

MMIX MMNOG
Forum 2023



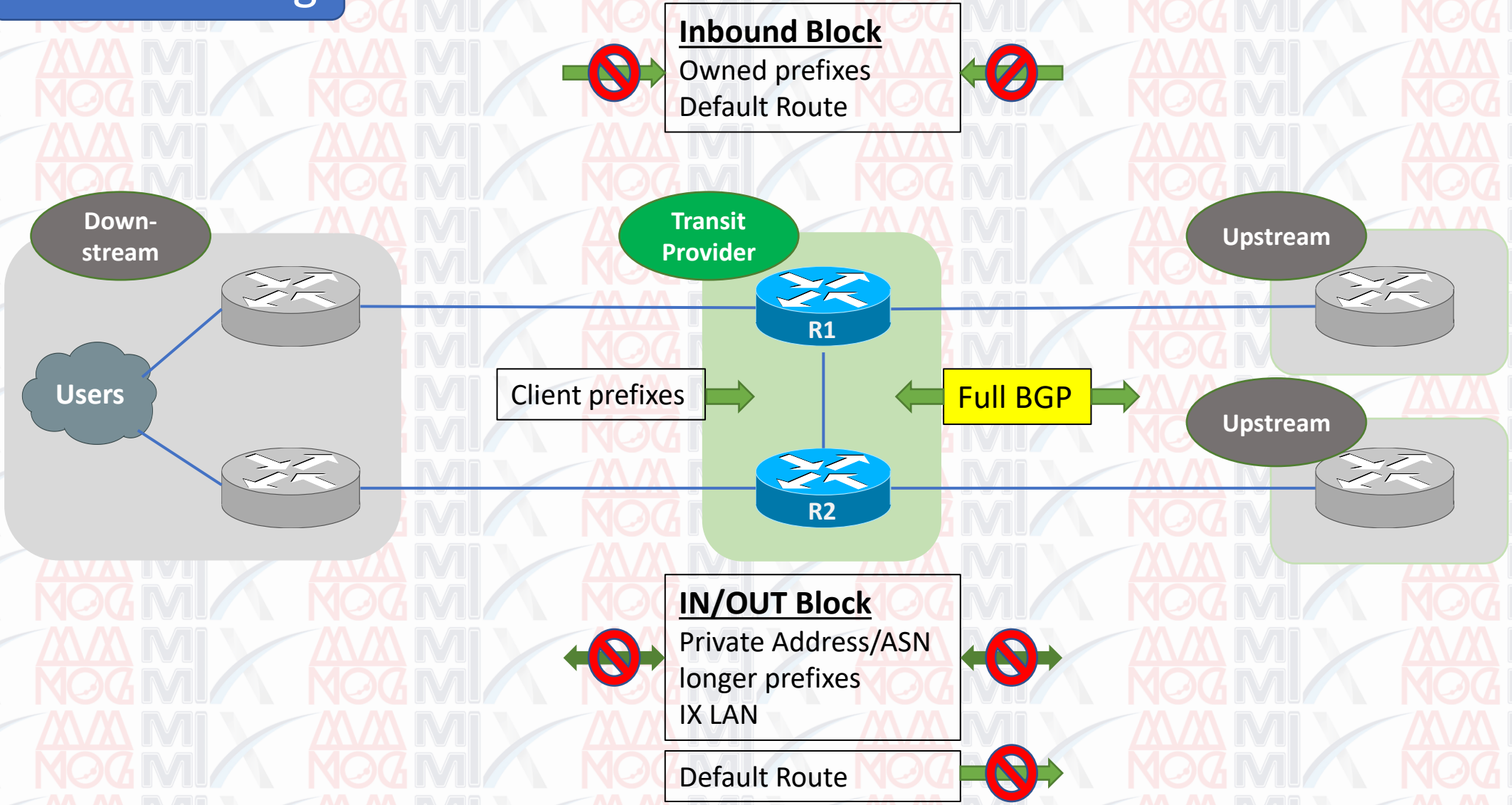
Thein Myint Khine
CCIE#41045
Update: 4 January 2023

