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Security !Maturity

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About me - Joshua “Jabra” Abraham

- Security Consultant/Researcher at Rapid7 LLC.
- Past speaking engagements
  - BlackHat, DefCon, ShmooCon, Infosec World, CSI, OWASP Conferences, LinuxWorld, Comdex and BLUG
- Recently became a Technical Editor for Syngress (Ninja Hacking)
- Contributes to BackTrack LiveCD, BeEF, Nikto, Fierce, and PBNJ
- Twitter: http://twitter.com/jabra
- Blog: http://spl0it.wordpress.com

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Rapid7 Overview

- Vulnerability Management

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- Open source projects

  metasploit

  w3af
  Web Application Attack and Audit Framework

- Professional Services
  - Network Pentesting
  - Web Application Audits
  - Training
  - Deployment

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Understanding the Environment

- People
- Process
- Technologies

- Focus on two points of reference
  - Penetration testing (OPs side)
  - Deploying a secure development lifecycle (non-OPs side)

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Breaking through a misconception

How many times during a scoping call have you heard the customer say the goal of the assessment is to “Hack Us?”

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“Hack Us” – Is NOT good enough

- “Hack Us” is subjective
- What do you mean by “Hack”?
- How do you know when you are done?
- What is the success criteria for “Hacking” the customer?
- How do you measure the “Hack”?

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Agenda

- **The need for a better approach**
- Goal Oriented Overview
- Examples from the Field
- Maturity 101
- Secure Development Lifecycle (SDL)
- Summary/Q&A

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Background Information

- The primary objective is to demonstrate risk
- Difference between risk from vulnerability scanner and a business risk (context)
- Vulnerabilities are found by automated tools
- A threat does not have to be demonstrated in order to constitute a risk.

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The need for a better approach

- How do you know what is MOST important?
- Achieve Domain Admin access on 1st day
- Access to all data
- Maybe get lucky and guess right
- Should not need to guess
  - Is data X more valuable/important than data Y ?

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Which Data or Systems would you go after?

- With Control of
  - The entire network
  - OR .. all windows systems
  - OR .. all *nix systems

- Evil Attacker - Destructive
- Evil Attack – Financially motivated
- Consultant – Penetration tester
- Malicious System Admin
- Malicious Employee
- Malicious Executive

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Raising the bar on penetration testing

- There are several technical methodologies
  - Define what and how to test
  - OWASP, OSSTMM and vulnerabilityassessment.co.uk
- Industry lacks a standard process
  - Outline a method to facilitate the testing process
  - Ensure assessment/project completion

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Real-World Penetration Testing

- Evil Attackers - Blackhats
  - Financially Motivated
  - Not limited by amount of time and/or resources

- Penetration Testers – Whitehats
  - Context / Goal Focused (experience, 6th sense, etc)
  - Demonstrate real world risks, but limited by the time of the engagement
  - A snapshot of the network/ application at a point in time

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Clear Motivation

- Emulate a Blackhat, by using Goals as motivation
- Doesn't decrease the experience / 6th sense elements
- Allows the Testing Team to focus efforts on critical weaknesses

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Goal Oriented Penetration Testing

- Non-technical methodology in which the process is the central focus
- Goals are focus points (drivers) for the assessment
- Provides the best (ROI) for organizations when they conduct a penetration assessment

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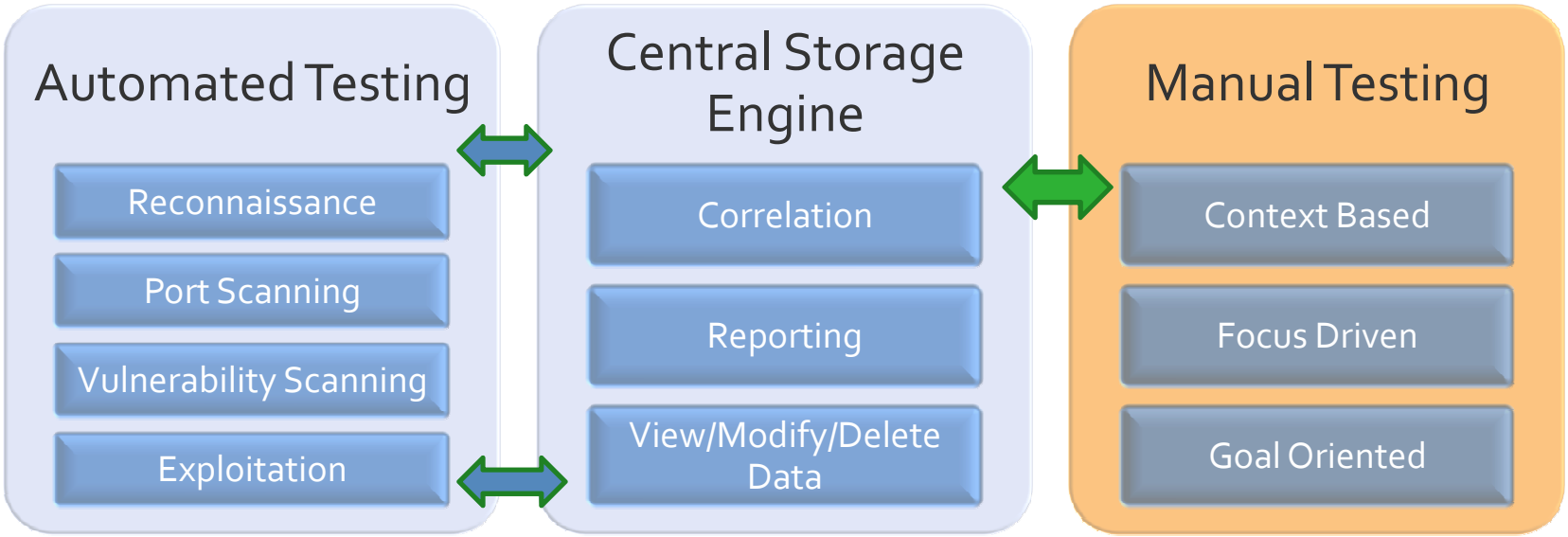
Goals 101

- Goals can be achieved in parallel or a serial process
- Each goal may have a number requirement for unique paths verified
  - Discussed during scoping call



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SMARTER Goals

- **S – Specific**
- **M – Measurable**
- **A – Attainable**
- **R – Relevant**
- **T – Time-Bound**
- **E – Evaluate**
- **R – Reevaluate**

- "Hack us" is NOT sufficient!
- S.M.A.R.T.E.R. Goals
  - PM technique
  - Saves Time!
- Customers should demand that consultants use a Goal Oriented Approach

