



<https://t.me/learningnets>



PROJECT

ENG

PRO

CYBER SECURITY FOR INDUSTRIAL CONTROL SYSTEMS

By Project **ENG PRO**



FR 5 – From IEC 62443

FR1 – Identification, authentication and access control

FR2 – Use Control

FR3 – System Integrity

FR4 – Data Confidentiality

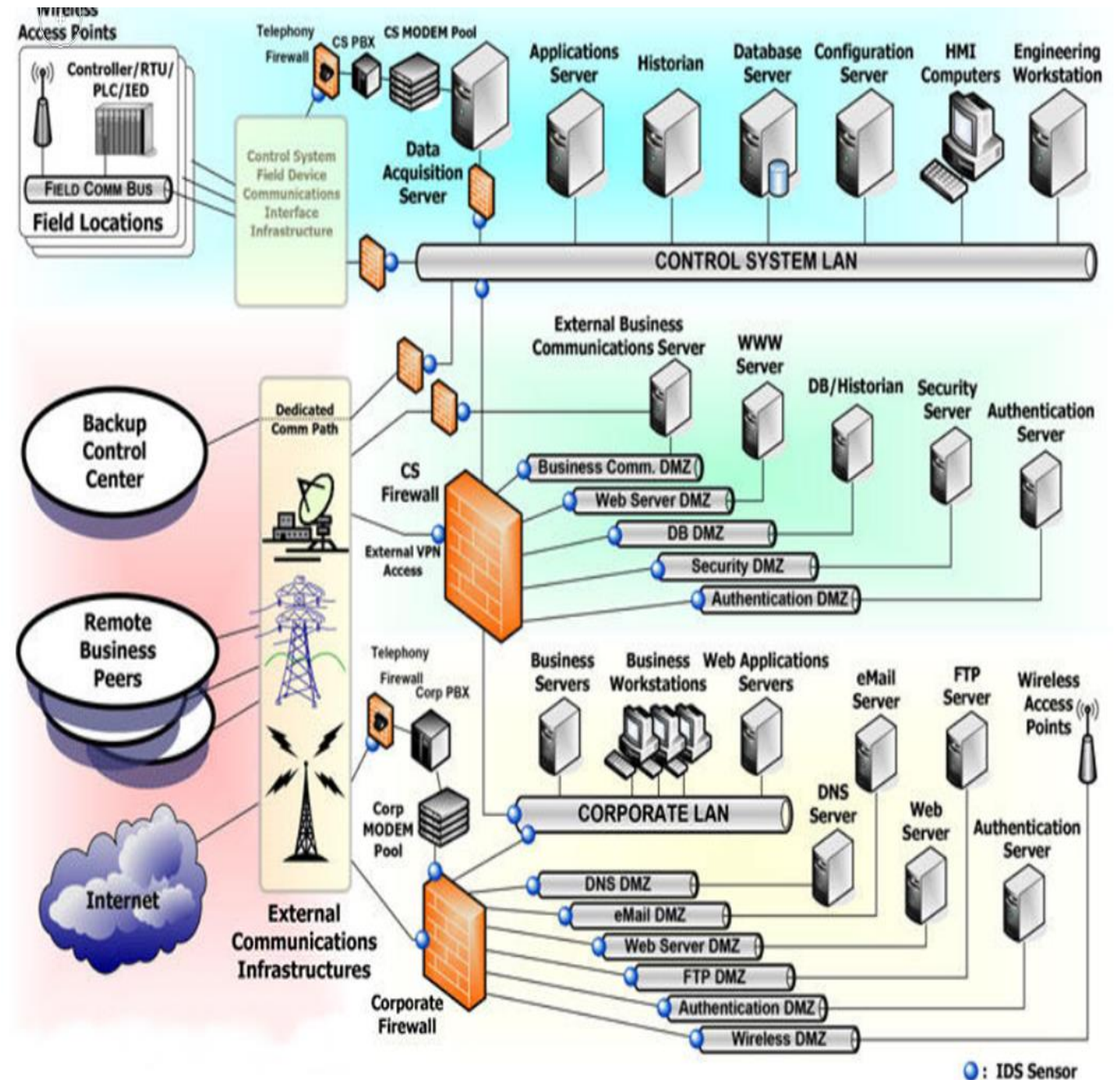
FR5 – Restrict Data Flow

