A user’s view of *ns*

VINT *ns* retreat
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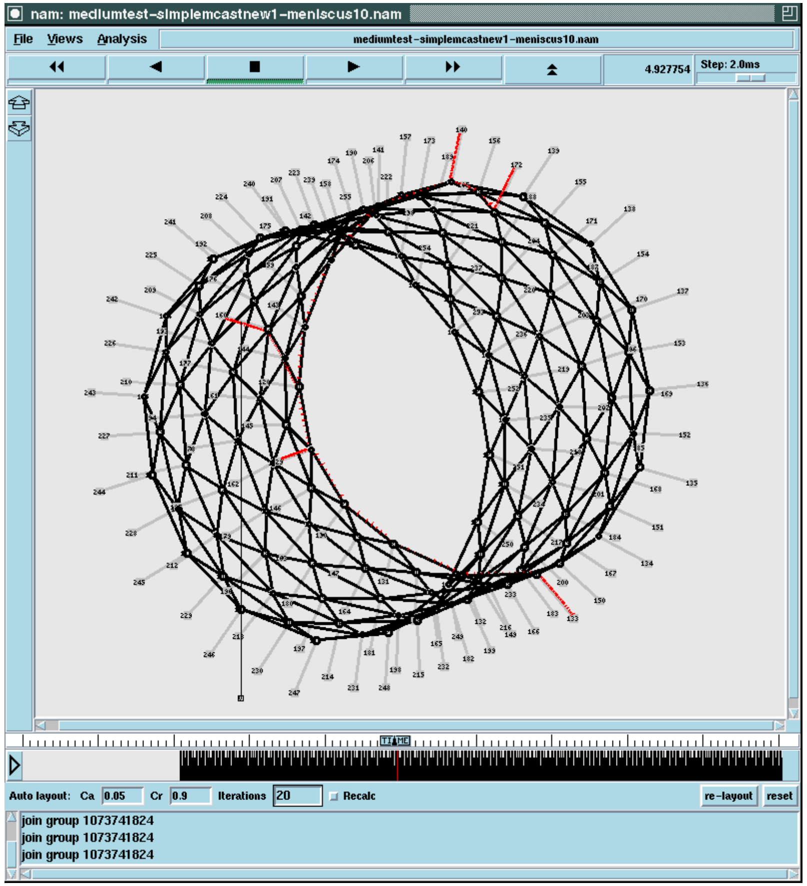
What I’m using *ns* for:

Playing with multicast across large mesh networks (satellite constellations). Trying to keep it simple; my understanding of *ns* is still pretty minimal.

Want dynamic topology
(but static at present)
with costs and
shared core-based trees,
so it’s CtrMcast or PIM-SM...

So, what’s up with PIM-SM?
Just throwing protocol work away?

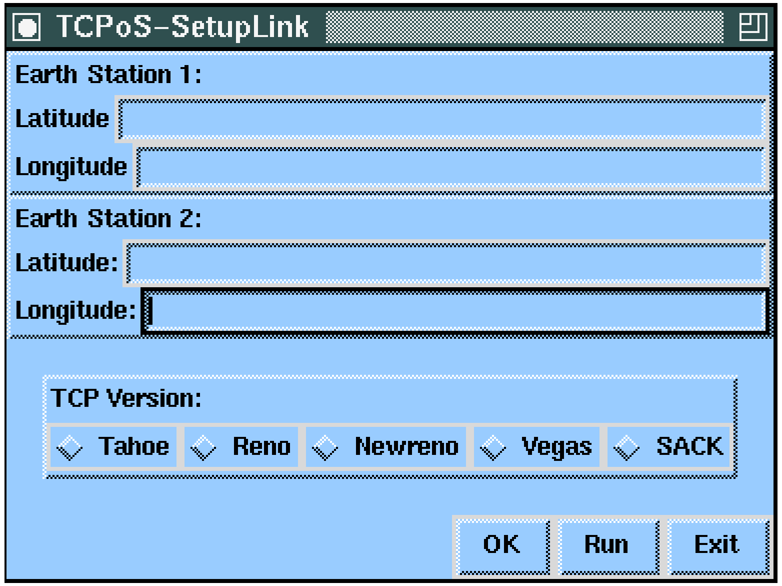

nam: mediumtest–simplemcastnew1–meniscus10.nam
File
Views
Analysis
mediumtest–simplemcastnew1–meniscus10.nam
4.927754
Step: 2.0ms
TIME
re–layout
reset

Auto layout: Ca 0.05 Cr 0.9 Iterations 20 □ Recalc

```
join group 1073741824
join group 1073741824
join group 1073741824
```

sixway-connected seamed near-polar constellation
showing CtrMcast multicast communication in progress

Education: watching my masters student...



