

BGP Wedgies --- Bad Policy Interactions that Cannot be Debugged

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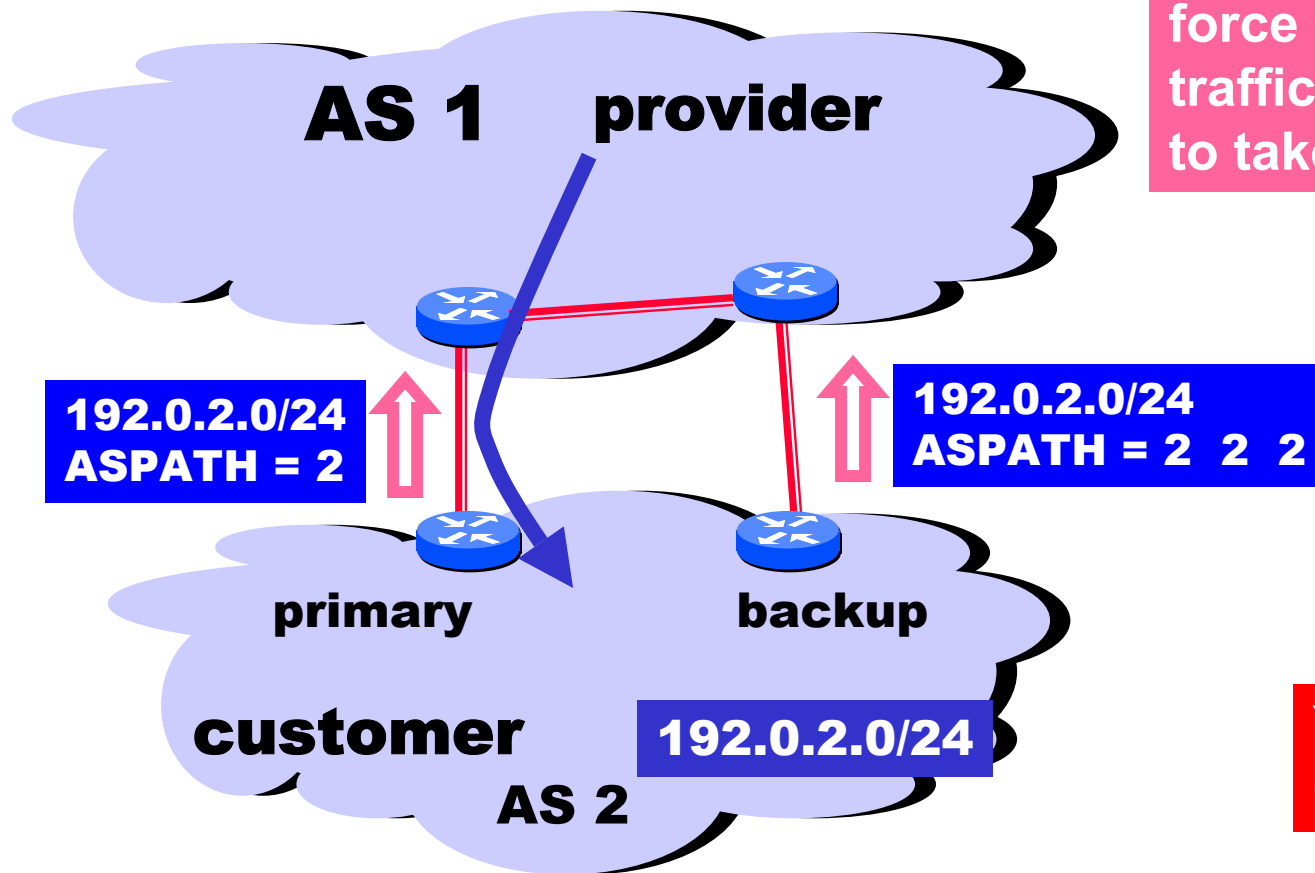
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BGP Wedgie

- **BBP policies make sense locally**
- **Interaction of local policies allows multiple global solutions**
- **Some solutions are consistent with intended policies, and some are not**
- **Manual intervention is required to kick the system back to an intended solution**
- **When unintended solutions are installed, no single AS has enough global knowledge to effectively debug the problem**

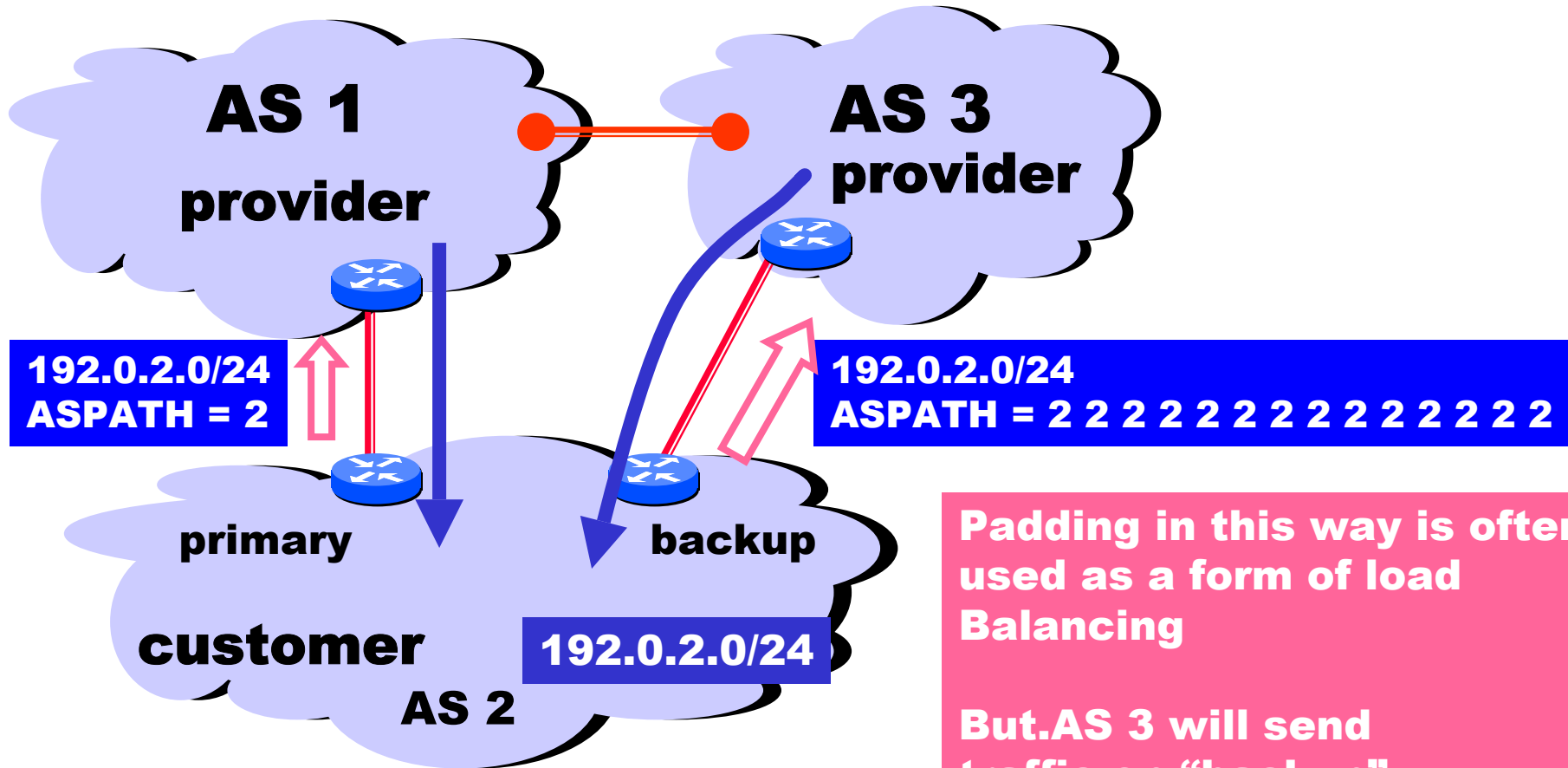
Shedding Inbound Traffic with ASPATH Prepending



