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# Four Keys to Preparing for a PCI DSS 3.0 Assessment

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# About 403 Labs

- 403 Labs, a division of Sikich LLP, is a full-service information security and compliance consultancy
  - Qualified Security Assessor (QSA)
  - Payment Application Qualified Security Assessor (PA-QSA)
  - Approved Scanning Vendor (ASV)
  - PCI Forensic Investigator (PFI)
  - QSA for Point-to-Point Encryption (QSA (P2PE))
  - PA-QSA for Point-to-Point Encryption (PA-QSA (P2PE))

# About the Presenter

- A graduate of Bellevue University with a:
  - Master of Science Degree in Security Management
  - Bachelor of Science Degree in Computer Science
- Became a QSA in May 2007
- Manager at 403 Labs

# About the Presenter

- Experience includes:
  - PCI DSS assessments
  - FISMA security control assessments
  - Risk assessments
  - Host configuration reviews, vulnerability and penetration testing, etc.

# Agenda

- Definitions
- Foundation
- Data Flow Diagram
- Segmentation and Penetration Tests
- Risk-Driven Policies and Procedures
- ArtiFACTS

Four keys

# Agenda

- **Definitions**
- Foundation
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- Segmentation and Penetration Tests
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- ArtiFACTS

Four keys

# Definitions

- The *Payment Card Industry (PCI)* is a self-regulated industry driven by the five major card brands
- The *PCI Data Security Standard (PCI DSS)* is a group of security requirements that apply to all system components included in or connected to the cardholder data environment (CDE)

# Definitions

- The *cardholder data environment (CDE)* is comprised of people, processes and technologies that store, process or transmit cardholder data or sensitive authentication data
- *Account Data* or *Card Data* is cardholder data and/or sensitive authentication data
- *Cardholder data (CHD)* is made up of the primary account number (PAN), cardholder name, expiration date and service code

# Definitions

- *SAD (Sensitive Authentication Data)* is comprised of full track data (magnetic-stripe data or equivalent on a chip), card verification codes or values and PINs/PIN blocks
- An *information system* is an integrated set of system components (software and hardware) organized expressly for the collection, processing, maintenance, use, sharing, dissemination or disposition of information

# Definitions

- *Segmentation* is the isolation of systems that store, process or transmit CHD from those that do not
- A *data flow diagram (DFD)* is a graphical representation of the "flow" of data through an information system, modeling its process aspects

# Definitions

- A *penetration test* is a security test focused on testing the effectiveness of the security controls designed to prevent unauthorized access to networks, systems or data
- *Artifacts* are physical evidence as opposed to attestations or statements (e.g., configuration files, logs, reports, screenshots of system configuration consoles)

# Definitions

- A *PCI risk assessment* is the process of identifying card data assets, threats to card data and vulnerabilities in processes and technology that comprise the PCI in-scope environment; the assessment should produce a formal report with recommendations on mitigating identified risks

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Four keys

# Foundation

- Organizations must validate PCI DSS compliance; the assessment is a method to accomplish this card brand mandate
- Organizations should be actively engaged in the assessment process
  - Vet the evidence of compliance that your organization is providing to your QSA and make certain it is complete and fully addresses the target PCI DSS requirement

# Foundation

- Organizations must present:
  - Written policies and procedures
  - Written plans, standards and diagrams
  - Artifacts or evidence demonstrating compliance
- In our experiences, we find that a lack of written policies, procedures and artifacts is the number-one reason organizations initially fail their assessment
  - Some organizations may have catastrophic failure, but almost all fail on this point

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# Data Flow Diagram

- PCI DSS Requirement 1.1.3 - Establish and implement firewall and router configuration standards that include current diagram(s) that shows all cardholder data flows across systems and networks
- The data flow diagram is expected to identify the location of all CHD that is stored, processed or transmitted within the environment, not just the network

# Data Flow Diagram

- Current diagram that shows all cardholder data flows across systems and networks
- PCI DSS also requires a current network diagram that identifies all connections between the cardholder data environment and other networks, including any wireless networks (Requirement 1.1.2)

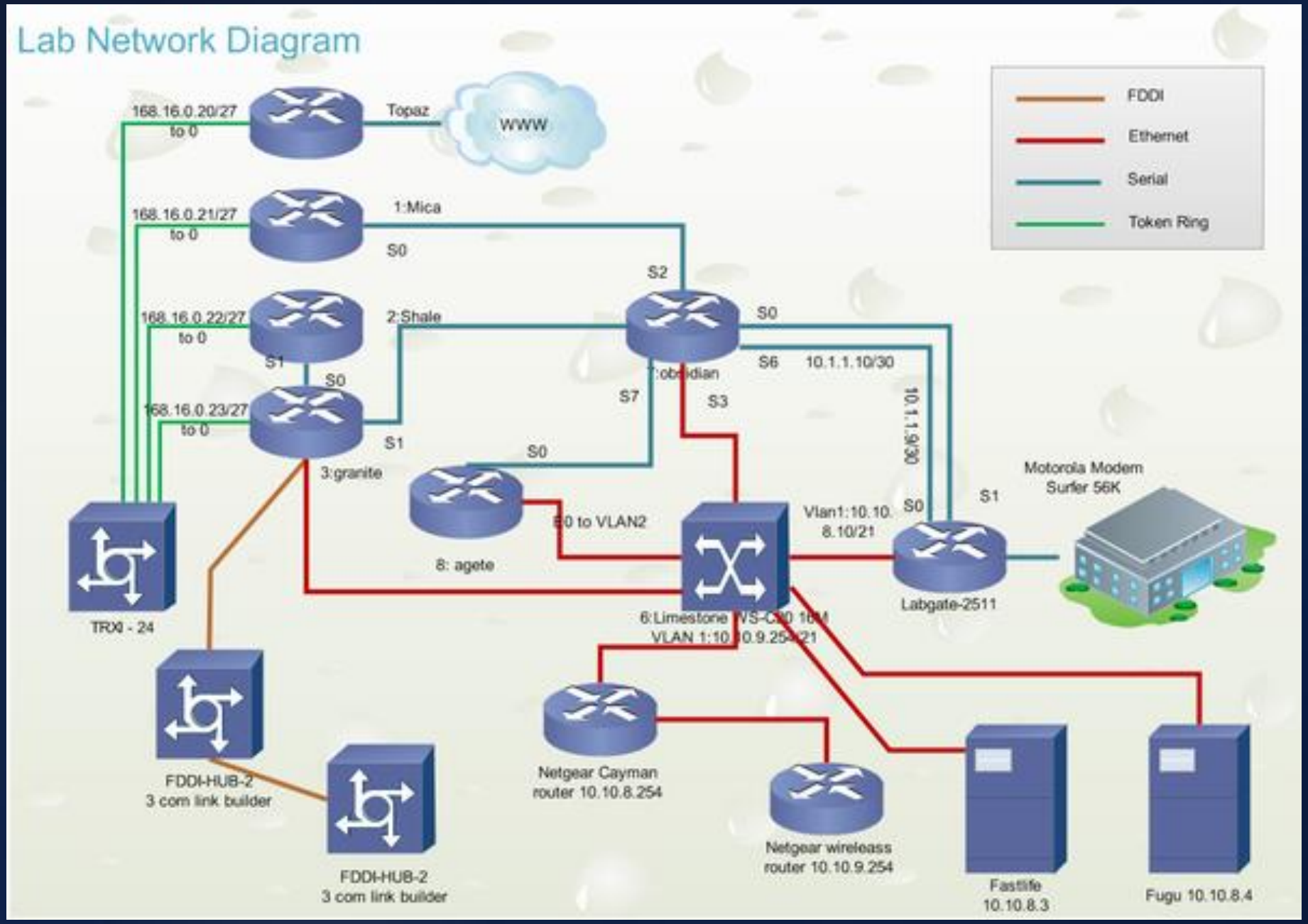
# Data Flow Diagram

- A diagram that illustrates and documents the:
  - Applications and processes that handle CHD
  - Where the data will come from and go to
    - Sources of received CHD
    - Destinations of transmitted CHD
    - Processes that generate CHD
  - CHD storage locations (i.e., data stores, warehouses and flat files)
  - The process that destroys or purges CHD

