



BORDER GATEWAY PROTOCOL

PRESENTATION IN
COMPUTER
NETWORKS

GROUP MEMBERS



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CONTENTS

INTRODUCTION

18. Avipsa Ghorai

ORIGIN OF THE BORDER GATEWAY PROTOCOL

17. Pratyush Chowdhury

WORKING

20. Krishnaraj Thadesar

ADVANTAGES OF BGP

16. Shivranjan Yogesh Pathak

LIMITATIONS OF BGP

19. Vaishnavi Powar



THANK YOU!

INTRODUCTION

18. Avipsa Ghorai

WHAT IS BGP?

- BGP stands for Border Gateway Protocol.
- **Border Gateway Protocol (BGP)** refers to a gateway protocol that enables the internet to exchange routing information between **autonomous systems (AS)**.
- BGP makes peering possible without which networks could **not** interact/communicate (send or receive information) with each other.



PRIMARY REQUIREMENTS

When one network router is linked to other networks, it cannot decide which network is the best network to share its data to by itself.

Border Gateway Protocol considers all peering partners that a router has and sends traffic to the router closest to the data's destination.

This communication is possible because, at boot, BGP allows peers to communicate their routing information and then stores that information in a Routing Information Base (RIB). BGP can access this information and use it to choose the best peering option.

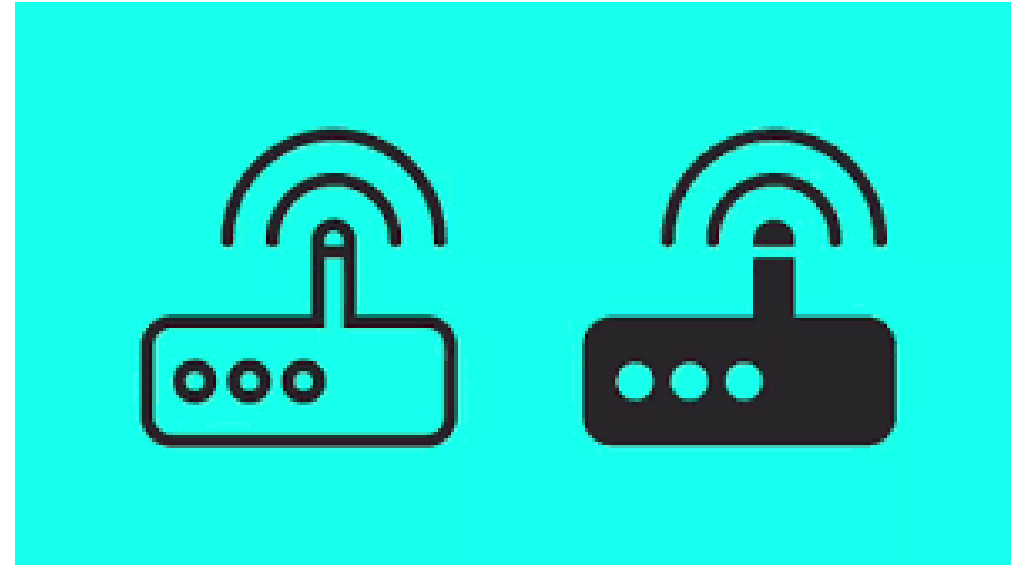
PRIMARY OBJECTIVE

- The main goal of BGP is to find any path to the destination that is loop-free.
- The routers that connect other ASs are called border gateways. The task of the border gateways is to forward packets between ASs. Each AS has at least one BGP speaker. BGP speakers exchange reachability information among ASs.



WHY DO WE NEED IT?

- When one network router is linked to other networks, it cannot decide which network is the best network to share its data to by itself.
- Border Gateway Protocol considers all peering partners that a router has and sends traffic to the router closest to the data's destination.
- This communication is possible because, at boot, BGP allows peers to communicate their routing information and then stores that information in a Routing Information Base (RIB). BGP can access this information and use it to choose the best peering option.





ORIGIN OF THE BORDER GATEWAY PROTOCOL

17. Pratyush Chowdhury



WHEN?

Border gateway protocol is how the internet routes traffic. Its origins date back to the early days of the internet. It initially came in the year 1989.