ISP Core Networks

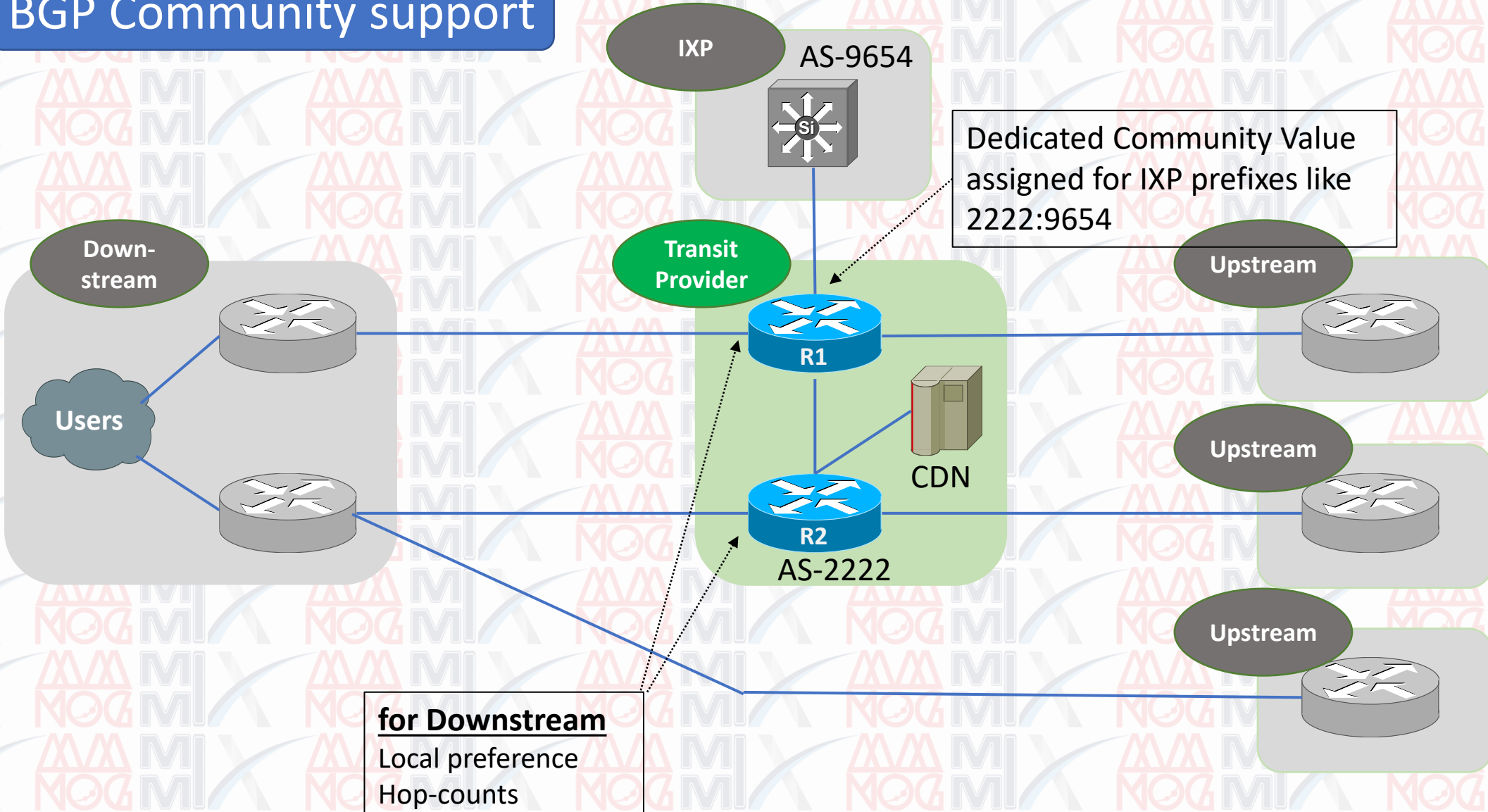
Important Facts you should know

- 1. BGP Setting for Transit Provider**
2. BGP Setting for ISP's Transit
3. Unexpected Problems
4. Optimized Design
5. RADB Update
6. Attack Mitigation