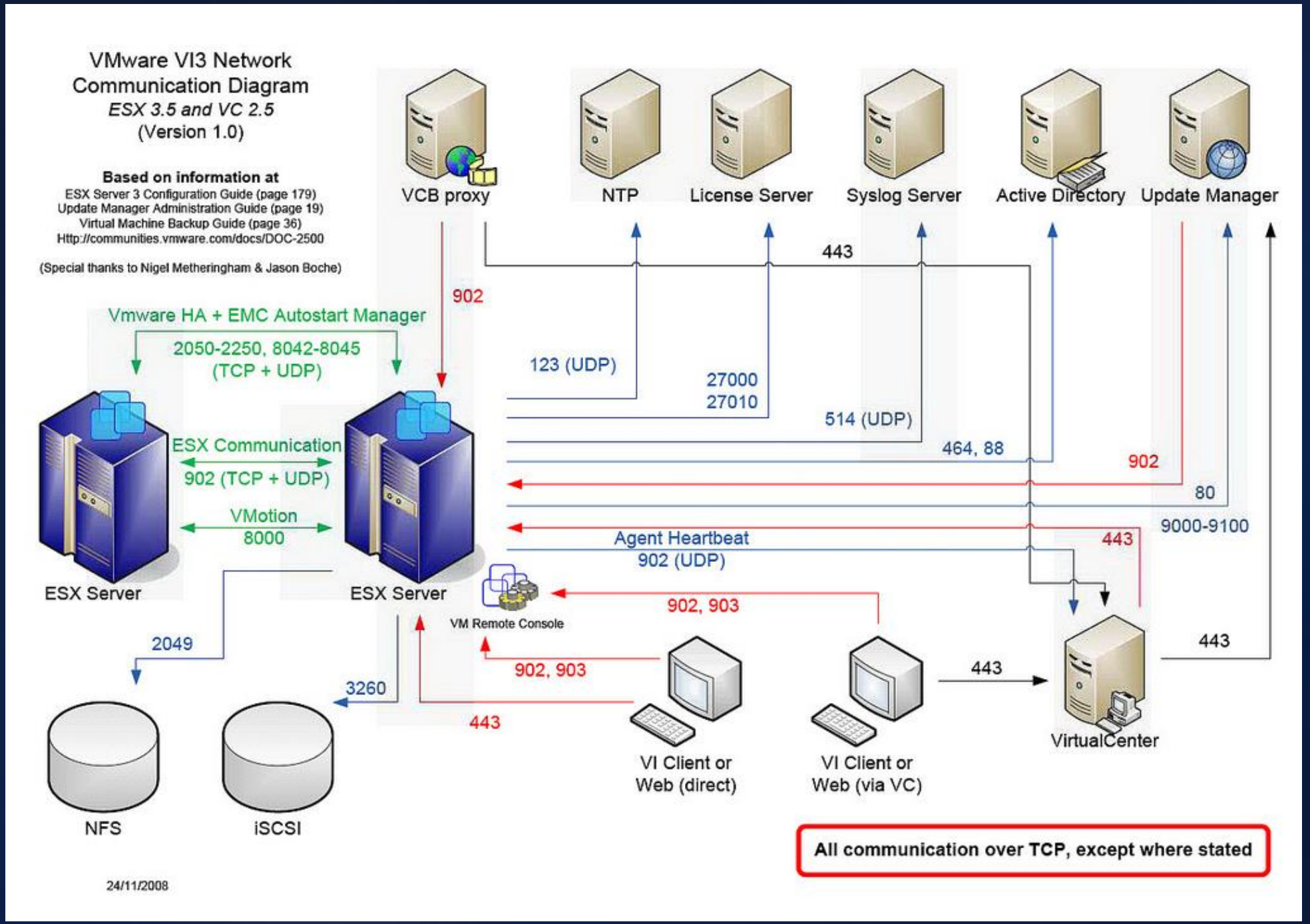
# Data Flow Diagram

- Data flow diagrams are important because they:
  - Help an organization understand and keep track of the scope of the environment
  - Identify the location of all CHD that is stored, processed or transmitted within the network
  - Show how CHD flows between individual systems, applications, processes and data stores
  - Help visualize data processing and where the data will come from and go to