As the internet grew, the need for network routing protocols increased. The internet became more dynamic, we needed more dynamic protocols. Today, we have border gateway protocol as the primary routing protocol.

FIRST NETWORKS AND PROTOCOLS

The first network was **ARPANET**, which the department of defense developed, and the Advanced Research Project Agency designed it.

In ARPANET, only one network exists, which was handled by the single administrator.

All the routers were the part of the single network, and the routing was performed with the help of the GGP (Gateway to Gateway Routing Protocol).

NEED TO IMPROVE PROTOCOLS

The GGP was the first protocol among all the routing protocols. The autonomous system numbers were not used in the GGP protocol.

When the internet came into the market, then GGP started creating the problem. As the internet backbone became large due to which the routing table was also large, which led to the maintenance issue.

To resolve this issue, the ARPANET was divided into multiple domains, known as autonomous systems. Each autonomous system can be handled individually, and each system has its own routing policy, and the autonomous system contains the small routing database.

HISTORY FROM RIP

- When the autonomous system concept was implemented, the first routing protocol came known as RIP that runs on the single autonomous system.
- To connect the one autonomous system with another autonomous system, EGP (Exterior Gateway Protocol) protocol was developed. The EGP protocol was launched in 1984.
- The EGP protocol was used for five years, but it had certain flaws due to which the new protocol known as Border Gateway Protocol (BGP) was developed in 1989.

A hand holding a pen is positioned over a document that features a line graph. The document is resting on a desk. In the background, a computer monitor is visible, and a mouse is partially seen in the lower-left corner. The scene is dimly lit, with the primary light source coming from the left, casting soft shadows.

VERSIONS OF BGP TILL NOW

There are many versions of BGP, such as:

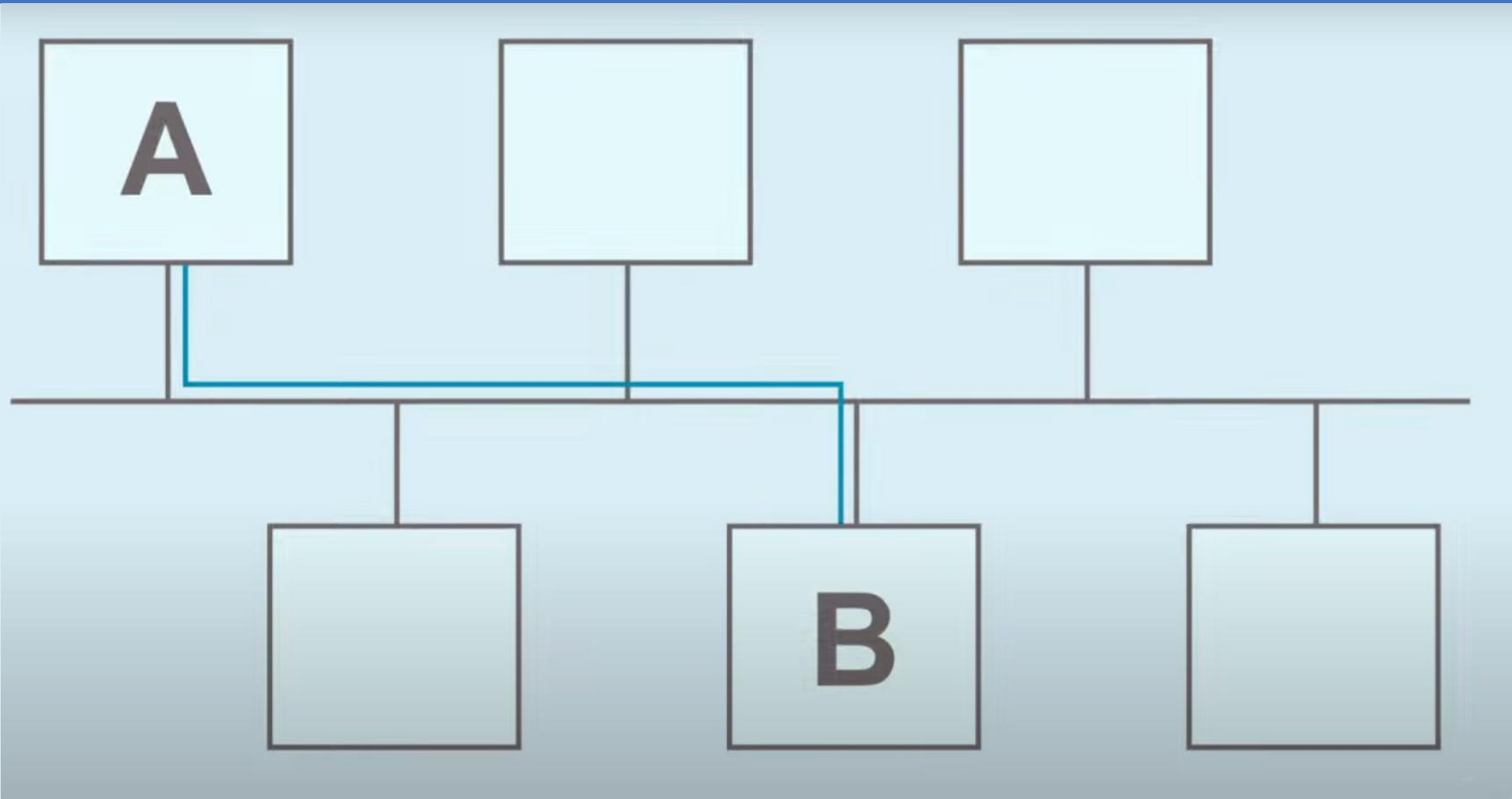
- BGP version 1: This version was released in 1989.
- BGP version 2: This version was released in 1990.
- BGP version 3: This version was released in 1991.
- BGP version 4: This version was released in 1994 and revised in 1995, It is the current version of BGP.

