

facebook

A tale of two labels



Zaid Hammoudi
Jose Leitao



Zaid

Jose



Jose Leitao added a new photo

18 mins · 🌐



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We'll be talking about



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We'll be talking about



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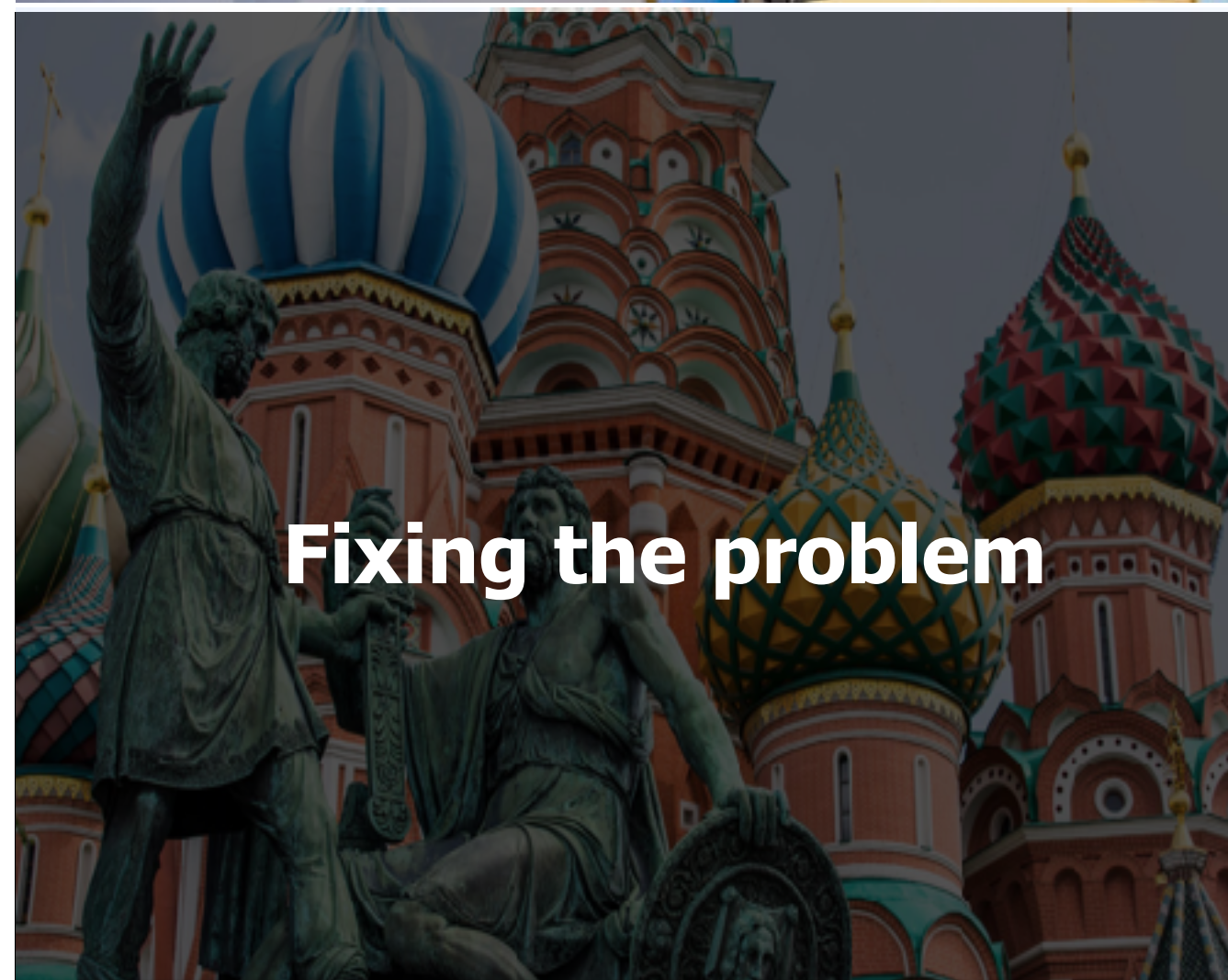


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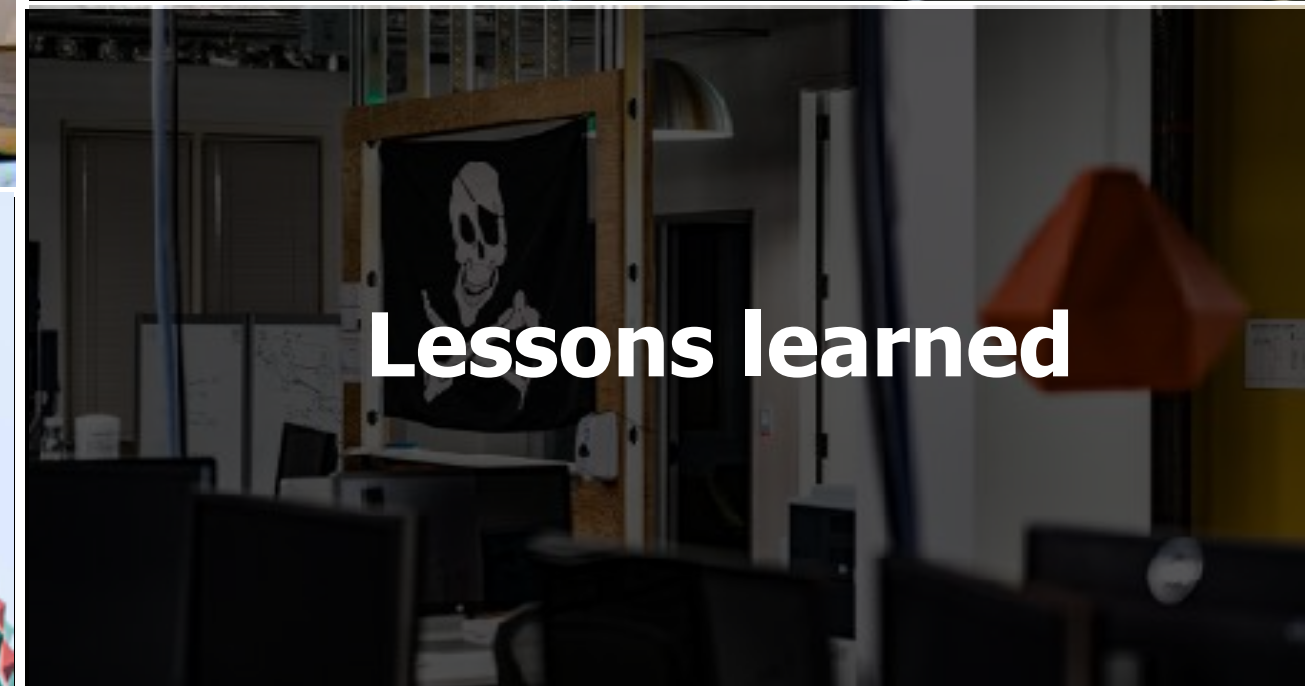


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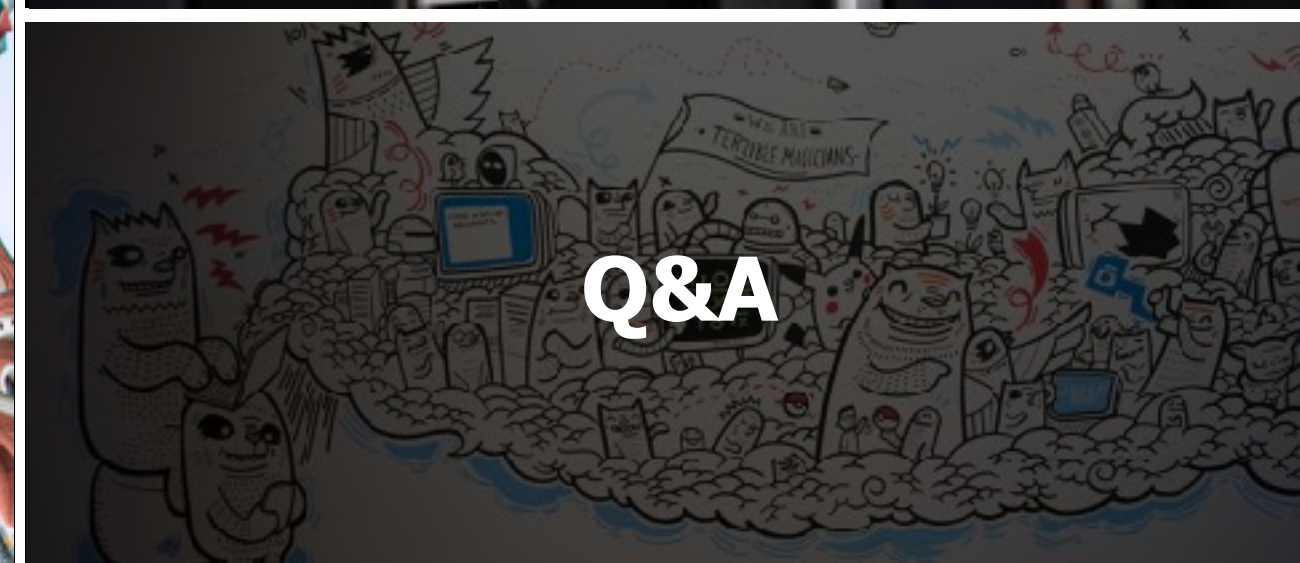


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We'll be talking about



Like

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Share

A photograph of an astronaut in a white space suit floating in a space station. The astronaut's helmet visor reflects the Earth. In the background, there are various pieces of equipment, including a control panel with dials and a framed picture of a yellow sun on a blue background. The entire image is dimmed and has a dark overlay.

