1. Rede 1
   1. Switch 0 (configurando as portas)
      1. Enable
      2. Configure terminal
      3. Vlan 10 [vlan de dados] -> name dados -> exit
      4. Vlan 11 [vlan de voz] -> name voz -> exit
      5. Porta 0/1, conectada ao roteador -> interface fastEthernet 0/1 -> switchport mode trunk -> exit
      6. Portas 0/2 até 0/7 -> switchport mode access -> switchport access vlan 10 [vlan de dados] -> exit [para cada]
      7. Portas 0/8 e 0/9 -> switchport mode access -> switchport access vlan 11 [vlan de voz] -> exit [para cada]
   2. Router 0 (configurando as interfaces)
      1. Enable -> configure terminal
      2. Porta 0/0, conectada ao switch -> no shutdown -> exit
      3. Porta 0/1, conectado ao router1 [rede 2] -> no shutdown -> ip address 1.0.0.1 255.0.0.0 -> exit
      4. \*Porta 1/0, conectada ao router2 [rede3] -> no shutdown -> ip address 2.0.0.1 255.0.0.0 -> exit
      5. Porta 0/0.10 [vlan de dados] -> encapsulation dot1Q 10 -> ip address 192.168.10.1 [gateway dados] 255.255.255.0
      6. Porta 0/0.11 [vlan de voz] -> encapsulation dot1Q 11 -> ip address 192.168.11.1 [gateway voz] 255.255.255.0

\* colocada com o NM-1FE-TX

1. Rede 2
   1. Switch 1 (configurando as portas)
      1. Enable -> configure terminal
      2. Vlan 20 [vlan de dados] -> name dados -> exit
      3. Vlan 21 [vlan de voz] -> name voz -> exit
      4. Porta 0/1, conectada ao roteador -> interface fastEthernet 0/1 -> switchport mode trunk -> exit
      5. Portas 0/2, 0/3 e 0/6 -> switchport mode access -> switchport access vlan 20 [vlan de dados] -> exit [para cada]
      6. Portas 0/4 e 0/5 -> switchport mode access -> switchport access vlan 21 [vlan de voz] -> exit [para cada]
   2. Router 1 (configurando as interfaces)
      1. Enable -> configure terminal
      2. Porta 0/0, conectada ao switch -> no shutdown -> exit
      3. Porta 0/1, conectada ao router0 [rede1] -> no shutdown -> ip address 1.0.0.2 255.0.0.0 -> exit
      4. \*Porta 1/0, conectada ao router2 [rede3] -> no shutdown -> ip address 3.0.0.1 255.0.0.0 -> exit
      5. Porta 0/0.20 [vlan de dados] -> encapsulation dot1Q 20 -> ip address 192.168.20.1 [gateway dados] 255.255.255.0
      6. Ip helper-address 192.168.10.2 [DHCP rede 1] -> exit
      7. Porta 0/0.21 [vlan de voz] -> encapsulation dot1Q 21 -> ip address 192.168.21.1 [gateway voz] 255.255.255.0
      8. Ip helper-address 192.168.10.2 [DHCP rede 1] -> exit
2. Rede 3
   1. Switch 2 (configurando as portas)
      1. Enable -> configure terminal
      2. Vlan 30 [vlan de dados] -> name dados > exit
      3. Vlan 31 [vlan de voz] -> name voz -> exit
      4. Porta 0/1, conectada ao roteador -> interface fastEthernet 0/1 -> switchport mode trunk -> exit
      5. Portas 0/2, 0/3 e 0/6 -> switchport mode access -> switchport access vlan 30 [vlan de dados] -> exit [para cada]
      6. Portas 0/4 e 0/5 -> switchport mode access -> switchport access vlan 31 [vlan de voz] -> exit [para cada]
   2. Router2 (configurando as interfaces)
      1. Enable -> configure terminal
      2. Porta 0/0, conectada ao switch -> no shutdown -> exit
      3. Porta 0/1, conectada ao router0 [rede1] -> no shutdown -> ip address 2.0.0.2 255.0.0.0 -> exit
      4. \*Porta 1/0, conectada ao router1 [rede2] -> no shutdown -> ip address 3.0.0.2 255.0.0.0 -> exit
      5. Porta 0/0.30 [vlan de dados] -> encapsulation dot1Q 30 -> ip address 192.168.30.1 [gateway dados] 255.255.255.0
      6. Porta 0/0.31 [vlan de voz] -> encapsulation dot1Q 31-> ip address 192.168.31.1 [gateway voz] 255.255.255.0
3. Rede 1
   1. Server-PT Servidor DHCP
      1. Desktop -> Ip Configuration
         * Static
         * IPv4 Address: 192.168.10.2
         * Subnet Mask: 255.255.255.0
         * Default gateway: 192.168.10.1
         * DNS Server: 192.168.10.3
      2. Services -> DHCP
         * Service: ON