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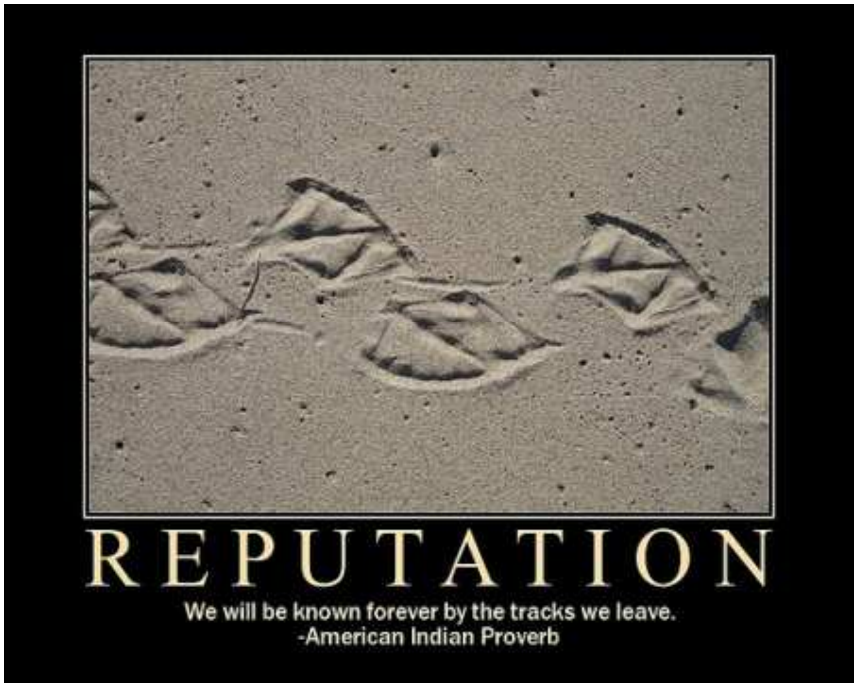
Scoping

- What type of data is most sensitive?
- What data would put the organization on the front-page of the New York Times?
- Data-classifications should be provided to the Testing Team
- Goals can be data-centric (but not always!)



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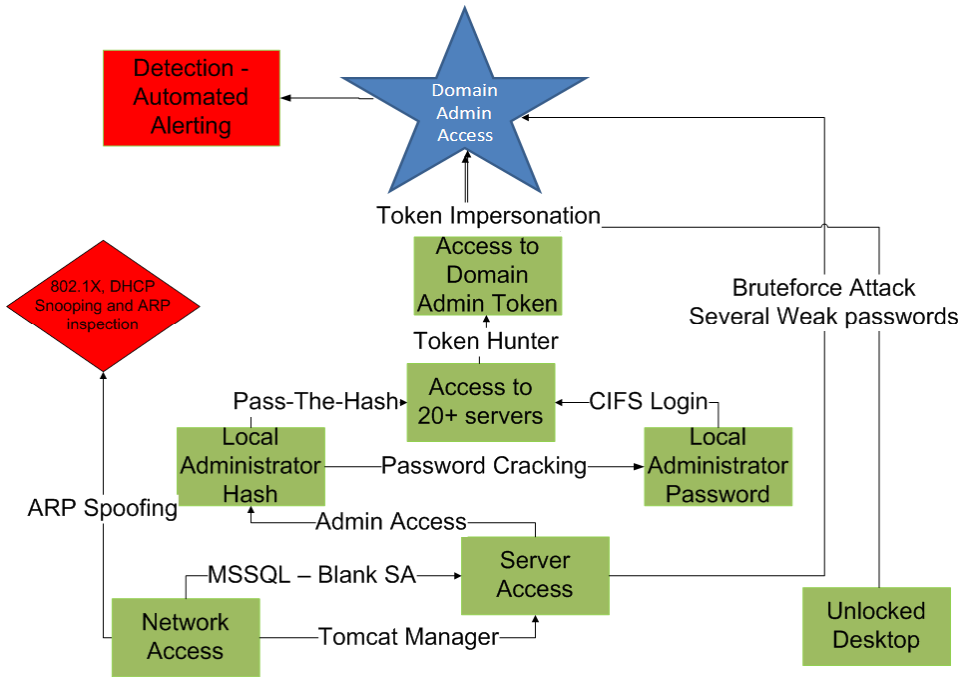
Leveraging Unique Paths



- Success criteria
- Demonstrating a specific number of unique paths
  - Clear-view that weaknesses exist in many areas of environment
- Will a penetration test find all unique paths?
  - Not necessarily
  - Hit a point of diminishing returns

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External Network Penetration Assessment – Sample Goals

- Identify all of the externally accessible IPs
- Gain access to
  - Internal network (remotely) –
    - Via network or application based vulnerability
    - Via social engineering
  - Production MSSQL database
- Achieve and maintain undetected access for 24 hours

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External Network Penetration Assessment – Customer X

- Found a system external that contained network diagrams (test.company.com)
- Diagram of All internal and external systems!
- Detailed how the network was configured
- Contained several root passwords for the internal network!
- Publicly accessible + No authentication needed
- Used Fierce v2 to find it - Enjoy - http://trac.assembla.com/fierce

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Application Assessment – Sample Goals

- Gain access to:
  - A user's account (bypass authentication)
  - An administrator's account (priv escalation)
  - The application's backend database
- Achieve and maintain undetected access for 24 hours to internal network
  - Network/Application based attack
  - Application based attack (social engineering)

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Application Assessment – Customer X

- SQLninja and SQLmap failed me.
  - This is pretty sad!
- How long would it take to develop a PoC to pull data from the database?

- ... Approximately 6 hours.
- Had a working PoC.

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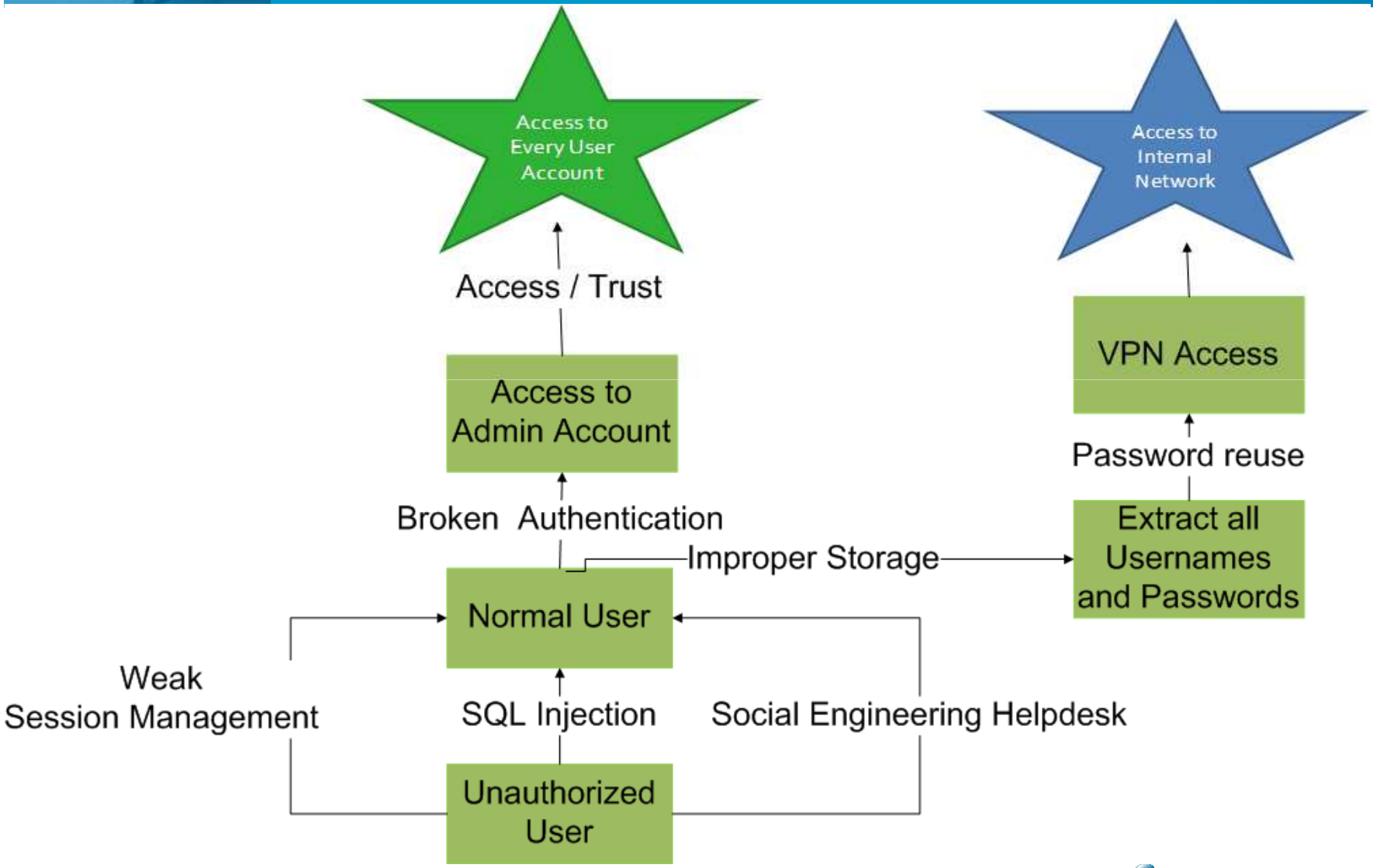
Application Assessment – Customer Y



