

# TRILL problem statement, service and architecture

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# Agenda

- Problem Statement
- TRILL model
- Goals from the proto-charter
- Service

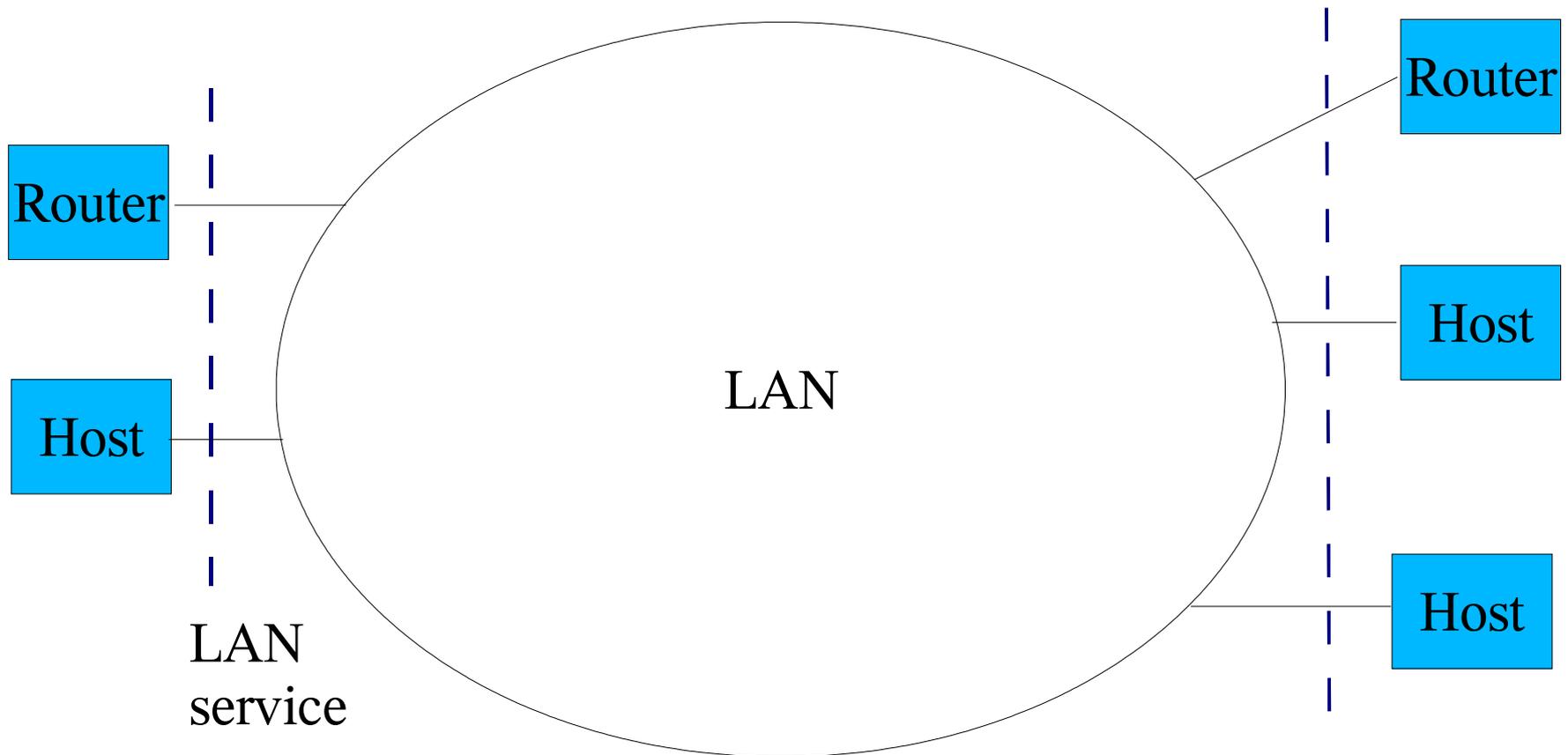
# Problem statement

- We have L2 solutions which have many benefits
  - IEEE 802 networks used as example here, but could be Fibrechannel, MPLS or something else
- We have L3 technology which have many benefits
- Desire to combine these technologies to create the best of both worlds for a LAN setting
  - LAN = broadcast domain

