

IEEE Std 802.1Q™-2014
Bridge Configuration Data and Status/State
UML Models

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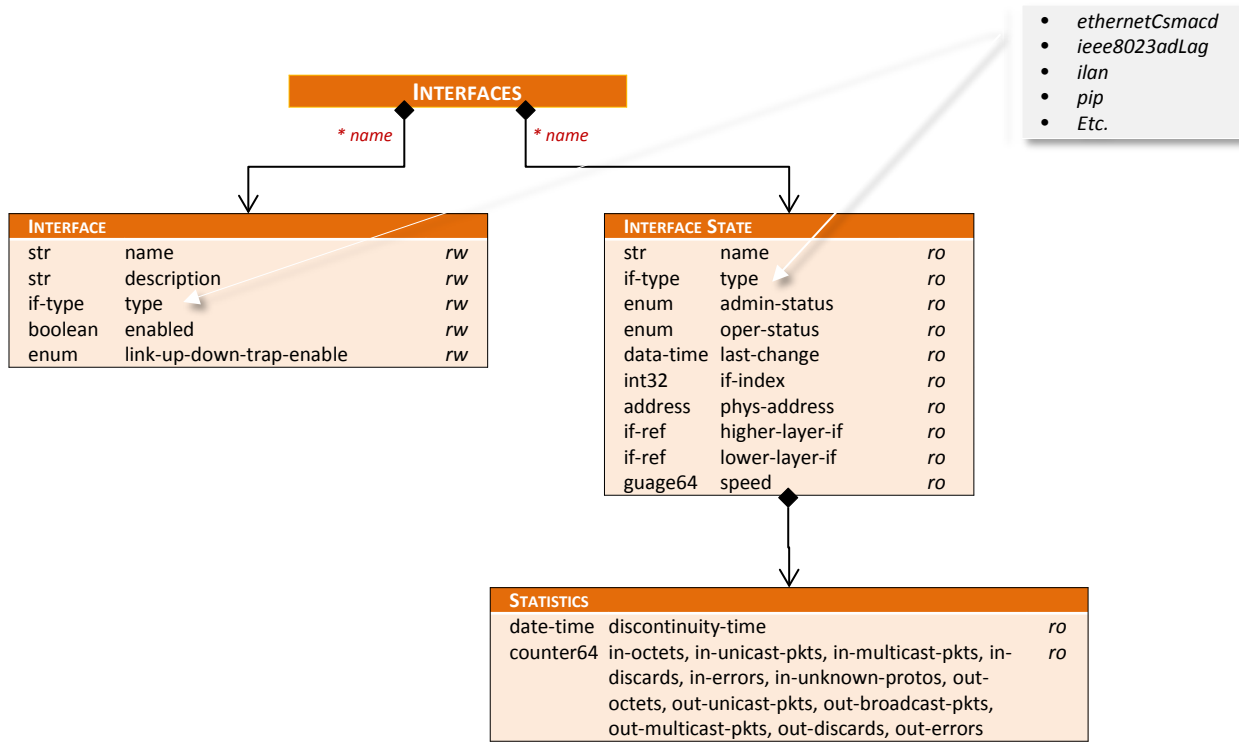
Introduction

- Introduce UML configuration data and state/status modeling of IEEE Std 802.1Q™-2014 Bridges
- IEEE 802.1Q Bridging modelled include:
 - TPMR (Two Port MAC Relay) Bridges
 - Customer VLAN Bridges
 - Provider Bridges
 - Provider Backbone Bridges
- IEEE 802.1Q features not (currently) being modelled include:
 - Bridge protocol entities (e.g., MST, etc.)
 - MRP and MMRP entities
 - CFM and DDCFM entities
 - PBB-TE entities
 - Shortest Path Bridging entities
 - Forwarding and queuing for time-sensitive stream entities
 - Congestion Notification entities
 - Stream Reservation Protocol (SRP) entities
 - Edge Virtual Bridge (EVB) entities
 - Edge Control Protocol (ECP) entities

Outstanding Model Areas

- Confirmation/validation that proposed model (structure) can gracefully accommodate
 - Link Aggregation (802.1AX)
 - CFM
 - 802.1X

IETF INTERFACES Model (RFC7223)



IEEE 802.1Q-2014 BRIDGE Model

- Extended filtering services
- Traffic classes
- Static entry individual port
- IVL capable
- SVL capable
- Hybrid capable
- Configurable PVID tagging
- Local VLAN capable

- I-component
- B-component
- C-VLAN component
- S-VLAN component
- VLAN unaware component
- EVB station edge relay component

- Customer VLAN Bridge
- Provider Bridge
- Provider Edge Bridge
- Backbone Edge Bridge
- Backbone Core Bridge
- Two-Port MAC Relay Bridge

BRIDGE		
macAddress	address	rw
str	name	rw
enum	type	rw
int	number-of-ports	rw
list*	port-list	ro
counter	up-time	ro
ResetBridge()		

COMPONENT		
int32	component-id	ro
enum	component-type	ro
macAddress	address	ro
int	number-of-ports	ro
boolean-array	capabilities	ro
boolean	traffic-class-enabled	rw
boolean	mrrp-enabled-status	rw

PERMANENT DATABASE		
int	size	ro
int	static-entries	ro
int	static-VLAN-registration-entries	ro

