

TP1

CLASSIFICATION & MARQUAGE



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Configurer Routage Statique dans GNS3

SCHÉMA CLASSIFICATION & MARQUAGE

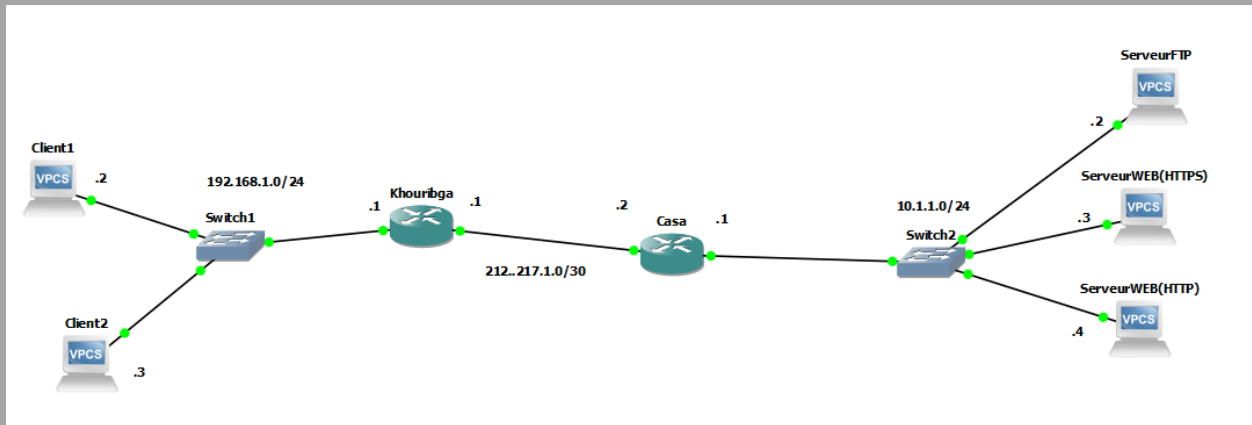


Tableau de routage -Khouribga-

```
Khouribga
Khouribga(config)#show ip route
% Invalid input detected at '^' marker.

Khouribga(config)#
Khouribga#
*Mar  1 00:00:42.695: %SYS-5-CONFIG_I: Configured from console by console
Khouribga#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

    212.217.1.0/30 is subnetted, 1 subnets
C       212.217.1.0 is directly connected, FastEthernet0/1
    10.0.0.0/24 is subnetted, 1 subnets
S       10.1.1.0 [1/0] via 212.217.1.2
C       192.168.1.0/24 is directly connected, FastEthernet0/0
Khouribga#
```

Tableau de routage -Casa-

```
Casa
et1/0, changed state to down
*Mar 1 00:00:05.747: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
*Mar 1 00:00:05.747: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
*Mar 1 00:00:06.407: %LINK-5-CHANGED: Interface FastEthernet1/0, changed state to administratively down
Casa#show ip route
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route

Gateway of last resort is not set

    212.217.1.0/30 is subnetted, 1 subnets
C      212.217.1.0 is directly connected, FastEthernet0/0
    10.0.0.0/24 is subnetted, 1 subnets
C      10.1.1.0 is directly connected, FastEthernet0/1
S      192.168.1.0/24 [1/0] via 212.217.1.1
Casa#
```

Configuration des interfaces sur Client1

```
Client1 - PuTTY
Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
Copyright (c) 2007-2014, Paul Meng (mirnshi@gmail.com)
All rights reserved.

VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

Client1> ip 192.168.1.2 255.255.255.0 192.168.1.1
Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0 gateway 192.168.1.1

Client1> 
```

Configuration des interfaces sur Client2

```
Client2 - PuTTY

Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
Copyright (c) 2007-2014, Paul Meng (mirnshi@gmail.com)
All rights reserved.

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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

Client2> ip 192.168.1.3 255.255.255.0 192.168.1.1
Checking for duplicate address...
PC1 : 192.168.1.3 255.255.255.0 gateway 192.168.1.1

Client2> 
```