Prefix Filtering



BGP Community support



Dedicated Community Value assigned for IXP prefixes like 2222:9654

for Downstream
Local preference
Hop-counts

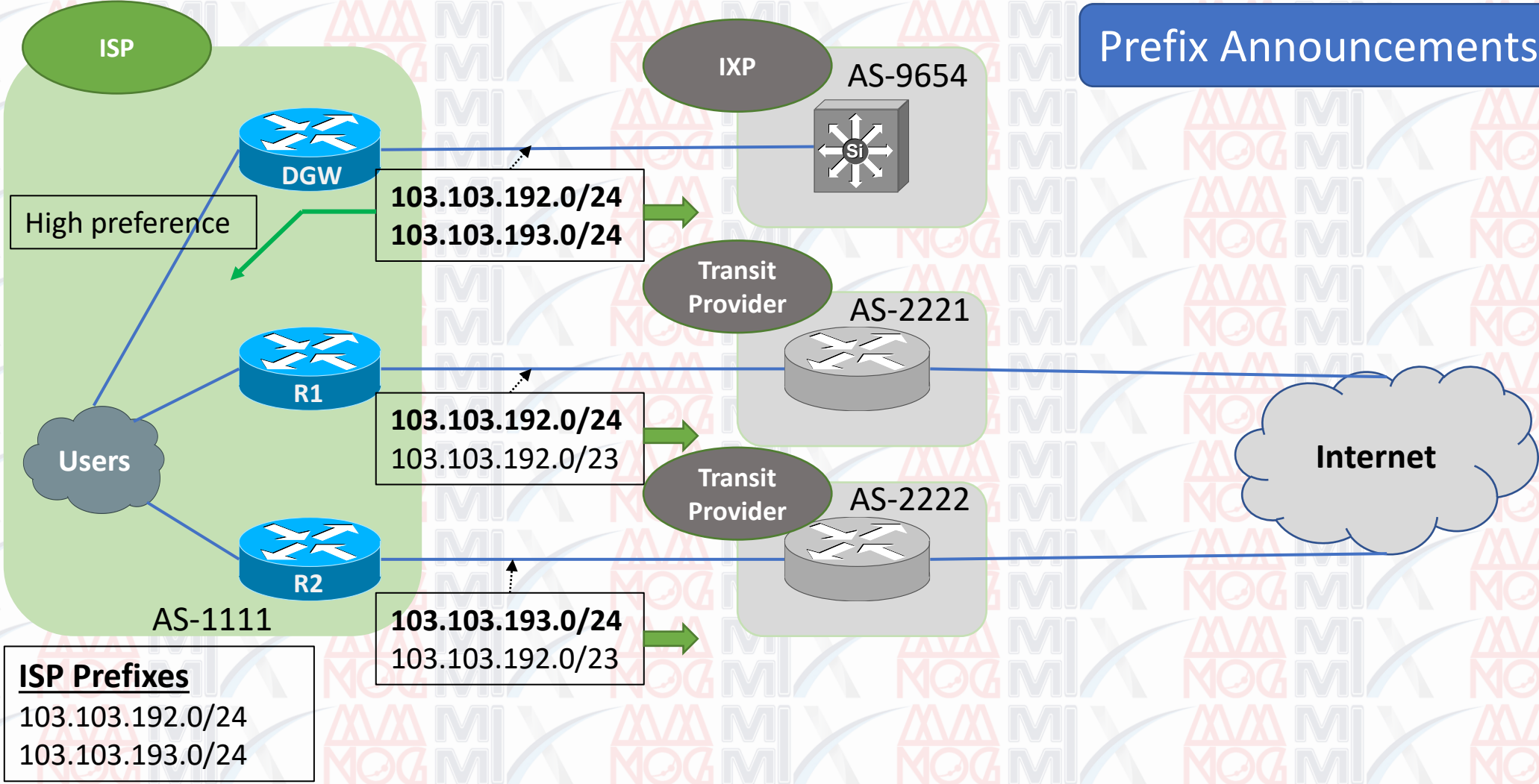
BGP Communities for downstream

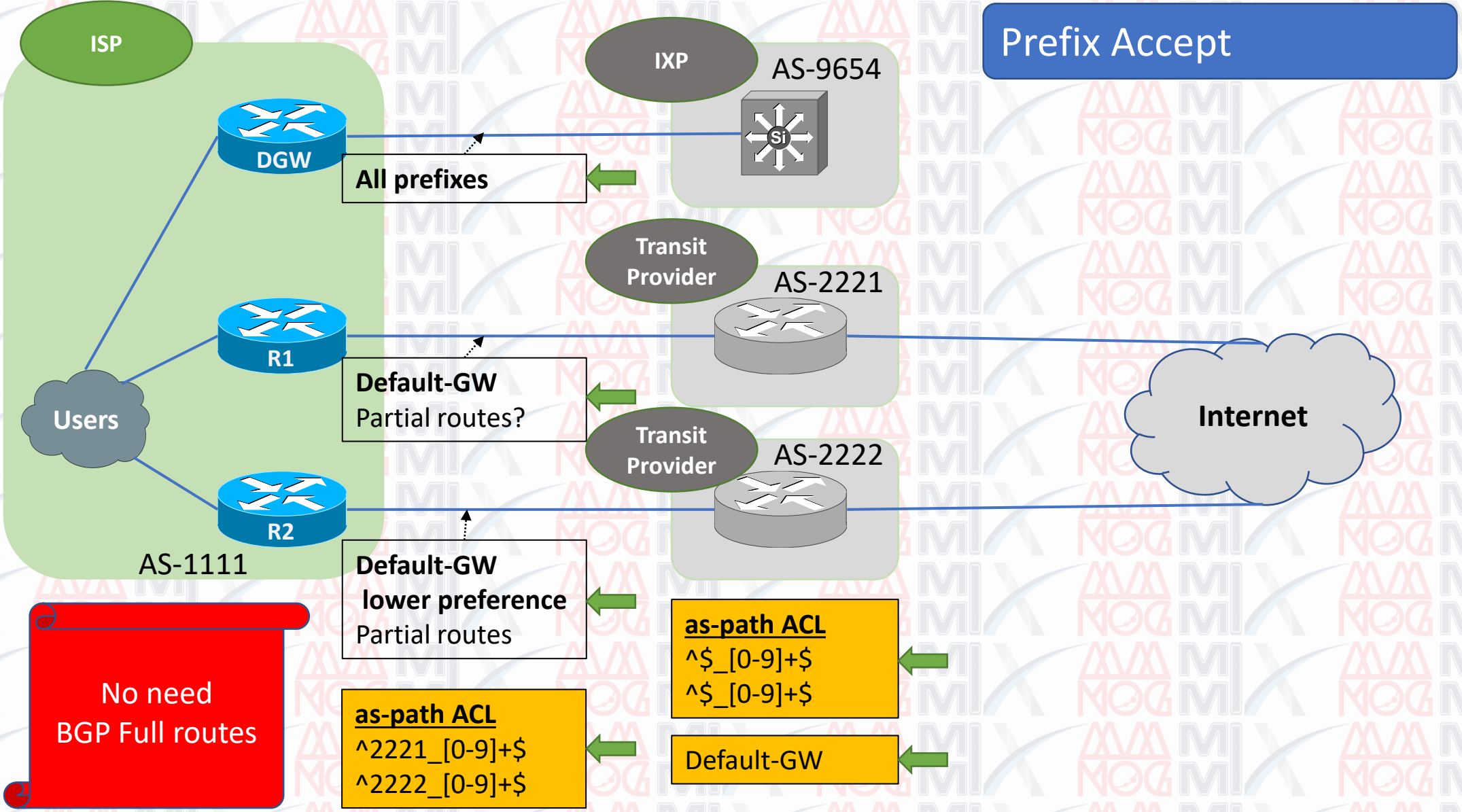
Example

2222:9654	Prefixes of AS9654 IXP (MMIX) <ul style="list-style-type: none">• for easily advertisement to downstream.• for easily prefix adjustment by downstream.
2222:110	Prefer outbound link for multi-link downstream.
2222:80	Backup outbound link for multi-link downstream.
9654:9654	Advertise to IXP (MMIX)
0:11344	Do not advertise to GGC (Google CDN)
1:11344	1 more hop to GGC
2:11344	2 more hop to GGC
0:2222	Do not advertise to upstream (same as no-export)

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Prefix Announcements





ISP

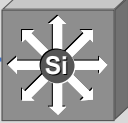
DGW

All prefixes

IXP

AS-9654

Prefix Accept



R1

Default-GW
Partial routes?

