

ORNL's FutureNet Infrastructure

Presented by

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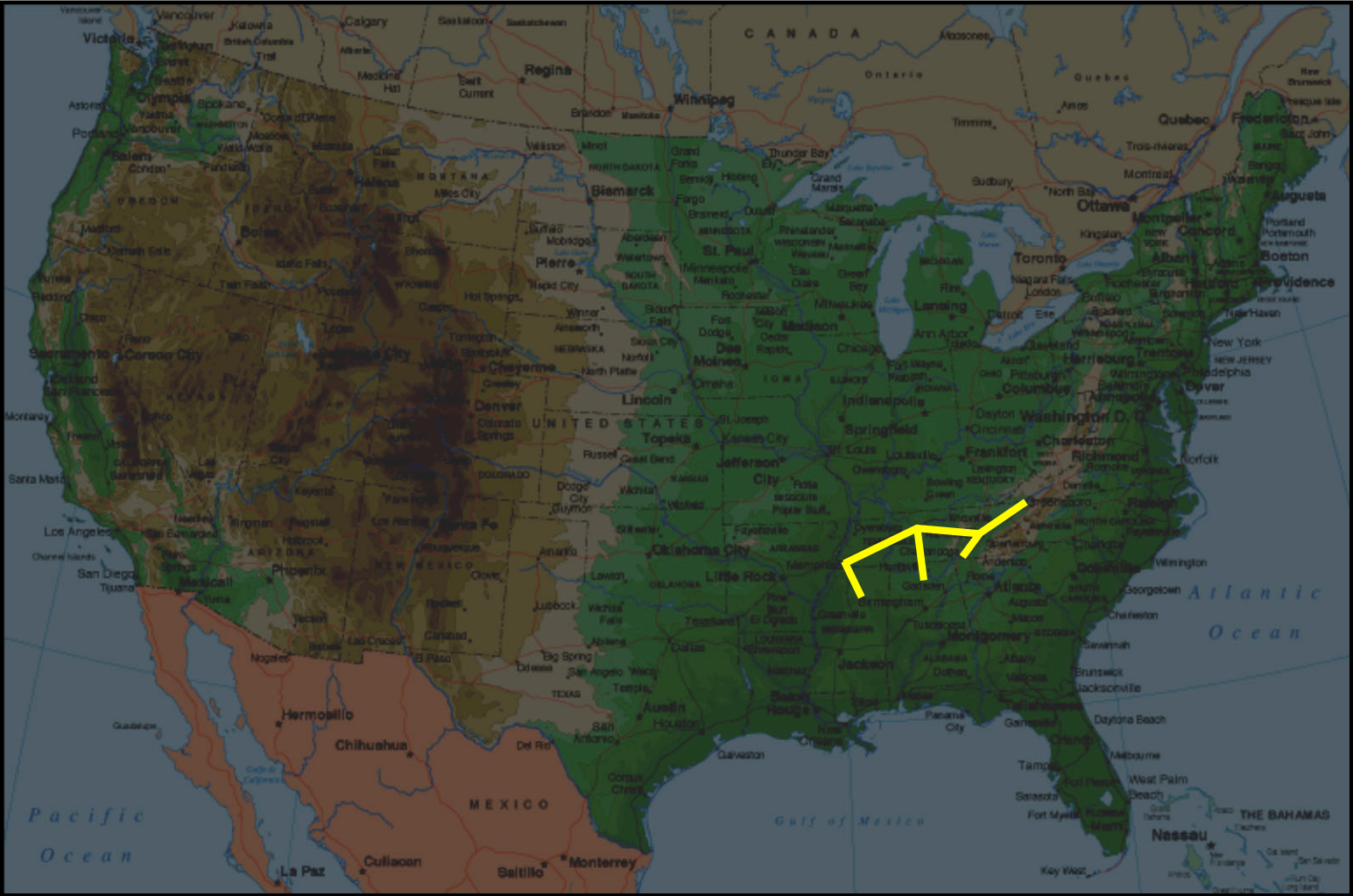
Computer Science Research Group
Computer Science and Mathematics Division



History and context

- In 2003 ORNL had a problem—poor connectivity:
 - ESnet connection only OC-12.
 - Qwest commercial OC-192 was costing \$400,000/year.
- Three simultaneous network research awards:
 - UltraScience Net (DOE circuit-switched research net),
 - CHEETAH (NSF circuit-switched research),
 - ETF (NSF extension of TeraGrid).
- Pooled funds to build capacity rather than lease it.