Prepending will (usually) force inbound traffic from AS 1 to take primary link

Yes, this is a Glorious Hack ...

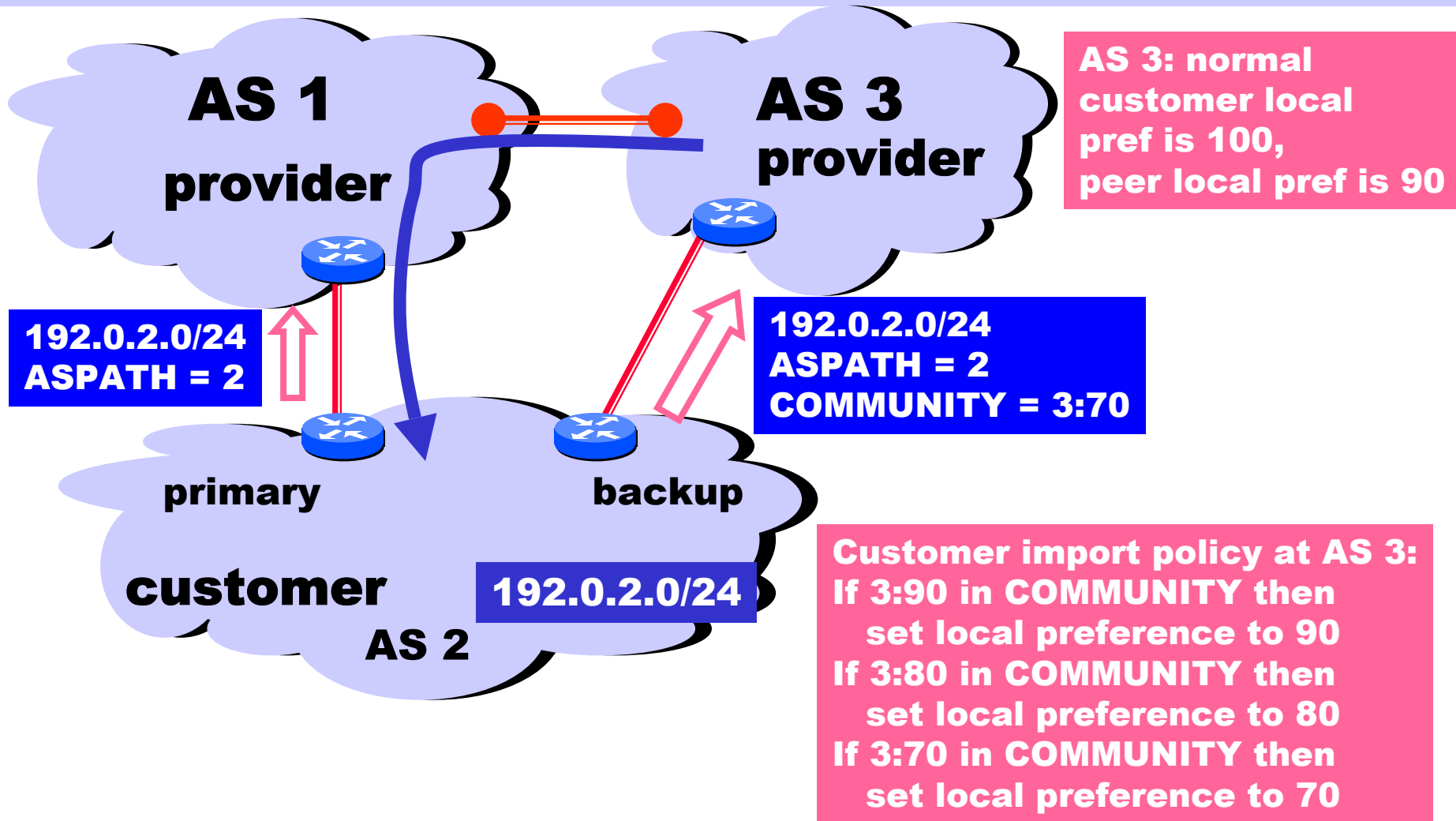
... But Padding Does Not Always Work



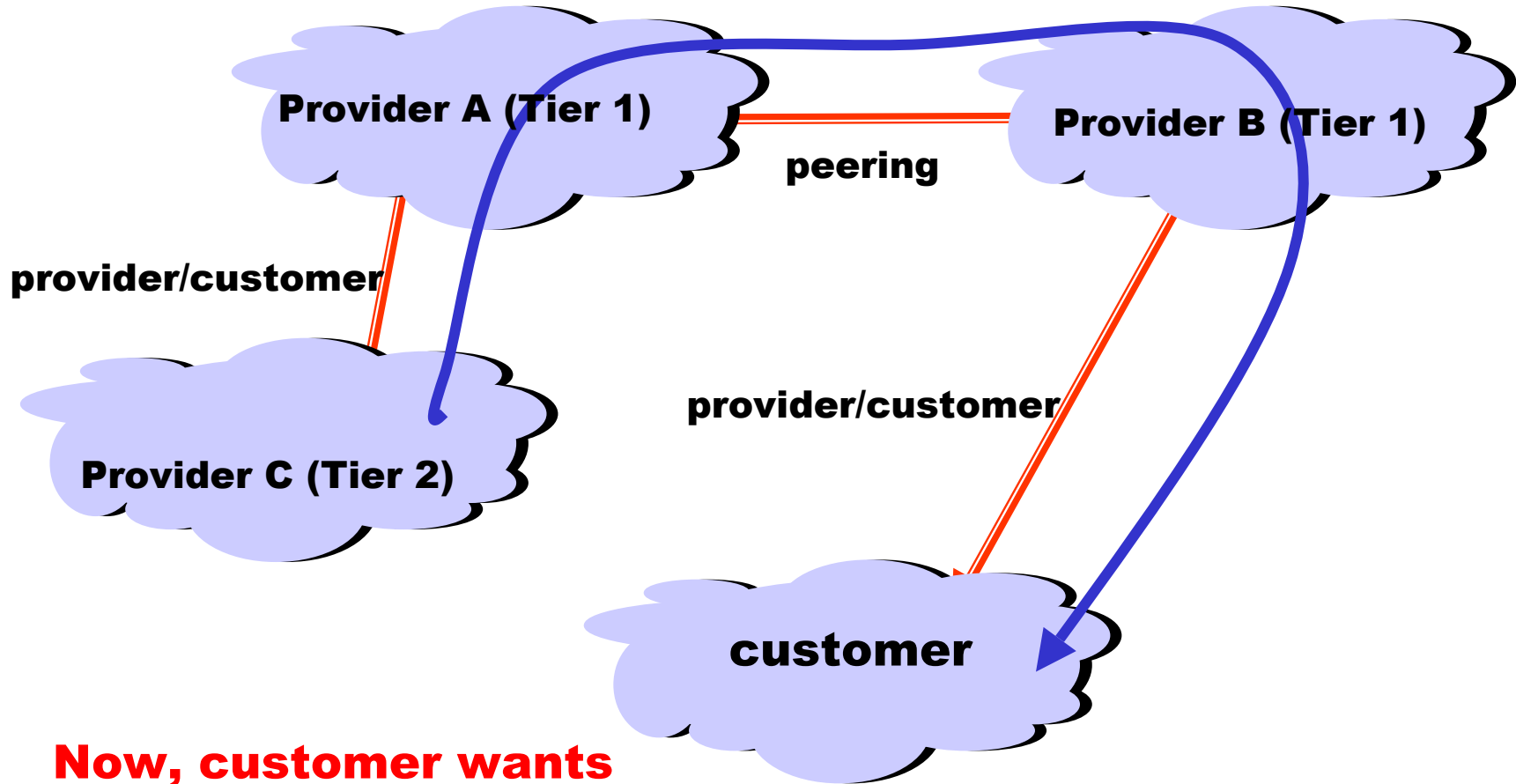
Padding in this way is often used as a form of load Balancing