Facebook scale / topology

Facebook scale

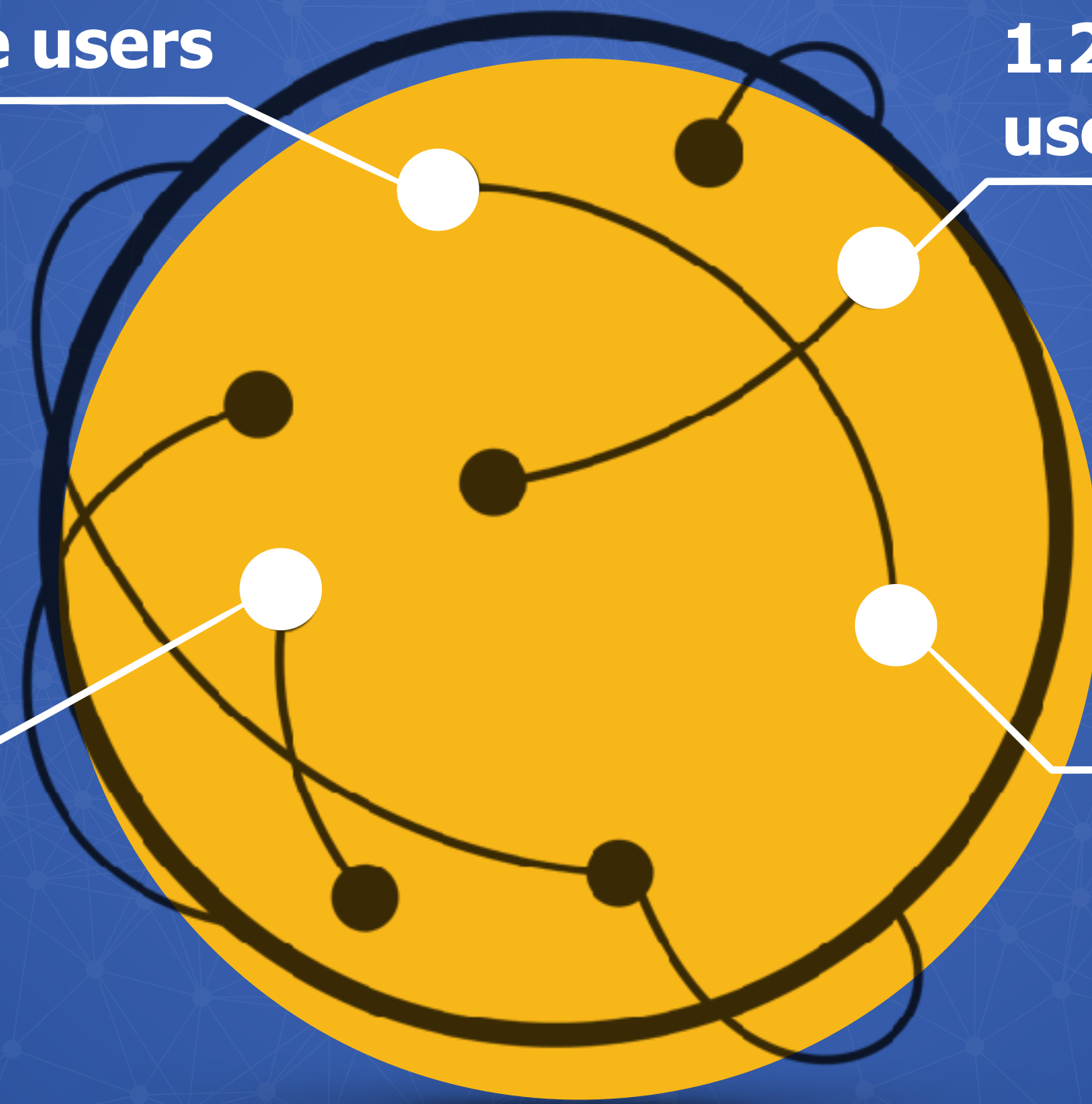
as of December 2016

**1.74 billion mobile
monthly active users**

**1.23 billion daily active
users on average**

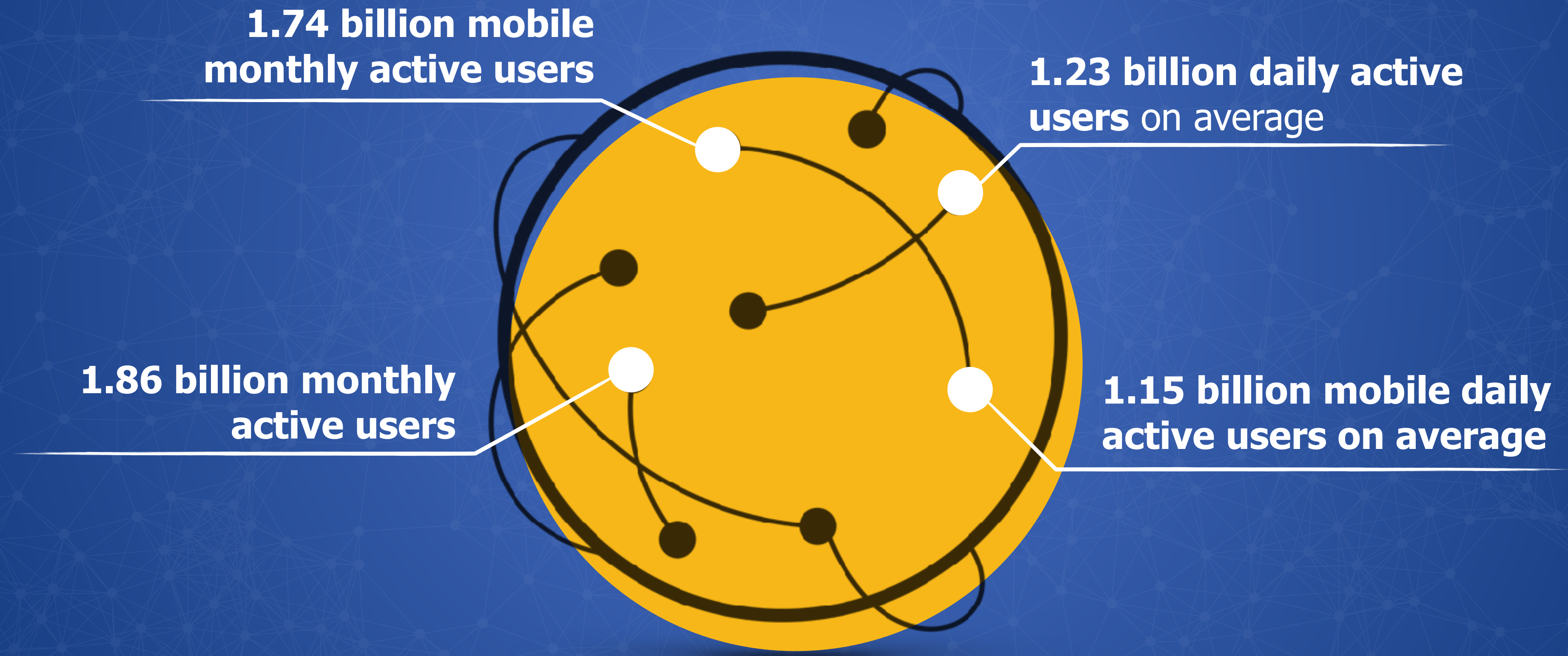
**1.86 billion monthly
active users**

**1.15 billion mobile daily
active users on average**



Facebook scale

as of December 2016



Approximately 85.2% of our daily active users are outside the US and Canada.

