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MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

MPLS & VPLS - PART 1



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Scenario

Islington College operates a multi-block campus network consisting of 9 academic and administrative blocks. The college owns a public IPv4 address range (160.30.132.0/24), which must be used for router loopback interfaces within an MPLS backbone.

We are required to design, implement, and verify an MPLS-based core network using MikroTik routers in GNS3, providing VPLS-based Layer-2 connectivity across all blocks while using a centralized DHCP server.

The LONDON_BLOCK is the main block, connected to the Internet (ISP), and all other blocks connect to it directly and via additional mesh links for redundancy and load balancing.

Network Architecture and IP Addressing Plan:

Core Design

- All block routers act as MPLS core routers
- OSPF is the IGP across all routers
- MPLS with LDP must be enabled on all core and mesh links
- ECMP / Load balancing must be implemented
- VPLS must be used to extend VLANs across all blocks
- No DHCP service should run on any router

Use the following explicit IP addressing scheme. All loopback addresses are from the public IPv4 range 160.30.132.0/24 (160.30.132.0 to 160.30.132.255). Do not use any other IPs for loopbacks or links.

Block Routers and Loopback IPs

- LONDON_BLOCK (main block, connected to ISP): Loopback IP 160.30.132.1/32
- UK_BLOCK: Loopback IP 160.30.132.11/32
- NEPAL_BLOCK: Loopback IP 160.30.132.12/32

- HIMAL_BLOCK: Loopback IP 160.30.132.13/32
- BRIT_BLOCK: Loopback IP 160.30.132.14/32
- SKILL_BLOCK: Loopback IP 160.30.132.15/32
- ALUMNI_BLOCK: Loopback IP 160.30.132.16/32
- KUMARI_BLOCK: Loopback IP 160.30.132.17/32

Point-to-Point Links from LONDON_BLOCK (Private IPs, /30 subnets):

- LONDON_BLOCK to UK_BLOCK: 10.0.0.0/30 (LONDON_BLOCK: 10.0.0.1, UK_BLOCK: 10.0.0.2)
- LONDON_BLOCK to NEPAL_BLOCK: 10.0.0.4/30 (LONDON_BLOCK: 10.0.0.5, NEPAL_BLOCK: 10.0.0.6)
- LONDON_BLOCK to HIMAL_BLOCK: 10.0.0.8/30 (LONDON_BLOCK: 10.0.0.9, HIMAL_BLOCK: 10.0.0.10)
- LONDON_BLOCK to BRIT_BLOCK: 10.0.0.12/30 (LONDON_BLOCK: 10.0.0.13, BRIT_BLOCK: 10.0.0.14)
- LONDON_BLOCK to SKILL_BLOCK: 10.0.0.16/30 (LONDON_BLOCK: 10.0.0.17, SKILL_BLOCK: 10.0.0.18)
- LONDON_BLOCK to KUMARI_BLOCK: 10.0.0.20/30 (LONDON_BLOCK: 10.0.0.21, KUMARI_BLOCK: 10.0.0.22)
- LONDON_BLOCK to ALUMNI_BLOCK: 10.0.0.24/30 (LONDON_BLOCK: 10.0.0.25, ALUMNI_BLOCK: 10.0.0.26)

Mesh Connections (Router-to-Router Private IPs, /30 subnets for redundancy):

- UK_BLOCK to NEPAL_BLOCK: 10.0.0.28/30 (UK_BLOCK: 10.0.0.29, NEPAL_BLOCK: 10.0.0.30)
- UK_BLOCK to HIMAL_BLOCK: 10.0.0.32/30 (UK_BLOCK: 10.0.0.34, HIMAL_BLOCK: 10.0.0.33)
- NEPAL_BLOCK to BRIT_BLOCK: 10.0.0.36/30 (NEPAL_BLOCK: 10.0.0.37, BRIT_BLOCK: 10.0.0.38)
- HIMAL_BLOCK to SKILL_BLOCK: 10.0.0.40/30 (HIMAL_BLOCK: 10.0.0.42, SKILL_BLOCK: 10.0.0.41)

- BRIT_BLOCK to KUMARI_BLOCK: 10.0.0.44/30 (BRIT_BLOCK: 10.0.0.46, KUMARI_BLOCK: 10.0.0.45)
- SKILL_BLOCK to ALUMNI_BLOCK: 10.0.0.48/30 (SKILL_BLOCK: 10.0.0.50, ALUMNI_BLOCK: 10.0.0.49)
- ALUMNI_BLOCK to KUMARI_BLOCK: 10.0.0.52/30 (ALUMNI_BLOCK: 10.0.0.53, KUMARI_BLOCK: 10.0.0.54)

VLANs and End-Device Subnets (Provided by Centralized DHCP):

- VLAN 100 (STUDENT): 172.16.0.0/19 (capacity for 5,000 student IPs)
- VLAN 200 (TEACHER): 172.16.32.0/19 (capacity for 1,000 teacher IPs)
- VLAN 300 (STAFF): 172.16.36.0/21 (capacity for 2,000 staff IPs)

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1. Set Identity, Loopback Address and RoMON to all Routers

1.1. LONDON-BLOCK

CMD

```
/system identity set name=LONDON-BLOCK

/interface bridge add name=loopback comment="LONDON-BLOCK_160.30.132.1_LOOPBACK"

/ip address add address=160.30.132.1/32 interface=loopback comment="LONDON-BLOCK_160.30.132.1_LOOPBACK"

/tool/romon/set enabled=yes
```

```
[admin@mikrotik] > /system identity set name=LONDON-BLOCK
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /interface bridge add name=loopback comment="LONDON-BLOCK_160.30.1132.1_LOOPBACK"
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /ip address add address=160.30.132.1/32 interface=loopback comment="LONDON-BLOCK_160.30.132.1_LOOPBACK"
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /tool/romon/set enabled=yes
```

Figure 1: Set Identity, Loopback Address and RoMoN of LONDON_BLOCK Router Through CMD

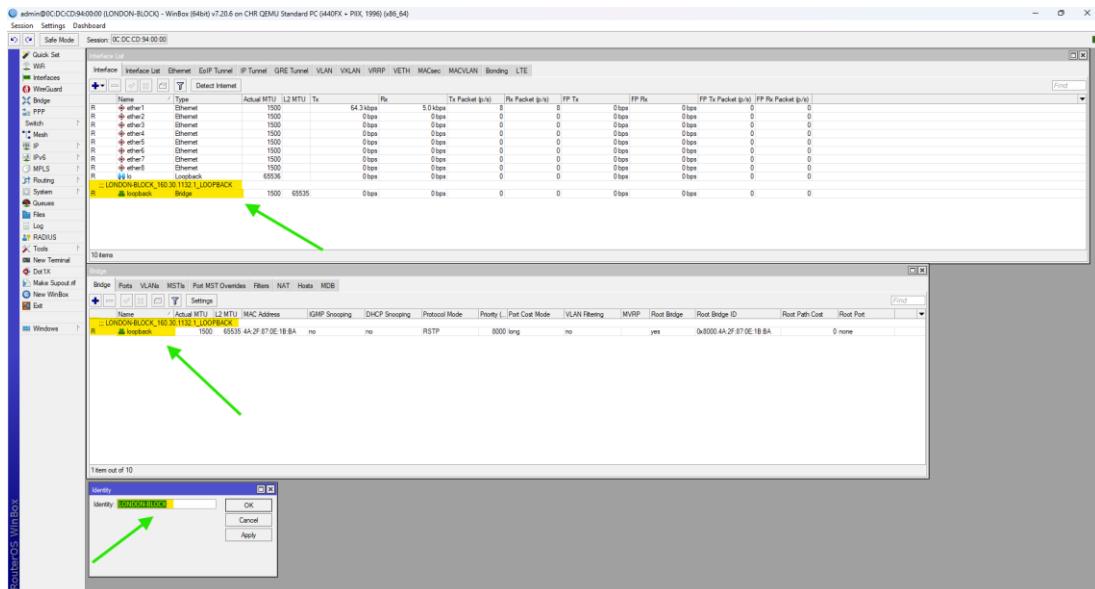


Figure 2: Set Identity, Loopback Address and RoMoN of LONDON_BLOCK Router Through WINBOX

1.2. UK-BLOCK

CMD

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```
/system identity set name= UK-BLOCK

/interface bridge add name=loopback comment=" UK-BLOCK_160.30.132.11_LOOPBACK"

/ip address add address=160.30.132.11/32 interface=loopback comment=" UK-BLOCK_160.30.132.11_LOOPBACK"

/tool/romon/set enabled=yes
```

```
[admin@MikroTik] > /system identity set name= UK-BLOCK
[admin@UK-BLOCK] >
[admin@UK-BLOCK] > /interface bridge add name=loopback comment=" UK-BLOCK_160.30.132.11_LOOPBACK"
[admin@UK-BLOCK] >
[admin@UK-BLOCK] > /ip address add address=160.30.132.11/32 interface=loopback comment=" UK-BLOCK_160.30.132.11_LOOPBACK"
[admin@UK-BLOCK] >
[admin@UK-BLOCK] > /tool/romon/set enabled=yes
[admin@UK-BLOCK] >
```

Figure 3: Set Identity, Loopback Address and RoMoN of UK-BLOCK Router Through CMD

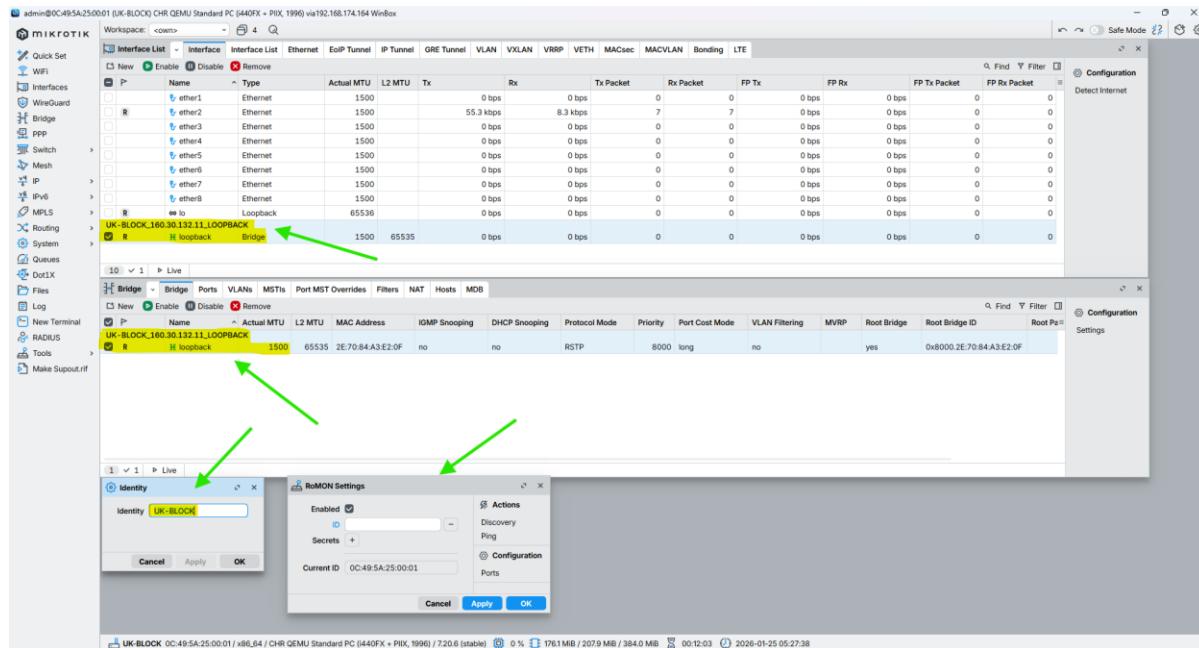


Figure 4: Set Identity, Loopback Address and RoMoN of UK-BLOCK Router Through WINBOX

1.3. NEPAL-BLOCK

CMD

```
/system identity set name=NEPAL-BLOCK

/interface bridge add name=loopback comment="NEPAL-BLOCK_160.30.132.12_LOOPBACK"

/ip address add address=160.30.132.12/32 interface=loopback comment="NEPAL-BLOCK_160.30.132.12_LOOPBACK"
```

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```
/tool/romon/set enabled=yes
```

```
[admin@mikrotik] >
[admin@mikrotik] > /system/identity/set name=NEPAL-BLOCK
[admin@NEPAL-BLOCK] >
[admin@NEPAL-BLOCK] > /interface/bridge/add name=loopback comment="NEPAL-BLOCK_160.30.132.12_LOOPBACK"
[admin@NEPAL-BLOCK] >
[admin@NEPAL-BLOCK] > /ip address/add address=160.30.132.12/32 interface=loopback
[admin@NEPAL-BLOCK] > /ip address/add address=160.30.132.12/32 interface=loopback comment="NEPAL-BLOCK_160.30.132.12_LOOPBACK"
[admin@NEPAL-BLOCK] >
[admin@NEPAL-BLOCK] > /tool/romon/set enabled=yes
[admin@NEPAL-BLOCK] >
```

Figure 5: Set Identity, Loopback Address and RoMoN of NEPAL-BLOCK Router Through CMD

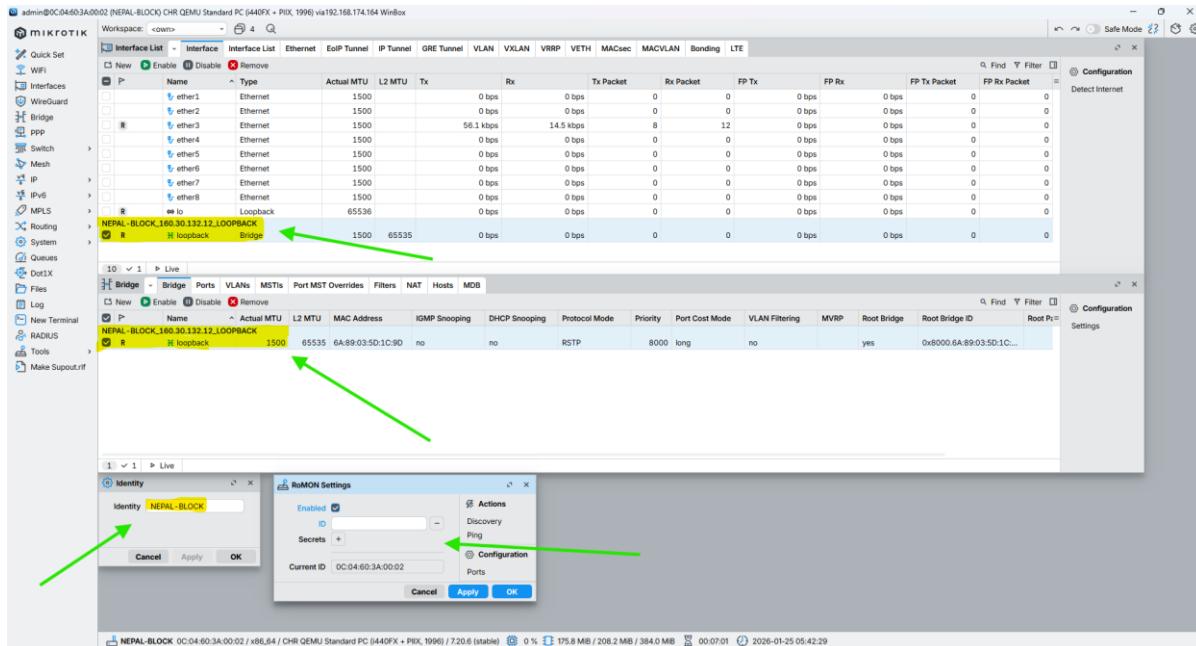


Figure 6: Set Identity, Loopback Address and RoMoN of NEPAL-BLOCK Router Through WINBOX

1.4. HIMAL-BLOCK

CMD

```
/system identity set name=HIMAL-BLOCK

/interface bridge add name=loopback comment="HIMAL-BLOCK_160.30.132.13_LOOPBACK"

/ip address add address=160.30.132.13/32 interface=loopback comment="HIMAL-BLOCK_160.30.132.13_LOOPBACK"

/tool/romon/set enabled=yes
```

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```
[admin@mikrotik] >
[admin@mikrotik] > /system/identity/set name=HIMAL-BLOCK
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > /interface/bridge/add name=loopback comment="HIMAL-BLOCK_160.30.132.13_LOOPBACK"
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > ip address/add address=160.30.132.13 interface=lo
[admin@HIMAL-BLOCK] > ip address/add address=160.30.132.13 interface=loopback comment="HIMAL-BLOCK_160.30.132.13_LOOPBACK"
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > /t
task tool
[admin@HIMAL-BLOCK] > /tool/romon/set enabled=yes
[admin@HIMAL-BLOCK] >
```

Figure 7: Set Identity, Loopback Address and RoMoN of NEPAL-BLOCK Router Through CMD

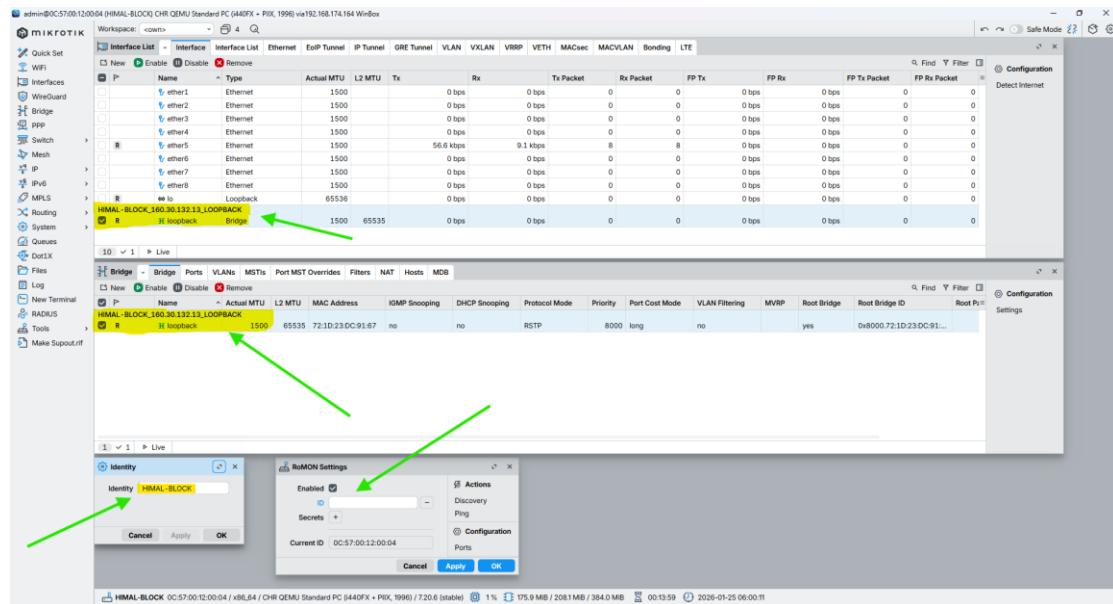


Figure 8: Set Identity, Loopback Address and RoMoN of NEPAL-BLOCK Router Through WINBOX

1.5. BRIT-BLOCK

CMD

```
/system identity set name=BRIT-BLOCK

/interface bridge add name=loopback comment="BRIT-BLOCK_160.30.132.14_LOOPBACK"

/ip address add address=160.30.132.14/32 interface=loopback comment="BRIT-BLOCK_160.30.132.14_LOOPBACK"

/tool/romon/set enabled=yes
```

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```
[admin@MikroTik] > system/identity/set name=BRIT-BLOCK
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] > interface/bridge/add name=loopback comment="BRIT-BLOCK_160.30.132.14_LOOPBACK"
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] > ip address/ add interface=loopback address=160.30.132.14 comment="BRIT-BLOCK_160.30.132.14_LOOPBACK"
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] > /tool/romon/set enabled=yes
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] >
```

Figure 9: Set Identity, Loopback Address and RoMoN of BRIT-BLOCK Router Through CMD

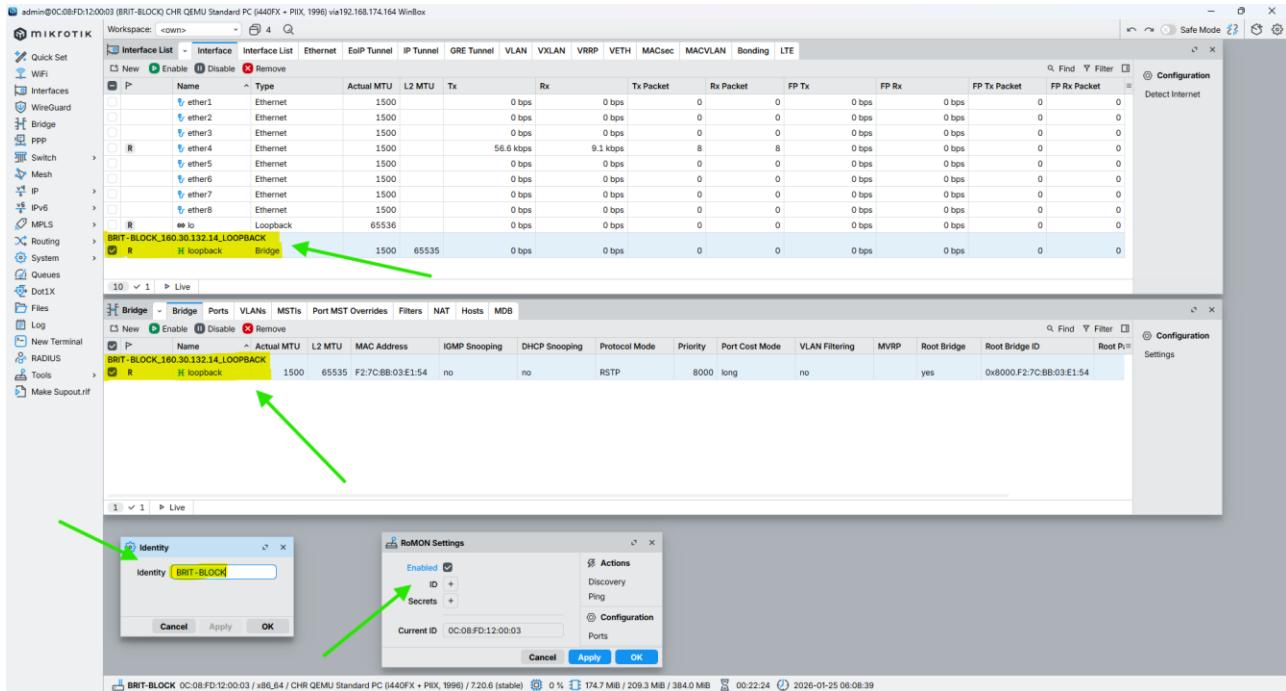


Figure 10: Set Identity, Loopback Address and RoMoN of BRIT-BLOCK Router Through WINBOX

1.6. SKILL-BLOCK

CMD

```
/system identity set name=SKILL-BLOCK

/interface bridge add name=loopback comment="SKILL-BLOCK_160.30.132.15_LOOPBACK"

/ip address add address=160.30.132.15/32 interface=loopback comment="SKILL-BLOCK_160.30.132.15_LOOPBACK"

/tool/romon/set enabled=yes
```

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

```
[admin@mikroTik] >
[admin@mikroTik] > /system identity set name=SKILL-BLOCK
[admin@SKILL-BLOCK] >
[admin@SKILL-BLOCK] > /interface bridge add name=loopback comment="SKILL-BLOCK_160.30.132.15_LOOPBACK"
[admin@SKILL-BLOCK] >
[admin@SKILL-BLOCK] > /ip address add address=160.30.132.15/32 interface=loopback comment="SKILL-BLOCK_160.30.132.15_LOOPBACK"
[admin@SKILL-BLOCK] >
[admin@SKILL-BLOCK] > /tool/romon/set enabled=yes
[admin@SKILL-BLOCK] >
```

Figure 11: Set Identity, Loopback Address and RoMoN of SKILL-BLOCK Router Through CMD

Figure 12: Set Identity, Loopback Address and RoMoN of SKILL-BLOCK Router Through WINBOX

1.7. ALUMNI-BLOCK

CMD

```
/system identity set name=ALUMNI-BLOCK

/interface bridge add name=loopback comment="ALUMNI-BLOCK_160.30.132.16_LOOPBACK"

/ip address add address=160.30.132.16/32 interface=loopback comment="ALUMNI-BLOCK_160.30.132.16_LOOPBACK"

/tool/romon/set enabled=yes
```

```
[admin@mikroTik] >
[admin@mikroTik] > /system identity set name=ALUMNI-BLOCK
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /interface bridge add name=loopback comment="ALUMNI-BLOCK_160.30.132.16_LOOPBACK"
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /ip address add address=160.30.132.16/32 interface=loopback comment="ALUMNI-BLOCK_160.30.132.16_LOOPBACK"
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /tool/romon/set enabled=yes
[admin@ALUMNI-BLOCK] >
```

Figure 13: Set Identity, Loopback Address and RoMoN of ALUMNI-BLOCK Router Through CMD

Figure 14: Set Identity, Loopback Address and RoMoN of ALUMNI-BLOCK Router Through WINBOX

1.8. KUMARI-BLOCK

CMD

```
/system identity set name=KUMARI-BLOCK

/interface bridge add name=loopback comment="KUMARI-BLOCK_160.30.132.17_LOOPBACK"

/ip address add address=160.30.132.17/32 interface=loopback comment="KUMARI-BLOCK_160.30.132.17_LOOPBACK"

/tool/romon/set enabled=yes
```

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```
[admin@mikrotik] >
[admin@mikrotik] > /system identity set name=KUMARI-BLOCK
[admin@KUMARI-BLOCK] >
[admin@KUMARI-BLOCK] > /interface bridge add name=loopback comment="KUMARI-BLOCK_160.30.132.17_LOOPBACK"
[admin@KUMARI-BLOCK] >
[admin@KUMARI-BLOCK] > /ip address add address=160.30.132.17/32 interface=loopback comment="KUMARI-BLOCK_160.30.132.17_LOOPBACK"
[admin@KUMARI-BLOCK] >
[admin@KUMARI-BLOCK] > /tool/romon/set enabled=yes
[admin@KUMARI-BLOCK] >
```

Figure 15: Set Identity, Loopback Address and RoMoN of KUMARI-BLOCK Router Through CMD

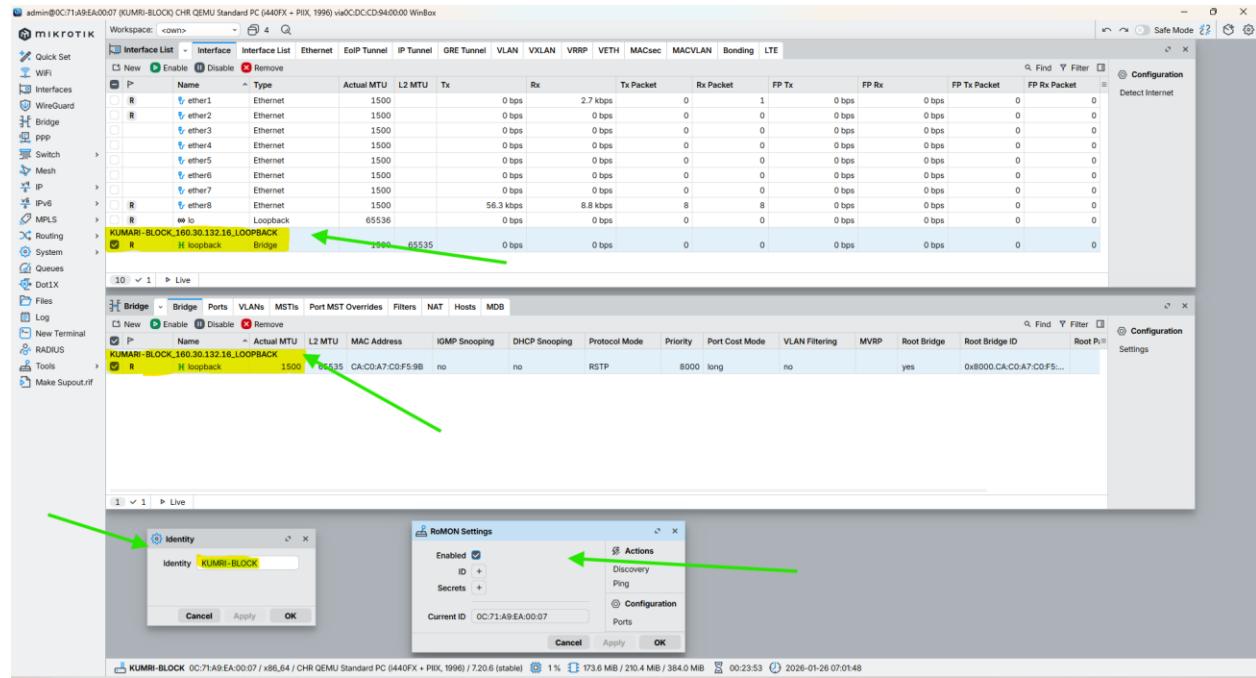


Figure 16: Set Identity, Loopback Address and RoMoN of KUMARI-BLOCK Router Through WINBOX

2. Set description on the Interface to all router

2.1. LONDON-BLOCK

CMD

