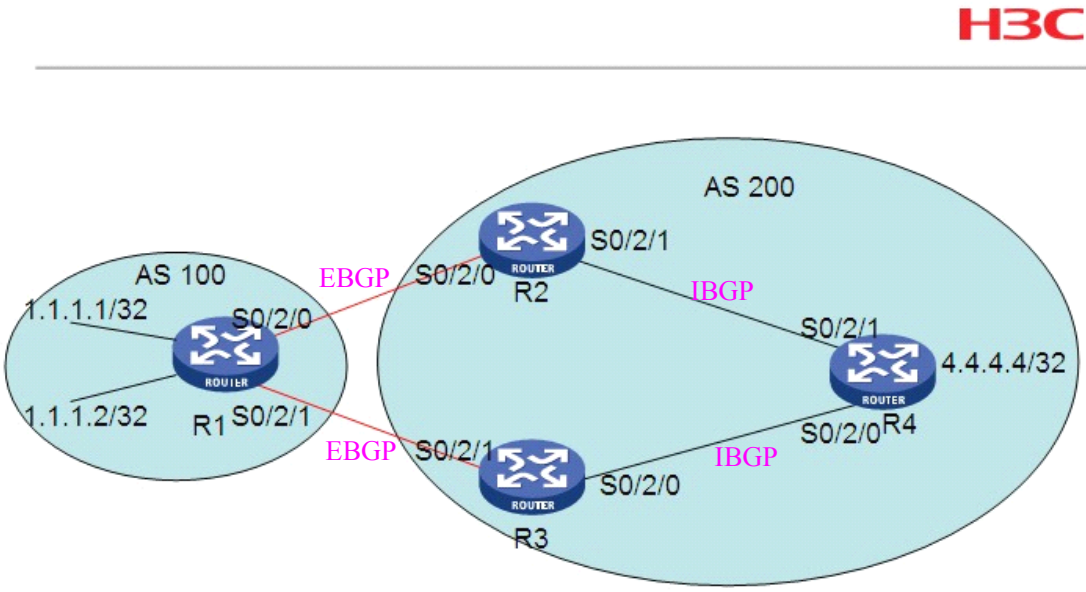
BGP 属性汇总

一、BGP 属性介绍

属性分类	主要包含的属性
公认必遵属性	ORIGIN 属性、AS_PATH 属性、NEXT_HOP 属性
公认可选属性	LOCAL_PREF 属性、ATOMIC_AGGREGATE 属性
可选传递属性	COMMUNITY 属性、AGGREGATE 属性
可选非传递属性	MED 属性、CLUSTER_LIST 属性、ORIGINATOR_ID 属性

二、拓扑结构



三、基本属性

1）ORIGIN 属性

[R2]ip route-static 3.3.3.3 32 NULL 0

[R2-bgp]import-route static

[R3-bgp]network 3.3.3.3 32

[R4]display bgp routing-table

Total Number of Routes: 4

BGP Local router ID is 4.4.4.4

Status codes: * - valid, > - best, d - damped,

h - history, i - internal, s - suppressed, S - Stale

Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*>i 3.3.3.3/32	34.1.1.1	0	100	0	i
* i	24.1.1.1	0	100	0	?

起源属性：**IGP>EGP>incomplete**

2) NEXT_HOP 属性

[R1-bgp]network 1.1.1.1 32

[R4]dis bgp routing-table

Total Number of Routes: 4

BGP Local router ID is 4.4.4.4

Status codes: * - valid, > - best, d - damped,

h - history, i - internal, s - suppressed, S - Stale

Origin : i - IGP, e - EGP, ? – incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
i 1.1.1.1/32	12.1.1.1	0	100	0	100i
i	13.1.1.1	0	100	0	100i

nextHop 不是 **IBGP** 对等体的接口 **IP**，当从 **EBGP** 传递路由 **1.1.1.1/32** 时，没有修改下一跳。

[R2-bgp]peer 24.1.1.2 next-hop-local

[R3-bgp]peer 34.1.1.2 next-hop-local

[R4]dis bgp routing-table

Total Number of Routes: 4

BGP Local router ID is 4.4.4.4

Status codes: * - valid, > - best, d - damped,

h - history, i - internal, s - suppressed, S - Stale

Origin : i - IGP, e - EGP, ? – incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn

