

# ECMP in Existing Bridges

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# Requests for ECMP in Existing Bridges

Network operators wanting ECMP also want:

- ▶ Controlled upgrade process (F-TAG support)
- ▶ To use existing infrastructure where possible

This raises the question:

- ▶ **Can existing bridges support ECMP?**

# Existing Bridge Functions

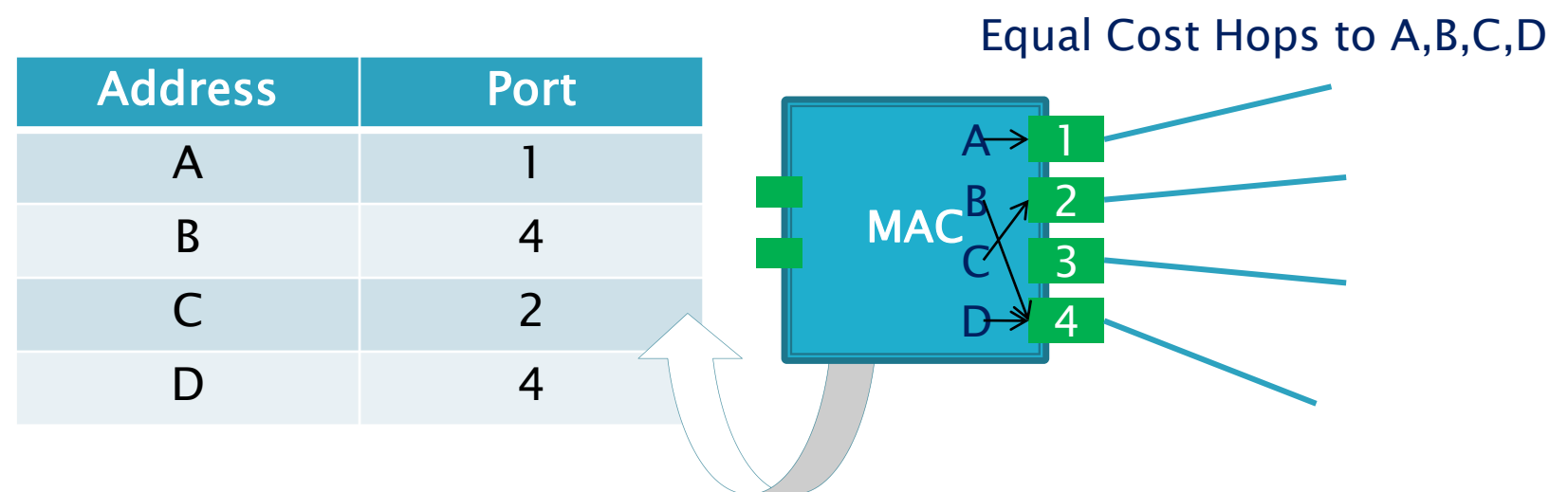
- ▶ Existing ports do not support F-TAG
  - No Flow Hash
  - No TTL
- ▶ Existing relay entity does not support hash-based lookup (multiple ports in Dynamic Filtering Entry)
- ▶ **How can existing bridges support ECMP?**

# Region Requirements

- ▶ Consistent VLAN control mode assignment (STP, PBB-TE, SPBM, SPBV)
- ▶ Consistent ECT-ALGORITHM assignment for SPB VLANs
- ▶ **If existing bridges are to support ECMP they must support SPBM & ECMP ECT Algorithm.**

