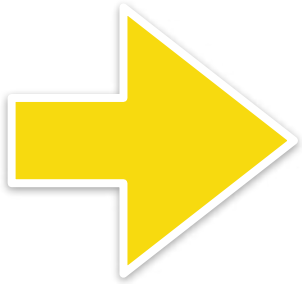
Becoming Multi-Homed

BGP for networks who peer: Part 4

Wolfgang Tremmel
wolfgang.tremmel@de-cix.net

BGP (new) Webinars Overview



→01 - Prefixes and AS numbers

→02 - BGP Introduction

→03a - Setting up iBGP

→03b - Setting up eBGP

→04 - Becoming multi-homed

→05 - BGP Best Path Selection

→06 - BGP Communities

→...

DE CIX

What we already know about BGP (1)

- ➔We already learned about prefixes
  - ➔IPv4 and IPv6
  - ➔BGP is about announcing prefixes
- ➔We also introduced the Autonomous System
  - ➔An Autonomous System groups prefixes together
  - ➔And has a common routing policy
  - ➔And has an Autonomous System Number (ASN, AS-Number)

What we already know about BGP (2)

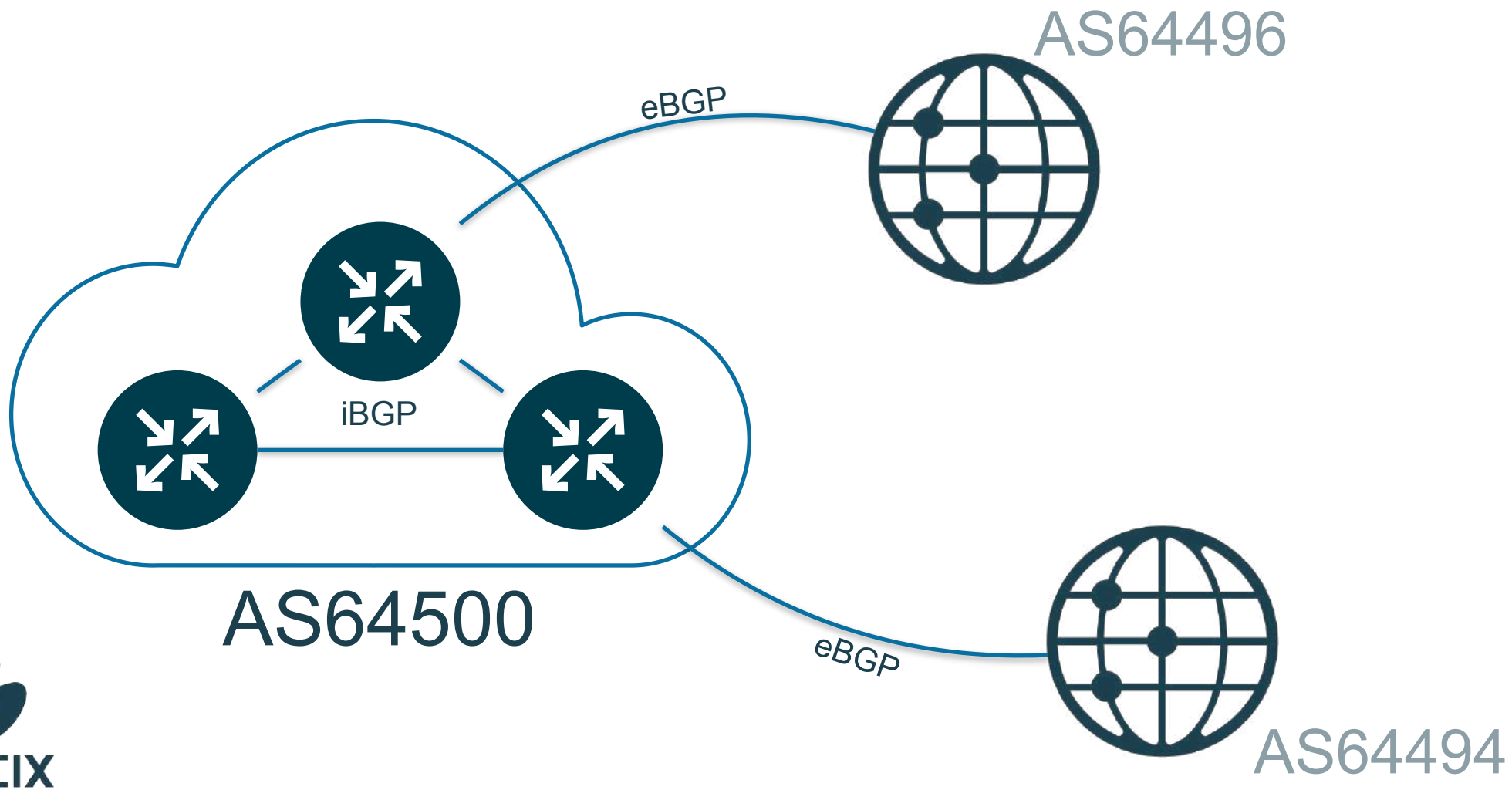
- ➔We configured iBGP
  - ➔iBGP is BGP within an AS
- ➔We configured eBGP
  - ➔eBGP is BGP to another AS
  - ➔like an upstream provider
- ➔Today we will do more with eBGP
  - ➔add a second upstream provider
  - ➔and add peering connections to other ASes

