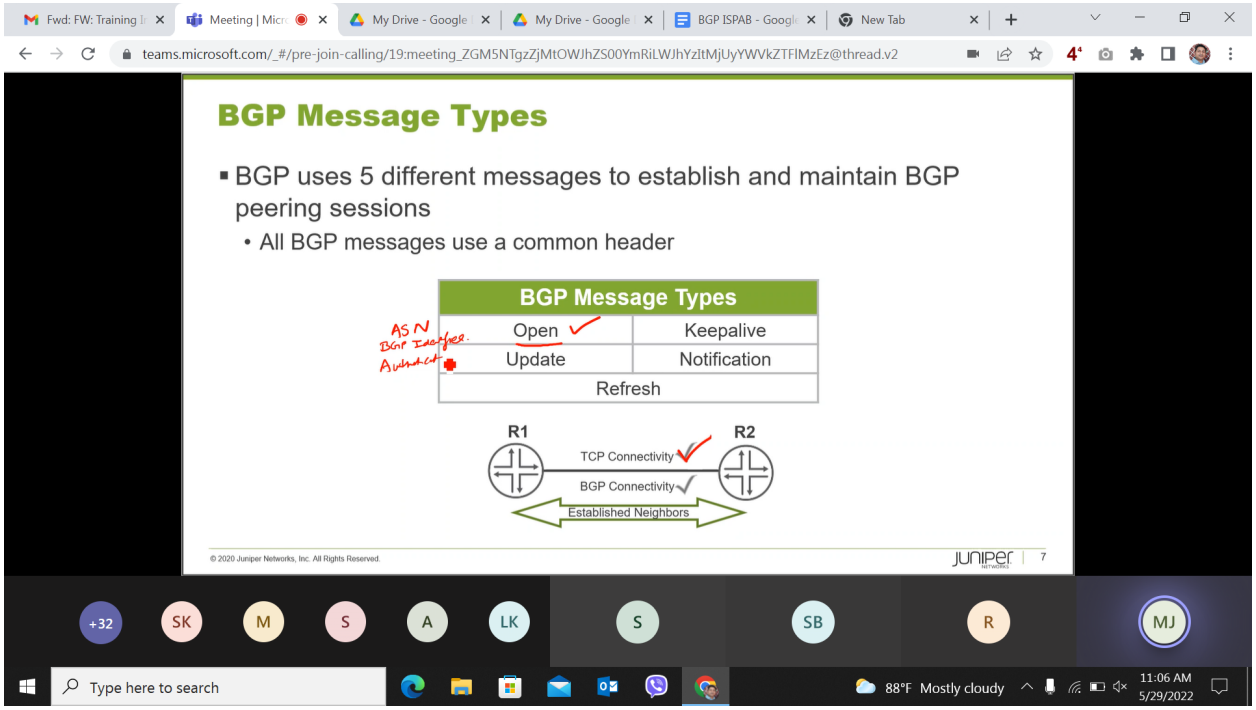
BGP Message Types
BGP uses 5 different messages to establish and maintain BGP peering sessions
All BGP messages use a common header
BGP Message Types
Open
Keepalive
Update
Notification
Refresh
ASN
BGP Interface
Authentication
R1
R2
TCP Connectivity
BGP Connectivity
Established Neighbors
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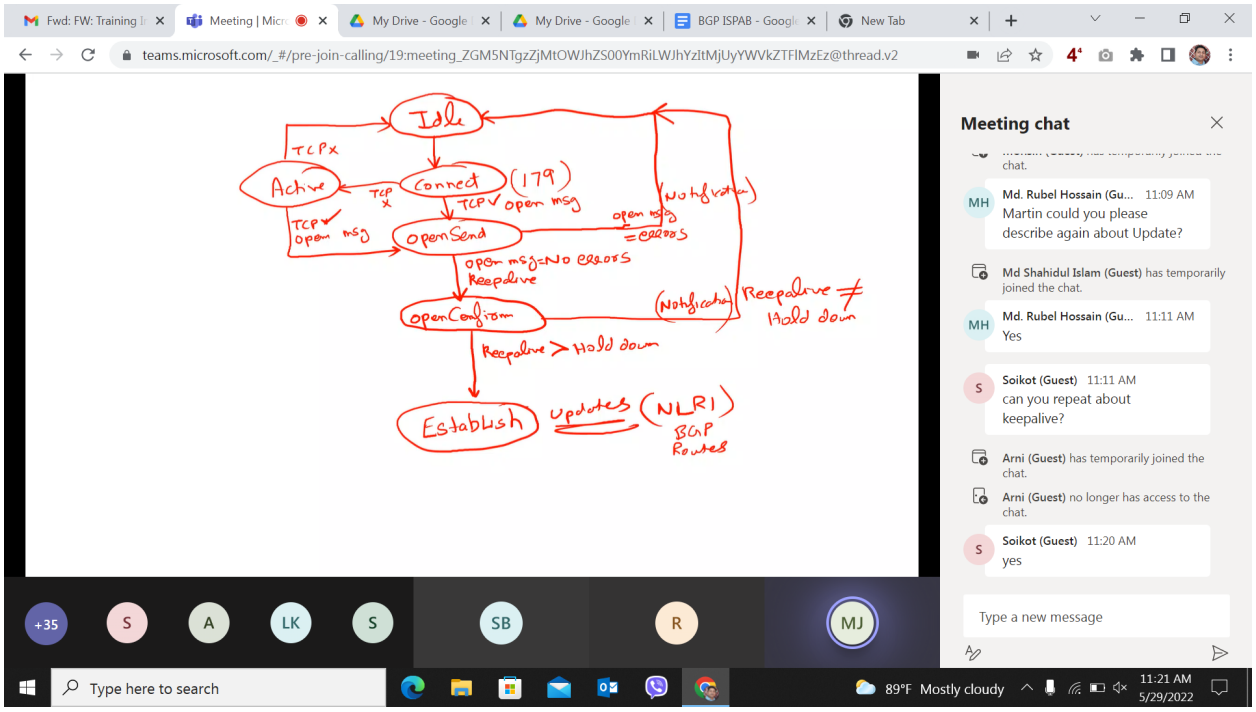
juniper
7


Idle
TCPx
Active
Connect
(179)
TCP open msg
OpenSend
open msg=No errors
Keepalive
OpenConfirm
Keepalive > Hold down
Keepalive ≠ Hold down
Establish
Updates
(NLRI)
BGP Routes
Meeting chat
Md. Rubel Hossain (Gu... 11:09 AM
Martin could you please describe again about Update?
Md Shahidul Islam (Guest) has temporarily joined the chat.
Md. Rubel Hossain (Gu... 11:11 AM
Yes
Soikot (Guest) 11:11 AM
can you repeat about keepalive?
Arni (Guest) has temporarily joined the chat.
Arni (Guest) no longer has access to the chat.
Soikot (Guest) 11:20 AM
yes
Type a new message

BGP Update Messages

- BGP update messages include path advertisements and their associated attributes:
  - NLRI
  - Origin
  - AS Path
  - BGP next-hop
  - Additional attributes include: Local preference, MED, and communities
  - Can also list withdrawn routes that are no longer reachable

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Meeting chat

Md. Rubel Hossain (Gu... 11:09 AM
Martin could you please describe again about Update?

Md Shahidul Islam (Guest) has temporarily joined the chat.

Md. Rubel Hossain (Gu... 11:11 AM
Yes

Soikot (Guest) 11:11 AM
can you repeat about keepalive?

Arni (Guest) has temporarily joined the chat.

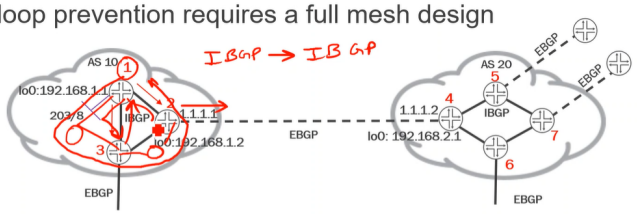
Arni (Guest) no longer has access to the chat.

Soikot (Guest) 11:20 AM
yes

Type a new message

Default BGP Advertisement Rules

- EBGP/IBGP routers advertise EBGP learned routes to EBGP and IBGP Peers
- EBGP routers advertise IBGP routes to EBGP peers
- EBGP/IBGP routers do not advertise IBGP learned routes to IBGP peers
- IBGP loop prevention requires a full mesh design



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Meeting chat

Arni (Guest) has temporarily joined the chat.

Arni (Guest) no longer has access to the chat.

Soikot (Guest) 11:20 AM
yes

Arni (Guest) has temporarily joined the chat.

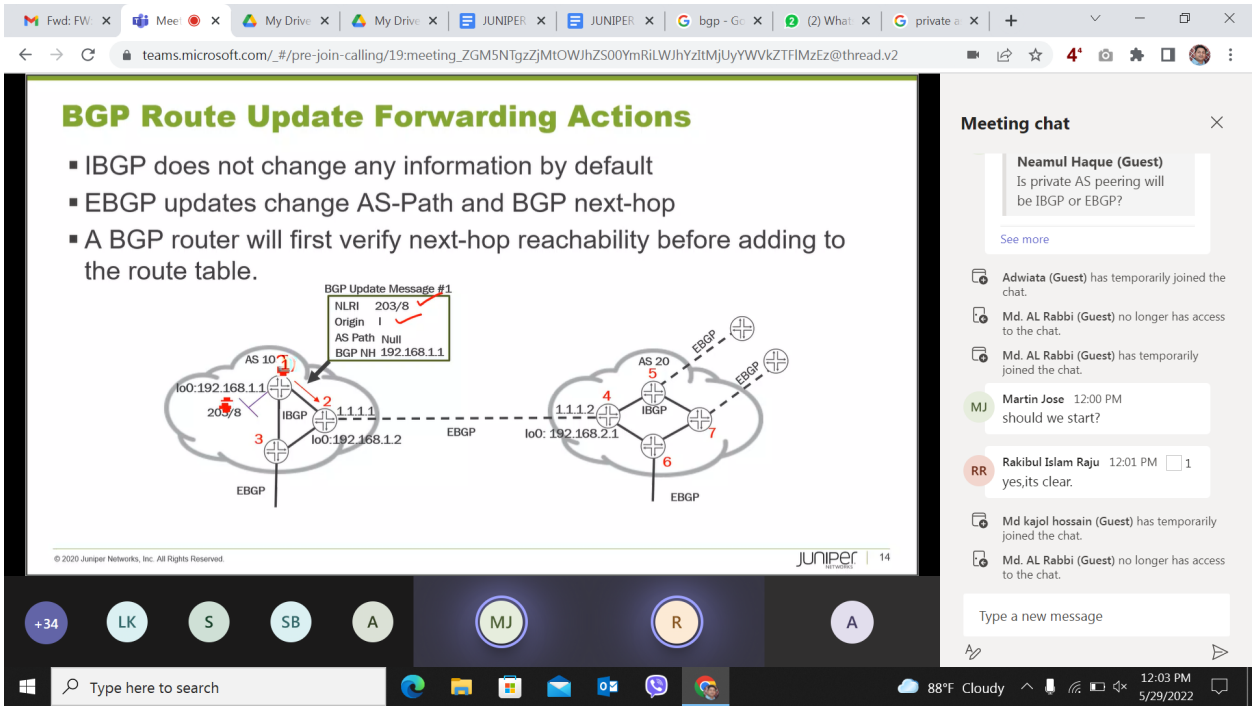
Arni (Guest) no longer has access to the chat.

Arni (Guest) has temporarily joined the chat.

M.Roman (Guest) 11:29 AM
rout reflect is mendatory in ibgp?

Rakibul Islam Raju 11:30 AM
give a brief about private as and public as....

Type a new message


teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
BGP Route Update Forwarding Actions
IBGP does not change any information by default
EBGP updates change AS-Path and BGP next-hop
A BGP router will first verify next-hop reachability before adding to the route table.
BGP Update Message #1
NLRI 203/8
Origin I
AS Path Null
BGP NH 192.168.1.1
AS 10
lo0:192.168.1.1
203/8
IBGP
1.1.1.1
lo0:192.168.1.2
EBGP
AS 20
1.1.1.2
lo0: 192.168.2.1
EBGP
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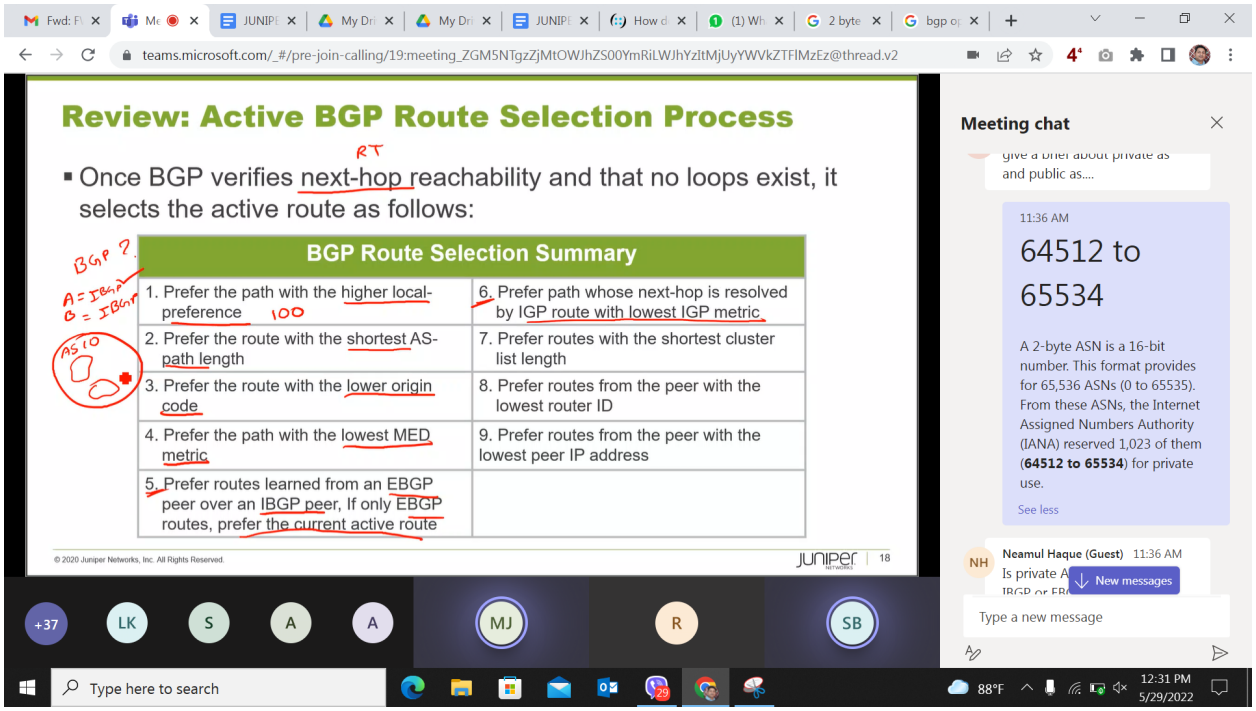
14
Meeting chat
Neamul Haque (Guest)
Is private AS peering will be IBGP or EBGP?
See more
Adwiata (Guest) has temporarily joined the chat.
Md. AL Rabbi (Guest) no longer has access to the chat.
Md. AL Rabbi (Guest) has temporarily joined the chat.
Martin Jose 12:00 PM
should we start?
Rakibul Islam Raju 12:01 PM
yes,its clear.
Md kajol hossain (Guest) has temporarily joined the chat.
Md. AL Rabbi (Guest) no longer has access to the chat.
Type a new message
Type here to search
88°F Cloudy
12:03 PM
5/29/2022


teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
Review: Active BGP Route Selection Process
RT
Once BGP verifies next-hop reachability and that no loops exist, it selects the active route as follows:
BGP ?
A = IBGP
B = IBGP
AS 10
BGP Route Selection Summary
1. Prefer the path with the higher local-preference 100
2. Prefer the route with the shortest AS-path length
3. Prefer the route with the lower origin code
4. Prefer the path with the lowest MED metric
5. Prefer routes learned from an EBGP peer over an IBGP peer, If only EBGP routes, prefer the current active route
6. Prefer path whose next-hop is resolved by IGP route with lowest IGP metric
7. Prefer routes with the shortest cluster list length
8. Prefer routes from the peer with the lowest router ID
9. Prefer routes from the peer with the lowest peer IP address
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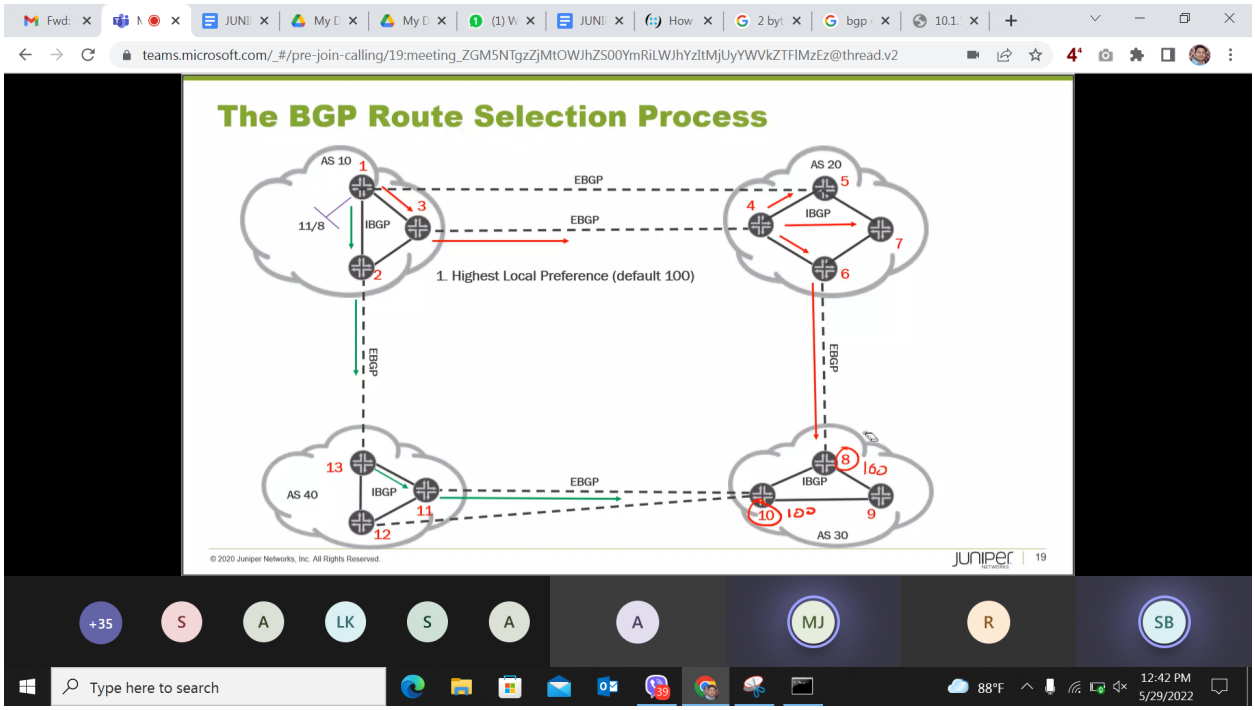
18
Meeting chat
and public as....
11:36 AM
64512 to 65534
A 2-byte ASN is a 16-bit number. This format provides for 65,536 ASNs (0 to 65535). From these ASNs, the Internet Assigned Numbers Authority (IANA) reserved 1,023 of them (64512 to 65534) for private use.
See less
Neamul Haque (Guest) 11:36 AM
New messages
Type a new message
Type here to search
88°F
12:31 PM
5/29/2022


The BGP Route Selection Process
AS 10
AS 20
AS 40
AS 30
11/8
IBGP
EBGP
1. Highest Local Preference (default 100)
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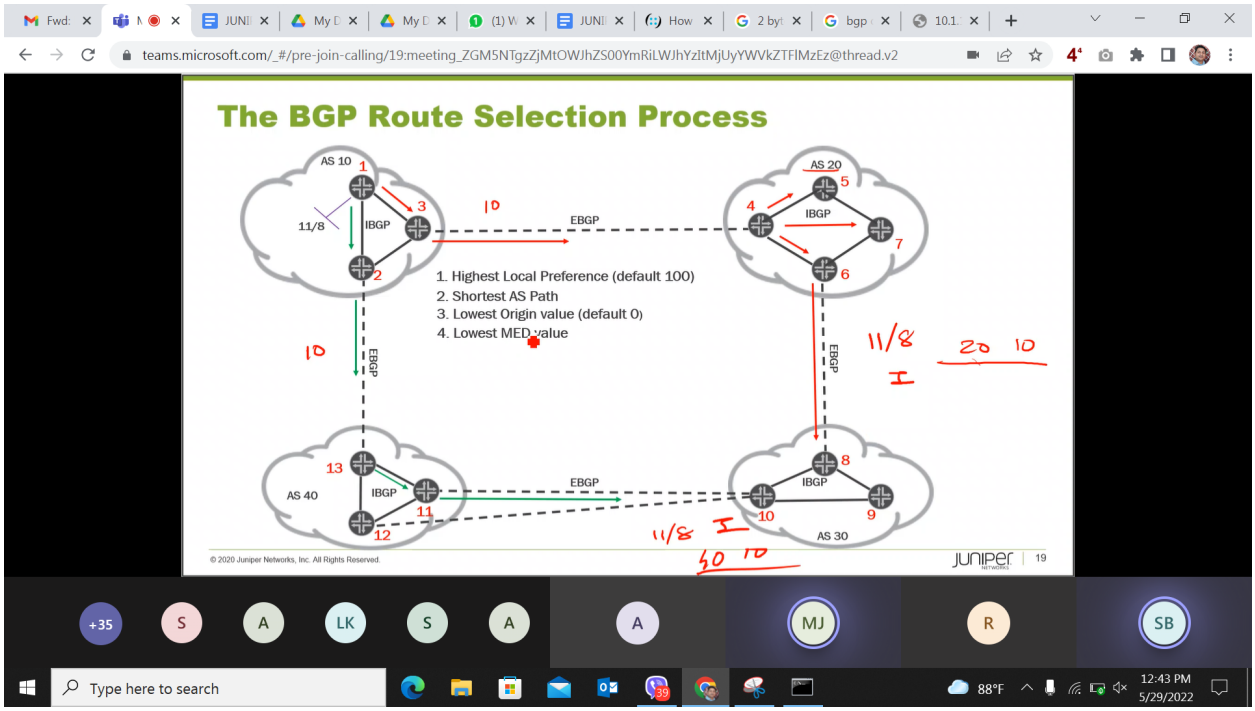
19
Type here to search
88°F
12:42 PM
5/29/2022