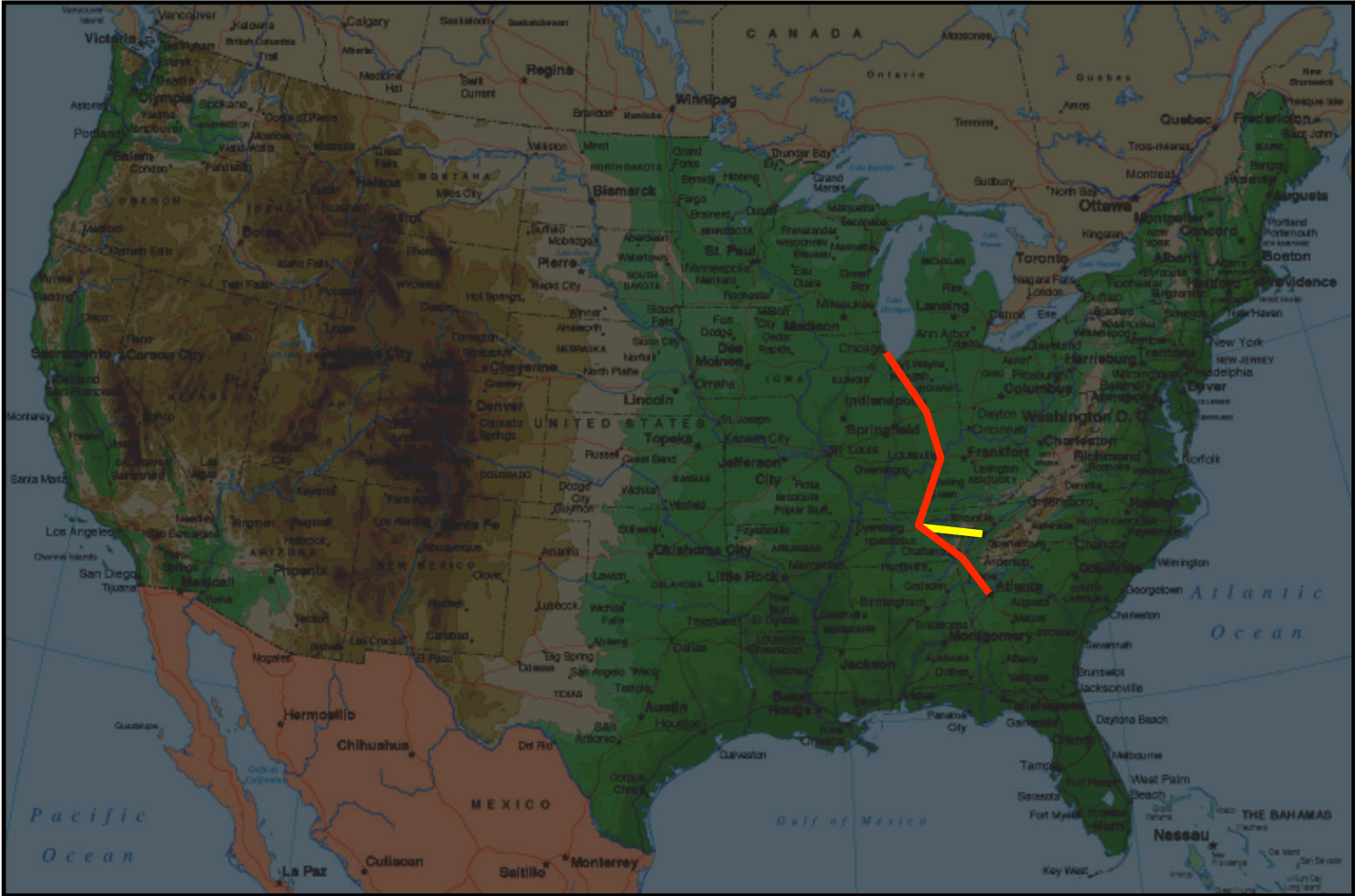
Bought options for 20-year IRU's on Tennessee Valley Authority fiber



