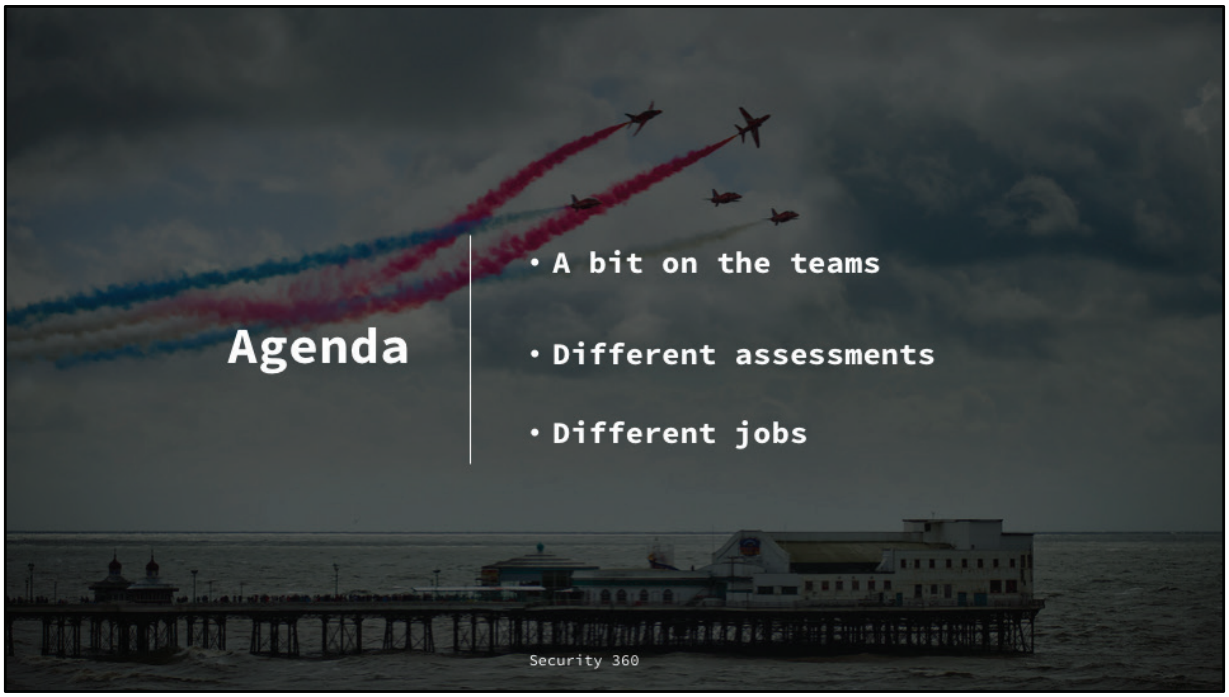
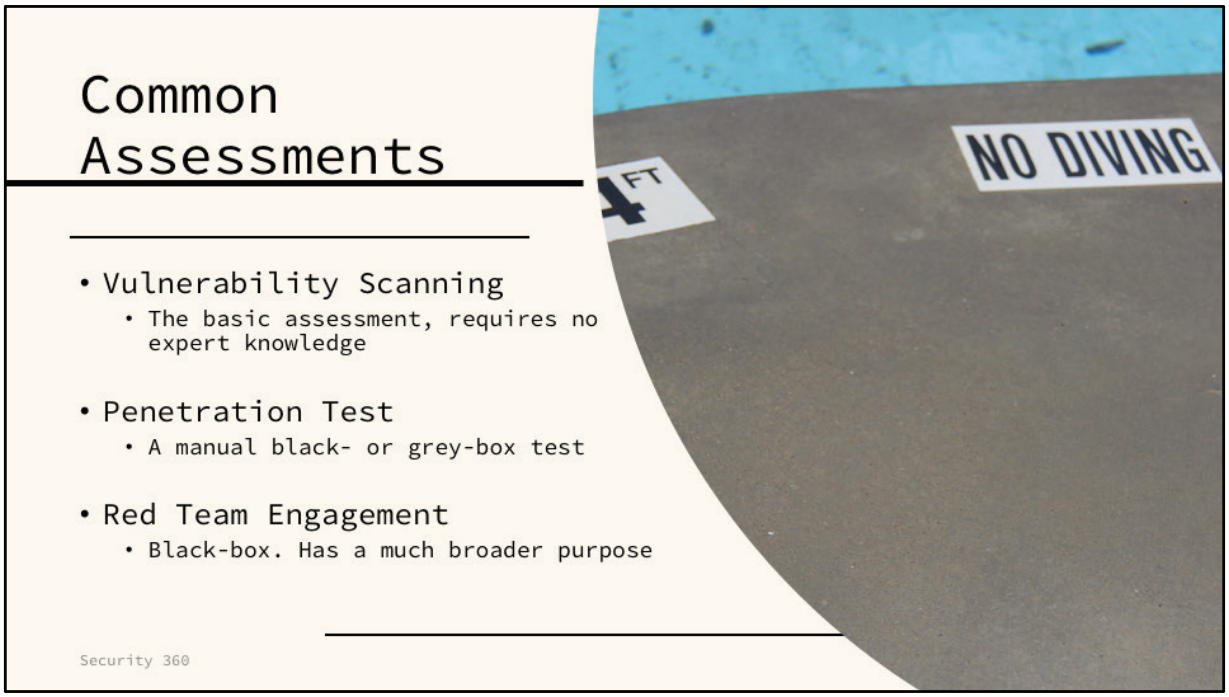
Red, Blue & Purple