The BGP Route Selection Process
AS 10
AS 20
AS 40
AS 30
11/8
IBGP
EBGP
1. Highest Local Preference (default 100)
2. Shortest AS Path
3. Lowest Origin value (default 0)
4. Lowest MED value
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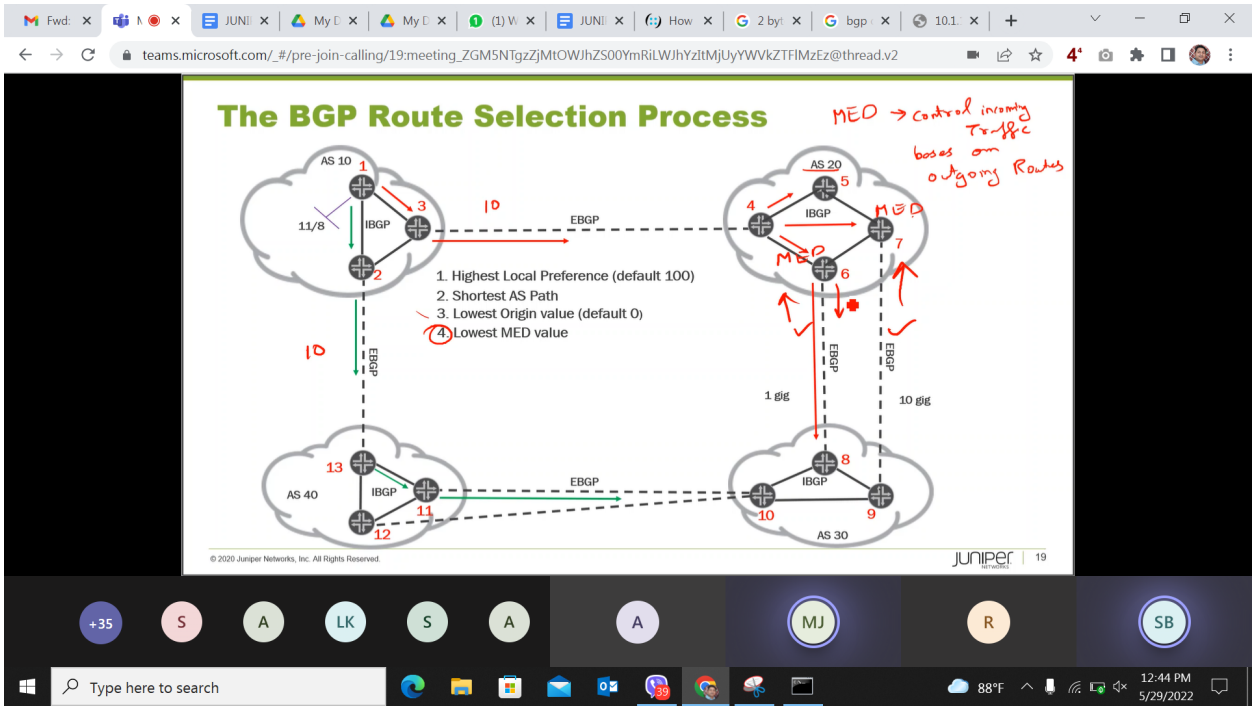
19
Type here to search
88°F
12:43 PM
5/29/2022


The BGP Route Selection Process
MED → control incoming Traffic bases on outgoing Routes
AS 10
AS 20
AS 40
AS 30
11/8
IBGP
EBGP
10
1. Highest Local Preference (default 100)
2. Shortest AS Path
3. Lowest Origin value (default 0)
4. Lowest MED value
1 gig
10 gig
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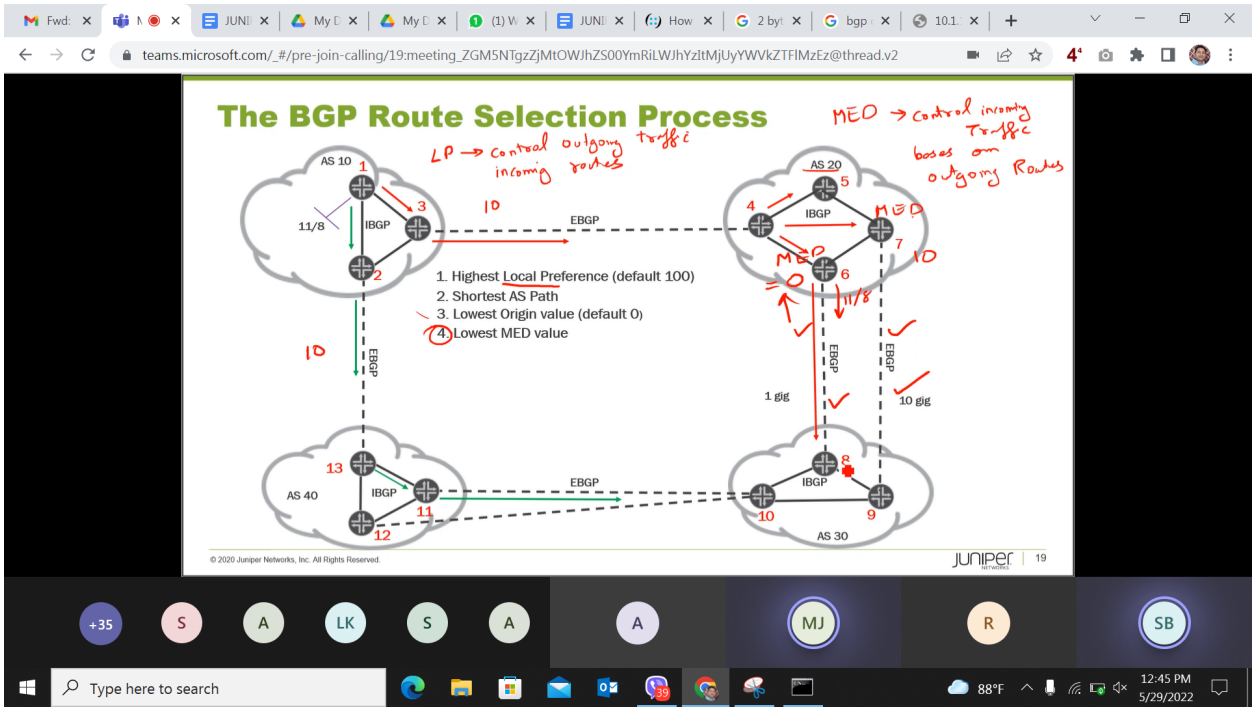
19


The BGP Route Selection Process
MED → control incoming Traffic bases on outgoing Routes
LP → control outgoing traffic
incoming routes
AS 10
AS 20
AS 40
AS 30
11/8
IBGP
EBGP
10
1. Highest Local Preference (default 100)
2. Shortest AS Path
3. Lowest Origin value (default 0)
4. Lowest MED value
1 gig
10 gig
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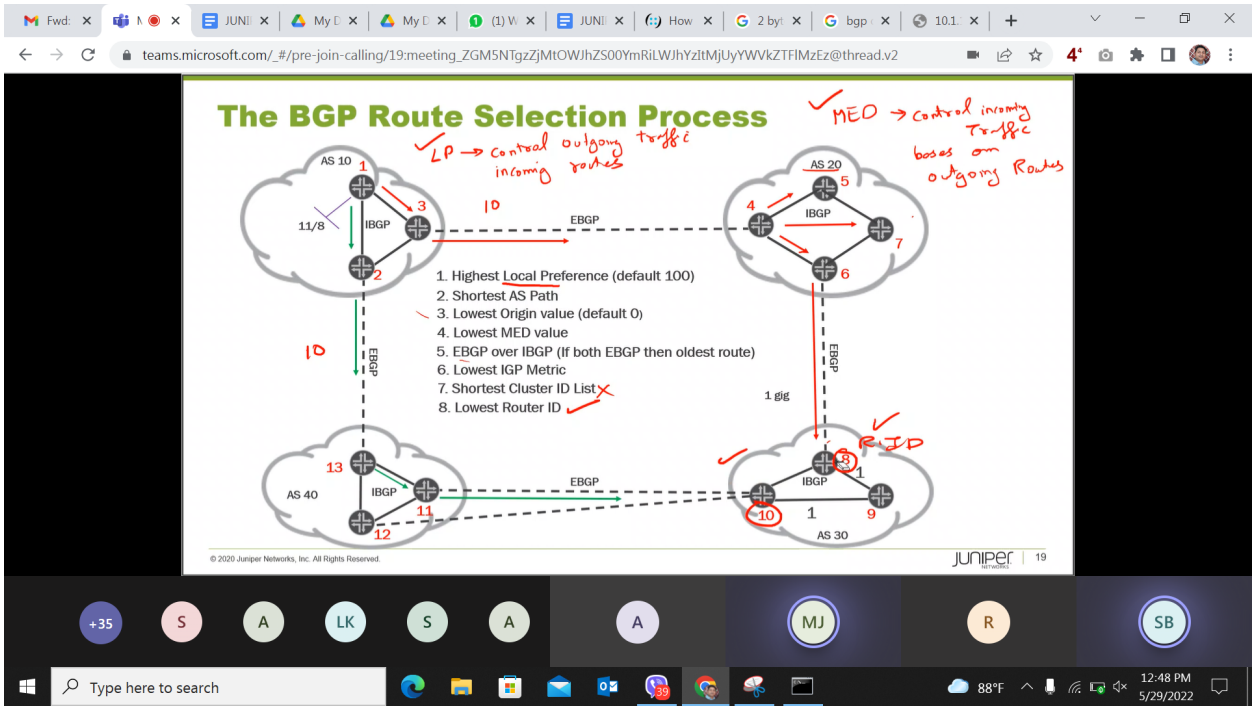
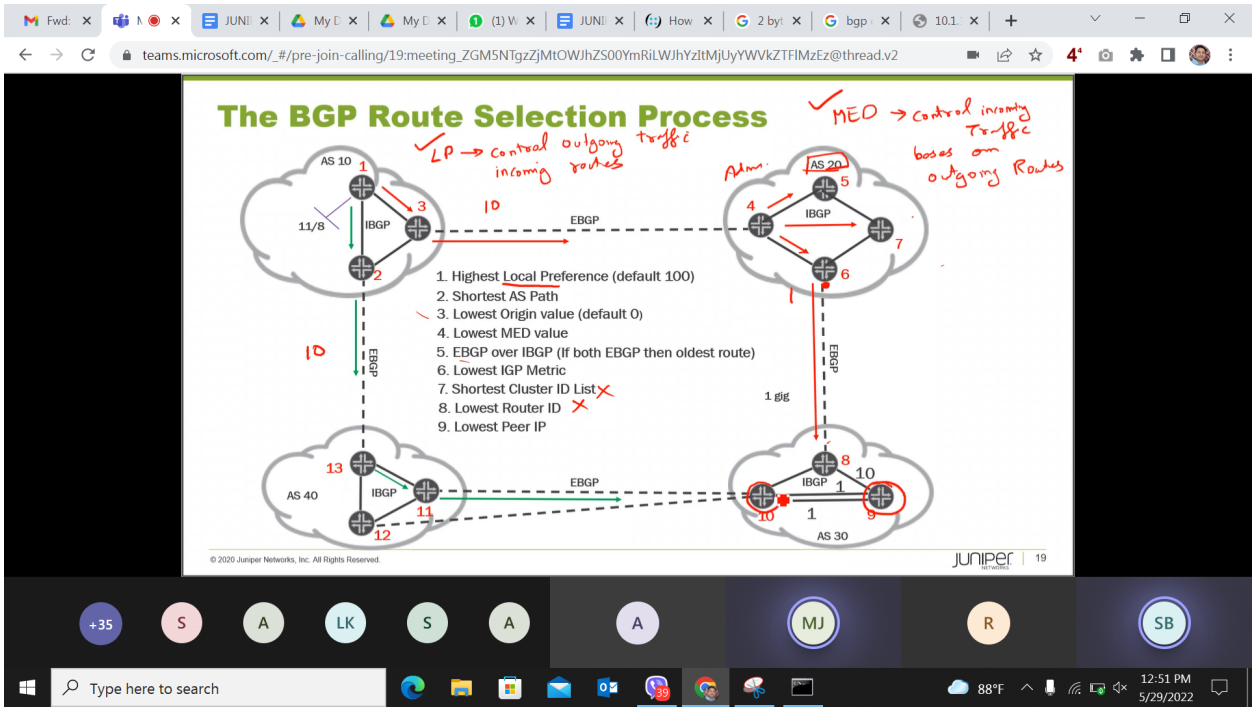
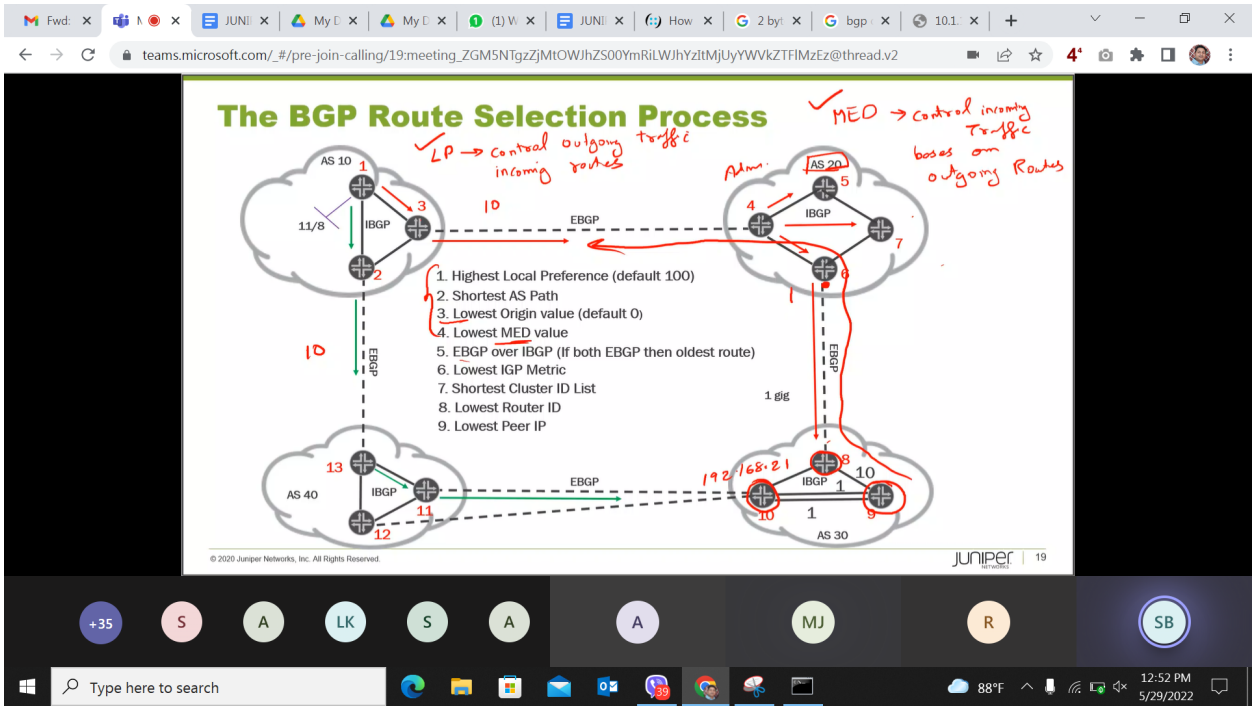
19



Router ID selection lower ip address




The BGP Route Selection Process
LP → control outgoing traffic
MED → control incoming Traffic
bases on outgoing Routes
AS 10
AS 20
AS 40
AS 30
11/8
IBGP
EBGP
10
1 gig
1. Highest Local Preference (default 100)
2. Shortest AS Path
3. Lowest Origin value (default 0)
4. Lowest MED value
5. EBGP over IBGP (If both EBGP then oldest route)
6. Lowest IGP Metric
7. Shortest Cluster ID List
8. Lowest Router ID
9. Lowest Peer IP
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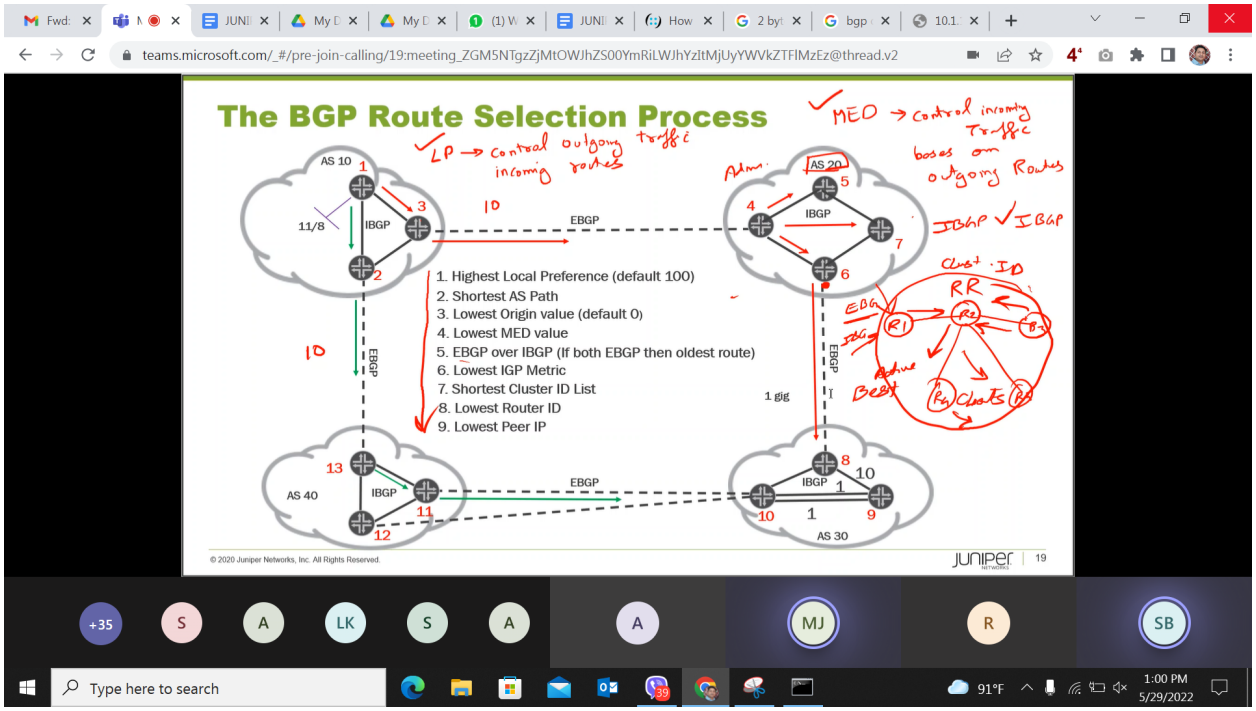
19


