PROJETO DE INFRAESTRUTURA DE REDE DE ALTA DISPONIBILIDADE

Implementação de Arquitetura de Campus com Redundância HSRP, Segmentação de 16 VLANs e Roteamento Dinâmico OSPF.

Responsável Técnico: Eduardo Mello de Almeida

Especialidade: Analista de Infraestrutura e Redes

E-mail: eduardo.m.almeida2008@gmail.com

WhatsApp: +55 (14) 99722-4868

Portfólio Técnico: github.com/Eduardoalmeida2008
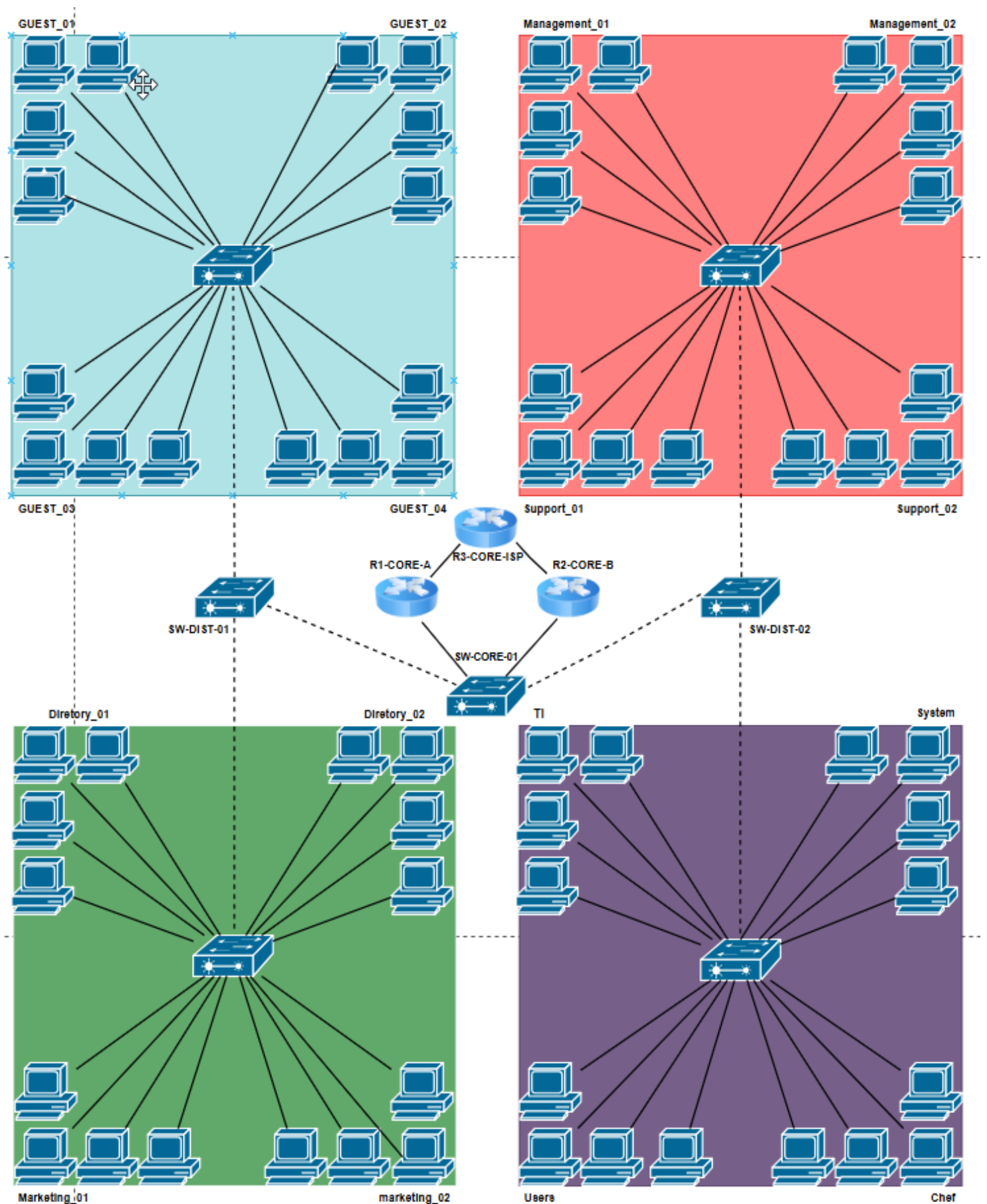
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*Este documento detalha a arquitetura de uma rede corporativa de grande porte, projetada para suportar alta densidade de usuários com foco em **zero tempo de inatividade**. Através da combinação de protocolos de redundância de primeiro salto (HSRP) e uma malha de roteamento inteligente (OSPF), a solução garante segurança na segmentação de dados e eficiência na entrega de serviços críticos.*

