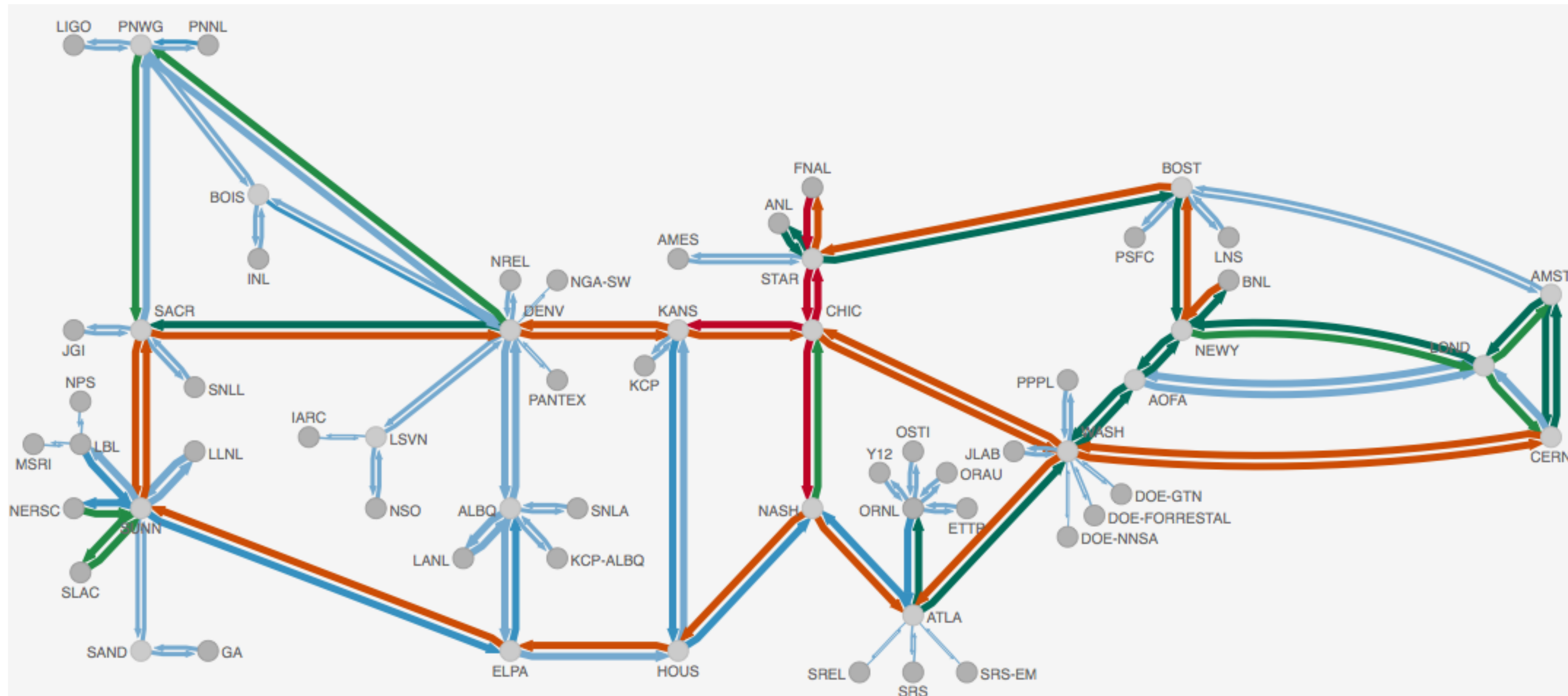


Network Traffic Optimization

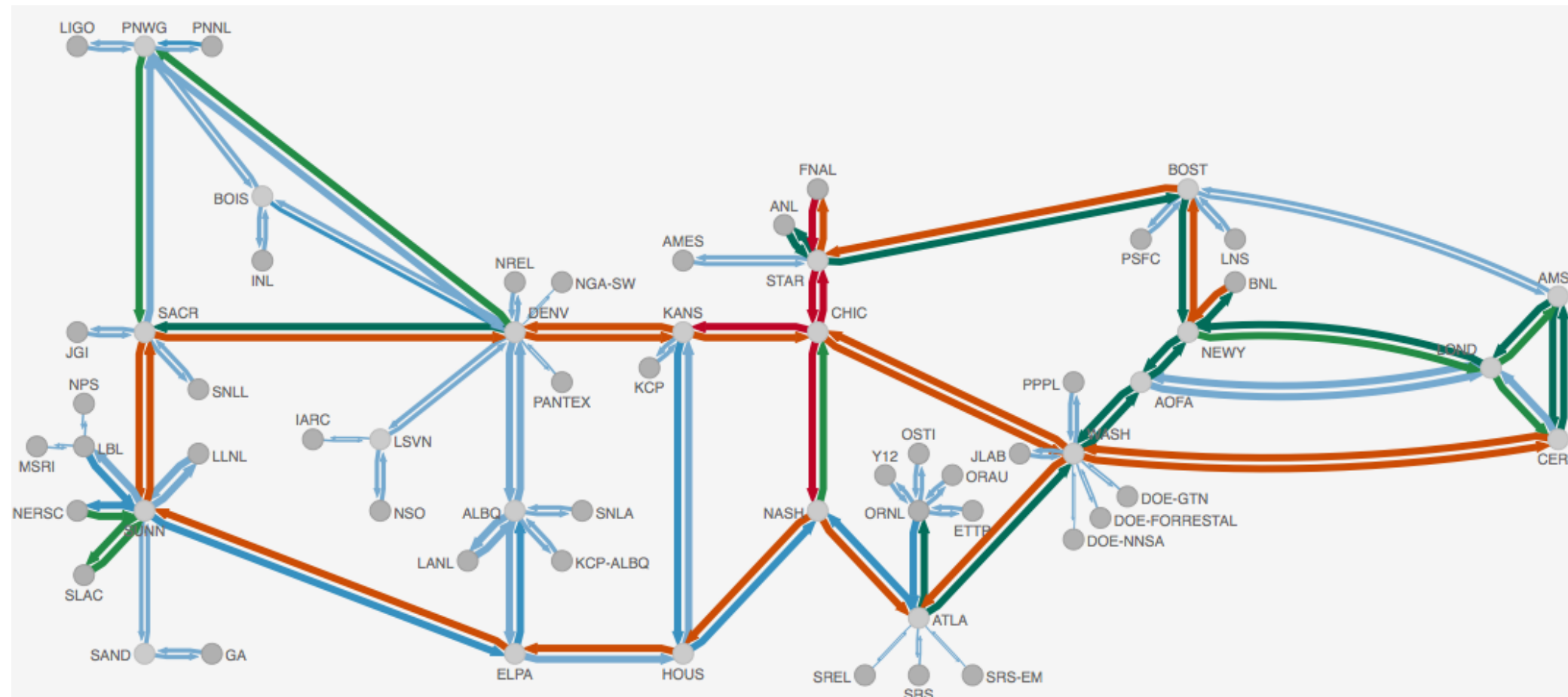
Yatish Kumar

esNet as an example



Multiple paths. Not all are heavily loaded.