The BGP Route Selection Process
LP → control outgoing traffic
MED → control incoming Traffic
bases on outgoing Routes
AS 10
AS 20
AS 40
AS 30
11/8
IBGP
EBGP
10
1 gig
IBGP ✓ IBGP
Clust ID
RR
1. Highest Local Preference (default 100)
2. Shortest AS Path
3. Lowest Origin value (default 0)
4. Lowest MED value
5. EBGP over IBGP (If both EBGP then oldest route)
6. Lowest IGP Metric
7. Shortest Cluster ID List
8. Lowest Router ID
9. Lowest Peer IP
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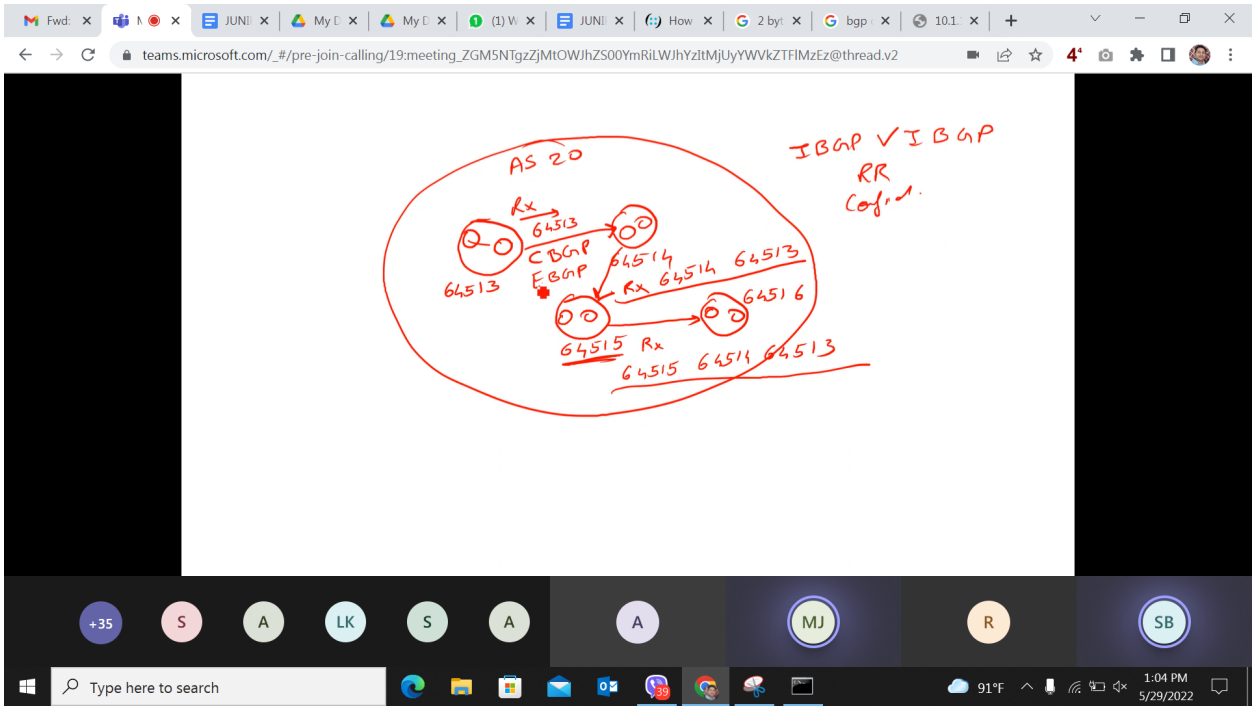
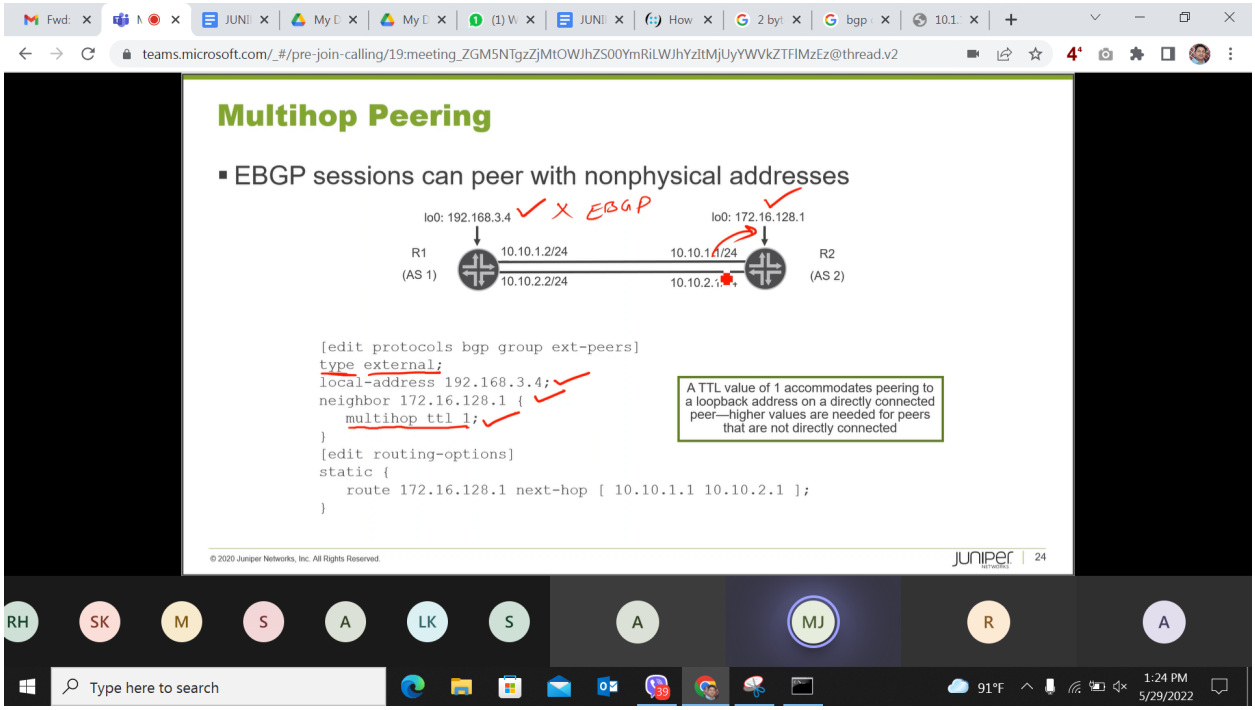
19


AS 20
IBGP / IBGP
RR
Conf.
Rx
64513
CBGP
EBGP
64514
64513
64516
64515
64513


Multihop Peering
EBGP sessions can peer with nonphysical addresses
lo0: 192.168.3.4
lo0: 172.16.128.1
R1
(AS 1)
10.10.1.2/24
10.10.2.2/24
10.10.1.1/24
R2
(AS 2)
[edit protocols bgp group ext-peers]
type external;
local-address 192.168.3.4;
neighbor 172.16.128.1 {
multihop ttl 1;
}
[edit routing-options]
static {
route 172.16.128.1 next-hop [10.10.1.1 10.10.2.1];
}
A TTL value of 1 accommodates peering to a loopback address on a directly connected peer—higher values are needed for peers that are not directly connected
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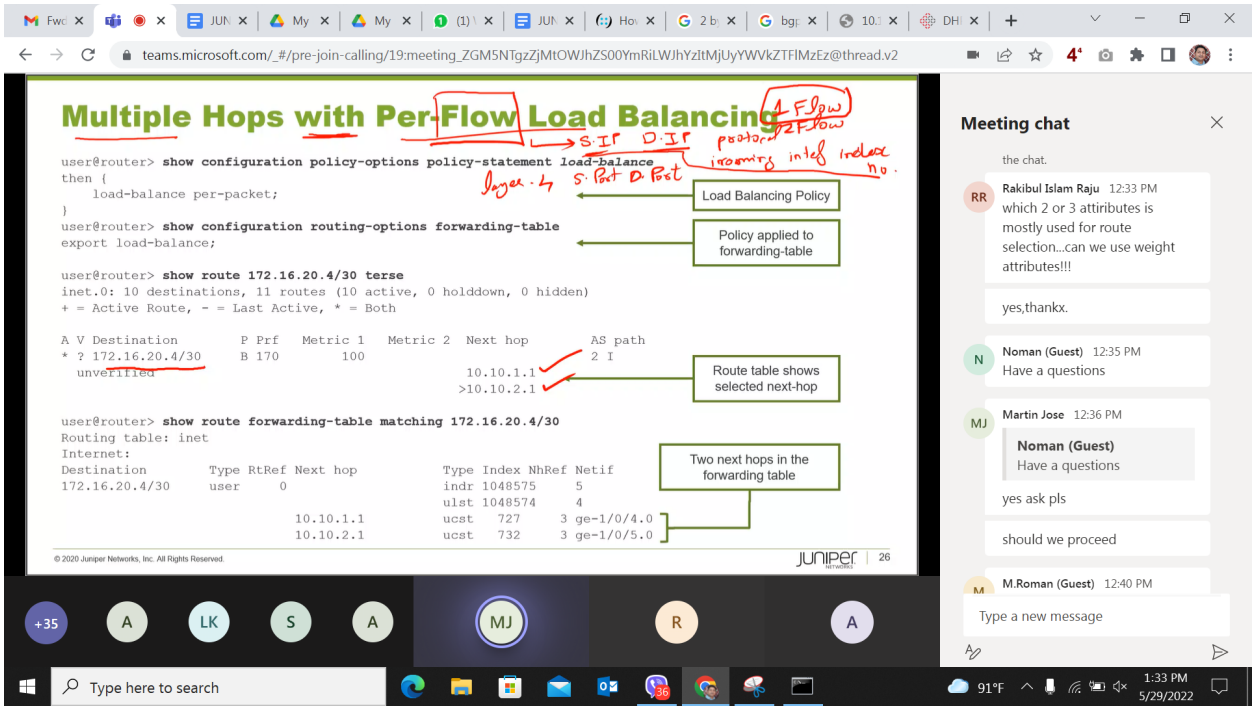
Multiple Hops with Per-Flow Load Balancing
user@router> show configuration policy-options policy-statement load-balance
then {
load-balance per-packet;
}
user@router> show configuration routing-options forwarding-table
export load-balance;
user@router> show route 172.16.20.4/30 terse
inet.0: 10 destinations, 11 routes (10 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
A V Destination P Prf Metric 1 Metric 2 Next hop AS path
* ? 172.16.20.4/30 B 170 100 2 I
unverified
10.10.1.1
>10.10.2.1
user@router> show route forwarding-table matching 172.16.20.4/30
Routing table: inet
Internet:
Destination Type RtRef Next hop Type Index NhRef Netif
172.16.20.4/30 user 0 indr 1048575 5
ulst 1048574 4
10.10.1.1 ucst 727 3 ge-1/0/4.0
10.10.2.1 ucst 732 3 ge-1/0/5.0
Load Balancing Policy
Policy applied to forwarding-table
Route table shows selected next-hop
Two next hops in the forwarding table
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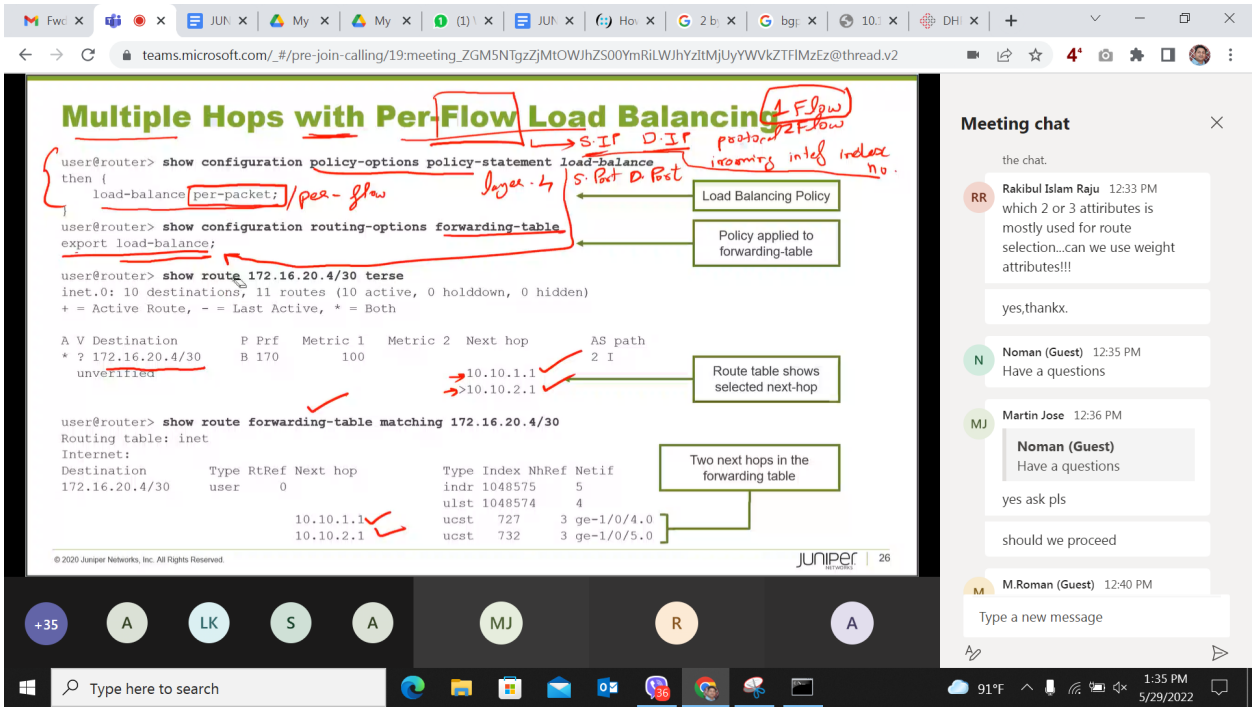
26
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
which 2 or 3 attiributes is mostly used for route selection...can we use weight attributes!!!
yes,thankx.
Noman (Guest) 12:35 PM
Have a questions
Martin Jose 12:36 PM
Noman (Guest)
Have a questions
yes ask pls
should we proceed
M.Roman (Guest) 12:40 PM
Type a new message
Type here to search
91°F
1:33 PM
5/29/2022


Multiple Hops with Per-Flow Load Balancing
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Routing table: inet
Internet:
Destination Type RtRef Next hop Type Index NhRef Netif
172.16.20.4/30 user 0 indr 1048575 5
ulst 1048574 4
10.10.1.1 ucst 727 3 ge-1/0/4.0
10.10.2.1 ucst 732 3 ge-1/0/5.0
Load Balancing Policy
Policy applied to forwarding-table
Route table shows selected next-hop
Two next hops in the forwarding table
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JUNIPER
26
Meeting chat
the chat.
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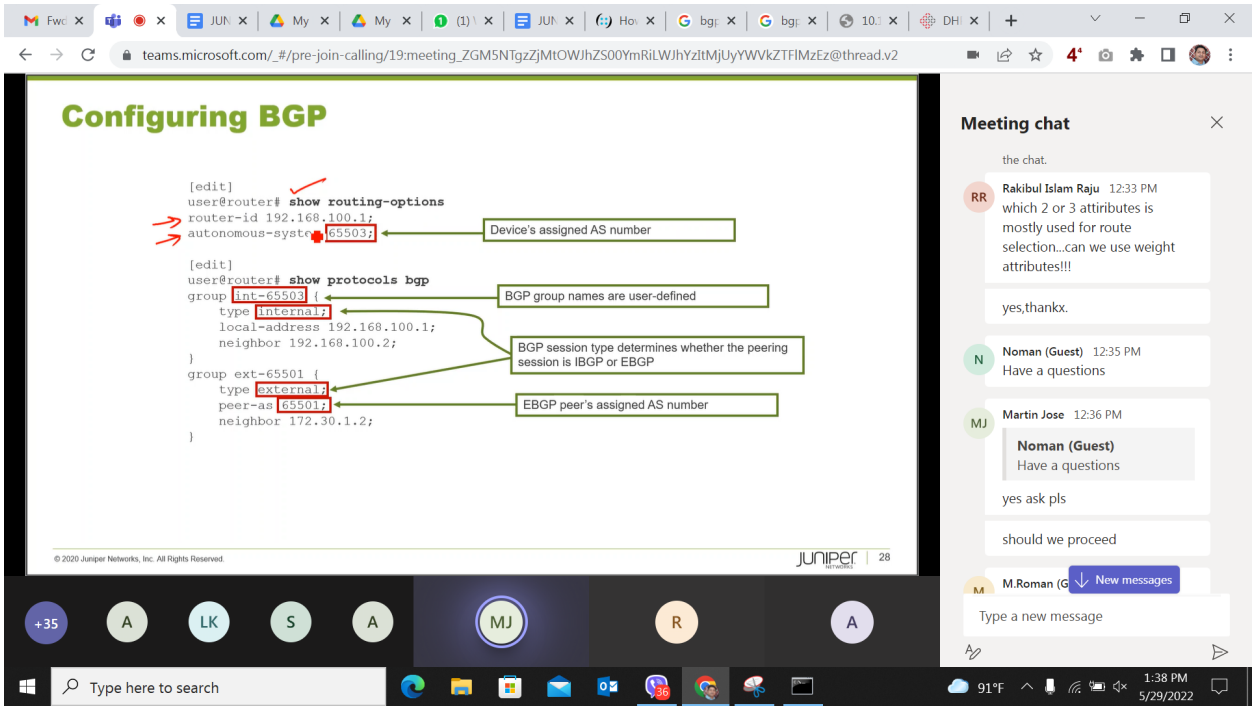
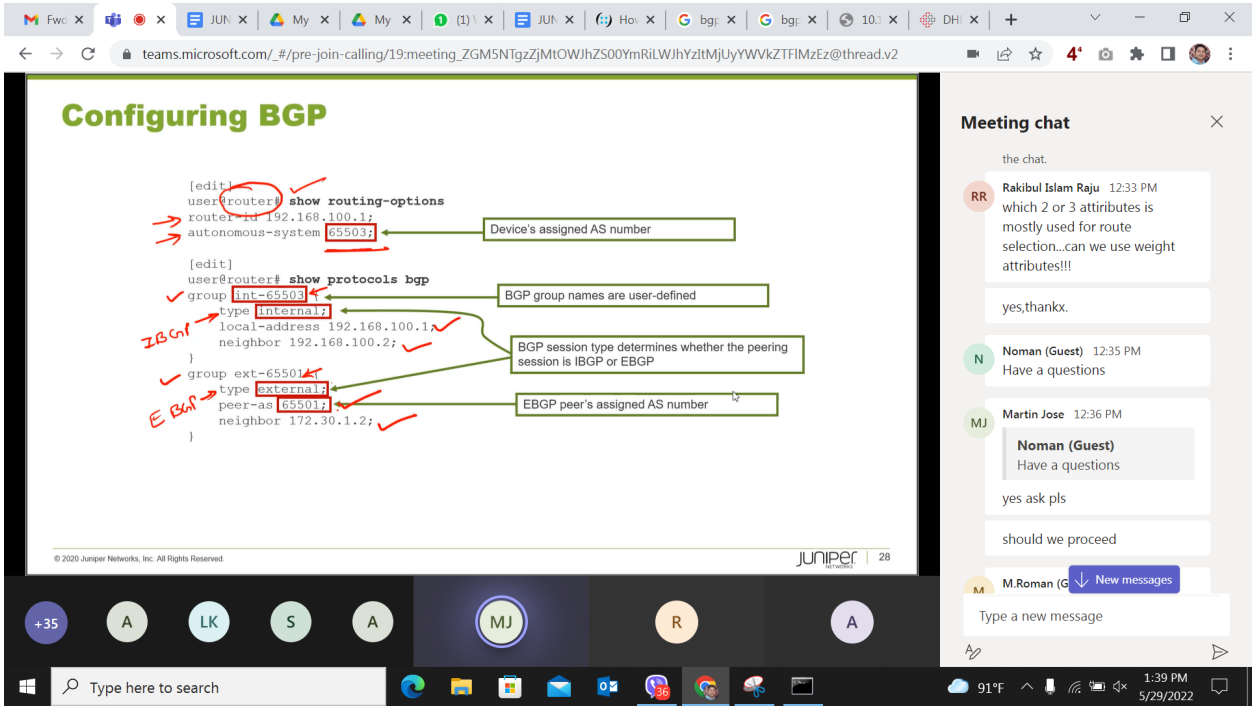
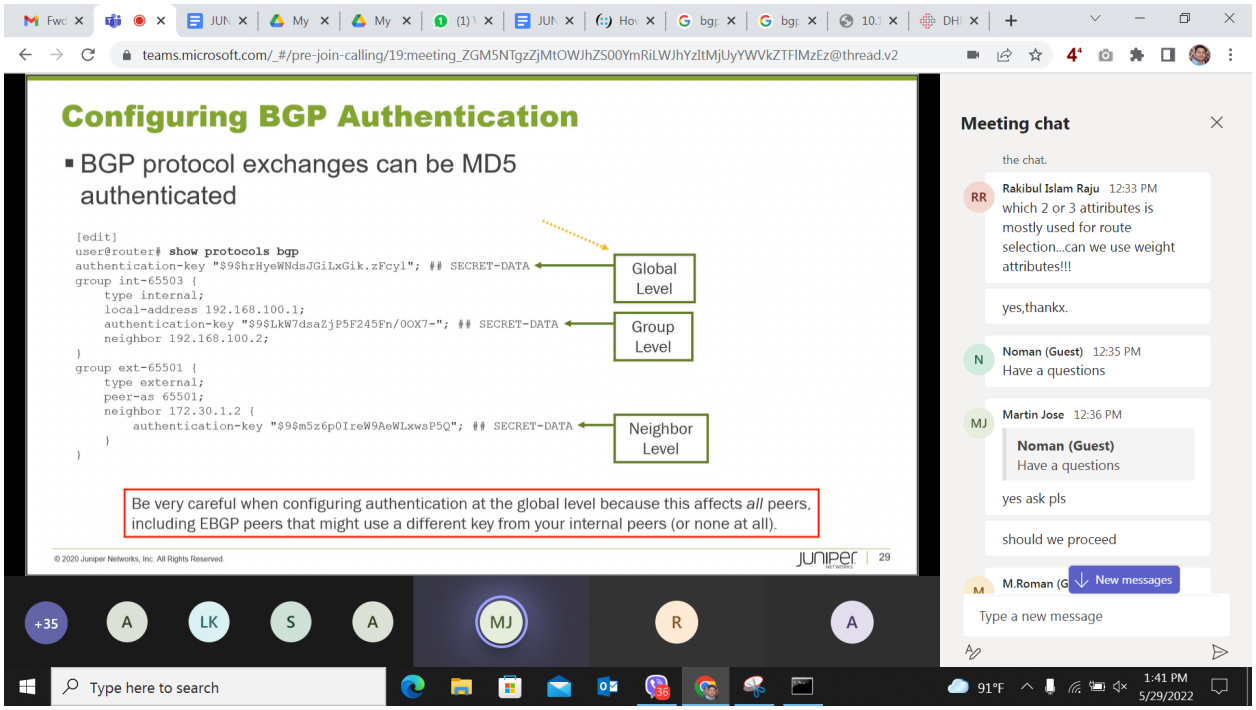
Noman (Guest) 12:35 PM
Have a questions
Martin Jose 12:36 PM
Noman (Guest)
Have a questions
yes ask pls
should we proceed
M.Roman (Guest) 12:40 PM
Type a new message
Type here to search
91°F
1:35 PM
5/29/2022



