

The longest LSP in the world

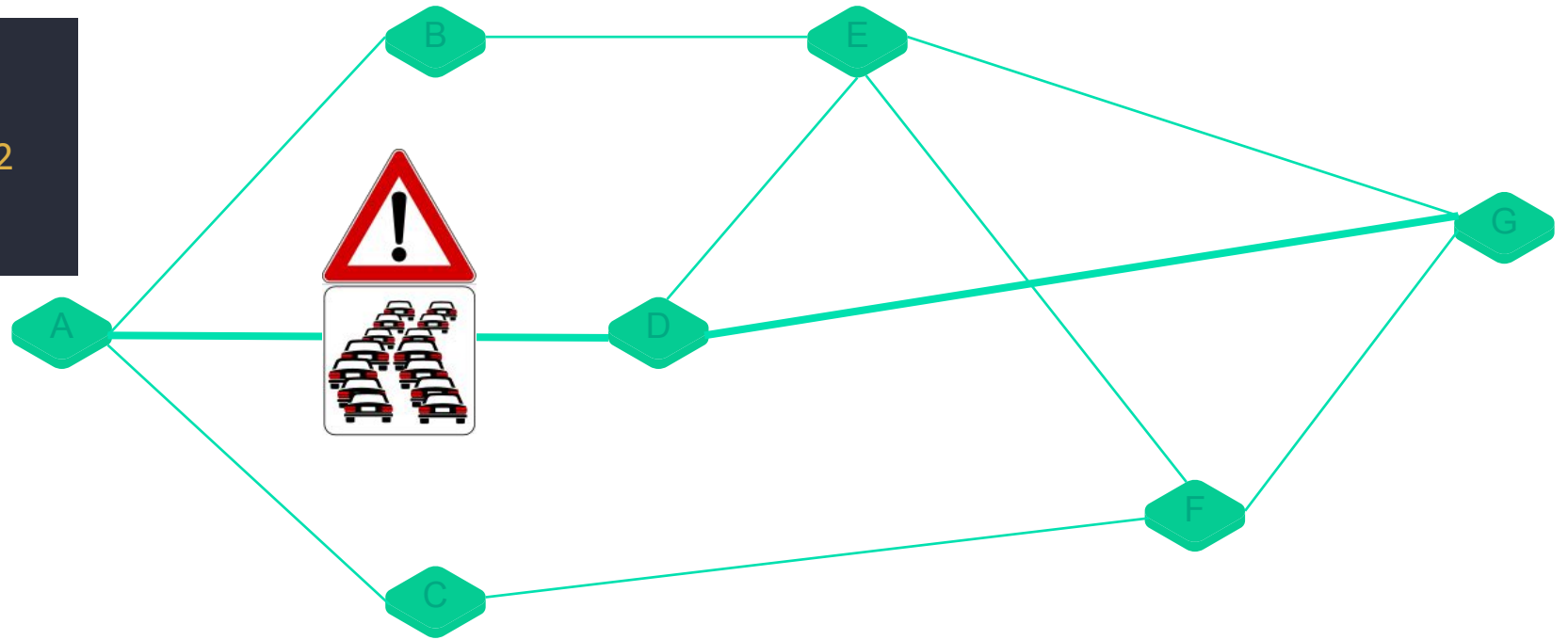
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- G, via D cost 2
- F, via C cost 2
- E, via B or D, cost 2