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Internal Network Penetration Assessment – Sample Goals

- Gain physical access to the network
- Gain access to the:
  - Corporate wireless
  - Production MSSQL database
  - Domain controller (within the PCI environment) as an administrator
- Achieve and maintain undetected access for 24 hours

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How it works!

Recon

- Gather list of employee names
- Social Networking (facebook, linkedin, hoovers, lead411)

Prepare Email

- Construct Email addresses based on email scheme
- Create email for email attack

Send out email

- Setup Metasploit for connections
- Send out Phishing Attacks

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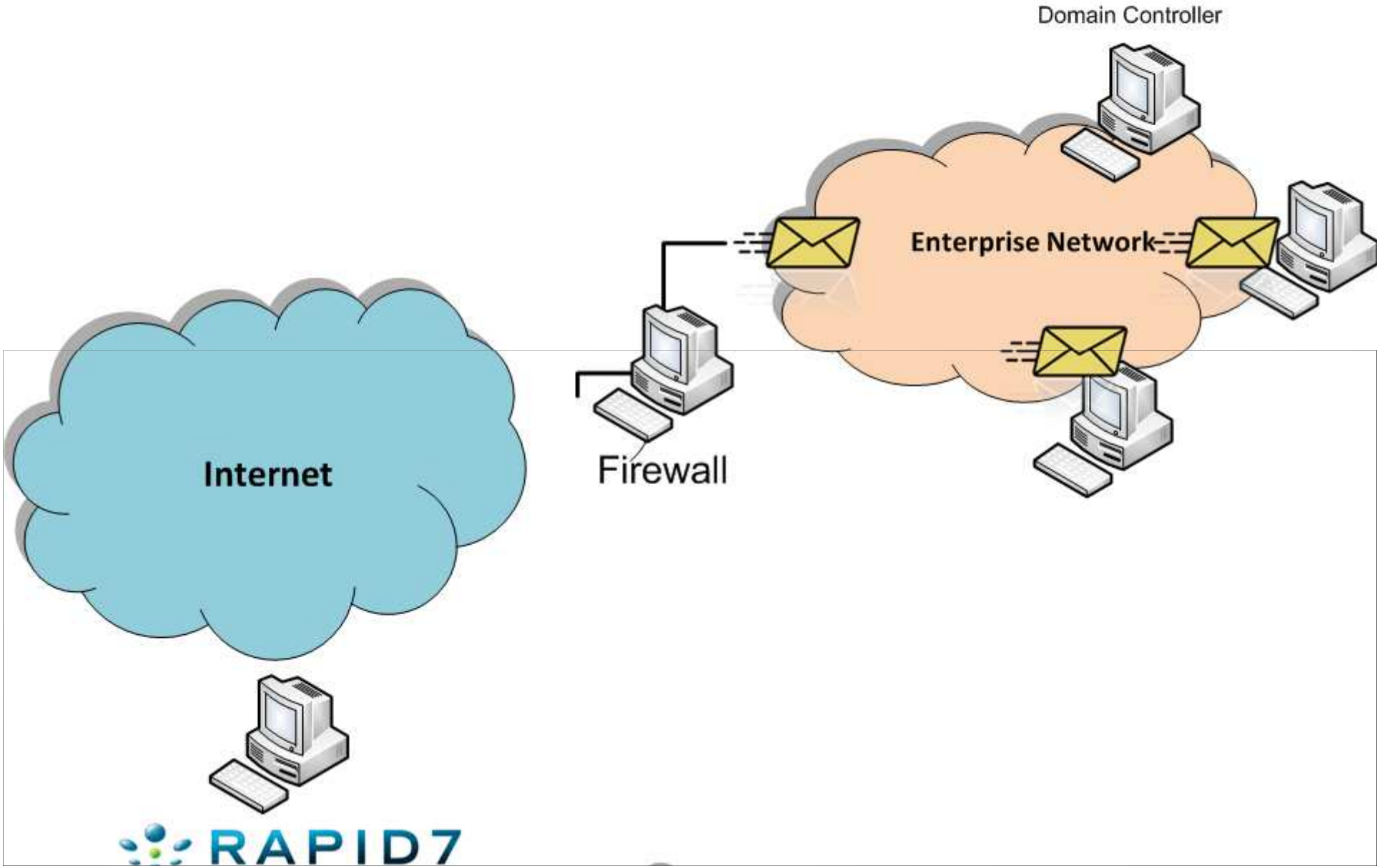
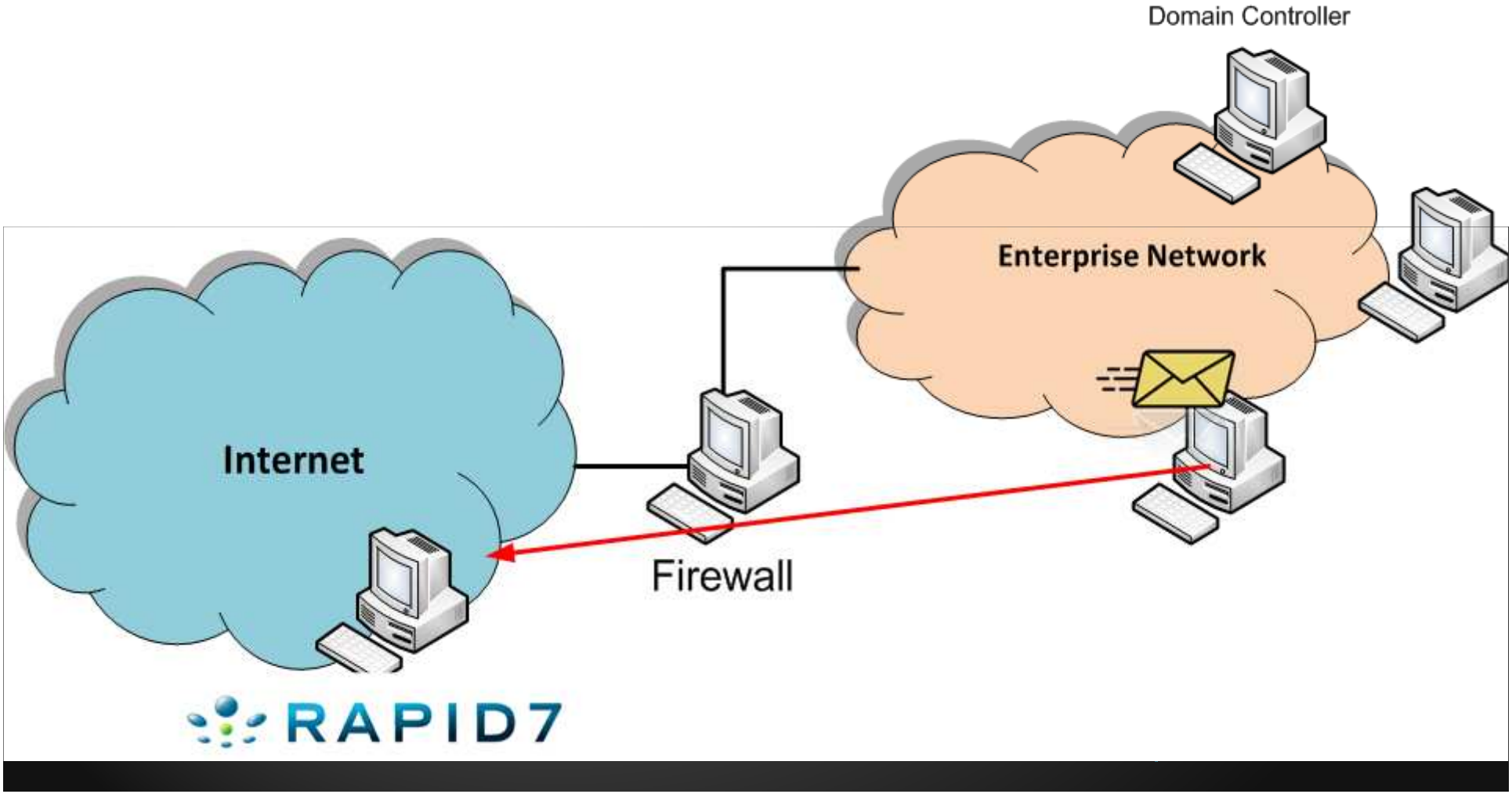
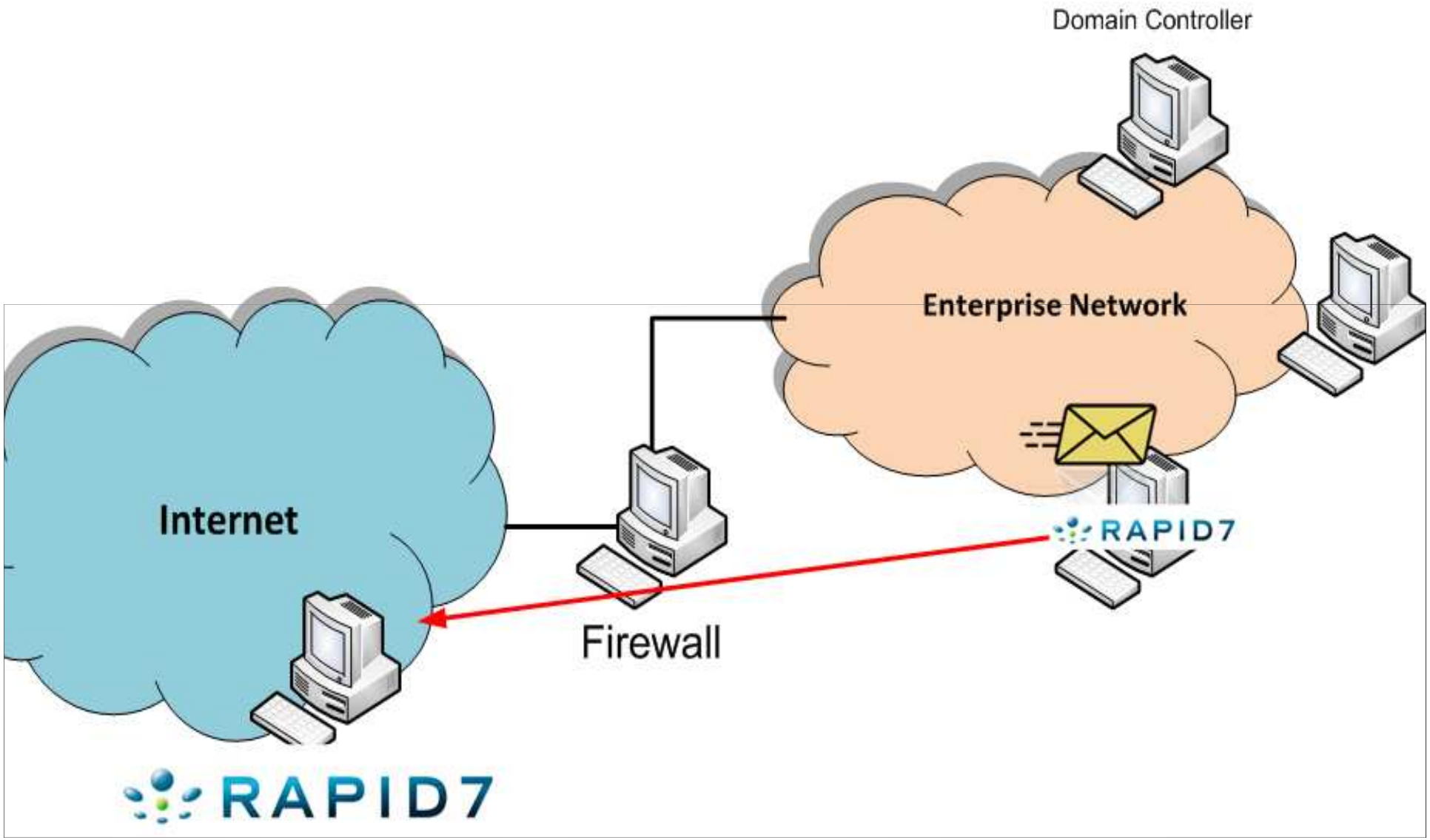
Phishing Attacks



