

# TIME-SHARED LINK – DRNI LEARNING

# From axbq-haddock-intra-das-link-0711-v02.pdf

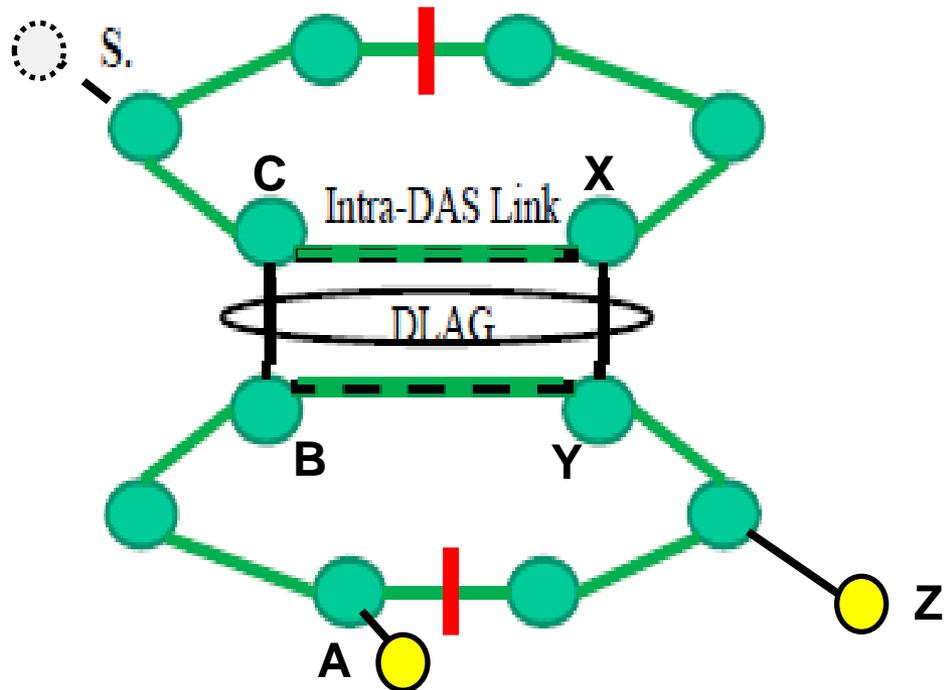
	Negotiated, symmetric Link Selection	Unilateral Link Selection
Link IS in active topology	CASE S2a Gateway selection based on Link Selection	CASE S2b Gateway selection based on ingress port
Link IS NOT in active topology	CASE S1 Gateway selection based on VID	

**The difference between case 2a and 2b is that there is no predetermined link selection.**

- When transmitting to the DRNI this means the link selected is on the first DRNI node encountered by the frame. In terms of gateway selection this means a DRNI node is the gateway for any frame received on any link that is not directly connected to the other DRNI node.
- When receiving from the DRNI node that receives the frame is also the gateway for that frame.