FR6 – Timely response to event

FR7 – Resource Availability

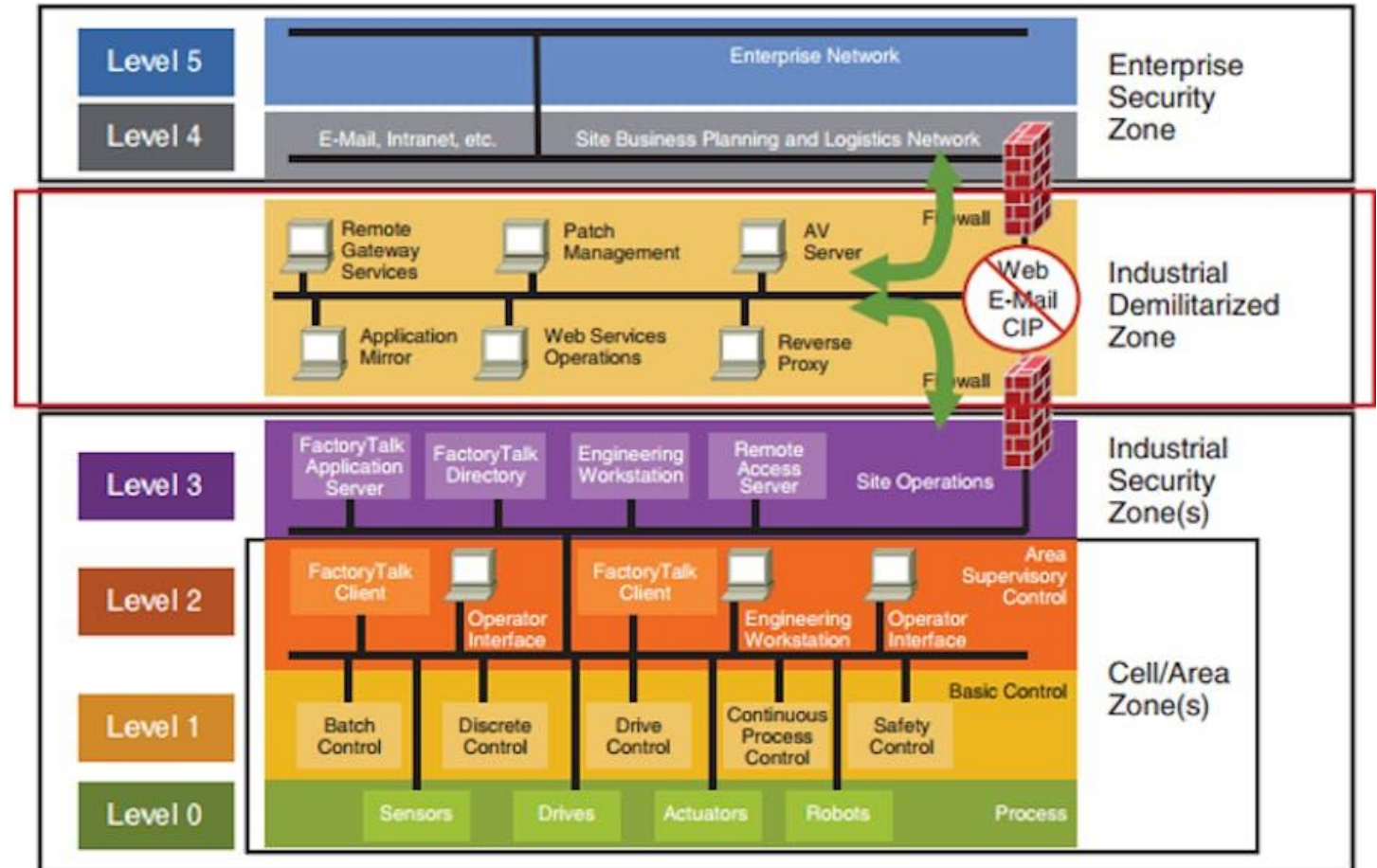
Introduction

- Importance of data flow control in Industrial Control Systems (ICS)
- Segmentation of control system architecture into zones and conduits
- Alignment with the Purdue model's logical separation approach