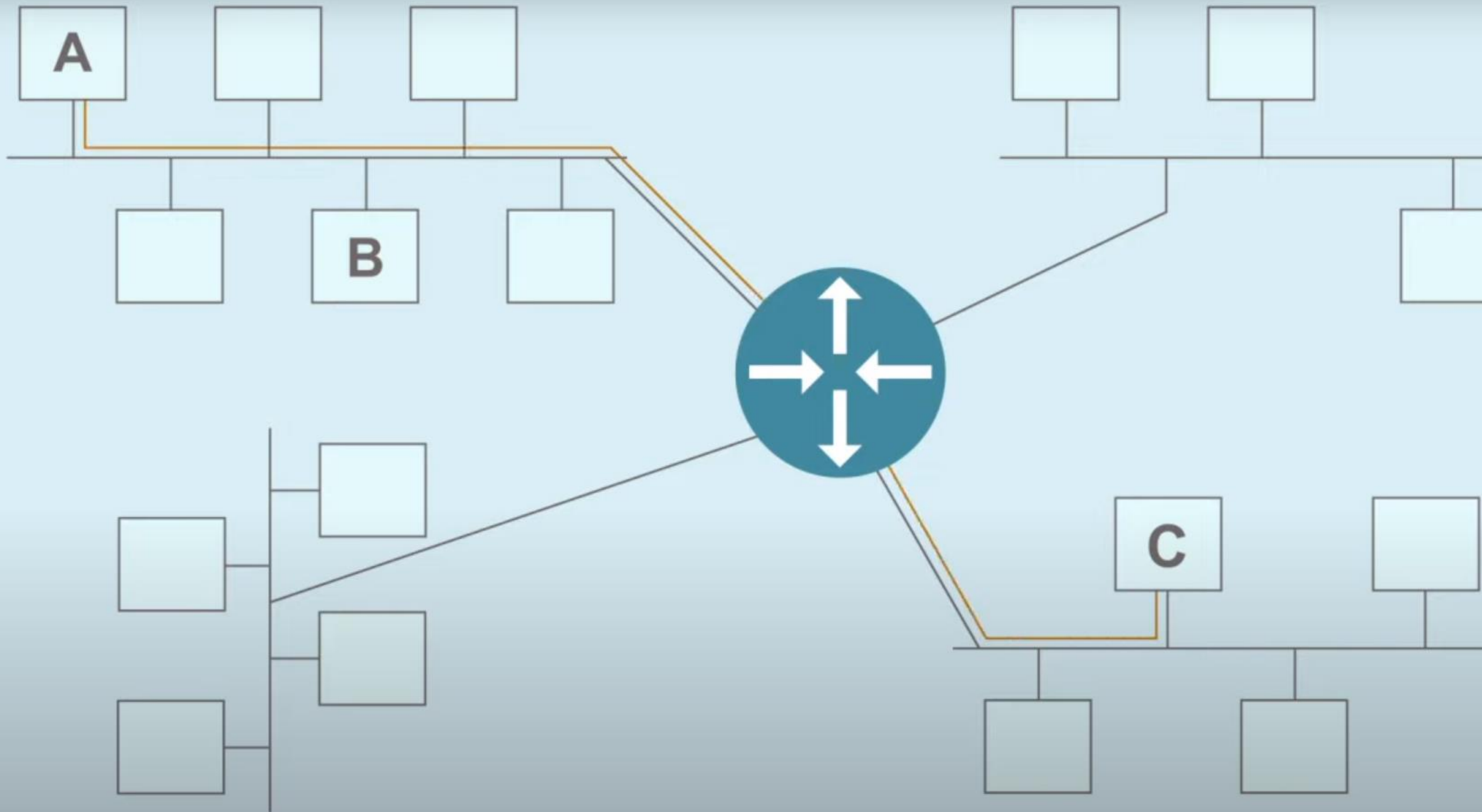


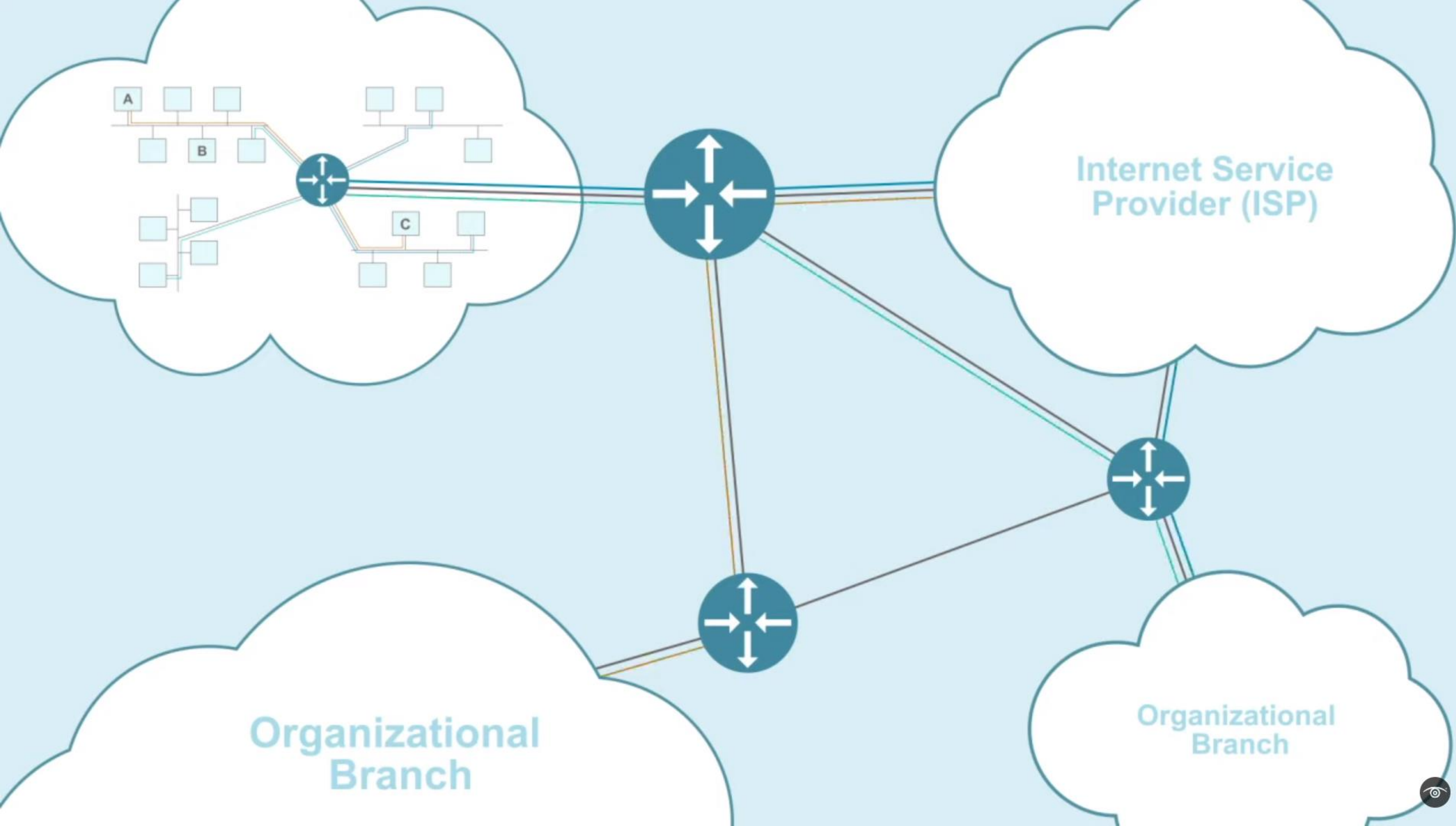
WORKING

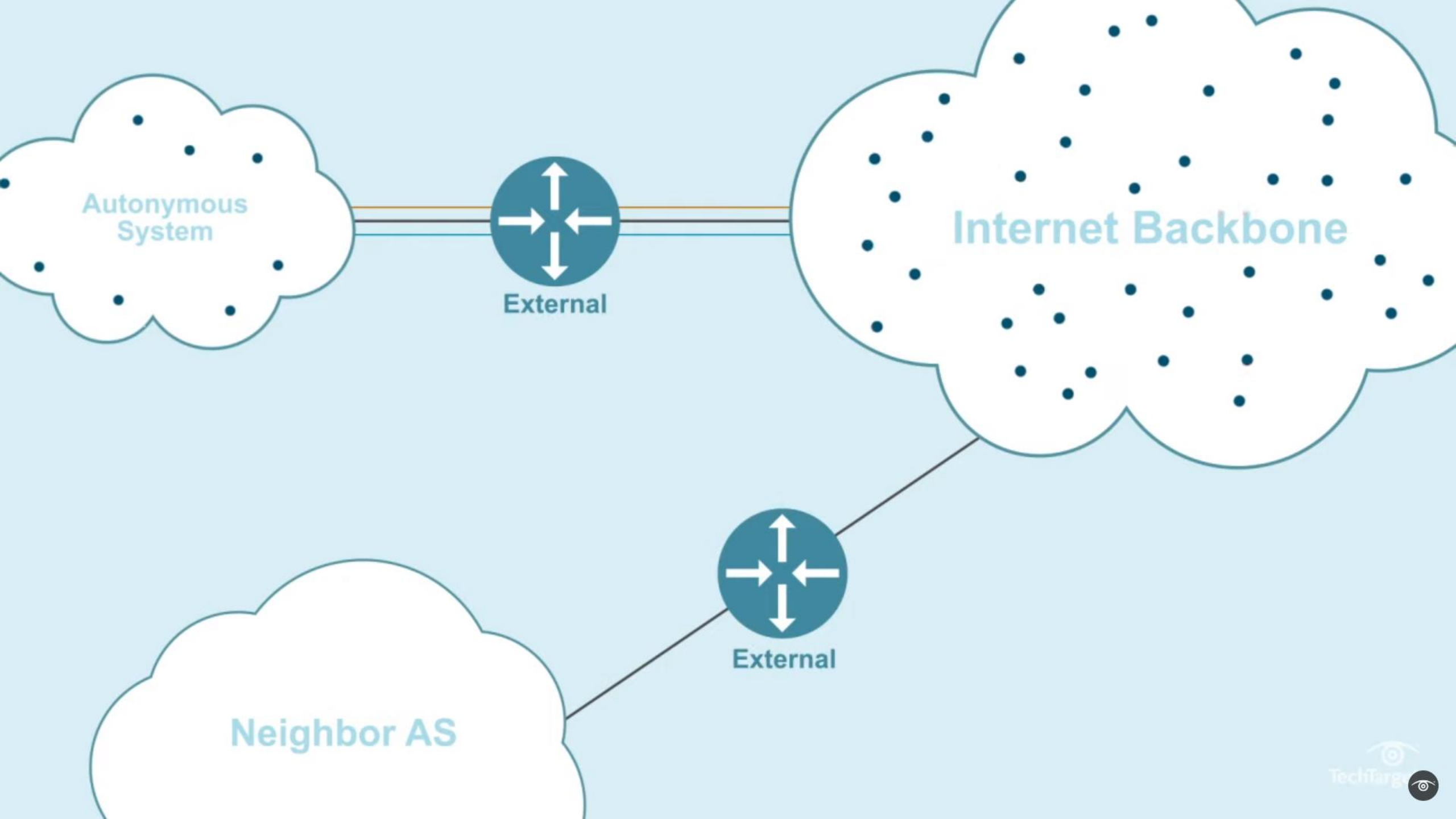
20. Krishnaraj Thadesar