Responsibilities & Jobs



The Teams

- Red
  - Hired in to simulate a malicious attack on an organisation's infrastructure (consultants)
  - Large organisations likely have red experts on staff
- Blue
  - Employed to defend organisation critical infrastructure
  - Full-time employment with the organisation



Vulnerability Scanning

- An assessment, usually automated by software
  - Find common vulnerabilities, not organisation-specific
  - Can be run by blue teams, red teams or non-experts

White-box/Authorised Vulnerability Scan
- Run locally or over the network, has admin rights

Grey-box Vulnerability Scan
- Run over the network, given some knowledge of network

Black-box/Manual Vulnerability Scan
- Run over the network with no special knowledge

Penetration Testing

- A manual assessment
- Carried out by a red team
  - Mimics common network attacks
  - Targeted at the organisation
- Different levels of focus
  - Can be black-box for general testing
  - Or grey-box for testing specific parts of the network
    - Organisation might reveal IP ranges/ports

Security 360

Red Team Engagement

- A mission
- Double-blind
  - opposing blue team is unaware
- Includes a vulnerability scan
  - manual or automated
- Includes a penetration test
  - Realistic techniques
- Breaches of physical security
- Social engineering
- Impact analysis

Physical Security

- Physical Pen Testing – it's a thing!
- Many techniques threaten physical security
  - Lockpicking
  - Copying RFID cards, key fobs
  - Theft
- Social engineering can help!
  - Cause a server outage, be the engineer
  - Sit beside victim in a cafe

Social Engineering

- Phishing & Spear-Phishing
- Pineapple WiFi
- Remember Koppix?
  - USB-bootable security distro
  - Boot-to-Kali & steal hashes manually

Social Engineering Hardware

- Rubber Ducky
  - Keyboard emulation, auto keystroke injection in a USB
- Bash Bunny
  - Scripted recon, opening shells, cred sniffing in a USB
- LAN Turtle, Packet Squirrel
  - Scripted MitM, packet sniffing in a USB

https://www.slideshare.net/TobyKohlenberg/red-teaming-probably-isnt-for-you-81283357

There's a NIST for that...

- NIST SP800-115
  - Technical Guide to InfoSec Testing & Assessment
- Four steps
  - Plan (& report)
  - Discover
  - Attack
    - Gain Access
    - Escalate Privileges
    - Browse (& re-discover)
    - Install tools
  - Report

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https://csrc.nist.gov/publications/detail/sp/800-115/final

NIST Vulnerability Categories

- Misconfigurations (as in OWASP)
  - Poorly implemented security controls / practices
- Kernel Flaws
  - Weaknesses in the core of the OS itself
- Buffer Overflows
  - Input does not fit in the allocated memory. Malicious code passed in & executed
    - Smashing the Stack for Fun & Profit

http://www-inst.eecs.berkeley.edu/~cs161/fa08/papers/stack_smashing.pdf

More Vulnerable Categories

- Poor Input Validation (injection in OWASP)
  - Attacks such as SQL-injection
- Symbolic Links
  - "shortcuts" while maintaining (elevated) permissions
- Race Conditions
  - Executing malicious code in parallel with privileged calls can give privileges to the malicious code

Red Team HQ

- Large organisations have in-house red teams
- Small & medium organisations use security firms & consultancies specialising in red teaming

- An organisation must have a strong blue team in place first, otherwise the work of the red team is wasted

Blue Team HQ

- Called the Security Operations Centre (SOC)
- On payroll – so they get an office
- The SOC uses a SIEM
  - Security Information and Event Management system
  - A single interface which aggregates logs, alerts and monitoring from IDS/IPS/Firewall/System/etc...
- OWASP is working on a framework which defines some responsibilities & roles

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https://www.owasp.org/index.php/OWASP_Security_Operations_Center_(SOC)_Framework_Project

OWASP SOC Framework

- Processes
  - Monitoring & Detection
  - Incident Response
  - Threat (Vulnerability) Hunting
  - Quality Assurance (Learning)

- Roles
  - SOC Analyst - monitor SIEM logs/alerts & raise tickets
  - SOC Engineer/Expert - configure SIEM & other components
  - SOC Incident Handler
  - SOC Manager

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Red teams have all the fun

- A blue team equivalent of pen tests and red team engagements?