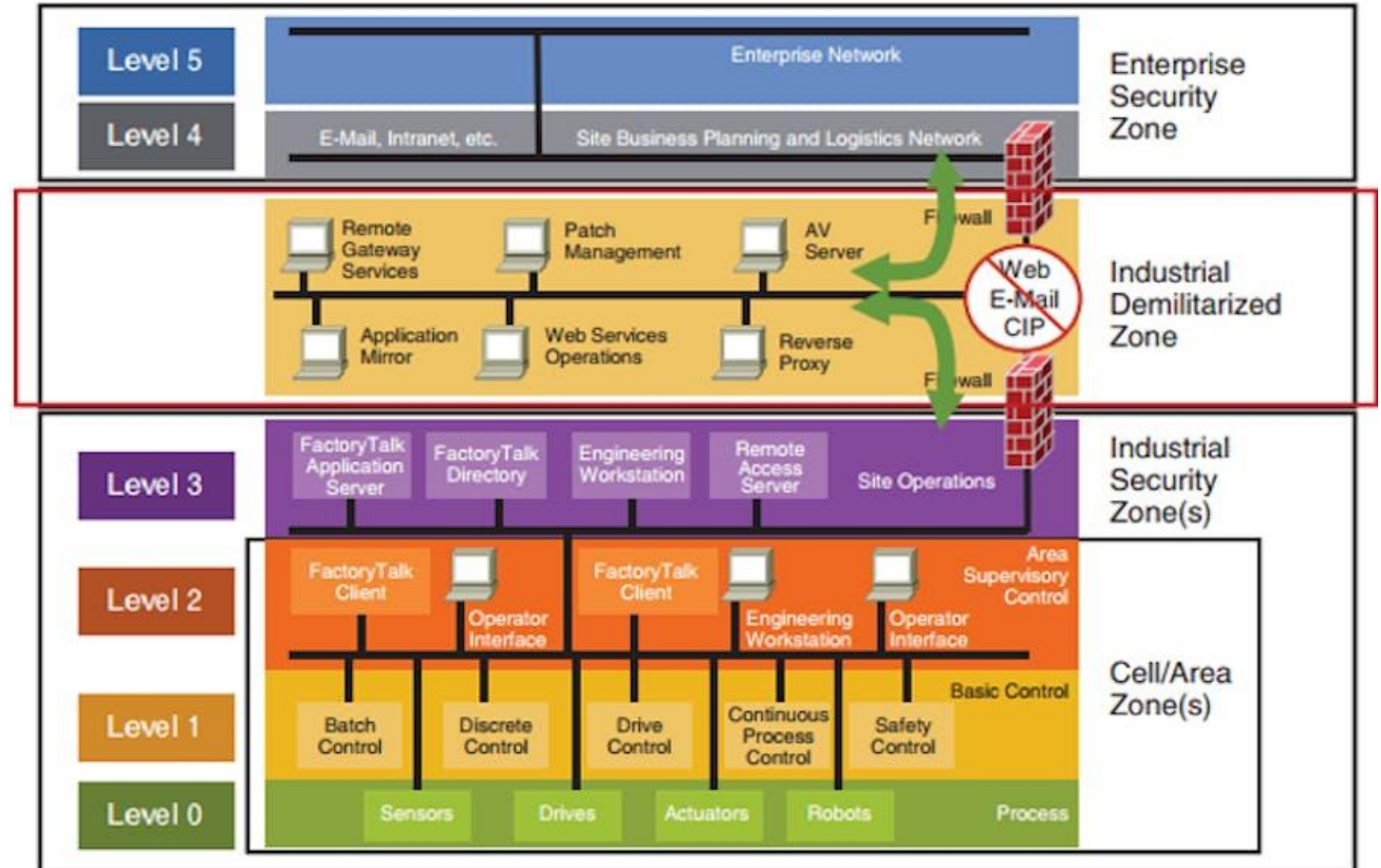
Purdue Model

The primary requirement for data flow control is to prevent unnecessary and undesired communication between different parts of the control system.



