


G-Lab_FoG


On Routing with Forwarding on Gates

Thomas Volkert, Florian Liers, Andreas Mitschele-Thiel
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Overview

- ▶ General idea of "Forwarding on Gates" (FoG)
- ▶ Separation of Forwarding and Routing
- ▶ Architecture of Routing Services
- ▶ Hierarchical Routing in FoG
- ▶ Future Work

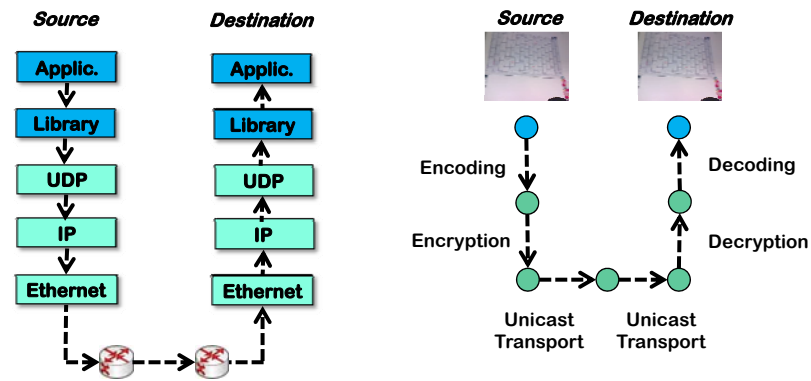


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On Routing with Forwarding on Gates



Idea: From Nodes to Edges



IP: Layered Protocol Stack with Node-based Forwarding

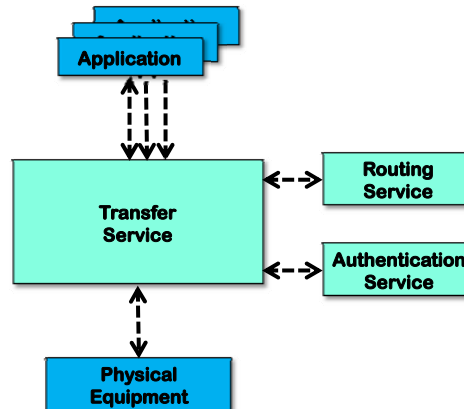
FoG: Chained Function Blocks with Edge-based Forwarding, using Gates as Facade for Functions

Gates

- ▶ Chainable functional Blocks
 - Representing physical Links
 - Unicast
 - Broadcast
 - Multicast
 - Application Functions
 - Video Encoder/Decoder
 - Data Filter: Virus Scanner
 - Packet Filter: Firewall
 - Additional Attributes for Transmission
 - Quality Guarantees
 - Connection oriented vs. connectionless

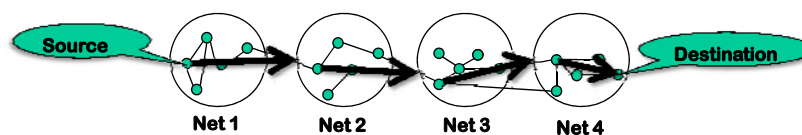
Architecture of FoG

- ▶ Separation of problems
 - Forwarding
 - Routing
- ▶ Structured Routing
 - Hierarchical Routing
 - Flat Routing
- ▶ QoS Support
 - Flow Separation based on Gates
 - Flow Prioritization as Gate Attribute
- ▶ Security
 - AAA Support



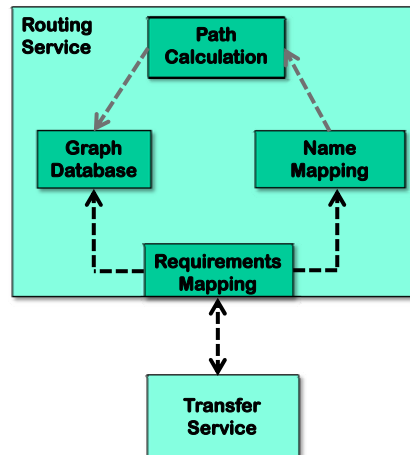
IP versus FoG Routing

- ▶ IP
 - Hop-by-Hop Routing on Nodes
 - Lookups per Router
 - Based on
 - Routing Tables: „Target Network N via next Hop B“
 - Packets: Target Address
- ▶ FoG
 - Zone-by-Zone Routing
 - Lookups per Zone
 - Based on
 - Routing Services: Database about local Topology
 - Packets: Target Address, Additional Requirements
 - Example:



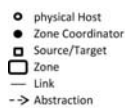
Architecture of a Routing Service

- ▶ Applications Requirements
 - Forward Error Correction
 - Packet Ordering
 - Retransmission
 - ..
- ▶ Human readable Addresses
 - Independent from Routing
 - Name (reverse) Mapping
- ▶ Iterative Path calculation
 - Zone-by-Zone
- ▶ Different Routing Algorithm



Hierarchical partial Routing

- ▶ Routing Hierarchy
 - Problem Division: improve Management
 - QoS Support: Traffic Classification and Separation
 - Hierarchical Addressing: identify Target Zone
- ▶ Example:



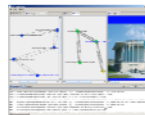
Summary and Future Work

► Summary

- Supporting different Routing Services
- Concept: hierarchical Routing



Demo Session!



► Future Work

- Evaluation with large Test Cases (G-Lab Test Bed)
- Comparisons with IP-world
- Interworking with IP and its Topology Distribution Protocols
 - OSPF
 - BGP
- Experimentation
 - Inhomogeneous Networks: Sensors Networks, Wireless Networks
 - Real World Prototype