FILTERING ENTRY		
int	database-id	rw
macAddress	address	rw
int	vid	rw
map	port-map	rw

FILTERING DATABASE		
int	size	ro
int	static-entries, dynamic-entries	ro
int	static-VLAN-registration-entries, dynamic-VLAN-registration-entries	ro
int	ageing-time	rw
int	mac-address-registration-entries	ro

FILTERING ENTRY		
int	database-id	rw
macAddress	address	rw
int	vid	rw
enum	entry-type	rw
map	port-map	rw

VLAN REGISTRATION ENTRY		
int	database-id	rw
int	vid	rw
enum	entry-type	rw
map	port-map	rw

INTERFACES

BRIDGE VLAN		
int	version	ro
int	max	ro
boolean	override-default-pvid	ro
format	protocol-template	ro
int	max-MSTI	ro

VLAN ID		
int	vid	rw
str	name	rw
list	untagged-ports	ro
list	egress-ports	ro

VID ↔ FID ALLOCATION		
int*	vid	rw
int	fid	rw
enum	type	ro

PROTOCOL GROUP DATABASE		
format	frame-format	rw
struct	type	rw
int	protocol-group-id	rw

- Undefined
- Fixed
- Dynamic

BRIDGE PORT Model

- BRIDGE PORT (representation) is an *extension* of the IETF INTERFACE definition

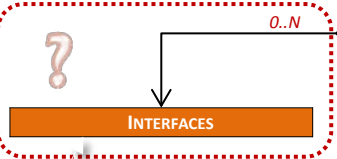
- 8P0D
- 7P1D
- 6P2D
- 5P3D

INTERFACES

INTERFACE		
str	name	rw
str	description	rw
if-type	type	rw
boolean	enabled	rw
enum	link-up-down-trap-enable	rw
BRIDGE PORT		
int	pvid	rw
int	default-priority	rw
table	priority-regeneration-table	rw
enum	pcp-selection	rw
table	pcp-decoding-table	rw
table	pcp-encoding-table	rw
boolean	use-dei	rw
boolean	drop-encoding	rw
enum	service-access-priority-selection	rw
table	service-access-priority-table	rw
table	traffic-class-table	rw
enum	acceptable-frame	rw
boolean	enable-ingress-filtering	rw
boolean	restricted-vlan-registration	rw
boolean	VID-translation-table	rw
boolean	egress-VID-translation-table	rw
int	protocol-group-id	rw
struct	protocol-group-database-contents	rw
uint	admin-point-to-point	rw

INTERFACE STATE		
str	name	ro
if-type	type	ro
enum	admin-status	ro
enum	oper-status	ro
data-time	last-change	ro
int32	if-index	ro
address	phys-address	ro
if-ref	higher-layer-if	ro
if-ref	lower-layer-if	ro
gauge64	speed	ro
BRIDGE PORT		
int	number	ro
boolean	port-and-protocol-based-VLAN	ro
int32	component-id	ro
enum	type	ro
macAddress	address	ro
uint	capabilities	ro
uint	type-capabilities	ro
boolean	external	ro
boolean	oper-point-to-point	ro

- C-VLAN Bridge port
- Provider Network Port (PNP)
- Customer Network Port (CNP)
- Customer Edge port (CEP)
- Customer Backbone Port (CBP)
- Virtual Instance Port (VIP)
- Provider Instance Port (PIP)
- D-Bridge Port
- Remote Customer Access Port (RCAP)
- Station-facing Bridge Port (SBP)
- Uplink Access Port (UAP)
- Uplink Relay Port (URP)