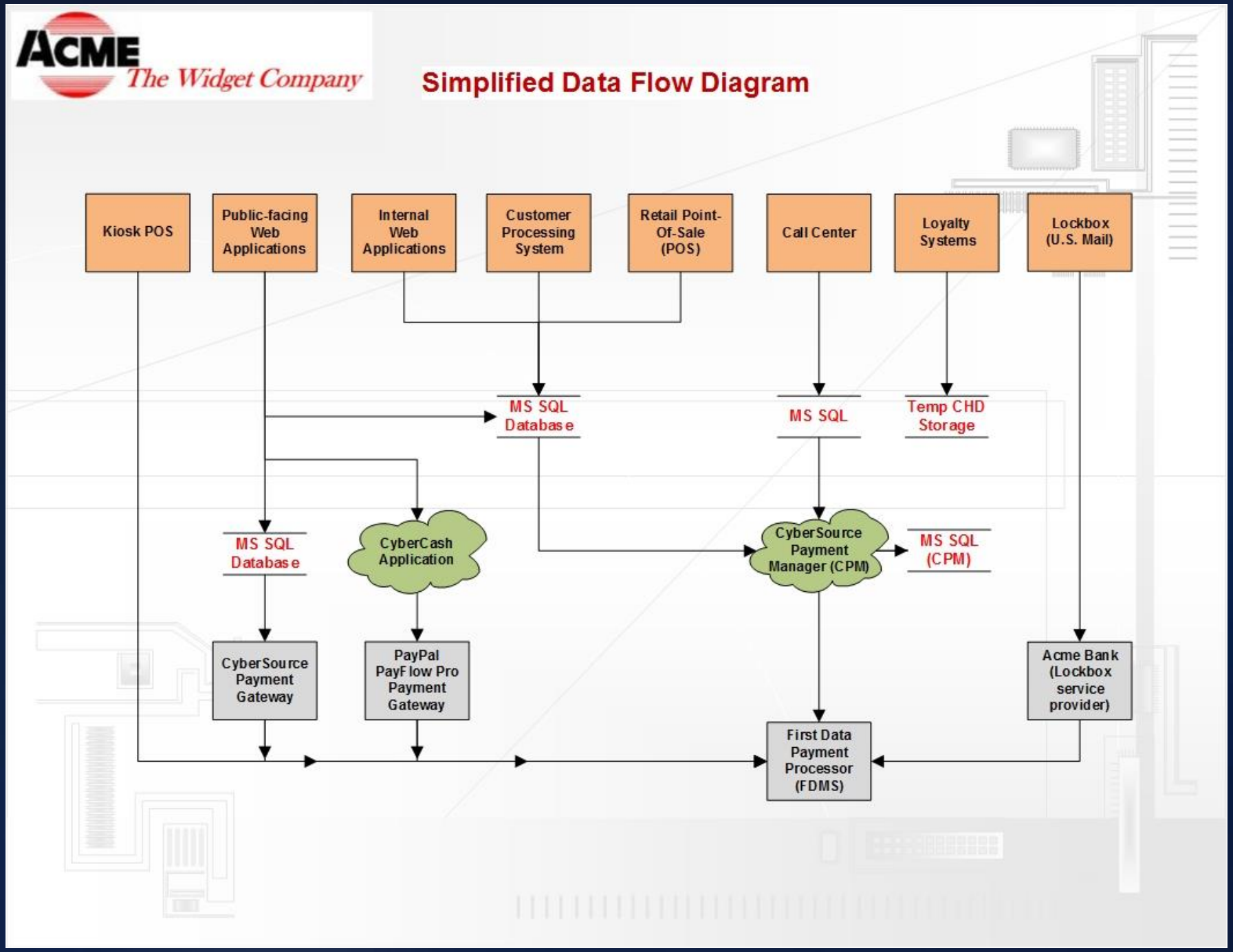
# Network diagram



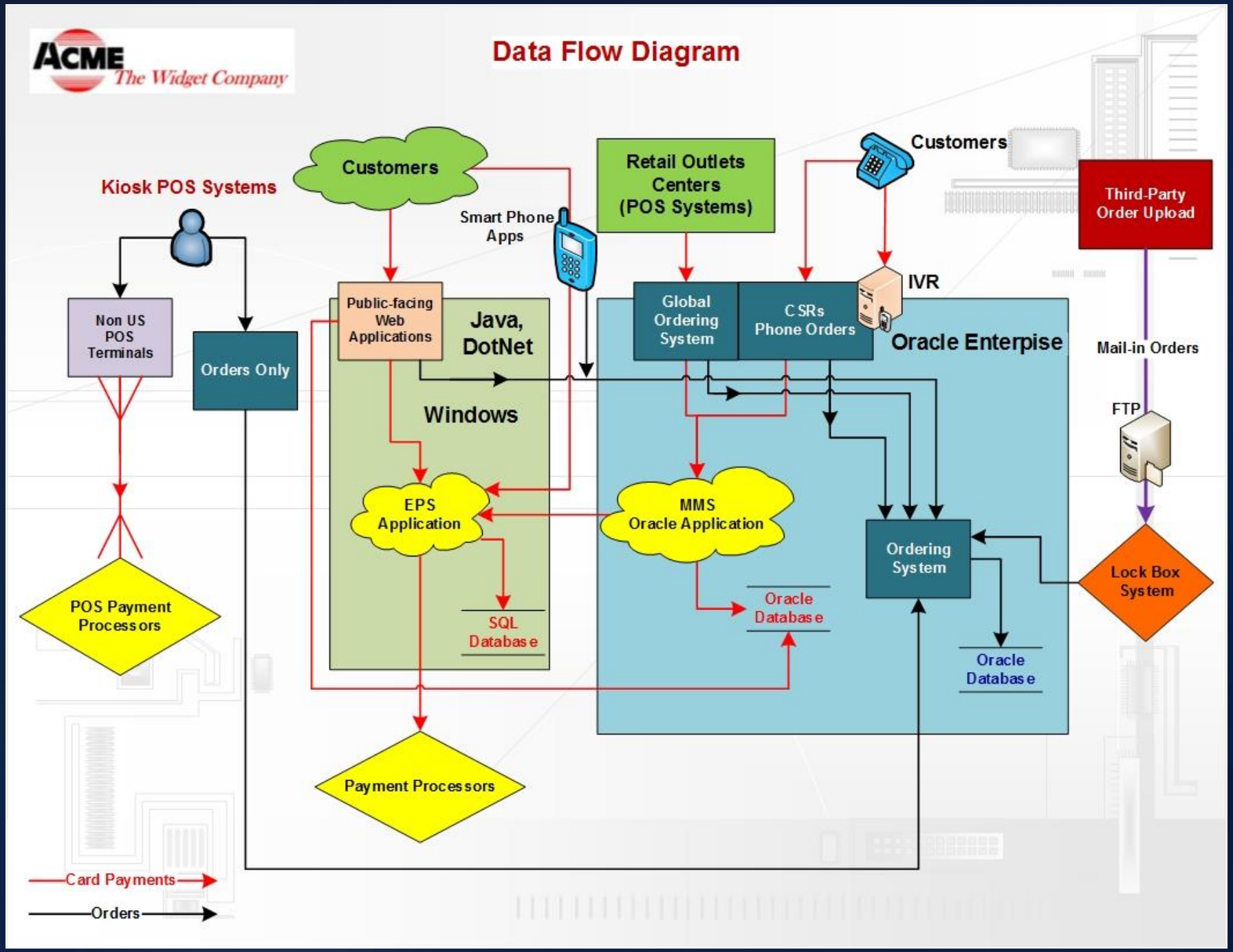
# Network diagram – not a data flow diagram



# Data flow diagram – basic diagram



# Data flow diagram – more context



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# Segmentation and Penetration Tests

- Segmentation = Isolation
  - Isolates systems that store, process or transmit CHD from those that do not
  - Dependent upon several factors (network configuration, deployed technologies, etc.)

# Segmentation and Penetration Tests

- Segmentation = Isolation
  - Without adequate segmentation, the entire network is in scope
  - Segmentation may:
    - Reduce the scope and cost of the PCI DSS assessment
    - Reduce the cost and difficulty of implementing and maintaining PCI DSS controls
  - Network and CHD flow diagrams aid in determining that segmentation is effective at isolating the CDE

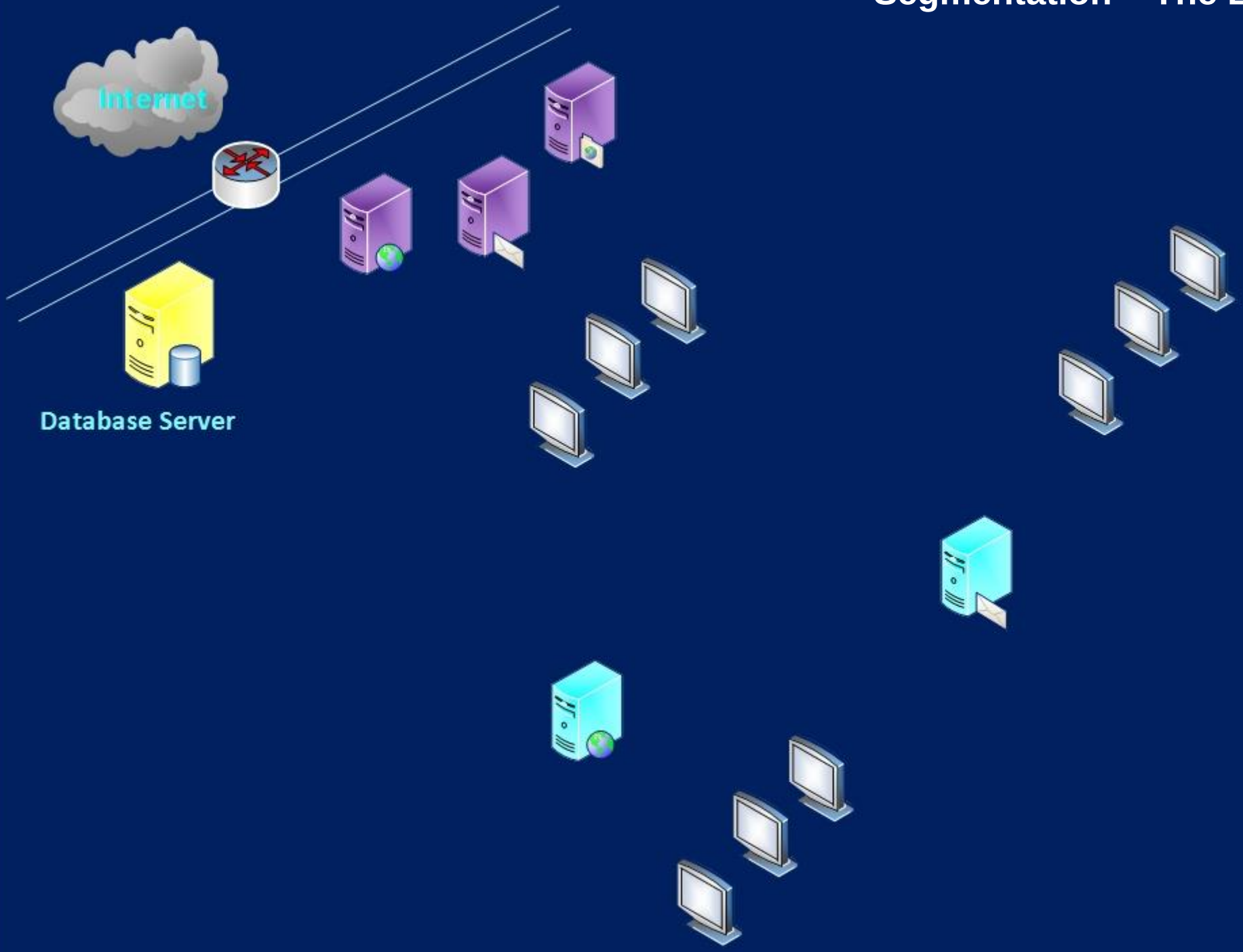
# Segmentation and Penetration Tests

- Keys to successful scope reduction with segmentation
  - Consider all out-of-scope networks as the Internet
  - Remember that all systems that may impact the security of card data are in scope
  - Thoroughly document the cardholder data flow