*>i 1.1.1.1/32	**24.1.1.1**	0	100	0	100i
* i	**34.1.1.1**	0	100	0	100i

3 ）AS_PATH 属性

[R1-bgp]network 1.1.1.1 32

[R4]dis bgp routing-table

Total Number of Routes: 2

BGP Local router ID is 4.4.4.4

Status codes: * - valid, > - best, d - damped,

h - history, i - internal, s - suppressed, S - Stale

Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*>i 1.1.1.1/32	24.1.1.1	0	100	0	100i
* i	34.1.1.1	0	100	0	100i

去往 1.1.1.1/32 的下一跳是 24.1.1.1，使用 AS_path 修改去往 1.1.1.1/32 的下一跳为 34.1.1.1

[R1] acl number 2000

[R1-acl-basic-2000] rule 0 permit source 1.1.1.1 0

[R1]route-policy for3 permit node 10

[R1-route-policy] if-match acl 2000

[R1-route-policy]apply as-path 1 2 3

[R1]route-policy for3 permit node 20

[R1-bgp]peer 12.1.1.2 route-policy for3 export

[R4]dis bgp routing-table

Total Number of Routes: 2

BGP Local router ID is 4.4.4.4

Status codes: * - valid, > - best, d - damped,

h - history, i - internal, s - suppressed, S - Stale

Origin : i - IGP, e - EGP, ? – incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
***>i 1.1.1.1/32**	**34.1.1.1**	**0**	**100**	**0**	**100i**
*** i**	**24.1.1.1**	**0**	**100**	**0**	**100 1 2 3i**

4 ）LOCAL_PREF 属性

[R2-bgp]default local-preference 200

[R3-bgp]default local-preference 100 //默认 100，以大为优

[R4]dis bgp routing-table

Total Number of Routes: 2

BGP Local router ID is 4.4.4.4

Status codes: * - valid, > - best, d - damped,

h - history, i - internal, s - suppressed, S - Stale
Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*>i 1.1.1.1/32	24.1.1.1	0	**200**	0	**100 1 2 3i**
* i	34.1.1.1	0	**100**	0	100i

5） MED 属性

[R4-bgp]network 4.4.4.4 32

[R1]dis bgp routing-table

Total Number of Routes: 3

BGP Local router ID is 1.1.1.1

Status codes: * - valid, > - best, d - damped,
h - history, i - internal, s - suppressed, S - Stale
Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*> 1.1.1.1/32	0.0.0.0	0		0	i
*> 4.4.4.4/32	12.1.1.2			0	200i
*	13.1.1.2			0	200i

访问 4.4.4.4/32，下一跳为 12.1.1.2，通过修改 MED 属性改变下一跳。

[R2-bgp]default med 100

[R3-bgp]default med 0 //默认 MED 值为 0，以小为优。

[R1]dis bgp routing-table

Total Number of Routes: 3

BGP Local router ID is 1.1.1.1

Status codes: * - valid, > - best, d - damped,
h - history, i - internal, s - suppressed, S - Stale
Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*> 1.1.1.1/32	0.0.0.0	0		0	i
***> 4.4.4.4/32**	**13.1.1.2**			**0**	**200i**
*****	**12.1.1.2**	**100**		**0**	**200i**

6) **Preferred-value** 私有属性

[R1]dis bgp routing-table

Total Number of Routes: 3

BGP Local router ID is 1.1.1.1

Status codes: * - valid, > - best, d - damped,
h - history, i - internal, s - suppressed, S - Stale
Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn

*>	1.1.1.1/32	0.0.0.0	0	0	i
*>	4.4.4.4/32	13.1.1.2		0	200i
*		12.1.1.2	100	0	200i

在上一个属性 MED 值中，已经通过修改 MED 值，更改了路由传播的路径，现在通过修改预选值来影响下一跳.

