Inteligencia Artificial: Parcial Final CTT 2025

Unidad Curricular: Inteligencia Artificial

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Estado: Re Entrega

Prompt final.

Necesito crear un diagrama de red de infraestructura completo en Mermaid con las siguientes características:

ARQUITECTURA EN 5 CAPAS:

CAPA 1 - FÍSICA:

- Servidor Dell R720 con Windows Server

CAPA 2 - VIRTUALIZACIÓN:

- Hyper-V (Windows Hypervisor)

CAPA 3 - SISTEMA OPERATIVO:

- Ubuntu Server 20.04 como máquina virtual

CAPA 4 - CONTENEDORES:

- Docker Engine ejecutando todos los contenedores

CAPA 5 - RED Y SERVICIOS:

WAN/Internet (192.150.25.2/24):

- Clientes externos (Chrome/Firefox/Opera)

Firewall pfSense 2.7.2 con 4 interfaces:

- LAN: 192.168.10.1

- DMZ: 192.168.20.1

- Invitados: 192.168.5.1

- OpenVPN: 10.8.0.1

DMZ (192.168.20.0/24) - Todos contenedores Docker:

- WAF (192.168.20.12)

- HAProxy (192.168.20.9) - Puertos 80/443

- Web Server Primario (192.168.20.3) - Apache + PHP 8.3, Puertos 8080/4433

- Web Server Secundario (192.168.20.5) - Apache + PHP 8.3, Puertos 8081/4444

- ProxySQL (192.168.20.11) - Balancea MySQL Master/Slave

- MySQL Master (192.168.20.7) - Puerto 3309

- MySQL Slave (192.168.20.6) - Puerto 3306

- DNS Server (192.168.20.10)

- SMTP (192.168.20.2) - Puerto 25

- Rsync Backup (192.168.20.4)

- Monitoreo (192.168.20.8) - Prometheus: 9090, Grafana: 3000

- Portainer (192.168.20.13) - Gestión de contenedores Docker

- Servidor FTP (192.168.20.15) - Puerto 21

LAN (192.168.10.0/24):

- PC Oficina 01 (administra Portainer y servicios, accede a Rsync vía SSH)

- PC Oficina 02

- Laptop Windows

Red de Invitados (192.168.5.0/24):

- Dispositivos Android

OpenVPN (10.8.0.0/24):

- iPhone (10.8.0.2)

- Laptop iOS (10.8.0.3)

CONEXIONES Y FLUJOS (con puertos específicos):

1. Infraestructura: Dell → Hyper-V → Ubuntu VM → Docker → Contenedores DMZ

2. HTTP/HTTPS: Cliente → WAF:443 → HAProxy:80/443 → WEB1:8080/4433 y WEB2:8081/4444

3. SQL: WEB1/WEB2 → ProxySQL:6033 → MySQL Master:3309 y Slave:3306

4. Admin: PC1 → Portainer:9000 → Todos los contenedores

5. Monitoreo: Prometheus/Grafana monitorea HAProxy, WEB1/2, MySQL, ProxySQL, WAF

6. Backup: Rsync respalda MySQL Master y Web Servers, PC1 accede vía SSH:22

7. FTP: PC1:21 → FTP → WEB1/WEB2

8. DNS: WEB1/2, HAProxy, PC1 usan DNS:53

9. SMTP: WEB1/2, Portainer, Monitoreo envían correos vía SMTP:25

10. RDP: PC1 → Hyper-V:3389 y Dell:3389

ESTILO VISUAL:

- Tema oscuro (fondo negro #000000)

- Color primario: #00ffcc (cyan)

- Usar emojis para identificar cada componente

- Conexiones coloreadas según tipo:

  * Verde: HTTP/HTTPS

  * Amarillo: SQL y FTP

  * Rosado: Admin/Gestión

  * Celeste: SSH

  * Azul claro: DNS

  * Rojo: SMTP

  * Magenta: RDP

  * Verde claro: Enlaces internos de red

- Incluir leyenda explicativa

- Diagrama tipo flowchart TB (top to bottom)

- Fuente: monospace

- Tamaño de fuente: 14px

Por favor genera el código Mermaid completo con todas las conexiones, estilos y colores especificados.