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3. Plano de Endereçamento e Configuração de VLANs.

VLAN	Departamento	Sub-rede	Gateway HSRP (Virtual)	Máscara
10	Guest 01	192.168.10.0/24	192.168.10.254	255.255.255.0
20	Guest 02	192.168.20.0/24	192.168.20.254	255.255.255.0
30	Guest 03	192.168.30.0/24	192.168.30.254	255.255.255.0
40	Guest 04	192.168.40.0/24	192.168.40.254	255.255.255.0
50	Management 01	192.168.50.0/24	192.168.50.254	255.255.255.0
60	Management 02	192.168.60.0/24	192.168.60.254	255.255.255.0
70	Management 03	192.168.70.0/24	192.168.70.254	255.255.255.0
80	Management 04	192.168.80.0/24	192.168.80.254	255.255.255.0
90	Directory 01	192.168.90.0/24	192.168.90.254	255.255.255.0
100	Directory 02	192.168.100.0/24	192.168.100.254	255.255.255.0
110	Directory 03	192.168.110.0/24	192.168.110.254	255.255.255.0
120	Directory 04	192.168.120.0/24	192.168.120.254	255.255.255.0
130	IT Department	192.168.130.0/24	192.168.130.254	255.255.255.0
140	Users	192.168.140.0/24	192.168.140.254	255.255.255.0
150	System	192.168.150.0/24	192.168.150.254	255.255.255.0
160	Chef / Executive	192.168.160.0/24	192.168.160.254	255.255.255.0

Todas as VLANs possuem DHCP configurado nos roteadores de Core com exclusão automática dos endereços de Gateway e IDs de rede.

Protocolos de Disponibilidade e Camada 2

Figura 4.1: Resumo do Spanning Tree Protocol (STP) garantindo a ausência de loops na malha de 16 VLANs."

```
Name                     Blocking Listening Learning Forwarding STP Active
---------------------    -------- --------- -------- ---------- ----------
VLAN0001                    0         0        0         4          4
VLAN0010                    0         0        0         4          4
VLAN0020                    0         0        0         4          4
VLAN0030                    0         0        0         4          4
VLAN0040                    0         0        0         4          4
VLAN0050                    0         0        0         4          4
VLAN0060                    0         0        0         4          4
VLAN0070                    0         0        0         4          4
VLAN0080                    0         0        0         4          4
VLAN0090                    0         0        0         4          4
VLAN0100                    0         0        0         4          4
VLAN0110                    0         0        0         4          4
VLAN0120                    0         0        0         4          4
VLAN0130                    0         0        0         4          4
VLAN0140                    0         0        0         4          4
VLAN0150                    0         0        0         4          4
VLAN0160                    0         0        0         4          4


---------------------    -------- --------- -------- ---------- ----------
17 vlans                    0         0        0        68         68
```

Figura 4.2: Status do HSRP nos roteadores de Core, demonstrando a redundância de Gateway virtual (.254) para todos os setores."

