

Active Optimization of the Internet for Simulation

Team 1: BBN, Columbia, Telcordia,
U. Penn. and U. Wash.

Active Nets PI meeting - 4/16/99

DoD High Level Architecture (HLA)

- Distributed Interactive Simulation (DIS) for *objects*
- HLA is a *publish/subscribe* architecture
- Architecture from Defense Modeling and Simulation Office (DMSO): All DoD simulations must be HLA-compliant; see **“Distributed Simulation, the HLA/RTI, and Active Networks”**, D. Van Hook

How can A.N. help?

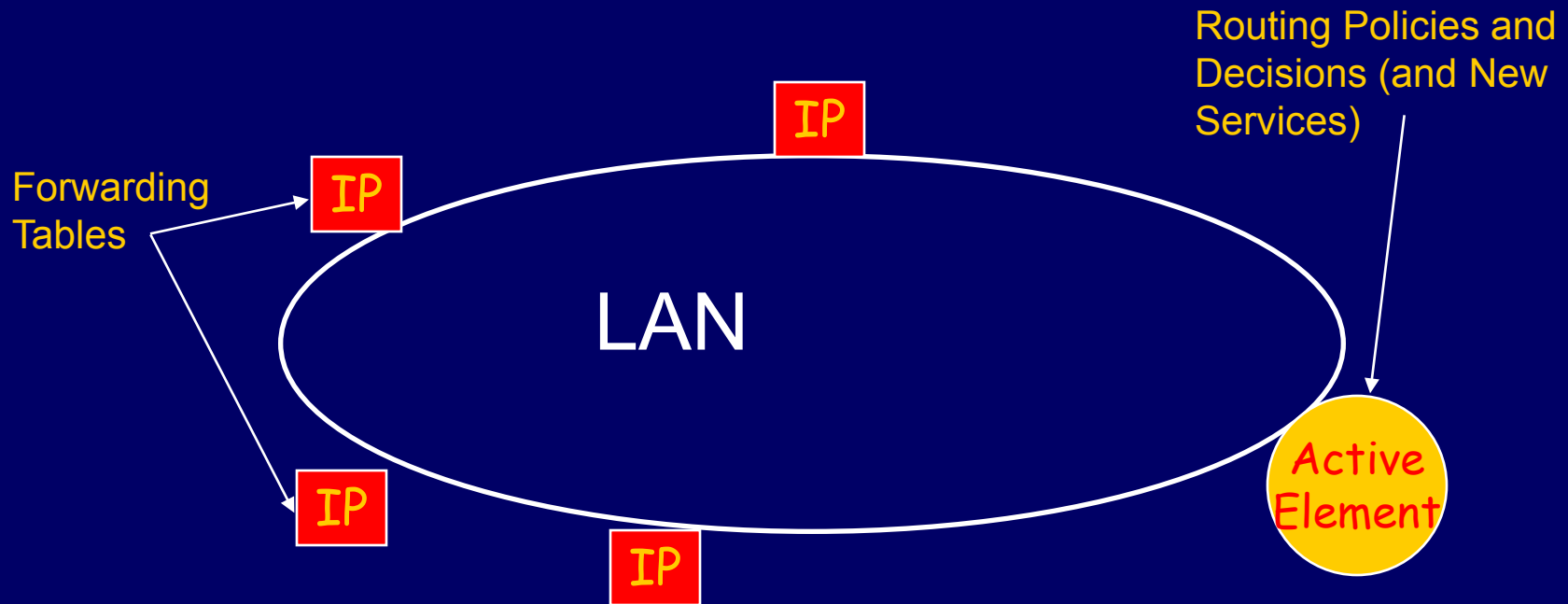
- Transparently optimize network for HLA applications (“Federates”)
- Expose some flexibility to Federates
- Augment Network types with A.N. (in reality, activated IP)
- A.N. solutions for time management and reliable multicast optimizations
- Performance comparison

Relevant Performance Metrics

- (real time) / (simulation time)
- # nodes, # objects (size of sim.)
- client load, wait time at client (may be speed mismatches)