Transit Provider

AS-2221

Internet

R2

Default-GW
lower preference
Partial routes

Transit Provider

AS-2222

AS-1111

No need
BGP Full routes

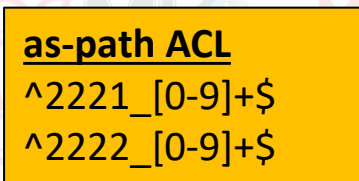
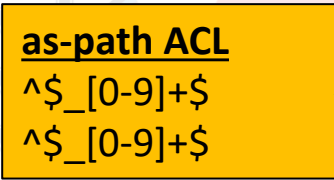
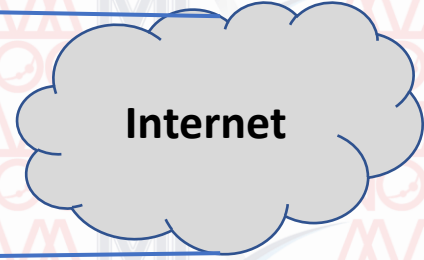
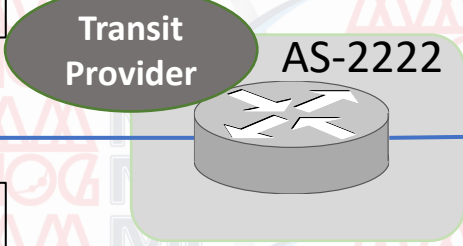
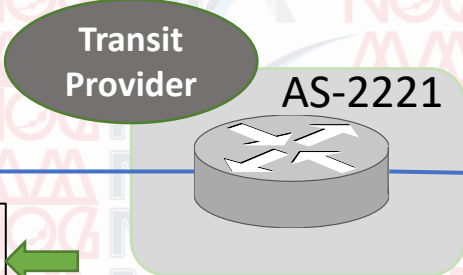
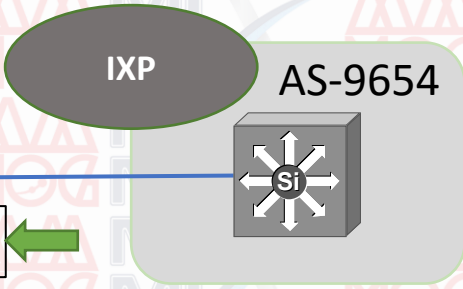
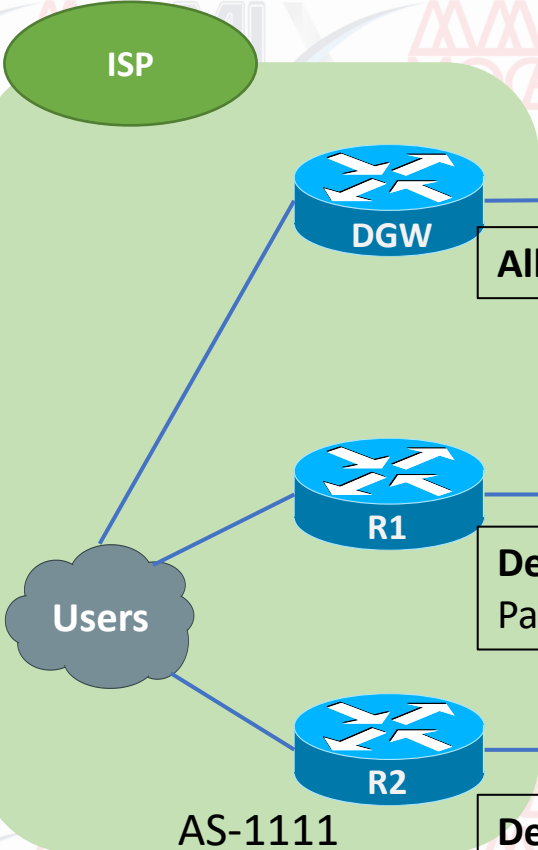
as-path ACL