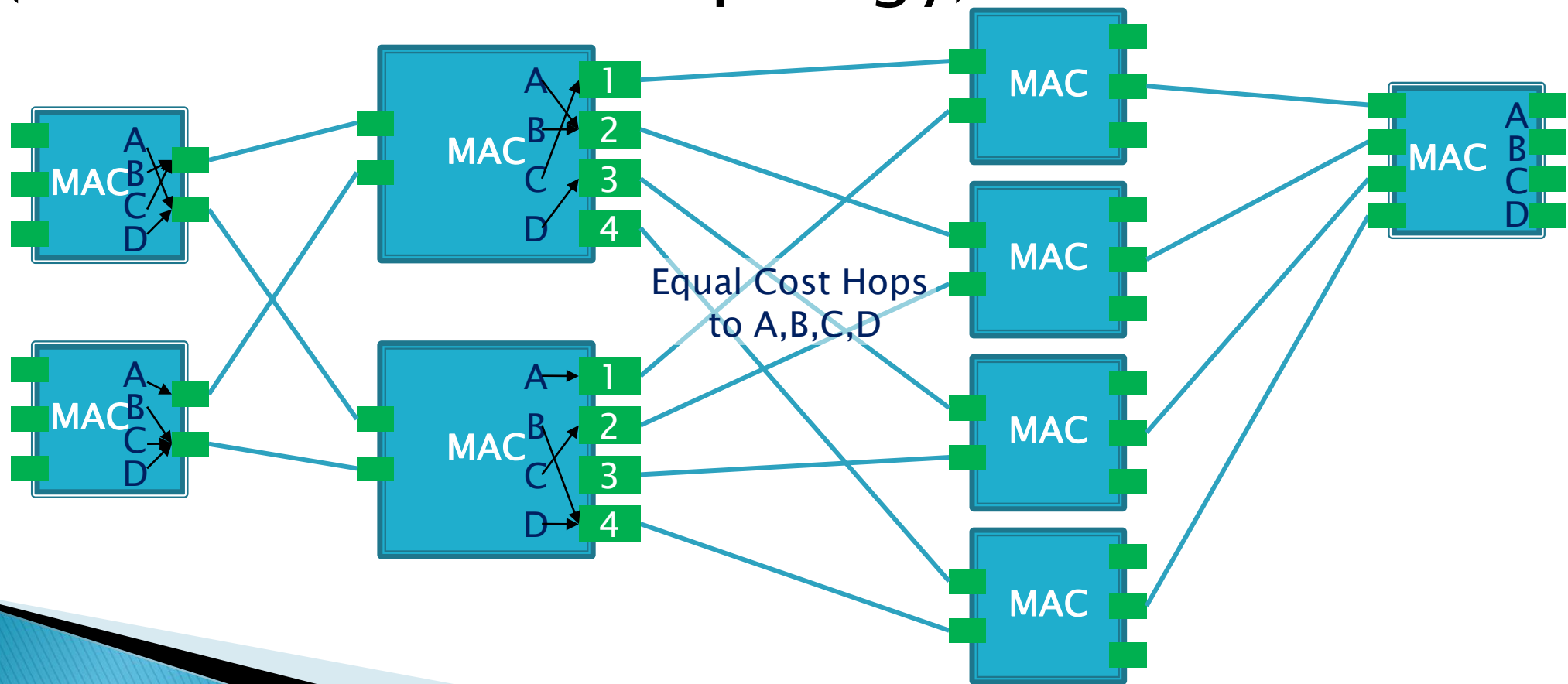
# ECMP Support in Existing Relay Entity

- ▶ FDB selection based on DA + VID
- ▶ For each individual address with multiple next hop choices, **use hash to select one** to install in FDB (Dynamic Filtering Entry)
- ▶ **“Per address” ECMP granularity.**