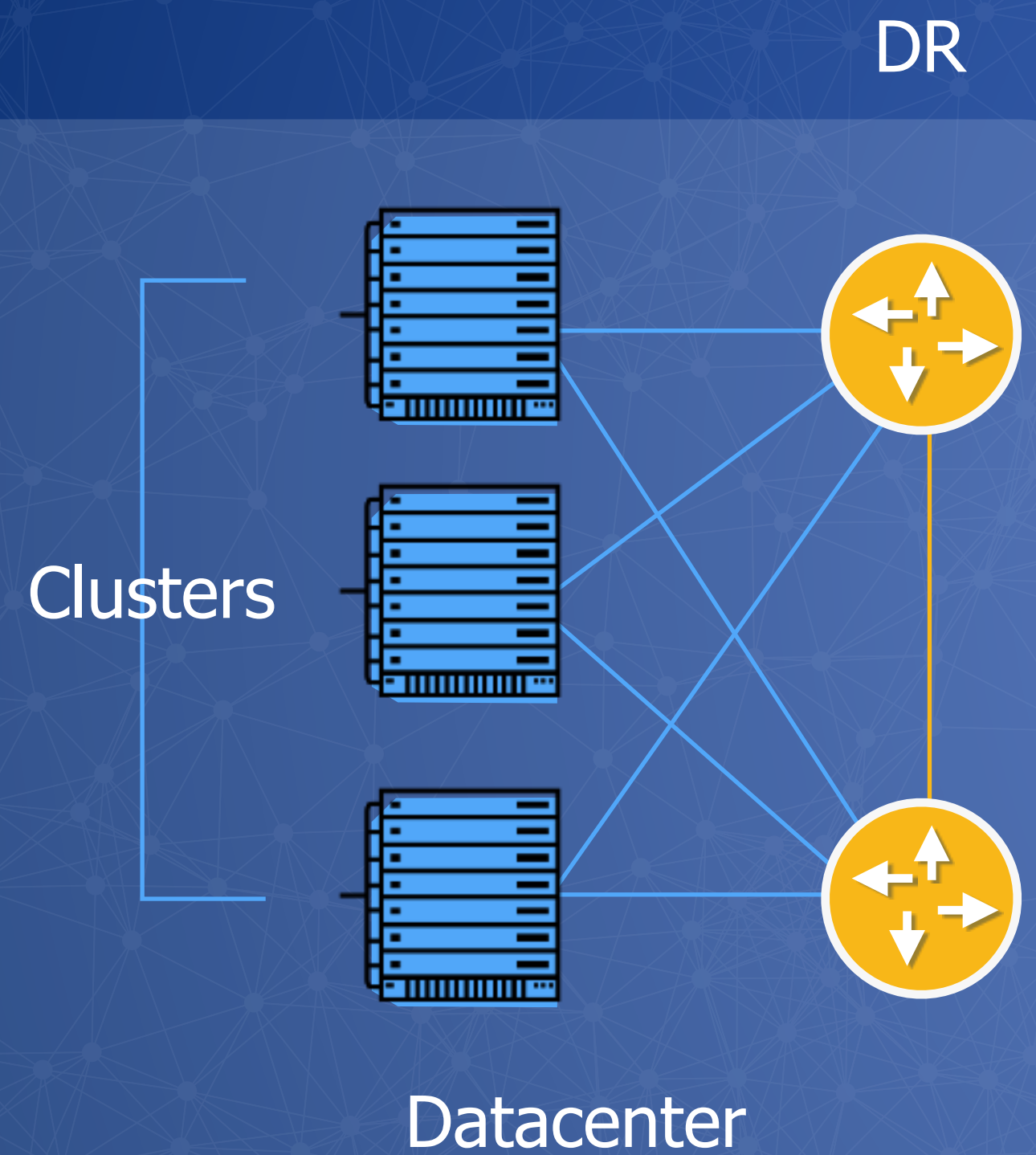
Network traffic



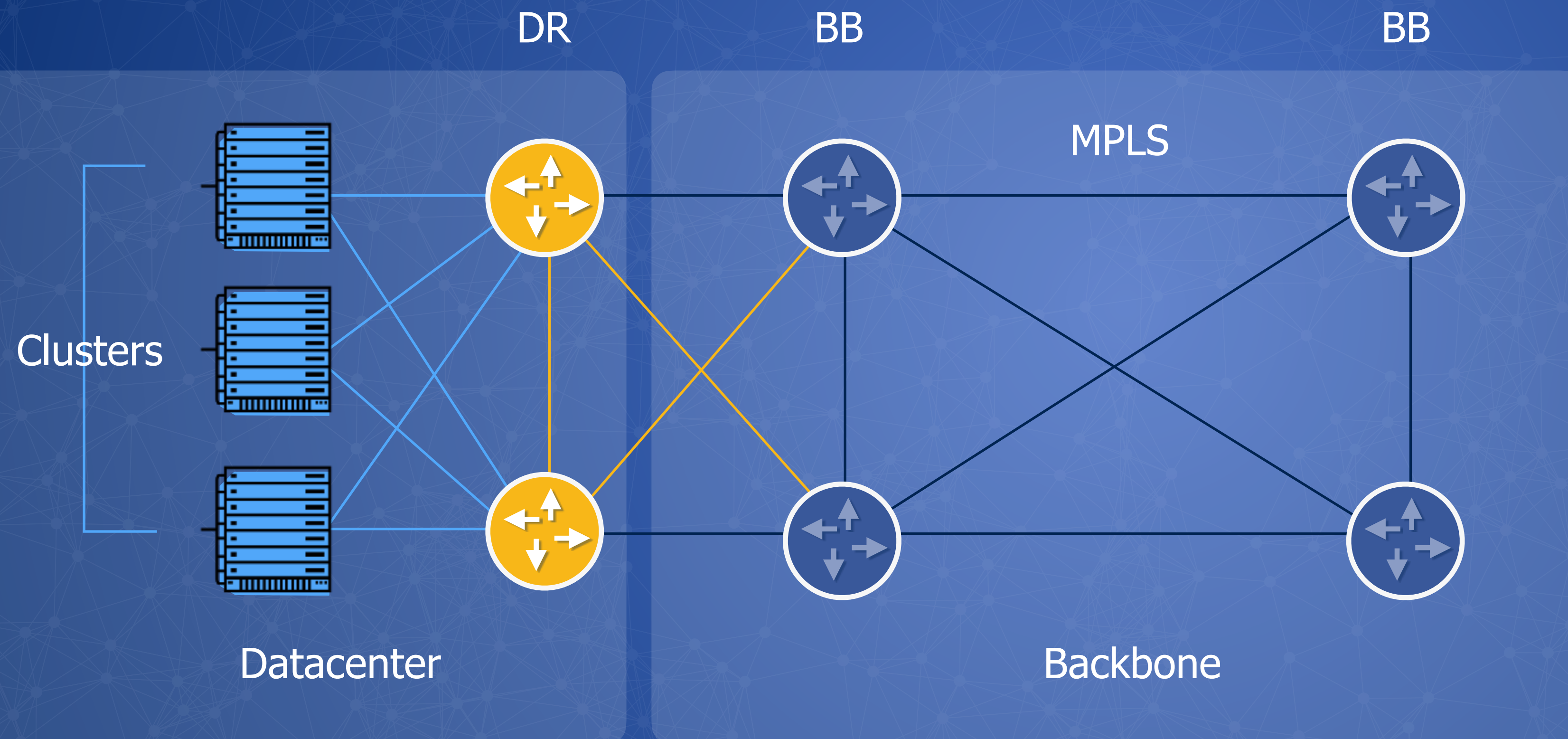
Machine to machine

Machine to user

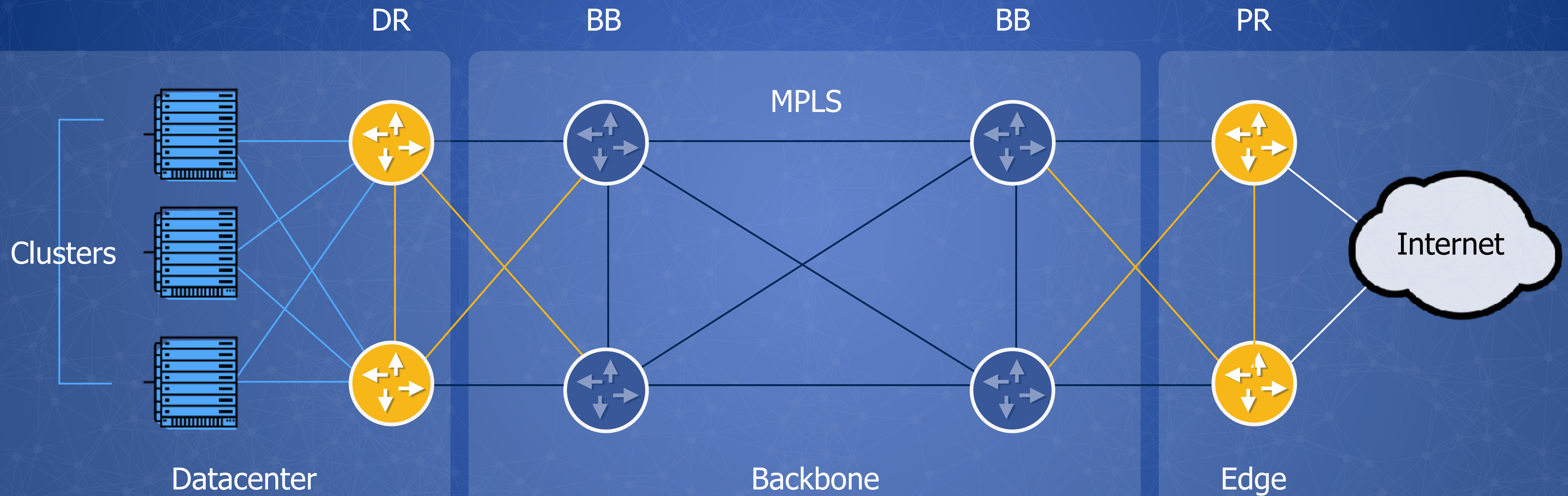
Topology



Topology



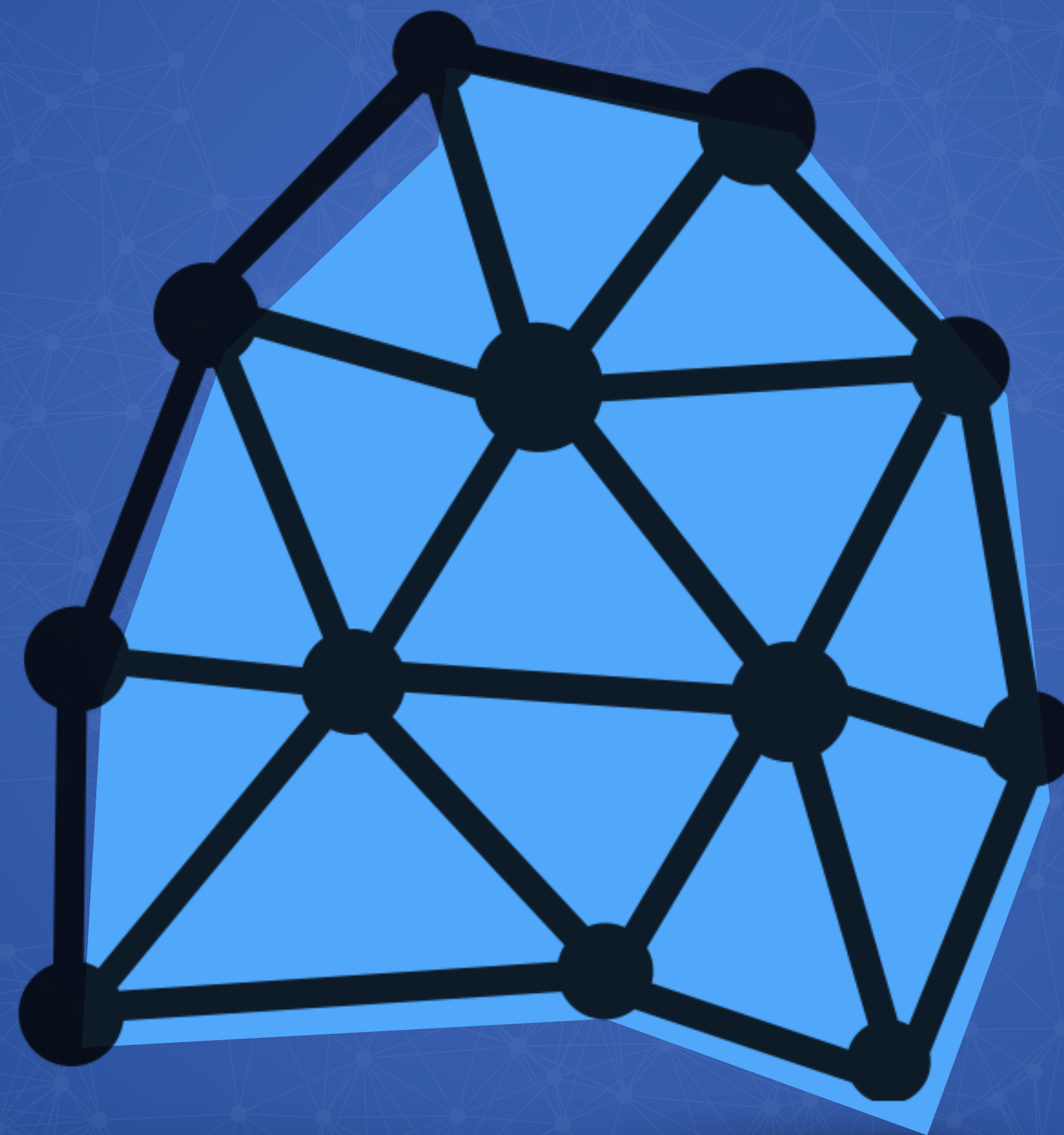
Topology



Protocols

ISIS

BGP



RSVP-TE (Auto-BW)

LSPs overview

SF LSPs

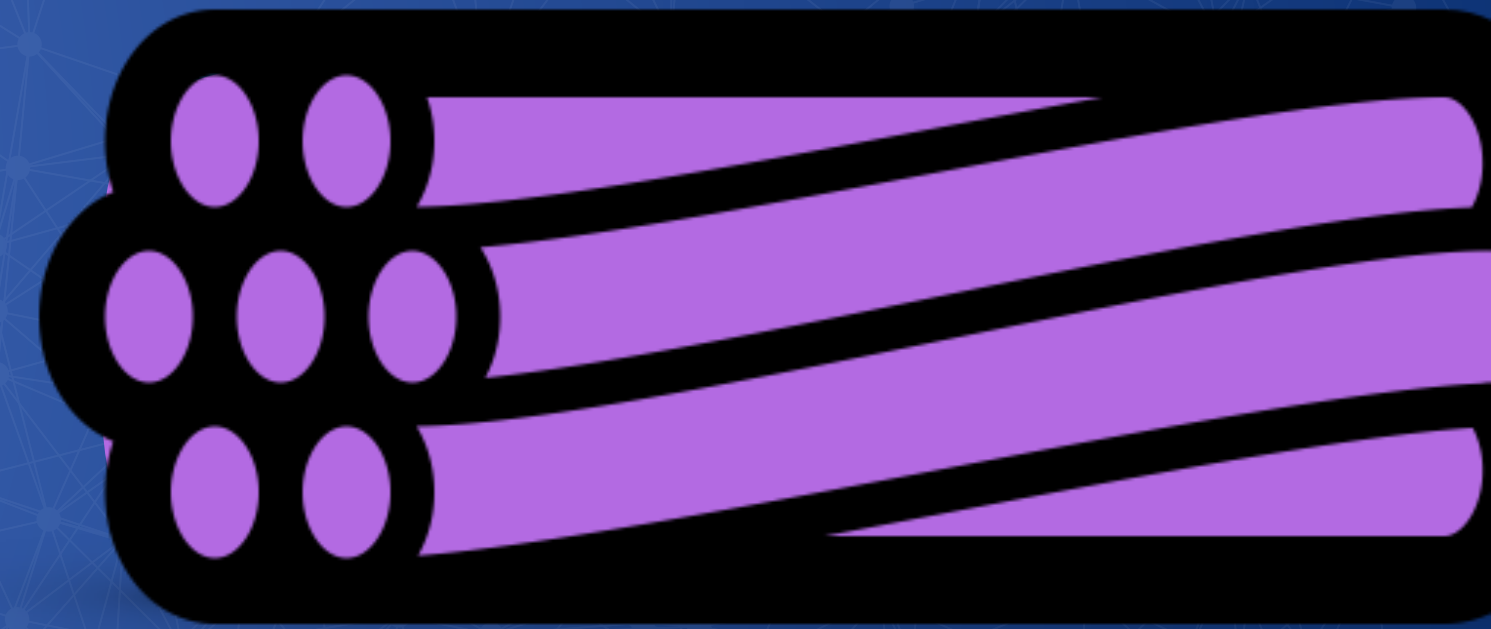


FRR

S LSPs



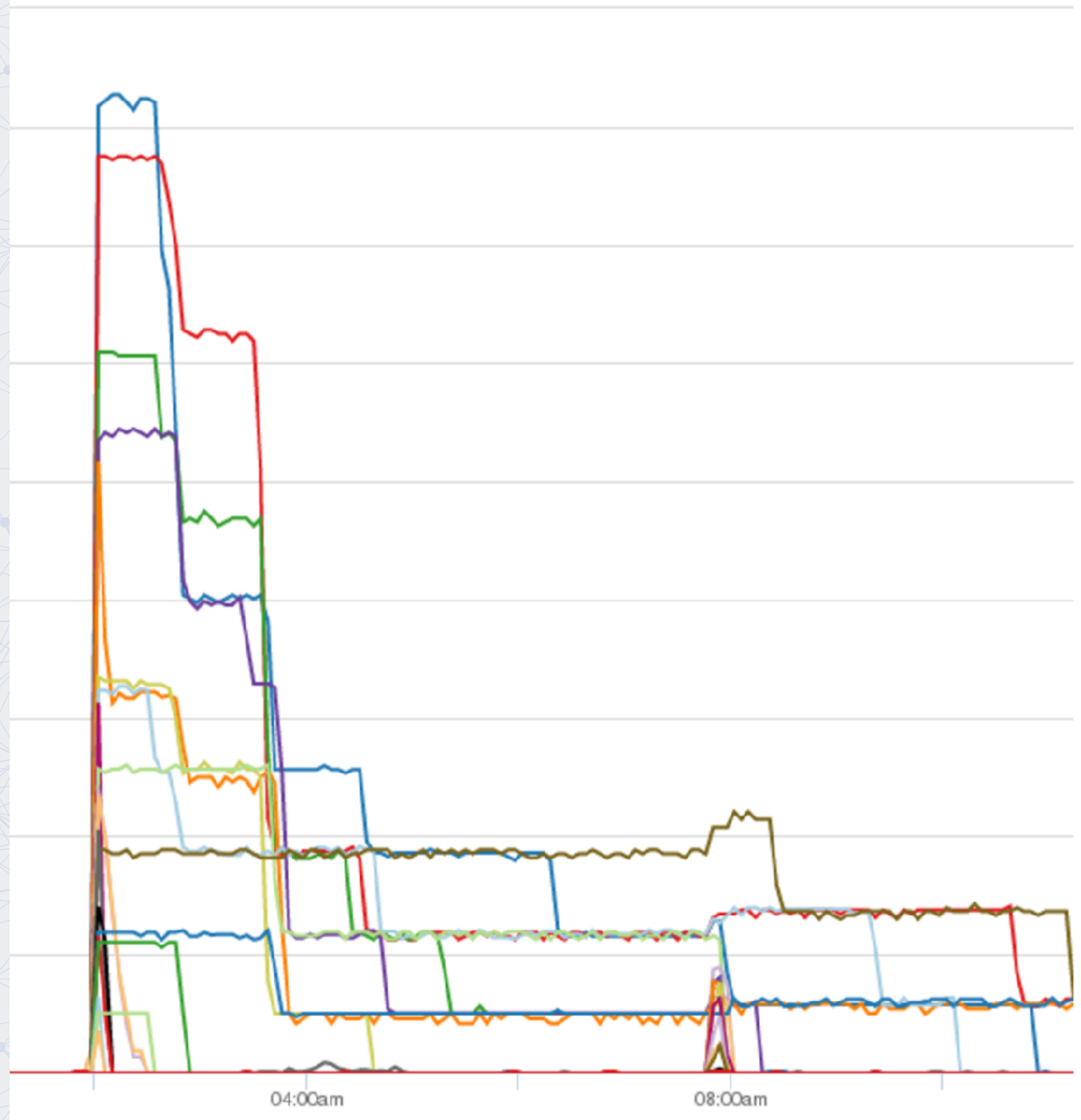
A LSPs



The image features a blue-tinted background of shattered glass. The glass is broken into several sharp, jagged fragments that radiate from a central point, creating a starburst effect. The word "Investigation" is written in a bold, white, sans-serif font, centered horizontally and partially overlapping the glass shards. The overall mood is one of mystery and discovery.