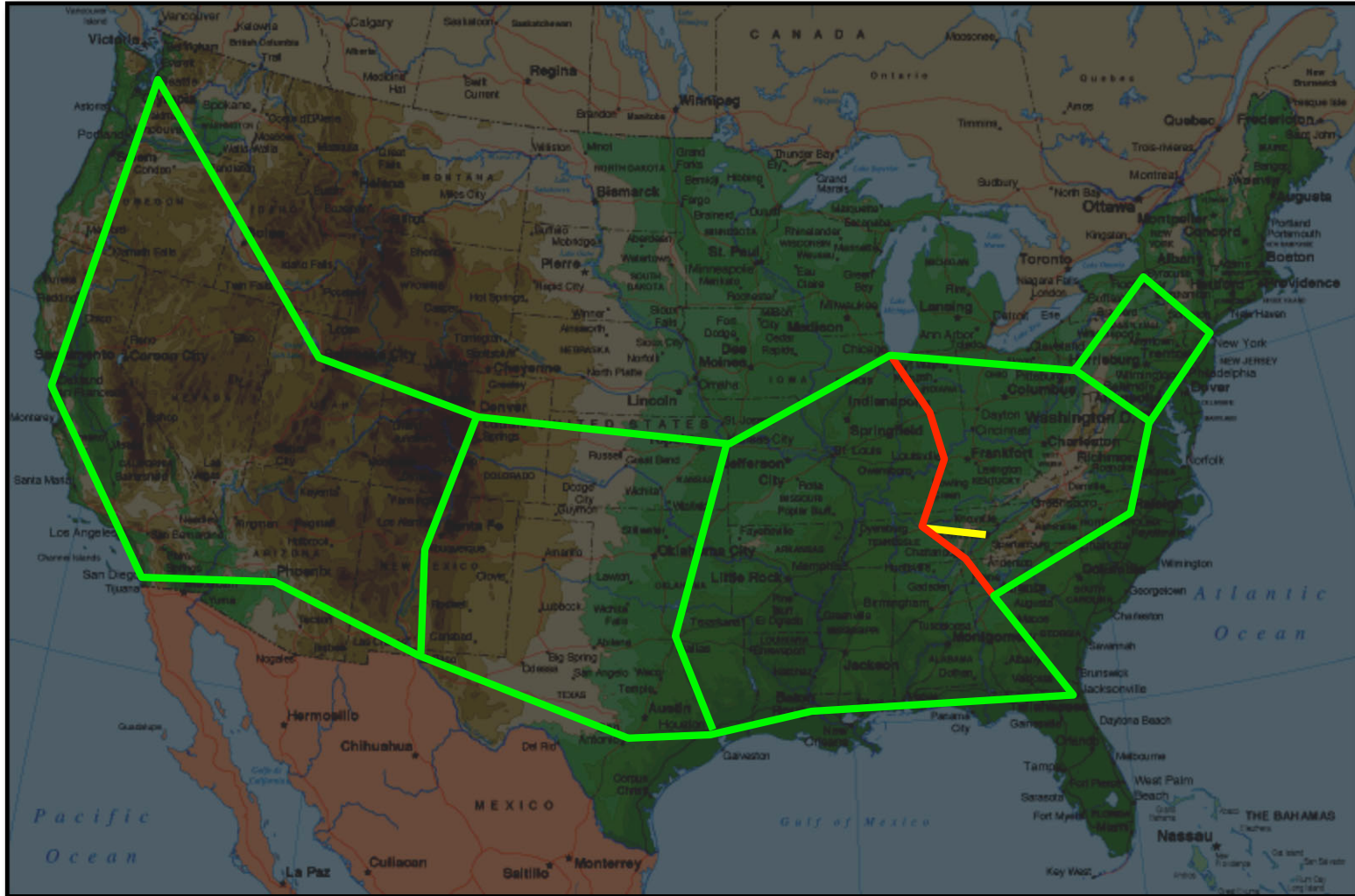
Bought a 20-year IRU with Qwest



Initially lit Atlanta-Chicago and Nashville-Oak Ridge



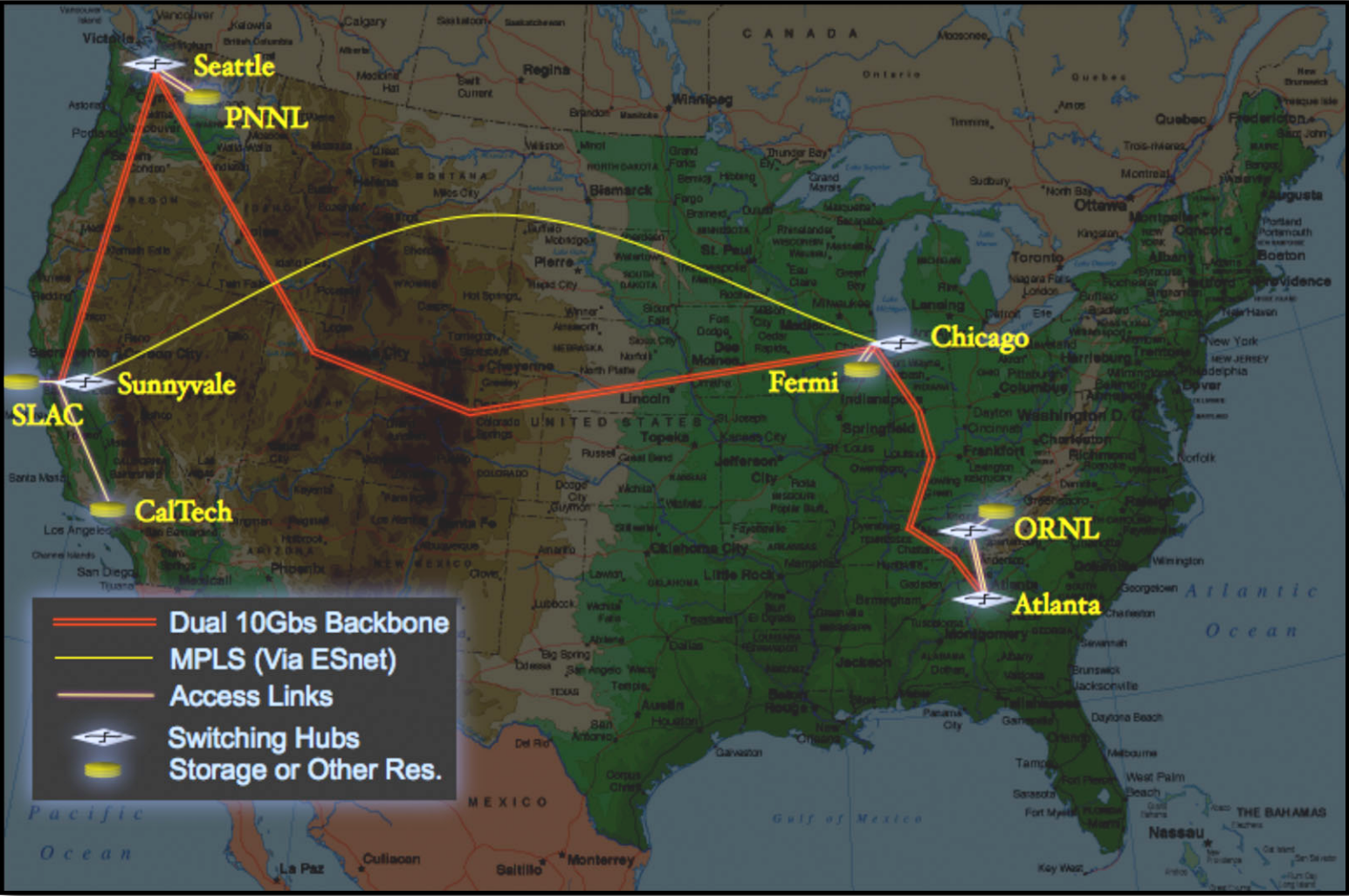
Arranged an asset trade with National LambdaRail for membership rights



Infrastructure–Not a network

- On it, we've built and added to three research networks and DOE's operational network, ESnet:
 - DOE's UltraScience Net (circuit switching with secure control and robust reservations),
 - NSF's CHEETAH and Internet2's HOPI (which will help study inter-domain issues),
 - ORNL's connection to TeraGrid.
- Options to connect to **EVERYTHING** worth connecting to.