iBGP load balancing




Configuring BGP Authentication
BGP protocol exchanges can be MD5 authenticated
[edit]
user@router# show protocols bgp
authentication-key "9hrHyeWNdsJGiLxGik.zFcyl"; ## SECRET-DATA
group int-65503 {
type internal;
local-address 192.168.100.1;
authentication-key "9LkW7dsaZjP5F245Fn/0OX7-"; ## SECRET-DATA
neighbor 192.168.100.2;
}
group ext-65501 {
type external;
peer-as 65501;
neighbor 172.30.1.2 {
authentication-key "9m5z6p0IreW9AeWLxwsP5Q"; ## SECRET-DATA
}
}
Global Level
Group Level
Neighbor Level
Be very careful when configuring authentication at the global level because this affects all peers, including EBGP peers that might use a different key from your internal peers (or none at all).
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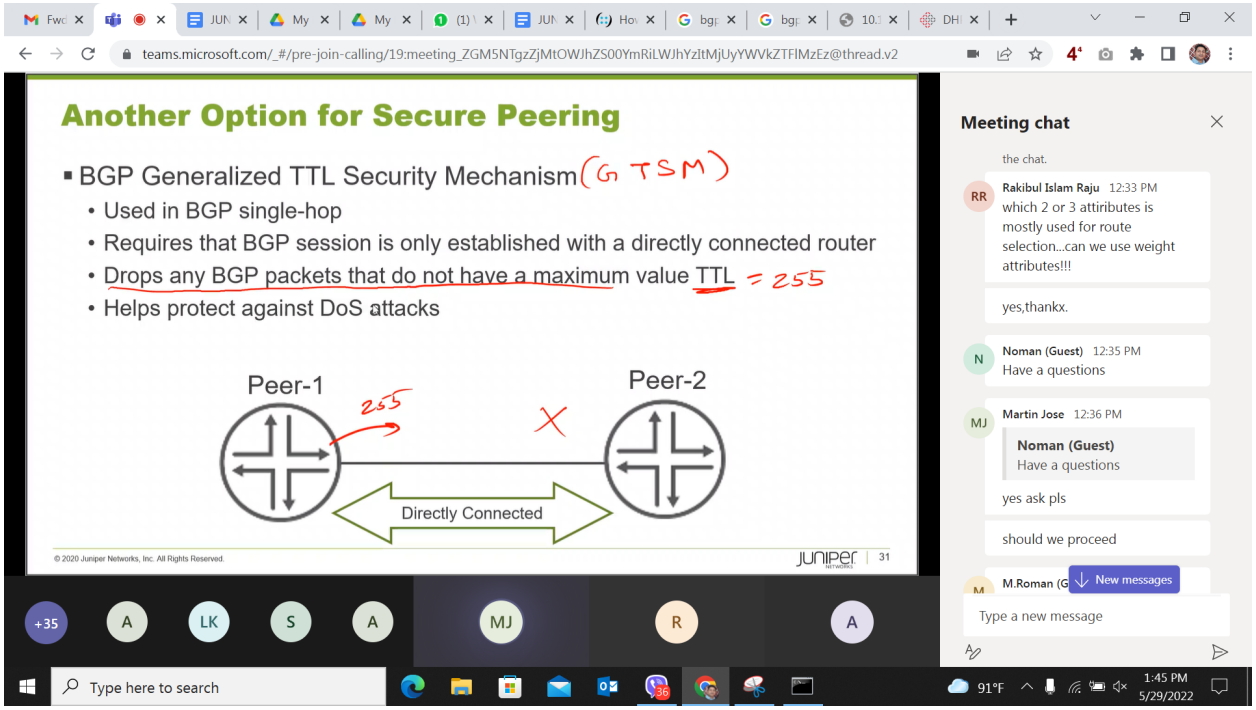
29
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
which 2 or 3 attiributes is mostly used for route selection...can we use weight attributes!!!
yes,thankx.
Noman (Guest) 12:35 PM
Have a questions
Martin Jose 12:36 PM
Noman (Guest)
Have a questions
yes ask pls
should we proceed
New messages
Type a new message
Type here to search
91°F
1:41 PM
5/29/2022


Another Option for Secure Peering
BGP Generalized TTL Security Mechanism (GTSM)
Used in BGP single-hop
Requires that BGP session is only established with a directly connected router
Drops any BGP packets that do not have a maximum value TTL = 255
Helps protect against DoS attacks
Peer-1
Peer-2
255
Directly Connected
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31
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
which 2 or 3 attiributes is mostly used for route selection...can we use weight attributes!!!
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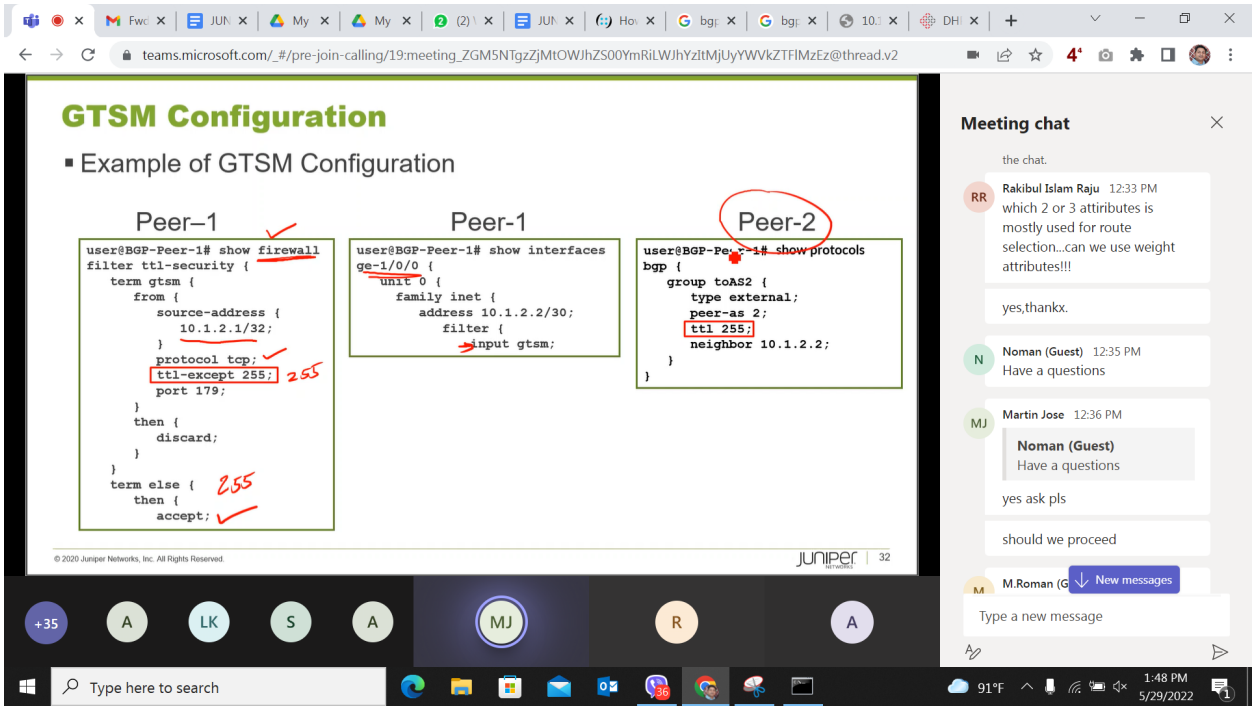
Noman (Guest) 12:35 PM
Have a questions
Martin Jose 12:36 PM
Noman (Guest)
Have a questions
yes ask pls
should we proceed
New messages
Type a new message
Type here to search
91°F
1:45 PM
5/29/2022


GTSM Configuration
Example of GTSM Configuration
Peer–1
user@BGP-Peer-1# show firewall
filter ttl-security {
term gtsm {
from {
source-address {
10.1.2.1/32;
}
protocol tcp;
ttl-except 255;
port 179;
}
then {
discard;
}
}
term else {
then {
accept;
Peer-1
user@BGP-Peer-1# show interfaces
ge-1/0/0 {
unit 0 {
family inet {
address 10.1.2.2/30;
filter {
input gtsm;
Peer-2
user@BGP-Peer-1# show protocols
bgp {
group toAS2 {
type external;
peer-as 2;
ttl 255;
neighbor 10.1.2.2;
}
}
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32
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
which 2 or 3 attiributes is mostly used for route selection...can we use weight attributes!!!
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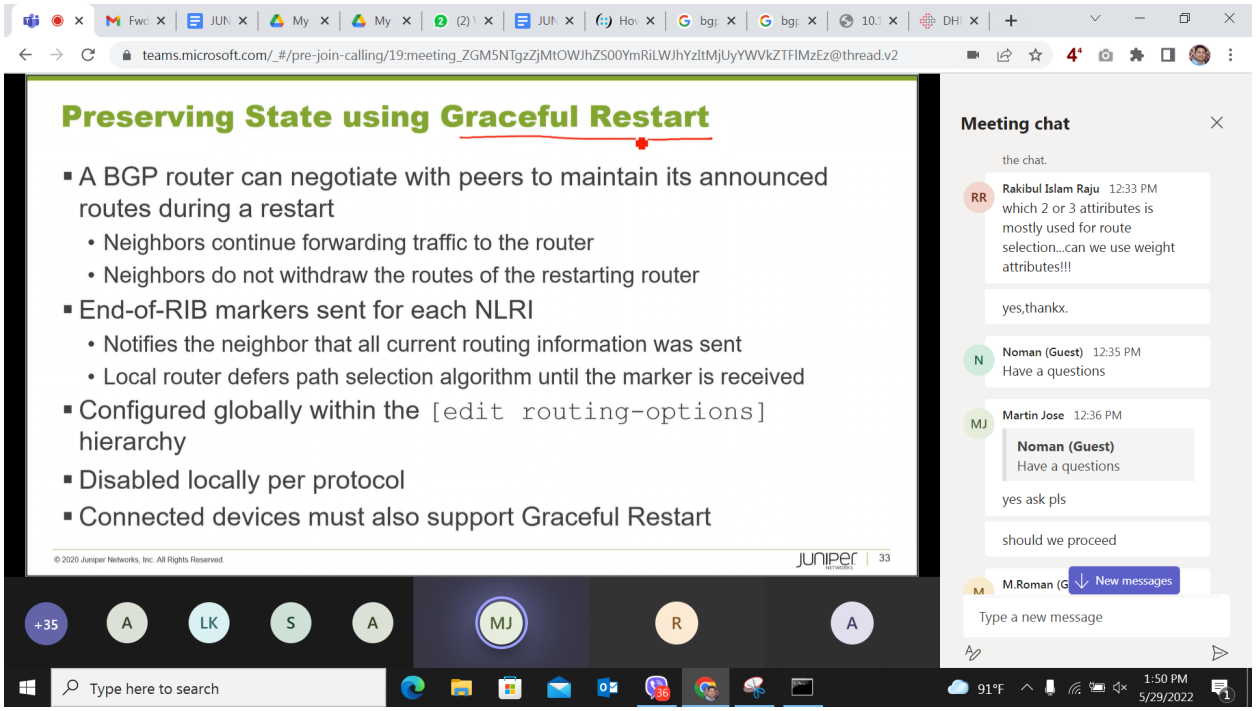
Have a questions
Martin Jose 12:36 PM
Noman (Guest)
Have a questions
yes ask pls
should we proceed
New messages
Type a new message
Type here to search
91°F
1:48 PM
5/29/2022


Preserving State using Graceful Restart
A BGP router can negotiate with peers to maintain its announced routes during a restart
Neighbors continue forwarding traffic to the router
Neighbors do not withdraw the routes of the restarting router
End-of-RIB markers sent for each NLRI
Notifies the neighbor that all current routing information was sent
Local router defers path selection algorithm until the marker is received
Configured globally within the [edit routing-options] hierarchy
Disabled locally per protocol
Connected devices must also support Graceful Restart
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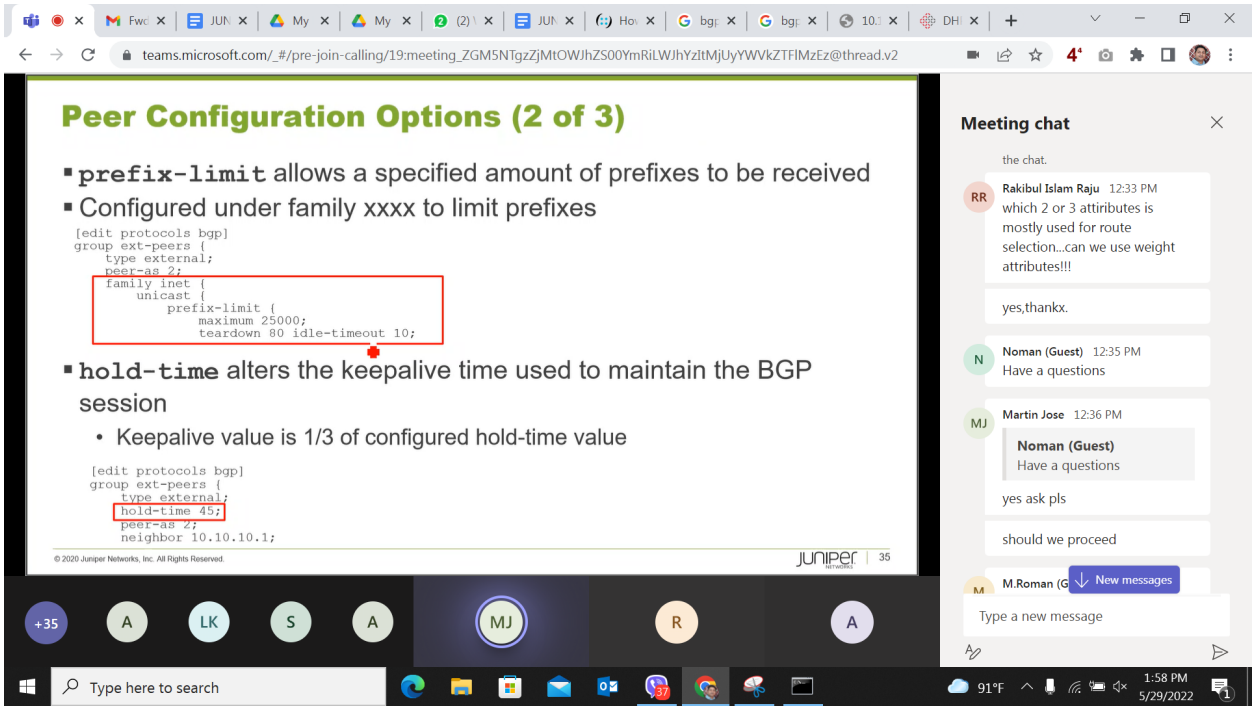
33
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
which 2 or 3 attiributes is mostly used for route selection...can we use weight attributes!!!
yes,thankx.
Noman (Guest) 12:35 PM
Have a questions
Martin Jose 12:36 PM
Noman (Guest)
Have a questions
yes ask pls
should we proceed
New messages
Type a new message
Type here to search
91°F
1:50 PM
5/29/2022


teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
Peer Configuration Options (2 of 3)
prefix-limit allows a specified amount of prefixes to be received
Configured under family xxxx to limit prefixes
[edit protocols bgp]
group ext-peers {
type external;
peer-as 2;
family inet {
unicast {
prefix-limit {
maximum 25000;
teardown 80 idle-timeout 10;
hold-time alters the keepalive time used to maintain the BGP session
Keepalive value is 1/3 of configured hold-time value
[edit protocols bgp]
group ext-peers {
type external;
hold-time 45;
peer-as 2;
neighbor 10.10.10.1;
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35
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
which 2 or 3 attiributes is mostly used for route selection...can we use weight attributes!!!
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Noman (Guest)
Have a questions
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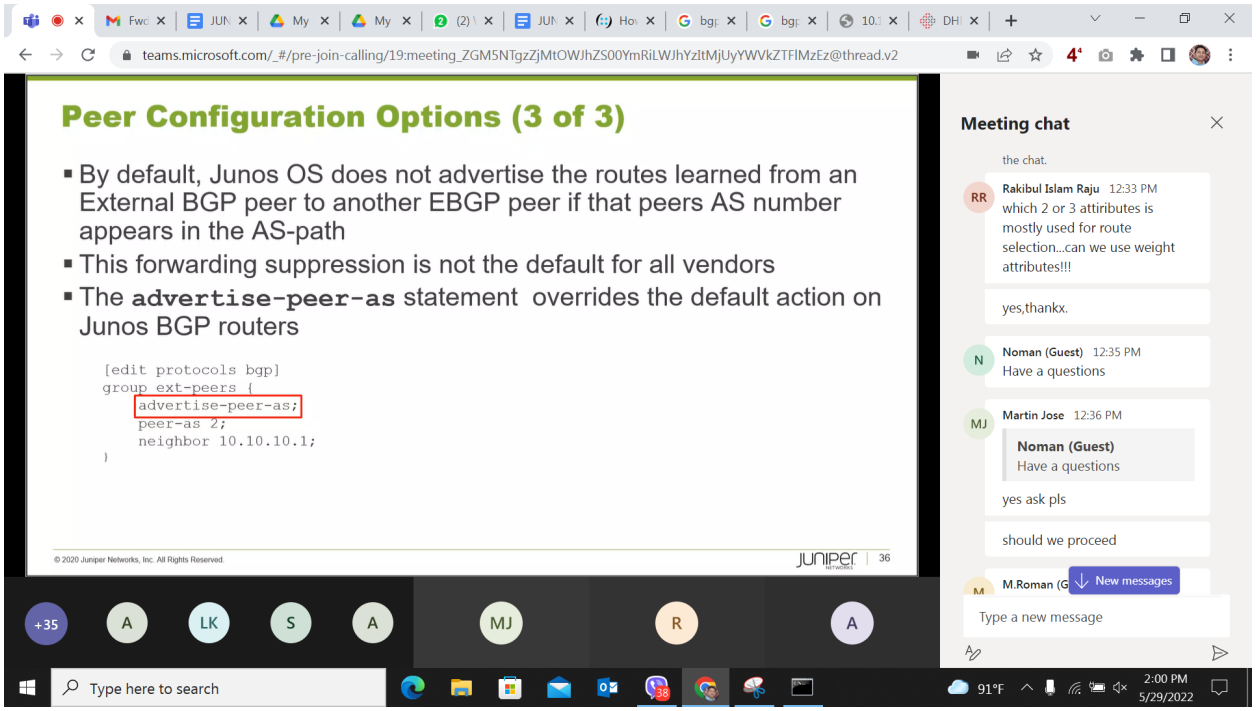
should we proceed
New messages
Type a new message
Type here to search
91°F
1:58 PM
5/29/2022


teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
Peer Configuration Options (3 of 3)
By default, Junos OS does not advertise the routes learned from an External BGP peer to another EBGP peer if that peers AS number appears in the AS-path
This forwarding suppression is not the default for all vendors
The advertise-peer-as statement overrides the default action on Junos BGP routers
[edit protocols bgp]
group ext-peers {
advertise-peer-as;
peer-as 2;
neighbor 10.10.10.1;
}
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36
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
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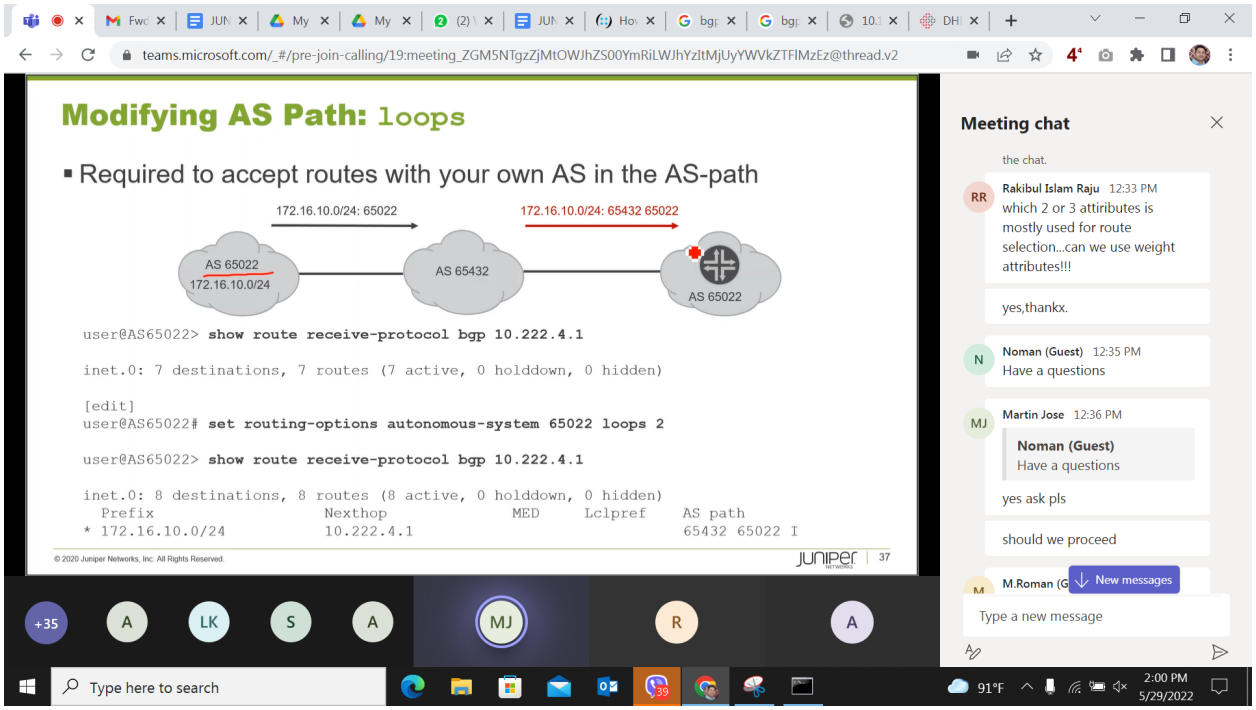
New messages
Type a new message
Type here to search
91°F
2:00 PM
5/29/2022