Resultado Final

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config:

 theme: dark

 themeVariables:

  primaryColor: '#00ffcc'

  edgeLabelBackground: '#222'

  tertiaryColor: '#111'

  fontFamily: monospace

  fontSize: 14px

  background: '#000000'

---

flowchart TB

 subgraph LAYER1[" 🔷 CAPA FÍSICA"]

    DELL[" 🖥️ Dell R720 - Servidor Físico\nWindows Server"]

 end

 subgraph LAYER2[" 🔷 CAPA DE VIRTUALIZACIÓN"]

    HYPER[" 🔷 Hyper-V (Windows Hypervisor)"]

 end

 subgraph LAYER3[" 🔷 CAPA DE SISTEMA OPERATIVO"]

    UBU[" 🐧 Ubuntu Server 20.04 - Máquina Virtual"]

 end

 subgraph LAYER4[" 🔷 CAPA DE CONTENEDORES"]

DOCK[" 🐳 Docker Engine - Motor de Contenedores"]

 end

subgraph LAYER5[" 🔷 CAPA DE RED Y SERVICIOS"]

  subgraph WAN[" 🌐 WAN / Internet (192.150.25.2/24)"]

    C1[" 👤 Cliente Chrome/Firefox/Opera"]

  end

  subgraph FW[" 🧱 pfSense 2.7.2"]

    FW_LAN["LAN (192.168.10.1)"]

    FW_DMZ["DMZ (192.168.20.1)"]

    FW_GUEST["Invitados (192.168.5.1)"]

    FW_VPN["OpenVPN (10.8.0.1)"]

  end

  subgraph DMZ[" 🧩 DMZ – 192.168.20.0/24 (Contenedores Docker)"]

    WAF[" 🛡️ WAF (192.168.20.12)"]

    HAProxy[" ⚙️ HAProxy (192.168.20.9)"]

    WEB1[" 🌐 Web Server Primario\nApache + PHP 8.3\n192.168.20.3"]

    WEB2[" 🌐 Web Server Secundario\nApache + PHP 8.3\n192.168.20.5"]

    PROXYSQL[" 💾 ProxySQL (192.168.20.11)\nBalancea MySQL Master/Slave"]

    MYSQLM[" 🗄️ MySQL Master (192.168.20.7)"]

    MYSQLS[" 🗄️ MySQL Slave (192.168.20.6)"]

    DNS[" 🌐 DNS Server (192.168.20.10)"]

    SMTP[" SMTP (192.168.20.2)"]

    RSYNC[" 🔁 Rsync Backup (192.168.20.4)"]

    MON[" 📊 Monitoreo (192.168.20.8)\nPrometheus + Grafana"]

    PORT[" 🧩 Portainer (192.168.20.13)\nGestión de contenedores Docker"]

    FTP[" 📁 Servidor FTP (192.168.20.15)"]

```
    end


    subgraph LAN["💻 LAN – 192.168.10.0/24"]
        PC1["🖥️ Oficina 01\n(Administra Portainer y servicios)"]
        PC2["🖥️ Oficina 02"]
        LAP["💼 Laptop Windows"]
    end


    subgraph GUEST["🎛️ Invitados – 192.168.5.0/24"]
        ANDR["🎛️ Android"]
    end


    subgraph VPN["🔐 OpenVPN – 10.8.0.0/24"]
        VPN1["📲 iPhone (10.8.0.2)"]
        VPN2["💻 Laptop iOS (10.8.0.3)"]
    end
end


subgraph LEGEND["📖 Leyenda de Conexiones"]
    L_HTTP["🌐 HTTP/HTTPS (verde)"]
    L_SQL["💾 SQL via ProxySQL (amarillo)"]
    L_ADMIN["🛠️ Admin/Gestión (rosado)"]
    L_FTP["📁 FTP (amarillo)"]
    L_SSH["🔐 SSH (celeste)"]
    L_DNS["🌐 DNS (azul claro)"]
    L_SMTP["✉️ SMTP (rojo)"]
    L_RDP["🖥️ RDP (magenta)"]
    L_NET["🌿 Enlaces internos (LAN/DMZ/VPN) verde claro"]
end
```