But AS 3 will send traffic on “backup” link because it prefers customer routes and local preference is considered before ASPATH length!

COMMUNITIES to the Rescue!

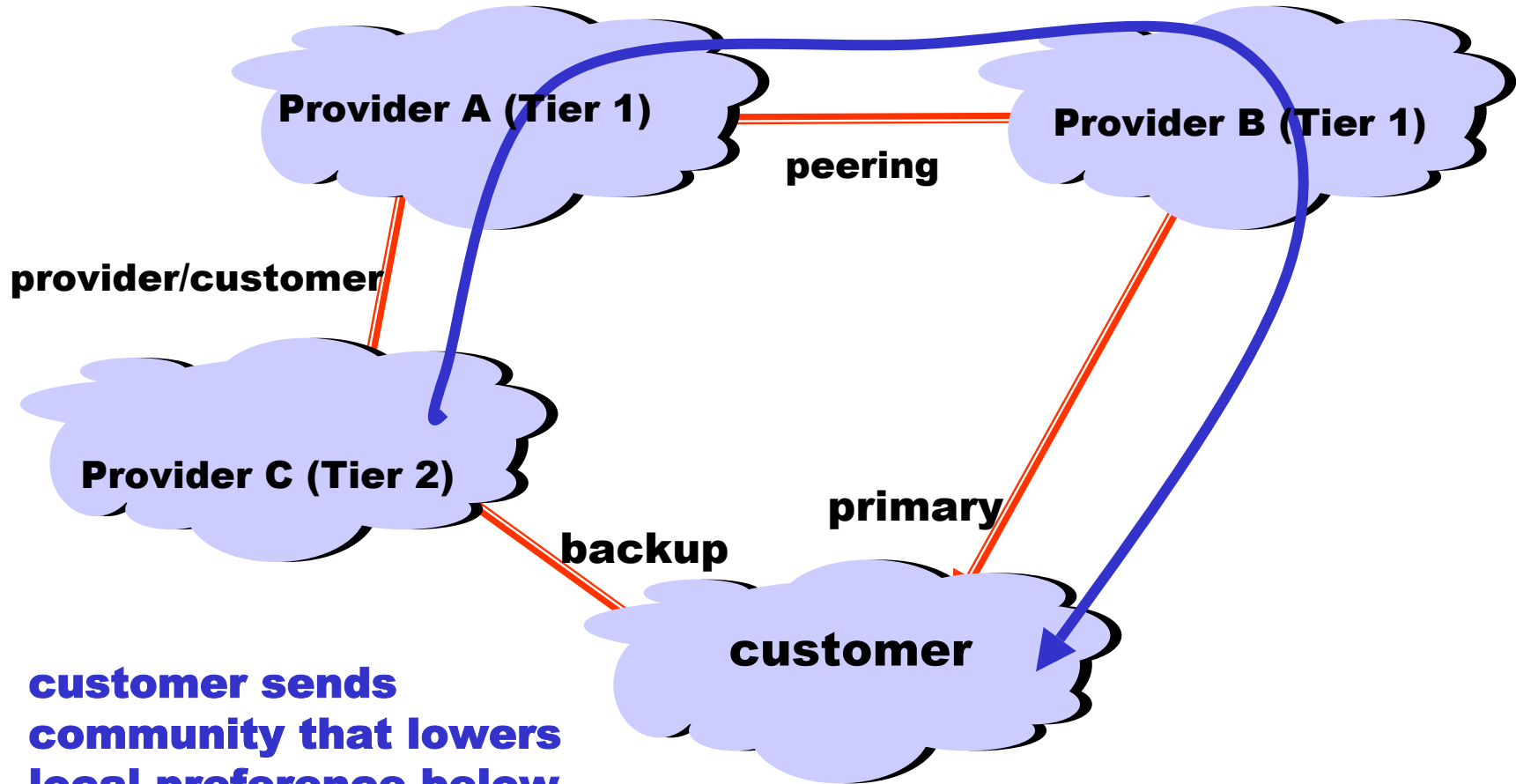


Don't Celebrate Just Yet....