For example, LAG members (interfaces) when the Bridge Port is a LAG

VID TRANSLATIONS		
int	local-vid	rw
int	relay-vid	rw

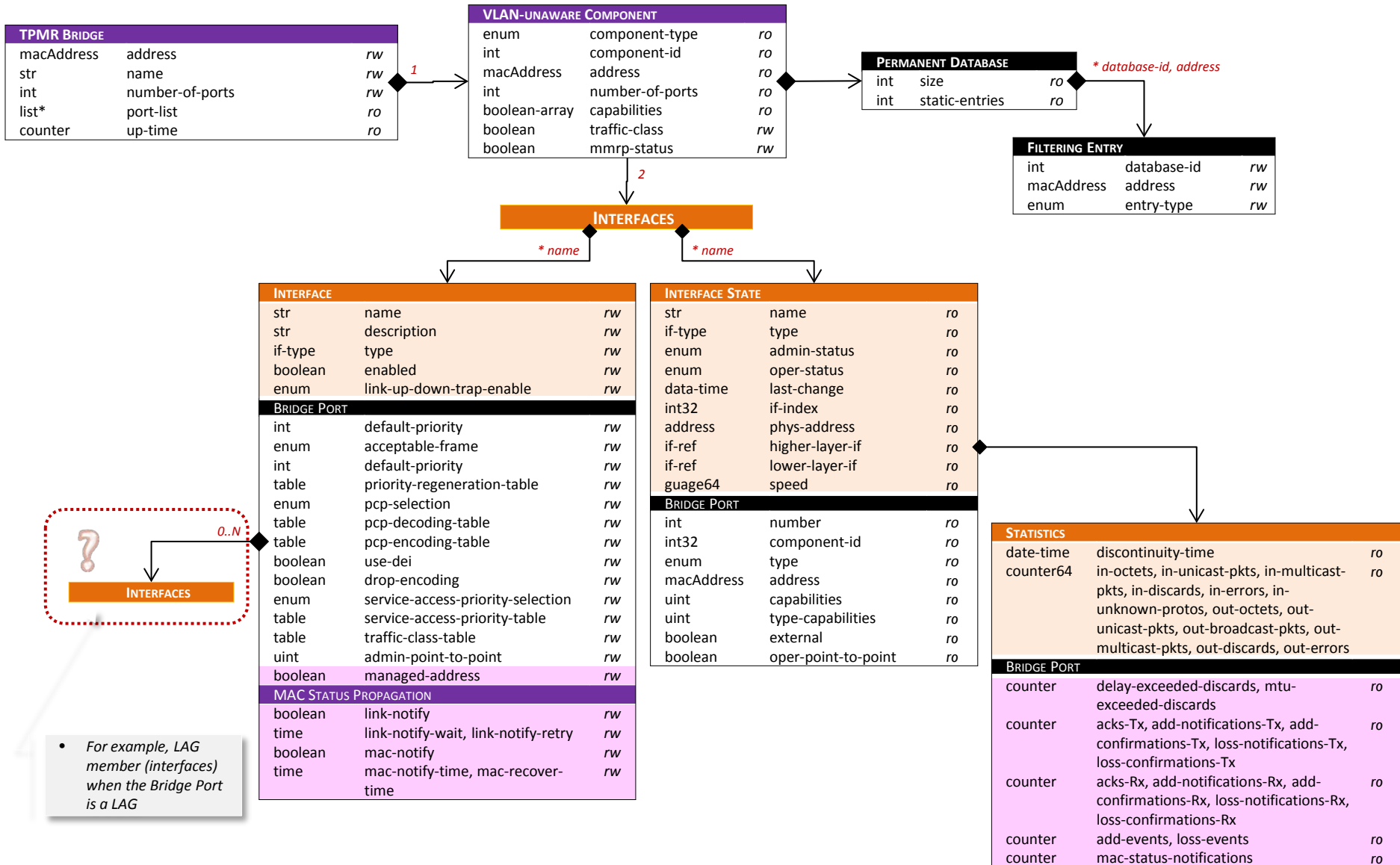
EGRESS VID TRANSLATIONS		
int	relay-vid	rw
int	local-vid	rw

STATISTICS		
date-time	discontinuity-time	ro
counter64	in-octets, in-unicast-pkts, in-multicast-pkts, in-discards, in-errors, in-unknown-protos, out-octets, out-unicast-pkts, out-broadcast-pkts, out-multicast-pkts, out-discards, out-errors	ro