R1-CORE-A

Physical   Config   CLI   Attributes

```
interface GigabitEthernet0/0.10
 encapsulation dot1Q 10
 ip address 192.168.10.251 255.255.255.0
 ip access-group 100 in
 standby 10 ip 192.168.10.254
 standby 10 priority 110
 standby 10 preempt
!
interface GigabitEthernet0/0.20
 encapsulation dot1Q 20
 ip address 192.168.20.251 255.255.255.0
 standby 20 ip 192.168.20.254
 standby 20 priority 110
 standby 20 preempt
!
interface GigabitEthernet0/0.30
 encapsulation dot1Q 30
 ip address 192.168.30.251 255.255.255.0
 standby 30 ip 192.168.30.254
 standby 30 priority 110
 standby 30 preempt
!
interface GigabitEthernet0/0.40
 encapsulation dot1Q 40
 ip address 192.168.40.251 255.255.255.0
 standby 40 ip 192.168.40.254
 standby 40 priority 110
 standby 40 preempt
!
interface GigabitEthernet0/0.50
 encapsulation dot1Q 50
 ip address 192.168.50.251 255.255.255.0
 ip access-group 100 in
 standby 50 ip 192.168.50.254
 standby 50 priority 110
 standby 50 preempt
!
interface GigabitEthernet0/0.60
 encapsulation dot1Q 60
 ip address 192.168.60.251 255.255.255.0
 standby 60 ip 192.168.60.254
 standby 60 priority 110
 standby 60 preempt
!
interface GigabitEthernet0/0.70
 encapsulation dot1Q 70
 ip address 192.168.70.251 255.255.255.0
 standby 70 ip 192.168.70.254
 standby 70 priority 110
 standby 70 preempt
!
```

R1-CORE-A

Physical   Config   CLI   Attributes

```
interface GigabitEthernet0/0.90
 encapsulation dot1Q 90
 ip address 192.168.90.251 255.255.255.0
 ip access-group 100 in
 standby 90 ip 192.168.90.254
 standby 90 priority 110
 standby 90 preempt
!
interface GigabitEthernet0/0.100
 encapsulation dot1Q 100
 ip address 192.168.100.251 255.255.255.0
 standby 100 ip 192.168.100.254
 standby 100 preempt
!
interface GigabitEthernet0/0.110
 encapsulation dot1Q 110
 ip address 192.168.110.251 255.255.255.0
 standby 110 ip 192.168.110.254
 standby 110 priority 110
 standby 110 preempt
!
interface GigabitEthernet0/0.120
 encapsulation dot1Q 120
 ip address 192.168.120.251 255.255.255.0
 standby 120 ip 192.168.120.254
 standby 120 priority 110
 standby 120 preempt
!
interface GigabitEthernet0/0.130
 encapsulation dot1Q 130
 ip address 192.168.130.251 255.255.255.0
 ip access-group 100 in
 standby 130 ip 192.168.130.254
 standby 130 priority 110
 standby 130 preempt
!
interface GigabitEthernet0/0.140
 encapsulation dot1Q 140
 ip address 192.168.140.251 255.255.255.0
 standby 140 ip 192.168.140.254
 standby 140 priority 110
 standby 140 preempt
!
interface GigabitEthernet0/0.150
 encapsulation dot1Q 150
 ip address 192.168.150.251 255.255.255.0
 standby 150 ip 192.168.150.254
 standby 150 priority 110
 standby 150 preempt
!
interface GigabitEthernet0/0.160
```
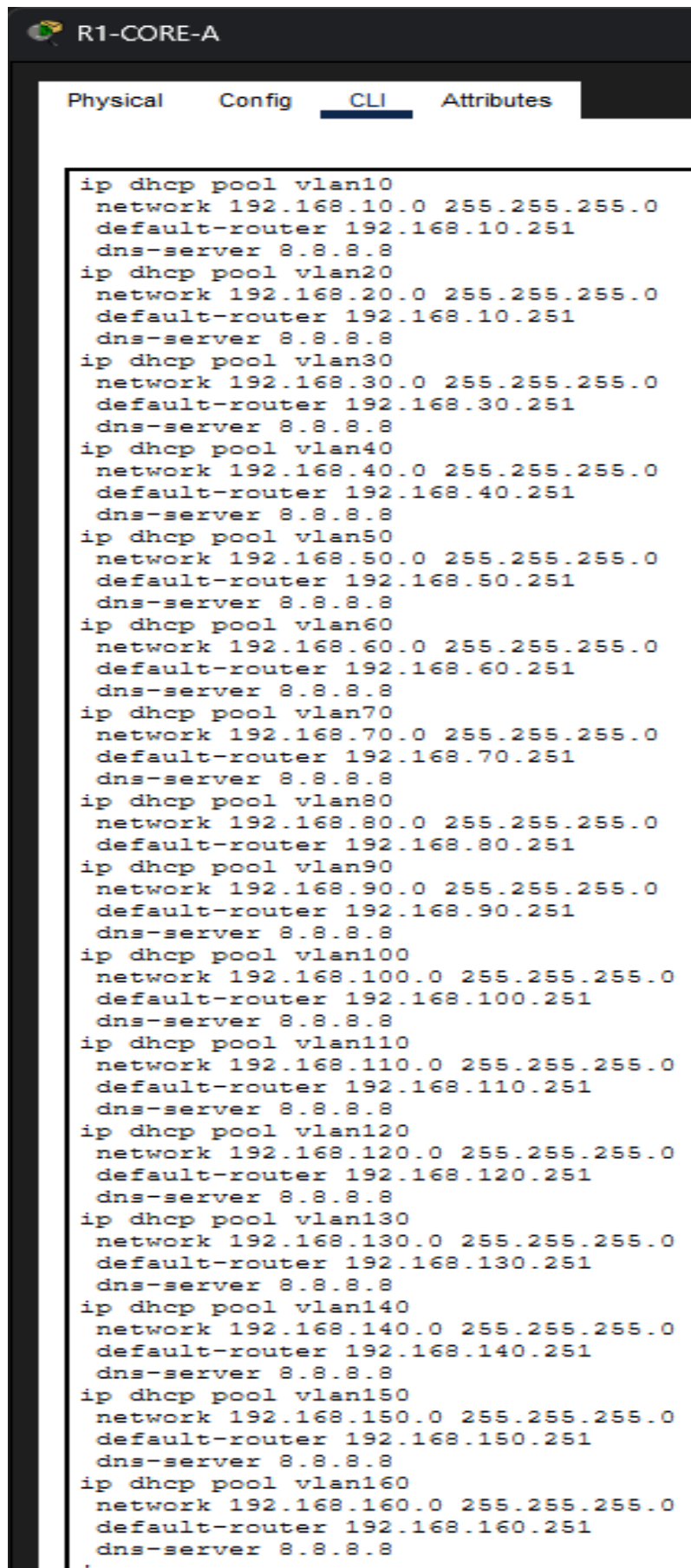
5. Roteamento Dinâmico (OSPF) e Serviços de Rede