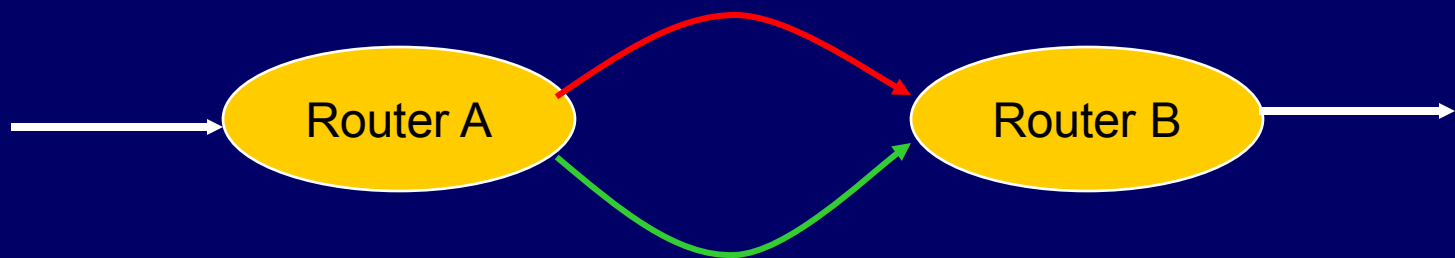
Active Router Control: Activating the Internet

□ IP Router/Forwarders co-located with
Active Elements:



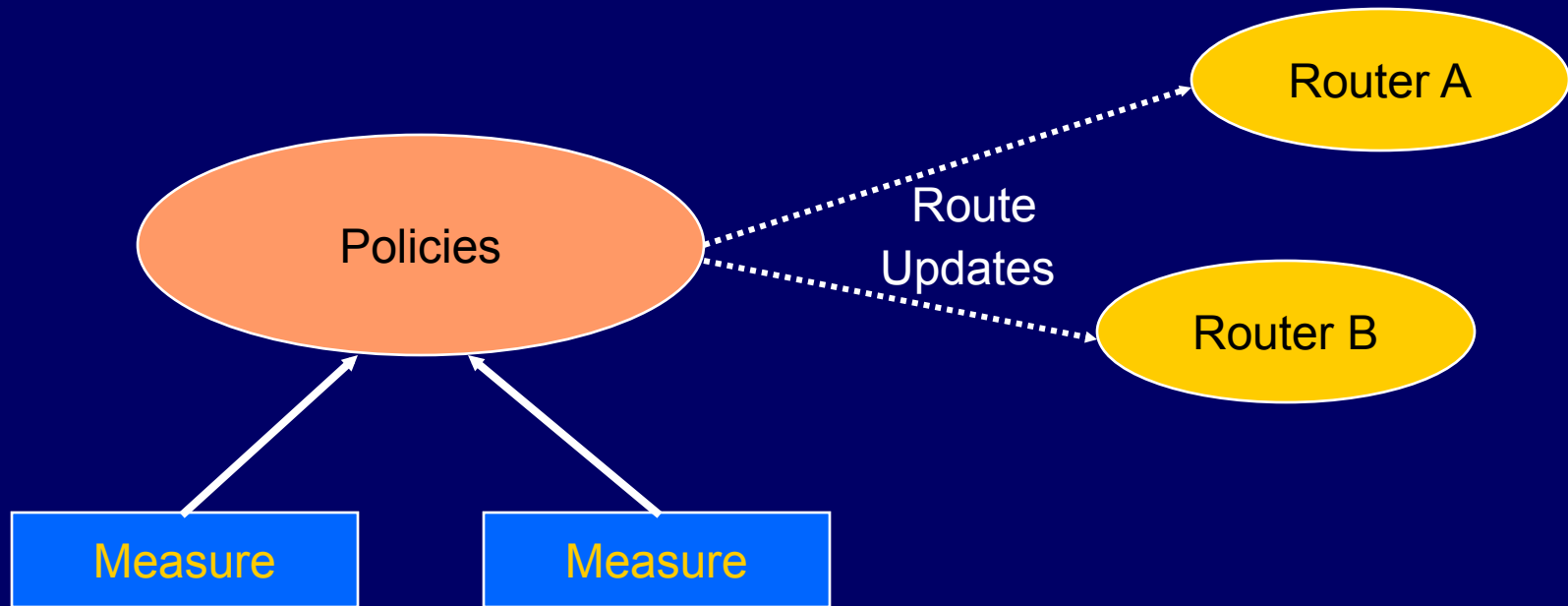
The Basic Opportunity:

Internet routing does not utilize the available network topology unless manually configured:

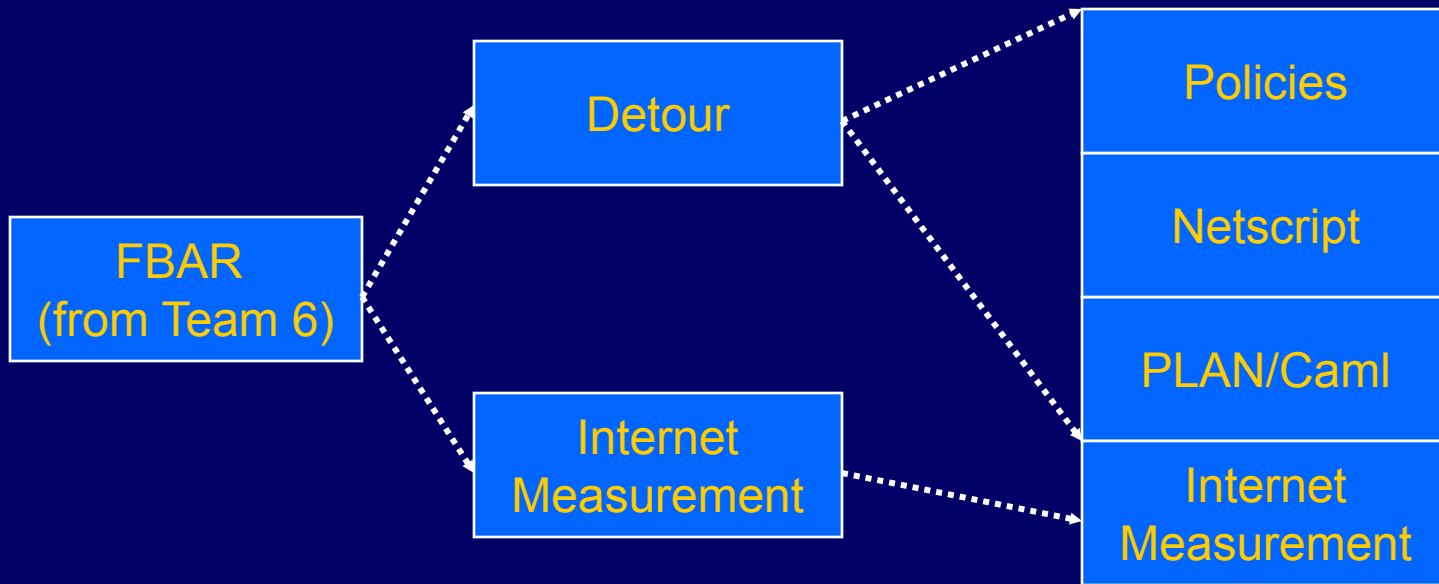


Goal: Resource Discovery and Exploitation!