$^{\wedge}\$_{[0-9]^{\wedge}}\$$
 $^{\wedge}\$_{[0-9]^{\wedge}}\$$

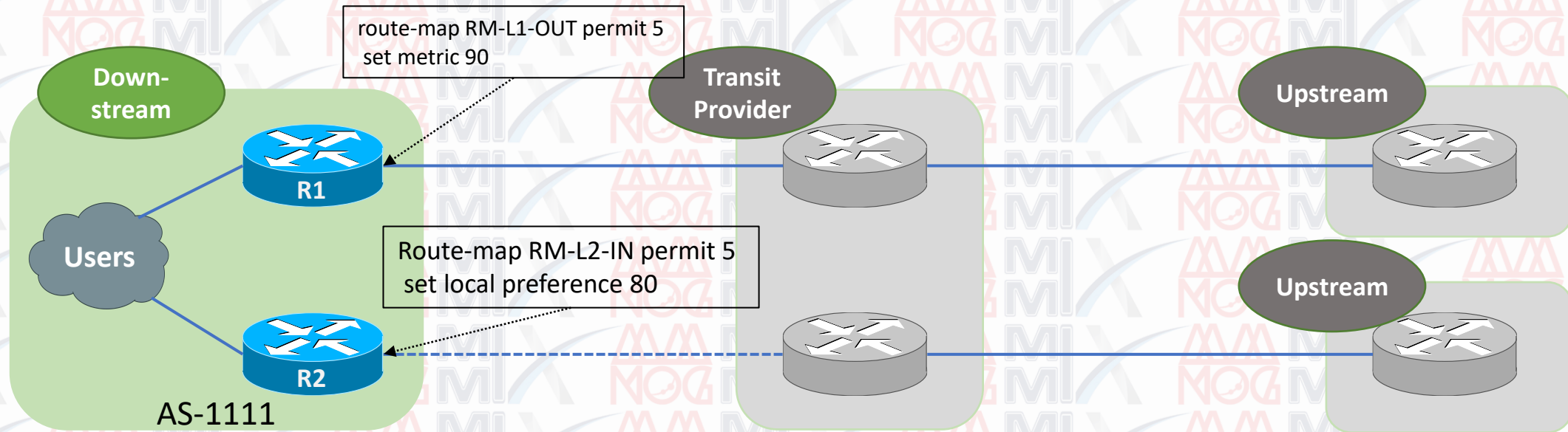
Default-GW

as-path ACL

$^{\wedge}2221_{[0-9]^{\wedge}}\$$
 $^{\wedge}2222_{[0-9]^{\wedge}}\$$



Primary/Backup links

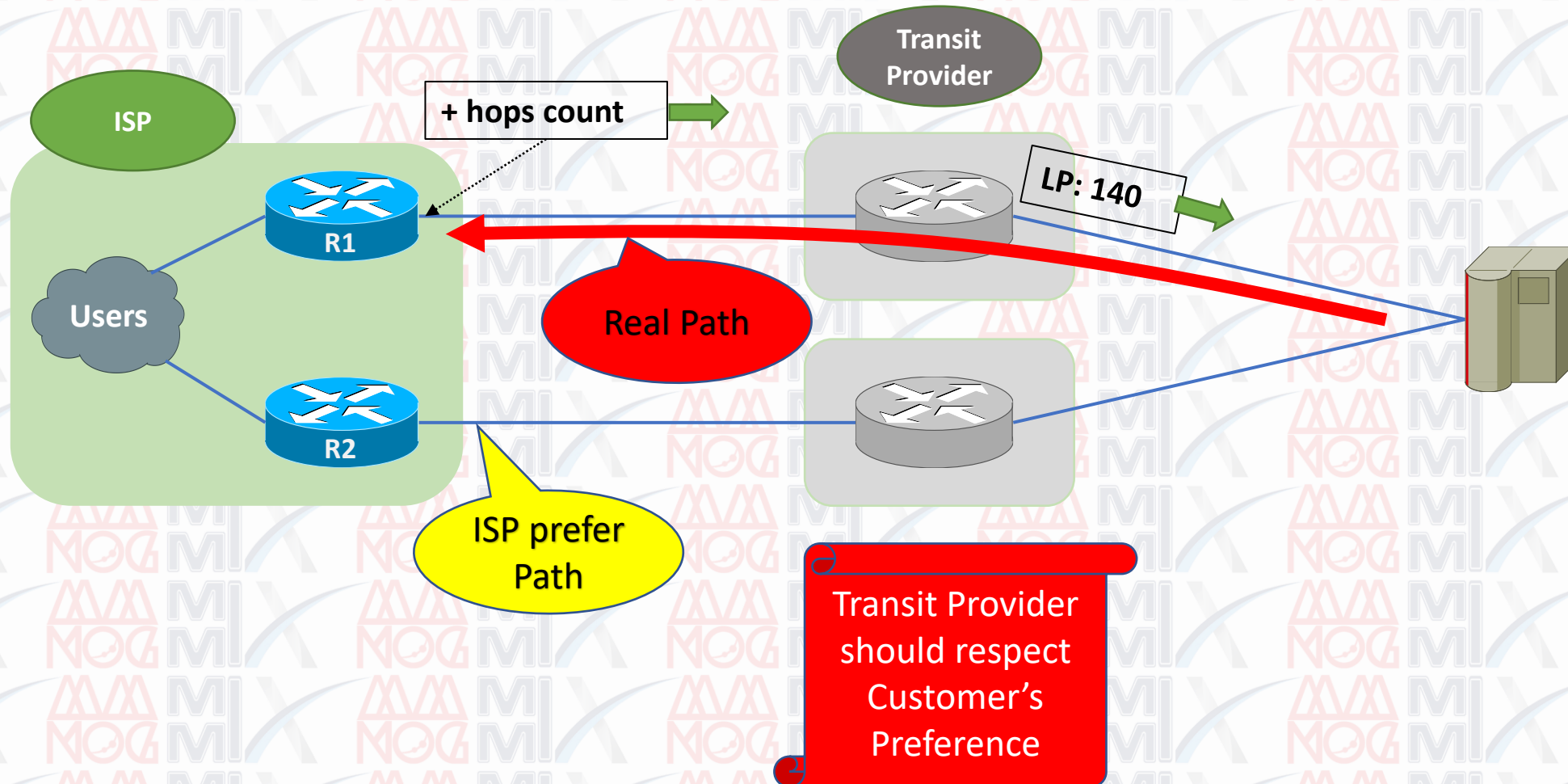


Inbound	outbound
Prepend	Prepend
MED	Local preference

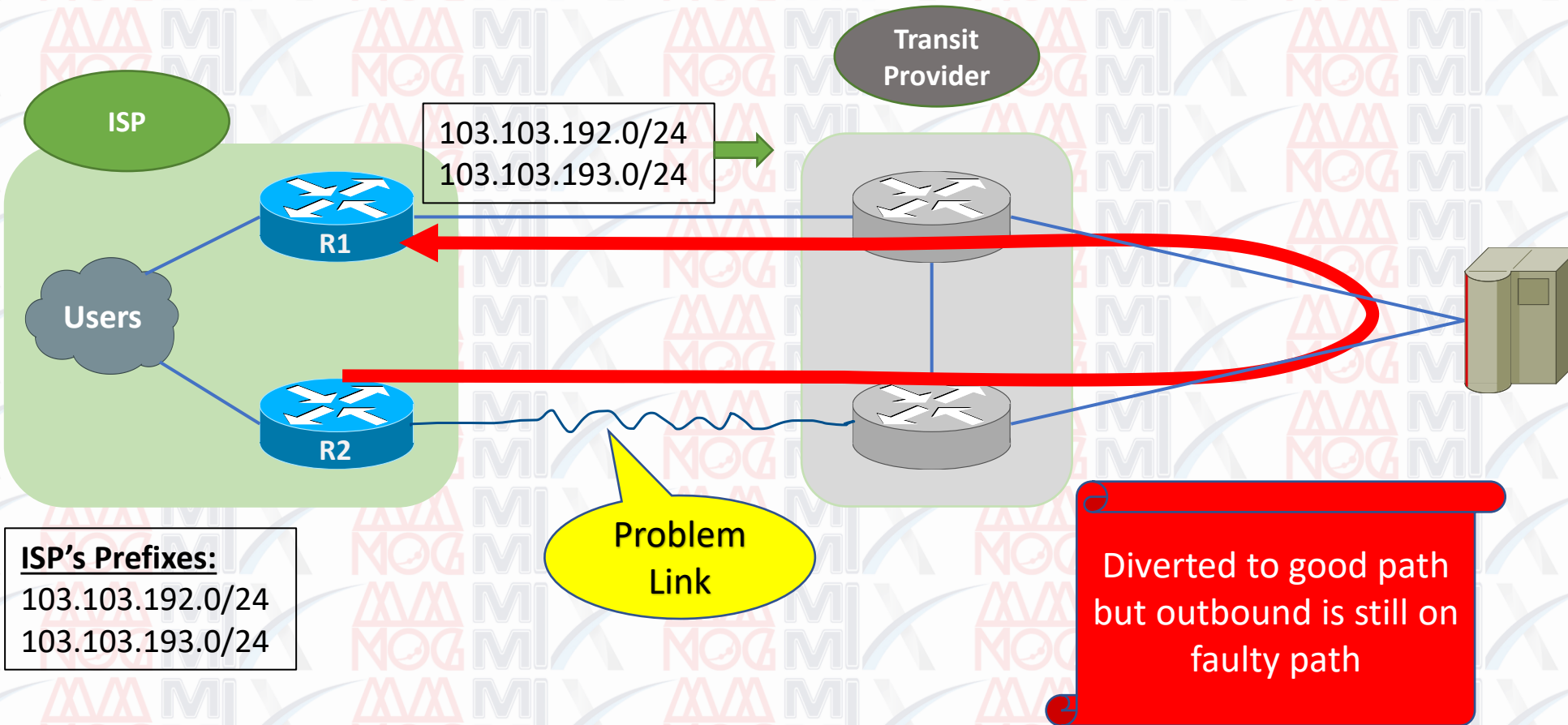
Inbound	outbound
Passive	Passive
	BGP Community