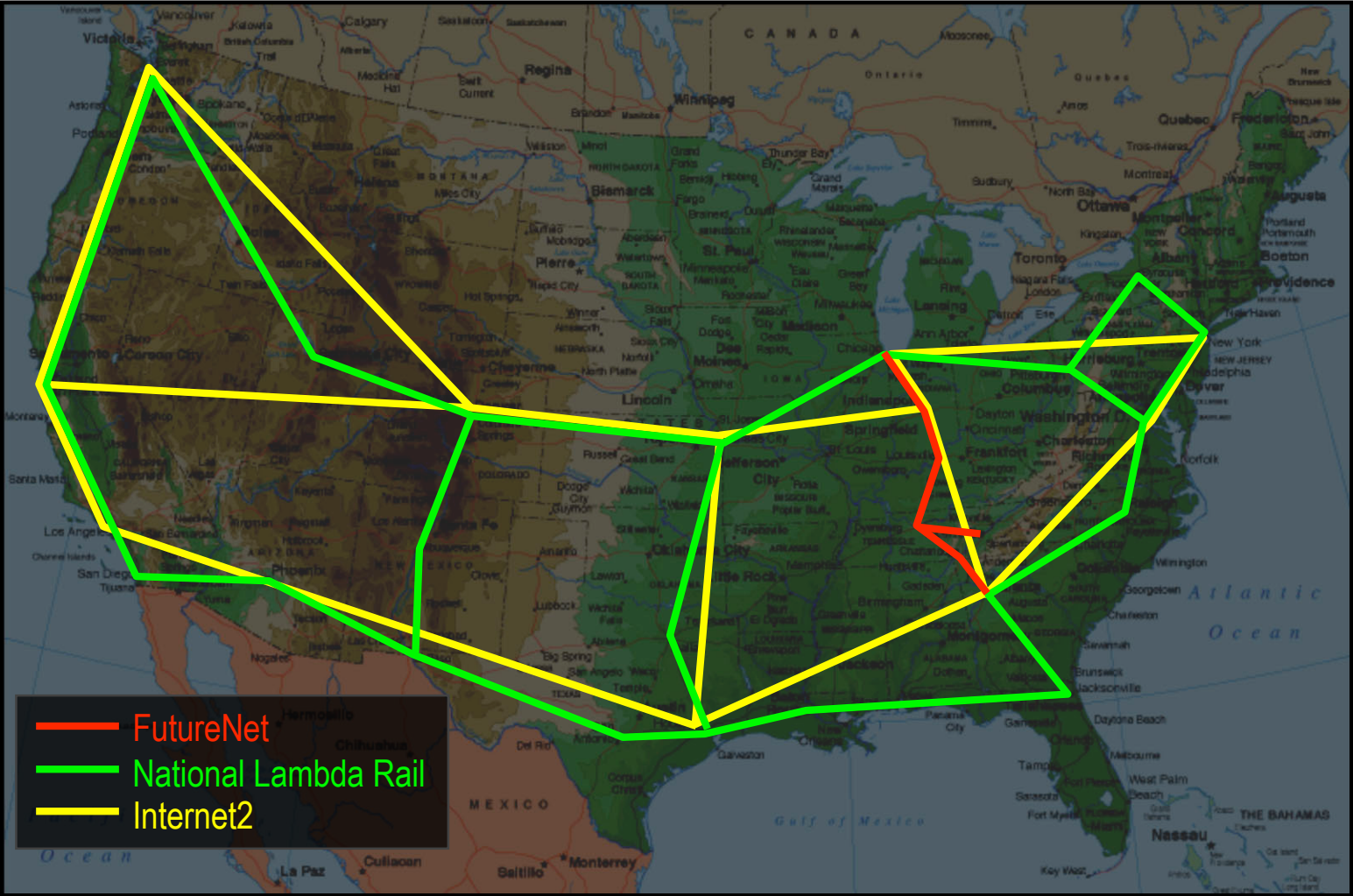
UltraScience Net: Fully-meshed, circuit-switched, dedicated-wave, research