LSDB



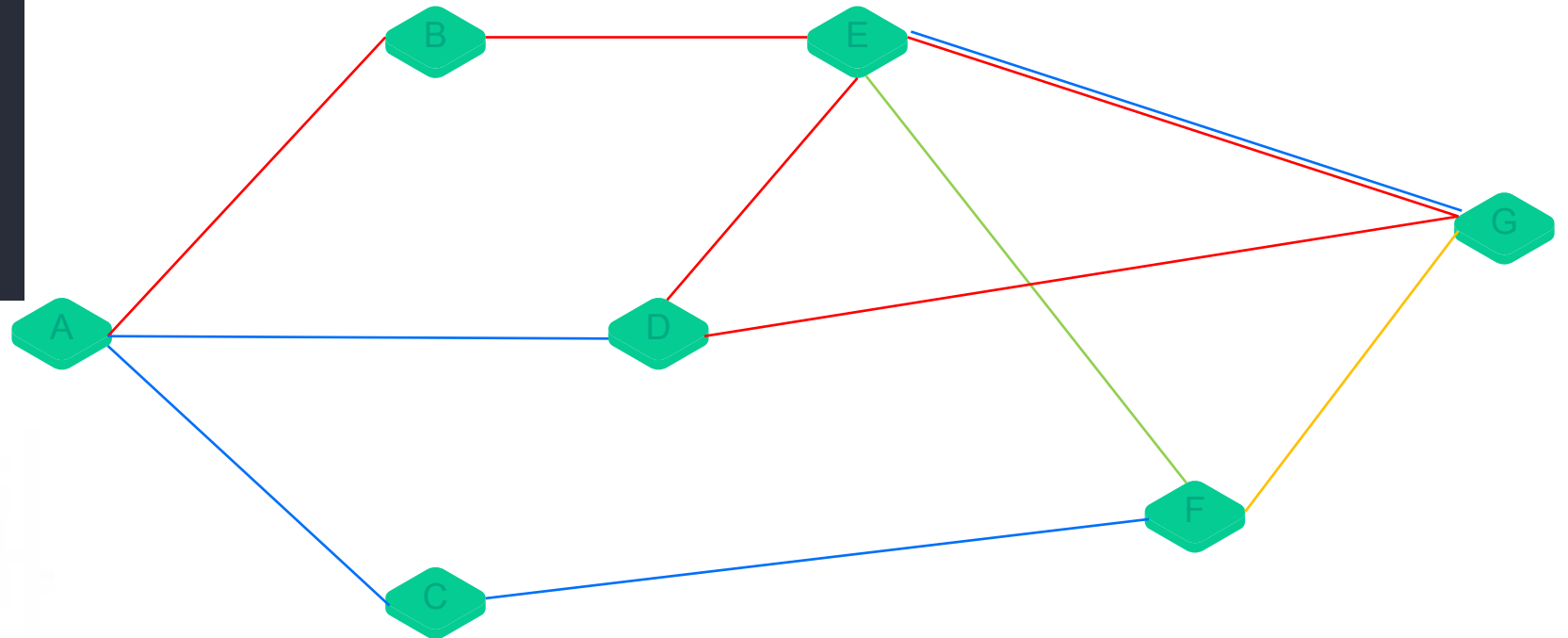
Traffic Engineering is about planning

Path from A to G
- Only red links
- At most 4 hops

PATH is A-B-E-D-G



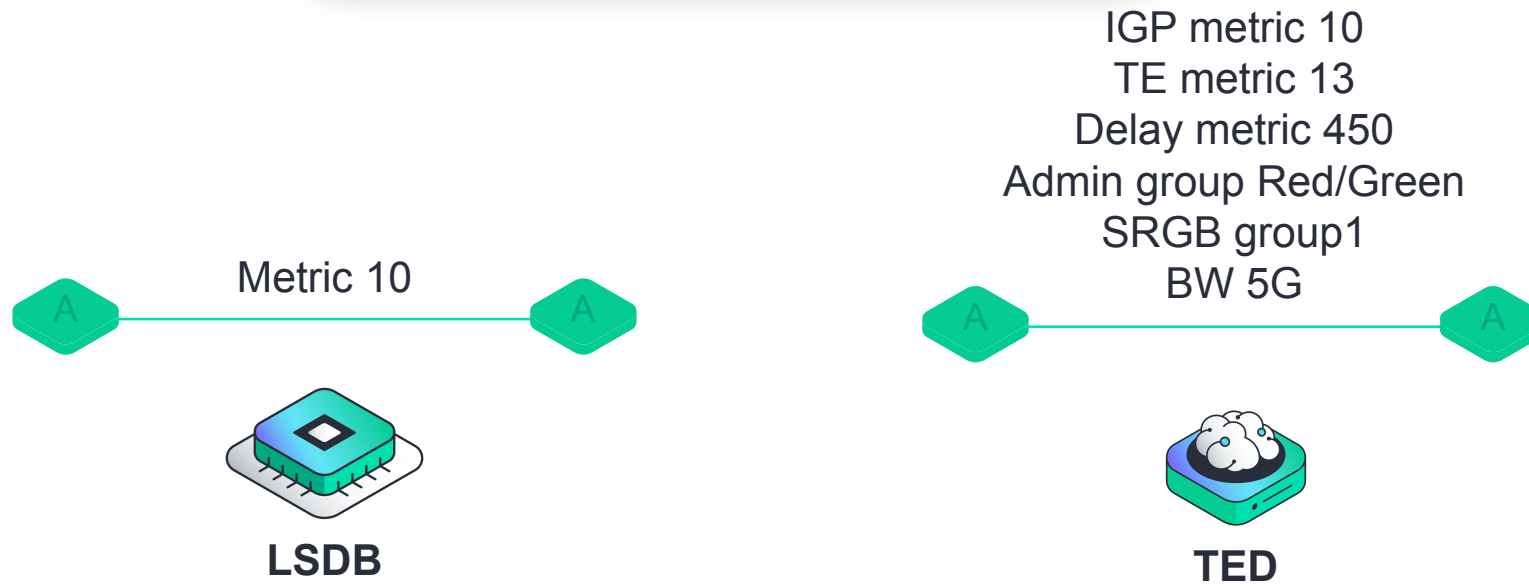
TED



JUST GO
THERE



INTENT



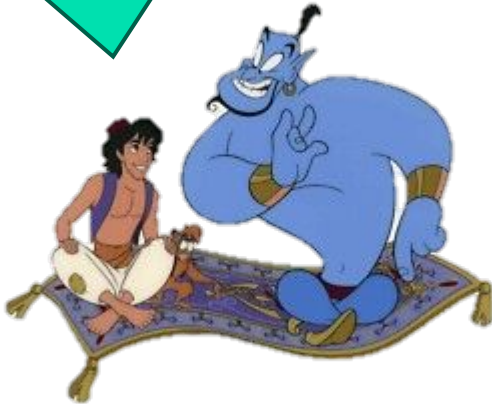
- Turns intent into reality
- Looks at network in terms of resources
- Plans resources usage
- Shortest path is just a coincidence



The longest SR LSP in the world...