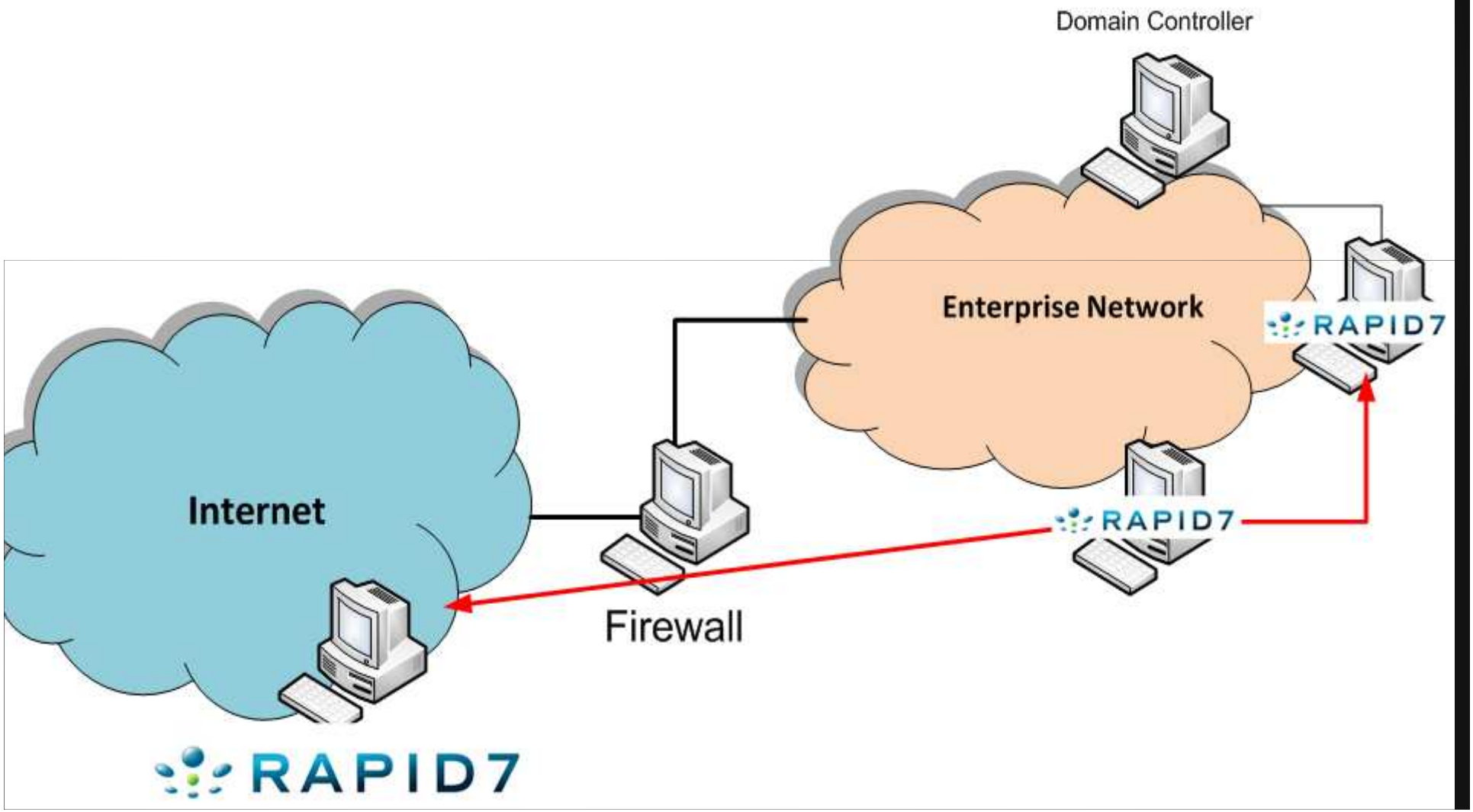
Malicious Executable (Egress Connection)