CHEETAH: MPLS/GMPLS-based research



But of course, the real goal has been connectivity



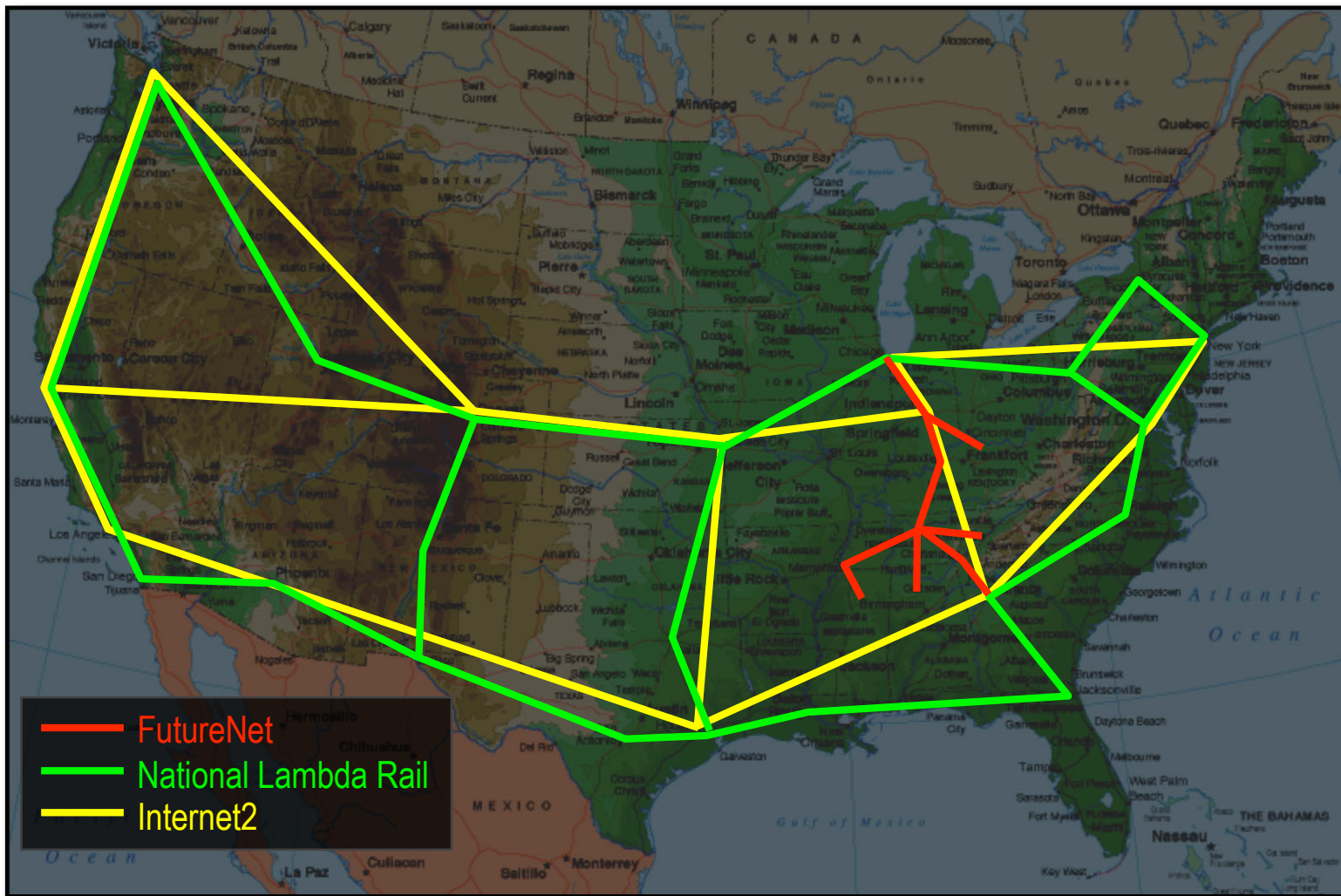
So, how are we really doing it?

- DWDM transport gear from Ciena
- Latest (3rd Gen) /w 25 Ghz lambda spacing
- C-band tunable transponders
- CoreDirector switches for lambda and sub-lambda switching
- Supports GFP-mapping, LCAS, VCAT

But the project isn't finished

- Lighting TVA fiber to Memphis, TN, and Starkville, MS
 - Pick up University of Memphis and Mississippi State
- Adding an extension to Cincinnati to connect AVATEC
- Providing NASA with a lambda through Nashville to Atlanta
- Providing University of Alabama a lambda through Nashville to Atlanta

Which will look like this when complete



Contacts

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