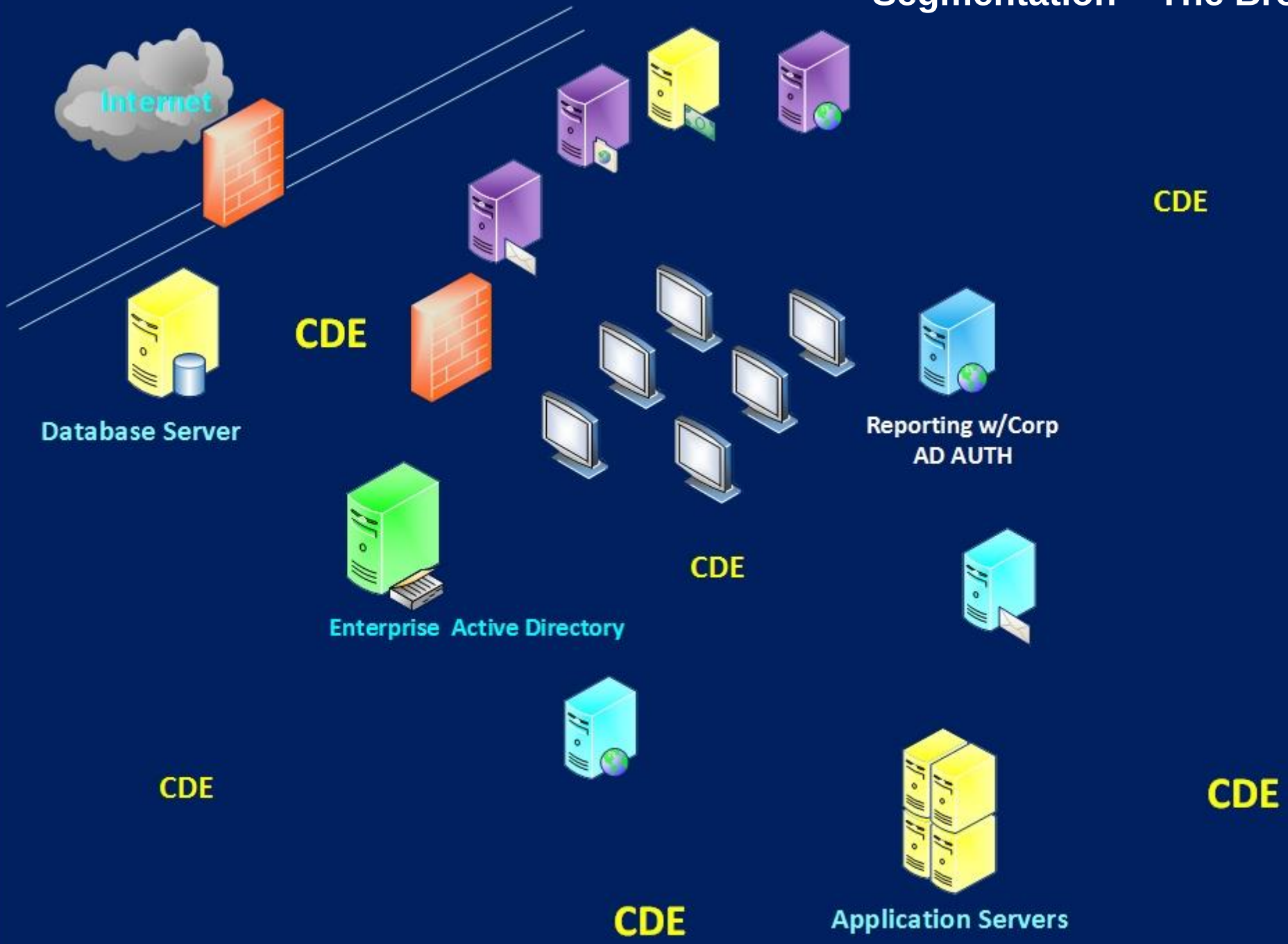
# Segmentation and Penetration Tests

- Keys to successful scope reduction with segmentation
  - Use risk assessments to determine acceptable network traffic
  - Implement additional security controls to mitigate risks
  - Be strict about network traffic permitted to the CDE