Why do we do this?

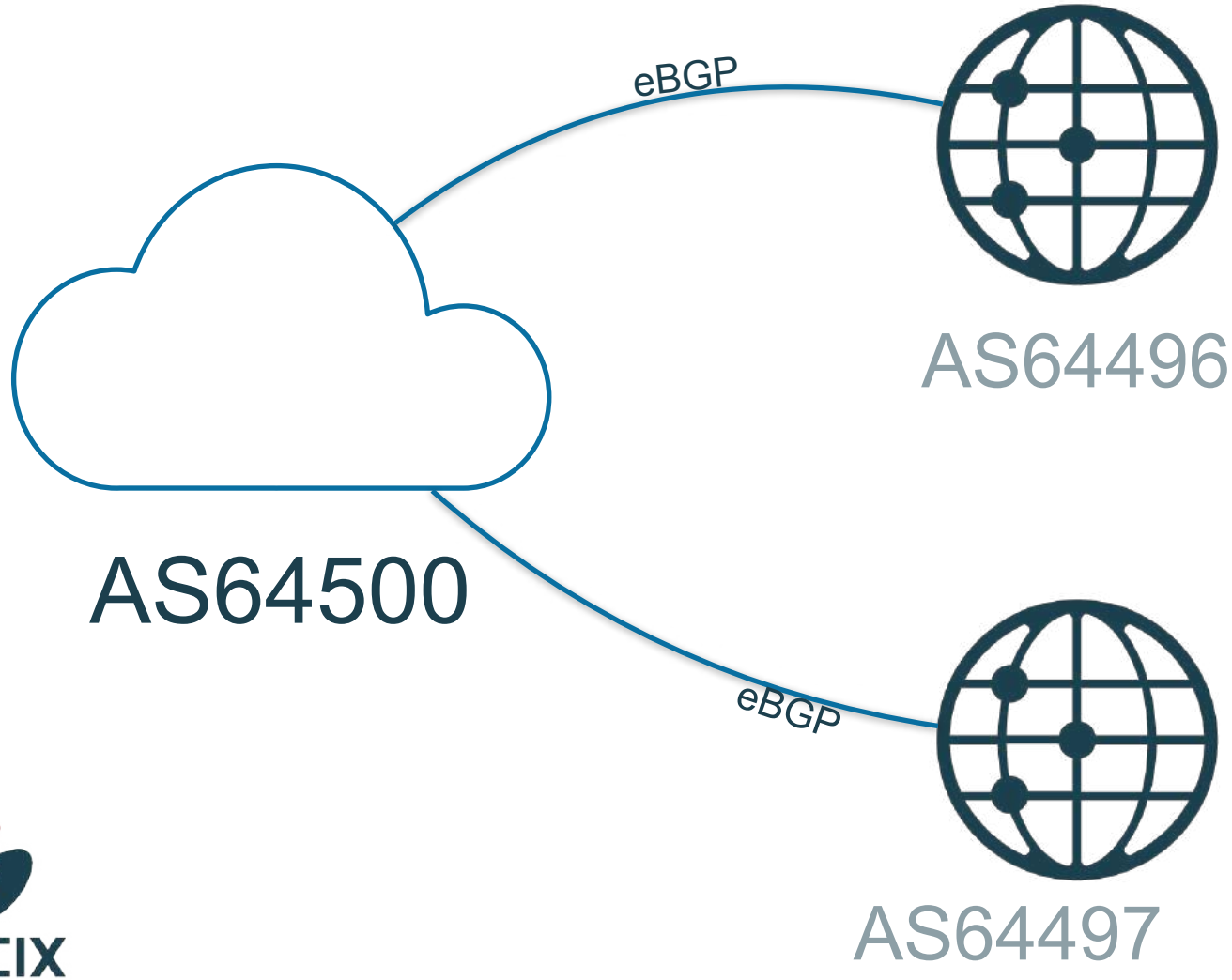
	With multiple Upstreams and Peering	Without an AS or with just one upstream
Redundancy	In case of a problem with one upstream you have a second one	If your upstream has a problem, you have a problem
Control	You have full control over your outgoing traffic	Your upstream ISP controls your traffic
Cost	You can optimize your traffic for cost	You just pay your one upstream ISP
Peering	You can setup your own peering policy and have full control	Your upstream ISP makes all decisions