Modifying AS Path: loops
Required to accept routes with your own AS in the AS-path
172.16.10.0/24: 65022
172.16.10.0/24: 65432 65022
AS 65022
172.16.10.0/24
AS 65432
AS 65022
user@AS65022> show route receive-protocol bgp 10.222.4.1
inet.0: 7 destinations, 7 routes (7 active, 0 holddown, 0 hidden)
[edit]
user@AS65022# set routing-options autonomous-system 65022 loops 2
user@AS65022> show route receive-protocol bgp 10.222.4.1
inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
* 172.16.10.0/24 10.222.4.1 65432 65022 I
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37
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
which 2 or 3 attributes is mostly used for route selection...can we use weight attributes!!!
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Noman (Guest) 12:35 PM
Have a questions
Martin Jose 12:36 PM
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Have a questions
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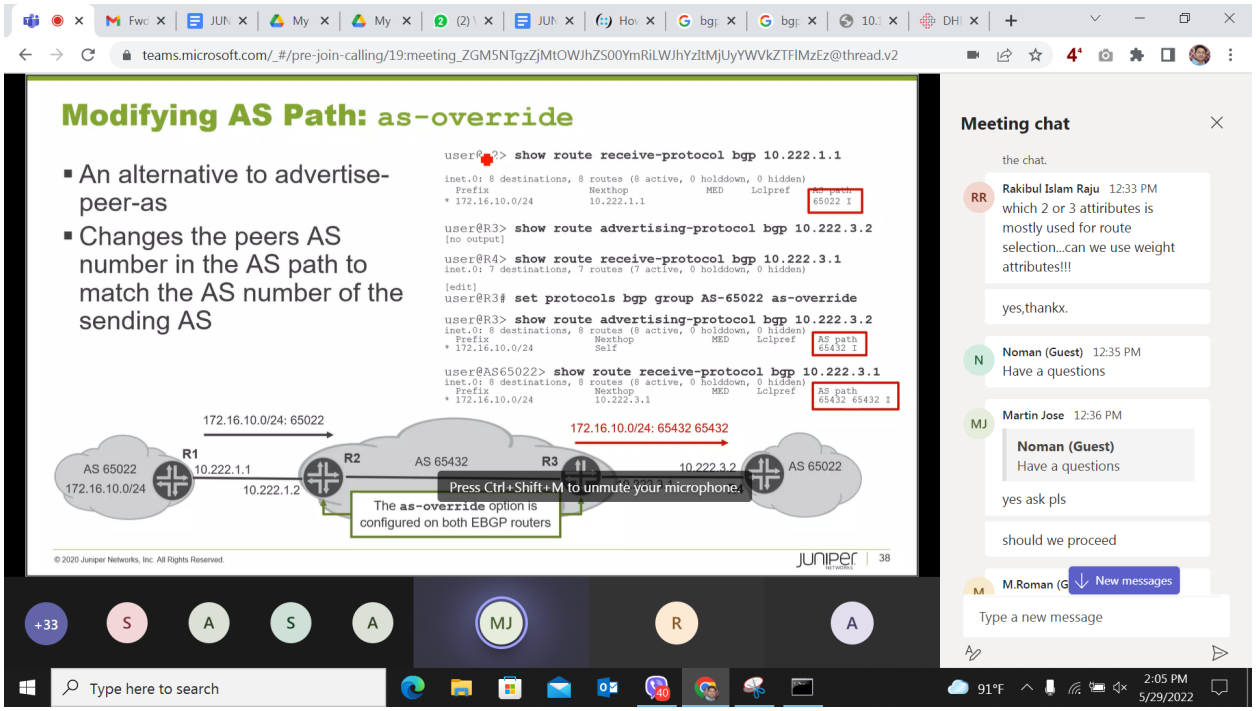
should we proceed
New messages
Type a new message
Type here to search
91°F
2:00 PM
5/29/2022


Modifying AS Path: as-override
An alternative to advertise-peer-as
Changes the peers AS number in the AS path to match the AS number of the sending AS
user@R2> show route receive-protocol bgp 10.222.1.1
inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
* 172.16.10.0/24 10.222.1.1 65022 I
user@R3> show route advertising-protocol bgp 10.222.3.2
[no output]
user@R4> show route receive-protocol bgp 10.222.3.1
inet.0: 7 destinations, 7 routes (7 active, 0 holddown, 0 hidden)
[edit]
user@R3# set protocols bgp group AS-65022 as-override
user@R3> show route advertising-protocol bgp 10.222.3.2
inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
* 172.16.10.0/24 Self 65432 I
user@AS65022> show route receive-protocol bgp 10.222.3.1
inet.0: 8 destinations, 8 routes (8 active, 0 holddown, 0 hidden)
Prefix Nexthop MED Lclpref AS path
* 172.16.10.0/24 10.222.3.1 65432 65432 I
172.16.10.0/24: 65022
172.16.10.0/24: 65432 65432
AS 65022
172.16.10.0/24
R1
10.222.1.1
10.222.1.2
R2
AS 65432
R3
10.222.3.2
AS 65022
Press Ctrl+Shift+M to unmute your microphone.
The as-override option is configured on both EBGP routers
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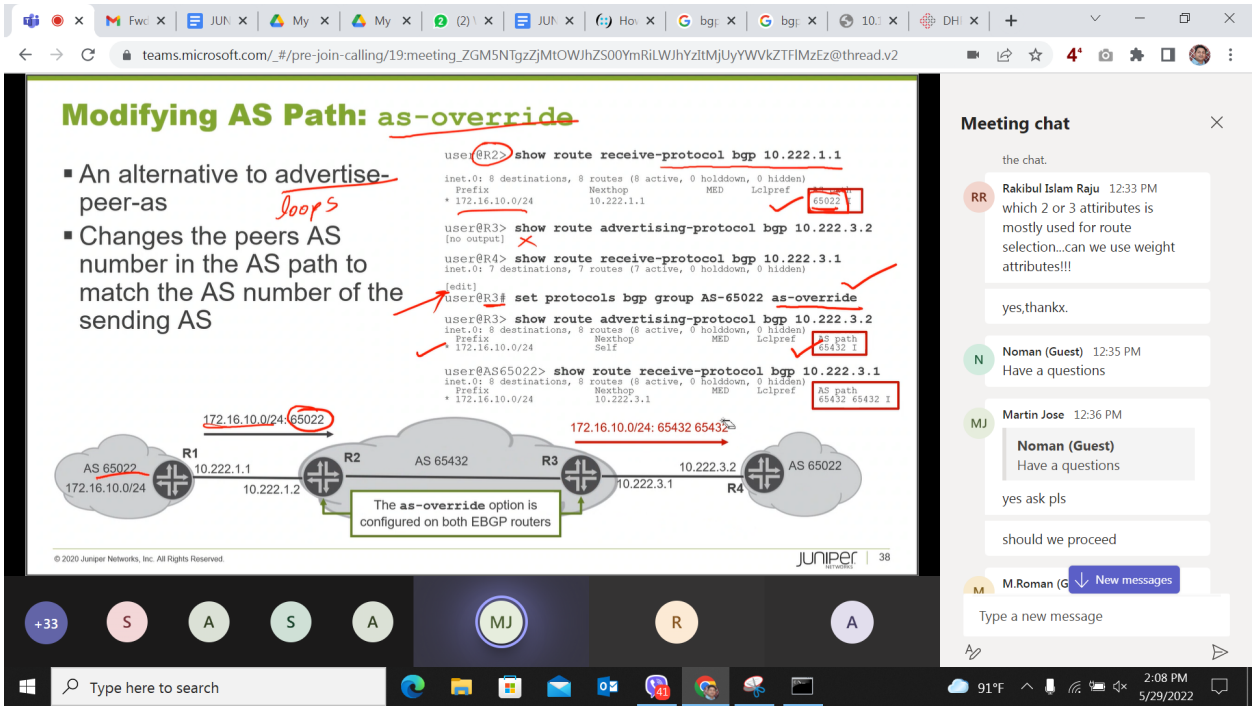
38
Meeting chat
the chat.
Rakibul Islam Raju 12:33 PM
which 2 or 3 attributes is mostly used for route selection...can we use weight attributes!!!
yes,thankx.
Noman (Guest) 12:35 PM
Have a questions
Martin Jose 12:36 PM
Noman (Guest)
Have a questions
yes ask pls
should we proceed
New messages
Type a new message
Type here to search
91°F
2:05 PM
5/29/2022


Modifying AS Path: as-override
An alternative to advertise-peer-as
Changes the peers AS number in the AS path to match the AS number of the sending AS
user@R2> show route receive-protocol bgp 10.222.1.1
user@R3> show route advertising-protocol bgp 10.222.3.2
user@R4> show route receive-protocol bgp 10.222.3.1
user@R3# set protocols bgp group AS-65022 as-override
user@R3> show route advertising-protocol bgp 10.222.3.2
user@AS65022> show route receive-protocol bgp 10.222.3.1
172.16.10.0/24: 65022
172.16.10.0/24: 65432 65432
AS 65022
172.16.10.0/24
R1
10.222.1.1
10.222.1.2
R2
AS 65432
R3
10.222.3.1
10.222.3.2
R4
AS 65022
The as-override option is configured on both EBGP routers
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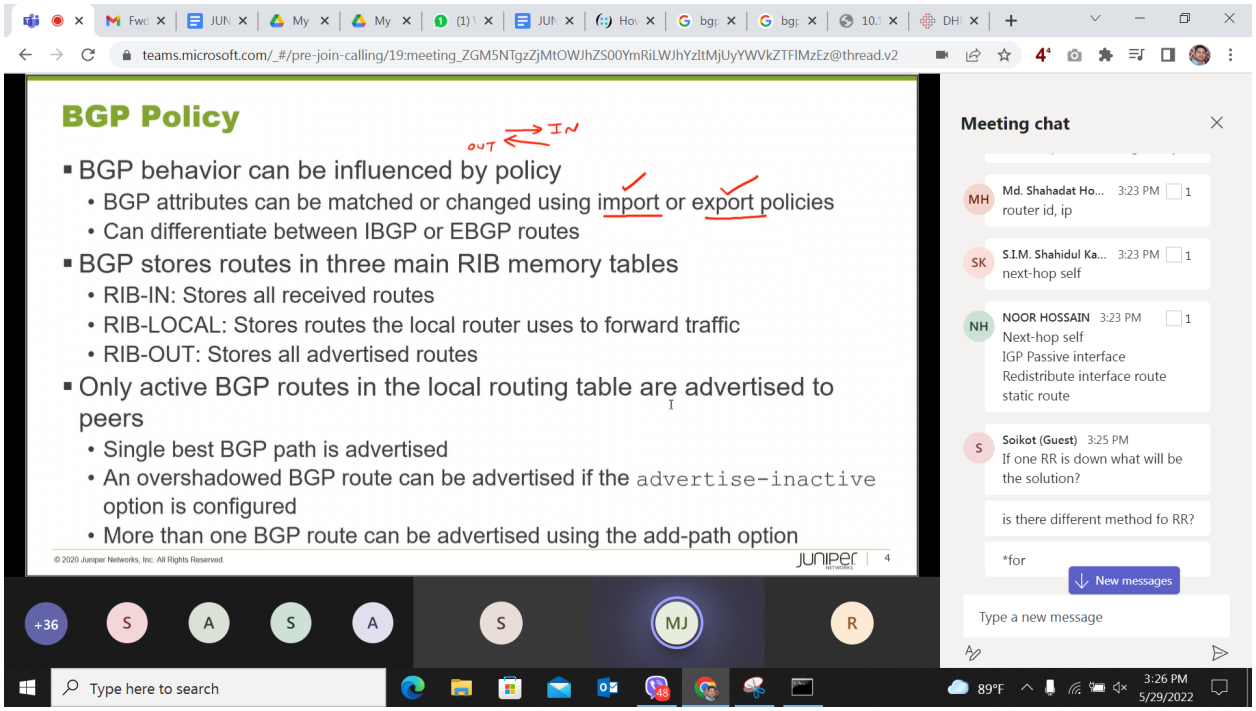
Meeting chat
Rakibul Islam Raju 12:33 PM
which 2 or 3 attiributes is mostly used for route selection...can we use weight attributes!!!
yes,thankx.
Noman (Guest) 12:35 PM
Have a questions
Martin Jose 12:36 PM
Noman (Guest)
Have a questions
yes ask pls
should we proceed
New messages
Type a new message
Type here to search
91°F
2:08 PM
5/29/2022


BGP Policy
BGP behavior can be influenced by policy
BGP attributes can be matched or changed using import or export policies
Can differentiate between IBGP or EBGP routes
BGP stores routes in three main RIB memory tables
RIB-IN: Stores all received routes
RIB-LOCAL: Stores routes the local router uses to forward traffic
RIB-OUT: Stores all advertised routes
Only active BGP routes in the local routing table are advertised to peers
Single best BGP path is advertised
An overshadowed BGP route can be advertised if the advertise-inactive option is configured
More than one BGP route can be advertised using the add-path option
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4
Meeting chat
Md. Shahadat Ho... 3:23 PM
router id, ip
S.I.M. Shahidul Ka... 3:23 PM
next-hop self
NOOR HOSSAIN 3:23 PM
Next-hop self
IGP Passive interface
Redistribute interface route static route
Soikot (Guest) 3:25 PM
If one RR is down what will be the solution?
is there different method fo RR?
*for
New messages
Type a new message
Type here to search
89°F
3:26 PM
5/29/2022

Test Your Knowledge

- Consider this policy statement:

```
policy-statement testing-as-paths {
    term as-paths {
        from as-path testing-1-2-3;
        then accept;
    }
    then reject;
```

- Will the router accept a route with the path 1024 44 44 2685, given the following as-path statements?

1. set as-path testing-1-2-3 ".* 1024"
2. set as-path testing-1-2-3 "1024 .*"
3. set as-path testing-1-2-3 ".* 1024 .*"

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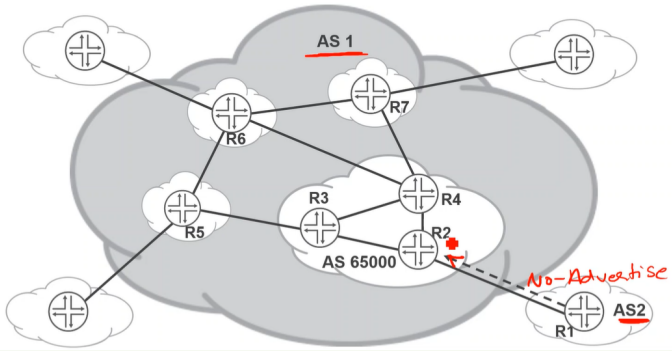
No-Advertise

- Routes go no further than the next hop



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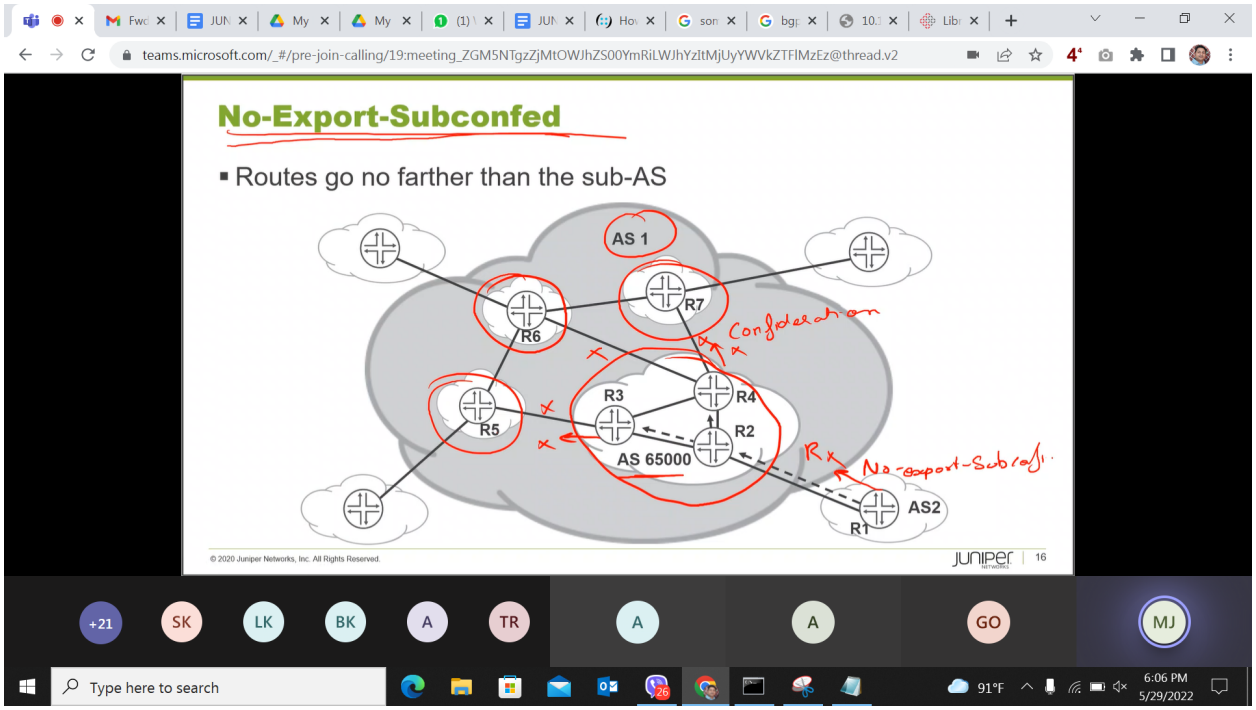
No-Export-Subconfed
Routes go no farther than the sub-AS
AS 1
R6
R7
R5
R3
R4
R2
AS 65000
AS2
R1
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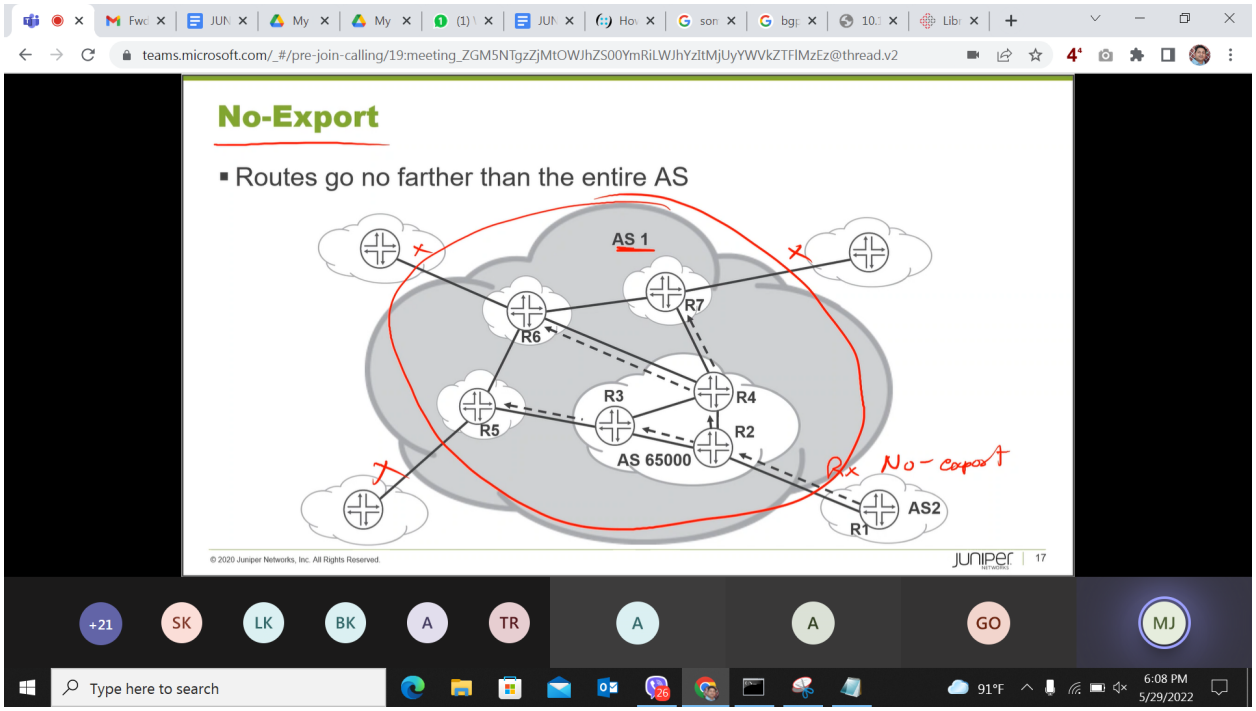
16