BRIDGE PORT		
counter	delay-exceeded-discards, mtu-exceeded-discards	ro
counter	frameRx, octetsRx, discardInbound, forwardOutbound, discardLackOfBuffers, discardTransitDelayExceeded, discardOnError, discardOnIngressFiltering, discardTTLExpired	ro

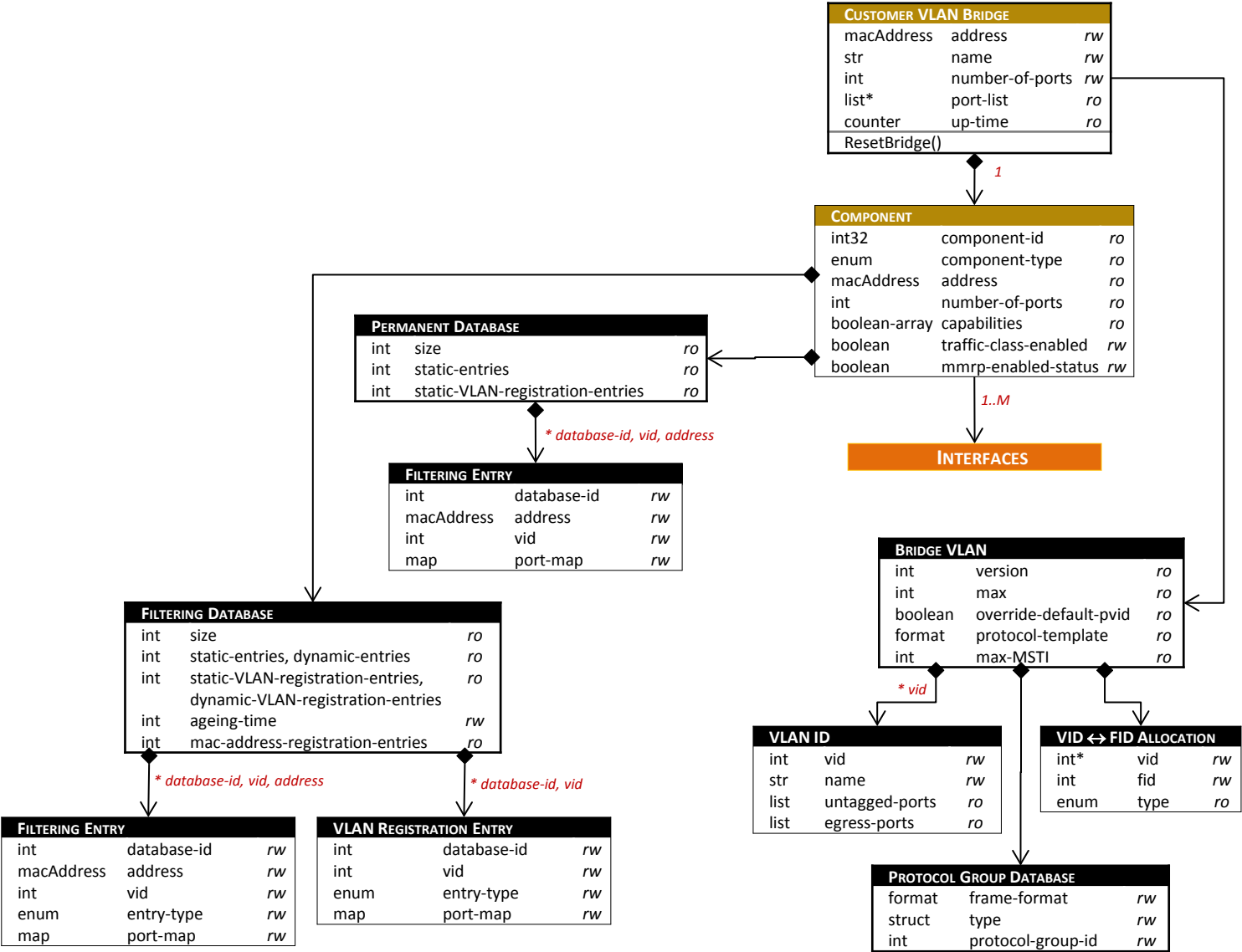
- Admit only VLAN-tagged frames
- Admit only Untagged and Priority Tagged frames
- Admit All frames