Example Network

Let's simplify that a bit

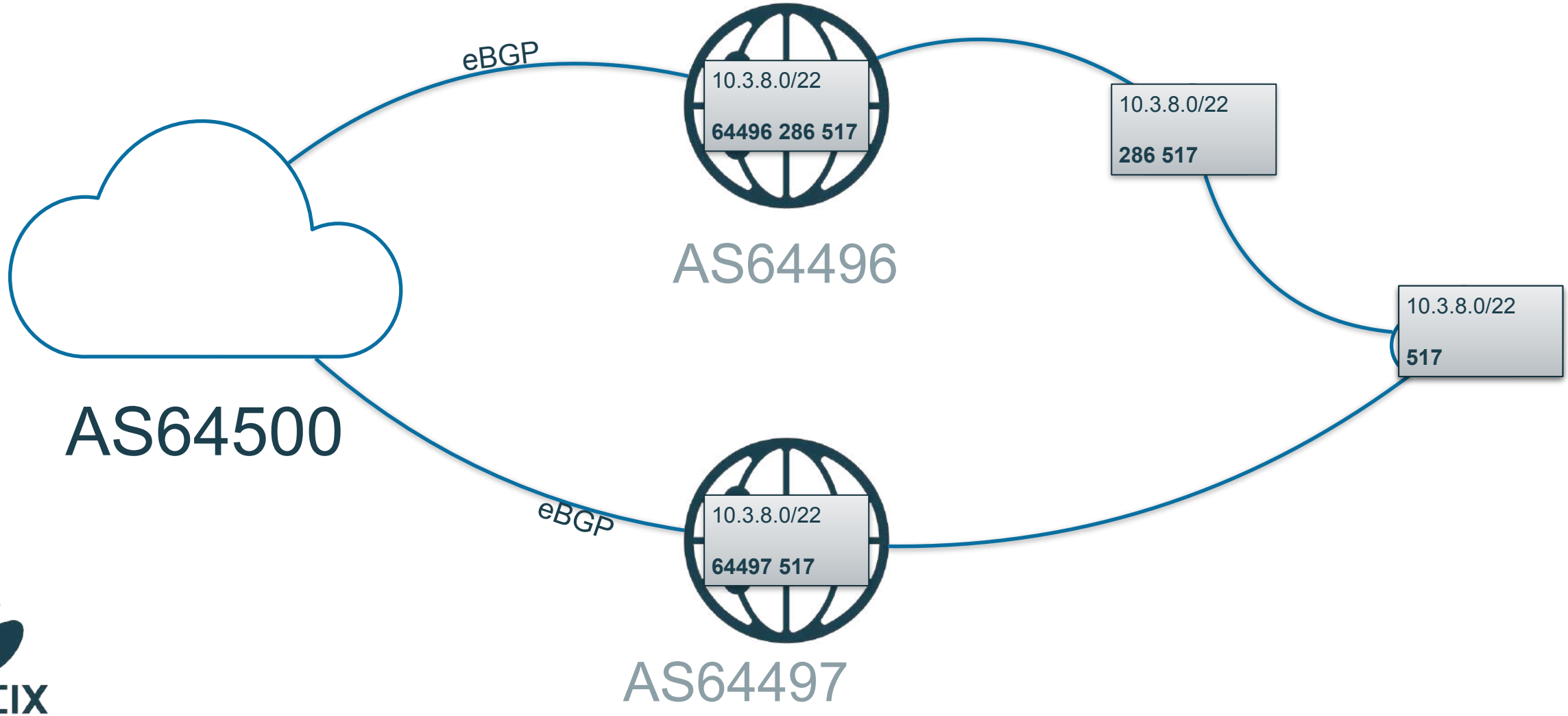


Let's get started.... with two upstreams