The basic architecture



High Level Architecture

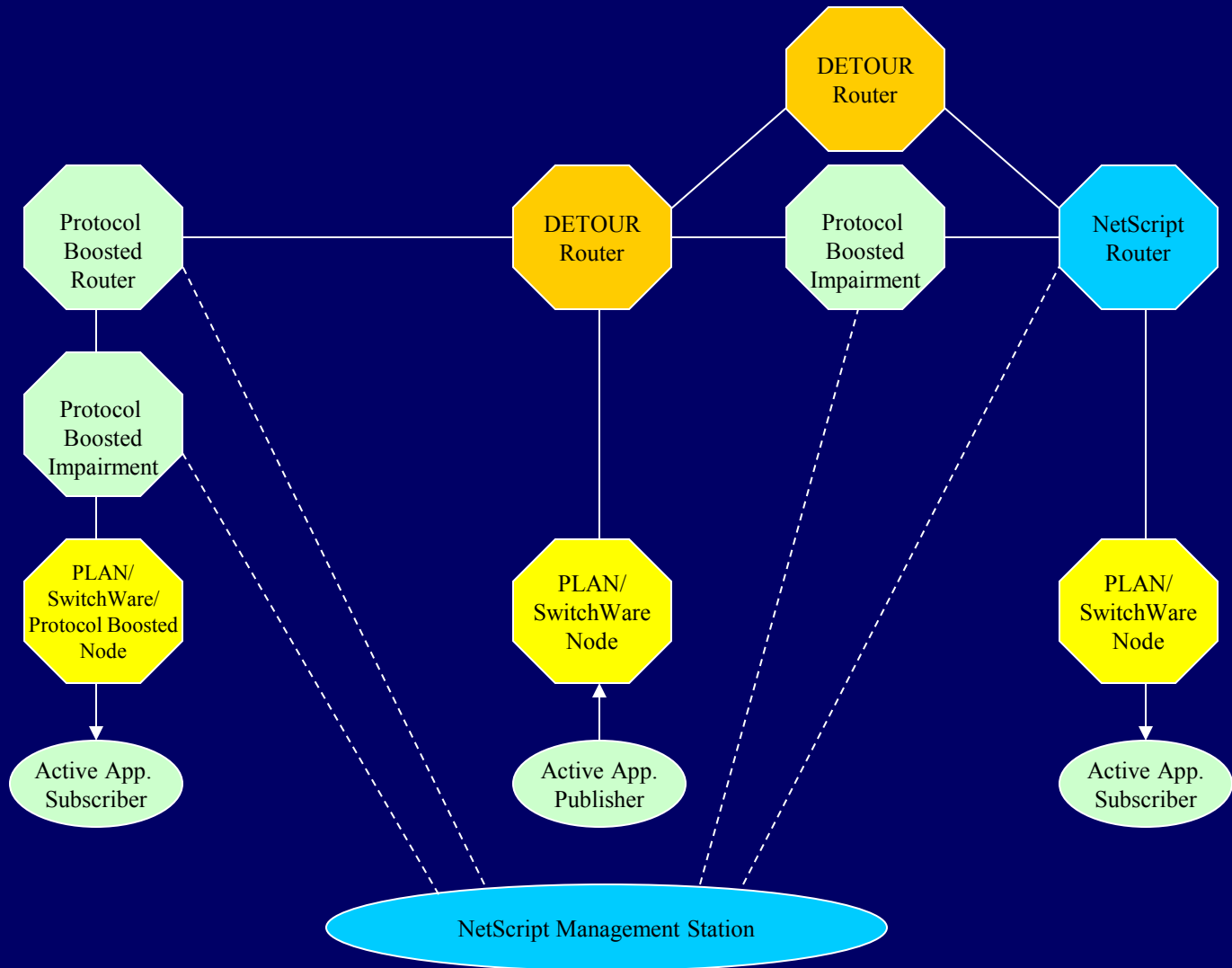


Application of
Active Router
Control (ARC)

Generalize Scout
Packets, Policies
with Detour

Active Router
Control (ARC) on
ABONE/IP

“Mid-term” Demonstration Setup:



Demonstration Highlights

- Netscript Module Composition and Active Element Control (Columbia University)
- DETOUR Routing and Router (U. Wash.)
- PLAN/SwitchWare/Alien Execution Environment (U. Penn. & Telcordia)
- Active Publish/Subscribe Application (Telcordia & U. Penn.)
- Protocol Boosters Execution Environment and FZC Application (Telcordia & U. Penn)

To Be Done and Equipment Needs:

- Significant To Be Dones:
 - Netscript/Protocol Booster API (for build and inserting protocol booster sequences on protocol booster router)
 - Graphical front-end for Publish/Subscribe application
 - Decide on content of Publish/Subscribe application
- Equipment Needs: 10 Pentium Class Machines with 10BaseT interfaces: (4 single homed laptops; 4 dual homed laptop; 1 triple homed desktop; 1 quad homed desktop; 1 quad port 10BaseT hub)