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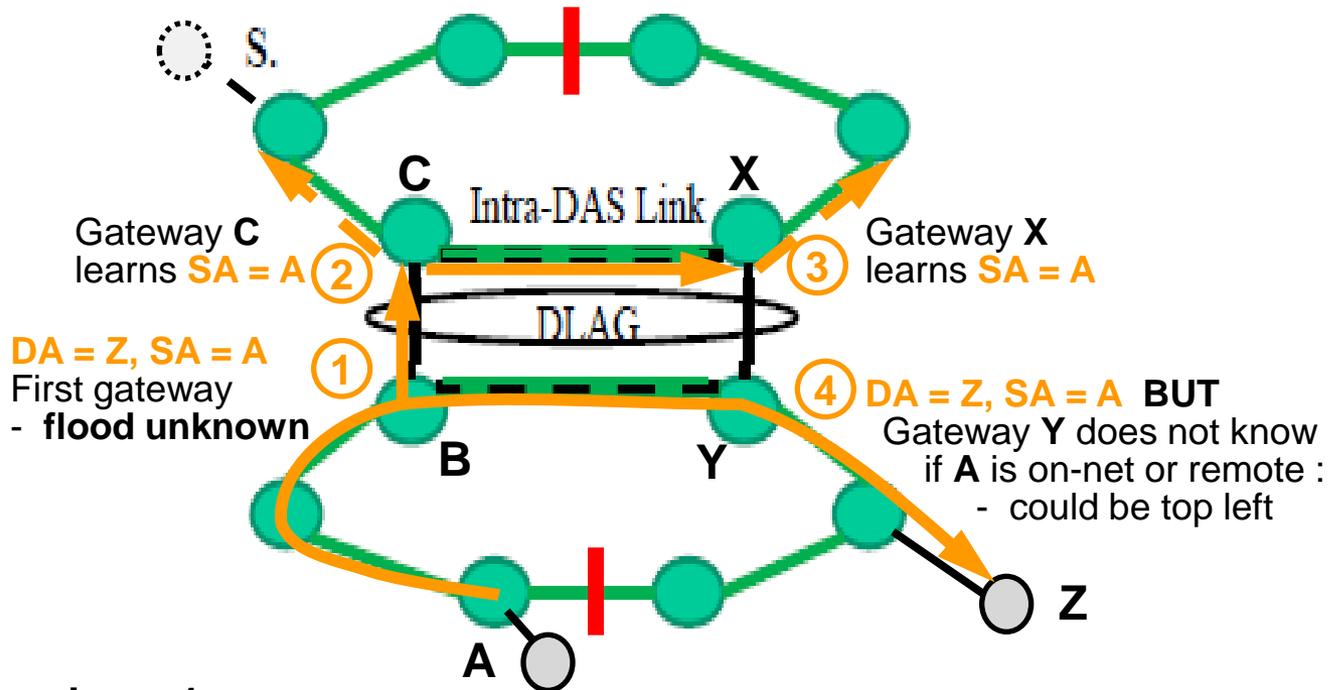
## - Basic scenario



- The DRNI is configured in the **IPL / Network Link** timeshare mode.
- The link between the Gateways (**B↔Y** and **C↔X**) is unblocked by STP in both networks;
- **A** initiates a conversation with **Z** on a VLAN which is configured on the top network also and crosses the DRNI.

“In this mode, the Gateway selected for a particular service will change dynamically, because the active Gateway for every frame received from any direction is the first Gateway in the Portal reached”