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Local Preference Problem



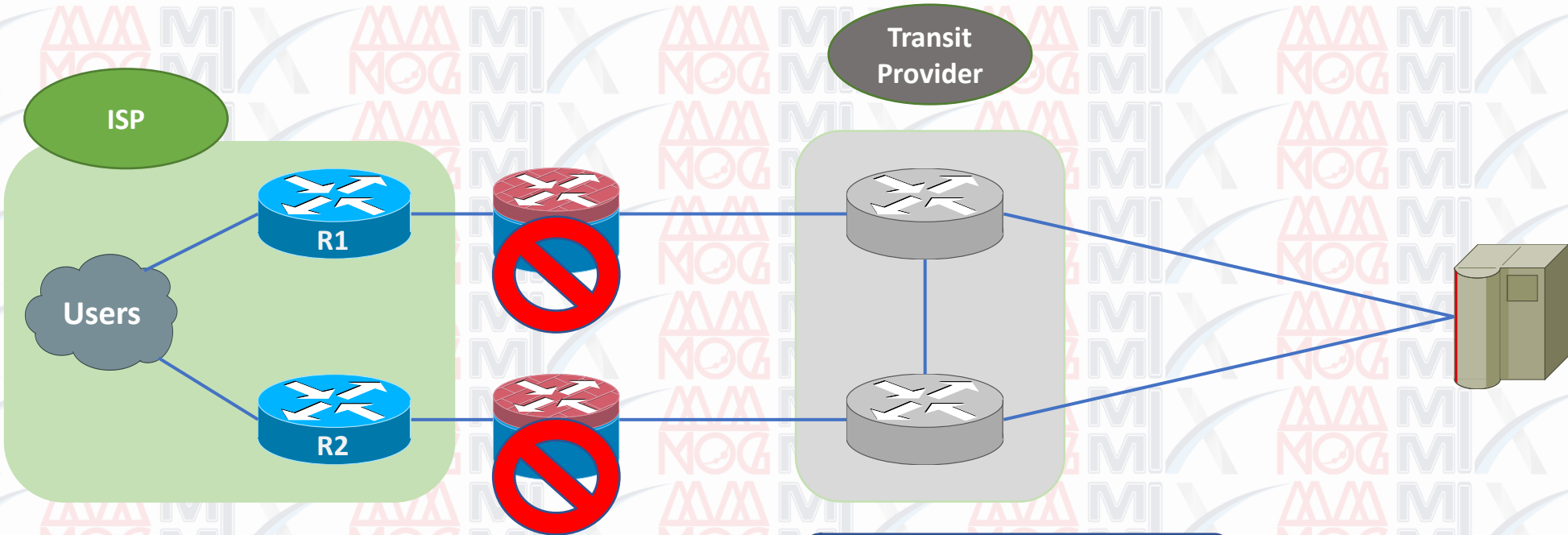
Faulty or congested link problem



Diverted to good path but outbound is still on faulty path

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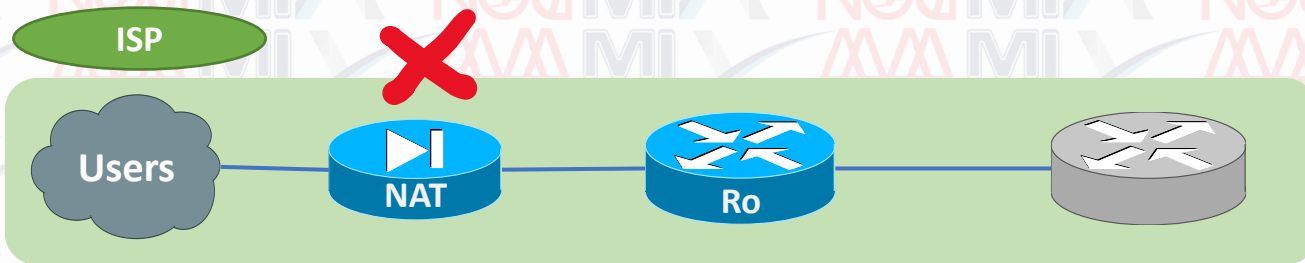
Faulty or congested link problem



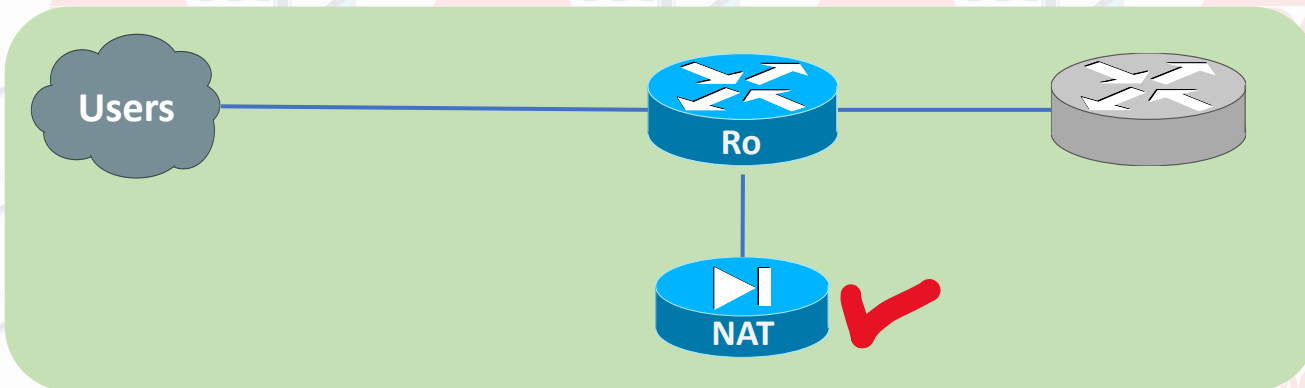
Don't place FW in front of GW router

Asymmetric is normal for BGP. FW doesn't allow asymmetric path.