         * Pool Name: serverPool
           1. Default gateway: 192.168.10.1
           2. DNS Server: 192.168.10.3
           3. Start IP Address: 192.168.10.5
           4. Subnet Mask: 255.255.255.0
           5. [SAVE]
         * Pool Name: serverPool2 [para a rede2]
           1. Default gateway: 192.168.20.1
           2. DNS Server: 192.168.10.3
           3. Start IP Address: 192.168.20.5
           4. Subnet Mask: 255.255.255.0
           5. [ADD]
         * Pool Name: voicePool [para voz]
           1. Default gateway: 192.168.11.1
           2. DNS Server: 0.0.0.0
           3. Start IP Address: 192.168.11.5
           4. Subnet mask: 255.255.255.0
           5. TFTP Server: 192.168.11.1
           6. [ADD]
         * Pool Name: voicePool2 [para voz da rede 2]
           1. Default gateway: 192.168.21.1 [voz da rede 2]
           2. DNS Server: 192.168.10.3 [da rede 1]
           3. Start IP Address: 192.168.21.5
           4. Subnet mask: 255.255.255.0
           5. TFTP Server: 192.168.21.1
           6. [ADD]
   2. Server-PT Servidor DNS
      1. Config
         * Default gateway: 192.168.10.1
         * DNS server: 192.168.10.3
      2. Desktop -> Ip Configuration
         * IPv4 Address: 192.168.10.3
         * Subnet mask: 255.255.255.0
         * Default gateway: 192.168.10.1
         * DNS Server: 192.168.10.3
      3. Services -> DNS
         * DNS Service: ON
   3. Server-PT Servidor HTTP
      1. Config
         * Default gateway: 192.168.10.1
         * DNS Server: 192.168.10.3
      2. Desktop -> Ip Configuration
         * IPv4 Address: 192.168.10.4
         * Subnet mask: 255.255.255.0
         * Default gateway: 192.168.10.1
         * DNS Server: 192.168.10.3
   4. Router 0 (configurando protocolo rip e rotas)
      1. Enable -> configure terminal
      2. Router rip
      3. Network 192.168.10.0 [dados]
      4. Network 192.168.11.0 [voz]
      5. Network 1.0.0.0 [para a rede2]
      6. Network 2.0.0.0 [para a rede3]
      7. End -> w
4. Rede 3
   1. Router 2 (configurando dhcp já que não usa da rede1)
      1. Ip dhcp pool dados
         * Network 192.168.30.0 255.255.255.0
         * Dns-server 192.168.10.3 [da rede1]
         * Default-router 192.168.30.1 [gateway dados]
         * Exit
      2. Ip dhcp pool voz
         * Netowkr 192.168.31.0 255.255.255.0
         * Default-router 192.168.31.1 [gateway voz]
         * Option 150 ip 192.168.31.1 [gateway voz]
         * Exit
5. Rede 1
   1. Router 0 (configurando telefones)
      1. Enable -> configure terminal
      2. ~~Subinterface 0/0.11 [vlan de voz] -> ip helper-address 192.168.10.2 [dhcp da rede 1 para fornecer ip pros telefones] -> exit~~
      3. Telephony-service [configuração telefonia]
      4. Max-dn 10 [número máximo de linhas]
      5. Max-ephones 10 [número máximo de telefones físicos]
      6. Ip source-address 192.168.11.1 [gateway voz] port 2000
      7. Auto assign 1 to 10 [números da vlan serão fornecidos automaticamente]
      8. Exit
      9. Ephone-dn 1 [acessa a linha 1]
      10. Number 100 [informa o ramal]
      11. Exit
      12. Ephone-dn 2 [acessa a linha 2]
      13. Number 101 [informa o ramal]
      14. Exit
   2. Switch (re-configurando as portas dos telefones para receber dados E voz)
      1. Enable -> configure terminal
      2. Interface range fastEthernet 0/8-9
      3. No switchport access vlan 11 [revogando acesso de voz]
      4. Switchport mode access
      5. Switchport access vlan 10 [concedendo acesso para vlan de dados]
      6. Switchport mode access
      7. Switchport voice vlan 11 [concedendo acesso para vlan de voz]
      8. End
      9. Show vlan brief [para ver as portas 0/8 e 0/9 em ambas as vlans]
6. Rede 2
   1. Router 1 (configurando protocolo rip e rotas)
      1. Enable -> configure terminal
      2. Router rip