Simple Assumption



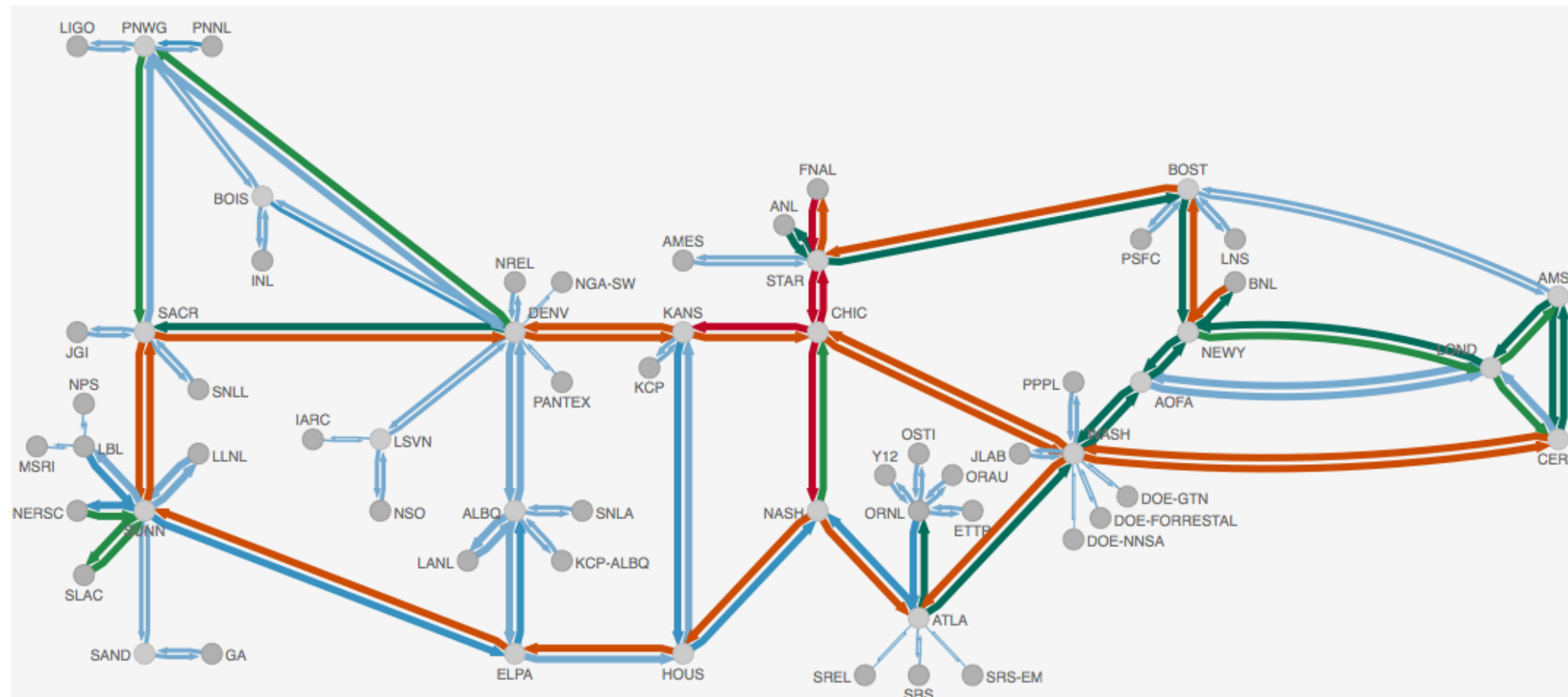
Using this topology and link rate information a system like Panda can compute the offered load onto all links in the network.

Ignore other sources of traffic.

2 Benefits

1. Panda can avoid competition with itself for various data transfers
2. It can potentially select non competing paths, as long as there is a transfer opportunity to use multiple path segments