```
/interface set ether2 comment="Link from LONDON-BLOCK (10.0.0.1/30) to UK-BLOCK (10.0.0.2/30)"  
/interface set ether3 comment="Link from LONDON-BLOCK (10.0.0.5/30) to NEPAL-BLOCK (10.0.0.6/30)"  
/interface set ether4 comment="Link from LONDON-BLOCK (10.0.0.9/30) to HIMAL-BLOCK (10.0.0.10/30)"  
/interface set ether5 comment="Link from LONDON-BLOCK (10.0.0.13/30) to BRIT-BLOCK (10.0.0.14/30)"  
/interface set ether6 comment="Link from LONDON-BLOCK (10.0.0.17/30) to SKILL-BLOCK (10.0.0.18/30)"  
/interface set ether7 comment="Link from LONDON-BLOCK (10.0.0.21/30) to ALUMNI-BLOCK (10.0.0.22/30)"  
/interface set ether8 comment="Link from LONDON-BLOCK (10.0.0.25/30) to KUMARI-BLOCK (10.0.0.26/30)"  
/interface set ether9 comment="LAN / Management link from LONDON-BLOCK to Local Network (192.168.174.0/24)"
```

2.2. UK-BLOCK

CMD

```
/interface set ether2 comment="Link from UK-BLOCK (10.0.0.2/30) to LONDON-BLOCK (10.0.0.1/30)"  
/interface set ether1 comment="Link from UK-BLOCK (10.0.0.29/30) to NEPAL-BLOCK (10.0.0.30/30)"  
/interface set ether3 comment="Link from UK-BLOCK (10.0.0.34/30) to HIMAL-BLOCK (10.0.0.33/30)"
```

```
[admin@UK-BLOCK] >  
[admin@UK-BLOCK] > /interface set ether2 comment="Link from UK-BLOCK (10.0.0.2/30) to LONDON-BLOCK (10.0.0.1/30)"  
[admin@UK-BLOCK] > /interface set ether1 comment="Link from UK-BLOCK (10.0.0.29/30) to NEPAL-BLOCK (10.0.0.30/30)"  
[admin@UK-BLOCK] > /interface set ether3 comment="Link from UK-BLOCK (10.0.0.34/30) to HIMAL-BLOCK (10.0.0.33/30)"  
[admin@UK-BLOCK] >
```

2.3. NEPAL-BLOCK

CMD

```
/interface set ether3 comment="Link from NEPAL-BLOCK (10.0.0.6/30) to LONDON-BLOCK (10.0.0.5/30)"  
/interface set ether1 comment="Link from NEPAL-BLOCK (10.0.0.30/30) to UK-BLOCK (10.0.0.29/30)"  
/interface set ether2 comment="Link from NEPAL-BLOCK (10.0.0.37/30) to BRIT-BLOCK (10.0.0.38/30)"
```

```
[admin@NEPAL-BLOCK] >  
[admin@NEPAL-BLOCK] > /interface set ether3 comment="Link from NEPAL-BLOCK (10.0.0.6/30) to LONDON-BLOCK (10.0.0.5/30)"  
[admin@NEPAL-BLOCK] > /interface set ether1 comment="Link from NEPAL-BLOCK (10.0.0.30/30) to UK-BLOCK (10.0.0.29/30)"  
[admin@NEPAL-BLOCK] > /interface set ether2 comment="Link from NEPAL-BLOCK (10.0.0.37/30) to BRIT-BLOCK (10.0.0.38/30)"  
[admin@NEPAL-BLOCK] >
```

2.4. HIMAL-BLOCK

CMD

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```
/interface set ether3 comment="Link from HIMAL-BLOCK (10.0.0.33/30) to UK-BLOCK (10.0.0.34/30)"  
/interface set ether4 comment="Link from HIMAL-BLOCK (10.0.0.10/30) to LONDON-BLOCK (10.0.0.9/30)"  
/interface set ether2 comment="Link from HIMAL-BLOCK (10.0.0.42/30) to SKILL-BLOCK (10.0.0.41/30)"
```

```
[admin@HIMAL-BLOCK] >  
[admin@HIMAL-BLOCK] > /interface set ether3 comment="Link from HIMAL-BLOCK (10.0.0.33/30) to UK-BLOCK (10.0.0.34/30)"  
[admin@HIMAL-BLOCK] > /interface set ether4 comment="Link from HIMAL-BLOCK (10.0.0.10/30) to LONDON-BLOCK (10.0.0.9/30)"  
[admin@HIMAL-BLOCK] > /interface set ether2 comment="Link from HIMAL-BLOCK (10.0.0.42/30) to SKILL-BLOCK (10.0.0.41/30)"  
[admin@HIMAL-BLOCK] >
```

2.5. BRIT-BLOCK

CMD

```
/interface set ether2 comment="Link from BRIT-BLOCK (10.0.0.38/30) to NEPAL-BLOCK (10.0.0.37/30)"  
/interface set ether5 comment="Link from BRIT-BLOCK (10.0.0.14/30) to LONDON-BLOCK (10.0.0.13/30)"  
/interface set ether1 comment="Link from BRIT-BLOCK (10.0.0.46/30) to KUMARI-BLOCK (10.0.0.44/30)"
```

```
[admin@BRIT-BLOCK] >  
[admin@BRIT-BLOCK] > /interface set ether2 comment="Link from BRIT-BLOCK (10.0.0.38/30) to NEPAL-BLOCK (10.0.0.37/30)"  
[admin@BRIT-BLOCK] > /interface set ether5 comment="Link from BRIT-BLOCK (10.0.0.14/30) to LONDON-BLOCK (10.0.0.13/30)"  
[admin@BRIT-BLOCK] > /interface set ether1 comment="Link from BRIT-BLOCK (10.0.0.46/30) to KUMARI-BLOCK (10.0.0.44/30)"  
[admin@BRIT-BLOCK] >
```

2.6. SKILL-BLOCK

CMD

```
/interface set ether2 comment="Link from SKILL-BLOCK (10.0.0.41/30) to HIMAL-BLOCK (10.0.0.42/30)"  
/interface set ether6 comment="Link from SKILL-BLOCK (10.0.0.18/30) to LONDON-BLOCK (10.0.0.17/30)"  
/interface set ether1 comment="Link from SKILL-BLOCK (10.0.0.50/30) to KUMARI-BLOCK (10.0.0.49/30)"
```

```
[admin@SKILL-BLOCK] >  
[admin@SKILL-BLOCK] > /interface set ether2 comment="Link from SKILL-BLOCK (10.0.0.41/30) to HIMAL-BLOCK (10.0.0.42/30)"  
[admin@SKILL-BLOCK] > /interface set ether6 comment="Link from SKILL-BLOCK (10.0.0.18/30) to LONDON-BLOCK (10.0.0.17/30)"  
[admin@SKILL-BLOCK] > /interface set ether1 comment="Link from SKILL-BLOCK (10.0.0.50/30) to KUMARI-BLOCK (10.0.0.49/30)"  
[admin@SKILL-BLOCK] >
```

2.7. ALUMNI-BLOCK

CMD

```
/interface set ether7 comment="Link from ALUMNI-BLOCK (10.0.0.22/30) to LONDON-BLOCK (10.0.0.21/30)"  
/interface set ether1 comment="Link from ALUMNI-BLOCK (10.0.0.49/30) to SKILL-BLOCK (10.0.0.50/30)"  
/interface set ether2 comment="Link from ALUMNI-BLOCK (10.0.0.53/30) to KUMARI-BLOCK (10.0.0.54/30)"
```

```
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /interface set ether7 comment="Link from ALUMNI-BLOCK (10.0.0.22/30) to LONDON-BLOCK (10.0.0.21/30)"
[admin@ALUMNI-BLOCK] > /interface set ether1 comment="Link from ALUMNI-BLOCK (10.0.0.49/30) to SKILL-BLOCK (10.0.0.50/30)"
[admin@ALUMNI-BLOCK] > /interface set ether2 comment="Link from ALUMNI-BLOCK (10.0.0.53/30) to KUMARI-BLOCK (10.0.0.54/30)"
[admin@ALUMNI-BLOCK] >
```

2.8. KUMARI-BLOCK

CMD

```
/interface set ether8 comment="Link from KUMARI-BLOCK (10.0.0.26/30) to LONDON-BLOCK (10.0.0.25/30)"
/interface set ether2 comment="Link from KUMARI-BLOCK (10.0.0.54/30) to ALUMNI-BLOCK (10.0.0.53/30)"
/interface set ether1 comment="Link from KUMARI-BLOCK (10.0.0.44/30) to BRIT-BLOCK (10.0.0.46/30)"
```

```
[admin@KUMARI-BLOCK] >
[admin@KUMARI-BLOCK] > /interface set ether8 comment="Link from KUMARI-BLOCK (10.0.0.26/30) to LONDON-BLOCK (10.0.0.25/30)"
[admin@KUMARI-BLOCK] > /interface set ether2 comment="Link from KUMARI-BLOCK (10.0.0.54/30) to ALUMNI-BLOCK (10.0.0.53/30)"
[admin@KUMARI-BLOCK] > /interface set ether1 comment="Link from KUMARI-BLOCK (10.0.0.44/30) to BRIT-BLOCK (10.0.0.46/30)"
[admin@KUMARI-BLOCK] >
```

3. Configuration IP in the Core Interface of all Routers

3.1. LONDON-BLOCK

CMD

```
/ip address add address=10.0.0.1/30 interface=ether2 comment="NETWORK-ID_10.0.0.0/30_LINK_FROM_LONDON-BLOCK_10.0.0.1/30_TO_UK-BLOCK_10.0.0.2/30"

/ip address add address=10.0.0.5/30 interface=ether3 comment="NETWORK-ID_10.0.0.4/30_LINK_FROM_LONDON-BLOCK_10.0.0.5/30_TO_NEPAL-BLOCK_10.0.0.6/30"

/ip address add address=10.0.0.9/30 interface=ether4 comment="NETWORK-ID_10.0.0.8/30_LINK_FROM_LONDON-BLOCK_10.0.0.9/30_TO_HIMAL-BLOCK_10.0.0.10/30"

/ip address add address=10.0.0.13/30 interface=ether5 comment="NETWORK-ID_10.0.0.12/30_LINK_FROM_LONDON-BLOCK_10.0.0.13/30_TO_BRIT-BLOCK_10.0.0.14/30"

/ip address add address=10.0.0.17/30 interface=ether6 comment="NETWORK-ID_10.0.0.16/30_LINK_FROM_LONDON-BLOCK_10.0.0.17/30_TO_SKILL-BLOCK_10.0.0.18/30"

/ip address add address=10.0.0.21/30 interface=ether7 comment="NETWORK-ID_10.0.0.20/30_LINK_FROM_LONDON-BLOCK_10.0.0.21/30_TO_ALUMNI-BLOCK_10.0.0.22/30"

/ip address add address=10.0.0.25/30 interface=ether8 comment="NETWORK-ID_10.0.0.24/30_LINK_FROM_LONDON-BLOCK_10.0.0.25/30_TO_KUMARI-BLOCK_10.0.0.26/30"
```

```
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /ip address add address=10.0.0.1/30 interface=ether2 comment="NETWORK-ID_10.0.0.0/30_LINK_FROM_LONDON-BLOCK_10.0.0.1/30_TO_UK-BLOCK_10.0.0.2/30"
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /ip address add address=10.0.0.5/30 interface=ether3 comment="NETWORK-ID_10.0.0.4/30_LINK_FROM_LONDON-BLOCK_10.0.0.5/30_TO_NEPAL-BLOCK_10.0.0.6/30"
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /ip address add address=10.0.0.9/30 interface=ether4 comment="NETWORK-ID_10.0.0.8/30_LINK_FROM_LONDON-BLOCK_10.0.0.9/30_TO_HIMAL-BLOCK_10.0.0.10/30"
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /ip address add address=10.0.0.13/30 interface=ether5 comment="NETWORK-ID_10.0.0.12/30_LINK_FROM_LONDON-BLOCK_10.0.0.13/30_TO_BRIT-BLOCK_10.0.0.14/30"
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /ip address add address=10.0.0.17/30 interface=ether6 comment="NETWORK-ID_10.0.0.16/30_LINK_FROM_LONDON-BLOCK_10.0.0.17/30_TO_SKILL-BLOCK_10.0.0.18/30"
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /ip address add address=10.0.0.21/30 interface=ether7 comment="NETWORK-ID_10.0.0.20/30_LINK_FROM_LONDON-BLOCK_10.0.0.21/30_TO_ALUMNI-BLOCK_10.0.0.22/30"
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /ip address add address=10.0.0.25/30 interface=ether8 comment="NETWORK-ID_10.0.0.24/30_LINK_FROM_LONDON-BLOCK_10.0.0.25/30_TO_KUMARI-BLOCK_10.0.0.26/30"
[admin@LONDON-BLOCK] >
```

Figure 17: Configuration IP in the Core Interface of LONDON-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

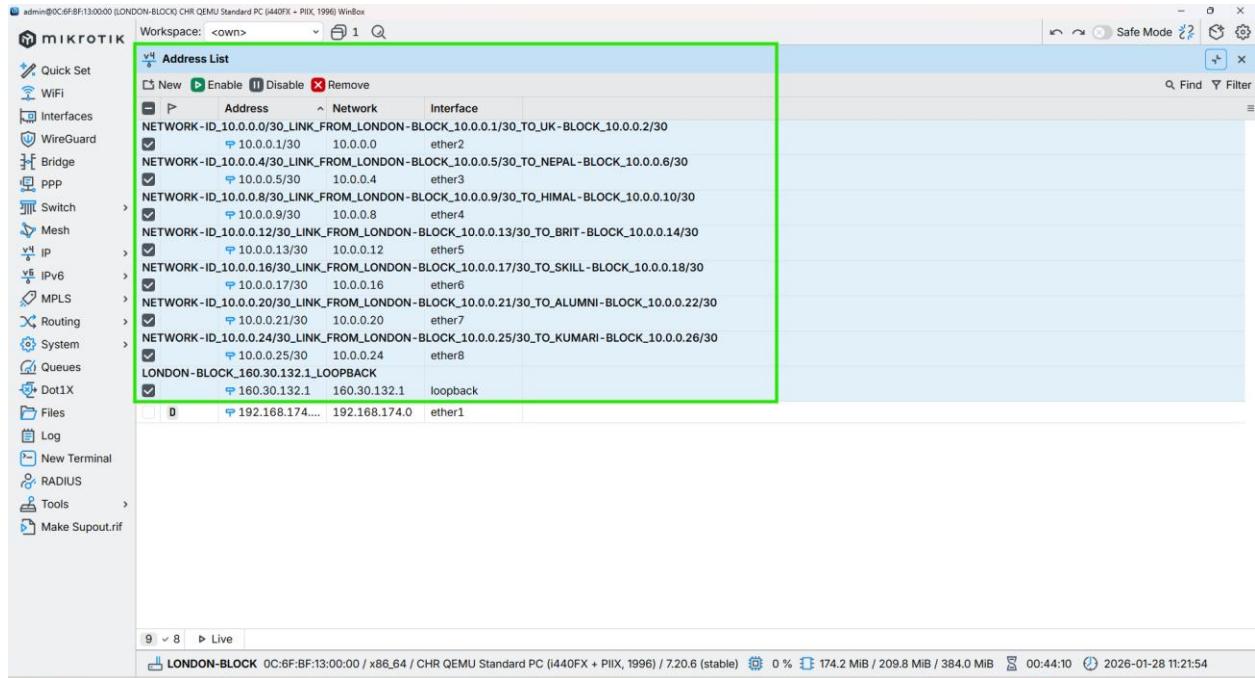


Figure 18: Configuration IP in the Core Interface of LONDON-BLOCK Router Through WINBOX

3.2. UK-BLOCK

CMD

```
/ip address add address=10.0.0.2/30 interface=ether2 comment="NETWORK-ID_10.0.0.0/30_LINK_FROM_UK-BLOCK_10.0.0.2/30_TO_LONDON-BLOCK_10.0.0.1/30"

/ip address add address=10.0.0.29/30 interface=ether1 comment="NETWORK-ID_10.0.0.28/30_LINK_FROM_UK-BLOCK_10.0.0.29/30_TO_NEPAL-BLOCK_10.0.0.30/30"

/ip address add address=10.0.0.34/30 interface=ether3 comment="NETWORK-ID_10.0.0.32/30_LINK_FROM_UK-BLOCK_10.0.0.34/30_TO_HIMAL-BLOCK_10.0.0.33/30"
```

```
[admin@UK-BLOCK] > /ip address add address=10.0.0.2/30 interface=ether2 comment="NETWORK-ID_10.0.0.0/30_LINK_FROM_UK-BLOCK_10.0.0.2/30_TO_LONDON-BLOCK_10.0.0.1/30"
[admin@UK-BLOCK] > /ip address add address=10.0.0.29/30 interface=ether1 comment="NETWORK-ID_10.0.0.28/30_LINK_FROM_UK-BLOCK_10.0.0.29/30_TO_NEPAL-BLOCK_10.0.0.30/30"
[admin@UK-BLOCK] > /ip address add address=10.0.0.34/30 interface=ether3 comment="NETWORK-ID_10.0.0.32/30_LINK_FROM_UK-BLOCK_10.0.0.34/30_TO_HIMAL-BLOCK_10.0.0.33/30"
[admin@UK-BLOCK]
```

Figure 19: Configuration IP in the Core Interface of UK-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

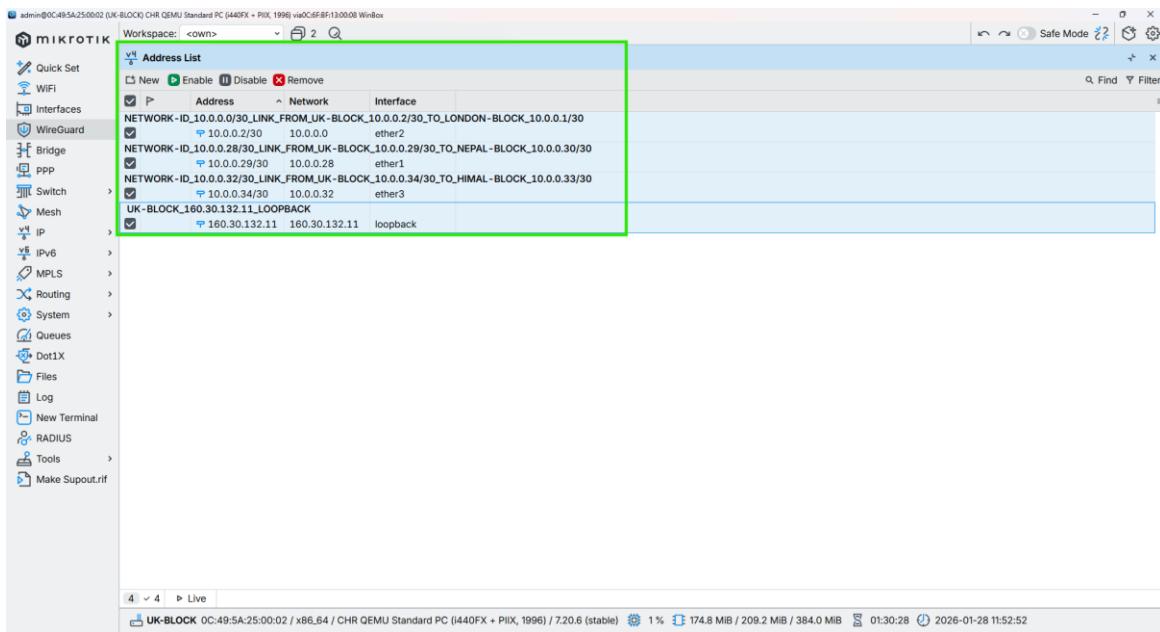


Figure 20: Configuration IP in the Core Interface of UK-BLOCK Router Through WINBOX

3.3. NEPAL-BLOCK

CMD

```
/ip address add address=10.0.0.6/30 interface=ether3 comment="NETWORK-ID_10.0.0.4/30_LINK_FROM_NEPAL-BLOCK_10.0.0.6/30_TO_LONDON-BLOCK_10.0.0.5/30"

/ip address add address=10.0.0.30/30 interface=ether1 comment="NETWORK-ID_10.0.0.28/30_LINK_FROM_NEPAL-BLOCK_10.0.0.30/30_TO_UK-BLOCK_10.0.0.29/30"

/ip address add address=10.0.0.37/30 interface=ether2 comment="NETWORK-ID_10.0.0.36/30_LINK_FROM_NEPAL-BLOCK_10.0.0.37/30_TO_BRIT-BLOCK_10.0.0.38/30"
```

```
[admin@EPAL-BLOCK] > /ip address add address=10.0.0.6/30 interface=ether3 comment="NETWORK-ID_10.0.0.4/30_LINK_FROM_NEPAL-BLOCK_10.0.0.6/30_TO_LONDON-BLOCK_10.0.0.5/30"
[admin@EPAL-BLOCK] > /ip address add address=10.0.0.30/30 interface=ether1 comment="NETWORK-ID_10.0.0.28/30_LINK_FROM_NEPAL-BLOCK_10.0.0.30/30_TO_UK-BLOCK_10.0.0.29/30"
[admin@EPAL-BLOCK] > /ip address add address=10.0.0.37/30 interface=ether2 comment="NETWORK-ID_10.0.0.36/30_LINK_FROM_NEPAL-BLOCK_10.0.0.37/30_TO_BRIT-BLOCK_10.0.0.38/30"
[admin@EPAL-BLOCK] >
```

Figure 21: Configuration IP in the Core Interface of NEPAL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

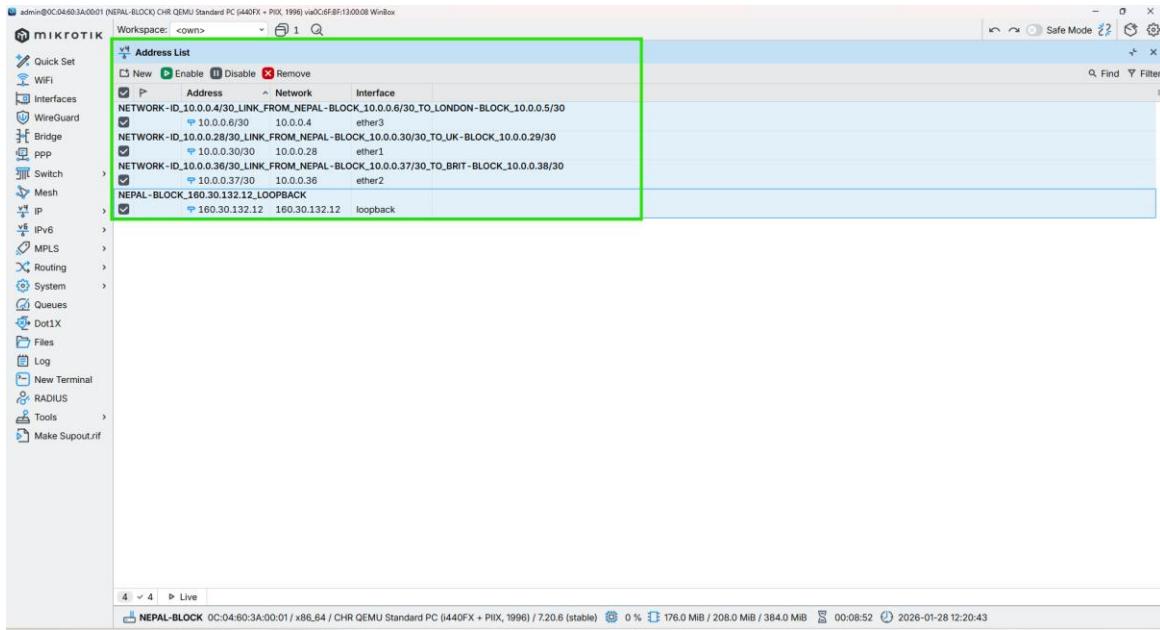


Figure 22: Configuration IP in the Core Interface of NEPAL-BLOCK Router Through WINBOX

3.4. HIMAL-BLOCK

CMD

```
/ip address add address=10.0.0.33/30 interface=ether3 comment="NETWORK-ID_10.0.0.32/30_LINK_FROM_HIMAL-BLOCK_10.0.0.33/30_TO_UK-BLOCK_10.0.0.34/30"

/ip address add address=10.0.0.10/30 interface=ether4 comment="NETWORK-ID_10.0.0.8/30_LINK_FROM_HIMAL-BLOCK_10.0.0.10/30_TO_LONDON-BLOCK_10.0.0.9/30"

/ip address add address=10.0.0.42/30 interface=ether2 comment="NETWORK-ID_10.0.0.40/30_LINK_FROM_HIMAL-BLOCK_10.0.0.42/30_TO_SKILL-BLOCK_10.0.0.41/30"
```

```
[admin@HIMAL-BLOCK] > /ip address add address=10.0.0.33/30 interface=ether3 comment="NETWORK-ID_10.0.0.32/30_LINK_FROM_HIMAL-BLOCK_10.0.0.33/30_TO_UK-BLOCK_10.0.0.34/30"
[admin@HIMAL-BLOCK] > /ip address add address=10.0.0.10/30 interface=ether4 comment="NETWORK-ID_10.0.0.8/30_LINK_FROM_HIMAL-BLOCK_10.0.0.10/30_TO_LONDON-BLOCK_10.0.0.9/30"
[admin@HIMAL-BLOCK] > /ip address add address=10.0.0.42/30 interface=ether2 comment="NETWORK-ID_10.0.0.40/30_LINK_FROM_HIMAL-BLOCK_10.0.0.42/30_TO_SKILL-BLOCK_10.0.0.41/30"
[admin@HIMAL-BLOCK] >
```

Figure 23: Configuration IP in the Core Interface of HIMAL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