(not quite)

- But honeypots!

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Honeypots

- Kind of like a penetration test in reverse
- Intentionally weak/vulnerable servers
  - **Not** obviously so, attacker cannot tell
  - Isolated, no danger to critical infrastructure
- With specific activity tracking scripts
- Verbose logging / monitoring

Honeypot Goals

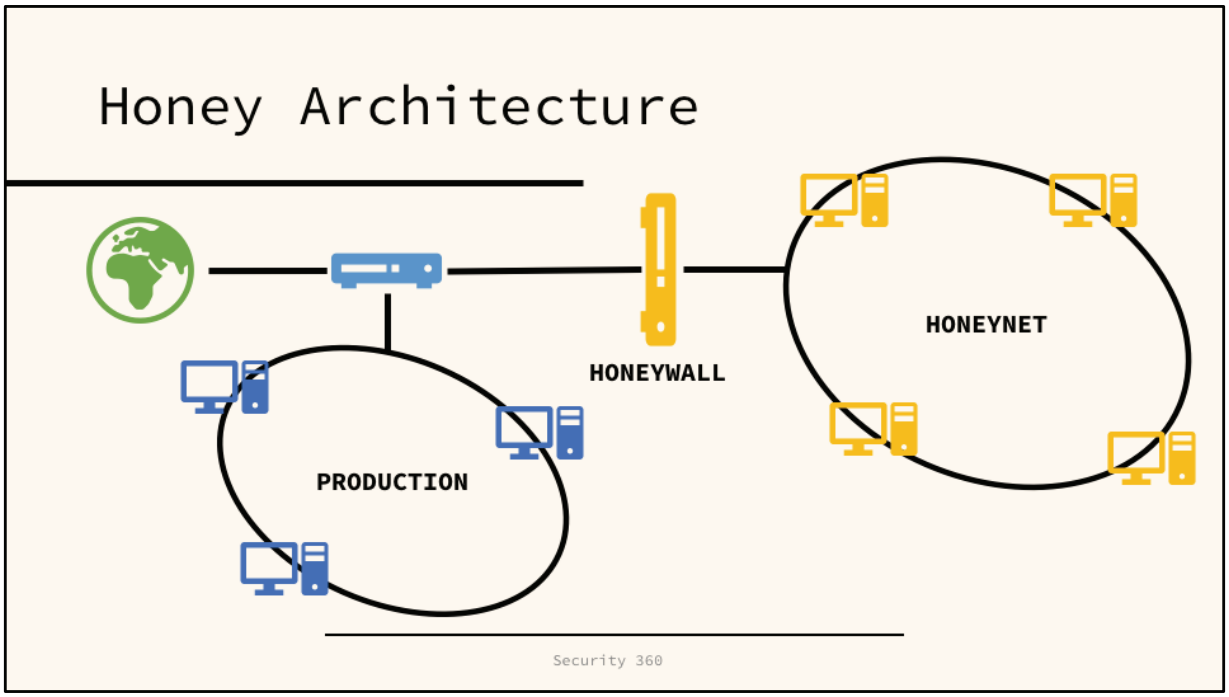
- See attempted passwords
- Follow attempted techniques
- See tools used
- Discover geolocation by IP
- Distract from critical infrastructure

Fingerprinting, or, building an attack signature

Honeynets

- A collection of honeypots, imitating a network
- Goals
  - Discover lateral movement across the honeynet
  - Discover probing techniques
  - Discover vulnerabilities
  - Discover lower layer OSI attacks
- Separated from real network by a **honeywall**
  - **Captures** data passing in & out of honeynet, covertly
  - **Controls** data passing in & out, for protection
  - **Analyses** data for the blue team

https://distrowatch.com/table.php?distribution=honeywall


Honey Architecture
HONEYWALL
HONEYNET
PRODUCTION
Security 360

Job Titles

- Job titles in security (and IT in general) are easily thrown around and used quite loosely