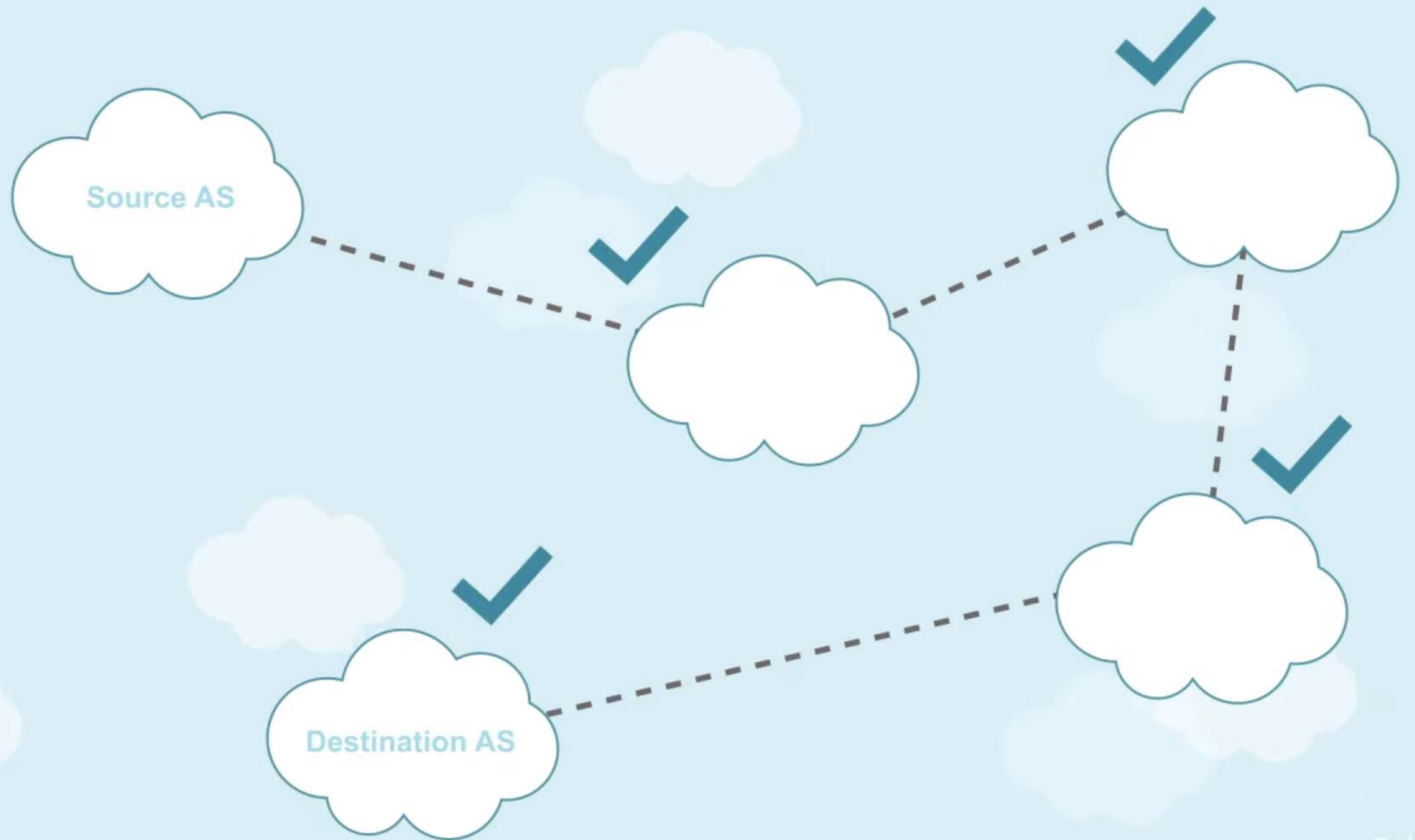
SIMPLE LAN





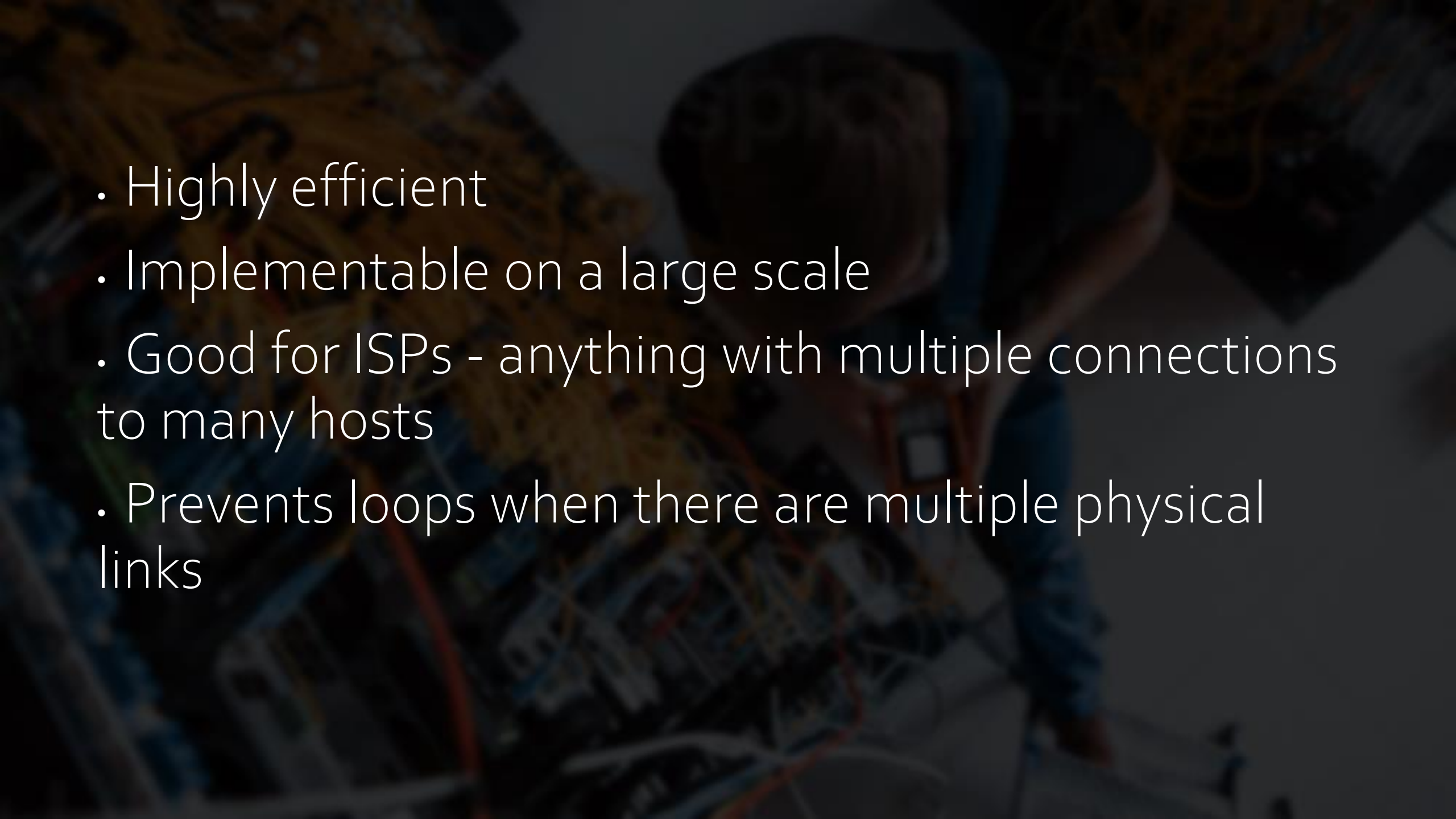






ADVANTAGES OF BGP

16. Shivranjan Yogesh Pathak

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- A person wearing a blue shirt and a black cap is working on a dense network of colorful cables (yellow, blue, red, green) connected to various electronic components. The scene is dimly lit, with the person's face partially visible in profile as they focus on the task.
- Highly efficient
 - Implementable on a large scale
 - Good for ISPs - anything with multiple connections to many hosts
 - Prevents loops when there are multiple physical links

