SwitchWare

Thinking about network services in the SwitchWare architecture

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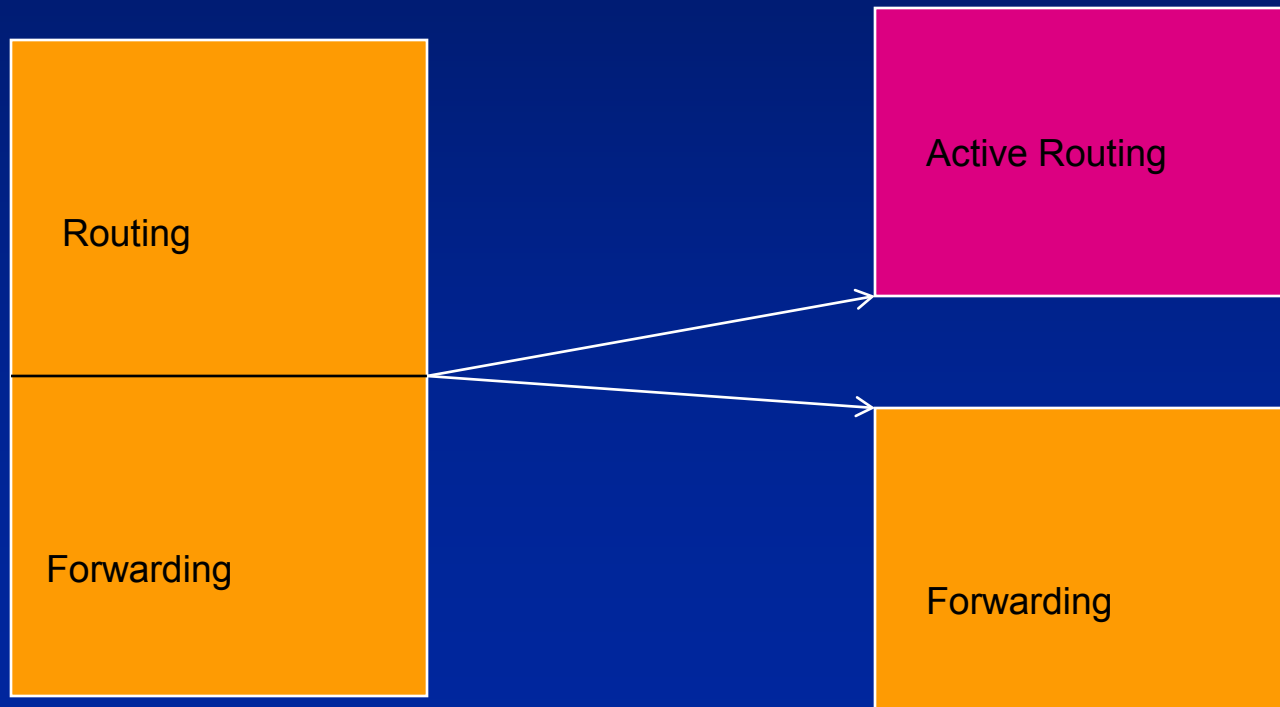
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What's a Network Service?

- It's something that makes the network more useful to users and applications
- Software to map from user requirements (e.g., reliability, security) to lower-level services (e.g., PLAN execution, IP forwarding, etc.)
- Next set of slides will give examples