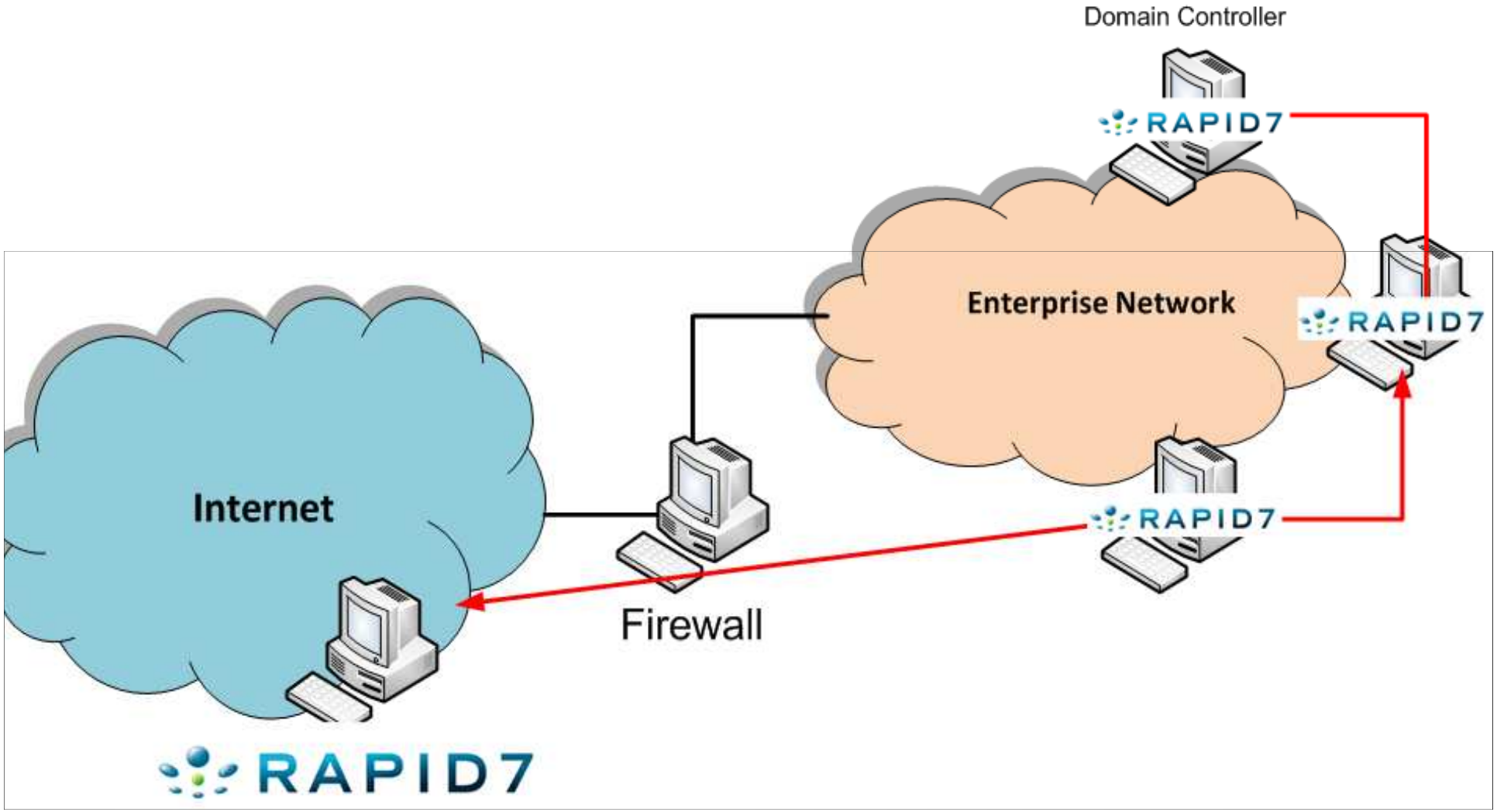
Internal Access



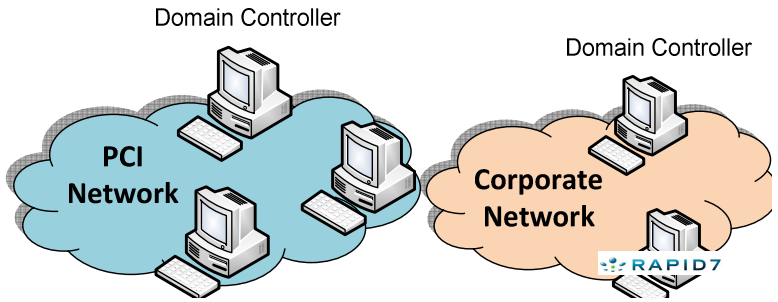
Pass-The-Hash

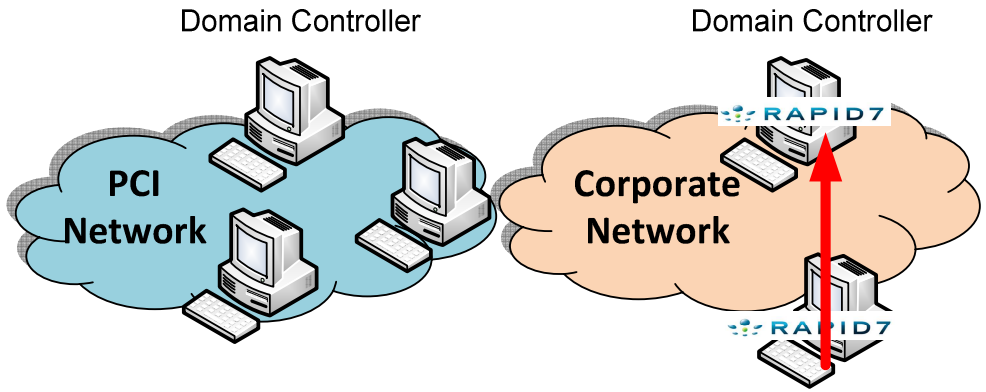


Pass-The-Hash (Domain Admin)



Internal Network Penetration Assessment – Customer X





- Pass-The-Hash + Token Impersonation
- ARP Spoofing
  - Unclear-text protocols
- Weak passwords
- Unpatched systems
- Workstation Network was easy
- PCI Network was well protected

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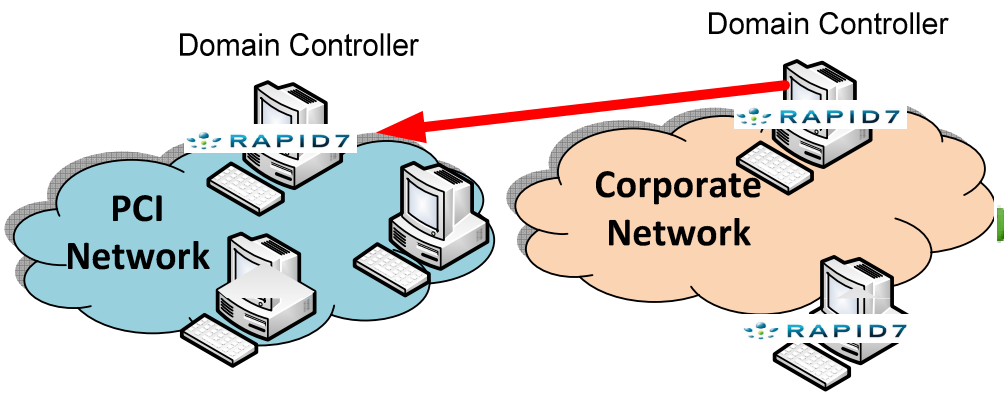
Internal Network Penetration Assessment – Customer X



- Added Admin Account onto PCI Network Domain Controller
- Inter-Domain Trust

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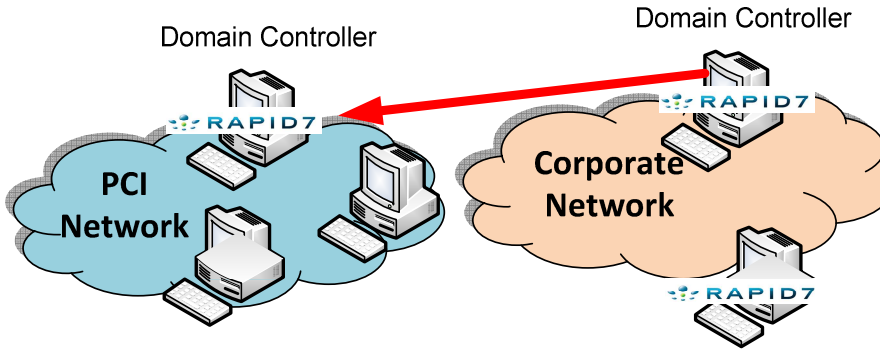
Goal Oriented Pentesting



- Explain the Process (Goal Oriented 101)
- Result of the penetration testing
  - Value security testing
  - Value of internal understanding the environment

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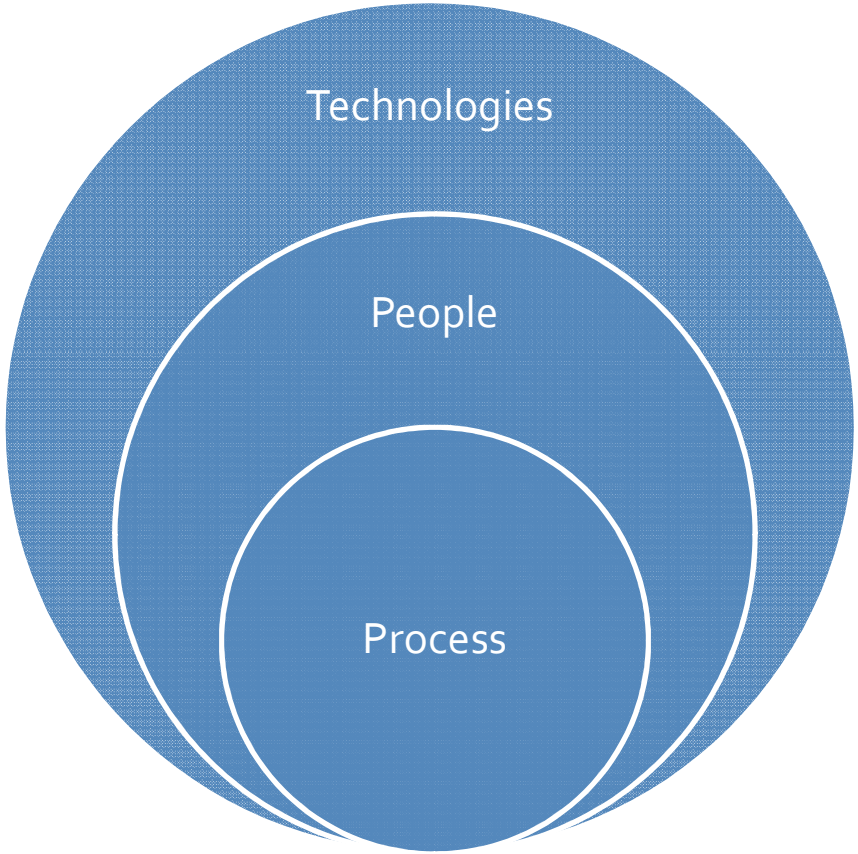
Understanding the Environment



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Understanding the Environment

If you don't understand the environment,
you probably won't be getting the most value
out of your security assessment

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Security Testing

- Demonstrates risk in areas of weaknesses
  - (known areas of focus - critical systems
  - (unknown areas of focus - trust relationships, stepping stones)
- Which is more scary?
  - Known areas of focus
  - Unknown areas of focus