      3. Network 192.168.20.0 [dados]
      4. Network 192.168.21.0 [voz]
      5. Network 1.0.0.0 [para a rede1]
      6. Network 3.0.0.0 [para a rede3]
   2. Switch 1 (re-configurando as portas dos telefones para receber dados E voz)
      1. Enable -> configure terminal
      2. Interface range fastEthernet 0/4-5
      3. No switchport access vlan 21 [revogando acesso de voz]
      4. Switchport mode access
      5. Switchport access vlan 20 [concedenco acesso para vlan de dados]
      6. Switchport mode access
      7. Switchport voice vlan 21 [concedenco acesso para vlan de voz]
      8. End
   3. Router 1 (configurando telefonia)
      1. Enable -> configure terminal
      2. Telephony-service
      3. Max-dn 10
      4. Max-ephones 10
      5. Ip source-address 192.168.21.1 [gateway voz] port 2000
      6. Auto assign 1 to 10
      7. Exit
      8. Ephone-dn 1
      9. Number 200 [ramal] -> exit
      10. Ephone-dn 2
      11. Number 201 -> exit
      12. End
7. Rede 3
   1. Router2 (configurando telefonia)
      1. Enable -> configure terminal
      2. Telephony-service
      3. Max-dn 10
      4. Max-ephones 10
      5. Ip source-address 192.168.31.1 [gateway voz] port 2000
      6. Auto assign 1 to 10
      7. Exit
      8. Ephone-dn 1
      9. Number 300 [ramal] -> exit
      10. Ephone-dn 2
      11. Number 201 -> exit
      12. End
   2. Router2 (configurando protocol RIP e rotas)
      1. Enable -> configure terminal
      2. Router rip
      3. Network 192.168.30.1 [dados]
      4. Network 192.168.31.1 [voz]
      5. Network 2.0.0.0 [para a rede 1]
      6. Network 3.0.0.0 [para a rede 2]
8. Rede 1
   1. Router0 (configurando VOIP)
      1. Enable -> configure terminal
      2. Dial-peer voice 1 voip [entra no modo de roteamento voip para a linha 1 da rede de destino]
      3. Destination-pattern 200 [para o primeiro ramal da rede 2]
      4. Session target ipv4:1.0.0.2 [para a rede 2] -> exit
      5. Dial-peer voice 2 voip
      6. Destination-pattern 201 [para o segundo ramal da rede 2]
      7. Session target ipv4:1.0.0.2 [para a rede 2] -> exit
      8. Dial-peer voice 3 voip
      9. Destionation-pattern 300 [para o primeiro ramal da rede 3]
      10. Session target ipv4:2.0.0.2 [para a rede 3] -> exit
      11. Dial-peer voice 4 voip
      12. Destination-pattern 301 [para o segundo ramal da rede 3]
      13. Session target ipv4:2.0.0.2 [para a rede 3] -> exit
9. Rede 2
   1. Router1 (configurando VOIP)
      1. Enable -> configure terminal
      2. Dial-peer voice 1 voip
      3. Destination-pattern 100 [para o primeiro ramal da rede 1]
      4. Session target ipv4:1.0.0.1 [para a rede 1] -> exit
      5. Dial-peer voice 2 voip
      6. Destination-pattern 101 [para o segundo ramal da rede 1]
      7. Session target ipv4:1.0.0.1 [para a rede 1]
      8. Dial-peer voice 3 voip
      9. Destination-pattern 300 [para o primeiro ramal da rede 3]
      10. Session target ipv4:3.0.0.2 [para a rede 3] -> exit
      11. Dial-peer voice 4 voip
      12. Destination-pattern 301 [para o segundo ramal da rede 3]
      13. Session target ipv4:3.0.0.2 [para a rede 3] -> exit
10. Rede 3
    1. Router2 (configurando VOIP)
       1. Enable -> configure terminal
       2. Dial-peer voice 1 voip
       3. Destination-pattern 100 [para o primeiro ramal da rede 1]
       4. Session target ipv4:2.0.0.1 [para a rede 1] -> exit
       5. Dial-peer voice 2 voip
       6. Destination-pattern 101 [para o segundo ramal da rede 1] -> exit
       7. Dial-peer voice 3 voip
       8. Destination-pattern 200 [para o primeiro ramal da rede 2]
       9. Session target ipv4:3.0.0.1 [para a rede 2] -> exit
       10. Dial-peer voice 4 voip
       11. Destination-pattern 201 [para o segundo ramal da rede 2]
       12. Session target ipv4:3.0.0.1 [para a rede 2] -> exit