STATISTICS		
BRIDGE PORT		
counter	frameRx, octetsRx, discardInbound, forwardOutbound, discardLackOfBuffers, discardTransitDelayExceeded, discardOnError, discardOnIngressFiltering, discardTTLExpired	ro

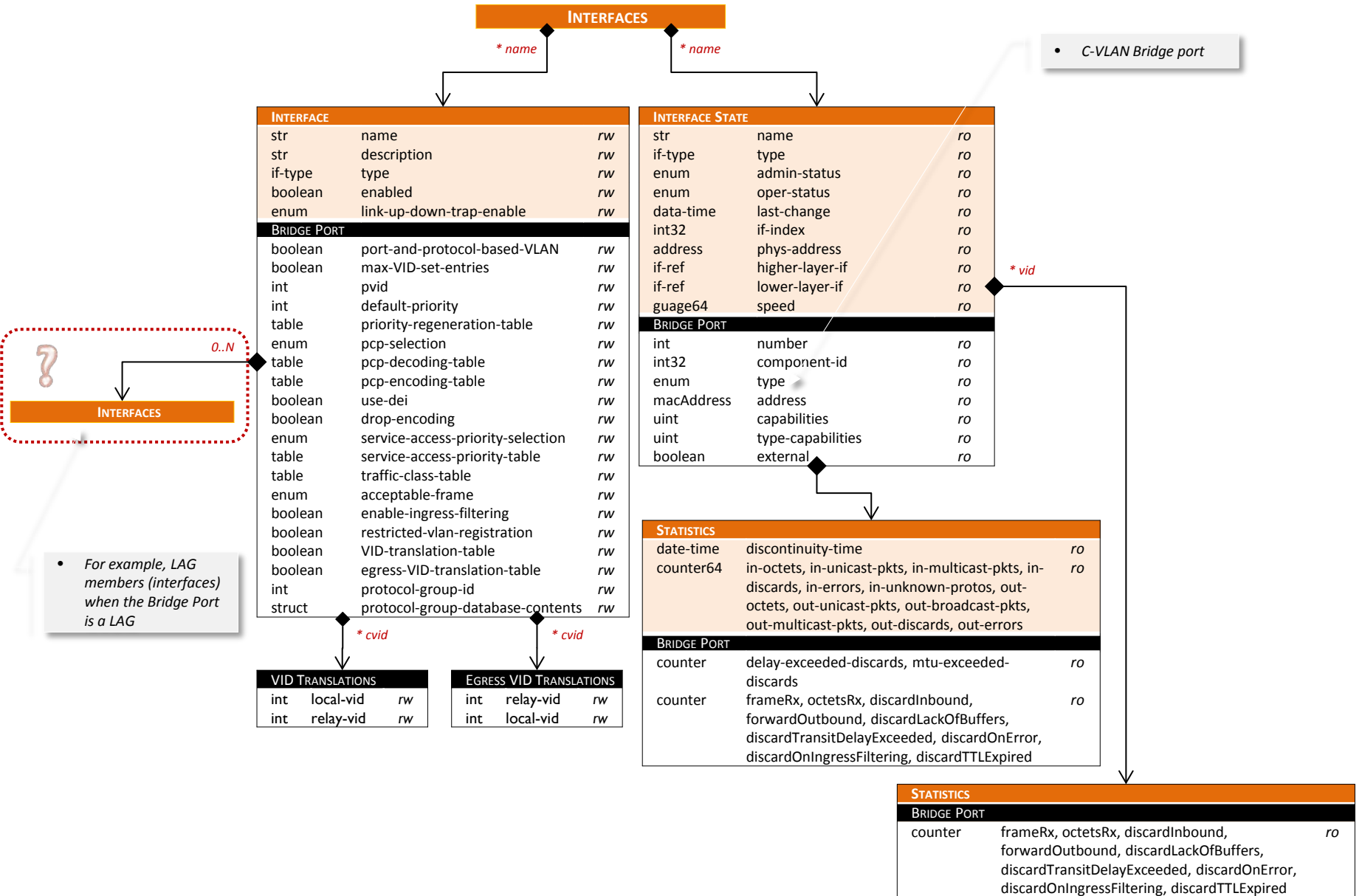
TPMR BRIDGE Model



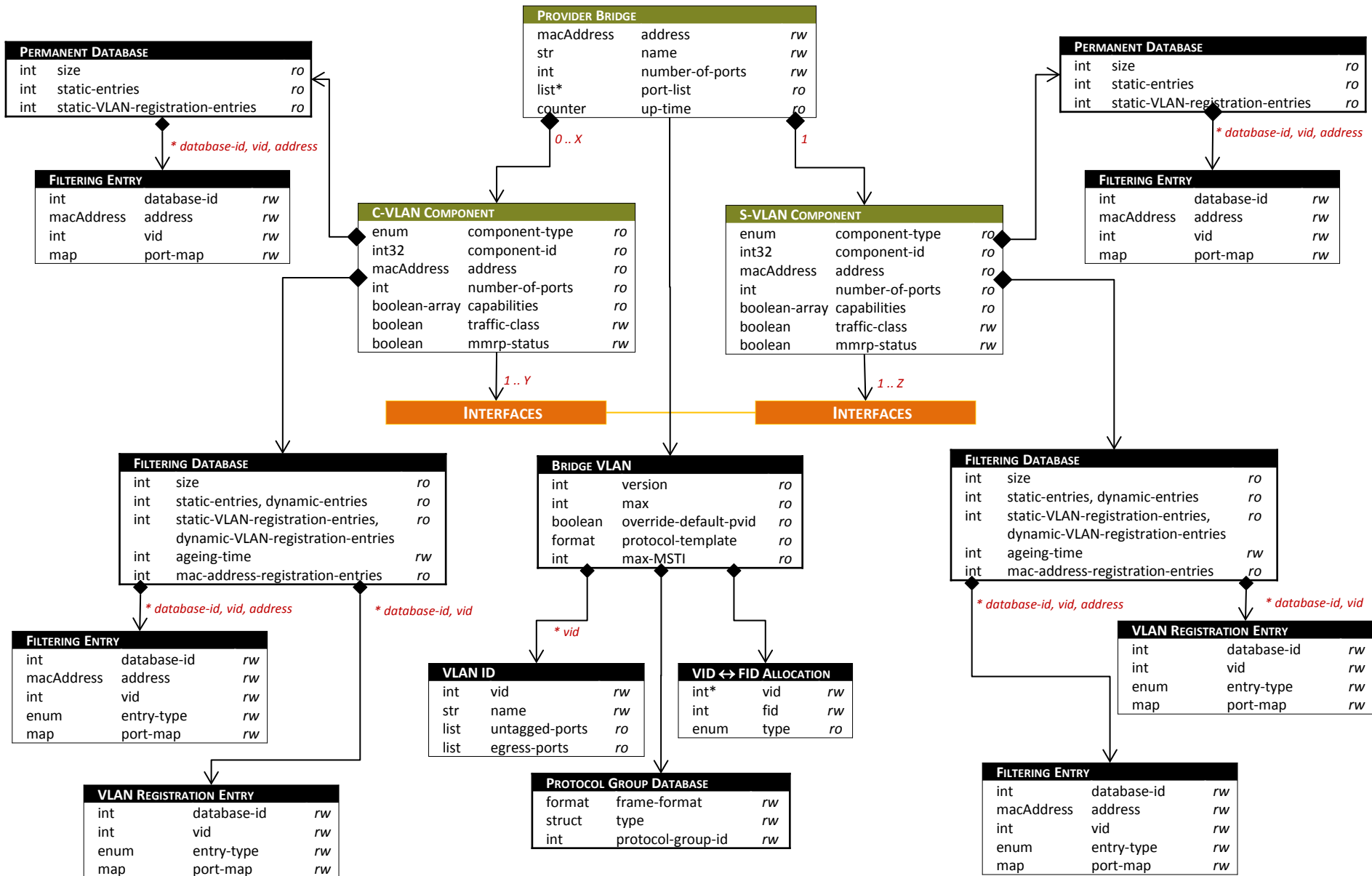
CUSTOMER VLAN BRIDGE Model



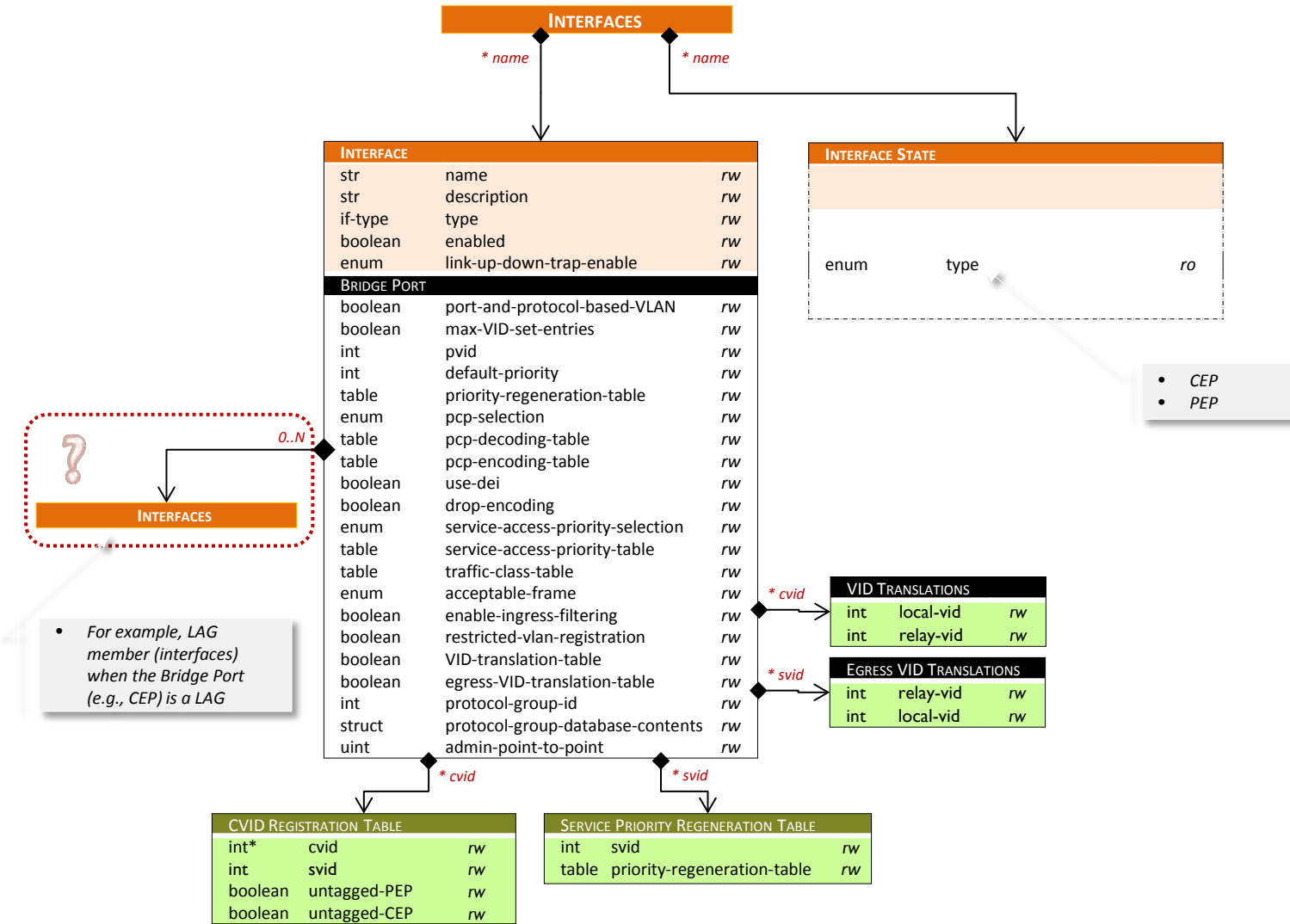
CUSTOMER VLAN BRIDGE COMPONENT INTERFACE Model



