OSPF ROUTING

by

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Introduction

Graduated:
Magister of ITB (Institut Teknologi Bandung)

Experiences:
✓ Certified Mikrotik Trainer (Rep. Ceko 2009)
✓ Training of Cisco Security Instructor (Philippines 2009)
✓ Training of Open Source (FOSS) workshop Instructor (Malaysia 2008)
✓ Training of Oracle Academy Instructor (Singapore 2007)
✓ Instructor CCNA Cisco Networking Academy Program (2005)

Job:
✓ SMK Telkom Sandhy Putra Malang
✓ STMIK Pradnya Paramita Malang
✓ Universitas Ma Chung Malang

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• OSPF (Open shortest Path First) is an open standard routing protocol.
• OSPF has become one of the most widely used protocols in existence today because of being able to implement it cross multi-vendor platforms.
• The popularity of OSPF is continuing to grow with the advent of Multi Protocol Label Switching (MPLS)
• OSPF can be used for:
  – Automatic Distribution of routing information instead of using static routes
  – Making fail-over connections
  – Load balancing
OSPF Router Types

• Internal routers (inside an area)
• Backbone Routers (Inside area 0)
• Area Border routers (ABR)
  – An ABR sits between two or more areas and it must touch area 0.
• Autonomous system boundary routers (ASBR)
  – Redistribute routing information between OSPF and other routing protocols.
OSPF in RouterOS

- MikroTik RouterOS implements OSPF Version 2 (RFC 2328)
- The routing package should be installed
  - Check with “system package print”
  - If not installed, upload same version as system package routing-2.8.x.npk file and reboot the routers.
- OSPF uses protocol 89 to communicate with the neighbors. Make sure the Input firewall does not filter it.
OSPF Router ID

• Router ID must be unique within the AS
• Router ID can be left as 0.0.0.0
OSPF Default Route

- Leave ‘Distribute default’ route to ‘never’, unless it is an ASBR
  - /routing ospf
  - set distribute-default=as-type-1
OSPF Route Redistribution

• Set redistribute connected routes (and static routes):
  – Routing ospf
  – Set redistribute-connected=as-type-1
  – Set redistribute-static=as-type-1
Area numbering

• Areas are defined by 32 bit numbers in IP address format.

• 0.0.0.0 reserved for the backbone area

• All areas must connect to area 0.0.0.0

• Configuration under
  – /routing ospf area
  – print
  – add name=internal1 area-id=0.0.0.0
OSPF Network

• Add networks to specify interfaces where you need OSPF running, and the area.

• The network address should include address of the interface
  – Routing ospf network
  – Add network=10.10.10.0/30 area=backbone
OSPF Interface Configuration

- If needed, set interface cost:
  - Routing ospf interface
  - Add interface=wlan1 cost=10
- For faster response, set Hello interval=7, Router dead interval=10 on all routers.
OSPF Troubleshooting

• Check MikroTik neighbors
  – /ip neighbor print

• Check OSPF neighbors
  – /routing ospf neighbor print

• Check routes
  – /ip route print

• Check logs
  – /log print
Configuration of R1
• IP interface R1

<table>
<thead>
<tr>
<th>Address</th>
<th>Network</th>
<th>Broadcast</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.10.10.1/30</td>
<td>10.10.10.0</td>
<td>10.10.10.3</td>
<td>wlan1</td>
</tr>
<tr>
<td>10.10.11.1/30</td>
<td>10.10.11.0</td>
<td>10.10.11.3</td>
<td>wlan2</td>
</tr>
<tr>
<td>192.168.0.254</td>
<td>192.168.0.0</td>
<td>192.168.0.255</td>
<td>ether1</td>
</tr>
</tbody>
</table>
• Mode of wlan1 in R1
• Mode of wlan2 in R1
• Cost OSPF of wlan1
Cost OSPF of wlan2
• Redistribute

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• OSPF network 1

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• OSPF network 2
• OSPF routes
- Route list

<table>
<thead>
<tr>
<th>Destination</th>
<th>Gateway</th>
<th>Gateway Interface</th>
<th>Interface</th>
<th>Distance</th>
<th>Routing Mark</th>
<th>Pref. Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAC</td>
<td>10.10.0.30</td>
<td>wlan1</td>
<td>0</td>
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<td>10.10.10.1</td>
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</tr>
<tr>
<td>DAC</td>
<td>10.10.11.0/30</td>
<td>wlan2</td>
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<td>10.10.11.1</td>
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<tr>
<td>DAo</td>
<td>10.10.12.0/30</td>
<td>10.10.10.2</td>
<td>wlan1</td>
<td>110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAC</td>
<td>192.168.0.0/24</td>
<td>ether1</td>
<td>0</td>
<td></td>
<td>192.168.0.254</td>
<td></td>
</tr>
<tr>
<td>DAo</td>
<td>192.168.2.0/24</td>
<td>10.10.11.2</td>
<td>wlan2</td>
<td>110</td>
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<td></td>
</tr>
</tbody>
</table>

5 items
Configuration of R2
• IP interface of R2
• Mode of wlan1 in R2
• Mode of wlan2 in R2
• OSPF cost of wlan1
- OSPF cost of wlan2
• OSPF network 1
• OSPF network 2
• Redistribute
• OSPF routes
• Route list

![Route List](image_url)
Configuration of R3
• IP interface of R3

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• Mode of wlan1 in R3
• Mode of wlan2 in R3
• OSPF Cost wlan1
• Redistribute
• OSPF cost wlan2
• OSPF network 1
OSPF network 2

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• OSPF routes
• Route list

<table>
<thead>
<tr>
<th>Route</th>
<th>Destination</th>
<th>Gateway</th>
<th>Gateway</th>
<th>Interface</th>
<th>Distance</th>
<th>Routing Mark</th>
<th>Pref. Source</th>
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</thead>
<tbody>
<tr>
<td>DAo</td>
<td>0.0.0.0/0</td>
<td>10.10.11.1</td>
<td>wlan1</td>
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<td></td>
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<td>10.10.11.1</td>
<td>wlan1</td>
<td>110</td>
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<tr>
<td>DAC</td>
<td>10.10.11.0/30</td>
<td>10.10.11.1</td>
<td>wlan1</td>
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<td>10.10.11.2</td>
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<tr>
<td>DAC</td>
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<td>10.10.11.1</td>
<td>wlan2</td>
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<td>10.10.12.1</td>
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<tr>
<td>DAc</td>
<td>192.168.0.0/24</td>
<td>10.10.11.1</td>
<td>wlan1</td>
<td>110</td>
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</tr>
<tr>
<td>DAC</td>
<td>192.168.2.0/24</td>
<td>10.10.11.1</td>
<td>ether1</td>
<td>0</td>
<td>192.168.2.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6 items
THANK YOU

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