%%% Conexiones entre capas de infraestructura

DELL ==>|Hypervisor| HYPER

HYPER ==>|VM| UBU

UBU ==>|Container Runtime| DOCK

DOCK ==>|Ejecuta todos los contenedores| DMZ

%%% Conexiones de red internas - verde claro

FW_LAN -.-> FW_DMZ

FW_LAN -.-> LAN

FW_LAN -.-> DELL

FW_DMZ -.-> FW_GUEST

FW_DMZ -.-> DMZ

FW_LAN -.-> UBU

FW_GUEST -.-> FW_VPN

FW_GUEST -.-> GUEST

FW_VPN -.-> VPN

WAN -.-> FW

FW -.-> DMZ

%%% HTTP/HTTPS - verde

C1 -->|443| WAF

WAF ==>|80/443| HAProxy

HAProxy ==>|8080/4433| WEB1

HAProxy ==>|8081/4444| WEB2

%%% SQL - amarillo

WEB1 -.->|6033| PROXYSQL

WEB2 -.->|6033| PROXYSQL

PC1 -.->|3306 Admin DB| PROXYSQL

PROXYSQL -.->|3309| MYSQLM

PROXYSQL -.->|3306| MYSQLS

RSYNC -.->|3309| MYSQLM

%% Admin/Gestión - rosado

PC1 -.->|9000| PORT

PORT -.->|8080/4433| WEB1

PORT -.->|8081/4444| WEB2

PORT -.->|6033| PROXYSQL

PORT -.->|80/443| HAProxy

PORT -.->|3309| MYSQLM

PORT -.->|3306| MYSQLS

PORT -.->|443| WAF

PORT -.->|53| DNS

PORT ==>|9090/3000| MON

PORT ==>|25| SMTP

PORT ==>|873| RSYNC

MON -.->|80/443| HAProxy

MON -.->|8080/4433| WEB1

MON -.->|8081/4444| WEB2

MON -.->|3309| MYSQLM

MON -.->|6033| PROXYSQL

MON -.->|443| WAF

PC1 -.->|6033| PROXYSQL

RSYNC -.->|8080/4433| WEB1

RSYNC -.->|8081/4444| WEB2

%% FTP - amarillo

PC1 ==>|21| FTP

FTP ==>|8080/4433| WEB1

FTP ==>|8081/4444| WEB2

%% SSH - celeste

PC1 -->|22| RSYNC

PC1 -->|22 SSH| UBU

PC1 -->|22 Backup| RSYNC

%% DNS - azul claro

WEB1 -->|53| DNS

WEB2 -->|53| DNS

HAProxy -->|53| DNS

PC1 -->|53| DNS

%% SMTP - rojo

WEB1 -->|25| SMTP

WEB2 -->|25| SMTP

PORT -->|25| SMTP

MON -->|25| SMTP

%% RDP - magenta

PC1 -->|3389 RDP| HYPER

PC1 -->|3389 RDP| DELL

%% Estilos de conexiones de infraestructura

linkStyle 0,1,2,3 stroke:#00ffcc,stroke-width:4px

%% Estilos de conexiones según leyenda

linkStyle 4,5,6,7,8,9,10,11,12,13 stroke:#00ff99,stroke-width:2px

linkStyle 14,15,16,17 stroke:#00ff00,stroke-width:3px

linkStyle 18,19,20,21,22,23 stroke:#ffff00,stroke-width:2px

linkStyle 24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41 stroke:#ff66cc,stroke-width:2px