# Segmentation – The Beginning



# Segmentation – The Bronze Age

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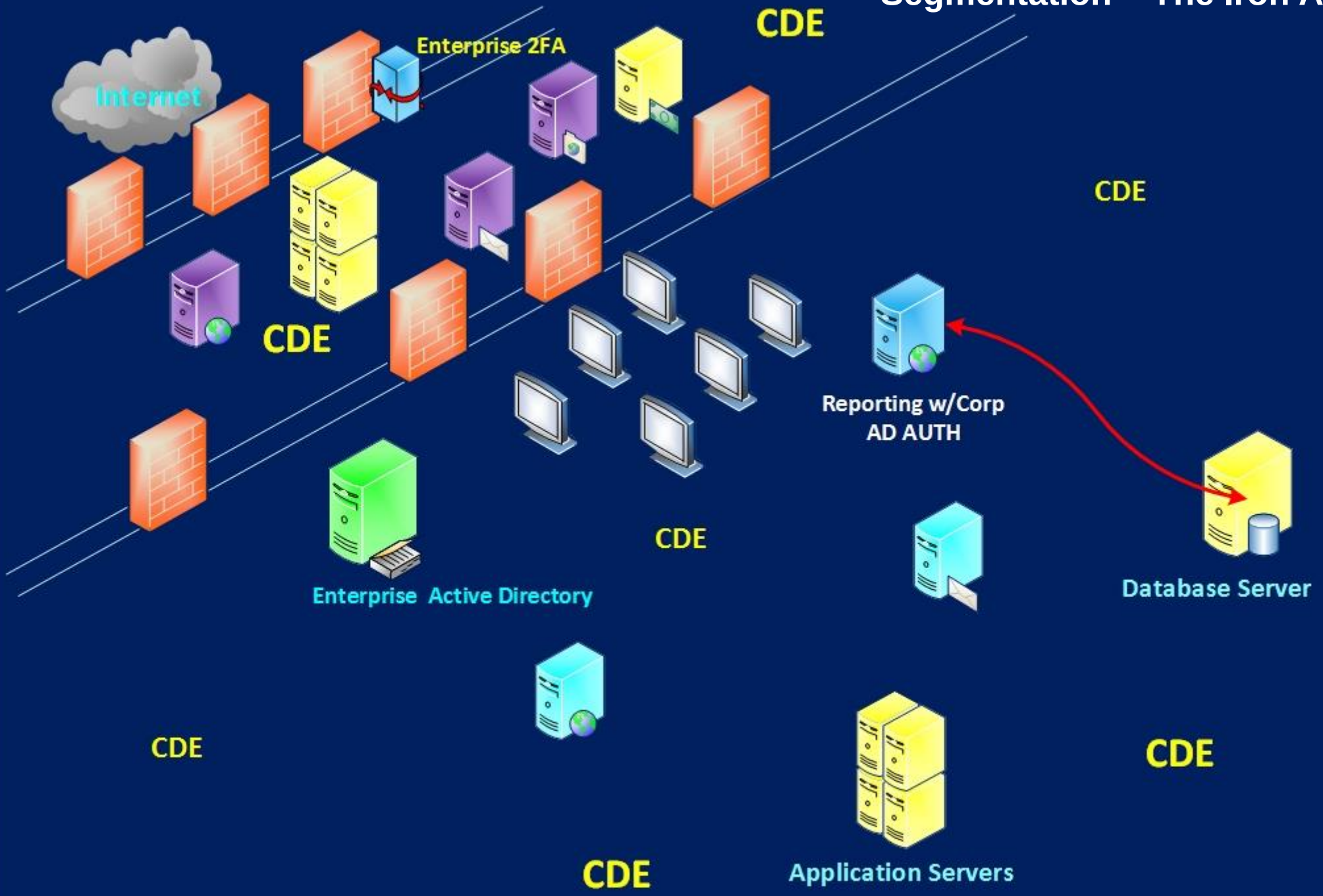
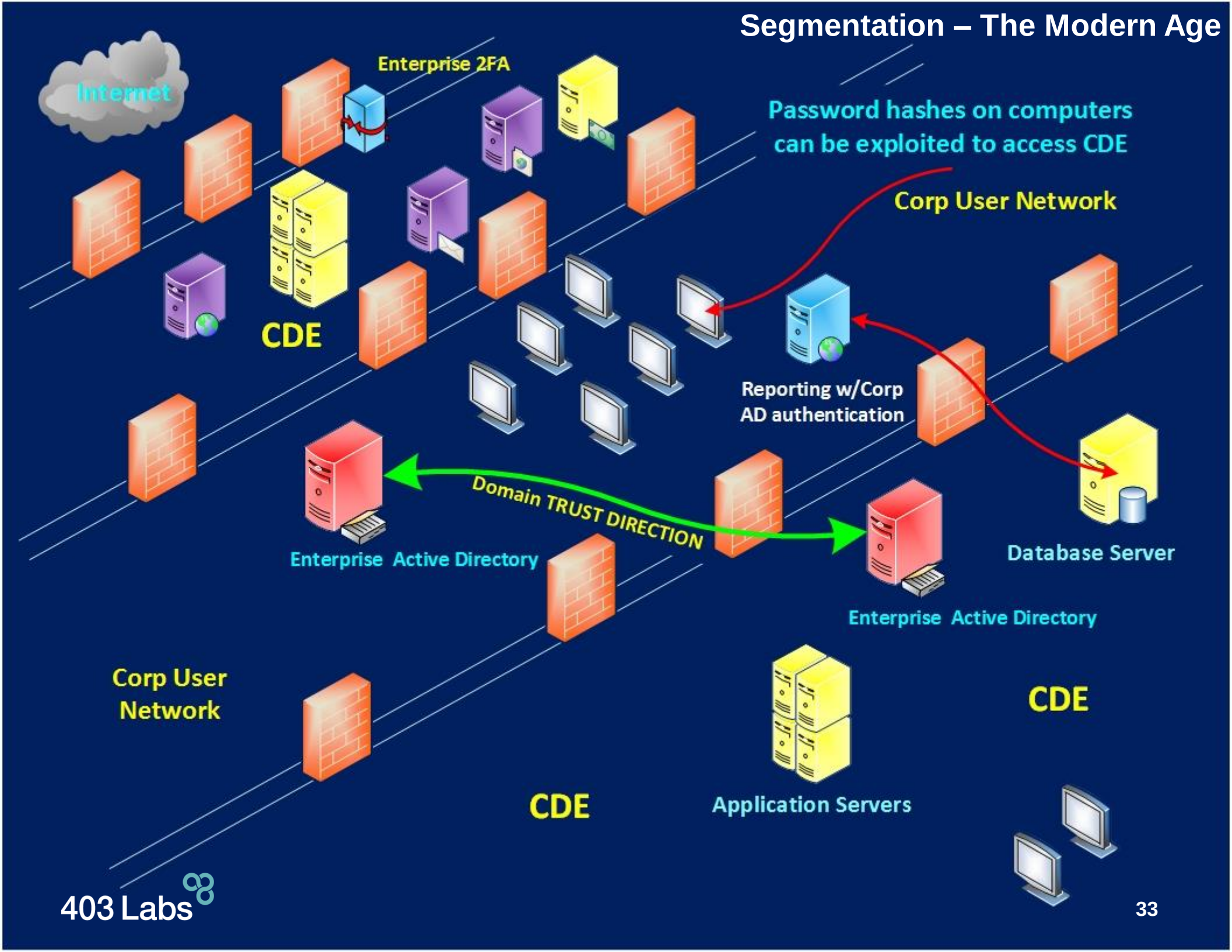
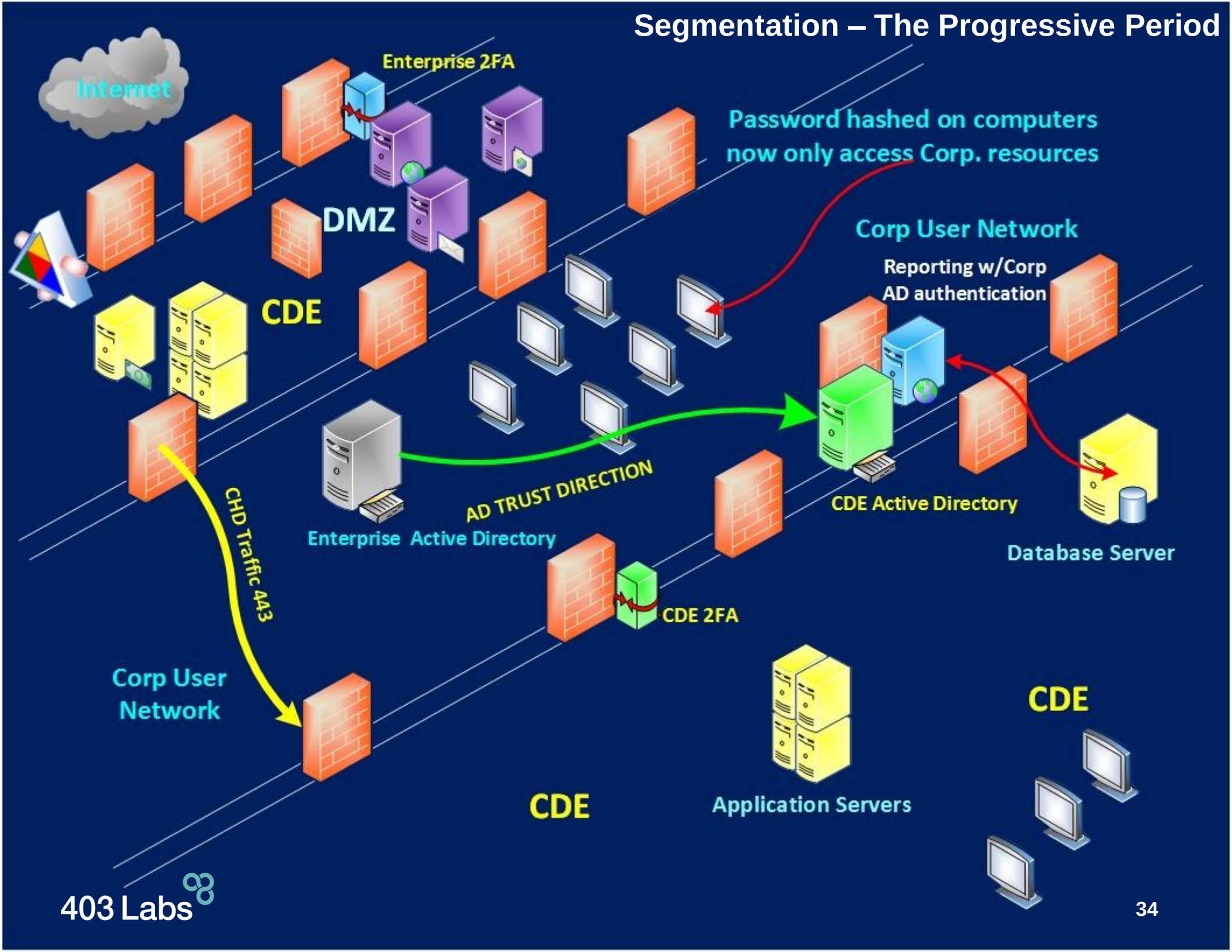
# Segmentation – The Iron Age