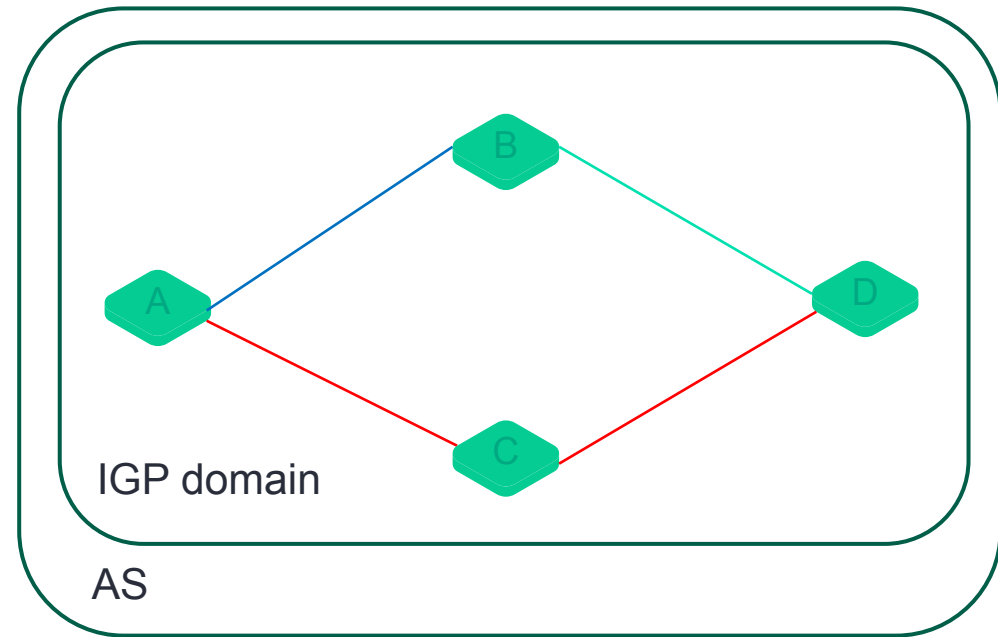
From A to D
Max 3 hops
No Blue Links
Lowest delay



Router A TED
(LSDB+...ok)



LINK A-B
LINK A-C
LINK B-D
LINK C-D



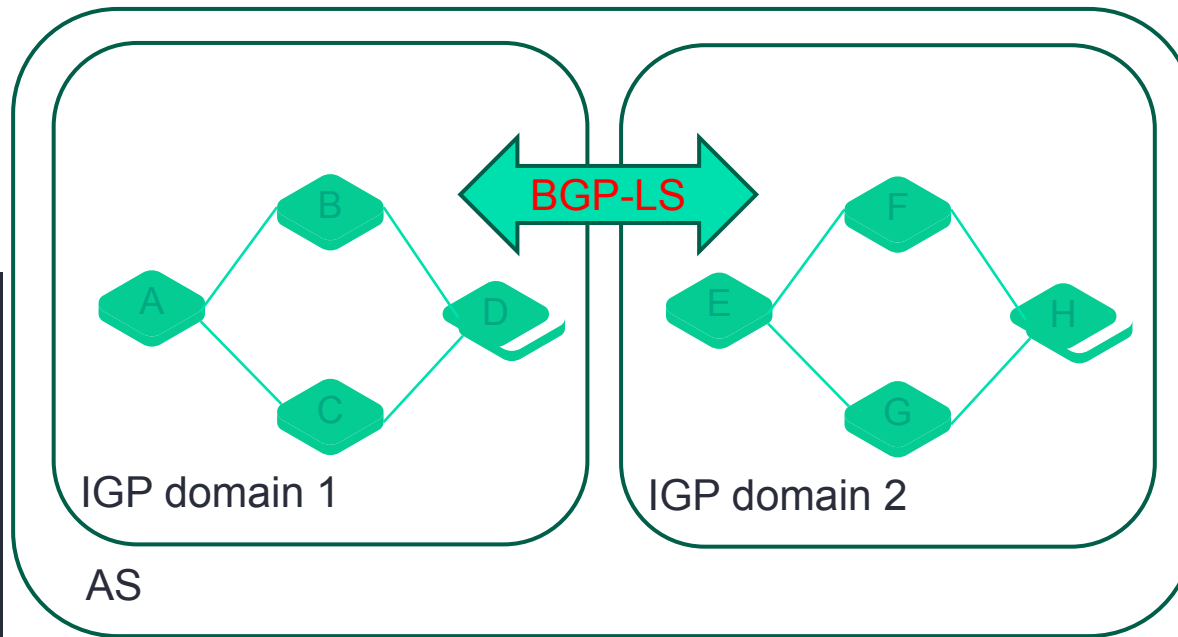
Multi-domain? Here comes BGP-LS!