50 Cybersecurity Titles That Every Job Seeker Should Know About

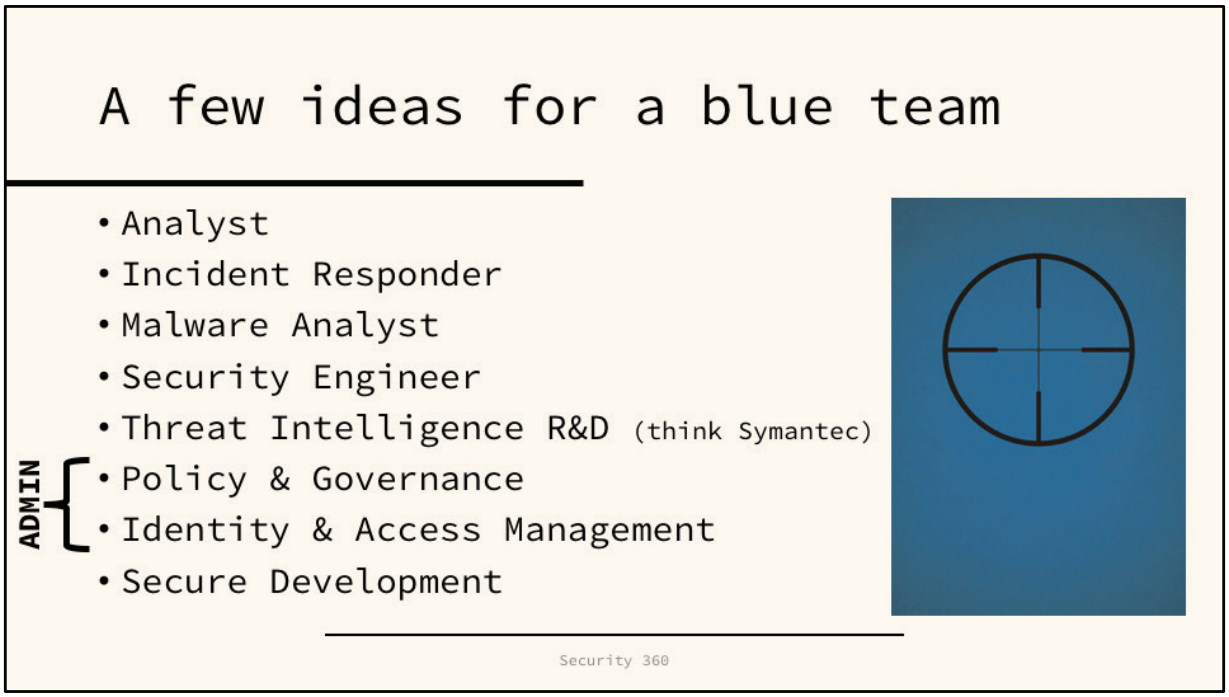
A special resource for cybercrime fighters and wannabes

– *Steve Morgan*

Northport, N.Y. — Feb. 1, 2019

There will be 3.5 million unfilled cybersecurity jobs by 2021 — enough to fill 50 NFL stadiums — according to Cybersecurity Ventures.

https://cybersecurityventures.com/50-cybersecurity-titles-that-every-job-seeker-should-know-about/



https://tisiphone.net/2015/11/08/starting-an-infosec-career-the-megamix-chapters-4-5/

A few less for a red team

- Penetration Tester
- Physical Pen Tester
- Vulnerability Researcher

Less positions

More demand because red teams are "cool"

Experience needed

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Certifications

- CompTIA path
  - The entry-level creds
- (ISC)² path
  - The pro creds
- OffSec path
  - Pen test bragging rights

Not highly regarded in industry

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CompTIA Pathway

- Computing Technology Industry Association
- Start with CompTIA Security+
- Then specialise:
  - CompTIA CySA+
    - Defence - a blue team cred
  - CompTIA PenTest+
    - Offence - a red team cred

(ISC)² Pathway

- International Information System Security Certification Consortium
- Enter with CISSP (min. 5 year paid work in 2 security streams)
- Specialise with
  - Information Systems Security **Architecture** Professional
    - CISSP-ISSAP
  - Information Systems Security **Engineering** Professional
    - CISSP-ISSEP
  - Information Systems Security **Management** Professional
    - CISSP-ISSMP
  - Certified **Cloud** Security Professional

OffSec Pathway

- From Offensive Security, creators of Kali
- Start with the OSCP
- Specialise with:
  - Offensive Security Certified Expert (OSCE)
    - Level up
  - Offensive Security Web Expert (OSWE)
    - WebAppSec
  - Offensive Security Exploitation Expert (OSEE)
    - Windows Exploits