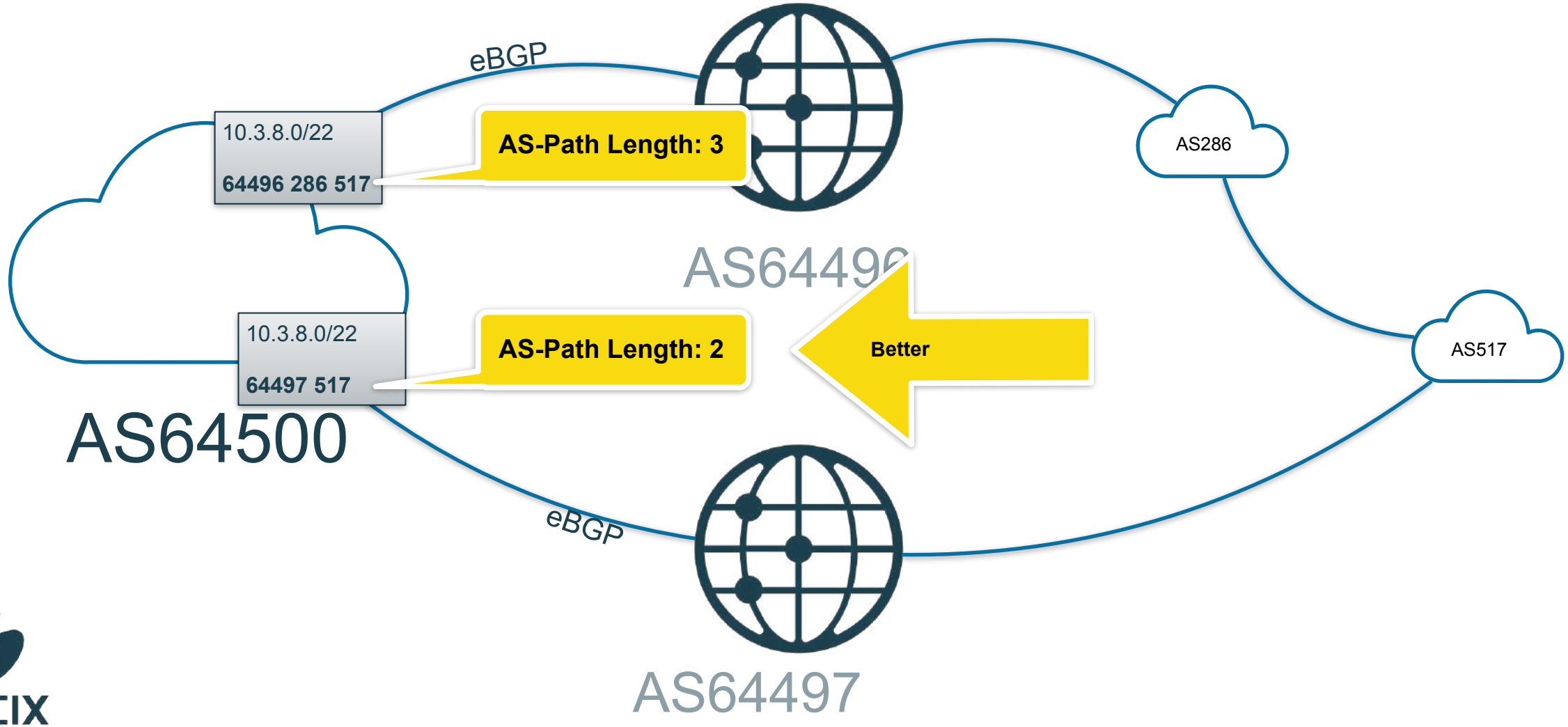


DE CIX

Let's get started.... with two upstreams

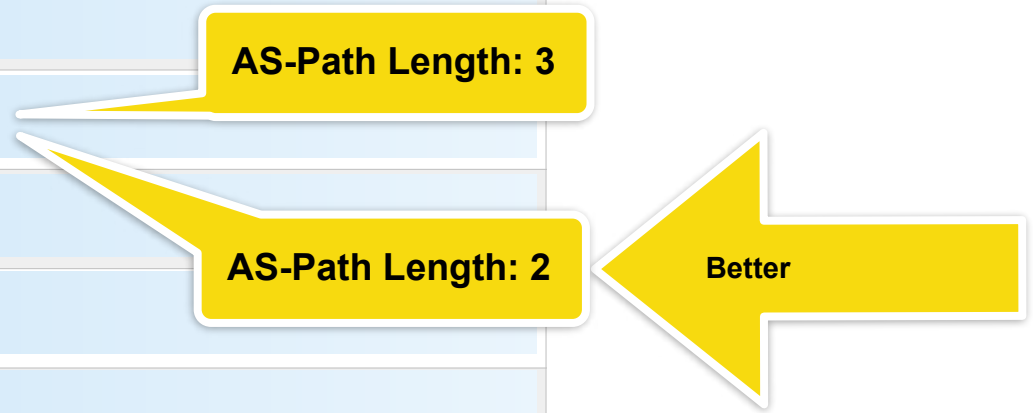