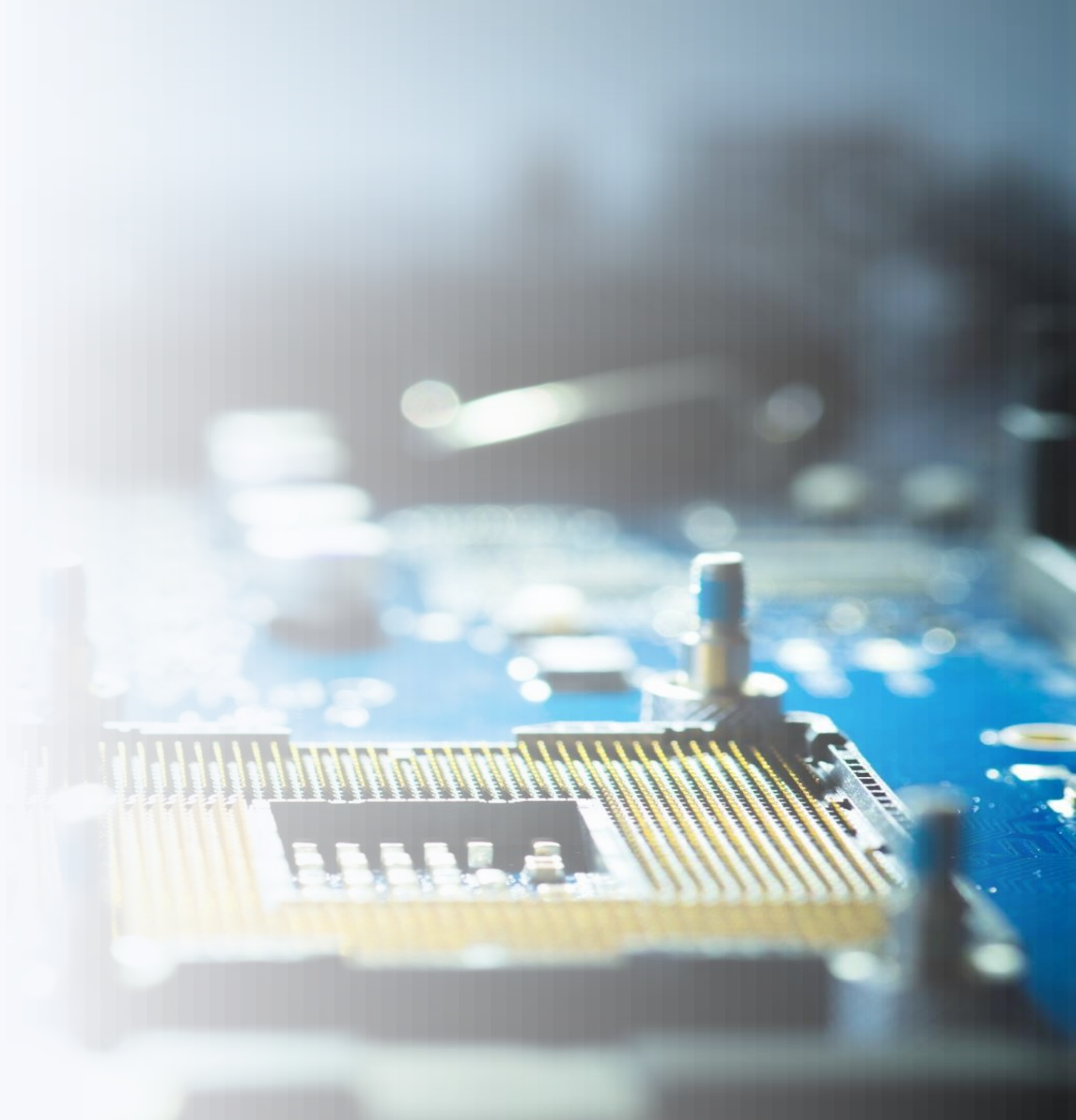
Purdue Model

Following the principles of the Purdue model, we can determine the appropriate zones within the control system architecture.



Scenario: Manufacturing Plant Hierarchy:

- Illustrating zones: Process Control, Supervisory Control, HMI, Corporate Network
- Variability in criticality and sensitivity across zones



Data Flow Control Technologies:



Firewalls



VLAN (Virtual LAN)



