# Data Plane for Resilient Network Interconnect

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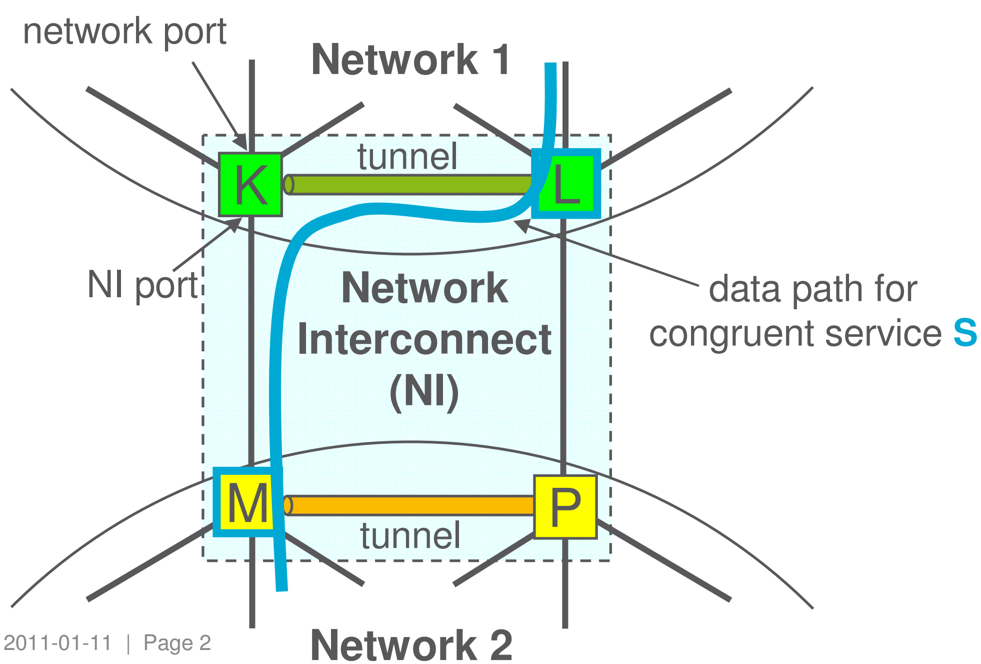
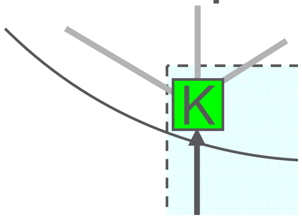
# Introduction

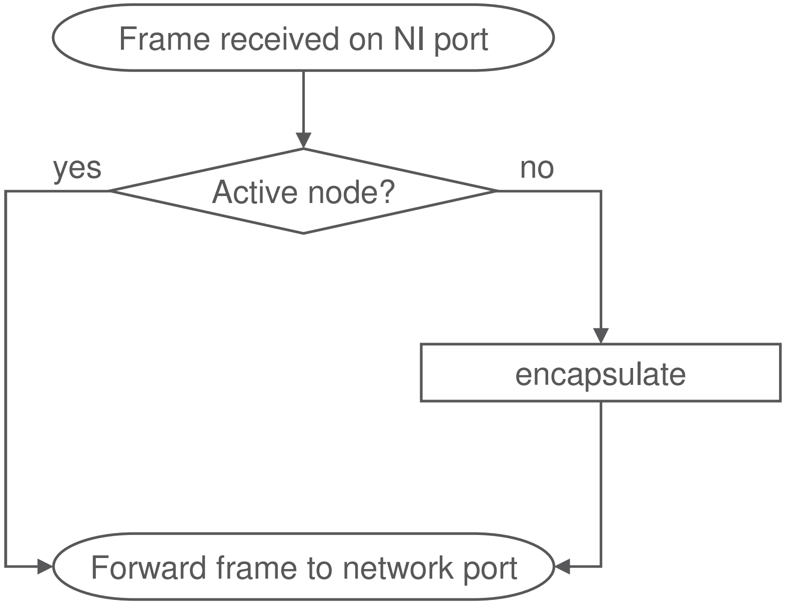
- Data paths do not depend on the applied control protocol
- How to implement the data paths within the 802.1 architecture?
- Let's cover the most complex case
  - Overlay tunnel within the network (single tunnel between a node-pair)
  - Support both congruent and non-congruent forwarding