BGP-LS to advertise TED data
 For example, links with all their TE attributes
 (IGP, TE, Delay, Adm Groups, etc...)

Router A TED



```
LINK A-B
LINK A-C
LINK B-D
LINK C-D
LINK D-E (TED only)
LINK E-F (TED only)
LINK E-G (TED only)
LINK F-H (TED only)
LINK G-H (TED only)
```



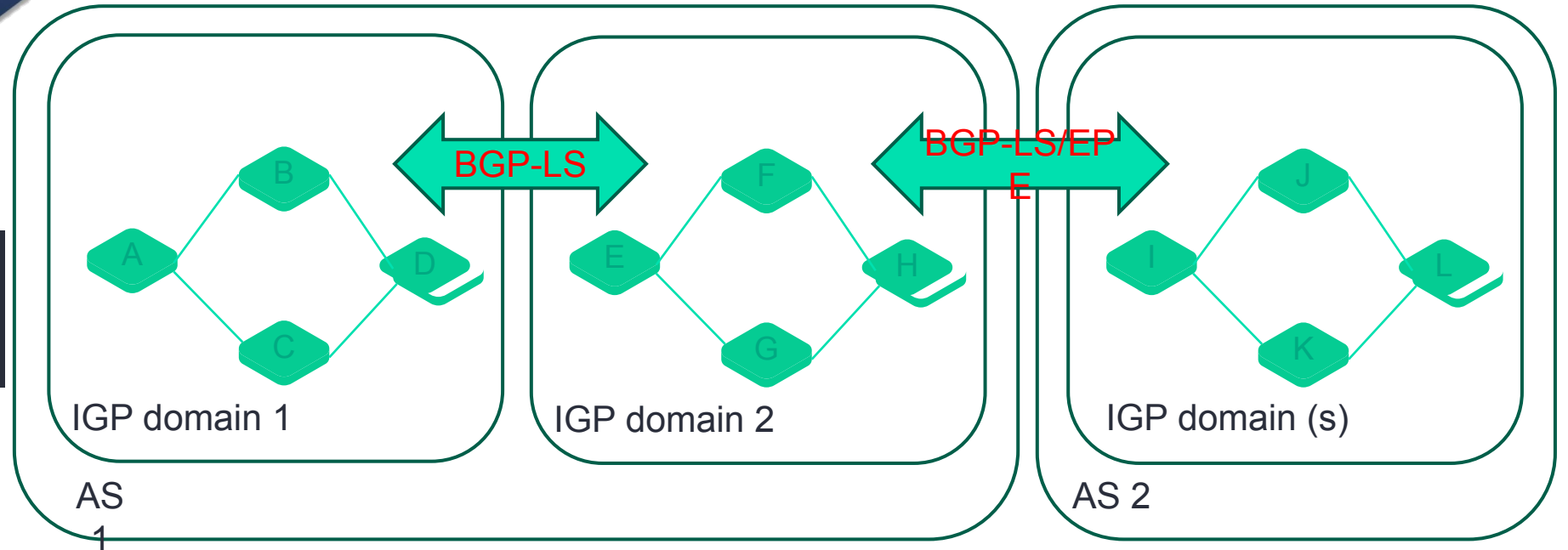


EPE models a link
Label + TE attributes
Into TED as link

Router A TED



AS1 LINKS
AS1-AS2 EPE LINK
AS2 LINKS

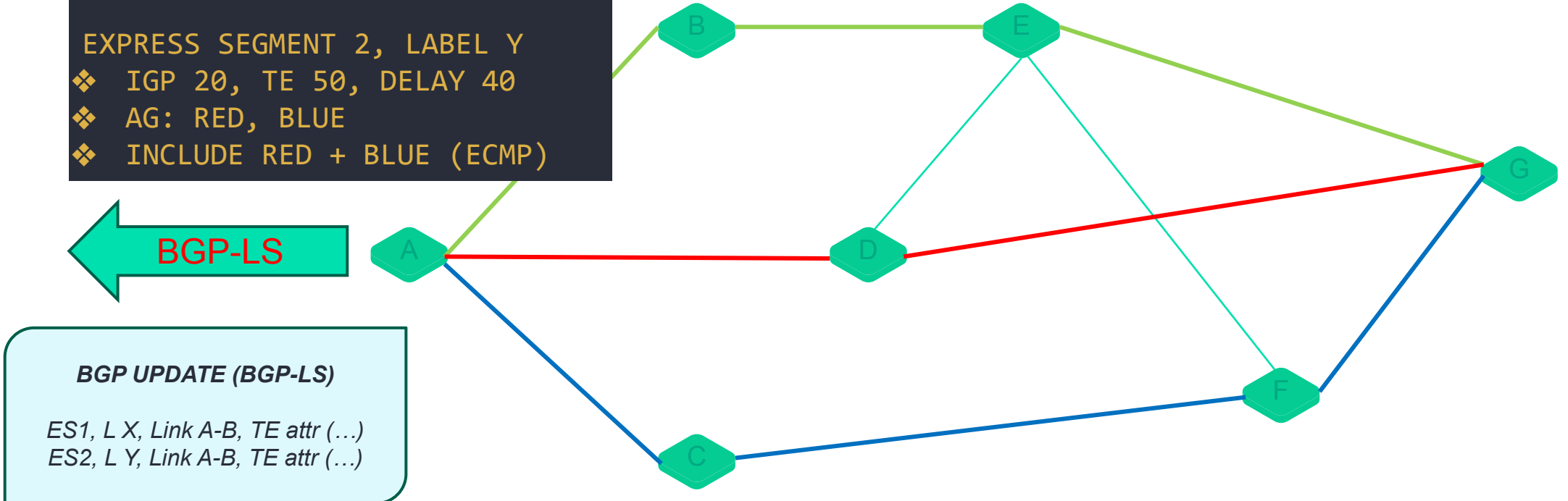


```

EXPRESS SEGMENT 1, LABEL X
❖ IGP 20, TE 50, DELAY 40
❖ AG: RED, BLACK
❖ INCLUDE GREEN PATH

EXPRESS SEGMENT 2, LABEL Y
❖ IGP 20, TE 50, DELAY 40
❖ AG: RED, BLUE
❖ INCLUDE RED + BLUE (ECMP)
    
```