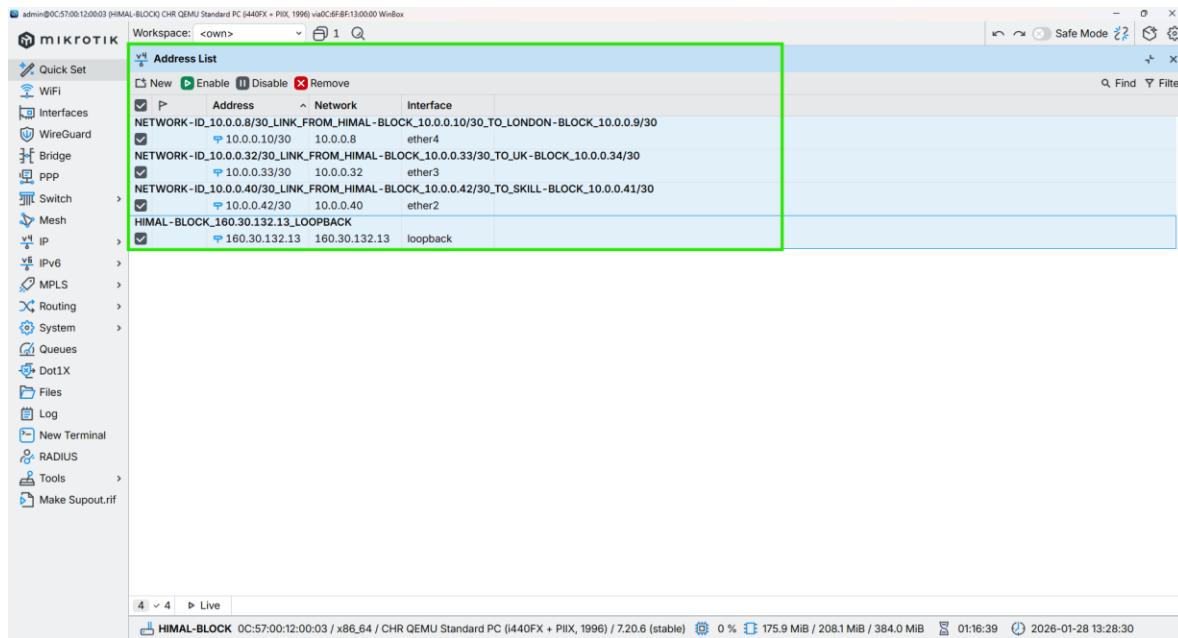


Figure 24: Configuration IP in the Core Interface of HIMAL-BLOCK Router Through WINBOX

3.5. BRIT-BLOCK

CMD

```
/ip address add address=10.0.0.38/30 interface=ether2 comment="NETWORK-ID_10.0.0.36/30_LINK_FROM_BRIT-BLOCK_10.0.0.38/30_TO_NEPAL-BLOCK_10.0.0.37/30"

/ip address add address=10.0.0.14/30 interface=ether5 comment="NETWORK-ID_10.0.0.12/30_LINK_FROM_BRIT-BLOCK_10.0.0.14/30_TO_LONDON-BLOCK_10.0.0.13/30"

/ip address add address=10.0.0.46/30 interface=ether1 comment="NETWORK-ID_10.0.0.44/30_LINK_FROM_BRIT-BLOCK_10.0.0.46/30_TO_KUMARI-BLOCK_10.0.0.45/30"
```

```
[admin@BRIT-BLOC] >
[admin@BRIT-BLOC] > /ip address add address=10.0.0.38/30 interface=ether2 comment="NETWORK-ID_10.0.0.36/30_LINK_FROM_BRIT-BLOCK_10.0.0.38/30_TO_NEPAL-BLOCK_10.0.0.37/30"
[admin@BRIT-BLOC] > /ip address add address=10.0.0.14/30 interface=ether5 comment="NETWORK-ID_10.0.0.12/30_LINK_FROM_BRIT-BLOCK_10.0.0.14/30_TO_LONDON-BLOCK_10.0.0.13/30"
[admin@BRIT-BLOC] > /ip address add address=10.0.0.46/30 interface=ether1 comment="NETWORK-ID_10.0.0.44/30_LINK_FROM_BRIT-BLOCK_10.0.0.46/30_TO_KUMARI-BLOCK_10.0.0.45/30"
[admin@BRIT-BLOC] >
```

Figure 25: Configuration IP in the Core Interface of BRIT-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

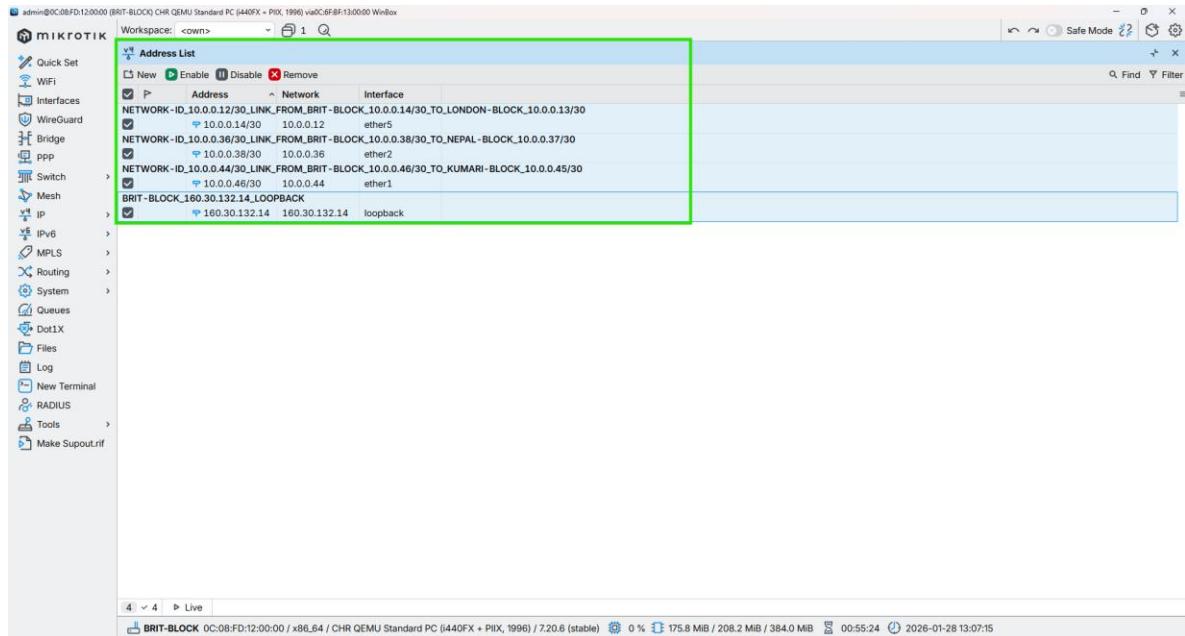


Figure 26: Configuration IP in the Core Interface of BRIT-BLOCK Router Through WINBOX

3.6. SKILL-BLOCK

CMD

```
/ip address add address=10.0.0.41/30 interface=ether2 comment="NETWORK-ID_10.0.0.40/30_LINK_FROM_SKILL-BLOCK_10.0.0.41/30_TO_NEPAL-BLOCK_10.0.0.42/30"

/ip address add address=10.0.0.18/30 interface=ether6 comment="NETWORK-ID_10.0.0.16/30_LINK_FROM_SKILL-BLOCK_10.0.0.18/30_TO_LONDON-BLOCK_10.0.0.17/30"

/ip address add address=10.0.0.50/30 interface=ether1 comment="NETWORK-ID_10.0.0.48/30_LINK_FROM_SKILL-BLOCK_10.0.0.50/30_TO_KUMARI-BLOCK_10.0.0.49/30"
```

```
[admin@SKILL-BLOCK] > /ip address add address=10.0.0.41/30 interface=ether2 comment="NETWORK-ID_10.0.0.40/30_LINK_FROM_SKILL-BLOCK_10.0.0.41/30_TO_NEPAL-BLOCK_10.0.0.42/30"
[admin@SKILL-BLOCK] > /ip address add address=10.0.0.18/30 interface=ether6 comment="NETWORK-ID_10.0.0.16/30_LINK_FROM_SKILL-BLOCK_10.0.0.18/30_TO_LONDON-BLOCK_10.0.0.17/30"
[admin@SKILL-BLOCK] > /ip address add address=10.0.0.50/30 interface=ether1 comment="NETWORK-ID_10.0.0.48/30_LINK_FROM_SKILL-BLOCK_10.0.0.50/30_TO_KUMARI-BLOCK_10.0.0.49/30"
[admin@SKILL-BLOCK] >
```

Figure 27: Configuration IP in the Core Interface of SKILL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

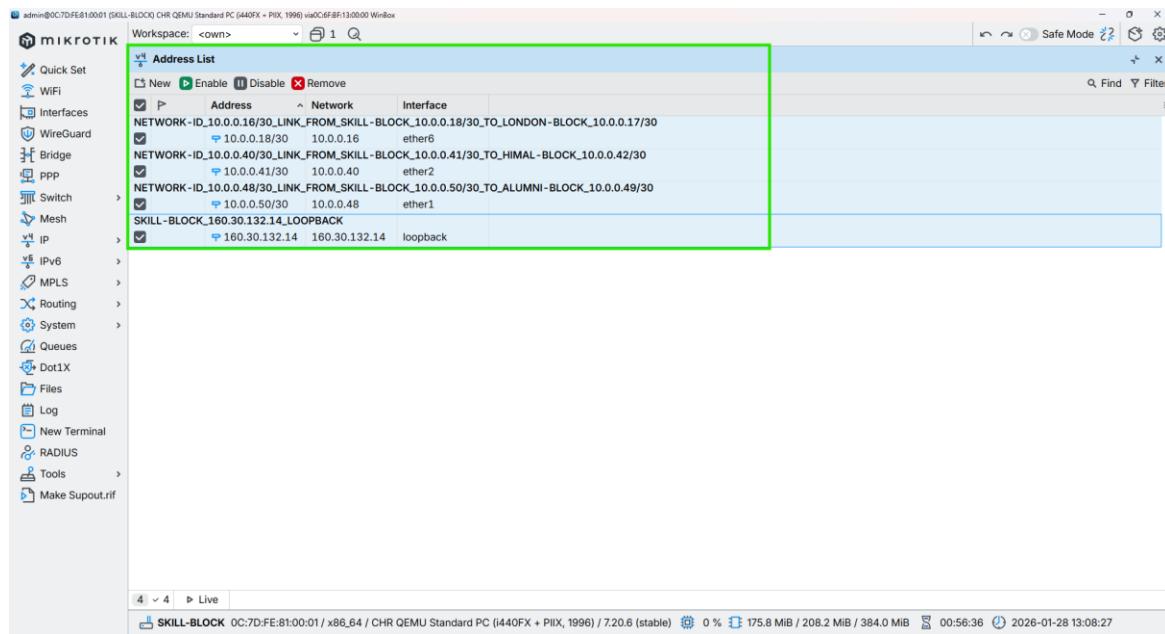


Figure 28: Configuration IP in the Core Interface of SKILL-BLOCK Router Through WINBOX

3.7. ALUMNI-BLOCK

CMD

```
/ip address add address=10.0.0.22/30 interface=ether7 comment="NETWORK-ID_10.0.0.20/30_LINK_FROM_ALUMNI-BLOCK_10.0.0.22/30_TO_LONDON-BLOCK_10.0.0.21/30"

/ip address add address=10.0.0.49/30 interface=ether1 comment="NETWORK-ID_10.0.0.48/30_LINK_FROM_ALUMNI-BLOCK_10.0.0.49/30_TO_SKILL-BLOCK_10.0.0.50/30"

/ip address add address=10.0.0.53/30 interface=ether2 comment="NETWORK-ID_10.0.0.52/30_LINK_FROM_ALUMNI-BLOCK_10.0.0.53/30_TO_KUMARI-BLOCK_10.0.0.54/30"
```

```
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /ip address add address=10.0.0.22/30 interface=ether7 comment="NETWORK-ID_10.0.0.20/30_LINK_FROM_ALUMNI-BLOCK_10.0.0.22/30_TO_LONDON-BLOCK_10.0.0.21/30"
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /ip address add address=10.0.0.49/30 interface=ether1 comment="NETWORK-ID_10.0.0.48/30_LINK_FROM_ALUMNI-BLOCK_10.0.0.49/30_TO_SKILL-BLOCK_10.0.0.50/30"
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /ip address add address=10.0.0.53/30 interface=ether2 comment="NETWORK-ID_10.0.0.52/30_LINK_FROM_ALUMNI-BLOCK_10.0.0.53/30_TO_KUMARI-BLOCK_10.0.0.54/30"
[admin@ALUMNI-BLOCK] >
```

Figure 29: Configuration IP in the Core Interface of ALUMNI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

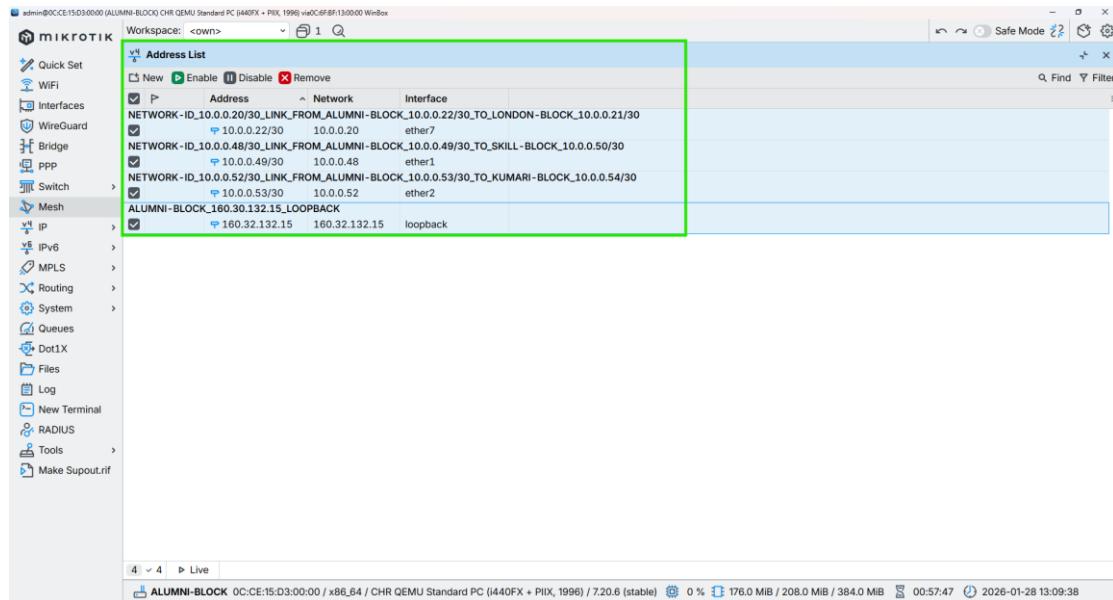


Figure 30: Configuration IP in the Core Interface of ALUMNI-BLOCK Router Through WINBOX

3.8. KUMARI-BLOCK

CMD

```
/ip address add address=10.0.0.26/30 interface=ether8 comment="NETWORK-ID_10.0.0.24/30_LINK_FROM_KUMARI-BLOCK_10.0.0.26/30_TO_LONDON-BLOCK_10.0.0.25/30"

/ip address add address=10.0.0.54/30 interface=ether2 comment="NETWORK-ID_10.0.0.52/30_LINK_FROM_KUMARI-BLOCK_10.0.0.54/30_TO_ALUMNI-BLOCK_10.0.0.53/30"

/ip address add address=10.0.0.44/30 interface=ether1 comment="NETWORK-ID_10.0.0.44/30_LINK_FROM_KUMARI-BLOCK_10.0.0.44/30_TO_BRIT-BLOCK_10.0.0.46/30"
```

```
[admin@KUMARI-BLOCK] > /ip address add address=10.0.0.26/30 interface=ether8 comment="NETWORK-ID_10.0.0.24/30_LINK_FROM_KUMARI-BLOCK_10.0.0.26/30_TO_LONDON-BLOCK_10.0.0.25/30"
[admin@KUMARI-BLOCK] > /ip address add address=10.0.0.54/30 interface=ether2 comment="NETWORK-ID_10.0.0.52/30_LINK_FROM_KUMARI-BLOCK_10.0.0.54/30_TO_ALUMNI-BLOCK_10.0.0.53/30"
[admin@KUMARI-BLOCK] > /ip address add address=10.0.0.44/30 interface=ether1 comment="NETWORK-ID_10.0.0.44/30_LINK_FROM_KUMARI-BLOCK_10.0.0.44/30_TO_BRIT-BLOCK_10.0.0.46/30"
[admin@KUMARI-BLOCK] >
```

Figure 31: Configuration IP in the Core Interface of KUMARI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

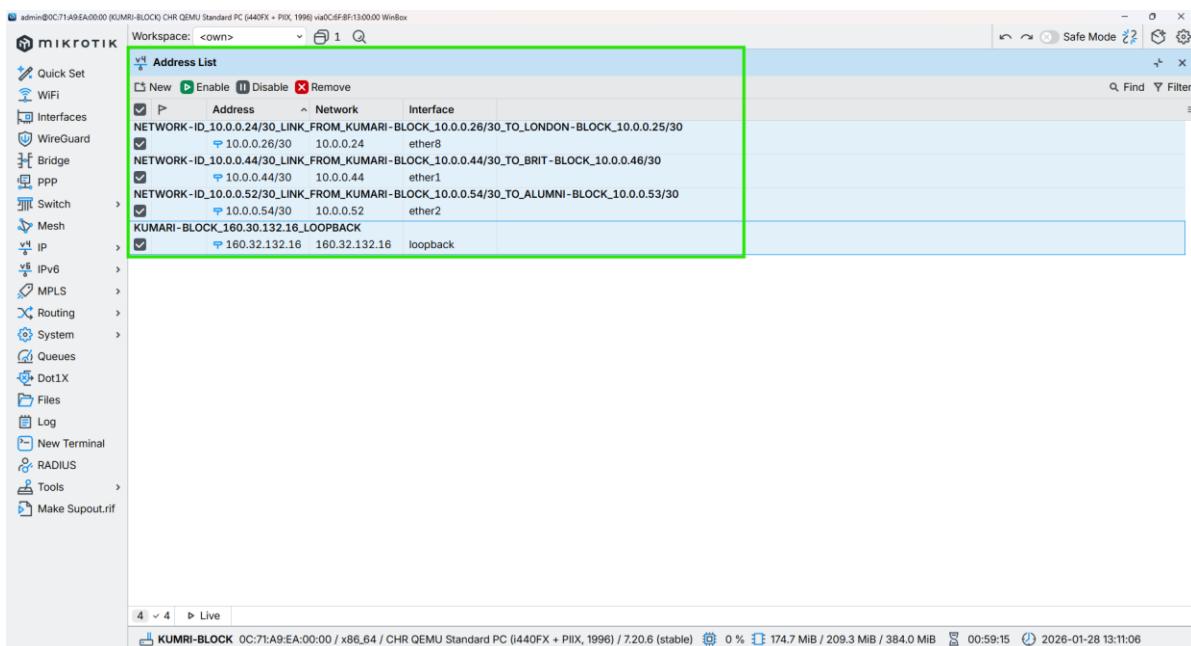


Figure 32: Configuration IP in the Core Interface of KUMARI-BLOCK Router Through WINBOX

4. Configuration OSPF to all Core Routers

4.1. LONDON-BLOCK

CMD

```
/routing ospf instance add name=OSPF_LONDON_BLOCK router-id=160.30.132.1 comment="OSPF instance for London block,
router-id 160.30.132.1"

/routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_LONDON_BLOCK comment="Backbone area 0.0.0.0 for
London OSPF"

/routing ospf interface-template

add interfaces=loopback area=backbone passive comment="Loopback London router-id 160.30.132.1 (passive)"

add      networks=10.0.0.0/30      interfaces=ether2      area=backbone      comment="ETHER-2_LINK_FROM_LONDON-
BLOCK_10.0.0.1_TO_UK-BLOCK_10.0.0.2"

add      networks=10.0.0.4/30      interfaces=ether3      area=backbone      comment="ETHER-3_LINK_FROM_LONDON-
BLOCK_10.0.0.5_TO_NEPAL-BLOCK_10.0.0.6"

add      networks=10.0.0.8/30      interfaces=ether4      area=backbone      comment="ETHER-4_LINK_FROM_LONDON-
BLOCK_10.0.0.9_TO_HIMAL-BLOCK_10.0.0.10"

add      networks=10.0.0.12/30     interfaces=ether5      area=backbone      comment="ETHER-5_LINK_FROM_LONDON-
BLOCK_10.0.0.13_TO_BRIT-BLOCK_10.0.0.14"

add      networks=10.0.0.16/30     interfaces=ether6      area=backbone      comment="ETHER-6_LINK_FROM_LONDON-
BLOCK_10.0.0.17_TO_SKILL-BLOCK_10.0.0.18"

add      networks=10.0.0.20/30     interfaces=ether7      area=backbone      comment="ETHER-7_LINK_FROM_LONDON-
BLOCK_10.0.0.21_TO_ALUMNI-BLOCK_10.0.0.22"

add      networks=10.0.0.24/30     interfaces=ether8      area=backbone      comment="ETHER-8_LINK_FROM_LONDON-
BLOCK_10.0.0.25_TO_KUMARI-BLOCK_10.0.0.26"
```

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

```
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /routing ospf instance add name=OSPF_LONDON_BLOCK router-id=160.30.132.1 comment="OSPF instance for London block, router-id 160.30.132.1"
[admin@LONDON-BLOCK] > /routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_LONDON_BLOCK comment="Backbone area 0.0.0.0 for London OSPF"
[admin@LONDON-BLOCK] > /routing ospf interface-template
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] > /routing/ospf/interface-template> add interfaces=loopback area=backbone comment="Loopback London router-id 160.30.132.1 (passive)"
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.0/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_LONDON-BLOCK_10.0.0.1_TO_UK-BLOCK_10.0.0.2"
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.4/30 interfaces=ether3 area=backbone comment="ETHER-3_LINK_FROM_LONDON-BLOCK_10.0.0.5_TO_NEPAL-BLOCK_10.0.0.6"
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.8/30 interfaces=ether4 area=backbone comment="ETHER-4_LINK_FROM_LONDON-BLOCK_10.0.0.9_TO_HIMAL-BLOCK_10.0.0.10"
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.12/30 interfaces=ether5 area=backbone comment="ETHER-5_LINK_FROM_LONDON-BLOCK_10.0.0.13_TO_BRIT-BLOCK_10.0.0.14"
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.16/30 interfaces=ether6 area=backbone comment="ETHER-6_LINK_FROM_LONDON-BLOCK_10.0.0.17_TO_SKILL-BLOCK_10.0.0.18"
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.20/30 interfaces=ether7 area=backbone comment="ETHER-7_LINK_FROM_LONDON-BLOCK_10.0.0.21_TO_ALUMNI-BLOCK_10.0.0.22"
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.24/30 interfaces=ether8 area=backbone comment="ETHER-8_LINK_FROM_LONDON-BLOCK_10.0.0.25_TO_KUMARI-BLOCK_10.0.0.26"
[admin@LONDON-BLOCK] > /routing/ospf/interface-template>
[admin@LONDON-BLOCK] >
```

Figure 33: Configuration OSPF to Core LONDON-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

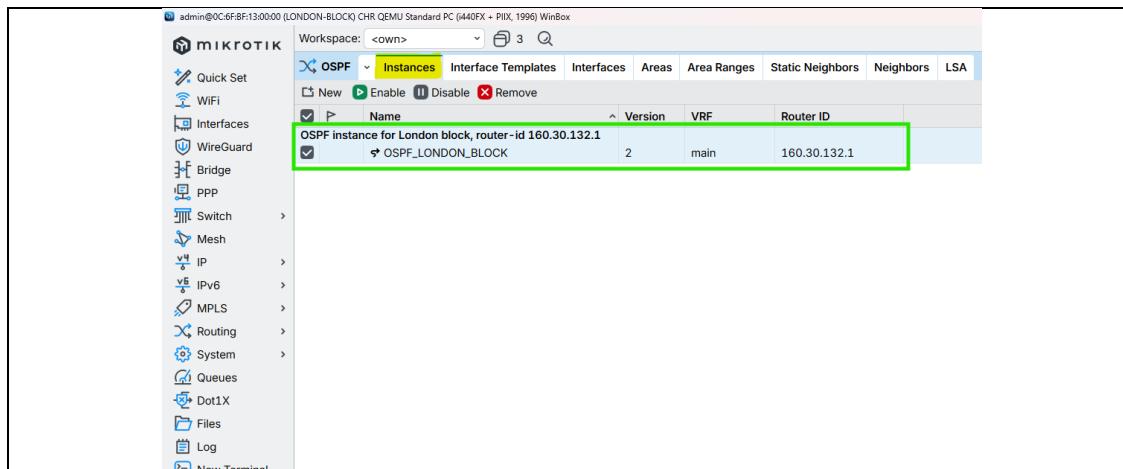


Figure 34: Configuration OSPF Instances to Core LONDON-BLOCK Router Through WINBOX

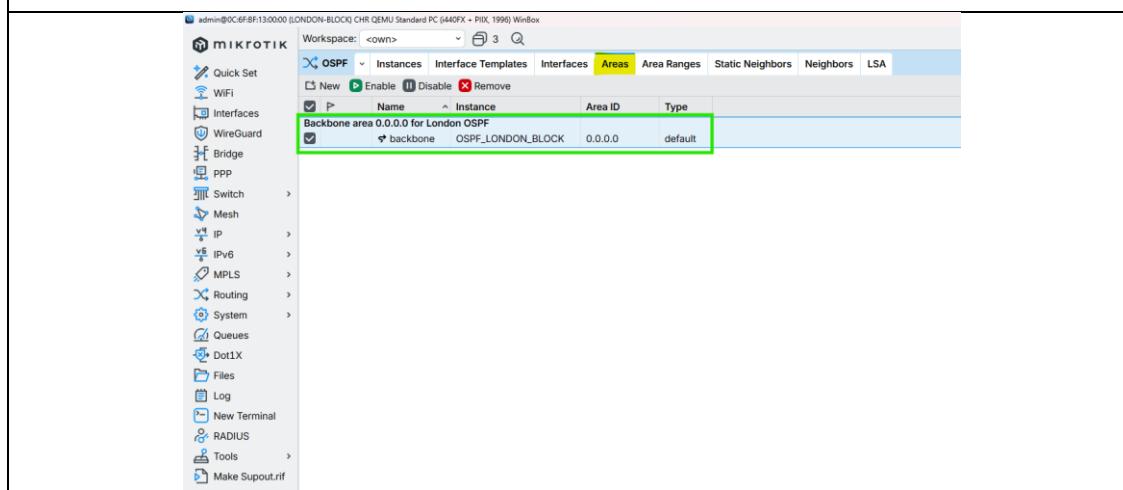


Figure 35: Configuration OSPF Area to Core LONDON-BLOCK Router Through WINBOX

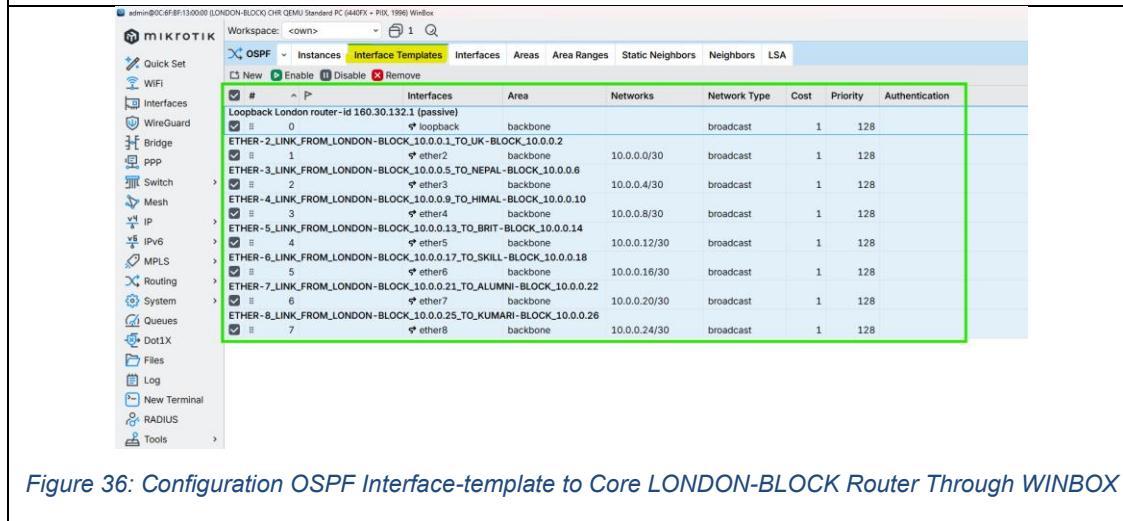


Figure 36: Configuration OSPF Interface-template to Core LONDON-BLOCK Router Through WINBOX