# Forwarding within an NI bridge
# 1) frame received on NI port

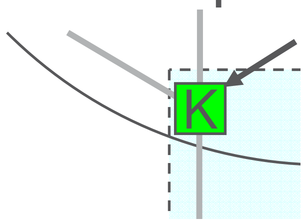
› For example

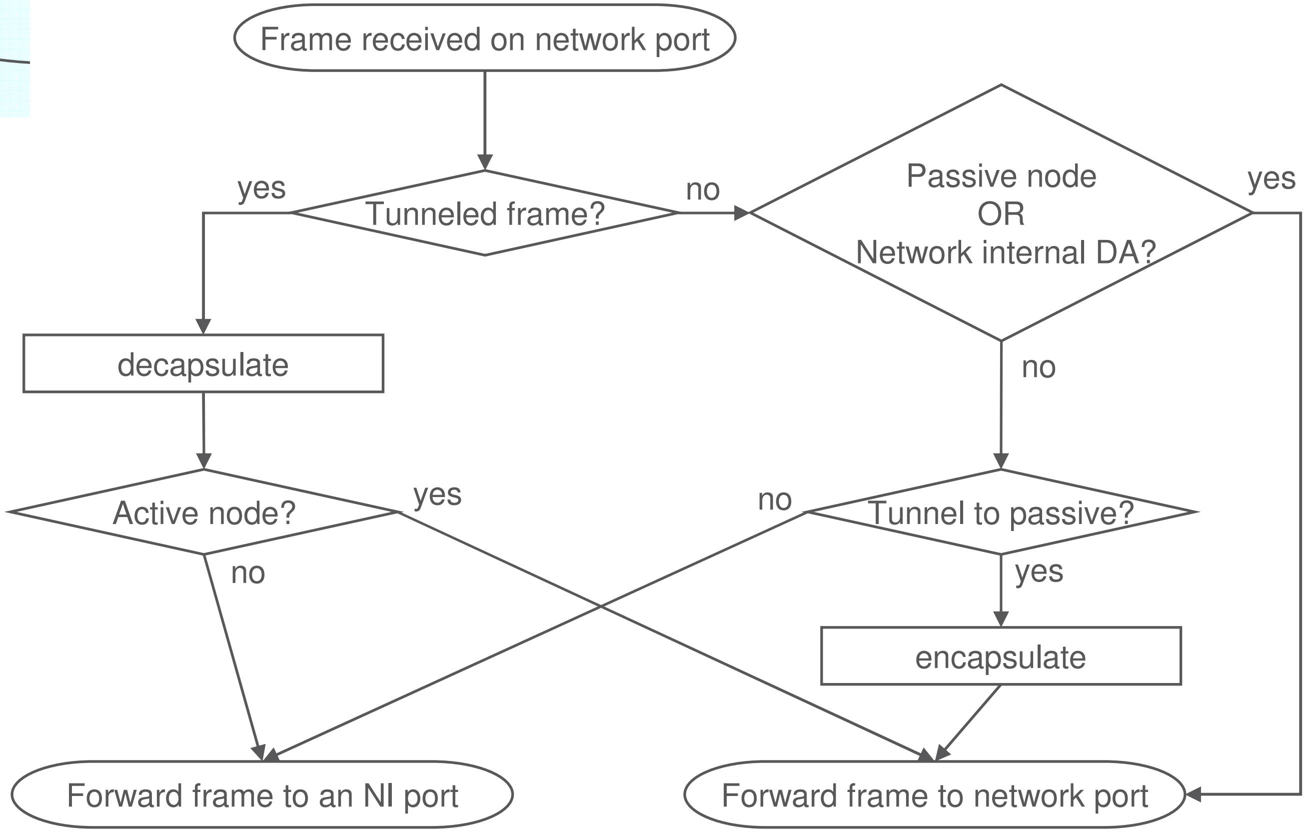


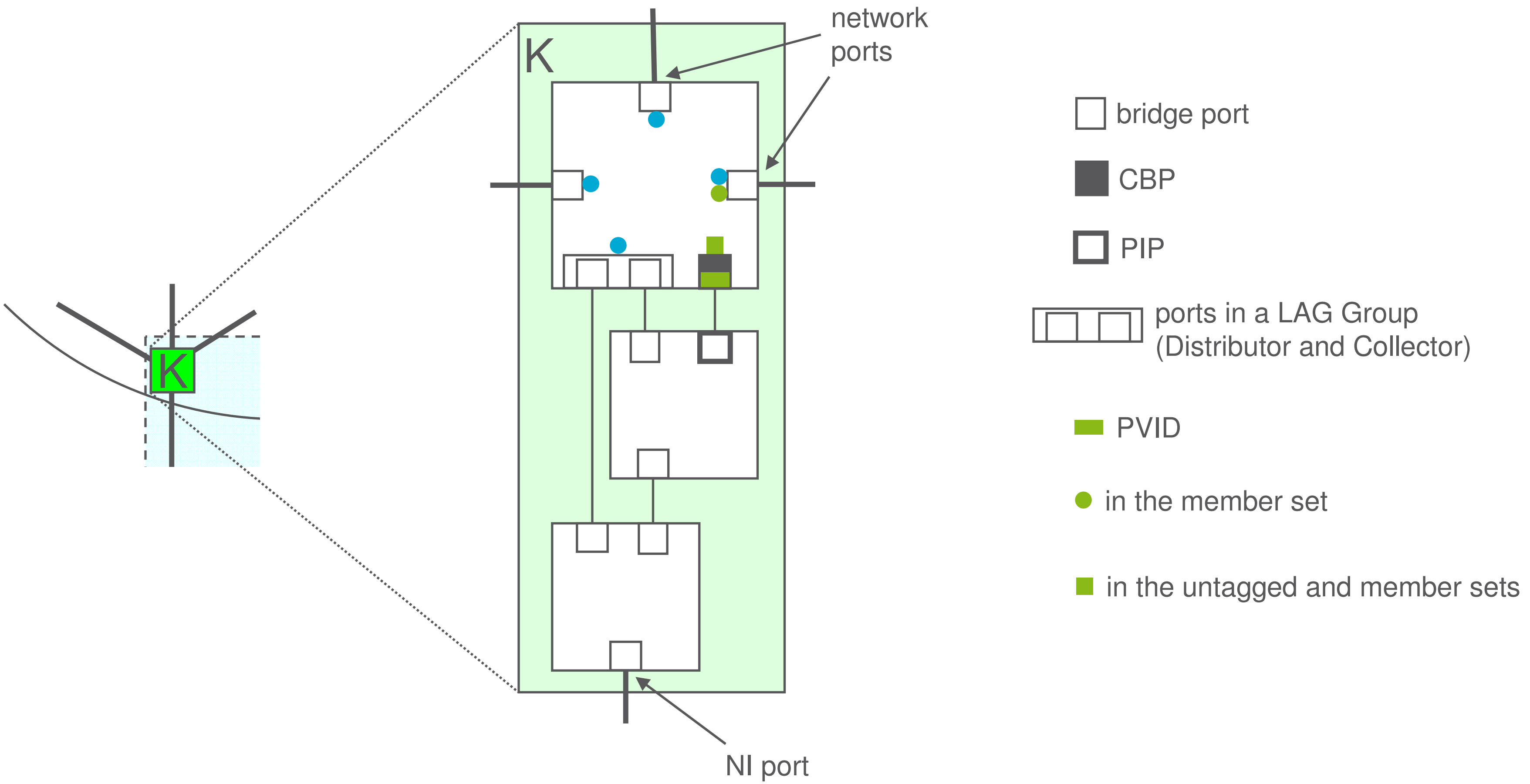
# Forwarding within an NI bridge
# **2)** frame received on network port

- For example



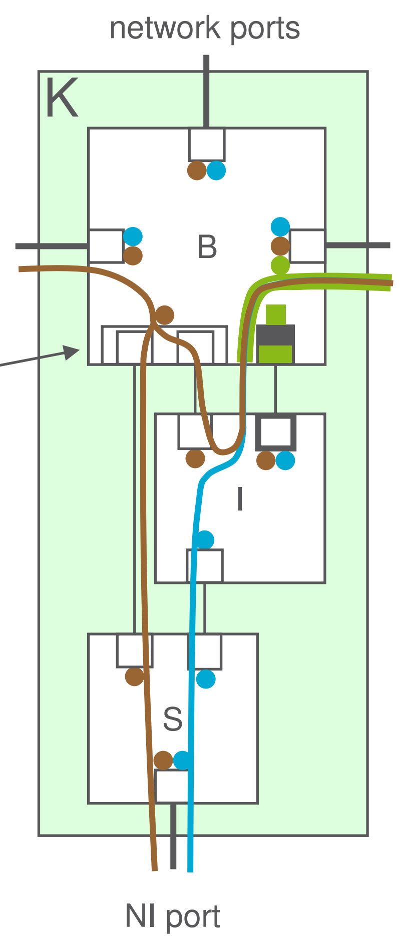
# Notations for bridge component model




- Operation of frame forwarding can also be described by the bridge component model
- Bridge component model is suitable to illustrate what needs to be implemented in the data plane

# Edge Bridge using LAG features and PBB encapsulation

- The Network is a PBN
- S-tagged NI
- LAG Distributor of the Active Gateway decides whether the Service VID is tunneled
- Single ingress to the relay from NI supports MAC learning for non-congruent services too
- Overlay tunnel between NI nodes is implemented by 802.1ah encapsulation
  - green B-VID is the tunnel B-VID
- NI node K is the Active Gateway for the brown S-VID
- NI node K is Passive for the blue S-VID
- Note that Gateway (re)-selection is just setting the VID member sets in the S-Components