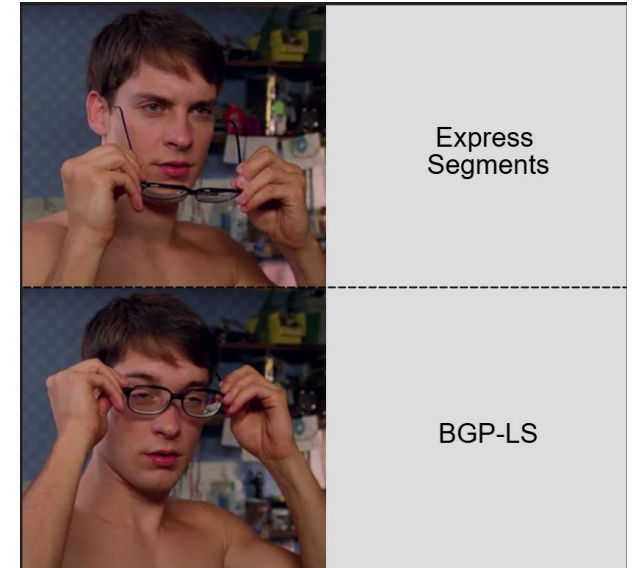
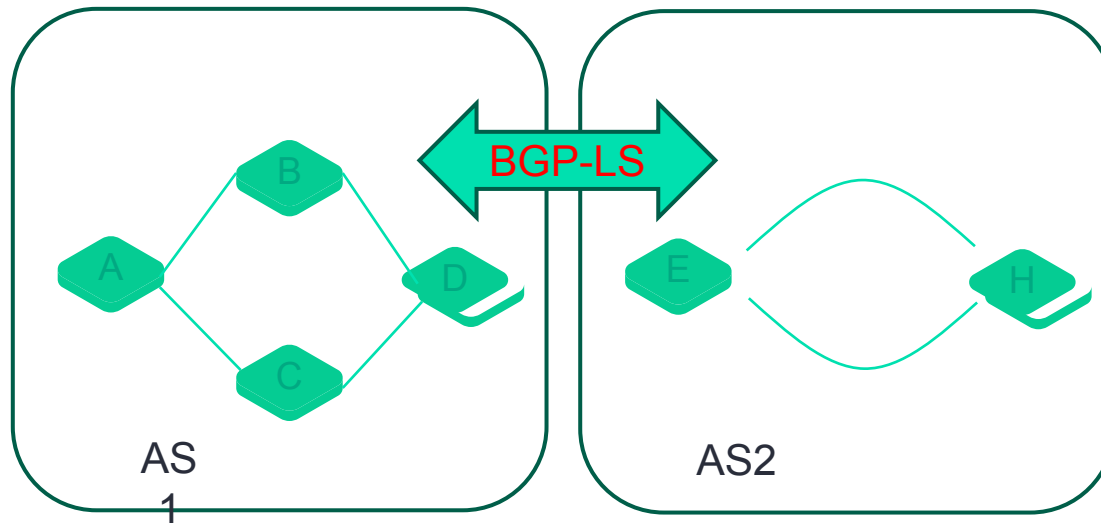
SR-FA (express segments)
 Are used to abstract underlay LSPs
 Hide "internals" while providing TE data



Router A TED



```
LINK A-B  
LINK A-C  
LINK B-D  
LINK C-D  
LINK D-E  
LINK E-H (ES1)  
LINK E-H (ES2)
```





Router A LSP RIB

```
To B, color 100, green
To B, color 200, blue
To B, color 300, purple
```