linkStyle 42,43,44 stroke:#ffff00,stroke-width:2px

linkStyle 45,46,47 stroke:#00bfff,stroke-width:2px

linkStyle 48,49,50,51 stroke:#2962FF,stroke-width:2px

linkStyle 52,53,54,55 stroke:#ff0000,stroke-width:2px

linkStyle 56,57 stroke:#ff00ff,stroke-width:3px

%% Estilos de capas de infraestructura

style DELL fill:#1a1a1a,stroke:#ffffff,color:#ffffff,font-size:20px,stroke-width:4px

style HYPER fill:#1a1a1a,stroke:#00d4ff,color:#ffffff,font-size:20px,stroke-width:4px

style UBU fill:#1a1a1a,stroke:#ff6c2c,color:#ffffff,font-size:20px,stroke-width:4px

style DOCK fill:#1a1a1a,stroke:#2496ed,color:#ffffff,font-size:20px,stroke-width:4px

style LAYER1 fill:#0d0d0d,stroke:#ffffff,color:#00ffcc,stroke-width:3px

style LAYER2 fill:#0d0d0d,stroke:#00d4ff,color:#00ffcc,stroke-width:3px

style LAYER3 fill:#0d0d0d,stroke:#ff6c2c,color:#00ffcc,stroke-width:3px

style LAYER4 fill:#0d0d0d,stroke:#2496ed,color:#00ffcc,stroke-width:3px

style LAYER5 fill:#0d0d0d,stroke:#00ff99,color:#00ffcc,stroke-width:3px

%% Estilos de nodos individuales

style C1 fill:#111111,stroke:#ff3333,color:#ffffff,font-size:20px

style FW_LAN fill:#111111,stroke:#00ffff,color:#ffffff,font-size:24px

style FW_DMZ fill:#111111,stroke:#00ff99,color:#ffffff,font-size:24px

style FW_GUEST fill:#111111,stroke:#ff00ff,color:#ffffff,font-size:24px

style FW_VPN fill:#111111,stroke:#00ffcc,color:#ffffff,font-size:24px

style WAF fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style HAProxy fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style WEB1 fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style WEB2 fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style PROXYSQL fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style MYSQLM fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style MYSQLS fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style DNS fill:#111111,stroke:#2962FF,color:#ffffff,font-size:20px

style SMTP fill:#111111,stroke:#ff0000,color:#ffffff,font-size:20px

style RSYNC fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style MON fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style PORT fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style FTP fill:#111111,stroke:#00ff99,color:#ffffff,font-size:20px

style PC1 fill:#111111,stroke:#00ffff,color:#ffffff,font-size:20px

style PC2 fill:#111111,stroke:#00ffff,color:#ffffff,font-size:20px

style LAP fill:#111111,stroke:#00ffff,color:#ffffff,font-size:20px

style ANDR fill:#111111,stroke:#ff00ff,color:#ffffff,font-size:20px

style VPN1 fill:#111111,stroke:#ff9900,color:#ffffff,font-size:20px

style VPN2 fill:#111111,stroke:#ff9900,color:#ffffff,font-size:20px

style L_HTTP font-size:18px,color:#00ff00

style L_SQL font-size:18px,color:#ffff00

style L_ADMIN font-size:18px,color:#ff66cc

style L_FTP font-size:18px,color:#ffff00

style L_SSH font-size:18px,color:#00bfff

style L_DNS font-size:18px,color:#2962FF

style L_SMTP font-size:18px,color:#ff0000

style L_RDP font-size:18px,color:#ff00ff

style L_NET font-size:18px,color:#00ff99

style LAN fill:#111111,stroke:#00ffff,color:#ffffff

style DMZ fill:#111111,stroke:#00ff99,color:#ffffff

style GUEST fill:#111111,stroke:#ff00ff,color:#ffffff

style VPN fill:#111111,stroke:#ff9900,color:#ffffff

style WAN fill:#111111,stroke:#ff3333,color:#ffffff

style FW fill:#111111,stroke:#00ffcc,color:#ffffff

style LEGEND fill:#111111,stroke:#00ffcc,color:#ffffff