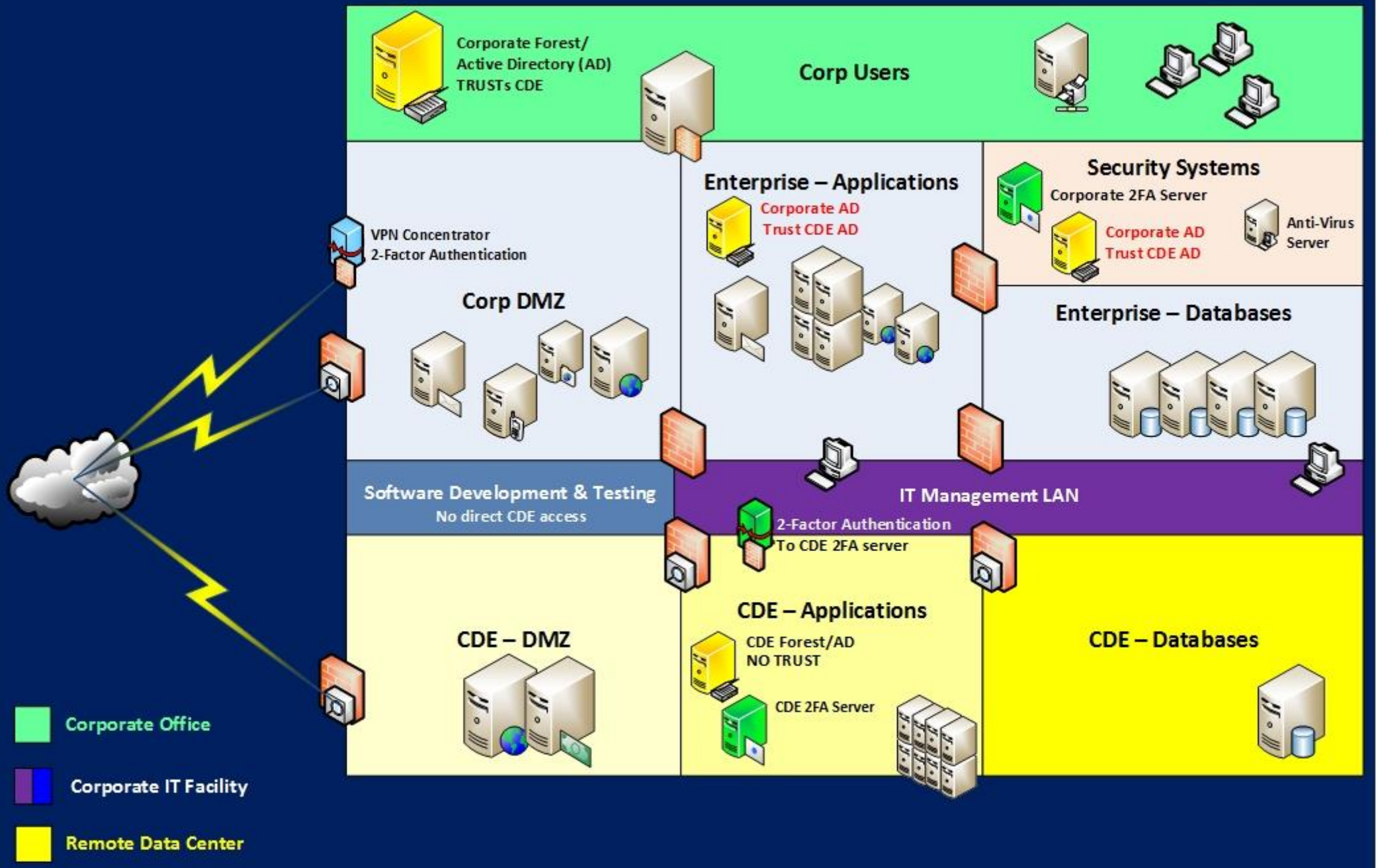
# Segmentation – The Modern Age



# Segmentation – The Progressive Period



# Segmentation – The Progressive Period Detailed

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# Segmentation and Penetration Tests

- Requirement 11.3 - Implement a methodology for penetration testing that includes the following:
  - Is based on industry-accepted penetration testing approaches (for example, NIST SP800-115)
  - Includes coverage for the entire CDE perimeter and critical systems
  - Includes testing from both inside and outside the network
  - Includes testing to validate any segmentation and scope-reduction control

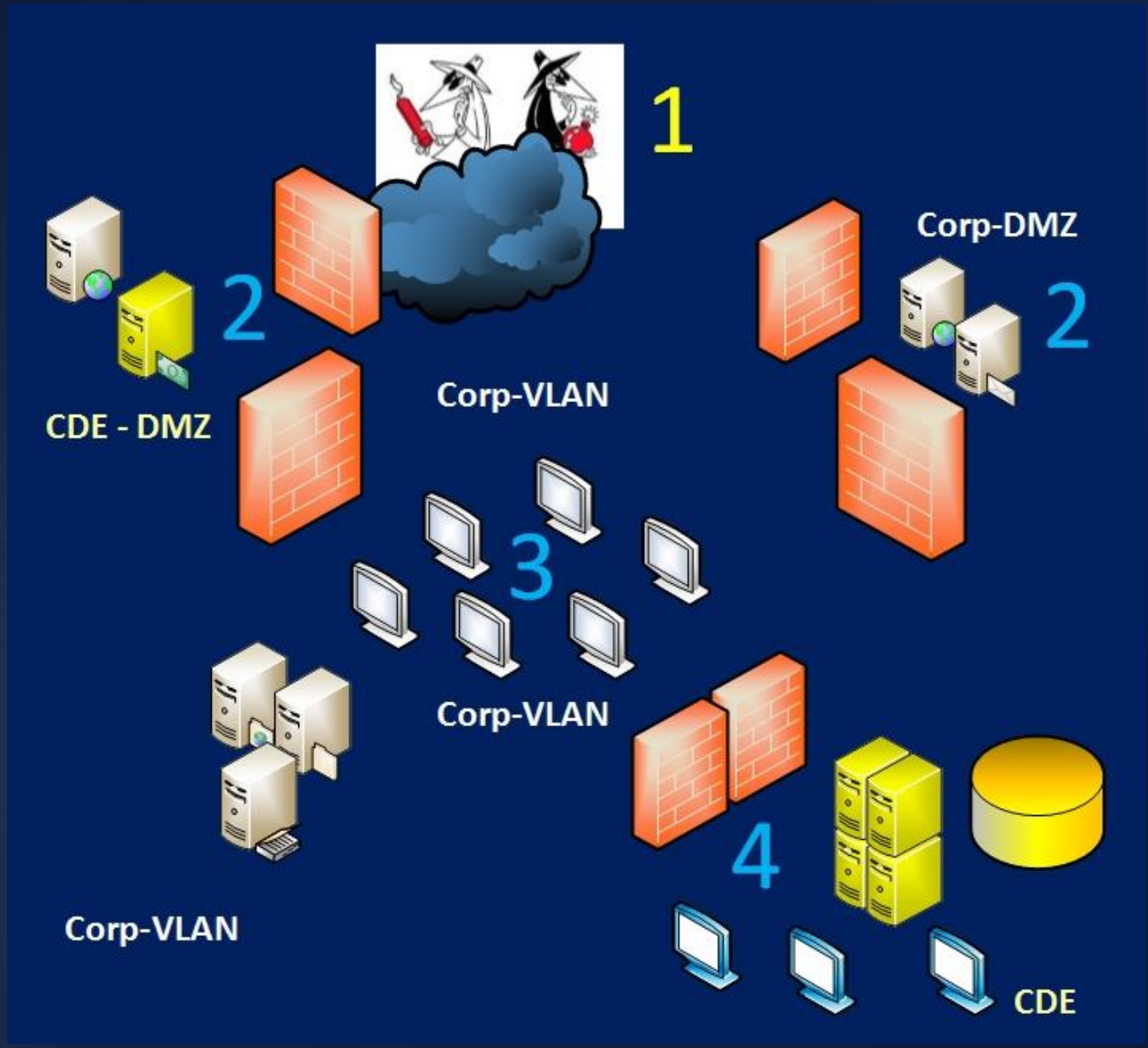
# Segmentation and Penetration Tests

- PCI penetration testing validates that segmentation and other security controls are effective
- A high-level approach is as follows:

# Segmentation and Penetration Tests

1) External testing

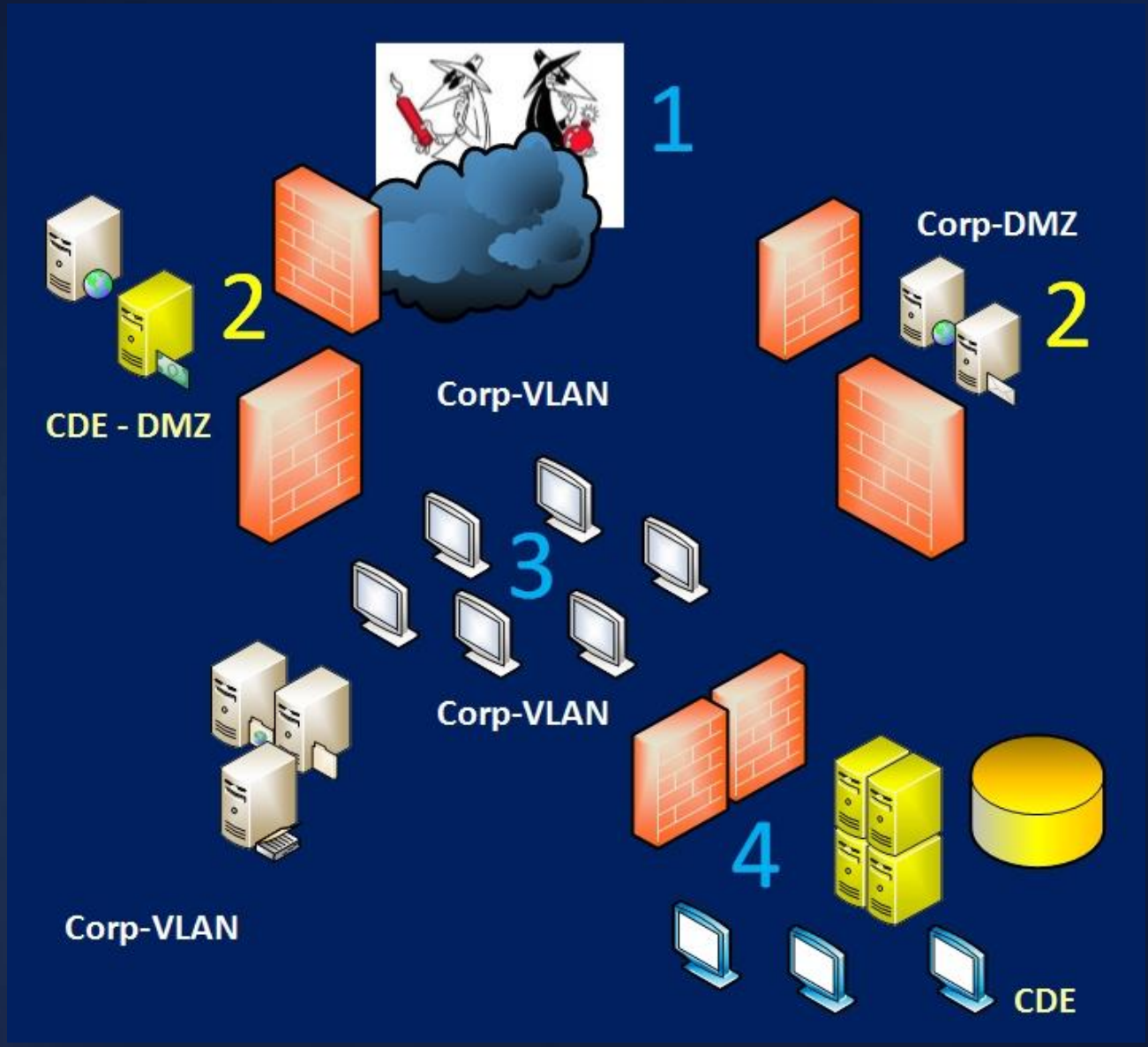
- The tester sits in a remote location across the Internet and attempts to gain unauthorized access to any DMZ that may provide a direct or indirect pathway to any in-scope system



# Segmentation and Penetration Tests

2) Internal testing: Testing assumes the DMZ has been breached

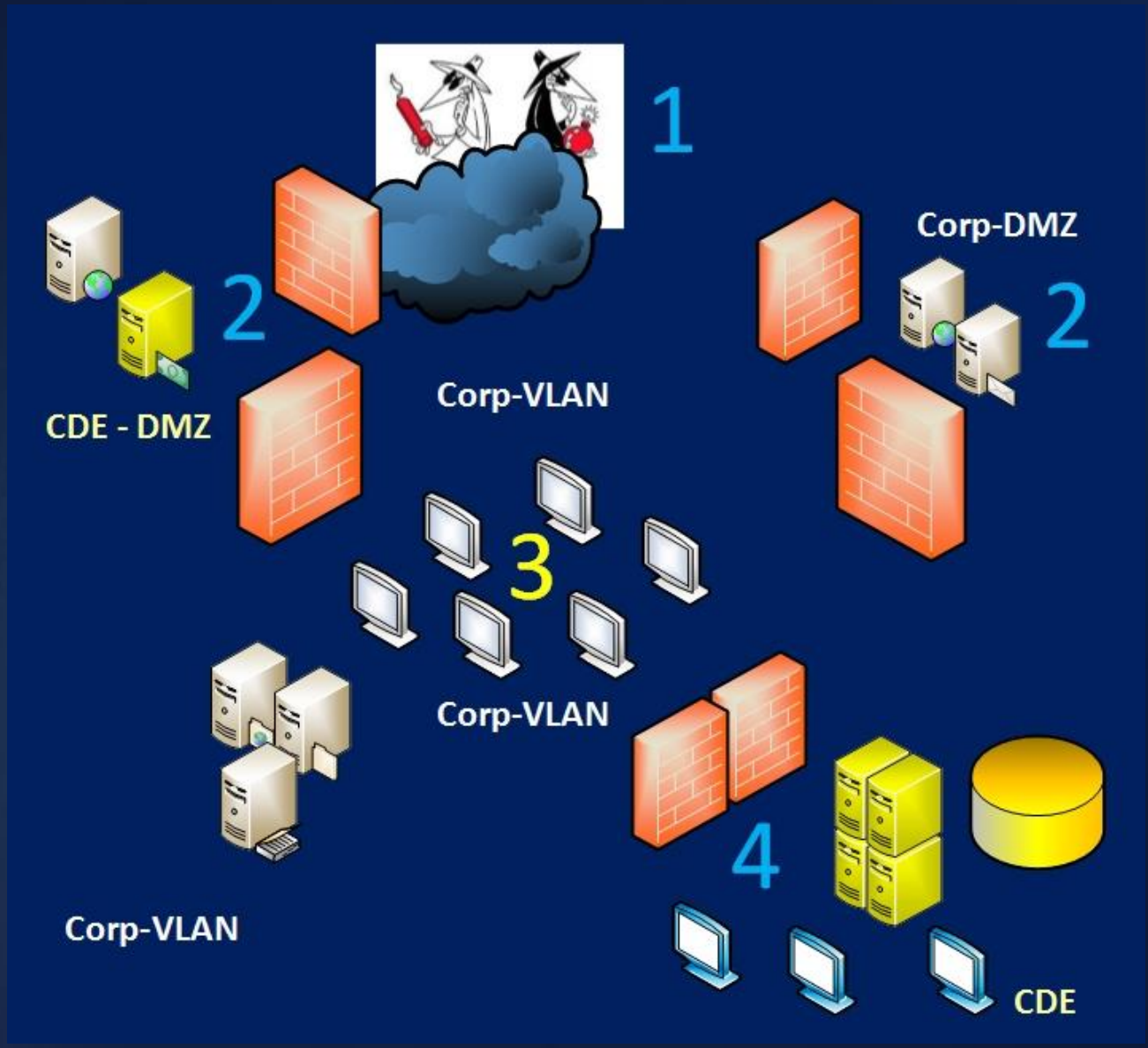
- The tester sits in the DMZ and attempts to gain unauthorized access to systems in the DMZ or the corporate network and then tries to get into the CDE