No-Export
Routes go no farther than the entire AS
AS 1
R6
R7
R5
R3
R4
R2
AS 65000
AS2
R1
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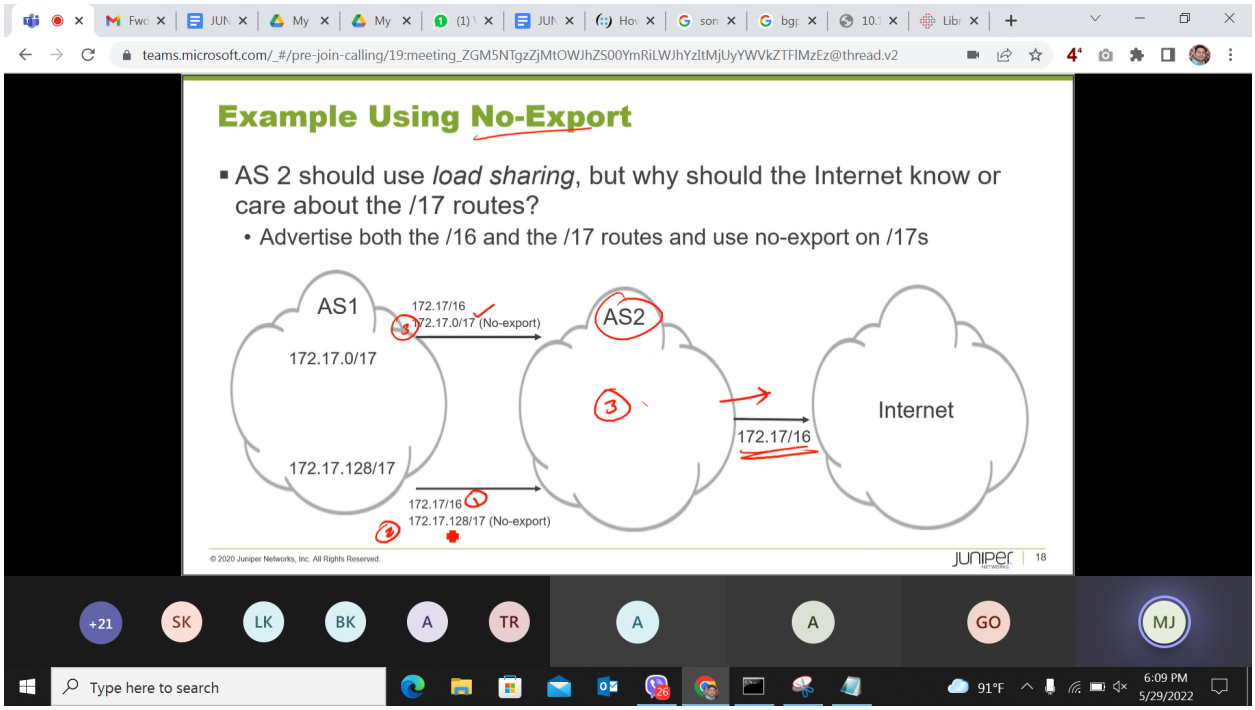
17


teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
Example Using No-Export
AS 2 should use load sharing, but why should the Internet know or care about the /17 routes?
Advertise both the /16 and the /17 routes and use no-export on /17s
AS1
172.17.0/17
172.17.128/17
172.17/16
172.17.0/17 (No-export)
172.17/16
172.17.128/17 (No-export)
AS2
172.17/16
Internet
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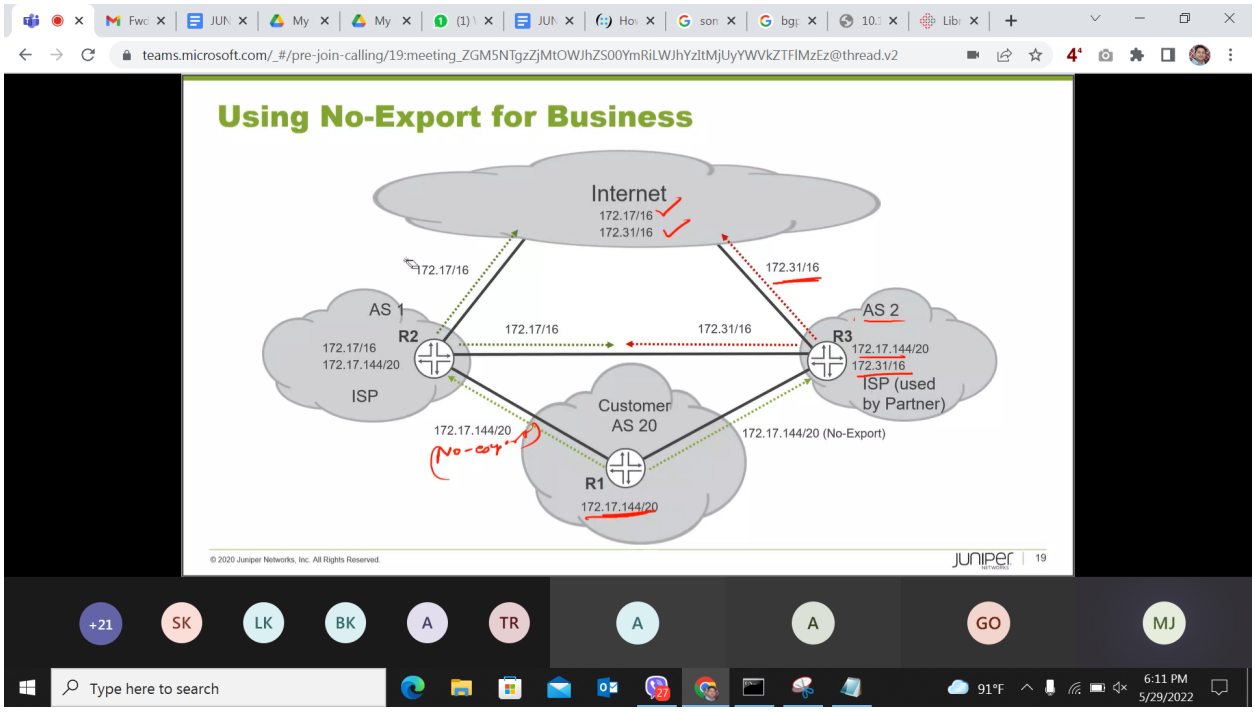
18
Type here to search
91°F
6:09 PM
5/29/2022


teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
Using No-Export for Business
Internet
172.17/16
172.31/16
172.17/16
172.31/16
AS 1
R2
172.17/16
172.17.144/20
ISP
172.17/16
172.31/16
AS 2
R3
172.17.144/20
172.31/16
ISP (used by Partner)
Customer AS 20
172.17.144/20
172.17.144/20 (No-Export)
R1
172.17.144/20
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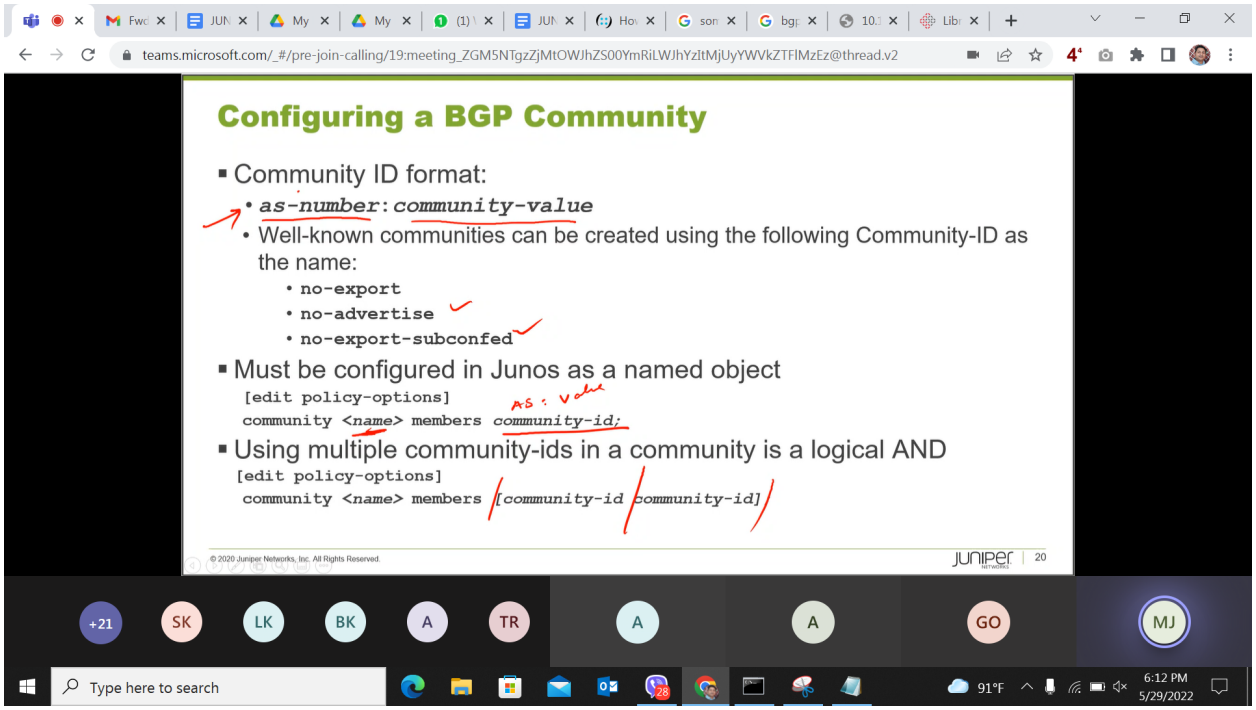
JUNIPER
19
Type here to search
91°F
6:11 PM
5/29/2022


Configuring a BGP Community
Community ID format:
as-number:community-value
Well-known communities can be created using the following Community-ID as the name:
no-export
no-advertise
no-export-subconfed
Must be configured in Junos as a named object
[edit policy-options]
community <name> members community-id;
Using multiple community-ids in a community is a logical AND
[edit policy-options]
community <name> members [community-id community-id]
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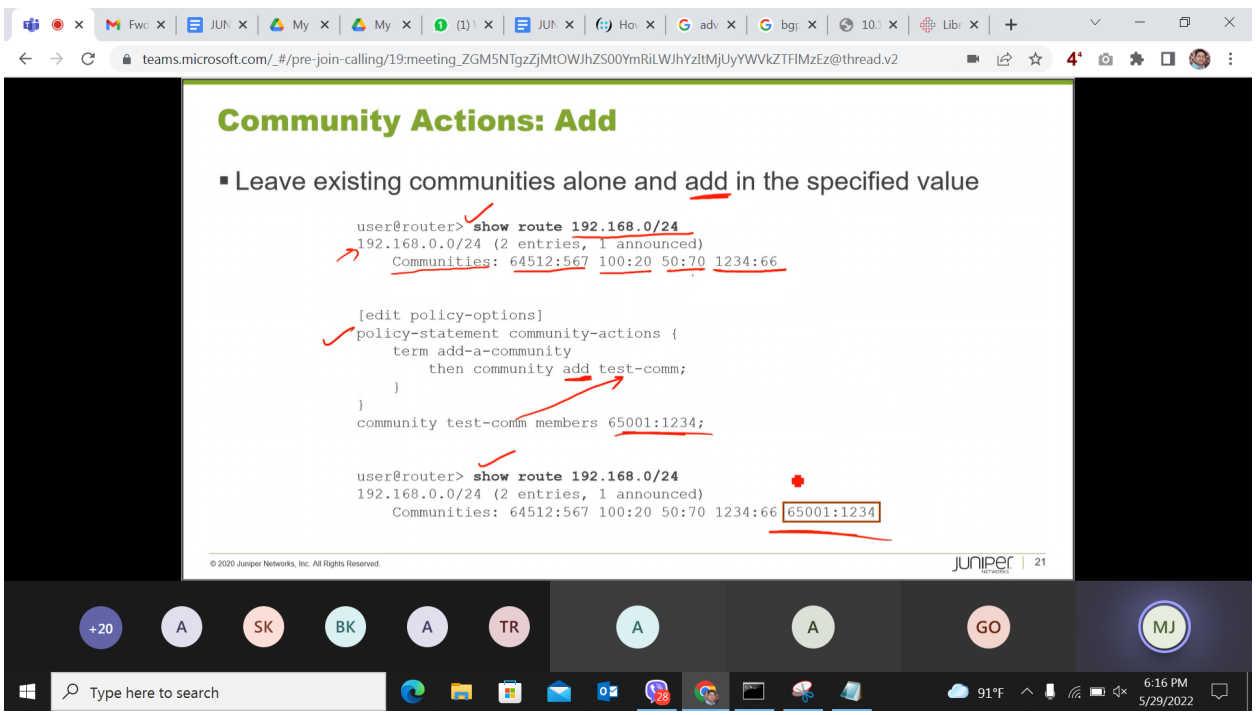
20


Community Actions: Add
Leave existing communities alone and add in the specified value
user@router> show route 192.168.0.0/24
192.168.0.0/24 (2 entries, 1 announced)
Communities: 64512:567 100:20 50:70 1234:66
[edit policy-options]
policy-statement community-actions {
term add-a-community
then community add test-comm;
}
}
community test-comm members 65001:1234;
user@router> show route 192.168.0.0/24
192.168.0.0/24 (2 entries, 1 announced)
Communities: 64512:567 100:20 50:70 1234:66 65001:1234
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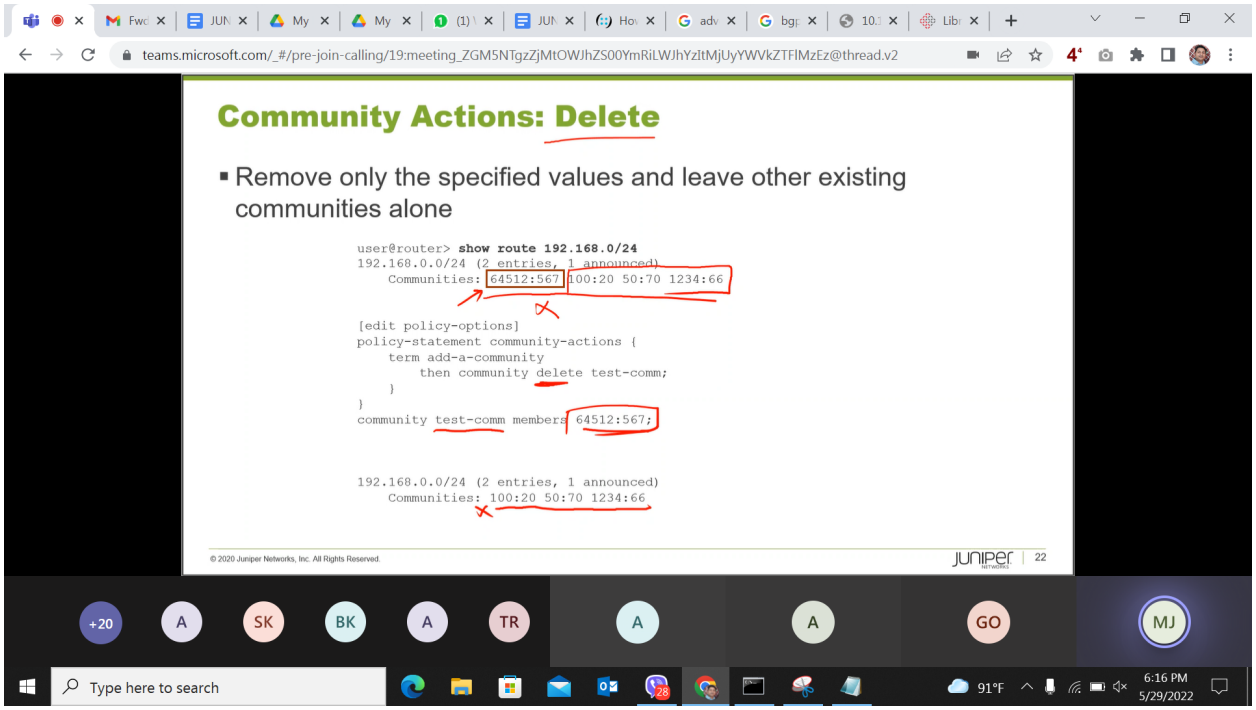
21


Community Actions: Delete
Remove only the specified values and leave other existing communities alone
user@router> show route 192.168.0.0/24
192.168.0.0/24 (2 entries, 1 announced)
Communities: 64512:567 100:20 50:70 1234:66
[edit policy-options]
policy-statement community-actions {
term add-a-community
then community delete test-comm;
}
}
community test-comm members 64512:567;
192.168.0.0/24 (2 entries, 1 announced)
Communities: 100:20 50:70 1234:66
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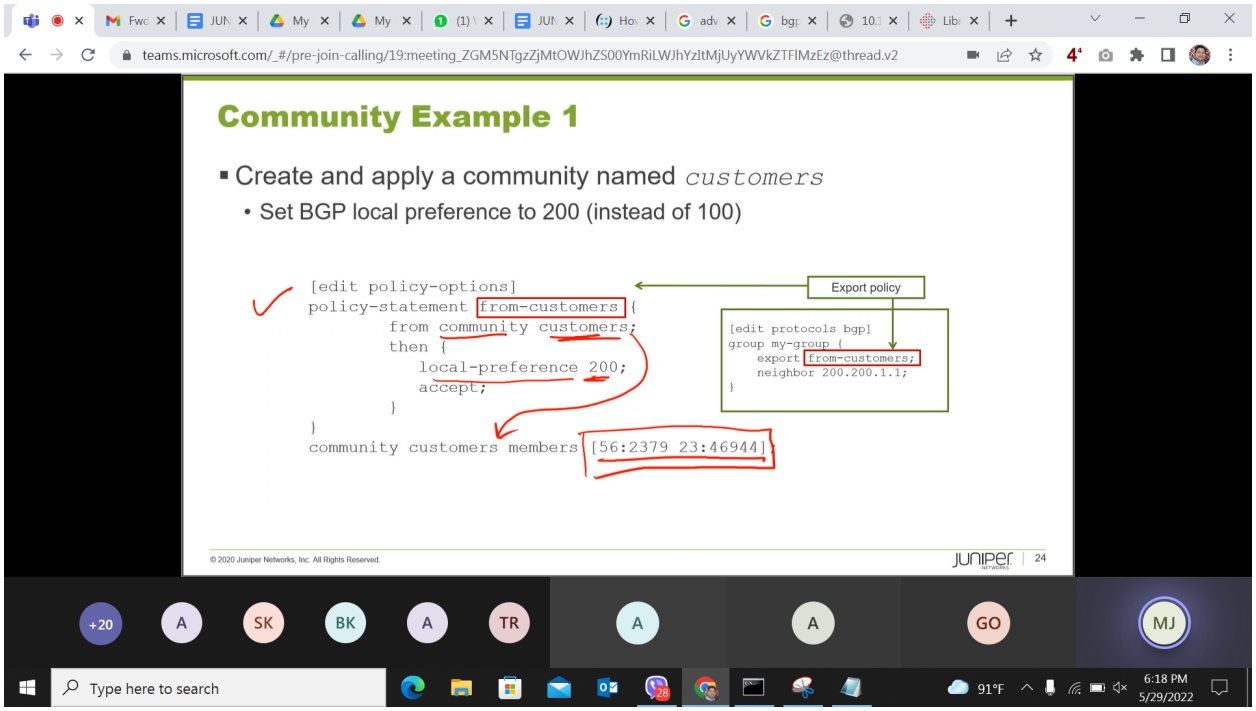
22


