

Internet Traffic Report 2002

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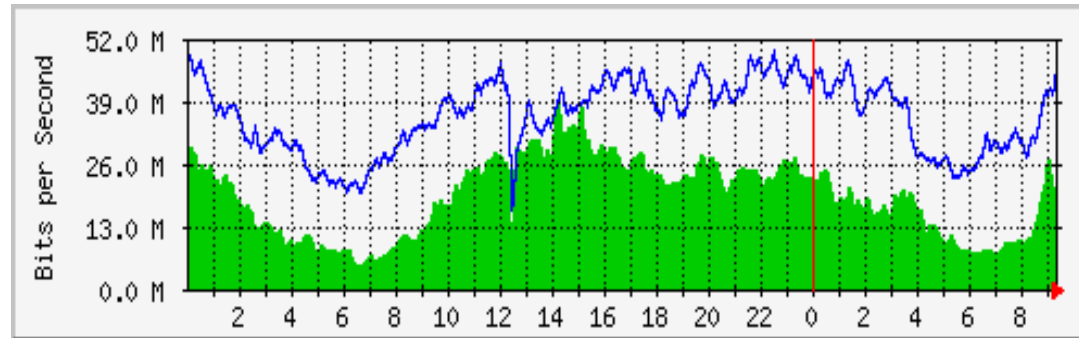
Since last we talked...

- Internet link went from 9 Mb/s to 155 Mb/s!
- LOTS of edge 10/100 switch installs/upgrades
- Average utilization from 100% to ~40%
- ResNet still largest consumer, but others growing
- No more Napster, but lots of alternatives in use
- We got to the NAP, ICN, Internet2 – its been great!
- No one complains about Internet capacity anymore
- ...and N&T has had one less thing to worry about

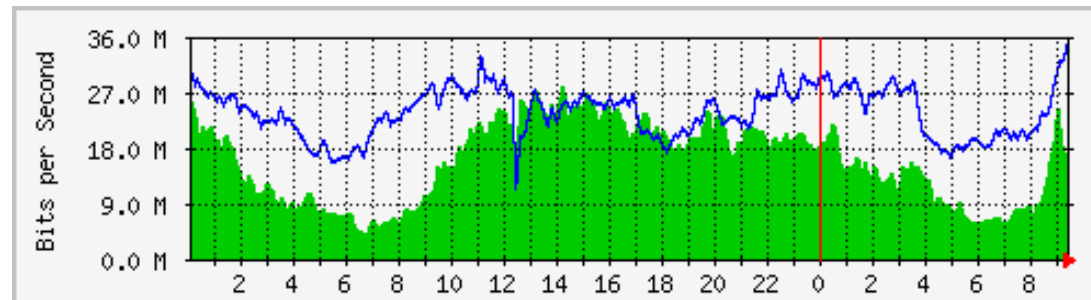
So, what is the problem now?

- The free ride with ICN is coming to an end
- ICN implementing cost recovery July 1, 2002
- What will Internet capacity cost us now?
- Where does the money come from?
- How much money do we need?
- If we can't afford it, what are the alternatives?

Current snapshot



Total Internet traffic including peers



ICN only traffic

Option 1: Do nothing – pay ICN

- First 20 Mb/s free, \$300 per additional 1 Mb/s
- Get 40 Mb/s (no growth, will be at 100% day one)
 - \$300 x 20 additional Mb/s = \$6000 per month
- If we kept maximum, ~100 Mb/s
 - First 20 Mb/s free
 - \$300 x 80 additional Mb/s = \$24,000/month!
- The cost is high no matter what we do
- There has got to be a better and cheaper way...

Option 2: Limit/block/shape traffic

- This sometimes helps, but not a panacea
- Difficult to do fairly – everyone suffers a little
- Short term solution – easy to get around
- We're doing some of this now
 - Requires regular network oversight
- Technically we are making policy decisions when we do this – we aren't the policy review board – we would really like to avoid doing this

Option 3: Leave ICN

- Relatively few drawbacks
 - Many ISPs charging \leq \$150 per Mb/s
 - As soon as we get to 40 Mb/s its worth it
 - CogentCo offering us 100 Mb/s for \$1000/mo.
- ICN lacks many full service ISP capabilities anyway
 - (e.g. 24x7 support, SLAs, security team)
- Can still use ICN's 20 Mb/s, but tricky to do
- Easy to go back if necessary

Option 4: Leave Chicago NAP

- We have a contract, we would incur penalty costs
- We would also lose:
 - Ability to setup peering arrangements
 - IPv6 research test network capability
 - Various other research network connectivity
 - We received a \$150K grant to make use of this
- Alternatives likely to be as costly if not more

Option 5: Leave UUNet backup

- Backup Internet link is expensive to maintain
- We have a contract, penalties apply
- We recommend keeping redundant Internet link
 - Internet network changes are mostly painless
 - Fail-over occurs within 2-5 minutes – life saver!
- We recommend re-evaluating backup providers
 - Cheaper alternatives do exist

Option 6: Give ResNet its own ISP

- Manage Internet for this user base separately
- We cannot do this easily (technically difficult)
 - ISPs may filter the smaller address space
 - It is not very *net-friendly*
 - Splits network management in two
 - Many unknown/unresolved issues
- We still have to pay for their capacity anyway
- Its not a fine line between ResNet and all others
- Interesting idea though, deserves more thought

Other ideas

- Embrace peer-to-peer (P2P)
 - Implement local P2P servers?
- Implement Akamai caching servers
 - This is happening
- Get more and better peering arrangements
 - Offloads traffic to default ISP
 - Internet2 will help greatly
 - Most peers we can get, we already got
 - Starlight, the next generation Internet?

Recommendation

- Switch to CogentCo as our primary ISP at the NAP
 - Cost incurred is \$1000/month for 100 Mb/s
 - Cogent uses a month-to-month contract
 - Compare to ICN pricing of \$24,000/month
- Continue to monitor and manage abusive traffic
 - We're doing this already and it helps
 - Solutions are all short-term, constant revamping
- Switch backup ISPs when UUNet contract expires
- Start planning for next generation Internet link now