**Unidirectional Gateways (Data
Diodes)**

Benefits of Effective Data Flow Control



Stricter access controls and prevention of unauthorized communication



Enhanced data confidentiality and security



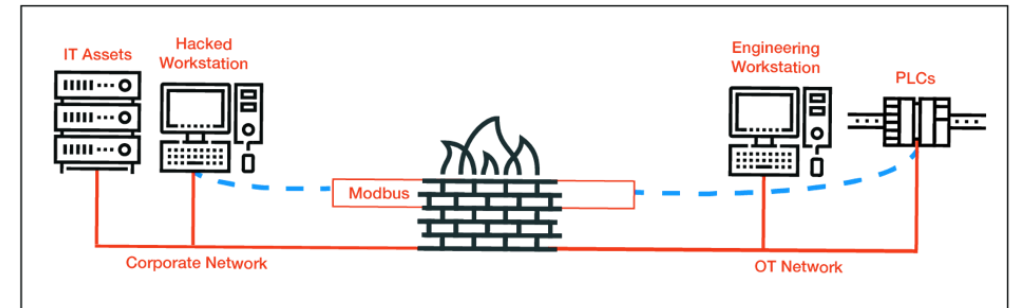
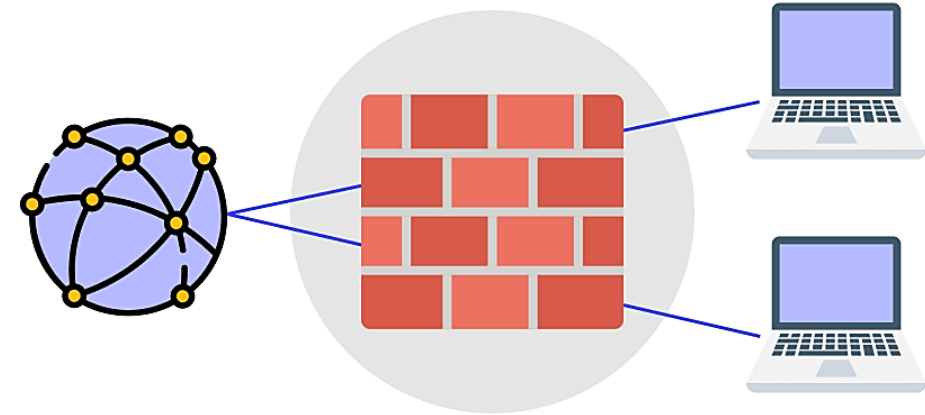
Efficient collaboration and communication within control environment



Regulatory compliance and stakeholder confidence

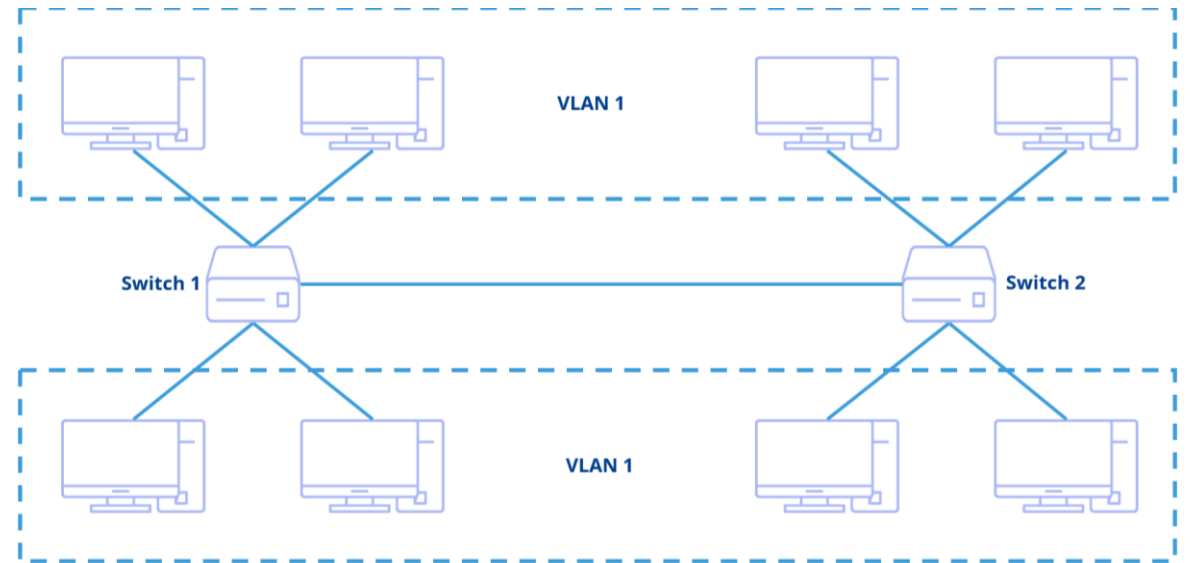
Firewalls

- Guardians of zone boundaries
- Enforce predefined rule sets
- Control incoming and outgoing traffic based on IP, protocols, and ports
- Prevention of unauthorized data flow between zones