TCPoS-SetupLink

Earth Station 1:

Latitude

Longitude

Earth Station 2:

Latitude:

Longitude:

TCP Version:

◇ Tahoe ◇ Reno ◇ Newreno ◇ Vegas ◇ SACK

He's started building a TCP/IP over satellite simulator.

"Why does this work in Tk, but not in ns?"

ns is using an OTcl *shell*; shells are *interactive*.

parameter-passing isn't. Leverage Tk! Then we can build educational tools (and gentler introductions to *ns*).

object-oriented *ns* -> filing system -> object-oriented nam? Overkill for educational purposes. Roll them together...

Stability and splintered worldviews

More than one of *anything* gives the implementer a choice of what to use (and what must be tested with) when adding other functionality. Will they use and test with everything? Apparently not.

Other oddities, e.g. multiPath_ only works with DV; multicast vs lans, stuff that only works with (or without?) mobile nodes, fun with addressing. I worry about derived classes complicating testing.

Validate doesn't go anywhere near far enough; can it be made to run through every script?

Now documentation has expanded, example scripts are the weakest point. An annotated guide - 300-word summary explaining features of each script? *Good* example code needed.

Visible improvements in the last year

Seemingly trivial things do count for a lot with users:

Visible CVS tree and class hierarchy.
(but stuff checked in isn’t necessarily maintained... snoop? topology generators?) Easier for users to provide immediately useful feedback; easier for developers to shrug ‘well, it’s all visible’ and go and do interesting stuff instead.

Online HTML documentation.
Docs can never be too accessible.

Marc Greis’ tutorial.
Without proof that an outsider could demonstrate useful things with *ns* (then teach them to others) I’d have given up early.

Future additions

diffserv; being able to easily assign queueing behaviours to groups of nodes, a la PHBs. Research in QoS calculus?

Questioning MAC-layer tradeoffs. MAC support is on LANs. It’s in wireless. But many things (e.g. multicast) don’t work across lans; MAC can be significant for overall latencies; allows support for more realistic error models.

Errors - an error rate expressed as a proportion of variable-length packets just isn’t that useful...

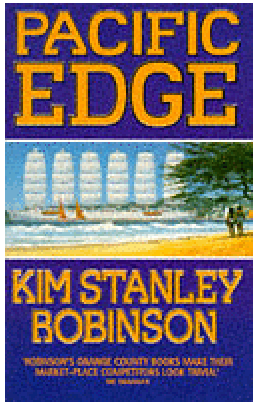
Fragmentation.

Obligatory audience participation section

just checking you’re awake

Three futures for *ns* - California dreams

(with apologies to Kim Stanley Robinson)


PACIFIC EDGE
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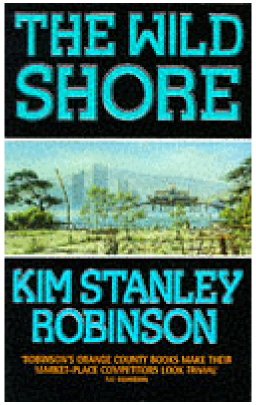
drastic triage. throw away everything that is known not to work under all conditions; cut back and refine to produce a limited tool with a solid featureset. One way of getting out of beta, but not very *research*.

unconstrained expansion without control; wild additions without moderation for interactions; *everything* gets into the CVS tree, even if it's not being actively maintained to stay current.


THE WILD SHORE
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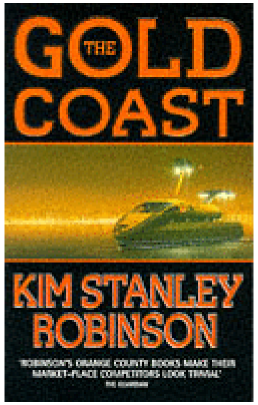
THE GOLD COAST
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controlled expansion. Lever educational and commercial synergy to enlarge the *ns* userbase and pool of developers; grow *ns* carefully, without letting it get *too* wild and uncontrolled.

BISANTE

Broadband integrated satellite network traffic evaluation

might also be: Binary executable satellite-focused ns to end-users

Simulating future connectivity for ISPs and characterising networks; interested in simulating:
broadband satellite using IP over ATM
QoS
GPRS (packet radio extensions to GSM)
but using existing protocols: telnet, http, etc.
Tool choice came down to *ns* or Opnet; *ns* won out.

Participants in Austria, Germany, France, UK.
Several years' funding; early days.

http://www.bisante.org/

and finally.... since UCL is hosting IWQoS...

I asked jon crowcroft if there was anything
he wanted me to bring up, and he replied:

> 1/ documentation :-)
>
> 2/ stability
>
> 3/ coding standards

...so there you have it.