# ECMP in an Existing Network

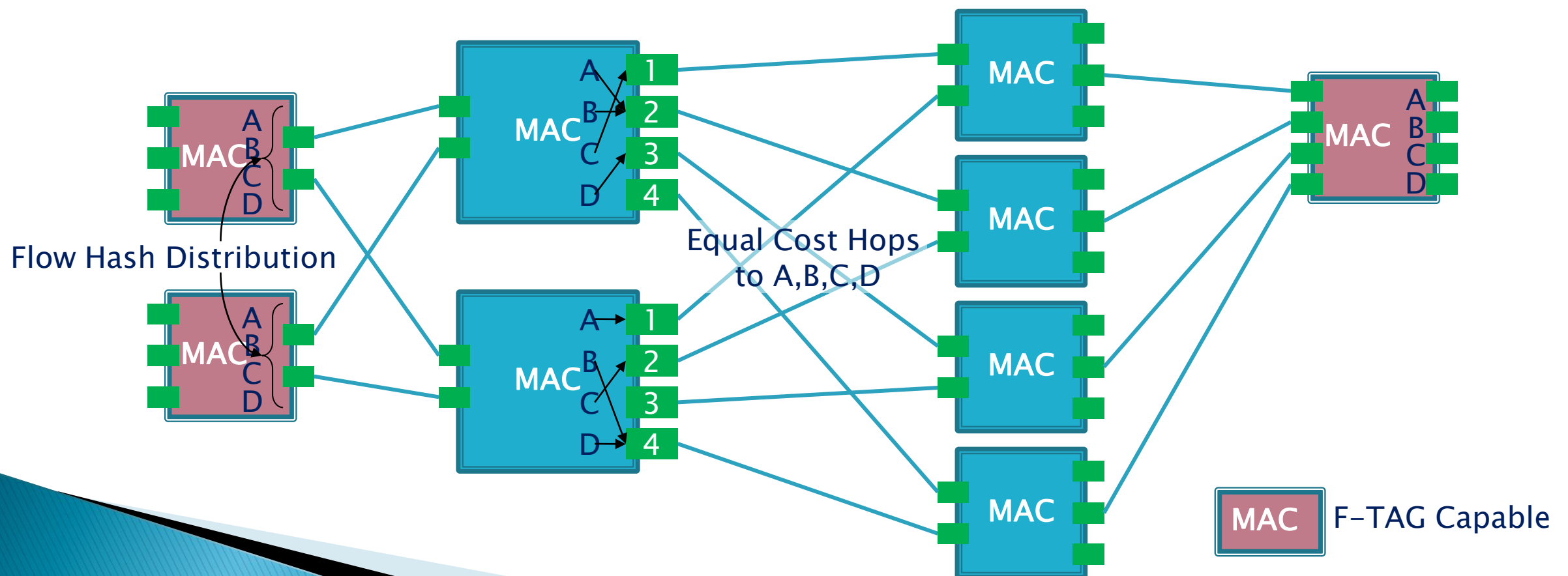
- ▶ Address ECMP can work in existing network (no change in port or relay capabilities)
- ▶ Loop prevention by Agreement Protocol (or infrastructure topology)





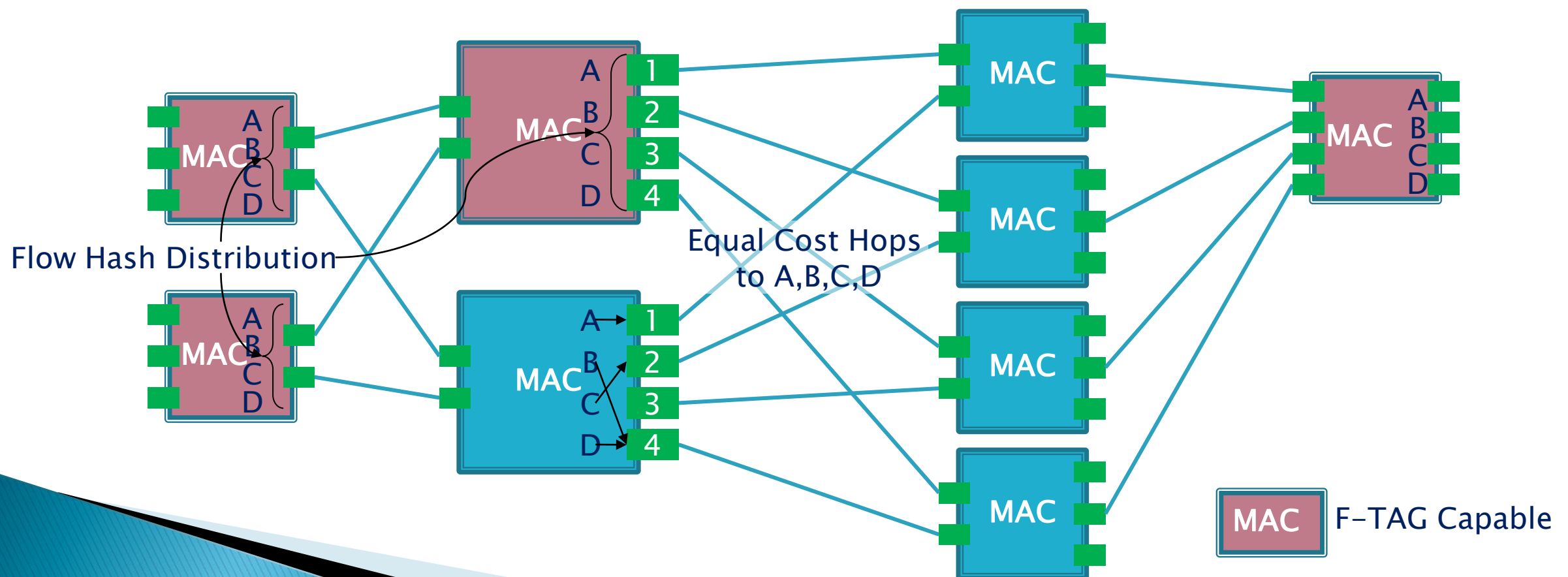
# Migration to Flow-based ECMP

- ▶ F-TAG capability must exist at edge nodes
- ▶ Core nodes may still use address ECMP
  - No F-TAG processing