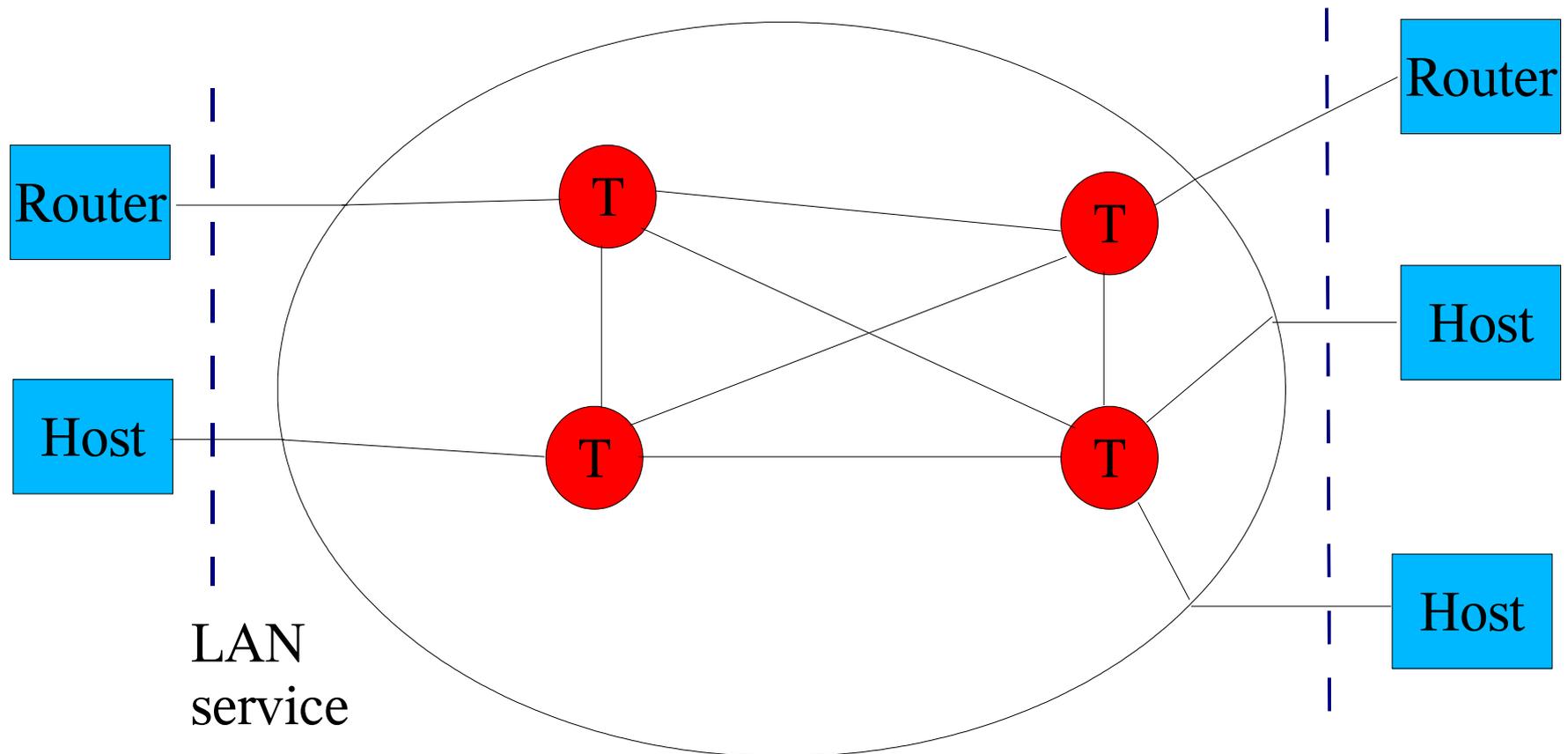
# Motivations

- Different for different participants
  - Better robustness than STP (but IEEE 802.1D-2004 would satisfy that)
  - Better aggregate bandwidth than L2 bridges
  - Better latency due to pair-wise shortest paths
  - Be able to interconnect different L2 types e.g., for home networking??
  - Be able to build larger LANs??