Configuration des interfaces sur ServeurFTP

```
ServeurFTP - PuTTY

Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
Copyright (c) 2007-2014, Paul Meng (mirnshi@gmail.com)
All rights reserved.

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Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.

Press '?' to get help.

Executing the startup file

ServeurFTP> ip 10.1.1.2 255.255.255.0 10.1.1.1
Checking for duplicate address...
PC1 : 10.1.1.2 255.255.255.0 gateway 10.1.1.1

ServeurFTP> 
```

Configuration des interfaces sur ServeurWeb(http)

```
SeurveurWeb(http) - PuTTY

Welcome to Virtual PC Simulator, version 0.6.2
Dedicated to Daling.
Build time: Apr 10 2019 02:42:20
Copyright (c) 2007-2014, Paul Meng (mirnshi@gmail.com)
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VPCS is free software, distributed under the terms of the "BSD" licence.
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For more information, please visit wiki.freecode.com.cn.

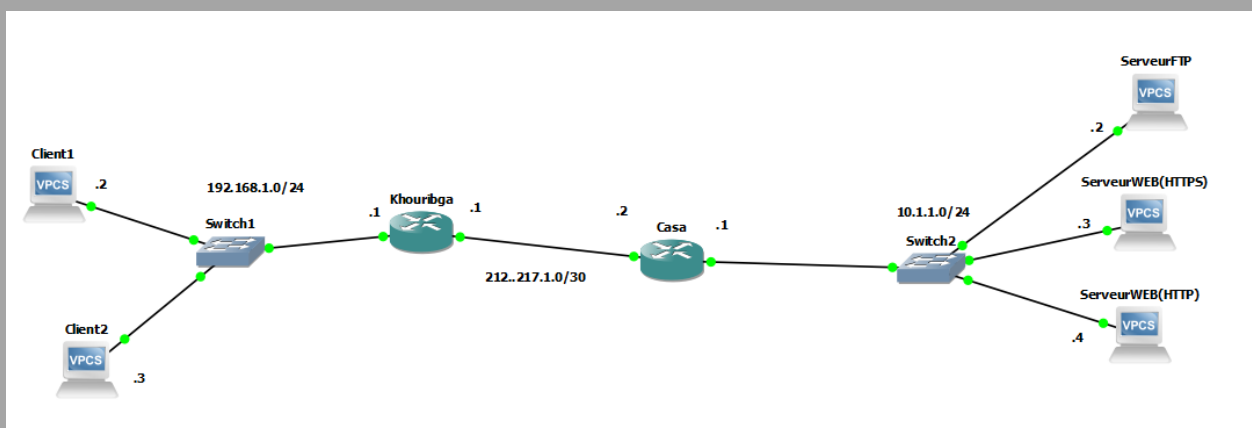
Press '?' to get help.

Executing the startup file

Hostname is too long. (Maximum 12 characters)

VPCS> ip 10.1.1.4 255.255.255.0 10.1.1.1
Checking for duplicate address...
PC1 : 10.1.1.4 255.255.255.0 gateway 10.1.1.1

VPCS> 
```



Teste la connexion entre client1 et ServeurFTP

```

Checking for duplicate address...
PC1 : 192.168.1.2 255.255.255.0 gateway 192.168.1.1

Client1> ping 10.1.1.2
10.1.1.2 icmp_seq=1 timeout
10.1.1.2 icmp_seq=2 timeout
10.1.1.2 icmp_seq=3 timeout
84 bytes from 10.1.1.2 icmp_seq=4 ttl=62 time=72.866 ms
84 bytes from 10.1.1.2 icmp_seq=5 ttl=62 time=74.695 ms

Client1> 