*Functionality of the component*

*Active / Passive for frames received on network port*

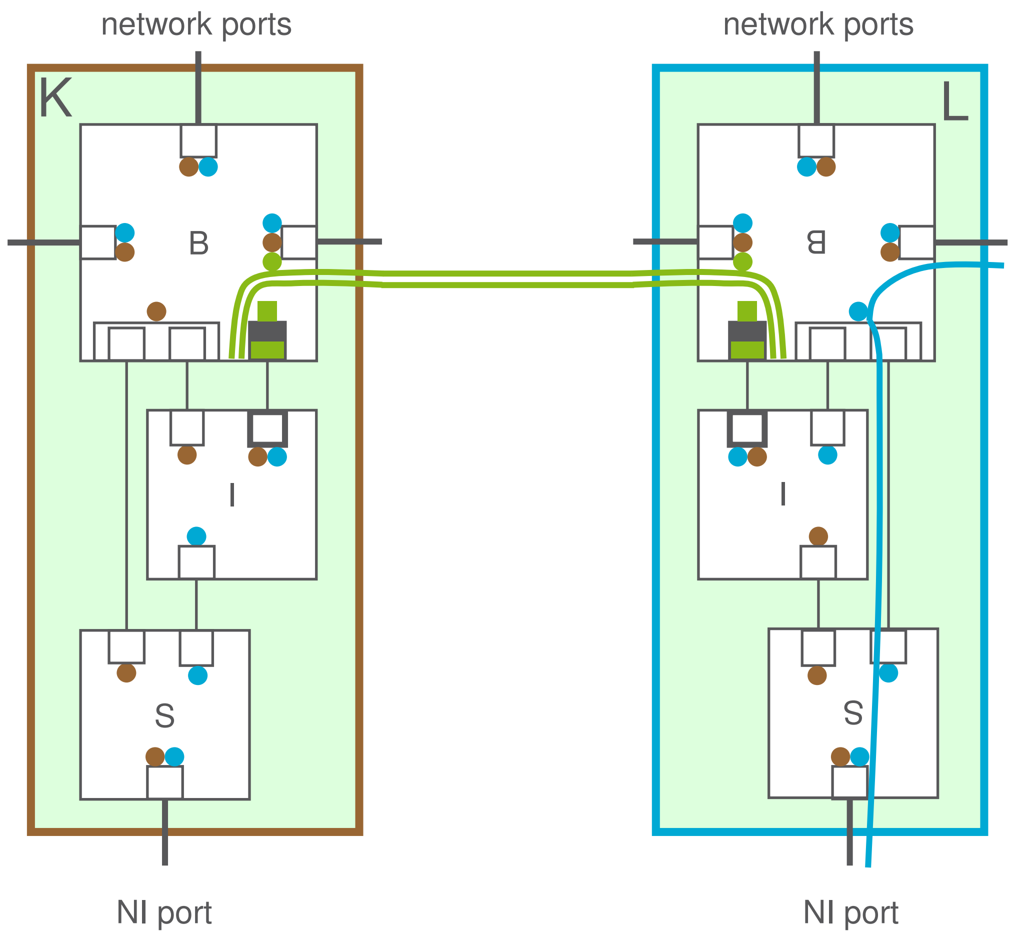
*MAC relay*

*Active / Passive for frames received on NI port*

# Edge Bridge using LAG features and PBB encapsulation

## Example path 1

K is
Active for brown
Passive for blue

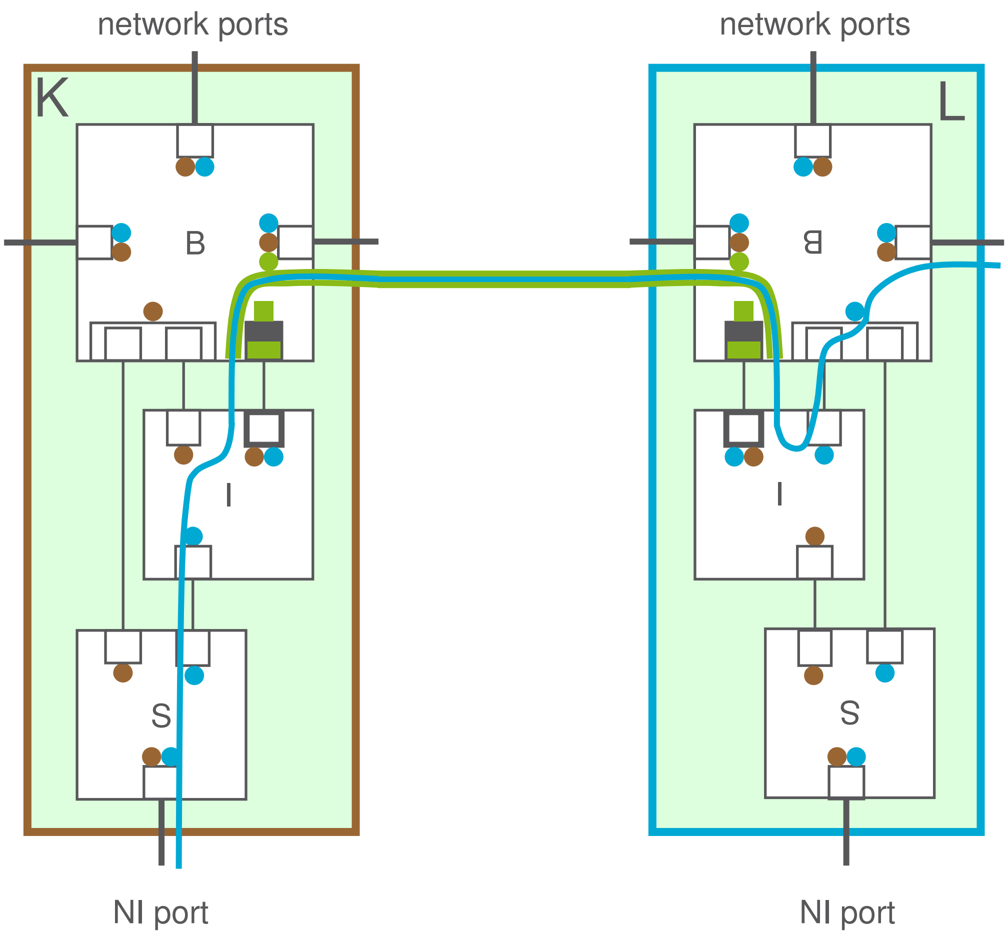



L is
Active for blue
Passive for brown

# Edge Bridge using LAG features and PBB encapsulation

## Example path 2

K is