MORE ADVANTAGES

- Load balances over redundant links
- It uses aggregation as a way of disseminating NLRI across routers.
- It uses path attributes for implementing routing policies .
- BGP offers network stability that guarantees routers can quickly adapt to send packets through another reconnection if one internet path goes down.

LIMITATIONS OF BGP

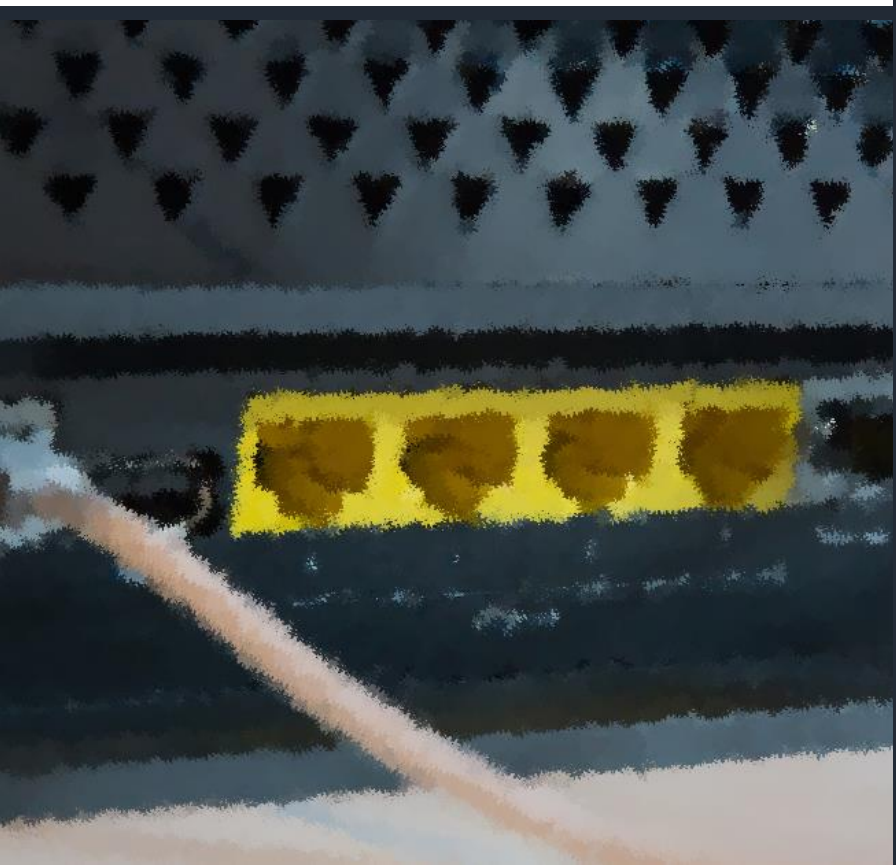
19 Vaishnavi Powar





- Information exchanges don't always succeed as information can be improperly formatted or contain incorrect data.
- Routers can run out of memory or storage, or be too slow to respond to updates. Routers send error codes and subcodes to communicate problems including timeouts, malformed requests and processing problems.

MORE LIMITATIONS



Not stable

No digital identifiers - implicit trust between routers running BGP

If misconfigured, chaos can ensue by advertising itself as the best path to an unrelated network

Advertising each other's paths may lead to repeated advertising - possibly a loop

There are very few alternatives in use. An example is GNU Zebra Routing.

REFERENCES

- https://www.youtube.com/watch?v=O6tCoD5c_U0
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- https://en.wikipedia.org/wiki/Border_Gateway_Protocol
- <https://www.fortinet.com/resources/cyberglossary/bgp-border-gateway-protocol>

A hand holding a smartphone with a colorful screen, set against a textured, brown background. The text "THANK YOU!" is overlaid in a yellow, sans-serif font.

THANK YOU!