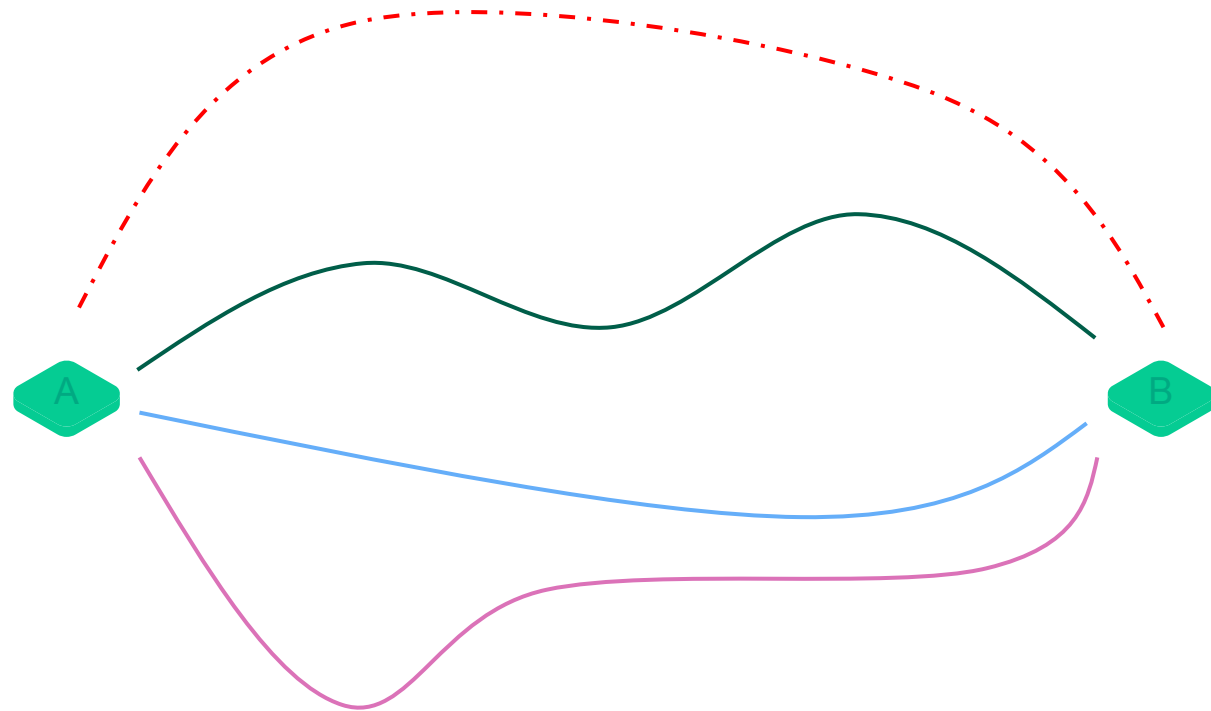


Router A IPV4 RIB

```
To D1, via green LSP
To D2, via blue LSP
To D3, via purple LSP
```

BGP

- D1: color 100, NH B
- D2: color 200, NH B
- D3: color 300, NH B





Router A TED

```
LINK A-B  
LINK A-C  
LINK B-D  
LINK C-D  
...  
NO INFO ABOUT AS2
```



Router A RIB

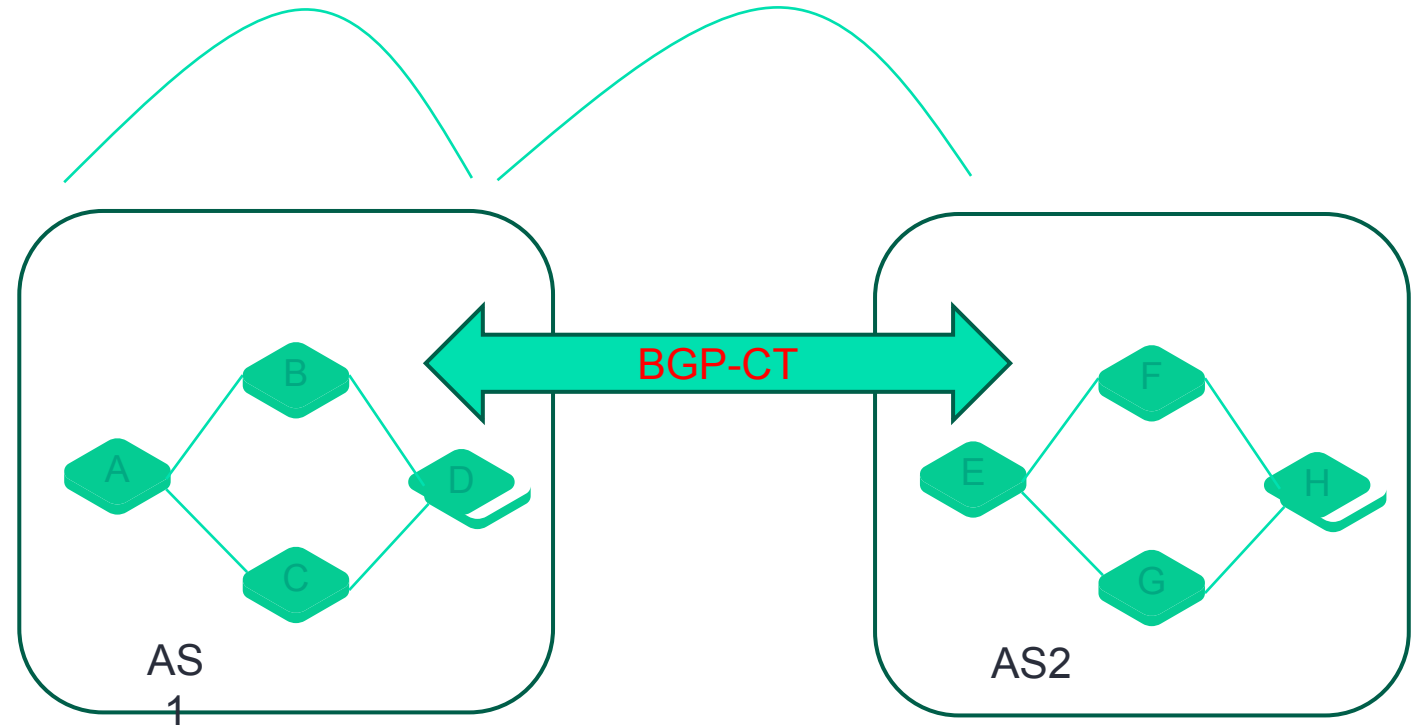
```
TO D, via LSP pippo color 100  
TO D, via LSP pluto color 200  
TO H+color100, PNH D (via pippo)  
TO H+color200, PNH D (via pluto)
```