[R1-bgp]peer 12.1.1.2 preferred-value 100

[R1-bgp]peer 13.1.1.2 preferred-value 10

预选值以大为优。

[R1]dis bgp routing-table

Total Number of Routes: 3

BGP Local router ID is 1.1.1.1

Status codes: * - valid, > - best, d - damped,

h - history, i - internal, s - suppressed, S - Stale

Origin : i - IGP, e - EGP, ? - incomplete

	Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*>	1.1.1.1/32	0.0.0.0	0		0	i
*>	4.4.4.4/32	12.1.1.2	100		100	200i
*		13.1.1.2			10	200i

7 ）COMMUNITY 属性

要求：R4 访问 1.1.1.1 下一跳为 24.1.1.1

R4 访问 1.1.1.2 下一跳为 34.1.1.1

- 团体属性是一组有相同特征的目的地址的集合，没有物理上的边界，与其所在的 AS 无关

<R4>dis bgp routing-table

Total Number of Routes: 4

BGP Local router ID is 4.4.4.4

Status codes: * - valid, > - best, d - damped,

h - history, i - internal, s - suppressed, S - Stale

Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*>i 1.1.1.1/32	24.1.1.1	0	100	0	100i
* i	34.1.1.1	0	100	0	100i
*>i 1.1.1.2/32	24.1.1.1	0	100	0	100i
* i	34.1.1.1	0	100	0	100i

[R1] acl number 2002

[R1-acl-basic-2002] rule 0 permit source 1.1.1.1 0

[R1] acl number 2003

[R1-acl-basic-2003] rule 0 permit source 1.1.1.2 0

[R1]route-policy for20 permit node 10

[R1-route-policy]if-match acl 2002

[R1-route-policy]apply community 200:1 //满足 ACL 2002，赋予团体属性为 200:1
[R1]route-policy for20 permit node 20
[R1-route-policy]if-match acl 2003
[R1-route-policy]apply community 300:1 //满足 ACL 2003,，赋予团体属性为 300:1

[R1]route-policy for30 permit node 10
[R1-route-policy]if-match acl 2002
[R1-route-policy]apply community 200:1 //满足 ACL 2002，赋予团体属性为 200:1
[R1]route-policy for30 permit node 20
[R1-route-policy]if-match acl 2003
[R1-route-policy]apply community 300:1 //满足 ACL 2003,，赋予团体属性为 300:1

[R1-bgp]peer 12.1.1.2 advertise-community
[R1-bgp]peer 13.1.1.2 advertise-community
[R1-bgp]peer 12.1.1.2 route-policy for20 export
[R1-bgp]peer 13.1.1.2 route-policy for30 export

[R2]ip community-list 1 permit 200:1
[R2]ip community-list 2 permit 300:1

[R3] ip community-list 1 permit 200:1
[R3] ip community-list 2 permit 300:1

[R2]route-policy for2 permit node 10
[R2-route-policy]if-match community 1
[R2-route-policy]apply local-preference 300
[R2]route-policy for2 permit node 20
[R2-route-policy]if-match community 2
[R2-route-policy]apply local-preference 200
[R2]bgp 200
[R2-bgp]peer 12.1.1.1 route-policy for2 import

[R3]route-policy for3 permit node 10
[R3-route-policy]if-match community 1
[R3-route-policy]apply local-preference 200
R3]route-policy for3 permit node 20
[R3-route-policy]if-match community 2
[R3-route-policy]apply local-preference 300
[R3]bgp 200
[R3-bgp]peer 13.1.1.1 route-policy for3 impor

<R4>dis bgp routing-table
Total Number of Routes: 4
BGP Local router ID is 4.4.4.4
Status codes: * - valid, > - best, d - damped,
h - history, i - internal, s - suppressed, S - Stale
Origin : i - IGP, e - EGP, ? - incomplete

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
*>i 1.1.1.1/32	24.1.1.1	0	300	0	100i
* i	34.1.1.1	0	200	0	100i
*>i 1.1.1.2/32	34.1.1.1	0	300	0	100i
* i	24.1.1.1	0	200	0	100i

四、附录 **BGP** 选路规则

- 首先丢弃下一跳（**NEXT_HOP**）不可达的路由；
- 优选 **Preferred-value** 值最大的路由；
- 优选本地优先级（**LOCAL_PREF**）最高的路由；
- 优选聚合路由；
- 优选 **AS** 路径（**AS_PATH**）最短的路由；
- 依次选择 **ORIGIN** 属性为 **IGP**、**EGP**、**Incomplete** 的路由；
- 优选 **MED** 值最低的路由；
- 依次选择从 **EBGP**、联盟、**IBGP** 学来的路由；
- 优选下一跳度量值最低的路由；
- 优选 **CLUSTER_LIST** 长度最短的路由；
- 优选 **ORIGINATOR_ID** 最小的路由；
- 优选 **Router ID** 最小的路由器发布的路由。
- 优选地址最小的对等体发布的路由。