Better Situation - Other Traffic



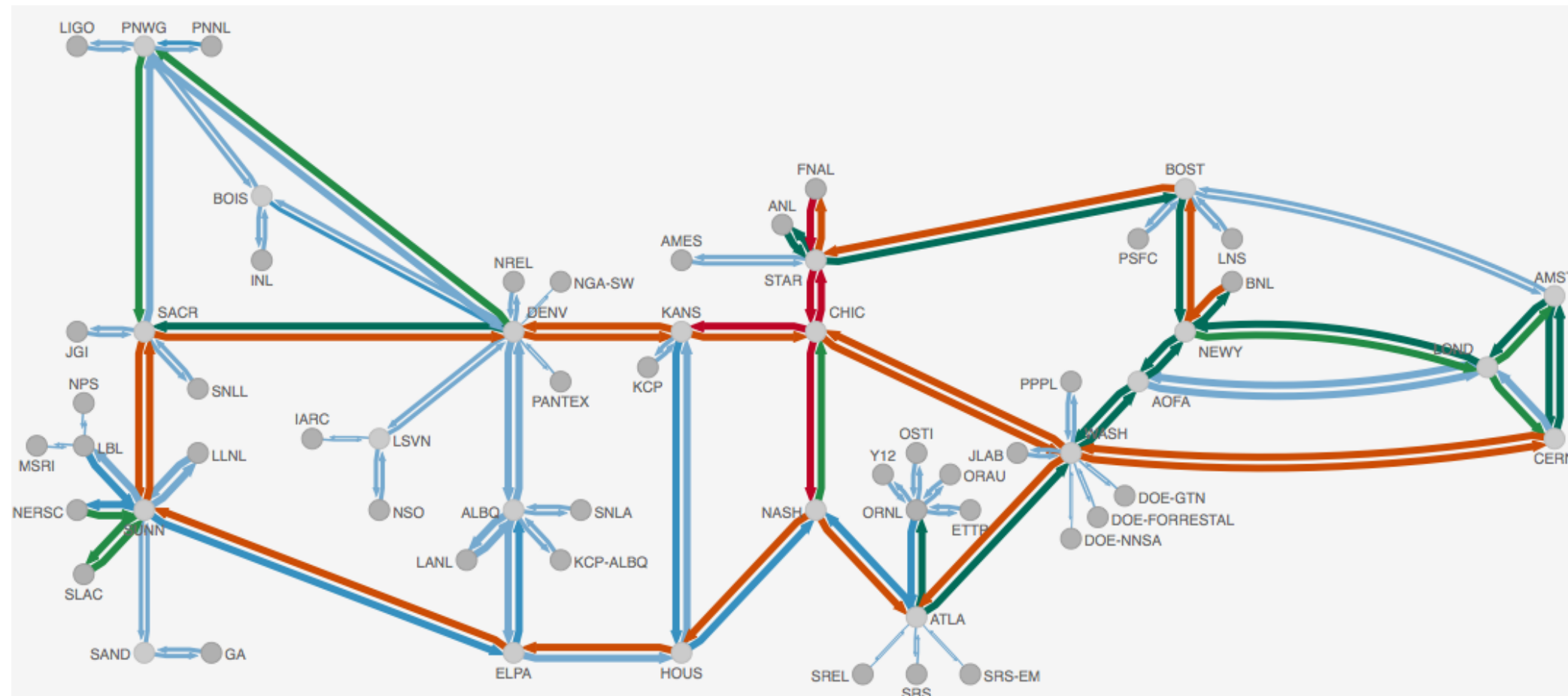
Using this topology and link rate information a system like Panda can compute the offered load onto all links in the network.

Incorporate path utilization updates to account for other traffic not under Panda's control

Benefits

1. Panda can avoid competition with itself for various data transfers
2. It can potentially select non competing paths, as long as there is a transfer opportunity to use multiple path segments
3. Be somewhat adaptive about scheduling transfers, based on network activity