Exploiting Generality

Promising Applications

Less General Approach

General Approach
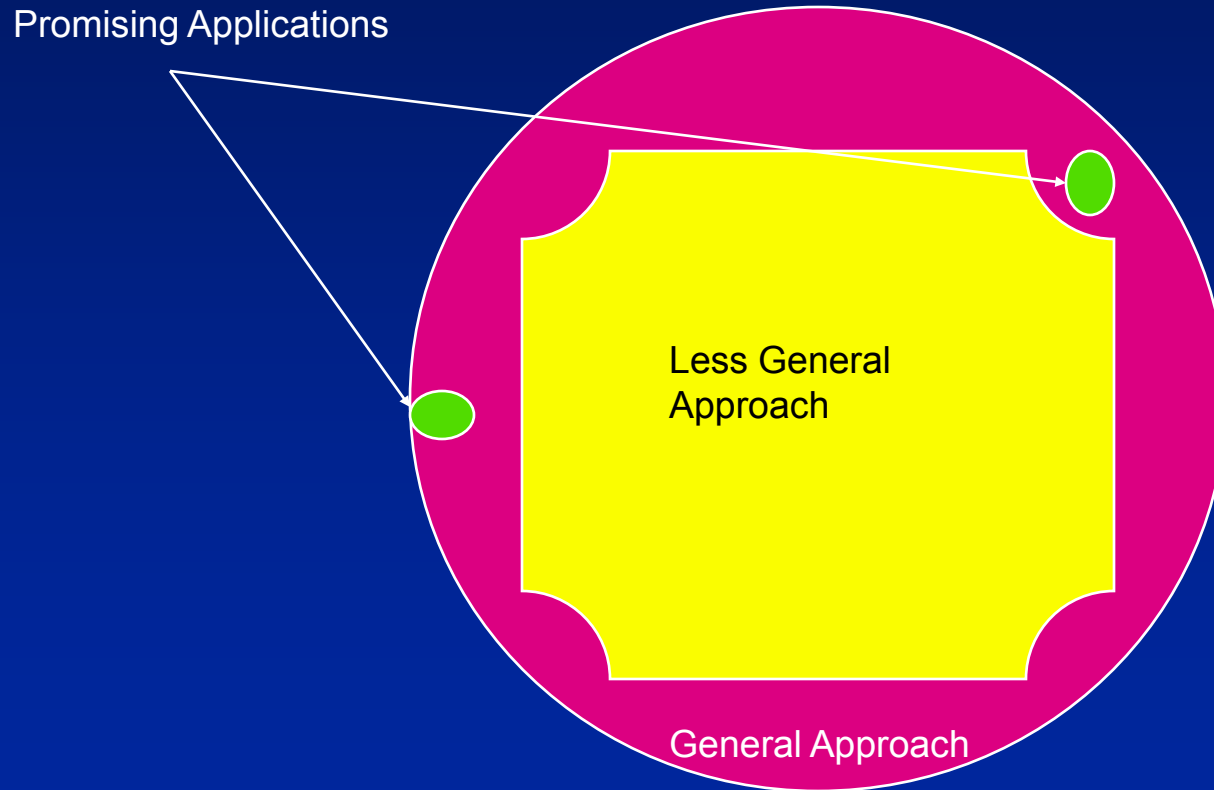
"Routers" really Forwarder+Router

Routing

Forwarding

Active Routing

Forwarding

AN Distance Vectors

- Need to estimate delay to neighbors
- Need estimator that combines propagation delay AND throughput
- Perhaps takes an "average packet size" estimator
- Logical "ping" beacon
- Better than hop count distances (IP)...

Delay Routing

- Use Delay based distance routing from previous service

- Figure out how to build an approximation to all-pairs shortest path graph optimization

- Can we support end-to-end delay estimation?

Active Net Mapper

- ☐ Discover Topology of Active Net
- ☐ How to represent it?
- ☐ Can it have overlap with flooding solution?
- ☐ Can resource discovery be combined with the mapper to make a resource mapper?

AN Resource Pricing

☐ Resource Identification and Discovery

  » Bandwidth

  » Memory

  » CPU time

☐ Attach Prices to these Resources

☐ Allow Price Discovery by, e.g., Alien or PLAN packets

AN Price Routing

- Need to get a model of requirements
- Model of money?
- Need to compute path costs
- What to do if price changes?
- Source routing versus dynamic routing

Using the Active Network Graph

- Discover two paths through AN graph
- Send packets on both paths (alternate?)
- Idea: double bandwidth
- Diversity Routing for reliability
- Path diffusion? (Frustrate Traffic Anal.)
  - » freq. Hopping -> path hopping
- How to keep paths separate?