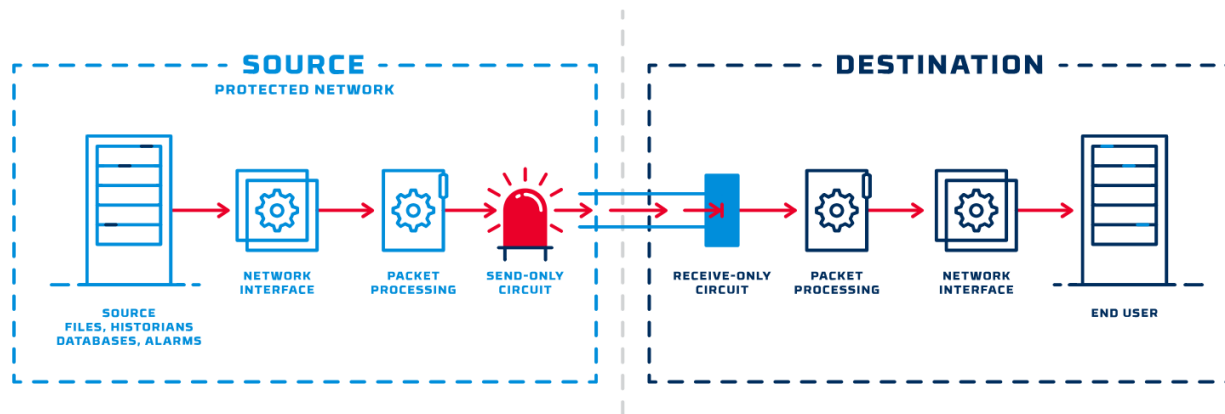


VLAN (Virtual LAN)

- Logical network separation within a single physical infrastructure
- Each VLAN operates as an isolated network
- Controlled communication between VLANs
- Ideal when physical separation is not feasible

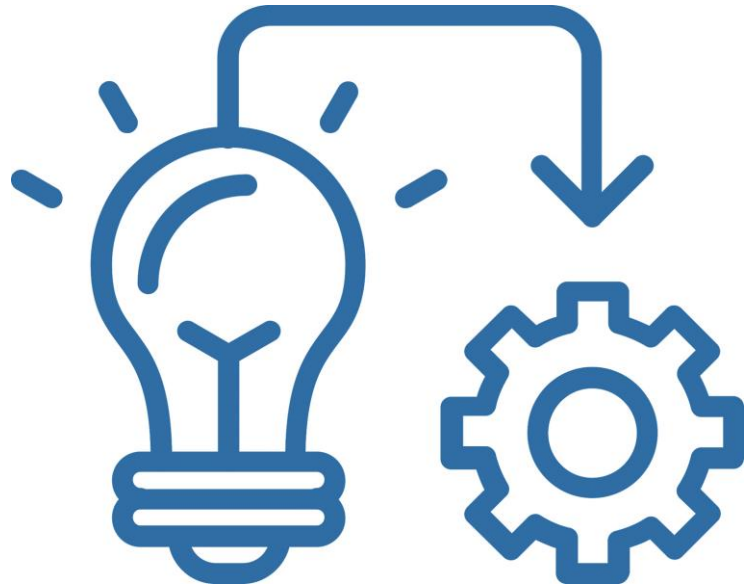


Unidirectional Gateways (Data Diodes)



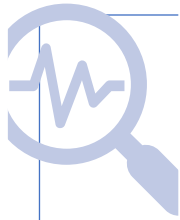
- Establish one-way flow of information between zones
- Enables secure transmission from high-security to low-security zones
- Prevents reverse communication
- Sharing critical data without compromising security

Implementation

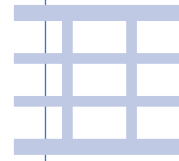


When implementing data flow control, it is essential to consider the criticality of systems and the potential impact of any disruptions.