Even Better Situation - Other Traffic



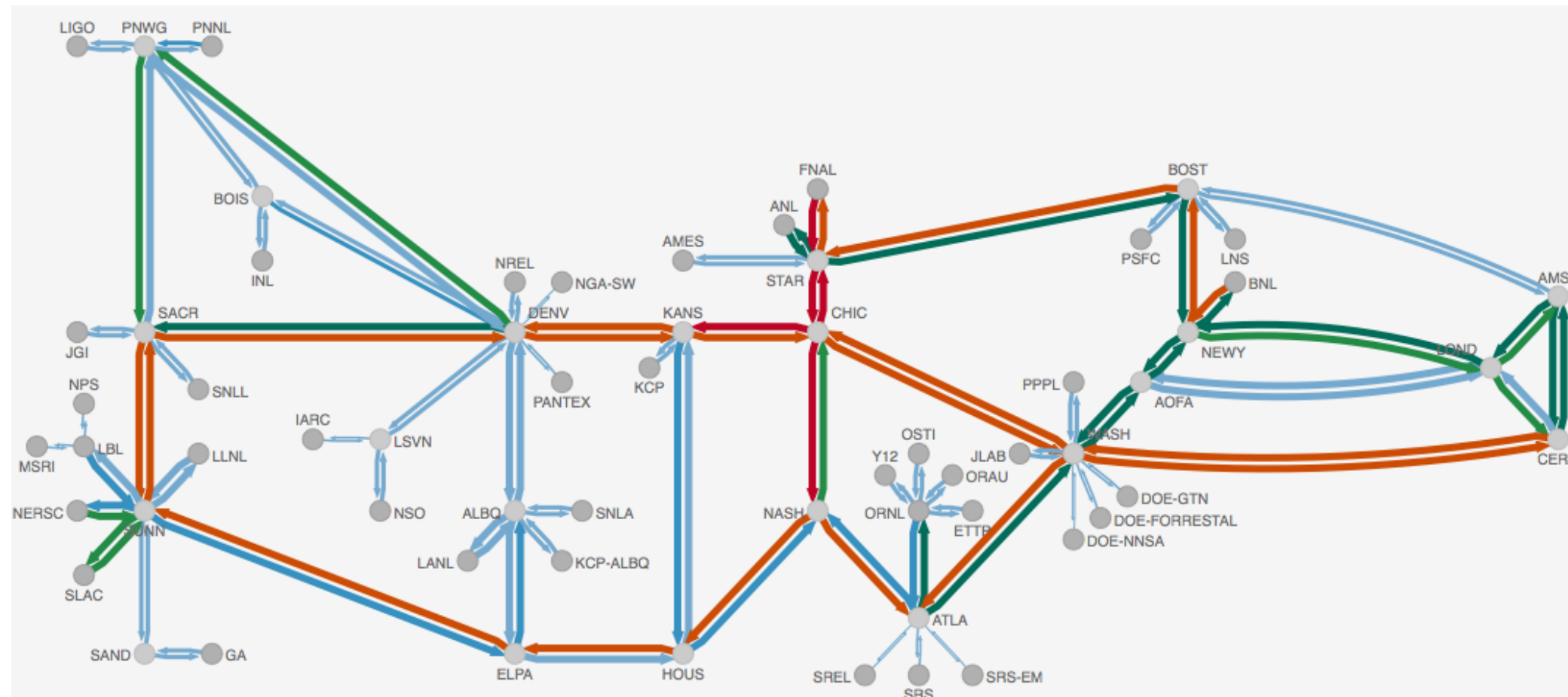
Using this topology and link rate information a system like Panda can compute the offered load onto all links in the network.

Publish scheduled data transfers to a calendar.

Benefits

1. Panda can avoid competition with itself for various data transfers
2. It can potentially select non competing paths, as long as there is a transfer opportunity to use multiple path segments
3. Be somewhat adaptive about scheduling transfers, based on network activity
4. Allow other users to cooperatively avoid competition with Panda for network resources