4.2. UK-BLOCK

CMD

```
/routing ospf instance add name=OSPF_UK_BLOCK router-id=160.30.132.11 comment="OSPF instance for UK block, router-id 160.30.132.11"

/routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_UK_BLOCK comment="Backbone area 0.0.0.0 for UK OSPF"

/routing ospf interface-template

add interfaces=loopback area=backbone comment="Loopback UK router-id 160.30.132.11 (passive)"

add networks=10.0.0.0/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_UK-BLOCK_10.0.0.2_TO_LONDON-BLOCK_10.0.0.1"

add networks=10.0.0.28/30 interfaces=ether1 area=backbone comment="ETHER-3_LINK_FROM_UK-BLOCK_10.0.0.29_TO_NEPAL-BLOCK_10.0.0.30"

add networks=10.0.0.32/30 interfaces=ether3 area=backbone comment="ETHER-3_LINK_FROM_UK-BLOCK_10.0.0.34_TO_HIMAL-BLOCK_10.0.0.33"
```

```
[admin@JK-BLOCK] >
[admin@JK-BLOCK] > /routing ospf instance add name=OSPF_UK_BLOCK router-id=160.30.132.11 comment="OSPF instance for UK block , router-id 160.30.132.11"
[admin@JK-BLOCK] >
[admin@JK-BLOCK] > /routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_UK_BLOCK comment="Backbone area 0.0.0.0 for UK OSPF"
[admin@JK-BLOCK] >
[admin@JK-BLOCK] > /routing ospf interface-template
[admin@JK-BLOCK] /routing/ospf/interface-template>
[admin@JK-BLOCK] /routing/ospf/interface-template> add interfaces=loopback area=backbone comment="Loopback UK router-id 160.30.132.11 (passive)"
[admin@JK-BLOCK] /routing/ospf/interface-template>
[admin@JK-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.0/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_UK-BLOCK_10.0.0.2_TO_LONDON-BLOCK_10.0.0.1"
[admin@JK-BLOCK] /routing/ospf/interface-template>
[admin@JK-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.28/30 interfaces=ether1 area=backbone comment="ETHER-3_LINK_FROM_UK-BLOCK_10.0.0.29_TO_NEPAL-BLOCK_10.0.0.30"
[admin@JK-BLOCK] /routing/ospf/interface-template>
[admin@JK-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.32/30 interfaces=ether3 area=backbone comment="ETHER-3_LINK_FROM_UK-BLOCK_10.0.0.34_TO_HIMAL-BLOCK_10.0.0.33"
[admin@JK-BLOCK] /routing/ospf/interface-template>
[admin@JK-BLOCK] >
```

Figure 37: Configuration OSPF to UK-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

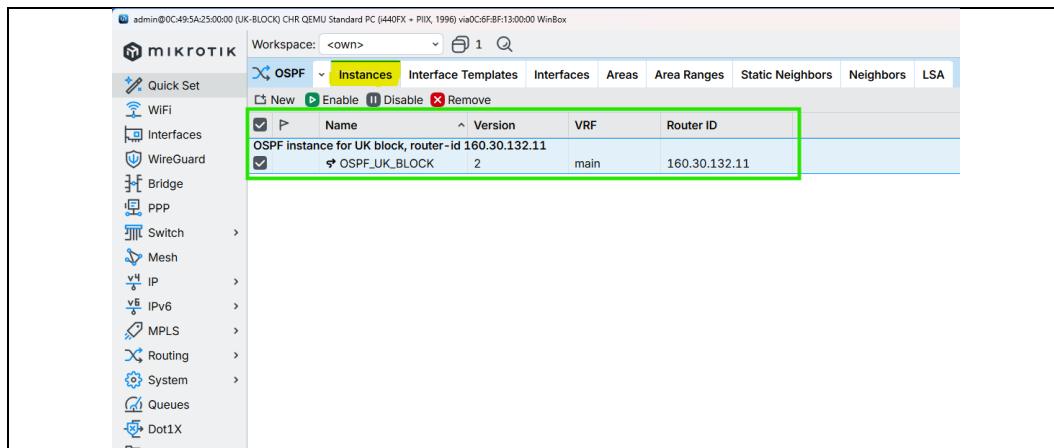


Figure 38: Configuration OSPF Instances to UK-BLOCK Router Through WINBOX

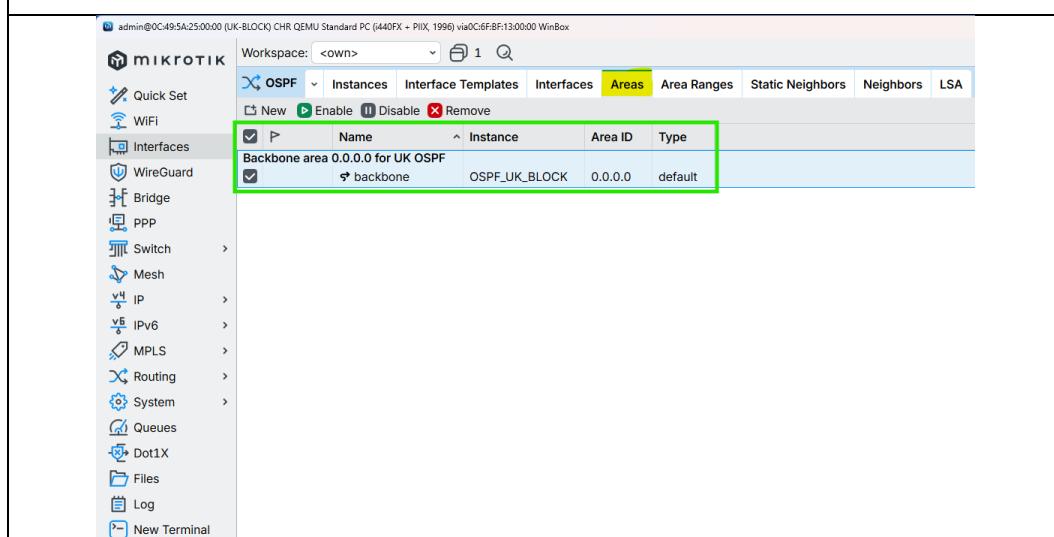


Figure 39: Configuration OSPF Area to UK-BLOCK Router Through WINBOX

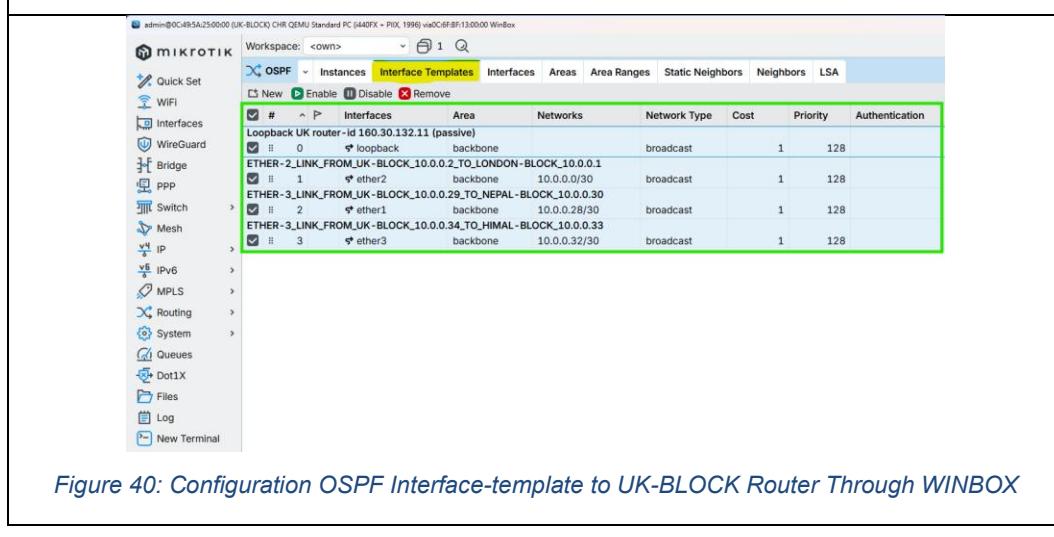


Figure 40: Configuration OSPF Interface-template to UK-BLOCK Router Through WINBOX

4.3. NEPAL-BLOCK

CMD

```
/routing ospf instance add name=OSPF_NEPAL_BLOCK router-id=160.30.132.12 comment="OSPF instance for NEPAL block,
router-id 160.30.132.12"

/routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_NEPAL_BLOCK comment="Backbone area 0.0.0.0 for
NEPAL OSPF"

/routing ospf interface-template

add interfaces=loopback area=backbone comment="Loopback NEPAL router-id 160.30.132.12 (passive)"

add      networks=10.0.0.28/30      interfaces=ether1      area=backbone      comment="ETHER-1_LINK_FROM_NEPAL-
BLOCK_10.0.0.30_TO_UK-BLOCK_10.0.0.29"

add      networks=10.0.0.4/30       interfaces=ether3      area=backbone      comment="ETHER-3_LINK_FROM_NEPAL-
BLOCK_10.0.0.6_TO_LONDON-BLOCK_10.0.0.5"

add      networks=10.0.0.36/30      interfaces=ether2      area=backbone      comment="ETHER-2_LINK_FROM_NEPAL-
BLOCK_10.0.0.37_TO_BRIT-BLOCK_10.0.0.38"
```

```
[admin@NEPAL-BLOCK] > /routing ospf instance add name=OSPF_NEPAL_BLOCK router-id=160.30.132.12 comment="OSPF instance for NEPAL block, router-id 160.30.132.12"
[admin@NEPAL-BLOCK] > /routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_NEPAL_BLOCK comment="Backbone area 0.0.0.0 for NEPAL OSPF"
[admin@NEPAL-BLOCK] > /routing ospf interface-template
[admin@NEPAL-BLOCK] /routing/ospf/interface-template> add interface=loopback area=backbone comment="Loopback NEPAL router-id 160.30.132.12 (passive)"
[admin@NEPAL-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.28/30 interfaces=ether1 area=backbone comment="ETHER-1_LINK_FROM_NEPAL-BLOCK_10.0.0.30_TO_UK-BLOCK_10.0.0.29"
[admin@NEPAL-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.4/30 interfaces=ether3 area=backbone comment="ETHER-3_LINK_FROM_NEPAL-BLOCK_10.0.0.6_TO_LONDON-BLOCK_10.0.0.5"
[admin@NEPAL-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.36/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_NEPAL-BLOCK_10.0.0.37_TO_BRIT-BLOCK_10.0.0.38"
[admin@NEPAL-BLOCK] /routing/ospf/interface-template>
[admin@NEPAL-BLOCK] >
```

Figure 41: Configuration OSPF to NEPAL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

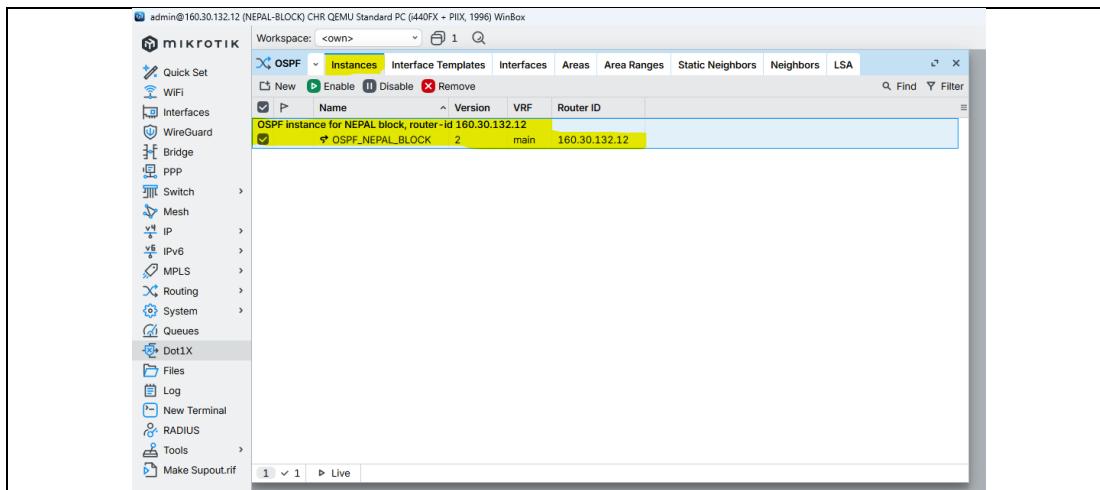


Figure 42: Configuration OSPF Instances to NEPAL-BLOCK Router Through WINBOX

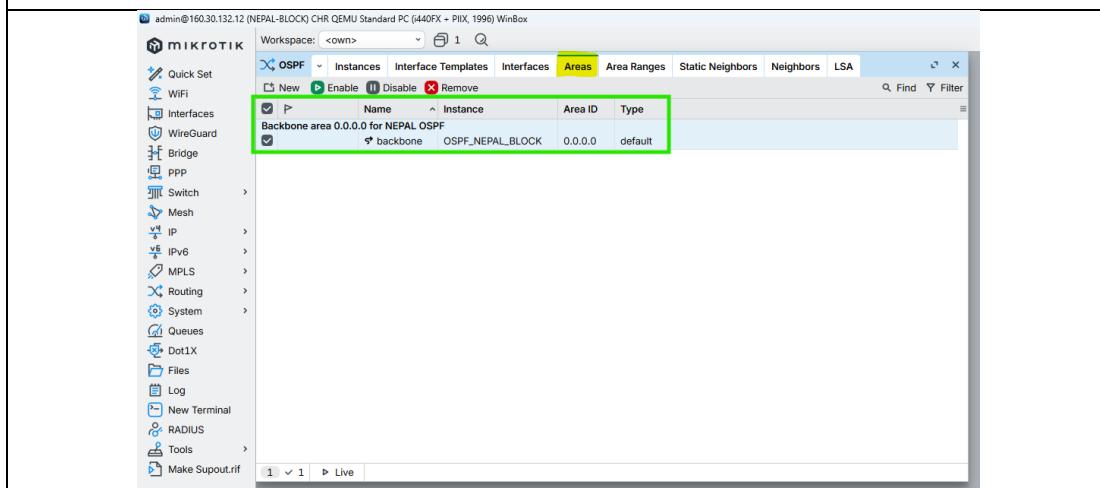


Figure 43: Configuration OSPF Area to NEPAL-BLOCK Router Through WINBOX

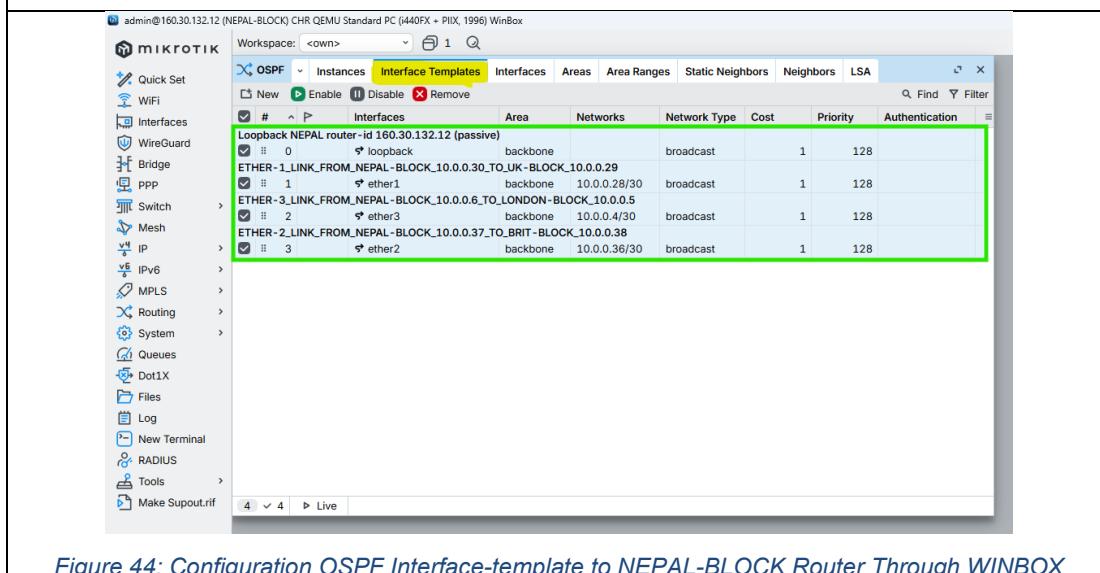


Figure 44: Configuration OSPF Interface-template to NEPAL-BLOCK Router Through WINBOX

4.4. HIMAL-BLOCK

CMD

```
/routing ospf instance add name=OSPF_HIMAL_BLOCK router-id=160.30.132.13 comment="OSPF instance for HIMAL block,
router-id 160.30.132.13"

/routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_HIMAL_BLOCK comment="Backbone area 0.0.0.0 for
HIMAL OSPF"

/routing ospf interface-template

add interfaces=loopback area=backbone comment="Loopback HIMAL router-id 160.30.132.13 (passive)"

add      networks=10.0.0.32/30      interfaces=ether3      area=backbone      comment="ETHER-3_LINK_FROM_HIMAL-
BLOCK_10.0.0.33_TO_UK-BLOCK_10.0.0.34"

add      networks=10.0.0.8/30      interfaces=ether4      area=backbone      comment="ETHER-4_LINK_FROM_HIMAL-
BLOCK_10.0.0.10_TO_LONDON-BLOCK_10.0.0.9"

add      networks=10.0.0.40/30     interfaces=ether2      area=backbone      comment="ETHER-2_LINK_FROM_HIMAL-
BLOCK_10.0.0.42_TO_SKILL-BLOCK_10.0.0.41"
```

```
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > /routing ospf instance add name=OSPF_HIMAL_BLOCK router-id=160.30.132.13 comment="OSPF instance for HI
MAL block, router-id 160.30.132.13"
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > /routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_HIMAL_BLOCK comment="Backbone area
0.0.0.0 for HIMAL OSPF"
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > /routing ospf interface-template
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template>
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template> add interfaces=loopback area=backbone comment="Loopback HIMAL router-i
d 160.30.132.13 (passive)"
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template>
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.32/30 interfaces=ether3 area=backbone comment="ETH
ER-3_LINK_FROM_HIMAL-BLOCK_10.0.0.33_TO_UK-BLOCK_10.0.0.34"
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template>
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.8/30 interfaces=ether4 area=backbone comment="ETHE
R-4_LINK_FROM_HIMAL-BLOCK_10.0.0.10_TO_LONDON-BLOCK_10.0.0.9"
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template>
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template> add networks=10.0.0.40/30 interfaces=ether2 area=backbone comment="ETH
ER-2_LINK_FROM_HIMAL-BLOCK_10.0.0.42_TO_SKILL-BLOCK_10.0.0.41"
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template>
[admin@HIMAL-BLOCK] > /routing/ospf/interface-template>
```

Figure 45: Configuration OSPF to HIMAL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

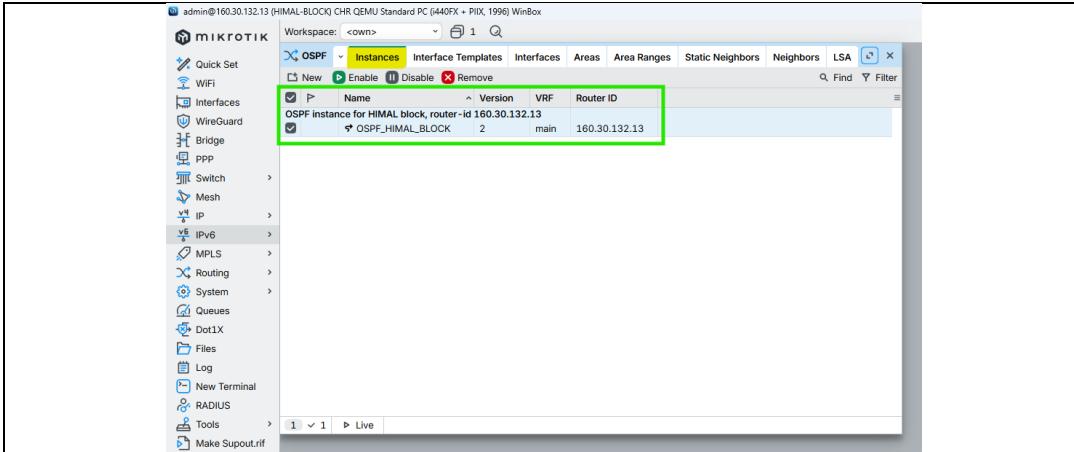


Figure 46: Configuration OSPF Instances to HIMAL-BLOCK Router Through WINBOX

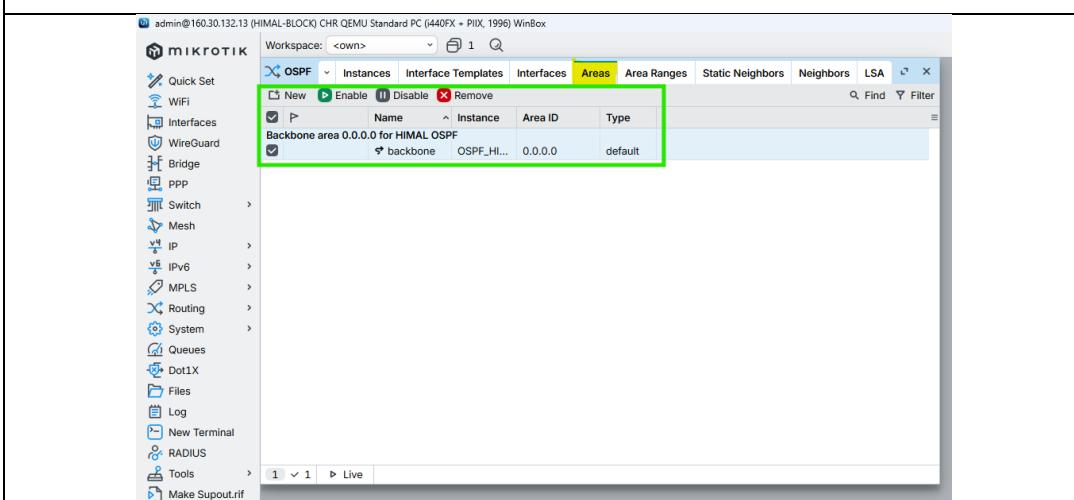


Figure 47: Configuration OSPF Area to HIMAL-BLOCK Router Through WINBOX

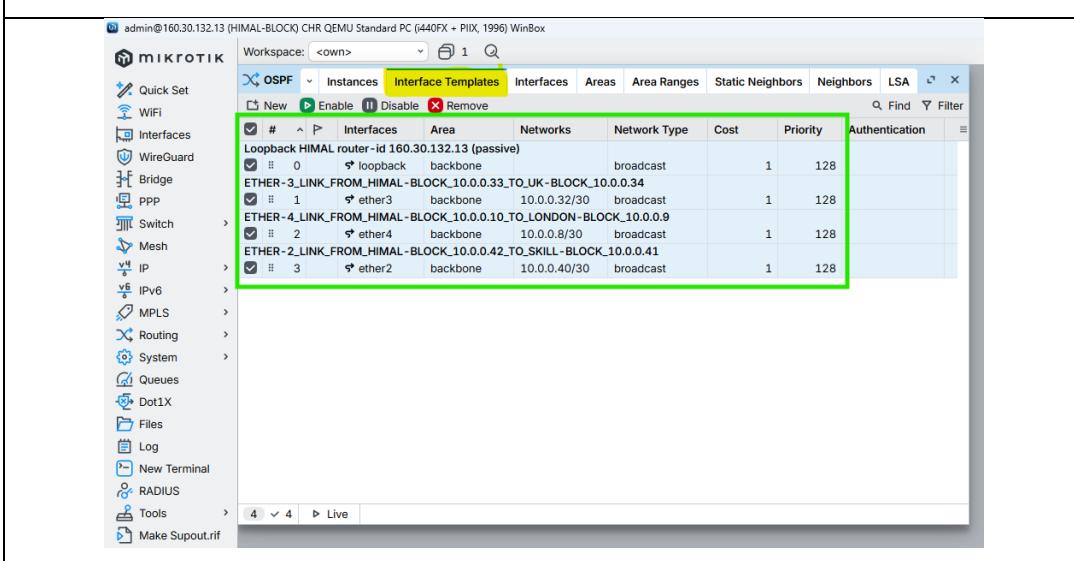


Figure 48: Configuration OSPF Interface-template to HIMAL-BLOCK Router Through WINBOX

4.5. BRIT-BLOCK

CMD

```
/routing ospf instance add name=OSPF_BRIT_BLOCK router-id=160.30.132.14 comment="OSPF instance for BRIT block, router-id 160.30.132.14"

/routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_BRIT_BLOCK comment="Backbone area 0.0.0.0 for BRIT OSPF"

/routing ospf interface-template

add interfaces=loopback area=backbone comment="Loopback BRIT router-id 160.30.132.14 (passive)"

add networks=10.0.0.36/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_BRIT-BLOCK_10.0.0.38_TO_NEPAL-BLOCK_10.0.0.37"

add networks=10.0.0.12/30 interfaces=ether5 area=backbone comment="ETHER-5_LINK_FROM_BRIT-BLOCK_10.0.0.14_TO_LONDON-BLOCK_10.0.0.13"

add networks=10.0.0.44/30 interfaces=ether1 area=backbone comment="ETHER-1_LINK_FROM_BRIT-BLOCK_10.0.0.46_TO_SKILL-BLOCK_10.0.0.45"
```

```
[admin@BRIT-BLOCK] > /routing ospf instance add name=OSPF_BRIT_BLOCK router-id=160.30.132.14 comment="OSPF instance for BRIT block, router-id 160.30.132.14"
[admin@BRIT-BLOCK] > /routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_BRIT_BLOCK comment="Backbone area 0.0.0.0 for BRIT OSPF"
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] > /routing ospf interface-template
[admin@BRIT-BLOCK] /routing/ospf/interface-template> add interfaces=loopback area=backbone comment="Loopback BRIT router-id 160.30.132.14 (passive)"
[admin@BRIT-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.36/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_BRIT-BLOCK_10.0.0.38_TO_NEPAL-BLOCK_10.0.0.37"
[admin@BRIT-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.12/30 interfaces=ether5 area=backbone comment="ETHER-5_LINK_FROM_BRIT-BLOCK_10.0.0.14_TO_LONDON-BLOCK_10.0.0.13"
[admin@BRIT-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.44/30 interfaces=ether1 area=backbone comment="ETHER-1_LINK_FROM_BRIT-BLOCK_10.0.0.46_TO_SKILL-BLOCK_10.0.0.45"
[admin@BRIT-BLOCK] /routing/ospf/interface-template>
[admin@BRIT-BLOCK] >
```

Figure 49: Configuration OSPF to BRIT-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