Community Example 1
Create and apply a community named customers
Set BGP local preference to 200 (instead of 100)
[edit policy-options]
policy-statement from-customers {
from community customers;
then {
local-preference 200;
accept;
}
}
community customers members [56:2379 23:46944];
Export policy
[edit protocols bgp]
group my-group {
export from-customers;
neighbor 200.200.1.1;
}
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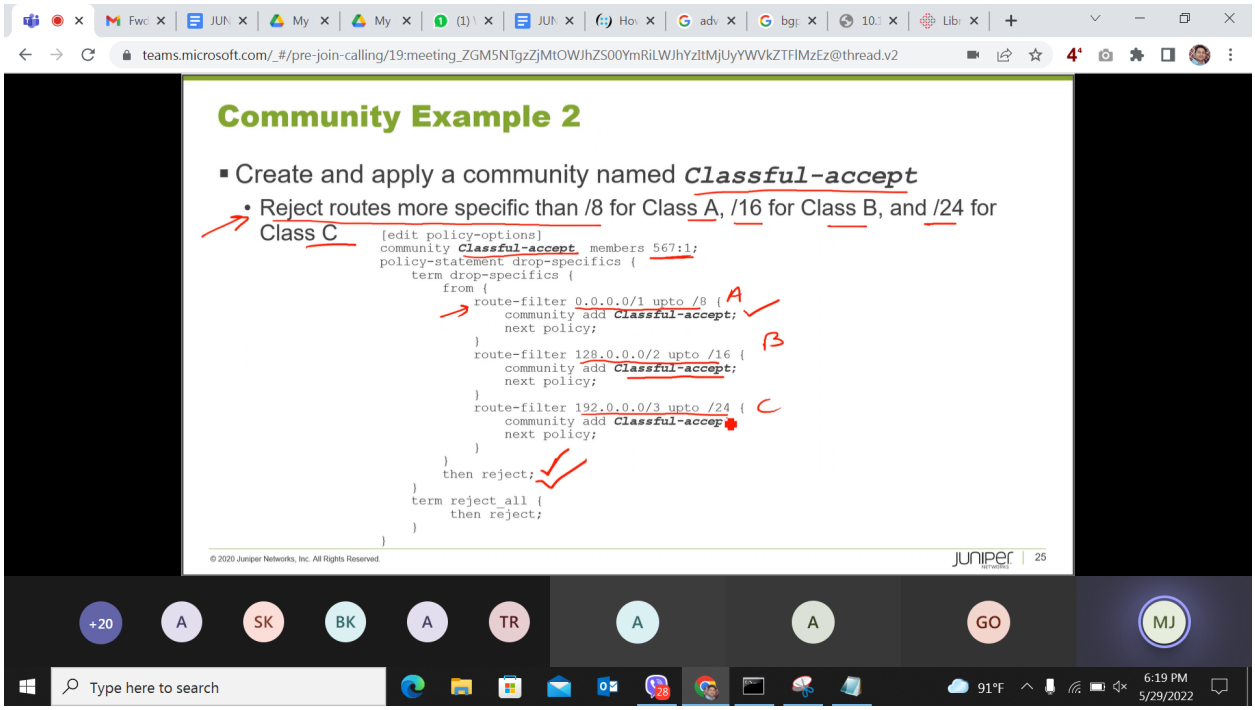
24


Community Example 2
▪ Create and apply a community named Classful-accept
• Reject routes more specific than /8 for Class A, /16 for Class B, and /24 for Class C
[edit policy-options]
community Classful-accept members 567:1;
policy-statement drop-specifics {
term drop-specifics {
from {
route-filter 0.0.0.0/1 upto /8 {
community add Classful-accept;
next policy;
}
route-filter 128.0.0.0/2 upto /16 {
community add Classful-accept;
next policy;
}
route-filter 192.0.0.0/3 upto /24 {
community add Classful-accept;
next policy;
}
}
then reject;
}
term reject_all {
then reject;
}
}
A
B
C
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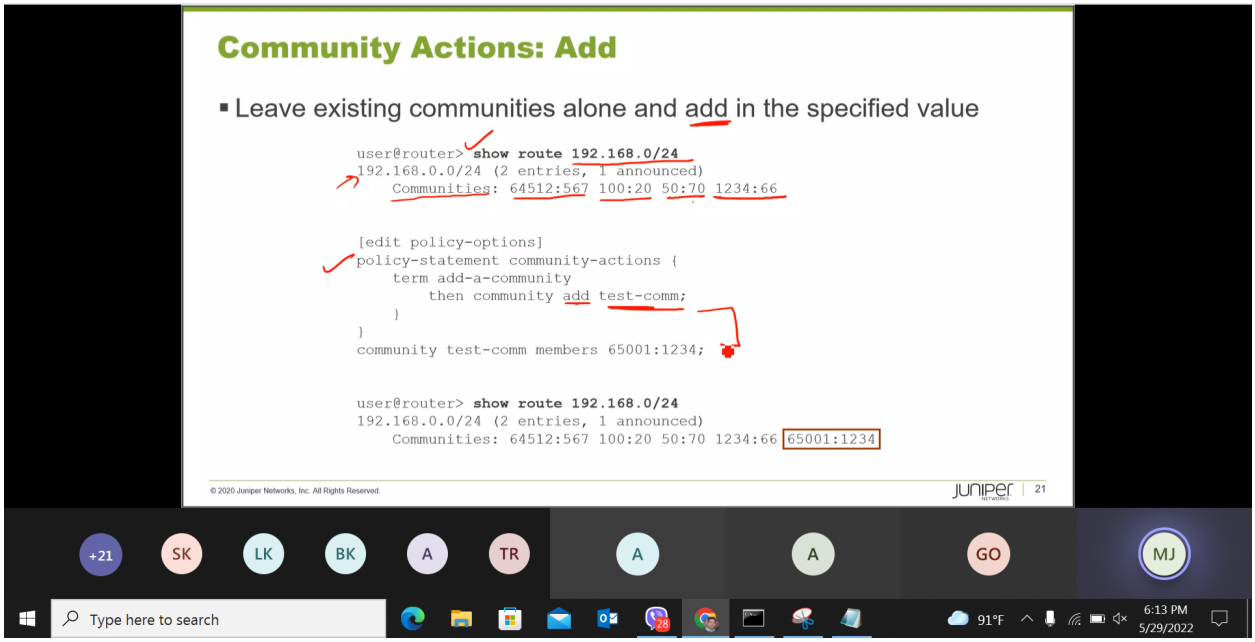
25


Community Actions: Add
▪ Leave existing communities alone and add in the specified value
user@router> show route 192.168.0.0/24
192.168.0.0/24 (2 entries, 1 announced)
Communities: 64512:567 100:20 50:70 1234:66
[edit policy-options]
policy-statement community-actions {
term add-a-community
then community add test-comm;
}
}
community test-comm members 65001:1234;
user@router> show route 192.168.0.0/24
192.168.0.0/24 (2 entries, 1 announced)
Communities: 64512:567 100:20 50:70 1234:66 65001:1234
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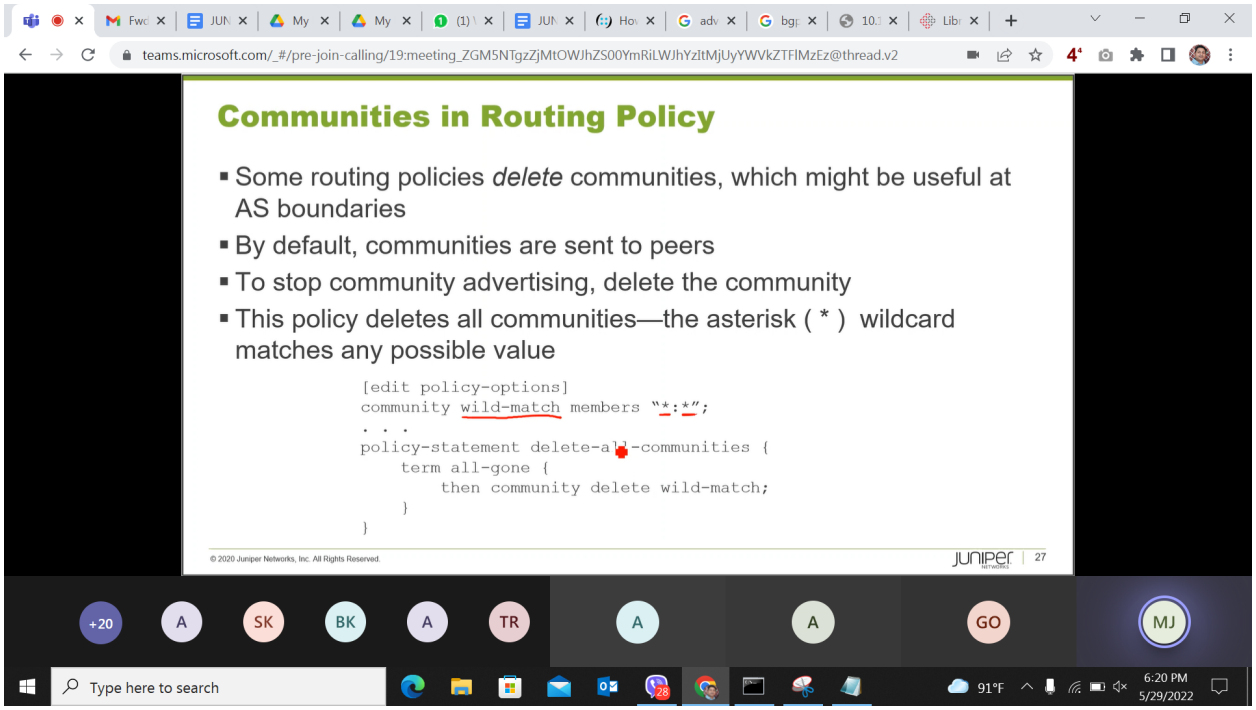
21


Communities in Routing Policy
Some routing policies delete communities, which might be useful at AS boundaries
By default, communities are sent to peers
To stop community advertising, delete the community
This policy deletes all communities—the asterisk (*) wildcard matches any possible value
[edit policy-options]
community wild-match members "*:*";
. . .
policy-statement delete-all-communities {
term all-gone {
then community delete wild-match;
}
}
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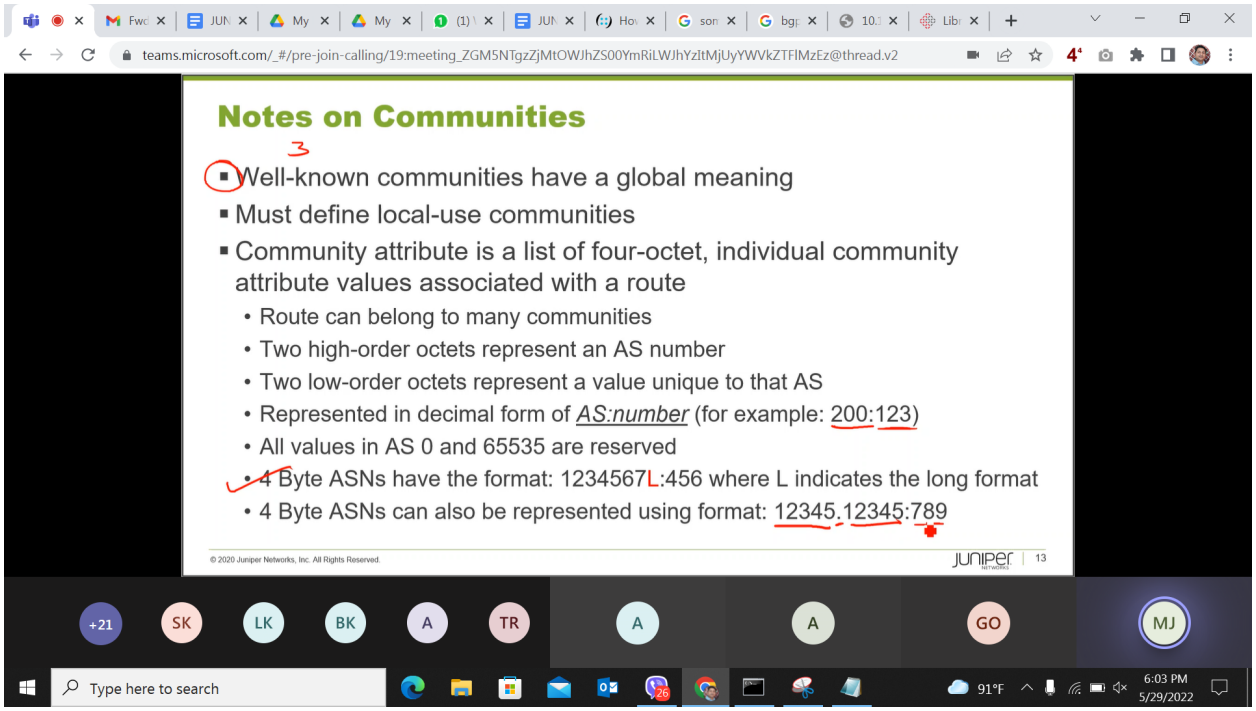
27