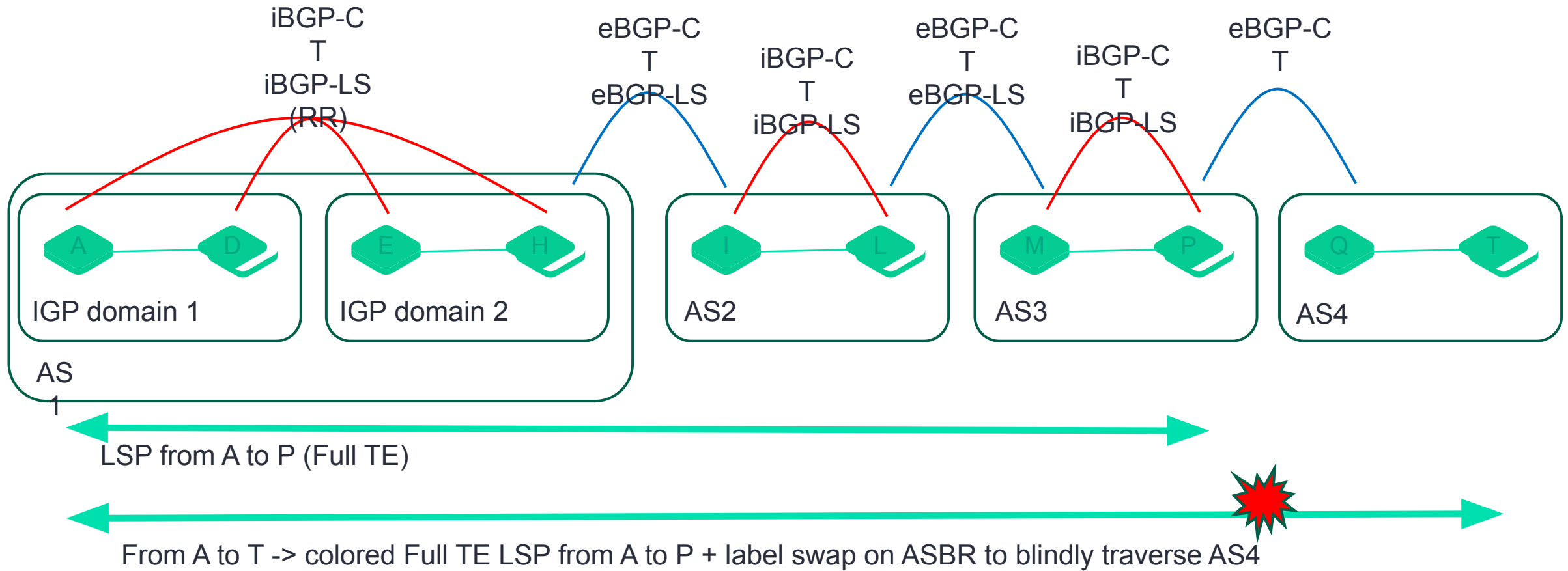
iBGP-CT

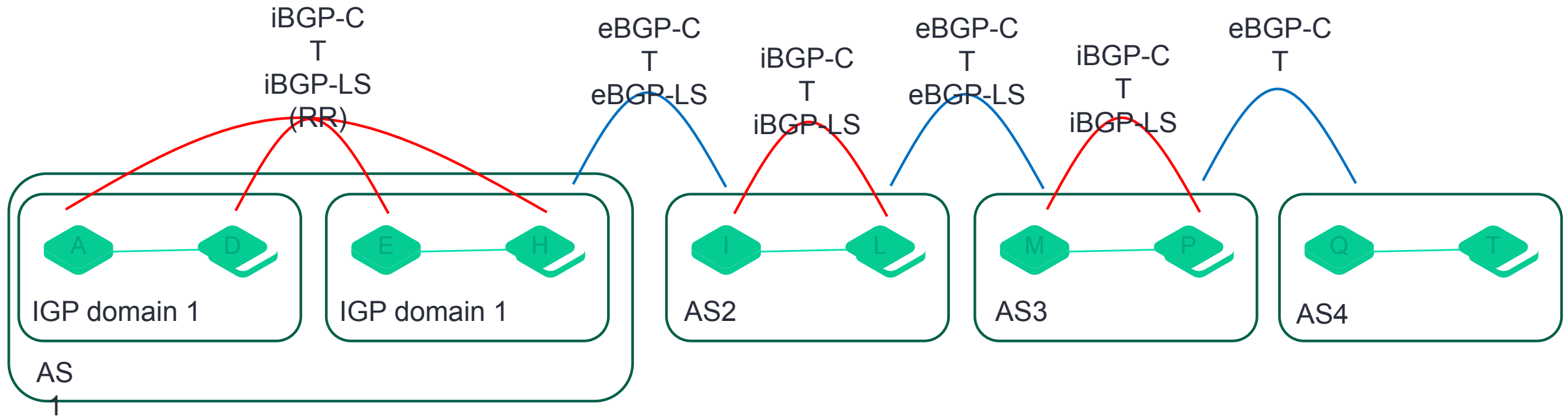
- H: color 100, L21, NH D
- H: color 200, L22, NH D
- G: color 100, L23, NH D
- F: color 300, L24, NH D

eBGP-CT

- H: color 100, L11, NH E
- H: color 200, L12, NH E
- G: color 100, L13, NH E
- F: color 300, L14, NH E