PROVIDER BRIDGE Model

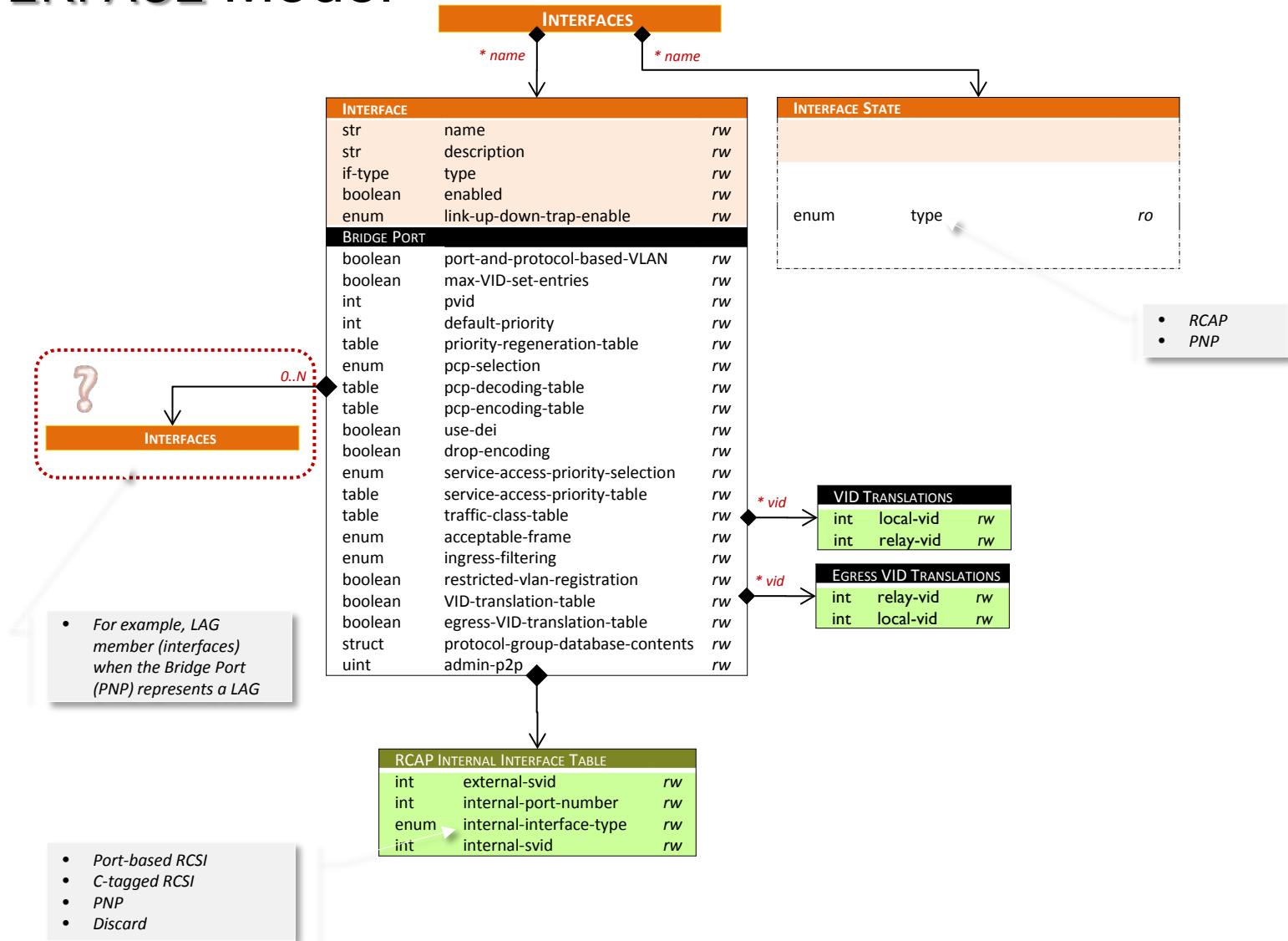


PROVIDER EDGE BRIDGE C-VLAN COMPONENT INTERFACE Model



PROVIDER BRIDGE S-VLAN COMPONENT

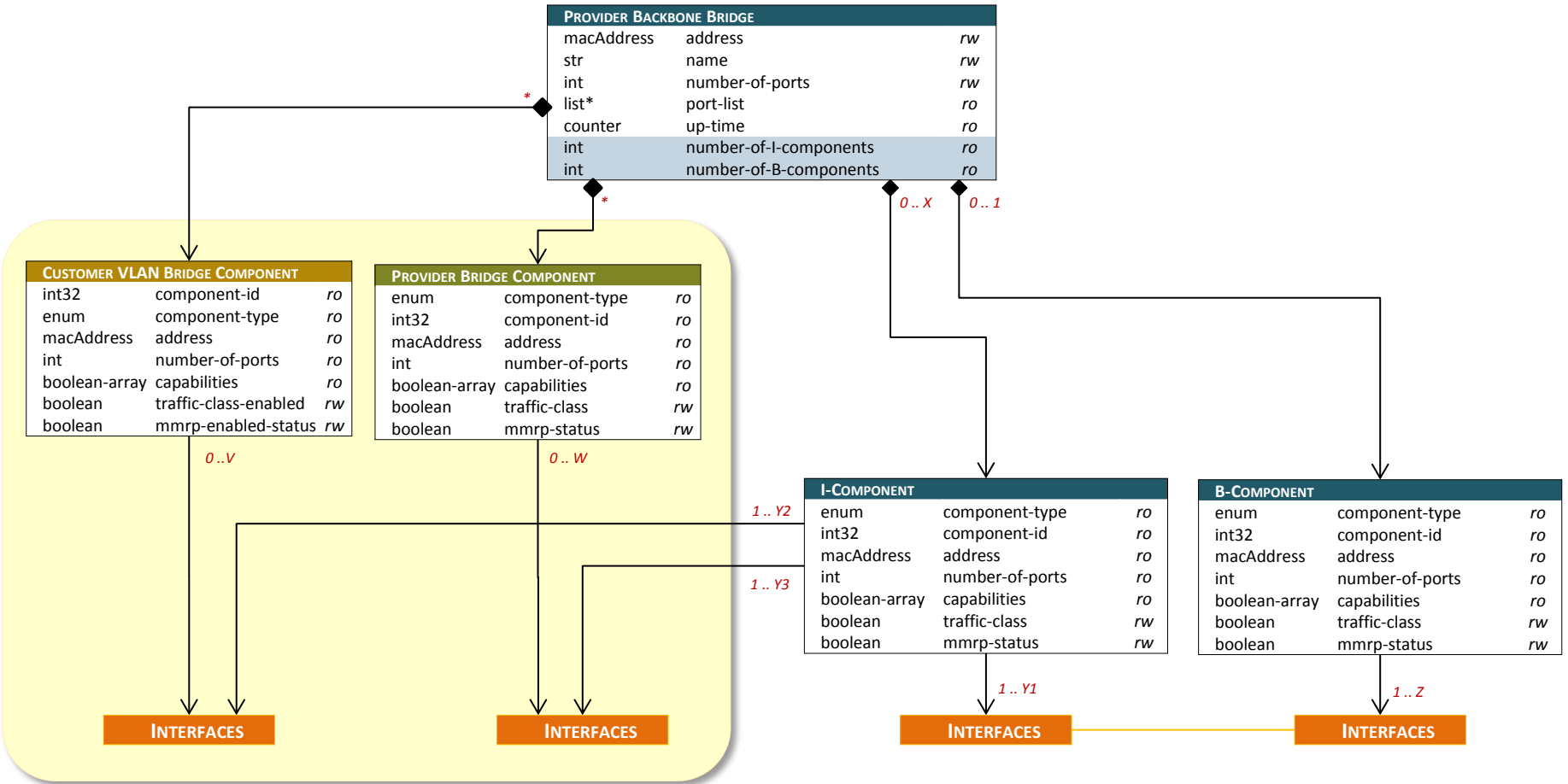
INTERFACE Model