# Migration to Flow-based ECMP

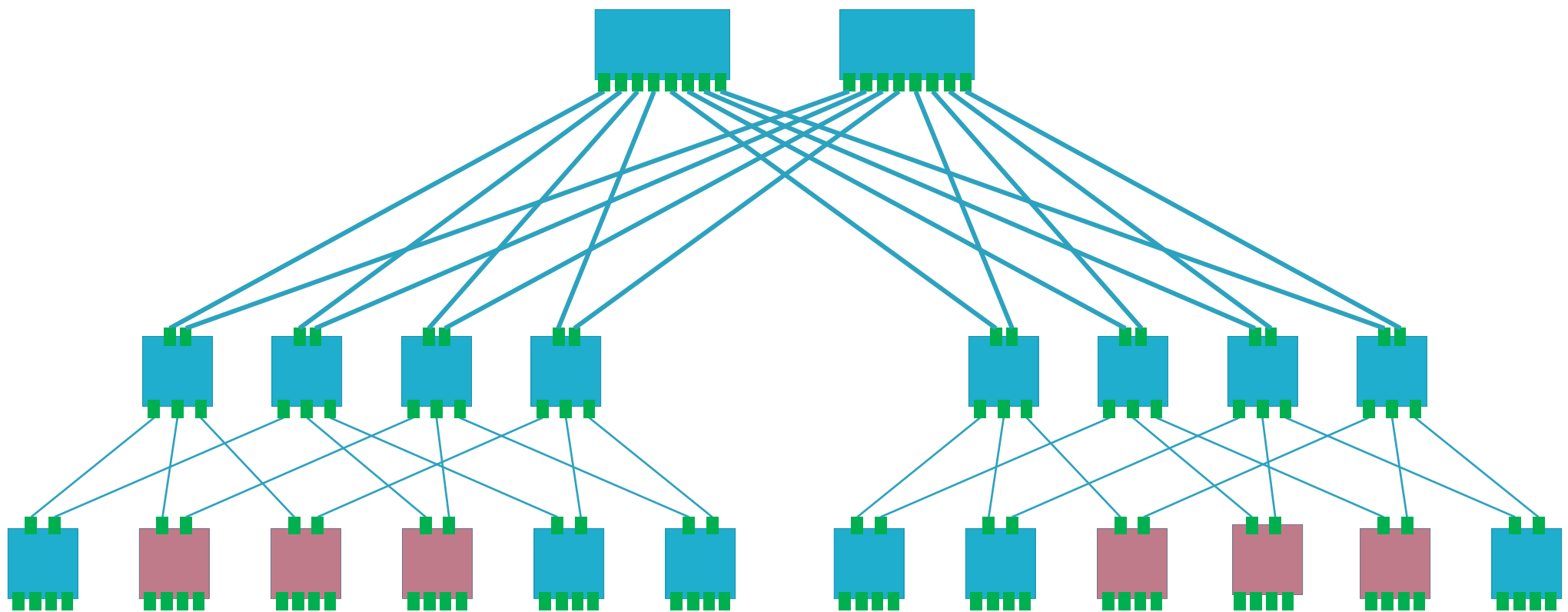
- ▶ Core node upgrade to support F-TAG can be incremental
  - Consistent F-TAG processing within each Bridge