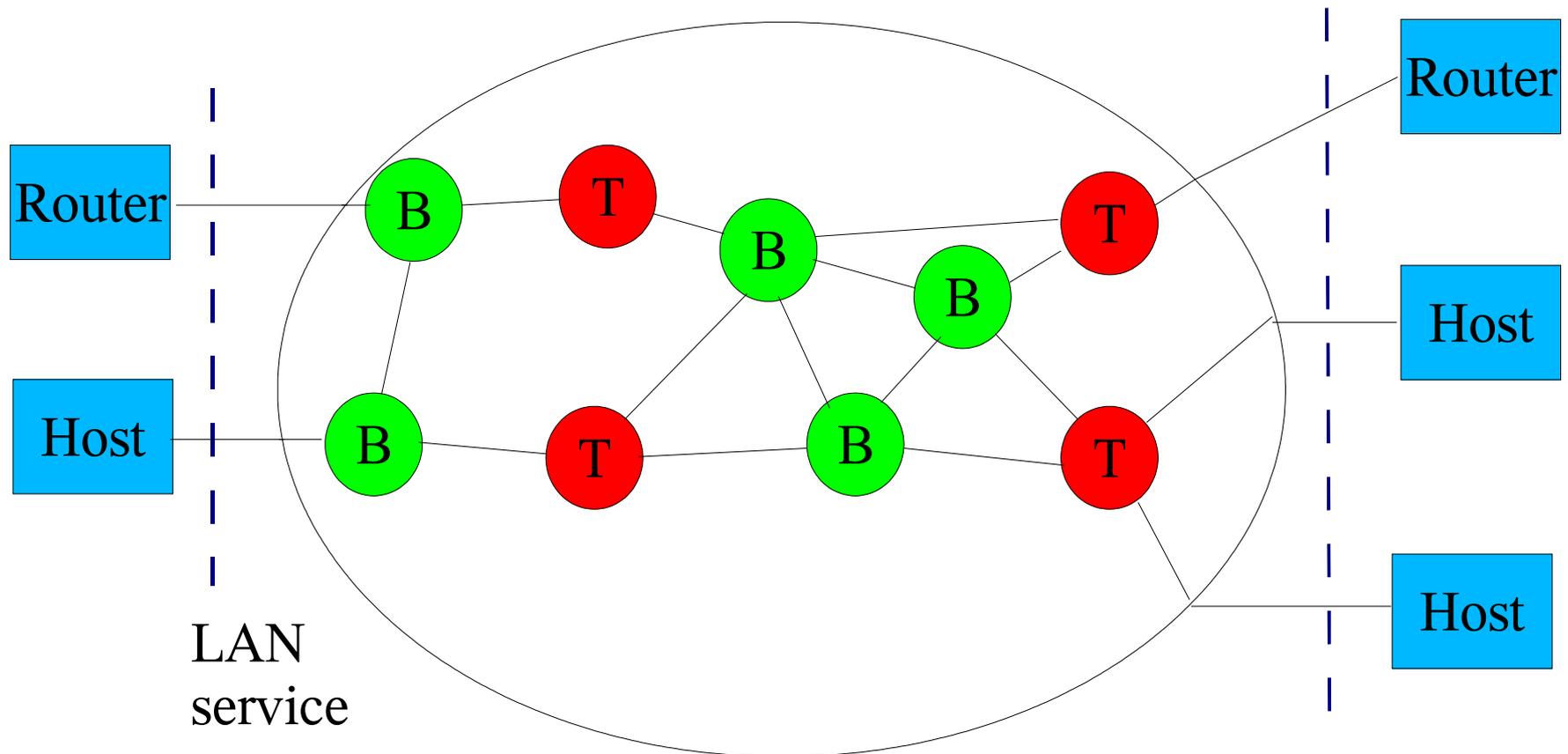
# Model



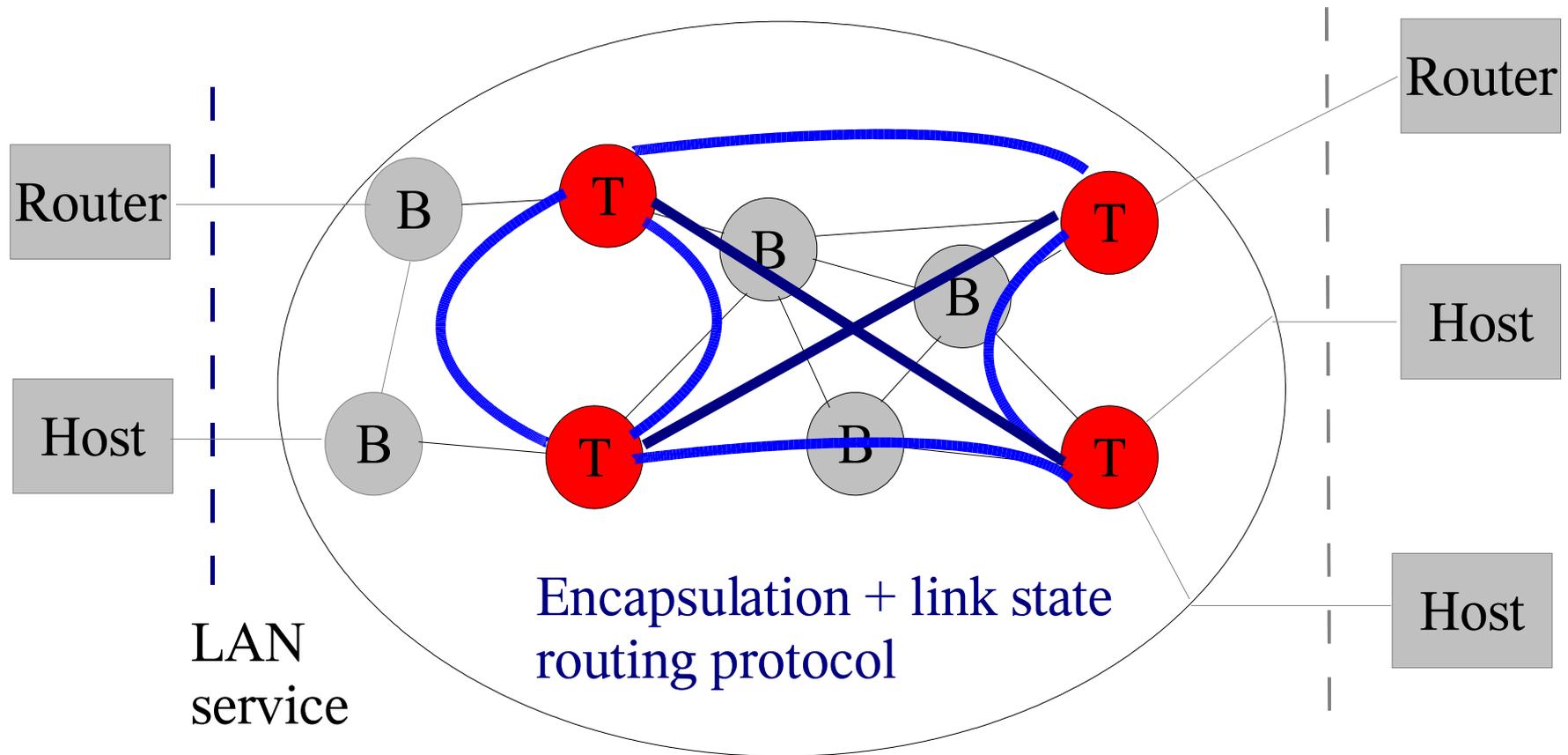
# Model with TRILL devices



# Model with TRILL and bridges



# TRILL overlay approach



# Goals from proto-charter (1)

- Zero configuration of the hybrid devices
- Ability for hosts to move without changing their IP address
- It should be possible to forward packets using pair-wise shortest paths, and exploit the redundant paths through the network for increased aggregate bandwidth
- Possible optimizations for ARP and Neighbor Discovery packets (potentially avoid flooding all the time)

## Goals (2)

- Support Secure Neighbor Discovery
- The packet header should have a hop count for robustness in the presence of temporary routing loops
- Nodes should be able to have multiple attachments to the network
- No delay when a new node is attached to the network

# Goals (3)

- Multicast should work (and after a re-charter it might make sense to look at optimizations for IP multicast)
- Be no less secure than existing bridges (and explore whether the protocol can make "L2 address theft" either harder, or easier to detect)
- No changes to hosts, routers, or L2 bridges
- Q: interconnect different L2 technologies?
- Supporting non-IP protocols

# LAN service

- Broadcast domain
- Reordering and duplication
  - Small probability only when network topology changes
- MTU
  - Most LANs have a uniform MTU between all stations

# IEEE 802.1 specific services

- Priority
- VLANs
- Makes sense to provide those in TRILL

# Which LAN service does IP need?

- There is the option to special case IPv4/IPv6/ARP because
  - The receiver does not inspect the L2 frame thus e.g. L2 source address can be mucked with (e.g., if it makes it easier to interwork with bridges)
  - Only known exception is a MIPv4 optimization to not use any encapsulation between FA and MN (hence ARP can't be used, etc, etc)
- Better if TRILL doesn't have to handle IP/ARP differently than other packets

Questions?