Notes on Communities
Well-known communities have a global meaning
Must define local-use communities
Community attribute is a list of four-octet, individual community attribute values associated with a route
Route can belong to many communities
Two high-order octets represent an AS number
Two low-order octets represent a value unique to that AS
Represented in decimal form of AS:number (for example: 200:123)
All values in AS 0 and 65535 are reserved
4 Byte ASNs have the format: 1234567L:456 where L indicates the long format
4 Byte ASNs can also be represented using format: 12345.12345:789
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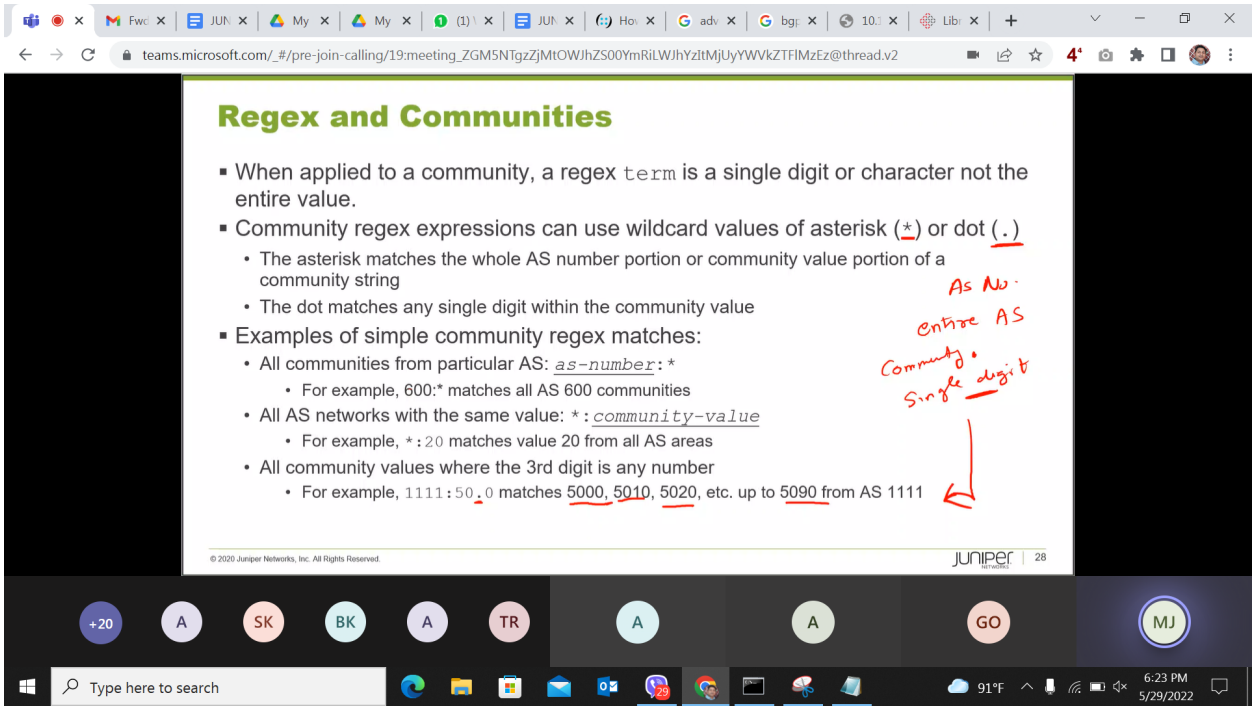
Regex and Communities
When applied to a community, a regex term is a single digit or character not the entire value.
Community regex expressions can use wildcard values of asterisk (*) or dot (.)
The asterisk matches the whole AS number portion or community value portion of a community string
The dot matches any single digit within the community value
Examples of simple community regex matches:
All communities from particular AS: as-number:*
For example, 600:* matches all AS 600 communities
All AS networks with the same value: *:community-value
For example, *:20 matches value 20 from all AS areas
All community values where the 3rd digit is any number
For example, 1111:50.0 matches 5000, 5010, 5020, etc. up to 5090 from AS 1111
As No.
entire AS
Community
Single digit
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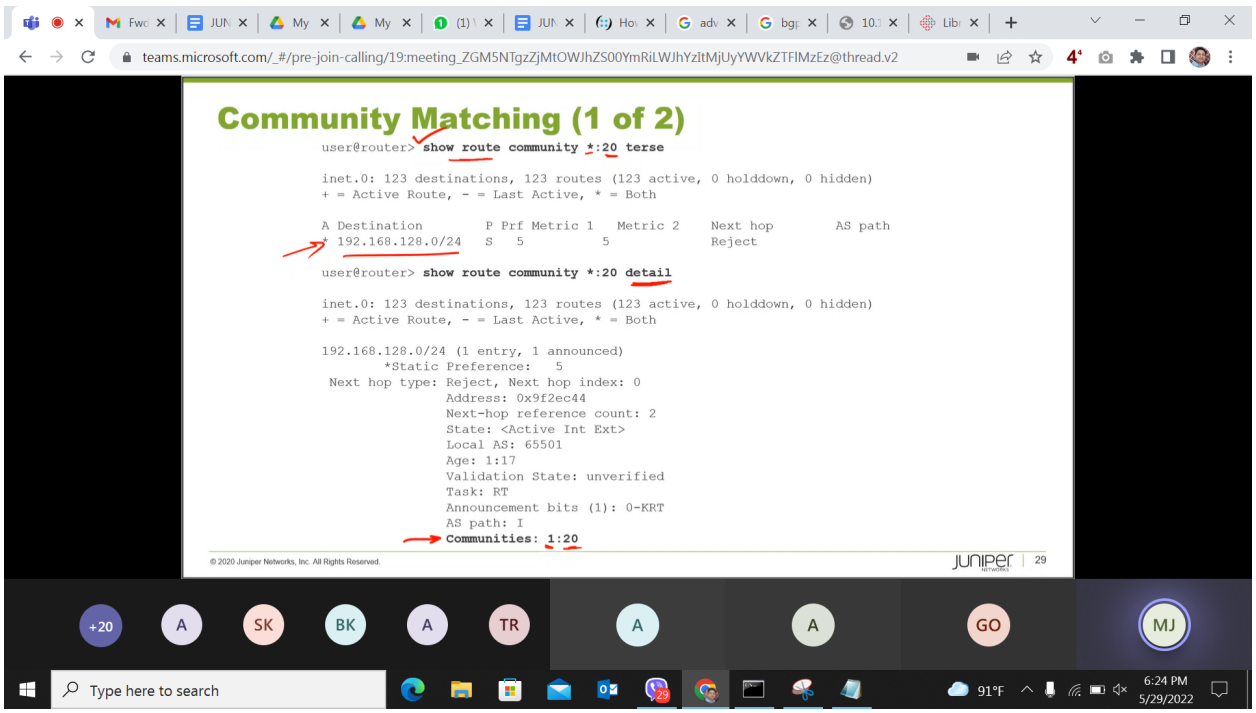
Community Matching (1 of 2)
user@router> show route community *:20 terse
inet.0: 123 destinations, 123 routes (123 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
A Destination P Prf Metric 1 Metric 2 Next hop AS path
* 192.168.128.0/24 S 5 5 Reject
user@router> show route community *:20 detail
inet.0: 123 destinations, 123 routes (123 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
192.168.128.0/24 (1 entry, 1 announced)
*Static Preference: 5
Next hop type: Reject, Next hop index: 0
Address: 0x9f2ec44
Next-hop reference count: 2
State: <Active Int Ext>
Local AS: 65501
Age: 1:17
Validation State: unverified
Task: RT
Announcement bits (1): 0-KRT
AS path: I
Communities: 1:20
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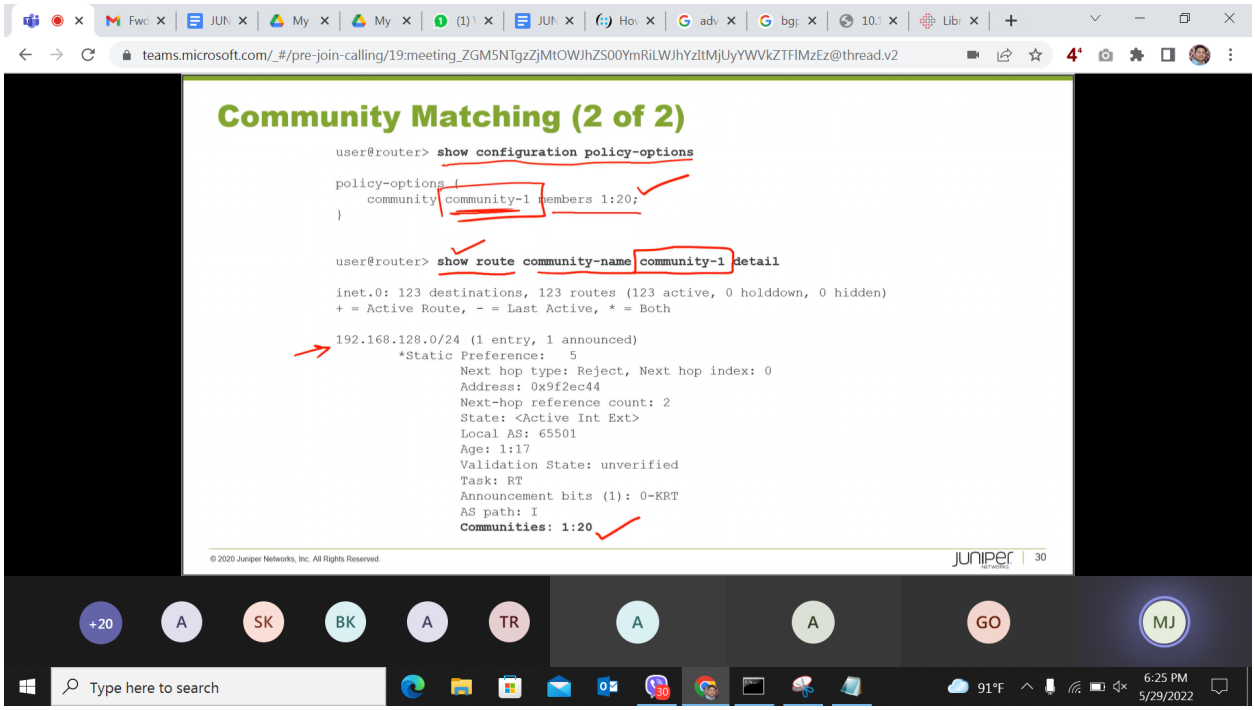
Community Matching (2 of 2)
user@router> show configuration policy-options
policy-options {
community community-1 members 1:20;
}
user@router> show route community-name community-1 detail
inet.0: 123 destinations, 123 routes (123 active, 0 holddown, 0 hidden)
+ = Active Route, - = Last Active, * = Both
192.168.128.0/24 (1 entry, 1 announced)
*Static Preference: 5
Next hop type: Reject, Next hop index: 0
Address: 0x9f2ec44
Next-hop reference count: 2
State: <Active Int Ext>
Local AS: 65501
Age: 1:17
Validation State: unverified
Task: RT
Announcement bits (1): 0-KRT
AS path: I
Communities: 1:20
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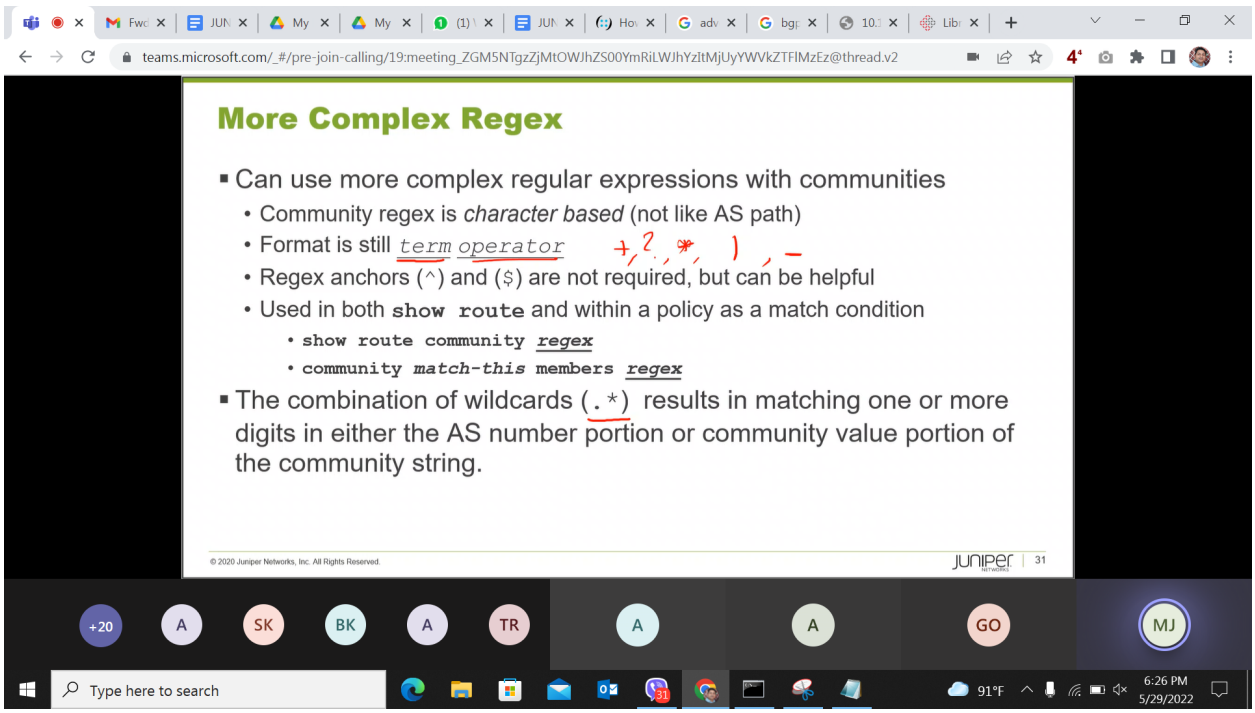
More Complex Regex
Can use more complex regular expressions with communities
Community regex is character based (not like AS path)
Format is still term operator
Regex anchors (^) and ($) are not required, but can be helpful
Used in both show route and within a policy as a match condition
show route community regex
community match-this members regex
The combination of wildcards (.*) results in matching one or more digits in either the AS number portion or community value portion of the community string.
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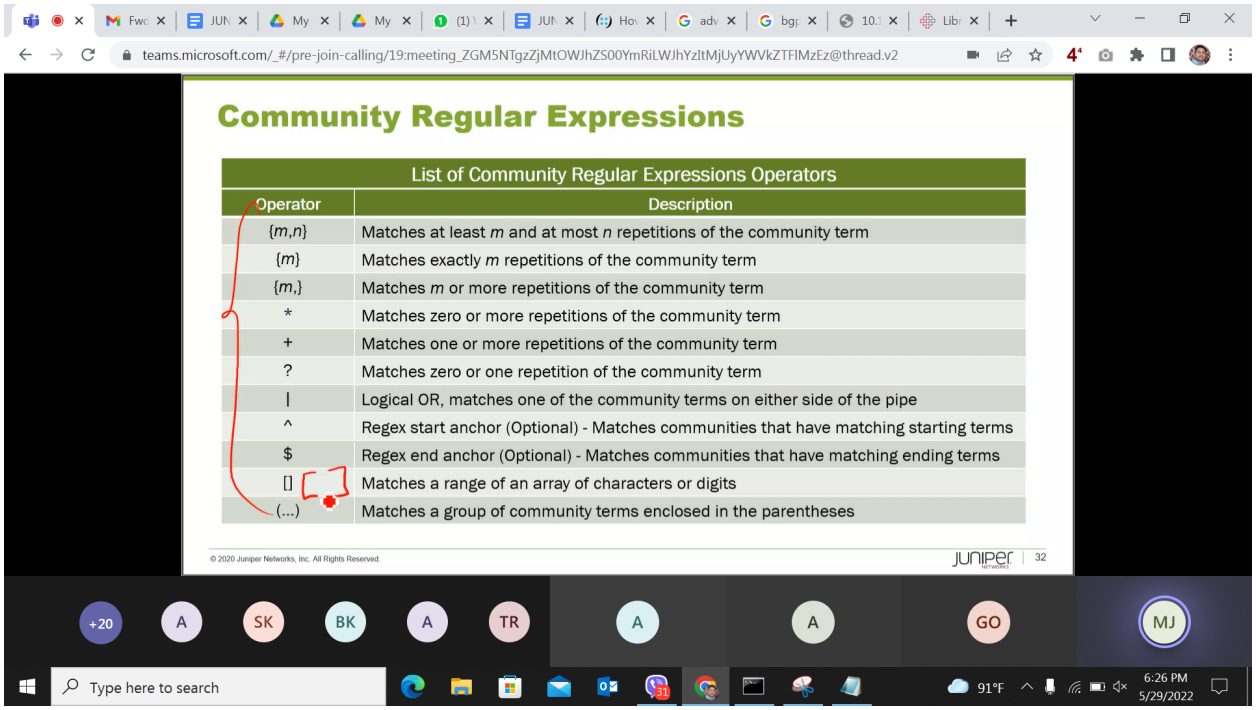
teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
Community Regular Expressions
List of Community Regular Expressions Operators
Operator
Description
{m,n}
Matches at least m and at most n repetitions of the community term
{m}
Matches exactly m repetitions of the community term
{m,}
Matches m or more repetitions of the community term
*
Matches zero or more repetitions of the community term
+
Matches one or more repetitions of the community term
?
Matches zero or one repetition of the community term
|
Logical OR, matches one of the community terms on either side of the pipe
^
Regex start anchor (Optional) - Matches communities that have matching starting terms
$
Regex end anchor (Optional) - Matches communities that have matching ending terms
[]
Matches a range of an array of characters or digits
(...)
Matches a group of community terms enclosed in the parentheses
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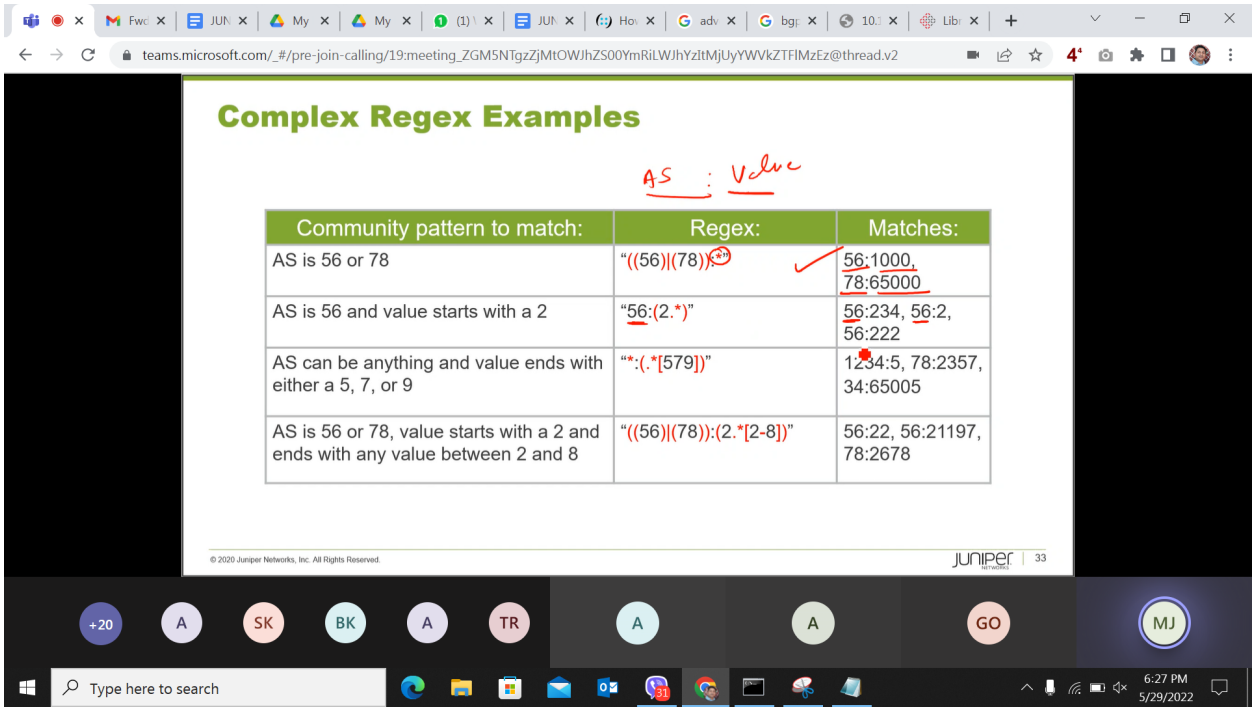
juniper
32
Type here to search
91°F
6:26 PM
5/29/2022


teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
Complex Regex Examples
AS : Value
Community pattern to match:
Regex:
Matches:
AS is 56 or 78
"((56)|(78)):(.*)"
56:1000, 78:65000
AS is 56 and value starts with a 2
"56:(2.*)"
56:234, 56:2, 56:222
AS can be anything and value ends with either a 5, 7, or 9
"*:(.*[579])"
1234:5, 78:2357, 34:65005
AS is 56 or 78, value starts with a 2 and ends with any value between 2 and 8
"((56)|(78)):(2.*[2-8])"
56:22, 56:21197, 78:2678
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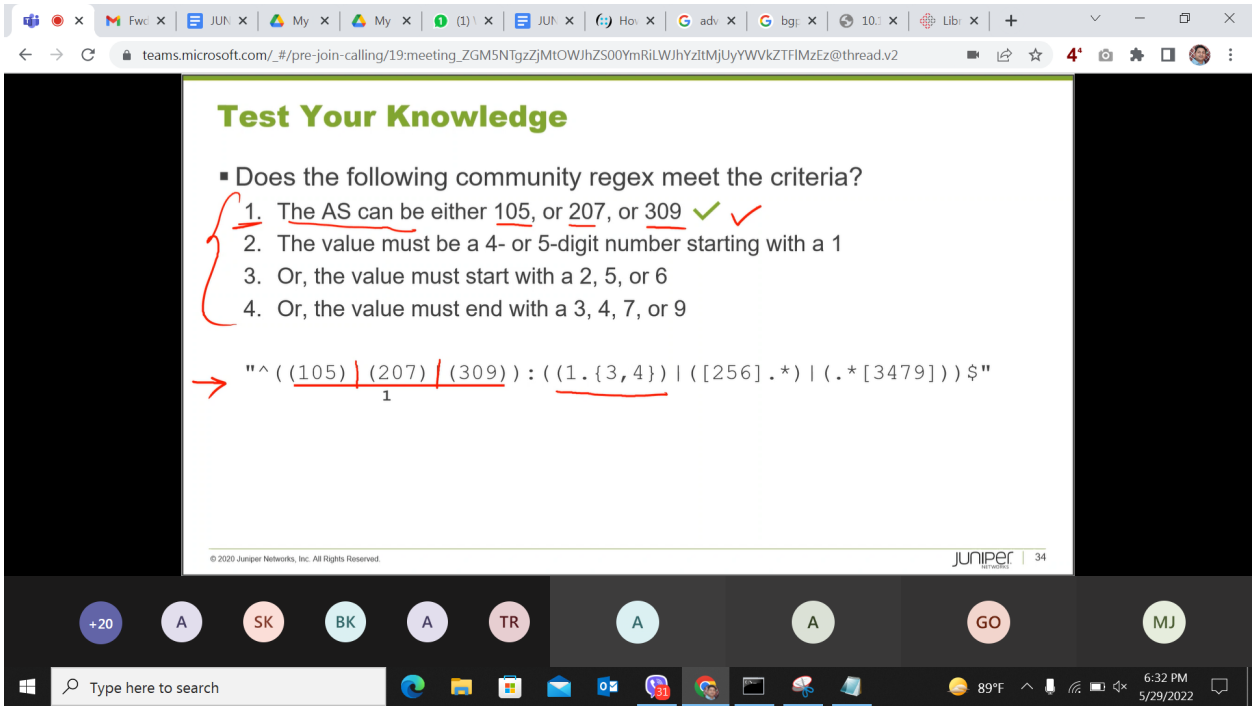
33
Type here to search
6:27 PM
5/29/2022


Test Your Knowledge
Does the following community regex meet the criteria?
1. The AS can be either 105, or 207, or 309
2. The value must be a 4- or 5-digit number starting with a 1
3. Or, the value must start with a 2, 5, or 6
4. Or, the value must end with a 3, 4, 7, or 9
"^((105)|(207)|(309)):((1.{3,4})|([256].*)|(.*[3479]))$"
1
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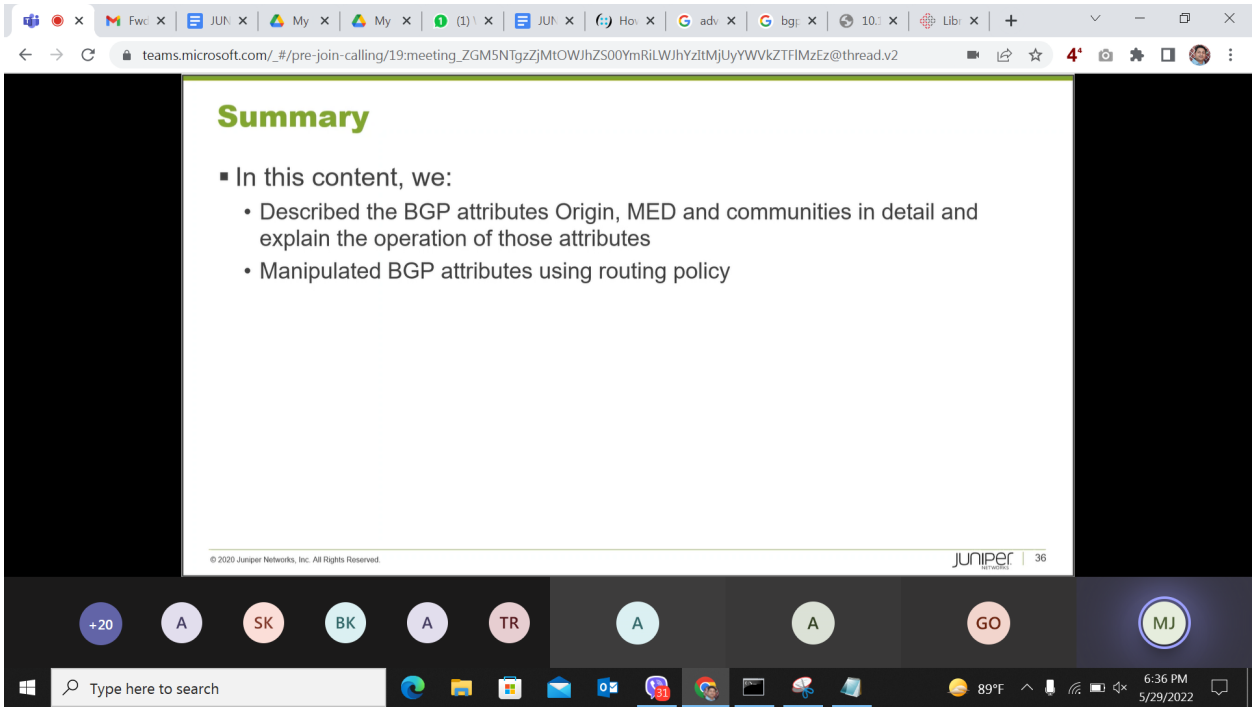
Summary
In this content, we:
Described the BGP attributes Origin, MED and communities in detail and explain the operation of those attributes
Manipulated BGP attributes using routing policy
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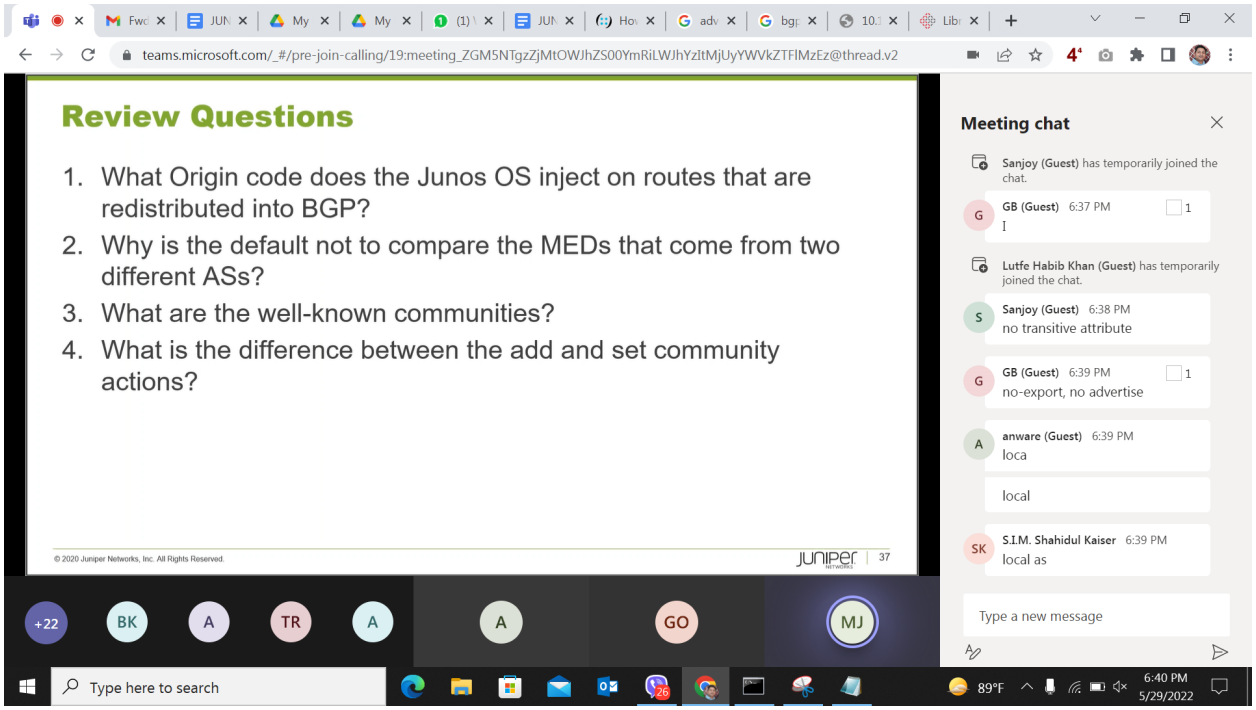
teams.microsoft.com/_#/pre-join-calling/19:meeting_ZGM5NTgzZjMtOWJhZS00YmRiLWJhYzItMjUyYWVkZTFlMzEz@thread.v2
Review Questions
1. What Origin code does the Junos OS inject on routes that are redistributed into BGP?
2. Why is the default not to compare the MEDs that come from two different ASs?
3. What are the well-known communities?
4. What is the difference between the add and set community actions?
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Meeting chat
Sanjoy (Guest) has temporarily joined the chat.
GB (Guest) 6:37 PM
I
Lutfe Habib Khan (Guest) has temporarily joined the chat.
Sanjoy (Guest) 6:38 PM
no transitive attribute
GB (Guest) 6:39 PM
no-export, no advertise
anware (Guest) 6:39 PM
loca
local
S.I.M. Shahidul Kaiser 6:39 PM
local as
Type a new message
+22
BK
A
TR
A
A
GO
MJ
Type here to search
89°F
6:40 PM
5/29/2022