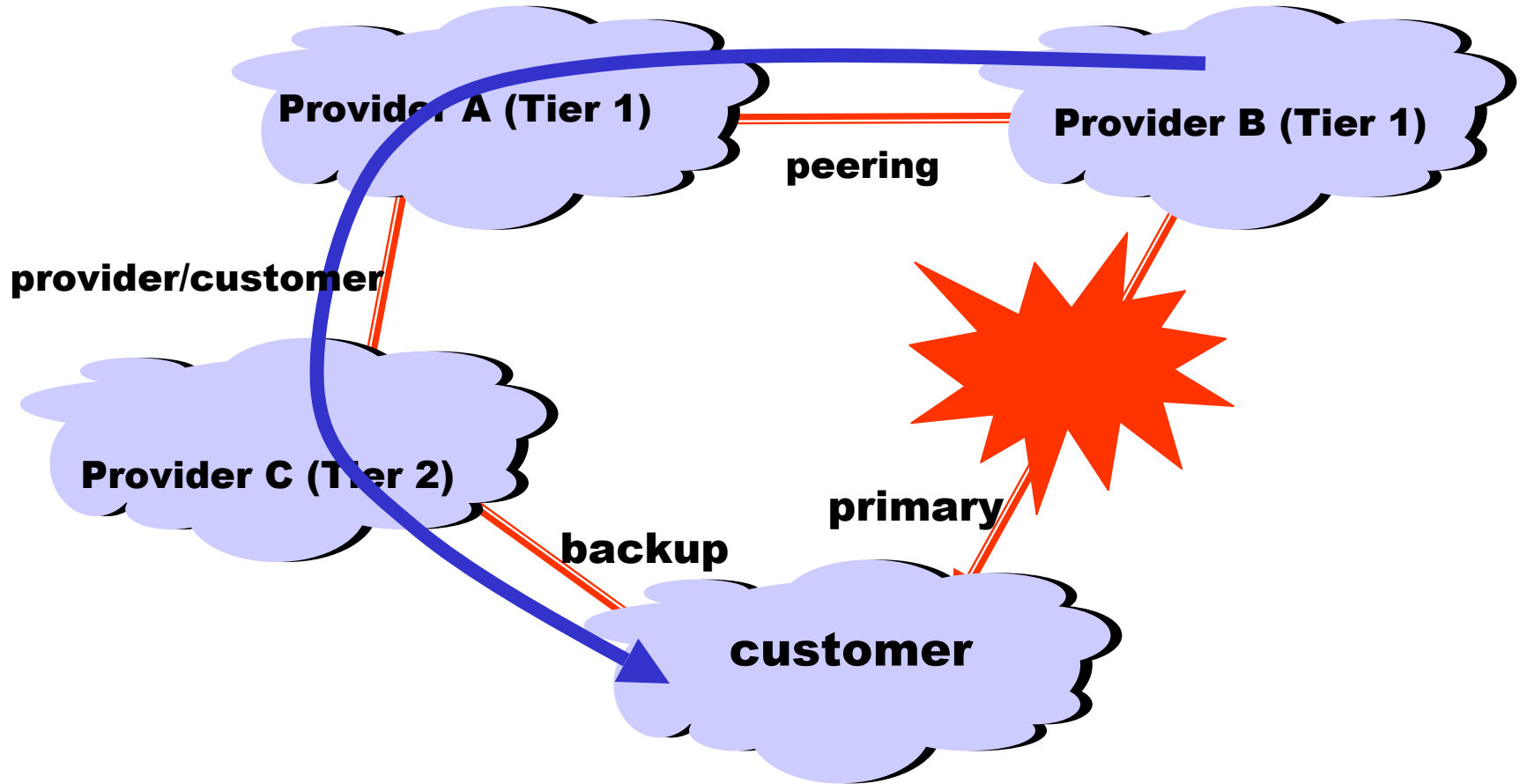
Now, customer wants a backup link to C....

Customer installs a “backup link” ...



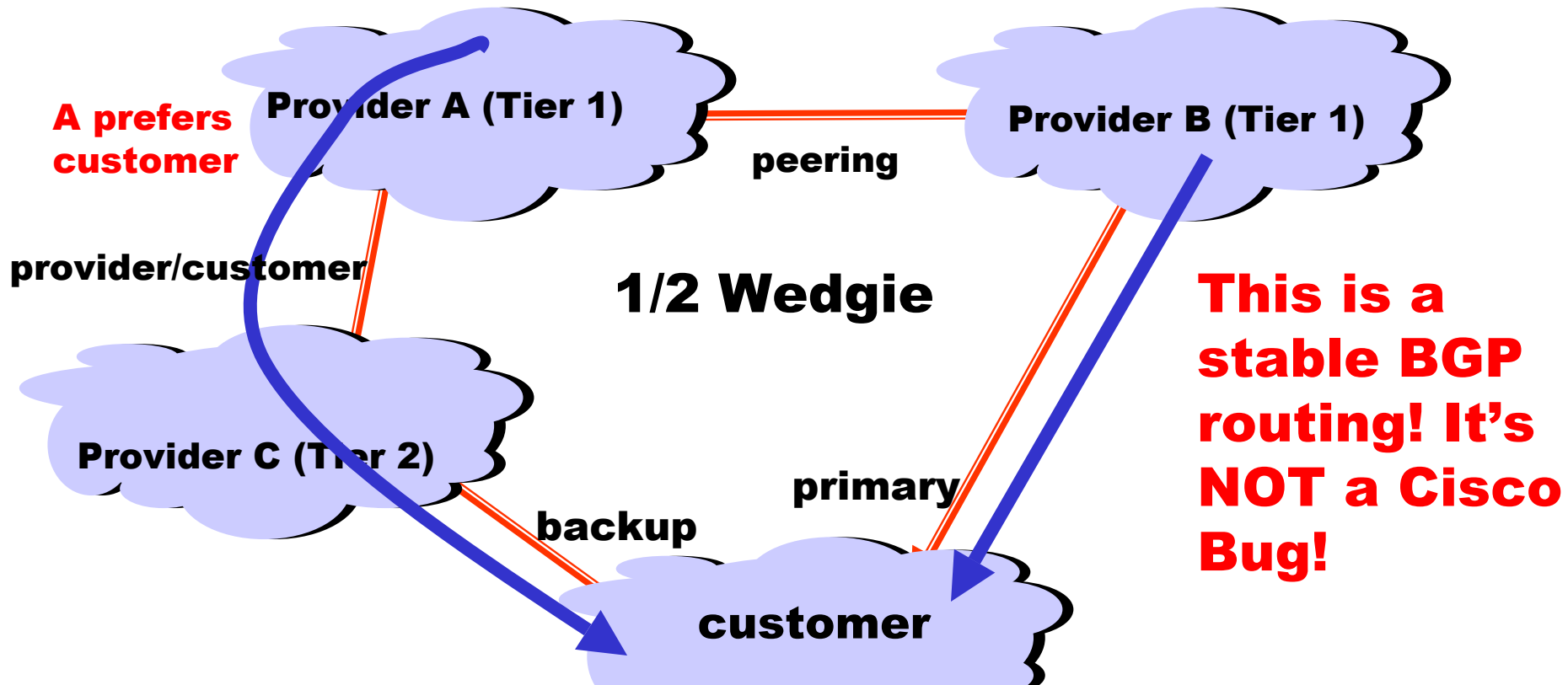
**customer sends
community that lowers
local preference below
a provider's**