Let's get started.... with two upstreams

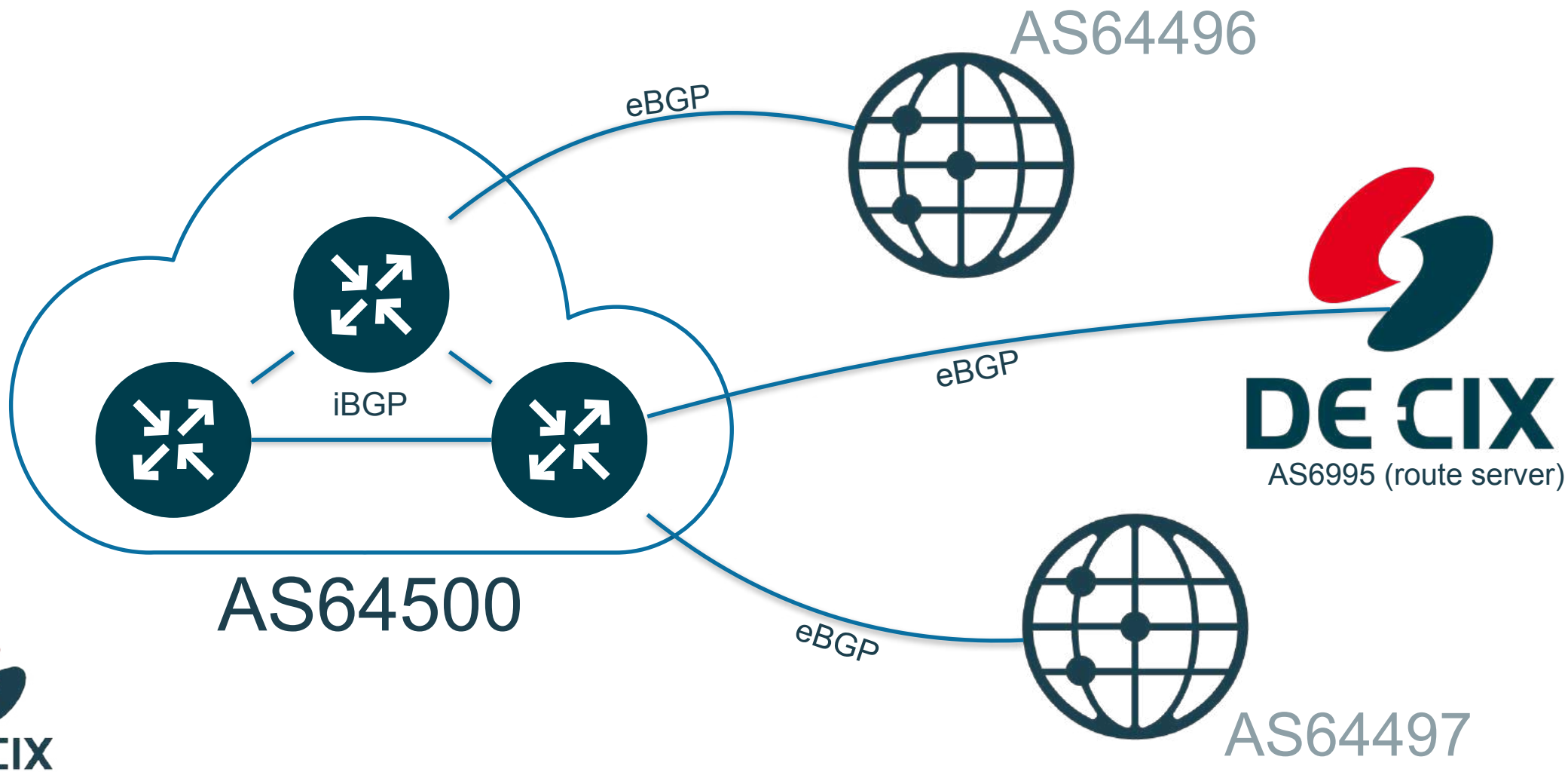


BGP Best Path Selection