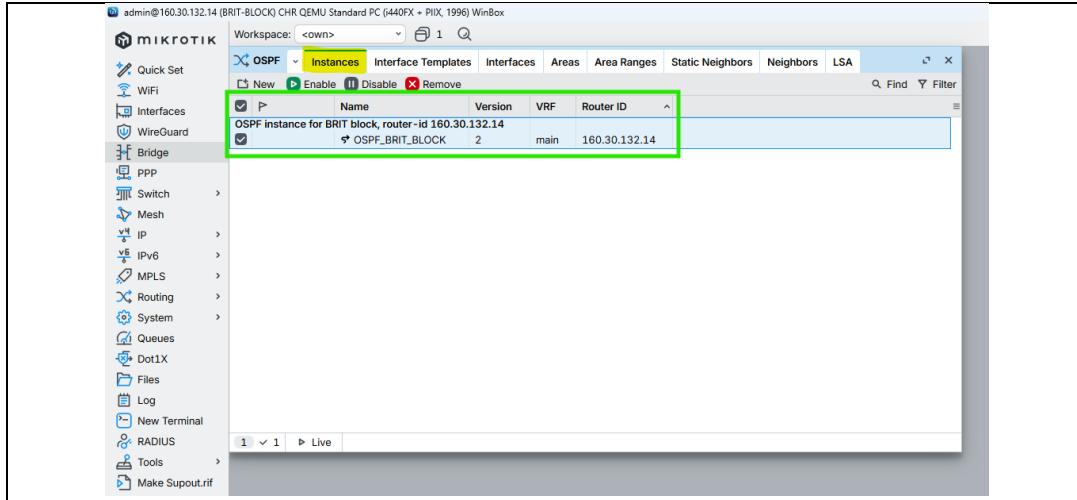


Figure 50: Configuration OSPF Instances to BRIT-BLOCK Router Through WINBOX

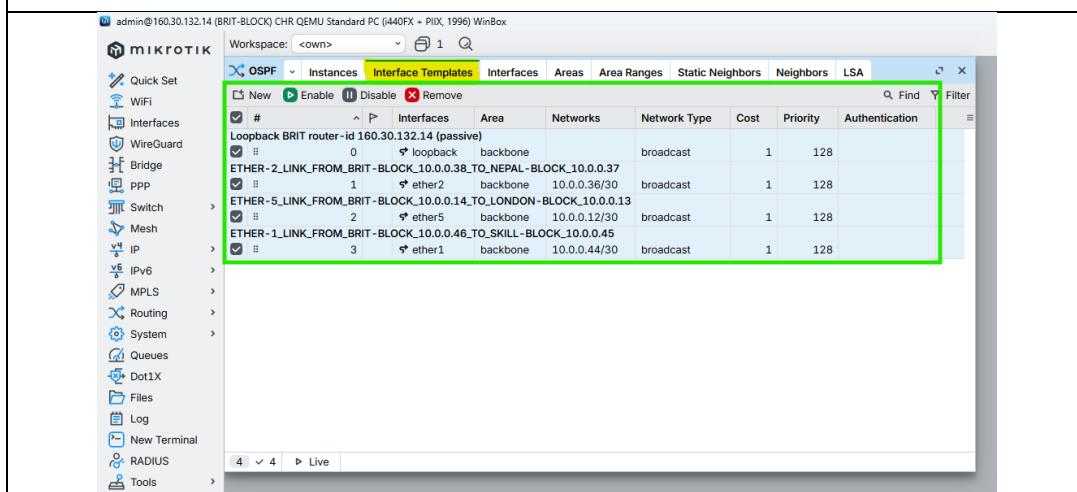


Figure 51: Configuration OSPF Area to BRIT-BLOCK Router Through WINBOX

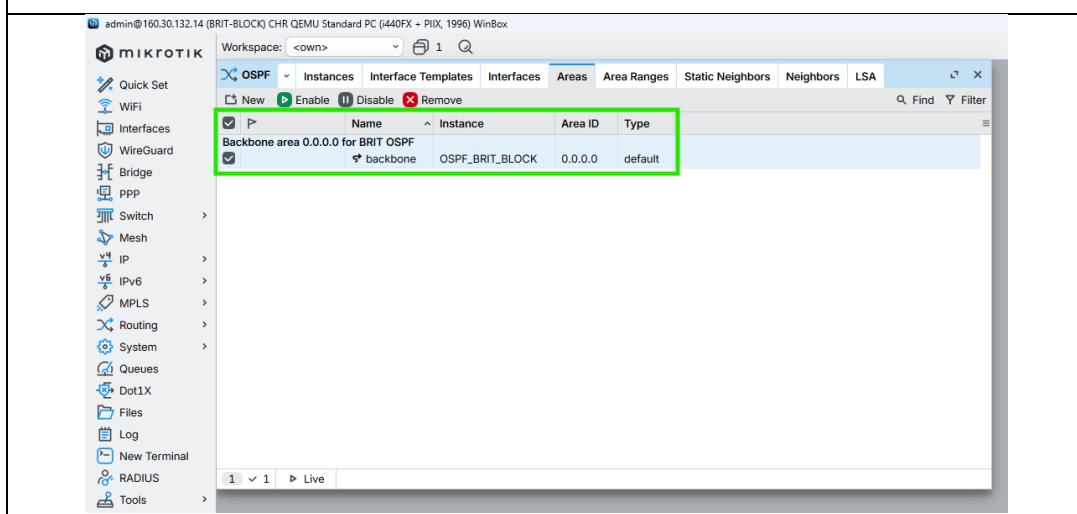


Figure 52: Configuration OSPF Interface-template to BRIT-BLOCK Router Through WINBOX

4.6. SKILL-BLOCK

CMD

```
/routing ospf instance add name=OSPF_SKILL_BLOCK router-id=160.30.132.15 comment="OSPF instance for SKILL block,
router-id 160.30.132.15"

/routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_SKILL_BLOCK comment="Backbone area 0.0.0.0 for
SKILL OSPF"

/routing ospf interface-template

add interfaces=loopback area=backbone comment="Loopback SKILL router-id 160.30.132.15 (passive)"

add      networks=10.0.0.40/30      interfaces=ether2      area=backbone      comment="ETHER-2_LINK_FROM_SKILL-
BLOCK_10.0.0.41_TO_HIMAL-BLOCK_10.0.0.42"

add      networks=10.0.0.16/30      interfaces=ether6      area=backbone      comment="ETHER-6_LINK_FROM_SKILL-
BLOCK_10.0.0.18_TO_LONDON-BLOCK_10.0.0.17"

add      networks=10.0.0.48/30      interfaces=ether1      area=backbone      comment="ETHER-1_LINK_FROM_SKILL-
BLOCK_10.0.0.50_TO_ALUMNI-BLOCK_10.0.0.49"
```

```
[admin@SKILL-BLOCK] > /routing ospf instance add name=OSPF_SKILL_BLOCK router-id=160.30.132.15 comment="OSPF instance for SKILL block, router-id 160.30.132.15"
[admin@SKILL-BLOCK] > /routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_SKILL_BLOCK comment="Backbone area 0.0.0.0 for SKILL OSPF"
[admin@SKILL-BLOCK] >
[admin@SKILL-BLOCK] > /routing ospf interface-template
[admin@SKILL-BLOCK] /routing/ospf/interface-template>
[admin@SKILL-BLOCK] /routing/ospf/interface-template> add interfaces=loopback area=backbone comment="Loopback SKILL router-id 160.30.132.15 (passive)"
[admin@SKILL-BLOCK] /routing/ospf/interface-template>
[admin@SKILL-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.40/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_SKILL-BLOCK_10.0.0.41_TO_HIMAL-BLOCK_10.0.0.42"
[admin@SKILL-BLOCK] /routing/ospf/interface-template>
[admin@SKILL-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.16/30 interfaces=ether6 area=backbone comment="ETHER-6_LINK_FROM_SKILL-BLOCK_10.0.0.18_TO_LONDON-BLOCK_10.0.0.17"
[admin@SKILL-BLOCK] /routing/ospf/interface-template>
[admin@SKILL-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.48/30 interfaces=ether1 area=backbone comment="ETHER-1_LINK_FROM_SKILL-BLOCK_10.0.0.50_TO_ALUMNI-BLOCK_10.0.0.49"
[admin@SKILL-BLOCK] /routing/ospf/interface-template>
```

Figure 53: Configuration OSPF to SKILL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

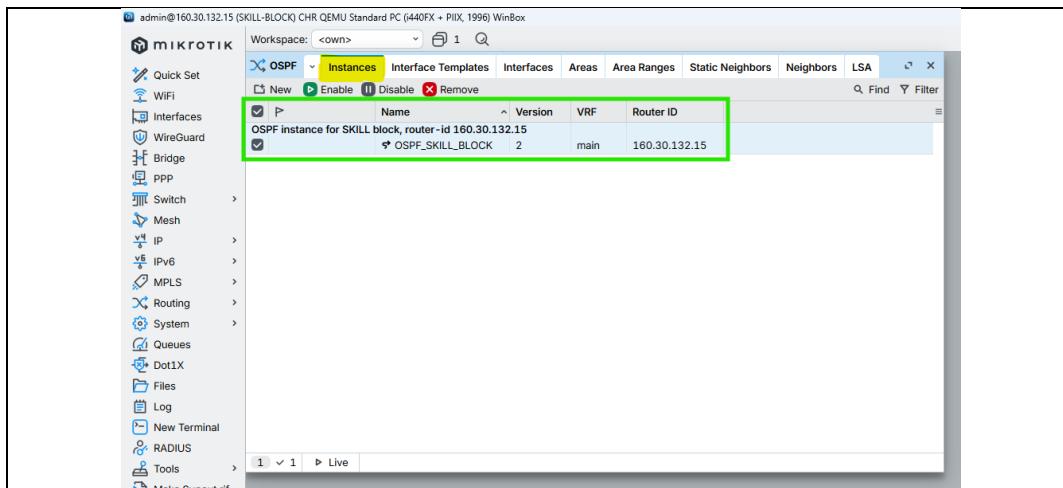


Figure 54: Configuration OSPF Instances to SKILL-BLOCK Router Through WINBOX

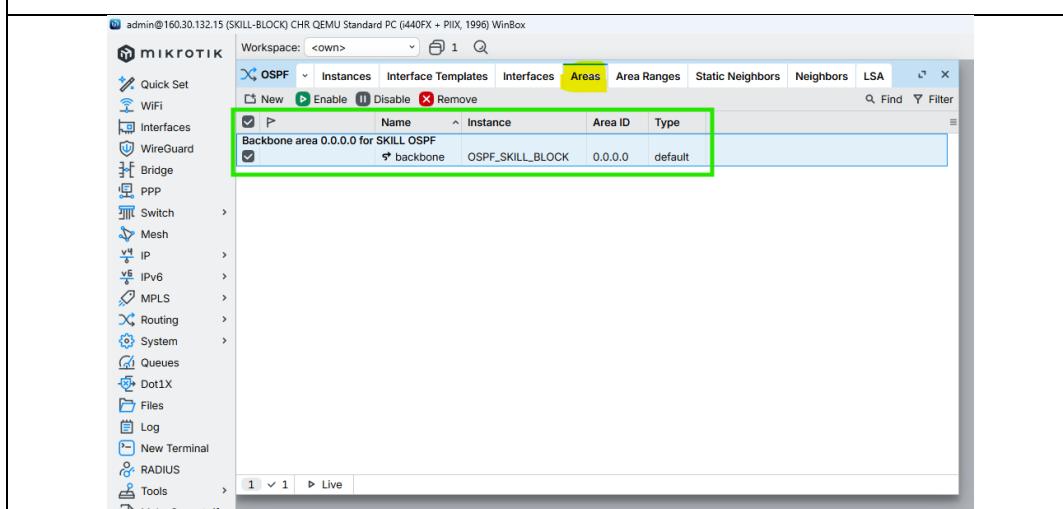


Figure 55: Configuration OSPF Area to SKILL-BLOCK Router Through WINBOX

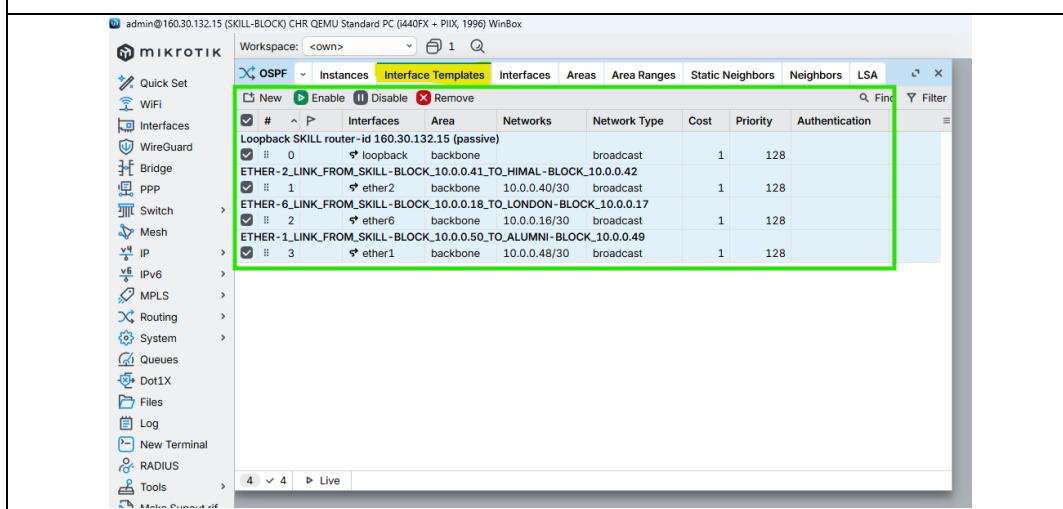


Figure 56: Configuration OSPF Interface-template to SKILL-BLOCK Router Through WINBOX

4.7. ALUMNI-BLOCK

CMD

```
/routing ospf instance add name=OSPF_ALUMNI_BLOCK router-id=160.30.132.16 comment="OSPF instance for ALUMNI block,
router-id 160.30.132.16"

/routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_ALUMNI_BLOCK comment="Backbone area 0.0.0.0 for
ALUMNI OSPF"

/routing ospf interface-template

add interfaces=loopback area=backbone comment="Loopback ALUMNI router-id 160.30.132.16 (passive)"

add      networks=10.0.0.48/30      interfaces=ether1      area=backbone      comment="ETHER-1_LINK_FROM_ALUMNI-
BLOCK_10.0.0.49_TO_SKILL-BLOCK_10.0.0.50"

add      networks=10.0.0.20/30      interfaces=ether7      area=backbone      comment="ETHER-7_LINK_FROM_ALUMNI-
BLOCK_10.0.0.22_TO_LONDON-BLOCK_10.0.0.21"

add      networks=10.0.0.52/30      interfaces=ether2      area=backbone      comment="ETHER-2_LINK_FROM_ALUMNI-
BLOCK_10.0.0.53_TO_KUMARI-BLOCK_10.0.0.54"
```

```
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /routing ospf instance add name=OSPF_ALUMNI_BLOCK router-id=160.30.132.16 comment="OSPF instance for ALUMNI block, router-id 160.30.132.16"
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_ALUMNI_BLOCK comment="Backbone area 0.0.0.0 for ALUMNI OSPF"
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /routing ospf interface-template
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template>
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template> add interfaces=loopback area=backbone comment="Loopback ALUMNI router-id 160.30.132.16 (passive)"
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template>
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.48/30 interfaces=ether1 area=backbone comment="ETHER-1_LINK_FROM_ALUMNI-BLOCK_10.0.0.49_TO_SKILL-BLOCK_10.0.0.50"
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template>
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.20/30 interfaces=ether7 area=backbone comment="ETHER-7_LINK_FROM_ALUMNI-BLOCK_10.0.0.22_TO_LONDON-BLOCK_10.0.0.21"
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template>
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template> add networks=10.0.0.52/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_ALUMNI-BLOCK_10.0.0.53_TO_KUMARI-BLOCK_10.0.0.54"
[admin@ALUMNI-BLOCK] /routing/ospf/interface-template>
```

Figure 57: Configuration OSPF to ALUMNI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

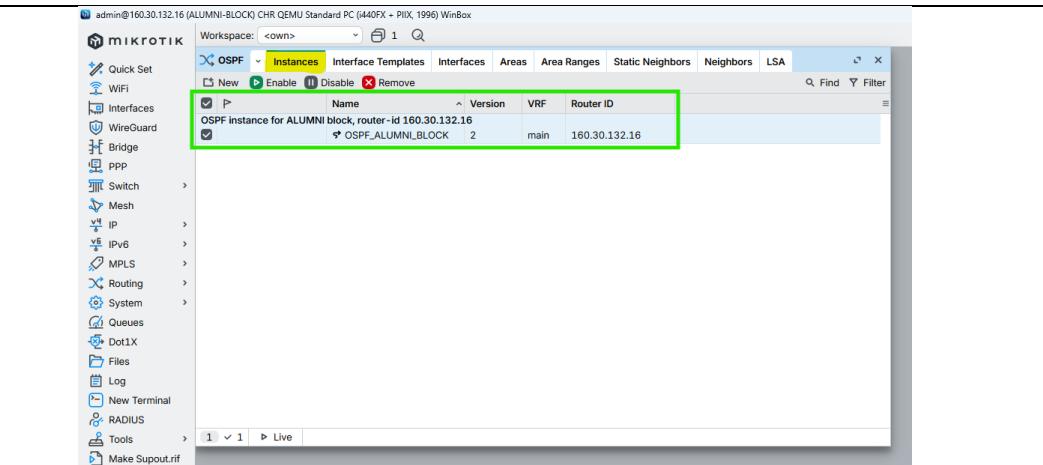


Figure 58: Configuration OSPF Instances to ALUMNI-BLOCK Router Through WINBOX

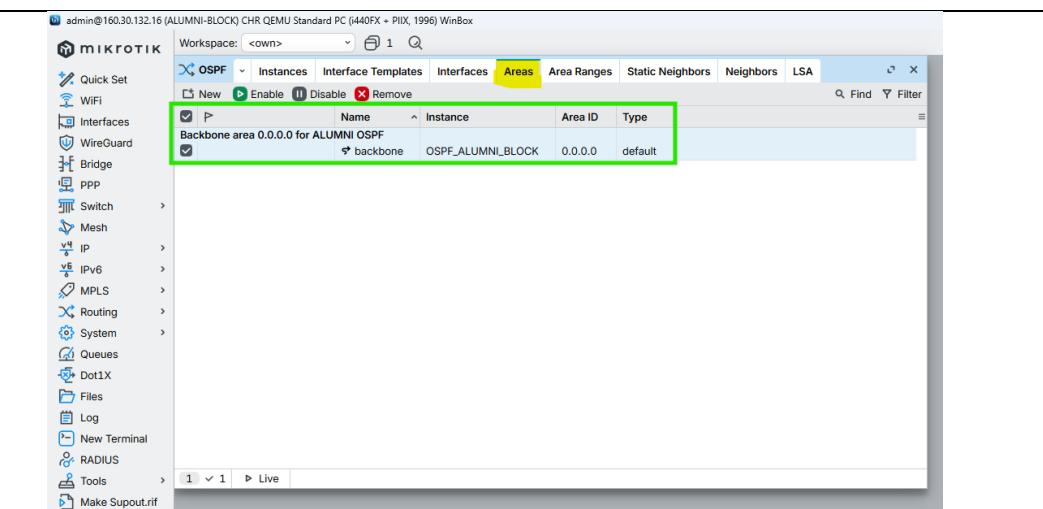


Figure 59: Configuration OSPF Area to ALUMNI-BLOCK Router Through WINBOX

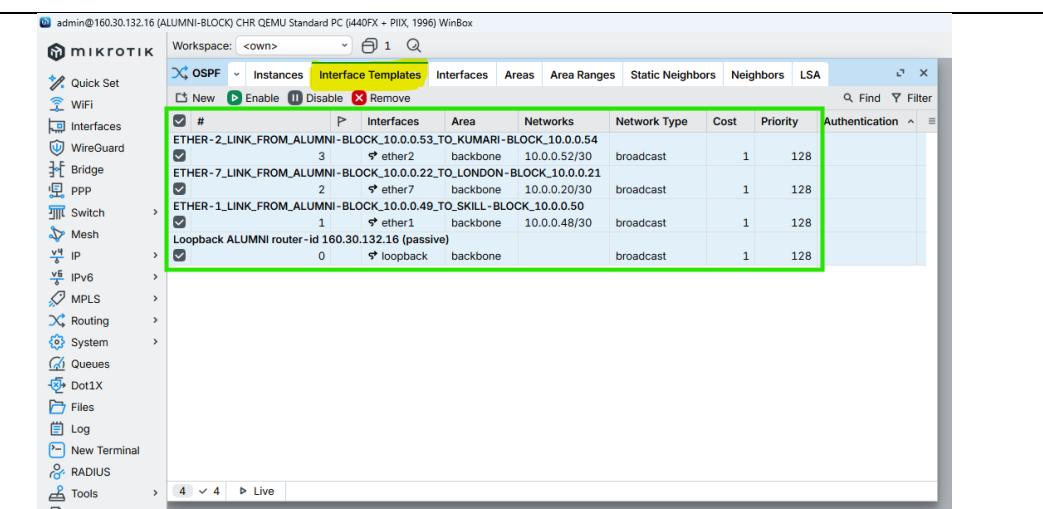


Figure 60: Configuration OSPF Interface-template to ALUMNI-BLOCK Router Through WINBOX

4.8. KUMARI-BLOCK

CMD

```
/routing ospf instance add name=OSPF_KUMARI_BLOCK router-id=160.30.132.17 comment="OSPF instance for KUMARI block,
router-id 160.30.132.17"

/routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_KUMARI_BLOCK comment="Backbone area 0.0.0.0 for
KUMARI OSPF"

/routing ospf interface-template

add interfaces=loopback area=backbone comment="Loopback KUMARI router-id 160.30.132.17 (passive)"

add      networks=10.0.0.44/30      interfaces=ether1      area=backbone      comment="ETHER-1_LINK_FROM_KUMARI-
BLOCK_10.0.0.45_TO_BRIT-BLOCK_10.0.0.46"

add      networks=10.0.0.24/30      interfaces=ether8      area=backbone      comment="ETHER-8_LINK_FROM_KUMARI-
BLOCK_10.0.0.26_TO_LONDON-BLOCK_10.0.0.25"

add      networks=10.0.0.52/30      interfaces=ether2      area=backbone      comment="ETHER-2_LINK_FROM_KUMARI-
BLOCK_10.0.0.54_TO_ALUMNI-BLOCK_10.0.0.53"
```

```
[admin@KUMARI_BLOCK] >
[admin@KUMARI_BLOCK] > /routing ospf instance add name=OSPF_KUMARI_BLOCK router-id=160.30.132.17 comment="OSPF instance for KUMARI block, router-id 160.30.132.17"
[admin@KUMARI_BLOCK] >
[admin@KUMARI_BLOCK] > /routing ospf area add name=backbone area-id=0.0.0.0 instance=OSPF_KUMARI_BLOCK comment="Backbone area 0.0.0.0 for KUMARI OSPF"
[admin@KUMARI_BLOCK] >
[admin@KUMARI_BLOCK] > /routing ospf interface-template
[admin@KUMARI_BLOCK] /routing/ospf/interface-template>
[admin@KUMARI_BLOCK] /routing/ospf/interface-template> add interfaces=loopback area=backbone comment="Loopback KUMARI router-id 160.30.132.17 (passive)"
[admin@KUMARI_BLOCK] /routing/ospf/interface-template>
[admin@KUMARI_BLOCK] /routing/ospf/interface-template> add networks=10.0.0.44/30 interfaces=ether1 area=backbone comment="ETHER-1_LINK_FROM_KUMARI-BLOCK_10.0.0.45_TO_BRIT-BLOCK_10.0.0.46"
[admin@KUMARI_BLOCK] /routing/ospf/interface-template>
[admin@KUMARI_BLOCK] /routing/ospf/interface-template> add networks=10.0.0.24/30 interfaces=ether8 area=backbone comment="ETHER-8_LINK_FROM_KUMARI-BLOCK_10.0.0.26_TO_LONDON-BLOCK_10.0.0.25"
[admin@KUMARI_BLOCK] /routing/ospf/interface-template>
[admin@KUMARI_BLOCK] /routing/ospf/interface-template> add networks=10.0.0.52/30 interfaces=ether2 area=backbone comment="ETHER-2_LINK_FROM_KUMARI-BLOCK_10.0.0.54_TO_ALUMNI-BLOCK_10.0.0.53"
[admin@KUMARI_BLOCK] /routing/ospf/interface-template>
[admin@KUMARI_BLOCK] >
```

Figure 61: Configuration OSPF to KUMARI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

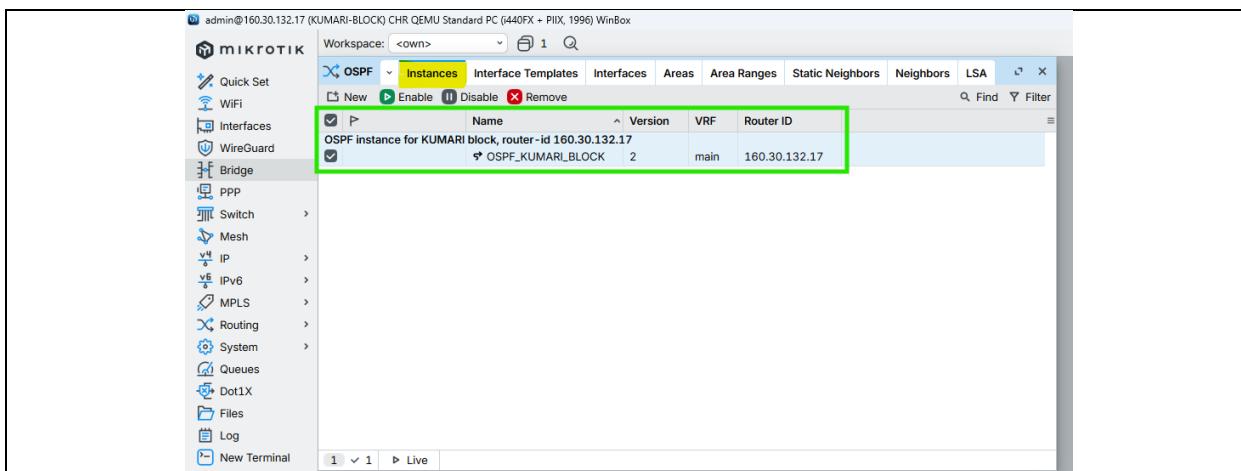


Figure 62: Configuration OSPF Instances to KUMARI-BLOCK Router Through WINBOX

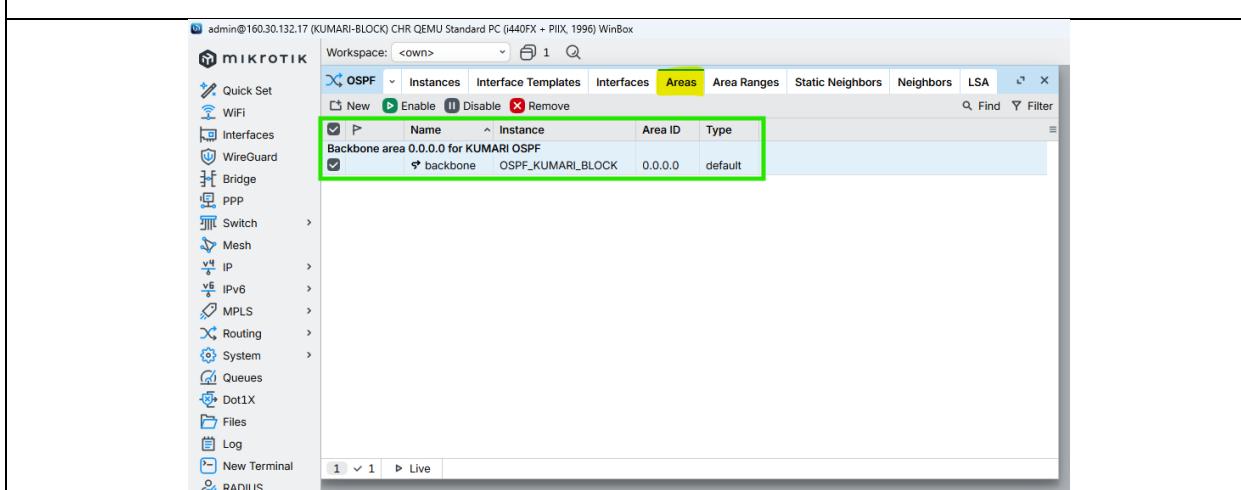


Figure 63: Configuration OSPF Area to KUMARI-BLOCK Router Through WINBOX

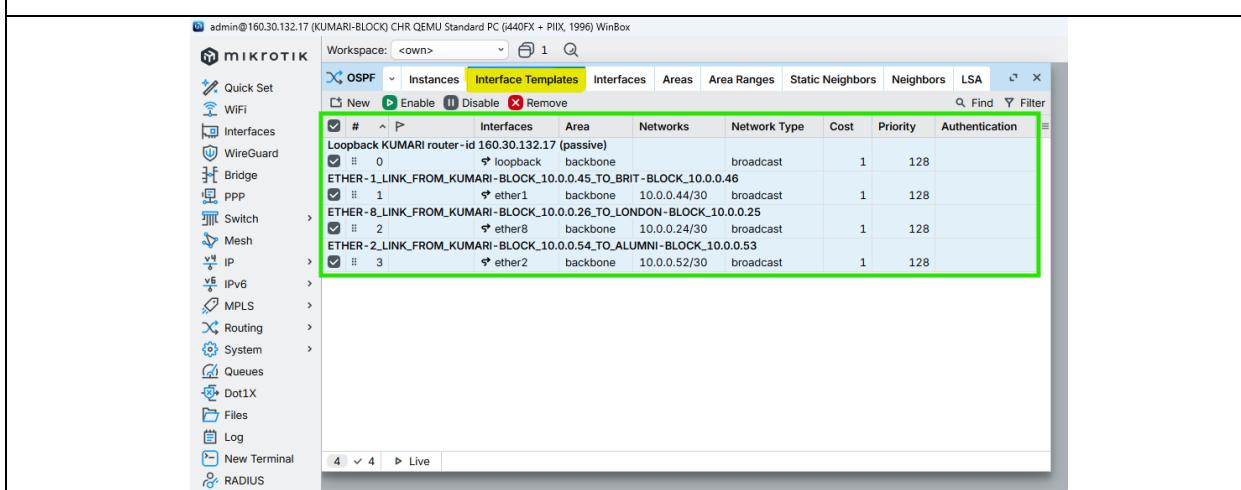


Figure 64: Configuration OSPF Interface-template to KUMARI-BLOCK Router Through WINBOX

5. Configure Management Access from PC to MPLS Loopback

5.1. PC (VMware Host) – Static Route Configuration

To allow the PC (VMware host) to reach the MPLS loopback network 160.30.132.0/24, a persistent static route is added on the PC pointing to the LONDON-BLOCK management interface.