Disaster Strikes!



customer is happy that backup was installed ...

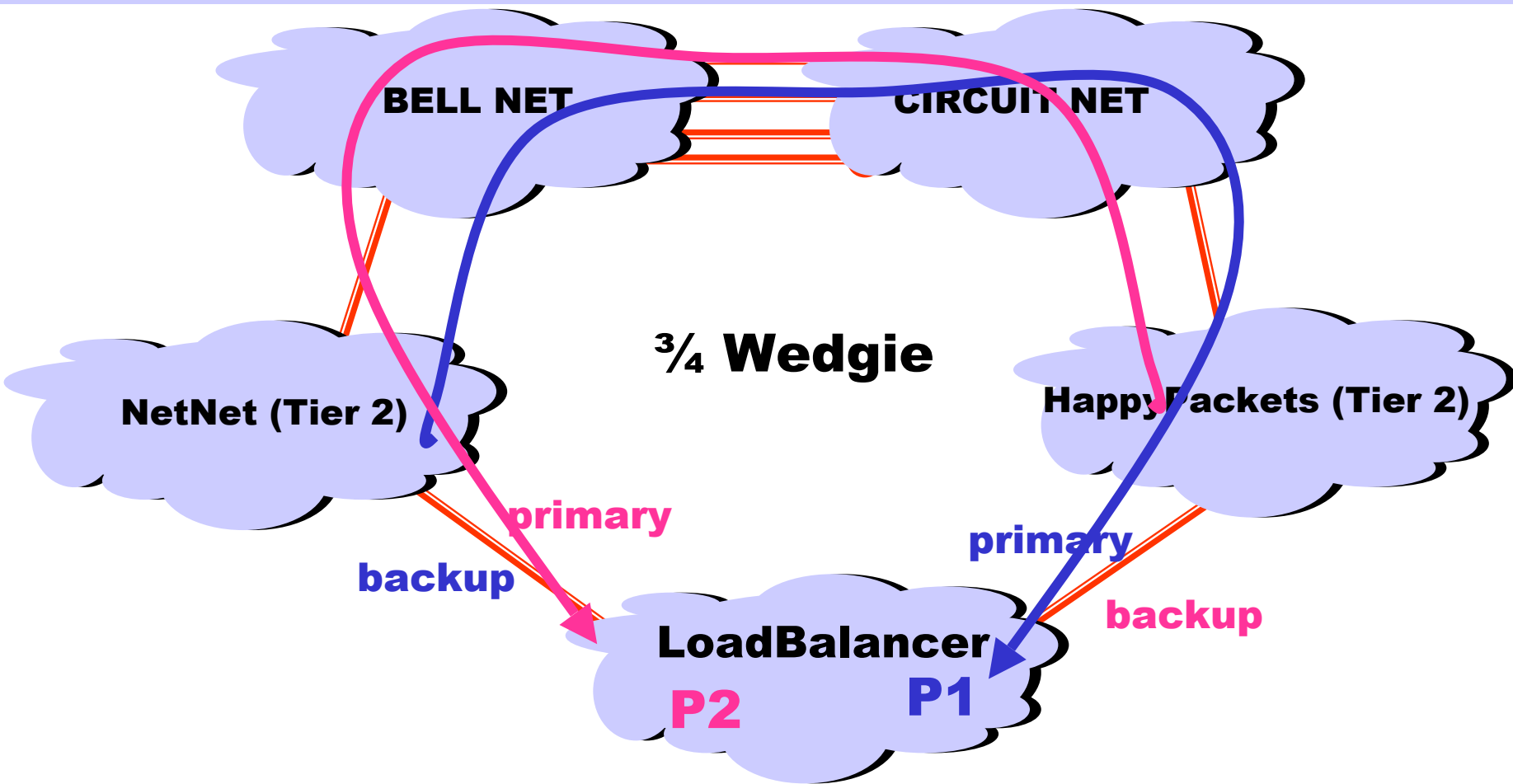
The primary link is repaired, yet routing does repair!



One "solution" --- reset BGP session on backup link!

Better --- C should translate its customer deprep communities to those of Provider A when re-exporting routes to A (not DT!)