Appliance Positioning

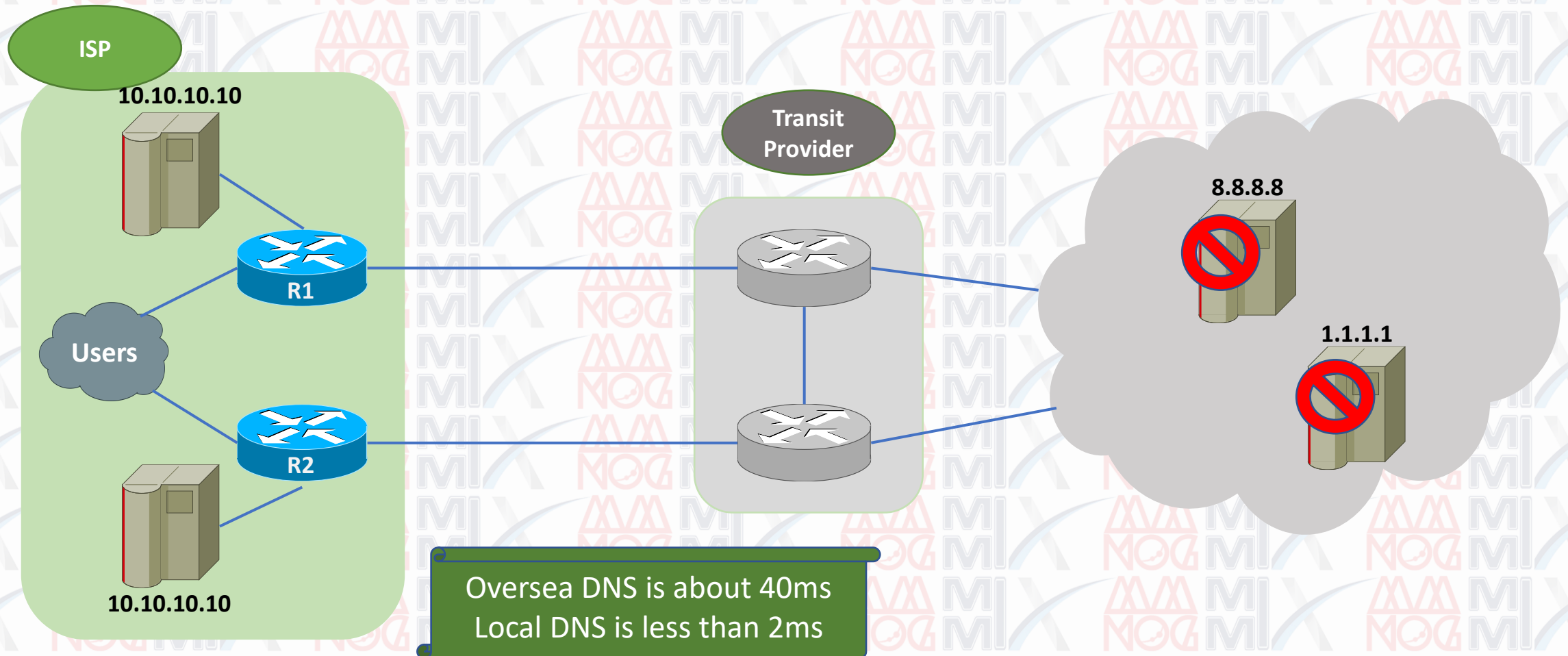


Dedicated NAT/Firewall/BRAS
- Don't place in line but beside.



To divert traffic
- Use Virtual Router
- Instead of PBR

Use Local DNS Resolvers



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RADB

RADB

Anyone can update records.
Multiple wrong records.

Recommend

Let prefix owner update their
owned records

```
route:      103.103.194.0/24
descr:      Proxy-registered route object
origin:      AS9654
notify:      matthew.chan@hgc.com.hk
mnt-by:      MAINT-HGC-INTL
changed:     matthew.chan@hgc.com.hk 20220307
source:      RADB
```

MMIX

```
route:      103.103.194.0/24
descr:      CMI (Customer Route)
origin:      AS132167
mnt-by:      MAINT-AS58453
changed:     qas_support@cmi.chinamobile.com 20200923
source:      RADB
```

Ooredoo

```
route:      103.103.194.0/24
descr:      CMI (Customer Route)
origin:      AS9304
mnt-by:      MAINT-AS58453
changed:     qas_support@cmi.chinamobile.com 20200916
source:      RADB
```

HGC

```
route:      103.103.194.0/24
descr:      MMIX Net 1
origin:      AS137955
mnt-by:      MAIBT-MM-MMIX
last-modified: 2022-12-21T22:32:27Z
source:      APNIC
```

MMIX

Apnic => RADB

Create record at Apnic Portal.