```

Classification MF sur le retour

Création de la class-map FTP :

```

Casa#class-map match-all FTP
^
% Invalid input detected at '^' marker.

Casa#config
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Casa(config)#class-map match-all FTP
Casa(config-cmap)#match protocol
Casa(config-cmap)#match protocol ftp
Casa(config-cmap)#exit
Casa(config)#

```

Création des class-map http et HTTPS :

```

Casa(config)#class-map match-all HTTP
Casa(config-cmap)#match protocol http
Casa(config-cmap)#match access-group name HTTP
Casa(config-cmap)#exit
Casa(config)#class-map match-all HTTPS
Casa(config-cmap)#match protocol secure-http
Casa(config-cmap)#exit
Casa(config)#

```

```

Casa(config-cmap)#exit
Casa(config)#class-map match-all DEFAULT
Casa(config-cmap)#match any
Casa(config-cmap)#exit
Casa(config)#

```

Création de l'ACL HTTPS:

```

Casa(config)#ip access-list extended HTTP
Casa(config-ext-nacl)#ip permit host 10.1.1.4 host 192.168.1.3
      ^
% Invalid input detected at '^' marker.

Casa(config-ext-nacl)#permit ip host 10.1.1.4 host 192.168.1.3
Casa(config-ext-nacl)#deny ip any any
Casa(config-ext-nacl)#

```

Marquage sur le routeur « Casa » :

Création 3 stratégies FTP HTTP st HTTPS :

```

Casa
Casa(config)#
Casa(config)#
Casa(config)#
Casa(config)#
Casa(config)#
Casa(config)#
Casa(config)#
Casa(config)#policy-
Casa(config)#policy-map FTP
Casa(config-pmap)#class FTP
Casa(config-pmap-c)#set ip dscp EF
Casa(config-pmap-c)#exit
Casa(config-pmap)#exit
Casa(config)#policy-map HTTP
Casa(config-pmap)#class HTTP
Casa(config-pmap-c)#set ip dscp AF31
Casa(config-pmap-c)#exit
Casa(config-pmap)#exit
Casa(config)#policy-map HTTPS
Casa(config-pmap)#class HTTPS
Casa(config-pmap-c)#set ip dscp AF22
Casa(config-pmap-c)#exit
Casa(config-pmap)#exit
Casa(config)#

Casa(config)#class-map match-all DEFAULT
Casa(config-cmap)#match any
Casa(config-cmap)#exit
Casa(config)#policy-map DEFAULT
Casa(config-pmap)#class DEFAULT
Casa(config-pmap-c)#set ip dscp 00
Casa(config-pmap-c)#

```

• Classe Bronze (Classe3) → Default

Classification BA sur le routeur

Création de la stratégie Or :

```
Khouribga(config)#policy-map Or
Khouribga(config-pmap)#set ip dscp EF
^
% Invalid input detected at '^' marker.

Khouribga(config-pmap)#class Or
Khouribga(config-pmap-c)#set ip dscp EF
Khouribga(config-pmap-c)#exit
```

Création de la stratégie Bronze Routine:

```
Khouribga(config)#policy-map Bronze
Khouribga(config-pmap)#class Bronze
Khouribga(config-pmap-c)#set ip dscp AF22
Khouribga(config-pmap-c)#exit
Khouribga(config-pmap)#exit
Khouribga(config)#policy-map Routine
Khouribga(config-pmap)#class Rou
Khouribga(config-pmap)#class Rou
Khouribga(config-pmap)#class Routine
Khouribga(config-pmap-c)#set ip dscp 00
Khouribga(config-pmap-c)#exit
Khouribga(config-pmap)#exit
Khouribga(config)#exit
Khouribga#wr
Building configuration...

*Mar  1 00:38:24.235: %SYS-5-CONFIG_I: Configured from console by console[OK]
Khouribga#
```

Re-Marquage sur le routeur « Khga »