Active for brown
Passive for blue



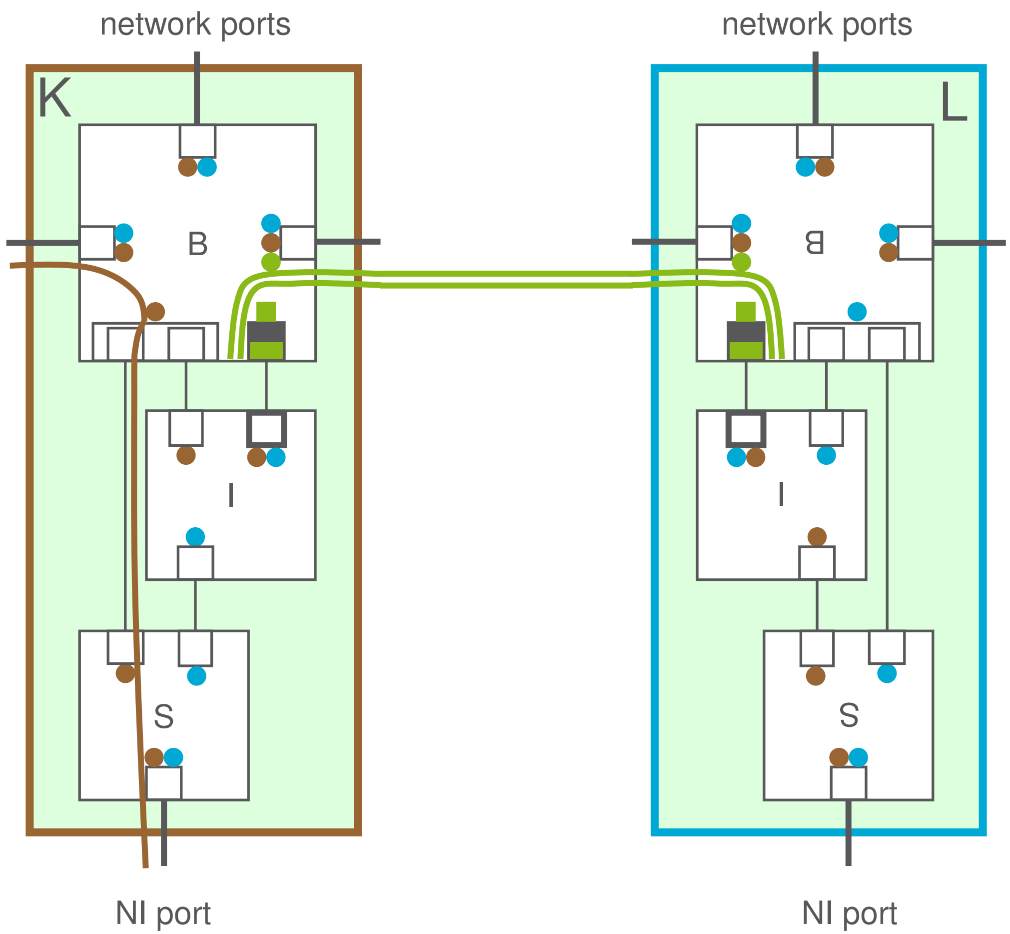

L is
Active for blue
Passive for brown

Note: this example is the same as shown on page 2

# Edge Bridge using LAG features and PBB encapsulation

## Example path 3

K is
Active for brown
Passive for blue



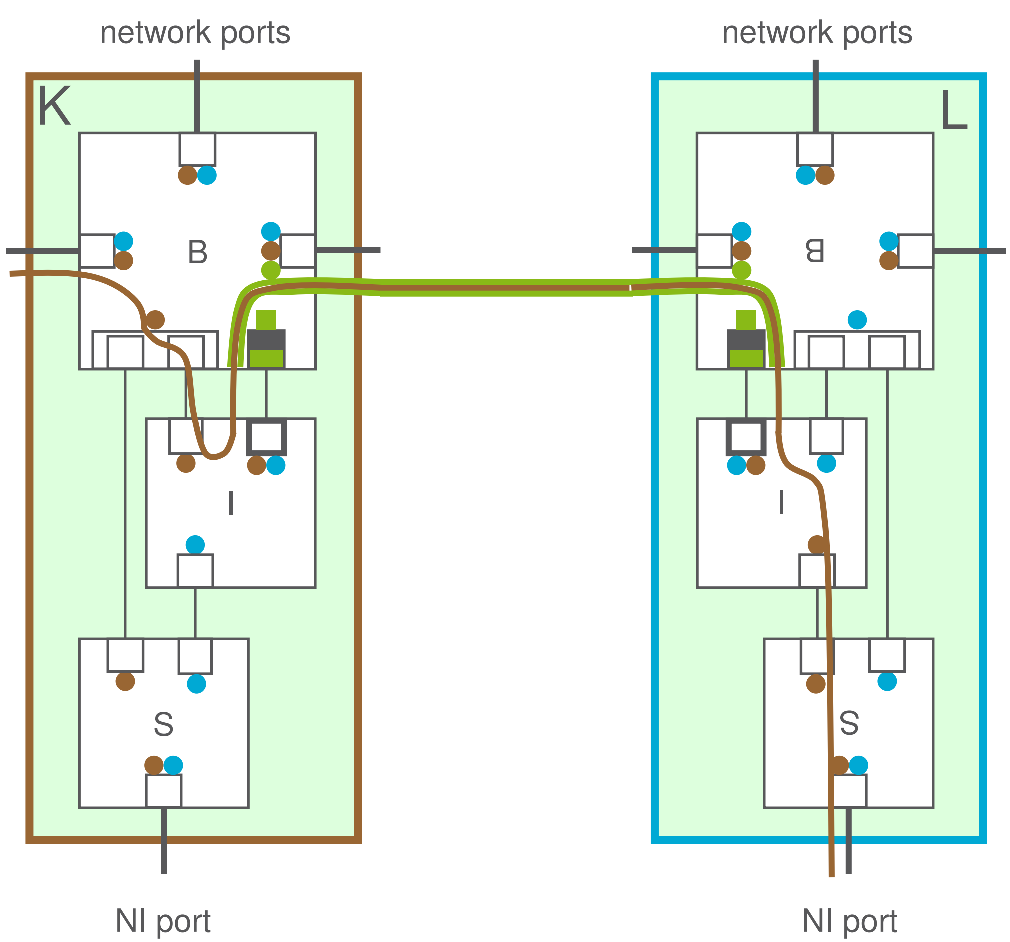

L is
Active for blue
Passive for brown

# Edge Bridge using LAG features and PBB encapsulation

## Example path 4

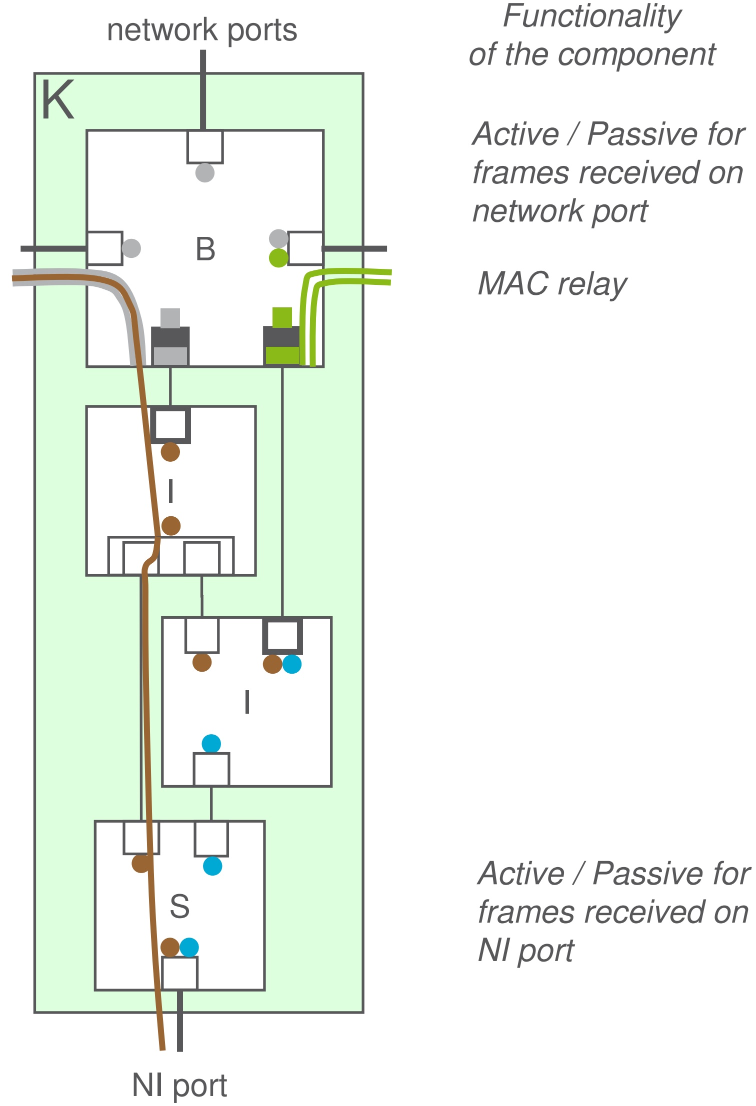