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- **Secure Development Lifecycle (SDL)**
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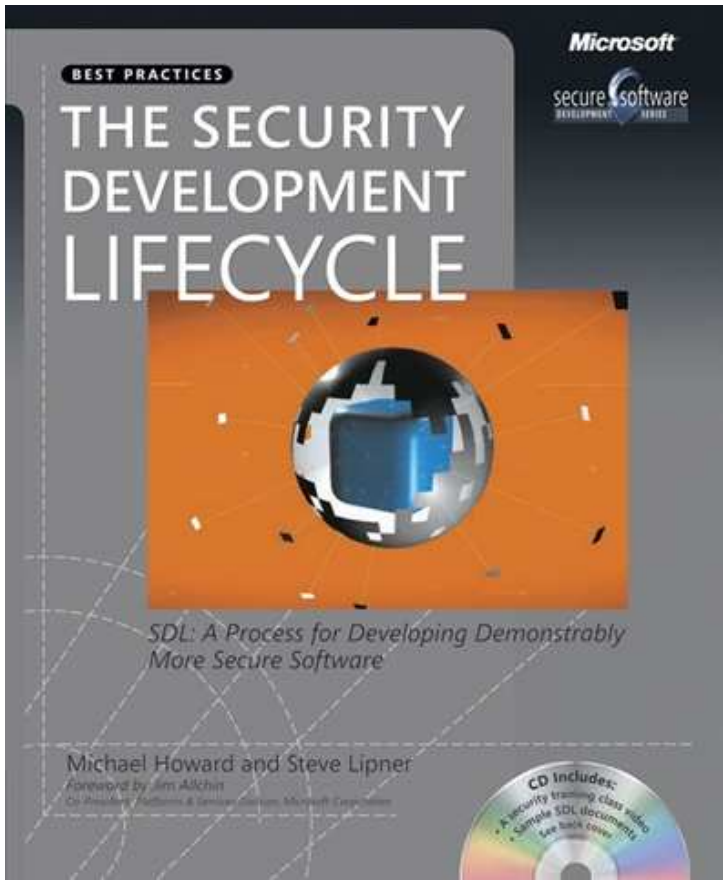
Implementing Secure Development Lifecycle (SDL)



- Proactive Approach
- Reduce and limit the impact of vulns
- Incorporate security into the development process

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Effect of SDL

- Development process
- Resources Requirement
  - Process changes
  - Training
  - New policies/standards/guidelines
  - Third-party review

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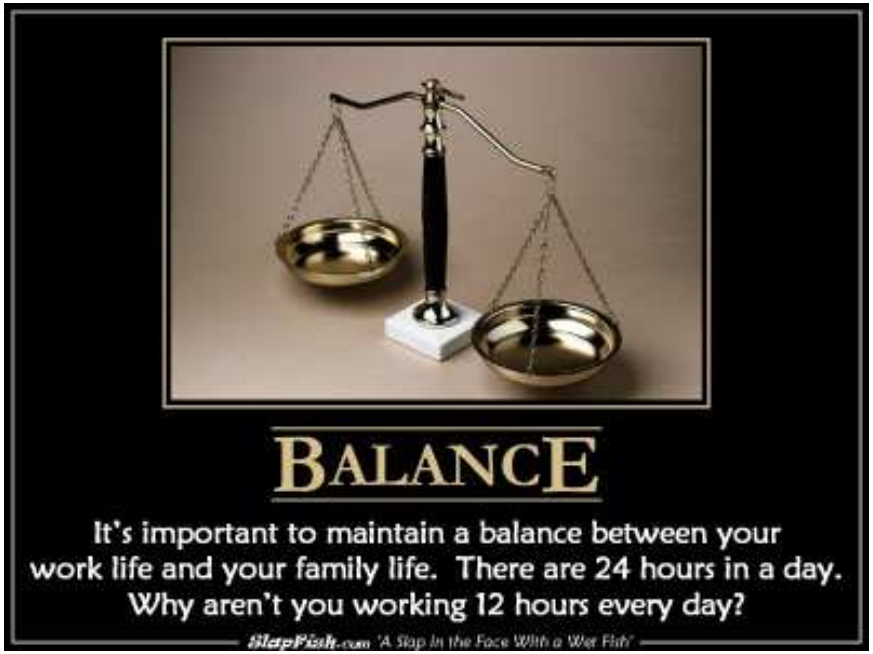
Is it worth doing?

- Rate of application development
  - Lines of code ? # new web apps over next 6-12 months?
- What type of data (stored, processed or transmitted)?
- Importance of the application(s) to the business?



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SDL Requirements

- Understanding
- Buy-in
- Requirements and Motivations
- Training

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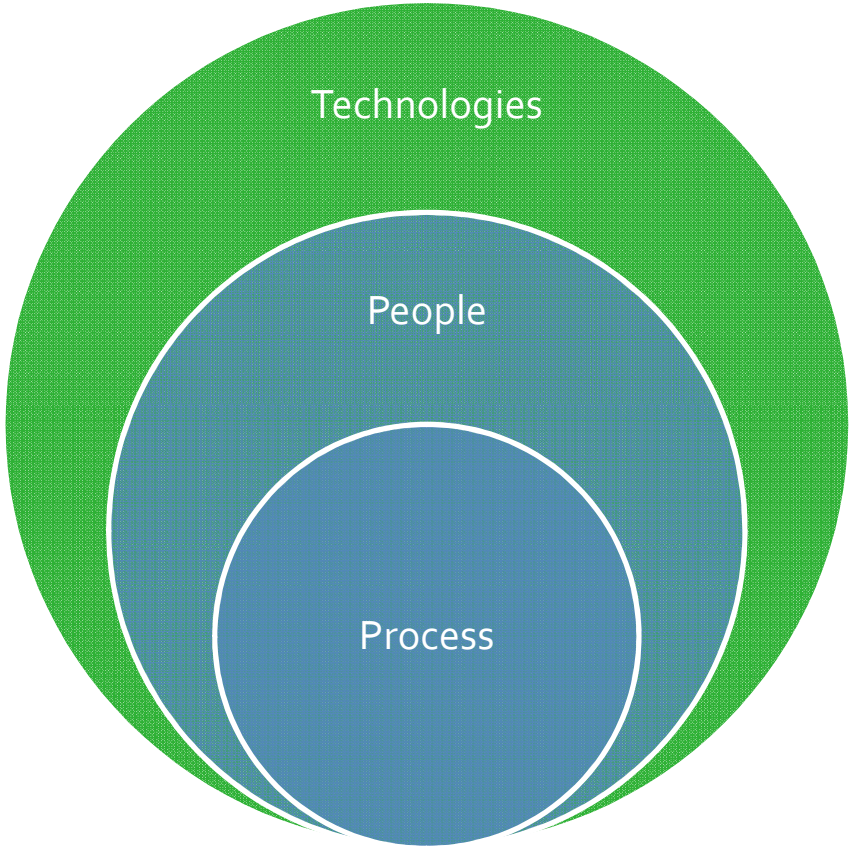
SDL – Technologies



- What types of applications are being developed ? (web apps, mobile etc.)
- What types of data do they store, process and transmit?
- What languages/frameworks are being used?