1	NextHop reachable?	Continue if "yes"
2		
3		
4		
5		
6		
7		
8		
9		
10		

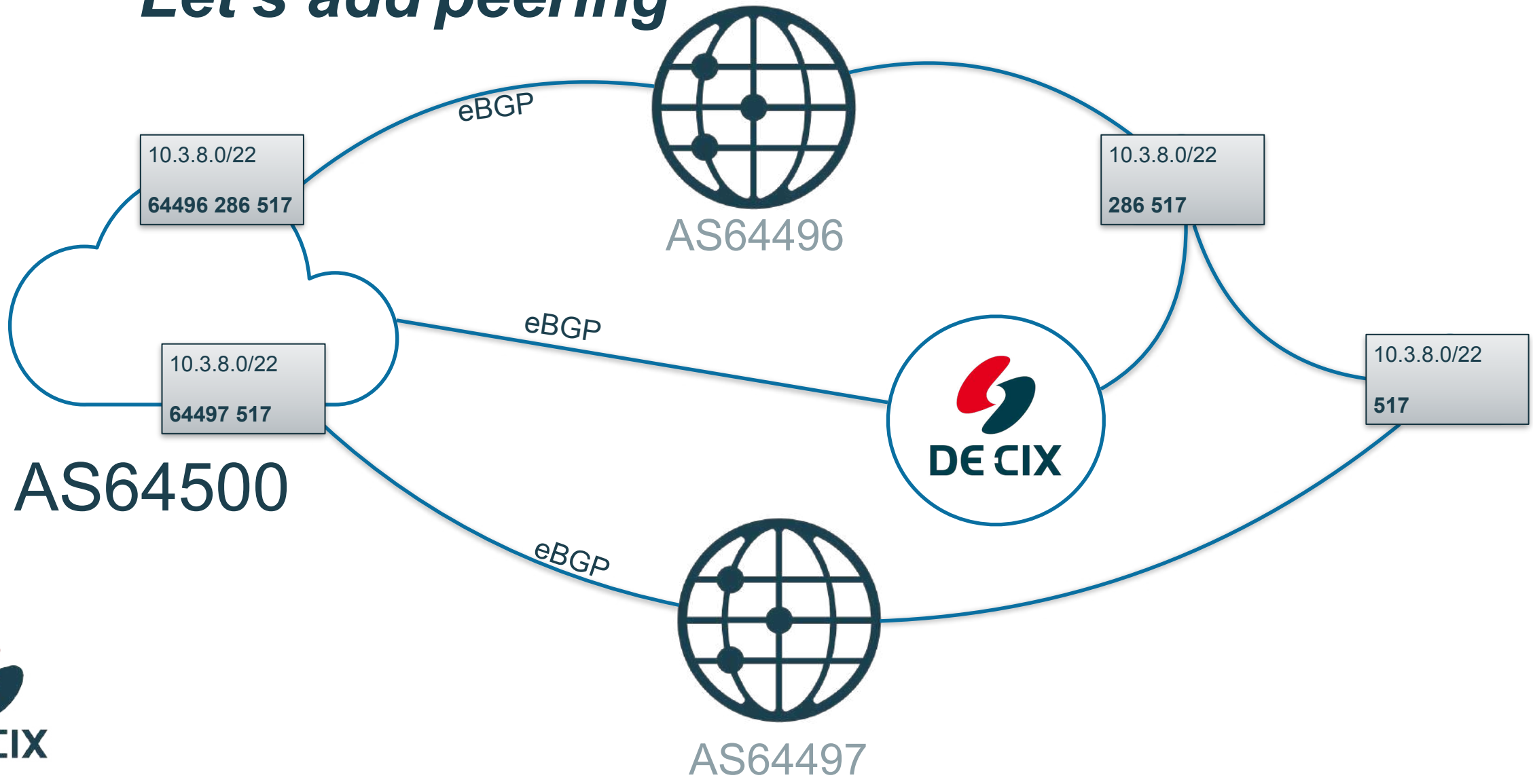


Let's continue...