Investigation

TimeSeries (4 minutes) ordered by Loss Ratio



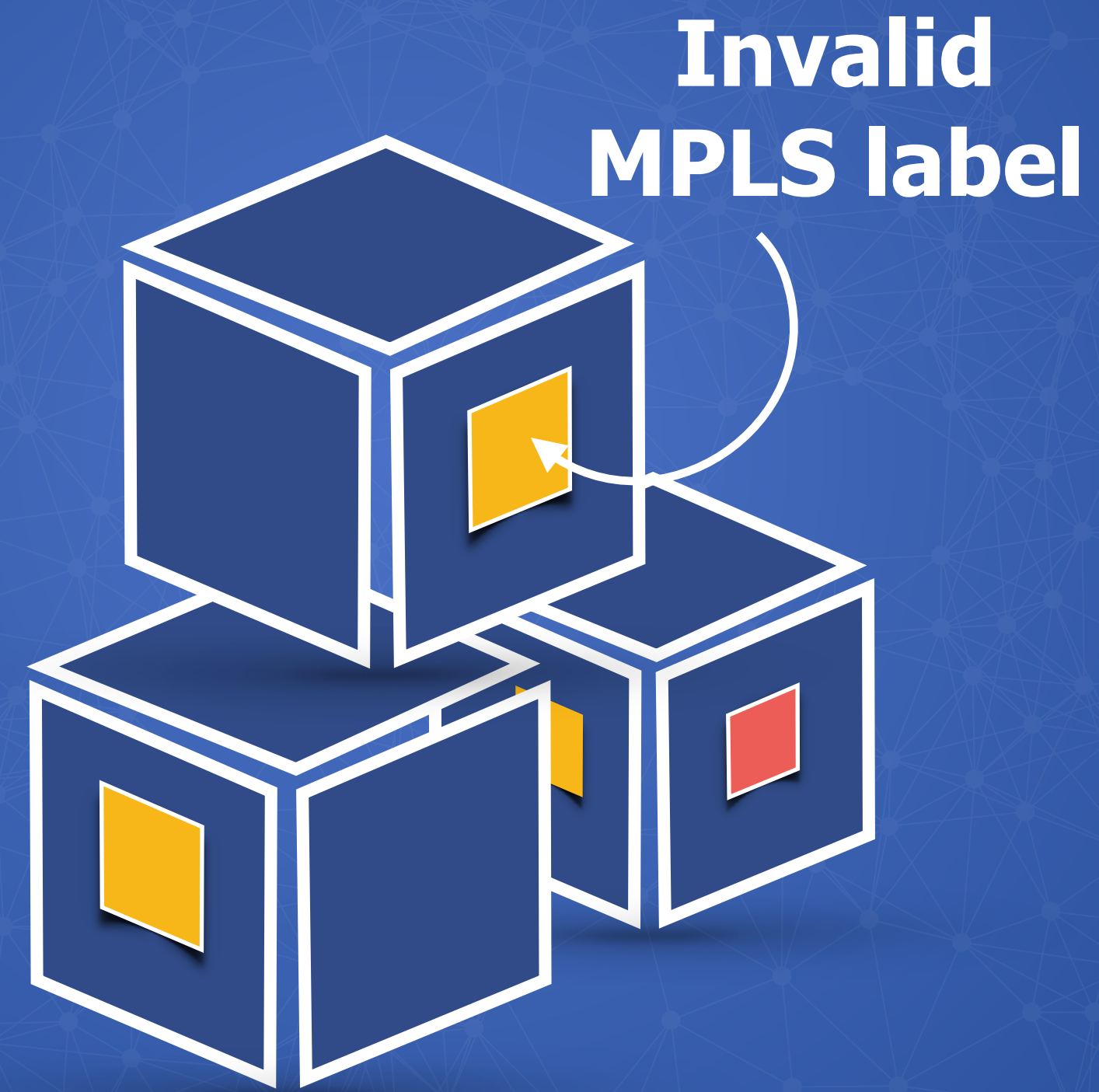
Analysis of dropped packets



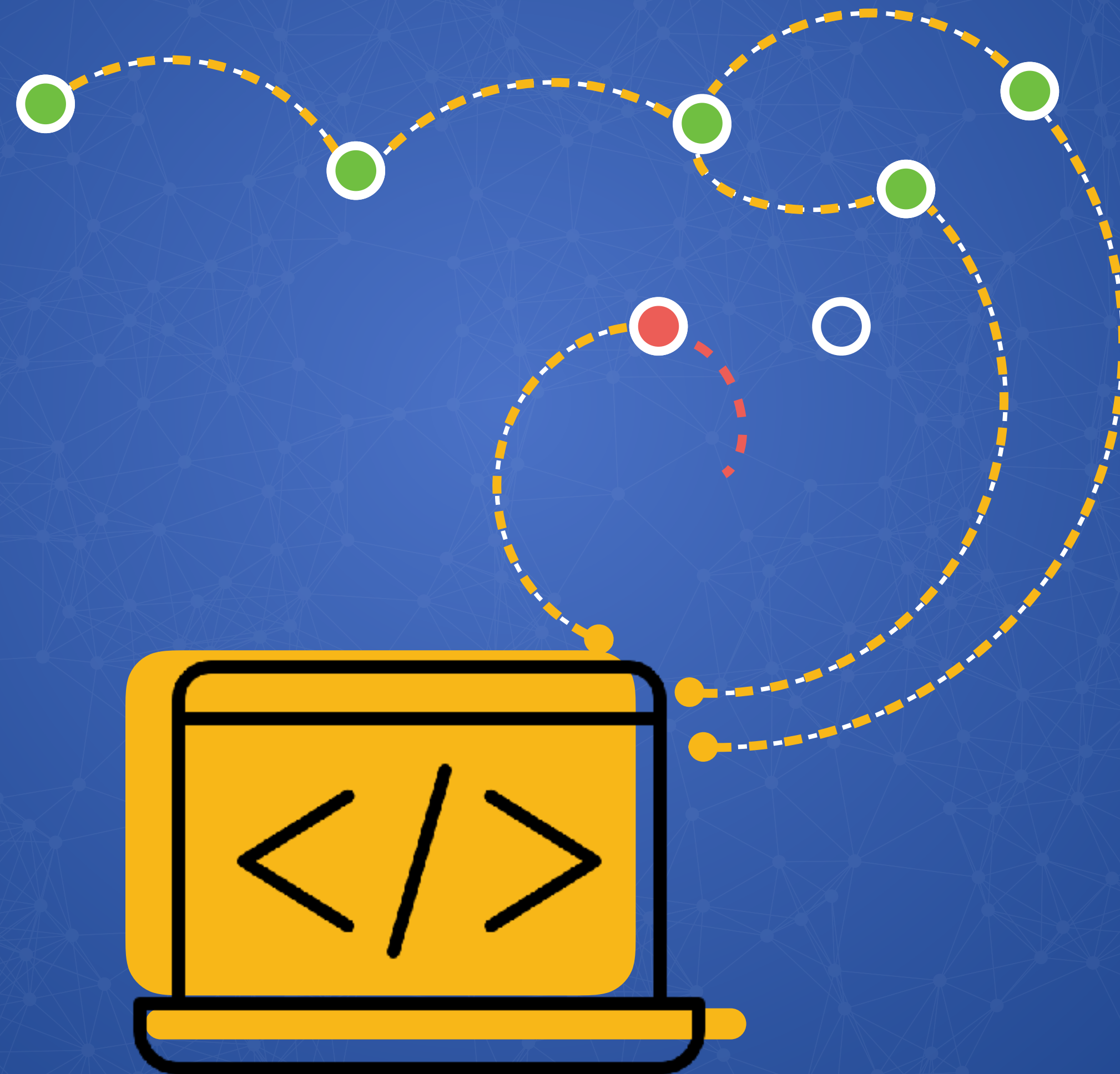
Investigating their labels



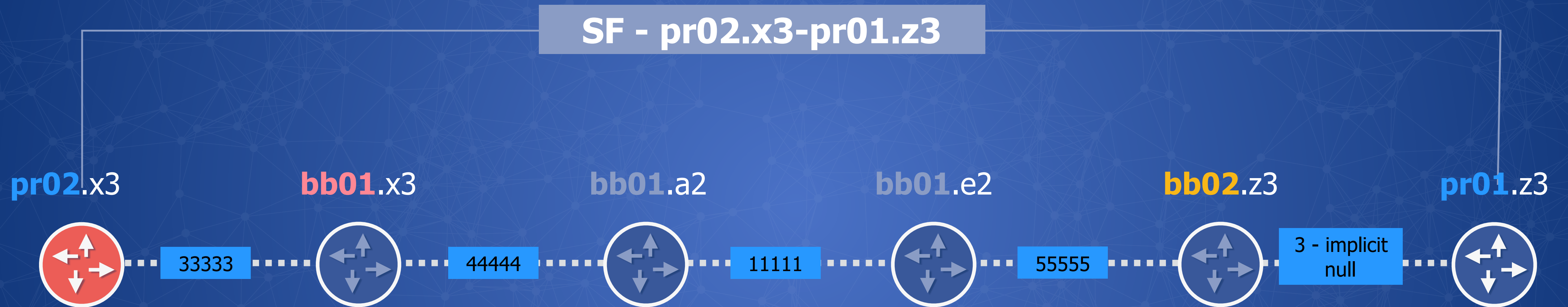
Early findings



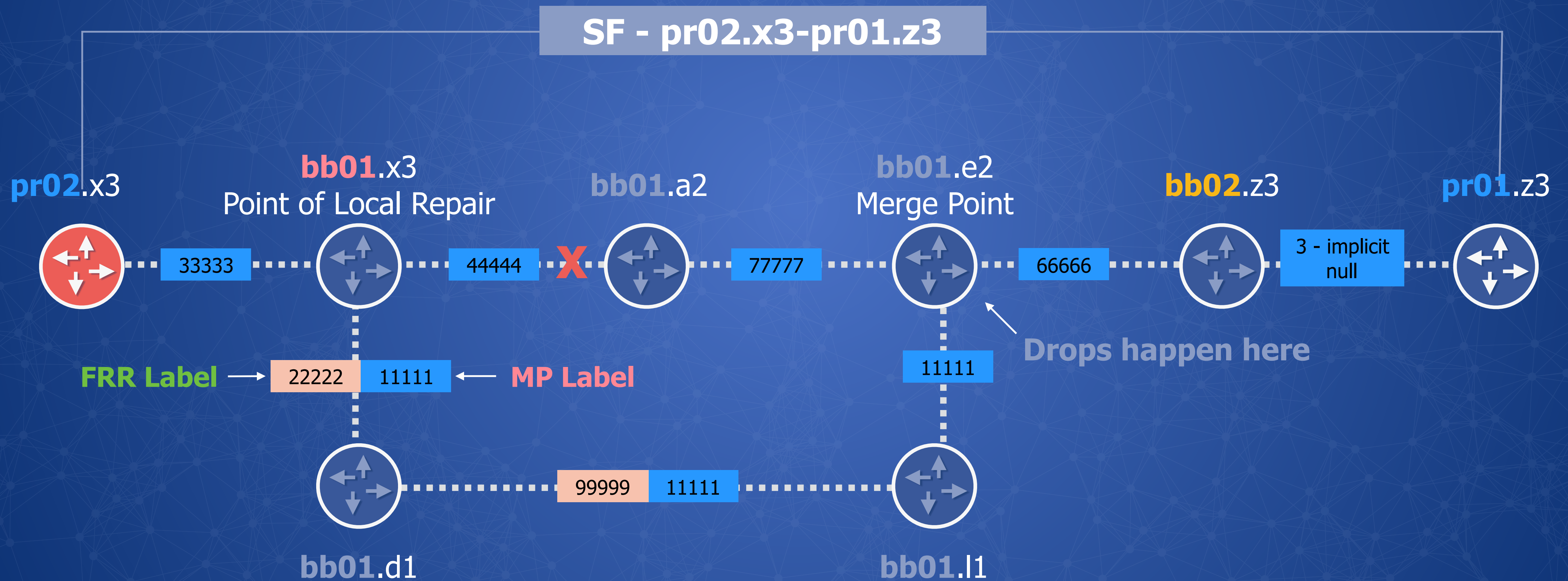
Active Probing



LSP with hops and labels



LSP with hops and labels





Fixing the problem

Bug #1

RFC 4090:

“Upon a failure event, a protected TE LSP is locally repaired by the PLR.”



Bug #1

RFC 4090:

“Upon a failure event, a protected TE LSP is locally repaired by the PLR.”