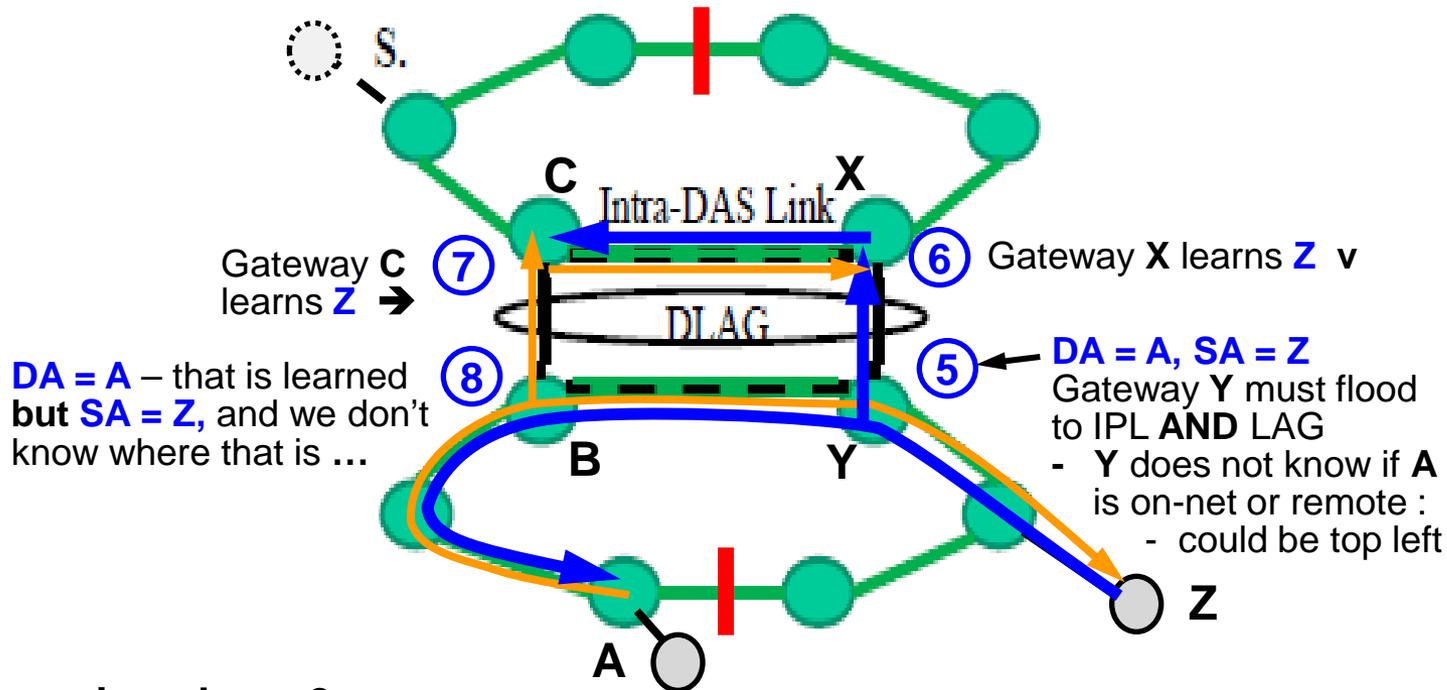
- Step 1



Learning phase 1

- A initiates a flood-unknown for Z
- B learns where to find A, having propagated the flood-unknown,
  - and thereby teaches C & X how they **might** (but don't) reach A,
- Y propagates the flood-unknown, but learns only that the packet from A arrived via the link from Gateway B :
  - it could have come from A (on-net),
  - it could have come across the DRNI from S (top L).