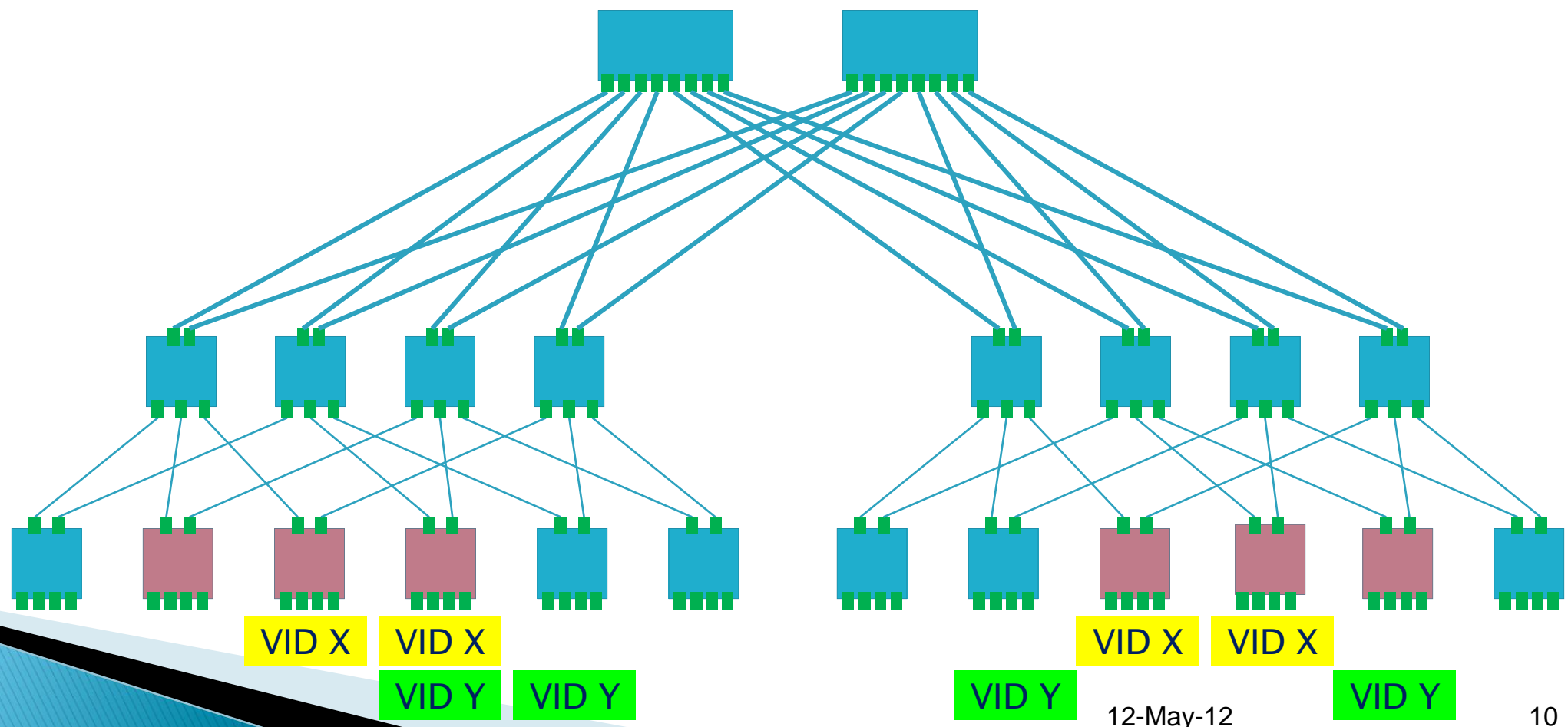
# Coherent Network Configuration

- ▶ Can leave responsibility with operator, or
- ▶ Can provide **automatic mode selection**
  - Flow-based mode selected iff all edge nodes support F-TAG (select for each ECMP Base VID)