Bug #1 Global Revertive Mode is Broken in Vendor 1

SF - pr02.x3-pr01.z3
AF = True

pr02.x3

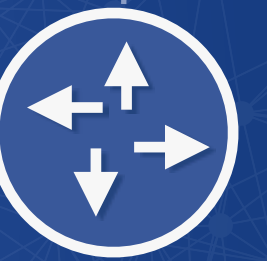
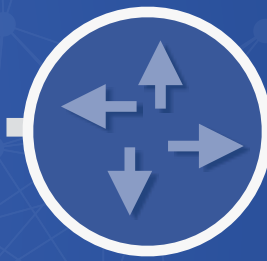
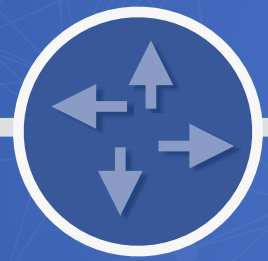
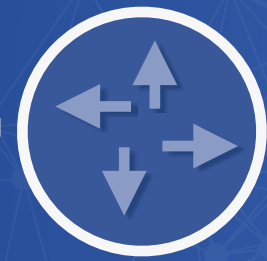
bb01.x3

bb01.a2

bb01.e2

bb02.z3

pr01.z3



Awesome
Flag = True

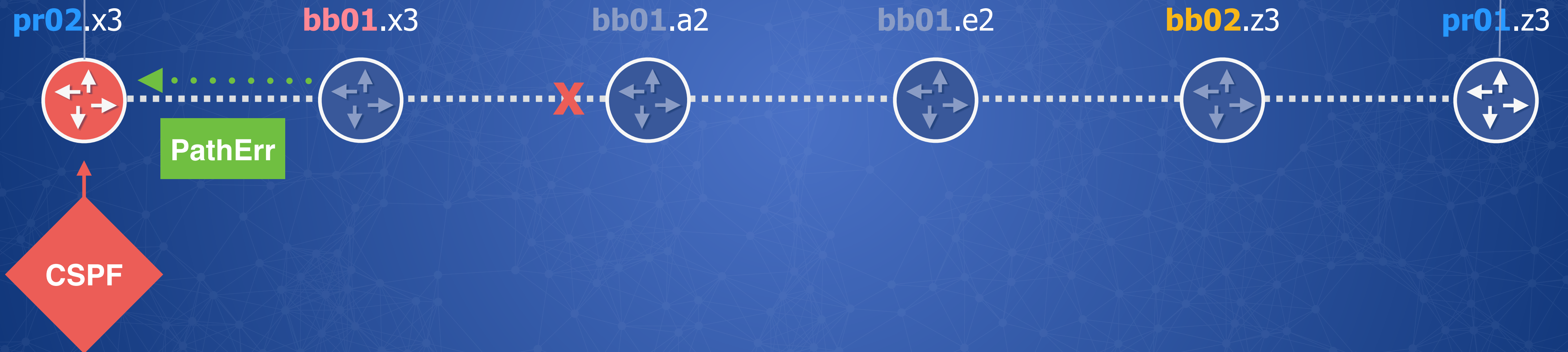
Bug #1 Global Revertive Mode is Broken in Vendor 1

SF - pr02.x3-pr01.z3
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SF - pr02.x3-pr01.z3
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Bug #1 Global Revertive Mode is Broken in Vendor 1