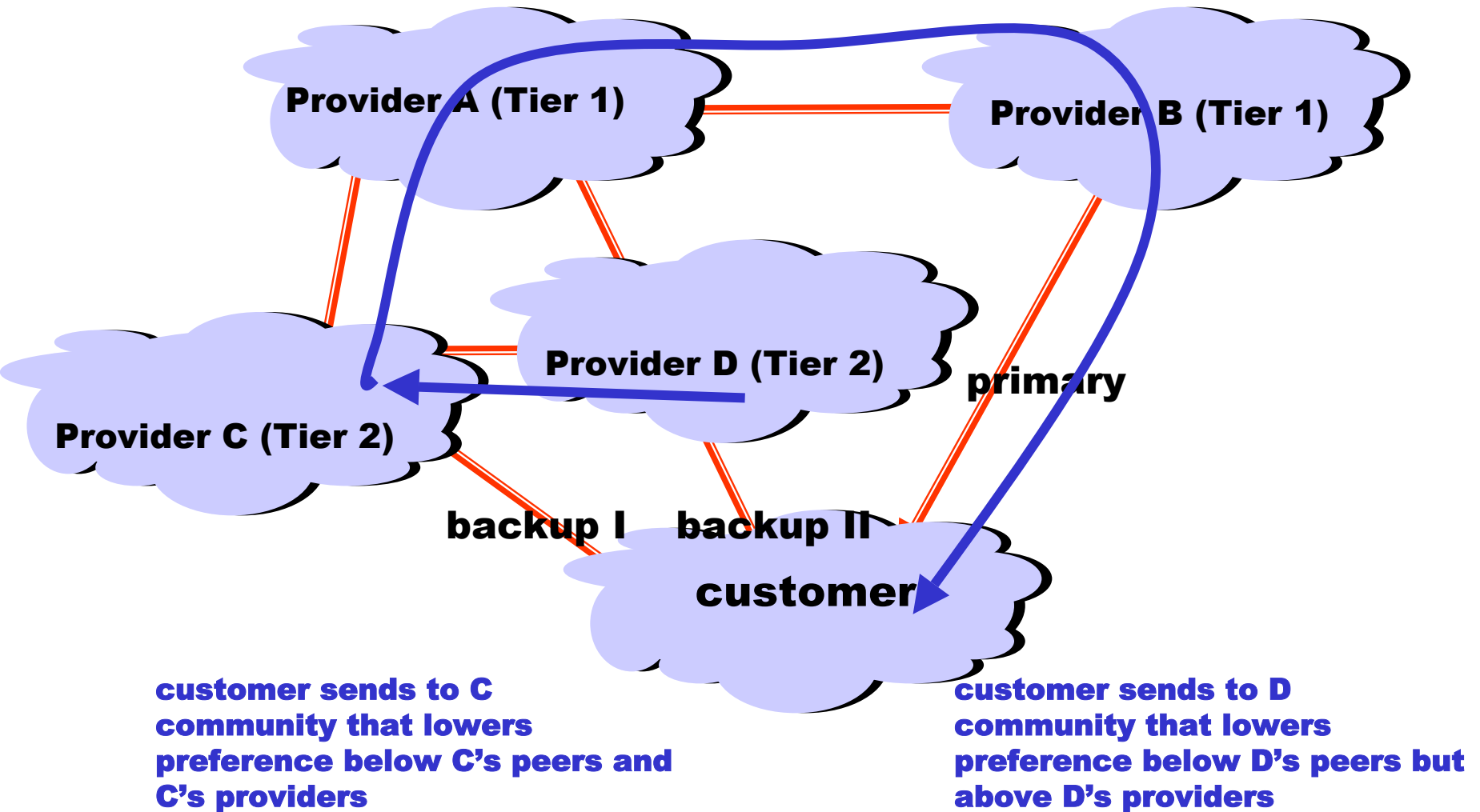
Using communities for per prefix load balancing



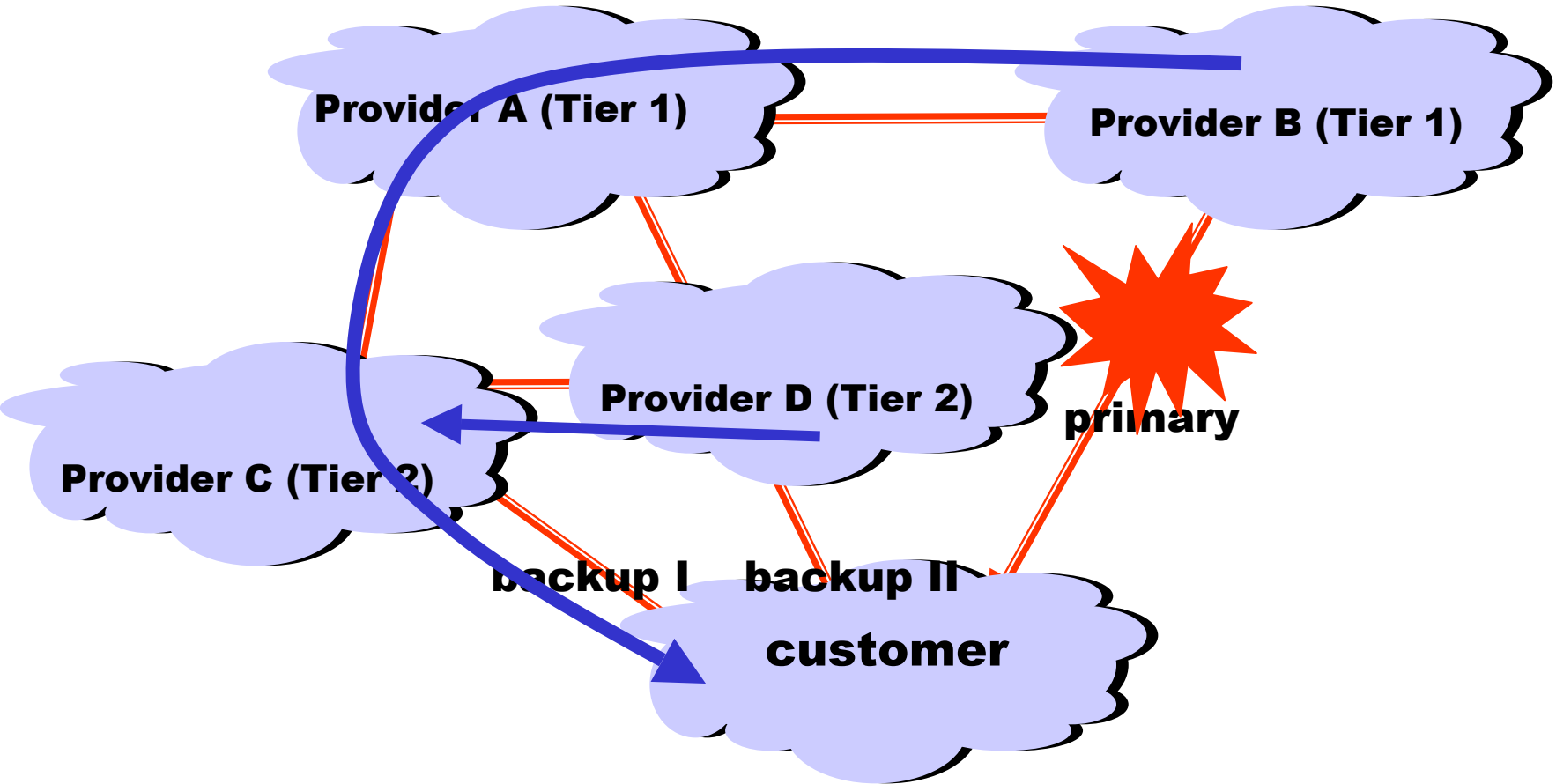
What the heck is going on?