CMD (Windows PC)

```
route -p add 160.30.132.0 mask 255.255.255.0 192.168.174.173
```

```
>route -p add 160.30.132.0 mask 255.255.255.0 192.168.174.173
```

OK!

5.2. UK-BLOCK – OSPF Configuration (No Management Network Advertisement)

LONDON-BLOCK acts as the central management gateway between the PC and the MPLS core. UK-BLOCK participates only in MPLS core OSPF. The VMware management network must not be added to OSPF.

```
/routing ospf interface-template
```

```
add networks=192.168.174.0/24 interfaces=ether9 area=backbone
```

```
/
```

```
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /routing ospf interface-template
[admin@LONDON-BLOCK] /routing/ospf/interface-template> add networks=192.168.174.0/24 interfaces=ether9 area=backbone
[admin@LONDON-BLOCK] /routing/ospf/interface-template> /
[admin@LONDON-BLOCK] >
```

5.3. Disable RoMON temporarily to avoid confusion

Cmd

```
/tool romon set enabled=no
```

5.4. End-to-End Verification (From PC)

Ping Test

```
ping 160.30.132.1  
ping 160.30.132.11  
ping 160.30.132.14  
ping 160.30.132.16
```

```
>ping 160.30.132.1  
Pinging 160.30.132.1 with 32 bytes of data:  
Reply from 160.30.132.1: bytes=32 time<1ms TTL=64  
Reply from 160.30.132.1: bytes=32 time<1ms TTL=64  
Reply from 160.30.132.1: bytes=32 time=1ms TTL=64  
Reply from 160.30.132.1: bytes=32 time<1ms TTL=64  
  
Ping statistics for 160.30.132.1:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 1ms, Average = 0ms  
  
>ping 160.30.132.11  
Pinging 160.30.132.11 with 32 bytes of data:  
Reply from 160.30.132.11: bytes=32 time<1ms TTL=63  
Reply from 160.30.132.11: bytes=32 time=1ms TTL=63  
Reply from 160.30.132.11: bytes=32 time=1ms TTL=63  
Reply from 160.30.132.11: bytes=32 time=1ms TTL=63  
  
Ping statistics for 160.30.132.11:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 1ms, Average = 0ms  
  
>ping 160.30.132.14  
Pinging 160.30.132.14 with 32 bytes of data:  
Reply from 160.30.132.14: bytes=32 time<1ms TTL=63  
Reply from 160.30.132.14: bytes=32 time=2ms TTL=63  
Reply from 160.30.132.14: bytes=32 time=1ms TTL=63  
Reply from 160.30.132.14: bytes=32 time=1ms TTL=63  
  
Ping statistics for 160.30.132.14:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 2ms, Average = 1ms  
  
>ping 160.30.132.16  
Pinging 160.30.132.16 with 32 bytes of data:  
Reply from 160.30.132.16: bytes=32 time<1ms TTL=63  
Reply from 160.30.132.16: bytes=32 time<1ms TTL=63  
Reply from 160.30.132.16: bytes=32 time=1ms TTL=63  
Reply from 160.30.132.16: bytes=32 time=1ms TTL=63  
  
Ping statistics for 160.30.132.16:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

6. Configuration MPLS to all Core Routers

6.1. LONDON-BLOCK

CMD

```
/mpls ldp add lsr-id=160.30.132.1 transport-addresses=160.30.132.1 comment="Enable MPLS LDP using loopback 160.30.132.1"

/mpls ldp set [find lsr-id=160.30.132.1] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.1"
```

```
[admin@LONDON-BLOCK] > /mpls ldp add lsr-id=160.30.132.1 transport-addresses=160.30.132.1 comment="Enable MPLS LDP using loopback 160.30.132.1"
[admin@LONDON-BLOCK] > /mpls ldp set [find lsr-id=160.30.132.1] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.1"
[admin@LONDON-BLOCK] >
```

Figure 65: Configuration MPLS to LONDON-BLOCK Router Through CMD

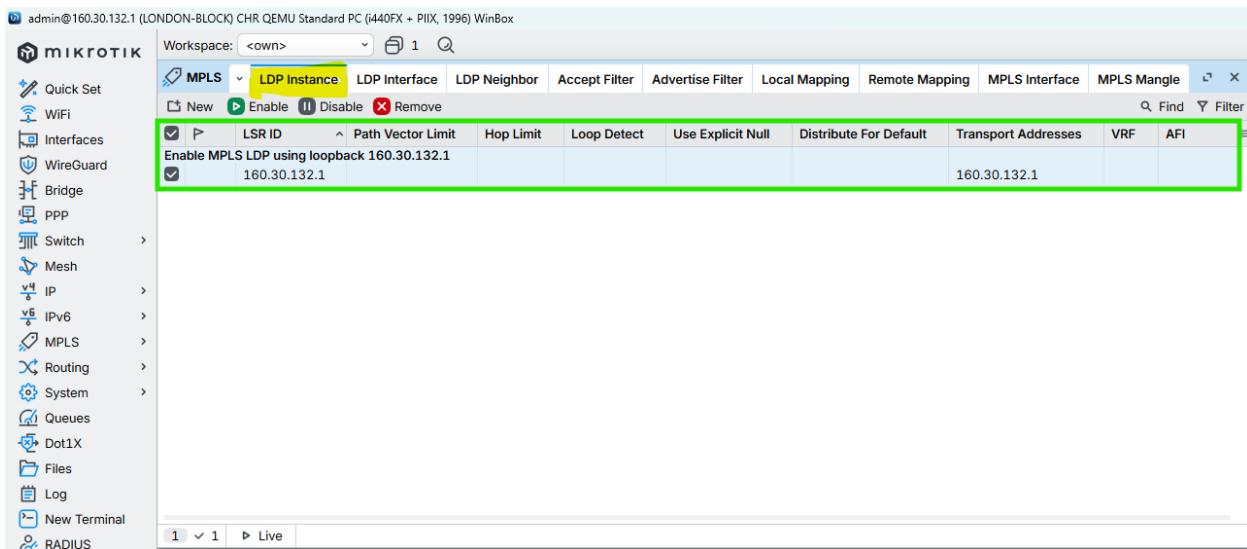


Figure 66: Configuration MPLS to LONDON-BLOCK Router Through WINBOX

6.2. UK-BLOCK

CMD

```
/mpls ldp add lsr-id=160.30.132.11 transport-addresses=160.30.132.11 comment="Enable MPLS LDP using loopback 160.30.132.11"

/mpls ldp set [find lsr-id=160.30.132.11] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.11"
```

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

```
[admin@UK-BLOCK] >
[admin@UK-BLOCK] > /mpls ldp add lsr-id=160.30.132.11 transport-addresses=160.30.132.11 comment="Enable MPLS LDP using loopback 160.30.132.11"
[admin@UK-BLOCK] >
[admin@UK-BLOCK] > /mpls ldp set [find lsr-id=160.30.132.11] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.11"
[admin@UK-BLOCK] >
```

Figure 67: Configuration MPLS to UK-BLOCK Router Through CMD

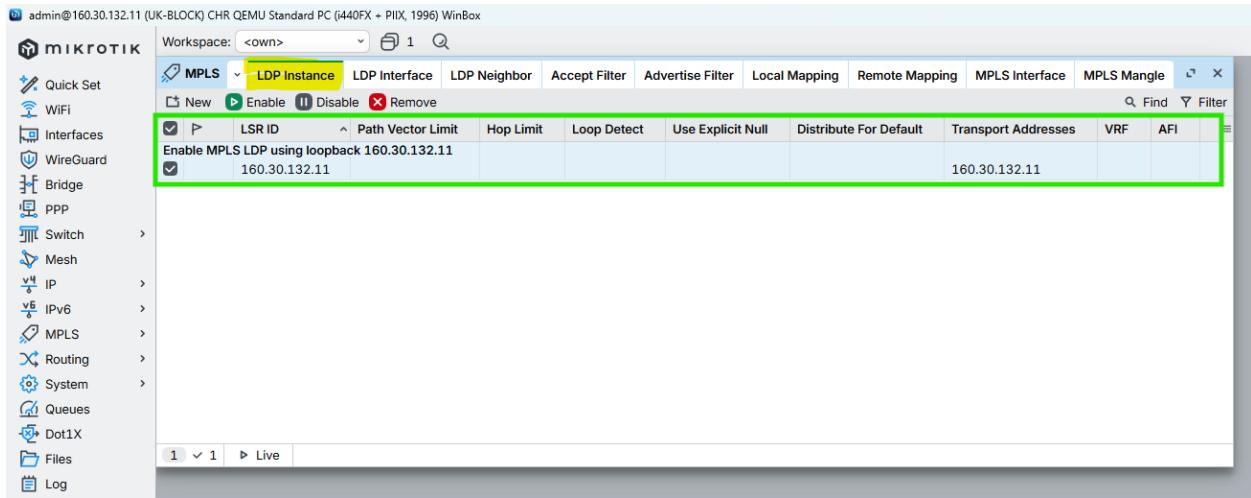


Figure 68: Configuration MPLS to UK-BLOCK Router Through WINBOX

6.3. NEPAL-BLOCK

CMD

```
/mpls ldp add lsr-id=160.30.132.12 transport-addresses=160.30.132.12 comment="Enable MPLS LDP using loopback 160.30.132.12"

/mpls ldp set [find lsr-id=160.30.132.12] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.12"
```

```
[admin@NEPAL-BLOCK] >
[admin@NEPAL-BLOCK] > /mpls ldp add lsr-id=160.30.132.12 transport-addresses=160.30.132.12 comment="Enable MPLS LDP using loopback 160.30.132.12"
[admin@NEPAL-BLOCK] >
[admin@NEPAL-BLOCK] > /mpls ldp set [find lsr-id=160.30.132.12] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.12"
[admin@NEPAL-BLOCK] >
```

Figure 69: Configuration MPLS to NEPAL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

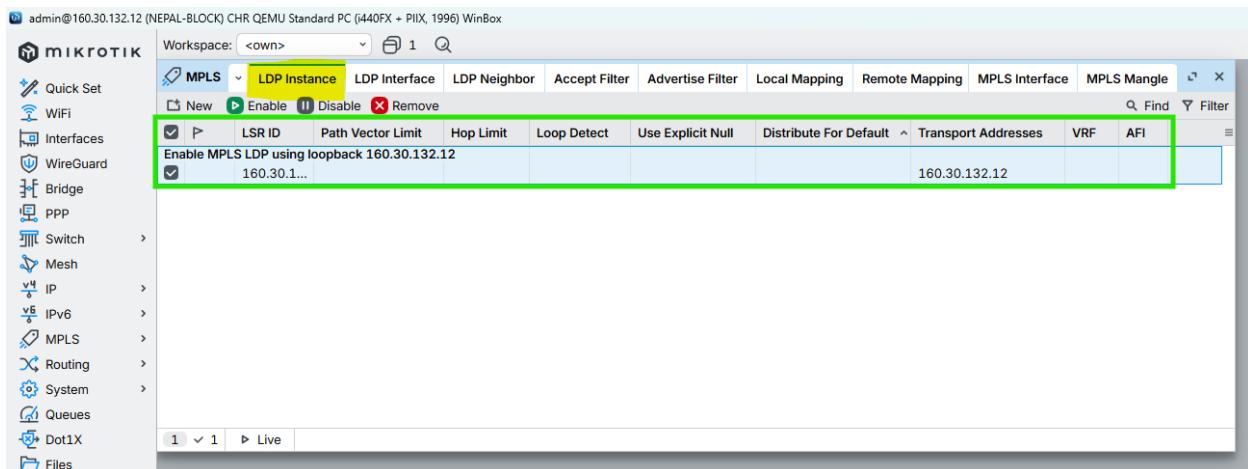


Figure 70: Configuration MPLS to NEPAL-BLOCK Router Through WINBOX

6.4. HIMAL-BLOCK

CMD

```
/mpls ldp add lsr-id=160.30.132.13 transport-addresses=160.30.132.13 comment="Enable MPLS LDP using loopback 160.30.132.13"

/mpls ldp set [find lsr-id=160.30.132.13] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.13"
```

```
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > /mpls ldp add lsr-id=160.30.132.13 transport-addresses=160.30.132.13 comment="Enable MPLS LDP using loopback 160.30.132.13"
[admin@HIMAL-BLOCK] > /mpls ldp set [find lsr-id=160.30.132.13] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.13"
[admin@HIMAL-BLOCK] >
```

Figure 71: Configuration MPLS to HIMAL-BLOCK Router Through CMD

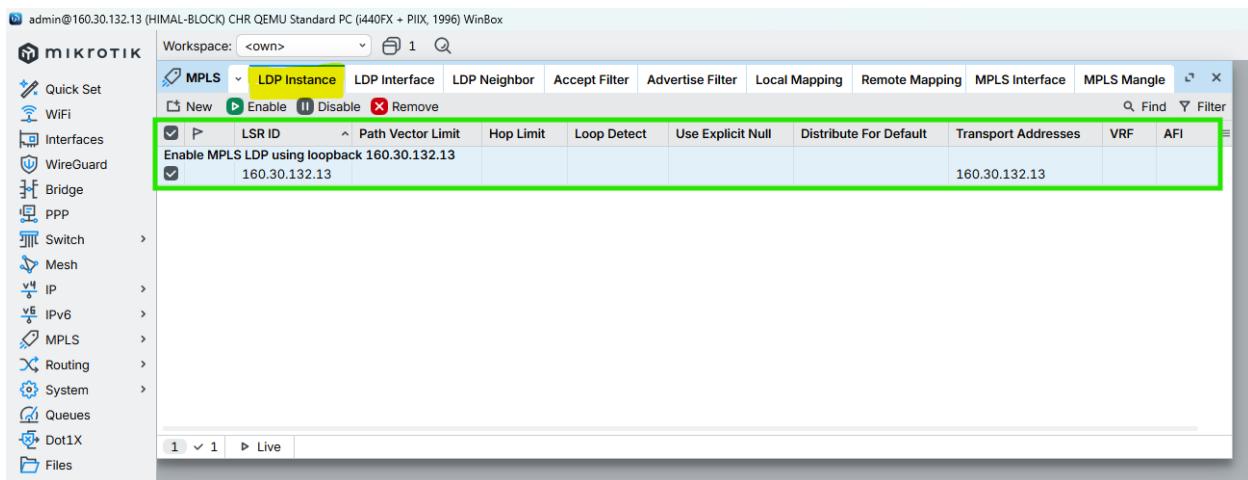


Figure 72: Configuration MPLS to HIMAL-BLOCK Router Through WINBOX

6.5. BRIT-BLOCK

CMD

```
/mpls ldp add lsr-id=160.30.132.14 transport-addresses=160.30.132.14 comment="Enable MPLS LDP using loopback 160.30.132.14"

/mpls ldp set [find lsr-id=160.30.132.14] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.14"
```

```
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] > /mpls ldp add lsr-id=160.30.132.14 transport-addresses=160.30.132.14 comment="Enable MPLS LDP using loopback 160.30.132.14"
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] > /mpls ldp set [find lsr-id=160.30.132.14] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.14"
[admin@BRIT-BLOCK] >
```

Figure 73: Configuration MPLS to BRIT-BLOCK Router Through CMD

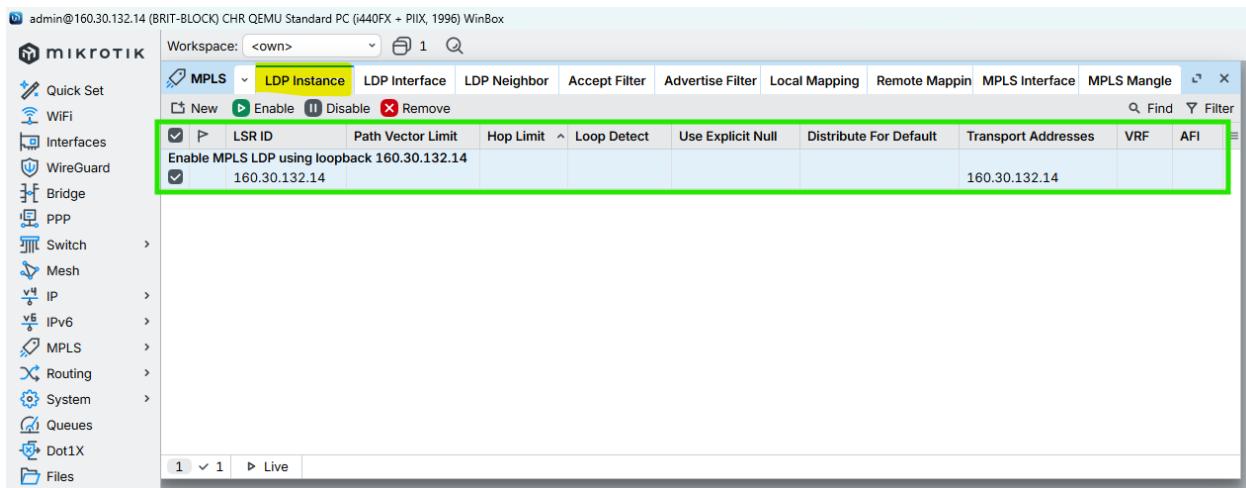


Figure 74: Configuration MPLS to BRIT-BLOCK Router Through WINBOX

6.6. SKILL-BLOCK

CMD

```
/mpls ldp add lsr-id=160.30.132.15 transport-addresses=160.30.132.15 comment="Enable MPLS LDP using loopback 160.30.132.15"

/mpls ldp set [find lsr-id=160.30.132.15] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.15"
```

```
[admin@SKILL-BLOCK] >
[admin@SKILL-BLOCK] > /mpls ldp add lsr-id=160.30.132.15 transport-addresses=160.30.132.15 comment="Enable MPLS LDP using loopback 160.30.132.15"
[admin@SKILL-BLOCK] >
[admin@SKILL-BLOCK] > /mpls ldp set [find lsr-id=160.30.132.15] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.15"
[admin@SKILL-BLOCK] >
```

Figure 75: Configuration MPLS to SKILL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

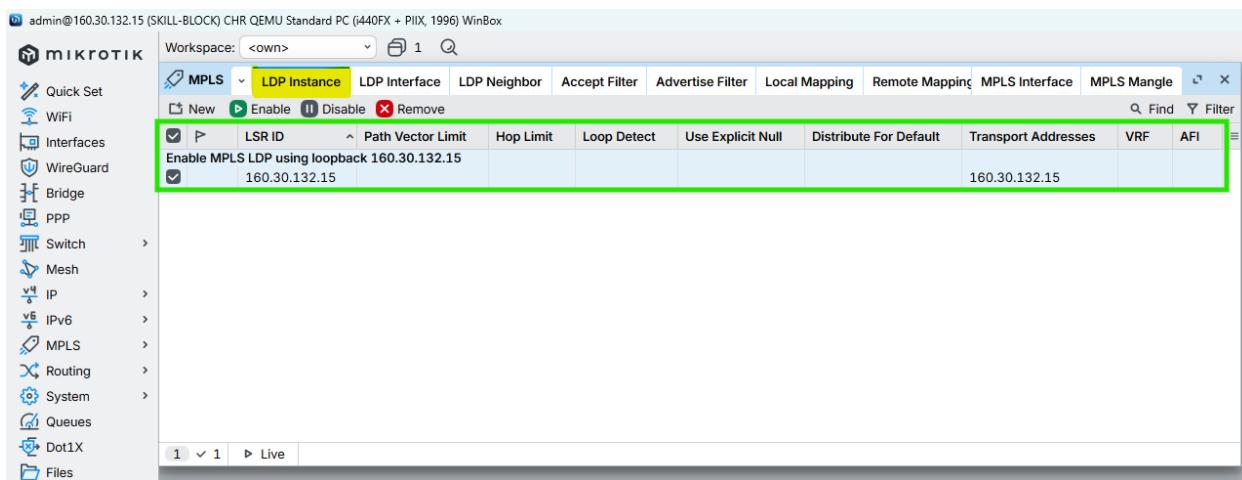


Figure 76: Configuration MPLS to SKILL-BLOCK Router Through WINBOX

6.7. ALUMNI-BLOCK

CMD

```
/mpls ldp add lsr-id=160.30.132.16 transport-addresses=160.30.132.16 comment="Enable MPLS LDP using loopback 160.30.132.16"

/mpls ldp set [find lsr-id=160.30.132.16] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.16"
```

```
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /mpls ldp add lsr-id=160.30.132.16 transport-addresses=160.30.132.16 comment="Enable MPLS LDP using loopback 160.30.132.16"
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /mpls ldp set [find lsr-id=160.30.132.16] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.16"
[admin@ALUMNI-BLOCK] >
```

Figure 77: Configuration MPLS to ALUMNI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

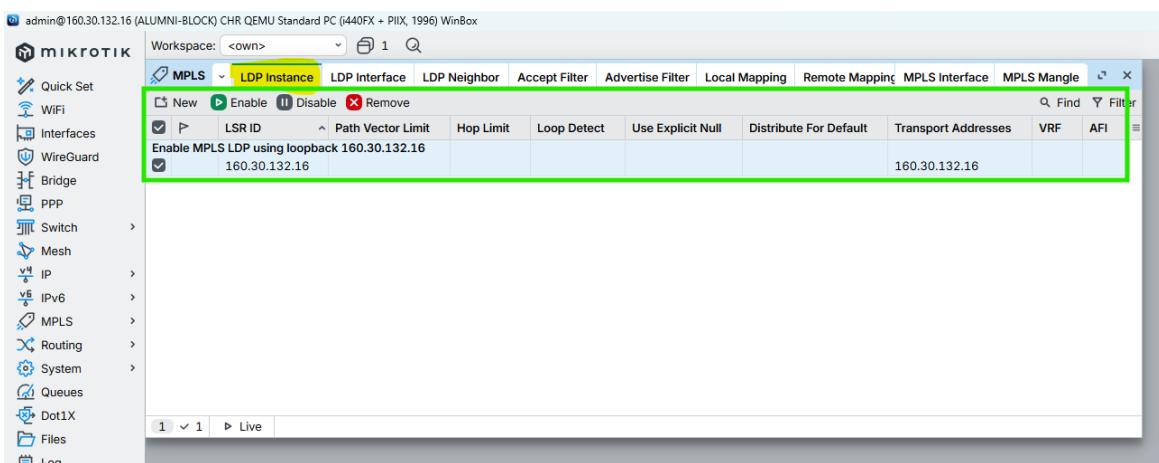


Figure 78: Configuration MPLS to ALUMNI-BLOCK Router Through WINBOX

6.8. KUMARI-BLOCK

CMD

```
/mpls ldp add lsr-id=160.30.132.17 transport-addresses=160.30.132.17 comment="Enable MPLS LDP using loopback 160.30.132.17"  
  
/mpls ldp set [find lsr-id=160.30.132.17] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.17"
```

```
[admin@KUMARI-BLOCK] > /mpls ldp add lsr-id=160.30.132.17 transport-addresses=160.30.132.17 comment="Enable MPLS LDP using loopback 160.30.132.17"  
[admin@KUMARI-BLOCK] > /mpls ldp set [find lsr-id=160.30.132.17] disabled=no comment="Enable MPLS LDP using loopback 160.30.132.17"  
[admin@KUMARI-BLOCK] >
```

Figure 79: Configuration MPLS to KUMARI-BLOCK Router Through CMD

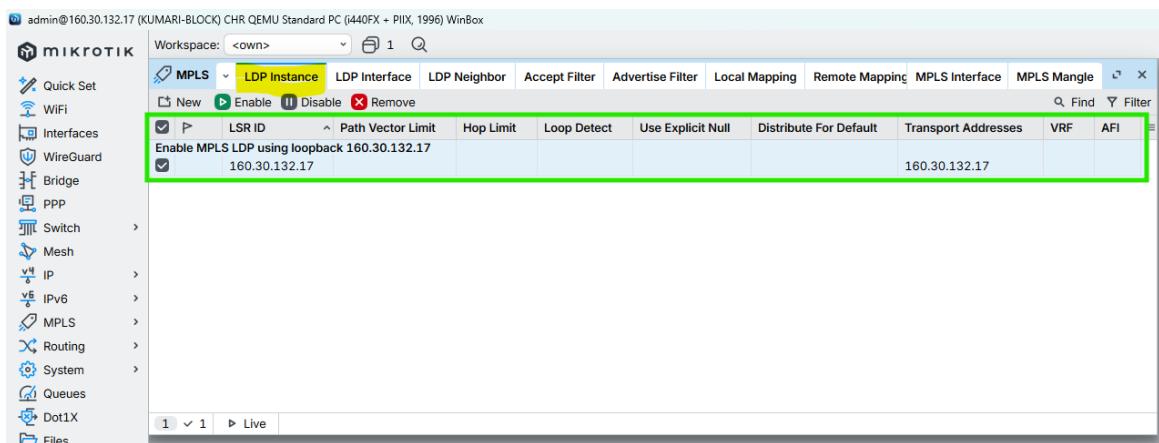


Figure 80: Configuration MPLS to KUMARI-BLOCK Router Through CMD

7. MPLS & LDP Configuration on Core Interfaces (with MTU)

This section enables LDP signaling, MPLS forwarding, and configures MPLS MTU (1508) on all core-facing interfaces only to support VPLS without fragmentation.

7.1. LONDON-BLOCK

7.1.1. Enable LDP on Core Interfaces ONLY

CMD

```
/mpls ldp interface
add interface=ether2 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.1/30_TO_UK-BLOCK_10.0.0.2/30"
add interface=ether3 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.5/30_TO_NEPAL-BLOCK_10.0.0.6/30"
add interface=ether4 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.9/30_TO_HIMAL-BLOCK_10.0.0.10/30"
add interface=ether5 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.13/30_TO_BRIT-BLOCK_10.0.0.14/30"
add interface=ether6 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.17/30_TO_SKILL-BLOCK_10.0.0.18/30"
add interface=ether7 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.21/30_TO_ALUMNI-BLOCK_10.0.0.22/30"
add interface=ether8 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.25/30_TO_KUMARI-BLOCK_10.0.0.26/30"
/
```