K is
Active for brown
Passive for blue

L is
Active for blue
Passive for brown



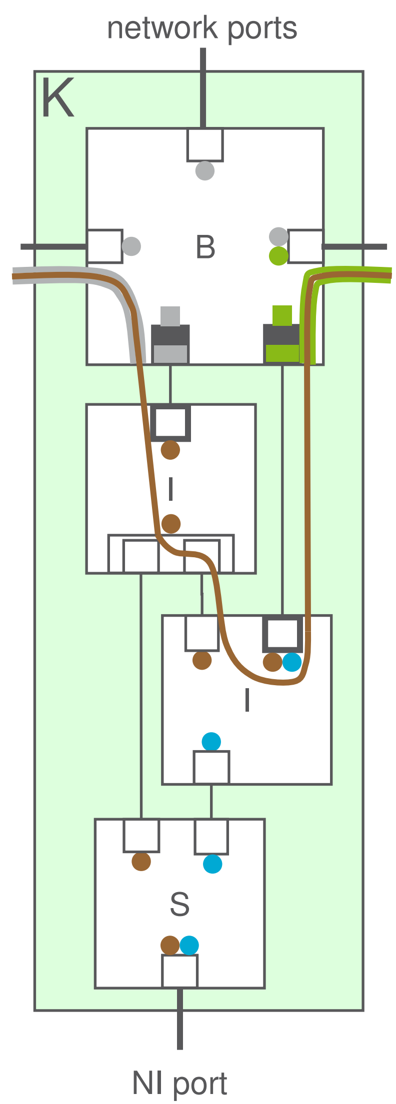
# Alternatively, Backbone Edge Bridge using LAG features – (example path 1)

- The Network is a PBBN
- S-tagged NI
- LAG Distributor of the Active Gateway decides whether the Service VID is tunneled
- A B-VID is used as overlay tunnel
  - green B-VID is the tunnel B-VID
- NI node K is the Active Gateway for the brown S-VID
- NI node K is Passive for the blue S-VID



# Alternatively, Backbone Edge Bridge using LAG features – (example path 2)

- The Network is a PBBN
- S-tagged NI
- LAG Distributor of the Active Gateway decides whether the Service VID is tunneled
- A B-VID is used as overlay tunnel
  - green B-VID is the tunnel B-VID
- NI node K is the Active Gateway for the brown S-VID
- NI node K is Passive for the blue S-VID