Figura 5.1: Adjacências OSPF estabelecidas em estado 'FULL'. Isso confirma que os roteadores de Core compartilham todas as 16 rotas de forma dinâmica.

```
R1-CORE#show ip ospf neighbor


Neighbor ID     Pri   State           Dead Time   Address         Interface
2.2.2.2           1   FULL/DR         00:00:35    192.168.10.252  GigabitEthernet0/0.10
2.2.2.2           1   FULL/DR         00:00:36    192.168.20.252  GigabitEthernet0/0.20
2.2.2.2           1   FULL/DR         00:00:36    192.168.30.252  GigabitEthernet0/0.30
2.2.2.2           1   FULL/DR         00:00:35    192.168.40.252  GigabitEthernet0/0.40
2.2.2.2           1   FULL/DR         00:00:35    192.168.50.252  GigabitEthernet0/0.50
2.2.2.2           1   FULL/DR         00:00:35    192.168.60.252  GigabitEthernet0/0.60
2.2.2.2           1   FULL/DR         00:00:36    192.168.70.252  GigabitEthernet0/0.70
2.2.2.2           1   FULL/DR         00:00:35    192.168.80.252  GigabitEthernet0/0.80
2.2.2.2           1   FULL/DR         00:00:35    192.168.90.252  GigabitEthernet0/0.90
2.2.2.2           1   FULL/DR         00:00:35    192.168.100.252 GigabitEthernet0/0.100
2.2.2.2           1   FULL/DR         00:00:35    192.168.110.252 GigabitEthernet0/0.110
2.2.2.2           1   FULL/DR         00:00:36    192.168.120.252 GigabitEthernet0/0.120
2.2.2.2           1   FULL/DR         00:00:36    192.168.130.252 GigabitEthernet0/0.130
2.2.2.2           1   FULL/DR         00:00:36    192.168.140.252 GigabitEthernet0/0.140
2.2.2.2           1   FULL/DR         00:00:35    192.168.150.252 GigabitEthernet0/0.150
2.2.2.2           1   FULL/DR         00:00:35    192.168.160.252 GigabitEthernet0/0.160
```

