Network Capacity Planning

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Introduction

- About Me
  - Lead Engineer of a team in Verizon whose primary focus is capacity planning data network(s) by utilizing Traffic Engineering principals.
  - Contact Information
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Capacity Plan for What?

- Do you care how your network routes traffic?
- Is the performance your customer receives important?
- Are packet drops or high latency acceptable?
- Then basic fundamentals of Network Capacity Planning are for you.

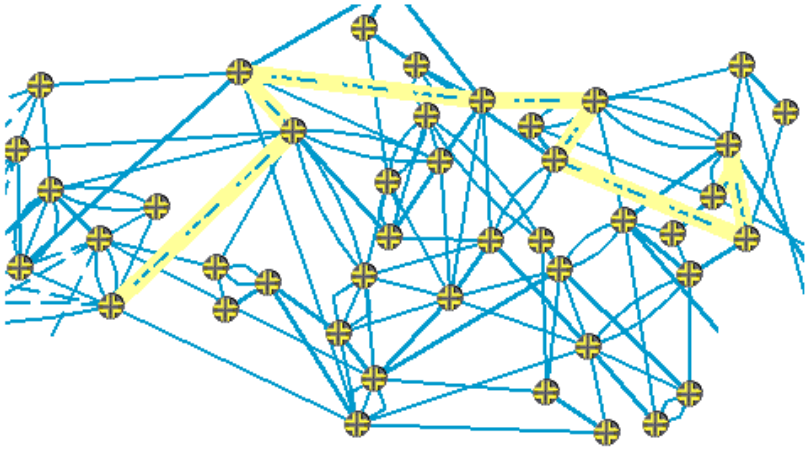
Focus for Capacity Planning

- Network Capacity Planning is a large topic, for today's discussion we will focus on traffic performance
- Performance on network
  - The traffic or demand flow across your network
    - What happens when a failure (link, card, node) occurs
    - What if I change admin cost, or take advantage of a new routing protocol?

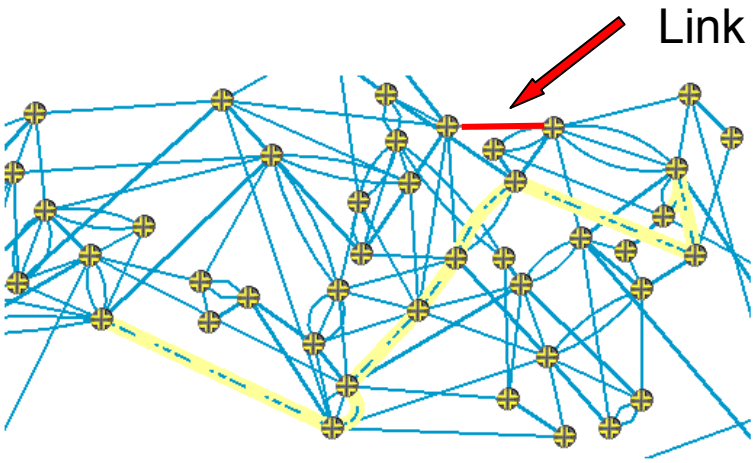
Failure Scenarios

- A simulation tool is necessary to enable proper prediction of network performance during failure scenarios.
  - Variation in scenarios include single link failure to whole router failure.
  - A tool, for example, will allow one to see the influence a failure on the east coast has to routers on the west coast.
  - Instead of over-engineering the network to protect against failure, only place capacity where you need it when you need it. Maximize your $ money.

Failure Scenarios



Routing During Stable State (No Failure)



A link Failure causes the route to change. How does this effect the network? (capacity, latency, etc..)

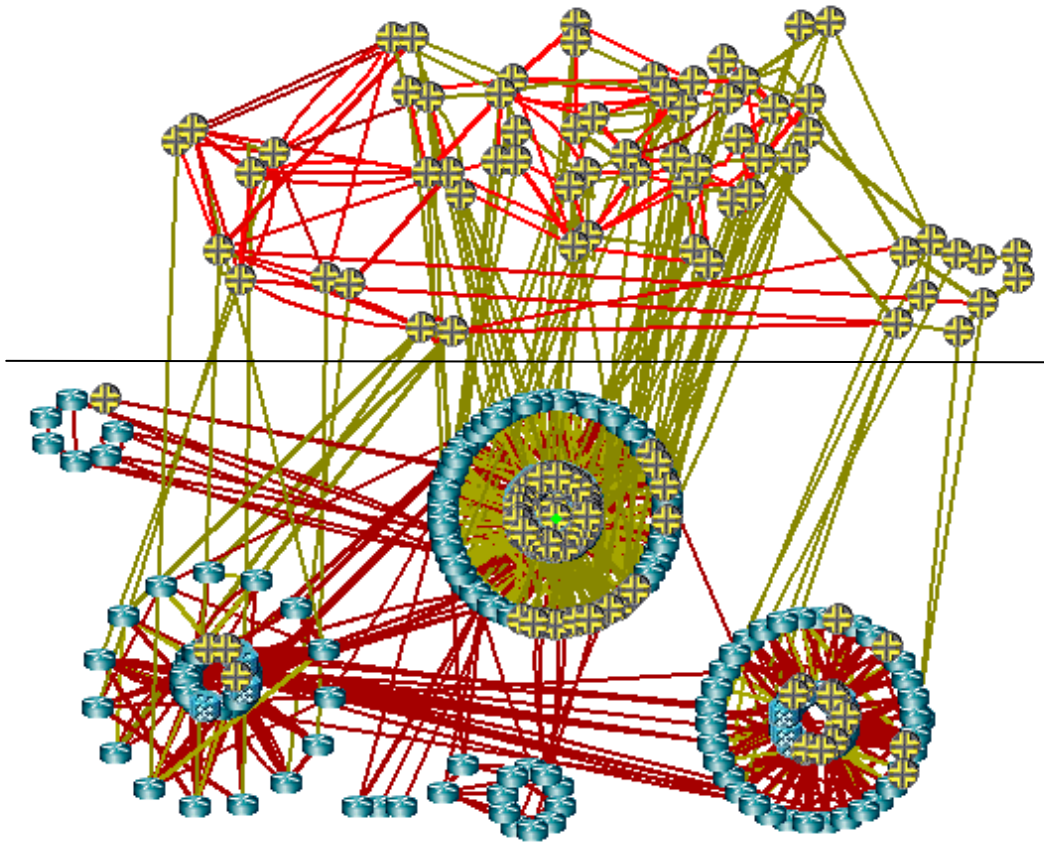
What-If Scenarios

- If you can dream it, a tool can help you see it.
  - You can create a sandbox with your network to see how it will respond to new situations.
    - How will a new customer or peering traffic effect the network?
    - What if I add MPLS capability to the network, and what different things can it do?
    - How much latency will my customer experience if I change metric costs?

What-If Example

- Example utilizing the WANDL tool
  - IGP merge two networks
    - Network A is a very large, many routers, global network, OSPF and MPLS enabled.
    - Network B is a global network, less routers but big pipes, OSPF and MPLS enabled.
    - Goal is to merge the two networks at the OSPF level where Net-B will function as the backbone for Net-A.
  - Problem
    - How do we set the OSPF / MPLS features to ensure the traffic from Net-A flows across Net-B and not the opposite.
    - The OSPF design of Net-A is inherently lower then Net-B; once the merge is implemented, all the traffic on Net-B would be sucked into Net-A.
  - Solution
    - Utilize the WANDL tool to redesign the OSPF for Net-A so it prefers to use Net-B as backbone.

What-If Example



Network B

Network A

Thanks