Further refinement



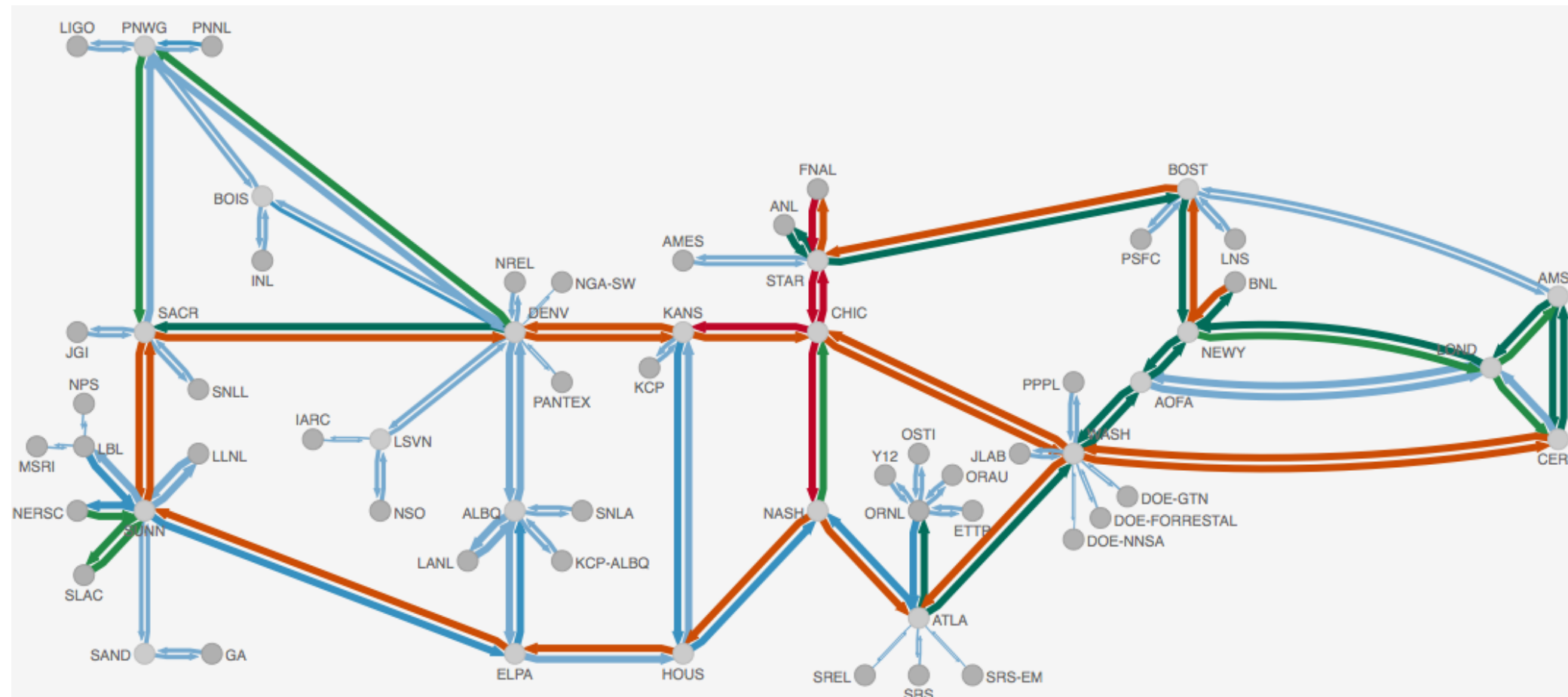
Using this topology and link rate information a system like Panda can compute the offered load onto all links in the network.

Incorporate Bandwidth SLAs

Benefits

1. Panda can avoid competition with itself for various data transfers
2. It can potentially select non competing paths, as long as there is a transfer opportunity to use multiple path segments
3. Be somewhat adaptive about scheduling transfers, based on network activity
4. Allow other users to cooperatively avoid competition with Panda for network resources
5. Create more predictable behaviours when multiple users are involved

Getting Carried Away



Using this topology and link rate information a system like Panda can compute the offered load onto all links in the network.

Install Data Staging in quiet parts of the network, or at key junctions

Benefits

1. Panda can avoid competition with itself for various data transfers
2. It can potentially select non competing paths, as long as there is a transfer opportunity to use multiple path segments
3. Be somewhat adaptive about scheduling transfers, based on network activity
4. Allow other users to cooperatively avoid competition with Panda for network resources
5. Create more predictable behaviours when multiple users are involved

Summary

Easy Steps: Don't ask anything of the service provider. Just document topology.