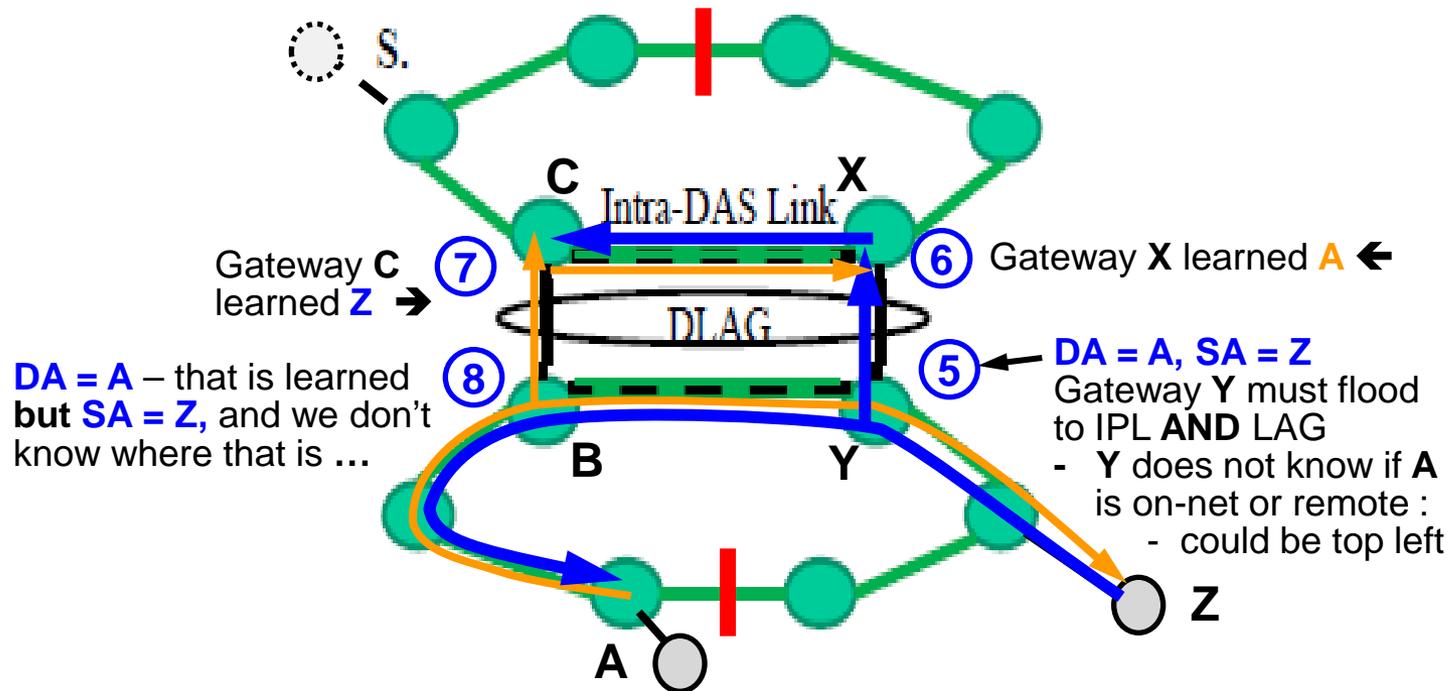
- **Step 2**



**Learning phase 2**

- Y propagates Z's reply on learned route (via B),
  - it must also **replicate it to the DRNI** (towards X), because the route could originate at S (top L), and Y is "1<sup>st</sup> Gateway" for route to S;
- B has learned a single port to reach A, so forwards the reply through that
- C learns port to Z is via X (←), X already learned port to A is via C (→)

- **Steady State**



- Every frame of the  $A \rightarrow Z$  conversation is propagated on-net, **and** also along the  $B \rightarrow C$  link, thence to  $X$  where it is discarded (2<sup>nd</sup> Gateway);
- Every frame of the  $Z \rightarrow A$  conversation is propagated on-net, **and** also along the  $Y \rightarrow X$  link, thence to  $C$  where it is discarded (2<sup>nd</sup> Gateway);
- Net-net, the entire  $A \leftrightarrow C$  conversation gets replicated on the IPL / Network Link of the remote network to no purpose.

## So what ?

### Mitigation possibilities include (in no particular order) :

1. eliminate the IPL / Network Link timeshare mode.
2. impose topology restrictions associated with the use of the IPL / Network Link timeshare mode
  - e.g. only p2p service between over DRNI is supported in this mode;
    - no MAC learning needed, simple VLAN forwarding rules “just work”
  - others ?
3. re-visit MAC learning synchronisation :
  - Exchange “MACs learned from DRNI” enables Gateways to learn unicast routes for all conversations.
4. there must be others ?

# Backup - Time Share -- Case 2b

## Case 2b: Network link is part of active topology; Link Selection is not negotiated.

→ Gateway selection is based on ingress port.

1. The Gateway on a given device is never selected for frames received from the Network Link that is time-shared as an Intra-DAS link.
2. The Gateway on a given device is always selected for frames received from any other link (including DRNI links).

→ Since Gateway selection is not based on VID there are potential learning issues, but only on the network link that is time-shared with the Intra-DAS Link. These issues are resolved in the control plane.

→ Link Selection and Gateway selection are inter-dependent.

1. For frames to be transmitted on a DRNI link, the selected link may be any DRNI link on the same device as the selected Gateway.
2. For frames received on a DRNI link, the selected Gateway is always on the same device as that DRNI link (by rule 2 above).

→ **Therefore no data frames need to traverse the Intra-DAS Link, but do need to traverse the Network link, when it is not obvious from whence they have come**