- **There is no guarantee that a BGP configuration has a unique routing solution.**
 - **When multiple solutions exist, the (unpredictable) order of updates will determine which one wins.**
- **There is no guarantee that a BGP configuration has any solution!**
 - **And checking configurations NP-Complete**
- **Complex policies (weights, communities setting preferences, and so on) increase chances of routing anomalies.**
 - **... yet this is the current trend!**

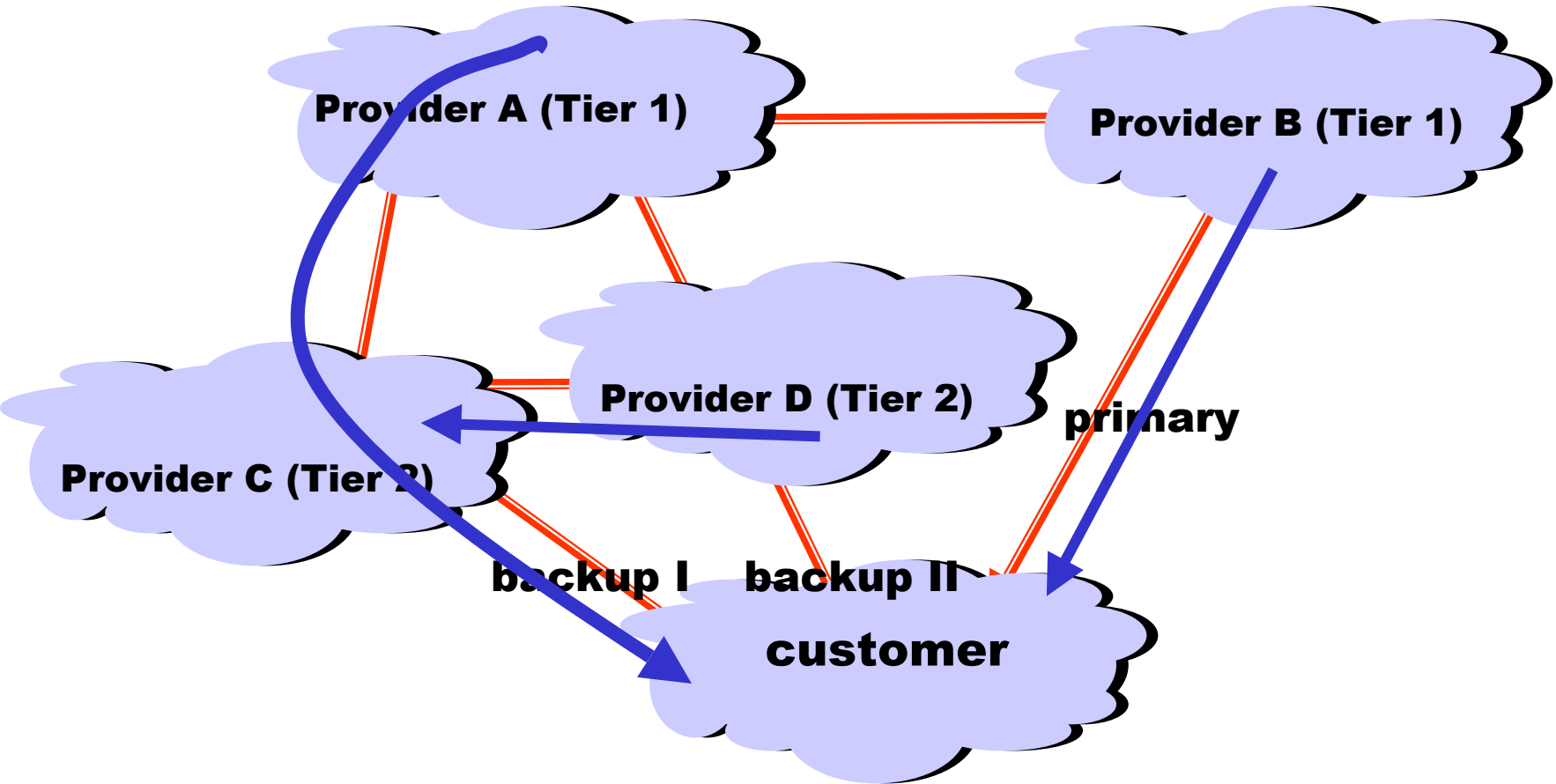
More fun with communities