SF - pr02.x3-pr01.z3
AF = True

pr02.x3

bb01.x3

bb01.a2

bb01.e2

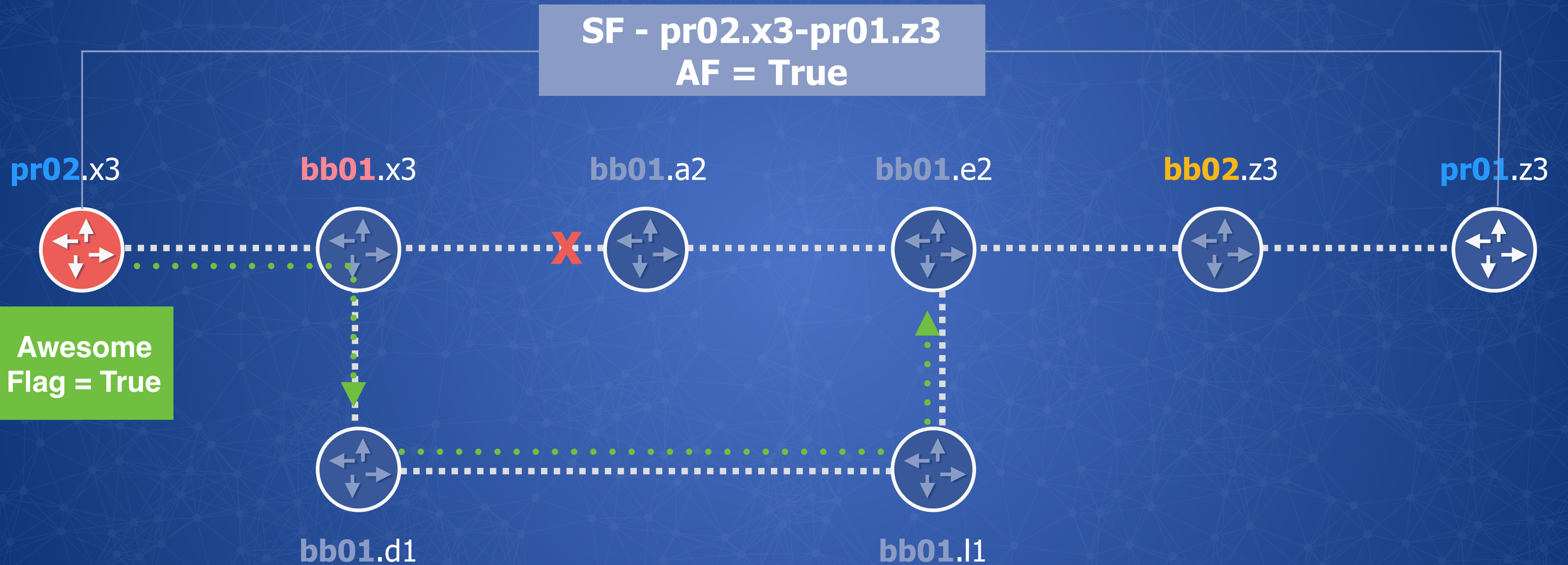
bb02.z3

pr01.z3

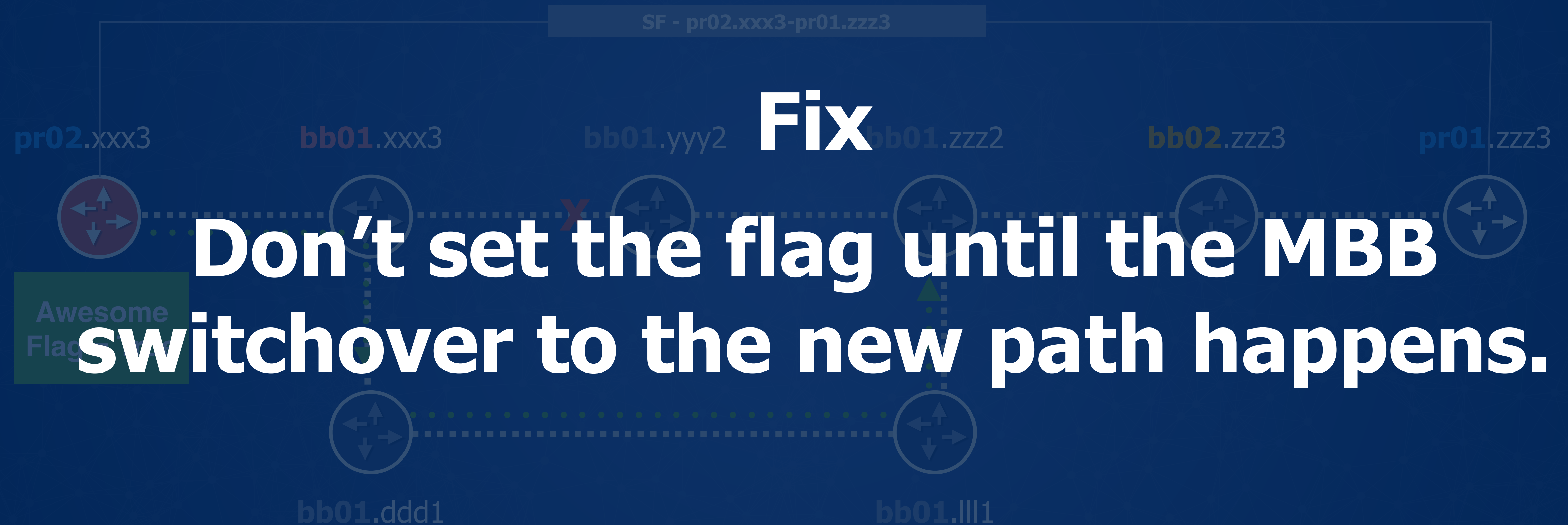
Awesome
Flag = True

bb01.d1

bb01.l1



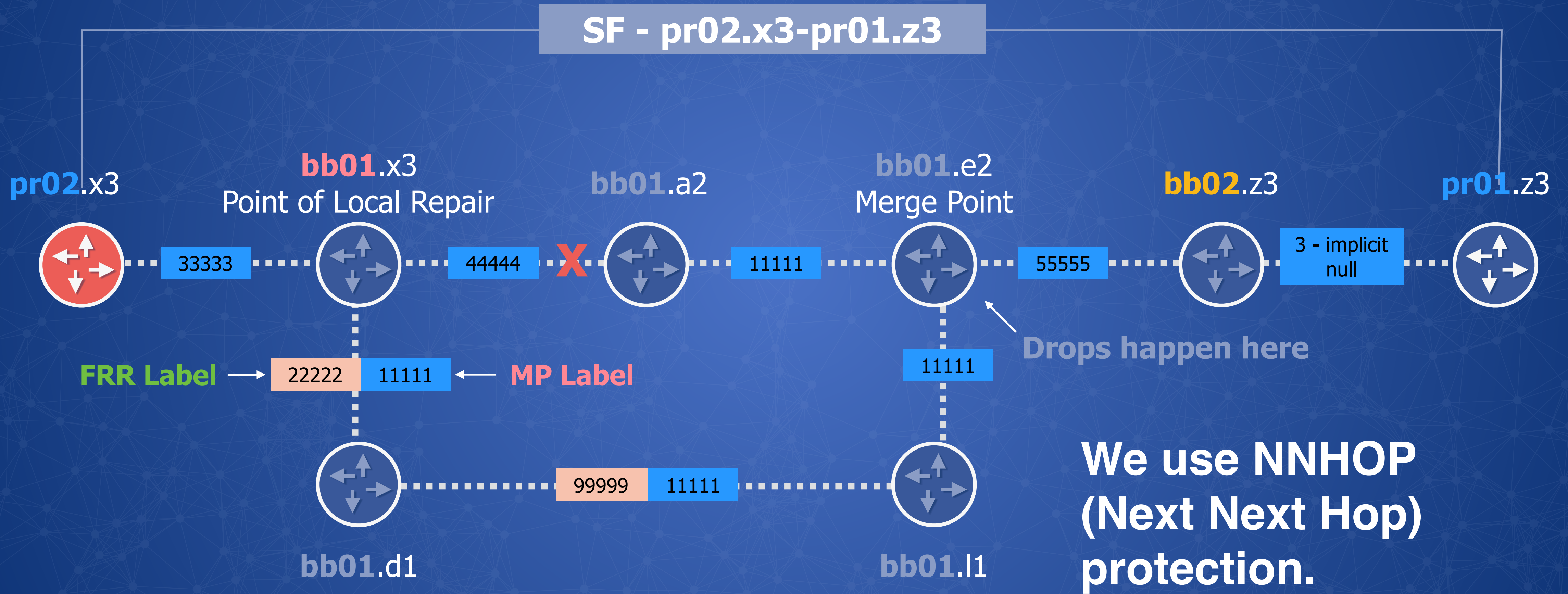
Bug #1 Global Revertive Mode is Broken in Vendor 1



Fix

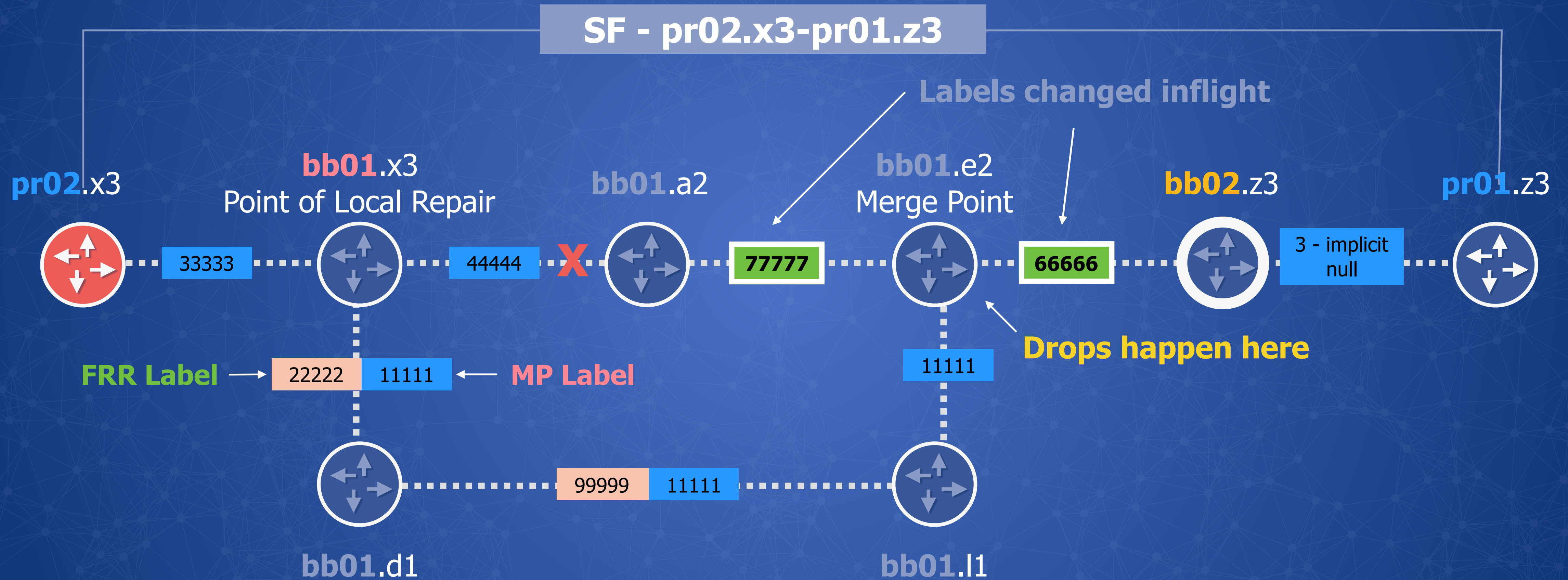
Don't set the flag until the MBB switchover to the new path happens.