Object Type

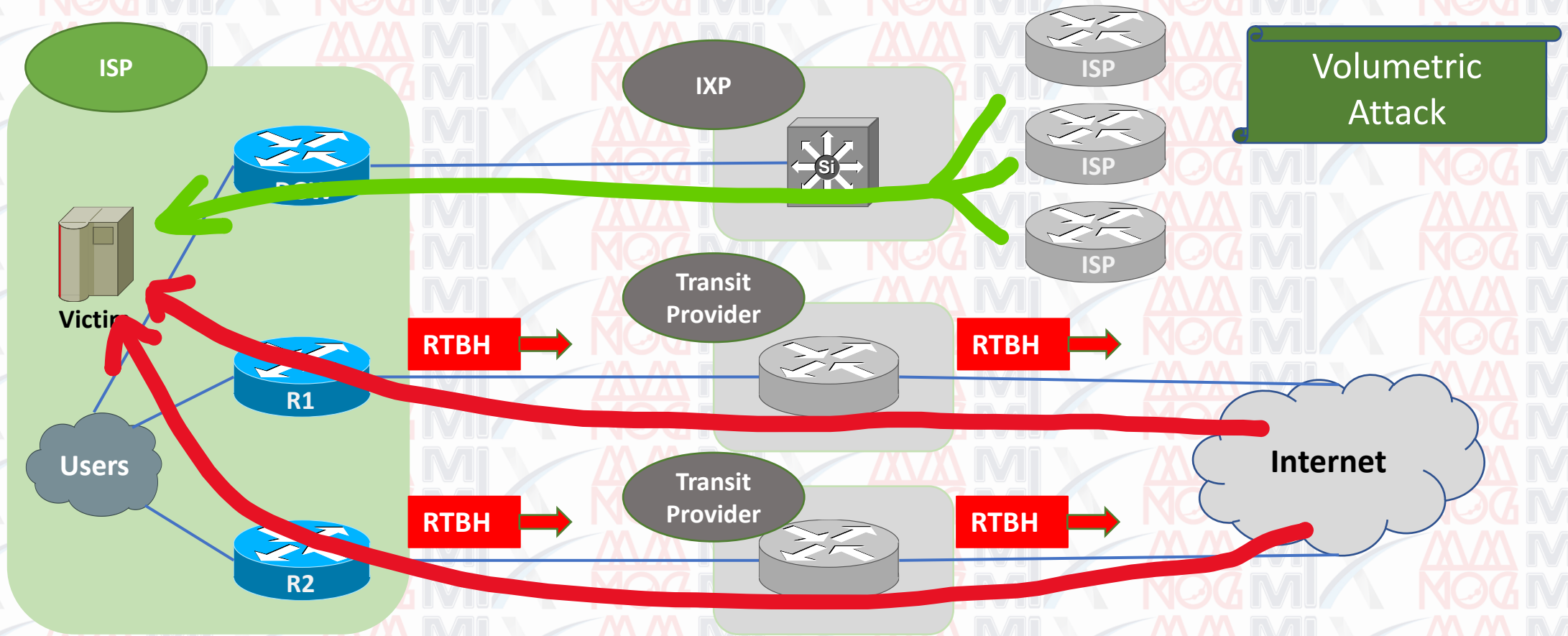
V4 prefix - 'route'

V6 prefix - 'route6'

```
route:          103.103.194.0/24
descr:         MMIX Net 1
origin:        AS137955
mnt-by:        MAIBT-MM-MMIX
last-modified: 2022-12-21T22:32:27Z
source:        APNIC
```

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Attack mitigation



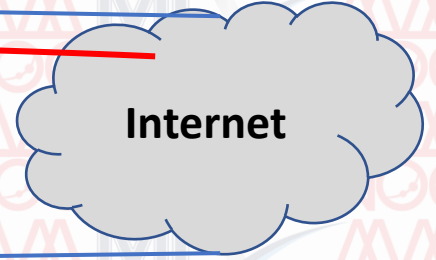
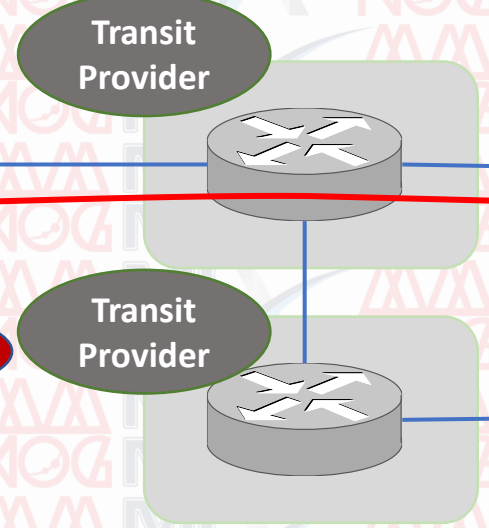
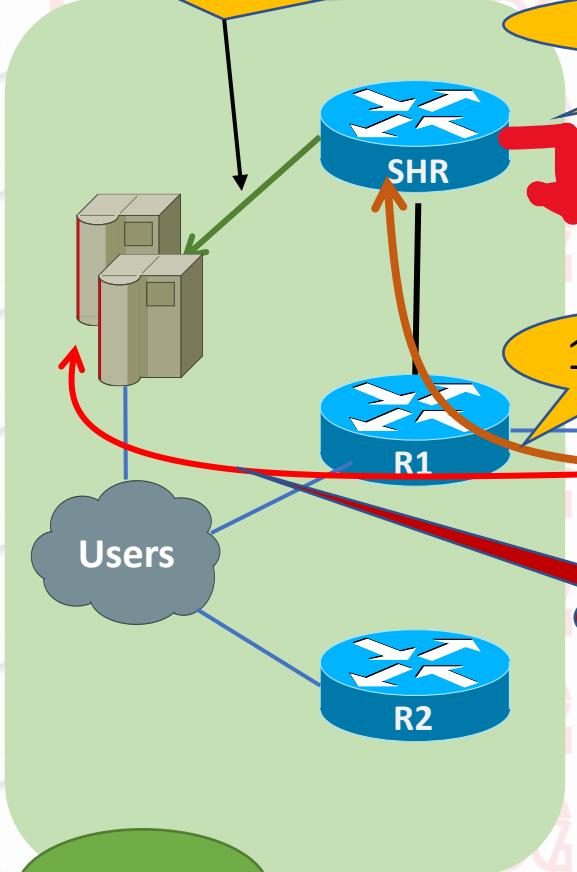
DDOS Attack – protect with Remote Trigger Block Holding (RTBH)

3. Forward Clean Traffic

2. Drop or store for analysis

1. Divert

Attack!



DOS Attack – Use Sinkhole for clean pipe

Thank you!

QnA

theinmyintkhine@mm-ix.net