Figura 5.2: Configuração dos escopos DHCP no Core. Cada VLAN possui sua própria reserva de IPs, DNS (8.8.8.8) e rotas padrão.



```
R1-CORE-A

Physical    Config    CLI    Attributes

ip dhcp pool vlan10
 network 192.168.10.0 255.255.255.0
 default-router 192.168.10.251
 dns-server 8.8.8.8
ip dhcp pool vlan20
 network 192.168.20.0 255.255.255.0
 default-router 192.168.10.251
 dns-server 8.8.8.8
ip dhcp pool vlan30
 network 192.168.30.0 255.255.255.0
 default-router 192.168.30.251
 dns-server 8.8.8.8
ip dhcp pool vlan40
 network 192.168.40.0 255.255.255.0
 default-router 192.168.40.251
 dns-server 8.8.8.8
ip dhcp pool vlan50
 network 192.168.50.0 255.255.255.0
 default-router 192.168.50.251
 dns-server 8.8.8.8
ip dhcp pool vlan60
 network 192.168.60.0 255.255.255.0
 default-router 192.168.60.251
 dns-server 8.8.8.8
ip dhcp pool vlan70
 network 192.168.70.0 255.255.255.0
 default-router 192.168.70.251
 dns-server 8.8.8.8
ip dhcp pool vlan80
 network 192.168.80.0 255.255.255.0
 default-router 192.168.80.251
ip dhcp pool vlan90
 network 192.168.90.0 255.255.255.0
 default-router 192.168.90.251
 dns-server 8.8.8.8
ip dhcp pool vlan100
 network 192.168.100.0 255.255.255.0
 default-router 192.168.100.251
 dns-server 8.8.8.8
ip dhcp pool vlan110