# Segmentation and Penetration Tests

3) Internal testing: Assumes a breach or a malicious internal unprivileged user

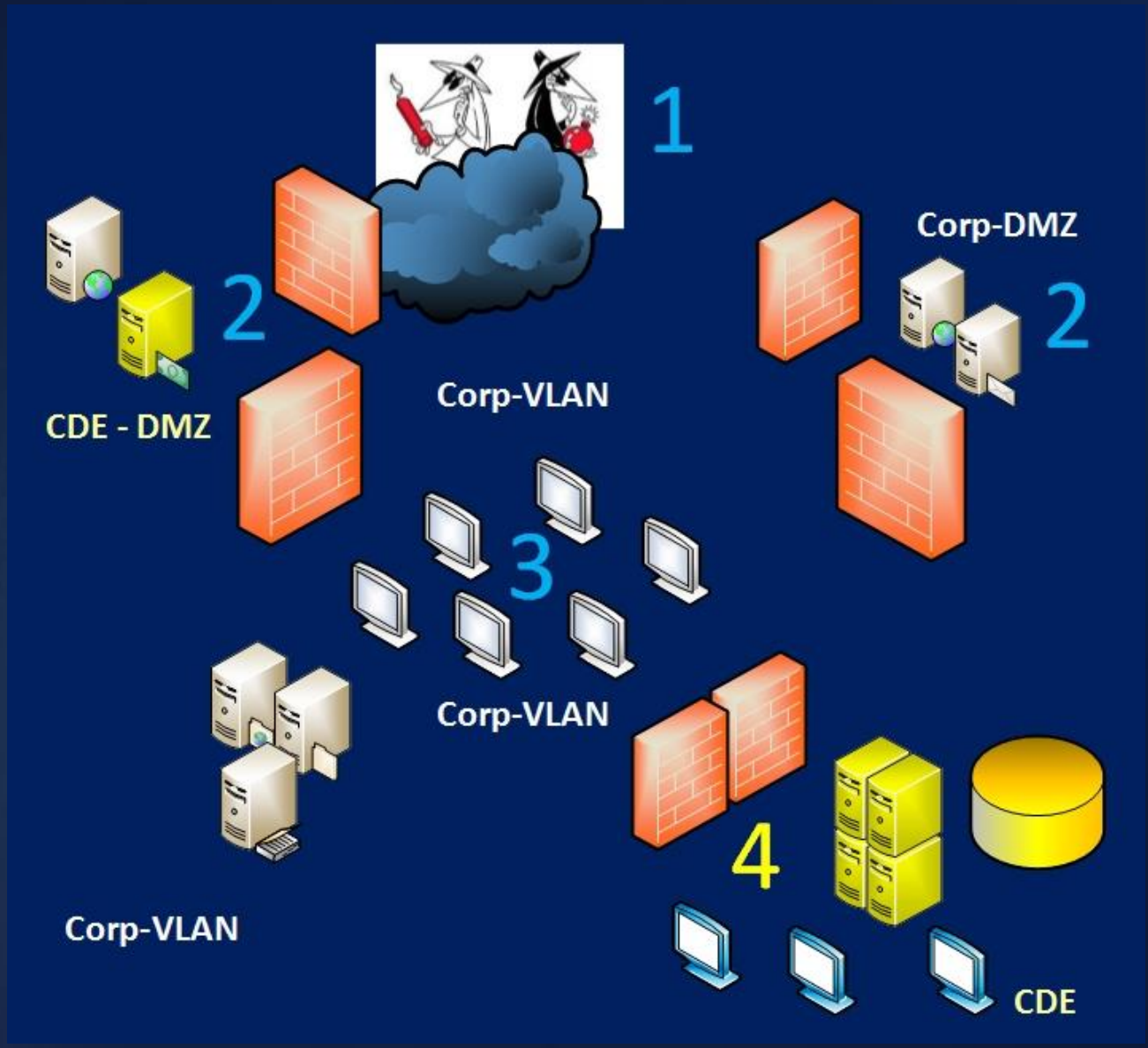
- The tester sits in the corporate user network and attempts to gain unauthorized access to local systems and then tries to get into the CDE



# Segmentation and Penetration Tests

4) Internal testing: Performed if users or admin PCs are in the CDE; assumes a breach or malicious internal unprivileged user

- The tester sits in the CDE and attempts to gain unauthorized access to systems that process or store CHD



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Four keys

# Risk-Driven Policies and Procedures

- Risk assessment focused on CHD
  - Conclusion should not be preconceived
- Policies express high-level direction to mitigate risk
- Standards to provide details on how to implement policy

# Risk-Driven Policies and Procedures

- Operational procedures to integrate security into business and IT operations
- Policy and procedures for every PCI DSS requirement

# Risk-Driven Policies and Procedures

- Challenge 1: No appetite for strict security policies
  - Establish a security policy for the enterprise
  - Establish a critical data security policy for the PCI environment that:
    - Establishes a separate set of rules
    - Is applicable only to the PCI in-scope environment (i.e., technology, processes and people)

# Risk-Driven Policies and Procedures

- Align data security policy with the PCI DSS
  - Build and maintain a secure network
  - Protect cardholder data
  - Maintain a vulnerability management program
  - Implement strong access control measures
  - Regularly monitor and test networks
  - Maintain an information security policy

# Risk-Driven Policies and Procedures

- Challenge 2: IT people aren't writers and have no time
  - Engage a specialist to write policies and procedures
    - Canned policies and procedures off the Internet will require extensive modification
    - Utilize an expert to develop policies, plans, standards and procedures that are in line with your organization's risks, operations and processes

# Risk-Driven Policies and Procedures

- Procedure example: 1.1.2 - Procedures for keeping the network and data flow diagrams current
  - Standard requires it, how is it done?
    - As part of the change control procedure, require a diagram illustrating the change to be submitted with the change request
    - The procedure should describe this process

# Risk-Driven Policies and Procedures

- Procedure example: 4.1 - Procedures for using strong cryptography/security protocols to protect CHD during transmission over open, public networks
  - Specific procedures to secure SSL/TLS certificates and keys

# Risk-Driven Policies and Procedures

- Procedures for Requirement 4.1 should explain how to:
  - Configure applications to only use valid signed certificates and strong ciphers
  - Prevent modification of related configurations
  - Secure and store SSL/TLS certificates and keys
  - Set permissions on certificates and keys
  - Encrypt private keys?

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# ArtiFACTS

- Policies and procedures present evidence of intent
- Artifacts present evidence of action
  - Configuration files
  - Reports and records
  - Results of host configuration reviews or assessments
    - Includes audit commands and results (see CIS benchmarks)

# Questions and Answers

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## Thank You!

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