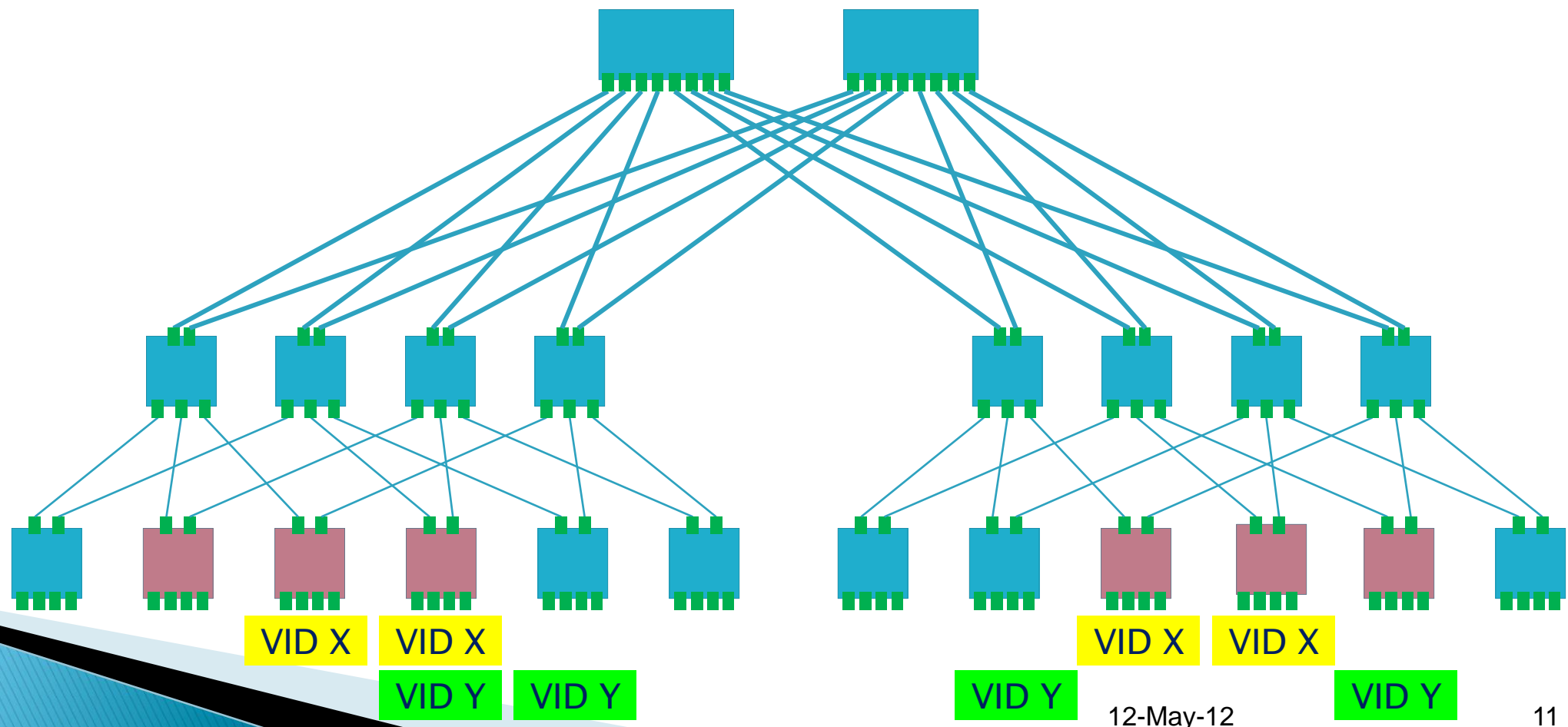
# Automatic Mode Selection

- ▶ Base VID X selects flow-based ECMP (F-TAG)
- ▶ Base VID Y selects address ECMP (no F-TAG)
- ▶ Core nodes use address ECMP



# Automatic Mode Selection Benefits

- ▶ Prevents F-TAG leaking out of SPT Region
  - Could cause hard-to-diagnose problems
- ▶ Automatically selects best mode
- ▶ Simplifies upgrade process



# Automatic Mode Selection Support

- ▶ Advertise F-TAG capability
  - Node level (SPB Instance sub-TLV)
  - Port level (ISID-ADDR sub-TLV)
- ▶ ISIS-SPB calculation includes mode selection

	Octet	Length
Type (3)	1	1
Length	2	1
B-MAC Address	3-8	6
reserved	9	4 bits
Base VID	9-10	12 bits

Use a bit to indicate F-TAG capability at this address (port)

	Octet	Length
Type (1)	1	1
Length	2	1
CIST Root Identifier	3-10	8
CIST External Root Path Cost	11-14	4
Bridge Priority	15-16	2
reserved	17-18	11 bits
V	18	1 bit
SPSourceID	18-20	20 bits
Number of Trees	21	1

Use a bit to indicate F-TAG capability at this node

# Proposal for ECMP in Existing Bridges

We are getting requests for:

- ▶ Controlled upgrade process (F-TAG support)
- ▶ To use existing infrastructure where possible

Supporting these requests seems possible:

- ▶ Some ECMP support possible in existing Bridges (address mode)
- ▶ Automatic mode selection can provide additional benefits
- ▶ Consider adding these to 802.1Qbp