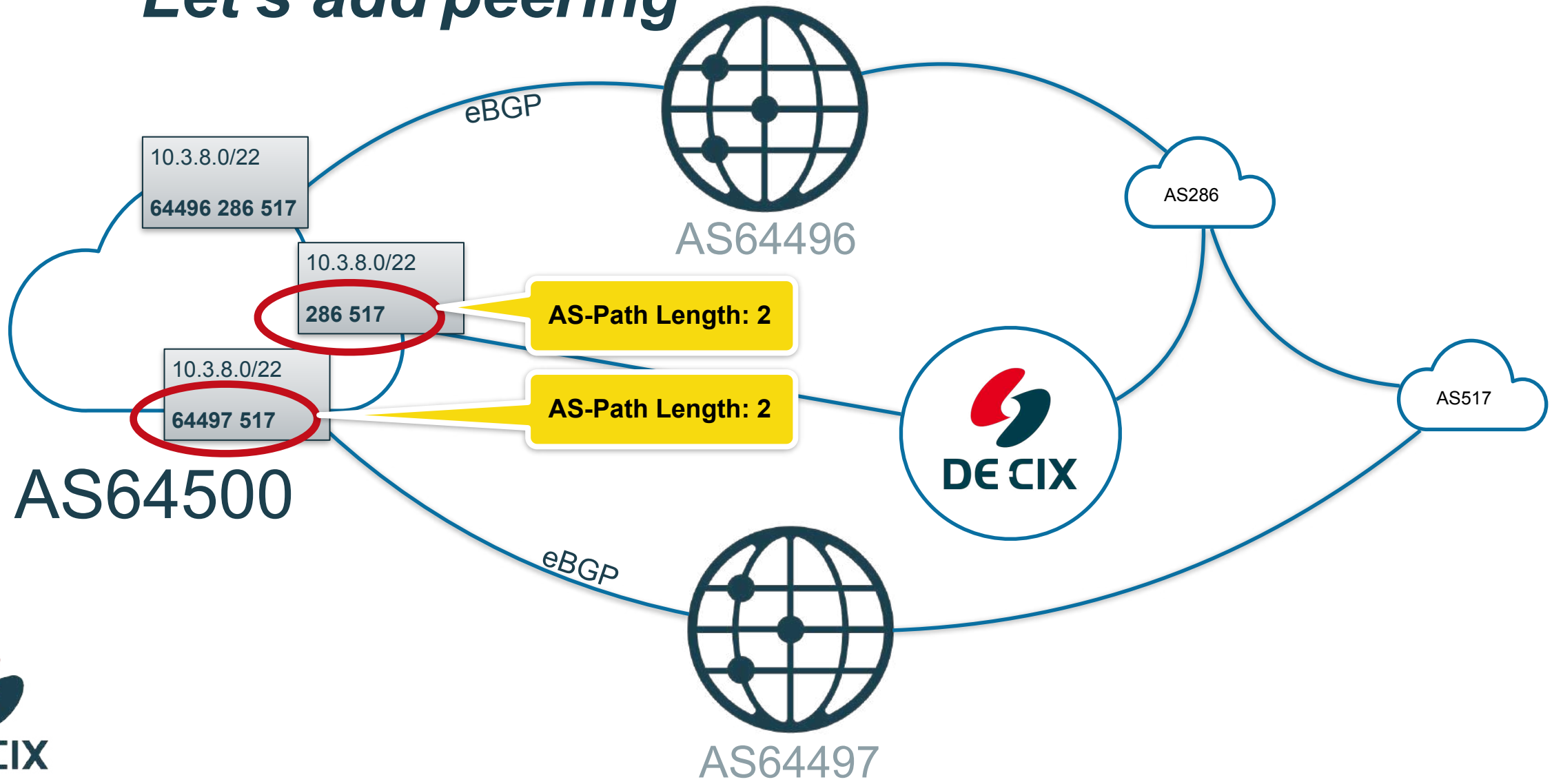
DE CIX

Let's add peering



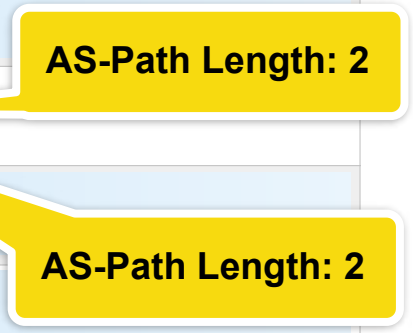
DE CIX

Let's add peering



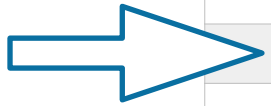
The BGP Routing Algorithm

1	NextHop reachable?	Continue if "yes"
2		
3	AS Path Length	shorter wins
4		
5		
6		
7		
8		
9		
10		



Local Preference

- Higher wins
- Integer value (32bit, 0-4294967295)
- Propagated via iBGP inside an Autonomous System
- Usually set using rules when receiving prefixes
- Typical values:
  - Customer prefixes: 10000
  - Peering prefixes: 1000
  - Upstream prefixes: 100