Bug #2 MP label change not honored by PLR

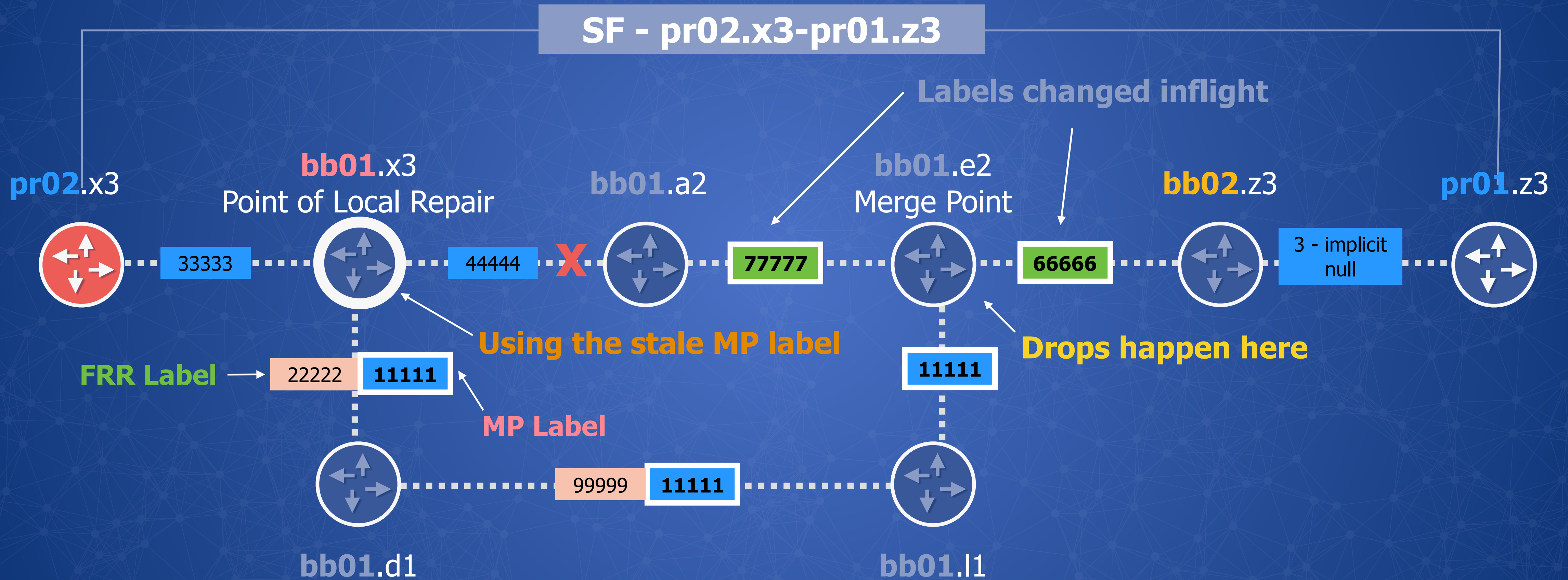


**We use NNHOP
(Next Next Hop)
protection.**

Bug #2 MP label change not honored by PLR



Bug #2 MP label change not honored by PLR



Bug #2 MP label change not honored by PLR

Fixes

Vendor 1:

Adding the label sub-object in the RRO when an LSP is in FRR mode.

But this node keeps using the old ones



Bug #2 MP label change not honored by PLR

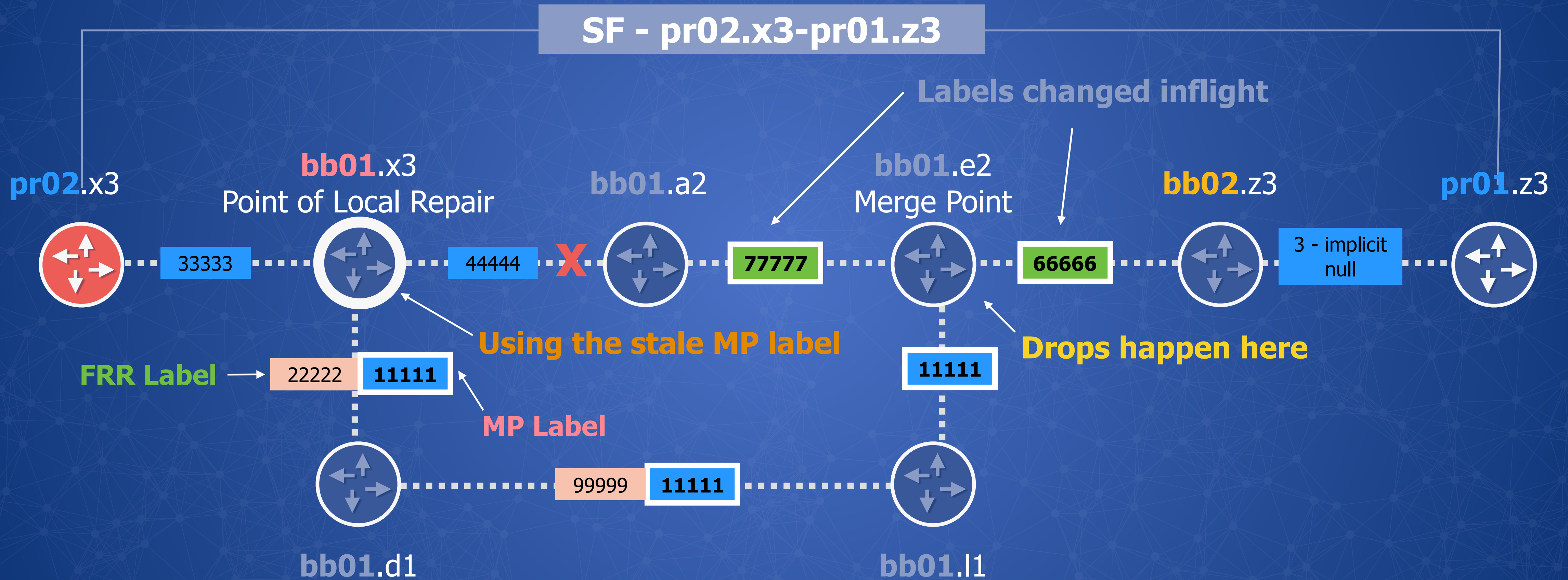
Fixes

Vendor 2:

Extract the MP label from the RRO when label is missing from the Node IP address but present in another IP address that belongs to the MP

But this node keeps using the old ones

Bug #2 MP label change not honored by PLR

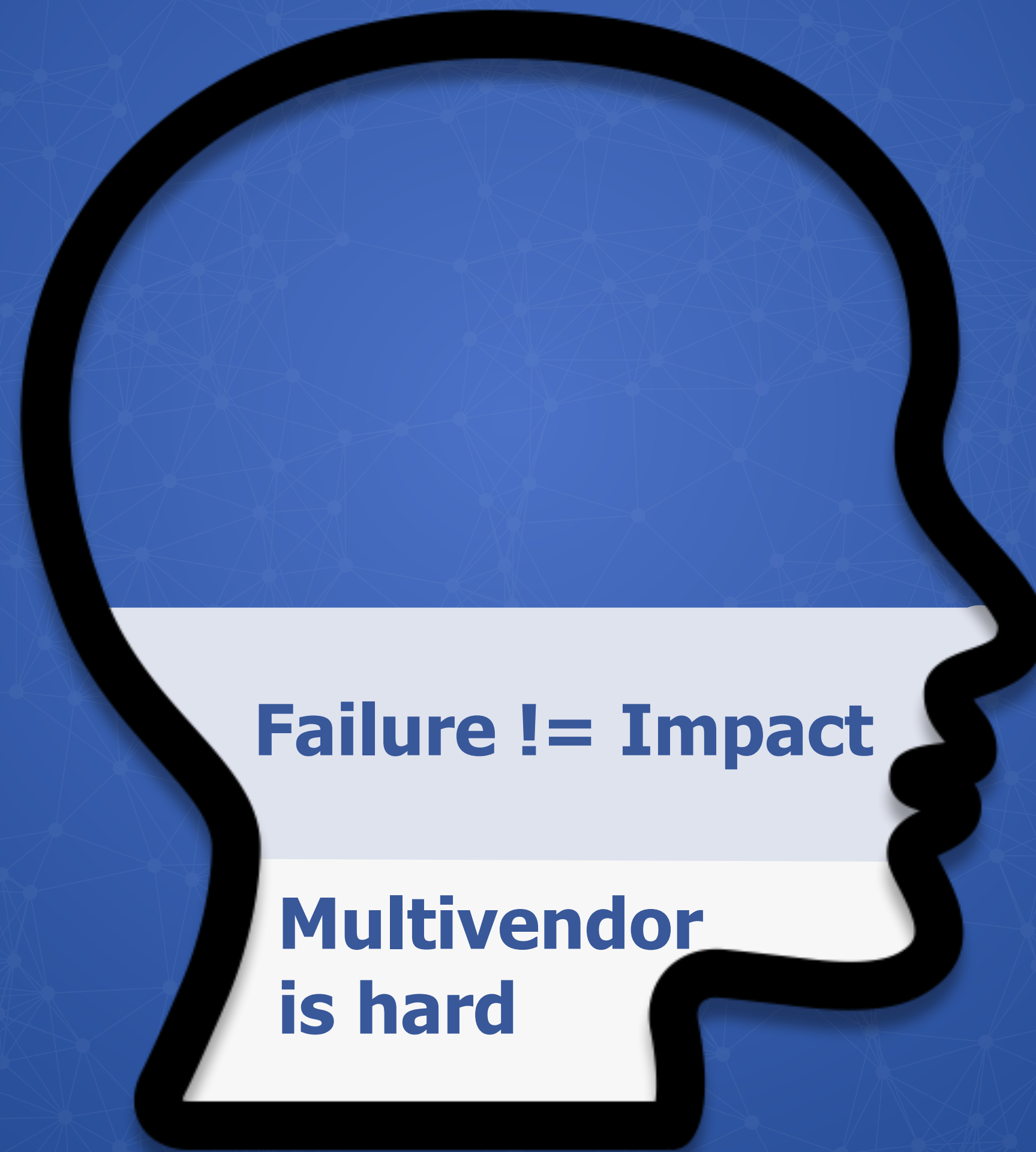


Lessons Learned

Lessons learned



Lessons learned



Failure != Impact

**Multivendor
is hard**

Lessons learned



Collect all the things

Failure != Impact

**Multivendor
is hard**

Lessons learned

Monitor end-to-end

Collect all the things

Failure != Impact

**Multivendor
is hard**