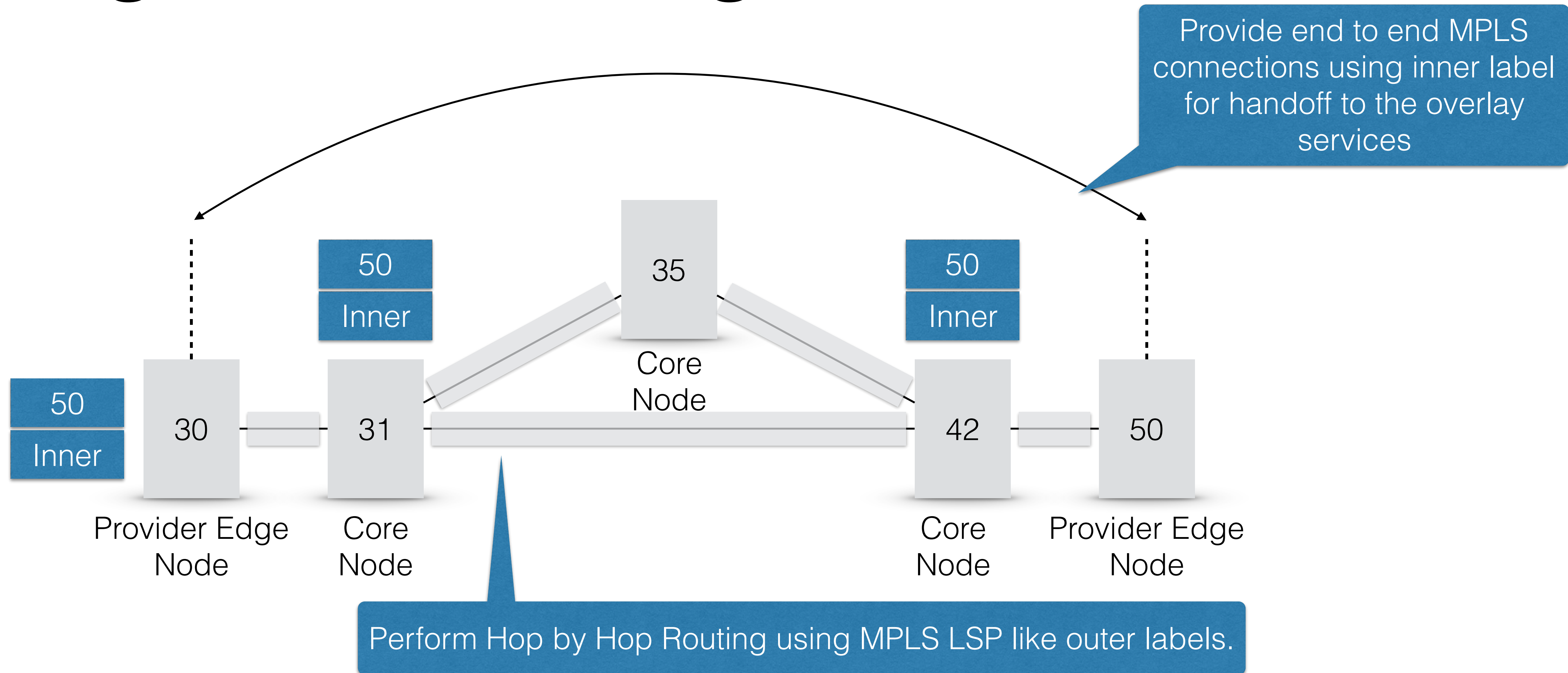
Next Level : Ask for a bandwidth calendar and traffic steering

Next Level : Ask for SLAs / bandwidth guarantees

All of the above are relatively easy requests possible on existing networks

Note: No BOD, no RSVP, no MPLS-TE, no L2 circuit setups

Segment routing in a nutshell



Segment routing in a nutshell

