



Joint ITU-T/IEEE Workshop on The Future of Ethernet Transport



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G.8031 Ethernet Linear Protection Switching

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■ Agenda

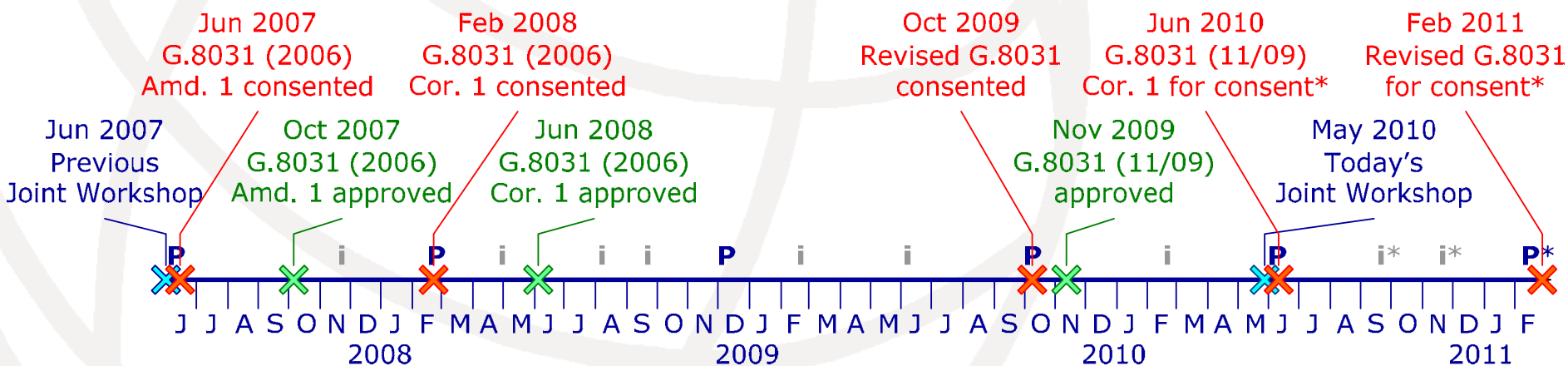
- G.8031 Timeline
- G.8031 (2006) Principles
- G.8031 (2006) Amd. 1 & Cor. 1
- G.8031 (11/2009)
- Future of G.8031

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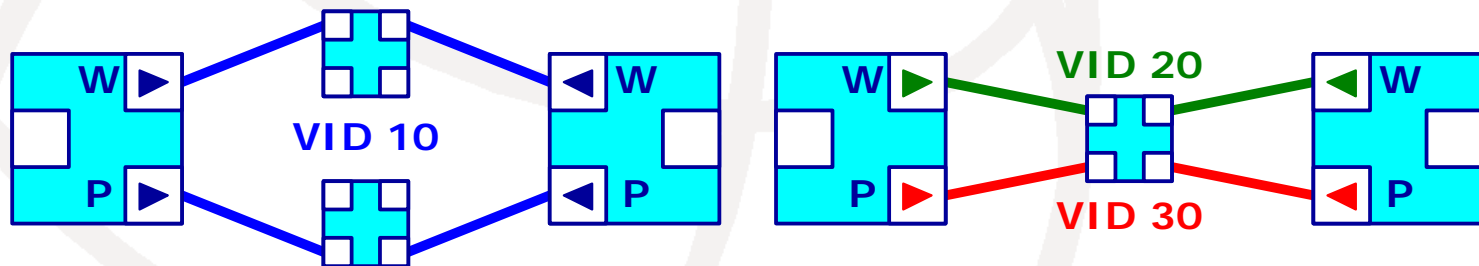
■ G.8031/Y.1342 Ethernet Linear Protection Switching

- Defines the APS protocol and linear protection switching mechanisms for point-to-point VLAN-based ETH Sub Network Connection (SNC) in Ethernet transport networks
- v1 approved Jun 2006 (as discussed in Jun 2007)
- v2 approved Nov 2009
- v3 under study, up for potential consent in Feb 2011



Legend: P Q9/15 Plenary i Q9/15 Interim whose ToR include G.8031 * Tentative

- Protected entity:
 - point-to-point VLAN-based Ethernet SNC
 - All other protection schemes including point-to-multipoint and multipoint-to-multipoint are for further study
 - Disjoint Working and Protection transport entities
 - Using same or different VIDs
 - SNC/S used for protection of a SNC
 - Can also be used to protect link or network connections



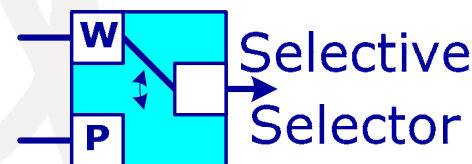
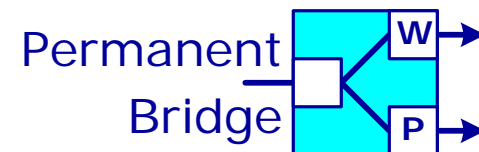
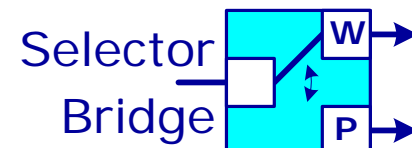
- Sub-50ms Protection Switching (PS)
- 1-Phase APS (when needed)
- Revertive and non-revertive operation

G.8031 (2006)

Principles (2/3)

■ G.8031:

- Defines 1:1 bi-directional PS
 - Using a Selector Bridge at head end
 - (1:1 uni-directional PS not supported)
- Defines 1 + 1 uni/bi-directional PS
 - Using a Permanent Bridge at head end
- Uses a Selective Selector at tail end for both architectures