```
[admin@LONDON-BLOCK] >
[admin@LONDON-BLOCK] > /mpls ldp interface
[admin@LONDON-BLOCK] /mpls/ldp/interface> add interface=ether2 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.1/30_TO_UK-BLOCK_10.0.0.2/30"
[admin@LONDON-BLOCK] /mpls/ldp/interface> add interface=ether3 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.5/30_TO_NEPAL-BLOCK_10.0.0.6/30"
[admin@LONDON-BLOCK] /mpls/ldp/interface> add interface=ether4 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.9/30_TO_HIMAL-BLOCK_10.0.0.10/30"
[admin@LONDON-BLOCK] /mpls/ldp/interface> add interface=ether5 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.13/30_TO_BRIT-BLOCK_10.0.0.14/30"
[admin@LONDON-BLOCK] /mpls/ldp/interface> add interface=ether6 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.17/30_TO_SKILL-BLOCK_10.0.0.18/30"
[admin@LONDON-BLOCK] /mpls/ldp/interface> add interface=ether7 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.21/30_TO_ALUMNI-BLOCK_10.0.0.22/30"
[admin@LONDON-BLOCK] /mpls/ldp/interface> add interface=ether8 comment="LDP_CORE_LINK_LONDON-BLOCK_10.0.0.25/30_TO_KUMARI-BLOCK_10.0.0.26/30"
[admin@LONDON-BLOCK] /mpls/ldp/interface>
```

Figure 81: Configuration MPLS LDP Interfaces to LONDON-BLOCK Router Through CMD

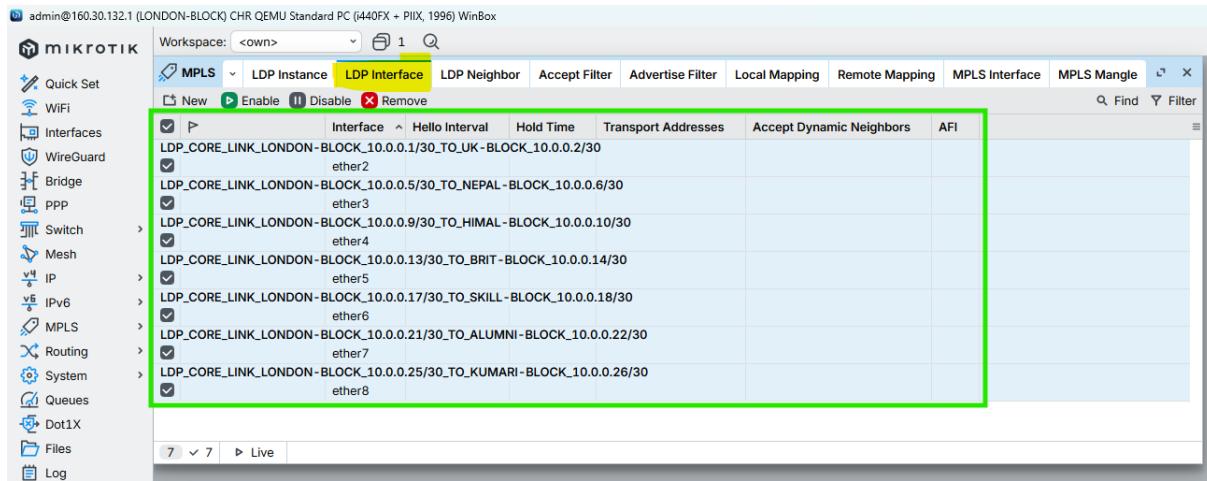


Figure 82: Configuration MPLS LDP Interfaces to LONDON-BLOCK Router Through WINBOX

7.1.2. Enable MPLS & Set MPLS MTU on interfaces

CMD

```
/mpls interface
add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_UK-BLOCK_MTU1508"
add interface=ether3 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_NEPAL-BLOCK_MTU1508"
add interface=ether4 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_HIMAL-BLOCK_MTU1508"
add interface=ether5 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_BRIT-BLOCK_MTU1508"
add interface=ether6 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_SKILL-BLOCK_MTU1508"
add interface=ether7 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_ALUMNI-BLOCK_MTU1508"
add interface=ether8 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_KUMARI-BLOCK_MTU1508"
/
```

```
[admin@LONDON-BLOCK] > /mpls interface
[admin@LONDON-BLOCK] > /mpls/interface
[admin@LONDON-BLOCK] /mpls/interface> add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_UK-BLOCK_MTU1508"
[admin@LONDON-BLOCK] /mpls/interface> add interface=ether3 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_NEPAL-BLOCK_MTU1508"
[admin@LONDON-BLOCK] /mpls/interface> add interface=ether4 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_HIMAL-BLOCK_MTU1508"
[admin@LONDON-BLOCK] /mpls/interface> add interface=ether5 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_BRIT-BLOCK_MTU1508"
[admin@LONDON-BLOCK] /mpls/interface> add interface=ether6 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_SKILL-BLOCK_MTU1508"
[admin@LONDON-BLOCK] /mpls/interface> add interface=ether7 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_ALUMNI-BLOCK_MTU1508"
[admin@LONDON-BLOCK] /mpls/interface> add interface=ether8 mpls-mtu=1508 comment="MPLS_CORE_LINK_LONDON-BLOCK_TO_KUMARI-BLOCK_MTU1508"
[admin@LONDON-BLOCK] /mpls/interface>
[admin@LONDON-BLOCK] >
```

Figure 83: Configuration MPLS MTU on Interfaces to LONDON-BLOCK Router Through CMD

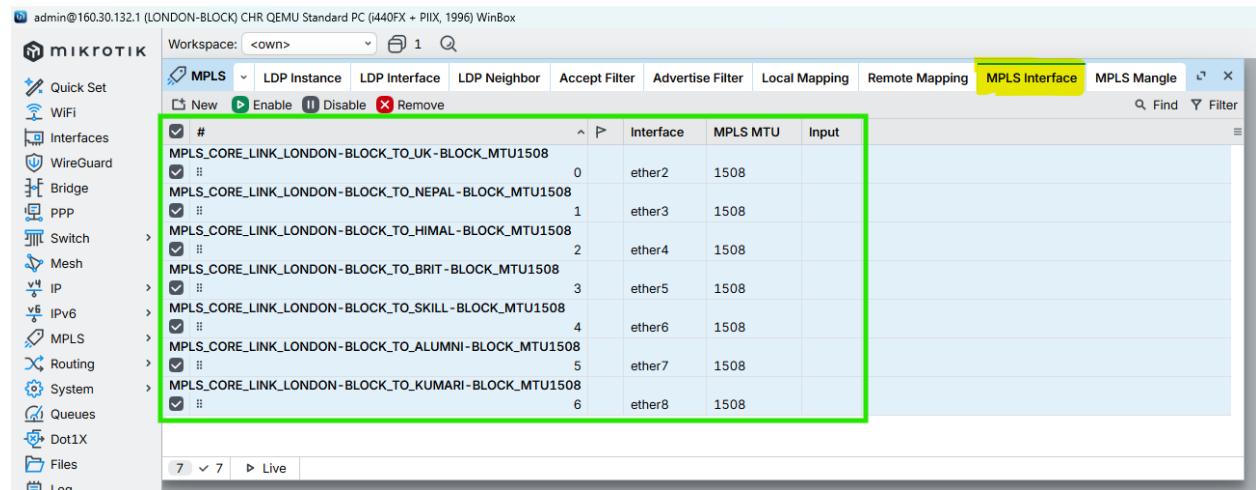


Figure 84: Configuration MPLS MTU on Interfaces to LONDON-BLOCK Router Through WINBOX

7.2. UK-BLOCK

7.2.1. Enable LDP on Core Interfaces ONLY

CMD

```
/mpls ldp interface
add interface=ether2 comment="LDP_CORE_LINK_UK-BLOCK_10.0.0.2/30_TO_LONDON-BLOCK_10.0.0.1/30"
add interface=ether1 comment="LDP_CORE_LINK_UK-BLOCK_10.0.0.29/30_TO_NEPAL-BLOCK_10.0.0.30/30"
add interface=ether3 comment="LDP_CORE_LINK_UK-BLOCK_10.0.0.34/30_TO_HIMAL-BLOCK_10.0.0.33/30"
/
```

```
[admin@JK-BLOCK] >
[admin@JK-BLOCK] > /mpls ldp interface
[admin@JK-BLOCK] /mpls/ldp/interface> add interface=ether2 comment="LDP_CORE_LINK_UK-BLOCK_10.0.0.2/30_TO_LONDON-BLOCK_10.0.0.1/30"
[admin@JK-BLOCK] /mpls/ldp/interface> add interface=ether1 comment="LDP_CORE_LINK_UK-BLOCK_10.0.0.29/30_TO_NEPAL-BLOCK_10.0.0.30/30"
[admin@JK-BLOCK] /mpls/ldp/interface> add interface=ether3 comment="LDP_CORE_LINK_UK-BLOCK_10.0.0.34/30_TO_HIMAL-BLOCK_10.0.0.33/30"
[admin@JK-BLOCK] /mpls/ldp/interface>
[admin@JK-BLOCK] >
```

Figure 85: Configuration MPLS LDP Interfaces to UK-BLOCK Router Through CMD

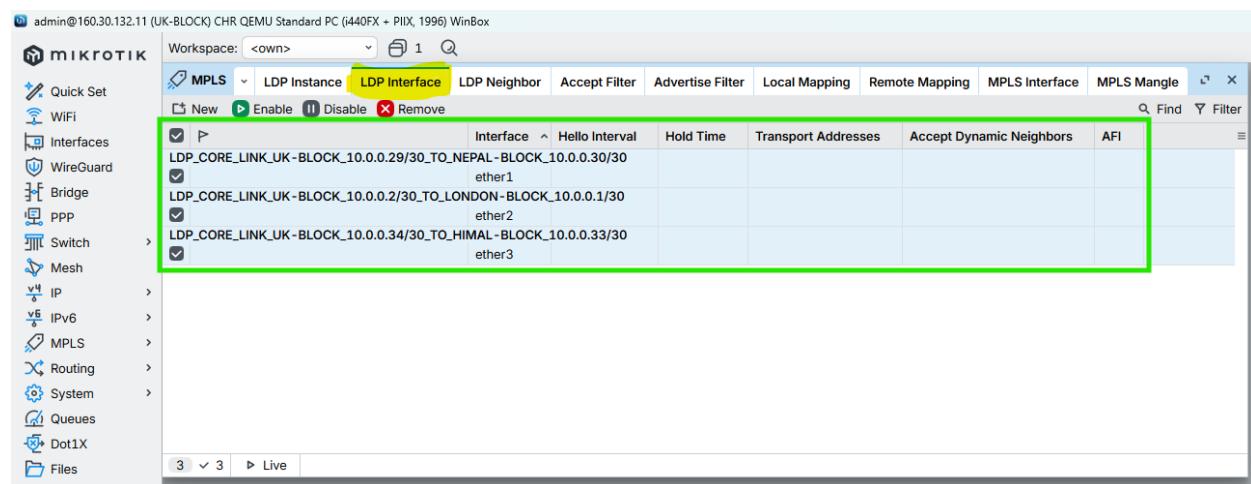


Figure 86: Configuration MPLS LDP Interfaces to UK-BLOCK Router Through WINBOX

7.2.2. Enable MPLS & Set MPLS MTU on interfaces

CMD

```
/mpls interface
add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_UK-BLOCK_TO_LONDON-BLOCK_MTU1508"
add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_UK-BLOCK_TO_NEPAL-BLOCK_MTU1508"
add interface=ether3 mpls-mtu=1508 comment="MPLS_CORE_LINK_UK-BLOCK_TO_HIMAL-BLOCK_MTU1508"
/
```

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```
[admin@UK-BLOCK] >
[admin@UK-BLOCK] > /mpls interface
[admin@UK-BLOCK] /mpls/interface> add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_UK-BLOCK_TO_LONDON-BLOCK_MTU1508"
[admin@UK-BLOCK] /mpls/interface> add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_UK-BLOCK_TO_NEPAL-BLOCK_MTU1508"
[admin@UK-BLOCK] /mpls/interface> add interface=ether3 mpls-mtu=1508 comment="MPLS_CORE_LINK_UK-BLOCK_TO_HIMAL-BLOCK_MTU1508"
[admin@UK-BLOCK] /mpls/interface>
[admin@UK-BLOCK] >
```

Figure 87: Configuration MPLS MTU on Interfaces to UK-BLOCK Router Through CMD

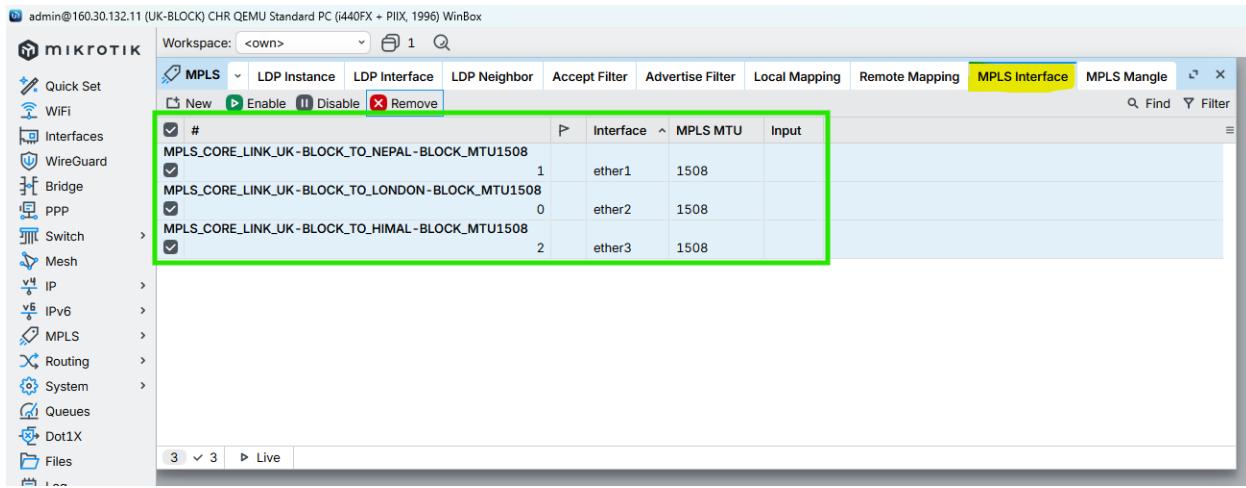


Figure 88: Configuration MPLS MTU on Interfaces to UK-BLOCK Router Through WINBOX

7.3. NEPAL-BLOCK

7.3.1. Enable LDP on Core Interfaces ONLY

CMD

```
/mpls ldp interface
add interface=ether3 comment="LDP_CORE_LINK_NEPAL-BLOCK_10.0.0.6/30_TO_LONDON-BLOCK_10.0.0.5/30"
add interface=ether1 comment="LDP_CORE_LINK_NEPAL-BLOCK_10.0.0.30/30_TO_UK-BLOCK_10.0.0.29/30"
add interface=ether2 comment="LDP_CORE_LINK_NEPAL-BLOCK_10.0.0.37/30_TO_BRIT-BLOCK_10.0.0.38/30"
/
```

```
[admin@NEPAL-BLOCK] >
[admin@NEPAL-BLOCK] > /mpls ldp interface
[admin@NEPAL-BLOCK] /mpls/ldp/interface> add interface=ether3 comment="LDP_CORE_LINK_NEPAL-BLOCK_10.0.0.6/30_TO_LONDON-BLOCK_10.0.0.5/30"
[admin@NEPAL-BLOCK] /mpls/ldp/interface> add interface=ether1 comment="LDP_CORE_LINK_NEPAL-BLOCK_10.0.0.30/30_TO_UK-BLOCK_10.0.0.29/30"
[admin@NEPAL-BLOCK] /mpls/ldp/interface> add interface=ether2 comment="LDP_CORE_LINK_NEPAL-BLOCK_10.0.0.37/30_TO_BRIT-BLOCK_10.0.0.38/30"
[admin@NEPAL-BLOCK] /mpls/ldp/interface>
```

Figure 89: Configuration MPLS LDP Interfaces to NEPAL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

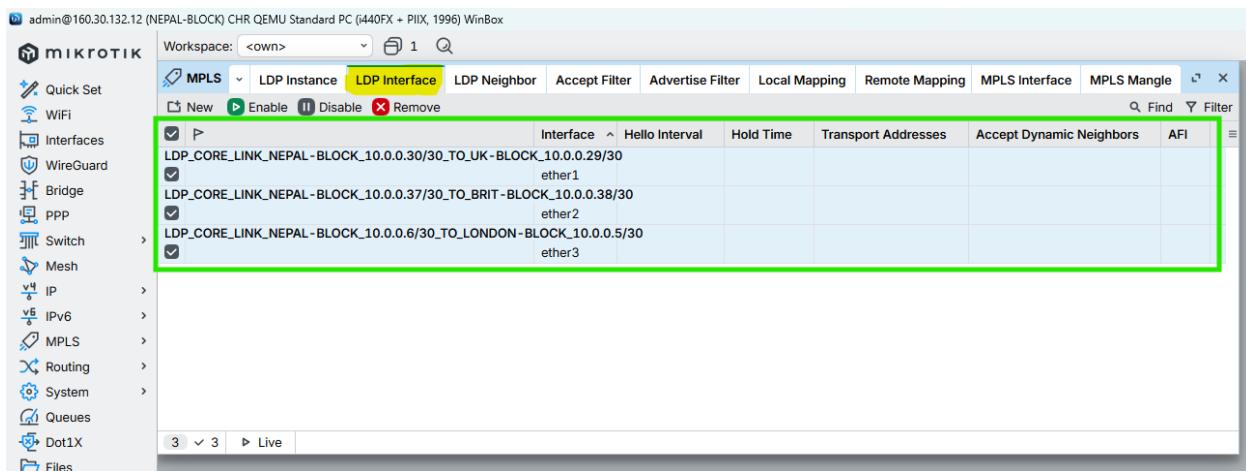


Figure 90: Configuration MPLS LDP Interfaces to NEPAL-BLOCK Router Through WINBOX

7.3.2. Enable MPLS & Set MPLS MTU on interfaces

CMD

```
/mpls interface
add interface=ether3 mpls-mtu=1508 comment="MPLS_CORE_LINK_NEPAL-BLOCK_TO_LONDON-BLOCK_MTU1508"
add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_NEPAL-BLOCK_TO_UK-BLOCK_MTU1508"
add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_NEPAL-BLOCK_TO_BRIT-BLOCK_MTU1508"
/
```

```
[admin@NEPAL-BLOCK] >
[admin@NEPAL-BLOCK] > /mpls interface
[admin@NEPAL-BLOCK] /mpls/interface> add interface=ether3 mpls-mtu=1508 comment="MPLS_CORE_LINK_NEPAL-BLOCK_TO_LONDON-BLOCK_MTU1508"
[admin@NEPAL-BLOCK] /mpls/interface> add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_NEPAL-BLOCK_TO_UK-BLOCK_MTU1508"
[admin@NEPAL-BLOCK] /mpls/interface> add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_NEPAL-BLOCK_TO_BRIT-BLOCK_MTU1508"
[admin@NEPAL-BLOCK] /mpls/interface>
```

Figure 91: Configuration MPLS MTU on Interfaces to NEPAL-BLOCK Router Through CMD

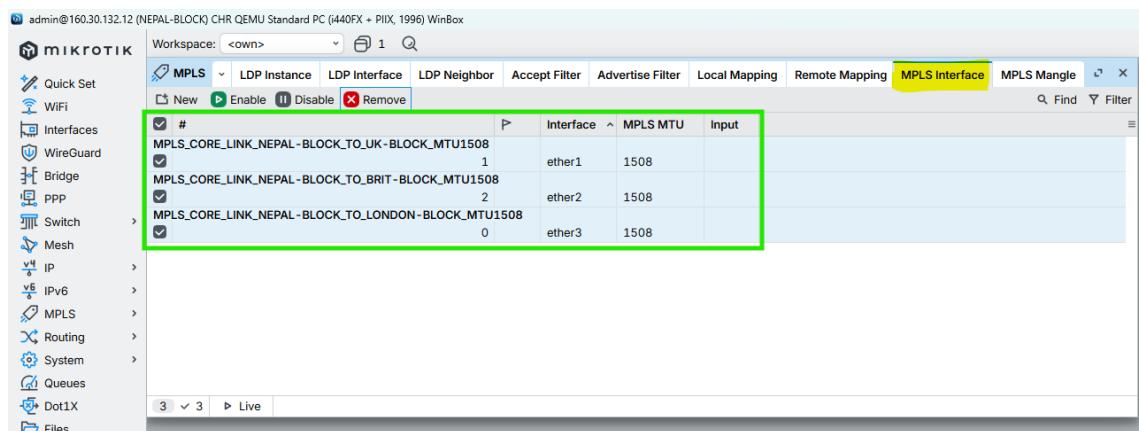


Figure 92: Configuration MPLS MTU on Interfaces to NEPAL-BLOCK Router Through WINBOX

7.4. HIMAL-BLOCK

7.4.1. Enable LDP on Core Interfaces ONLY

CMD

```
/mpls ldp interface
add interface=ether3 comment="LDP_CORE_LINK_HIMAL-BLOCK_10.0.0.33/30_TO_UK-BLOCK_10.0.0.34/30"
add interface=ether4 comment="LDP_CORE_LINK_HIMAL-BLOCK_10.0.0.10/30_TO_LONDON-BLOCK_10.0.0.9/30"
add interface=ether2 comment="LDP_CORE_LINK_HIMAL-BLOCK_10.0.0.42/30_TO_SKILL-BLOCK_10.0.0.41/30"
/
```

```
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > /mpls ldp interface
[admin@HIMAL-BLOCK] /mpls/ldp/interface> add interface=ether3 comment="LDP_CORE_LINK_HIMAL-BLOCK_10.0.0.33/30_TO_UK-BLOCK_10.0.0.34/30"
[admin@HIMAL-BLOCK] /mpls/ldp/interface> add interface=ether4 comment="LDP_CORE_LINK_HIMAL-BLOCK_10.0.0.10/30_TO_LONDON-BLOCK_10.0.0.9/30"
[admin@HIMAL-BLOCK] /mpls/ldp/interface> add interface=ether2 comment="LDP_CORE_LINK_HIMAL-BLOCK_10.0.0.42/30_TO_SKILL-BLOCK_10.0.0.41/30"
[admin@HIMAL-BLOCK] /mpls/ldp/interface>
```

Figure 93: Configuration MPLS LDP Interfaces to HIMAL-BLOCK Router Through CMD

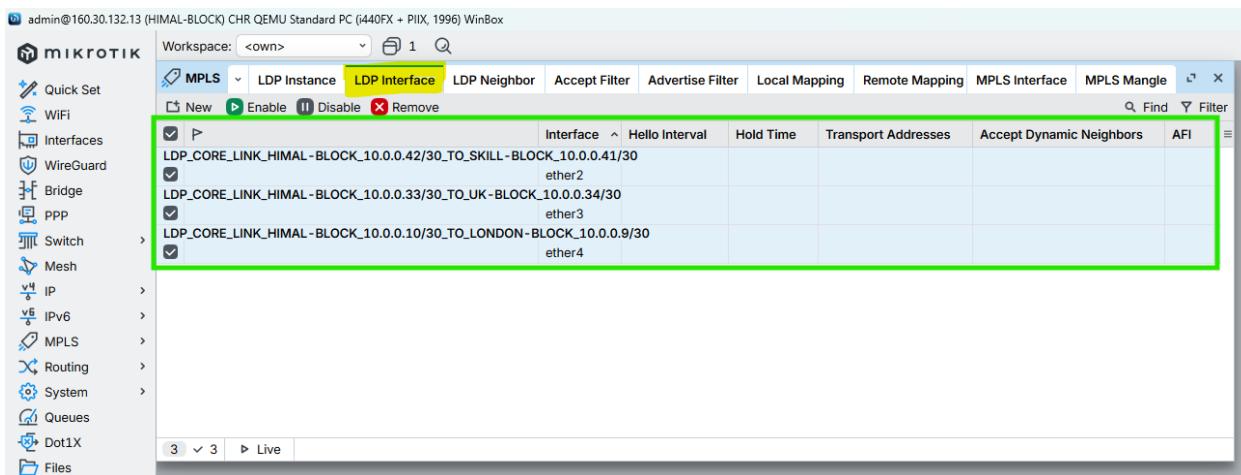


Figure 94: Configuration MPLS LDP Interfaces to HIMAL-BLOCK Router Through WINBOX

7.4.2. Enable MPLS & Set MPLS MTU on interfaces

CMD

```
/mpls interface
add interface=ether3 mpls-mtu=1508 comment="MPLS_CORE_LINK_HIMAL-BLOCK_TO_UK-BLOCK_MTU1508"
add interface=ether4 mpls-mtu=1508 comment="MPLS_CORE_LINK_HIMAL-BLOCK_TO_LONDON-BLOCK_MTU1508"
add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_HIMAL-BLOCK_TO_SKILL-BLOCK_MTU1508"
/
```

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

```
[admin@HIMAL-BLOCK] >
[admin@HIMAL-BLOCK] > /mpls interface
[admin@HIMAL-BLOCK] /mpls/interface> add interface=ether3 mpls-mtu=1508 comment="MPLS_CORE_LINK_HIMAL-BLOCK_TO_UK-BLOCK_MTU1508"
[admin@HIMAL-BLOCK] /mpls/interface> add interface=ether4 mpls-mtu=1508 comment="MPLS_CORE_LINK_HIMAL-BLOCK_TO_LONDON-BLOCK_MTU1508"
[admin@HIMAL-BLOCK] /mpls/interface> add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_HIMAL-BLOCK_TO_SKILL-BLOCK_MTU1508"
[admin@HIMAL-BLOCK] /mpls/interface>
[admin@HIMAL-BLOCK] >
```

Figure 95: Configuration MPLS MTU on Interfaces to HIMAL-BLOCK Router Through CMD

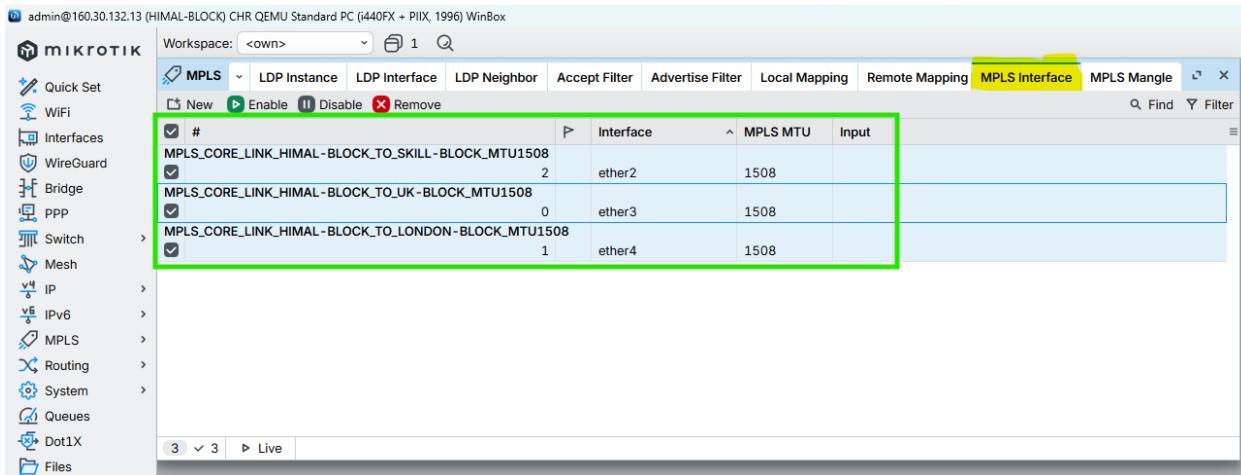


Figure 96: Configuration MPLS MTU on Interfaces to HIMAL-BLOCK Router Through WINBOX