 network 192.168.110.0 255.255.255.0
 default-router 192.168.110.251
 dns-server 8.8.8.8
ip dhcp pool vlan120
 network 192.168.120.0 255.255.255.0
 default-router 192.168.120.251
 dns-server 8.8.8.8
ip dhcp pool vlan130
 network 192.168.130.0 255.255.255.0
 default-router 192.168.130.251
 dns-server 8.8.8.8
ip dhcp pool vlan140
 network 192.168.140.0 255.255.255.0
 default-router 192.168.140.251
 dns-server 8.8.8.8
ip dhcp pool vlan150
 network 192.168.150.0 255.255.255.0
 default-router 192.168.150.251
 dns-server 8.8.8.8
ip dhcp pool vlan160
 network 192.168.160.0 255.255.255.0
 default-router 192.168.160.251
 dns-server 8.8.8.8
```
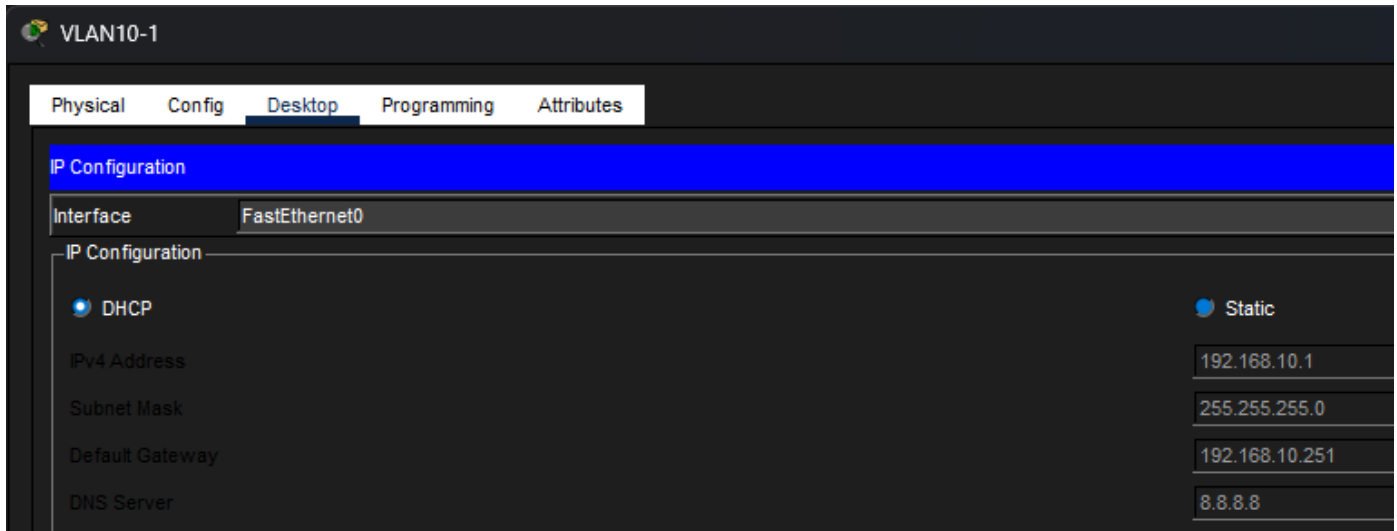
7. Validação de Conectividade
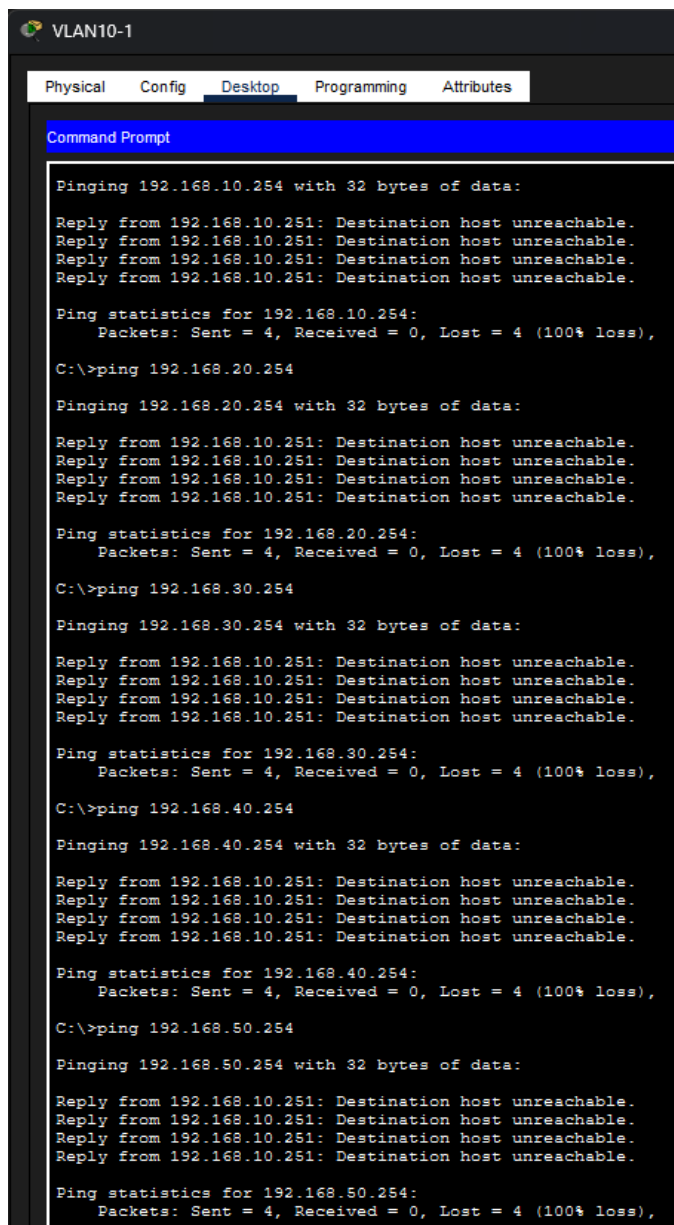
7. CONCLUSÃO E CONSIDERAÇÕES FINAIS

"A infraestrutura desenvolvida para o Projeto 9.2 representa uma solução completa de rede de campus, integrando alta disponibilidade (HSRP), roteamento dinâmico (OSPF) e segmentação lógica avançada (16 VLANs).

A validação através dos testes de conectividade e serviços de DHCP comprova que a rede está pronta para suportar o tráfego de dados com redundância e segurança, seguindo rigorosamente as melhores práticas de design hierárquico da Cisco."