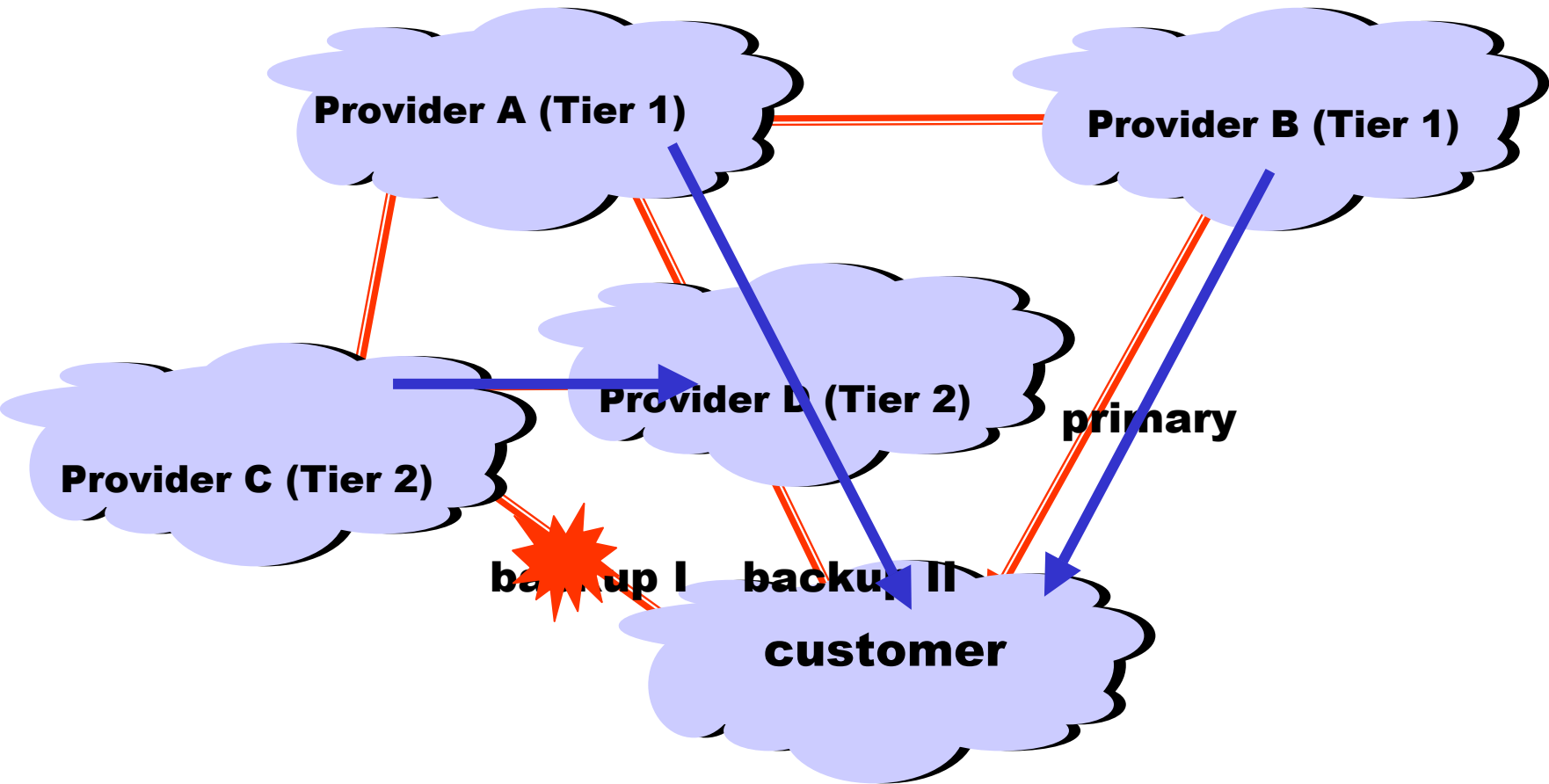
Primary goes down!



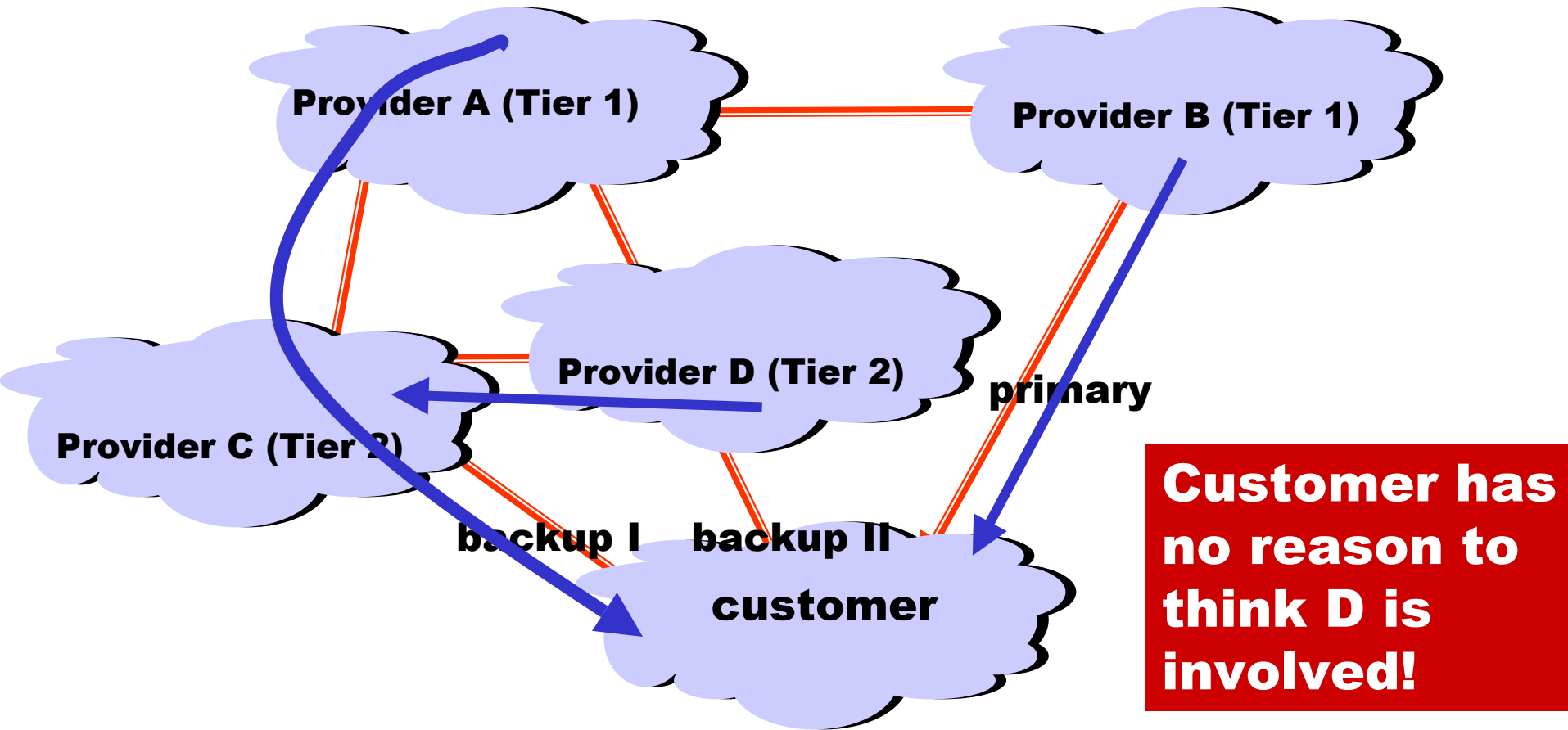
Primary repaired



Reset Backup I session? First, take it down....



Now Bring it up ... THE FULL WEDGIE!



“solution” --- reset BGP session on BOTH backup links simultaneously!

BGP Wedgie

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Recommendations

- **Interdomain communities that can tweak a route's preference should be defined with care and consistently implemented.**
- **Communities should be translated and transited**