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Electric Reliability Council of Texas (ERCOT)

Cyber Security Workshop

Defining the Electronic Security Perimeter

Bill Addington

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Assets

- Critical Assets ->
  - Critical Cyber Assets ->
    - Electronic Security Perimeters
      - Access Control and Monitoring Devices
      - Non-Critical Cyber Asset

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Requirement: Electronic Security Perimeter CIP-005/R1

- **R1 – The Responsible Entity shall ensure that every Critical Cyber Asset resides within an Electronic Security Perimeter.**
- **Identify and document**
  - **Electronic Security Perimeter**
    - **Can have many such perimeters in organization**
  - **All access points to the perimeter**
    - Identify different device types used as access points

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Electronic Security Perimeter (ESP)

- Logical concept
  - Doesn't physically exist
  - Cyber Assets within a defined perimeter are accessible only through a defined access point for the ESP.
- Identify
  - Provide a name or other unique identifier
- Document
  - Critical Cyber Assets within the ESP
  - Non-Critical Cyber Assets within the ESP
  - Access Points for the ESP

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Access Points

- An access point is any place where electronic traffic crosses the Electronic Security Perimeter
  - Examples (not all inclusive)
    - Routers (including wireless access points)
    - Firewalls
    - Dial-Up
    - Radio Frequency (RF) devices
    - Infrared (IR) devices
- Terminates at any device within the defined ESP

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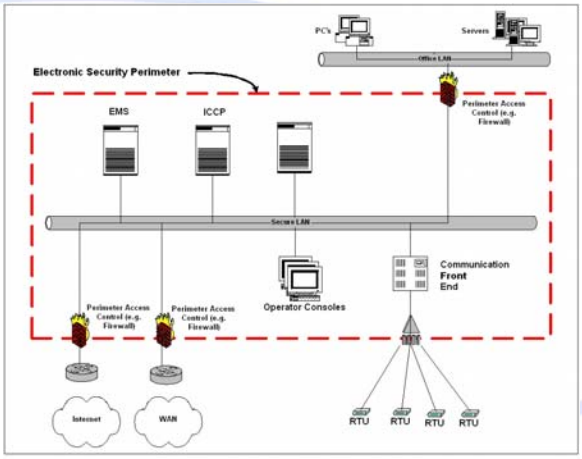
ESP illustration



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Evolving Network Infrastructure

- Convergence of control systems (SCADA, EMS, OMS, DMS)
- Linkage to Corporate networks
- New access points to the corporate network
  - Service providers
  - Supply chain partners
  - Customers

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Evolving Substation roles

- No routable protocols (No NERC Critical Cyber Assets)
- Routable protocols within but not connected externally (No NERC Critical Cyber Assets)
- Connected to Control Center via routable protocol, connected to other substations (Yes, NERC Critical Cyber Assets)
- Connected to Corporate LAN (Video links, physical security equipment)
- Rogue access points (External links for projects, wireless for convenience)

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Substations

- Regardless of importance to business, not worried about distribution load serving status UNLESS the station could affect the grid (cascading failure)
- Subset of stations could be critical assets
  - Tie Lines
  - Black start corridor
- Can apply standards to non-critical substations, but don't put on Critical Asset list
- Substations designated as critical will have to have at one defined access point

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Other Considerations: Dial-up

- Dial-up connection to a single device that does not use a routable protocol requires a separate ESP be defined and documented for that device
  - ESP requires access control and logging
  - Must meet requirements defined throughout CIP for access control

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Communications Links

- Links between perimeters are not part of the ESP (explicitly EXCLUDED)
- End points of those links are access points
- If substations are linked together without intervening access control points, they then lie within the same ESP and communications links ARE included for audit accountability
  - How would you physically protect them?

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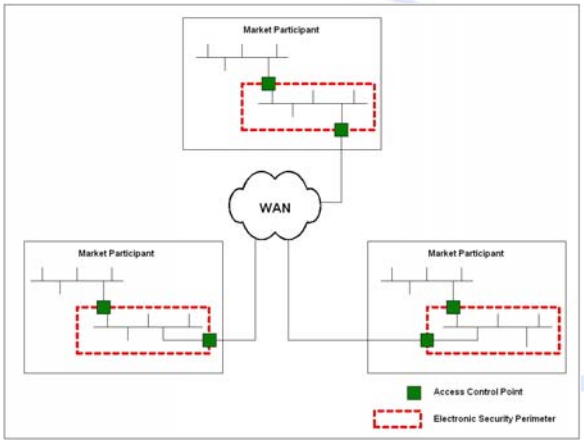
Communications Links



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Access Control

- Access points and cyber assets used in access control and monitoring require the protective measures defined throughout the CIP standards
  - Access control management
  - Physical Security

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Documentation

- Each Electronic Security Perimeter
  - All devices connected with routable protocols within the defined perimeter
    - Critical Cyber Assets
    - Non-Critical Cyber Assets
      - Consider moving non-critical assets to separate electronic perimeter
  - Electronic access points for the ESP
  - Cyber Assets required monitoring and control of the access points
- Document any changes to the ESP, access points or controls within 90 days of the change

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Required Review

- **Review the defined ESPs annually and update as necessary**
  - Perimeters all defined?
  - All documentation maintained and accessible?
  - All Critical cyber assets located in an ESP?
  - Documentation process integrated into change management process?
    - All changes being reflected properly?

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Substation Governance

- Many organizations, substation property is a communal asset with no centralized person or group responsible for all changes to the substation
- Change management and documentation is now essential for substations designated critical