Router A TED

```
AS1 LINKS
AS2 LINKS
AS3 LINKS (SR-FA)
```



Router A LSP RIB

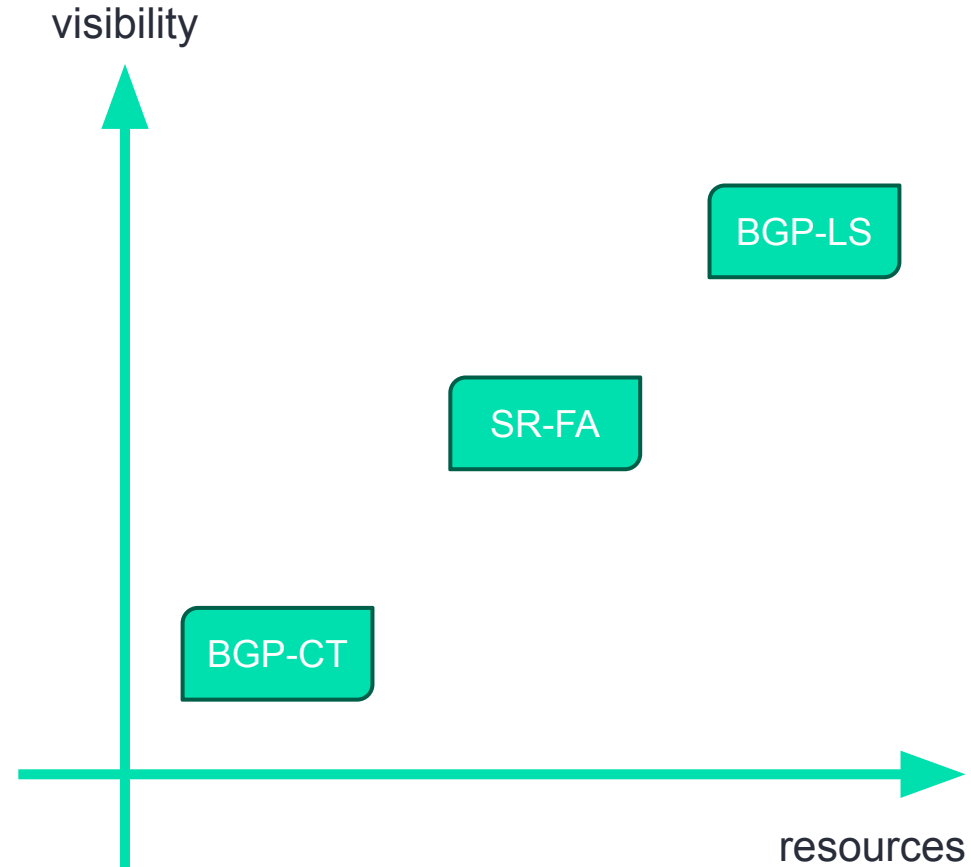
```
To P, color 100, green
To P, color 200, blue
To P, color 300, purple
```



Router A RIB

```
To D1/col100, PNH P (green)
To D2/col200, PNH P (purple)
```

Which one? The technical ideal world





ciao