Création autre stratégie Or Argent Bronze et Routine


```
Khouribga
Enter configuration commands, one per line.  End with CNTL/Z.
Khouribga(config)#policy-map Or
Khouribga(config-pmap)#class Or
Khouribga(config-pmap-c)#set ip dscp AF32
Khouribga(config-pmap-c)#exit
Khouribga(config-pmap)#exit
Khouribga(config)#policy-map Argent
Khouribga(config-pmap)#class Argent
Khouribga(config-pmap-c)#set ip dscp AF21
Khouribga(config-pmap-c)#exit
Khouribga(config-pmap)#exit
Khouribga(config)#policy-map Bronze
Khouribga(config-pmap)#class Bronze
Khouribga(config-pmap-c)#set ip dscp Default
Khouribga(config-pmap-c)#exit
Khouribga(config-pmap)#exit
Khouribga(config)#policy-map Routine
Khouribga(config-pmap)#class Routine
Khouribga(config-pmap-c)#set ip dscp Routine
^
% Invalid input detected at '^' marker.
Khouribga(config-pmap-c)#set ip dscp AF33
Khouribga(config-pmap-c)#exit
```

Teste avec Wireshark

test marquage rtcp

*Local Area Connection

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

rtsp

No.	Time	Source	Destination	Protocol	Length	Info
3061...	1539.038292	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1539.041357	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1544.028308	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1544.031491	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1549.021621	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1554.031452	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1559.031248	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1564.043782	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1564.047882	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1569.026529	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1574.033937	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1574.036650	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1579.019116	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1579.021744	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1584.049098	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1584.051959	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1589.052073	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1594.019561	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1594.022115	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1599.054529	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1599.057323	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1604.057521	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1609.037427	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1614.027967	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1619.024894	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1619.027740	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1624.035158	200.0.2.4	100.0.1.2	RTCP	102	Sender Report Source description
3061...	1624.038022	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)
3061...	1629.052714	100.0.1.2	200.0.2.4	ICMP	130	Destination unreachable (Port unreachable)

Frame 306136: 102 bytes on wire (816 bits), 102 bytes captured (816 bits) on interface 0

Ethernet II, Src: Cisco_0e:c3:46 (e8:b7:48:0e:c3:46), Dst: Cisco_c6:c9:9c (64:16:8d:c6:c9:9c)

Internet Protocol Version 4, Src: 200.0.2.4, Dst: 100.0.1.2

0100 ... = Version: 4

... 0101 = Header Length: 20 bytes (5)

Differentiated Services Field: 0xb8 (DSCP: EF PHB, ECN: Not-ECT)

1011 10... = Differentiated Services Codepoint: Expedited Forwarding (46)

.... ..00 = Explicit Congestion Notification: Not ECN-Capable Transport (0)

Total Length: 88

Identification: 0x32f4 (13044)

Flags: 0x0000

Time to live: 127

Protocol: UDP (17)