*Functionality of the component*

*Active / Passive for frames received on network port*

*MAC relay*

*Active / Passive for frames received on NI port*

# Alternatively, Backbone Edge Bridge using LAG features – (example path 3)

- The Network is a PBBN
- S-tagged NI
- LAG Distributor of the Active Gateway decides whether the Service VID is tunneled
- A B-VID is used as overlay tunnel
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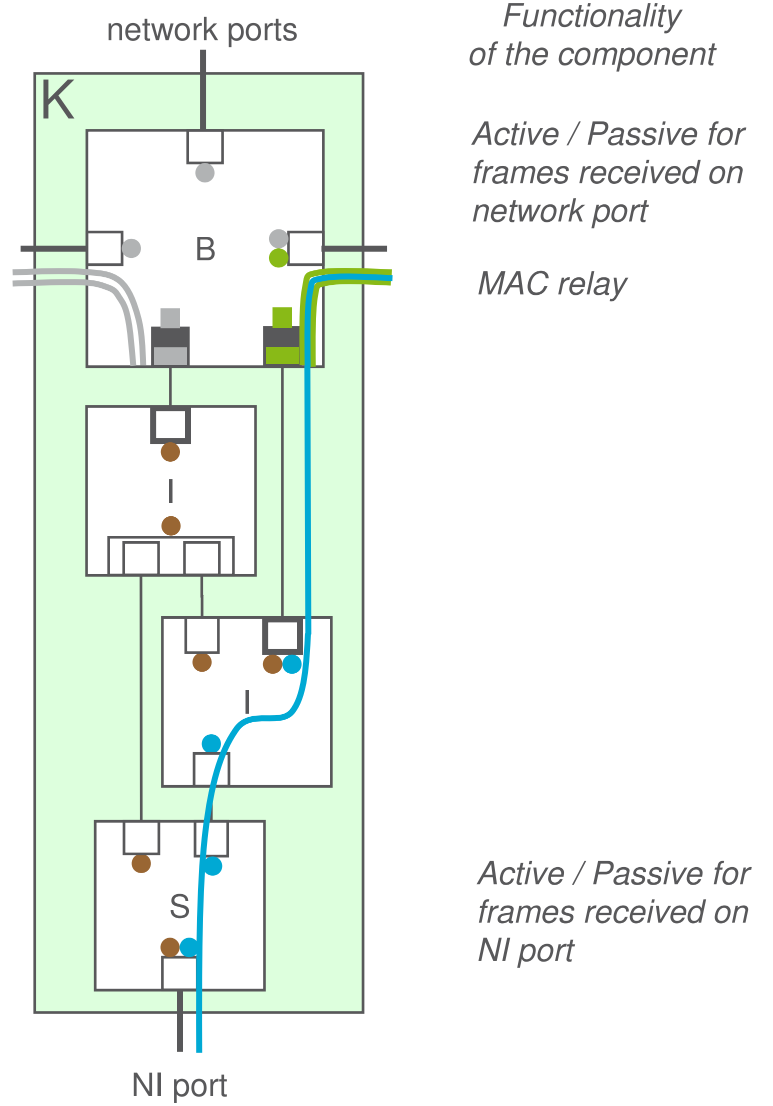
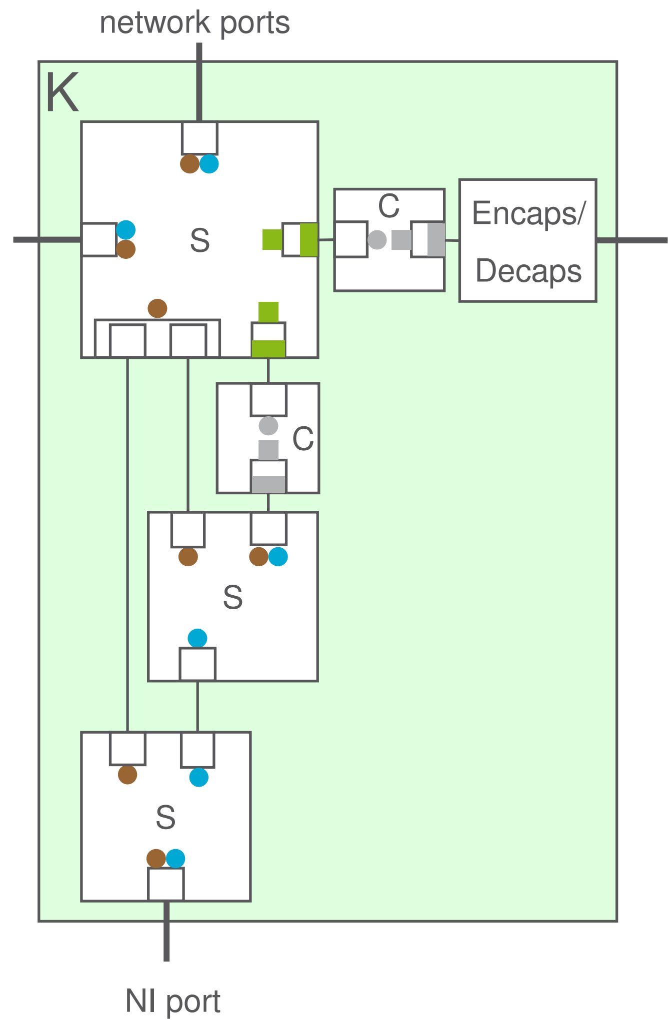


# Edge Bridge using LAG features and generic tunneling

- The Network is a PBN
- S-tagged NI
- LAG Distributor of the Active Gateway decides whether the Service VID is tunneled
- Generic Overlay tunnel between NI nodes
  - Green S-VID and grey C-VID are NI node internal VIDs only applied in the bridge component model description
- NI node K is the Active Gateway for the brown S-VID
- NI node K is Passive for the blue S-VID



# Summary

- The model presented here is proposed to be used as the data plane for the Resilient Network Interconnect
- Both congruent and non-congruent data paths can be supported by the same components
- Overlay tunneling can also be supported
  - Direct physical link between NI nodes is also covered
  - Tunneling support provides connectivity between NI nodes as long as the Network is not split
- The Gateway Selection functionality of the control protocol only has to adjust VID member set for a couple of ports