■ Prioritized switching triggers and requests

- SF, SF-P: upon CCM loss (w/ or w/o hold off)
- Local requests: LO, FS, MS, Clear
- Remote requests: rcvd via APS from far end



- Y.1731-defined APS PDU encapsulates **G.8031-defined** data (configurable MEL)

	1								2								3								4							
	8	7	6	5	4	3	2	1	8	7	6	5	4	3	2	1	8	7	6	5	4	3	2	1	8	7	6	5	4	3	2	1
1	MEL				Version (0)				OpCode (0d39)								Flags (0)								TLV Offset (0x04)							
5	Request/State				Prot Type				Requested Signal								Bridged Signal								Reserved							
					A B D R																											
9	End TLV (0)																															

APS-Specific Information

Request/State: top-priority global request as per switching algorithm

Protection Type: **A** (APS or not), **B** (1:1 or 1+1), **D** (bi or uni-directional), **R** (revertive or not)

Requested Signal: signal requested by near end to be carried over Protection

Bridged Signal: signal bridged by near end over Protection

- PS algorithm uses logic to

- Prioritize local and (validated) remote requests vs PS triggers → Set local Bridge/Selector
- Detect mismatched Requested/Bridged Signals → Set Failure Of Protocol defect (dFOP – bridge/selector mismatch cleared by operator)

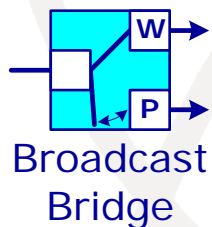
G.8031 (2006) Amd. 1 & Cor. 1

- G.8031 (2006) Amd. 1
 - Renamed to Ethernet "Linear" Protection Switching
 - No merging of G.8031 ELPS and G.8032 ERPS
 - Added Management Information for configuration
 - Specified Reverse Request (RR) in reply to Exercise (EXER)
 - No dFOP raised in the absence of RR
 - Moved dFOP specification to G.8021
 - Aligned modeling with G.8021
- G.8031 (2006) Cor. 1
 - Allowed activation of WTR timer even when both ends concurrently detect clearance of SF
 - Specified DNR state is entered when in non-revertive mode and both ends are in NR state with protection active

■ G.8031 (11/2009)

- Added hold-off timer for SF-P
- Added MS-W operation (w/ MS>MS-W>WTR)
- Corrected text/figures for 1:1 bi-directional PS
- Added Appendix for state transition tables in SDL format
- Made various clarifications/corrections, e.g.:
 - Global priority logic calculates all state machine transitions
 - How equal-priority requests are handled
 - How “R” bit mismatch is handled to ensure interworking of revertive and non-revertive modes for both uni- and bi-directional failures (new WTR column in Tables A.4 & A.8)
 - PS algorithm updated and state transition tables augmented to avoid transient traffic loss and increase PS speed

- G.8031 (11/2009) Cor. 1
 - Up for potential consent in Jun 2010
 - Further clarifies PS algorithm
 - Adds omitted state transition to avoid transient traffic loss
- Future G.8031 for potential consent in Feb 2011



- Broadcast bridge to support SD-based PS, which:
 - Is recommended to be used in revertive mode
 - Could also be used for SF
 - Remains under study
- Current Study Points (SPs) on the Living List
 - Retained SP on DNI/MNI PS
 - Revived SP on SD as a PS trigger
 - Updated SP on extensions to support PBB-TE PS
 - Added SP for dFOP when no APS message is received



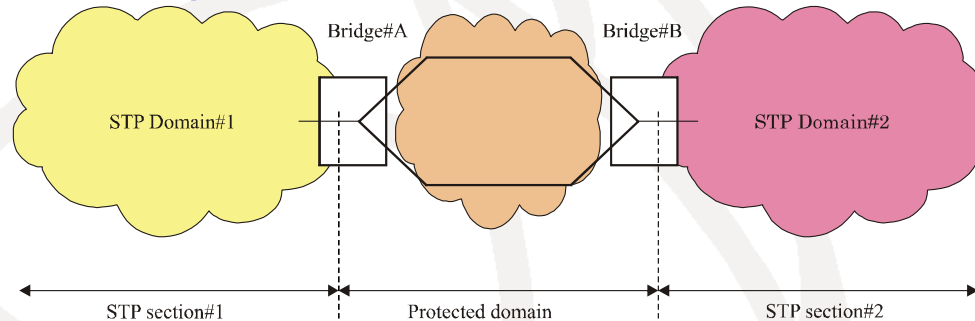
Thank you



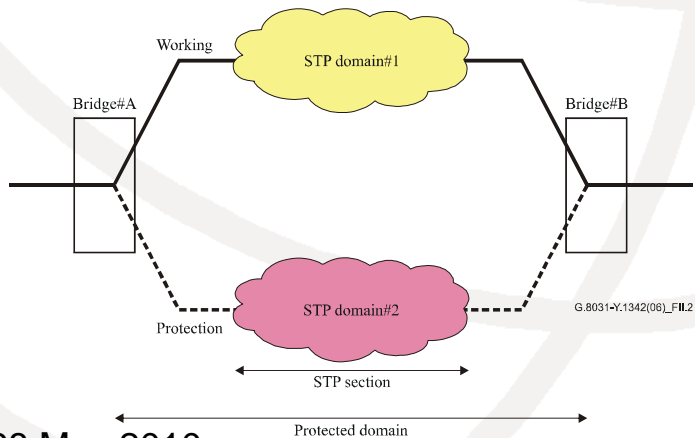
Backup

G.8031 and STP Interaction

- Interaction with STP described in G.8031 as follows
 - No overlapping between protected domain and STP



- Overlapping between protected domain and STP



- Overlapping between protected domain and STP per VLAN