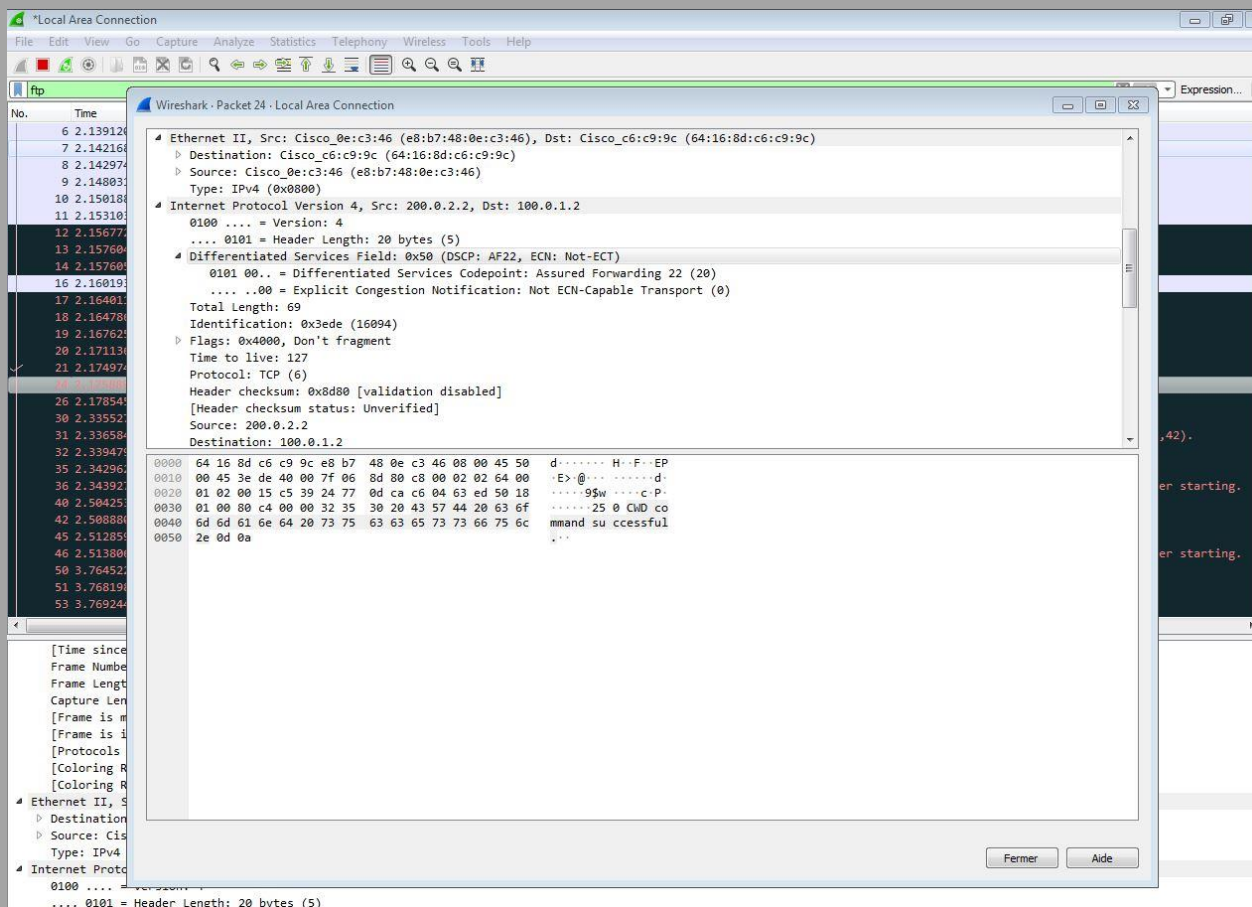
Header checksum: 0xd8e2 [validation disabled]

[Header checksum status: Unverified]

Source: 200.0.2.4

Destination: 100.0.1.2

test ftp



Conclusion

En conclusion, ce TP de GNS3 sur la classification et le marquage de QoS a permis de comprendre l'importance de la qualité de service dans les réseaux informatiques. Nous avons appris que la classification de trafic est la première étape pour appliquer une politique de QoS. Elle permet d'identifier les différents types de trafic dans le réseau et de leur attribuer une priorité en fonction de leur importance.

Le marquage quant à lui, permet d'associer une étiquette de priorité à chaque paquet en fonction de sa classe de trafic. Cette étiquette sera ensuite utilisée par les équipements du réseau pour prendre des décisions de traitement et d'acheminement.

Au cours de ce TP, nous avons utilisé l'outil GNS3 pour simuler un réseau et avons configuré différents équipements pour mettre en place une politique de QoS en utilisant la classification et le marquage. Nous avons ainsi pu constater les effets de la QoS sur les performances du réseau en termes de latence et de débit.

En somme, ce TP a été une opportunité pour acquérir une meilleure compréhension de la QoS, de ses composantes et de son importance dans la gestion des réseaux informatiques.