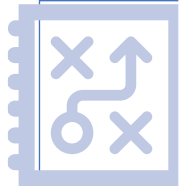
Implementation Strategy



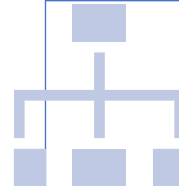
Determine criticality and sensitivity of zones



Strategically place firewalls at interaction points

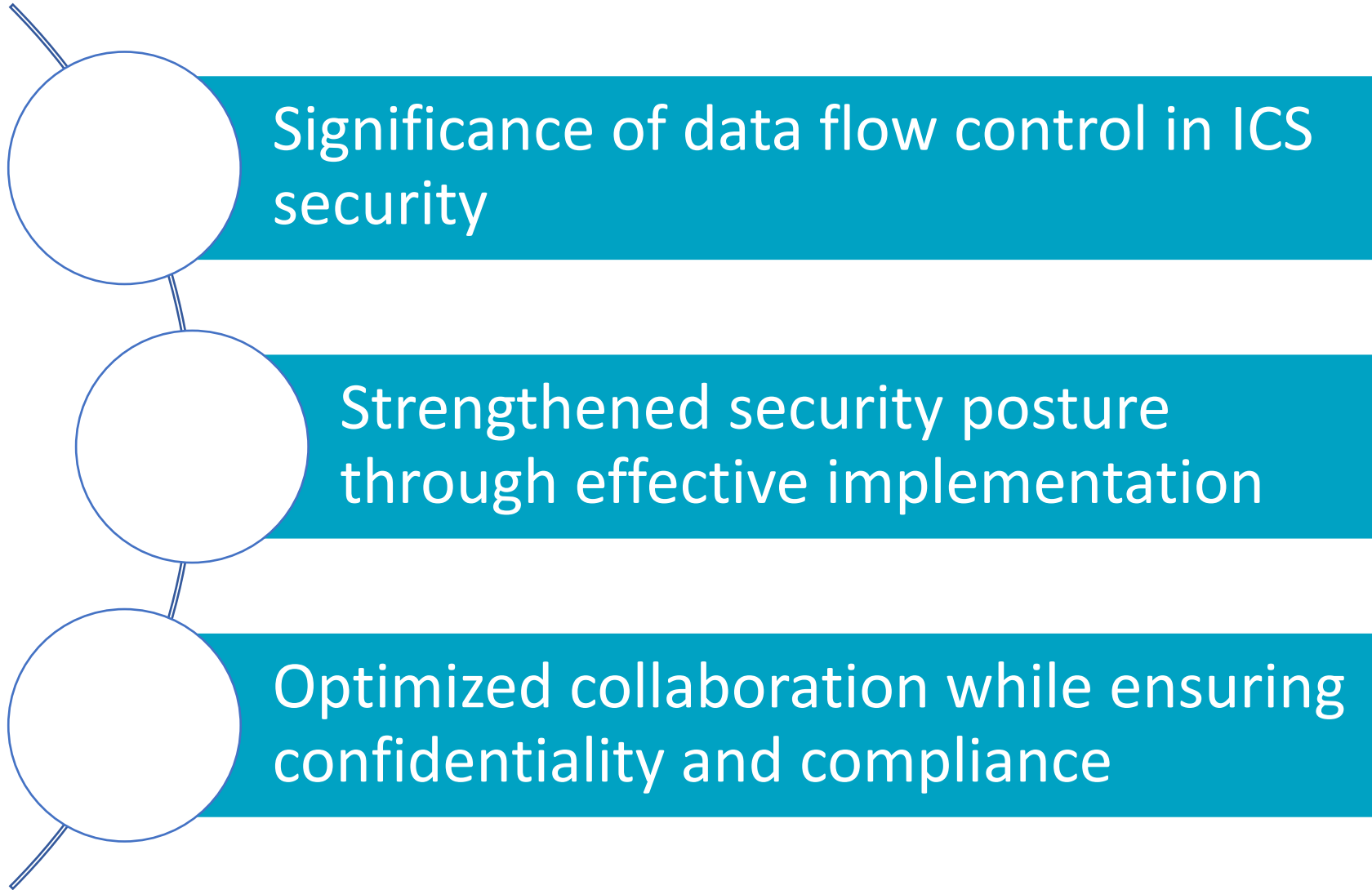


Implement VLANs for logical separation



Deploy unidirectional gateways for one-way data transmission

Wrap Up





<https://t.me/learningnets>