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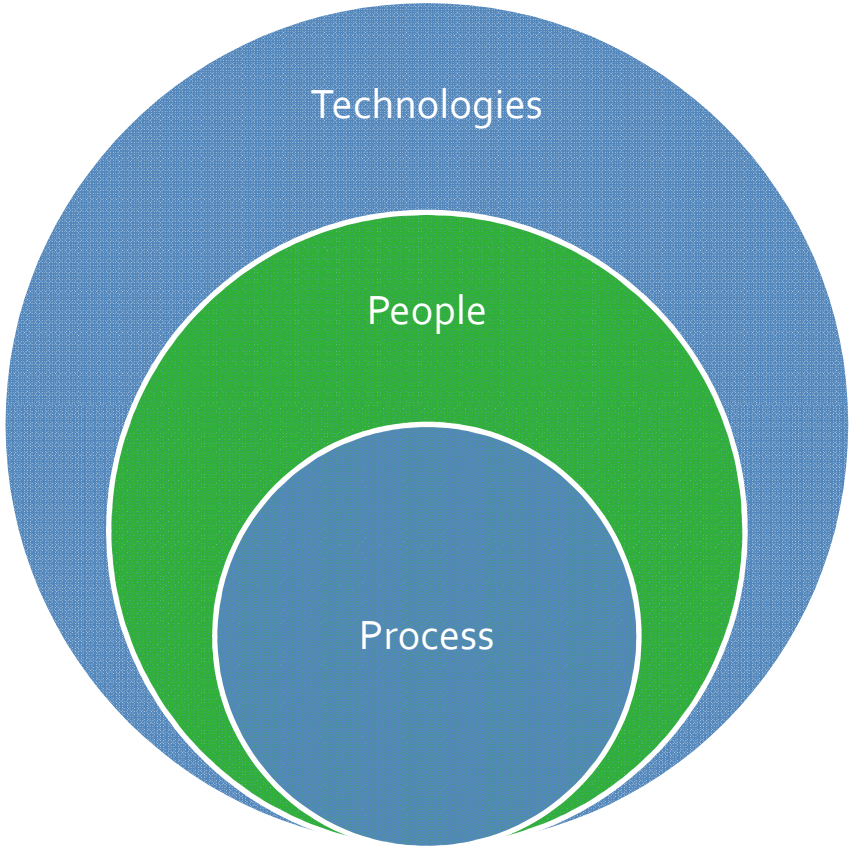
SDL – People



- Who/Where are the developers?
- How many Dev/QA/Release teams are there?
- Who is involved during development, testing, production?
- Who is involved in the transition between dev stages?

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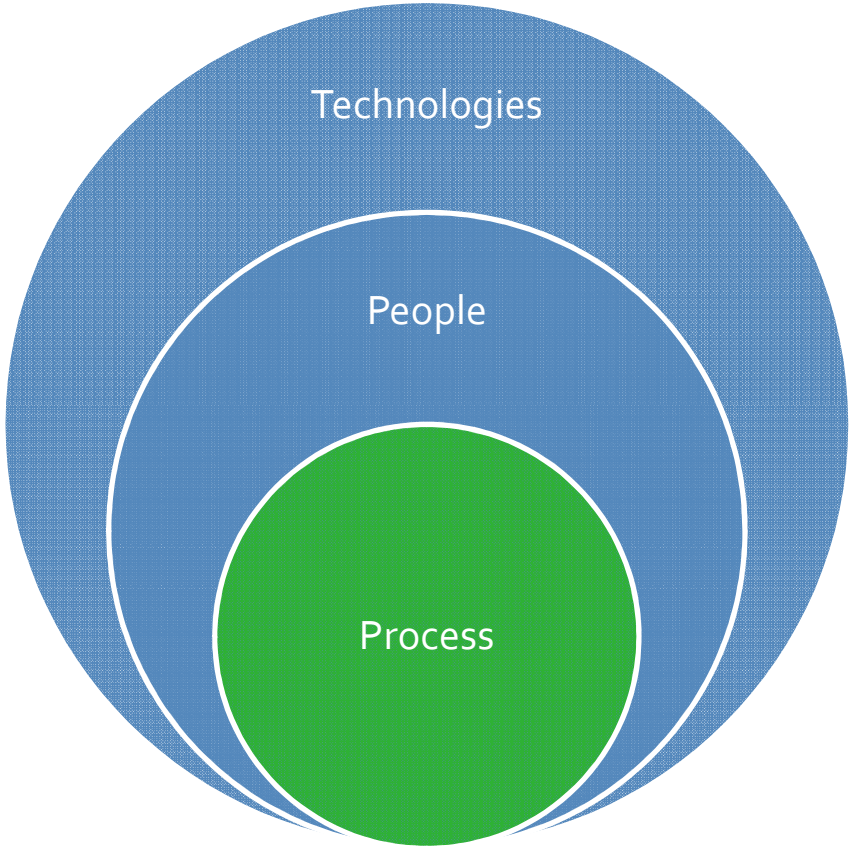
SDL – Process



- What is the process for building new custom apps?
- What development method is used?(Agile/Scrum, Waterfall, etc.)
- What are the stages of development?

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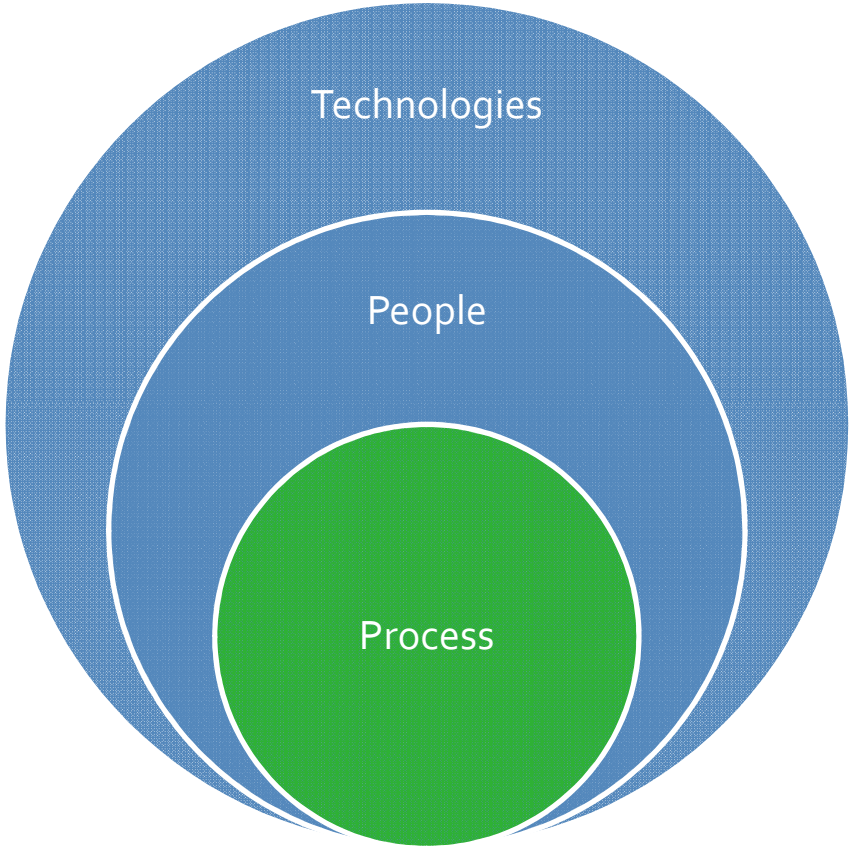
SDL – Process



- What are the requirements before a product is ready to move from one stage to the next?
- Formal review occur before moving into production?

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Summary

- Understanding the Environment is very important to a creating a successful security program!
- Goal Oriented Penetration Testing - Strategic and Practical Methodology for Improving the ROI of any security assessment
  - Leverages project management ideals
  - Goals are not the only element of testing, only a place to start
- Slides will be posted online!

  http://spl0it.org/files/talks/rss10/Security_Immaturity.pdf

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Discussion/QA

- How are you handling these problems from a (client or consultant) perspective ?
- Questions/Comments/Rants/Feedback

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References

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Comments/Questions?

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