7.5. BRIT-BLOCK

7.5.1. Enable LDP on Core Interfaces ONLY

CMD

```
/mpls ldp interface
add interface=ether2 comment="LDP_CORE_LINK_BRIT-BLOCK_10.0.0.38/30_TO_NEPAL-BLOCK_10.0.0.37/30"
add interface=ether5 comment="LDP_CORE_LINK_BRIT-BLOCK_10.0.0.14/30_TO_LONDON-BLOCK_10.0.0.13/30"
add interface=ether1 comment="LDP_CORE_LINK_BRIT-BLOCK_10.0.0.46/30_TO_KUMARI-BLOCK_10.0.0.44/30"
/
```

```
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] > /mpls ldp interface
[admin@BRIT-BLOCK] /mpls/ldp/interface> add interface=ether2 comment="LDP_CORE_LINK_BRIT-BLOCK_10.0.0.38/30_TO_NEPAL-BLOCK_10.0.0.37/30"
[admin@BRIT-BLOCK] /mpls/ldp/interface> add interface=ether5 comment="LDP_CORE_LINK_BRIT-BLOCK_10.0.0.14/30_TO_LONDON-BLOCK_10.0.0.13/30"
[admin@BRIT-BLOCK] /mpls/ldp/interface> add interface=ether1 comment="LDP_CORE_LINK_BRIT-BLOCK_10.0.0.46/30_TO_KUMARI-BLOCK_10.0.0.44/30"
[admin@BRIT-BLOCK] /mpls/ldp/interface>
```

Figure 97: Configuration MPLS LDP Interfaces to BRIT-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

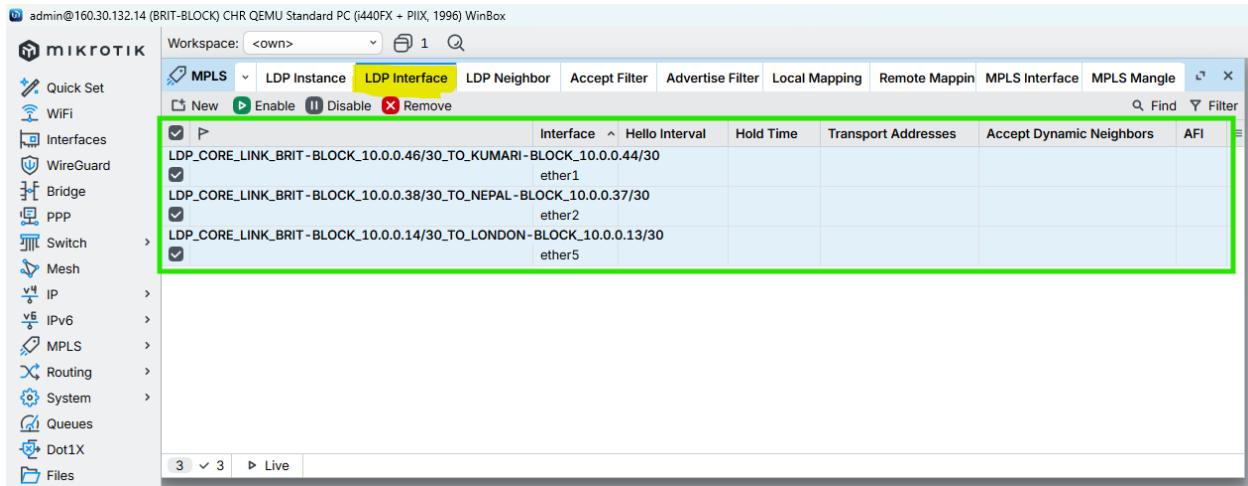


Figure 98: Configuration MPLS LDP Interfaces to BRIT-BLOCK Router Through WINBOX

7.5.2. Enable MPLS & Set MPLS MTU on interfaces

CMD

```
/mpls interface
add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_BRIT-BLOCK_TO_NEPAL-BLOCK_MTU1508"
add interface=ether5 mpls-mtu=1508 comment="MPLS_CORE_LINK_BRIT-BLOCK_TO_LONDON-BLOCK_MTU1508"
add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_BRIT-BLOCK_TO_KUMARI-BLOCK_MTU1508"
/
```

```
[admin@BRIT-BLOCK] >
[admin@BRIT-BLOCK] > /mpls interface
[admin@BRIT-BLOCK] /mpls/interface> add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_BRIT-BLOCK_TO_NEPAL-BLOCK_MTU1508"
[admin@BRIT-BLOCK] /mpls/interface> add interface=ether5 mpls-mtu=1508 comment="MPLS_CORE_LINK_BRIT-BLOCK_TO_LONDON-BLOCK_MTU1508"
[admin@BRIT-BLOCK] /mpls/interface> add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_BRIT-BLOCK_TO_KUMARI-BLOCK_MTU1508"
[admin@BRIT-BLOCK] /mpls/interface> /
[admin@BRIT-BLOCK] >
```

Figure 99: Configuration MPLS MTU on Interfaces to BRIT-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

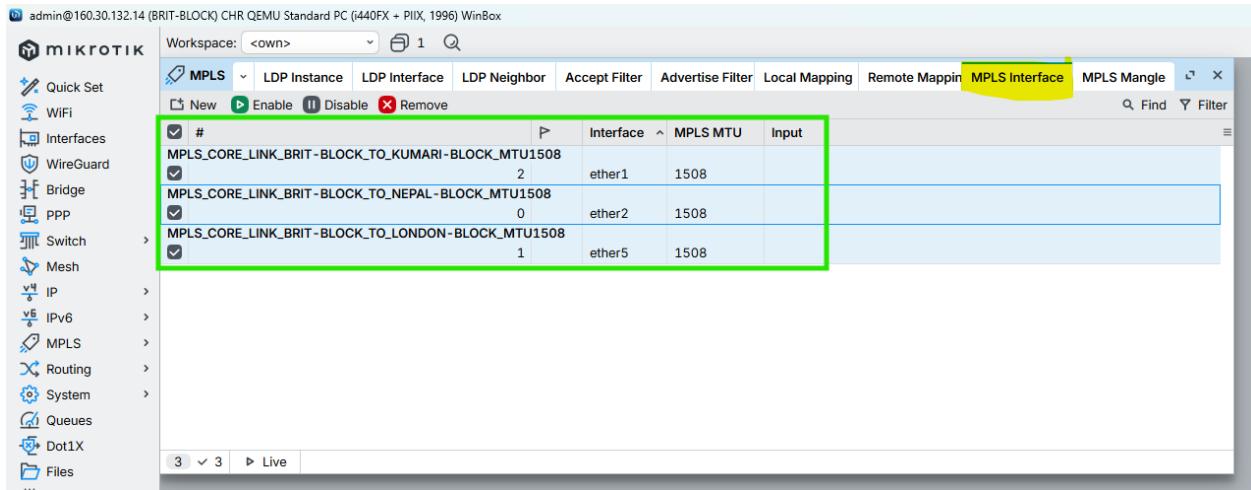


Figure 100: Configuration MPLS MTU on Interfaces to BRIT-BLOCK Router Through WINBOX

7.6. SKILL-BLOCK

7.6.1. Enable LDP on Core Interfaces ONLY

CMD

```
/mpls ldp interface
add interface=ether2 comment="LDP_CORE_LINK_SKILL-BLOCK_10.0.0.41/30_TO_HIMAL-BLOCK_10.0.0.42/30"
add interface=ether6 comment="LDP_CORE_LINK_SKILL-BLOCK_10.0.0.18/30_TO_LONDON-BLOCK_10.0.0.17/30"
add interface=ether1 comment="LDP_CORE_LINK_SKILL-BLOCK_10.0.0.50/30_TO_KUMARI-BLOCK_10.0.0.49/30"
/
```

```
[admin@SKILL-BLOCK] >
[admin@SKILL-BLOCK] > /mpls ldp interface
[admin@SKILL-BLOCK] /mpls/ldp/interface> add interface=ether2 comment="LDP_CORE_LINK_SKILL-BLOCK_10.0.0.41/30_TO_HIMAL-BLOCK_10.0.0.42/30"
[admin@SKILL-BLOCK] /mpls/ldp/interface> add interface=ether6 comment="LDP_CORE_LINK_SKILL-BLOCK_10.0.0.18/30_TO_LONDON-BLOCK_10.0.0.17/30"
[admin@SKILL-BLOCK] /mpls/ldp/interface> add interface=ether1 comment="LDP_CORE_LINK_SKILL-BLOCK_10.0.0.50/30_TO_KUMARI-BLOCK_10.0.0.49/30"
[admin@SKILL-BLOCK] /mpls/ldp/interface>
[admin@SKILL-BLOCK] >
```

Figure 101: Configuration MPLS LDP Interfaces to SKILL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

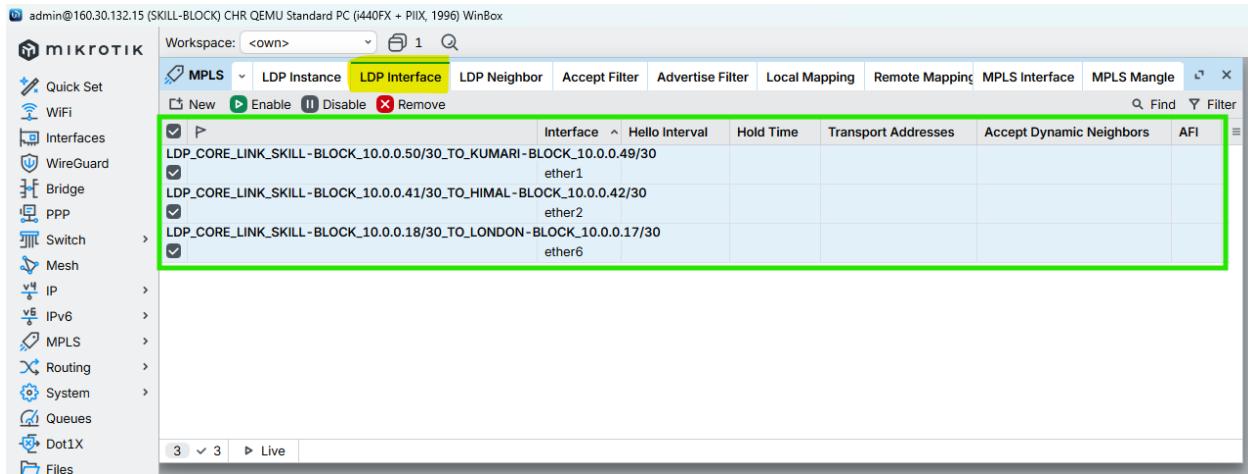


Figure 102: Configuration MPLS LDP Interfaces to SKILL-BLOCK Router Through WINBOX

7.6.2. Enable MPLS & Set MPLS MTU on interfaces

CMD

```
/mpls interface
add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_SKILL-BLOCK_TO_HIMAL-BLOCK_MTU1508"
add interface=ether6 mpls-mtu=1508 comment="MPLS_CORE_LINK_SKILL-BLOCK_TO_LONDON-BLOCK_MTU1508"
add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_SKILL-BLOCK_TO_KUMARI-BLOCK_MTU1508"
/
```

```
[admin@SKILL-BLOCK] >
[admin@SKILL-BLOCK] > /mpls interface
[admin@SKILL-BLOCK] /mpls/interface> add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_SKILL-BLOCK_TO_HIMAL-BLOCK_MTU1508"
[admin@SKILL-BLOCK] /mpls/interface> add interface=ether6 mpls-mtu=1508 comment="MPLS_CORE_LINK_SKILL-BLOCK_TO_LONDON-BLOCK_MTU1508"
[admin@SKILL-BLOCK] /mpls/interface> add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_SKILL-BLOCK_TO_KUMARI-BLOCK_MTU1508"
[admin@SKILL-BLOCK] /mpls/interface>
```

Figure 103: Configuration MPLS MTU on Interfaces to SKILL-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

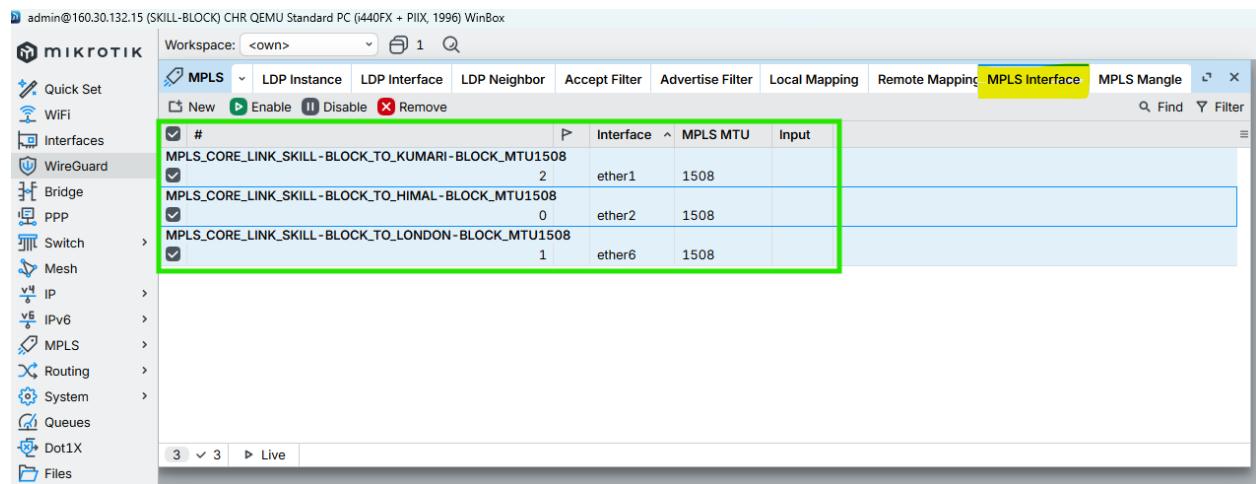


Figure 104: Configuration MPLS MTU on Interfaces to SKILL-BLOCK Router Through WINBOX

7.7. ALUMNI-BLOCK

7.7.1. Enable LDP on Core Interfaces ONLY

CMD

```
/mpls ldp interface
add interface=ether7 comment="LDP_CORE_LINK_ALUMNI-BLOCK_10.0.0.22/30_TO_LONDON-BLOCK_10.0.0.21/30"
add interface=ether1 comment="LDP_CORE_LINK_ALUMNI-BLOCK_10.0.0.49/30_TO_SKILL-BLOCK_10.0.0.50/30"
add interface=ether2 comment="LDP_CORE_LINK_ALUMNI-BLOCK_10.0.0.53/30_TO_KUMARI-BLOCK_10.0.0.54/30"
/
```

```
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /mpls ldp interface
[admin@ALUMNI-BLOCK] /mpls/ldp/interface> add interface=ether7 comment="LDP_CORE_LINK_ALUMNI-BLOCK_10.0.0.22/30_TO_LONDON-BLOCK_10.0.0.21/30"
[admin@ALUMNI-BLOCK] /mpls/ldp/interface> add interface=ether1 comment="LDP_CORE_LINK_ALUMNI-BLOCK_10.0.0.49/30_TO_SKILL-BLOCK_10.0.0.50/30"
[admin@ALUMNI-BLOCK] /mpls/ldp/interface> add interface=ether2 comment="LDP_CORE_LINK_ALUMNI-BLOCK_10.0.0.53/30_TO_KUMARI-BLOCK_10.0.0.54/30"
[admin@ALUMNI-BLOCK] /mpls/ldp/interface>
```

Figure 105: Configuration MPLS LDP Interfaces to ALUMNI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

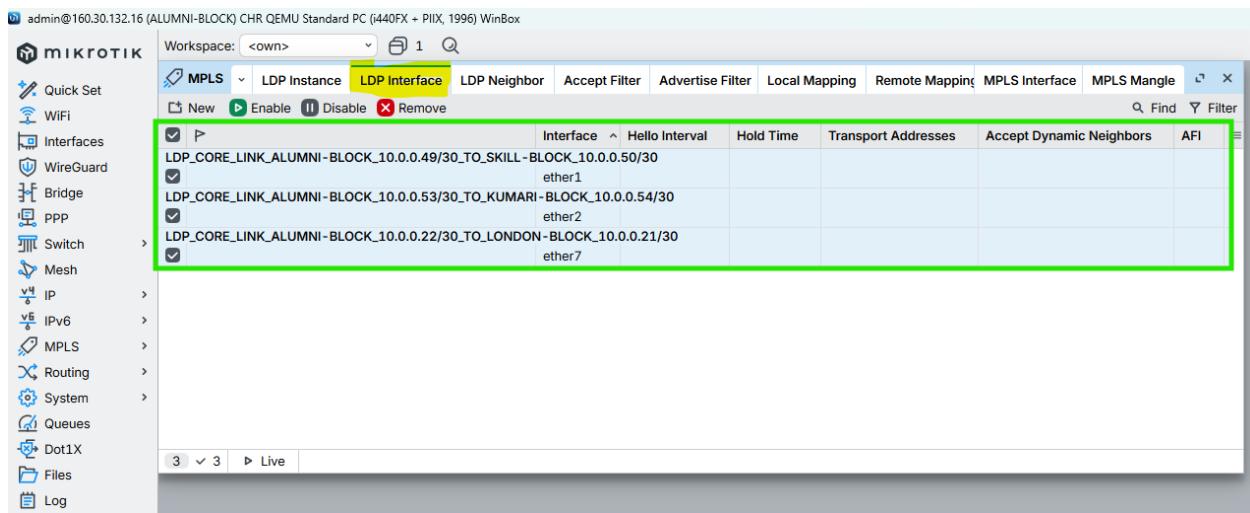


Figure 106: Configuration MPLS LDP Interfaces to ALUMNI-BLOCK Router Through WINBOX

7.7.2. Enable MPLS & Set MPLS MTU on interfaces

CMD

```
/mpls interface
add interface=ether7 mpls-mtu=1508 comment="MPLS_CORE_LINK_ALUMNI-BLOCK_TO_LONDON-BLOCK_MTU1508"
add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_ALUMNI-BLOCK_TO_SKILL-BLOCK_MTU1508"
add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_ALUMNI-BLOCK_TO_KUMARI-BLOCK_MTU1508"
/
```

```
[admin@ALUMNI-BLOCK] >
[admin@ALUMNI-BLOCK] > /mpls interface
[admin@ALUMNI-BLOCK] /mpls/interface> add interface=ether7 mpls-mtu=1508 comment="MPLS_CORE_LINK_ALUMNI-BLOCK_TO_LONDON-BLOCK_MTU1508"
[admin@ALUMNI-BLOCK] /mpls/interface> add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_ALUMNI-BLOCK_TO_SKILL-BLOCK_MTU1508"
[admin@ALUMNI-BLOCK] /mpls/interface> add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_ALUMNI-BLOCK_TO_KUMARI-BLOCK_MTU1508"
[admin@ALUMNI-BLOCK] /mpls/interface>
```

Figure 107: Configuration MPLS MTU on Interfaces to ALUMNI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

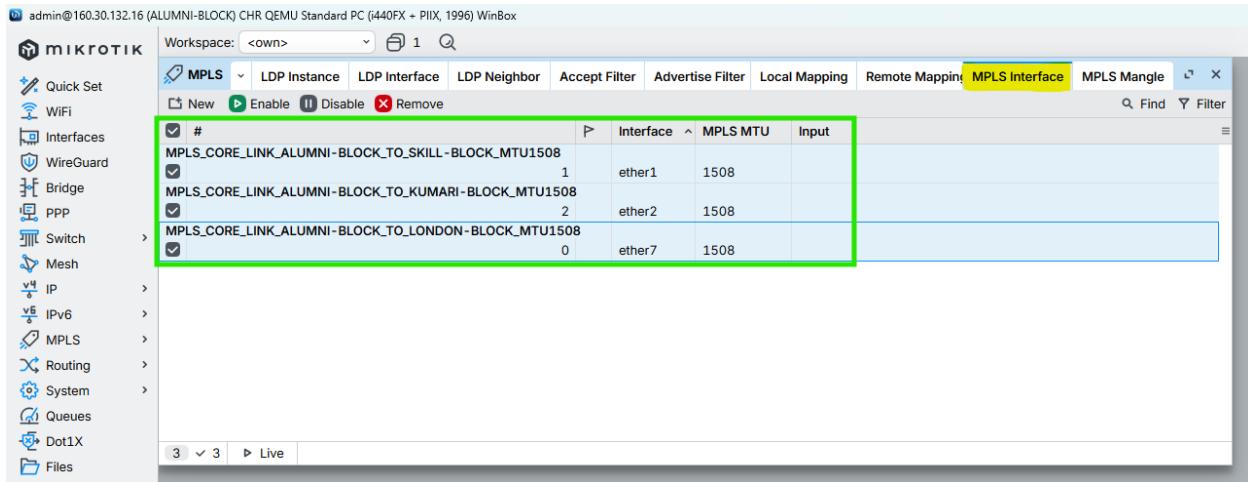


Figure 108: Configuration MPLS MTU on Interfaces to ALUMNI-BLOCK Router Through WINBOX

7.8. KUMARI-BLOCK

7.8.1. Enable LDP on Core Interfaces ONLY

CMD

```
/mpls ldp interface
add interface=ether8 comment="LDP_CORE_LINK_KUMARI-BLOCK_10.0.0.26/30_TO_LONDON-BLOCK_10.0.0.25/30"
add interface=ether2 comment="LDP_CORE_LINK_KUMARI-BLOCK_10.0.0.54/30_TO_ALUMNI-BLOCK_10.0.0.53/30"
add interface=ether1 comment="LDP_CORE_LINK_KUMARI-BLOCK_10.0.0.44/30_TO_BRIT-BLOCK_10.0.0.46/30"
/
```

```
[admin@KUMARI-BLOCK] >
[admin@KUMARI-BLOCK] > /mpls ldp interface
[admin@KUMARI-BLOCK] /mpls/ldp/interface> add interface=ether8 comment="LDP_CORE_LINK_KUMARI-BLOCK_10.0.0.26/30_TO_LONDON-BLOCK_10.0.0.25/30"
[admin@KUMARI-BLOCK] /mpls/ldp/interface> add interface=ether2 comment="LDP_CORE_LINK_KUMARI-BLOCK_10.0.0.54/30_TO_ALUMNI-BLOCK_10.0.0.53/30"
[admin@KUMARI-BLOCK] /mpls/ldp/interface> add interface=ether1 comment="LDP_CORE_LINK_KUMARI-BLOCK_10.0.0.44/30_TO_BRIT-BLOCK_10.0.0.46/30"
[admin@KUMARI-BLOCK] /mpls/ldp/interface>
```

Figure 109: Configuration MPLS LDP Interfaces to KUMARI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

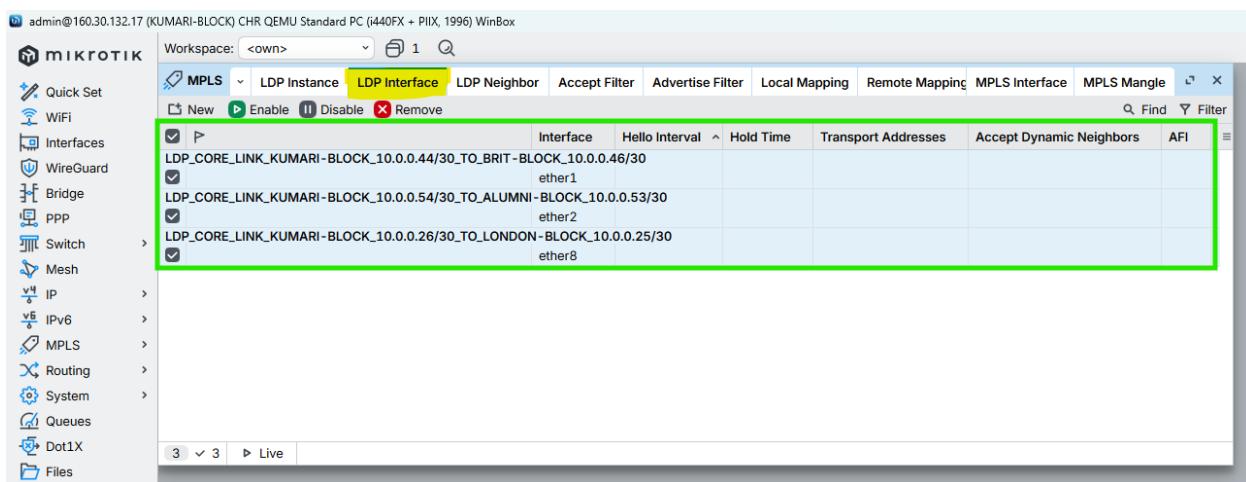


Figure 110: Configuration MPLS LDP Interfaces to KUMARI-BLOCK Router Through WINBOX

7.8.2. Enable MPLS & Set MPLS MTU on interfaces

CMD

```
/mpls interface
add interface=ether8 mpls-mtu=1508 comment="MPLS_CORE_LINK_KUMARI-BLOCK_TO_LONDON-BLOCK_MTU1508"
add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_KUMARI-BLOCK_TO_ALUMNI-BLOCK_MTU1508"
add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_KUMARI-BLOCK_TO_BRIT-BLOCK_MTU1508"
/
```

```
[admin@KUMARI-BLOCK] >
[admin@KUMARI-BLOCK] > /mpls interface
[admin@KUMARI-BLOCK] /mpls/interface> add interface=ether8 mpls-mtu=1508 comment="MPLS_CORE_LINK_KUMARI-BLOCK_TO_LONDON-BLOCK_MTU1508"
[admin@KUMARI-BLOCK] /mpls/interface> add interface=ether2 mpls-mtu=1508 comment="MPLS_CORE_LINK_KUMARI-BLOCK_TO_ALUMNI-BLOCK_MTU1508"
[admin@KUMARI-BLOCK] /mpls/interface> add interface=ether1 mpls-mtu=1508 comment="MPLS_CORE_LINK_KUMARI-BLOCK_TO_BRIT-BLOCK_MTU1508"
[admin@KUMARI-BLOCK] /mpls/interface>
```

Figure 111: Configuration MPLS MTU on Interfaces to KUMARI-BLOCK Router Through CMD

MPLS & VPLS Backbone Design based on Islington College Using GNS3 and MikroTik

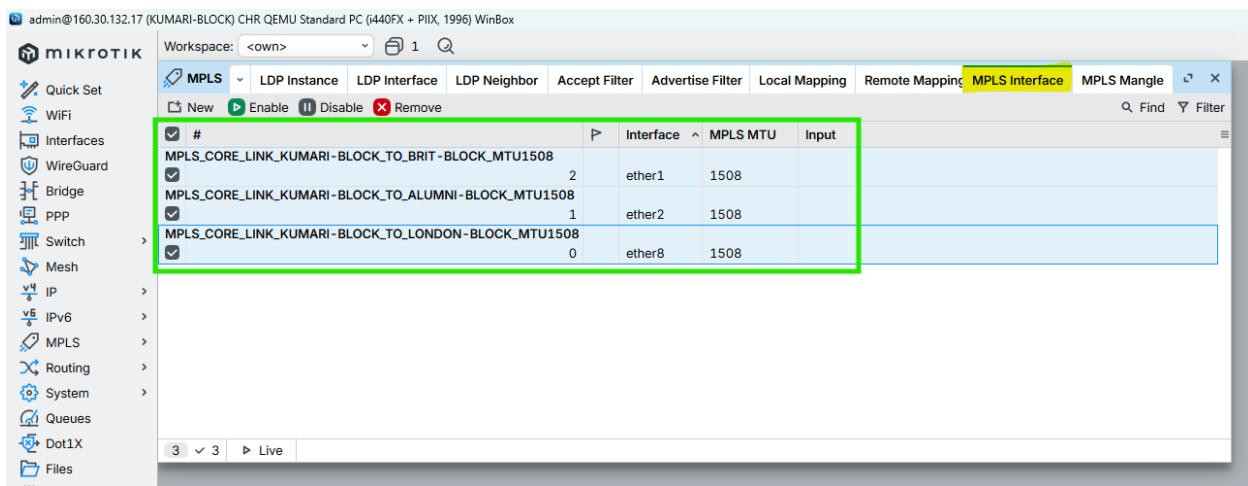


Figure 112: Configuration MPLS MTU on Interfaces to KUMARI-BLOCK Router Through WINBOX