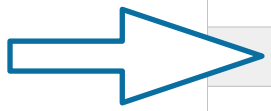


1		NextHop reachable?	Continue if "yes"
2		Local Preference	higher wins
3		AS Path Length	shorter wins
4			
5			
6			
7			
8			
9			
10			

Local Preference - how to set

- High level:

```
if (prefix received from customer)
  then set local-preference of prefix = 10000
else if (prefix received from peer)
  then set local-preference of prefix = 1000
else
  set local-preference of prefix = 100
```

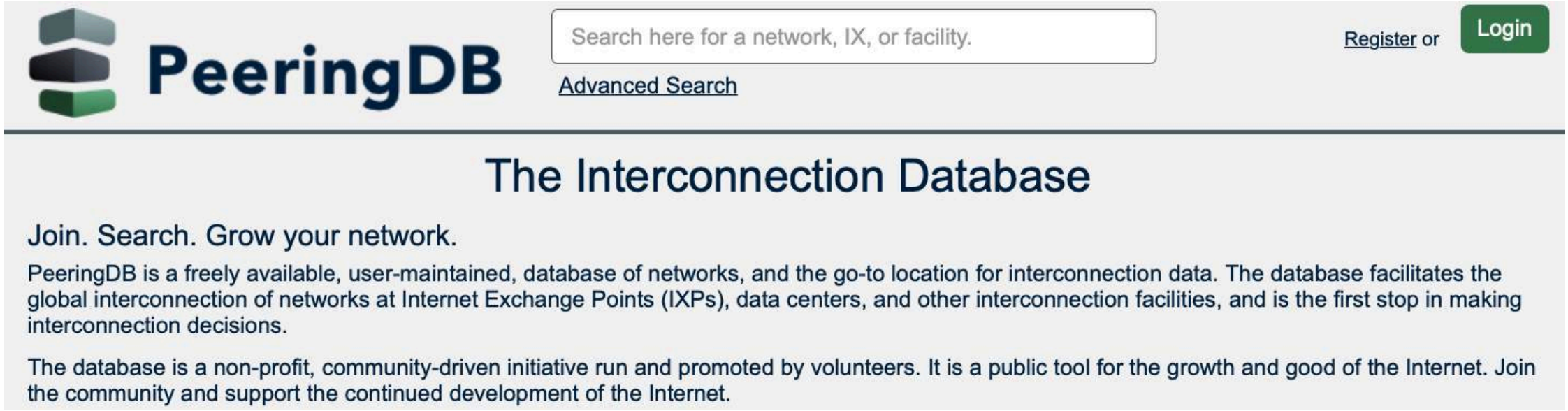


1	NextHop reachable?	Continue if "yes"
2	Local Preference	higher wins
3	AS Path Length	shorter wins
4		
5		
6		
7		
8		
9		
10		

- Cisco IOS or FRRouting:

```
route-map peering-in permit 10
  set local-preference 1000
router bgp 64500
  neighbor peering route-map peering-in in
```

Before we go to our experiment part....



https://docs.peeringdb.com/

DE CIX

Experiment: Setup eBGP

experiment 02b + ./2a-solution-ipv4 + ./2a-solution-ipv6

Thank you!

Interested in more webinars? Please subscribe to our mailing list at https://lists.de-cix.net/wws/subscribe/academy

DE-CIX Management GmbH | Lindleystr. 12 | 60314 Frankfurt | Germany
Phone + 49 69 1730 902 0 | sales@de-cix.net | www.de-cix.net

Links and further reading

Interested in more webinars? Please subscribe to our mailing list at https://lists.de-cix.net/wws/subscribe/academy

Links visited during the webinar

- RFCs
  RFCs are Internet standards issued by the Internet Engineering Task Force (IETF)
  - RFC4271 - A Border Gateway Protocol 4 (BGP-4)
    - see 5.1.5 for a definition of *Local Preference*
    - see 9.1 for the BGP best path selection algorithm

- BGP Best Path Selection by vendor
  - Cisco
  - Juniper
  - Mikrotik
  - Nokia
  - BIRD
  - FRRouting

- If you peering at any Internet Exchange - please use PeeringDB

DE CIX

Interested in more webinars? Please subscribe to our mailing list at https://lists.de-cix.net/wws/subscribe/academy