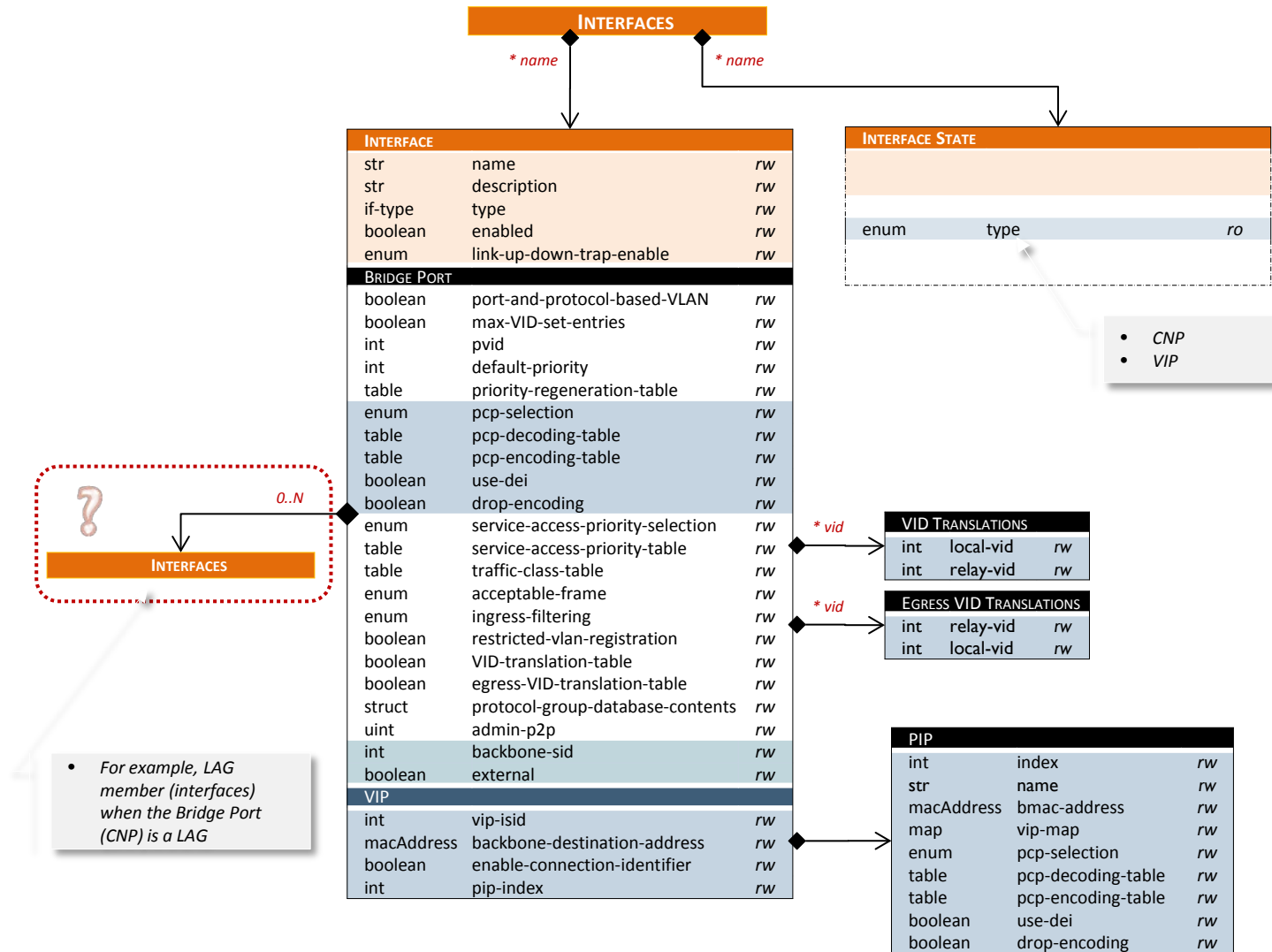
Backup Material

- Provider Backbone Bridge Models

PROVIDER BACKBONE BRIDGE Model



BACKBONE EDGE BRIDGE I-COMPONENT INTERFACE Model



BACKBONE BRIDGE B-COMPONENT INTERFACE Model

